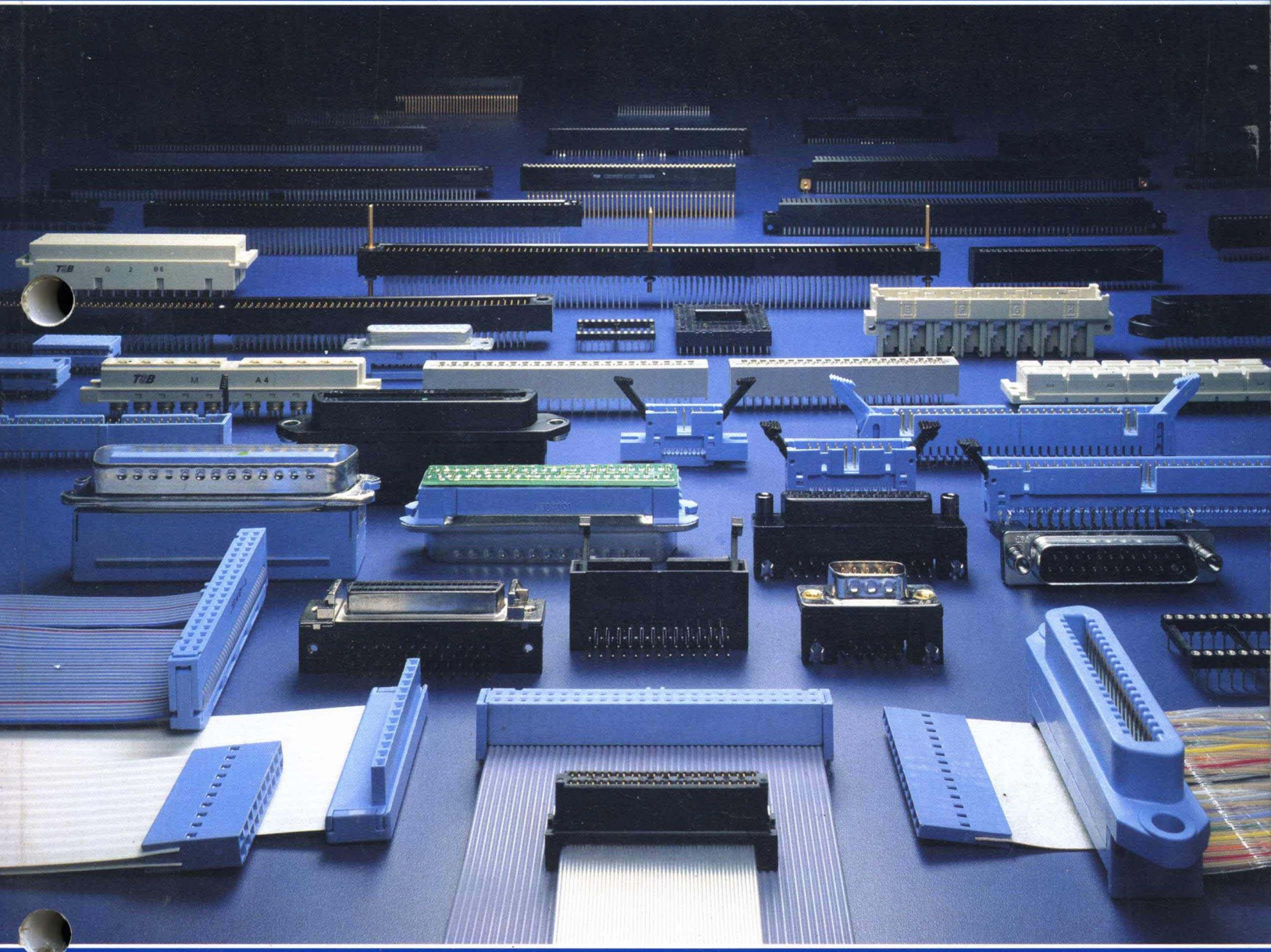
Thomas&Betts

Electronics Division

FULL LINE CATALOG



Thomas & Betts Electronics Division Full Line Catalog

WARRANTY: Thomas & Betts sells this product with the understanding that the user will perform all necessary tests to determine the suitability of this product for his intended use. Thomas & Betts manufactures its goods and tools in a manner to be free of defects. Should any defect occur in its goods (within two years) or tools (within ninety days), Thomas & Betts, upon prompt notification, will at its option, exchange or repair the goods or tools or refund the purchase price.

LIMITATIONS AND EXCLUSIONS: THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS AND EXPRESSED AND IMPLIED WARRANTIES (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL THOMAS & BETTS BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGES OR LOSSES.

Printed in U.S.A.

Interconnections for a world of electronics applications.

The Electronics Division of Thomas & Betts Corporation is a leading supplier of electronic interconnection components, serving diversified original equipment manufacturers on a worldwide basis.

From standard products to customized solutions.

The breadth of products in the Thomas & Betts line offers solutions for most interconnection applications. This full line catalog is representative of the wide range of products available off-the-shelf or for quick turnaround from your authorized Thomas & Betts distributor.

In addition, Thomas & Betts has the engineering capabilities to modify or customize interconnection designs to suit specific customer requirements not covered by the broad line of standard products. Consult with your Thomas & Betts distributor for details on non-standard requirements.

A qualified source for partnering.

With global capability, financial stability as part of a billion-dollar sales corporation, and a history of innovation and commitment to the electronics industry, Thomas & Betts is qualified to serve the particular needs of our customers in terms of partnering as well as our role in supplying quality interconnects and interconnection systems.

Total Quality Excellence

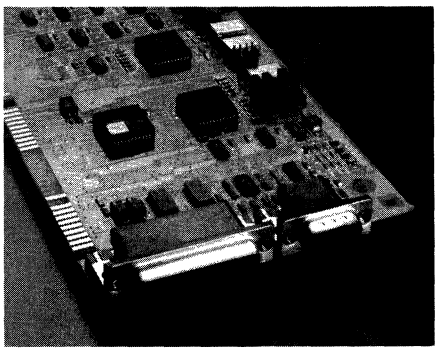
At Thomas & Betts, our corporate-wide program of quality control is called Total Quality Excellence. This program covers all aspects of design and manufacturing, human resources, information systems, environmental management, and organizational effectiveness.

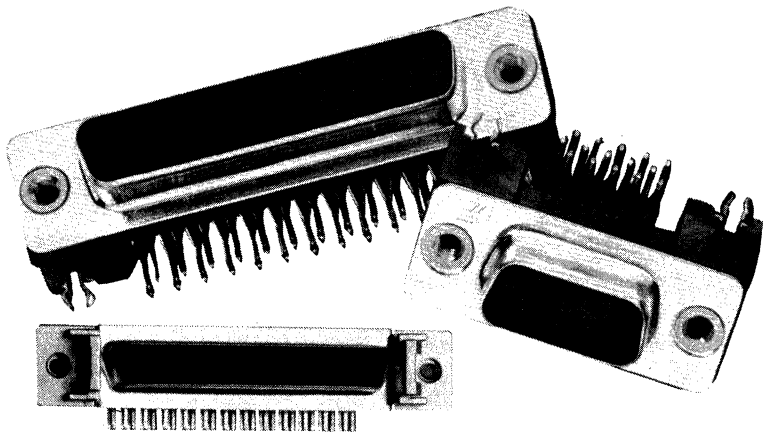
This overall commitment to quality, combined with our dedication to understand our customers' needs, has resulted in our achieving:

- "Vendor of Excellence" awards from several major electronics customers
- ISO 9002 approval (England and France facilities)

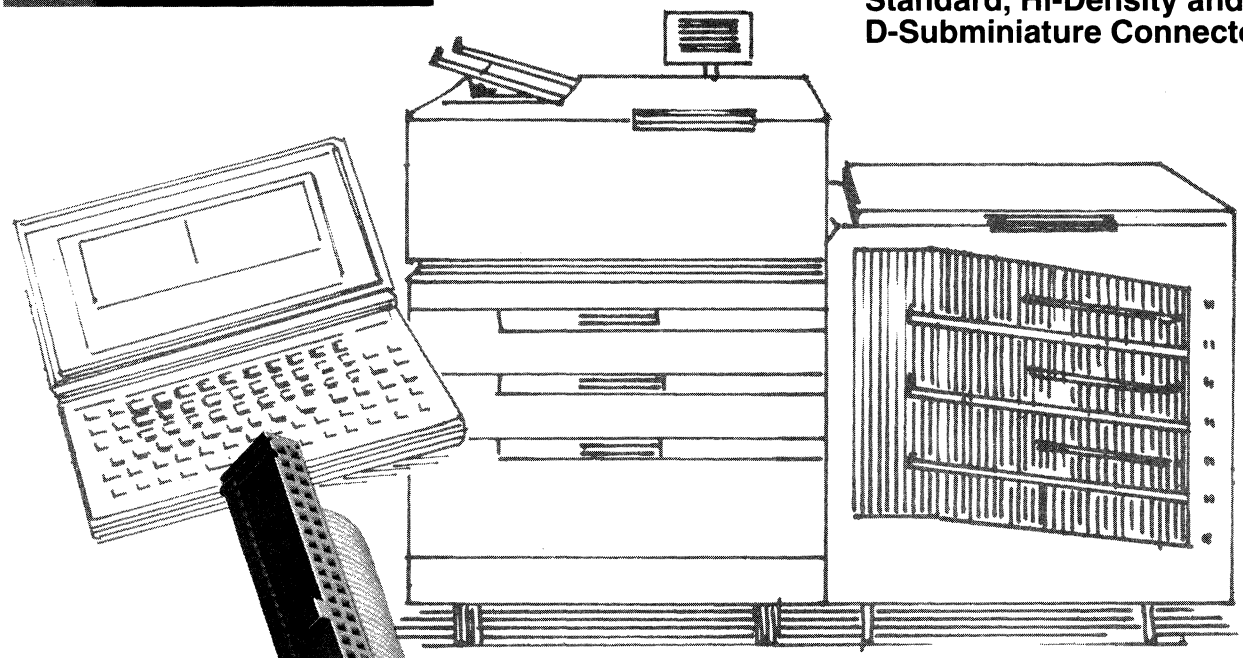
Distribution and Value Added Services

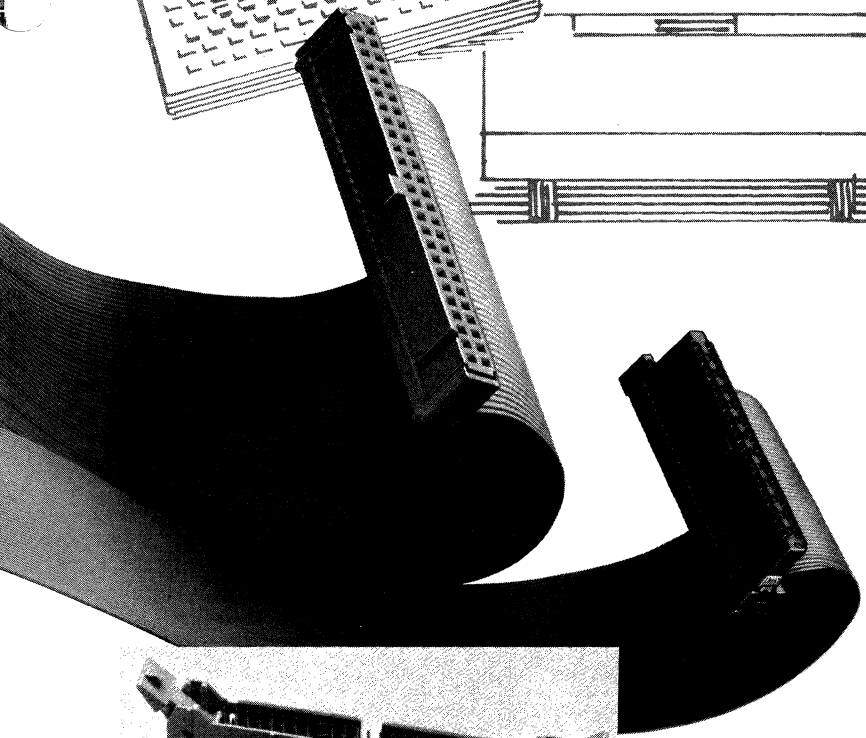
The broad line of Thomas & Betts products is available from authorized stocking distributors throughout the United States and the rest of the world. In addition to providing timely delivery and experienced advice, many of these distributors provide Value Added Services in the form of connector and cable assemblies and other enhancements to interconnection applications. Consult the Thomas & Betts representative in your area.

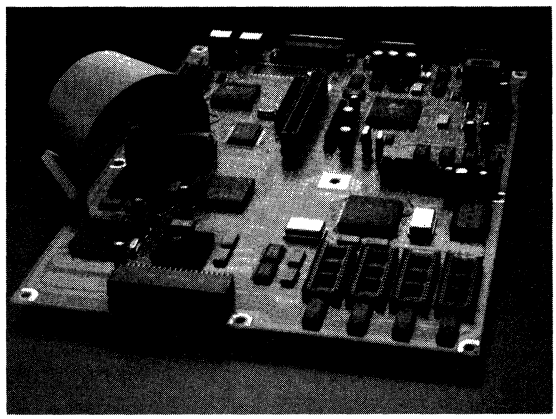


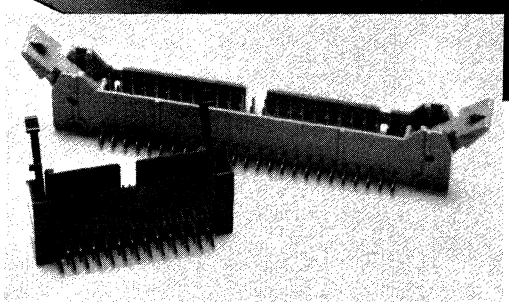


Standard, Hi-Density and Fine Pitch D-Subminiature Connectors



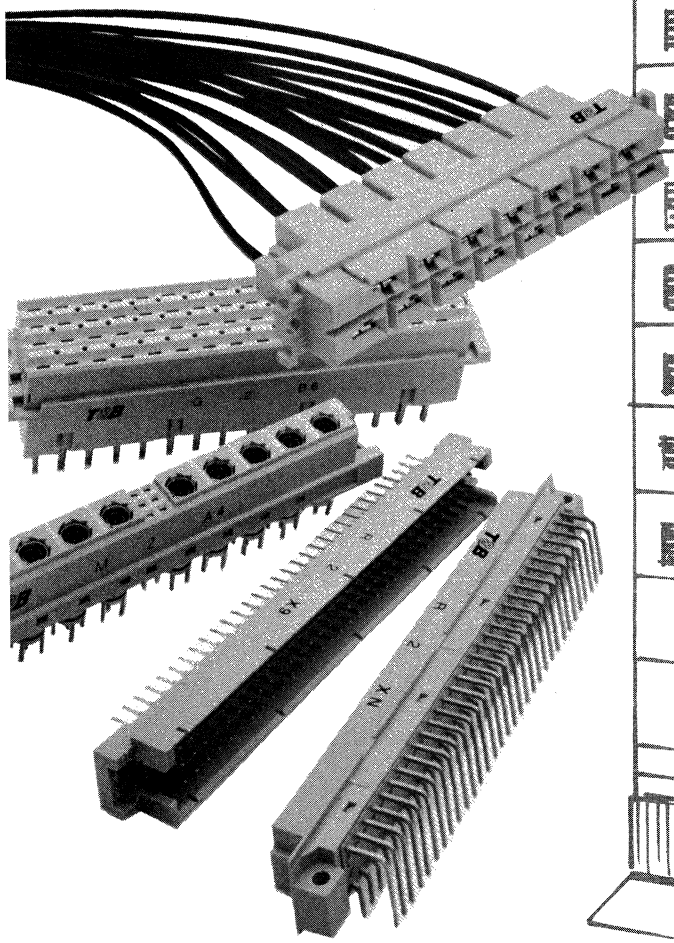


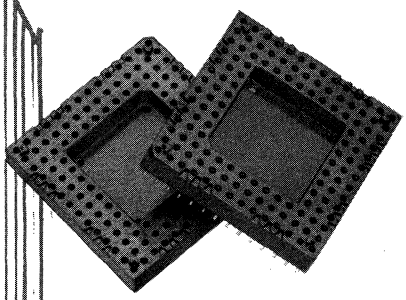




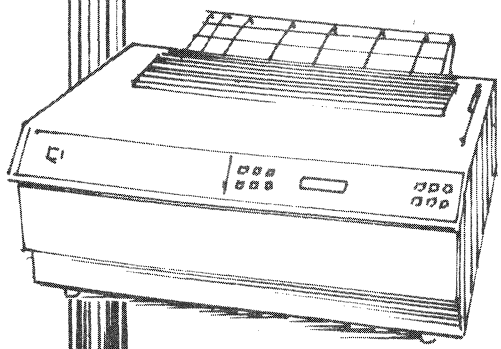
IDC Mass Termination Connectors and Cable

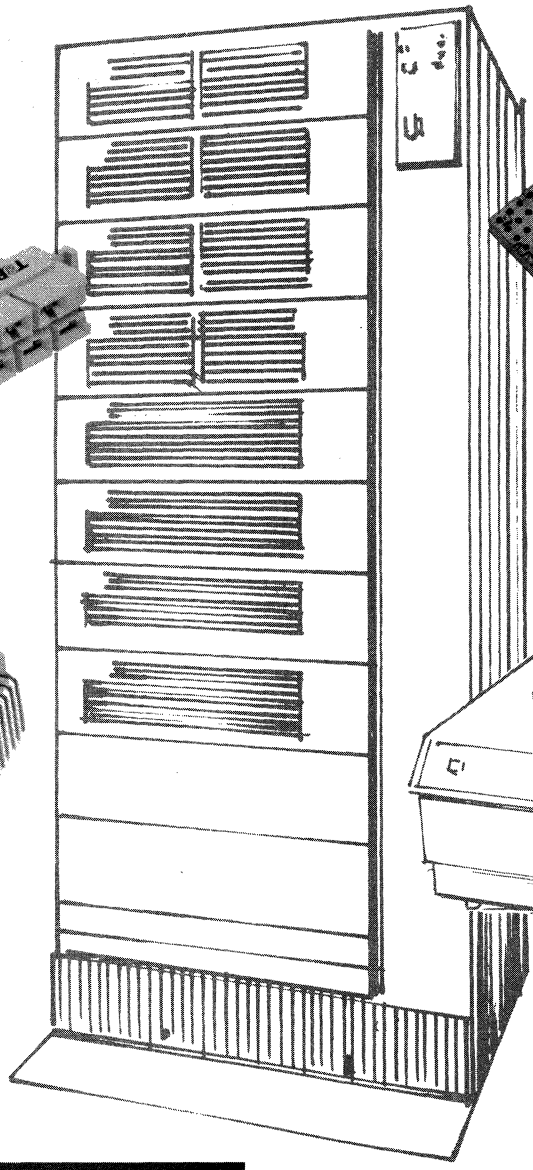
DIN 41612 Connectors

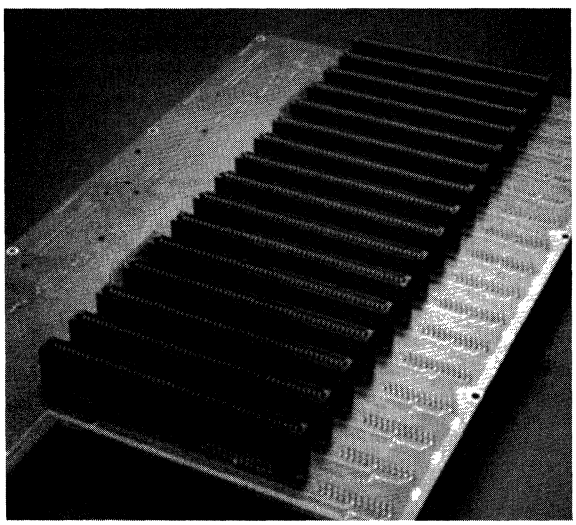


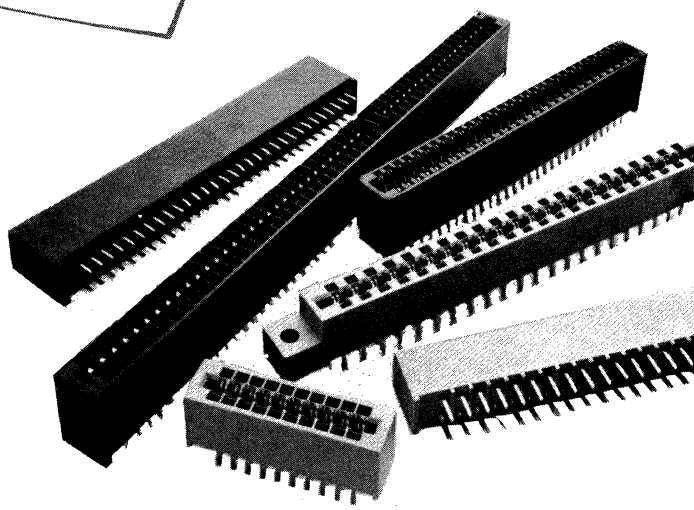


IC Interconnects

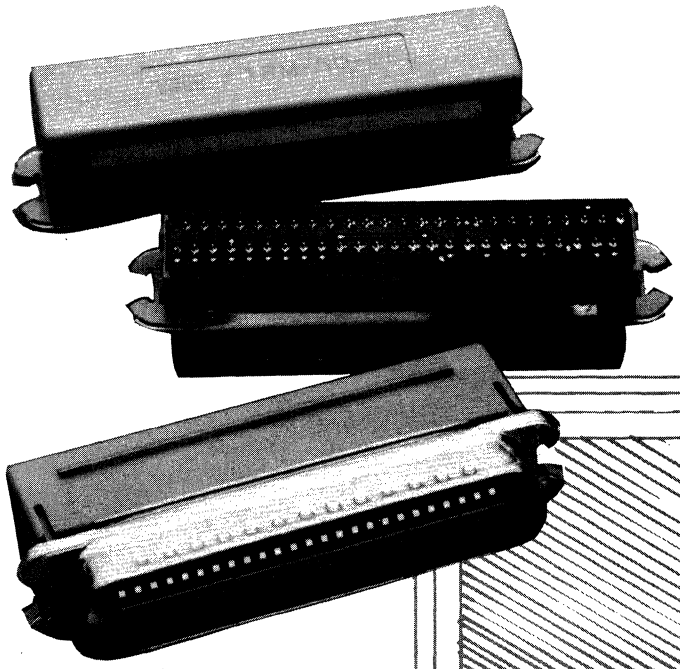


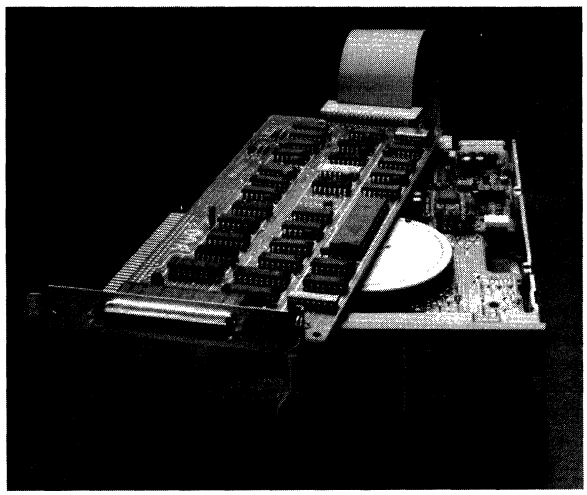


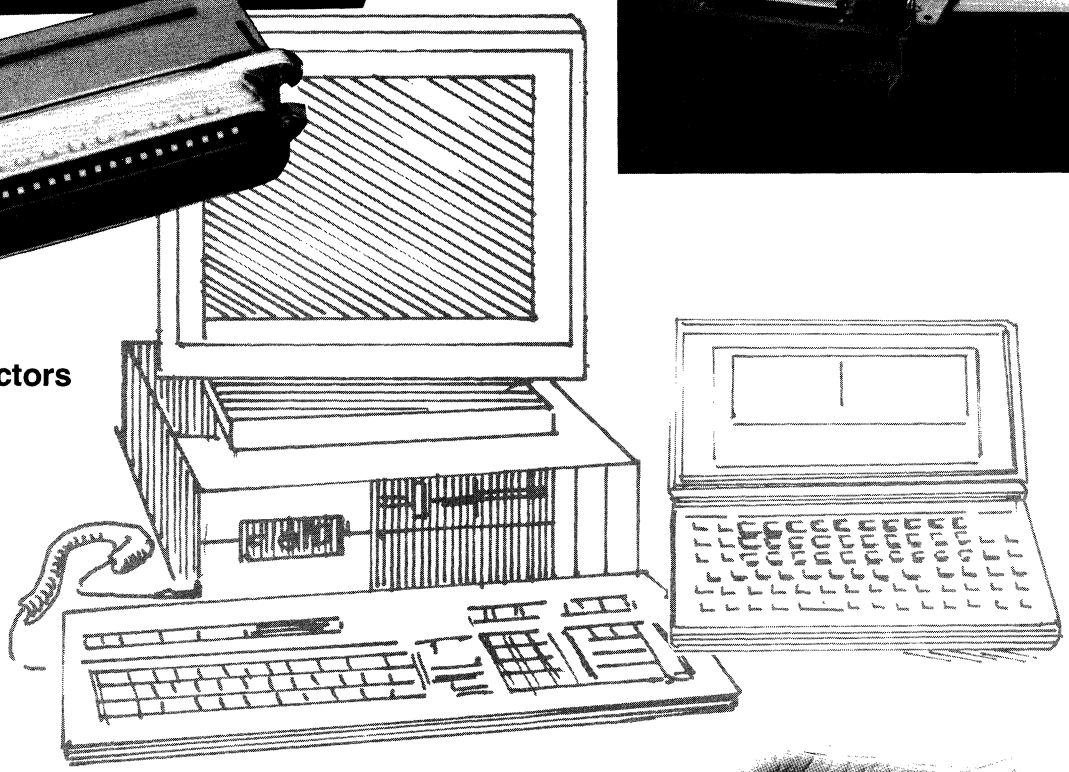




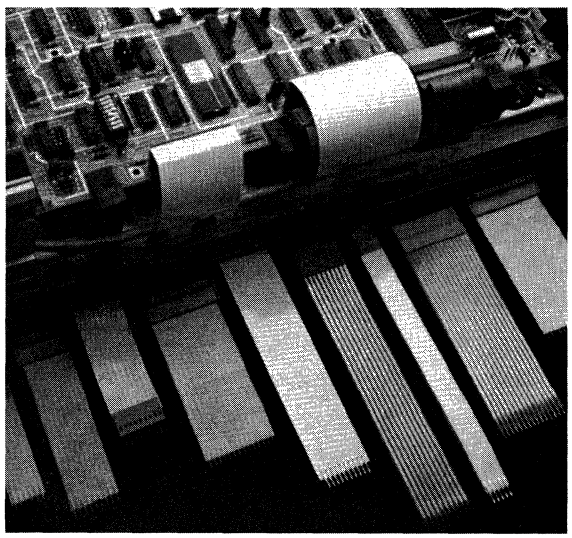
Card Edge Connectors





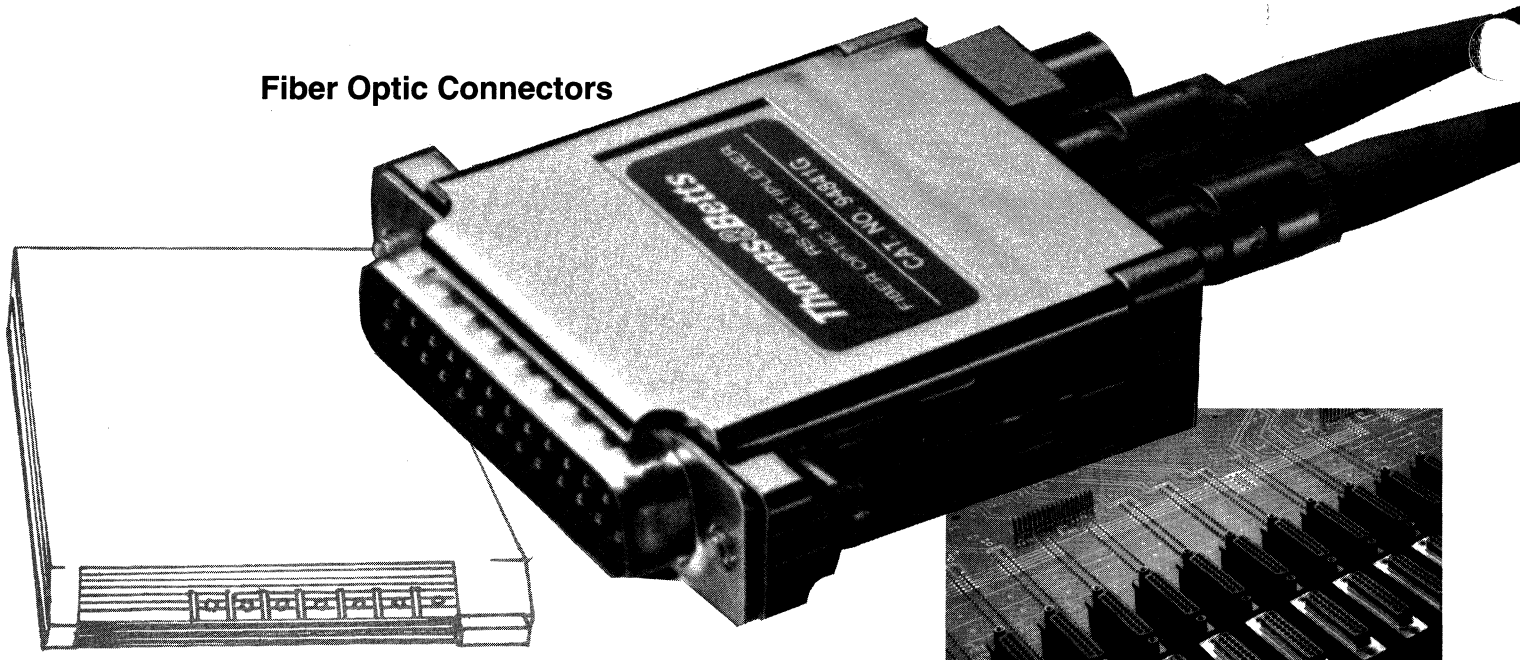


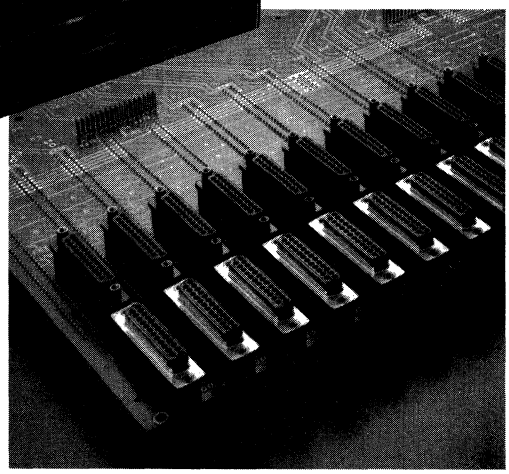
Active Connectors



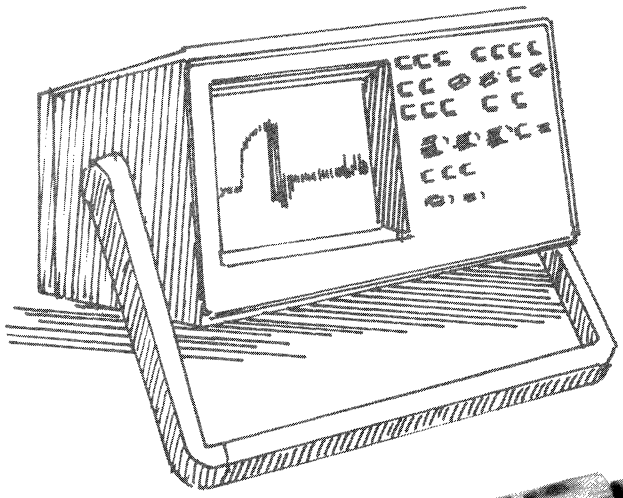
Flexible Interconnects

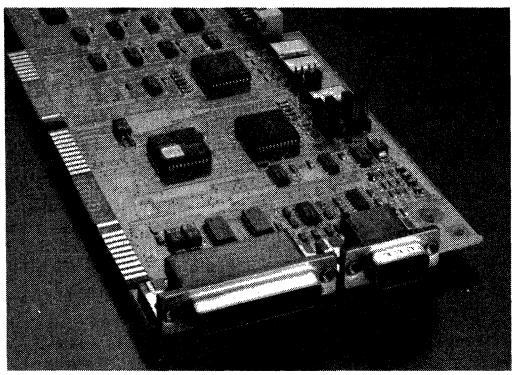
Fiber Optic Connectors

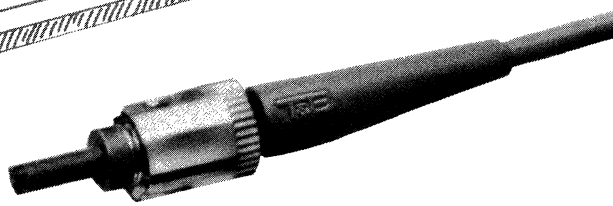




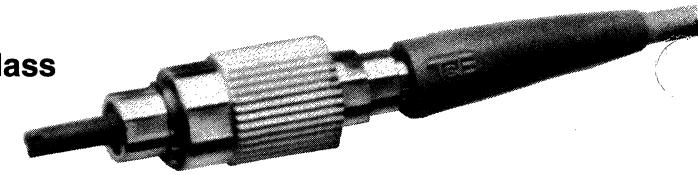
RS-232-C and RS-422 Data Interface Connectors







SMA and ST* In-Line Connectors for Glass and Plastic Fiber Optic Cable



*Trademark of AT&T Technologies.

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Flexible Interconnects

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SYSTEM HIGHLIGHTS

The Meaning of High Performance Interconnection

To meet these demanding requirements, Thomas & Betts has pioneered innovative concepts in flexible flat conductor jumpers and custom assemblies. Based on more than 20 years of experience in developing flat cable and compatible interconnection components, the FLEXPAC™ assembly and FLEXSTRIP® Jumper systems permit a high degree of design and packaging versatility.

With off-the-shelf convenience, these products provide cost-effective assemblies utilizing FLEXSTRIP® Jumpers, FLEXPAC™ cable or a user's own membrane switches. FLEXSTRIP® Jumpers offer greater reliability and easier installation than point-to-point wiring and feature flat conductors for life-time flexibility, round pin ends and uniform pitch spacing for easy PCB insertion.

With the FLEXPAC™ concept, the goals of the design engineer can be realized through the use of FLEXPAC™ solder-pin contact, single or double row male or female socket connectors and card edge connectors. The result: an expansion of packaging densities, reduced costs, increased reliability, and enhanced integrity with high flex life.

Service and Support

Recognizing the vast mechanical and electrical considerations involved in the selection of appropriate flexible interconnect components, we maintain a staff of trained field salespeople and customer service representatives. They can help you select cost-effective, quality interconnection components without compromising system performance integrity. Whether your needs can be met with a standard product or require a custom solution, we stand ready.

To maximize product availability, we maintain and support a national service network of authorized distributors. They not only stock in-depth, they are also prepared to provide "value-added" services, including custom interconnection assemblies to your specifications.

Board-to-Board Packaging System Highlights

The continued expansion of electronic applications has placed new demands on the design engineer to increase packaging density, lower costs, facilitate servicing, reduce weight, and improve interconnection integrity with repeated flexing. Many of these demands are best addressed with innovative board-to-board interconnection alternatives. To meet these emerging needs, Thomas & Betts has pioneered board-to-board connectors, high-flex cable-connector assemblies and mating headers.

Innovative Board-To-Board Interconnection Products

Among T&B's more recent developments are:

- Solid-Spacers... designed to function as both electrical interconnection and mechanical stand-off when joining two PCB's.
- Micro-Headers... designed to provide fast, reliable PCB-to-PCB interconnection.

These newer products complement T&B's extensive family of other board-to-board interconnection components. These components, which include FLEXSTRIP® jumpers and the FLEXPAC™ cable-connector system, permit design and fabrication of special assemblies to satisfy the most challenging interconnection requirements.

FLEXSTRIP® Jumper System

T&B's FLEXSTRIP® jumpers provide multiple-conductor, board-to-board interconnection without wire stripping, cutting-to-length, or solder preparation. This alternative to conventional point-to-point wiring consists of a family of flexible board-to-board jumpers which can be repeatedly flexed without failure.

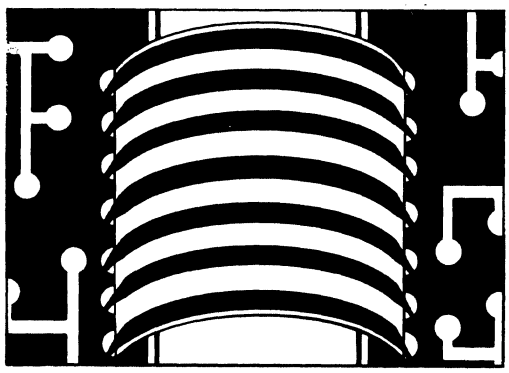
FLEXSTRIP® jumpers are available with four insulation choices, six standard pitch dimensions, and a host of pin-end configurations to satisfy your individual application needs. Pre-plated, round pins permit direct soldering to a PCB.

Where quick disconnection is required, FLEXSTRIP® jumpers are complemented by single-row sockets and low profile socket contacts designed specifically to accept the FLEXSTRIP® jumper pins. Additionally jumpers can be supplied with latching headers and sockets where conditions of high vibration or accidental disengagement are likely to occur.

FLEXPAC™ Cable-Connector Assemblies

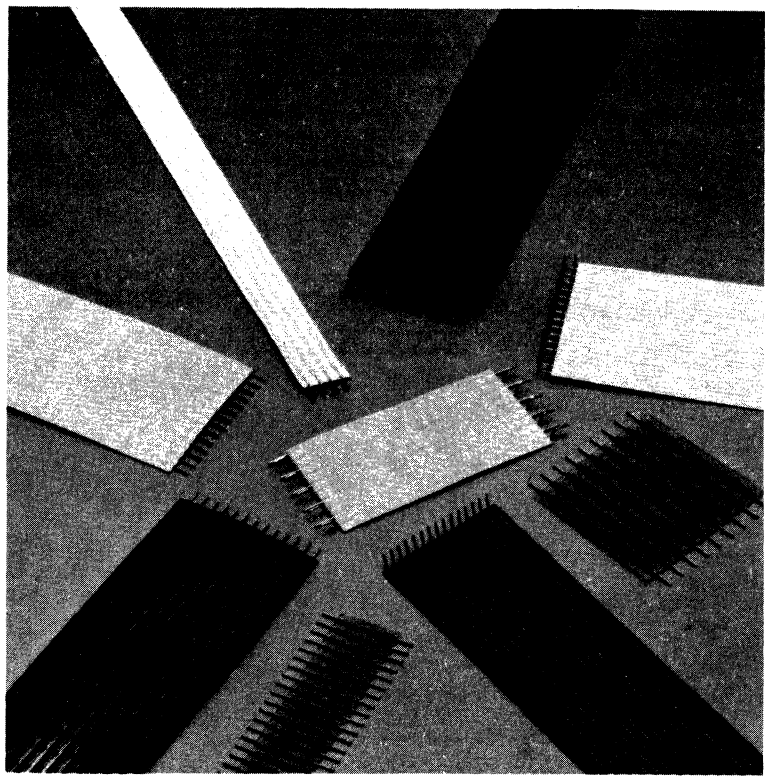
The FLEXPAC™ system is a low-profile, high-performance flat conductor-connector assembly that provides versatile interconnection solutions for printer/plotter designs, dense PC stacking, retractile assemblies, membrane switches, and a host of other high-flex, high performance applications. The system combines flat conductor or custom flexible circuits with a variety of contact/connector styles. These, coupled with the recently developed polarized locking header, enable you to specify custom-designed "connectorized" assemblies to meet your unique board-to-board requirements.

With ever-increasing packaging density requirements, T&B continues to explore new interconnection alternatives. We invite your inquiry and look forward to helping you achieve a reliable, cost-effective system design.



FLEXSTRIP® JUMPERS

Repeated flex without failure



Description/Application

FLEXSTRIP® Jumpers are multi-conductor board-to-board interconnect devices, preplated and ready to use – without wire stripping, cutting to length, or solder preparation. They provide a convenient, reliable alternative to conventional point-to-point wiring for high density, high-vibration PC board interconnect applications.

FLEXSTRIP® Jumpers may be repeatedly flexed without failure. Flat/round conductor design and one-piece construction give vibration-proof reliability and longer life than conventional wiring systems.

Design Considerations

- One-piece construction
- Round copper conductors rolled flat for high flex life; tin-plated for easy soldering
- Round-to-flat transition zone permits flexing stress to be distributed evenly throughout flat conductor area
- Round-to-flat design provides vibration-proof reliability and long life
- Round-to-flat transition zone acts as a hinge between PC boards; allows boards to be opened for fabrication and servicing, then closed for compactness
- Round pin ends facilitate PC board insertion and long life
- Choice of conductor pitch to accommodate virtually any PCB hole pattern; tightly held tolerances
- Available in 4 insulations for high volume commercial use as well as military/aerospace applications
- Jumpers may be "connectorized" to mate with other industry-standard headers (see page 14)
- Jumpers may be used as part of Flexpac™ assemblies

RESISTANCE PER 1,000 FEET	65 OHMS
CURRENT RATING	3 AMPS
RATED VOLTAGE	300 VAC
RATED TEMPERATURE	105°C
CONDUCTOR	COPPER PER QQ-W-343 TIN PLATED
EQUIVALENT WIRE GAUGE	24 AWG

FLEX LIFE
FLEXSTRIP® Jumpers may be repeatedly flexed without failure. Flat/round conductor design and one-piece construction give vibration-proof reliability and longer life than conventional wiring systems.

Standard Product Options

The information below provides a general overview of this product family.

STANDARD JUMPERS

4 PIN CONFIGURATIONS, SAME ON BOTH ENDS

.5" TO 24" LENGTHS

.050" TO .200" CONDUCTOR PITCH

4 INSULATIONS

SPECIAL JUMPERS

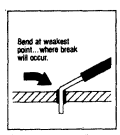
11 PIN CONFIGURATIONS, MAY BE DIFFERENT ON EACH END

.5" TO 24" LENGTHS

.050" TO .250" ANY CONDUCTOR PITCH

4 INSULATIONS

FLEXSTRIP® JUMPERS
U.S. Patent No. 3,601,755



CONVENTIONAL WIRING

FLEXSTRIP® JUMPER ORDERING INFORMATION

STANDARD JUMPERS

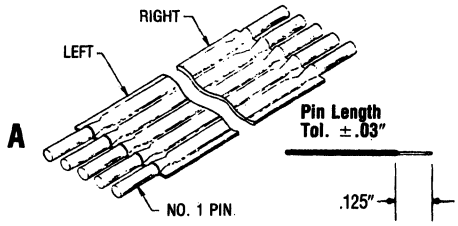
FS N-1 2 A-20

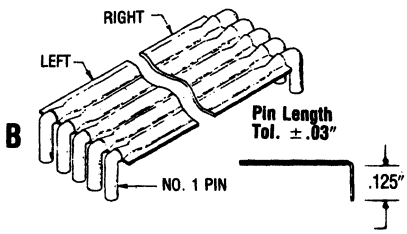
- **Product Code**
- **Insulation Material**
  - N – Nomex
  - T – Teflon
  - K – Kapton
  - P – Polyester
- **Conductor Pitch**
  - 1 – .050"
  - 2 – .100"
  - 3 – .125"
  - 4 – .150"
  - 5 – .200"
  - 6 – .075"
- **Insulation Length**
  .5" Min. to 24" Max., in .050" increments
- **Pin Arrangement (for both ends)**
  - A – Straight pins
  - B – Right angle pins
  - C – Right angle staggered pins
  - D – Straight staggered pins
- **Number of Conductors**

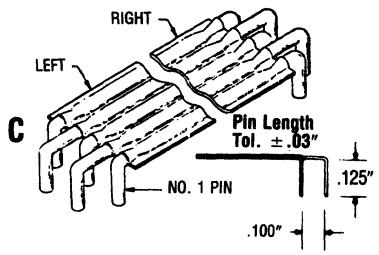
SPECIAL JUMPERS

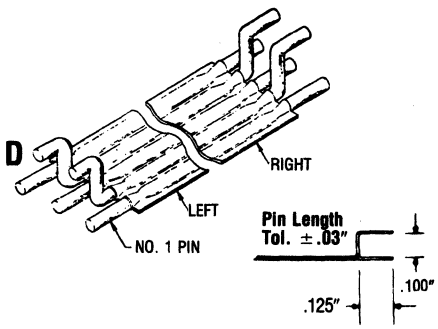
FS 050 N 3.25 G H 20

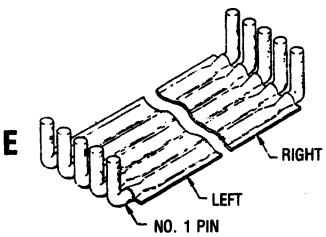
- **Product Code**
- **Conductor Pitch**
  .050" to .200"
- **Insulation Material**
  - N – Nomex
  - T – Teflon
  - K – Kapton
  - P – Polyester
- **Insulation Length**
  .5" Min. to 24" Max., in .050" increments
- **Left End / Right End Pin Arrangement (see below)**
- **Number of Conductors (max. recommended width 3 inches)**

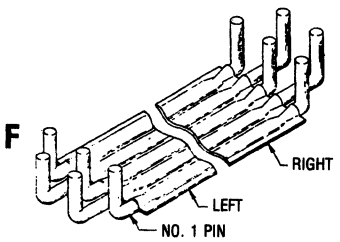


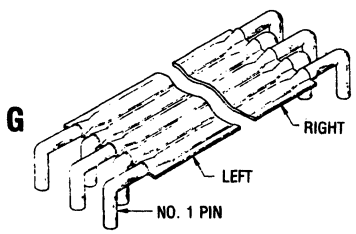


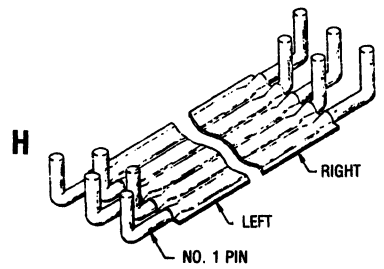


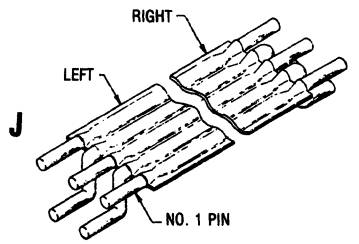


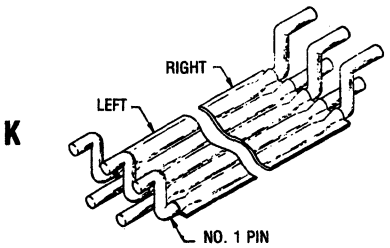


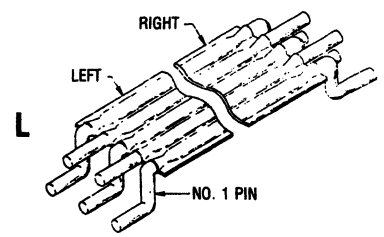












FLEXSTRIP® JUMPERS

NOMEX* INSULATION

- An opaque nylon paper that has excellent temperature capability
- Can be installed by conventional soldering techniques
- Unaffected by common soldering process chemicals such as freon TMC
- Meets most application needs
- Resistant to damage by contact with hot soldering iron
- U.L. style No. 5188

TEFLON* INSULATION

- A translucent film that has exceptional electrical and chemical properties
- Can be installed by most commonly used soldering techniques
- Resistant to damage by contact with a hot soldering iron
- Surface has been treated for bondability
- Most commonly used for high electrical and mechanical performance applications
- U.L. style No. 2928

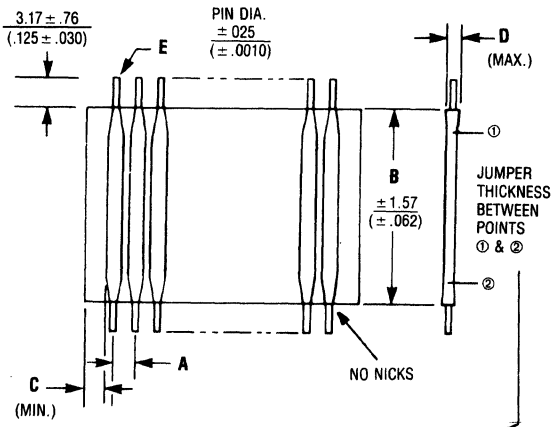
POLYESTER INSULATION

- A lower temperature film that has excellent mechanical and electrical properties
- Easily installed by controlled soldering techniques
- The insulation appears to be opaque and white because of the self-extinguishing adhesive
- Recommended for use where controlled soldering methods can be used
- U.L. style No. 2639

KAPTON* INSULATION

- A distinctive amber film that will withstand all normal soldering methods
- Unsurpassed mechanical properties, especially at elevated temperatures
- Dimensionally stable over the full temperature and humidity range
- Not damaged by accidental contact with a hot soldering iron
- Used in the most exacting applications
- U.L. style No. 2927

*Registered trademarks of E.I. DuPont de Nemours



MID-PIN JUMPER THICKNESS

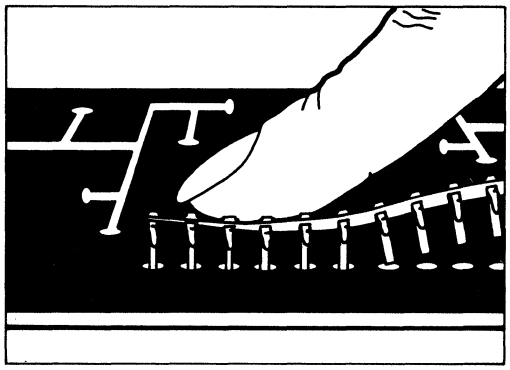
(.050), (.075), (.100), (.125), (.150) & (.200) Pitch
.254 (.010) NOMEX
.254 (.010) KAPTON
.406 (.016) TEFLON
.254 (.010) POLYESTER

INSULATION MATERIAL	POLYESTER	NOMEX	TEFLON	KAPTON
Conductor Pitch	.100″	.100″	.100″	.100″
Equivalent Conductor Size (American Wire Gauge)	24	24	24	24
Insulation Resistance (gnd, sig, gnd) 12 inch sample @ 500VDC	$1x10^{12}\Omega$	$2x10^{12}\Omega$	$2x10^{12}\Omega$	$2x10^{12}\Omega$
Capacitance (picofarad/foot) (sig, gnd, sig)	10.2pf/ft	8.9 pf/ft	10.5 pf/ft	9.1 pf/ft
Characteristic Impedance Ω (gnd, sig, gnd)	118Ω	123Ω	101Ω	112Ω
Temperature Rating	105°C	105°C	125°C	150°C
Current Rating	3 amps	3 amps	3 amps	3 amps
Voltage Rating	300 volts	300 volts	300 volts	300 volts
Minimum Breakdown Voltage @ 1 min.	1500 volts	1500 volts	1500 volts	1500 volts
Minimum Bend Radius (diameter)	⅛″	⅛″	⅛″	⅛″

PITCH A	LENGTH B	MARGIN C	THICKNESS (PIN END) D	WIRE GAUGE	PIN DIAMETER E	FOR PCB WITH THE FOLLOWING DIAMETER: (±.001) HOLES AND (±.005) CENTER TOLERANCE	NUMBER OF CONDUCTORS RECOMMENDED (MIN.-MAX.)
1.27(.050)	ANY LENGTH ½″ TO 24″	.25(.010)	.64(.025)	28	.320(.0126)	.71(.028)	2-30
1.27(.050)		.25(.010)	.64(.025)	28	.320(.0126)	.71(.028)	2-30
1.27(.050)		.25(.010)	.64(.025)	28	.320(.0126)	.71(.028)	2-30
1.90(.075)		.25(.010)	.84(.033)	26	.404(.0159)	.79(.031)	2-40
1.90(.075)		.25(.010)	.84(.033)	26	.404(.0159)	.79(.031)	2-40
1.90(.075)		.25(.010)	.84(.033)	26	.404(.0159)	.79(.031)	2-40
2.54(.100)		.25(.010)	.84(.033)	24	.511(.0201)	.94(.037)	2-30
2.54(.100)		.25(.010)	.84(.033)	24	.511(.0201)	.94(.037)	2-30
2.54(.100)		.25(.010)	.84(.033)	24	.511(.0201)	.94(.037)	2-30
3.18(.125)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-25
3.18(.125)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-25
3.18(.125)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-25
3.81(.150)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-20
3.81(.150)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-20
3.81(.150)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-20
5.08(.200)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-15
5.08(.200)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-15
5.08(.200)		.51(.020)	.84(.033)	24	.511(.0201)	.94(.037)	2-15

TOLERANCE ON PITCH: ± .25mm (± .010) NON-CUMULATIVE

DIMENSIONS ARE SHOWN IN mm/(inches)



FLEXSTRIP® LOW-PROFILE SOCKET CONTACTS

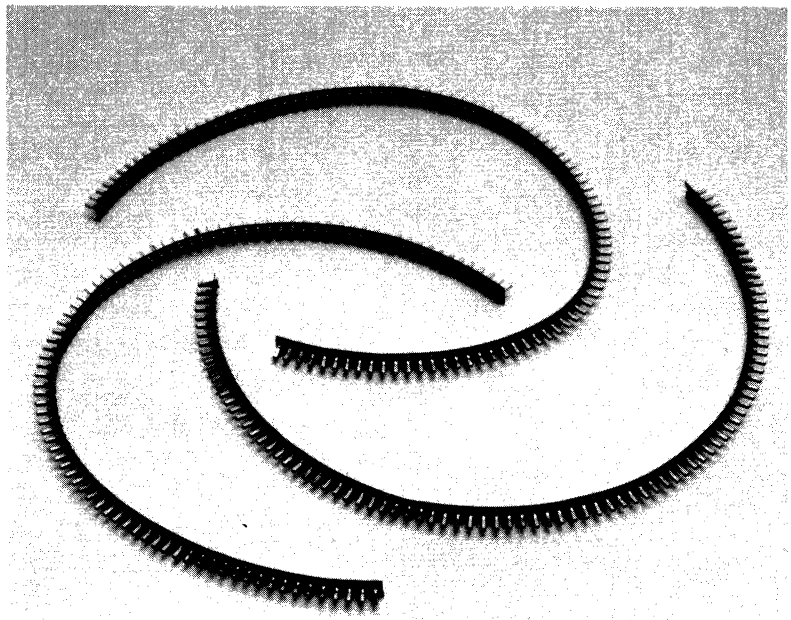
Description/Application

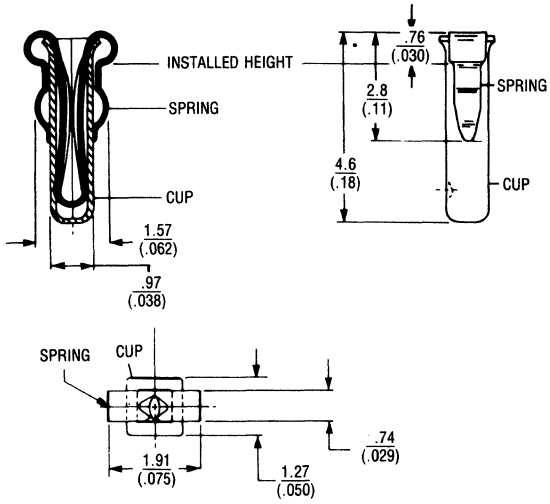
FLEXSTRIP® socket contacts provide a reliable, system for FLEXSTRIP® Jumper quick disconnect applications. The low-profile socket contacts are supplied on a carrier strip of 100 socket contacts for easy installation. The socket offers gold-plated beryllium copper contacts inside a tinned copper cup. This cup allows the socket to be wave- or hand-soldered from the underside of the board without solder flow into the contact area.

Design Considerations

- Low-profile – only 0.8mm (.030") above PC board
- Positive retention prior to soldering
- Contact area sealed with protective membrane to prevent contamination
- No special tooling necessary
- Sockets on 2.54mm (.100") centers
- Gold-plated beryllium copper contacts inside a tinned copper cup for maximum insertion/withdrawal cycles
- Suitable for 1.33mm (.050") to 1.5mm (.058") PCB hole diameters
- Easily inserted by hand

Designed specifically to mate with FLEXSTRIP® Jumpers



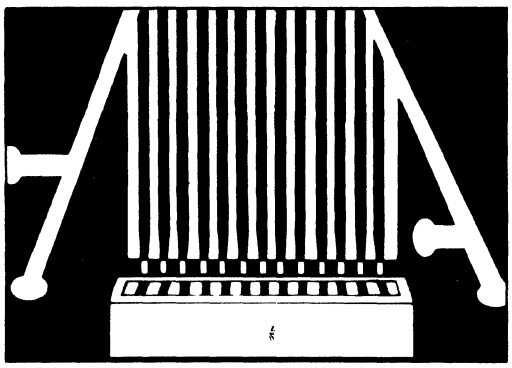


RECOMMENDED HOLE DIAMETER: 1.27 – 1.6MM (.050 – .058)
NOTE: MAX. LEAD INSERTION DEPTH: 4.57mm (.180)
MIN. LEAD INSERTION DEPTH: 2.03mm (.080)

DIMENSIONS ARE SHOWN IN mm/(inches)

CAT. NO.	DESCRIPTION
741	Carrier Strip of 100 Contacts

PHYSICAL PROPERTIES		
CUP	GILDING MATERIAL (COPPER ALLOY) PER MIL-C-21768	
CUP PLATING	TIN PLATE, SHIPLEY LT-26	
SPRING MATERIAL	BeCu PER QQ-C-533	
SPRING PLATING	GOLD, 30 MICROINCHES (MIL-G-45204B-TYPE C) OVER NICKEL, 40 MICROINCHES (QQ-N-290)	
WITHDRAWAL FORCE	50 GRAMS	24 AWG
	30 GRAMS	26 AWG
	30 GRAMS	28 AWG
ELECTRICAL PROPERTIES		
CURRENT RATING	2.5 AMPS	
CONTACT RESISTANCE	2.0 MILLIOHMS MAXIMUM	
ENVIRONMENTAL PROPERTIES		
TEMPERATURE RATING	– 40°C TO 105°C	



FLEXSTRIP® SINGLE-ROW SOCKETS

A

Description/Application

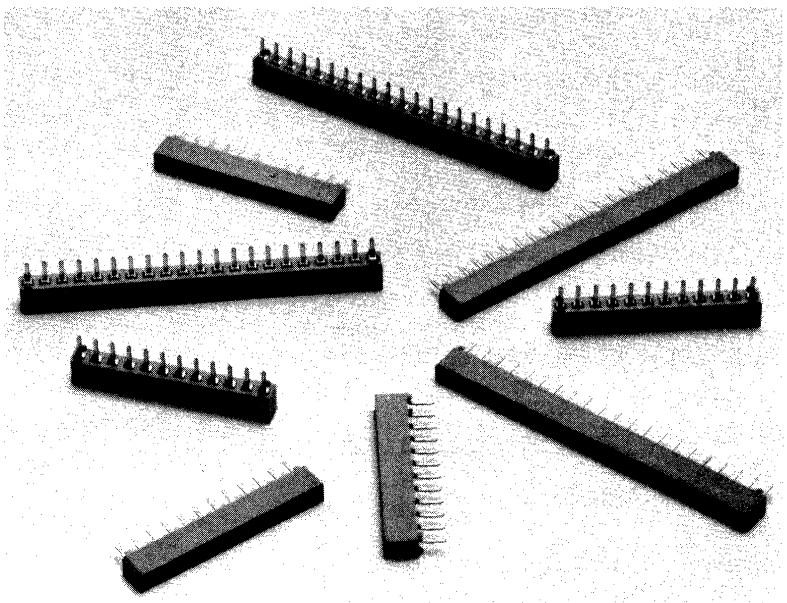
The FLEXSTRIP® socket is a board-mountable single-row socket designed specifically to accommodate FLEXSTRIP® Jumper pins. This design provides optimum insertion/withdrawal forces as well as superior mechanical and electrical characteristics.

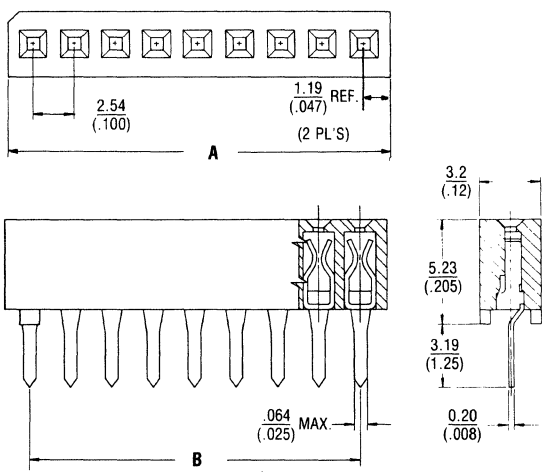
Design Considerations

- Available in 5-30 positions inclusive
- Dual-beam socket contacts
- Superior insertion/extraction performance
- Withstands adverse environmental conditions such as shock, vibration, and corrosion
- Corner identification of position #1 on connector housing simplifies board assembly
- Suitable for 1.33mm (.050") to 1.5mm (.058") PCB hole diameters

PHYSICAL PROPERTIES	
INSULATION MATERIAL	GLASS REINFORCED THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	COPPER NICKEL ALLOY
CONTACT PLATING	FINISH: TIN PLATED
ELECTRICAL PROPERTIES	
CURRENT RATING	1 AMP
INSULATION RESISTANCE	$>1 \times 10^9$ OHMS
DIELECTRIC STRENGTH	>650 VAC 1 MIN.
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	– 40°C TO 100°C
UL RECOGNIZED	E60980

Designed specifically to mate with FLEXSTRIP® Jumpers



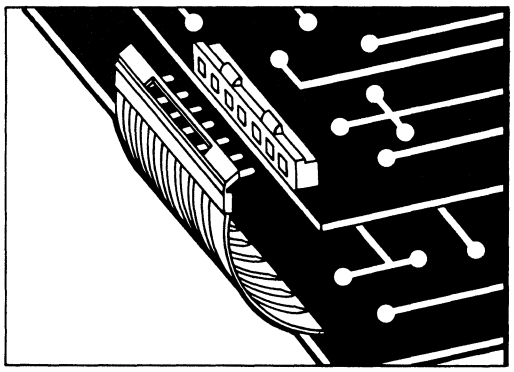


DIMENSIONS ARE SHOWN IN mm/(inches)

CAT. NO.	NO. OF POS.	DIMENSIONS A	DIMENSIONS B
744-5	5	12.56(.494)	10.16(.400)
744-6	6	15.10(.594)	12.70(.500)
744-7	7	17.64(.694)	15.24(.600)
744-8	8	20.18(.794)	17.78(.700)
744-10	10	25.26(.994)	22.86(.900)
744-11	11	27.80(1.094)	25.40(1.000)
744-12	12	30.34(1.194)	27.94(1.100)
744-13	13	32.88(1.294)	30.48(1.200)
744-14	14	35.42(1.394)	33.02(1.300)
744-15	15	37.96(1.494)	35.56(1.400)
744-16	16	40.50(1.594)	38.10(1.500)
744-17	17	43.04(1.694)	40.64(1.600)

CAT. NO.	NO. OF POS.	DIMENSIONS A	DIMENSIONS B
744-18	18	45.58(1.794)	43.18(1.700)
744-20	20	50.66(1.994)	48.26(1.900)
744-21	21	53.20(2.094)	50.80(2.000)
744-22	22	55.73(2.194)	53.34(2.100)
744-23	23	58.27(2.294)	55.88(2.200)
744-24	24	60.81(2.394)	58.42(2.300)
744-25	25	63.35(2.494)	60.96(2.400)
744-26	26	65.89(2.594)	63.50(2.500)
744-27	27	68.43(2.694)	66.04(2.600)
744-28	28	70.97(2.794)	68.58(2.700)
744-29	29	73.51(2.894)	71.12(2.800)
744-30	30	76.05(2.994)	73.66(2.900)

Minimum insertion depth: 2.2mm (.085")
Maximum insertion depth: 4.5mm (.180")



FLEXSTRIP® HEADER AND SOCKET SYSTEM

Description/Application

The FLEXSTRIP® Header and Socket system consists of an insert-molded FLEXSTRIP® Jumper and a mating, board-mountable socket.

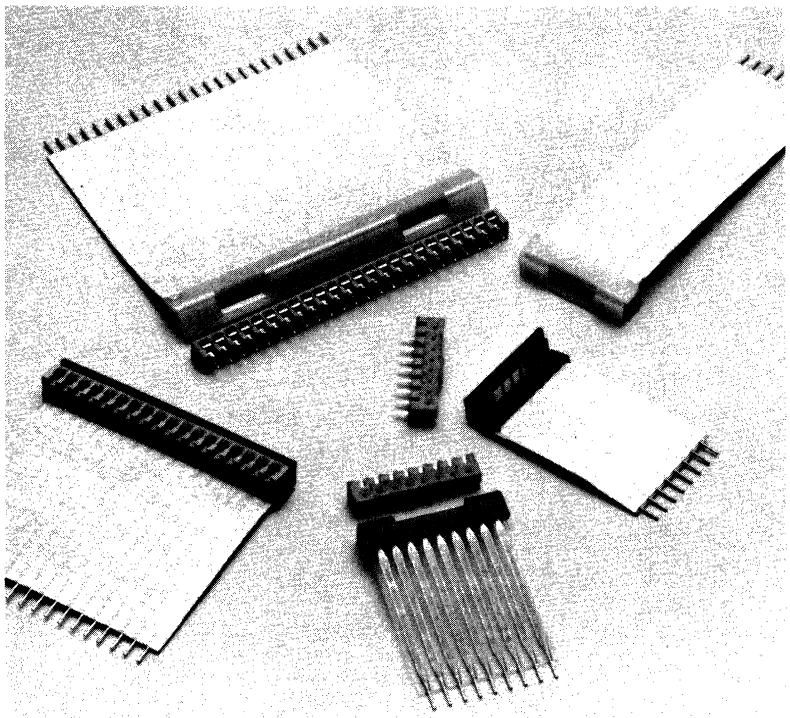
The jumper features an integral nylon cap which serves as both a pull tab and a locking device for connect/disconnect cycles. The two-piece system is ideally suited for applications where conditions of high vibration or accidental disengagement of header and socket is likely to occur.

The FLEXSTRIP® Header and Socket system offers extremely low profile interconnection, and in addition, provides pluggability in a wide variety of professional electronics and automotive applications.

Design Considerations

- Available in 8, 9, 10, 12, 14, 16, 18, 20, 22, and 24 positions
- 0.100" pitch FLEXSTRIP® Jumper, lengths of .75" to 24"
- Choice of Polyester, Nomex, Teflon, or Kapton insulation
- Mating socket has dielectric voltage of 500VAC, current rating of 2 AMPS, operating temperature of -55°C to 105°C
- Edge mount means extremely low profile right angle disconnect
- Mating socket requires only .17" of PCB real estate on the edge of the board
- Engaged height of only .240"
- When mated, the jumper is mechanically latched to the socket

Pluggability plus all the benefits of FLEXSTRIP® Jumpers



Standard Product Options

The information below provides a general overview of this product family.

Insert-Molded Jumper

FH N 1.85 A 16

- **FH** — *Product Code*
- **N** — *Insulation Material*: *N – Nomex**, *T – Teflon**, *K – Kapton**, *P – Polyester*
- **1.85** — *Length of Jumper* .75" – 24"
- **A** — *Pin Configuration*
- **16** — *Number of Conductors*

Mating Socket

FHS – 10

- **FHS** — *Product Code*
- **10** — *Number of Positions*

*Registered Trademark of DuPont.
**Available only with Flexstrip® Jumper.

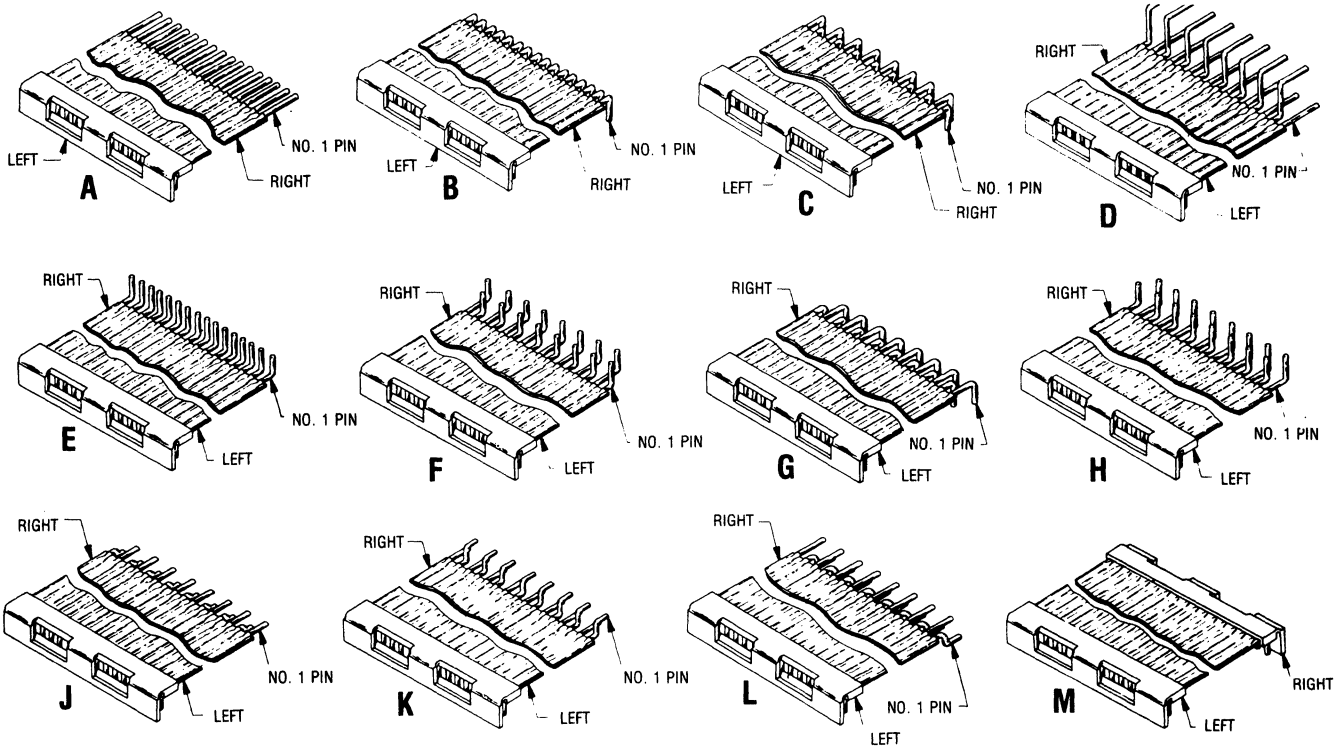
A

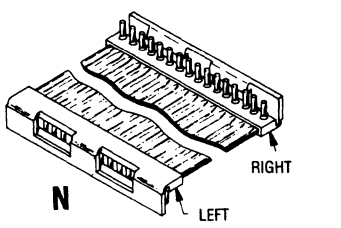
FLEXSTRIP® HEADER & SOCKET SYSTEM

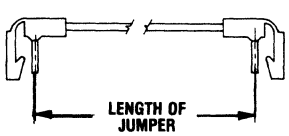
Insert-Molded Jumper Part Numbering System

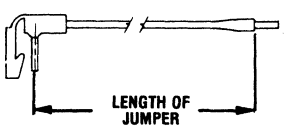
FH N 1.85 A 16

- **FH** — *Product Code*
- **N** — *Insulation Material*: *N – Nomex* T – Teflon* K – Kapton* P – Polyester*
- **1.85** — *Length of Jumper .75" – 24" (in .050" increments)*
- **A** — *Configuration Option (A-N)*
- **16** — *Number of Conductors (.100" pitch)*









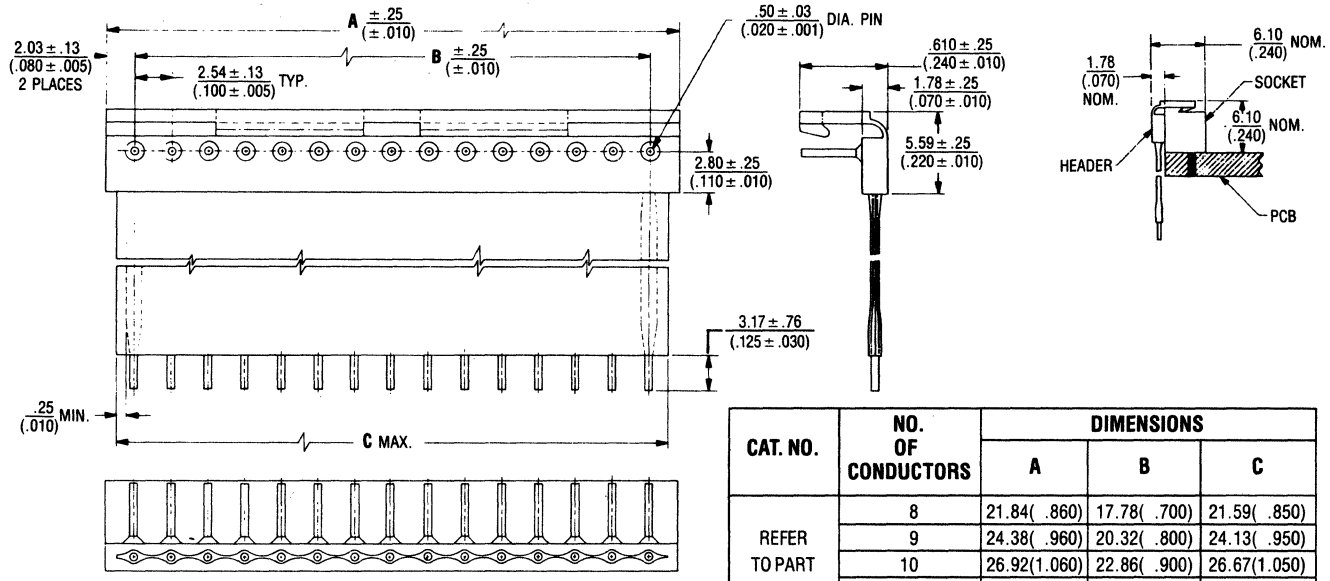
Electrical and Material Characteristics

MATING SOCKET	
DIELECTRIC WITHSTANDING VOLTAGE (MAXIMUM)	500 VOLTS A.C.
CURRENT RATING (MAXIMUM)	2 AMPS
OPERATING TEMPERATURE	-55°C TO 105°C
CONTACT RESISTANCE (MAXIMUM)	15 MILLIOHMS
INSULATION RESISTANCE (MINIMUM)	5000 MEGOHMS
INSERTION FORCE PER CONTACT	8 OZ. (227 GRAMS) MAX.
EXTRACTION FORCE PER CONTACT	2 OZ. (57 GRAMS) MIN.
MATERIAL	
INSULATOR	GLASS FILLED POLYESTER, COLOR BLUE, FLAMMABILITY UL-94V-0
CONTACT	COPPER ALLOY
FINISH	BRIGHT TIN

INSERT-MOLDED JUMPER	
RESISTANCE PER 1000 FT.	65 OHMS
U.L. CURRENT RATING	3 AMPS
U.L. RATED VOLTAGE	300VAC
INSULATION RESISTANCE	1 x 10^{12} OHMS
MATERIAL	
CONDUCTOR	TIN PLATED COPPER COPPER PER QQ-W-343 TYPE "S"
INSULATION	NOMEX, TEFLON, KAPTON POLYESTER
REINFORCEMENT (LATCH)	NYLON

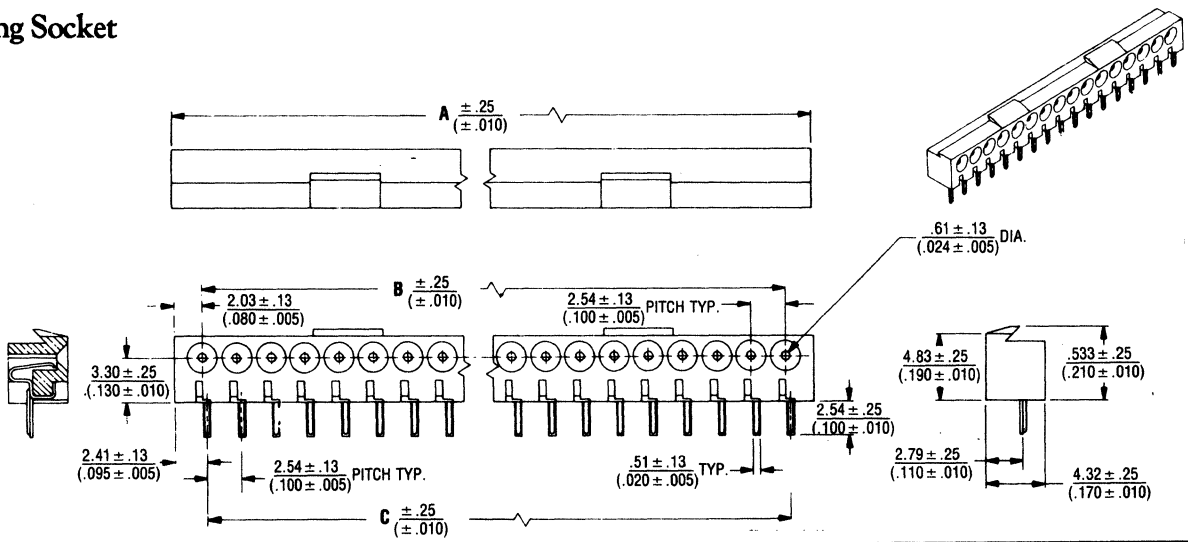
FLEXSTRIP® HEADER & SOCKET SYSTEM

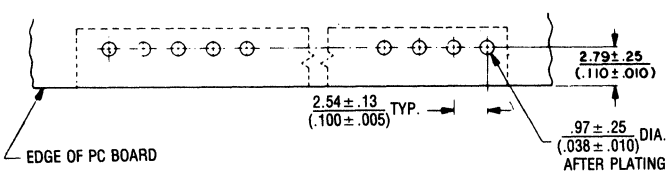
Insert-Molded Jumper (Header)



CAT. NO.	NO. OF CONDUCTORS	DIMENSIONS		
		A	B	C
REFER TO PART NUMBERING SYSTEM ON OPPOSITE PAGE	8	21.84(.860)	17.78(.700)	21.59(.850)
	9	24.38(.960)	20.32(.800)	24.13(.950)
	10	26.92(1.060)	22.86(.900)	26.67(1.050)
	12	32.00(1.260)	27.44(1.100)	31.75(1.250)
	14	37.08(1.460)	33.02(1.300)	36.83(1.450)
	16	42.16(1.660)	38.10(1.500)	41.91(1.650)
	18	45.72(1.860)	43.18(1.700)	46.99(1.850)
	20	52.32(2.060)	48.26(1.900)	52.07(2.050)
	22	57.40(2.260)	53.34(2.100)	57.15(2.250)
	24	62.48(2.460)	58.42(2.300)	62.23(2.450)

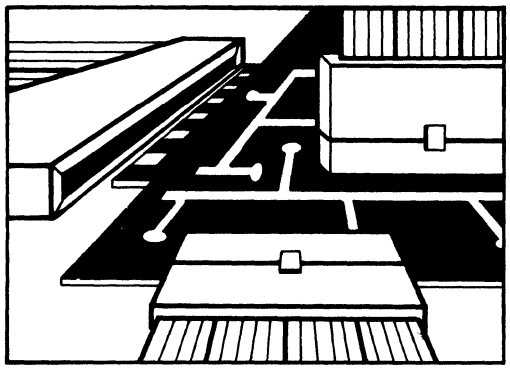
Mating Socket





CAT. NO.	NO. OF POS.	DIMENSIONS		
		A	B	C
FHS-08	8	21.84(.860)	17.78(.700)	17.78(.700)
FHS-09	9	24.38(.960)	20.32(.800)	20.32(.800)
FHS-10	10	26.92(1.060)	22.86(.900)	22.86(.900)
FHS-12	12	32.00(1.260)	27.94(1.100)	27.44(1.100)
FHS-14	14	37.08(1.460)	33.02(1.300)	33.02(1.300)
FHS-16	16	42.16(1.660)	38.10(1.500)	38.10(1.500)
FHS-18	18	45.72(1.860)	43.18(1.700)	43.18(1.700)
FHS-20	20	52.32(2.060)	48.26(1.900)	48.26(1.900)
FHS-22	22	57.40(2.260)	53.34(2.100)	53.34(2.100)
FHS-24	24	62.48(2.460)	58.42(2.300)	58.42(2.300)

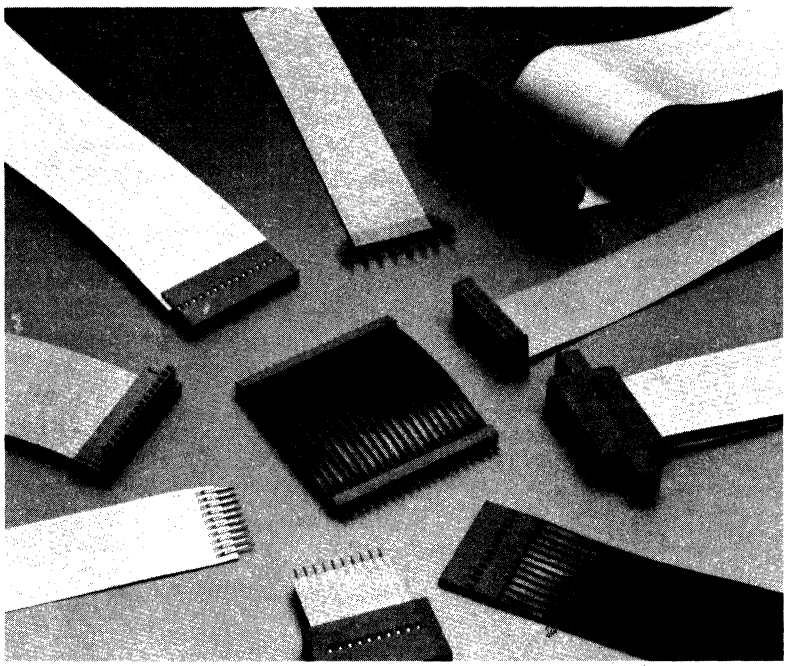
DIMENSIONS ARE SHOWN IN mm/(inches)



FLEXPAC™ CABLE-CONNECTOR ASSEMBLY SYSTEM

A

High performance, high flex life interconnect solutions



Description/Application

The FLEXPAC™ System is a high-performance flat conductor interconnect technology that provides versatile solutions for printer/plotter designs, dense PC stacking, retractile assemblies, and a host of other applications.

Building upon advanced IDC product capability, the FLEXPAC™ System combines flat conductor cable (or custom flexible circuits) with a variety of contact/connector styles, enabling you to specify custom-designed "connectorized" assemblies to meet the most challenging interconnection requirements. FLEXPAC™ interconnection assemblies are used in a wide variety of military, aerospace, commercial, automotive, medical, membrane switch, and industrial applications.

Design Considerations

- Cable and connectors on industry-standard 2.54mm (.100") centers
- Number of conductors/positions: 2 to 64
- Two cable types: FLEXPAC™ cable, FLEXSTRIP® Jumper
- Four termination options: solder pins, female socket connectors, male connectors and card edge connectors
- Locking headers in straight and right angle configurations: single row (4-32 position), double row (8-64 position)
- Cable may be repeatedly flexed without failure
- Variety of insulations available
- Intermateable with Ansley® mass-termination IDC headers and sockets
- Customized interconnect assemblies with off-the-shelf convenience

Standard Product Options

The information below provides a general overview of this product family.

Cable-Connector Assemblies

P 22 N 15.5 F2-A

- **P** — *Product Code*
- **22** — *Number of Conductors*
- **N** — *Insulation Material*
- **15.5** — *Assembly Length*
- **F2** — *Left End Termination*
- **A** — *Right End Termination*

Locking Headers

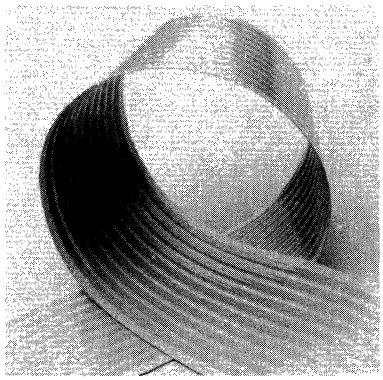
FPH – 10 21 T

- **FPH** — *Product Code*
- **10** — *No. of Positions*
- **21** — *Single row, straight pins*
  22 — *Double row, straight pins*
  01 — *Single row, right angle pins*
  02 — *Double row, right angle pins*
- **T** = *Tin*
  G = *Gold*

FLEXPAC™ SYSTEM CABLE-CONNECTOR ASSEMBLIES

CABLE

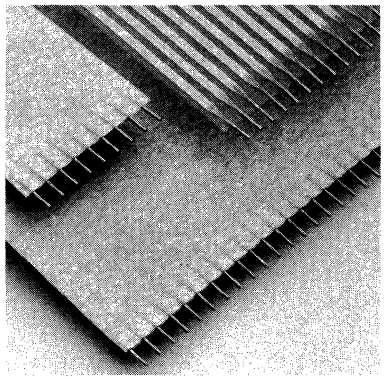
Suited for applications where high degrees of vibration or flexing are encountered, this polyester-insulated cable also offers weight and space reduction as well as consistent electrical characteristics. Manufactured to assure accurate and consistent pitch spacing of bare copper conductors, rolled flat to .076mm (.003") by 1.57mm (.062"). This 24 AWG-equivalent flat wire is ideal for power connections in any system.



P FLEXPAC™ Cable

JUMPERS

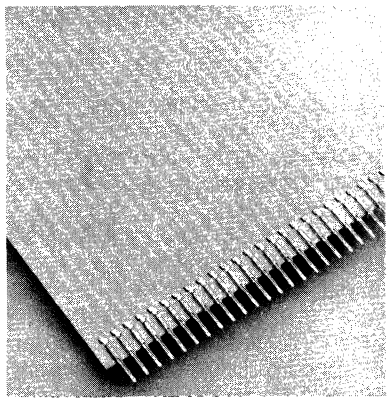
Though the FLEXSTRIP® Jumper is a flexible interconnect system in itself (see page 5), this product is also a component of the FLEXPAC™ System. Featuring flat, flexible conductors which are precision-tapered to round pin ends, FLEXSTRIP® Jumpers—in a variety of insulations—are available as cable-connector assemblies terminated to FLEXPAC™ Female Socket, Male, and Card Edge Connectors.



S FLEXSTRIP® Jumper

SOLDER PINS

Pins are suitable for soldering directly to plated-through holes on PC boards; feature up to 6 points of contact.



A STRAIGHT FLEXSTRIP® Pins, Tin-Plated*

B RIGHT ANGLE FLEXSTRIP® Pins, Tin Plated*

C RIGHT ANGLE STAGGERED FLEXSTRIP® Pins, Tin-Plated*

D STRAIGHT STAGGERED FLEXSTRIP® Pins, Tin-Plated*

E FLEXPAC™ SOLDER PINS, Straight

E2 FLEXPAC™ SOLDER PINS, Right Angle Up

E3 FLEXPAC™ SOLDER PINS, Right Angle Down

Part Numbering System

P	22	P	15.5	F2	A

Product Code
P – Flexpac™ Cable
S – Flexstrip® Jumper

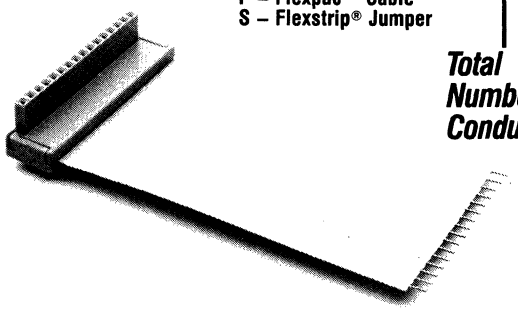
Total Number of Conductors

Insulation Material
P – *Polyester*
N – *Nomex**
T – *Teflon**
K – *Kapton**

Assembly Length
(to nearest tenth of an inch. See cable specification drawings for measurement criteria)

Left End Termination

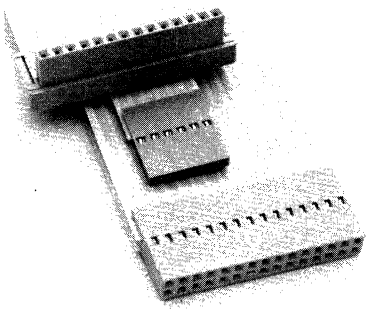
Right End Termination



*Available only with Flexstrip® Jumper; registered trademark of DuPont.
Nomex, Teflon and Kapton are trademarks of DuPont.

FEMALE SOCKET CONNECTORS

Socket connectors—in single- or double-row configuration—terminate either to FLEXSTRIP® Jumpers or FLEXPAC™ Cable. Available in both straight and right angle styles, they are on 2.54 mm (.100") centers to mate directly with FLEXPAC™ Male Connectors, FLEXPAC™ Locking Headers and to industry-standard Ansley® Mass Termination IDC Headers.



F SINGLE ROW SOCKET** Tin-Plated Contacts

F2 SINGLE ROW, RIGHT ANGLE** SOCKET Tin-Plated Contacts

G DOUBLE ROW SOCKET** Tin-Plated Contacts

H SINGLE ROW SOCKET** Gold-Plated Contacts

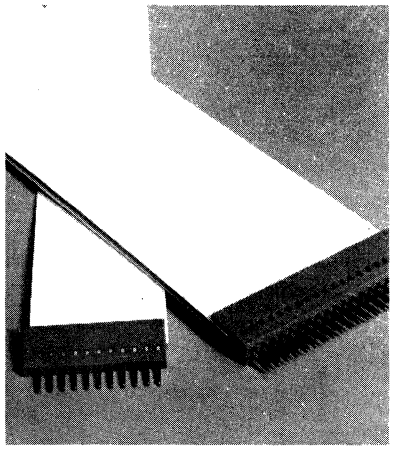
H2 SINGLE ROW, RIGHT ANGLE** SOCKET Gold-Plated Contacts

I DOUBLE ROW SOCKET** Gold-Plated Contacts

***Available only with Flexstrip® Jumper**
****Note: Specify polarization on drawings.**

MALE CONNECTORS

Male connectors—in single- or double-row configuration—terminate either to Flexstrip® Jumpers or Flexpac™ Cable. They are on 2.54mm (.100") centers to mate directly with Flexpac™ Female Socket Connectors as well as to industry-standard Ansley® IDC Female Sockets.



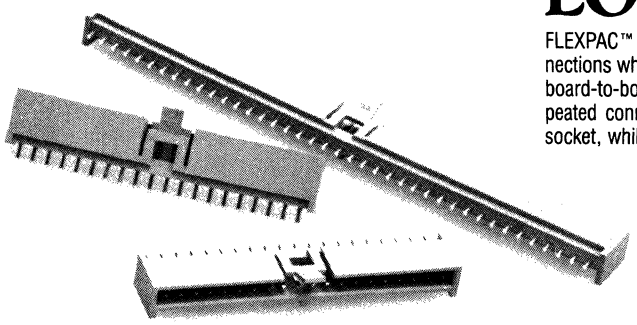
J SINGLE ROW MALE, Tin-Plated Contacts

K DOUBLE ROW MALE, Tin-Plated Contacts

L SINGLE ROW MALE, Gold-Plated Contacts

M DOUBLE ROW MALE, Gold-Plated Contacts

FLEXPAC™ POLARIZED LOCKING HEADERS

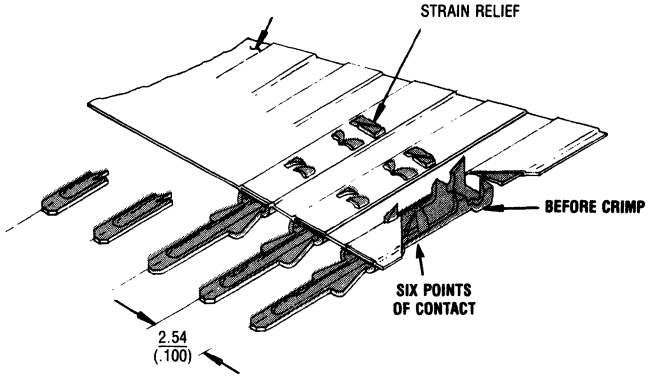


FLEXPAC™ Polarized Locking Headers are designed to provide fast, simple, polarized interconnections when mated to FLEXPAC™ Polarized Female Socket Connectors. They provide reliable board-to-board interconnections using FLEXPAC™ flat conductor in applications requiring repeated connection and disconnection. Built-in tab-locks easily engage and retain the female socket, while integral industry-standard polarization ensures proper mating.

SOLDER PIN, CABLE & JUMPER SPECIFICATIONS

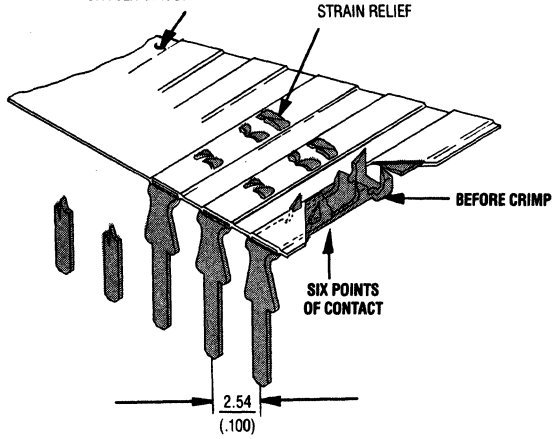
STRAIGHT SOLDER PIN

FLAT CONDUCTOR CABLE, FLEXSTRIP® JUMPER OR FLEX CIRCUIT



RIGHT ANGLE SOLDER PIN

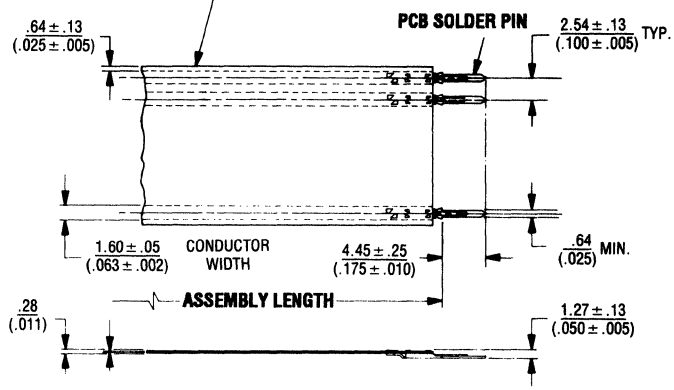
FLAT CONDUCTOR CABLE, FLEXSTRIP® JUMPER OR FLEX CIRCUIT



Contact to cable tensile strength of 2.4 lbs/contact

DIMENSIONS ARE SHOWN IN mm/(inches)

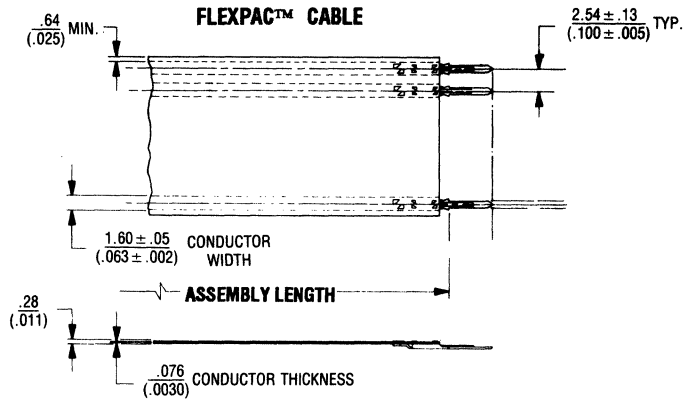
RECOMMENDED FLEXCIRCUIT LAYOUT



FLEXPAC™ Solder Pin Specifications

Contact Material	Phosphor Bronze
Contact Plating	Bright Tin
Current Rating	3 amps
Conductor or Circuit Size	.076mm (.003)/.127mm (.005) thick x 1.499mm (.059)/1.65mm (.065) wide

FLEXPAC™ CABLE

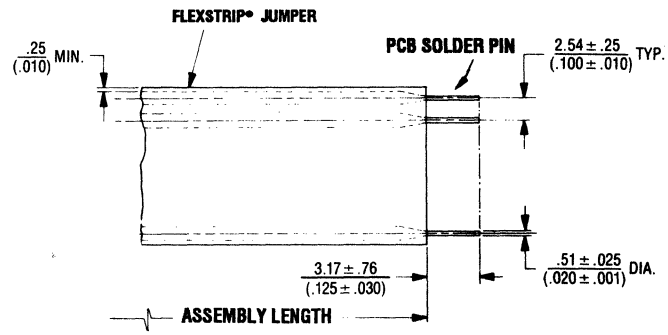


FLEXPAC™ Cable Specifications

Conductor Size	.076mm (.003) x 1.57mm (.062) rolled OFC
Pitch	2.54mm (.100) C-C
Material	Bare copper per QQ-C-502
Cable Dimensions	.356mm (.014) thick (nominal)
Insulation	Polyester
U.L. Style No.	2639
Voltage Rating	300 volt*
Temperature Rating	105°C
Current Rating	3 amps
Capacitance	12.6 Pf/ft
Resistance	43 ohms/1000 ft
Impedance	110Ω

*600 volt rated cable (F600P3-XX) UL Style #20395 also available, consult factory.

FLEXSTRIP® JUMPER

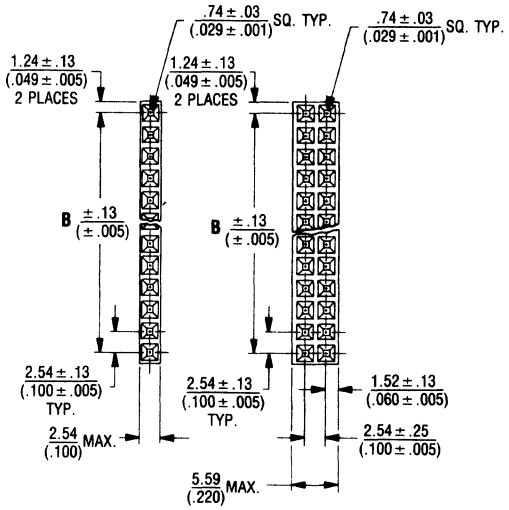


FLEXSTRIP® Jumper Specifications

Resistance per 1,000 feet	65 ohms
Current Rating	3 amps
Rated Voltage	300 VAC
Rated Temperature	105°C
Conductor	Copper per QQ-W-343 Tin Plated
Equivalent Wire Gauge	24 AWG

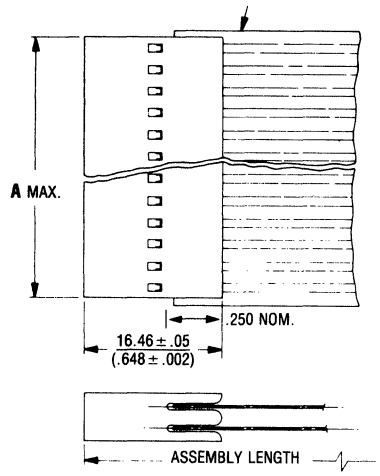
A

FLEXPAC™ FEMALE SOCKET CONNECTOR, STRAIGHT

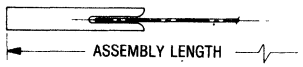


FLEXSTRIP® JUMPER
FLEXPAC™ HIGH FLEX CABLE

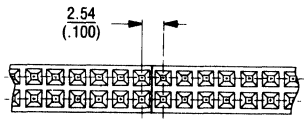
RECOMMENDED FLEXCIRCUIT LAYOUT



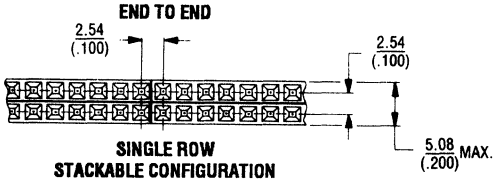
DOUBLE ROW



SINGLE ROW



DOUBLE ROW
STACKABLE CONFIGURATION
END TO END



SINGLE ROW
STACKABLE CONFIGURATION
SIDE BY SIDE &
END TO END

Assembly Length Tolerance

23" and below	± .10"
24" – 60"	± .25"
over 60"	± .50"

FLEXPAC™ Female Socket Specifications

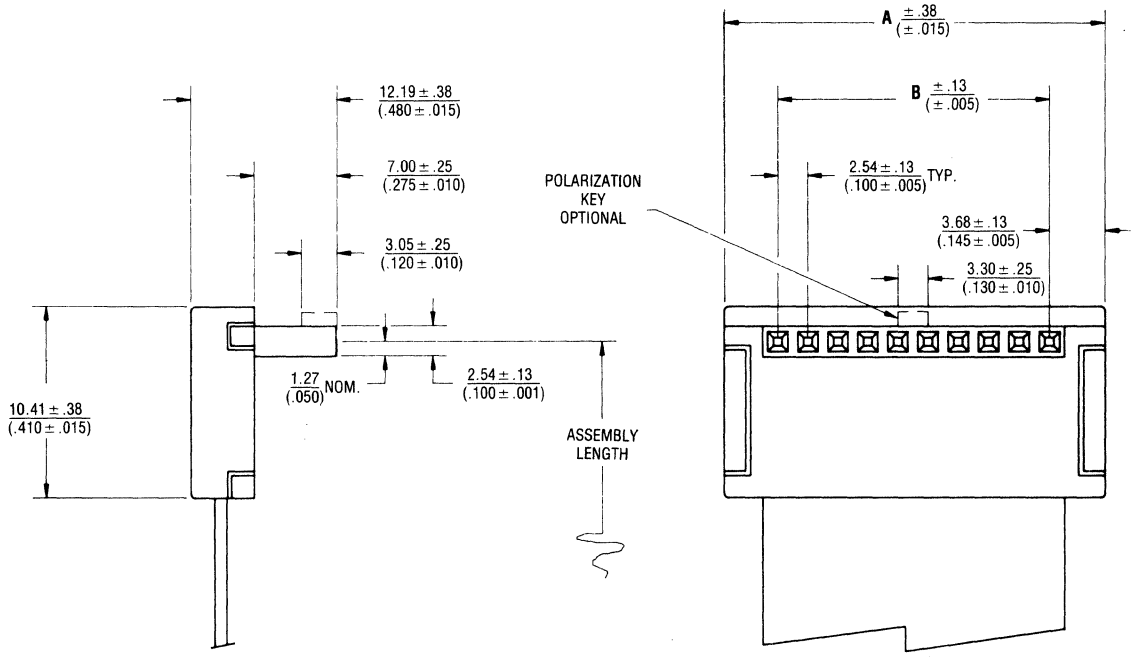
Contact Material	Copper Alloy CDA 725
Contact Plating	.000050" thick gold over nickel in contact engagement area
Current Rating	3 amps
Housing	Glass filled polyester 94V-0 rated Single row: up to 32 contacts Double row: up to 64 contacts (2 x 32)
Polarizing Pin	Part No. 609-0000 Insertion depth 6.35mm (.250) to 7.37mm (.290)
Insertion Force	5.14 oz. per contact
Withdrawal Force	4.30 oz. per contact
Min. Insertion Depth	.20"
Max. Insertion Depth	.35"

Note: Polarization key option available.
Consult factory.

NO. OF POSITIONS		DIMENSIONS		
SINGLE ROW	DOUBLE ROW	A	B	B TOLERANCE
2	4	5.08(.200)	2.54(.100)	±.13(±.005)
3	6	7.62(.300)	5.08(.200)	±.13(±.005)
4	8	10.16(.400)	7.62(.300)	±.13(±.005)
5	10	12.70(.500)	10.16(.400)	±.13(±.005)
6	12	15.24(.600)	12.70(.500)	±.13(±.005)
7	14	17.78(.700)	15.24(.600)	±.13(±.005)
8	16	20.32(.800)	17.78(.700)	±.13(±.005)
9	18	22.86(.900)	20.32(.800)	±.13(±.005)
10	20	25.40(1.000)	22.86(.900)	±.13(±.005)
11	22	27.94(1.100)	25.40(1.000)	±.13(±.005)
12	24	30.48(1.200)	27.94(1.100)	±.13(±.005)
13	26	33.02(1.300)	30.48(1.200)	±.13(±.005)
14	28	35.56(1.400)	33.02(1.300)	±.13(±.005)
15	30	38.10(1.500)	35.56(1.400)	±.13(±.005)
16	32	40.64(1.600)	38.10(1.500)	±.13(±.005)
17	34	43.18(1.700)	40.64(1.600)	±.13(±.005)
18	36	45.72(1.800)	43.18(1.700)	±.13(±.005)
19	38	48.26(1.900)	45.72(1.800)	±.13(±.005)
20	40	50.80(2.000)	48.26(1.900)	±.13(±.005)
21	42	53.34(2.100)	50.80(2.000)	±.13(±.005)
22	44	55.88(2.200)	53.34(2.100)	±.13(±.005)
23	46	58.42(2.300)	55.88(2.200)	±.13(±.005)
24	48	60.96(2.400)	58.42(2.300)	±.13(±.005)
25	50	63.50(2.500)	60.96(2.400)	±.13(±.005)
26	52	66.04(2.600)	63.50(2.500)	±.13(±.005)
27	54	68.58(2.700)	66.04(2.600)	±.13(±.005)
28	56	71.12(2.800)	68.58(2.700)	±.13(±.005)
29	58	73.66(2.900)	71.12(2.800)	±.13(±.005)
30	60	76.20(3.000)	73.66(2.900)	±.13(±.005)
31	62	78.74(3.100)	76.20(3.000)	±.13(±.005)
32	64	81.28(3.200)	78.74(3.100)	±.13(±.005)

DIMENSIONS ARE SHOWN IN mm/(inches)

FLEXPAC™ FEMALE SOCKET CONNECTOR RIGHT ANGLE, SINGLE ROW



NO. OF POS.	DIMENSIONS	
	A	B
2	9.1 (.390)	2.54(.100)
3	12.45(.490)	5.08(.200)
4	14.99(.590)	7.62(.300)
5	17.53(.690)	10.16(.400)
6	20.07(.790)	12.70(.500)
7	22.61(.890)	15.24(.600)
8	25.15(.990)	17.78(.700)
9	27.69(1.090)	20.32(.800)
10	30.23(1.190)	22.86(.900)
11	32.77(1.290)	25.40(1.000)
12	35.31(1.390)	27.94(1.100)
13	27.85(1.490)	30.48(1.200)
14	40.39(1.590)	33.02(1.300)
15	42.91(1.690)	35.56(1.400)
16	45.47(1.790)	38.10(1.500)
17	48.01(1.890)	40.64(1.600)
18	50.55(1.990)	43.18(1.700)
19	53.09(2.090)	45.72(1.800)
20	55.63(2.190)	48.26(1.900)
21	58.17(2.290)	50.80(2.000)
22	60.71(2.390)	53.34(2.100)
23	63.25(2.490)	55.88(2.200)
24	65.79(2.590)	58.42(2.300)
25	68.33(2.690)	60.96(2.400)
26	70.87(2.790)	63.50(2.500)
27	73.41(2.890)	66.04(2.600)
28	75.95(2.990)	68.58(2.700)
29	78.49(3.090)	71.12(2.800)
30	81.03(3.190)	73.66(2.900)
31	83.57(3.290)	76.20(3.000)
32	86.11(3.390)	78.34(3.100)

FLEXPAC™ Female Socket Specifications

Contact Material	Copper Alloy CDA 725
Contact Plating	.000050" thick gold over nickel in contact engagement area
Current Rating	3 amps
Housing	Glass filled polyester 94V-0 rated Single row: up to 32 contacts Double row: up to 64 contacts (2 x 32)
Polarizing Pin	Part No. 609-0000 Insertion depth 6.35mm (.250) to 7.37mm (.290)
Insertion Force	5.14 oz. per contact
Withdrawal Force	4.30 oz. per contact
Min. Insertion Depth	.20"
Max. Insertion Depth	.35"

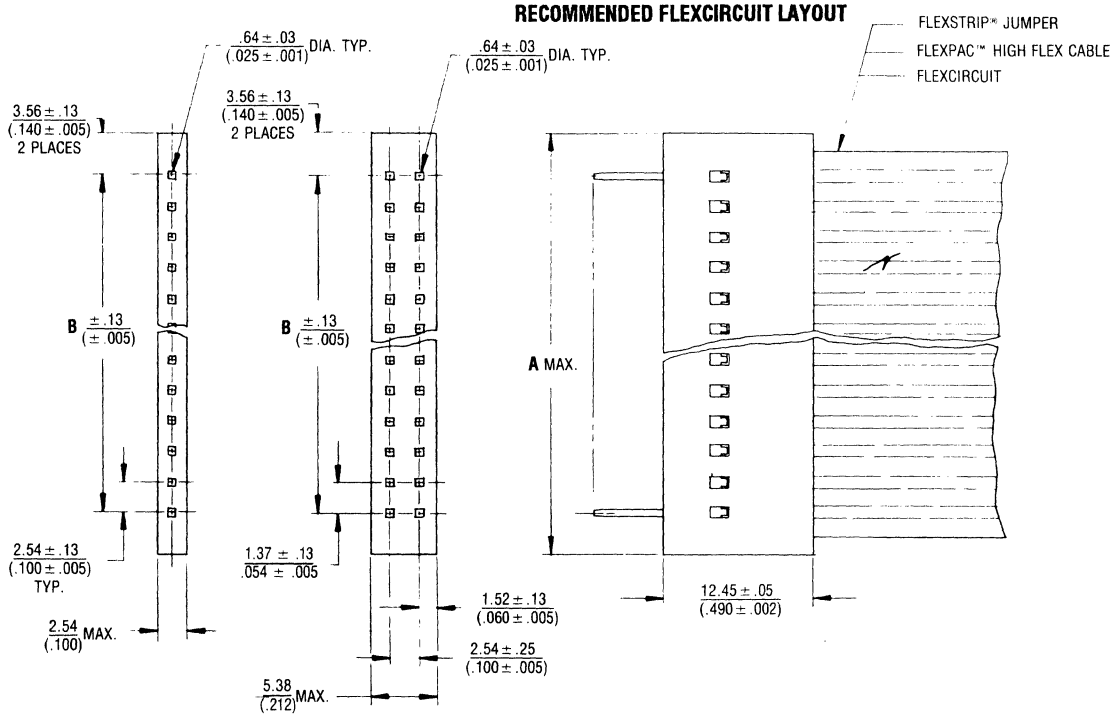
Note: Unless otherwise specified, the Right Angle socket faces down in an assembly.

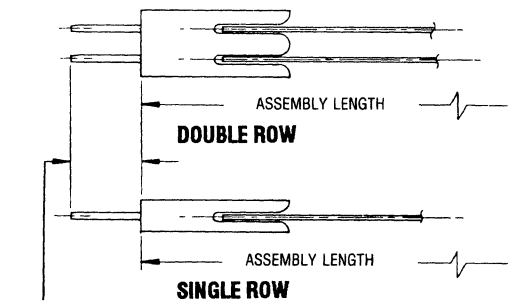
DIMENSIONS ARE SHOWN IN mm/(inches)

A

FLEXPAC™ MALE CONNECTOR

RECOMMENDED FLEXCIRCUIT LAYOUT





5.72 ± .38 (.225 ± .015)

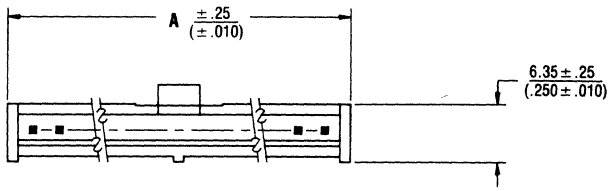
NO. OF POSITIONS		DIMENSIONS		
SINGLE ROW	DOUBLE ROW	A	B	B TOLERANCE
2	4	9.91(.390)	2.54(.100)	± .13(± .005)
3	6	12.45(.490)	5.08(.200)	± .13(± .005)
4	8	14.99(.590)	7.62(.300)	± .13(± .005)
5	10	17.53(.690)	10.16(.400)	± .13(± .005)
6	12	20.07(.790)	12.70(.500)	± .13(± .005)
7	14	22.61(.890)	15.24(.600)	± .13(± .005)
8	16	25.15(.990)	17.78(.700)	± .13(± .005)
9	18	27.69(1.090)	20.32(.800)	± .13(± .005)
10	20	30.23(1.190)	22.86(.900)	± .13(± .005)
11	22	32.77(1.290)	25.40(1.000)	± .13(± .005)
12	24	35.31(1.390)	27.94(1.100)	± .13(± .005)
13	26	37.85(1.490)	30.48(1.200)	± .13(± .005)
14	28	40.39(1.590)	33.02(1.300)	± .13(± .005)
15	30	42.93(1.690)	35.56(1.400)	± .13(± .005)
16	32	45.47(1.790)	38.10(1.500)	± .13(± .005)
17	34	48.01(1.890)	40.64(1.600)	± .13(± .005)
18	36	50.55(1.990)	43.18(1.700)	± .13(± .005)
19	38	53.09(2.090)	45.72(1.800)	± .13(± .005)
20	40	55.63(2.190)	48.26(1.900)	± .13(± .005)
21	42	58.17(2.290)	50.80(2.000)	± .13(± .005)
22	44	60.71(2.390)	53.34(2.100)	± .13(± .005)
23	46	63.25(2.490)	55.88(2.200)	± .13(± .005)
24	48	65.79(2.590)	58.42(2.300)	± .13(± .005)
25	50	68.33(2.690)	60.96(2.400)	± .13(± .005)
26	52	70.87(2.790)	63.50(2.500)	± .13(± .005)
27	54	73.41(2.890)	66.04(2.600)	± .13(± .005)
28	56	75.95(2.990)	68.58(2.700)	± .13(± .005)
29	58	78.49(3.090)	71.12(2.800)	± .13(± .005)
30	60	81.03(3.190)	73.66(2.900)	± .13(± .005)
31	62	83.57(3.290)	76.20(3.000)	± .13(± .005)
32	64	86.11(3.390)	78.74(3.100)	± .13(± .005)

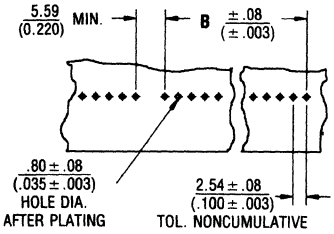
FLEXPAC™ Male Connector Specifications

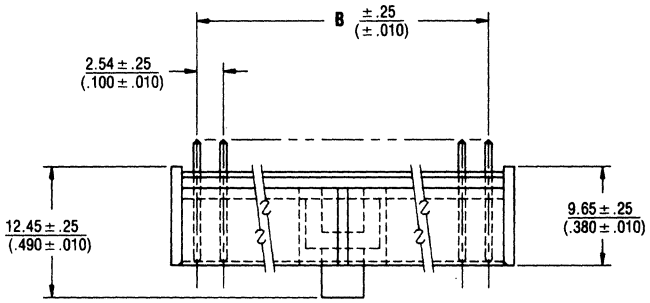
Contact Material	Copper Alloy CDA 725
Contact Plating	.000030" thick gold over nickel in contact engagement area
Current Rating	3 amps
Housing	Glass filled polyester 94V-0 rated Single row: up to 32 contacts Double row: up to 64 contacts (2 x 32)

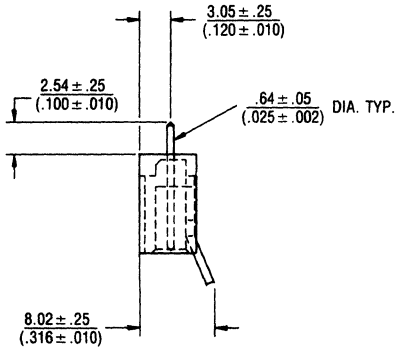
DIMENSIONS ARE SHOWN IN mm/(inches)

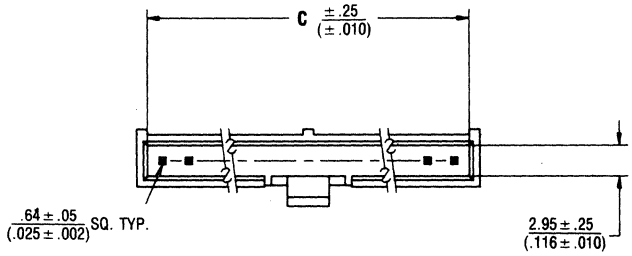
FLEXPAC™ LOCKING HEADER, SINGLE ROW STRAIGHT CONTACTS

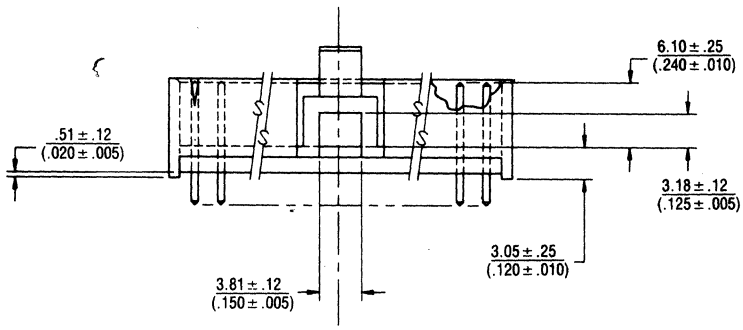












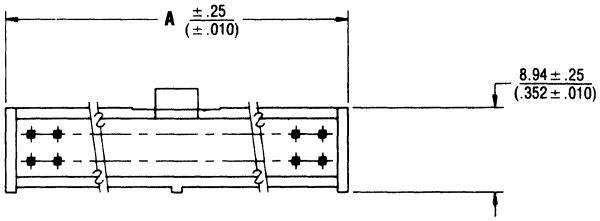
CAT. NO.	NO. OF POS.	DIMENSIONS		
		A	B	C
FPH-0421G	4	12.70(.500)	7.62(.300)	10.57(.416)
FPH-0521G	5	15.24(.600)	10.16(.400)	13.11(.516)
FPH-0621G	6	17.78(.700)	12.70(.500)	15.65(.616)
FPH-0721G	7	20.32(.800)	15.24(.600)	18.19(.716)
FPH-0821G	8	22.86(.900)	17.78(.700)	20.73(.816)
FPH-0921G	9	25.40(1.000)	20.32(.800)	23.27(.916)
FPH-1021G	10	27.94(1.100)	22.86(.900)	25.81(1.016)
FPH-1121G	11	30.48(1.200)	25.40(1.000)	28.35(1.116)
FPH-1221G	12	33.02(1.300)	27.94(1.100)	30.89(1.216)
FPH-1321G	13	35.56(1.400)	30.48(1.200)	33.43(1.316)
FPH-1421G	14	38.10(1.500)	33.02(1.300)	35.97(1.416)
FPH-1521G	15	40.64(1.600)	35.56(1.400)	38.51(1.516)
FPH-1621G	16	43.18(1.700)	38.10(1.500)	41.05(1.616)
FPH-1721G	17	45.72(1.800)	40.64(1.600)	43.59(1.716)
FPH-1821G	18	48.26(1.900)	43.18(1.700)	46.13(1.816)
FPH-1921G	19	50.80(2.000)	45.72(1.800)	48.67(1.916)
FPH-2021G	20	53.34(2.100)	48.26(1.900)	51.21(2.016)
FPH-2121G	21	55.88(2.200)	50.80(2.000)	53.75(2.116)
FPH-2221G	22	58.42(2.300)	53.34(2.100)	56.29(2.216)
FPH-2321G	23	60.96(2.400)	55.88(2.200)	58.83(2.316)
FPH-2421G	24	63.50(2.500)	58.42(2.300)	61.37(2.416)
FPH-2521G	25	66.04(2.600)	60.96(2.400)	63.91(2.516)
FPH-2621G	26	68.58(2.700)	63.50(2.500)	66.45(2.616)
FPH-2721G	27	71.12(2.800)	66.04(2.600)	68.99(2.716)
FPH-2821G	28	73.66(2.900)	68.58(2.700)	71.53(2.816)
FPH-2921G	29	76.20(3.000)	71.12(2.800)	74.07(2.916)
FPH-3021G	30	78.74(3.100)	73.66(2.900)	76.61(3.016)
FPH-3121G	31	81.28(3.200)	76.20(3.000)	79.15(3.116)
FPH-3221G	32	83.82(3.300)	78.74(3.100)	81.69(3.216)

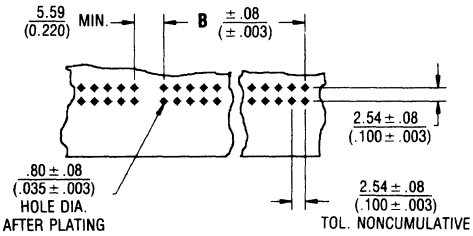
NOTE: 1. Part numbers shown indicate gold plated pins.
For tin plated pins, substitute "T" for "G".
2. To be used with polarization key option on socket

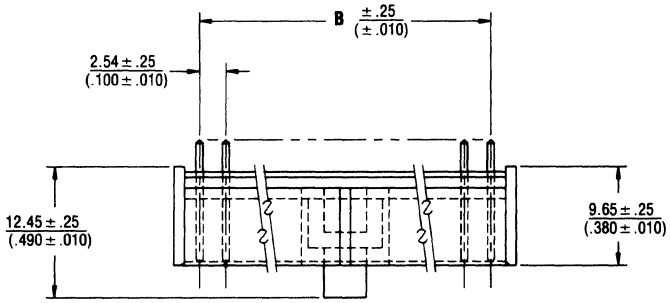
DIMENSIONS ARE SHOWN IN mm/(inches)

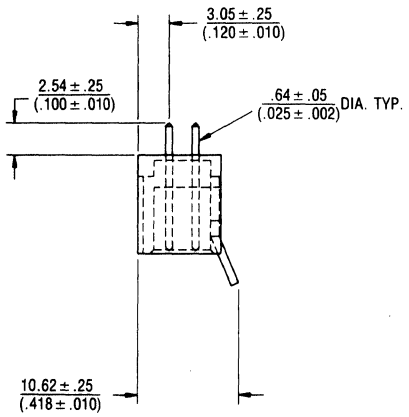
PHYSICAL PROPERTIES	
INSULATION MATERIAL	THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	PHOSPHOR BRONZE
CONTACT PLATING	CONTACT AREA: .000030 GOLD OVER .000050 NICKEL PCB AREA: .000150 TIN OVER .000050 NICKEL
ELECTRICAL PROPERTIES	
CURRENT RATING	3 AMPS
INSULATION RESISTANCE	>1 x 10^9 OHMS @ 500VDC
DWV	>500 VRMS AT SEA LEVEL
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	– 40°C TO 105°C
U.L. APPROVAL	E47817

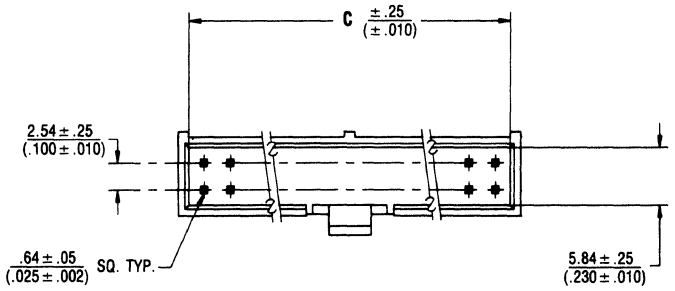
FLEXPAC™ LOCKING HEADER, DOUBLE ROW STRAIGHT CONTACTS

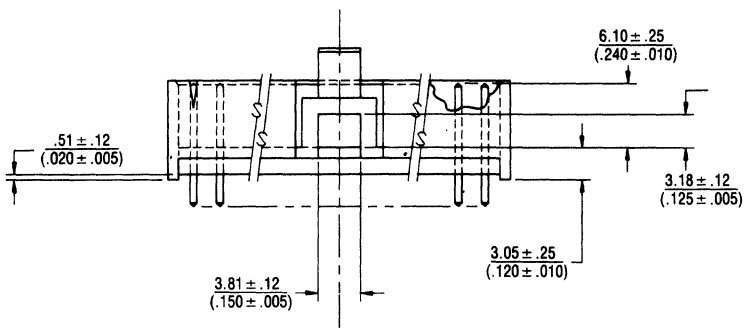












CAT. NO.	NO. OF POS.	DIMENSIONS		
		A	B	C
FPH-0822G	8	12.70(.500)	7.62(.300)	10.57(.416)
FPH-1022G	10	15.24(.600)	10.16(.400)	13.11(.516)
FPH-1222G	12	17.78(.700)	12.70(.500)	15.65(.616)
FPH-1422G	14	20.32(.800)	15.24(.600)	18.19(.716)
FPH-1622G	16	22.86(.900)	17.78(.700)	20.73(.816)
FPH-1822G	18	25.40(1.000)	20.32(.800)	23.27(.916)
FPH-2022G	20	27.94(1.100)	22.86(.900)	25.81(1.016)
FPH-2222G	22	30.48(1.200)	25.40(1.000)	28.35(1.116)
FPH-2422G	24	33.02(1.300)	27.94(1.100)	30.89(1.216)
FPH-2622G	26	35.56(1.400)	30.48(1.200)	33.43(1.316)
FPH-2822G	28	38.10(1.500)	33.02(1.300)	35.97(1.416)
FPH-3022G	30	40.64(1.600)	35.56(1.400)	38.51(1.516)
FPH-3222G	32	43.18(1.700)	38.10(1.500)	41.05(1.616)
FPH-3422G	34	45.72(1.800)	40.64(1.600)	43.59(1.716)
FPH-3622G	36	48.26(1.900)	43.18(1.700)	46.13(1.816)
FPH-3822G	38	50.80(2.000)	45.72(1.800)	48.67(1.916)
FPH-4022G	40	53.34(2.100)	48.26(1.900)	51.21(2.016)
FPH-4222G	42	55.88(2.200)	50.80(2.000)	53.75(2.116)
FPH-4422G	44	58.42(2.300)	53.34(2.100)	56.29(2.216)
FPH-4622G	46	60.96(2.400)	55.88(2.200)	58.83(2.316)
FPH-4822G	48	63.50(2.500)	58.42(2.300)	61.37(2.416)
FPH-5022G	50	66.04(2.600)	60.96(2.400)	63.91(2.516)
FPH-5222G	52	68.58(2.700)	63.50(2.500)	66.45(2.616)
FPH-5422G	54	71.12(2.800)	66.04(2.600)	68.99(2.716)
FPH-5622G	56	73.66(2.900)	68.58(2.700)	71.53(2.816)
FPH-5822G	58	76.20(3.000)	71.12(2.800)	74.07(2.916)
FPH-6022G	60	78.74(3.100)	73.66(2.900)	76.61(3.016)
FPH-6222G	62	81.28(3.200)	76.20(3.000)	79.15(3.116)
FPH-6422G	64	83.82(3.300)	78.74(3.100)	81.69(3.216)

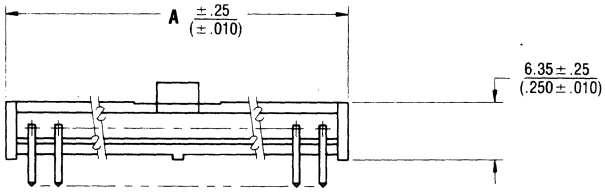
NOTE: 1. Part numbers shown indicate gold plated pins.
For tin plated pins, substitute "T" for "G".
2. To be used with polarization key option on socket

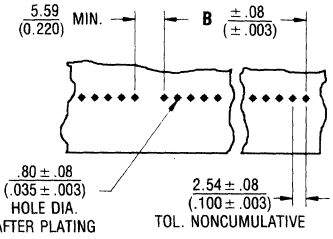
DIMENSIONS ARE SHOWN IN mm/(inches)

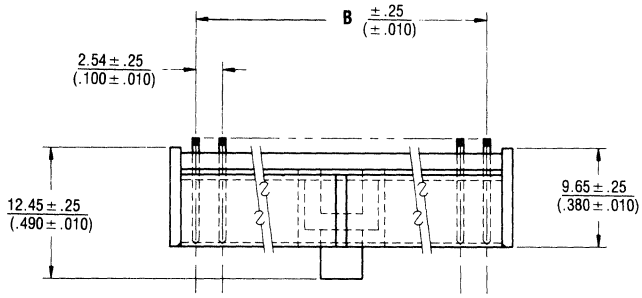
PHYSICAL PROPERTIES	
INSULATION MATERIAL	THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	PHOSPHOR BRONZE
CONTACT PLATING	CONTACT AREA: .000030 GOLD OVER .000050 NICKEL PCB AREA: .000150 TIN OVER .000050 NICKEL
ELECTRICAL PROPERTIES	
CURRENT RATING	3 AMPS
INSULATION RESISTANCE	>1 x 10⁹ OHMS @ 500VDC
DWV	>500 VRMS AT SEA LEVEL
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	– 40°C TO 105°C
U.L. APPROVAL	E47817

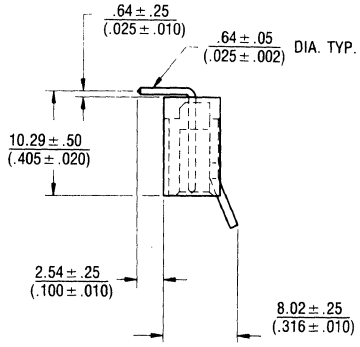
A

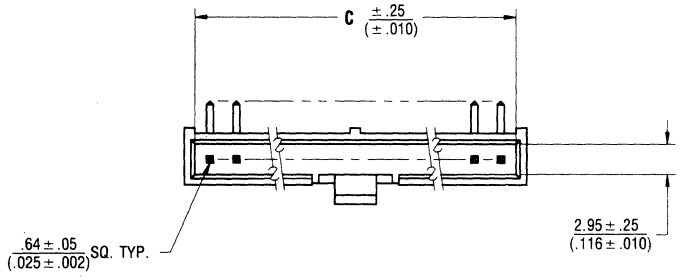
FLEXPAC™ LOCKING HEADER, SINGLE ROW RIGHT ANGLE CONTACTS

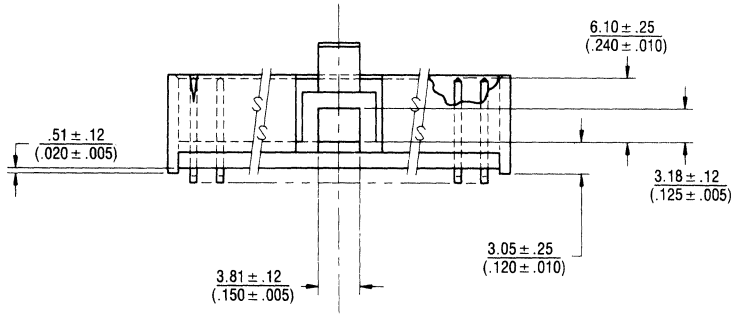












CAT. NO.	NO. OF POS.	DIMENSIONS		
		A	B	C
FPH-0401G	4	12.70(.500)	7.62(.300)	10.57(.416)
FPH-0501G	5	15.24(.600)	10.16(.400)	13.11(.516)
FPH-0601G	6	17.78(.700)	12.70(.500)	15.65(.616)
FPH-0701G	7	20.32(.800)	15.24(.600)	18.19(.716)
FPH-0801G	8	22.86(.900)	17.78(.700)	20.73(.816)
FPH-0901G	9	25.40(1.000)	20.32(.800)	23.27(.916)
FPH-1001G	10	27.94(1.100)	22.86(.900)	25.81(1.016)
FPH-1101G	11	30.48(1.200)	25.40(1.000)	28.35(1.116)
FPH-1201G	12	33.02(1.300)	27.94(1.100)	30.89(1.216)
FPH-1301G	13	35.56(1.400)	30.48(1.200)	33.43(1.316)
FPH-1401G	14	38.10(1.500)	33.02(1.300)	35.97(1.416)
FPH-1501G	15	40.64(1.600)	35.56(1.400)	38.51(1.516)
FPH-1601G	16	43.18(1.700)	38.10(1.500)	41.05(1.616)
FPH-1701G	17	45.72(1.800)	40.64(1.600)	43.59(1.716)
FPH-1801G	18	48.26(1.900)	43.18(1.700)	46.13(1.816)
FPH-1901G	19	50.80(2.000)	45.72(1.800)	48.67(1.916)
FPH-2001G	20	53.34(2.100)	48.26(1.900)	51.21(2.016)
FPH-2101G	21	55.88(2.200)	50.80(2.000)	53.75(2.116)
FPH-2201G	22	58.42(2.300)	53.34(2.100)	56.29(2.216)
FPH-2301G	23	60.96(2.400)	55.88(2.200)	58.83(2.316)
FPH-2401G	24	63.50(2.500)	58.42(2.300)	61.37(2.416)
FPH-2501G	25	66.04(2.600)	60.96(2.400)	63.91(2.516)
FPH-2601G	26	68.58(2.700)	63.50(2.500)	66.45(2.616)
FPH-2701G	27	71.12(2.800)	66.04(2.600)	68.99(2.716)
FPH-2801G	28	73.66(2.900)	68.58(2.700)	71.53(2.816)
FPH-2901G	29	76.20(3.000)	71.12(2.800)	74.07(2.916)
FPH-3001G	30	78.74(3.100)	73.66(2.900)	76.61(3.016)
FPH-3101G	31	81.28(3.200)	76.20(3.000)	79.15(3.116)
FPH-3201G	32	83.82(3.300)	78.74(3.100)	81.69(3.216)

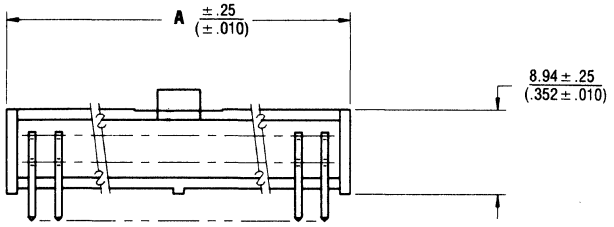
NOTE: 1. Part numbers shown indicate gold plated pins.
For tin plated pins, substitute "T" for "G".
2. To be used with polarization key option on socket

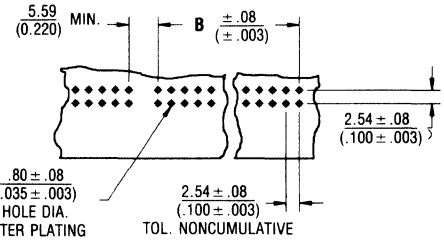
PHYSICAL PROPERTIES	
INSULATION MATERIAL	THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	PHOSPHOR BRONZE
CONTACT PLATING	CONTACT AREA: .000030 GOLD OVER .000050 NICKEL PCB AREA: .000150 TIN OVER .000050 NICKEL
ELECTRICAL PROPERTIES	
CURRENT RATING	3 AMPS
INSULATION RESISTANCE	>1 x 10^9 OHMS @ 500VDC
DWV	>500 VRMS AT SEA LEVEL
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	– 40°C TO 105°C
U.L. APPROVAL	E47817

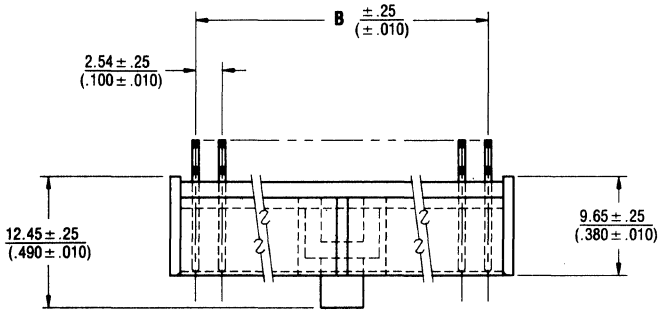
DIMENSIONS ARE SHOWN IN mm/(inches)

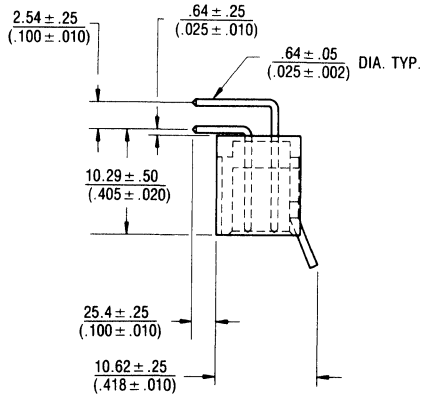
A

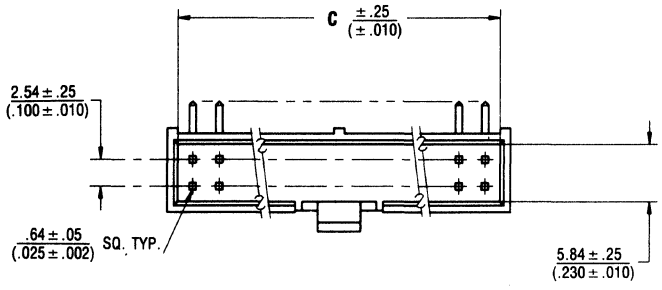
FLEXPAC™ LOCKING HEADER, DOUBLE ROW RIGHT ANGLE CONTACTS

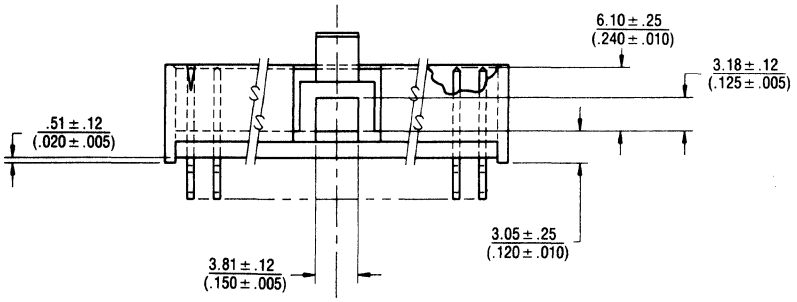










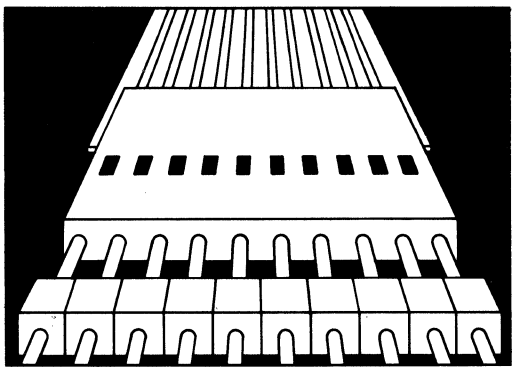


CAT. NO.	NO. OF POS.	DIMENSIONS		
		A	B	C
FPH-0802G	8	12.70(.500)	7.62(.300)	10.57(.416)
FPH-1002G	10	15.24(.600)	10.16(.400)	13.11(.516)
FPH-1202G	12	17.78(.700)	12.70(.500)	15.65(.616)
FPH-1402G	14	20.32(.800)	15.24(.600)	18.19(.716)
FPH-1602G	16	22.86(.900)	17.78(.700)	20.73(.816)
FPH-1802G	18	25.40(1.000)	20.32(.800)	23.27(.916)
FPH-2002G	20	27.94(1.100)	22.86(.900)	25.81(1.016)
FPH-2202G	22	30.48(1.200)	25.40(1.000)	28.35(1.116)
FPH-2402G	24	33.02(1.300)	27.94(1.100)	30.89(1.216)
FPH-2602G	26	35.56(1.400)	30.48(1.200)	33.43(1.316)
FPH-2802G	28	38.10(1.500)	33.02(1.300)	35.97(1.416)
FPH-3002G	30	40.64(1.600)	35.56(1.400)	38.51(1.516)
FPH-3202G	32	43.18(1.700)	38.10(1.500)	41.05(1.616)
FPH-3402G	34	45.72(1.800)	40.64(1.600)	43.59(1.716)
FPH-3602G	36	48.26(1.900)	43.18(1.700)	46.13(1.816)
FPH-3802G	38	50.80(2.000)	45.72(1.800)	48.67(1.916)
FPH-4002G	40	53.34(2.100)	48.26(1.900)	51.21(2.016)
FPH-4202G	42	55.88(2.200)	50.80(2.000)	53.75(2.116)
FPH-4402G	44	58.42(2.300)	53.34(2.100)	56.29(2.216)
FPH-4602G	46	60.96(2.400)	55.88(2.200)	58.83(2.316)
FPH-4802G	48	63.50(2.500)	58.42(2.300)	61.37(2.416)
FPH-5002G	50	66.04(2.600)	60.96(2.400)	63.91(2.516)
FPH-5202G	52	68.58(2.700)	63.50(2.500)	66.45(2.616)
FPH-5402G	54	71.12(2.800)	66.04(2.600)	68.99(2.716)
FPH-5602G	56	73.66(2.900)	68.58(2.700)	71.53(2.816)
FPH-5802G	58	76.20(3.000)	71.12(2.800)	74.07(2.916)
FPH-6002G	60	78.74(3.100)	73.66(2.900)	76.61(3.016)
FPH-6202G	62	81.28(3.200)	76.20(3.000)	79.15(3.116)
FPH-6402G	64	83.82(3.300)	78.74(3.100)	81.69(3.216)

NOTE: 1. Part numbers shown indicate gold plated pins.
For tin plated pins, substitute "T" for "G".
2. To be used with polarization key option on socket

DIMENSIONS ARE SHOWN IN mm/(inches)

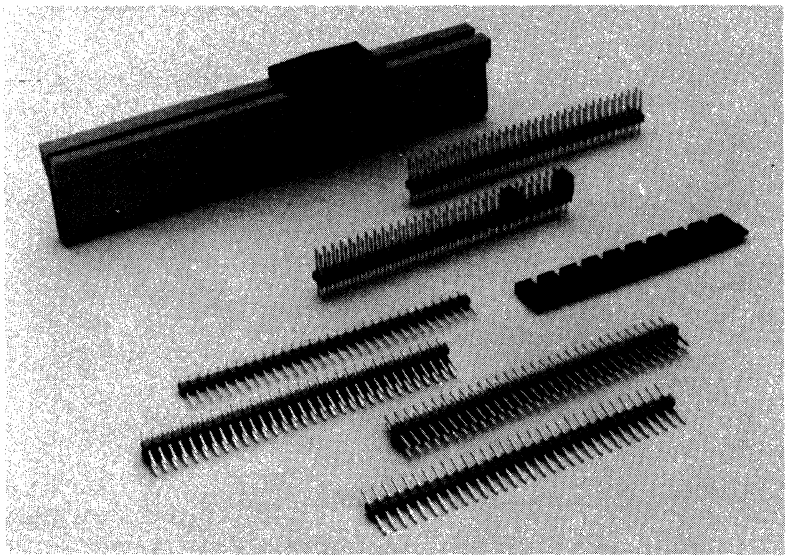
PHYSICAL PROPERTIES	
INSULATION MATERIAL	THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	PHOSPHOR BRONZE
CONTACT PLATING	CONTACT AREA: .000030 GOLD OVER .000050 NICKEL PCB AREA: .000150 TIN OVER .000050 NICKEL
ELECTRICAL PROPERTIES	
CURRENT RATING	3 AMPS
INSULATION RESISTANCE	>1 x 10^9 OHMS @ 500VDC
DWV	>500 VRMS AT SEA LEVEL
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	– 40°C TO 105°C
U.L. APPROVAL	E47817



PIN STRIP HEADERS

INCLUDING DESIGN INFORMATION ON PROGRAMMING JUMPER SWITCHES

Provides a convenient, reliable and cost effective interface



Description/Application

Pin Strip Headers are designed to provide a convenient, reliable and cost effective interface when mated with Female Sockets or Flexpac™ Female Socket systems. Available in single or double row versions, headers can be easily separated at desired lengths. Separations are clean and smooth, leaving no rough-end circuit conditions.

Strip Headers are available with two mating pin lengths (.240″ and .318″) and two solder tail pin lengths to accommodate .062″ through .125″ board thicknesses.

Design Considerations

- Square posts of .025″ on .100″ x .100″ centerline spacing allow mating with Female Sockets, Flexpac™ Female Socket systems and other commonly used connector interfaces
- Straight and right angle post configurations permit mounting versatility
- Connector body material: glass-filled polyester (94V-0 flammability rating)
- Three plating options: 30 microinches gold, tin/lead, 15 microinches gold
- Strips are available in two sizes—single row strips with 32 contacts; double row strips with 64 contacts; consult factory for specific discrete component sizes
- Connector posts are on .100″ x .100″ centerline spacing

The Programming Jumper Switch is designed to provide a reliable mating interface that can be used with either square or round pins. The Jumpers feature a positive connection to the male pin and virtually eliminate shock or vibration accidents which may result in de-programming.

The Programming Jumper Switches dramatically reduce applied costs and are a reliable alternative to conventional printed circuit board switches.

Installation Tools:

Break-off Tool for Pin Strip Headers—P/N 779-6860

Standard Product Options

The information below provides a general overview of this product family.

PS–XX X X–X X X X

Product Code

Number of Positions (40, 80)

S = Single Row
D = Double Row

Pin Type
S = Straight
R = Right Angle

Plating
M = 50μ″ Gold min.
H = 30μ″ Gold min.
G = 15μ″ Gold min.
T = Tin Lead 100μ″ min.

Mating Pin Length
A = .318″
B = .230″

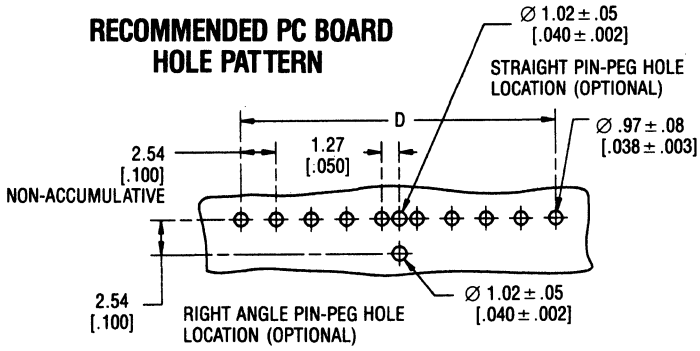
PC Tail Length
A = .125″
B = .165″

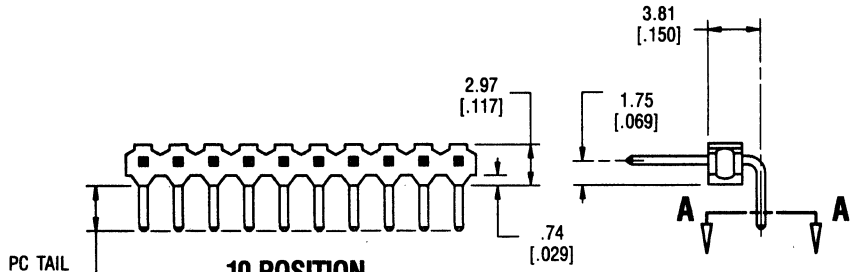
Retention Feature
K = Kinked Pins

A

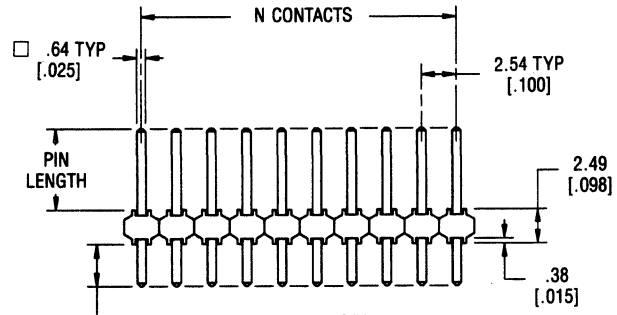
PIN STRIP HEADERS

RECOMMENDED PC BOARD HOLE PATTERN

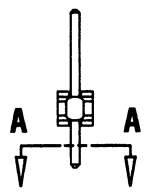




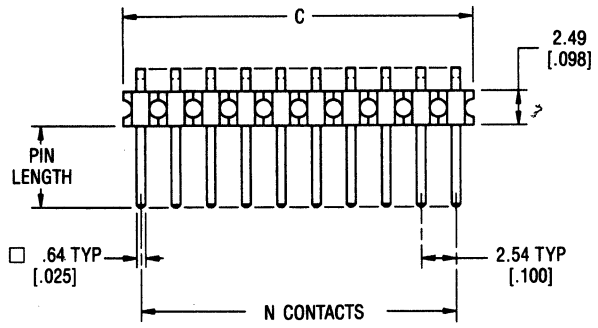
10 POSITION
RIGHT ANGLE PIN STRIP HEADER

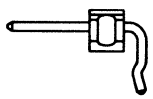


10 POSITION
STRAIGHT PIN STRIP HEADER

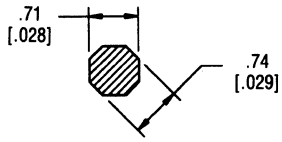


N	C	D
40	4.000	3.900
39	3.900	3.800
38	3.800	3.700
37	3.700	3.600
36	3.600	3.500
35	3.500	3.400
34	3.400	3.300
33	3.300	3.200
32	3.200	3.100
31	3.100	3.000
30	3.000	2.900
29	2.900	2.800
28	2.800	2.700
27	2.700	2.600
26	2.600	2.500
25	2.500	2.400
24	2.400	2.300
23	2.300	2.200
22	2.200	2.100
21	2.100	2.000
20	2.000	1.900
19	1.900	1.800
18	1.800	1.700
17	1.700	1.600
16	1.600	1.500
15	1.500	1.400
14	1.400	1.300
13	1.300	1.200
12	1.200	1.100
11	1.100	1.000
10	1.000	.900
9	.900	.800
8	.800	.700
7	.700	.600
6	.600	.500
5	.500	.400
4	.400	.300
3	.300	.200
2	.200	.100
1	.100	—

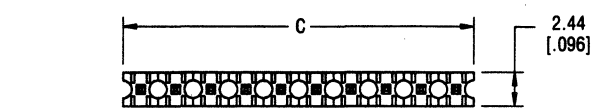


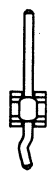


OPTIONAL
RETENTION FEATURE



SECTION A-A

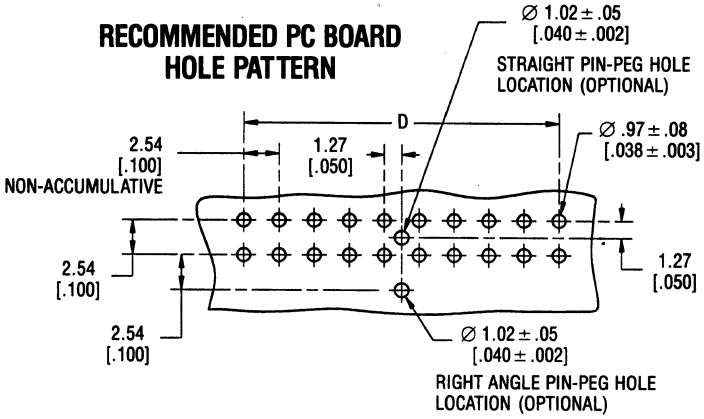


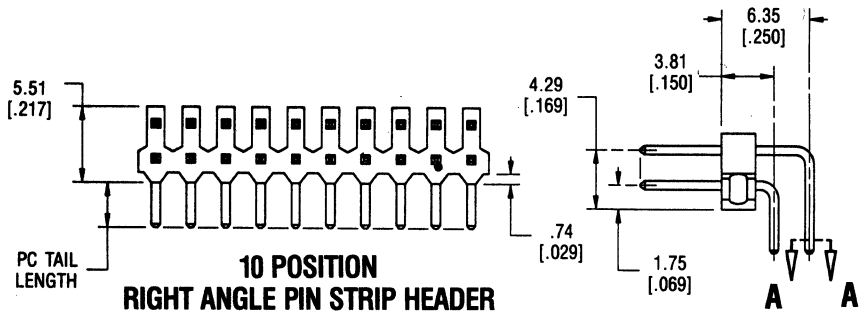


OPTIONAL
RETENTION FEATURE

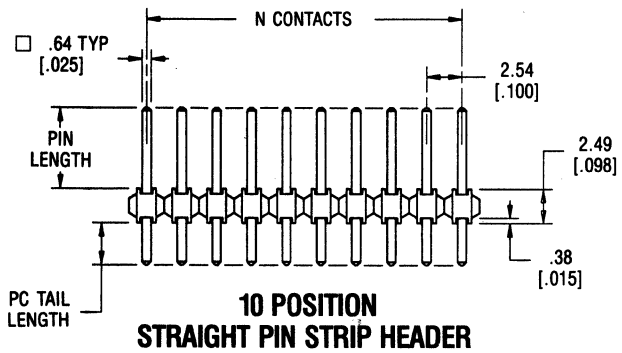
PIN STRIP HEADERS

RECOMMENDED PC BOARD HOLE PATTERN

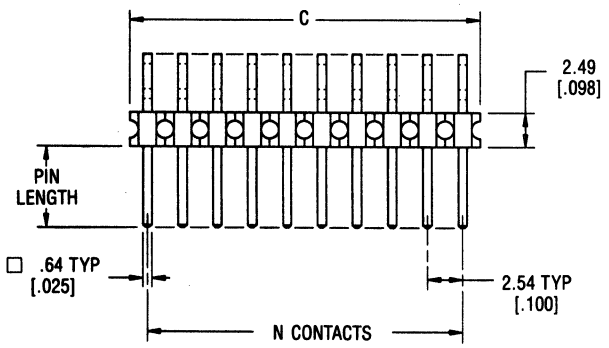


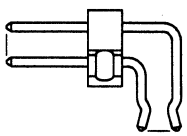


10 POSITION
RIGHT ANGLE PIN STRIP HEADER

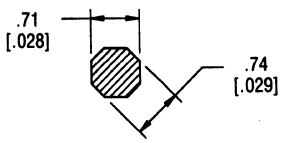


10 POSITION
STRAIGHT PIN STRIP HEADER

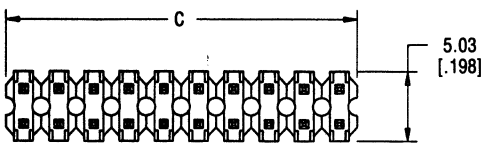


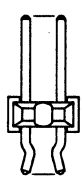


OPTIONAL
RETENTION FEATURE



SECTION A-A



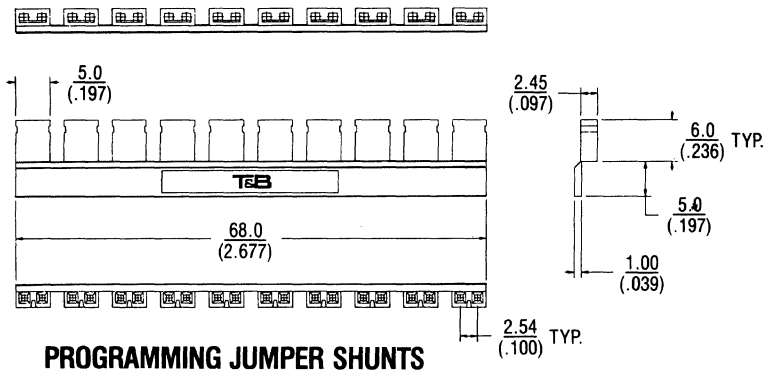


OPTIONAL
RETENTION FEATURE

N	C	D
80	4.000	3.900
78	3.900	3.800
76	3.800	3.700
74	3.700	3.600
72	3.600	3.500
70	3.500	3.400
68	3.400	3.300
66	3.300	3.200
64	3.200	3.100
62	3.100	3.000
60	3.000	2.900
58	2.900	2.800
56	2.800	2.700
54	2.700	2.600
52	2.600	2.500
50	2.500	2.400
48	2.400	2.300
46	2.300	2.200
44	2.200	2.100
42	2.100	2.000
40	2.000	1.900
38	1.900	1.800
36	1.800	1.700
34	1.700	1.600
32	1.600	1.500
30	1.500	1.400
28	1.400	1.300
26	1.300	1.200
24	1.200	1.100
22	1.100	1.000
20	1.000	.900
18	.900	.800
16	.800	.700
14	.700	.600
12	.600	.500
10	.500	.400
8	.400	.300
6	.300	.200
4	.200	.100
2	.100	—

A

PIN STRIP HEADERS



PROGRAMMING JUMPER SHUNTS

The programming jumper shunt is designed to provide a reliable mating interface that can be used with either square or round pins. The shunts feature a positive connection to the male pin and virtually eliminate shock or vibration accidents which may result in de-programming.

programming jumper shunt dramatically reduce applied cost and are a reliable alternative to conventional printed circuit board switches.

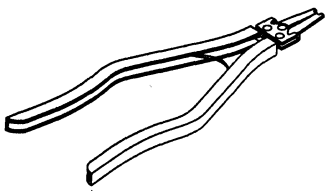
PHYSICAL PROPERTIES	
INSULATION MATERIAL	15% MIN. GLASS REINFORCED THERMOPLASTIC RATED 94V-0
COLOR	BLACK
CONTACT MATERIAL	PHOSPHOR BRONZE
CONTACT PLATING	CONTACT AREA—AS NOTED
ELECTRICAL PROPERTIES	
CURRENT RATING	5 AMPS
INSULATION RESISTANCE	>1 x 10^6 MEGOHMS @ 500 VDC
DWV	5000 VRMS @ SEA LEVEL
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	−55°C TO +125°C

CATALOG NUMBERS

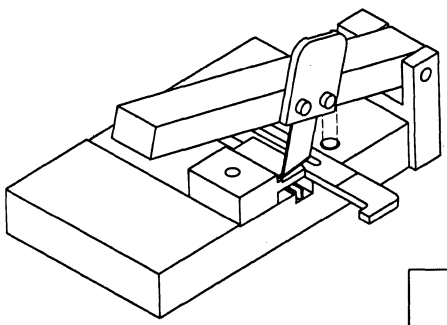
TE5400R (INSULATION MATERIAL COLOR RED: CONTACT PLATING 30μ" MIN. GOLD OVER 75 MICROINCHES MIN. NICKEL)

TE5400B (INSULATION MATERIAL COLOR BLUE: CONTACT PLATING 15μ" MIN. GOLD OVER 75 MICROINCHES MIN. NICKEL)

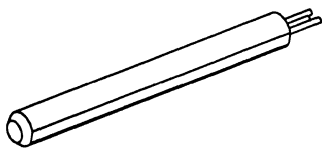
TE5400N (INSULATION MATERIAL COLOR BLACK: CONTACT PLATING 200μ" MIN. 90/10 TIN-LEAD OVER 75 MICROINCHES MIN. NICKEL)



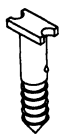
PEG INSERTION TOOL
CAT. NO. PS-INS



SEPARATION TOOL
CAT. NO. PS-SEP

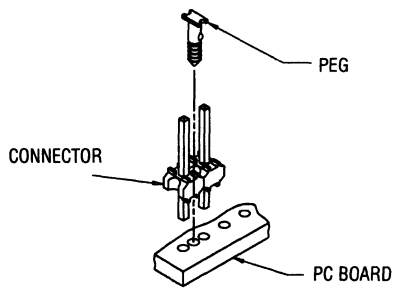


HEADER INSERTION TOOL
CAT. NO. PS-HDR-INS



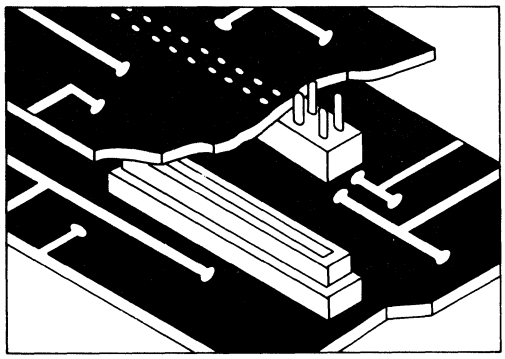
PEG
CAT. NO. PS-PEG-L

L = Loose Piece



PEG IS DESIGNED TO HOLD CONNECTOR TO PC BOARD. ELIMINATING CONNECTOR MOVEMENT DURING THE SOLDERING PROCESS

OPTIONAL PARTS	
CAT. NO.	**DESCRIPTION**
PS-INS	INSERTION TOOL (PEG)
PS-SEP	SEPARATION TOOL
PS-PEG-L	PEG (LOOSE PIECE)
PS-HDR-INS	HEADER INSERTION TOOL



BOARD EXPANSION CONNECTORS

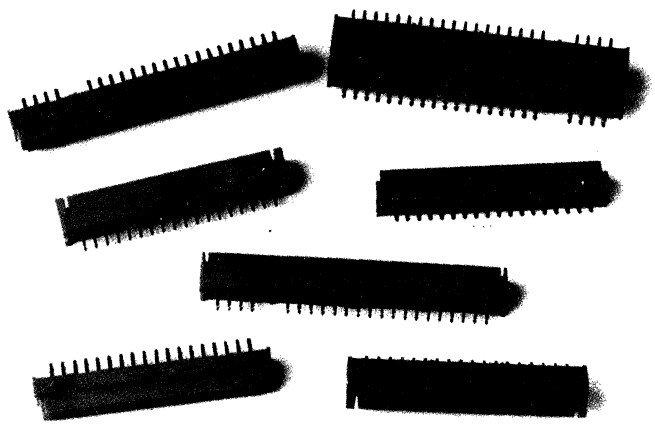
Description/Application

The Board Expansion Connector system offers a quick, reliable, cable-free method for interconnecting PC boards in stacked and mother/daughter board applications. It can also be used to facilitate add-on modules or modifications to standard electronic equipment. Positive polarization and latching provide an extremely reliable interface that can withstand multiple insertion/withdrawal cycles.

Design Considerations

- Available in four configurations: 36-position male header, 36-position female socket, 44-position male header and 44-position female socket
- Polarized male and female connectors latch when mated to provide enhanced mechanical and electrical integrity
- Contacts are selectively plated – gold/tin
- Mated dimension: .500" PCB to PCB
- Durability rating: 200 mating/unmating cycles minimum
- Contacts suitable for flow soldering during normal board assembly
- IEEE Standard P959 (pending)
- Space saving design maximizes packaging density
- Special polarization system ensures proper orientation of connectors; prevents mismating
- Latching male and female connectors assure mechanical and electrical integrity
- Male and female connector standoffs facilitate PC board cleaning

Cable-free method for stacking mother and daughter pc boards



Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification pages.

36-Position Male Connector

609-BX366

36-Position Female Connector

609-BX360

44-Position Male Connector with 36-Position bridge

609-BX446

44-Position Female Connector with 36-Position bridge

609-BX440

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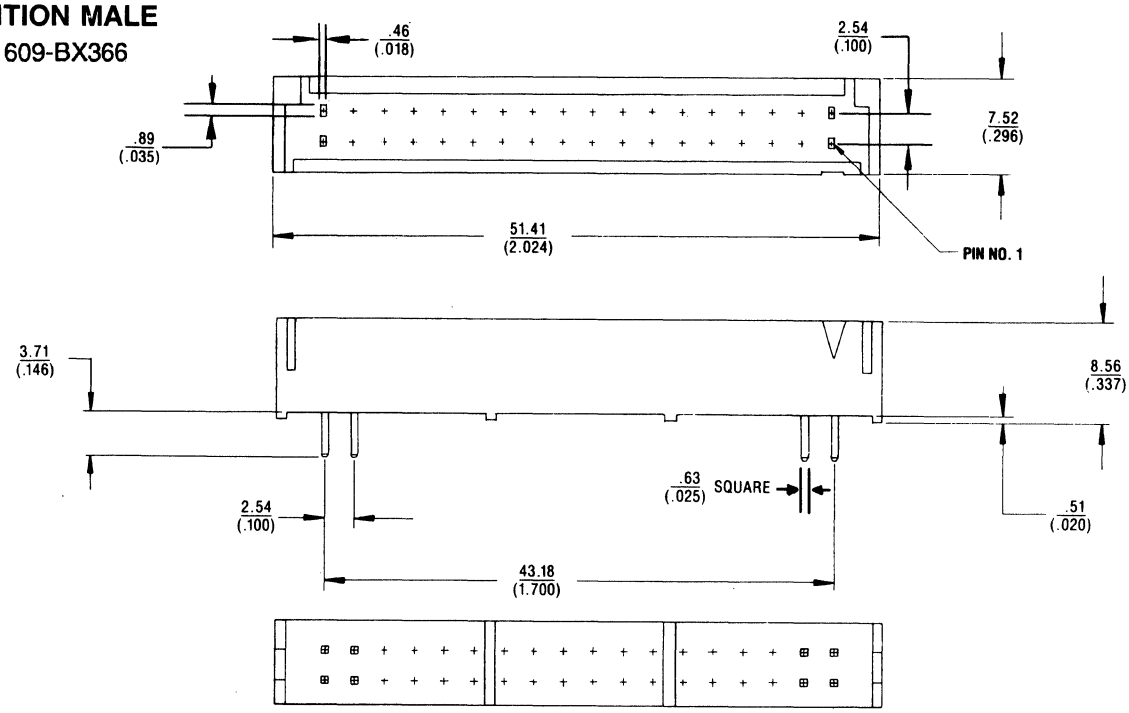
ANSLEY® BOARD EXPANSION CONNECTORS – 36 POSITION

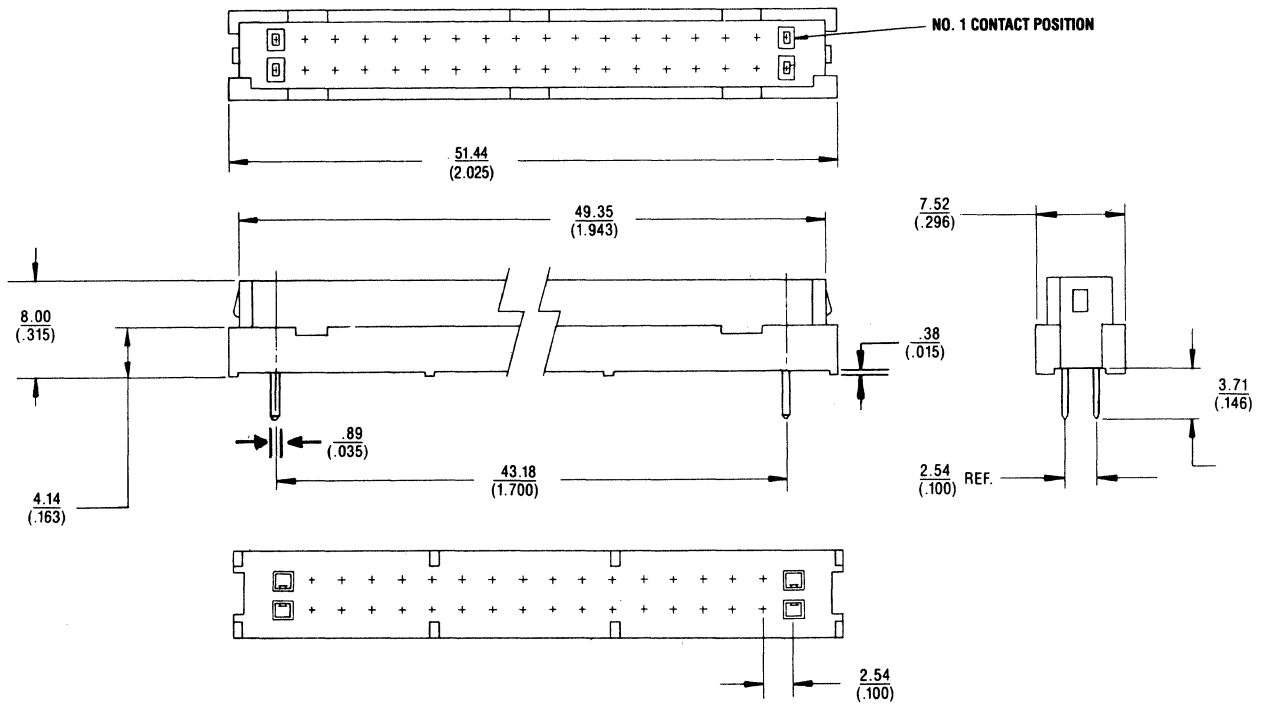
36-POSITION MALE

CAT NO. 609-BX366



36-POSITION FEMALE

CAT NO. 609-BX360

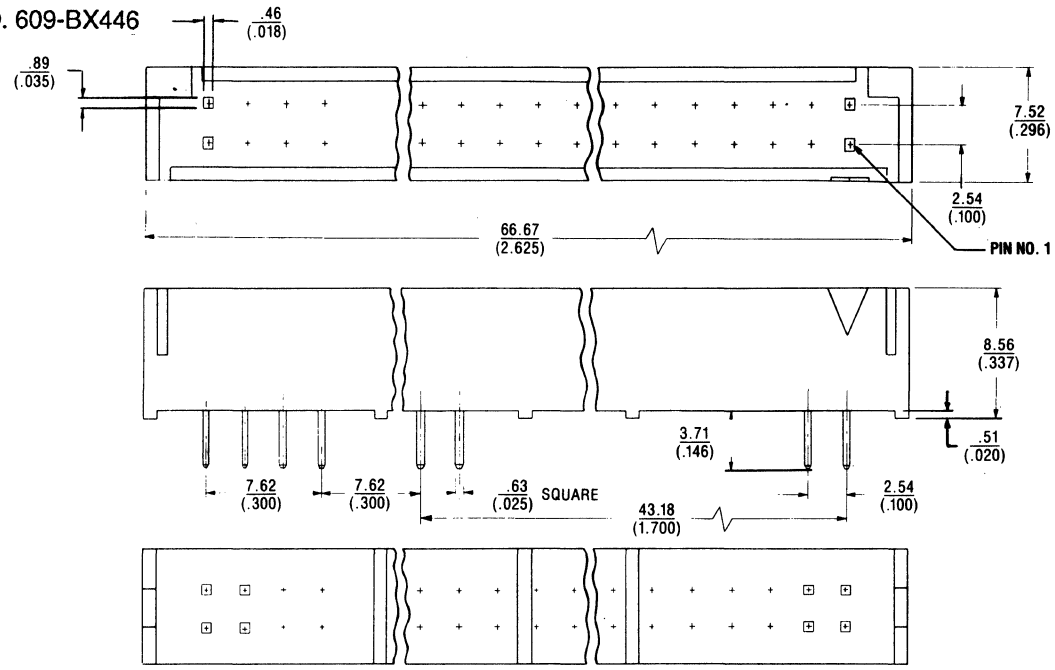


DIMENSIONS ARE SHOWN IN mm/(inches)

ANSLEY® BOARD EXPANSION CONNECTORS – 44 POSITION

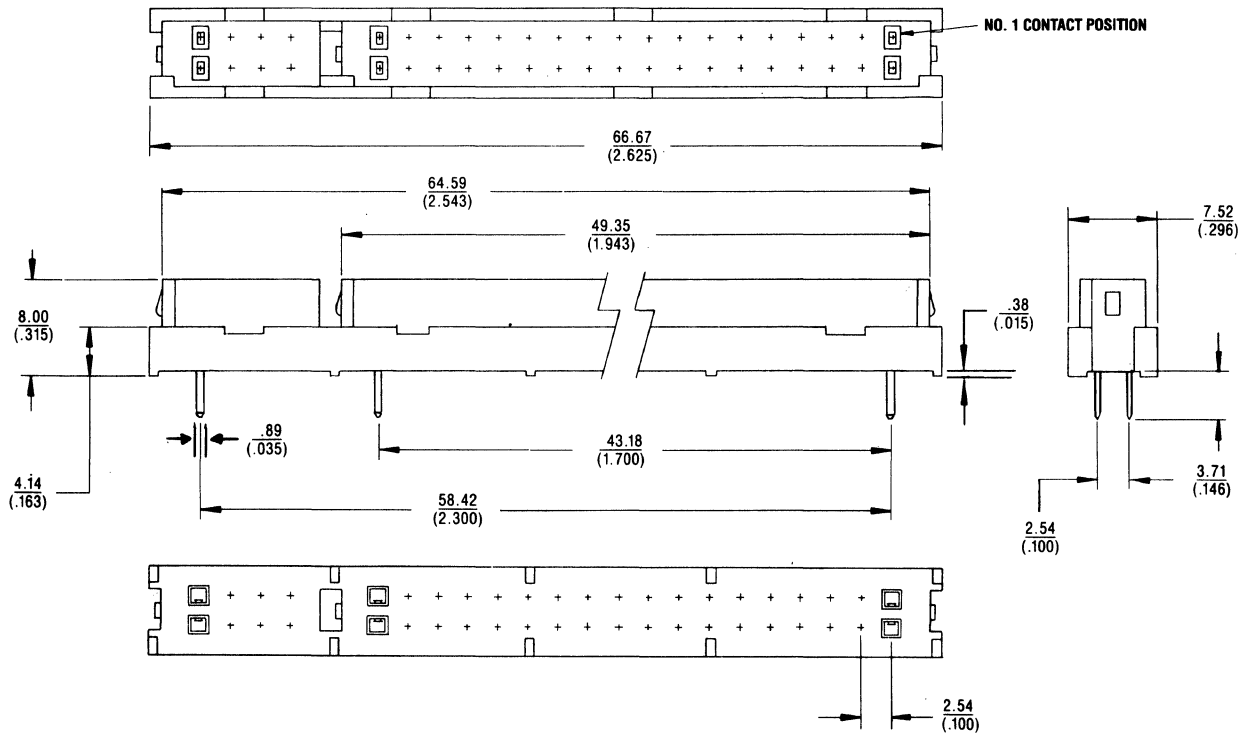
44-POSITION MALE

CAT NO. 609-BX446



44-POSITION FEMALE

CAT NO. 609-BX440

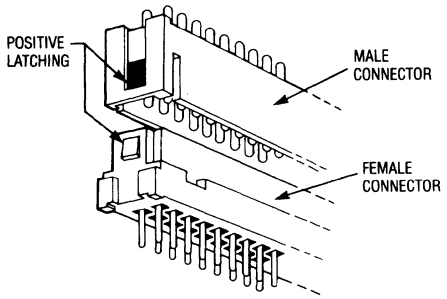


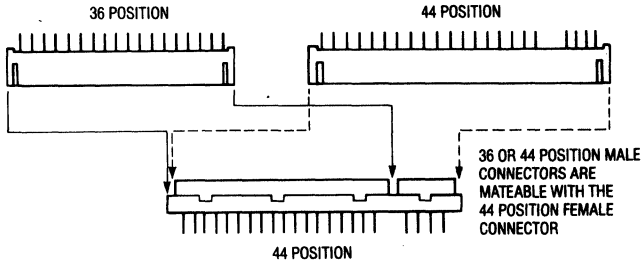
DIMENSIONS ARE SHOWN IN mm/(inches)

A

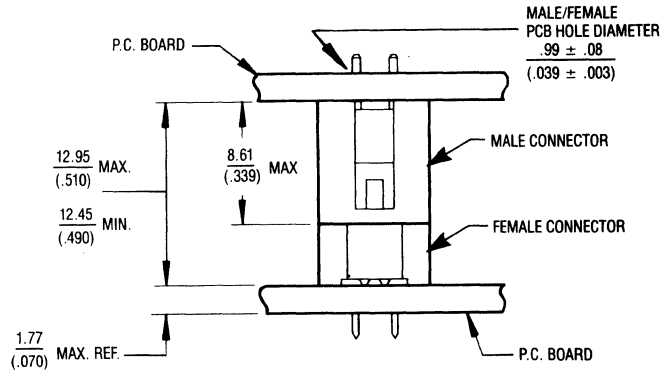
ADDITIONAL DATA

DESIGN





PCB DIMENSIONAL INFORMATION



DIMENSIONS ARE SHOWN IN mm/(inches)

PHYSICAL PROPERTIES

INSULATION MATERIAL	GLASS REINFORCED THERMOPLASTIC RATED 94V-0
COLOR	BLUE
CONTACT MATERIAL	COPPER ALLOY
CONTACT PLATING	GOLD OVER NICKEL

ELECTRICAL PROPERTIES

CURRENT RATING	3 AMPS
INSULATION RESISTANCE	$\geq 1 \times 10^9$ OHMS
DIELECTRIC STRENGTH	>500VDC AT SEA LEVEL

ENVIRONMENTAL PROPERTIES

TEMPERATURE RATING	–55°C TO 125°C

FLEXIBLE INTERCONNECTS REFERENCE GUIDE

I. Introduction

The rapid evolution of very large scale integrated (VLSI) circuits, high power transistors and lower profile printed circuit board components has stimulated the use of electronics in a variety of new applications.

