PRODUCT GUIDE

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DATA I/O

As a Data I/O customer, you can depend on total support from a worldwide network of more than 65 manufacturing, sales and service offices. Data I/O sales and field applications engineers are always available with applications information, service and spare parts or a quick answer to a question about instrument operation. We are committed to total customer support and a continued pioneering spirit in new product development.

Data I/O, Redmond, Washington

When Data I/O® introduced the first commercially available PROM programmer in 1972, it set the world's standard for device programmers. Ever since then, we have achieved new levels of excellence. Our advanced line of programmers, systems, and software products continually evolves to meet the microprocessor industry's changing set of complex requirements.

We offer a broad spectrum of standard and custom programmers and systems to suit virtually all applications. The newest addition to this extensive line—the 21A EPROM Programmer—is dedicated to programming MOS and CMOS EPROMs exclusively. This powerful low cost programmer offers intelligent algorithms and automatic self tests, and can be linked to a host computer for remote operation. Just eight inches wide and barely five pounds, the 21A easily fits into a briefcase for field service.

In addition to extensive PROM programming support, we have developed a family of logic programmers that enhance programmable logic design. For example, two new logic programmers fully support programmable logic devices from design engineering to high volume production. Ideal for the design engineer who programs standard PAL® and IFL devices only, the dedicated 60A Logic Programmer is unsurpassed in its ease of operation, accuracy and full functional testing. And for high-volume production programming, the 60H Production Logic Programmer combines accuracy,

speed and operating ease. This advanced production programmer delivers the highest throughput of any logic programmer available today.

Moreover, Data I/O is equally committed to providing the digital design engineer automated electronic design tools for PROM programming and programmable logic design and testing. We have recently established the Design Automation Group to develop a wide range of innovative software products that enhance design and programming capabilities.

Two of the group's previously released products include ABEL™ (Advanced Boolean Expression Language) and PROMlink™. ABEL processes logic designs for PALs, IFLs, or PROMs and allows you to specify your design in any combination of state diagrams, truth tables or Boolean equations. PROMlink allows optional control of the Data I/O Series 22, 29B, 29A, 19, 120A/121A, 60A and 60H programmers from an IBM® Personal Computer. It provides a simple operator interface, as well as disk storage and retrieval of program data files.

When you select Data I/O as your programming resource, you'll receive comprehensive support. From helping you identify just the right programmer, to providing update, repair and calibration support agreements, Data I/O is the only programmer manufacturer with the broad-based experience and resources to ensure that all of your evolving requirements are fulfilled.

21A EPROM PROGRAMMER

low cost programmer

Our 21A EPROM programmer is the ideal choice for companies which program MOS and CMOS EPROMs exclusively. With no additional modules, this self-contained programmer supports more than 130 devices—virtually all EPROMs and EEPROMs up to 256k. Just eight inches wide and barely five pounds, the 21A can be easily carried in a briefcase for field service. Small and large companies alike can afford to equip multiple workstations with these programmers.

BUILT-IN SPEED AND RELIABILITY

The 21A doesn't sacrifice high performance for low cost. Equipped with the latest intelligent algorithms which eliminate redundant programming pulses, the 21A greatly reduces programming time and increases throughput. In addition, it performs a series of self-tests, such as memory, display and address checks to ensure that your device will be programmed correctly. And after it has been programmed, a reliability check verifies programming quality.

TWO FLEXIBLE MODES OF OPERATION

The 21A is designed to operate in two modes: stand-alone or integrated into your workstation. A full-stroke keyboard, editing capabilities and large alphanumeric display, allow you to easily operate the programmer in the stand-alone mode from the front panel.

The workstation mode enables you to control and manipulate data from a host computer. With its remote control mode, RS232C serial port and seven common translation formats, the 21A will interface to virtually any popular development system.

21A FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled
RAM: 32k x 8
Devices Programmed: MOS and CMOS EPROMs/EEPROMs to 256k
Sockets: 24/28-pin Textool
Keyboard: 16-key hexadecimal, 8-key functional
Display: 7-segment alphanumeric
Electronic Identification: Included
Intelligent Algorithms: Included
Input/Output: Serial RS232C
Baud Rates: 110, 300, 600, 1200, 2400, 4800, 9600
Remote Control: Terminal mode, CPU mode
Translation Formats: 8
Select Codes: 15
Error Codes: 28
Accessories Included: Power cord, instruction manual, operator guide

ELECTRICAL REQUIREMENTS

Operating Voltages: 85V to 249 VAC
Frequency Range: 48 Hz through 420 Hz
Power Consumption: 17VA nominal

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 21 x 6.5 x 28 cm (8" x 2.5" x 11")
Weight: 1.9 kg (4.2 pounds)
Operating Temperature: 0°C to +40°C
Storage Temperature: −10°C to +60°C
Humidity: To 90% (noncondensing)

SERIES 22 PROM PROGRAMMER
NAM SMART ADAPTER

an affordable PROM programmer that expands to meet changing needs

SELF TEST-OK   PROM PROGRAMMER

MORE THAN "MOS ONLY"

The Series 22 is the ideal programmer for the firmware designer. The basic Series 22 programs more than 150 MOS and CMOS EPROMs and easily expands to program EEPROMs, fuse-link or AIM bipolar PROMs, and 40-pin microcomputers. Equipped with Computer Remote Control (CRC) and 27 data translation formats, the Series 22 can be integrated into any work environment.

ECONOMICAL WAY TO MEET YOUR NEEDS

Choose from a variety of programming options to customize your Series 22 PROM programmer to meet your current requirements. As your applications or needs change or new devices become available, you can expand its capabilities to program over 750 devices.

PROGRAMS NAMS FOR CELLULAR RADIOS

One of several hardware options available for the Series 22 is a "smart adapter" containing built-in firmware to change the prompting parameters for programming application-specific devices. By plugging this option into the programmer's front panel, you can program number assignment modules (NAMs) for cellular radio installation and servicing. A menu-driven prompting system uses familiar cellular radio terminology to guide users through each step of the programming process.

LINKS TO PC FOR PROGRAMMING EASE

The Series 22 operates as a standalone; however, it can also be controlled from an IBM Personal Computer with Data I/O's optional PROMlink software. PROMlink provides a convenient PC interface and a flexible data storage system.

SUPERIOR IN THE DESIGN LAB OR IN THE FIELD

The Series 22 is equipped with the latest intelligent algorithms to greatly reduce programming time and increase throughput. It has the built-in capability to read electronic identifiers.

Although the entire programmer weighs only 16 pounds, it is rugged and made to last. For extra protection, the Series 22 is housed in an impact-resistant, molded-plastic case, ideal for both field and production station applications.

