Codex
6050 Distributed Communications Processor

Operator's Guide

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codex
corporation

PROPRIETARY MATERIAL

USER/READER COMMENTS

Your attention is directed to the last page of this document which is a Codex-
addressed reply form to be used for evaluating the effectiveness of this manual.
All comments are beneficial to both you, the product consumer, and to Codex, the
supplier.

WARNING

This equipment generates, uses, and can radiate radio
frequency energy and if not installed and used in
accordance with the instruction manual, may cause in-
terference to radio communications. As temporarily
permitted by regulation, it has not been tested for com-
pliance with the limits for Class A computing devices
pursuant to Subpart J of Part I5 of FCC Rules, which
are designed to provide reasonable protection against
such interference. Operation of this equipment in a
residential area is likely to cause interference in which
case the user, at his own expense, will be required to
take whatever measures may be required to correct
the interference.   06888

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1.1 GENERAL

The Codex 6050 Distributed Communications Processor (DCP), shown in Figure 1-1, is an advanced information transportation system with the capabilities required to support the wide-ranging needs of modern data networks, and the adaptability to meet the evolving needs of future data networks. This chapter provides general information on the capabilities and interaction of 6050 supervisory devices, identifying and describing pertinent physical characteristics and general functions of each supervisory device, and providing an overall view of the relationship between the interface ports, intelligent port modules, and the supervisory devices.

66051-1

Figure 1-1
Codex 6050 Distributed Communications Processor

1.2 NETWORK OVERVIEW

The 6050 DCP is a powerful communications processor which serves as a node in a distributed communications network. A typical 6050 network (see Figure 1-2) is made up of two or more nodes, each of which offers support for up to 120 circuits requiring access to the network. 6050 nodes communicate with each other via terrestrial or satellite network links. There are two types of nodes in the 6050 network: primary and secondary. At the minimum, a primary node includes an Intelligent Floppy Disk Port (I/FDP) with floppy disk drives, an Intelligent Control Terminal Port (I/CTP) with a control terminal, and a Network Port or Group Band Network Port. A secondary node does not contain a system software disk.
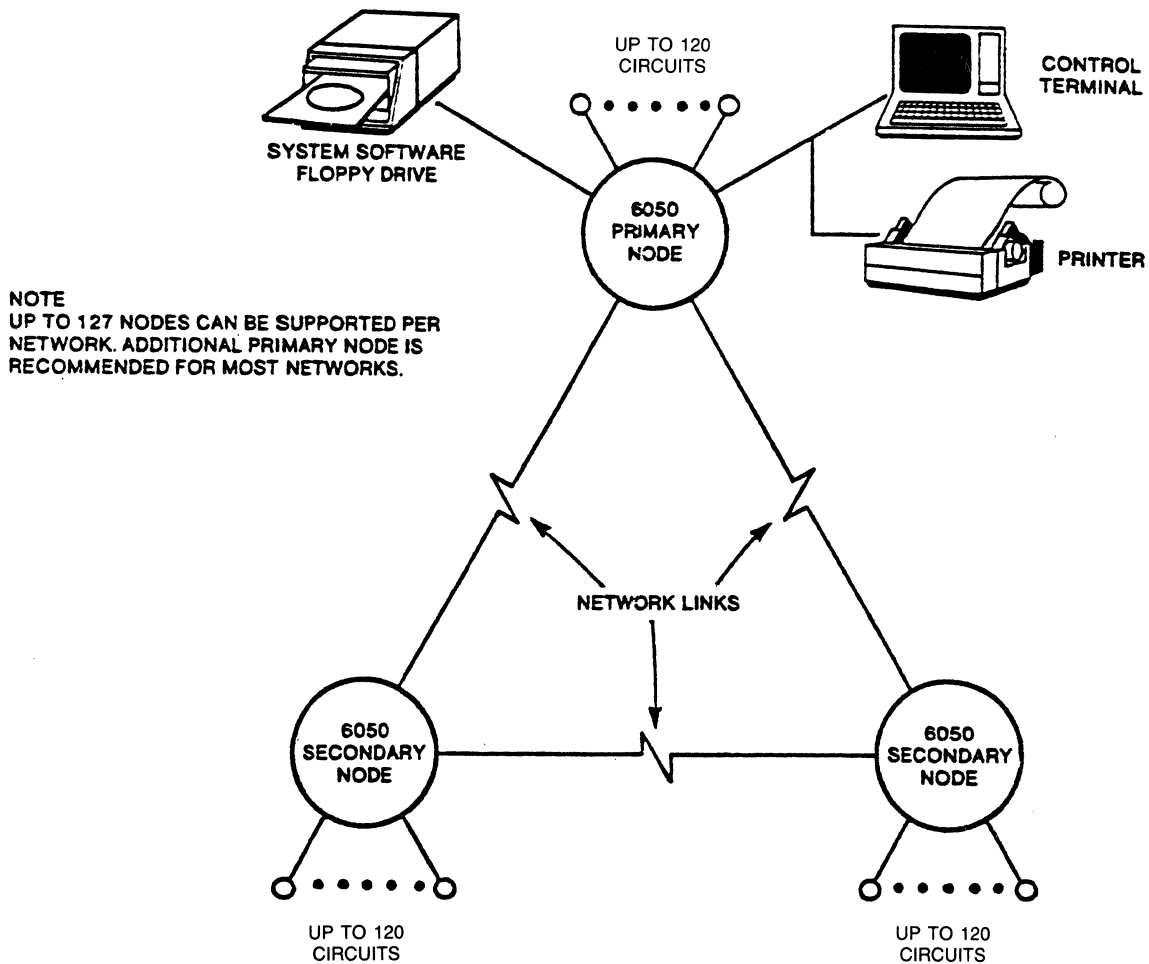
Figure 1-2
Basic Network Architecture

From any I/CTP in the network, various operating characteristics and parameter thresholds for any node in the entire network may be defined, employing easy-to-use English language commands. At nodes without an I/CTP, on-site initiation of a limited number of supervisory functions is made possible through the mainframe console.

The 6050 DCP has an advanced modular design. As a result, a 6050 communications network can easily be expanded to support additional circuits, adapted to support new protocols, or enhanced with additional software features with the simple addition or modification of one or more modules in the existing network.

At least one 6050 node in the network will have a floppy disk which contains the system software. Upon network intitialization, the primary node 6050's will load themselves from their floppy disks and then transfer the software to any secondary 6050 nodes in the network. Up to three additional floppy disks can be used to provide backup capability. The initialization procedure for each node includes diagnostic tests to verify the functionality of all elements prior to inclusion of that element in the node.

At each node, intelligent ports are used to interface with lines, controllers, or terminals requiring access to the network. There are several different intelligent port types for the protocols supported. An intelligent terminal port is used to interface the user's peripheral equipment to the 6050 network. The amount of data that must be transmitted through the network is significantly reduced through adaptive data compression.

The path by which information is routed through the network, from the source node to the destination node, is determined in one of three ways: (1) a fixed path can be predefined by the user, (2) a preferred route may be specified, or (3) the route is dynamically assigned according to the shortest path available at the time the call is made. Transmit and receive paths between two ports in the network are routed independently of each other.

The 6050 is also capable of rerouting calls in progress. If a network link becomes too congested or fails completely, these calls are rerouted over alternate network links.

Data from active terminals, bound for transmission over the same network link, is statistically multiplexed on the link. Intelligent network ports act as an interface between a 6050 node and the physical network link.

The delivery of the data from source to destination is ensured by the use of an end-to-end GO-BACK-N-ARQ scheme. Intelligent port buffers are protected from overflow and subsequent loss of data with an automatic data restraint capability. GO-BACK-N-ARQ is also employed locally on network links.

Network operating parameters (such as network link error density) are continuously monitored, and performance statistics are calculated and updated at each node. If the predefined threshold for a particular parameter is exceeded, a report is generated and sent to a predefined central monitoring location. The report is then displayed at the 6050 control terminal or printed on the 6050 control printer.

An operator receiving an alarm report can respond from any control terminal by using the extensive diagnostic capabilities to quickly isolate the source of the problem. The problem can then be bypassed to prevent degradation of the unaffected portion of the network. In many cases, recovery from the problem is automatic.

For problems that are not easily resolved, the Codex Remote Diagnostics Option allows thoroughly trained Codex Customer Service personnel, under user control, to dial into the affected network to perform various diagnostic functions from the Codex Remote Diagnostics Center. The user retains the right to restrict access to the network.

1.3 SUPERVISORY FUNCTIONS

The supervisory functions offered by the 6050 DCP are described in the following paragraphs.

1.3.1 MODE CONTROL

The control terminal and the mainframe console function in one of three operating modes. Each mode provides a different level of supervisory capabilities:

- Monitor Mode. In this mode an operator is restricted to the examination of the network configuration, statistics, and reports. The operator is not allowed to redefine network operating parameter values.

- Program Mode. The Program Mode is identical to the Monitor Mode, except that new parameter values can be defined.

- Control Mode (Customer Engineering Mode). A password is required to enter the Control Mode which allows authorized personnel to access additional functions not normally needed in a working network. The Control Mode is used with the main-frame console, while the equivalent Customer Engineering Mode is used with the control terminal.

1.3.2 CONFIGURATION EDITOR

The Configuration Editor function allows an operator to define the operatingara-meters for each node and port in the communications network. Depending on the size of the node, one to four node configurations can be defined and stored in the configuration memory of a 6050 DCP.

The configuration process, which can be performed from any control terminal in the network, is structured in an easy-to-use menu format. A list of command options or parameters is displayed on the control terminal screen for examination. Using the control terminal keyboard, the operator can call up the configuration of a parti-cular node or port by selecting the appropriate command options (for example, Node Address, Port Address, etc.) or may redefine the value of one or more parameters (for example, speed, mode, etc.) on a single line.

1.3.3 INITIALIZATION

The intialization or boot function is an operator command specifying that the network or a specific node or port be reinitialized, often with a new operating configuration. There are four types of boots: network, forced, node, and port. All four types of boots can be performed from the control terminal in either the Program or Control Mode. Boots from the control terminal also allow respecification of the running software revision and release. The only type of boots that can be performed from the mainframe are port resets and loads, and node boots.

     a. Network Boot. A network boot reinitializes all nodes in the network with the configuration specified during the boot command. The configuration may be specified as one of the four standard total network configurations.

     b. Forced Boot. A forced boot can be issued to reinitialize a specified node in its current operating configuration or in a special diagnostic configuration.

     c. Node Boot. A node boot enables a node to be reinitialized in a specific offline configuration.

     d. Port Boot. A port boot can be used to reinitialize a specified port in its current operating configuration or in a special diagnostic configuration.

1.3.4 PERFORMANCE STATISTICS

Each 6050 DCP continuously monitors and maintains comprehensive network performance statistics (i.e., Statistical Throughput, Error Density, Buffer Utilization, etc.).

Performance statistics can be requested for any node or port in the network from any supervisory control terminal, and a hard-copy record of the requested statistics may be printed out if a control terminal printer is present.

1.3.5 NETWORK REPORTS

The 6050 will automatically generate a report in the event of a node or port failure, an exceeded performance statistic threshold, or a significant network occurrence (such as when a node or link is initialized).

These reports can be routed to any control terminal in the network. The destination node and port for network reports are defined per node by the operator. Depending upon the cause of the report, one of two report types is generated:

     a. Alarm Reports. The 6050 monitors the status of critical performance parameters and will automatically generate an alarm report if the value of any one of the parameters exceeds a configured threshold. The parameter thresholds are set by the user during the configuration process and can be individually modified as needed. An alarm report is also issued if there is a significant occurrence in the network or if any segment of the communications network fails.

     b. Status Reports. Each node upon request can generate a status report consisting of the current values of the calculated performance statistics for the node and each port at the node.

1.3.6 FLOPPY UTILITIES

The floppy utilities function is used to format floppy disks as software disks, to copy disks, to examine or modify floppy disk files, and to perform diagnostic checks of floppy disks and disk drives.

1.3.7 PROTECTED SERVICE UTILITIES

The system services function allows an operator, using the correct password, to perform various diagnostic operations. (These functions are not used in normal operations.) There are two types of protected utilities:

a. <u>Packetgen Utility</u>. Packet generation is used to send addressed packets of information to any node or port in the network. This information may cause a port reset, may initiate diagnostics for a node or specific port, or may reinitialize a port or node after diagnostics are completed. The packet generation utility can only be accessed in the control mode, which requires a special operator password.

b. <u>Memory Utility</u>. The memory utility allows an operator to examine nonrestricted areas of memory at any active node or port in the network. Basically, these nonrestricted areas are those not containing user data. Portions of memory can be displayed in 1- to 238-byte blocks and, if the control terminal is in the password-protected control mode, authorized personnel are allowed to modify the contents of the displayed memory.

1.3.8 DIAGNOSTICS

The 6050 DCP provides comprehensive diagnostics capabilities which enable easy detection of failed elements in the communications network, thereby ensuring network availability.

There are three areas of diagnostic capabilities: Start-Up Diagnostics, On-Line Background Diagnostics, and Built-In Selective Test Routines. Each of these is described below.

      a. <u>Start-Up Diagnostics</u>. Whenever the network, or a specific node or port, is initialized, a comprehensive range of start-up diagnostics is performed to verify the functionality of the associated elements before user data is accepted. The status of the involved elements is indicated via a network report which is sent to a specified supervisory control terminal (except during power-up, when only failing elements will generate a report).

      b. <u>On-Line Background Diagnostics</u>. Various routines are included in the system software to monitor the status of functional components during normal network operation. Performance statistics are calculated and maintained and any degradation of performance will trigger a network report which is sent to a specified supervisory control terminal. The network report indicates the nature and location of the problem. Using network reports, an operator can quickly react to remedy or bypass a network fault before user data is affected.

      c. <u>Built-In Selective Test Routines</u>. The 6050 DCP includes an extensive range of selective test routines to enable an operator to perform diagnostics. The test routines include special node or port diagnostic configurations and port loopback testing.

1.3.9 CODEX DIAL-IN DIAGNOSTICS SERVICES

To reduce network downtime in the event of network problems that are not easily identifiable, Codex has established a 6050 Remote Diagnostics Center. The 6050 offers a Remote Diagostics Option (see Figure 1-3), consisting of an Intelligent Control Terminal Port (I/CTP) and a dial-up modem, which allows experienced Codex Customer Service personnel to dial in to the user network to perform sophisticated diagnostics from the Remote Diagnostics Center. To ensure network security, the dial-up modem can be switched off-line under user control.

1.4 SUPERVISORY DEVICES

There are six supervisory devices used with the 6050 to perform all management functions. The relationship of the supervisory devices and intelligent ports to the 6050 DCP mainframe is illustrated in Figure 1-4. Following is a general description of the functions, capabilities, and requirements of the supervisory devices. Interface ports are described in Section 1.5.

CUSTOMER NETWORK

6050
NODE

REMOTE DIAGNOSTICS OPTION

I/CTP

DIAL
MODEM

CODEX
DISTRIBUTED
DIAGNOSTICS
CENTER
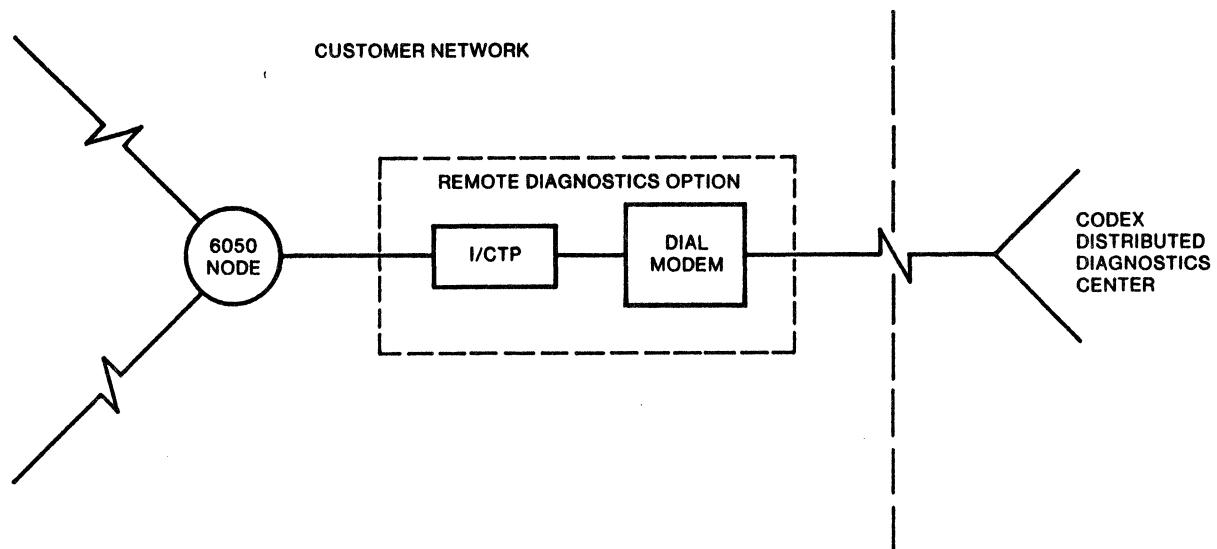
Figure 1-3
Remote Diagnostics Option

1.4.1 CONTROL TERMINAL

The Control Terminal (CT) is an ASCII asynchronous terminal through which the operator communicates with the Intelligent Control Terminal Port (I/CTP). The CT serves as a centralized control station, and in conjunction with other supervisory interface devices, provides a means for the management of an entire 6050 network. A minimum of one CT is required per network to initiate and perform all of the management functions available with the 6050 DCP. An additional CT is recommended for redundancy purposes. Note that the CT merely provides the means for the operator to communicate with the I/CTP. It is the I/CTP which implements the supervisory functions.

All communications between the operator and the I/CTP are via English-language commands and instructions. The command process is menu-formatted: a list of command options is presented and the operator selects one to be acted on; based upon the operator's selection, an action is intitiated, a parameter value is defined, or an additional set of command options is presented.

To aid the operator with the use of the CT, the I/CTP maintains a list of messages which are triggered for display by operator errors. These messages identify the specific operator action which caused the error, thereby allowing easy recovery.

The specific capabilities of the I/CTP include mode control, configuration editing, booting, performance statistics, network reports, floppy utilities, and diagnostics. See Section 1.3 for explanations of these capabilities.

Chapter 2 provides a detailed description of system operation from the Control Terminal.

1-8

MAINFRAME
CONSOLE

SUPERVISORY
PORTS

MAINFRAME

SUPERVISORY
DEVICES

I/CTP

I/FDP

CONTROL
TERMINAL

PRINTER

SYSTEM
SOFTWARE
DRIVE
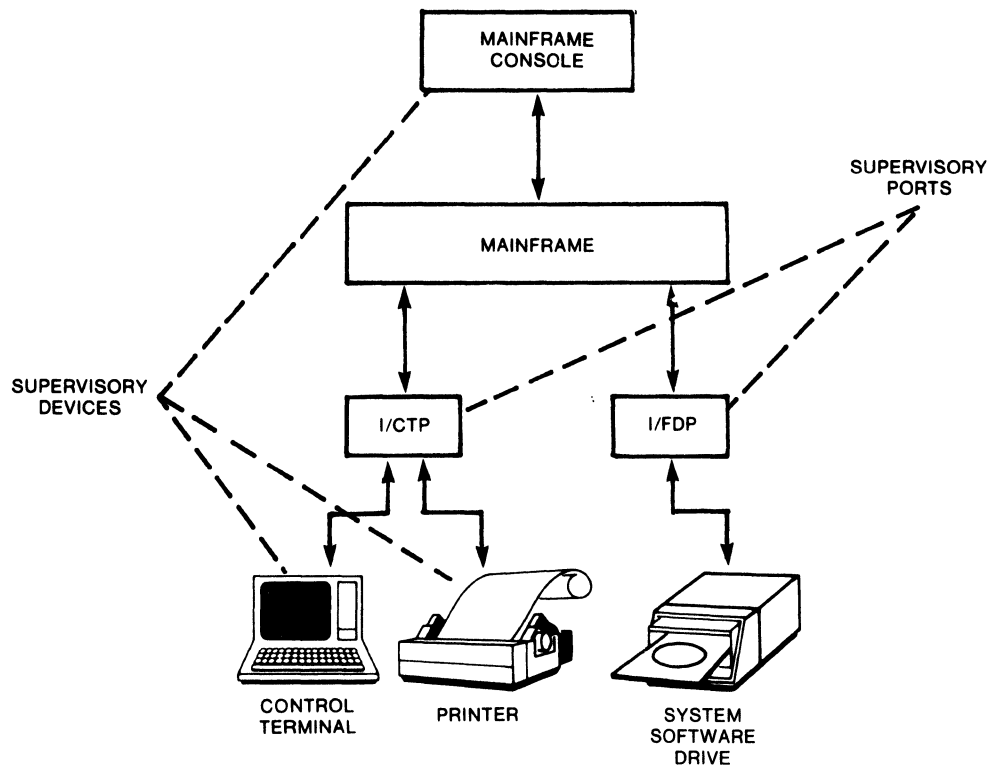
Figure 1-4
Supervisory Interface

1.4.2 MAINFRAME CONSOLE

The mainframe console is used to provide secondary nodes without a CTP with a limited number of supervisory functions. From the mainframe console, most supervisory capability is limited to elements within the node.

The mainframe console is the only device at the node which is directly interfaced to the 6050 mainframe and is mounted directly on the front of the mainframe. The mainframe therefore performs all control functions required to implement supervisory operations from the console. The supervisory functions available with the console are listed below:

. Node Initialization
. Port Reset
. Report Examination
. Node Diagnostics
. Port Diagnostics
. Memory Read and Write (Password Access)

The mainframe console consists of a 32-character self-scan display that is used to display entered commands and status information; an 18-key, multifunction keyboard, with each key labeled with commands and alphanumeric characters; a locking mode-control keyswitch which allows the power to the mainframe to be controlled and has three power-on settings: MON (monitor), PGM (program), and DIAG (diagnostics); and 16 LED status indicators which display machine and processor status.

The mainframe console mode is used to control the commands which are usable on the keypad at any given time. The mainframe console mode is controlled first by the position of the keyswitch and then by entry of a mode command at the keypad.

With the keyswitch in the Monitor Mode position (the normal power-on position), only some of the front panel commands are available. With the keyswitch in the Program position, the full set of commands is available. The diagnostics position is not used during normal operation.

The mode commands are:

. Monitor Mode
. Program Mode
. Control Mode

As stated earlier, the Monitor Mode is the only mode available when the keyswitch is in the Monitor position, whereas all three modes are available when the keyswitch is in the Program position.

Chapter 3 provides a detailed description of the operation of the mainframe console.

1.4.3 CONTROL PRINTER

The control printer is an optional device that can be used for logging hard copies of network reports and statistics. Any asynchronous character printer can be used as the control printer.

The I/CTP provides an interface for the control printer as well as for the supervisory control terminal.

The functions of the control printer are described below:

- <u>Report Display</u>. These reports are generated by nodes and ports throughout the network to indicate to the operator exceptions, failures, and thresholds that have been exceeded. The user may elect to have reports printed upon request by setting the Report Display Mode. The operator is notified by a changed prompt character that reports have been received and they may be displayed manually.

- <u>Statistics Monitoring</u>. The operator may request that statistics for a specific node or port be pritned.

1.4.4 SYSTEM SOFTWARE FLOPPY

The system software floppy is used to support software loading. The floppy drive is interfaced to the 6050 via an Intelligent Floppy Disk Port (I/FDP). During network initialization, the software which is stored on the floppy disk is "read" into the 6050 node via the I/FDP and subsequently downline loaded to the connected nodes over network links.

A minimum of one floppy disk drive is required at a network primary node to support the system software floppy disk. Although only one system software disk and floppy drive is <u>required</u> for a network, at least one additional unit is recommended to provide a backup source of software in the event of a primary drive failure.

The standard floppy drive assembly includes two floppy disk drives: one to support the system software disk and a second to support a backup source of software in the event of a primary drive failure.

A software floppy disk can be copied to an inactive disk for backup purposes. The operator is permitted to copy a complete floppy disk from one I/FDP drive to any other within the connected network.

1.5 INTELLIGENT PORTS

Communications with the 6050 system are implemented through interface ports. There are four functional categories of interface port types: network ports, which provide an interface between the mainframe and network links; terminal ports, which provide an interface for DTE devices seeking access to the network; supervisory ports, which provide an interface for 6050 supervisory devices; and software ports, which are actually subsets to one of the other port categories. The network, terminal, and supervisory ports are intelligent processor-based hardware modules; the software ports exist only in the configuration software.

1.5.1 INTELLIGENT NETWORK PORTS

Network ports provide an interface between the physical network link medium and the 6050 mainframe. The network port is responsible for exchanging information frames, which are assembled by the mainframe, with another network port at a remote node via a network link. The GO-BACK-N-ARQ error detection and retransmit mechanism is implemented by the network ports. The network ports also monitor the status of the network link and inform the mainframe in the event of network link failure, degradation, or congestion.

The following paragraphs describe the three types of network ports which provide an interface for three modes of network link operation.

1.5.1.1 Intelligent Network Port (I/NP).

The I/NP provides the interface for the 6050 network links, with speeds up to 19.2K bps. An I/NP can transmit up to 128 frames over a network link without acknowledgment (ARQ-ACK).

1.5.1.2 Intelligent Group Band Network Port (I/GBNP).

The I/GBNP provides the interface for the 6050 network links of 48K bps to 64K bps. An I/GBNP can transmit up to 128 frames over a network link without acknowledgment (ARQ-ACK).

1.5.1.3 Intelligent Multiplexer Port (I/MXP).

The I/MXP provides the interface to a 6001, 6005, 6010, or a 6030/6040 network for up to 25 multiplexed connections.

1.5.2 INTELLIGENT TERMINAL PORTS

The intelligent terminal ports provide an interface for DTE devices requiring access to the communications network. DCE devices are also supported with the use of Codex crossover cables.

The terminal ports are responsible for establishing a call between two terminals which wish to exchange information, handling the protocol and control signals of their interfacing terminals, and implementing the end-to-end flow control mechanism. Terminal ports also measure and monitor an extensive set of performance statistics for their respective terminal links and report any performance statistics which exceed a predefined threshold.

There are four types of terminal ports, each used to support a different terminal protocol. Three of the port types – I/MATP, I/MSTP, I/BOP – provide transparent protocol support (i.e., 6050 intervention is not required).

1.5.2.1 Intelligent Multiple Asynchronous Terminal Port (I/MATP).

The I/MATP passes data from 1 to 16 asynchronous terminals to the 6050 network without protocol intervention.

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1.5.2.2 Intelligent Multiple Synchronous Terminal Port (I/MSTP).

The I/MSTP passes data from 1 to 16 synchronous lines or devices to the 6050 network without protocol intervention. A single-threaded data movement feature allows an MSTP configured with only one virtual port or thread to be handled as a single-thread port (e.g., I/BOP), thereby eliminating the mainframe buffering delay. This provides the user with a method of decreasing network delay for critical bisync circuits. This feature will work only when a single thread is configured on the port.

1.5.2.3 Intelligent Bit-Oriented Protocol Port (I/BOP).

The I/BOP provides the interface for HDLC, SDLC, and ADCCP lines or devices.

1.5.2.4 Intelligent Block Mode Bisync Protocol Intervention Terminal Port (I/SSTP).

The I/SSTP provides the interface between the network and a synchronous terminal. Protocol intervention is used by this port type to maximize the number of bisync blocks passed through the network.

1.5.2.5 Automatic Data Compression Disable.

For an I/MATP or I/MSTP up to eight threads can be supported by data compression.

1.5.3 SUPERVISORY INTERFACE PORTS

The 6050 supervisory ports offer a software and hardware interface for 6050 supervisory devices. The 6050 supervisory functions are implemented in the supervisory ports. There are two types of supervisory ports, as described in the following paragraphs.

1.5.3.1 Intelligent Control Terminal Port (I/CTP).

The I/CTP allows the network operator to perform on-line configuration, network booting, on-line customer engineering maintenance, and statistics and report displaying for the 6050 network. In addition, a printer may be connected to the second channel of the control terminal card to provide hard copy of acknowledgments and messages received. The supervisory functions controlled in the I/CTP are described in Section 1.3. Multiple I/CTP's operating at various data rates (up to 19.2K bps) can be supported at a node.

1.5.3.2 Intelligent Floppy Drive Port (I/FDP).

The I/FDP provides an interface for up to four double-sided, double-density floppy disk drives. The I/FDP supports a file system that allows reading of software modules stored on floppy disk by name. This file system allows the 6050 to load itself with the system software. The I/FDP is also capable of writing files on floppy disk to allow formatting of new diskettes, and copying of software diskettes.

1.5.4 SOFTWARE PORTS

Software ports, as the name implies, exist only in the mainframe configuration memory. The three types of software ports are listed below.

1.5.4.1 Transfer Port.

A transfer port is configured at a node to provide a software port through which to route information which is received over a network link, destined for another node.

1.5.4.2 Virtual Port.

A virtual port must be configured to support each of the multiple terminal links which are interfaced through an I/MXP, I/MATP, or I/MSTP.

1.5.4.3 Autospeed Definitions.

Autospeed definitions can be configured for an asynchronous terminal link that is defined as an autospeed port. Autospeed allows a terminal port to automatically configure itself according to the characteristics of the data terminal it is servicing. Autospeed definitions are "spare" terminal port configurations which are stored in configuration memory.

1.6 INTELLIGENT PORT MODULES

Each intelligent interface port consists of the following hardware modules: an engine module, one or more communications modules, and an I/O adapter module for each communications module. Brief explanations of these hardware modules are given below.

1.6.1 ENGINE MODULES

The engine module contains a 6800 or 6809 microprocessor with sufficient RAM and ROM to provide significant processing capacity for the port, two Bus Interface Chips (BIC's) for coordinating communications between the port, the mainframe, and a real-time clock generator. The 6800-based module is referred to as an I/ENG1 and the 6809-based module is referred to as an I/ENG2.

1.6.2 COMMUNICATIONS MODULES

The communications module handles all protocol with the external DTE during data and control signal transfer. The general type of communications module varies according to port type.

There are two hardware versions of the communications module: a daughterboard communications module and a stand-alone communications module.

1.6.2.1 <u>Daughter-Type Communications Modules.</u>
The daughterboard mounts directly on the engine module with which it is operating. There are two functional types of daughter board communications modules as described below.

- <u>BIT Daughter (BIT-D).</u> Used as the communications module for an I/MXP, I/NP, or I/BOP terminal port.

- <u>BYTE Daughter (BYTE-D).</u> Used as the communications module for I/SSTP terminal ports.

1.6.2.2 <u>Stand-Alone Communications Modules.</u>
A stand-alone communications module is a full-size board which mounts in the next slot to the immediate right of its associated engine module. There are four functional types of stand-alone communications modules as described below.

- <u>Quad-Byte (QBYTE).</u> Used as the communications module for the I/MATP and I/MSTP terminal ports. Up to four QBYTE modules can be combined under the control of a single engine to support up to 16 devices.

- <u>Group Band Communications Module (VBIT).</u> Used as the communications module for the I/GBNP network port.

- <u>Control Terminal Card (CTC).</u> Used as the communications module for the I/CTP and the I/DGP supervisory ports.

- <u>Floppy Drive Controller (FDC).</u> Used as the communications module for the I/FDP.

1.6.3 I/O ADAPTER MODULES

The I/O adapter modules extend the port interface through the open top of the port nest backplane for cabling to the peripheral device. The I/O adapter modules allow for all interface connections to be made in the rear of the mounting cabinet, allowing free access to all mainframe and port controls and providing an unobstructed view of the status indicators at the front of the cabinet.

There are four types of I/O adapters, each of which is described below.

- Single RS-232-C Adapter Module. Used with all of the daughter-type communications module-based ports and mounts on the port's engine module. The I/NP, I/BOP, I/SSTP, and I/MXP intelligent ports use a Single I/O adapter.

- Quad RS-232-C Adapter Module. Provides an interface connection for up to four peripheral devices operating within EIA RS-232-C/CCITT V.35 specifications. The Quad I/O edge connector plugs over the connector of its associated stand-alone communications module. The I/MATP, I/MSTP, and I/CTP intelligent ports use a Quad I/O adapter.

- Dual Flat Cable Adapter Module. Provides two, 50-pin flat cable connectors for mainframe I/O bus cabling or floppy drive cabling. The flat cable I/O adapter is used for the I/FDP and the INIC.

- V.35 I/O Adapter Module. Provides a single interface to the I/GBNP for a peripheral device operating within CCITT V.35/Bell DDS group band specifications. The V.35 I/O is connected to the VBIT communications module.

1.7 ADDRESSING CONVENTIONS

Port addresses should be configured according to the following guidelines.

1.7.1 PHYSICAL PORT ADDRESSES

A 6050 nest contains a Nest Interface Card (NIC) slot and 16 additional card slots, each capable of receiving a circuit card. Each slot has two hexadecimal addresses; therefore, each nest has a total of 32 hexadecimal addresses. These addresses begin at x'00' for the first slot in the first nest and continue upward to x'1F' for the last slot in the first nest; x'3F' for the last slot in the second nest; and so forth, up to x'7F' for the last slot in the fourth nest (see Figure 1-5).

All ports in the 6050 require a physical address. This address is the first (even) hexadecimal address of the slot into which the supporting circuit card is plugged. For example, the physical port address of the last (rightmost) slot of the first nest would be x'1E.' Note that all physical addresses are even, that is, x'00,' x'02,' x'04,' etc. Also note that since the first slot in the first nest of all 6050 systems is reserved for a debugger, addresses x'00' and x'01' are reserved.

32 ADDRESSES PER NEST

NEST 1

N	00	02	04	06	08	0A	0C	0E	10	12	14	16	18	1A	1C	1E
I																
C	01	03	05	07	09	0B	0D	0F	11	13	15	17	19	1B	1D	1F

RESERVED FOR DEBUGGER (↑)

NEST 3

N	40	42	44	46	48	4A	4C	4E	50	52	54	56	58	5A	5C	5E
I																
C	41	43	45	47	49	4B	4D	4F	51	53	55	57	59	5B	5D	5F

NEST 2

N	20	22	24	26	28	2A	2C	2E	30	32	34	36	38	3A	3C	3E
I																
C	21	23	25	27	29	2B	2D	2F	31	33	35	37	39	3B	3D	3F

NEST 4

N	60	62	64	66	68	6A	6C	6E	70	72	74	76	78	7A	7C	7E
I																
C	61	63	65	67	69	6B	6D	6F	71	73	75	77	79	7B	7D	7F

Figure 1-5
Nest Slot Addresses

1.7.2 CONFIGURATION PORT ADDRESSES

Certain 6050 ports support multiple communications lines: the I/MATP and the I/MSTP, which may support up to 16 lines each; and the I/MXP, which may support up to 32 virtual circuits. For the 6050 to be able to address any of these individual lines or circuits, not only is a physical address required (for the group of lines or circuits), but a virtual port address is required for each individual line or circuit.

As shown in Figure 1-6, the I/MATP itself will require a _physical_ address, and each of the four subports to which the terminals are attached requires a _virtual_ address.

1.7.3 ASSIGNMENT OF PORT ADDRESSES

Physical addresses are taken from the lower-numbered (even) of the two hexadecimal addresses for the slot that each port is plugged into. This leaves many unused addresses out of the entire range of possible choices. The unused addresses are:

- The higher-numbered (odd) addresses for each slot used by "engine" cards.

- Both addresses from slots that the I/MATP and I/MSTP "Quad" cards are plugged into.

- The higher-numbered (odd) address from slots containing an I/CTP, I/FDP, or I/DGP "engine" card, plus both addresses from the rightmost slot of that port card set.

- Both addresses from unused slots.

- Addresses in the range of x'80' to x'FF' for which there are no nests.
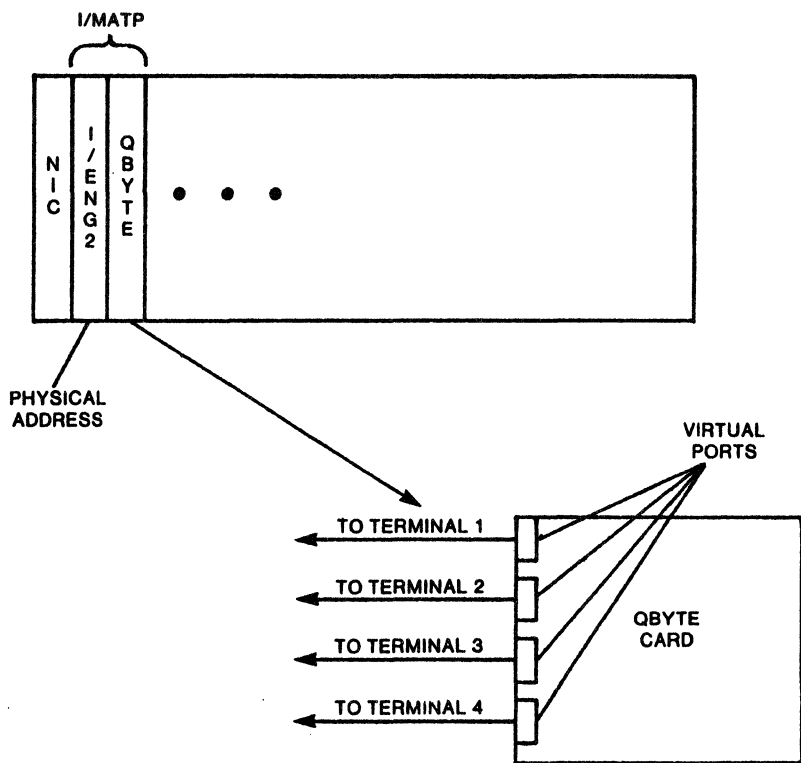
Figure 1-6
Addressing Example

1.8 START-UP PROCEDURES

In addition to the procedures outlined on the Diskette Care and Management Card (Part No. 06629), please observe the following guidelines.

a. Before powering up the mainframe, be sure that the drive window is open and the floppy diskette is not in drive.

b. Turn power on.

c. After start-up diagnostics, when the display reads "DIAG COMPLETE," insert diskette and close window. When inserting the diskette, be sure that the label is on the right-hand side surface.

d. In the event of a power failure, remove the diskette from drive.

e. If it is not necessary, do not leave the diskette running overnight. Remove the diskette and place in its protective jacket.

f. Since data will be recorded double-density, a high-quality 2D diskette must be used. Codex currently recommends 2D diskettes made by MAXELL and DYSAN.

Please note that the rectangular notch cut into the side of the diskette is for the write-enable and write-protect functions:

a. If cutout is exposed, the diskette is protected.

b. If cutout is covered with the silver tape provided, the diskette is write-enabled.

1-18

CHAPTER 2
CONTROL TERMINAL

2.1 <u>GENERAL</u>
The purpose of this chapter is to provide the user with a thorough understanding of
the operation of the Control Terminal (CT) (see Figure 2-1) for 6050 network
management.

This includes:

. A general overview of the 6050 supervisory architecture.

. Descriptions of the CT command menu, display format, input guidelines, and error
messages.

. Detailed descriptions of the menu options required to perform each available
network management operation.

Figure 2-1
Control Terminal

2.1.1 CT CONTROL OVERVIEW

In a 6050 communications network all control functions can be performed from a single ASCII-compatible terminal, located at any node in the network. However, there is no limit on the number of control terminals that can be employed in the network.

The control terminal is interfaced to a 6050 DCP mainframe via an Intelligent Control Terminal Port (I/CTP) (see Figure 2-2). The terminal in this configuration is referred to as the Control Terminal (CT).

The I/CTP contains the software and processing power necessary to communicate with an operator via the CT. The I/CTP also codes supervisory command requests from the operator into addressed command packets for transport to other network nodes, and decodes supervisory packets containing the results of a specified control operation, requested network performance or configuration information, etc., for display on the CT screen.

Note
Although the I/CTP actually performs all operator-interface related functions, this document will, for simplicity, refer to the CT as the active coordinator of control operations.

There are 13 categories of CT-initiated network management functions, each of which allows an operator to initiate one or more specific control operations. Brief descriptions of each general type of control operation are given in the following subsections.
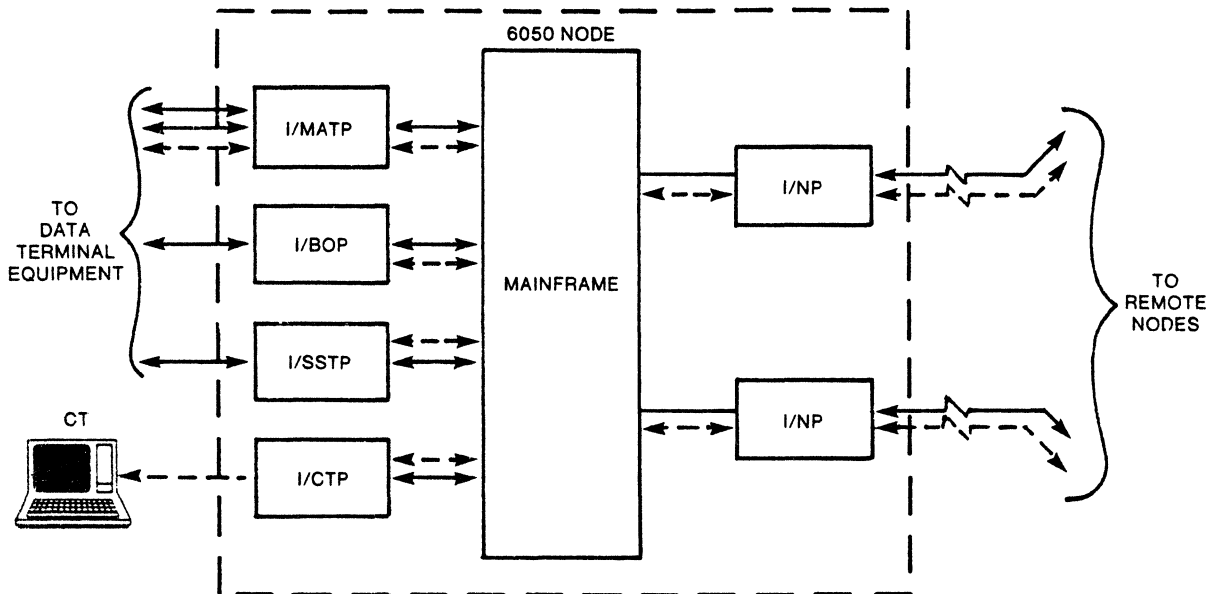
Figure 2-2
Typical CT Configuration

2.1.1.1 Configuration Editor.
The Configuration Editor function allows an operator to examine and, if desired, redefine the operating characteristics, path parameters, and statistical thresholds of any node or port in the network.

2.1.1.2 Muxport Control.
The Muxport Control option provides a way for a 6050 operator to configure a remote 6005, 6010, 6030, or 6040 Intelligent Network Processor over an existing I/MXP network link.

2.1.1.3 Reset I/CTP.
The Reset I/CTP option allows the operator to change the on-line operating characteristics (speed, data bits, etc.) of the I/CTP without performing a full port boot.

2.1.1.4 Boot.
The Boot function provides a way to reset, run start-up diagnostics on, and reinitialize any node or port or all nodes and ports in the network. This function also allows an operator to load a port, node, or the entire network with special diagnostic or operating software.

The control terminal must be in either the Program or Customer Engineering mode to access the booting functions.

2.1.1.5 System Services.
System Services provides various utilities which allow an operator to perform control functions in two areas: Floppy Utilities provides the means to format or reinitialize floppy disks and create/delete, examine, checksum, or modify disk files or sectors; Memory Utilities allows the operator to display segments of the unprotected sections of RAM for any port or node.

All System Services operations, with the exception of some floppy utilities and the memory examination function, require that the operator configure the control terminal in the Program or Customer Engineering mode.

2.1.1.6 Diagnostics.
The Diagnostics option, accessed in the Program Mode, allows an operator to run diagnostic test routines on any port in the network.

The diagnostics can be specified as ROM, which are stored in the mainframe or port memory, or loadable, which will allow standard or special diagnostic software to be down-line loaded to the node or port from a system software floppy disk.

2.1.1.7 Reports.

The Reports function allows an operator to request any accumulated network reports for examination. There are three types of network reports: alarm, status, and diagnostic. If the performance of any network element degrades below a predefined threshold, an alarm report is automatically generated and routed to a designated CT. A status report is generated in the event of a significant occurence in the network such as the establishment of a new network link. The operator is informed of a diagnostic routine with a diagnostic report.

2.1.1.8 Statistics.

The mainframe calculates, continually updates, and maintains performance statistics for the node. Each port calculates, updates, and maintains its own performance statistics.

The Statistics function allows the operator to request a listing of performance statistics for any node or port in the network.

2.1.1.9 Mode.

The Mode control function enables an operator to configure the control terminal in one of three access modes: (1) Monitor, which allows examination of the network configuration, performance statistics, and status reports, but does not allow redefinition of parameters or initiation of control functions that would impact normal network operation; (2) Program, which allows both examination and redefinition of configuration and performance parameters; or (3) Customer Engineering, which allows initiation of specialized control and diagnostic functions.

2.1.1.10 Reports Display Mode.

The Reports Display Mode can be configured for one of three display modes: (1) reports can be displayed on the CT screen upon operator request, (2) printed on the CT printer upon request, or (3) automatically printed when they are received.

2.1.1.11 Statistics Display Mode.

The Statistics Display Mode determines in which of three ways statistics will be presented: (1) statistics can be displayed on the CT screen when requested; (2) printed on an optional CT printer when requested; or (3) set to print periodically on the CT printer.

2.1.1.12 Operating Display Mode.

The Operating Display Mode allows the operator to specify one of three input/output modes for the CT. The CT can be configured to: (1) display both operator input and I/CTP output on the CT screen; (2) display operator input on the CT screen and I/CTP output on both the CT screen and CT printer; or (3) simply monitor I/CTP output on the CT printer.

2.1.1.13 Quit.

The Quit function is used as a special option when an operator is in the process of requesting statistics and would like to terminate the statistics function. This function also allows the operator to exit from MXP control.

2.1.2 GENERAL OPERATION

This section of the chapter outlines the general operating characteristics, requirements, and features of the CT.

2.1.2.1 CT Command Menu.

The CT command menu is structured in hierarchical command levels. Six of the thirteen general options listed in Paragraph 2.1.1 are available at the top level of the CT command menu; the remaining six options can be initiated at any point in the CT menu.

Six of the thirteen general options have a substructure made up of one or more command sublevels. Each of these six general options represents a category of control operations (e.g., Configuration Editor). The bottom (terminating) levels in the command structure of a general option represent specific control operations within the category (e.g., defining a port configuration, defining a node configuration, etc.). Command levels between the general option and the terminating option allow the operator to supply information (e.g., the address of the node whose configuration the operator wishes to edit) which is required to perform the desired operation.

Therefore, options displayed to the operator are one of three types: (1) general options, (2) execute options, or (3) intermediate options.

2.1.2.2 General Options.

The 13 options listed in Paragraph 2.1.1 are referred to as general options. A general option represents a category of control operations.

The general options are organized in two groups: Top-Level Options and Floating Options.

    a. Top-Level Options. Top-Level Options are those general options that can only be accessed from the top level of the CT menu. The operator must finish or cancel any other operation and direct the CT to the top level of the command menu using special control characters before the Top-Level Options can be specified. The special control characters which are used to branch around the CT menu are defined in a later section of this document.

The general options which must be accessed from the top level of the CT menu are:

- Configuration Editor
- MXP Control
- Boot
- System Services
- Diagnostics

    b. Floating Options. Floating Options are general options that can be specified at any point in the CT menu. The floating options are listed below.

- Reports
- Statistics
- Mode
- Statistic Display Mode
- Report Display Mode
- Operating Display Mode
- Quit

2.1.2.3 Execute Options.

Execute options represent specific control operations within the command menu of a general option. An execute option, when specified by the operator, will result in the actual execution of the desired control operation.

For example, the general option, Configuration Editor, offers nine execute options:

- Copying an entire defined configuration to an empty configuration (Copy To Couration).

- Emptying a configuration (Empty Configuration).

- Clearing configuration memory (CLEAR CMEM).

- Displaying the configured parameters of a node for examination or editing (Node Parameters).

- Displaying the path parameters of a port for examination or editing (Path).

- Displaying the operating characteristics of a port for examination or editing (Characteristics).

- Copying an entire defined port configuration to another port (Copy To Port).

- Displaying a list of the virtual ports attached to a port (Virtual Port List).

- Displaying the list of Autospeed Definition Ports (ADP's) attached to any VATP (ADP list).

All execute options reside at a terminating (bottom) level in the command menu of a general option. When an execute option has been specified, the operator must use special control characters to return to the top level of the CT menu.

2.1.2.4 Intermediate Options.

An intermediate option allows an operator to supply information that is required to perform an execute option. For example, under the general option, Configuration Editor, an intermediate option is used to specify the address of the node from which configuration information is requested.

Intermediate options reside at menu levels between the general option and the execute options.

2.1.2.5 Command Menu Diagrams.

The Command Menu of a general option, including intermediate and execute options, can be illustrated in a tree diagram. As an example, the menu for the general option, Configuration Editor, is illustrated in the tree diagram in Figure 2-3.

The conventions used in the Command Menu Diagrams, as well as throughout the Chapter, are defined in Table 2-1.

Level				
top level	Configuration EDitor			
2nd level	Configuration: n			
3rd level	Node: X'nn'	*COPY TO CONFiguration: X'nn'		
4th level	Port: X'nn'	Node Parameters	*EMPTY CONFiguration	CLEAR CMEM	ADP list
5th level	Type: xxxx			
6th level	CHaracteristics	PAth	Virtual Port list	*COPY TO PORT: X'nn'
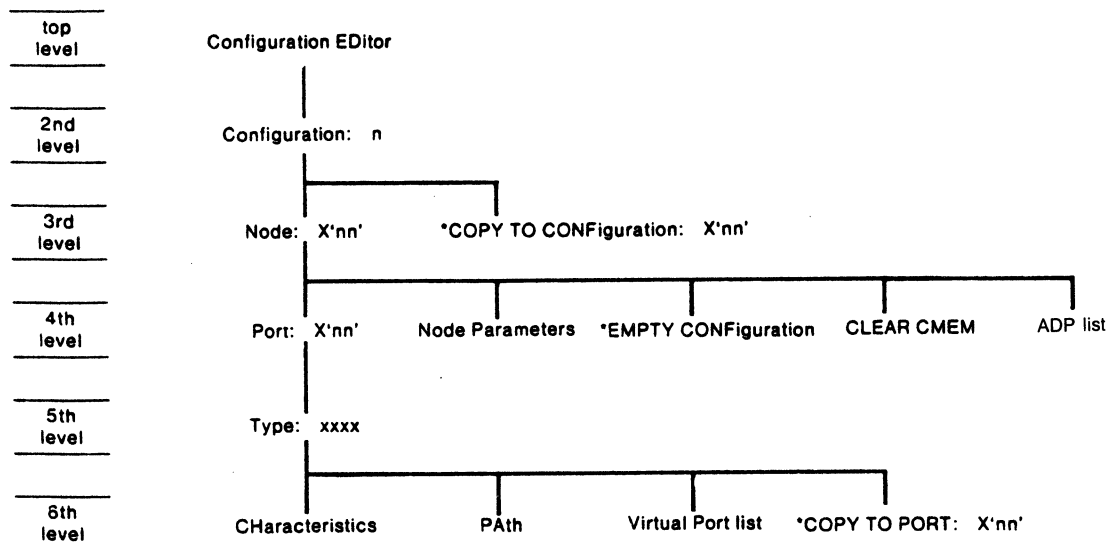
Figure 2-3
Configuration EDitor Command Menu Diagram

Table 2-1
Command Menu Diagram Conventions

Symbol	Definition
‾‾‾‾	Execute options are underlined.
----	Those options which are directly linked with a horizontal line are displayed together at the indicated menu level as choices for the operator.
**	Indicates that the associated option is only available when the CT is in the customer engineering mode.
*	Indicates that the associated option is only available when the CT is in the program or customer engineering modes.
#	Indicates that the associated option is only available when addressing Configuration 0.
:	Indicates that the operator must define a value for the associated option.
nn	Identifies a double-digit option value.
X' '	Identifies a hexadecimal option value.
xxxx	Indicates that the option value has a mnemonic syntax.

2.1.3 I/O PROTOCOL

The CT normally resides at the top level of the CT command menu. At this level, the six Top-Level General Options are displayed on the CT screen as selections for the operator (see Figure 2-4). The last line, RUNNING CONFIGURATION:, is a status line indicating the configuration that is running on-line. The seven Floating General Options, which can be specified at any level, are also available.

Note

The options which are displayed at a particular
level depend on the access mode (MODE) of the CT.

The typical procedure involved in the initiation of a control function is listed below:

• The operator specifies the appropriate general option (e.g., Configuration Editor) and redefines its value if necessary.

• The SCT will branch to the next menu level (if there is one) and display the intermediate and/or execute options at that level.

• The operator specifies the appropriate execute option or defines an intermediate option.

• If an execute option is specified, the CT will wait for information on the results of the control function that was initiated. If an intermediate option is defined, the CT will branch to the next level in the command menu of general option and display the execute and/or intermediate options at that level.

• This specification/branching procedure continues until all of the intermediate options which are required to initiate an execute option are defined and the appropriate execute option is specified.

CODEX 6050 NETWORK CONTROL PORT ON LINE

Configuration EDitor
MXP control
RESET ICTP
BOOT   (OPTIONS)
System Services
DIAGnostics
RUNNING CONFIGURATION: X'02'

>
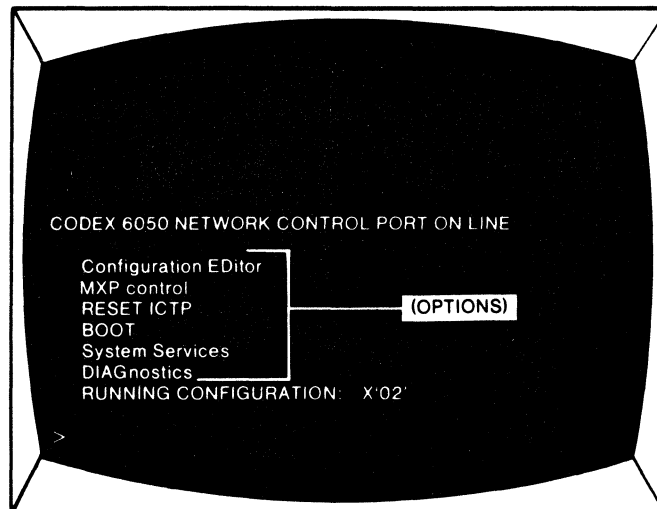
Figure 2-4
Top-Level General Options

2-8

2.1.4 DISPLAY FORMAT

The Configuration Editor command menu is used in this section to provide examples of the CT display format.

2.1.4.1 Command Option Syntax.

A basic Command Option is displayed as shown below.

<center>Configuration EDitor</center>

The upper-case letters are used to indicate the valid input abbreviation for the mnemonic. The valid input abbreviation for Configuration EDitor is CED.

Command options that have a value are displayed as shown below.

<center>Node: X'06'</center>

Where:

```
    Node = Command option mnemonic
     (N = Valid input abbreviation for the mnemonic)
      : = Separator character between the option and its value
     06 = Value of the command option
  X'  ' = Symbol indicating that the option value is given in hexadecimal
```

<center>Note</center>
<center>
Command options that have a configurable value are
always defined at some value. If the option has
not been previously defined, the option will be
defined at preset default value.
</center>

2.1.4.2 Standard Screen Format.

As described in the previous section, when an operator selects a command option the CT will descend to the next level in the command menu and display the options at that level. The general format of the screen display is illustrated in Figure 2-5.

The basic CT screen display is made up of four segments: verification field, command option field, orientation line, and an input line. The verification field, command option field, and orientation line are I/CTP output lines. All I/CTP output lines are indented two characters from the left margin when displayed on the CT screen. Each of these display segments is described in the following sections.
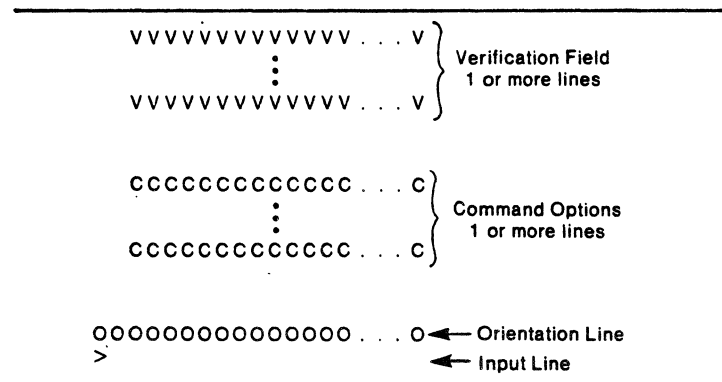
<center>Figure 2-5
Format of Standard Screen Display</center>

a. <u>Verification Field.</u> When the CT branches to a new command level in any of the general option menus, the first line (or lines) of display is (are) used to verify the command option selection(s) at the preceding command level.

For example, when an operator specifies a new configuration of 2 (two) for the intermediate option, Configuration: n, in the Configuration Editor command menu, the CT will respond by displaying a verification of the command as shown below.

<p style="text-align:center">Configuration: 2</p>

A verification line is displayed for each command option selected or defined on the last operator input line.

b. <u>Command Option Field.</u> After the verification field is displayed the CT will space down three lines and display the command options at the next level of the menu. Each command option is displayed on a separate line. The command options which are displayed at this menu level in the example are:

    Node: X'nn'
    COPY TO CONFiguration: X'nn'

Node: X'nn' is an intermediate option requesting the address of a node; COPY TO CONFiguration: X'nn' is an execute option which requests the address of a configuration that configuration 2 should be copied to; EMPTY CONFiguration is an execute option requesting that the configuration specified at the preceding level be emptied.

c. <u>Orientation Line.</u> After the command options are displayed, the CT will again space down three lines and display an orientation line. The orientation line indicates the current location of the CT in the command menu, and serves as a reference showing which command options the operator selected at each of the preceding levels of the menu. The abbreviated mnemonics for the command options selected at each of the preceding command levels are displayed on a single line, separated by a space.