Computer peripherals, office automation systems, robotics, bank terminals, consumer appliances, automobile electronics packages and military equipment are only a few examples. Each application places new demands on the design engineer to increase packaging densities to achieve lower costs, easier servicing, greater reliability, reduced weight, and/or greater integrity with repeated cable flexing.

To meet these emerging needs Thomas & Betts has pioneered **flexible flat conductor cables and customized assemblies** that permit higher degrees of design and packaging versatility. The FLEXSTRIP® Jumper and FLEXPAC™ Cable System, based upon more than 20 years of experience developing flat cable and compatible interconnection components, represents the state-of-the-art manufacture of high-performance related assemblies.

Utilizing "experience" gained through advanced insulation displacement contact (IDC) technology and unique flat cable manufacturing techniques, the system combines high-flexibility flat conductor cable with a variety of contact/connector styles specifically developed for flat conductors. These components permit design and fabrication of customized assemblies to satisfy the most challenging interconnection requirements.

The following information has been prepared as a reference guide to assist the design/packaging engineer in considering this interconnection option. We hope it provides a basic perspective on high-flex life, high-performance flat conductor assemblies, and will stimulate your imagination to consider the possibilities afforded by these products.

II. Design Features & Benefits of Flat Conductor Cable

While most flat cable (including jacketed, color-coded, shielded, and ground plane cable) utilizes round conductors, higher performance levels in continuous cable flexing demands flat conductors to achieve longer flex life. When rolled flat, as are the conductors in FLEXSTRIP® and FLEXPAC™ high-flex cable, one achieves uniform thickness and optimal strength — both important parameters influencing system performance.

Other engineered features of T&B's flexible interconnect system include:

- multi-point insulation piercing contacts with integral individual strain reliefs.
- symmetric cable cross section aids in extending flex life and allows mounting connectors on either side of cable.
- compatible with industry standard Ansley® mass-termination IDC Header/Socket products.
- round pin ends of FLEXSTRIP® jumpers and FLEXPAC™ solder pins are suitable for PCB through hole soldering.
- single and double row female sockets and male connector configurations.
- card edge connectors with and without mounting ears.

These design features, coupled with the selection of compatible components, offer benefits where high density electronic packaging and/or high-flex life interconnections are required.

These include:

(1) Maximum Flexibility — flat conductor cable offers greater flexibility than round conductor cable, permitting bending, rolling, flexing frequency without compromising interconnection integrity.

(2) Maximum Flex Life — cable flex life tests performed at over 350 cycles per minute have demonstrated reliable performance after millions of cycles.

(3) Space Savings — flat conductor cable flexibility and profile enable it to offer packaging densities even higher than those achievable with electrodeposited foil or round conductor systems.

(4) Reliability — multi-point contact design and integral strain relief, coupled with the inherent strength of flat conductors, provide consistent electrical performance in both low and high-frequency flexing applications.

(5) IDC Transition Compatibility — FLEXPAC™ double row male and female connectors are compatible with IDC mass termination connectors. This compatibility permits an easy transition from the flat conductor assemblies to the round conductor flat cable elements of the system.

(6) Cost Savings — the foregoing features add up to substantial cost/performance benefits. Reduced overall labor, less inspection, and better material and space utilization can cut total costs while achieving optimal packaging, servicing, and/or performance objectives.

FLEXIBLE INTERCONNECTS REFERENCE GUIDE

III. System Components for Flexible Interconnect Assemblies

To allow the design engineer to optimize system packaging and performance characteristics, Thomas & Betts has developed a family of compatible flexible flat conductors and termination components.

In addition to the standard FLEXSTRIP® jumpers described on pages 5 through 7, other system components are available whicl can be married to satisfy a variety of custom interconnection assembly requirements.

The system includes:

- FLEXSTRIP® jumpers
- FLEXSTRIP® single-row sockets
- FLEXSTRIP® low-profile socket contacts
- FLEXPAC™ cables
- FLEXPAC™ solder pins
- FLEXSTRIP® solid spacers
- FLEXSTRIP® microheaders
- FLEXPAC™ polarized locking headers
- strip headers
- FLEXPAC™ female socket connectors
- FLEXPAC™ male connectors
- FLEXPAC™ card edge connectors

Each of these is described in the following component selection guide (Table 1), together with a summary of those system components with which each is compatible. Table 2 and Table 3 provide insulation and cable characteristics, respectively, to further aid in the component selection process.

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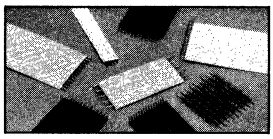
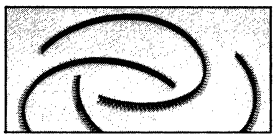
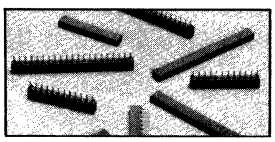
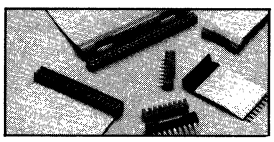
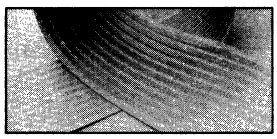
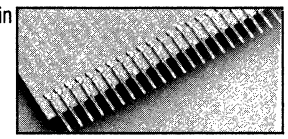
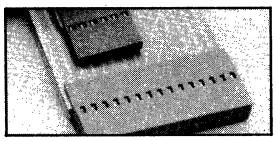
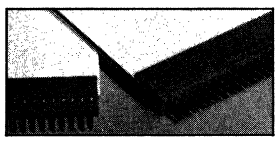
TABLE 1 — FLEXPAC™ INTERCONNECT COMPONENT SELECTION GUIDE

FLEXPAC™ Interconnection System Component	Component Description	Compatible with these cable/connectors	See Page No.
FLEXSTRIP® Jumper 	Flat, 0.100″ pitch conductor, with Nomex*, Kapton*, Teflon*, or Polyester, insulation. Patented wire flattening process for unequaled flex life. Available in a variety of pin ends.	All FLEXPAC™ connectors.	3A
FLEXSTRIP® Low-Profile Socket Contacts 	Wave or hand-solderable, PCB mounted (0.050″ to 0.058″ diam. PCB holes) multi-socket strip connector. Features gold-plated beryllium copper contacts inside a tinned cup for maximum insertion/withdrawal cycles. Permits quick disconnect of FLEXSTRIP® jumper.	All 0.100″ pitch FLEXSTRIP® jumpers with straight or right angle pin ends.	6A
FLEXSTRIP® Single-row Socket 	Single-row PCB mounted socket featuring dual beam contacts for positive retention of cable pins during shock/vibration. Permits quick disconnect of FLEXSTRIP® jumper. 5-30 contact positions.	All 0.100″ pitch FLEXSTRIP® jumpers with straight or right angle pin ends.	7A
FLEXSTRIP® Header and Socket System 	Insert Molded FLEXSTRIP® Jumper with a mating right angle board mountable socket.	All 0.100″ pitch FLEXSTRIP® jumpers.	8A
FLEXPAC™ Cable 	Flat, 0.100″ pitch conductor with Polyester insulation.	FLEXPAC™ solder pins and all FLEXPAC™ connectors.	11A
FLEXPAC™ Solder Pin 	Provides up to six (6) insulation-piercing points of contact with integral strain relief. Suitable for soldering into PCB plated through holes.	All FLEXPAC™ cables.	11A
FLEXPAC™ Female Socket Connector 	Single or double row female socket connectors which mate with FLEXPAC™ male connectors, or directly with 0.025″ posts.	All 0.100″ pitch FLEXPAC™ cables and FLEXSTRIP® jumpers, FLEXPAC™ male connectors and Ansley® IDC Headers.	11A
FLEXPAC™ Male Connector 	Single or double row male connectors which mate with FLEXPAC™ and Ansley® IDC female socket connectors.	All 0.100″ pitch FLEXPAC™ cables, and FLEXSTRIP® jumpers, FLEXPAC™ and Ansley® IDC female socket connectors.	11A

*Registered trademarks of E.I. Dupont de Nemours

FLEXIBLE INTERCONNECTS REFERENCE GUIDE

TABLE 1 — FLEXPAC INTERCONNECT COMPONENT SELECTION GUIDE (Cont.)

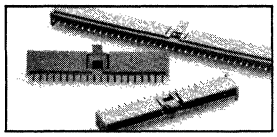
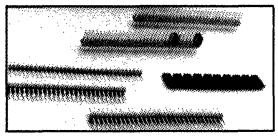
FLEXPAC™ Interconnection System Component	Component Description	Compatible with these cable/connectors	See Page No.
FLEXPAC™ Polarized Locking Header 	Single or double row locking header system available in both tin or gold platings and both straight or right angle bends. For .062" PCB thickness.	FLEXPAC™ Female Socket Connectors with polarization key.	11A
Pin Strip Headers 	Available with two mating pin lengths (.250" and .318") and two solder tail pin lengths. Accommodates .062" through .125" board thicknesses.	Female sockets and FLEXPAC™ Female Socket Systems.	22A

TABLE 2 — INSULATION SELECTION GUIDE

Insulation Material	Characteristics	Typical Applications
Polyester	Excellent mechanical and electrical properties.	Recommended for use where controlled soldering methods can be used.
Nomex*	Tolerant to conventional soldering techniques.	Recommended where variations in insulation resistance due to changes in humidity are not critical.
Teflon*	Excellent electrical and chemical properties. Resists damage when contacted by hot soldering iron.	Most commonly used for high electrical and mechanical performance applications.
Kapton*	Unsurpassed mechanical properties especially at elevated temperatures. Dimensionally stable over the full temperature and humidity range. Tolerant to all normal soldering methods.	Used in most exacting applications.

TABLE 3 — FLEXIBLE INTERCONNECTION CABLE SELECTION GUIDE

High-Flex Life Cable	Available Insulation Materials	U.L. Style #	Voltage Rating	Temperature Rating	Current Rating	Typical Applications	See Page No.
FLEXSTRIP® Jumper	Polyester Nomex* Teflon* Kapton*	2639 5188 2928 2927	300V not specified 300 V 300 V	105°C 105°C 105°C 150°C	2 Amps 2 Amps 2 Amps 2 Amps .	Inter- and intra-circuit flexible interconnections where round contacts, special pin arrangements, and/or a choice of insulation materials is desired.	3A
FLEXPAC™ flat conductor cable	Polyester	2639	300V**	105°C	3 Amps	Ideal in applications requiring: • extreme flex conditions • high frequency of bending cycles • minimum weight • high packaging density • consistent performance under severe shock or vibration	11A

*Registered trademark of E.I. Dupont de Nemours

**600 volt rated cable (F600P3-XX) UL style #20395 also available, consult factory.

FLEXIBLE INTERCONNECTS REFERENCE GUIDE

IV. TYPICAL APPLICATIONS

The most obvious applications for flat conductor, flat cable are those which require repeated flexing. Two familiar examples are the interconnection cables to a disk drive read/write head assembly and to a printer head assembly—both requiring cabling connections capable of tolerating millions of bending cycles without degradation in performance.

Beyond the flexing capability, FLEXPAC™ assemblies can be configured with accordion pleats or can be rolled up for extension and retraction in systems where racks or drawers pull out for inspection and servicing.

These physical attributes, plus a choice of insulation materials, have allowed design and packaging engineers to realize cost/performance benefits in a variety of applications.

Initial applications were in military, aerospace, and avionics systems where weight, packaging constraints, and/or reliability requirements were best satisfied by these characteristics. Today FLEXPAC™ and FLEXSTRIP® interconnection assemblies are also used in an array of commercial, automotive, medical and industrial applications. These include:

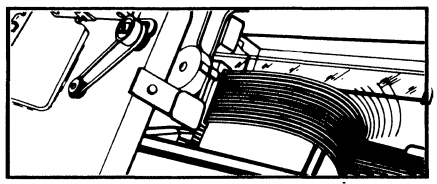
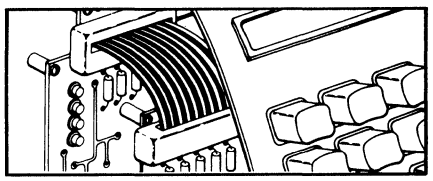
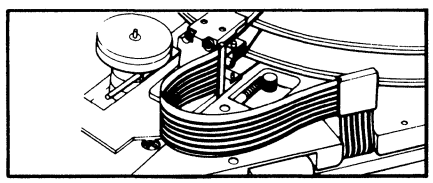
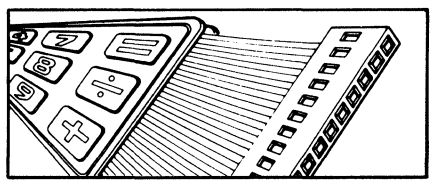
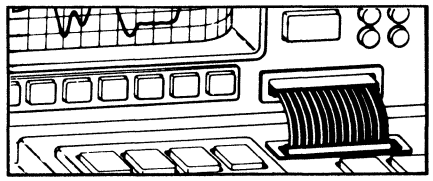
- office copiers
- plotters
- robot arms
- POS terminals
- computers
- bank terminals
- machine tools
- appliances
- industrial controls
- keyboards
- disk drives
- printers
- avionics packages
- electroluminescent panels
- extend and retract systems
- radar equipment
- missiles
- membrane switch assemblies
- automotive electronics
- industrial controls
- portable test instruments
- cellular phones

Each application is typically characterized by some key requirement best satisfied with flexible flat conductor interconnection systems (Table 4).

A brief sampling of the versatility of this flexible interconnection alternative is shown below. Here are depicted only a few types of custom assemblies which have been developed to customer specifications utilizing the FLEXPAC™ or FLEXSTRIP® system. Other configurations can be produced to satisfy a wide range of PCB to PCB, backplane, card edge, and cable-to-cable interconnection requirements.

A

TABLE 4 — TYPICAL FLEXIBLE INTERCONNECT APPLICATIONS

Typical Applications	Key Factor Influencing Use of Flexible Interconnect Assemblies	Typical Flexible Interconnect Assembly
Printers Plotters Robots Office Copiers	• High number of repeated bending cycles	
POS Terminals Bank Terminals Medical Instruments Automotive Electronics Appliances Mobile Phones	• Maximum packaging density	
Machine Tools Industrial Controls Computers Disk Drives Radar Equipment Retractable Electronic Panels	• Ease of servicing	
Membrane Switches Keyboards Electroluminescent Panels	• Flat conductor termination compatibility	
Missiles Avionics Packages Portable Test Instruments	• Disconnectability and reduced system weight	

FLEXIBLE INTERCONNECTS REFERENCE GUIDE

V. TEST DATA

Title
Flex life test on flat conductor cable

Test Purpose
To determine the "flex life" of Flexpac™ Flat Conductor Cable

Sample Description

Quantity	Description
30 ft.	Flexpac™ Polyester Cable (.002 in. thick conductor)
30 ft.	Flexpac™ Polyester Cable (.003 in. thick conductor)

Test Procedures
1. The cables to be flexed were wired in series and were installed in the flexing machine fabricated by T&B Lab.
2. One cycle of flexing consisted of one forward and one reverse movement of the cables. The flexing travel was 4 inches both for forward and reverse. The cables were flexed at the rate of one half million cycles a day, or approximately 350 cycles/minute.
3. A monitoring circuit was connected on the conductors in series in such a way that any interruption greater than 10 microseconds would stop the flexing.
4. The cables were tested on four sizes of diameter loop (bend); ½", 1", 1½" and 2". A counter was attached to the machine which determined the number of cycles on each flexing diameter bend.
5. A graph was plotted based on the data gathered for each type of cable tested.

Equipment Used
1. Flexing Machine, fabricated by T&B Lab
2. Monitoring Circuit, fabricated by T&B Lab

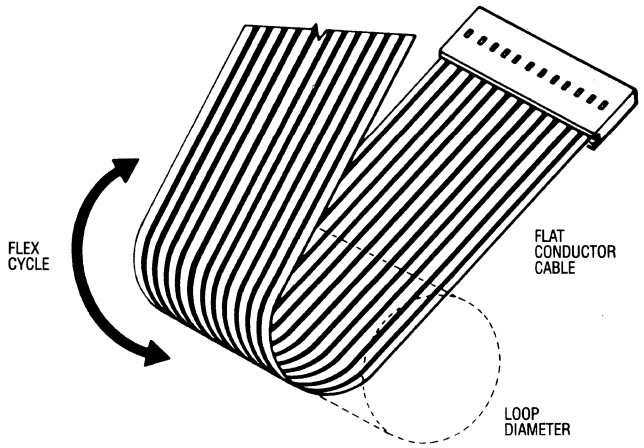
Results

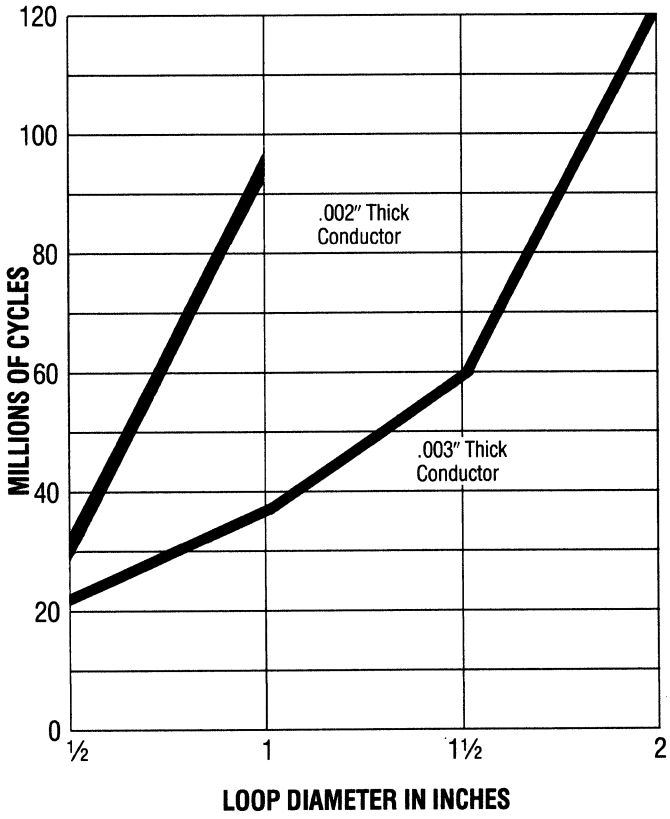
	Number of Flex Cycles	
Loop Diameter	**.002" thick conductor**	**.003" thick conductor**
½ in.	30 million	22 million
1 in.	98 million	38 million
1½ in.	100 million*	60 million
2 in.	115 million*	120 million

*Machine was stopped at this cycle level. Cable had not failed.

Chart at right indicates
Flex cycles vs loop diameter

Graphic representation of flex test





IDC Mass Termination Systems

B

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OVERVIEW

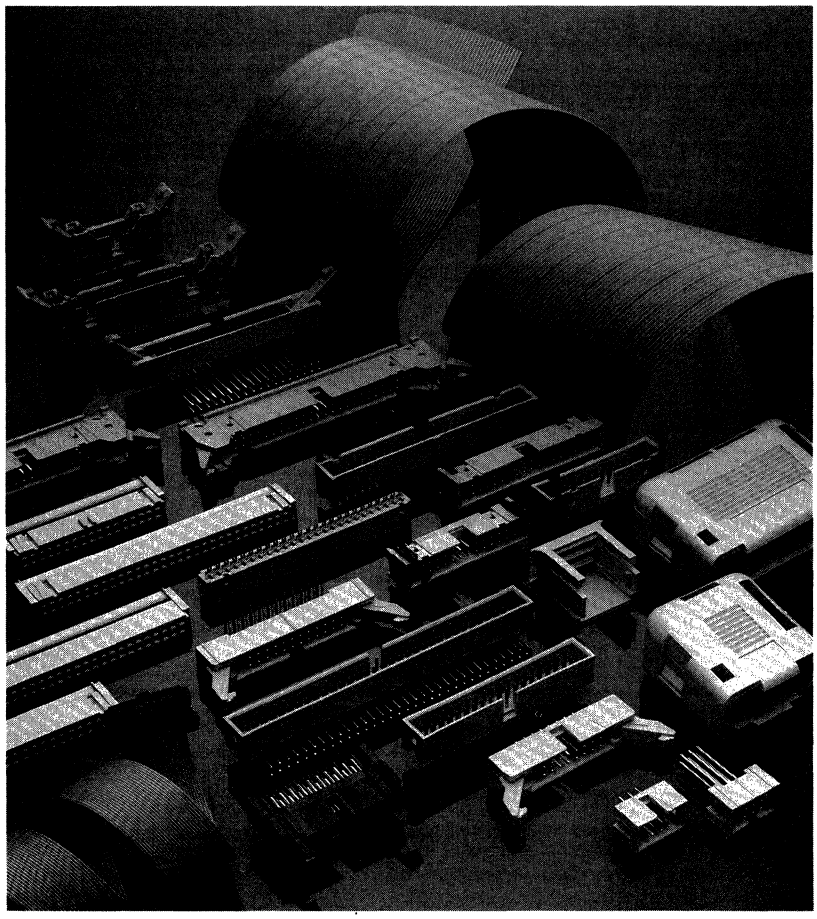
Thomas & Betts: Problem-Solvers in Electronic Interconnection

Thomas & Betts Corporation designs, manufactures and markets electronic and electrical components and systems for connecting, fastening, protecting, insulating and identifying wires, components and conduits. The Thomas & Betts Electronics Division produces IDC mass termination cables and connectors, two-piece connectors, fiber optics, DIP and VLSI sockets, flexible interconnects, and multipin connectors.

Mass Termination IDC Systems

The density, reliability and cost-effectiveness of modern electronic systems packaging would literally have been impossible to achieve using the cumbersome wiring harnesses of the past.

By pioneering the development of multiconductor flat cable and mass termination, Thomas & Betts provided the industry with a better alternative which opened the way for today's compact and reliable electronics.



Thomas & Betts enhances the benefits of Mass Termination IDC

A totally integrated system of connectors, cables, and tooling...designed for productivity, built for performance.

The IDC Connector System from Thomas & Betts enhances the benefits of mass termination with a broad range of matched-by-design IDC connectors, flat, flexible cables and application tooling — all uniquely qualified to meet the stringent price/performance requirements of today's most demanding commercial and industrial applications.

Designed to deliver simple, reliable and cost-effective solutions to interconnection problems, Thomas & Betts system components are totally complementary and compatible with each other. The following information describes the components in general terms. For more details, please refer to specific product sections.

Value-Added Distribution

To maximize product availability, we maintain and support a national network of ***Value-Added*** distributors. These special distributor locations have the expertise and tailored inventory which enable them to deal directly to provide interconnection systems, custom assembled to your specifications — in prototype or production quantities. From concept to completion, your assemblies receive the attention, expertise and craftsmanship that you would provide yourself — with fast turnaround and cost-effective product.

Service and Support

To assist you in selecting the best cable/connector system for your application, Thomas & Betts maintains a staff of trained field salespeople, customer service representatives and technical service support. They can help you select the right components for your interconnection system, or work with you to develop a custom solution.

One-Piece Connector Design

Thomas & Betts has the broadest line of IDC flat cable connectors in the industry. All are UL and CSA listed.

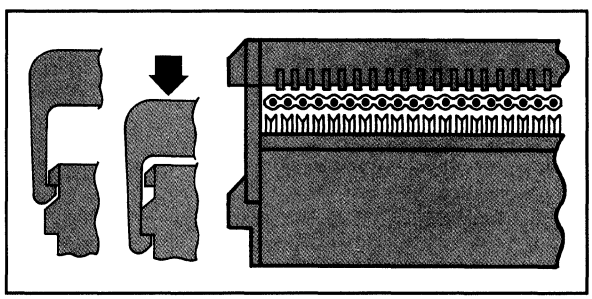
Their one-piece design — available in a number of different configurations — helps speed assembly and lower installed cost.

Some connectors have built-in polarization, while others may be selectively polarized to fit individual requirements. A variety of backshells, hardware, strain reliefs and mounting, locking and ejection options are available.

Integral side latches keep the cable/connector assembly intact before, during and after crimping. And a molded-in self-aligning cable guide assures accurate positioning of cable in the connector for positive electrical contact.

The Thomas & Betts IDC system comprises the following connector configurations:

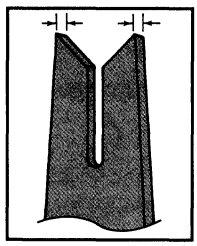
- Plastic "D" connectors
- Low profile metal "D" connectors
- Plastic and metal ribbon connectors
- SCSI terminators
- Male connectors
- Female socket transition connectors
- Standard and low profile PCB male headers
- Surface mount low profile headers
- Card edge connectors
- PCB solder transition connectors
- Standard and low profile DIP plugs
- DIP socket connectors and headers.



One-piece connector design and precision pitch cable assure a positive electrical and mechanical termination.

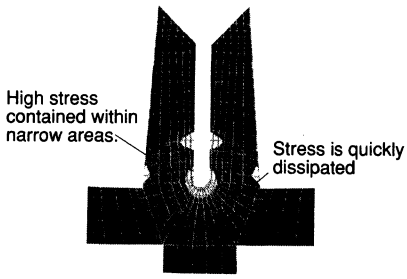
Superior Contact Design

Thomas & Betts IDC contacts are made of beryllium copper for outstanding stress retention and reliability, with 12 mil tine thickness which is two-times the circular mil area of solid 28 AWG wire for maximum mating area. The wire is terminated in the critical zone where stress is evenly distributed throughout the contact for greater strength and optimum contact. Precision gold over nickel plating is used on connector mating surfaces for further reliability.



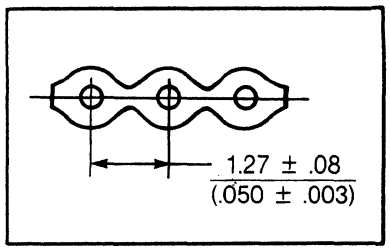
Superior contact thickness:
–Tine contact 12 mils
–Circular contact 8 mils

Contact design assures that wire falls within critical zone.



Extruded Cable

Thomas & Betts helped pioneer the development of flat cable as a compact, lightweight and flexible alternative to the cumbersome wiring harnesses of the past. While many manufacturers insulate conductors with laminated sheets, Thomas & Betts uses an extrusion process, which assures highly accurate and consistent pitch spacing.



Extruded cable assures uniform pitch.

The Thomas & Betts IDC system offers a variety of cable configurations:

- Standard flat
- Flat-to-round
- Twisted pair flat
- High flex life flat
- "Soft-Tear" ground plane flat
- Color coded flat
- Jacketed flat
- Jacketed shielded flat
- Teflon flat

Application Tooling

Tooling for the Thomas & Betts IDC system is designed for both production and field application. Tools, dies and platens are matched to connectors and cables to provide fast, reliable and cost-effective IDC mass terminations without the need for wire stripping or soldering.

B

SYSTEM 311: FINE PITCH IDC SYSTEM FOR .025" CONDUCTOR SPACING

NEW PRODUCT

Product Description

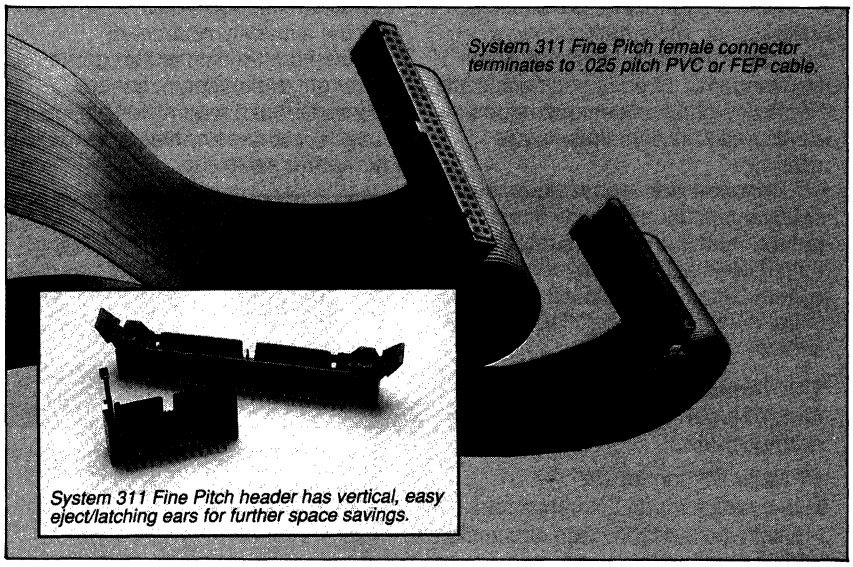
Our new System 311 fine pitch interconnection products are designed to exceed the performance criteria of other systems, by incorporating innovative features specifically requested by our customers:

Design Advantages

- Dual Beam Contact
  —redundant contact provides 100 grams normal force.
  —provides greater than 150 KPSI/hertz stress.
- Coined Contact Slot
  —insures positive insulation piercing capability.
- 12 mil thick Contact Material provides contact-to-conductor surface area of at least twice the circular mil area of 30 gauge solid wire.
- High Performance Beryllium Copper Contact assures excellent stress retention properties over time.
- Conductor positioned within the "Critical Zone" assures optimum surface mating area.
- Selectively plated with 30 micro inches gold minimum.
- 1 amp current rating.

Application Tooling

Hand Tool	779-2100
with Die	779-3112151
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3113151
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3113151



An integrated approach to performance in fine pitch IDC mass termination– Same performance, one-half the size.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

311-026072E

- 311 — *T&B Series*
- 026 — *Number of Contacts*
- 072 — *072 for Male Header, 302 for Female Socket*
- E — *Ejector Latches (Male only)*

System 311: The New Standard In Fine Pitch Technology.

Thomas & Betts has combined the best features of our successful 622 Series mass terminated IDC products with the benefits of a system half the size. The result, is our new System 311 – a family of interconnection products featuring high performance and lower installed cost in a fine pitch system.

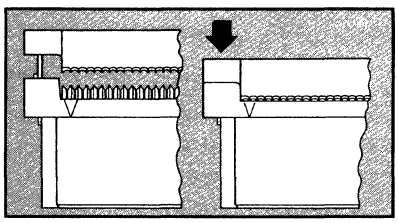
System Engineered

Our new fine pitch products are backed by over 20 years of pioneering experience in IDC interconnection systems.

In addition, our broad line capabilities and in-depth expertise in both flat cable and IDC connectors provide us with the unique ability to control critical design parameters from engineering concept through manufacturing and installation. System 311 is a matched-by-design system of complementary connectors, cables, and installation tooling – uniquely qualified to meet the ever-increasing performance demands of today's challenging professional electronics applications.

One Piece Housing Design

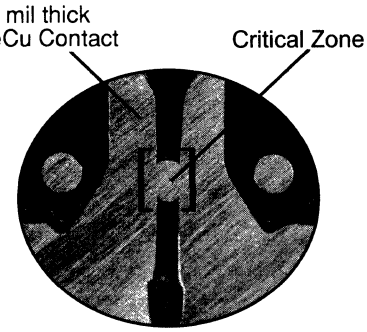
- Self aligning ridges and integral side latches assures positive termination.



Compact System – Big Benefits

- Staggered four-row header footprint saves 42% more board space (real estate) and assures easy PCB trace routing.
- Vertical lock eject header maximizes useable board real estate.
- .018" square header post increases system strength.

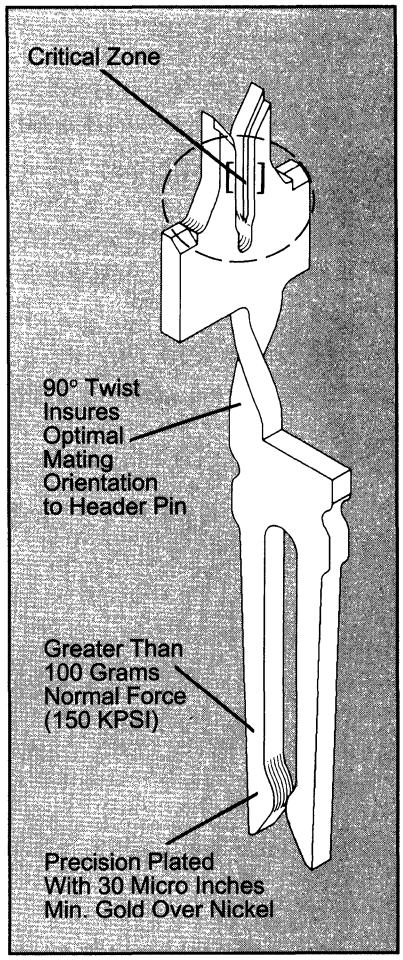
NEW PRODUCT



"Coined" contact slot provides twice the cross-sectional area of a 30 gage solid wire.

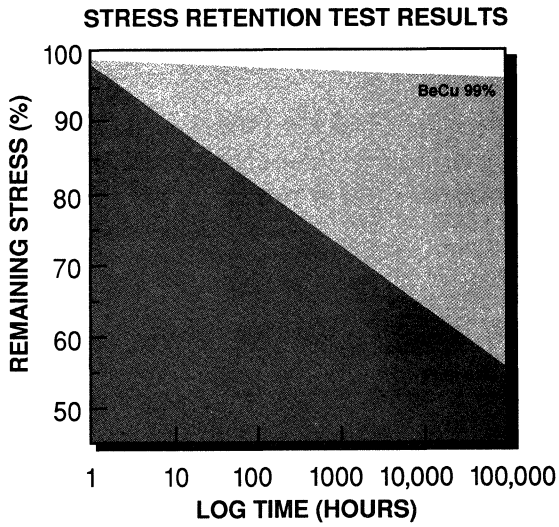
Built to Last

System 311 fine pitch connectors are built to last with durable, high-temperature-rated PPS housing, shrouded solder tails, and coined-edge beryllium copper contact slots. In addition, our extruded 30 and 32 gauge cable is insulated with durable PVC or chemical- and abrasion-resistant FEP.



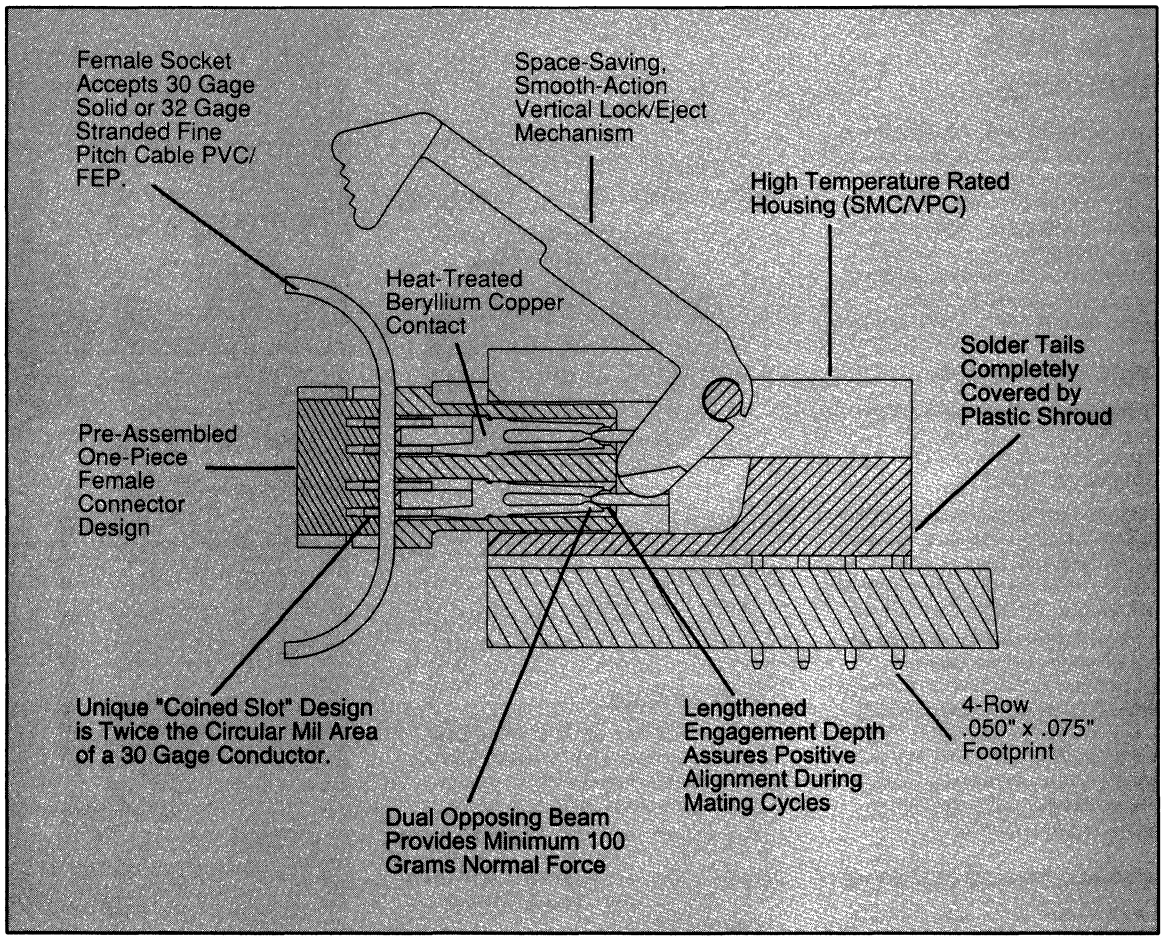
Contact features unique "coined" slot for added strength and selective gold plating on tails for superior performance.

Material selection can be as important to the function of the connector as the component design itself. Beryllium copper offers excellent stress retention properties over time.



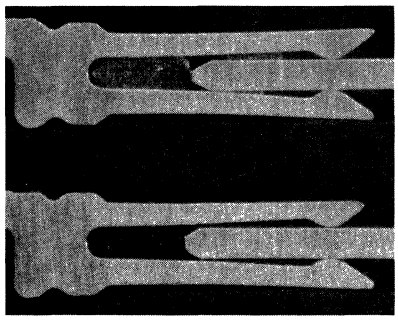
System 311 – at half the size of standard pitch IDC — provides a new standard of reliability in fine pitch IDC.

NEW PRODUCT



System 311 Female Socket Features:

- .050" x .100" Mating Interface
- Cable Termination Options:
  - 30 Gauge Solid PVC/FEP
  - 32 Gauge Stranded PVC/FEP
- Daisy Chain Capable
- Cable Guides
- Positive Locking Side Latches
- Positive Center Bump Polarization
- Dual Beam Mating Contact



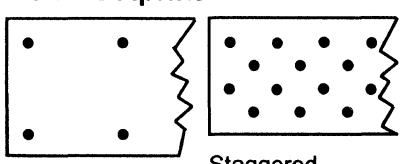
Female socket features a dual beam contact with greater than 100 gram normal force contact design.

System 311 Header Features:

- Vertical Lock and Eject Mechanism
- .050" x .075" Staggered Footprint
- High Temperature Material
- .050" x .100" Mating Interface
- .018" Square Tails
- Tapered Pin Tip

Staggered four-row footprint allows traces to be easily routed while saving board real estate.

PCB Footprint



Standard Pitch .100" x .100"

Staggered .050" x .075" Fine Pitch

Fine Pitch Female Sockets With .050 Contact Spacing

NEW PRODUCT

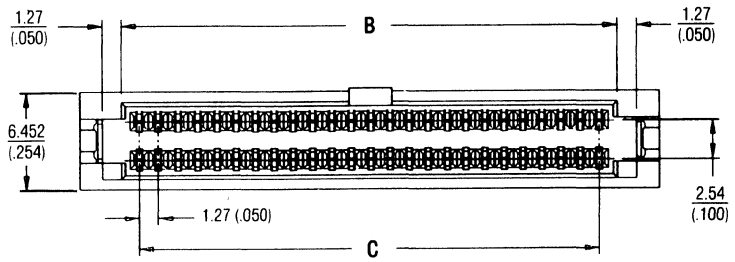
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

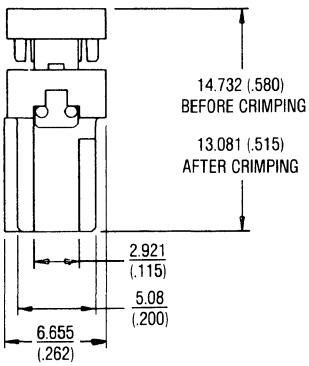
Physical Properties
Insulation Material: Glass reinforced thermoplastic, rated UL 94V-0, black.
Contact Material: Beryllium copper with 30 μ inches min. gold over 50 μ inches min. nickel plating

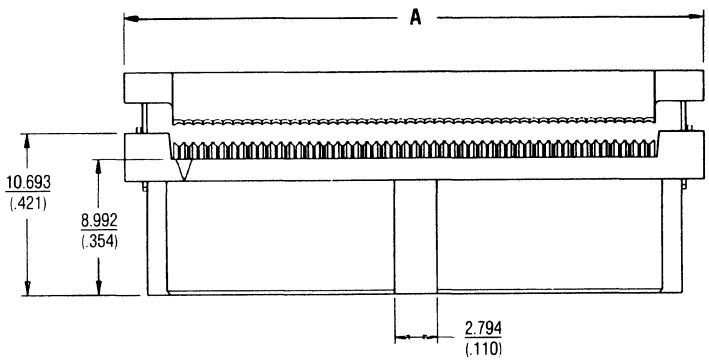
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms
Dielectric Strength: > 1000 VDC (Sea Level)

Environmental Properties
Temperature Rating: −55°C to 125°C.

Cable Requirements
.025 Pitch
30/32 AWG Solid or Stranded







Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)		
		A	B	C
311-020302*	20	19.35 (.762)	13.82 (.544)	11.43 (.450)
311-026302	26	23.16 (.912)	17.63 (.694)	15.24 (.600)
311-030302*	30	25.70 (1.012)	20.17 (.794)	17.78 (.700)
311-034302*	34	28.24 (1.112)	22.71 (.894)	20.32 (.800)
311-040302	40	32.05 (1.262)	26.52 (1.044)	24.13 (.950)
311-050302	50	38.40 (1.512)	32.87 (1.294)	30.48 (1.200)
311-068302	68	49.83 (1.962)	44.30 (1.744)	41.91 (1.650)
311-080302*	80	57.45 (2.262)	51.92 (2.044)	49.53 (1.950)
311-100302*	100	70.15 (2.762)	64.62 (2.544)	62.23 (2.450)

*Consult customer service for availability.

Fine Pitch Male Headers With Lock/Ejector Latches With .050 Contact Spacing

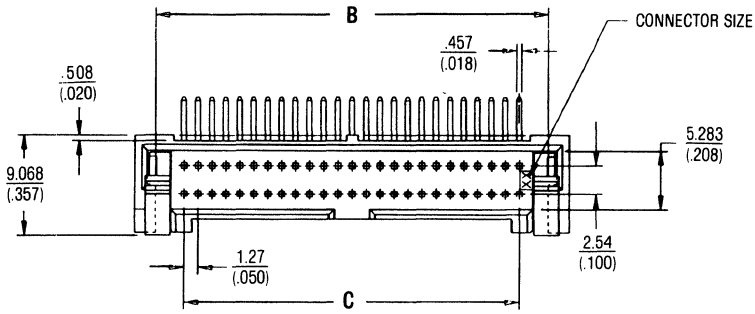
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

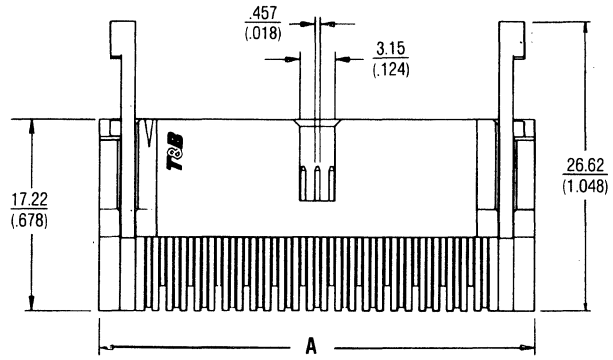
NEW PRODUCT

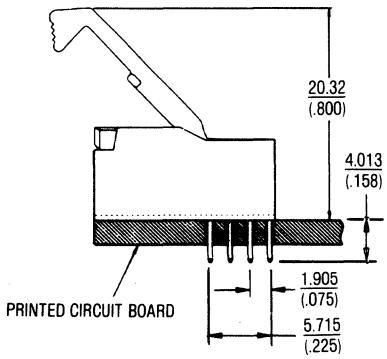
Physical Properties
Insulation Material: Glass reinforced thermoplastic, rated UL 94V-0, black.
Contact Material: Phosphor bronze with 30 μ inches min. gold over 50 μ inches min. nickel plating

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms
Dielectric Strength: > 1000 VDC (Sea Level)

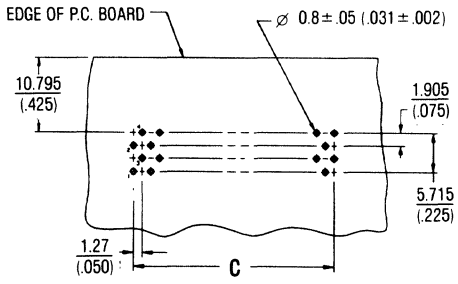
Environmental Properties
Temperature Rating: −55°C to 125°C.



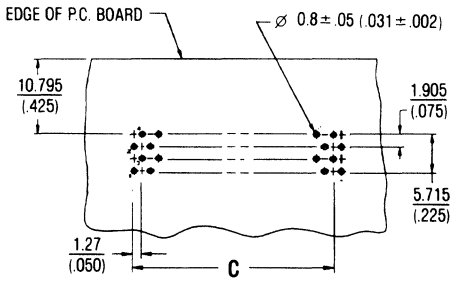




RECOMMENDED PC BOARD LAYOUT (20, 40, 68, 80 AND 100 POSITIONS)



RECOMMENDED PC BOARD LAYOUT (26, 30, 34 AND 50 POSITIONS)



Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)		
		A	B	C
311-020072E*	20	20.68 (.814)	16.87 (.664)	11.43 (.450)
311-026072E	26	24.49 (.964)	20.68 (.814)	15.24 (.600)
311-030072E*	30	27.03 (1.064)	23.22 (.914)	17.78 (.700)
311-034072E*	34	29.57 (1.164)	25.76 (1.014)	20.32 (.800)
311-040072E	40	28.80 (1.314)	29.57 (1.164)	24.13 (.950)
311-050072E	50	39.73 (1.564)	35.92 (1.414)	30.48 (1.200)
311-068072E	68	51.16 (2.014)	47.35 (1.864)	41.91 (1.650)
311-080072E*	80	58.78 (2.314)	54.97 (2.164)	49.53 (1.950)
311-100072E*	100	71.48 (2.814)	67.67 (2.664)	62.23 (2.450)

*Consult customer service for availability.

System 311 Fine Pitch Cable– Uniform .025" Conductor Spacing in PVC or FEP Insulation

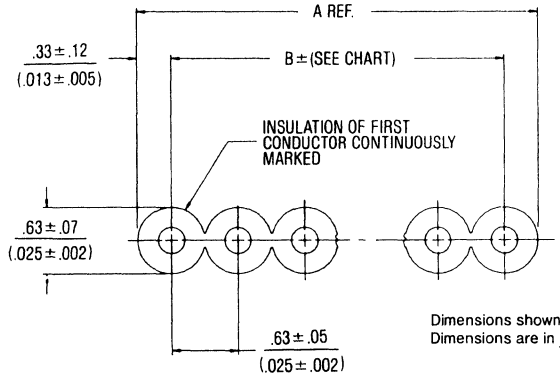
NEW PRODUCT

Physical Properties
Insulation Material: PVC or FEP
Extruded PVC: Blue
Extruded FEP: Natural

Electrical Properties
Voltage Rating: 150 RMS

Impedance
PVC 30 AWG: 77 Ohms
PVC 32 AWG*
FEP 30 AWG: 90 Ohms
FEP 32 AWG: 95 Ohms
Attenuation–db @ 1 MHZ (100 ft.)

Environmental Properties
Temperature Rating: 105°C



ACCUMULATION OF PITCH TOLERANCE BETWEEN CONDUCTORS IN ENTIRE CABLE MAY NOT EXCEED TOLERANCE OF DIM. "B"

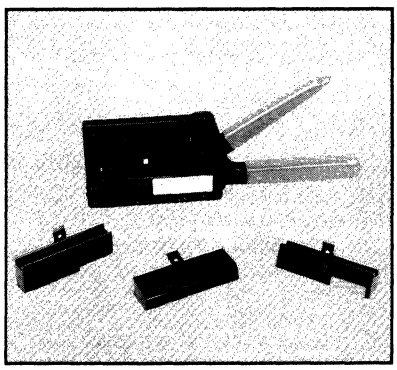
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

B

Ordering Information

NUMBER OF CONDUCTORS	PVC CAT. NO. 30 AWG SOLID	PVC CAT. NO. 32 AWG STRANDED	FEP CAT. NO. 30 AWG SOLID	FEP CAT. NO. 32 AWG STRANDED	DIMENSIONS IN MM (INCHES)			
					A	B	PVC B TOLERANCE	FEP B TOLERANCE
20	136-020*	135-020*	141-020	140-020	12.70 (.500)	12.07 (.475)	± .15 (.006)	± .15 (.006)
26	136-026	135-026	141-026	140-026	16.51 (.650)	15.88 (.625)	± .15 (.006)	± .12 (.005)
30	136-030*	135-030*	141-030	140-030	19.05 (.750)	18.41 (.725)	± .20 (.008)	± .12 (.005)
34	136-034*	135-034*	141-034	140-034	21.59 (.850)	20.95 (.825)	± .20 (.008)	± .12 (.005)
40	136-040	135-040	141-040	140-040	25.40 (1.000)	24.76 (.975)	± .25 (.010)	± .15 (.006)
50	136-050	135-050	141-050	140-050	31.75 (1.250)	31.11 (1.225)	± .25 (.010)	± .15 (.006)
68	136-068*	135-068*	141-068	140-068	43.18 (1.700)	42.54 (1.675)	± .30 (.012)	± .25 (.010)
80	136-080*	135-080*	141-080	140-080	50.80 (2.000)	50.16 (1.975)	± .30 (.012)	± .25 (.010)
100	136-100*	135-100*	141-100	140-100	63.50 (2.500)	62.86 (2.475)	± .30 (.012)	± .25 (.010)

*Consult customer service for availability.

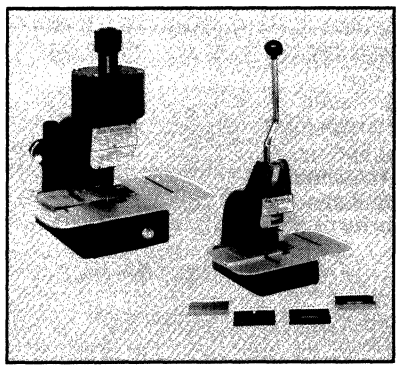


Cable Cutter
Catalog No. 779-5030M

Quick and accurate cutting of both PVC and FEP flat cable is assured with the Thomas & Betts cable cutter (not shown).

Hand Crimp Tools
Catalog No. 779-2100
Catalog No. 779-3112151
Hand Tool Die

Ideal for bench and field applications. Tool frame accommodates snap-in interchangeable dies for mass terminating the entire range of Thomas & Betts connectors, including Systems 311 IDC connectors.



Production Crimp Tools
Catalog No. 779-3200 Manual
Catalog No. 779-3500XT Pneumatic
Catalog No. 779-3113151 Base Plate

These manual and pneumatic bench presses are rugged, easy-to-use production tools designed for large volume mass termination. Crimping platens are interchangeable and cover the complete range of Thomas & Betts connectors, including System 311 IDC connectors.

FEMALE SOCKET TRANSITION CONNECTORS

Product Description

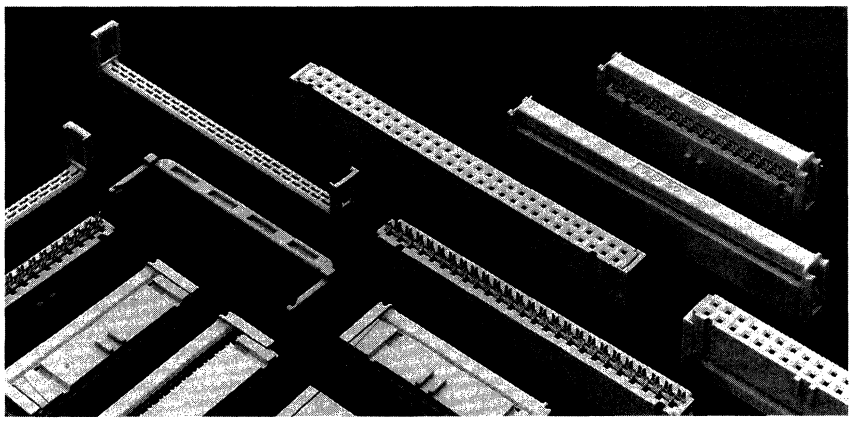
The Thomas & Betts 622 Female Socket Transition Connector is designed to mate with a wide variety of Male Headers in PC board applications which require repeated connection and disconnection. The connectors provide fast, high-integrity mass termination of all types of flat cable, simplifying and improving the quality of electronic interconnection. 622 Female Socket Transition Connectors are UL recognized and CSA certified.

Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold in contact area over 50 micro inches min. nickel plating.
- Connector (with or without strain reliefs and polarization tabs) available in 18 contact sizes—4, 6, 10, 12, 14, 16, 20, 24, 26, 30, 34, 36, 40, 44, 50, 56, 60 and 64 positions.
- Strain relief available for all connector sizes (4-64 positions), protects cable-connector termination area and maintains integrity of mass termination over repeated insertion and extraction cycles.
- Polarizing keys provide positive polarization by preventing improper connector entry.

Application Tooling

Hand Tool	779-2100
with Die	779-2151
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3151
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3151



Fast, reliable mass termination of all types of flat cable to male headers on PC boards.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-1000

T&B Series

Number of Positions

- ***00*** *- Female Socket Transition Connector*
- ***01*** *- Connector with Strain Relief*
- ***30*** *- Connector with Polarization Tab*
- ***31*** *- Strain Relief only*
- ***41*** *- Connector with Polarization Tab and Strain Relief*

622-0000 *- Polarizing Key*

Female Socket Transition Connector 4 to 64 Positions

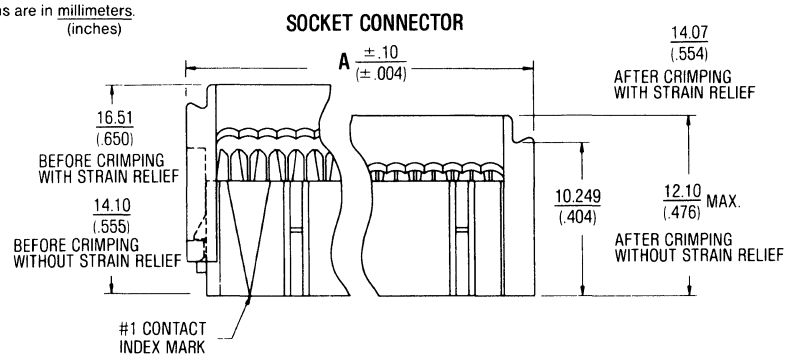
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

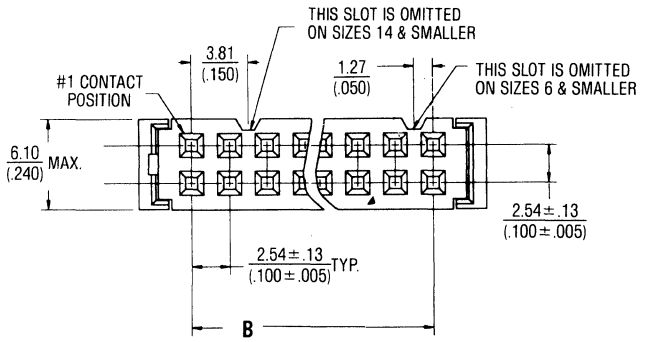
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

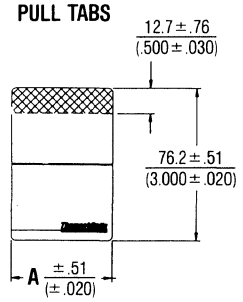
Environmental Properties
Temperature Rating: −55°C to 125°C.

SOCKET CONNECTOR





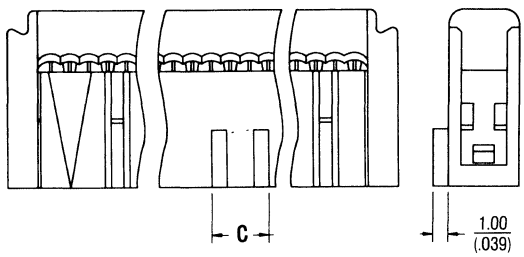
PULL TABS



CATALOG NUMBER	A
622-3.2PT	82.6 (3.250)
622-3.1PT	78.7 (3.100)
622-2.5PT	63.5 (2.500)
622-2PT	50.8 (2.000)
622-1.5PT	38.1 (1.500)
622-1PT	25.4 (1.000)
622-.5PT	12.7 (0.500)

622-0000 POLARIZING KEY
FOR POLARIZING CONNECTORS BY BLOCKING CONTACT ENTRY

POLARIZED SOCKET CONNECTOR



Ordering Information

CATALOG NUMBERS				NO. OF POS.	DIMENSIONS IN MM (INCHES)		
SOCKET CONN.	SOCKET CONN. WITH STRAIN RELIEF	POLARIZED SOCKET CONN.	POLARIZED SOCKET WITH STRAIN RELIEF		A	B	C
622-0400	622-0401	622-0430	622-0441	04	9.58 (.377)	2.54 (.100)	1.90 (.075)
622-0600	622-0601	622-0630	622-0641	06	12.12 (.477)	5.08 (.200)	1.90 (.075)
622-1000	622-1001	622-1030	622-1041	10	17.20 (.677)	10.16 (.400)	3.20 (.126)
622-1200	622-1201	622-1230	622-1241	12	19.74 (.777)	12.70 (.500)	3.80 (.150)
622-1400	622-1401	622-1430	622-1441	14	22.28 (.877)	15.24 (.600)	3.80 (.150)
622-1600	622-1601	622-1630	622-1641	16	24.82 (.977)	17.78 (.700)	3.80 (.150)
622-2000	622-2001	622-2030	622-2041	20	29.90 (1.177)	22.86 (.900)	3.80 (.150)
622-2400	622-2401	622-2430	622-2441	24	34.96 (1.377)	27.94 (1.100)	3.80 (.150)
622-2600	622-2601	622-2630	622-2641	26	37.52 (1.477)	30.48 (1.200)	3.80 (.150)
622-3000	622-3001	622-3030	622-3041	30	42.60 (1.677)	35.56 (1.400)	3.80 (.150)
622-3400	622-3401	622-3430	622-3441	34	47.68 (1.877)	40.64 (1.600)	3.80 (.150)
622-3600	622-3601	622-3630	622-3641	36	50.22 (1.977)	43.18 (1.700)	3.80 (.150)
622-4000	622-4001	622-4030	622-4041	40	55.30 (2.177)	48.26 (1.900)	3.80 (.150)
622-4400	622-4401	622-4430	622-4441	44	60.38 (2.377)	53.34 (2.100)	3.80 (.150)
622-5000	622-5001	622-5030	622-5041	50	68.00 (2.677)	60.95 (2.400)	3.80 (.150)
622-6000	622-6001	622-6030	622-6041	60	80.70 (3.177)	73.66 (2.900)	3.80 (.150)
622-6400	622-6401	622-6430	622-6441	64	85.78 (3.377)	78.74 (3.100)	3.80 (.150)

Female Socket Connector Assembly With "Daisy Chain" Strain Relief Straps

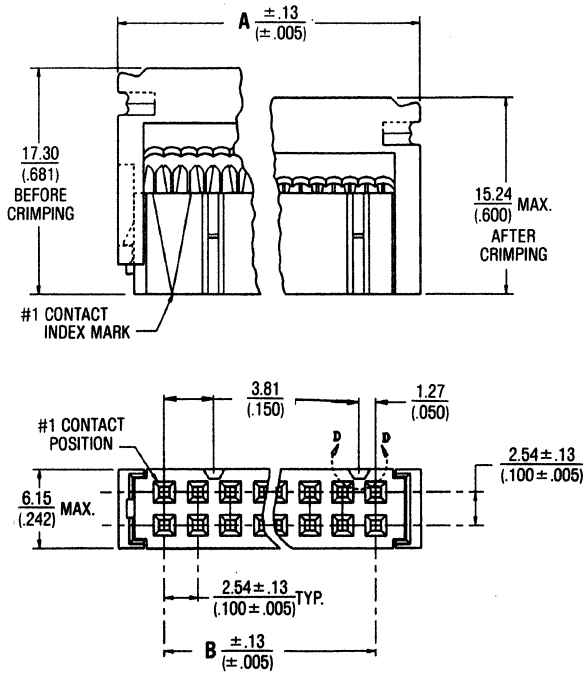
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

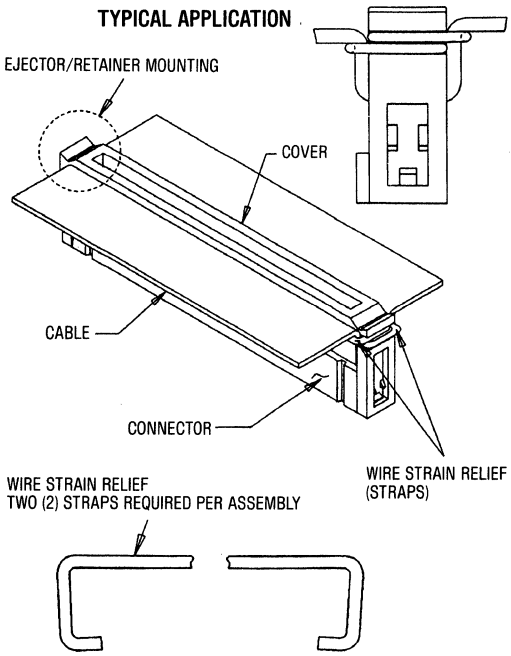
Environmental Properties
Temperature Rating: −55°C to 125°C.

Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

SOCKET CONNECTOR 622-XX00DS

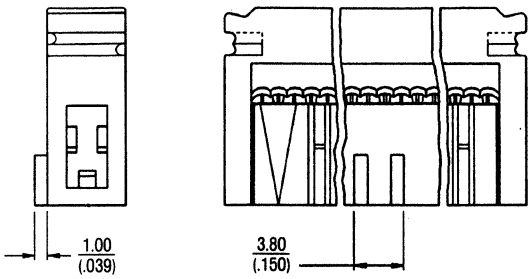


TYPICAL APPLICATION



WIRE STRAIN RELIEF
TWO (2) STRAPS REQUIRED PER ASSEMBLY

POLARIZED SOCKET CONNECTOR 622-XX30DS



Ordering Information

CATALOG NUMBERS		NO. OF POS.	DIMENSIONS IN MM (INCHES)	
SOCKET CONN.	POLARIZED SOCKET CONN.		A	B
622-4000DS	622-4030DS	40	55.40 (2.181)	48.26 (1.900)
622-5000DS	622-5030DS	50	68.10 (2.681)	60.95 (2.400)
622-6000DS	622-6030DS	60	80.80 (3.181)	73.66 (2.900)

NEW PRODUCT

Fine Pitch Female Sockets With .050 Contact Spacing

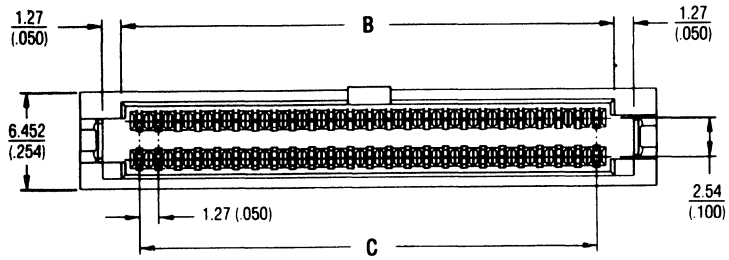
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

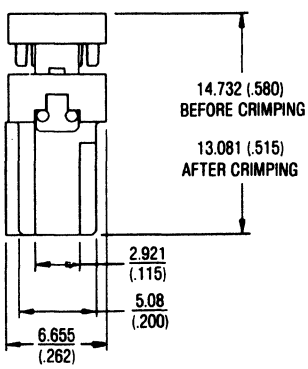
Physical Properties
Insulation Material: Glass reinforced thermoplastic, rated UL 94V-0, black.
Contact Material: Beryllium copper with 30 μ inches min. gold over 50 μ inches min. nickel plating

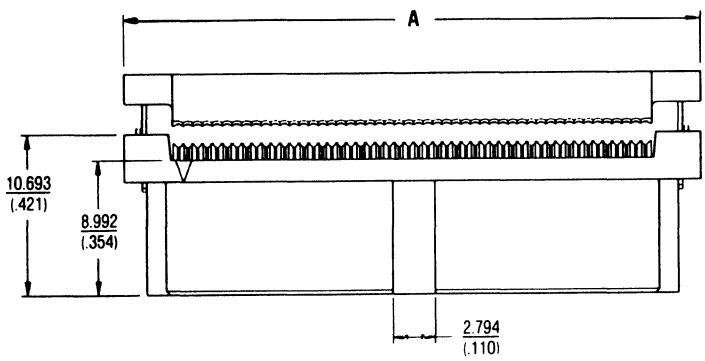
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms
Dielectric Strength: > 1000 VDC (Sea Level)

Environmental Properties
Temperature Rating: −55°C to 125°C.

Cable Requirements
.025 Pitch
30/32 AWG Solid or Stranded







Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)		
		A	B	C
311-020302*	20	19.35 (.762)	13.82 (.544)	11.43 (.450)
311-026302	26	23.16 (.912)	17.63 (.694)	15.24 (.600)
311-030302*	30	25.70 (1.012)	20.17 (.794)	17.78 (.700)
311-034302*	34	28.24 (1.112)	22.71 (.894)	20.32 (.800)
311-040302	40	32.05 (1.262)	26.52 (1.044)	24.13 (.950)
311-050302	50	38.40 (1.512)	32.87 (1.294)	30.48 (1.200)
311-068302	68	49.83 (1.962)	44.30 (1.744)	41.91 (1.650)
311-080302*	80	57.45 (2.262)	51.92 (2.044)	49.53 (1.950)
311-100302*	100	70.15 (2.762)	64.62 (2.544)	62.23 (2.450)

*Consult customer service for availability.

MALE CONNECTORS

Product Description

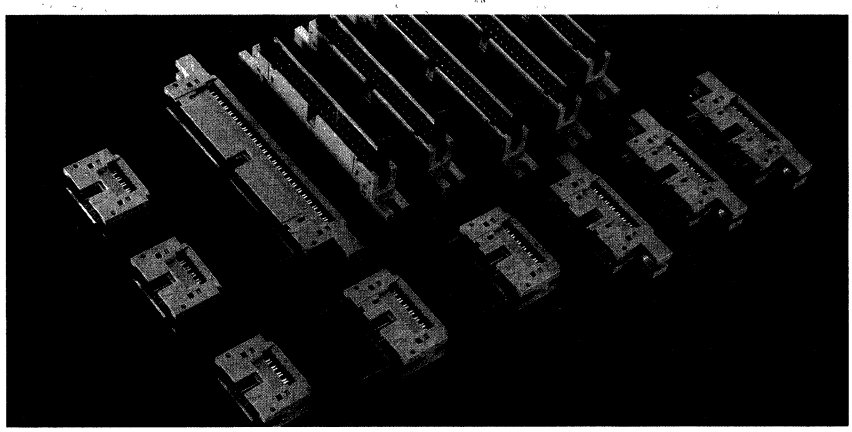
Male Connectors are designed to mate with Female Socket Transition Connectors. Used primarily for in-line cable splice and "T" tap applications, they are available with optional mounting ears for I/O applications. Retainer/ejector latches provide a convenient means of disconnect.

Design Advantages

- 13 connector sizes—10, 14, 16, 20, 24, 26, 34, 40, 44, 50, 56, 60 and 64-position.
- Available with or without mounting ears.
- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 30μ" (minimum) gold plating in contact mating areas.
- Box shape assures polarization and protects mating pins.
- Connector designed for *center bump* and *dual slot* polarizing methods.
- Solid .025" square posts for strength and durability.
- Strain relief available for both connector versions.
- Optional polarizing key.

Application Tooling

Hand Tool	779-2100
with Die	779-2168A
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3168A
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3168A



Ejector/retainer latches provide ease of disconnect; protect against pin damage

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-1006E

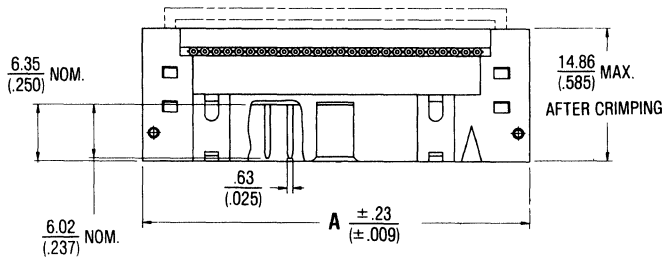
- **622** — *T&B Series*
- **10** — *Number of Positions*
- **06** — *Male Connector without mounting ears*
  16 — *Male Connector with half mounting ears*
  66 — *Strain Relief only*
- **E** — *Leave blank - for no ears*
  E - Add for latches to accommodate Female Socket Transition Connectors WITHOUT strain relief
  ES - Add for latches to accommodate Female Socket Transition Connectors WITH strain relief

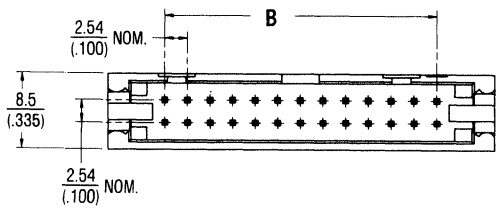
622-0056P - Polarizing Key

Military Polarization
***622-1006A** - 10 position Male connector (without mounting ears) with MIL-spec polarization, no center slot*
***622-1016A** - 10 position Male connector (half mounting ears) with MIL-spec polarization, no center slot*

Male Connector 10 to 64 Positions Without Mounting Ears

Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)



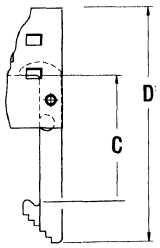


Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

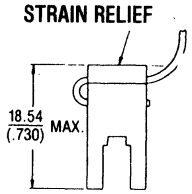
Environmental Properties
Temperature Rating: −55°C to 125°C.

EJECTOR LATCH



DIMENSIONS IN MM (INCHES)		FINISH	FOR USE WITH
C	D		
10.54(.415)	E = 22.22(.875)	BLACK OXIDE	FEMALE SOCKET CONNECTOR WITHOUT STRAIN RELIEF
14.63(.576)	ES = 26.31(1.036)	BLACK OXIDE	FEMALE SOCKET CONNECTOR WITH STRAIN RELIEF

STRAIN RELIEF



Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)		POLARIZATION
		A	B	
622-1006A	10	23.10 (.906)	10.16 (.400)	MIL-TYPE ONLY
622-1006	10	23.10 (.906)	10.16 (.400)	CENTER SLOT ONLY
622-1406	14	28.09 (1.106)	15.24 (.600)	MIL-TYPE AND CENTER SLOT
622-1606	16	30.63 (1.206)	17.78 (.700)	
622-2006	20	35.71 (1.406)	22.86 (.900)	
622-2406	24	40.79 (1.606)	27.94 (1.100)	
622-2606	26	43.33 (1.706)	30.48 (1.200)	
622-3406	34	48.41 (1.906)	40.64 (1.600)	
622-4006	40	56.03 (2.206)	48.26 (1.900)	
622-4406	44	66.19 (2.606)	53.34 (2.100)	
622-5006	50	73.81 (2.906)	60.96 (2.400)	
622-5606	56	81.43 (3.206)	68.58 (2.700)	
622-6006	60	86.51 (3.406)	73.66 (2.900)	
622-6406	64	91.59 (3.606)	78.74 (3.100)	

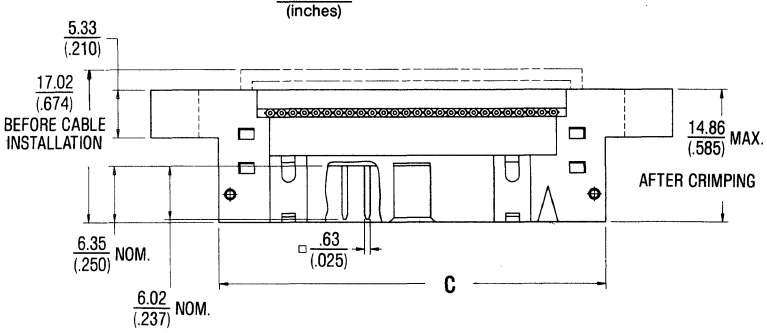
Male Connector 10 to 64 Positions With Half Mounting Ears

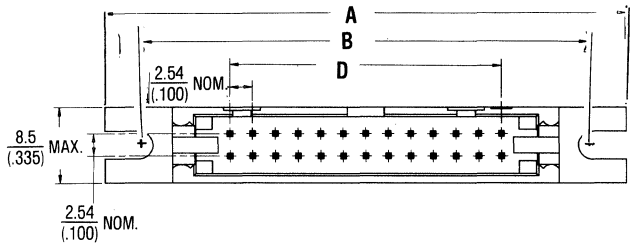
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

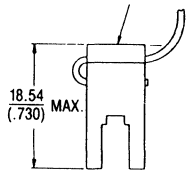
Environmental Properties
Temperature Rating: −55°C to 125°C.

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

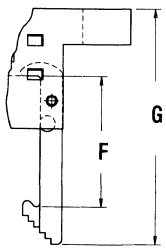




STRAIN RELIEF

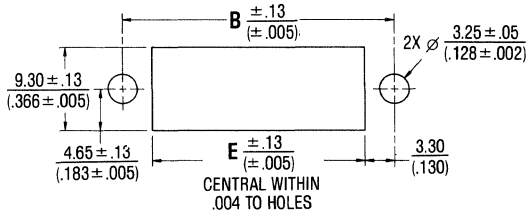


EJECTOR LATCH



DIMENSIONS IN MM (INCHES)		FINISH	FOR USE WITH
F	G		
10.54(.415)	E=22.22(.875)	BLACK OXIDE	FEMALE SOCKET CONNECTOR WITHOUT STRAIN RELIEF
14.63(.576)	ES=26.31(1.036)	BLACK OXIDE	FEMALE SOCKET CONNECTOR WITH STRAIN RELIEF

RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)					POLARIZATION
		A	B	C	D	E	
622-1016A	10	38.10 (1.500)	30.48 (1.200)	23.10 (.906)	10.16 (.400)	23.88 (.940)	MIL-TYPE ONLY
622-1016	10	38.10 (1.500)	30.48 (1.200)	23.10 (.906)	10.16 (.400)	23.88 (.940)	CENTER SLOT ONLY
622-1416	14	43.18 (1.700)	35.56 (1.400)	28.09 (1.106)	15.24 (.600)	28.96 (1.140)	MIL-TYPE AND CENTER SLOT
622-1616	16	45.72 (1.800)	38.10 (1.500)	30.63 (1.206)	17.78 (.700)	31.50 (1.240)	
622-2016	20	50.80 (2.000)	43.18 (1.700)	35.71 (1.406)	22.86 (.900)	36.58 (1.440)	
622-2416	24	55.88 (2.200)	48.26 (1.900)	40.79 (1.606)	27.94 (1.100)	41.66 (1.640)	
622-2616	26	58.42 (2.300)	50.80 (2.000)	43.33 (1.706)	30.48 (1.200)	43.18 (1.740)	
622-3416	34	68.58 (2.700)	60.96 (2.400)	53.49 (2.106)	40.64 (1.600)	54.36 (2.140)	
622-4016	40	76.20 (3.000)	68.58 (2.700)	61.11 (2.406)	48.26 (1.900)	61.98 (2.440)	
622-4416	44	81.28 (3.200)	73.66 (2.900)	66.19 (2.606)	53.34 (2.100)	67.06 (2.640)	
622-5016	50	88.90 (3.500)	81.28 (3.200)	73.81 (2.906)	60.96 (2.400)	74.68 (2.940)	
622-5616	56	96.52 (3.800)	88.90 (3.500)	81.43 (3.206)	68.58 (2.700)	82.30 (3.240)	
622-6016	60	101.60 (4.000)	93.98 (3.700)	86.51 (3.406)	73.66 (2.900)	87.38 (3.440)	
622-6416	64	106.68 (4.200)	99.06 (3.900)	91.59 (3.606)	78.74 (3.100)	92.46 (3.640)	

Fine Pitch Male Headers With Lock/Ejector Latches With .050 Contact Spacing

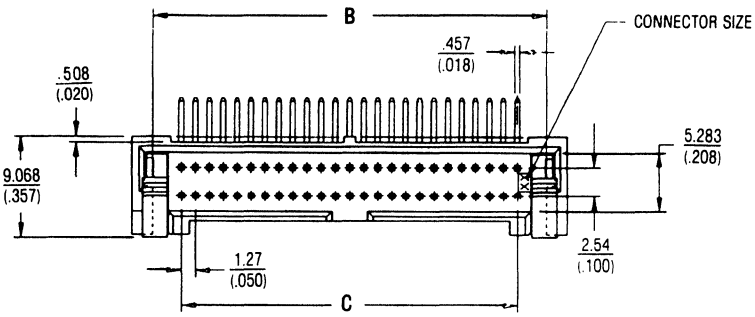
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

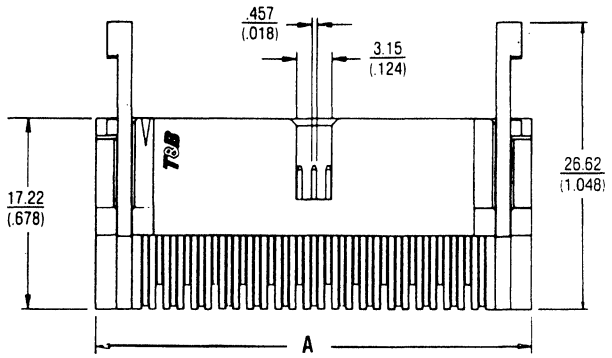
NEW PRODUCT

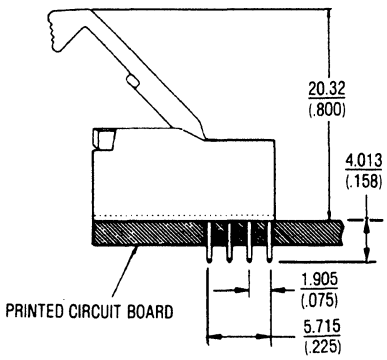
Physical Properties
Insulation Material: Glass reinforced thermoplastic, rated UL 94V-0, black.
Contact Material: Phosphor bronze with 30 μ inches min. gold over 50 μ inches min. nickel plating

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms
Dielectric Strength: > 1000 VDC
(Sea Level)

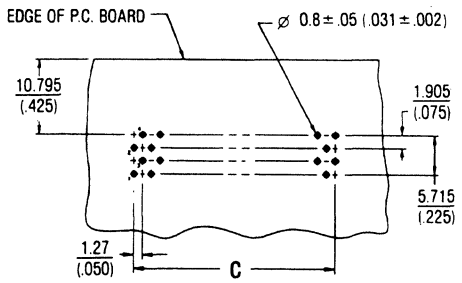
Environmental Properties
Temperature Rating: −55°C to 125°C.



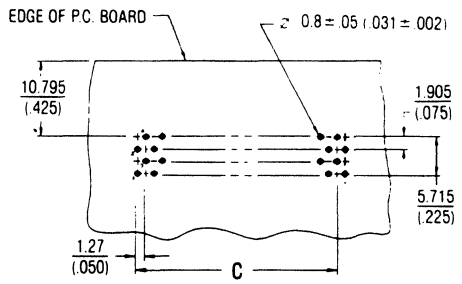




RECOMMENDED PC BOARD LAYOUT
(20, 40, 68, 80 AND 100 POSITIONS)



RECOMMENDED PC BOARD LAYOUT
(26, 30, 34 AND 50 POSITIONS)



Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)		
		A	B	C
311-020072E*	20	20.68 (.814)	16.87 (.664)	11.43 (.450)
311-026072E	26	24.49 (.964)	20.68 (.814)	15.24 (.600)
311-030072E*	30	27.03 (1.064)	23.22 (.914)	17.78 (.700)
311-034072E*	34	29.57 (1.164)	25.76 (1.014)	20.32 (.800)
311-040072E	40	28.80 (1.314)	29.57 (1.164)	24.13 (.950)
311-050072E	50	39.73 (1.564)	35.92 (1.414)	30.48 (1.200)
311-068072E	68	51.16 (2.014)	47.35 (1.864)	41.91 (1.650)
311-080072E*	80	58.78 (2.314)	54.97 (2.164)	49.53 (1.950)
311-100072E*	100	71.48 (2.814)	67.67 (2.664)	62.23 (2.450)

*Consult customer service for availability.

PCB SOLDER TRANSITION CONNECTORS, 4 ROW AND 2 ROW

Product Description

PCB Solder Transition Connectors provide fast, permanent termination of flat cable to printed circuit boards. The PCB Standard 4 Row and 2 Row Connectors can be soldered to the board either before or after crimping the cable.

Design Advantages

4 ROW

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 11 contact sizes—10, 14, 16, 20, 26, 34, 40, 44, 50, 56, and 60 positions
- Available in solder tail lengths for 1.57 mm (.062") or 3.18 mm (.125") board thickness
- Diagonal pin pattern

2 ROW

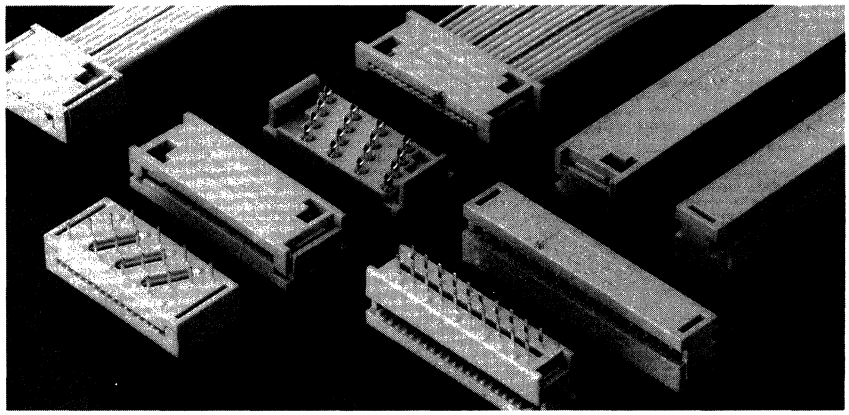
- Contact Material—Beryllium copper with tin/lead over 50 micro inches min. nickel plating.
- 16 contact sizes—4, 6, 8, 10, 14, 16, 20, 24, 26, 30, 34, 36, 40, 44, 50 and 60 positions
- Available in solder tail lengths for 1.57 mm (.062") or 3.18 mm (.125") board thickness
- Narrow design maximizes packaging density—designed to fit into a standard 2.54 mm x 2.54 mm (.100" x .100") male header grid pattern

Application Tooling

Hand Tool	779-2100*
with Die	779-2152*
	779-2153* (2 Row only)
Bench Press (manual)	779-3200*
	779-3200**
with Platen	779-3130*
	779-3132**
	779-3133** (2 Row only)
with Base Plate	779-3152*
	779-3154**
	779-3153* (2 Row only)
Bench Press (pneumatic)	779-3500XT*
with Platen	779-3130*
	779-3132**
	779-3133** (2 Row only)
with Base Plate	779-3152*
	779-3154**
	779-3153* (2 Row only)

*Use when cable is installed before connector is soldered to PC board.

**Use when cable is installed after connector is soldered to PC board.



Replace header/socket systems when disconnect is not required.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622 - 1053R

- **622** — *T&B Series 2 Row*
- **1053** — *Number of Positions*
- **R** — *Retention Feature (Leave Blank When Not Required)*
- *33 - Strain Relief only*
- *53 - 2 Row Solder Transition Connector (.062" PCB)*
- *63 - 2 Row Solder Transition Connector (.125" PCB)*

609 - 1003R

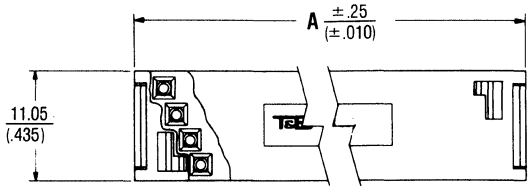
- **609** — *T&B Series 4 Row*
- **1003** — *Number of Positions*
- **R** — *Retention Feature (Leave Blank When Not Required)*
- *03 - Standard Solder 4 Row Transition Connector (.062" PCB)*
- *43 - Standard Solder 4 Row Transition Connector (.125" PCB)*

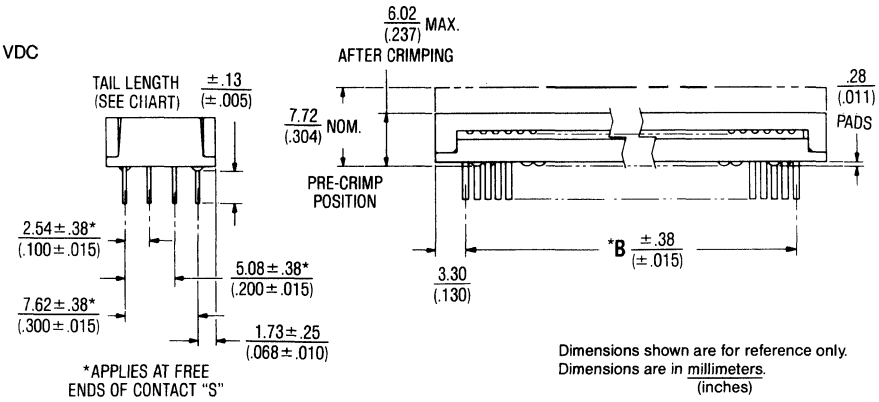
Standard 4 Row PCB Solder Transition Connectors

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: Tin-lead over 50 μ nickel.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

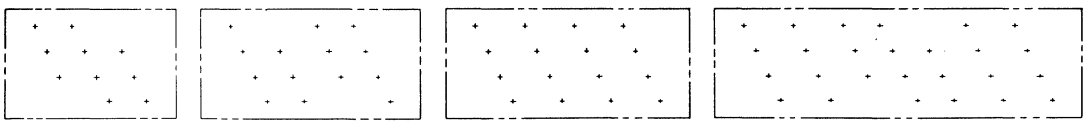




Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

B

RECOMMENDED P.C. BOARD PATTERN



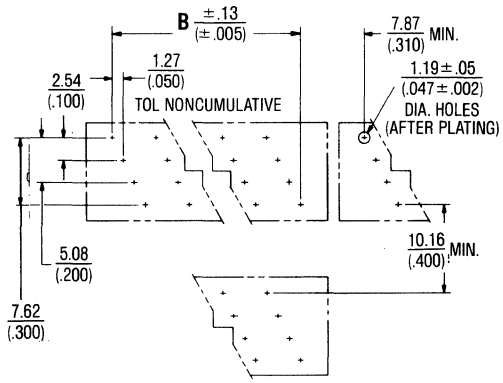
HOLE PATTERN FOR 10 POSITION CONNECTOR

HOLE PATTERN FOR 14 POSITION CONNECTOR

HOLE PATTERN FOR 16, 20, 40, 44, 56 AND 60 POSITION CONNECTOR (16 POSITION SHOWN)

HOLE PATTERN FOR 26, 34 AND 50 POSITION CONNECTOR (26 POSITION SHOWN)

RECOMMENDED P.C. BOARD PATTERN



Ordering Information

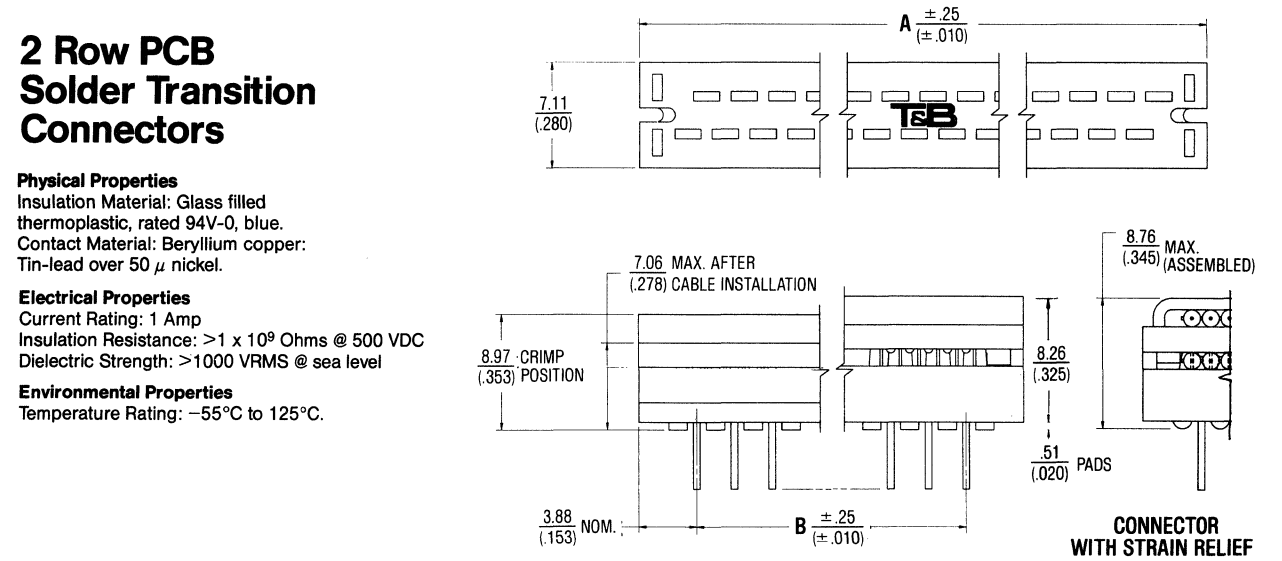
CATALOG NUMBERS			DIMENSIONS IN MM (INCHES)	
SOLDER TAIL LENGTH				
2.54 (.100)	3.96 (.156)	NO. OF POS.	A	B
PCB THICKNESS 1.57 (.062)	PCB THICKNESS 3.18 (.125)			
609-1003	609-1043	10	18.03 (.710)	11.43 (.450)
609-1403	609-1443	14	23.11 (.910)	16.51 (.650)
609-1603	609-1643	16	25.65 (1.010)	19.05 (.750)
609-2003	609-2043	20	30.73 (1.210)	24.13 (.950)
609-2603	609-2643	26	38.35 (1.510)	31.75 (1.250)
609-3403	609-3443	34	48.51 (1.910)	41.91 (1.650)
609-4003	609-4043	40	56.13 (2.210)	49.53 (1.950)
609-4403	609-4443	44	61.21 (2.410)	54.61 (2.150)
609-5003	609-5043	50	68.83 (2.710)	62.23 (2.450)
609-5603	609-5643	56	76.45 (3.010)	69.85 (2.750)
609-6003	609-6043	60	81.53 (3.210)	74.93 (2.950)

2 Row PCB Solder Transition Connectors

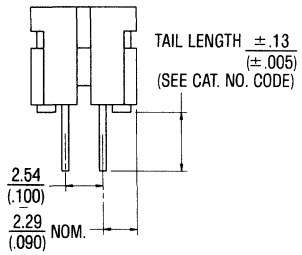
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: Tin-lead over 50 μ nickel.

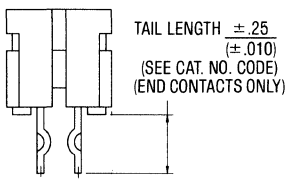
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.



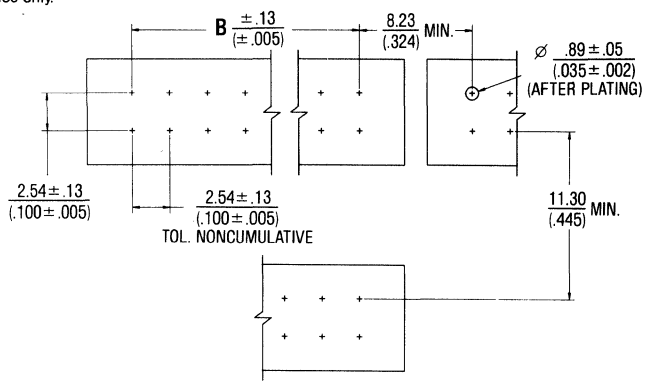
Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)





RETENTION FEATURE

RECOMMENDED P.C. BOARD PATTERN



Ordering Information

CATALOG NUMBERS			DIMENSIONS IN MM (INCHES)	
SOLDER TAIL LENGTH				
2.54 (.100)	3.96 (.156)	NO. OF POS.	A	B
PCB THICKNESS 1.57 (.062)	PCB THICKNESS 3.18 (.125)			
622-0453	622-0463	4	10.31 (.406)	2.54 (.100)
622-0653	622-0663	6	12.85 (.506)	5.08 (.200)
622-0853	622-0863	8	15.39 (.606)	7.62 (.300)
622-1053	622-1063	10	17.93 (.706)	10.16 (.400)
622-1453	622-1463	14	23.01 (.906)	15.24 (.600)
622-1653	622-1663	16	25.55 (1.006)	17.78 (.700)
622-2053	622-2063	20	30.63 (1.206)	22.86 (.900)
622-2453	622-2463	24	35.71 (1.406)	27.94 (1.100)
622-2653	622-2663	26	38.25 (1.506)	30.48 (1.200)
622-3053	622-3063	30	43.33 (1.706)	35.56 (1.400)
622-3453	622-3463	34	48.41 (1.906)	40.64 (1.600)
622-3653	622-3663	36	50.95 (2.006)	43.18 (1.700)
622-4053	622-4063	40	56.03 (2.206)	48.26 (1.900)
622-4453	622-4463	44	61.11 (2.406)	53.34 (2.100)
622-5053	622-5063	50	68.73 (2.706)	60.96 (2.400)
622-6053	622-6063	60	81.43 (3.206)	73.66 (2.900)

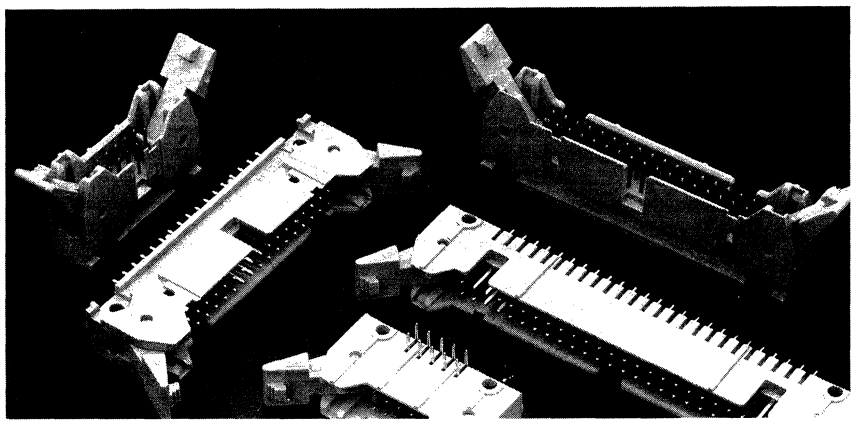
PCB STANDARD HEADERS

Product Description

Square Pin PCB Male Headers provide reliability, convenience and positive polarization when mated with Female Socket Transition Connectors in PC board applications which require repeated connection and disconnection. Optional retainer-ejector latches easily disengage the header and female socket, eliminating stress in the cable termination and solder joint areas during disconnect.

Design Advantages

- 16 contact sizes—6, 10, 12, 14, 16, 20, 24, 26, 30, 34, 36, 40, 44, 50, 60 and 64 positions.
- Industry standard polarization—mates with center polarization bump as well as dual-slot polarization Female Socket Transition Connectors.
- Available with compact retainer-ejector latches to accommodate terminated Female Socket Connectors, with or without strain reliefs.
- Available with straight, right angle or wrap post tails; for use with either 1.57 mm (0.62″) or 3.18 mm (.125″) thick boards.
- 30μ″ (minimum) gold plating in contact mating areas.



Reliability, convenience and positive polarization.

B

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

609-1004E

- **609** — *T&B Series*
- **1004** — *Number of Positions*
- **04** — *Solder tail header (.062 PCB) right angle*
- **14** — *Solder tail header (.125 PCB) right angle*
- **24** — *Solder tail header (.062 PCB) straight*
- **34** — *Solder tail header (.125 PCB) straight*
- **44** — *Wrap post tail header right angle*
- **54** — *Wrap post tail header straight*
- **E** — *Latches required to accommodate female socket transition connectors without strain relief*
- **ES** — *Latches required to accommodate female socket transition connectors with strain relief*
- *Leave* **blank** *- if not required*

609-0056P - *Polarizing Key*

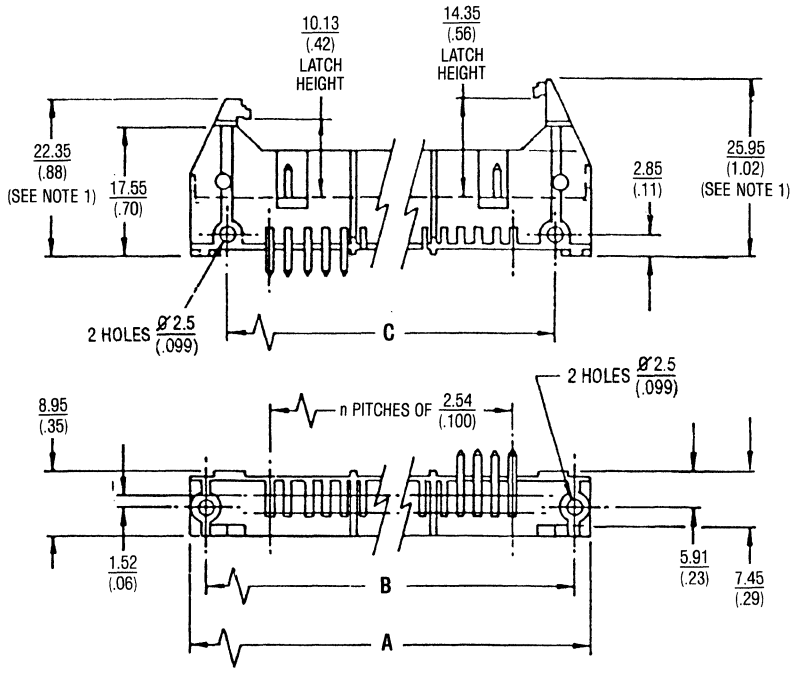
PCB Standard Headers Straight and Right Angle, With and Without Ejectors

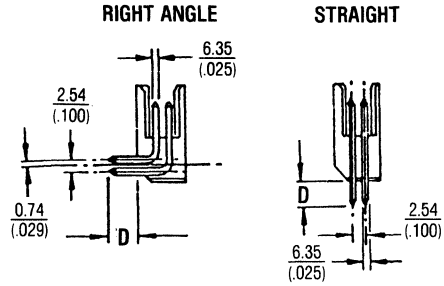
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

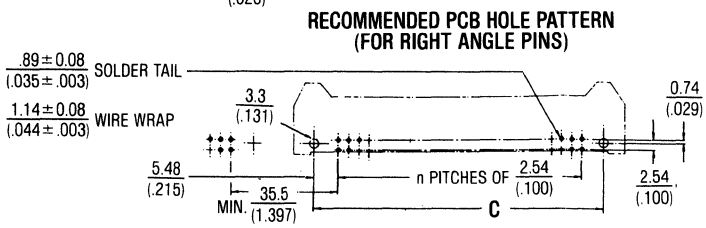
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

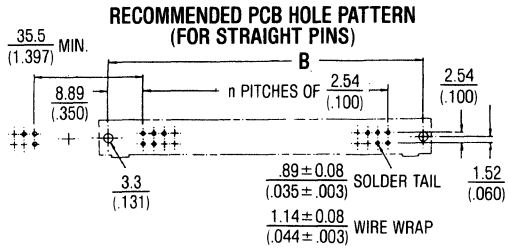
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.









Ordering Information

CATALOG NUMBERS						NO. OF POS.	DIMENSIONS IN MM (INCHES)		
PCB 1.57 MM (.062) D=2.9 MM (.114)		PCB 3.18 MM (.125) D=4.48 MM (.176)		WIREWRAP D=15.5 MM (.610)					
STRAIGHT	RIGHT ANGLE	STRAIGHT	RIGHT ANGLE	STRAIGHT	RIGHT ANGLE		A	B	C
609-0624	609-0604	609-0634	609-0614	609-0654	609-0644	6	27.05 (1.07)	22.86 (.90)	16.76 (.66)
609-1024	609-1004	609-1034	609-1014	609-1054	609-1044	10	32.13 (1.26)	27.94 (1.10)	21.64 (.85)
609-1224	609-1204	609-1234	609-1214	609-1254	609-1244	12	34.64 (1.36)	30.48 (1.20)	24.38 (.96)
609-1424	609-1404	609-1434	609-1414	609-1454	609-1444	14	37.21 (1.46)	33.02 (1.30)	26.92 (1.06)
609-1624	609-1604	609-1634	609-1614	609-1654	609-1644	16	39.75 (1.56)	35.56 (1.40)	29.46 (1.16)
609-2024	609-2004	609-2034	609-2014	609-2054	609-2044	20	44.83 (1.76)	40.64 (1.60)	34.54 (1.36)
609-2424	609-2404	609-2434	609-2414	609-2454	609-2444	24	49.88 (1.96)	45.72 (1.80)	39.62 (1.56)
609-2624	609-2604	609-2634	609-2614	609-2654	609-2644	26	52.45 (2.06)	48.26 (1.90)	42.16 (1.66)
609-3024	609-3004	609-3034	609-3014	609-3054	609-3044	30	57.50 (2.26)	53.34 (2.10)	47.26 (1.86)
609-3424	609-3404	609-3434	609-3414	609-3454	609-3444	34	62.61 (2.46)	58.42 (2.30)	52.32 (2.06)
609-3624	609-3604	609-3634	609-3614	609-3654	609-3644	36	65.12 (2.56)	60.96 (2.40)	54.86 (2.16)
609-4024	609-4004	609-4034	609-4014	609-4054	609-4044	40	70.23 (2.76)	66.04 (2.60)	59.94 (2.36)
609-4424	609-4404	609-4434	609-4414	609-4454	609-4444	44	75.31 (2.96)	71.12 (2.80)	65.02 (2.56)
609-5024	609-5004	609-5034	609-5014	609-5054	609-5044	50	82.93 (3.26)	78.74 (3.10)	72.64 (2.86)
609-6024	609-6004	609-6034	609-6014	609-6054	609-6044	60	95.63 (3.76)	91.44 (3.60)	85.35 (3.36)
609-6424	609-6404	609-6434	609-6414	609-6454	609-6444	64	100.71 (3.96)	96.52 (3.80)	90.42 (3.56)

1. FOR LONG EJECTORS, ADD SUFFIX ES (609-XXXXES). FOR SHORT EJECTORS, ADD SUFFIX E (609-XXXXE).

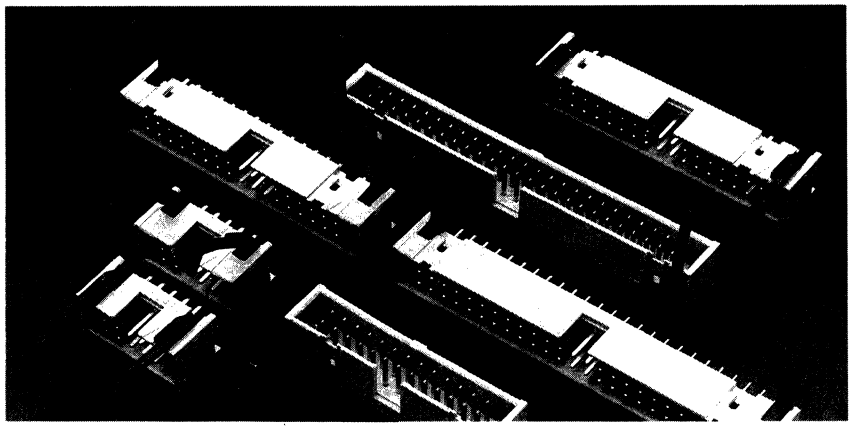
LOW PROFILE PCB HEADERS WITH VERTICAL RETAINER/EJECTOR LATCHES

Product Description

The Low Profile Vertical Ejector Header is designed to provide stability, reliability and convenience when mated with Female Socket Transition Connectors in PC board applications which require repeated connection and disconnection. While retaining all the advantages of conventional ejector header designs, PC board real estate is maximized. Unlike conventional designs where the ejector latches swing left and right, the "vertical" ejector latches swing front and back, permitting headers to be soldered end-to-end with no wasted board space.

Design Advantages

- 16 contact sizes—6, 10, 12, 14, 16, 20, 24, 26, 30, 34, 36, 40, 44, 50, 60 and 64 positions.
- 30μ inches min. gold over 50μ inches nickel in contact zone; tin-lead over nickel in termination area.
- PCB space is maximized due to the low profile and vertical eject.
- Installable polarizing keys can be used to offer a military type of polarization.
- Header provides strong, positive stops for ejector.
- Retainer-ejector latches easily disengage header and mating socket and do not stress the cable termination and solder joint areas during disconnect.
- Ejectors provide for maximum ejection of the female socket.
- Header has a rugged box construction to withstand ejection loads.
- Available with straight or right angle solder tails.
- Available with optional retention feature.



Vertical ejector design uses minimum PCB space.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

501-1007ESR

- **501** — *T&B Series*
- **10** — *Number of Positions*
- **07** — *Right angle configuration .062" THK P.C. board*
  17 — *Right angle configuration .125" THK P.C. board*
  27 — *Straight configuration .062" THK P.C. board*
  37 — *Straight configuration .125" THK P.C. board*
- **E** — *Latches required to accommodate female socket transition connectors without strain relief*
  ES — *Latches required to accommodate female socket transition connectors with strain relief*
- **R** — *Optional Retention Feature (Leave Blank When Not Required)*

***622-0056P** - Polarization Key*

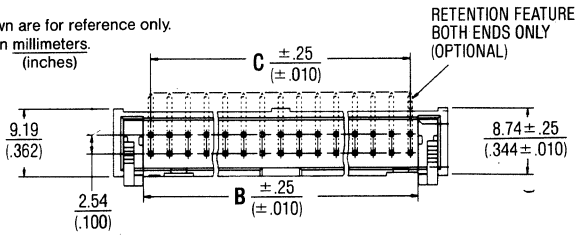
Low Profile PCB Headers With Vertical Retainer/Ejector Latches, Right Angle Pins

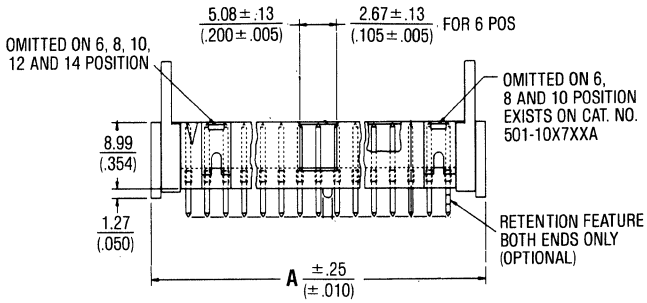
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

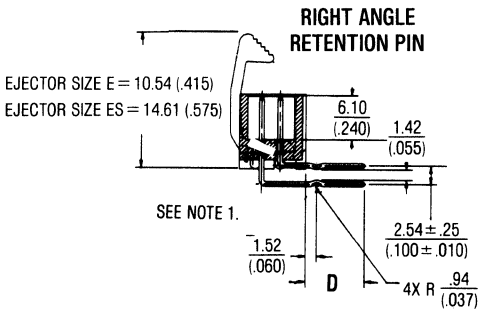
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

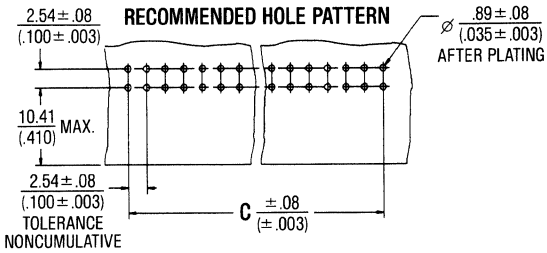
Environmental Properties
Temperature Rating: −55°C to 125°C.

Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)









Ordering Information

CATALOG NUMBERS		NO. OF POS.	DIMENSIONS IN MM (INCHES)		
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS		A	B	C
D 2.59 ± .25 (.102 ± .010)	D 4.11 ± .25 (.162 ± .010)				
501-0607XX	501-0617XX	6	15.24 (.600)	7.11 (.280)	5.08 (.200)
501-1007XX	501-1017XX	10	20.32 (.800)	12.19 (.480)	10.16 (.400)
501-1207XX	501-1217XX	12	22.86 (.900)	14.73 (.580)	12.70 (.500)
501-1407XX	501-1417XX	14	25.40 (1.000)	17.27 (.680)	15.24 (.600)
501-1607XX	501-1617XX	16	27.94 (1.100)	19.81 (.780)	17.78 (.700)
501-2007XX	501-2017XX	20	33.02 (1.300)	24.89 (.980)	22.86 (.900)
501-2407XX	501-2417XX	24	38.10 (1.500)	29.97 (1.180)	27.94 (1.100)
501-2607XX	501-2617XX	26	40.64 (1.600)	32.51 (1.280)	30.48 (1.200)
501-3007XX	501-3017XX	30	45.72 (1.800)	37.59 (1.480)	35.56 (1.400)
501-3407XX	501-3417XX	34	50.80 (2.000)	42.67 (1.680)	40.64 (1.600)
501-3607XX	501-3617XX	36	53.34 (2.100)	45.21 (1.780)	43.18 (1.700)
501-4007XX	501-4017XX	40	58.42 (2.300)	50.29 (1.980)	48.26 (1.900)
501-4407XX	501-4417XX	44	63.50 (2.500)	55.37 (2.180)	53.34 (2.100)
501-5017XX	501-5017XX	50	71.12 (2.800)	62.99 (2.480)	60.96 (2.400)
501-6007XX	501-6017XX	60	83.82 (3.300)	75.69 (2.980)	73.66 (2.900)
501-6407XX	501-6417XX	64	88.90 (3.500)	80.77 (3.180)	78.74 (3.100)

1. FOR LONG EJECTORS, ADD SUFFIX ES
FOR SHORT EJECTORS, ADD SUFFIX E

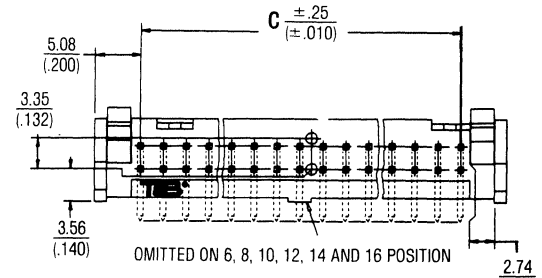
Low Profile PCB Headers With Vertical Retainer/Ejector Latches, Straight Pins

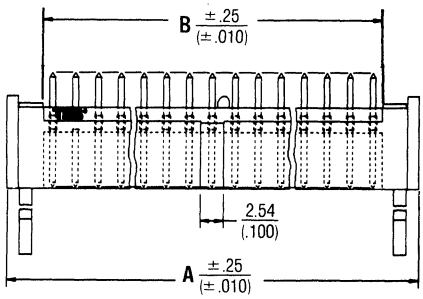
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

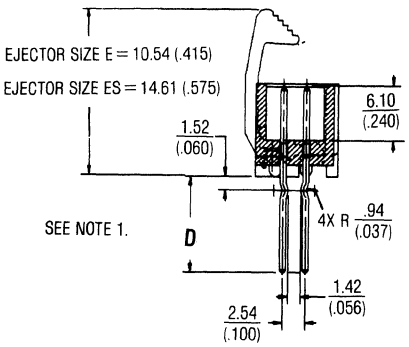
Environmental Properties
Temperature Rating: −55°C to 125°C.

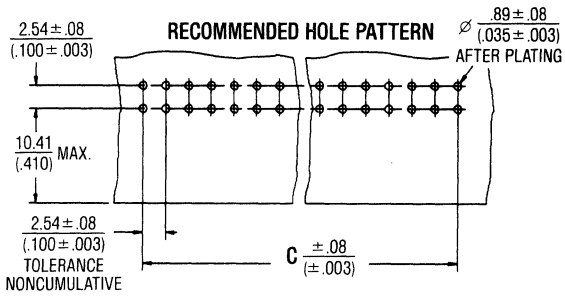
Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)





STRAIGHT RETENTION PIN





Ordering Information

CATALOG NUMBERS		NO. OF POS.	DIMENSIONS IN MM (INCHES)		
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS		A	B	C
D 2.59 ± .25 (.102 ± .010)	D 4.11 ± .25 (.162 ± .010)				
501-0627XX	501-0637XX	6	15.24 (.600)	7.11 (.280)	5.08 (.200)
501-1027XX	501-1037XX	10	20.32 (.800)	12.19 (.480)	10.16 (.400)
501-1227XX	501-1237XX	12	22.86 (.900)	14.73 (.580)	12.70 (.500)
501-1427XX	501-1437XX	14	25.40 (1.000)	17.27 (.680)	15.24 (.600)
501-1627XX	501-1637XX	16	27.94 (1.100)	19.81 (.780)	17.78 (.700)
501-2027XX	501-2037XX	20	33.02 (1.300)	24.89 (.980)	22.86 (.900)
501-2427XX	501-2437XX	24	38.10 (1.500)	29.97 (1.180)	27.94 (1.100)
501-2627XX	501-2637XX	26	40.64 (1.600)	32.51 (1.280)	30.48 (1.200)
501-3027XX	501-3037XX	30	45.72 (1.800)	37.59 (1.480)	35.56 (1.400)
501-3427XX	501-3437XX	34	50.80 (2.000)	42.67 (1.680)	40.64 (1.600)
501-3627XX	501-3637XX	36	53.34 (2.100)	45.21 (1.780)	43.18 (1.700)
501-4027XX	501-4037XX	40	58.42 (2.300)	50.29 (1.980)	48.26 (1.900)
501-4427XX	501-4437XX	44	63.50 (2.500)	55.37 (2.180)	53.34 (2.100)
501-5027XX	501-5037XX	50	71.12 (2.800)	62.99 (2.480)	60.96 (2.400)
501-6027XX	501-6037XX	60	83.82 (3.300)	75.69 (2.980)	73.66 (2.900)
501-6427XX	501-6437XX	64	88.90 (3.500)	80.77 (3.180)	78.74 (3.100)

1. FOR LONG EJECTORS, ADD SUFFIX ES
FOR SHORT EJECTORS, ADD SUFFIX E

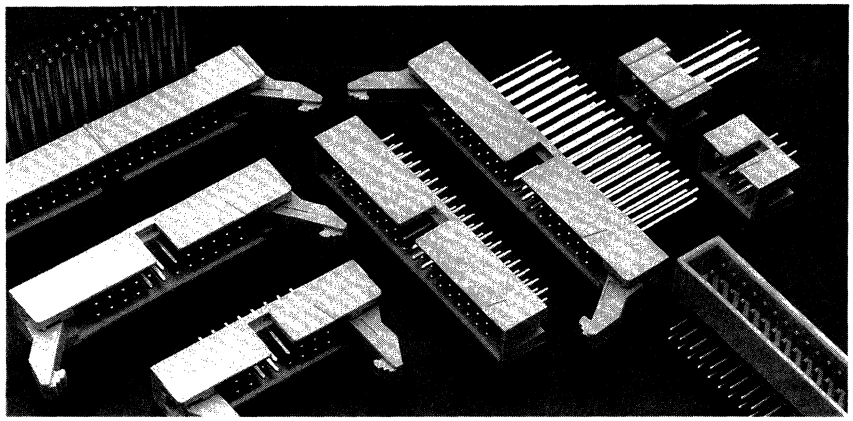
LOW PROFILE PCB HEADERS WITH AND WITHOUT SIDE EJECTORS

Product Description

The Low Profile PCB Male Header is designed to provide stability, reliability, convenience, and positive polarization when mated with a Female Socket Transition Connector in PC board applications which require repeated connection and disconnection.

Design Advantages

- 18 contact sizes—6, 8, 10, 12, 14, 16, 20, 24, 26, 30, 34, 36, 40, 44, 50, 56, 60 and 64 positions.
- Center polarization slot mates with center polarization tab on Female Socket Transition Connectors.
- 30μ" (minimum) gold plating in contact mating areas.
- Available with straight or right angle wrap post tails; straight or right angle solder tails (for use with either 1.57mm (.062") or 3.18mm (.125") thick boards).
- Optional retainer/ejector latches ease insertion/withdrawal and protect IDC terminations.
- Fully-shrouded (four-walled) design provides maximum protection of .635mm (.025") square mating pins and assures positive polarization—the header cannot be incorrectly engaged with its corresponding Female Socket Transition Connector.



Maximize packaging density with low profile header body

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

609-1007ESR

- **609** — *T&B Series*
- **10** — *Number of Positions*
- **07** — *Solder Tail Header (.062" PCB), Right Angle Contacts*
  - *17 - Solder Tail Header (.125" PCB), Right Angle Contacts*
  - *27 - Straight Solder Tail for .062" PCB*
  - *37 - Straight Solder Tail for .125" PCB*
  - *47 - Right Angle Wrap Post Tail*
  - *57 - Straight Wrap Post Tail*
- **E** — *With Ejector Latches to accommodate Female Socket Connector without Strain Relief*
  - *Leave blank - when not required*
  - *ES - With Ejector Latches to accommodate Female Socket Connector with Strain Relief*
- **SR** — *Optional Retention Feature (Leave Blank When Not Required)*

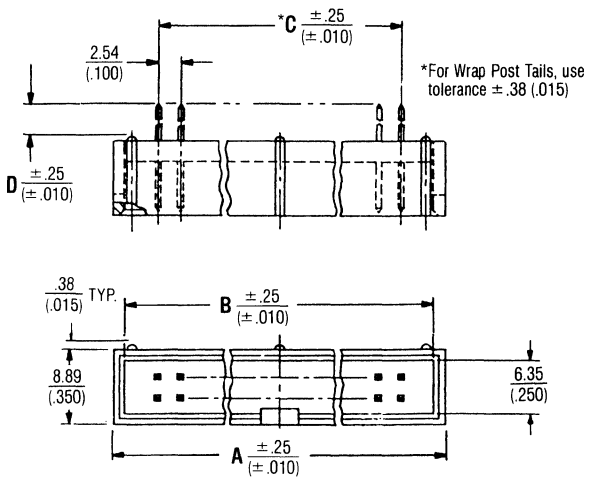
Low Profile PCB Headers Straight Pins

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

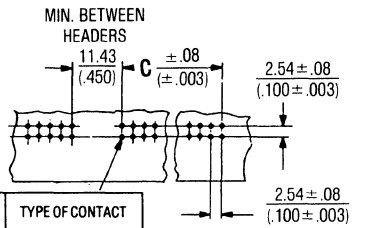
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

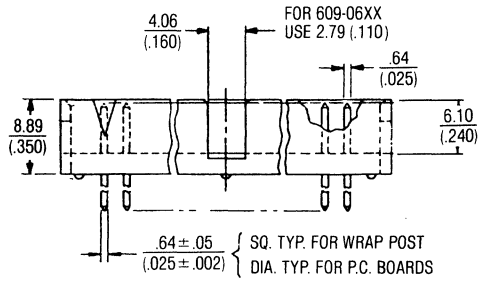
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



RECOMMENDED HOLE PATTERN



HOLE DIA. ±.08(±.003) AFTER PLATING	TYPE OF CONTACT
.89(.035)	PCB SOLDER TAILS
1.14(.045)	WRAP POST TAILS



Ordering Information

CATALOG NUMBERS			NO. OF POS.	DIMENSIONS IN MM (INCHES)		
DIMENSIONS "D" IN MM (INCHES)						
2.59 (.102)	4.19 (.165)	15.49 (.610)				
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS	WRAP POST TAILS		A	B	C
609-0627	609-0637	609-0657	6	15.24 (.600)	12.70 (.500)	5.80 (.200)
609-0827	609-0837	609-0857	8	17.78 (.700)	15.24 (.600)	7.26 (.300)
609-1027	609-1037	609-1057	10	20.32 (.800)	17.78 (.700)	10.16 (.400)
609-1227	609-1237	609-1257	12	22.86 (.900)	20.32 (.800)	17.70 (.500)
609-1427	609-1437	609-1457	14	25.40 (1.000)	22.86 (.900)	15.24 (.600)
609-1627	609-1637	609-1657	16	27.94 (1.100)	25.40 (1.000)	17.78 (.700)
609-2027	609-2037	609-2057	20	33.02 (1.300)	30.48 (1.200)	22.86 (.900)
609-2427	609-2437	609-2457	24	38.10 (1.500)	35.56 (1.400)	27.94 (1.100)
609-2627	609-2637	609-2657	26	40.64 (1.600)	38.10 (1.500)	30.48 (1.200)
609-3027	609-3037	609-3057	30	42.72 (1.800)	43.18 (1.700)	35.56 (1.400)
609-3427	609-3437	609-3457	34	50.80 (2.000)	48.26 (1.900)	40.64 (1.600)
609-3627	609-3637	609-3657	36	53.34 (2.100)	50.80 (2.000)	43.18 (1.700)
609-4027	609-4037	609-4057	40	58.42 (2.300)	55.88 (2.200)	48.26 (1.900)
609-4427	609-4437	609-4457	44	63.50 (2.500)	60.96 (2.400)	53.34 (2.100)
609-5027	609-5037	609-5057	50	71.12 (2.800)	68.58 (2.700)	60.96 (2.400)
609-5627	609-5637	609-5657	56	78.74 (3.100)	76.20 (3.000)	68.58 (2.700)
609-6027	609-6037	609-6057	60	83.82 (3.300)	81.28 (3.200)	73.66 (2.900)
609-6427	609-6437	609-6457	64	88.90 (3.500)	86.36 (3.400)	78.74 (3.100)

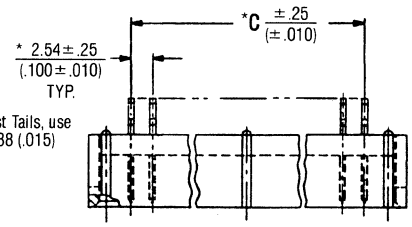
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

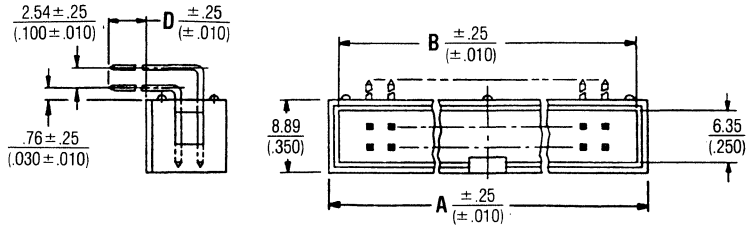
Low Profile PCB Headers Right Angle Pins

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

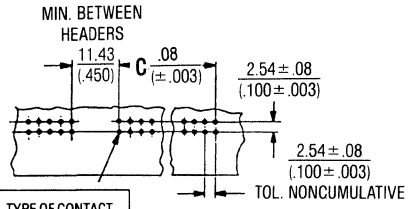
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

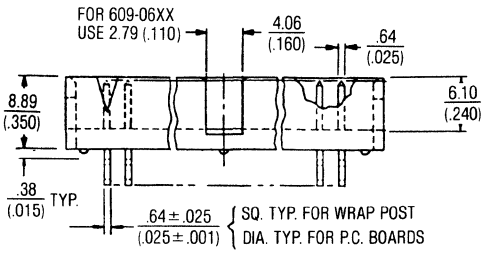




RECOMMENDED HOLE PATTERN



HOLE DIA. ±.08(±.003) AFTER PLATING	TYPE OF CONTACT
.89(.035)	PCB SOLDER TAILS
1.14(.045)	WRAP POST TAILS



Ordering Information

CATALOG NUMBERS DIMENSIONS "D" IN MM (INCHES)			NO. OF POS.	DIMENSIONS IN MM (INCHES)		
2.59 (.102)	4.19 (.165)	15.49 (.610)				
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS	WRAP POST TAILS		A	B	C
609-0607	609-0617	609-0647	6	15.24 (.600)	12.70 (.500)	5.80 (.200)
609-0807	609-0817	609-0847	8	17.78 (.700)	15.24 (.600)	7.62 (.300)
609-1007	609-1017	609-1047	10	20.32 (.800)	17.78 (.700)	10.16 (.400)
609-1207	609-1217	609-1247	12	22.86 (.900)	20.32 (.800)	17.70 (.500)
609-1407	609-1417	609-1447	14	25.40 (1.000)	22.86 (.900)	15.24 (.600)
609-1607	609-1617	609-1647	16	27.94 (1.100)	25.40 (1.000)	17.75 (.700)
609-2007	609-2017	609-2047	20	33.02 (1.300)	30.48 (1.200)	22.86 (.900)
609-2407	609-2417	609-2447	24	38.10 (1.500)	35.56 (1.400)	27.94 (1.100)
609-2607	609-2617	609-2647	26	40.64 (1.600)	38.10 (1.500)	30.48 (1.200)
609-3007	609-3017	609-3047	30	45.72 (1.800)	43.18 (1.700)	35.56 (1.400)
609-3407	609-3417	609-3447	34	50.80 (2.000)	48.26 (1.900)	40.64 (1.600)
609-3607	609-3617	609-3647	36	53.34 (2.100)	50.80 (2.000)	43.18 (1.700)
609-4007	609-4017	609-4047	40	58.42 (2.300)	55.88 (2.200)	48.26 (1.900)
609-4407	609-4417	609-4447	44	63.50 (2.500)	60.96 (2.400)	53.34 (2.100)
609-5007	609-5017	609-5047	50	71.12 (2.800)	68.58 (2.700)	60.96 (2.400)
609-5607	609-5617	609-5647	56	78.74 (3.100)	76.20 (3.000)	68.58 (2.700)
609-6007	609-6017	609-6047	60	83.82 (3.300)	81.28 (3.200)	73.66 (2.900)
609-6407	609-6417	609-6447	64	88.90 (3.500)	86.36 (3.400)	78.74 (3.100)

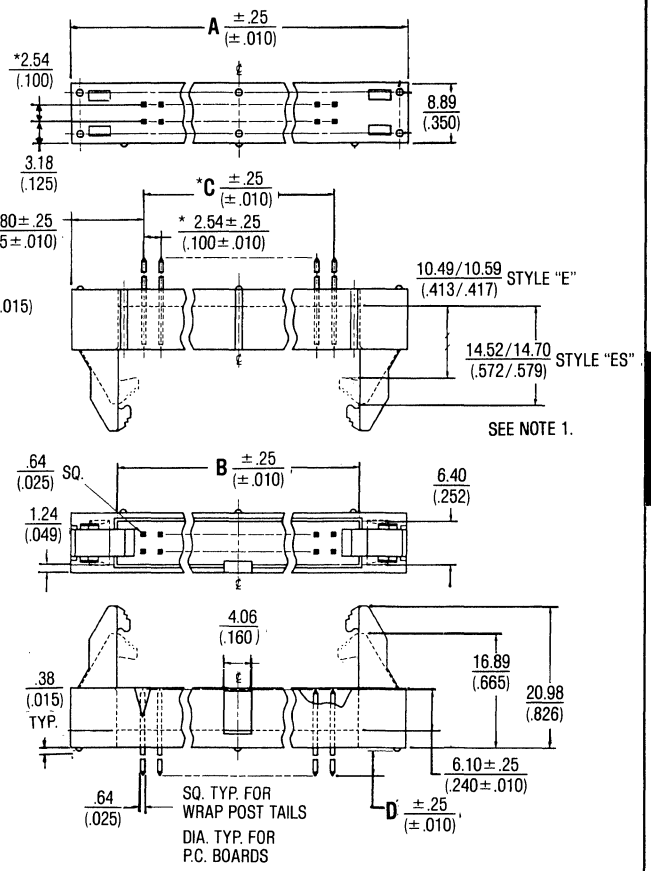
Low Profile PCB Headers Straight Pins With Retainer Ejector Latches

Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

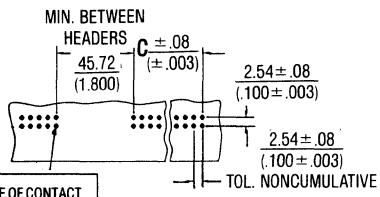
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.



*For Wrap Post Tails, use tolerance ±.38 (.015)

RECOMMENDED HOLE PATTERN



HOLE DIA. ±.08(±.003) AFTER PLATING	TYPE OF CONTACT
.89(.035)	PCB SOLDER TAILS
1.14(.045)	WRAP POST TAILS

Ordering Information

CATALOG NUMBERS DIMENSIONS "D" IN MM (INCHES)			NO. OF POS.	DIMENSIONS IN MM (INCHES)		
2.59 (.102)	4.19 (.165)	15.49 (.610)				
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS	WRAP POST TAILS		A	B	C
609-0827XX	609-0837XX	609-0857XX	8	29.21 (1.150)	15.24 (.600)	7.62 (.300)
609-1027XX	609-1037XX	609-1057XX	10	31.75 (1.250)	17.78 (.700)	10.16 (.400)
609-1227XX	609-1237XX	609-1257XX	12	34.29 (1.350)	20.32 (.800)	12.70 (.500)
609-1427XX	609-1437XX	609-1457XX	14	36.83 (1.450)	22.86 (.900)	15.24 (.600)
609-1627XX	609-1637XX	609-1657XX	16	39.37 (1.550)	25.40 (1.000)	17.78 (.700)
609-2027XX	609-2037XX	609-2057XX	20	44.45 (1.750)	30.48 (1.200)	22.86 (.900)
609-2427XX	609-2437XX	609-2457XX	24	49.53 (1.950)	35.56 (1.400)	27.94 (1.100)
609-2627XX	609-2637XX	609-2657XX	26	52.07 (2.050)	38.10 (1.500)	30.48 (1.200)
609-3027XX	609-3037XX	609-3057XX	30	57.15 (2.250)	43.18 (1.700)	35.56 (1.400)
609-3427XX	609-3437XX	609-3457XX	34	62.23 (2.450)	48.26 (1.900)	40.64 (1.600)
609-3627XX	609-3637XX	609-3657XX	36	64.77 (2.550)	50.80 (2.000)	46.18 (1.700)
609-4027XX	609-4037XX	609-4057XX	40	69.85 (2.750)	55.88 (2.200)	48.26 (1.900)
609-4427XX	609-4437XX	609-4457XX	44	74.93 (2.950)	60.95 (2.400)	53.34 (2.100)
609-5027XX	609-5037XX	609-5057XX	50	82.55 (3.250)	68.58 (2.700)	60.96 (2.400)
609-5627XX	609-5637XX	609-5657XX	56	90.17 (3.550)	76.20 (3.000)	68.58 (2.700)
609-6027XX	609-6037XX	609-6057XX	60	95.25 (3.750)	81.28 (3.200)	73.66 (2.900)
609-6427XX	609-6437XX	609-6457XX	64	100.33 (3.950)	85.36 (3.400)	78.74 (3.100)

1. FOR LONG EJECTORS, ADD SUFFIX ES
FOR SHORT EJECTORS, ADD SUFFIX E

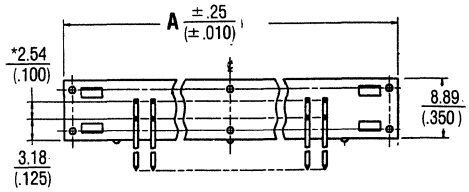
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

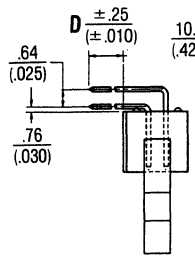
Low Profile PCB Headers Right Angle Pins With Retainer Ejector Latches

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

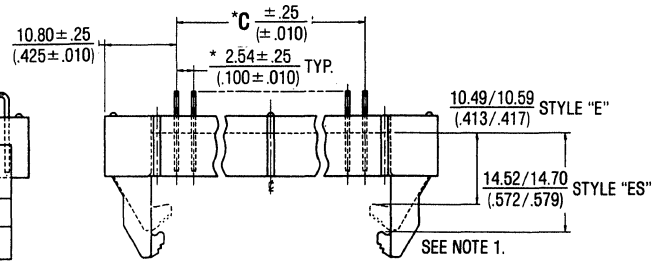
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

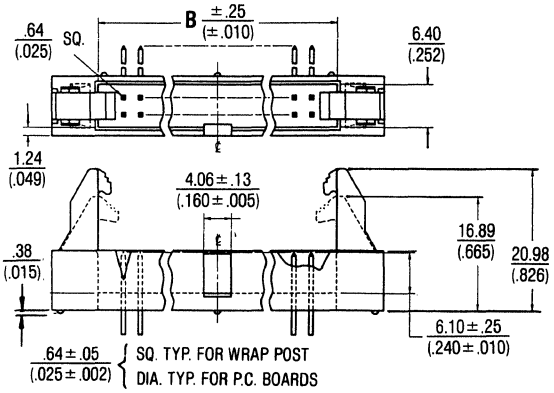
Environmental Properties
Temperature Rating: −55°C to 125°C.



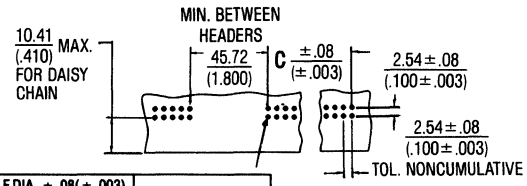


*For Wrap Post Tails, use tolerance ±.38 (.015)





RECOMMENDED HOLE PATTERN



HOLE DIA. ±.08(±.003) AFTER PLATING	TYPE OF CONTACT
.89(.035)	PCB SOLDER TAILS
1.14(.045)	WRAP POST TAILS

Ordering Information

CATALOG NUMBERS				DIMENSIONS IN MM (INCHES)		
DIMENSIONS "D" IN MM (INCHES)						
2.59 (.102)	4.19 (.165)	15.49 (.610)	NO. OF POS.	A	B	C
1.57 (.062) P.C. BOARDS	3.18 (.125) P.C. BOARDS	WRAP POST TAILS				
609-0807XX	609-0817XX	609-0847XX	8	29.21 (1.150)	15.24 (.600)	7.62 (.300)
609-1007XX	609-1017XX	609-1047XX	10	31.75 (1.250)	17.78 (.700)	10.16 (.400)
609-1207XX	609-1217XX	609-1247XX	12	34.29 (1.350)	20.32 (.800)	12.70 (.500)
609-1407XX	609-1417XX	609-1447XX	14	36.83 (1.450)	22.86 (.900)	15.24 (.600)
609-1607XX	609-1617XX	609-1647XX	16	39.37 (1.550)	25.40 (1.000)	17.78 (.700)
609-2007XX	609-2017XX	609-2047XX	20	44.45 (1.750)	30.48 (1.200)	22.86 (.900)
609-2407XX	609-2417XX	609-2447XX	24	49.53 (1.950)	35.56 (1.400)	27.94 (1.100)
609-2607XX	609-2617XX	609-2647XX	26	52.07 (2.050)	38.10 (1.500)	30.48 (1.200)
609-3007XX	609-3017XX	609-3047XX	30	57.15 (2.250)	43.18 (1.700)	35.56 (1.400)
609-3407XX	609-3417XX	609-3447XX	34	62.23 (2.450)	48.26 (1.900)	40.64 (1.600)
609-3607XX	609-3617XX	609-3647XX	36	64.77 (2.550)	50.80 (2.000)	46.18 (1.700)
609-4007XX	609-4017XX	609-4047XX	40	69.85 (2.750)	55.88 (2.200)	48.26 (1.900)
609-4407XX	609-4417XX	609-4447XX	44	74.93 (2.950)	60.95 (2.400)	53.34 (2.100)
609-5007XX	609-5017XX	609-5047XX	50	82.55 (3.250)	68.58 (2.700)	60.96 (2.400)
609-5607XX	609-5617XX	609-5647XX	56	90.17 (3.550)	76.20 (3.000)	68.58 (2.700)
609-6007XX	609-6017XX	609-6047XX	60	95.25 (3.750)	81.28 (3.200)	73.66 (2.900)
609-6407XX	609-6417XX	609-6447XX	64	100.33 (3.950)	86.36 (3.400)	78.74 (3.100)

1. FOR LONG EJECTORS, ADD SUFFIX ES
FOR SHORT EJECTORS, ADD SUFFIX E

FLEX-FIT™ COMPLIANT CONTACT PCB HEADERS

Product Description

The Compliant Contact Header provides reliable, solderless press-fit termination to PC boards and backpanels. Its lock/ejector feature assures positive contact and easy ejection capability. The header features Flex-Fit™ Compliant Contacts and is compatible with flat cable female socket connectors. The Flex-Fit™ Compliant Contact minimizes PCB plated through-hole deformation, and conforms to the requirements of MIL-STD-2166.

Contacts can be removed and replaced without compromising mechanical or electrical performance.

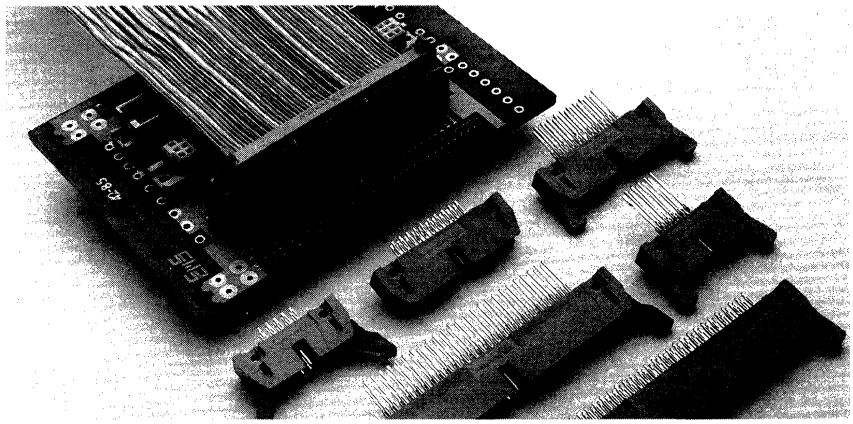
Design Advantages

- Lock/eject option for positive connector latching.
- Available in 10 contact sizes—10, 14, 16, 20, 26, 34, 40, 50, 60 and 64 positions.
- Ejector versions E, ES.
- Flex-Fit™ Compliant Contact meets the performance requirements of MIL-STD-2166.
- Finished plated through-hole range: .037" through .043".
- PCB thickness: .062"-.125".
- Select from a wide range of flat cables and connectors for specific backpanel cabling applications.
- The superior compliant properties of the Flex-Fit™ Contact eliminate costly plated through-hole damage or cut-through.

Application Tooling

Platen for XX4 and XX7
Flex-Fit™ Headers 889-H7XX

XX=Number of Positions



For press-fit solderless backpanel applications.

Ordering Information

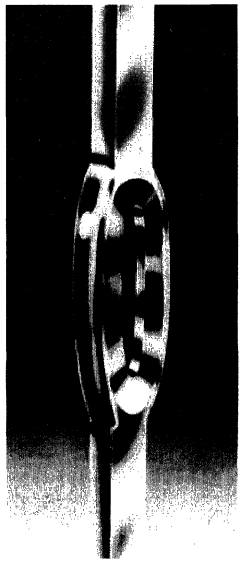
The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

609-26400-2

- **609** — *T&B Series*
- **26** — *Number of Positions 10-64*
- **4** — *Header Type 4 - Standard 7 - Low Profile*
- **0** — *Style 0 - No Ejector/Retainer*
- **0** — *Tail Length E 0 — Level 4.67 (.184) Tin/Lead only*
- **2** — *Plating Code Mating End 2 — 30 Microinches Gold*

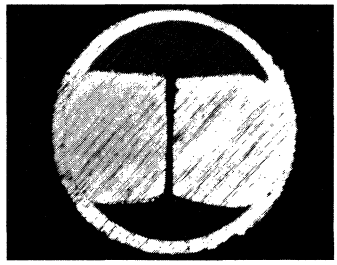
Ejector Ears Sold Separately
609-0004E - no strain relief
609-0004ES - strain relief

FLEX-FIT™ Compliant Contact Headers

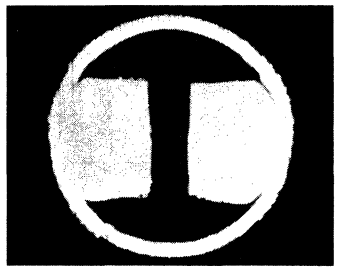


- Flexural properties of the contact beams minimize hole deformation, and eliminate the potential for hole wall cut-through.
- Two flexible contact beams provide compliancy within the full range of finished hole sizes.
- Smooth, coined contact edges conform to the PCB hole radius.

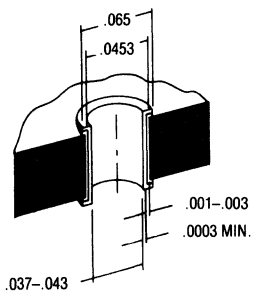
Centerplane cross section of the Flex-Fit™ Compliant Pin in a 0.037″ diameter finished through-hole. (.125″ PCB)



Centerplane cross section of the Flex-Fit™ Compliant Pin in a 0.043″ diameter finished through-hole.



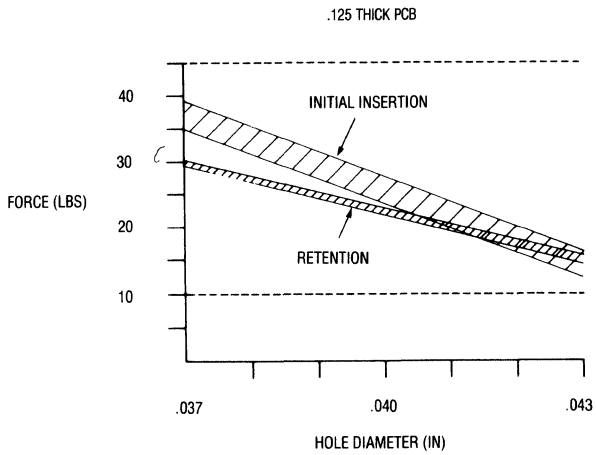
Flex-Fit™ Compliant Pin Recommended PCB Hole Size Specifications.



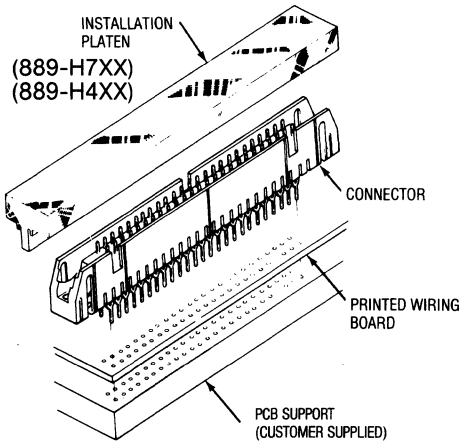
PLATED THROUGH-HOLE SPECIFICATIONS

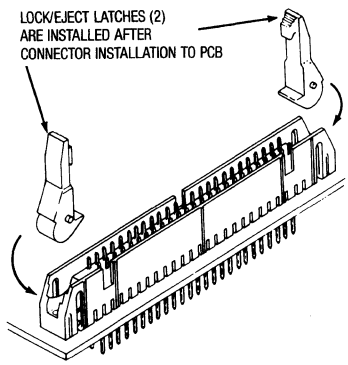
REQUIRED DRILL SIZE	0.0453 (1.15)	
DRILLED HOLE DIS. ±.0010 (±0.025)	0.0453 (1.15)	
PLATING THICKNESS	COPPER .001-.003 (0.03-0.08)	TIN/LEAD .0003 (0.0076) MIN.
HOLE DIA.	AFTER PLATING .037-.043 (0.94-1.09)	
PAD DIA. MIN.	.065 (1.65)	

Note: All dimensions in inches (mm)



Flex-Fit™ Compliant pin initial insertion and retention forces in 0.125″ thick PCB plated through-holes.





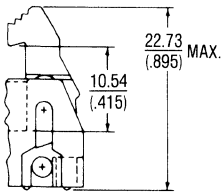
FLEX-FIT™ Compliant Contact Headers With Lock/Eject Latches

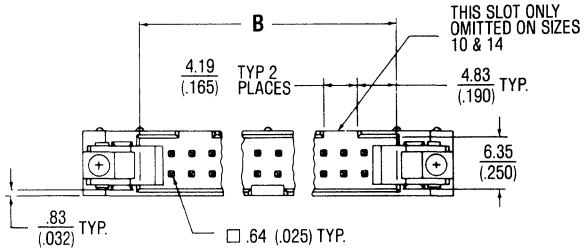
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

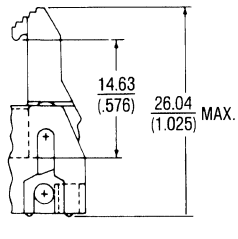
Environmental Properties
Temperature Rating: −55°C to 125°C.

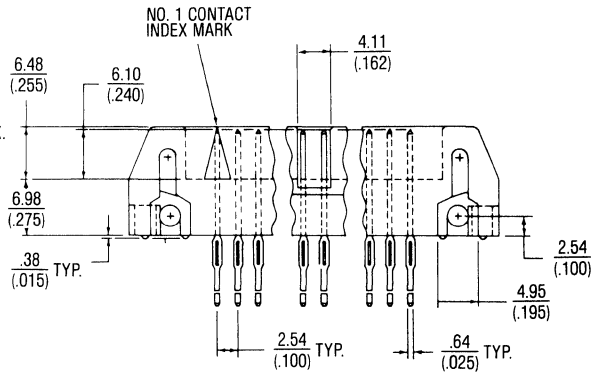
CAT. NO. 609-0004E WITHOUT STRAIN RELIEF



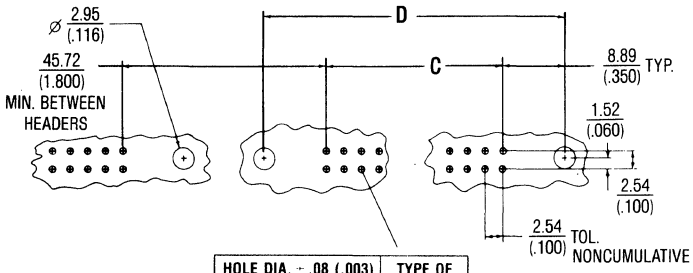


CAT. NO. 609-0004ES WITH STRAIN RELIEF

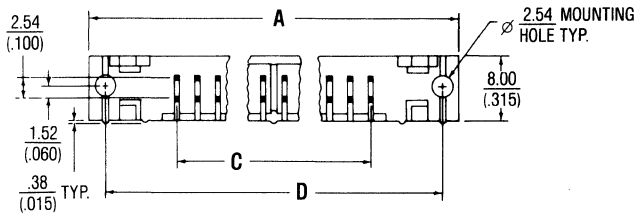




RECOMMENDED HOLE PATTERN



HOLE DIA. ± .08 (.003) AFTER PLATING	TYPE OF CONTACT
1.02 (.040)	FLEX-FIT™



Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Ordering Information

CATALOG NUMBERS	NO. OF POS.	DIMENSIONS IN MM (INCHES)			
		A	B	C	D
609-10400-2	10	32.00 (1.260)	17.53 (.690)	10.16 (.400)	27.94 (1.100)
609-14400-2	14	37.08 (1.460)	22.61 (.890)	15.24 (.600)	33.02 (1.300)
609-16400-2	16	39.62 (1.560)	25.15 (.990)	17.78 (.700)	35.56 (1.400)
609-20400-2	20	44.70 (1.760)	30.23 (1.190)	22.86 (.900)	40.64 (1.600)
609-26400-2	26	52.32 (2.060)	37.85 (1.490)	30.48 (1.200)	48.26 (1.900)
609-34400-2	34	62.48 (2.460)	48.01 (1.890)	40.64 (1.600)	58.42 (2.300)
609-40400-2	40	70.10 (2.760)	55.63 (2.190)	48.26 (1.900)	66.04 (2.600)
609-50400-2	50	82.80 (3.260)	68.33 (2.690)	60.96 (2.400)	78.74 (3.100)
609-60400-2	60	95.50 (3.760)	81.03 (3.190)	73.66 (2.900)	91.44 (3.600)
609-64400-2	64	100.58 (3.960)	86.11 (3.390)	78.74 (3.100)	96.52 (3.800)

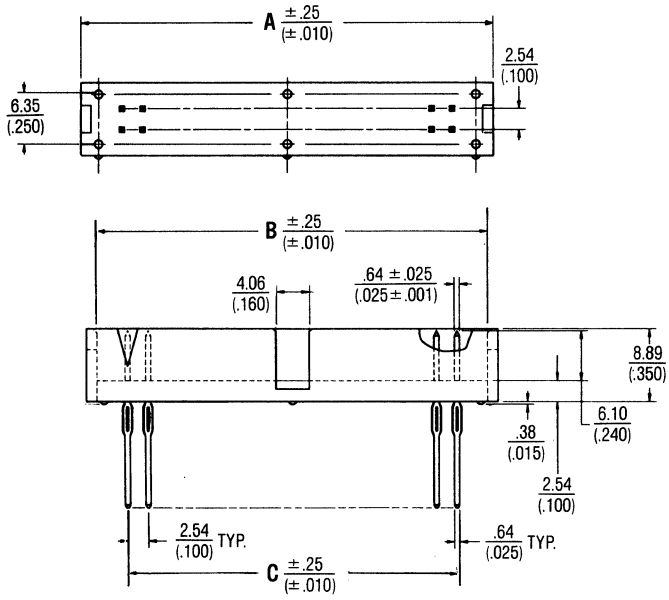
1. FOR LONG EJECTORS, ADD SUFFIX ES
FOR SHORT EJECTORS, ADD SUFFIX E

Low Profile FLEX-FIT™ Compliant Contact Headers

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

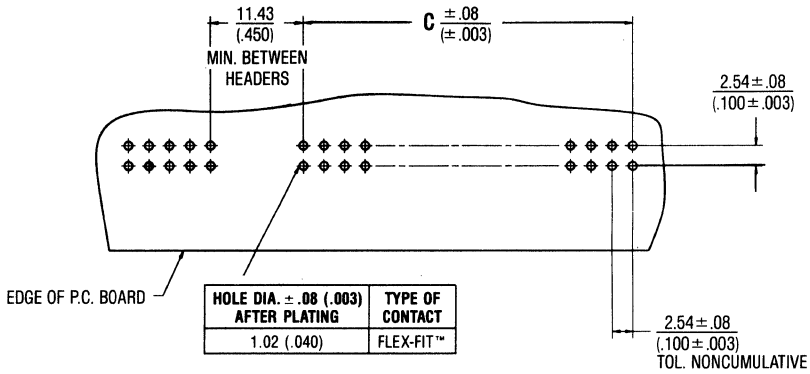
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.



Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

RECOMMENDED HOLE PATTERN



HOLE DIA. ±.08 (.003) AFTER PLATING	TYPE OF CONTACT
1.02 (.040)	FLEX-FIT™

Ordering Information

CATALOG NUMBERS	NO. OF POS.	DIMENSIONS IN MM (INCHES)		
		A	B	C
609-10700-2	10	31.75 (1.250)	17.78 (0.700)	10.16 (0.400)
609-14700-2	14	36.83 (1.450)	22.86 (0.900)	15.24 (0.600)
609-16700-2	16	39.37 (1.550)	25.40 (1.000)	17.78 (0.700)
609-20700-2	20	44.45 (1.750)	30.48 (1.200)	22.86 (0.900)
609-24700-2	24	49.53 (1.950)	35.56 (1.400)	27.94 (1.100)
609-26700-2	26	52.07 (2.050)	38.10 (1.500)	30.48 (1.200)
609-34700-2	34	62.23 (2.450)	48.26 (1.900)	40.64 (1.600)
609-36700-2	36	64.77 (2.550)	50.80 (2.000)	46.18 (1.700)
609-40700-2	40	69.85 (2.750)	55.88 (2.200)	48.26 (1.900)
609-44700-2	44	74.93 (2.950)	60.95 (2.400)	53.34 (2.100)
609-50700-2	50	82.55 (3.250)	68.58 (2.700)	60.96 (2.400)
609-56700-2	56	90.17 (3.550)	76.20 (3.000)	68.58 (2.700)
609-60700-2	60	95.25 (3.750)	81.28 (3.200)	73.66 (2.900)
609-64700-2	64	100.33 (3.950)	86.36 (3.400)	78.74 (3.100)

SURFACE MOUNT LOW PROFILE PCB HEADER 6 THROUGH 64 POSITIONS

Product Description

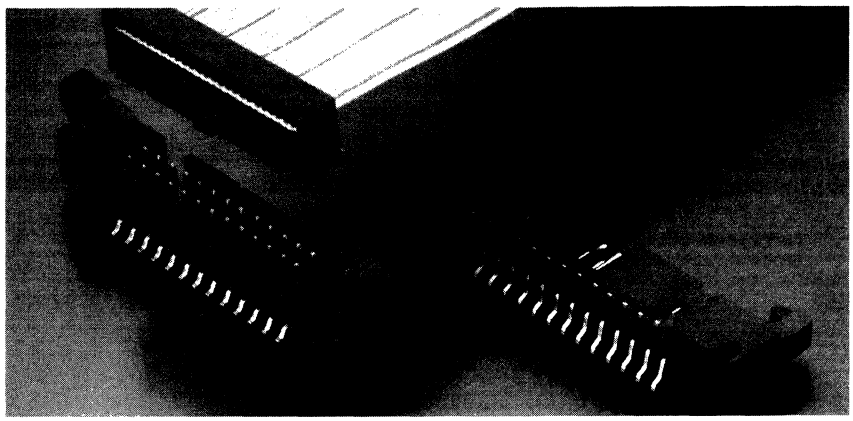
The Surface Mount Header is designed to facilitate excellent solder fillet when utilizing surface mount techniques. This assures reliable, stress-free solder joints. The surface mount header can also be loaded using automation techniques, resulting in lower installation cost. As with all surface mount technology, both sides of the printed circuit board may be utilized for maximum component loading. Elimination of through-holes permits increased signal density.

Design Advantages

- 17 contact sizes—6, 8, 10, 12, 14, 16, 20, 24, 26, 30, 34, 40, 44, 50, 56, 60 and 64 positions.
- Plating—30 microinches of gold over nickel.
- Dual polarization and center bump polarization included on each connector.
- High temperature plastic withstands reflow soldering techniques.
- Packaged in tubes for automatic feed system.
- Polarizing keys available.
- .100" x .100" centerline pins.

Features and Benefits

- The unique gull wing contact design assures reliable, exacting solder fillet.
- Stress-free solder joints are assured due to the compliancy of the foot.
- Two hold-down options are available: screw mount or press-fit.
- Loading of components may be accomplished through automation techniques.
- The contact transition area is supported by a plastic header which eliminates potential stress points.
- Either vapor phase or infrared solder can be used.
- Designed with retainer-ejector latches which accommodate terminated female socket connectors either with or without strain reliefs.
- Engaged latching header provides a stable connection with little chance of unintentional disengagement due to vibration or mishandling.



Gull wing contact design assures reliable solder fillet.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

SMH-06270-2 A

- SMH — T&B Series
- 06 — Number of Positions
- 2 — Mounted Style: 2 Mounting Hole, 3 Mounting Post
- 7 — Low Profile
- 0 — 0 = No Ejector/Retainer; 1 = Ejector/Retainer without Strain Relief; 2 = Ejector/Retainer with Strain Relief
- 2 — Plating Code: 2 = 30 Microinches Gold
- A — Military Polarization 10 Position Only

622-0056 P — Polarizing Key

Surface Mount Low Profile PCB Header

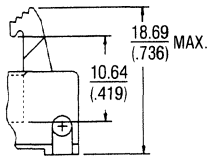
Physical Properties
Insulation Material: High temperature glass filled thermoplastic, rated 94V-0, black.
Contact Material: Phosphor bronze: 30 μ inches gold over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >500 VRMS @ sea level.

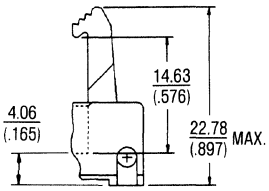
Environmental Properties
Temperature Rating: −55°C to 125°C.

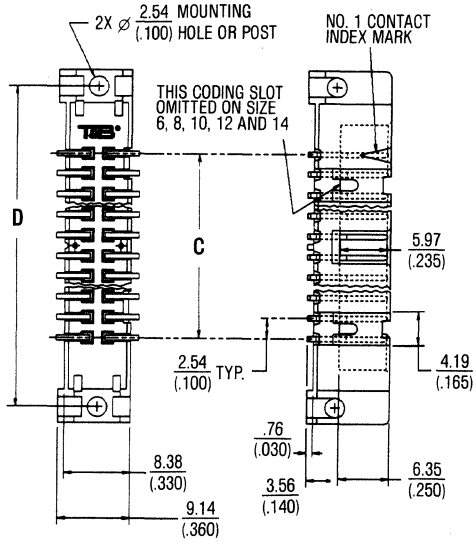
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

STYLE 1
WITHOUT STRAIN RELIEF

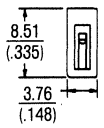


STYLE 2
WITH STRAIN RELIEF

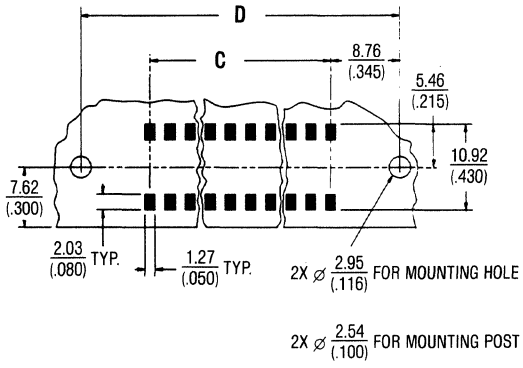


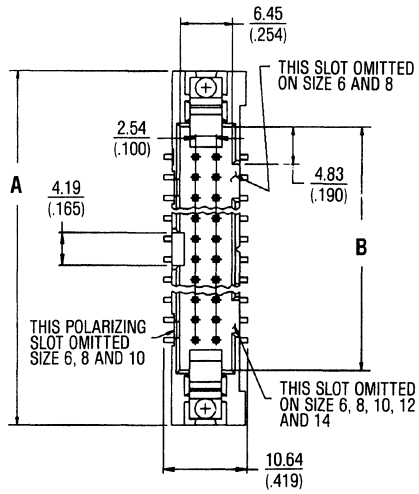


POLARIZING KEY
622-0056P



RECOMMENDED PAD PATTERN





Ordering Information

*CATALOG NUMBERS	NO. OF POS.	DIMENSIONS IN MM (INCHES)			
		A	B	C	D
SMH-06	6	26.67 (1.050)	12.80 (.504)	5.08 (.200)	22.61 (.890)
SMH-08	8	29.21 (1.150)	15.34 (.604)	7.62 (.300)	25.15 (.990)
SMH-10	10	31.75 (1.250)	17.88 (.704)	10.16 (.400)	27.69 (1.090)
SMH-12	12	34.29 (1.350)	20.42 (.804)	12.70 (.500)	30.23 (1.190)
SMH-14	14	36.83 (1.450)	22.96 (.904)	15.24 (.600)	32.77 (1.290)
SMH-16	16	39.37 (1.550)	25.50 (1.004)	17.78 (.700)	35.31 (1.390)
SMH-20	20	44.45 (1.750)	30.58 (1.204)	22.86 (.900)	40.39 (1.590)
SMH-24	24	49.53 (1.950)	35.66 (1.404)	27.94 (1.100)	45.47 (1.790)
SMH-26	26	52.07 (2.050)	38.20 (1.504)	30.48 (1.200)	48.00 (1.890)
SMH-30	30	57.15 (2.250)	43.28 (1.704)	35.56 (1.400)	53.09 (2.090)
SMH-34	34	62.23 (2.450)	48.36 (1.904)	40.64 (1.600)	58.17 (2.290)
SMH-40	40	69.85 (2.750)	55.98 (2.204)	48.26 (1.900)	65.79 (2.590)
SMH-44	44	74.93 (2.950)	61.06 (2.404)	53.34 (2.100)	70.87 (2.790)
SMH-50	50	82.55 (3.250)	68.68 (2.704)	60.96 (2.400)	78.49 (3.090)
SMH-56	56	90.17 (3.550)	76.30 (3.004)	68.58 (2.700)	86.11 (3.390)
SMH-60	60	95.25 (3.750)	81.38 (3.204)	73.66 (2.900)	91.19 (3.590)
SMH-64	64	100.33 (3.950)	86.46 (3.404)	78.74 (3.100)	96.27 (3.790)

*See part number matrix for complete product number

PLASTIC SHELL "D" CONNECTORS 9 THROUGH 50 POSITION

Product Description

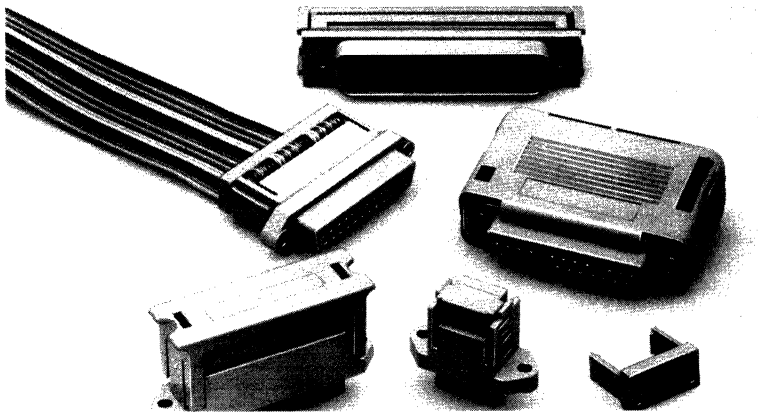
Plastic "D" Connectors are used in panel-mounted I/O applications, providing mass termination, convenience and IDC integrity while maintaining compatibility with all industry-standard "D" connectors. Backshell reliefs and a full complement of mounting hardware accessories are available for this series.

Design Advantages

- Contact Material–Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 4 contact sizes – 9, 15, 25, and 37 positions.
- Pin connector and socket connector versions.
- Backshell strain relief in straight and right angle styles for flat cable.
- Patented contact design enables mass termination to 1.27mm (.050") pitch flat cable while maintaining I/O compatibility with 2.77mm (.109") industry-standard "D" connectors.
- 30 μ inches (minimum) gold plating in contact mating areas.

Application Tooling

Hand Tool	779-2166 (9-37)
with Die	779-2167 (50)
Bench Press (manual)	779-3200
with Platen	779-3139 (9-37)
with Base Plate	779-3130 (50)
Bench Press (pneumatic)	779-3500XT
with Platen	779-3166 (9-37)
with Base Plate	779-3160 (50)



I/O compatibility with all industry-standard "D" connectors.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

609-15P

- **609** — *T&B Series*
- **15** — *Number of Positions*
- **P** — *P - Pin Contacts; S - Socket Contacts*

Strain Relief Included

B

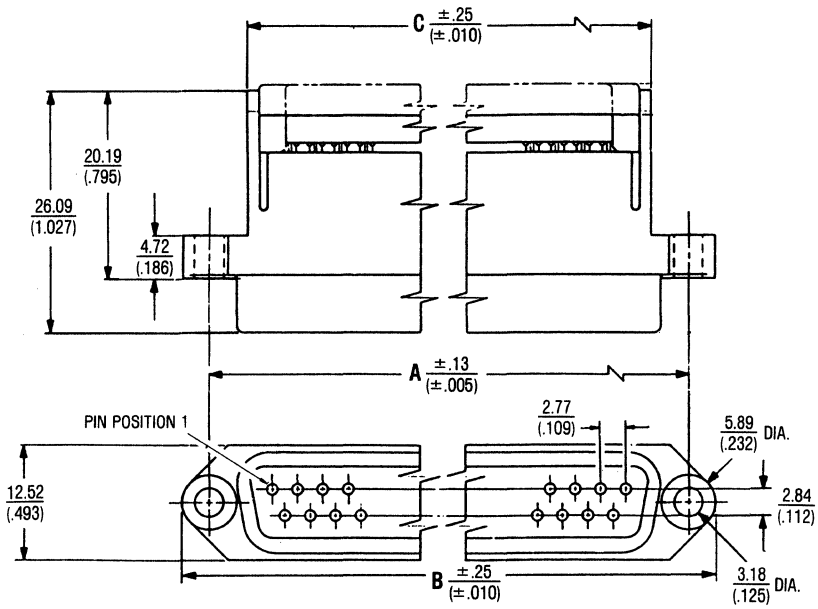
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Plastic Shell "D" Connectors
9-37 Position Pins

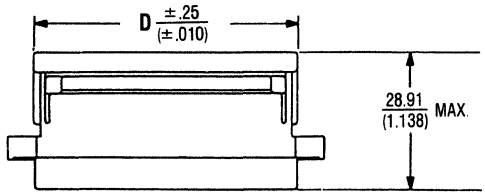
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

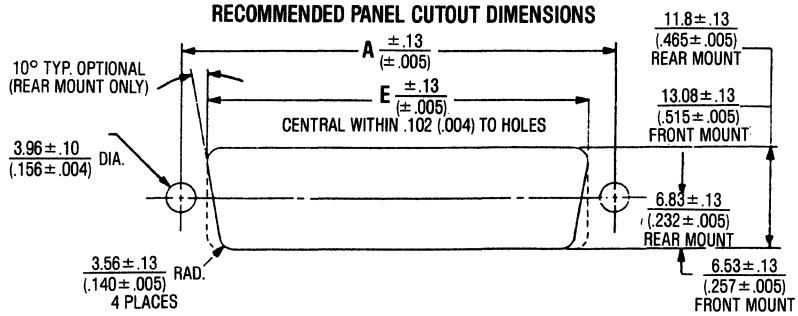
Environmental Properties
Temperature Rating: −55°C to 125°C.



CONNECTOR ASSEMBLY WITH STRAIN RELIEF



RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NUMBERS	NO. OF POS.	DIMENSIONS IN MM (INCHES)				
		A	B	C	D	E
609-09P	9	24.99 (.489)	30.89 (1.216)	16.23 (.639)	18.95 (.746)	19.46 (.766)
609-15P	15	27.00 (1.312)	39.22 (1.544)	24.54 (.966)	27.25 (1.073)	27.76 (1.093)
609-25P	25	47.07 (1.852)	52.93 (2.084)	38.38 (1.511)	41.02 (1.615)	41.61 (1.638)
609-37P	37	63.50 (2.500)	69.39 (2.732)	54.99 (2.165)	57.61 (2.268)	58.09 (2.287)

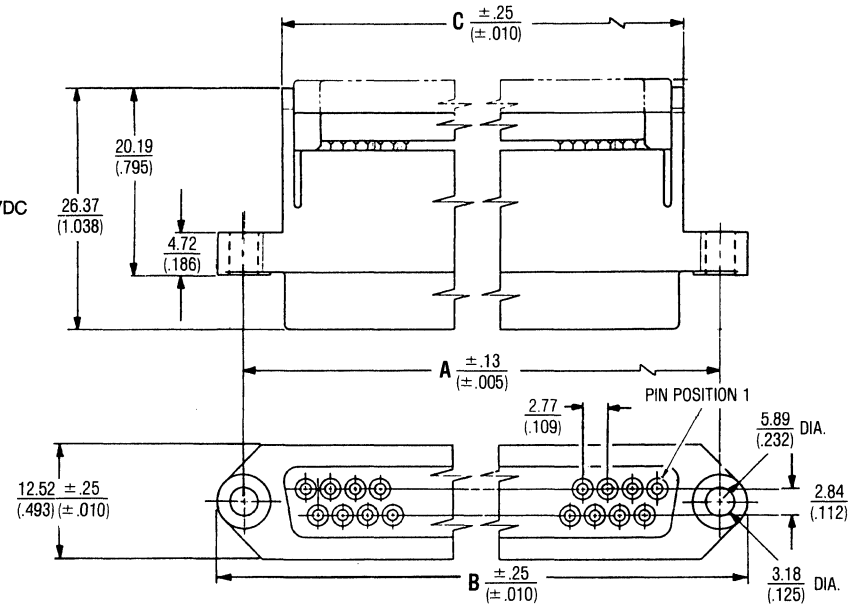
Plastic Shell "D" Connectors
9-37 Position Sockets

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

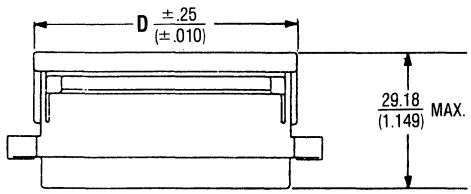
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

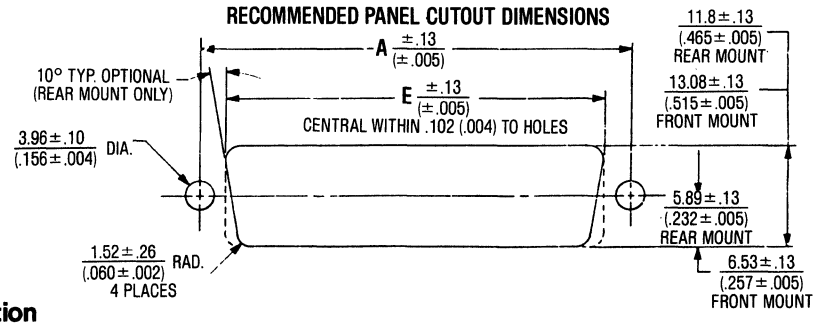
Environmental Properties
Temperature Rating: −55°C to 125°C.