BASIC 22 FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6809)
RAM: 16k x 8 standard
Devices Programmed: MOS and CMOS EPROMs
Controls and Indicators: 29B compatible
Keyboard: 16-key hexadecimal, 10-key functional
Display: 16-character alphanumeric
Input/Output: Serial RS232C
Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200 (software-selectable)
Remote Control: System 19/29A computer remote control
Translation Formats: 27
Select Codes: 29
Error Codes: 45

OPTIONS

Device Programming: MOS EEPROMs, MOS INTEL 40-pin MCU, fuse-link PROMs, vertical-fuse PROMs

Hardware: 32k x 8 RAM, 64k x 8 RAM, UV lamp assembly, socket adapters
Accessories Included: Cover, power cord, instruction manual, operator guide

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC ±10%
Frequency Range: 50 to 60 Hz
Power Consumption: 35W nominal
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 34 x 43 x 11 cm (13.5" x 17" x 4.5")
Weight: 16 pounds
Shipping Weight: 18 pounds
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 90% (noncondensing)
Operational Altitude: To 10,000 feet

29B PROGRAMMING SYSTEM

top-of-the-line universal programming system

SYSTEM SOLUTION

Data I/O's 29B Universal Programming System offers the most comprehensive capabilities of any device programmer available today.

The concept behind Data I/O's 29B Programming System is simple: develop a basic mainframe unit that can accommodate a variety of interchangeable paks. These paks give you the advantage of programming a wide range of devices and, thus, selecting the devices best suited to your application.

PROGRAMS OVER 1,000 DEVICES

Fully equipped, the 29B programs over 1,000 different devices: MOS and CMOS EPROMs and EEPROMs, fuse-link and vertical-fuse bipolar PROMs, Intel 40-pin microcomputers, and more than 125 different logic devices including PAL, FPLS, FPLA and FPGA.

With its standard 64k x 8 RAM, it supports even the newest 512k EPROMs.

Other programming paks are available for devices with limited use, such as ECL PROMs.

PROVEN RELIABILITY: THE DATA I/O ADVANTAGE

The 29B is dedicated to one basic mission: reliable programming.

To accomplish this goal, the 29B constantly checks itself, confirms device integrity, checks input, looks for programming errors, monitors memory, signals invalid data, and watches for a host of other hazards that can ruin your devices. Most of this self-examination is automatic.

AN EXPANDABLE SYSTEM

The beauty of the system is the ease with which the 29B can be updated. As new, larger devices become available, the standard 64k x 8 data RAM can be expanded. And paks can be updated or new ones developed to handle new device technologies.

LINKS TO PC FOR PROGRAMMING EASE

The 29B Programming System operates as a standalone; however, it can also be controlled from an IBM Personal Computer with Data I/O's optional PROMlink software. PROMlink provides a convenient PC interface and a flexible data storage system.

29B FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6802)
RAM: 64k x 8 standard
Programming Support: GangPak™, LogicPak™, UniPak 2™, MOSPak™ and programming paks
Keyboard: 16-key hexadecimal, 9-key functional
Display: 16-character alphanumeric
Electronic Identification: Included in programming modules
Intelligent Algorithms: Included in programming modules
Input/Output: Serial RS232C and 20 mA current loop
Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200
Remote Control: CRC - standard, SRC - standard, TRC - optional
Other Options: Handler Interface Control
Translation Formats: 27
Select Codes: 29
Error Codes: 45
Accessories Included: Power cord, instruction manual

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC + 5% or −10%
Frequency Range: 48-52 Hz & 58-62 Hz for 100 & 120V, 48-52 Hz for 220 & 240V
Power Consumption: 115W/175VA maximum w/pak
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 38.1 x 15.2 x 27.3 cm (15" x 6" x 10.8")
Weight: 6.4 kg (14.1 pounds)
Shipping Weight: 7.3 kg (16.1 pounds)
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 95% (noncondensing)
Operational Altitude: To 10,000 feet

GANGPAK

UNIPAK 2

a versatile production programming pak

the universal programming pak

Data I/O's GangPak™ offers the most cost-effective way to produce firmware for prototyping or limited-scale manufacturing.

INNOVATIVE SET PROGRAMMING

Combined with the 29B Universal Programmer, the GangPak programs multiple MOS PROM sets, including wide-word PROM sets, in one operation. A set consists of from one to eight devices programmed differently, such as two sets of four, four sets of two, or other combinations. Data from systems using up to 64-bit words can be downloaded and programmed into sets. A PROM set containing 32-bit words, for example, would consist of four 8-bit-wide PROMs, and the GangPak can program two such sets simultaneously. The operator needs only to identify the number of devices in the set and/or the width of the data words.

Set programming saves time by eliminating separate downloading and programming operations for multiple-PROM sets. After a single download, the GangPak partitions the data into appropriately sized blocks. The first partition is assigned to the first device in each set, the second partition to the second device, and so on.

SIMPLICITY AND CONVENIENCE AT YOUR FINGERTIPS

Because the GangPak uses software-controlled algorithms, no characterizers or adapters are needed to identify devices. The operator simply keys in unique four-digit codes and the GangPak selects the correct algorithm.

Currently, the GangPak supports over 100 types of 24- and 28-pin EPROMs and EEPROMs, including the new single-voltage EEPROMs, 16k x 8 EPROMs and 32k x 8 EPROMs.

EASY PC INTERFACE

For storage and retrieval of program data files, as well as easy-to-use operation menus, the 29B with GangPak can be controlled from an IBM®-PC with Data I/O's new PROMlink software driver.

Combined with the 29B Universal Programmer, the UniPak™ 2 programs more than 800 devices without additional hardware. In fact, this module programs more devices than any other programming module available, including fuse-link bipolar, AIM, DEAP, ISO-Z, EPROMs and EEPROMs. In addition, by using pinout adapters, you can program Intel 40-pin microcomputers and other devices with non-standard pinouts.

THE DESIGN LAB'S ESSENTIAL PROGRAMMING MODULE

The UniPak 2 may be the only programming module you'll need. Because it utilizes programmable pin drivers and software-controlled algorithms, this module replaces many single-family programming paks and adapters. Because it gives you the freedom to select the best device for each application, the UniPak 2 is the smartest choice for software design labs requiring an affordable, versatile programming module.

SIMPLE TO OPERATE

Use the UniPak 2 once, and you'll discover just how simple it is to operate. Key a four-digit code into the 29B to identify the device, load data into RAM, then insert the device; the UniPak 2 quickly duplicates RAM data into the device. Select the optional electronic device identification, and the UniPak 2 reads information programmed into the device by the manufacturer. This information identifies the device and the optimum conditions for programming it.

EASY PC INTERFACE

For storage and retrieval of program data files, as well as easy-to-use operation menus, the 29B with the UniPak 2 can be controlled from an IBM-PC with Data I/O's new PROMlink software driver.

PROGRAMMABLE LOGIC DEVELOPMENT SYSTEM

a logic workstation for advanced design, programming, and testing

PROGRAM AND TEST ANY LOGIC DEVICE

Data I/O's Programmable Logic Development System (PLDS) is our premier logic workstation offering extensive support for virtually all logic devices, including IFLs, PALs, 40-pin MegaPAL®s and CMOS. The system combines the Data I/O 29B universal mainframe, (or earlier models 29A and 19) with the LogicPak. This sophisticated engineering tool offers the most advanced logic design, programming and testing capabilities.

PROGRAMMING PAKS FOR ADDITIONAL SUPPORT

With additional plug-in paks for PROM programming, you can expand the capabilities of your 29B, 29A or 19 mainframe. Exchange the LogicPak for the UniPak 2, and program more devices than any other PROM programmer on the market. Or insert the GangPak, and program multiple MOS EPROM sets in just one operation.

