®*MICOM BOX* type 3

Protocol Converter

User's Manual
Stock Number 800-1386-1a

MICOM®

®MICOM BOX type 3

Protocol Converter

User's Manual
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FEATUREPAK Cartridges
MB3-BPC and MB3-SPC

September 1987

MICOM BOX type 3

Protocol Converter

Addendum
Stock Number 801-1386-101

FEATUREPAK Cartridges
MB3-BPC and MB3-SPC

This addendum is for use with the MICOM BOX type 3 Protocol Converter User's Manual, stock number 800-1386-1a. It provides new information on configurable channel data rates, and a replacement figure for the Terminal Type Menu.

Faster Data Rate Available

You can now configure up to eight input asynchronous channels of the MB3 Protocol Converter for the data rate of 19,200 bps. This increases the already available range of 300, 600, 1200, 2400, or 9600 bps. Autobaud is available at speeds of up to 9600 bps, but not at 19,200 bps.

NOTE: **No more than eight channels will perform satisfactorily at 19,200 bps.**

Paragraphs 5.2.3 and A.2 of the MB3 Protocol Converter User's Manual (stock number 800-1386-1a) show the possible speeds you may choose from. Make sure to update these pages to reflect the new 19,200 bps option.

Terminal Type Menu

Refer to the following figure in place of figure 6-2 of the MB3 Protocol Converter User's Manual. An additional terminal type (HP Generic) has been added.

TERMINAL	CHAR.	TERMINAL	CHAR.	TERMINAL	CHAR.
TACT	T	HZT EX80	EX	TV9XX	V9
BEH-DM78	DM	HZT 1400	H4	TV970	VO
CItoh 80	CI	HZT 1500	H5	T2200/39	AS
DM-CSCAN	CS	IBM PC	PC	T5410/20	54
DG200	DG	IBM 3101	IO	VP 60	V6
DECVT-52	V5	IBM 3151	I5	VP60 COL	6C
DECVT100	V1	IBM 3161	I1	VP 78	V7
DECVT SP	VS	IBM 3163	I3	VP78 COL	7C
DECVT220	V2	IBM 3164	I4	XL 42/44	X4
DECVT240	V4	LS-ADM3A	3A	WYSE 50	W5
ESP-1078	E1	LS-ADM5	A5	WYSE 100	W1
ESP 6310	E6	LS-ADM22	A2	WYSE 350	W3
HP 2621	H2	LS-31/42	A3	Hrdcpy 1	P1
HP 2640	H6	LS-1178	A8	Hrdcpy 2	P2
HP 2392A	H9	NT-FONE	FN	Hrdcpy 3	P3
HP GENRC	HG	Scanset	SC	HRDCPY 4	P4
HZT ESP2	E2	TEL 10M	LR		

Figure 6-2. The Terminal Type Menu

THANK YOU FOR CHOOSING THE MICOM BOX TYPE 3 PROTOCOL CONVERTER

The MICOM BOX Type 3 (MB3) Protocol Converter, a member of MICOM's family of intelligent data communications products, is designed to help you make the most efficient use of your data communications lines.

WARRANTY

MICOM provides a warranty for the MB3 Protocol Converter, as described on the following page. Information about equipment repair by MICOM Customer Service is also on the following page.

PUBLICATION CHANGE REQUEST

There is a postage-paid comment form at the end of this manual for you to use if you think of an improvement to, or find a mistake in, this manual.

NOTICE

Specifications, tolerances, and design characteristics described in this manual are subject to change without notice.

TRADEMARKS

MICOM, MICOM BOX, and FEATUREPAK are trademarks of MICOM Systems, Inc.

IBM is a trademark of International Business Machines Corporation.

SAFETY WARNING

Always observe standard safety precautions during installation, operation, and maintenance of this product. To avoid the possibility of electric shock, disconnect the power cord from the power source before performing any repairs.

WARRANTY

MICOM warrants that the equipment delivered shall be free from defective material and workmanship for a period of 1 year from the date of delivery of equipment when given normal, proper and intended usage, and agrees to repair or replace, without cost, any part manufactured by MICOM provided that:

(a) MICOM is promptly notified upon discovery that the equipment is defective;

(b) The equipment is returned prepaid to the MICOM plant from which the equipment was shipped; and

(c) MICOM's examination of the equipment shall disclose that any defect was not caused by accident, misuse, neglect, alteration, improper installation, unauthorized repair or improper testing.

MICOM may, in its sole discretion, elect to repair or replace the equipment, in which event MICOM shall have a reasonable time to make repairs or to replace the equipment. MICOM will return the equipment freight prepaid.

THE PROVISIONS OF THIS WARRANTY ARE IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND MICOM'S LIABILITY ARISING OUT OF THE MANUFACTURE, SALE, OR SUPPLYING OF THE EQUIPMENT OR ITS USE, WHETHER BASED UPON WARRANTY, CONTRACT, NEGLIGENCE, PRODUCTS LIABILITY OR OTHERWISE, SHALL NOT EXCEED THE ORIGINAL COST TO THE BUYER OF THE EQUIPMENT. IN NO EVENT SHALL MICOM BE LIABLE TO THE BUYER OR ANY OTHER PERSON OR ENTITY FOR UNINTENDED OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR USE DAMAGES) ARISING OUT OF THE MANUFACTURE, SALE OR SUPPLYING OF THE EQUIPMENT.

MICOM warrants all repairs or upgrades performed at its factory location or performed by MICOM Customer Service for a period of 90 days after completion.

HOW TO GET YOUR EQUIPMENT FIXED BY MICOM CUSTOMER SERVICE

MICOM's Customer Service offers a wide range of support functions, including complete factory repair for both in-warranty and out-of-warranty equipment.

Before returning any equipment, please contact MICOM Customer Service or your local Distributor. In the U.S.A. and Canada, call MICOM's Customer Service Hotline (800) 833-3282. In all other countries, contact your local MICOM Distributor.

A Customer Service engineer will answer warranty-related questions, discuss your specific equipment problems, and — when necessary — give you shipping instructions for returning equipment to MICOM for repair. To return a product for service or repair, you *must* obtain a Return Authorization number from MICOM Customer Service.

When you do call Customer Service, it will be very helpful to know the PROM set number of the unit malfunctioning. You can easily determine this information by looking at the label on the bottom of the FEATUREPAK cartridge.

Shipping charges must be prepaid.

800-1386-1a

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PREFACE

This manual describes the MICOM BOX Type 3 (MB3) Protocol Converter and how to use it. It should be used in conjunction with the MICOM Supported Terminal Reference Guide, stock number 800-1423, which describes the terminals the protocol converter supports.

This manual is intended for persons who will be installing and/or supervising the use of the MB3 Protocol Converter.

It is assumed that such an audience has a working familiarity with the IBM 3270 Information Display System (IDS). If you do not have this background, you can use the following resources:

- IBM publications about their 3270 IDS. Refer to paragraph 2.4.

- Section 2 of this manual provides background information about the IBM world and protocol conversion using the MB3 Protocol Converter.

The following documentation conventions are used:

- CR represents the carriage return key on ASCII terminals.

- Ctrl-X means hold the control key and press X.

- ESC X means press the escape key and then press X.

- Either uppercase or lowercase letters may be used to enter keyboard commands, unless otherwise indicated.

The manual is divided into the following sections and appendixes:

- SECTION 1, DESCRIPTION, is a general overview of the MICOM BOX Type 3 and describes some of its features and capabilities.

- SECTION 2, ACCESSING THE IBM WORLD, is a brief description of the IBM world, how protocol conversion fits into this world, and how the MICOM BOX Type 3 Protocol Converter can be used in it.

- SECTION 3, THE MICOM BOX TYPE 3, is an in-depth description of the MB3 hardware.

- SECTION 4, INSTALLATION, describes how to select a location, attach the cables to the connectors, and apply power.

- SECTION 5, COMMAND PORT, describes how to configure your unit, and the channels attached to it, to meet the requirements of your particular application.

- SECTION 6, 3270 MODE, describes how to get a terminal into operation emulating an IBM 3270 terminal.

- SECTION 7, HARDCOPY TERMINAL SUPPORT, describes how to use a keyboard printer as if it were a display terminal.

- SECTION 8, PRINTER OPERATIONS, describes how to use a printer in conjunction with your display terminal.

- SECTION 9, TERMINAL-ACTIVATED CHANNEL TEST, describes the TACT Feature, which allows you to perform testing of your unit and the system.

- SECTION 10, SECURITY FEATURES, describes the protocol converter security features.

- SECTION 11, OPTIONS, describes what you can do to enhance the use of your protocol converter.

- APPENDIX A, TECHNICAL SPECIFICATIONS, lists the technical specifications for your protocol converter.

- APPENDIX B, APPLICATIONS, describes some of the more sophisticated protocol converter applcations.

- APPENDIX C, MECHANICAL PROCEDURES, describes some of the mechanical procedures needed to service your unit.

- APPENDIX D, KEYBOARD MAPS AND THE CODE CONVERSION TABLES, lists the key conversions for generic keyboards and keyboard printers, as well as the hexadecimal conversions your protocl converter makes between EBCDIC and ASCII characters.

- APPENDIX E, IBM SYSTEM SOFTWARE AND PROGRAMMING SUPPORT, lists IBM publications that describe their system software and what types of IBM programming the protocol converter supports.

- APPENDIX F, DEFAULT VALUES, lists the configuration values that are stored in ROM; the values that the protocol converter will revert to if a cold start is performed.

- APPENDIX G, CABLES, shows the pin assignments for the MICOM cables that are used with the protocol converter.

SECTION 1

DESCRIPTION

The unit shown in figure 1-1 is the MICOM BOX Type 3 (MB3). The functionality for the unit is provided by various FEATUREPAK cartridges. The MB3 using FEATUREPAK cartridge MB3-BPC or MB3-SPC is called the MICOM BOX Type 3 Protocol Converter, which is described in this manual.
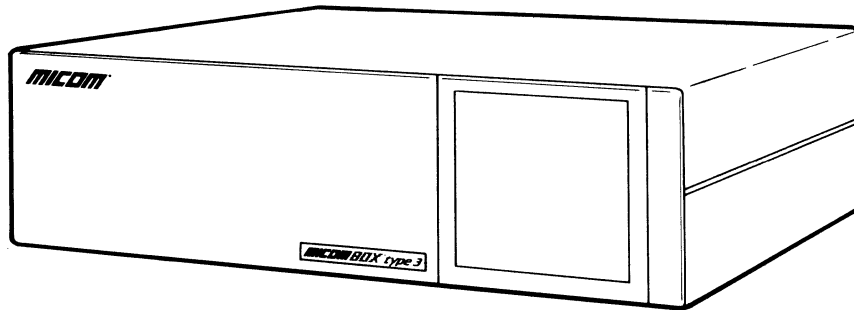
MI-1387-1a-01

Figure 1-1. The MICOM BOX Type 3

1.1 BASIC FUNCTIONS

The MB3 Protocol Converter (called the protocol converter throughout this manual) enables asynchronous ASCII terminals, printers, and computers to be used as IBM devices. To the IBM host, the protocol converter and its attached devices appear to be IBM synchronous devices.

The protocol converter fully emulates the capabilities of an IBM 3274 Control Unit, Model 51C: it accepts transmissions from the host, formats screen images from these transmissions, displays the images on designated display terminal screens, and directs data to printers.

The protocol converter thus provides a gateway to IBM host communications for a wide variety of asynchronous terminals and printers.

1.2 MODELS

The model numbers for the protocol converter are MB3110-4, MB3110-10, and MB3110-16. These models have 4, 10, and 16 channels, respectively.

1.3 FEATUREPAK CARTRIDGES

FEATUREPAK cartridges contain the firmware (software in a hardware form) that determines the function of the MB3 unit.

To function as a protocol converter, the MB3 must be used with one of the following FEATUREPAK cartridges:

- MB3-BPC -- This is the BSC FEATUREPAK cartridge. It enables the MB3 to communicate with a host system using 3274 BSC protocol.

- MB3-SPC -- This is the SNA FEATUREPAK cartridge. It enables the MB3 to communicate with a host system using 3274 SNA/SDLC protocol.

1.4 FEATURES

All protocol converter FEATUREPAK cartridges have the following features:

- The Message Feature enables the protocol converter to send stored messages to attached terminals and printers.

  You can configure the following messages:

  - The banner message, which appears on a terminal screen when entering 3270 mode. The banner message is typically used to identify the system.

  - The broadcast message, which is text that the Command Port operator sends to a selected terminal or to all terminals attached to the protocol converter.

  - The disconnect message, which is a message that the protocol converter sends to a terminal before removing it from 3270 emulation.

- The Draft Formatting Feature permits local control of print formatting. It allows a user to select a specific printer and to specify spacing, print case, and page length.

- The Automatic Logon Feature simplifies and expedites the connection of a terminal to a host application. Upon receiving a simple keyboard request, the protocol converter transmits a user-configured logon message sequence to the host system.

- The Inbound Priority Feature establishes one of two priority levels for each channel. Inbound traffic from higher priority channels is transmitted before inbound traffic from lower priority channels.

- The Security Protection Feature reduces system and network vulnerability. The Command Port operator can control the following security capabilities:

  - Terminal Password Access prevents unauthorized terminal use. It requires a user to enter a password before a terminal can operate in 3270 mode.

  - Command Port Password Access prevents unauthorized use of the Command Port.

  - Logoff Message enables the protocol converter to send a logoff message to the host when a terminal is removed from 3270 emulation.

  - SNA Session Control Security prevents access to unauthorized application software. This capability is available only with FEATUREPAK cartridge MB3-SPC.

  - TACT/TICC Disable allows TACT and TICC to be disabled. This prevents unsophisticated terminal users from making inadvertent or unauthorized changes to the configuration of a channel.

  - Timeout Disconnect allows a specified time of inactivity to be set, after which a terminal will be removed from 3270 mode. Optionally, a warning message can be sent to the terminal prior to disconnection from 3270 mode.

  - Variable XID Data allows the Command Port operator to specify the identity of a protocol converter in an SNA dial application. This capability identifies the protocol converter as a specific control unit to the host processor. Variable XID Data is available only with FEATUREPAK cartridge MB3-SPC.

- The Terminal-Activated Channel Test (TACT) Feature enables a terminal attached to the protocol converter to run self tests.

- The Terminal-Initiated Channel Configuration (TICC) Feature enables any terminal attached to the protocol converter to modify its parameters.

- The Display/Printer Line-Sharing Feature lets users support both a display terminal and a printer using just one protocol converter channel. (The display terminal must have an externally addressable auxiliary printer port for this feature to be supported.)

- The Asynchronous Host Feature adds four asynchronous host channels and permits switching of a terminal between 3270 emulation and any of four asynchronous host channels.

- The Graphics Pass Through Feature provides support for graphics software that can be used on ASCII terminals attached to the protocol converter.

1.5 CAPABILITIES

All protocol converter FEATUREPAK cartridges have the following capabilities:

- Autobaud detect enables the protocol converter to determine the data rate of all attached terminals automatically.

- The Command Port is used for on-line system configuration and performance monitoring.

- International character set enables a terminal or printer to display or print certain non-standard characters by allowing modifications in the EBCDIC-to-ASCII code conversion tables.

- Keyboard map enables keys or key sequences on supported asynchronous terminals to correspond to keys on IBM 3278 terminals.

- Screen refresh re-displays a screen image on a terminal.

- Status inquiry enables a terminal user to request information normally displayed on a 3270-type terminal status line.

- Terminal type selection enables each channel to support many possible types of terminals, including keyboard printers and personal computers.

1.6 OPTIONS

The following options are available:

- The SyncModem Cable Option (MB3-SyncModem) is used to connect the protocol converter to a synchronous modem for connection to the IBM host.

- The SyncHost Cable Option (MB3-SyncHost) is used to connect the protocol converter to an IBM communications controller or front-end processor.

NOTE: One of the two Sync Cable Options must be specified before purchase. The option chosen will depend on your application. The other option is available should your application change. The option chosen is provided at no charge when ordered with a FEATUREPAK cartridge.

These options are more fully described in section 11.

1.7 UPGRADES

The protocol converter can be enhanced with a field-installable upgrade kit, MB-RMK-1, the Rack-Mount Upgrade Kit. This upgrade kit enables you to mount the protocol converter unit in a standard 19-inch rack.

1.8 IBM PERSONAL COMPUTER SOFTWARE

A special MICOM software product, M7000/IBMPC, can be ordered. This software enables an IBM Personal Computer (PC) to emulate an IBM 3278 or 3279 display station. M7000/IBMPC can be ordered alone or in conjunction with any other option.

SECTION 2

ACCESSING THE IBM WORLD

The protocol converter provides a gateway to the synchronous IBM world for asynchronous devices. It does this by allowing asynchronous terminals, printers, and computers to access the IBM host.

This section describes how the protocol converter provides a gateway into the IBM world.

2.1 THE IBM WORLD

A typical IBM device arrangement includes three general parts. These parts are the following:

● The IBM host computer

● The control unit or units

● The synchronous devices

These three parts are shown in figure 2-1 and are described in the following paragraphs.
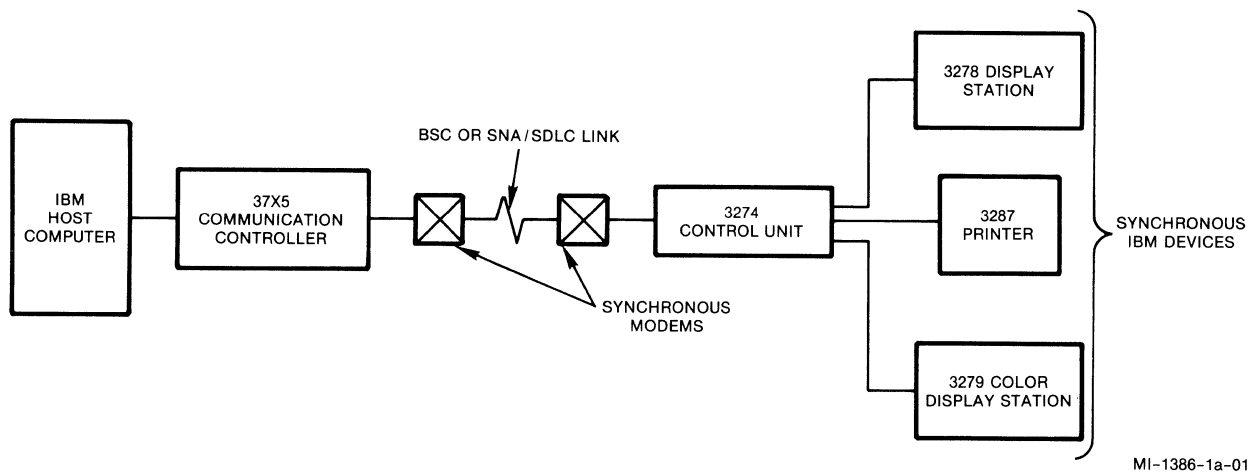
Figure 2-1. A Typical IBM Device Arrangement

2.1.1 The IBM Host Computer

The IBM host computer (which will be called the host throughout the rest of this manual) is the System/370-type IBM computer that has the data processing power, the programs, and the storage that terminal users want to access.

A host uses channels as intermediary devices to relieve it from the burden of communicating directly with the peripheral devices.

2.1.2 The Control Units

Control units are used to regulate data flow and coordinate operation between peripheral devices and the host.

There are two types of control units associated with a typical IBM device arrangement. They are the following:

- The 3274 Control Unit, Model 51C

- The 37X5 Communication Controller

These control units are described in the following paragraphs.

Peripheral devices connect to the 3274 Control Unit, which can be located either remotely or at the host site.

If located locally (it must be within 200 feet of the host), it can attach directly to channels on the host; otherwise, it is attached to a communication controller. See figure 2-1.

The Communication Controller is used only when the peripheral devices are located remotely from the host. When this is the case, the peripheral devices attach directly to a 3274 Control Unit, which attaches to a 37X5 Communication Controller over a communications link. See figure 2-1.

2.1.3 The Synchronous Devices

Synchronous IBM devices attach, through the control unit or units, to the host. These devices are commonly terminals and printers. See figure 2-1.

It is these devices that are accessing the programs resident on the host.

2.2 PROTOCOL CONVERSION

A communications protocol is a set of rules governing information flow in a data communications link or network. A protocol converter is a device that translates from one communications protocol to another.