CONNECTOR ASSEMBLY WITH STRAIN RELIEF



RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NUMBERS	NO. OF POS.	DIMENSIONS IN MM (INCHES)				
		A	B	C	D	E
609-09S	9	24.99 (.489)	30.89 (1.216)	16.23 (.639)	18.95 (.746)	19.46 (.766)
609-15S	15	27.00 (1.312)	39.22 (1.544)	24.54 (.966)	27.25 (1.073)	27.76 (1.093)
609-25S	25	47.07 (1.852)	52.93 (2.084)	38.38 (1.511)	41.02 (1.615)	41.61 (1.638)
609-37S	37	63.50 (2.500)	69.39 (2.732)	54.99 (2.165)	57.61 (2.268)	58.09 (2.287)

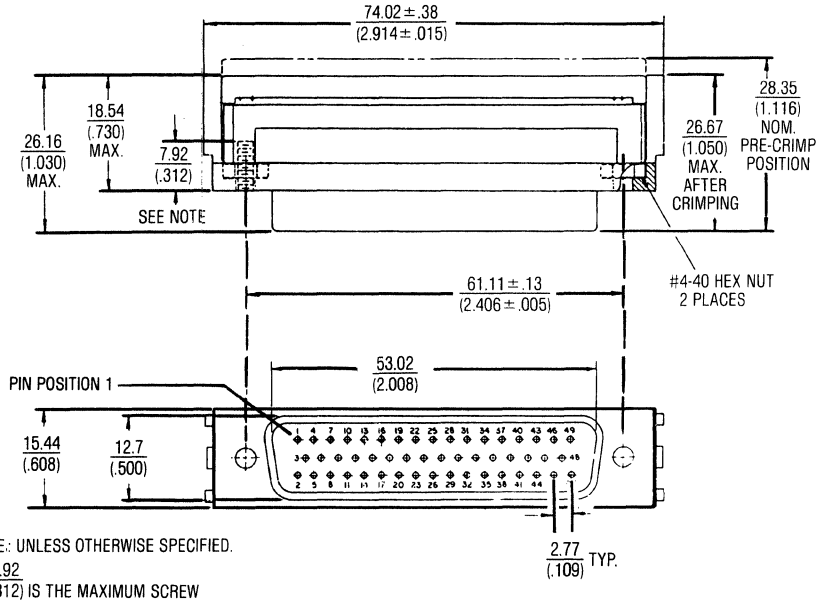
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Plastic Shell "D" Connectors
50 Position Pins

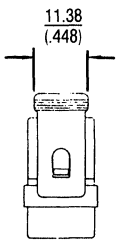
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

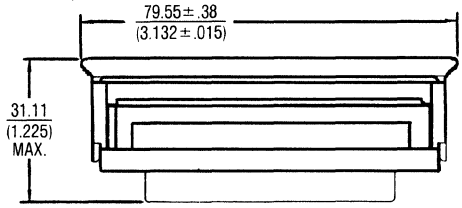
Environmental Properties
Temperature Rating: −55°C to 125°C.



NOTE: UNLESS OTHERWISE SPECIFIED.
7.92
(.312) IS THE MAXIMUM SCREW PENETRATION INTO THE CONNECTOR.



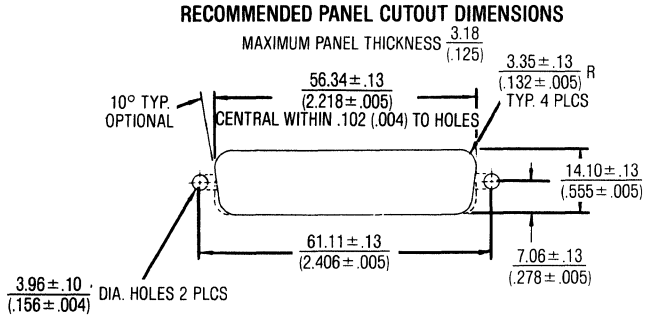
CONNECTOR WITH STRAIN RELIEF



Ordering Information

CATALOG NUMBER	NO. OF POS.
609-50P	50

RECOMMENDED PANEL CUTOUT DIMENSIONS



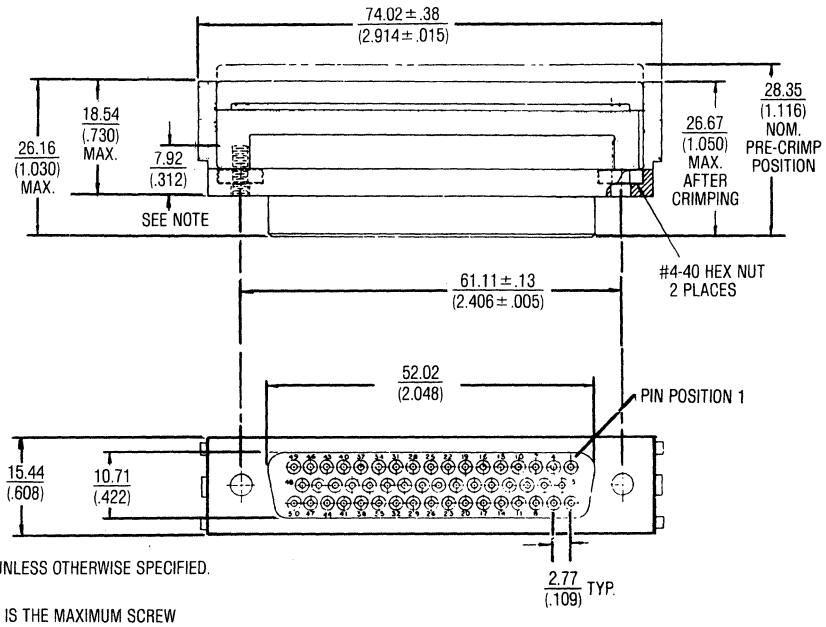
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Plastic Shell "D" Connectors
50 Position Sockets

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

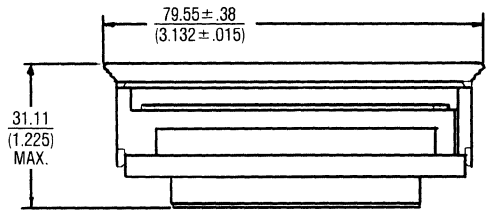
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.



NOTE: UNLESS OTHERWISE SPECIFIED.
7.92 (.312) IS THE MAXIMUM SCREW PENETRATION INTO THE CONNECTOR.

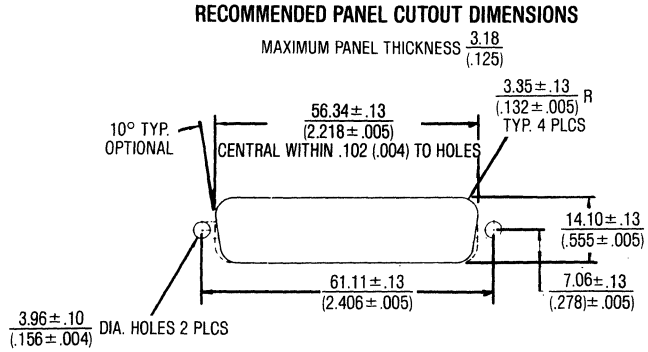
CONNECTOR WITH STRAIN RELIEF



Ordering Information

CATALOG NUMBER	NO. OF POS.
609-50S	50

RECOMMENDED PANEL CUTOUT DIMENSIONS



B

BACKSHELLS FOR USE WITH PLASTIC SHELL "D" CONNECTORS AND FLAT CABLE

Product Description

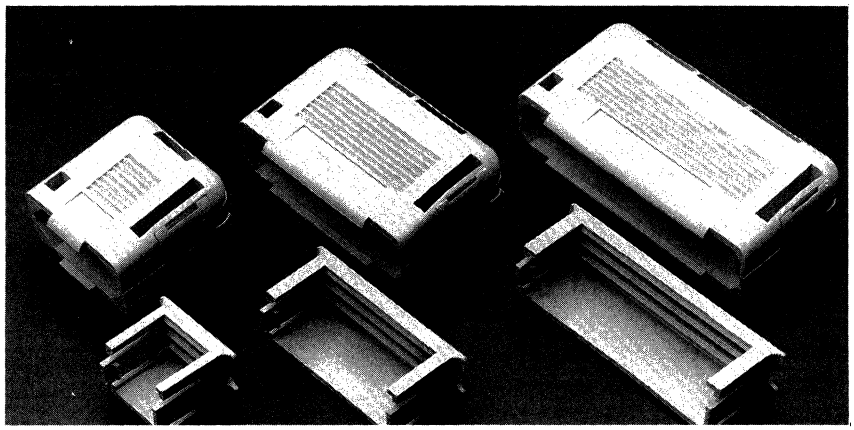
Plastic "D" Connector Backshells used with matching Thomas & Betts jacketed flat cable provide a reliable interconnection cable that withstands harsh environments.

Mounting of all backshells is fast and easy. All versions have durable snap latches. Backshells for 50 position "D" connectors are available with slidelock retaining features.

Backshells with straight cable outlets accommodate the connector complete with its standard strain relief. The right angle version substitutes the connector strain relief for the integral backshell. All backshells act as a strain relief for both jacket and flat cable, thus protecting the flat cable contacts from mechanical loading.

Design Advantages

- Backshells are made of durable reinforced thermoplastic.
- Efficient, economic design.
- Provide additional strain relief.



Backshells act as a strain relief for both jacketed & flat cable, protecting contacts from mechanical loading.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

609-037R

T&B Series

Number of Positions

Leave Blank- *For straight backshell, 9-37 positions*

R- *Right angle backshell, 9-37 positions*

D- *Straight backshell, 50 positions*

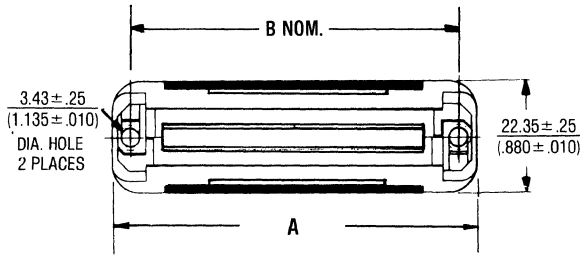
Backshells for Plastic Shell "D" Connectors 9-50 Positions

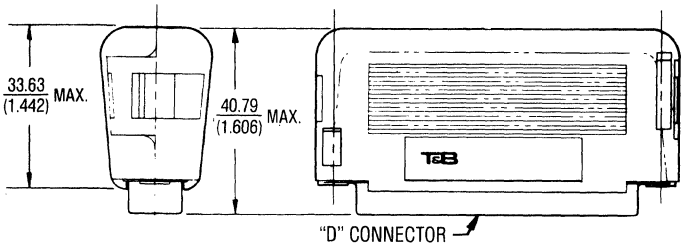
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.

Environmental Properties
Temperature Rating: −55°C to 125°C.

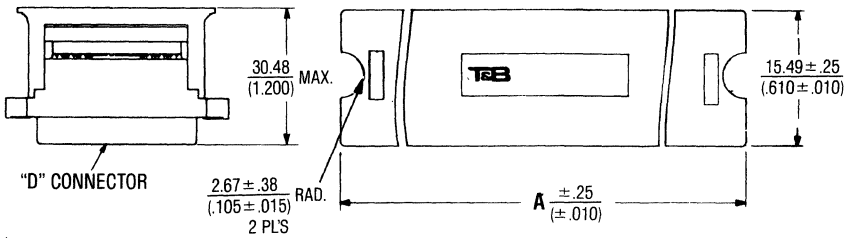
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

9-37 POSITION STRAIGHT BACKSHELL

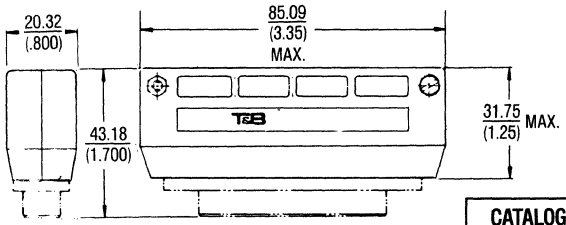




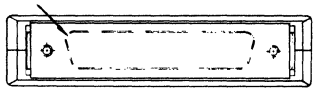
9-37 POSITION RIGHT ANGLE BACKSHELL



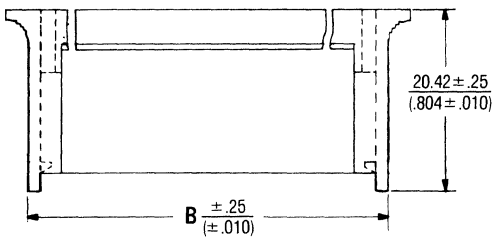
50 POSITION STRAIGHT BACKSHELL



BACKSHELL WILL ACCOMMODATE PIN OR SOCKET CONNECTOR WITH OR WITHOUT STRAIN RELIEF



CATALOG NUMBER 50 POS.
609-050 D



Ordering Information

CATALOG NUMBERS		NO. OF POS.	DIMENSIONS IN MM (INCHES)		USED WITH
STRAIGHT	RIGHT ANGLE		A	B	
609-09	609-09R	9	34.09 (1.342)	24.94 (.982)	609-9P/9S
609-015	609-015R	15	42.42 (1.670)	33.27 (1.310)	609-15P/15S
609-025	609-025R	25	55.45 (2.183)	47.04 (1.852)	609-25P/25S
609-037	609-037R	37	71.91 (2.831)	63.50 (2.500)	609-37P/37S

LOW PROFILE METAL SHELL "D" CONNECTORS

Product Description

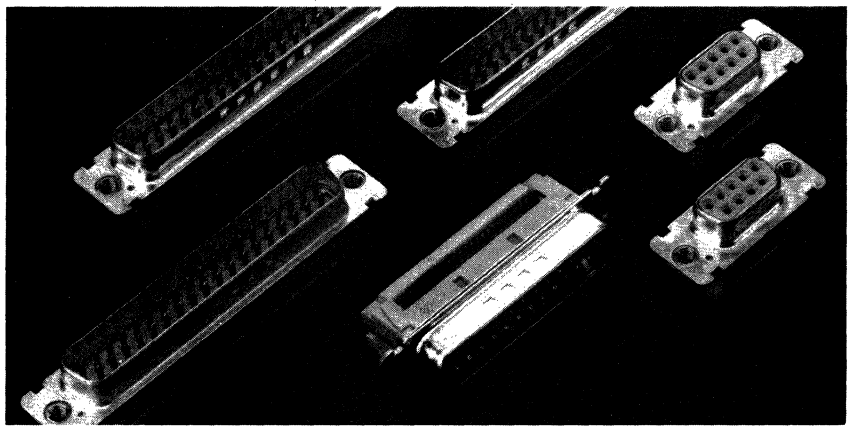
Low Profile Metal Shell "D" Connectors are designed for reliable EMI/RFI shielding interfaces in modern, high-density applications. The low-profile "D" can be integrated into even the most dense applications.

Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- Low profile:
  .610 in. for pin version
  .614 in. for socket version
  .992 in. for mated connectors
- Connectors can be equipped with a low profile stainless steel cable strain relief.
- Backshells are available in metallized and plastic versions for 9-50 position connectors.
- Patented spread pitch contact design.
- Available in 9-50 positions.
- Indents in Metal Shell allows positive grounding to unclad "D" Connectors.
- UL listed, CSA certified.

Application Tooling

Hand Tool	779-2100
Die	779-2179 (9-37 pos.) 779-2167 (50 pos.)
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3179
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3179 (9-37 pos.) 779-3167 (50 pos.)



For reliable EMI/RFI protection in high density, low profile applications.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-09PM

- **622** — *T&B Series*
- **09** — *Number of Positions*
- **P** — *P-Pin connector*
- **S** — *S-Socket connector*
- **M** — *M-with through-hole*
- **M1** — *M1-with 4-40 UNC threaded insert*
- **M2** — *M2-with M3 threaded insert*

*For matching strain relief replace **PM** with **SR** as shown in example:*
***622-XXSR**-Metal strain relief for 9-37 position "D" connectors, low profile 50 pos. includes strain relief*

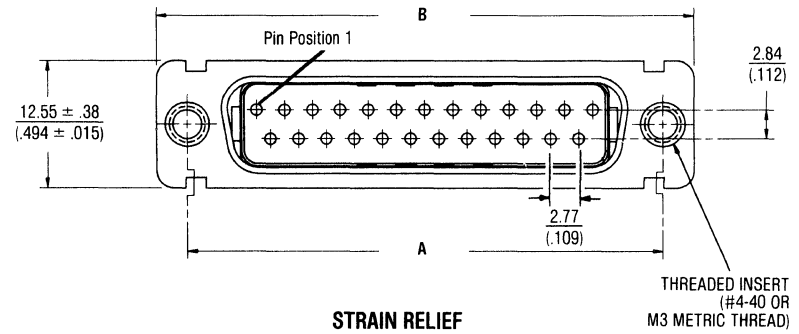
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

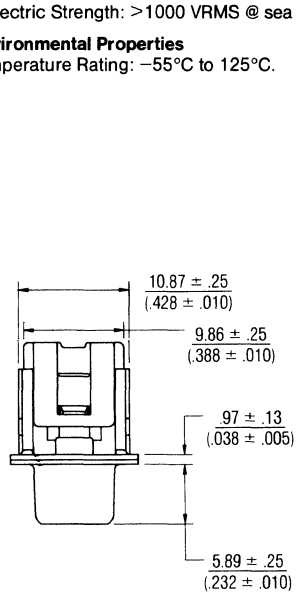
Metal Shell "D" Connector
Low Profile
9-37 Position Pins

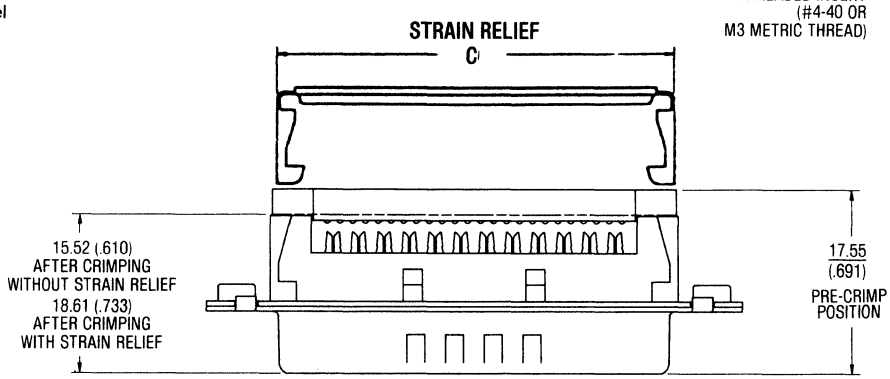
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.
Metal Shell: Steel with tin plating

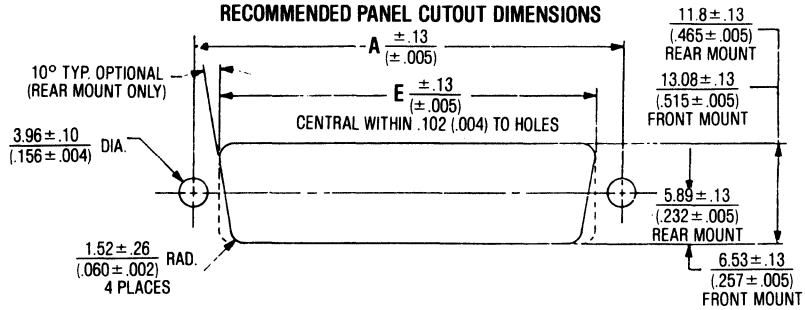
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.









Ordering Information

CATALOG NUMBERS	NO. OF POS.	A	B	STRAIN RELIEF CATALOG NO.	C
622-09PM (W/.125 THRU HOLE)	9	24.99 (.984)	30.81 (1.213)	622-09 SR	19.20 (.756)
622-09PM1 (W/4-40 FLUSH THREADED INSERT)					
622-09PM2 (W/M3 FLUSH THREADED INSERT)					
622-15PM (W/.125 THRU HOLE)	15	33.32 (1.312)	39.14 (1.541)	622-15 SR	27.51 (1.083)
622-15PM1 (W/4-40 FLUSH THREADED INSERT)					
622-15PM2 (W/M3 FLUSH THREADED INSERT)					
622-25PM (W/.125 THRU HOLE)	25	47.04 (1.852)	53.04 (2.088)	622-25 SR	41.30 (1.626)
622-25PM1 (W/4-40 FLUSH THREADED INSERT)					
622-25PM2 (W/M3 FLUSH THREADED INSERT)					
622-37PM (W/.125 THRU HOLE)	37	63.50 (2.500)	69.31 (2.729)	622-37 SR	57.96 (2.282)
622-37PM1 (W/4-40 FLUSH THREADED INSERT)					
622-37PM2 (W/M3 FLUSH THREADED INSERT)					

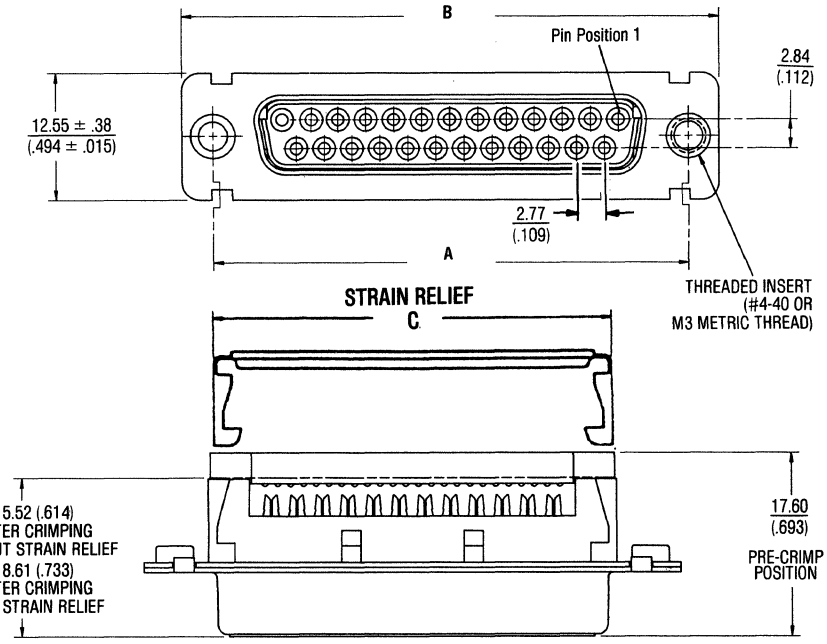
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

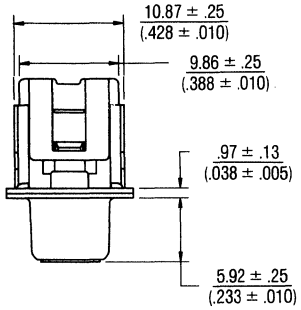
Metal Shell "D" Connector
Low Profile
9-37 Position Sockets

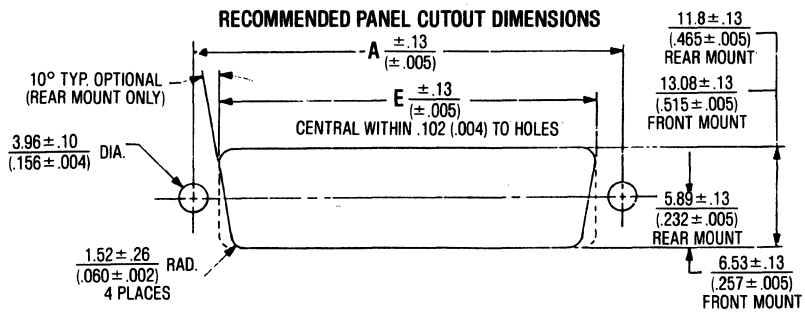
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.
Metal Shell: Steel w/tin plating.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms @ 500 VDC
Dielectric Strength: > 1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.







Ordering Information

CATALOG NUMBERS	NO. OF POS.	A	B	STRAIN RELIEF CATALOG NO.	C
622-09SM (W/.125 THRU HOLE)	9	24.99 (.984)	30.81 (1.213)	622-09 SR	19.20 (.756)
622-09SM1 (W/4-40 FLUSH THREADED INSERT)					
622-09SM2 (W/M3 FLUSH THREADED INSERT)					
622-15SM (W/.125 THRU HOLE)	15	33.32 (1.312)	39.14 (1.541)	622-15 SR	27.51 (1.083)
622-15SM1 (W/4-40 FLUSH THREADED INSERT)					
622-15SM2 (W/M3 FLUSH THREADED INSERT)					
622-25SM (W/.125 THRU HOLE)	25	47.04 (1.852)	53.04 (2.088)	622-25 SR	41.30 (1.626)
622-25SM1 (W/4-40 FLUSH THREADED INSERT)					
622-25SM2 (W/M3 FLUSH THREADED INSERT)					
622-37SM (W/.125 THRU HOLE)	37	63.50 (2.500)	69.31 (2.729)	622-37 SR	57.96 (2.282)
622-37SM1 (W/4-40 FLUSH THREADED INSERT)					
622-37SM2 (W/M3 FLUSH THREADED INSERT)					

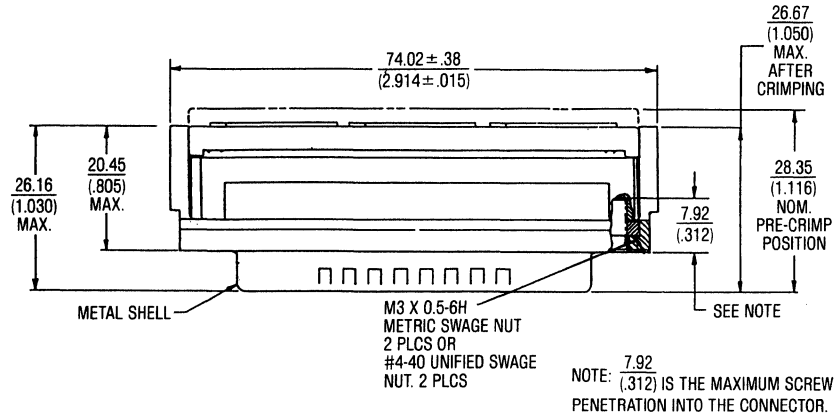
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

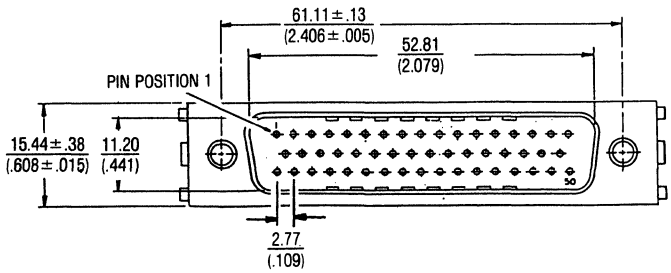
Metal Shell "D" Connector
Low Profile
50 Position Pins

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.
Metal Shell: Steel w/tin plating.

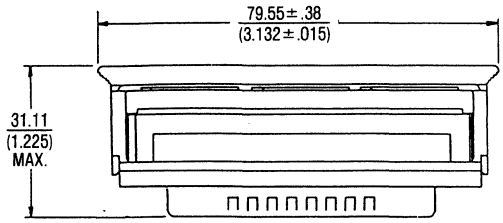
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms @ 500 VDC
Dielectric Strength: > 1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

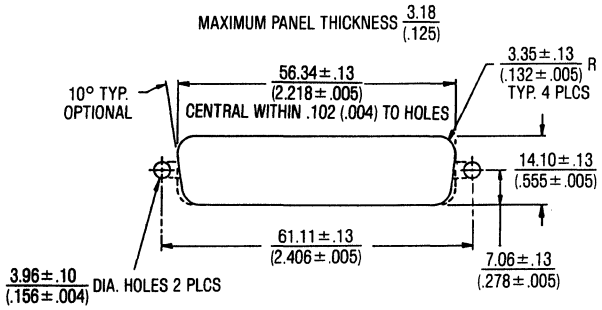




CONNECTOR WITH STRAIN RELIEF



RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NO.	DESCRIPTION	THREAD TYPE
622-50PM1	Pin Receptacle Connector Assy. Tin Plated Front Shell (Corrugated)	4-40 Flush Threaded Insert
622-50PM2	Pin Receptacle Connector Assy. Tin Plated Front Shell (Corrugated)	M3 Threaded Insert

B

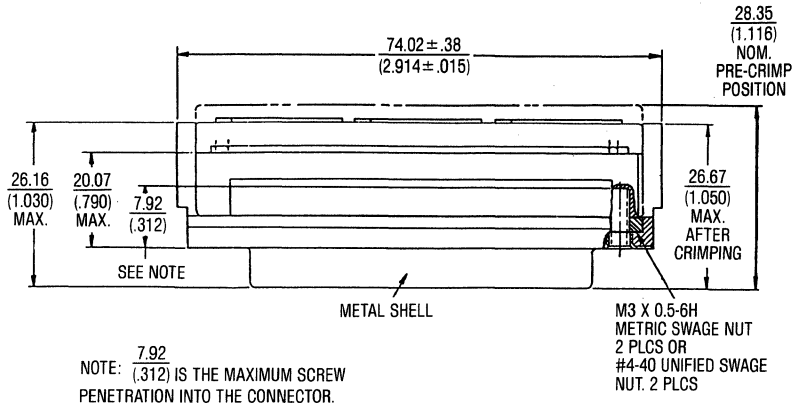
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Metal Shell "D" Connector
Low Profile
50 Position Sockets

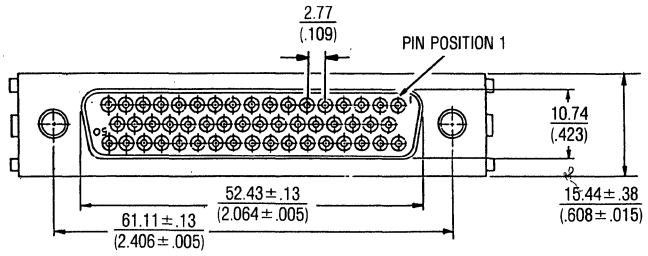
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Phosphor bronze: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.
Metal Shell: Steel w/tin plating.

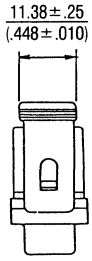
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms @ 500 VDC
Dielectric Strength: > 1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

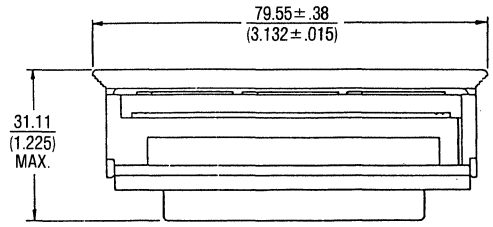


NOTE: 7.92 (.312) IS THE MAXIMUM SCREW PENETRATION INTO THE CONNECTOR.

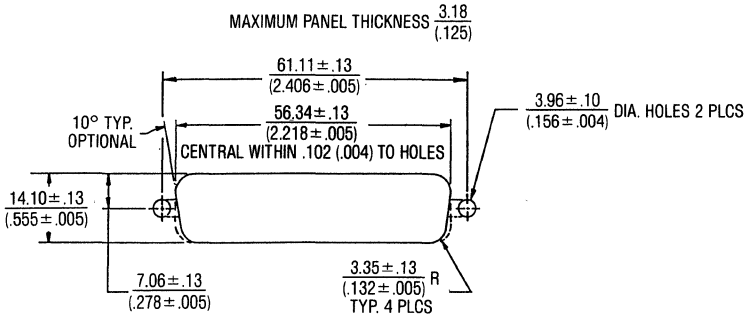




CONNECTOR WITH STRAIN RELIEF



RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NO.	DESCRIPTION	THREAD TYPE
622-50SM1	Socket Plug Connector Assy. Tin Plated Front Shell	4-40 Flush Threaded Insert
622-50SM2	Socket Plug Connector Assy. Tin Plated Front Shell	M3 Threaded Insert

BACKSHELLS FOR METAL SHELL "D" CONNECTORS 9 THROUGH 50 POSITIONS

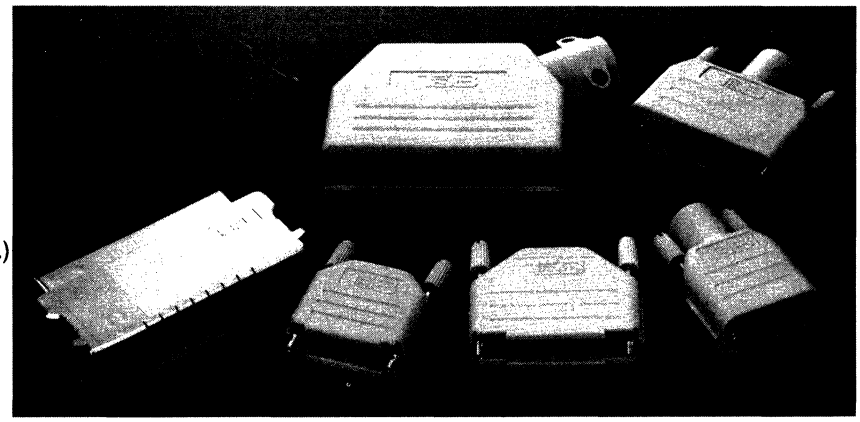
Product Description

Thomas & Betts Backshells are designed as a universal accessory for the Thomas & Betts Metal Shell "D" Connectors.

The backshells are made of durable plastic and withstand harsh environments.

Snap latches make backshell installation easy. The housings can be closed with installation tools. (See page 100 and 101.)

The backshell series allows the use of different cable types to meet application-specific requirements. Backshells with flat cable outlet are suited for shielded or unshielded jacketed flat cable. Backshells with round cable outlet can be used with round to flat cable (shielded, unshielded, or twisted). The cable outlets have integral strain reliefs that act upon the cable jacket.



Backshells act as a strain relief for both jacketed & flat cable, protecting contacts from mechanical loading.

Design Advantages

- Backshells are available for 9-50 position connectors. They have outlets for jacketed flat cable or special round-to-flat cable.
- Metallized for EMI/RFI protection.
- Fast and convenient installation.
- Optional bail lock assembly to fasten backshells (50 position only).
- Metallized version features electroplated chrome.
- IPI compatible backshells are available for 50 position connector.

Application Tooling

Backshells with flat cable outlet:

Hand Tool	779-2100
with Die	779-2173
Bench Press or	779-3200
Bench Press (pneumatic)	779-3500XT
with Standard Platen	779-3130
and Base Plate	779-3173

Backshells with round cable outlet:

Hand Tool	779-2100
with Die	779-2174
Bench Press or	779-3200
Bench Press (pneumatic)	779-3500XT
with Standard Platen	779-3130
with Base Plate	779-3174
Crimp Tool	WT4454G

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

622-025 D

- **622** — *T&B Series*
- **025** — *Number of Positions*
- **D** — *Cable Outlet Option*

D - with flat cable outlet
DM - metallized with flat cable outlet
DR - with round cable outlet
DRM - metallized with round cable outlet
DI - IPI-compatible with flat cable outlet (50 position only)
DIM - IPI-compatible, metallized with flat cable outlet (50 position only)
DRI - IPI-compatible with round cable outlet (50 position only)
DRIM - IPI-compatible, metallized, with round cable outlet

609-09-300

- **609** — *T&B Series*
- **09** — *Number of Positions*
- **300** — *Cable Type*

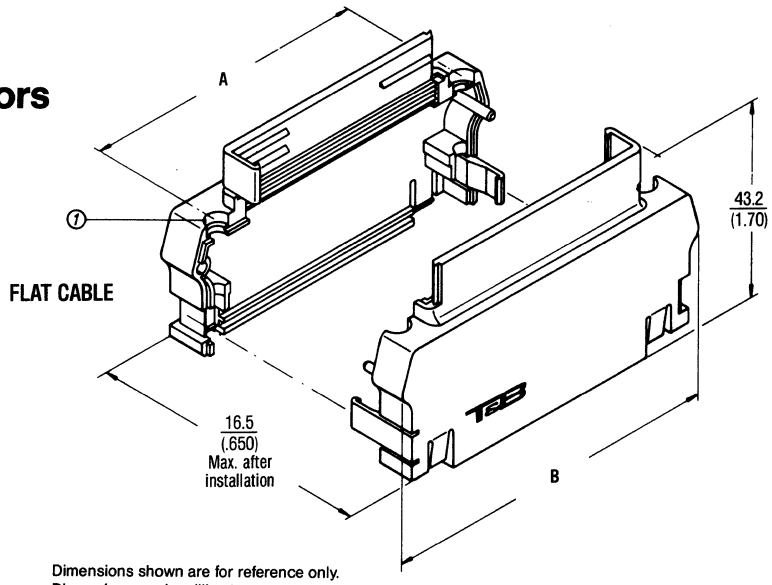
300 - Shielded
301 - Unshielded

Backshells for Metal Shell "D" Connectors 9 Through 37 Positions

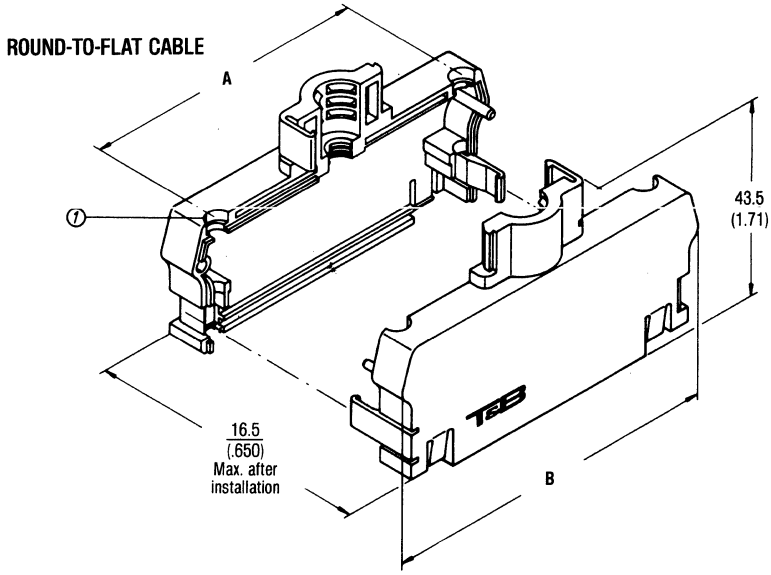
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, black.
Insulation Material (shielded): glass filled thermoplastic, rated 94V-0 chrome electroplated.

Electrical Properties
Shielding Efficiency: >40 dB @ 100 MHz to 1 GHz.

Environmental Properties
Temperature Rating: −55°C to 125°C.



Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



① Use for screw set:
Mounting screw 609-004 with Jacksocket Assembly 609-003, 609-006-1 or 609-007-1

Ordering Information

CATALOG NUMBERS BACKSHELL WITH CABLE OUTLET				FOR CONNECTOR TYPES SERIES 622	NO. OF POS.	DIMENSIONS IN MM (INCHES)					
						BACKSHELLS		ROUND CABLE JACKET ⌀		ROUND CABLE SHIELD ⌀	
FLAT CABLE	ROUND CABLE	FLAT CABLE (METALLIZED)	ROUND CABLE (METALLIZED)			A	B	MIN.	MAX.	MIN.	MAX.
622-09D	622-09DR	622-09DM	622-09DRM	622-09PM, M1, M2 622-09SM, M1, M2	9	25.0 (.98)	37.5 (1.48)	4.6 (.18)	6.0 (.24)	2.8 (.11)	4.2 (.165)
622-015D	622-015DR	622-105DM	622-015DRM	622-15PM, M1, M2 622-15SM, M1, M2	15	33.3 (1.31)	45.8 (1.80)	6.1 (.24)	7.6 (.299)	4.3 (.169)	5.8 (.228)
622-025D	622-025DR	622-025DM	622-025DRM	622-25PM, M1, M2 622-25SM, M1, M2	25	47.0 (1.85)	59.5 (2.34)	7.1 (.28)	8.8 (.35)	5.3 (.21)	7.0 (.276)
622-037D	622-037DR	622-037DM	622-037DRM	622-37PM, M1, M2 622-37SM, M1, M2	37	63.5 (2.50)	76.0 (2.99)	8.3 (.33)	9.8 (.386)	6.5 (.26)	8.1 (.32)

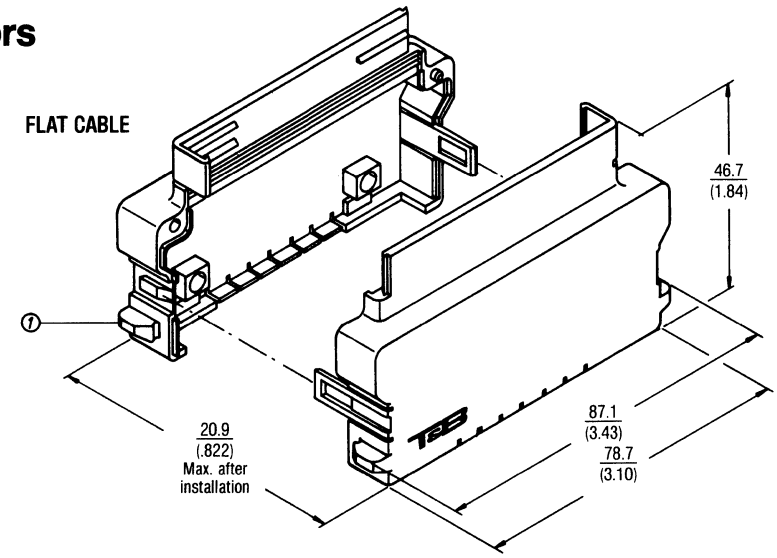
Backshells for Metal Shell "D" Connectors 50 Position

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, black.
Insulation Material (shielded): glass filled thermoplastic, rated 94V-0 chrome electroplated.

Electrical Properties
Shielding Efficiency: >40 dB @ 100 MHz to 1 GHz.

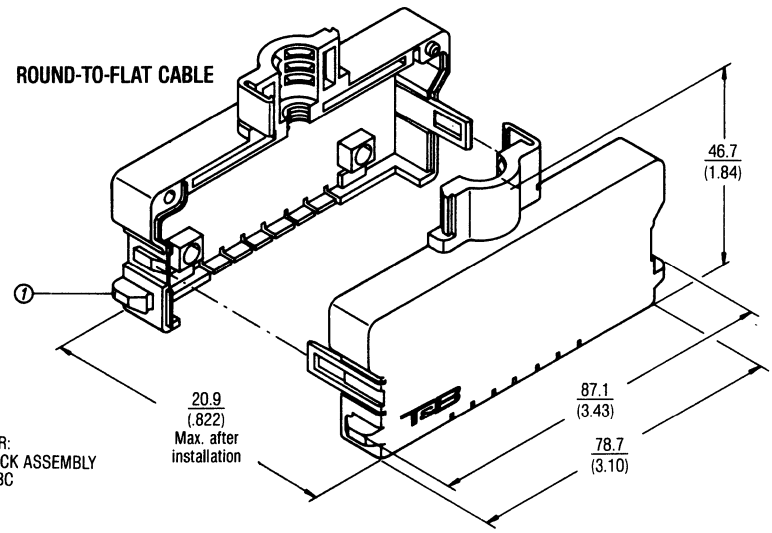
Environmental Properties
Temperature Rating: −55°C to 125°C.

FLAT CABLE



Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

ROUND-TO-FLAT CABLE



① USE FOR:
BAIL LOCK ASSEMBLY
609-50BC

Ordering Information

CATALOG NUMBERS BACKSHELL WITH CABLE OUTLET				FOR CONNECTOR TYPES SERIES 622	NO. OF POS.	ROUND CABLE DIMENSIONS IN MM (INCHES)			
						JACKET ⌀		DIELECTRIC OR SHIELD ⌀	
FLAT CABLE	ROUND CABLE	FLAT CABLE METALLIZED	ROUND CABLE METALLIZED			MIN.	MAX.	MIN.	MAX.
622-050D	622-050DR	622-050DM	622-050DRM	622-50PM, M1, M2	50	9.4 (.37)	11.2 (.44)	7.6 (.30)	9.4 (.37)
622-050DI	622-050DRI	622-050DMI	622-050DRIM	622-50PM, M1, M2	50*	9.4 (.37)	11.2 (.44)	7.6 (.30)	9.4 (.37)

*For Intelligent Peripheral Interface (IPI)

Backshells for Metal Shell "D" Connectors for Round-to-Flat Cable 9-50 Position

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

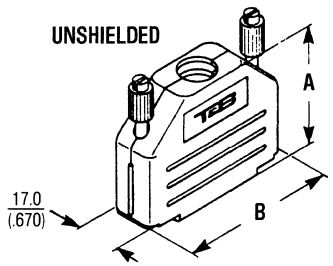
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, grey. Insulation material (shielded): glass filled thermoplastic, rated 94V-0 chrome electroplated.

Electrical Properties
Shielding Efficiency: >40 dB @ 100 MHz to 1 GHz.

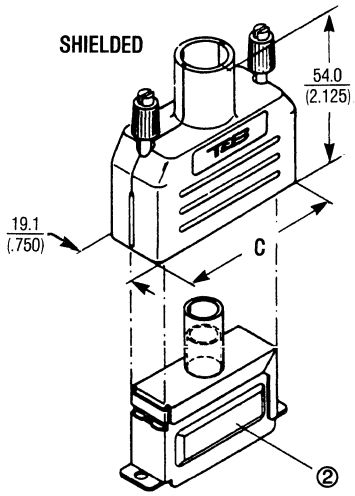
Environmental Properties
Temperature Rating: −55°C to 125°C.

9-37 POSITION

UNSHIELDED

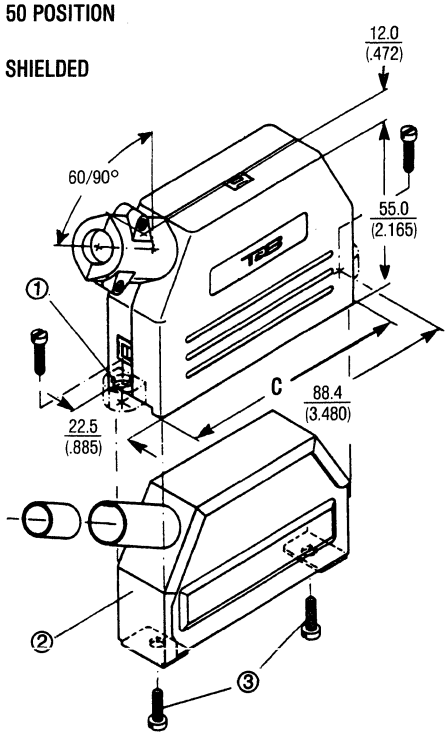


SHIELDED



50 POSITION

SHIELDED



① Mounting ears and jackscrews, 4-40 UNC, only on 609-50300-2 (IPI standard)
② Metal lining (steel plate) with shield crimp barrel
③ Connector mounting screws, 4-40 UNC, only on 609-50300-2

Ordering Information

CATALOG NUMBERS FOR PLASTIC BACKSHELL			NO. OF POS.	FOR CONNECTOR TYPES SERIES 622	CABLE OUTLET (DEGREES)	DIMENSIONS IN MM (INCHES)			INSTALLATION TOOL FOR SHIELD TERMINATION WT4454G DIE NO.
UNSHIELDED	SHIELDED WITH METAL LINING	WITH MOUNTING SCREWS OR OPTIONAL SLIDE LOCK RETAINER				A	B	C	
609-09301	609-09300	4-40 UNC	9	622-09 X MI	180	34.0 (1.338)	33.0 (1.300)	35.0 (1.378)	WT09300
609-15301	609-15300	4-40 UNC	15	622-15 X MI	180	34.0 (1.338)	41.0 (1.615)	43.0 (1.693)	WT15300
609-25301	609-25300	4-40 UNC	25	622-25 X MI	180	40.0 (1.575)	54.5 (2.145)	57.5 (2.264)	WT25300
609-37301	609-37300	4-40 UNC	37	622-37 X MI	180	40.0 (1.575)	71.0 (2.795)	74.0 (2.913)	WT37300
—	609-50300	4-40 UNC*	50	622-50 X MI	60	—	—	81.0 (3.189)	WT50300
—	609-50300-1	4-40 UNC*	50	622-50 X MI	90	—	—	81.0 (3.189)	WT50300
—	609-50300-2	4-40 UNC (IPI STD.)	50	622-50 X MI	60	—	—	81.0 (3.189)	WT50300

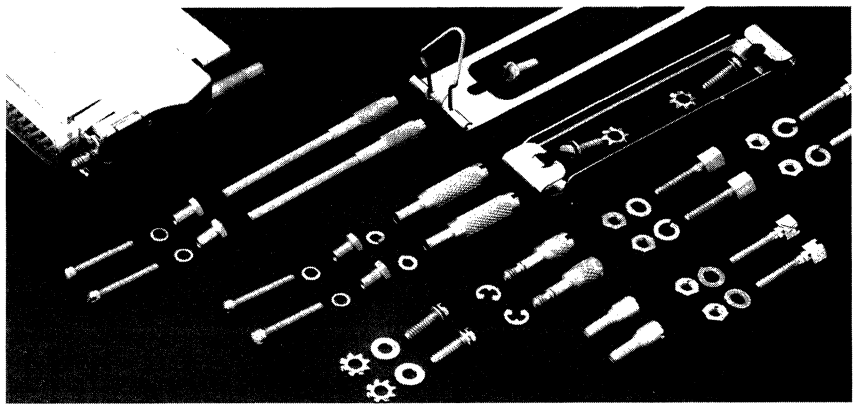
*Note: Slide lock assembly (609-50SL) available as an option on 50-position backshell.

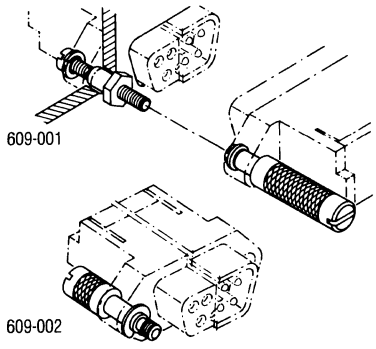
Hardware for Plastic and Metal Shell "D" Connectors 9-37 Position

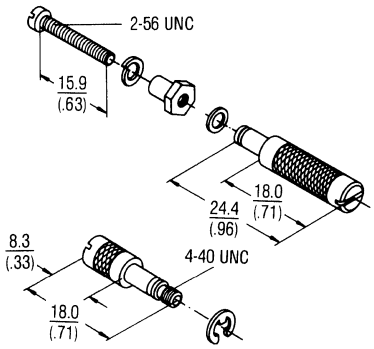
Product Description

Screw sets and mounting accessories are available for all Thomas & Betts "D" Connectors, facilitating any type of installation (e.g. front panel mounting, coupling, combination of Thomas & Betts "D" Connectors and standard "D" connectors employing other connection techniques).

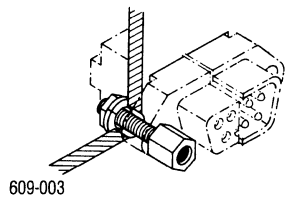
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

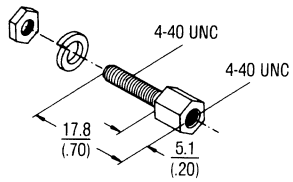




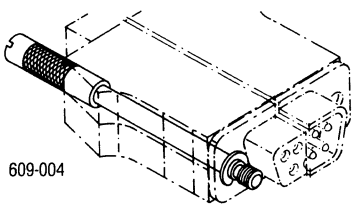


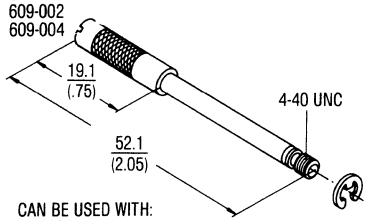
CAN BE USED WITH:
609-003
609-006-1
609-007-1



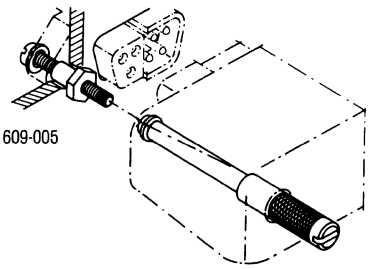


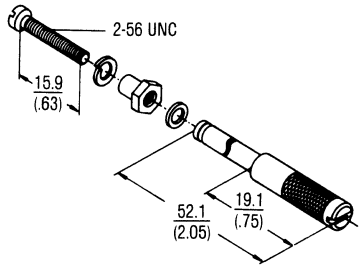
CAN BE USED WITH:
609-002
609-004





CAN BE USED WITH:
609-003
609-006-1
609-007-1





609-001

Screwlock Assembly
- locks a plastic or metal shell "D" connector to another rear panel mounted plastic or metal shell "D" connector

Panel thickness 3.2 (.13) mm max.
Use 779-6211 retaining ring installation tool

609-002

Jackscrew Assembly
- locks a plastic or metal shell "D" connector to a jacksocket

Use 779-6210 retaining ring installation tool

609-003

Jacksocket Assembly
- locks a plastic or metal shell "D" connector with a jackscrew to any other front panel mounted "D" connector

Panel thickness 5.0 (.196) mm max.

609-004

Jackscrew Assembly
- locks plastic "D" connectors with backshells or metal "D" connectors with backshells with a jacksocket assembly to any "D" connector

Use 779-6210 retaining ring installation tool

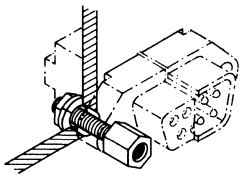
609-005

Backshell Screwlock Assembly
- locks plastic "D" connector to another rear panel mounted plastic "D" connector with backshell

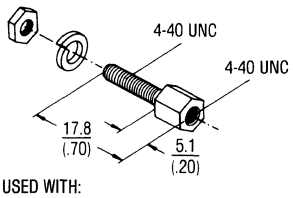
Panel thickness 3.2 (.13) mm max.
Use 779-6211 retaining ring installation tool

Hardware for Plastic and Metal Shell "D" Connectors 50 Position

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



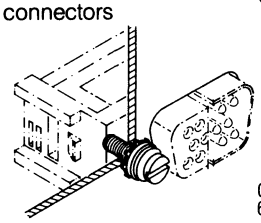
609-006-1
609-007-1



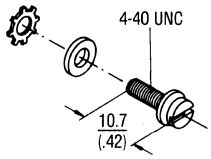
CAN BE USED WITH:
609-002
609-004

609-006-1 1.3 (.05)
609-007-1 2.2 (.09)

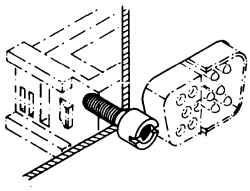
Application for
50 position "D" connectors



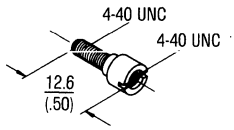
609-008-50



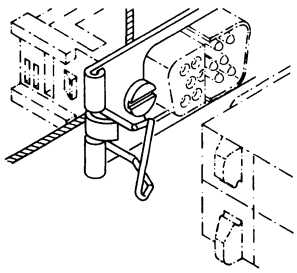
CAN BE USED WITH:
609-50SL



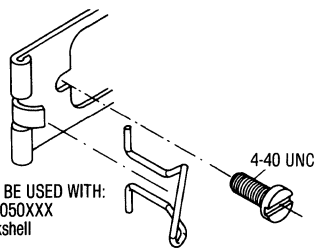
609-009-50



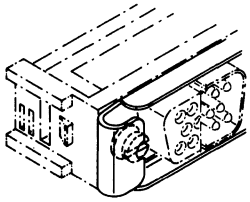
CAN BE USED WITH:
4-40 UNC
Jackscrews



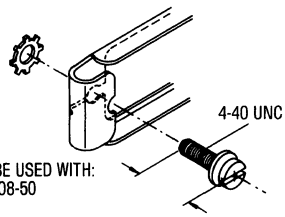
609-50 BL



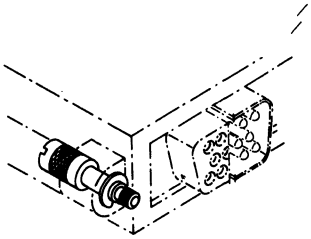
CAN BE USED WITH:
609-050XXX
Backshell



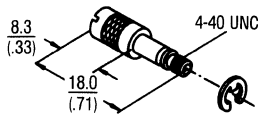
609-50 SL



CAN BE USED WITH:
609-008-50



609-002



CAN BE USED WITH:
609-006-1
609-007-1

609-006-1

Jacksocket Assembly
- for plastic "D" connector and metal (622) "D" connector
- connects rear panel mounted "D" connector through jackscrew assembly to any "D" connector

Panel thickness 1.6 (.06) mm max.

609-007-1

Jacksocket Assembly
- similar to 622-003, but for

Panel thickness 2.4 (.09) to 3.2 (.13) mm max.

609-008-50

Slide Lock Post
- locks 50 position "D" connector (with or without rear panel mounting) through slide lock retainer to any 50 position "D" connector

Panel thickness 2.4 (.09) mm max.

609-009-50

Jacksocket Assembly
- locks rear panel mounted 50 position "D" connector through a jackscrew assembly to discrete wire 50 position "D" connector

Panel thickness 1.6 (.06) mm max.

609-50 BL

Bail Lock Assembly
- locks rear panel mounted 50 position "D" connector through backshell with bail mount ears for bail lock assembly 622-050XXX to any 50 position "D" connector

Panel thickness 1.6 (.06) mm max.

609-50 SL

Slide Lock Retainer
- locks 50 position "D" connector through slide lock post to any 50 position "D" connector with or without rear panel mounting

609-002

Jackscrew Assembly
- retains 50 position "D" connectors with backshell for IPI-compatible interfaces through jacksocket assembly

Use 779-6210 retaining ring installation tool

PLASTIC SHELL RIBBON CONNECTOR

Product Description

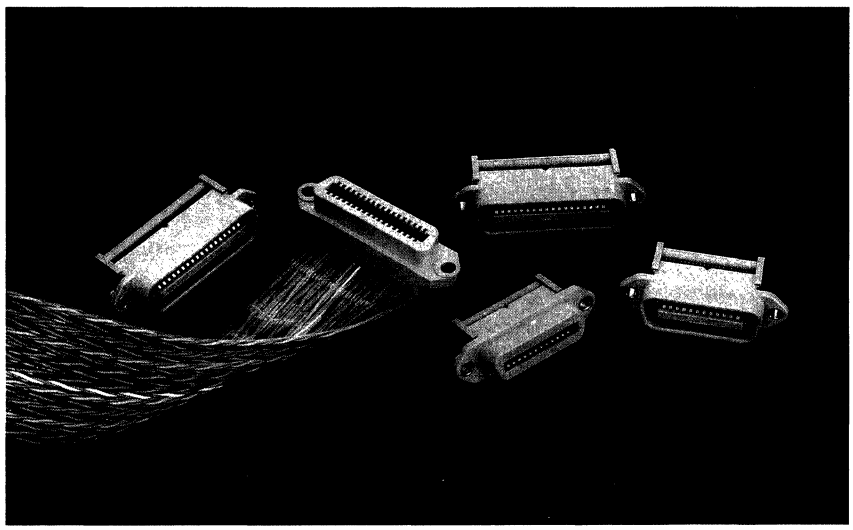
Plastic Shell Ribbon Connectors are designed primarily for internal applications where EMI/RFI suppression is not required. This connector mates with other SCSI (Small Computer Systems Interface) compatible connectors and terminates to Flat Ribbon Cable.

Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 4 contact sizes: 14, 24, 36 and 50 positions.
- I/O mating ribbon contacts are on 2.16 mm (.085") centers.
- Available with thru-hole, metric and 4-40 threaded inserts.
- Compatible with FCC document 47 part 68 subpart F.

Application Tooling

Hand Tool	779-2100
with Die	779-2172
Bench Press (manual)	779-3200
with Base Plate	779-3184
Bench Press (pneumatic)	779-3500XT
with Platen	779-3500
with Base Plate	779-3184



Terminates to Flat Ribbon Cable

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-14M

T&B Series

Number of Positions

M *-male with thru-hole mounting ears*
M1 *-male with mounting ears: 3.5 mm threaded insert*
M2 *-male with mounting ears: 4-40 threaded insert*
F *-female with thru-hole mounting ears*
F1 *-female with mounting ears: 3.5 mm threaded insert*
F2 *-female with mounting ears: 4-40 threaded insert*

622-XXRSR *-Metal Strain Relief XX = 14, 24, 36,50*

B

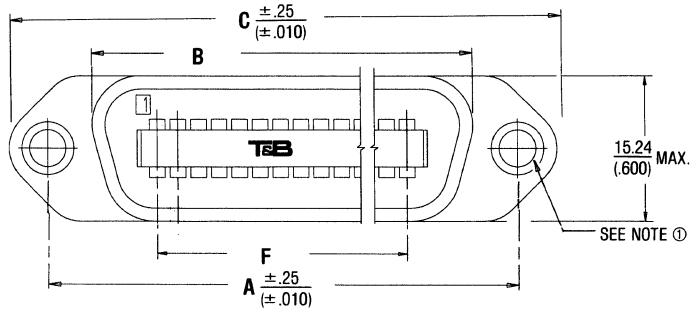
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Plastic Shell Ribbon Connector 14, 24, 36 and 50 Position, Male

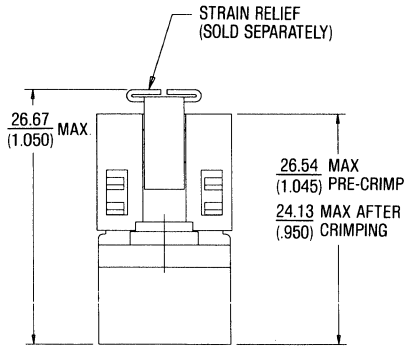
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

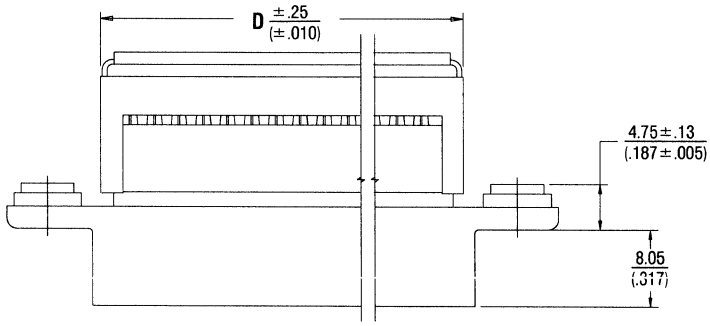
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

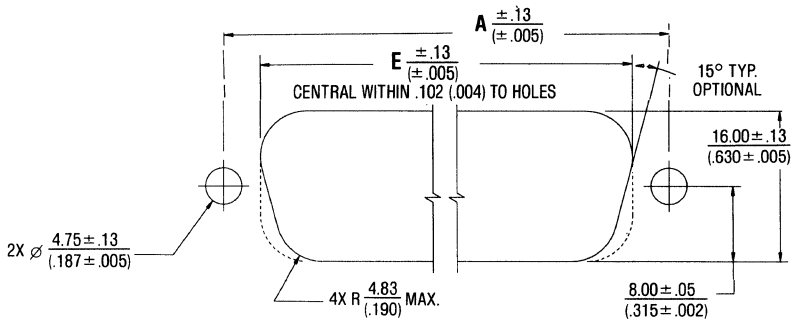


① CAT. NO. 622-XXM −⌀3.89±.13/(.153±.005) Thru-Hole Insert.
CAT. NO. 622-XXM1−3.5/(.138) Threaded Insert.
CAT. NO. 622-XXM2−4-40 Threaded Insert.
Maximum Panel Thickness: 3.18/(.125).





RECOMMENDED PANEL CUTOUT DIMENSIONS
(BACK PANEL MOUNTED)



Ordering Information

CATALOG NUMBERS			NO. OF POS.	DIMENSIONS IN MM (INCHES)					
M−MALE WITH THRU-HOLE MOUNTING EARS	M1−MALE WITH MOUNTING EARS: 3.5MM THREADED INSERT	M2−MALE WITH MOUNTING EARS: 4-40 THREADED INSERT		A	B	C	D	E	F
622-14M	622-14M1	622-14M2	14	35.99 (1.417)	28.55 (1.124)	44.20 (1.740)	22.81 (.898)	29.84 (1.175)	12.95 (.510)
622-24M	622-24M1	622-24M2	24	46.79 (1.842)	39.34 (1.549)	54.99 (2.165)	35.51 (1.398)	40.64 (1.600)	23.75 (.935)
622-36M	622-36M1	622-36M2	36	59.74 (2.352)	52.30 (2.059)	67.95 (2.675)	50.75 (1.998)	53.59 (2.110)	36.70 (1.445)
622-50M	622-50M1	622-50M2	50	74.85 (2.947)	67.41 (2.654)	83.06 (3.270)	68.53 (2.698)	68.83 (2.710)	51.81 (2.040)

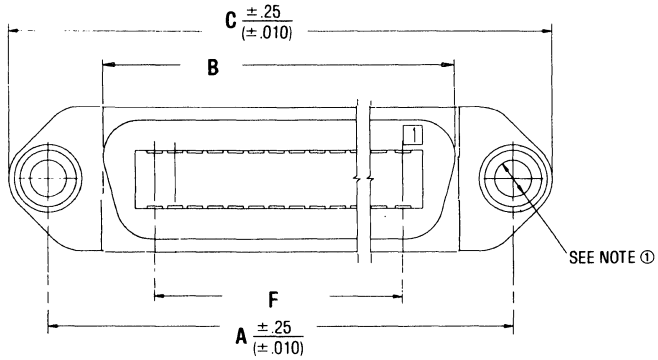
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Plastic Shell Ribbon Connector
14, 24, 36 and 50 Position, Female

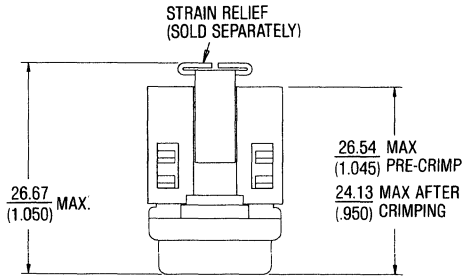
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

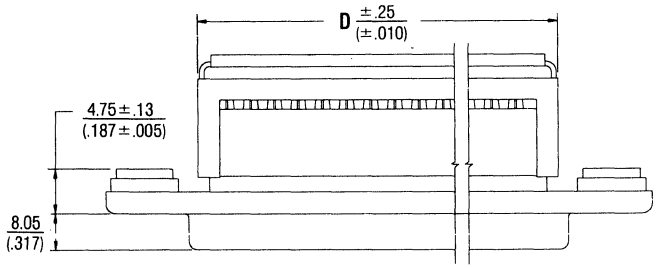
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

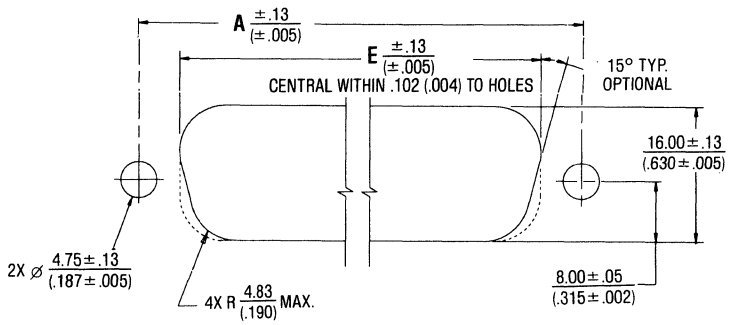


① CAT. NO. 622-XXF −⌀3.89±.13/(.153±.005) Thru-Hole Insert.
CAT. NO. 622-XXF1−3.5/(.138) Threaded Insert.
CAT. NO. 622-XXF2−4-40 Threaded Insert.
Maximum Panel Thickness: 3.18/(.125).
Connector must be centered in cutout to allow for completing mating with male plug.





RECOMMENDED PANEL CUTOUT DIMENSIONS
(BACK PANEL MOUNTED)



Ordering Information

CATALOG NUMBERS			NO. OF POS.	DIMENSIONS IN MM (INCHES)					
F—FEMALE WITH THRU-HOLE MOUNTING EARS	F1—FEMALE WITH MOUNTING EARS: 3.5MM THREADED INSERT	F2—FEMALE WITH MOUNTING EARS: 4-40 THREADED INSERT		A	B	C	D	E	F
622-14F	622-14F1	622-14F2	14	35.99 (1.417)	28.55 (1.124)	44.20 (1.740)	22.81 (.898)	29.84 (1.175)	12.95 (.510)
622-24F	622-24F1	622-24F2	24	46.79 (1.842)	39.34 (1.549)	54.99 (2.165)	35.51 (1.398)	40.64 (1.600)	23.75 (.935)
622-36F	622-36F1	622-36F2	36	59.74 (2.352)	52.30 (2.059)	67.95 (2.675)	50.75 (1.998)	53.59 (2.110)	36.70 (1.445)
622-50F	622-50F1	622-50F2	50	74.85 (2.947)	67.41 (2.654)	83.06 (3.270)	68.53 (2.698)	68.83 (2.710)	51.81 (2.040)

METAL SHELL RIBBON CONNECTOR

Product Description

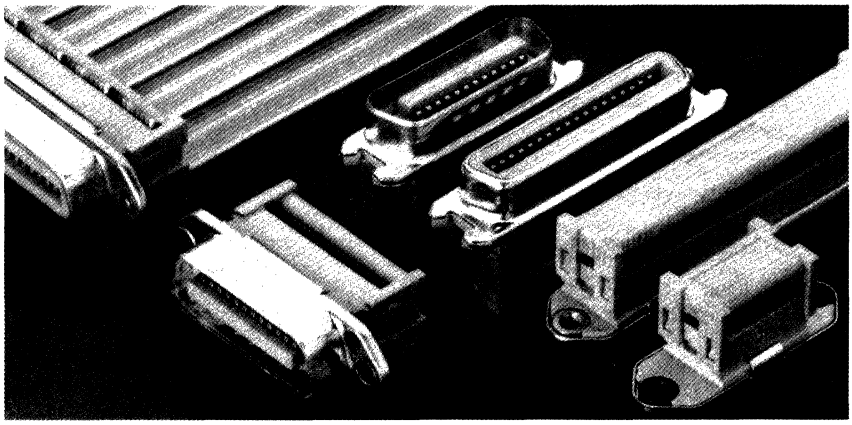
Metal Shell Ribbon Connectors are designed primarily for I/O applications where EMI/RFI suppression is required. They provide maximum installation versatility by maintaining I/O compatibility with all industry-standard Ribbon Connectors and are SCSI approved (Small Computer Systems Interface) for mass terminating to Thomas & Betts Flat Cable.

Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 4 contact sizes – 14, 24, 36, and 50 positions.
- I/O mating ribbon contacts on industry-standard 2.16 mm (.085") centers.
- Available with bail mount or full mounting ears, (thru-hole, 4-40 threaded or metric threaded insert) – complete with mounting hardware.
- Indents in male shell and high quality tin plated shell assure superior ground connection.
- Ribbon Connector backshells for round or flat cable.
- Compatible with FCC document 47 part 68 subpart F.

Application Tooling

Hand Tool	779-2100
with Die	779-2172
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3184
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3184



Metal shells suppress spurious EMI/RFI signals.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-14 MM

T&B Series

Number of Positions

- ***MM*** *-male with thru-hole mounting ears*
- ***MM1*** *-male with mounting ears: 3.5 mm threaded insert*
- ***MM2*** *-male with mounting ears: 4-40 threaded insert*
- ***MAM*** *-male with bail mount ears*
- ***MM3*** *-male with attached bail mount latches*
- ***FM*** *-female with thru-hole mounting ears*
- ***FM1*** *-female with mounting ears: metric threaded insert*
- ***FM2*** *-female with mounting ears: 4-40 threaded insert*
- ***FAM*** *-female with bail mount ears*
- ***FM3*** *-female with attached bail mount latches and 4-40 threaded insert*

622-XXRSR *-Metal Strain Relief*
XX *= 14, 24, 36,50*

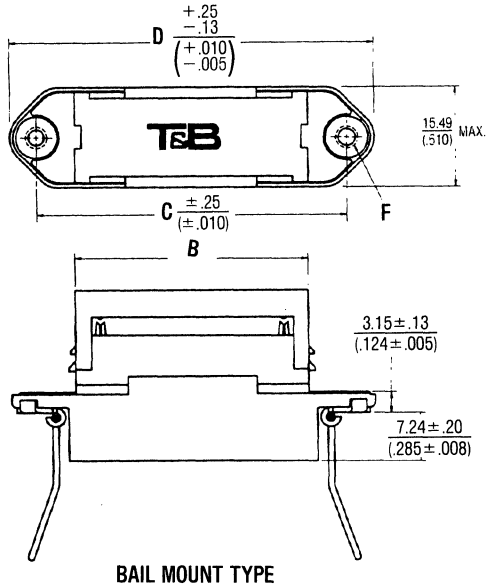
Metal Shell Ribbon Connector 14, 24, 36 and 50 Position, Female Thru-Hole and Bail Mount

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

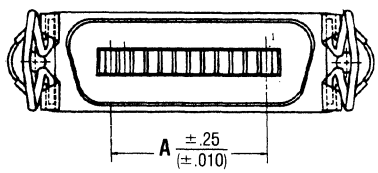
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

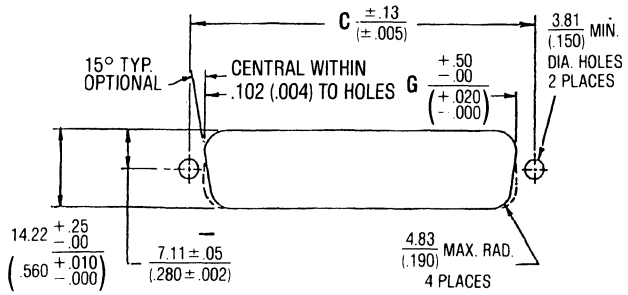
Environmental Properties
Temperature Rating: –55°C to 125°C.



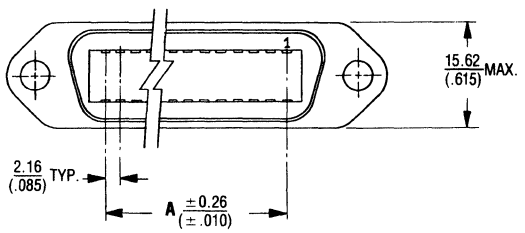
BAIL MOUNT TYPE



RECOMMENDED PANEL CUTOUT DIMENSIONS
(BACK PANEL MOUNTED)



THRU-HOLE THREADED TYPE



Ordering Information

CATALOG NUMBER	NO. OF POS.	DIMENSIONS IN MM (INCHES)						
		A	B	C	D	E	F	G
622-14FM	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	.142±.003 ⌀ THRU	28.19 (1.110)
622-24FM	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	.142±.003 ⌀ THRU	39.12 (1.540)
622-36FM	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	.142±.003 ⌀ THRU	51.82 (2.040)
622-50FM	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	.142±.003 ⌀ THRU	67.06 (2.640)
622-14FM1	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	M3.5x0.6-6H THD	28.19 (1.110)
622-24FM1	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	M3.5x0.6-6H THD	39.12 (1.540)
622-36FM1	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	M3.5x0.6-6H THD	51.82 (2.040)
622-50FM1	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	M3.5x0.6-6H THD	67.06 (2.640)
622-14FM2*	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	4-40 UNC-2B THD	28.19 (1.110)
622-24FM2*	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	4-40 UNC-2B THD	39.12 (1.540)
622-36FM2*	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	4-40 UNC-2B THD	51.82 (2.040)
622-50FM2*	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	4-40 UNC-2B THD	67.06 (2.640)
622-14FAM	14	12.95 (.510)	22.81 (.898)	N/A	N/A	30.38 (1.196)	N/A	N/A
622-24FAM	24	23.75 (.935)	35.51 (1.398)	N/A	N/A	41.17 (1.621)	N/A	N/A
622-36FAM	36	36.70 (1.445)	50.75 (1.998)	N/A	N/A	54.13 (2.131)	N/A	N/A
622-50FAM	50	51.82 (2.040)	68.53 (2.698)	N/A	N/A	69.24 (2.725)	N/A	N/A

*AVAILABLE WITH ATTACHED BAIL MOUNT LATCHES—USE SUFFIX FM3 FOR PART NUMBER.

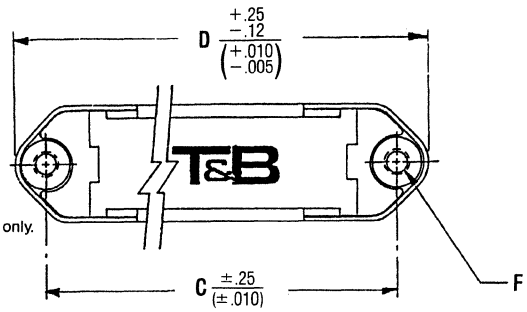
Metal Shell Ribbon Connector 14, 24, 36 and 50 Position, Male Thru-Hole and Bail Mount

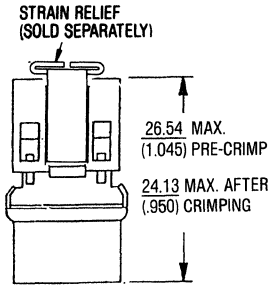
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

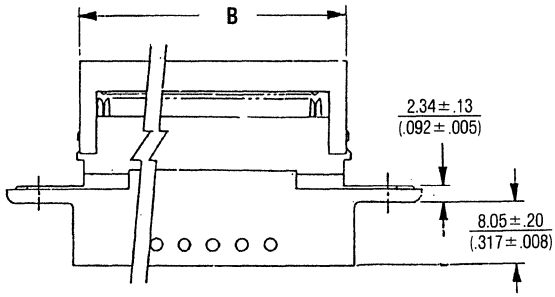
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

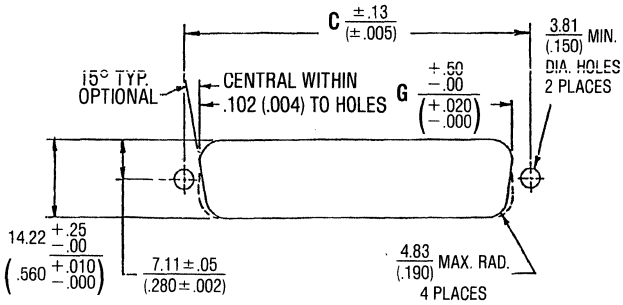
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



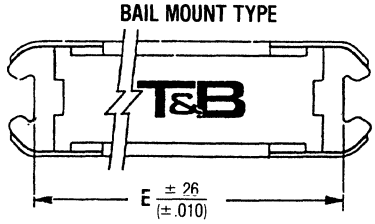




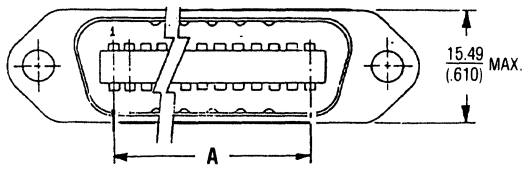
RECOMMENDED PANEL CUTOUT DIMENSIONS
(BACK PANEL MOUNTED)



BAIL MOUNT TYPE



THRU-HOLE THREADED TYPE



Ordering Information

CATALOG NUMBER	NO. OF POS.	DIMENSIONS IN MM (INCHES)						
		A	B	C	D	E	F	G
622-14MM	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	.142±.003 ⌀ THRU	28.19 (1.110)
622-24MM	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	.142±.003 ⌀ THRU	39.12 (1.540)
622-36MM	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	.142±.003 ⌀ THRU	51.82 (2.040)
622-50MM	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	.142±.003 ⌀ THRU	67.06 (2.640)
622-14MM1	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	M3.5x0.6-6H THD	28.19 (1.110)
622-24MM1	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	M3.5x0.6-6H THD	39.12 (1.540)
622-36MM1	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	M3.5x0.6-6H THD	51.82 (2.040)
622-50MM1	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	M3.5x0.6-6H THD	67.06 (2.640)
622-14MM2*	14	12.95 (.510)	22.81 (.898)	35.99 (1.417)	39.12 (1.540)	N/A	4-40 UNC-2B THD	28.19 (1.110)
622-24MM2*	24	23.75 (.935)	35.51 (1.398)	46.78 (1.842)	54.99 (2.165)	N/A	4-40 UNC-2B THD	39.12 (1.540)
622-36MM2*	36	36.70 (1.445)	50.75 (1.998)	59.74 (2.352)	67.94 (2.675)	N/A	4-40 UNC-2B THD	51.82 (2.040)
622-50MM2*	50	51.82 (2.040)	68.53 (2.698)	74.85 (2.947)	83.06 (3.270)	N/A	4-40 UNC-2B THD	67.06 (2.640)
622-14MAM	14	12.95 (.510)	22.81 (.898)	N/A	N/A	30.38 (1.196)	N/A	N/A
622-24MAM	24	23.75 (.935)	35.51 (1.398)	N/A	N/A	41.17 (1.621)	N/A	N/A
622-36MAM	36	36.70 (1.445)	50.75 (1.998)	N/A	N/A	54.13 (2.131)	N/A	N/A
622-50MAM	50	51.82 (2.040)	68.53 (2.698)	N/A	N/A	69.24 (2.725)	N/A	N/A

*AVAILABLE WITH ATTACHED BAIL MOUNT LATCHES—USE SUFFIX MM3 FOR PART NUMBER.

BACKSHELLS FOR METAL SHELL RIBBON CONNECTORS
(For use with 174, 187, 203 and 204 cable types)

Product Description
For use with Ribbon Connectors, a full range of backshells allows implementation of connections cables, cable splices, and cable extensions.

The backshells are durable plastic to withstand adverse environments. Several versions are available to accommodate different flat and round-to-flat cables.

Installation is easy. The stable snap latch can be closed with installation tools. No screw mounting is necessary. Entries for jacketed flat cable or special round-to-flat cable have integral strain reliefs.

With matching screw sets and bail mount shown on pages 60 and 61, backshells form a reliable interconnect for any application.

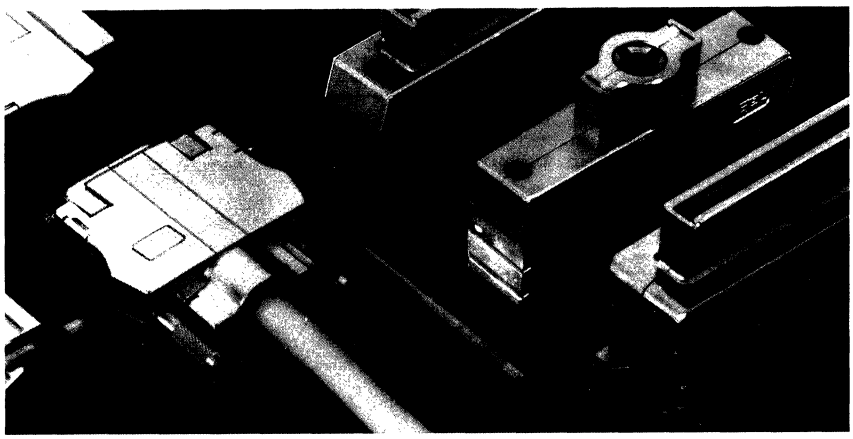
Design Advantages
- Available in 14 to 50 position sizes.
- Available for jacketed flat cable or special round cable.
- Available in metallized versions for EMI/RFI shielding.
- Snap latches enable efficient closing of backshells without time-consuming screw mounting.

Application Tooling
Backshells with flat cable outlet:

Hand Tool	779-2100
with Die	779-2173
Bench Press or	779-3200
Bench Press (pneumatic)	779-3500XT
with Standard Platen	779-3130
and Base Plate	779-3173

Backshells with round cable outlet:

Hand Tool	779-2100
with Die	779-2174
Bench Press or	779-3200
Bench Press (pneumatic)	779-3500
with Standard Platen	779-3130
with Base Plate	779-3174



Backshells act as a strain relief for both jacketed & flat cable, protecting contacts from mechanical loading.

Ordering Information
The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

622-014RM

- 622 — *T&B Series*
- 014 — *Number of Positions*
- RM — *Leave blank - for flat cable outlet*
  - *M - with flat cable outlet metallized*
  - *R - with round cable outlet*
  - *RM - with round cable outlet metallized*

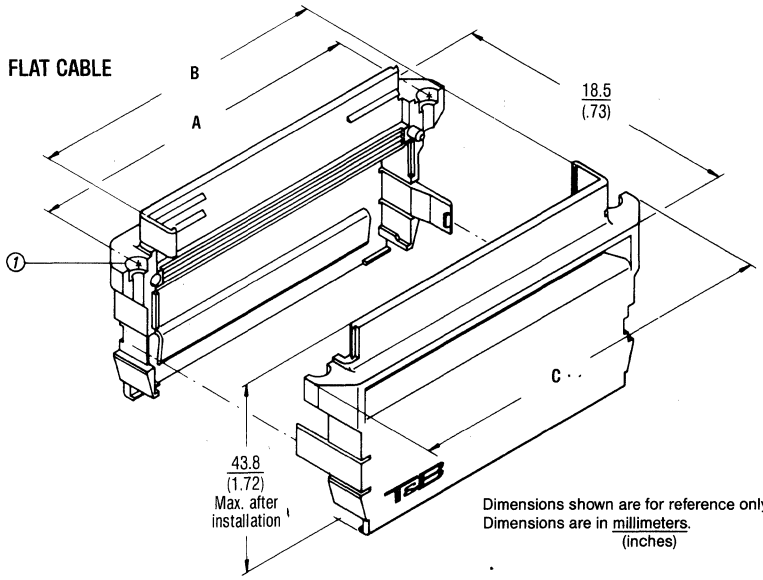
Backshells for Metal Shell Ribbon Connectors 14-50 Position

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0.

Electrical Properties
Shielding Efficiency: >40 dB @ 100 MHz to 1 GHz.

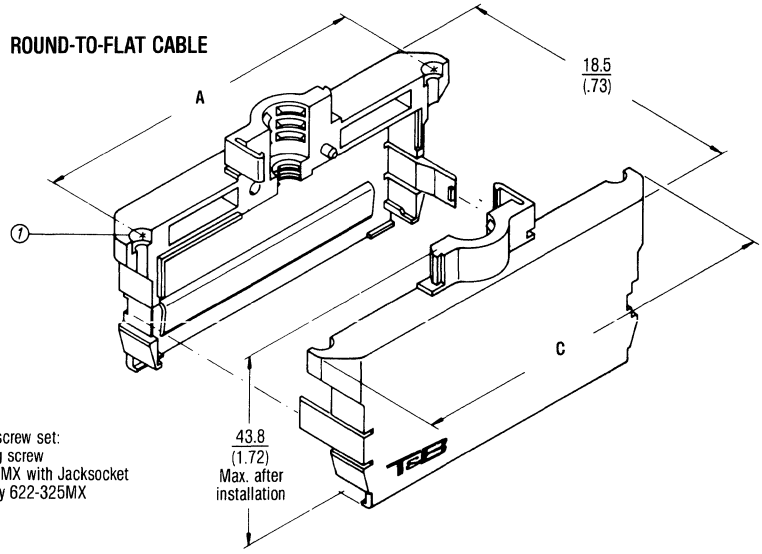
Environmental Properties
Temperature Rating: –55°C to 125°C.

FLAT CABLE



Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

ROUND-TO-FLAT CABLE

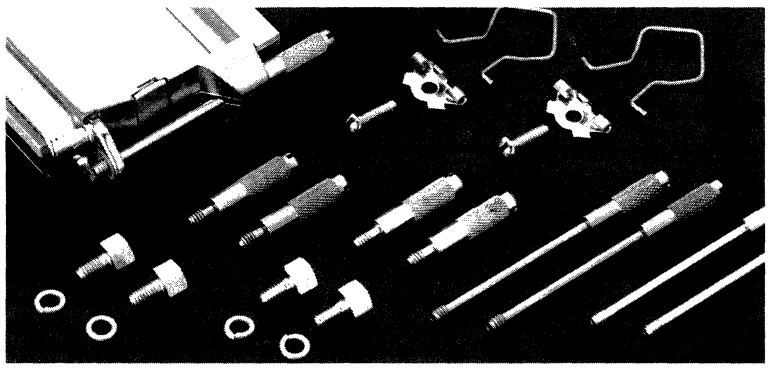


① Use for screw set:
Mounting screw
622-327MX with Jacksocket
Assembly 622-325MX

Ordering Information

CABLE TYPE	CATALOG NUMBERS		NO. OF POS.	DIMENSIONS IN MM (INCHES)			RECOMMENDED			
							JACKET DIAMETER		SHIELD DIAMETER	
	PLASTIC (BLACK)	METALLIZED (CHROME)		A	B	C	MIN.	MAX.	MIN.	MAX.
Flat Cable	622-014	622-014M	14	36.0 (1.42)	21.3 (.84)	44.2 (1.74)	–	–	–	–
Flat Cable	622-024	622-024M	24	46.8 (1.84)	34.0 (1.34)	55.0 (2.16)	–	–	–	–
Flat Cable	622-036	622-036M	36	59.7 (2.35)	49.3 (1.94)	68.0 (2.68)	–	–	–	–
Flat Cable	622-050	622-050M	50	74.9 (2.95)	67.1 (2.64)	83.1 (3.27)	–	–	–	–
Round Cable	622-014R	622-014RM	14	36.0 (1.42)	–	44.2 (1.74)	6.0 (.24)	7.4 (.29)	4.2 (.17)	5.6 (.21)
Round Cable	622-024R	622-024RM	24	46.8 (1.84)	–	55.0 (2.17)	7.0 (.28)	8.5 (.33)	5.2 (.20)	6.7 (.25)
Round Cable	622-036R	622-036RM	36	59.7 (2.35)	–	68.0 (2.68)	8.1 (.32)	9.8 (.39)	6.4 (.25)	8.0 (.30)
Round Cable	622-050R	622-050RM	50	74.9 (2.95)	–	83.1 (3.27)	9.4 (.37)	11.2 (.44)	7.6 (.30)	9.4 (.35)

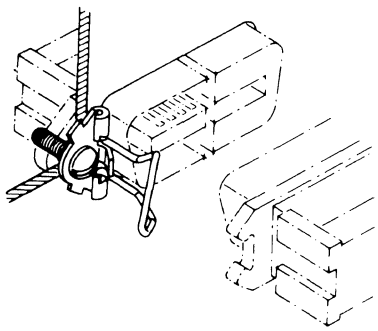
Mounting Hardware for Metal Shell Ribbon Connectors

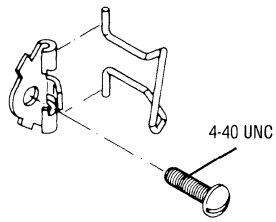


Product Description

Screw sets and bail mounts are available for all Thomas & Betts Metal Shell Ribbon Connectors. These allow cable splices, panel mounting and combinations with standard ribbon connectors for individual wiring applications. All mounting hardware are easy to install.

B



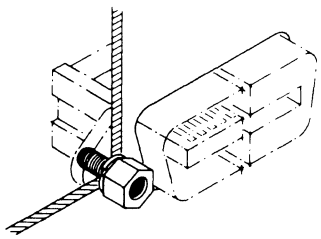


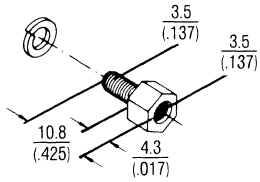
FOR USE WITH:
CONNECTORS
622-XXMM2
622-XXFM2
622-XXF2
622-XXM2

622-320M

Bail mount clip
Mounting screw 4-40 UNC
- couples ribbon connector with or without back panel mounting to another ribbon connector and can be used with or without backshell.

Panel thickness 3.2 (.13) max.



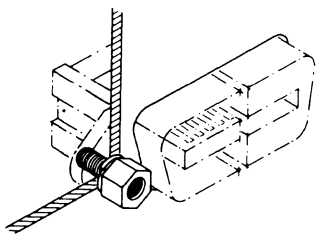


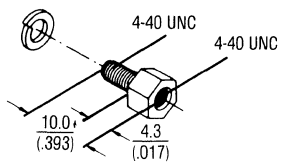
FOR USE WITH:
CONNECTORS
622-XXMM1
622-XXFM1
622-XXF1
622-XXM1

622-325M1

Jacksocket assembly
Mounting screw M 3.5
- couples ribbon connector with or without back-panel mounting via mounting screw to another ribbon connector with or without backshell

Surface: zinc-plated
Panel thickness 2.4 (.094) max.





FOR USE WITH:
622-XXMM2
622-XXFM2
622-XXM2
622-XXF2

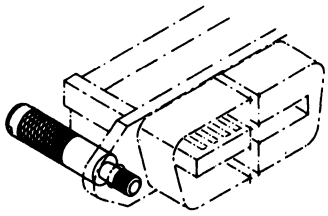
622-325M2

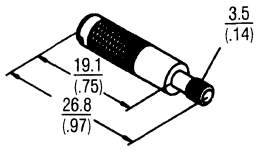
Jacksocket assembly 4-40 UNC
- couples ribbon connector with or without back-panel mounting via mounting screws to another ribbon connector with or without backshell

Surface: zinc-plated
Panel thickness 2.4 (.094) max.

Mounting Hardware for Ribbon Connectors

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)





FOR USE WITH:

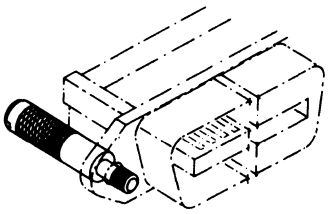
CONNECTORS	JACKSOCKET
622-XXMM1	622-325M1
622-XXFM1	
622-XXM	
622-XXF	

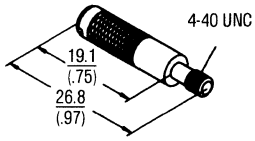
622-326M1

Mounting screw M 3.5

- couples ribbon connector without backshell via jacksockets to ribbon connector, with or without panel mounting

Surface: zinc-plated





FOR USE WITH:

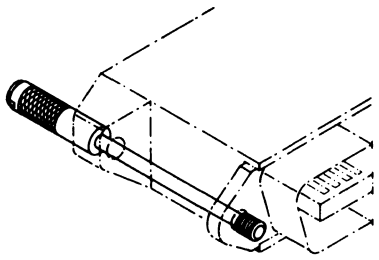
CONNECTORS	JACKSOCKET
622-XXMM2	622-325M2
622-XXFM2	
622-XXM	
622-XXF	

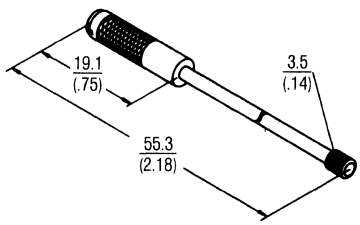
622-326M2

Mounting screw 4-40 UNC

- couples ribbon connector without backshell via jackscrews to ribbon connector, with or without panel mounting

Surface: zinc-plated





FOR USE WITH:

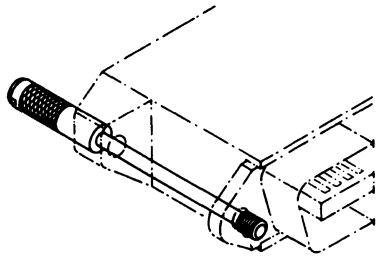
CONNECTORS	JACKSOCKET
622-XXMM1	622-325M1
622-XXFM1	
with backshell	

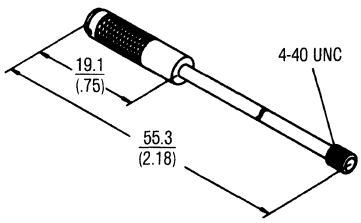
622-327M1

Mounting screw M 3.5

- couples ribbon connector with backshell via jacksockets to ribbon connector, with or without panel mounting

Surface: zinc-plated





FOR USE WITH:

CONNECTORS	JACKSOCKET
622-XXMM2	622-325M2
622-XXFM2	
with backshell	

622-327M2

Mounting screw 4-40 UNC

- couples ribbon connector with backshell via jacksockets to ribbon connector, with or without panel mounting

Surface: zinc-plated

FLEX-FIT™ COMPLIANT CONTACT PLASTIC RIBBON CONNECTORS

NEW PRODUCT

Product Description

The Compliant Contact Ribbon provides reliable, solderless press-fit termination to PC boards and backpanels.

The Compliant Contact Ribbon provides maximum installation versatility by maintaining I/O compatibility with all industry-standard Ribbon Connectors and are SCSI approved (Small Computer Systems Interface) for mass terminating to Thomas & Betts Flat Cable.

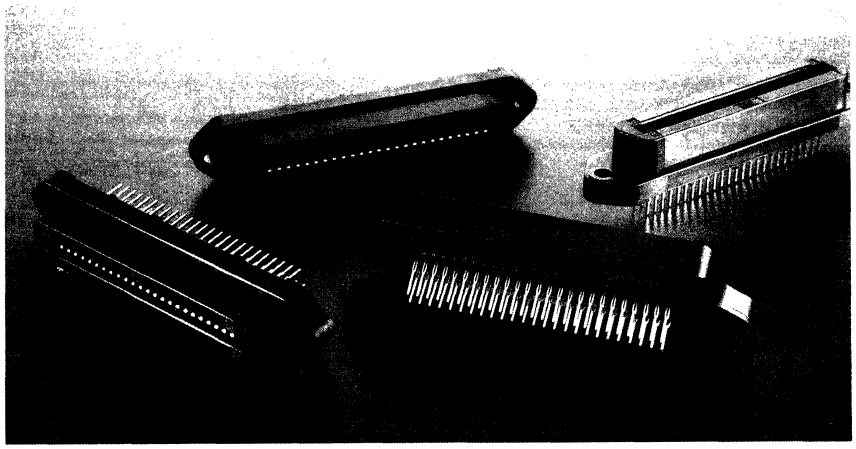
The Flex-Fit™ Compliant Contacts minimize PCB plated through-hole deformation, and conform to the requirements of MIL-STD-2166.

Design Advantages

- Available with through-hole 4-40 insert or 4-40 standoff mounting hardware.
- I/O mating ribbon contacts on industry standard 2.16 mm (.085") centers
- Compatible with FCC document 47 part 68, sub-part F.
- Flex-Fit™ Compliant Contact meets the performance requirements of MIL-STD-2166.
- Finished plated-through hole range: .030"-.035".
- PCB thickness accommodated= .062"-.125".
- Compatible with a wide range of flat cables and connectors for specific backpanel cabling applications.
- The superior compliant properties of the Flex-Fit™ Contact, eliminate costly plated through-hole damage or cut-through.

Application Tooling

None required, flat plate installation.



For press-fit solderless backpanel applications.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

RI F 50 PF 29 X 2

- RI — *T&B SERIES*
- F — *CONNECTOR GENDER*
- 50 — *NUMBER OF POSITIONS*
- PF — *"FLEX-FIT" COMPLIANT PINS*
- 29 — *PLATING CODE 29 = 30 MICROINCH GOLD IN MATING AREA. TINLEAD TAILS*
- X — *MOUNTING STYLE*
  A = THRU HOLES (.153⌀)
  B = 4-40 STAND-OFFS
  C = 4-40 FLUSH THREADS
- 2 — *TAIL LENGTH: 2 = .300*

FLEX-FIT Compliant Contact Plastic Ribbon Connectors

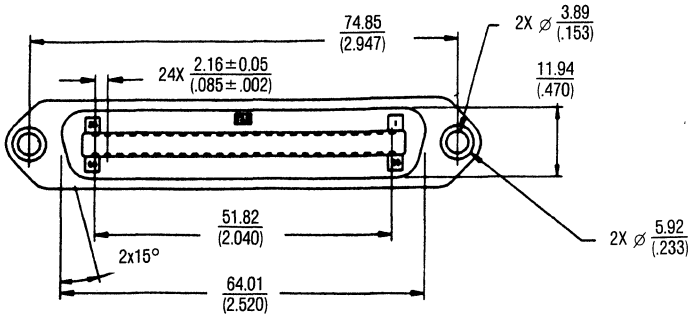
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

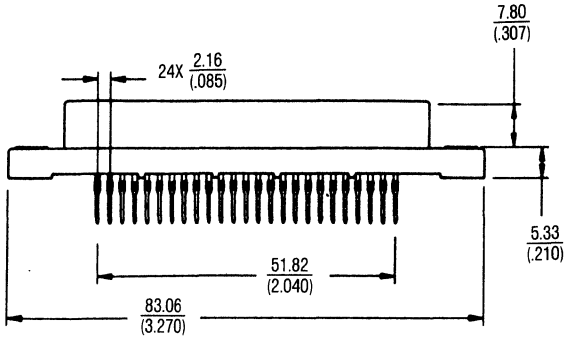
NEW PRODUCT

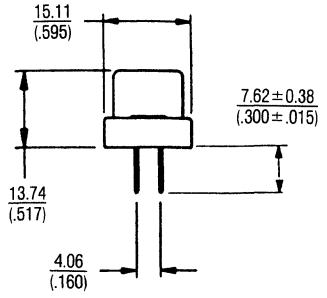
Physical Properties
Insulation Material: Glass reinforced thermoplastic, rated 94V-0, black.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone, tin-lead over nickel in termination area.

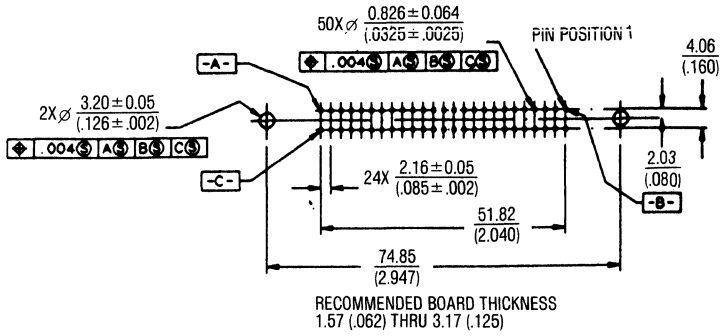
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: > 1 X 10^9 Ohms
Dielectric Strength: > 1000 VDC @ sea level

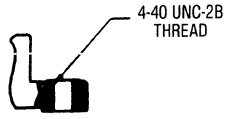
Environmental Properties
Temperature Rating: −55°C to 125°C.



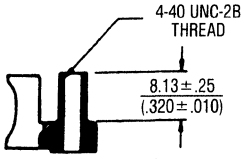








"C" MOUNTING STYLE



"B" MOUNTING STYLE

RECOMMENDED PCB HOLE SIZE SPECIFICATIONS		
REQUIRED DRILL SIZE	.97 (.038)	
DRILLED HOLE D.S. ±0.025 ±(.0010)	.97 (.038)	
PLATING THICKNESS	COPPER .025-.051 (.001-.002)	TIN/LEAD 0.0076 (.0003) MIN.
HOLE DIA.	AFTER PLATING .76-.89 (.030-.035) MIN.	
PAD DIA. MIN.	1.47 (.058)	

Ordering Information

CATALOG NUMBER	NO. OF POS.	MOUNTING OPTION
R1F50PF29A2	50	.153 ⌀ THRU-HOLE
R1F50PF29B2	50	4-40 STAND-OFF
R1F50PF29C2	50	4-40 FLUSH THREADS

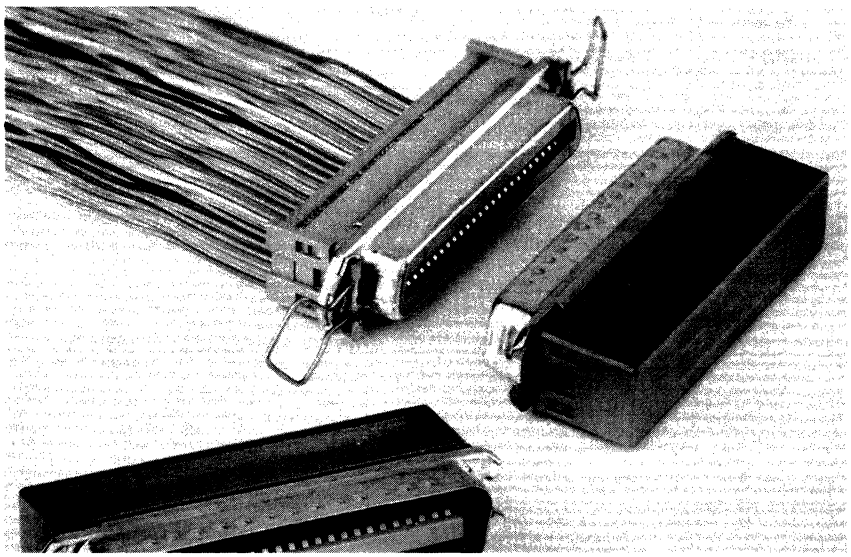
SCSI TERMINATORS

Product Description

The SCSI Terminators incorporate a connector and resistor network design that provides a known impedance at the end of a bus line in computer applications. This assures improved signals due to the control of reflections through the system. The terminator contacts are designed on.085" centers to meet the needs of the SCSI (small computer system interface) standard. The fully-shielded terminators will help meet EMI/RFI requirements and comply with the FCC, part 15 emissions standard.

Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- 50-position standard male micro-ribbon connector.
- Mates to industry standard .085" center female microribbon bail-mount connector.
- UL recognition/CSA certification.
- Beryllium copper contact material.
- Selective gold plating on contact interfaces.
- Glass reinforced thermoplastic insulation material rated at 94V-0.
- 100% electrically tested.
- Fully shielded component.
- Custom connector enclosures and resistor networks can be developed.



Complies with SCSI industry standard

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

TRM-50-XX

- TRM: *T&B Series*
- 50: *Number of Positions*
- XX: *01 - Single-ended termination*; *02 - Differential terminator*

B

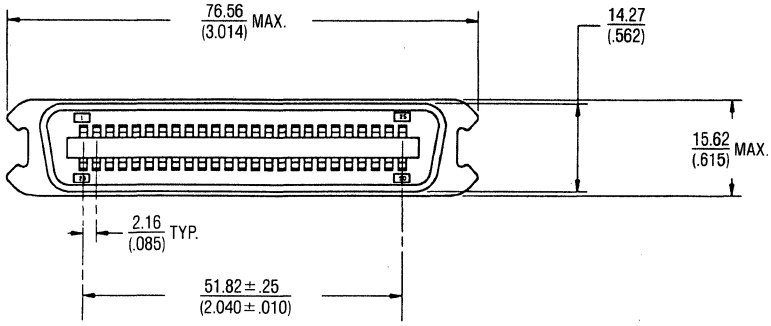
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

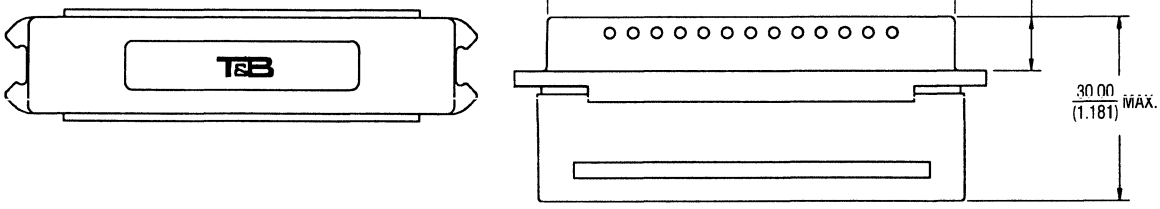
SCSI Terminators
50 Position
Series TRM

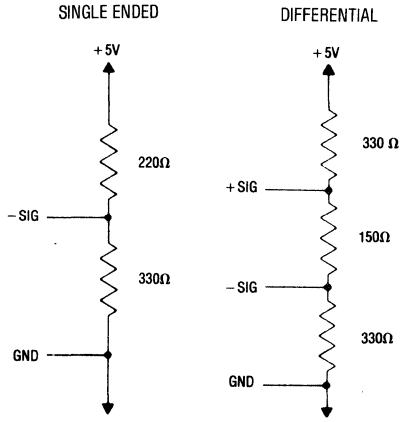
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.







Ordering Information

CATALOG NUMBERS	TYPE
TRM-50-01	Single Ended
TRM-50-02	Differential

CARD EDGE CONNECTORS 10 THROUGH 60 POSITIONS

Product Description

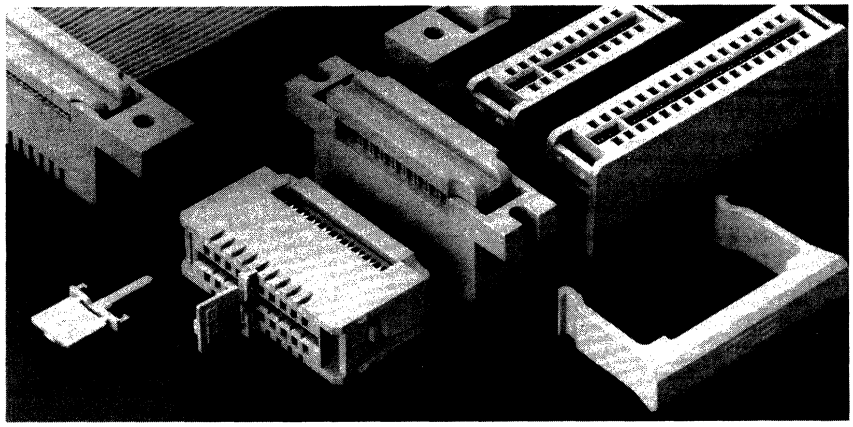
The Card Edge Connectors are designed to provide a high-performance flat cable interface to double-sided printed circuit boards. A variety of mounting options provide application versatility.

Design Advantages

- 10 connector sizes—10, 16, 20, 26, 30, 34, 40, 44, 50 and 60 positions.
- Available in three mounting configurations: full mounting ears, half mounting ears, and no mounting ears.
- Contact Material—Beryllium copper with 30 micro inches min. gold plating over 50 micro inches min. nickel plating.
- 30μ" (minimum) gold plating in contact mating areas.
- Bifurcated contact design offers two points of contact for electrical reliability; tolerates PCB pad variations.
- Withstands increased mating and unmating forces.
- Uniform wall thickness provides consistent contact force.
- Separate polarizing key available.
- Polarizing key locks securely into body of connector tabs.
- Strain relief available for card edge connector with no mounting ears.

Application Tooling

Hand Tool	779-2100
with Die	779-2164
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3164
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3164



Side latching provides visual inspection assuring positive crimp has been made; enhanced cover design prevents warpage.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

622-1005

- **622** — *T&B Series*
- **10** — *Number of Positions*
- **05** — *Connector with full mounting ears*
- **15** — *Connector without mounting ears*
- **25** — *Connector with half mounting ears*
- **35** — *Strain Relief only*

***622-0005** - Optional polarizing key*
***622-2015PK03-05** - 20-position Card Edge Connector with molded-in polarization between contacts 3 and 5*
***622-3415PK03-05** - 34-position Card Edge Connector with molded-in polarization between contacts 3 and 5*

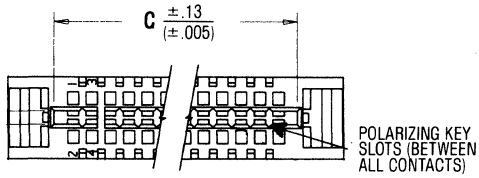
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

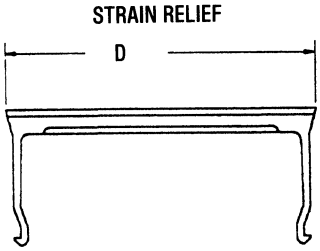
Card Edge Connector Without Mounting Ears

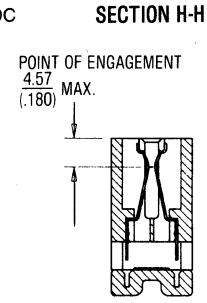
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

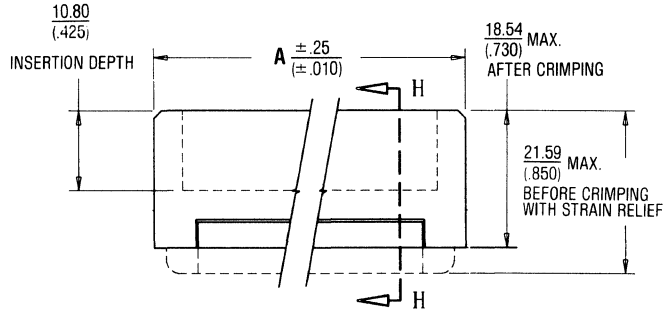
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

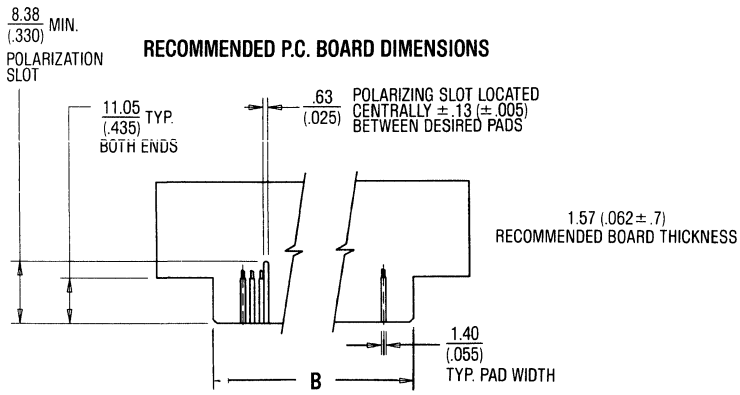
Environmental Properties
Temperature Rating: −55°C to 125°C.











Ordering Information

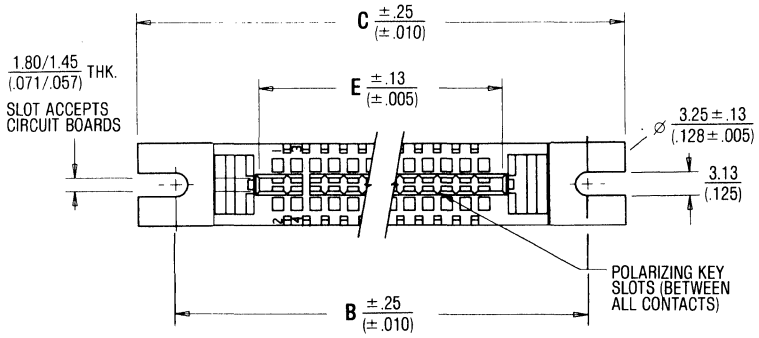
CATALOG NUMBERS	NUMBER OF POSITIONS	DIMENSIONS IN MM(INCHES)			
		A	B	C	D
622-1015	10	24.38 (.960)	15.11 (.595)	15.37 (.605)	29.26 (1.152)
622-1615	16	32.00 (1.260)	22.73 (.895)	22.99 (.905)	36.88 (1.452)
622-2015	20	37.08 (1.460)	27.81 (1.095)	28.07 (1.105)	41.96 (1.652)
622-2615	26	44.70 (1.760)	35.43 (1.395)	35.69 (1.405)	49.58 (1.952)
622-3015	30	49.78 (1.960)	40.51 (1.595)	40.77 (1.605)	54.66 (2.152)
622-3415	34	54.86 (2.160)	45.59 (1.795)	45.85 (1.805)	59.74 (2.352)
622-4015	40	62.48 (2.460)	53.21 (2.095)	53.47 (2.105)	67.36 (2.652)
622-4415	44	67.56 (2.660)	58.29 (2.295)	58.55 (2.305)	72.44 (2.852)
622-5015	50	75.18 (2.960)	65.91 (2.595)	66.17 (2.605)	80.06 (3.152)
622-6015	60	87.88 (3.460)	78.61 (3.095)	78.87 (3.105)	92.76 (3.652)

Card Edge Connector With Half Mounting Ears

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

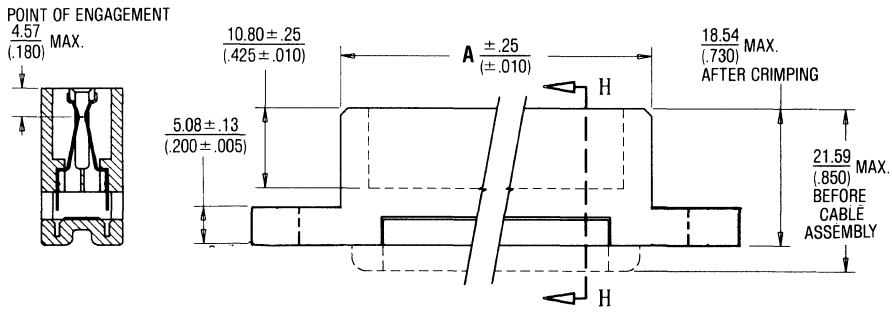
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

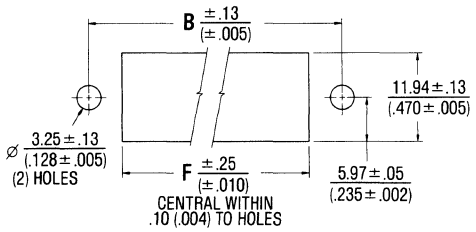


Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

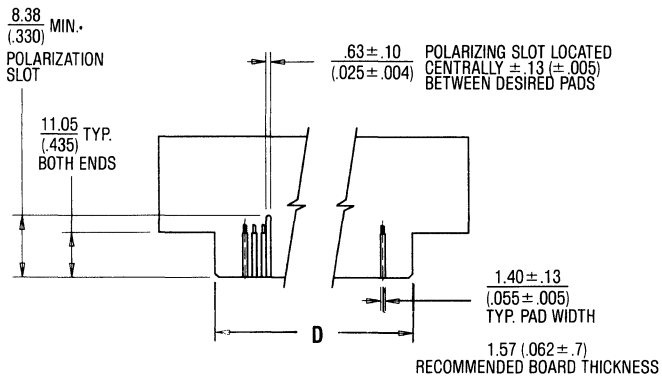
SECTION H-H



RECOMMENDED PANEL CUTOUT DIMENSIONS



RECOMMENDED P.C. BOARD DIMENSIONS



Ordering Information

CATALOG NUMBERS	NUMBER OF POSITIONS	DIMENSIONS IN MM (INCHES)					
		A	B	C	D	E	F
622-1025	10	24.38 (.960)	33.02 (1.300)	38.01 (1.500)	15.11 (.595)	15.37 (.605)	25.12 (.989)
622-1625	16	32.00 (1.260)	40.64 (1.600)	45.72 (1.800)	22.73 (.895)	22.99 (.905)	32.74 (1.289)
622-2025	20	37.08 (1.460)	45.72 (1.800)	50.80 (2.000)	27.81 (1.095)	28.07 (1.105)	37.82 (1.489)
622-2625	26	44.70 (1.760)	53.34 (2.100)	58.42 (2.300)	35.43 (1.395)	35.69 (1.405)	45.44 (1.789)
622-3025	30	49.78 (1.960)	58.42 (2.300)	63.50 (2.500)	40.51 (1.595)	40.77 (1.605)	50.52 (1.989)
622-3425	34	54.86 (2.160)	63.50 (2.500)	68.58 (2.700)	45.59 (1.795)	45.85 (1.805)	55.60 (2.189)
622-4025	40	62.48 (2.460)	71.12 (2.800)	76.20 (3.000)	53.21 (2.095)	53.47 (2.105)	63.22 (2.489)
622-4425	44	67.56 (2.660)	76.20 (3.000)	81.28 (3.200)	58.29 (2.295)	58.55 (2.305)	68.30 (2.889)
622-5025	50	75.18 (2.960)	83.82 (3.300)	88.90 (3.500)	65.91 (2.595)	66.17 (2.605)	75.92 (2.989)
622-6025	60	87.88 (3.460)	96.52 (3.800)	101.60 (4.000)	78.61 (3.095)	78.87 (3.105)	88.62 (3.489)

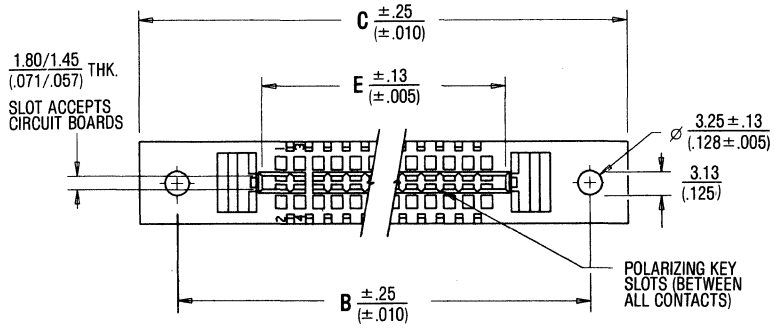
B

Card Edge Connector With Full Mounting Ears

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

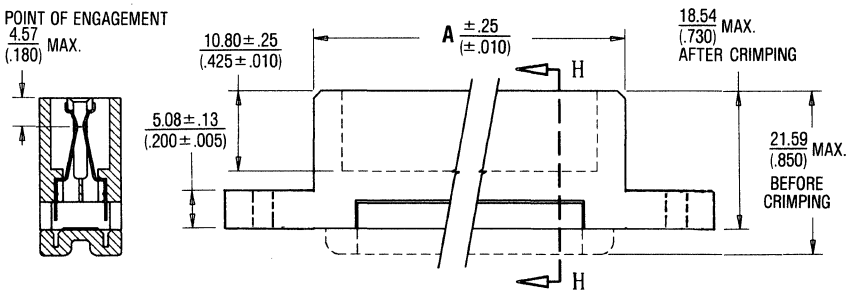
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

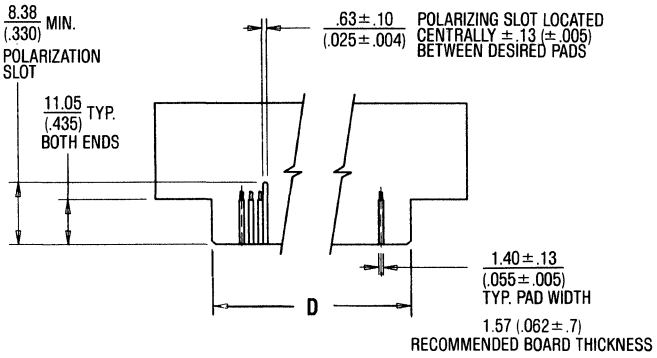


Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

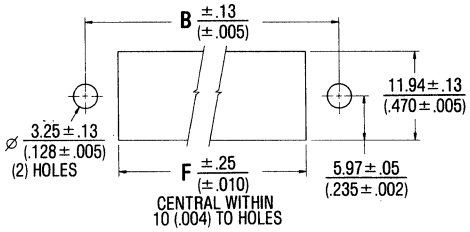
SECTION H-H



RECOMMENDED P.C. BOARD DIMENSIONS



RECOMMENDED PANEL CUTOUT DIMENSIONS



Ordering Information

CATALOG NUMBERS	NUMBER OF POSITIONS	DIMENSIONS IN MM (INCHES)					
		A	B	C	D	E	F
622-1005	10	24.38 (.960)	35.56 (1.400)	47.24 (1.860)	15.11 (.595)	15.37 (.605)	25.12 (.989)
622-1605	16	32.00 (1.260)	43.18 (1.700)	54.86 (2.160)	22.73 (.895)	22.99 (.905)	32.74 (1.289)
622-2005	20	37.08 (1.460)	48.26 (1.900)	59.94 (2.360)	27.81 (1.095)	28.07 (1.105)	37.82 (1.489)
622-2605	26	44.70 (1.760)	55.88 (2.200)	67.56 (2.660)	35.43 (1.395)	35.69 (1.405)	45.44 (1.789)
622-3005	30	49.78 (1.960)	60.96 (2.400)	72.64 (2.860)	40.51 (1.595)	40.77 (1.605)	50.52 (1.989)
622-3405	34	54.86 (2.160)	66.04 (2.600)	77.72 (3.060)	45.59 (1.795)	45.85 (1.805)	55.60 (2.189)
622-4005	40	62.48 (2.460)	73.66 (2.900)	85.34 (3.360)	53.21 (2.095)	53.47 (2.105)	63.22 (2.489)
622-4405	44	67.56 (2.660)	78.74 (3.100)	90.42 (3.560)	58.29 (2.295)	58.55 (2.305)	68.30 (2.889)
622-5005	50	75.18 (2.960)	86.36 (3.400)	98.04 (3.860)	65.91 (2.595)	66.17 (2.605)	75.92 (2.989)
622-6005	60	87.88 (3.460)	99.06 (3.900)	110.74 (4.360)	78.61 (3.095)	78.87 (3.105)	88.62 (3.489)

DIP PLUGS
STANDARD AND LOW PROFILE

Product Description

The Standard and Low Profile DIP Plugs are primarily used as a disconnectable interface to DIP sockets. Heavy-duty leads are standard features on both Standard and Low Profile DIP Plugs. Low Profile DIP Plugs are also available with tin-plated pins, providing a permanent flat cable transition to printed circuit boards.

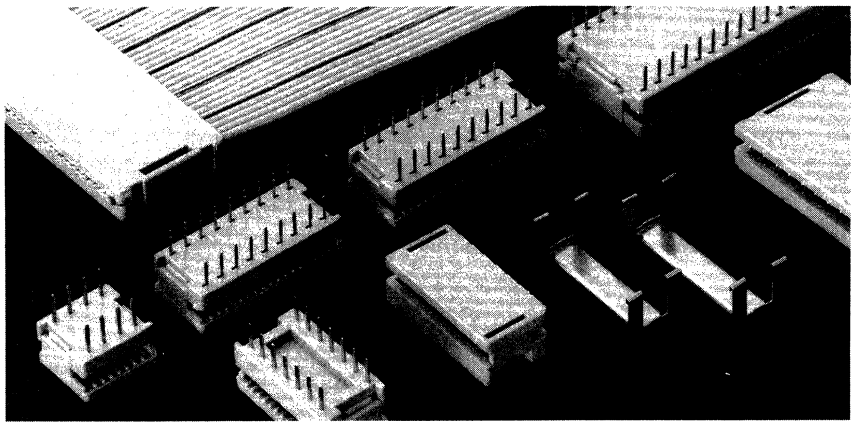
Design Advantages

- Contact Material—Beryllium copper with 30 micro inches min. gold over 50 micro inches min. nickel plating.
- Standard DIP Plugs available in 14 and 16 pin versions to mate with DIP sockets for disconnect applications on 2.54mm x 7.62mm (.100" x .300") grids.
- Low Profile DIP Plugs available in 9 contact sizes—8, 14, 16, 18, 20, 22, 24, 40, and 48.
- Heavy-duty gold-plated contacts provided on both Standard and Low Profile DIP Plugs.
- Heavy-duty tin-plated contacts available on Low Profile DIP Plugs.
- Snap-on strain reliefs available for 24- and 40-position Low Profile versions.

Application Tooling

Hand Tool	779-2100
with Die	779-2156* 779-2155**
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3155
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3155

*Standard DIP plugs
**Low Profile DIP plugs



Mate with DIP sockets for disconnect applications; tin-plated versions for PCB solder applications.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Order Chart on the following page(s).

609-M141H

- **609** — *T&B Series*
- **M** — *DIP Plugs*
- **141** — *Number of Positions*
- **1H** — *Standard DIP Plug*
- **5H** — *Low Profile DIP Plugs (except 40 position), Gold-Plated contacts*
- **5TH** — *Low Profile DIP Plugs (except 40 position), Tin-Plated contacts*

609-M407H	*Low Profile DIP Plug (40 position), Gold-Plated Contacts*
609-M407TH	*Low Profile DIP Plug (40 position), Tin-Plated Contacts*
609-M245S	*Strain Relief for 24-Position Low Profile DIP Plug*
609-M407S	*Strain Relief for 40-Position Low Profile DIP Plug*

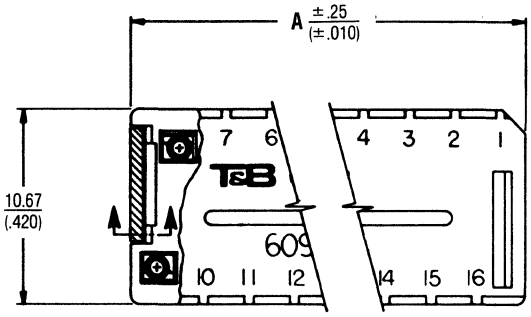
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

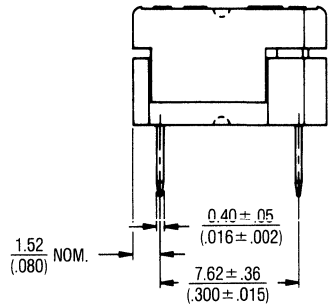
DIP Plugs
Standard 14 & 16 Position

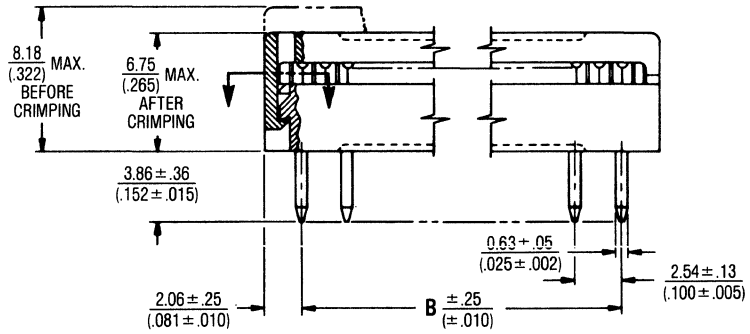
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

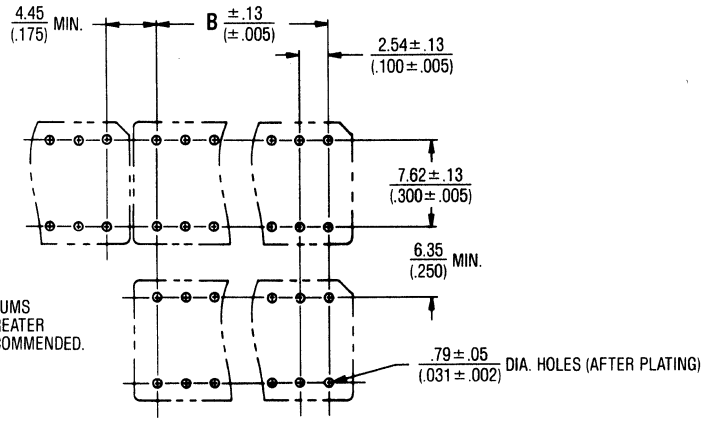
Environmental Properties
Temperature Rating: –55°C to 125°C.







RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)	
		A	B
609-M141H	14	19.35 (.762)	15.24 (.600)
609-M161H	16	21.89 (.862)	17.78 (.700)

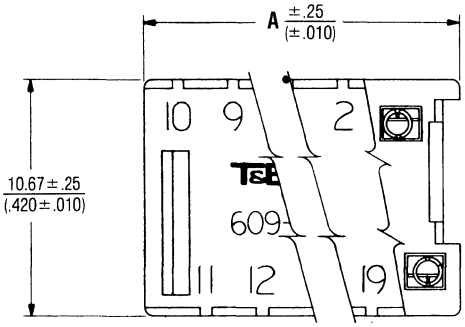
DIP Socket
Low Profile
8-20 Position

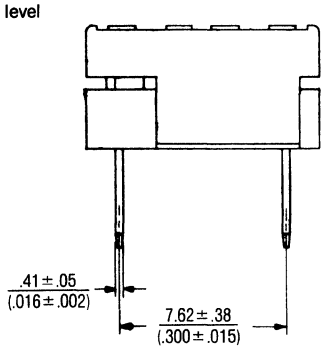
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

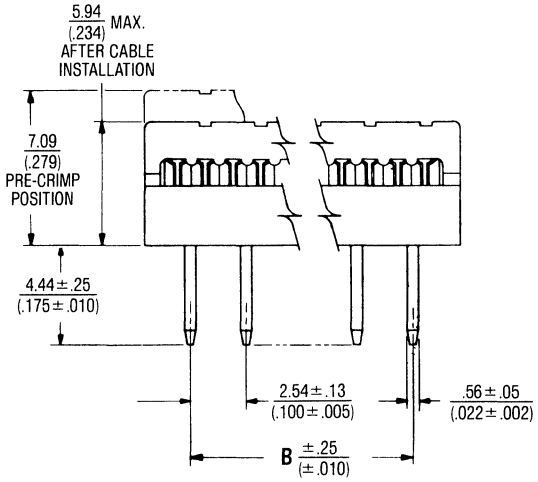
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.

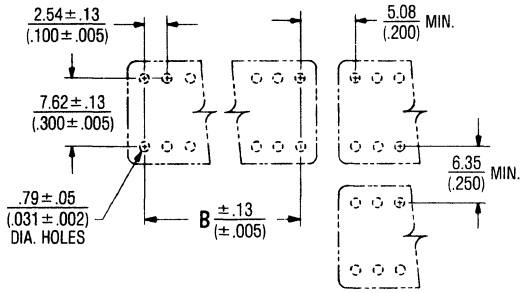
Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)







RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)	
		A	B
609-M085H	8	11.76 (.463)	7.62 (.300)
609-M145H	14	19.38 (.763)	15.24 (.600)
609-M165H	16	21.92 (.863)	17.78 (.700)
609-M185H	18	24.46 (.963)	20.32 (.800)
609-M205H	20	27.00 (1.063)	22.86 (.900)
609-M085TH	8	11.76 (.463)	7.62 (.300)
609-M145TH	14	19.38 (.763)	15.24 (.600)
609-M165TH	16	21.92 (.863)	17.78 (.700)
609-M185TH	18	24.46 (.963)	20.32 (.800)
609-M205TH	20	27.00 (1.063)	22.86 (.900)

B

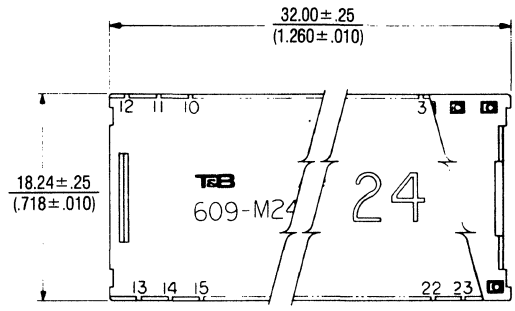
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

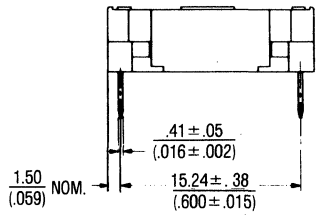
DIP Plugs
Low Profile
24 Position

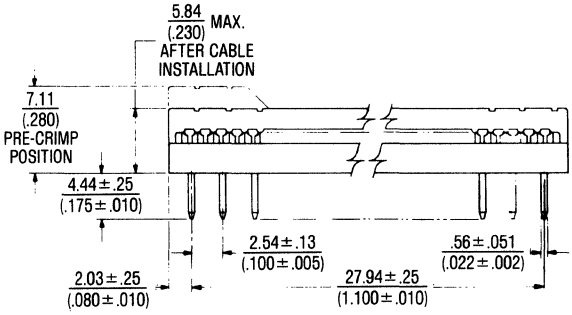
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

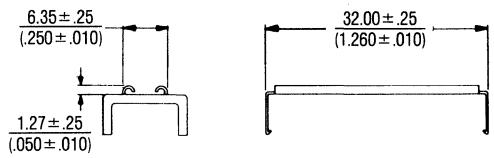
Environmental Properties
Temperature Rating: −55°C to 125°C.



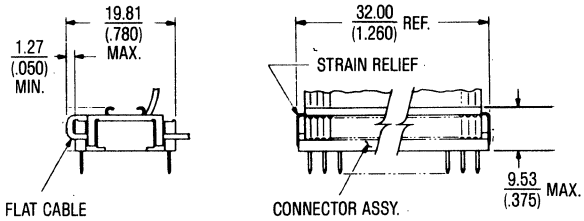




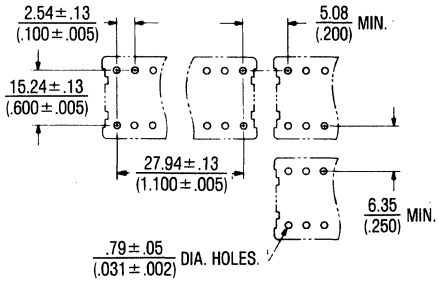
STRAIN RELIEF



CONNECTOR ASSEMBLY WITH STRAIN RELIEF



RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CAT. NO.	DESCRIPTION
609-M245H	GOLD OVER NICKEL
609-M245TH	TIN OVER NICKEL
609-M245S	STRAIN RELIEF

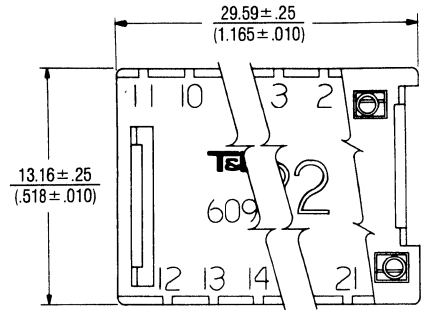
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

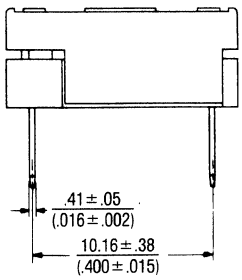
DIP Plugs
Low Profile
22 Position

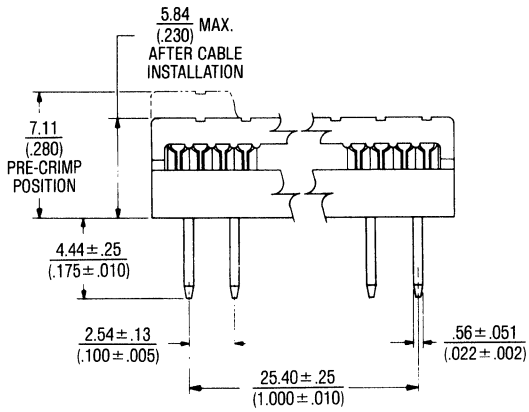
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

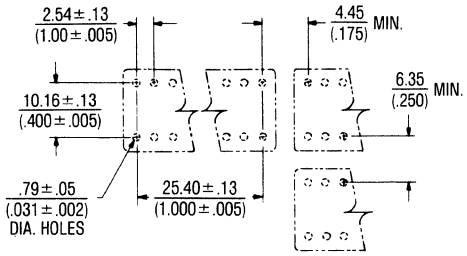
Environmental Properties
Temperature Rating: −55°C to 125°C.







RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CAT. NO.	CONTACT PLATING
609-M225H	GOLD OVER NICKEL
609-M225TH	TIN OVER NICKEL

B

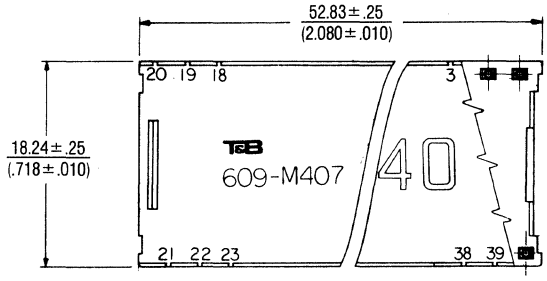
DIP Plugs
Low Profile
40 Position

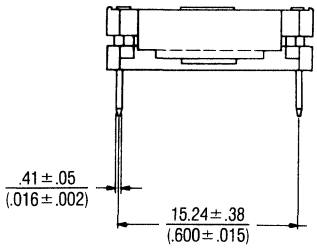
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

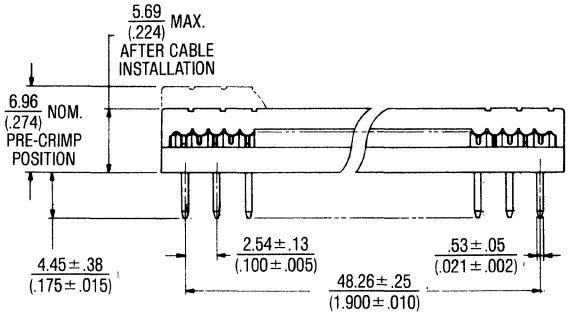
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

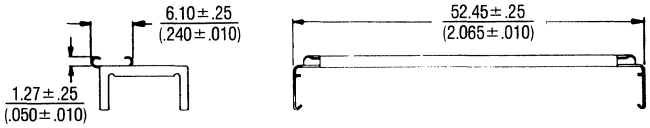
Environmental Properties
Temperature Rating: –55°C to 125°C.



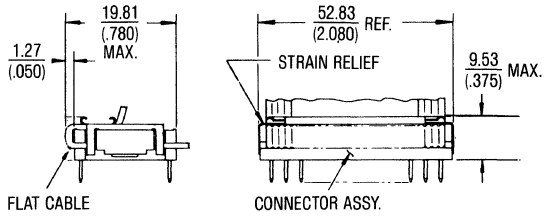




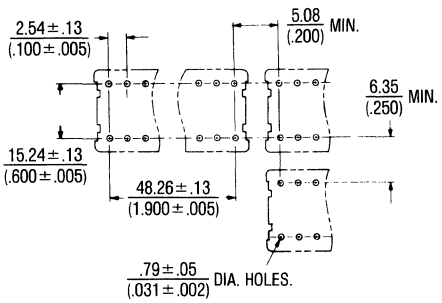
STRAIN RELIEF



CONNECTOR ASSEMBLY WITH STRAIN RELIEF



RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CAT. NO.	DESCRIPTION
609-M407H	GOLD OVER NICKEL
609-M407TH	TIN OVER NICKEL
609-M407S	STRAIN RELIEF

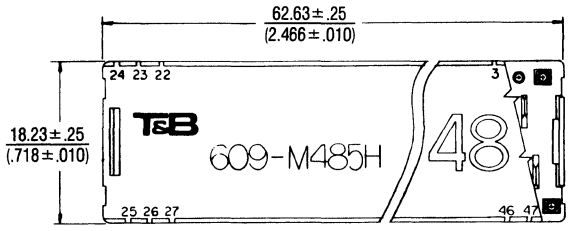
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

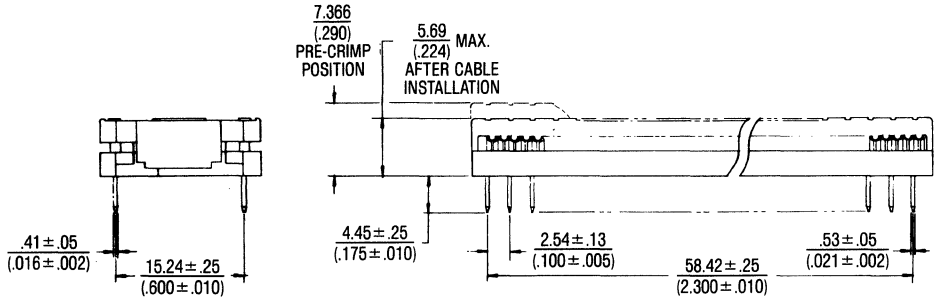
DIP Plugs
Low Profile
48 Position

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

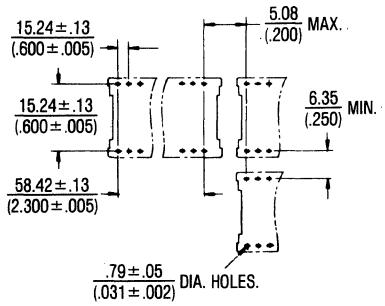
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.





RECOMMENDED MOUNTING HOLE PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CAT. NO.	CONTACT PLATING (HEAVY DUTY)
609-M485H	GOLD OVER NICKEL
609-M485TH	TIN OVER NICKEL

DIP SOCKET CONNECTORS AND HEADERS 14 AND 16 POSITIONS

Product Description

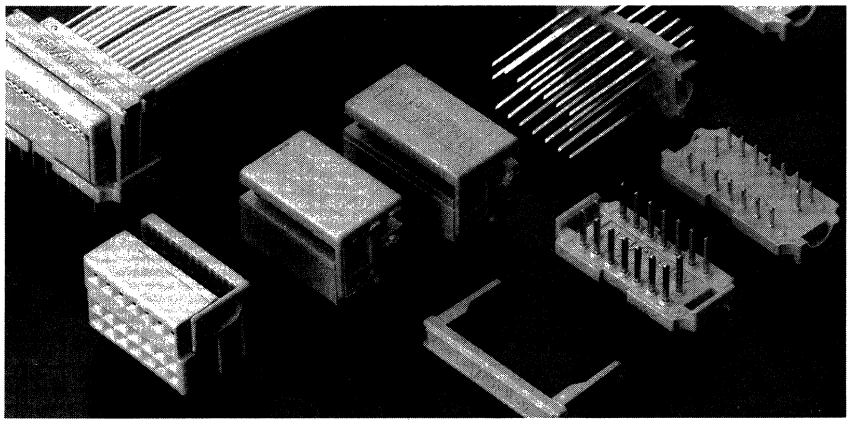
The DIP Socket Connector is designed to provide reliability for plug-gable dual in-line packaging. Mating headers and sockets prevent damage to DIP pins during repeated insertion and extraction cycles—the mating pins are completely enclosed in plastic.

Design Advantages

- Available in 14 or 16 positions.
- Mating Socket Connector and Headers enclose DIP pins.
- Headers include retainer clip.
- Compatible with .64mm (.025") square posts on either a 2.54mm x 5.08mm (.100" x .200") or a 2.54mm x 7.62mm (.100" x .300") grid.

Application Tooling

Hand Tool	779-2100
with Die	779-2162
Bench Press (manual)	779-3200
with Platen	779-3130
with Base Plate	779-3162
Bench Press (pneumatic)	779-3500XT
with Platen	779-3130
with Base Plate	779-3162



Protect DIP pins against breakage or bending.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

Sockets

609-F141M

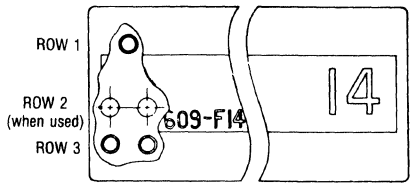
- **609** — *T&B Series*
- **F** — *Sockets Only*
- **14** — *Number of Positions*
- **1M** — *1M = .100" x .300" grid; 1M2 = .100" x .200" grid*

Headers

609-1478

- **609** — *T&B Series*
- **14** — *Number of Positions*
- **78** — *78 = Solder tail (.062" PCB); 88 = Solder tail (.125" PCB); 98 = Wrap post tail*

DIP Socket Connectors 14 and 16 Positions

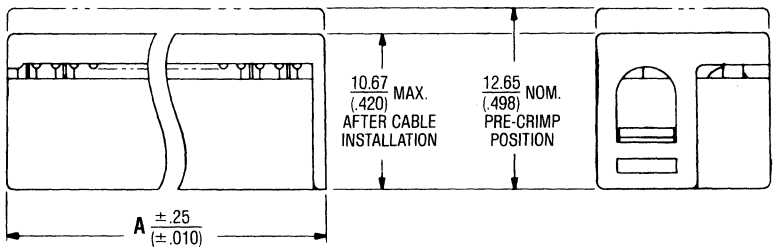


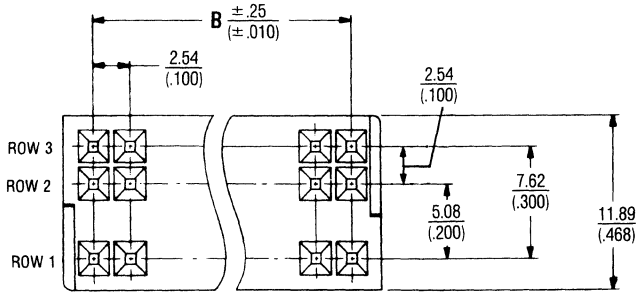
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.
Metal Shell: Steel with tin plating

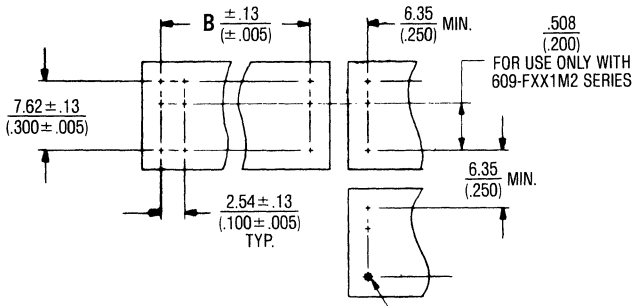
Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

Environmental Properties
Temperature Rating: −55°C to 125°C.





RECOMMENDED POST PATTERN



NOTE: CONNECTOR SPACINGS ARE GIVEN AS MINIMUMS FOR EASE OF PLUGGING OR UNPLUGGING. GREATER SPACING IN AT LEAST ONE DIRECTION IS RECOMMENDED.

Ordering Information

CATALOG NO.	NO. OF POS.	GRID SPACING	DIMENSIONS IN MM (INCHES)		CONTACT POSITIONS
			A	B	
609-F141M2	14	2.54 x 5.06 (.100 x .200)	19.51 (.768)	15.24 (.600)	ROWS 1 AND 2
609-F161M2	16	2.54 x 5.06 (.100 x .200)	22.05 (.868)	17.78 (.700)	ROWS 1 AND 2
609-F141M	14	2.54 x 7.62 (.100 x .300)	19.51 (.768)	15.24 (.600)	ROWS 1 AND 3
609-F161M	16	2.54 x 7.62 (.100 x .300)	22.05 (.868)	17.78 (.700)	ROWS 1 AND 3

B

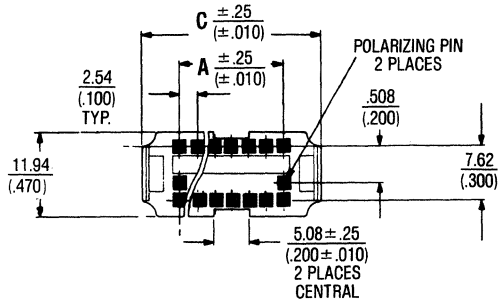
DIP Socket Headers 14 and 16 Positions

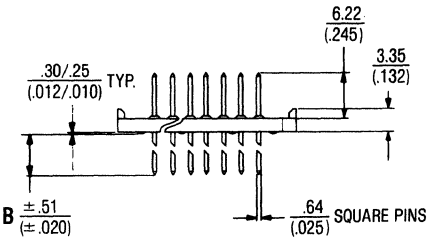
Physical Properties
Insulation Material: Glass filled thermoplastic, rated 94V-0, blue.
Contact Material: Beryllium copper: 30 μ inches minimum gold over 50 μ inches nickel in contact zone; tin-lead over nickel in termination area.

Electrical Properties
Current Rating: 1 Amp
Insulation Resistance: >1 x 10^9 Ohms @ 500 VDC
Dielectric Strength: >1000 VRMS @ sea level

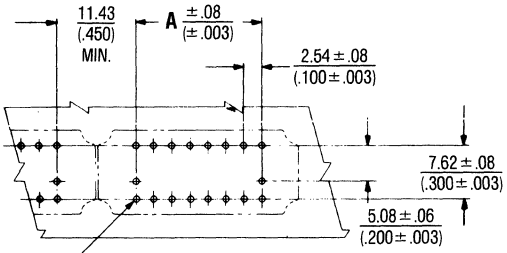
Environmental Properties
Temperature Rating: −55°C to 125°C.

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

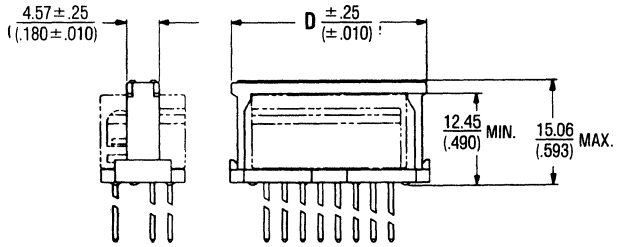




RECOMMENDED HOLE PATTERN



HOLE DIA. AFTER PLATING	CAT. NO. USED FOR
.89 ± .08 (.035 ± .003)	609-1478, 609-1488 609-1678, 609-1688
$.97^{+.08}_{-.05}$ $\left(.038^{+.003}_{-.002}\right)$	609-1498, 609-1698



INSULATOR WITH RETAINER CLIP AND CONNECTOR (IN PHANTOM) INSTALLED

Ordering Information

CATALOG NO.	NO. OF POS.	DIMENSIONS IN MM (INCHES)				FOR USE WITH
		A	B	C	D	
609-1478	14	15.24 (.600)	3.05 (.120)	26.06 (1.026)	25.25 (.994)	1.57 (.062) THICK PCB
609-1488	14	15.24 (.600)	4.57 (.180)	26.06 (1.026)	25.25 (.994)	3.18 (.125) THICK PCB
609-1498	14	15.24 (.600)	16.26 (.640)	26.06 (1.026)	25.25 (.994)	WRAP POST TAILS (3 LEVEL)
609-1678	16	17.78 (.700)	3.05 (.120)	28.60 (1.126)	27.79 (1.094)	1.57 (.062) THICK PCB
609-1688	16	17.78 (.700)	4.57 (.180)	28.60 (1.126)	27.79 (1.094)	3.18 (.125) THICK PCB
609-1698	16	17.78 (.700)	16.26 (.640)	28.60 (1.126)	27.79 (1.094)	WRAP POST TAILS (3 LEVEL)

STANDARD FLAT CABLE .050" CONDUCTOR SPACING

B

Product Description

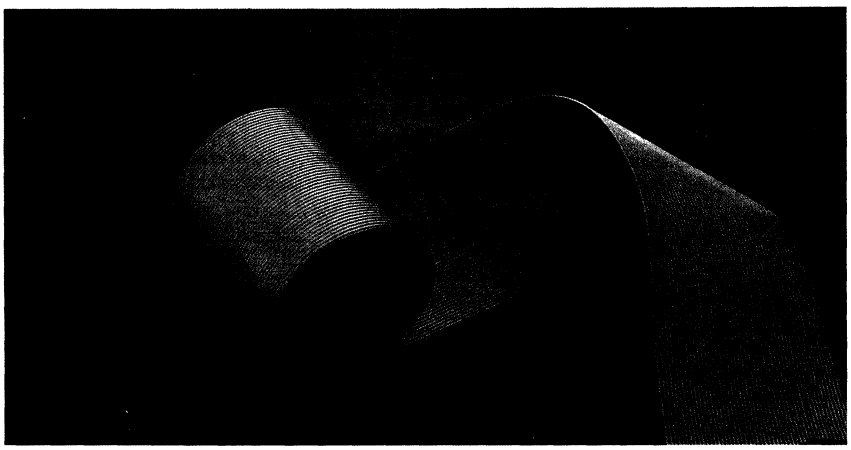
Standard Flat Cable is designed to mass terminate to all types of IDC Connectors without wire stripping or soldering. Primarily designed for intra-cabinet wiring applications, this highly flexible, symmetrical cable is extruded, so that exacting 1.27mm (.050") pitch tolerances are maintained from conductor to conductor. Connectors can be terminated to flat cable in up or down configurations or 180° from each other.

Design Advantages

- 28 AWG Stranded and Solid, 26 AWG Stranded and Solid configurations available.
- 1.27mm (.050") conductor spacing.
- Red stripe on number 1 conductor assures positive polarization.
- 28 AWG Stranded Standard Flat Cable available with 4, 6, 8, 9, 10, 12, 14, 15, 16, 20, 24, 25, 26, 28, 30, 32, 34, 36, 37, 40, 44, 50, 56, 60 or 64 conductors.
- 28 AWG Solid Standard Flat Cable available with 9, 10, 14, 15, 16, 20, 24, 25, 26, 34, 37, 40, 44, 50, 56, or 60 conductors.
- 26 AWG Solid Standard Flat Cable available with 14, 24, 36, or 50 conductors.
- 26 AWG Stranded Standard Flat Cable available with 14, 24, 36, or 50 conductors.

Application Tooling

Cable Cutter	779-5030M



Grooves on both sides of cable assure accurate alignment.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

171-10

T&B Series

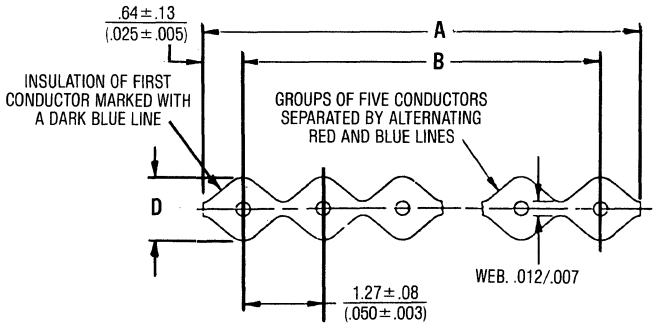
171 – 28 AWG Stranded (Tin Plated)
173 – 28 AWG Solid
178 – 26 AWG Solid
179 – 26 AWG Stranded

Number of Conductors

Standard Flat Cable
Series 171, 173, 178 & 179

SPECIFICATIONS									
CATALOG SERIES		171		173		178		179	
Wire Size AWG		28 Stranded		28 Solid		26 Solid		26 Stranded	
Insulation Material		PVC		PVC		PVC		PVC	
Conductor Spacing mm (in)		1.27 (.050)		1.27 (.050)		1.27 (.050)		1.27 (.050)	
Temperature Rating (°C)		105		105		105		105	
Voltage Rating (RMS)		300		300		300		300	
Impedance Ohms		100		105		103		93	
Capacitance pF/M (pF/FT)		46 (14)		44.3 (13.5)		44.3 (13.5)		49.5 (15.1)	
Inductance μH/M (μH/FT)		.46 (.14)		.49 (.15)		.46 (.14)		.43 (.13)	
Velocity of Propagation nS/M (nS/FT)		4.53 (1.38)		4.53 (1.38)		4.53 (1.38)		4.43 (1.35)	
Insulation Resistance Ohms/FT		10^{10}		10^{10}		10^{10}		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0	3.0	7.0	3.0	7.0	3.0	7.0
	Near End (%)	5.0	3.2	4.8	3.1	5.0	3.2	5.2	3.8
	Far End (%)	6.7	2.7	7.3	2.9	6.7	2.7	6.1	2.3
UL Style No.		2651		2651		2651		2651	

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



CABLE SERIES	DIMENSIONS IN MM (INCHES)
	D
171	.91 (.036)
173	.91 (.036)
178	.97 (.038)
179	1.02 (.040)

ACCUMULATION OF PITCH TOLERANCE BETWEEN CONDUCTORS IN ENTIRE CABLE MAY NOT EXCEED TOLERANCE OF DIM. "B"

Ordering Information

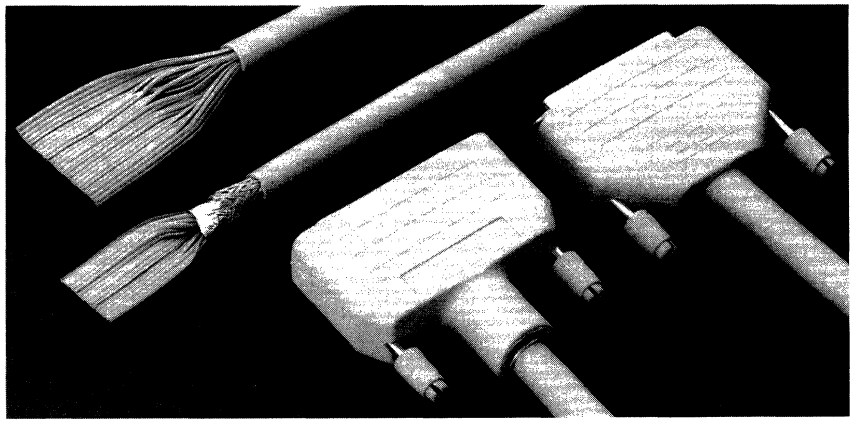
CATALOG NUMBERS				NO. OF POS.	DIMENSIONS IN MM (INCHES)		
28 GAUGE STRANDED	28 GAUGE SOLID	26 GAUGE SOLID	26 GAUGE STRANDED		A	B	B TOLERANCE
171-04	–	–	–	4	5.08 (.200)	3.81 (.150)	±.18 (±.007)
171-06	–	–	–	6	7.62 (.300)	6.35 (.250)	
171-08	–	–	–	8	10.16 (.400)	8.89 (.350)	
171-09	173-09	–	–	9	11.43 (.450)	10.16 (.400)	
171-10	173-10	–	–	10	12.70 (.500)	11.43 (.450)	
171-12	–	–	–	12	15.24 (.600)	13.97 (.550)	
171-14	173-14	178-14	179-14	14	17.78 (.700)	16.51 (.650)	
171-15	173-15	–	–	15	19.05 (.750)	17.78 (.700)	±.25 (±.010)
171-16	173-16	–	–	16	20.32 (.800)	19.05 (.750)	
171-20	173-20	–	–	20	25.40 (1.000)	24.13 (.950)	
171-24	173-24	178-24	179-24	24	30.48 (1.200)	29.21 (1.150)	
171-25	173-25	–	–	25	31.75 (1.250)	30.48 (1.200)	
171-26	173-26	–	–	26	33.02 (1.300)	31.75 (1.250)	
171-28	–	–	–	28	35.56 (1.400)	34.29 (1.350)	
171-30	–	–	–	30	38.10 (1.500)	36.83 (1.450)	
171-32	–	–	–	32	40.64 (1.600)	39.37 (1.550)	
171-34	173-34	–	–	34	43.18 (1.700)	41.91 (1.650)	
171-36	–	178-36	179-36	36	45.72 (1.800)	44.45 (1.750)	
171-37	173-37	–	–	37	46.99 (1.850)	45.72 (1.800)	
171-40	173-40	–	–	40	50.80 (2.000)	49.53 (1.950)	±.38 (±.015)
171-44	173-44	–	–	44	55.88 (2.200)	54.61 (2.150)	
171-50	173-50	178-50	179-50	50	63.50 (2.500)	62.23 (2.450)	
171-56	173-56	–	–	56	71.12 (2.800)	69.85 (2.750)	
171-60	173-60	–	–	60	76.20 (3.000)	74.93 (2.950)	
171-64	–	–	–	64	81.28 (3.200)	80.01 (3.150)	

FLAT-TO-ROUND CABLE .050" CONDUCTOR SPACING

Product Description

Flat to round mass termination cable is compact in size and designed for convenient internal and external equipment routing. You get all of the advantages of round cable along with the benefits of mass terminating flat cable. The cable is available in unshielded and shielded versions ensuring EMI and RFI protection even around severe bends. The inner core flat cable has mass-termination areas (flat sections) every 2.36" for easy field installability. It consists of standard extruded flat cable, 28 AWG stranded, that maintains .050" (1.27 mm) pitch tolerance from conductor to conductor. The jacket is made from a highly flexible PVC material.

The cable terminates to any Thomas & Betts flat cable connector and provides a mechanically stable, high performance connection.



Combines the versatility of conventional round, jacketed cable with the convenience of mass termination flat cable

Design Advantages

- Tin plated 28 AWG stranded
- 360° plastic laminated double foil shield reduces EMI and RFI interference (300 series)
- Shield can be positively crimped to the metal lining of the backshell (300 series)
- Flexible, compact cable structure helps meet dense packaging requirements
- Compatible with shielded and unshielded "D" and ribbon style connectors for use in internal and external applications
- Available in 17 sizes from 9 to 64 conductors
- Both 300-XX and 301-XX series cables are UL recognized and CSA approved
- Dark blue stripe on number 1 conductor on the internal cable assures positive polarization. Alternating red and blue stripes every 5th conductor offer easy identification
- Available in 100-foot continuous reels
- New and improved "D" backshells available for optimum system performance

Application Tooling

Cutting (flat cable)	
Hand Cable Cutter	779-5030M
Die for all Thomas & Betts Bench Press Cable Cutters	779-3181
with Platen	779-3132

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

300-50

T&B Series Shielded

No. of Conductors

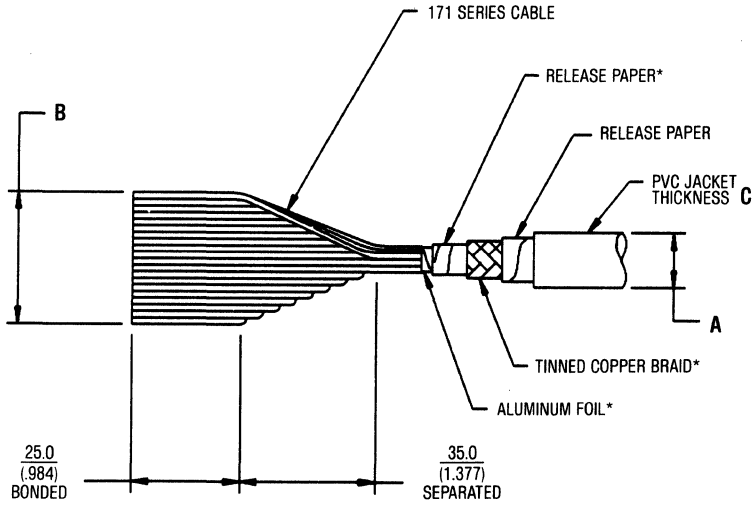
301

T&B Series Unshielded

Flat-to-Round Cable Series 300 & 301

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

SPECIFICATIONS					
CATALOG SERIES		300 Shielded		301 Unshielded	
Wire Size AWG		28		28	
Insulation Material		PVC		PVC	
Conductor Spacing mm (in)		1.27 (.050)		1.27 (.050)	
Temperature Rating (°C)		80		80	
Voltage Rating (RMS)		300		300	
Impedance Ohms		57		63	
Capacitance pF/M (pF/FT)		92.2 (36.3)		80.5 (31.7)	
Inductance μH/M (μH/FT)		.30 (.120)		.33 (.129)	
Velocity of Propagation nS/M (nS/FT)		4.5 (1.79)		4.4 (1.73)	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3	7	3	7
	Near End (%)	3.8	1.8	4.8	3.5
	Far End (%)	4.8	3.3	5.8	3.0
UL Style No.		20267		20267	



*ITEMS MARKED ARE ON 300-XX SHIELDED CABLE ONLY.

Ordering Information

NO. OF CONDUCTORS	SHIELDED CABLE CATALOG NO.	DIMENSIONS IN MM (INCHES) A	B	C	NON-SHIELDED CABLE CATALOG NO.	DIMENSIONS IN MM (INCHES) A	B	C
9	300-09	7.0 (0.27)	11.43 (0.45)	0.8 (0.03)	301-09	6.5 (0.26)	11.43 (0.45)	0.8 (0.03)
10	300-10	7.0 (0.27)	12.70 (0.50)	0.8 (0.03)	301-10	6.5 (0.26)	12.70 (0.50)	0.8 (0.03)
14	300-14	7.5 (0.29)	17.78 (0.70)	0.8 (0.03)	301-14	7.0 (0.28)	17.78 (0.70)	0.8 (0.03)
15	300-15	7.5 (0.29)	19.05 (0.75)	0.8 (0.03)	301-15	7.0 (0.28)	19.05 (0.75)	0.8 (0.03)
16	300-16	8.4 (0.33)	20.30 (0.80)	0.8 (0.03)	301-16	7.9 (0.31)	20.30 (0.80)	0.8 (0.03)
20	300-20	8.5 (0.33)	25.40 (1.00)	0.8 (0.03)	301-20	8.0 (0.31)	25.40 (1.00)	0.8 (0.03)
24	300-24	9.2 (0.36)	30.48 (1.20)	0.8 (0.03)	301-24	7.7 (0.30)	30.48 (1.20)	0.8 (0.03)
25	300-25	9.2 (0.36)	31.75 (1.25)	0.8 (0.03)	301-25	7.7 (0.30)	31.75 (1.25)	0.8 (0.03)
26	300-26	9.8 (0.39)	33.02 (1.30)	0.8 (0.03)	301-26	9.3 (0.37)	33.02 (1.30)	0.8 (0.03)
30	300-30	9.8 (0.39)	38.10 (1.50)	0.8 (0.03)	301-30	9.3 (0.37)	38.10 (1.50)	0.8 (0.03)
34	300-34	10.5 (0.41)	43.20 (1.70)	0.8 (0.03)	301-34	10.0 (0.39)	43.20 (1.70)	0.8 (0.03)
36	300-36	10.6 (0.42)	45.72 (1.80)	0.8 (0.03)	301-36	10.1 (0.40)	45.72 (1.80)	0.8 (0.03)
37	300-37	10.6 (0.42)	47.00 (1.85)	1.0 (0.04)	301-37	10.1 (0.40)	47.00 (1.85)	1.0 (0.04)
40	300-40	11.3 (0.44)	50.80 (2.00)	1.0 (0.04)	301-40	10.8 (0.43)	50.80 (2.00)	1.0 (0.04)
50	300-50	11.6 (0.45)	63.50 (2.50)	1.0 (0.04)	301-50	11.1 (0.44)	63.50 (2.50)	1.0 (0.04)
60	300-60	13.0 (0.51)	76.20 (3.00)	1.0 (0.04)	301-60	12.5 (0.49)	76.20 (3.00)	1.0 (0.04)
64	300-64	13.5 (0.53)	81.30 (3.20)	1.0 (0.04)	301-64	13.0 (0.51)	81.30 (3.20)	1.0 (0.04)

TWISTED PAIR FLAT CABLE .050" CONDUCTOR SPACING

Product Description

Twisted Pair Flat Cable is designed for applications where cross-talk reduction is required. It combines the time and cost savings of mass termination with the electrical performance of twisted pairs, making it ideally suited for differential driver or signal-ground circuit applications.

The cable consists of stranded round conductors insulated with color-coded PVC, twisted into pairs and laminated to a polyester film. Reverse twisting of adjacent pairs assures optimal signal performance.

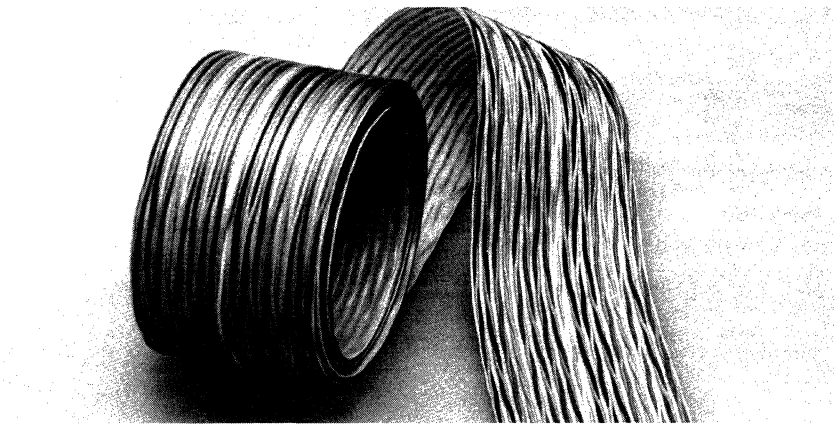
U.L. Style No. 20184

Design Advantages

- Tin plated 28 AWG (7/36) stranded conductors
- 1.27mm (.050") flat zone conductor spacing
- Color-coded conductors ease identification of particular pairs; standard color-coded PVC insulation with tan common.
- Splice-free spools eliminate cutting scrap
- One-sided lamination increases flexibility and permits discrete wire breakouts
- 10, 14, 16, 20, 24, 26, 34, 36, 40, 50, 60, and 64 conductors (5 to 32 pairs)
- Twisted Pair Flat Cable assemblies, together with Female Sockets and Metal Shell "D" Connectors are compatible for use with ANSI's Intelligent Peripheral Interface (IPI) standard
- 12-13 twists per pair in each twist section
- Standard 18" twisted and 2" flat section
- Supplied in 100' continuous rolls

Application Tooling

Cable Cutter	779-5030M



Clear backing provides visual polarization.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

200-10A

T&B Series Twisted Pair — *Number of Conductors*

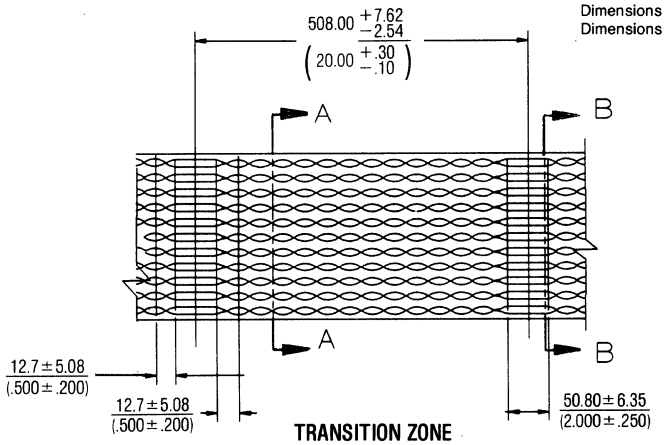
B

Twisted Pair Flat Cable Series 200

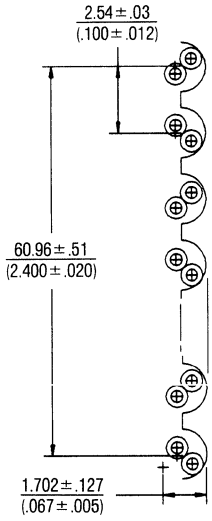
SPECIFICATIONS			
CATALOG SERIES		200	
Wire Size AWG		28	
Insulation Material		PVC	
Conductor Spacing mm (in)		1.27 (.050)	
Temperature Rating (°C)		80	
Voltage Rating (RMS)		300	
Impedance Ohms		100	
Capacitance pF/M (pF/FT)		(16.0)	
Velocity of Propagation nS/M (nS/FT)		(1.56)	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0
	Near End (%)	6.3	3.8
	Far End (%)	7.5	4.0
UL Style No.		20634	

NOTES:
1. ADJACENT PAIRS ARE TWISTED IN OPPOSITE DIRECTION.
2. COLOR CODE: ALTERNATING BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY, WHITE, BLACK, THEN REPEATED. EACH COLOR LEAD PAIRED WITH A TAN (COMMON).
3. THIS CABLE IS LISTED UNDER U.L. STYLE #20634 AT 300V AND 80°C.