We have worked closely with semiconductor manufacturers during product development to ensure that the PLDS will always support the latest programmable logic devices, technologies and packaging.

FULL FUNCTIONAL TESTING VERIFIES DEVICE ACCURACY

Selectable three-level device testing ensures that programmed devices match your design specifications. An automatic array verify confirms that all fuses have been programmed correctly. An optional structured-vectors test compares actual device output with designer-specified results. And our unique Logic Fingerprint uses a signature analysis-based technique to compare newly programmed logic devices with known-good master devices.

PC OR TERMINAL INTERFACE FOR PROGRAMMING EASE

While the PLDS operates as a stand-alone system, it can also be linked to a personal computer or terminal. With just the terminal, menu options displayed in clear English commands guide you through operation. As you become more proficient, you can bypass these prompts and control the PLDS from the main menu display or directly from the programmer keyboard.

To further facilitate logic design and programming on a personal computer, Data I/O offers two software tools compatible with the PLDS. ABEL, a high-level language, allows you to specify your logic designs in any combination of truth tables, state diagrams or Boolean equations. When you have completed your design, the PROMlink software driver provides a convenient IBM-PC interface for selecting all programming functions as well as storing and retrieving data.

PLDS FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6802)
RAM: 64k x 8 standard
Keyboard: 16-key hexadecimal, 10-key functional
Display: 16-character alphanumeric
Input/Output: Serial RS232C and 20 mA current loop
Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200
Remote Control: CRC - standard, SRC - standard, TRC - optional
Other Options: Handler Interface Control
Translation Format: JEDEC-42.1-81-62
Device Testing (Selectable): Blank, illegal bit, array verify, structured vectors, Logic Fingerprint
Accessories Included: Power cord, instruction manual

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC + 5% or -10%
Frequency Range: 48-52 Hz & 58-62 Hz for 100 & 120V, 48-52 Hz for 220 & 240V
Power Consumption: 115W/175VA maximum
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 38.1 x 15.2 x 27.3 cm (15" x 6" x 10.8")
Weight: 6.4 kg (14.1 pounds)
Shipping Weight: 7.3 kg (16.1 pounds)
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 95% (noncondensing)
Operational Altitude: To 10,000 feet

60A LOGIC PROGRAMMER

a cost-effective dedicated logic programmer

DEDICATED TO SUPERIOR LOGIC PROGRAMMING

Dedicated to programming standard PAL and IFL logic devices exclusively, the 60A Logic Programmer is unsurpassed in its ease of operation, accuracy and full functional testing. Because we have worked closely with semiconductor manufacturers during product development to obtain their approval, you can be assured that the 60A will program devices precisely to their specifications.

To support your current device requirements, choose from one of three programmer configurations: 20- and 24-pin PALs; 20-, 24- and 28-pin IFLs; or combined PAL/IFL support. As new devices and technologies become widely accepted, we will offer software updates that allow you to easily expand device support. You'll find that dedicated logic support makes the 60A the most cost-effective logic programmer available today.

DESIGN AND PROGRAM WITH THE GREATEST OF EASE

As a stand-alone programmer, the 60A's simple operating protocol guides you through programming procedures with easy-to-understand commands. You can instantly select all functions such as load, test and program in just a few keystrokes.

While the 60A operates as a stand-alone unit, it can also be linked to a personal computer or terminal. With just the terminal, menu options displayed in clear English commands guide you through operation. As you become more proficient, you can bypass these prompts and control the 60A from the main menu display or directly from the programmer keyboard.

To further facilitate logic design and programming on a personal computer, Data I/O offers two software tools compatible with the 60A. ABEL, a high-level language, allows you to specify your logic designs in any combination of truth tables, state diagrams or Boolean equations. When you have completed your design, the PROMlink software driver provides a convenient IBM-PC interface for selecting all programming functions as well as storing and retrieving data.

FULL FUNCTIONAL TESTING VERIFIES DEVICE ACCURACY

Selectable three-level device testing ensures that programmed devices match your design specifications. An automatic array verify confirms that all fuses have been programmed correctly. An optional structured-vectors test compares actual device output with designer-specified results. And our unique Logic Fingerprint uses a signature analysis-based technique to compare newly programmed logic devices with known-good master devices.

RUGGED FOR FIELD SERVICE

Although the entire programmer weighs only 16 pounds, it is rugged and made to last. For extra protection in the field, the 60A is housed in an impact-resistant, molded-plastic case.

60A FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6809)
RAM: 64k x 8 standard
Keyboard: 16-key hexadecimal, 10-key functional
Display: 16-character alphanumeric
Input/Output: Serial RS232C
Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200 (software selectable)
Remote Control: System 29B/29A/19 computer remote control
Translation Format: JEDEC-42.1-81-62
Device Testing (Selectable): Blank, illegal bit, array verify, structured vectors, Logic Fingerprint
Options: Device programming, 20-, 24-pin programmable array logic support; 20-, 24-, 28-pin integrated fuse logic support

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC + 10%
Frequency Range: 48 to 62 Hz
Power Consumption: 150W maximum
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 34 x 43 x 11 cm (13.5" x 17" x 4.5")
Weight: 16 pounds
Shipping Weight: 18 pounds
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 90% (noncondensing)
Operational Altitude: To 10,000 feet

abel™ SOFTWARE

the high-level design tool for programmable logic

Data I/O's logic design software gives designers capabilities never before available in one package. ABEL—Advanced Boolean Expression Language—combines a natural design language with logic reduction and simulation in one integrated design package. ABEL reduces your development time, lets you use fewer components, and allows you to make design changes quickly and easily.

HIGH-LEVEL LANGUAGE

ABEL features state diagrams, truth tables, and Boolean equations which can be used in any combination to describe logic for PALs, IFLs or PROMs. The same logic description can be used for many devices of different types. ABEL automatically converts state diagrams and truth tables to expanded Boolean equations fully describing the logic design. It also features a complete macro-facility, file inclusion, and compiler directives.

THE CONVENIENCE OF LOGIC REDUCTION

Logic reduction minimizes the number of logic terms required to carry out a logic function. You'll be able to use fewer and smaller devices to implement the same function. And because logic reduction is automatic, it eliminates tedious and error-prone DeMorgan conversion and Karnaugh mapping.

INTEGRATED DEVICE SIMULATION

While other languages treat device simulation as an add-on, ABEL integrates it into the development of logic designs. Your design is tested before a device is ever programmed, resulting in fewer errors and virtually no misprogrammed devices. Test vectors specify the required function of the device and are used to simulate the design.

FEATURES

PRESTO Reduction Algorithm: Logic reduction reduces the number of product terms required so designs fit into smaller devices.
Simulation: Designs are tested before devices are programmed.
Design Documentation: Device and design documentation is automatically generated.
Error Checking: Extensive checking indicates what the errors are and where they occur.
Portability and Speed: Written in the C programming language for maximum speed and portability to other systems.
Boolean Equations: Logical, arithmetic, and relational operators can be used to write simple or complex Boolean equations. Equations are automatically converted to a sum-of-products form.
State Diagrams: State machines can be described directly with ABEL state diagrams. State transitions are defined with IF-THEN-ELSE, CASE, and GOTO statements.
Truth Tables: Logic functions can be described with truth tables that specify input-to-output relationships for both combinational and registered outputs.
Test Vectors: Test vectors specify the desired operation of a design so that the design can be simulated. Required outputs are listed for specific inputs in truth table-like form.