The MB3 Protocol Converter is a device that translates between one of two IBM protocols (BSC or SNA/SDLC) and the protocol of the attached peripheral devices.

To provide this protocol conversion, the MB3 takes the place of (and emulates the functions of) the Control Unit.

Figure 2-2 shows the same device arrangement as shown in figure 2-1, with the MB3 Protocol Converter taking the place of the 3274 Control Unit, and asynchronous devices taking the place of the synchronous IBM devices.
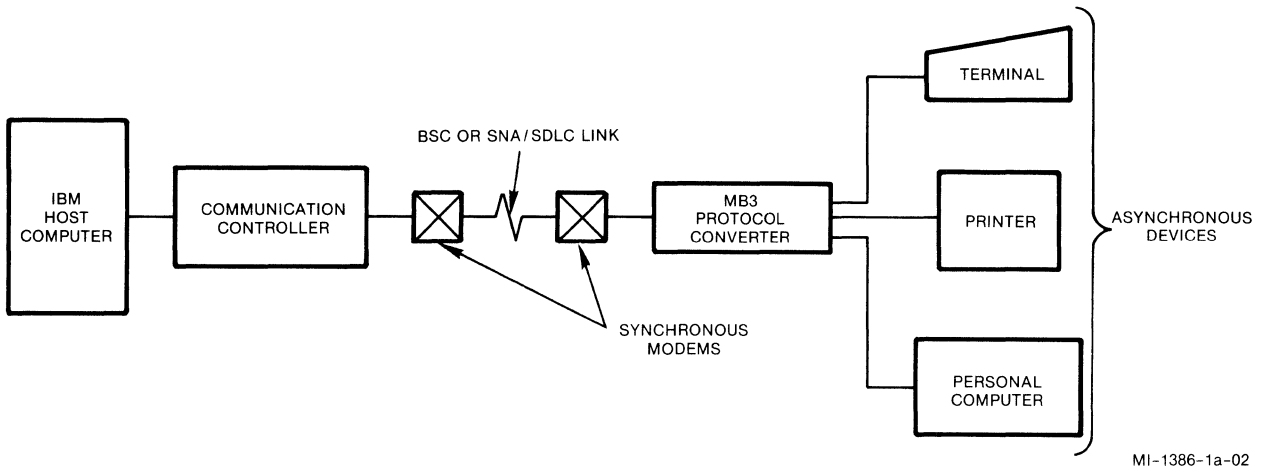
Figure 2-2. Using the MB3 Protocol Converter

2.3 REFERENCES

For more information on the IBM world, refer to the following IBM publications:

- An Introduction to the IBM 3270 Information Display System (GA27-2739)

- IBM 3270 Information Display System 3278 Display Station Operator's Guide (GA27-2890)

- IBM 3287 Printer Operator's Guide (GA18-2002)

- IBM 3270 Information Display System: 3274 Control Unit Description and Programmer's Guide (GA23-0061-0)

SECTION 3

THE MICOM BOX TYPE 3

The MICOM BOX Type 3 is made up of the following major components (see figure 3-1):

* Enclosure

* Touch Panel

* Modules

* Indicators

* FEATUREPAK cartridge

* Power supply

An optional Rack-Mount Upgrade Kit (MB-RMK-1) is available for installing the protocol converter in a 19-inch wide rack (refer to paragraph 4.1.2).
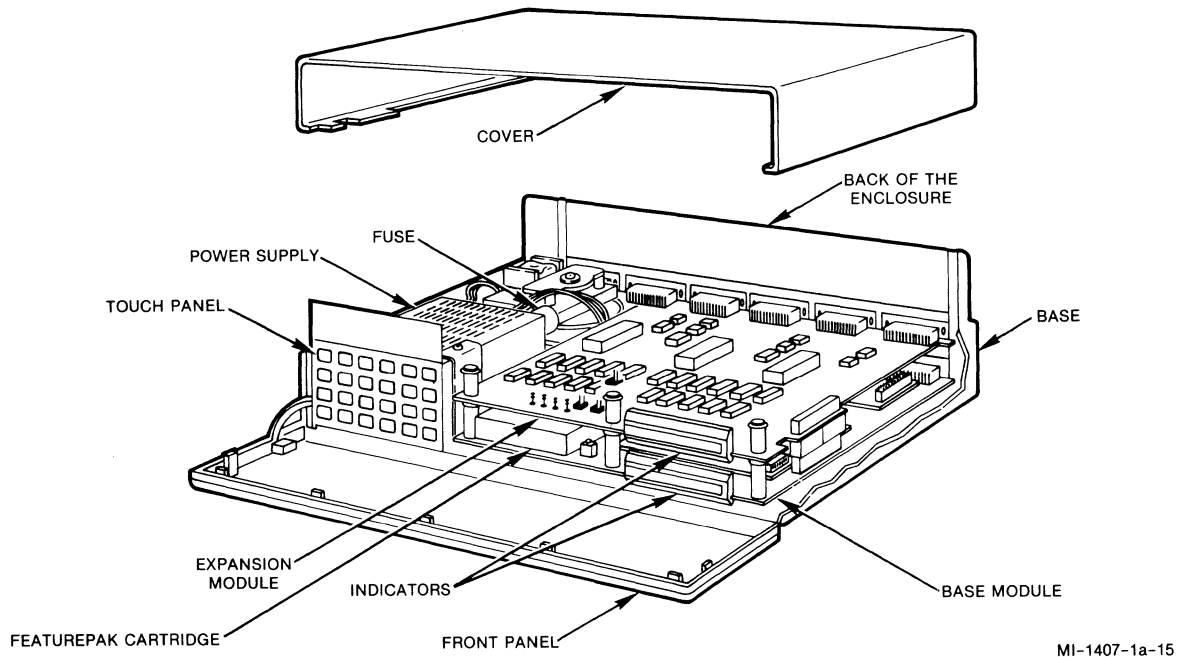
Figure 3-1. Major Components of the MB3

3.1 ENCLOSURE

The enclosure consists of a base, a cover, a front panel, and a back (see figure 3-1).

The base, which interlocks with the cover, holds the other major components. The front panel swings open for access to the inside of the unit. The back consists of interlocking panels that are attached to the modules. (A blank panel is installed when an expansion module is not in place.)

It is necessary to open and close the enclosure in order to install or remove the expansion modules. Refer to appendix C for these procedures.

3.2 TOUCH PANEL

The Touch Panel is located behind the front panel. The membrane surface of the Touch Panel is sectioned into 24 keys (see figure 3-2).

1	2	3	4	MODEM	TEST
5	6	7	8	SYS 1	SYS 2
CH1/2	CH3/4	CH5/6	CH7/8	SYS 3	SYS 4
CH9/10	CH11/12	CH13/14	CH15/16	RESET	RESET
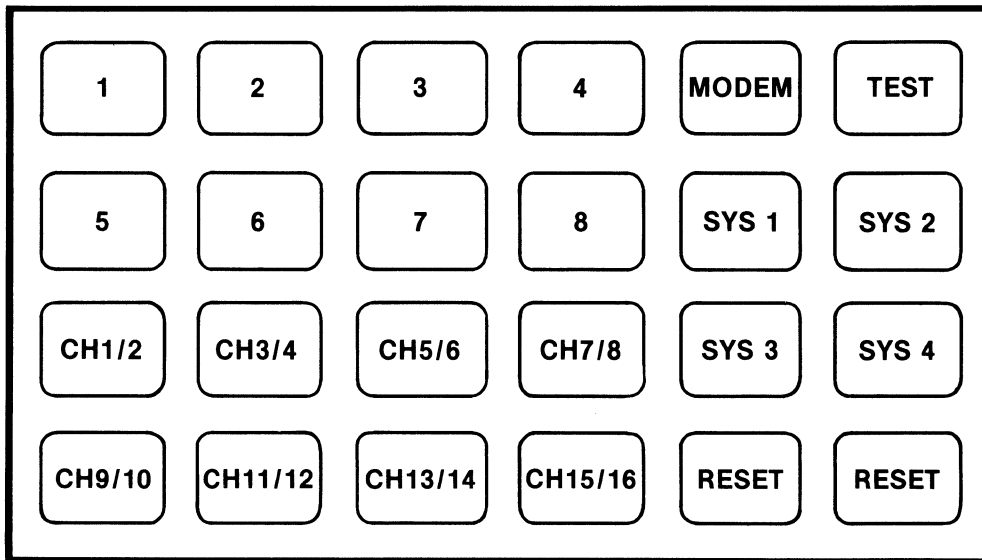
MI-1407-1a-17

Figure 3-2. The Touch Panel

You can use the Touch Panel to do the following:

- Perform a warm start

- Perform a cold start

- Set the host line data rate

- Set the control unit or physical unit address

3.2.1 Warm Start

A warm start reinitializes the protocol converter, keeping the current configuration.

NOTE: **You can also perform a warm start using selection 8 of the Configuration Commands Menu (refer to paragraph 5.2.8).**

To perform a warm start using the Touch Panel, simultaneously press both RESET keys.

Some of the indicators on the base module will go ON. When only the AT indicator remains ON, the warm start is complete. Enter CR to continue.

3.2.2 Cold Start

A cold start restores the default configuration values. For a list of the default values, refer to appendix F.

To perform a cold start, simultaneously press the SYS 3 and SYS 4 keys.

All indicators will go OFF. When AT goes ON, the cold start is complete. Enter CR to continue.

If you install a FEATUREPAK cartridge with a different PROM set number, the protocol converter will automatically perform a cold start on power up.

3.2.3 Host Line Data Rate

You can use the Touch Panel to set the host line data rate.

To set the host line data rate with the Touch Panel, perform the following procedure:

1. Press the SYS 1 key.

NOTE: After touching the SYS 1 key, you must enter the hexadecimal numbers within 15 seconds.

2. Press a key (see table 3-1) for the selected data rate.

Table 3-1. Host Line Data Rate Selections

Available Data Rates	Key to Press
1200	3
2400	CH11/12
4800	CH9/10
9600	6
19200	CH5/6

NOTE: If the synchronous host line is connected to a synchronous modem, do not use the Touch Panel to select the host line data rate. Instead, select EXTERNAL at the Command Port prompt HOST SPEED (refer to paragraph 5.2.1).

3.2.4 Setting the Control Unit or Physical Unit Address

You can use the Touch Panel to set the control unit or physical unit address. This address is a two-digit hexadecimal number.

The keys labeled 1 through 8 on the Touch Panel represent the hexadecimal digits 1 through 8. The keys labeled CH1/2 through CH15/16 represent the hexadecimal digits 9 through 0.

To set the address, perform the following procedure:

1. Obtain the address from the host site.

2. Press the SYS 2 key.

NOTE: After touching the SYS 2 key, you must enter the hexadecimal numbers within 15 seconds.

3. Press the key that represents the first hexadecimal digit of the address.

4. Press the key that represents the second hexadecimal digit of the address.

NOTE: You can also use the Command Port Controller Prompt ENTER CONTROL UNIT ADDRESS to set the control unit or physical unit address (refer to section 5).

3.3 MODULES

Modules are circuit boards that contain the logic and support circuitry necessary for operation. There are two modules available for the protocol converter. They are:

- MB3-CCM -- A four-channel base module. It is the only module in a four-channel model. It contains the following:

  - The Command Port connector, the host line connector (labeled COMPOSITE), and four channel connectors

  - The slot for the FEATUREPAK cartridge

  - Eight status activity and four channel activity indicators

- MB3-EM6 -- A six-channel expansion module. One is included in the 10-channel model and two are included in the 16-channel model. It also contains the following:

  - Six channel connectors

  - Six channel activity indicators

The locations of the base and expansion modules are shown in figure 3-1.

To install or remove expansion modules on your unit, refer to paragraph C.2 and see figure C-2.

NOTE: Each module has a panel attached to it. When modules are inserted correctly, these panels form the back of the enclosure. Filler panels are used if the panels of the expansion modules do not fully form the back of the enclosure. These filler panels must be removed before you remove any expansion modules.

3.4 INDICATORS

The indicators are located behind the front panel on the modules. They are labeled with, and identified by, their abbreviated names. They display the operating status of the unit. When an indicator is ON, it is visible through the front panel.

The base module has eight system status indicators and indicators for channels 1 through 4. The first expansion module has indicators for channels 5 through 10. The second expansion module has indicators for channels 11 through 16.

Figure 3-3 shows the indicators and table 3-2 explains the significance of their conditions.
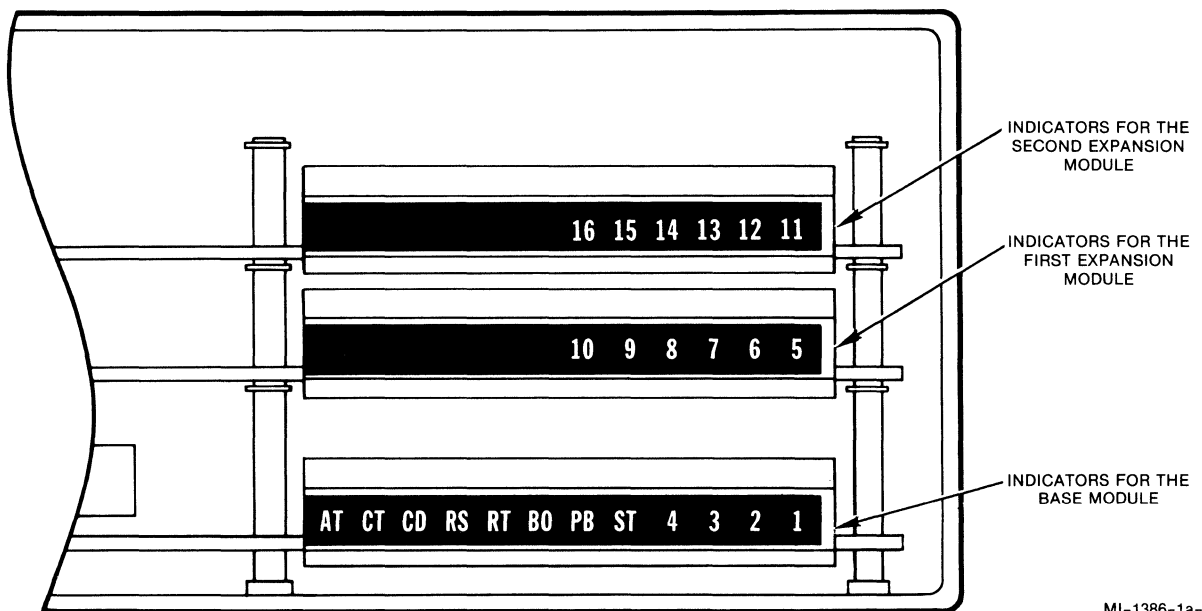
Figure 3-3. Indicators

Table 3-2. Indicator Interpretation

Indicator	ON	OFF
AT Active Mode	Normal operation	Indicates reset or a fault.
CT Contacted	When using MB3-BPC, means the protocol converter has received a Select Command or is transmitting data. When using MB3-SPC, means the controller has made contact with the PC at the SDLC level.	When using MB3-BPC, means the protocol converter has received or transmitted an end-of-text. When using MB3-SPC, means the controller has not made contact with the PC at the SDLC level.
CD Carrier Detect	Carrier Detect is present.	Carrier Detect is not present.
RS Request-To-Send	The protocol converter is ready to transmit.	The protocol converter has nothing to transmit.
RT Retransmission	Recovery from a host transmission error	Normal operation
BO Buffer Overflow	Internal buffer memory is more than 50 percent full.	Normal operation
PB Processor Busy	The protocol converter is more than 300 milliseconds behind in processing input.	Normal operation
ST Self-Test Failure	The protocol converter has detected an internal failure.	Normal operation
4, 3, 2, 1 (and so on)	A terminal is transmitting or receiving data.	No data activity

NOTE:
  The RS indicator does not indicate the status of RTS when the unit's synchronous port EIA leads are configured as constant.

3.5 FEATUREPAK CARTRIDGE

The slot for the FEATUREPAK cartridge is behind the front panel. If you are going to install or remove a FEATUREPAK cartridge, first open the front panel by pulling the top out and down.

CAUTION: Touch the protocol converter's metal enclosure before touching the FEATUREPAK cartridge to avoid possible damage to the expansion module from static discharge.

3.6 POWER SUPPLY

A multi-output ac power supply is installed prior to shipment. The input voltage is 115 or 230 V ac, 50 to 60 Hz. Output voltages are +5, +12, and -12 V dc.

Before applying power to the unit, verify that the power supply is set for the voltage used in your area, and that the appropriate fuse is installed.

Refer to paragraph C.4 for this procedure.

SECTION 4

INSTALLATION

To install the protocol converter you need to select a location, attach the cables to the connectors on the back panel, and apply power. This section describes these functions.

4.1 SELECTING A LOCATION

The location you select for your protocol converter depends on whether it is a standalone or a rack-mount unit.

CAUTION: Do not obstruct air flow around a unit.

4.1.1 Standalone Units

Standalone units should be located near the equipment to which they connect. They should also be within six feet of a grounded ac outlet. Enough space should be left for opening the door of the unit. Refer to appendix A for the size of the unit.

CAUTION: Do not stack other equipment on top of a standalone unit. This may bend the cover and damage the components inside.

4.1.2 Rack-Mount Units

For rack-mount installation, use a standalone unit with optional Rack-Mount Upgrade Kit MB-RMK-1.

Rack-mount installation instructions are included with the kit.

4.2 BACK PANEL

Connectors extend through the back panel of the protocol converter (see figure 4-1). Use the appropriate cables (refer to paragraph 4.4) to attach devices to these connectors.
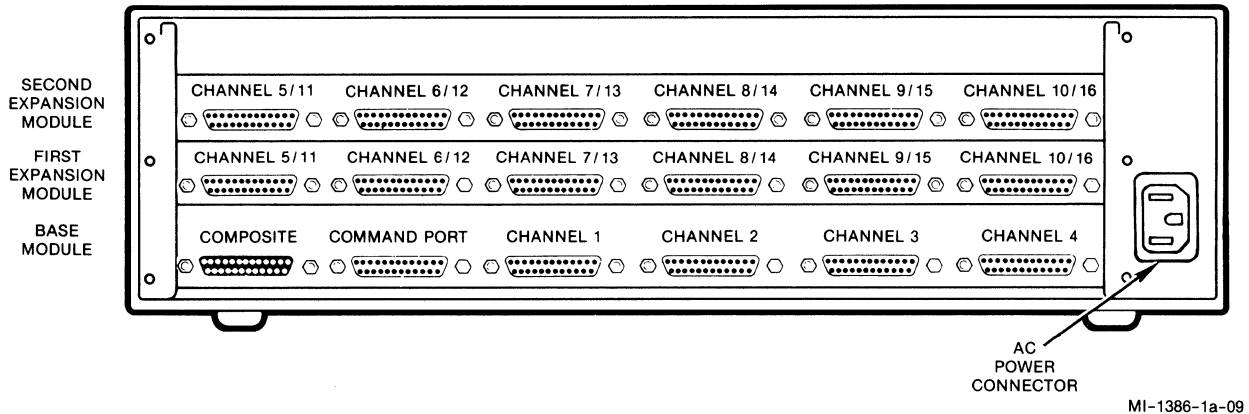
Figure 4-1. Back Panel

4.3 CONNECTIONS

There are three types of connectors on the back of the protocol converter (see figure 4-1).

They are the host line connector, the Command Port connector, and the channel connectors. (There are either 4, 10, or 16 channel connectors on your unit, depending on the model.)

4.3.1 The Host Line Connector

The host line connector (labeled COMPOSITE on the unit) attaches the protocol converter to other devices in two ways:

- It attaches the protocol converter to a synchronous modem using the Synchronous Modem Cable (see figure 4-2). This cable is available from MICOM in the SyncModem Cable Option.

- It attaches the protocol converter to a communication controller using the Synchronous Host Cable (see figure 4-3). This cable is available from MICOM in the SyncHost Cable Option.