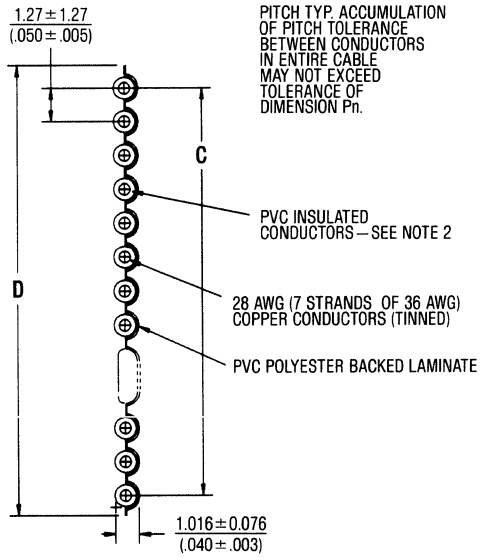
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



TRANSITION ZONE



SECTION A-A



SECTION B-B

PITCH TYP. ACCUMULATION OF PITCH TOLERANCE BETWEEN CONDUCTORS IN ENTIRE CABLE MAY NOT EXCEED TOLERANCE OF DIMENSION Pn.

Ordering Information

CATALOG NUMBERS	NUMBER OF CONDUCTORS (PAIRS)	DIMENSIONS IN MM (INCHES)	
		C	D
200-10A	10 (5)	11.43±0.08 (0.45±0.010)	12.29±0.40 (.484±0.016)
200-14A	14 (7)	16.51±0.25 (0.65±0.010)	17.37±0.40 (.684±0.016)
200-16A	16 (8)	19.05±0.25 (0.75±0.010)	19.91±0.40 (.784±0.016)
200-20A	20 (10)	24.13±0.25 (0.95±0.010)	24.99±0.40 (.984±0.016)
200-24A	24 (12)	29.21±0.25 (1.15±0.010)	30.07±0.40 (1.184±0.016)
200-26A	26 (13)	31.75±0.25 (1.25±0.010)	32.61±0.40 (1.284±0.016)
200-34A	34 (17)	41.91±0.35 (1.65±0.014)	42.77±0.53 (1.684±0.021)
200-36A	36 (18)	44.45±0.35 (1.75±0.014)	45.31±0.53 (1.784±0.021)
200-40A	40 (20)	49.53±0.35 (1.95±0.014)	47.85±0.53 (1.884±0.021)
200-50A	50 (25)	62.23±0.35 (2.45±0.014)	63.09±0.53 (2.484±0.021)
200-60A	60 (30)	74.93±0.35 (2.95±0.014)	75.79±0.53 (2.984±0.021)
200-64A	64 (32)	80.01±0.35 (3.15±0.014)	80.87±0.53 (3.184±0.021)

HIGH FLEX LIFE FLAT CABLE .050" CONDUCTOR SPACING

Product Description

High Flex Life Flat Cable is designed for standard IDC mass termination in applications requiring upward of 50 million flex cycles. It features PVC-insulated conductors made up of 19 strands of 40 AWG tinned wire (28 AWG), providing the superior flex life characteristics necessary for moving printer heads and similarly demanding accessories.

Extruded PVC insulation maintains exacting pitch tolerances from conductor over the life of the cable. The symmetric cross-section of High Flex Life Flat Cable extends flex life and allows connectors to be mounted on either side of the cable. The cable mass terminates to all types of Thomas & Betts IDC connectors without wire stripping or soldering.

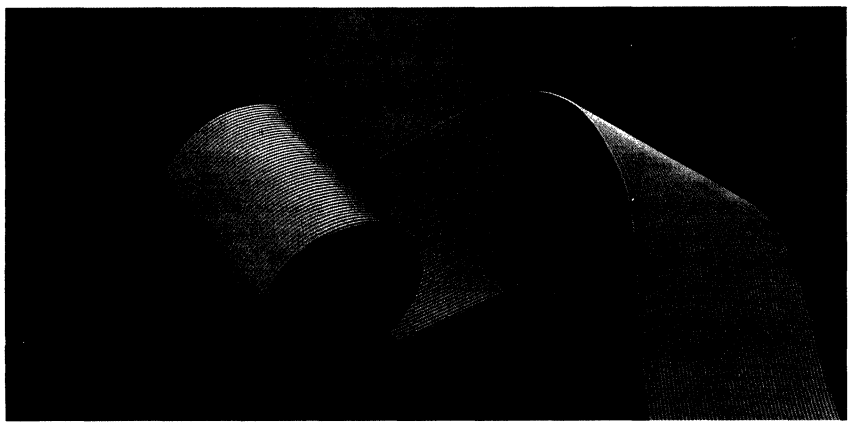
U.L. Style No. 2651

Design Advantages

- Special 19/40 conductor stranding for superior flex life
- 1.27mm (.050") conductor spacing
- Number 1 conductor has black polarity stripe.
- 10, 14, 16, 18, 20, 22, 24, 26, 34, 40 and 50 conductors
- Supplied in 100' rolls

Application Tooling

Cable Cutter	779-5030M



Grooves on both sides of cable assure accurate alignment.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

185-10

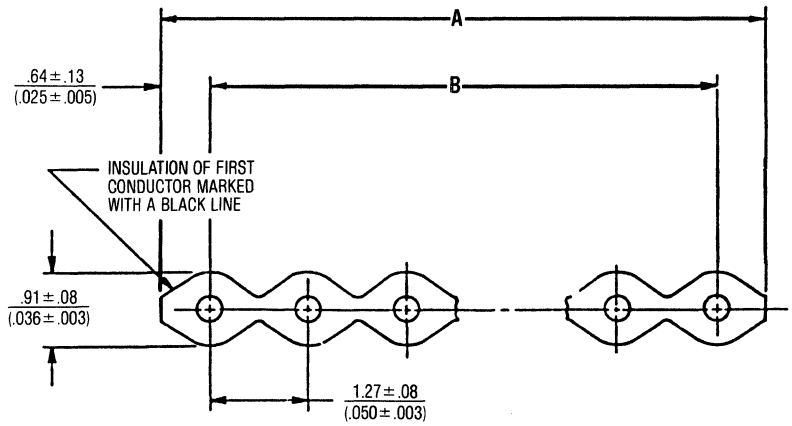
185 — *T&B Series High Flex Life*

10 — *Number of Conductors*

High Flex Life Flat Cable
Series 185

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

SPECIFICATIONS			
CATALOG SERIES		185	
Wire Size AWG		28	
Insulation Material		PVC	
Conductor Spacing mm (in)		1.27 (.050)	
Temperature Rating (°C)		105	
Voltage Rating (RMS)		300	
Impedance Ohms		96	
Capacitance pF/M (pF/FT)		53 (16)	
Inductance μH/M (μH/FT)		(.16)	
Velocity of Propagation nS/M (nS/FT)		4.53 (1.38)	
Insulation Resistance Ohms/FT		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0
	Near End (%)	5.0	3.2
	Far End (%)	6.7	2.7
UL Style No.		2651	



Ordering Information

CATALOG NUMBERS	NUMBER OF CONDUCTORS	DIMENSIONS IN MM (INCHES)		
		A	B	B TOLERANCE
185-10	10	12.70 (.500)	11.43 (.450)	±.18 (.007)
185-14	14	17.78 (.700)	16.51 (.650)	±.18 (.007)
185-16	16	20.32 (.800)	19.05 (.750)	±.25 (.010)
185-18	18	22.86 (.900)	21.59 (.850)	±.25 (.010)
185-20	20	25.40 (1.000)	24.13 (.950)	±.25 (.010)
185-22	22	27.94 (1.100)	26.67 (1.050)	±.25 (.010)
185-24	24	30.48 (1.200)	29.21 (1.150)	±.25 (.010)
185-26	26	33.02 (1.300)	31.75 (1.250)	±.25 (.010)
185-34	34	43.18 (1.700)	41.91 (1.650)	±.25 (.010)
185-40	40	50.80 (2.000)	49.53 (1.950)	±.38 (.015)
185-50	50	63.50 (2.500)	62.23 (2.450)	±.38 (.015)

GROUND PLANE FLAT CABLE .050" CONDUCTOR SPACING

Product Description

Soft-Tear Ground Plane Flat Cable is designed for intra- and inter-cabinet high speed data transmission applications. It provides high density, consistent, and repeatable electrical characteristics, with particularly low crosstalk, for high-speed data transmission.

The unique economical Soft-Tear design, combined with notching and trimming tools, greatly simplifies the removal of insulation and ground plane, reducing preparation time by as much as 70% over conventional ground plane cable. The extruded insulation maintains exacting pitch tolerances from conductor to conductor over the life of the cable.

U.L. Style No. 20218

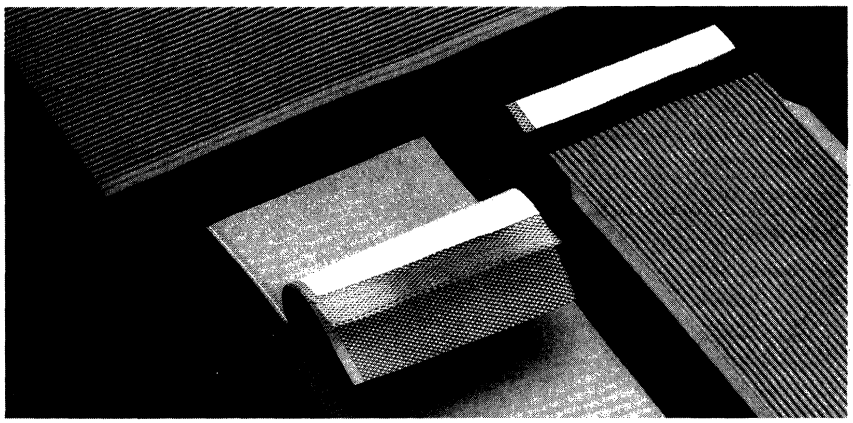
Design Advantages

- No insulation grinding required
- 28 AWG stranded conductors
- 1.27 mm (.005") conductor spacing
- 0.127mm (.050") thick ground plane (expanded copper mesh) at a controlled distance from the conductors assures electrical consistency throughout the cable length
- 14, 20, 25, 26, 34, 37, 40, 50, 60, and 64 conductors
- Number 1 conductor with red or blue polarity stripe on insulation acts as a drain wire in contact with the ground plane
- Supplied in 100' rolls
- Tin plated 28 AWG

Application Tooling

Hand Notching Tool	779-4030
Hand Notching Die	779-41XX*
Bench Press (pneumatic) with Scoring/ Notching Platen	779-3500XT 779-4030
Cable Cutter	779-5030M

*XX—Number of conductors



"Soft-tear" feature eliminates insulation grinding.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

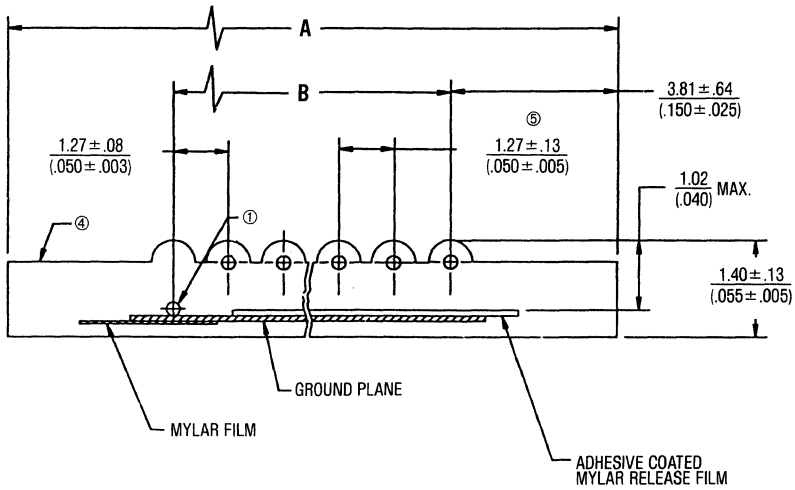
196-20

T&B Series — *Number of Conductors*

Ground Plane Flat Cable
Series 196

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

SPECIFICATIONS			
CATALOG SERIES		196	
Wire Size AWG		28	
Insulation Material		PVC	
Conductor Spacing mm (in)		1.27 (.050)	
Temperature Rating (°C)		105	
Voltage Rating (RMS)		300	
Impedance Ohms		66	
Capacitance pF/M (pF/FT)		95 (29)	
Velocity of Propagation nS/M (nS/FT)		6.07 (1.85)	
Insulation Resistance Ohms/M (Ohms/FT)		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0
	Near End (%)	3.9	2.0
	Far End (%)	7.0	3.75
UL Style No.		20218	



Ordering Information

CATALOG NUMBERS	NUMBER OF CONDUCTORS	DIMENSIONS IN MM (INCHES)		
		A±2.54 (.10)	B	B TOLERANCE
196-14	14	24.13 (.95)	16.51 (.650)	±.25 (.007)
196-20	20	31.75 (1.25)	24.13 (.950)	±.25 (.010)
196-25	25	38.10 (1.50)	30.48 (1.200)	±.25 (.010)
196-26	26	39.37 (1.55)	31.75 (1.250)	±.25 (.010)
196-34	34	49.53 (1.95)	41.91 (1.650)	±.25 (.010)
196-37	37	53.34 (2.10)	45.72 (1.800)	±.38 (.015)
196-40	40	57.15 (2.25)	49.53 (1.950)	±.38 (.015)
196-50	50	69.85 (2.75)	62.23 (2.450)	±.38 (.015)
196-60	60	82.55 (3.25)	74.93 (2.950)	±.38 (.015)
196-64	64	87.63 (3.45)	80.01 (3.150)	±.38 (.015)

NOTES: UNLESS OTHERWISE SPECIFIED
① DRAIN WIRE MUST MAKE ELECTRICAL CONTACT WITH COPPER MESH. RESISTANCE < 50m Ω /FT.
2. MINIMUM OF .007 PVC INSULATION AT ANY POINT AROUND COND. EXCEPT FOR DRAIN WIRE WHICH IS TO HAVE .007 MINIMUM BETWEEN DRAIN WIRE AND OUTSIDE.
3. DIELECTRIC STRENGTH: 2000 VAC, 60 HZ FOR ONE MINUTE
   A) BETWEEN ADJACENT CONDUCTORS
   B) BETWEEN CONDUCTORS TO GROUND
   C) BETWEEN CONDUCTORS AND GROUND TO WATER AFTER ONE HOUR IMMERSION.
④ THIS EDGE TO BE MARKED WITH A RED OR BLUE LINE TO INDICATE DRAIN WIRE SIDE.

COLOR CODED FLAT CABLE .050" CONDUCTOR SPACING

Product Description

Color Coded Flat Cable is designed for easy individual conductor identification in interconnect applications requiring mass terminations. Designed to mass-terminate to all types of Thomas & Betts connectors without wire stripping or soldering, this highly flexible, extruded flat cable is primarily designed for intra-cabinet applications with dense packaging requirements. The extruded insulation maintains exacting pitch tolerances from conductor to conductor over the life of the cable. Grooves on both sides of the cable assure accurate alignment in IDC connectors.

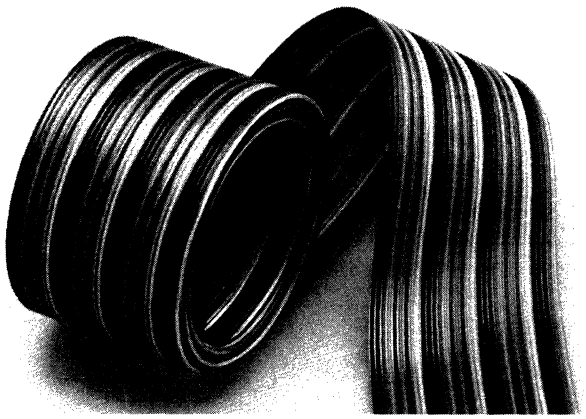
U.L. Style No. 20067

Design Advantages

- 28 AWG stranded, 26 AWG solid configurations
- 1.27mm (.050") conductor spacing
- Color coding permits easy identification of individual conductors when separated
- Industry-standard color coding (as per MIL-STD-104) sequence: brown, red, orange, yellow, green, blue, violet, gray, white, black; repeated for larger conductor widths
- 28 AWG Stranded Color Coded Flat Cable: 9, 10, 14, 15, 16, 20, 24, 25, 26, 34, 36, 37, 40, 44, 50, 56, 60, and 64 conductors
- 26 AWG Solid Color Coded Flat Cable: 14, 24, 36, and 50 conductors
- Supplied in 100' rolls

Application Tooling

Cable Cutter 779-5030M



Extruded insulation for exacting pitch tolerances. Grooves on both sides of cable assure accurate alignment with connectors.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

201-10

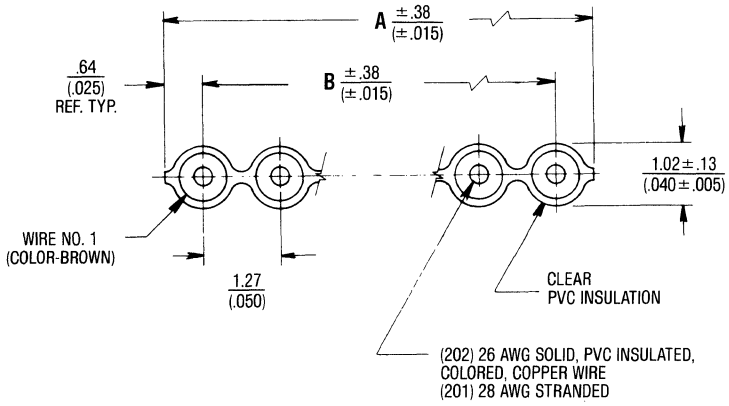
T&B Series

Number of Conductors

201 – 28 AWG Stranded (tin plated)
202 – 26 AWG Solid (tin plated)

Color Coded Flat Cable Series 201 & 202

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



SPECIFICATIONS					
CATALOG SERIES		201		202	
Wire Size AWG		28 Stranded		26 Solid	
Insulation Material		PVC		PVC	
Conductor Spacing mm (in)		1.27 (.050)		1.27 (.050)	
Temperature Rating (°C)		105		105	
Voltage Rating (RMS)		300		300	
Impedance Ohms		100		103	
Capacitance pF/M (pF/FT)		(1.4)		(13.5)	
Inductance μH/M (μH/FT)		(.14)		(.14)	
Velocity of Propagation nS/M (nS/FT)		(1.38)		(1.38)	
Insulation Resistance Ohms/FT		10^{10}		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0	3.0	7.0
	Near End (%)	5.0	3.2	5.0	3.2
	Far End (%)	6.7	2.7	6.7	2.7
UL Style No.		20067		20067	

WIRE COLOR SEQUENCE (REPEAT CONDUCTOR NUMBERS)	
CONDUCTOR NUMBER	COLOR
1	BROWN
2	RED
3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	VIOLET
8	GRAY
9	WHITE
10	BLACK

Ordering Information

NUMBER OF CONDUCTORS	SERIES 201 28 GAUGE STRANDED	SERIES 202 26 GAUGE SOLID	DIMENSIONS IN MM (INCHES)	
			A	B
9	201-09	—	11.43 (.450)	10.16 (.400)
10	201-10	—	12.70 (.500)	11.43 (.450)
14	201-14	202-14	17.78 (.700)	16.51 (.650)
15	201-15	—	19.05 (.750)	17.78 (.700)
16	201-16	—	20.32 (.800)	19.05 (.750)
20	201-20	—	25.40 (1.000)	24.13 (.950)
24	201-24	202-24	30.48 (1.200)	29.21 (1.150)
25	201-25	—	31.75 (1.250)	30.48 (1.200)
26	201-26	—	33.02 (1.300)	31.75 (1.250)
34	201-34	—	43.18 (1.700)	41.91 (1.650)
36	201-36	202-36	45.72 (1.800)	44.45 (1.750)
37	201-37	—	46.99 (1.850)	45.72 (1.800)
40	201-40	—	50.80 (2.000)	49.53 (1.950)
44	201-44	—	55.88 (2.200)	54.61 (2.150)
50	201-50	202-50	63.50 (2.500)	62.23 (2.450)
56	201-56	—	71.12 (2.800)	69.85 (2.750)
60	201-60	—	76.20 (3.000)	74.93 (2.950)
64	201-64	—	81.28 (3.200)	80.01 (3.150)

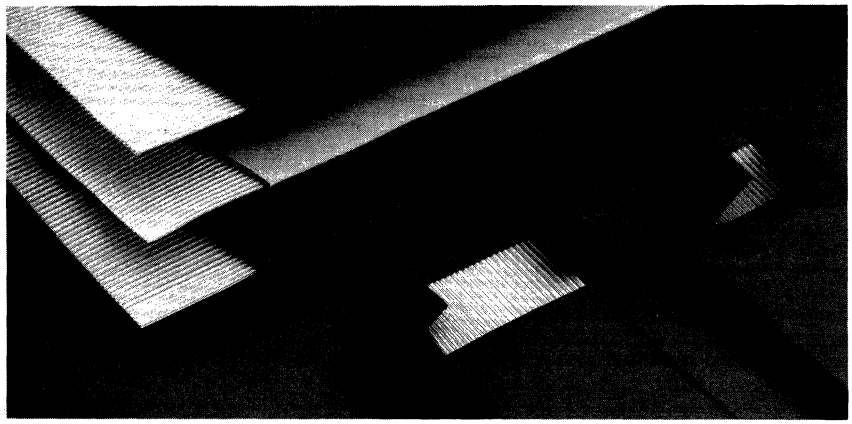
NOTES: UNLESS OTHERWISE SPECIFIED:
1. 202-XX TO BE USED WITH MICRO-RIBBON CONNECTORS, CATALOG NUMBERS 622-XXM, MA, F OR FA. CONSULT FACTORY FOR USE WITH OTHER CONNECTORS.

JACKETED FLAT CABLE .050" CONDUCTOR SPACING

Product Description

Jacketed Flat Cable combines protection and flexibility with the predictable electric characteristics found in flat cable. The cable structure is ideal for external interconnection of electronic equipment. The Jacketed Flat Cable also exhibits the consistently low crosstalk characteristics required for high speed data processing equipment.

The core cable is designed for mass termination to all Thomas & Betts flat cable connectors without wire stripping or soldering, and meets dense packaging requirements. The extruded insulation maintains exacting pitch tolerances from conductor to conductor over the life of the cable. Grooves on both sides of the core cable assure accurate alignment in all Thomas & Betts IDC connectors.



Mechanical protection, plus the flexibility of flat cable

Design Advantages

- 28 AWG stranded and 26 AWG stranded configurations available.
- 1.27mm (.050") conductor spacing
- 28 AWG Stranded Jacketed Flat Cable: 9, 10, 14, 15, 16, 20, 24, 25, 26, 34, 36, 37, 40, 44, 50, 56, 60, and 64 conductors
- 26 AWG Stranded Jacketed Flat Cable: 14, 24, 36, and 50 conductors
- 28 AWG Stranded Thin Jacketed Flat Cable: 20, 25, 26, 34, 37, 40, and 50 conductors
- Supplied in 100' rolls

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

174-10

T&B Series

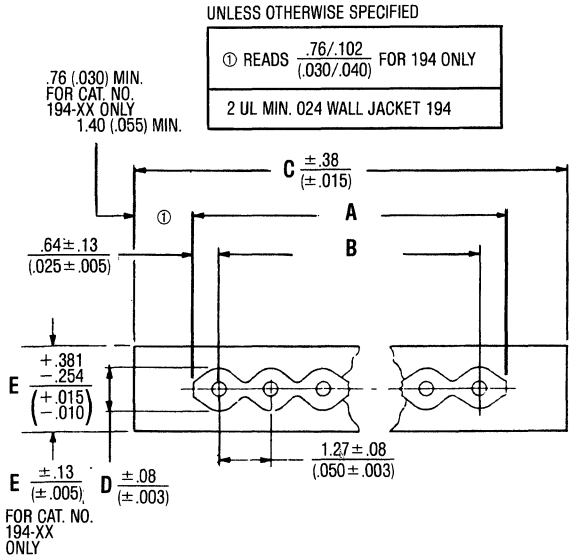
Number of Conductors

174 – 28 AWG Stranded Jacketed (tin plated)
180 – 26 AWG Stranded Jacketed (tin plated)
194 – 28 AWG Stranded Thin Jacketed (tin plated)

Jacketed Flat Cable
Series 174, 180 & 194

SPECIFICATIONS							
CATALOG SERIES		174		180		194	
Wire Size AWG		28 Stranded		26 Stranded		28 Stranded	
Insulation Material		Polyethylene with PVC Jacket		Polyethylene with PVC Jacket		Polyethylene with PVC Jacket	
Conductor Spacing mm (in)		1.27 (.050)		1.27 (.050)		1.27 (.050)	
Temperature Rating (°C)		75		75		75	
Voltage Rating (RMS)		90		90		90	
Impedance Ohms		93		80		95	
Capacitance pF/M (pF/FT)		63.0 (19.2)		55.6 (200)		55.1 (16.8)	
Inductance μH/M (μH/FT)		.56 (.17)		.43 (.13)		.56 (.17)	
Velocity of Propagation nS/M (nS/FT)		5.25 (1.60)		5.25 (1.60)		5.02 (1.53)	
Insulation Resistance Ohms/M (Ohms/FT)		10^{10}		10^{10}		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0	3.0	7.0	3.0	7.0
	Near End (%)	4.5	4.1	4.6	4.2	3.9	3.0
	Far End (%)	–	2.0	2.7	1.8	1.4	0.7
UL Style No.		2604		2604		2984	

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



CABLE SERIES	DIMENSIONS IN MM (INCHES)	
	D	E
174	.86 (.034)	4.19 (.165)
180	1.02 (.040)	4.19 (.165)
194	.86 (.034)	2.67 (.105)

Ordering Information

NO. OF CONDUCTORS	SERIES 194 THIN JACKETED CABLE	SERIES 174 28 GAUGE STRANDED	SERIES 180 26 GAUGE STRANDED	DIMENSIONS IN MM (INCHES)			
				A	B	B TOLERANCE	C
9	–	174-09	–	11.43 (.450)	10.16 (.400)	±.18 (.007)	14.48 (.570)
10	–	174-10	–	12.70 (.500)	11.43 (.450)		15.75 (.620)
14	–	174-14	180-14	17.78 (.700)	16.51 (.650)		20.83 (.820)
15	–	174-15	–	19.05 (.750)	17.78 (.700)	±.25 (.010)	22.10 (.870)
16	–	174-16	–	20.32 (.800)	19.05 (.750)		23.37 (.920)
20	194-20	174-20	–	25.40 (1.000)	24.13 (.950)		28.45 (1.120)
24	–	174-24	180-24	30.48 (1.200)	29.21 (1.150)		33.53 (1.320)
25	194-25	174-25	–	31.75 (1.250)	30.48 (1.200)		34.80 (1.370)
26	194-26	174-26	–	33.02 (1.300)	31.75 (1.250)		36.07 (1.420)
34	194-34	174-34	–	43.18 (1.700)	41.91 (1.650)		46.23 (1.820)
36	–	174-36	180-36	45.72 (1.800)	44.45 (1.750)		48.77 (1.920)
37	194-37	174-37	–	46.99 (1.850)	45.72 (1.800)		50.04 (1.970)
40	194-40	174-40	–	50.80 (2.000)	49.53 (1.950)	±.38 (.015)	53.85 (2.120)
44	–	174-44	–	55.88 (2.200)	54.61 (2.150)		58.93 (2.320)
50	194-50	174-50	180-50	63.50 (2.500)	62.23 (2.450)		66.55 (2.620)
56	–	174-56	–	71.12 (2.800)	69.85 (2.650)		74.17 (2.920)
60	–	174-60	–	76.20 (3.000)	74.93 (2.950)		79.25 (3.120)
64	–	174-64	–	81.28 (3.200)	80.01 (3.150)		84.33 (3.320)

JACKETED SHIELDED FLAT CABLE .050" CONDUCTOR SPACING

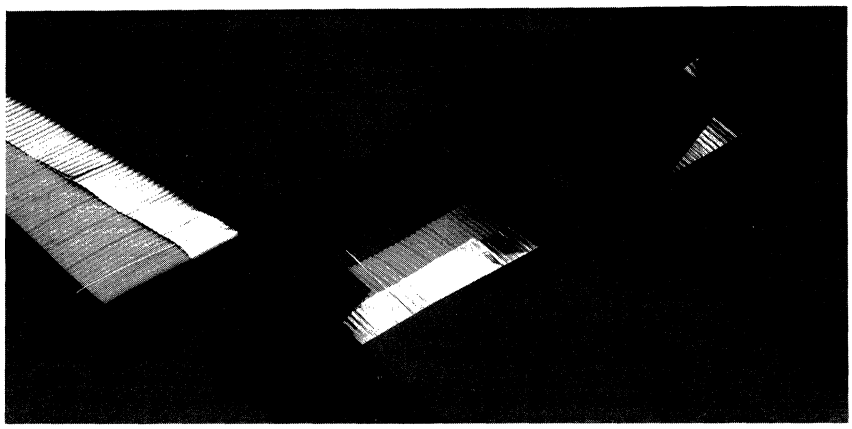
Product Description

Jacketed Shielded Flat Cable is designed primarily for use with "D" Connectors, Ribbon Connectors, and Male Connectors. It features 28 AWG stranded PVC insulated wire with a flexible solid aluminum foil shielding surrounded by a black PVC outer jacket. It also incorporates a special drain wire which can be terminated directly to a contact in the connector or pigtailed out to achieve a shielded ground termination.

The core cable is designed for mass termination to all Thomas & Betts flat cable connectors without wire stripping or soldering, and meets dense packaging requirements. The extruded insulation maintains exacting pitch tolerances from conductor to conductor over the life of the cable. Grooves on both sides of the core cable assure accurate alignment in IDC connectors.

Design Advantages

- 28 AWG tin plated stranded PVC insulated wire with a solid aluminum foil shield surrounded by a black PVC outer jacket.
- 1.27mm (.050") conductor spacing
- 28 AWG Stranded Jacketed Solid Shielded Flat Cable: 9, 10, 14, 15, 16, 20, 24, 25, 26, 34, 36, 37, 40, 44, 50, 56, 60, and 64 conductors



Combines mechanical protection with EMI/RFI shielding

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

187-10

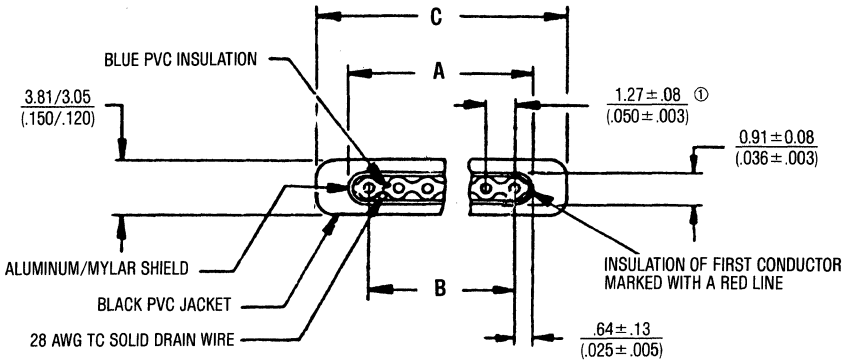
187 — T&B Series

10 — Number of Conductors

Jacketed Shielded Flat Cable
Series 187

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

SPECIFICATIONS			
CATALOG SERIES		187	
Wire Size AWG		8	
Insulation Material		PVC	
Conductor Spacing mm (in)		1.27 (.050)	
Temperature Rating (°C)		105	
Voltage Rating (RMS)		300	
Impedance Ohms		40	
Capacitance pF/M (pF/FT)		164 (50)	
Velocity of Propagation nS/M (nS/FT)		5.57 (1.70)	
Insulation Resistance Ohms/FT		10^{10}	
Typical Crosstalk Characteristics 10 FT Sample 1 Line Driven	Rise Time nSec	3.0	7.0
	Near End (%)	3.0	1.6
	Far End (%)	2.0	2.5
UL Style No.		20529	



Ordering Information

CATALOG NUMBERS	NUMBER OF CONDUCTORS	DIMENSIONS IN MM (INCHES)			
		A	B	B TOLERANCE	C±.51 (±.02)
187-09	9	11.43 (.450)	10.16 (.400)	±.18 (.007)	14.73 (.580)
187-10	10	12.70 (.500)	11.43 (.450)	±.18 (.007)	16.00 (.630)
187-14	14	17.78 (.700)	16.51 (.650)	±.18 (.007)	21.08 (.830)
187-15	15	19.05 (.750)	17.78 (.700)	±.25 (.010)	22.35 (.880)
187-16	16	20.32 (.800)	19.05 (.750)	±.25 (.010)	23.62 (.930)
187-20	20	25.40 (1.000)	24.13 (.950)	±.25 (.010)	28.70 (1.130)
187-24	24	30.48 (1.200)	29.21 (1.150)	±.25 (.010)	33.78 (1.330)
187-25	25	31.75 (1.250)	30.48 (1.200)	±.25 (.010)	35.05 (1.380)
187-26	26	33.02 (1.300)	31.75 (1.250)	±.25 (.010)	36.32 (1.530)
187-34	34	43.18 (1.700)	41.91 (1.650)	±.25 (.010)	46.48 (1.830)
187-36	36	45.72 (1.800)	44.45 (1.750)	±.25 (.010)	49.02 (1.930)
187-37	37	46.99 (1.850)	45.72 (1.800)	±.25 (.010)	50.29 (1.980)
187-40	40	50.80 (2.000)	49.53 (1.950)	±.38 (.015)	54.10 (2.130)
187-44	44	55.88 (2.200)	54.61 (2.150)	±.38 (.015)	59.18 (2.330)
187-50	50	63.50 (2.500)	62.23 (2.450)	±.38 (.015)	66.80 (2.630)
187-56	56	71.12 (2.800)	69.85 (2.750)	±.38 (.015)	74.42 (2.930)
187-60	60	76.20 (3.000)	74.93 (2.950)	±.38 (.015)	79.50 (3.130)
187-64	64	81.28 (3.200)	80.01 (3.150)	±.38 (.015)	84.58 (3.330)

TEFLON* RIBBON FLAT CABLE .050" CONDUCTOR SPACING

Product Description

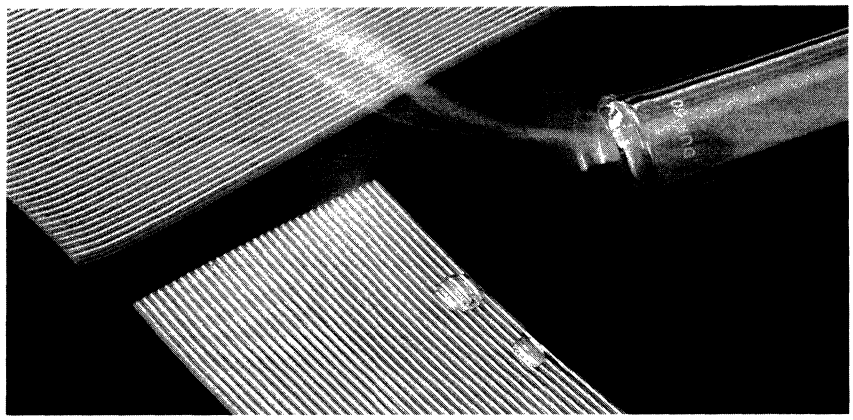
Teflon* Ribbon Cable is an excellent choice for high performance applications. Mechanical properties include uniform spacing of conductors, thermal stability of 200°C, universal chemical inertness, anti-stick characteristics, increased flex life and resistance to corrosion. Electrical properties include high dielectric strength, reduced crosstalk and controlled impedance to match system impedance.

The cable is an unshielded, multiconductor ribbon cable with round conductors and insulated with Fluorinated Ethylene Propylene (FEP). The cable meets Group A inspections performed according to MIL-C-49055.

Design Advantages

- High fidelity and density signal transmission
- Low dissipation factors
- Low dielectric constant
- Dark Blue Stripe on number 1 conductor assures positive polarization
- 28 AWG stranded silver coated copper conductors
- Splice-free spools eliminate cutting scrap
- Teflon* Ribbon Cable is designed for use with Thomas & Betts IDC connectors

*Registered trademark of E.I. DuPont de Nemours



For high-performance applications requiring controlled impedance, chemical resistance and operation under high temperatures.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

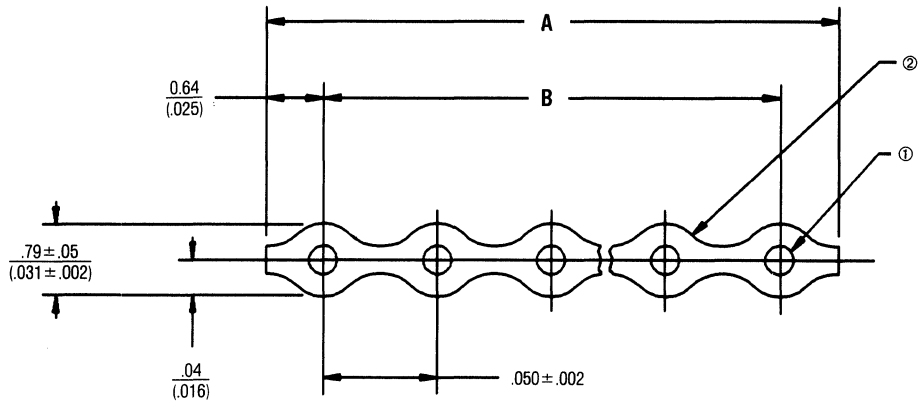
181 - 20

T&B Series — *Number of Conductors*

Teflon Ribbon Flat Cable
Series 181

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

SPECIFICATIONS	
CATALOG SERIES	181
Wire Size AWG	28
Insulation Material	Teflon (FEP)
Insulation Resistance	7500 MΩ/FT
Temperature Rating (°C)	200
Voltage Rating (RMS)	300
Dielectric Withstanding Voltage	1500
Effective Dielectric Constant	1.4
Impedance Ohms	165
Capacitance pF/M (pF/FT)	(5.7)
Velocity of Propagation nS/M (nS/FT)	(1.19)
UL Style No.	20424
MIL. SPEC.	MIL-C-49055



NOTES:
① CONDUCTORS: 28 AWG (7/36) SILVER PLATED STRANDED COPPER WIRE.
② INSULATION: TEFLON (FEP) COLOR TO BE LIGHT BLUE WITH DARK BLUE POLARIZATION STRIPE ON #1 CONDUCTOR.

Ordering Information

CATALOG NUMBERS	NUMBER OF CONDUCTORS	DIMENSIONS IN MM (INCHES)	
		A	B
181-09	9	11.43 + .254 (.450±.010)	10.16 + .203 (.400±.008)
181-10	10	12.70 + .254 (.500±.010)	11.43 + .203 (.450±.008)
181-14	14	17.78 + .254 (.700±.010)	16.51 + .203 (.650±.008)
181-15	15	19.05 + .254 (.750±.010)	17.78 + .254 (.700±.010)
181-16	16	20.32 + .381 (.800±.015)	19.05 + .254 (.750±.010)
181-20	20	25.40 + .381 (1.000±.015)	24.13 + .254 (.950±.010)
181-24	24	30.48 + .381 (1.200±.015)	29.21 + .254 (1.150±.010)
181-25	25	31.75 + .381 (1.250±.015)	30.48 + .254 (1.200±.010)
181-26	26	33.02 + .381 (1.300±.015)	31.75 + .254 (1.250±.010)
181-34	34	43.18 + .458 (1.700±.018)	33.02 + .305 (1.650±.012)
181-37	37	46.99 + .458 (1.850±.018)	45.72 + .305 (1.800±.012)
181-40	40	50.80 + .508 (2.000±.020)	49.53 + .356 (1.950±.014)
181-50	50	63.50 + .508 (2.500±.020)	62.23 + .381 (2.450±.015)
181-60	60	76.20 + .508 (3.000±.020)	74.93 + .508 (2.950±.020)
181-64	64	81.28 + .508 (3.200±.020)	80.01 + .508 (3.150±.020)

FINE PITCH FLAT CABLE .025" CONDUCTOR SPACING

Product Description

Thomas & Betts fine pitch flat cable provides the means to reduce mass and weight in flexible wiring assemblies. Available with PVC or FEP insulation, the cable is extruded rather than molded to assure precision and uniform alignment of the conductor spacing.

Design Advantages

- Broad selection of cable sizes— available in 20*, 26, 30*, 34*, 40, 50, 68, 80* and 100* conductor sizes.
- Extruded PVC or FEP insulation for precise conductor spacing.
- PVC or FEP insulation types both available with 30 AWG solid or 32 AWG stranded conductors.
- Polarizing stripe allows easy identification of number one circuit even in twisted or irregularly curved applications.
- Thomas & Betts cable cutters and IDC termination tooling are matched to the cable tolerances to provide uniform results and trouble-free, high performance fine pitch cable assemblies.

*Consult Customer Service for availability.

An integrated approach to performance in fine pitch IDC mass termination– Same performance, one-half the size.

Ordering Information

The information below shows the elements of a catalog number, including available options. To select a product for your specific needs, please refer to appropriate Ordering Chart on the following page(s).

135-0500

T&B Series

135 - *PVC Stranded Wire*
136 - *PVC Solid Wire*
140 - *FEP Stranded Wire*
141 - *FEP Solid Wire*

Number of conductors

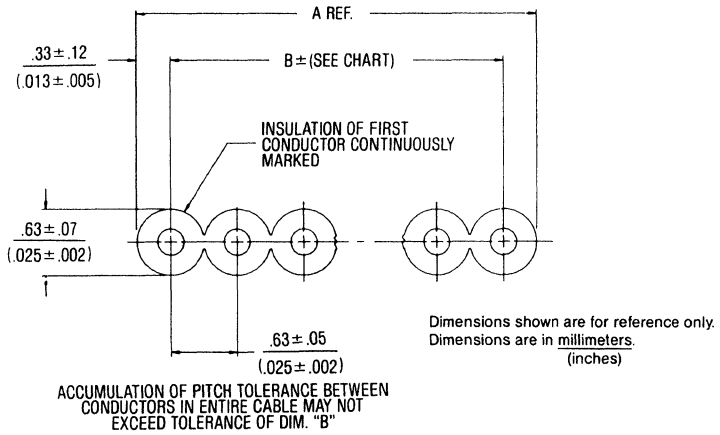
System 311 Fine Pitch Cable– Uniform .025" Conductor Spacing in PVC or FEP Insulation

Physical Properties
Insulation Material: PVC or FEP
Extruded PVC: Blue
Extruded FEP: Natural

Electrical Properties
Voltage Rating: 150 RMS

Impedance
PVC 30 AWG: 77 Ohms
PVC 32 AWG*
FEP 30 AWG: 90 Ohms
FEP 32 AWG: 95 Ohms
Attenuation–db @ 1 MHZ (100 ft.)

Environmental Properties
Temperature Rating: 105°C



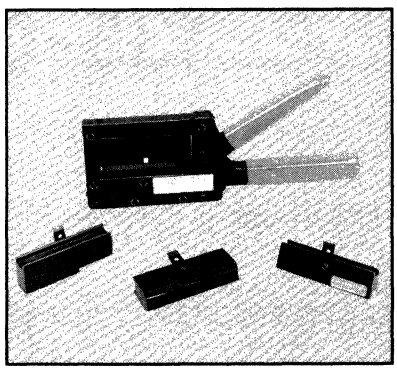
ACCUMULATION OF PITCH TOLERANCE BETWEEN CONDUCTORS IN ENTIRE CABLE MAY NOT EXCEED TOLERANCE OF DIM. "B"

Dimensions shown are for reference only.
Dimensions are in millimeters. (inches)

Ordering Information

NUMBER OF CONDUCTORS	PVC CAT. NO. 30 AWG SOLID	PVC CAT. NO. 32 AWG STRANDED	FEP CAT. NO. 30 AWG SOLID	FEP CAT. NO. 32 AWG STRANDED	DIMENSIONS IN MM (INCHES)			
					A	B	PVC B TOLERANCE	FEP B TOLERANCE
20	136-020*	135-020*	141-020	140-020	12.70 (.500)	12.07 (.475)	± .15 (.006)	± .15 (.006)
26	136-026	135-026	141-026	140-026	16.51 (.650)	15.88 (.625)	± .15 (.006)	± .12 (.005)
30	136-030*	135-030*	141-030	140-030	19.05 (.750)	18.41 (.725)	± .20 (.008)	± .12 (.005)
34	136-034*	135-034*	141-034	140-034	21.59 (.850)	20.95 (.825)	± .20 (.008)	± .12 (.005)
40	136-040	135-040	141-040	140-040	25.40 (1.000)	24.76 (.975)	± .25 (.010)	± .15 (.006)
50	136-050	135-050	141-050	140-050	31.75 (1.250)	31.11 (1.225)	± .25 (.010)	± .15 (.006)
68	136-068*	135-068*	141-068	140-068	43.18 (1.700)	42.54 (1.675)	± .30 (.012)	± .25 (.010)
80	136-080*	135-080*	141-080	140-080	50.80 (2.000)	50.16 (1.975)	± .30 (.012)	± .25 (.010)
100	136-100*	135-100*	141-100	140-100	63.50 (2.500)	62.86 (2.475)	± .30 (.012)	± .25 (.010)

*Consult customer service for availability.

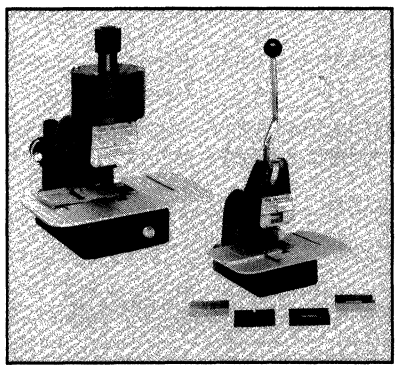


Cable Cutter
Catalog No. 779-5030M

Quick and accurate cutting of both PVC and FEP flat cable is assured with the Thomas & Betts cable cutter (not shown).

Hand Crimp Tools
Catalog No. 779-2100
Catalog No. 779-3112151
Hand Tool Die

Ideal for bench and field applications. Tool frame accommodates snap-in interchangeable dies for mass terminating the entire range of Thomas & Betts connectors, including Systems 311 IDC connectors.



Production Crimp Tools
Catalog No. 779-3200 Manual
Catalog No. 779-3500XT Pneumatic
Catalog No. 779-3113151 Base Plate

These manual and pneumatic bench presses are rugged, easy-to-use production tools designed for large volume mass termination. Crimping platens are interchangeable and cover the complete range of Thomas & Betts connectors, including System 311 IDC connectors.

Flat Cable Clamps

Product Description

Flat cable clamps facilitate bundling, clamping or mounting flat cable, both inside and outside of cabinets.

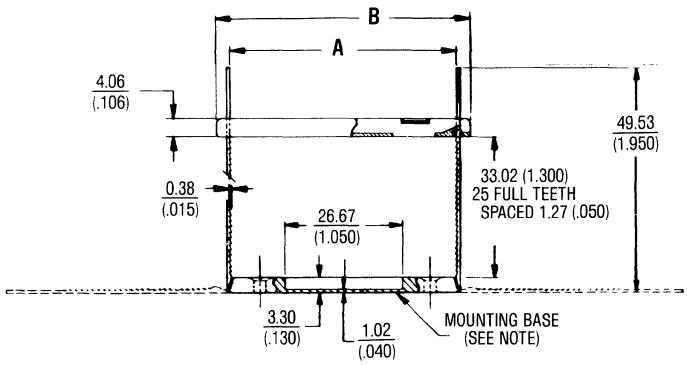
Available with screw mount or adhesive bases, these tough nylon clamps are easy to release and adjust in applications where cables are added or removed.

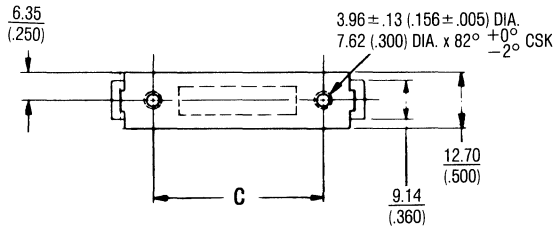
Cable Clamps

- Available with screw mounting bases or adhesive mounting bases to accommodate cable widths of less than one inch to a maximum of three inches.
- Made of tough, durable nylon.
- Installed by simply sliding upper clamp through tails of lower clamp and pressing together, then folding excess tails into detents of upper clamps.
- Self-locking Flat Cable Clamps are ideal for low profile bundling, clamping, or mounting of all types of flat cable in both intra-cabinet and out-of-cabinet installations. Made of tough nylon, these durable clamps are designed to be released and adjusted in applications where cables are added or removed.

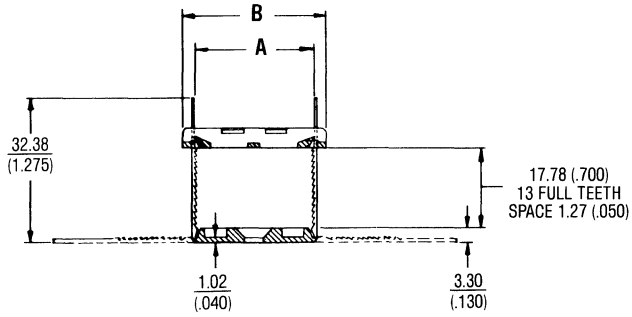
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

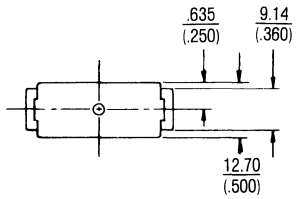
CAT. NO. FCC-2A AND FCC-3A





CAT. NO. FCC-1 AND FCC-1A





Ordering Information

CAT. NO.	DIMENSIONS IN MM (INCHES)			CABLE SIZE (MAX.)	
	MAX. CABLE WIDTH A	B	C	WIDTH	HEIGHT
FCC-1	25.4 (1.000)	32.51 (1.280)	—	25 (1.000)	10 (.400)
FCC-2	50.8 (2.000)	57.91 (2.280)	39.12 (1.540)	51 (2.000)	25 (1.000)
FCC-3	76.2 (3.000)	83.31 (3.280)	64.52 (2.540)	76 (3.000)	25 (1.000)
FCC-1A	25.4 (1.000)	32.51 (1.280)	—	25 (1.000)	10 (.400)
FCC-2A	50.8 (2.000)	57.91 (2.280)	39.12 (1.540)	51 (2.000)	25 (1.000)
FCC-3A	76.2 (3.000)	83.31 (3.280)	64.52 (2.540)	76 (3.000)	25 (1.000)

NOTE: Suffix 'A' indicates adhesive backing.

B

FLAT CABLE PREPARATION TOOLS

Product Description

Cable Preparation Tools are designed for both production and field applications. The Cable Cutter easily and precisely cuts ALL types of flat cable.

The Notching/Scoring tool, available in both Bench Press and Hand Tool versions, is designed specifically for preparing Soft-Tear Ground Plane Flat Cable for termination; notching guide plates for various conductor widths are available. The Notching/Scoring Tool provides clean, efficient, economical preparation of Soft-Tear Ground Plane Flat Cable with no insulation grinding necessary; cable preparation time is reduced by as much as 70% over conventional ground plane cable.

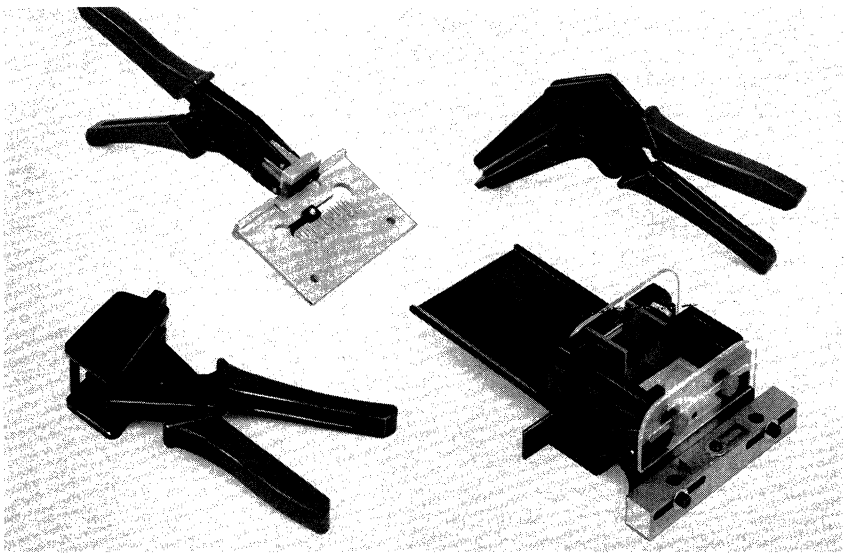
Design Advantages

CABLE CUTTER

- Cuts all types of flat cable, including Standard, Color Coded, Jacketed, Jacketed Shielded, and Ground Plane types—up to 64 conductors.
- Cable alignment guide assures precise right-angle cut.
- Cutting blade provides burr-free cut.

NOTCHING/SCORING TOOL

- Allows notching for "daisy-chain" applications.
- Designed for one-step notching and scoring of Soft-Tear Ground Plane Flat Cable.
- Adapts to the 779-3500XT pneumatic bench press.
- Interchangeable dies for notching 20-64 conductor Soft-Tear Ground Plane Flat Cable.



Ideal for production and field applications.

Ordering Information

Tool Number	*Description*
	Cable Cutting
779-5030M	*Cutter for up to 64 conductor flat cable*
779-5030MC-1	*Replacement blade for 779-5030M Cutter*
779-5030MP-1	*Replacement platen for 779-5030M Cutter*
	Notching / Scoring
779-3140	*Jacket Scorer for cable series 174, 180, 187 and 194*
779-3141	*Replacement blade for 779-3140*
779-4030	*Hand Notching Tool for Soft-Tear Ground Plane Flat Cable*
779-4100	*Scoring / Notching Platen for Soft-Tear Ground Plane Flat Cable*
779-4120	*Notching Die for 20 conductor cable*
779-4125	*Notching Die for 25 conductor cable*
779-4126	*Notching Die for 26 conductor cable*
779-4134	*Notching Die for 34 conductor cable*
779-4137	*Notching Die for 37 conductor cable*
779-4140	*Notching Die for 40 conductor cable*
779-4150	*Notching Die for 50 conductor cable*
779-4160	*Notching Die for 60 conductor cable*
779-4164	*Notching Die for 64 conductor cable*

HAND CRIMP TOOL CONNECTOR TO FLAT CABLE

Product Description

The 779-2100 Hand Crimp Tool satisfies varying requirements for production and field applications. This Hand Crimp Tool provides quick economical installation without stripping wire or soldering.

Design Advantages

- 779-2100 tool frame accommodates snap-in interchangeable dies to mass terminate the entire range of Thomas & Betts IDC connectors up to 64 conductors.
- Precision ratchet mechanism controls crimp-cycle to insure proper termination of connector to cable.

Ordering Examples

To mass terminate *any* Thomas & Betts Card Edge Connector to multiconductor flat cable using the 779-2100 Hand Crimp Tool described on this page, order die Cat. No. 779-2164.

To mass terminate *any* Thomas & Betts Micro Ribbon Connector to multiconductor flat cable using the 779-2100 Hand Crimp Tool described on this page, order die Cat. No. 779-2172.

NOTE: The pages in this catalog which describe the various connectors also contain complete information on the tooling needed to apply them to flat, multiconductor cable.

Ideal for bench and field applications.

Ordering Information

The information below covers the 779-2100 Hand Crimp Tool and the dies which are used to apply various types of plugs and connectors to multiconductor flat cable. Operating instructions for this tool can be ordered from Thomas & Betts.

779-2100

T&B Series Tool Number Prefix

Die Number (Tool Frame Requires a Die)

Use Die Number	*To Apply*
779-2151	*All 622 Female Transition Connectors*
779-2152	*Standard PCB Solder Transition Connectors*
779-2153	*Slimline PCB Solder Transition Connectors*
779-2155	*All Low Pro DIPs*
779-2156	*All Standard DIP Plugs*
779-2162	*All DIP Socket Connectors*
779-2164	*All Card Edge Connectors*
779-2166	*All Plastic "D" Connectors except 50 Position*
779-2166M	*All Metal "D" Connectors except 50 Position*
779-2167	*All 50 Position Metal or Plastic 'D' Connectors*
779-2168A	*All 622 Series Male Connectors*
779-2172	*All Micro Ribbon Connectors*
779-2173	*Flat Cable Backshell*
779-2174	*RD Cable Backshell*
779-2175	*Slimline PCB 622 Series*
779-2179	*Low Profile 'D' Connectors*
779-3112151	*Fine Pitch Socket*

PRODUCTION CRIMP TOOLS CONNECTOR TO FLAT CABLE

Product Description

Manual and Pneumatic Bench Presses are rugged, easy-to-use production crimp tools designed for large volume mass termination of flat cable or 1.27mm (.050") centers. A complete series of interchangeable base plates accommodates the entire range of Thomas & Betts IDC connectors and eliminates the need for wire stripping or soldering.

Design Advantages

- Available in both manual and pneumatic versions.
- Includes standard platen 779-3130; modified platens for special connectors available.
- Full series of base plates for mass terminating all Thomas & Betts IDC-connector families.
- Base plates and platens can be rotated 90° to accommodate cable clearance for mid-span crimping.
- Cable guide assures that cable enters connector at right angles and load is evenly distributed in the center of press during compression cycle.
- Crimp reliability assured through the positive bottoming action of the die on the connector.
- Base plate and platen rotation for mid-span crimping maximizes installation versatility.
- 779-3500XT Bench Press quickly converts to Notcher/Scorer Tool for use with the ground plane cable.

Ordering Examples

To apply Slimline PCB Solder Transition Connectors *before* connector is soldered to the board, use Base Plate 779-3153 with Platen 779-3130.

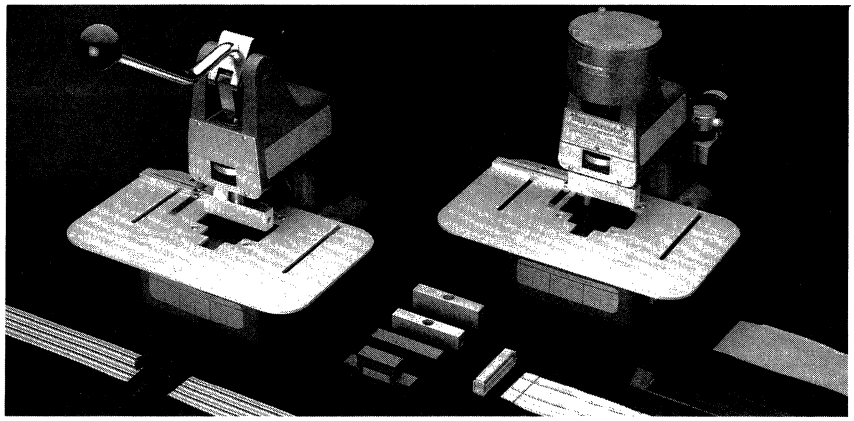
To apply Slimline PCB Solder Transition Connectors *after* connector is soldered to the board, use Base Plate 779-3154 with Platen 779-3133.

To apply *any* Thomas & Betts Card Edge Connector, use Base Plate 779-3164 with Platen 779-3130.

Platen/Base Plate Selection

To select the correct Platen/Base Plate combinations for use with either the 779-3200 or 779-5200XT Production Crimp Tools, proceed as follows:

1. In the table, find the connector you wish to apply.
2. Determine the recommended Base Plate.
3. If recommended Base Plate is 779-3166. use modified Platen 779-3131. If Recommended Base Plate is 779-3154, use either modified Platen 779-3132, or, if you are applying Slimline use Platen 779-3133.



For mass termination of the entire range of Thomas & Betts IDC Connectors.

Ordering Information

779-3200

T&B Series — *Manual*

779-3500XT

T&B Series — *Pneumatic—w/foot pedal activator*

Platen Numbers

Use Platen	*With*
779-3130	*All Base Plates listed below except 779-3166 and 779-3154*
779-3131	*779-3166 Base Plate*
779-3132	*779-3154 Base Plate*
779-3133	*779-3154 Base Plate to terminate Slimline PCB Connectors*

Use Base Plate	*To Apply*
779-3151	*All Female Socket Transition Connectors*
779-3152	*Standard PCB Solder Transition Connectors (to terminate cable BEFORE connector is soldered to board)*
779-3153	*Slimline PCB Solder Transition Connectors (to terminate cable BEFORE connector is soldered to board)*
779-3154	*Standard and Slimline PCB Solder Transition Connectors (to terminate cable AFTER connector is soldered to board)*
779-3155	*Low Profile & Standard DIP Plugs*
779-3162	*All DIP Socket Connectors*
779-3164	*All Card Edge Connectors*
779-3166	*All Plastic "D" Connectors except 50 position*
779-3166M	*All Metal Shell "D" Connectors except 50 position*
779-3167	*All 50 Position "D" Connectors*
779-3168A	*All 622 Series Male Connectors*
779-3173	*Flat Cable Backshell*
779-3174	*RD Cable Backshell*
779-3175	*622 Series Slimline PCB*
779-3179	*Low Profile 'D' Connectors*
779-3181	*Bench Press Cable Cutter*
779-3184	*All Ribbon Connectors*
779-3196	*Slimline PCB Terminator*
779-3113151	*Fine Pitch Socket*

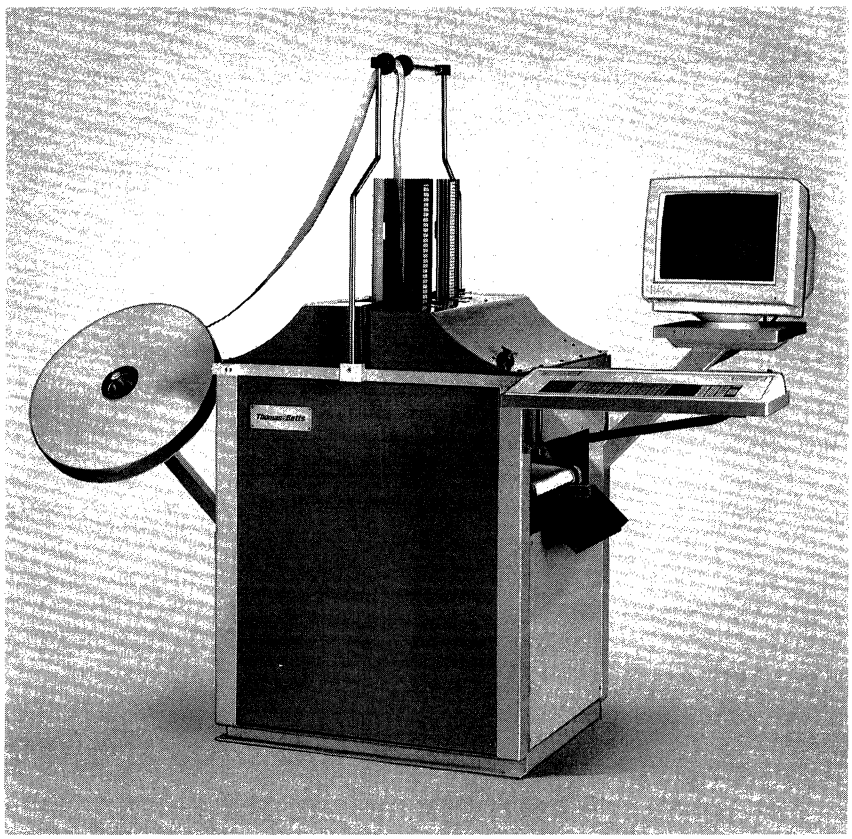
AUTOMATIC PRODUCTION TOOL CONNECTOR TO FLAT CABLE

Product Description

The Automatic IDC Termination Production Tool quickly, easily and efficiently terminates card edge and/or female socket connectors. Virtually anyone can learn to use the tool within minutes to improve termination quality and enhance profitability. Three minutes is all it takes to change die sets; initial programming is accomplished within two minutes. Cable lengths may be cut from ½" to unlimited lengths.

Design Advantages

- Programmable microprocessor-controlled.
- Pneumatic operation.
- Safe to operate.
- Assembles up to 600 cables/hour.
- Fast Return-On-Investment.
- Substantially reduced labor.
- Substantially increased productivity.



Programmable, microprocessor-controlled for fast, easy, cost-effective IDC terminations.

Ordering Information

Catalog number for the semi-automatic tool is shown below. Consult factory for die-sets and programming information.

779-9000

779: *T&B Series*
9000: *Automatic*

TEST INFORMATION ORDERING GUIDE

Description	Form Number
Female Socket Transition Connectors—Series 622	TR-006
Card Edge Connectors	TR-008
Low Profile "D" Connectors—Series 622, Sockets and Pins	TR-022
2 Row (Slimline) PCB Connectors—Series 622	TR-023
Design Considerations and Connection Products	TR-058
Surface Mounting Considerations	TR-062
Choosing Packages	TR-063
Compliant Pin Technology	TR-064

IDC CROSS REFERENCE GUIDE

Thomas & Betts Old Part Number	Thomas & Betts New Part Number	Description	Thomas & Betts Old Part Number	Thomas & Betts New Part Number	Description
609-XX00M	622-XX00	Female Socket	609-XX05	622-XX05	Card Edge
609-XX01M	622-XX01	Female Socket	609-XX15	622-XX15	Card Edge
609-XX30	622-XX30	Female Socket	609-XX25	622-XX25	Card Edge
609-XX41	622-XX41	Female Socket	609-XXM	622-XXM	Ribbon
609-XX31	622-XX31	Strain Relief	609-XXF	622-XXF	Ribbon
609-0000	622-0000	Polarizing Key	609-XXP-M	622-XXPM	'D' Connector
609-XX53	622-XX53	Slimline PCB	609-XXP-M1	622-XXPM	'D' Connector
609-XX63	622-XX63	Slimline PCB	609-XXS-M	622-XXSM	'D' Connector
609-XX06	622-XX06	Male Connector	609-XXS-M1	622-XXSM	'D' Connector
609-XX16	622-XX16	Male Connector	609-OXXM-1	622-OXXD	'D' Backshell
609-XX66	622-XX66	Strain Relief	609-OXXM-2	622-OXXDM	'D' Backshell

REGULATORY AGENCY APPROVALS

All Thomas & Betts Electronics Division products are recognized by Underwriters Laboratories (UL) and certified by the Canadian Standards Association (CSA) wherever applicable. These approvals are evidence that our products are in conformance with independent safety evaluations. Regulatory agency files have been established for the following generic families:

Product	UL File	CSA File
Connector products	E60980	LR49571
Flat Ribbon Cable	E41651	LL53375
Round-to-Flat Cables	E47817	LR66880
Cable Assemblies	E47817	LR58162

REFERENCE GUIDE

I. The Mass Termination Concept

Insulation Displacement Contact (IDC) mass termination with flat cable/connector systems, first pioneered in the 1960's, has evolved rapidly in recent years. Constantly pressed to meet increasing packaging densities, IDC systems have found wide acceptance in high-speed data transmission applications in the computer and telecommunications fields. In addition they satisfy the interconnection requirements in a variety of automotive, aerospace, appliance, instrumentation, industrial control, consumer electronics, and business machine applications.

Thomas & Betts has devoted two decades to the design and development of flat cable and compatible interconnection components, keeping pace with state-of-the-art advances in solid state technology. Our efforts enabled us to develop and use the extrusion process in the manufacture of flat cable. With this capability we have overcome the limitations of lamination and other production techniques. The result is flat cable which has greater dimensional consistency, less mechanical variations, and which can repeatedly be produced in longer single-piece lengths.

As specialists in the manufacture of flat cable we have been able to develop unique, cost effective, high-performance connector designs which take full advantage of the superior characteristics of flat cable.

Unlike firms involved in only connector design or flat cable production, our expertise in both flat cable and related connectors has enabled us to control the critical design parameters from engineering concept through manufacture and installation. The result has been a system of complementary cable and connectors, and installation tooling designed to meet the ever-increasing cost/performance demands in industrial, commercial and military applications.

The following technical notes have been prepared to serve as a primer for the newcomer to IDC systems, as well as a refresher for the experienced engineer and purchasing professional. It provides a basic perspective on IDC technology, and can be used as a reference when choosing the appropriate IDC system components in a given application.

II. Flat Cable/Connector Mass Termination IDC Systems

The terms "flat cable" or "ribbon cable" generally refer to any cable with two or more round or flat conductors arranged parallel and in the same plane, and fixed in that position by encapsulation with an insulating material. Commonly called "flexible flat cable," it may consist of flat conductors or round conductors, generally of one size in a given cable. While flat-conductor flat cable offers certain features which may be desirable in selected applications (such as high flexing ability), most flat cable uses round conductors arranged side-by side in a single plane as shown in *Figure 1.*

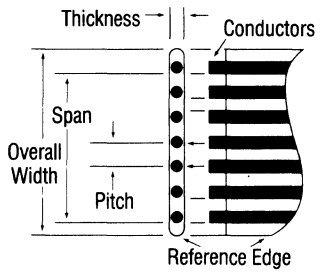


Fig. 1—Flat-cable nomenclature includes several key terms.

Typically, flat cable is available with stranded or solid wire in sizes from 24 to 30 AWG. Size 28 AWG stranded round conductor—because of its current carrying capability, and its ability to meet the general requirements of most data-processing equipment—has evolved as an industry "standard."

Both flat cable and IDC components are now designed around this norm. In fact MIL-C-49055 specifies its use in military systems applications.

Although available in a range of conductor spacings (from 0.025 inches to 0.156 inches for round-conductor designs), 0.050 inch pitch design is most widely used as it matches most interconnecting needs in a variety of today's electronics systems.

Flat cable is produced in a number of surface profiles, colors, and materials. *Figure 2* depicts some typical round-conductor flat cable cross sections. In the most common style (a) both sides of the flat cable are contoured with the same profile; this to allow either side of the cable to be easily terminated with the mating connector's configuration. A similar profile (b) consists of insulated conductors laminated/extruded between a thin layer of transparent PVC. Alternatively the cable can be contoured on one side to match the mating connector's insulation displacement configuration, while the other side is flat and notched to permit easy separation of the conductors as may be required to make breakouts for cable routing (c).

Individual color-coded insulated conductors (d) are frequently laminated to a clear PVC base sheet resulting in yet another flat-cable arrangement.

For applications in which cables are subject to possible damage due to handling or environmental conditions,

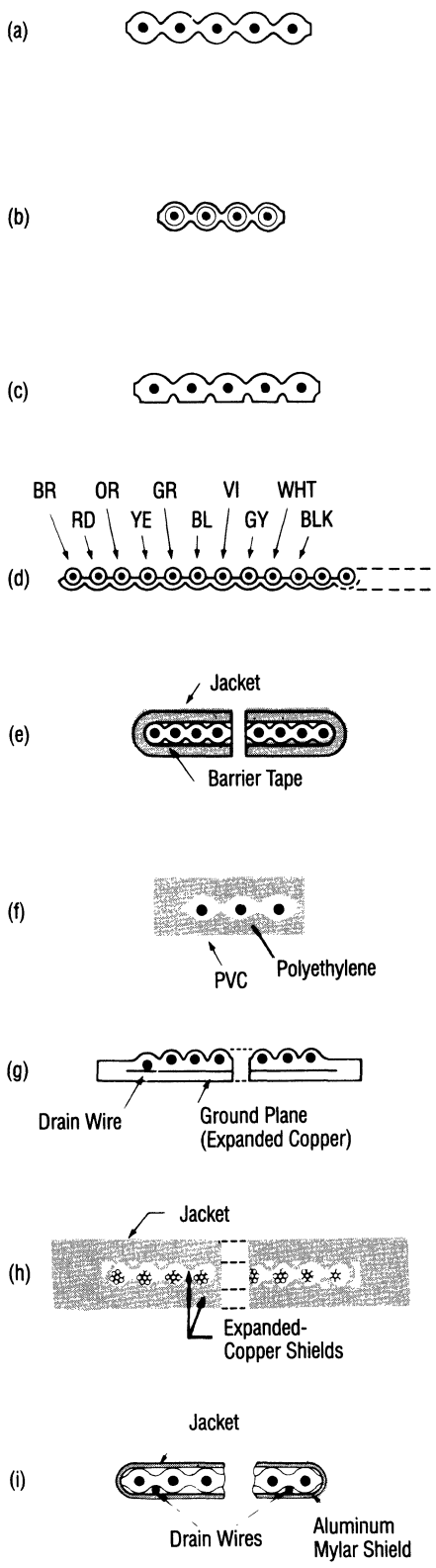


Fig. 2—A variety of cross sections characterizes round-conductor flat cable.

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the basic cable is generally enclosed in a protective jacket to meet the requirements of Underwriters Laboratories or other applicable standards. One typical configuration consists of flat cable covered by a thin plastic barrier sheet surrounded by a heavy PVC jacket (e). Still another features polyethylene-insulated conductors covered by a molded PVC outer jacket (f), a configuration which offers reduced crosstalk in selected applications.

Where reduced crosstalk or a controlled characteristic impedance are critical parameters, flat cables can be made with an embedded ground plane (g), dual-mesh copper shields surrounded by a heavy PVC jacket (h), and full aluminum shielded cable with integral drain wires (i).

As has been illustrated, the flat cable design engineer has a number of parameters with which to work to achieve desired performance characteristics. By varying insulation material, the amount of insulation, conductor size/spacing, and by adding ground planes, shields or drain wires, a variety of transmission characteristics can be achieved.

While PVC is the most popular insulation material because of its low cost and compliance with UL requirements, other insulation and jacket materials may be specified. The IDC Glossary covers other insulation materials together with key performance characteristics which may be of value in specific applications. When designed with specially selected insulations and shielding to minimize losses/crosstalk, and to control impedance, flat cable is often referred to as "transmission cable."

Common terms used to identify cable dimensions are noted in *Figure 1.* Each is broadly defined in the Glossary included in this Handbook.

III. Design Features & Benefits of Flat Cable

Today's flat cable is designed to offer electrical and mechanical characteristics ideally suited to interconnecting complex and miniaturized electronic systems. Among its design features and related application benefits are the following:

(1) Flexibility—flat cable offers almost unlimited flexibility perpendicular to the plane of its conductors; permitting it to be bent, folded, or flexed as though it were a single wire. This allows the engineer to address the electronic interconnection from several directions without interference from a large radius wire bundle.

(2) Space savings—flat cable flexibility and profile enable it to fit virtually any application with space savings as great as 70% of that required by conventional wiring.

(3) Weight savings—flat cable uses thin insulation, yet its integrated mechanical structure permits use of smaller conductors without sacrificing overall strength. Wire size can be selected to meet the electrical requirements rather than the mechanical needs. This reduction in size, coupled with elimination of conventional round cable support hardware, can trim the interconnection cabling system by up to 80%.

(4) Reliability—flat cable fixed parallel conductors, coupled with controlled spacing, provides consistent electrical characteristics, better heat dissipation and abrasion resistance.

(5) Elimination of wiring errors—flat cable maintains wire in a well-defined pattern reducing the possibility of miswiring. Coupled with available color-coding, and single-step, multi-conductor (mass) termination connectors, flat cable virtually eliminates assembly errors.

(6) Ease of termination—precise conductor positioning, and the availability of compatible IDC connectors, permits mass termination without stripping the insulation or requiring any wire preparation.

(7) Cost savings—the foregoing features add up to substantial savings in installed cost. Reduced overall labor, fewer assembly errors, less inspection, and better material and space usage can cut up to 60% off the cost to install conventional wire.

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IV. IDC Connectors & Mass Termination

The unique mechanical properties and precise conductor positioning inherent in flat cable make it ideally suited to single-step, multiple-conductor termination. Such "mass termination" represents substantial installation cost savings over discrete wire termination alternatives such as crimping and soldering.

The rapid growth in the use of multiconductor flat cable has been stimulated by the development of IDC connectors which mass terminate the flat cable conductors by penetrating the insulation and "clamping" the wires between contact fingers *(Figure 3, 4)*.

A connector fitted with a number of insulation displacement contacts can be positioned at any point along the length of the flat cable and all conductors can be simultaneously terminated with a single "crimp." The insulation remains virtually intact, retaining almost all of its original tensile strength. At the same time there is no damage to the conductor as is normally encountered during stripping.

By designing the surface of the cable with grooves, the leading edge of the insulation displacement contact can precisely center the wire as it starts to displace the insulation. Thus the process has high inherent reliability through minimizing potential conductor damage inherent with conventional crimping, soldering and wire wrapping termination techniques.

Contact plating material, pin geometry/length, strain relief, retaining clips, polarizing plugs, printed circuit board thickness, number of pins, locking tabs are some of the options/variables which can be offered to address specific application requirements. For full details, consult the individual product specifications contained within this catalog, or consult a Thomas & Betts application specialist.

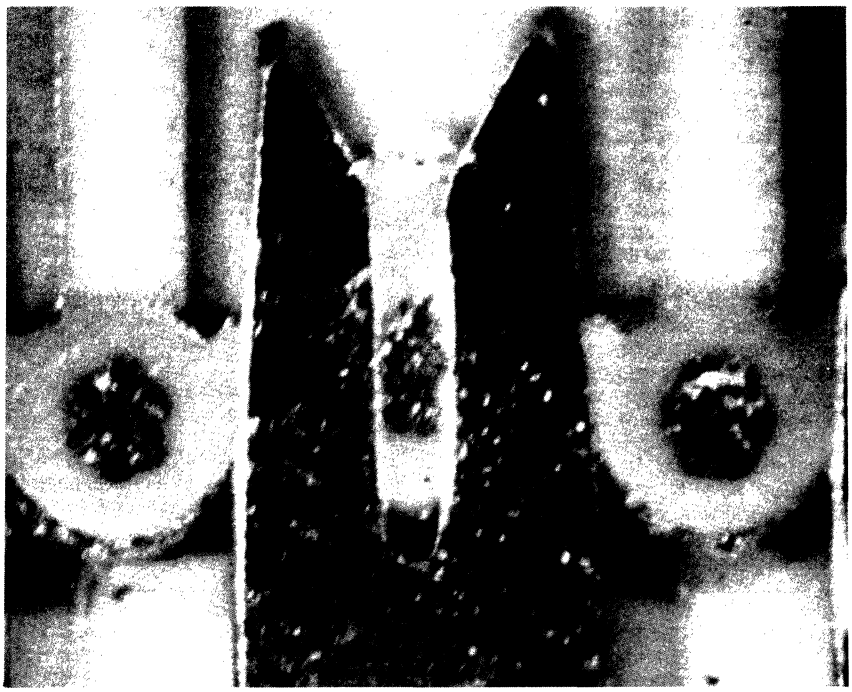

Fig. 3—Cross Section of Contact—Stranded Wire

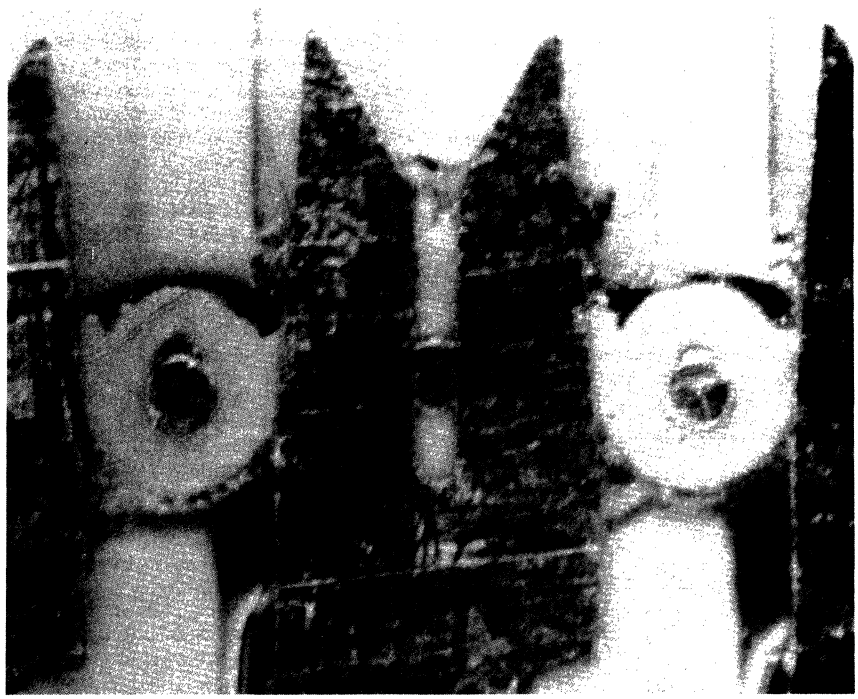

Fig. 4—Cross Section of Contact—Solid Wire

B

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V. Parallel Blade Contact Design

Function

Insulation displacement contacts perform two fundamental functions:

(1) Pierce through the insulation that surrounds the conductor, while displacing it from the active contact area.

(2) Provide long lasting, highly reliable contact with the conductor to maintain low, uniform electrical contact resistance.

Beyond this generalized description, particular application criteria strongly influence the design. For this discussion, the target design is directed toward terminating multiconductor flat cables, with round conductors located on .050 inch (1.27 mm) center spacings. Some specific design objectives and criteria are listed below:

- Conductors: soft copper wire ranging from AWG 26 solid to AWG 28 stranded
- Cable geometry: flat, .050 inch (1.27 mm) pitch
- Insulation materials: polyvinylchloride, polyethylene, and fluoroethylene propylene
- Application environment: general office environments and industrial applications. Must withstand temperature extremes of −40°C to +105°C
- Contact life expectancy: 40 years @ 20°C
- Constriction resistance: less than 1×10^{-3} ohms
- Connector voltage rating: 300 volts

Design

Briefly reviewing electrical contact phenomena, it can be shown that the minimum constriction resistance may be calculated using the Holm formula:

$$R_c = \frac{P}{2d}$$

where P=the resistivity of the contact material and d=the diameter of the conductor. This formula assumes that the contact area is equal to, or greater than, the cross-sectional area of the wire.

If a wire is simply gripped between two parallel blades, the blades must be pressed together, deforming the conductor and increasing the contact area. The deformation must be great enough to assure that the contact area is at least twice as large as the conductor cross-sectional area. This distortion of the conductor requires that the forces be sufficiently high to cause plastic deformation of the conductor (Fig. 5).

However, care must be taken that the conductor is not plastically deformed to such an extent that it becomes embrittled and shears in two. Also to be considered is the tendency of soft copper under high compressive stress to experience stress relaxation and creep over time. This creep can cause the resultant force between an improperly designed contact and the wire to decrease, eventually allowing oxidation or corrosion to occur at the interface. These oxides are nonconductive and will cause contact resistance to increase beyond acceptable limits.

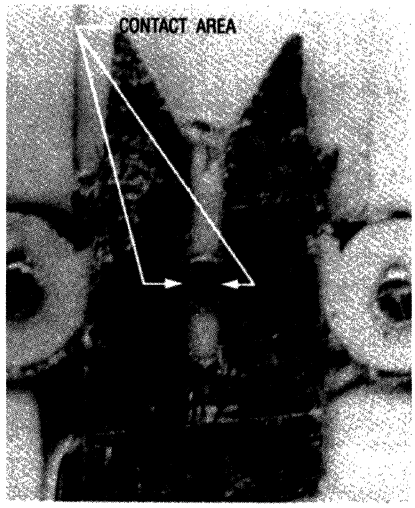

Fig. 5

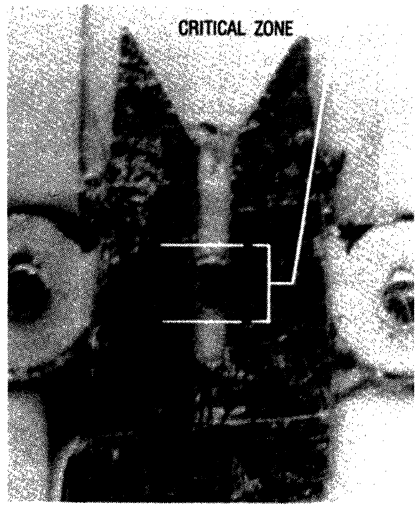

Fig. 6

The first step to the solution of these problems is to calculate the required reduction in wire diameter which will produce the necessary conductor deformation that will lead to the desired low contact resistance.

Then, a slot of this dimension is formed in a rigid contact material such that upon insertion of a conductor, the desired deformation is achieved. However, those are only the first two steps.

The contact slot must be able to accommodate more than one size of wire. Thus, the production limits of size of the slot must guarantee enough deformation to produce the 2:1 ratio of contact area to wire area for the smaller wire, but must not overdeform the larger wire such that the wire fractures. Since the force which deforms the conductor is produced by the resistance to deflection generated by the contact tines, to compensate for the different wire sizes and equalize as much as possible their deformations, wires must be inserted deep into the slot. Thomas & Betts has determined that there is a "critical zone" depth to which the wires must be inserted (Fig. 6).

If the insertion is too shallow, the optimum deformation will not occur, leading to poor contact resistances. If the insertion is too deep, the contact itself will become overstressed and will possibly set, or fracture.

The critical zone in the slot also helps overcome creep tendencies in the conductor. Because of the physical location, very small deflections of the contact beams cause very high forces, thereby producing a very high spring rate. Therefore, very small movements will maintain high forces. As the conductor creeps, the stored energy in the contact legs causes the slot to close, maintaining the proper contact pressure.

The active beam length of the IDC contact becomes very short because of the critical zone. This significantly complicates the strength analysis of the contact. The IDC contact is a short cantilever beam which deflects very small amounts while it is deforming the wire conductor. Not all of this deflection can be explained by the simple bending equation for a cantilever cited in the textbooks. This equation was derived for a long beam embedded into a wall (Figure 7 shows a rectangular section cantilever). When the beam has a high aspect ratio (ratio of the active beam length from the point of application of the force to the wall constraints divided by the beam thickness in the direction of load application), all of the deflection is explainable by the simple bending equation. However, as the aspect ratio decreases, and the load moves closer to the bottom of the slot, two additional phenomena contribute to the deflection.

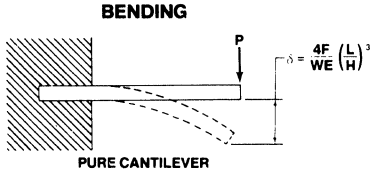

Fig. 7

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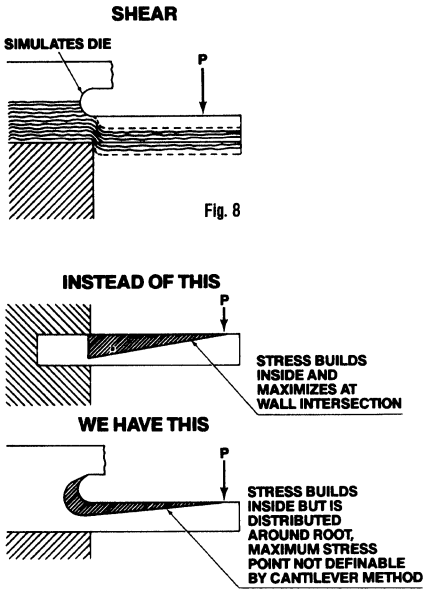

Fig. 8

Fig. 9

The first phenomenon is shear (Figure 8). If the load were moved all the way to the base of the slot, there would be no cantilever bending, and the contact would react as if it were a metal in a shearing die. The second phenomenon occurs because the cantilever is the same material as the constraining wall, thus distributing stresses and strains differently (Figure 9). The contribution to the deflection produced by these two phenomena is shown by Figures 10 and 11. In the critical zone used by Thomas & Betts, only about ⅓ to ½ of the deflection seen can be attributed to simple bending.

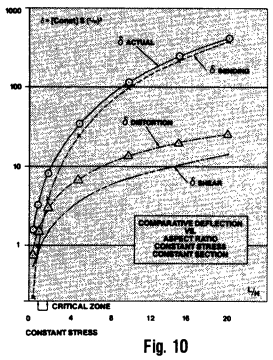

Fig. 10

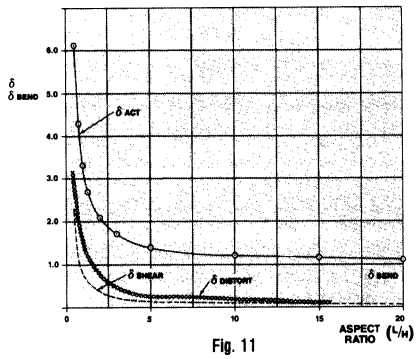

Fig. 11

The effect on stresses from these two phenomena is also complex. The maximum shear stress operates on the neutral axis, while the bending stress is maximum at the point of constraint, which in the IDC is at the tangency point between the slot and its root. Thus, the bending stress and the shear stress are not usually additive. However, the stress effects of the distortion become nearly unpredictable by conventional calculations.

Because of the above, finite element analysis was done to determine the stress loading of the IDC contacts. A distribution plot for one contact is shown in Figure 12. Typically, the maximum stress occurs at the root and is near to and sometimes exceeds the elastic yield point of the material. However, the stress is quickly dissipated, which leaves the contact with strong spring characteristics.

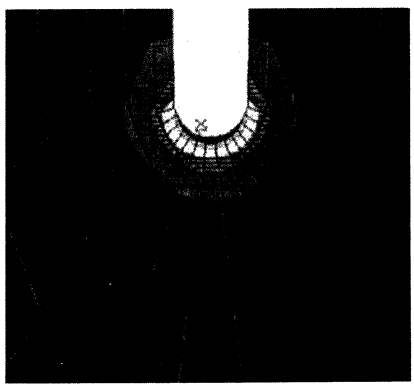

Fig. 12

To maintain these spring characteristics, the contact material chosen must have a high yield strength. Additionally, the material must also have a high stress retention over time. Figure 13 shows the comparison of beryllium copper to phosphor bronze. The material most usually used by Thomas & Betts for IDC contacts is beryllium copper, because of its high strength and its life characteristics. Any other alternate materials chosen are looked at very carefully for similar properties.

STRESS RETENTION AT 105°C
Beryllium Copper (BeCu) vs. Phosphor Bronze (PhBr)

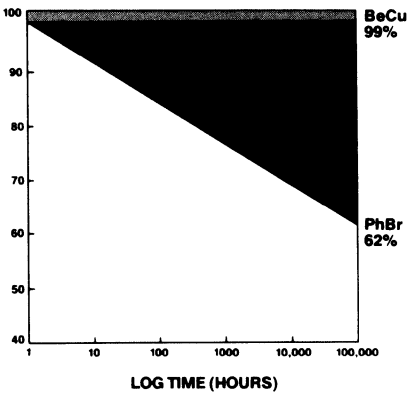

Fig. 13

VI. Testing

Extensive testing has been performed to verify the performance capabilities of the Thomas & Betts IDC contact. The overall bulk resistance of a contact mated pair is a function of the connector designs and their uses, and thus vary from one design to another. However, the performance of the IDC portion of the contact is essentially the same, and can be isolated by measuring its constriction resistance.

Constriction resistance measurements were taken by terminating cable midspan, applying current from one end of the cable through the connector to its mating counterpart, and then probing the voltage from the other end of the cable to the top of the contact. The probings were done through holes drilled in the plastic cover. Data was taken before and after conditioning. The conditions used were:

Temperature Cycling: 5 cycles from −55°C to 125°C, one hour per cycle.

Heat Aging: Studies done on the creep characteristics of copper indicate that long-term aging can be simulated by submitting the samples to a higher temperature. Desiring a lifetime of 40

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years at 20°C, the samples were aged 168 hours at 136°C. This test simulates the amount of degradation over the 40-year period.

Temperature Life: The samples were aged 1,000 hours at 125°C. This was considered to be a destructive test because the cables used were rated only for 105°C. Thus, some high resistances with 28 AWG stranded cable were to be expected.

Humidity: Samples were tested for 50 cycles (1,200 hours) with each cycle consisting of: 4 hours at 75°C and 90% Relative Humidity 16 hours at 75°C and 40-50% Relative Humidity, 4 hours at 25°C and 40-50% Relative Humidity. The results for the 622-XX05 series Card-edge are shown in Figure 14.

	28 AWG SOLID			28 AWG STRANDED		
	Minimum Observed	Average	Maximum Observed	Minimum Observed	Average	Maximum Observed
TEMPERATURE CYCLING −55°C, 125°C	Not Performed			.05 / .05	.10 / .15	.59 / .53
HEAT AGING 168 HRS. @ 136°C	.10 / .12	.11 / .18	.19 / .22	.07 / .07	.11 / .18	.22 / .53
TEMPERATURE LIFE 1,000 HRS. @ 125°C	.05 / .07	.11 / .14	.12 / .35	.04 / .05	.10 / .22	.17 / 3.8
HUMIDITY 1,200 HRS.	.05 / .07	.11 / .09	.12 / .11	.05 / .05	.10 / .13	.20 / .96

Fig. 14 — Construction Resistance (Milliohms) Initial / Final

VII. Selecting Flat Cable

Armed with an understanding of the basics of flat cable and IDC mass termination, one is now better prepared to approach the selection process. Among the parameters to be considered are:

voltage requirements—most flat cable is limited to voltages up to 300 volts.

current carrying requirements—since most flat cable conductors are in the size range of 24 to 30 AWG, they cannot handle high currents.

Since flat cable is essentially a signal-level transmission medium, it is frequently used for high-speed, digital data applications. In such applications design considerations must also include the following performance characteristics:

(a) characteristic impedance
(b) crosstalk
(c) attenuation
(d) capacitance
(e) inductance
(f) propagation delay

A variety of cable configurations are available, each designed to address the demanding requirements inherent in high-speed signal transmission. Conductor sizes, spacing, insulation properties, adhesives, grounding and shielding all represent variables which can be controlled to satisfy specific application requirements.

Recommended Thomas & Betts Jacketed Cable Stripping Dimensions

(174/180/194/187 Series)

Mass Termination IDC Connectors	Stripping Length ±.38 (.015) mm (inches)
PCB Solder Transition Connectors	11.94 (.470)
14 & 16 position standard and low Profile DIP Plugs	11.43 (.450)
24 & 40 position Low Profile DIP Plugs	19.05 (.750)
Socket Connectors	12.70 (.500)
Female Socket Transition Connectors	6.86 (.270)
Female Socket Transition Connectors with Strain Relief	15.24 (.600)
Male Connectors	8.89 (.350)
Male Connectors with Strain Relief	21.08 (.830)
Card Edge Connectors	11.94 (.470)
Ribbon Connectors	12.70 (.500)
Ribbon Connectors with Backshell Strain Relief	19.05 (.750)
"D" Connectors	12.70 (.500)
"D" Connectors with Standard Strain Relief	25.40 (1.000)
"D" Connectors with Backshell Strain Relief	36.83 (1.450)
"D" Connectors with Right Angle Backshell Strain Relief	15.88 (.625)

Thomas & Betts Flat Cable Test Data and IDC Connector Compatibility

Catalog Number	*Wire Gauge	Insulation	Rating (°C)	Voltage Rating (RMS)	Impedance Ohms	Capacitance pF/M (pF/FT)	Inductance μH/M (mH/FT)	Velocity of Propagation nS/M (nS/FT)	Insulation Resistance Ohms/FT	Typical Crosstalk Characteristics 3.1 M (10 ft.) sample, 1 line driven			UL Style Number	IDC Connector Compatibility
										Rise Time nSec	Near End	Far End		
171	28 STR	PVC	105	300	100	46 (14)	.46 (.14)	4.53 (1.38)	10^{10}	3.0 7.0	5.0% 3.2%	6.7% 2.7%	2651	All Ansley® Connectors
173	28 SOL	PVC	105	300	105	44.3 (13.5)	.49 (.15)	4.53 (1.38)	10^{10}	3.0 7.0	4.8% 3.1%	7.3% 2.9%	2651	All Ansley® Connectors except Ribbon
174	28 STR	P/PVC **	75	90	93	63 (19.2)	.56 (.17)	5.25 (1.60)	10^{10}	3.0 7.0	4.5% 4.1%	3.2% 2.0%	2604	All Ansley® Connectors
178	26 SOL	PVC	105	300	103	44.3 (13.5)	.46 (.14)	4.53 (1.38)	10^{10}	3.0 7.0	5.0% 3.2%	6.7% 2.7%	2651	Primarily for Ribbon Connectors
179	26 STR	PVC	105	300	93	49.5 (15.1)	.43 (.13)	4.43 (1.35)	10^{10}	3.0 7.0	5.2% 3.8%	6.1% 2.3%	2651	Primarily for Ribbon Connectors
180	26 STR	P/PVC **	75	90	80	65.6 (20)	.43 (.13)	5.25 (1.60)	10^{10}	3.0 7.0	4.6% 4.2%	2.7% 1.8%	2604	Primarily for Ribbon Connectors
181	28 STR	Teflon	200	300	G-S 165 G-S-G 125	G-S 6.7 G-S-G 11.1	—	1.19	—	—	—	—	—	All Ansley® Connectors
185	28 STR	PVC	105	300	100	46 (14)	.46 (.14)	4.53 (1.38)	10^{10}	3.0 7.0	5.0% 3.2%	6.7% 2.7%	2651	All Ansley® Connectors
187	28 STR	PVC	75	300	42	164 (48)	.26 (.09)	5.57 (1.170)	10^{10}	3.0 7.0	3.0% 1.6%	2.0% 2.5%	20036	All Ansley® Connectors
194	28 STR	P/PVC **	75	90	95	55.1 (16.8)	.56 (.17)	5.02 (1.53)	10^{10}	3.0 7.0	3.9% 3.0%	1.4% 0.7%	2984	All Ansley® Connectors
196	28 STR	PVC	105	300	65	8.4 (28)	.35 (.12)	5.50 (1.68)	10^{11}	3.0 7.0	1.2% 0.4%	2.8% 1.8%	20218	All Ansley® Connectors
200	28 STR	PVC	105	300	95	15.7	—	1.60		3.0 7.0	4.2% 4.0%	8.5% 5.4%	20184	All Ansley® Connectors
201	28 STR	PVC	105	300	100	46 (14)	.46 (.14)	4.50 (1.38)	10^{10}	3.0 7.0	5.0% 3.2%	6.7% 2.7%	20067	All Ansley® Connectors
202	26 SOL	PVC	105	300	103	44.3 (13.5)	.46 (.14)	4.50 (1.38)	10^{10}	3.0 7.0	5.0% 3.2%	6.7% 2.7%	20067	Primarily for Ribbon Connectors

*All wire gauges AWG; STR = stranded, SOL = solid
**Insulation is polyethylene with PC jacket

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VIII. Selecting IDC Connectors

To fully realize the performance benefits of flat cable/connector systems, careful attention must be paid to matching the IDC connector electrically and mechanically to the flat cable and to other system requirements. Among the parameters to be considered are:

(a) type of connector (header, DIP, female socket, card-edge, solder transition, "D", ribbon, etc.)
(b) type of conductor (round stranded, round solid)
(c) conductor size (AWG)
(d) number of conductors
(e) conductor spacing
(f) insulation type & thickness
(g) number of insertion/withdrawal cycles
(h) current carrying capacity
(i) dielectric withstand voltage
(j) contact resistance
(k) temperature range
(l) type polarization
(m) type keying
(n) locking/eject requirements
(o) installation tooling requirements
(p) applicable standards/specifications (MIL specs, IPC specs, UL requirements, etc).

As one can see, electrical specifications form only one element of the connector selection process. Equally important parameters regarding system installation, and mass termination tooling must also be addressed. Tooling requirements will be dictated by the number of terminations which must be done. For very low volume, or systems maintenance, simple hand tools may suffice. As volumes increase, bench presses and other semi-automatic equipment can enhance production capability.

IX. Cable-Connector Matching

By now you have recognized the importance of properly matching the flat cable and IDC connector to achieve optimal system performance. Despite a relatively high degree of "standardization," there exist few industry standards to ensure interchangeability among the various cable/connector manufacturers.

Each flat cable manufacturer sets his own tolerance on critical parameters such as conductor pitch and registration of the surface grooves. In addition insulation characteristics such as hardness, flexibility, and resistance to penetration may vary considerably, as may stranding tightness and conductor plating techniques.

At the same time there exists subtle mechanical differences in polarization, keying, and locking/eject features among the IDC connector manufacturers.

As VLSI devices gain wider acceptance, and digital data transmission speeds increase, impedance mismatching or discontinuities caused by the cable/connector system become increasingly important. A mismatch or discontinuity can distort or delay transmission pulses degrading system performance.

Those experienced in the application and use of flat cable and mass termination IDC components recognize the potential effects of mismatching. To realize the performance and cost benefits, most deal with a single vendor with expertise in producing each of the elements of the mass termination system —flat cable, IDC connectors, and related installation tooling.

X. Mass Terminated Flat Cable in High Speed Digital Applications

The geometry of parallel conductor flat cables provides uniform and predictable transmission line characteristics. For this reason, flat cables have become increasingly popular in high speed, digital applications where controlled impedance, minimum crosstalk and minimum signal distortion is a must. In many of these applications, standard product, mass terminated interconnects more than satisfy system requirements. This section discusses the transmission line properties of mass terminated systems, and compares the performance with other, conventional interconnect schemes.

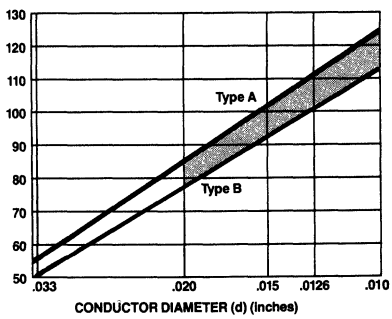


Fig. 15 — Characteristic Impedence, Unshielded, Mass Termination Flat Cable with Conductors on .050" Center Spacing

Cable Design

The selection of conductor size, conductor spacing and insulating materials determines the transmission line characteristics of all cable structures. For compatibility with typical or "standard" IDC connectors, the cable conductors must be located on .050 inch centers and may vary in size from AWG 30 solid (.25mm or .010 inch diameter) to AWG 24 stranded (.64mm or .025 inch diameter). Choosing a compatible packaging profile and commercially available insulating materials, the resultant structures range in characteristic impedance (Zo) from 76 to 122 ohms, when terminated in a ground-signal-ground configuration *(See Figure 15.)* The choice of insulating material also determines the cable's propagation delay (Tpd). For most mass termination structures the range is from 1.33 (PVC insulated) to 1.60 (polyethylene-jacketed) nanoseconds per foot.

B

CABLE REFERENCE GUIDE

Annealed Bare Copper Wire American Wire Gauge

GAUGE (AWG) OR (B & S)	DIAMETER INCHES (NOM.)	AREA CIRCULAR MILS	WEIGHT POUNDS PER M	RESISTANCE AT 68°F OHMS PER M
10	.1019	10380.	31.43	.9989
11	.09074	8234.	24.92	1.260
12	.08081	6530.	19.77	1.588
13	.07196	5178.	15.68	2.003
14	.06408	4107.	12.43	2.525
15	.05707	3260.	9.858	3.184
16	.05082	2583.	7.818	4.016
17	.04526	2050.	6.200	5.064
18	.04030	1620.	4.917	6.385
19	.03589	1200.	3.899	8.051
20	.03196	1020.	3.092	10.15
21	.02846	812.1	2.452	12.80
22	.02535	640.4	1.945	16.14
23	.02257	511.5	1.542	20.36
24	.02010	404.0	1.223	25.67
25	.01790	320.4	.9699	32.37
26	.01594	253.0	.7692	40.81
27	.01420	201.5	.6100	51.47
28	.01264	159.8	.4837	64.90
29	.01126	126.7	.3836	81.83
30	.01003	100.5	.3042	103.2
31	.008928	79.7	.2413	130.1
32	.007950	63.21	.1913	164.1
33	.007080	50.13	.1517	206.9
34	.006305	39.75	.1203	260.9
35	.005615	31.52	.09542	331.0
36	.005000	25.00	.07568	414.8
37	.004453	19.83	.0613	512.1
38	.003965	15.72	.04759	648.6
39	.003531	12.20	.03774	847.8
40	.003145	9.61	.02993	1080.0

Recommended Thomas & Betts Jacketed Cable Stripping Dimensions (174/180/194/187 Series)

Mass Termination IDC Connectors	Stripping Length ±.38 (.015) mm (inches)
PCB Solder Transition Connectors	11.94 (.470)
14 & 16 position standard and low Profile DIP Plugs	11.43 (.450)
24 & 40 position low Profile DIP Plugs	19.05 (.750)
Socket Connectors	12.70 (.500)
Female Socket Transition Connectors	6.86 (.270)
Female Socket Transition Connectors with Strain Relief	15.24 (.600)
Male Connectors	8.89 (.350)
Male Connectors with Strain Relief	21.08 (.830)
Card Edge Connectors	11.94 (.470)
Ribbon Connectors	12.70 (.500)
Ribbon Connectors with Backshell Strain Relief	19.05 (.750)
'D' Connectors	12.70 (.500)
'D' Connectors with Standard Strain Relief	25.40 (1.000)
'D' Connectors with Backshell Strain Relief	36.83 (1.450)
'D' Connectors with Right Angle Backshell Strain Relief	15.88 (.625)

Stranded Tinned Copper Wire American Wire Gauge

AWG SIZE	STRAND-ING	NOM. O.D. OF STRAND	APPROX. O.D.	CIRCULAR MIL. AREA	WGT. PER 1000	OHMS PER 1000
10	105/30	.0100	.116	10,530.0	31.76	.98
10	49/27	.0142	.116	9,878.4	29.89	1.09
10	37/26	.0159	.115	9,353.6	28.31	1.11
12	165/34	.0063	.095	6,548.9	19.82	1.58
12	65/30	.0100	.095	6,500.0	19.66	1.75
12	19/25	.0179	.093	6,087.6	18.43	1.70
12	7/20	.0320	.096	7,168.0	21.69	1.45
14	105/34	.0063	.073	4,167.5	12.61	2.49
14	41/30	.0100	.073	4,100.0	12.40	2.53
14	19/27	.0142	.073	3,830.4	11.59	2.70
14	7/22	.0253	.073	4,480.0	13.56	2.31
16	105/36	.0050	.059	2,625.00	7.95	3.99
16	65/34	.0063	.059	2,579.85	7.81	4.02
16	26/30	.0100	.059	2,600.00	7.87	4.00
16	19/29	.0113	.058	2,426.30	7.35	4.27
16	7/24	.0201	.060	2,828.00	8.56	3.67
18	65/36	.0050	.047	1,625.00	4.91	6.39
18	41/34	.0063	.047	1,627.29	4.92	6.37
18	19/30	.0100	.049	1,900.00	5.75	5.46
18	16/30	.0100	.047	1,600.00	4.84	6.48
18	7/26	.0159	.048	1,769.60	5.36	5.86
20	41/36	.0050	.036	1,025.00	3.10	10.02
20	26/34	.0063	.036	1,031.94	3.12	10.05
20	19/32	.0080	.037	1,216.00	3.68	8.63
20	10/30	.0100	.035	1,000.00	3.025	10.32
22	26/36	.0050	.030	650.00	1.97	15.94
22	19/34	.0063	.031	754.11	2.28	13.73
22	7/30	.0100	.030	700.00	2.120	14.74
24	41/40	.0031	.023	384.40	1.160	25.59
24	19/36	.0050	.024	475.00	1.430	21.08
24	10/34	.0063	.023	396.90	1.201	26.09
24	7/32	.008	.024	448.00	1.356	23.3
26	19/38	.0040	.020	304.00	.920	34.43
26	10/36	.0050	.021	250.00	.757	41.48
26	7/34	.0063	.019	277.83	.841	37.3
27	7/35	.0056	.018	219.52	.664	51.47
28	19/40	.0031	.016	182.59	.553	56.7
28	7/36	.005	.015	141.75	.529	64.9
30	19/42	.0025	.012	118.75	.359	87.3
30	7/38	.004	.012	112.00	.339	103.2
32	19/44	.002	.009	76.00	.230	136.4
32	7/40	.0031	.008	67.27	.203	164.0
34	7/42	.0025	.0075	43.75	.132	237.0
36	7/44	.002	.006	28.00	.085	371.0

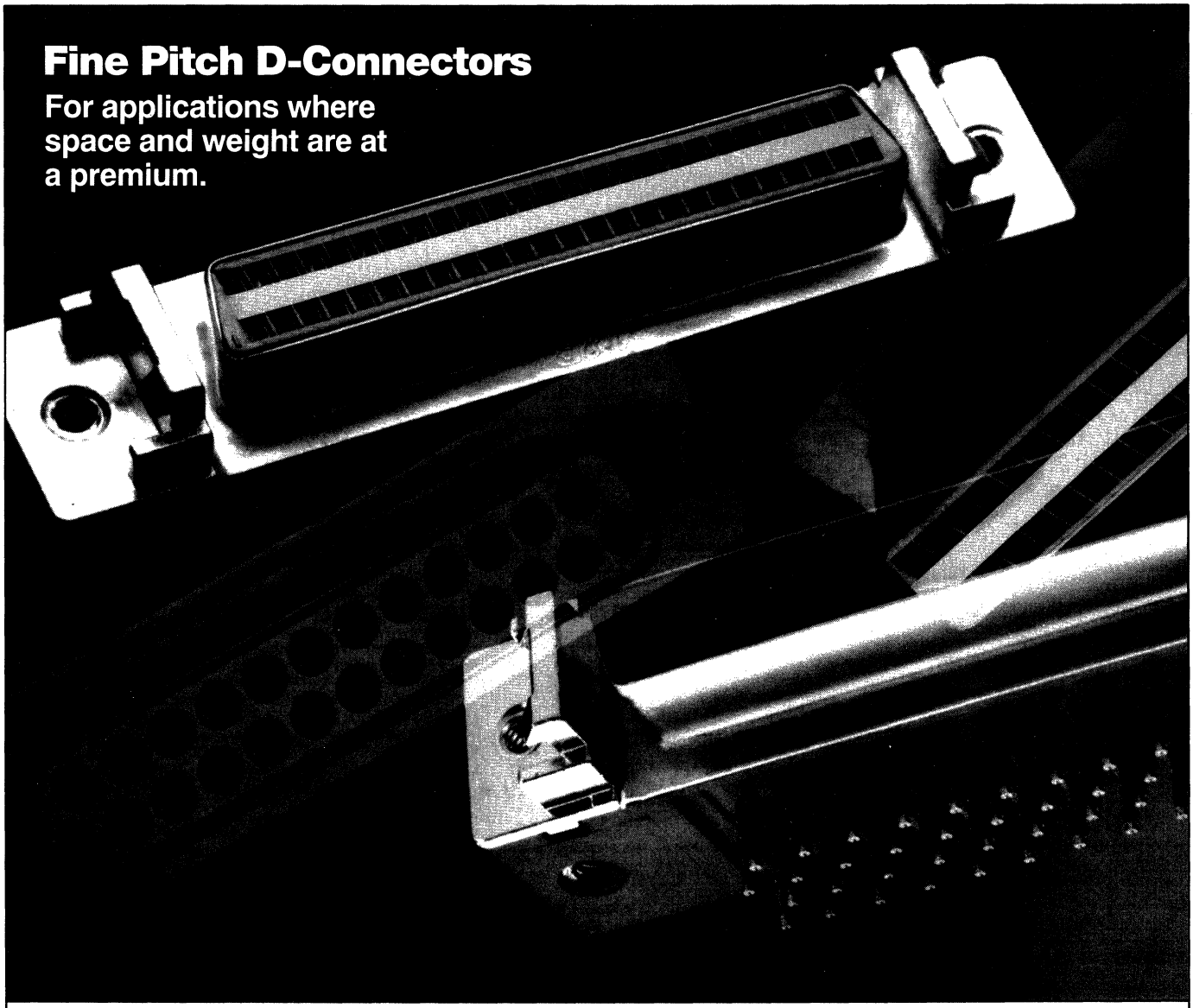
D-Subminiature Connectors

C

TABLE OF CONTENTS

Fine Pitch D-Connectors

For applications where space and weight are at a premium.



Taking the HOLMBERG® standard of performance to a new level.

In response to the growing need for high density interconnects, Thomas & Betts – a worldwide leader in D-Subminiature technology – has combined the features of our standard size HOLMBERG® D-Subminiature connector into a connector which uses one-half the space of the standard product.

The result is a Fine Pitch D-Connector which offers distinct advantages while maintaining the criteria established for all industry standard fine pitch connectors.

Space saving applications

The Thomas & Betts Fine Pitch D-Connector is ideally suited for such applications as laptop and compact desktop computers, peripherals, and other new generation equipment where space and weight are at a premium, and high performance is required.

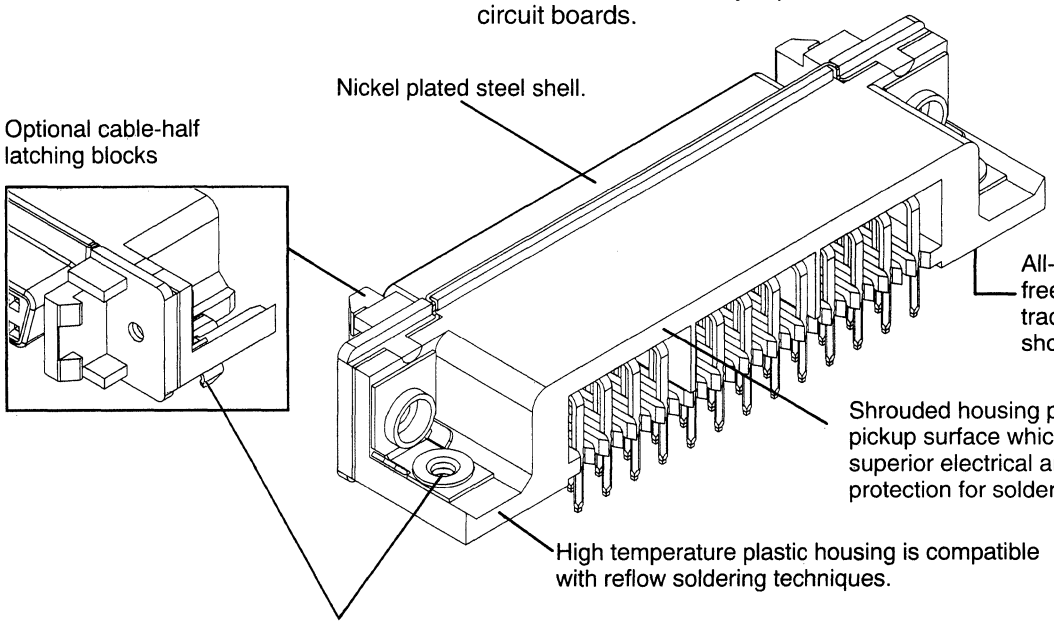
Broad application scope

Thomas & Betts Fine Pitch D-Connectors comply with the latest industry standards:

- SCSI-2, with 50 pin and 68 pin Fine Pitch D-Connectors.
- IPI 2, with 50 pin Fine Pitch D-Connectors.
- RS232-E, with 26 pin Fine Pitch D-Connectors.

Superior operational features.

- Dual opposing beam female contacts provide minimum 100 grams normal force per beam with 150K PSI Hertz stress for maximum reliability.
- Lightweight – a 50 position connector weighs under 11 grams.
- All plastic housing mounting pads allow maximum trace routing density without risk of shorting.
- True position tail guides hold contact tails in proper position for easy printed circuit board insertion.
- Two different solder tail lengths are available to accommodate .062" thru .125" multilayer printed circuit boards.
- Bulkhead mounting face simplifies panel cutout and provides optimum cable strain relief.
- Cable-half retention latches assure positive connector mating.
- A full range of mounting and grounding options allows greater design flexibility.



C

Part Numbering Matrix

HFR050RA29JS1

- ***Thomas & Betts Series***
- ***Receptacle Contacts***
- ***Number of Positions (26, 50, 68)***
- ***Right Angle Tail Configuration***
- ***Plating Code****
  29 – .000050" Nickel Underplate Overall
  .000030" Gold in Contact Area with
  .000100" Tin-Lead on Tails
- ***Panel Mounting Option:***
  B - Threaded Standoff (2-56)
  C - Flush Thread (4-40)
  J - Cable Latch Blocks
- ***Board Mounting Option:***
  S - Grounding Snap Latch
  X - Ground Strap with #2-56 insert
- ***Tail Length Option:***
  1 - .130" Long/3.3mm (.062, .093 PCBs)
  2 - .162" Long/4.1mm (.125 PCBs)

**** Other Platings Available Upon Request***

FINE PITCH D-CONNECTOR
Right Angle, Receptacle Contacts

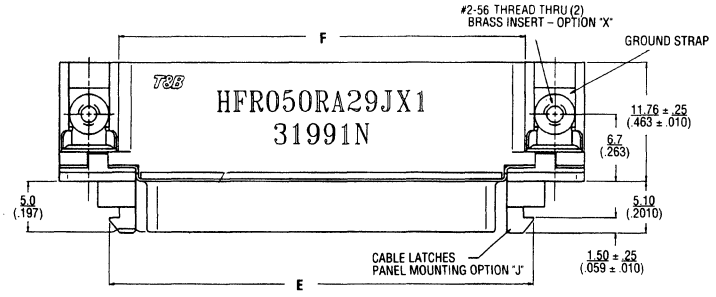
Physical Properties
Insulation Material–Glass reinforced thermoplastic rated 94V-0, Black.

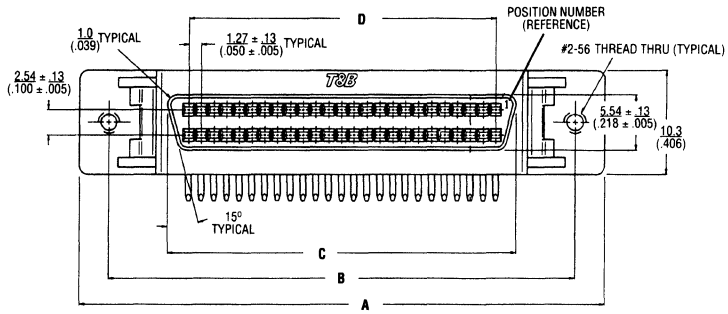
Contact Material–High strength copper alloy with gold over nickel plating in contact area; Tin-lead plating on tails.

Electrical Properties
Current Rating 1 amp
Insulation Resistance > 1000 megohms
Dielectric Strength > 1,000 VDC (Sea level)

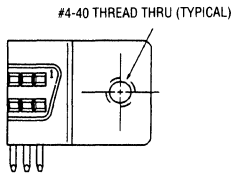
Environmental Properties
Temperature Rating -55°C to +125°C

Dimensions shown are for reference only.
Dimensions are in millimeters
(inches)

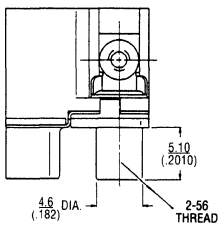




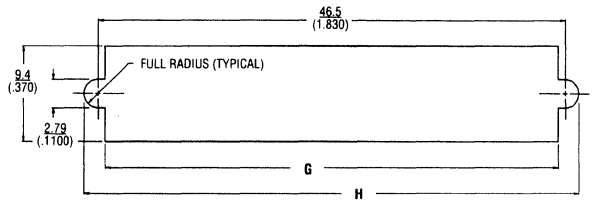
FLUSH PANEL MOUNTING OPTION "C"



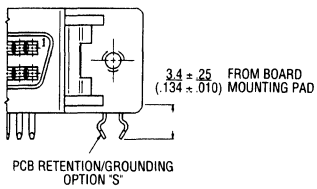
STANDOFF PANEL MOUNTING OPTION "B"



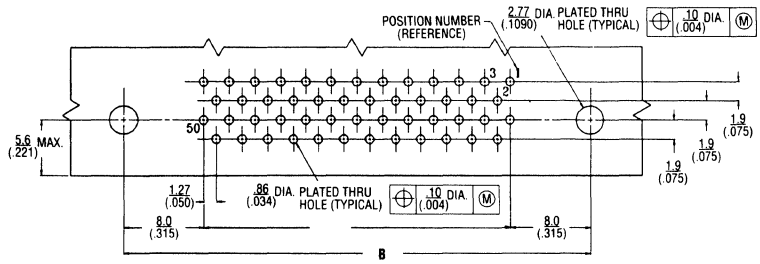
RECOMMENDED PANEL CUT-OUT



ALTERNATE PCB MOUNTING STYLE OPTION "S"



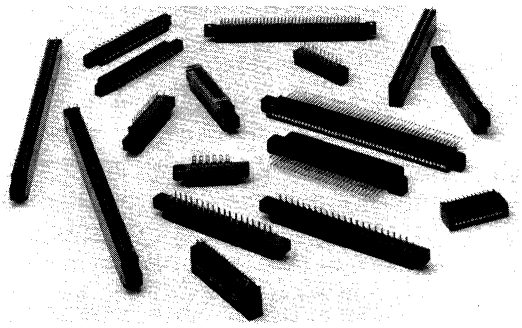
RECOMMENDED BOARD LAYOUT



Ordering Information

NUMBER OF CONTACTS	PANEL MOUNTING TYPE	CATALOG NUMBER		DIMENSIONS IN MILLIMETERS (INCHES)							
		BOARD MOUNTING TYPE									
		GROUND STRAP W/#2-56 INSERT	GROUNDING SNAP LATCH	A	B	C	D	E	F	G	H
26	2-56 Cable Latch	HFR026RA29JX1*	HFR026RA29JS1	37.2 (1.465)	31.2 (1.230)	19.5 (.766)	15.24 (.600)	27.1 (1.065)	25.3 (.995)	29.8 (1.175)	34.0 (1.340)
	2-56 Standoff	HFR026RA29BX1	HFR026RA29BS1								
	4-40 Flush	HFR026RA29CX1	HFR026RA29CS1								
50	2-56 Cable Latch	HFR050RA29JX1*	HFR050RA29JS1	52.5 (2.065)	46.5 (1.830)	34.7 (1.366)	30.48 (1.200)	42.3 (1.665)	40.5 (1.595)	45.1 (1.775)	49.3 (1.940)
	2-56 Standoff	HFR050RA29BX1	HFR050RA29BS1								
	4-40 Flush	HFR050RA29CX1	HFR050RA29CS1								
68	2-56 Cable Latch	HFR068RA29JX1*	HFR068RA29JS1	63.9 (2.515)	57.9 (2.280)	46.1 (1.816)	41.91 (1.650)	53.7 (2.115)	51.9 (2.045)	56.5 (2.225)	60.7 (2.390)
	2-56 Standoff	HFR068RA29BX1	HFR068RA29BS1								
	4-40 Flush	HFR068RA29CX1	HFR068RA29CS1								

*Suffix 1 = .130" Tail Length; Suffix 2 = .162" Tail Length



PRODUCT DESCRIPTION

HOLMBERG® D-Subminiature connectors are all plastic or metal-shielded for printed circuit board applications in the telecommunications, data processing, instrumentation, industrial control and other industries where low cost and high performance are required. They are fully intermatable with all D-Subminiature connectors – including crimp, solder and insulation displacement types.

The connector housing is molded in black glass-filled polyester, UL rates 94V-0. Contacts are high strength copper alloy and are selectively plated-gold-over-nickel in the contact area with solder plating on the tails. This assures contact reliability, superior solderability and long shelf life at a lower cost.

The metal shielded connector is designed specifically for mating with EMI-RFI qualified cables, the H4 metal shell connectors incorporate a grounding bulkhead mount, or can be supplied with a grounding strap for grounding to the topside, underside or both, of PC boards. The bright tin-plated steel metal shell provides a cost-effective medium for grounding – which can also be accomplished through the mounting hardware.

Available in 9, 15, 25 and 37 positions, the unique design of the HOLMBERG® D-Subminiature connectors ensures excellent contact retention and precisely located, rigid contact tails for easy assembly.

DESIGN FEATURES

LARGE LEAD-IN PROVIDES EASY MATING, Allows male plug to be off true position as much as ± .040" and still mate. Corner radii around "D" outline also aids pin alignment. SMOOTH LEAD ON TIP OF PINS. Allows easy mating and low insertion force with mating receptacle.

RIGID TAILS NEED NO SUPPORT. Right angle tails have channel cross-section for exceptional strength and rigidity. They are precisely positioned for easy mounting. Since no plastic inserts or spacers are required for alignment or support, nothing obstructs cleaning after soldering.

60/40 TIN/LEAD SELECTIVE PLATING ON THE TAIL ENHANCES SOLDERABILITY. Nickel-plated tail surface above the board forms effective solder mask. Large cross-section of the above board tail portion provides good heat sink to further control solder application.

METAL SHELL provides electrical ground path continuity and magnetic shielding, from the mating receptacle metal shell through the grounding bumps on the male shell. The steel shell with bright tin-plating also provides for grounding through the factory installed mounting hardware.

PERFORMANCE CHARACTERISTICS

Operating voltage:	600VDC (sea level)
Current rating:	5 Amperes
Operating temperature:	-55°C to +125°C
Contact resistance:	10 milliohms max. @ rated current
Insulation resistance:	5000 megohms minimum
Dielectric withstanding voltage	1000 VAC minimum
Durability:	up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected

MATERIALS

Insulator body:	Glass filled polyester, UL rating 94V-0, color-black
Contact:	High yield strength copper alloy
Metal Shell:	Steel, bright tin plate.

UL Recognized and CSA Certified

PART NUMBER DESCRIPTION AND ORDERING INFORMATION

H2 R 25 RA 29 A P M

SERIES DESIGNATOR
H2 — All Plastic
H3 — All Plastic
H4 — Metal Shell
H5 — Metal Shell
H9 — Metal Shelf — High Profile
HD Series, Metal Shell High Density

CONTACT TYPE
R — Female Receptacle
M — Male Pins

NUMBER OF CONTACTS
09, 15, 25, 37

PC TERMINATION TYPE
RA — Right Angle
ST — Straight Tail

CONTACT PLATING
29 — Selective .000030" gold over .000050" nickel in the contact area with .0001" to .0003" 60/40 tin/lead on the contact tails.

Other platings available (consult factory).

MOUNTING STYLE
Right Angle
A — Basic Connector with Thru Holes
B — Round Standoff, 4-40 Thread
C — Flush insert, 4-40 Thread
D — Plastic Standoff, with 4-40 Threaded Insert
F — Locking Post
J — Latch with Standoff and 4-40 Threaded Insert (RS 449 & 232)

Straight Tail
A — Basic Connector with Thru Holes
B — Round Standoff, # 4-40 Thread
C — Flush Insert, # 4-40 Thread
D — Flush board mounting with Thru Holes
J — Latch with Standoff and # 4-40 Threaded Insert (for RS 449 and RS 232 cable assemblies)

PCB OPTIONS
P — Snap Latch/.062 PCB
S — Metal Snap Latch/.062 PCB
See page 45 for right angle PCB options.

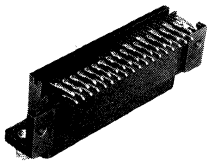
SPECIAL MODIFICATIONS
M30 — Metric Thread Size M3
M33 — Metric Thread with inside ground strap
M35 — Metric Thread with outside/inside ground strap
M43 — Inside Ground Strap
M44 — Solder Ground
M45 — Outside/Inside Ground Strap
M50 — Back Board Mounting Hole
M53 — Back Board Mounting Hole with inside ground strap
M55 — Back Board Mounting Hole with outside/inside ground strap
M60 — Back Board Mounting Hole
M63 — Metric Thread with inside ground strap. Back Mounting
M65 — Metric Thread with outside/inside ground strap. Back Board Mounting
See page 58 for right angle modification options.
Consult factory for grounding options on straight tail connectors.

C

H2 SERIES

9, 15, 25 AND 37 POSITIONS

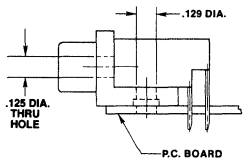
ALL PLASTIC RIGHT ANGLE
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



MOUNTING STYLES

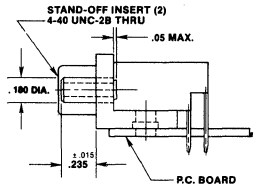
STYLE A

This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039) is available.



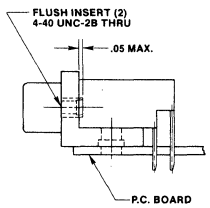
STYLE B

This configuration includes a #4-40 threaded standoff-which provides 6 in-lb torque retention, for mating to RS 232 cable assemblies. One-piece construction of the factory-installed insert eliminates need for separate hardware.



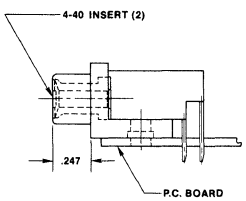
STYLE C

Style C mounting provides a flush, #4-40 threaded insert of nickel-plated brass. The insert has rows of knurling that capture it in the plastic, preventing rotation or push-out. It provides 6 in-lb torque retention.

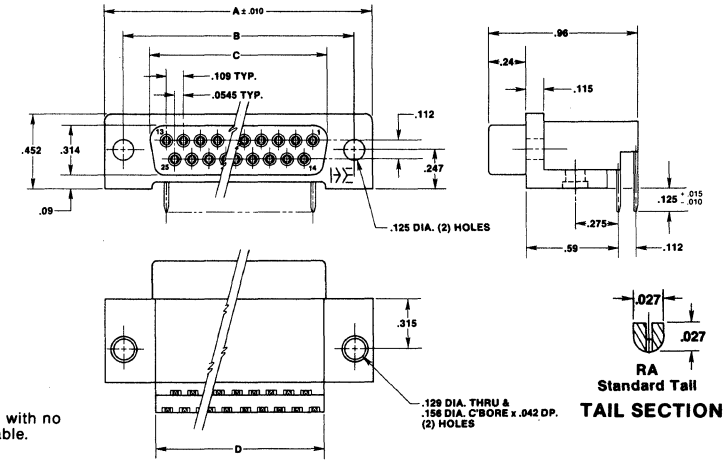


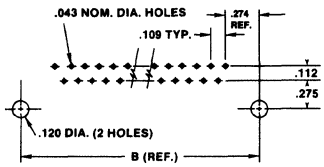
STYLE D

Unique Style D configuration has molded-in plastic standoff with factory-installed nickel-plated brass hex-headed, #4-40 threaded insert. Specifically designed for RS 232 cable assemblies. Insert is threaded all the way through. Hexagonal shape positively locks insert in place to provide 6 in-lb torque retention and eliminate rotation. Style D is functionally equivalent to Style B.



DIMENSIONS (Shown In Inches)





PC BOARD PATTERN

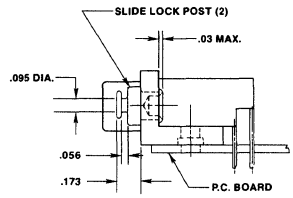
NOTE:

1. **Receptacle position numbers begin top row, RIGHT to LEFT, continue bottom row, RIGHT to LEFT.**
2. **Maximum tail will fit .038" diameter gauge hole.**
3. **Maximum recommended board thickness is .093".**

NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.646	.624
15	1.552	1.312	.974	.952
25	2.092	1.852	1.514	1.492
37	2.740	2.500	2.162	2.140

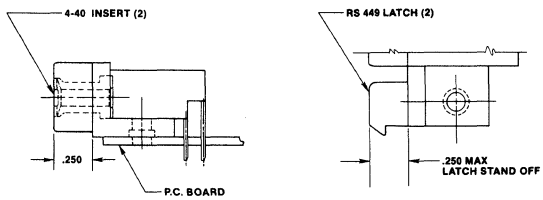
STYLE F

Style F has brass locking posts designed to mate with AMP's slide-latch clip assembly. Positronic's slide-lock assembly and equivalent connectors.



STYLE J

Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

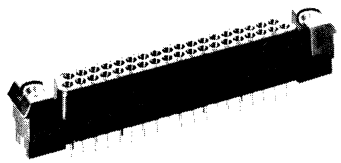


H2 SERIES

9, 15, 25 AND 37 POSITIONS

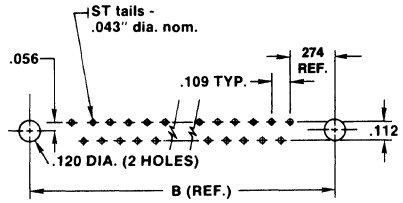
STRAIGHT TAIL ALL PLASTIC

FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)

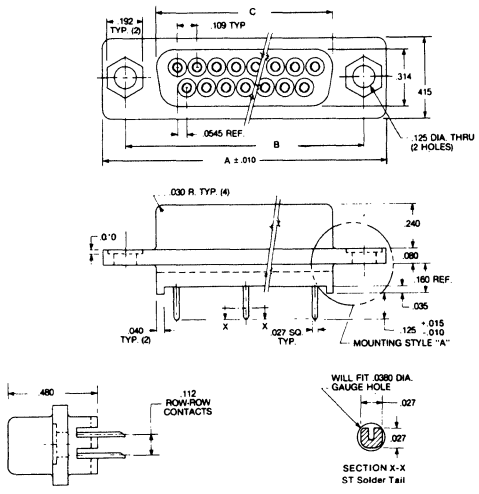
NUMBER OF CONTACTS	A	B	C
9	1.224	.984	.646
15	1.552	1.312	.974
25	2.092	1.852	1.514
37	2.740	2.500	2.162



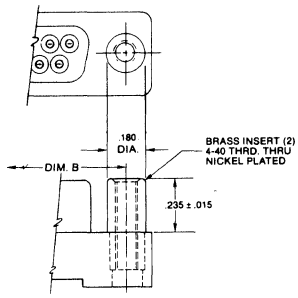
PC BOARD PATTERN

DIMENSIONS (Shown In Inches)

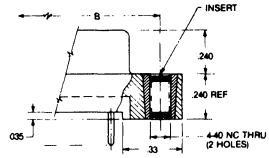
MOUNTING STYLE A



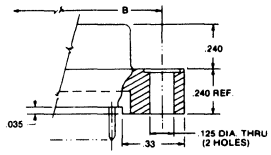
MOUNTING STYLE B



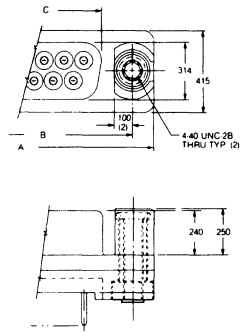
MOUNTING STYLE C



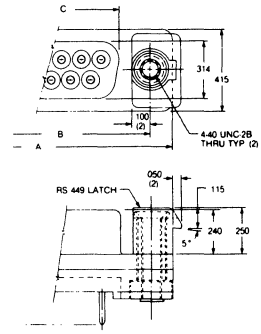
MOUNTING STYLE D



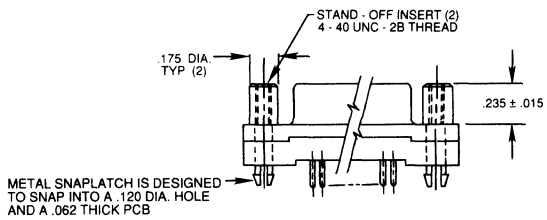
MOUNTING STYLE H



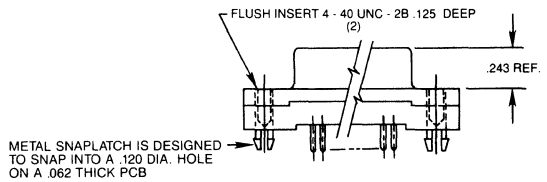
MOUNTING STYLE J



MOUNTING STYLE BS



MOUNTING STYLE CS

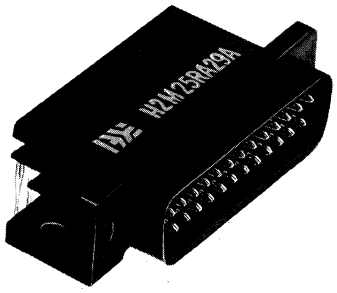


C

H2 SERIES

9, 15, 25 AND 37 POSITIONS

ALL PLASTIC RIGHT ANGLE
MALE PINS FOR PRINTED CIRCUIT BOARD MOUNTING

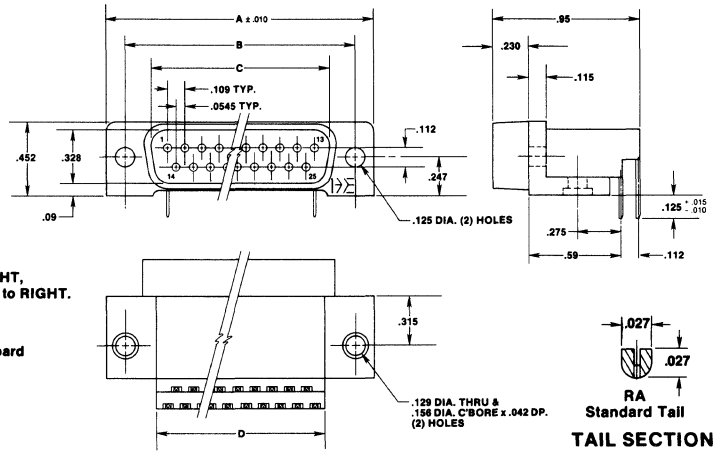


NOTE:

1. **Pin position numbers begin top row, LEFT to RIGHT, continue bottom row, LEFT to RIGHT.**
2. **Maximum tail will fit .038" diameter gauge hole.**
3. **Maximum recommended board thickness is .093".**

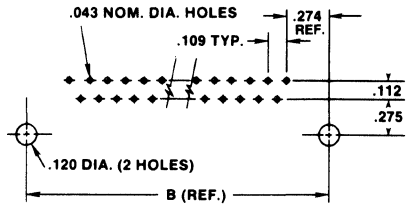
DIMENSIONS (Shown In Inches)

MOUNTING STYLE A



TAIL SECTION

NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.666	.624
15	1.552	1.312	.994	.952
25	2.092	1.852	1.534	1.492
37	2.740	2.500	2.183	2.140



PC BOARD PATTERN

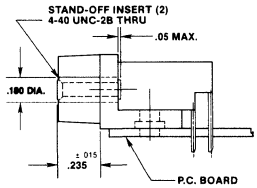
MOUNTING STYLES

STYLE A

This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039) is available. Style A is a new design which is produced in a cammed mold, eliminating top and bottom grooves around board mounting holes. This style is easier to rivet to the board because the rivet head is completely supported by solid plastic. It is also recommended for installations having board traces running under the connector — since there are no sharp edges to damage traces.

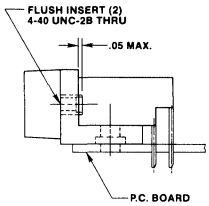
STYLE B

This configuration includes a #4-40 threaded standoff which provides 6 in-lb torque retention, for mating to RS 232 cable assemblies. One-piece construction of the factory-installed insert eliminates need for separate hardware.



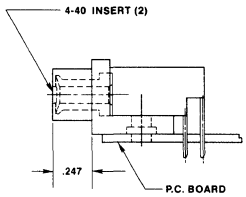
STYLE C

Style C mounting provides a flush, molded-in, #4-40 threaded insert of nickel-plated brass. The insert has rows of knurling that capture it in the plastic, preventing rotation or push-out.



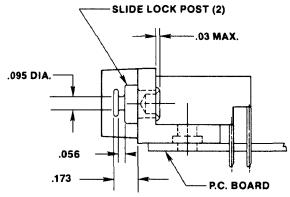
STYLE D

Unique Style D configuration has molded-in plastic standoff with factory-installed tin-plated brass hex-headed, #4-40 threaded insert. Specifically designed for RS 232 cable assemblies. Insert is threaded all the way through. Hexagonal shape positively locks insert in place providing 6 in-lb torque retention. Style D is functionally equivalent to Style B.



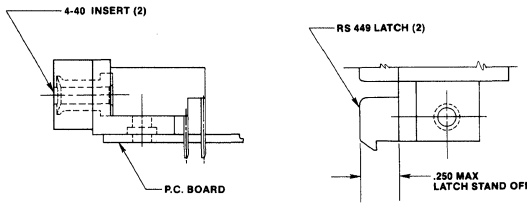
STYLE F

This configuration has brass locking posts designed to mate with AMP's slide-latch assembly. Positronics' slide-lock assembly and equivalent connectors.



STYLE J

Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

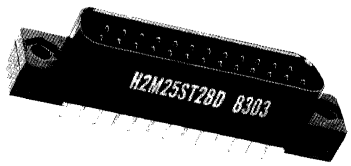


H2 SERIES

9, 15, 25 AND 37 POSITIONS

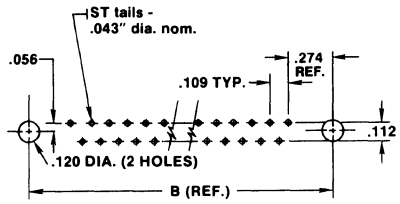
STRAIGHT TAIL ALL PLASTIC

MALE PINS FOR
PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)

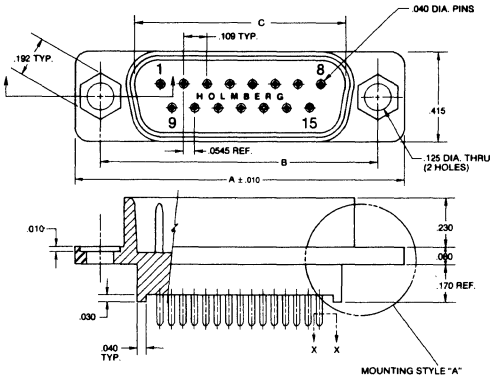
NUMBER OF CONTACTS	A	B	C
9	1.224	.984	.666
15	1.552	1.312	.994
25	2.092	1.852	1.534
37	2.740	2.500	2.183

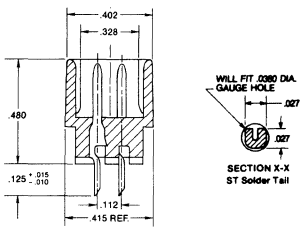


PC BOARD PATTERN

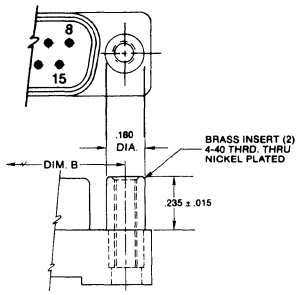
DIMENSIONS (Shown In Inches)

MOUNTING STYLE A

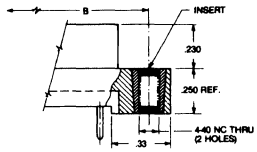




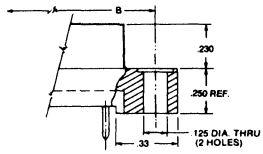
MOUNTING STYLE B



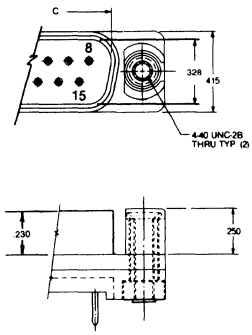
MOUNTING STYLE C



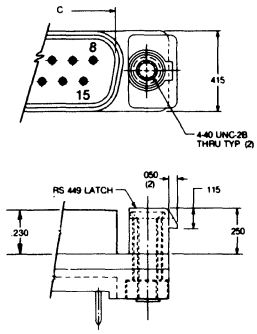
MOUNTING STYLE D



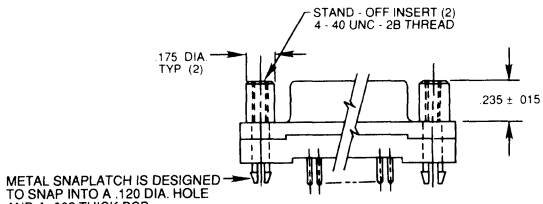
MOUNTING STYLE H



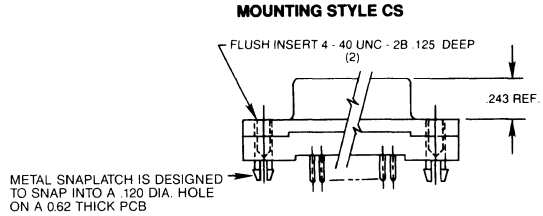
MOUNTING STYLE J



MOUNTING STYLE BS



MOUNTING STYLE CS

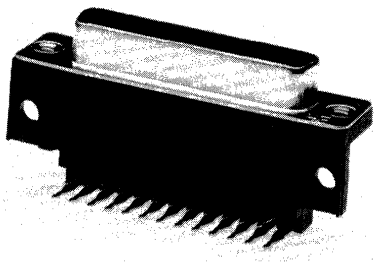


C

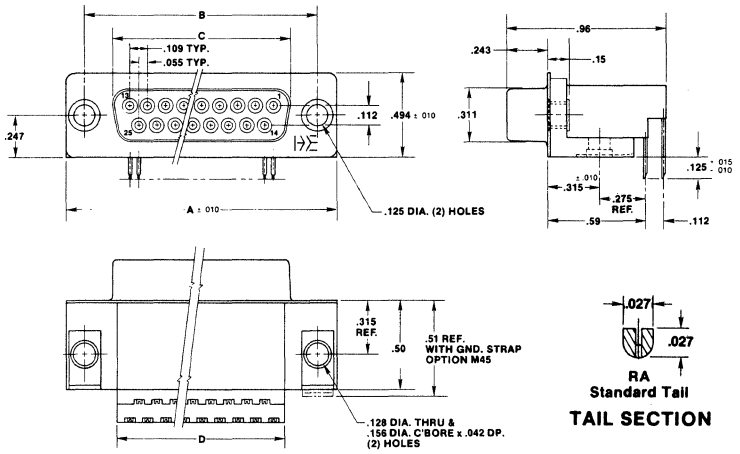
H4 SERIES

9, 15, 25 AND 37 POSITIONS

METAL SHELL RIGHT ANGLE
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)



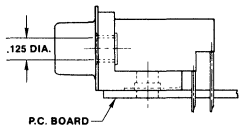
TAIL SECTION

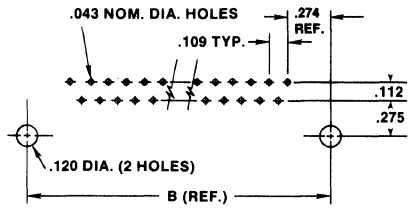
NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.646	.624
15	1.552	1.312	.974	.952
25	2.092	1.852	1.514	1.492
37	2.740	2.500	2.162	2.140

MOUNTING STYLES

STYLE A

This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039-01) is available. For grounding to the P.C. board there are outside and inside grounding straps available, factory installed (see part number description for ordering). Grounding straps are copper alloy tin plate.

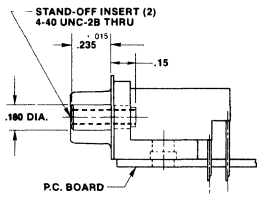




PC BOARD PATTERN

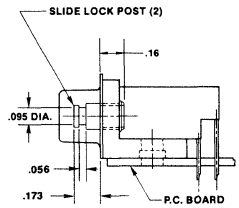
STYLE B

Style B designates a round standoff which has #4-40 threads. This provides 6 in-lb torque retention, for mating to R.S. 232 cable assemblies. One-piece construction of the factory installed insert estimates need for separate hardware. Also, outside or inside grounding straps are available, factory installed, for grounding to the P.C. board (see part number description for ordering).



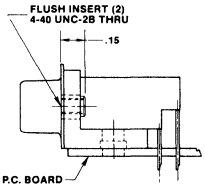
STYLE F

Style F designates locking posts. This configuration has factory installed brass locking posts, designed to mate with AMP's slide-lock assembly and equivalent connectors. Also, available with outside or inside grounding straps.



STYLE C

Style C mounting provides a flush #4-40 threaded insert with 6 in-lb torque retention for bulkhead mounting. The factory installed inserts eliminates the need to install jamb nuts in back of the panel. Also, available with inside or outside grounding straps.



STYLE J

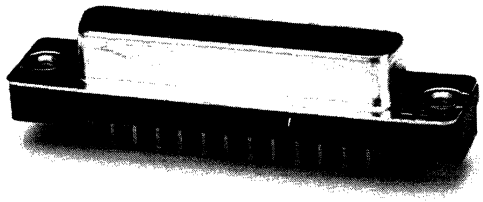
Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

H4 SERIES

9, 15, 25 AND 37 POSITIONS

STRAIGHT TAIL METAL SHELL

FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)

NUMBER OF CONTACTS	A	B	C
9	1.224	.984	.646
15	1.552	1.312	.974
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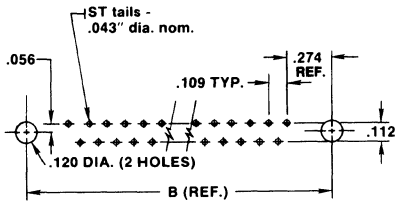
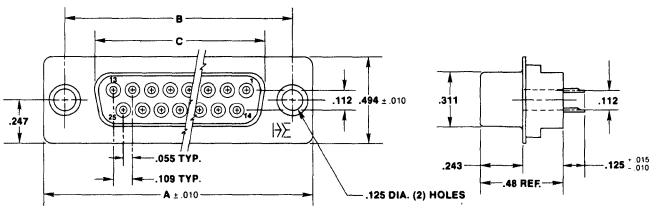
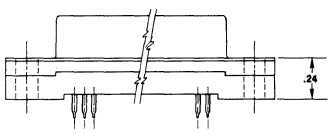


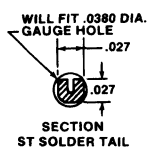
PC BOARD PATTERN

DIMENSIONS (Shown In Inches)

MOUNTING STYLE A

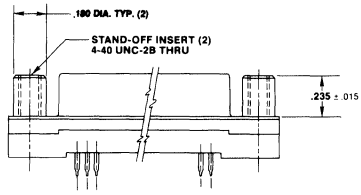




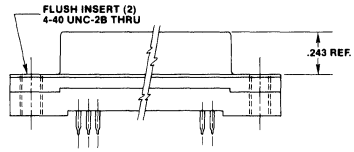


SECTION
ST SOLDER TAIL

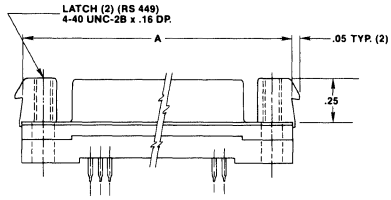
MOUNTING STYLE B



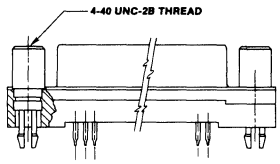
MOUNTING STYLE C



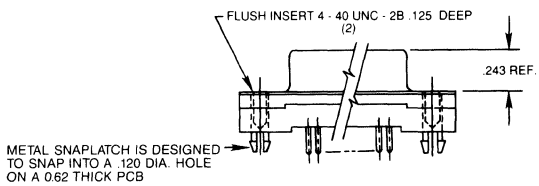
MOUNTING STYLE J



MOUNTING STYLE BS



MOUNTING STYLE CS



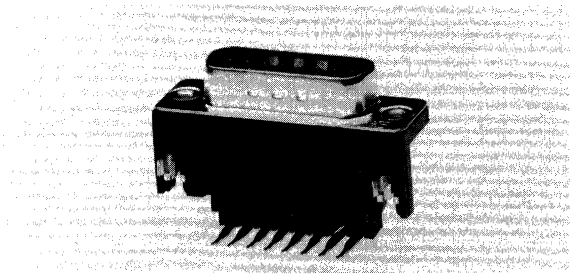
C

H4 SERIES

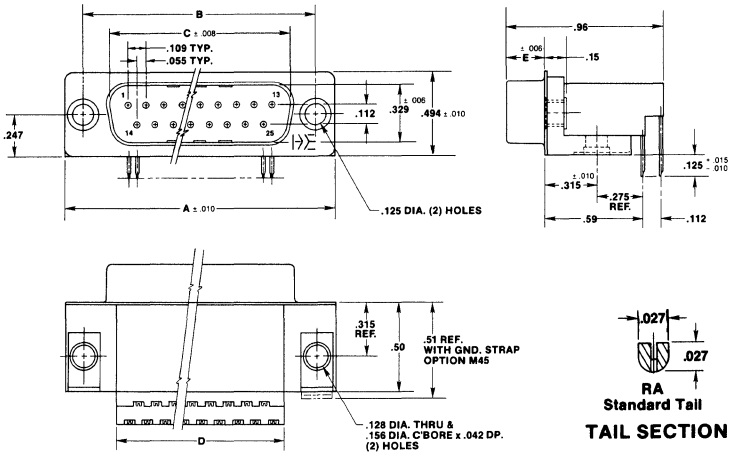
9, 15, 25 AND 37 POSITIONS

METAL SHELL RIGHT ANGLE

MALE PINS FOR PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)



RA
Standard Tail

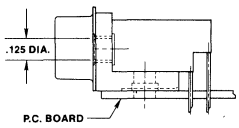
TAIL SECTION

NUMBER OF CONTACTS	A	B	C	D	E
9	1.224	.984	.666	.624	.235
15	1.552	1.312	.994	.952	.235
25	2.092	1.852	1.534	1.492	.230
37	2.740	2.500	2.183	2.140	.230

MOUNTING STYLES

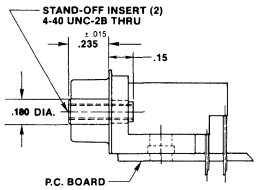
STYLE A

This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039-01) is available. For grounding to the P.C. board there are outside and inside grounding straps available, factory installed (see part number description for ordering). Grounding straps are copper alloy tin plate.



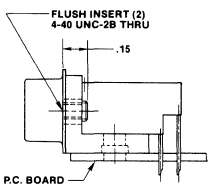
STYLE B

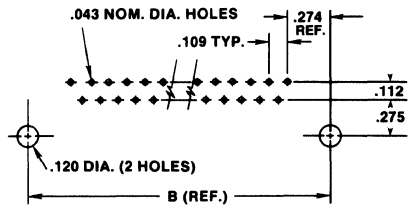
Style B designates a round standoff which has #4-40 threads. This provides 6 in-lb torque retention, for mating to R.S. 232 cable assemblies. One-piece construction of the factory installed insert estimates need for separate hardware. Also, outside or inside grounding straps are available, factory installed, for grounding to the P.C. board (see part number description for ordering).



STYLE C

Style C mounting provides a flush #4-40 threaded insert with 6 in-lb torque retention for bulkhead mounting. The factory installed inserts eliminates the need to install jamb nuts in back of the panel. Also, available with inside or outside grounding straps.

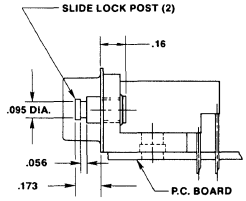




PC BOARD PATTERN

STYLE F

Style F designates locking posts. This configuration has factory installed brass locking posts, designed to mate with AMP's slide-lock assembly and equivalent connectors. Also, available with outside or inside grounding straps.



STYLE J

Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

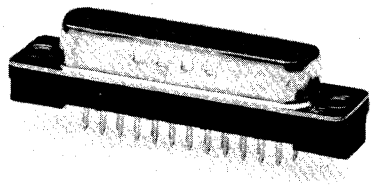
MOUNTING STYLE J
Threaded Cable Latch
(RS 449)

H4 SERIES

9, 15, 25 AND 37 POSITIONS

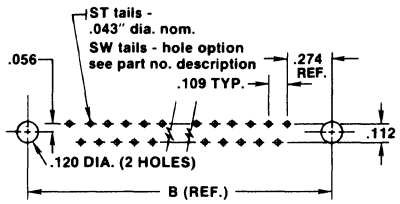
STRAIGHT TAIL METAL SHELL

MALE PINS FOR
PRINTED CIRCUIT BOARD MOUNTING



DIMENSIONS (Shown In Inches)

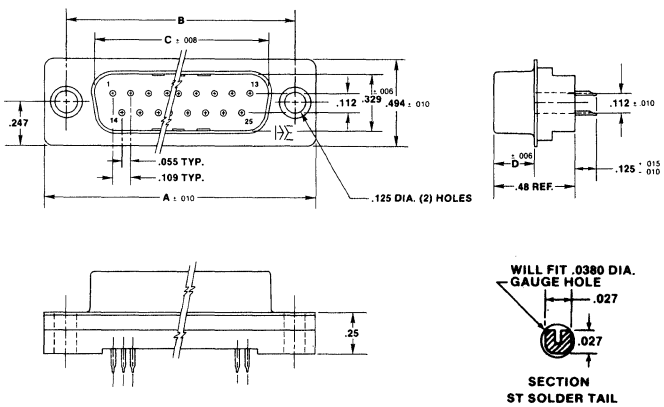
NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.666	.235
15	1.552	1.312	.994	.235
25	2.092	1.852	1.534	.230
37	2.740	2.500	2.182	.230



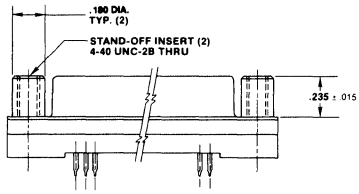
PC BOARD PATTERN

DIMENSIONS (Shown In Inches)

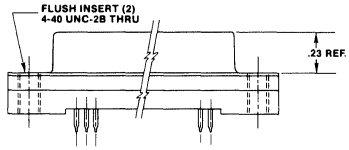
MOUNTING STYLE A



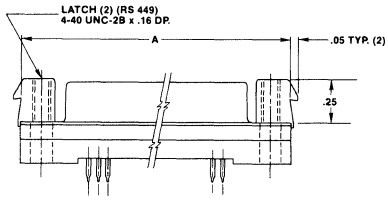
MOUNTING STYLE B



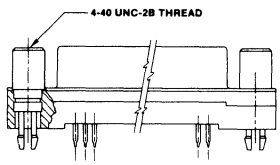
MOUNTING STYLE C



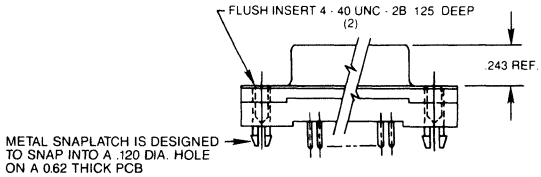
MOUNTING STYLE J



MOUNTING STYLE BS



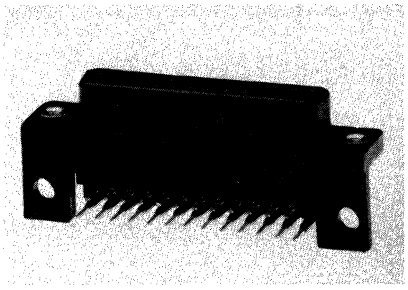
MOUNTING STYLE CS

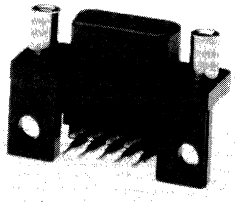


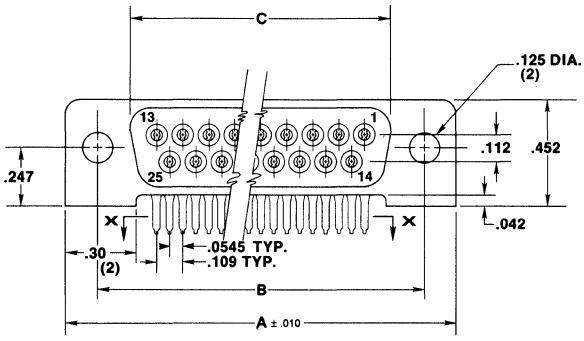
H3 SERIES, .318 FOOTPRINT

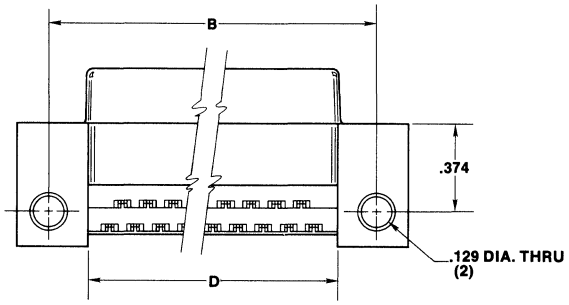
9, 15, 25 AND 37 POSITIONS

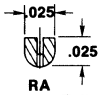
ALL PLASTIC RIGHT ANGLE
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



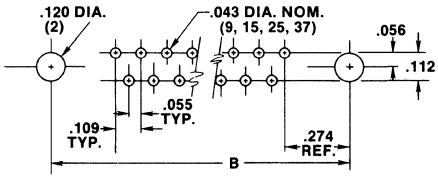








TAIL SECTION (X-X)



PC BOARD HOLE PATTERN

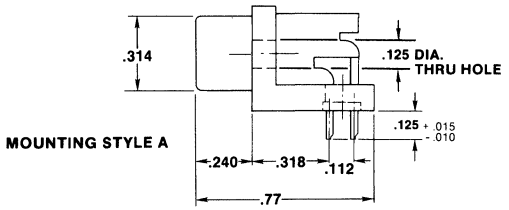
DIMENSIONS (Shown In Inches)

NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.646	.624
15	1.552	1.312	.974	.952
25	2.092	1.852	1.514	1.492
37	2.740	2.500	2.162	2.140

MOUNTING STYLES

STYLE A

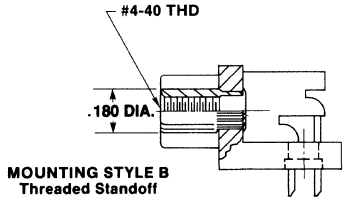
This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039-01) is available.



MOUNTING STYLE A

STYLE B

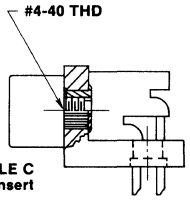
This configuration includes a #4-40 threaded standoff-which provides 6 in-lb torque retention, for mating to RS 232 cable assemblies. One-piece construction of the factory-installed insert eliminates need for separate hardware.



MOUNTING STYLE B
Threaded Standoff

STYLE C

Style C mounting provides a flush, #4-40 threaded insert. The insert has rows of knurling that capture it in the plastic, preventing rotation or push-out.



MOUNTING STYLE C
Flush Threaded Insert

STYLE J

Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

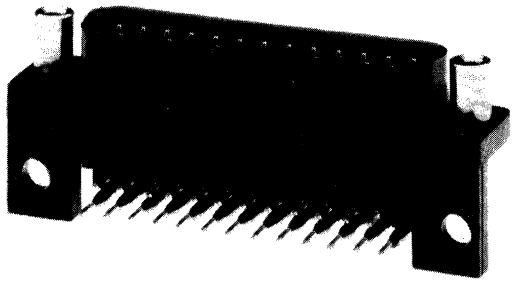
MOUNTING STYLE J
Threaded Cable Latch
(RS 449)

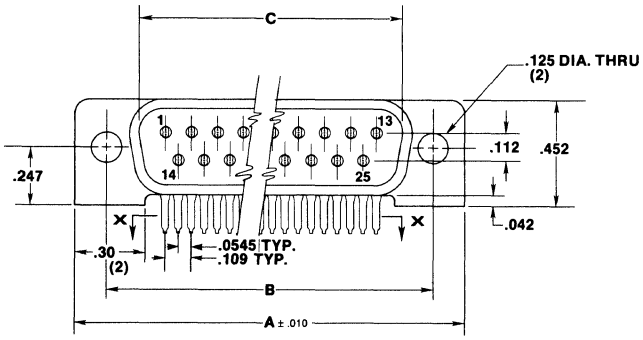
H3 SERIES, .318 FOOTPRINT

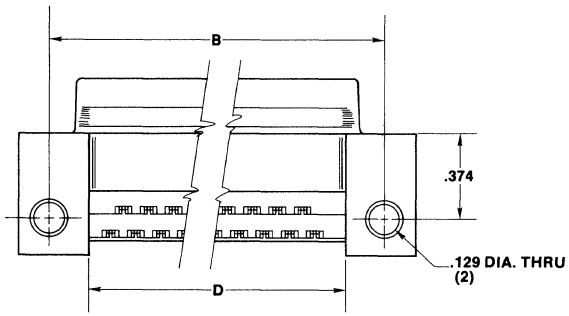
9, 15, 25 AND 37 POSITIONS

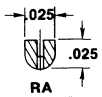
ALL PLASTIC RIGHT ANGLE

MALE PINS FOR
PRINTED CIRCUIT BOARD MOUNTING

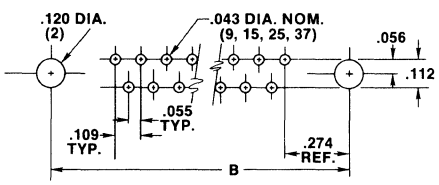








TAIL SECTION (X-X)



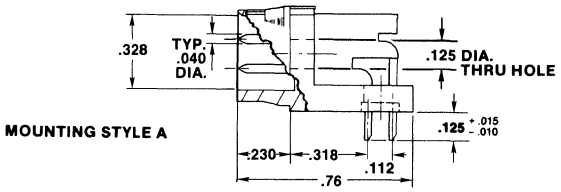
PC BOARD HOLE PATTERN

DIMENSIONS (Shown In Inches)

NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.666	.624
15	1.552	1.312	.994	.952
25	2.092	1.852	1.534	1.492
37	2.740	2.500	2.183	2.140

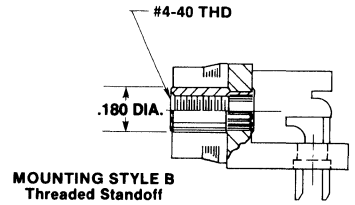
MOUNTING STYLES

STYLE A
This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039-01) is available.



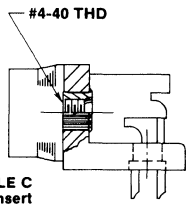
MOUNTING STYLE A

STYLE B
This configuration includes a #4-40 threaded standoff-which provides 6 in-lb torque retention, for mating to RS 232 cable assemblies. One-piece construction of the factory-installed insert eliminates need for separate hardware.



MOUNTING STYLE B
Threaded Standoff

STYLE C
Style C mounting provides a flush, #4-40 threaded insert. The insert has rows of knurling that capture it in the plastic, preventing rotation or push-out.



MOUNTING STYLE C
Flush Threaded Insert

STYLE J
Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

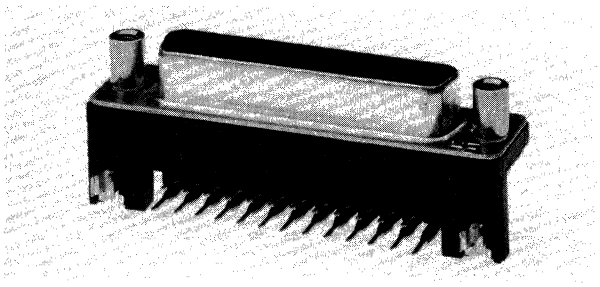
MOUNTING STYLE J
Threaded Cable Latch
(RS 449)

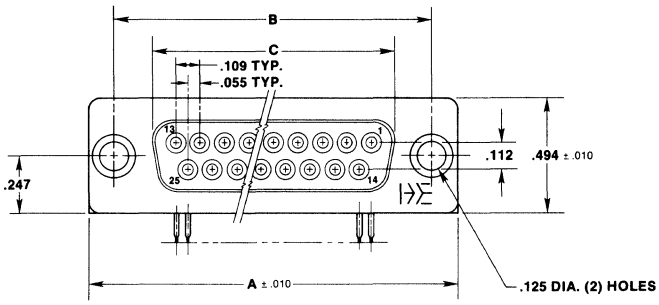
C

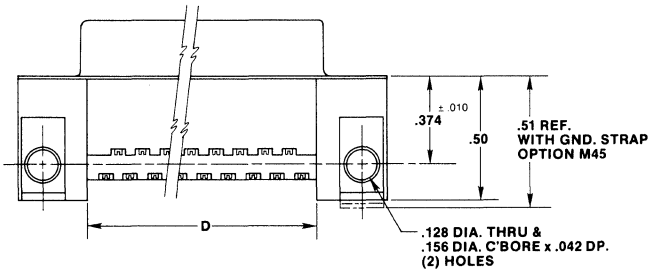
H5 SERIES, .318 FOOTPRINT

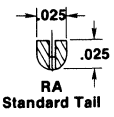
9, 15, 25 AND 37 POSITIONS

METAL SHELL RIGHT ANGLE
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING

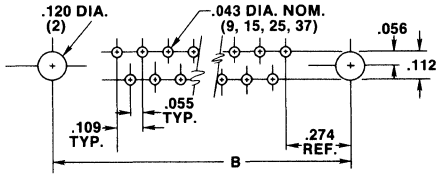








TAIL SECTION (X-X)



PC BOARD HOLE PATTERN

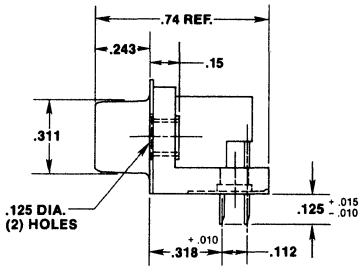
DIMENSIONS (Shown In Inches)

NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.646	.624
15	1.552	1.312	.974	.952
25	2.092	1.852	1.514	1.492
37	2.740	2.500	2.162	2.140

MOUNTING STYLES

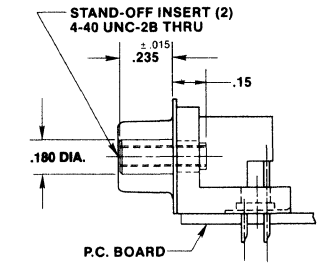
STYLE A

This configuration is the basic connector with mounting holes only. It comes with no permanent hardware, but a separate hardware kit (part number 98039-01) is available.



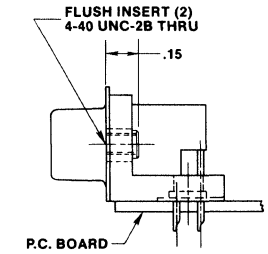
STYLE B

Style B designates a round standoff which has #4-40 threads. This provides 6 in-lb torque retention, for mating to RS 232 cable assemblies. One-piece construction of the factory installed insert eliminates need for separate hardware. Also, outside or inside grounding straps are available, factory installed, for grounding to the P.C. board (see part number description for ordering).



STYLE C

Style C mounting provides a flush #4-40 threaded insert with 6 in-lb torque retention for bulkhead mounting. The factory installed inserts eliminates the need to install jamb nuts in back of the panel. Also, available with inside or outside grounding straps.



STYLE J

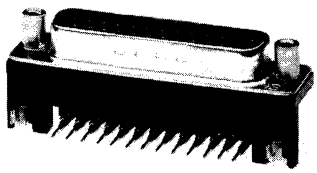
Style J provides a unique connector which mates to both RS 232 and RS 449 cable assemblies.