The orientation line at this level of the Configuration Editor menu would be as follows.

    CED C=2

where:

    CED   Indicates that Configuration Editor was selected as the general
              option at the top level of the menu.
    C=2   Indicates that configuration two was specified at the last level.

d. **Input Line.** The fourth segment of the standard screen display is an operator input line. The input line is identified with a prompt character. The standard prompt character is the "greater than" (>) sign.

The full screen display for this command level, as it will appear on the CT, is illustrated in Figure 2-6.

2.1.4.3 Scrolling Screen Display.

The CT displays information in a scrolling manner. As information is received by the CT (from either the operator or the I/CTP) it is displayed on the required number of display lines at the bottom of the screen. As new information is received, the older information is shifted up on the screen to allow enough lines of display to display the new information. Older information eventually scrolls off the top of the display screen.

2.1.5 INPUT FORMAT

All communications from the operator are entered on an input line. The input line allows an operator to specify and/or redefine one or more command options. However, an input line can also be used to simply direct the CT to a specific location in the command menu. These applications of the input line are detailed in the following subsections.

An input line typically consists of three elements (see Figure 2-7): an input prompt, which is displayed by the CT and serves to identify the need for information from the operator; an option selection field, in which the operator specifies, and if desired, redefines one or more command options or parameters; and an input line terminator, which is required at the end of all input lines and, when entered at the CT keyboard, will actually cause the input information to be routed from the CT to the I/CTP for implementation. Input line terminators also contain special instructions for the CT.

At minimum, an input line consists of the displayed input prompt and an input line terminator.


```
Configuration:  X'02'

Node:  X'nn'
COPY TO CONFiguration:  X'nn'

CED C=2
>
```
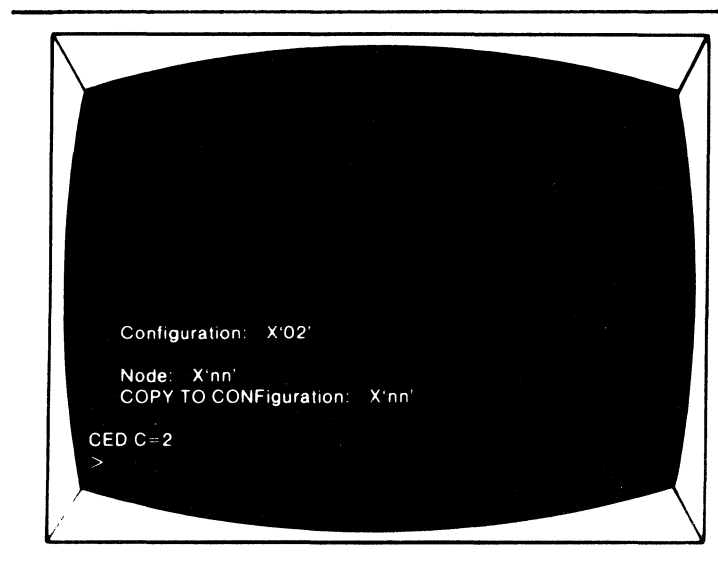
Figure 2-6
Example Screen Display

2.1.5.1 Input Prompt.

The input prompt is a character used to identify the need for an input line from the operator. The standard prompt character is the "greater than" sign, > , and is displayed in the first column of the input line.

Note
The input prompt character will change to a pound sign (#) as a means to notify the operator when network reports have been received and are being stored pending examination.

2.1.5.2 Option Selection Field.

The Option Selection Field allows an operator to specify and redefine one or more command options or parameters.

  a. Selecting/Redefining Command Options. A Command Option is specified by entering the indicated abbreviation for the option mnemonic. The proper input abbreviation for an option mnemonic is indicated with upper-case characters. For example, the proper abbreviation for the mnemonic Configuration EDitor is CED.

When redefining a command option value, the input abbreviation and new value are entered, separated by an "equal" sign (=). To redefine the Configuration: X'nn' option as two (2), the operator enters:

$$\textbf{>} C=2(CR)$$

where:
  C   is the input abbreviation for Configuration.
  =   is the input separator between the option and its new value.
  2   is the new configuration value in hexadecimal.
  (CR) is the input line terminator, parenthesized because terminators are not displayed on the CT screen when entered.
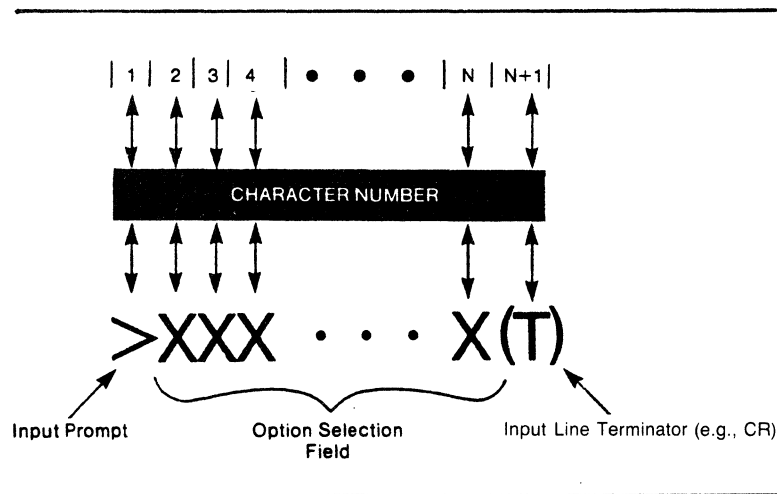
Figure 2-7
Input Line Syntax

b. **Using the Control/E (HELP) Terminator.** The input line terminator, Control/E, serves as a HELP command for the operator. The Control/E Terminator is entered by simultaneously depressing the Control and E keys on the CT keyboard.

The Control/E input line Terminator, when entered after a command option, will direct the CT to list the allowable values for the specified option. For example, if the operator entered the Control/E Terminator after the intermediate option Node: X'nn', the CT would respond by listing all the allowable node address values. This function of the Control/E Terminator is shown below.

> ❯ N(Control/E)

> Node: Min = X'01', Max = X'FF'

The Control/E Terminator can be used to request a listing of the allowable values for any configurable option.

In addition, the Control/E Terminator can be used to request a listing of the Floating General Options. To display the Floating General Options, the operator enters the Control/E Terminator by itself on an input line as shown below.

> ❯ (Control/E)

The resulting list of Floating General Options is illustrated in Figure 2-8.


```
>(Control/E)

   REPorts
   STATistics
   MODE:  ProGraM
   Statistic Display Mode:   TERMinal
   Report Display Mode:   PRinter on REQuest
   Operating Display Mode:   MONitor
   Quit

>
```
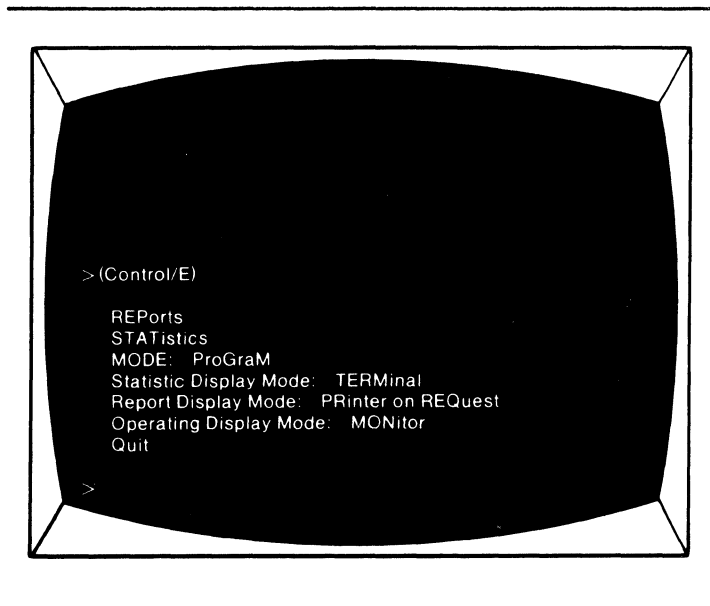
Figure 2-8
Floating General Options

c. <u>Stacking Command Option Selections</u>. More than one Command Option can be specified on a single input line, with each option separated by a space. Note, however, that when entering multiple options on a single input line, each option must represent a selection from succeeding levels in the appropriate general option command menu. The general option mnemonic abbreviation is entered immediately after the input prompt display, followed by a space; the option selection from the next level is then entered, also followed by a space; the option selection from the next level (if any) is entered, followed by a space; etc.

As an example, the syntax of the input line required to request a listing of path parameters from configuration 2 for node 2F, port 08 (I/BOP), from the top level of the menu (refer to Figures 2-3 and 2-4) is shown below.

> CED C=2 N=2F P=8 T=BOP PA(CR)

where:

CED is the mnemonic abbreviation for the general option Configuration EDitor.

C=2 is the intermediate option at the second level in the menu and is used to define the appropriate configuration.

N=2F is the intermediate option at the third level in the menu and is used to specify the address of the node where the port resides.

P=8 is the intermediate option at the fourth level in the menu identifying the appropriate port.

T=BOP is the Intermediate Option at the fifth level of the menu identifying the port type.

PA is the execute option at the sixth level requesting path parameters for the identified port.

(CR) is the Carriage Return terminator character.

<div align="center">

Note
Command option selections for the Statistics Gen-
eral Option cannot be stacked; i.e., each option
selection must be entered on a separate input line.

</div>

2.1.5.3 <u>Input Line Terminator</u>.
An input line terminator, which can be any one of 10 special control characters, is required to end all operator input lines. The terminator, when entered at the end of an input line, will cause the input line to be routed to the I/CTP for execution. In addition, each input line terminator provides a unique instruction to the CT. Therefore, an input line terminator can be entered by itself on an input line to direct the CT to branch to a specific location in the command menu or perform a special function.

<div align="center">

Note
Input line terminators are not displayed on the
screen as they are entered from the keyboard.

</div>

Each of the 10 input line terminators is listed and defined in Table 2-2.

Table 2-2
Input Line Terminators

Key(s)	Description
Carriage Return	Carriage return (CR) is the standard terminator character and does not provide any additional instructions to the CT. When used to terminate an input line containing option selections and definitions, the CT will proceed to the next level in the command menu. When entered by itself on an input line, the CT will redisplay the current level of the menu.
Control/T	Directs the CT to return to the top level of the menu and display the general command options.
Control/A	Directs the CT to branch down to the next level in the menu. Note that when there is more than one set of options at the next level, the CT will branch to the predefined "default" set of options (e.g., if Control/A is entered at the top of the menu, Configuration EDitor is selected as default and the CT will branch accordingly).
Control/D	Directs the CT to branch back up to the preceding level in the command menu.
Control/E	When entered after a configurable option or parameter, the CTL/F Terminator is used to request a listing of the allowable values for the option/parameter. When entered alone on an input line, the CT will display the Floating General Options.
Control/S	Acts as an XOFF character instructing the I/CTP to halt output of information to the CT.
Control/Q	Acts as an XON character instructing the I/CTP to resume output of information to the CT.
Control/H	Control/H does not actually terminate the input line, but directs the CT to delete the last character entered on the input line.
Control/L	Control/L does not terminate an input line either. It directs the CT to delete all characters entered on the input line.
Escape (ESC)	Special character used to terminate a Port List, Diagnostic Parameters, or Password Input line.

Note: Keys listed together, separated by a slash (/), indicate that both keys should be depressed simultaneously to create the special terminator character.

2.1.6 OPERATOR MESSAGES

To simplify CT operation, the I/CTP maintains a listing of several operator mes-
sages which are triggered for display on the CT screen if the operator makes an
error while attempting to initiate a network management function or the function
cannot be performed because of routing difficulties. The messages indicate the
source of the error or problem.

In addition to the operator error and routing failure messages, there are messages
associated with some of the general options. These specialized messages are in-
cluded in Sections 2.2 and 2.3 where appropriate.

A full listing of all operator messages is presented in Appendix A, CT Messages.

2.1.6.1 Error Messages.

The CT error messages are listed and defined in Table 2-3.

Table 2-3
Error Messages

Message	Explanation
*** KEYWORD ERROR	The option or parameter was specified incorrectly or is not available at this menu level.
*** DATA ENTRY ERROR	The parameter value entered is not valid.
*** ILLEGAL COMMAND	Attempted to define a "read only" option or parameter.

Each of the preceding messages is suffixed with the following message.

Message	Explanation
*** FOLLOWING TEXT IGNORED: XXXX	Indicates that the text which triggered the preceding error message was ignored and lists the erroneous text (XXXX).

2.1.6.2 Packet Failure Messages.

Operator requests for control operations are formatted into addressed data packets
and routed to the appropriate node mainframe or port for implementation. The
messages listed in Table 2-4 are used to inform an operator when a supervisory
packet cannot be routed for implementation.

Table 2-4
Packet Failure Messages

Message	Explanation
*** PACKET FAILURE	The supervisory packet which was sent to initiate the operator-requested control operation could not reach its destination.

The above message is followed with one of the explanations given below.

Message	Explanation
*** NODE NOT FOUND	The node that the packet was destined for could not be found. Verify the validity of the node address specified.
*** PORT NOT FOUND	The port that the packet was destined for could not be found. Verify the validity of the port address specified.
*** NETWORK TOO CONGESTED	The packet could not be routed without interfering with the transfer of user data.
*** RECEIVER NOT FOUND	The addressed node was not available to receive the supervisory packet.
*** PORT UNAVAILABLE	The addressed port is not available to respond to the supervisory packet.

2.1.7 CT OPERATION EXAMPLE

An annotated transcript of a typical CT operation is included as Appendix B, CT Operation Example.

2.2 TOP-LEVEL GENERAL OPTIONS

Note
The preceding sections of this chapter, which
outline the general operation of the CT, should be
read and understood before performing the
procedures given in the following subsections.

This section is intended to fully acquaint the operator with the command menu of
each Top-Level General Option. The Top-Level Options are displayed at the top
level of the CT command menu (see Figure 2-9). The CT is directed to the top of
the menu by entering the Control/T or Escape terminator characters (refer to
Paragraph 2.1.5.3, Input Line Terminator) from the CT keyboard.

For each Top-Level Option menu: The command menu diagram is illustrated and the
execute and intermediate options are listed and defined as follows.

Required Intermediate Options	The intermediate options which must be defined prior to specifying the execute option.
Display Syntax	The syntax of the option as it is displayed on the CT screen.
Input Syntax	The syntax of the input line required to select and/or redefine the option.
Configurable Values	The allowable values for the option if the option is configurable.

```
CODEX 6050 NETWORK CONTROL PORT ON LINE

   Configuration EDitor
   MXP control
   RESET ICTP
   BOOT
   System Services
   DIAGnostics
   RUNNING CONFIGURATION:  X'02'

>
```
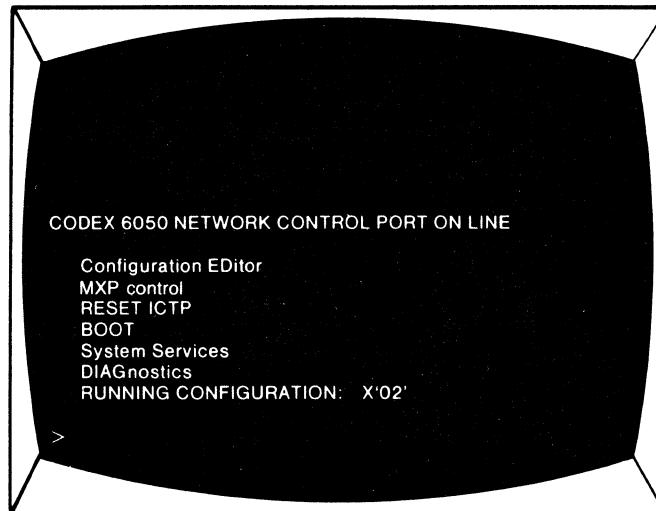
Figure 2-9
Top-Level General Options

Top-Level Input Line   The syntax of the input line required to
                                        initiate the execute option from the top
                                        level of the CT command menu. Consists of
                                        the desired execute option and its required
                                        intermediate options.

Confirmation Message   The message which is displayed to verify
                                        that the execute option has been initiated.

Resulting Display   The information (e.g., a listing, table,
                                        etc.), if any, which is displayed after an
                                        execute option has been specified.

Note
Carriage Return (CR), which is not displayed on the
CT screen when entered by the operator, is included
in parentheses in the examples of input syntax in
the following subsections.

2.2.1 CONFIGURATION EDITOR

All configurable parameters for a node and the individual ports at the node are stored off-line as a node configuration. Up to four full configurations can be stored off-line at a node and the operator can specify any one to be used on-line. The on-line configuration is referred to as Configuration 0.

The Configuration EDitor general option (see Figure 2-10) allows an operator to examine and/or modify the operating characteristics, path parameters, and statistical thresholds for any of the four off-line configurations at any node in the network.
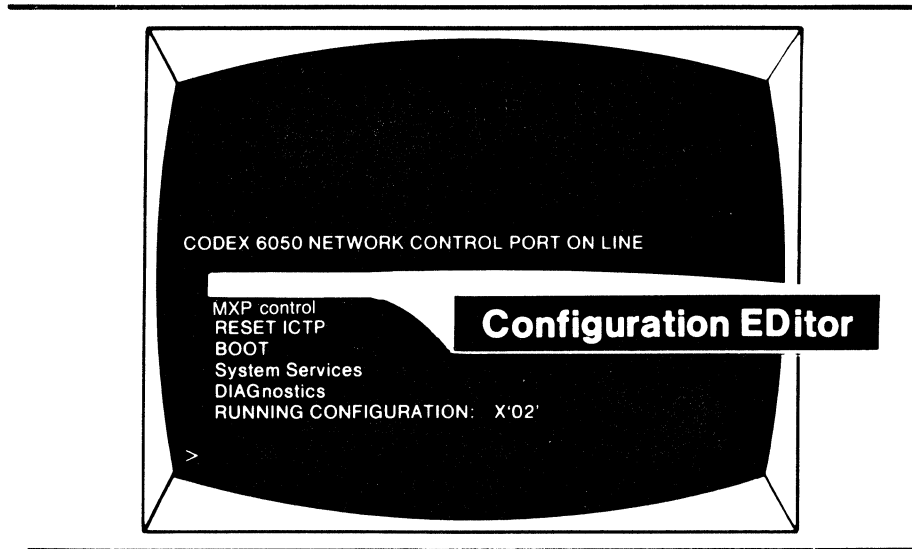
Figure 2-10
Configuration Editor General Option

The Configuration EDitor command menu is illustrated in Figure 2-11. The execute and intermediate options are listed and defined in the following subparagraphs.
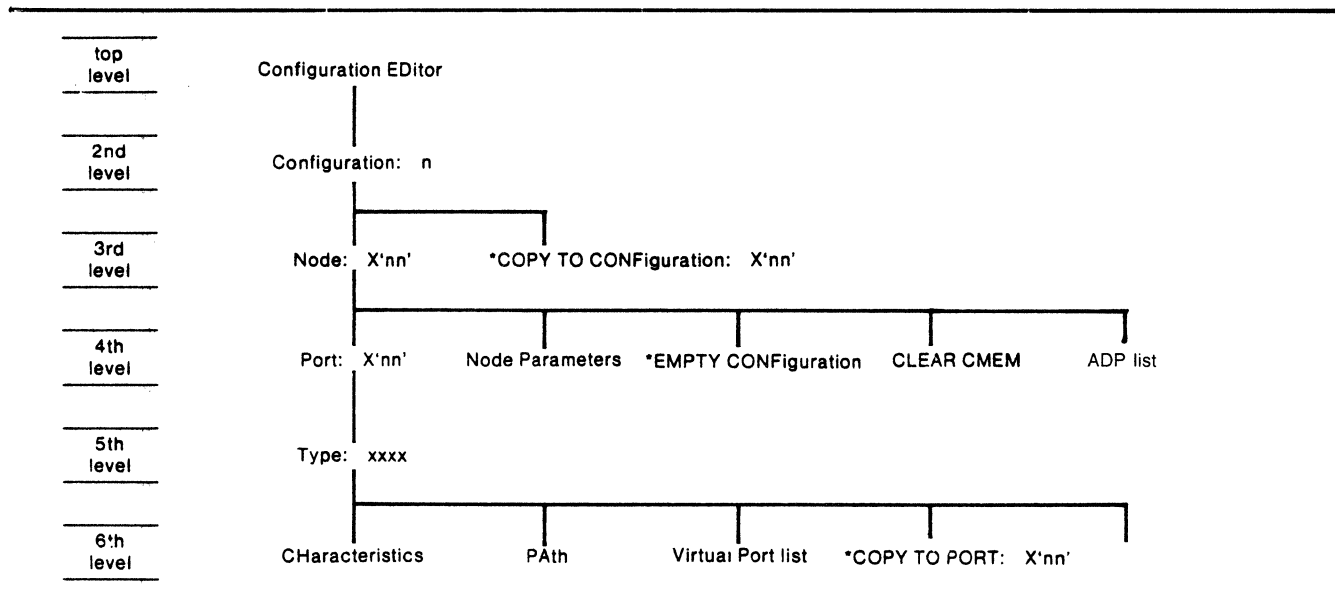
Figure 2-11
Configuration Editor Command Menu Diagram

2.2.1.1 Execute Options.

The Configuration EDitor general option allows the operator to perform nine specific control functions. These nine execute options are listed below.

- Copying an entire (off-line) node configuration to another node configuration (COPY TO CONFiguration).

- Displaying and/or modifying the node-related parameters for any network node (Node Parameters).

- Designating an off-line configuration as empty (EMPTY CONFiguration).

- Clearing Configuration Memory (CLEAR CMEM).

- Copying a defined port configuration to another port configuration (COPY TO PORT).

- Displaying and/or modifying the path parameters of any port (PAth).

- Displaying and/or modifying the operating characteristics of any port (CHaracteristics).

- Displaying the ADP list which indicates the autospeeding ports defined for the node.

- Displaying a list of the configuration addresses of all virtual ports supported by a particular I/MSTP, I/MATP, or I/MXP physical port (Virtual Port list).

The procedures required to perform each of the nine options are described in the following subparagraphs.

a. COPY TO CONFIGURATION.

The Copy to Configuration option allows an operator to copy an existing off-line configuration (1, 2, 3, or 4) at a node to another off-line configuration at the same node. This option is only displayed if the CT is in either the program or customer engineering mode.

Required Intermediate Options

      Configuration: n -- Specifies the single configuration to be copied from.

Display Syntax

      COPY TO CONFiguration: X'nn'

Input Syntax

    ❯COPY TO CONF=n(CR)

Configurable Values

    ❯n = 1, 2, 3, or 4

Top-Level Input Line

      CED C=n COPY TO CONF=n(CR)

Confirmation Message

      COPY TO CONF: X'nn'

b. __NODE PARAMETERS.__

Node Parameters is an option requesting a listing of all node-related configurable parameters from one of the configurations of any node.

Required Intermediate Options

Configuration: n — Specifies the off-line configuration from which the node parameters are requested.

Node: X'nn' — Specifies the address of the node from which parameters are requested.

Display Syntax

Node Parameters

Input Syntax

➤ NP(CR)

Top-Level Input Line

➤ CED C=n N=X'nn' NP(CR)

Resulting Display

When the operator specifies the Node Parameters execute option, an addressed request packet is sent to the specified node. The node will then respond with a listing of the node parameters from the specified configuration. A typical Node Parameters listing is illustrated in Figure 2-12.

Redefining Node Parameter Values

Note in Figure 2-12 that, after the node parameters are listed, an orientation line and an input prompt are displayed. If the CT is in the program or customer engineering modes, the operator can use the input line to redefine one or more parameter values. For example, to redefine the report Node and report Port Parameters, the operator would simply enter:

N=X'nn" P=X'nn'(CR)

The CT will remain at this point in the command menu until the operator uses an input line terminator to redirect the CT to another location.

Each of the configurable parameters for a node are listed and defined in Table 2-5.
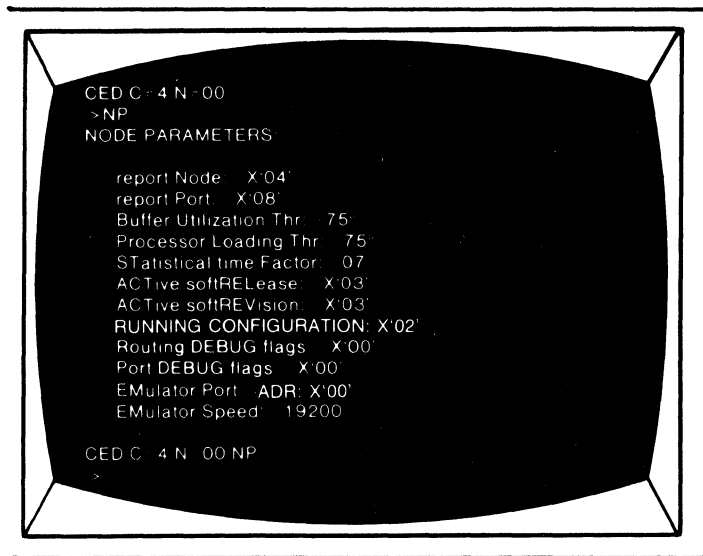
Figure 2-12
Typical Node Parameters Listing

Table 2-5
Node Parameters

Mnemonic	Configurable Values	Description
report Node: (N)	X'01' to X'7F'	Specifies the address (in hexadecimal) of the node to which network reports should be sent.
report Port: (P)	X'02' to X'FE'	Specifies the port address (in hexadecimal) of the I/CTP at the report Node.
Buffer Utilization threshold: (BU)	00 to 100%	Specifies the alarm threshold for buffer utilization at the node. If the threshold is exceeded, an alarm report will be generated and routed to the report Node. The suggested value is 75%.
Processor Loading threshold: (PL)	00 to 100%	Specifies the alarm threshold for processor utilization at the node. If the threshold is exceeded, an alarm report is generated and routed to the report Node. The suggested value is 75%.
STatistical time Factor: (STF)	0 to 15	Specifies the rate at which statistical data is sampled and averaged. The suggested value is 6.

Table 2-5 (Cont)
Node Parameters

Mnemonic	Configurable Values	Description			

		Entered Time Factor	Averaging Time Period	Entered Time Factor	Averaging Time Period
		0	6 sec	8	25.6 min
		1	12 sec	9	51.2 min
		2	24 sec	10	1.71 hr
		3	48 sec	11	3.41 hr
		4	1.6 min	12	6.83 hr
		5	3.2 min	13	13.65 hr
		6	6.4 min	14	1.14 day
		7	12.8 min	15	2.28 day
ACTive softRELease: (ACTREL)	X'00' to X'FF'	Displays the release designation of the system software currently being used. Read only.			
ACTive softREVision: (ACTREV)	X'00' to X'FF'	Displays the revision designation of the system software currently being used. Read only.			
Routing DEBUG flags (RDEBUG)	No Trace Path Trace Call Trace Both Path & Call Trace	Customer Service Debugging Tool. This should be set to No Trace.			
Port DEBUG flags: (PDEBUG)	X'00' to X'FF'	Used as Customer Service troubleshooting tool. Set to X'19'.			
EMulator Port ADR: (EMPADR)	X'00 to X'FE' (even only)	Specifies the address of the floppy emulator port. Normally set to X'00'.			
EMulator Speed: (EMS)	50 to 19,200 bps	Specifies the speed at which the floppy emulator port will pass data. This should be set to 19,200.			
RUNNING CONFIGURATION	1,2,3,4, or 5	Indicates the current running configuration. Read only.			

c. <u>EMPTY CONFIGURATION.</u>
This option allows an operator to designate an off-line node configuration as empty; i.e., undefined.

<u>Required Intermediate Options</u>

Configuration: n -- Specifies the configuration to be emptied.

<u>Display Syntax</u>

> EMPTY CONFiguration

<u>Input Syntax</u>

EMPTY CONF(CR)

<u>Top-Level Input Line</u>

> CED C=n EMPTY CONF(CR)

After the option is specified, the CT will request verification of the step:

ARE YOU SURE?: Y or N
To Initiate: Y (CR)
To Abort: N (CR)

<u>Confirmation Message</u>

EMPTY CONF: X'nn'

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d. <u>CLEAR CMEM.</u>

This option allows the operator in the Customer Engineering Mode to clear all configurations in configuration memory.

<u>Required Intermediate Option</u>

Configuration: n -- Can be specified as 0, 1, 2, 3, or 4.

Node: X'nn' -- Specifies the address of the node where CMEM is to be cleared.

<u>Display Syntax</u>

CLEAR CMEM

<u>Input Syntax</u>

> CLEAR CMEM(CR)

<u>Top-Level Input Line</u>

> CED C=n N=X'nn' CLEAR CMEM(CR)

After the option is specified, the CT will request verification of the step:

ARE YOU SURE?: Y or N
To Initiate: Y (CR)
To Abort: N (CR)

e. <u>COPY TO PORT.</u>
The Copy To Port option allows an operator to copy an existing port configuration (i.e., path parameters and operating characteristics) to any other compatible port in the local node. The port being copied to must be of the same port type as the port being copied from. This option is not displayed if the CT is in the Monitor mode.

<u>Required Intermediate Options</u>

      Configuration: n -- Specifies which of the four off-line configurations that the port configuration is to be stored in.

      Node: X'nn' -- Specifies the address of the node from which the port configuration is to be copied.

      Port: X'nn' -- Specifies the address of the port configuration to be copied from.

      Type: xxxx -- Specifies the type of port being copied (i.e., I/CTP, I/BOP, etc.)

<u>Display Syntax</u>

    COPY TO PORT: X'nn'

<u>Input Syntax</u>

    ⋗ COPY TO PORT=X'nn'(CR)

<u>Configurable Values</u>

    X'nn" = X'02' to X'FE'

<u>Top-Level Input Line</u>

    ⋗ CED C=n N=X'nn' P=X'nn' T=xxxx COPY TO PORT=X'nn'(CR)

<u>Confirmation Message</u>

    COPY TO PORT: X'nn'

f. __PATH.__
The Path option requests a listing of the configurable path parameters for any port.

Note

Path parameters can only be defined for the following types of port configurations: I/BOP, I/SSTP, VSTP, VATP, VBTP, and transfer ports (XP).

Required Intermediate Options

Configuration: n -- Specifies the node configuration from which the port path parameters are requested.

Node: X'nn' -- Specifies the address of the node from which the path parameters are requested.

Port: X'nn' -- Specifies the address of the port from which the path parameters are requested.

Type: xxxx -- Specifies the type of port (I/BOP, VSTP, etc.) from which path parameters are requested.

Display Syntax

PAth

Input Syntax

➤ PA(CR)

Top-Level Input Line

➤CED C=n N=X'nn' P=X'nn' T=xxxx PA(CR)

Resulting Display

When the operator specifies the PAth execute option, the CT will respond with a listing of the configured path parameters for the predesignated port. A typical path parameters listing is illustrated in Figure 2-13.
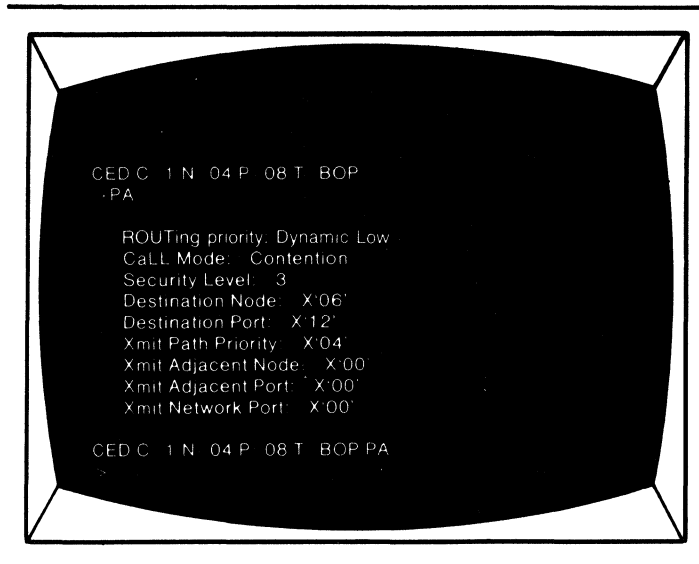
Figure 2-13
Typical Port Path Parameters Listing

Redefining Port Path Parameters

The configured values for the path parameters can be redefined (the CT must be in the Program or Customer Engineering Mode) on the input line displayed after the parameter listing. For example, if the operator wanted to redefine the ROUTing and Security Level parameters, he would enter the new values on the input line as shown below.

> ROUT=xxxx SL=n(CR)

The path parameters are listed and defined in Table 2-6.

Table 2-6
Port Path Parameters

Path Parameter	Configurable Values	Description
ROUTing: (ROUT)		Determines the routing mode and priority for the port.
	Dynamic Low Dynamic High	If Dynamic Low, the port will be assigned a path based on the shortest available path at the time of the call. The path will not, however, be assigned until the link is uncongested. If Dynamic High, the shortest path will be assigned without regard to congestion.

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Table 2-6 (Cont)
Port Path Parameters

Path Parameter	Configurable Values	Description
	Fixed Low Fixed High	If Fixed Low, a predefined path (the Xmit Adjacent Node, Xmit Adjacent Port, and Xmit Network Port Path Parameters are used to predefine the path) is assigned if the path is uncongested. If Fixed High, the predefined path is assigned without regard to congestion. Note that, for both Fixed routing modes, if the predefined path fails, the call will not be rerouted.
	Preferred Low Preferred High	If Preferred Low routing is specified, the path will be assigned based on the predefinition of the Xmit Adjacent Node, Xmit Adjacent Port, and Xmit Network Port Path Parameters only if the path is uncongested. If the path is congested, the port will default to dynamic routing. If Preferred High is specified, the preferred path is assigned without regard to congestion. Note that, for both Preferred routing modes, a path will be reassigned dynamically in the event of a link failure in the preferred path. Once the port has defaulted to dynamic routing it will not revert back automatically to the preferred path.
CaLL Mode: (CLLM)		Specifies the method of call establishment.
	Leased Line	The port, when booted, will initiate a call to the Destination Node and Port. Call initiation is attempted until successful. The call, once established, will be maintained.
	Auto Dial	The port will initiate a call to the Destination Node and Port upon detection of Data Terminal Ready (DTR/108) going "high" on the equipment interface. The call will be terminated when DTR/108 goes "low".
CaLL Mode (cont)	Dialup	The port, when it detects DTR-High, will request the address (in hexadecimal) of the destination node and port. When the user enters the addresses, the call will be initiated. The call is terminated when DTR goes low. Note that the Dialup Call Mode is only valid for VATP's.
	Contention	The port can only receive calls, not initiate them.

Table 2-6 (Cont)
Port Path Parameters

Path Parameter	Configurable Values	Description
Security Level (SL)	0 to 7	Intended for ports configured for the Dialup Call Mode. A port can only dial up remote ports having an equal or less security level.
Destination Node (DN)	X'01' to X'7F'	The address of the node to which the port will transmit data.
Destination Port (DP)	X'02' to X'FF'	The address of the I/BOP at the destination node to which this port will transmit data.
Xmit Path Priority (XPP)	0 to 7	The Xmit Path Priority is used to calculate the percentage of a frame that can be assigned to an active port.

Note: The following path parameters are used to specify a routing path for ports configured for Fixed or Preferred Routing.

Xmit Adjacent Node (XAN)	X'01' to X'7F'	The address of the adjacent node (connected directly via a network link) to which all Transmitted Data should be routed.
Xmit Adjacent Port (XAP)	X'02' to X'FF'	The address of the destination port of transfer port (XP) at the adjacent node to which all Transmitted Data should be routed.
Xmit Network Port (XNP)	X'02' to X'FE' (even only)	The address of the network port at this node through which data is to be transmitted to the adjacent node.

g. CHARACTERISTICS.

The Characteristics execute option is used to request a listing of the configured operating characteristics of any port in the network. The operating characteristics of a port include the speed of transmission/reception, the number of data bits per character, etc.

Required Intermediate Options

Configuration: n -- Specifies the configuration from which the operating characteristics are to be listed.

Node: X'nn' -- Specifies the node address, in hexadecimal, of the port from which operating characteristics are requested.

Port: X'nn' -- Specifies the address of the port from which the operating characteristics are requested.

Type: xxxx -- Specifies the type of port from which operating characteristics are requested (e.g., I/CTP, I/NP, I/MATP, etc.).

Display Syntax

CHaracteristics

Input Syntax

➢ CH(CR)

Top-Level Input Line

➢ CED C=n N=X'nn' P=X'nn'

T=xxxx CH(CR)

```
CED C=2 N=00 P=08 T=VSTP
>CH

    SUBType:  X'00'
    CODE:  ASCII
    SPeeD:  9600
    MODE:  Normal
    Data Bits:  7
    PARity:  None
    force mark IDLE:  Yes
    BiSynchronous Control code tables:  X'00'
    DELay:  0
    STatistics time Factor:  2
    Cts Delay:  0
    Error Density thr.:  50%
    Compression Eff. Thr:  134%
    Data COMPression:  ON
    CALL logging:  No
    PHYSical Port address:  X'06'
    THRead NUMber:  1

CED C=2 N=00 P=08 T=VSTP CH
    >
```
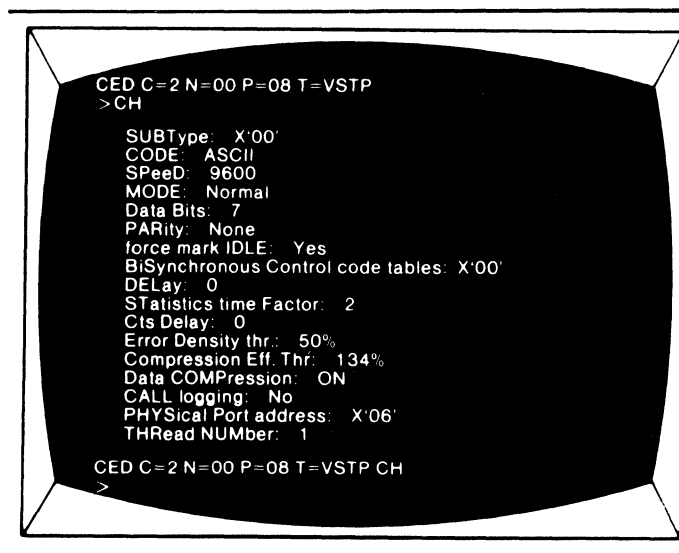
Figure 2-14
Typical Port Operating Characteristics Listing

Resulting Display

When the Characteristics execute option is selected, the CT will respond with a listing of the configured operating characteristics for the port specified. A typical characteristics listing is shown in Figure 2-14.

Redefining Port Operating Characteristics

The listed operating characteristics of a port can be modified if the CT is in the program or customer engineering modes. The characteristics are redefined on the input line which is displayed at the bottom of the listing. For example, if an operator wanted to redefine the configured values for the Speed and Data Bits characteristics in Figure 2-14, he would enter the new values as shown below.

S=nnnn DB=n(CR)

The number of configurable operating characteristics for a port varies according to port type. Due to the large size of the table which is required to list and define the configurable port operating characteristics, it has been included as Appendix C, Configurable Port Characteristics, at the back of this manual.

h. VIRTUAL PORT LIST.

The Virtual Port List option allows the operator to request a listing of the configuration addresses for all virtual ports supported by a particular physical port (i.e., I/MSTP, I/MATP, I/MXP).

Required Intermediate Options

Configuration: n — Specifies the configuration from which the virtual port list should be taken.

Node: X'nn' — Specifies the node from which the information is to be retrieved.

Port: X'nn' — Specifies the physical address of the multiple port.

Type: xxxx — Specifies the type of port (I/MSTP, I/MATP, I/MXP).

Display Syntax

Virtual Port list

Input Syntax

> VP(CR)

Top-Level Input Line

> CED C=n N=X'nn'
P=X'nn' T=xxxx
VP(CR)


```
>VP(CR)

Virtual Port List:

07  09  14  15  16  17  21  23  ......
```

Physical Port
Thread Number

```
1
2
3
4
5
6
7
8
Up To 16
```
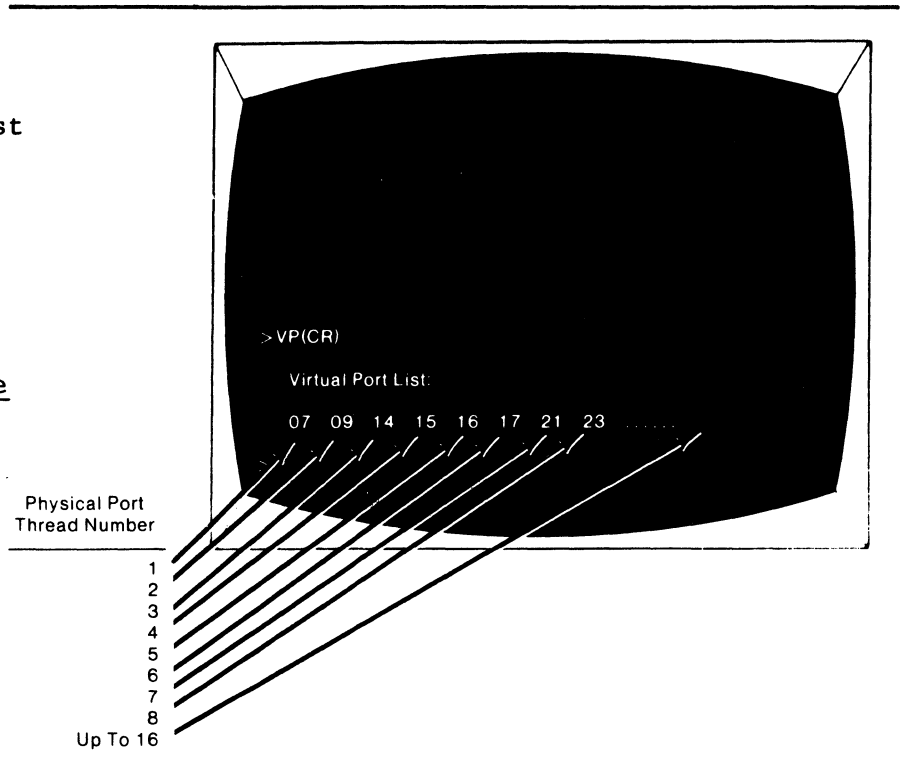
Figure 2-15
Typical Virtual Port Listing

Resulting Display

When the Virtual Port List option is specified, the configuration adddresses are listed on the CT screen. A typical Virtual Port List is illustrated in Figure 2-15.

i. AUTOSPEED DEFINITION PORT (ADP) LIST.

For use with VATP's only, the ADP List allows the operator to request a listing of the configuration addresses of all the autospeed definition ports assigned to the VATP.

Required Intermediate Options

See above.

Display Syntax

ADP list

Input Syntax

> ADP(CR)

TopLevel Input Line

> CED C=n N=X'nn' ADP(CR)

Resulting Display

A typical ADP list is illustrated in Figure 2-16.
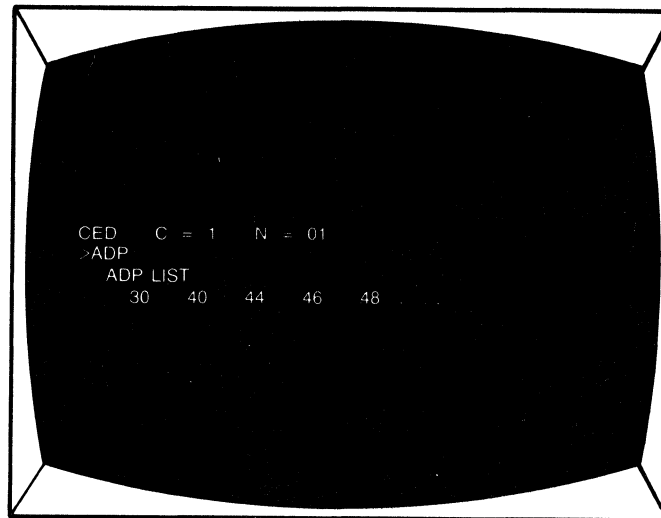
Figure 2-16
Typical ADP List

The 6050 supports Autospeed capability for VATP (Virtual Asynchronous Terminal Port) links in the 6050 network, as well as VATP links that pass traffic, via an I/MXP, to a remote Codex 6010, 6005, or 6001 Intelligent Network Processor (INP).

Note
To enable Autospeed capability for VATP links that
pass traffic via an I/MXP to a remote 6030 or 6040
INP, a software modification, M#5229, must be
implemented on the 6030/40.

The Autospeed feature allows a VATP to dynamically select any one of multiple predefined operating configurations. This allows the VATP to "adapt" to the characteristics of the device requesting service (see Figure 2-17). These predefined operating configurations are a new software port type, called Autospeed Definition Ports (ADP's). Each ADP port consumes one address from the maximum of 120 configuration addresses available in each node. The maximum speed that can be defined for an ADP is 2400 bps.

To prepare the 6050 for Autospeed:

   a. One or more ADP configurations must be predefined in CMEM. The full list of ADP CHaracteristics is defined in Appendix C.

   b. Path Parameters for the autospeed VATP must still be predefined.

   c. The Autospeed characteristic of the VATP configuration must be defined as one.
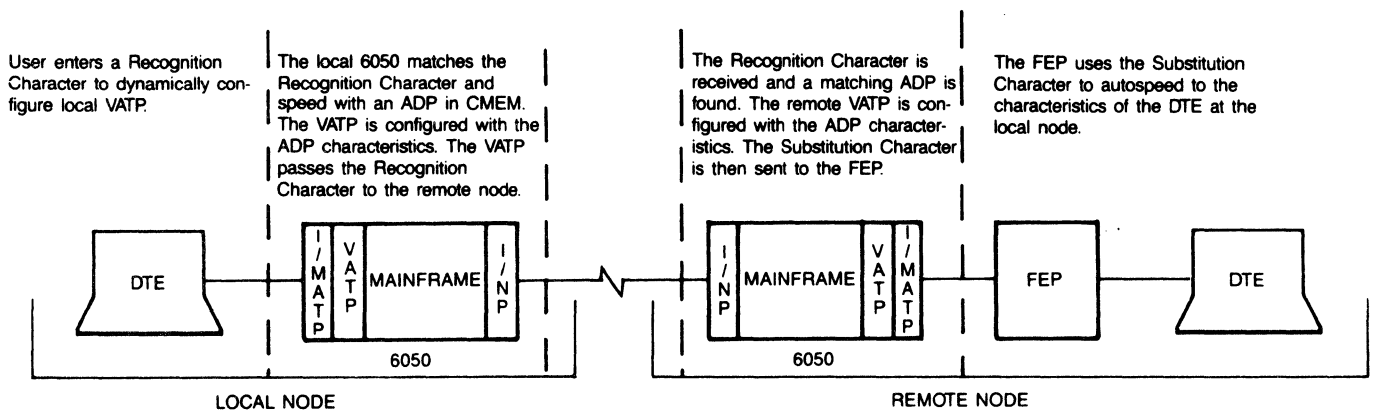
Figure 2-17
Autospeed Operation

2.2.1.2 <u>Intermediate Options.</u>

The intermediate options in the Configuration Editor command menu are defined in the following subsections.

   a. <u>Configuration.</u>

The Configuration option is used to specify one of the configurations which are stored in a node mainframe. Up to four configurations (designated 1, 2, 3, and 4) can be stored off-line at a node. The on-line configuration is referred to as Configuration 0.

   <u>Display Syntax</u>

       Configuration: n

   <u>Input Syntax</u>

     ❯ C=n(ILT)

   <u>Allowable Values</u>

       n = 0, 1, 2, 3, 4,

   b. <u>Node.</u>

The Node option allows the operator to specify the address, in hexadecimal, of the node to be involved in the Configuration Editor function.

   <u>Display Syntax</u>

       Node: X'nn'

   <u>Input Syntax</u>

     ❯ N=X'nn'

   <u>Allowable Values</u>

       X'nn' = 00 to 7F

c. __Port.__
The Port option allows the operator to specify the address, in hexadecimal, of the port to be involved in the Configuration Editor function.

__Display Syntax__

    Port: X'nn'

__Input Syntax__

  > P=X'nn'(CR)

__Allowable Values__

    X'nn' = 02 to FF

d. __Type.__
The Type option allows the operator to specify the type of port that is to be involved in the Configuration Editor function.

__Display Syntax__

    Type: xxxx

__Input Syntax__

  > T=xxxx(CR)

__Allowable Values__

    xxxx = i/CTP, i/FDP, i/NP, i/GBNP,
          i/SSTP, i/BOP, i/MATP, i/MSTP, i/MXP,
          VATP, VSTP, VBTP, XP, or ADP.

2.2.1.3 __Unique Messages.__
Table 2-7 lists and defines the operator messages which are associated with the Configuration Editor general option.

Table 2-7
Configuration Editor Messages

Message	Explanation
*** CHANGE NOT PERMITTED	Attempted to change a node parameter, path paramter, or operating characteristic that is not redefinable.
*** INVALID CONFIGURATION	Specified a configuration that is not valid for the intended operation.
*** INVALID PORT	Specified a port address that is invalid for the intended operation.
*** EMPTY CONFIGURATION	Specified a configuration which is not enabled by the node chip or is currently defined as empty to be examined or copied from.
*** CHANGE NOT PERMITTED IN MONITOR MODE	Attempted to change a node parameter, path parameter, or operating characteristic while CT is configured in the Monitor mode.
*** CHANGED OFFLINE - BOOT REQUIRED	Indicates that the configuration change was made in the off-line configuration corresponding to the current online configuration. A boot is required to implement the change on-line (refer to Paragraph 2.2.4, Boot).

2.2.2 GENERAL

This section provides an overview of 6050 Intelligent/Multiplexer Port (I/MXP) operation and describes the procedures required to initiate the MXP Control option from a 6050 control terminal. The Muxport option allows an operator to establish a Virtual Control Terminal Port (VCTP), which provides the capability to configure and monitor any remote 6040, 6030, 6010, or 6005 multiplexer.

2.2.2.1 Muxport Overview (See Figure 2-18).

The I/MXP provides a gateway of up to twenty-five (25) individual asynchronous or synchronous channels between a 6050 DCP network and any other 6000 Series network. The I/MXP is connected via a communication medium to a 6040, 6030, 6010, or 6005 multiplexer.

a. Configuring Muxport.

Refer to the example Muxport link in Figure 2-19 for the following explanation of the configuration requirements of a Muxport link through a 6050 DCP node.

1. The I/MXP (Address 04) must be configured.

2. The I/MXP VATP (Configuration Address 20) must be configured. Under Characteristics for the VATP:

   • The Physical Port address parameter (PHYSP) must be set to the physical address of the I/MXP (04).

   • The Thread Number (THRNUM) must be set to: the destination port in a remote 6001, 6005, or 6010; the slot number in a remote 6030 or 6040.
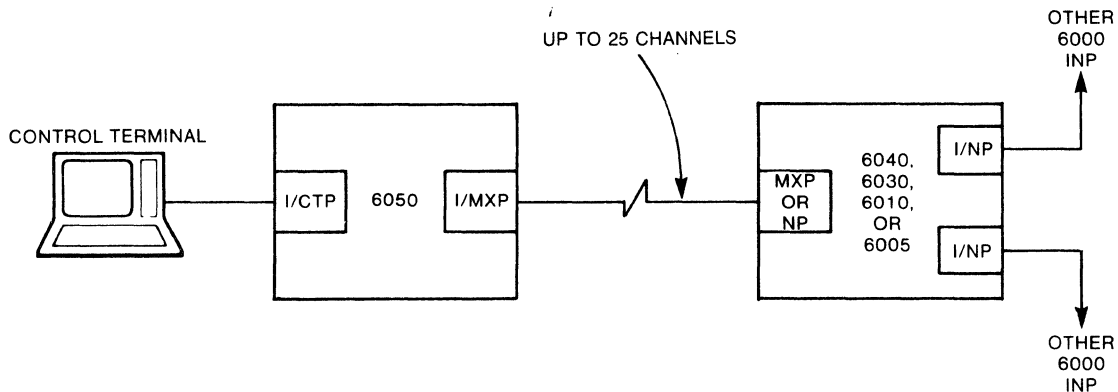
Figure 2-18
Muxport Overview

Under Path parameters for the VATP:

- The Destination Node (DN) parameter must be set to the node number of the I/MATP VATP (0A).

- The Destination Port (DP) parameter must be set to the address of the I/MATP VATP (22).

3. The I/MATP VATP (Configuration address 22) must be configured. Under Characteristics for the VATP:

- The Physical Port address parameter (PHYSP) must be set to the physical address of the I/MATP (06).

- The Thread Number parameter (THRNUM) must be set to the corresponding thread number of the I/MATP.

Under Path parameters for the VATP:

- The Destination Node parameter (DN) must be set to the node number of the I/MXP VATP (0A).

- The Destination Port parameter (DP) must be set to the configuration address of the I/MXP VATP (20).
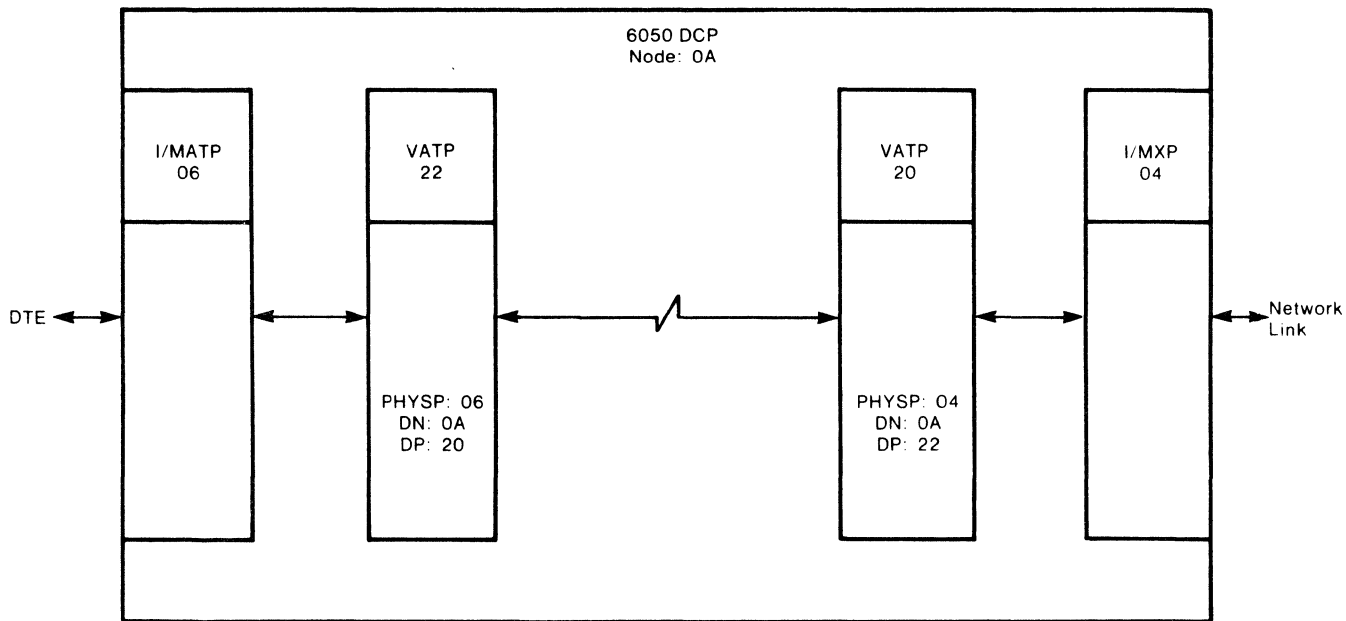
Figure 2-19
Configuring Muxport

4. The I/MATP (Address 06) must be configured.

This configuration example must be repeated for each link supported by the I/MXP.

b. **I/MXP Characteristics.**
The characteristics which must be specified for the I/MXP configuration are listed defined in Appendix C.

c. **I/MXP Strapping.**
The I/MXP consists of an Engine 2 module, a Bit-D Communications module, and a single RS-232-C I/O Adapter.

d. **Bit-Oriented Portocols Over Muxport Link.**
The I/MXP will now support bit-oriented protocols (e.g., SDLC) to a 6030/40. A new software port type, Virtual Bit-Oriented Terminal Port (VBTP), has been implemented to support this feature. Path parameters for the VBTP are identical to the path parameters for I/BOP, VATP, and VSTP ports. The characteristics which must be defined for the VBTP are listed and explained in Appendix C.

Note
The corresponding SDLC port in the remote 6030/40
must be configured with an opmode equal to 88.

Strapping for the Bit-D module is given in Paragraph 4.4.4.1. Additional Bit-D straps for the I/MXP are listed and defined below.

- J15, Address Strap. In position 1-2 the I/MXP is address "A" and in position 2-3 the I/MXP is address "B". The address must be different at each end of an I/MXP link. It is recommended that the 6050 be set for address B and the 6030/40, 6010, or 6005 at the opposite end of the link be set to address A.

- J16, Identification Strap. Identifies the port as an I/MXP in position 2-3.

- J17, Boot Enable Strap. In position 1-2, a boot will not be initiated when a reset sequence is detected from the remote end of the I/MXP link. In position 2-3, the boot will be inititated upon detection of the reset sequence.

- J18, Delay Strap. Strap should be in position 2-3 for I/MXP operation.

- J19, Boot Detect. In position 1-2, the detection of all loopback and boot sequences from the remote end of the I/MXP link is disabled. In position 2-3, detection is enabled.

e. VATP/VSTP Characteristics.