For more information about these synchronous cable options, refer to section 11.
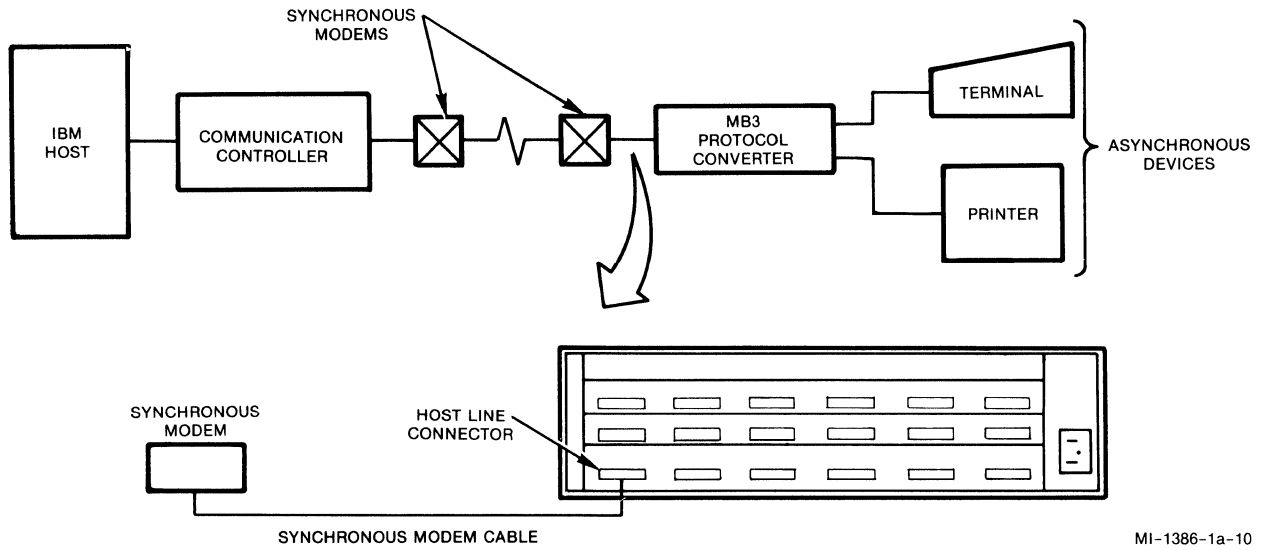
Figure 4-2. Connection to a Synchronous Modem
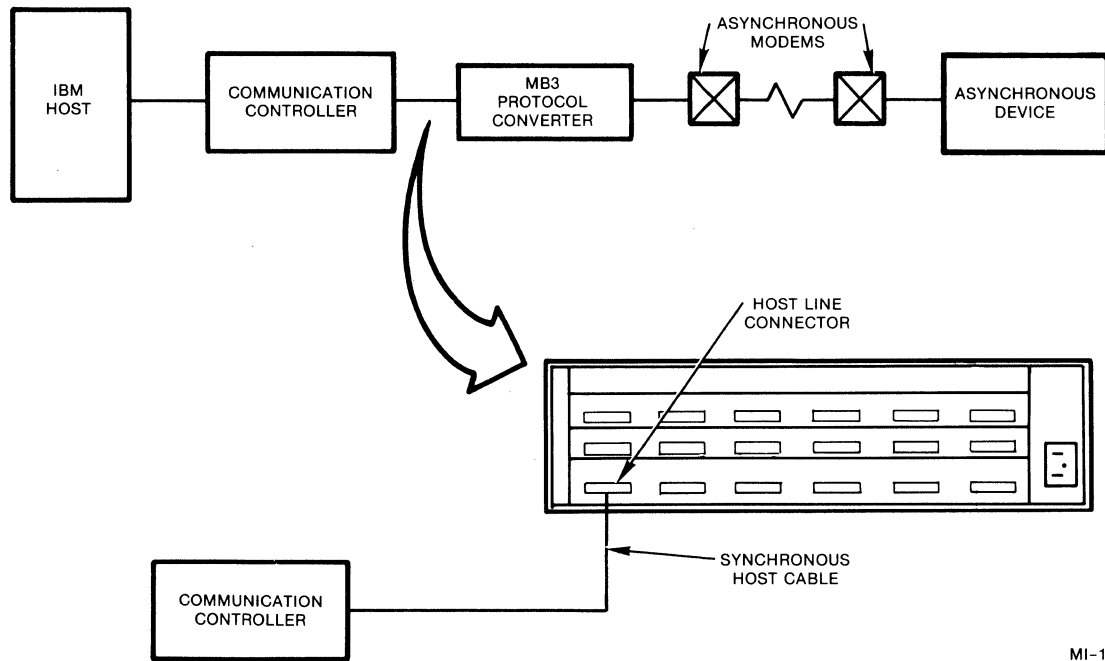
Figure 4-3. Connection to a Communication Controller

4.3.2 The Command Port Connector

The Command Port connector attaches the protocol converter to other devices in two ways:

- It attaches the protocol converter to a terminal or a printer using a MICOM or user supplied straight-through cable (see figure 4-4).

- It attaches the protocol converter to an asynchronous modem (for remote use of the Command Port) using the Crossover Cable (see figure 4-5).

NOTE: The Command Port connector can be used only for access to the Command Port. It is not available for communications.
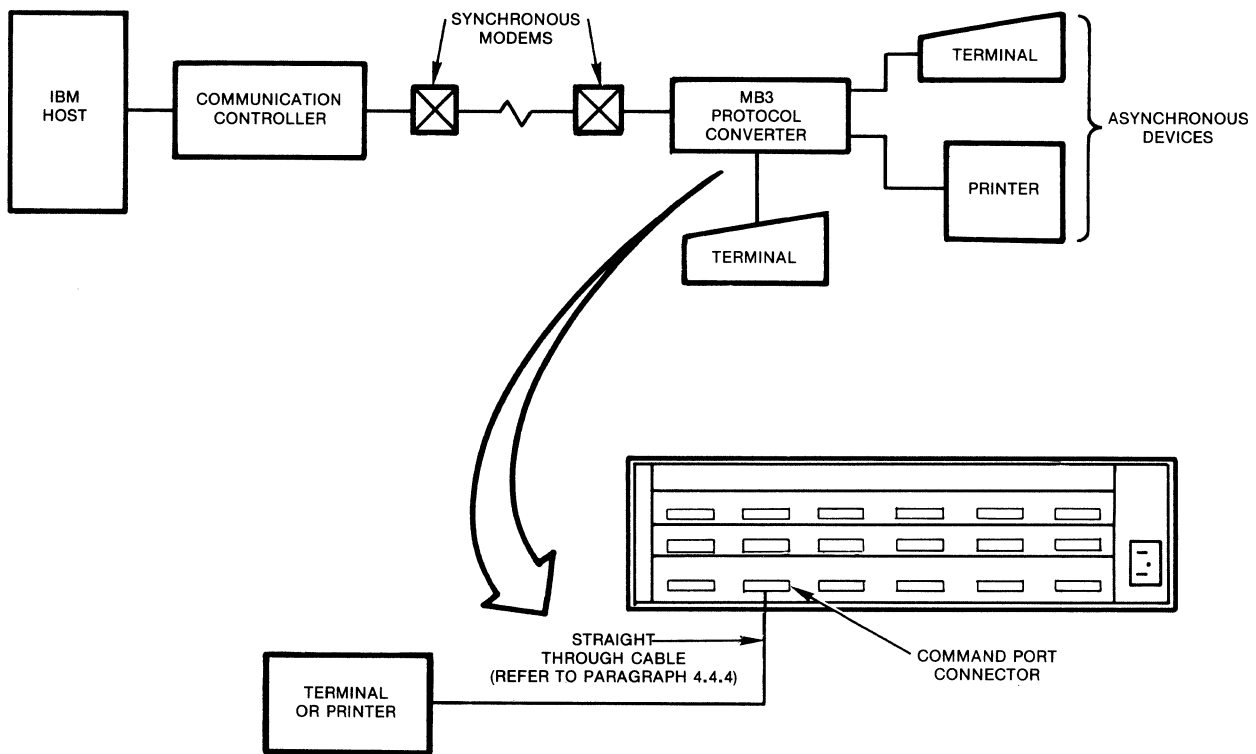
NOTE:
A TERMINAL ATTACHED TO THE COMMAND PORT CONNECTOR CAN ONLY
BE USED FOR CONFIGURING THE PROTOCOL CONVERTER. IT IS NOT
AVAILABLE FOR COMMUNICATIONS TO A HOST.

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Figure 4-4. Connection to a Terminal
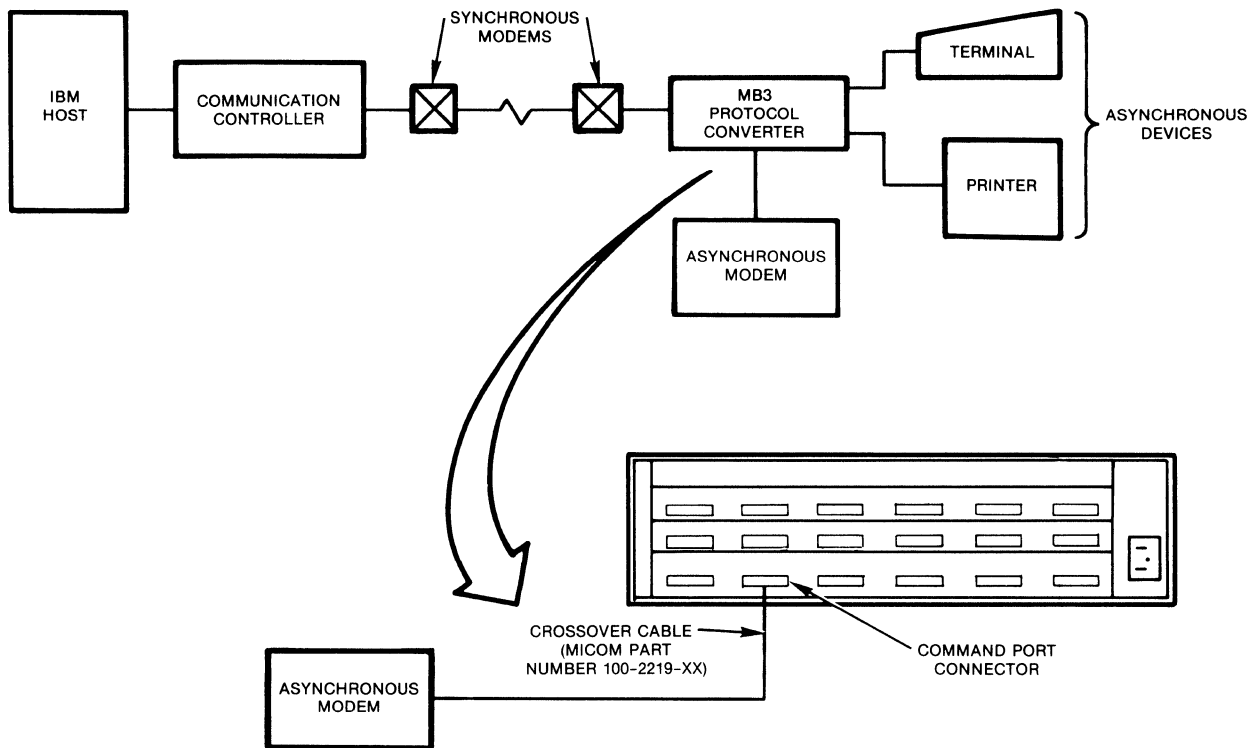
NOTE:
AN ASYNCHRONOUS MODEM ATTACHED TO THE COMMAND PORT
CONNECTOR CAN ONLY BE USED FOR REMOTE CONFIGURATION OF THE
PROTOCOL CONVERTER. IT IS NOT AVAILABLE FOR COMMUNICATIONS TO A
HOST.

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Figure 4-5.   Connection to an Asynchronous Modem

4.3.3 The Channel Connectors

The channel connectors (labeled 1 through 4, 10, or 16, depending on your model) attach the protocol converter to other devices in two ways:

- They attach the protocol converter to asynchronous DTEs, such as terminals, printers, and computers, using a MICOM or user-supplied straight-through cable (see figure 4-6).

- They attach the protocol converter to asynchronous DCEs, such as modems and Data PABXs, using the Crossover Cable (see figure 4-7).
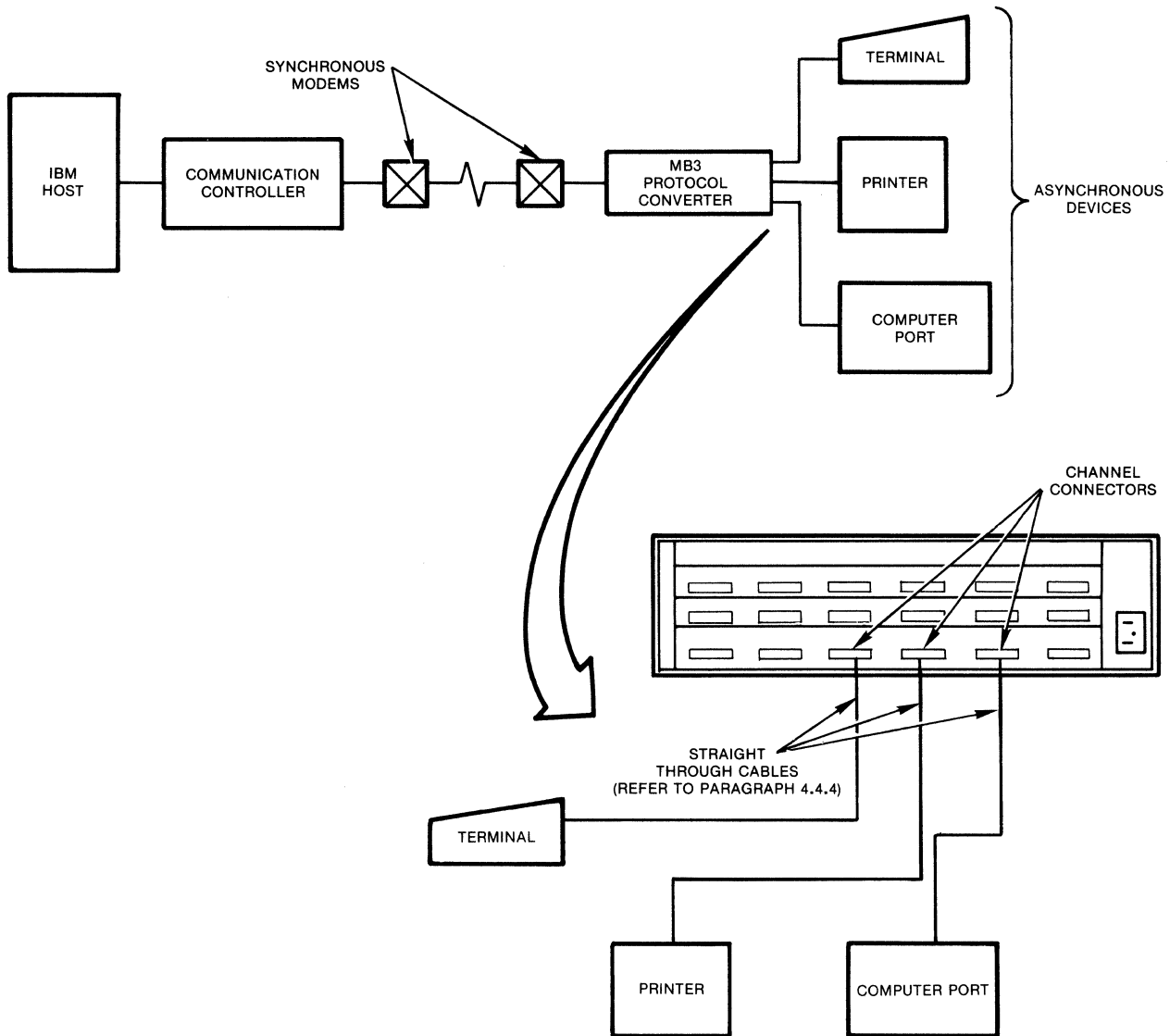
MI-1386-1a-14

Figure 4-6. Connections to Asynchronous DTE Devices

Figure 4-7. Connections to Asynchronous DCE Devices
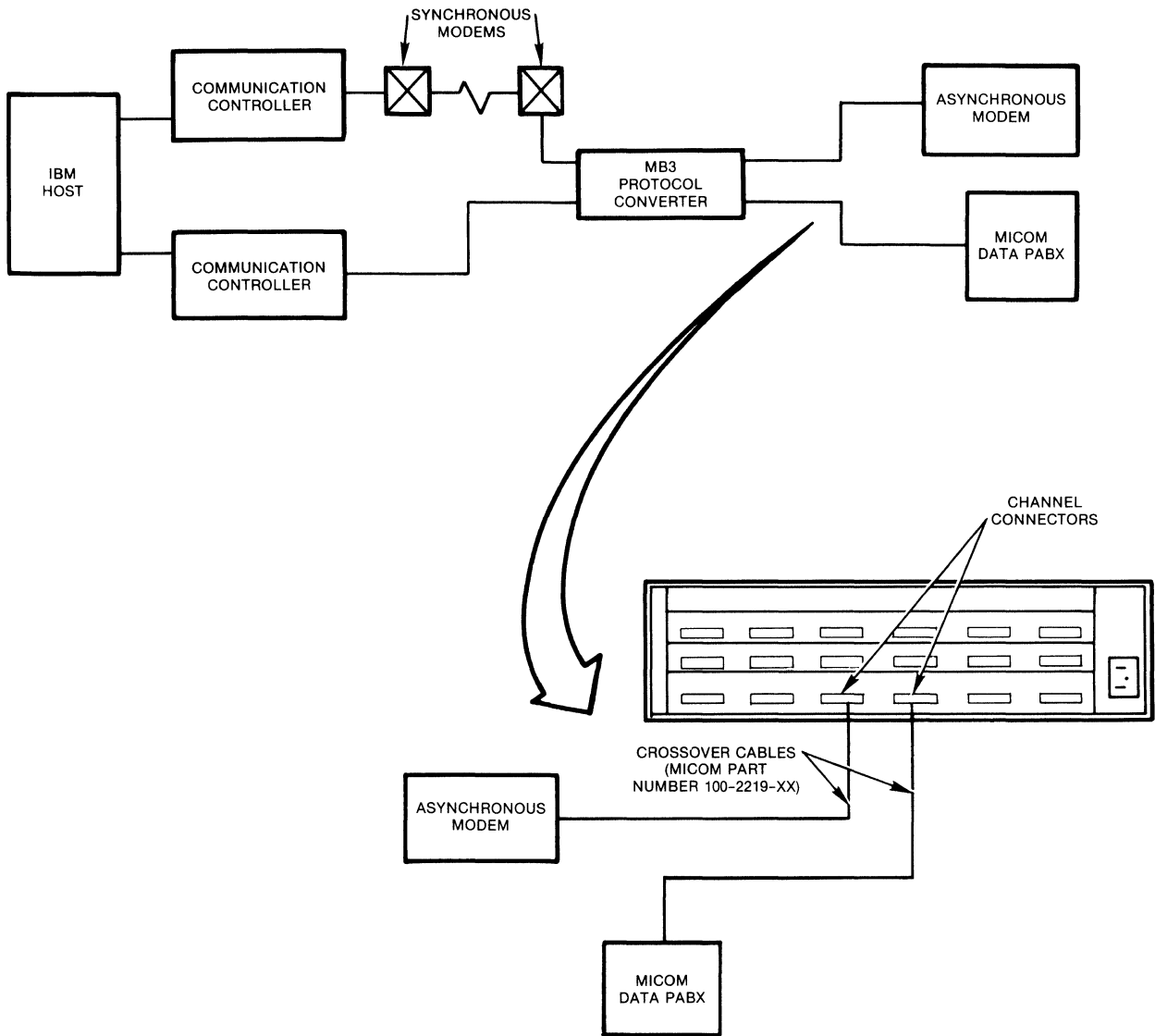
NOTE:
THE PROTOCOL CONVERTER WILL BE ATTACHED DIRECTLY TO A
COMMUNICATION CONTROLLER IF IT IS LOCATED AT THE IBM HOST SITE. IF
IT IS LOCATED REMOTELY FROM THE IBM HOST, IT WILL BE ATTACHED TO
A SYNCHRONOUS MODEM PAIR AND THEN TO THE COMMUNICATION
CONTROLLER.

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4.4 CABLING

Cables are used to connect your protocol converter to other devices. Cables come with the protocol converter, but user-supplied cables may also be used.

Non-MICOM-supplied cables must conform to the pin assignments in appendix G.