H5 SERIES, .318 FOOTPRINT

9, 15, 25 AND 37 POSITIONS

METAL SHELL RIGHT ANGLE

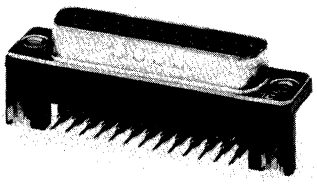
MALE PINS FOR PRINTED CIRCUIT BOARD MOUNTING

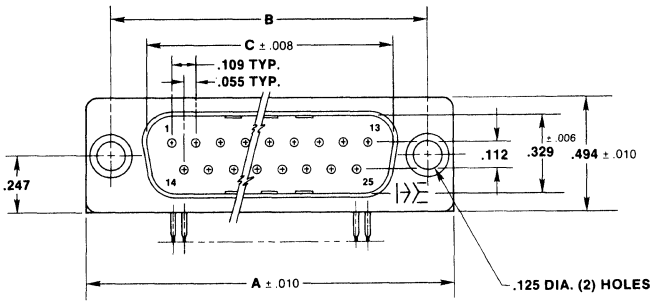


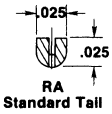
DIMENSIONS (Shown In Inches)

NUMBER OF CONTACTS	A	B	C	D	E*
9	1.224	.984	.666	.624	.235
15	1.552	1.312	.994	.952	.235
25	2.092	1.852	1.534	1.492	.230
37	2.740	2.500	2.183	2.140	.230

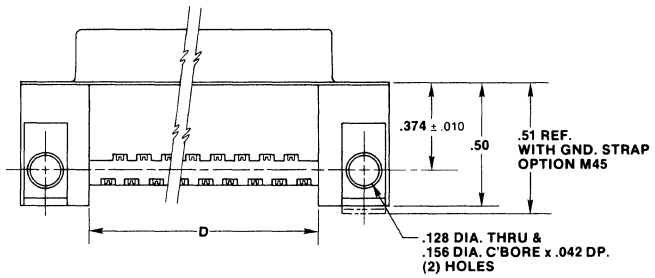
*E Dimension — See pg. 56

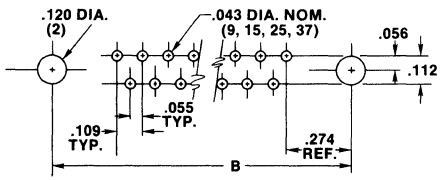






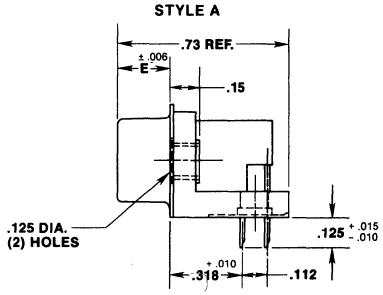
TAIL SECTION (X-X)



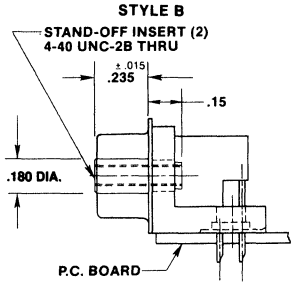


PC BOARD HOLE PATTERN

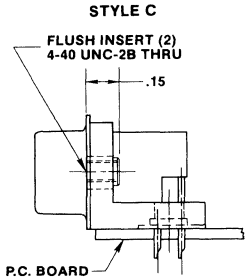
STYLE A



STYLE B



STYLE C

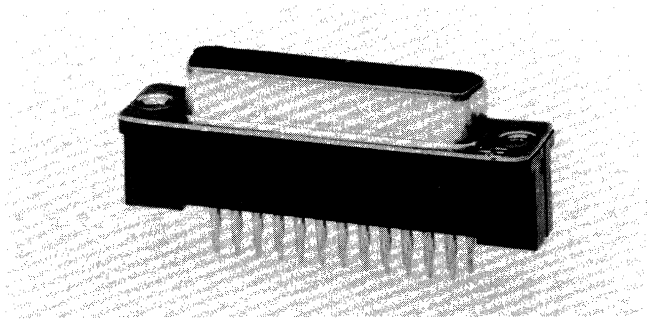


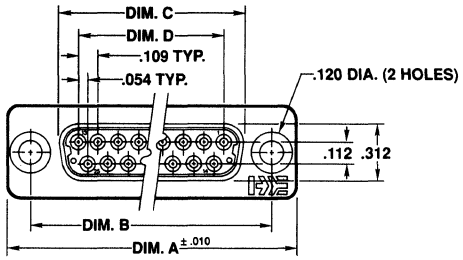
STYLE J

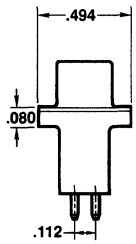
H9 SERIES RECEPTACLE

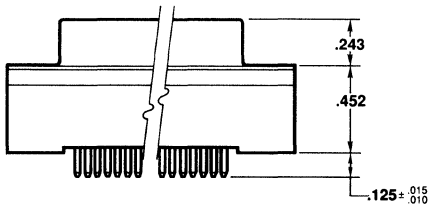
9, 15, 25 and 37 POSITIONS

HIGH PROFILE STRAIGHT TAIL
METAL SHELL
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



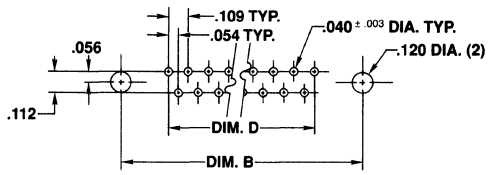




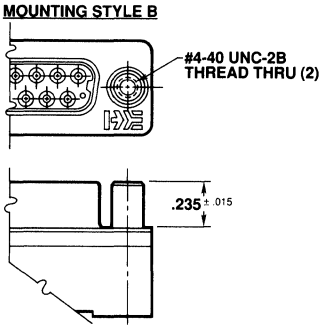


DIMENSIONS (Shown In Inches)

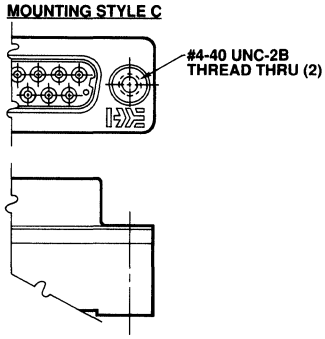
NUMBER OF CONTACTS	A	B	C	D
9	1.224	.984	.646	.436
15	1.552	1.312	.974	.763
25	2.092	1.852	1.514	1.308
37	2.740	2.500	2.162	1.962



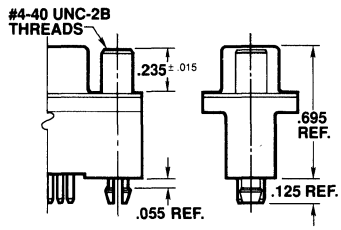
MOUNTING STYLE B



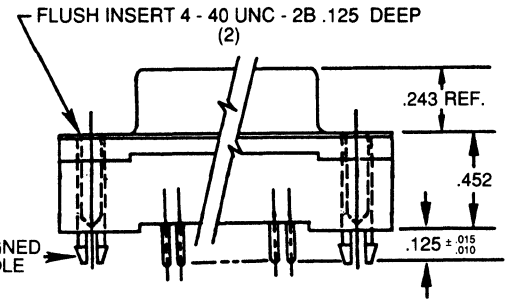
MOUNTING STYLE C



MOUNTING STYLE BS



MOUNTING STYLE CS

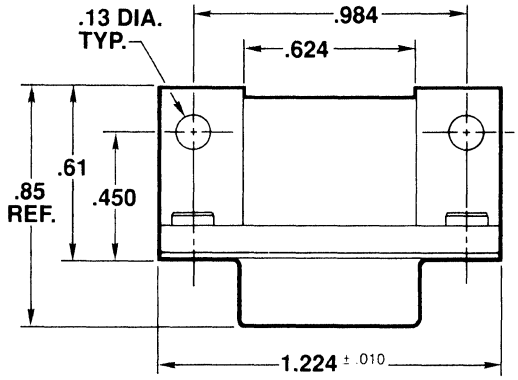


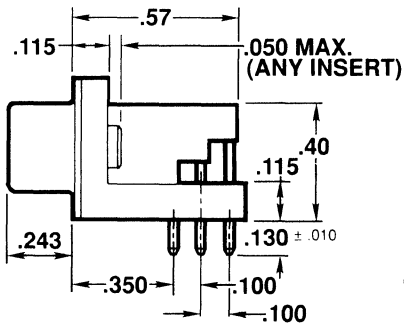
METAL SNAPLATCH IS DESIGNED TO SNAP INTO A .120 DIA. HOLE AND A .062 THICK PCB

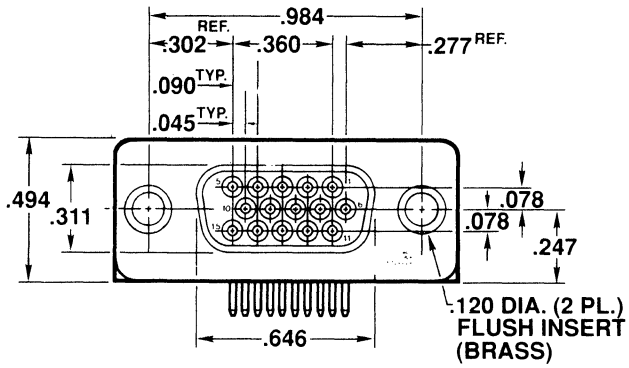
HD SERIES (HIGH DENSITY)

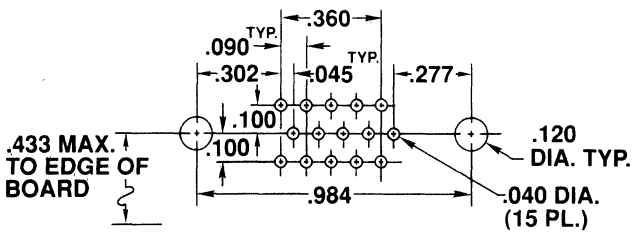
15 POSITIONS

METAL SHELL RIGHT ANGLE
FEMALE RECEPTACLES FOR PRINTED CIRCUIT BOARD MOUNTING



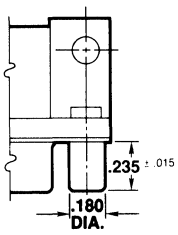


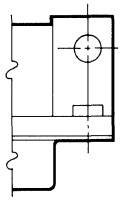


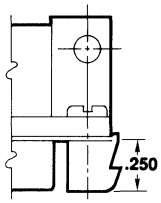


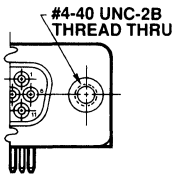
C

HD SERIES (HIGH DENSITY)

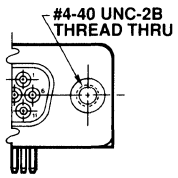




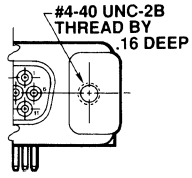




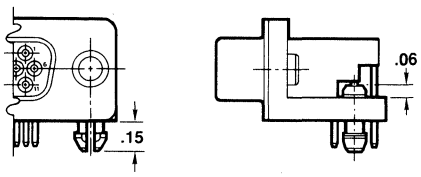
MOUNTING STYLE B
THREADED STANDOFF



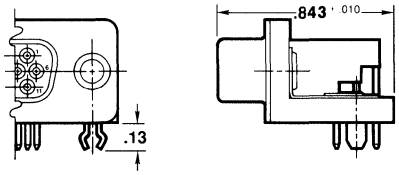
MOUNTING STYLE C
FLUSH INSERT



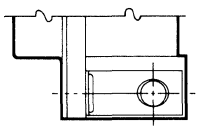
MOUNTING STYLE J
THREADED CABLE LATCH

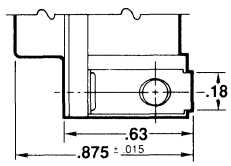


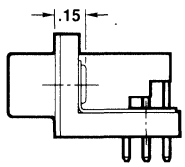
PLASTIC SNAP LATCH
STYLE P



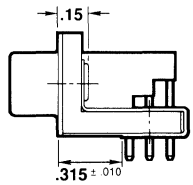
METAL SNAP LATCH
STYLE S



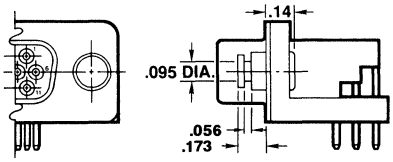




SPECIAL MOD M43
INSIDE GROUND STRAP



SPECIAL MOD M45
OUTSIDE/INSIDE GROUND STRAP



MOUNTING STYLE F
SLIDE LOCK POST

OTHER SPECIAL MODS

M30 - MOUNTING STYLE B, C, OR J WITH METRIC THREAD M3 RATHER THAN #4-40 UNC-2B.
M33 - METRIC THREAD INSERT AND INSIDE GROUND STRAP.
M35 - METRIC THREAD INSERT AND OUTSIDE/INSIDE GROUND STRAP.

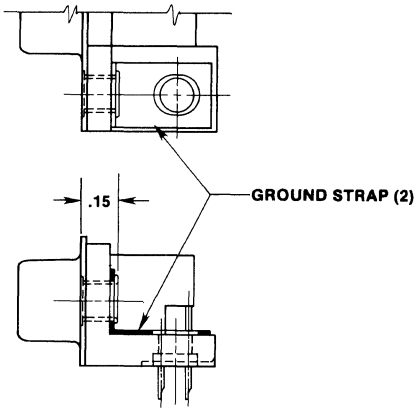
M30 — Metric thread size M3.

M33 — Metric thread with inside ground strap.

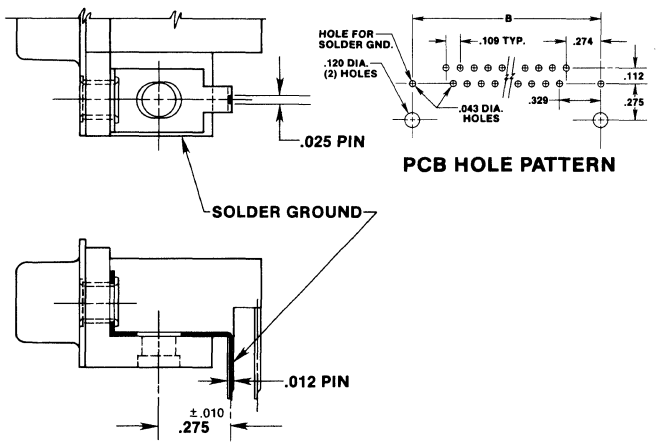
M34 — Metric thread with solder ground.

M35 — Metric thread with outside/inside ground strap.

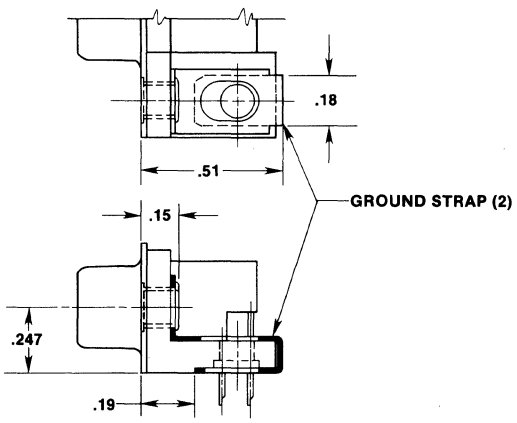
M43 — Inside ground strap.



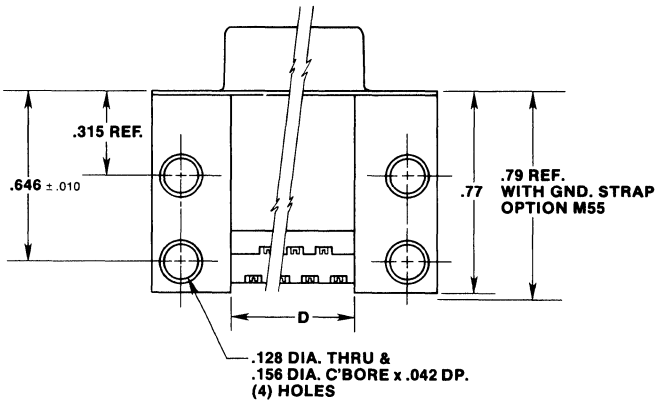
M44 — Solder ground.



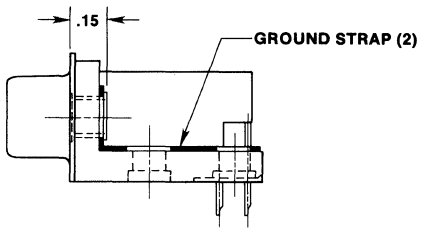
M45 — Outside/inside ground strap.



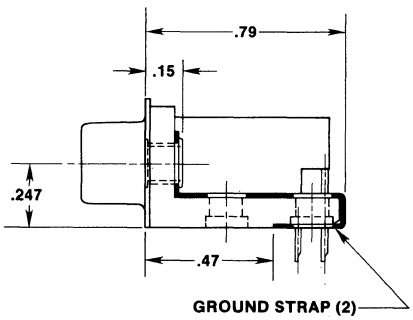
M50 — Back mounting hole.



M53 — Back mounting hole with inside ground strap.



M55 — Back mounting hole with outside/inside ground strap.



M60 — Back mounting hole, metric thread.

M63 — Back mounting hole, metric thread with inside ground strap.

M65 — Back mounting hole, metric thread with outside/inside ground strap.

C

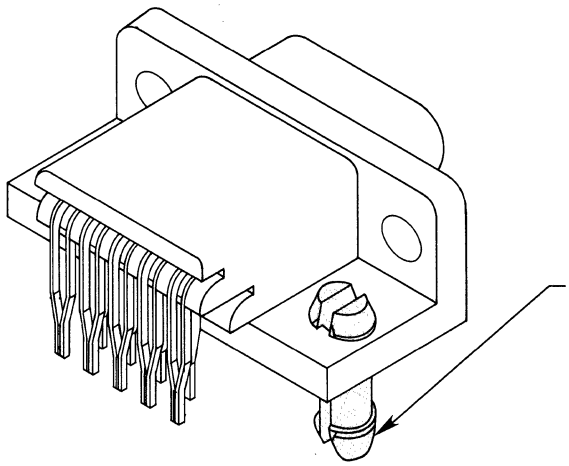
SNAP LATCHES for HOLMBERG®
Right Angle D-Subminiature Connectors

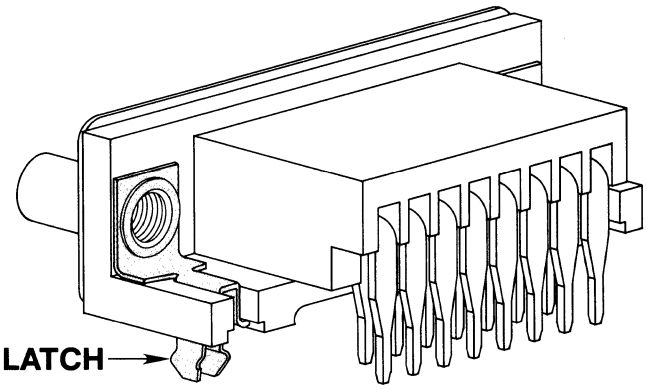
HOLMBERG® snap latches, both plastic and metal, hold connectors securely in place before and during solder process and eliminates the need for board mounting hardware, plus, facilitates robotic assembly. These latches can be used with any HOLMBERG® right angle D-Subminiature connector.

Both latches withstand the normal wave solder process.

The metal latch can be used to establish ground, requires lower insertion force into board and has a higher retention force.

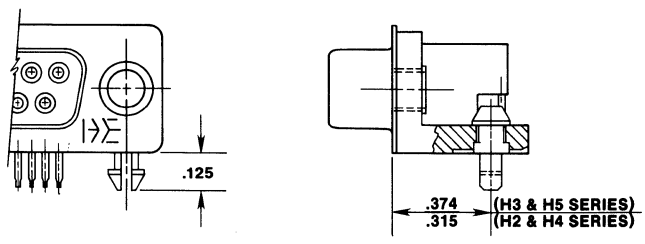
Low Cost Plastic Latch



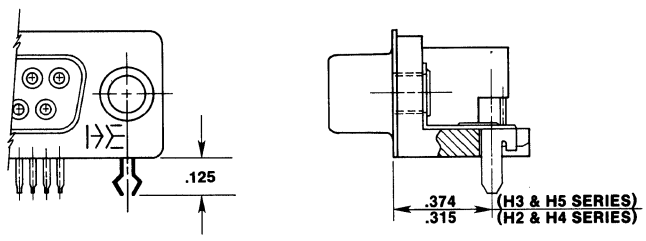


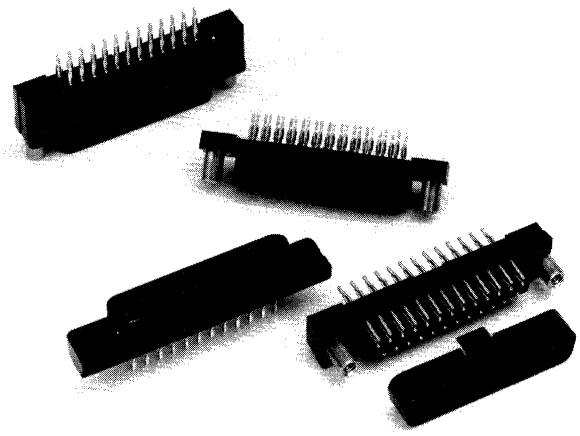
Tin plated Copper-Nickel-Tin Alloy Metal Latch

"P" DESIGNATION — Plastic snap latch.



"S" DESIGNATION — Metal snap latch.





HOLMBERG® H2, H3 and H8 connector series are used with press fit backplane boards. The compliant tail section provides a gas tight seal between contact tail and plated thru hole thus eliminating the need to solder.

These connectors can be shipped with factory installed covers or with separately packaged caps which can be easily snapped onto the bases. Available positions are 9, 15, 25 and 37.

DESIGN FEATURES

- Large, closed entry lead-in provides easy mating; allows male plug to be off true position as much as .040" and still mate. Corner radii around "D" outline also aid pin alignment.
- Selective gold plating permits precise placement of valuable gold only where needed.
- Mass insertion heads for installing multiple connectors onto boards, may be fabricated per customer requirements.
- Force required to install connector onto board shall be no more than 40 lb. per pin. Force required to remove pins from board shall be no less than 10 lb. per pin.
- The suggested board thickness is .093-.125.
- Recommended plated thru hole finished diameter is .040 ±.003.
- The insulator cap provides excellent positional control of the male contact pins with respect to female contacts.
- The removable cap allows quick individual pin replacement.
- A variety of plating, mounting, termination, and identification options are offered to meet specific user requirements.

PERFORMANCE CHARACTERISTICS

Operating voltage:	600 VDC (sea level)
Current rating:	5 Amperes
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms max. @ rated current
Insulation resistance:	5000 megohms minimum
Dielectric withstanding voltage	1000 VAC minimum
Durability:	up to 300 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected

MATERIALS

Insulator body:	Glass filled polyester, UL rated 94V-O, color-black
Contact:	High strength copper alloy C72500

UL recognized and CSA certified.

PART NUMBER DESCRIPTION AND ORDERING INFORMATION

H3 R 25 PF 29 B

SERIES DESIGNATOR
H3 (.152 Dim. E)
H2 (.237 Dim.E)
H8 (.452 Dim. E)

CONTACT TYPE
R-Female Receptacle

NUMBER OF CONTACTS
09, 15, 25 and 37

PC TERMINATION STYLE
PF - Press Fit

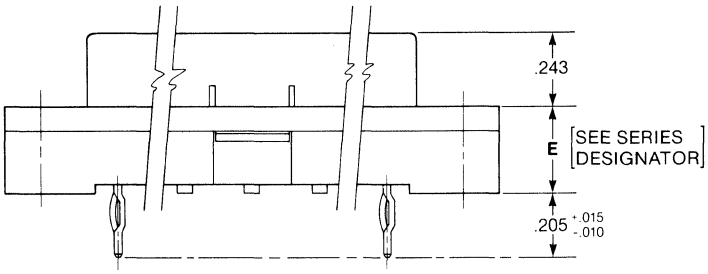
CONTACT PLATING
29 - 30 μ-in gold selectively plated over contact area; tin-lead over tails; 50 μ-in nickel underplate all over.

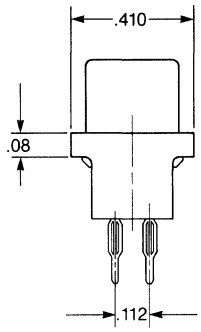
MOUNTING STYLE
A-Basic connector with .120 dia. thru holes
B-4-40 threaded stand off
C-4-40 flush threaded insert

INDIVIDUAL REPLACEMENT PIN PART NUMBERS
10114**C-01 (H3)
10114**C-02 (H2)
10114**C-03 (H8) **Plating Code (See Contact Plating)

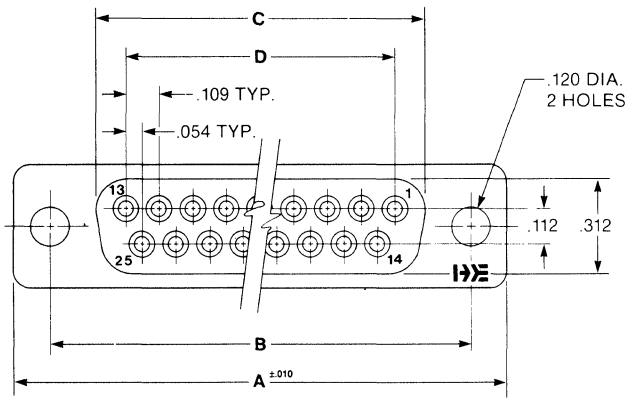
NOTE:
- Tool for removing connector cap (to facilitate individual contact replacement) — HOLMBERG® part number 98172.
- Tool for individual contact replacement — HOLMBERG® part number 98180.
- Mass insertion tool — HOLMBERG™ part number 98235**

C

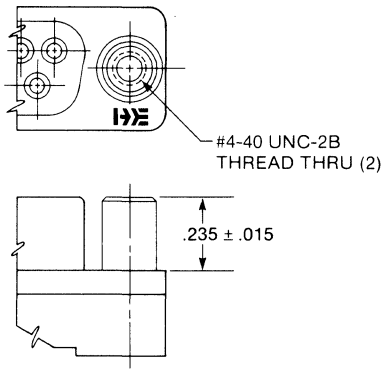


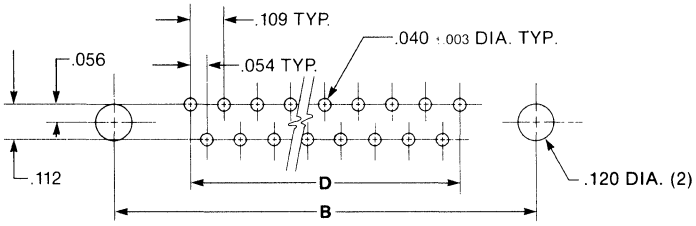


MOUNTING STYLE A



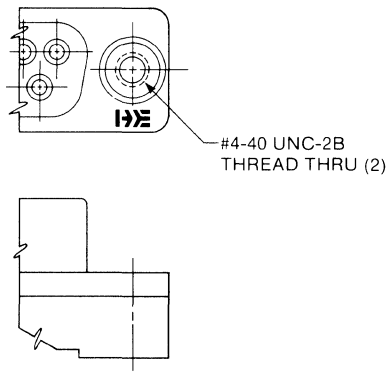
MOUNTING STYLE B





P.C. BOARD HOLE PATTERN

MOUNTING STYLE C



NO. POS.	DIM. A	DIM. B	DIM. C	DIM. D
09	1.224	.984	.646	.436
15	1.552	1.312	.974	.763
25	2.092	1.852	1.514	1.308
37	2.740	2.500	2.162	1.962

PLATED THROUGH HOLE SPECIFICATIONS

Hole Type	Required Drill Size	Drilled Hole Dia. ±.0010 inches ±.0025 (mm)	Plating Thickness		Hole Diameter	Pad Dia. Min. inches (mm)
			Copper inches (mm)	Tin/Lead inches (mm)	After Plating inches (mm)	
Plated Through	1.15 mm	.0453 (1.15)	.001-.003 (0.03-0.08)	.0003 (0.008) Min.	.037-.043 (0.94-1.09)	.062 (1.57)

HOLMBERG® H4, H5, and H9 connector series are used with press fit backplane boards. The compliant tail section provides a gas tight seal between contact tail and plated thru hole thus eliminating the need to solder.

These connectors can be shipped with factory installed covers or with separately packaged caps which can be easily snapped onto the bases. Available positions are 9, 15, 25 and 37.

PERFORMANCE CHARACTERISTICS

Operating voltage:	600 VDC (sea level)
Current rating:	5 Amperes
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms max. @ rated current
Insulation resistance:	5000 megohms minimum
Dielectric withstanding voltage:	1000 VAC minimum
Durability:	Up to 300 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected

MATERIALS

Insulator body:	Glass filled polyester, UL rating 94V-O, color-black
Contact:	High strength copper alloy C72500.
Metal Shell:	Steel, bright tin plate

UL recognized and CSA certified.

DESIGN FEATURES

- Large, closed entry lead-in provides easy mating; allows male plug to be off true position as much as .040" and still mate. Corner radii around "D" outline also aid pin alignment.
- Selective gold plating permits precise placement of valuable gold only where needed.
- Force required to install connector onto board shall be no more than 40 lb. per pin. Force required to remove pins from board shall be no less than 10 lb. per pin.
- Mass insertion heads for installing multiple connectors onto boards, may be fabricated per customer requirements.
- The suggested board thickness is .093-.125.
- Recommended plated thru hole finished diameter is .040 ±.003.
- The insulator cap provides excellent positional control of the male contact pins with respect to female contacts.
- The removable cap allows quick individual pin replacement.
- A variety of plating, mounting, termination, and identification options are offered to meet specific user requirements.

PART NUMBER DESCRIPTION AND ORDERING INFORMATION

H5 R 25 PF 29 B

SERIES DESIGNATOR
H5 (.152 Dim. E)
H4 (.237 Dim. E)
H9 (.452 Dim. E)

CONTACT TYPE
R-Female Receptacle

NUMBER OF CONTACTS
09, 15, 25, and 37

PC TERMINATION STYLE
PF - Press Fit

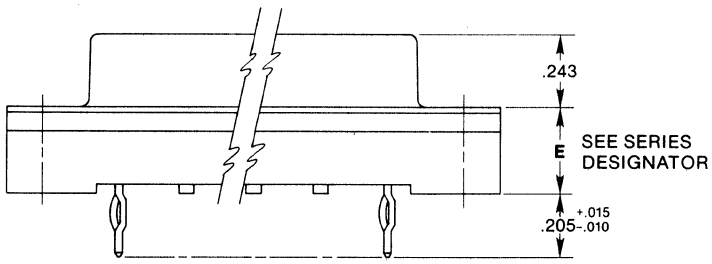
CONTACT PLATING
29 - 30 μ-in. gold selectively plated over contact area; tin-lead over tails; 50 μ-in. nickel underplate all over.

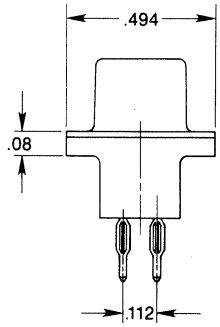
MOUNTING STYLE
A - Basic connector with .120 dia. thru holes
B - 4-40 threaded stand off
C - 4-40 flush threaded insert

INDIVIDUAL REPLACEMENT PIN PART NUMBERS
10114**-01 — H5 series
10114**-02 — H4 series
10114**-03 — H9 series **Plating Code (See Contact Plating)

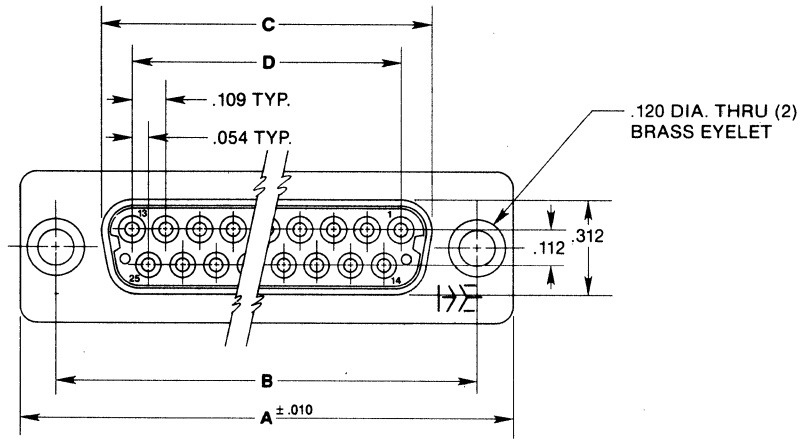
NOTE:
- Tool for removing connector cap (to facilitate individual contact replacement) — HOLMBERG® part number 98175.
- Tool for individual contact replacement — HOLMBERG® part number 98180.
- Mass insertion tool — HOLMBERG™ part number 98235**.

C

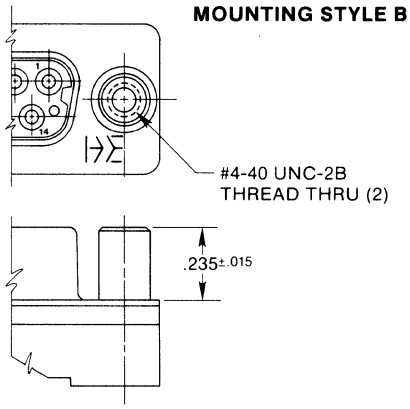




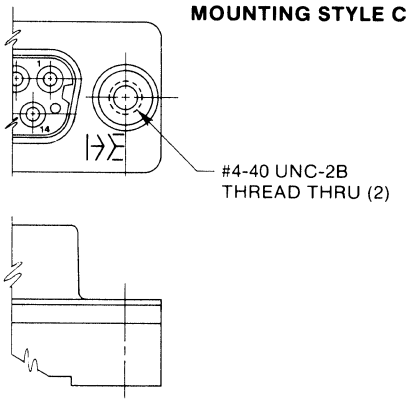
MOUNTING STYLE A



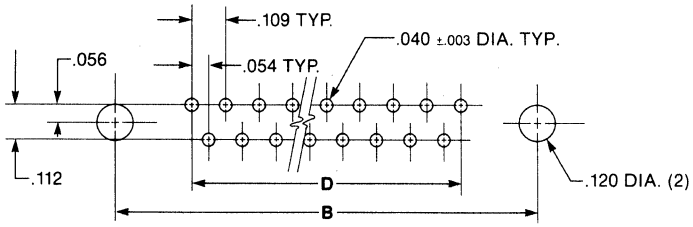
MOUNTING STYLE B



MOUNTING STYLE C



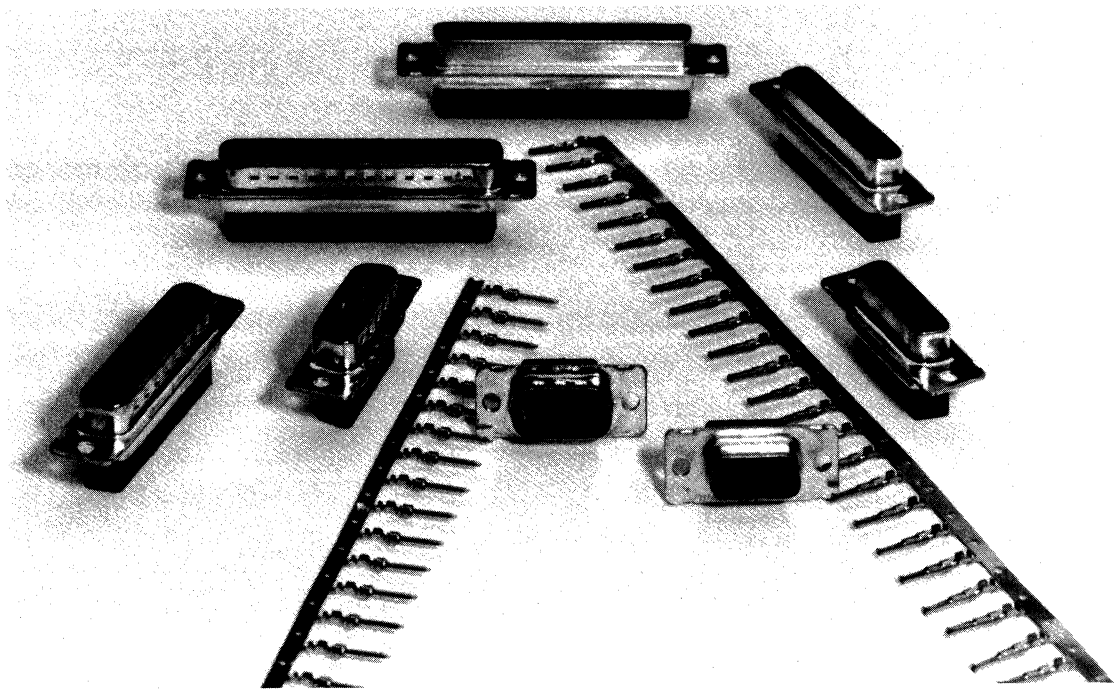
P.C. BOARD HOLE PATTERN



NO. POS.	DIM. A	DIM. B	DIM. C	DIM. D
09	1.224	.984	.646	.436
15	1.552	1.312	.974	.763
25	2.092	1.852	1.514	1.308
37	2.740	2.500	2.162	1.962

PLATED THROUGH HOLE SPECIFICATIONS

Hole Type	Required Drill Size	Drilled Hole Dia. ± .0010 inches ± .0025 (mm)	Plating Thickness		Hole Diameter	Pad Dia. Min. inches (mm)
			Copper inches (mm)	Tin/Lead inches (mm)	After Plating inches (mm)	
Plated Through	1.15 mm	.0453 (1.15)	.001-.003 (0.03-0.08)	.0003 (0.008) Min.	.037-.043 (0.94-1.09)	.062 (1.57)



C

FEATURES AND BENEFITS

- Available in all standard contact configurations including: 9, 15, 25, 37, 50.
- Designed to comply with most industry interface standards such as: EIA-RS-232C, EIA RS-449.
- Complete line of mounting and locking hardware types.
- Application tooling available.
- Stamped and formed contacts available in both reeled and loose-piece form, along with several plating options.
- Rear release snap-in contact design provides maximum field service economy.
- Bright tin plate with grounding indents provide high reliability shielding interface.

PART NUMBER DESCRIPTION AND ORDERING INFORMATION

HOUSINGS

H M 09 A

SERIES DESIGNATOR

CONTACT TYPE
R - Female Receptacle
M - Male Pins

NO. OF POSITIONS
09, 15, 25, 37, 50

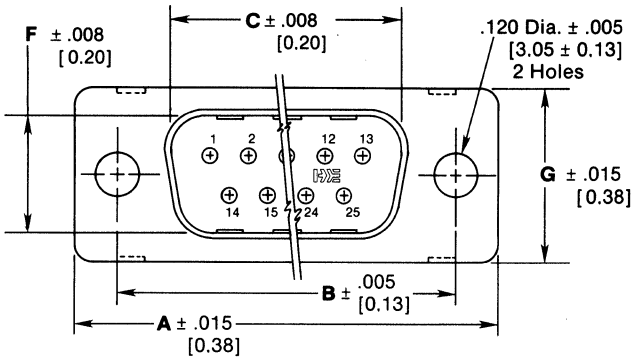
HOUSING PLATINGS
A - Bright Tin Plating with indents
B - Bright Tin Plating

*Tab Option for Male Only

Contacts are strip formed, reeled for miniature applicators, 10,000 parts per reel. For strips of 25 contacts add the number 25 to end of part number.

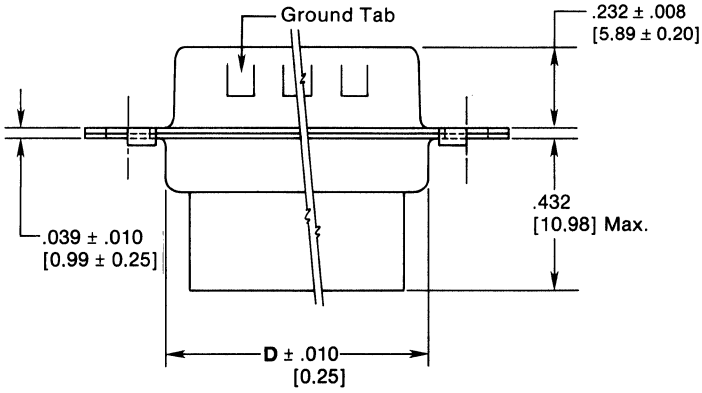
CONTACTS WITH INSULATION SUPPORT

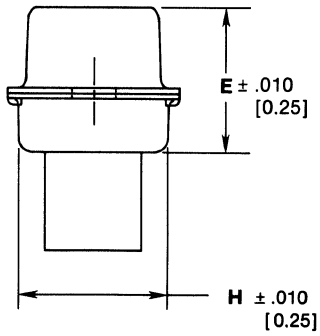
PART NUMBER CHART	24 DUPLEX GOLD FLASH	04 FULL GOLD FLASH	29 DUPLEX 30 GOLD	49 FLASH AND 30 GOLD	INS. DIA.
	Duplex plated gold flash on mating end for length of .150 (3.81) min. (pin) or .100 (2.54) min. (socket). .000100-.000200 (0.00254-0.00508) bright tin on termination end, with entire contact underplated .000030 (0.00076) nickel	Gold flash over .000030 (0.00076) nickel on entire contact	Duplex plated .000030 (0.00076) gold on mating end for length of .150 (3.81) min. (pin) or .100 (2.54) min. (socket). .000100-.000200 (0.00254-0.00508) bright tin on termination end, with entire contact underplated .000050 (0.00127) nickel	Gold flash over .000030 (0.00076) nickel on entire contact, selectively plated with additional .000030 (0.00076) gold on mating end for length of .150 (3.81) min. (pin) or .100 (2.54) min. (socket)	
MALE CONTACTS PIN 20-24 AWG	1008424C-01	1008404C-01	1008429C-01	1008449C-01	.060
PIN 24-28 AWG	1008424C-02	1008404C-02	1008429C-02	1008449C-02	.040
FEMALE CONTACTS SOCKET 20-24 AWG	1008524F-01	1008504F-01	1008529F-01	1008549F-01	.060
SOCKET 24-28 AWG	1008524F-02	1008504F-02	1008529F-02	1008549F-02	.040



Male Contact

(With insulation Support)





Contact Positions	Male Connector Dimensions															
	A		B		C		D		E		F		G		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
9	1.213	30.81	.984	24.99	.666	16.92	.759	19.28	.422	10.72	.329	8.36	.494	12.55	.428	10.87
15	1.541	39.14	1.312	33.32	.994	25.25	1.083	27.51	.422	10.72	.329	8.36	.494	12.55	.428	10.87
25	2.088	53.04	1.852	47.04	1.534	38.96	1.630	41.40	.426	10.82	.329	8.36	.494	12.55	.428	10.87
37	2.729	69.32	2.500	63.50	2.182	55.42	2.272	57.71	.426	10.82	.329	8.36	.494	12.55	.428	10.87
50	2.635	66.93	2.406	61.11	2.079	52.81	2.178	55.32	.426	10.82	.436	11.07	.605	15.37	.532	13.51

Connector Material and Performance Characteristics

Male Pin
- Material — Brass per QQ-B-613
- Standard plating — (see chart)

Female Pin
- Material — Phos Bronze per QQ-B-750
- Standard plating — (see chart)

Insulators
- Material — Thermoplastic, 94V-0 rated
- Color — Black

Metal Shells
- Material — Steel
- Standard Plating — Bright Tin

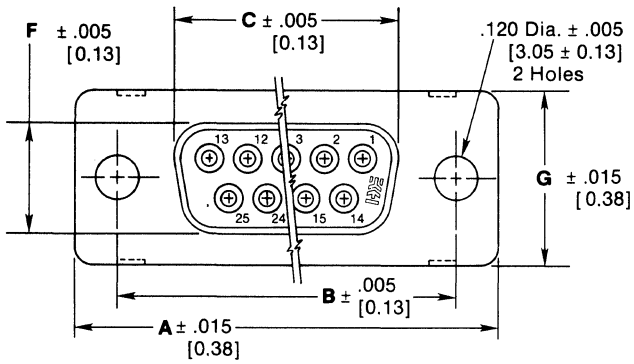
Temperature Range — -55° C to 105° C

Current Rating — 7.5 A max.

Contact Resistance — 5 milliohms max. initial, 10 milliohms max. after environmental testing.

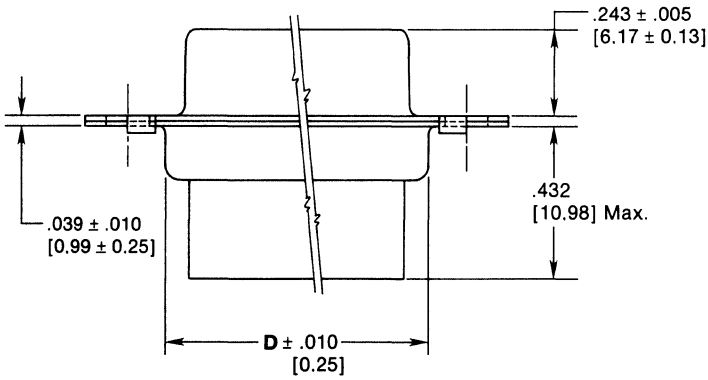
Dielectric Withstanding Voltage — 1000 Vac min.

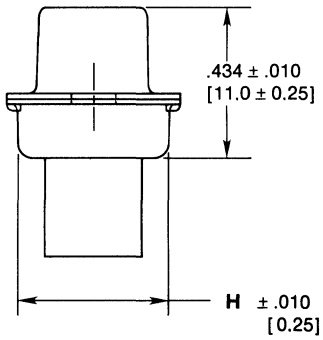
Wire Range — #24-20 AWG and #28-24 AWG



Female Contact

(With Insulation Support)





Contact Positions	Female Connector Dimensions													
	A		B		C		D		F		G		H	
	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM
9	1.213	30.81	.984	24.99	.643	16.33	.759	19.28	.311	7.90	.494	12.55	.428	10.87
15	1.541	39.14	1.312	33.32	.971	24.66	1.083	27.51	.311	7.90	.494	12.55	.428	10.87
25	2.088	53.04	1.852	47.04	1.511	38.38	1.630	41.40	.311	7.90	.494	12.55	.428	10.87
37	2.729	69.32	2.500	63.50	2.159	54.84	2.272	57.71	.311	7.90	.494	12.55	.428	10.87
50	2.635	66.93	2.406	61.11	2.064	52.42	2.178	55.32	.423	10.74	.605	15.37	.532	13.51

Hardware

Retaining clip and screw assembly. P/N 98151-01

Card Edge Connectors

D

TABLE OF CONTENTS

"UL Recognized and CSA Certified"

DESIGN FEATURES

HOLMBERG® card edge connector series are double readout, configured with optional wire-wrap and square dip-solder tails and are suitable for either hand or automatic termination in backplane or discrete applications. Individual connectors are functionally and dimensionally interchangeable with any industry standard PC connector regardless of manufacturer and conform to the applicable design requirements of MIL-C-21097. All popular sizes from 6 to 65 positions are available.

PROVEN CONTACT DESIGN

Highly reliable contacts are utilized to ensure optimum normal contact force over the full range of PC board thicknesses. A uniquely contoured mating surface on each contact further increases reliability by concentrating the normal force in the real contact area while maintaining circuit continuity under all stipulated test and operating conditions. Individual contacts are replaceable if accidentally damaged during handling or installation for most series.

PROVEN INSULATOR DESIGN

Designed to meet or exceed UL flammability requirements, connector bodies are molded in UL 94V-0 thermoplastic material and are offered in several mounting styles. Solder standoffs are provided to facilitate cleaning and preclude solder wicking; all styles incorporate polarizing keyways between the contacts and a generous lead-in chamber for ease of PC card entry.

PROVEN PERFORMANCE

Utilizing only proven and the most cost-effective designs and materials, HOLMBERG® connectors guarantee performance which meets or exceeds industry standard requirements, at the same time, providing an exemplary level of operational reliability at attractive and competitive prices.

DESIGN OPTIONS

A variety of plating, mounting, termination and identification options are offered to meet specific user requirements.

PERFORMANCE CHARACTERISTICS

Operating voltage:	A6D 1500VDC (sea level) A7D 1000VDC (sea level) A8D 600VDC (sea level)
Current rating:	3 Amperes
Operating temperature:	-55°C to +125°C
Contact resistance:	10 milliohms
Insulation resistance:	5000 megohms minimum
Contact retention:	4 lbs. minimum - Dip Solder, 8 lbs. minimum - wire wrap.
Durability:	up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected
Insertion/withdrawal force:	2 to 8 oz. average contact pair using .0620 steel test blade.
Temperature cycling:	MIL-STD-202, method 107B
Moisture resistance:	Humidity per MIL-STD-202, method 103
Vibration:	MIL-STD-202, method 204A
Thermal shock:	MIL-STD-202, method 107

Note: Specifications are subject to change without notice-consult factory for available modifications and verification of design details.

Note: Wire-wrap is a registered trademark of Gardner-Denver, specifications are subject to change without notice - consult factory for available modifications and verification of design details.

All dimensions shown in inches.

MATERIALS

Insulator body:	Glass filled thermoplastic, UL rating 94V-O, color - black
Spring contact:	Hi-Strength Copper Alloy
Polarizing Key:	Nylon, color-white

PART NUMBER DESCRIPTION AND ORDERING INFORMATION

A8 D43 WW 29 A 3

SERIES DESIGNATOR
A6, A7, A8

NUMBER OF CONTACT PAIRS AND READOUTS
D — Double Readout
6, 10, 15, 18, 22, 28, 30, 31, 36, 43, and 50 contact pairs typical

TERMINATION STYLE
WW — Wire-wrap, DS - Dip Solder

CONTACT PLATING
Standard Plating
29 — Selective .000030" Au over .000050" Ni in contact area with .0001" — .0003" Sn/Pb on tails

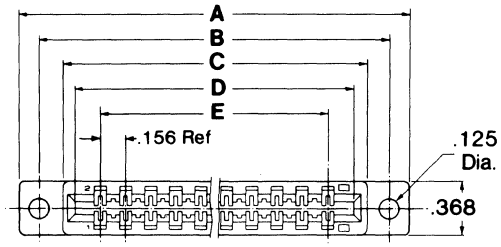
MOUNTING STYLE
A — .125" diameter mounting holes
B — #4-40 threaded inserts
C — Without mounting ears
D — Flush mount /.125" dia. holes
E — Flush mount with #4-40 threaded inserts/E — Cross-drill standard ear, RA only
F — Offset Mounting/F — Cross-drill flush mount ear, RA only

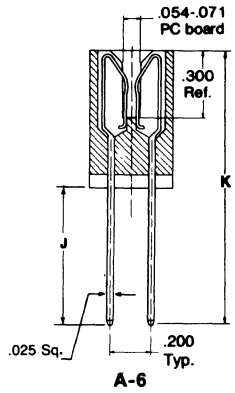
CONTACT TAIL LENGTH
See Series Charts
Consult factory for availability of other lengths.

A6D-DS, WW SERIES

DIP SOLDER TAILS
WIRE WRAP TAILS

.156" CENTER-TO-CENTER
.200" ROW-TO-ROW





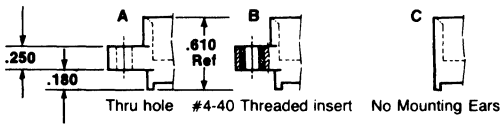
A-6

PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A6D10XX**A†	2.408	2.158	1.845	1.724	1.404
A6D12XX**A†	2.720	2.470	2.157	2.036	1.716
A6D15XX**A†	3.188	2.938	2.625	2.504	2.184
A6D18XX**A†	3.656	3.406	3.093	2.972	2.652
A6D22XX**A†	4.280	4.030	3.717	3.596	3.276
A6D25XX**A†	4.748	4.498	4.185	4.064	3.744
A6D28XX**A†	5.216	4.966	4.653	4.532	4.212
A6D36XX**A†	6.464	6.214	5.901	5.780	5.460
A6D43XX**A†	7.556	7.306	6.993	6.872	6.552

XX - DS, WW
** - Contact Plating Code
† - Tail Length

DS = .025 sq. tail
WW = .025 sq. tail

MOUNTING STYLES



POLARIZING KEY: 9801401 or 98023

STANDARD CONTACT TAIL LENGTHS

Size	DS	
	J	K
2	.160	.770
3	.220	.830

Size	WW	
	J	K
3	.560	1.170

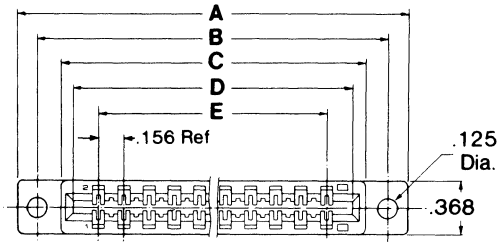
Consult factory for other lengths.

D

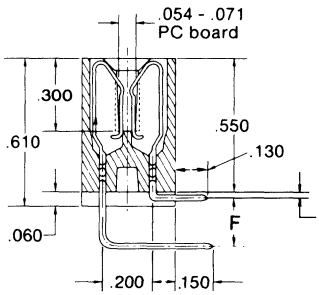
A6D-RA SERIES

SAME AS ABOVE WITH RIGHT ANGLE DIP SOLDER TAILS

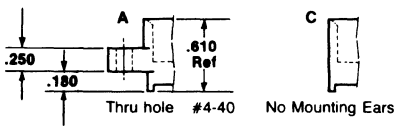
.156" CENTER-TO-CENTER
.200" ROW-TO-ROW

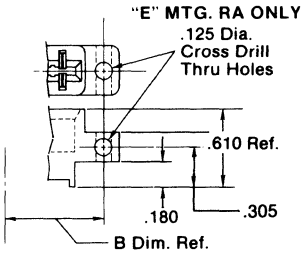


RIGHT ANGLE TAILS



MOUNTING STYLES





PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A6D10XX**A†	2.408	2.158	1.845	1.724	1.404
A6D12XX**A†	2.720	2.470	2.157	2.036	1.716
A6D15XX**A†	3.188	2.938	2.625	2.504	2.184
A6D18XX**A†	3.656	3.406	3.093	2.972	2.652
A6D22XX**A†	4.280	4.030	3.717	3.596	3.276
A6D25XX**A†	4.748	4.498	4.185	4.064	3.744
A6D28XX**A†	5.216	4.966	4.653	4.532	4.212
A6D36XX**A†	6.464	6.214	5.901	5.780	5.460
A6D43XX**A†	7.556	7.306	6.993	6.872	6.552

XX - DS, WW
** - Contact Plating Code
† - Tail Length

DIM.	ROW-TO-ROW	DESIGNATION
F	.200	NONE
F	.150	M233

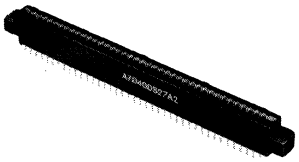
EXAMPLE:
A6DXXRAXXA=.200 ROW TO ROW
A6DXXRAXXM233=.150 ROW TO ROW

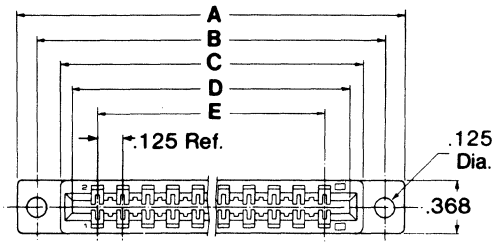
A7D-DS, WW SERIES

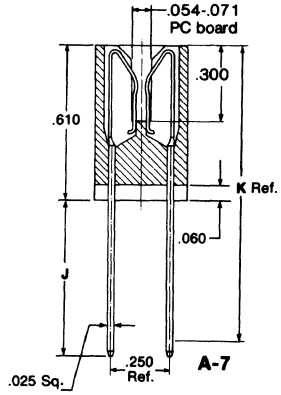
DIP SOLDER TAILS
WIRE WRAP TAILS

.125" CENTER-TO-CENTER

.250" ROW-TO-ROW





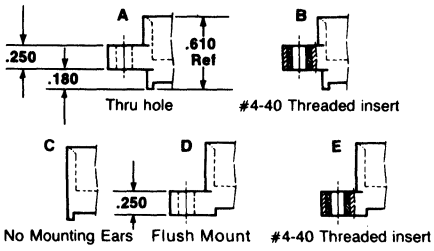


DS = .025 sq. tail
WW = .025 sq. tail

PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A7D06XX**A†	1.555	1.295	1.035	0.875	0.625
A7D10XX**A†	2.055	1.795	1.535	1.375	1.125
A7D15XX**A†	2.680	2.420	2.160	2.000	1.750
A7D18XX**A†	3.055	2.795	2.535	2.375	2.125
*A7D20XX**A†	3.305	3.045	2.785	2.625	2.375
A7D22XX**A†	3.555	3.295	3.035	2.875	2.625
A7D25XX**A†	3.930	3.670	3.410	3.250	3.000
A7D28XX**A†	4.305	4.045	3.785	3.625	3.375
A7D30XX**A†	4.555	4.295	4.035	3.875	3.625
A7D35XX**A†	5.180	4.920	4.660	4.500	4.250
A7D36XX**A†	5.305	5.045	4.785	4.625	4.375
A7D40XX**A†	5.805	5.545	5.285	5.125	4.875
A7D43XX**A†	6.180	5.920	5.660	5.500	5.250
A7D50XX**A†	7.055	6.795	6.535	6.375	6.125

XX - DS, WW
** - Contact Plating Code
† - Tail Length
* - Not Tooled

MOUNTING STYLES



POLARIZING KEY: 9801401 or 98023

STANDARD CONTACT TAIL LENGTHS

Size	DS	
	J	K
2	.160	.770

Size	WW	
	J	K
3	.560	1.170

Consult factory for other lengths.

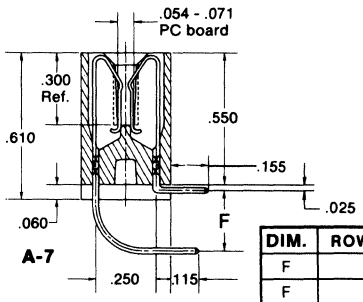
A7D-RA SERIES

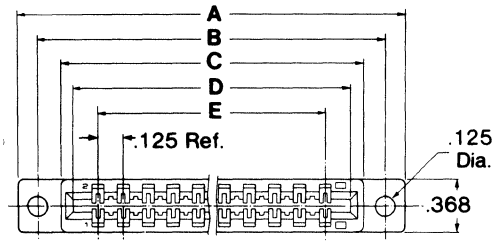
SAME AS ABOVE WITH RIGHT ANGLE DIP SOLDER TAILS

.125" CENTER-TO-CENTER

.250" ROW-TO-ROW

A7 RIGHT ANGLE TAILS

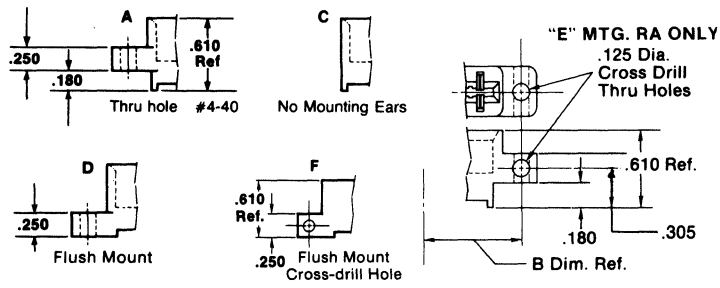




DIM.	ROW-TO-ROW	DESIGNATION
F	.250	NONE
F	.200	M232
F	.150	M231

EXAMPLE:
A7DXXRAXXA=.250 ROW TO ROW
A7DXXRAXXM232=.200 ROW TO ROW
A7DXXRAXXA231=.150 ROW TO ROW

MOUNTING STYLES



PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A7D06XX**A†	1.555	1.295	1.035	0.875	0.625
A7D10XX**A†	2.055	1.795	1.535	1.375	1.125
A7D15XX**A†	2.680	2.420	2.160	2.000	1.750
A7D18XX**A†	3.055	2.795	2.535	2.375	2.125
*A7D20XX**A†	3.305	3.045	2.785	2.625	2.375
A7D22XX**A†	3.555	3.295	3.035	2.875	2.625
A7D25XX**A†	3.930	3.670	3.410	3.250	3.000
A7D28XX**A†	4.305	4.045	3.785	3.625	3.375
A7D30XX**A†	4.555	4.295	4.035	3.875	3.625
A7D35XX**A†	5.180	4.920	4.660	4.500	4.250
A7D36XX**A†	5.305	5.045	4.785	4.625	4.375
A7D40XX**A†	5.805	5.545	5.285	5.125	4.875
A7D43XX**A†	6.180	5.920	5.660	5.500	5.250
A7D50XX**A†	7.055	6.795	6.535	6.375	6.125

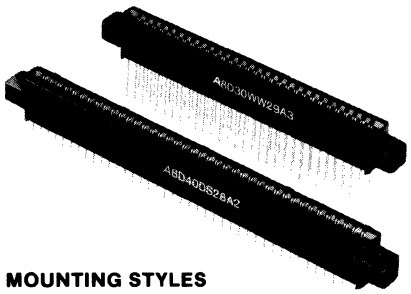
XX - DS, WW
** - Contact Plating Code
† - Tail Length
* - Not Tooled

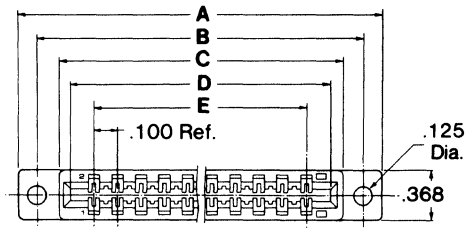
A8D-DS, WW SERIES

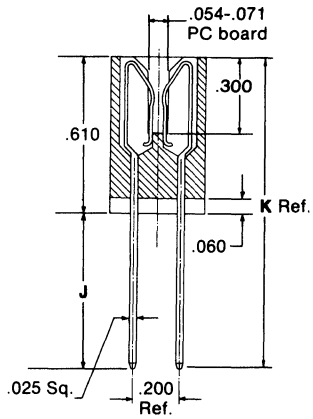
DIP SOLDER TAILS
WIRE WRAP TAILS

.100" CENTER-TO-CENTER

.200" ROW-TO-ROW







DS = .025 sq. tail
WW = .025 sq. tail

PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A8D10XX**A†	1.835	1.575	1.260	1.100	.900
A8D12XX**A†	2.035	1.775	1.460	1.300	1.100
A8D15XX**A†	2.335	2.075	1.760	1.600	1.400
A8D18XX**A†	2.635	2.375	2.060	1.900	1.700
A8D20XX**A†	2.835	2.575	2.260	2.100	1.900
A8D22XX**A†	3.035	2.775	2.460	2.300	2.100
A8D25XX**A†	3.335	3.075	2.760	2.600	2.400
A8D28XX**A†	3.635	3.375	3.060	2.900	2.700
A8D30XX**A†	3.835	3.575	3.260	3.100	2.900
A8D31XX**A†	3.935	3.675	3.360	3.200	3.100
A8D35XX**A†	4.335	4.075	3.760	3.600	3.400
A8D36XX**A†	4.435	4.175	3.860	3.700	3.500
A8D40XX**A†	4.835	4.575	4.260	4.100	3.900
A8D43XX**A†	5.135	4.875	4.560	4.400	4.200
A8D44XX**A†	5.235	4.975	4.660	4.500	4.300
A8D50XX**A†	5.835	5.575	5.260	5.100	4.900
A8D60XX**A†	6.835	6.575	6.260	6.100	5.900
*A8D65XX**A†	7.335	7.075	6.760	6.600	6.400

XX - DS, WW ** - Contact Plating Code † - Tail Length
* - Flush Mount Only

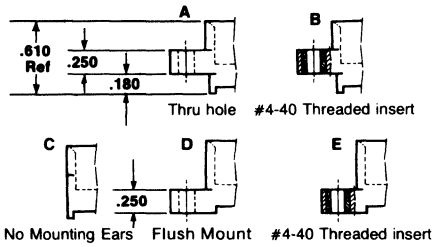
STANDARD CONTACT TAIL LENGTHS

Size	DS	
	J	K
2	.160	.770
3	.220	.830

Size	WW	
	J	K
3	.560	1.170

Consult factory for other lengths.

MOUNTING STYLES



POLARIZING KEY: 9801401 or 98023

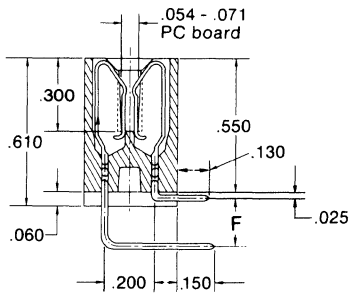
A8D-RA SERIES

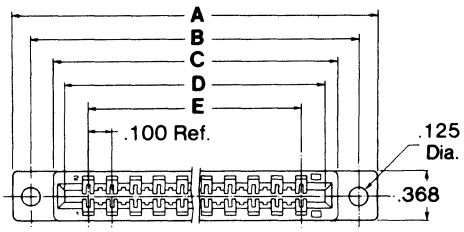
SAME AS ABOVE WITH RIGHT ANGLE DIP SOLDER TAILS

.100" CENTER-TO-CENTER

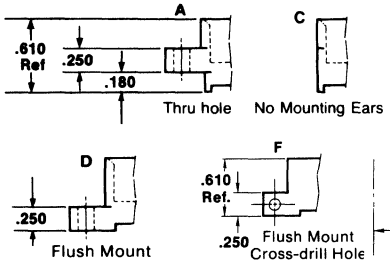
.200" ROW-TO-ROW

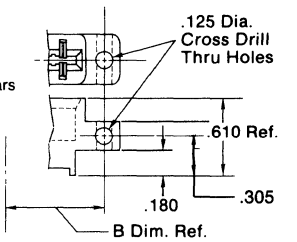
A8 RIGHT ANGLE TAILS





MOUNTING STYLES





"E" MTG. RA ONLY

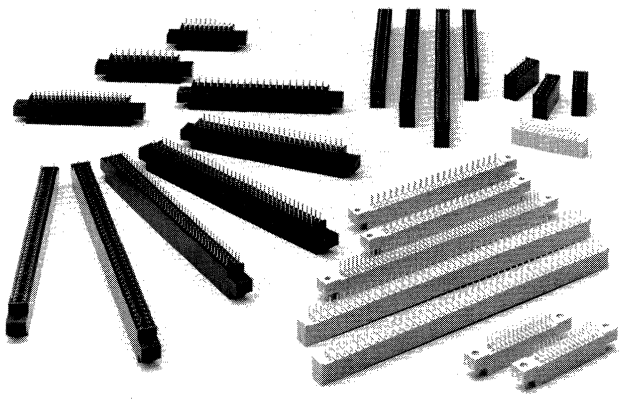
PART NUMBER	A (±.010)	B (±.006)	C (±.008)	D (±.005)	E (±.004)
A8D10XX**A†	1.835	1.575	1.260	1.100	.900
A8D12XX**A†	2.035	1.775	1.460	1.300	1.100
A8D15XX**A†	2.335	2.075	1.760	1.600	1.400
A8D18XX**A†	2.635	2.375	2.060	1.900	1.700
A8D20XX**A†	2.835	2.575	2.260	2.100	1.900
A8D22XX**A†	3.035	2.775	2.460	2.300	2.100
A8D25XX**A†	3.335	3.075	2.760	2.600	2.400
A8D28XX**A†	3.635	3.375	3.060	2.900	2.700
A8D30XX**A†	3.835	3.575	3.260	3.100	2.900
A8D31XX**A†	3.935	3.675	3.360	3.200	3.100
A8D35XX**A†	4.335	4.075	3.760	3.600	3.400
A8D36XX**A†	4.435	4.175	3.860	3.700	3.500
A8D40XX**A†	4.835	4.575	4.260	4.100	3.900
A8D43XX**A†	5.135	4.875	4.560	4.400	4.200
A8D44XX**A†	5.235	4.975	4.660	4.500	4.300
A8D50XX**A†	5.835	5.575	5.260	5.100	4.900
A8D60XX**A†	6.835	6.575	6.260	6.100	5.900
*A8D65XX**A†	7.335	7.075	6.760	6.600	6.400

XX - DS, WW ** - Contact Plating Code † - Tail Length
* - Flush Mount Only

DIM.	ROW-TO-ROW	DESIGNATION
F	.200	NONE
F	.150	M233

EXAMPLE:
A8DXXRAXXA=.200 ROW TO ROW
A8DXXRAXXM=.150 ROW TO ROW

D



PART NUMBER DESCRIPTION AND ORDERING INFORMATION

C2 D43 DS 29 A X X

SERIES DESIGNATOR
C2, C3, C4, C5, C6, C7, C8

NUMBER OF CONTACT PAIRS AND READOUTS
D — Double Readout
6, 10, 12, 14, 18, 20, 22, 25, 28
30, 31, 35, 36, 40, 43, 44, 50 and 60

TERMINATION STYLE
DS — Dip Solder

CONTACT PLATING
29 — Selective .000030" Gold over .000050" Nickel in the contact area with .0001" — .0003" Tin/Lead on the tails

MOUNTING STYLE
A — .125" diameter mounting holes
B — #4-40 threaded inserts
C — Without mounting ears
D — Flush mount/.125" Thru hole
E — Flush mount/insert

CONTACT TAIL LENGTH
See Series Chart

SPECIAL OR CUSTOMER MODIFICATION
"M" followed by (3) digit factory assigned number

DESIGN FEATURES

HOLMBERG® C2D, C3D, C4D, C5D, C6D, C7D and C8D Connector Series are double readout, configured with optional dip solder and are suitable for either hand or automatic termination in backplane or discrete applications. Individual connectors are functionally and dimensionally interchangeable with any industry standard PC connector regardless of manufacturer and conform to the applicable requirements of MIL-C-21097. All popular sizes from 6 to 60 positions are available.

PROVEN CONTACT DESIGN

Highly reliable cantilever contacts are utilized to ensure optimum normal contact force over the full range of PC board thicknesses. A uniquely contoured mating surface on each contact further increases reliability by concentrating the normal force in the real contact area while maintaining circuit continuity under all stipulated test and operating conditions. Individual contacts are replaceable if accidentally damaged during handling or installation for most series.

PROVEN INSULATOR DESIGN

Designed to meet or exceed UL flammability requirements, connector bodies are molded in UL 94V-0 thermoplastic material and are offered in several mounting styles. Solder standoffs are provided to facilitate cleaning and preclude solder wicking; all styles incorporate polarizing keyways between the contact and a generous lead-in chamber for ease of PC card entry.

PROVEN PERFORMANCE

Utilizing only proven and the most cost-effective designs and materials, HOLMBERG® connectors guarantee performance which meets or exceeds industry standard requirements, at the same time, providing an exemplary level of operational reliability at attractive and competitive prices.

DESIGN OPTIONS

A variety of plating, mounting, termination and identification options are offered to meet specific user requirements.

Performance Characteristics

Operating voltage:	C2D 1500VDC (sea level) C3D 1500VDC (sea level) C4D 1000VDC (sea level) C5D 600VDC (sea level) C6D 1500VDC (sea level) C7D 1000VDC (sea level) C8D 600VDC (sea level)
Current rating:	3 Amps (5 Amps C2S)
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms
Insulation resistance:	5000 megohms minimum
Contact retention:	4 lbs. minimum - Dip Solder
Durability:	Up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected
Insertion/withdrawal force:	2 to 8 oz. average contact pair using .0620 steel test blade
Temperature cycling:	MIL-STD-202, method 107B
Moisture resistance:	Humidity per MIL-STD-202, method 103
Vibration:	MIL-STD-202, method 204A
Thermal shock:	MIL-STD-202, method 107

Note: Specifications are subject to change without notice — consult factory for available modifications and verification of design details.

All dimensions shown in inches.

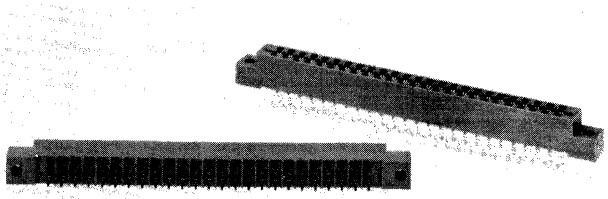
Materials

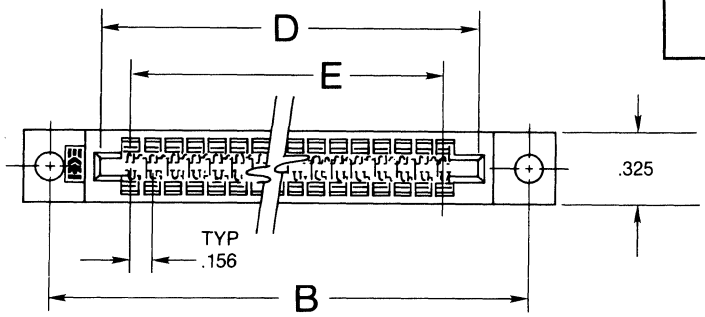
Insulator body:	Glass filled thermoplastic, UL rating 94V-O
Spring contact:	Phosphor Bronze alloy
Polarizing Key:	Nylon, color-white P/N 9801400

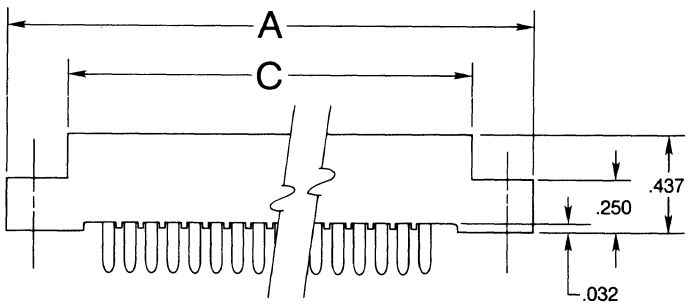
C2, C3, C4, C5 UL Recognized and CSA Certified
C6, C7, C8 UL Recognized and CSA Certified

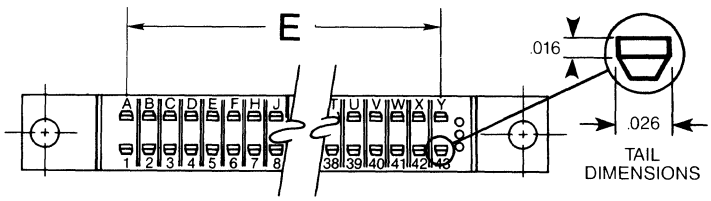
C2-DS Series

.156" center-to-center
.145" row-to-row

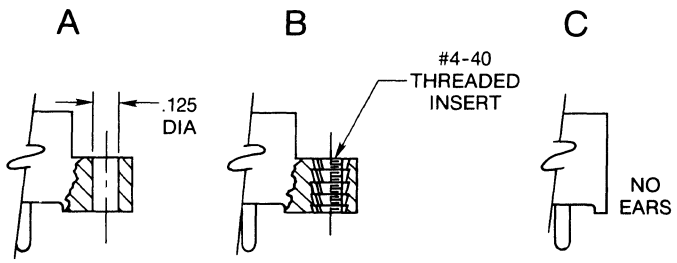






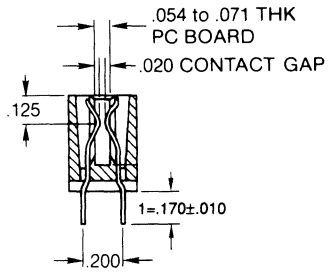


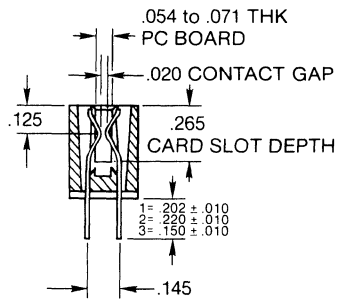
MOUNTING STYLES



Special Modification Option

A .200" row-to-row spacing option with the assigned modification number, M396, is offered for the C2, C4 and C5 series.

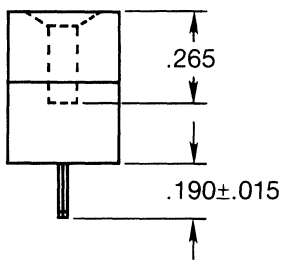




	No. of Contacts	DIMENSIONS				
		A±.010	B±.008	C±.010	D±.005	EBSC
06	6/12	1.781	1.531	1.218	1.078	.780
10	10/20	2.405	2.155	1.843	1.702	1.404
12	12/24	2.717	2.467	2.154	2.014	1.716
15	15/30	3.185	2.935	2.622	2.482	2.184
18	18/36	3.653	3.403	3.090	2.950	2.652
22	22/44	4.277	4.027	3.714	3.574	3.276
25	25/50	4.745	4.495	4.182	4.042	3.744
28	28/56	5.213	4.963	4.650	4.510	4.212
36	36/72	6.461	6.211	5.898	5.758	5.460
43	43/86	7.553	7.303	6.990	6.850	6.552

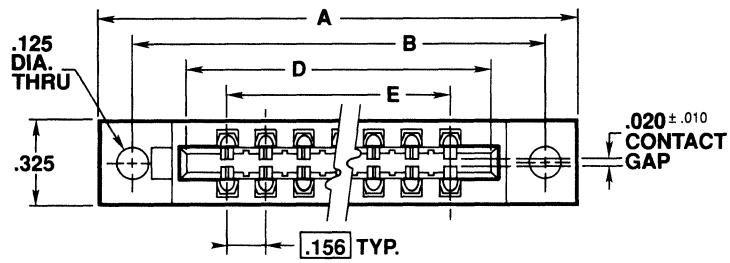
C2S, DS Single Read Out

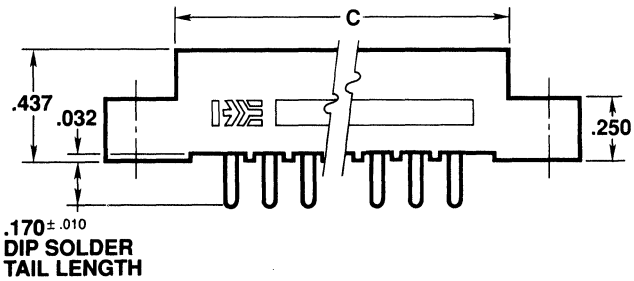
All dimensions are the same as the C2D series.

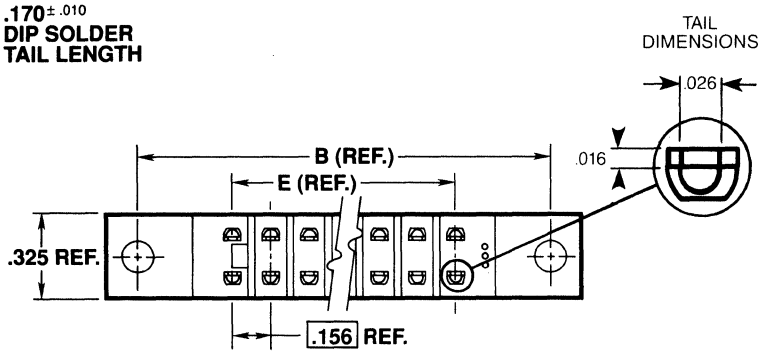


C3-DS Series

.156" center-to-center
.200" row-to-row





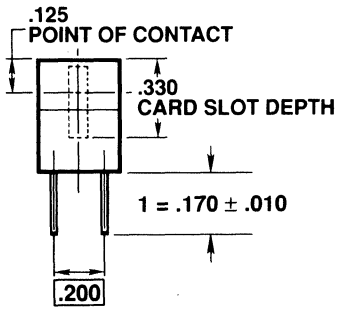


Special Modification Option

A .145 row-to-row spacing option with the assigned modification number, M395 is offered for the C3 series.

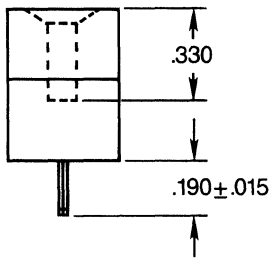
DIMENSIONS (Shown In Inches)

NO. OF CONTACTS		A ±.010	B ±.008	C ±.010	D ±.005	E BSC
6	6/12	1.781	1.53	1.218	1.100	.780
10	10/20	2.405	2.15	1.842	1.724	1.404
12	12/24	2.717	2.46	2.154	2.036	1.716
15	15/30	3.185	2.93	2.622	2.504	2.184
18	18/36	3.653	3.40	3.090	2.972	2.652
22	22/44	4.277	4.03	3.714	3.596	3.276
24	24/48	4.589	4.33	4.026	3.908	3.588
25	25/50	4.745	4.49	4.182	4.064	3.744
28	28/56	5.213	4.96	4.650	4.532	4.212
36	36/72	6.461	6.21	5.898	5.780	5.460
43	43/86	7.553	7.30	6.990	6.872	6.552

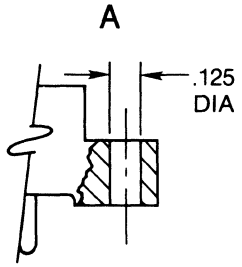


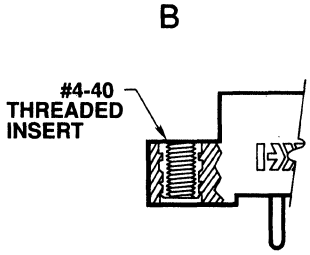
C3S, DS Single Read Out

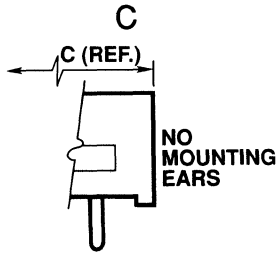
All dimensions are the same as the C3D series.



MOUNTING STYLES

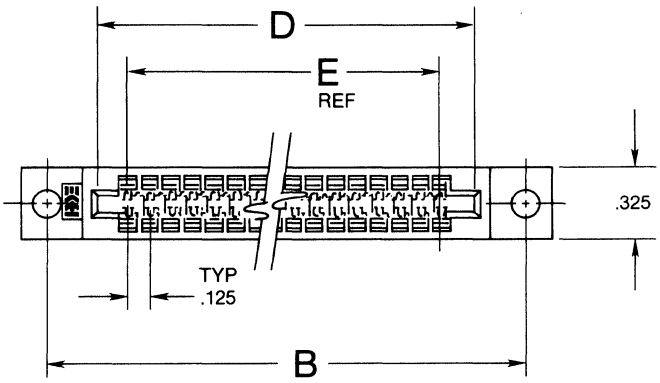


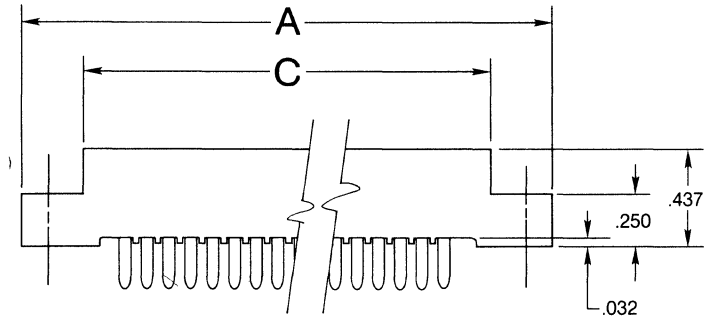


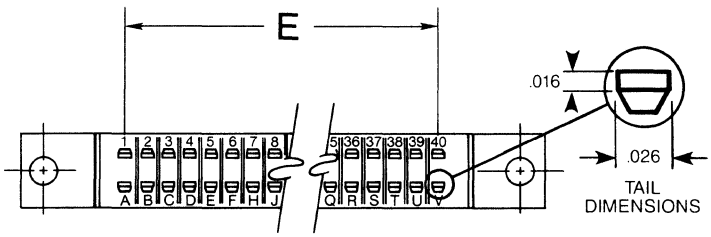


C4-DS Series

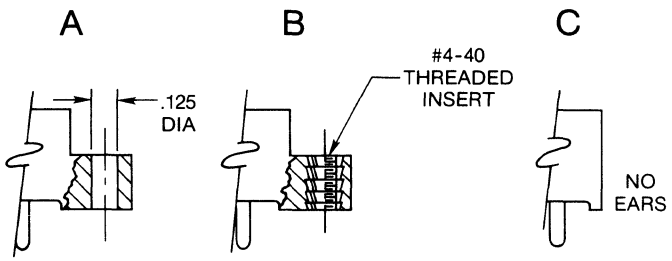
.125" center-to-center
.145" row-to-row





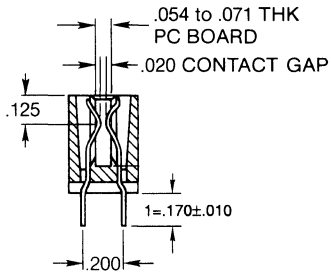


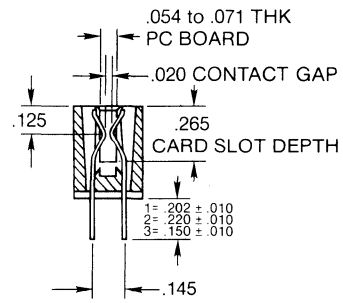
MOUNTING STYLES



Special Modification Option

A .200" row-to-row spacing option with the assigned modification number, M396, is offered for the C2, C4 and C5 series.



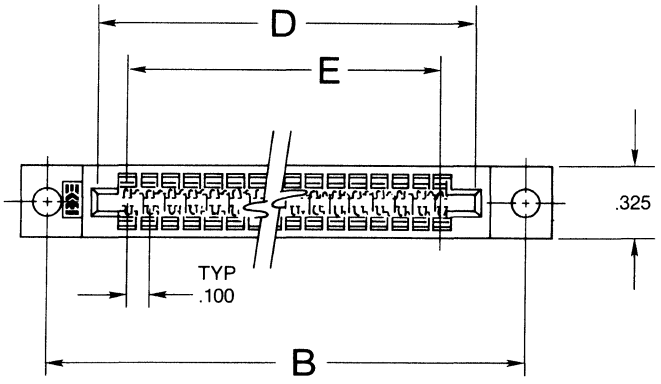


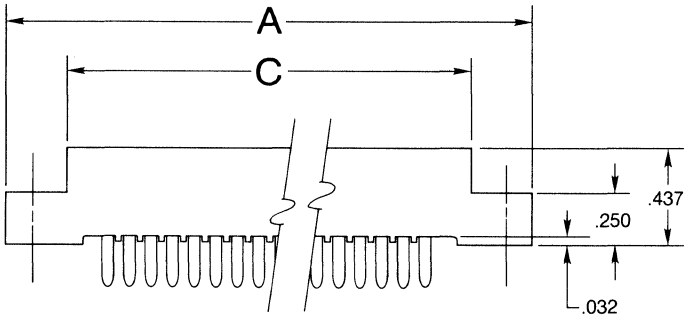
D

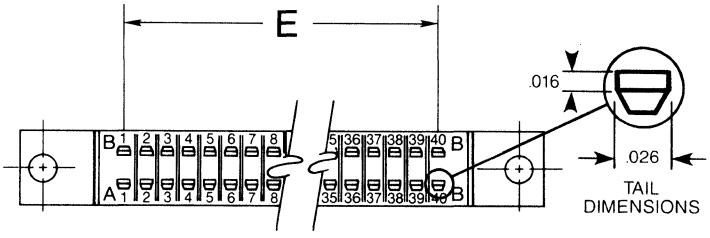
	No. of Contacts	DIMENSIONS				
		A±.010	B±.008	C±.010	D±.005	EBSC
06	6/12	1.555	1.295	1.035	.875	.625
10	10/20	2.055	1.795	1.535	1.375	1.125
14	14/28	2.555	2.295	2.035	1.875	1.625
15	15/30	2.680	2.420	2.160	2.000	1.750
18	18/36	3.055	2.795	2.535	2.375	2.125
20	20/40	3.305	3.045	2.785	2.625	2.375
22	22/44	3.555	3.295	3.035	2.875	2.625
28	28/56	4.305	4.045	3.785	3.625	3.375
30	30/60	4.555	4.295	4.035	3.875	3.625
31	31/62	4.680	4.420	4.160	4.000	3.750
35	35/70	5.180	4.920	4.560	4.500	4.250
36	36/72	5.305	5.045	4.785	4.625	4.375
37	37/74	5.430	5.170	4.910	4.750	4.500
40	40/80	5.805	5.545	5.285	5.125	4.875
43	43/86	6.180	5.920	5.560	5.500	5.250
44	44/88	6.305	6.045	5.785	5.625	5.375
49	49/98	6.930	6.685	6.410	6.250	6.000
50	50/100	7.055	6.795	6.535	6.375	6.125

C5-DS Series

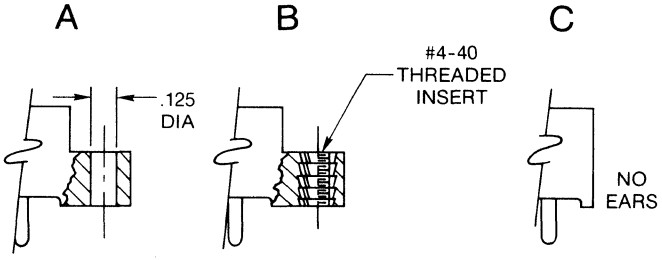
.100" center-to-center
.150" row-to-row





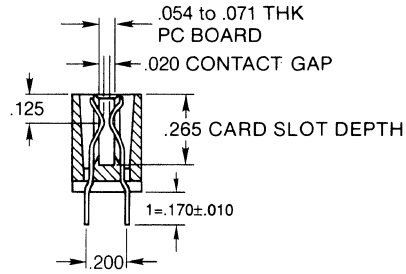


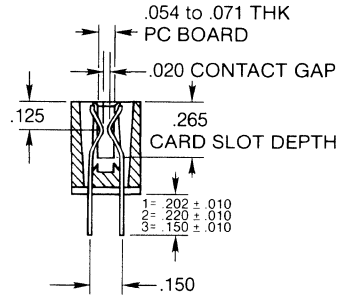
MOUNTING STYLES



Special Modification Option

A .200" row-to-row spacing option with the assigned modification number, M396, is offered for the C2, C4 and C5 series.

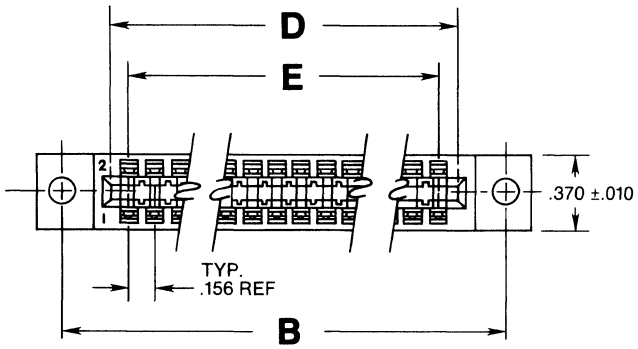


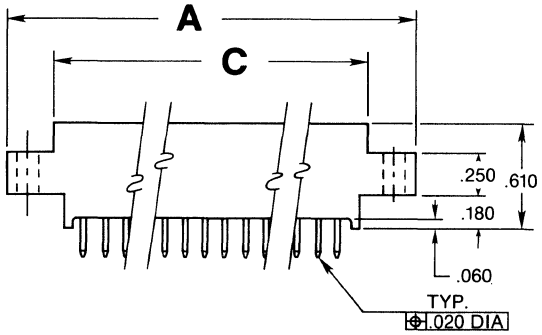


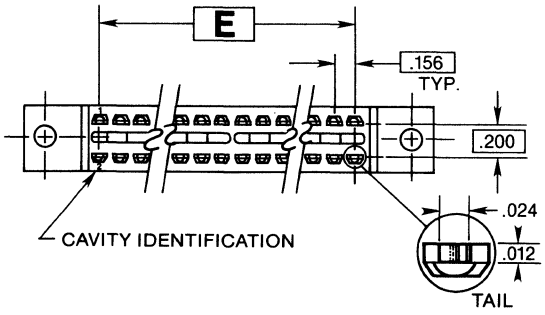
	No. of Contacts	DIMENSIONS				
		A±.010	B±.008	C±.010	D±.005	EBSC
06	6/12	1.475	1.175	.868	.707	.500
10	10/20	1.875	1.575	1.268	1.107	.900
12	12/24	2.075	1.775	1.468	1.307	1.100
15	15/30	2.375	2.075	1.768	1.607	1.400
18	18/36	2.675	2.375	2.068	1.907	1.700
20	20/40	2.875	2.575	2.268	2.107	1.900
22	22/44	3.075	2.775	2.468	2.307	2.100
25	25/50	3.375	3.075	2.768	2.607	2.400
28	28/56	3.675	3.375	3.068	2.907	2.700
30	30/60	3.875	3.575	3.268	3.107	2.900
31	31/62	3.975	3.675	3.368	3.207	3.000
35	35/70	4.375	4.075	3.768	3.607	3.400
36	36/72	4.475	4.175	3.868	3.707	3.500
40	40/80	4.875	4.575	4.268	4.107	3.900
43	43/86	5.175	4.875	4.568	4.407	4.200
44	44/88	5.275	4.975	4.668	4.507	4.300
50	50/100	5.875	5.575	5.268	5.107	4.900

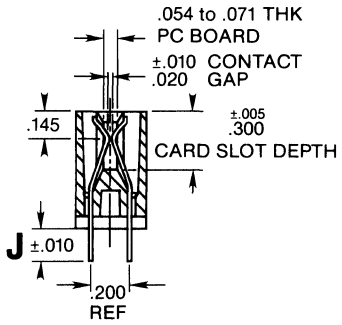
C6-DS Series

.156" center-to-center
.200" row-to-row









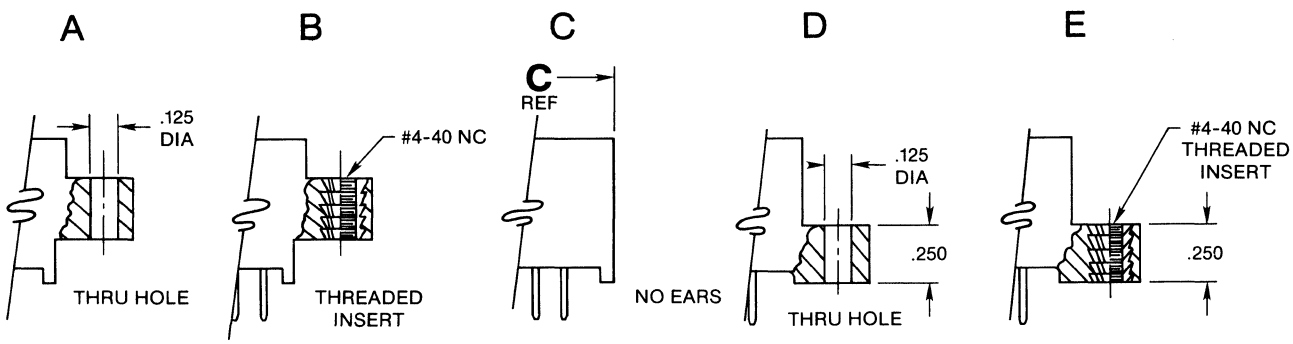
TAIL LENGTH

SIZE	J
1	.130
3	.160
4	.220

**	No. of Contacts	DIMENSIONS				
		A ±.010	B ±.008	C ±.010	D ±.005	E BSC
D06	6/12	1.784	1.534	1.221	1.100	.780
D10	10/20	2.408	2.158	1.845	1.724	1.404
D12	12/24	2.720	2.470	2.157	2.036	1.716
D15	15/30	3.188	2.938	2.625	2.504	2.184
D18	18/36	3.656	3.406	3.093	2.972	2.652
D20	20/40	3.968	3.718	3.405	3.284	2.964
D22	22/44	4.280	4.030	3.717	3.596	3.276
D25	25/50	4.748	4.498	4.185	4.064	3.744
D28	28/56	5.216	4.966	4.653	4.532	4.212
D30	30/60	5.528	5.278	4.965	4.844	4.524
D31	31/62	5.684	5.434	5.121	5.000	4.680
D35	35/70	6.308	6.058	5.745	5.624	5.304
D36	36/72	6.464	6.214	5.901	5.780	5.460
D40	40/80	7.088	6.838	6.525	6.404	6.085
D43	43/86	7.556	7.306	6.993	6.872	6.552

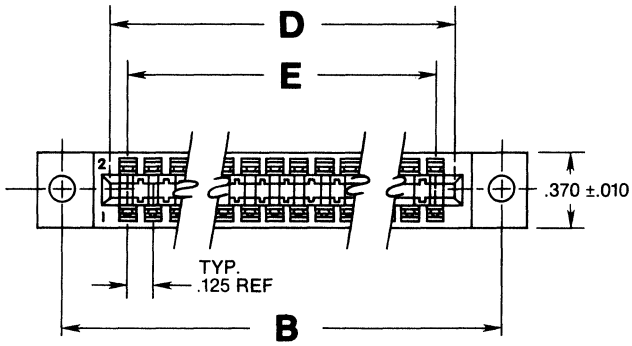
D

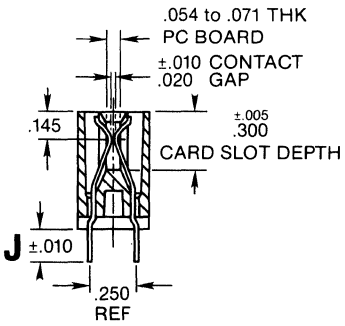
MOUNTING STYLES



C7-DS Series

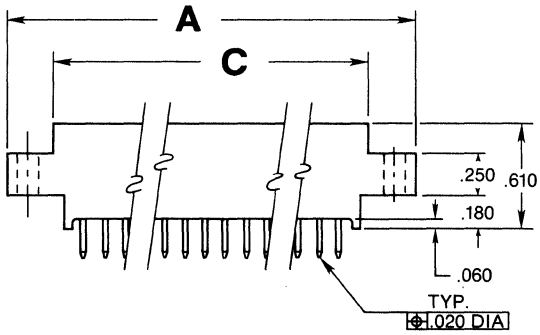
.125" center-to-center
.250" row-to-row

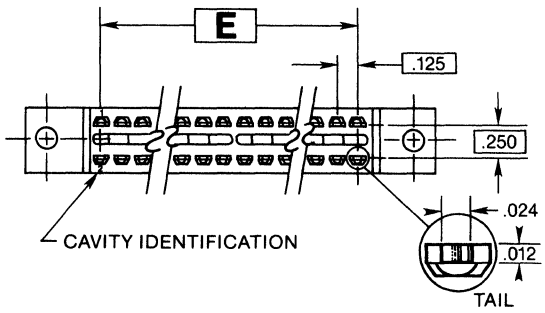




TAIL LENGTH

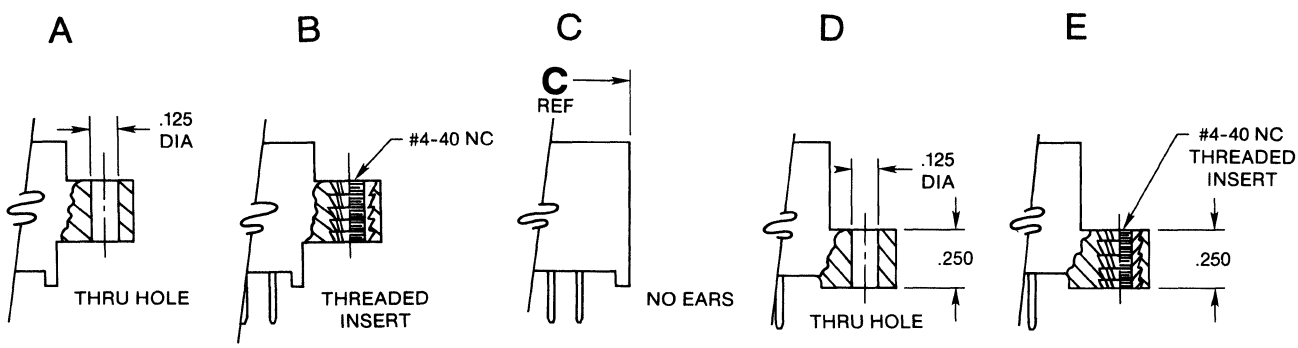
SIZE	J
1	.130
3	.160
4	.220





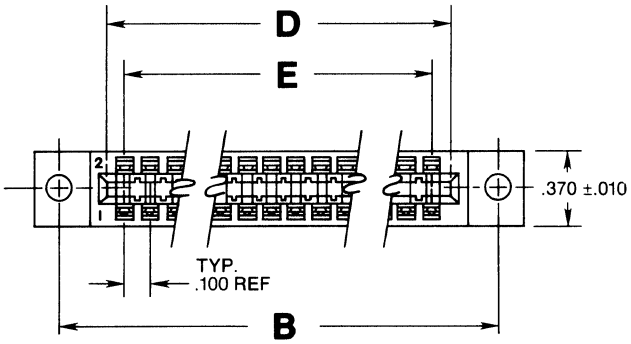
**	No. of Contacts	DIMENSIONS				
		A ±.010	B ±.008	C ±.010	D ±.005	E BSC
D06	6/12	1.555	1.295	1.035	.875	.625
D10	10/20	2.055	1.795	1.535	1.375	1.125
D12	12/24	2.305	2.045	1.785	1.625	1.375
D15	15/30	2.680	2.420	2.160	2.000	1.750
D18	18/36	3.055	2.795	2.535	2.375	2.125
D20	20/40	3.305	3.045	2.785	2.625	2.375
D22	22/44	3.555	3.295	3.035	2.875	2.625
D25	25/50	3.930	3.670	3.410	3.250	3.000
D28	28/56	4.305	4.045	3.785	3.625	3.375
D30	30/60	4.555	4.295	4.035	3.875	3.625
D31	31/62	4.680	4.420	4.160	4.000	3.750
D35	35/70	5.180	4.920	4.660	4.500	4.250
D36	36/72	5.305	5.045	4.785	4.625	4.375
D40	40/80	5.805	5.545	5.285	5.125	4.875
D43	43/86	6.180	5.920	5.660	5.500	5.250
D50	50/100	7.055	6.795	6.535	6.375	6.125

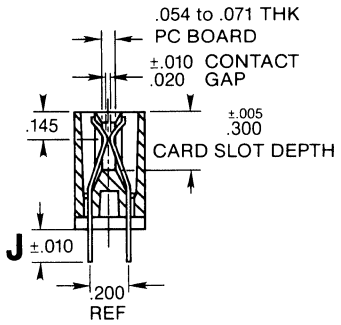
MOUNTING STYLES



C8-DS Series

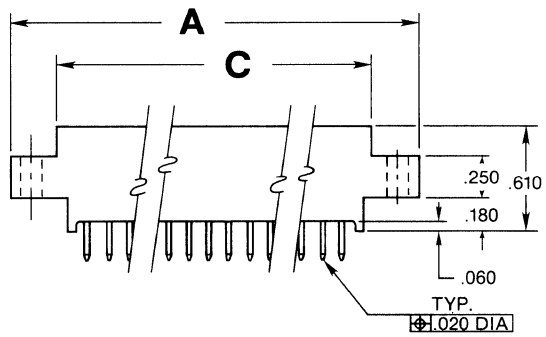
.100" center-to-center
.200" row-to-row

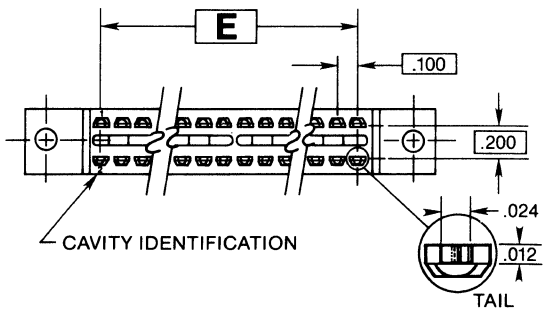




TAIL LENGTH

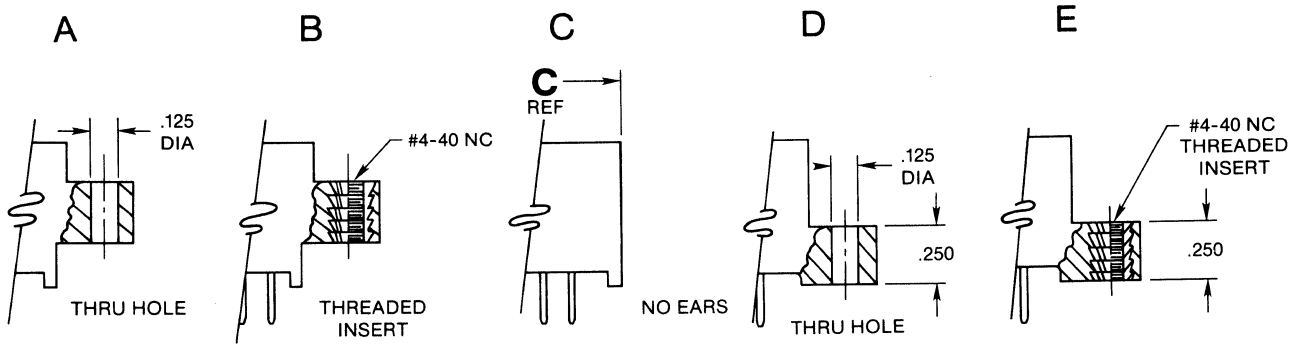
SIZE	J
1	.130
3	.160
4	.220





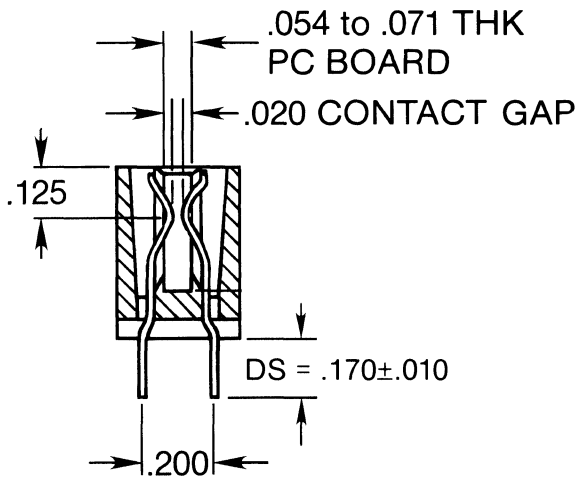
**	No. of Contacts	DIMENSIONS				
		A ±.010	B ±.008	C ±.010	D ±.005	E BSC
D06	6/12	1.435	1.175	.860	.700	.500
D10	10/20	1.835	1.575	1.260	1.100	.900
D12	12/24	2.035	1.775	1.460	1.300	1.100
D15	15/30	2.335	2.075	1.760	1.600	1.400
D18	18/36	2.635	2.375	2.060	1.900	1.700
D20	20/40	2.835	2.575	2.260	2.100	1.900
D22	22/44	3.035	2.775	2.460	2.300	2.100
D25	25/50	3.335	3.075	2.760	2.600	2.400
D28	28/56	3.635	3.375	3.060	2.900	2.700
D30	30/60	3.835	3.575	3.260	3.100	2.900
D31	31/62	3.935	3.675	3.360	3.200	3.000
D35	35/70	4.335	4.075	3.760	3.600	3.400
D36	36/72	4.435	4.175	3.860	3.700	3.500
D40	40/80	4.835	4.575	4.260	4.100	3.900
D43	43/86	5.135	4.875	4.560	4.400	4.200
D50	50/100	5.835	5.575	5.260	5.100	4.900
D60	60/120	6.835	6.575	6.260	6.100	5.900

MOUNTING STYLES



C2, C4 and C5 Series

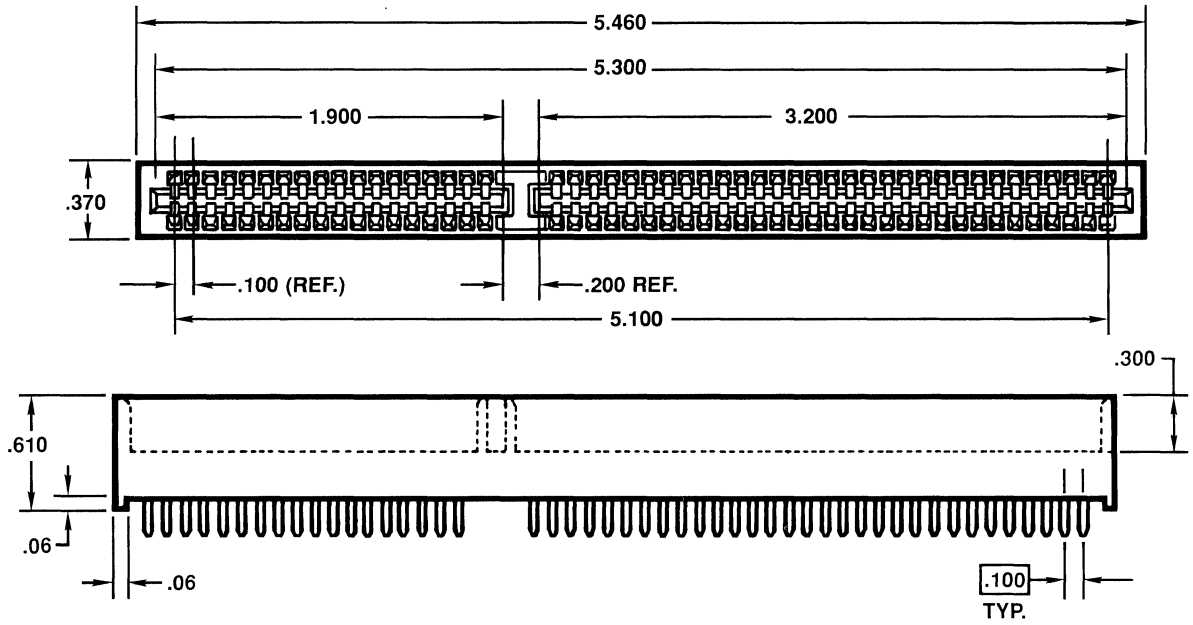
A .200" row-to-row spacing option with the assigned modification number, M396, is offered for the C2, C4 and C5 series.



C8 Series

C8D52DS29C1M191 — Insulator with molded-in polarizing key with card guide chamber. The card slot length is 1.900 and 3.200. This mod number also represents retention tails.

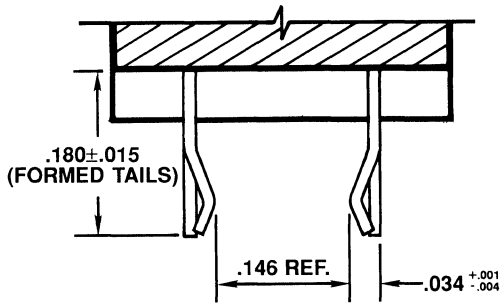
C8D52DS29C1M195 — Insulator same as M191 but with no retention tails. Straight DS contacts only.



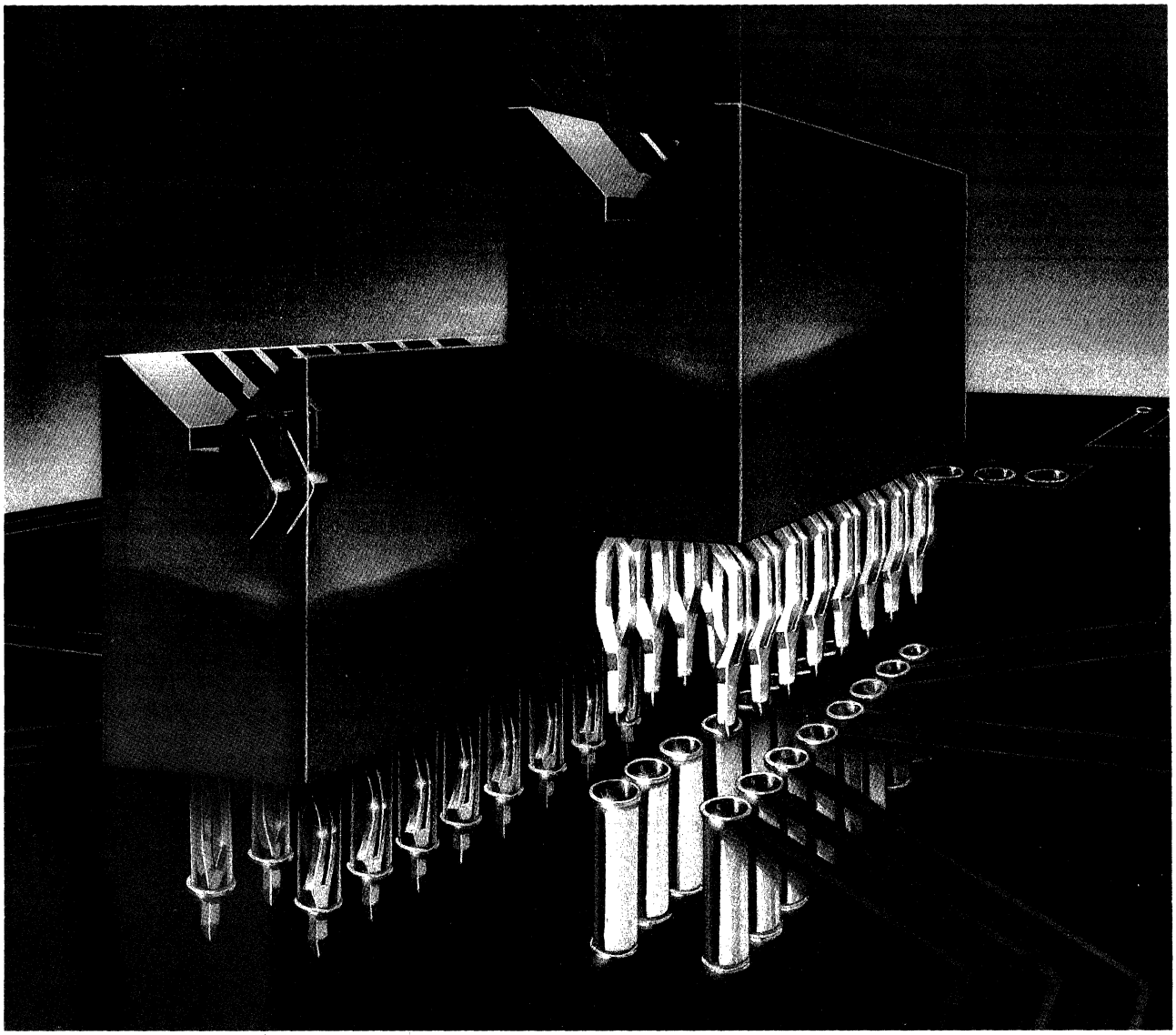
C8D31DS29C1 — No retention tails.

C8D31DS29C1M192 — With retention tails.

Bifurcated Contacts available in C6, C7, and C8 connectors. Consult factory for availability and part number.



RETENTION FORM DETAIL



D

TRIFLEX™
SOLDERLESS COMPLIANT PINS

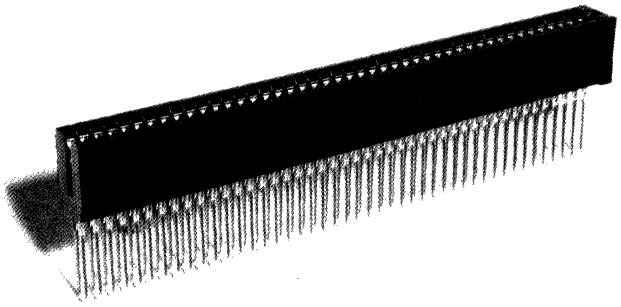
100% connection reliability even in your toughest multilayer designs.

TRIFLEX™ solderless compliant pin connectors are your best solution for difficult press-fit assembly problems associated with high density backplane designs.

TRIFLEX's unique, dual compliancy design combines the compliant action of a split post with the torsional effect of a radial tri-beam, giving you the most consistent insertion forces throughout the entire range of hole sizes.

Unlike standard compliant designs, TRIFLEX stores elastic energy longer for continuous high pressure between the compliant section and the hole wall. You're assured of reliable performance—in any operating environment.

Plus, we've made significant investments in statistical process controls (SPC) for our manufacturing operations to insure product quality before it leaves the manufacturing cycle. Our "JUST IN TIME" and "SHIP TO STOCK" programs save you the expense of additional inspections and the need for larger inventories.



DESIGN FEATURES
Proven cantilever contact design, performance consistency in installation forces and electrical characteristics after artificial aging, excellent characteristics under all operating conditions, available in positions 18 thru 60, closed ended, open ended, and stackable.

PROVEN CONTACT DESIGN
Highly reliable cantilever contacts are utilized to ensure optimum normal contact force over the full range of PC board thicknesses. A uniquely contoured mating surface on each contact further increases reliability by concentrating the normal force in the real contact area while maintaining circuit continuity under all stipulated test and operating conditions. Individual contacts are replaceable if accidentally damaged during handling or installation.

PROVEN INSULATOR DESIGN
Designed to meet or exceed UL flammability requirements, connector bodies are molded in UL 94V-O thermoplastic material and are offered in several design options. All styles incorporate polarizing keyways between the contacts and a generous lead-in chamber for ease of PC card entry.

PROVEN PERFORMANCE
Utilizing only proven and the most cost-effective designs and materials, Holmberg connectors guarantee performance which meets or exceeds industry standard requirements, at the same time, providing an exemplary level of operational reliability at attractive and competitive prices.

DESIGN OPTIONS
A variety of plating, termination and identification options are offered to meet specific user requirements.

RECOMMENDED P.C.B. HOLE CONSTRUCTION
Drilled hole of .0453±.0010, .001-.003 Copper, .0003 min. Tin/Lead to a finished hole size of .040±.003. Recommended board thickness .093-.125

BOARD RETENTION
Force required to install connector onto board shall be no more than 40 lb. per pin. Force required to remove pins from board shall be no less than 10 lb. per pin.

PERFORMANCE CHARACTERISTICS

Operating voltage:	1000 VDC (sea level)
Current rating:	3 amps
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms
Insulation resistance:	5000 megohms minimum
Contact retention/Insulator:	5 lbs. minimum
Durability:	Up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected
Contact insertion force:	10 oz. max. measured with a .0700±.0001 THK polished blade per MIL-C-21097C
Contact withdrawal force:	1 oz. min. measured with a .0540±.0001 THK polished test blade per MIL-C-21097C after sizing 3 times with a .0700±.0001 THK test blade
Temperature cycling:	MIL-STD-202, method 107B
Moisture resistance:	Humidity per MIL-STD-202, method 103
Vibration:	MIL-STD-202, method 204A
Thermal shock:	MIL-STD-202, method 107

Note: Specifications are subject to change without notice – consult factory for available modifications and verification of design details

All dimensions shown in inches.

MATERIALS

Insulator body:	UL rating 94V-O
Spring contact:	Phosphor Bronze alloy
Polarizing Key:	Nylon, color-white P/N 9801400

UL Recognized and CSA Certified

PART NUMBER, DESCRIPTION AND ORDERING INFORMATION

C1 D35 PF 29 01 3 XX

SERIES DESIGNATOR
C1

NUMBER OF CONTACT PAIRS AND READOUTS
D - Dual readout
18, 20, 22, 25, 28, 30, 35, 36, 40, 43, 45, 58, 60

TERMINATION STYLE
PF - Press Fit

CONTACT PLATING
29 - 30 μ-in. gold selectively plated over contact area; tin lead over tails; 50 μ-in. nickel underplate all over. Other platings available (consult factory).

DESIGN OPTIONS
01 - .415 card depth/closed ends/.550 ht.
02 - .415 card depth/open ends/.550 ht.
03 - .415 card depth/open/closed ends/.550 ht.
04 - .300 card depth/closed ends/.550 ht.
05 - .300 card depth/open/closed ends/.550 ht.
06 - .350 card depth/closed ends/.550 ht.
07 - .350 card depth/open/closed ends/.550 ht.

CONTACT TAIL LENGTHS
3 - .180"±.015
5 - 475±.015
7 - .625±.015

SPECIAL MODIFICATION
(consult factory)

INSERTION TOOLING
(consult factory)

C1-PF Series
.100×.100

C1D ** PF ** ** *

CONNECTOR SERIES IDENTIFIER
(.100 x .100 CTRS. P/F CARD EDGE)

REF. NOTE #3
FOR PLATING OPTIONS.

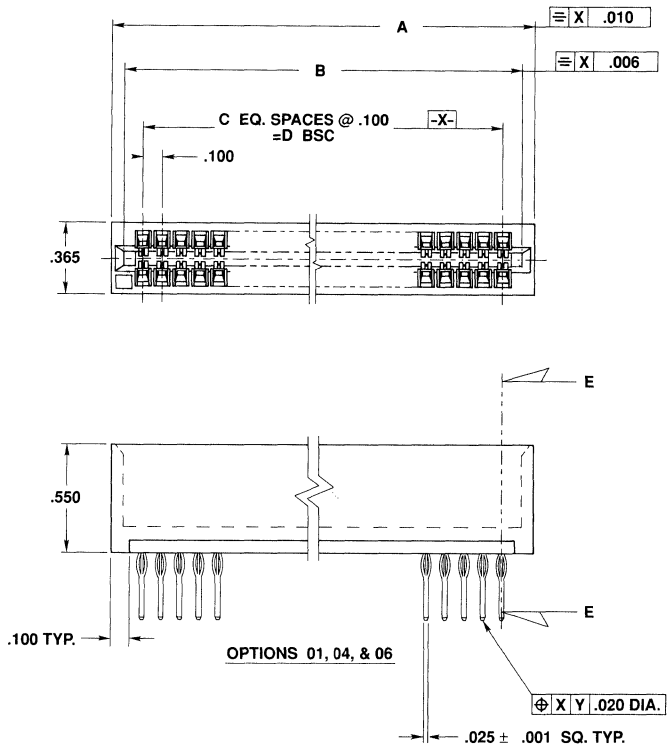
"G"	TAIL LENGTHS
5	.475 ± .015
7	.625 ± .015

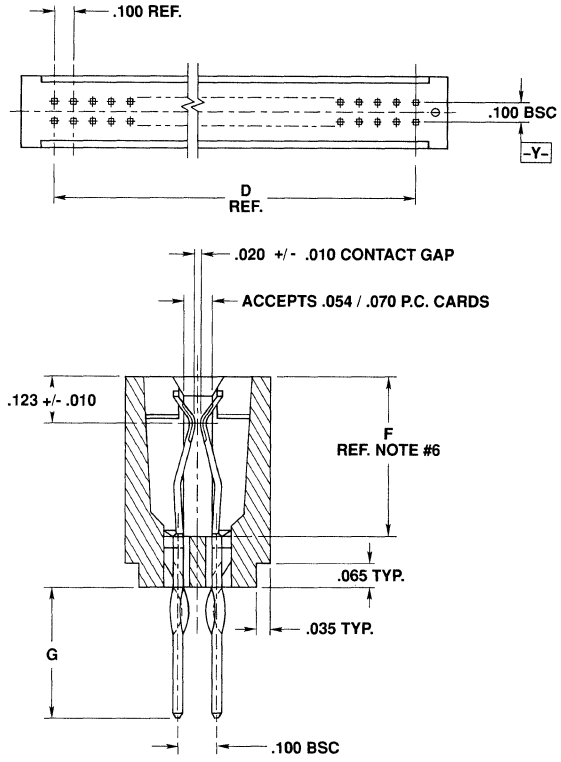
OPTION NO.	DESIGN OPTIONS DESCRIPTION	"F" CARD DPTH.
01	CLOSED ENDS/.550 HT.	.415
02	OPEN ENDS/.550 HT.	.415
03	OPEN/CLOSED ENDS/.550 HT.	.415
04	CLOSED ENDS/.550 HT.	.300
05	OPEN/CLOSED ENDS/.550 HT.	.300
06	CLOSED ENDS/.550 HT.	.350
07	OPEN CLOSED ENDS/.550 HT.	.350

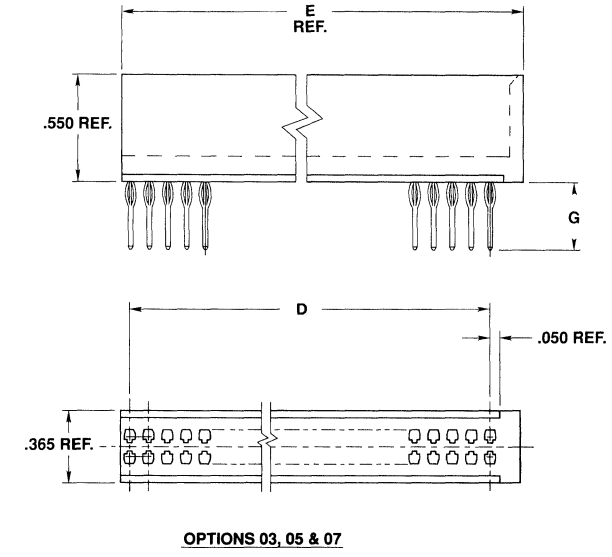
NUMBER OF POSITIONS		"A" +/- .010	"A_2" +/- .002	"B" +/- .005	"C" EQ. SPACES	"D" +/- .005	"E" REF.
18	18/36	2.034	1.800	1.904	17	1.700	1.917
20	20/40	2.234	2.000	2.104	19	1.900	2.117
22	22/44	2.434	2.200	2.304	21	2.100	2.317
25	25/50	2.734	2.500	2.604	24	2.400	2.617
28	28/56	3.034	2.800	2.904	27	2.700	2.917
30	30/60	3.234	3.000	3.104	29	2.900	3.117
35	35/70	3.734	3.500	3.604	34	3.400	3.617
36	36/72	3.834	3.600	3.704	35	3.500	3.717
40	40/80	4.234	4.000	4.104	39	3.900	4.117
43	43/86	4.534	4.300	4.404	42	4.200	4.417
45	45/90	4.734	4.500	4.604	44	4.400	4.617
50	50/100	5.234	5.000	5.104	49	4.900	5.117
60	60/120	6.234	6.000	6.104	59	5.900	6.117

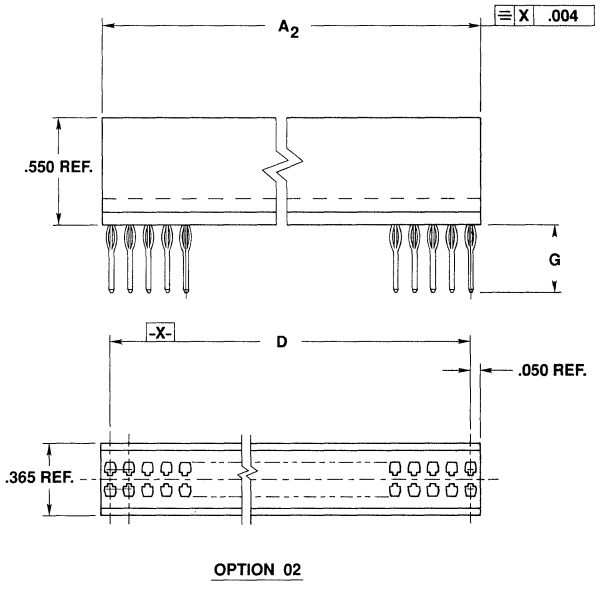
D

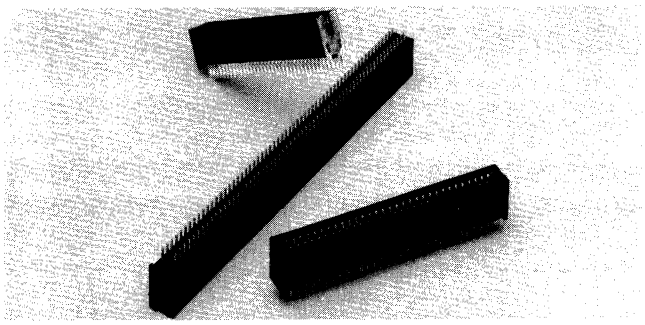
C1-PF Series
.100x.100











DESIGN FEATURES

Proven cantilever contact design, performance consistency in installation forces and electrical characteristics after artificial aging, excellent characteristics under all operating conditions, available in positions 6 thru 60, closed ended, open ended, and stackable. Also available in low and high profile (.550 & .610) configurations.

PROVEN CONTACT DESIGN

Highly reliable cantilever contacts are utilized to ensure optimum normal contact force over the full range of PC board thicknesses. A uniquely contoured mating surface on each contact further increases reliability by concentrating the normal force in the real contact area while maintaining circuit continuity under all stipulated test and operating conditions. Individual contacts are replaceable if accidentally damaged during handling or installation for most series.

PROVEN INSULATOR DESIGN

Designed to meet or exceed UL flammability requirements, connector bodies are molded in UL 94V-O thermoplastic material and are offered in several mounting styles. All styles incorporate polarizing keyways between the contacts and a generous lead-in chamber for ease of PC card entry.

PROVEN PERFORMANCE

Utilizing only proven and the most cost-effective designs and materials, Holmberg connectors guarantee performance which meets or exceeds industry standard requirements, at the same time, providing an exemplary level of operational reliability at attractive and competitive prices.

DESIGN OPTIONS

A variety of plating, mounting, termination and identification options are offered to meet specific user requirements.

RECOMMENDED P.C.B. HOLE CONSTRUCTION

Drilled hole of .0453±.0010, .001-.003 Copper, .0003 min. Tin/Lead to a finished hole size of .040±.003. Recommended board thickness .093-.125.

PERFORMANCE CHARACTERISTICS

Operating voltage:	C6D 1800 VDC (sea level) C7D 1500 VDC (sea level) C8D 1000 VDC (sea level)
Current rating:	3 amps
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms
Insulation resistance:	5000 megohms minimum
Contact retention:	5 lbs. minimum
Durability:	Up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected
Contact insertion force:	10 oz. max. measured with a .0700±.0001 THK polished blade per MIL-C-21097C
Contact withdrawal force:	1 oz. min. measured with a .0540±.0001 THK polished test blade per MIL-C-21097C after sizing 3 times with a .0700±.0001 THK test blade
Temperature cycling:	MIL-STD-202, method 107B
Moisture resistance:	Humidity per MIL-STD-202, method 103
Vibration:	MIL-STD-202, method 204A
Thermal shock:	MIL-STD-202, method 107

Note: Specifications are subject to change without notice — consult factory for available modifications and verification of design details

All dimensions shown in inches.

MATERIALS

Insulator body:	Glass filled thermoplastic, UL rating 94V-O
Spring contact:	Phosphor Bronze alloy
Polarizing Key:	Nylon, color-white P/N 9801400

UL Recognized and CSA Certified

PART NUMBER, DESCRIPTION AND ORDERING INFORMATION

C6 D43 PF 29 01 3 XX

SERIES DESIGNATOR
C6, C7, C8

NUMBER OF CONTACT PAIRS AND READOUTS
D - Dual readout
06, 10, 12, 15, 18, 20, 22, 25, 28, 30, 31, 35, 36, 40, 43, 50, 60

TERMINATION STYLE
PF - Press Fit

CONTACT PLATING
29 - 30 μ-in. gold selectively plated over contact area; tin lead over tails; 50 μ-in. nickel underplate all over.
Other platings available (consult factory).

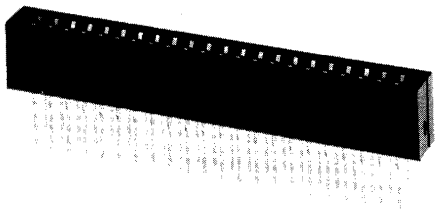
STYLE OF DESIGN OPTION
01 - .300 card slot depth/closed end/.610 HT.
02 - .415 card slot depth/closed end/.550 HT.
03 - .300 card slot depth/closed end/.550 HT.
04 - .415 card slot depth/closed end/.610 HT.
05 - .300 card slot depth/open end/.610 HT.
06 - .415 card slot depth/open end/.550 HT.
07 - .300 card slot depth/open end/.550 HT.
08 - .415 card slot depth/open end/.610 HT.
09 - .300 card slot depth/closed end, open end/ .610 HT. (stackable)
10 - .415 card slot depth/closed end, open end/ .550 HT. (stackable)
11 - .300 card slot depth/closed end, open end/ .550 HT. (stackable)
12 - .415 card slot depth/closed end, open end/ .610 HT. (stackable)
13 - .350 card slot depth/closed end/.610 HT.
14 - .350 card slot depth/closed end/.550 HT.
15 - .350 card slot depth/closed end, open end/.610 HT. (stackable)
16 - .350 card slot depth/closed end, open end/.550 HT. (stackable)

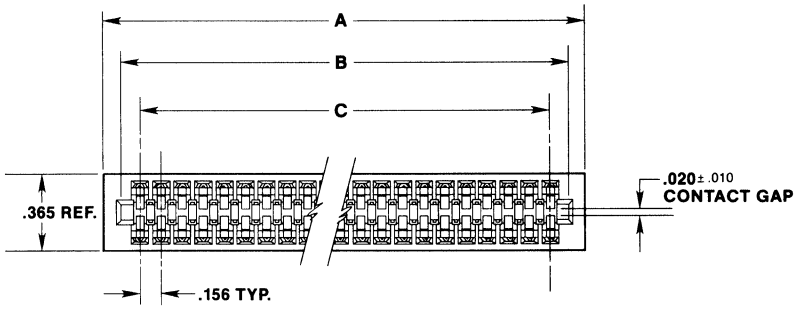
CONTACT TAIL LENGTHS
2 - .670 ± .015 (.550 HT.) (C6, C7, C8) (.610 HT. C7)
3 - .180 ± .015 (.550 HT. and .610 HT.) (C6, C7, C8)
4 - .690 ± .015 (.610 HT.) (C6, C8)
5 - .475 ± .015 (.550 & .610 HT.) (C6, C8)
6 - .378 ± .015 (.550 & .610 HT) (C6, C8)
7 - .625 ± .015 (.550 & .610 HT.) (C8)

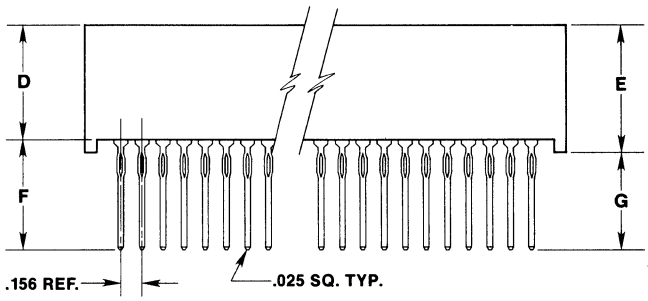
SPECIAL MODIFICATION
(consult factory)

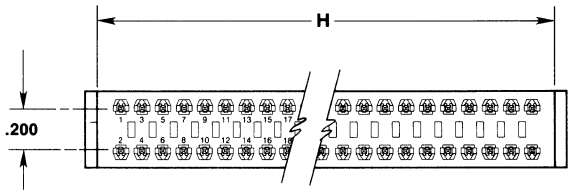
C6-PF Series

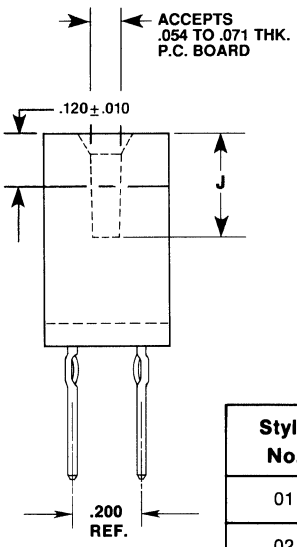
.156 x .200
Closed End Design









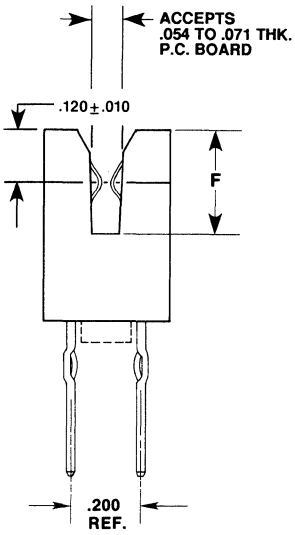


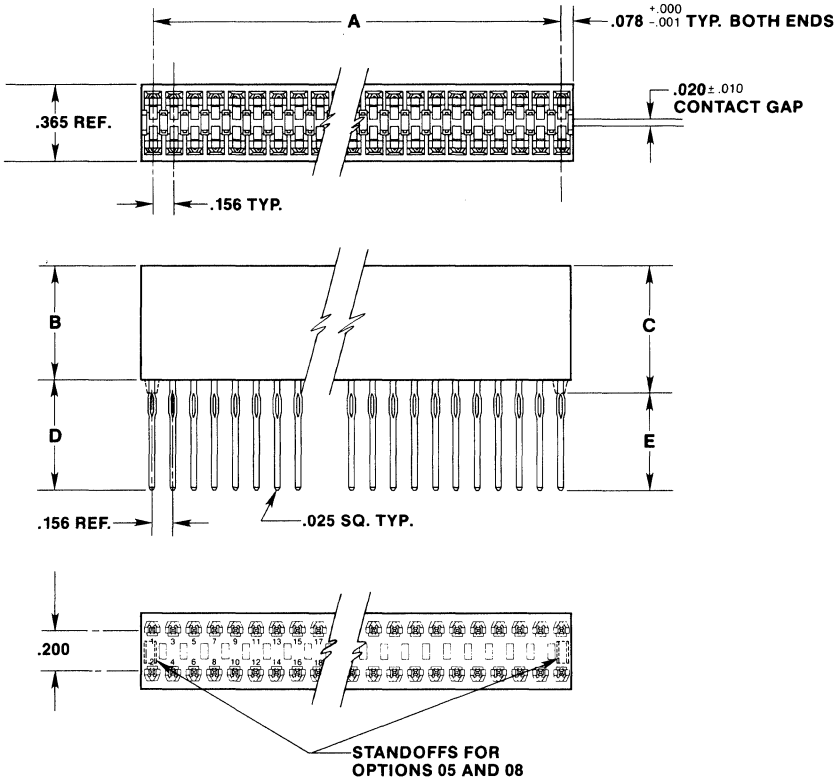
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS							
	Description	A	B	C	D	E	F	G	H	J
01	.300 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.300
02	.415 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.415
03	.300 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.300
04	.415 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.415

**	No. of Contacts	DIMENSIONS										
		A±.010	B±.005	C BSC	D±.005	E±.010	F_1	F_2	G_1	G_2	H±.010	J±.005
06	6/12	1.221	1.100	.780	.550	.610	.180	.670	.180	.690	1.101	.300/.415
10	10/20	1.845	1.724	1.404	.550	.610	.180	.670	.180	.690	1.725	.300/.415
12	12/24	2.157	2.036	1.716	.550	.610	.180	.670	.180	.690	2.037	.300/.415
15	15/30	2.625	2.504	2.184	.550	.610	.180	.670	.180	.690	2.505	.300/.415
18	18/36	3.093	2.972	2.652	.550	.610	.180	.670	.180	.690	2.973	.300/.415
20	20/40	3.405	3.284	2.964	.550	.610	.180	.670	.180	.690	3.285	.300/.415
22	22/44	3.717	3.596	3.276	.550	.610	.180	.670	.180	.690	3.597	.300/.415
25	25/50	4.185	4.064	3.744	.550	.610	.180	.670	.180	.690	4.065	.300/.415
28	28/56	4.653	4.532	4.212	.550	.610	.180	.670	.180	.690	4.533	.300/.415
30	30/60	4.965	4.844	4.524	.550	.610	.180	.670	.180	.690	4.845	.300/.415
31	31/62	5.121	5.000	4.680	.550	.610	.180	.670	.180	.690	5.001	.300/.415
35	35/70	5.745	5.624	5.304	.550	.610	.180	.670	.180	.690	5.625	.300/.415
36	36/72	5.901	5.780	5.460	.550	.610	.180	.670	.180	.690	5.781	.300/.415
40	40/80	6.525	6.404	6.085	.550	.610	.180	.670	.180	.690	6.405	.300/.415
43	43/86	6.993	6.872	6.552	.550	.610	.180	.670	.180	.690	6.873	.300/.415

C6-PF Series

.156 x .200
Open Ended Design



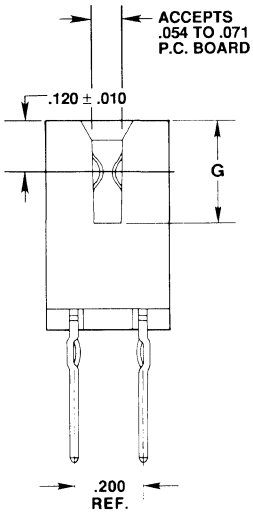


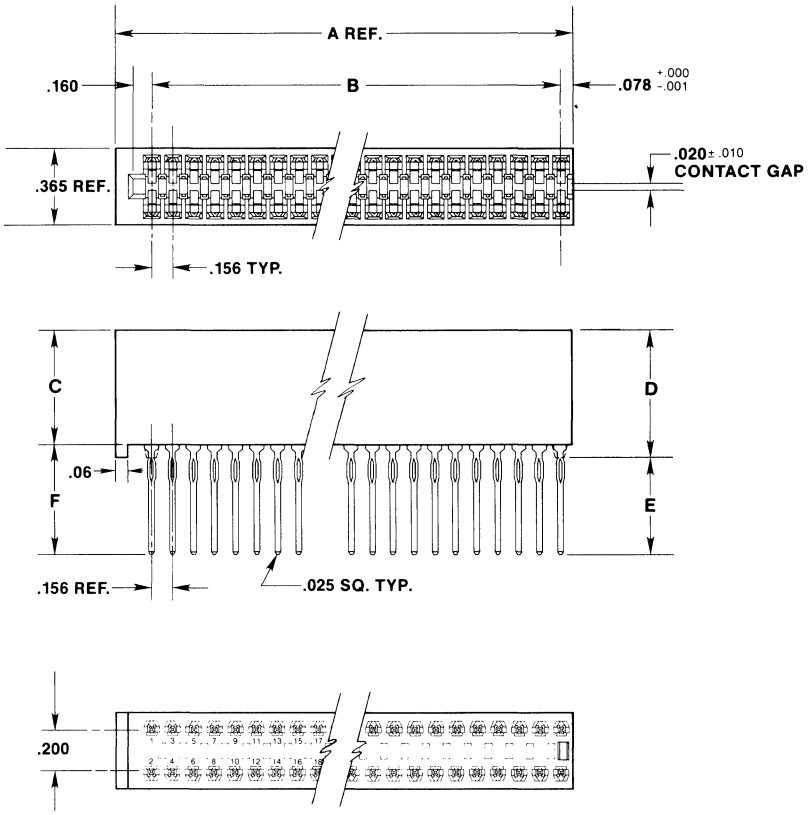
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS					
	Description	A	B	C	D	E	F
05	.300 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.300
06	.415 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.415
07	.300 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.300
08	.415 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.415

**	No. of Contacts	DIMENSIONS							
		A BSC	B ±.005	C ±.010	D_1	D_2	E_1	E_2	F ±.005
06	6/12	.780	.550	.610	.180	.670	.180	.690	.300/.415
10	10/20	1.404	.550	.610	.180	.670	.180	.690	.300/.415
12	12/24	1.716	.550	.610	.180	.670	.180	.690	.300/.415
15	15/30	2.184	.550	.610	.180	.670	.180	.690	.300/.415
18	18/36	2.652	.550	.610	.180	.670	.180	.690	.300/.415
20	20/40	2.964	.550	.610	.180	.670	.180	.690	.300/.415
22	22/44	3.276	.550	.610	.180	.670	.180	.690	.300/.415
25	25/50	3.744	.550	.610	.180	.670	.180	.690	.300/.415
28	28/56	4.212	.550	.610	.180	.670	.180	.690	.300/.415
30	30/60	4.524	.550	.610	.180	.670	.180	.690	.300/.415
31	31/62	4.680	.550	.610	.180	.670	.180	.690	.300/.415
35	35/70	5.304	.550	.610	.180	.670	.180	.690	.300/.415
36	36/72	5.460	.550	.610	.180	.670	.180	.690	.300/.415
40	40/80	6.085	.550	.610	.180	.670	.180	.690	.300/.415
43	43/86	6.552	.550	.610	.180	.670	.180	.690	.300/.415

C6-PF Series

.156 x .200
Stackable Design





Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS						
	Description	A	B	C	D	E	F	G
09	.300 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.300
10	.415 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.415
11	.300 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.300
12	.415 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.415

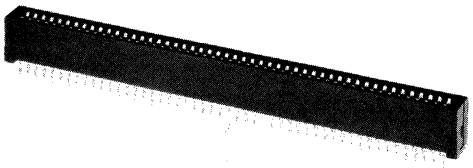
**	No. of Contacts	DIMENSIONS								
		A REF.	B BSC	C ±.005	D ±.010	E1	E2	F1	F2	G ±.005
06	6/12	1.078	.780	.550	.610	.180	.690	.180	.670	.300/.415
10	10/20	1.702	1.404	.550	.610	.180	.690	.180	.670	.300/.415
12	12/24	2.014	1.716	.550	.610	.180	.690	.180	.670	.300/.415
15	15/30	2.482	2.184	.550	.610	.180	.690	.180	.670	.300/.415
18	18/36	2.950	2.652	.550	.610	.180	.690	.180	.670	.300/.415
20	20/40	3.262	2.964	.550	.610	.180	.690	.180	.670	.300/.415
22	22/44	3.574	3.276	.550	.610	.180	.690	.180	.670	.300/.415
25	25/50	4.042	3.744	.550	.610	.180	.690	.180	.670	.300/.415
28	28/56	4.510	4.212	.550	.610	.180	.690	.180	.670	.300/.415
30	30/60	4.822	4.524	.550	.610	.180	.690	.180	.670	.300/.415
31	31/62	4.978	4.680	.550	.610	.180	.690	.180	.670	.300/.415
35	35/70	5.602	5.304	.550	.610	.180	.690	.180	.670	.300/.415
36	36/72	5.758	5.460	.550	.610	.180	.690	.180	.670	.300/.415
40	40/80	6.383	6.085	.550	.610	.180	.690	.180	.670	.300/.415
43	43/86	6.850	6.552	.550	.610	.180	.690	.180	.670	.300/.415

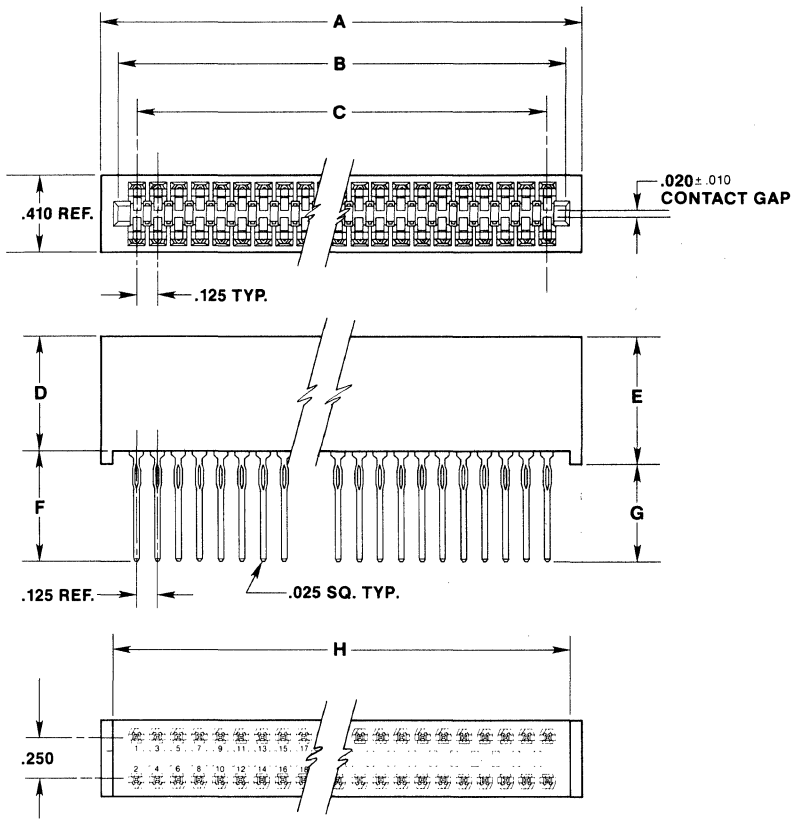
*Additional tail lengths shown on page 16

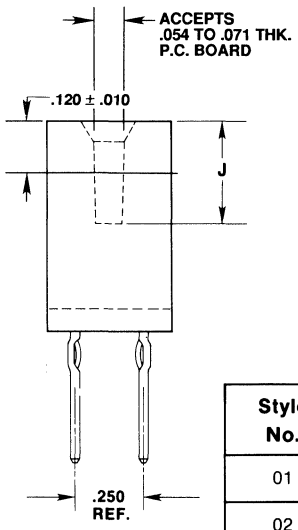
D

C7-PF Series

.125 x .250
Closed End Design





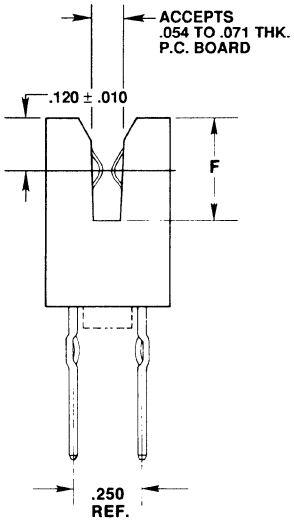


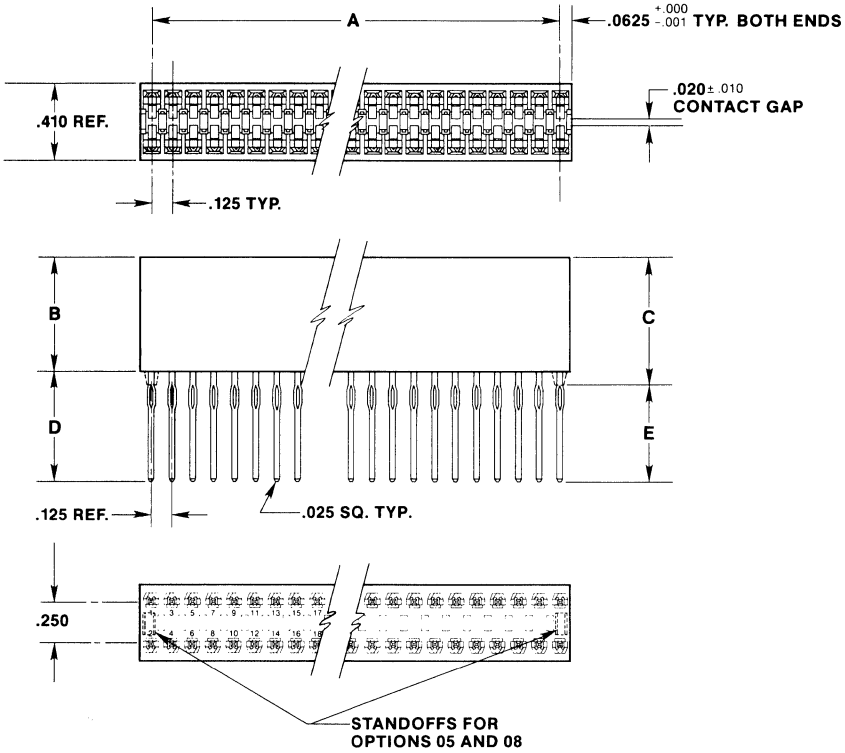
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS								
	Description	A	B	C	D	E	F	G	H	J
01	.300 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.300
02	.415 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.415
03	.300 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.300
04	.415 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.415

**	No. of Contacts	DIMENSIONS										
		A±.010	B±.005	CBSC	D±.005	E±.010	F1	F2	G1	G2	H±.010	J±.005
06	6/12	1.035	.875	.625	.550	.610	.180	.670	.180	.670	.915	.300/.415
10	10/20	1.535	1.375	1.125	.550	.610	.180	.670	.180	.670	1.415	.300/.415
12	12/24	1.785	1.625	1.375	.550	.610	.180	.670	.180	.670	1.665	.300/.415
15	15/30	2.160	2.000	1.750	.550	.610	.180	.670	.180	.670	2.040	.300/.415
18	18/36	2.535	2.375	2.125	.550	.610	.180	.670	.180	.670	2.415	.300/.415
20	20/40	2.785	2.625	2.375	.550	.610	.180	.670	.180	.670	2.665	.300/.415
22	22/44	3.035	2.875	2.625	.550	.610	.180	.670	.180	.670	2.915	.300/.415
25	25/50	3.410	3.250	3.000	.550	.610	.180	.670	.180	.670	3.290	.300/.415
28	28/56	3.785	3.625	3.375	.550	.610	.180	.670	.180	.670	3.665	.300/.415
30	30/60	4.035	3.875	3.625	.550	.610	.180	.670	.180	.670	3.915	.300/.415
31	31/62	4.160	4.000	3.750	.550	.610	.180	.670	.180	.670	4.040	.300/.415
35	35/70	4.660	4.500	4.250	.550	.610	.180	.670	.180	.670	4.540	.300/.415
36	36/72	4.785	4.625	4.375	.550	.610	.180	.670	.180	.670	4.665	.300/.415
40	40/80	5.285	5.125	4.875	.550	.610	.180	.670	.180	.670	5.165	.300/.415
43	43/86	5.660	5.500	5.250	.550	.610	.180	.670	.180	.670	5.540	.300/.415
50	50/100	6.535	6.375	6.125	.550	.610	.180	.670	.180	.670	6.415	.300/.415

C7-PF Series

.125 x .250
Open Ended Design



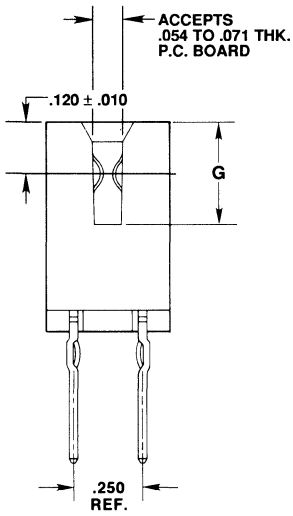


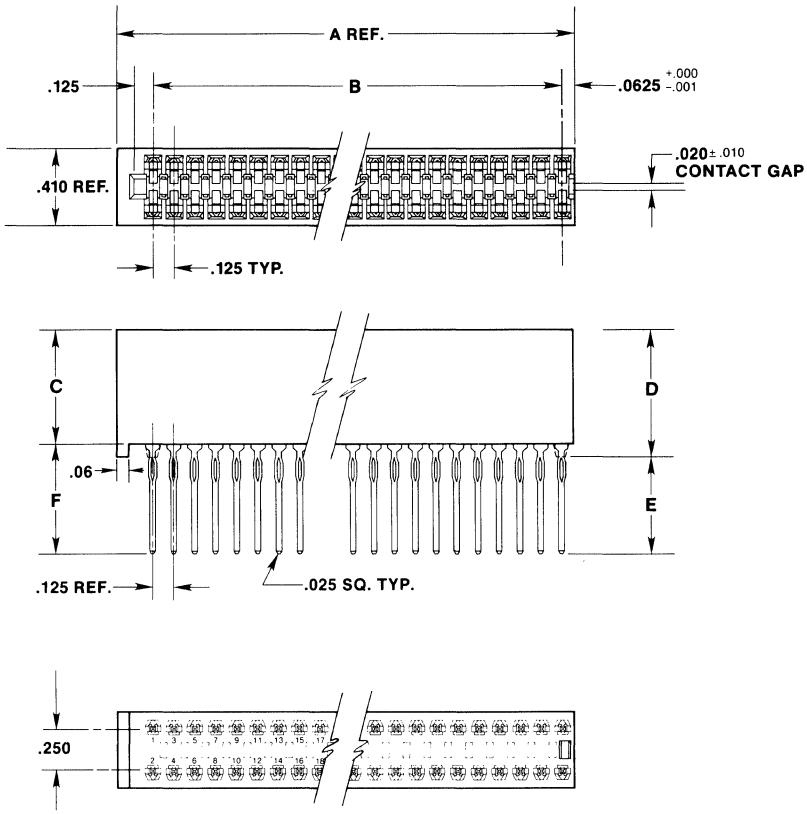
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS					
	Description	A	B	C	D	E	F
05	.300 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.300
06	.415 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.415
07	.300 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.300
08	.415 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.415

**	No. of Contacts	DIMENSIONS							
		A BSC	B ±.005	C ±.010	D_1	D_2	E_1	E_2	F ±.005
06	6/12	.625	.550	.610	.180	.670	.180	.670	.300/.415
10	10/20	1.125	.550	.610	.180	.670	.180	.670	.300/.415
12	12/24	1.375	.550	.610	.180	.670	.180	.670	.300/.415
15	15/30	1.750	.550	.610	.180	.670	.180	.670	.300/.415
18	18/36	2.125	.550	.610	.180	.670	.180	.670	.300/.415
20	20/40	2.375	.550	.610	.180	.670	.180	.670	.300/.415
22	22/44	2.625	.550	.610	.180	.670	.180	.670	.300/.415
25	25/50	3.000	.550	.610	.180	.670	.180	.670	.300/.415
28	28/56	3.375	.550	.610	.180	.670	.180	.670	.300/.415
30	30/60	3.625	.550	.610	.180	.670	.180	.670	.300/.415
31	31/62	3.750	.550	.610	.180	.670	.180	.670	.300/.415
35	35/70	4.250	.550	.610	.180	.670	.180	.670	.300/.415
36	36/72	4.375	.550	.610	.180	.670	.180	.670	.300/.415
40	40/80	4.875	.550	.610	.180	.670	.180	.670	.300/.415
43	43/86	5.250	.550	.610	.180	.670	.180	.670	.300/.415
50	50/100	6.125	.550	.610	.180	.670	.180	.670	.300/.415

C7-PF Series

.125 x .250
Stackable Design



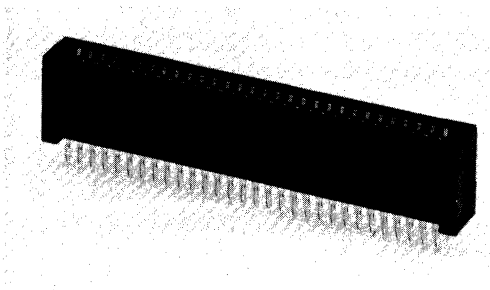


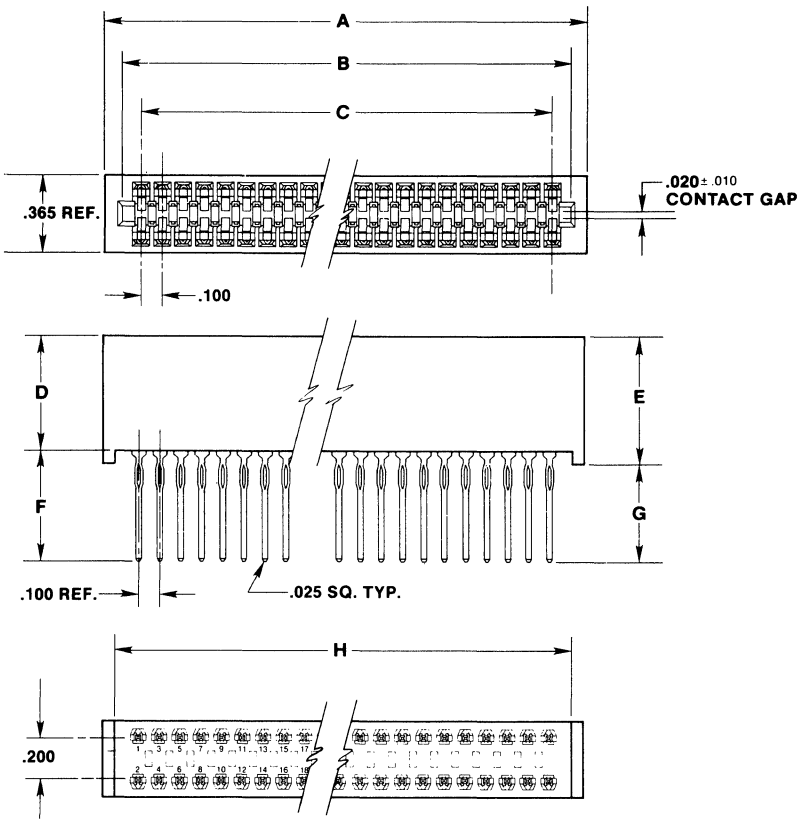
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS						
	Description	A	B	C	D	E	F	G
09	.300 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.300
10	.415 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.415
11	.300 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.300
12	.415 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.415

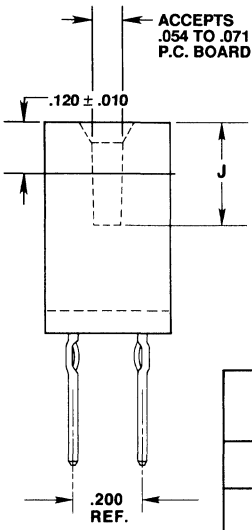
**	No. of Contacts	DIMENSIONS								
		A REF.	B BSC	C ±.005	D ±.010	E1	E2	F1	F2	G ±.005
06	6/12	.893	.625	.550	.610	.180	.670	.180	.670	.300/.415
10	10/20	1.393	1.125	.550	.610	.180	.670	.180	.670	.300/.415
12	12/24	1.643	1.375	.550	.610	.180	.670	.180	.670	.300/.415
15	15/30	2.018	1.750	.550	.610	.180	.670	.180	.670	.300/.415
18	18/36	2.393	2.125	.550	.610	.180	.670	.180	.670	.300/.415
20	20/40	2.643	2.375	.550	.610	.180	.670	.180	.670	.300/.415
22	22/44	2.893	2.625	.550	.610	.180	.670	.180	.670	.300/.415
25	25/50	3.268	3.000	.550	.610	.180	.670	.180	.670	.300/.415
28	28/56	3.643	3.375	.550	.610	.180	.670	.180	.670	.300/.415
30	30/60	3.893	3.625	.550	.610	.180	.670	.180	.670	.300/.415
31	31/62	4.018	3.750	.550	.610	.180	.670	.180	.670	.300/.415
35	35/70	4.518	4.250	.550	.610	.180	.670	.180	.670	.300/.415
36	36/72	4.643	4.375	.550	.610	.180	.670	.180	.670	.300/.415
40	40/80	5.143	4.875	.550	.610	.180	.670	.180	.670	.300/.415
43	43/86	5.518	5.250	.550	.610	.180	.670	.180	.670	.300/.415
50	50/100	6.393	6.125	.550	.610	.180	.670	.180	.670	.300/.415

C8-PF Series

.100 x .200
Closed End Design





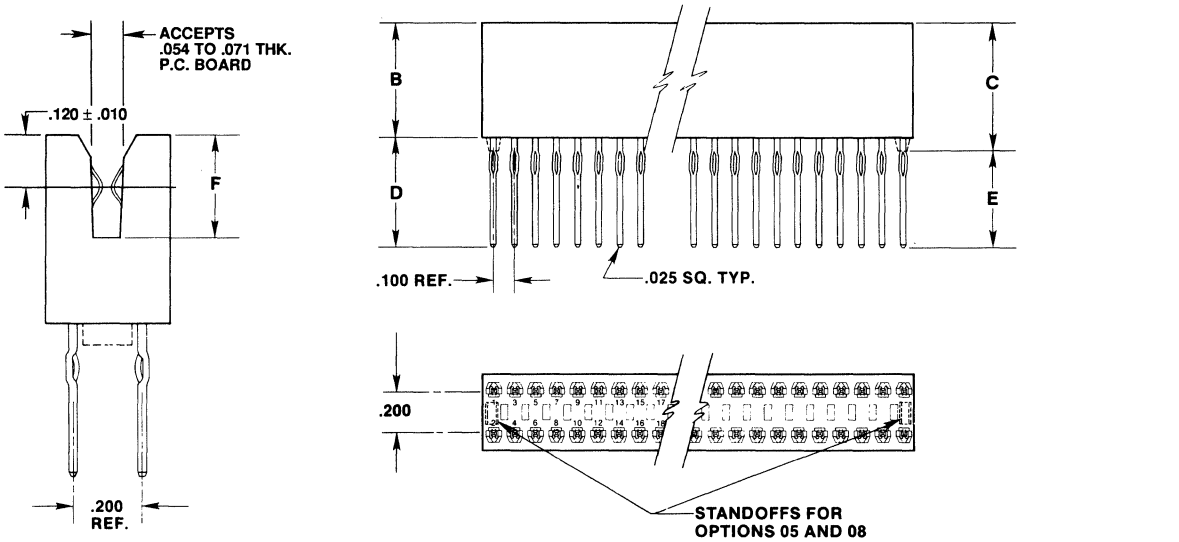


Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS								
	Description	A	B	C	D	E	F	G	H	J
01	.300 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.300
02	.415 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.415
03	.300 Card Slot Depth/Closed End/.550 HT.	√	√	√	√	—	√	—	—	.300
04	.415 Card Slot Depth/Closed End/.610 HT.	√	√	√	—	√	—	√	√	.415

**	No. of Contacts	DIMENSIONS										
		A±.010	B±.005	CBSC	D±.005	E±.010	F1	F2	G1	G2	H±.010	J±.005
06	6/12	.860	.700	.500	.550	.610	.180	.670	.180	.690	.740	.300/.415
10	10/20	1.260	1.100	.900	.550	.610	.180	.670	.180	.690	1.140	.300/.415
12	12/24	1.460	1.300	1.100	.550	.610	.180	.670	.180	.690	1.340	.300/.415
15	15/30	1.760	1.600	1.400	.550	.610	.180	.670	.180	.690	1.640	.300/.415
20	20/40	2.260	2.100	1.900	.550	.610	.180	.670	.180	.690	2.140	.300/.415
22	22/44	2.460	2.300	2.100	.550	.610	.180	.670	.180	.690	2.340	.300/.415
25	25/50	2.760	2.600	2.400	.550	.610	.180	.670	.180	.690	2.640	.300/.415
28	28/56	3.060	2.900	2.700	.550	.610	.180	.670	.180	.690	2.940	.300/.415
30	30/60	3.260	3.100	2.900	.550	.610	.180	.670	.180	.690	3.140	.300/.415
31	31/62	3.360	3.200	3.000	.550	.610	.180	.670	.180	.690	3.240	.300/.415
35	35/70	3.760	3.600	3.400	.550	.610	.180	.670	.180	.690	3.640	.300/.415
36	36/72	3.860	3.700	3.500	.550	.610	.180	.670	.180	.690	3.740	.300/.415
40	40/80	4.260	4.100	3.900	.550	.610	.180	.670	.180	.690	4.140	.300/.415
43	43/86	4.560	4.400	4.200	.550	.610	.180	.670	.180	.690	4.440	.300/.415
50	50/100	5.260	5.100	4.900	.550	.610	.180	.670	.180	.690	5.140	.300/.415
60	60/120	6.260	6.100	5.900	.550	.610	.180	.670	.180	.690	6.140	.300/.415

C8-PF Series

.100 x .200
Open Ended Design

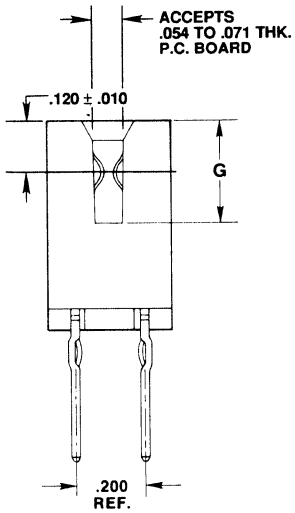


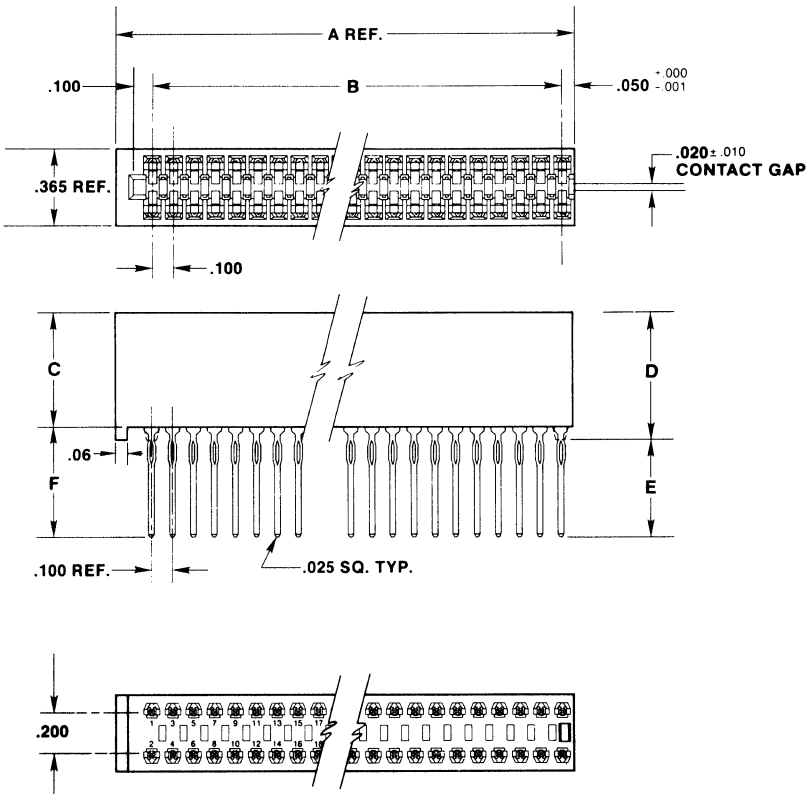
Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS					
	Description	A	B	C	D	E	F
05	.300 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.300
06	.415 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.415
07	.300 Card Slot Depth / Open End / .550 HT.	√	√	—	√	—	.300
08	.415 Card Slot Depth / Open End / .610 HT.	√	—	√	—	√	.415

**	No. of Contacts	DIMENSIONS							
		A BSC	B ±.005	C ±.010	D_1	D_2	E_1	E_2	F ±.005
06	6/12	.500	.550	.610	.180	.670	.180	.690	.300/.415
10	10/20	.900	.550	.610	.180	.670	.180	.690	.300/.415
12	12/24	1.100	.550	.610	.180	.670	.180	.690	.300/.415
15	15/30	1.400	.550	.610	.180	.670	.180	.690	.300/.415
20	20/40	1.900	.550	.610	.180	.670	.180	.690	.300/.415
22	22/44	2.100	.550	.610	.180	.670	.180	.690	.300/.415
25	25/50	2.400	.550	.610	.180	.670	.180	.690	.300/.415
28	28/56	2.700	.550	.610	.180	.670	.180	.690	.300/.415
30	30/60	2.900	.550	.610	.180	.670	.180	.690	.300/.415
31	31/62	3.000	.550	.610	.180	.670	.180	.690	.300/.415
35	35/70	3.400	.550	.610	.180	.670	.180	.690	.300/.415
36	36/72	3.500	.550	.610	.180	.670	.180	.690	.300/.415
40	40/80	3.900	.550	.610	.180	.670	.180	.690	.300/.415
43	43/86	4.200	.550	.610	.180	.670	.180	.690	.300/.415
50	50/100	4.900	.550	.610	.180	.670	.180	.690	.300/.415
60	60/120	5.900	.550	.610	.180	.670	.180	.690	.300/.415

C8-PF Series

.100 x .200
Stackable Design



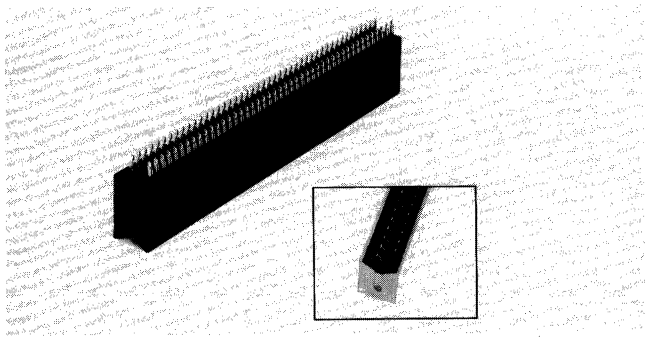


Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS						
	Description	A	B	C	D	E	F	G
09	.300 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.300
10	.415 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.415
11	.300 Card Slot Depth / Closed End / Open End / .550 HT.	√	√	√	—	—	√	.300
12	.415 Card Slot Depth / Closed End / Open End / .610 HT.	√	√	—	√	√	—	.415

**	No. of Contacts	DIMENSIONS								
		A REF.	B BSC	C ±.005	D ±.010	E1	E2	F1	F2	G ±.005
06	6/12	.630	.500	.550	.610	.180	.670	.180	.690	.300/.415
10	10/20	1.030	.900	.550	.610	.180	.670	.180	.690	.300/.415
12	12/24	1.230	1.100	.550	.610	.180	.670	.180	.690	.300/.415
15	15/30	1.530	1.400	.550	.610	.180	.670	.180	.690	.300/.415
20	20/40	2.030	1.900	.550	.610	.180	.670	.180	.690	.300/.415
22	22/44	2.230	2.100	.550	.610	.180	.670	.180	.690	.300/.415
25	25/50	2.430	2.300	.550	.610	.180	.670	.180	.690	.300/.415
28	28/56	2.730	2.600	.550	.610	.180	.670	.180	.690	.300/.415
30	30/60	3.030	2.900	.550	.610	.180	.670	.180	.690	.300/.415
31	31/62	3.130	3.000	.550	.610	.180	.670	.180	.690	.300/.415
35	35/70	3.530	3.400	.550	.610	.180	.670	.180	.690	.300/.415
36	36/72	3.630	3.500	.550	.610	.180	.670	.180	.690	.300/.415
40	40/80	4.030	3.900	.550	.610	.180	.670	.180	.690	.300/.415
43	43/86	4.330	4.200	.550	.610	.180	.670	.180	.690	.300/.415
50	50/100	5.030	4.900	.550	.610	.180	.670	.180	.690	.300/.415
60	60/120	6.030	5.900	.550	.610	.180	.670	.180	.690	.300/.415

W8 PRESS FIT FULL SCOOP

.100 x .200, CLOSED END, OPEN ENDED AND STACKABLE



DESIGN FEATURES

Proven cantilever contact design, performance consistency in installation forces and electrical characteristics after artificial aging, excellent characteristics under all operating conditions, available in positions 6 thru 60, closed ended, open ended, and stackable. Also available in low and high profile (.645 & .705) configurations.

PROVEN CONTACT DESIGN

Highly reliable cantilever contacts are utilized to ensure optimum normal contact force over the full range of PC board thicknesses. A uniquely contoured mating surface on each contact further increases reliability by concentrating the normal force in the real contact area while maintaining circuit continuity under all stipulated test and operating conditions. Individual contacts are replaceable if accidentally damaged during handling or installation for most series.

PROVEN INSULATOR DESIGN

Designed to meet or exceed UL flammability requirements, connector bodies are molded in UL 94V-O thermoplastic material and are offered in several mounting styles. All styles incorporate polarized keyways between the contacts and a generous lead-in chamber for ease of PC card entry.

PROVEN PERFORMANCE

Utilizing only proven and the most cost-effective designs and materials, Holmberg connectors guarantee performance which meets or exceeds industry standard requirements, at the same time, providing an exemplary level of operational reliability at attractive and competitive prices.

DESIGN OPTIONS

A variety of plating, mounting, termination and identification options are offered to meet specific user requirements.

RECOMMENDED P.C.B. HOLE CONSTRUCTION

Drilled hole of .0453±.0010, .001-.003 Copper, .0003 min. Tin/Lead to a finished hole size of .040±.003.

Part Number, Description and Ordering Information

W8 D43 PF 29 01 3 XX

SERIES DESIGNATOR

NUMBER OF CONTACT PAIRS AND READOUTS
D - Dual readout
18, 20, 22, 25, 28, 30, 35, 36, 40, 43, 45, 50, 60

TERMINATION STYLE
PF - Press Fit

CONTACT PLATING
29 - 30 μ-in. gold selectively plated over contact area; tin lead over tails; 50 μ-in. nickel underplate all over. Other platings available (consult factory).