The characteristics for the VATP and VSTP configurations are listed in Appendix C with the following exceptions:

- VATP: OpMode characteristic is used to enable/disable flow control for the thread.

  and   00 enables flow control, 02 disables flow control. VSTP's must be
  VSTP disabled.

- VATP: When the I/MXP is connected to a 6030/40, the FLYBack character (FLYB) parameter must be set to equal the product of the Slot Weight and Buffer Multiplier parameters of the 6030/40 virtual port. When connected to a 6005 or 6010, FLYBack character must be equal to the storage allotment value of the 6005 or 6010 port.

- VATP The THRead NUMber parameter cannot be set to 01 when connected to a 6010.

2.2.2.2 Muxport Control Option (See Figure 2-20).

The Muxport Control option of the 6050 control terminal allows the operator to establish a VCTP which is used to configure the remote 6000 for muxport operation. The VCTP also allows the operator to monitor the performance and status of the remote 6000 network and edit configurations as necessary. The VCTP, in effect, provides the operator with virtual control of the remote 6000 network.

Once the VCTP is established, all operator/terminal communications is in the language of the particular 6000 model multiplexer at the remote node.

The command menu for the Muxport option is illustrated in Figure 2-21. Each option in the menu is defined in sequence below.


```
CODEX 6050 NETWORK CONTROL PORT ON LINE

    Configuration EDitor

    RESET ICTP
    BOOT
    System Services
    DIAGnostics
    RUNNING CONFIGURATION: X'02'

 >
```

MXP control
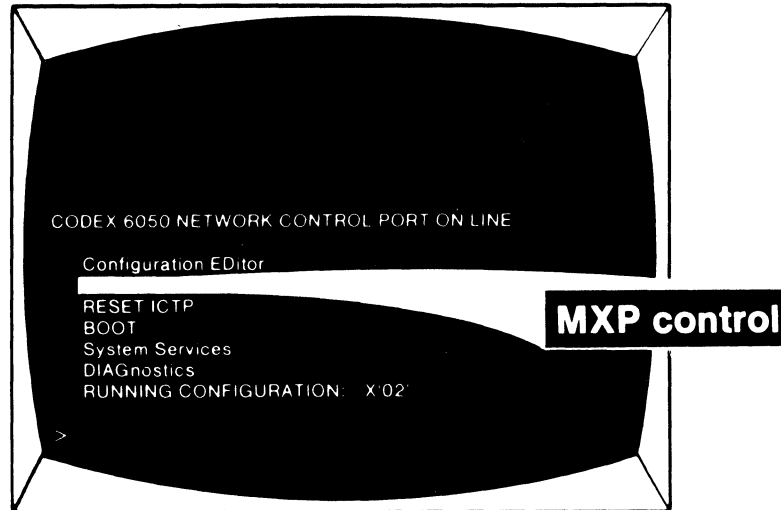
Figure 2-20
Muxport Control Option

top level	MXP control
2nd level	Node: X'nn'
3rd level	Port: X'nn'
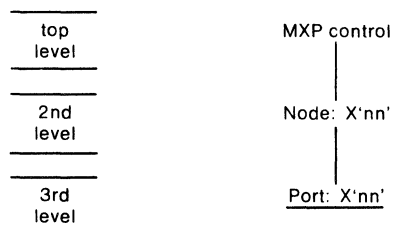
Figure 2-21
Muxport Command Menu Diagram

a. **Muxport Control.**

The Muxport Control option is specified at the top level of the CT menu.

Display Syntax

> MXP control

Input Syntax

> MXP(CR)

b. **Node.**

After the Muxport Control option is specified, the CT will request the node address of the 6050 I/MXP through which the operator wants to access the remote 6000 network.

Display Syntax

> Node: X'nn'

Input Syntax

> N=nn(CR)

Configurable Values

> nn = X'01' to X'7F'

c. Port.

When the Node address is entered, the CT will request the port address of the 6050 I/MXP through which the operator wants to access the remote 6000 network.

Display Syntax

Port: X'nn'

Input Syntax

> P=nn(CR)

Configurable Values

nn = X'02' to X'FF'

When the I/MXP port address is entered, the CT will respond with the following confirmation message:

LOCAL I/MXP CHANNEL ESTABLISHED

d. Establishing the VCTP.

To establish the VCTP, the operator simply types in:

V(CR)

When the VCTP is established, the CT will display a confirmation message listing, the type of 6000 that the I/MXP is connected to, and the node address of the 6000. An example of this message is shown below.

DEVICE-- 6040   NODE--01
CONNECTED

e. Control Terminal Language.
Note that all communications between the operator and terminal are now in the language of the particular 6000 model to which the 6050 I/MXP is directly connected.

Refer to the appropriate operation manual of the remote 6000 for control terminal operation instructions. The part numbers of each 6000 model manual are listed below.

- 6040 INTELLIGENT NETWORK PROCESSOR, OPERATION MANUAL
  Part No. 04289, Rev B

- 6030 INTELLIGENT NETWORK PROCESSOR, OPERATION MANUAL
  Part No. 04287, Rev C

- 6010 INTELLIGENT NETWORK PROCESSOR, USER MANUAL
  Part No. 04285, Rev B

- 6005 INTELLIGENT NETWORK PROCESSOR, USER MANUAL
  Part No. 07507

f. Network Reports.
When in the VCTP mode, the 6050 operator is notified of the reception of a network report with the following message:

*** REPORTS WAITING

Note, however, that to examine the reports, the operator must terminate the VCTP request by typing:

> Q(CR)

and request the reports listing using the 6050 CT option:

REP(CR)

g. Report Formats.

An example of the format of reports received across the I/MXP from the remote 6000 INP network, is shown below.

*** 6000 NETWORK   NODE   PORT ***

            6050   A   02
            6040   B   04
            6010   C   06

ASCII TEXT OF MESSAGE

Note that the report lists the addresses of each node in its path from the originating device to the 6050 control terminal. The last device listed is the originator of the report. The ASCII test of the message will be in the format of the originating 6000 INP.

2.2.3 RESET ICTP

The Reset ICTP general option (see Figure 2-22) is a stand-alone command which will reset, on-line, the operating characteristics of the I/CTP. This allows the operator to change any operating characteristics (e.g., reducing the configured speed to add a control printer) without the requirement of initiating a full Boot of the port.

There are no additional command options involved with the Reset ICTP general option.

The CT must be configured in the program mode to initiate this function.

Display Syntax

  RESET ICTP

Input Syntax

> RESET ICTP(CR)

Confirmation Message

  When the Reset ICTP option is specified, the CT will respond with a confirmation message:

  ICTP WILL RESET IN FIVE SECONDS

The reset is delayed 5 seconds to allow the operator to make the required changes to the control terminal itself.

CODEX 6050 NETWORK CONTROL PORT ON LINE

    Configuration EDitor
    MXP control

    BOOT
    System Services
    DIAGnostics
    RUNNING CONFIGURATION: X'02'

    >
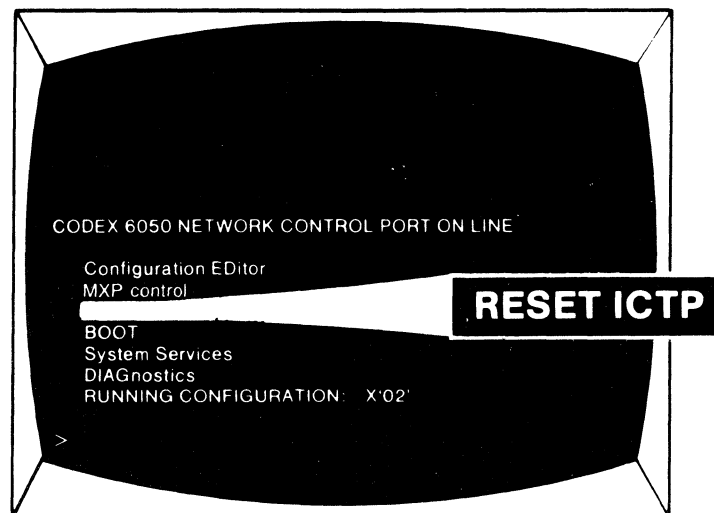
RESET ICTP

Figure 2-22
Reset ICTP General Option

2.2.4 BOOT
Booting involves the following procedure:

. Resetting (clearing all existing system software and data registers).

. Loading new software from a system software floppy disk (if the floppy disk is remotely located, the system software is down-line loaded via intermediate nodes) or from a colocated port of the same type.

. Restarting operation.

Note
The CT must be configured in the Program or Customer Engineering Mode to utilize the Boot command menu.

The Boot general option (see Figure 2-23) provides four categories of Booting functions:

. Booting the entire network(Network Boot)

. Force Booting a specific node to its current configuration (Force Boot)

. Booting a specific port (Port Boot)

. Booting a specific node to a new configuration (NODE)

CODEX 6050 NETWORK CONTROL PORT ON LINE

Configuration EDitor
MXP control
RESET ICTP

System Services
DIAGnostics
RUNNING CONFIGURATION: X'02'

BOOT

>
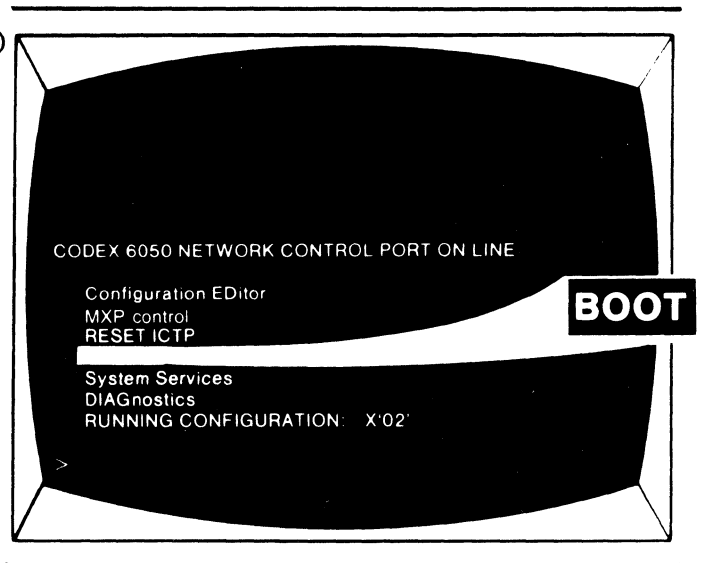
Figure 2-23
Boot General Option

These categories are presented as intermediate options at the second level of the Boot command menu (see Figure 2-24). Each of these categories will be described as segments of the Boot command menu.

top
level

BOOT

2nd
level

Force Boot   Network Boot   Port Boot   NODE
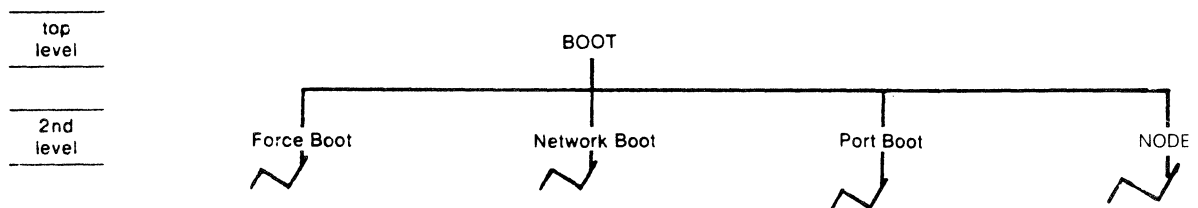
Figure 2-24
Four Segments of Boot Command Menu

2.2.4.1 Network Boot.

The Network Boot option allows the operator to boot the entire network with a specified configuration, software release, and software revision. The Network Boot segment of the Boot command menu is illustrated in Figure 2-25.

The lone execute option in this segment is RELease: X'nn'. The boot will be implemented when the software release designation is specified.

To perform a network boot, the operator must specify: the general option, BOOT; the intermediate options, Network Boot, Configuration: n and REVision: X'nn'; and the execute option, RELease: X'nn'.

Each of these options is described in sequence in the following subparagraphs.

   a. General Option -- BOOT.
The operator must specify the general option, Boot, first.

   Display Syntax

      BOOT

   Input Syntax
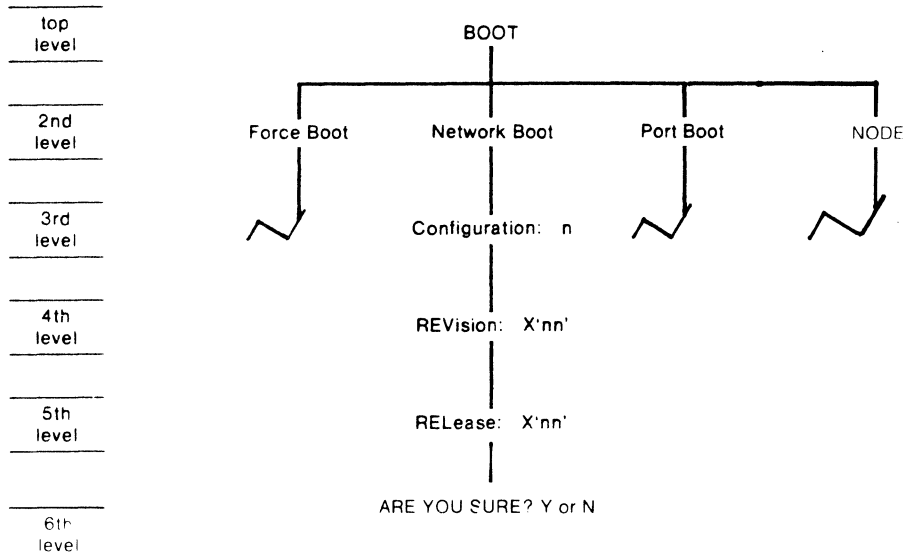
   ❯BOOT(CR)

Figure 2-25
Network Boot Segment of Boot Command Menu

b. Intermediate Option -- Network Boot.
At the second level of the Boot command menu, the Network Boot option is selected.

Display Syntax

    Network Boot

Input Syntax

>NB(CR)

c. Intermediate Option -- Configuration: n.
At the third level, the intermediate option, Configuration: n, must be defined.
The Configuration option is used to specify which off-line configuration is to be
booted on-line.

Display Syntax

    Configuration: n

Input Syntax

>C=n(CR)

Configurable Values

    n = 1, 2, 3, 4

d. Intermediate Option -- REVision: X'nn'.
At the fourth level, the intermediate option, REVision, must be defined. This
option allows the operator to specify the revision level of the system software
that is to be booted on-line in the network.

Display Syntax

    REVision: X'nn'

Input Syntax

>REV=X'nn'(CR)

Configurable Values

    X'nn' = 01 to FF

e. Execute Option -- RELease: X'nn'.

The Network boot is executed by defining the RELease option at the fifth level of the Boot command menu. The RELease option is used to specify the release level of the system software that is to be booted on-line in the network.

Display Syntax

RELease: X'nn'

Input Syntax

$\blacktriangleright$ REL=X'nn'(CR)

Configurable Values

X'nn' = 01 to FF

f. Top-Level Input Line.

The Network Boot can be initiated by specifying all of the above options on a single input line at the top of the CT menu. The syntax of the input line required to initiate a network boot from the top level of the Boot command menu is illustrated below.

$\blacktriangleright$ BOOT NB C=n REV=X'nn' REL=X'nn'(CR)

g. Verification Request.

When the RELease option is first specified, the CT will request verification of the boot before initiation:

ARE YOU SURE? Y or N

To initiate: Y(CR)
To abort: N(CR)

h. Confirmation Message.

When the RELease option is verified, the boot will be executed and the CT will display confirmation of initiation as follows:

OPERATION INITIATED

The operator will receive notification on the results of the boot attempt via network reports.

2.2.4.2 Force Boot.

The Force Boot segment of the Boot command menu (see Figure 2-26) allows an operator to boot a specific node in the network. The Force Boot option provides three types of node boots:

. Loading standard system software in the node mainframe (STandarD software).

. Loading special operator-specified system software in the node mainframe (Software Name: xxxx).

. Loading standard software in a network port (NP Load).

Each of these functions is described in the following subparagraphs.

```
top                              BOOT
level
                                   |
        _____
       |                           |                  |                   |
2nd    |                           |                  |                   |
level  Network Boot            Force Boot         Port Boot             NODE
       \_/                         |              \_/                   \_/
                                   |
3rd                            Node:  X'nn'
level                              |
                                   |
4th                            NPPORT:  X'nn'
level                              |
                        _____|_____
                       |                                               |
5th                    |                                               |
level               MainFrame LOAD                                  NP load
               _____|_____
              |                 |
6th           |                 |
level    SPeCial software   STandarD software
              |                 |
              |                 |
7th           |            ARE YOU SURE? Y or N
level    Software Name:  xxxx
```
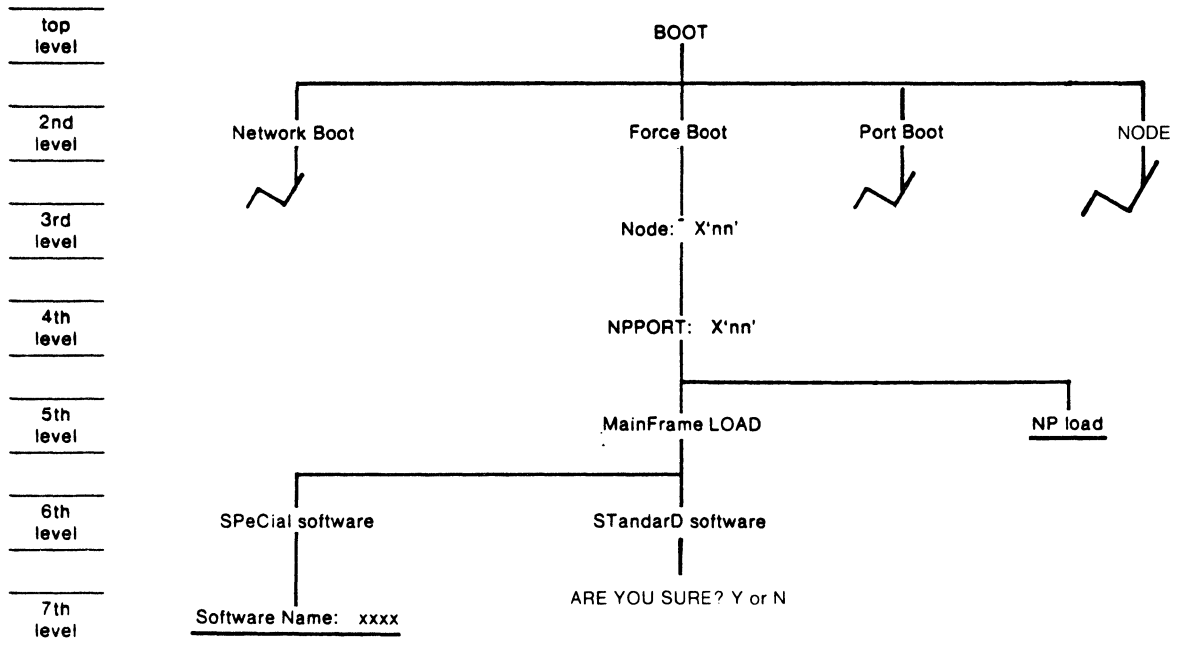
Figure 2-26
Force Boot Segment of Boot Command Menu

2.2.4.2.1 Mainframe Load-Standard Software.

To boot the mainframe with standard software, the operator must specify: the general option BOOT; the intermediate options, Force Boot, Node: X'nn', NPPort: X'nn', and MainFrame LOAD; and the execute option, STandarD software.

Required Intermediate Options

Force Boot -- Specifies that the operator wishes to boot only a single node.

Node: X'nn' -- Specifies the address of the node that is adjacent to the node to be booted and through which the boot command packets will be routed.

NPPort: X'nn' -- Specifies the address of the network port at the adjacent node through which the boot command packets will be routed.

MainFrame LOAD -- Specifies that the software will be loaded in the node mainframe.

Display Syntax

STandarD software

Input Syntax

> STD(CR)

Top-Level Input Line

> BOOT FB N=X'nn' NPP=X'nn' MFLOAD STD(CR)

Verification Request

ARE YOU SURE? Y(CR) or N(CR)

Confirmation Message

OPERATION INITIATED

Results

The operator is informed of the results of the mainframe boot by network reports.

2.2.4.2.2 Mainframe Load--Special Software.

To load the mainframe with special software, the operator must specify: the general option BOOT; the intermediate options, Force Boot, Node: X'nn', NPPort: X'nn', MainFrame LOAD, and SPeCial software; and the execute option Software Name: xxxx.

Required Intermediate Options

   Force Boot -- Specifies that the operator wishes to boot only a single node.

   Node: X'nn' -- Defines the address of the node which is adjacent to the node to be booted and through which the boot command packets and system software will be routed.

   NPPort: X'nn' -- Defines the address of the network port at the adjacent node through which the boot command packets and system software are to be routed.

   MainFrame LOAD -- Specifies that the node mainframe will be reloaded with system software.

   SPeCial software -- Specifies that the mainframe will be loaded with special system software.

Display Syntax

  Software Name: xxxx

Input Syntax

 ❯ SN=xxxx(CR)

Top-Level Input Line

 ❯ BOOT FB N=X'nn' NPP=X'nn' MFLOAD SPC
  SN=xxxx(CR)

Configurable Values

  The software name designation consists of up to 8 ASCII characters.

Verification Request

  ARE YOU SURE? Y(CR) or N(CR)

Confirmation Message

  OPERATION INITIATED

Results

  The operator is informed of the results of the special software boot by network reports.

2.2.4.2.3 NP Load.

The NP load option allows the operator to reload standard software into an isolated I/NP. An I/NP is considered isolated if it is the only I/NP at a secondary node (i.e., a node without a local source of system software). To load the isolated I/NP, the adjacent node and associated I/NP are specified and software loaded across the network link to the isolated I/NP.

Required Intermediate Options

Force Boot -- Specifies that the operator wishes to force boot a node or network port.

Node: X'nn' -- Specifies the address of the node which is adjacent to the I/NP to be booted and through which the command packets and system software will be routed.

NPPort: X'nn' -- Specifies the address of the I/NP at the node which is directly linked to the I/NP to be booted.

Display Syntax

NP load

Input Syntax

>NP(CR)

Top-Level Input Line

>BOOT FB N=X'nn' NPP=X'nn' NP(CR)

Verification Request

ARE YOU SURE?: Y(CR) or N(CR)

Confirmation Message

OPERATION INITIATED

2.2.4.3 Port Boot.

The Port Boot segment of the Boot command menu (see Figure 2-27) allows an operator to restart any specific port or list of ports in the network. The Port Boot option provides six types of port boot executions.:

- A normal port boot in which the port hardware is reset, ROM diagnostics are run, loadable diagnostics are optional, the port is reloaded with standard software, and booted on-line (Normal).

- A special port boot in which there is an optional hardware reset, optional ROM diagnostics, and a restart/nonstart without reloading the port system software (No Load).

- A special port boot in which a hardware reset and ROM diagnostics are optional, the port is reloaded with standard software and restarted at the normal program start address (Standard Software - Standard Start).

- A special port boot in which a hardware reset and ROM diagnostics are optional, the port is reloaded with the standard software and restarted at an operator-specified program start address (Standard Software - Special Start).

- A special port boot in which a hardware reset and ROM diagnostics are optional, the port is reloaded with special operator-specified software and restarted at the normal program start address (Special Software - Standard Start).

- A special port boot in which a hardware reset and ROM diagnostics are optional, the port is reloaded with special operator-specified software, and restarted at a special operator-specified program start address (Special Software - Special Start).

Each of these types of port boots are described in the following subparagraphs.

BOOT

2nd
level

Network Boot   Port Boot   Force Boot   NODE

3rd
level

Node: X'nn'

4th
level

NoRMal   SPeCial

5th
level

LOADable Diag: xxxx   RESet: xxxx

6th
level

Portlist: X'nn'   ROM diagnostics: xxxx

7th
level

No Load   Load

8th
level

ONLine: xxxx   STandarD software   SPeCial software

9th
level

Portlist: X'nn'   SPecial Start   STandard Start   Software Name: xxxx

10th
level

start ADDRess: ONLine: xxxx   STandard Start   SPecial Start

11th
level

ONLine: xxxx   Portlist: X'nn'   ONLine: xxxx   start ADDRess: X'nn'

12th
level

Portlist: X'nn'   Portlist: X'nn'   ONLine: xxxx

13th
level

Portlist: X'nn'

Figure 2-27
Port Boot Segment of Boot Command Menu

2.2.4.3.1 Normal.
A normal port boot will reset the port hardware, run resident ROM diagnostics, reload the port with standard operating software, and restart the port on-line. Loadable diagnostics are optional.

Each of the options which must be specified and defined to perform a normal port boot is described in sequence below.

   a. BOOT.
The general option, Boot, must be specified at the top level of the CT menu.

      Display Syntax

            BOOT

      Input Syntax

          > BOOT(CR)

   b. Port Boot.
At the second level of the BOOT command menu, the intermediate option, Port Boot, must be specified.

      Display Syntax

            Port Boot

      Input Syntax

          > PB(CR)

   c. Node:.
The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

      Display Syntax

            Node: X'nn'

      Input Syntax

          > N=X'nn'(CR)

      Configurable Values

            X'nn' = 00 to 7F

d. <u>Normal.</u>
The Normal option specifies that the port or ports are to be given a normal boot.

<u>Display Syntax</u>

NoRMal

<u>Input Syntax</u>

❯ NRM(CR)

e. <u>Loadable Diagnostics:.</u>
The Loadable Diagnostics option allows the operator to specify whether loadable diagnostics are to be loaded into the port and run before the port is booted on-line.

<u>Display Syntax</u>

LOADable Diag: xxxx

<u>Input Syntax</u>

❯ LOADD=xxxx(CR)

<u>Configurable Values</u>

xxxx = Yes or No

f. <u>Portlist:.</u>
The execute option, Portlist, is used to specify the address(es) of the port(s) to be booted on-line. When specifying more than one port address, the addresses should be separated by a space on the input line.

<u>Display Syntax</u>

PortList: X'nn'

<u>Input Syntax</u>

❯ PL=X'nn' X'nn' X'nn' ...(ESC)

<u>Configurable Values</u>

X'nn' = 02 to FF

g. <u>Top-Level Input Line</u>.

To initiate a normal port boot from the top of the CT menu, the options are entered on a single input line as shown below.

>BOOT PB N=X'nn' NRM LOADD=xxxx PL=X'nn' X'nn'
X'nn' ...(ESC)

h. <u>Verification Request</u>

When an option is specified, the CT will request verification of the boot request before initiation:

ARE YOU SURE?   Y or N

To initiate: Y(CR)
To abort: N(CR)

i. <u>Confirmation Message</u>.

When the operator verifies the Portlist option, the CT will respond with a confirmation message.

OPERATION INITIATED

2.2.4.3.2 <u>No Load</u>.
The No Load port boot involves an optional hardware reset, optional ROM diagnostics, and a restart/nonstart of the port without reloading the port operating software.

The options required to initiate a No Load port boot are detailed in the following subparagraphs.

     a. <u>Boot</u>.
The general option, Boot, must be specified at the top level of the CT menu.

        <u>Display Syntax</u>

           BOOT

        <u>Input Syntax</u>

         ➤BOOT(CR)

     b. <u>Port Boot</u>.
At the second level of the Boot command menu, the intermediate option, Port Boot, must be specified.

        <u>Display Syntax</u>

           Port Boot

        <u>Input Syntax</u>

         ➤PB(CR)

     c. <u>Node:</u>.
The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

        <u>Display Syntax</u>

           Node: X'nn'

        <u>Input Syntax</u>

         ➤N=X'nn'(CR)

        <u>Configurable Values</u>

           X'nn' = 00 to 7F

2-66

d. Special.

The special option specifies that special port boot is to be performed.

Display Syntax

SPeCial

Input Syntax

> SPC(CR)

e. Reset:.

The Reset option is used to specify whether port hardware is to be reset before the port or ports are booted.

Display Syntax

RESet: xxxx

Input Syntax

> RES=xxxx(CR)

Configurable Values

xxxx = Yes or No

f. ROM Diagnostics:.

The ROM diagnostics option is used to specify if resident ROM diagnostics are to be run before the port or ports are booted.

Display Syntax

ROM diagnostics: xxxx

Input Syntax

> ROM=xxxx(CR)

Configurable Values

xxxx = Yes or No

g. <u>No Load.</u>

This option specifies that operating software should not be reloaded into the port or ports. The operating software that is currently loaded into the port or ports is retained.

<u>Display Syntax</u>

No Load

<u>Input Syntax</u>

❯NL(CR)

h. <u>Online:.</u>

This option is used to specify if the port(s) should be booted back on-line.

<u>Display Syntax</u>

ONLine: xxxx

<u>Input Syntax</u>

❯ONL=xxxx(CR)

<u>Configurable Values</u>

xxxx = Yes or No

i. <u>Portlist:.</u>

The execute option, Portlist, is used to specify the address of the port(s) to be booted. When specifying more than one port address, the addresses should be separated by a space on the input line.

<u>Display Syntax</u>

PortList: X'nn'

<u>Input Syntax</u>

❯PL=X'nn' X'nn' X'nn' ...(ESC)

<u>Configurable Values</u>

X'nn' = 02 to FF

j. <u>Top-Level Input Line</u>.
The syntax of the input line required to initiate the No Load port boot from the top of the CT menu is shown below.

> ❯BOOT PB N=X'nn' SPC RES=xxxx ROM=xxxx NL
> ONL=xxxx PL=X'nn' X'nn' X'nn' ...(ESC)

k. <u>Verification Request</u>.
When an option is specified, the CT will request verification of the boot before initiation.

```
ARE YOU SURE?  Y or N
```

```
To initiate:  Y(CR)
To abort:     N(CR)
```

l. <u>Confirmation Message</u>.
When the port list is specified, the CT will respond with the following confirmation message.

OPERATION INITIATED

The operator is informed of the results of the operation by network reports.

2.2.4.3.3 Standard Software -- Standard Start.

The Standard Software--Standard Start port boot performs an optional reset of port hardware, optional ROM diagnostics, a reload of the port operating software, and a restart of the port at the normal start address.

The options which are required to initiate a Standard Software--Standard Start port boot are described in sequence in the following subparagraphs.

a. Boot.

The general option, Boot, must be specified at the top level of the CT menu.

Display Syntax

    BOOT

Input Syntax

    >BOOT(CR)

b. Port Boot.

At the second level of the Boot command menu, the intermediate option, Port Boot, must be specified.

Display Syntax

    Port Boot

Input Syntax

    >PB(CR)

c. Node:.

The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

Display Syntax

    Node: X'nn'

Input Syntax

    >N=X'nn'(CR)

Configurable Values

    X'nn' = 00 to 7F (CR)

d. **Special.**
The Special option specifies that a special port boot is to be performed.

      Display Syntax

          SPeCial

      Input Syntax

          ❯SPC(CR)

e. **Reset:.**
The Reset option is used to specify whether port hardware is to be reset before the port or ports are booted.

      Display Syntax

          RESet: xxxx

      Input Syntax

          ❯RES=xxxx(CR)

      Configurable Values

          xxxx = Yes or No

f. **ROM Diagnostics:.**
The ROM Diagnostics option is used to specify if resident ROM diagnostics are to be run before the port or ports are booted.

      Display Syntax

          ROM diagnostics: xxxx

      Input Syntax

          ❯ROM=xxxx(CR)

      Configurable Values

          xxxx = Yes or No

g. __Load.__
The Load option specifies that the port operating software is to be reloaded.

  __Display Syntax__

    Load

  __Input Syntax__

    ❯L(CR)

h. __Standard Software__
This option specifies that the port(s) is to be reloaded with standard operating software.

  __Display Syntax__

    STandarD software

  __Input Syntax__

    ❯STD(CR)

i. __Standard Start.__
This option specifies that the port(s) is to be restarted at the normal start address.

  __Display Syntax__

    STandard Start

  __Input Syntax__

    ❯ STS(CR)

j. <u>Online:</u>.
This option is used to specify if the port(s) should be booted back on-line.

<u>Display Syntax</u>

    ONLine: xxxx

<u>Input Syntax</u>

  ❯ONL=xxxx(CR)

<u>Configurable Values</u>

    xxxx = Yes or No

k. <u>Portlist:</u>.
The execute option, Portlist, is used to specify the address(es) of the port(s) to be booted. When specifying more than one port address, the addresses should be separated by a space on the input line.

<u>Display Syntax</u>

    PortList: X'nn'

<u>Input Syntax</u>

  ❯PL=X'nn' X'nn' X'nn' ...(ESC)

<u>Configurable Values</u>

    X'nn' = 02 to FF

1. Top-Level Input Line.
The syntax of the input line required to initiate the Standard Software—Standard
Address port boot from the top of the CT menu is shown below.

❭ BOOT PB N=X'nn' SPC RES=xxxx ROM=xxxx L STD STS ONL=xxxx PL=X'nn' X'nn'(CR)
X'nn'...(ESC)

m. Verification Request.
When an option is specified, the CT will request verification of the boot before
initiation:

    ARE YOU SURE?: Y or N

    To initiate: Y(CR)
    To abort: N(CR)

n. Confirmation Message.
When the operator verifies the port list, the CT will respond with the following
Confirmation Message:

OPERATION INITIATED

The operator is informed of the results of the operation by network reports.

2.2.4.3.4 Standard Software--Special Start.

The Standard Software--Special Start port boot performs an optional reset of port hardware, optional ROM diagnostics, a reload of the standard port operating software, and a restart of the port at an operator-specified start address.

The options which are required to initiate a Standard Software--Special Start port boot are described in sequence in the following subsections.

a. Boot.

The general option, Boot, must be specified at the top level of the CT menu.

Display Syntax

    BOOT

Input Syntax

    ❯BOOT(CR)

b. Port Boot.

At the second level of the Boot command menu, the intermediate option, Port Boot, must be specified.

Display Syntax

    Port Boot

Input Syntax

    ❯ PB(CR)

c. Node:.

The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

Display Syntax

    Node: X'nn'

Input Syntax

    ❯ N=X'nn'(CR)

Configurable Values

    X'nn' = 00 to 7F

d. Special.

The Special option specifies that a special port boot is to be performed.

Display Syntax

SPeCial

Input Syntax

>SPC(CR)

e. Reset:.

The Reset option is used to specify whether port hardware is to be reset before the port or ports are booted.

Display Syntax

RESet: xxxx

Input Syntax

>RES=xxxx(CR)

Configurable Values

xxxx = Yes or No

f. ROM Diagnostics:.

The ROM Diagnostics option is used to specify if resident ROM diagnostics are to be run before the port or ports are booted.

Display Syntax

ROM diagnostics: xxxx

Input Syntax

>ROM=xxxx(CR)

Configurable Values

xxxx = Yes or No

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g. Load.

The Load option specifies that the port operating software is to be reloaded.

Display Syntax

Load

Input Syntax

❯L(CR)

h. Standard Software.

The Standard Software option specifies that the port(s) is to be reloaded with standard operating software.

Display Syntax

STandarD software

Input Syntax

❯ STD(CR)

i. Special Start.

The Special Start option specifies that the port(s) should be restarted at a special start address.

Display Syntax

SPecial Start

Input Syntax

❯ SPS(CR)

j. **Start Address:**.
This option, Start Address, is used to specify the special starting address.

Display Syntax

start ADDRess: X'nnnn'

Input Syntax

⟩ ADDR=X'nnnn'(CR)

Configurable Values

X'nnnn' = 0000 to FFFF

k. **Online:**.
This option is used to specify if the port(s) should be booted back on-line.

Display Syntax

ONLine: xxxx

Input Syntax

⟩ONL=xxxx(CR)

Configurable Values

xxxx = Yes or No

1. Portlist:.

The execute option, Portlist, is used to specify the address(es) of the port(s) to be booted. When specifying more than one port address, the addresses should be separated by a space on the input line.

Display Syntax

PortList: X'nn'

Input Syntax

➤ PL=X'nn' X'nn' X'nn' ...(ESC)

Configurable Values

X'nn' = 02 to FF

m. Top-Level Input Line.

The syntax of the input line required to initiate the Standard Software--Special Start port boot from the top of the CT menu is shown below.

➤ BOOT PB N=X'nn' SPC RES=xxxx ROM=xxxx L STD SPS ADDR=X'nnnn' ONL=xxxx
PL=X'nn'(CR) X'nn' X'nn' ... (ESC)

n. Verification Request.

When an option is specified, the CT will request verification of the boot before initiation:

ARE YOU SURE?: Y or N

To initiate: Y(CR)
To abort: N(CR)

o. Confirmation Message.

When the operator verifies the port list, the CT will respond with the following Confirmation Message:

OPERATION INITIATED

The operator is informed of the results of the operation by network reports.

2.2.4.3.5 Special Software--Standard Start.
The Special Software--Standard Start port boot performs an optional reset of port hardware, optional ROM diagnostics, a reload of operator-specified port operating software, and a restart of the port at the normal start address.

The options which are required to initiate a Special Software--Standard Start port boot are described in sequence in the following subparagraphs.

    a. Boot.
The general option, Boot, must be specified at the top level of the CT menu.

        Display Syntax

            BOOT

        Input Syntax

            >BOOT(CR)

    b. Port Boot.
At the second level of the Boot command menu, the intermediate option, Port Boot, must be specified.

        Display Syntax

            Port Boot

        Input Syntax

            > PB(CR)

    c. Node.
The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

        Display Syntax

            Node: X'nn'

        Input Syntax

            > N=X'nn'(CR)

        Configurable Values

            X'nn' = 00 to 7F

d. Special.

The Special option specifies that a special port boot is to be performed.

Display Syntax

SPeCial

Input Syntax

>SPC(CR)

e. Reset:.

The Reset option is used to specify whether port hardware is to be reset before the port or ports are booted.

Display Syntax

RESet: xxxx

Input Syntax

>RES=xxxx(CR)

Configurable Values

xxxx = Yes or No

f. ROM Diagnostics:.

The ROM Diagnostics option is used to specify if resident ROM diagnostics are to be run before the port or ports are booted.

Display Syntax

ROM diagnostics: xxxx

Input Syntax

> ROM=xxxx(CR)

Configurable Values

xxxx = Yes or No

g. Load.

The Load option specifies that the port operating software is to be reloaded.

Display Syntax

Load

Input Syntax

> L(CR)

h. Special Software.

This option, Special Software, specifies that the port(s) is to be reloaded with special operating software.

Display Syntax

SPeCial software

Input Syntax

> SPC(CR)

i. Software Name:.

The Software Name option is used to specify the designation of the special operating software.

Display Syntax

Software Name: xxxx

Input Syntax

> SN=xxxx(CR)

Configurable Values

The software name designation consists of up to 8 ASCII characters.

j. **Standard Start.**
This option specifies that the port is to be restarted at the normal start address.

Display Syntax

   STandard Start

Input Syntax

   > STS(CR)

k. **Online:.**
This option is used to specify if the port(s) should be booted back on-line.

Display Syntax

   ONLine: xxxx

Input Syntax

   > ONLxxxx(CR)

Configurable Values

   xxxx = Yes or No

1. Portlist:.

The execute option, Portlist, is used to specify the address(es) of the port(s) to be booted. When specifying more than one port address, the addresses should be separated by a space on the input line.

Display Syntax

    PortList: X'nn'

Input Syntax

    ➤ PL=X'nn' X'nn' X'nn' ...(ESC)

Configurable Values

    X'nn' = 02 to FF

m. Top-Level Input Line.

The syntax of the input line required to initiate the Special Software--Standard Start port boot from the top of the CT menu is shown below.

➤ BOOT PB N=X'nn' SPC RES=xxxx ROM=xxxx L SPC SN=xxxx STS ONL=xxxx PL=X'nn'(CR) X'nn' X'nn' ...(ESC)

n. Verification Request.

When an option is specified, the CT will request verification of the boot before initiation:

    ARE YOU SURE? Y or N

    To initiate: Y(CR)
    To abort: N(CR)

o. Confirmation Message.

When the operator verifies the port list, the CT will respond with the following Confirmation Message:

                    OPERATION INITIATED

The operator is informed of the results of the operation by network reports.

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2.2.4.3.6 Special Software--Special Start.

The Special Software--Special Start port boot performs an optional reset of port hardware, optional ROM diagnostics, a reload of operator-specified port operating software, and a restart of the port at an operator-specified start address.

The options which are required to initiate a Special Software--Special Start port boot are described in sequence in the following subparagraphs.

a. Boot.

The general option, Boot, must be specified at the top level of the CT menu.

Display Syntax

BOOT

Input Syntax

> BOOT(CR)

b. Port Boot.

At the second level of the Boot command menu, the intermediate option, Port Boot, must be specified.

Display Syntax

Port Boot

Input Syntax

> PB(CR)

c. Node:.

The intermediate option, Node, is used to specify the address of the node where the port or ports to be booted reside.

Display Syntax

Node: X'nn'

Input Syntax

> N=X'nn'(CR)

Configurable Values.

X'nn' = 00 to 7F

d. Special.
The Special option specifies that a special port boot is to be performed.

Display Syntax

    SPeCial

Input Syntax

    ➤SPC(CR)

e. Reset:.
The Reset option is used to specify whether port hardware is to be reset before the port or ports are booted.

Display Syntax

    RESet: xxxx

Input Syntax

    ➤RES=xxxx(CR)

Configurable Values

    xxxx = Yes or No

f. ROM Diagnostics:.
The ROM Diagnostics option is used to specify if resident ROM diagnostics are to be run before the port or ports are booted.

Display Syntax

    ROM diagnostics: xxxx

Input Syntax

    ➤ROM=xxxx(CR)

Configurable Values

    xxxx = Yes or No

g. Load.

The Load option specifies that the port operating software is to be reloaded.

Display Syntax

Load

Input Syntax

>L(CR)

h. Special Software.

This option specifies that the port(s) is to be reloaded with special operating software.

Display Syntax

SpeCial software

Input Syntax

>SPC(CR)

i. Software Name:.

This option is used to specify the designation of the special operating software.

Display Syntax

Software Name: xxxx

Input Syntax

> SN=xxxx(CR)

Configurable Values

The software name designation consists of up to 8 ASCII characters.

j. Special Start.
This option is used to specify that the port(s) is to be restarted at a special start address.

Display Syntax

SPecial Start

Input Syntax

>SPS(CR)

k. Start Address.
This option is used to specify the special start address.

Display Syntax

start ADDRess: X'nnnn'

Input Syntax

>ADDR=X'nnnn'(CR)

Configurable Values

X'nnnn' = 0000 to FFFF

l. Online:.
This option is used to specify if the port(s) should be booted back on-line.

Display Syntax

ONLine: xxxx

Input Syntax

>ONL=xxxx(CR)

Configurable Values

xxxx = Yes or No

m. Portlist:.

The execute option, Portlist, is used to specify the address(es) of the port(s) to be booted. When specifying more than one port address, the addresses should be separated by a space on the input line.

Display Syntax

PortList: X'nn'

Input Syntax

➤PL=X'nn' X'nn' X'nn' ...(ESC)

Configurable Values

X'nn' = 02 to FF

n. Top-Level Input Line.

The syntax of the input line required to initiate the Special Software--Special Start Address port boot is shown below.

➤ BOOT PB N=X'nn' SPC RES=xxxx ROM=xxxx L SPC SN=xxxx SPS ADDR=X'nnnn' ONL=xxxx (CR)
PL=X'nn' X'nn' X'nn' ...(ESC)

o. Verification Request.

When an option is specified, the CT will request verification of the boot before initiation.

ARE YOU SURE?   Y or N

To initiate: Y(CR)
To abort: N(CR)

p. Confirmation Message.

When the operator verifies the port list, the CT will respond with the following Confirmation Message:

OPERATION INITIATED

The operator is informed of the results of the operation by network reports.

2.2.4.4 Node Boot.

The Node Boot option allows the operator to boot a single node to a specific off-line configuration and/or a new software revision or release. The Node Boot segment of the Boot command menu is illustrated in Figure 2-28. The options which must be specified to perform a node boot are defined in the required sequence in the following subparagraphs.

```
top
level                                    BOOT

2nd
level    Network Boot    Forced Boot     NODE         Port Boot

3rd
level       ∿              ∿         Node: X'nn'        ∿

4th
level                              Configuration: X'nn'

5th
level                               REVision: X'nn'

6th
level                               RELease: X'nn'


7th
level                            ARE YOU SURE? Y or N
```
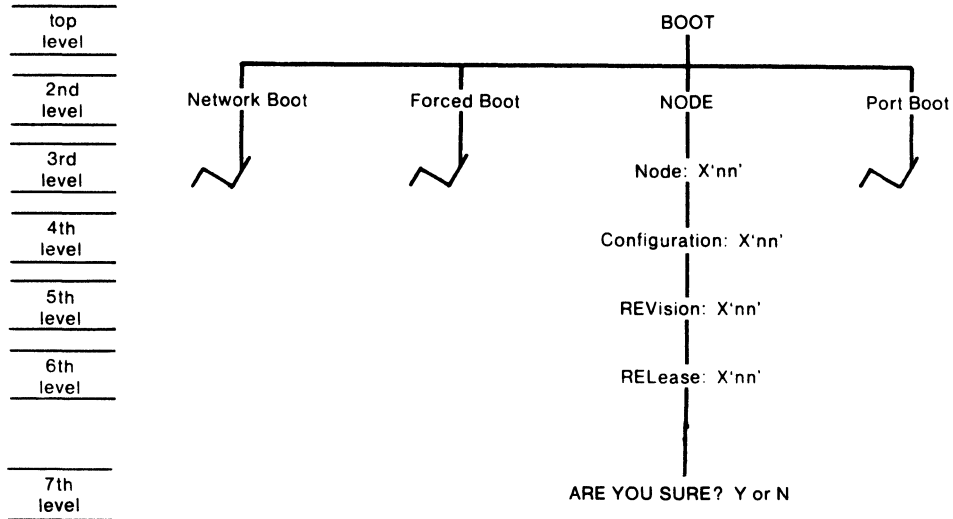
Figure 2-28
Node Boot Segment of Boot Command Menu

a. Boot.

The general option Boot must be specified at the top level of the CT command menu.

Display Syntax

    BOOT

Input Syntax

    > BOOT(CR)

b. <u>Node Boot.</u>
At the second level of the menu, the intermediate option, Node Boot, is specified.

<u>Display Syntax</u>

NODE

<u>Input Syntax</u>

NODE(CR)

c. <u>Node:</u>.
The address of the node to be booted is then specified.

<u>Display Syntax</u>

Node: X'nn'

<u>Input Syntax</u>

➤ N='nn'(CR)

<u>Configurable Values</u>

nn = X'00' to X'7F'

d. Configuration:.

Next, the offline configuration which is to be booted online for the specified node.

Display Syntax

Configuration: X'0n'

Input Syntax

➤C=n(CR)

Configurable Values

n = 1, 2, 3, 4, or 5

e. Revision:.

The desired software revision is then specified.

Display Syntax

REVision: X'nn'

Input Syntax

➤REV=nn(CR)

Configurable Values

nn = X'01' to X'FF'

f. __Release:.__
The last option specified before the boot is executed is the release number of the system software. The boot is executed when the release number is entered.

Display Syntax

RELease: X'nn'

Input Syntax

＞REL=nn(CR)

Configurable Values

nn = X'01' to X'FF'

g. __Top-Level Input Line.__
The syntax of the input line required to initiate a node boot from the top of the CT command menu is shown below.

BOOT NB N=nn C=n REV=nn REL=nn(CR)

h. __Verification Request.__
After the RELease parameter is specified, the CT will request verication of the boot before initiation:

ARE YOU SURE? Y or N

To initiate: Y(CR)
To abort: N(CR)

i. __Confirmation Message.__
The initiation of the node boot is verified with the following display:

OPERATION INITIATED

The operator will be informed of the results of the boot via network reports.

2.2.5 SYSTEM SERVICES

The System Services general option (see Figure 2-29) offers five different categories of network service utilities: Packetgen, Node Memory Utilities, Port Memory Utilities, Floppy Utilities, and Timeset.

These five categories are presented as selections at the second level of the System Services command menu (see Figure 2-30).

Note
The Packetgen, Node Memory, and Port Memory Utilities are for Customer Service debugging purposes and are therefore only available in the Customer Engineering Mode.

The Timeset and Floppy Utilities will be described as separate segments of the System Services command menu.

CODEX 6050 NETWORK CONTROL PORT ON LINE

Configuration EDitor
MXP control
RESET ICTP
BOOT

System Services

DIAGnostics
RUNNING CONFIGURATION: X'02'

>
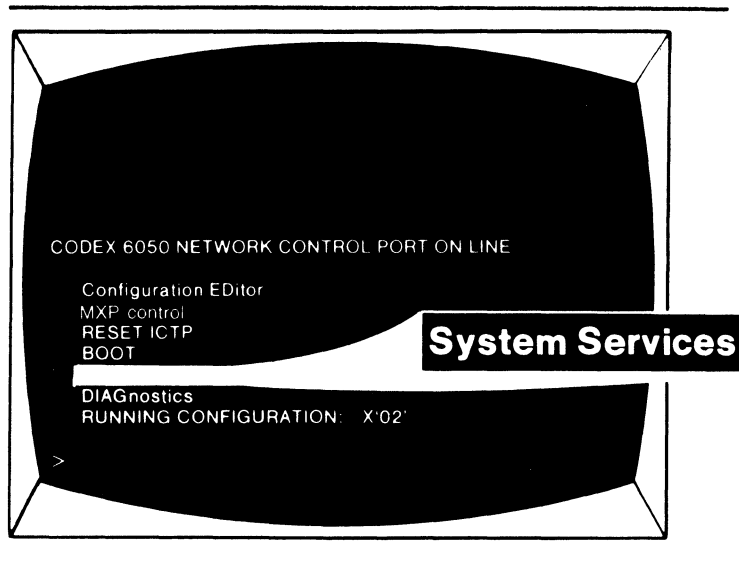
Figure 2-29
System Services General Option

top level

System Services

2nd level

**PACKetgen   TIMEset: hh:mm:ss   Floppy Utilities   **Node MEMory utilities   **Port MEMory utilities
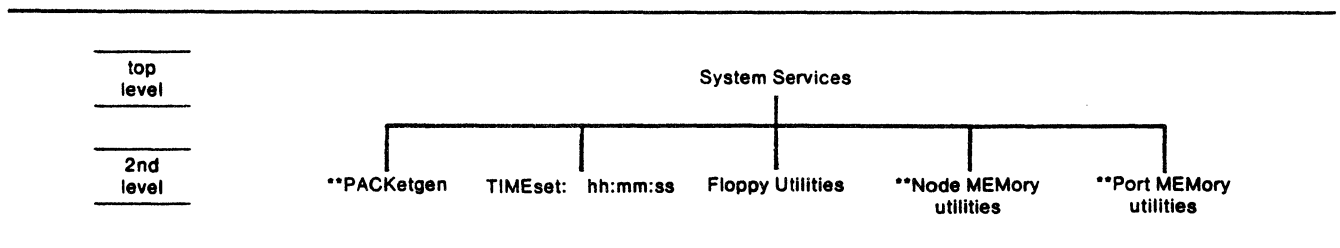
Figure 2-30
Segments of System Services Command Menu

2.2.5.1 Timeset.

The Timeset option is a stand-alone system service option allowing the operator to set the system real-time.

To define the Timeset option, the operator must first specify the System Services general option at the top of the CT menu.

Display Syntax

        TIMEset: hh:mm:ss

where:
          hh -- is hours
          mm -- is minutes
          ss -- is seconds

Input Syntax

        TIME=hh:mm:ss(CR)

Configurable Values

          hh = 00 to 23
          mm = 00 to 59
          ss = 00 to 59

Top-Level Input Line

        SS TIMEhh:mm:ss(ILT)

Confirmation Message

        When the timeset option is defined, the CT will echo a verification
        of the new time. For example, after the operator defines the time as
        01 hours, 44 minutes, and 00 seconds, the CT will respond:

                    TIMESET: 01:44:00

2.2.5.2 Floppy Utilities.

The Floppy Utilities segment of the System Services menu (see Figure 2-31) provides the operator with the ability to perform each of the following floppy operations.

. Put a drive online for normal operations (ONLine).

. Take a drive offline (OFFLine).

. Format a disk (FORMAT).

. Copy the existing format of a disk on one drive to another disk on an alternate drive (MOVEdisk).

. Verify the integrity of each software file on the disk (ChecKSuM).
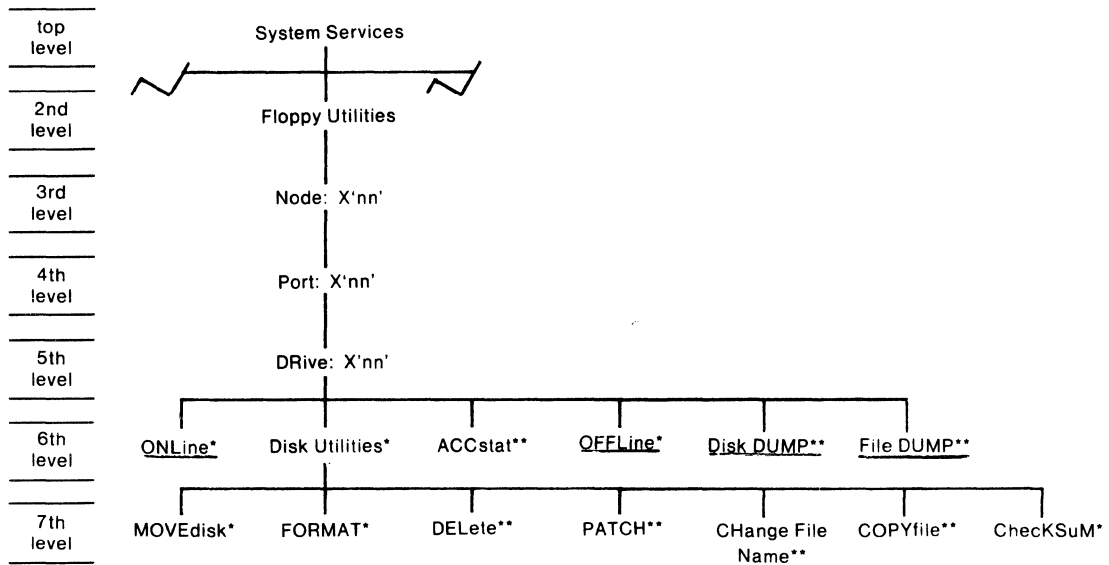
*ACCESSIBLE IN PROGRAM MODE.
**INTENDED FOR CUSTOMER ENGINEER USE ONLY.

Figure 2-31
Floppy Utilities Segment of System Service Command Menu

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2.2.5.2.1 Required Intermediate Options.
The intermediate options which must be specified to access any of the floppy util-
ities (refer to Figure 2-31) are defined in sequence below.

Floppy Utilities -- The Floppy Utilities segment of the System Services menu
must be specified.

Node: X'nn' -- The address of the node which houses the floppy drive
assemblies and I/FDP. Allowable values are 01 to 7F.

Port: X'nn' -- The address of the I/FDP. Allowable values are 02 to FF.

Drive: X'nn' -- The drive number for the disk involved. Allowable values
are 00 to 03.

Disk Utilities -- Must be specified after Drive: X'nn' to perform Movedisk,
Format, Delete, and Patch operations.

2.2.5.2.2 Utility Descriptions. The procedures required to perform each floppy
utility function are outlined in the following subsections.

a. ONLINE.
The Online option is used to designate a specific floppy drive as online and ready
for normal operation. It is recommended that one drive be configured online and
the other drive be configured offline.

Display Syntax

ONLine

Input Syntax

ONL(CR)

Confirmation Message

OPERATION INITIATED

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b. __OFFLINE.__

The Offline option is used to designate a specific drive as offline and unavailable for normal operations. A drive must be taken offline to perform the MOVEdisk, Patch Disk, and FORMAT options.

__Display Syntax__

OFfLine

__Input Syntax__

➤OFL(CR)

__Confirmation Message__

OPERATION INITIATED

c. __Accstat.__

The use of the Accstat option is reserved for qualified Codex personnel.

d. __Disk Dump.__

The use of the Disk Dump option is reserved for qualified Codex personnel.

e. __File Dump.__

The use of the File Dump option is reserved for qualified Codex personnnel.

f. __FORMAT.__

The Format option is ued to prepare a disk for operation as a System Software disk.

Note
Before formatting a disk in a particular drive, the drive must be taken offline (Refer to Paragraph III.4.2).

__Display Syntax__

FORMAT

__Input Syntax__

➤FORMAT(CR)

When the Format option is specified, the CT will respond with various disk parameters which must be defined by the operator. Each of these parameters are defined in the sequence that they appear.

1. Sides.
   Identifies the disk as one-sided or two-sided.

   Display Syntax

       Sides: X'nn'

   Input Syntax

       > S=n(CR)

   Configurable Values

       n = 1 or 2

2. Density.
   Identifies the disk type as single or double density.

   Display Syntax

       DENsity: X'nn'

   Input Syntax

       > DEN=n(CR)

   Configurable Values

       n = 1 or 2

3. Volume Identification.
   An ASCII test identifier for the disk. This ID will be used to
   identify the disk in network reports.

   Display Syntax

       VOLume ID: xxxxxxxx

   Input Syntax

      ❯VOLID=xxxxxxxx

   Configurable Values

       xxxxxxxx = Up to eight ASCII
                  characters.

4. Optional Text.
   This parameter allows the operator to enter up to 64 characters to be
   associated with the disk for user applications.

   Display Syntax

       OPTional text:

   Input Syntax

      ❯OPT=xxxx...(CR)
       xxxxxxxxx...(ESC)

   Note
   CR is used to continue on to a new line, ESC is
   used to terminate the optional text input. Current
   restrictions require the user to use "_" (under-
   score) or "." (period) instead of blank spaces in
   the text.