NOTE: **Any cable attached to the protocol converter should be shielded according to FCC requirements for protection against radio frequency interference. MICOM's cables meet this requirement.**

The cables used to connect the protocol converter to other devices are described in the following paragraphs. Figure 4-8 shows how they are attached in a protocol converter system.

4.4.1 The Synchronous Modem Cable

The Synchronous Modem Cable attaches the host line connector to a synchronous modem for remote communications with the IBM host.

The pin assignments for this cable are shown in figure G-1.

4.4.2 The Synchronous Host Cable

The Synchronous Host Cable attaches the host line connector to a communication controller or a front-end processor for direct connection to the IBM host.

The pin assignments for this cable are shown in figure G-2.

4.4.3 The Crossover Cable

The Crossover Cable (see figure G-3) attaches an asynchronous channel on the protocol converter to an asynchronous DCE, such as a modem or a Data PABX. It also attaches an asynchronous modem to the Command Port connector for remote use of the Command Port.

A standard, asynchronous crossover cable can also be used.

4.4.4 Straight-Through Cables

Straight-through cables are used with the protocol converter to make two types of attachments. They attach:

- The Command Port connector to a terminal or printer

- The channel connectors to terminals, printers, or computer ports

Straight-through cables are provided by the user or they can be obtained from MICOM.

User-supplied straight-through cables are the cables that came with your terminal, printer, or computer port.

If the cable that came with your device is not available or cannot make the connection, straight-through cables for use with the protocol converter are available from MICOM.

There are two straight-through cables available from MICOM. These are the Male-to-Female Straight-Through Cable and the Male-to-Male Straight-Through Cable.

The pin assignments for these two cables are shown in figures G-4 and G-5.

The MICOM Male-to-Female Straight-Through Cable should be used if your device has a male connector on it. This cable is MICOM part number 100-2200-15.

The MICOM Male-to-Male Straight-Through Cable should be used if your device has a female connector on it. This cable is MICOM part number 100-2645-25.
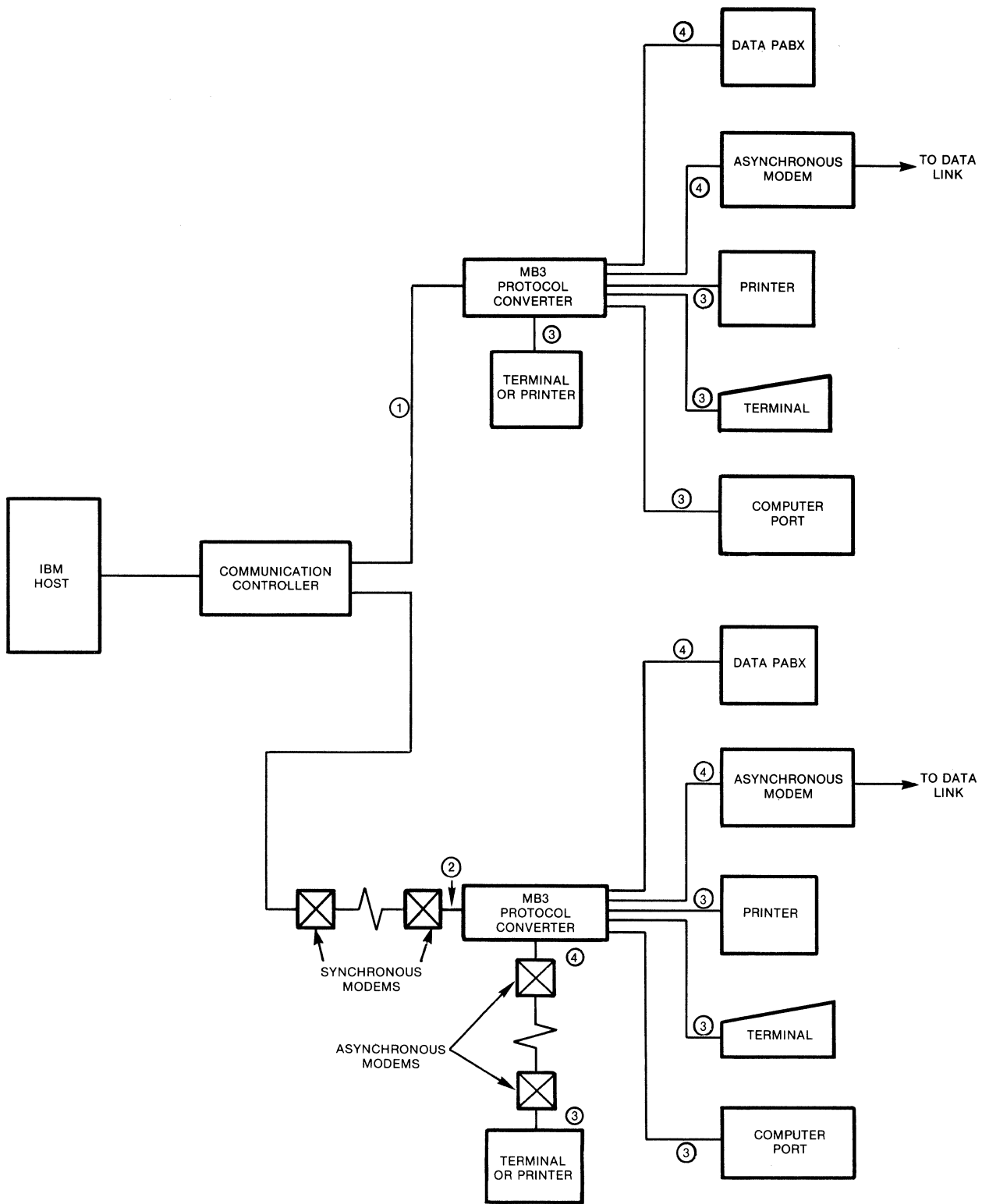
LEGEND:
1 = SYNCHRONOUS HOST CABLE
2 = SYNCHRONOUS MODEM CABLE
3 = STRAIGHT-THROUGH CABLE (REFER TO PARAGRAPH 4.4.4)
4 = CROSSOVER CABLE

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Figure 4-8. Cabling Diagram

4.5 APPLYING POWER

Connect the power cord to the unit and then plug it into a grounded ac outlet.

CAUTION: Before applying power you _must_ check the voltage for which your unit
is set. Refer to paragraph C.4 for this procedure.

When you first apply power to the protocol converter, all of the indicators
will go ON for a few seconds. Wait until the AT indicator goes ON.

At this time, all indicators except AT and the numbered indicators should be
OFF. If indicators other than these remain ON, consult MICOM Customer
Service.

After you have installed and configured the protocol converter, follow the
instructions provided at your site to bring up the host line. Notify the
appropriate personnel at the host site that the protocol converter is ready
for operation.

SECTION 5

THE COMMAND PORT

The protocol converter contains a Command Port to provide configuration, diagnostic, and channel-control capabilities. Any standard, asynchronous, ASCII display terminal or a printer with a keyboard may be attached to the Command Port.

The Command Port is only for configuring, monitoring, and testing; it is not available for communications.

It is not necessary for a terminal to be attached to the Command Port during normal operation. You only need to attach a terminal or printer when you want to configure the unit or the system.

It is also possible to attach an asynchronous modem to the Command Port. This allows configuration to be done from a remote site.

For ease of reference, this section describes the use of the Command Port with a display terminal and not with a printer. The only difference lies in the medium -- screen image or printout -- on which the messages appear.

In selecting a device to attach to the Command Port, remember that:

- Pin 20 on the Command Port connector is used to detect the presence of a terminal. It cannot be used to detect flow control.

- The following data rates are supported: 9600, 4800, 2400, 1200, 600, and 300.

- The Command Port detects the data rate automatically.

Set up the terminal that is attached to the Command Port connector according to the following guidelines:

- Data rate   -- 300, 600, 1200, 1800, 2400, 4800, or 9600 bps

- Code level -- 7 bits per character plus parity

- Stop bits   -- 1 for all data rates

- Parity   -- Space or Mark

- Operation -- Full-duplex

5.1 THE PROTOCOL CONVERTER COMMAND PORT MENU

Follow these guidelines to make Command Port menu selections and to respond to prompts:

- To make a selection on any Command Port menu, enter the selection number and CR.

- Ctrl-H is used to backspace in order to correct mistakes.

- Ctrl-K returns you to the previous menu (if you are at a menu).

- When prompts that display selections appear, enter CR to choose a displayed selection or press the space bar to display the next possible selection.

- Selections that have asterisks in front of the prompt do not take effect until you perform a reset.

To begin using the Command Port:

1. Enter CR so that the protocol converter can detect the data rate.

NOTE: If no banner message or password prompt has been configured, you will go directly to the Protocol Converter Command Port Menu.

2. Wait until the banner message appears, if one has been configured. (The banner message is a message of up to 64 characters that appears on the screen when you begin to use a channel of the protocol converter.)

3. If a password prompt appears, enter the password and CR.

4. Wait until the Protocol Converter Command Port Menu (see figure 5-1) appears on the screen.

```
PROTOCOL CONVERTER COMMAND PORT

1 CONFIGURE
2 CONFIGURATION DISPLAY
3 STATUS DISPLAY
4 TACT
5 COPY CHANNEL CONFIGURATION
SELECT:
```
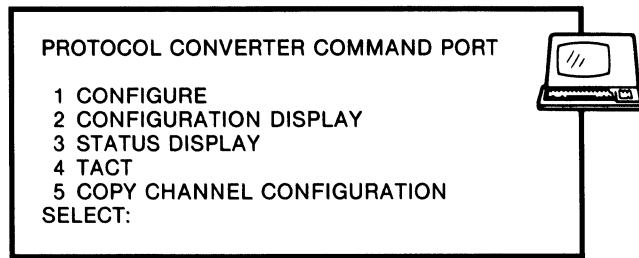
MI-1386-1a-28

Figure 5-1. The Protocol Converter Command Port Menu

The Protocol Converter Command Port Menu (see figure 5-1) has five selections
as follows:

- Configure -- This selection provides access to the Configuration Commands
  Menu, which enables you to define the operating characteristics of the
  communications link, all channels, and the terminal cluster (refer to
  paragraph 5.2).

- Configuration Display -- This selection provides access to the
  Configuration Display Menu, which enables you to see the configuration
  values established using the Configuration Commands Menu (refer to
  paragraph 5.3).

- Status Display -- This selection provides access to the Status Display
  menu, which enables you to monitor the operation of the communications
  link and each channel (refer to paragraph 5.4).

- TACT -- This selection provides access to the TACT Menu, which enables
  you to perform diagnostics (refer to paragraph 5.5).

- Copy Channel Configuration -- This selection lets you copy the
  configuration of any channel to any other channel (refer to paragraph
  5.6).

Each of the selections of the Protocol Converter Command Port Menu is
described in the following paragraphs.

5.2 THE CONFIGURATION COMMANDS MENU

The Configuration Commands Menu (see figure 5-2) is used to configure the protocol converter.

CONFIGURATION COMMANDS
 1 LINE
 2 CONTROLLER
 3 CHANNEL
 4 COMMAND PORT
 5 BROADCAST
 6 TERMINAL SUPPORT SPECIFICATION
 7 CHARACTER SET MODIFICATION
 8 RESET UNIT
 9 DISPLAY PROM ID
SELECT:
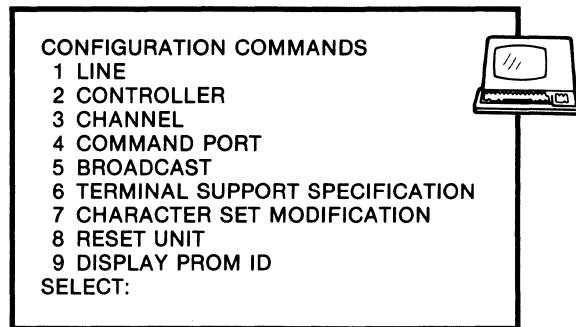
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Figure 5-2. The Configuration Commands Menu

Each selection of the Configuration Commands Menu is described in the following paragraphs.

5.2.1 Line

Selection 1, LINE, of the Configuration Commands Menu enables you to set the data rate of the link between the protocol converter and the synchronous host.

To set the data rate of the link, select 1 at the Configuration Commands Menu and CR. You will see the following display.

*HOST A SPEED
  [(KEYPAD)]
  [EXTERNAL]
  [1200]
  [9600]
  [19200]
  [4800]
  [2400]

The (KEYPAD) selection is used when you want to set the data rate using the Touch Panel.

The EXTERNAL selection is used when the synchronous host interface is connected to a synchronous modem.

The numbered selections (1200, 9600, 19200, 4800, and 2400) are used when the synchronous host interface is attached to a communications control unit.

You will be returned to the Configuration Commands Menu after making your selection.

5.2.2 Controller

Selection 2, CONTROLLER, of the Configuration Commands Menu enables you to make configuration selections for the protocol converter terminal cluster.

To make configuration selections for the terminal cluster, select 2 at the Configuration Commands Menu and CR. You will see the following prompts.

*ENTER CONTROL UNIT ADDRESS - 00 (KEYPAD)

Enter a two-digit hexadecimal address to change the address.

*ENTER XID DATA

(You will see this prompt only if you are using FEATUREPAK cartridge MB3-SPC.)

An exchange identifier (XID) is provided in SNA/SDLC dial environments to fix the identity of the control unit type and its serial number.

The default XID is 01700000. The first three digits (017) identify the MB3-SPC as an IBM 3274 control unit. The remaining five digits indicate that the unit has a serial number of 0.

If you need to change the XID, enter the appropriate eight hexadecimal digits and CR.

*NRZI
  [NO]
  [YES]
  [AUTO]

(You will see this prompt only if you are using FEATUREPAK cartridge MB3-SPC.)

NO disables this capability; YES enables it. When set to AUTO, the protocol converter will automatically lock into the coding mode, which it reads on the communications link.

ENTER UNBIND PARAMETER -- OF

(You will see this prompt only if you are using FEATUREPAK cartridge MB3-SPC.)

Enter an appropriate unbind parameter here.

*DISPLAY/PRINTER LINE-SHARING
  [NO]
  [YES]

This prompt tells the protocol converter whether or not you are going to be
using the Display/Printer Line-Sharing Feature.

Select YES if you are; select NO if you are not.

*SYNCH PORT EIA LEADS
  [SWITCHED]
  [CONSTANT]

This prompt controls the state of certain EIA control leads for the
synchronous host interface.

SWITCHED means the transmit carrier is under control of Request-To-Send.
CONSTANT means Request-To-Send is always held High.

NOTE: Do not select CONSTANT with multipoint lines.

CR DELAY

LF DELAY

FF DELAY

These three prompts provide Carriage Return, Line Feed, and Form Feed delays,
respectively, for printers.

Enter the number of null characters (0 through 15) to be transmitted to a
device after each of these three sequences.

The output of these null characters ensures that certain printers will not
lose data characters transmitted to them.

ENTER HIGHLIGHT INDICATOR

Enter a single character such as + or * to indicate high intensity display fields. This selection is useful if your system contains terminals with only one level of video intensity.

TIMEOUT DISCONNECT VALUE (MINUTES)

Enter a number of minutes from 3 to 60. This value indicates the number of minutes that the protocol converter will wait before automatically disconnecting an idle terminal.

USE COMMA INSTEAD OF PERIOD IN NUMERIC FIELD
   [NO]
   [YES]

Use this prompt to allow a comma to represent a decimal point in a numeric field.

NO disables this capability; YES enables it.

*ASYNC HOST
   [NO]
   [YES]

(You will see this prompt only if you are using a 10- or 16-channel unit.)

This prompt tells the protocol converter whether or not your unit has the Asynchronous Host Feature.

Select YES if your unit does; select NO if your unit does not.

SEND FF BEFORE LOCAL COPY
   [NO]
   [YES]

This prompt allows you to specify if a form feed will be sent at the beginning of each local print.

YES enables this capability; NO disables it.

ENTER CHANNEL PASSWORD TEXT

This prompt allows you to enter a password for channel access.

Enter a password of up to seven characters. To remove a channel password, enter a space and CR.

ENTER LOGOFF MESSAGE TEXT

Enter a logoff of up to 37 characters.

If configured, this message is automatically sent to the host when you intentionally or inadvertently disconnect a terminal.

The protocol converter detects a disconnection when a terminal lowers Request-To-Send or sends a BREAK.

ENTER TIMEOUT WARNING MESSAGE TEXT

Enter a text of up to 58 characters, including CR and LF characters. This text is automatically sent to a terminal 30 seconds prior to a timeout disconnect.

Each channel can be enabled or disabled separately to disconnect after the timeout period.

ENTER TIMEOUT DISCONNECT MESSAGE TEXT

Enter a text of up to 58 characters, including CR and LF characters. This message is issued when a channel is disconnected due to the end of the data inactivity timeout period.

Each channel can be configured separately so that it will disconnect after the time period specified by the timeout disconnect value.

ENTER SESSION CONTROL DISCONNECT MESSAGE TEXT

(You will see this prompt only if you are using FEATUREPAK cartridge MB3-SPC.)

Enter a message of up to 60 characters.

This message will be sent to the terminal when disconnected due to certain session control situations. Refer to the prompt SESSION CONTROL DISCONNECT IF in paragraph 5.2.3 for more information.

ENTER BANNER MESSAGE TEXT

Enter a text of up to 58 characters to be displayed as the banner message. The banner message is a text message that appears on the screen when you begin to use any channel of the protocol converter.

After you have entered a message for this prompt, you will be returned to the Configuration Commands Menu.

5.2.3 Channel

Selection 3, CHANNEL, of the Configuration Commands Menu enables you to set the operating characteristics of devices attached to each asynchronous channel of the protocol converter. These devices include display terminals and printers.

Asynchronous hosts can also be included if the protocol converter has the Asynchronous Host Feature (refer to paragraph 11.3).

When a unit has this option, only the following prompts appear for asynchronous host channels:

SPEED

STOP BITS

PARITY

EIA LEADS CONTROLS

FORCE SELECT

To set the operating characteristics of a channel or channels, select 3 at the Configuration Commands Menu and CR. You will see the following prompt:

ENTER CHANNEL NUMBER

Enter the number of the channel that you want to configure. After entering the channel number, you will see the following prompts.

*EMULATION
  [DISPLAY]
  [PRINTER]

This prompt enables you to configure the channel to support either a display terminal or a printer.

DISPLAY configures the channel to support a device that emulates an IBM 3278 or 3279 Display Station.

PRINTER configures the channel to support a device that emulates an IBM 3287 printer.

SPEED
  [AUTO]
  [600]
  [2400]
  [9600]
  [4800]
  [1200]
  [300]

Select [AUTO] or one of the numbered speeds that appear on the screen. Make sure that the selection entered here agrees with the setting on the attached device.

STOP BITS
  [1]
  [2]

This prompt selects the transmit stop bits on the attached device.

Make sure that the selection entered here agrees with the stop bit setting on the attached device.

PARITY
  [SPACE]
  [EVEN]
  [MARK]
  [ODD]
  [NONE]

This prompt sets the transmit parity. Received parity is not checked.

XOFF CONFIGURATION
  [ASSUME NEXT CHARACTER - XON]
  [WAIT XON]
  [IGNORE XOFF]

This prompt tells the protocol converter what to do when it receives an XOFF character.

The ASSUME NEXT CHARACTER - XON selection means the protocol converter will halt data flow until it receives the next character, which it will interpret as an XON (restart transmission) regardless of what the character actually is.

The WAIT XON selection means the protocol converter will wait for an explicit XON to restart data flow after it receives an XOFF (stop transmission).

The IGNORE XOFF selection means the protocol converter will not halt data flow when it receives an XOFF character.

BUSY OUT
  [NO]
  [YES]

This prompt controls the states of certain EIA leads when a modem is attached to the protocol converter.

NO means that the channel will operate.

YES means the the Busy Out lead is held High and that Data Set Ready is held Low. These lead states cause some modems to appear busy to a dial facility.

PRIORITY
  [LOW]
  [HIGH]

This prompt determines the priority level for inbound messages to the host.

LOW selects low priority; HIGH selects high priority.

DISABLE TACT/TICC
  [NO]
  [YES]

NO means that the terminal or keyboard printer operator can use TACT and TICC on the channel.

YES means that TACT and TICC are not available on the channel.