STYLE OF DESIGN OPTION
01 - .510 card slot depth/closed ends/no standoffs
02 - .510 card slot depth/open ends/no standoffs
03 - .510 card slot depth/open end & closed end/ no standoffs
04 - .395 card slot depth/closed ends/no standoffs
05 - .395 card slot depth/open end & closed end/ no standoffs
06 - .510 card slot depth/closed ends/standoffs
07 - .510 card slot depth/open ends/standoffs
08 - .510 card slot depth/open end & closed end/ standoffs
09 - .395 card slot depth/closed ends/standoffs
10 - .395 card slot depth/open end & closed end/ standoffs

CONTACT TAIL LENGTHS
2 - (D_2) - .670 ± .015 (wire wrap) (.645 high insulator)
3 - (D_3) - .180 ± .015
4 - (D_4) - .690 ± .015 (wire wrap) (.705 high insulator)
5 - (D_5) - .475 ± .015 (wire wrap)
6 - (D_6) - .378 ± .015
7 - (D_7) - .625 ± .015

SPECIAL MODIFICATION
(consult factory)

Performance Characteristics

Operating voltage:	W8D 600 VDC (sea level)
Current rating:	3 amps
Operating temperature:	-55° C to +125° C
Contact resistance:	10 milliohms
Insulation resistance:	5000 megohms minimum
Contact retention:	5 lbs. minimum
Durability:	Up to 500 insertions and withdrawals without degradation of performance, dependent upon contact plating thickness selected
Contact insertion force:	10 oz. max. measured with a .0700±.0001 THK polished blade per MIL-C-21097C
Contact withdrawal force:	1 oz. min. measured with a .0540±.0001 THK polished test blade per MIL-C-21097C after sizing 3 times with a .0700±.0001 THK test blade
Temperature cycling:	MIL-STD-202, method 107B
Moisture resistance:	Humidity per MIL-STD-202, method 103
Vibration:	MIL-STD-202, method 204A
Thermal shock:	MIL-STD-202, method 107

Note: Specifications are subject to change without notice — consult factory for available modifications and verification of design details

All dimensions shown in inches.

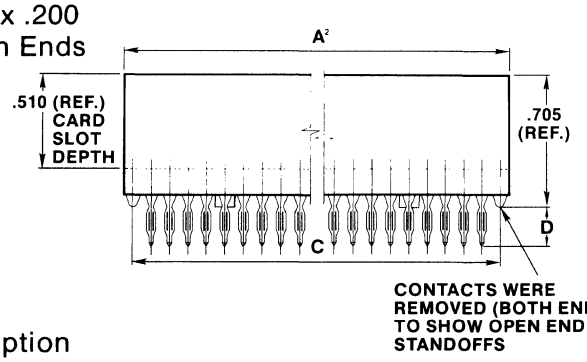
Materials

Insulator body:	Glass filled thermoplastic, UL rating 94V-O
Spring contact:	Phosphor Bronze alloy
Polarizing Key:	Nylon, color-white P/N 9801400

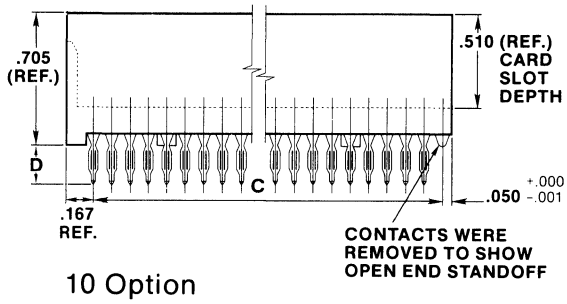
UL Recognized and CSA certified.

W8-PF, Full Scoop, Series

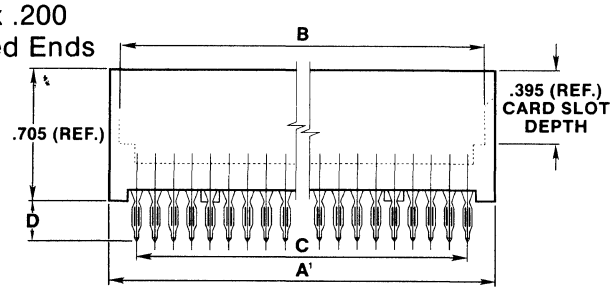
07 Option
.100 x .200
Open Ends



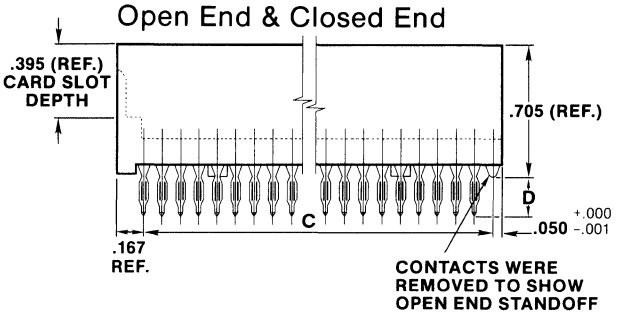
08 Option
.100 x .200
Open End & Closed End



09 Option
.100 x .200
Closed Ends



10 Option
.100 x .200
Open End & Closed End



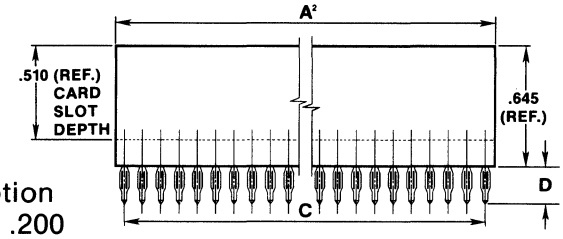
D

Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS				
	Description	A^1	A^2	B	C	D
07	.510 Card Slot Depth/Open Ends/Standoffs	—	√	—	√	√
08	.510 Card Slot Depth/Open End Closed End/Standoffs	—	—	—	√	√
09	.395 Card Slot Depth/Closed Ends/Standoffs	√	—	√	√	√
10	.395 Card Slot Depth/Open End Closed End/Standoffs	—	—	—	√	√

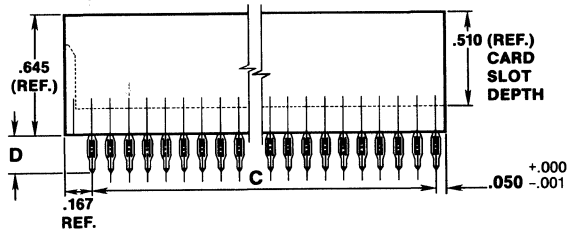
NUMBER OF CONTACTS		$A^1 \pm .007$	$A^{2\,+.000}_{-.002}$	$B \pm .004$	$C \pm .005$	D_2	D_3	D_4	D_5	D_6	D_7
18	18/36	2.034	1.800	1.904	1.700	.670	.180	.690	.475	.378	.625
20	20/40	2.234	2.000	2.104	1.900	.670	.180	.690	.475	.378	.625
22	22/44	2.434	2.200	2.304	2.100	.670	.180	.690	.475	.378	.625
25	25/50	2.734	2.500	2.604	2.400	.670	.180	.690	.475	.378	.625
28	28/56	3.034	2.800	2.904	2.700	.670	.180	.690	.475	.378	.625
30	30/60	3.234	3.000	3.104	2.900	.670	.180	.690	.475	.378	.625
35	35/70	3.734	3.500	3.604	3.400	.670	.180	.690	.475	.378	.625
36	36/72	3.834	3.600	3.704	3.500	.670	.180	.690	.475	.378	.625
40	40/80	4.234	4.000	4.104	3.900	.670	.180	.690	.475	.378	.625
43	43/86	4.534	4.300	4.404	4.200	.670	.180	.690	.475	.378	.625
45	45/90	4.734	4.500	4.604	4.400	.670	.180	.690	.475	.378	.625
50	50/100	5.234	5.000	5.104	4.900	.670	.180	.690	.475	.378	.625
60	60/120	6.234	6.000	6.104	5.900	.670	.180	.690	.475	.378	.625

W8-PF, Full Scoop, Series

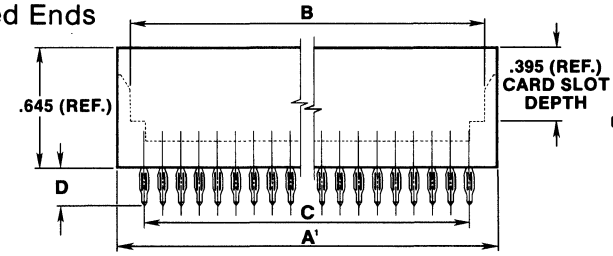
02 Option
.100 x .200
Open Ends



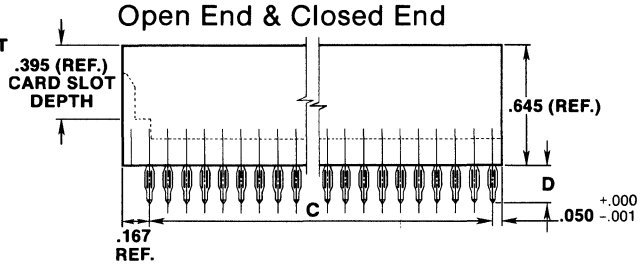
03 Option
.100 x .200
Open End & Closed End



04 Option
.100 x .200
Closed Ends



05 Option
.100 x .200
Open End & Closed End



Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS				
	Description	A^1	A^2	B	C	D
02	.510 Card Slot Depth / Open Ends / No Standoffs	—	√	—	√	√
03	.510 Card Slot Depth / Open End / Closed End / No Standoffs	—	—	—	√	√
04	.395 Card Slot Depth / Closed Ends / No Standoffs	√	—	√	√	√
05	.395 Card Slot Depth / Open End / Closed End / No Standoffs	—	—	—	√	√

NUMBER OF CONTACTS		$A^1 \pm .007$	$A^{2\,+.000}_{-.002}$	$B \pm .004$	$C \pm .005$	D_2	D_3	D_4	D_5	D_6	D_7
18	18/36	2.034	1.800	1.904	1.700	.670	.180	.690	.475	.378	.625
20	20/40	2.234	2.000	2.104	1.900	.670	.180	.690	.475	.378	.625
22	22/44	2.434	2.200	2.304	2.100	.670	.180	.690	.475	.378	.625
25	25/50	2.734	2.500	2.604	2.400	.670	.180	.690	.475	.378	.625
28	28/56	3.034	2.800	2.904	2.700	.670	.180	.690	.475	.378	.625
30	30/60	3.234	3.000	3.104	2.900	.670	.180	.690	.475	.378	.625
35	35/70	3.734	3.500	3.604	3.400	.670	.180	.690	.475	.378	.625
36	36/72	3.834	3.600	3.704	3.500	.670	.180	.690	.475	.378	.625
40	40/80	4.234	4.000	4.104	3.900	.670	.180	.690	.475	.378	.625
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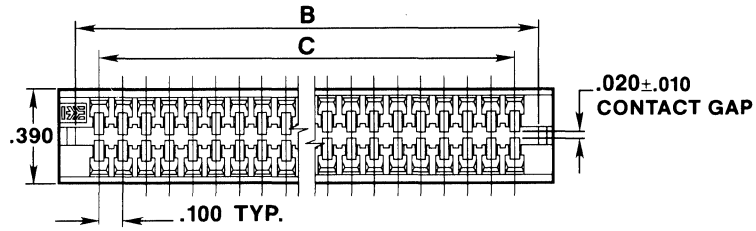
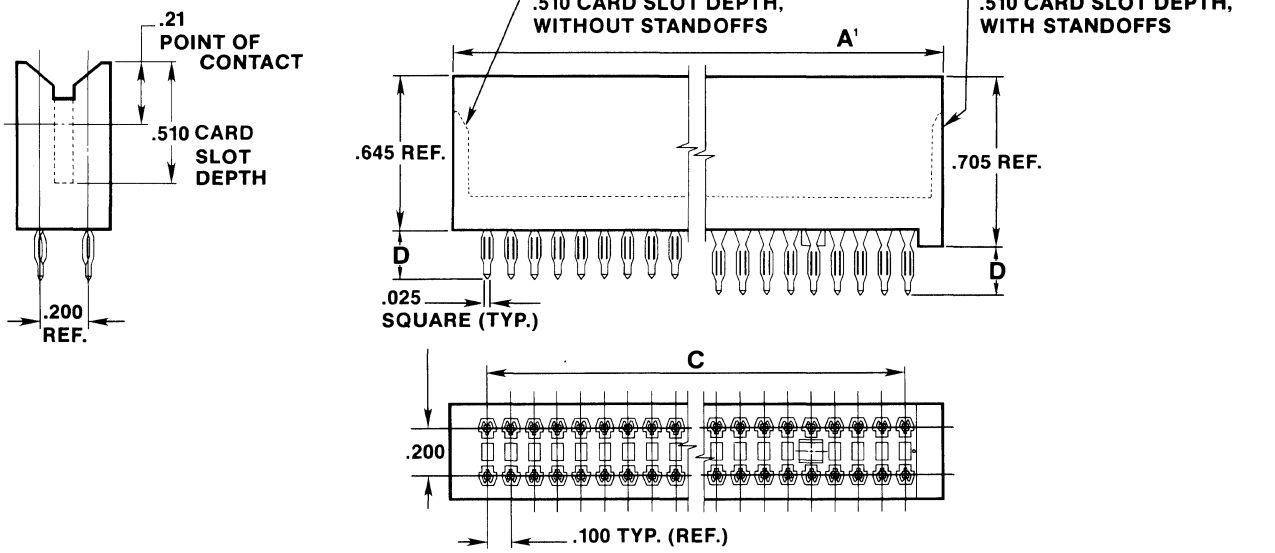
45	45/90	4.734	4.500	4.604	4.400	.670	.180	.690	.475	.378	.625
50	50/100	5.234	5.000	5.104	4.900	.670	.180	.690	.475	.378	.625
60	60/120	6.234	6.000	6.104	5.900	.670	.180	.690	.475	.378	.625

W8-PF, Full Scoop, Series

01 Option
.100 x .200
Closed Ends

06 Option
.100 x .200
Closed Ends





Style No.	DESIGN OPTIONS	APPLICABLE DIMENSIONS				
	Description	A^1	A^2	B	C	D
01	.510 Card Slot Depth/Closed Ends / No Standoffs	√	—	√	√	√
06	.510 Card Slot Depth/Closed Ends / Standoffs	√	—	√	√	√

NUMBER OF CONTACTS		$A^1 \pm .007$	$A^{2\,+.000}_{-.002}$	B ± .004	C ± .005	D_2	D_3	D_4	D_5	D_6	D_7
18	18/36	2.034	1.800	1.904	1.700	.670	.180	.690	.475	.378	.625
20	20/40	2.234	2.000	2.104	1.900	.670	.180	.690	.475	.378	.625
22	22/44	2.434	2.200	2.304	2.100	.670	.180	.690	.475	.378	.625
25	25/50	2.734	2.500	2.604	2.400	.670	.180	.690	.475	.378	.625
28	28/56	3.034	2.800	2.904	2.700	.670	.180	.690	.475	.378	.625
30	30/60	3.234	3.000	3.104	2.900	.670	.180	.690	.475	.378	.625
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40	40/80	4.234	4.000	4.104	3.900	.670	.180	.690	.475	.378	.625
43	43/86	4.534	4.300	4.404	4.200	.670	.180	.690	.475	.378	.625
45	45/90	4.734	4.500	4.604	4.400	.670	.180	.690	.475	.378	.625
50	50/100	5.234	5.000	5.104	4.900	.670	.180	.690	.475	.378	.625
60	60/120	6.234	6.000	6.104	5.900	.670	.180	.690	.475	.378	.625

DIN 41612
Connector Systems

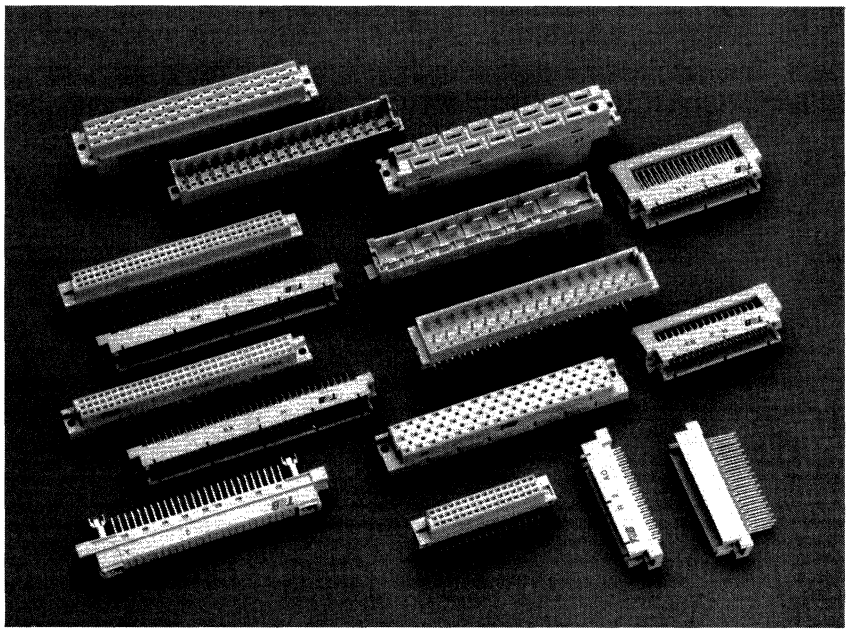
E

TABLE OF CONTENTS

OVERVIEW

Thomas & Betts Corporation designs, manufactures and markets electronic and electrical components and systems for connecting, fastening, protecting, insulating and identifying wires, components and conduits. Products include IDC mass termination cables and connectors, two-piece connectors, fiber optics, DIP and VLSI sockets, flexible interconnects, multipin connectors, wire fastening devices, fittings, solderless terminals, insulation products, and accessories.

Thomas & Betts products are used in a variety of equipment, applications and markets. From computers to power stations, medical equipment to telecommunications—you can rely on Thomas & Betts for reliable, innovative problem-solving products for electronic and electrical applications.



Compliance

The Thomas & Betts DIN 41612 two-piece connector system is manufactured to the highest quality standards. It complies with the following major industry standards:

DIN 41612

VG 95324

IEC 603-2

BS 9525

BT 222

UL/CSA

HE 12

How to use this catalog

This catalog describes our line of DIN 41612 two-piece printed circuit connector types:

CATEGORY	DIN TYPES	THOMAS & BETTS SERIES NUMBER
Standard DIN	B, C	16
Inverse DIN	Q, R	21
Power—Low Profile	D, E	17
Power—Heavy Duty	F, G	38
High Current	H	37
Hybrid—Power, Signal & Coax	M	22

The Thomas & Betts DIN 41612 product line is organized into six categories. Each category is designated by a distinct Thomas & Betts Series number. Each Series number consists of different connector types, each with variations of gender, housing configuration, number of positions, termination style, contact loading, plating and performance level.

Use the Table of Contents to find specific connectors. At the beginning of each Series section, you will find a general description of the Series, including application information and design considerations.

Service and Support

Recognizing the many electrical and mechanical variables involved in selecting a printed circuit board connector, Thomas & Betts maintains a staff of trained sales people and technical service representatives.

In recognition of the need to supply sophisticated backplane technology, Thomas & Betts works closely with the leading backplane manufacturers through our Backpanel Interconnection Program. Consult your Thomas & Betts representative for more information concerning your specific application.

OVERVIEW

DIN 41612 Two-Piece PCB Connectors

Thomas & Betts DIN 41612 connectors incorporate internationally accepted design advantages of DIN 41612/IEC 603-2 two-piece connectors with the quality and performance that you expect.

The Deutsches Institut für Normung (DIN) in Germany develops specifications for components of industrial equipment. This standardization has achieved consistent and economical design.

The DIN 41612 specification was introduced during 1976, although in 1980 the International Electronic Commission (IEC) drafted identical standards (603-2). The U.S. and British Government have also established specifications (MIL-C-55302 and BS 9525). Inverse DIN specifications were completed in 1984.

DIN 41612 connectors are manufactured according to performance levels as shown below.

Performance level 1 per DIN 41612, part 5

250 mating cycles.
21 days gas test using 10 ppm SO_2.
250 mating cycles.
Measurement of contact resistance, then visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.

Performance level 2 per DIN 41612, part 5

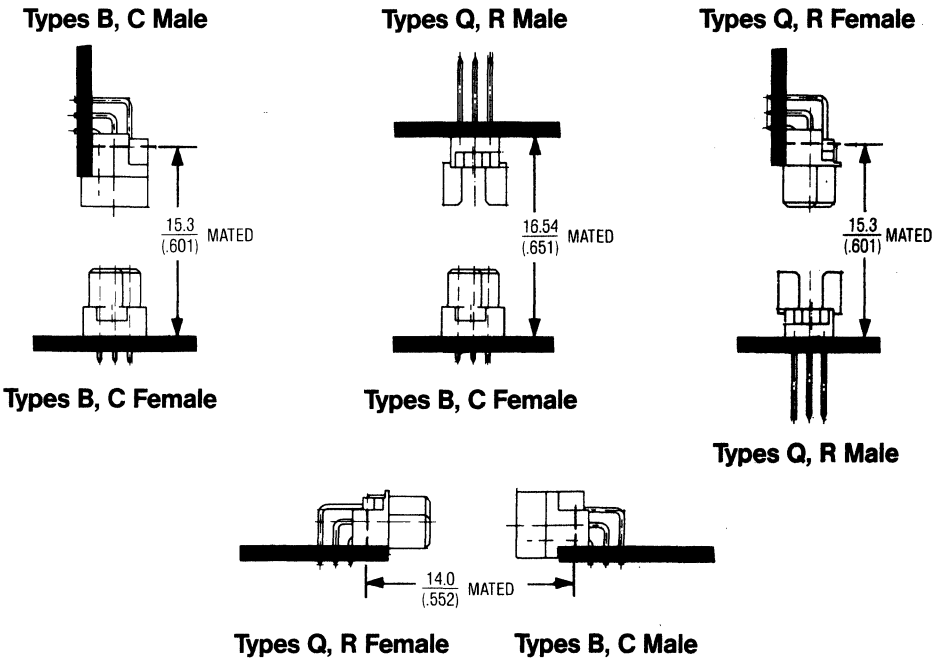
200 mating cycles.
4 days gas test using 10 ppm SO_2.
200 mating cycles.
Measurement of contact resistance, then visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.

Performance level 3 per DIN 41612, part 5

50 mating cycles.
Visual inspection. No gas test.

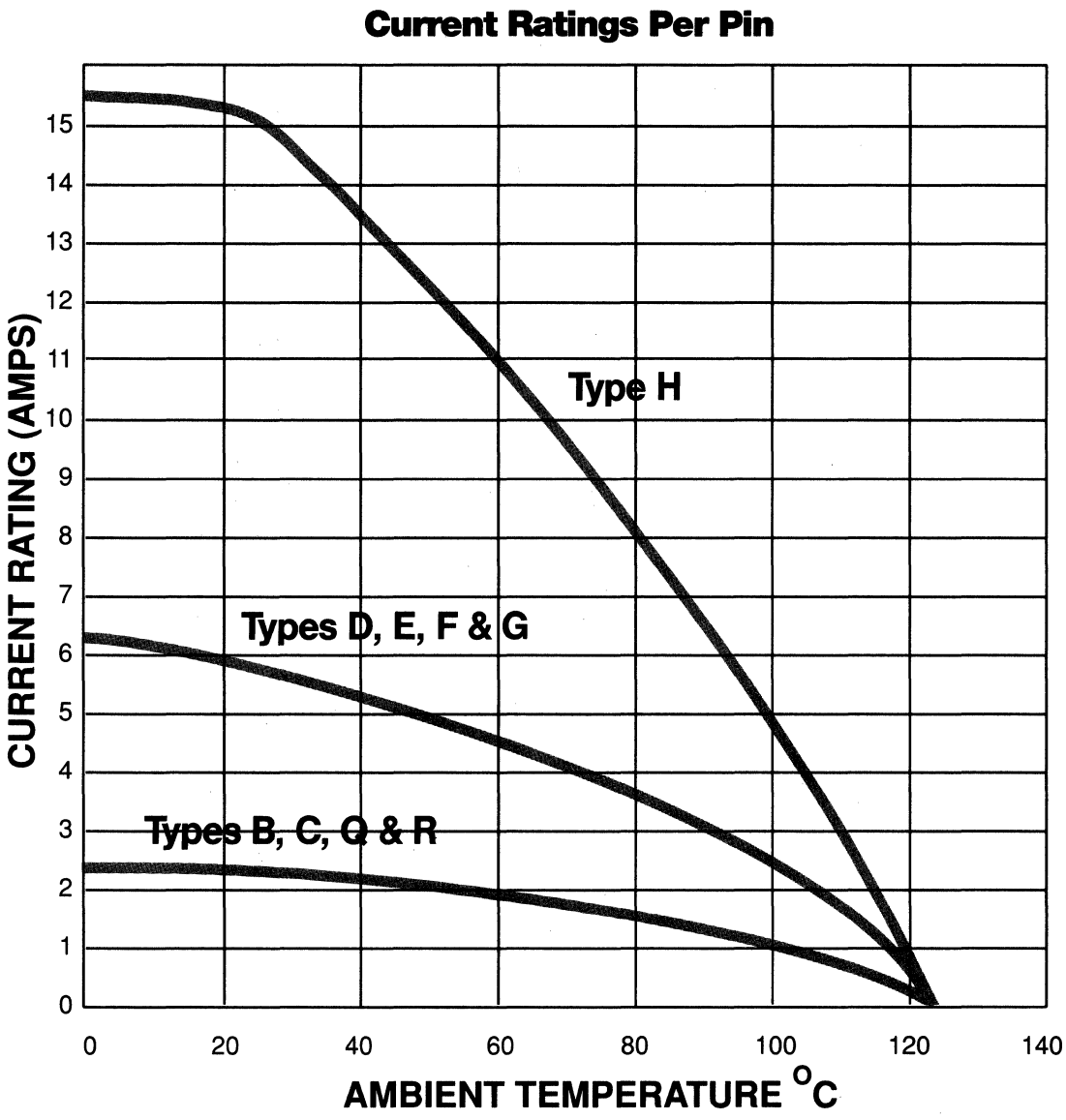
Measurement of contact resistance, then visual inspection. No abrasion of the contact finish through to the base material. No functional impairment.

Intermateability of DIN 41612 Connector Types



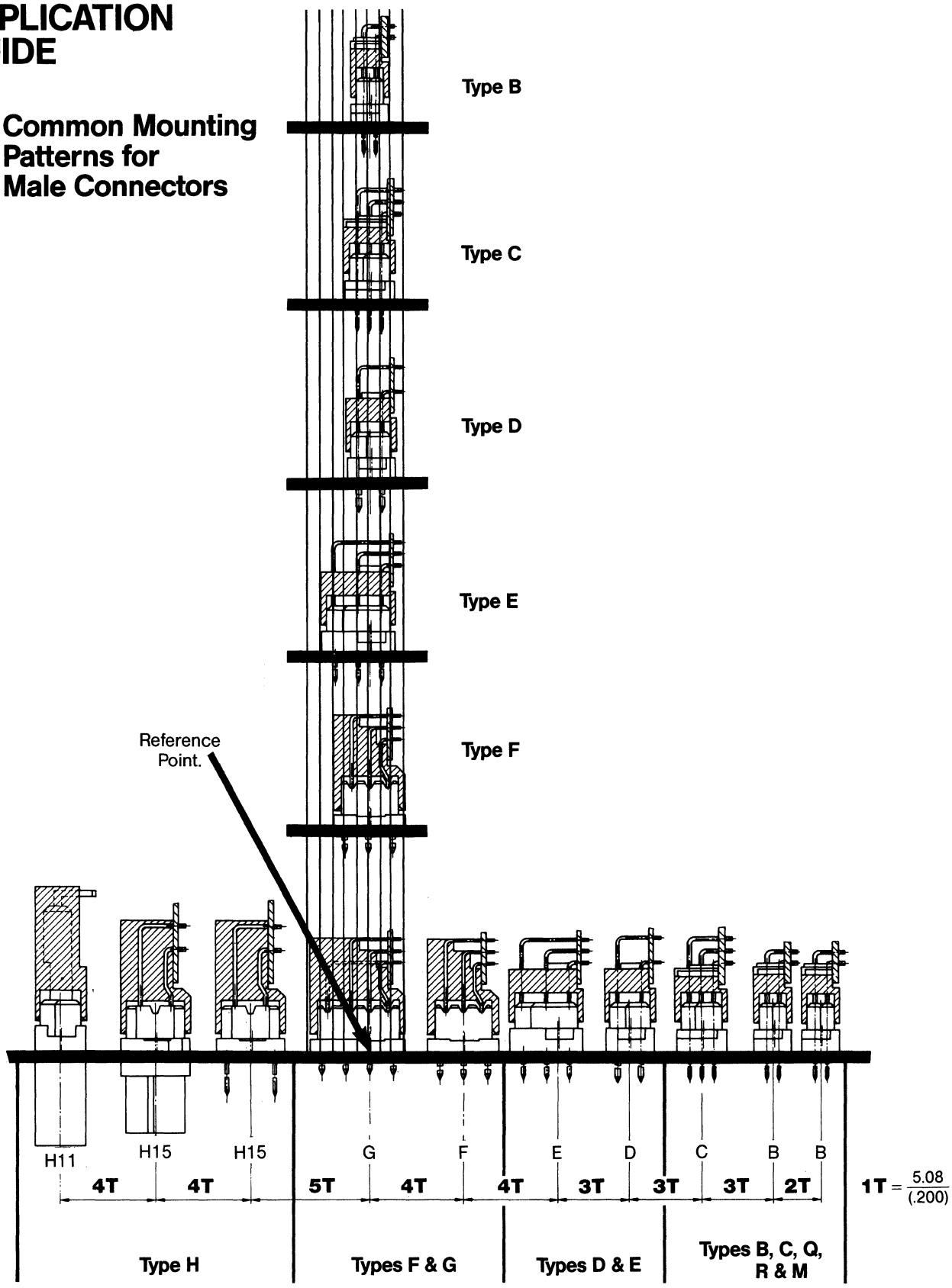
Dimensions shown are for reference only.
Dimensions are in MM (inches)

APPLICATION GUIDE



APPLICATION GUIDE

Common Mounting Patterns for Male Connectors



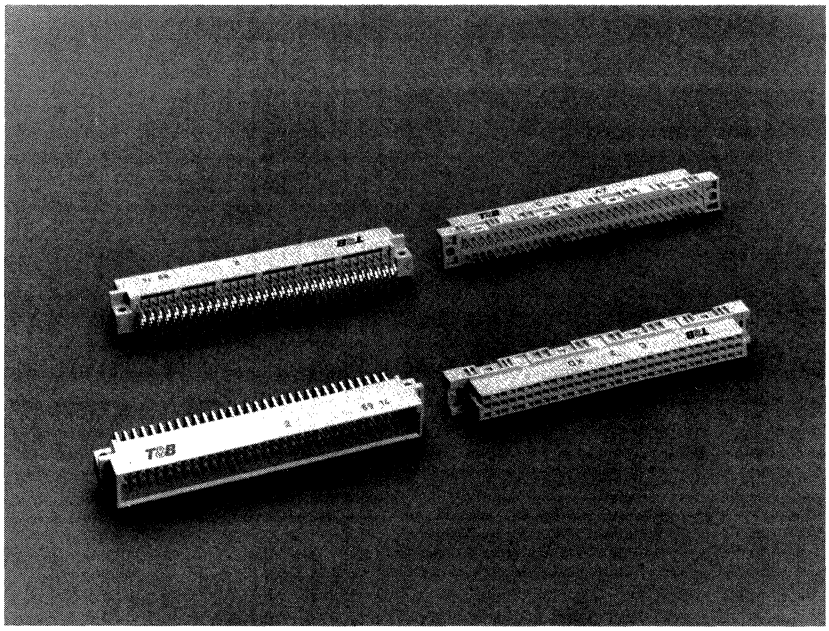
Minimum Recommended Spacing Between Female Connectors.

STANDARD DIN TYPES B AND C SERIES 16

LR92984 E60980

Description/Application

Thomas & Betts Series 16 two-piece connectors are designed to provide a reliable, convenient means to interconnect printed circuit boards according to DIN 41612, part 1 and IEC (International Electronic Commission) 603-2. Ideal for use in telecom, data processing and industrial electronics applications, they are fully compatible with 19" subracks and assemblies.



Design Considerations

- Available in 10, 16, 20, 24, 30, 32, 48, 64 and 96 positions
- Dual opposing beam contacts for full contact redundancy
- Coined and polished mating surfaces for reduced insertion forces
- Rounded solder posts for easier insertion into PC boards
- Tin/lead plating offers long shelf life for consistent solderability and resistance to whisker growth.
- Available in a full complement of termination styles, including solder eyelet, 90° solder post, straight solder post, solder tail, wire wrap post and pressfit post.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.

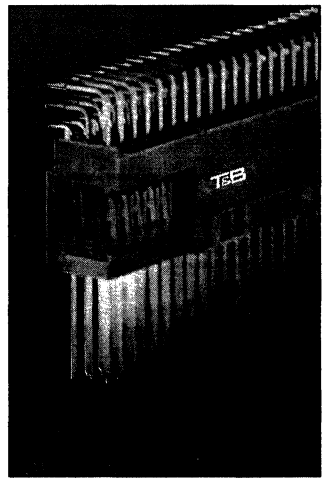
Ordering Information

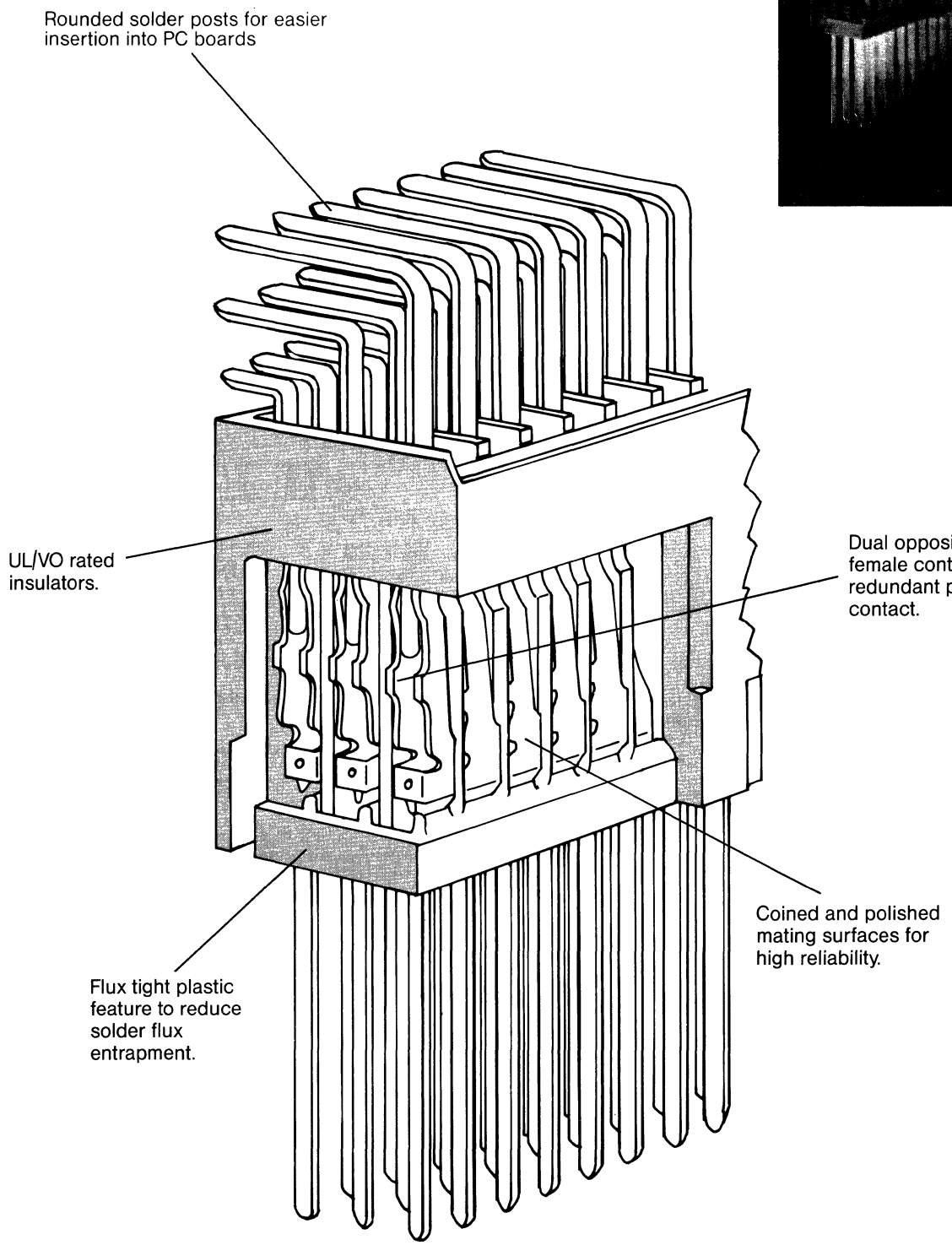
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

161-99630-300X

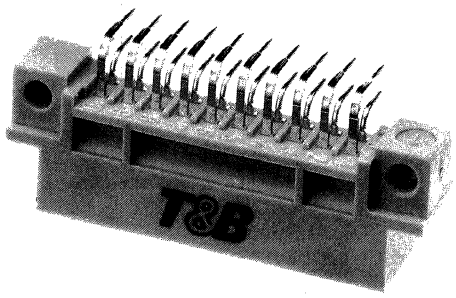
- ***T & B Series*** — 161
- ***Gender*** — 1
- ***Housing*** — 99630
- ***Number of Contacts*** — 300
- ***Contact Loading*** — 30
- ***Termination Style*** — 0
- ***Plating in Termination Area*** — X
- ***Performance Level*** — X

DESIGN CONSIDERATIONS





Type B/3
Male Connector
Series 16

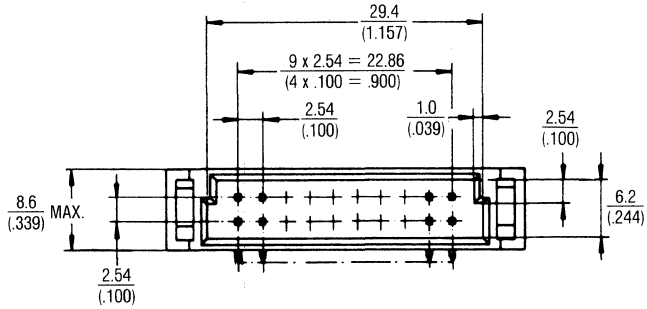


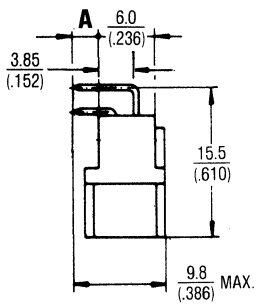
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

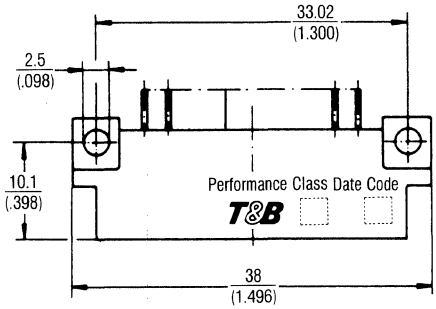
Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

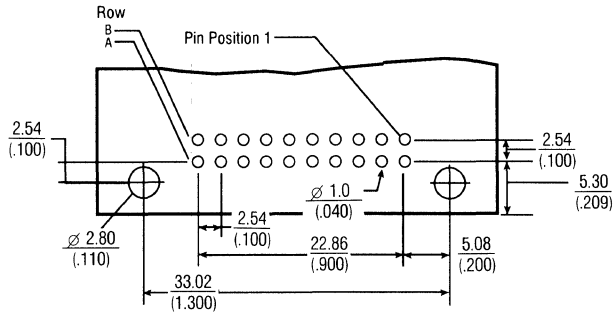






Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

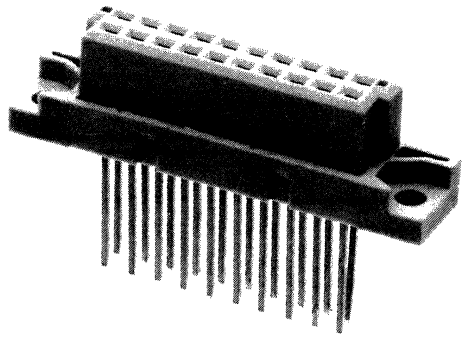


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
20	a, b 1, 2, 3 - 10	161-12030-300X	A = 2.9 (.114)	0.6 (.024), 0.6 (.024), 1.0 (.040) **Solder Post** 0.6 x 0.6 (.024 x .024)
20	a, b 1, 2, 3 - 10	161-12030-310X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type B/3
Female Connector
Series 16

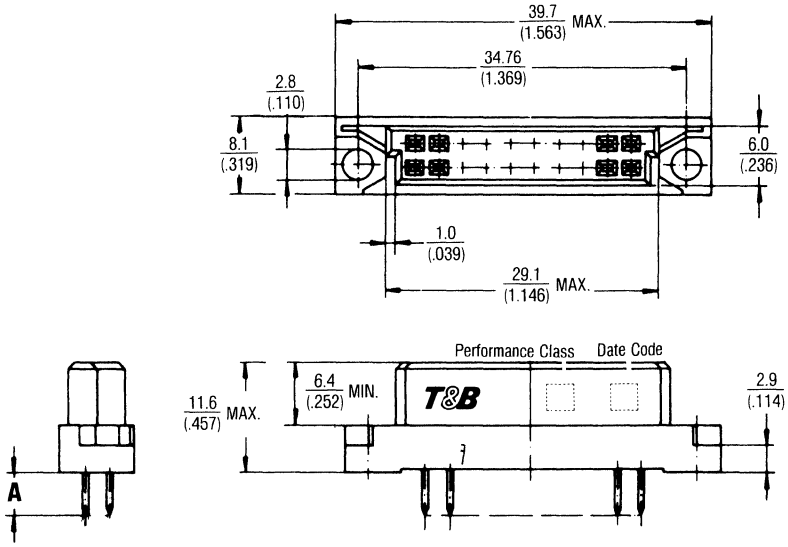


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

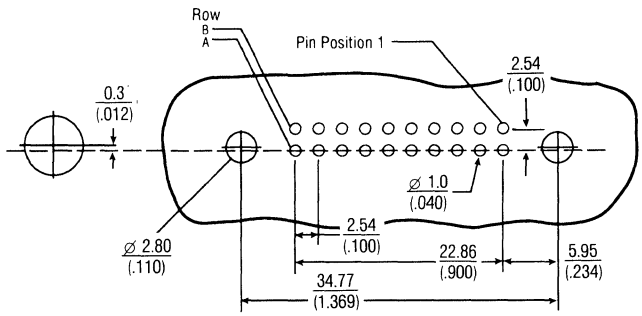
Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



Recommended Printed Circuit Board Layout

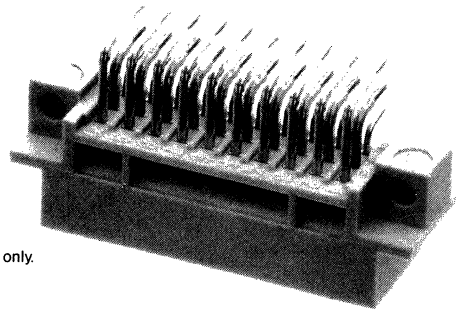


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
20	a, b 1, 2, 3 - 10	162-12030-625X	A = 2.9 (.114)	Solder Tail 0.6 x 0.25 (.024 x .010)
20	a, b 1, 2, 3 - 10	162-12030-725X	A = 4.5 (.177)	
20	a, b 1, 2, 3 - 10	162-12030-605X	A = 2.9 (.114)	Solder Post 0.6 x 0.6 (.024 x .024)
20	a, b 1, 2, 3 - 10	162-12030-705X	A = 4.5 (.177)	
20	a, b 1, 2, 3 - 10	162-12030-505X	A = 13.0 (.512)	Wire Wrap Post 0.64 x 0.64 (.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C/3
Male Connector
Series 16

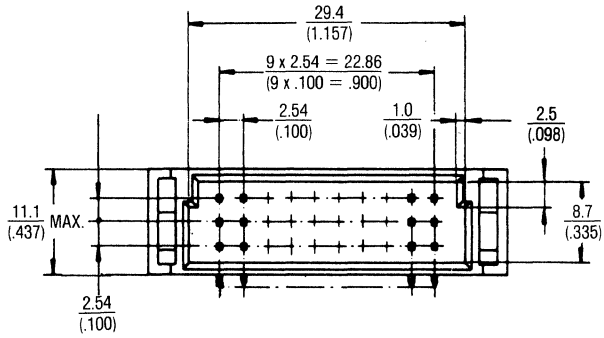


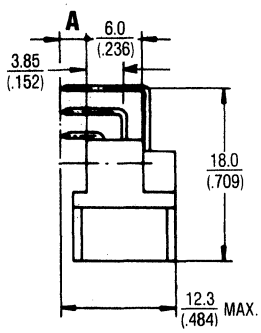
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

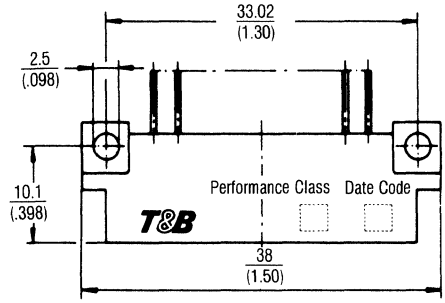
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

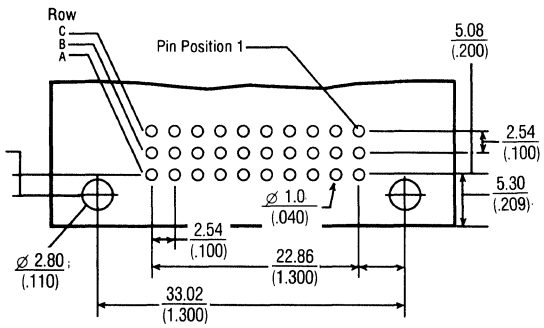




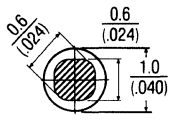


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

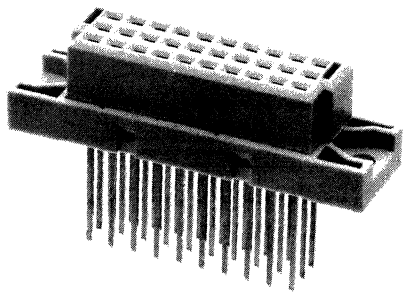


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
20 30	a, c 1, 2, 3 - 10 a, b, c 1, 2, 3 - 10	161-22050-300X 161-23030-300X	A = 2.9 (.114)	 Solder Post 0.6 x 0.6 (.024 x .024)
20 30	a, c 1, 2, 3 - 10 a, b, c 1, 2, 3 - 10	161-22050-310X 161-23030-310X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C/3
Female Connector
Series 16

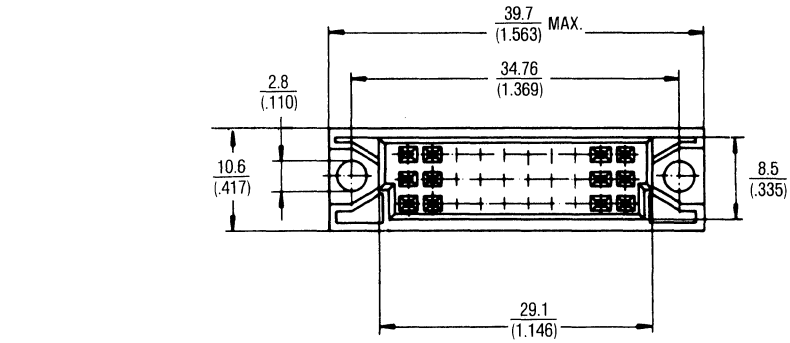


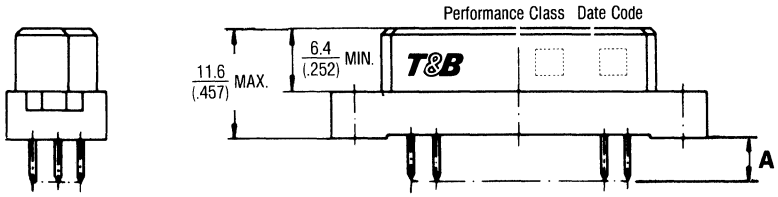
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

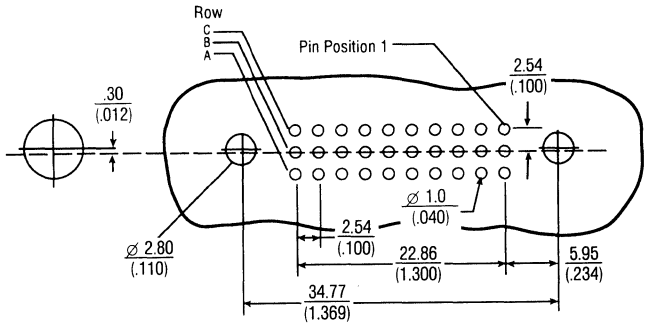
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM / (inches)

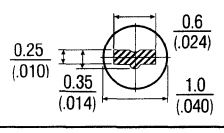
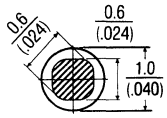




Recommended Printed Circuit Board Layout

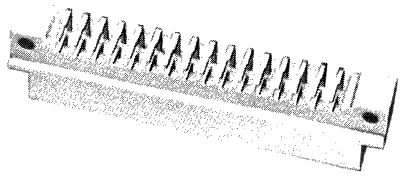


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM / (INCHES)		
20 30	a, c 1, 2, 3 - 10 a, b, c 1, 2, 3 - 10	162-22050-625X 162-23030-625X	A = 2.9 / (.114)		**Solder Tail** 0.6 x 0.25 (.024 x .010)
20 30	a, c 1, 2, 3 - 10 a, b, c 1, 2, 3 - 10	162-22050-725X 162-23030-725X	A = 4.5 / (.177)		
30	a, b, c 1, 2, 3 - 10	162-23030-605X	A = 2.9 / (.114)		**Solder Post** 0.6 x 0.6 (.024 x .024)
30	a, b, c 1, 2, 3 - 10	162-23030-705X	A = 4.5 / (.177)		
20 30	a, c 1, 2, 3 - 10 a, b, c 1, 2, 3 - 10	162-22050-505X 162-23030-505X	A = 13.0 / (.512)	**Wire Wrap Post**	0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

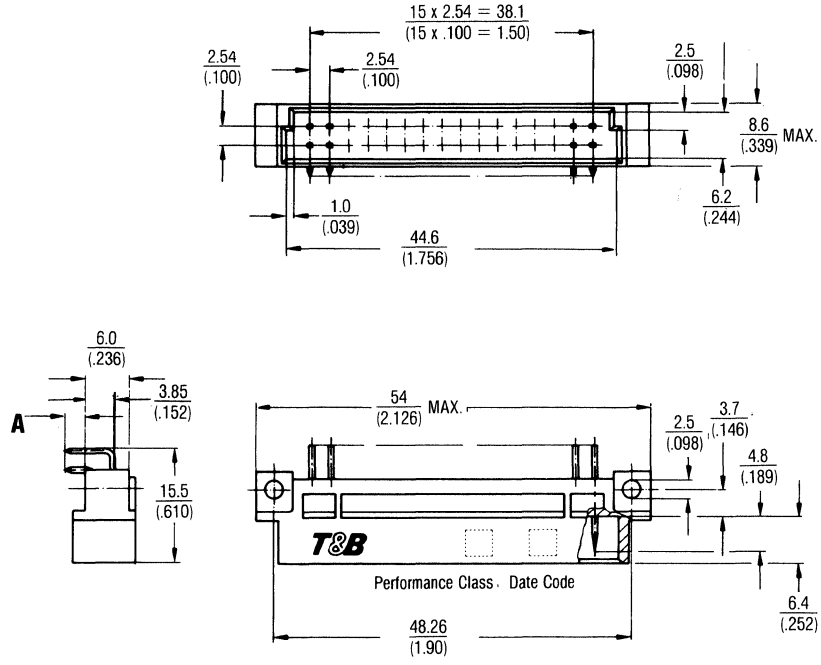
Type B/2
Male Connector
Series 16



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

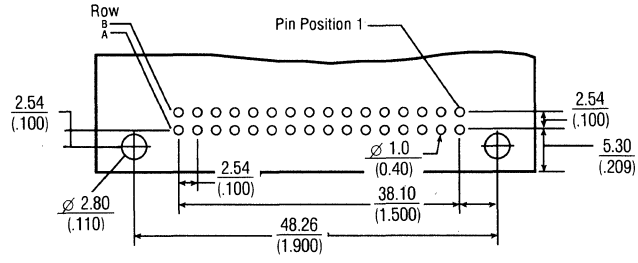
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Dimensions shown are for reference only.
Dimensions are in MM (inches)

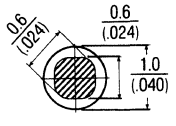


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

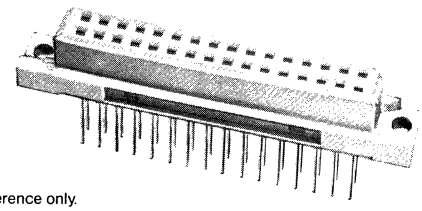


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	161-31620-300X 161-33230-300X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	161-31620-310X 161-33230-310X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type B/2
Female Connector
Series 16

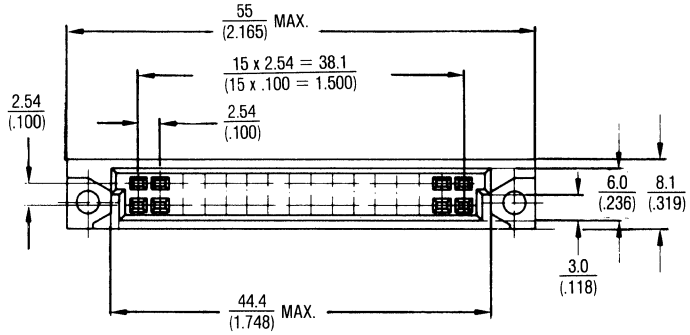


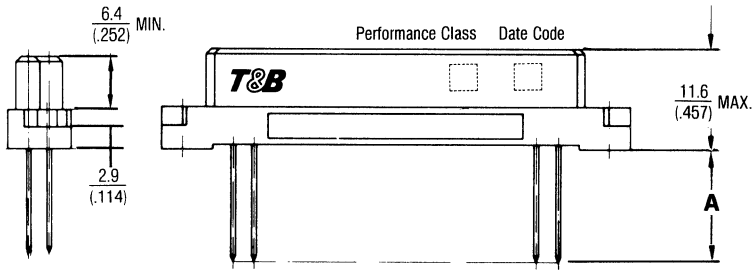
Physical Properties
Insulation Material–Glass filled thermoplastic rated UL 94V-0, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

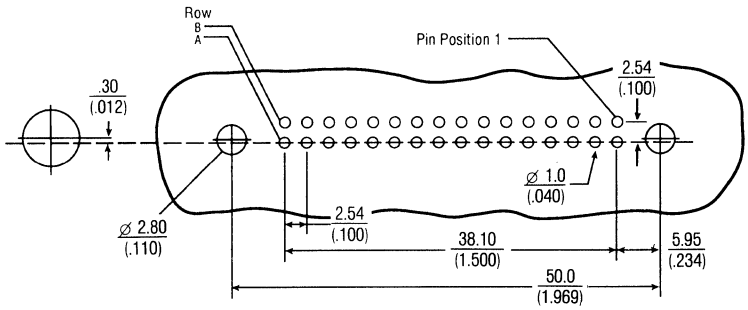
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

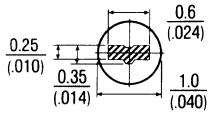
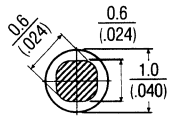




Recommended Printed Circuit Board Layout

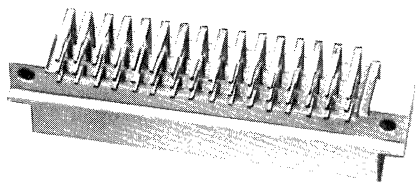


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	162-31620-625X 162-33230-625X	A = 2.9 (.114)		**Solder Tail** 0.6 x 0.25 (.024 x .010)
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	162-31620-725X 162-33230-725X	A = 4.5 (.177)		
32	a, b 1, 2, 3 - 16	162-33230-605X	A = 2.9 (.114)		**Solder Post** 0.6 x 0.6 (.024 x .024)
32	a, b 1, 2, 3 - 16	162-33230-705X	A = 4.5 (.177)		
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	162-31620-505X 162-33230-505X	A = 13 (.512)	**Wire Wrap Post**	0.64 x 0.64 (.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C/2
Male Connector
Series 16

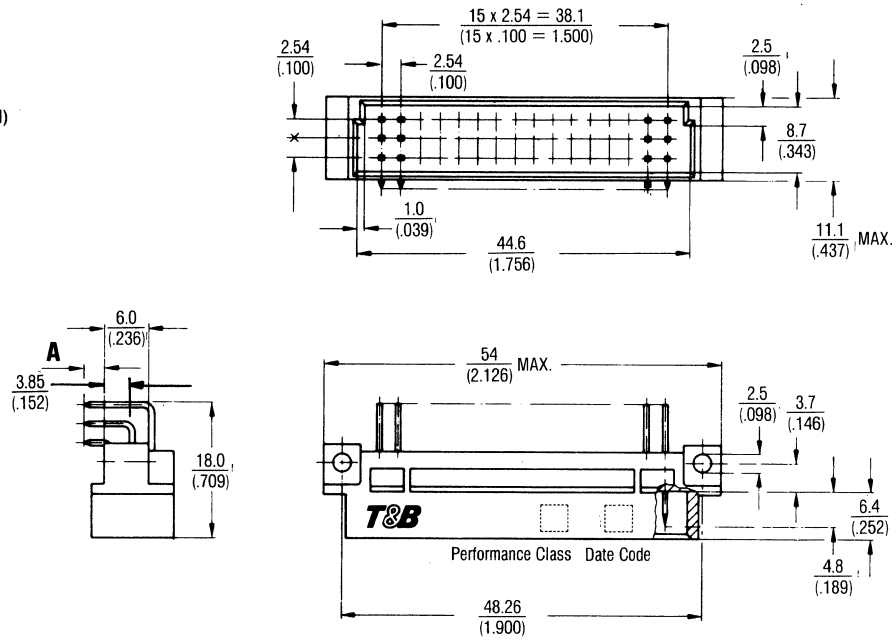


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

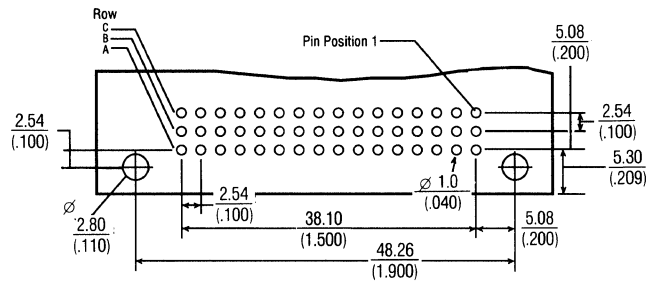
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

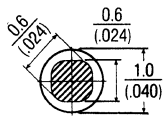


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

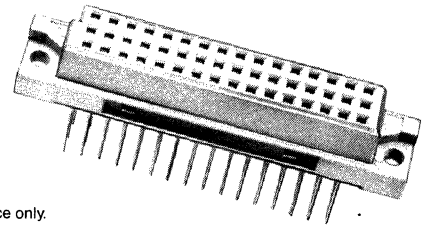


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	161-43250-300X 161-44830-300X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	161-43250-310X 161-44830-310X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C/2
Female Connector
Series 16

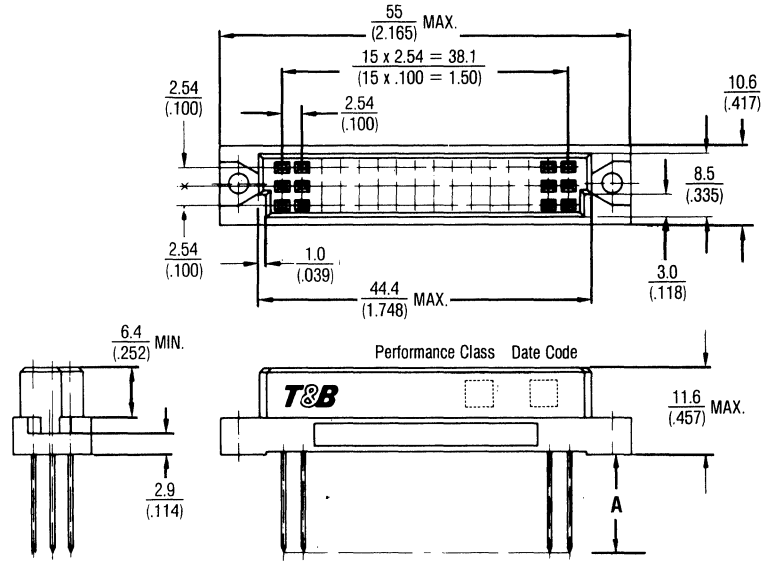


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

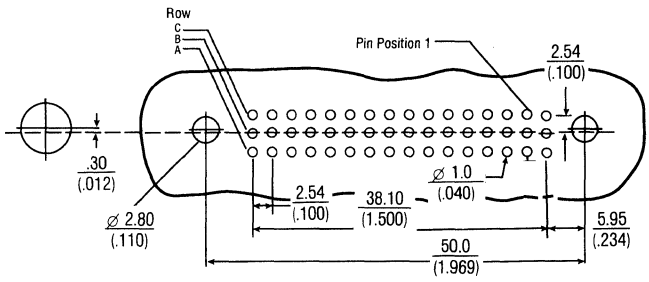
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

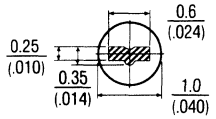
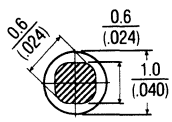
Dimensions shown are for reference only.
Dimensions are in MM (inches)



Recommended Printed Circuit Board Layout

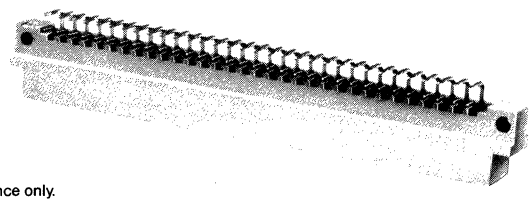


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	162-43250-625X 162-44830-625X	A = 2.9 (.114)	 **Solder Tail** 0.6 x 0.25 (.024 x .010)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	162-43250-725X 162-44830-725X	A = 4.5 (.177)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	162-43250-605X 162-44830-605X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	162-43250-705X 162-44830-705X	A = 4.5 (.177)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	162-43250-505X 162-44830-505X	A = 13.0 (.512)	**Wire Wrap Post** 0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type B
Male Connector
Series 16

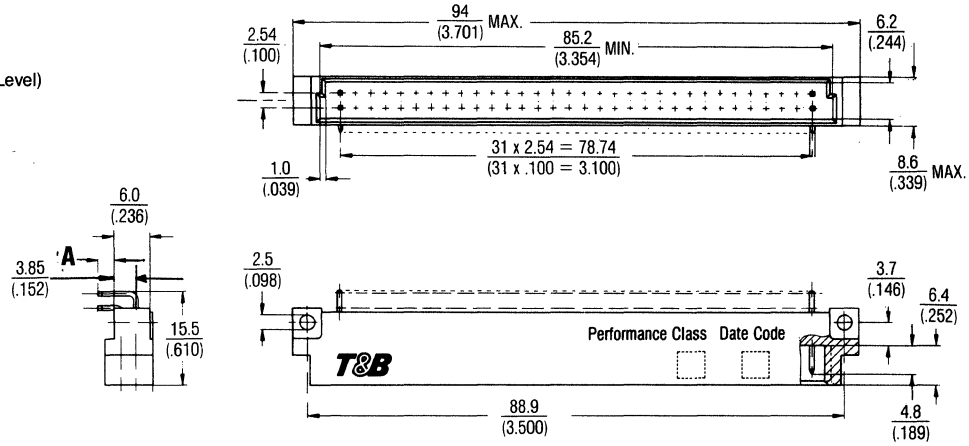


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

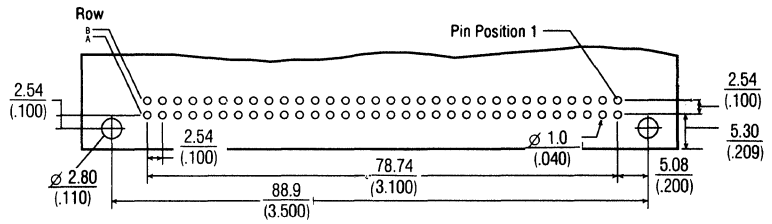
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

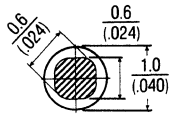


Recommended Printed Circuit Board Layout



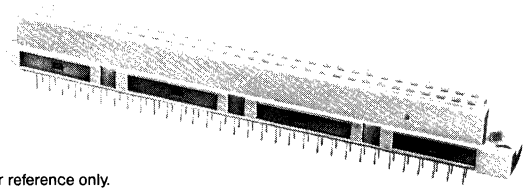
Extended length contacts available. Consult factory for details.

Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 64	a, b 2, 4, 6 - 32 a, b, 1, 2, 3 - 32	161-63220-300X 161-66430-300X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
32 64	a, b 2, 4, 6 - 32 a, b, 1, 2, 3 - 32	161-63220-310X 161-66430-310X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type B
Female Connector
Series 16

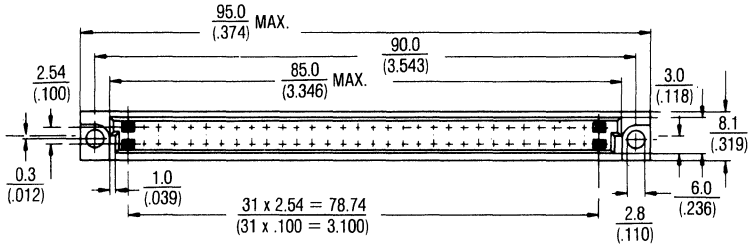


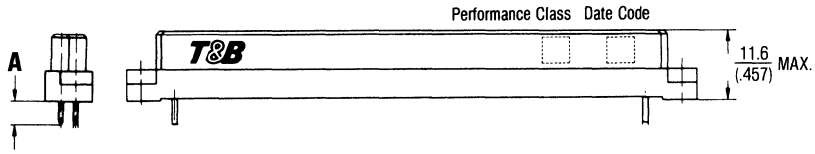
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

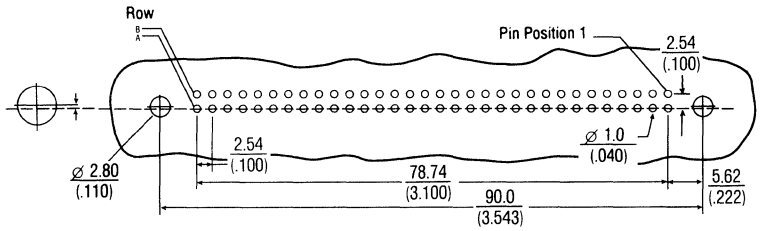
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)

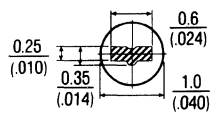
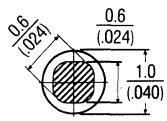




Recommended Printed Circuit Board Layout

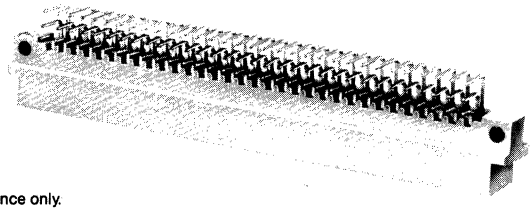


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	162-63250-625X 162-66430-625X	A = 2.9 (.114)		**Solder Tail** 0.6 x 0.25 (.024 x .010)
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	162-63250-725X 162-66430-725X	A = 4.5 (.177)		
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	162-63250-605X 162-66430-605X	A = 2.9 (.114)		**Solder Post** 0.6 x 0.6 (.024 x .024)
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	162-63250-705X 162-66430-705X	A = 4.5 (.177)		
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	162-63250-505X 162-66430-505X	A = 13.0 (.512)	**Wire Wrap Post**	0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C
Male Connector
Series 16

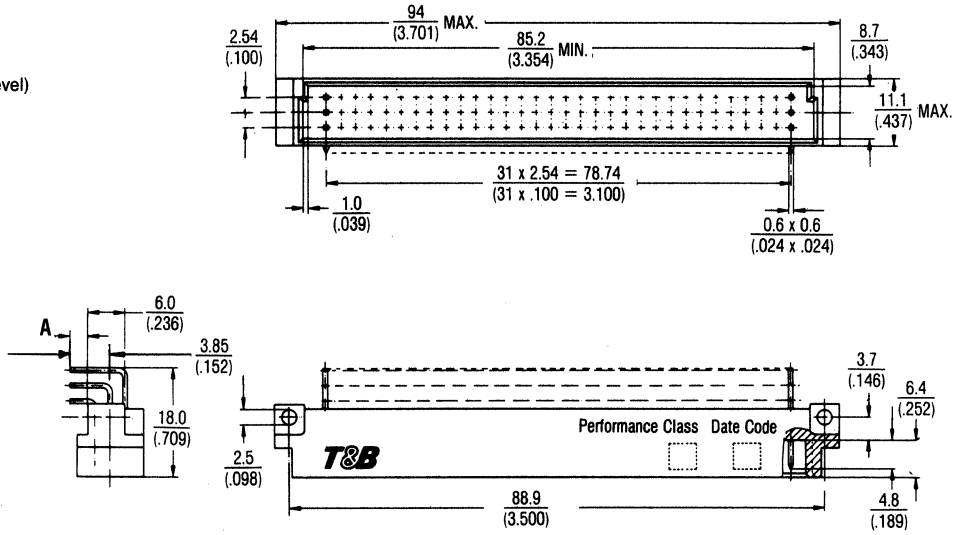


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

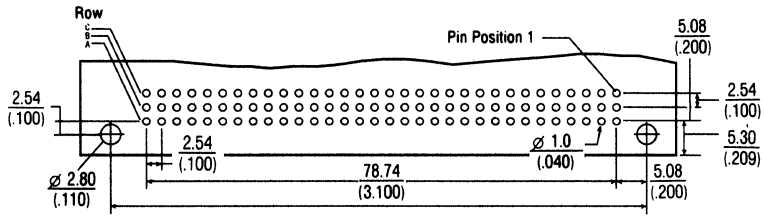
Environmental Properties
Temperature Rating —55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

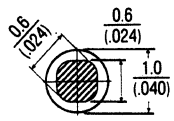


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

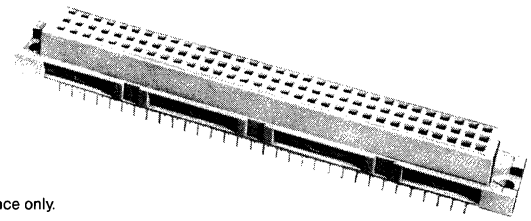


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	161-96450-300X 161-99630-300X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	161-96450-310X 161-99630-310X	A = 3.7 (.146)	

*X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type C
Female Connector
Series 16

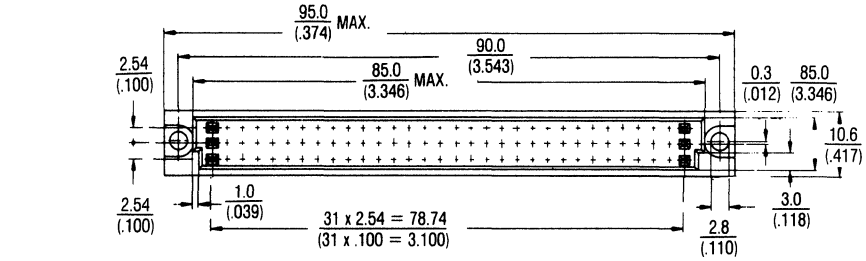


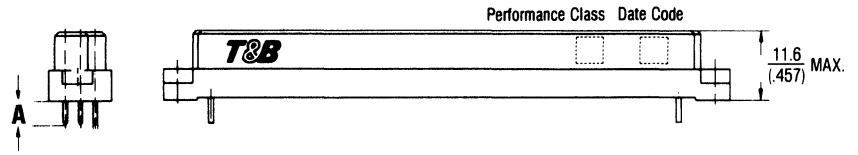
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

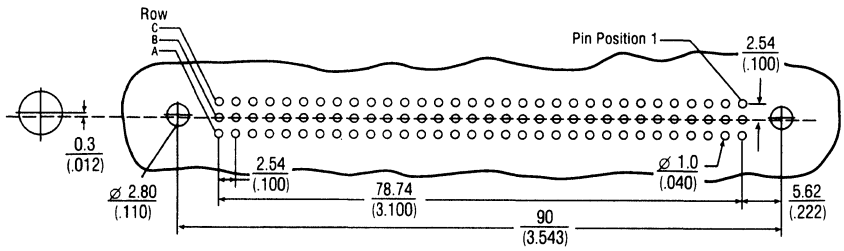
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

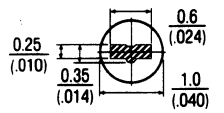
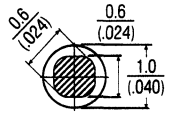




Recommended Printed Circuit Board Layout



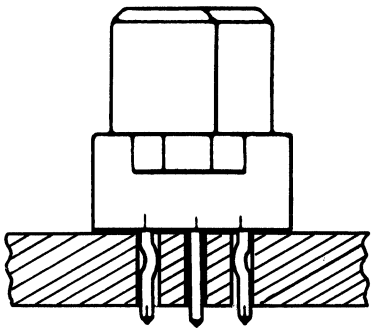
Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	162-96450-625X 162-99630-625X	A = 2.9 (.114)		**Solder Tail** 0.6 x 0.25 (.024 x .010)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	162-96450-725X 162-99630-725X	A = 4.5 (.177)		
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	162-96450-605X 162-99630-605X	A = 2.9 (.114)		**Solder Post** 0.6 x 0.6 (.024 x .024)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	162-96450-705X 162-99630-705X	A = 4.5 (.177)		
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	162-96450-505X 162-99630-505X	A = 13.0 (.512)	**Wire Wrap Post**	0.64 x 0.64 (.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type B & C
PCB Retention Features
Series 16

Retention Leads

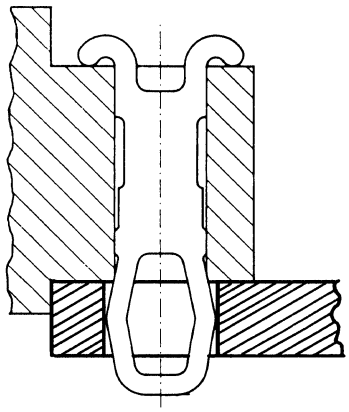


Ordering Information

16X–XXXXX–XXXX**R**

Add R To Any
Series 16 Catalog Number
For Retention Leads

Retention Clips



Ordering Information

16X–XXXXX–XXXX**C**

Add C To Any
Series 16 Catalog Number
For Retention Clips

STANDARD DIN–TYPES B AND C AVAILABLE CONFIGURATIONS SERIES 16

161-99630-300X*

T&B Series.
16 – Standard DIN

Housing Type
1 – Male Connector
2 – Female Connector

Housing
1 – Type B/3
2 – Type C/3
3 – Type B/2
4 – Type C/2
6 – Type B
9 – Type C

No. of contacts:
(other quantities of contacts available upon request)
10 – B/3, C/3
16 – B/2, C/2
20 – B/3, C/3
24 – C/2
30 – C/3
32 – B/2, C/2, B, C
48 – C/2, C
64 – B, C
96 – C

Contact loading

	Row A	Row B	Row C
10 –	All	–	–
20 –	Even	Even	–
30 –	All	All	All
40 –	Even	–	Even
50 –	All	–	All
60 –	Odd	Even	–
70 –	Odd	–	Even
80 –	Even	–	Odd
90 –	Even	Odd	Even
91 –	Odd	Odd	Odd
92 –	Even	Even	Even

No. of contacts:

B/3	C/3	B/2	C/2	B	C
10	10	16	16	32	32
10	10	16	16	32	32
20	30	32	48	64	96
–	10	–	16	–	32
–	20	–	32	–	64
10	10	16	16	32	32
–	–	–	16	–	32
–	–	–	16	–	32
–	–	–	24	–	48
–	–	–	24	–	48
–	–	–	24	–	48

*Availability of specific part numbers can vary. Consult factory for details.

Performance Level Per DIN 41612
(Mating Area)
1 – 500 Mating Cycles
8 – 400 Mating Cycles
4 – 200 Mating Cycles

Plating in Termination Area
0 – Male connector tin/lead plate
5 – Female connector tin/lead plate
3 – Wire wrap pin selective gold plated, Performance level 2
1 – Wire wrap pin selective gold plated, Performance level 3

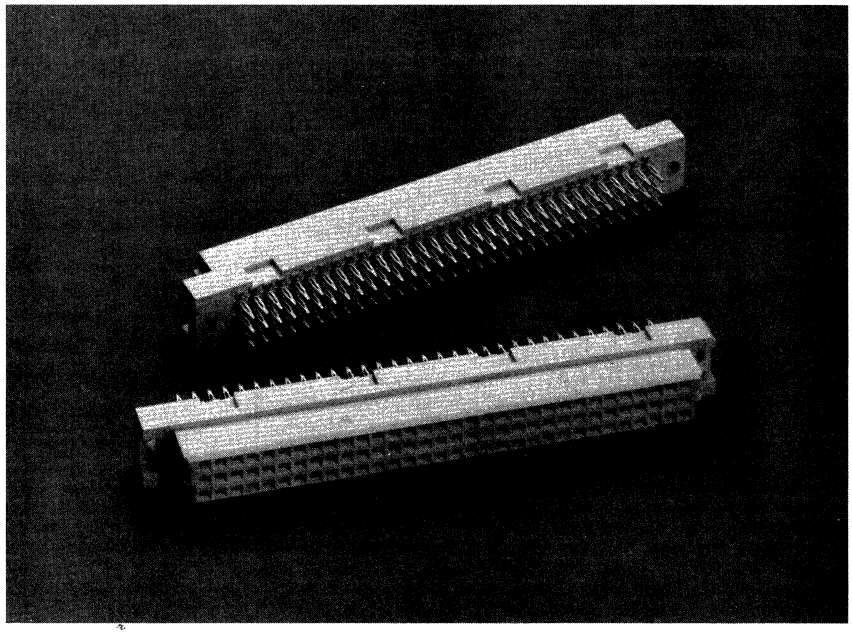
Termination Style:

10 – Solder eyelet	0.6 x 0.25 (.024 x .010)
22 – Solder tail	0.6 x 0.25 (.024 x .010)
30 – 90° Solder post	2.9 (.114)
31 – 90° Solder post	3.7 (.146)
32 – 90° Solder post	4.5 (.177)
34 – Solder post	0.6 x 0.6 x 8.6 (.024 x .024 x .339)
35 – Solder post	0.6 x 0.6 x 13.7 (.024 x .024 x .539)
36 – Solder post	0.6 x 0.6 x 21.6 (.024 x .024 x .850)
39 – Solder post	0.6 x 0.6 x 24.8 (.024 x .024 x .976)
40 – Solder post	⌀.065 x 3.5 (⌀.026 x .138)
50 – Wire wrap post	0.64 x 0.64 x 13 (.025 x .025 x .512)
51 – Wire wrap post	0.64 x 0.64 x 17 (.025 x .025 x .669)
60 – Solder post	0.6 x 0.6 x 2.9 (.024 x .024 x .114)
62 – Solder tail	0.25 x 0.6 x 2.9 (.010 x .024 x .114)
70 – Solder post	0.6 x 0.6 x 4.5 (.024 x .024 x .177)
72 – Solder tail	0.25 x 0.6 x 4.5 (.010 x .024 x .177)
80 – Wire wrap post	0.64 x 0.64 x 22 (.025 x .025 x .866)

STANDARD DIN FLEX-FIT™ TYPES B AND C FEMALE PCB CONNECTORS

LR92984 E60980

For solderless backpanel applications.



Description/Application

The Thomas & Betts Types B and C FLEX-FIT™ female PCB connectors are designed to provide a reliable solderless pressfit termination to printed circuit boards.

Pressfit technology suits demanding cost and performance requirements while retaining the reliability of a soldered connection.

In addition, solderless termination offers tremendous flexibility in the sequence of manufacturing processes which offers great convenience for surface mount PCB applications.

Design Considerations

- FLEX-FIT™ compliant contacts meet the performance requirements of MIL-STD-2166 and DIN 41611
- Performance classes may be selected per DIN 41612 to meet system requirements
- 3 wrap post lengths are available
- Finished plated through-hole range: .037" through .043"
- PCB thicknesses accommodated: .062" through .150"
- FLEX-FIT™ compliant contacts reduce costly plated through-hole damage

Ordering Information

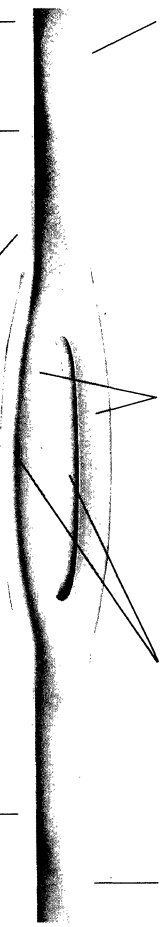
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

FHC048-101-X-Y

- FHC — Female
- 048 — Number of Contacts
- 101 — DIN Type B or C / Contact Tail Length
- X — Mounting Provisions
- Y — Tail Plating
- Optional For Half Sizes
- Performance Level

FLEX-FIT™ COMPLIANT CONTACT TECHNOLOGY

FLEX-FIT™ Compliant Contact



First-Mate/ Last-Break grounding option

Zone 1 plating options: (Mating area)
- 1.27 μm (50 μ") gold
- 0.76 μm (30 μ") gold
- 0.40 μm (15 μ") gold
- Gold flash over palladium/nickel

Extended entry/exit lead-in allows for use in full range of PCBs— .062", .093", .125", and .150"

Pin geometry allows for even distribution of forces reducing axial pin rotation and preserving perpendicularity to the surface of the PCB

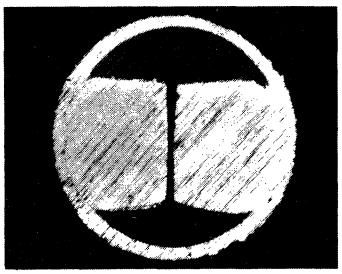
Zone 2 mating options: (Terminal area)
- Gold plate
- Gold flash
- Tin/lead

.064mm (0.025") square pins Phosphor bronze

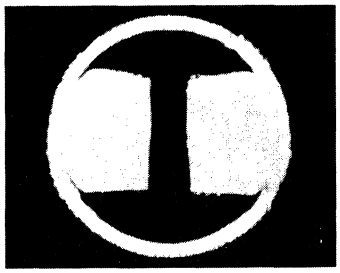
Two linear spring contacts function independently, allowing maximum compliance with minimum deformation across a broad range of plated through-hole dimensions (.037"-.043")

Edge and side coining provide a uniform pin radius insuring maximum surface contact without "skiving" the plated through-hole

Four standard tail length options



Centerplane cross section of the FLEX-FIT™ compliant pin in a 0.037" diameter finished through-hole.



Centerplane cross section of the FLEX-FIT™ compliant pin in a 0.043" diameter finished through-hole.

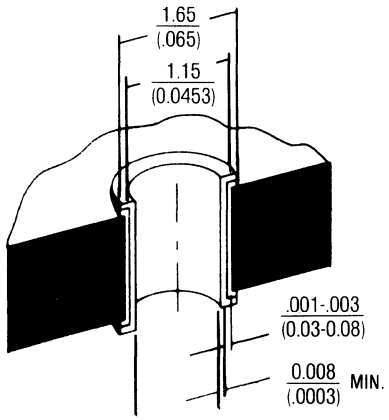
E

FLEX-FIT™ COMPLIANT CONTACT TECHNOLOGY

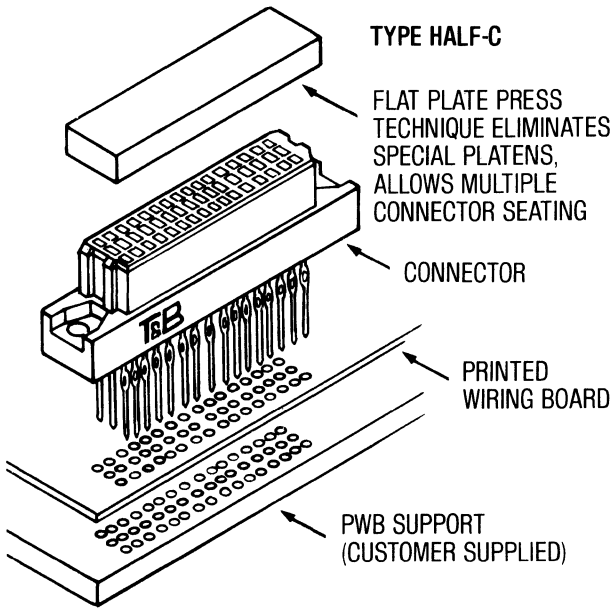
Dimensions shown are for reference only.
Dimensions are in MM (inches)

FLEX-FIT™ Compliant Pin Recommended PCB Hole Specifications

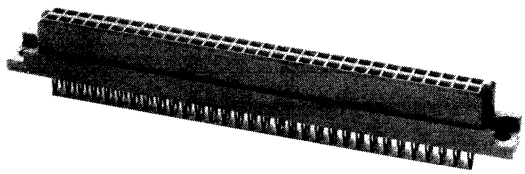
REQUIRED DRILL SIZE	1.15 (0.0453)	
DRILLED HOLE DIA. ±0.025 (±.0010)	1.15 (0.0453)	
PLATING THICKNESS	COPPER 0.03-0.08 (.001-.003)	TIN/LEAD 0.008 (.0003) MIN.
HOLE DIA.	AFTER PLATING 0.94-1.09 (.037-.043)	
PAD DIA. MIN.	1.65 (.065)	
INITIAL INSERTION FORCE PER PIN	40 LBS. MAX.	
MIN. RETENTION FORCE PER PIN	10 LBS. MIN.	



Installation Procedure



Type B
FLEX-FIT™ Female
PCB Connector



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

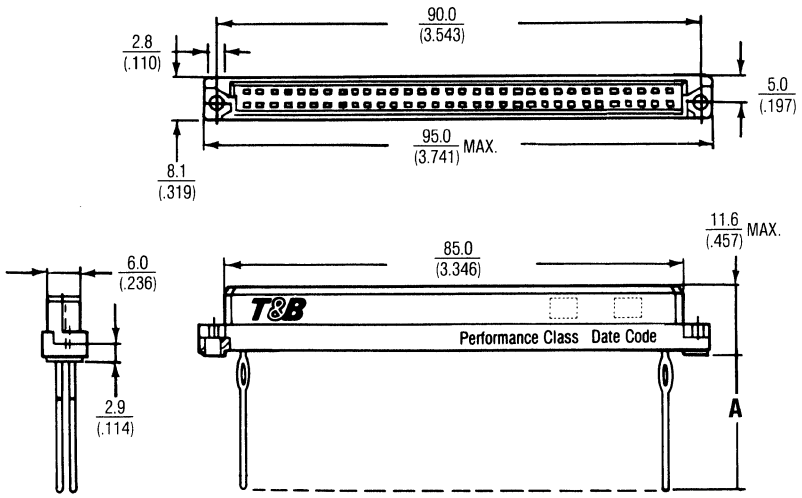
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

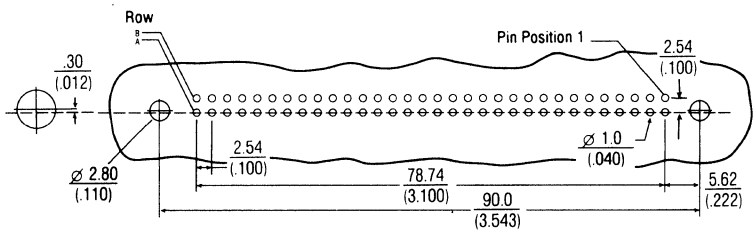
Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

Dimensions shown are for reference only.
Dimensions are in MM (inches)

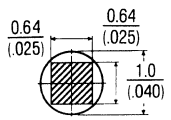


Recommended Printed Circuit Board Layout



Ordering Information

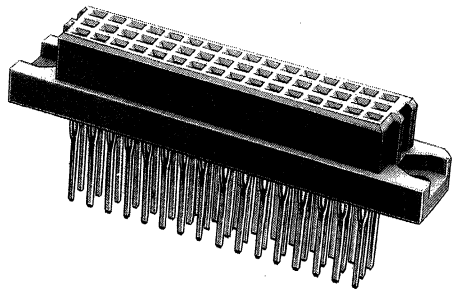
NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	FB032-081-X FB064-081-X	A = 4.7 (.184)	
32 64	a, b 2, 4, 6 - 32 a, b, c 1, 2, 3 - 32	FB032-091-X-Y FB064-091-X-Y	A = 13.0 (.512)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	FB032-101-X-Y FB064-101-X-Y	A = 17.0 (.669)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	FB032-111-X-Y FB064-111-X-Y	A = 20.9 (.823)	



Press-Fit Wire Wrap Post
0.64 x 0.64
(.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)

Type C/2 FLEX-FIT™ Female PCB Connector



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

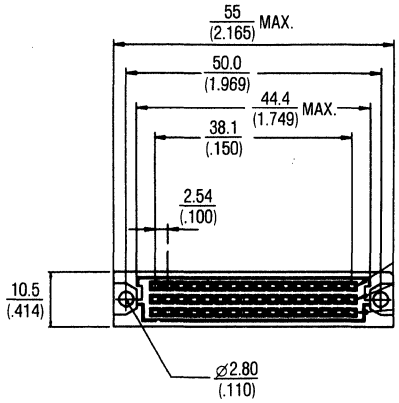
Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

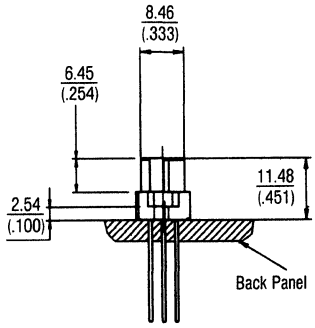
Environmental Properties
Temperature Rating −55°C to 125°C

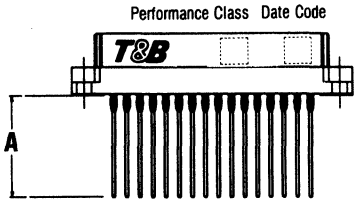
Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

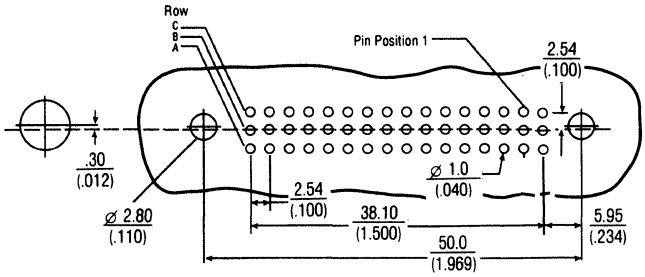
Dimensions shown are for reference only.
Dimensions are in MM (inches)





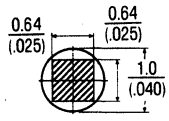


Recommended Printed Circuit Board Layout



Ordering Information

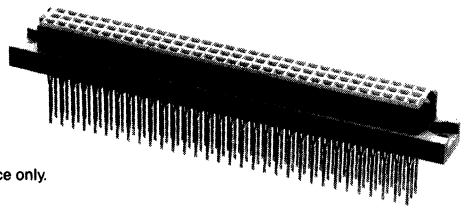
NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	FHC032-081-X FHC048-081-X	A = 4.7 (.184)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	FHC032-091-X-Y FHC048-091-X-Y	A = 13.0 (.512)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	FHC032-101-X-Y FHC048-101-X-Y	A = 17.0 (.669)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	FHC032-111-X-Y FHC048-111-X-Y	A = 20.9 (.823)	



Press-Fit Wire Wrap Post
0.64 x 0.64
(.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)

Type C
FLEX-FIT™ Female
PCB Connector



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

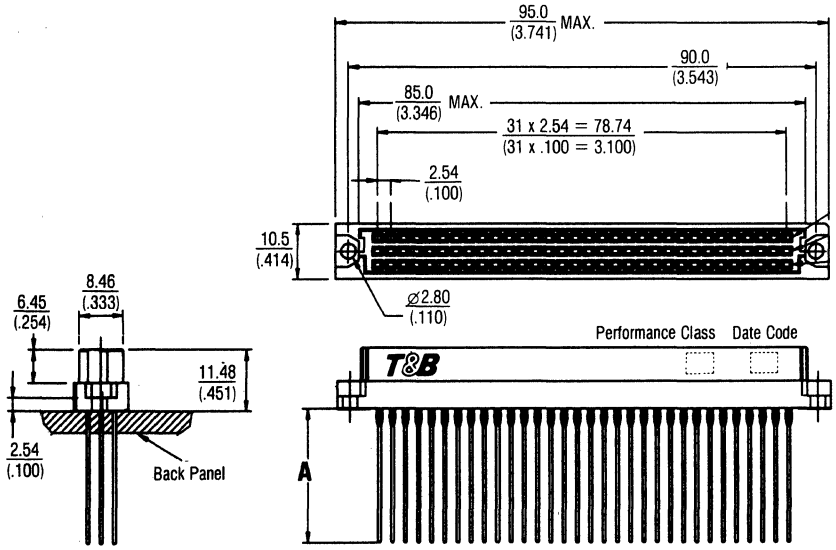
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1 x 10^9 Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

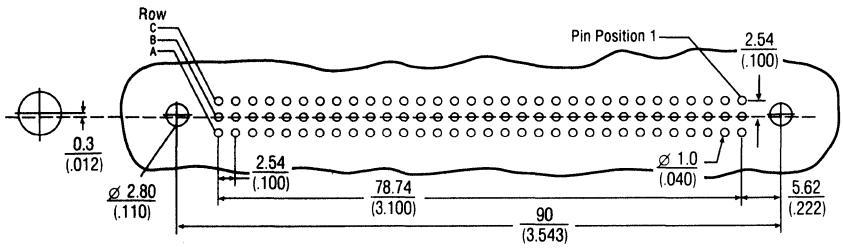
Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

Dimensions shown are for reference only.
Dimensions are in MM (inches)

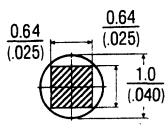


Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	FC064-081-X FC096-081-X	A = 4.7 (.184)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	FC064-091-X-Y FC096-091-X-Y	A = 13.0 (.512)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	FC064-101-X-Y FC096-101-X-Y	A = 17.0 (.669)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	FC064-111-X-Y FC096-111-X-Y	A = 20.9 (.823)	



Press-Fit Wire Wrap Post
0.64 x 0.64 (.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)

E

INVERSE DIN TYPES Q AND R SERIES 21

LR92984 E60980

Description/Application

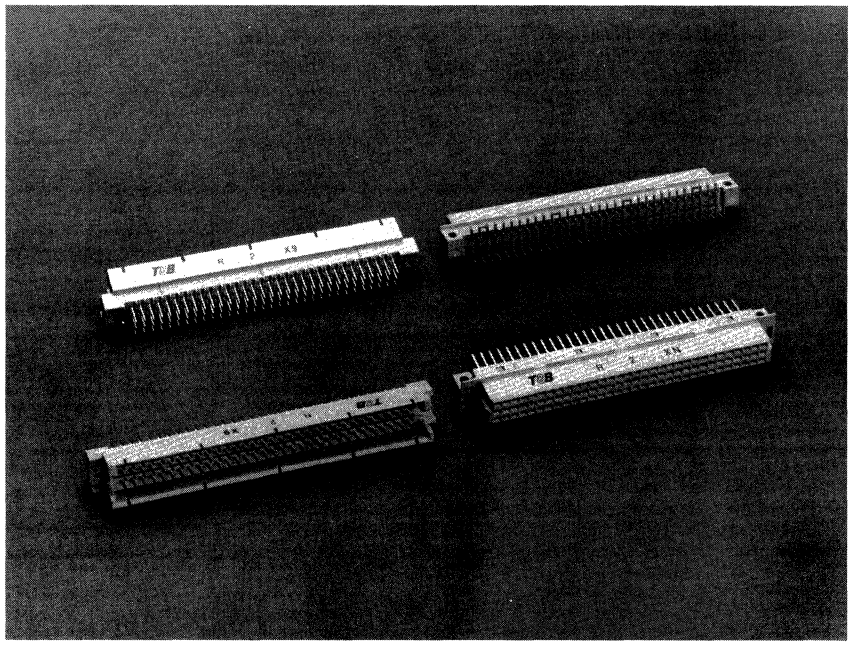
These connectors have been manufactured in line with the design principles of DIN Standard 41612 part 1. Due to the compatible mounting geometries, they fit in form and function into 19" subracks and assemblies according to DIN 41494.

Design Considerations

- Available in 16, 24, 32, 48, 64 and 96 positions.
- Tin/lead plating offers long shelf life for consistent solderability and resistance to whisker growth.
- Dual opposing beam contacts for full contact redundancy.
- Coined and polished mating surfaces reduce insertion forces.
- Round solder posts permit easy insertion into PC Boards.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.



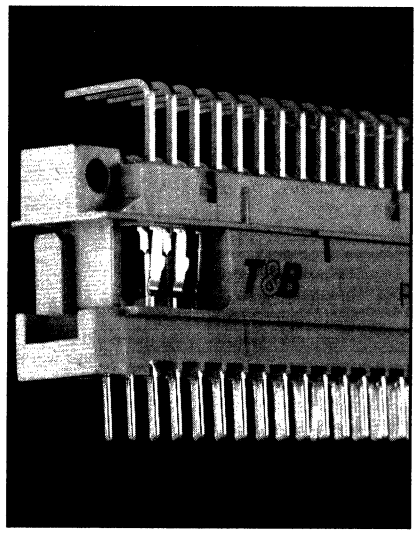
Ordering Information

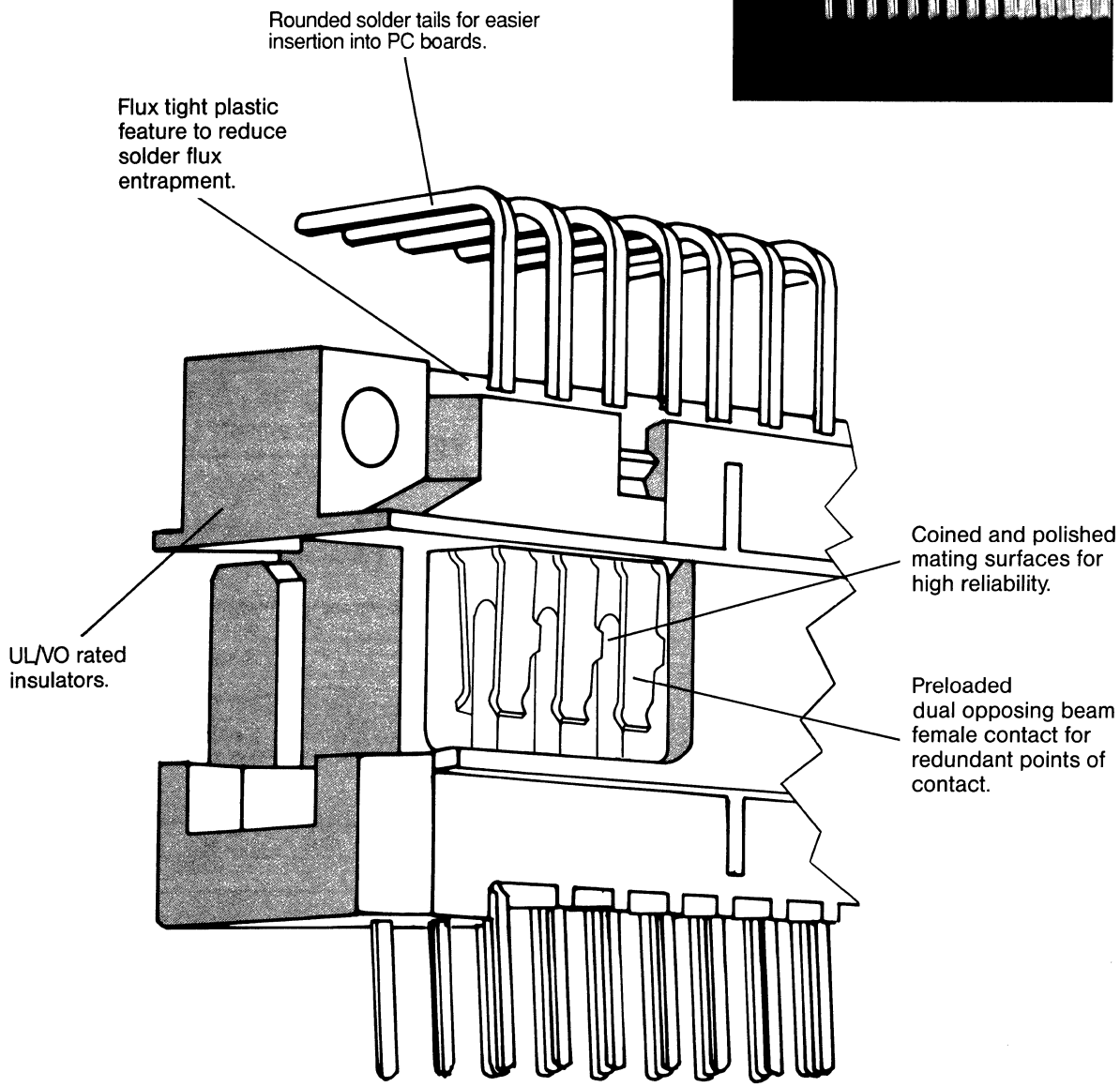
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

211-31620-500X

- ***T & B Series*** — 211
- ***Gender*** — -
- ***Housing*** — 3
- ***Number of Contacts*** — 16
- ***Contact Loading*** — 20
- ***Termination Style*** — -500
- ***Plating in Termination Area*** — X
- ***Performance Level***

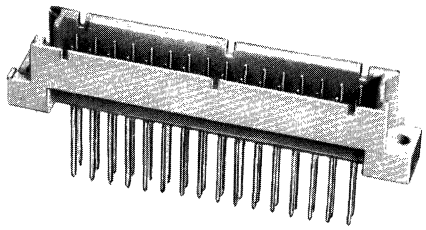
DESIGN CONSIDERATIONS





E

Type Q/2
Male Connector
Series 21

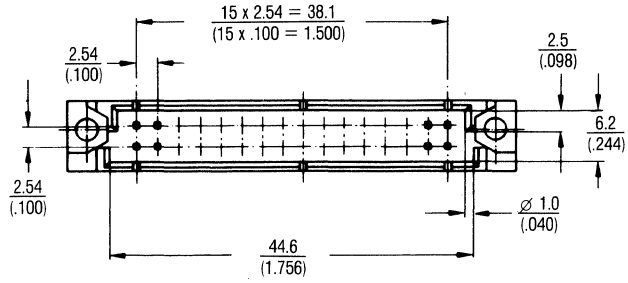


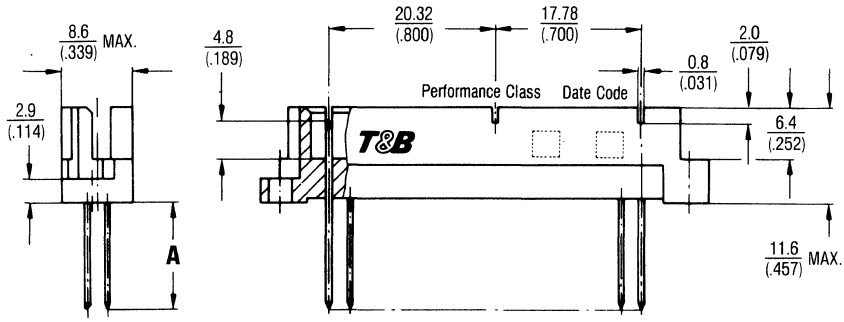
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

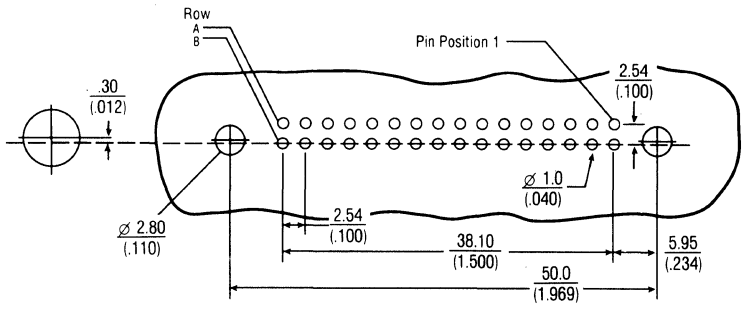
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



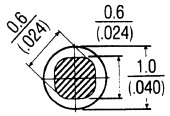


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

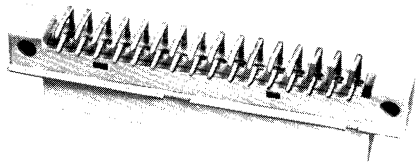


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE $\frac{MM}{(INCHES)}$		
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	211-31620-600X 211-33230-600X	$A = \frac{2.9}{(.114)}$		**Solder Post** 0.6 x 0.6 (.024 x .024)
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	211-31620-700X 211-33230-700X	$A = \frac{4.5}{(.177)}$		
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	211-31620-500X 211-33230-500X	$A = \frac{13.0}{(.512)}$	**Wire Wrap Post**	0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type Q/2 Female Connector Series 21

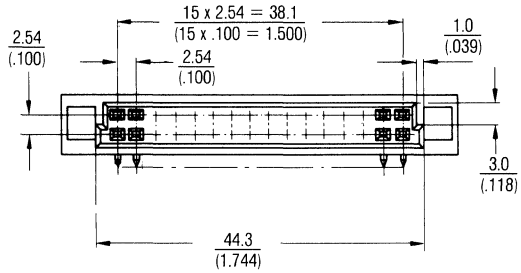


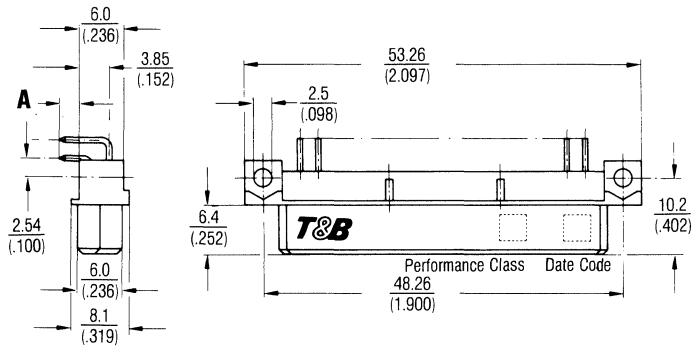
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

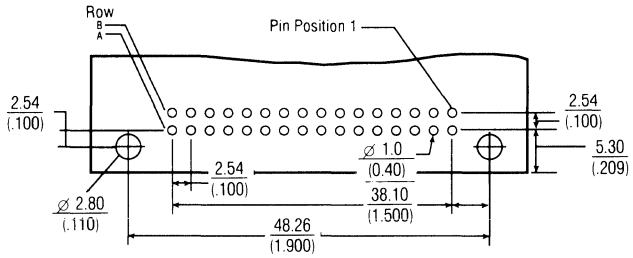
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

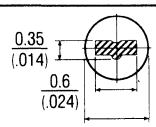
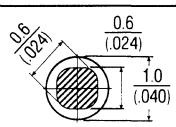




Recommended Printed Circuit Board Layout

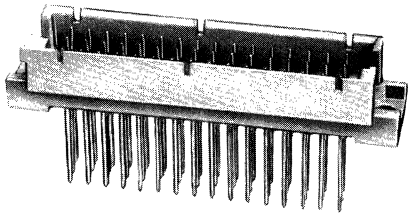


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	212-31620-205X 212-33230-205X	A = 2.9 (.114)	 **Solder Tail** 0.6 x 0.25 (.024 x .010)
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	212-31620-215X 212-33230-215X	A = 3.7 (.146)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	212-31620-305X 212-33230-305X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	212-31620-315X 212-33230-315X	A = 3.7 (.146)	

X = Performance Class for F contacts: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type R/2
Male Connector
Series 21

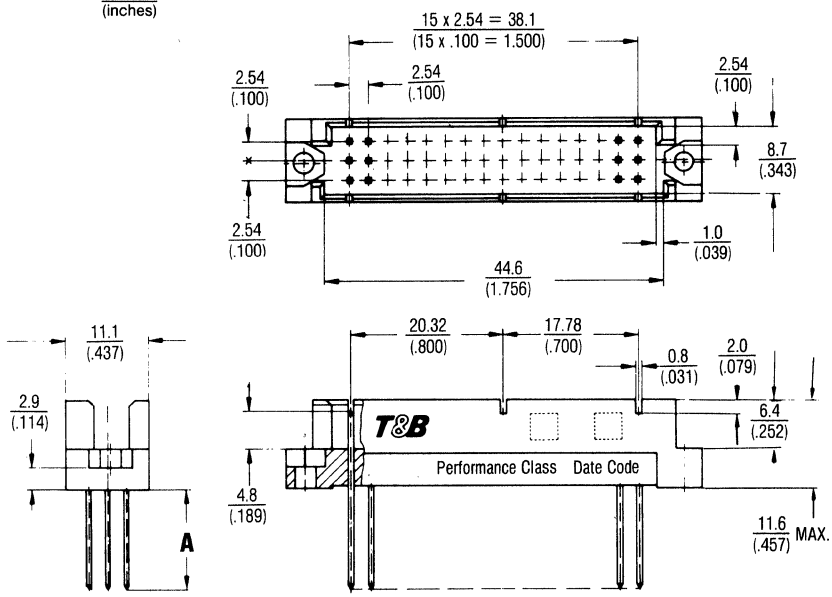


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

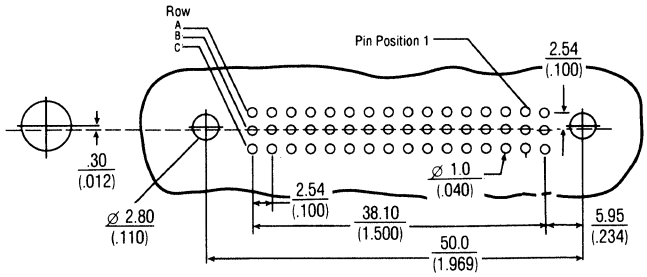
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

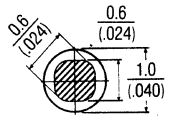


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

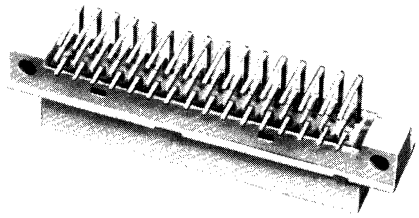


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	211-43250-600X 211-44830-600X	A = 2.9 (.114)		Solder Post 0.6 x 0.6 (.024 x .024)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	211-43250-700X 211-44830-700X	A = 4.5 (.177)		
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	211-43250-500X 211-44830-500X	A = 13.0 (.512)	Wire Wrap Post	0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type R/2
Female Connector
Series 21

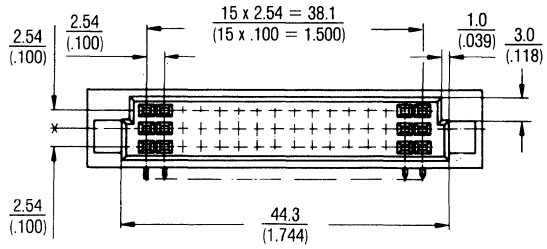


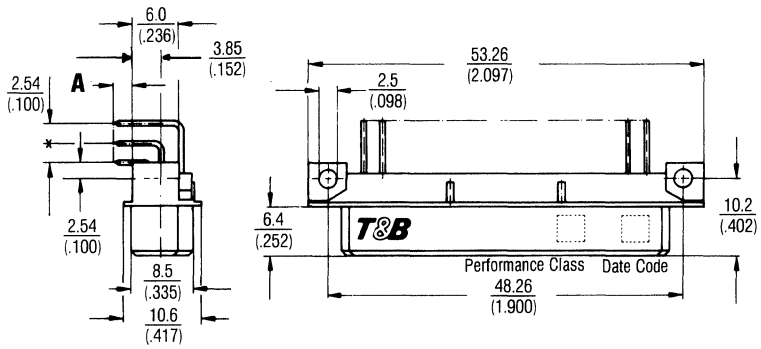
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

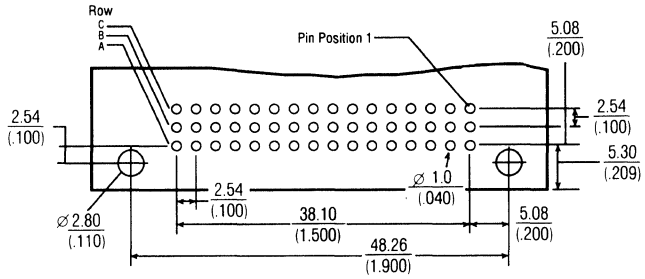
Environmental Properties
Temperature Rating —55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

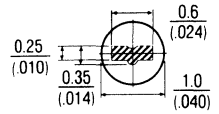
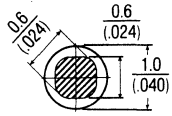




Recommended Printed Circuit Board Layout

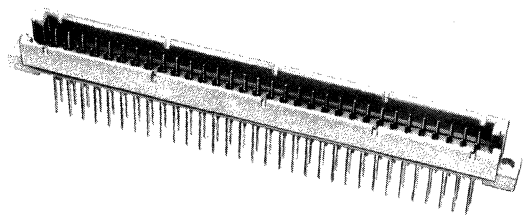


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	212-43250-205X 212-44830-205X	A = 2.9 (.114)	 **Solder Tail** 0.6 x 0.25 (.024 x .010)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	212-43250-215X 212-44830-215X	A = 3.7 (.146)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	212-43250-305X 212-44830-305X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	212-43250-315X 212-44830-315X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type Q
Male Connector
Series 21

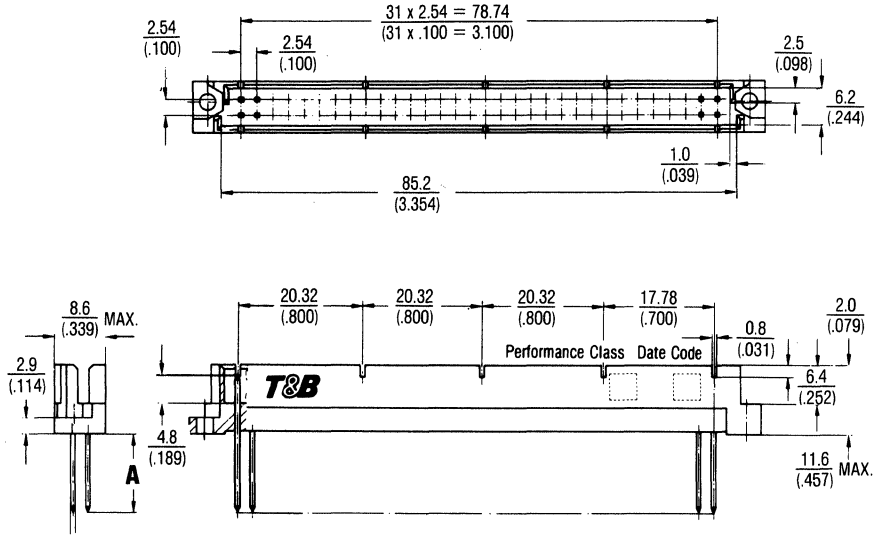


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

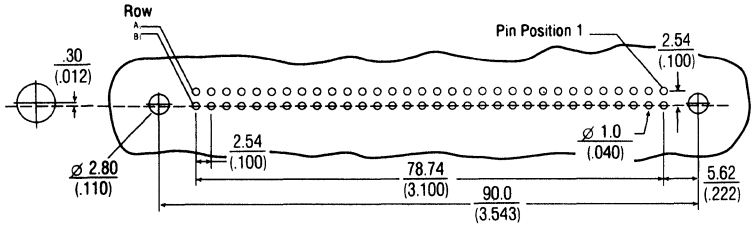
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

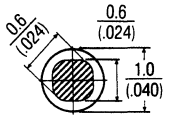


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

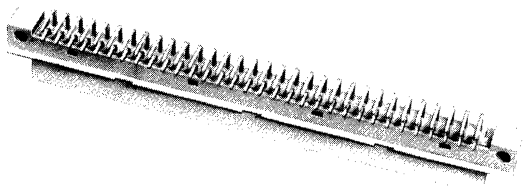


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	211-63220-600X 211-66430-600X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	211-63220-700X 211-66430-700X	A = 4.5 (.177)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	211-63220-500X 211-66430-500X	A = 13.0 (.512)	**Wire Wrap Post** 0.64 x 0.64 (.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type Q
Female Connector
Series 21

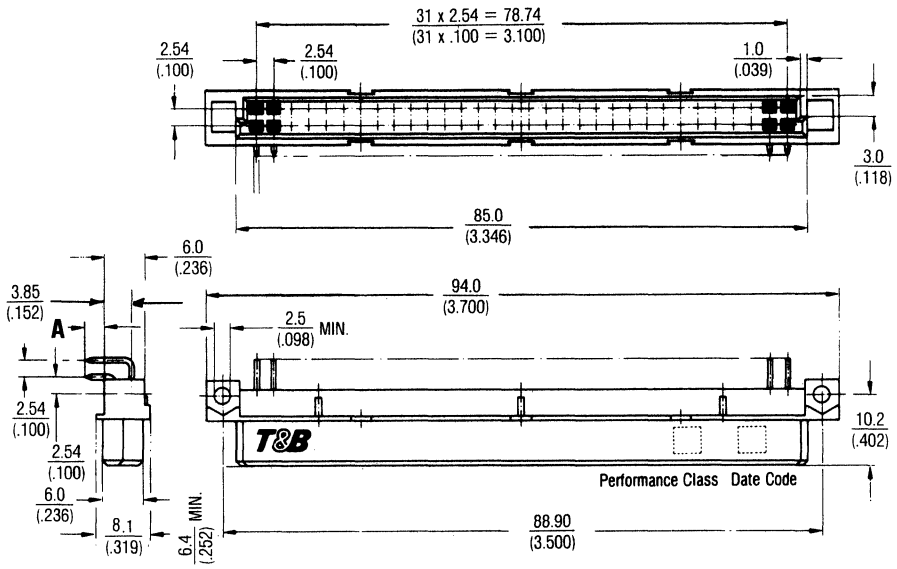


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

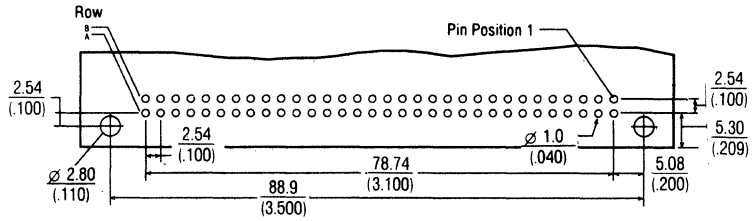
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

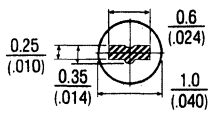
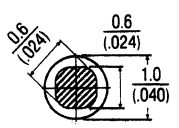
Dimensions shown are for reference only.
Dimensions are in MM (inches)



Recommended Printed Circuit Board Layout



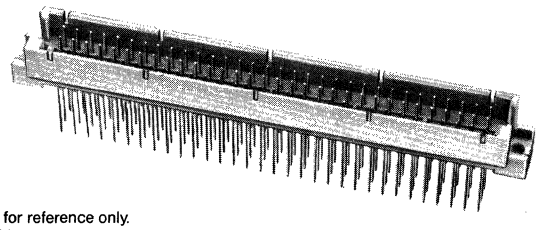
Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	212-63220-205X 212-66430-205X	A = 2.9 (.114)	 **Solder Tail** 0.6 x 0.25 (.024 x .010)
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	212-63220-215X 212-66430-215X	A = 3.7 (.146)	
64	a, b 1, 2, 3 - 32	212-66430-305X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
64	a, b 1, 2, 3 - 32	212-66430-315X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

E

Type R
Male Connector
Series 21

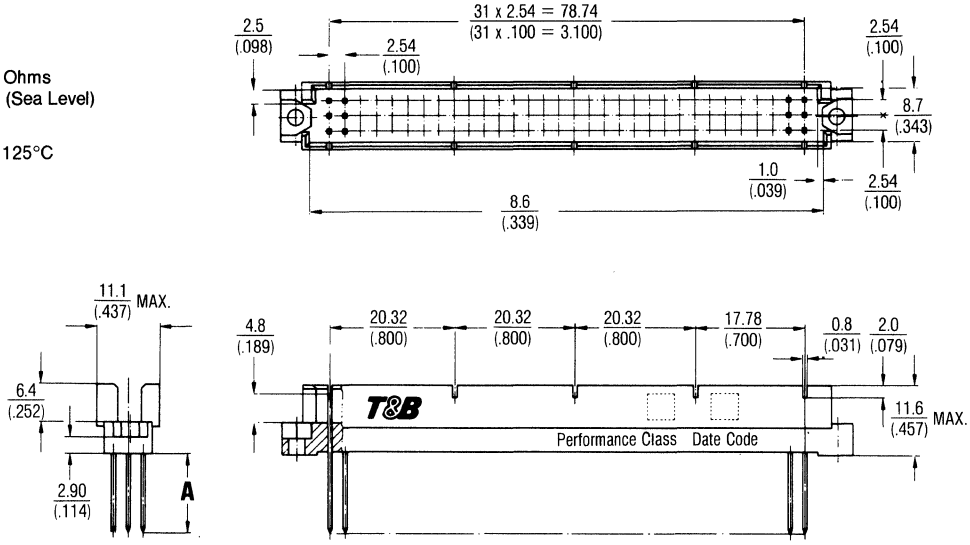


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

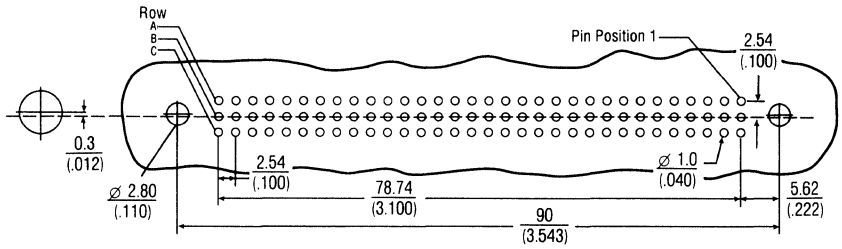
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

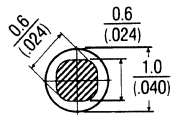


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

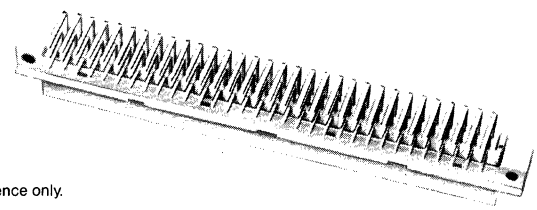


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	211-96450-600X 211-99630-600X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	211-96450-700X 211-99630-700X	A = 4.5 (.177)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	211-96450-500X 211-99630-500X	A = 13.0 (.512)	**Wire Wrap Post** 0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type R
Female Connector
Series 21

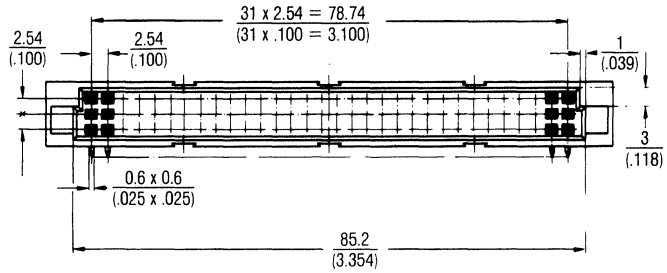


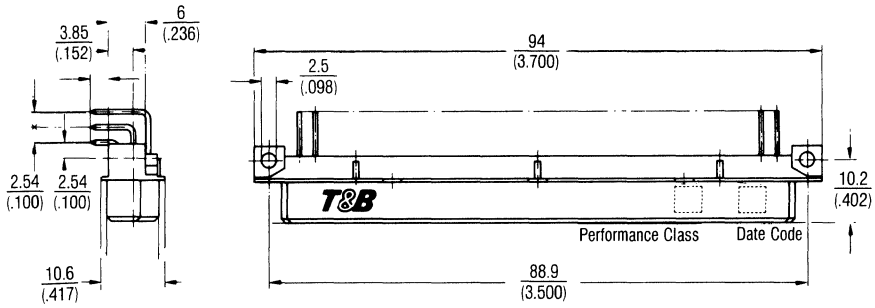
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

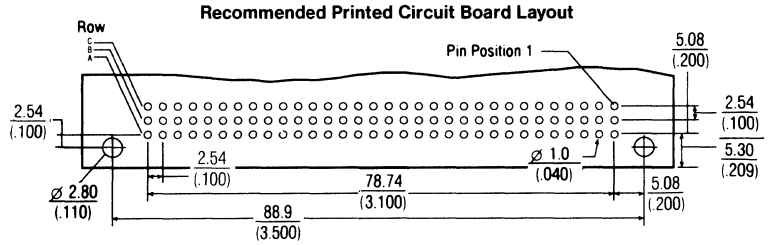
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

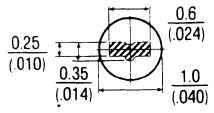
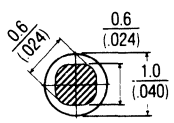




Recommended Printed Circuit Board Layout



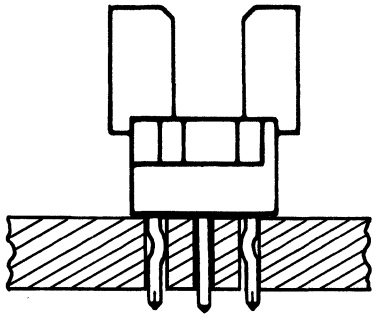
Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	212-96450-205X 212-99630-205X	A = 2.9 (.114)	 **Solder Tail** 0.6 x 0.25 (.024 x .010)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	212-96450-215X 212-99630-215X	A = 3.7 (.146)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	212-96450-305X 212-99630-305X	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	212-96450-315X 212-99630-315X	A = 3.7 (.146)	

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type Q & R
PCB Retention Features
Series 21

Retention Leads

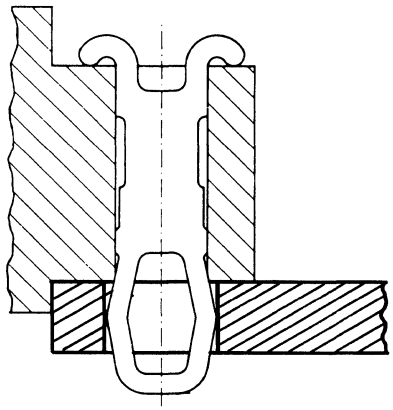


Ordering Information

21X–XXXXX–XXXX**R**

Add R To Any Series 21 Catalog Number For Retention Leads

Retention Clips



Ordering Information

21X–XXXXX–XXXX**C**

Add C To Any Series 21 Catalog Number For Retention Clips

INVERSE DIN—TYPES Q AND R AVAILABLE CONFIGURATIONS SERIES 21

211-31630-300X*

T&B Series
21 — Inverse DIN

Housing Type
1 — Male Connector
2 — Female Connector

Housing
3 — Type Q/2
4 — Type R/2
6 — Type Q
9 — Type R

No. of contacts:
(other quantities of contacts available upon request)
16 — Q/2, R/2
24 — R/2
32 — Q/2, R/2, Q, R
48 — R/2, R
64 — Q, R
96 — R

Contact loading

	Row A	Row B	Row C
10 —	All	—	—
20 —	Even	Even	—
30 —	All	All	All
40 —	Even	—	Even
50 —	All	—	All
60 —	Odd	Even	—
70 —	Odd	—	Even
80 —	Even	—	Odd
90 —	Even	Odd	Even
91 —	Odd	Odd	Odd
92 —	Even	Even	Even

No. of contacts:

Q/2	R/2	Q	R
16	16	32	32
16	16	32	32
32	48	64	96
—	16	—	32
—	32	—	64
16	16	32	32
—	16	—	32
—	16	—	32
—	24	—	48
—	24	—	48
—	24	—	48

Termination Style:

20 — Solder Tail	2.9 (.114)
21 — Solder Tail	3.7 (.146)
30 — 90° Solder post	2.9 (.114)
31 — 90° Solder post	3.7 (.146)
32 — 90° Solder post	4.5 (.177)
50 — Wire wrap post	0.64 x 0.64 x 13 (.025 x .025 x .512)
51 — Wire wrap pin	0.64 x 0.64 x 17 (.025 x .025 x .669)
60 — Solder post	0.6 x 0.6 x 2.9 (.024 x .024 x .114)
70 — Solder post	0.6 x 0.6 x 4.5 (.024 x .024 x .177)

Performance Level Per DIN 41612
(Mating Area)
1 — 500 Mating Cycles
8 — 400 Mating Cycles
4 — 200 Mating Cycles

Plating in Termination Area
0 — Male connector tin/lead plate
5 — Female connector tin/lead plate
3 — Wire wrap pin selective gold plated, Performance level 2
1 — Wire wrap pin selective gold plated, Performance level 3

*Availability of specific part numbers can vary. Consult factory for details.

INVERSE DIN FLEX-FIT™ TYPES Q AND R MALE PCB CONNECTORS

LR92984 E60980

Description/Application

Pressfit technology offers a reliable, cost-effective alternative to soldering in backpanel applications. As an added feature, FLEX-FIT™ contacts offer the benefits of easy contact repair and replacement with simple hand tools.

Pressfit technology suits demanding cost and performance requirements while retaining the reliability of a soldered connection.

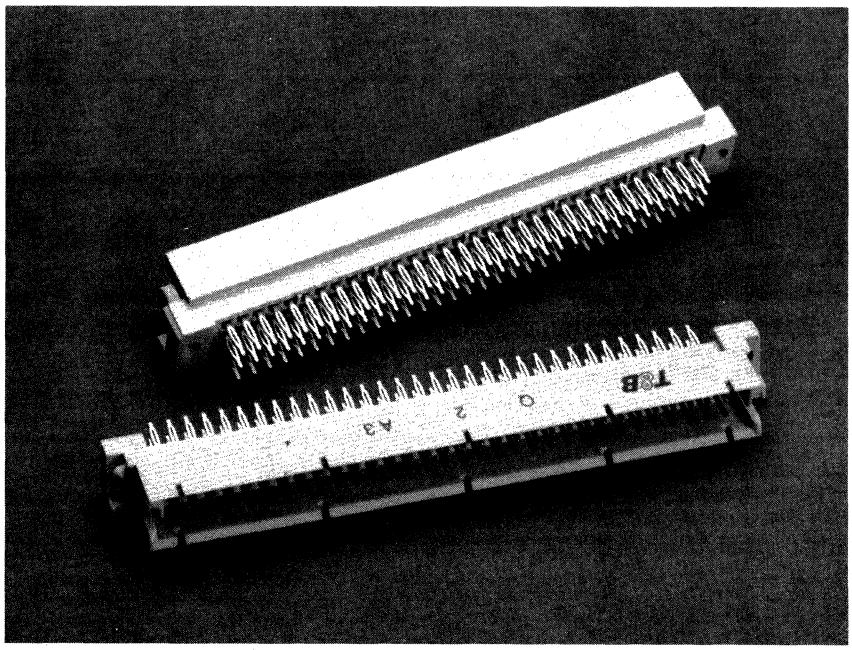
In addition, solderless termination offers tremendous flexibility in the sequence of manufacturing processes which offers great convenience for surface mount PCB applications.

Design Considerations

- FLEX-FIT™ compliant contacts meet the performance requirements of MIL-STD-2166.
- Performance classes per DIN 41612 may be selected to meet system requirements
- Front and rear repairability because of dual compliant sections
- 3 wrap post lengths are available
- Finished plated through-hole range: .037" through .043"
- PCB thicknesses accommodated: .062" through .150"
- FLEX-FIT™ compliant contacts reduce costly plated through-hole damage

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.



Ordering Information

The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

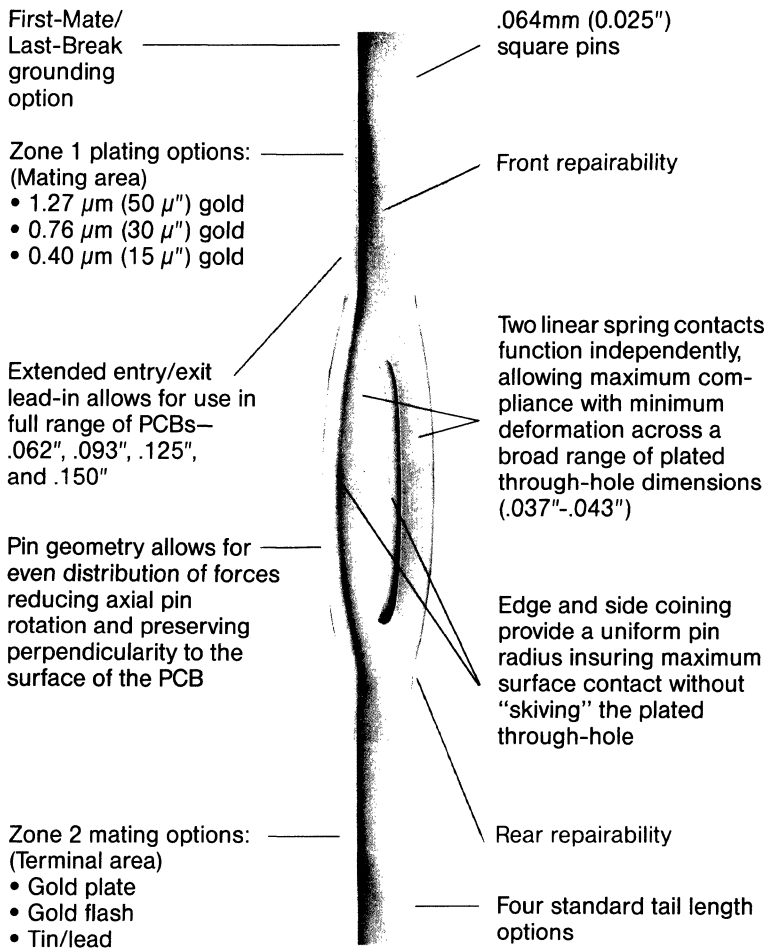
MHR 032-081-X-Y

- **Gender** *M=Male*
- **Half Size** *(Omit for full size)*
- *R=Type*
- **Number of Contacts**
- **Contact Tail Length**
- **Mounting Provisions** *(straight)*
- **Performance Level** *(1, 2, or 3)*
- **Tail Plating** *(1, 2, or 3, omit for zero length)*

FLEX-FIT™ COMPLIANT CONTACT TECHNOLOGY

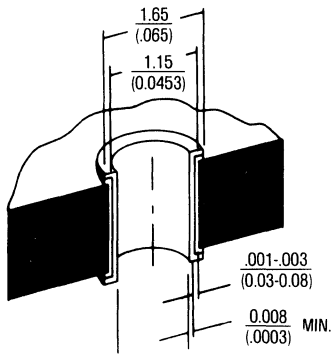
Dimensions shown are for reference only.
Dimensions are in MM (inches)

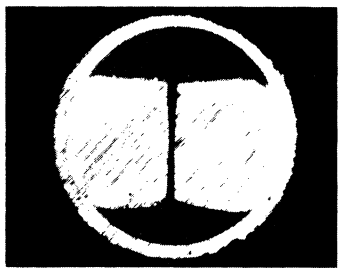
FLEX-FIT™ Compliant Contact



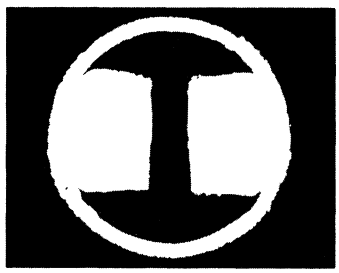
FLEX-FIT™ Compliant Pin Recommended PCB Hole Specifications

REQUIRED DRILL SIZE	1.15 (0.0453)	
DRILLED HOLE DIA. ±0.025 (±.0010)	1.15 (0.0453)	
PLATING THICKNESS	COPPER 0.03-0.08 (.001-.003)	TIN/LEAD 0.008 (.0003) MIN.
HOLE DIA.	AFTER PLATING 0.94-1.09 (.037-.043)	
PAD DIA. MIN.	1.65 (.065)	
INITIAL INSERTION FORCE PER PIN	40 LBS. MAX.	
MIN. RETENTION FORCE PER PIN	10 LBS. MIN.	



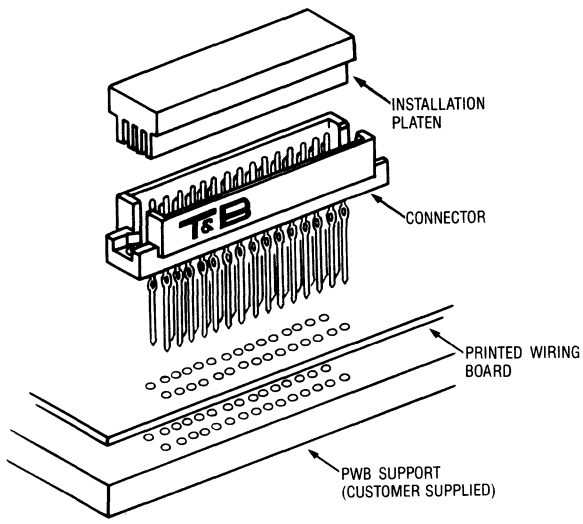


Centerplane cross section of the FLEX-FIT™ compliant pin in a 0.037" diameter finished through-hole.

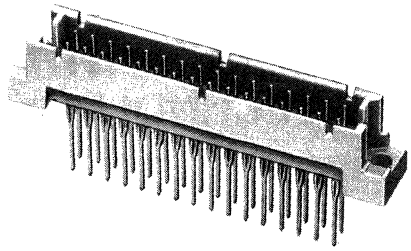


Centerplane cross section of the FLEX-FIT™ compliant pin in a 0.043" diameter finished through-hole.

Installation Procedure



Type Q/2 FLEX-FIT™ Male PCB Connector



Dimensions shown are for reference only.
Dimensions are in MM (inches)

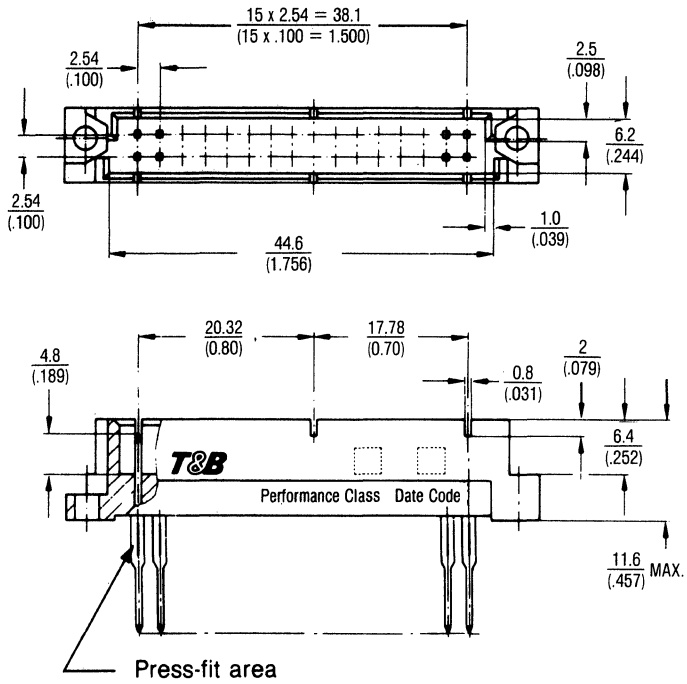
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

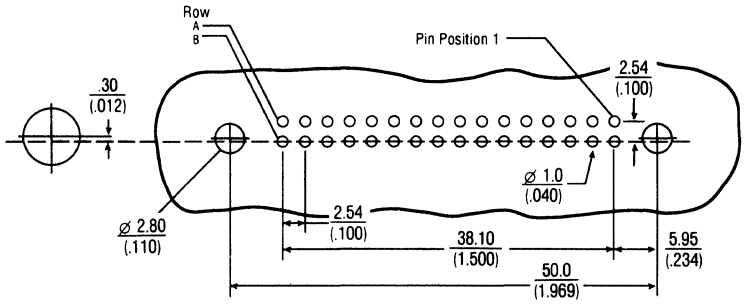
Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.



Extended length contacts available. Consult factory for details.

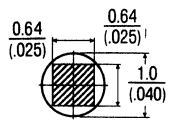
Application Tooling
Installation Platen: 889–DQ032
Pin Replacement Tool: 889-100

Recommended Printed Circuit Board Layout



Ordering Information

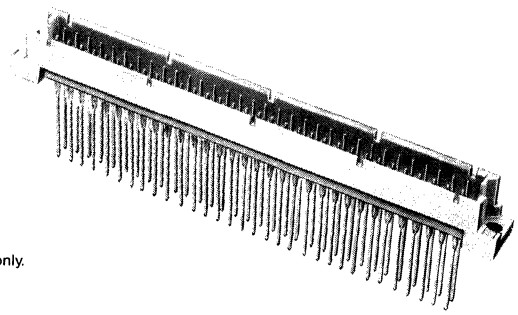
NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	MHQ016-081-X MHQ032-081-X	A = 4.7 (.184)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	MHQ016-091-X-Y MHQ032-091-X-Y	A = 13.0 (.512)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	MHQ016-101-X-Y MHQ032-101-X-Y	A = 17.0 (.669)	
16 32	a, b 2, 4, 6 - 16 a, b 1, 2, 3 - 16	MHQ016-111-X-Y MHQ032-111-X-Y	A = 20.9 (.823)	



Pressfit Wire Wrap Post
0.64 x 0.64
(.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)
Connectors with optional first mating (ground) contacts are available: consult factory.

Type Q
FLEX-FIT™ Male
PCB Connector



Physical Properties
Insulation Material–Glass filled thermoplastic rated UL 94V-0, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

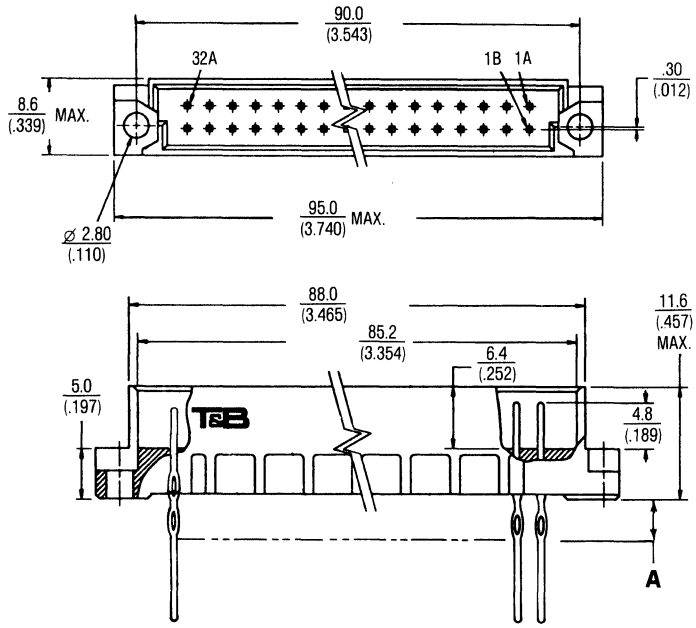
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

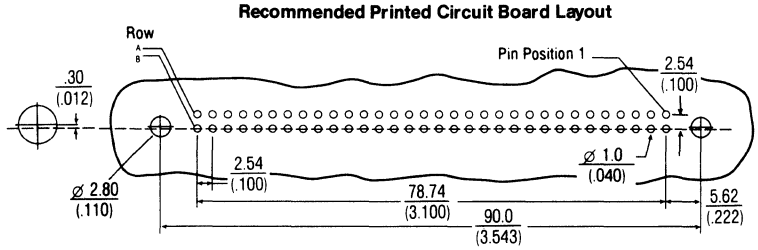
Dimensions shown are for reference only.
Dimensions are in MM (inches)



Extended length contacts available. Consult factory for details.

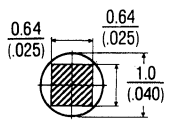
Application Tooling
Installation Platen: 889–DQ064
Pin Replacement Tool: 889-100

Recommended Printed Circuit Board Layout



Ordering Information

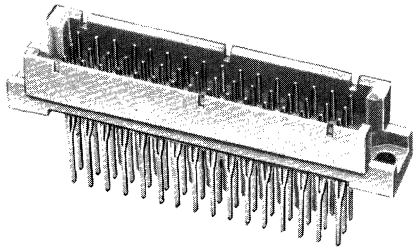
NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	MQ032-081-X MQ064-081-X	A = 4.7 (.184)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	MQ032-091-X-Y MQ064-091-X-Y	A = 13.0 (.512)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	MQ032-101-X-Y MQ064-101-X-Y	A = 17.0 (.669)	
32 64	a, b 2, 4, 6 - 32 a, b 1, 2, 3 - 32	MQ032-111-X-Y MQ064-111-X-Y	A = 20.9 (.823)	



Pressfit
Wire Wrap Post
0.64 x 0.64
(.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1–Tin/Lead, 2–Gold flash (.200" from pin tip), 3–Gold plate 30 microinches thick min. (.200" from pin tip)
Connectors with optional first mating (ground) contacts are available: consult factory.

Type R/2
FLEX-FIT™ Male
PCB Connector



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

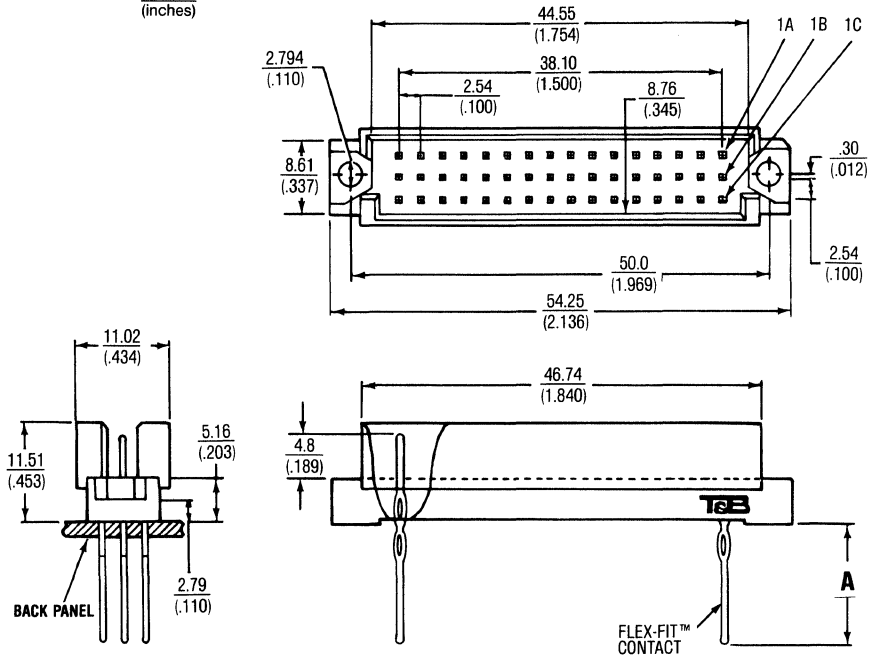
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

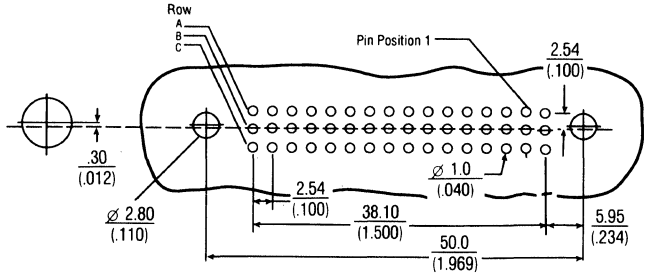
Dimensions shown are for reference only.
Dimensions are in MM (inches)



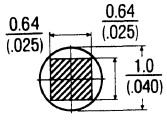
Extended length contacts available. Consult factory for details.

Application Tooling
Installation Platen: 889–DR048
Pin Replacement Tool: 889-100

Recommended Printed Circuit Board Layout

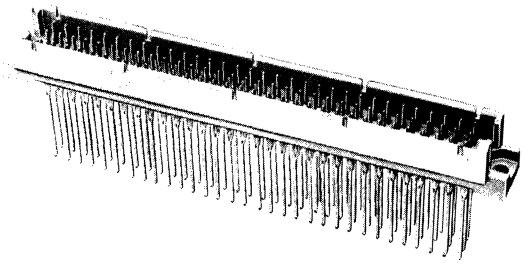


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	MHR032-081-X MHR048-081-X	A = 4.7 (.184)	 Pressfit Wire Wrap Post 0.64 x 0.64 (.025 x .025)
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	MHR032-091-X-Y MHR048-091-X-Y	A = 13.0 (.512)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	MHR032-101-X-Y MHR048-101-X-Y	A = 17.0 (.669)	
32 48	a, c 1, 2, 3 - 16 a, b, c 1, 2, 3 - 16	MHR032-111-X-Y MHR048-111-X-Y	A = 20.9 (.823)	

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)
Connectors with optional first mating (ground) contacts are available: consult factory.

Type R
FLEX-FIT™ Male
PCB Connector



Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

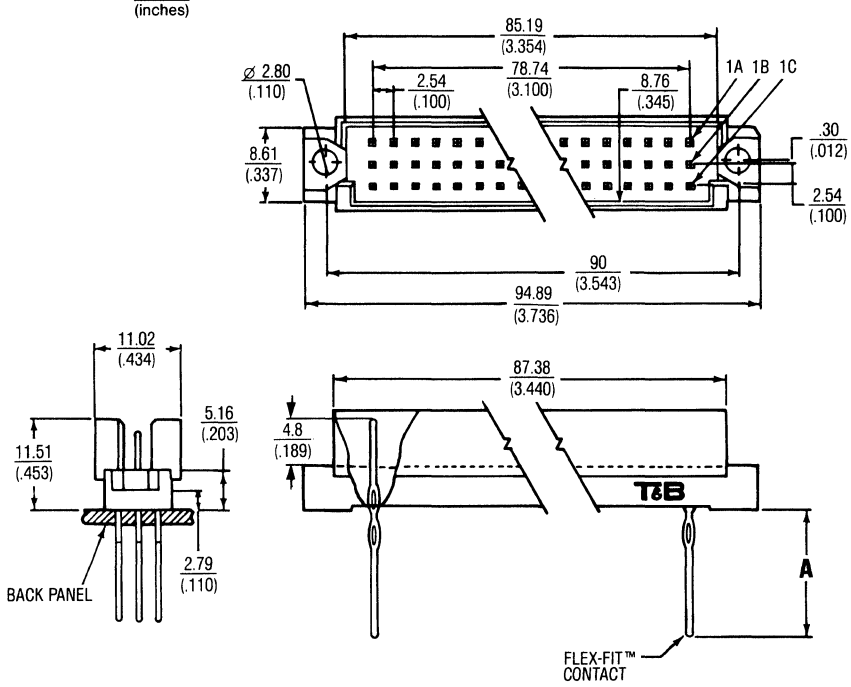
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Initial Insertion Force Per Pin
40 lbs. maximum when staked into glass epoxy PCB substrate 0.037" diameter finished through-hole.

Retention Force Per Pin
10 lbs. minimum when staked into glass epoxy PCB substrate 0.043" diameter finished through-hole.

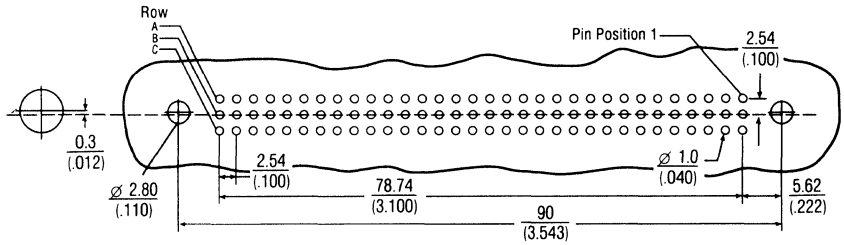
Dimensions shown are for reference only.
Dimensions are in MM (inches)



Extended length contacts available. Consult factory for details.

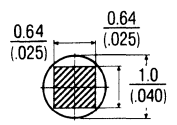
Application Tooling
Installation Platen: 889–DR096
Pin Replacement Tool: 889-100

Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	MR064-081-**X** MR096-081-**X**	**A** = 4.7 (.184)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	MR064-091-**X-Y** MR096-091-**X-Y**	**A** = 13.0 (.512)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	MR064-101-**X-Y** MR096-101-**X-Y**	**A** = 17.0 (.669)	
64 96	a, c 1, 2, 3 - 32 a, b, c 1, 2, 3 - 32	MR064-111-**X-Y** MR096-111-**X-Y**	**A** = 20.9 (.823)	



Pressfit
Wire Wrap Post
0.64 x 0.64
(.025 x .025)

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **2**, for Class 3 insert **3**.
Y=Tail Plating: 1—Tin/Lead, 2—Gold flash (.200" from pin tip), 3—Gold plate 30 microinches thick min. (.200" from pin tip)
Connectors with optional first mating (ground) contacts are available: consult factory.

EXPANDED INVERSE DIN TYPE R SERIES 21

Description/Application

The Inverse DIN two-piece connector system offers improved electrical integrity for board-to-board packaging applications. Available in expanded Type R, male connectors can be mounted on the backpanel or motherboard, while the female connector is mounted on the daughterboard. The high performance design of Type R connectors feature ultra-low mating force female contacts which permit smooth insertion and reduced mating/unmating forces.

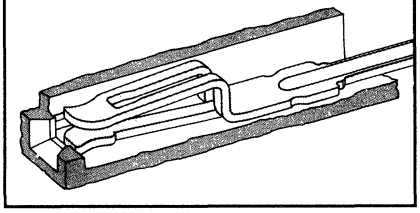
Design Considerations

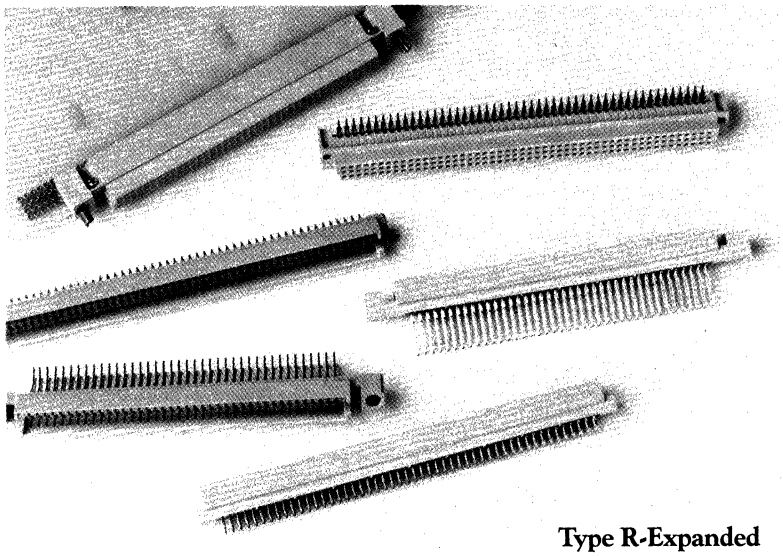
- Ultra-low mating force contact design
- Less than 2-oz. per contact pair mating force
- 120 and 150 contact configurations
- 64 combination connector keying is optional
- Maintain DIN 41612 mounting standards
- Maintain DIN 41612 performance classes
- First make/last break male connector option
- Both solder and compliant pin termination styles
- Front/rear panel compliant contact repairability
- FLEX-FIT™ compliant contact conforms to requirements of MIL-STD-2166
- Connector keying option is available to prevent connector pair mismatch

Installation Tooling

Press-Platens for FLEX-FIT™ connectors:
120 position male: Cat. no. 889-DR120
150 position male: Cat. no. 889-DR150

Ultra-low Mating Force Female Contact





Type R-Expanded

Ordering Information

The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

K M X R120-031-2-2

- ***Use when ordering keyed versions only*** — K
- ***Gender*** — M
- ***Expanded*** — X
- ***Type R*** — R
- ***No. of Contacts 120/150*** — 120
- ***Contact Variation*** — 031
- ***Mounting Provision*** — 2
- ***Performance Level*** — 2
- ***Tail Plating*** *(Omit for non-wrap post versions)*

Dimensions shown are for reference only.
Dimensions are in MM (inches)

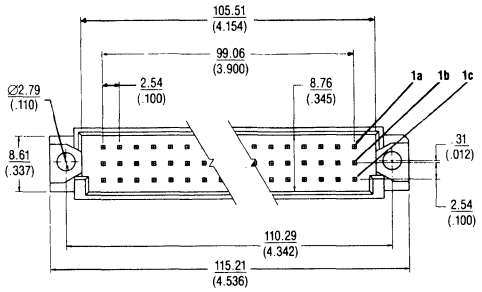
Type R
Male, Female Inverse Din
PCB Connector (120 position)
Series 21

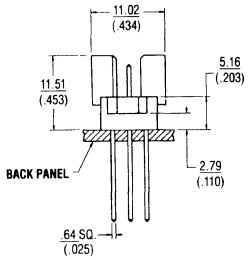
Physical Properties
Insulation Material– Glass filled thermoplastic rated UL 94V-0, compatable with vapor phase soldering, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

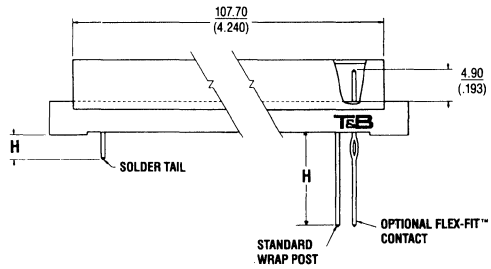
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating -55°C to 125°C

Male (120 position)





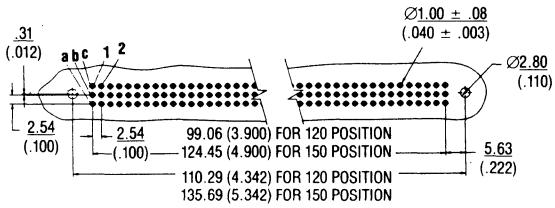


Ordering Information

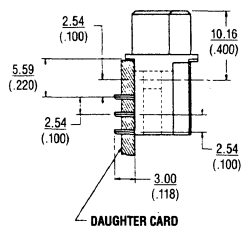
CONTACT NUMBER	H (TAIL LENGTH)	WRAP LEVEL	CONTACT STYLE
MXR120-021-X	2.50 (.098)	—	SOLDER TAIL
MXR120-031-X	4.00 (.157)	—	SOLDER TAIL
MXR120-041-X-Y	7.00 (.276)	1	WRAP POST
MXR120-051-X-Y	13.00 (.512)	2	WRAP POST
MXR120-061-X-Y	17.00 (.669)	3	WRAP POST
MXR120-081-X	4.67 (.184)	—	FLEX-FIT™
MXR120-091-X-Y	13.00 (.512)	1	FLEX-FIT™
MXR120-101-X-Y	17.00 (.669)	2	FLEX-FIT™
MXR120-111-X-Y	20.90 (.823)	3	FLEX-FIT™

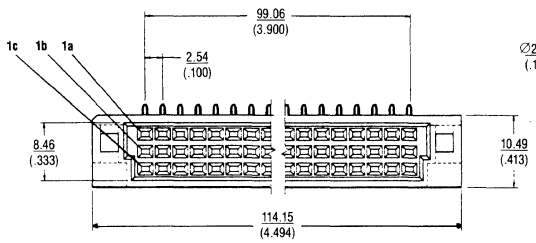
NOTES:
1. X = Performance class per DIN 41612 (1, 2 or 3).
2. Y = Tail Plating:
   1 — Tin/lead
   2 — Gold flash
3. Connectors with optional first mating (ground) contacts are available; consult factory.

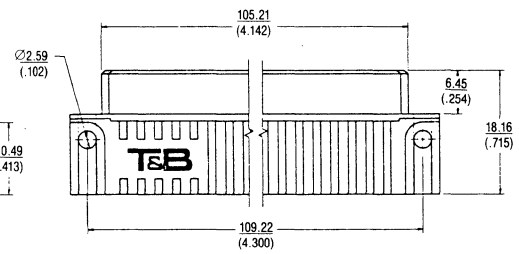
Recommended Printed Circuit Board Layout



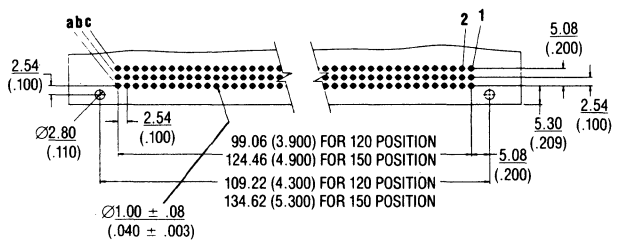
Female (120 position)







Recommended Printed Circuit Board Layout



Ordering Information

CATALOG NUMBER	FXR120-012-X

NOTE: 1. X = Performance class per DIN 41612 (1, 2 or 3).

Type R
Male, Female Inverse Din
PCB Connector (150 position)
Series 21

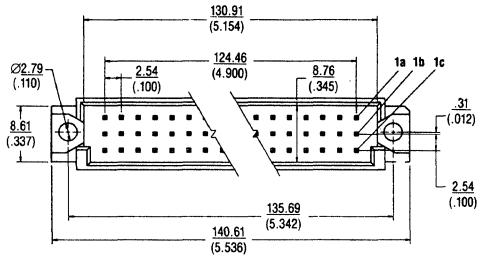
Dimensions shown are for reference only.
Dimensions are in MM (inches)

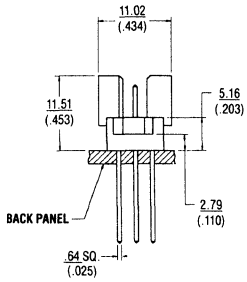
Physical Properties
Insulation Material– Glass filled thermoplastic rated UL 94V-0, compatable with vapor phase soldering, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

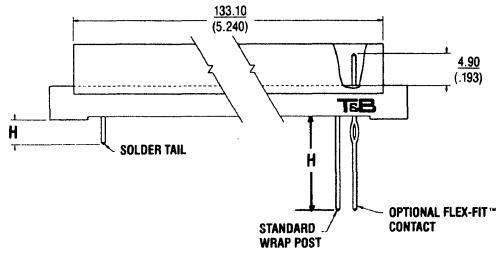
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating -55°C to 125°C

Male (150 position)





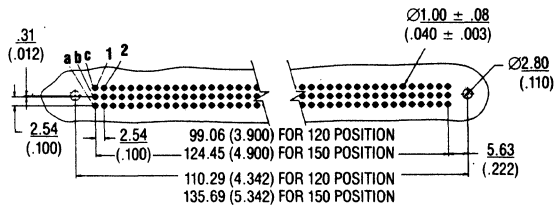


Ordering Information

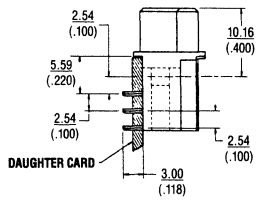
CATALOG NUMBER	H (TAIL LENGTH)	WRAP LEVEL	CONTACT STYLE
MXR150-021-X	2.50 [.098]	—	SOLDER TAIL
MXR150-031-X	4.00 [.157]	—	SOLDER TAIL
MXR150-041-X-Y	7.00 [.276]	1	WRAP POST
MXR150-051-X-Y	13.00 [.512]	2	WRAP POST
MXR150-061-X-Y	17.00 [.669]	3	WRAP POST
MXR150-081-X	4.67 [.184]	—	FLEX-FIT™
MXR150-091-X-Y	13.00 [.512]	1	FLEX-FIT™
MXR150-101-X-Y	17.00 [.669]	2	FLEX-FIT™
MXR150-111-X-Y	20.90 [.823]	3	FLEX-FIT™

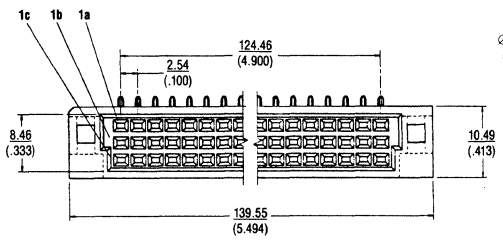
NOTES:
1. X = Performance class per DIN 41612 (1, 2 or 3).
2. Y = Tail Plating:
   1—Tin/lead
   2—Gold flash
3. Connectors with optional first mating (ground) contacts are available; consult factory.

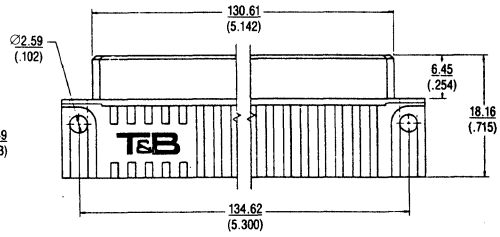
Recommended Printed Circuit Board Layout



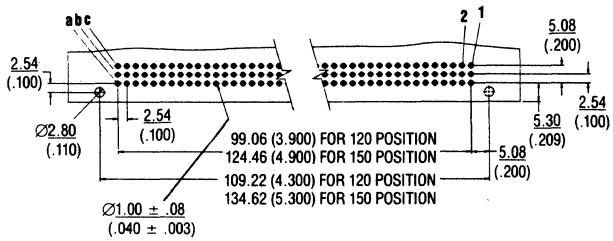
Female (150 position)







Recommended Printed Circuit Board Layout



Ordering Information

CATALOG NUMBER	FXR150-012-X

NOTE: 1. X = Performance class per DIN 41612 (1, 2 or 3).

Type R
Male, Female Inverse Din PCB Connector (Keyed) Series 21

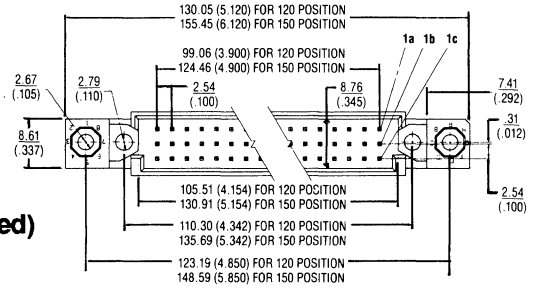
Dimensions shown are for reference only.
Dimensions are in MM (inches)

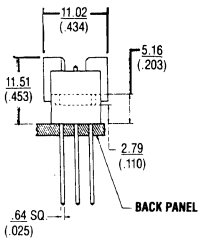
Physical Properties
Insulation Material– Glass filled thermoplastic rated UL 94V-0, compatable with vapor phase soldering, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

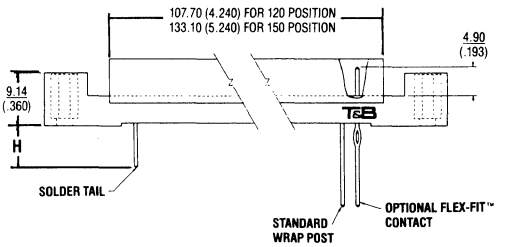
Electrical Properties
Current Rating 2 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating -55°C to 125°C

Male (120/150 position Keyed)





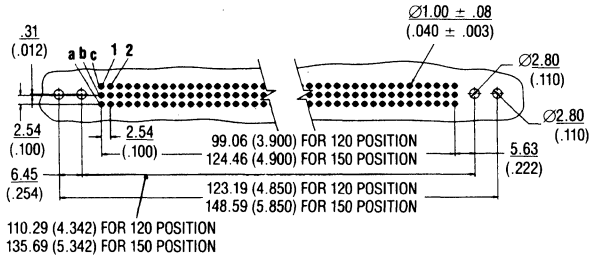


Ordering Information

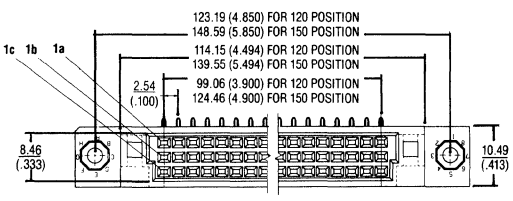
CATALOG NUMBER	H	WRAP LEVEL	CONTACT STYLE
KMXR120-021-X KMXR150-021-X	2.50 (.098)	—	SOLDER TAIL
KMXR120-031-X KMXR150-031-X	4.00 (.157)	—	SOLDER TAIL
KMXR120-041-X-Y KMXR150-041-X-Y	7.00 (.276)	1	WRAP POST
KMXR120-051-X-Y KMXR150-051-X-Y	13.00 (.512)	2	WRAP POST
KMXR120-061-X-Y KMXR150-061-X-Y	17.00 (.669)	3	WRAP POST
KMXR120-081-X KMXR150-081-X	4.67 (.184)	—	FLEX-FIT™
KMXR120-091-X-Y KMXR150-091-X-Y	13.00 (.512)	1	FLEX-FIT™
KMXR120-101-X-Y KMXR150-101-X-Y	17.00 (.669)	2	FLEX-FIT™
KMXR120-111-X-Y KMXR150-111-X-Y	20.90 (.823)	3	FLEX-FIT™

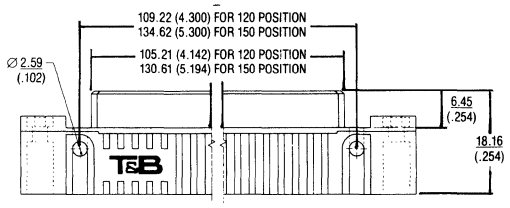
NOTES:
1. X = Performance class per DIN 41612 (1, 2 or 3).
2. Y = Tail Plating: 1—Tin/lead · 2—Gold flash · 3—Gold plate 30 microinches thick min.
3. Connectors with optional first mating (ground) contacts are available: consult factory.

Recommended Printed Circuit Board Layout



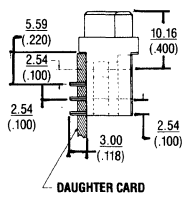
Female (120/150 position Keyed)



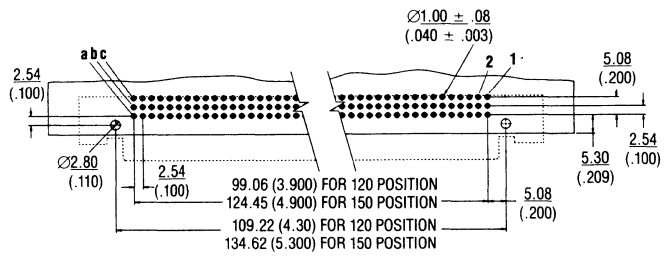


Ordering Information

CATALOG NUMBER	KFXR120-012-X KFXR150-012-X



Recommended Printed Circuit Board Layout



ACCESSORIES FOR TYPE C AND R PINLESS BACKPLANE SHROUDS

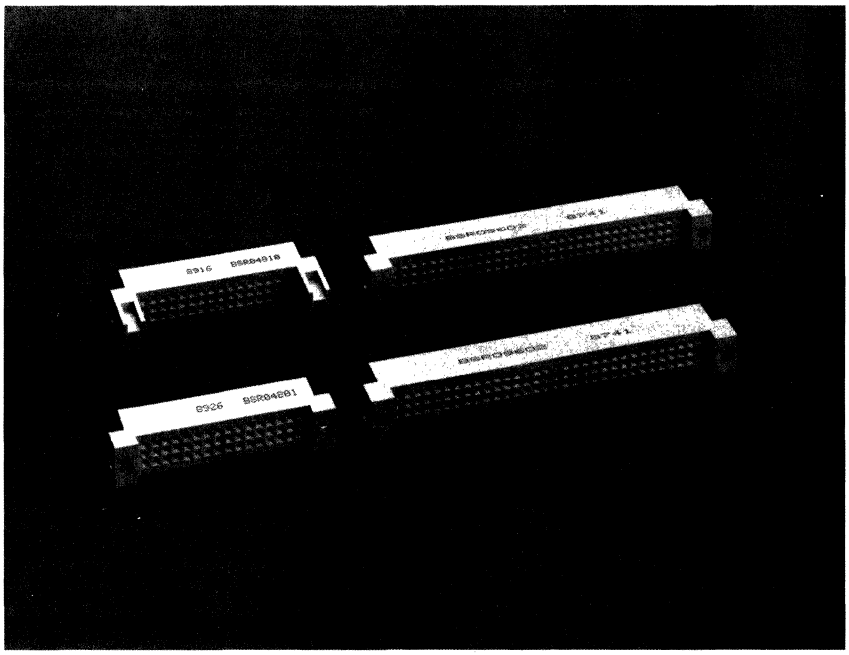
Description/Application

The pinless backplane shrouds provide board-to-board interconnections from the DIN C or R type connector to a second DIN connector interface.