   Configurable Values

       Up to 64 ASCII characters.

5. <u>Software Disk.</u>
   This parameter is used to designate the disk as a system software
   disk. As a software disk, the disk is loaded with a specific revision
   and release of system software and operates as a source of software.

   <u>Display Syntax</u>

       SOFTware disk

   <u>Input Syntax</u>

       >SOFT(CR)

6. <u>Revision.</u>
   The revision number of the software to be loaded into the disk.

   <u>Display Syntax</u>

       REVision: X'nn'

   <u>Input Syntax</u>

       >REV=nn(CR)

   <u>Configurable Values</u>

       nn = X'01' to X'FF'

7. <u>Release</u>.
The release number of the software to be loaded into the port.

<u>Display Syntax</u>

    RELease: X'nn'

<u>Input Syntax</u>

    > REL=nn(CR)

<u>Configurable Values</u>

    nn = X'01' to X'FF'

8. <u>Confirmation Messages</u>.
When the Release parameter has been defined and the formatting completed, the CT will respond with a network report:

<p align="center">FORMAT COMMAND COMPLETE</p>

The operator must then return to the top of the CT menu by entering:

<p align="center">> (CTL-T) and > (CR)</p>

The operator must then wait for a report stating:

UNLOCK DRIVE # COMMAND COMPLETE

The Formatting operation is then complete and the software disk ready for use.

g. __MOVEDISK.__

The Movedisk utility allows an operator to copy the contents of the disk in the
specified drive to another disk in another drive.

Note

Before initiating the Movedisk utility, the drive
housing the disk to be copied to must be taken off-
line. The drive housing the disk to be copied from
must be online. The disk being copied to must be
formatted.

Display Syntax

MOVEdisk

Input Syntax

➤ MOVE(CR)

When the Movedisk option is specified, the CT will respond with various parameters
which must be defined by the operator. Each of these parameters are defined in the
sequence that they appear.

1. __To Drive.__
Identifies the drive number which houses the disk to be copied to.

Display Syntax

To DRive: X'nn'

Input Syntax

➤ TDR=n(CR)

Configurable Values

n = 1, 2, or 3

2. **To Node.**
The address of the node where the disk to be copied to resides.

Display Syntax

To Node: X'nn'

Input Syntax

➤ TN=nn(CR)

Configurable Values

nn = X'00' to X'7F'

3. **To Port.**
The address of the I/FDP at the node specified above.

Display Syntax

To Port: X'nn'

Input Syntax

➤ TP=nn(CR)

Configurable Values

nn = X'02' to X'FF'

4. **From Volume Identification.**
   The Volume ID of the disk being copied from. The Volume ID is obtained from the initialization report when the disk is initialized.

   Display Syntax

   > From Volume id: xxxxxxxx

   Input Syntax

   > FV=xxxxxxxx(CR)

5. **To Volume Identification.**
   The Volume ID of the disk being copied to.

   Display Syntax

   > To Volume id: xxxxxxxx

   Input Syntax

   > TV=xxxxxxxx(CR)

6. **Confirmation Message.**
   The Movedisk function is initiated when the To Volume ID parameter is defined. The initiation of the function is confirmed with the following display:

   OPERATION INITIATED

h. **PATCH**.

The use of the Patch option is reserved for qualified Codex personnel.

i. <u>DELETE</u>.
The use of the Delete option is reserved for qualified Codex personnel.

j. Change File Name.
The use of the Change File Name option is reserved for qualified Codex personnel.

k. <u>Copyfile</u>.
The use of the Copyfile option is reserved for qualified Codex personnel.

1. **System Software Disk Checksum.**

A checksum diagnostic routine can be run on the 6050 System Software disk to verify
the integrity of each software file on the disk. The Checksum function is initi-
ated under the major control terminal function, System Services. Table 2-8 pro-
vides a sequenced listing of the options, with their displayed syntax, input
syntax, and required value, that must be specified at descending levels of the
System Services menu to initiate the checksum function.

Table 2-8
Procedure for Initiating Checksum Function

Menu Level	Option Displayed	Input Syntax	Required Value
1	System Services	SS(CR)	
2	Floppy Utilities	FU(CR)	
3	Node: X'nn'	N=nn(CR)	nn = CMEM node address (hex) of the system software drive.
4	Port: X'nn'	P=nn(CR)	nn = address (hex) of the I/FDP.
5	DRive: X'nn'	DR=nn(CR)	nn = the drive number (0, 1, 2) of the system software disk.
6	Disk Utilities	DU(CR)	
7	ChecKSuM	CKSM(CR)	

When the ChecKSuM option is specified, the checksum routine is performed and a
listing of the byte count and checksum value for each system software file is
displayed on the control terminal. Table 2-9 lists and example of checksum values.
Note that the last column, Software Type, is not displayed with the checksum
lig and is therefore provided in parentheses.

Table 2-9
Example of Checksum Values Display

Filename	Byte Count	Checksum	Software Type
D001	32BA	957D	(Diagnostics -- CTC 1)
D002	4664	1CD9	(Diagnostics -- CTC 2)
D003	4664	1CD9	(Diagnostics -- CTC 3)
D101	49B6	EDF2	(Diagnostics -- I/NP)
D201	4440	EC80	(Diagnostics -- BYTED)
D301	49B6	EDF2	(Diagnostics -- I/BOP)
D401	2782	2FDC	(Diagnostics -- Engine 1 with QBYTE)
D402	55BA	317E	(Diagnostics -- QBYTE)
D501	3D1E	389F	(Diagnostics -- FDC 1)
D502	32D8	C0AF	(Diagnostics -- FDC 2)
D503	32D8	C0AF	(Diagnostics -- FDC3)
D601	2782	2FDC	(Diagnostics -- Engine 1 with QBYTE)
D602	55BA	317E	(Diagnostics -- I/MSTP)
D701	271A	095D	(Diagnostics -- VBIT 1)
D702	7B38	9108	(Diagnostics -- VBIT 2)
D801	32BA	957D	(Diagnostics -- Engine 1 with CTC)
D802	4664	1CD9	(Diagnostics -- Engine 2 with CTC)
D803	4664	1CD9	(Diagnostics -- Engine 3 with CTC)
DFF1	2636	9B9D	(Diagnostics -- Engine 1)
DFF2	31FA	3A4E	(Diagnostics -- Engine 2)
DFF3	31FA	3A4E	(Diagnostics -- Engine 3)
M000	A4EA	60F4	(Operating Software -- Mainframe)
D000	1B70	F83D	(Diagnostics -- Mainframe)
OFFDP	420E	E4D8	(Diagnostics -- Floppy Disk)
IP00	9C00	675C	(Operating Software -- I/CTP)
IP01	2A80	7286	(Operating Software -- I/NP)
IP02	2C9E	5686	(Operating Software -- I/GBNP)
IP05	3554	3274	(Operating Software -- I/BOP)
IP06	5F3A	864A	(Operating Software -- I/FDP)
IP0B	5C26	523C	(Operating Software -- I/MXP)
IP0C	4AA6	A046	(Operating Software -- I/MSTP)
IP0D	5948	8ED8	(Operating Software -- I/MATP)

2.2.6 DIAGNOSTICS

This section provides the procedures and definitions required to initiate all diagnostic options from any network Control Terminal (CT) and interpret diagnostic network reports.

Note
For information on the general operation of the CT, refer to Section 2.1, General Operation.

The information in this section is presented in four parts: (1) Diagnostic Execute Options identifies the diagnostic procedures which are available and illustrates the required sequence of command options in the diagnostic command menu; (2) Command Option Definitions shows the display syntax, input syntax, and configurable values of each of the command options; (3) Standard Port Diagnostic Sequence explains the sequence of operations which occur after standard port diagnostics are initiated; and (4) Interpreting Diagnostic Reports identifies and describes each field in a diagnostic network report.

2.2.6.1 DIAGNOSTIC EXECUTE OPTIONS

The Diagnostics general option (see Figure 2-32) allows an operator to initiate standard diagnostic routines on up to eight interface ports at a time (STandarD software -- STandard Start). These tests provide a thorough check of both the engine and communication modules of each port and will verify correct operation or isolate problem areas to a specific functional section of the port. The operator is informed of the results of all diagnostic operations by network reports.

In addition, the diagnostics command menu (see Figure 2-33) allows the operator to specify the following: a shorter, ROM resident, diagnostic check (No Load); a special prearranged diagnostic software (SPeCial software); a special software starting address (SPecial Start); and/or various diagnostic parameters which determine the number of times the tests are run, the acceptable number of errors before the test is terminated, etc. (Diag Parameters).

```
CODEX 6050 NETWORK CONTROL PORT ON LINE

    Configuration EDitor
    MXP control
    RESET ICTP
    BOOT
    System Services                    DIAGnostics

    RUNNING CONFIGURATION:   X'02'

  >
```
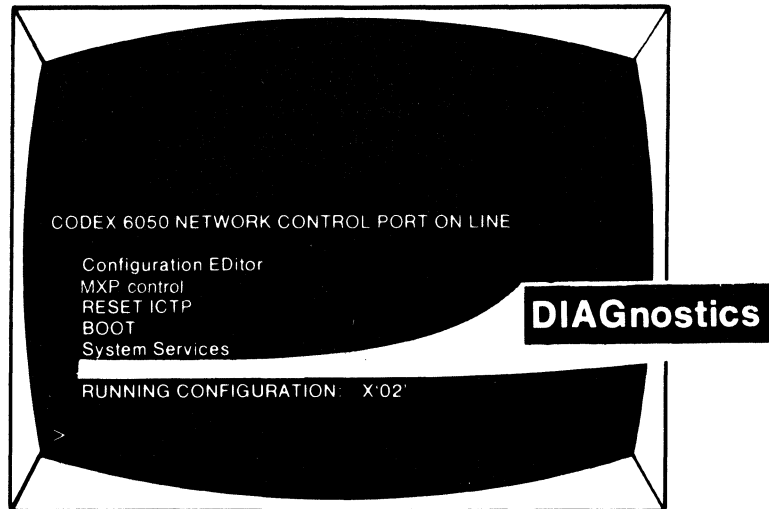
Figure 2-32
Diagnostics General Option

1	DIAGnostics
2	Node: X'nn'
3	PORT diagnostics
4	ROM diag: XXXX
5	No Load LOADable
6	Port List: Standard software SPeCial software
	Software Name: XXXX
7	Special Start Standard Start
	Start ADDRess: X'nnnn'
8	DSTAtus message: XXXX
9	DERRor message: XXXX
10	Port List:
11	Diag Parameters:
12	ARE YOUR SURE? Y or N
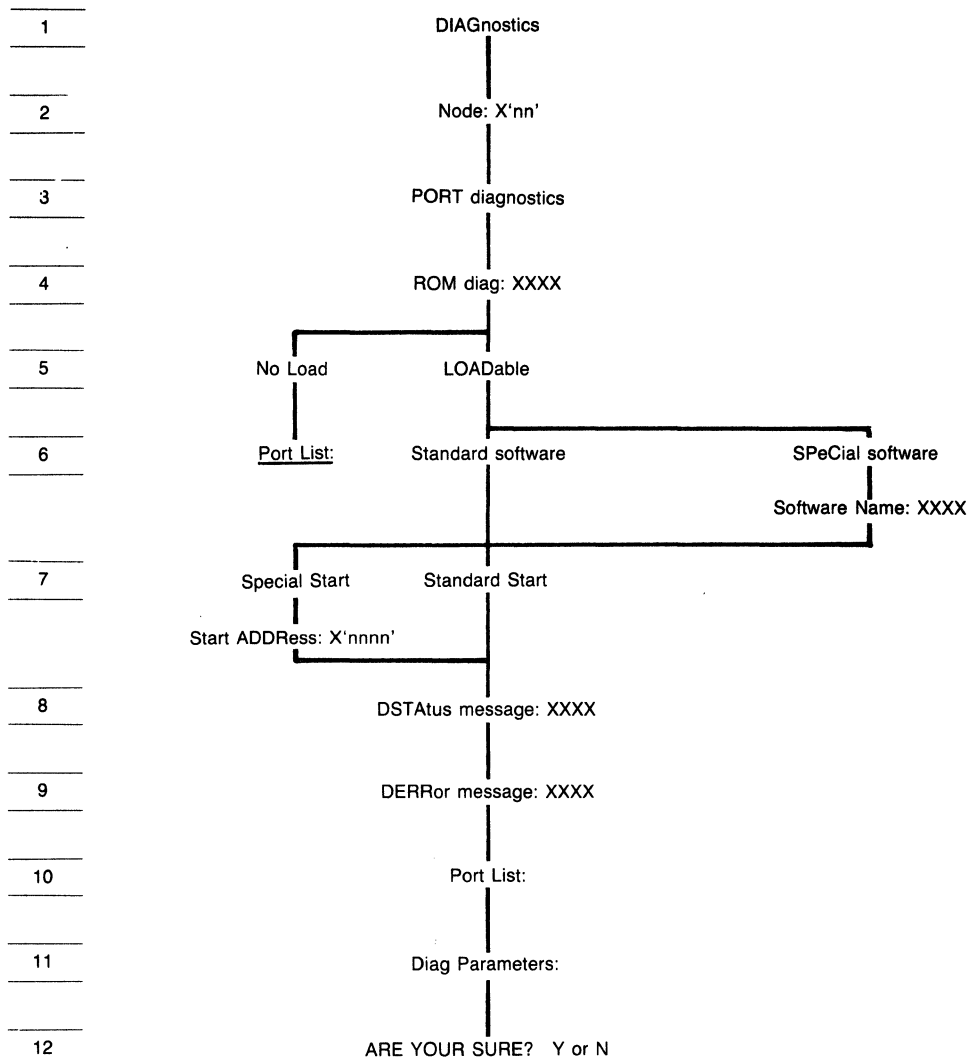
Figure 2-33
Diagnostics Command Menu

2.2.6.2 Command Option Definitions.

The options which must be specified to initiate diagnostics for one or more ports are detailed in the required sequence below.

2.2.6.2.1 Diagnostics.

At the top level of the CT menu, the general option Diagnostics must be specified.

Display Syntax

    DIAGnostics

Input Syntax

    ➤DIAG(CR)

2.2.6.2.2 NODE.

When the general option, Diagnostics, is specified, the CT will branch to the second level of the Diagnostics command menu. At this level, the operator specifies the address of the node where port diagnostics are to be performed. Up to eight ports at this node can be tested with a single command.

Display Syntax

    Node: X'nn'

Input Syntax

    ➤N=nn(CR)

Configurable Values

    nn = X'01' to X'7F'

2.2.6.2.3 Port Diagnostics or Node Diagnostics.

After the node address is specified, the CT will branch to the next level in the Diagnostics menu and display a choice of port diagnostics or node diagnostics.

    a. Node Diagnostics.

Node Diagnostics is not a valid option as of this software release.

    b. Port Diagnostics.

To initiate port diagnostics for one or more ports, the intermediate option, Port Diagnostics, is specified.

Display Syntax

       PORT diagnostics

Input Syntax

     ❯PORT(CR)

2.2.6.2.4 ROM Diagnostics.

This intermediate option is used to specify whether ROM-resident, start-up diagnostics are to be run on the port prior to loadable diagnostics. This will also cause a port hardware reset. The user should select the default value "Yes".

Display Syntax

ROM diag: xxxx

Input Syntax

➤ROM=xxxx(CR)

Configurable Values

xxxx = Yes or No

2.2.6.2.5 No Load or Loadable.

The SCT will branch down to the next level in the Diagnostics menu and display two choices for the operator: No Load and Loadable.

a. No Load.

The No Load option is used to initiate simple, ROM resident, start-up diagnostics for the port; i.e., diagnostic software is not loaded into the port. If standard or special diagnostic software is to be loaded into the port, then the Loadable option should be specified at this time.

Display Syntax

No Load

Input Syntax

➤ NL(CR)

After the No Load option has been selected, the CT will request the addresses of
the ports that are to be start-up tested.

Display Syntax

PortList:

Input Syntax

Up to eight port addresses can be specified on the input line. Each
address must be separated by a comma or a space. The Portlist input
line must be terminated with an Escape character.

>PL=nn,nn,nn,... nn(ESC)

Configurable Values

nn = X'02' to X'FF'

When the portlist is entered, start-up diagnostics are run for each port specified.
When the diagnostics are initiated, the DIAG LED on the front rail of each port's
engine module will illuminate (see Chapter 4, Figure 4-5). If the tests are com-
pleted successfully, the DIAG LED will go out; if any test is failed, the LED will
remain illuminated.

b. Loadable.

The Loadable option specifies that full diagnostics are to be run on the port or ports to be tested. During full diagnostics: each port is hardware reset and memory is cleared; ROM start-up diagnostics are run; and standard or special diagnostic operating software is loaded into the port and executed according to the diagnostic parameters specified by the operator. The diagnostics for an I/FDP are an exception to this; specifying Loadable causes special ROM-resident floppy disk controller tests to be run.

Display Syntax

LOADable

Input Syntax

> LOAD(CR)

2.2.6.2.6 Standard Software or Special Software.

When the Loadable option is specified, the SCT will branch down to the next level in the menu and display two choices for the operator: standard software and special software.

a. Standard Software.

The standard software option specifies that standard diagnostic software is to be loaded into the port from a system software floppy disk at a network primary node.

Display Syntax

STandarD software

Input Syntax

> STD(CR)

If standard software is selected, skip ahead to subsection 2.2.6.2.7, Standard Start or Special Start.

b. Special Software.

The special software option is used to request that special predefined diagnostic software be loaded into the port and executed.

Display Syntax

SPeCial software

Input Syntax

> SPC(CR)

After the Special Software option is selected, the SCT will request the name of the special diagnostic software.

Display Syntax

Software Name:

Input Syntax

> SN=xxxxxxxx(CR)

Configurable Values

xxxxxxxx = up to eight ASCII characters

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2.2.6.2.7 <u>Standard Start or Special Start</u>.
At the sixth level of the Diagnostics menu there are two options displayed as
choices for the operator: Standard Start and Special Start.

    a. <u>Standard Start</u>.
The Standard Start option specifies that the diagnostics are to be executed from
the normal starting address.

    <u>Display Syntax</u>

        STandard Start

    <u>Input Syntax</u>

      ➤STS(CR)

    b. <u>Special Start</u>.
The Special Start option allows the operator to specify a special starting address
for the diagnostic routine to be executed. This option is intended primarily as a
troubleshooting tool for Customer Service engineering personnel.

    <u>Display Syntax</u>

        SPecial Start

    <u>Input Syntax</u>

      ➤SPS(CR)

When the Special Start option is specified, the CT will request the special start-
ing address.

    <u>Display Syntax</u>

        starting ADDRess: X'nnnn'

    <u>Input Syntax</u>

      ➤ ADDR=nnnn(CR)

    <u>Configurable Values</u>

        nnnn = X'0000' to X'FFFF'

2.2.6.2.8 Diagnostic Status Messages.

After a standard start or special start address is specified, the Diagnostic Status Messages option is displayed. If Yes, the operator will receive a Diagnostic Status Report after the completion of each subtest in the diagnostic routine. If No, the operator will only receive a Diagnostic Report if an error is detected during any test routine and will receive a final Diagnostic Termination Message when all tests are complete.

Display Syntax

   DSTATus messages: xxxx

Input Syntax

   ➤DSTAT = x(CR)

Configurable Values

   xxxx = Yes or No

2.2.6.2.9 Diagnostic Error Messages.

After Diagnostic Status Messages are enabled or disabled, a Diagnostics Error Messages option is displayed. If Yes, the operator will receive a Diagnositc Error Report for each error detected during the test routines, up to the maximum specified for the MAXXMT parameter field of the Diagnostic Parameters option (see Paragraph 2.2.6.2.11). If No, Diagnotic Error Reports will not be generated.

Display Syntax

       DERRor messages: xxxx

Input Syntax

    > DERR = X(CR)

Configurable Values

       XXXX = Yes or No

2.2.6.2.10 Portlist.
The Portlist option is used to specify the addresses of the ports to be tested.

      Display Syntax

          PortList:

      Input Syntax

        PL=nn,nn,nn,... nn(ESC)

Up to eight ports can be entered on the Portlist input line, each separated by a comma or space. The input line must be terminated with an ESCAPE character.

Note
All ports must be located at the same node.

      Configurable Values

        nn = X'02' to X'FF'

2.2.6.2.11 Diagnostic Parameters.
The Diagnostics Parameters option allows the operator to specify each of the following test parameters:

. Number of times the tests should be run (MAXPASS).

. Maximum number of errors allowed before the tests should be terminated (MAXERR).

. The maximum number of diagnostic error reports to be sent (MAXXMT).

. The interface loopback mode (OFFLINE).

. External loopback plug locations (EXTERNAL LOOPBACK).

Display Syntax

     Diag Parameters:

Input Syntax

     The diagnostic parameter values are entered immediately after the
     Diagnostic Parameters option, as shown in Figure 2-34. Each of the
     diagnostic parameter fields is explained below.

        a. Maxpass.
Maxpass is a 4-digit hexadecimal value which specifies the number of times that the tests are to be repeated. The four digits are entered immediately after the Diagnostic Parameters display as two pairs of digits separated by a comma. For example, to specify that the tests are to be repeated 15 times, the operator would enter the MAXPASS parameter as:

     > Diag Parameters:00,0F ...(ESC)

The default value for the MAXPASS parameter is 00,00 (one pass).

        b. Maxerr.
The Maxerr parameter is a 4-digit hexadecimal value which represents the maximum number of errors that are allowed during the test routine. If this number is exceeded, all testing is terminated. The Maxerr parameter is separated from the Maxpass parameter by a space. As with the Maxpass parameter, the four digits are entered as two pairs of digits separated by a comma. For example, to specify that the tests should be terminated after the detection of five errors, the operator would enter the MAXERR parameter as:

     Diag Parameters:nn,nn 00,05 ...(ESC)

The default value for the MAXERR parameter is 00,0A (ten errors).

c. <u>Maxxmt</u>.

The Maxxmt parameter is a 4-digit hexadecimal value used to specify the maximum number of test error messages sent to inform the operator. After this limit is reached, no more error messages are sent to the operator, although the test will continue to run. The Maxxmt parameter is separated from the Maxerr parameter on the input line by a space. Again, the parameter value is entered as two pairs of digits separated by a comma. For example, to specify the test error report threshold as two, the operator enters the parameter as:

> Diag Parameters:nn,nn nn,nn 00,02 ...(ESC)

The default value for the MAXXMT parameter is 00,00. If the Diagnostic Status Message option is specified as no, 00, 0A if the DSTAT option is specified as Yes.

d. <u>Options</u>.

The fourth field in the Diagnostic Parameters input segment is a 2-digit value; specified as 00 to disable printing of DSTATUS Disagnostic Status Reports messages, 01 to enable printing default, 00, overides Diagnostic STATus messages option.

> Diag Parameters:nn,nn nn,nn nn,nn 00 ...(ESC)

e. <u>Offline</u>.

The offline parameter is used to select between Offline diagnostics which require the operator to set up the hardware for testing, and Online diagnostics which are less thorough but require no operator intervention.

Offline is a 2-digit hexadecimal value entered after the Reserved field (including a space) on the diagnostic parameters input line. Online is specified as 00, Offline as 01. For example, to select Offline diagnostics:

> Diag Parameters:nn,nn nn,nn nn,nn nn 01 ...(ESC)

If Offline is selected, the operator must reset each port being tested, remove the communication module for each, strap all EIA interface signals for standard (straight-through) operation, and connect a loopback plug to the interface connector.

The default value for the Offline parameter is 00 (Online).
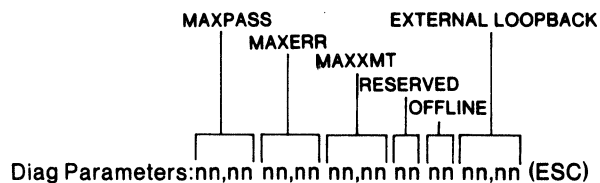
Figure 2-34
Diagnostics Parameter Fields

f. External Loopback.

The External Loopback parameter is a 4-digit hexadecimal value which is used to indicate which ports have an external loopback plug mounted on their interface connector.

Figure 2-35 illustrates the breakdown of the External Loopback parameter field. Each hexadecimal digit represents one of the four possible communication modules associated with a port. The communication module that is mounted immediately adjacent to the port's engine module in the port nest is considered to be Module 1.

Each hexadecimal digit is further broken down to its 4-digit binary equivalent. Each binary digit represents one of four possible interface connectors associated with the communications module. The uppermost connector of the communication module is considered to be Connector 1, and the lowermost connector is considered to be Connector 4.

To define the EXTERNAL parameter, a binary one (1) must be set in each location which corresponds to an interface connector that has an external loopback plug in place. The resulting binary value must then be converted to its hexadecimal equivalent and entered as the External Loopback parameter.
For example, to define the External Loopback parameter for an MATP using four communication modules, with an external loopback plug on the top two connectors of each:

Binary Layout

0011 0011 0011 0011

Equivalent Hexadecimal

3 3 3 3

Input Syntax for EXTERNAL Parameter

Diag Parameters:nn,nn nn,nn nn,nn nn nn 33,33(ESC)

```
EXTERNAL
LOOPBACK ────►    X     X  ,  X     X
FIELD
                  │     │     │     │
                  ▼     ▼     ▼     ▼
COMMUNICATION
MODULE       ────►  2     1     4     3
DESIGNATION
                  ▲     ▲     ▲     ▲
                  │     │     │     │
                  ▼     ▼     ▼     ▼
BINARY
EQUIVALENT ────►  XXXX  XXXX  XXXX  XXXX

EIA CONNECTOR ──► 4 3 2 1  4 3 2 1  4 3 2 1  4 3 2 1
DESIGNATION
```
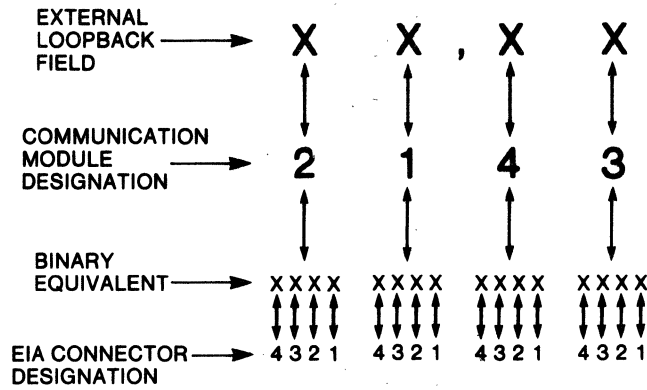
Figure 2-35
Breakdown of External Loopback Field

For a single-threaded port (e.g. I/BOP), there will only be one communication module and one connector. Therefore, the input syntax of the EXTERNAL parameter will always be 01,00 (loopback plug present) or 00,00 (loopback plug not present).

The default value for the EXTERNAL parameter is 00,00.

Note
A Control-A terminator character can be entered on the Diagnostic Parameters input line to select all default values for the parameters.

2.2.6.2.12 <u>Verification and Initiation.</u>
After Diagnostic Parameters have been entered, a request for verification of the
diagnostic is displayed:

> <u>Display Syntax</u>

>> ARE YOU SURE?   Y or N

> To initiate diagnostics: ➤Y(CR)

> To abort the diagnostics command: ➤N(CR)

2.2.6.3 Standard Port Diagnostic Sequence.

When standard diagnostics are initiated for a port, the following test sequence occurs:

- The DIAG LED on the engine module of the port being tested illuminates. The LED will remain on until diagnostics are completed successfully.

- ROM diagnostics are executed. The ROM diagnostics which are stored on the engine module provide a start-up check of the engine module processor instruction set, RAM and ROM memory, parity checking circuitry, and Bus Interface Chip (BIC) performance. ROM diagnostics are run if the No Load diagnostic option is specified and at the start of a Loadable diagnostic sequence. The No Load diagnostic test sequence ends at this time. If ROM Diagnostics are failed, the operator is informed with an MDM Message.

- Standard diagnostic software is loaded into the port from the most accessible System Software disk.

- The engine module is tested. Diagnostic Status Message is routed to the operator if the module passes the subtest, a Diagnostic Error Message is routed if the module fails the subtest.

- The communication module is tested. A number of subtests, varying according to the hardware type of the communication module, are executed. A Diagnostic Status or Diagnostic Error message is sent to the operator upon completion of each subtest to inform the operator of the results.

- If, at any point in the port diagnostic sequence, the predefined maximum error threshold (Maxerr) is exceeded, the port tests are terminated and a Termination Message is sent to the operator.

- The engine and communication module tests (excluding ROM diagnostics) are repeated according to the MAXPASS parameter of the Diagnostic Parameters option (refer to paragraph 2.2.6.2.13a).

- A Termination Message is sent at the completion of all tests.

2.2.6.4 Interpreting Diagnostic Reports.

The basic format for all Diagnostic Reports is illustrated in Figure 2-36. Each segment of the report format is described below.

2.2.6.4.1 Node Address.

The 2-digit hexadecimal node address of the port being tested.

2.2.6.4.2 Real Time.

The time that the report was received at the Control Terminal Port (I/CTP) in hours:minutes:seconds.

2.2.6.4.3 Port Address.

The 2-digit hexadecimal address of the diagnosed port.

2.2.6.4.4 Message Type.

An ASCII text message identifying the diagnostic report type as one of the following four types:

. MDM MSG   -- Sent upon the completion of the No Load diagnostic option or if there is a failure during the ROM Diagnostics phase of a standard test sequence.

. DIAG STATUS MSG   -- Sent upon completion of a port subtest or to inform the operator of special test conditions.

. DIAG ERROR MSG   -- Sent whenever an error is detected. There may be many DIAG ERROR Messages generated in one subtest.

. TERMINATION MSG   -- Sent when all loadable diagnostics for a port are ended.
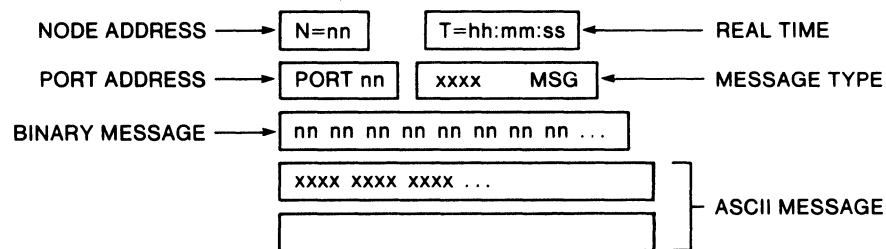
Figure 2-36
Diagnostics Report Segments

2.2.6.4.5 Numeric Message Field.
The Numeric Message Field segment of a diagnostic report provides various diagnostic information in 2-digit hexadecimal code.

Note
The Numeric Message Field segment is not included
in MDM MSG type diagnostic reports.

The segments of the Numeric Message Field are identified in in Figure 2-37. Each field is defined in the following subparagraphs.

a. **Message Type.**
A 2-digit hexadecimal value indicating the type of diagnostic message.

00 = Status, or Error Messages
01 = Termination Message

b. **Error Code.**
A 2-digit hexadecimal value indicating the source of the error, if any.

00 = No error

c. **Test Number.**
A 2-digit hexadecimal value indicating the subtest which is the subject of the report. The subtest codes vary according to the type of hardware modules being tested. Table 2-10 lists test numbers and names according to port hardware module types. For Termination Messages, this field is 00.

d. **Port Type.**
A 2-digit hexadecimal value identifying the functional type of the port being tested:

Hex Value	Port Type
00	I/CTP
10	I/NP
20	I/SSTP or Floppy Emulator Port
30	I/BOP or I/MXP
40	I/MATP
50	I/FDP
60	I/MSTP
70	I/GBNP

Error Messages Only

Test Number

Message Type   Pass Number   Expected Results   Address

nn nn nn nn nn nn nn nn nn nn nn nn nn nn nn nn

Error Code   Total Errors   Actual Results   Miscellaneous

Port Type
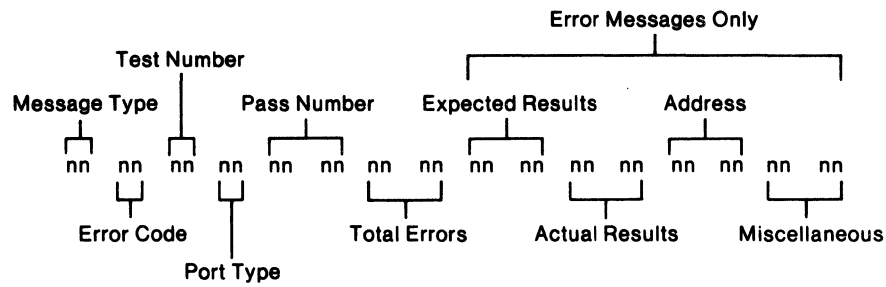
Figure 2-37
Numeric Message Fields

Table 2-10
Test Names and Numbers

I/NP AND I/BOP TESTS

Engine 1   Bit-Daughter

40 MAP Register   01 General Register
41 Processor Speed   02 ACS Register
60 Straps Test   03 Baud Rate
    04 ADLC Chip
    *05 LED

I/MATP AND I/MSTP TESTS

Engine 2   Q-Byte

41 Processor Speed   01 Register
60 Straps Test   02 Async Data
    03 Async Baud Rate
    04 Bisync Transmit
    05 Bisync Transmit and Receive
    *06 Break Detect
    *07 ACS Register
    *08 External Clock
    *09 LED

*Valid in "Offline" test mode only (refer to
subparagraph 2.2.6.2.13e).

Table 2-10 (Cont)
Test Names and Numbers

I/CTP TESTS

Engine 2		CTC	
41	Processor Speed	01	Register
60	Straps Test	02	Async Data
		03	Async Baud Rate
		*04	LED

I GBNP TESTS

Engine 2		VBit	
41	Processor Speed	01	ID Register
60	Straps Test	02	Short Memory
		03	Run-Halt
		04	Processor Instruction Set
		05	Interrupt Status Register
		06	Status Register
		07	Interrupts
		08	Baud Clock
		09	Long Memory
		0A	DMA
		0B	ADLC

I/MXP TESTS

Engine 2		Bit-Daughter	
41	Processor Speed	01	General Register
60	Straps Test	02	ACS Register
		03	Baud Rate
		04	ADLC
		*05	LED

*Valid in "Offline" test mode only (refer to subparagraph 2.2.6.2.13e).

Table 2-10 (Cont)
Test Names and Numbers

I/SSTP TESTS

Engine 2		Byte-Daughter	
40	Map Register	01	Register
41	Processor Speed	02	Async Data
60	Straps Test	03	Async Baud Rate
		04	Bisync Transmit
		05	Bisync Transmit and Receive
		06	PGC Functional
		*07	Break Detect
		*08	ACS
		*09	External Clock
		*0A	LED

I/FDP TESTS

Note
Special software name "D501" must be specified to
initiate I/FDP Diagnostics.

Engine 1		FDC	
40	MAP Register	01	Register
41	Processor Speed	02	Drive Access
60	Straps Test	*03	Floppy Read
		*04	Simple Floppy Read/Write
		*05	Total Floppy Read/Write

*Valid in "Offline" test mode only (refer to
subparagraph 2.2.6.2.13e).

e. **Pass Number.**
A 4-digit hexadecimal value indicating the current pass or repitition of the diagnostic sequence. For example, on the tenth pass in a diagnostic sequence, this field in the Binary Message segment would read:

... 00 0A ...

f. **Total Errors.**
A 4-digit hexadecimal value indicating the total number of errors encountered up to this point in the diagnostic sequence.

Note
The remaining four segments of the Binary Message segment are only included in diagnostic error messages.

g. **Expected Results.**
A 4-digit hexadecimal value representing the expected results of the subtest in which the error occurred.

h. **Actual Results.**
A 4-digit hexadecimal value representing the actual results of the subtest in which the error occurred.

i. **Address.**
This field varies according to the test performed.

1. **Register and Memory Tests.**
   For register and memory testing, the field reflects the 4-digit hexadecimal memory address under test. For the floppy disk port, this segment specifies the drive number (0000 to 0004) in which the error occurred.

2. **I/MATP and I/MSTP Tests.**
   For certain tests involving multi-threaded ports (I/MATP or I/MSTP), this field consists of two pairs of hex digits.

   The first pair (leftmost) identifies the number (01 to 04) of the communication module being tested. The communication module mounted immediately adjacent to the engine module is considered 01.

   The second pair of hex digits in this field identify which thread on the communication module was being tested. For test purposes, the thread associated with the topmost connector is considered 01, and the bottommost connector is considered 04.

   For example, a Numerical Message Field segment which reads 02 04 in the address field is indicating that the thread associated with the bottom connector of the second communication module was tested.

3. **I/FDP Tests.**
   For I/FDP tests, this field will reflect the number of the floppy drive that was tested. For example, if drive number three was tested, the field would read:

   00 03

j. **Miscellaneous.**
The miscellaneous segment is reserved for various Customer Engineering functions.

2.2.6.4.6 Text Message Field.

The contents of the Text Message Field segment vary according to the type of the diagnostic message.

a. **MDM MSG.**

The Text Message Field segment in an MDM MSG indicates that the No Load diagnostic test sequence was completed successfully:

OPERATION COMPLETED ... NO ERROR

If there is a ROM Diagnostics failure:

ROM DIAGNOSTICS FAILURE

b. **DIAG Status MSG.**

For diagnostic status message, the Text Message Field segment will identify the hardware module type and the subtest that was completed, and indicate that the test was successful or that it failed. For example:

BIT-D BAUD RATE TEST PASSED

A typical status message indicating special test conditions is shown below:

LOOP MODE IS INTERNAL

c. **DIAG Error MSG.**

The Diagnostic Error Message segment in a diagnostic error message indicates the specific source of the diagnostic error. For example:

BYTE-D 2651-PCI CUMULATIVE STATUS BAD

d. **Termination Messages.**

The Text Message Field segment in a termination message indicates that the diagnostics were terminated; the type of engine module and whether it passed or failed; the hardware type of the communication module and whether it passed or failed; the number of times the tests were repeated (4-digit hex); the total number of errors detected (4-digit hex); and whether the predefined error threshold (Maxerr) was exceeded. A typical termination message is shown below:

TEST TERMINATION: IP ENGINE2 TESTS PASSED, QBYTE TESTS FAILED
TESTS EXECUTED 0001 TIMES, ERRORS = 0001 ERROR LIMIT EXCEEDED

2.3 FLOATING GENERAL OPTIONS

Floating general options are options that can be specified by the operator at any point in the CT menu, regardless of any CT operations in progress.

To display the list of floating options and their configured values, the operator enters the Control/E input line terminator on any input line. The operator input of Control/E and typical CT display of the floating options is illustrated in Figure 2-38.

The operator can specify the floating option on any available input line, even if he is in the midst of a Top-Level option menu. When the Floating option function is completed, the operator can return to the exact location in the CT menu by entering a Carriage Return (CR) terminator character.

An exception to this is the Statistics option. If the operator wishes to return to the same location in the menu, he must use the Quit floating option.

The function, display, input syntax, and configurable values of each of the seven floating options are described in the following subparagraphs.

```
>(Control/E)

  REPorts
  STATistics
  MODE:  ProGraM
  Statistic Display Mode:   TERMinal
  Report Display Mode:   PRinter on REQuest
  Operating Display Mode:   MONitor
  Quit

>
```
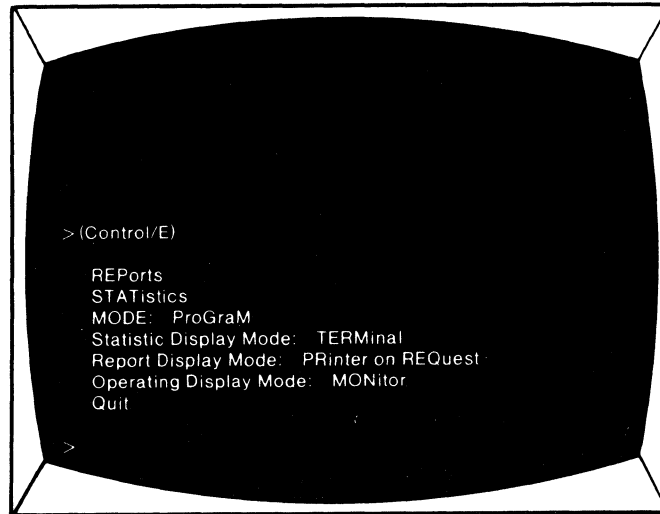
Figure 2-38
Floating General Options

2.3.1 REPORTS

Each node and port in the network is capable of generating network reports which are routed to a predesignated CT for operator examination. The destination of network reports is defined as one of the configurable node parameters for each node in the network.

The Reports floating option (see Figure 2-39) is a stand-alone command used to request that all accumulated network reports be either displayed on the CT screen or printed on the optional control printer. The mode of report display is determined by the Report Display Mode Floating option.

Report Prompt

When there are accumulated network reports, the standard prompt character will change to a pound sign:

#

Display Syntax

REPorts

Input Syntax

> REP(CR)

```
> (Control/E)                                    REPorts

  STATistics
  MODE:   ProGraM
  Statistic Display Mode:   TERMinal
  Report Display Mode:   PRinter on REQuest
  Operating Display Mode:   MONitor
  Quit

>
```
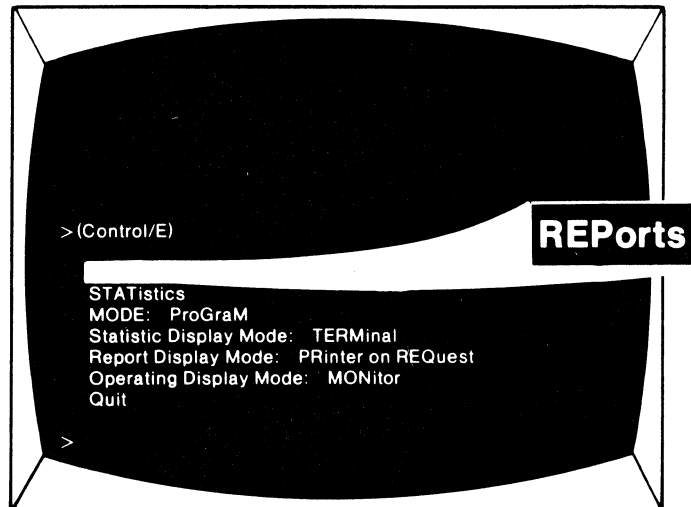
Figure 2-39
Reports Floating Option

Resulting Display

When the Reports option is specified, all accumulated network reports will be routed to the device designated by the Report Display Mode (refer to Paragraph 2.4.5).

If there are no accumulated reports, the CT will respond:

NO REPORTS WAITING

Report Syntax

All reports are prefixed with the following message.

N=X'nn' P=X'nn' T=xxxx at nn:nn:nn

where:

N=X'nn' is the address of the node that originated the report.
P=X'nn' is the address of the port that originated the report.
T=xxxx is the type of port that originated the report.
nn:nn:nn is the time that the report was sent in
hours:minutes:seconds.

There are three types of network reports generated: status reports, alarm reports, and diagnostic reports.

Due to the length of the report syntax listing, the listing is included as Appendix D, Network Reports, at the back of this manual.

2.3.2 STATISTICS

The mainframe at each 6050 network node calculates and maintains performance statistics for the node as a whole, while each individual port maintains its own performance statistics.

The Statistics floating option (see Figure 2-40) allows an operator to request the statistics for any node or individual port in the network. When requested, the statistics will be displayed according to the configured value of the Statistic Display Mode (refer to Paragraph 2.3.4).

The Statistics command menu is illustrated in the diagram of Figure 2-41. The Statistics command menu offers two execute options: Node Statistics and Port Statistics. The procedures required to initiate each execute option are outlined in the following subparagraphs.
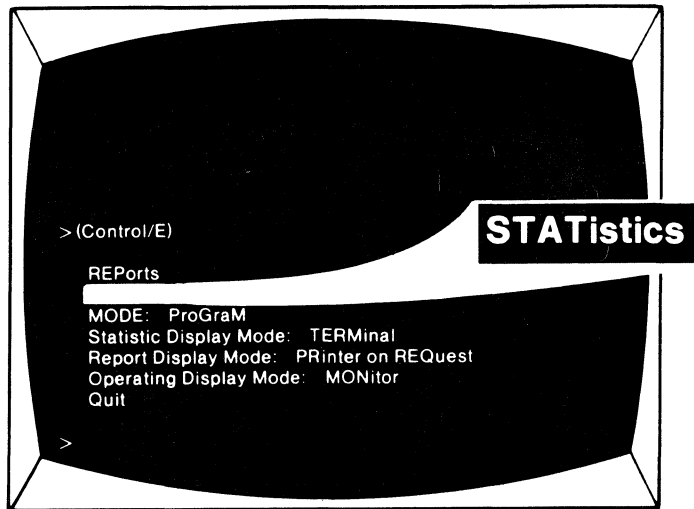
Figure 2-40
Statistics Floating Option
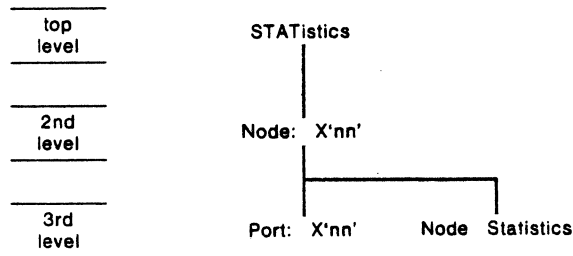
Figure 2-41
Statistics Command Menu

2.3.2.1 <u>Node Statistics</u>.
The Node Statistics option requests node-related performance statistics for a specific node. To request node statistics, the operator must first specify the Statistics floating option, and then define the address of the node. The procedure is detailed below.

     a. <u>Statistics</u>.
The floating general option, Statisticde: X'nn'

Input Syntax

   ❯N=X'nn'(CR)

Configurable Values

    X'nn' = 00 to 7F

    b. <u>Node:</u>.
At the second level of the STatistics command menu, the intermediate option, Node, must be defined.

Display Syntax

     Node: X'nn'

Input Syntax

   ❯N=X'nn'(CR)

Configurable Values

    X'nn' = 00 to 7F

    c. <u>Node Statistics</u>
At the third level of the menu, the operator specifies the execute option, Node Statistics.

Display Syntax

    Node Statistics

Input Syntax

   ❯NS(CR)

d. Resulting Display.

When the Node Statistics option is selected, the CT will respond with a listing of the current performance statistics for the node specified. A typical node statistics listing is illustrated in Figure 2-42.

Each of the node statistics is defined in Table 2-11.

```
N=00
>NS

N=04      T=00:12:58

MAINFRAME STATISTICS:
PROCESSOR LOADING:  44%
BUFFER UTILIZATION:  16%
APPARENT THROUGHPUT:  9810 CPS
STATISTICAL NODE THOUGHPUT:  8400 CPS
MAINFRAME CAPACITY:  5094 KCPS

    PORT:  X'08'
    NODE STATISTICS

N=00
>
```
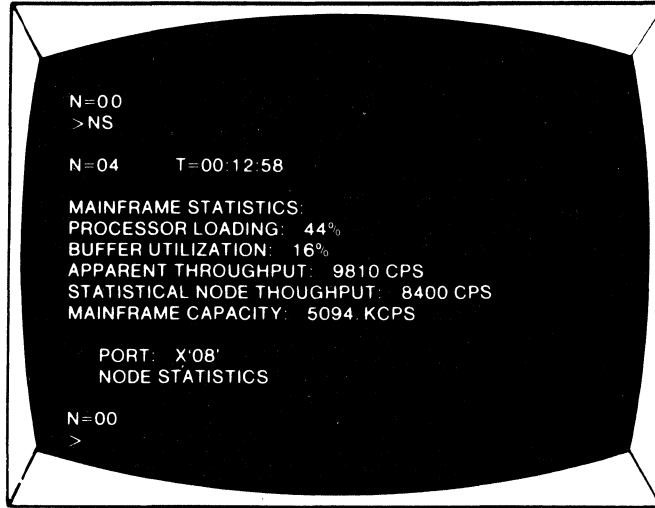
Figure 2-42
Typical Node Statistics Listing

Table 2-11
Node Statistics

Mnemonic	Unit of Measure	Definition
PROCESSOR LOADING	00 to 100%	The percentage of the available mainframe processing capacity that is in use.
BUFFER UTILIZATION	00 to 100%	The percentage of the available mainframe buffer capacity that is in use.
APPARENT THROUGHPUT	Characters per Second (CPS)	The sum of the operating rates of all active devices at the node.
STATISTICAL NODE THROUGHPUT	Characters per Second (CPS)	The actual average number of characters throughput at the node per second.
MAINFRAME CAPACITY	Thousands of Characters per second (KCPS)	The throughput capacity of the mainframe.

e. Terminating Syntax.

To terminate the statistics function and return to the preceding location in the SCT command menu, the operator enters:

>Q(CR)

2.3.2.2 Port Statistics.

The Port Statistics option requests performance statistics for any port in the network. To request port statistics, the operator must first specify the Statistics floating option and define the address of the node where the port resides. The procedure for requesting statistics and the statistics for each type of port are defined in the following subparagraphs.

a. Statistics.

The floating option, Statistics, must be specified first.

Display Syntax

STATistics

Input Syntax

> STAT(CR)

b. Node:.

The intermediate option, Node, must be defined at the second level of the Statistics menu.

Display Syntax

Node: X'nn'

Input Syntax

> N=X'nn'(CR)

Configurable Values

X'nn' = 00 to 7F

c. **Port:.**
At the third level of the menu, the execute option, Port, must be defined.

Display Syntax

Port: X'nn'

Input Syntax

>P=X'nn'(CR)

Configurable Values

X'nn' = 02 to FF

d. **Resulting Display.**
When the operator defines the Port option, the CT will respond with a listing of the performance statistics for the specified port. A typical port statistics listing is illustrated in Figure 2-43.

The performance statistics for each port type are defined in Table 2-12.

e. **Consecutive Statistics.**
After statistics for a port are displayed, the CT will return to the third level of the statistics command menu. This allows the operator to request statistics for any other port at the defined node by entering the new port address.

f. **Terminating Option.**
To terminate the Statistics function and return the CT to its location prior to the statistics request, the operator must use the Quit floating option:

Q(CR)


```
N=00
    PORT  X'OC'
N=04 P=OC      T=00:18:42
REMOTE NODE:  XX
REMOTE PORT:  XX
INP STATISTICS:
PROCESSOR LOADING:     65%
BUFFER UTILIZATION:      0%
RETRANSMISSION RATE:  0 FPS
FRAME RATE:           125
DATA RATE:            209 CPS
DELAY:               50MS
NAK COUNT:            0
AVERAGE ARQ COUNT:   8
MAINFRAME PAD CNT:   0
MAX BUFFER COUNT:    2151
MODEM SIGNAL STATUS DCD:

   Port  X'OC'
   NODE STATISTICS
 N=00
```
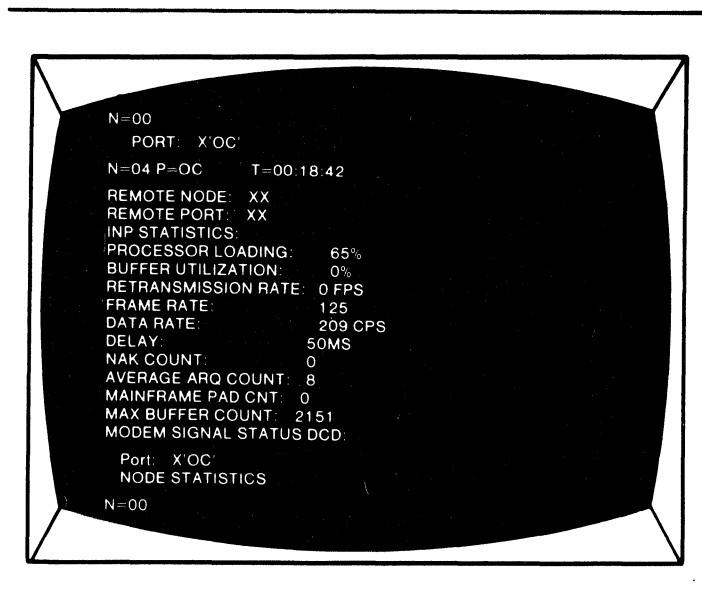
Figure 2-43
Typical Port Statistics Listing

Table 2-12
Port Statistics

Statistic	Unit of Measure	Definition
	I/NP	
REMOTE NODE	X'01' to X'7F'	Identifies the address of the node to which this I/NP is connected via a network link.
REMOTE PORT	X'02' to X'FE'	Identifies the address of the I/NP at the remote node to which this I/NP is connected.
PROCESSOR LOADING	0 to 100%	The percentage of the I/NP's processing capacity that is currently in use.
BUFFER UTILIZATION	0 to 100%	The percentage of the I/NP's buffer capacity that is currently in use.
RETRANSMISSION RATE	Frames/Second	The average number of frames retransmitted by the I/NP per second.
FRAME RATE	Frames/Second	The average number of frames transmitted by the I/NP per second.
DATA RATE	Characters/Second	The average number of non-overhead characters transmitted by the I/NP per second.
DELAY	Milliseconds	The average round-trip delay between transmission of a frame of data and reception of an ACK or NAK from the remote I/NP.
NAK COUNT	NAK's/Second	The average number of negative acknowledgements received from the remote I/NP per second.
AVERAGE ARQ COUNT	Frames	The average number of outstanding frames on the network link. An outstanding frame is one that has been transmitted by this I/NP, but has not been acknowledged by the remote end.
MAINFRAME PAD COUNT	Pad Characters	Currently invalid statistic.
MAX BUFFER COUNT	0 to 3000	The number of buffers remaining after port initialization.
MODEM SIGNAL STATUS	DCD: Up/Down	Indicates the status of the interface signal DCD.

Table 2-12 (Cont)
Port Statistics

Statistic	Unit of Measure	Definition
		I/GBNP
PROCESSOR LOADING	0 to 100%	The percentage of the I/GBNP's processing capacity that is currently in use.
BUFFER UTILIZATION	0 to 100%	The percentage of the I/GBNP's buffer capacity that is currently in use.
RETRANSMIT FRAME RATE	Frames/Second	The average number of frames retransmitted by the I/GBNP per second.
TRANSMIT DATA FRAME RATE	Frames/Second	The average number of frames transmitted by the I/GBNP per second.
ROUND TRIP LINK DELAY	Milliseconds	The average round-trip delay between transmission of a frame of data and a reception of an ACK or NAK from the remote end.
NAK RECEPTION RATE	NAK's/Second	The average number of negative acknowledgements received from the remote end per second.
RETRANSMIT QUEUE SIZE	Frames	The average number of frames queued up awaiting retransmission.
MF TRANSMIT CHARACTER RATE	Characters/Second	The average number of non-overhead characters transmitted by the I/GBNP per second.
AVAILABLE TRANSMIT CHARACTER RATE	Characters/Second	The average available nonoverhead character transmission capacity.
MAXIMUM BUFFER COUNT	0 to 3000	The number of buffers remaining after port initialization.
DYNAMIC TIME FACTOR	0 to 15	The actual number of sample periods used to compute the statistics in this listing.
CONFIGURED TIME CONSTANT	0 to 15	The configured (intended) number of sample periods used to compute statistics for the I/GBNP.
MODEM SIGNAL STATUS	DCD: Up/Down	Indicates the status of the interface signal DCD.

Table 2-12 (Cont)
Port Statistics

Statistic	Unit of Measure	Definition
	I/MSTP and I/MATP	
PROCESSOR LOADING	0 to 100%	The percentage of the port's processing capacity that is currently in use.
BUFFER UTILIZATION	0 to 100%	The percentage of the port's buffer capacity that is currently in use.
CURRENT TIME CONSTANT	0 to 15	The actual number of sample periods used to compute the statistics in this listing.
CONFIGURED TIME CONSTANT	0 to 15	The configured (intended) number of sample periods used to compute statistics for the port.
	I/MXP	
PROCESSOR LOADING	0 to 100%	The percentage of the I/MXP's processing capacity that is currently in use.
BUFFER UTILIZATION	0 to 100%	The percentage of the I/MXP's buffer capacity that is currently in use.
RETRANSMIT QUEUE SIZW	Frames/Second	The average number of frames awaiting retransmission by the I/MXP.
RECEIVE RATE	Frames/Second	The average number of frames received by the I/MXP per second.
ERROR RATE	Frames/Second	The average number of bad frames received by the I/MXP per second.
TRANSMIT RATE	Frames/Second	The average number of frames transmitted by the I/MXP per second.
RETRANSMIT RATE	Frames/Second	The average number of frames retransmitted by the I/MXP per second.
CURRENT TIME CONSTANT	0 to 15	The actual number of sample periods used to compute the statistics in this listing.
CONFIGURED TIME CONSTANT	0 to 15	The configured (intended) number of sample periods used to compute statistics for the I/MXP.
IMXP LINK STATUS	Up/Down	Reflects the current status of the I/MXP link.
MODEM SIGNAL STATUS	DCD: Up/Down	Indicates the status of the interface signal DCD.

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Table 2-12 (Cont)
Port Statistics

Statistic	Unit of Measure	Definition
		I/BOP
PROCESSOR LOADING	0 to 100%	The percentage of the I/BOP's processing capacity that is currently in use.
BUFFER UTILIZATION	0 to 100%	The percentage of the I/BOP's buffer capacity that is currently in use.
COMPRESSION EFFICIENCY	0 to 200%	The average ratio of total data bits received as Transmitted Data to the number of bits sent out as Transmitted Data after data compression.
FRAME ERROR RATE	0 to 100%	The average ratio of erroneous frames received to the total frames received.
STATISTICAL LOADING	0 to 100%	The average ratio of the total number of user bits throughput to the number of data bits that could have been throughput in the averaging period.
COMPRESSED LOADING	0 to 100%	The average ratio of the compressed throughput to the total number of data bits that could have been throughput in the averaging period.
RECEIVE FRAME RATE	Frames/Second	The average number of Received Data frames accepted by the I/BOP per second.
TRANSMIT FRAME RATE	Frames/Second	The average number of Transmitted Data frames sent out by the I/BOP per second.
MAXIMUM BUFFER COUNT	0 to 3000	The number of buffers remaining after port initiation.
DYNAMIC TIME FACTOR	0 to 15	The actual number of sample periods used to compute the statistics in this listing.
CONFIGURED TIME CONSTANT	0 to 15	The configured (intended) number of sample periods used to compute statistics for the I/BOP.
MODEM SIGNAL STATUS	Up/Down	Indicates the status of the interface signals for the I/BOP.