TICC CHANGES NVRAM
  [YES]
  [NO]

YES means that a channel configured with TICC is stored in the protocol converter's nonvolatile memory.

NO means that changes made to a channel configuration with TICC are only maintained while a terminal is in 3270 mode.

Once a terminal leaves 3270 mode, the Command Port or default configuration parameters take effect when the terminal reenters 3270 mode. Printer configuration changes are always permanent.

EIA LEAD CONTROLS
  [LEASED]
  [SWITCHED]

This prompt enables you to specify the type of asynchronous attachment:

LEASED means that a device is directly attached to an asynchronous channel of the protocol converter.

In terms of EIA leads, LEASED means that Ring Indicator and Busy Out are not used, and Data Set Ready is always held High.

SWITCHED means that a modem is attached to an asynchronous channel of the protocol converter for dial access.

In terms of EIA leads, Data Terminal Ready goes High when Ring Indicator is detected. If the unit has the 4-Channel Asynchronous Host Option, the channel simulates a DCE and generates Ring Indicator.

FORCE SELECT
  [YES]
  [NO]

The Force Select capability allows a terminal user to change a terminal type and keyboard map. It also allows a terminal user to attach a printer if the Display/Printer Line-Sharing Feature is enabled and the terminal selected supports it.

YES enables the Force Select capability; NO disables it.

PASSWORD USE
  [NO]
  [YES]

This prompt indicates whether or not a terminal operator needs to use a password during the 3270 mode entry process.

NO means that a password is not needed; YES means that a password is needed.

LOGON MESSAGE USE
   [NO]
   [AUTO]
   [YES]

Use this prompt to enable or disable the Automatic Logon Feature.

NO disables this feature; YES enables it. When enabled, this feature allows
you to enter a simple keyboard command to send a logon sequence to the host
after entering 3270 mode.

AUTO causes a logon sequence to be sent to the host automatically after
entering 3270 mode.

LOGOFF MESSAGE USE
   [NO]
   [YES]
   [SEND UNBIND]

This prompt controls the use of the Automatic Logoff Feature.

NO disables this feature. YES means that a logoff message is sent to the host
automatically when your terminal becomes disconnected or when you enter BREAK.

The SEND UNBIND selection (found only on FEATUREPAK cartridge MB3-SPC) means
that the protocol converter sends an unbind request to the host when the
terminal attached to this channel is removed from 3270 mode.

TIMEOUT DISCONNECT USE
   [NO]
   [YES]

NO disables this capability.

YES means that the protocol converter will remove a terminal from 3270 mode
after the period of keyboard inactivity specified as the TIMEOUT DISCONNECT
value. Refer to TIMEOUT DISCONNECT VALUE (MINUTES) prompt in paragraph 5.2.2.

*SESSION CONTROL DISCONNECT IF
  [NONE]
  [INACTIVE]
  [UNBOUND]

(You will see this prompt only if you are using FEATUREPAK cartridge MB3-SPC.)

This prompt specifies under what session control situations the protocol converter will disconnect a terminal.

INACTIVE means that the protocol converter disconnects a terminal when the LU becomes inactive. This selection works in two ways in dial environments:

- If the host system goes down, the protocol converter sends the Session Control Disconnect Message and disconnects the terminal.

- If the host system is down when the terminal attempts to dial into a channel, the protocol converter does not allow the terminal to connect.

UNBOUND means that the protocol converter will send the Timeout Disconnect Message and then disconnect the terminal.

NONE means no disconnect due to session control will occur.

SPECIFIC KEYBOARD MAP PROMPT
  [NO]
  [YES]

NO means that a terminal attached to this channel will use its Specific Keyboard Map listed in the Supported Terminal Reference Guide, stock number 800-1423.

YES means that the prompt USE SPECIFIC KEYBOARD MAP? will appear during the 3270 mode entry process.

TERMINAL TYPE (BLANK FOR PROMPT)

To configure a channel to support a specific type of terminal, enter the code
for the terminal, and CR. The codes for each terminal can be found in the
MICOM Supported Terminal Reference Guide, stock number 800-1423.

If you enter a blank, the terminal type selection prompt appears during the
3270 mode entry process.

ATTACH LINE-SHARING PRINTER
   [ASK]
   [YES]
   [NO]

This prompt determines whether you can logically attach to the printer cabled
to your display terminal. It is valid only if the Display/Printer Line-
Sharing Feature is enabled.

ASK means that the prompt DISPLAY/PRINTER LINE-SHARING will appear during the
3270 mode entry process for the channel.

YES means you are going to use the printer attached to your terminal as your
local copy printer; NO means that you are not.

PRINTER DESTINATION - 0

Enter the number of a channel connected to a printer. Print requests from the
terminal are sent to the printer connected to the channel number entered here.

The default value 0 means the first printer configured on a higher-numbered
channel.

You can also use this prompt to assign logical channel numbers to line-sharing
printers. You must assign the channel number from the display terminal where
the line-sharing printer is attached. Do not use the default value of 0 when
assigning printer destinations for line-sharing printers.

ENTER LOGON MESSAGE TEXT

Enter a 37-character logon message text. This text must terminate with a
backslash (\) and a CR.

After entering a message in response to this prompt, you will be returned to
the Configuration Commands Menu.

Printer Emulation Prompts

The following prompts appear after the EIA LEAD CONTROLS prompt, replacing those 11 prompts with the following 7 prompts, when you make the selection PRINTER at the prompt EMULATION (the second prompt in this paragraph).

PAGE LENGTH

Enter a number from 1 to 99 to indicate the number of lines to be printed on a page. Make certain that the page length configuration on your printer is set to the value entered here.

PRINT CASE
   [MIXED]
   [UPPER]
   [LOWER]

Select the kind of typeface in which you want your printer to operate.

MIXED means both uppercase and lowercase; UPPER means all uppercase; and LOWER means all lowercase.

USE FORM FEED
   [NO]
   [YES]

NO means that the protocol converter sends an appropriate number of line feed characters to a printer instead of a form feed character.

YES means that the protocol converter sends a form feed character to a printer (hexadecimal OC).

SPACING
   [SINGLE]
   [DOUBLE]
   [TRIPLE]

Select the line spacing you want your printer to use.

INITIALIZATION MESSAGE USE
   [NO]
   [YES]

NO means that an initialization message is not sent to the printer attached to this channel.

YES means that an initialization message is sent to the printer attached to this channel.

A printer receives an initialization message from the protocol converter when the following circumstances occur:

- When directly attached to the protocol converter, printers receive an initialization message when the printer power is turned on or after BREAK is entered.

- In dial environments, printers receive an initialization message after a phone connection is made.

- If the Display/Printer Line-Sharing Feature is enabled, printers receive an initialization message after you respond to the prompt DISPLAY/PRINTER LINE SHARING? in the 3270 Mode Entry Process.

ENTER INITIALIZATION MESSAGE TEXT

Enter a text message of up to 38 characters for a printer initialization message.

You will be returned to the Configuration Commands Menu after you enter an initialization message.

5.2.4 Command Port

Selection 4, COMMAND PORT, of the Configuration Commands Menu allows you to enter or change a Command Port password.

The protocol converter will require the use of this password before you are allowed to begin Command Port operation.

When the protocol converter is shipped, the Command Port is not configured with a password. Once a Command Port password has been entered, you can change the password, but you cannot remove it.

If you forget the Command Port password, perform a cold start. This will reset the configuration to the default values, where the Command Port password is not configured.

To enter or change a password, select 4 at the Configuration Commands Menu and CR. You will see the following prompt:

    ENTER COMMAND PORT PASSWORD

Enter a password of up to seven characters. After entering the Command Port password, you will be returned to the Configuration Commands Menu.

5.2.5 Broadcast

Selection 5, BROADCAST, of the Configuration Commands Menu allows you to send a message to display terminals and printers attached to the asynchronous channels of the protocol converter.

You can send a message to an individual terminal or printer or to all attached terminals and printers.

To send a message, select 5 at the Configuration Commands Menu and CR. You will see the following prompt:

    BROADCAST MESSAGE - ENTER CHANNEL NUMBER

Enter A to send a message to all channels. Enter a channel number to send a message to a specific channel.

After entering the channel number you will see the following prompt:

    ENTER MESSAGE TEXT

Enter a message of up to 62 characters. After entering this message, you will be returned to the Configuration Commands Menu.

5.2.6 Terminal Support Specification

Selection 6, TERMINAL SUPPORT SPECIFICATION, of the Configuration Commands Menu enables you to create a customized terminal type for a particular application.

One example of the use of this command is the definition of a new keyboard map.

NOTE: Before creating a new terminal type, consult a MICOM Sales Support representative for the appropriate codes to define a terminal type customized for the needs of your application.

To create a terminal type, select 6 at the Configuration Commands Menu and CR. You will see the following prompt:

  ENTER TERMINAL DEFINITION

Enter the appropriate characters for the terminal definition. After entering these characters you will be returned to the Configuration Commands Menu.

5.2.7 Character Set Modification

Selection 7, CHARACTER SET MODIFICATION, of the Configuration Commands Menu enables you to modify the EBCDIC-to-ASCII translation table.

This capability is useful to map EBCDIC characters to appropriate ASCII values that are application dependent.

This capability only allows you to modify the translation table for displayable characters. You cannot change control characters.

(Appendix D lists the default ASCII-to-EBCDIC translation table, and shows the displayable characters you can modify.)

When you make this selection, you will see the following prompt:

    ENTER EBCDIC HEX, ASCII HEX (SEPARATED BY A COMMA)

Enter an EBCDIC hexadecimal value, a comma, and the ASCII hexadecimal value and CR.

The protocol converter will re-display the character set prompt. At this time you can enter another set of translation values or enter CR again to return to the Configuration Commands Menu.

In the following example, the underlined entries are examples of modifications to the EBCDIC international character set.

Under normal circumstances, the protocol converter translates EBCDIC 5B to ASCII 24, and EBCDIC 4A to ASCII 5B. On an English (U.S.A.) EBCDIC keyboard, EBCDIC 5B corresponds to a dollar sign, and 4A transmits a cent sign. On an English (U.K.) keyboard, however, 5B corresponds to a pound sign, and 4A transmits a dollar sign.

Due to the translation made in the following example, EBCDIC 5B becomes the equivalent of ASCII 23, and EBCDIC 4A becomes the equivalent of ASCII 24.

This translation enables the pound sign on an ASCII keyboard to transmit the code associated with the pound sign of an English (U.K.) EBCDIC keyboard.

The following is an example of a character set modification.

ENTER EBCDIC HEX, ASCII HEX (SEPARATED BY A COMMA)
5B,23

ENTER EBCDIC HEX, ASCII HEX (SEPARATED BY A COMMA)
4A,24

5.2.8 Reset Unit

Selection 8, RESET UNIT, of the Configuration Commands Menu enables you to warm start (refer to paragraph 3.2.1) the protocol converter.

To reset the unit with a warm start, select 8 at the Configuration Commands Menu and CR. You will see the following prompt:

  ARE YOU SURE THAT YOU WANT TO RESET THE UNIT?

Enter Y and CR to reset the unit. All indicators will go OFF. When the AT indicator goes ON, the reset is complete. Enter CR to continue.

5.2.9 Display Prom ID

Selection 9, DISPLAY PROM ID, of the Configuration Commands Menu allows you to display the identification number of the PROM set in the protocol converter.

To see the PROM set identification number, select 9 at the Configuration Commands Menu and CR. You will see the following display:

  PROM ID # 907-XXXX-XX

The PROM set identification number contains coded information about the features, options, and version number of the software.

This information is primarily used by MICOM Customer Service personnel. You will be requested to provide this information if you make inquiries about service for your unit.

5.3 THE CONFIGURATION DISPLAY MENU

The Configuration Display Menu (see figure 5-3) allows you to display or print the configuration parameters of the protocol converter.

The parameters and values displayed in the various configuration displays correspond to responses made to configuration prompts (refer to paragraph 5.2).

CONFIGURATION DISPLAY

1 LINE
2 CONTROLLER
3 CHANNEL
4 CHANNEL MESSAGES
5 SYSTEM MESSAGES
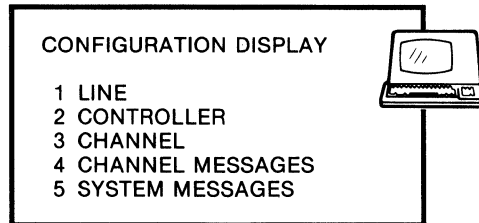
MI-1386-1a-32

Figure 5-3. The Configuration Display Menu

The selections of the Configuration Display Menu are described in the following paragraphs.

5.3.1 Line

Selection 1, LINE, of the Configuration Display Menu is used to display the link data rate settings of the synchronous hosts attached to the protocol converter.

To view the link data rate settings, select 1 at the Configuration Display Menu and CR. You will see the Line Speed Configuration Display.

The following is an example of the Line Speed Configuration Display.

    LINE A (KEY PAD)

For an explanation of the entries in the Line Speed Configuration Display, refer to the explanation of the prompt in paragraph 5.2.1.

The following data rates are available:

    (KEY PAD)

    EXTERNAL

    19200

     9600

     4800

     2400

     1200

5.3.2 Controller

Selection 2, CONTROLLER, of the Configuration Display Menu is used to display values and parameters that pertain to the protocol converter terminal cluster.

These values and parameters are the same as those entered in response to the Configuration Command CONTROLLER (refer to paragraph 5.2.2).

To view the Controller Configuration Display, select 2 at the Configuration Display Menu and CR. You will see the Controller Configuration Display. The following is an example of a Controller Configuration Display.

```
CLUSTER ADDRESS      00 (KEY PAD)
XID DATA             01700000
NRZI                 NO
LINE-SHARING         NO
SYNCH EIA LEADS      SWITCHED
CR DELAY             0
LF DELAY             0
FF DELAY             0
INDICATOR CHAR
TIMEOUT LENGTH       5
NUMERIC COMMA        NO
SEND FF BEFORE LOCAL COPY      NO
ASYNC HOST           NO
UNBIND PARAMETER     OF
```

For an explanation of the items shown in the Controller Configuration Display, refer to the explanations of each prompt in paragraph 5.2.2.

To return to the Configuration Display Menu, enter CR.

5.3.3 Channel

Selection 3, CHANNEL, of the Configuration Display Menu shows information about the configuration characteristics of devices attached to each channel of the protocol converter.

To view the Channel Configuration Display, select 3 at the Configuration Display Menu and CR. You will see the Channel Configuration Display.

The following is an example of the Channel Configuration Display for a 4-channel unit.

```
   D S        B   D T E    P L L T D S    A P                I
 C / P   S    S I T C I F S 0 0 I S K T L T P P F S N S
 H P D   B P  Y P T N A S W N G M C M T P R L C F P T U

 1 P 2400 1 S N L N Y L                      66    M N 1
 2D AUTO 1 S N L N Y L Y N N N N N N N A 0
 3
 4
```

NOTE: The SU entry appears only if you are using FEATUREPAK cartridge MB3-SPC.

For an explanation of the items shown in the Channel Configuration Display, see table 5-1 and refer to the explanations of each prompt in paragraph 5.2.3.

Enter CR to return to the Configuration Display Menu.

Table 5-1. Channel Configuration Display Headings and Options

Heading Abbreviation	Meaning	Possible Options
The following headings apply to both displays and printers:		
C H	Channel	A number from 1 to 16, depending on model
D / P	Display or Printer	D -- Display P -- Printer A -- Asynchronous Host (for units with the 4-Channel Asynchronous Host Option)
S P D	Speed	AUTO or a valid speed (data rate)
S B	Transmit Stop Bits	1, 2
P	Transmit Parity	E -- Even; O -- Odd; M -- Mark; S -- Space; N -- None
B S Y	Busy Out	Y -- Yes, N -- No
I P	Inbound Priority	H --High; L -- Low
D T T	Disable TACT/TICC	N -- No; Y -- Yes
T C N	TCN	Y -- Yes; N -- No
E I A	EIA Lead Controls	L -- Leased; S -- Switched
The following headings apply only to displays:		
F S	Force Select Enabled	Y -- Yes; N -- No

Table 5-1. Channel Configuration Display Headings and Options (continued)

Heading Abbreviation	Meaning	Possible Options
P S W	Password Use	Y -- Yes; N -- N
L O N	Logon Message Use	Y -- Yes; N -- N
L O G	Logoff Message Use	Y -- Yes; N -- No; U -- Unbind
T I M	Timeout Disconnect	Y -- Yes; N -- No
S K M	Specific Keyboard Map	Y -- Yes; N -- No
T T	Terminal Type	A code for one of the terminals shown on the terminal type menu
A L P	Attach Line-Sharing Printer	A -- Ask; Y -- Yes; N -- No
P T R	Printer Destination	A channel number for the screen printer assigned to a display terminal
D S C	Session Control Disconnect	N -- None; I -- Inactive; U -- Unbind

The following columns only appear when a channel is configured for printer emulation:

P L	Page Length	A number from 1 to 99
P C	Printer Case	U -- Upper; L -- Lower; M -- Mixed

Table 5-1. Channel Configuration Display Options (continued)

Heading Abbreviation	Meaning	Possible Options
F F	Form Feed	Y -- Yes; N -- No
S P	Spacing	S -- Single; D -- Double; T -- Triple
I N T	Printer Initialization Message	Y -- Yes; N -- No
S U	Send Unbind	Y -- Yes; N -- No

NOTE:
    You will see the Send Unbind parameter only if you have FEATUREPAK cartridge MB3-SPC.

5.3.4 Channel Messages

Selection 4, CHANNEL MESSAGES, of the Configuration Display Menu shows the logon and printer initialization messages (if configured) for each channel.

To view the logon and printer initialization messages, select 4 at the Configuration Display Menu and CR. You will see the Channel Messages Display.

The following shows the Channel Messages Display for a 4-channel unit.

   LOGON JNS'OD

   PRINTER ONLINE

Each line in the Channel Messages Display represents a channel. A blank line indicates that a message has not been configured.

For an explanation of the messages that appear on the Channel Messages Display, refer to the appropriate message prompts in paragraph 5.2.3.

After viewing the Channel Messages Display, enter CR to return to the Configuration Display Menu.

5.3.5 System Messages

Selection 5, SYSTEM MESSAGES, of the Configuration Display Menu shows the system messages that have been configured.

To see the configured system messages, select 5 at the Configuration Display Menu and CR. You will see the System Messages Display.

The following is an example of the System Messages Display.

    LOGOFF MESSAGE
    LOGOFF
    WARNING MESSAGE
    *** THIS TERMINAL WILL BE DISCONNECTED IN 30 SECS ***
    TIMEOUT DISCONNECT MESSAGE
    *** THIS TERMINAL WAS INTENTIONALLY DISCONNECTED *** 'OD'OA
    SESSION CONTROL DISCONNECT MESSAGE
    *** THIS TERMINAL WAS INTENTIONALLY DISCONNECTED *** 'OD'OA
    BANNER MESSAGE
    WELCOME TO THE SYSTEM

(The Session Control Disconnect Message appears only if you are using FEATUREPAK cartridge MB3-SPC.)

For an explanation of the messages in the System Messages Display, refer to the appropriate message prompt in paragraph 5.2.2.

After displaying the system messages, enter CR to return to the Configuration Display Menu.

5.4 THE STATUS DISPLAY MENU

The Status Display Menu (see figure 5-4) allows you to monitor the operation of the protocol converter and the devices attached to it.

```
STATUS DISPLAY
  1 CONTROLLER
  2 CHANNELS
  3 SYNCH TRACE
  4 ADDRESS TRACE
  5 ASYNCH TRACE
SELECT:
```
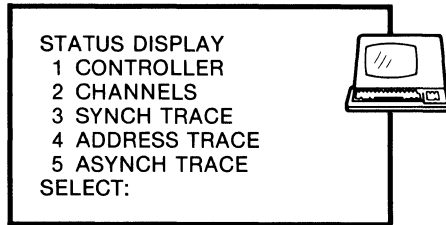
MI-1386-1a-38

Figure 5-4. The Status Display Menu

Each selection of the Status Display Menu is described in the following paragraphs.

5.4.1 Controller

Selection 1, CONTROLLER, of the Status Display Menu allows you to display information on the buffer availability in the protocol converter.

To see buffer availability information, select 1 at the Status Display Menu and CR. You will see the Controller Status Display.