Directives: Directives that include other files, help to create complex test vectors, and control output listings can be written into the logic design.
Set Operations: Signals can be grouped into sets and operated on as units. Sets can be used in Boolean equations, state diagrams, truth tables and test vectors.
Macros: Macros can be defined to substitute text into a logic description. Combined with directives, macros are powerful tools for test vector generation.

SYSTEM REQUIREMENTS

ABEL operates on the following systems with the stated minimum requirements.

IBM-PC and Compatibles
MS™-DOS or PC-DOS operating system
2 floppy disk drives recommended
128k RAM (192k recommended)
Distributed on 5.25" DSDD floppy disks.

VAX™
VMS™ 3.0 or later operating system. (Distributed on ANSI-format, 1600 BPI magnetic tape or 8" floppy disk.)
UNIX™ Berkely 4.1 and 4.2 bsd operating systems (Distributed on TAR-format, 1600 BPI magnetic tape.)

VALID™
SCALDsystems™ I, II and IV
SCALDstar™ UNIX release 7.0. Distributed on TAR-format, 1600 BPI 1/2" magnetic tape.

PROMlink™ SOFTWARE

linking programmers to the
IBM PC

Now with PROMlink software, you can operate your Data I/O programmers from an IBM Personal Computer. This software package gives you a convenient alternative to stand-alone programmer operation.

NOT A "SLAVE" SYSTEM

Unlike "slave" programmers that burden the host computer's processor with all programming tasks, Data I/O programmers are designed as self-sufficient stand-alone units. PROMlink provides a menu-driven interface and easy data storage on the PC, but the programmer performs all programming and verification functions.

EASY-TO-USE FUNCTION MENU

Function commands are simple to activate. Just key in one number from a menu displayed on the CRT. The user can design a custom menu of frequently-used functions. A configuration file allows a production engineer to define and set up programming parameters for a specific application just once. This eliminates the need for skilled operators.

In addition, PROMlink offers a variety of operating functions that include loading program data, programming devices, verifying devices, editing and displaying program data, and maintaining device statistics.

ON-LINE HELP

By activating any function command, you can easily access a "help" text. This gives you detailed descriptions of the command and its options.

Default operating parameters eliminate the need to set up the same parameter each time PROMlink is run. Stored on a disk file, these parameters include programmer type, device type, and I/O format. The status of the programming system is always displayed for your convenience.

FULL SCREEN EDITING

PROMlink 1.1 offers a cursor-controlled full screen RAM editor. By simply moving the cursor and entering data, the operator can edit RAM in ASCII or hexadecimal notation.

FEATURES

- Provides complete control of the programmers from the PC
- Disk storage and retrieval of programmer RAM data
- Menu-driven operation
- On-line help messages
- Expanded error definition
- Menus of programmers, device manufacturers, input/output formats and devices for easy set-up and programming
- Full screen display of programmer RAM contents, in hexadecimal or ASCII
- Easy editing of programmer RAM contents
- Automatic collection of programming statistics
- RS232C serial communications cable included

SUPPORTED PROGRAMMERS, PAKS AND DEVICES

PROMlink provides convenient programming of all MOS and CMOS EPROMs and EEPROMs, fuse-link and vertical-fuse bipolar PROMs, and 40-pin microcomputers supported by the following Data I/O programmers and paks**:

Programmers: model 29B, model 29A, model 19, Series 22, model 22A, model 22B, models 120A/121A
Paks: UniPak 2, UniPak, GangPak, MOSPak, 24-pin Gang Module, 28-pin Gang Module, 40-pin Gang Module

SYSTEM REQUIREMENTS

PROMlink operates on an IBM-PC, XT, AT or TI Professional with the following minimum requirements: PC-DOS 1.1 or 2.0 operating system, 1 DSDD, 5.25" floppy disk drive, 192k RAM and an RS232C serial communications port. The PROMlink software is distributed on a 5.25" DSDD floppy disk.

**All revisions of programmers and paks are supported unless noted otherwise.

60H PRODUCTION LOGIC PROGRAMMER

delivers the highest throughput of any logic programmer

KEEP PACE WITH HIGH-VOLUME PRODUCTION PROGRAMMING

The 60H Production Logic Programmer combines accuracy, speed and programming ease to deliver the highest throughput of any logic programmer. Compatible with most device handlers, the 60H programs 20- and 24-pin PALs and 20-, 24- and 28-pin IFLs. In addition, its capabilities can be expanded to support new devices and technologies as they become widely accepted. We work closely with all semiconductor manufacturers so that you can be sure your devices will be programmed precisely to their specifications, producing maximum possible yields.

ENSURES WAVEFORM INTEGRITY

The 60H includes a parallel port for control signals and a series of handler interface adapters. Waveform integrity is ensured by special circuitry installed at the handler test head to compensate for any degradation that occurs while the signal is transmitted through the connecting cable. This allows a longer cable, giving you greater flexibility in your production workstation.

PROGRAM WITH THE GREATEST OF EASE

The 60H requires minimal operator involvement. Programming configurations are set up for each application only once. When you turn the power off, programming parameters are automatically stored in non-volatile memory (NOVRAM), eliminating the need to reset them at the beginning of the next shift.

Ideal for computer-automated environments, the 60H can be linked to a personal computer or mainframe. This allows you to completely operate your programmer with simple single-character commands at any remote location.

A FULL RANGE OF TESTS TO VERIFY DEVICE ACCURACY

Before your device is programmed, the 60H performs an optional continuity test. To verify that your programmed devices match design specifications, the 60H performs an automatic array verify and an optional structured-vectors test. In addition, the programmer uses our unique Logic Fingerprint test—a signature analysis-based technique—to compare newly programmed logic devices with known-good master devices.

SERVICE AFTER THE SALE

Because of the importance of minimizing unscheduled downtimes, we offer a range of special 60H update and calibration contracts for servicing your programmer. And with worldwide support centers and a vast network of specially trained technicians at your service, you can be confident that your 60H logic programmer will be available when you need it.