Table 2-12 (Cont)
Port Statistics

Statistic	Unit of Measure	Definition
	VSTP, VATP, and VBTP	
COMPRESSION EFFICIENCY	0 to 200%	The average ratio of total bits received as Transmitted Data to the number of bits sent out as Transmitted Data after data compression.
ERROR RATE	0 to 100%	The average ratio of data received in error to the total amount of data received.
STATISTICAL LOADING	0 to 100%	The average ratio of the total number of user bits throughput to the number of bits that could have been throughput in the averaging period.
COMPRESSED LOADING	0 to 100%	The average ratio of the compressed throughput to the total number of data bits that could have been throughput in the averaging period.
CURRENT TIME CONSTANT	0 to 15%	The actual number of sample periods used to compute the statistics in this listing.
CONFIGURED TIME CONSTANT	0 to 15%	The configured (intended) number of sample periods used to compute statistics for the virtual port.
CALL STATUS	Up/Down Destination Node nn Port nn	"Up" indicates that a call path is established. "Down" indicates that a path has not been established. Read only.
MODEM SIGNAL STATUS	Up/Down	Indicates the status of the interface signals for the virtual ports.

2.3.3 MODE

The Mode floating option (see Figure 2-44) is a stand-alone option which allows the operator to configure the CT in one of three access modes:

- <u>Monitor</u>. The Monitor Mode restricts access to critical control operations, but allows examination of all network configuration parameters and statistics.

- <u>Program</u>. The Program Mode allows an operator to redefine configuration parameters and perform some critical control operations.

- <u>Customer Engineering</u>. The Customer Engineering Mode allows unrestricted access to all CT initiated control operations.

CAUTION
The Customer Engineering Mode allows initiation of control functions which could have a significant impact on normal network operations. This access mode is normally reserved for Codex Customer Service personnel. Special caution should be exercised when the control terminal is configured in this mode.

<u>Display Syntax</u>

    MODE: xxxx

<u>Input Syntax</u>

    MODE=xxxx(CR)

> (Control/E)

REPorts
STATistics

Statistic Display Mode: TERMinal
Report Display Mode: PRinter on REQuest
Operating Display Mode: MONitor
Quit

>
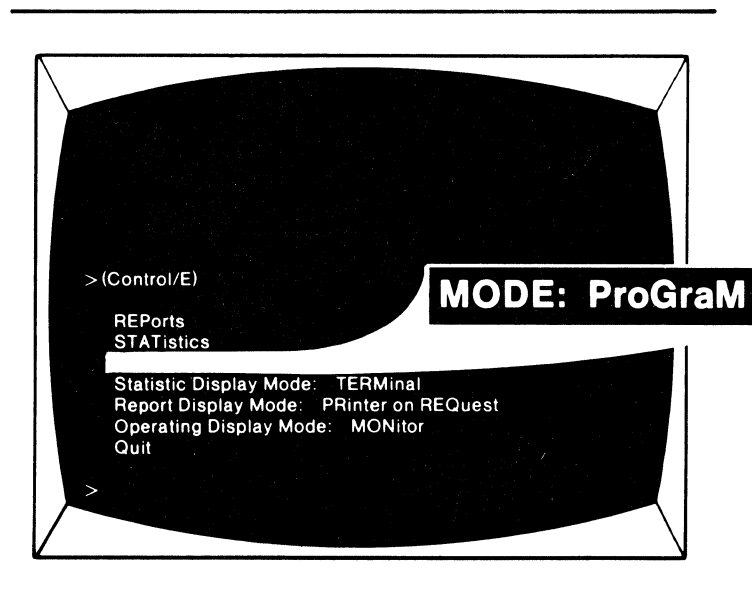
MODE: ProGraM

Figure 2-44
Mode Floating Option

Configurable Values

    xxxx = MONitor, ProGraM, or Customer
          ENGineering

Confirmation Message

The CT will respond with a verification of a change to the Mode option. For example, if the operator configured the Mode option for Program, the CT would respond with:

          MODE: PROGRAM

Terminating Syntax

To return the CT to its location prior to the initiation of the Mode option, the operator enters a Carriage Return (CR) terminator character:

          (CR)

2.3.4 STATISTIC DISPLAY MODE

Statistic Display Mode (SDM) is a floating option (see Figure 2-45) which is used to specify one of three display modes for performance statistics:

- <u>Terminal</u>. The Terminal Mode will display performance statistics on the CT screen when requested by the operator.

- <u>Printer</u>. The Printer Mode will route statistics to the control printer and control terminal when requested by the operator.

- <u>Monitor</u>. The Monitor Mode will automatically route statistics to the control printer upon request.

Display Syntax

    Statistic Display Mode: xxxx

Input Syntax

    ❯ SDM=xxxx(CR)

Configurable Values

    xxxx = TERMinal, PRINTer, or MONitor

```
>(Control/E)        Statistic Display Mode:  TERMinal

REPorts
STATistics
MODE:  ProGraM

Report Display Mode:   PRinter on REQuest
Operating Display Mode:   MONitor
Quit

>
```
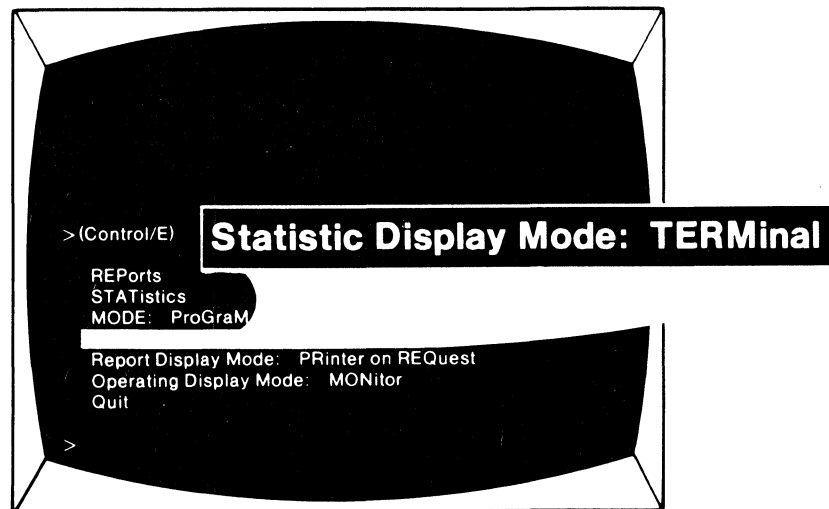
Figure 2-45
Statistics Display Mode Floating Option

Confirmation Message

When the SDM is redefined, the CT will display a confirmation of the change. For example, if the SDM is defined as Printer, the CT will respond:

STATISTIC DISPLAY MODE: PRINTER

Terminating Syntax

To return the CT to its location prior to the initiation of the SDM option, the operator enters the Carriage Return (CR) terminator character:

(CR)

2.3.5 REPORT DISPLAY MODE

The Report Display Mode (RDM) is a floating option (see Figure 2-46) which is used to specify one of three display modes for network reports:

- **Terminal on Request.** In the Terminal on Request mode, reports are received, stored, and routed to the CT for display when requested by the operator.

- **Printer on Request.** In this mode, accumulated reports are routed to the control printer and CT when requested by the operator.

- **Printer when Received.** In this mode, reports are automatically routed to the printer upon request.

Display Syntax

    Report Display Mode: xxxx

Input Syntax

    RDM=xxxx(CR)

Configurable Values

    xxxx = TERMinal on REQuest, PRinter on REQuest, or PRinter when RECeived

Confirmation Message

When the RDM option is redefined, the CT will display a confirmation of the change. For example, when the RDM is defined as PRinter when RECeived, the CT will respond:

    REPORT DISPLAY MODE: PRINTER WHEN RECEIVED

Report Display Mode: PRINTer on REQuest

> (Control/E)

    REPorts
    STATistics
    MODE: ProGraM
    Statistic Display Mode: TERMinal

    Operating Display Mode: MONitor
    Quit

>
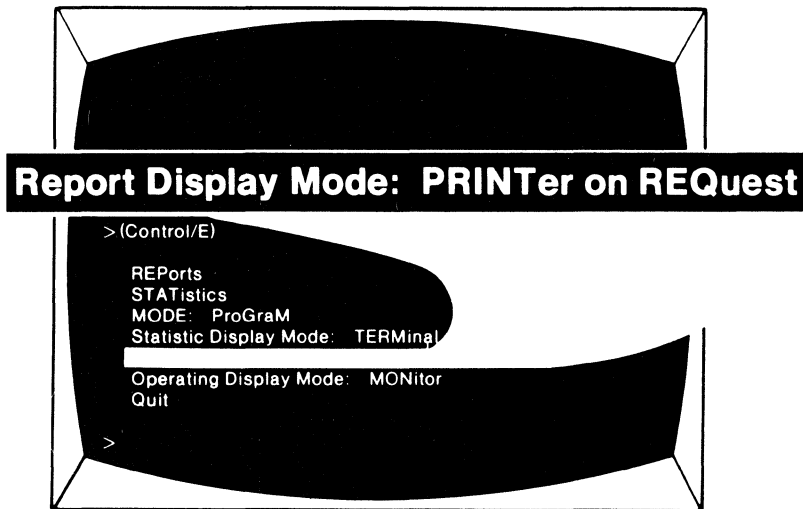
Figure 2-46
Report Display Mode Floating Option

Terminating Message

To return the CT to its location prior to the initiation of the RDM option, the operator enters the Carriage Return (CR) terminator character:

(CR)

2.3.6 OPERATING DISPLAY MODE

The Operating Display Mode (ODM) is a floating option (see Figure 2-47) which is used to specify the mode of display for CT communications. There are three Operating Display Modes:

- Terminal. When the ODM is set to Terminal, both operator input and I/CTP output are displayed on the CT screen.

- Printer. In the Printer mode, operator input is displayed on the CT screen and I/CTP output is printed on both the control printer and the CT screen.

- Monitor. In this mode, both operator input and I/CTP output are printed on the control printer.

Display Syntax

Operating Display Mode: xxxx

Input Syntax

ODM=xxxx(CR)

Configurable Values

xxxx = TERMinal, PRINTer, MONitor

Confirmation Message

When the ODM option is redefined, the CT will display a confirmation of the change. For example, when the ODM is defined as PRINTer, the CT will respond:

OPERATING DISPLAY MODE: PRINTER

Operating Display Mode: MONitor

```
>(Control/E)

    REPorts
    STATistics
    MODE:  ProGraM
    Statistic Display Mode:  TERMinal
    Report Display Mode:  PRinter on REQuest

    Quit

>
```
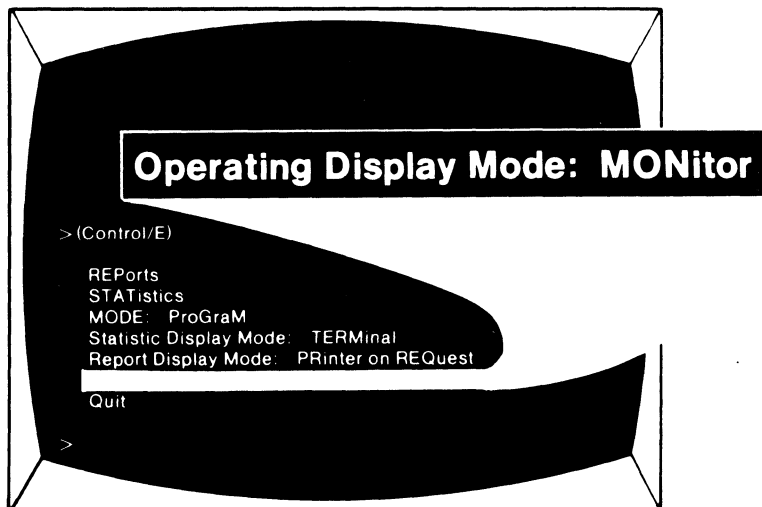
Figure 2-47
Operating Display Mode Floating Option

2.3.7 QUIT

The Quit option is a special control function used to terminate the Statistics, MXP control, and REPorts functions.

When Statistic or Report displays, or the MXP control option is completed, the Quit option is specified to terminate the function and return the CT to its previous location in the command menu (see Figure 2-48).

<u>Display Syntax</u>

Quit

<u>Input Syntax</u>

❯Q(CR)

QUIT

```
>(Control/E)

    REPorts
    STATistics
    MODE:  ProGraM
    Statistic Display Mode:  TERMinal
    Report Display Mode:  PRinter on REQuest
    Operating Display Mode:  MONitor

>
```
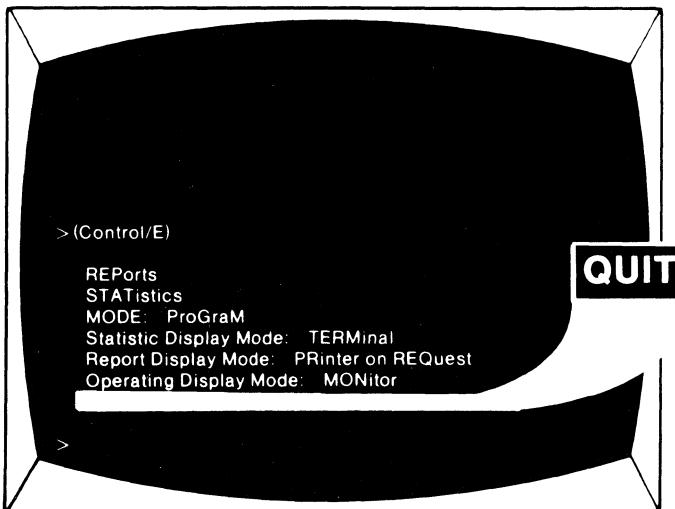
Figure 2-48
Quit Floating Option

CHAPTER 3
MAINFRAME CONSOLE

3.1 GENERAL

The mainframe console is located at the top front of the 6050 DCP cabinet (see Figure 3-1), allowing secondary nodes to initiate a limited number of supervisory functions. From the mainframe console, supervisory capability is limited to elements within the node. The supervisory functions available with the mainframe console are listed below:

- Mode Control
- Booting (including port reset and load)
- Port Status
- Report Examination
- Diagnostics

The following sections describe the console controls and indicators, general I/O protocol, display format, use of the multifunction keyboard, and the specific procedures used to initiate each of the supervisory functions available from the console keyboard.

3.1.1 PHYSICAL DESCRIPTION

A front view of the mainframe console is shown in Figure 3-1. The console presents, from left to right: a row of processor ID lamps, a row of processor status lamps, a row of interrupt level lamps, a 32-character 5x7 dot alphanumeric self-scan display, a row of operating mode indicator lamps, and an 18-key keyboard. The functions of the controls and lamps are listed in Table 3-1.

3.1.1.1 Self-Scan Display.

The alphanumeric self-scan display is used to display commands and error conditions. An asterisk (*) appearing in character position 1 of the self-scan screen notifies the operator when a message is waiting to be displayed. The "greater than" symbol (>) appearing at the end of a display indicates that the message is not shown in its entirety on the screen, and the ENTER key must be pressed for the remainder of the message to be displayed.

3.1.1.2 Multifunction Keyboard.

The keyboard consists of 18 pushbutton keys, as shown in Figure 3-1. Each key has more than one function, depending upon the type of command being used. Therefore, each key has two or three different words or symbols printed on it.

In the lower left-hand corner of each of the 16 square keys is a number or letter indicating the hexadecimal digits 0 to F (see Figure 3-2). Port addresses are in hexadecimal.

A set of alphabetic characters is also printed on the keys (see Figure 3-3). Note that the hexadecimal digits A through F double as alphabetic characters for the mnemonic code set. The character "0" doubles as both the number "zero" and the letter "0," and the character "1" doubles as both the number "one" and the letter "1."
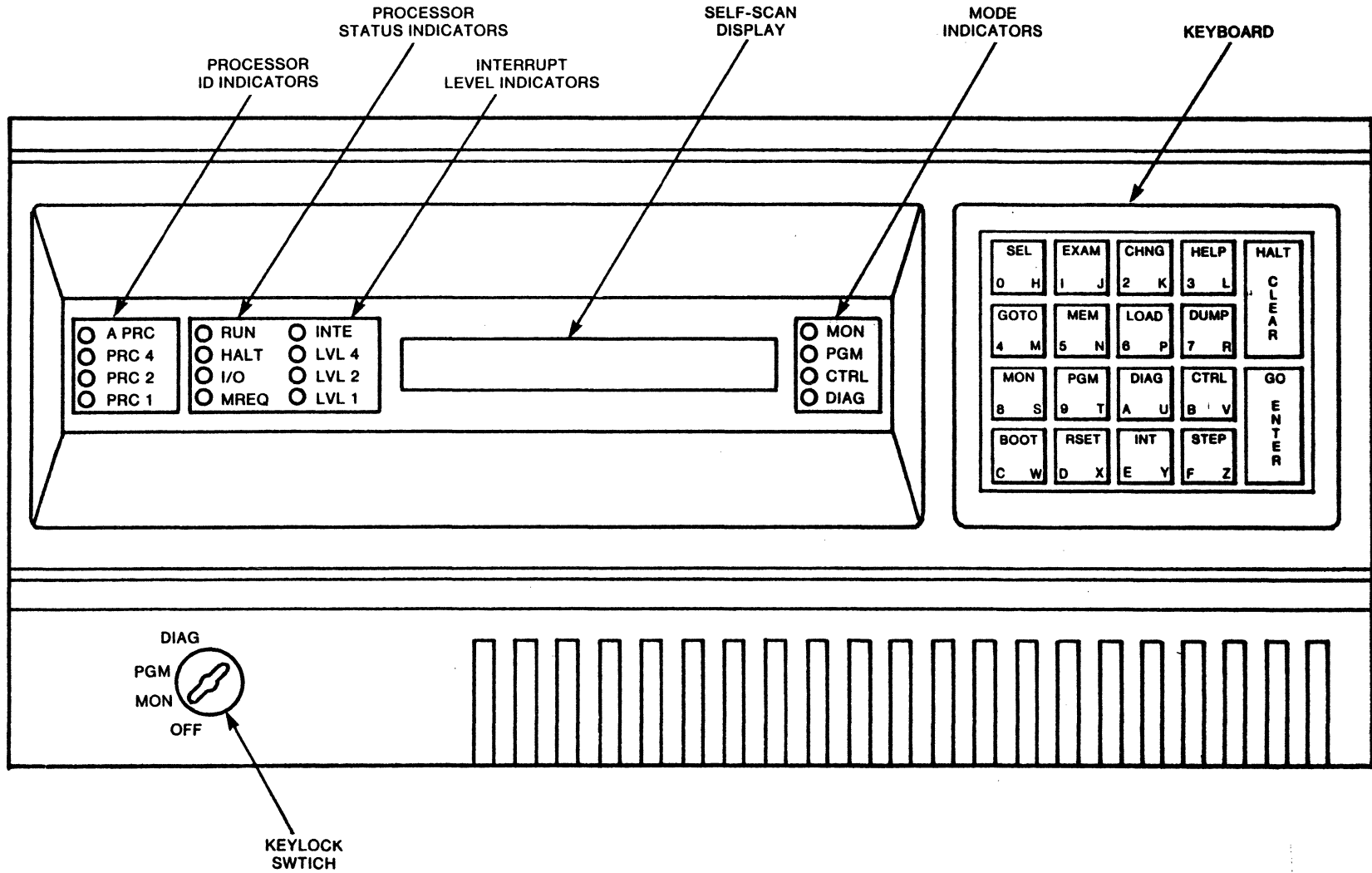
Figure 3-1
Codex 6050 DCP Mainframe Console

The valid command key set for the Monitor mode is shown in Figure 3-4; the valid command key set for the Program mode is shown in Figure 3-5; and the valid command key set for the Control mode is shown in Figure 3-6.

The MON (monitor), PGM (program), and CTRL (control) keys in the third row are mode keys and are used to change the system mode, while the DIAG key is used to clear parity errors, run ROM diagnostics, and optionally load and run diagnostics in a port.

The four keys across the top (SEL, EXAM, CHNG, and HELP) are command keys. EXAM (examine) is used to examine system parameters. HELP is used as an aid in explaining commands. The SEL and CHNG commands are reserved for future expansion, but are not currently used.

The BOOT key is used for bootstrapping; that is, loading the system with a desired predetermined configuration. Pressing the ENTER key causes a display to change or a command to be executed. The CLEAR key is used to clear the screen or to abort a command before it is executed.

The GOTO and INT functions are reserved for future expansion, but are not currently used.

The functions of these keys and the remainder of the keys are explained in more detail in Section 3.2.

Table 3-1
Controls and Indicators

Control/Indicator	Function
Processor ID Indicators	
A PRC indicator(green)	Indicates all processors in use. Illuminated in MON, PGM, and CTRL Modes.
PRC 4, PRC 2, PRC 1 indicators (yellow)	Indicates binary code of processor status being displayed. The processor ID indicators continuously cycle through the mainframe processors and indicate which processor's status information is being displayed at the time.
Processor Status Indicators	Indicate status of the processor whose number is displayed in the processor ID indicators.
RUN indicator (green)	Indicates the selected processor is running.
HALT indicator (yellow)	Indicates the selected processor has halted.
I/O indicator (yellow)	Indicates that the processor input/output operations are being performed.

Table 3-1 (Cont)
Controls and Indicators

Control/Indicator	Function
Processor Status Indicators (Cont)	
MREQ indicator (yellow)	Indicates that the processor memory access operations are being performed.
Interrupt Level Indicators	
INTE indicator (green)	Indicates interrupt enabled for the selected processor.
LVL 4, LVL 2, LVL 1 indicator (yellow)	Indicates interrupt priority level in binary code.
Self-Scan Display	Displays alphanumeric data, such as commands, system messages, and error conditions.
Mode Indicators	
MON indicator (green)	Indicates mainframe console is in Monitor Mode.
PGM indicator (yellow)	Indicates mainframe console is in Program Mode.
CTRL indicator (red)	Indicates mainframe console is in Control Mode.
DIAG indicator (red)	Indicates mainframe console is in Diagnostic Mode.
Keyboard	Used to enter commands (see Paragraph 3.1.1.2).
Keylock Switch Position (See Figure 3-1.)	
OFF	Shuts off power to system.
MON	Restricts operation to Monitor Mode only.
PGM	Allows only Monitor, Program, and Control Modes.
DIAG	Permits selection of Diagnostics and Monitor Modes. (Not used in normal operation.)
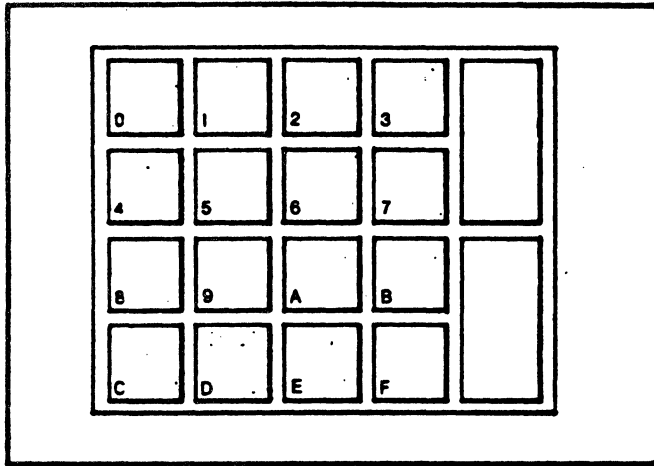
Figure 3-2
Hexadecimal Key Set

0	1	2	3	
4	5	6	7	
8	9	A	B	
C	D	E	F	
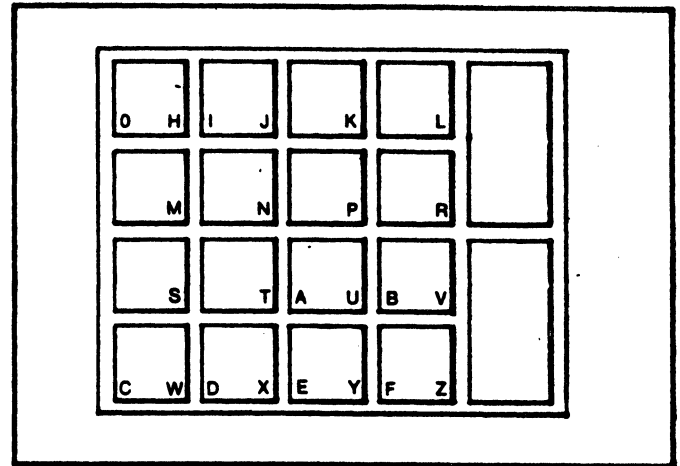
Figure 3-3
Alphabetic Keys

O H	I J	K	L	
M	N	P	R	
S	T A	U B	V	
C W	D X	E Y	F Z	
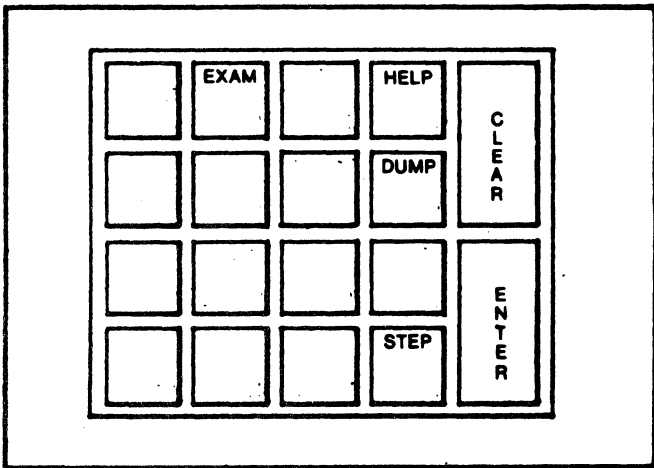
Figure 3-4
Valid Command Keys
for Monitor Mode

	EXAM		HELP	CLEAR
			DUMP	
				ENTER
			STEP	
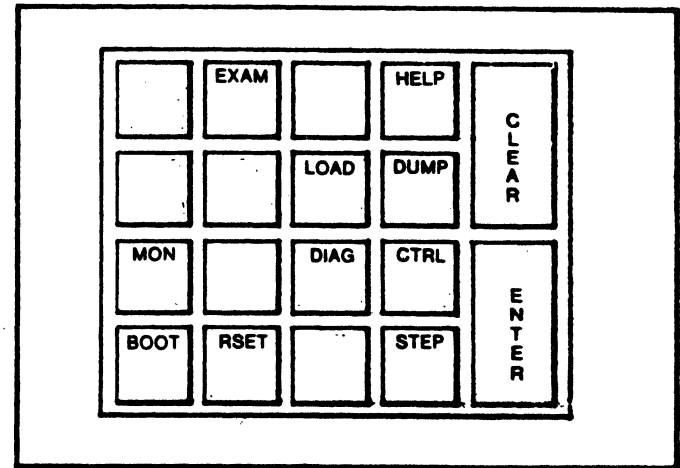
Figure 3-5
Valid Command Keys
for Program Mode

	EXAM		HELP	CLEAR
		LOAD	DUMP	
MON		DIAG	CTRL	ENTER
BOOT	RSET		STEP	
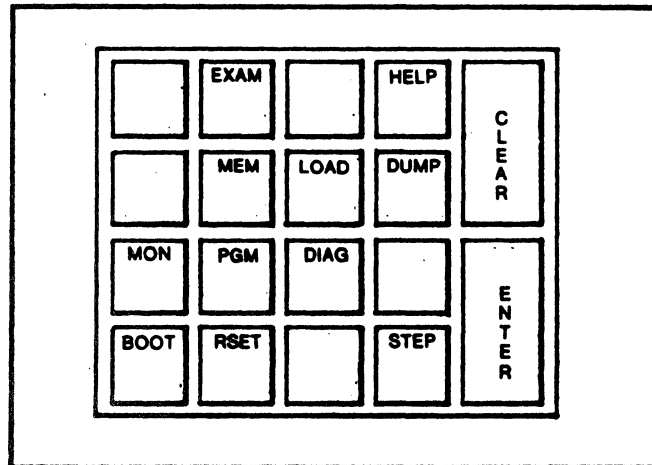
Figure 3-6
Valid Command Keys
for Control Mode

	EXAM		HELP	CLEAR
	MEM	LOAD	DUMP	
MON	PGM	DIAG		ENTER
BOOT	RSET		STEP	

3.2 SUPERVISORY FUNCTIONS

The following sections describe the commands available from the keyboard of the mainframe console. In these descriptions, brackets are used to indicate optional input parameters and X,Y,Z,x,y,z represent hexadecimal digits; YY always indicates a port number; and xxxx always indicates a memory address. Note that when entering multiple hex digits for a field, leading zero's may be omitted.

3.2.1 OPERATOR ASSISTANCE

The HELP command tells the operator which commands are valid under the current panel mode. To use the HELP command:

   a. Press HELP.

   b. Press ENTER.

      1. If the mainframe console is in the monitor mode, the display is:

                     HELP DUMP EXAM STEP PGM

         PGM is not displayed if the Mode Keylock Switch is at the MON or DIAG position.

      2. If the mainframe console is in the program mode, the display is:

                  HELP DUMP EXAM STEP LOAD RSET >

         where > indicates that there are more commands waiting to be displayed. Press ENTER and the remainder comes up:

                        DIAG BOOT MON CTRL

      3. If the mainframe console is in the control mode, the display is:

                  HELP DUMP EXAM STEP LOAD RSET >

         where > indicates that there are more commands waiting to be displayed. Press ENTER and the remainder comes up:

                      DIAG BOOT MEM MON PGM

The operator may then use the HELP key to view the syntax of the desired command:

   c. Press HELP.

   d. Press the key for the appropriate command. (The command must be valid in the current mainframe console mode.)

   e. Press ENTER.

If the HELP key is followed by a command key which is valid in the current main-frame console mode, the syntax of the associated command is shown in one of the following displays:

```
'BOOT' N 'ENTER'
'CTRL' PASSWORD 'ENTER'
'DIAG' [YY] 'ENTER' [COMMAND] > 'ENTER'
'DUMP' [XXXX] 'ENTER' [YY] 'ENTER'
'EXAM' [YY] 'ENTER'
'HELP' [COMMAND] 'ENTER'
'LOAD' [YY] 'ENTER'
'MEM' [XXXX] 'ENTER' [YY] 'ENTER' > [ZZ] 'ENTER'
'MON' 'ENTER'
'PGM' 'ENTER'
'RSET' [YY] 'ENTER'
'STEP'
```

For example, if the operator presses HELP followed by BOOT, the self-scan responds with the display of:

'BOOT' N 'ENTER'

where N is the configuration number which the operator must specify. If a command key not valid in the current mode is pressed following the HELP key, the command syntax is not displayed. Instead, the following message is displayed:

BAD COMMAND

3.2.2 MODE CONTROL
The operator selects the allowable modes by using the keyswitch, but actually puts the mainframe console into a specific mode by using the apprpriate keyboard command.

a. With the keyswitch in the MON position (the normal power-on position), the monitor mode is the only mode available; that is, it is not possible to enter the program or control modes with the keyswitch in the MON position. The following commands are valid in the monitor mode: STEP, HELP, DUMP, and EXAM.

b. With the keyswitch in the PGM position, all three modes (monitor, program, and control) are available from the keypad. In the program mode, all commands except MEM may be used.

c. As stated above, the control mode can be entered with the keyswitch in the PGM position; however, the control mode is password-protected. All commands are available in the control mode, but it is not used in normal operation.

Note
The DIAG mode is for use by Codex personnel only;
however, the mainframe temporarily enters the
diagnostics mode upon system power-up.

3.2.2.1 MON Key.

To enter the monitor mode from the program mode or control mode:

    a. Press MON.

    b. Press ENTER.

The display will echo back 'MON' to the left of the self-scan screen and the MON mode LED will illuminate. Pressing another key between the 'MON' key and the 'ENTER' key results in the display of 'BAD COMMAND'.

3.2.2.2 PGM Key.

To enter the program mode from the monitor mode or control mode:

    a. Press PGM.

    b. Press ENTER.

The display will echo back 'PGM' to the left of the self-scan screen and the 'PGM' mode LED will illuminate. Note that the keyswitch must be positioned at PGM in order to enter the program mode. Pressing another key between the 'PGM' key and the 'ENTER' key results in the display of 'BAD COMMAND'.

3.2.2.3 CTRL Key.

The control mode is password-protected. It is not used for normal system opera-ation. To enter the control mode from the program mode:

    a. Press CTRL.

    b. Key in the password. If more than the required number of keys is input, the last ones entered are used.

    c. Press ENTER.

There is no display response to the proper transition into the control mode; however, the CTRL mode LED will illuminate. Note that the keyswitch must be positioned at PGM in order to enter the control mode.

3.2.3 BOOT, RESET, and LOAD

3.2.3.1 BOOT Key.

The BOOT command is used to optionally bootstrap the local node with one of the configurations in the off-line configuration memory (CMEM). The allowable choices are from 1 to 5, assigned as follows:

               No. 1 = off-line configuration in CMEM
               No. 2 = off-line configuration in CMEM
               No. 3 = off-line configuration in CMEM
               No. 4 = off-line configuration in CMEM
               No. 5 = default hardware configuration for local boot

To boot the local node:

    a. Press BOOT.

    b. Press N, where N is the configuration number between 1 and 5 which must be specified.

    c. Press ENTER.

The resulting display may be any of the messages listed in Paragraphs 3.3.1.4, 3.3.3, 3.3.7, and 3.4.

Note that this command is not available in the monitor mode.

3.2.3.2 <u>RSET Key</u>.

The RSET command is used to reset a port that is currently active. Any call that is in progress is terminated and all paths used by the port are cleared. This command <u>must</u> be used before a DIAG or LOAD command can be issued to the port, except during start-up procedures.

<div align="center">

Note
This command should be used with care, since all
data buffered in the port or in transit in the
network will be lost.

</div>

To reset a port:

    a. Press RSET.

    b. Using the hexadecimal keys, key in the hexadecimal port number (between X'02' and X'FE') of the port to be reset. If YY is not specified, the default will be used. The default number is the last port to be identified in the last previous command. If no port was previously identified, the default is X'00'.

    c. Press ENTER.

The resulting display echoes the command and the specified port number. For example, if port number X'02' was chosen, the display is:

<div align="center">

RSET 02

</div>

3.2.3.3 <u>LOAD Key</u>.

The LOAD command is used to load and start operational software in a port that was previously reset during the RSET command.

To load software:

    a. Press LOAD.

    b. Using the hexadecimal keys, key in the hexadecimal port number (between X'02' and X'FE') of the port to be loaded. If YY is not specified, the default will be used. The default number is the last port to be identified in the last previous command. If no port was previously identified, the default is X'00'.

c. Press ENTER.

The resulting display echoes the command and the specified port number. For example, if port number X'02' was chosen, the display is:

LOAD 02

3.2.4 EXAM KEY

The EXAM command is used to examine 6 status registers of an intelligent port's BIC chip: Packet BIC status, Inbound Packet status, Outbound Packet status, FIFO BIC status, Inbound FIFO status, and Outbound FIFO status. It is not used in normal operation. The contents of the status registers are meaningful to Codex personnel only.

To examine a status register:

a. Press EXAM.

b. Using the hexadecimal keys, key in the hexadecimal port number (between X'02' and X'FE') of the port to be examined. If YY is omitted, the default intelligent port address is used.

c. Press ENTER.

The resulting display is:

$$YY=y1\ y2\ y3\ y4\ y5\ y6$$

where YY is the intelligent port address and y1 through y6 are the contents of the intelligent port's 6 BIC status registers as follows:

y1 = contents of the CBICST0 register (Packet BIC)
y2 = contents of the CIFFST0 register (Inbound Packet)
y3 = contents of the COFFST0 register (Outbound Packet)
y4 = contents of the CBICST1 register (FIFO BIC)
y5 = contents of the CIFFST1 register (Inbound FIFO)
y6 = contents of the COFFST1 register (Outbound FIFO)

Before the status registers are read, the mainframe console verifies the existence of an intelligent port corresponding to the entered address. If the port does not exist, the resulting display is:

PORT YY DOES NOT EXIST

Subsequent pressing of the ENTER key causes the status registers of the intelligent port with the same intelligent port address to be updated.

3.2.5 STEP KEY

The STEP command is used to display messages that are queued to the front panel. An asterisk (*) appearing in the first position of the display indicates that messages are waiting to be displayed. To display the first outstanding message, press STEP.

Each time the STEP key is pressed, the next subsequent message is displayed. When no more messages are outstanding or when another command key is pressed, message display terminates. Up to 16 messages may be queued to the front panel at one time. If more than 16 messages are sent to the front panel without being displayed, only the last 16 are queued. If the STEP key is pressed when there are no messages remaining to be displayed, the resulting display is:

EMPTY

3.2.6 DIAG KEY

The DIAG command is used to clear parity errors, run ROM diagnostics and optionally load and run extensive loadable diagnostics in a port. Before this command can be issued, the port must previously have been reset. If the RSET command has not been given, the following error message is displayed:

PORT YY NOT IDLE

To load and run diagnostics:

a. Press DIAG.

b. Using the hexadecimal keys, key in the hexadecimal port number (between X'02' and X'FE') of the port to be displayed.

c. Press ENTER.

d. Press [COMMAND], where [ ] indicates that this entry is optional, and where COMMAND may be RSET, in which case only ROM diagnostics are run; or may be LOAD or omitted, in which case loadable diagnostics are loaded and run.

e. Press ENTER.

As a result of the diagnostics command, messages will be queued to the front panel and may be displayed by using the STEP command, as explained in Paragraph 3.2.5. The possible messages are listed in Section 3.4.

3.2.7 MEMORY UTILITIES

The memory utilities are not used in normal operation.

3.2.7.1 DUMP Key.

The DUMP command is used to dump a memory block of four consecutive locations in the range from X'0080' through X'FFFF' for the mainframe or X'0000' through X'FFFF' for a port.

To dump memory:

a. Press DUMP.

b. Using the hexadecimal keys, key in XXXX, which is the address of the starting memory location. If XXXX is omitted, the default memory (the last memory address to be identified), is used.

c. Press ENTER.

The display format is:

DUMP A = XXXX   P =

    d. Using the hexadecimal keys, key in [YY], where [ ] indicates optional parameters and YY is an optional port address which causes memory in that port to be displayed. If not specified, the default port address (the last port address identified) is used. X'00' is mainframe memory.

    e. Press ENTER.

The display format is:

DUMP A = XXXX   P = YY   V = X'nn' X'nn' X'nn' X'nn'

    where X'nn' X'nn' X'nn' and X'nn' are 2-digit hex numbers in the range of X'00' through X'FF' which are the contents of four consecutive memory locations starting from the address XXXX.

After this command is processed, the default memory address points to the next memory location. The default memory address is wrapped around so that X'80' follows X'FFFF' if the mainframe was specified or X'00' if a port was specified.

Subsequent ENTER commands cause the contents of the next four consecutive memory locations to be dumped.

3.2.7.2 MEM Key.
The MEM command may be used only in the control mode and allows an operator to inspect and change the contents of a memory location:

    a. Press MEM.

    b. Press [XXXX], where [ ] indicates optional parameters and XXXX is the address of a memory location to be examined.

    c. Press ENTER.

The resulting display is:

MEM A=XXXX   P=

If XXXX is less than X'80' (for the mainframe), the resulting display is:

MEM 00-7F PROTECTED

    d. Press [YY], where [ ] indicates optional parameters and YY is the port address. If YY is not entered, the default port address is used.

e. Press ENTER. The resulting display is:

MEM A=XXXX P=YY V=XX /

where / indicates that the mainframe console is waiting for the new hex
digits, ZZ, to be input to replace XX, the content of memory location XXXX.
After the hex input, ZZ, the operator must still press ENTER to effect the
change. This gives the operator a chance to double-check the echoed hex
digits. If the ENTER key is pressed without hex input, ZZ, the content of the
current memory location is preserved and the next memory location is dis-
played. (This process can be terminated by pressing the CLEAR key.) The
sequence then continues as follows:

f. Press [ZZ], where [ ] indicates optional parameters and ZZ is the new
value to replace the content of the memory location at XXXX.

g. Press ENTER.

The resulting display is:

MEM A=XXXX P=YY V=XX / ZZ yy

where yy is the content of the same memory location read again after the
writing is done. This is to allow the operator to confirm whether the writing
of the memory location has indeed been successful. At this point, any command
may be entered. If just an ENTER key is input, the MEM command is still in
effect for the next memory location.

At the end of this entire process, the default memory address points to the next
memory location following the last one displayed for a valid MEM command which was
not aborted by a CLEAR key.

3.3 MAINFRAME DIAGNOSTICS AND LOADING

When the system is powered up, the mainframe automatically enters the diagnostics mode and goes through six phases of test routines for diagnostics and loading. Booting from the mainframe console causes all ports to be reset but, as a rule, does not cause all six phases of diagnostics to be run on the mainframe. However, the mainframe code is checksummed, and if bad, all six phases of diagnostics will be run.

Messages will appear on the self-scan display of the mainframe console to inform the operator of the progress of the diagnostics and loading routines. In some cases, a secondary message is displayed to supply additional information.

Note that the primary message is displayed unless the operator presses the ENTER key. If a secondary message is being displayed and the primary message changes, the new primary message is displayed.

     a. Primary Messages. Load status is the primary message and is displayed on the mainframe console screen during Mainframe Initial Load (MIL). Until software is actually being loaded, the screen is separated into two fields: the left side of the display represents the current status field, and the right side of the display represents the last error field. However, during actual loading, the display shows the loading address of the current frame and the frame number, instead of the last error field.

     b. Secondary Messages. These messages give more information on status and are displayed only when an operator enters a key from the keyboard. There is a single type of secondary message:

        1. Error Messages. When a fatal mainframe error occurs, the display will show all asterisks. Pressing the ENTER key causes the secondary message to be displayed. These messages are listed in Tables 3-3 and 3-4.

        2. Floppy Disk Port Status Messages. A status message is generated for each floppy disk port which runs diagnostics. These messages may be displayed one at a time by pressing the ENTER key.

At restart, a series of "at" signs (@) will fill the self-scan display for approximately 2 seconds, and then diagnostics will begin execution. If it is a reconfiguration restart, the message 'RECONFIGURATION RESTART' will appear for 10 seconds and diagnostics will not be run. Instead, the mainframe code is checksummed and if it is good, the system jumps to Phase 3 of diagnostics and loading. If it is bad, a system error message is displayed for the number of minutes specified in CMEM, and the mainframe resets itself and starts diagnostics (Phase 1).

As the mainframe is running through its diagnostics routines, each port is also engaged in diagnostics. The diagnostics LED on each intelligent port engine card will illuminate on system power-up and will extinguish when the engine diagnostic completes without an error (8 to 10 seconds); the continued illumination of the LED indicates a problem with the intelligent port engine card.

The six phases of mainframe diagnostics and loading are listed and explained in the following sections. Phase 1 constitutes diagnostics, while Phases 2 through 6 are involved in loading and initializing the node.

3.3.1 PHASE 1 -- MAINFRAME DIAGNOSTICS

In Phase 1, mainframe diagnostics begin running. They include processor tests, memory tests, master controller tests, and NIC loopback tests.

Before proceeding to processor testing, the self-scan display first reads:

NODE RESTART

3.3.1.1 Processor Tests.

During processor tests, the self-scan display reads:

MF DIAGNOSTICS: # # # # # #

Each # represents a counter corresponding to each processor card (up to six may be present). Each processor increments its counter upon completion of each processor test. If diagnostics discover a failure, an asterisk is displayed to the left of the counter corresponding to the processor which found the failure. All processors are then halted. The numeric characters corresponding to the tests are listed below:

```
0 = Simple Instruction Set Test
1 = ROM Checksum Test
2 = Local Storage Test
3 = Base Register Test
4 = Processor Status Initialization Test
5 = Processor Uniqueness Test
6 = Processor Run-Halt Test
```

3.3.1.2 Mainframe Memory Tests.

These tests are executed by processor 0. During memory tests, the self-scan display reads:

| | (If Applicable) |
Status Field	Error Field
MF DIAGNOSTICS: #	RAM FAIL AAAA

where # is the counter maintained by processor 0, which continues to increment during the memory tests. The message in the Error Field appears only if there is a failure and AAAA is the address of the failure. All processors are then halted. During the low RAM test, random data briefly appears on the screen.

The alphanumeric characters corresponding to the memory tests are listed below:

```
7 = Page 0 Memory Test
8 = Low RAM Test
9 = High Bank RAM Test
A = Lockbyte Test
```

3.3.1.3 Master Controller Tests.

During master controller tests, the self-scan display reads:

	(If Applicable)
Status Field	Error Field
MF DIAGNOSTICS: # X X	MC FAILURE

where # is the counter maintained by processor 0, which continues to increment during the master controller tests; and X X represent two additional counters, indicating the number of the processor which has completed each test. Only one X is present for tests B and C. The last two tests (D) are executed sequentially by each processor. The message in the error field only appears in the event that a failure is detected. All processors are then halted. The alphabetic characters corresponding to the tests are listed below:

$$B = \text{Real Time Clock Timing Test}$$
$$C = \text{Real Time Clock Interrupt Test}$$
$$D = \text{X X Fork, Dispatch, and Suspend Test}$$
$$D = \text{X X-1 Interrupt Level and Enqueue Test}$$

For example, if the Real Time Clock Timing Test is currently being executed and the last processor to complete the test is processor 4, then the display is:

$$\text{MF DIAGNOSTICS: B 4}$$

If the Fork, Dispatch, and Suspend Test is currently being executed and the last processor to complete the test is processor 4, then the display is:

$$\text{MF DIAGNOSTICS: D 4 4}$$

If the Interrupt Level and Enqueue Test is currently being executed and the last processor to complete the test is processor 4, then the display is:

$$\text{MF DIAGNOSTICS: D 4 3}$$

Therefore, only one number will be present following the test-identifying character B or C; if Test D (Fork, Dispatch, and Suspend) is being run, two identical numbers will follow the identifying character 'D'; and if Test D (Interrupt Level and Enqueue) is being run, two numbers will follow the identifying character D, the second being one digit lower than the first.

3.3.1.4 NIC Loopback Test.

During the NIC loopback test, the self-scan display reads:

	(If Applicable)
Status Field	Error Field
MF DIAGNOSTICS: E	NIC n FAILURE or NO NEST PRESENT

where E indicates that diagnostics is currently performing the NIC Loopback Test. A message will only appear in the Error Field in the event that an error is detected, and n represents the number of the failed NIC. All processors are then halted.

3.3.1.5 Diagnostics Complete.
If diagnostics run successfully, the following message will be displayed:

MF DIAG COMPLETE

The mainframe then enters Phase 2, which begins the loading routines.

3.3.2 PHASE 2 -- SELECT SOFTWARE OR DIAGNOSTIC MONITOR
In Phase 2, two commands are recognized from the front panel of the local mainframe. Following the display of 'MF DIAG COMPLETE' in Phase 1, the operator may, within 30 seconds, enter one of the following optional commands:

    a. <u>Diagnostics Monitor</u>. This command instructs the mainframe to load the diagnostics monitor instead of loading regular system software.

    1. Press DIAG. The resulting display is:

DIAGNOSTIC MONTR

    2. The operator has 30 seconds to press the ENTER key to proceed with this routine or the 6050 will continue to search for the standard operating software to load the node.

    3. Press the ENTER key and the mainframe will load the software to perform the DIAGNOSTIC MONITOR routine. The resulting display is:

-STEP- FOR HELP OR -GO- FOR TEST

    4. Two selections are available, STEP or GO (ENTER key):

        a) If STEP is pressed three times the resulting display of the utility menu is:

-1- CMEM CHECKSUM WRITE ROUTINE

-2- BIC DIAGNOSTIC AID ROUTINE (not currently usable)

-3- CONFIGURATION AND ROUTINE (not currently usable)

Press STEP. This returns to utiltiy 1, CMEM CHECKSUM WRITE ROUTINE. This routine is used to allow operation of the mainframe should the mainframe fail the CMEM CHECKSUM verification during Phase 1 diagnostics. The resulting display from such a failure is:

INVALID CMEM

Press ENTER. The resulting display is:

PARAM: 0000 0000 0000 0000

Press the ENTER key twice to enter the CMEM CHECKSUM WRITE ROUTINE. Once the routine is initiated the CMEM Checksum is recalculated. The display upon completion of the routine is:

CMEM CHECKSUM WRITE COMPLETE

A power-down is now required to load the standard operating software.

b) If GO (ENTER key) is selected, the following is displayed:

PRESS TEST SELECTION

Press 1. This selects the first utility in the menu, the CMEM CHECKSUM WRITE ROUTINE. The resulting display is:

PARAM: 0000 0000 0000 0000

Press the ENTER key twice to initiate the CMEM CHECKSUM WRITE ROUTINE. Once the routine is initiated the CMEM Checksum is recalculated. The display upon completion of the routine is:

CMEM CHECKSUM WRITE COMPLETE

A power-down is now required to load the standard operating software.

Note
The DIAGNOSTIC MONITOR ROUTINE can only be initiated in a node that is going to be reloaded with the level of software that it was previously operating with. The DIAGNOSTIC MONITOR routine has no routine to force it to look for any level (NO PREFERRED SOFTWARE) of software.

b. No Preferred Software. This command instructs the mainframe to load any software available, and overrides any previous commands received. In addition, this command is propagated through the network to any other nodes which are loading software, and this overrides any previous requests at any nodes which are loading at this time.

1. Press LOAD.

The resulting display is:

NO PREFERRED SFTW

2. Press ENTER.

If an invalid key was pressed, the following message will be displayed:

BAD KEY!!

3.3.3 PHASE 3 -- VERIFY CONFIGURATION AND TEST INTELLIGENT PORT ENGINES

3.3.3.1 Status Field Messages.
In Phase 3, each of the following messages will come up sequentially in the Status Field:

CMEM CHECKSUM

PORT TESTS##

(where ## is the address of the port currently being tested.)

RESTART TYPE RR

where RR is the restart type:

    Restart Type 01 = forced boot
                 02 = network boot
                 03 = reconfiguration
                 FF = determining restart type

3.3.3.2 Error Field Messages.
If an error is detected in the CMEM CHECKSUM test, the following message will be displayed in the Error Field:

INVALID CMEM

If an error is detected in the intelligent port engine tests (which were being executed concurrently with mainframe diagnostics), one of the following appropriate messages will be displayed in the Error Field:

P## ENG FAIL
(where ## is the port number)

P## BIC FAIL
(where ## is the port number)

If mainframe checksum fails, the mainframe will return to Phase 1 of diagnostics.

3.3.4 PHASE 4 — LOCATE SOFTWARE SOURCE

In Phase 4, one of the following messages will appear in the Status Field:

LOAD RNP##
(where RNP## is the network port (NP or GBNP) being loaded through)

LOOKING SWVV.LL
(where VV is the software revision and LL is the software release)

FLOPPY DIAG FD##
(where ## is the port number)

At any point after this, the floppy diagnostics messages may be displayed by prng ENTER:

FD## D0## D1## D2## D3##

(where ## is the status of the floppy drive controller and D0## through D3## represent the status of the four drives. ## is a 2-character hexadecimal message between 00 and FF. For a detailed explanation of these messages, see Paragraph 3.4.3.)

3.3.5 PHASE 5 — BEGIN LOADING MAINFRAME

3.3.5.1 Status Field Messages.

In Phase 5, depending on the configuration of the node parameter, software source port, etc., the self-scan display will respond with the appropriate message in the Status Field:

LOAD MF FD##
(where ## is the port number loading from floppy disk)

LOAD MF NP##
(where ## is the port number)

3.3.5.2 Error Field Messages.

a. If an error has been detected during LOAD MF FD, the appropriate error message will appear in the Error Field:

FD## BAD LOAD
(where ## is the port number)

FD## NO PREFSW
(where ## is the port number)

FD## BAD BLOCK
(where ## is the port number)

b. If an error has been detected during LOAD MF NP, the appropriate error message will appear in the Error Field:

NP## BAD LOAD
(where ## is the port number)

NP## LINK DOWN
(where ## is the port number)

NP## NO PREFSW
(where ## is the port number)

NP## STARTED
(where ## is the port number)

NP## BAD BLOCK
(where ## is the port number)

At the completion of Phase 5, one of the following messages will appear:

MF LOAD COMPLETE
(indicating diagnostics and loading have been successful)

ALL LOADING PORTS - FATAL ERROR!!
(indicating no working ports available for loading)

3.3.6 PHASE 6 — MAINFRAME RUNNING SYSTEM SOFTWARE

If diagnostics and loading have been successful, the following message will appear on the self-scan display, indicating that the mainframe is up and running:

NODE XX   CONF X: CODEX 6050 DCP

(where NODE XX is the 2-digit hexadecimal address of the node, and CONF X is the off-line configuration 1 through 4 or the special default configuration 5.)

Pressing the CLEAR key at any time while the system is operating will also cause this message to be displayed.

3.4 SYSTEM REPORTS

Although the preferred method of interfacing to the 6050 DCP is through the I/CTP, some of the I/CTP functions can be performed using the mainframe console. While the system is up and running, various messages may be displayed on the mainframe console self-scan display. They include operator error messages, floppy drive messages, and status reports. These messages are listed in the following tables, defined where necessary and, where applicable, operator action is suggested.

In addition to the messages listed in this section, there are also messages and status reports which appear during the phases of diagnostics and loading. These messages are listed and explained in proper sequence in Section 3.3.

3.4.1 OPERATOR ERROR MESSAGES

Table 3-2 lists error messages resulting from keypunch errors or entry of invalid commands. Depending on the nature of the error, the message may be preceded by the word MAINFRAME or PORT. These messages are self-explanatory.

Table 3-2
Operator Error Messages

Error Message
INVALID
BAD KEY
COMMAND TIME OUT
OFFLINE
MEMORY ACCESS CONFLICT

3.4.2 SYSTEM ERROR MESSAGES

A number of 2-character hexadecimal error messages may appear on the bezel during Phase 3 of the diagnostics and loading routines (see Paragraph 3.3.3). During this phase if all asterisks (*) are displayed, press the ENTER key and one of these messages will appear. Those messages which indicate errors that are operator-correctable are defined in Table 3-3. For these messages, recovery (automatic or manual) varies according to the configuration.

Table 3-4 identifies those errors which require the intervention of Codex Customer Service personnel. Should any of these messages appear, record all of the data displayed on the bezel along with the error code and relay this information to the Codex representative.

Table 3-3
Operator-Correctable System Error Messages

Error Code	Meaning	Operator Action
00	Error starting transmitter; this error message will only appear if the operator has turned the the keyswitch to the DIAG position and pressed a key on the keyboard.	Power down and then up to recover. Depending on configuration, recovery could be automatic.
01	Unsupported mainframe port type.	If recovery is manual, boot configuration 5, reconfigure, and boot desired configuration. If recovery is automatic, reconfigure, and boot the configuration.
08	CMEM error.	If recovery is manual, boot configuration 5, reconfigure, and boot desired configuration. If recovery is automatic, reconfigure, and boot the configuration.
09	General system initialization error.	If recovery is manual, boot configuration 5, reconfigure, and boot desired configuration. If recovery is automatic, reconfigure, and boot the configuration.
18	Mainframe checksum error.	Reload mainframe. Recovery could be automatic, depending on configuration. If this error appears repeatedly, contact Codex representative.
FF	No system error has occurred.	None.

Table 3-4
Catastrophic System Error Messages

Error Code	Error Code	Error Code	Error Code	Error Code
02	03	04	05	06
07	0B	0C	0D	0E
0F	10	11	12	13
14	15	16	17	19
0A				

Note: If any of these messages should appear, record all of the data displayed on the screen and relay this information to the Codex Customer Service representative. The system may attempt automatic recovery, depending on the configuration.

3.4.3 FLOPPY DISK CONTROLLER AND DRIVE MESSAGES

During Phase 4 of the diagnostic and loading routines (see Section 3.3.4), many status and error messages are possible. Table 3-5 defines those floppy disk messages which may occur while loading. When these messages appear on the screen, an additional longer message may be displayed by pressing the STEP key.

As noted above, when any of the messages defined in Table 3-5 appears on the mainframe console screen, an additional longer message may be displayed by pressing the STEP key.

```
FD##   D0##   D1##   D2##   D3##
 |      |      |      |      |
 |      |      |      |      └──── Drive 3 status
 |      |      |      |
 |      |      |      └────────── Drive 2 status
 |      |      |
 |      |      └──────────────── Drive 1 status
 |      |
 |      └────────────────────── Drive 0 status
 |
 └──────────────────────────── Floppy disk controller status
```

is a 2-character hexadecimal message.

Table 3-5
Floppy Disk Messages While Loading

Error Message	Meaning
ID FAILED	The communications card is not the type specified, or floppy disk controller is absent or has a bad ID register.
BAD CKSUM	The floppy disk controller PROM has failed its internal checksum test.
BAD FIFO	The floppy disk controller sector buffer is bad.
NON-FATAL	An error has been detected but it does not necessarily preclude loading of software. The operator should display the long controller/drive status message and record the results for future problem determination.
BAD FREQ	The floppy disk controller clocks are out of tolerance.
NO CABLE	The ribbon cable from the controller to the drive assembly is missing, unplugged, or backwards.
NO POWER	The floppy disk drive assembly is powered off or the cable is damaged.