The following is an example of the Controller Status Display.

```
BUFFERS USED / AVAILABLE
1/55
PU STATE: DISCON
```

(The PU state is only shown if you are using FEATUREPAK cartridge MB3-SPC.)

The Controller Status Display indicates the level of system buffer use. The first number gives the number of buffers in use, and the second number gives the number of available buffers.

To return to the Status Display Menu, enter CR.

5.4.2 Channels

Selection 2, CHANNELS, of the Status Display Menu shows status information on all devices attached to the protocol converter.

To see a display of channel status information, select 2 at the Status Display Menu and CR. You will see the Channel Status Display.

The following is an example of the Channel Status Display for a 4-channel unit.

CH	SPEED	TT	CON	TCT	XFF	LCK	INS	ACT	BND
1	AUTO		N	N	N	N	N	Y	Y
2	AUTO		N	N	N	N	N	Y	Y
3	9600		Y	N	N	N	N	Y	Y
4	9600		Y	N	N	N	N	Y	Y

(The columns ACT and BND appear only if you are using FEATUREPAK cartridge MB3-SPC.)

NOTE: The Channel Status Display shown does not apply when Display/Printer Line-Sharing is configured.

In the Channel Status Display, the first line displayed is a heading that lists abbreviations of the information displayed for each numbered channel. These items are explained as follows:

CH   is the channel number.

SPEED is the data rate last used or currently in use.

TT   is the terminal type of the device attached to this channel. The code is one of the characters selected from the Terminal Type Menu.

CON   means connected. There are two possible states:

Y -- (Yes) means a device is connected to the channel.

N -- (No) means there is no device connected to the channel.

TCT   indicates whether or not a terminal is in TACT.

Y -- (Yes) means a channel is in TACT.

N -- (No) means a channel is not in TACT.

XFF   means XOFF (transmit off). The value shown in this column indicates
        whether a device is receiving data from the protocol converter. There
        are two possible values:

        Y -- (Yes) means a device has sent an XOFF character (ASCII Ctrl-S) to
             the protocol converter. Many printers either automatically send
             an XOFF character or lower DTR to the unit when the printer
             buffer is full. After the printer empties its buffer, it
             automatically sends an XON character (Ctrl-Q) to the protocol
             converter or raises DTR to restart message transmission. Yes
             also indicates that an attached printer has initiated DTR flow
             control.

             It is also possible to enter XON and XOFF from a terminal
             keyboard to stop and restart message transmission.

        N -- (No) means a device has not transmitted an XOFF character to the
             protocol converter and/or has not lowered DTR.

LCK   indicates whether a terminal keyboard is locked. There are two
        possible states:

        Y -- (Yes) means it is locked.

        N -- (No) means it is unlocked.

INS   means insert mode. There are two possible states:

        Y -- (Yes) means a keyboard is in insert mode.

        N -- (No) means a keyboard is not in insert mode.

ACT   shows whether or not an LU is active. There are two possible states:

        Y -- (Yes) means an LU is active.

        N -- (No) means an LU is not active.

BND   shows whether a LU is bound or unbound. There are two possible
        states:

        Y -- (Yes) indicates a bound LU.

        N -- (No) indicates an unbound LU.

5.4.3 Synch Trace

Selection 3, SYNCH TRACE, of the Status Display Menu shows what the host is sending over the communications link. The display generated, called the Synch Trace Display, is used for error diagnosis.

The Synch Trace Display shows all data characters and some control characters in hexadecimal format (see the following example).

The protocol converter displays the data blocks that it sends and receives. The blocks that the protocol converter sends include synch and pad characters.

NOTES: The Synch Trace Display is not a complete substitute for a datascope.

          If you are going to use the Synch Trace Display, you should make sure that the Command Port terminal is operating at the same or higher data rate than that of the synchronous link.

The procedure for performing a synch trace depends on the FEATUREPAK cartridge you are using.

Perform the following procedure for a synch trace using FEATUREPAK cartridge MB3-BPC:

1. Enter 3 at the Status Display Menu and CR. You will see a prompt for the number of the specific device.

2. Enter the number of the device you want to run the synch trace on (from 0 to 15) and CR.

      You will see the synch trace display for the selected device.

Perform the following procedure for a synch trace using FEATUREPAK cartridge MB3-SPC:

1. Enter 3 at the Status Display Menu and CR. You will see a prompt for the LU.

      If you enter a specific number, you will see the synch trace display for that specific LU. If you enter an A, you will see the synch trace display for all LUs.

2. Enter an LU number or an A (for All) and CR.

      You will see the synch trace display for the specific LU or for all LUs.

NOTE: You can use XON/XOFF flow control to pause a synch trace. Ctrl-S (XOFF) will pause the synch trace; Ctrl-Q (XON) will restart it. You will, however, lose data for the trace that is entered while the trace is paused.

The following is an example of the Synch Trace Display.

0227F140C1C2C303 32330140C17D03FF

WARNING: As a terminal user connected to the protocol converter, you should not enter CR to initiate another transaction until the host has completed the transmission that you are tracing.

To end the Synch Trace Display, enter BREAK. If you want to continue using the Command Port, enter CR and then the Command Port password, if configured. You will be returned to the Protocol Converter Command Port Menu.

5.4.4 Address Trace

Selection 4, ADDRESS TRACE, of the Status Display Menu shows which terminal control units are being polled or selected on the communications link.

To see which terminal control units are being polled or selected, select 4 at the Status Display Menu and CR. You will see the Address Trace Display.

The following is an example of the Address Trace Display.

    C1
    C2
    C3

The example shows three hexadecimal numbers: C1, C2, and C3. These numbers represent the device or PU addresses of terminal control units on a multipoint link.

In applications where only one address is polled, the single address is displayed only once.

Where several addresses are polled sequentially, as in multipoint configurations, an address is displayed each time that the host polls a different address.

The protocol converter does not display the same consecutively polled address.

NOTE: All addresses received from the host will be displayed.

To end the Address Trace Display, enter BREAK and CR.

5.4.5 Asynch Trace

Selection 5, ASYNCH TRACE, of the Status Display Menu is used to view the data sent to a selected asynchronous channel.

If the terminal type of the Command Port and the terminal attached to the selected channel are the same, the Command Port operator can see an exact copy of what is displayed on the terminal attached to the selected channel.

NOTE: The speed and parity of the two terminals must be the same.

To see the data being sent to an asynchronous channel, select 5 at the Status Display Menu and CR. When you do so, you will see the following prompt:

   ENTER CHANNEL NUMBER

After you enter the number of the channel and CR, the data sent to the selected channel is displayed.

To end the Asynch Trace Display, enter BREAK. If you want to continue using the Command Port, enter CR.

5.5 THE TACT COMMANDS MENU

The Terminal-Activated Channel Test (TACT) Feature is used to test the channels in the system.

TACT functions can be initiated from the Command Port for any channel configured to support a display or a printer, except asynchronous host channels or line-sharing printers.

NOTE: TACT functions can also be initiated from terminals or printers connected to the protocol converter. Refer to section 9 for more information.

When you select 4, TACT, from the Command Port Primary Menu, you will see the following prompt:

ENTER CHANNEL NUMBER

Enter the channel number of the channel you want to test and CR. The TACT Commands Menu will be displayed (see figure 5-5).


```
ENTER COMMAND
  1 TERMINAL TEST
  2 LOOP TEST
  3 STOP TEST
  4 SEND PRINTER INITIALIZATION
  5 FORCE AUTOBAUD
SELECT:
```
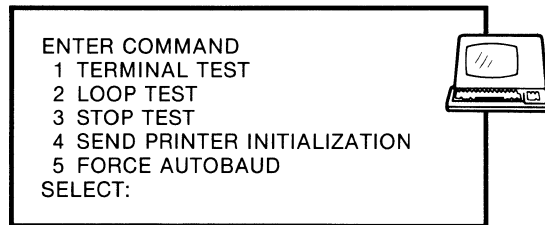
MI-1386-1a-43

Figure 5-5. The TACT Commands Menu

Each selection of the TACT Commands Menu is described in the following paragraphs.

5.5.1 Terminal Test

Selection 1, TERMINAL TEST, of the TACT Commands Menu accesses the Terminal Test. The Terminal Test enables you to see if a terminal or printer is receiving data correctly from the protocol converter.

To start the Terminal Test, select 1, TERMINAL TEST, from the TACT Commands Menu, and enter CR twice. The Terminal Test will start, and you will be returned to the Command Port Primary Menu.

Once a Terminal Test has been initiated from the Command Port, the protocol converter will send the fox message to the terminal until the test is ended. While the test is in progress, you can perform other Command Port functions.

The fox message is:

   THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890

There are two ways to end a Terminal Test:

*   Enter BREAK on the terminal or printer keyboard.

*   Select 4, TACT, from the Command Port Primary Menu. Select the channel number. You will get the TACT Commands Menu. Select 3, STOP TEST, and CR. The test will end.

After ending the Terminal Test, enter CR and you will be returned to the Protocol Converter Command Port Menu.

5.5.2 Loop Test

Selection 2, LOOP TEST, of the TACT Commands Menu accesses the Loopback Test. The Loopback Test enables you to see if a terminal or printer is transmitting and receiving data correctly.

To start the Loopback Test, select 2, LOOP TEST, from the TACT Commands Menu, and enter CR twice. The Loopback Test will start, and you will be returned to the Command Port Primary Menu.

Once a Loopback Test has been initiated from the Command Port, the protocol converter will display each character typed on the selected terminal or printer keyboard. While the test is in progress, you can perform other Command Port functions.

There are two ways to end a Loopback Test:

- Enter BREAK on the terminal or printer keyboard.

- Select 4, TACT, from the Command Port Primary Menu. Select the channel number. You will get the TACT Commands Menu. Select 3, STOP TEST, and CR. The test will end.

5.5.3 Stop Test

Selection 3, STOP TEST, of the TACT Commands Menu is used to end the Terminal and Loopback Tests.

To do this, you must first go to the Command Port Primary Menu while the test is in progress, then go to the TACT Commands Menu, then select 3, STOP TEST, and CR. The test will end.

Further information about using this selection is included in the descriptions of the Terminal and Loopback Tests (refer to paragraphs 5.5.1 and 5.5.2, respectively).

5.5.4 Send Printer Initialization

Selection 4, SEND PRINTER INITIALIZATION, of the TACT Commands Menu sends an initialization message to the printer attached to the channel you selected when you entered TACT.

There are four situations in which a printer initialization message is sent from the protocol converter to the printer. These situations are the following:

* When printers are directly attached to the protocol converter, a message is sent when the printer's power is turned on.

* When printers are directly attached to the protocol converter, a message is sent when BREAK is pressed.

* In dial environments, a message is sent when a phone connection is made.

* With display/printer line-sharing, a message is sent when there is a response to the line sharing prompt in the 3270 mode entry process.

To send a printer initialization message from the Command Port, select 4, SEND PRINTER INITIALIZATION, from the TACT Commands Menu, and CR.

The protocol converter will send the printer initialization message to the printer attached to the channel you selected when you entered TACT.

To enter a printer initialization message, refer to the prompt ENTER INITIALIZATION MESSAGE TEXT, found in paragraph 5.2.3.

5.5.5 Force Autobaud

Selection 5, FORCE AUTOBAUD, of the TACT Commands Menu forces a terminal user or printer operator to enter a CR so that the protocol converter can automatically determine the data rate. This is called forced autobaud.

WARNING: Do not send a force autobaud command to a printer with no keyboard.

To initiate a forced autobaud, enter 5, FORCE AUTOBAUD, from the TACT Commands Menu, and CR two times. You will be returned to the Command Port Main Menu.

To change the data rate of the selected terminal, change the switches on the selected terminal, and CR.

5.6 COPY CHANNEL CONFIGURATION

The Copy Channel Configuration capability is used to copy the channel configuration of any channel to any other channel.

To do this, select 5 at the Protocol Converter Command Port Menu and <u>CR</u>. You will see the following prompt:

    ENTER SOURCE CHANNEL NO

Enter the number of the channel whose configuration you want to copy and <u>CR</u>. You will see the following prompt:

    ENTER DESTINATION CHANNEL NO (SEP BY :)

Enter the first destination channel number, a colon, and the last destination channel number, and <u>CR</u>.

The configuration of the source channel will be copied to the destination channel.

Enter <u>CR</u> to return to the Protocol Converter Command Port Menu.

SECTION 6

3270 MODE

One of the main characteristics of the protocol converter is to allow asynchronous terminals to access the IBM world. The protocol converter does this by making the IBM host think that the asynchronous terminals are actually IBM 3278 terminals, part of IBM's 3270 Information Display System.

To accomplish this, the terminal must be operating in 3270 mode. Operating in 3270 mode means that certain terminal operation parameters have been established. Once established, the terminal can function as an IBM 3278 terminal.

To establish the necessary terminal operation parameters, each terminal must go through the 3270 mode entry process.

6.1 THE 3270 MODE ENTRY PROCESS

The 3270 mode entry process consists of going through a series of steps. When all steps have been successfully completed, you will be in 3270 mode.

NOTE: The number of steps necessary for a specific terminal to complete the 3270 mode entry process varies, depending on the configuration of the channel. Some terminals may need all steps to be configured; others only a few steps.

The steps of the 3270 mode entry process are shown in figure 6-1 and described in the following paragraphs.

NOTE: Entering BREAK at any point during the 3270 mode entry process will abort what you have done and return you to the beginning of the process.

Figure 6-1. The 3270 Mode Entry Process
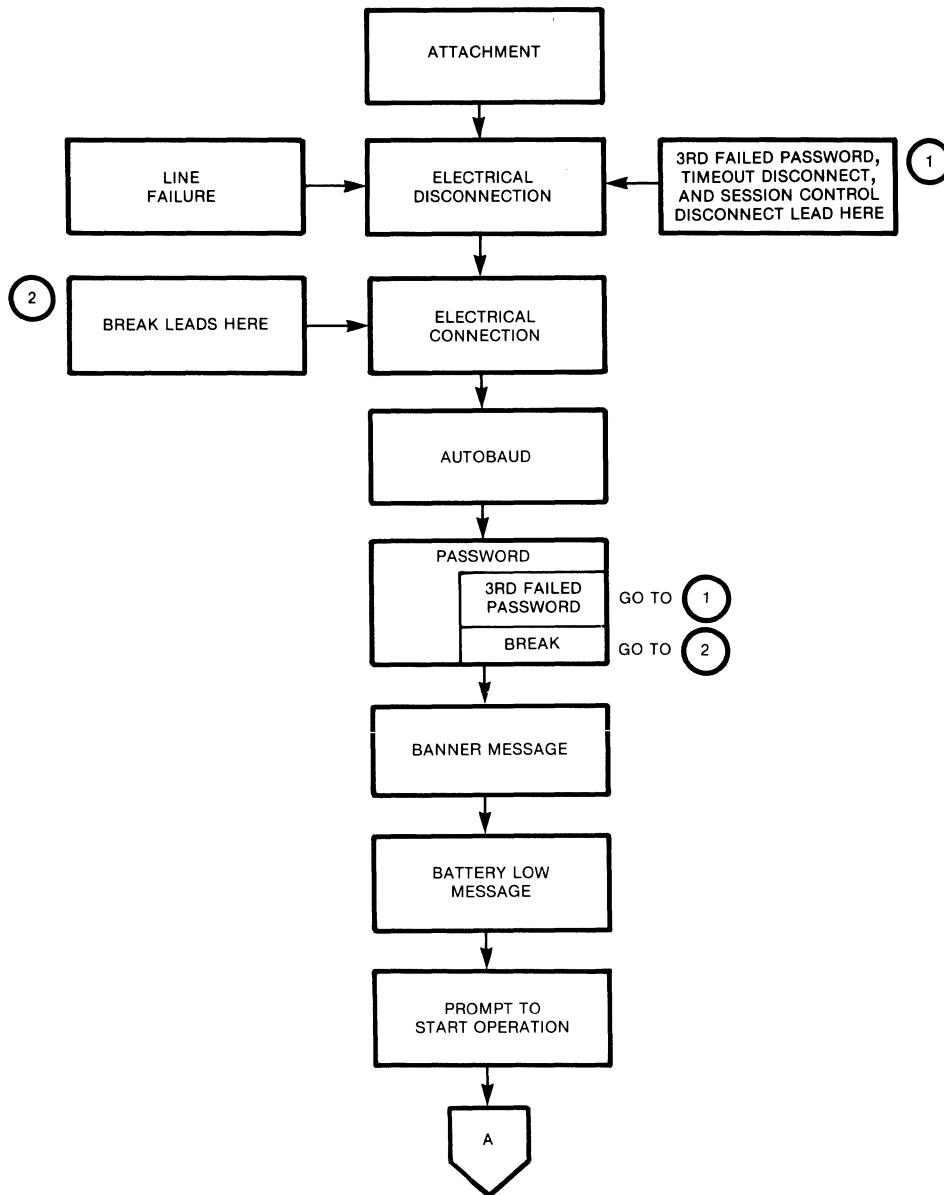
MI-1386-1a-54
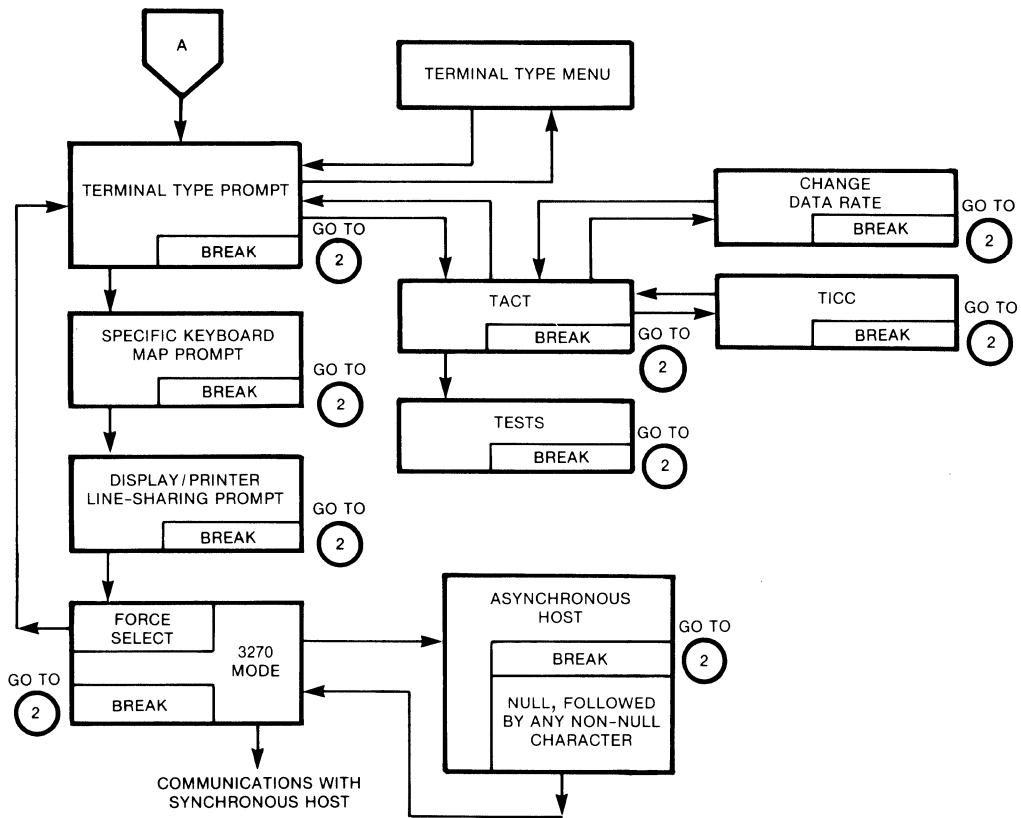
Figure 6-1. The 3270 Mode Entry Process (continued)

6.1.1 Attachment

To begin the 3270 mode entry process, your display terminal must be physically attached to the protocol converter.

For information about connecting your terminal to the protocol converter, refer to section 4.

6.1.2 Electrical Connection

Electrical connection refers to the V.24/RS-232 lead states in asynchronous devices attached to the protocol converter.

When RTS is logically High, a device is connected. When RTS is logically Low, the device is disconnected.