60H FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6809)
RAM: 64k x 8 standard
Devices Programmed: 20-, 24-pin PAL; 20-, 24-, 28-pin IFL
Keyboard: 16-key hexadecimal, 10-key functional
Display: 16-character alphanumeric
Input/Output: Serial RS232C, parallel handler control port
Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200 (software selectable)
Remote Control: System 29B/29A/19 computer remote control
Translation Format: JEDEC-42.1-81-62
Device Testing (Selectable): Continuity, blank, illegal bit, array verify, structured vectors, Logic Fingerprint
Accessories Included: Cover, power cord, instruction manual, operator guide

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC ± 10%
Frequency Range: 48 to 62 Hz
Power Consumption: 150W maximum
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 34 x 43 x 11 cm (13.5" x 17" x 4.5")
Weight: 16 pounds
Shipping Weight: 18 pounds
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 90% (noncondensing)
Operational Altitude: To 10,000 feet

120A/121A GANG PROGRAMMERS

reliable, fast production programming
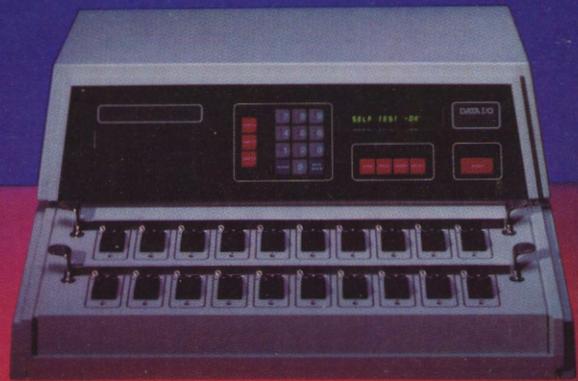
Data I/O's rugged and reliable gang programmers yield higher throughputs for greater cost efficiency. With Data I/O's 120A and 121A, you can program up to 20 devices simultaneously—faster than ever before—without sacrificing accuracy.

INCREASES THROUGHPUT AND YIELD

Intelligent algorithms enable your devices to be programmed many times faster than with standard programming algorithms. Data I/O works closely with all semiconductor manufacturers to develop optimum programming algorithms and produce the highest possible yields.

Data I/O is the first manufacturer to support electronic identification. To help reduce operator error and costly mistakes, the 120A and 121A read built-in manufacturer identification codes. Therefore, the device type can be set up automatically by the programmer. For even greater reliability and maximum assurance, both programmers provide extensive preprogramming device testing and automatic device verification at two voltage levels.

For storage and retrieval of program data files, as well as easy-to-use operation menus, these two gang programmers can be controlled from an IBM-PC with Data I/O's new PROMlink software driver.

121A: A VERSATILE DEVELOPMENT TOOL

Set programming, or the ability to program different device programming patterns simultaneously, gives the 121A Gang Programmer the versatility you need for software development. The 121A programs five sets of four 32k x 8 MOS, CMOS EPROMs or EEPROMs each—or any other combination—simultaneously. Programming that once required separate operations for each data pattern can now be done in a single operation. The 121A has a larger RAM than the 120A, as well as address-oriented editing and 16-bit mode programming.

120A: A HIGH-THROUGHPUT STAND-ALONE GANG DUPLICATOR

The 120A Gang Programmer provides the same features as the 121A, but does not have the ability to program different sets of devices simultaneously. Like the 121A, the 120A programs EPROMs and EEPROMs and improves production programming throughput and accuracy.

120A/121A FUNCTIONAL SPECIFICATIONS

General Architecture: Microprocessor-controlled (6809)
Sockets: 20 ZIF sockets with quick-release bails
Devices Programmed: MOS, CMOS EPROMs and EEPROMs
RAM: 32k x 8 (120A), 64k x 8 (120A), 128k x 8 (121A) or 256k x 8 (121A)
Keyboard: 12-key pad with full alphanumeric capability via shift mechanisms
Display: 16-character alphanumeric
I/O Ports: One (120A) or two (121A) RS232C serial ports
Baud Rates: (Switch selectable) 110, 150, 300, 600, 1200, 2400, 4800 or 9600
Remote Control: 34 commands via RS232C port
Translation Formats: 26
Select Codes: 25
Error Codes: 82

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 220 or 240 VAC (all within 10%)
Frequency Range: 48 to 62 Hz
Power Consumption: 165W
Fuse Protection: Primary and secondary fuse protection

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: 66 x 27 x 55 cm (26" x 10 5/8" x 21 1/2")
Shipping Weight: 23.5 kg (52 pounds)
Operating Temperature: +5° to +45°C (41° to 113°F)
Storage Temperature: −40° to +70°C (−40° to +158°F)
Humidity: To 90% (noncondensing)
Operational Altitude: To 10,000 feet

156A IN-CIRCUIT PROGRAMMING SYSTEM

flexible in-circuit programming from Data I/O

Data I/O offers the only flexible software-controlled in-circuit programming system that allows you to program fully-loaded circuit boards. With the 156A, you can program up to eight boards—each with over 1.5M bytes—in a single operation.

During every phase of MOS/CMOS EPROM and EEPROM programming, the CRT displays prompting messages in user-friendly language. And because it is software-controlled, the system easily accommodates different board sizes and architecture. The 156A programs any type of memory package, including 600-mil-wide DIPs, chip carriers, hybrids and flat packs.

THE MOST COST-EFFECTIVE SYSTEM

In manufacturing, the 156A reduces programming steps, labor and inventories of sockets and preprogrammed PROMs. It lets you treat your devices as you would any other component automatically stuffed on the board. Therefore, memory device handling is reduced, minimizing time, assembly errors, and damaged

memory devices. Last minute changes can be easily programmed into your blank memory assemblies, as well.

The 156A also allows you to easily reprogram entire boards without having to remove devices. By eliminating the need to manually rework your boards, the 156A In-Circuit Programming System reduces reprogramming time and saves you money.

AUTOMATED VERIFICATION AT BOARD LEVEL

The 156A In-Circuit Programming System automatically tests for accuracy at every step. Devices are first given blank and illegal-bit checks. Throughout programming, they are protected from over-current, overvoltage, undervoltage and power line failures. After programming has been completed, the 156A performs up to a three-pass verification with user-selectable Vcc levels. Accuracy is verified by checksum and cyclic redundancy calculations to ensure the entire board has been programmed correctly.

156A FUNCTIONAL SPECIFICATIONS

Programming Support: MOS and CMOS EPROMs and EEPROMs
Disk Drives: 10M byte Winchester disk drive, 320k byte 5¼" flexible disk drive
Terminal: 11 program-controlled function keys, detached keyboard, tilt and swivel CRT, 25 lines by 80 column display
Programming Power Supplies: 20A Vcc supply, 5A Vpp supply, remote sensing
Programming Interface: 32 address lines, 32 data lines, programming bus control lines, independent or multiplexed bus architecture, fixture detection, board detection
RS232C Ports: Host ports, printer port, terminal port, 100, 150, 300, 600, 1200, 2400, 4800, 9600 baud

OPTIONS

High Power Vcc and Vpp: 50A Vcc supply, 10A Vpp supply
Line Printer
Auxiliary Programmable Power Supplies (max. 4)
Operator Workstation
Auxiliary Equipment Bay

Spares Kit
Fixture Kit
Accessories Included: Terminal, confidence adapter, operator manual, maintenance manual

ELECTRICAL REQUIREMENTS

Operating Voltages: 100, 120, 208 or 230 VAC ±10% (+10% or −8% for 208V)
Frequency Ranges: 50 or 60 Hz ±10%
Current: 30 Amps max. per bay
Protection: AC line monitor

PHYSICAL AND ENVIRONMENTAL SPECIFICATIONS

Dimensions: Standard bay, 70cm W x 82cm D x 111cm H (24" x 32" x 44"); Work station, 122cm W x 82cm D x 92cm H (48" x 32" x 38"); Auxiliary equipment bay, 70 cm W x 82cm D x 92cm H (24" x 32" x 38")
Weight: Standard bay, 245kg (550 lbs.); Work station, 48kg (105 lbs.); Auxiliary equipment bay, 177kg (390 lbs.)
Operating Temperature: +10°C to +35°C (+50°F to +95°F)
Storage Temperature: −20°C to +50°C (−4° to +122°F)
Humidity: 20% to 80% (noncondensing)

SPECIAL PRODUCTS

Data I/O offers the most extensive line of versatile device programmers and programming systems. In addition, your unique applications are handled by our team of Special Products engineers. Whether you need to change your programmer's interface to optimize a routine manufacturing process, or add a new operation for testing your devices under unusual conditions, you can depend on these skilled engineers to propose the right solution. You'll find that we have the range of resources required to satisfy virtually any special programming application.