The messages for the floppy disk controller are defined in Table 3-6. The floppy drive status messages are defined in Table 3-7.

Table 3-6
Floppy Disk Controller Messages

Hexadecimal Code (FD##=)	Meaning
00	No error.
01 - 3F	Non-fatal error; loading continues.
40 - 7F	Non-fatal error; operator-correctable; loading continues.
80 - BF	Fatal error detected at the controller; loading aborted. Record the error code and notify Codex Customer Service representative.
CO - FF	Fatal error detected at the controller; loading aborted. These errors may be operator-correctable. Check the following: a. Power on at drives (fans and motor hum). b. Cable is connected properly. c. Disks are correctly inserted. d. Drive doors are closed.

Table 3-7
Floppy Drive Messages

Hexadecimal Code (Dn=##)	Meaning
00	No error. Drive is ready, disk is inserted, and door is closed.
01 - 3F	Non-fatal error; loading will be attempted.
40 - 7F	Non-fatal error; operator-correctable; loading will be attempted.
80 - BF	Fatal drive error; loading from this drive aborted. Attempt recovery by putting the system disk in a different drive. If this fails, record the error code and notify Codex Customer Service representative.
C0 - FF	Fatal drive error; loading from this drive aborted. These errors are operator-correctable. Check the following: a. Drive exists (the test assumes four drives; most systems may be supplied with only two or three drives). b. Cable is connected properly. c. Disks are correctly inserted. d. Drive doors are closed.

3.4.4 TYPES 01 AND 02 MESSAGES

There are two types of 2-character messages which may be displayed on the self-scan screen during the diagnostics and loading routines (see Paragraph 3.3.7). An asterisk appearing in the first character position of the screen indicates that messages are waiting to be displayed. Pressing the STEP key causes these hex messages to be displayed (one at a time). The messages for Type 01 are displayed in the following format:

TxxPxx ## MM ## TT ID PPPP nn

where

      Txx = the type of report generated. (If the first character is an 'N' and not a 'T', record all the information appearing on the screen and contact the Codex Customer Service representative.) The types of messages possible in this display are:

          T01 = diagnostics termination message sent from loadable diagnostics running in a port.

      Pxx = port number in hexadecimal.

      ## = 2-character mnemonic identifying the error.

      MM = number of times this message has been received by the front panel.

= error code (same as previous error code).

TT = Test number in hexadecimal.

ID = Hardware ID register of communications card being tested.

PPPP = 4-digit pass number (0001 for pass 1).

NN = Cumulative number of errors encountered during tests.

Type 02 messages are displayed in the following format:

$$T02Pxx \quad \#\# \quad z \quad @$$

where

TO2 = the type of report generated. Type 02 are operator and mainframe error messages. (If the first character is an 'N' and not a 'T', record all the information appearing on the screen and contact the Codex Customer Service representative.)

Pxx = port number in hexadecimal.

= 2-character mnemonic identifying the error.

z = number of times this message has been received by the front panel.

@ = no more binary data to follow.

For some messages, additional data will be displayed on the right side of the screen. This data is only for assistance to Codex Customer Service personnel.

Table 3-8 defines Type 02 error messages which are operator-correctable and suggests operator action to correct the problem.

Table 3-9 lists Type 02 messages which indicate errors requiring assistance from Codex Customer Service personnel. If any of these messages occur, record all of the information displayed on the screen and relay this information to the Codex representative.

Table 3-8
Type 02 Operator-Correctable Error Messages

Error Code (##=)	Meaning	Action
OK	No error.	None.
IV	Invalid command code in Addressed Packet.	Issue correct command.
PI	Invalid port.	Specify correct port number.
NF	Port not configured.	Specify correct port number.
NC	Run local command has no function flags.	Issue correct command.
MR	Duplicate resets for port in cleanup.	Wait 1 minute and then issue RSET command; if reoccurs, issue BOOT command.
NE	Port is not plugged in.	Plug port in or specify valid port number.
NR	Port needs reset prior to command.	Issue RSET command and then reissue command.
DF	Port failed ROM diagnostics.	Engine card may need to be replaced.
BC	Port failed the basic BIC tests.	Engine card may need to be replaced.
EB	Extended BIC test failure.	Engine card may need to be replaced.
LF	Port failure to load.	Run ROM diagnostics.
R1	No response to Reset 1.	Run ROM diagnostics.
P1	Port stopped sending packets due to first parity error in 30 minutes.	None. Recovery is automatic and will vary depending on configuration.
P2	Port stopped sending packets due to second parity error in 30-minute period.	None. Recovery is automatic and will vary depending on configuration. Engine card may need to be replaced.
DN	Port stopped sending packets and no parity error.	None. Recovery is automatic and will vary depending on configuration.
AT	Previous Load or Diagnostics operation aborted due to RSET command.	Reissue command if desired.

Table 3-8 (Cont)
Type 02 Operator-Correctable Error Messages

Error Code (##=)	Meaning	Action
DP	Incomplete diagnostics packet from port due to 1-second time-out.	Reissue command; if reoccurs, contact Codex representative. Engine card may need to be replaced.
NN	In RUN remote node command, port number not an I/NP or I/GBNP.	Specify valid port number.

Table 3-9
Type 02 Catastrophic Error Messages

Error Code	Error Code
IT	GS
GP	BW
LU	LO
LA	LS

Note: Should any of these messages occur, record all of the data displayed on the screen along with the error code, and relay this information to the Codex Customer Service representative.

CHAPTER 4
NEST CONTROLS, INDICATORS, AND STRAPPING

4.1 GENERAL

This chapter identifies and briefly describes the various modules that may be used in each intelligent interface port. It also lists and explains the controls, indicators, and strapping of the modules.

Controls for the modules are switches, either thumbwheel or pushbutton types. Indicators are LED's (Light Emitting Diodes). All controls and indicators are situated on the module front rails for ready access.

Strapping is done with female plug links that are manually pushed onto brightly labelled pins. The user is advised to become familiar with the factory-installed strapping and then to examine the additional options listed herein for possible gains in operating effectiveness.

While the many strapping options fulfill requirements of EIA RS-232-C and CCITT V.24 interface standards, they also offer considerable versatility in the configuration of the modules and the overall system. The nature of strapping falls into three categories:

      a. Internal clocking, where straps are used to select internal clocking for operations.

      b. External clocking, where straps are used to bypass internal clocking and convert operations to external clocking.

      c. Signal strapping, where straps may be used to select various signal options.

All three types are clearly diagrammed, listed, and described herein.

Prior to changing or installing any strapping, the key switch on the Mainframe Console must be set to PGM. If the module to be strapped is one of the QBYTE's, the Engine Module must first be reset according to Paragraph 3.2.3.2 of Chapter 3. The modules may then be removed and strapped while power is on. After strapping, replace and reload the module and continue operation. A typical nest arrangement is depicted in Figures 4-1 and 4-2.
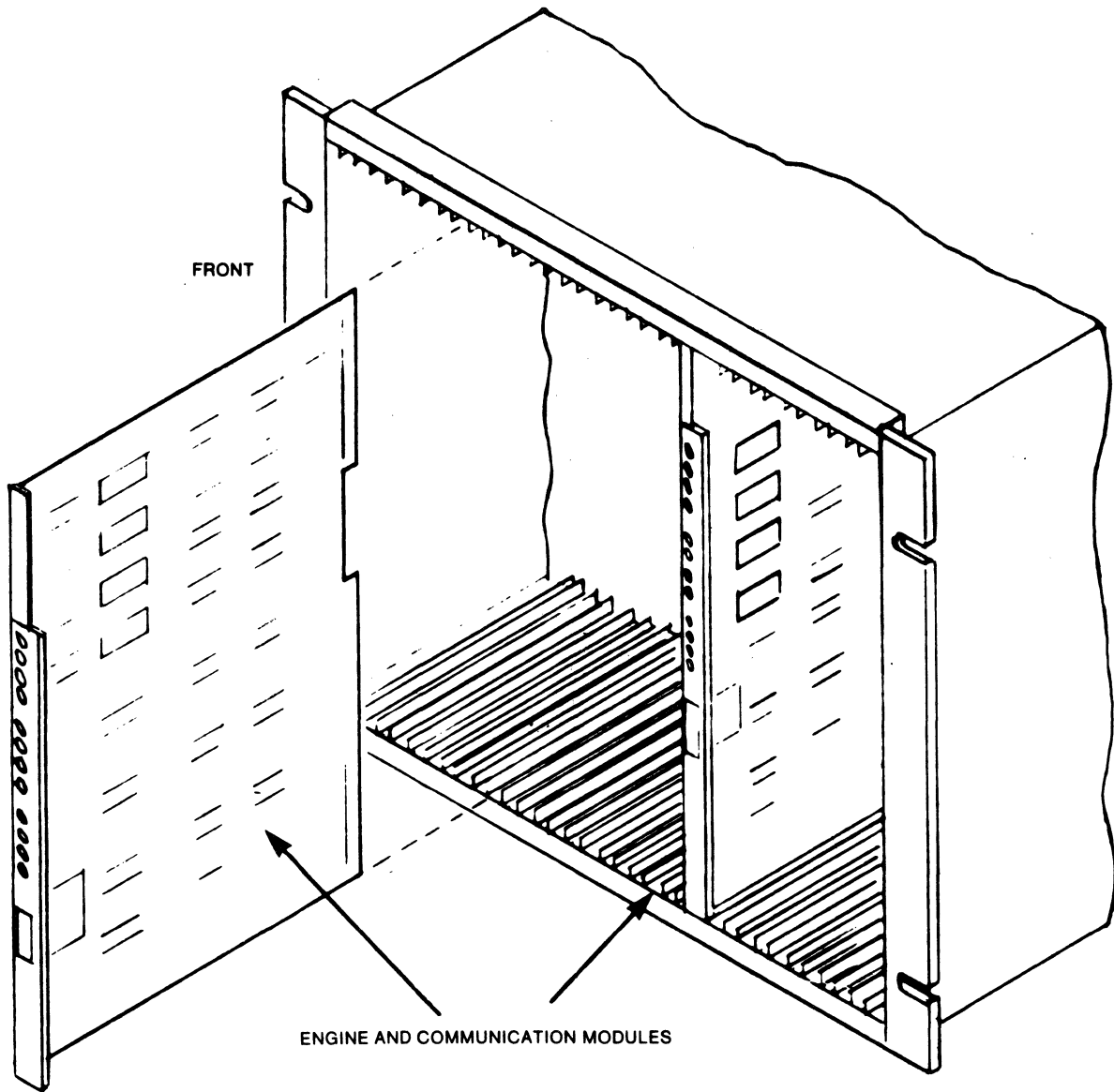
Figure 4-1
Typical Arrangement of an Intelligent Interface Port Nest
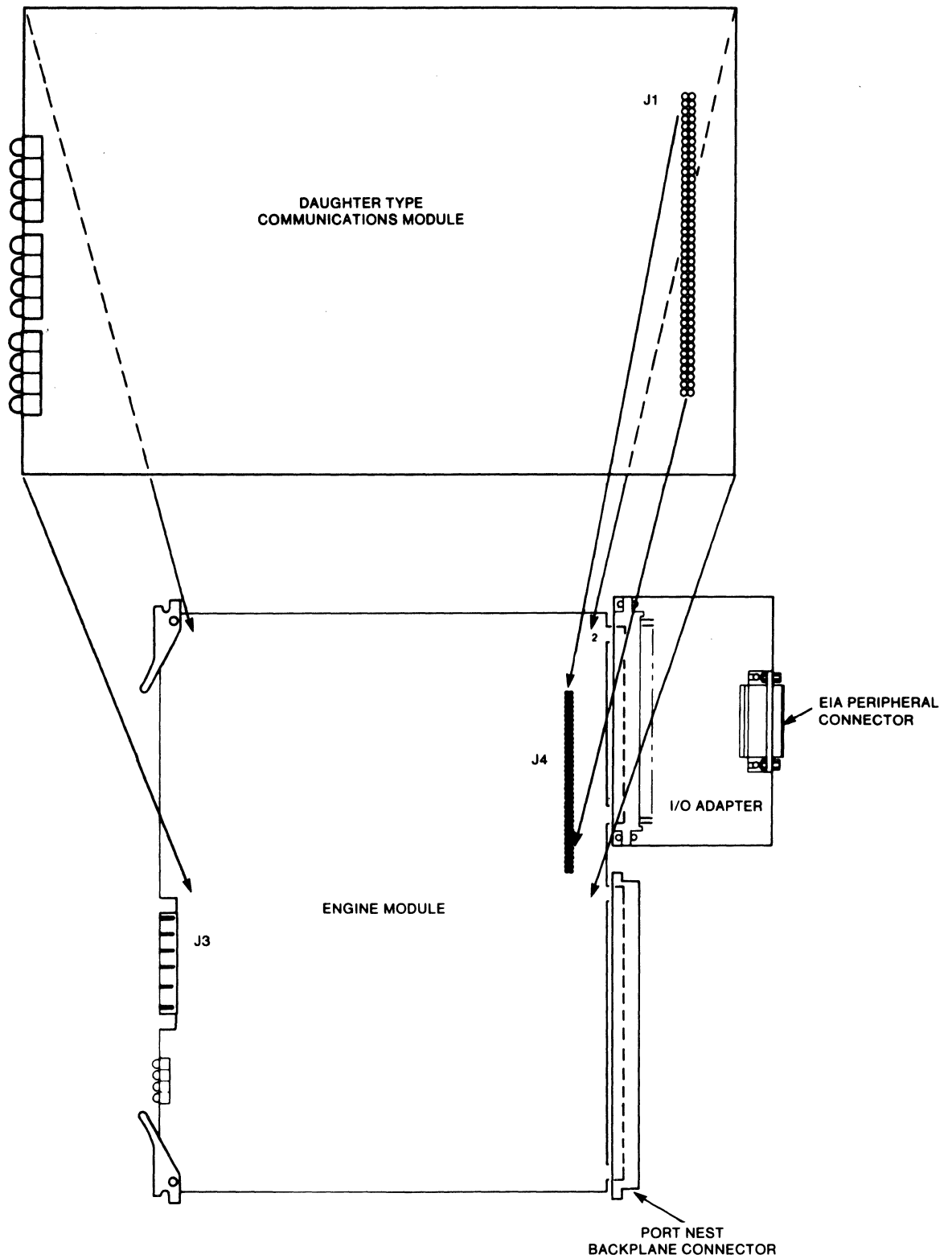
Figure 4-2
Port Configuration with
Daughterboard Communications Module

4.2 MODULE TYPES

Each intelligent interface port of the nest is configured for communications with the following modules:

    a. An engine module.

    b. I/O circuitry or an I/O adapter module.

    c. One or more communications modules.

The communications module(s) may be either of two versions, as follows: (1) a daughterboard communications module; and (2) a stand-alone communications module. All modules (with the exception of the daughterboards) have an extending plastic grip to facilitate insertion and removal at the port nest.

4.2.1 DAUGHTERBOARD COMMUNICATIONS MODULES

A daughterboard module is attached directly to the side of its associated engine module, as shown in Figure 4-2. Since a daughterboard has no way of connecting to an I/O adapter module, it uses I/O circuitry on the engine module. There are two types of daughterboard communications modules:

    a. A BIT Daughter (BITD), for bit-oriented protocols.

    b. A BYTE Daughter (BYTED), for byte-oriented protocols.

4.2.2 STAND-ALONE COMMUNICATIONS MODULE

A stand-alone communications module is positioned to the immediate right of its associated engine module. It connects to the engine module via J1, a 130-pin rear-edge connector, and it connects to its I/O adapter via J2, an 86-pin rear-edge connector. The stand-alone module is illustrated in Figure 4-3. There are four types of stand-alone communications modules:

    a. QBYTE (Quad Byte).   c. FDC (Floppy Drive Controller).

    b. VBIT (Group Band).   d. CTC (Control Terminal Card).
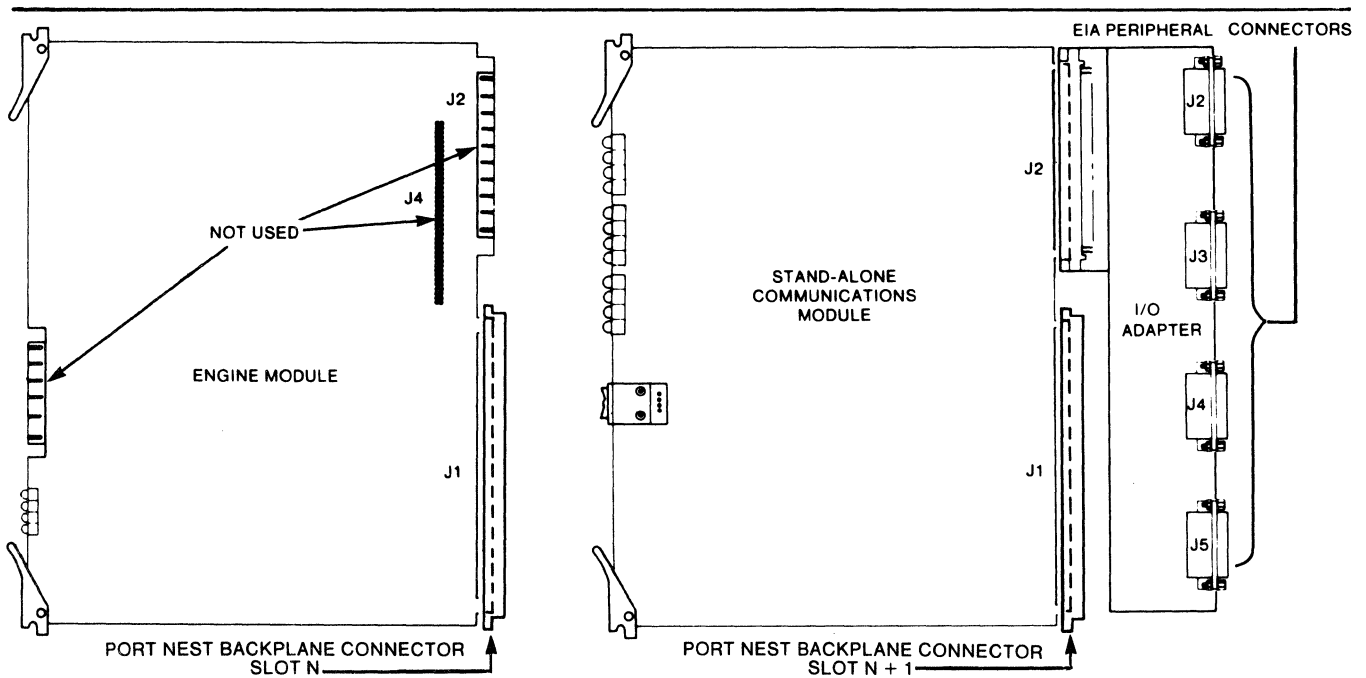
Figure 4-3
Port Configuration with a
Stand-Alone Communications Module

4.3 PORT CONFIGURATION

Module requirements for the various configuration options of an intelligent interface port are given in Table 4-1.

Table 4-1
Module Requirements for Configuration
of an Intelligent Interface Port

Intelligent Port Type	Engine Type		Communications Board Type					
	ENG-1	ENG-2	BITD	BYTED	QBYTE	VBIT	FDC	CTC
I/NP	X		X					
I/GBNP		X				X		
I/MXP		X	X					
I/MATP*		X			X			
I/MSTP*		X			X			
I/BOP	X		X					
I/SSTP		X		X				
I/CTP		X						X
I/FDP	X						X	

*An I/MATP or I/MSTP may consist of up to four QBYTE modules.

Legend

I/NP	=	Intelligent Network Port
I/GBNP	=	Intelligent Group Band Network Port
I/MXP	=	Intelligent Multiplexer Port
I/MATP	=	Intelligent Multiple Asynchronous Terminal Port
I/MSTP	=	Intelligent Multiple Synchronous Terminal Port
I/BOP	=	Intelligent Bit Oriented Port
I/SSTP	=	Intelligent Synchronous Spoofing Terminal Port
I/CTP	=	Intelligent Control Terminal Port
I/FDP	=	Intelligent Floppy Disk Port

4.4 NEST STRAPPING AND OPERATION

4.4.1 GENERAL STRAPPING INFORMATION

Strapping is implemented with jumpers that are connected between appropriate pins of the strappable modules (BITD, BYTED, QBYTE, VBIT, and CTC). It may be changed by the user to suit special needs, as described in the strapping tables that follow. When such changes are made, please note that the square pad at each strap location indicates pin 1. Pins 2, 3, and 4 are situated counter-clockwise from pin 1, as shown in Figure 4-4.
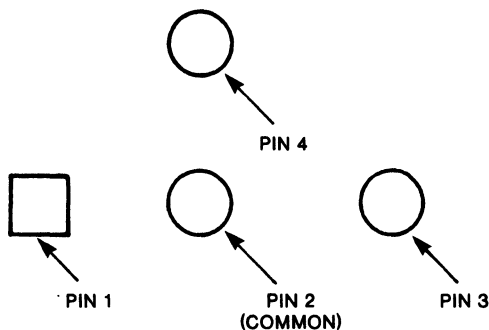
Figure 4-4
Sample Strapping Pin Arrangement

4.4.2 ENGINE MODULES

The engine module contains a 6800 or 6809 microprocessor with a real-time clock generator and two Bus Interface Chips (BIC's) for coordinating communications between its port and the INIC. It also has sufficient RAM and ROM to support the processing capacity of its port. The 6800-based module is referred to as an "I/ENG1" and the 6809-based module an "I/ENG2." Neither module has any strapping provisions. The front edges of the engine modules contain LED indicators, as shown in Figure 4-5.

EIM (EXTERNAL INTERRUPT MASK) WHEN BLINKING AT A STEADY RATE (APPROXIMATELY 1-SECOND INTERVALS), THE PORT IS WAITING FOR OPERATING SOFTWARE. WHEN BLINKING ERRATICALLY, THE PORT IS BEING LOADED WITH SOFTWARE. WHEN ON AND NOT BLINKING, THE PORT IS FULLY LOADED AND OPERATIONAL. IF THE ENGINE MODULE IS PLUGGED IN CORRECTLY AND POWER APPLIED, THE EIM INDICATOR SHOULD NOT BE OFF CONTINUOUSLY.

RESET INDICATES THE PORT IS IN SOFTWARE RESET CONDITION.

PARITY INDICATES A RAM MEMORY PARITY ERROR ON THE ENGINE MODULE.

DIAG (DIAGNOSTIC MODE) GOES ON WITH SYSTEM POWER-UP; GOES OFF ON COMPLETION OF DIAGNOSTICS. IF IT REMAINS ON FOR MORE THAN 8-10 SECONDS AFTER SYSTEM POWER-UP, IT INDICATES DETECTION OF AN ERROR BY THE DIAGNOSTICS AND THAT THE ENGINE MODULE AND ITS ASSOCIATED PORTS ARE INOPERATIVE.

Figure 4-5
Front Rail of Engine Modules

4.4.3 I/O ADAPTER MODULES: INIC (Intelligent Nest Interface Card)

The INIC is mounted in the first slot of all port nests to serve as the interface between the mainframe and the intelligent ports. It has no strapping hardware. Its front edge contains four LED indicators and one pushbutton, that are arranged as shown in Figure 4-6.

UPE (UPSTREAM PARITY ERROR) ON FOR A PARITY ERROR DETECTED IN INFORMATION RECEIVED FROM THE MAINFRAME OR AN UPSTREAM (TOWARD THE MAINFRAME) NEST.

NPE (NEST PARITY ERROR) ON FOR A PARITY ERROR IN THE LOCAL NEST BUS.

DPE (DOWNSTREAM PARITY ERROR) ON FOR A PARITY ERROR DETECTED IN INFORMATION RECEIVED FROM A DOWNSTREAM NEST.

NIC LOOP ON WHEN INIC IS IN A DIAGNOSTICS LOOPBACK MODE. IT IS ALSO ON BRIEFLY AFTER A POWER-UP.

RESET SWITCH WHEN PRESSED, THE THREE PARITY ERROR FLIP FLOPS ARE RESET AND THE INDICATORS EXTINGUISHED.

Figure 4-6
Front Rail of the INIC

4.4.4 COMMUNICATIONS MODULES

The communications modules handle all external DTE protocol during data and control signal transfer. There is a different module for each type of port. Every communication module type, with the exception of the FDC, has 12 LED's on its front rail to indicate status of the EIA signals and of the intelligent port. The LED arrangement is shown and explained in Figure 4-7.

DTR/108 ON WHEN DTR IS ACTIVE.

RTS/105 ON WHEN RTS IS ACTIVE.

SPR ON WHEN SPARE IS ACTIVE.

TXD/103 ON WHEN TXD IS ACTIVE.

DSR/107 ON WHEN DSR IS ACTIVE.

DCD/109 ON WHEN DCD IS ACTIVE.

CTS/106 ON WHEN CTS IS ACTIVE.

RXD/104 ON WHEN RXD IS ACTIVE.

CALL WHEN BLINKING, INDICATES PORT IS TRYING TO ESTABLISH A CALL WITH ANOTHER INTELLIGENT PORT; WHEN ON STEADILY, INDICATES A CALL IS ESTABLISHED; WHEN OFF, INDICATES NO CALL IN PROCESS.

ACT WHEN BLINKING, THE PORT IS ACTIVE ABLE TO EXCHANGE INFORMATION WITH ANOTHER PORT.

LOOPBK THE PORT IS IN DIAGNOSTIC LOOPBACK MODE.

NO LEGEND RESERVED FOR FUTURE APPLICATION.

Figure 4-7
Front Rail of the BITD and
BYTED Modules

4.4.4.1 BITD (Bit Daughter) Module.

The BITD communications module supports serially transmitted, bit-oriented protocols. It is used with an I/NP, I/BOP, or I/MXP. Its indicators are as shown in Figure 4-7.

BITD strapping locations are shown in Figure 4-8. Those straps that control clock generation are listed and described in Table 4-2, while their recommended placement is illustrated in Figures 4-9 and 4-10. Those straps dealing with control signals are listed and described in Table 4-3; their connections are shown schematically in Figure 4-11.

Table 4-2
Straps Affecting the Generation of BITD Clocking

Strap No.	EIA/CCITT DCE Interface Signal Name	Strapping Connections
J2	Connects DB to DD	P1-P2 = Disconnected P2-P3 = Connected
J3*	DD/115 - RCV CLK (Receive Clock, Outbound)	P1-P2 = Disconnected P2-P3 = Connected
J6*	DB/114 - XMT CLK (Transmit Clock, Outbound)	P1-P2 = Disconnected P2-P3 = Connected
J7	Internally generated clock: If strapped 1-2 enables all valid speeds within the range of 50 to 9600 bps. If strapped 2-3, provides a clock speed of 19.2 kbps only. Note that the speed of 14.4 kbps must be supplied from an external source.	
J9*	Cross Over (DB) Clock, Outbound	P1-P2 = Ext Clocking P2-P3 = Int Clocking P2-P4 = Disconnected
J11*	External XMT Clock, Inbound	P1-P2 = Ext Clocking P2-P3 = Int Clocking P2-P4 = Disconnected

*Does not apply to asynchronous applications; that is I/MXP's that support asynchronous links.
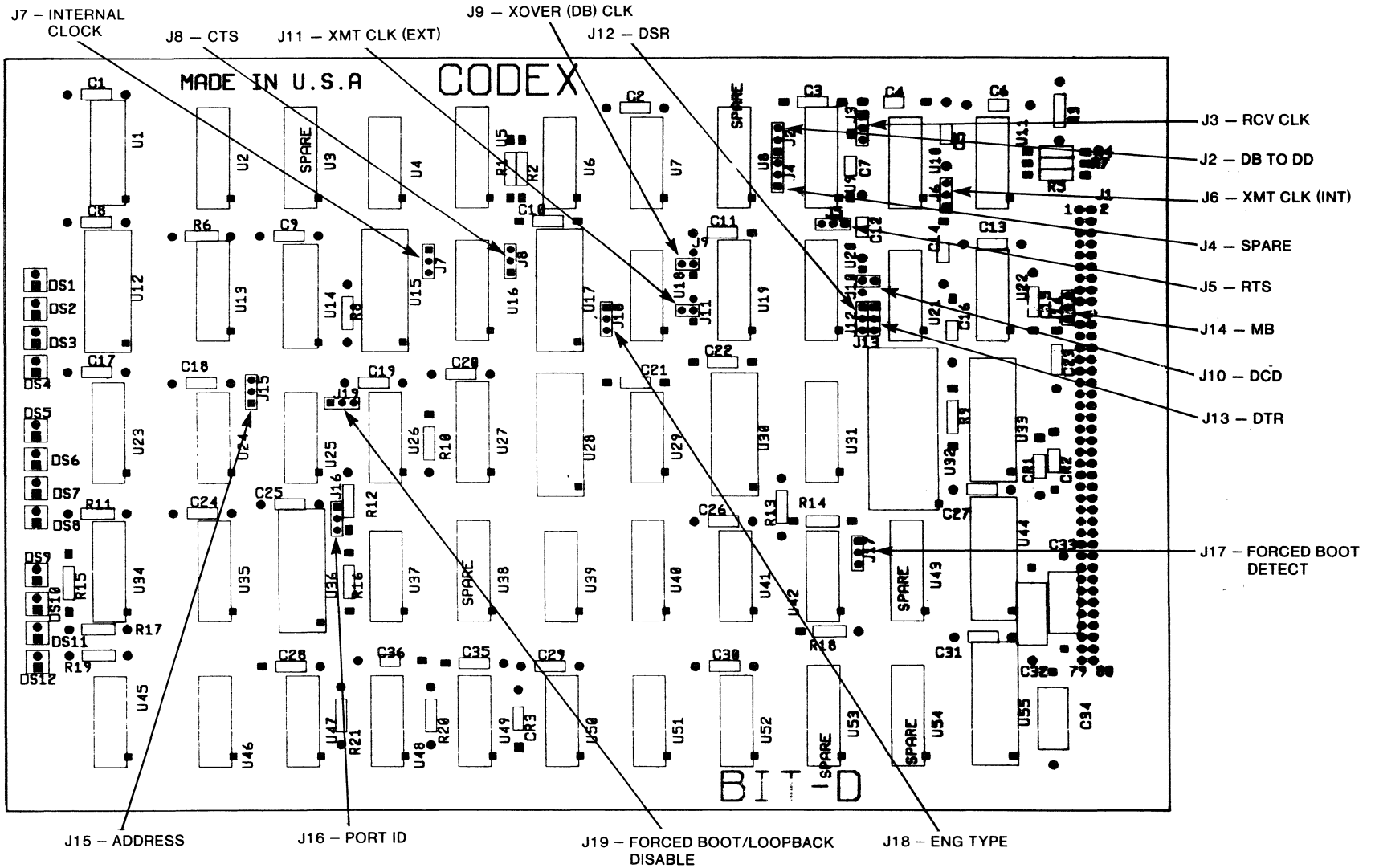
Figure 4-8
BITD Strapping Locations
(Labeled with DCE Interface Signals)
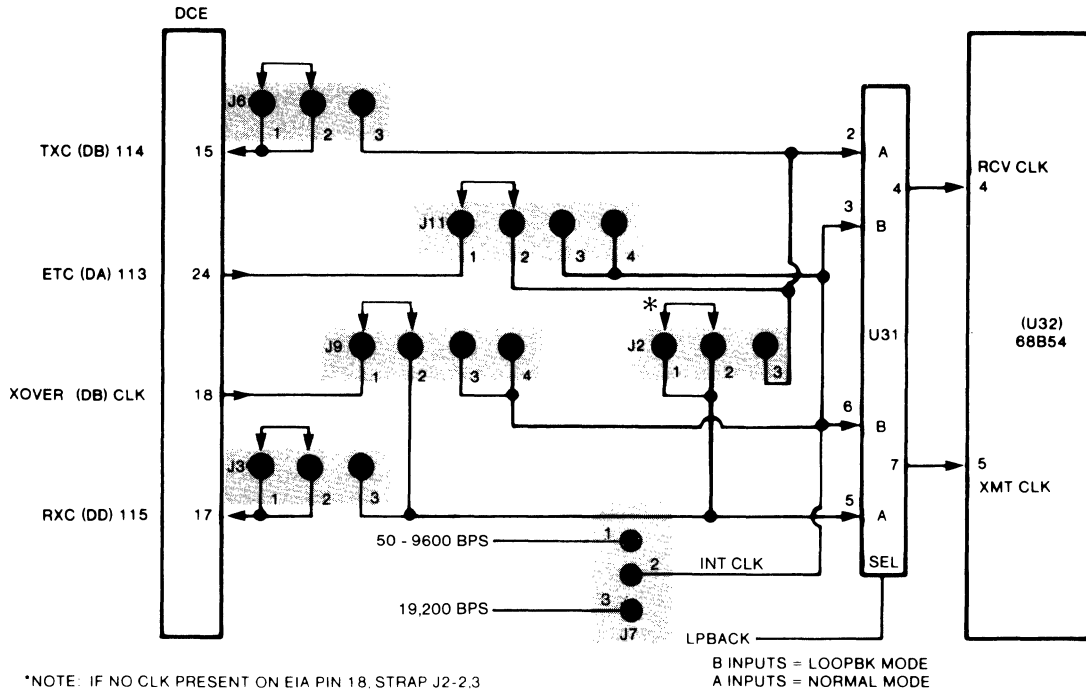
Figure 4-9
Recommended Strapping for the External
Generation of BITD Clocking
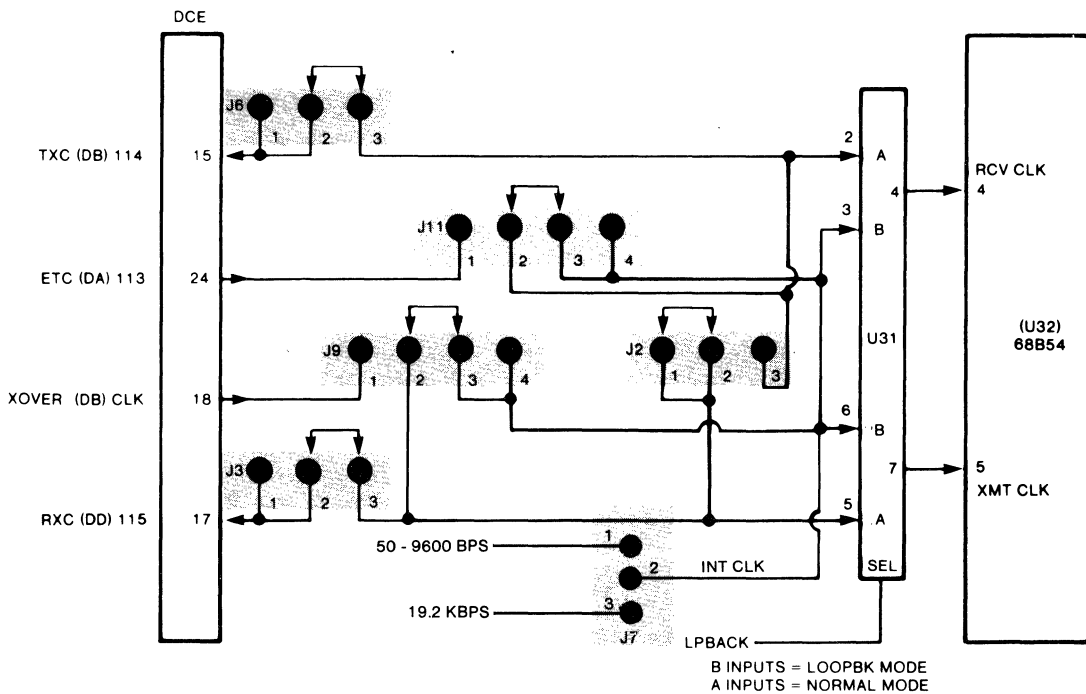
Figure 4-10
Recommended Strapping for the Internal
Generation of BITD Clocking

Table 4-3
BITD Control Strapping

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
J4	SPR – Spare	With P1-P2 in, SPR input is held in the "on" state; With P2-P3 in, SPR input follows EIA pin 14.
J5	CA/105 – RTS (Request To Send)	With P1-P2 in, RTS is held in the "on" state; with P2-P3 in, RTS input follows EIA pin 4.
J8	CB/106 – CTS (Clear To Send)	CTS output is under software control; refer to CTS delay menu selection on the CTP. With P1-P2 in, CTS output follows the software generation of CTS; with P2-P3 in, CTS output is held in the "on" state.
J10	CF/109 – DCD (Data Carrier Detect)	With P1-P2 in, DCD output is controlled by the remote RTS input. With P2-P3 in, DCD output follows DSR. With P2-P4 in, DCD output is held in the "on" state.
J12	CC/107 – DSR (Data Set Ready)	With P1-P2 in, DSR follows DTR (generally from the remote port); with P2-P3 in, DSR output is held in the "on" state.
J13	CD/108 – DTR (Data Terminal Ready)	With P1-P2 in, DTR input is held in the "on" state; with P2-P3 in, DTR input follows EIA pin 20.
J14	MB – Make Busy	With P1-P2 in, MB input follows EIA pin 25; with P2-P3 in, MB input is held in the "off" state.
J15	Address	For I/NP and I/MXP applications: P1-P2 for address A; P2-P3 for address B. A 6050 I/MXP must be strapped for address B and the remote 6000 muxport strapped for address A. An I/NP must be strapped to the opposite of its remote I/NP.
J16	Port ID	P1-P2 for an I/NP, P2-P3 for an I/BOP or I/MXP.
J17	Forced Boot Detect	For I/NP and I/MXP applications: P1-P2 disables the ability of the port to recognize a Forced Boot command sequence received across the network link. P2-P3 enables the ability to detect a Forced Boot command sequence. P1-P2 is recommended for I/MXP's, P2-P3 for I/NP's.

Table 4-3 (Cont)
BITD Control Strapping

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
J18	Engine Type	P1-P2 for Engine 1 (I/NP or I/BOP); P2-P3 for Engine 2 (I/MXP).
J19	Forced Boot/ Loopback Disable	For I/NP and I/MXP applications: P1-P2 disables the Forced Boot and Loopback functions for the port, regardless of strap J17. P2-P3 enables the Forced Boot function, depending on strap J17, and the Loopback function, regardless of strap J17. P1-P2 is recommended for I/MXP's; P2-P3 is recommended for I/NP's.

4.4.4.2 BYTED (Byte Daughter) Module.
The BYTED communications module supports serially-transmitted, byte-oriented protocols. It is used as the communications module for the I/SSTP. Its front-rail indicators are as shown and described in Figure 4-7.

Figure 4-12 shows the locations of all BYTED straps. Those straps that control clock generation are listed and described in Table 4-4, while their recommended placement is illustrated in Figures 4-13 and 4-14. Those straps dealing with control signals are listed and described in Table 4-5; their connections are shown schematically in Figure 4-15.

4.4.4.3 QBYTE (Quad Byte) Modules.
The QBYTE communications module contains four independent, byte-oriented transmission interfaces that accommodate up to four asynchronous or bisynchronous protocol devices for serial data transmission. The QBYTE is used as the communications module for the I/MATP and I/MSTP. Up to four QBYTE modules can be combined under the control of a single engine to support up to 16 devices.

There are 12 indicators and a thumbwheel switch on the front edge of the QBYTE, as shown and described in Figure 4-16.

The QBYTE has one set of straps for each of four ports. Strap J43 and straps J70 through J86 are unused at this time. Figures 4-17 through 4-20 show strapping for each port. Straps that control clock generation are listed and described in Table 4-6, while their recommended placement is illustrated in Figures 4-21 and 4-22. Control Signal straps are listed in Table 4-7; their connections are depicted schematically in Figure 4-23.
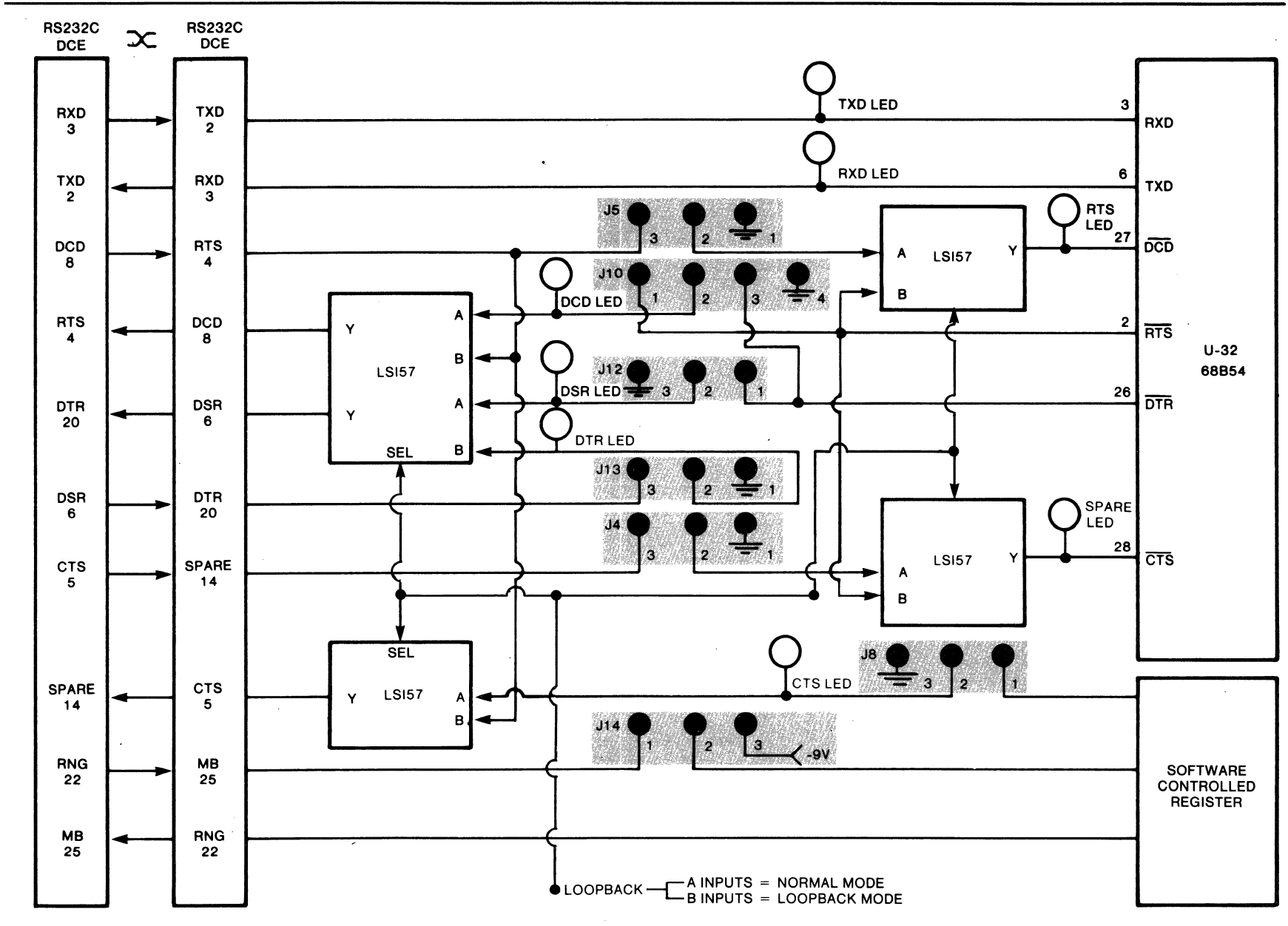
Figure 4-11
BITD Interface Signal Strapping

Table 4-4
Straps Affecting the Generation of BYTED Clocking

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
J3	Connects DB to DD	P1-P2 = Disconnected P2-P3 = Connected
J4	Cross Over (DB) Clock, Outbound	P1-P2 = Ext. Clocking P2-P3 = Disconnected
J5	DA/113 – XMT CLK (Transmit Clock, Inbound)	P1-P2 = Ext. Clocking P2-P3 = Disconnected
J7	DB/114 – XMT CLK (Transmit Clock, Outbound)	P1-P2 = Connected P2-P3 = Disconnected
J9	DD/115 – RCV CLK (Receive Clock, Outbound)	P1-P2 = Connected P2-P3 = Disconnected
J35	Special Speed	P1-P2 = When connected, port will accept external clock of special speed.

Figure 4-12
BYTED Strapping Locations
(Labeled with DCE Interface Signals)
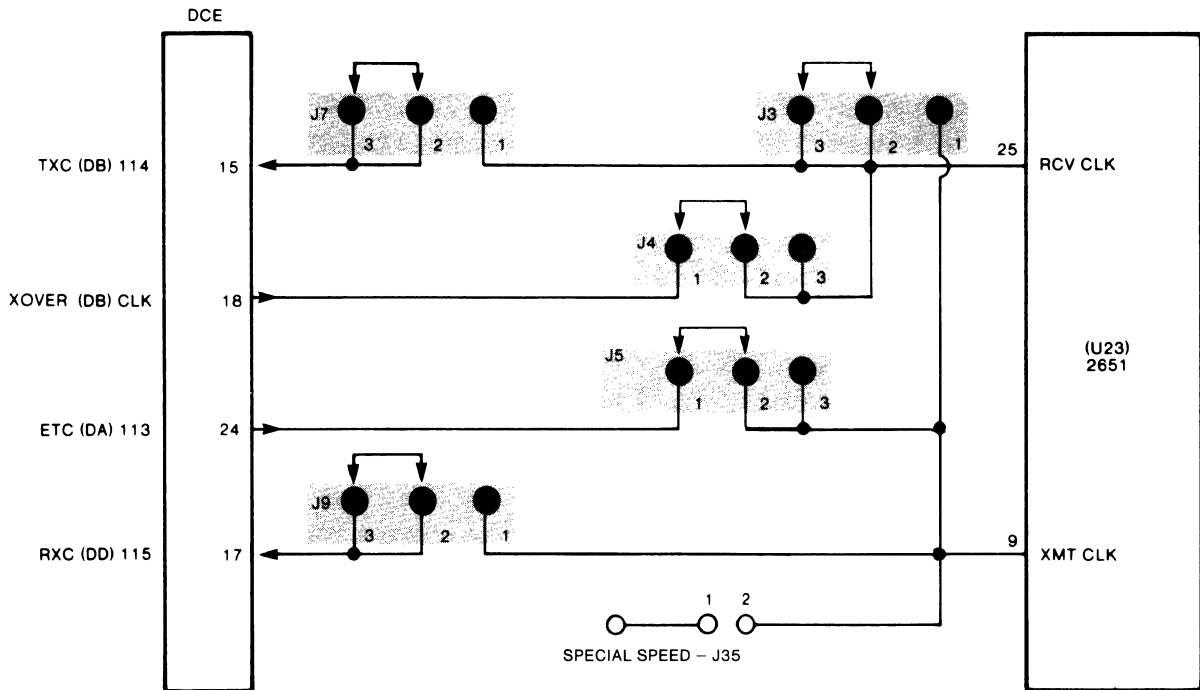
Figure 4-13
Recommended BYTED Strapping for the
External Generation of Clocking
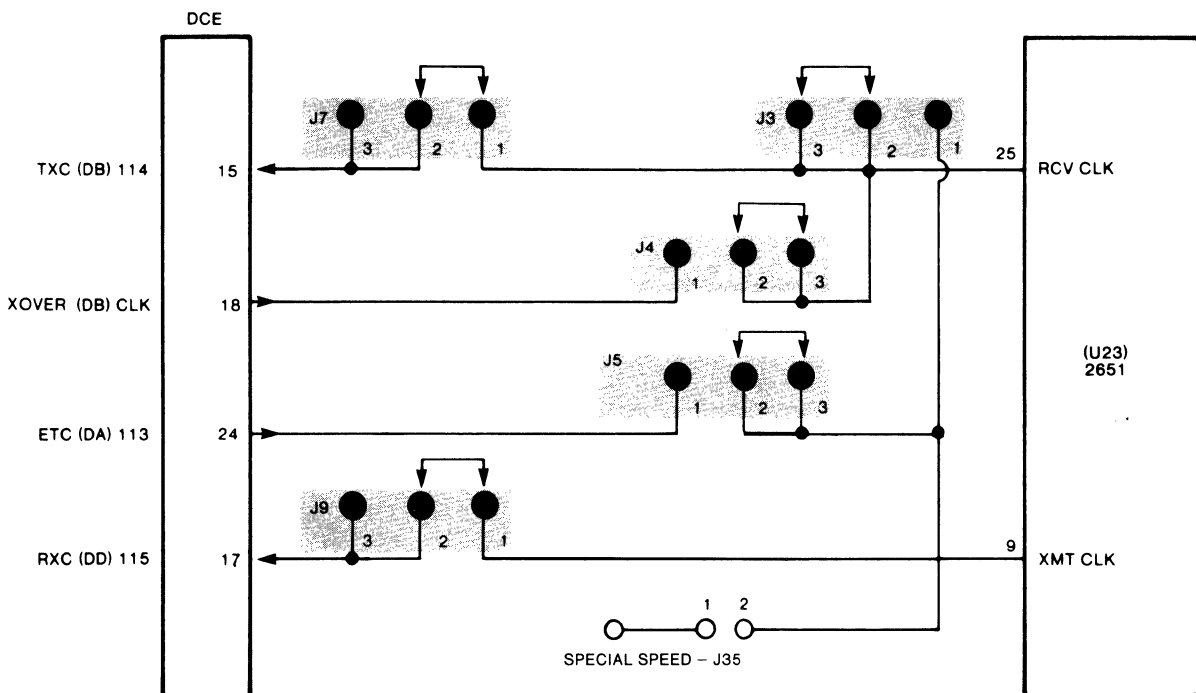
Figure 4-14
Recommended BYTED Strapping for the
Internal Generation of Clocking

Table 4-5
BYTED Interface Signal Strapping

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
J2 and J11	CB/106 – CTS (Clear To Send)	CTS output is under software control; refer to CTS delay menu selection on the CTP. J2 & J11 work together. With P1-P2 in (for J2), CTS output is held in the "on" state; with P2-P3 in, CTS output follows the software generation of CTS. With P1-P2 in (for J11), CTS output is connected to EIA pin 5; with P2-P3 in, CTS output is disconnected from EIA pin 5.
J6	SPR – Spare	With P1-P2 in, SPR input follows EIA pin 14; with P2-P3 in, SPR input is held in the "on" state.
J8	CE/115 – RNG (Ring)	With P1-P2 in, RNG output follows MB from the remote end; with P2-P3 in, the RNG output is disconnected from EIA pin 22.
J10	CA/105 – RTS (Request To Send)	With P1-P2 in, RTS input follows EIA pin 4; with P2-P3 in, RTS input is held in the "on" state.
J12	CD/108 – DTR (Data Terminal Ready)	With P1-P2 in, DTR input follows EIA pin 20; with P2-P3 in, DTR input is held in the "on" state.
J13	CC/107 – DSR (Data Set Ready)	With P1-P2 in, DSR is held in the "on" state; with P2-P3 in, DSR output follows DTR (generally from the remote port).
J14	SBB/119 – SRXD (Secondary Received Data)	With P1-P2 in, SRXD is output on pin 16; with P2-P3 in, SRXD is not output.
J15	SBA/118 – STXD (Secondary Transmitted Data)	With P1-P2 in, SBA input is held in the "off" state; with P2-P3 in, SBA input follows EIA pin 11.
J16	MB – Make Busy	With P1-P2 in, MB input is held in the "off" state; with P2-P3 in, MB input follows EIA pin 25.
J17	SCA/120 – SRTS, SCB/121 – SCTS (Secondary RTS + CTS)	With P1-P2 in, SRTS accepted and looped back as SCTS; with P2-P3 in, SRTS is not looped back as SCTS; the SCTS lead is unused.
J18	CF/109 – DCD (Data Carrier Detect)	With P1-P2 in, DCD output is held in the "on" state; with P2-P3 in, DCD output follows DSR; with P2-P4 in, DCD is controlled by RTS (generally from the remote port).

Note: J1 is the engine interface connector, and straps J19 through J35 are not used for standard customer applications.
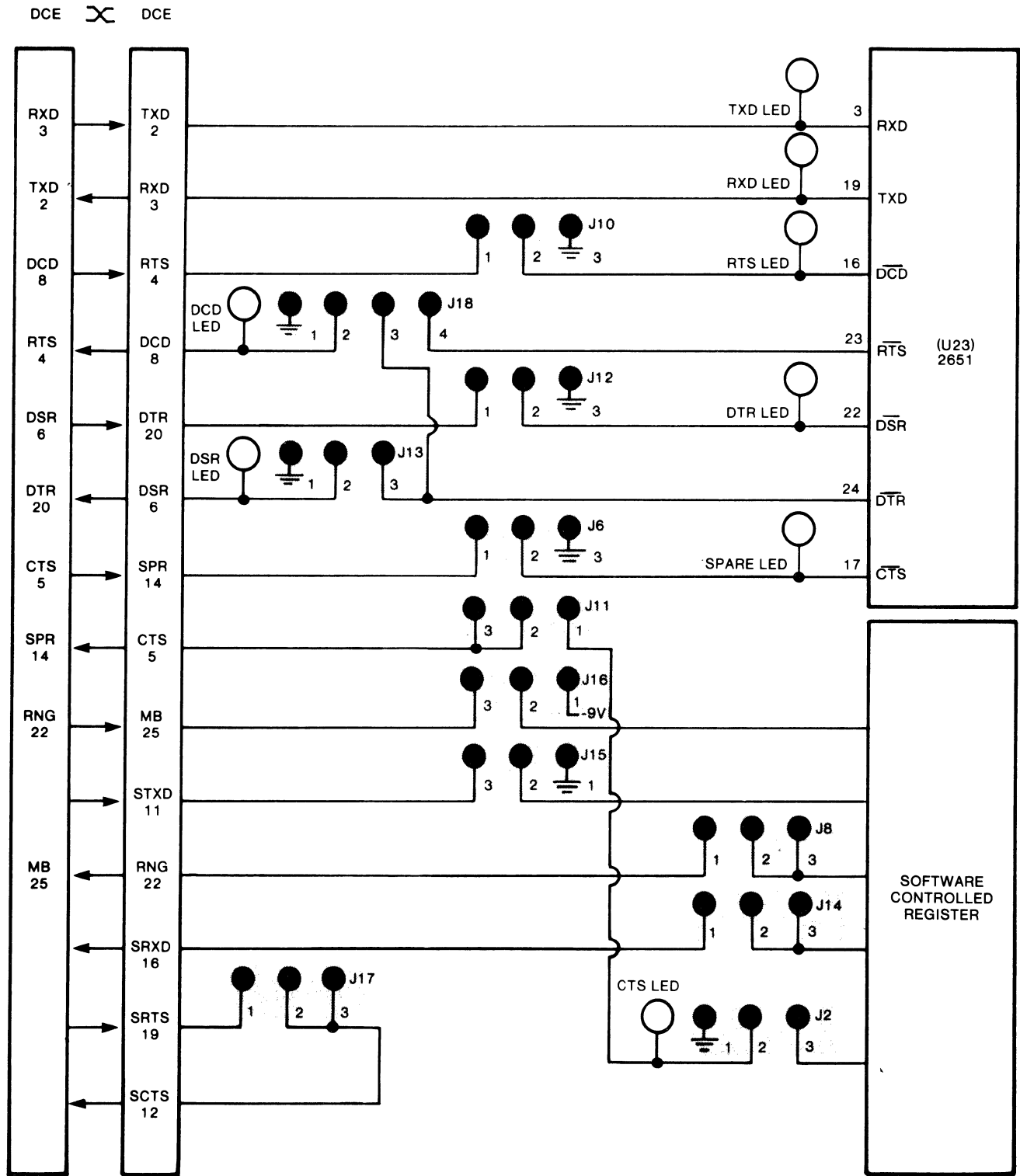
Figure 4-15
BYTED Interface Signal Strapping

There are 12 indicators and a thumbwheel switch on the front edge of the QBYTE, as shown and described in Figure 4-16.

The QBYTE has one set of straps for each of four ports. Strap J43 and straps J70 through J86 are unused at this time. Figures 4-17 through 4-20 show strapping for each port. Straps that control clock generation are listed and described in Table 4-6, while their recommended placement is illustrated in Figures 4-21 and 4-22. Control Signal straps are listed in Table 4-7; their connections are depicted schematically in Figure 4-23.

DTR/108 ON WHEN DTR IS ACTIVE.
RTS/105 ON WHEN RTS IS ACTIVE.
SPR ON WHEN SPARE IS ACTIVE.
TXD/103 ON WHEN TXD IS ACTIVE.
DSR/107 ON WHEN DSR IS ACTIVE.
DCD/109 ON WHEN DCD IS ACTIVE.
CTS/106 ON WHEN CTS IS ACTIVE.
RXD/104 ON WHEN RXD IS ACTIVE.

PORT 1, 2, 3, OR 4; DETERMINED BY THUMBWHEEL SWITCH.

CALL WHEN BLINKING, INDICATES PORT IS TRYING TO ESTABLISH A CALL WITH ANOTHER INTELLIGENT PORT; WHEN ON STEADILY, INDICATES A CALL IS ESTABLISHED; WHEN OFF, INDICATES NO CALL IN PROCESS.

ACT WHEN BLINKING, THE PORT IS ACTIVE AND EXCHANGING INFORMATION WITH ANOTHER PORT.

LOOPBK THE PORT IS IN DIAGNOSTIC LOOPBACK MODE.

NO LEGEND RESERVED FOR FUTURE APPLICATION.