Three different types of attachments can be made before a printer or terminal is electrically connected to the protocol converter:

- When a terminal or printer is directly attached to the protocol converter, the terminal or printer is electrically connected when the terminal or printer is on and the protocol converter has been plugged in.

- When a leased line is attached to an asynchronous port of the protocol converter with a modem, the terminal or printer at the remote site is electrically connected after all devices on the link have been attached.

- When a dial line is attached to an asynchronous port of the protocol converter with an asynchronous modem, the terminal or printer at the remote site is electrically connected after the modem notifies the protocol converter that it has received and answered a call.

6.1.3 Autobaud

The autobaud capability allows the protocol converter to detect the data rate of attached devices and match those rates.

In order for autobaud to work, it has to be configured for the channel. Refer to the prompt SPEED, found in paragraph 5.2.3.

If autobaud is configured, enter CR to set the data rate after you turn on the terminal, enter BREAK, or establish a dial-up connection.

After you enter CR, there are two possible actions that may occur:

- If autobaud is the only step configured in the 3270 mode entry process for your channel, your terminal will be placed in 3270 mode.

- If additional steps are necessary for your channel, the protocol converter will go on to those steps.

If there is no activity on your terminal after you enter CR the first time, enter it again.

Autobaud is the default data rate configuration for each asynchronous channel. If the channel data rate has been changed to a specific value, there are two ways to reset it to autobaud:

- You can reset the data rate with the Command Port (refer to the prompt SPEED, found in paragraph 5.2.3).

- You can change the data rate with TACT (refer to section 9).

6.1.4 The Password Prompt

The password prompt requires you to correctly enter a password before you can proceed with the 3270 mode entry process.

The 3270 mode entry process is not password-protected by default. To configure a password for the channel, refer to the prompts ENTER CHANNEL PASSWORD TEXT in paragraph 5.2.2 and PASSWORD USE in paragraph 5.2.3.

If the 3270 mode entry process is password protected, the protocol converter will display the password prompt.

The following display shows the password prompt.

    Please enter password:

As you enter your password, the system displays asterisks. After you enter your password, enter CR.

If you entered your password incorrectly, the protocol converter displays an error message and then re-displays the password prompt. You will see the following display.

    Please enter password: ****
    Password incorrect
    Please enter password:

The protocol converter allows you three chances to enter a password correctly. If you fail to enter a password correctly on the third attempt, the protocol converter displays a disconnect message.

NOTE: If the channel is configured as switched, and a modem is attached, the protocol converter will disconnect the modem after the third unsuccessful password attempt.

The following display shows the disconnect message.

    Password incorrect
        Invalid Password -- Disconnect

When the disconnect message appears, the protocol converter aborts the 3270 mode entry process.

6.1.5 Banner Message

The banner message is a text message that has a maximum of 58 characters. If configured, it will be sent to the terminal during the 3270 mode entry process.

The following prompt shows an example of a banner message.

   Welcome to the System

To enter or change a banner message, refer to the prompt ENTER BANNER MESSAGE TEXT, found in paragraph 5.2.2.

It is possible that a terminal may be configured with the banner message as the only required step in the 3270 mode entry process. In this instance, the banner message is displayed with a prompt.

The following display shows an example of a banner message with the prompt to start operation.

   Welcome to the System

   To start operation, type any character

When you see the "start operation" prompt, you are in 3270 mode.

If additional steps in the 3270 mode entry process are necessary for your channel, the prompts for these steps appear after the banner message.

6.1.6 Battery Low Message

If the protocol converter's nonvolatile memory battery is low, the battery low message appears after the banner message.

The following display shows the battery low message.

    WARNING - BATTERY LOW

Although the protocol converter will continue to operate when you see this message, you should notify your MICOM Customer Service representative to make arrangements to replace the battery.

6.1.7 Terminal Type Selection Prompt

The protocol converter default is to display the terminal type selection prompt during the 3270 mode entry process.

The following display shows the terminal type selection prompt.

    XXX PROTOCOL CONVERTER
    Enter terminal type or ? for menu

        =>

There are three valid responses to this prompt:

Response	Meaning
Two characters	Indicates a terminal type
?	Displays the Terminal Type Menu (see figure 6-2).
T	Selects TACT (refer to section 9).

Terminal Types

The codes for terminal types are found in the Supported Terminal Reference Guide, stock number 800-1423, and on the Terminal Type Menu (see figure 6-2).

Terminal-Activated Channel Test (TACT)

Entering T at the terminal type selection prompt puts you into TACT. From TACT you can change the data rate, perform tests, or enter TICC.

When you exit TACT you will be returned to the terminal type selection prompt.

The Terminal Type Menu

If you enter ? in response to the terminal type selection prompt, the system displays the Terminal Type Menu (see figure 6-2).

TERMINAL	CHAR.	TERMINAL	CHAR.	TERMINAL	CHAR.
TACT	T	HZT EX80	EX	TV9XX	V9
BEH-DM78	DM	HZT 1400	H4	TV970	VO
CItoh 80	CI	HZT 1500	H5	T2200/39	AS
DM-CSCAN	CS	IBM PC	PC	T5410/20	54
DG200	DG	IBM 3101	I0	VP 60	V6
		IBM 3151	I5		
DECVT-52	V5	IBM 3161	I1	VP60 COL	6C
DECVT100	V1	IBM 3163	I3	VP 78	V7
DECVTSP	VS	IBM 3164	I4	VP78 COL	7C
DECVT220	V2	LS-ADM3A	3A	XL 42/44	X4
DECVT240	V4	LS-ADM5	A5	WYSE 50	W5
ESP-1078	E1	LS-ADM22	A2	WYSE100	W1
ESP 6310	E6	LS-31/42	A3	WYSE-350	W3
HP 2621	H2	LS-1178	A8	Hrdcpy 1	P1
HP 2640	H6	NT-FONE	FN	Hrdcpy 2	P2
HP 2392A	H9	Scanset	SC	Hrdcpy 3	P3
HZT ESP2	E2	TEL 10M	LR	HRDCPY 4	P4

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Figure 6-2. The Terminal Type Menu

The Terminal Type Menu displays the terminal types supported by the terminal support package in the protocol converter.

If you enter an invalid character at the terminal type selection prompt, the protocol converter responds with an error message.

The following display shows the invalid terminal type selection error message.

    Invalid Terminal Type Selection.
       =>

After you enter a valid terminal type code, the protocol converter goes to the next step in the 3270 mode entry process.

The terminal type selection prompt will not appear if a terminal type has already been selected for the channel. You can select a terminal type for a channel in two ways:

- Using the Command Port, select a terminal type at the prompt TERMINAL TYPE (BLANK FOR PROMPT). Refer to paragraph 5.2.3.

- Using TICC, select a terminal type at the prompt TERMINAL TYPE (BLANK FOR PROMPT). Refer to paragraph 9.4.4.

6.1.8 Specific Keyboard Map Prompt

If the specific keyboard map prompt has been enabled from the Command Port, the system displays a prompt.

The following shows the specific keyboard map prompt.

Use specific keyboard map?

There are two valid responses to this prompt:

Y -- indicates that you want to use the specific keyboard map for your terminal. Refer to the Supported Terminal Reference Guide, stock number 800-1423, for a list of specific keyboard maps.

N -- indicates that you want to use the generic keyboard map. The generic keyboard map allows the same keys or key sequences on all supported terminals to correspond to the keys on IBM 3278 terminal keyboards (refer to appendix D).

The default for the specific keyboard map prompt is disabled. To enable the specific keyboard map prompt, refer to the prompt SPECIFIC KEYBOARD MAP PROMPT, found in paragraph 5.2.3.

6.1.9 The Display/Printer Line-Sharing Feature

This feature allows printers to be attached to supported display terminals, not to the protocol converter.

The display/printer line-sharing prompt appears during the 3270 mode entry process for a channel if the following conditions are met:

- You have enabled the Display/Printer Line-Sharing Feature (refer to paragraph 5.2.2).

- You have entered a terminal type that supports the Display/Printer Line-Sharing Feature.

- You have chosen the value ASK for the prompt ATTACH LINE SHARING PRINTER (refer to paragraph 5.2.3).

If any of these conditions is not met, or you have already assigned a printer destination for the channel through the Command Port or TICC using the prompt PRINTER DESTINATION (refer to paragraphs 5.2.3 and 9.4.4, respectively), then you will not see the display/printer line-sharing prompt.

The following shows the display/printer line sharing prompt.

Line-sharing available. Attach printer?

There are two valid responses to this prompt:

Y -- indicates that you want to use a printer attached to your terminal.

N -- indicates that you do not want to attach a printer.

NOTE: The display terminal must have an externally addressable auxiliary printer port in order to support the Display/Printer Line-Sharing Feature.

After making a valid response to this prompt, you will be in 3270 mode.

6.2 OPERATING IN 3270 MODE

When your terminal is in 3270 mode, you can do any of the following:

- You can log onto the host system.

- If your system has the asynchronous host option, you can communicate with an asynchronous host (refer to paragraph 11.3).

- You can enter a force select key sequence (if configured).

6.2.1 Logging Onto the Host System

To log onto the host system, follow the directions provided at your site.

6.2.2 Communicating With an Asynchronous Host

If your unit has the Asynchronous Host Option, you can enter into communications with an asynchronous host.

Entering into communications with an asynchronous host from 3270 mode is described in paragraph 11.3.

6.2.3 Use of Force Select

If force select is enabled for your channel, you can use a force select key sequence after you have entered 3270 mode.

Force select is useful if you wish to change your response to any of three prompts seen during the 3270 mode entry process without going through the entire process again.

The force select key sequence is dependent upon the keyboard map used. Refer to the Supported Terminal Reference Guide, stock number 800-1423, for the force select key sequence for each terminal-specific keyboard map.

The force select key sequence causes the following prompts (if they are enabled) to be displayed:

- The terminal type selection prompt

- The specific keyboard map prompt

- The display/printer line-sharing prompt

When you finish entering responses to these prompts, the protocol converter returns your terminal to 3270 mode. Force select will never logoff a terminal from the host system.

6.3 EXITING 3270 MODE

There are several ways to exit from 3270 mode:

- You can turn off the terminal.

- You can detach your terminal from the protocol converter.

- You can enter BREAK.

- When your terminal is idle for a specified period of time, it may be removed from 3270 mode. Refer to the prompt TIMEOUT DISCONNECT.

- A protocol converter using FEATUREPAK cartridge MB3-SPC removes a terminal from 3270 mode under certain conditions. Refer to the prompt SESSION CONTROL DISCONNECT IF.

- You can use the key sequence ESC Ctrl-D.

- You can terminate the connection on a dial-up line.

SECTION 7

HARDCOPY TERMINAL SUPPORT

7.1 INTRODUCTION

Hardcopy terminal support enables asynchronous ASCII keyboard printers to access applications designed for IBM 3270 Display Stations. Data destined for the 3270 screen is printed, and data entered from the printer keyboard is transmitted to the host system.

Before you begin to use a hardcopy terminal for communications, you should be familiar with the screen formats and basic keyboard operation of an IBM 3270 Display Station. Refer to section 2.

7.1.1 Keyboard Printer Requirements

For hardcopy terminal support, a keyboard printer must have the following characteristics:

- The printer must have a serial RS-232/V.24 interface.

- The printer must be asynchronous.

- The printer must use the ASCII character set.

- The printer must respond in a standard fashion to the ASCII characters CR (Carriage Return), LF (Line Feed), and BS (Backspace).

- The printer must support at least one of the data rates that the protocol converter provides for an asynchronous port.

7.1.2 Types of Hardcopy Support

There are four types of hardcopy support:

- Type 1 Hardcopy Support is designed for access to full screen applications with multiple input fields.

- Type 2 Hardcopy Support is designed for simple applications with only one or two input fields.

- Type 3 Hardcopy Support has the features of Type 1, but supports keyboard printers capable of printing only 80 columns of data.

- Type 4 Hardcopy Support is the same as Type 2, except that when the Write Command is sent from the host, the protocol converter transmits only the new data received. No line or column formatting is provided. Also, no additional CR/LF is added, so there is only one CR/LF for each Write Command.

All four types of hardcopy support consist of two phases:

- In the display phase, the protocol converter prints the screen image.

- In the editing phase, data is input or modified.

The four types of hardcopy support use the same generic keyboard map (refer to appendix D).

All four types of hardcopy support can be used with any keyboard printer compatible with the protocol converter.

7.2 HARDCOPY SELECTION

Asynchronous protocol converter channels may be configured for specific types of hardcopy support in several ways:

*   The Command Port can be used to configure a channel for a specific type of hardcopy support. Refer to the prompt ENTER TERMINAL TYPE (BLANK FOR PROMPT). If the Command Port operator enters a P1, P2, P3, or P4 in response to this prompt, he can configure the channel to support Type 1, 2, 3, or 4 Hardcopy, respectively.

*   The Command Port operator can enter a blank in response to the prompt ENTER TERMINAL TYPE (BLANK FOR PROMPT). A blank entry requires each user to respond to the terminal type selection prompt during the 3270 mode entry process.

*   By typing a key sequence called force select, a user can cause the protocol converter to display the terminal type selection prompt when a terminal is in 3270 mode. Force select is useful if you need to switch from one type of hardcopy support to another.

*   Each terminal user can use a TICC command to select Hardcopy 1, 2, 3, or 4 as a terminal type if TICC is enabled for a channel. TICC provides another method of allowing you to switch from one type of hardcopy support to another. Refer to the prompt TERMINAL TYPE (BLANK FOR PROMPT), found in paragraph 5.2.3.

7.3 TYPE 1 HARDCOPY SUPPORT

Type 1 Hardcopy Support is for access to full screen applications with
multiple input fields. As with the other types of hardcopy support, Type 1
Hardcopy Support consists of two phases: display and editing. These phases
are described in the following paragraphs.

7.3.1 Display Phase

After you select Type 1 Hardcopy, the host computer sends a copy of screen
data to the protocol converter. The protocol converter then sends data lines
of the screen image to the hardcopy printer. Blank lines on the screen image
do not appear on the printout. Each line printed is preceded by a number,
indicating its location on an IBM 3270 screen. A scale is printed at the top
of printed screen data to show column numbers.

After the last line of printed screen data, the protocol converter prints a
blank line. A prompt follows the blank line. In general, this prompt
indicates the cursor position on an IBM 3270 screen. Figure 7-1 shows an
example of a typical printed screen image. This example shows a host logon
screen.
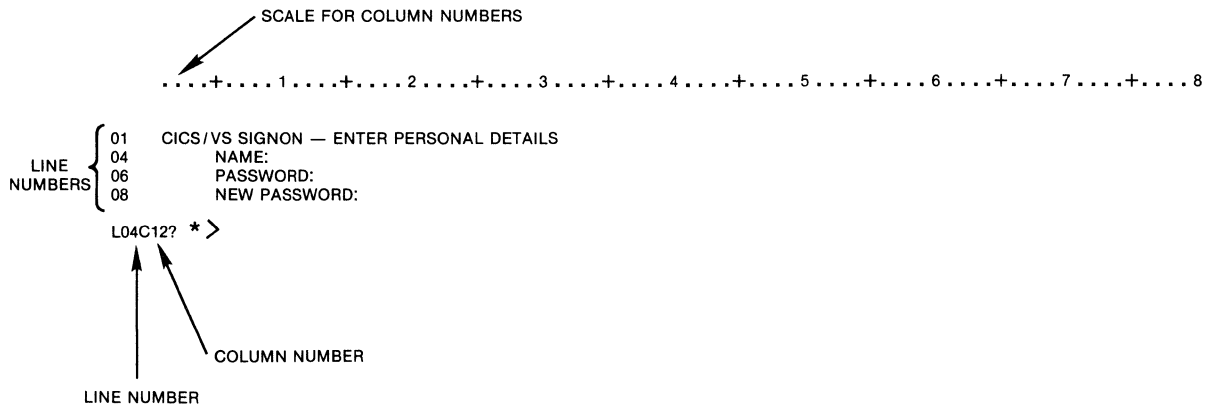
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Figure 7-1. Sample Screen Transmitted From Host System

In the example in figure 7-1, the prompt indicates the first character
position of the first input field where data is to be entered on the screen: L
indicates the line number; C indicates the column number.

The host expects information to be entered in the input field following NAME,
which begins on line 4, column 12.

A keyboard printer should have at least 84 columns for use with Type 1 Hardcopy. Eighty-four columns are required for the keyboard printer to place the line number and complete line of data on a single print line.

If the printer has less than 84 columns, the overflow wraps to the next line, as shown in figure 7-2. The printout in figure 7-2 was made by a printer with only 80 columns.

```
....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+
....8

LINE        01    CICS/VS SIGNON — ENTER PERSONAL DETAILS
NUMBERS     04        NAME:
            06        PASSWORD:
            08        NEW PASSWORD:

PROMPT      L04C12? * >
```

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Figure 7-2. Type 1 Hardcopy With an 80-Column Keyboard Printer

7.3.2 Editing Phase

During the editing phase, data may be entered and modified. In the example shown in figure 7-1, the prompt identifies the input field following NAME. To enter data in this field, type the appropriate information in response to the prompt as shown in figure 7-3.

```
┌──────────────────────────┐
│ L04C12? * > JNSX          │
│          │                │
│          USER SUPPLIED TEXT│
└──────────────────────────┘
```

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Figure 7-3. Example of Data Added to an Input Field

Field Position Keys

Two key functions position the prompt on input fields:

- TAB causes the prompt for the next input field to be printed. For example, if you press TAB after entering the text in the input field following NAME (see figure 7-1), the system prints the prompt for the input field following PASSWORD:

  L06C16 *>

- HOME (ESC H) prints the prompt for the first input position of a screen. In the example shown in figure 7-1, entering HOME would cause the system to display the prompt for the input field following NAME:

  (L04C12? *>).

NOTE: Data previously entered in a field is retained until you erase or type over it. TAB and HOME position the prompt on input fields, but do not change previously entered data.

Erasing Functions

For removing data already entered, hardcopy terminal support provides three erasing functions:

- BACKSPACE (Ctrl-H) deletes the most recently entered character in a field. When you press BACKSPACE, the keyboard printer moves its carriage down one line and back one space. BACKSPACE is only effective if characters have already been entered in a field and if the input position is beyond the first character of a field.

- ERASE FIELD (ESC E) erases all characters entered in the current field. After you enter an ERASE FIELD command, the system displays the prompt for the first character position of the current input field. At this point, you can reenter data in this field.

  For example, if you enter the data shown in figure 7-3 and then enter an ERASE FIELD command, the system will display the prompt for the input field following NAME (L04C12? *>).

- ERASE INPUT (ESC I) removes all data from all fields of the current screen. After you enter an ERASE INPUT COMMAND, the system prints the prompt for the first input field.

7.3.3 Screen Refresh

The Screen Refresh Command (ESC R) enables you to reprint data that would appear on a screen. Use this command to verify that data has been entered correctly before you transmit it to the host system.

If you enter a Screen Refresh Command after typing the data shown in the previous example (see figure 7-3), the system reprints the data in the appropriate position as shown in figure 7-4.

```
....+....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8
01      CICS/VS SIGNON — ENTER PERSONAL DETAILS
04            NAME: JNSX
06            PASSWORD:
08            NEW PASSWORD:

L06C16? * >
```

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Figure 7-4. Screen Data After Screen Refresh

After the system prints the screen data in the appropriate position, it prints the prompt indicating a line and column number for the cursor position on an IBM 3270 display screen.

In figure 7-4, the prompt (L06C16? *>) indicates the first character position of the first input field following PASSWORD. At this point, you can continue data entry, edit, or transmit the data to the host system.

7.3.4 Host Transmission Keys

After you complete editing, use ENTER (RETURN or Ctrl-M) to transmit the data to the host system.

In addition to ENTER, other 3270 host transmission key sequences, such as CLEAR, PF1 through PF24, PA1, PA2, and PA3, function as they do for display terminals.

7.3.5 Status Inquire

The Status Inquire key sequence (ESC ?) is provided with hardcopy support. When you enter the Status Inquire key sequence, system status messages are printed.

7.4 TYPE 2 HARDCOPY SUPPORT

Type 2 Hardcopy Support is designed for applications that require less sophisticated editing functions than those provided by Type 1 Hardcopy Support.

It is best suited for applications that have only one or two input fields or for those that prompt a user to enter data line by line. Type 2 Hardcopy Support also uses the generic keyboard map in appendix B.