When you request a customized Data I/O programmer or system, we assign the appropriate specialists to examine your prerequisites and develop a proposal. From our in-circuit programming experts to our software engineers, our people work closely with you to modify our programmers' electrical characteristics, operation, interface or packaging. If you have already determined what modifications you'll need, we can create a customized system directly from your specifications.

We offer several products including ROM/EPROM testers, custom in-circuit programmers and LCC socket adapters. Contact your Data I/O Sales Engineer for more information about our Special Products services, and let us put our programming expertise to work for you.

CUSTOMER SUPPORT

The rapidly changing microprocessor industry demands its own brand of customer support, one that enables you to keep pace with newly introduced technologies and devices. As you search for the right device programmer or system, you'll discover Data I/O is the only company with the range of resources to support your evolving requirements.

Data I/O's Customer Support is dedicated to delivering on-going assistance throughout the life of your device programmer or system. From providing software updates and new hardware options to guidance in operation or repair and calibration, this group of highly skilled engineers is committed to helping you fulfill your device programming objectives today, and in the future.

A customer support engineer, as close as your telephone, will assist you while you are learning to use your new Data I/O device programmer or system. And throughout every step of the programming process, you can consult with Customer Support to ensure you are getting optimum performance from your Data I/O products. Because we maintain an effective working relationship with semiconductor manufacturers, we can also help you quickly distinguish between programmer and device-related problems.

Each time your requirements change, you can depend on our Customer Support group to determine the most cost-effective method for updating your programmer. For example, your customer support engineer may recommend that you purchase a Data I/O user-installable update kit to reduce your updating cost and speed the installation of a new device algorithm.

To help you budget updates, calibrations and repairs throughout the year, we offer a range of support agreements at fixed annual rates. Tailored to your needs these agreements allow you to plan routine calibration and updates during slack periods to eliminate unscheduled downtime. We routinely send you update notices informing you of newly introduced programming capabilities. Since it's difficult to keep abreast of today's proliferation of memory and logic devices, you'll appreciate this valuable service.

In addition, you can take advantage of our software update services for all Data I/O software products, including ABEL and PROMlink. Each time we revise a software product to enhance its capabilities or add additional device support, we will automatically send you new software, updated documentation, application notes and corresponding logic diagrams.

Whenever you require assistance in using Data I/O software to its fullest potential, the Customer Support Center in Redmond, Washington, is available to help you. A team of skilled software experts is prepared to assist you in using Data I/O's software in your specific applications. With the capability to receive and transmit your files over the telephone, the Center can ensure that you obtain the desired results quickly by identifying and helping you correct your problem.

Data I/O regional Customer Support Centers, fully staffed with service technicians and customer support engineers, are conveniently located throughout the United States. Because we are the only programmer manufacturer with this extensive support network, we can respond more quickly and thoroughly to your on-going requirements than any other device programmer manufacturer.

We work with you to meet your programming requirements. And Data I/O's Customer Support will stay with you, providing on-going service throughout the life of your Data I/O product. Data I/O Customer Support is your partner in meeting your objectives.

U.S. WARRANTY

Data I/O warrants that all equipment sold pursuant to any resultant agreement shall be free from defects in material or workmanship at the time of delivery. Such warranty for products shall extend for one year, except for specific products otherwise noted. Buyer must provide notice to Data I/O within this prescribed warranty period of any defect; if the defect is not the result of improper usage, service, maintenance or installation and equipment has not been otherwise damaged or modified after delivery, Data I/O shall either replace or repair the defective part or parts of equipment or replace the equipment or refund the purchase price at Data I/O's option after return of such equipment by buyer to Data I/O. Shipment to Data I/O's facility shall be borne on account of buyer. Shipment from Data I/O's facility shall be borne by Data I/O.

(a) Consequential Damages—Data I/O shall not be liable for any incidental or consequential damages incurred as a result of any defect in any equipment sold hereunder and Data I/O's liability is specifically limited to its obligation described herein to repair or replace a defective part or parts covered by this warranty.

(b) Exclusive Warranty—The warranty set forth herein is the only warranty, oral or written, made by Data I/O and is in lieu of and replaces all other warranties, expressed or implied, including the WARRANTY OF MERCHANTIBILITY AND THE WARRANTY OF FITNESS FOR PARTICULAR PURPOSE.

The prices listed are net prices at time of printing, and are subject to change without notice.

These prices apply only to domestic USA customers who do not purchase for export.

Programmable device manufacturers occasionally change programming algorithms. Data I/O accepts no liability for programming equipment changes neccessitated in connection therewith.

U.S. PRICE LIST

21A EPROM PROGRAMMER

21A	EPROM Programmer, for 16k to 256k MOS, CMOS EPROMs and EEPROMs, 32k x 8 RAM, 120V	$1450

SERIES 22 PROGRAMMER

Basic 22	MOS/CMOS Programmer	$1995
	RAM04 - 16k x 8 RAM, 22S30 - MOS Basic Programming, Full Data Manipulation, RS232C, 27 Data Formats, Computer Remote Control (CRC), Standard Remote Control (SRC)	

HARDWARE OPTIONS

VA120	120 VAC	N/C
RAM05	32k x 8 RAM	200
RAM06	64k x 8 RAM	400
22H15	UV Lamp Assembly	300
22H20	351A-064B Dual 20-pin Socket Adapter	125
22H22	351A-075B 40-pin Socket Adapter (8741, 8748, etc.)	125
22H23	351A-076 40-pin Socket Adapter (8751)	125
22H24	351A-084 16-pin Socket Adapter for Texas Instrument 18S030	125

MOS/CMOS Programming

22S31	MOS EEPROM	100
22S32*	MOS Intel 40-pin MCU	100
22S39*	All MOS	150

Fuse-Link Programming

22S40*	AMD	175
22S43*	Fairchild	175
22S46*	Harris/Motorola	175
22S48*	Mitsubishi	175
22S49*	MMI/Raytheon	175
22S50*	National Semiconductor	175
22S53*	Signetics	175
22S55*	Texas Instruments	175
22S57*	Thomson	175
22S59*	All Fuse-Link	1100

Vertical-Fuse Programming

22S60*	Fairchild ISOZ	175
22S63*	Fujitsu DEAP	175
22S66*	Hitachi AIM	175
22S69*	Intersil AIM	175
22S72*	NEC AIM	175
22S74*	Signetics	175
22S79*	All Vertical Fuse	500

*Socket adapter may be required.