THUMBWHEEL SWITCH FOUR-POSITION SWITCH THAT SELECTS THE PORT TO BE REPRESENTED BY THE LED INDICATORS.
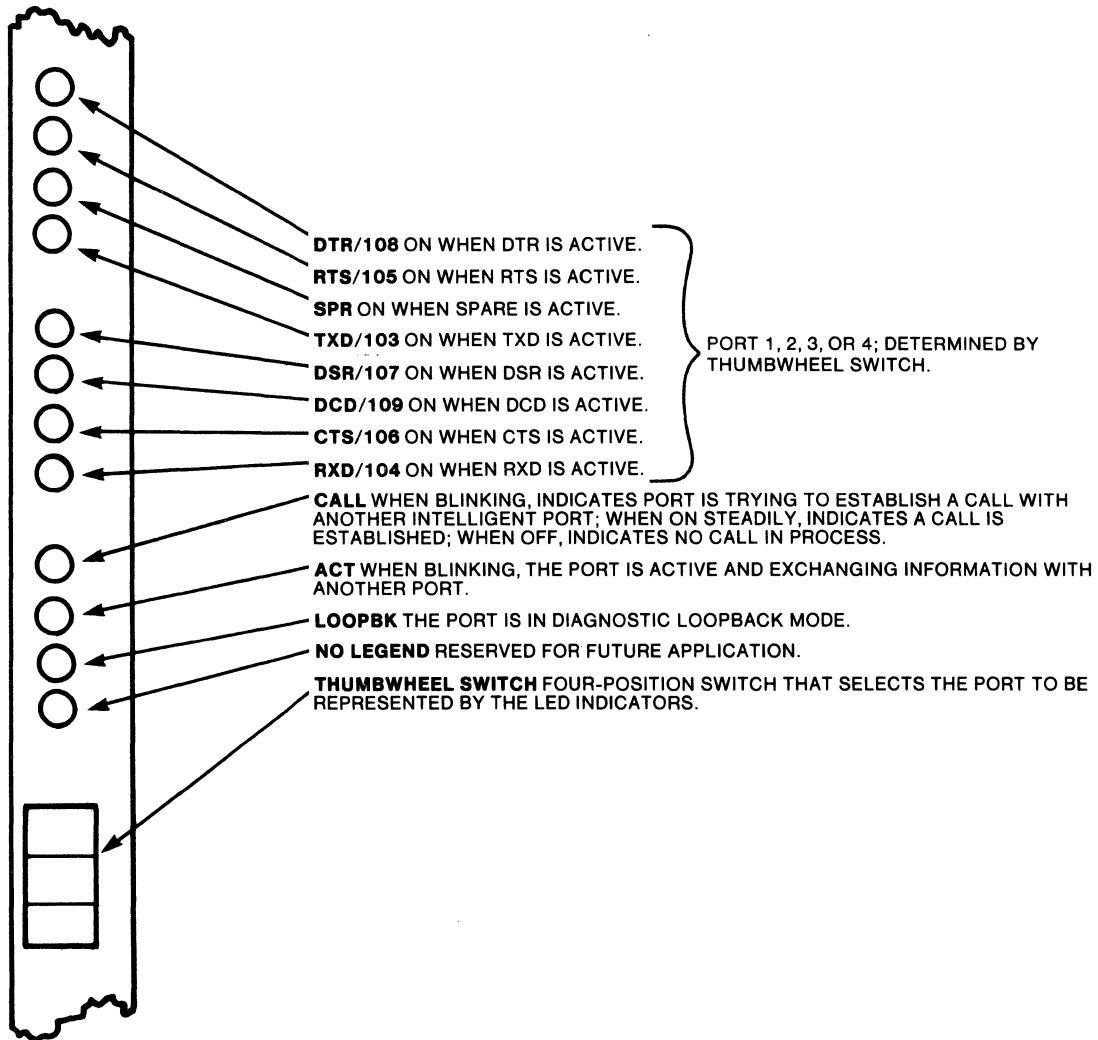
Figure 4-16
Front Rail of the QBYTE
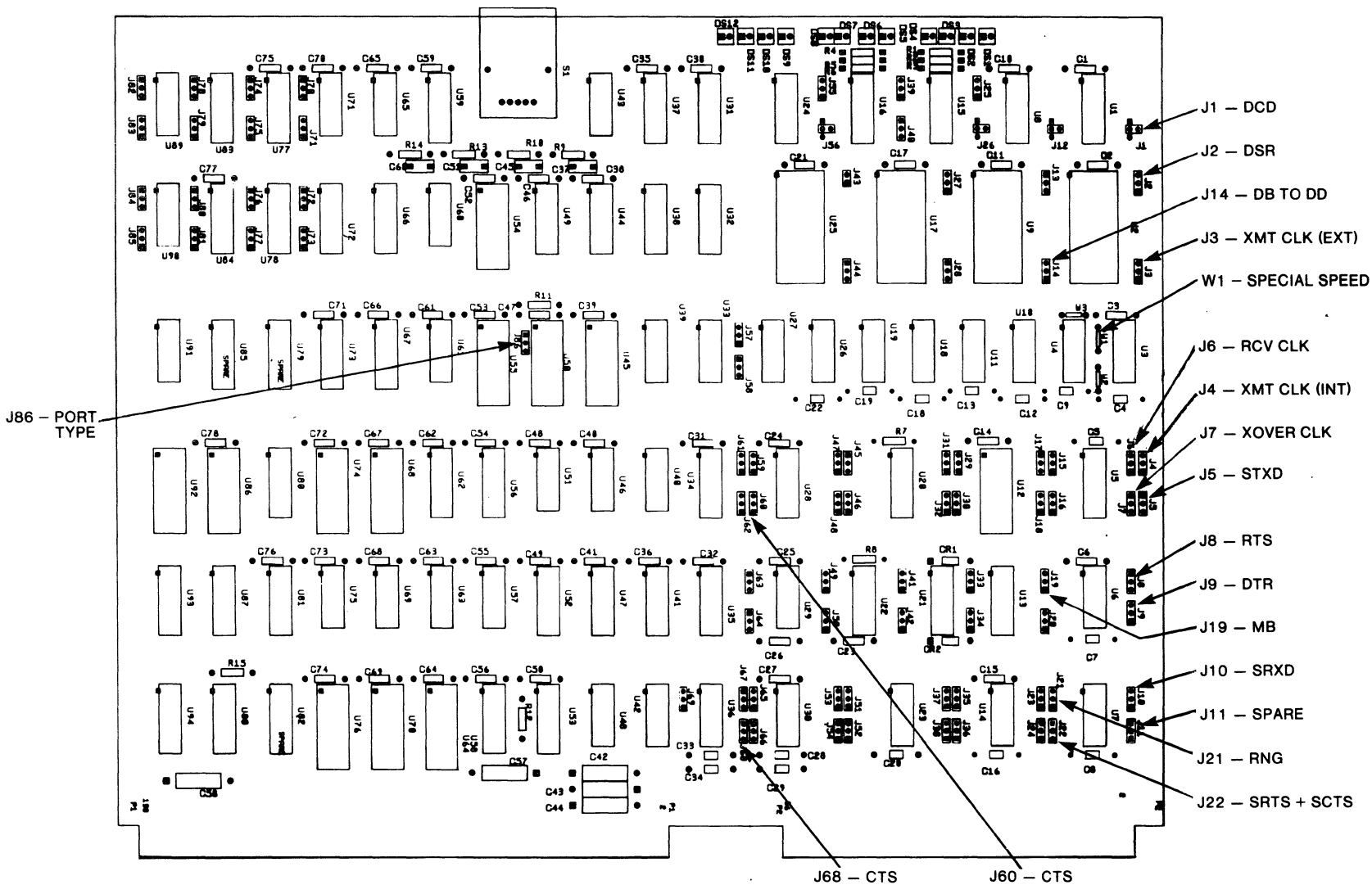
Figure 4-17
QBYTE Strapping Locations - Port 1
(Labeled with DCE Interface Signals)
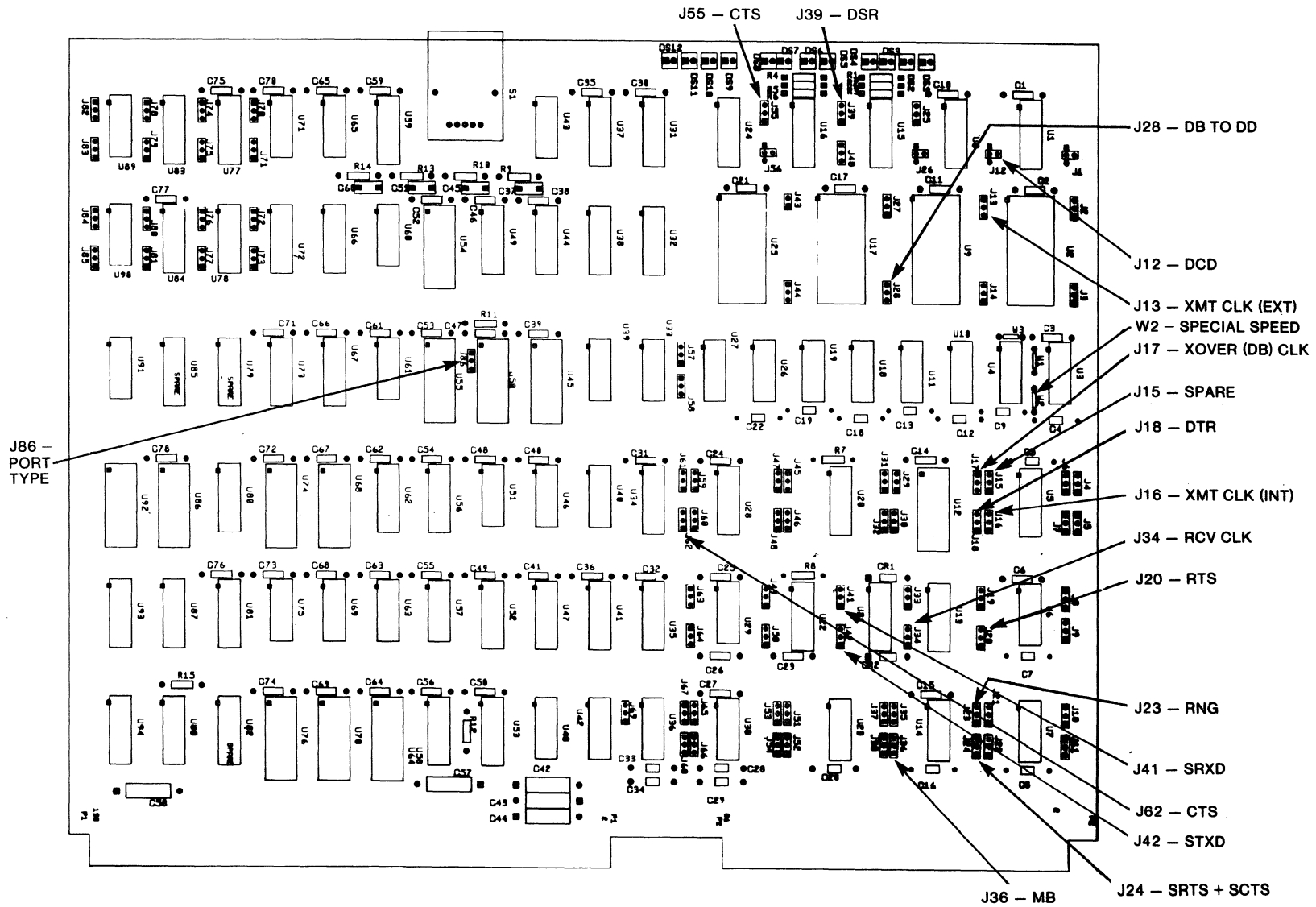
Figure 4-18
QBYTE Strapping Locations — Port 2
(Labeled with DCE Interface Signals)
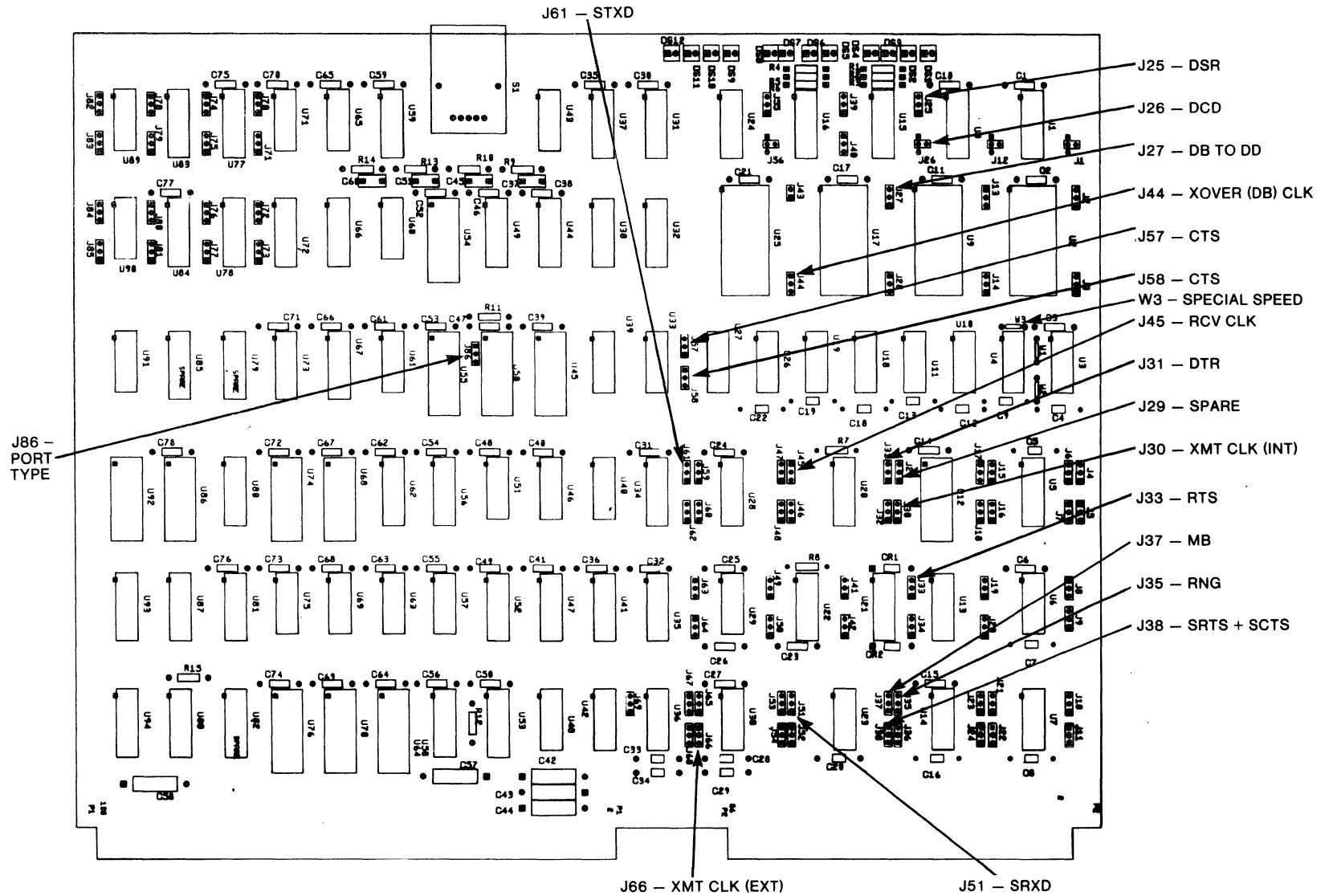
Figure 4-19
QBYTE Strapping Locations - Port 3
(Labeled with DCE Interface Signals)
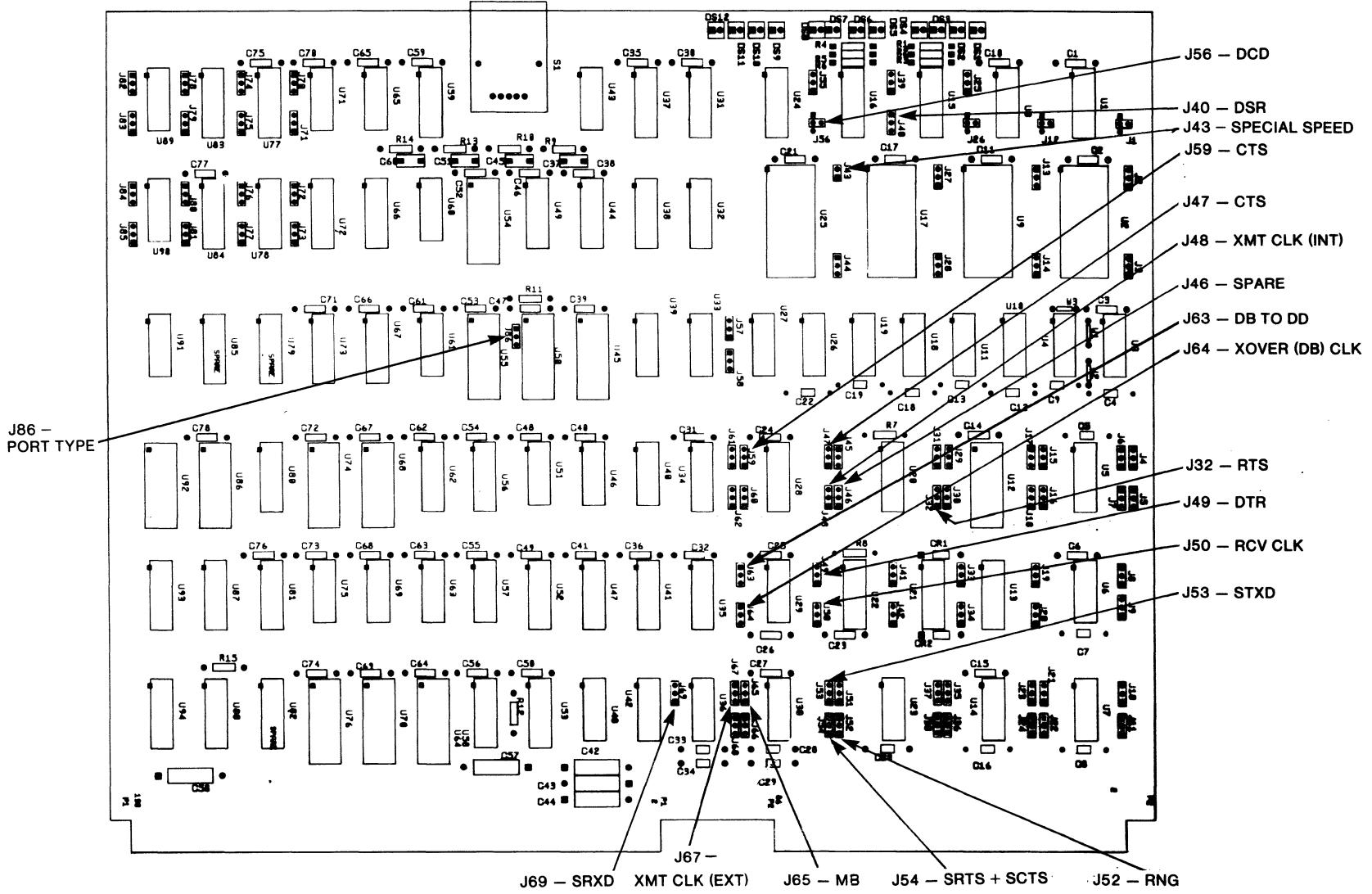
Figure 4-20
QBYTE Strapping Locations – Port 4
(Labeled with DCE Interface Signals)

Table 4-6
Straps Affecting the Generation of QBYTE Clocking

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
Port 1: J4 Port 2: J16 Port 3: J30 Port 4: J48	DB/114 – XMT CLK (Transmit Clock)	P1-P2 = Connected P2-P3 = Disconnected
Port 1: J6 Port 2: J34 Port 3: J45 Port 4: J50	DD/115 – RCV CLK (Receive Clock)	P1-P2 = Connected P2-P3 = Disconnected
Port 1: J7 Port 2: J17 Port 3: J44 Port 4: J64	Cross Over (DB) CLK – Inbound	P1-P2 = Connected P2-P3 = Disconnected
Port 1: J3 Port 2: J13 Port 3: J66 Port 4: J67	External XMT CLK – Inbound	P1-P2 = Connected P2-P3 = Disconnected
Port 1: J14 Port 2: J28 Port 3: J27 Port 4: J63	Connects DB to DD	P1-P2 = Connected P2-P3 = Disconnected
Port 1: W1 Port 2: W2 Port 3: W3 Port 4: J43	Special Speed	P1-P2 to enable special, externally generated, speeds.
All Ports: J86	Physical Port Type	P1-P2 = I/MATP P2-P3 = I/MSTP
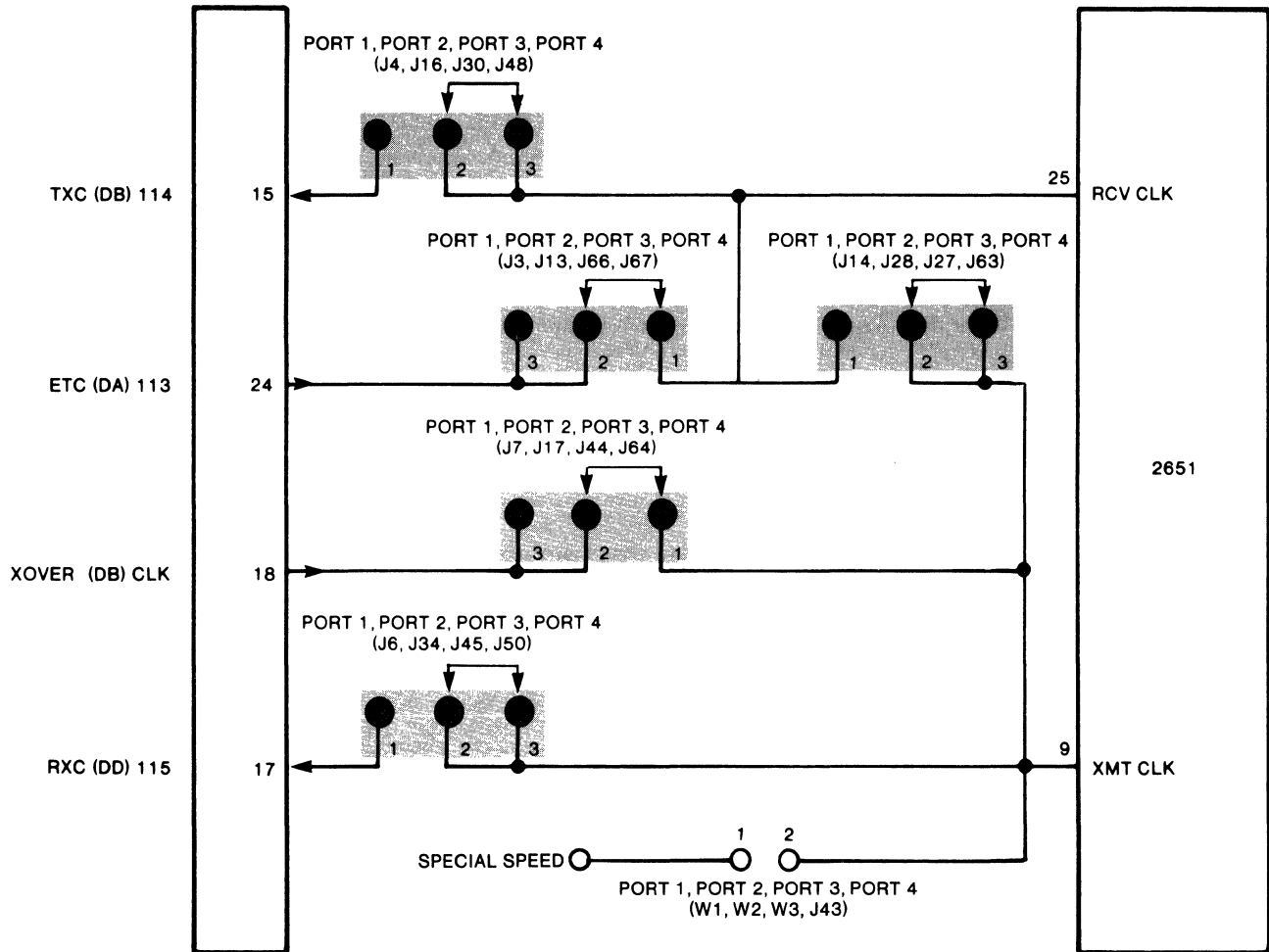
Figure 4-21
Recommended QBYTE Strapping for the
External Generation of Clocking
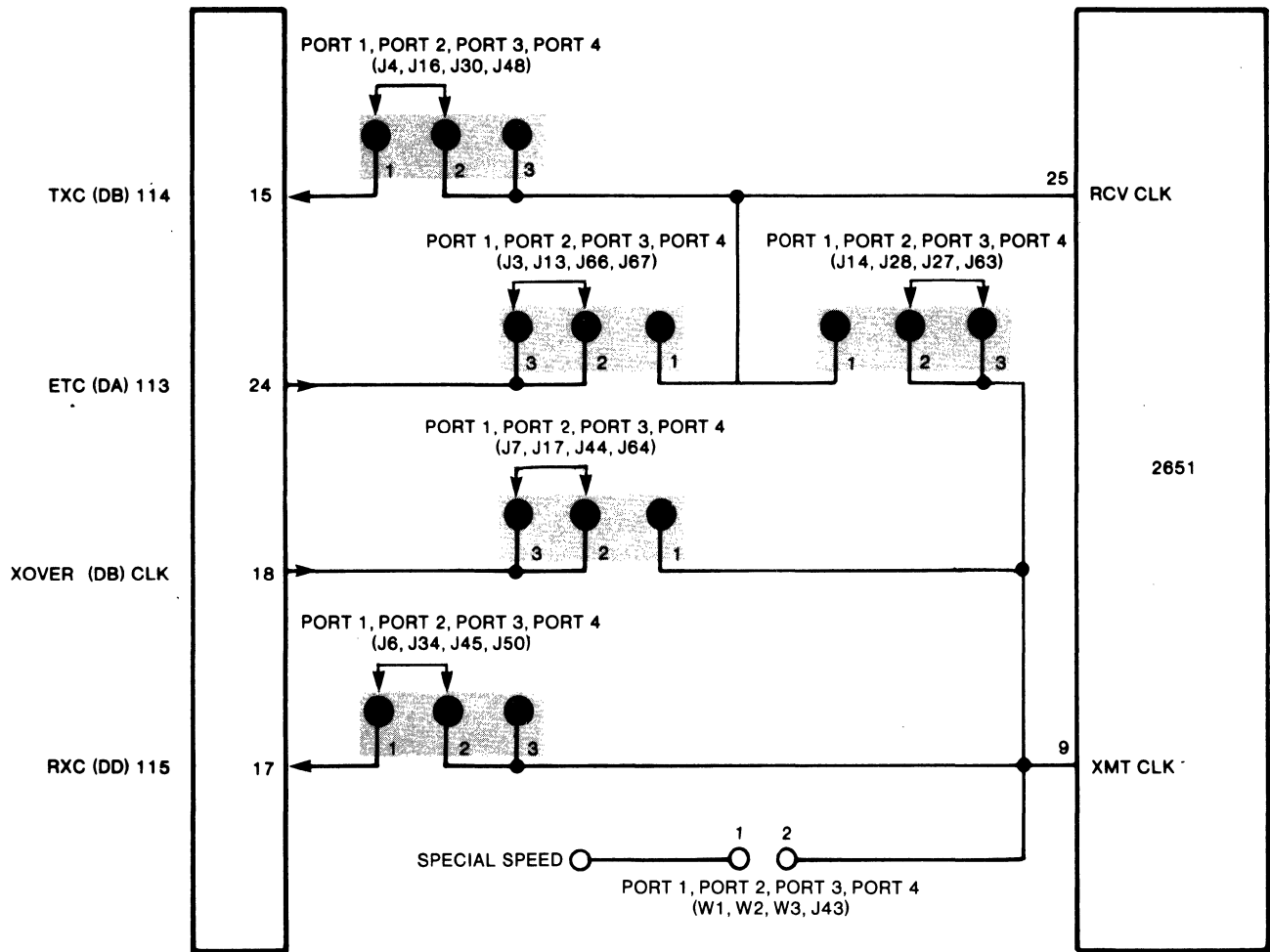
Figure 4-22
Recommended QBYTE Strapping for the
Internal Generation of Clocking

Table 4-7
QBYTE Interface Signal Strapping

Strap No.	EIA/CCITT - DCE Interface Signal Name	Strapping Connections
Port 1: J8 Port 2: J20 Port 3: J33 Port 4: J32	CA/105 - RTS (Request To Send)	With P1-P2 in, RTS input follows EIA pin 4; with P2-P3 in, RTS input is held in the "on" state.
Port 1: J2 Port 2: J39 Port 3: J25 Port 4: J40	CC/107 - DSR (Data Set Ready)	With P1-P2 in, DSR output follows DTR (generally from the remote port). With P2-P3 in, DSR output is held in the "on" state.
Port 1: J9 Port 2: J18 Port 3: J31 Port 4: J49	CD/108 - DTR (Data Terminal Ready)	With P1-P2 in, DTR input follows EIA pin 20; with P2-P3 in, DTR input is held in the "on" state.
Port 1: J1 Port 2: J12 Port 3: J26 Port 4: J56	CF/109 - DCD (Data Carrier Detect)	With P1-P2 in, DCD output follows DSR. With P2-P3 in, DCD output is held in the "on" state. With P2-P4 in, DCD output follows RTS (generally from the remote port).
Port 1: J11 Port 2: J15 Port 3: J29 Port 4: J46	SPR - (Spare)	With P1-P2 in, SPR input follows EIA pin 14; with P2-P3 in, SPR input is held in the "on" state.
Port 1: J60, 68 Port 2: J62, 55 Port 3: J57, 58 Port 4: J59, 47	CB/106 - CTS (Clear To Send)	CTS output is under software control; refer to CTS delay menu selection. All 'J' numbers work only together. With P1-P2 in (for J68, 55, 58, and 47), CTS output follows the software generation of CTS; with P2-P3 in, CTS output is held in the "on" state. With P1-P2 in (for J60, 62, 57, and 59), CTS is connected to EIA pin 5; with P2-P3 in, CTS is disconnected from EIA pin 5.
Port 1: J19 Port 2: J36 Port 3: J37 Port 4: J65	MB - (Make Busy)	With P1-P2 in, MB input follows EIA pin 25; with P2-P3 in, MB input is held in the "off" state.

Table 4-7 (Cont)
QBYTE Interface Signal Strapping

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
Port 1: J21 Port 2: J23 Port 3: J35 Port 4: J52	RNG – (Ring)	With P1-P2 in, RNG output follows MB from the remote port; with P2-P3 in, the RNG output is disconnected from EIA pin 22.
Port 1: J10 Port 2: J41 Port 3: J51 Port 4: J69	SBB/119 – SRXD (Secondary Received Data)	With P1-P2 in, SRXD is output on pin 16; with P2-P3 in, SRXD is not output.
Port 1: J5 Port 2: J42 Port 3: J61 Port 4: J53	SBA/118 – STXD (Secondary Trans- mitted Data)	With P1-P2 in, STXD is accepted on EIA pin 11; with P2-P3 in, STXD is not accepted.
Port 1: J22 Port 2: J24 Port 3: J38 Port 4: J54	SCA/120 – SRTS, SCB/121 – SCTS (Secondary RTS + CTS)	With P1-P2 in, SRTS is looped back as SCTS; with P2-P3 in, SRTS is not looped back; the SCTS lead is unused.

4.4.4.4 **VBIT (Group Band) Module.**
The VBIT communications module supports bit-oriented protocols at serial transmission rates in the group band range of up to 64kbps. It is used as the communications module for the I/GBNP, which conforms to CCITT V.35/Bell DDS specifications. Its front-rail indicator arrangement is shown in Figure 4-7.

VBIT strapping locations are shown in Figure 4-24. A schematic diagram of the strapping is shown in Figure 4-25, and all straps are listed and described in Table 4-8.

Figure 4-23
QBYTE Control Signal Strapping
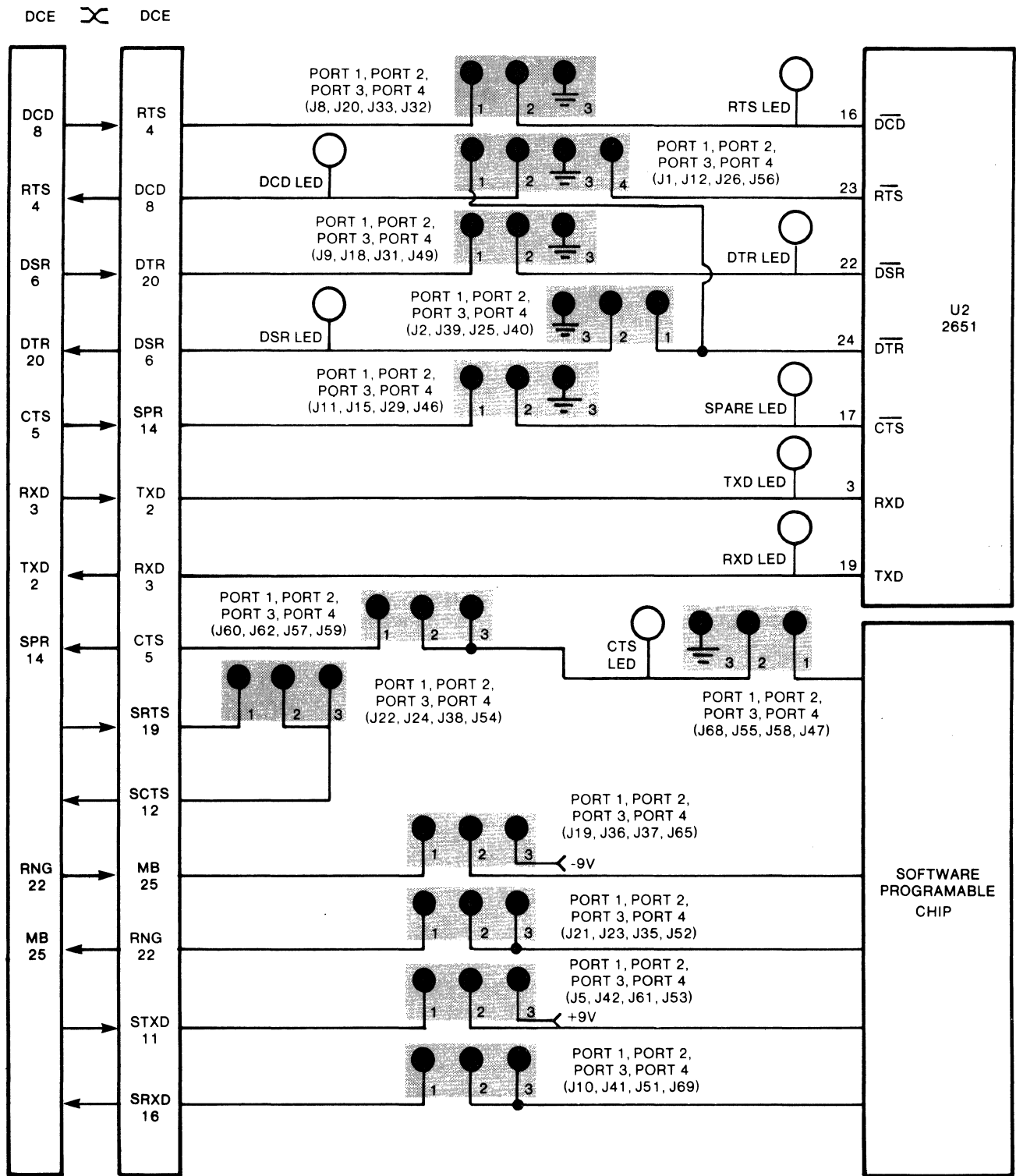
Figure 4-24
VBIT Strapping Locations
(Labeled with DCE Interface Signals)
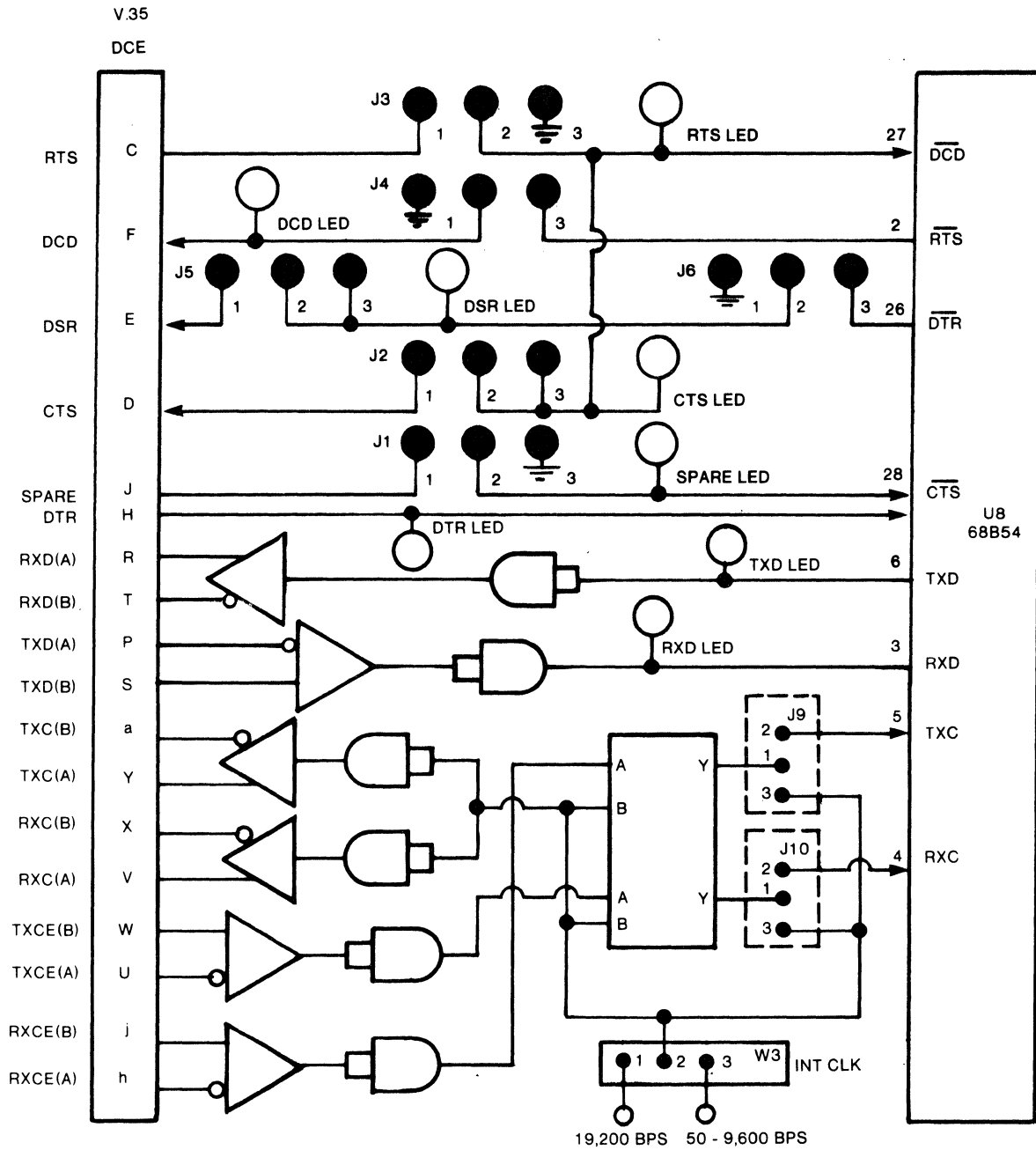
Figure 4-25
VBIT Strapping Schematic

Table 4-8
VBIT Control Signal Strapping

Strap No.	EIA/CCITT DCE Interface Signal Name	Strapping Connections
J1	SPR - (Spare)	With P1-P2 in, SPR follows EIA pin 14; with P2-P3 in, SPR input is held in the "on" state.
J2	CB/106 - CTS (Clear To Send)	With P1-P2 in, CTS is controlled by the local RTS input on EIA pin 4; with P2-P3 in, CTS output is disconnected from EIA pin 5.
J3	CA/105 - RTS - (Request To Send)	With P1-P2 in, RTS input follows EIA pin 4; with P2-P3 in, RTS is held in the "on" state.
J4	CF/109 - DCD (Data Carrier Detect)	With P1-P2 in, DCD output is held in the "on" state; with P2-P3 in, DCD output is controlled by RTS (generally from the remote port).
J5 + J6	CC/107 - DSR (Data Set Ready)	With P1-P2 in (for J6), DSR output is held in the "on" state; with P2-P3 in, DSR output follows DTR from the remote end. With P1-P2 in (for J5), DSR output is connected to pin 6; with P2-P3 in, DSR output is disconnected from pin 6.
J7	Address	With P1-P2 IN, address equals (A). With P2-P3 IN, address equals (B). When connecting up a link between two GBNP's each end must have opposite addresses.
J8	Mainframe Boot	With P1-P2 IN, disables mainframe boots; with P2-P3 IN, enables mainframe booting.
J9	DB/114, TXC (Transmit Clock)	With P1-P2 IN, the port is set up for external transmit clock generation. With P2-P3 IN, the port is set up for internal transmit clock generation.

Table 4-8 (Cont)
VBIT Control Signal Strapping

Strap No.	EIA/CCITT DCE Interface Signal Name	Strapping Connections
J10	DD/115, RXC (Receive Clock)	With P1-P2 IN, the port is set up for external receive clock generation. With P2-P3 IN, the port is set up for internal receive clock generation.
W3	INT CLK	P1-P2 for 19,200 bps operation. P2-P3 for 50 to 9,600 bps operation.

4.4.4.5 FDC (Floppy Drive Controller) Module.
The FDC is used as the communications module for an I/FDP, which conforms to the Shugart interface standards. It contains no strapping. Its front rail contains four LED's, as shown in Figure 4-26.

CALL NOT USED FOR FDC.

ACT FLASHING WHEN THE I/FDP IS ACTIVE.

LOOPBK THE PORT IS IN DIAGNOSTIC LOOPBACK MODE.

NO LEGEND RESERVED FOR FUTURE EXPANSION.
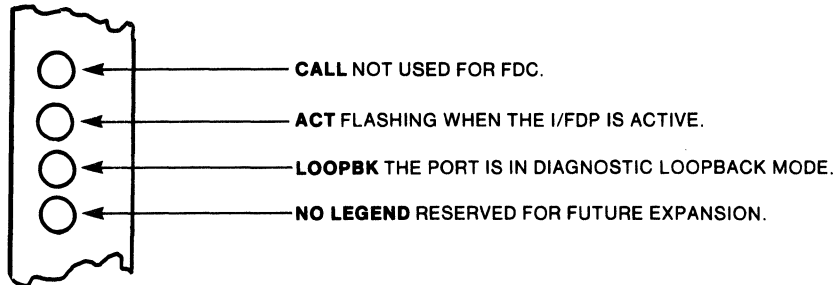
Figure 4-26
Front Rail LED's of the FDC

4.4.4.6 CTC (Control Terminal Card) Module.
The CTC communications module serves as an asynchronous interface for supervisory operations. It is used as the communications module for the I/CTP and I/DGP supervisory ports. The CTC supports two EIA RS-232-C channels. One channel provides a CRT terminal interface and the second interfaces with a hard copy printer device. System reconfiguration and program changes are executed via the CRT channel. Statistics are recorded via the printer channel.

There are 12 LED indicators on the front rail of the CTC, as shown in Figure 4-27. A thumbwheel switch on the card edge selects the channel to be represented by LED's.

DTR/108 ON WHEN DTR IS ACTIVE.

RTS/105 ON WHEN RTS IS ACTIVE.

SPR ON WHEN SPARE IS ACTIVE.

TXD/103 ON WHEN TXD IS ACTIVE.

DSR/107 ON WHEN DSR IS ACTIVE.

DCD/109 ON WHEN DCD IS ACTIVE.

CTS/106 ON WHEN CTS IS ACTIVE.

RXD/104 ON WHEN RXD IS ACTIVE.

CALL NOT USED ON CTC.

ACT WHEN BLINKING, THE PORT IS ACTIVE AND EXCHANGING INFORMATION WITH ANOTHER PORT.

LOOPBK THE PORT IS IN DIAGNOSTIC LOOPBACK MODE.

NO LEGEND RESERVED FOR FUTURE APPLICATION.

LINK-SELECT SWITCH A 2-POSITION SWITCH THAT SELECTS THE CHANNEL TO BE REPRESENTED BY THE LED INDICATORS. POSITION 1 FOR CONTROL TERMINAL SIGNALS; POSITION 2 FOR CONTROL PRINTER SIGNALS.

Figure 4-27
Front Rail of the CTC

Figure 4-28 shows CTC strapping locations. Schematic representations of strapping options for channels 1 and 2 are given in Figures 4-29 and 4-30, respectively. The strapping for the two channels is listed and described in Tables 4-9 and 4-10, respectively.
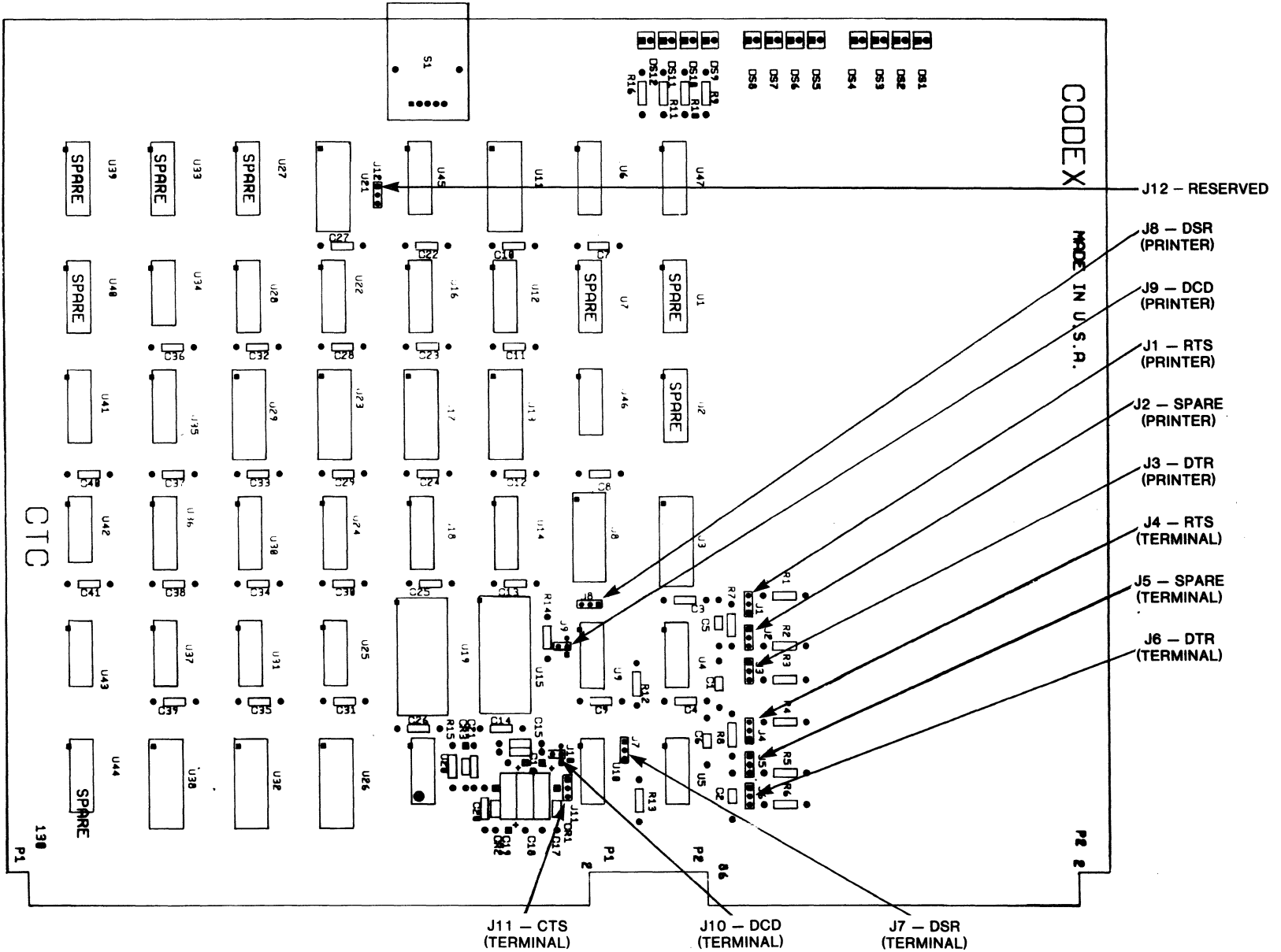
Figure 4-28
CTC Strapping Locations
(Labeled with DCE Interface Signals)
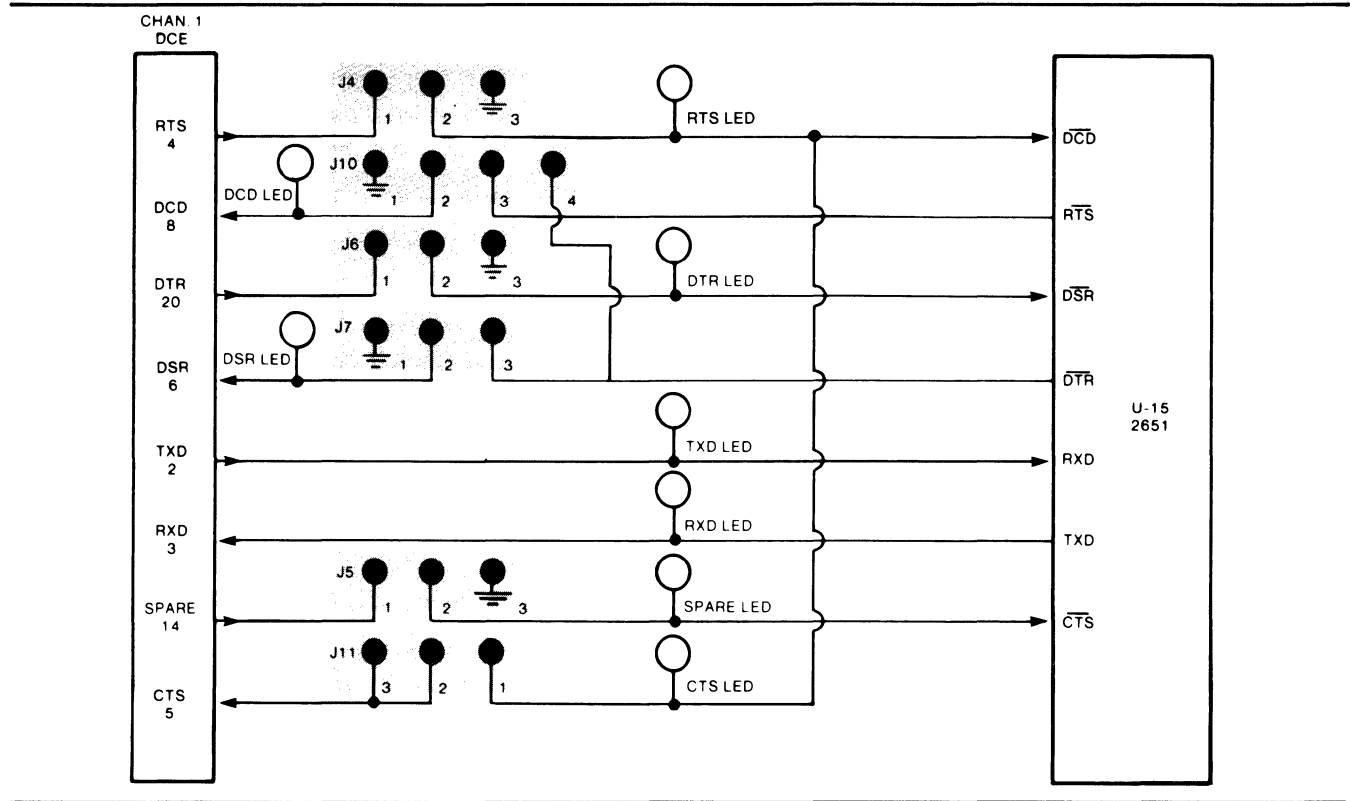
Figure 4-29
CTC Channel 1 (Terminal) Strapping
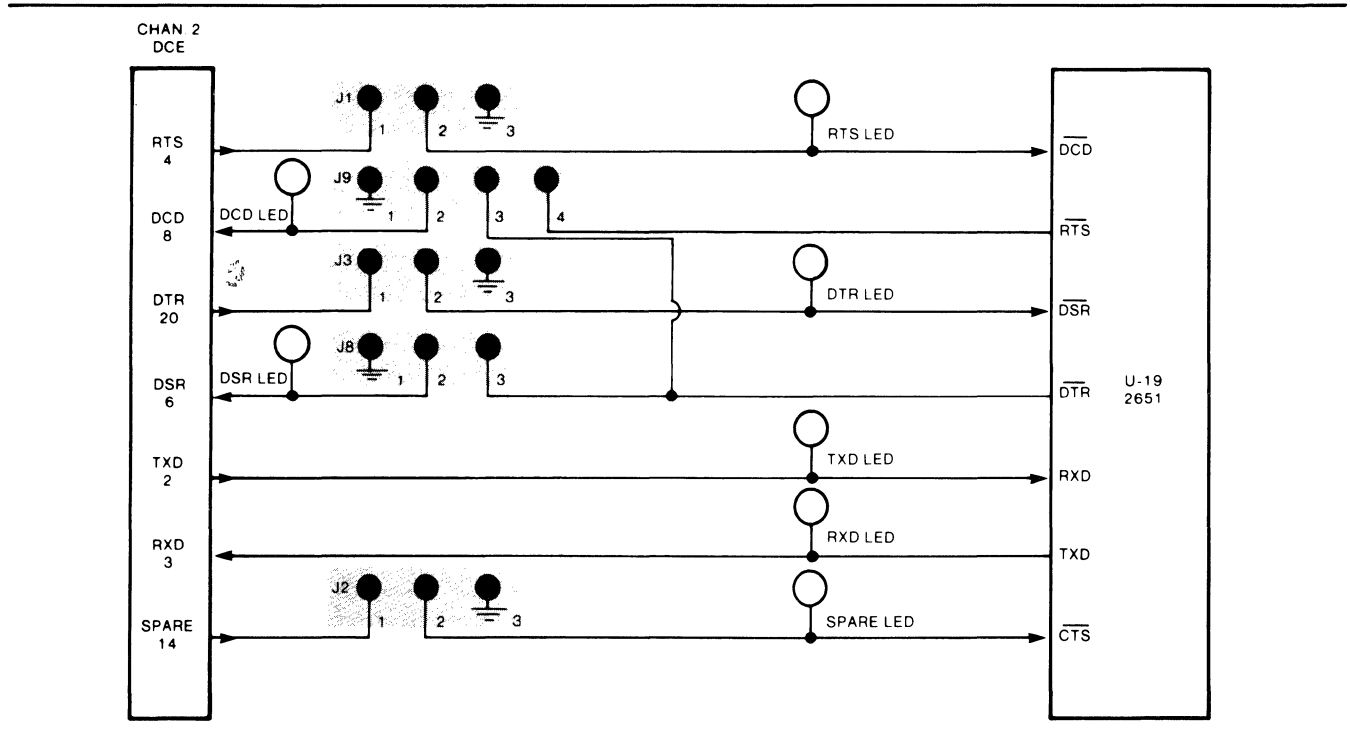
Figure 4-30
CTC Channel 2 (Printer) Strapping

Table 4-9
Strapping for CTC Channel 1 (Terminal)

Strap No.	EIA/CCITT – DCE Interface Signal Name	Strapping Connections
J4	CA/105 – RTS (Request To Send)	With P1-P2 in, RTS input follows EIA pin 4; with P2-P3 in, RTS input is held in the "on" state.
J5	SPR – (Spare)	With P1-P2 in, SPR input follows EIA pin 14; with P2-P3 in, SPR input is held in the "on" state.
J6	CD/108 – DTR (Data Terminal Ready)	With P1-P2 in, DTR input follows EIA pin 20; with P2-P3 in, DTR input is held in the "on" state.
J7	CC/107 – DSR (Data Set Ready)	With P1-P2 in, DSR output is held in the "on" state; with P2-P3 in, DSR output follows DTR (generally from the remote port).
J10	CF/109 – DCD (Data Carrier Detect)	With P1-P2 in, DCD output is held in the "on" state; with P2-P3 in, DCD output follows RTS (generally from the remote port); with P2-P4 in, DCD output follows DTR (generally from the remote port).
J11	CB/106 – CTS (Clear To Send)	With P1-P2 in, CTS output follows the output of RTS Strap, J4; with P2-P3 in, CTS output is disconnected from EIA pin 5.
J12	Reserved	Must be set to P1-P2.

Table 4-10
Strapping for CTS Channel 2 (Printer)

Strap No.	EIA/CCITT - DCE Interface Signal Name	Strapping Connections
J1	CA/105 - RTS (Request To Send)	With P1-P2 in, RTS input follows EIA pin 4; with P2-P3 in, RTS input is held in the "on" state.
J2	SPR - (Spare)	With P1-P2 in, SPR input follows EIA pin 14; with P2-P3 in, SPR input is held in the "on" state.
J3	CD/108 - DTR (Data Terminal Ready)	With P1-P2 in, DTR input follows EIA pin 20; with P2-P3 in, DTR input is held in the "on" state.
J8	CC/107 - DSR (Data Set Ready)	With P1-P2 in, DSR output is held in the "on" state; with P2-P3 in, DSR output follows DTR (generally from the remote port).
J9	CF/109 - DCD (Data Carrier Detect)	With P1-P2 in, DCD output is held in the on state; with P2-P3 in, DCD output follows DTR (generally from the remote port); with P2-P4 in, DCD output follows RTS (generally from the remote port).

A full listing of the CT operator messages is included in the table that follows.

Message   Explanation

OPERATOR ERROR MESSAGES

*** KEYWORD ERROR   The option or parameter was specified
                                                 incorrectly or is not available at this
                                                 menu level.

*** DATA ENTRY ERROR   The value entered is not valid for this
                                                 parameter.

*** ILLEGAL COMMAND   Attempted to define a "read only"
                                                 option or parameter.