The shrouds accommodate a variety of extended contact lengths to provide a versatile, rear panel connection system.

Design Considerations

- Glass filled thermoplastic, 94 V-O UL rated
- Mounting provisions allow for screw fastening or an interference fit to any orientation
- Shrouds are removable, facilitating field repairability
- Nine sizes accommodate 3 wrap-post lengths used in a wide range of PCBs
- Shroud retained on .024" and .025" square posts.



Pinless shrouds are dimensionally compatible with DIN 41612 and IEC-603-2 specifications

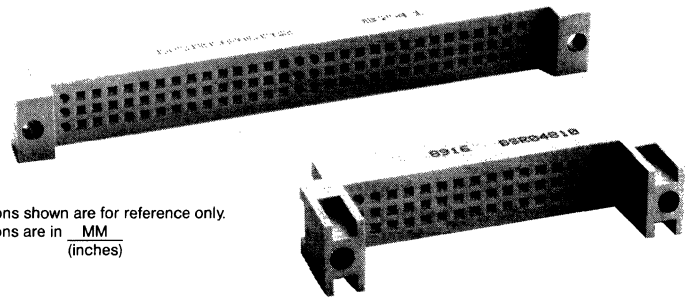
Ordering Information

The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

BSR09601

- ***T & B Series***
- ***Number of Contacts***
- ***Configuration*** *01-09*

Type C, R, C/2 & R/2 Accessories
Pinless Backplane
Shrouds



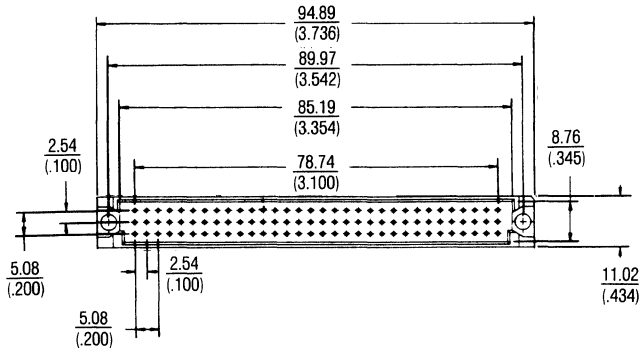
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray

Electrical Properties
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

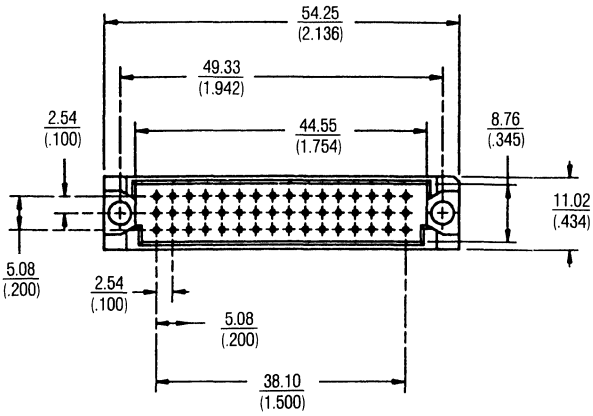
Environmental Properties
Temperature Rating —55°C to 125°C

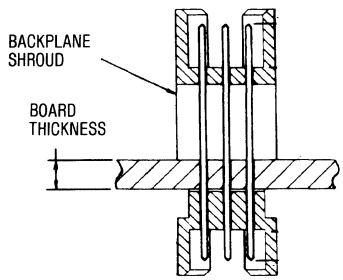
Dimensions shown are for reference only.
Dimensions are in MM (inches)

Types C or R



Types C/2 or R/2





Ordering Information

CATALOG NUMBER		A	B	NOM. BOARD THICKNESS
96 POSITION	48 POSITION			
BSR09601	BSR04801	2.41 (.095)	11.30 (.445)	3.18 (.125)
BSR09602	BSR04802	3.25 (.128)	12.14 (.478)	2.36 (.093)
BSR09603	BSR04803	4.06 (.160)	12.95 (.510)	1.57 (.062)
BSR09604	BSR04804	6.43 (.253)	15.32 (.603)	3.18 (.125)
BSR09605	BSR04805	7.24 (.285)	16.13 (.635)	2.36 (.093)
BSR09606	BSR04806	8.00 (.315)	16.89 (.665)	1.57 (.062)
BSR09607	BSR04807	10.34 (.407)	19.23 (.757)	3.18 (.125)
BSR09608	BSR04808	11.18 (.440)	20.07 (.790)	2.36 (.093)
BSR09609	BSR04809	11.94 (.470)	20.83 (.820)	1.57 (.062)

E

LOW PROFILE POWER TYPES D AND E SERIES 17

LR92984 E60980

Description/Application

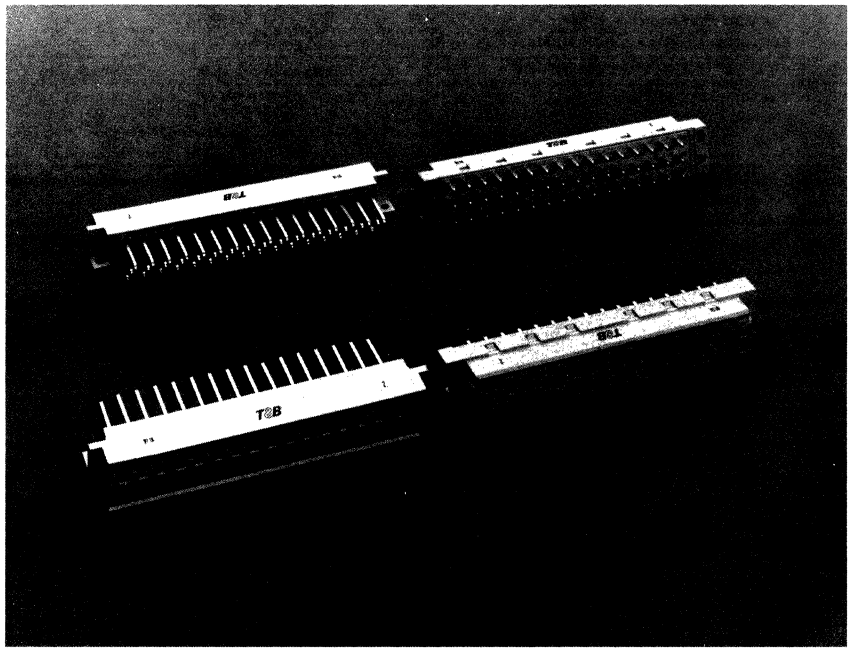
Series 17 connectors conform in all respects to the requirements of DIN 41612, type D and E. They are used predominantly for high current applications. The dimensions and basic outside pin spacings dimensions conform to Thomas & Betts DIN 41612 Series 16, type C. Therefore these two Series can be mounted together. Due to their common size they fit into 19" sub-racks and assemblies according to DIN 41494.

Design Considerations

- Excellent wear resistance and contact quality are achieved by hard gold plating over nickel.
- Dual opposing beams with high normal force contacts provide for excellent contact reliability.
- Coined and polished mating surfaces for optimal contact geometry.
- Rounded corners of male solder posts facilitate insertion into printed circuit board hole patterns.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.



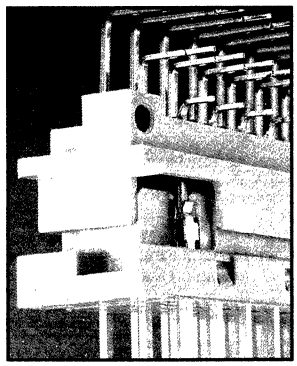
Ordering Information

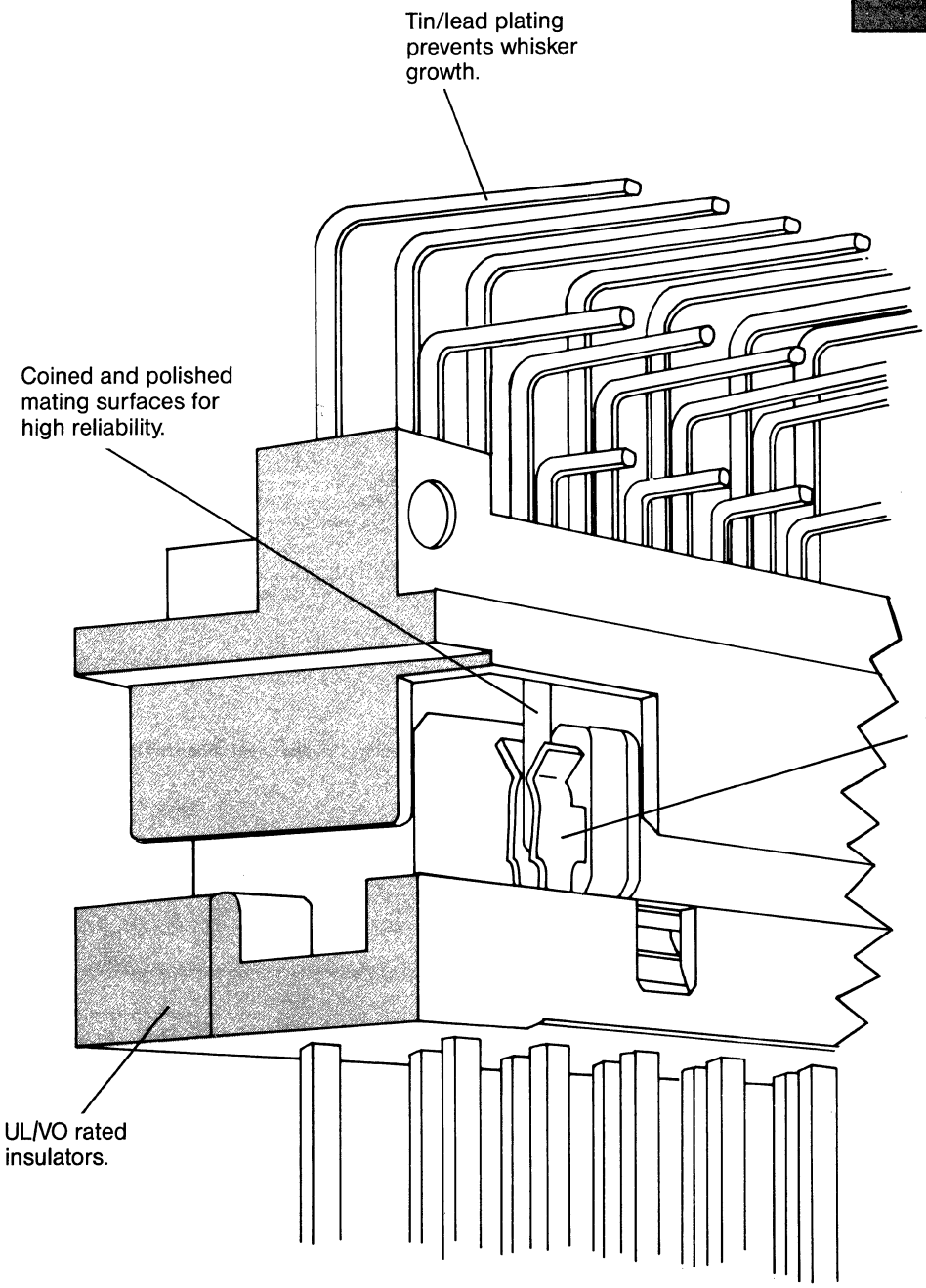
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

171-33230-300X

- ***T & B Series*** — 171
- ***Gender*** — 1
- ***Housing*** — 33
- ***Number of Contacts*** — 230
- ***Contact Loading*** — 3
- ***Termination Style*** — 00
- ***Plating in Termination Area*** — X
- ***Performance Level*** — X

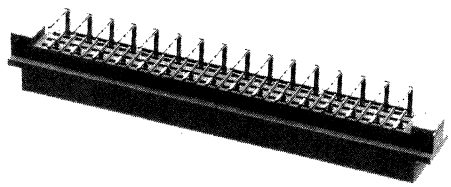
DESIGN CONSIDERATIONS





E

Type D
Male Connector
Series 17

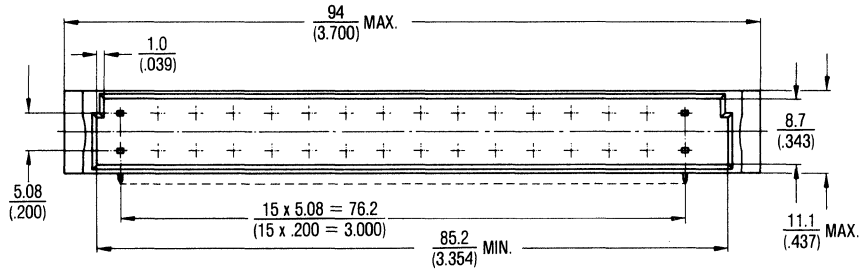


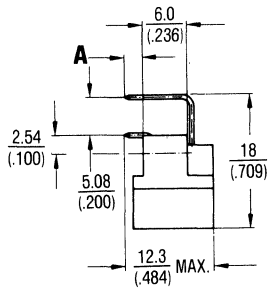
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder posts.

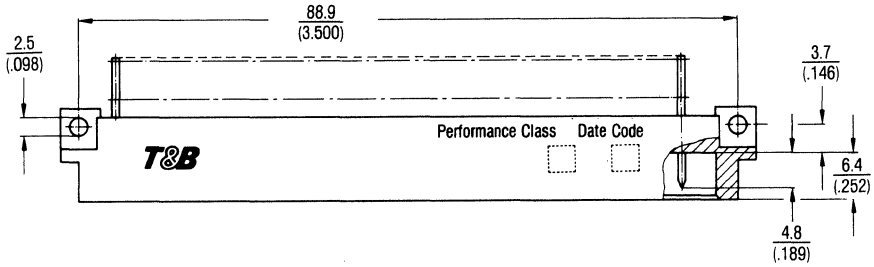
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

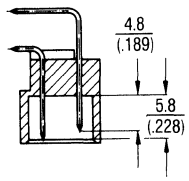
Environmental Properties
Temperature Rating —55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



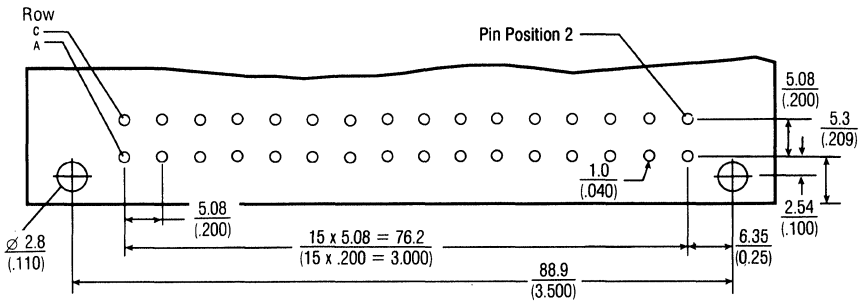




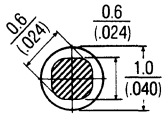


Extended length contacts available. Consult factory for details.

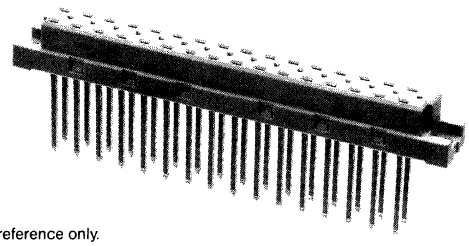
Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
32	a, c 2, 4, 6 - 32	171-33230-3008	A = 2.9 (.114)		**Solder Post** 0.6 x 0.6 (.024 x .024)

Type D
Female Connector
Series 17

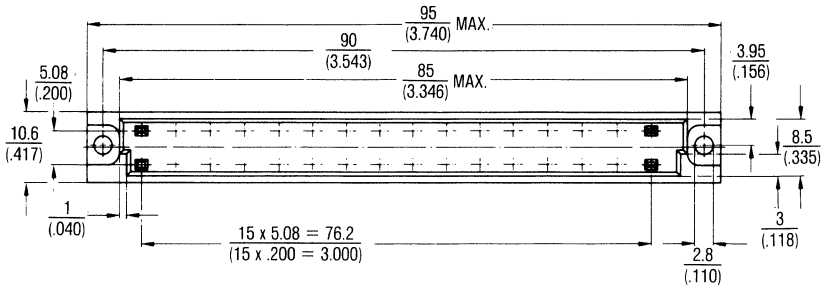


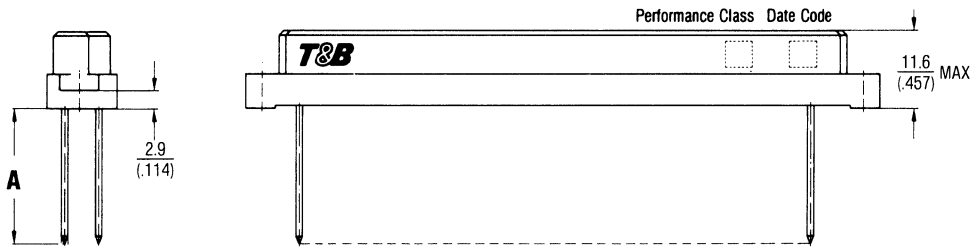
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead or gold on posts.

Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

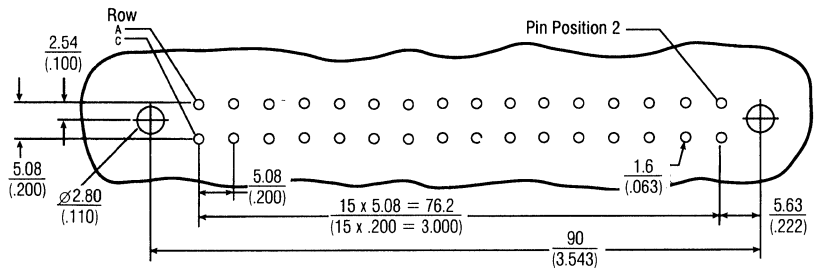
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

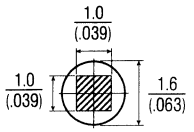




Recommended Printed Circuit Board Layout

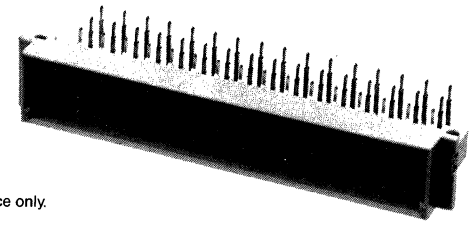


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32	a, c 2, 4, 6 - 32	172-33230-8058	A = 20.0 (.787)	 Wire Wrap Post 1.0 x 1.0 (.039 x .039)
32	a, c 2, 4, 6 - 32	172-33230-9058	A = 4.0 (.147)	

E

Type E
Male Connector
Series 17

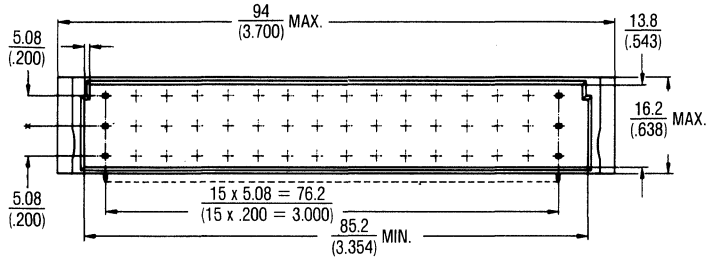


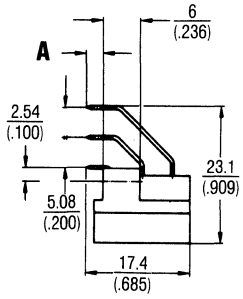
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder posts.

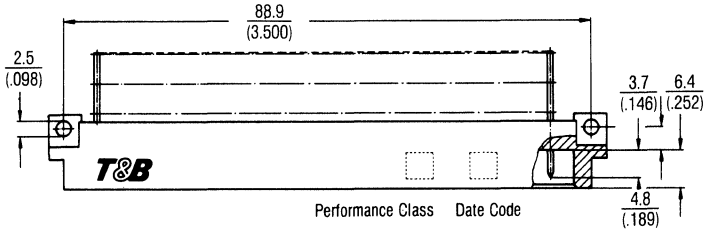
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

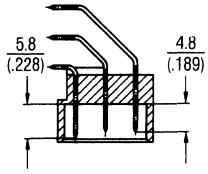
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



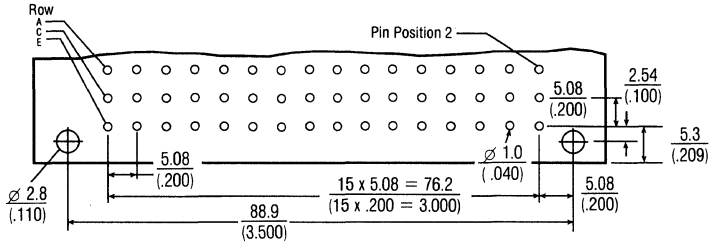




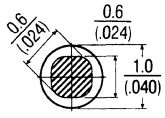


Extended length contacts available. Consult factory for details.

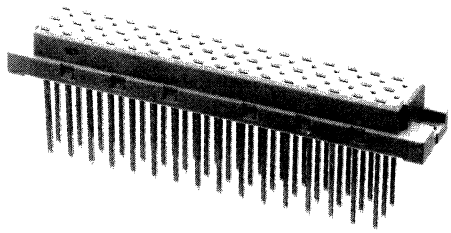
Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a e 2, 4, 6 - 32 a, c, e 2, 4, 6 - 32	171-43240-3008 171-44830-3008	A = 2.9 (.114)	 **Solder Post** 0.6 x 0.6 (.024 x .024)

Type E
Female Connector
Series 17

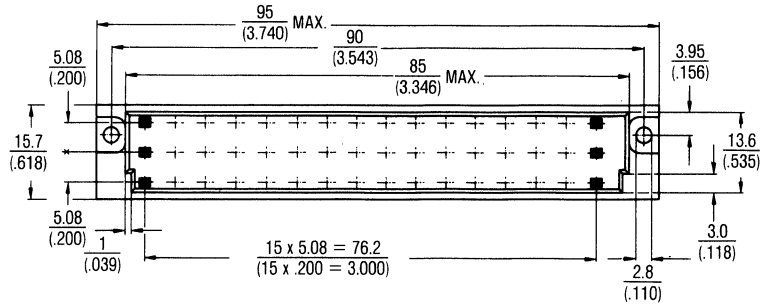


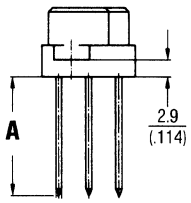
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone.
Tin/lead on solder posts.

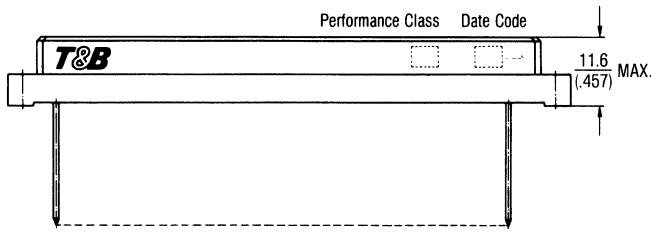
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

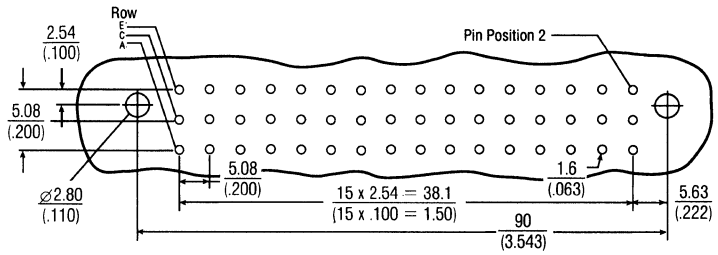
Dimensions shown are for reference only.
Dimensions are in MM (inches)



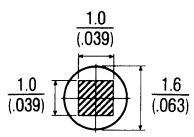




Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32 48	a, e 2, 4, 6 - 32 a, c, e 2, 4, 6 - 32	172-43240-8058 172-44830-8058	A = 20.0 (.787)	 Wire Wrap Post 1.0 x 1.0 (.040 x .040)
32 48	a, e 2, 4, 6 - 32 a, c, e 2, 4, 6 - 32	172-43240-9058 172-44830-9058	A = 4.0 (.157)	

E

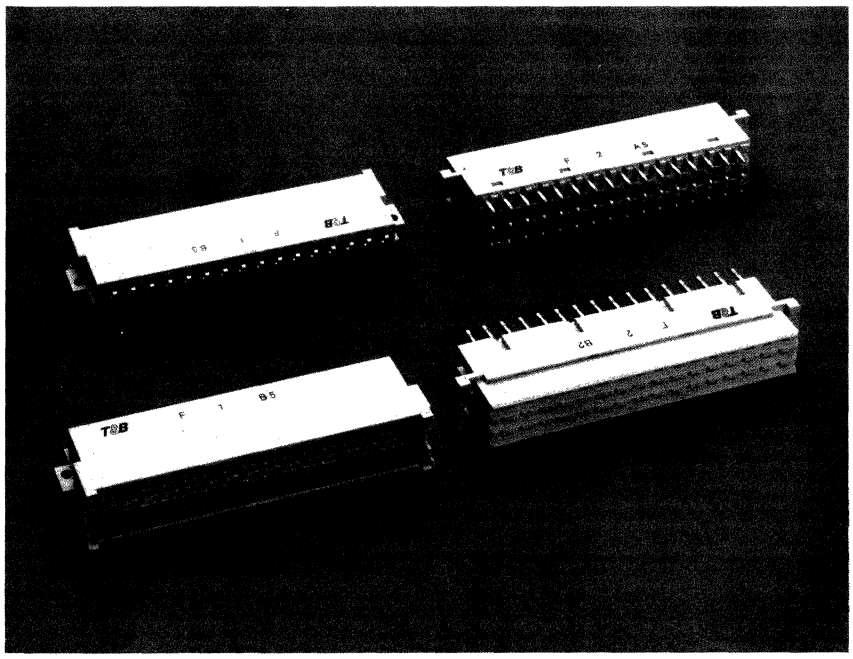
HEAVY DUTY POWER TYPES F AND G SERIES 38

LR92984 E60980

Description/Application

These heavy duty connectors are designed for the transmission of high currents and voltages in industrial environments. With their standard geometries, they fit into 19" subracks and assemblies according to DIN 41494. Due to the robust design, a high degree of electrical and mechanical security is provided.

Using maximum dielectric spacing as well as optimum-sized contacts, these connectors are well suited for applications where downtime is extremely prohibitive in cost.



Design Considerations

- Protected front entry of female insulator prevents stubbing of contacts.
- Preloaded female contact geometry provides for high normal forces with low insertion forces for higher reliability.
- Dual beam female contact design provides redundant contact points for low resistance interface.
- Rugged design results in mechanical and electrical integrity, even under severe conditions.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.

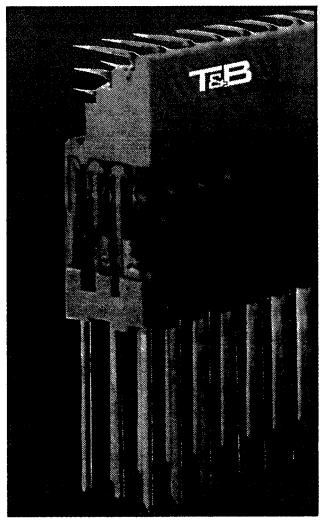
Ordering Information

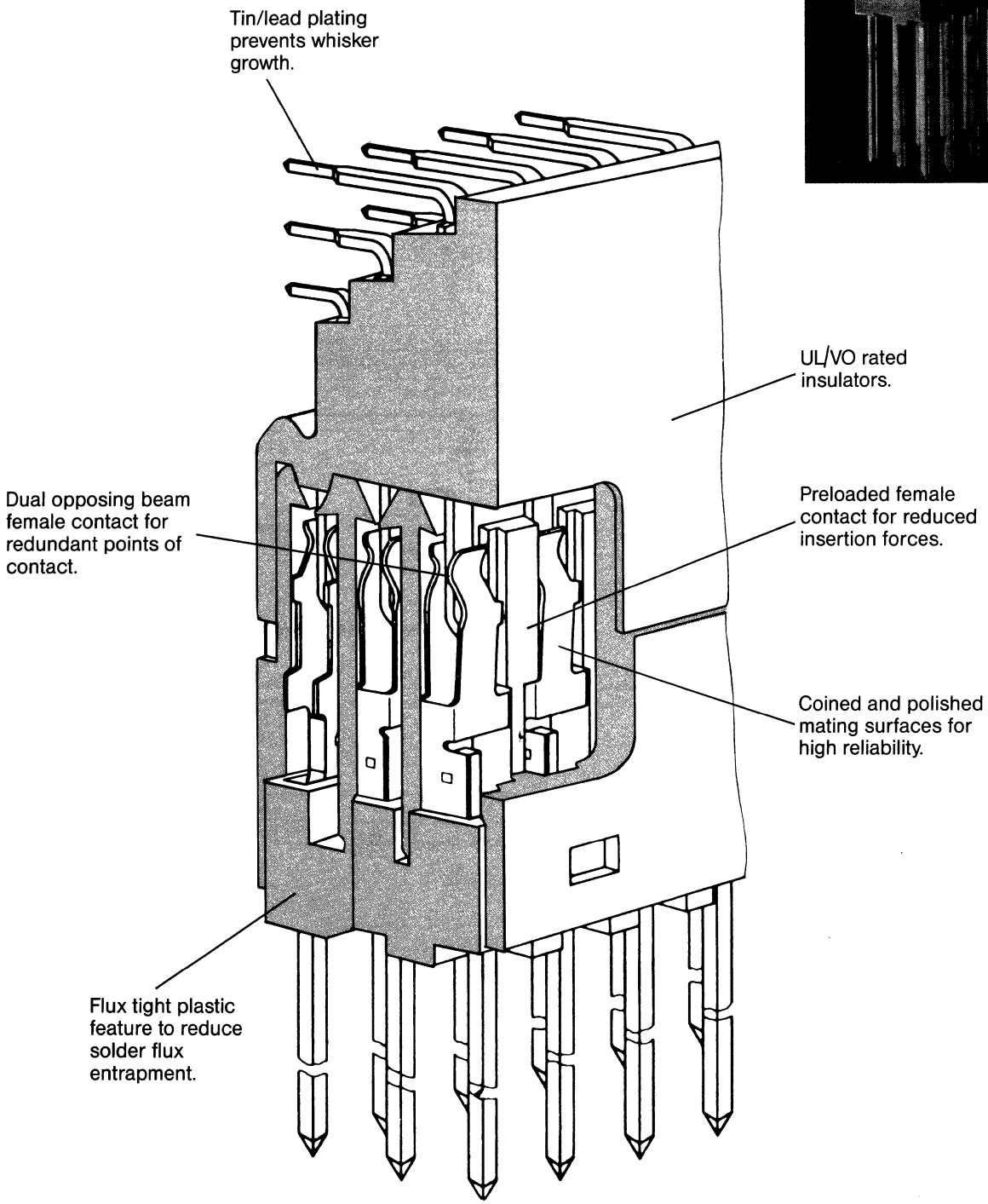
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

381-43250-300X

- ***T & B Series***
- ***Gender***
- ***Housing***
- ***Number of Contacts***
- ***Contact Loading***
- ***Termination Style***
- ***Plating in Termination Area***
- ***Performance Level***

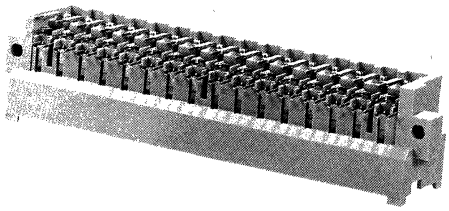
DESIGN CONSIDERATIONS





E

Type F
Male Connector
Series 38

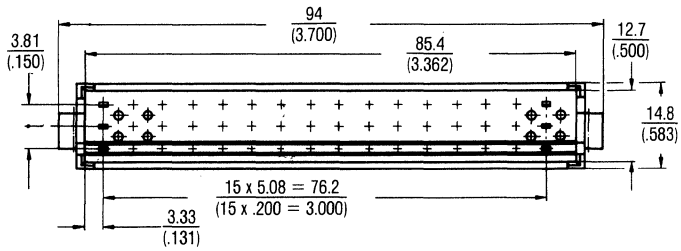


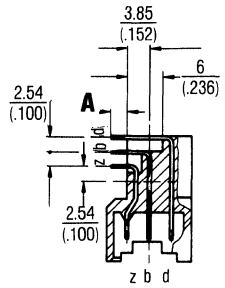
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

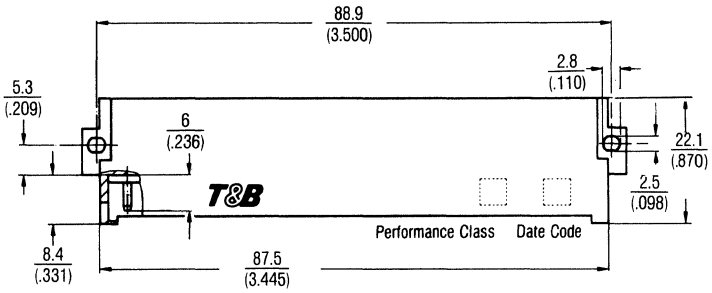
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

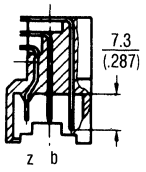
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



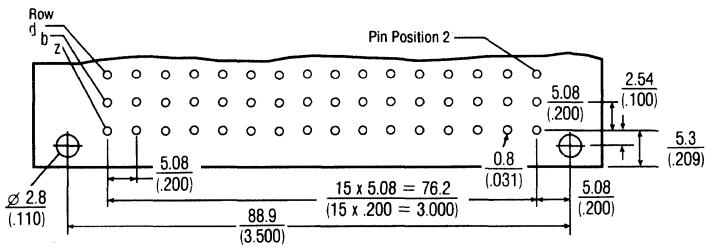






Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

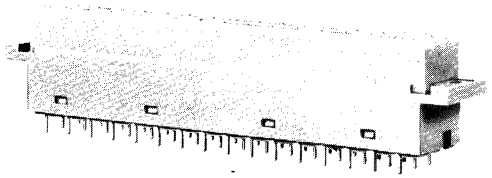


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
32	z, b 2, 4, 6 - 16	381-43250-300X	A = 2.8 (.110)	0.64 (.025) x 0.64 (.025) x 0.8 (.031) **Solder Post** 0.64 x 0.64 (.025 x .025)
32	z, d 2, 4, 6 - 16	381-43240-300X		
48	z, b, d 2, 4, 6 - 16	381-44830-300X		

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type F
Female Connector
Series 38

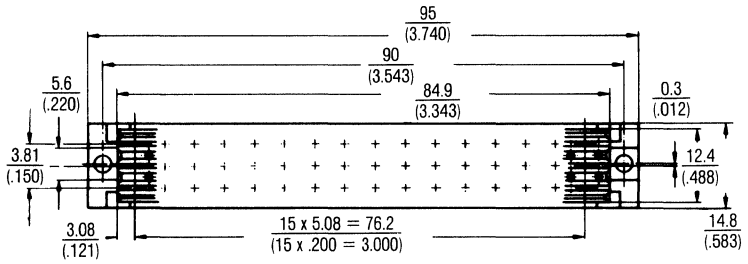


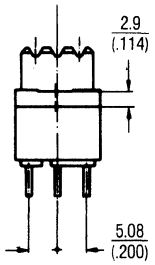
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

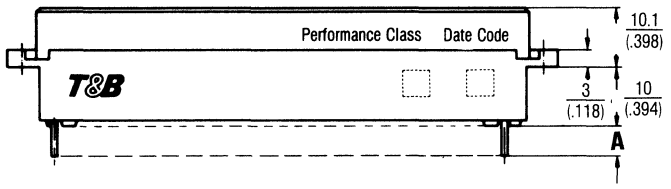
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

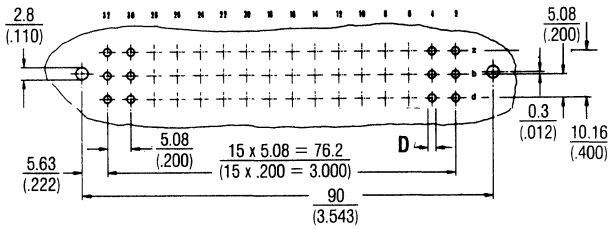
Dimensions shown are for reference only.
Dimensions are in millimeters.
(inches)



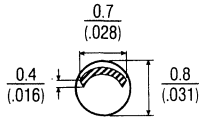
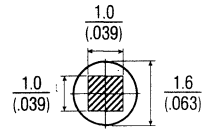




Recommended Printed Circuit Board Layout



Ordering Information

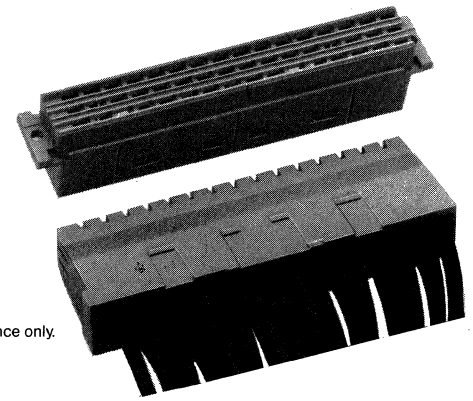
NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)			
32 32 48	z, b 2, 4, 6 - 32 z, d 2, 4, 6 - 32 z, b, d 2, 4, 6 - 32	382-43250-725X 382-43240-725X 382-44830-725X	A = 3.2 (.126)	D = 0.8 (.031)		**Solder Tail** 0.7 x 0.4 (.028 x .016)
32 32 48	z, b 2, 4, 6 - 32 z, d 2, 4, 6 - 32 z, b, d 2, 4, 6 - 32	382-43250-925X 382-43240-925X 382-44830-925X	A = 4.5 (.177)			
32 48	z, b 2, 4, 6 - 32 z, b, d 2, 4, 6 - 32	382-43250-705X 382-44830-705X	A = 3.2 (.126)	D = 1.6 (.063)		**Solder Post** 1.0 x 1.0 (.039 x .039)
32 48	z, b 2, 4, 6 - 32 z, b, d 2, 4, 6 - 32	382-43250-905X 382-44830-905X	A = 4.5 (.177)			

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

E

Type F
Female Connector Housing and Crimp, Snap-In Contacts Series 38

Two Piece Housing

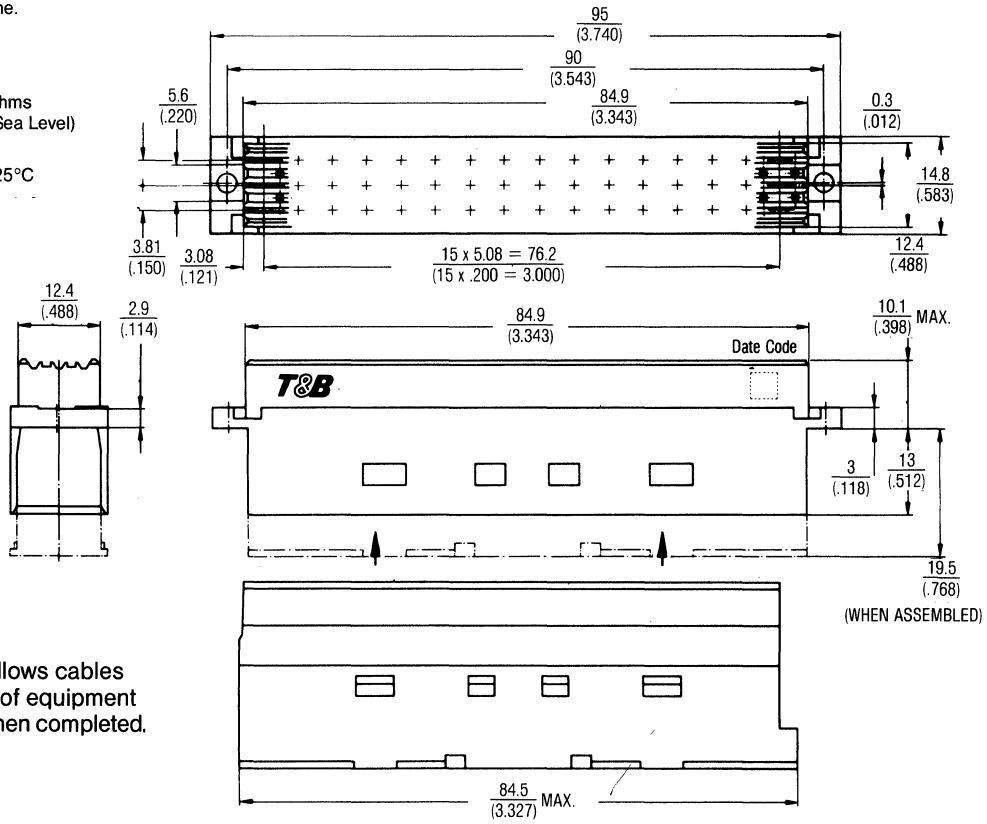


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead in crimp area.

Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

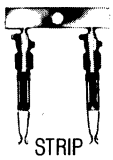
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



Two piece construction allows cables to be assembled outside of equipment and snapped into place when completed.

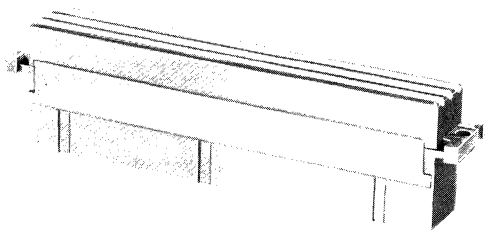
Ordering Information

ITEM	PACKAGING	CONDUCTOR SIZE		CATALOG NO.	CRIMP TOOL
		MM	AWG		
 STRIP	LARGE REEL 2500 CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-1-215X 385-1-225X 385-1-235X	180-021 180-022 180-023
	SMALL REEL 200 CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-2-215X 385-2-225X 385-2-235X	180-021 180-022 180-023
 LOOSE	INDIVIDUAL CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-3-215X 385-3-225X 385-3-235X	180-011 180-012 180-013
HOUSING 48 POSITION	N/A	N/A	N/A	385-448-1	N/A

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**.

Type F
Female Connector Housing and Crimp, Snap-In Contacts Series 38

One Piece Housing

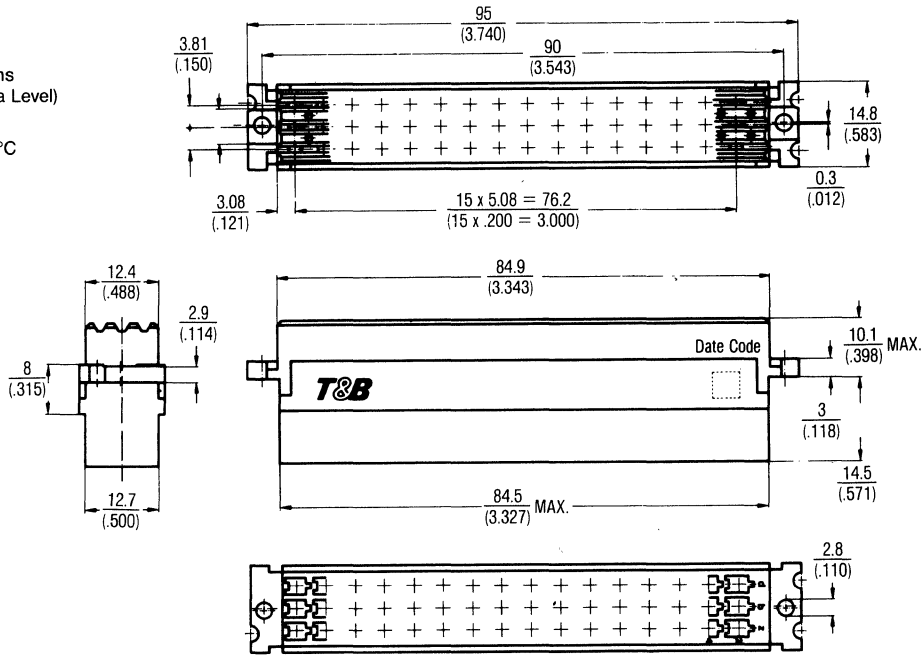


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead in crimp area.

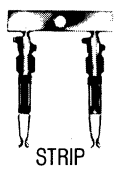
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

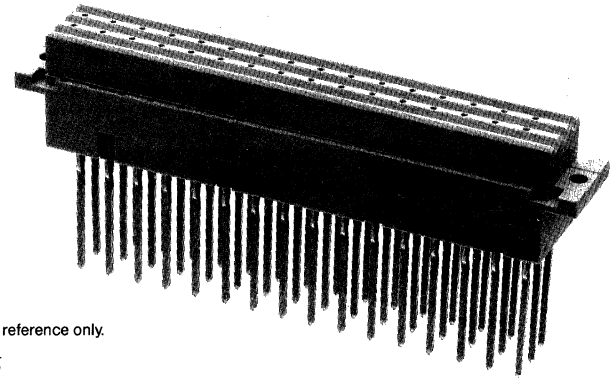


Ordering Information

ITEM	PACKAGING	CONDUCTOR SIZE		CATALOG NO.	CRIMP TOOL
		MM	AWG		
 STRIP	LARGE REEL 2500 CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-1-215X 385-1-225X 385-1-235X	180-021 180-022 180-023
	SMALL REEL 200 CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-2-215X 385-2-225X 385-2-235X	180-021 180-022 180-023
 LOOSE	INDIVIDUAL CONTACTS	1 - 2 2 - 3 3 - 6	16-14 14-12 12-10	385-3-215X 385-3-225X 385-3-235X	180-011 180-012 180-013
HOUSING 48 POSITION	N/A	N/A	N/A	385-448-2	N/A

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**.

Type F
Pressfit Female Connector
Series 38

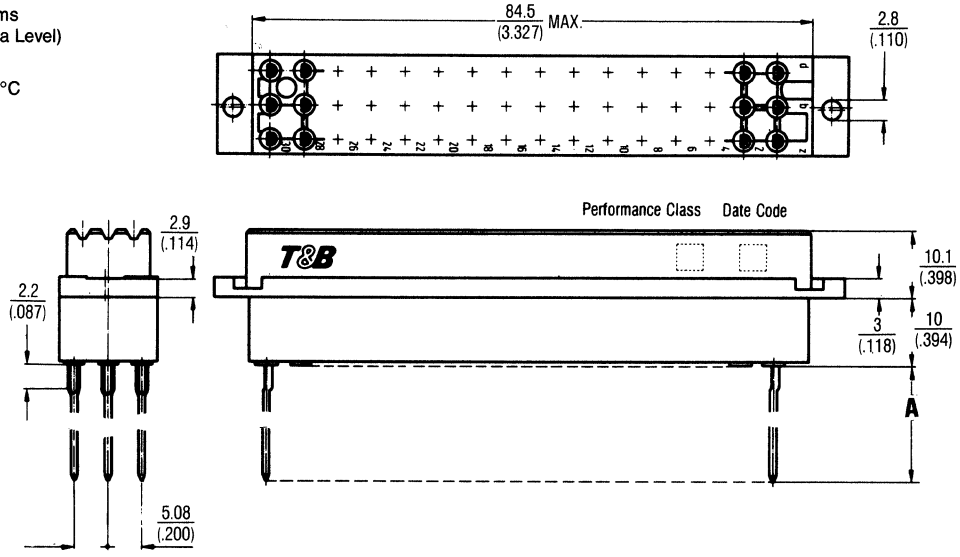


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

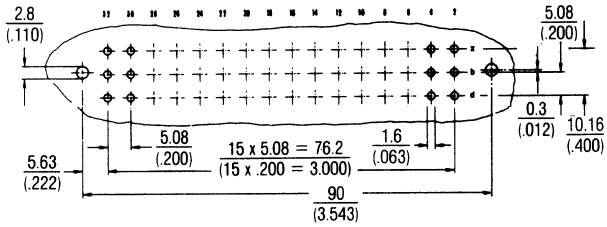
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating —55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM / (inches)



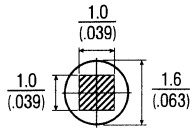
Recommended Printed Circuit Board Layout



Plated Thru Hole Specifications:

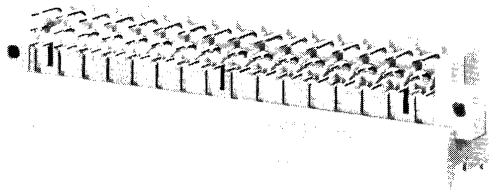
Final Hole Diameter	1.6 ± .09 / (.063 ± .003)
Copper Thickness	.0025 (.0001)
Tin/Lead Thickness	.0005-.0015 / (.00002-.00006)
Printed Circuit Board Thickness Range	1.6-3.2/(.063-.125)

Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM / (INCHES)	
32	z, b 2, 4, 6 - 32	382-43250-845X	A = 22.0 / (.866)	 Wire Wrap Post 1.0 x 1.0 (.039 x .039)
32	z, d 2, 4, 6 - 32	382-43240-845X		
48	z, b, d 2, 4, 6 - 32	382-44830-845X		
32	z, b 2, 4, 6 - 32	382-43250-945X	A = 6.5 / (.256)	
32	z, d 2, 4, 6 - 32	382-43240-945X		
48	z, b, d 2, 4, 6 - 32	382-44830-945X		

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type G
Male Connector
Series 38

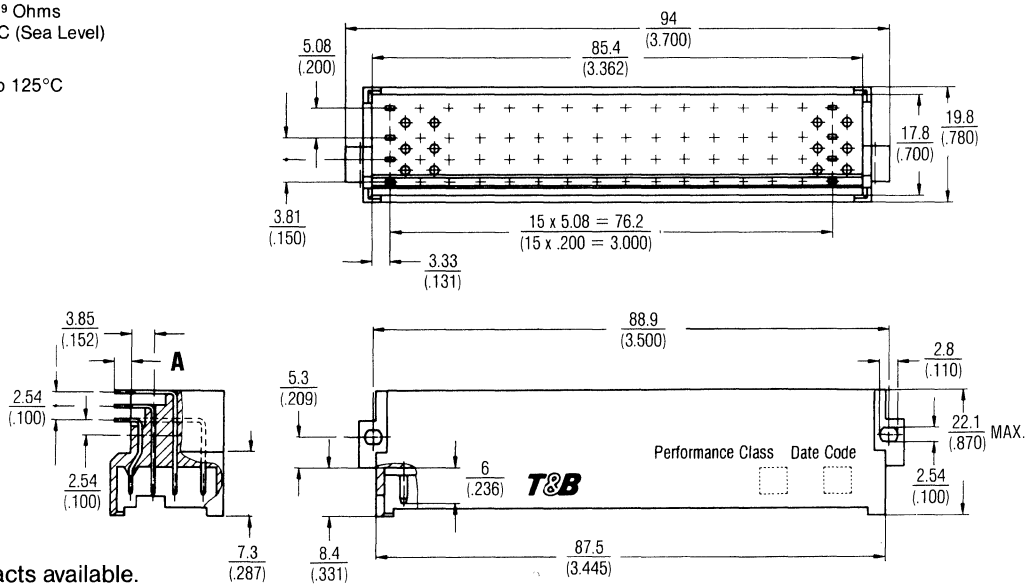


Physical Properties
Insulation Material–Glass filled thermoplastic rated UL 94V-0, gray
Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

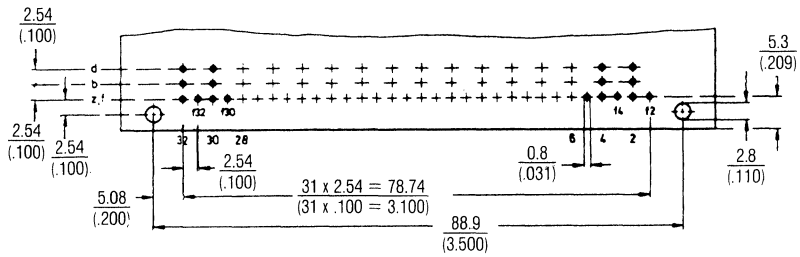
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

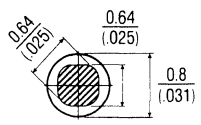


Extended length contacts available.
Consult factory for details.

Recommended Printed Circuit Board Layout

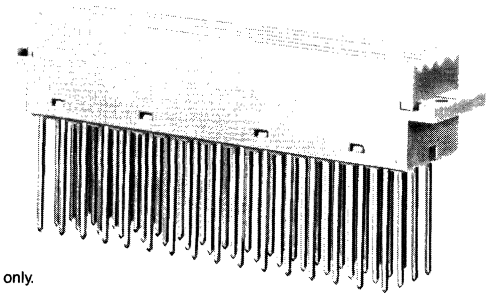


Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
64	z, b, d, f 2, 4, 6 - 32	381-66430-300X	A = 2.9 (.114)		**Solder Post** 0.64 x 0.64 (.025 x .025)

X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type G
Female Connector
Series 38

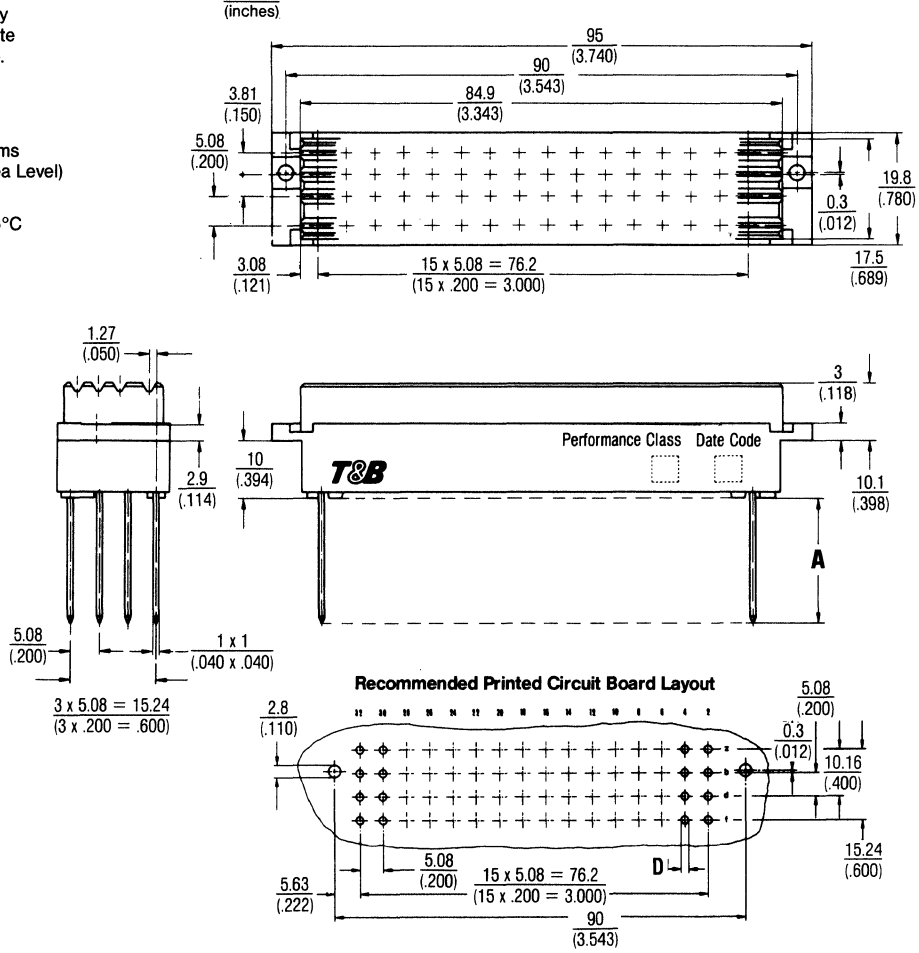


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead or gold on posts.

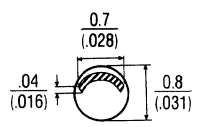
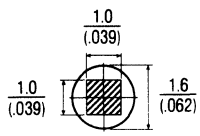
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



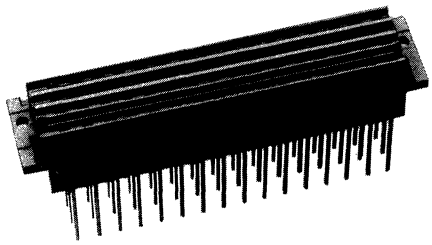
Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)			
64	z, b, d, f 2, 4, 6 - 32	382-66430-725X	A = 3.2 (.126)	D = 0.8 (.031)		**Solder Tail** 0.7 x 0.4 (.028 x .016)
64	z, b, d, f 2, 4, 6 - 32	382-66430-925X	A = 4.5 (.177)			
64	z, b, d, f 2, 4, 6 - 32	382-66430-705X	A = 3.2 (.126)	D = 1.6 (.063)		**Solder Post** 1.0 x 1.0 (.039 x .039)
64	z, b, d, f 2, 4, 6 - 32	382-66430-905X	A = 4.5 (.177)			

X=Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type F/G Female Connector Series 38

Mates to either F type or G type male connector

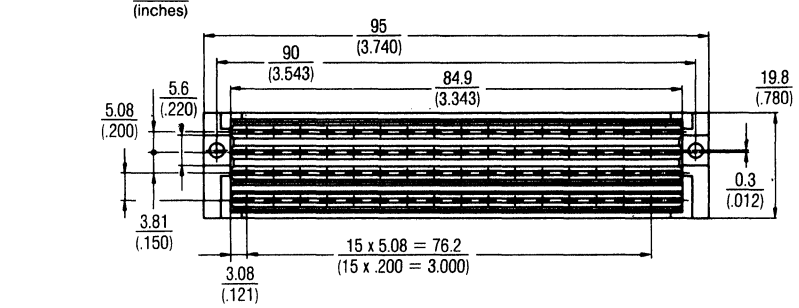


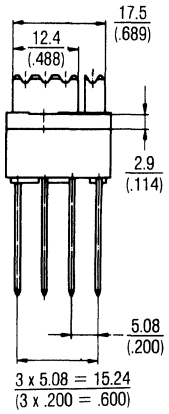
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

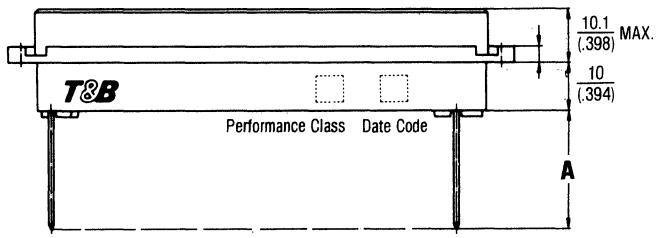
Electrical Properties
Current Rating 5.5 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

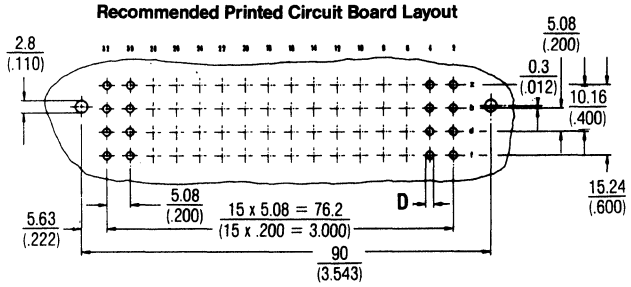
Dimensions shown are for reference only.
Dimensions are in MM (inches)



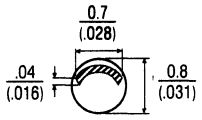
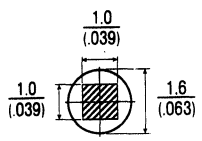




Recommended Printed Circuit Board Layout



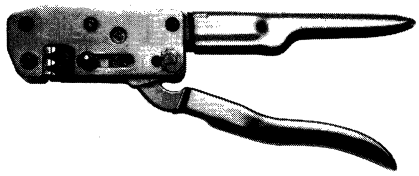
Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)			
48/64	z, b, d, f 2, 4, 6 - 32	382-00101-725X	A = 3.2 (.126)	D = 0.8 (.031)		**Solder Tail** 0.7 x 0.4 (.028 x .016)
48/64	z, b, d, f 2, 4, 6 - 32	382-00102-925X	A = 4.5 (.177)			
48/64	z, b, d, f 2, 4, 6 - 32	382-00103-705X	A = 3.2 (.126)	D = 1.6 (.063)		**Solder Post** 1.0 x 1.0 (.039 x .039)
48/64	z, b, d, f 2, 4, 6 - 32	382-00103-905X	A = 4.5 (.177)			

X=Performance Class: for Class 1 insert 1, for Class 2 insert 8, for Class 3 insert 4.

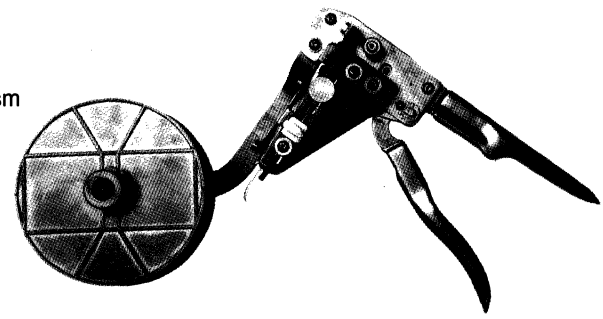
Application Tools
Series 38

Loose Contact Tool
with positioning device
for F and G contacts



CONDUCTOR SIZE		CATALOG NO.
MM	AWG	
1-2	16-14	180-011
2-3	14-12	180-012
3-6	12-10	180-013

Reel Feed Contact Crimp Tool
support for reel
and feeding mechanism
for F and G contacts



CONDUCTOR SIZE		CATALOG NO.
MM	AWG	
1-2	16-14	180-021
2-3	14-12	180-022
3-6	12-10	180-023

Contact Replacement Tool
For F and G Crimp,
Snap In contacts

CATALOG NO.
385-001

HEAVY DUTY POWER PCB CONNECTORS
AVAILABLE CONFIGURATIONS
SERIES 38

381-43250-300X*

T&B Series
38 – Heavy Duty Power

Housing Type
1 – Male Connector
2 – Female Connector
5 – Female Connector housing for crimp contacts

Housing
4 – Type F
6 – Type G

No. of contacts:
(other quantities of contacts available upon request)
16
32
48
64

Contact loading / No. of contacts:

	Row A	Row B	Row D	Row F
10 –	All	–	–	–
30 –	All	All	All	All
40 –	All	–	All	–
50 –	All	All	–	–
51 –	–	All	All	–

Termination Style:

70 – Solder pin	*1 x 1 x 3.2 (.039 x .039 x .126)*
72 – Solder pin	*0.7 x 0.4 x 3.2 (.028 x .016 x .126)*
80 – Wire wrap pin	*1 x 1 x 22 (.039 x .039 x .866)*
84 – Wire wrap pin with pressfit zone	*1 x 1 x 22 (.039 x .039 x .866)*
90 – Solder pin	*1 x 1 x 4.5 (.039 x .039 x .177)*
92 – Solder pin	*0.7 x 0.4 x 3.2 (.028 x .016 x .126)*
94 – Pressfit pin	*1 x 1 x 6.5 (.039 x .039 x .256)*

Tail Plating
0 – Male – Tin/Lead
5 – Female – Tin/Lead

Performance Level Per DIN 41612
(Mating Area)
1 – 1 – 500 Mating Cycles
8 – 2 – 400 Mating Cycles
4 – 3 – 200 Mating Cycles

*Availability of specific part numbers can vary. Consult factory for details.

HIGH CURRENT CONNECTORS
TYPE H
SERIES 37

LR92984 E60980

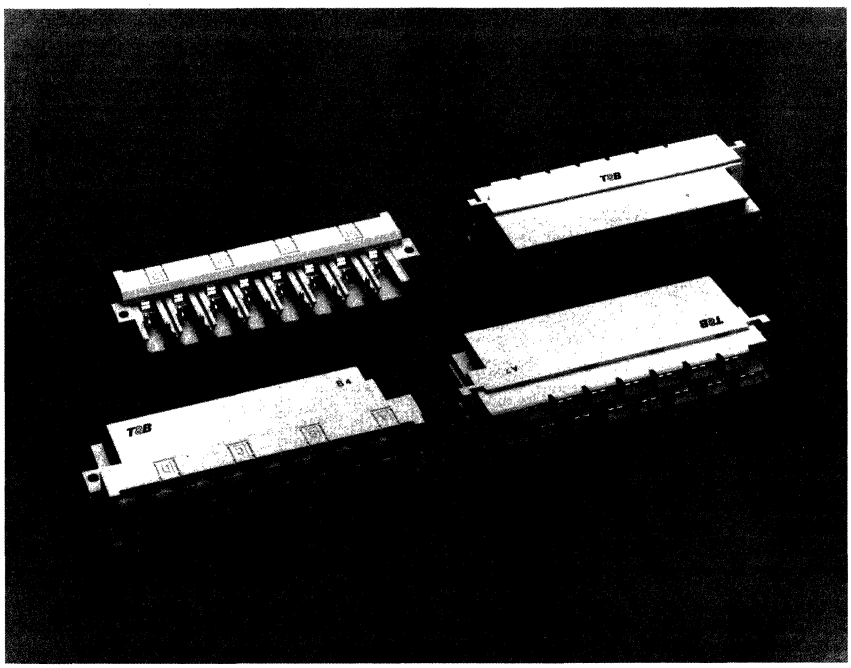
Description/Applications

These connectors are designed in accordance to DIN 41612 part 1.

All type H connectors fit into standard 19" sub racks as per DIN 41494.

Style H11 matches the mounting dimensions of types C and D. Type H15 and H7/F24 match the mounting dimensions of type F.

Applications include power supplies, boards carrying relays, and other high current applications.



Design Considerations:

- Dual opposing beam female contacts offer redundant contact points for high reliability and long service life.
- Coined and polished mating surfaces reduce mating/unmating forces.
- Protected front entry, female insulator with integral preload ribs reduces insertion/extraction forces and prevents stubbing of female contracts.
- Low profile, H15 female connectors can be soldered side by side with types B, C, D, E, M, Q and R. (See also Series 16, 17, 21 and 22).
- The H15 and H7/F24 female connectors are available with crimp contacts.
- Crimp contacts are gas tight, corrosion and vibration resistant.
- Connectors with blade contacts offer the flexibility of easy modifications in the field or at the factory.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.

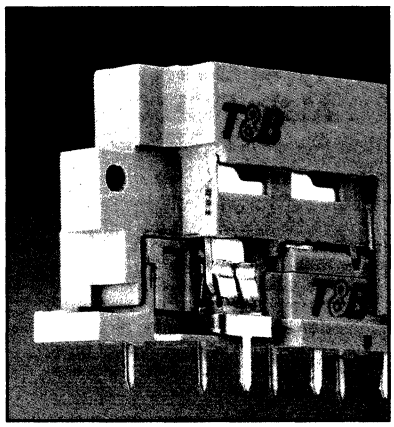
Ordering Information

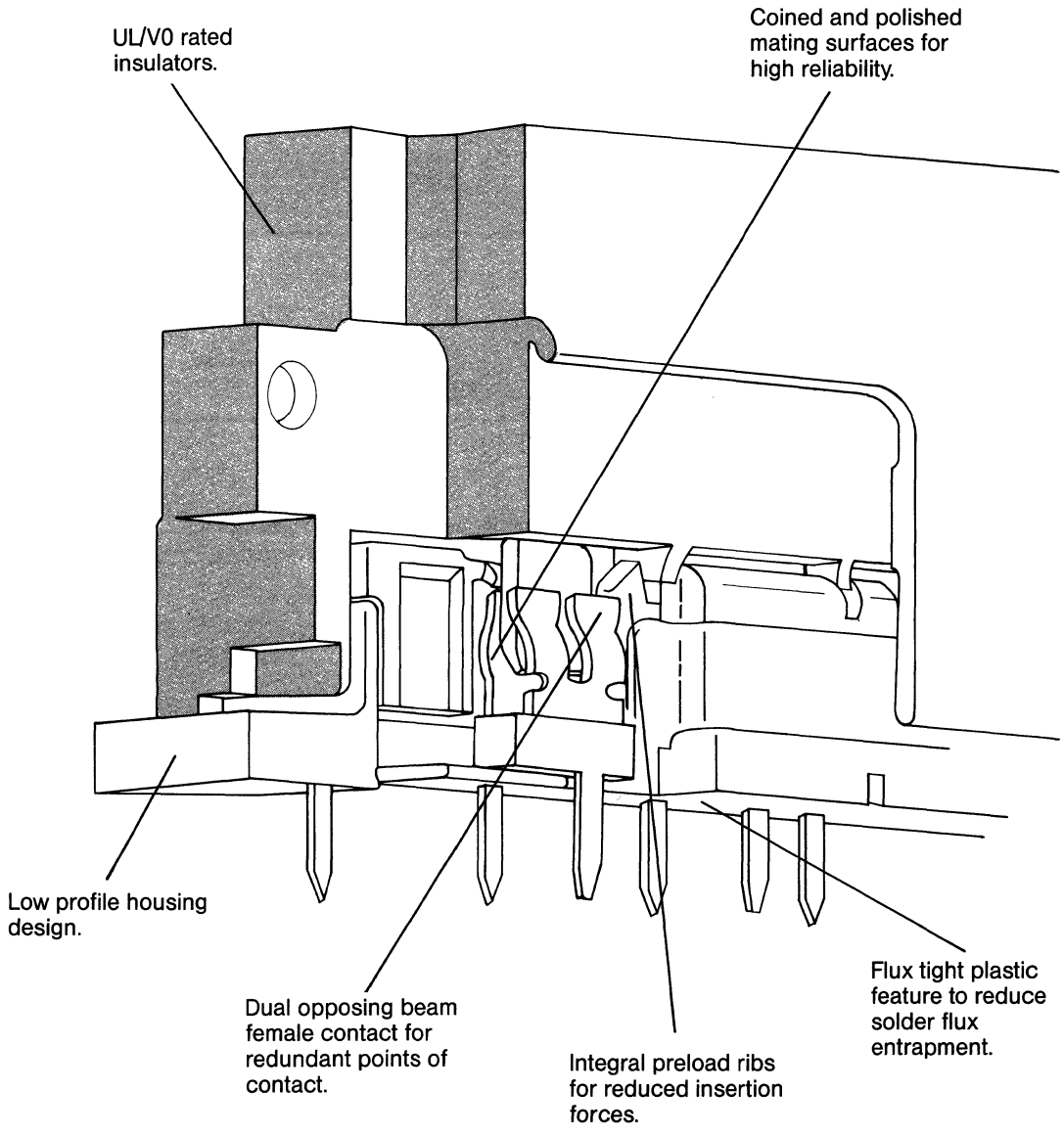
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

371-11130-30Y X

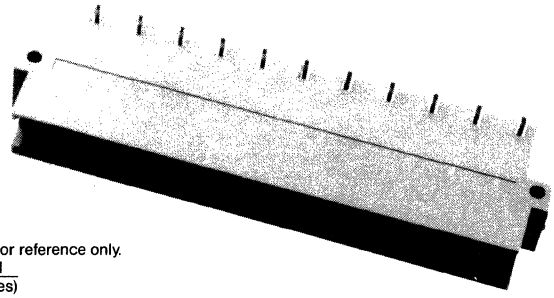
- ***T & B Series*** — 371
- ***Gender*** — 1
- ***Housing*** — 1
- ***Number of Contacts*** — 130
- ***Contact Loading*** — 30
- ***Termination Style*** — Y
- ***Performance Level - H Contacts*** — X
- ***Performance Level - F Contacts*** — X

DESIGN CONSIDERATIONS





Type H11
Male PCB Connector
Series 37

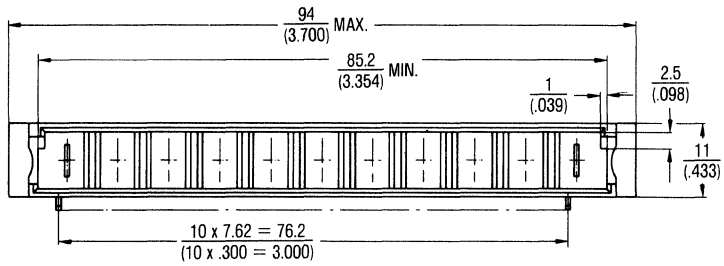


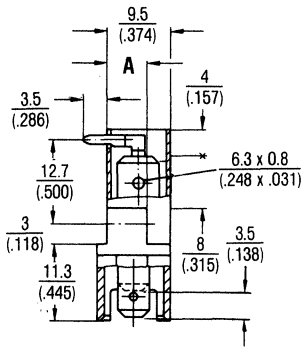
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 20 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

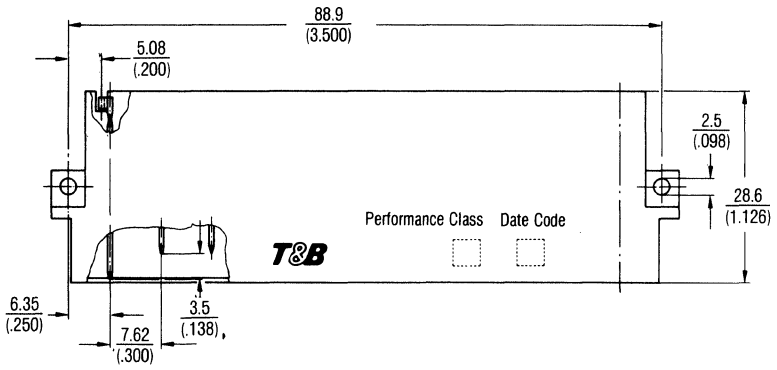
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

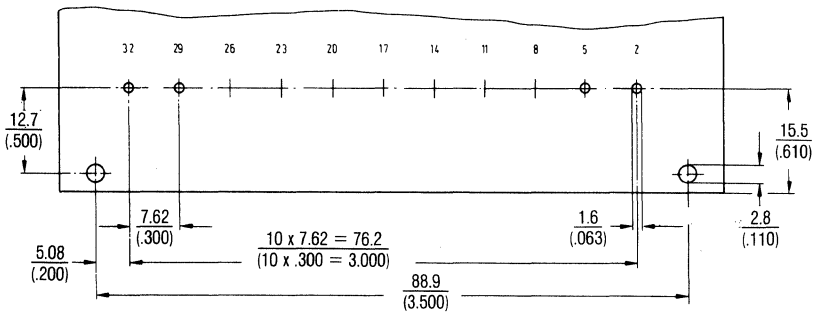




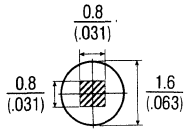
Extended length contacts available.
Consult factory for details.



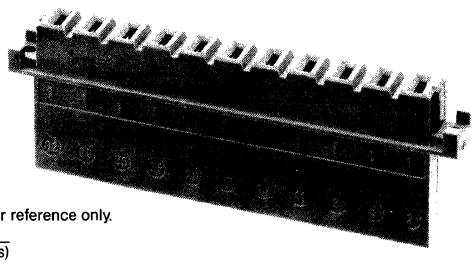
Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
11	All	371-11130-305X	A = 6.0 (.236)		**Solder Post** 0.8 x 0.8 (.031 x .031)

Type H11 Female Connector with Blade Contacts Series 37

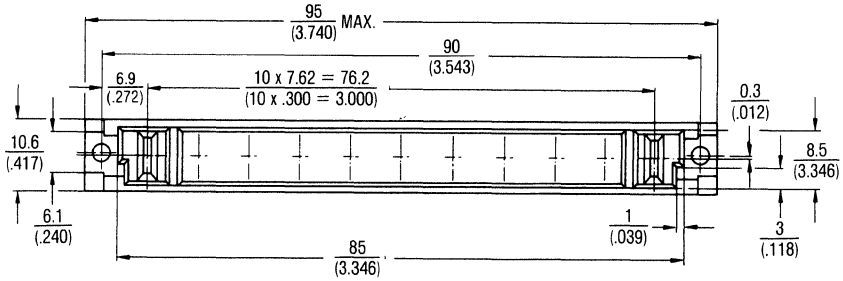


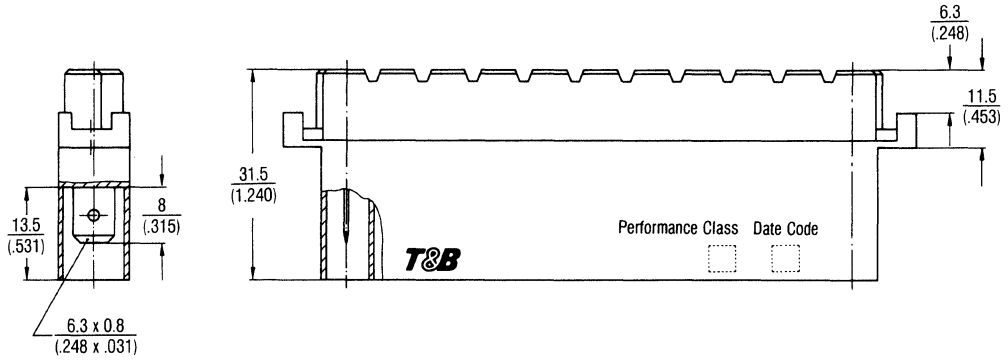
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 20 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

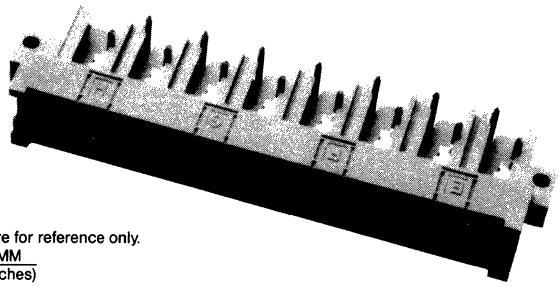




Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)
11	All	372-11130-075X	6.3 (.248), 0.8 (.031) **Blade** 0.8 x 6.3 (.031 x .248)

Type H15
Male PCB Connector with Solder Tails
Series 37

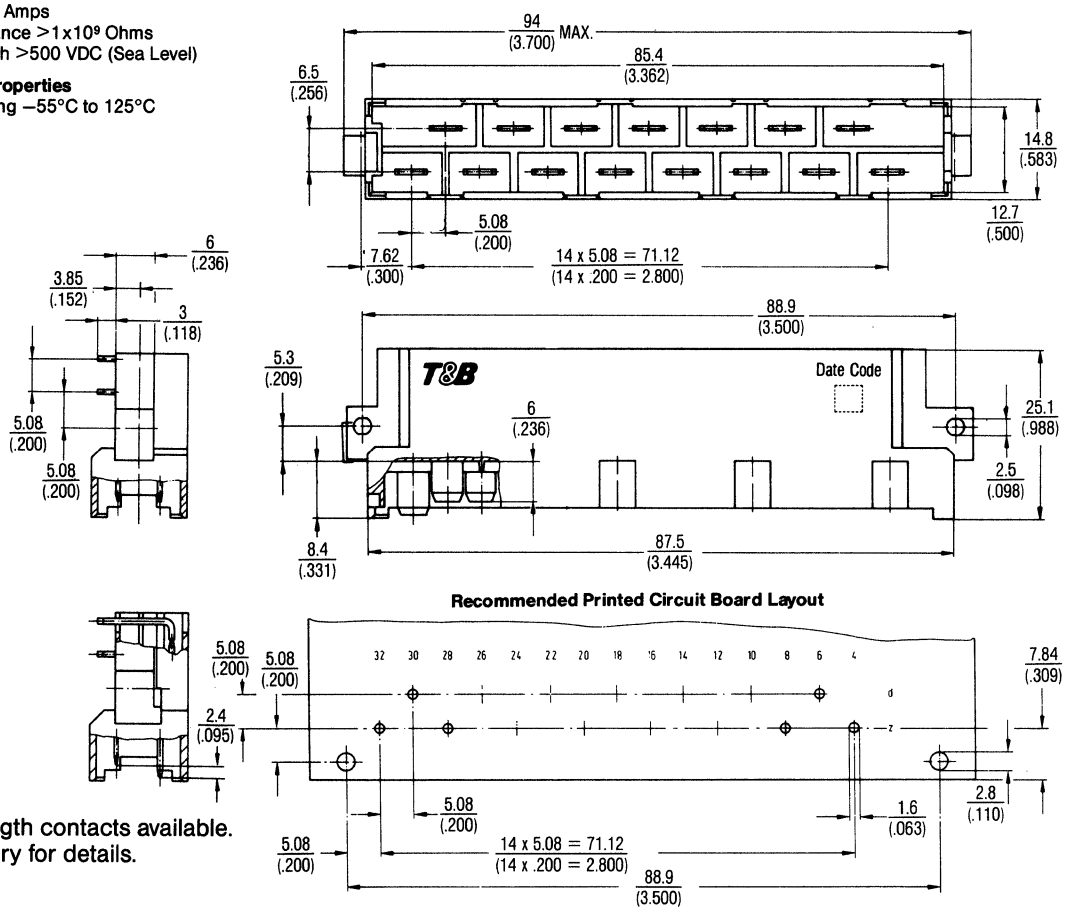


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, tin/lead over nickel overall.

Electrical Properties
Current Rating 15 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

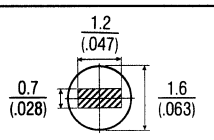
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

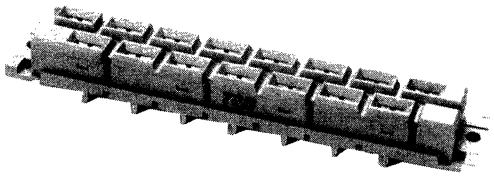


Extended length contacts available.
Consult factory for details.

Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
15	z, d 2, 4, 6 - 32	371-21530-305X	A = 6.0 (.236)		**Solder Tail** 1.2 x 0.7 (.047 x .028)

Type H15
Female PCB Connector with Solder Tails
Series 37

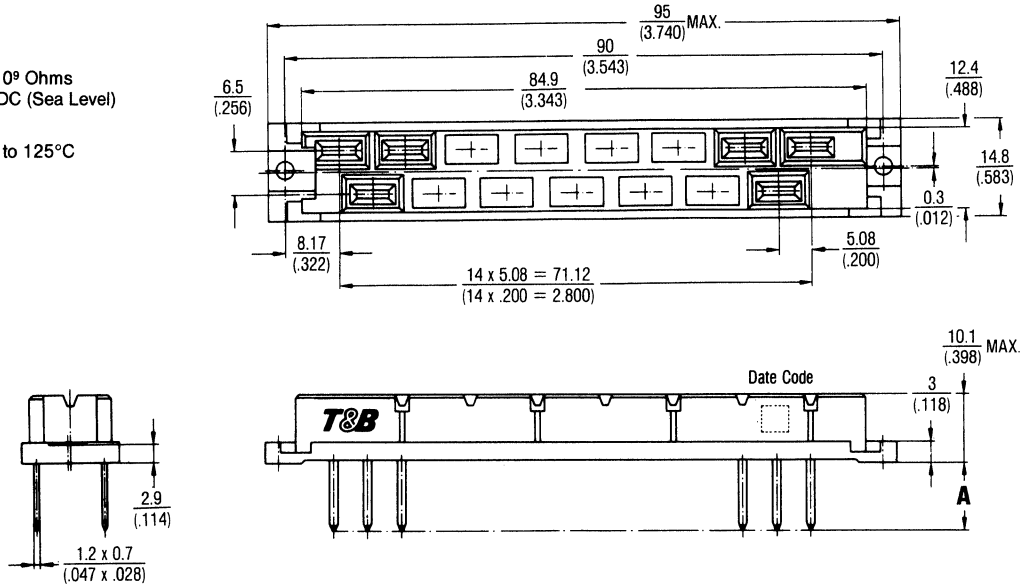


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, tin/lead over nickel overall.

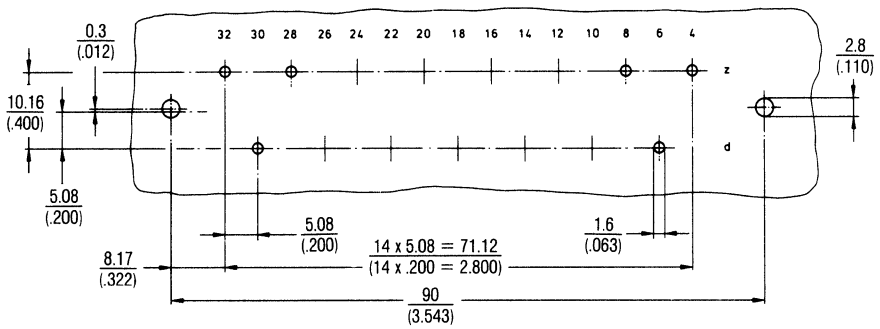
Electrical Properties
Current Rating 15 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



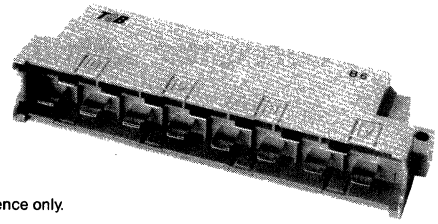
Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
15	z 4, 8 – 32 d 6, 10 – 30	376-21530-065X	A = 10 (.394)	1.2 (.047) 0.7 (.028) 1.6 (.063)	**Solder Tail** 1.2 x 0.7 (.047 x .028)
15	z 4, 8 – 32 d 6, 10 – 30	376-21530-095X	A = 4.5 (.177)		

Type H15
Male PCB Connector with Blade Contacts
Series 37

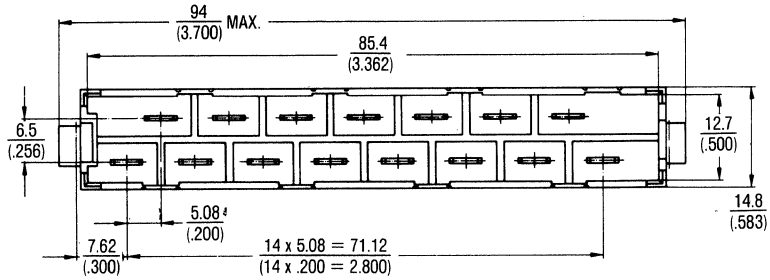


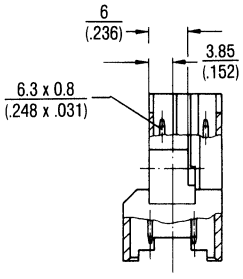
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, tin/lead over nickel overall.

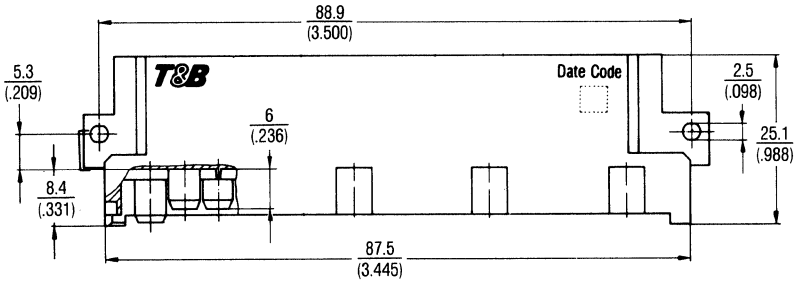
Electrical Properties
Current Rating 15 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

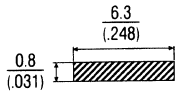




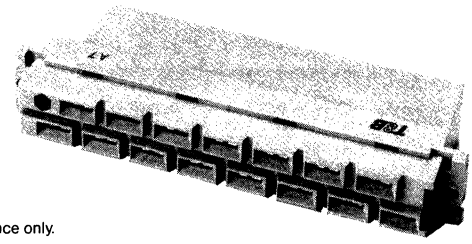


Extended length contacts available.
Consult factory for details.

Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)
15	z 4, 8, 12 - 32 d 6, 10, 14 - 30	371-21530-075X	 **Blade** 0.8 x 6.3 (.031 x .248)

Type H15
Female PCB Connector with Blade Contacts
Series 37

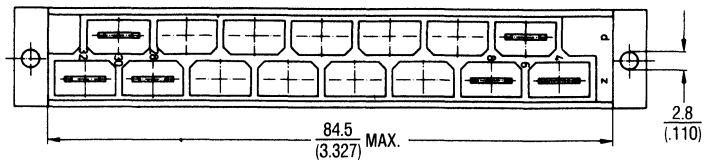


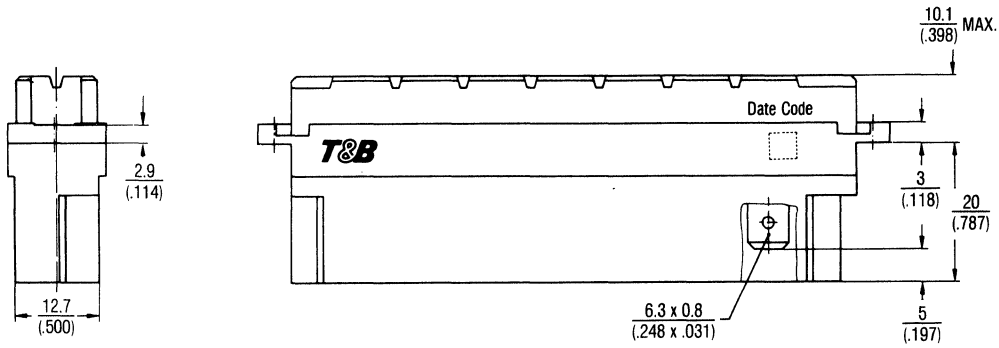
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, tin/lead over nickel overall.

Electrical Properties
Current Rating 15 Amps
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

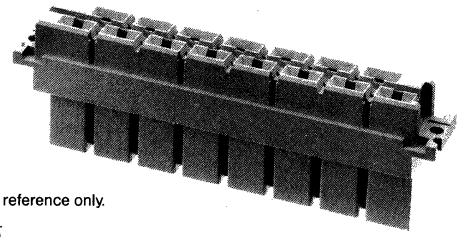




Ordering Information

NO. OF CONTACTS	CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)	
15	z 4, 8, 12 - 32 d 6, 10, 14 - 30	372-21530-075X	A = 6.0 (.236)	6.3 (.248), 0.8 (.031) **Blade** 0.8 x 6.3 (.031 x .248)

Type H15
Female Connector Housing and Crimp, Snap-In Contacts Series 37

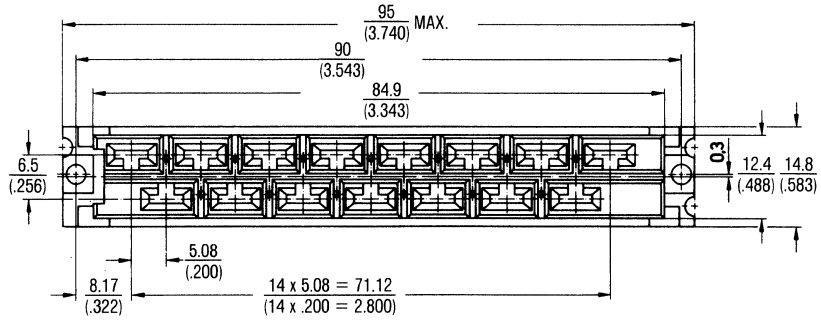


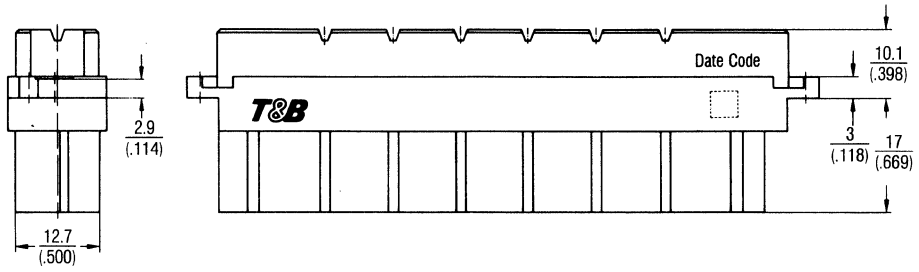
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, tin/lead over nickel overall.

Electrical Properties
Current Rating 15 Amps
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

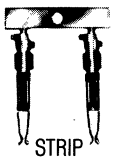
Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

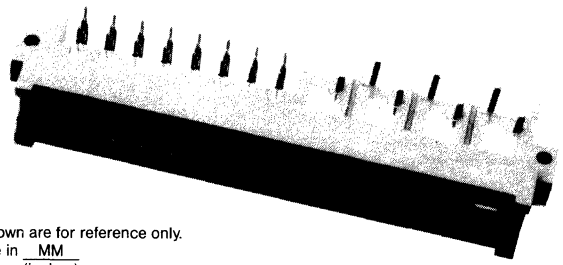




Ordering Information

ITEM	PACKAGING	CONDUCTOR SIZE		CATALOG NO.	CRIMP TOOL
		MM	AWG		
 STRIP	LARGE REEL 1200	2 - 3 3 - 6	14-12 12-10	375-1-2355 375-1-2455	180-024
	SMALL REEL 100	2 - 3 3 - 6	14-12 12-10	375-2-2355 375-2-2455	180-024
 LOOSE	INDIVIDUAL CONTACTS	2 - 3 3 - 6	14-12 12-10	375-3-2355 375-3-2455	180-014
HOUSING 15 POSITION	N/A	N/A		375-215	N/A

Type H7/F24
Male PCB Connector with Solder Tails
Series 37

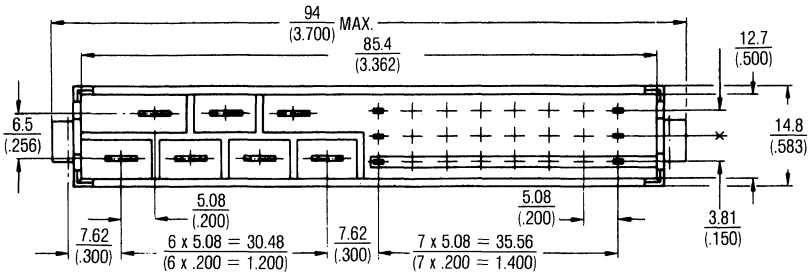


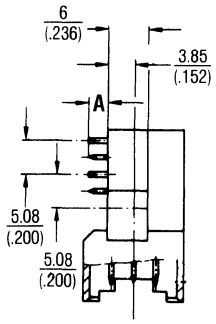
Physical Properties
Insulation Material–Glass filled thermoplastic rated UL 94V-0, gray.
F Contacts–Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder posts.
H Contacts–Copper alloy, tin/lead plate over nickel over all.

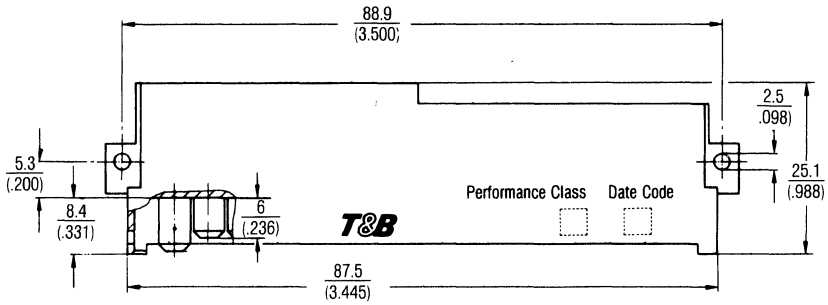
Electrical Properties
Current Rating 15 Amps–H/5.5 Amps–F
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

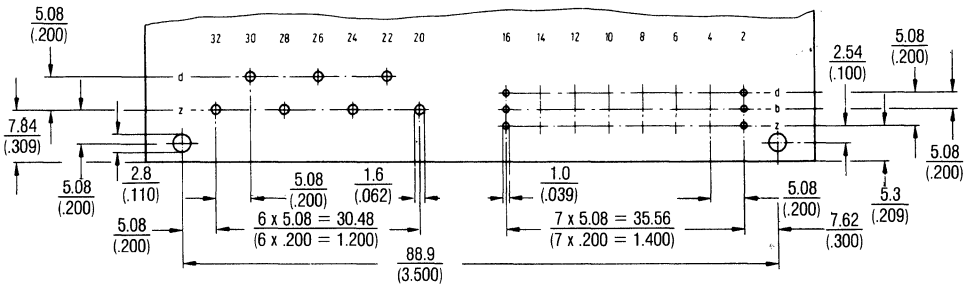




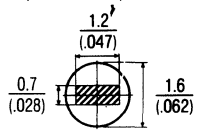
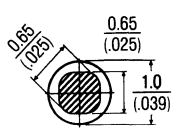


Extended length contacts available. Consult factory for details.

Recommended Printed Circuit Board Layout

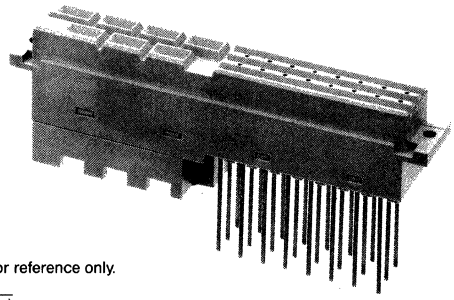


Ordering Information

NO. OF CONTACTS		CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
H	F				H CONTACTS	F CONTACTS
7	24	All	371-33130-305X	A = 3.0 (.118)	**Solder Tail** 1.2 x 0.7 (.047 x 0.28) 	**Solder Post** 0.65 x 0.65 (.025 x .025) 

X = Performance Class for F contacts: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type H7/F24 Female Connector with Blade Contacts—H Wire Wrap Posts—F Series 37

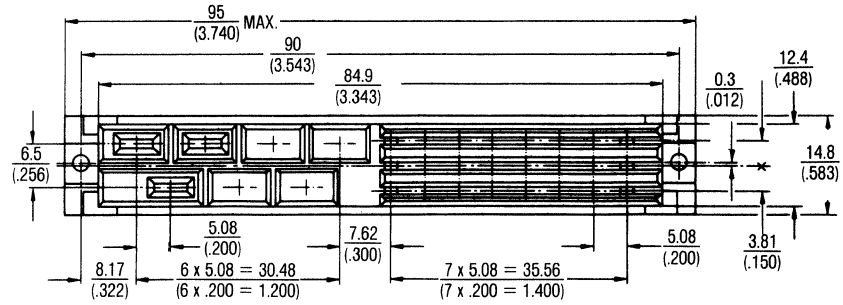


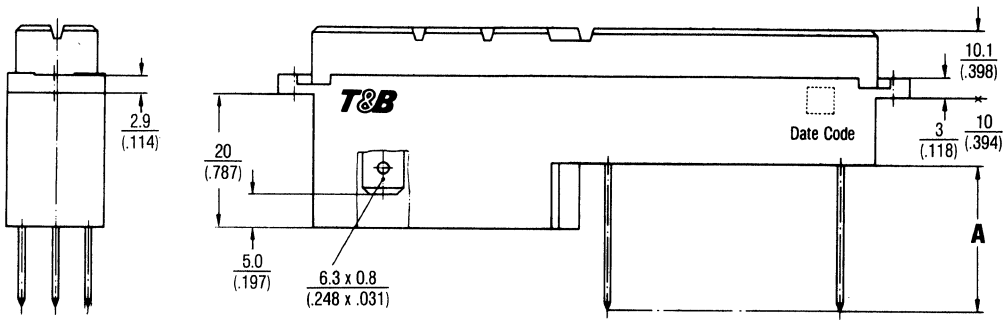
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray.
F Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder posts.
H Contacts—Copper alloy, tin/lead plate over nickel overall.

Electrical Properties
Current Rating 15 Amps—H/5.5 Amps—F
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

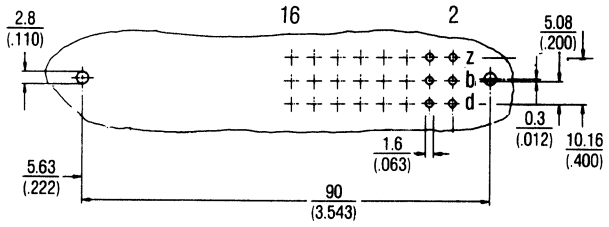
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)

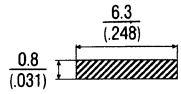
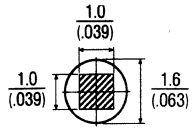




Recommended Printed Circuit Board Layout

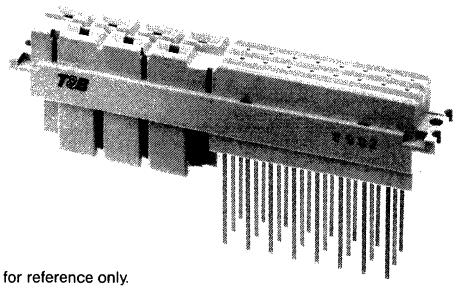


Ordering Information

NO. OF CONTACTS		CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
H	F				H CONTACTS	F CONTACTS
7	24	All	372-33130-875X	A = 22.0 (.866)	**Blade** 0.8 x 6.3 (.031 x .248) 	**Wire Wrap Post** 1.0 x 1.0 (.039 x .039) 

X = Performance Class for F contacts: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type H7/F24 Female Connector with Crimp, Snap-In Housing-H Wire Wrap Posts—F Series 37



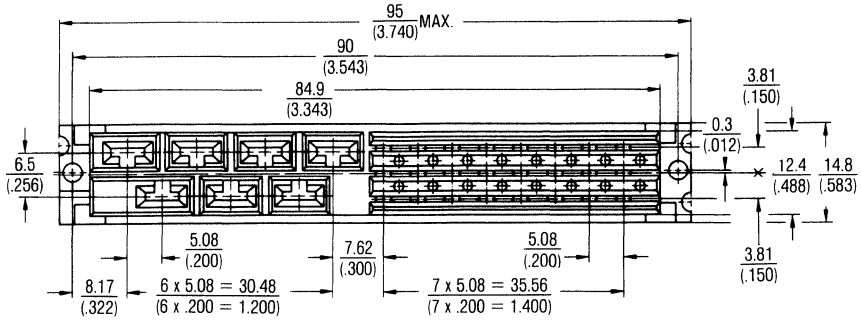
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

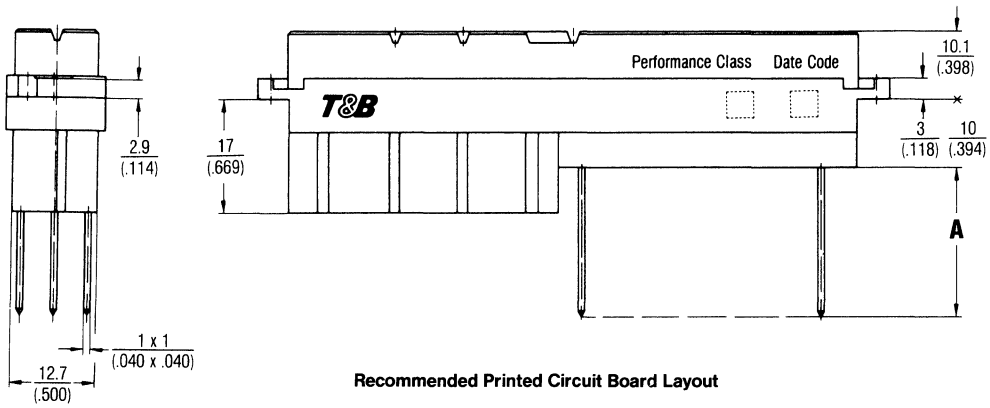
F Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder posts.
H Contacts—Copper alloy, tin/lead plate over nickel overall.

Electrical Properties
Current Rating 15 Amps—H/5.5 Amps—F
Insulation Resistance $>1 \times 10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

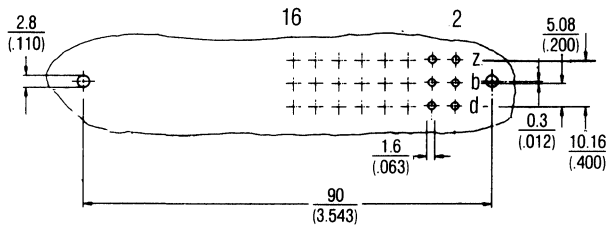
Environmental Properties
Temperature Rating −55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)





Recommended Printed Circuit Board Layout



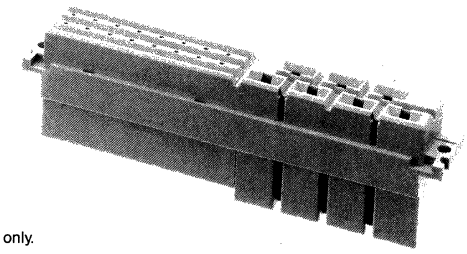
H— Crimp Contact
see page 292F.

Application Tools
see page 292F.

Ordering Information

NO. OF CONTACTS		CONTACT LOADING	CATALOG NO.	TERMINATION STYLE MM (INCHES)		
H	F					
7	24	F z, b, d 2, 4—16 H-Housing no contacts loaded	372-33132-90X8	A = 4.5 (.177)	1.0 (.039) 1.0 (.039) 1.6 (.063)	Wire Wrap Post 1.0 x 1.0 (.039 x .039)
			372-33132-80X8	A = 22.0 (.866)		

Type H7/F24
Female Connector with
H, F Crimp, Snap-In Contacts
Series 37

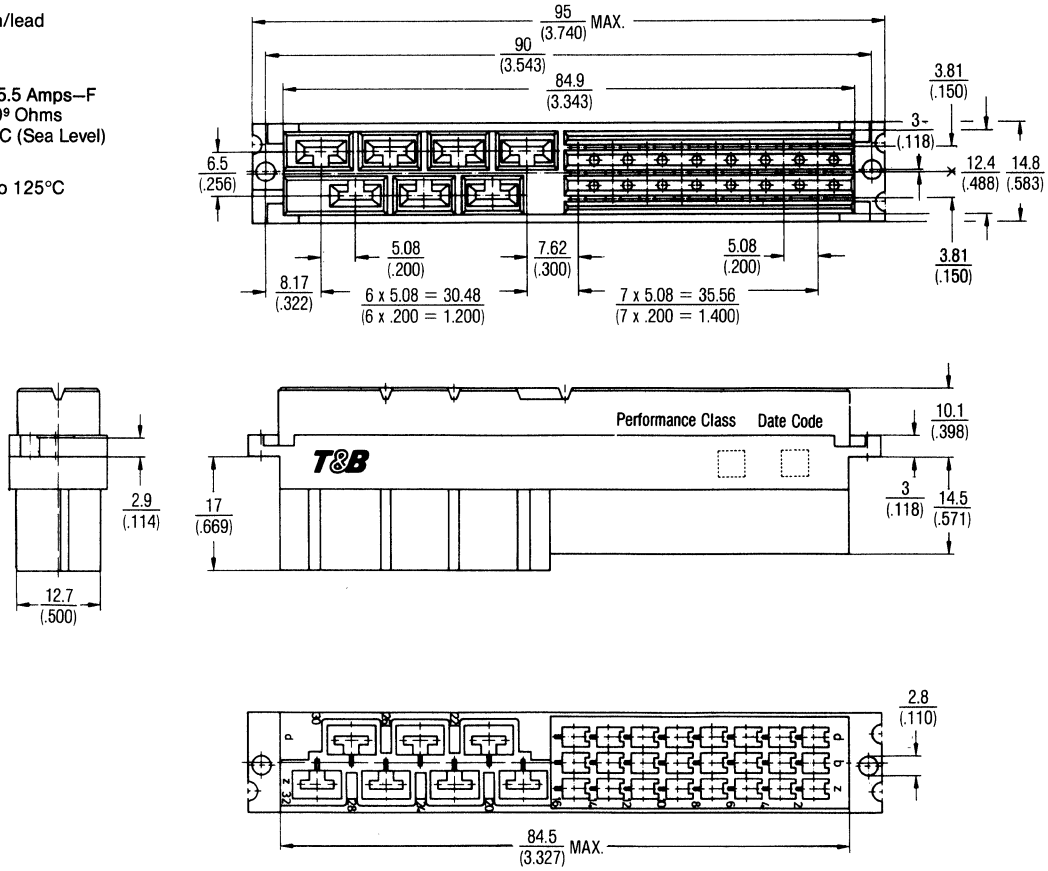


Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray.
F Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead in crimp area.
H Contacts—Copper alloy, tin/lead plate over nickel over all.

Electrical Properties
Current Rating 15 Amps—H/5.5 Amps—F
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C

Dimensions shown are for reference only.
Dimensions are in MM (inches)



Ordering Information

ITEM	CATALOG NO.	APPLICATION
HOUSING	375-331	H7/F24
H CONTACTS	See page 292F	Application Tools See page 292F
F CONTACTS	See page 276F	Application Tools See page 282F

HIGH CURRENT CONNECTORS AVAILABLE CONFIGURATIONS SERIES 37

371-11130-30 Y X*

*Availability of specific part numbers can vary. Consult factory for details.

T&B Series
37 – High Current Connectors

Housing Type
1 – Male Connector, Type H11, H15 and H7/F24
2 – Female Connector, Type H11, H15 and H7/F24
5 – Female housing for Crimp, Snap-In contacts, Type H15 and H7/F24
6 – Female connectors, low profile, Type H15

Housing
1 – H11
2 – H15
3 – H7/F24, mixed version

No. of contacts:
11 – 11 H11
15 – 15 H15,
31 – 24/7 H7/F24

Contact loading:
30 – All contacts assembled M-F H11, H15,
32 – All contacts assembled Female H7/F24

Termination Style:

	F– Contacts	H–Contacts
07 –	–	Blade contact
06 –	–	Solder Pin 0.7 x 1.2 x 10 (.028 x .047 x .393)
09 –	–	Solder Pin 0.7 x 1.2 x 4.5 (.028 x .047 x .177)
17 –	Solder eyelet	Blade contact 6.3, x 0.8 (.248 x .031)
30 –	90° Solder Post	90° Solder Post
37 –	90° Solder Post	Blade contact 6.3 x 0.8 (.248 x .031)
80 –	Wire Wrap 1 x 1 x 22 (.039 x .039 x .866)	Crimp contact
87 –	Wire Wrap 1 x 1 x 22 (.039 x .039 x .866)	Blade contact 6.3 x 0.8 (.248 x .031)
90 –	Solder Pin 1 x 1 x 4.5 (.039 x .039 x .177)	Crimp contact

Performance Level
F – Contacts
(Mating Area)
1 – 1 – 500 Mating Cycles (Gold)
8 – 2 – 400 Mating Cycles (Gold)
4 – 3 – 200 Mating Cycles (Gold)
X – if no F – Contacts

Performance Level
H – Contacts
(Mating Area)
1 – 1 – 500 Mating Cycles (Silver)
2 – 2 – 400 Mating Cycles (Silver)
5 – 1 – 500 Mating Cycles (Tin)
X – if no H – Contacts

HYBRID POWER, SIGNAL AND COAX TYPE M SERIES 22

LR92984 E60980

Description/Application

These connectors are designed according DIN 41612, part 1, and can be assembled to standard 19" subsystems conforming to DIN 41494.

Series 22 consists of five basic versions: male and female connectors with option cavities for 2, 4, 6, 8 or 10 special contacts. These contacts are snap-fit into the housings, and are available in coax, high current and high voltage types.

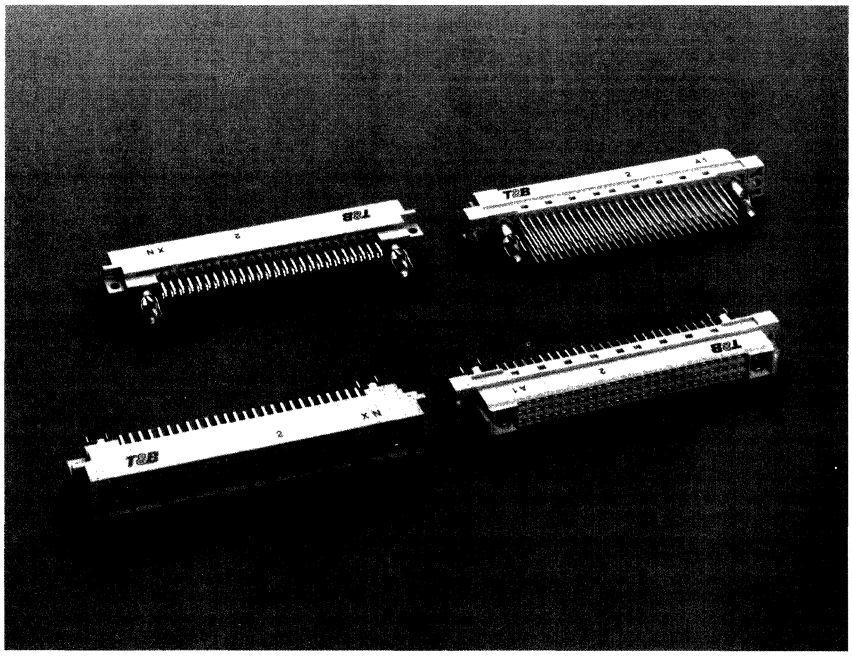
All special contacts are installed into the housing without tools.

Design Considerations

- Available in 78+2, 60+4, 48+6, 24+8, and 6+10 signal optional contact positions
- Dual opposing beam contacts for full contact redundancy.
- Coined and polished mating surfaces for reduced insertion forces.
- Rounded solder posts for easier insertion into PC boards.

Also Available

In addition to the configurations listed in this catalog, others are available. Please contact Thomas & Betts for more information on different numbers of contacts, high-temperature insulators, and First-Mate/Last-Break contacts.



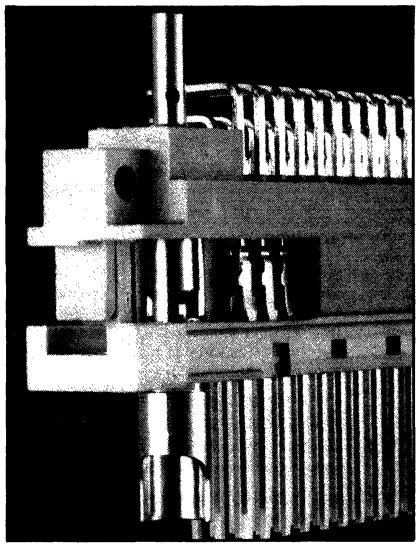
Ordering Information

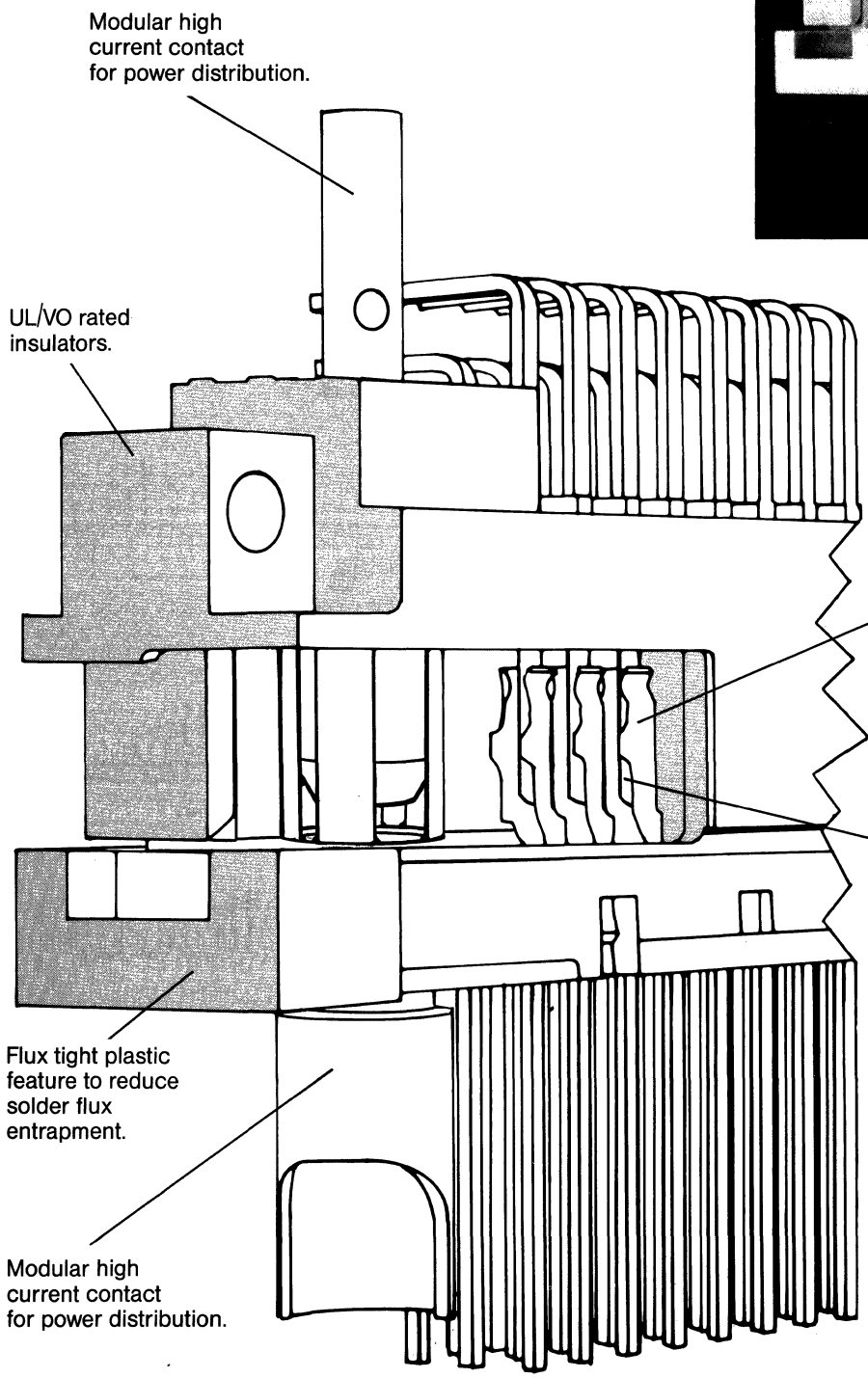
The information below shows the elements of a part number. To select a product for your specific needs, please refer to the appropriate Ordering Information charts on the following pages.

221-97813-300X

- 221 — *T & B Series*
- 9 — *Gender*
- 7 — *Housing*
- 8 — *Number of Contacts*
- 1 — *Special Contacts*
- 3 — *Contact Loading/Signal Contacts*
- 00 — *Termination Style*
- X — *Plating in Termination Area*
- *Performance Level*

DESIGN CONSIDERATIONS

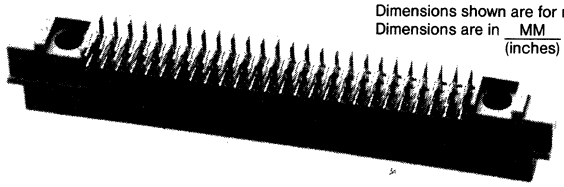




E

Type M
Male PCB Connector
Series 22

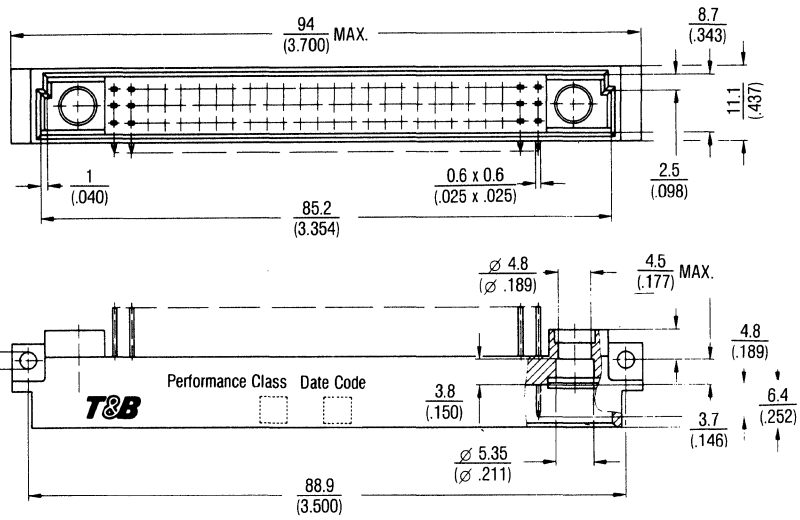
Dimensions shown are for reference only.
Dimensions are in MM (inches)

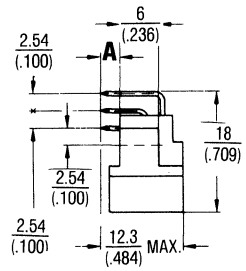


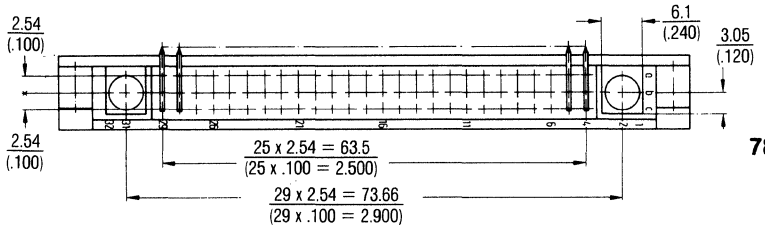
Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amp
Insulation Resistance >1x10⁹ Ohms
Dielectric Strength >500 VDC (Sea Level)

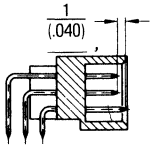
Environmental Properties
Temperature Rating –55°C to 125°C

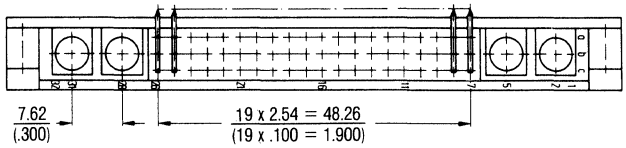






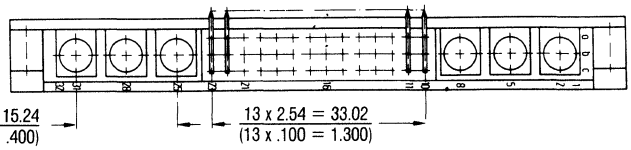
78 + 2





60 + 4

Extended length contacts available. Consult factory for details.



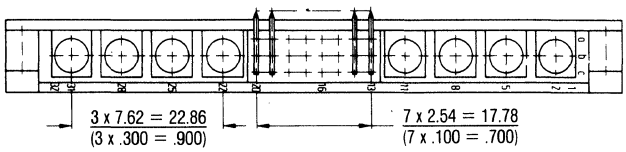
42 + 6

Contacts and Mounting

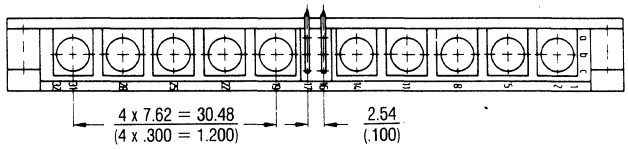
For Coax Contacts
see pages 305F, 306F

For High Current Contacts
see pages 307F

For High Voltage Contacts
see page 308F



24 + 8

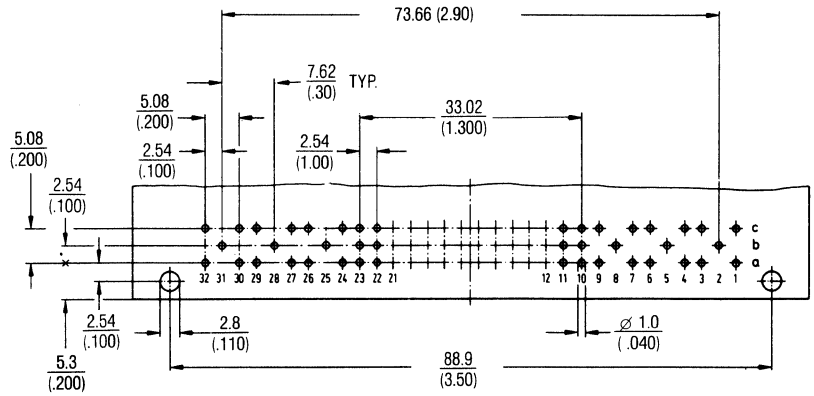


6 + 10

Type M
Male PCB Connector
Series 22

Dimensions shown are for reference only.
Dimensions are in MM (inches)

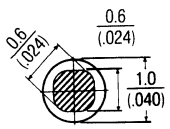
Recommended Printed Circuit Board Layout



Ordering Information

NO. OF CONTACTS	CONTACT LOADING		CATALOG NO.	TERMINATION STYLE MM (INCHES)
78 + 2	a, b, c	4, 5, 6 - 29	221-97813-300X	A = 2.9 (.114)
	a, b, c	4, 5, 6 - 29	221-97813-310X	A = 3.7 (.146)
60 + 4	a, b, c	7, 8, 9 - 26	221-96023-300X	A = 2.9 (.114)
	a, b, c	7, 8, 9 - 26	221-96023-310X	A = 3.7 (.146)
42 + 6	a, b, c	10, 11, 12 - 23	221-94233-300X	A = 2.9 (.114)
	a, b, c	10, 11, 12 - 23	221-94233-310X	A = 3.7 (.146)
24 + 8	a, b, c	13, 14, 15 - 20	221-92443-300X	A = 2.9 (.114)
	a, b, c	13, 14, 15 - 20	221-92443-310X	A = 3.7 (.146)
6 + 10	a, b, c	16 + 17	221-90653-300X	A = 2.9 (.114)
	a, b, c	16 + 17	221-90653-310X	A = 3.7 (.146)

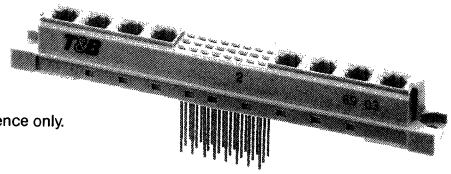
Solder Post
0.6 x 0.6
(.024 x .024)



X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

E

Type M
Female Connector
Series 22

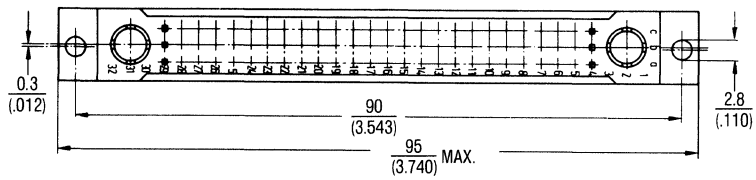


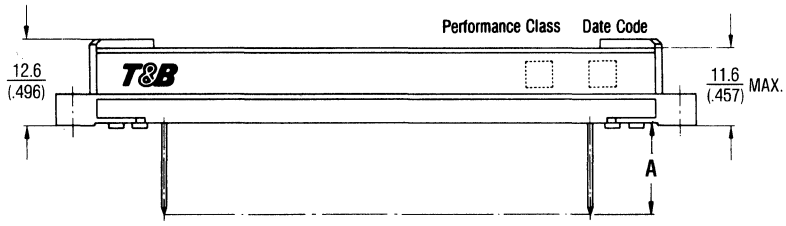
Dimensions shown are for reference only.
Dimensions are in MM (inches)

Physical Properties
Insulation Material—Glass filled thermoplastic rated UL 94V-0, gray
Contacts—Copper alloy, nickel plate overall, gold finish in contact zone. Tin/lead on solder tails, tin/lead or gold on posts.

Electrical Properties
Current Rating 2 Amp
Insulation Resistance $>1x10^9$ Ohms
Dielectric Strength >500 VDC (Sea Level)

Environmental Properties
Temperature Rating –55°C to 125°C



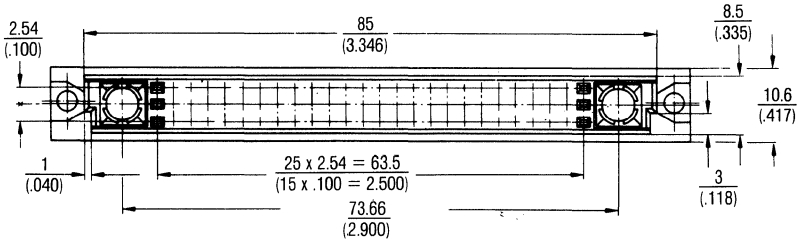


Contacts and Mounting

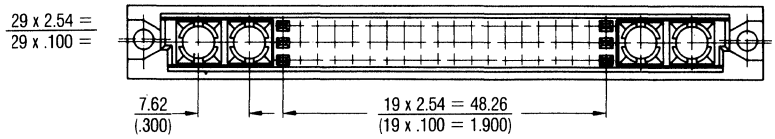
For Coax Contacts
see pages 305F, 306F

For High Current Contacts
see pages 307F

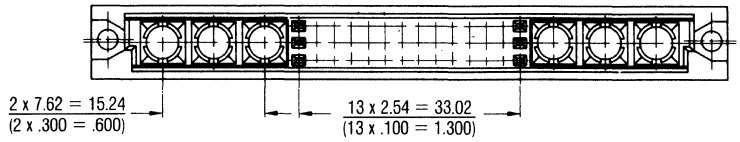
For High Voltage Contacts
see page 308F



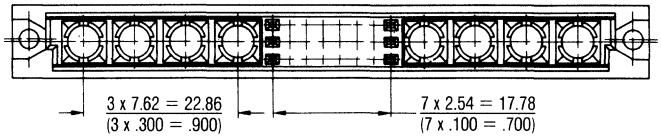
78 + 2



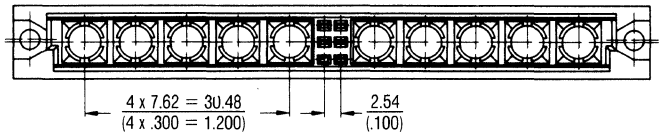
60 + 4



42 + 6



24 + 8

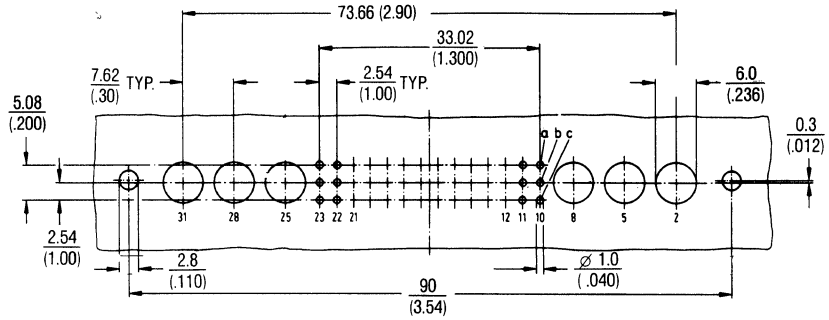


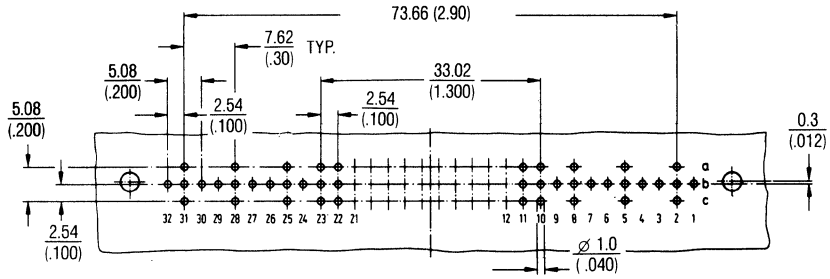
6 + 10

Type M
Female Connector
Series 22

Dimensions shown are for reference only.
Dimensions are in MM (inches)

Recommended Printed Circuit Board Layout

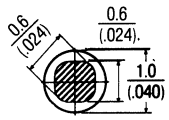




Ordering Information

NO. OF CONTACTS	CONTACT LOADING		CATALOG NO.	TERMINATION STYLE MM (INCHES)
78 + 2	a, b, c	4, 5, 6 - 29	222-97813-505X	A = 13.0 (.512)
	a, b, c	4, 5, 6 - 29	222-97813-605X	A = 2.9 (.114)
	a, b, c	4, 5, 6 - 29	222-97813-705X	A = 4.5 (.177)
60 + 4	a, b, c	7, 8, 9 - 26	222-96023-505X	A = 13.0 (.512)
	a, b, c	7, 8, 9 - 26	222-96023-605X	A = 2.9 (.114)
	a, b, c	7, 8, 9 - 26	222-96023-705X	A = 4.5 (.177)
42 + 6	a, b, c	10, 11, 12 - 23	222-94233-505X	A = 13.0 (.512)
	a, b, c	10, 11, 12 - 23	222-94233-605X	A = 2.9 (.114)
	a, b, c	10, 11, 12 - 23	222-94233-705X	A = 4.5 (.177)
24 + 8	a, b, c	13, 14, 15 - 20	222-92443-505X	A = 13.0 (.512)
	a, b, c	13, 14, 15 - 20	222-92443-605X	A = 2.9 (.114)
	a, b, c	13, 14, 15 - 20	222-92443-705X	A = 4.5 (.177)
6 + 10	a, b, c	16 + 17	222-90653-505X	A = 13.0 (.512)
	a, b, c	16 + 17	222-90653-605X	A = 2.9 (.114)
	a, b, c	16 + 17	222-90653-705X	A = 4.5 (.177)

Solder Post
0.6 x 0.6
(.024 x .024)



X = Performance Class: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

HYBRID POWER, SIGNAL AND COAX CONNECTORS AVAILABLE CONFIGURATIONS SERIES 22

221-97813-300X*

T&B Series
22 – Hybrid Power

Housing Type
1 – Male Connector
2 – Female Connector

Housing
9 – Full Size (c)

Number of Contacts (signal contacts/contact loading)

	Row A	Row B	Row C
06 – 6	All	All	All
24 – 24	All	All	All
42 – 42	All	All	All
60 – 60	All	All	All
78 – 78	All	All	All
04 – 4	All	–	All
16 – 16	All	–	All
28 – 28	All	–	All
40 – 40	All	–	All
52 – 52	All	–	All
02 – 2	Even	–	Even
08 – 8	Even	–	Even
14 – 14	Even	–	Even
20 – 20	Even	–	Even
26 – 26	Even	–	Even

Numbers of Possible Special Contacts
1 – 78 + 2
2 – 60 + 4
3 – 42 + 6
4 – 24 + 8
5 – 6 + 10

Contact loading / Signal contacts:

	Row A	Row B	Row C
3 –	All	All	All
4 –	Even	–	Even
5 –	All	–	All

Termination Style:

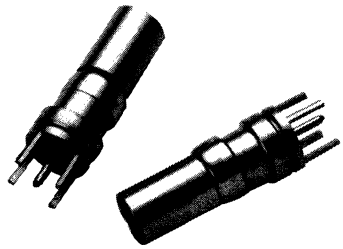
30 – 90° Solder post	2.9 (.114)
31 – 90° Solder post	3.7 (.146)
40 – Solder post	⌀0.65 x 2.7 (⌀.026 x .138)
50 – Wire wrap post	0.64 x 0.64 x 13 (.025 x .025 x .512)
51 – Wire wrap post	0.64 x 0.64 x 17 (.025 x .025 x .669)
60 – Solder post	0.6 x 0.6 x 2.9 (.024 x .024 x .114)
70 – Solder post	0.6 x 0.6 x 4.5 (.024 x .024 x .177)
80 – Wire wrap post	0.64 x 0.64 x 19 (.025 x .025 x .748)

Performance Level Per DIN 41612
(Mating Area)
1 – 1 – 500 Mating Cycles
8 – 2 – 400 Mating Cycles
4 – 3 – 200 Mating Cycles

Plating in Termination Area
0 – Male – Tin/Lead
5 – Female – Tin/Lead
3 – Wire Wrap – Gold Flash (Level 2)
1 – Wire Wrap – Gold Plate (Level 3)

*Availability of specific part numbers can vary. Consult factory for details.

Type M
Coax Contacts Per DIN 41626 Part 2
Series 22

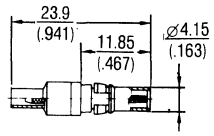
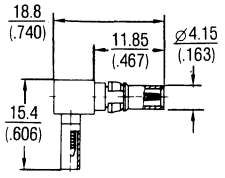
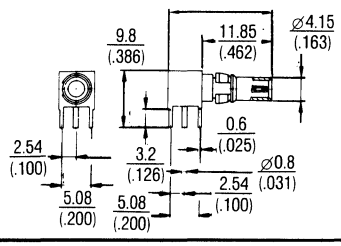
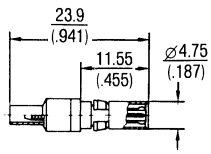
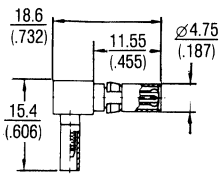
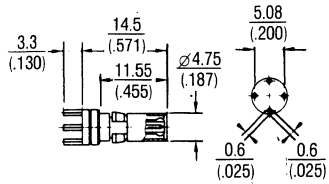


For Crimp Tool 220-011
see page 309F

Technical Data

Impedance:	50 Ω	Contact resistance	
Operating frequency:	≦ 30 GHz	Inner/outer Conductor:	3 m Ω / 10 m Ω
optimum:	0-10 GHz	Temperature range:	−65°C to +125°C
Test voltage:	750 V, 50 Hz	Reflection factor:	max. 0.05 to 1GHz
Insulation resistance:	10^{12} Ω		max. 0.07 to 4 GHz
Working resistance:	250 V ~		max. 0.10 to 10 GHz

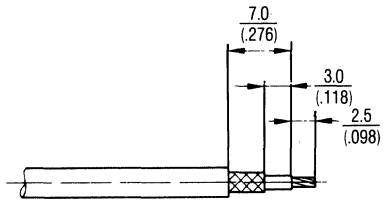
Ordering Information

TERMINATION	TYPE OF COAX CABLE	⌀ MM (INCHES)	DIMENSIONS MM (INCHES)	CATALOG NUMBER	CRIMP INSERT
MALE Cable—Straight	RG 178 B/U RG 196 A/U	2.0 (.079) 2.0 (.079)		221-31-14X	220-031
	RG 188 A/U RG 174 A/U RG 316 U RG 179 B/U RG 187 A/U	2.8 (.110) 2.6 (.102) 2.6 (.102) 2.6 (.102) 2.8 (.110)		221-32-14X	220-041
MALE Cable—Right angle	RG 178 B/U RG 196 A/U	2.0 (.079) 2.0 (.079)		221-31-24X	220-031
	RG 188 A/U RG 174 A/U RG 316 U RG 179 B/U RG 187 A/U	2.8 (.110) 2.6 (.102) 2.6 (.102) 2.6 (.102) 2.8 (.110)		221-32-24X	220-041
MALE PCB—Right angle				221-33-32X	
FEMALE Cable—Straight	RG 178 B/U RG 196 A/U	2.0 (.079) 2.0 (.079)		222-31-14X	220-031
	RG 188 A/U RG 174 A/U RG 316 U RG 179 B/U RG 187 A/U	2.8 (.110) 2.6 (.102) 2.6 (.102) 2.6 (.102) 2.8 (.110)		222-32-14X	220-041
FEMALE Cable—Right angle	RG 178 B/U RG 196 A/U	2.0 (.079) 2.0 (.079)		222-31-24X	220-031
	RG 188 A/U RG 174 A/U RG 316 U RG 179 B/U RG 187 A/U	2.8 (.110) 2.6 (.102) 2.6 (.102) 2.6 (.102) 2.8 (.110)		222-32-24X	220-041
FEMALE PCB—Straight				222-33-13X	

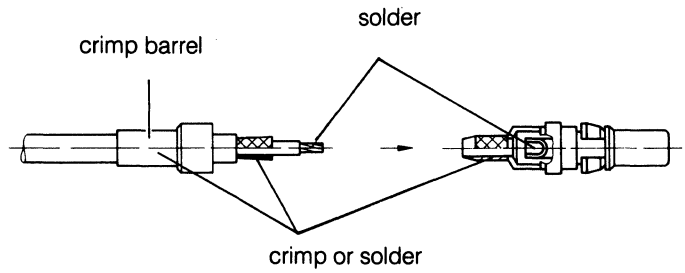
X = Performance Class for F contacts: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

E

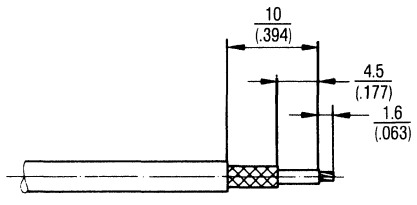
Assembly Procedure for Type M Series 22 Coax Contacts

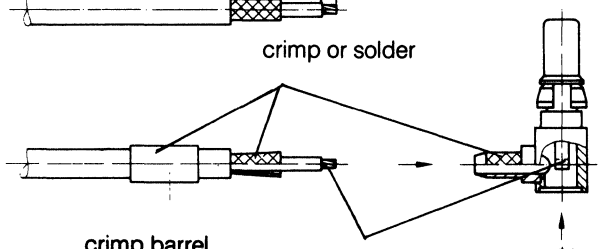


CATALOG NO.

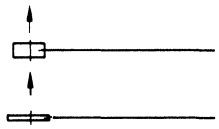


221-31-14X
221-32-14X
222-31-14X
222-32-14X





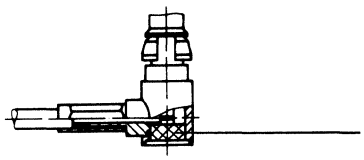
221-31-24X
221-32-24X
222-31-24X
222-32-24X



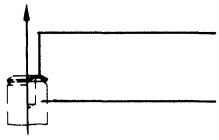
Insulating washer

Sealing cap

Assembly procedure for special contacts



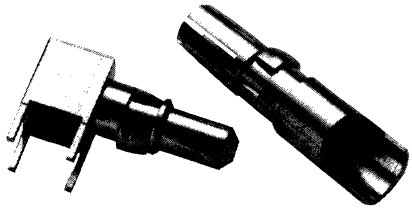
Insulating washer



Sealing cap

Insertion tool

Type M High Current Contacts Series 22

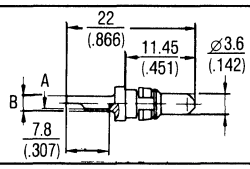
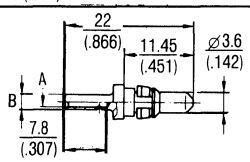
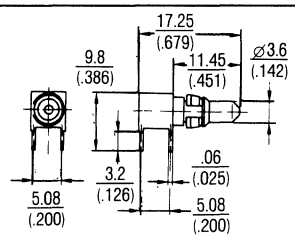
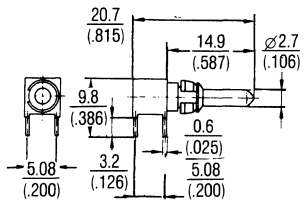
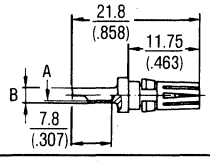
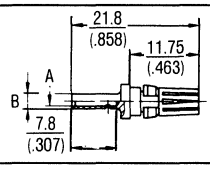
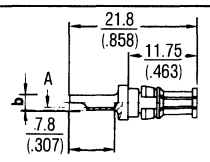
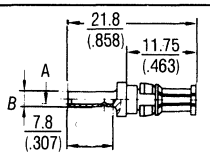


Technical Data

Contact resistance:	≦ 1 m Ω
Max. operating current:	40 Amps
Insertion/Withdrawal forces:	≦ 10 N
Temperature range:	−65°C to +125°C

For Crimp Tool 220-021 see page 309F

Ordering Information

TERMINATION STYLE	OPERATING CURRENT	⌀ MM (Inches) A	⌀ MM (Inches) B	WIRE GAUGE (AWG)	DIMENSIONS MM (INCHES)	CATALOG NUMBER
MALE Cable—Straight solder	10 Amps	1.7 (.067)	2.55 (.100)	14		221-11-11X
	20 Amps	2.8 (.110)	3.7 (.146)	12		221-12-11X
	30 Amps	3.5 (.138)	4.44 (.175)	10		221-13-11X
	40 Amps	4.8 (.189)	5.6 (.220)	8		221-14-11X
MALE Cable—Straight crimp	10 Amps	1.7 (.067)	2.55 (.100)	14		221-11-14X
	20 Amps	2.8 (.110)	3.7 (.146)	12		221-12-14X
	30 Amps	3.5 (.138)	4.44 (.175)	10		221-13-14X
	40 Amps	4.8 (.189)	5.6 (.220)	8		221-14-14X
MALE PCB—Right angle	40 Amps					221-14-32X
MALE PCB—Right angle extended length	40 Amps					223-14-32X
FEMALE Cable—Straight solder	10 Amps	1.7 (.067)	2.55 (.100)	14		222-11-11X
	20 Amps	2.8 (.110)	3.7 (.146)	12		222-12-11X
	30 Amps	3.5 (.138)	4.44 (.175)	10		222-13-11X
	40 Amps	4.8 (.189)	5.6 (.220)	8		222-14-11X
FEMALE Cable—Straight crimp	10 Amps	1.7 (.067)	2.55 (.100)	14		222-11-14X
	20 Amps	2.8 (.110)	3.7 (.146)	12		222-12-14X
	30 Amps	3.5 (.138)	4.44 (.175)	10		222-13-14X
	40 Amps	4.8 (.189)	5.6 (.220)	8		222-14-14X
FEMALE Cable—Straight solder (for extended length male)	10 Amps	1.7 (.067)	2.55 (.100)	14		224-11-11X
	20 Amps	2.8 (.110)	3.7 (.146)	12		224-12-11X
	30 Amps	3.5 (.138)	4.44 (.175)	10		224-13-11X
	40 Amps	4.8 (.189)	5.6 (.220)	8		224-14-11X
FEMALE Cable—Straight crimp (for extended length male)	10 Amps	1.7 (.067)	2.55 (.100)	14		224-11-14X
	20 Amps	2.8 (.110)	3.7 (.146)	12		224-12-14X
	30 Amps	3.5 (.138)	4.44 (.175)	10		224-13-14X
	40 Amps	4.8 (.189)	5.6 (.220)	8		224-14-14X

1) Extended length contacts must be used in pairs, e.t., male contact 223-14-32**X** and female contact 224-11-11**X**

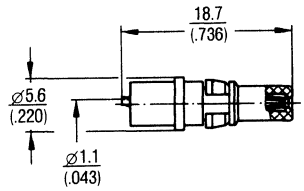
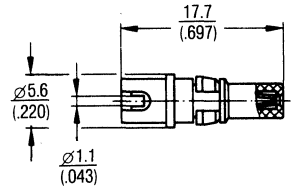
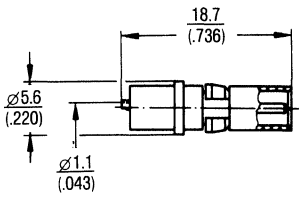
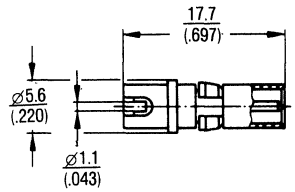
X = Performance Class for F contacts: for Class 1 insert **1**, for Class 2 insert **8**, for Class 3 insert **4**.

Type M
High Voltage Connector
Series 22

Technical Data

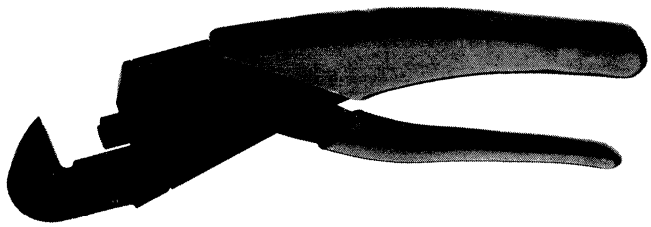
Working voltage:	2.8 kV
Test voltage:	3.8 kV
Operating current:	1.5 A
Contact resistance:	≦ 3 m Ω
Insulation material:	PTFE

Ordering Information

TERMINATION STYLE	WIRE SIZE	DIMENSIONS MM (INCHES)	CATALOG NUMBER
MALE Cable—Straight solder	0.5 mm² AWG 20		221-21-111
MALE Cable—Right angle solder			221-21-211
FEMALE Cable—Straight solder	0.5 mm² AWG 20		222-21-111
FEMALE Cable—Right angle solder			222-21-211

Hybrid Coax, Power, and Signal Connectors
Tools/Accessories
Series 22

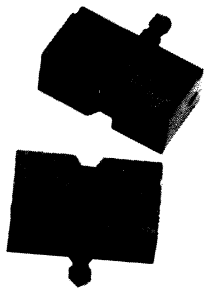
Hand crimping tool for coax contacts

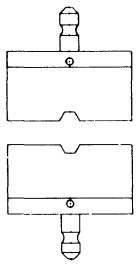


CATALOG NO.

220-011

Die sets for crimping coax contacts

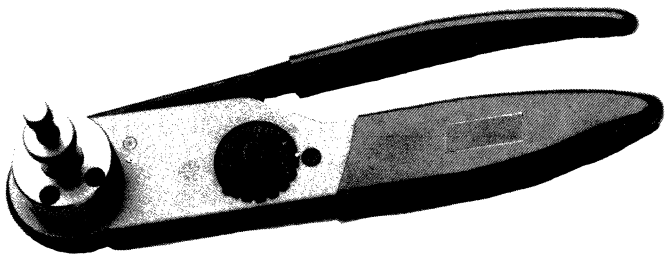




Outside Diameter

	CATALOG NO.
⌀2 mm (.079)	220-031
⌀2.6-2.8 mm (.100-.110)	220-041

Hand crimping tool for 10 to 40 A high current contacts



CATALOG NO.

220-021

Contact removal for all special contacts

CATALOG NO.

220-002

Assembly gauge for male connectors (max. 8 special contacts)

CATALOG NO.

220-051

MODULAR CONTACT ORDERING INFORMATION SERIES 22

221-31-118*

T&B Series: *Hybrid Power Signal, and Coax Modular Contacts*

Gender:
1 – Male
2 – Female
3 – Male for Early Mate
4 – Female for Early Mate

Contact Type:
11 – High Current / 16 AWG / 10 Amps
12 – High Current / 14 AWG / 20 Amps
13 – High Current / 12 AWG / 30 Amps
14 – High Current / 08 AWG / 40 Amps
21 – High Voltage / 20 AWG
31 – Coax / Small O.D.
32 – Coax / Large O.D.
33 – Coax / PCB Mount

Termination Style:
11 – Straight Cable / Solder
13 – Straight PCB Mount / Solder
14 – Straight Cable / Crimp
21 – Right Angle Cable / Solder
24 – Right Angle Cable / Crimp
32 – Right Angle PCB Mount / Solder

Performance Class:
1 – Class 1 Per DIN 41612 Part 5
8 – Class 2 Per DIN 41612 Part 5
4 – Class 3 Per DIN 41612 Part 5

*Availability of specific part numbers can vary. Consult factory for details.

Apex-ix

- Performance Specifications
- Pressfit Compliant Contact Technology

E

GENERAL PERFORMANCE SPECIFICATIONS PER DIN 41612

Performance Level:
Temperature Range:-55°C to 125°C
1 – 500 mating cycles-21 days/gas test/10ppm SO_2 or 1ppm H_2S
2 – 400 mating cycles-4 days/gas test/10ppm SO_2 or 1ppm H_2S
3 – 50 mating cycles-no gas test required

		CONNECTORS												
STYLE		B	C	Q	R	M	D	E	F	G	H7	H11	H15	F24
THOMAS & BETTS SERIES		16		21		22	17		38		37			
NUMBER OF CONTACTS		64	96	64	96	78	32	48	48	64	7	11	15	24
CURRENT RATING +20°C		1.5 A					5.5 A				15.0 A	20.0 A	15.0 A	5.5 A
CURRENT RATING +70°C		1.0 A					4.0 A				12.0 A	15.0 A	12.0 A	4.0 A
DIELETRIC WITHSTANDING VOLTAGE		250 V									500 V			250 V
WITHSTANDING VOLTAGE CONTACT-CONTACT		1000 V					1550 V				3100 V			1550 V
WITHSTANDING VOLTAGE CONTACT-GROUND		1550 V					2500 V				3100 V			2500 V
CONTACT RESISTANCE LESS THAN		20m Ω					15m Ω				8m Ω			15m Ω
MAXIMUM INSERTION AND WITHDRAWAL FORCE	N	60	90	60	90	100	40	75	75	100	90			
	LBS.	13.5	20.0	13.5	20.0	22.5	9.0	16.9	16.9	22.5	20.0			

PRESSFIT COMPLIANT CONTACT TECHNOLOGY

Why Technology

Traditionally soldering has been a widely used method for realizing acceptable electrical connections. However, the continuing evolution of electronics technology has resulted in a variety of new requirements for which the soldering process can impose limitations to both manufacturability and system interconnection flexibility. For example, applications involving high pin counts, several terminations per pin, or the use of front- and rear-board connection systems can each be affected by the practicality of flow soldering.

To overcome some of the inherent soldering process limitations, solderless connection systems have evolved. Popular examples are wire wrap technology, quick-connects and integrated circuit socketing. Each of these provide manufacturing economies and facilitate field repairs—without compromising the required electrical or mechanical integrity of the interconnection.

Their proven, reliable performance and the manufacturing economies associated with these interconnection techniques, have stimulated user's interest in other forms of solderless termination. Applications characterized by high unit volume; the need for rapid, reliable field repair; requirements for selected changes to tailor product specifications, etc. have prompted the development of new contact designs for solderless connection of components into printed circuit board plated through-holes. Manufacturers of computers, computer peripherals, and telecommunication equipment have been particular catalysts for this activity.

The result has been a number of pin geometries, each intended to provide acceptable electrical and mechanical interconnections without solder. These designs are based on the use of pressure to provide reliable, long-term metal-to-metal contact between the component pins and the printed circuit board (PCB) plated through-holes.

Typically the component and PCB are pressed together, with contact designs providing the elastic energy required to maintain interface pressure and insure reliable performance for the life of the connection. User application of these "pressfit" components offers a number of potential benefits. These are summarized in Figure 1.

Benefits Derived From Use of Pressfit Technology

- Gain the reliability of gas tight pressure termination
- Reduce assembly/manufacturing costs
- Allows easy and reliable repairs
- Avoid problems inherent in soldering process
- Extend system configuration flexibility

Figure 1

User Specifications for Connections

Pressfit component-to-PCB interconnections differ considerably from other solderless interconnections. First, they are usually characterized by a higher number of contacts than in other connection systems. Secondly, the allowable tolerance dimensions span a wide range due to the permissable through-hole diameters and varying PCB thicknesses. Through-hole plating characteristics can also vary considerably from supplier-to-supplier.

Recognizing these variables, and the forces associated with pressfit technology which address these conditions, users have established an array of required pressfit pin specifications. These specifications typically describe test methods and parameters which are used to determine if a given pressfit pin design is acceptable for use.

Some of the major parameters with which users are concerned are summarized in Figure 2.

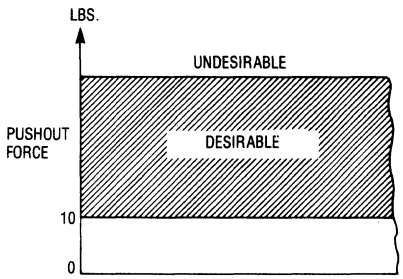
Parameters of Concern to Users of Pressfit Connections

- Insertion force
- Retention force
- Contact resistance
- Hole size/PCB thicknesses accommodated
- Radial hole deformation

Figure 2

PRESSFIT COMPLIANT CONTACT TECHNOLOGY

While these are typically weighted differently depending upon application, each may become an important consideration in vendor selection.



Low retention forces correlate with low pin compliancy. Excessive insertion force may result in hole deformation damage or PCB warpage.

Figure 3

Insertion force: excessive pin insertion forces can make mass termination impractical. Additionally, unacceptably high forces may be interpreted as noncompliancy of the pin. Such noncompliancy can result in high local stress in the PCB and/or in hole deformation and PCB warpage.

Retention force: low retention forces (as typically defined in Figure 3) may also correlate with low-pin compliancy, i.e. little stored elastic energy. It also is directly related to the mechanical and electrical integrity of the interconnection.

Contact resistance: initially is a direct measure of the electrical integrity of the interconnection. Additionally, it correlates with the "gas tightness" of the interface and with the ability of the connection to resist degradation due to corrosion or stress relaxation over time.

Hole size/PCB thicknesses accommodated: typical PCB plated through-holes range from 0.037 inches to 0.043 inches, with standard PCBs having thicknesses of 0.062 inches, 0.093 inches and 0.125 inches. The ideal pressfit pin will perform acceptably across this dimensional spectrum.

Radial hole deformation: generally examined in a minimum anticipated hole diameter to insure that the pin is sufficiently compliant as not to cause excess radial damage. Such damage compromises reinsertability and may result in PCB deformation or high contact resistance.

FLEX-FIT™ Contact Qualification Tests

The FLEX-FIT™ compliant contact has been tested in accorance with MIL-STD-2166 and DIN 41611 as summarized in Figure 4 and has been found to meet or exceed these stringent requirements.

Test Sequence

GROUP I • VISUAL AND MECHANICAL INSPECTION • INITIAL INSERTION FORCE (TYPES I, II AND III) • LOW-LEVEL CONTACT RESISTANCE • RATED CONTACT RESISTANCE • RETENTION
SUBGROUP I • CONDITIONING (PTH) • LOW-LEVEL CONTACT RESISTANCE • RETENTION • PLATED THROUGH-HOLE INTEGRITY
SUBGROUP II • TEMPERATURE CYCLING/ THERMAL SHOCK • LOW-LEVEL CONTACT RESISTANCE • SHOCK—MECHANICAL • RETENTION
SUBGROUP III • VIBRATION • HUMIDITY/MOISTURE • LOW-LEVEL CONTACT RESISTANCE • RETENTION

Figure 4

High Performance IC Interconnect Systems

F

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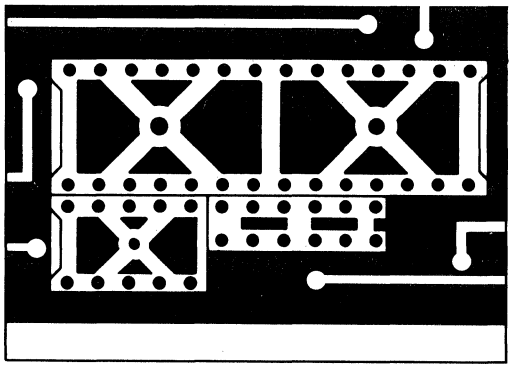


OPEN-FRAME DIP SOCKETS

Description/Application

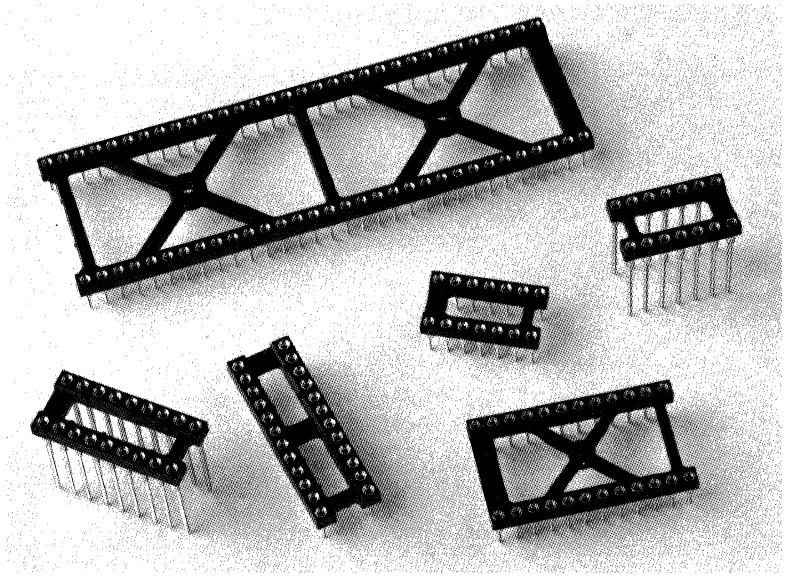
Open-Frame DIP Sockets provide reliable interconnection for a wide variety of dual in-line packaged devices in PCB applications where frequent removal and replacement of DIP devices is required.

Design Considerations

- Available in 6, 8, 14, 16, 18, 20, 22, 24, 28, 32, 36, 40, 48 and 64 positions
- Available in two solder-tail lengths and two wrap-post lengths
- Extremely low-profile frame: 2.29mm (.090") thick
- Accepts .28mm x .46mm (.011" x .018") rectangular and .40mm (.016") to .53mm (.021") diameter round IC leads, in lengths from 2.54mm (.100") to 3.94mm (.155")
- Open-frame construction with reinforcing "X" supports in .100" x .600" and .100" x .900" styles
- Open-frame construction optimizes cleaning, visibility for inspection, airflow and heat dissipation
- End-to-end and side-to-side stacking for maximum I.C. packaging density

OUTER SLEEVE	BRASS BASE MATERIAL PER QQB-626-B GOLD PLATING PER MIL G-45204B OVER NICKEL PER QQN-290
TIN PLATING	PER MIL T10727
CONTACT MATERIAL	HEAT TREATED BERYLLIUM COPPER PER QQC-533 GOLD PLATING PER MIL G-45204B OVER NICKEL PER QQN-290
INSULATOR	GLASS FILLED THERMOPLASTIC UL94V-0 RECOGNIZED

Open-frame, low-profile design for maximum airflow and heat dissipation; screw-machined sleeves



Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult the following page.

SMO – 06 – S6 T

- ***Product Code***
- ***Number of Positions***
- ***Pin Type***
  - ***S6*** *– .125" Solder Tail*
  - ***S8*** *– .175" Solder Tail*
  - ***W2*** *– 2 Level Wrap Post*
  - ***W3*** *– 3 Level Wrap Post*
- ***Outer Pin Plating***
  - ***G*** *– Gold*
  - ***T*** *– Tin (Available for S6 and S8 Pin Types Only)*
- ***Inner Clip Plating***
  - *— – 30μ" Gold*
  - ***G1*** *– 10μ" Gold**
  - ***T1*** *– Tin**
  - **Available with tin outer plating only.*

SMO-243-XXX*–24 Position Skinny DIP Socket*

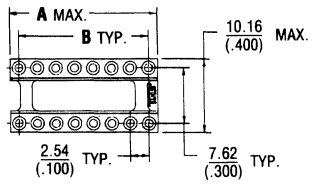


FIGURE 1

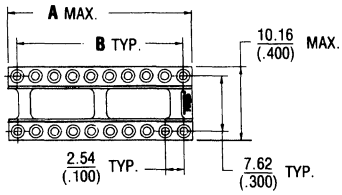


FIGURE 2

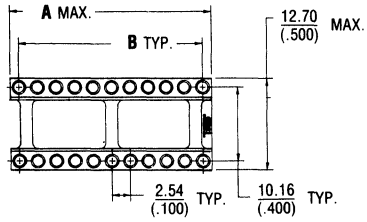


FIGURE 3

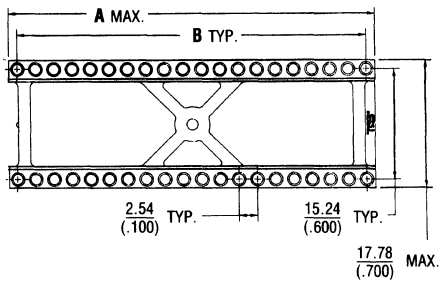


FIGURE 4

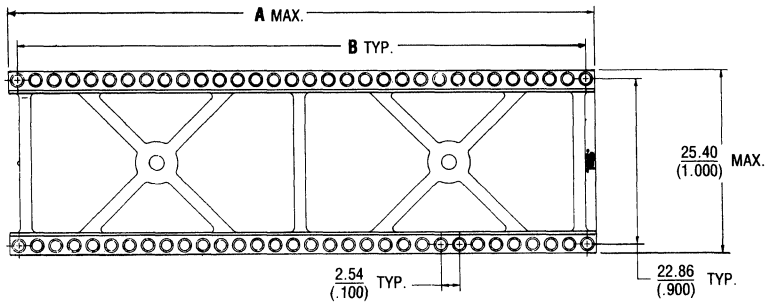
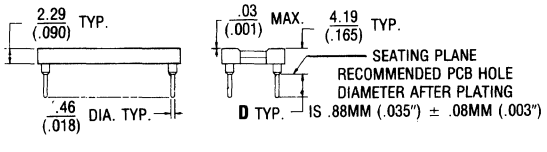
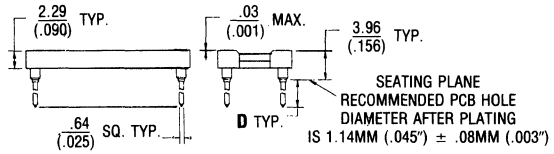


FIGURE 5



SIDE VIEW END VIEW

TYPICAL SOLDER-TAIL PIN



SIDE VIEW END VIEW

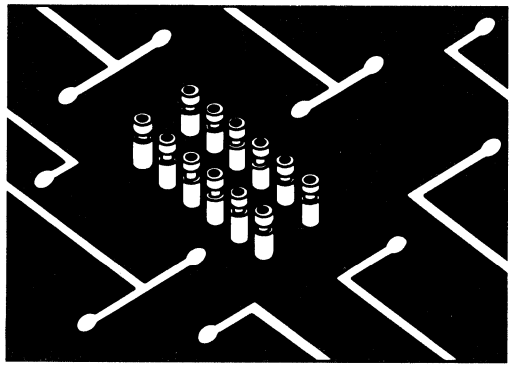
TYPICAL WRAP-POST PIN

CAT. NO.				NO. OF POS.	FIG. NO.	DIMENSIONS	
TAIL LENGTH (SEE DIMENSION "D")							
3.18(.125)	4.45(.175)	10.39(.409)	13.87(.546)			A	B
SOLDER TAILS		WRAP POST TAILS					
		LEVEL 2	LEVEL 3				
SM0-06-S6XXX	SM0-06-S8XXX	SM0-06-W2G	SM0-06-W3G	6	1	7.62(.300)	5.08(.200)
SM0-08-S6XXX	SM0-08-S8XXX	SM0-08-W2G	SM0-08-W3G	8	1	10.16(.400)	7.62(.300)
SM0-14-S6XXX	SM0-14-S8XXX	SM0-14-W2G	SM0-14-W3G	14	1	17.78(.700)	15.24(.600)
SM0-16-S6XXX	SM0-16-S8XXX	SM0-16-W2G	SM0-16-W3G	16	1	20.32(.800)	17.78(.700)
SM0-18-S6XXX	SM0-18-S8XXX	SM0-18-W2G	SM0-18-W3G	18	1	22.86(.900)	20.32(.800)
SM0-20-S6XXX	SM0-20-S8XXX	SM0-20-W2G	SM0-20-W3G	20	2	25.40(1.000)	22.86(.900)
SM0-22-S6XXX	SM0-22-S8XXX	SM0-22-W2G	SM0-22-W3G	22	3	27.94(1.100)	25.40(1.000)
SM0-243-S6XXX	SM0-243-S8XXX	SM0-243-W2G	SM0-243-W3G	24	2	30.48(1.200)	27.94(1.100)
SM0-24-S6XXX	SM0-24-S8XXX	SM0-24-W2G	SM0-24-W3G	24	4	30.48(1.200)	27.94(1.100)
SM0-28-S6XXX	SM0-28-S8XXX	SM0-28-W2G	SM0-28-W3G	28	4	35.56(1.400)	33.02(1.300)
SM0-32-S6XXX	SM0-32-S8XXX	SM0-32-W2G	SM0-32-W3G	32	4	40.64(1.600)	38.10(1.500)
SM0-36-S6XXX	SM0-36-S8XXX	SM0-36-W2G	SM0-36-W3G	36	4	45.72(1.800)	43.18(1.700)
SM0-40-S6XXX	SM0-40-S8XXX	SM0-40-W2G	SM0-40-W3G	40	4	50.80(2.000)	48.26(1.900)
SM0-48-S6XXX	SM0-48-S8XXX	SM0-48-W2G	SM0-48-W3G	48	4	60.96(2.400)	58.42(2.300)
SM0-64-S6XXX	SM0-64-S8XXX	SM0-64-W2G	SM0-64-W3G	64	5	81.28(3.200)	78.74(3.100)

NOTE: X denotes plating options.

DIMENSIONS ARE SHOWN IN mm/(inches)

F



IC SOCKET PINS

Description/Application

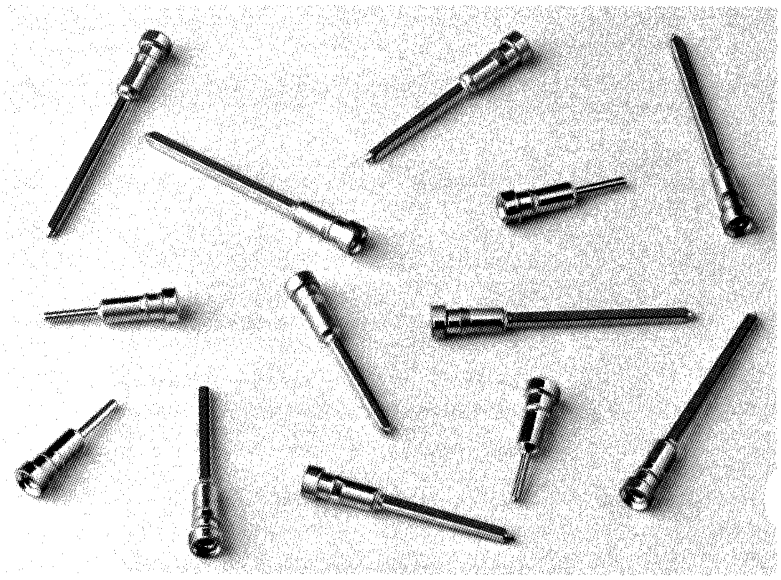
T&B precision-machined IC Socket Pins provide a versatile, cost effective alternative to conventional DIP socket devices, eliminating the need for a socket insulator or carrier. Socket pins can be inserted into a PC board–recommended hole size for press fit is 1.4mm (.055″)–in any desired configuration for applications where frequent removal and replacement of DIP devices is required.

Design Considerations

- Available in two solder-tail lengths and two wrap post lengths
- Low profile: nominal socket pin height is .76mm (.030″) off the board when press-fit, 4.19mm (.165″) off the board when soldered
- Accepts .28mm x .46mm (.011″ x .018″) rectangular and .40mm (.016″) to .53mm (.021″) diameter round IC leads, in lengths from 2.54mm (.100″) to 3.94mm (.155″)
- Closed-end construction

OUTER SLEEVE	BRASS BASE MATERIAL PER QQB-626-B GOLD PLATING PER MIL G-45204B OVER NICKEL PER QQN-290
TIN PLATING	PER MIL T10727
CONTACT MATERIAL	HEAT TREATED BERYLLIUM COPPER PER QQC-533 GOLD PLATING PER MIL G-45204B OVER NICKEL PER QQN-290

Socket pins to maximize custom designs



Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult the following page.