NAM PROGRAMMER CONFIGURATION

22S90	Special version of the Series 22, 120V	$3300
	Contains firmware specifically designed to support programming for cellular radios. Programs only selected 32 x 8 fuse-link PROMs, designated NAM (Numeric Access Module).	

29B UNIVERSAL PROGRAMMER

29B-20600	29B, Universal Mainframe, CRC, SRC, 64k x 8 RAM, 120V	$4300
29B-20601	29B, Universal Mainframe, CRC, SRC, TRC and 64k x 8 RAM, 120V	4550
29B-20602*	29B, Universal Mainframe, CRC, SRC, 64k x 8 RAM and Handler Interface, 120V	4800
29B-20603*	29B, Universal Mainframe, CRC, SRC, TRC, 64k x 8 RAM and Handler Interface, 120V	5050

*NOTE: Handler denotes handler interface capability.

TOTALPAKS

TOTALPak 2	29B Plus MOSPak - (64k x 8 RAM, standard remote control and computer remote control in 29B)	$4975
TOTALPak 3	29B Plus UniPak 2 - (64k x 8 RAM, standard remote control and computer remote control in 29B)	6250
TOTALPak 4	29B Plus LogicPak with any three adapters - (64k x 8 RAM, standard remote control and computer remote control in 29B)	5475
TOTALPak 6	29B Plus GangPak - (64k x 8 RAM, standard remote control and computer remote control in 29B)	6450
TOTALPak 7	29B Plus UniPak 2, GangPak, and LogicPak with any three adapters - (64k x 8 RAM, standard remote control and computer remote control in 29B)	9975
TOTALPak 8	29B Plus UniPak 2, and LogicPak with any three adapters - (64k x 8 RAM, standard remote control and computer remote control in 29B)	7975
TOTALPak 9	29B Plus UniPak 2 and GangPak - (64k x 8 RAM, standard remote control and computer remote control in 29B)	8475

NOTE: All 29B programmers may be ordered with the following options:

29B-20601	Terminal Remote Control	Add $250
29B-20602	Handler Interface	Add 500
29B-20603	Handler Interface and Terminal Remote Control	Add 750

NOTICE: ABEL and PROMlink are available at a reduced price when purchased with any TOTALPak. Software pricing with these TOTALPaks is as follows:

ABEL PC-DOS (MS-DOS compatible)	$ 895
ABEL VX VMS	2295
ABEL VX UNIX	2295
PROMlink PCD	200

Model Number	Description	Price
PROGRAMMING PAKS		
Program Pak 1	Motorola ECL	$1350
	Card Set: 350A-001 (919-0002-001)	
	Socket Adapter: 715-1003-4	
Program Pak 2	Motorola 68701	1350
	Card Set: 350A-002 (919-0035-002)	
	Socket Adapter: 715-0036-001	
Program Pak 3	Fairchild AIM	1350
	Card Set: 350A-004 (919-0043-003)	
	Socket Adapters: 715-1722-001,	
	715-1722-002, 715-1722-003	
Program Pak 4	CMOS	1350
	Card Set: 350A-013 (919-1416-1)	
	Socket Adapter: 715-1450,	
	715-1706-001, 715-1449,	
	715-1707-002	
Program Pak 5	Fairchild FPLA 93458/59	1350
	Card Set: 350A-018 (919-1549)	
	Socket Adapter: 715-1594-1	
Program Pak 6	Texas Instruments Bi-Polar	1000
	Card Set: 350A-022 (919-1063-3)	
	Socket Adapter: 715-1037	
Program Pak 7	1702A	1000
	Card Set: 350A-008 (919-1183-1)	
	Socket Adapter: 715-1047	
Program Pak 8	Motorola 68705 (919-003)	1500
	Card Set: 350A-021 (919-0003-002)	
	Socket Adapters: 351A-079 or	
	351A-080 or 351A-082	
Program Pak 9	Fairchild ECL	1350
	Card Set: 350A-016 (919-1507)	
	Socket Adapter: 715-1003-4	
UNIPAK 2		
UniPak 2	Universal Programming Pak	$2575
351A-065	UniPak 2 Socket Adapter, 4k x 4, 20-pin	150
351A-066	UniPak 2 Socket Adapter, AMD, 27S45	150
351A-067	UniPak 2 Socket Adapter, 22-pin	150
351A-068	UniPak 2 Socket Adapter, 24-pin	150
351A-070	UniPak 2 Socket Adapter, 40-pin (8741/42/48/48H/49H)	200
351A-071	UniPak 2 Socket Adapter, 40-pin (8751)	200
351A-072	UniPak 2 Socket Adapter, 40-pin (8755/55A).......................	200
351A-073	UniPak 2 Socket Adapter, 24-pin (AMD & MMI)	150
GANGPAK		
GangPak	Production Programming Pak	$2475
60A LOGIC PROGRAMMER		
60A BOTH	Model 60A Logic Programmer .... Programmable Array and Integrated Fuse Logic Device Support, 120V	$3425
60A ARRAY Logic	Model 60A Logic Programmer .... Programmable Array Logic Device Support Only, 120V	3150
60A IFL	Model 60A Logic Programmer .... Integrated Fuse Logic Device Support Only, 120V	3275
360A-001	Programmable Array Logic............ Programming Option	500
360A-002/3	Integrated Fuse Logic .... Programming Option	500
60H PRODUCTION LOGIC PROGRAMMER		
60H	60H Production Logic Programmer...... Programmable Array and Integrated Fuse Logic Device Support, 120V	$4425
60A-H CONVER	60A to 60H Conversion Kit............. 360A-101 User Installable Interface Hardware	2200
360A-001	Programmable Array Logic............ Programming Option	500
360A-002/3	Integrated Fuse Logic .... Programming Option	500
PROGRAMMABLE LOGIC DEVELOPMENT SYSTEM		
LogicPak	LogicPak............................	$1875
303A-001	IFL P/T Adapter	395
303A-002	MMI National PAL P/T Adapter	395
303A-003	Harris P/T Adapter	395
303A-004	AMD PAL P/T Adapter	395
303A-006	Texas Instruments PLA P/T Adapter	395
303A-007	Harris CMOS P/T Adapter..............	395
303A-008A	32R16 P/T Adapter (DIP + LCC)	1875
303A-008B	32R16 P/T Adapter (DIP + NLCC)	1875
303A-009	CMOS P/T Adapter...................	395
303A-100	PALASM Design Adapter	395
303A-101	Signetics H & L Design Adapter	395

ABEL SOFTWARE

Model Number	Description	Price
ABEL PCDOS	IBM PC Version* (MS-DOS compatible)	$ 995
ABEL VXVMS	VAX VMS Version	2495
ABEL VXUNIX4.2	VAX UNIX Version	2495
ABEL VALID	Valid Logic Systems Version**	2495

*Additional copies on same order: $595.
**Additional copies on same order: $1875.

Warranty — 90 days on media only.