Each of the preceding messages is followed by:

*** FOLLOWING TEXT IGNORED:
    XXXX   Indicates that the text which triggered
                                                 the operator error message was ignored
                                                 and lists the ignored text (XXXX).

CONFIGURATION EDITOR RELATED MESSAGES

*** CHANGE NOT PERMITTED   Attempted to change a node parameter,
                                                 path paramter, or operating
                                                 characteristic that is not redefinable.

*** INVALID CONFIGURATION   Specified a configuration that is not
                                                 valid for the intended operation.

*** INVALID PORT   Specified a port address that is not
                                                 valid for the intended operation.

*** EMPTY CONFIGURATION   Specified a configuration which is
                                                 currently defined as empty to be
                                                 examined or copied from.

*** CHANGE NOT PERMITTED IN MONITOR MODE   Attempted to change a node parameter,
                                                 path parameter, or operating
                                                 characteristic while the CT is
                                                 configured in the Monitor Mode.

*** N = xx   P = yy   An attempt was made to enable a ninth
    ADC DISABLED DUE TO BUFFER   thread for data compression. The vir-
    UTILIZATION   tual port address of the thread is yy.

Message	Explanation

*** CHANGED OFFLINE - BOOT REQUIRED

Indicates that the configuration change was made in the off-line configuration corresponding to the current on-line configuration. A boot is required to implement the change on-line (refer to Paragraph 2.2.4, BOOT).

PACKET FAILURE MESSAGES

*** PACKET FAILURE

The supervisory packet which was sent to initiate the operator-requested control operation could not reach its destination.

The above message is followed by one of the explanations given below.

*** NODE NOT FOUND

The node that the packet was destined for could not be found. Verify the validity of the node address specified.

*** PORT NOT FOUND

The port that the packet was destined for could not be found. Verify the validity of the port address specified.

*** NETWORK TOO CONGESTED

The packet cannot be routed at this time without interfering with the transfer of user data.

*** RECEIVER NOT FOUND

The addressed node was not available to receive the supervisory packet.

*** PORT UNAVAILABLE

The addressed port is not available to respond to the supervisory packet.

REPORTS RELATED MESSAGES

*** REPORTS WAITING

Displayed when first network report is received (stored) at the I/CTP.

*** NO REPORTS WAITING

Displayed in response to an operator request for reports when there are no reports waiting.

Message	Explanation

CONFIRMATION MESSAGE

*** OPERATION INITIATED

Displayed upon initiation of an operator-requested control operation.

INVALID HELP REQUEST

*** ITEM HAS NO DATA FIELD

Displayed in response to an invalid request for the allowable values of a non-configurable option or parameter; e.g., CED (CTL-E).

APPENDIX B
CT OPERATION EXAMPLE

Appendix B is an example of CT operation. In this example an operator at Node 7 redefines the Report Node and Report Port parameters of Node 4 so that all reports generated at Node 4 will be routed to Node 7 for examination.

An annotated transcript of the operation is provided below. It may be helpful to refer to Figure 2-11, Configuration Editor Command Menu Diagram, while reading the transcript.

Note
Input line terminators (e.g., CR) are not normally displayed on the CT screen entered from the keyboard. They are, however, included in parentheses in this example.

Display	Explanation
6050 NETWORK CONTROL PORT ONLINE	The I/CTP is initialized.
Configuration EDitor MXP Control BOOT System Services DIAGnostics	The Top-Level General Options are displayed.
RUNNING CONFIGURATION: X'01'	Status line.
❯MODE=PGM	The operator configures the CT in the Program Mode to allow configuration changes.
MODE: PROGRAM	The change is confirmed.
❯(CR)	The operator enters a Carriage Return terminator character to redisplay the Top-Level General Options.
Configuration EDitor MXP Control BOOT System Services DIAGnostics RUNNING CONFIGURATION: X'01'	In the Program mode, the RESET ICTP option is now included.

Display	Explanation
>CED(CR)	The Configuration Editor option is specified.
CONFIGURATION EDITOR	The selection is displayed for verification.
Configuration: 2	The intermediate option at the next level of the CED menu is displayed.
CED > C=1(CR)	The orientation line. The Configuration option is redefined as 1, the running configuration.
CONFIGURATION: X'01'	The value is displayed for verification.
Node: X'2B' COPY TO CONFiguration: X'00'	The intermediate options at the third level of the CED menu are displayed.
CED C=01 #REP(CR)	The orientation line. The prompt character changed to a pound sign (#), indicating that reports are waiting. Report display is requested.
N=X'06' P=X'12' T=BOP T=12:22:46 PROCESSOR LOADING THRESHOLD EXCEEDED 87%	Reports indicating an excessive burst of traffic is occurring at remote node 6, port 12.
N=X'06' P=X'12' T=BOP T=12:22:47 BUFFER UTILIZATION THRESHOLD EXCEEDED 91% > (CR)	CR terminator character is entered to return the CT to its location prior to the report request.
Node: X'2B' COPY TO CONFiguration: X'00' CED C=01 > N=R4(CR)	Operator inadvertently enters incorrect value for the Node option.
*** DATA ENTRY ERROR	Error message is displayed and orientation and input lines are redisplayed.
*** FOLLOWING TEXT IGNORED: R4	

Display	Explanation
CED C=01 **>**N=4(CR)	Operator enters correct node address.
NODE: X'04'	Change displayed for verification.
Port: X'18' Node Parameters EMPTY CONFiguration CLEAR CMEM	Options at fourth level of CED menu.
CED C=01 N=04 **>**NP(CR)	Orientation line. Operator specifies Node Parameters.
NODE PARAMETERS:	The node parameters for Node 4 are displayed.
report Node: X'04' report Port: X'06' buffer Utilization thr: 85% Processor Loading thr: 85% STatistics time Factor: 04 ACTive softRELease: X'01' ACTive softREVision: X'02' Routing DEBUG flags: X'00' Port DEBUG flags: X'19' EMulator Port ADR: X'00' EMulator Speed: 9600	
>N=7 P=12(CR)	The Report Node and Report Port parameters for Node 4 are redefined.
REPORT NODE: X'07' REPORT PORT: X'12' report Node: X'07' report Port: X'12' buffer Utilization thr: 85% Processor Loading thr: 85% STatistics time Factor: 04 ACTive softRELease: X'01' ACTive softREVision: X'02' Routing DEBUG flags: X'00' Port DEBUG flags: X'19' EMulator Port ADR: X'00' EMulator Speed: 9600	The changes are displayed for verification and the node parameters are relisted.

Display	Explanation
⟩ (Control/T)	The terminator character Control/T is entered to return the CT to the top of the command menu.
Configuration EDitor MXP Control BOOT System Services DIAGnostics RUNNING CONFIGURATION: X'01'	The Top-Level options are redisplayed.

APPENDIX C
CONFIGURABLE PORT OPERATING CHARACTERISTICS

Notes

(1) 6050 Standard Baud Rates (bps):

50	75	110	134.5
150	300	600	1200
1800	2000	2400	3600
4800	7200	9600	19200

(2) 6050 Group Band Internal Baud Rates (bps):

48000E   56000E   64000E

(3) Upper-case characters form the valid input abbreviation for the mnemonic.

(4) OpMode Characteristic:
The OpMode characteristic for VATP, VSTP, and VBTP configurations is defined as a two-digit hexadecimal value. The most significant or leftmost digit is not used and should always be defined as 0 (i.e. 0x). The least significant or rightmost digit is determined by breaking it down to its four-bit binary equivalent (see Figure C-1) and setting Bits 0, 1, and 2 as explained in the following subparagraphs.
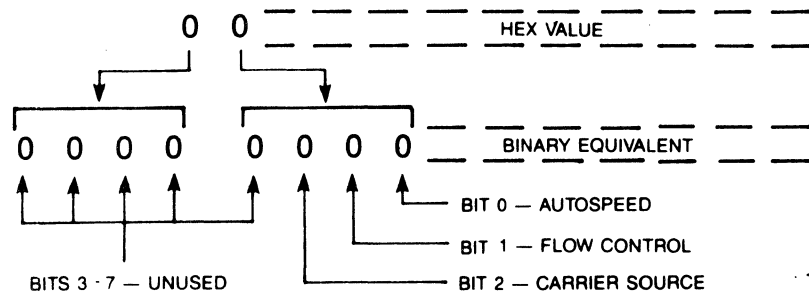
Figure C-1
OpMode Characteristic Bit Assignments

Bit 0 - Autospeed
OpMode bit 0 is only used for autospeed applications of VATP's and
establishes the method of call termination for an autospeed link. Setting
bit 0 to a 1 will cause both ports in an autospeed link to reset to the
autospeed search state when interface signal DTR is toggled down and back
up at either port. Setting bit 0 to a 0 will require that DTR be toggled
down and back up at both ports to reset them to the autospeed search state.
Any odd hex value will set bit 0 to a one and any even hex value will set
bit 0 to a 0.

Bit 1 - Flow Control
OpMode bit 1 is used to enable/disable flow control (refer to the 6050
Planning Guide, Part No. 07072, for an explanation of flow control) over
VATP, VSTP, and VBTP links. Setting bit 1 to a 1 disables flow control;
setting bit 1 to a 0 enables flow control. Flow control must be disabled
on VSTP and VBTP links, but can be enabled or disabled for VATP links.

Bit 2 - Carrier Source Control
OpMode bit 2 is used to determine the control source for interface signal
DCD on VSTP links. If bit 2 is set to a 1, the state of DCD will be
determined by software control. If bit 2 is set to a 0, DCD will follow
the state of RTS, generally from the remote port.

Bit 3 to Bit 7 are not currently used.

Table C-1
I/CTP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	Defines the subtype of the I/CTP. Normally set at X'00'. Values X'01', X'02', and X'03' are reserved for future use.
SPeeD (SPD)	50 to 19,200 bps	Specifies the operating rate of data transfer for the I/CTP.
Data Bits (DB)	7 or 8	Specifies the number of data bits per character transmitted/received, not including parity.
Stop Bits (SB)	1, 1.5, or 2	Specifies the number of stop bits per character transmitted/received.
PARity (PAR)	Odd, Even, Mark, Space, or None	Specifies which form of parity checking is to be used, or specifies that no parity checking should be performed (None). When no parity is specified, character's length is equal to data bits and stop bits.
FLYBack character (FLYB)	X'00' to X'FF'	Defines the character, in hexadecimal, to be interpreted as a signal to delay the output of user data by inserting null character into the Received Data stream. This delay allows the mechanical carriages of receiving devices to return to the left margin of the printer page. X'00' indicates no flyback character. For 7-bit ASCII, CR or LF character is recommended. CR = X'0D'. LF = X'0A'.
GARble Character (GAR)	X'00' to X'FF'	Designates the character, in hexadecimal to be substituted for characters received with bad parity, a framing error, etc. For 7-bit ASCII, the recommended character is X'3F', a question mark (?).
autoECHO (ECHO)	Yes or No	Defines whether input characters, entered by the operator from the CT keyboard, are to be echoed back to the CT screen for display. Default is Yes.

Table C-1 (Cont)
I/CTP Characteristics

Mnemonic	Configurable Values	Description
STatistics time Factor (STF)	0 to 15	Specifies the rate at which sampled performance data is averaged. The equivalent time periods for each configurable value are given below.

Time Factor	Averaging Time Period	Time Factor	Averaging Time Period
0	6 sec	8	25.6 min
1	12 sec	9	51.2 min
2	24 sec	10	1.7 hr
3	48 sec	11	3.41 hr
4	1.6 min	12	6.83 hr
5	3.2 min	13	13.65 hr
6	6.4 min	14	1.14 day
7	12.8 min	15	2.28 day

Mnemonic	Configurable Values	Description
Processor Loading threshold (PL)	00 to 100%	Specifies the maximum allowable percentage of utilization of the port's processing capacity. If the threshold is exceeded, an alarm report is automatically generated and routed to the node's specified report device. 00 disables this threshold.
Buffer Utilization threshold (BU)	00 to 100%	Specifies the maximum allowable percentage of utilization of the port's buffer space. If the threshold is exceeded, an alarm report is automatically generated and routed to the node's specified report device (see Node Parameters). 00 disables the BU threshold.

Note
The I/CTP provides an interface for both the CT and
an optional control printer. The following para-
meters are used to configure the operating charac-
teristics of a control printer.

Mnemonic	Configurable Values	Description
PRinter SPeed (PRSP)	50 to 19,200 bps	Specifies the rate at which the control printer will receive and print characters.
PRinter Data Bits (PRDB)	5, 6, 7, or 8	Specifies the number of data bits per character routed to the control printer.

Table C-1 (Cont)
I/CTP Characteristics

Mnemonic	Configurable Values	Description
PRinter Stop Bits (PRSB)	1, 1.5, or 2	Specifies the number of stop bits per character routed to the control printer.
PRinter PARity (PRPAR)	Odd, Even, Mark, Space, or None	Defines the form of parity checking (if any) that should be performed on data routed to the control printer.
PRinter FLYBack character (PRFLYB)	X'00' to X'FF'	Designates the character (in hexadecimal) to be interpreted as the printer flyback character.
PRinter Flyback DELay (PRFDEL)	00 to 255	The number of null characters to be inserted into the Received Data stream upon detection of a flyback character. Typically 3 characters.

Table C-2
I/FDP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' or X'01'	Defines the subtype of the port. Floppy Disk Port is X'00', Floppy Emulator Port is X'01'.
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data is sampled and averaged (see Table C-1). The suggested value is 6.
Processor Loading threshold (PL)	0 to 100%	Specifies the maximum allowable percentage utilization of the I/FDP's processing capacity. If the threshold is exceeded, an alarm report is automatically generated and routed to the node's specified report device. 00 disables this threshold. The suggested value is 90%.
Buffer Utilization threshold (BU)	0 to 100%	Specifies the I/FDP's buffer utilization alarm threshold in percentage. If the threshold is exceeded, an alarm report is automatically generated and routed to the node's specified report device. 00 disables this threshold. The suggested value is 75%.
DRIVE Count (DRIVEC)	1 to 4	Specifies the number of floppy drives for the I/FDP.
Software write PRotect 0 (SPR0)	Yes or No	If yes, the capability of writing to drive 0 is disabled.
Software write PRotect 1 (SPR1)	Yes or No	If yes, the capability of writing to drive 1 is disabled.
Software write PRotect 2 (SPR2)	Yes or No	If yes, the capability of writing to drive 2 is disabled.
Software write PRotect 3 (SPR3)	Yes or No	If yes, the capability of writing to drive 3 is disabled.
OFFLINE drive 0 (OFFLINE 0)	Yes or No	Yes specifies that the identified drive is to be taken off-line and made inaccessible.

Table C-2 (Cont)
I/FDP Characteristics

Mnemonic	Configurable Values	Description
OFFLINE drive 1 (OFFLINE 1)	Yes or No	Yes specifies that the identified drive is to be taken off-line and made inaccessible.
OFFLINE drive 2 (OFFLINE 2)	Yes or No	Yes specifies that the identified drive is to be taken off-line and made inaccessible.
OFFLINE drive 3 (OFFLINE 3)	Yes or No	Yes specifies that the identified drive is to be taken off-line and made inaccessible.
EMulator Speed (EMS)	50 to 19,200 bps	Speed of the FDP when it is used as an emulator port to load and 6050 software.

Table C-3 (Cont)
I/NP and I/GBNP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	Specifies the subtype of the network port. Normally set to X'00'. Values X;01', X'02, and X'03' are reserved for future use.
SPeeD (SPD)	50E to 19,200E bps	Rate of data transfer for I/NP configurations. Normally, external clocking is used. For internal clocking, the suffix, E, should be omitted.
	50,000E to 64,000E bps	Rate of data transfer for I/GBNP configurations. For internal clocking, the suffix, E, should be omitted.
MODE	Normal, Local Loopback, Remote Loopback	I/GBNP only. Specifies the operating mode for the group band port. In either loopback mode: the port will accept Transmitted Data from the attached device, loop the data back, and return the data through the local node as Received Data. Also, the port will accept Received Data from the remote I/GBNP, loop the data back, and return the data to the remote I/GBNP as Transmitted Data.
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data is sampled and averaged (See Table C-1).
NOack Time-out (NOT)	0 to 127 sec	Specifies the time period that is allowed for non-acknowledgement of outstanding frames. Network link is declared down after this period. 0 means no NOack Timeout. Typically 2 sec or greater. Recommended: 10 sec.

Table C-3 (Cont)
I/NP and I/GBNP Characteristics

Mnemonic	Configurable Values	Description
MINimum Frame Length (MINFL)	00 to 255	The minimum frame length in 16-byte units. I/NP only.
MAXimum Frame Length (MAXFL)	00 to 255	The maximum frame length in 16-byte units. I/NP only.
CLock TIMeout (CLTIM)	0 to 255 sec	Specifies the number of seconds that elapse before a link is declared down due to lack of clock, DCD, or CTS. Recommended: 3 sec. I/NP only.

Note

If any of the following thresholds is exceeded, an alarm report is routed to the specified report device (see I/CTP).

Mnemonic	Configurable Values	Description
Processor Loading threshold (PL)	00 to 100%	The alarm threshold percentage of the port's processing capacity. 00 disables PL threshold.
Buffer Utilization threshold (BU)	00 to 100%	The alarm threshold percentage of the port's buffer capacity. 00 disables BU threshold.
Error Density threshold (ED)	00 to 100%	The alarm threshold percentage of the frames received in error. 00 disables error density threshold.
Retransmit rate THreshold (RTH)	00 to 255	The alarm threshold of the number of frames retransmitted per second. 00 disables retransmit rate threshold.

Table C-4
I/BOP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	The subtype of the I/BOP port. Normally set to 00. Values X'01', X'02', and X'03' are reserved for future use.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the port.
MODE	Normal, Local Loopback, or Remote Loopback	Defines the operating mode of the port. In Local Loopback, the port will accept transmitted data from the attached device, loop the data back, and return the data to the attached device as received data. In Remote Loopback, the port will accept recieved data from a remote port, loop the data back, and then send the data back to its source port as transmitted data.
Data Bits (DB)	5, 6, 7, or 8	The information-field word length in bits.
ENCoding (ENC)	NRZ or NRZI	Line signaling mode between port and terminal. NRZ is Non-Return-to-Zero. NRZI is Non-Return-to-Zero-Inverted.
Bad Frame option (BF)	Abort or Discard	Specifies the port's response to the reception, from a remote port, of an aborted frame with a bad Frame Check Sequence (FCS). If Abort, the bad frame is passed with an abort sequence appended. If Discard, the bad frame is not passed to the terminal. Recommended: Abort.
character DELay (DEL)	00 to 255	Specifies the number of characters that are buffered before transmission to an external device. 00 causes an entire block of data to be buffered.

Table C-4 (Cont)
I/BOP Characteristics

Mnemonic	Configurable Values	Description
Address field EXTension (AEXT)	Yes or No	Specifies whether the address field of the port's frames should be extendable. If No is specified, the address field is limited to one 8-bit byte.
Control field EXTension (CEXT)	Yes or No	Specifies whether the control field of the port's frames should be extended from one 8-bit byte, to two 8-bit bytes.
Logical Control Field (LCF)	Yes or No	Specifies if the frames of this port will have a logical control field.
Abort extended to IDLe	Yes or No	If Yes, frame abort is extended to at least 16 bits (mark idle). If No, frame abort is 7 - 15 bits.
FLAgs (FLA)	1 or 2	Specifies the minimum number of flags that will be inserted between frames.
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the port is sampled and averaged (see Table C1).
Cts Delay (CD)	0 to 255	The number of 10 ms units that the port should delay raising CTS upon detection of RTS going high.
CALL Logging (CALL)	Yes or No	Unavailable Option. Should be set to No.
Data COMPression (DCMP)	On or Off	If On, data received by the port is dynamically compressed with an adaptive data compression technique.

Note
If any of the following thresholds is exceeded, an
alarm report is routed to the specified report
device.

Mnemonic	Configurable Values	Description
Processor Loading threshold (PL)	0 to 100%	The alarm threshold percentage of the port's processor capacity. 0 disables this threshold.
Buffer Utilization threshold (BU)	0 to 100%	The alarm threshold percentage of the port's buffer capacity. 0 disables this threshold.

Table C-4 (Cont)
I/BOP Characteristics

Mnemonic	Configurable Values	Description
Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the port. 0 disables this threshold.
Error Density Threshold (ED)	0 to 100%	The alarm threshold of the ratio of bad frames to total frames inthe transmitted data stream. 0 disables this threshold.

Table C-5
I/SSTP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	The subtype of the I/SSTP. Normally set to X'00'. Values X'01', X'02', and X'03' are reserved for future use.
CODE	ASCII, EBCDIC, or Transcode	Specifies the code type being supported by the I/SSTP.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the port.
MODE	Normal, Local Loopback, or Remote Loopback	Defines the operating mode of the port. In Local Loopback, the port will accept Transmitted Data from the attached device, loop the data back, and return the data to the attached device as Received Data. In Remote Loopback, the port will accept Received Data from a remote port, loop the data back, and then send the data back to its source port as Transmitted Data.
Data Bits (DB)	5, 6, 7, or 8	The number of data bits per character transferred by the port.
PARity (PAR)	Odd, Even, Mark Space, or None	Specifies which form of parity checking is to be used, or specifies that no parity checking is to be performed (None).
RESYnc (RESY)	Single or Double	Specifies the number of sync characters that are to be isnerted between blocks for synchronization.
force mark IDLE (IDLE)	Yes or No	If Yes, a minimum of three X'FF' characters is always included in the Received Data stream between BSC blocks.
DELay (DEL)	0 to 255	The number of characters to be accumulated before transmission to the attached device.
OpMode		See Item #4, Page C-1.

Table C-5 (Cont)
I/SSTP Characteristics

Mnemonic	Configurable Values	Description
BiSync Control code tables (BSC)	X'00' to X'FF'	Reserved for special applications. Should be set to X'00' (IBM BSC).
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the port is sampled and averaged (see Table C-1).
Cts Delay (CD)	0 to 255	Specifies the number of 10 ms units that the port should delay raising CTS upon detection of RTS going high.
CALL Logging (CALL)	Yes or No	If Yes, administrative statistics are calculated for the port and routed to an I/FDP for storage.
Data COMPression (DCOMP)	Yes or No	If Yes, transmitted data is coded with an adaptive data compression technique before network transmission, and received data is decompressed before being output.

Note
If any of the following thresholds is exceeded, an
alarm report is routed to the specified report
device.

Mnemonic	Configurable Values	Description
Processor Loading threshold (PL)	0 to 100%	The alarm threshold percentage of the port's processing capacity. 0 disables this threshold.
Buffer Utilization threshold (BU)	0 to 100%	The alarm threshold percentage of the port's buffer capacity. 0 disables this threshold.
Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the port. 0 disables this threshold.
Error Density threshold (ED)	0 to 100%	The alarm threshold of the ratio of erroneous data transmitted to total data transmitted. 0 disables this threshold.

Table C-6
VATP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	Specifies the subtype of the VATP link. Should be set to X'00'. X'01' to X'03' reserved for future use.
CODE	ASCII, Transcode, amd EBCDIC	Code type must be identical at both ends of the link. Any asynchronous code type can be supported, except for VATP's configured in the Dialup Call Mode (see Path Parameters).
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the link. If external clocking is desired, the speed value must have the suffix E attached (e.g., 9600E).
MODE	Normal, Local or Remote Loopback	Defines the operating mode of the port. In Local Loopback, the port will accept transmitted data from the attached device, loop the data back, and return the data to the attached device as received data. In Remote Loopback, the port will accept received data from a remote port, loop the data back, and then send the data back to its source port as transmitted data.
Data Bits (DB)	5, 6, 7, or 8	The number of data bits per character transferred (not including parity).
Stop Bits (SB)	1, 1.5, or 2	The number of stop bits per character transferred.
PARity (PAR)	Odd, Even, Mark, Space, or None	Specifies which form of parity checking is to be used by the port, or specifies that no parity checking should be performed (None).
GARble Character (GAR)	X'00' to X'FF'	Designates the character, in hexadecimal, to be substituted for characters received with bad parity, a framing error, etc. For ASCII, the recommended character is X'3F', (?).
AutoSpeed (AS)	Yes or No	Yes for autospeed VATP. If Yes, only subtype and CODE must be specified for this configuration.

Table C-6 (Cont)
VATP Characteristics

Mnemonic	Configurable Values	Description
FLYBack Character (FLYB)	X'00' to X'FF'	Defines character, in hexadecimal, to be interpreted as a signal to delay the output of user data by inserting pad characters into the received data stream. This delay allows themechanical carriages of receiving devices to return to the left margin of the printer page. X'00' denotes no flyback character. For ASCII, the carriage return (X'0D') or line feed (X'0A') characters are recommended.
END of transmit OPTion (ENDOPT)	None	End of Transmit Option does not apply. Calls are terminated according to Call Mode.
	Default	Control/D will terminate call without dropping DTR. Only valid for VATP's configured in the Dialup Call Mode.
	From Terminal	Port will request terminate character when call is established. Only valid for VATP's configured in the Dialup Call Mode.
	Disable Termination	Disables all termination options. This port cannot terminate a call.
autoECHO (ECHO)	Yes or No	If Yes, the transmitted data stream is echoed back tothe originating device.
OpMode (OM)		See Item #4, Page C-1.
Statistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the link is sampled and averaged (see Table C-1).
Cts Delay (CD)	0 to 255	Specifies the length of time (in 10 ms units) that the port should delay raising CTS upon detection of RTS going high.
Data COMPression (DCOMP)	On or Off	If On, Transmitted Data is coded with an adaptive data compression technique before network transmission, and Received Data is decoded before being output.
FLYback DELay (FLYDEL)	0 to 255	The number of null characters to be inserted into the received data stream upon detection of a flyback character. 0 disables the flyback character. Recommended: 3 characters.

Table C-6 (Cont)
VATP Characteristics

Mnemonic	Configurable Values	Description
CALL logging (CALL)	Yes or No	Unavailable option. Should be set to No.
Data Restraint IN (DRIN)	XOFFxon, DSR or OFF	If XOFFxon: The port will output an XOFF character to the attached external device when the port's buffers fill to a preset level, typically 75% of capacity. The attached device will then stop sending Transmitted Data. The port will send an X-ON character to the device to resume data flow when the buffer level falls to a preset level, typically 25% of capacity. If DSR: the port will signal the device to stop/start data flow by lowering/raising the interface signal DSR. If OFF: input data restraint is disabled.
Data Restraint OUT (DROUT)	XOFFxon, DSR, or OFF	If XOFFxon: The port will stop sending Received Data to the external device upon reception of an XOFF character from the device and resume sending Received Data upon reception of an XON character. If DSR: the port will stop/start output data flow when the state of interface pin 4 goes low/high. If OFF: Output Data Restraint is disabled.
X-ON character (X-ON)	X'00' to X'FF'	Specifies X-ON character. If X'00', then no X-ON character.
X-OFF character (X-OFF)	X'00' to X'FF'	Specifies X-OFF character. If X'00', then no X-OFF character.
PHYSical Port address (PHYSP)	X'02' to X'FF' (even only)	The physical port address of the I/MATP or I/MXP which is supporting this circuit.
THRead NUMber (THRNUM)	1 to 16 (I/MATP) 1 to 25 (I/MXP) --6030/40: 1 to 25 --6010: 2 to 25	Specifies the sequence number of this channel in relation to the other channels supported by the smae physical port.

Table C-6 (Cont)
VATP Characteristics

Mnemonic	Configurable Values	Description
		Note If either of the following thresholds is exceeded, an alarm report is routed to the specified report device.
Error Density threshold (ED)	0 to 100%	The alarm threshold percentage of data passing through the circuit that is received in error. This includes parity, framing, and overrun errors. 0 disables this threshold.
Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the channel. 0 disables this threshold.

Table C-7
VSTP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	Specifies the subtype of the VSTP link. Should be set to X'00'. X'01' to X'03' are reserved for future use.
CODE	ASCII, Transcode, and EBCDIC	Code type must be identical at both ends of the link. Any asynchronous code type can be supported, except for VATP's configured in the Dialup Call Mode (see Path Parameters).
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the link. If external clocking is desired, the speed value must have the suffix, E, attached (e.g., 9600E).
	Normal, Local, or Remote Loopback	Defines the operating mode of the port. In Local Loopback: the port will accept Transmitted Data from the attached device, loop the data back, and return the data to the attached device as Received Data. In Remote Loopback: the port will accept Received Data from a remote port, loop the data back, and then send the data back to its source port as Transmitted Data.
Data Bits (DB)	6, 7, or 8	Specifies the number of data bits (not including parity) per character transferred via this circuit.
PARity (PAR)	Odd, Even, Mark, Space, or None	Specifies which form of parity checking is to be used, or specifies that no parity checking is to be performed (None).
RESYnc (RESY)	Single, double	Specifies the number of sync characters required between blocks for synchronization.
force mark IDLE (IDLE)	Yes or No	If yes, a minimum of three X'FF' characters is always included in the Data stream between BSC blocks.
DELay (DEL)	0 to 255	Specifies the number of characters to be accumulated before transmitting to the attached device.
OpMode (OM)		See Item #4, Page C-1.

Table C-7 (Cont)
VSTP Characteristics

Mnemonic	Configurable Values	Description
BiSynchronous Control code tables (BSC)	X'00' to X'255'	Reserved for special applications. Should be set to X'00' (IBM BSC).
Statistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the link is sampled and averaged (see I/CTP).
Cts Delay (CD)	00 to 255	Specifies the length of time (in 10 ms units) the circuit should delay raising CTS upon detection of RTS going high.
Data COMPression (DCOMP)	On or Off	If On, Transmitted Data is coded with an adaptive data compression technique before network transmission, and Received Data is decoded before being output.
CALL logging (CALL)	Yes or No	Unavailable option. Should be set to No.
PHYSical Port address (PHYSP)	X'02' to X'FE' (even only)	The physical port address of the I/MATP or I/MXP which is supporting this circuit.
THRead NUMber (THRNUM)	1 to 16 (I/MATP) 1 to 25 (I/MXP) --6030/40: 1 to 25 --6010: 2 to 25	Specifies the sequence number of this channel in relation to the other channels supported by the same physical port.

Note
If either of the following thresholds is exceeded,
an alarm report is routed to the specified report
device.

Mnemonic	Configurable Values	Description
Error Density threshold (ED)	00 to 100%	The alarm threshold percentage of the characters passing through the circuit that is received in error. This includes parity, framing, and overrun errors. 0 disables this threshold.
Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the channel. 0 disables this threshold.

Table C-8
VBCS Characteristics

Mnemonic	Configurable Values	Description
SUBType		Not used.
CODE	ASCII, Transcode, and EBCDIC	Code type must be identical at both ends of the link. Any asynchronous code type can be supported, except for VATP's configured tin the Dialup Call Mode (see Path Parameters).
CRC type (CRC)	LRC8, CRC16, or VRCCRC16	The type of error checking used by the SSTP to verify block correctness.
EOT option (EOT)	On or Off	If On when the NAK Limit has been exceeded, the SSTP will send an EOT to the stations, send a message to the CTP indicating how many blocks were lost, and reinitialize. If Off when the NAK limit has been exceeded, the SSTP will send a message to the CTP indicating that the NAK Limit has been exceeded and will attempt to retransmit the block.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the link. If external clocking is desired, the speed value must have the suffix, E, attached (e.g., 9600E).
MODE	Normal, Local or Remote Loopback	Defines the operating mode of the port. In Local Loopback, the port will accept transmitted data from the attached device, loop the data back, and return the data to the attached device as received data. In Remote Loopback, the port will accept recieved data from a remote port, loop the data back, and then send the data back to its source port as transmitted data.
Data Bits (DB)	5, 6, 7, or 8	The number of data bits per character transferred (not including parity).
PARIty (PAR)	Odd, Even, Mark	Specifies which form of parity checking is to be used by the port, or specifies that no parity checking should be performed.
Sync Count (SC)	X'00' to X'0F'	The number of syncs the SSTP will output before a block or a response.
Mark Idle Cound (MIC)	X'00' to X'0F'	The number of trailing pad characters the SSTP will transmit following a block or response.

Table C-8 (Cont)
VBCS Characteristics

Mnemonic	Configurable Values	Description
OpMode (OM)	X'00' or X'01'	In OpMode 00 operation an EOT generated by either station prior to the end of a message is regarded byt he SSTP as an abort sequence. The SSTP will reinitialize and send a message to the CTP indicating the number of blocks lost. In OpMode 01 operation the SSTP will store data if an EOT is generated prior to the end of a message. The SSTP will attempt to complete transmission but if unesuccessful will send a message to the CTP indicating the number of blocks lost. In OpMode 01 operation the Nak Limit is also used as the number of times the SSTP will attempt to complete transmission before generating the message for the CTP. In using the 01 operation 1) the user must be using a leased line configuration, 2) the stations must be operating point-to-point, and 3) the stations must not drop DTR.
Bisynchronous Control code tables (BSC)		No used.
Error Density threshold (ED)	0 to 100%	The alarm threshold percentage of data passing through the circuit that is receiving in error. This includes parity, framing, and overrun errors. 0 disables the threshold.
Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the channel. 0 disables this threshold.
Data COMPression (DCOMP)	On or Off	If On, transmitted data is coded with an adaptive data compression technique before network tranmission, and received data is decoded before being output.
PHYSical Port address (PHYSP)		The physical port address of the I/SSTP which is supporting this circuit.
THRead NUMber (THRNUM)	1	Compulsory setting.

Table C-9
VBTP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	The subtype of the port. Normally set to X'00'. Values X'01', X'02', and X'03' are reserved for fugure use.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the port.
Data Bits (DB)	5, 6, 7, or 8	The information-field word length in bits.
OpMode (OM)		See Item #4, Page C-1.
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the port is sampled and averaged (see Table C-1).
Data COMPression (DCOMP)	On or Off	If On, data received by the port is dynamically compressed with an adaptive data compression technique.
CALL logging (CALL)	Yes or No	Unavailable Option. Should be set to No.
PHYSical Port address (PHYSP)	X'02' to X'7E' (even only)	The address of the I/MXP which supports this bit-oriented thread.
THRead NUMber (THRNUM)	1 to 25	The thread number that distinguishes this bit-oriented channel from the other channels supported by the same I/MXP.

Note
If the following threshold is exceeded, an alarm
report is routed to specified report device.

Compression Efficiency Threshold (CET)	0 to 200%	The alarm threshold percentage of data compression efficiency for the thread. 0 disables this thresholds.

Table C-10
XP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	The subtype of the port. Normally set to X'00'. Values X'01', X'02', and X'03' are reserved for future use.

Table C-11
Autospeed Definition Port (ADP) Characterisitcs

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	Specifies the subtype of the VATP link. Should be set to X'00'. S'01' to X'03' are reserved for future use.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer of the link. If external clocking is desired, the speed value must have the suffix, E, attached (e.g., 9600E).
Data Bits (DB)	5, 6, 7, or 8	The number of data bits per character transferred (not including parity).
Stop Bits (SB)	1, 1.5, or 2	The number of stop bits per character transferred.
PARity (PAR)	Odd, Even, Mark, Space, or None	Specifies which form of parity checking is to be used by the port, or specifies that not parity checking should be performed (None).
FLYBack character (FLYB)	X'00' to X'FF'	Defines character, in hexadecimal, to be interpreted as a signal to delay the output of user data by inserting pad characters into the received data stream. This dealy allows the mechanical carriages of receiving devices to return to the leftr margin of the printer page. X'00' denotes no flyback character. For ASCII, the carriage return (X'0D') or line feed (X'0A') cahracters are recommended.
GARble character (GAR)	X'00' to X'FF'	Designates the character, in hexadecimal, to be substituted for characters received with bad parity, a framing error, etc. For ASCII, the recommended character is X'3F', (?).
RECognition character (REC)	X'00' to X'FF'	Defines the recognition character used in Autospeed function of a VATP. When a VATP, with Autospeed enabled, receives a recognition character in its Tranmitted Data stream that matches this AD recognition character, the VATP is configured with the characteristics defined in this AD.

Table C-11 (Cont)
ADP Characteristics

Mnemonic	Configurable Values	Description
Substitution CHaracter (SCH)	X'00' to X'FF'	Defines the substitution character used in this Autospeed fucntion of a VATP. When this AD is used to configure a VATP, the substitution character is passed to the desitnation VATP and is used to match the VATP with an AD at the remote node.
END of transmit OPTion (ENDOPT)	None	End of Transmit Option does not apply. Calls are terminated accordint to Call Mode.
	Default	Control/D will terminate call without dropping DTR. Only valid for VATP's configured in the Dialup Call Mode.
	From Terminal	Port will request terminate character when call is established. Only valid for VATP's configured in the Dialup Call Mode.
	Disable Termiantion	Disables all termination options. This port cannot terminate a call.
autoECHO (ECHO)	Yes or No	If Yes, the transmitted data stream is echoed back to the originating device.
STatistics time Factor (STF)	0 to 15	Specifies the rate at which performance data for the link is sampled and averaged (see Table C-1).
Data Restraint IN (DRIN)	XOFFxon, DSR, or OFF	If XOFFxon: The port will output an XOFF character to the attached external device when the port's buffers fill to a preset level, typically 75% of capacity. The attached device will then stop sending Transmitted Data. The port will send an XON character to the device to resume data flow when the buffer level falls to a preset level, typically 25% of capacity. If DSR; the port will signal the device to stop/start data flow by lowering/raising the interface signal DSR. If OFF: input data restraint is disabled.
Data Restraint OUT (DROUT)	XOFFxon, DSR, or OFF	If XOFFxon: The port will stop sending Received Data to the external device upon reception of an XOFF character from the device and resume sending Received Data upon reception of an XON character. If DSR: the port will stop/start output data flow when the state of interface pin 4 goes low/high. If OFF: Output Data Restraint is disabled.

Table C-11 (Cont)
ADP Characteristics

Mnemonic	Configurable Values	Description
XON character (X-ON)	X'00' to X'FF'	Specifies X-ON character. If X'00', then no X-ON character.
X-OFF character (X-OFF)	X'00' to X'FF'	Specifies X-OFF character. If X'00', then no X-OFF character.
FLYback DELay (FLYDEL)	0 t9 255	The number of null characters to be inserted into the received data stream upon detection of a flyback character. 0 disables the flyback character. Recommended: 3.
Cts Delay (CT)	0 to 255	Specifies the length of time (in 10 ms units) that the port should delay raising CTS upon detection of RTS going high.
Data COMPression (DCOMP)	On or Off	If On, Transmitted Data is coded with an adaptive data compression technique before network transmission, and Received Data is decoded before being output.

Table C-12
I/MXP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00' to X'03'	The subtype of the I/MXP port. Should be set to X'00'.
SPeeD (SPD)	50 to 19,200 bps	The rate of data transfer for the port.
MODE	Normal, Local Loopback, or Remote Loopback	Defines the operating mode of the port. In Local Loopback, the port will accept transmitted data from the attached device, loop the data back, and return the data to the attached device as received data. IN Remote Loopback, the port will accept received data from a remote port, loop the data back, and then send the data back to its source port as transmitted data.
Control field EXTension (CEXT)	Yes or No	Specifies whether the control field of the port's frames should be extended from one 8-bit byte, to two 8-bit bytes.
Statistics Time Factor (STF)	0 to 15	Sepcifies the rate at which performance data for the port is sampled and averaged (see Table C-1).

Note

If any of the following thresholds is exceeded, an alarm report is routed to the specified report device.

Mnemonic	Configurable Values	Description
Processor Loading threshold (PL)	0 to 100%	The alarm threshold percentage of the port's processor capacity. 0 disables this threshold.
Buffer Utilization threshold (BU)	0 to 100%	The alarm threshold percentage of the port's buffer capaicty. 0 disables this threshold.
Error Density threshold (ED)	0 to 100%	The alarm threshold of the ratio of bad frames to total frames in the transmitted data stream. 0 disables this threshold.

Table C-13
I/MATP and I/MSTP Characteristics

Mnemonic	Configurable Values	Description
SUBType (SUBT)	X'00'	Defines the subtype of the port. Compulsory setting.
STatistics time Factor (STF)	0-100%	Specifies the rate at which performance data is sampled and averaged (see Table C-1). The suggested value is 6.
Processor Loading threshold (PL)	0-100%	The alarm threshold percentage of the port's processing capacity. If the threshold is exceeded, an alarm report is generated and routed to the node's report device. 0 disables the PL threshold. The suggested value is 90.
Buffer Utilization threshold (BU)	0-100%	The alarm threshold percentage of the port's buffer capacity. If the threshold is exceeded, an alarm report is generated and routed to the node's report device. 0 disables the BU threshold. The suggested value is 75.

APPENDIX D
NETWORK REPORTS

D.1 GENERAL
This appendix provides a listing of all status and alarm reports that are generated
in the network and routed to the CT for operator examination.

All network reports are prefixed with the following message:

                 N=X'nn' P=X'nn' T=xxxx at nn:nn:nn

where:

        N=X'nn' is the address of the node that originated the report.
        P=X'nn' is the port that originated the report.
        T=xxxx is type of port that originated the report.
       nn:nn:nn is the time that the report was received in hours:minutes:seconds.

D.1.1 STATUS REPORTS
Status reports are generated to inform the operator of any significant network
occurrence, such as node or port initialization, port diagnostics, etc. The syntax
of each status report is given in the following paragraphs.

RESTART PENDING
This report is generated to inform the operator that a network Boot has been
initiated and will start in 1 minute.

Display Syntax

>AUTOMATIC RESTART WILL BE TRIGGERED IN 1 MINUTE FOR CONFIGURATION n(1) UNLESS
OPERATOR ISSUES NEW BOOT REQUEST. CURRENT ACTIVE CONFIGURATION IS n(2) THE
BOOT WAS ORIGINATED BY X'nn'(1)/X'nn'(2)

. Where:
> n is configuration 1, 2, 3, or 4
> (1) - the off-line configuration that will be booted on-line
> (2) - the configuration that is currently running on-line

> X'nn' is the hexadecimal address of:
> (1) - the originating node
> (2) - the originating port

BOOT COMPLETE
This report is generated to inform the operator that a network Boot (initialization) has been completed successfully.

Display Syntax

--BOOT COMPLETE--
CONFIGURATION=n, BY NODE=X'nn', REASON=xxxx

. Where:

C is the configuration number that was booted. The values for n are 1, 2, 3, or 4.

X'nn' is the hexadecimal address of the node that originated the boot request. X'nn' = 00 to FF.

xxxx is the one of the following sources of the boot initiation:

AUTOMATIC BOOT
OPERATOR-INITIATED BOOT
POWER-UP BOOT
AUTOMATIC NP RESTART

LINK UP
The Link Up report is sent to inform the operator that a call has been established between two ports.

Display Syntax

INP LINK FROM PORT X'nn'(1)/X'nn'(2) TO PORT X'nn'(3)/X'nn'(4) ESTABLISHED AT nnnn BAUD

. Where:

X'nn' is the two digit hexadecimal address of:
    (1) - the local node
    (2) - the local port
    (3) - the remote node
    (4) - the remote port

nnnn is the rate of data transfer on the link

LINK DOWN

The link down report is sent to inform the operator when a call has been terminated.

Display Syntax

    INP LINK FROM PORT X'nn'(1)/X'nn'(2) TO PORT X'nn'(3)/X'nn'(4) DISCONNECTED
    BAUD RATE WAS nnnn
    CAUSE = xxxx

. Where:
    X'nn' is the two digit hexadecimal address of:
        (1) - the local node
        (2) - the local port
        (3) - the remote node
        (4) - the remote port

    nnnn is the rate of data transfer on the link

    xxxx is one of the following causes:

        LINK FAIL
        LOST CLEAR-TO-SEND
        OPERATOR REQUESTED
        REMOTE INP NOT RESPONDING (NOACK)
        LOST TRANSMIT CLOCK
        OFFLINE
        LOST DCD
        LOST RECEIVE CLOCK
        REMOTE INP DOWN
        REMOTE NP INTO LOOPBACK

UNEXPECTED LINK INITIALIZATION ATTEMPTED
The Unexpected LIA report is sent to inform the operator that an invalid Link
Initialization Attempt (LIA) frame was received by the reporting INP. The frame is
ignored.

<u>Display Syntax</u>

    RECOVERABLE ERROR--- UNEXPECTED LIA FRAME. IGNORED.

UNEXPECTED STARTUP
This report is generated to inform the operator that an invalid start-up message
was sent to a port.

<u>Display Syntax</u>

    RECOVERABLE ERROR--- UNEXPECTED STARTUP. IGNORED.

OVERRUN ERROR
This report is generated to inform the operator that a recoverable overrun error
has occurred.

<u>Display Syntax</u>

    RECOVERABLE ERROR--- RECEIVER OVERRUN. IGNORED.

UNDERRUN ERROR
This report is generated to inform the operator that a recoverable underrun error
has occurred.

<u>Display Syntax</u>

    RECOVERABLE ERROR...TRANSMITTER UNDERRUN.

FLOPPY INITIATIZATION COMPLETED
This report is generated to inform the operator when an I/FDP initialization has been completed.

Display Syntax

```
6050 INTELLIGENT FLOPPY CONTROL PORT INITIALIZED
DRIVE   n(1)   VOLUME-ID xxxx(1)
DISK TYP=xxxx(2)
DENSITY=x(1)   SIDES=x(1)
MASTER DIRECTORY=nn(1)   SECTORS.   xxxx(3)
SUBDIRECTORIES=nn(2)   SECTORS.   xxxx(3)
DATA RECORD COUNT=nn(3)   ENTRIES.   xxxx(3)
FREE RECORDS POOL=nn(4)   ENTRIES.   xxxx(3)
ERROR RECORDS POOL=nn(5)   ENTRIES.   xxxx(3)
FILES=nn(6)
WRITE PROTECT=x(2)
```

. Where:
         n is a decimal digit indicating drive number 0, 1, 2, or 3

      xxxx is a string of up to 8 ASCII characters:
         (1)   Volume Identification
         (2)   Identifies the type of disk as Program, General, or Logger
         (3)   Invalid or Valid

         x is a single ASCII character:
         (1)   S for single, D for double
         (2)   Y for yes, N for no

      nn is a 2-byte decimal indicating:
         (1)   the count of sectors used to store the master directory
         (2)   the count of sectors used to store the subdirectories
         (3)   the count of available records that are in use
         (4)   the count of remaining records on disk
         (5)   the count of records detected in error
         (6)   the count of files existing on disk

D.1.2 ALARM REPORTS

Alarm reports are generated when a performance threshold is exceeded, or there is a failure in the network. They syntax of each alarm report is given in the following paragraphs.

PROCESSOR UTILIZATION

This report is generated if the configured processor utilization threshold of any node or port is exceeded.

Display Syntax

PROCESSOR UTILIZATION THRESHOLD EXCEEDED: nn%

. Where:
nn is the calculated percentage of processor utilization.

BUFFER UTILIZATION

This report is generated if the configured buffer utilization threshold of any node or port is exceeded.

Display Syntax

BUFFER UTILIZATION THRESHOLD EXCEEDED: nn%

. Where:
nn is the calculated percentage of buffer utilization

USER DATA RATE
This report is generated if the congigured rate of data transfer for the port is
exceeded.

Display Syntax

    USER DATA RATE EXCEEDED. nn HUNDRED CHARACTERS PER SECOND

. Where:
    nn is the calculated rate of data transfer in 100-character units.

ERROR DENSITY
This report is generated if the configured error density threshold for the port is
exceeded.

Display Syntax

    ERROR DESNITY THRESHOLD EXCEEDED. nn FRAMES PER SECOND

. Where:
    nn is the calculated number of erroneous frames received.

ERROR DENSITY
This report is generated if the configured error density threshold for the port is
exceeded.

Display Syntax

    ERROR DENSITY THRESHOLD EXCEEDED. nnnn%

. Where:
    nnnn is the calculated percentage of data received in error.

EXCEEDED AGGREGATE SPEED
This report is generated when the maximum aggregate rate of data transfer for a
multiple port (i.e. I/MATP, I/MSTP, or I/MXP) is exceeded.

Display Syntax

    EXCEEDED MAXIMUM PERMITTED AGGREGATE SPEED.
    CONFIGURED AGGREGATE SPEED=nnnn.

. Where:
    nnnn is the configured speed

THREAD CONFIGURATION ERROR
This report is generated when a configuration error is detected in a thread
(virtual port) configuration.

Display Syntax

    THREAD CONFIGURATION ERR.
    CAUSE=xxxx

. Where
    xxxx is one of the following:

        INCOMPATIBLE CODE CHARACTERISTICS
        UNSUPPORTED CALL OPTION
        INVALID PATH PARAMETER
        INVALID THREAD NUMBER
        MCM CODE ERROR
        PACKET DELIVERY ERROR

NO CONFIUGRED VIRTUAL PORT(S)
This report is generated during multi-threaded port start-up for which no virtual
ports are configured.

Display Syntax

    NO CONFIGURED VIRTUAL PORT(S).

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CALL TERMINATION ERROR
Generated when a call between two devices ends abnormally.

Display Syntax

CALL ENDED IN ERROR--xxxx

. Where:
xxxx is one of the following explanations:

SECURITY VIOLATION.
NO ANSWER AT RECEIVER.
DIFFERING CODE TYPES.
DIFFERING DATA BITS PER CHARACTER.
INCOMPATIBLE CALL TYPES.
INCOMPATIBLE PORT TYPES.
DIFFERING BSC CONTROL TABLES.

INSUFFICIENT MEMORY (FLOPPY)
This message is sent to inform the operator that, due to insufficient memory
capacity, floppy port initialization could not be completed.

Display Syntax

INSUFFICIENT MEMORY TO COMPLETE PORT INITIALIZATION.

INVALID DIRECTORY
This report is generated to inform the operator that the indicated directory is invalid for the filename.

Display Syntax

```
DRIVE-n(1)  VOLUME-ID xxxx
xxx DIRECTORY INVALID FOR FILE xxxxxxxx
LOCATION= TRACK nn(1)  SECTOR nn(2)
```

. Where

n is a decimal digit indicating the floppy drive number as 0, 1, 2, or 3.

xxx is a 3-character designation, SUB, which is present if the invalid directory is a subdirectory.

xxxx is an 8-character ASCII Volume Identification.

xxxxxxxx is a 16-character ASCII Filename.

FREE RECORDS POOL ERROR
There are two type of alarm reports generated in response to a free records pool
error. Each is described below.

    a. <u>Invalid Free Sector Map</u>. This report is generated to inform the operator
that there is a physical error in the free sectors map. This report is associated
with a DELETE, RST FREE, FSM FREE, or ERP FREE floppy utility.

<u>Display Syntax</u>

      DRIVE n VOLUME-ID xxxx
      FREE RECORDS POOL ERROR. DISK FREE=TRACK nn(1) SECTOR nn(2) FILE=xxxxxxxx

• Where
          n is a decimal digit indicating floppy
          drive number 0, 1, 2, or 3.

      xxxx is an 8-character ASCII Volume
          Identification.

        nn is a 2-digit decimal indicating:
        (1) track location, 0 to 77
        (2) sector location, 1 to 26

xxxxxxxx is a 16-character ASCII Filename.

b. <u>Invalid Free Record Pool</u>. This report is generated if an error occurs during any floppy utility involving a write operation, e.g., Movedisk, Change Filename, Copy File, etc.

<u>Display Syntax</u>

       DRIVE n VOLUME-ID xxxx
       FREE RECORDS POOL ERROR. RECORD=TRACK nn(1) SECTOR nn(2)

. Where:
           n is a decimal digit indicating floppy drive
              number 0, 1, 2, or 3.

       xxxx is an 8-character ASCII Volume
              Identification.

       nn is a 2-digit decimal indicating:
           (1) track location, 0 to 77
           (2) sector location, 1 to 26

WRITE ERROR ON FLOPPY
This report is generated when a write error to the disk occurs during any utility involving a write operation.

<u>Display Syntax</u>

       DRIVE n VOLUME-ID xxxx
       WRITE ERROR ON FLOPPY. FILE=xxxxxxxx
       LOCATION=TRACK nn(1) SECTOR nn(2)

. Where
           n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

       xxxx is an 8-character ASCII Volume Identification.

       xxxxxxxx is a 16-character ASCII Filename.

       nn is a 2-digit decimal indicating:
           (1) track location, 0 to 77
           (2) sector location, 1 to 26

READ ERROR ON FLOPPY
This report is generated when an error occurs during any utility involving a read operation.

Display Syntax

        DRIVE N VOLUME-ID xxxx
        READ ERROR ON FLOPPY. FILE=xxxxxxxx
        LOCATION= TRACK nn(1) SECTOR nn(2)

. Where
                n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

        xxxx is an 8-character ASCII Volume Identification.

    xxxxxxxx ia a 16-character ASCII Filename.

            nn is a 2-digit decimal indicating:
            (1) track location, 0 to 77
            (2) sector location, 1 to 26

WRITE PROTECT ERROR
This report is generated when a write operation is performed on a disk that is write-protected.

Display Syntax

        DRIVE n VOLUME-ID xxxx
        WRITE PROTECT ERROR ON FILE xxxxxxxx
        LOCATION= TRACK nn(1) SECTOR nn(2)

. Where:
                n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

        xxxx is an 8-character ASCII Volume Identification.

    xxxxxxxx is a 16-character ASCII Filename.

            nn is a 2-digit decimal indicating:
            (1) track location, 0 to 77
            (2) sector location, 1 to 26

DISK FULL
This report is generated when an attempt is made to add a file to a disk that doesn't have sufficient capacity.

Display Syntax

```
DRIVE n  VOLUME-ID xxxx
DISK FULL ON FILE xxxxxxxx
```

. Where:

n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

xxxx is an 8-character ASCII Volume Identification.

xxxxxxxx is a 16-character ASCII Filename.

FLOPPY NOT READY OR DISABLED
This report is generated in response to an attempt to perform any floppy utility without the disk in the drive, or the drive door closed.

Display Syntax

```
FLOPPY DRIVE n  NOT READY OR DISABLED.  VOLUME-ID xxxx
```

. Where:

n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

xxxx is an 8-character ASCII Volume Identification.

TERMINAL FLOPPY DRIVE ERROR
This report is generated when there is a terminal error during the initialization
of a floppy drive.

Display Syntax

        DRIVE n(1) VOLUME-ID xxxx
        TERMINAL ERROR ON n(2)
        ERROR STATUS= X'nn'

. Where:

            n is a decimal digit indicating:
            (1) floppy drive number 0, 1, 2, or 3.
            (2) the source of the directory error as:
                0 = Volume Label Record-1
                1 = Volume Label Record-2
                2 = Error Records Pool
                3 = Free Sectors Map
                4 = Restore
                5 = Master Directory
                6 = Reserve Sector Track (limit exceeded)

        xxxx is an 8-character ASCII Volume Identification

        X'nn' is a 2-digit hex value used for Customer Engineering debugging purposes.

INVALID PORT DEFINED
This report is generated in response to an operator attempt to define a port type
other than an I/CTP, I/FDP, or I/DGP as a logging port.

Display Syntax

        INVALID LOG PORT (X'nn'(1) X'nn'(2))NOT AN ICTP, IFDP, OR DATAGRAM PORT.

. Where:
        X'nn' is the two-digit hexadecimal address of:
                (1) - the defined logging node
                (2) - the defined logging port

RESERVE SECTORS WARNING
This report is generated as a warning to the operator that the number of available sectors is running low.

Display Syntax

    DRIVE n   VOLUME-ID xxxx
    RESERVE SECTOR nn(1) IN USE OF nn(2)
    RSTFREE SHOULD BE RUN FROM ICTP SOON.

. Where
            n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

         xxxx is an 8-character ASCII Volume Identification.

           nn is a 2-digit decimal indicating:
              (1) the number of sectors in use.
              (2) the total number of sectors available.

      RSTFREE is a floppy utility offered by the CT to free the sectors which are
              reserved in the Reserve Sectors Track (RST).

RESERVED SECTORS MINIMUM REACHED

This report is routed to the operator when the number of available sectors falls below a defined minimum.

<u>Display Syntax</u>

```
DRIVE n        VOLUME-ID xxxx
RESERVE SECTORS MINIMUM REACHED OR EXCEEDED
RSTFREE MUST BE RUN BEFORE NEXT FLOPPY IPL
OR DRIVE WILL NOT BE ALLOWED ONLINE.
```

• Where:

n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

xxxx is an 8-character ASCII Volume Identification.

RSTFREE is a floppy utility offered by the CT to free the sectors which are reserved in the Reserve Sectors Track (RST).

IPL is Initial Program Load.

SEEK ERROR
This report is generated during any operation involving a read or write operation
when a hardware error occurs.

Display Syntax

    VOLUME-ID xxxx(1)
    SEEK HARDWARE ERROR ON TRACK nn(1) SECTOR nn(2)
    RECORD TYPE=xxxx(2)
    FILENAME-xxxxxxxx

. Where:
            n is a decimal digit indicating floppy drive number 0, 1, 2, or 3.

        xxxx is 8-character ASCII text indicating:
            (1) Volume Identification
            (2) Record Type as:
                DATA
                VLR-1 (VOLUME LABEL RECORDS-1)
                ERP (ERROR RECORDS POOL)
                MASTER DIRECTORY
                FSM (FREE SECTORS MAP)
                SUB (SUBDIRECTORY)
                UNKNOWN

    xxxxxxxx is a 16-character ASCII Filename.

USER/READER COMMENTS

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Please comment on this manual's completeness, accuracy, organization, usability, and readability.

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---------------------------- FOLD HERE -------------------------------

------------------------ DO NOT TEAR — FOLD HERE AND STAPLE -------------------------
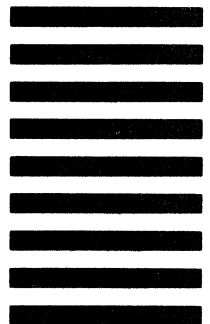
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