SOI – XX G

Product Code

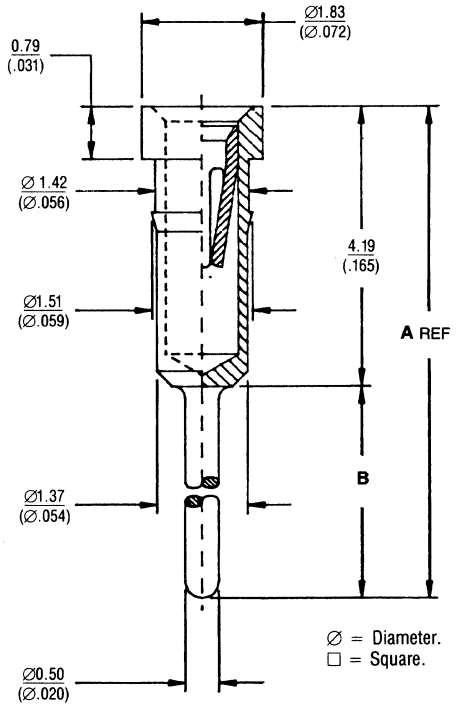
Pin Type
S6 *– .125″ Solder Tail*
S8 *– .175″ Solder Tail*
W2 *– 2 Level Wrap Post*
W3 *– 3 Level Wrap Post*

Outer Pin Plating
G*–Gold*
T*–Tin (Available with S6 or S8 Pin Only)*

Inner Clip Plating
— – 30μ″ Gold
G1 *– 10μ″ Gold**
T1 *– Tin**
**Available with tin outer plating only.*

IC SOCKET PINS

SOLDER TAIL



CAT. NO.	DIMENSIONS	
	A	B
SOI-S6G	7.37(.290)	3.18(.125)
SOI-S8G	8.38(.330)	4.19(.165)

CATALOG NUMBERING SYSTEM

SOI - XX X XX

Product Code

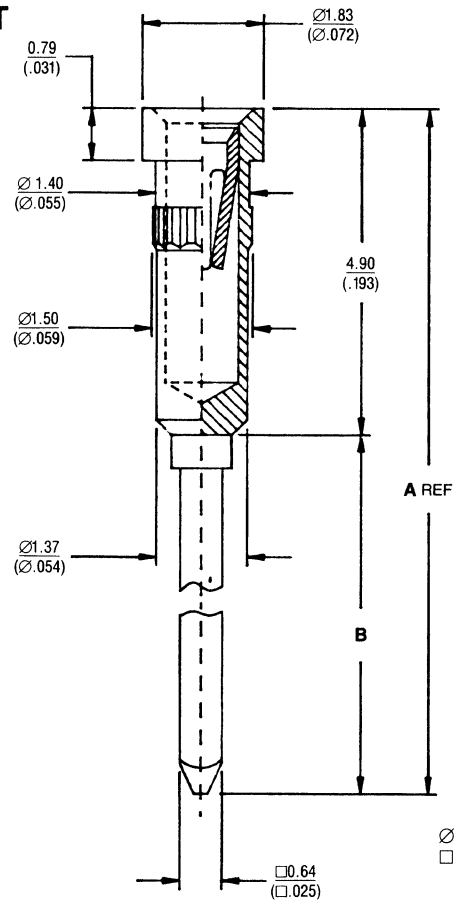
Pin Type
S6 – .125" Solder Tail
S8 – .165" Solder Tail

Inner Clip Plating
— – .000030 Gold
*G1 – .000010 Gold**
*T1 – Tin**
**Available with tin outer plating only.*

Outer Pin Plating
G – Gold
T – Tin

Recommended PCB hole diameter after plating:
For press fit: 1.40mm (.055) ±0.05mm (.002)
For solder hole: 0.88mm (.035) ±0.08mm (.003)

WRAP POST



CAT. NO.	DIMENSIONS	
	A	B
SOI-W2G	14.42(.568)	9.52(.375)
SOI-W3G	17.86(.703)	12.95(.510)

CATALOG NUMBERING SYSTEM

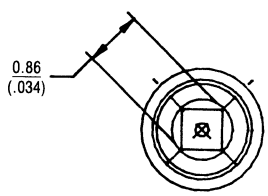
SOI - XX X

Product Code

Plating
G – .000010 Gold Outer Pin
.000030 Gold Inner Clip

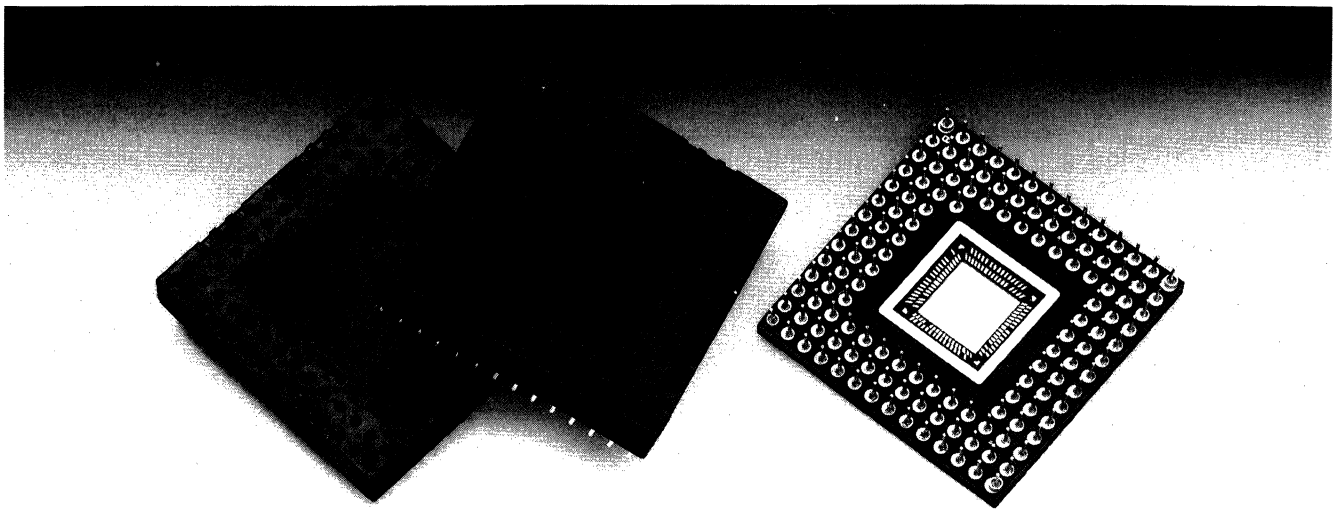
Pin Type
W2 – 2 Level Wrap Post
W3 – 3 Level Wrap Post

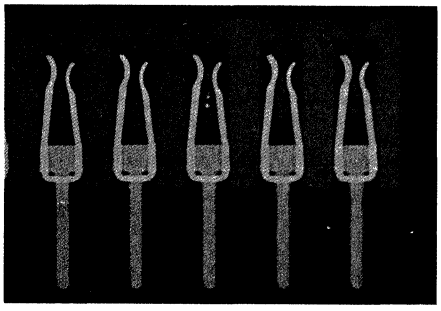
Recommended PCB hole diameter after plating:
For press fit: 1.40mm (.055) ±0.05mm (.002)
For solder hole: 1.14mm (.045) ±0.08mm (.003)



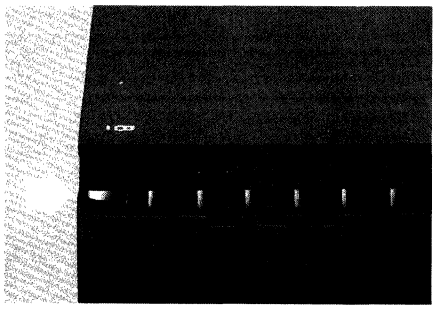
DIMENSIONS ARE SHOWN IN mm/(inches)

LIF PIN GRID ARRAY SOCKETS

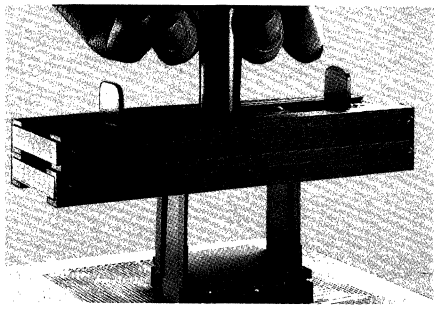




Staggered-entry mating points on contacts provide low insertion force but maintain high, consistent normal force.



Unique top-side insulator standoff feature prevents over-insertion of IC device and allows for air flow and heat dissipation.



Patent pending extraction tool fits notches in insulator and lifts the IC device in an even, perpendicular fashion to prevent bending and damage to IC pins.

Features/Benefits

- Socket accepts pin grid array pins with diameter of .016″ to .020″.
- Three styles of plastic insulators are available: fully populated, custom populated, and center relief.
- Select from a wide variety of patterns in grids: 10 x 10 through 18 x 18.
- Contacts have staggered-entry mating points for low insertion force.
- Contacts feature anti-wicking solder ledge to prevent solder contamination.
- Sockets are polarized and tube-loaded for ease in robotic assembly.
- Socket designed to withstand vapor phase and IR process temperatures.
- Operating temperature range −65°C to 125°C.
- Optional board retention available.
- Three tail-length options accommodate standard board thicknesses.

Description/Application

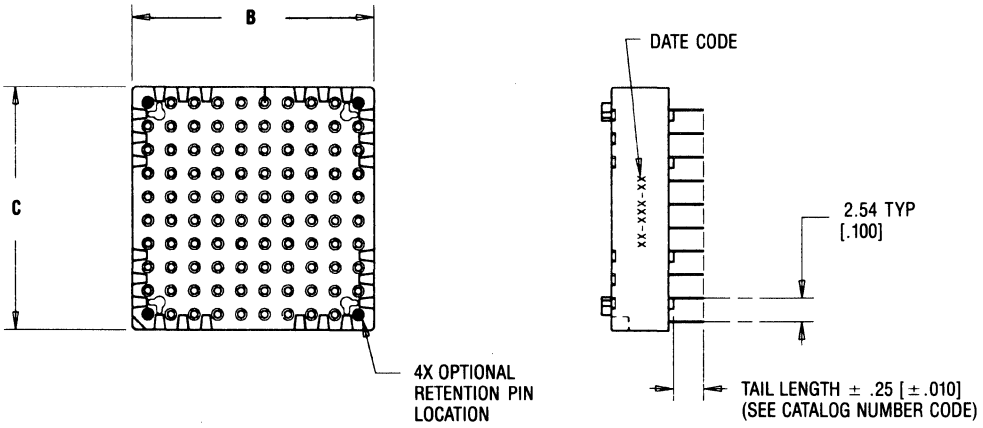
New LIF pin grid array sockets are engineered to provide easy insertion and removal of the IC device without damaging the pins, and also provide high, consistent normal force for optimum performance.

Top-side standoffs prevent IC device over-insertion and allow for air flow, while bottom-side standoffs facilitate cleaning. The unique removal tool allows for perpendicular extraction of the IC device, preventing damage to the IC pins and board solder joints.

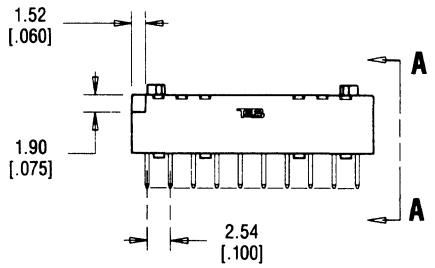
LPG 132 B 14-01 R

- ***Basic Catalog Number*** — LPG
- ***Number of Contacts*** *(Use 3 digits)* — 132
- ***Pattern and Style of Designator*** *(A,B,C . . .)* — B
- ***Grid Size*** — 14
- ***Contact Style*** — 01
  - *01 = 2.59 (.102) tail length For .062 PCB*
  - *02 = 3.38 (.133) tail length For .093 PCB*
  - *03 = 4.19 (.165) tail length For .125 PCB*
- ***Optional Board Retention Pin*** *(Omit when not specified)* — R

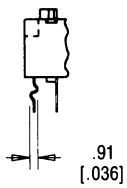
LIF PIN GRID ARRAY SOCKETS



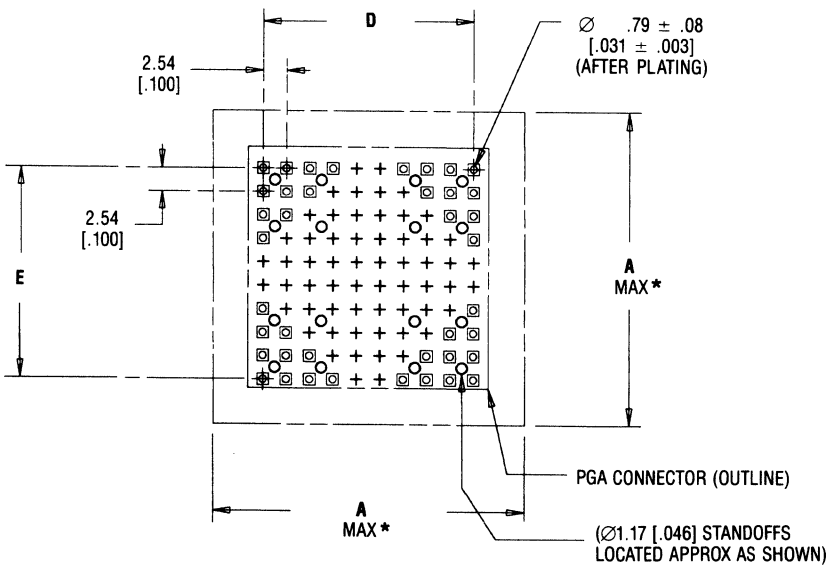
PATTERN A



VIEW A-A



Optional board retention pin requires .031 ± .003 diameter after plating through hole.



STD DIMENSIONS

Standoff .020 min
Overall height .305 max
Polarizing notch (.060) x (.075)
Tail length .102 ± .010
.133 ± .010
.165 ± .010
Through hole ∅ .031 ± .003

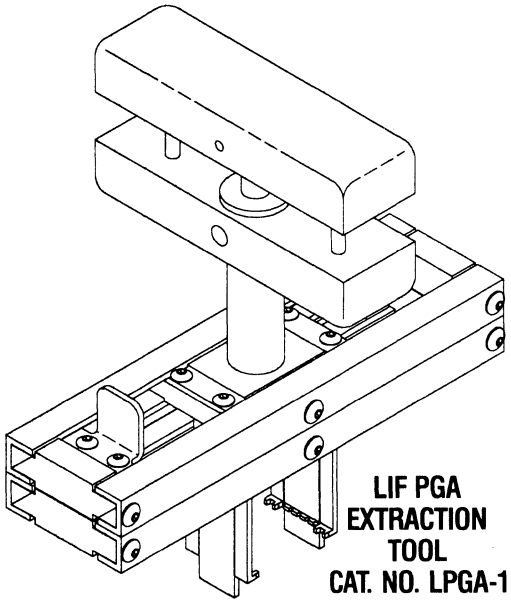
Pin-to-pin spacing .100

*A recommended minimum of 3.81 [.150] clearance is required per side on either 2 opposing sides from the maximum external envelope of the PGA device or the socket to accommodate the device extraction tool. Extraction tool Cat. No. LPGA-1.

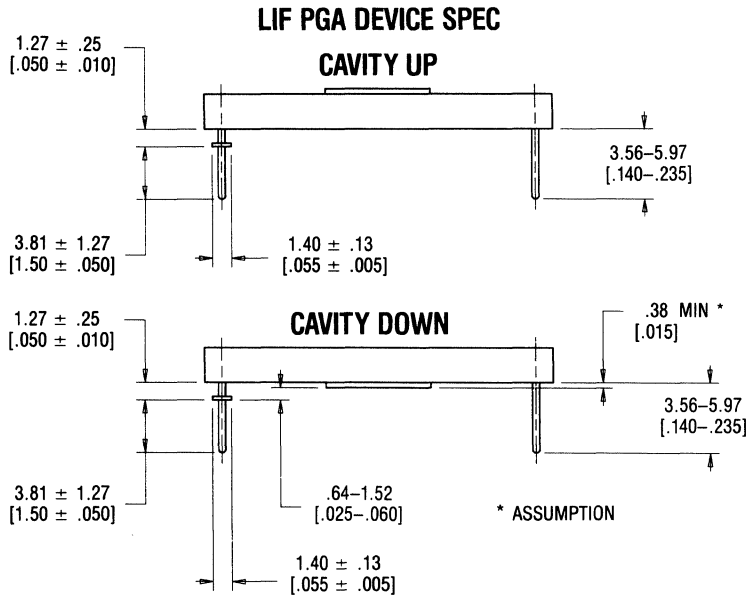
	A	B	C	D	E
Patterns	Socket/Tool Clearance	Socket Outside X max	Socket Outside Y max	Grid X	Grid Y
10x10	1.335	1.035	1.035	.900	.900
11x11	1.435	1.135	1.135	1.000	1.000
12x12	1.535	1.235	1.235	1.100	1.100
13x13	1.653	1.335	1.335	1.200	1.200
14x14	1.735	1.435	1.435	1.300	1.300
15x15	1.835	1.535	1.535	1.400	1.400
16x16	1.935	1.635	1.635	1.500	1.500
17x17	2.035	1.735	1.735	1.600	1.600
18x18	2.135	1.835	1.835	1.700	1.700

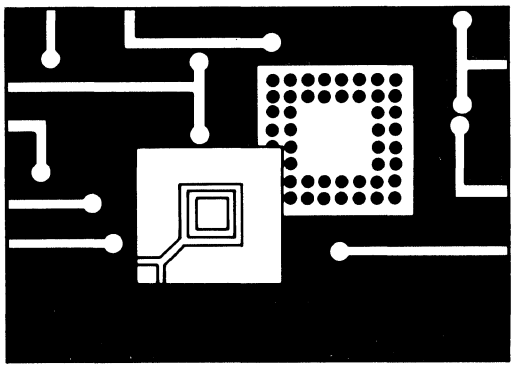
F

PHYSICAL PROPERTIES	
INSULATION MATERIAL	GLASS FILLED PPS THERMOPLASTIC RATED 94V-0
COLOR	BLACK
CONTACT MATERIAL	BERYLLIUM COPPER
CONTACT PLATING	CONTACT AREA: 30 MICROINCHES GOLD MIN. OVER NICKEL TERMINATION AREA: TIN-LEAD OVER NICKEL
ELECTRICAL PROPERTIES (PROVISIONAL)	
CURRENT RATING	1 AMP
INSULATION RESISTANCE	$> 1 \times 10^9$ OHMS @ 600 VDC
DWV	> 1000 VRMS (SEA LEVEL)
ENVIRONMENTAL PROPERTIES (PROVISIONAL)	
TEMPERATURE RATING	–65°C TO 125°C



LIF PGA EXTRACTION TOOL CAT. NO. LPGA-1





SCREW MACHINE PIN GRID ARRAY LIF SOCKET

Description/Application

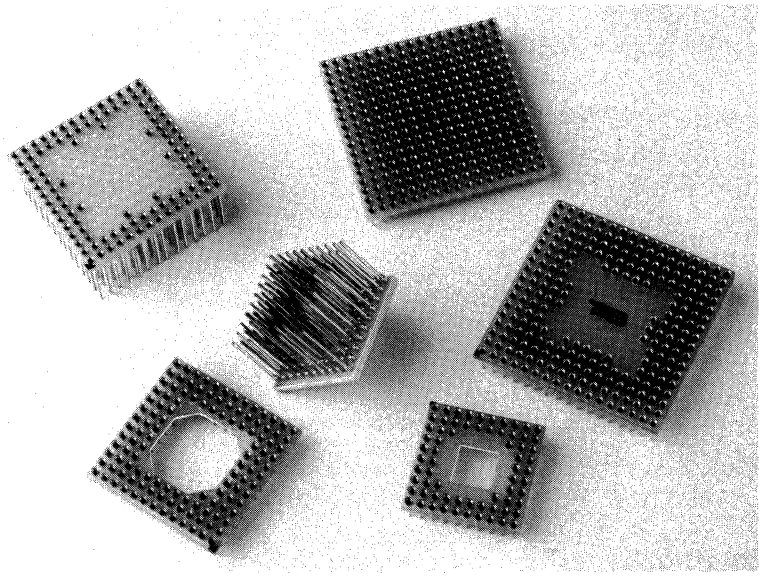
Screw Machine Pin Grid Array Sockets provide low-cost, reliable interconnection for ICs in most common pin grid array packages. Featuring precision-machined contact sleeves for optimum performance, these versatile sockets are suitable for a wide variety of both production and development applications.

Design Considerations

- Grid sizes available in both solder-tail and wrap-post versions: 8x8 through 21x21 with custom patterns available.
- Wide variety of pin patterns (see Pin Grid Array Patterns)*
- Low profile: 4.19mm (.165″) max. height off board
- Accepts 0.46mm (0.18″ ± .002″) round pins with low insertion force and optimum normal force; – may be used in "sacrificial" interface carrier
- Standard 0.100″ pin spacing; mountable on every side without grid position loss
- Pin No. 1 polarity indentification

OUTER SLEEVE	BRASS BASE MATERIAL PER QQ-B-626D GOLD PLATING PER MIL-G-45204C OVER NICKEL PER QQ-N-290A
TIN PLATING	PER MIL-T-10727
CONTACT MATERIAL	HEAT TREATED BERYLLIUM COPPER PER QQ-C-533B GOLD PLATING PER MIL-G-45204C OVER NICKEL PER QQ-N-290A
INSULATOR	GLASS EPOXY, 1.57(.062″) THICK PER MIL-P-13949

Low-insertion-force socket provides IC-to-board-pluggability in a wide variety of pin patterns; screw-machine reliability



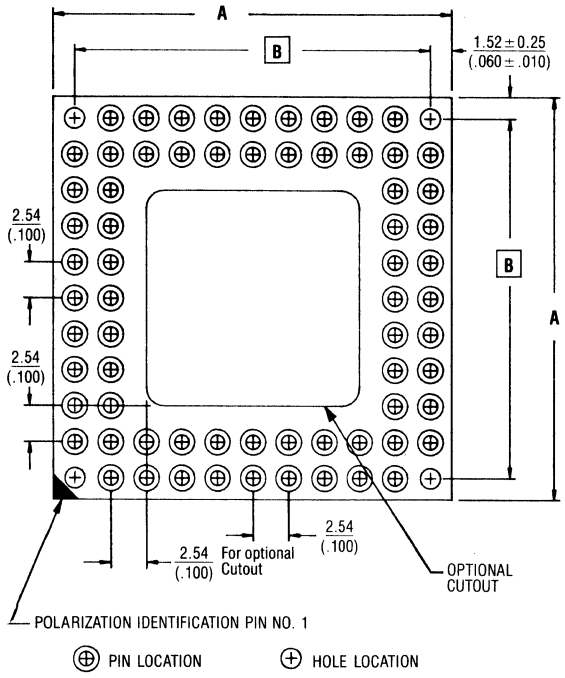
Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult the following pages.

PGM 068 A 11 – S6 T C 1

- ***Product Code*** — PGM
- ***Number of Pins*** — 068
- ***Pin Pattern*** — A
- ***Grid Size*** — 11
- ***Contact Style and Inner Clip Plating*** — S6
  - ***S6*** – *Solder Tail .125″ Long 30μ″ Gold Clip*
  - ***S8*** – *Solder Tail .165″ Long 30μ″ Gold Clip*
  - ***W3*** – *Wire Wrap Post .520″ Long 30μ″ Gold Clip*
  - ***R7*** – *Round Pin, Solder Tail .144″ Long*
  - **Not available in tin.*
- ***Outer Body Plating*** — T
  - ***G*** – *Gold–10μ″ Minimum*
  - ***T*** – *Tin– 180μ″ Minimum*
- ***Grid Pattern*** — C
  - ***F****-Fully Drilled*
  - ***C****-Custom Drilled*
- ***Visual Orientation Mark*** — 1
  - ***1****-Lower Left Corner*

SCREW MACHINE PIN GRID ARRAY LIF SOCKET



CUSTOM DRILLED BOARD SHOWN FOR ILLUSTRATION.

Sample part number for diagram shown

CATALOG NUMBERING SYSTEM

PGM 068 B 11 - S6 T C 1

Number of Pins

Pin Pattern
See Pages 24-32.

Grid Size

Visual Orientation Mark
0 *– None*
1 *– Lower Left Corner*
2 *– Lower Right Corner*
3 *– Upper Left Corner*
4 *– Upper Right Corner*

Grid Pattern
F *– Fully Drilled*
C *– Custom Drilled*

Outer Body Plating
G *– Gold–10μ" Minimum*
T *– Tin–180μ" Minimum*

Contact Style
S6 *– Solder Tail .125" Long 30μ" Gold Clip*
S8 *– Solder Tail .165" Long 30μ" Gold Clip*
W3 *– Wire Wrap Post .520" Long 30μ" Gold Clip*
R7 *– Round Pin, Solder Tail .144" Long 30μ" Gold Clip*

MATERIAL SPECIFICATIONS

Inner Contact
Heat treated beryllium copper per QQ-C-533B.
Gold plated 30 micro inches minimum per MIL-G-45204C over 50-100 micro inches low stress nickel per QQ-N-290A.

Outer Sleeve
Brass base material per QQ-B-626D
Gold plating–10 micro inches minimum per MIL-G-45204C over 50-100 micro inches low stress nickel per QQ-N-290A.
Tin plating–180 to 250 micro inches per MIL-T-10727 over 50-100 micro inches low stress nickel per QQ-N-290A.

Insulator
Glass epoxy resin, flame resistant. Type GFN06200/00A2A. per MIL-P-13949, 1.57 (.062) thick.

MECHANICAL SPECIFICATIONS

Contact Retention: 7.5 lbs minimum.

Insertion Force: 3 oz. max. per contact using a .018 inch dia. bullet nose steel pin with 4 micro inches finish.

Withdrawal Force: 1 oz. min. per contact using a .018 inch dia. steel pin with 4 micro inches finish.

Normal Force: not to be less than 45 grams.

Rotational torque wire wrap minimum of 2.5 inch-ounce.

ELECTRICAL SPECIFICATIONS

Contact resistance shall not exceed 20 milliohms.

Contact Rating: 3 amp.

Capacitance pin to pin shall not exceed two picofarads.

Insulation resistance shall not be less than 5000 megohms.

Dielectric withstand voltage: There shall be no evidence of flashover or arcing after being subjected to 600 vac for a period of one minute.

ENVIRONMENTAL SPECIFICATIONS

Operational Temp. −55°C to +125°C.

Humidity: The insulation resistance following the moisture resistance test shall not be less than 5000 megohms. When measured in accordance to MIL-S-83734C and method 103 of MIL-STD-202F.

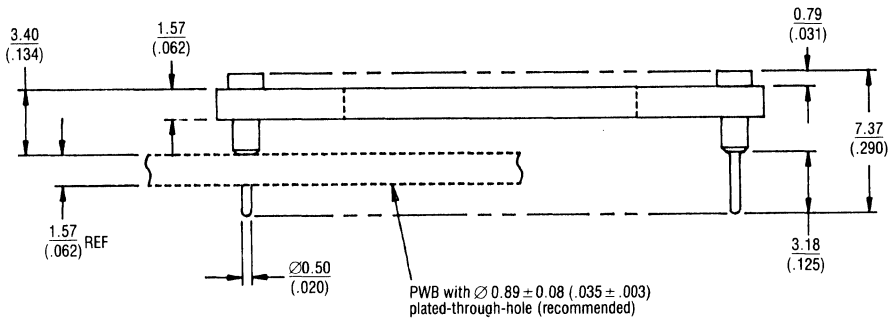
Industrial Gas: Initial low-signal level contact resistance shall not exceed 20 milliohms using method 3002 of MIL-STD-1344A.

Vibration: There shall be no evidence of physical damage. There shall be no discontinuities in excess of one microsecond. Test per MIL-S-83734C and method 2005 of MIL-STD-1344A cond. III.

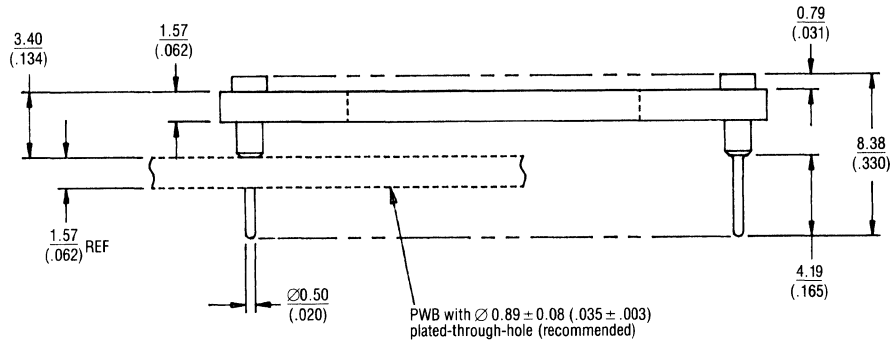
Solderability Process: Wave solder and vapor phase reflow.

INSULATOR	DIMENSIONS	
	A $^{+0.50}_{-0}$ (+.020 −.000)	B
8 x 8	20.83 (.820)	17.78 (.700)
9 x 9	23.37 (.920)	20.32 (.800)
10 x 10	25.91 (1.020)	22.86 (.900)
11 x 11	28.91 (1.020)	25.40 (1.000)
13 x 13	33.53 (1.320)	30.48 (1.200)
14 x 14	36.07 (1.420)	33.02 (1.300)
15 x 15	38.61 (1.520)	35.56 (1.400)
17 x 17	43.69 (1.720)	40.64 (1.600)
18 x 18	46.23 (1.820)	43.18 (1.700)
19 x 19	48.77 (1.920)	45.72 (1.800)
20 x 20	51.31 (2.020)	48.26 (1.900)
21 x 21	53.85 (2.120)	50.80 (2.000)

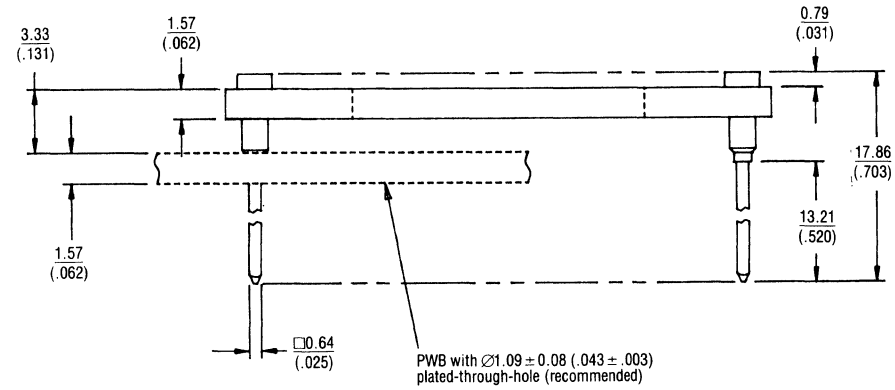
SCREW MACHINE PIN GRID ARRAY LIF SOCKET



SOLDER TAIL ARRANGEMENT - S6 (.125")



SOLDER TAIL ARRANGEMENT - S8 (.165")



WRAP POST TAIL ARRANGEMENT - W3 (.520")

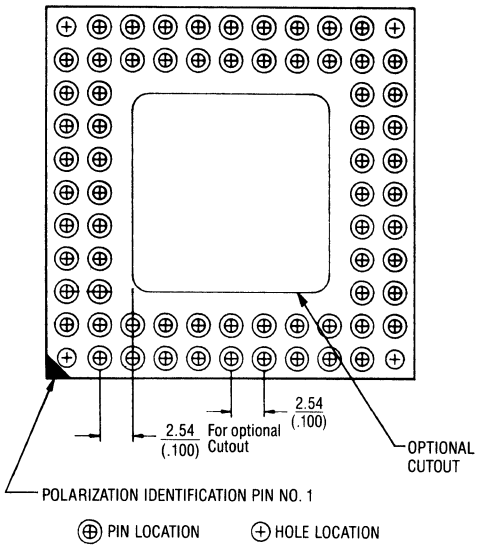
DIMENSIONS ARE SHOWN IN mm/(inches)

F

ORDERING INFORMATION-CUSTOM PIN PATTERNS*

DESIGN SPECIFICATIONS FOR SCREW MACHINE PIN GRID ARRAY LIF SYSTEM

Complete bottom half of page for custom pin patterns, cut on dotted line and mail to address below.



CUSTOM DRILLED BOARD SHOWN FOR ILLUSTRATION.

DIMENSIONS ARE SHOWN IN mm/(inches)

PIN GRID ARRAY SOCKETS-PGM SERIES

CATALOG NUMBERING SYSTEM

PGM 068 A 11 - S6 T C 1

Number of Pins

Pin Pattern
See Pages 24-32.

Grid Size
8x8 = 08
9x9 = 09
10x10 = 10
11x11 = 11
12x12 = 12
13x13 = 13
14x14 = 14
15x15 = 15
16x16 = 16
17x17 = 17
19x19 = 19
20x20 = 20

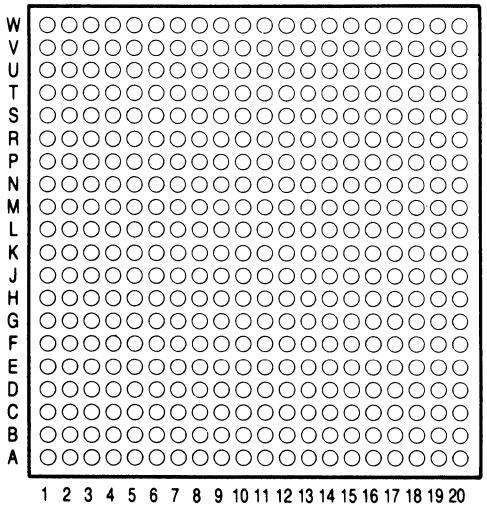
Visual Orientation Mark
***0** – None*
***1** – Lower Left Corner*
***2** – Lower Right Corner*
***3** – Upper Left Corner*
***4** – Upper Right Corner*

Grid Pattern
***F** – Fully Drilled*
***C** – Custom Drilled*

Outer Body Plating
***G** – Gold – 10 Micro Inch Minimum*
***T** – Tin – 180 Micro Inch Minimum*

Contact Style
***S6** – Solder Tail .125 Long 30μ" Gold CLip*
***S8** – Solder Tail. .165 Long 30μ" Gold Clip*
***W3** – Wire Wrap Post .520 Long 30μ" Gold Clip*
***R7** – Round Pin, Solder Tail .144 Long 30μ" Gold Clip*

BLACKEN HOLES TO INDICATE PIN POSITION



TOP VIEW OF SOCKET

Note: All custom parts are non-cancellable and non-returnable. Unless otherwise specified, standard cut out dimensions will be used.

PART NUMBER

PGM ___ ___ ___ ☐ ___ ___ - ___ ___ ___ ___ ___

Date _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

Specifier _____

Sales Representative _____

Quotation Requirements: ☐ Yes ☐ No

Quantity Required _____ Date Required _____

Sample Requirements: ☐ Yes ☐ No

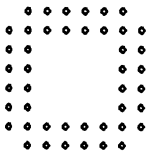
Quantity Required _____ Date Required _____

Comments _____

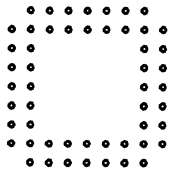
_____

Customer Signature _____

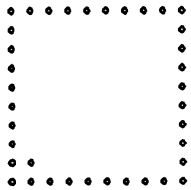
PIN GRID ARRAYS



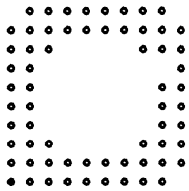
8 x 8
44 PINS
Pattern A



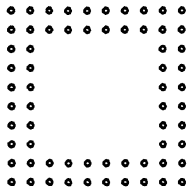
9 x 9
52 PINS
Pattern A



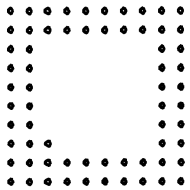
10 x 10
37 PINS
Pattern A



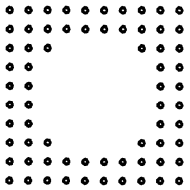
10 x 10
64 PINS
Pattern A



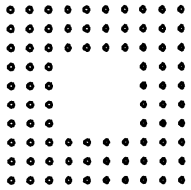
10 x 10
64PINS
Pattern B



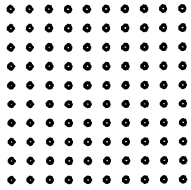
10 x 10
65 PINS
Pattern A



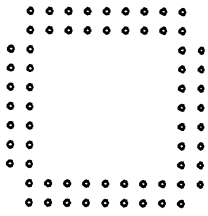
10 x 10
68 PINS
Pattern A



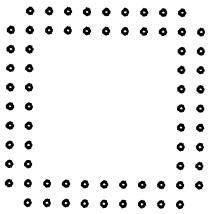
10 x 10
84PINS
Pattern A



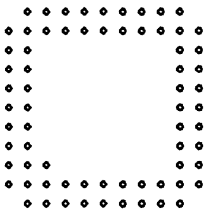
10 x 10
100 PINS
Pattern A



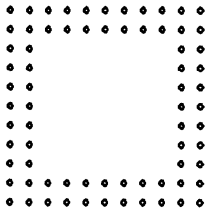
11 x 11 65 PINS
Pattern A



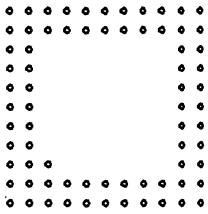
11 x 11 68 PINS
Pattern A



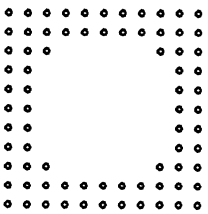
11 x 11 69 PINS
Pattern A



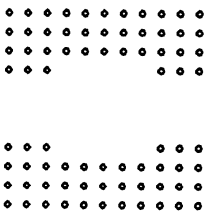
11 x 11 72 PINS
Pattern A



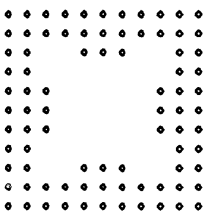
11 x 11 73 PINS
Pattern A



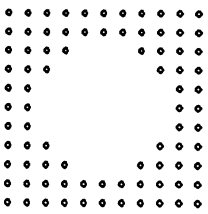
11 x 11 76 PINS
Pattern A



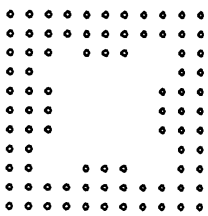
11 x 11 78 PINS
Pattern A



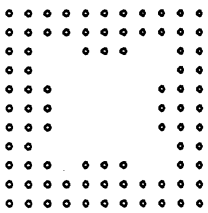
11 x 11 84 PINS
Pattern A



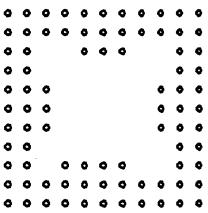
11 x 11 84 PINS
Pattern B



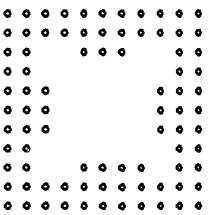
11 x 11 85 PINS
Pattern A



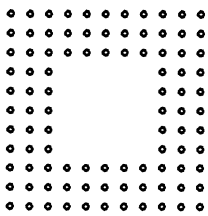
11 x 11 85 PINS
Pattern B



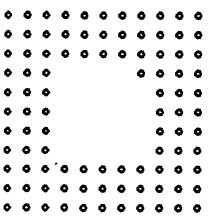
11 x 11 85 PINS
Pattern C



11 x 11 85 PINS
Pattern D



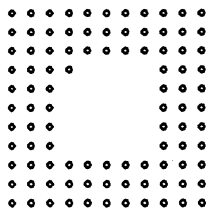
11 x 11 96 PINS
Pattern A



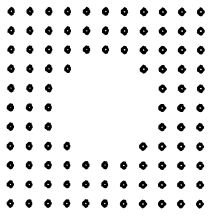
11 x 11 97 PINS
Pattern A

F

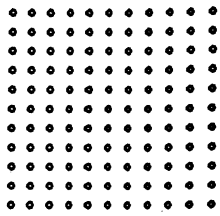
PIN GRID ARRAYS



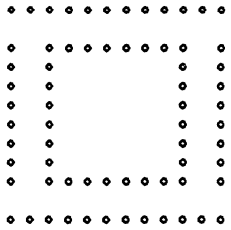
11 x 11 97 PINS
Pattern B



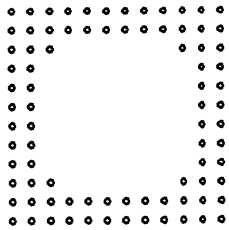
11 x 11 100 PINS
Pattern A



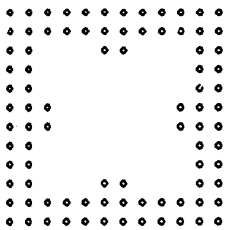
11 x 11 121 PINS
Pattern A



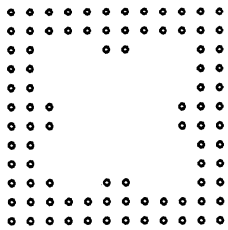
12 x 12 68 PINS
Pattern A



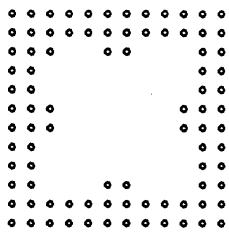
12 x 12 84 PINS
Pattern A



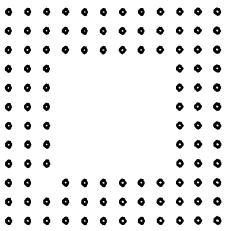
12 x 12 88 PINS
Pattern A



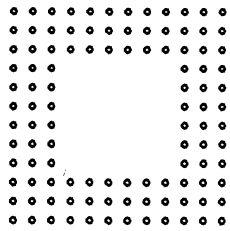
12 x 12 89 PINS
Pattern A



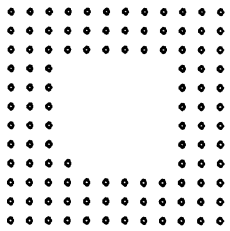
12 x 12 89 PINS
Pattern B



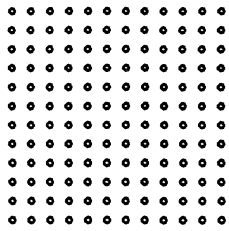
12 x 12 107 PINS
Pattern A



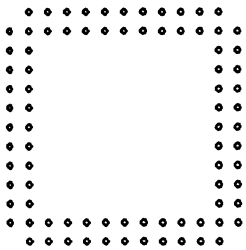
12 x 12 108 PINS
Pattern A



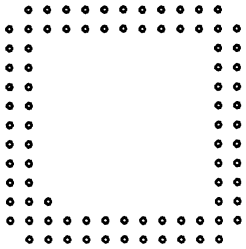
12 x 12 109 PINS
Pattern A



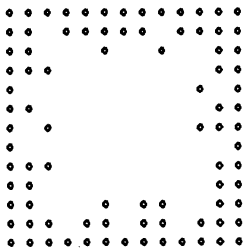
12 x 12 144 PINS
Pattern A



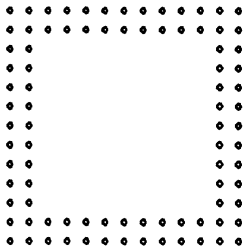
13 x 13 84 PINS
Pattern A



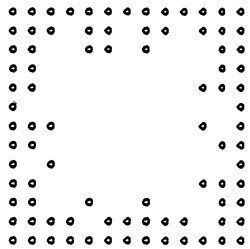
13 x 13 85 PINS
Pattern A



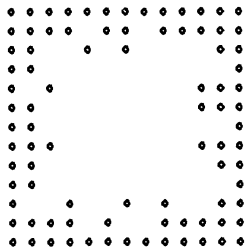
13 x 13 88 PINS
Pattern A



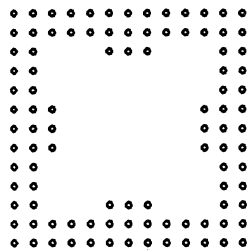
13 x 13 88 PINS
Pattern B



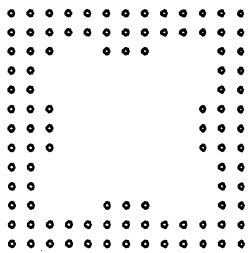
13 x 13 88 PINS
Pattern C



13 x 13 88 PINS
Pattern F

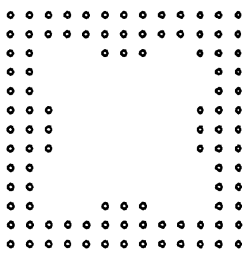


13 x 13 100 PINS
Pattern A

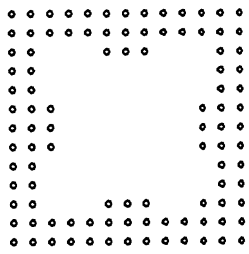


13 x 13 101 PINS
Pattern B

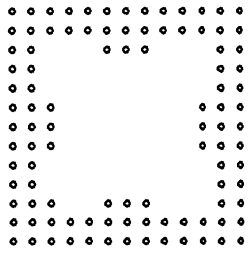
PIN GRID ARRAYS



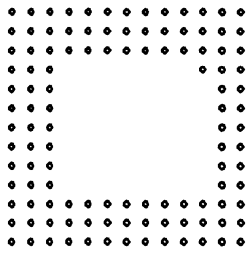
13 x 13 101 PINS
Pattern C



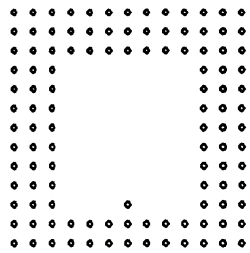
13 x 13 101 PINS
Pattern D



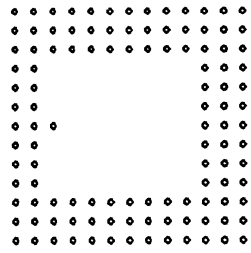
13 x 13 101 PINS
Pattern E



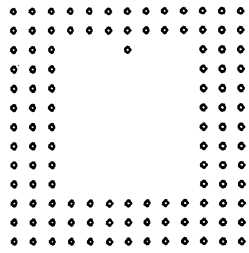
13 x 13 114 PINS
Pattern A



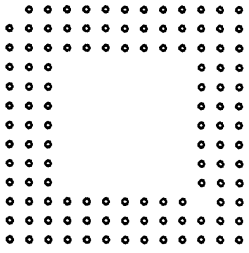
13 x 13 114 PINS
Pattern B



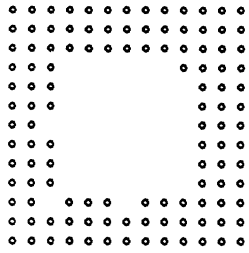
13 x 13 114 PINS
Pattern C



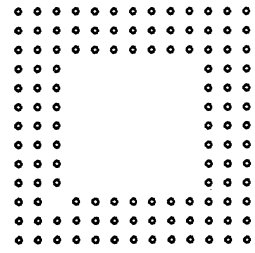
13 x 13 114 PINS
Pattern E



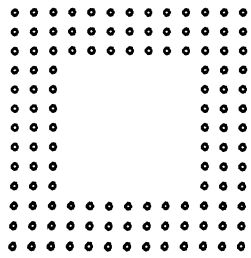
13 x 13 118 PINS
Pattern A



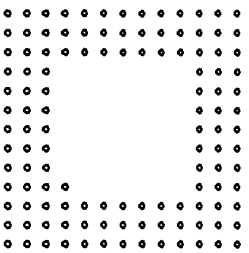
13 x 13 118 PINS
Pattern B



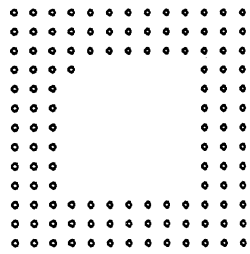
13 x 13 119 PINS
Pattern A



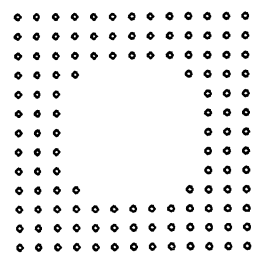
13 x 13 120 PINS
Pattern A



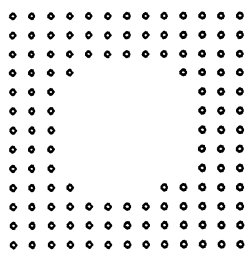
13 x 13 121 PINS
Pattern A



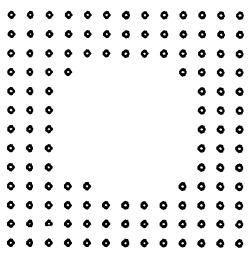
13 x 13 121 PINS
Pattern B



13 x 13 124 PINS
Pattern A



13 x 13 125 PINS
Pattern A



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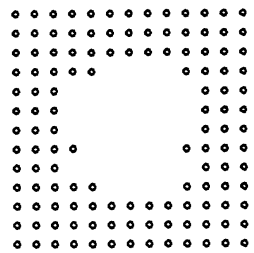
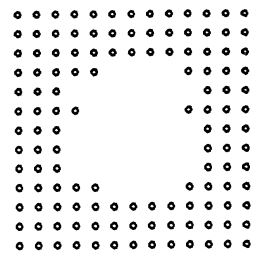
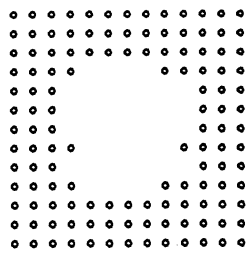
Pattern B



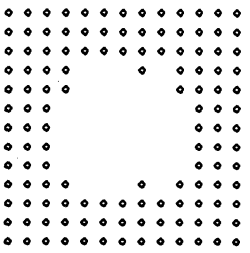
13 x 13 128 PINS
Pattern A



13 x 13 128 PINS
Pattern B



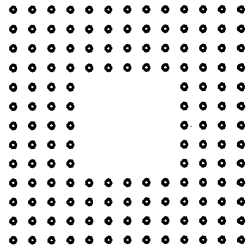
13 x 13 128 PINS
Pattern C



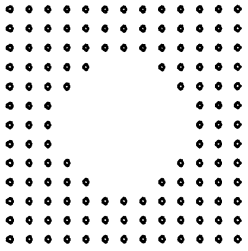
13 x 13 128 PINS
Pattern D

F

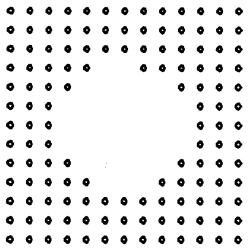
PIN GRID ARRAYS



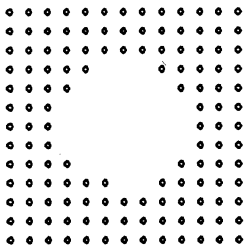
13 x 13 128 PINS
Pattern E



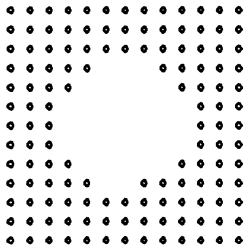
13 x 13 132 PINS
Pattern A



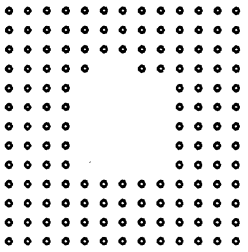
13 x 13 133 PINS
Pattern A



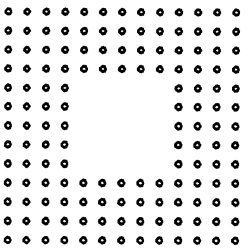
13 x 13 133 PINS
Pattern B



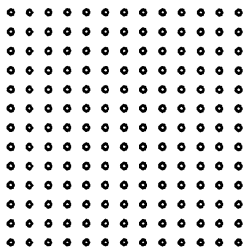
13 x 13 133 PINS
Pattern C



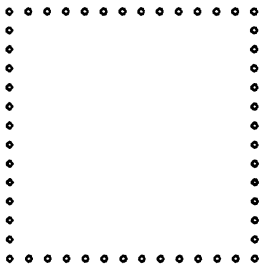
13 x 13 142 PINS
Pattern A



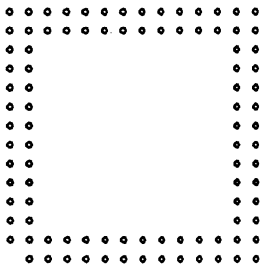
13 x 13 144 PINS
Pattern A



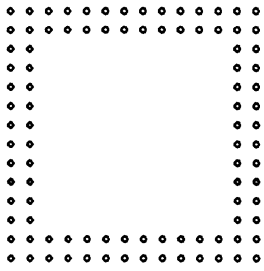
13 x 13 169 PINS
Pattern A



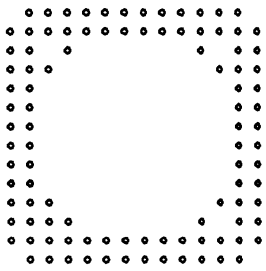
14 x 14 52 PINS
Pattern A



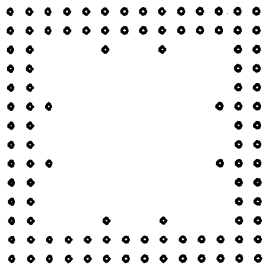
14 x 14 95 PINS
Pattern A



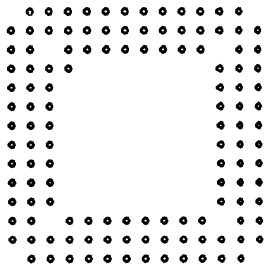
14 x 14 96 PINS
Pattern A



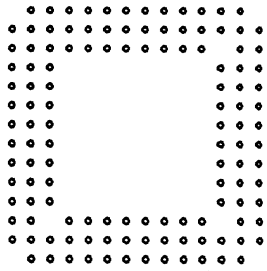
14 x 14 101 PINS
Pattern A



14 x 14 104 PINS
Pattern A

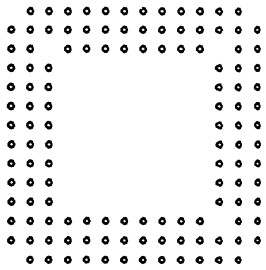


14 x 14 125 PINS
Pattern A

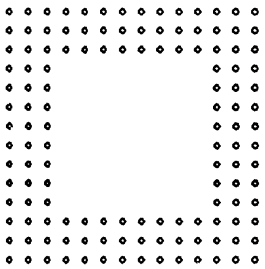


14 x 14 125 PINS
Pattern B

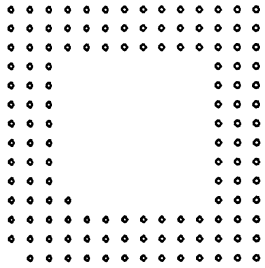
PIN GRID ARRAYS



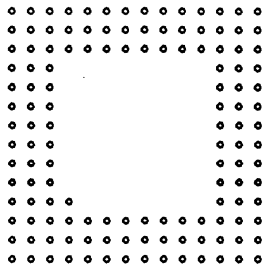
14 x 14 125 PINS
Pattern C



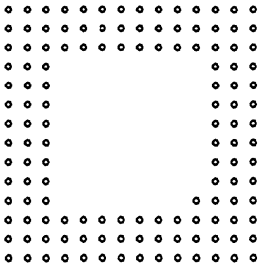
14 X 14 132 PINS
Pattern A



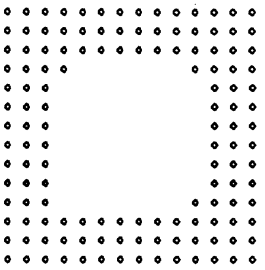
14 x 14 132 PINS
Pattern C



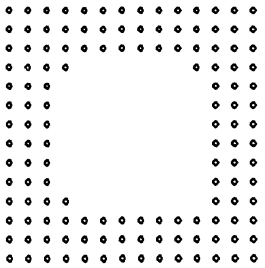
14 x 14 133 PINS
Pattern A



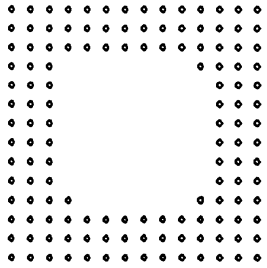
14 x 14 133 PINS
Pattern B



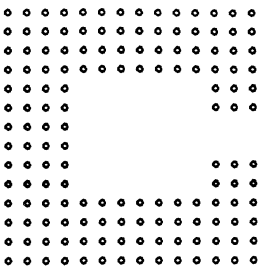
14 X 14 135 PINS
Pattern A



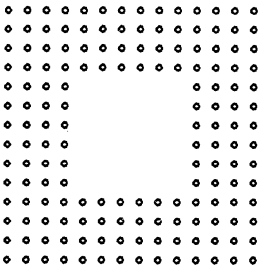
14 x 14 135 PINS
Pattern B



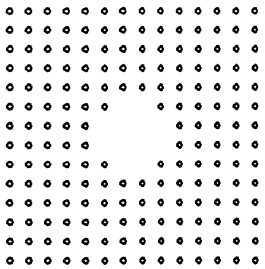
14 x 14 135 PINS
Pattern C



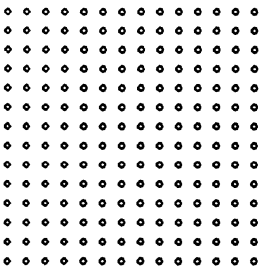
14 x 14 148 PINS
Pattern A



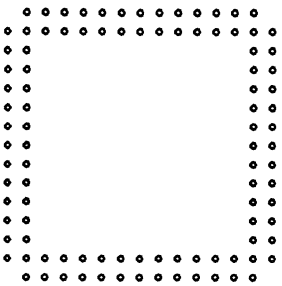
14 X 14 160 PINS
Pattern A



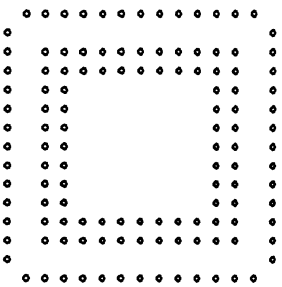
14 x 14 184 PINS
Pattern A



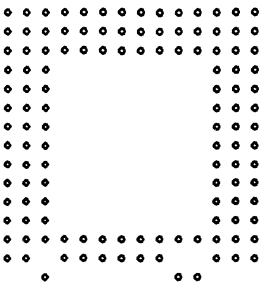
14 x 14 196 PINS
Pattern A



15 x 15 100 PINS
Pattern A



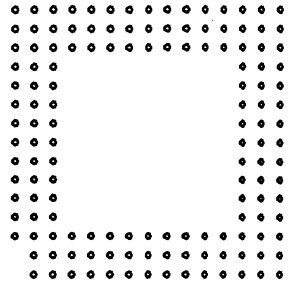
15 X 15 124 PINS
Pattern A



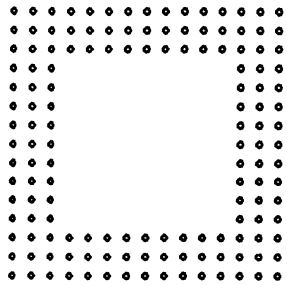
15 x 15 132 PINS
Pattern A

F

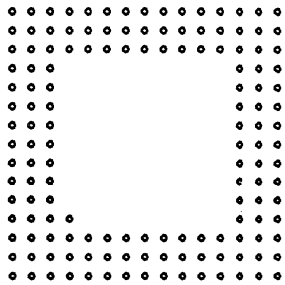
PIN GRID ARRAYS



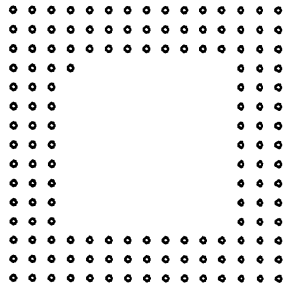
15 x 15 142 PINS
Pattern A



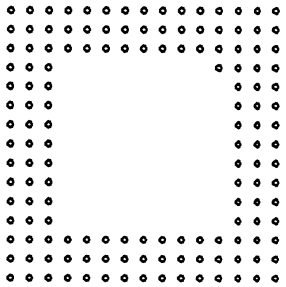
15 x 15 144 PINS
Pattern A



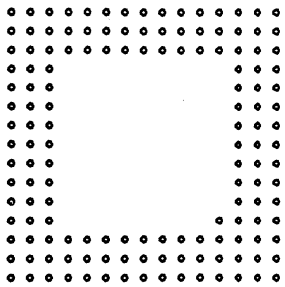
15 x 15 145 PINS
Pattern A



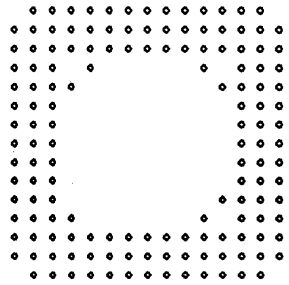
15 x 15 145 PINS
Pattern B



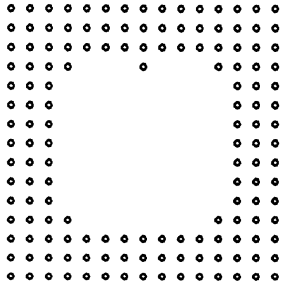
15 x 15 145 PINS
Pattern C



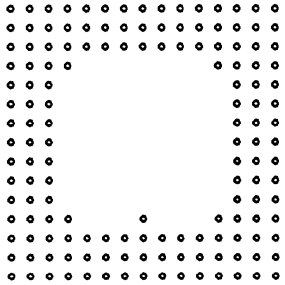
15 x 15 145 PINS
Pattern E



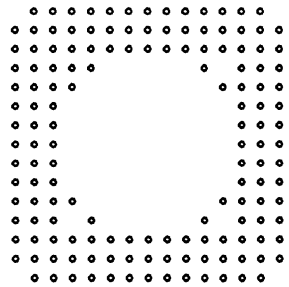
15 x 15 147 PINS
Pattern A



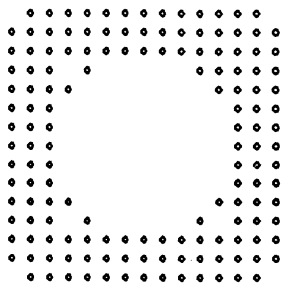
15 x 15 149 PINS
Pattern B



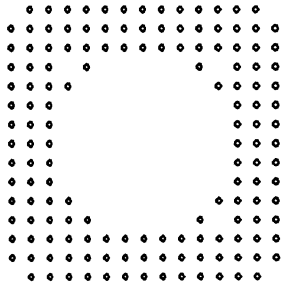
15 x 15 149 PINS
Pattern C



15 x 15 149 PINS
Pattern D

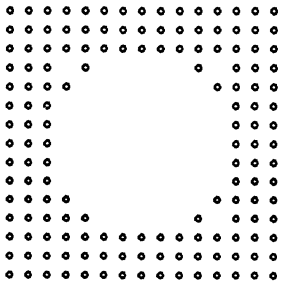


15 x 15 149 PINS
Pattern E

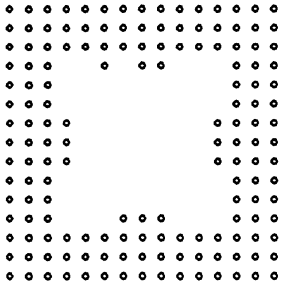


15 x 15 149 PINS
Pattern F

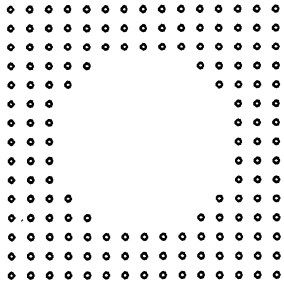
PIN GRID ARRAYS



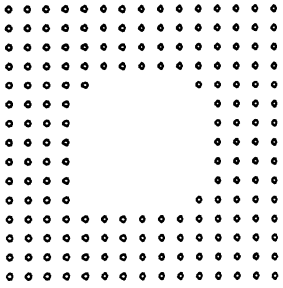
15 x 15 153 PINS
Pattern A



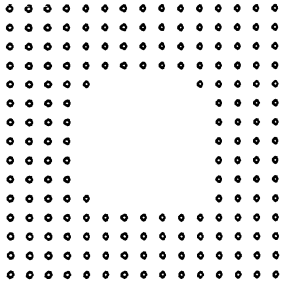
15 x 15 156 PINS
Pattern A



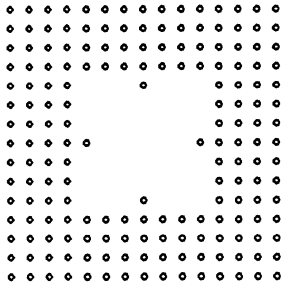
15 x 15 156 PINS
Pattern B



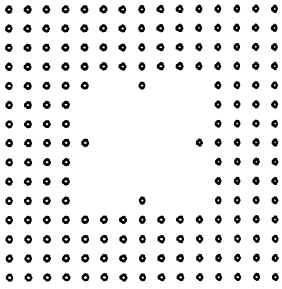
15 x 15 179 PINS
Pattern A



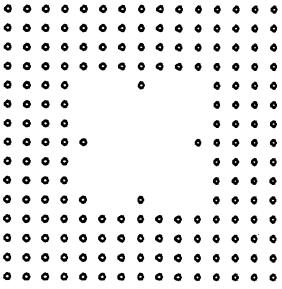
15 x 15 179 PINS
Pattern B



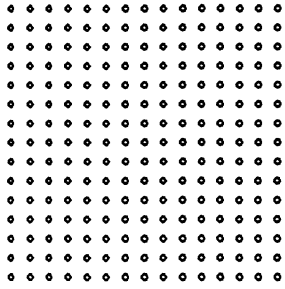
15 x 15 180 PINS
Pattern A



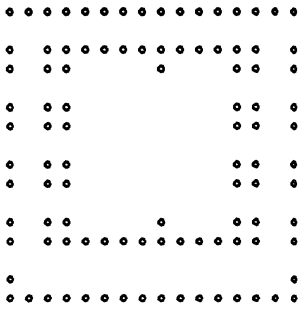
15 x 15 181 PINS
Pattern A



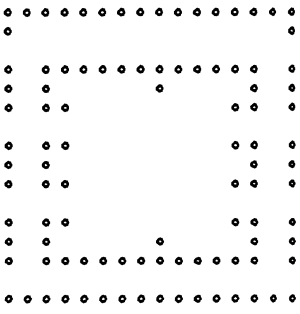
15 x 15 181 PINS
Pattern B



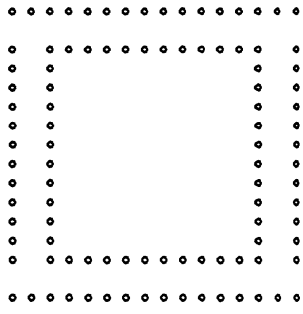
15 x 15 225 PINS
Pattern A



16 x 16 100 PINS
Pattern A



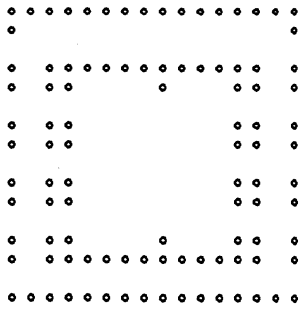
16 x 16 100 PINS
Pattern B



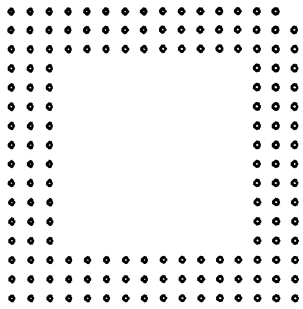
16 x 16 100 PINS
Pattern C

F

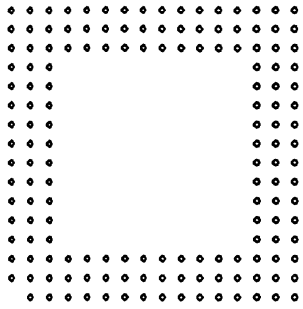
PIN GRID ARRAYS



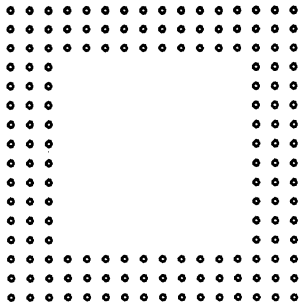
16 x 16 100 PINS
Pattern D



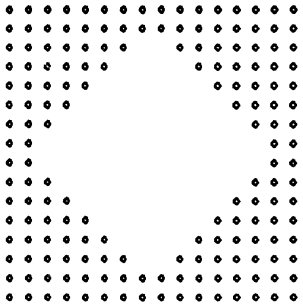
16 x 16 155 PINS
Pattern A



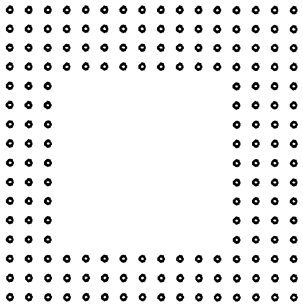
16 x 16 155 PINS
Pattern B



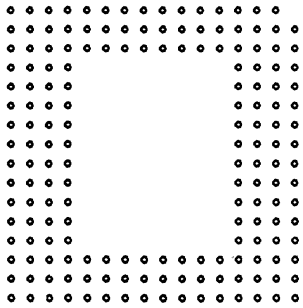
16 x 16 156 PINS
Pattern A



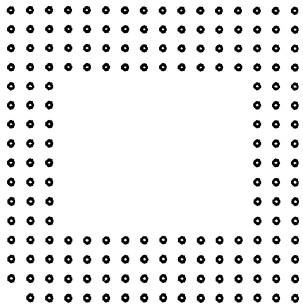
16 x 16 172 PINS
Pattern A



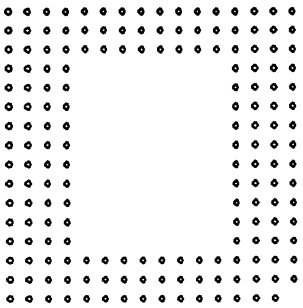
16 x 16 175 PINS
Pattern B



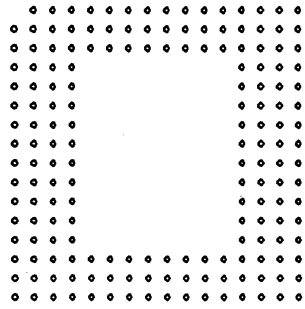
16 x 16 175 PINS
Pattern C



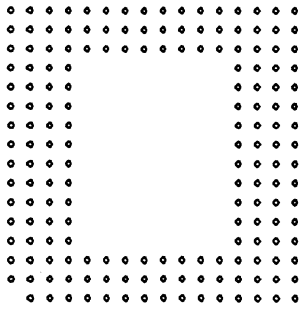
16 x 16 175 PINS
Pattern D



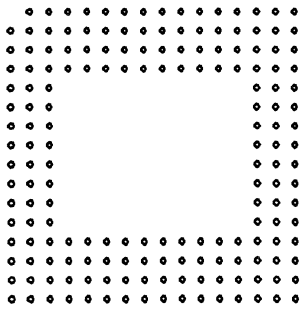
16 x 16 175 PINS
Pattern E



16 x 16 175 PINS
Pattern F

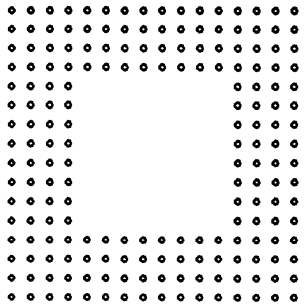


16 x 16 175 PINS
Pattern G

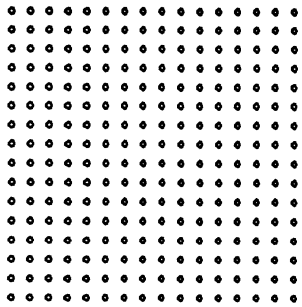


16 x 16 175 PINS
Pattern H

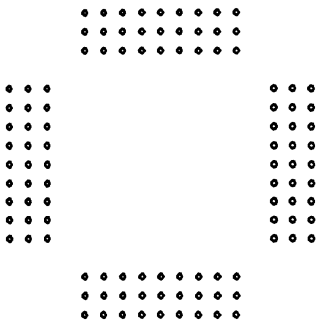
PIN GRID ARRAYS



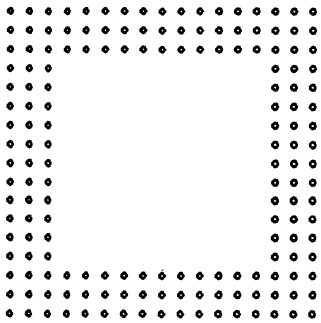
16 x 16 192 PINS
Pattern A



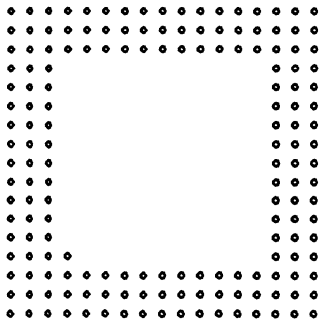
16 x 16 256 PINS
Pattern A



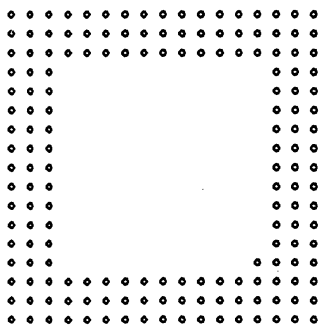
17 x 17 108 PINS
Pattern A



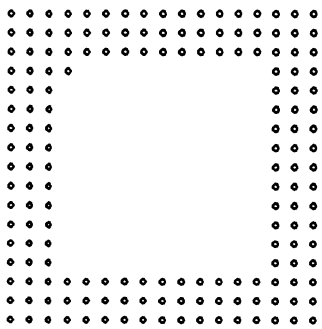
17 x 17 168 PINS
Pattern A



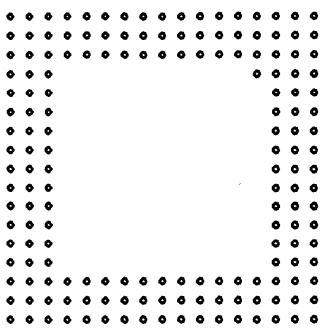
17 x 17 169 PINS
Pattern A



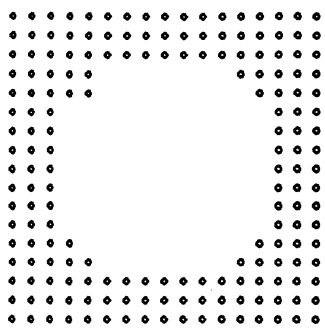
17 x 17 169 PINS
Pattern B



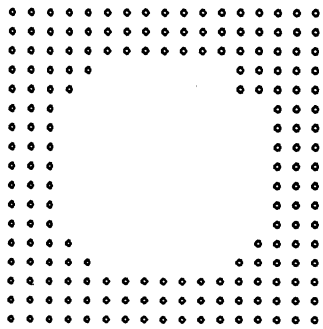
17 x 17 169 PINS
Pattern C



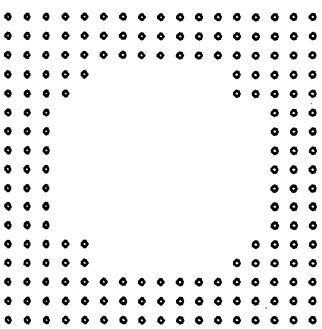
17 x 17 169 PINS
Pattern D



17 x 17 181 PINS
Pattern A



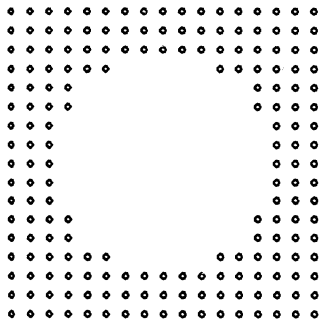
17 x 17 181 PINS
Pattern C



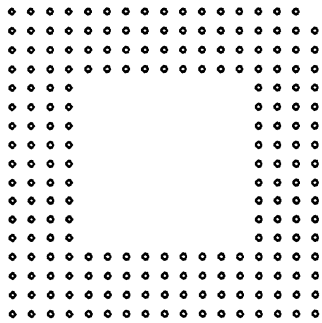
17 x 17 182 PINS
Pattern A

F

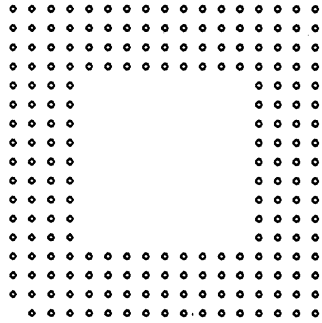
PIN GRID ARRAYS



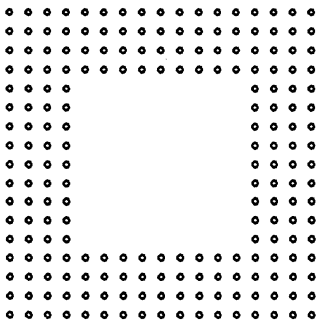
17 x 17 188 PINS
Pattern A



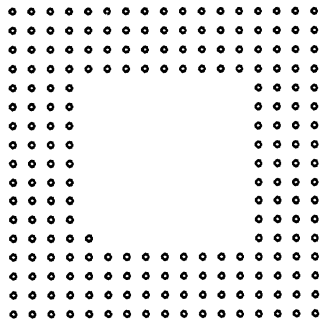
17 x 17 207 PINS
Pattern A



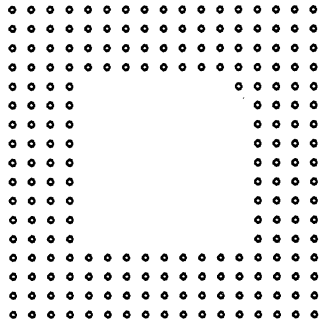
17 x 17 207 PINS
Pattern B



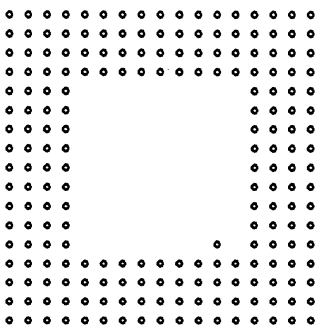
17 x 17 208 PINS
Pattern A



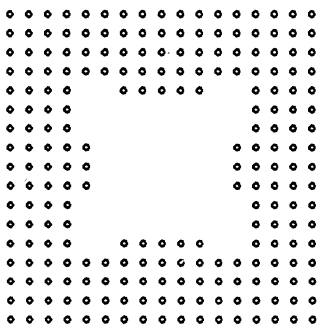
17 x 17 209 PINS
Pattern A



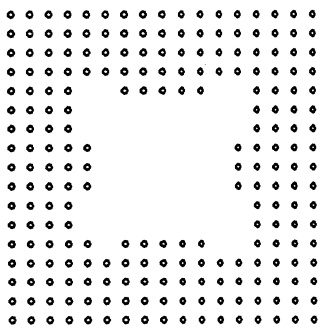
17 x 17 209 PINS
Pattern B



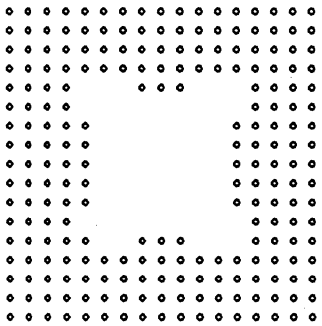
17 x 17 209 PINS
Pattern C



17 x 17 224 PINS
Pattern A



17 x 17 225 PINS
Pattern A



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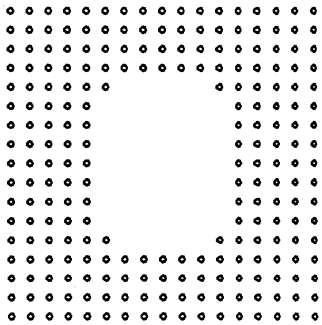
Pattern B



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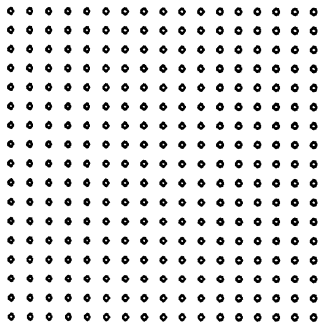
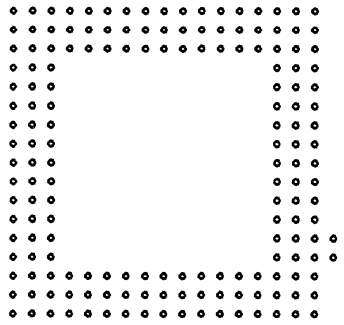
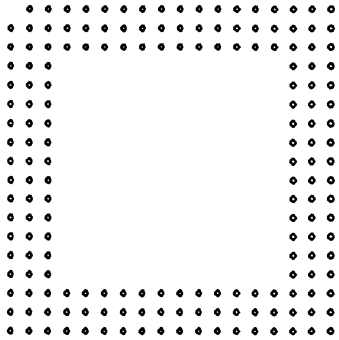


17 x 17 289 PINS
Pattern A

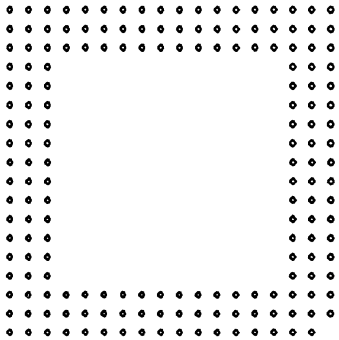
PIN GRID ARRAYS



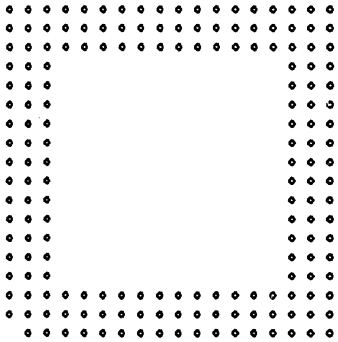
18 x 18 170 PINS
Pattern A



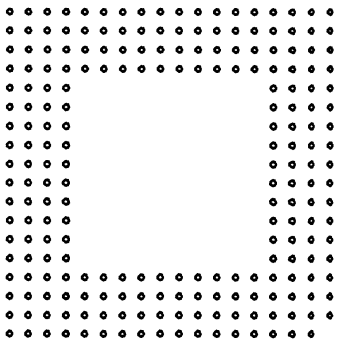
18 x 18 179 PINS
Pattern A



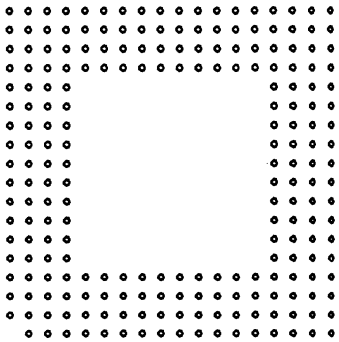
18 x 18 179 PINS
Pattern B



18 x 18 179 PINS
Pattern C



18 x 18 223 PINS
Pattern A



18 x 18 223 PINS
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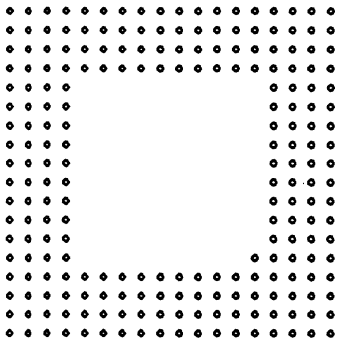
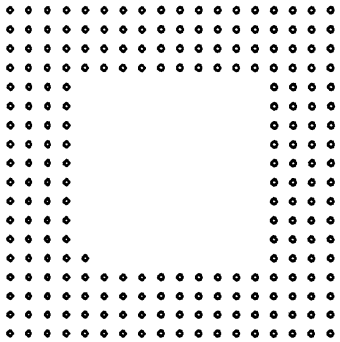


18 x 18 225 PINS
Pattern A



18 x 18 225 PINS
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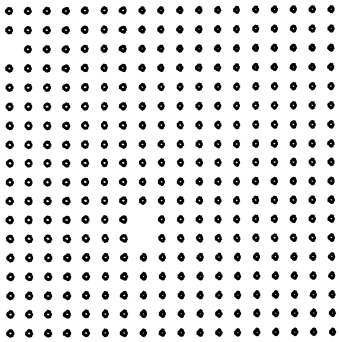
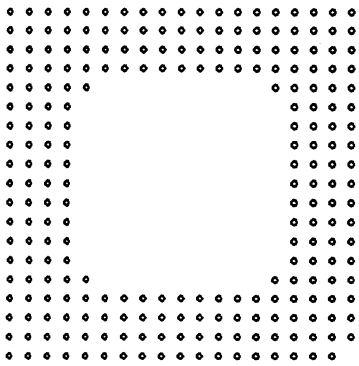


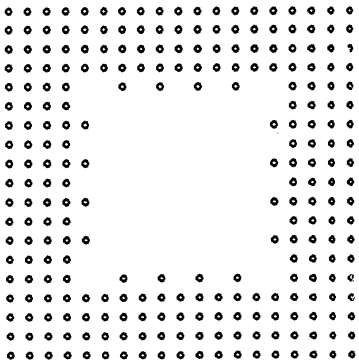
18 x 18 324 PINS
Pattern A

F

PIN GRID ARRAYS



19 x 19 243 PINS
Pattern A



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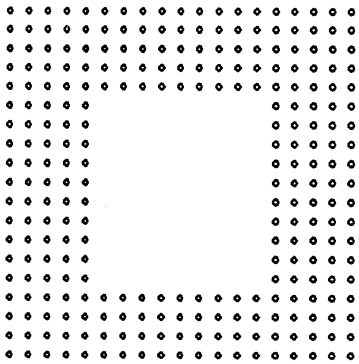
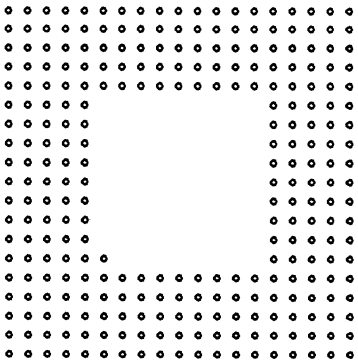
Pattern A



19 x 19 271 PINS
Pattern A



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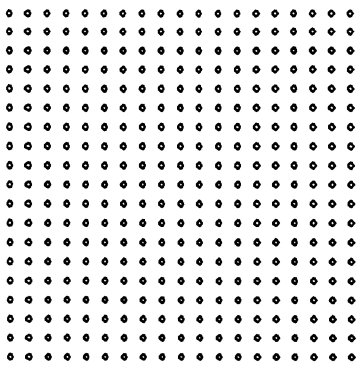
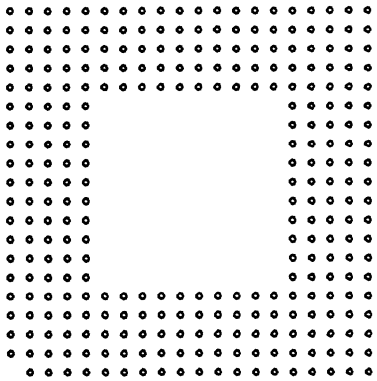
Pattern A

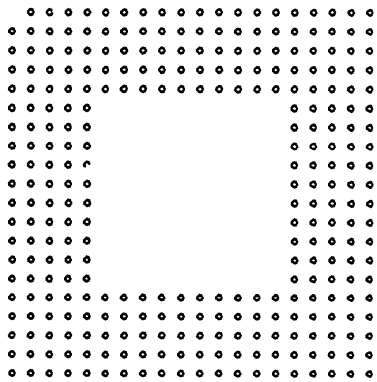


19 x 19 361 PINS
Pattern A

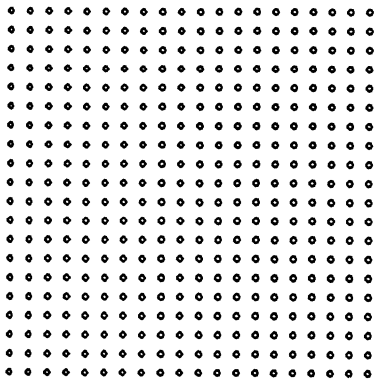
PIN GRID ARRAYS



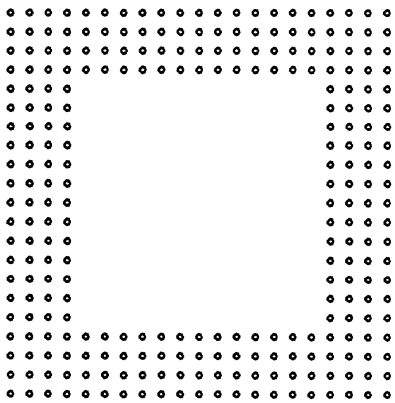
20 x 20 299 PINS
Pattern A



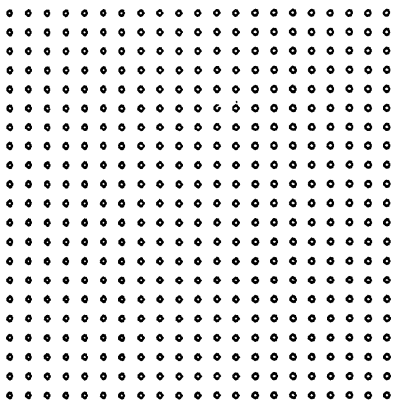
20 x 20 299 PINS
Pattern B



20 x 20 400 PINS
Pattern A



21 x 21 272 PINS
Pattern A



21 x 21 441 PINS
Pattern A

F

Fiber Optic Connectors

TABLE OF CONTENTS

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INTRODUCTION

Typical Applications

With all the preceding benefits, these are some initial applications for fiber optic transmission:

Data Communications

Telecommunications

- Local Area Networks
- Telephone Trunking

Video Transmission

- Closed Circuit Television
- Cable Television
- Electronic News Gathering

Military

- Command Control and Communications (C^3)
- Tactical Field Communication Systems

Basic Fiber Optics Theory

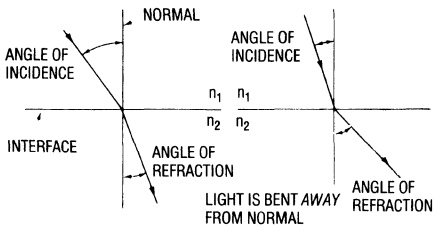
To understand in its simplest terms how light can be transmitted along a thin optical fiber, it is only necessary to know a few physical properties related to refraction and reflection. The index of refraction, called n, is the ratio of the speed of light in a vacuum to its speed in a given medium:

$$n = \frac{\text{speed of light in a vacuum}}{\text{speed of light in a medium}}$$

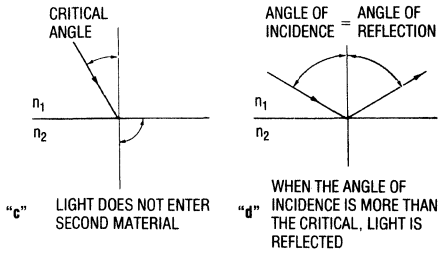
Typical values of the index of refraction for common materials are:

n = 1 for air
n = 1.33 for water
n = 1.5 for glass

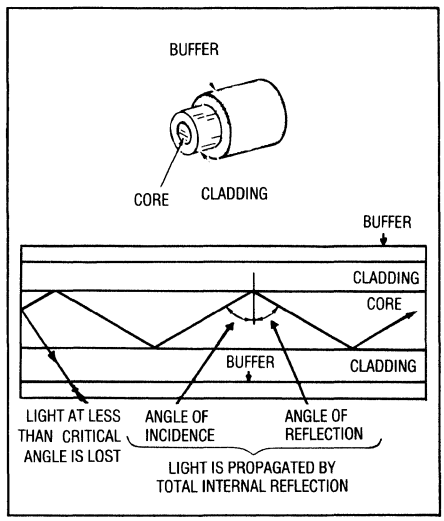
If a ray of light traveling in one medium enters a second medium it will be bent in a manner proportional to the individual indexes of refraction.



Looking at the case where n_1 is greater than n_2, "b" above, if we increase the angle of incidence the angle of refraction will approach 90°. At the point where the angle of refraction reaches 90°, the angle of incidence becomes known as the critical angle. At any angle of incidence greater than this critical angle, all the light will be reflected and none will enter the second medium.



It is this property of total reflection that exists when the angle of incidence exceeds the critical angle, "d" above, that is the key to optical fiber transmission. By constructing a fiber that consists of two media, a core and a cladding, and providing the core with an index of refraction greater than that of the cladding, rays of light will propagate down the fiber by bouncing off the barrier between core and cladding and none will escape from the core.



Service and Support

Recognizing the vast mechanical and electrical considerations involved in the selection of appropriate fiber optic components, we maintain a staff of trained field salespeople and customer service representatives. They can help you select cost-effective, quality interconnection components without compromising system performance integrity.

To maximize product availability, we maintain and support a national service network of authorized distributors. They not only stock in-depth, they are also prepared to provide "value-added" services, including custom interconnection assemblies to your specifications.

SYSTEM HIGHLIGHTS

Fiber Optic System Highlights

With the emergence, acceptance and growing application of fiber optic technology, new interconnection requirements have arisen. The reliable termination of both plastic and glass fibers to interface optics and electronics represent a new technical challenge.

Thomas & Betts has applied their design and manufacturing capabilities to the development of an innovative, reliable family of quality fiber optic interconnection products. Each has been engineered to permit fast, simple termination at a lower installed cost.

Thomas & Betts' fiber optic connectors and interface products are available in both simplified polish or cleavable termination versions. Products for glass fiber can be terminated by a proprietary, one-step cleaving tool. This hand-held tool permits error-free field installation of glass fiber connectors.

For high-precision applications,our Pre-Cap™ Series Connectors combine the rugged construction advantages of a durable composite polymer alloy with the precision tolerance of a glass capillary.

Innovative Fiber Optic Products

The current family of Thomas & Betts fiber optic products includes active connectors, electronic-to-optic interfaces and fiber preparation tooling. Products for plastic fiber include:

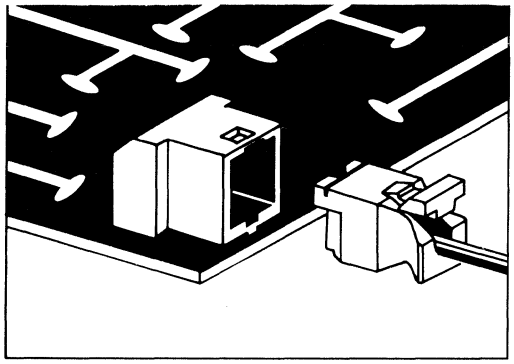
- Fiber Optic PCB Data Link...combines Thomas & Betts' self-termination technology with an integral opto device package to achieve a high-performance, cost effective data link (also available in HP compatible versions).
- Active Duplex Fiber Optic Connector...this package offers an integral emitter-detector opto device in a standard electronic subminiature "D" compatible configuration.
- Fiber Splice Kit—permits in-field splicing of simplex or duplex plastic fiber without special fiber preparation tooling.
- Plastic Fiber Bulkhead Connector...permits field installation of inter-cabinet or through-panel connectors.

Products for Glass Fiber:

- Pre-Cap™ ST* Connector...connector is easily mounted via a polarized and spring-loaded, quarter-turn bayonet lock.
- Pre-Cap™ SMA Connector...suitable for high performance, simplified polishing multimode fiber applications. It is intermateable with SMA connectors designed to EIA-475-01 Standards.
- Cleavable SMA Connector...first in the industry to meet user demands for reliable, field-termination of glass cable to EIA and MIL Standards.

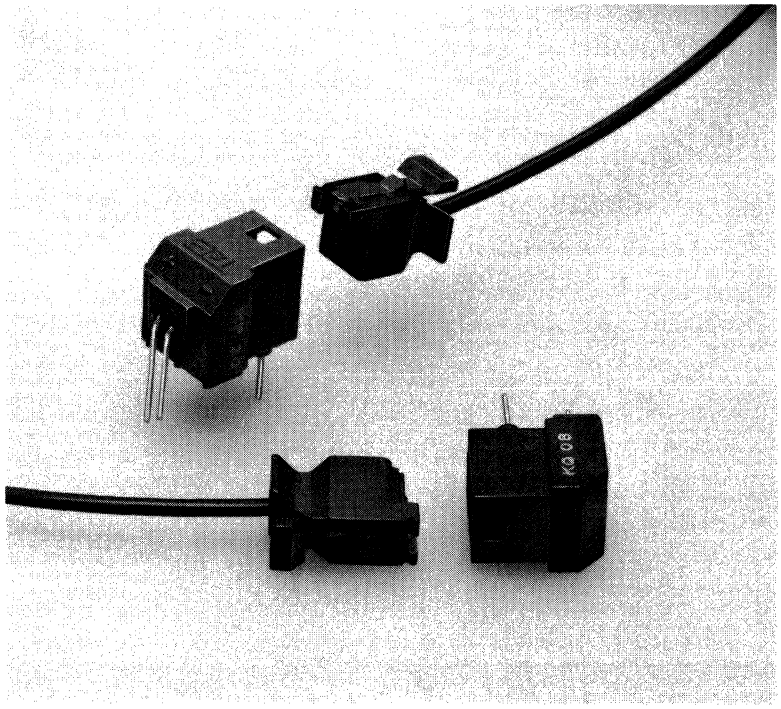
These products represent Thomas & Betts' innovative designs in a growing family of fiber optic interconnection devices. Each will be aimed at providing the user with simple and reliable, field installability.

With the growing application of fiber optic technology, Thomas & Betts continues to explore new interconnection alternatives. We invite your inquiry and look forward to helping you achieve a reliable, cost-effective system design.



FIBER OPTIC PCB DATA LINK

Self-terminating optical-electronic interface



Description/Application

Thomas & Betts Optic PCB Data Link combines the benefits of fiber optic signaling with the convenience of plug-in PCB electrical termination. It is designed to permit fast, reliable self-termination of single channel plastic optical fiber... without the need for special tools, adhesives, or polishing.

The Data Link consists of a PCB-mounted receptacle with an integral emitter or detector optodevice; and a mating, self-terminating cable connector plug featuring a quick-release tab. The receptacle is wave solderable and color-coded for easy transmitter and receiver identification. It mates with the polarized cable connector plug with positive detents to achieve a high performance, cost-effective link.

Thomas & Betts PCB data link is ideal where EMI/RFI immunity, ground loop isolation, extended distance needs, and spark-free data transmission are required.

Design Considerations

- Compatible with 1mm diameter, simplex plastic optical fiber with an OD of 2.25mm
- Terminates fiber optic cable in seconds without tools, adhesives, or polishing
- Suitable for terminating data transmission links at signal rates of 3Mb/s (NRZ)
- Opto-electrical interface includes a TTL compatible receiver and LED driver
- Polarized connector plug provides positive, snap retention with quick-release tab
- Optional color-coded (red) cable connector plug permits easy identification of transmission or receiver end of cable assembly

INTERFACE	PC BOARD
FIBER TYPE	1mm PLASTIC SIMPLEX
CABLE TYPE	POLYETHYLENE JACKET
DATA RATE	3Mb/sec
OPERATING TEMPERATURE	0°C to 70°C

Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

PCB-Mounted Receptacle

92915 – T – DD

Receptacle Function (Color)
T-DD – Transmitter (Red)
R-HS-4 – Receiver (Black)

Self-Terminating Cable-Connector Plug

92910 – R

With red fiber clamp (For black fiber clamp, leave blank).

Plastic Polyethylene-Jacketed Simplex Fiber

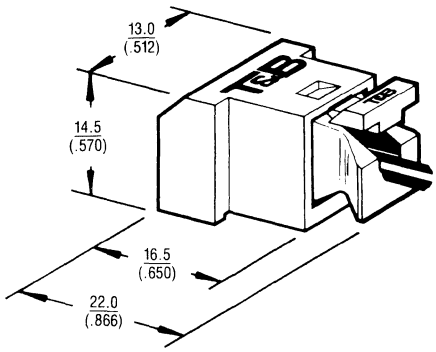
93902 – 100

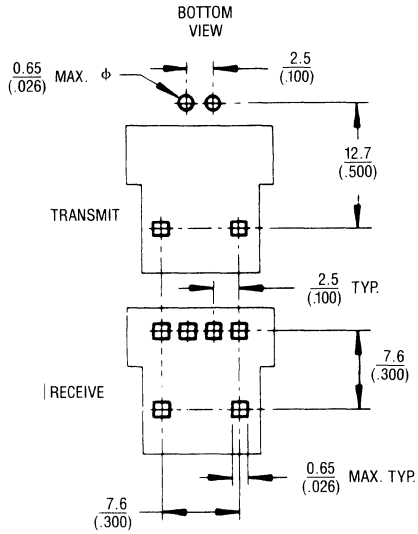
Length of Roll
100 *– 100 Feet*
500 *– 500 Feet*

92910KT
Designer Kit
Contains transmitter, receiver, 2 connector plugs, 10 feet of cable, application notes and data sheet.

FIBER OPTIC PCB DATA LINK SPECIFICATIONS

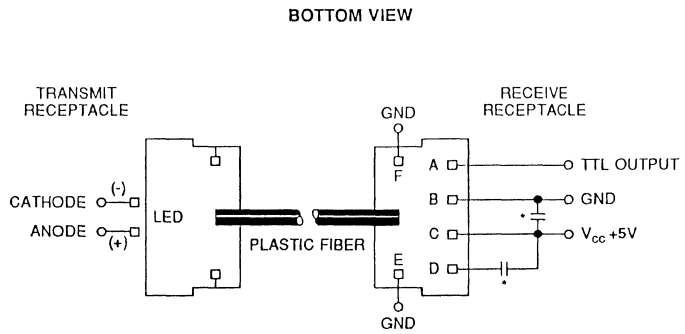
Dimensional Specifications





DIMENSIONS ARE SHOWN IN mm/(inches)

Pin Assignment

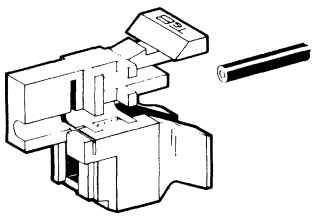


NOTE: * CONNECT a0.1μF BY-PASS CAPACITOR (VOLTAGE RATING 25V OR MORE).

Proper operation of this product requires observance of certain design considerations. Refer to T&B publication No. OPD-AN100. "Performance specification and application notes."

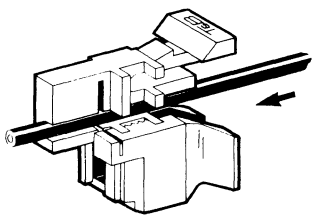
Installation Procedure

1.



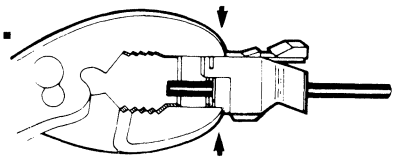
The connector plug is packaged ready to use. No fiber preparation is necessary.

2.



Insert the fiber in the connector as shown. The fiber should protrude through the housing by a minimum of 1 cm.

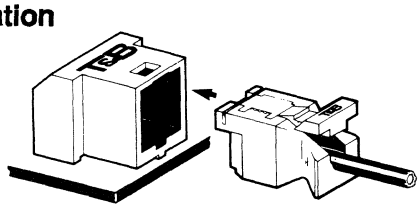
3.



Using pliers as shown, press down on the fiber clamp until it is fully bottomed in the housing. The termination is then complete. Discard unused fiber.

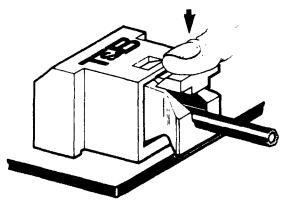
Easy Operation

1.



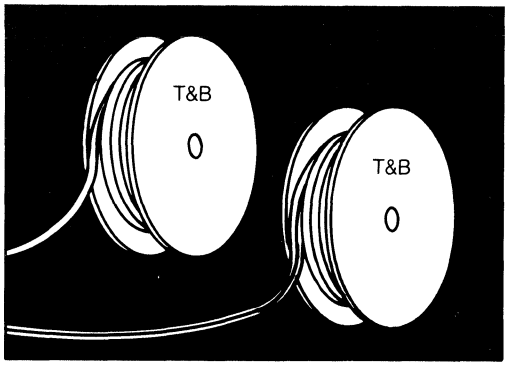
Insert the polarized positive-snap retention plug into the color-coded receptacle.

2.



To remove, depress the quick-release tab and slide the plug out of the receptacle.

G



PLASTIC FIBER OPTIC CABLE

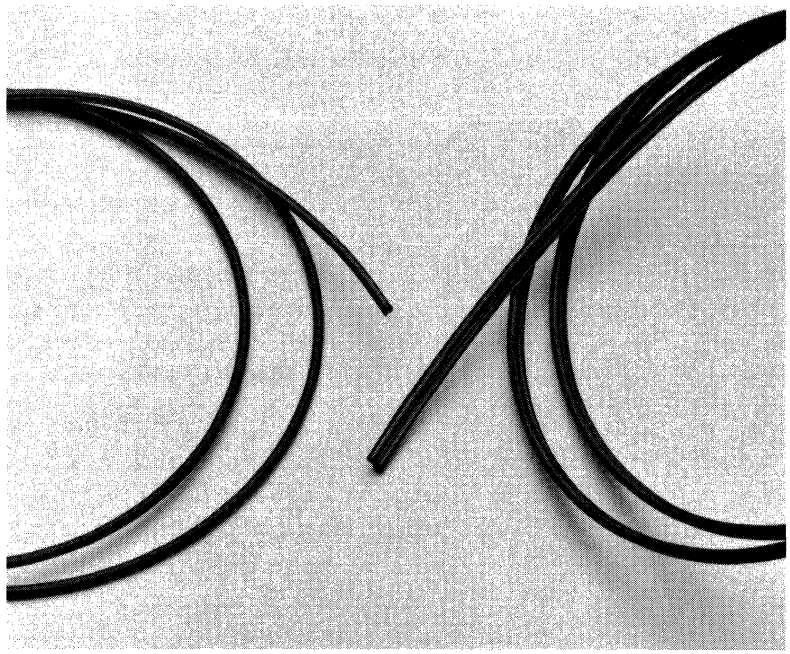
Description/Application

Thomas & Betts Plastic Fiber Optic Cable consists of a PMMA core, polymer clad with a durable black polyethylene jacket. It is available in 100 and 500 foot lengths in both simplex and duplex zipcord styles.* The cable is compatible with a complete line of Thomas & Betts connector products which include: the Thomas & Betts PCB Data Link System, Active duplex Connector, Bulkhead Connector, RS-232-C Modem and Splice Kit.

Design Considerations

- Low-profile, lightweight
- Perfect for sub 130 meter applications
- No polishing
- Compatible with Thomas & Betts self-termination technology
- Low bend radius (approximately 1-inch)
- High strain relief
- Wide temperature range (−35°C to +80°C)
- Low-cost.
- No installation tooling necessary
- 1mm plastic fiber

Low-profile, lightweight, plastic fiber optic cable



Standard Product Options

The information below provides a general overview of the product family. Standard catalog number options can be constructed below.

Simplex Optical Cable

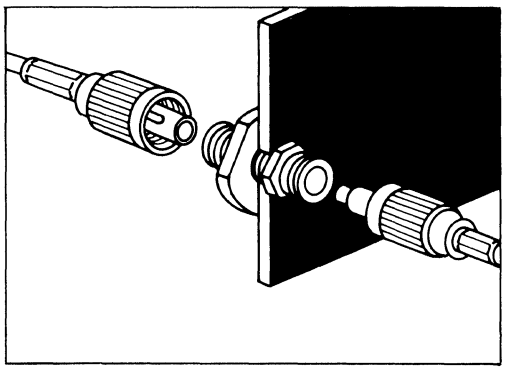
93902 – 100

Length of Roll
100—*100 Feet*
500—*500 Feet*

Duplex Optical Cable

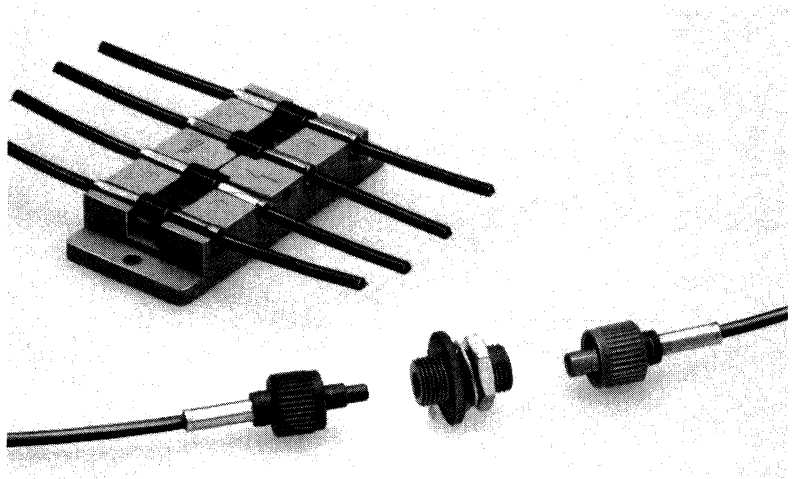
93802 – 100

Length of Roll
100—*100 Feet*
500—*500 Feet*



PLASTIC FIBER BULKHEAD CONNECTOR & SPLICE KIT

Field-installable plastic fiber connectors



Description/Application

Thomas & Betts Bulkhead Connector and Splice Kit permit field termination of plastic fiber optic cable.

The splice kit is ideal for emergency restoration or junction termination, without need of heat guns, epoxies, or polishing. It includes components for up to 4 splices, and features a cable cutting fixture which ensures proper fiber length. This fixture also serves as a screw-mountable terminal block when required.

The bulkhead connector provides a rugged means for terminating plastic fiber cable to a panel where intra-cabinet of thru-panel connections are required. It features a bulkhead mounted coupler with color-coded and polarized male/female knurled, thread-on connectors.

Connector-to-cable termination is via a simple installation procedure using the termination kits and a standard crimp tool.

Design Considerations

- Designed for 1mm diameter plastic fiber cable
- Insertion loss: less than 1dB for the splice kit; less than 3dB for the bulkhead connector assembly (1dB option available)
- 12 lbs. minimum cable retention-tensile strength
- Operating temperature: 0° to 70°

Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

Plastic Fiber Bulkhead Connector

92700 – C2 – F

Female Cable-Connector for 2.25mm O.D. Plastic Fiber

92700 – C2 – M

Male Cable-Connector for 2.25mm O.D. Plastic Fiber

92700TK

Termination Kit for Installation of Connector

92740

Coupler with Mounting Hardware

93800SK

Splice Kit Includes
4 splices
1 cutting fixture
10 cutting blades, and
1 vial of index matching gel

92299KT

Crimp Tool with 00 Die

NOTE: Use crimp tool frame catalog number 92299KT with hex die.

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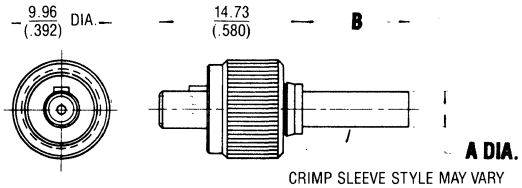
FIBER OPTIC BULKHEAD CONNECTOR SPECIFICATIONS

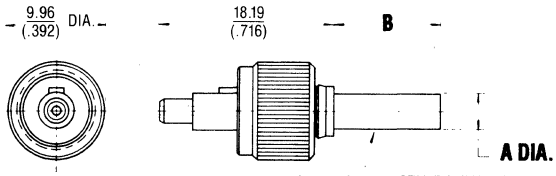
Female Connector



CRIMP SLEEVE STYLE MAY VARY DEPENDING ON CABLE USED.

CAT. NO.	DIMENSIONS	
	A	B
92700-C2-F	3.7 (.144)	11.4 (.450)

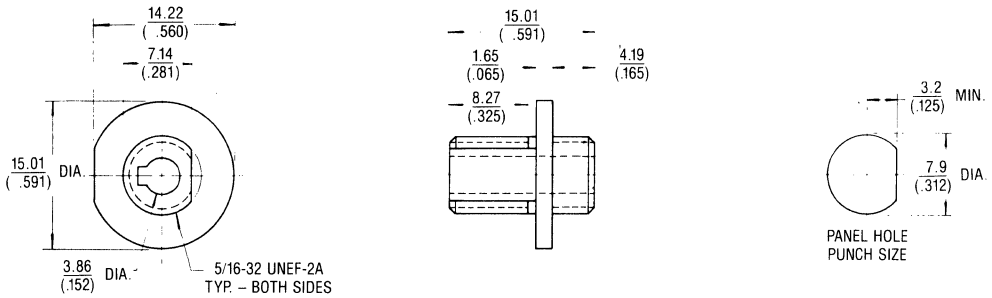
Male Connector



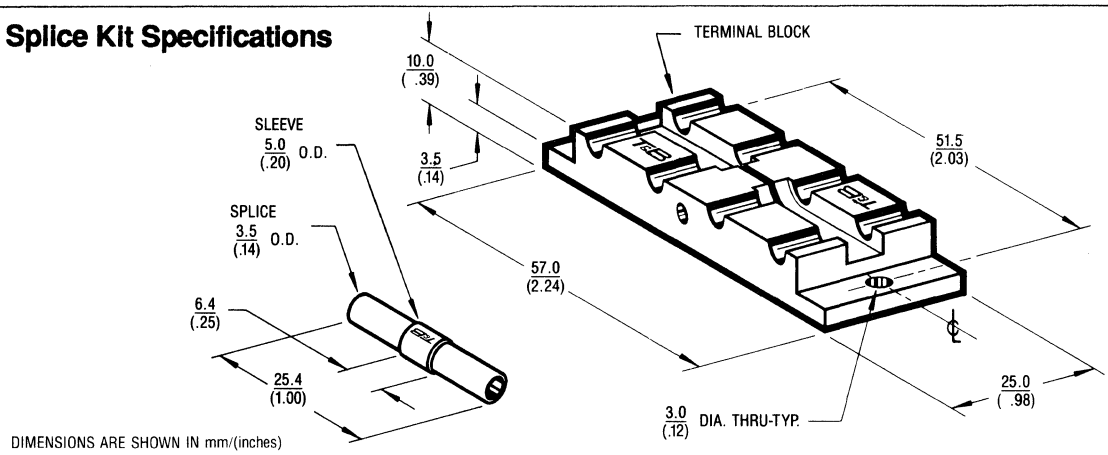
CRIMP SLEEVE STYLE MAY VARY DEPENDING ON CABLE USED.

CAT. NO.	DIMENSIONS	
	A	B
92700-C2-M	3.7 (.144)	11.1 (.450)

Coupler



Fiber Optic Splice Kit Specifications



DIMENSIONS ARE SHOWN IN mm/(inches)

Installation Procedure

1. Prepare cable ends to be spliced as shown in Fig. 1.

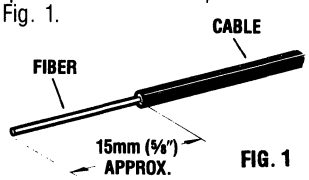


FIG. 1

2. Insert fiber into cutting fixture/terminal block as shown in Fig. 2. Cut fiber using razor blade supplied, Fig. 3.

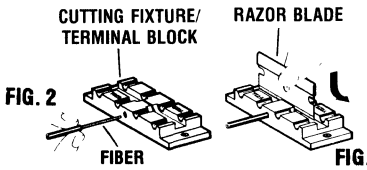


FIG. 2 FIG. 3

3. Dip the cut fiber ends into the silicone index matching gel supplied, Fig. 4.

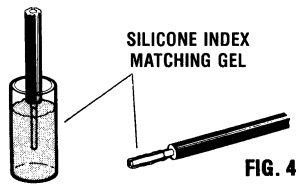


FIG. 4

4. Slide protective shield onto the cable and insert fiber into the splice tube, Fig. 5.

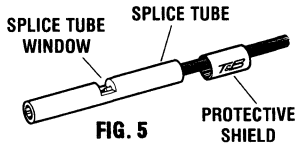


FIG. 5

5. Crimp the splice tube. Fill the window with index matching gel and insert the other fiber into the splice tube, Fig. 6. Ensure that fiber ends are in contact.

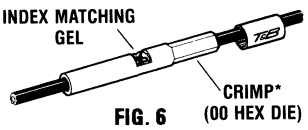


FIG. 6

6. Crimp remaining splice tube end and slide the protective shield over the window. The splice is now ready for use, Fig. 7.

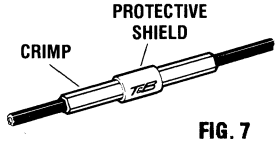
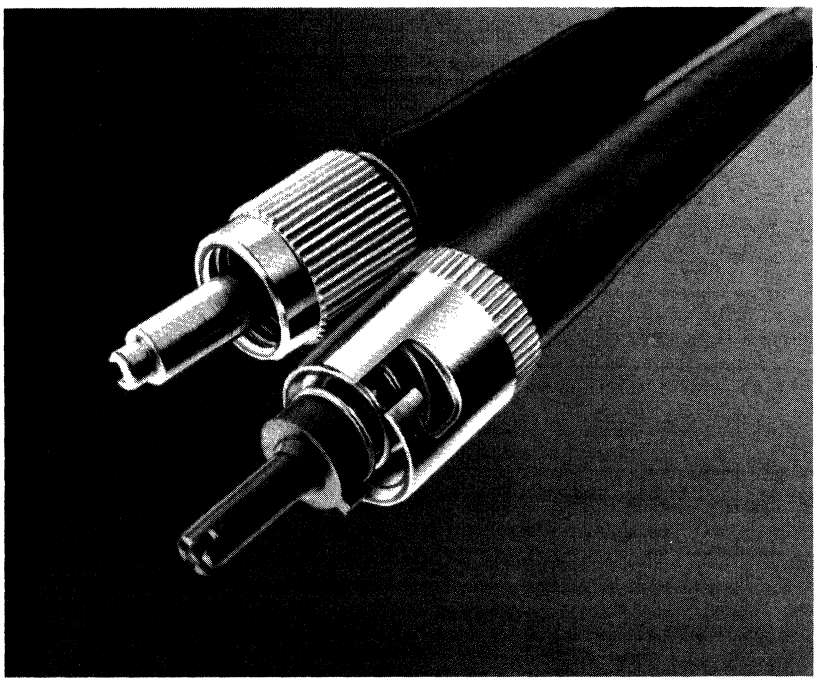


FIG. 7

PRE-CAP™ SERIES INTRODUCTION



Pre-Cap™ Series Connectors for Glass Optical Fiber SMA-ST*

The Pre-Cap™ Series Connectors for Glass Optical Fiber consists of a complete line of common fiber optic connector designs including: SMA, and ST* types.

Combining the rugged construction advantages of a durable composite polymer alloy with the precision tolerance of a glass capillary, the Pre-Cap™ Series provides both performance and durability for multimode fiber applications.

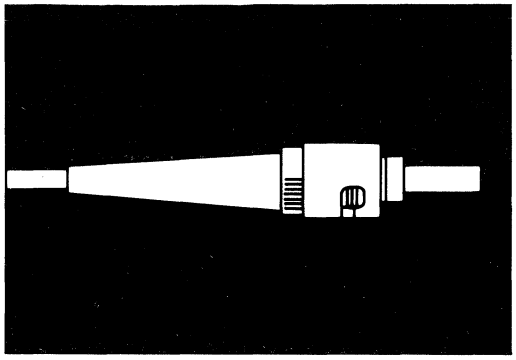
High performance is achieved via a precision manufactured (1 micron tolerance) 10mm long glass capillary which provides superior alignment while matching the thermal stability of the glass fiber.

Offered in a simplified crimp and polish termination procedure, the Pre-Cap™ Series accommodates 125μm and 140μm multimode fibers and can be terminated on all styles of optical fiber cables available from the major cable manufacturers.

The polishable Pre-Cap™ Series provides a reduced contact area which increases connector performance. Also, the polished connector provides a smooth, flat nonconcave fiber end surface since the fiber and capillary are uniformly polished as one glass surface. This means higher connector yield by giving installers the ability to eliminate fiber surface imperfections while reducing polishing time and allowing the use of automated polishing equipment.

The Pre-Cap™ Connector Series includes connectors, couplers, factory assembled cables and all the tooling necessary to meet today's fiber optic interconnection requirements.

*Trademark of AT&T Technologies.



PRE-CAP™ SERIES ST* COMPATIBLE CONNECTOR FOR GLASS OPTICAL FIBER

Description/Application

The Pre-Cap™ Series ST* compatible connector combines the rugged construction advantages of a durable composite polymer alloy with the precision manufacturing tolerance of a glass capillary for high-performance and durability in multimode fiber applications. Available in a simplified crimp and polish termination, this connector provides superior performance in a quick-connect, small space-saving package.

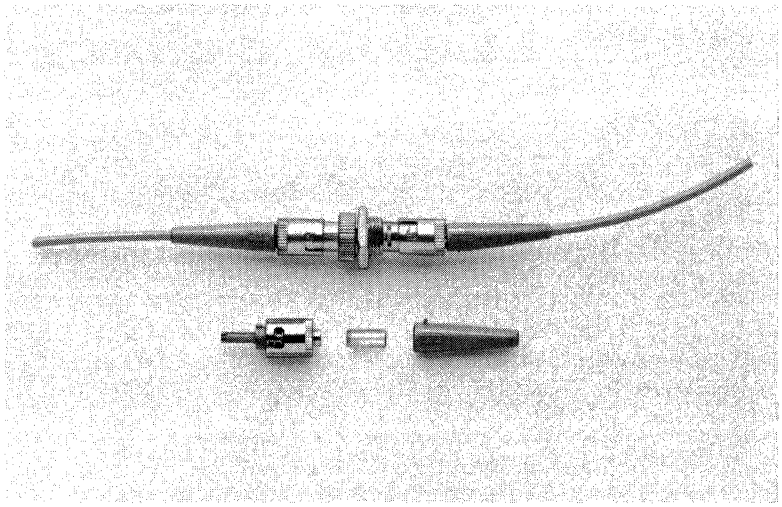
The connector is easily mounted via a polarized and spring-loaded quarter-turn bayonet lock. The lock ensures positive connector contact. It is highly-suitable for manual or automated polishing, and the precision micron tolerance glass capillary increases installer yield, allowing the uniform polishing of glass capillary and fiber.

Design Considerations

- Mean insertion loss 0.12dB (62.5/125μm)
- Rugged composite polymer alloy construction
- Precision glass capillary
- Low installer dependence increases yield
- Spring-loaded bayonet for secure connections
- Active and passive couplers
- Easily field serviceable and maintainable
- Thermally matched fiber and glass capillary
- Suitable for automated polishing
- No heat cured epoxy required

*Trademark of AT&T Technologies.

Yields a truly high-performance, cost-effective connection



Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

ST* Connector

91810 – 125 – 1P

For Glass Fiber O.D. Size
125 *– 125 microns*
140 *– 140 microns*

1P *– 3mm Jacket O.D.*
2P *– 2.5mm Jacket O.D.*

Passive Coupler
91840

Active Coupler
91850

Assembly Kit
91000AKP

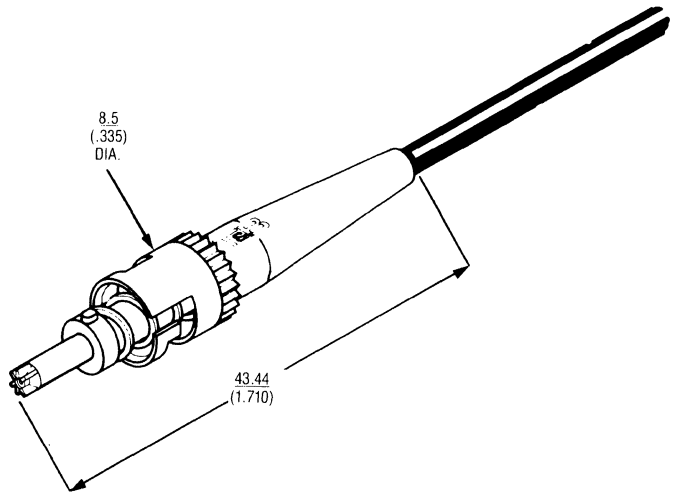
Glass Fiber

936 10 – 125

Type – Size Fiber
10-125 *– 50/125 micron Simplex*
12-125 *– 50/125 micron Duplex*
10-140 *– 100/140 micron Simplex*
12-140 *– 100/140 micron Duplex*
10-625 *– 62.5/125 micron Simplex*
12-625 *– 62.5/125 micron Duplex*

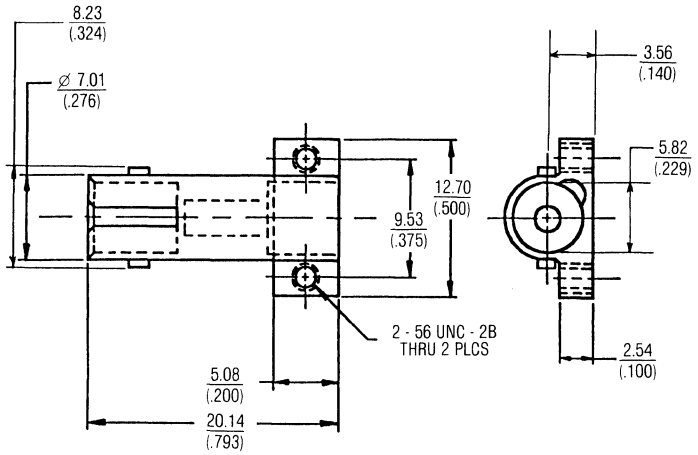
ST* FIBER OPTIC CONNECTOR SPECIFICATIONS

ST* Connector



*Trademark of AT&T Technologies.

91850 Active Coupler



DIMENSIONS ARE SHOWN IN mm/(inches)

91810 Series Performance Specifications

	91810-125-XP*	91810-140-XP*
INSERTION LOSS $\bar{x}, \sigma$	0.12dB, 0.05dB	0.06dB, 0.03dB
FIBER CORE/CLAD	62.5/125um	100/140um
DURABILITY MATE/REMATE (500 CYCLES)	<0.1dB	<0.1dB
INSERTION LOSS CHANGE OVER OPERATING TEMPERATURE RANGE** (−20°C to +60°C)	<0.1dB	<0.1dB
TENSILE LOAD*** (USING AT&T OR SIECOR STANDARD DUTY CABLE)	35 lbs. min.	35 lbs. min.
BACK REFLECTION	−21dB min.	−21dB min.

PERFORMANCE NOTES:
*See standard product options on previous page for connector/cable jacket compatibility.
**Operating temperature range is cable dependent.
***Tensile load is cable dependent.

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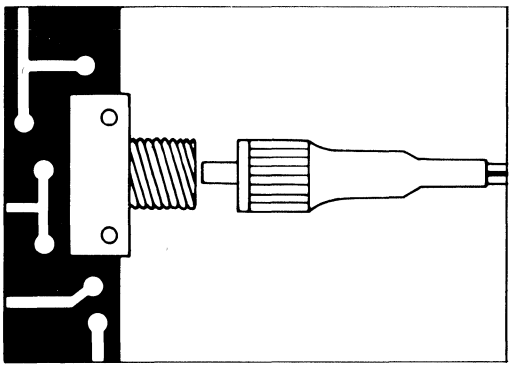


PRE-CAP™ SERIES SMA-COMPATIBLE CONNECTOR FOR GLASS OPTICAL FIBER

Description/Application

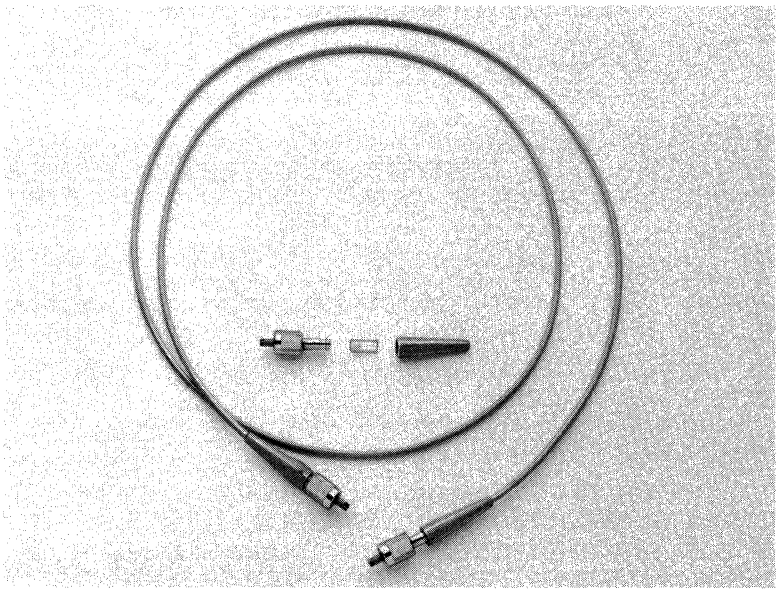
The Pre-Cap™ Series SMA-compatible connector combines the rugged construction advantages of a durable composite polymer alloy with the precision manufacturing tolerance of a glass capillary. It is suitable for high performance simplified polishing of multimode fiber and is intermateable with SMA connectors designed to EIA-475-01 standards.

No heat curing of epoxies are required. It incorporates a knurled nut for easy thread-on connection, and thermally-matched glass capillary and fiber. The uniform surface of the capillary and fiber increases installer yield, and is suitable for both manual and automated polishing.

Design Considerations

- Mean insertion loss 0.7dB (62.5/125μm)
- Intermateable with EIA 475-01
- Precision glass capillary
- Rugged composite polymer alloy construction
- Easy thread-on knurled mounting nut
- Active and passive couplers
- Low installer dependence increases yield
- Easily field serviceable and maintainable
- Thermally matched fiber and glass capillary
- Suitable for automated polishing
- Compatible with SMA Style 905

Provides a high performance SMA compatible connection for glass optical fiber



Standard Product Options

The information provides a general overview of this product family. For complete ordering information, please consult specification page.

SMA Connector

91710 – 125 – 1P

For Glass Fiber O.D. Size
125 *– 125 microns*
140 *– 140 microns*

1P *– 3mm Jacket O.D.*
2P *– 2.5mm Jacket O.D.*

Passive Coupler
91740

Active Coupler
91750

Assembly Kit
91000AKP

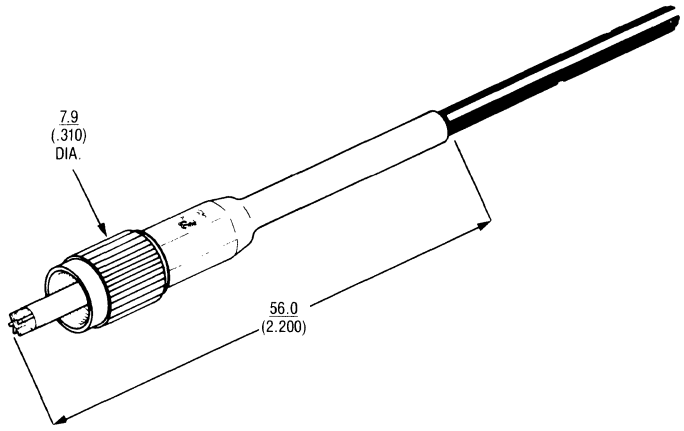
Glass Fiber

936 10 – 125

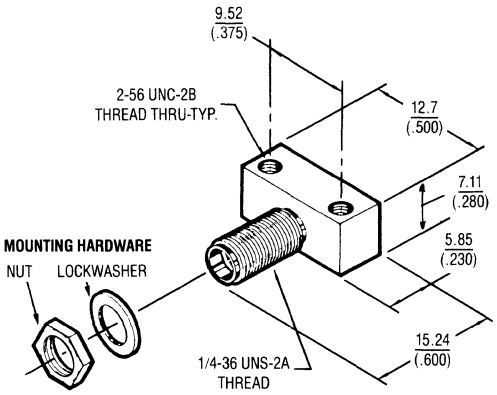
Type – Size Fiber
10-125 *– 50/125 micron Simplex*
12-125 *– 50/125 micron Duplex*
10-140 *– 100/140 micron Simplex*
12-140 *– 100/140 micron Duplex*
10-625 *– 62.5/125 micron Simplex*
12-625 *– 62.5/125 micron Duplex*

SMA-COMPATIBLE CONNECTOR FOR GLASS OPTICAL FIBER SPECIFICATIONS

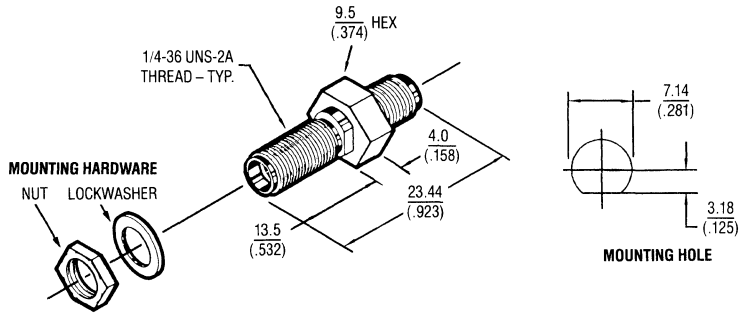
SMA Connector



SMA Active Coupler



SMA Passive Coupler



DIMENSIONS ARE SHOWN IN mm/(inches)

91710 Series Performance Specifications

	91710-125-XP*	91710-140-XP*
INSERTION LOSS $\bar{x}$, σ	0.7dB, .05dB	0.4dB, .05dB
FIBER CORE/CLAD	62.5/125μm	100/140μm
DURABILITY MATE/REMATE (500 CYCLES)	<0.1dB	<0.1dB
INSERTION LOSS CHANGE OVER OPERATING TEMPERATURE RANGE** (−20°C TO +60°C)	<0.1dB	<0.1dB
TENSILE LOAD*** (USING AT&T OR SIECOR STANDARD DUTY CABLE)	35 lbs. min.	35 lbs. min.

PERFORMANCE NOTES:
*See standard product description options on previous page for connector/cable jacket compatibility.
**Operating temperature range is cable dependent.
***Tensile load-cable dependent.

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PRE-CAP™ FIBER OPTIC CONNECTOR ST*CONNECTOR COMPATIBLE FOR CABLED OPTICAL GLASS FIBER

INSTALLATION PROCEDURE—FLAT POLISHED
NOTE: READ ENTIRE PROCEDURE CAREFULLY BEFORE BEGINNING INSTALLATION.

A. CABLE PREPARATION

1. Slide strain relief boot and crimp sleeve on cable prior to cable preparation. Prepare cable as shown in Figure 1 following cable manufacturer's recommendations.
   NOTE: Be sure that all buffer residue has been removed. Use isopropyl alcohol or other cleaning agent recommended by the cable manufacturer and lint free tissue.

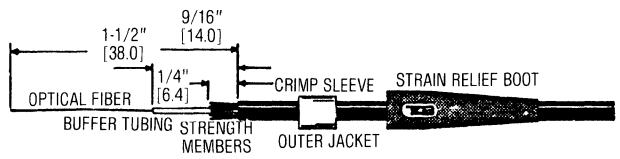


FIGURE 1
CABLE PREPARATION

B. CONNECTOR INSTALLATION

1. Remove protective cup from the connector ferrule tip prior to installation. Make sure the hole in the ferrule is clear. Use exposed fiber to probe through.
2. For quick termination use "HARDMAN 5 MIN." epoxy Cat. No. 91700HE. Mix small amount of epoxy in accordance with the manufacturer's recommendations. Apply as shown in Figure 2.

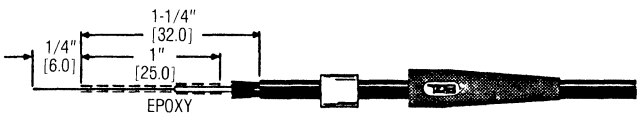


FIGURE 2
EPOXY APPLICATION

91810 SERIES
U.S. PAT. NO. 4,815,809

3. Gently slide fiber into connector body using rotary motion until outer jacket of the cable bottoms out against knurled flange of the connector. To insure that fiber has not been broken, pull the fiber back and push it again watching for movement of the protruded portion of the fiber. While holding connector body and cable, slide crimp sleeve over the trimmed strength members and knurled part of the connector body, until it stops. See Figure 3.

FIGURE 3
CONNECTOR TERMINATION

4. Using Thomas & Betts crimp tool Cat. No. 92299KT (03 die), crimp as shown in Figure 4.

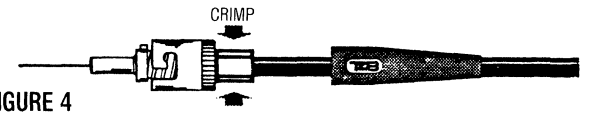


FIGURE 4
CRIMPING

5. Slide strain relief boot toward the connector, apply small amount of epoxy into large end of the boot and on the cable outer jacket. Using rotary motion slide boot onto connector until it stops, see Figure 5.
   NOTE: Be sure that the epoxy doesn't migrate on the connector nut. Allow epoxy to cure for minimum of ten minutes. Periodically check remaining amount for hardness. For high volume termination consult factory for proper epoxy selection.

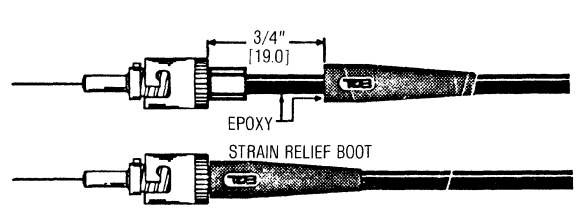
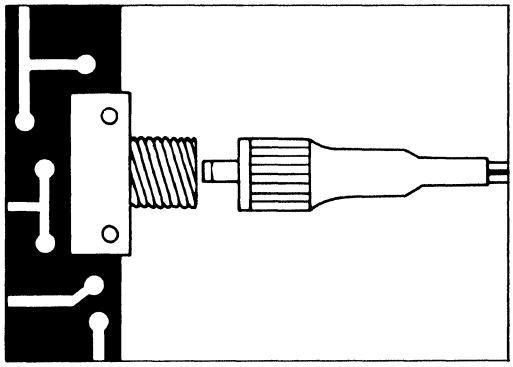


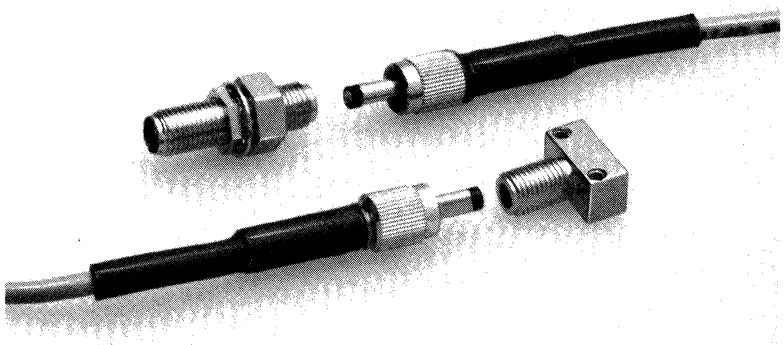
FIGURE 5
STRAIN RELIEF BOOT INSTALLATION

TEST RESULTS OF PRE-CAP CONNECTOR			
Parameter	**Test method**	**No. of samples**	**Results**
Insertion loss	FOTP 171 Method A 62.5/125 ± 3μm	252	0.16 dB average
Back reflection loss	FOTP 107	10 samples	−27 dB min.
Thermal shock	FOTP 3 −40 to +70°C, 10 cycles	5 mated pairs	less than 0.1 dB
Vibration	FOTP 11 10-500 Hz 3 axis 10 G peak	5 mated pairs	less than 0.1 dB
Durability	FOTP 21 500 cycles	10 samples	less than 0.05 dB
Temperature life	FOTP 4 +70°C 96 Hrs	5 mated pairs	less than 0.1 dB
Humidity	FOTP 5 Cond. A 40°C @ 95 % RH	5 mated pairs	less than 0.1 dB
Impact	FOTP 2 modified 8' H. x 10 concr. floor	10 samples	less than 0.05 dB
Shock	FOTP 14 Cond. I 30 Gs sawtooth 3 axis	5 mated pairs	less than 0.05 dB
Flex	FOTP 1 90° arc, 300 cycles, 2.5 kg	5 mated pairs	less than 0.1 dB
Retention	FOTP 6 15.3 KGf	10 samples	less than 0.1 dB



CLEAVABLE SMA FIBER OPTIC CONNECTOR SYSTEM

Stainless steel field-installable connector for glass fiber; pc board or thru-panel mounting



Description/Application

Thomas & Betts SMA Fiber Optic Connector System is the first in the industry to meet user demands for reliable, field-termination of glass cable to proposed EIA and MIL Standards.

The System consists of four components. They include the connector body (for cable termination), a passive coupler (for fiber-to-fiber splices and bulkhead applications), an active receptacle (for fiber-to-active device matings at the PCB or bulkhead); and an easy-to-use, one-step hand cleaving tool.

The cleaving tool reduces the time and skill associated with in-field installation while permitting fast, efficient, low-cost installation.

Design Considerations

- Accommodates cabled glass fibers of 125 and 140 microns O.D.
- Designed to the proposed EIA 475-01 and MIL-C-83522 standards
- Insertion loss: less than 1dB(100/140μm)
- Cable retention: 35 lbs. (15.6kg) using Siecor 144 structure
- Durability: change in attenuation after 100 mate-unmate cycles of less than 0.1dB
- Rugged stainless steel alloy construction features easy-grip, knurled connector bodies

INTERFACE	PC BOARD OR PANEL
FIBER TYPE	50/125 MICRON, 62.5/125 MICRON, 85/125 MICRON, 100/400 MICRON, SIMPLEX AND DUPLEX
CABLE TYPE	POLYURETHANE JACKET
DISTANCE	FIBER DEPENDENT
DATA RATE	DEVICE DEPENDENT
OPERATING TEMPERATURE	0°C to 70°C*

Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

SMA Connector

91700 – 125–1C *3mm jacket O.D.*

–2C *2.5mm jacket O.D.*

For Glass Fiber O.D. Size
125 – 125 microns
140 – 140 microns

Hand Cleaving Tool

92214

Passive Coupler

91740

Active Receptacle

91750

Glass Fiber

936 10 – 125

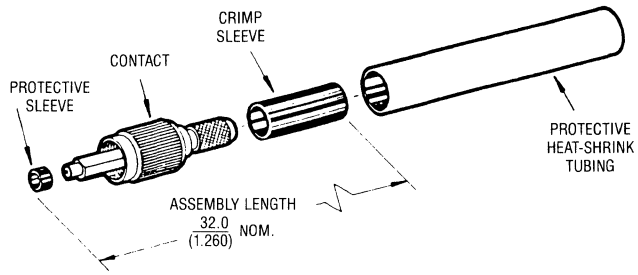
Type – Size Fiber
10-125 *– 50/125 micron Simplex*
12-125 *– 50/125 micron Duplex*
10-140 *– 100/140 micron Simplex*
12-140 *– 100/140 micron Duplex*
10-625 *– 62.5/125 micron Simplex*
12-625 *– 62.5/125 micron Duplex*

NOTES: Use crimp tool frame catalog number 92299KT with hex die.

G

SMA FIBER OPTIC CONNECTOR SPECIFICATIONS

SMA Connector

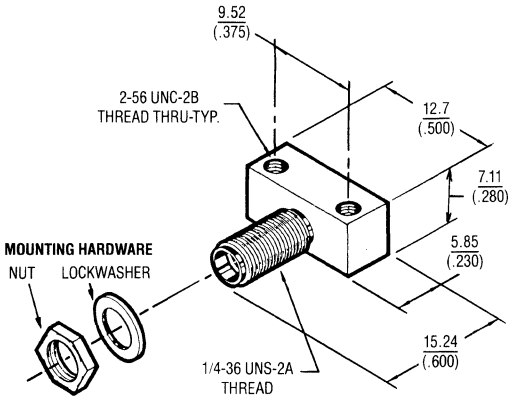


91700 Series Performance Specifications

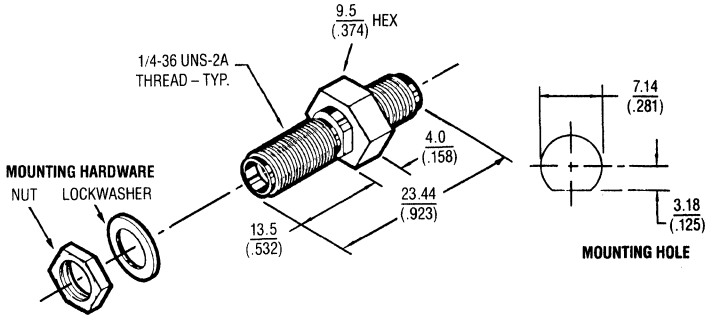
	91700-125-XC	91700-140-XC
INSERTION LOSS $\bar{x}$, σ	1.5dB, 1.2dB	.56dB, .10dB
FIBER CORE/CLAD	62.5/125μm	100/140μm
DURABILITY MATE/REMATE (500 CYCLES)	<0.1dB	<0.1dB
INSERTION LOSS CHANGE OVER OPERATING TEMPERATURE RANGE* (−20°C to +60°C)	<0.1dB	<0.1dB
TENSILE LOAD** USING AT&T OR SIECOR STANDARD DUTY CABLE	35 lbs. min.	35 lbs. min.

PERFORMANCE NOTES:
*Operating temperature range is cable dependent.
**Tensile load — cable dependent.

SMA Active Coupler



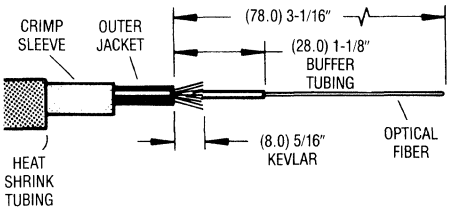
SMA Passive Coupler



DIMENSIONS ARE SHOWN IN mm/(inches)

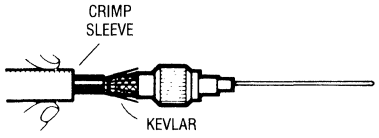
Installation Procedure

1.



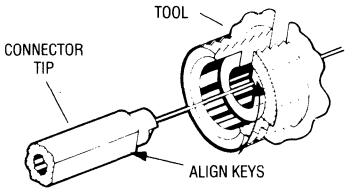
Prepare fiber.

2.



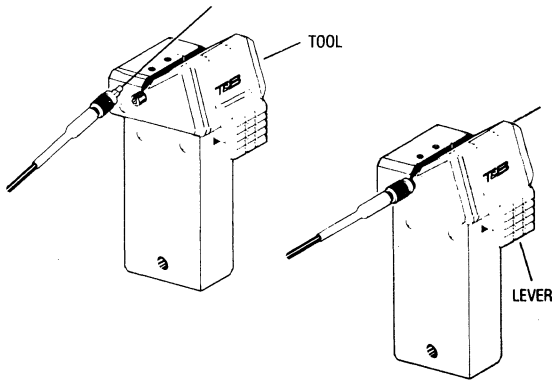
Fasten fiber into SMA connector and strain relieve cable.

3.



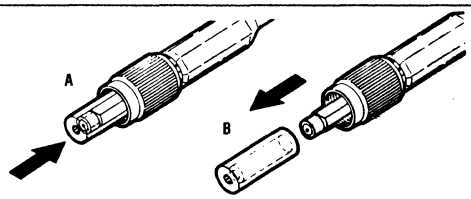
Insert connector into cleaving tool.

4.

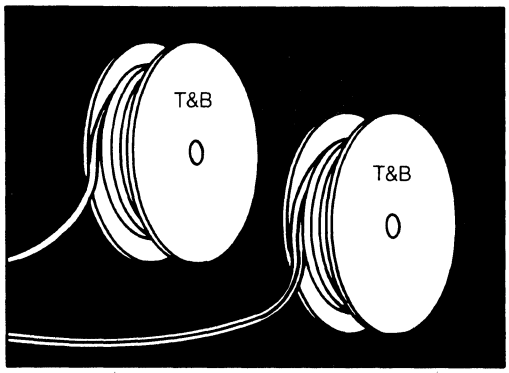


Actuate the ratcheted cleaving tool lever to cleave the fiber.

5.

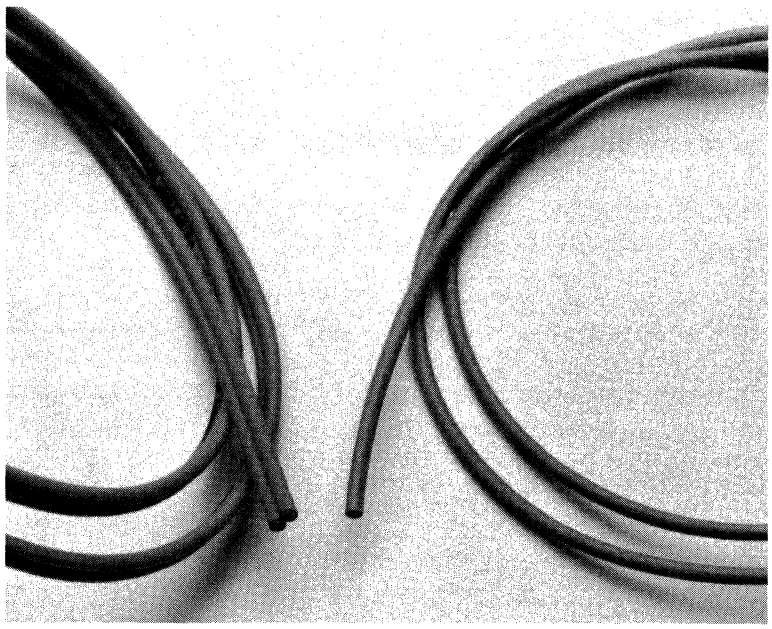


Insert connector into protective sleeve holder (A); remove holder (B); the connector is now ready for immediate use.



GLASS FIBER OPTIC CABLE

For high-performance, durable, multi-mode fiber applications



Description/Application

Thomas & Betts Glass Fiber Optic Cable is designed for both office and factory applications. Cables are available in simplex and duplex polyurethane jacket constructions, with 900 micron, mechanically-strippable buffer coating. Strain relief is achieved via high-strength aramid yarns stranded around the buffered fiber. Fiber diameters available include 50/125, 62.5/125 and 100/140 (micron). The fiber is completely compatible with the Pre-Cap™ Series Glass Fiber Optic Connectors in the most popular designs (SMA, and ST* types).

These connectors allow the user to combine the tolerance of a glass capillary with the rugged construction advantages of a durable composite polymer alloy for high performance and durability for multimode fiber applications.

Design Considerations

- Available in kilometer length rolls
- Wide operating temperature range (−20°C to +70°C).
- Supports both 850nm and 1300nm wavelengths
- Flexible, durable jacketing
- Kevlar-reinforced for high tensile strength
- Compatible with Thomas & Betts Pre-Cap™ Series connectors

Installation Tools

	CRIMP TOOLS (WITH CRIMP DIES)	CLEAVE TOOLS	COUPLERS	
			ACTIVE	PASSIVE
SMA	92299KT	92214XX	91750	91740
ST	92299KT	92299ST	91850	91840

*Trademark of AT&T Technologies.

Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

Glass Fiber

936 10 – 125

Type—Size Fiber
10-125 – *50/125 micron Simplex*
12-125 – *50/125 micron Duplex*
10-140 – *100/140 micron Simplex*
12-140 – *100/140 micron Duplex*
10-625 – *62.5/125 micron Simplex*
12-625 – *62.5/125 micron Duplex*

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THOMAS & BETTS GLASS FIBER OPTIC CABLE SPECIFICATIONS

Glass Optical Fiber/Connector Capability Chart

DESCRIPTION			CAT. NO.		
MULTIMODE FIBER DIAMETER (μM)	STANDARD CABLE DIAMETER (mm)	TYPE	PRE-CAP™ SERIES CONNECTORS		STAINLESS STEEL CONNECTORS
			SMA	ST*	SMA
125	3.0	CLEAVABLE	–	–	91700-125-XC
125	2.5	CLEAVABLE	–	–	91700-125-XC
140	3.0	CLEAVABLE	–	–	91700-140-XP
140	2.5	CLEAVABLE	–	–	91700-140-XP
125	3.0	POLISHABLE	91710-125-1P	91810-125-1P	–
125	2.5	POLISHABLE	91710-125-2P	91810-125-2P	–
140	3.0	POLISHABLE	91710-140-1P	91810-140-1P	–
140	2.5	POLISHABLE	91710-140-2P	91810-140-2P	–

Pre-Cap™ Series, ST* and SMA are designed to accommodate cable jacket sizes between 2 and 3mm.

Glass Fiber Specifications

PHYSICAL CHARACTERISTICS

CABLE PART NUMBER	UNIT OF MEASURE	93610-125 (SIMPLEX) / 93612-125 (DUPLEX)	93610-625 (SIMPLEX) / 93612-625 (DUPLEX)	93610-140 (SIMPLEX) / 93612-140 (DUPLEX)
CORE DIAMETER	μm	50	62.5	100
CLADDING DIAMETER	μm	125	125	140
BUFFERING DIAMETER	μm	900	900	900
CABLE OUTSIDE DIAMETER (NOMINAL PER CHANNEL)	mm	3.0	3.0	3.0
CABLE WEIGHT (NOMINAL PER CHANNEL)	kg/km	7.5	7.5	7.5

OPTICAL SPECIFICATIONS

MAXIMUM ATTENUATION @ 850 nm[1]	dB/km	5.0	5.0	6.0
MAXIMUM ATTENUATION @ 1300 nm[1]	dB/km	4.0	3.0	5.0
MINIMUM BANDWIDTH @ 850 nm[1]	MHz•km	400	160	100
MINIMUM BANDWIDTH @ 1300 nm[1]	MHz•km	400	200	100
NUMERICAL APERTURE		0.20	0.29	0.29

MECHANICAL & ENVIRONMENTAL SPECIFICATIONS

STORAGE TEMPERATURE RANGE, ON ORIGINAL SHIPPING REEL	°C	−40 to +70	
OPERATING TEMPERATURE RANGE, INSTALLED[2]	°C	−20 to +70	0 to +70
MAXIMUM TENSILE LOAD, DURING INSTALLATION	N[3]	300	
MAXIMUM TENSILE LOAD, LONG TERM INSTALLED	N	50	
MAXIMUM BEND RADIUS, DURING INSTALLATION (MAX. TENSILE LOAD)	cm	5	
MINIMUM BEND RADIUS, LONG TERM (UNLOADED)	cm	3	
CRUSH RESISTANCE (BETWEEN PARALLEL PLATES)[4]	N/cm	550	
IMPACT RESISTANCE[4]	IMPACTS @ 2.2 N•m	20	
CYCLIC FLEX RESISTANCE (±90°)[4]	CYCLES	10,000	
MAXIMUM VERTICAL RISE[5] (UNSUPPORTED)	m	300	
FLAME RESISTANCE		UL-62 (VW-1)	

FIBER OPTIC ASSEMBLIES

Catalog Number Code

XX X X-X XXXX X X

Cable Assembly Type
J1 – Jumper Simplex
J2 – Jumper Duplex
P1 – Pigtail Simplex
P2 – Pigtail Duplex

Connector End No. 1
A – ST™ Pre-Cap™ (Multimode)
B – SMA Pre-Cap™
C – SMA Cleavable
P – Plastic Fiber ST Compatible

Connector End No. 2
A – ST™ Pre-Cap™ (Multimode)
B – SMA Pre-Cap™
C – SMA Cleavable
P – Plastic Fiber ST Compatible
X – None (Pigtail)

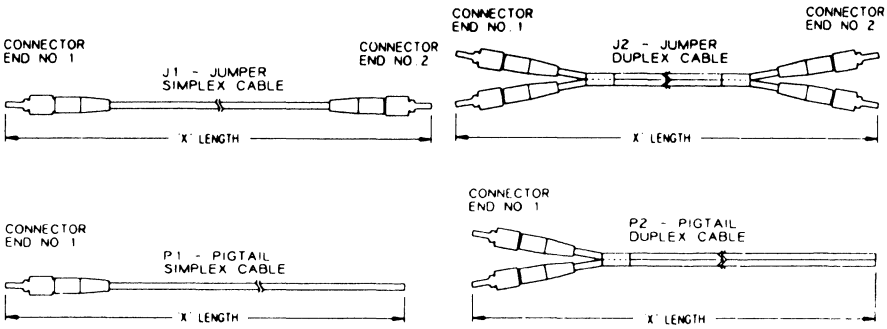
Fiber Core/Clad (Microns)
A – 50/125
B – 62.5/125
C – 100/140
D – Plastic (1mm)

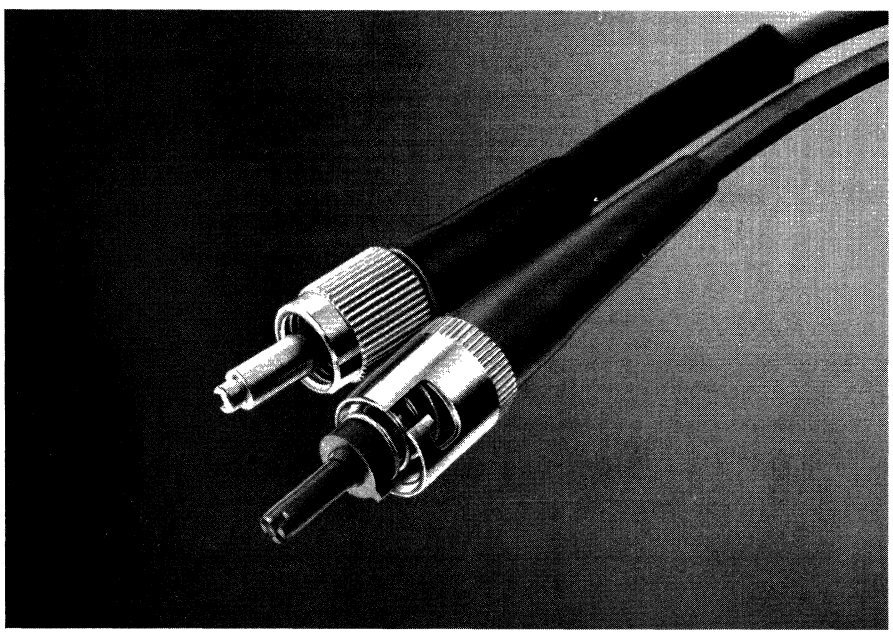
Cable Assembly Length 'X' (See Note 1 & 2)

UNITS
F – Feet
M – Meters

Fiber Finish
P – Physical Contact (Omit If Not Required)

Notes:
1. Cable assembly length tolerance is ± 1% of 'X' length, 0.5 foot or 0.2 meters which ever is greater.
2. Available cable assembly lengths 'X' range from 0.5 foot/0.2 meters to 9999 feet/meters in 0.5 foot/0.2 meter increments. The maximum length decimal sequence is as follows 99.5 feet or 99.8 meters (ex. XXXX-X99.8M).





Value added services: Fiber Optic assemblies to your specifications.

Thomas & Betts offers the industry's broadest line of fiber optic cable and connectors. Which means we can give you an almost unlimited variety of cable-connector assemblies to meet your specific design requirements. With components specifically designed to mate with each other, to assure you maximum flexibility and assembly reliability.

Your Value-Added Center can design and fabricate these assemblies to your specifications. With the right cables and connectors. With the manufacturing and testing tools to assure fast turnaround from prototype to delivery. With professional, factory-certified engineering expertise. All provided on a local basis.

You save labor, time and trouble. You get fully tested assemblies designed to your specs. You cut down on inventory and paperwork. And you get the assurance of Thomas & Betts quality and reliability.

You name it. We can help.

SMA Connectors, ST* Connectors, Bulkhead Connectors, PCB Data Links, Plastic Fiber Cable and Glass Fiber Cable.

Whatever your needs, your local Value-Added Center is ready to help. He is completely equipped to act as your assembly source, or add to your own assembly capability. He can supply standard cable assemblies in small or large quantities, and help with the more complex, labor-intensive assemblies too.

If you have your own assembly set-up, your local Value-Added Center can add to that capability with important cost and performance benefits. He'll deliver fully tested connector assemblies, rapidly and exactly to spec. You won't have to worry about rejects. You'll have fewer field failures. And you'll have total source traceability while reducing your internal documentation requirements, because your local Value-Added Center does it all for you.

If you don't have your own assembly capability, your local Value-Added Center eliminates unnecessary capital investment for equipment, inventory and storage space, as well as skilled labor to fabricate the assemblies. You get fully tested assemblies, exactly as you ordered them, faster than you could do it yourself.

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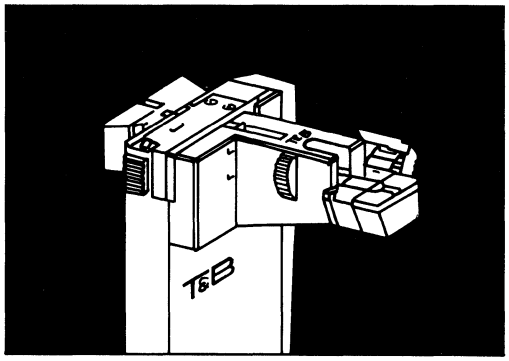


UNIVERSAL FIBER OPTIC CLEAVING TOOL

Description/Application

The Universal Fiber Optic Cleaving Tool eliminates time consuming polishing of optical fibers. The tool delivers consistent high quality cleaves by field personnel outside the laboratory environment. Human engineered, the palm-sized cleaving tool incorporates a simple two-stroke design. This eliminates subjective operator skills while producing the end angle required for single-mode splicing without chips, lips or hackle.

The universal cleaving tool is designed for single and multi-mode fiber with nominal diameters (O.D.) of 125 micron without operator adjustments of any kind. Tool package includes bench mounting clamp, hand carrying strap and protective case.

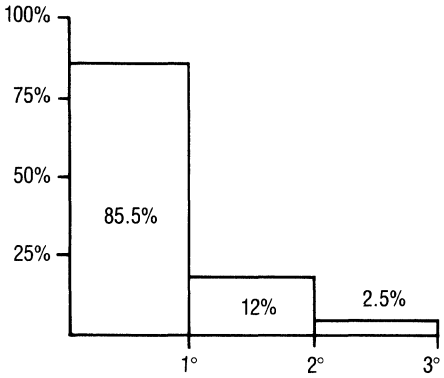
Design Characteristics

- Single-mode precision
- Fast, in-field terminations
- Eliminates polishing
- No special training required
- Eliminates tedious microscopic fiber inspection
- Delivers over 3000 reliable cleaves

TYPICAL END ANGLE DISTRIBUTION

END ANGLE SPECIFICATION:
Maximum end angle: 3° Typical end angle: see graph

FIBER TEST SAMPLE:
Corning Glass Works, AT&T, and Northern Telecom. (Single-mode).



High Quality in-field cleaves first time ...every time

Standard Product Options

The information below provides a general overview of this product family. For complete ordering information, please consult specification page.

Universal Cleaving Tool

92208 Calibrated to 125 micro inches

92208B Calibrated to 140 microns

Breaking Clamp Replacement

92208BC Calibrated to 125 microns

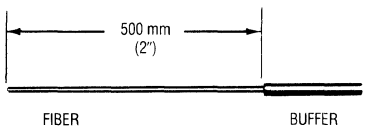
UNIVERSAL CLEAVING TOOL SPECIFICATIONS

Operating Procedure

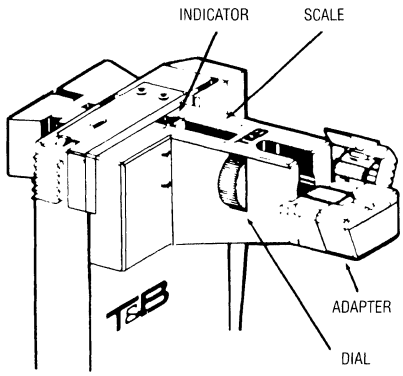
1.

FIBER SIZE:
Ensure that the fiber to be broken is a glass fiber of nominal diameter: 125 μm* and buffer O.D. is: 250 μm to 1.5mm
*(fiber diameters other than 125 μm can be accommodated—consult factory);

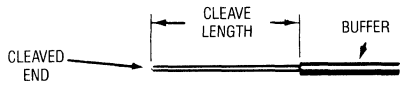
FIBER PREPARATION:
Prepare fiber for cleaving by removing 50mm (2") of buffer.



2.

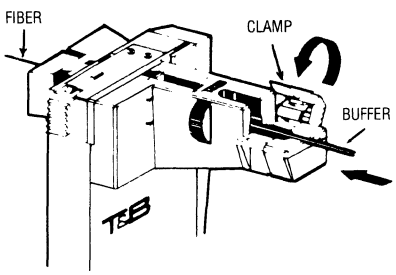


ADAPTER ADJUSTMENT:
Adapter has a cleave length scale from 3 to 20mm (each division on scale is 1mm). Set indicator to desired cleave length by turning dial.



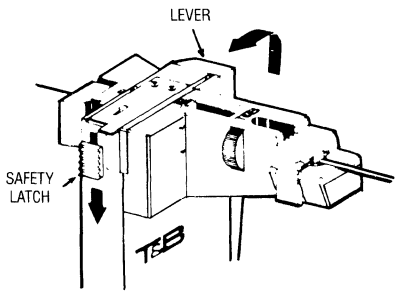
3.

FIBER BREAKING:
Insert fiber into adapter until it stops (fiber should be protruding out of tool), then press clamp down into lock position.



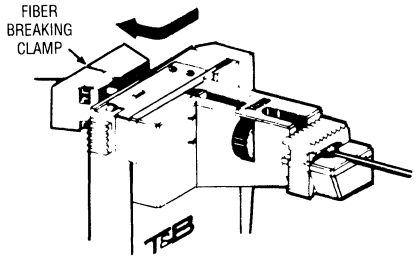
4.

Slide safety latch down. While latch is in down position, squeeze lever until it stops, then release.



5.

Firmly squeeze fiber-breaking clamp and while squeezing slide clamp slightly away from tool.

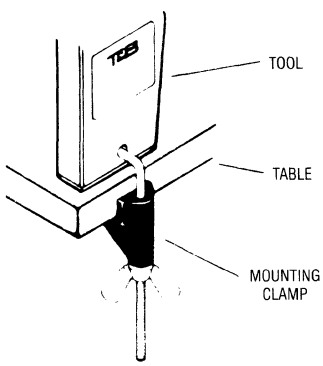


Remove fiber stub from fiber-breaking clamp and safely discard, then unlock clamp on adapter and remove cleaved fiber.

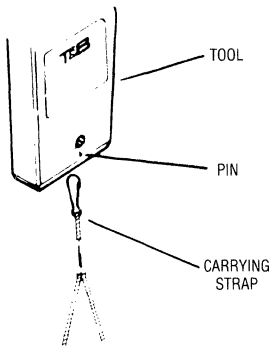
Accessories

For convenience of operation this tool comes complete with the following accessories.

1. TABLE MOUNTING CLAMP
Insert clamp into hole on tool and mount on table.



2. HAND CARRYING STRAP
Mount carrying strap clasp to pin at base of tool.



3. PROTECTIVE CASE
Store tool and adapter in case provided.

Catalog Information

Description	CAT. NO.
UNIVERSAL CLEAVING TOOL	92208
BREAKING CLAMP REPLACEMENT	92208BC

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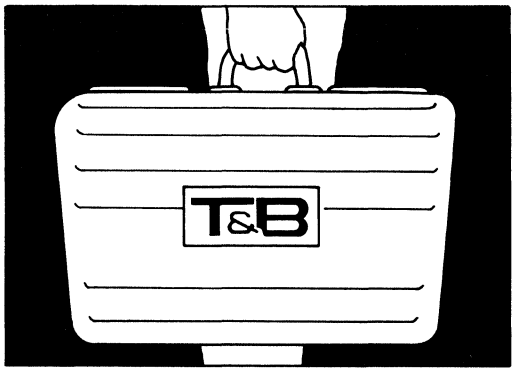


CONNECTOR INSTALLATION KITS FOR PRE-CAP™ SERIES AND CLEAVABLE CONNECTOR SYSTEMS

Description/Application

The Thomas & Betts installation kits provide all components necessary for complete assembly of the Pre-Cap™ Series Connectors and cleavable style multimode connectors. Durable, compact and lightweight, the termination kits are ideal for in-field, laboratory and production/assembly connector terminations.

Design Considerations

- Portable and lightweight (17" x 12" x 3")
- Includes all assembly equipment
- Video instruction included on 91700AK-1XX†
- Designed for Thomas & Betts simplified polish or cleave system

CONTENTS OF 91700AK-1XX† CLEAVABLE SMA TERMINATION KIT:

- Durable case (17" x 12" x 3")
- 92214-1XX† SMA Cleaving tool
- 92299KT Crimping tool w/03 Die set
- 92299WS Cable stripper
- 92299NN No nik buffer stripper
- 92299CB Cutting shears
- 10 Epoxy packages, epoxy mixing cups and sticks*
- Complete assembly instructions and video

91000CK consumables kit refill
91000RF refill kit, polishing film only

CONTENTS OF 91000AKP PRE-CAP™ SIMPLIFIED POLISHING KIT:
(includes above contents less video and 92214-1XX† plus items below)

- Polishing Plate
- Polishing Fixtures (ST*, SMA)
- 6-3 micron polishing films
- 6-.3 micron polishing films
- Cleaving wipes
- 92299ST Hand Scribe Tool

OPTIONAL ITEMS

Fotec V100 Inspection Scope—Cat. No. 92299FV
Bausch & Lomb Inspection Scope—
Cat. No. 92299BL

*Trademark of AT&T Technologies.
†1XX = 125 or 140 diameter cable.

Complete and compact kits for on-site, in-field or laboratory terminations

Standard Product Options

The information below provides a general overview of the product family. Standard catalog number options can be constructed below.

Installation Kit for PRE-CAP™ Series Connectors

91000AKP

Accomodates all PreCap™ Connectors including ST * and SMA

Installation Kit for Cleavable Connectors

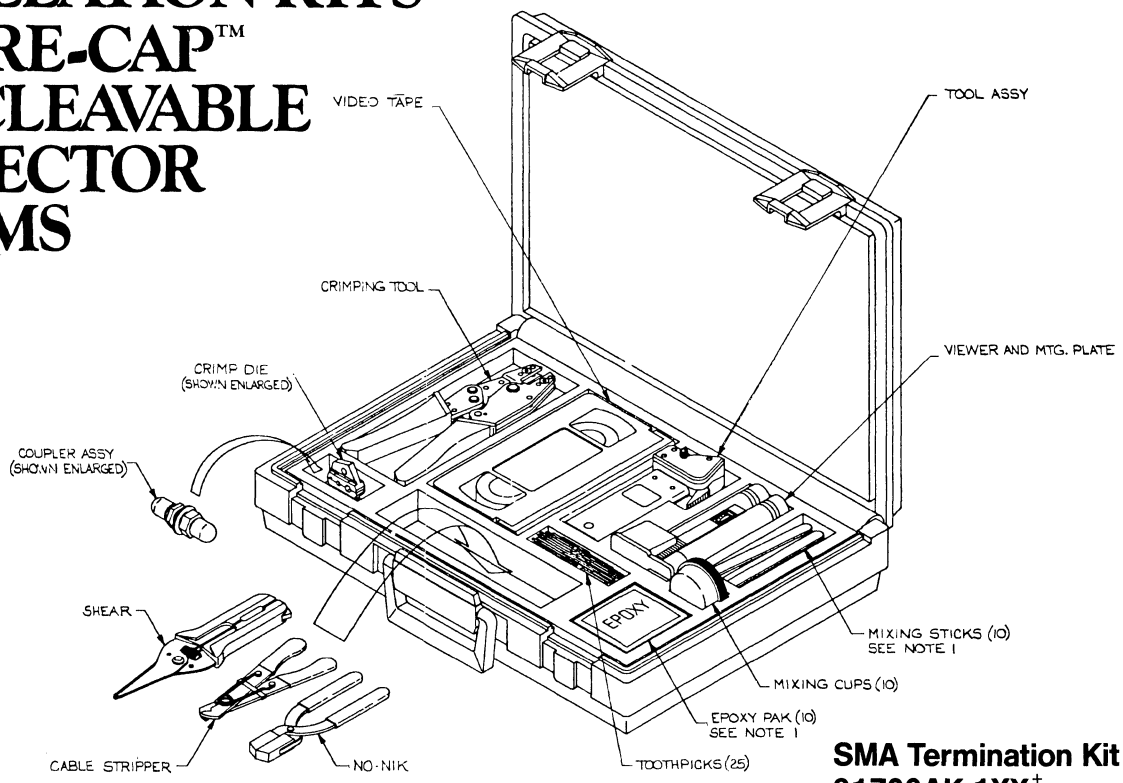
91700AK-125

91700AK-140

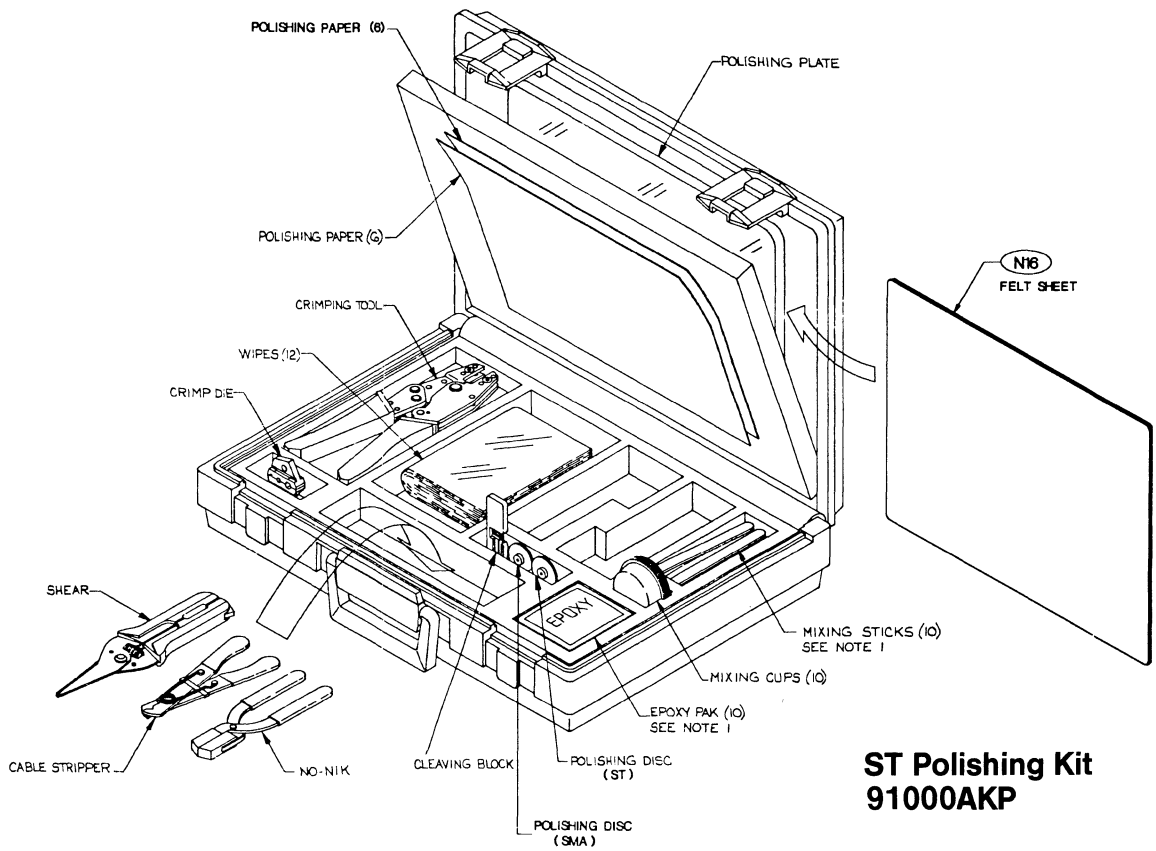
Crimp Tool

92299KT

INSTALLATION KITS FOR PRE-CAP™ AND CLEAVABLE CONNECTOR SYSTEMS



SMA Termination Kit
91700AK-1XX†



ST Polishing Kit
91000AKP

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Thomas & Betts Global Operations

Thomas & Betts is truly global in its scope and operations. Manufacturing and sales facilities are strategically located throughout the world.

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