ABEL MANUALS

Model Number	Description	Price
ABEL VXVMSM	VAX VMS Version Manual	$100
ABEL VXUNIXM	VAX UNIX Version Manual	100
ABEL VALIDM	Valid Logic Systems Version Manual	100

Quantity Pricing: 10 or more - $75 each.

ABEL SUBSCRIPTION SERVICE

Model Number	Description	Price
ABEL PCDOSS	IBM PC Version 12 month subscription	$150*
ABEL VXVMSS	VAX VMS Version 12 month subscription	250*
ABEL VXUNIXS	VAX UNIX Version 12 month subscription	250*
ABEL VALID	Valid Logic Systems Version 12 month subscription	250*

*Subscription price when ordered with ABEL or within the 90 day warranty period. If ordered after 90 days from ABEL purchase date add $50 for PC version, $100 for versions other than PC. U.S. price list only.

PROMLINK SOFTWARE

Model Number	Description	Price
PROMlink PCD	PROMlink Distribution Package for PC-DOS	$295
PROMlink PCDS	PROMlink One Year Service Contract	150

Warranty — 90 days.

Additional quantities on same order: 2-10 = $250 each; 11 or more = $200 each. When purchased with any TOTALPak, the price is $200 each. U.S. price list only.

120A AND 121A GANG PROGRAMMER

Model Number	Description	Price
120A-20500	120A Gang Programmer, 32k x 8 RAM, 120V	$5200
120A-20600	120A Gang Programmer, 64k x 8 RAM, 120V	6400
121A-20700	121A Gang Programmer, 128k x 8 RAM, 120V	8800
121A-20800	121A Gang Programmer, 256k x 8 RAM, 120V	9850

156A IN-CIRCUIT PROGRAMMING SYSTEM

Model Number	Description	Price
156AXX	156A Mainframe (01=115 VAC, 02=230 VAC, 03=100 VAC, 04=208 VAC)	$49950
156HXX	Auxiliary Equipment Bay (01=115 VAC, 02=230 VAC, 03=100 VAC, 04=208 VAC)	3000
156H05	Operator Workstation	1300
156H10	Printer	649
156I01	Interface Kit	2600

POWER SUPPLIES (6 MAX.):

Model Number	Main Bay:	Aux. Bay:	Price
156PXX	0-7V 50A (XX=1-12)	(XX=51-62)	5100
	0-7V 20A (XX=13-24)	(XX=63-74)	4050
	0-26V 5A (XX=25-36)	(XX=75-86)	3950
	0-26V 10A (XX=37-48)	(XX=87-98)	4050
156L20	On-site installation		N/C

Contact your nearest sales representative for complete ordering information.

NOTE: Warranty is 90 days on 156A.

CALIBRATION EQUIPMENT

Model Number	Description	Price
292A	Universal Calibrator	$400
292A-004	Calibration Extender Fixture (100A, 29A, 29B, 19)	175
292A-006	Calibration Extender (120A/121A)	100
293A-004	LogicPak Service Cable	100
293A-006	LogicPak Extender Board	125

Model Number	Description	Price
UPDATES/UPGRADES		
951-0002-002	Model 16 Upgrade Kit 8k x 8	$ 575
951-0078-001	24-pin Gang Module Upgrade to 28-pin .	435
951-0188-001	Disc Drive Update Kit for 200A	900
951-0188-002	Control Panel Update Kit for 200A	500
951-1259-004	22B to 22A Upgrade	1700
120-1A-SUPD	120/121 Software/Algorithm Update Kit . .	325
U1-SUPD	UniPak User Installable Update	325
U2-SUPD	UniPak 2 User Installable Update	325
M-SUPD	MOSPak User Installable Update	325
G-SUPD	GangPak User Installable Update	325
EXPANDED MEMORIES AND MEMORY UPGRADES		
950-1533-2	System 19 16k RAM Expansion (For old 1900 series only)	$850
29A 16K EXP	Model 29A 16k RAM Expansion (For use in all Model 29A's, the new 1900 Series and with Model 100A)	850
29A 64K EXP	Model 29A 64k RAM Expansion (For use in Model 29A only.)	800
120/121 SOFTWARE AND HARDWARE UPDATES		
120/1ASUPD	120A or 121A Software/Algorithm Update Kit (user installable)	$ 325
121AC128K1	121A Conversion Update: 16 or 32k 120 or 122 to 128k 121	3750
121AC128K2	121A Conversion Update: 64k 120 to 128k 121	2600
121AC256K1	121A Conversion Update: 16 or 32k 120 or 122 to 256k 121	4785
121AC256K2	121A Conversion Update: 64k 120 to 256k 121	3640
120A32K	120A RAM/Software Update: 16k to 32k	650
120A64K	120A RAM/Software Update: 16 or 32k to 64k	1250
121A128K1	121A RAM/Software Update: 32 or 64k to 128k	1250
121A128K2	121A RAM/Software Update: 128k to 256k	1250
121A256K	121A RAM/Software Update: 32 or 64k to 256k	2290
SPARE SOCKET KITS		
951-0074	For Gang Programming Module (28-pin Sockets)	$200
951-0075	For Gang Programming Module (24-pin Sockets)	110
951-0076	For MOSPak	100
951-0099	For UniPak	150

Model Number	Description	Price
MISCELLANEOUS ACCESSORIES		
324-0188-002	Data File Operating System (DFOS) (DCU)	$ 25
449-0019	Carrying Case for 29A, 29B or System 17/19 with UniPak or UniPak 2	150
709-0059-001	Intel Interface Cable	100
709-0080	Tektronix to 17/19 Cable	100
709-1012	Shield Cable 26-pin	50
709-0197-001	IBM PC to 29/19/22/120 Interface Cable .	40
750-1511-001	PLDS Carrying Case	300
940-0919	Program Carrier Pak	100
240A*	Port Multiplier with Interface Kit	660
950-1950	Serial Paper Tape Reader	950
901-1951	Serial Paper Tape Reader Punch (100A, 29A, 29B, System 17/19, Model 16)	2750
950-0101-001	Footswitch	125
950-0102-001	MCT Interface Kit	825
950-0102-002	Delta Interface Kit	825
950-0103-001	Blank Discs, box of 10 (200A)	100
999-XXXX	Variable Programming Parameter Option available for 121A or UniPak 2 . . . . (Restricted distribution, contact your nearest sales representative.)	1000

This price list does not represent the entire Data I/O product line. For specific details about price and availability, contact your local Data I/O office representative.

Prices and model numbers are subject to change without notice.

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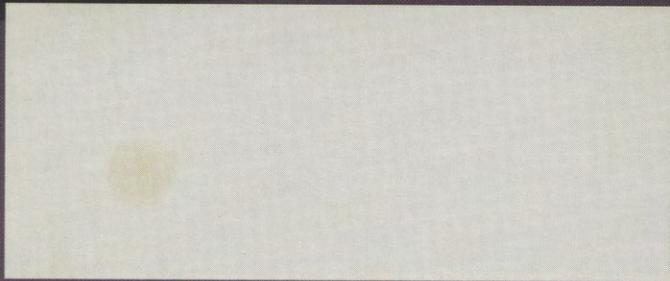Electro Sales Associates
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