As with Type 1 Hardcopy support, Type 2 Hardcopy has two phases: display and editing.

7.4.1 Display Phase

After you select Type 2 Hardcopy Support, the host computer transmits data to the protocol converter. The protocol converter then prints the non-blank lines of a screen on the hardcopy terminal.

Unlike Type 1 Hardcopy, Type 2 Hardcopy does not provide a column scale at the top of the printed screen data.

After the last line of the screen data is printed, the protocol converter generates a blank line. Then it waits for input data. Figure 7-5 is an example of a Type 2 Hardcopy Display.

```
CICS/VS SIGNON — ENTER PERSONAL DETAILS
     NAME:
     PASSWORD:
     NEW PASSWORD:

JNSS
 └────── DATA FOR INPUT FIELD FOLLOWING NAME
```

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Figure 7-5. Type 2 Hardcopy Display
(Input Data for first field shown)

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7.4.2 Editing Phase

During the editing phase, data may be input and modified. To enter data in the first input field shown during the display phase, begin typing information in the first character position of the line following the blank line. In the example shown in figure 7-5, any characters typed would be entered in the input field following NAME.

Field Position Keys

With Type 2 Hardcopy, the two field position keys operate as follows:

- TAB moves to the next input field. For example, if you press TAB after entering the information shown in figure 7-5, the hardcopy terminal moves the carriage to a new line where you may begin to enter data for the input field following PASSWORD.

- HOME (ESC H) allows you to reenter information in the first input field. If you enter the HOME Command at any time while entering information in the example shown in figure 7-5, the system moves the carriage to a new line where you may begin to reenter for the first input field following NAME.

NOTE: Data previously entered in a field is retained until you erase or type over it. TAB and HOME position the prompt on input fields, but do not change previously entered data.

Erasing Functions

With Type 2 Hardcopy, erasing functions operate as follows:

- BACKSPACE (Ctrl-H) for Type 2 Hardcopy operates as it does for Hardcopy Type 1 (refer to paragraph 7.3.2).

- ERASE FIELD (ESC E) erases all characters entered in the current input field. After you enter an ERASE FIELD Command, the system moves the carriage to a new line where you can begin to reenter information at the beginning of the current field.

- ERASE INPUT (ESC I) removes all data from fields of the current screen. After you enter an ERASE INPUT Command, the system hardcopy terminal moves the carriage to a new line where you may begin to enter information for the first input field.

7.4.3 Screen Refresh

If you enter a Screen Refresh key sequence (ESC R) after typing the data shown in figure 7-5, the system reprints the screen data in the appropriate position as shown in figure 7-6.

```
┌─────────────────────────────────────────────┐
│  CICS/VS SIGNON — ENTER PERSONAL DETAILS     │
│         NAME: JNSS                            │
│         PASSWORD:                             │
│         NEW PASSWORD:                         │
│                                              │
└─────────────────────────────────────────────┘
```

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Figure 7-6. Refreshed Screen Image

After the system reprints the refreshed screen data, it prints a blank line. At this point, you can enter data to continue the first input field, move to the next input field, or transmit the screen data to the host system.

7.4.4 Host Transmission Keys

In addition to ENTER, host transmission key sequences (such as CLEAR, PF1 through PF24, PA1, PA2, and PA3) function as they do for display terminals and Hardcopy Type 1.

7.4.5 Status Inquire

The Status Inquire key sequence (ESC ?) can also be used with Hardcopy Type 2.

7.5 TYPE 3 HARDCOPY SUPPORT

Type 3 Hardcopy is similar to Type 1 Hardcopy, but is designed for hardcopy terminals with less than 84 print columns. Type 3 Hardcopy avoids the line wrapping that occurs when Type 1 Hardcopy is used with printing terminals that have less than 84 columns (see figure 7-2).

When you use Type 3 Hardcopy, it truncates the print line: data beyond the 80th column is not printed. You can enter data beyond the 80th column, but the carriage remains in the last column while you complete typing the line.

To select Type 3 Hardcopy, enter 3 after the terminal type selection prompt.

Type 3 Hardcopy uses the same keyboard map as Type 1 Hardcopy and Type 2 Hardcopy (refer to appendix D).

7.6 TYPE 4 HARDCOPY SUPPORT

Type 4 Hardcopy is the same as Hardcopy 2, with the exception of the handling of the Write Command.

With Hardcopy 4, the protocol converter transmits to the terminal only the new data received when the Write Command is sent from the host.

No line or column formatting is provided. No additional CR/LF is added, so there is only one CR/LF for each Write Command.

SECTION 8

PRINTER OPERATIONS

This section explains how the protocol converter enables asynchronous printers to emulate IBM 3287 printers. It provides information on:

- Printer requirements

- Printer controls

- Host-initiated print operations

- Local print operations

- The Display/Printer Line-Sharing Feature

8.1 PRINTER REQUIREMENTS

Almost any asynchronous ASCII printer with a serial interface can be attached to the protocol converter for IBM 3287 emulation.

The basic specifications required are given in this section. Some of the specifications listed are optional. Lack of certain specifications limits the 3287 emulation capabilities of a printer.

8.1.1 132 Columns

IBM printers have 132 column output capability. It is recommended that any printer attached to the protocol converter should also have 132 columns so that it will be compatible with the line size of an IBM 3287 printer.

It is also possible to use a printer with an 80-column carriage. If a line sent to a printer is longer than the number of available columns, the printer wraps the characters to the next line or truncates the line. The action is dependent on the specific printer.

Some 80-column printers have a compressed mode capability. This capability allows you to print 132 columns in a compressed format. Refer to the manual that accompanies your printer for directions on using compressed format for printing.

8.1.2 Keyboard

Keyboard commands enable asynchronous printers attached to the protocol converter to emulate IBM 3287 operator controls. Keyboard commands allow users to gain the benefit of many convenient 3287 features.

8.1.3 Control Characters

The protocol converter uses several ASCII control characters. An attached printer must respond in the standard fashion to the ASCII control characters listed in table 8-1.

Table 8-1. Printer Control Characters

Character	ASCII	Hexadecimal
Carriage Return	Ctrl-M	0D
Line Feed	Ctrl-J	0A

Support of the Form Feed character is optional. A Command Port prompt allows you to indicate that a printer does not respond to the ASCII Form Feed character. Refer to the prompt USE FORM FEED (refer to paragraph 5.2.3).

8.1.4 Additional Requirements

There are four additional requirements:

- The printer must support at least one of the speeds which the protocol converter provides for asynchronous channels.

- The printer must use the ASCII code set.

- The printer must communicate over a link electronically compatible with the protocol converter.

- The printer must have a serial interface.

8.2 KEYBOARD OPERATOR CONTROLS

Keyboard commands enable ASCII printers to emulate the controls on the front panel of an IBM 3287 printer (see table 8-2).

NOTE: If your printer does not have a keyboard, the keyboard commands listed in table 8-2 are unavailable.

Table 8-2. Printer Keyboard Commands

Command	Key Sequence	Use
Hold Print (XOFF)	Ctrl-S	Stops a print operation until an Enable Print Command is entered.
Enable Print (XON)	Ctrl-Q or any character	Restarts a print operation after a Hold Print Command has been entered.
Index	Ctrl-J	Advances the paper one line.
Form Feed	Ctrl-L	Advances the paper to the beginning of the next form.
TACT	T	Enters TACT
PA1	1	Host-program dependent
PA2	2	Host-program dependent
Cancel Print	C	Cancels print operation

NOTE:
The last three commands apply only to FEATUREPAK cartridge MB3-SPC only.

8.3 PRINTOUT FORMAT

The following format specifications are entered either from TICC or from the Command Port:

- Uppercase, lowercase, or mixed

- Spacing

- Page length

You can configure printout formats with TICC (refer to paragraph 9.4.4) or with the Command Port (refer to paragraph 5.2.3). Table 8-3 provides a summary list of printout format prompts and lists the default values.

Table 8-3. Printout Format Specifications

Specification	Prompt	Available Values	Default
Length	PAGE LENGTH	1 through 99	66
Case	PRINT CASE	MIXED LOWER UPPER	MIXED
Spacing	SPACING	SINGLE DOUBLE TRIPLE	SINGLE

8.4 HOST-CONTROLLED PRINT OPERATIONS

Terminal operators may issue keyboard commands to the host system to initiate print operations.

Keyboard commands for specific print operations are dependent upon the operating system.

For example, an operating system may provide specific commands to print files, formatted text, and program listings.

8.5 SCREEN PRINTING

The Command Port is used to assign a local copy or "screen" printer to a display terminal. Refer to the prompt PRINTER DESTINATION, found in paragraph 5.2.3.

If the Command Port has not been used to specify a screen printer for a display, the default destination is the printer with the next highest channel number.

During display terminal operations, a display terminal operator can issue a Print Command to print the contents of a display terminal.

The specific key sequence for a Print Command depends on the keyboard map in use. Refer to appendixes D and to MICOM's Supported Terminal Reference Guide, stock number 800-1423.

When you issue a Print Command and a local copy printer is unavailable, busy, or inoperable, an error message appears on the 24th line of the screen, and the terminal bell rings.

At this point, the keyboard locks. Before you can continue operating the keyboard, you must perform your terminal reset sequence. Reenter the Print Command when your assigned printer is no longer busy.

Table 8-4 lists printer error messages.

Table 8-4. Printer Error Messages

Message	Meaning
OPERATOR UNAUTHORIZED	Indicates that you do not have a printer available as a local copy printer
PRINTER BUSY	Indicates that your assigned local copy printer is already performing a print operation
PRINTER NOT WORKING	Indicates that the printer is not electrically connected using RS-232-C (V.24) leads

8.6 THE DISPLAY/PRINTER LINE-SHARING FEATURE

This feature allows for the support of both a display terminal and a printer using a single connection to the protocol converter. The protocol converter can address the two devices logically, even though there is only one physical connection to it.

The protocol converter does this by multiplexing the data to the two devices by using the display terminal's control codes to start and stop the printer port if print data is being sent on the line.

There are certain restrictions to this feature. These include the following:

- The display terminal must have an externally addressable auxiliary printer port in order to support this feature.

- The protocol converter cannot support both directly attached printers and display/printer line-sharing printers at the same time.

For instructions on cabling printers to display terminals, refer to the reference manual or specifications provided by the display terminal manufacturer.

NOTE: Use of the Asynchronous Host Option impacts the use of this feature; it restricts the total number of devices to being no more than the total number of physical 3270 channels available.

8.6.1 Using the Display/Printer Line-Sharing Feature

To set up a printer for display/printer line-sharing, perform the following procedure:

1. Ensure that the display terminal has an externally addressable auxiliary printer port.

2. Ensure that the protocol converter does not have any physical channels configured as printers.

3. Enable the Display/Printer Line-Sharing Feature (refer to paragraph 5.2.2).

4. Reset the unit.

5. Select ASK at the prompt ATTACH LINE SHARING PRINTER (refer to paragraph 5.2.3).

6. Begin the 3270 mode entry process.

7. Select Y (for yes) when you come to the display/printer line-sharing prompt during the 3270 mode entry process.

8. Assign the printer a logical channel number using TICC. (Refer to the following paragraphs to determine the logical channel numbers available.)

NOTE: Indicate a specific channel number for the prompt PRINTER DESTINATION when configuring a channel for display/printer line-sharing. Do not use the default value of 0. When assigning channel numbers to line-sharing printers, be aware that a local copy printer for one display terminal may be physically attached to another display terminal.

Two terminals in 3270 mode cannot be logically attached to the same printer. If a terminal is already attached to the printer designated for your terminal, the display/printer line-sharing prompt will not appear during the 3270 mode entry process.

8.6.2 The Display/Printer Line-Sharing Feature on 4-Channel Models

The Display/Printer Line-Sharing Feature extends the capabilities of a 4-channel model of the protocol converter. It allows a 4-channel model to accommodate up to eight devices: four display terminals and four printers.

Figure 8-1 shows the recommended configuration for a 4-channel model. The connectors on the back panel of the protocol converter for channels 1 through 4 are attached to the display terminals. The printers are attached to the display terminals and are assigned logical channel numbers.


```
CHANNEL 1        CHANNEL 2        CHANNEL 3        CHANNEL 4
   |                |                |                |
 DISPLAY          DISPLAY          DISPLAY          DISPLAY
 PRINTER          PRINTER          PRINTER          PRINTER
   |                |                |                |
CHANNEL 5        CHANNEL 6        CHANNEL 7        CHANNEL 8
```
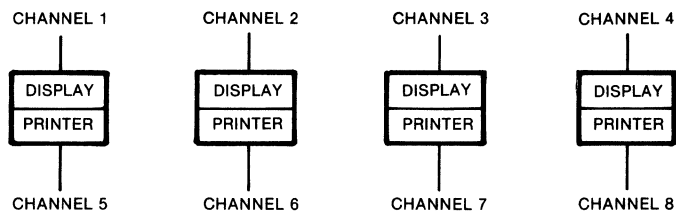
MI-1225c-88

Figure 8-1. The Display/Printer Line-Sharing Feature on a 4-Channel Model

NOTE: Do not configure channels 1 through 4 as logical printer channels on 4-channel models. If you configure channels 1 through 4 as printers, you will not be able to attach any more devices.

To enter configuration parameters for the printers attached to logical channels 5 through 8, refer to paragraph 5.2.3.

8.6.3 The Display/Printer Line-Sharing Feature on 10-Channel Models

The Display/Printer Line-Sharing Feature extends the capabilities of a 10-channel model. It allows 10-channel models to accommodate up to 16 devices: 10 display terminals and 6 printers.

The connectors for channels 1 through 10 (located on the back of the protocol converter) are physically attached to the display terminals. The printers are physically attached to the display terminals and can be assigned logical channel numbers 11 through 16.

To enter configuration parameters for the printers attached to logical channels 11 through 16, refer to paragraph 5.2.3.

8.6.4 The Display/Printer Line-Sharing Feature on 16-Channel Models

The Display/Printer Line-Sharing Feature is not applicable to 16-channel models.

8.7 PRINTER TEST

TACT selection provides a test to ensure that a printer is receiving correct data transmissions from the protocol converter. This test can be initiated from the printer keyboard or from the Command Port.

NOTE: **TACT cannot be used on line-sharing printers.**

To initiate a test from the printer keyboard, do the following:

1. Enter TACT.

2. Start the Terminal Test.

3. Enter BREAK to stop the test.

To initiate a printer test from the Command Port, perform the following procedure:

1. Select TACT from the Command Port Primary Menu.

2. Enter the channel number of the attached printer, and <u>CR</u>.

3. When the system displays the TACT Menu, enter T and <u>CR</u>.

There are two ways to stop a Terminal Test initiated on the Command Port:

• Select TACT from the Command Port Primary Menu, enter the same channel number, and choose the selection STOP TEST from the TACT Menu.

• Enter BREAK on the printer keyboard.

SECTION 9

TERMINAL-ACTIVATED CHANNEL TEST (TACT)

The Terminal-Activated Channel Test (TACT) Feature is provided on all models of the protocol converter.

NOTE: TACT can be accessed in two ways: from a terminal or printer keyboard, or from the Command Port. This section describes the use of TACT when accessed from a terminal or a printer keyboard only. For information on using TACT when accessed from the Command Port, refer to paragraph 5.5.

TACT allows you to enter commands from a terminal or printer keyboard to do the following:

- Perform a Terminal Test

- Perform a Loopback Test

- Configure the channel using Terminal-Initiated Channel Configuration (TICC)

- Display the PROM identification number

- Send a printer initialization message

- Change the data rate

When you access TACT from a terminal or printer keyboard, you can only configure the channel you are on. When you access TACT from the Command Port, you can perform TACT functions on any channel on which TACT is available.

9.1 AVAILABILITY OF TACT

TACT is not available on all channels. There are two ways that a specific channel may not have TACT available:

- TACT does not operate on line-sharing printer channels or on asynchronous host channels.

- TACT can be disabled for a channel using the Command Port.

    If TACT has been disabled for your channel through use of the Command Port, you will not be able to access TACT until it is enabled.

    For more information about disabling TACT using the Command Port, refer to paragraph 5.2.3.

9.2 ACCESSING TACT WITH A TERMINAL

There are two ways to access TACT with a terminal:

- You can enter TACT during the 3270 mode entry process, if the terminal type selection prompt has not been disabled.

- You can enter TACT with force select, if this capability has not been disabled.

9.2.1 Accessing TACT During the 3270 Mode Entry Process

If the channel to which your terminal is attached is configured for a terminal type selection prompt, you can access TACT during the 3270 mode entry process. To configure the terminal type selection prompt, refer to the prompt TERMINAL TYPE (BLANK FOR PROMPT), found in paragraph 5.2.3.

To reach TACT during the 3270 mode entry process, perform the following procedure:

1. Follow the directions for entering the 3270 mode entry process for your channel (refer to paragraph 6.1).

2. When the terminal type selection prompt appears (refer to paragraph 6.1.7), enter T (for TACT). You will see the TACT Menu (see figure 9-1).

9.2.2 Accessing TACT With Force Select

If the channel to which your terminal is attached is configured with the force select capability, you can access TACT when your terminal is in 3270 mode.

The force select key sequence causes the following prompts to appear (if they are configured):

- The terminal type selection prompt

- The specific keyboard map prompt

- The display/printer line-sharing prompt

The key sequence for force select depends upon the keyboard map that you are using. Refer to MICOM's Supported Terminal Reference Guide, stock number 800-1423.

To reach TACT with force select, perform the following procedure:

1. Enter the force select key sequence for your terminal type. The terminal type selection prompt will appear (see figure 9-1).

2. Enter the letter T after the terminal type selection prompt. The TACT Menu will appear.

9.3 ACCESSING TACT WITH A KEYBOARD PRINTER

If your printer has a keyboard, you can access TACT. To reach TACT from a printer, type the letter T in uppercase or lowercase. This action causes the TACT Menu to be printed.

NOTE: TACT cannot be used on line-sharing printers.

9.4 THE TACT MENU

After accessing TACT using either a terminal or a keyboard printer, you will see the TACT Menu (see figure 9-1).

```
PROTOCOL CONVERTER CHANNEL X IN TACT

1 EXIT FROM TACT
2 START TERMINAL TEST
3 START LOOPBACK TEST
4 CONFIGURE USING TICC
5 DISPLAY PROM ID
6 SEND PRINTER INITIALIZATION
7 CHANGE BAUD RATE
SELECT:
```
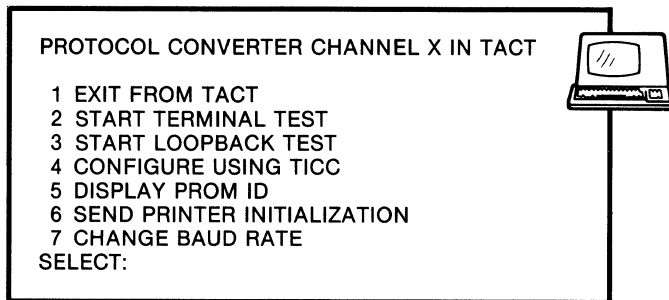
NOTE:
  THE TACT MENU SHOWN WILL APPEAR IF YOU ARE USING A TERMINAL.
  IF YOU ARE USING A KEYBOARD PRINTER, THE SELECTION, ITEM 6, SEND
  PRINTER INITIALIZATION, WILL NOT APPEAR.

MI-1386-1a-27

Figure 9-1. The TACT Menu

NOTE: The TACT Menu is different from the TACT Commands Menu (refer to paragraph 5.5). Because of the different modes of access, there are different TACT functions available.

Each selection of the TACT Menu is described in the following paragraphs.

9.4.1 Exit From TACT

Selection 1, EXIT FROM TACT, of the TACT Menu returns you to the terminal type prompt.

9.4.2 Start Terminal Test

Selection 2, START TERMINAL TEST, of the TACT Menu accesses the Terminal Test. The Terminal Test enables you to see if a terminal or printer is receiving correct data transmissions from the protocol converter.

In dial connections through an asynchronous modem, the Terminal Test can show whether or not the connection is faulty.

To start the Terminal Test, select 2 at the TACT Menu and CR. The protocol converter will continuously send the fox message to the terminal or printer until the test is ended.

The fox message is:

   THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 1234567890

To end the Terminal Test, enter BREAK.

9.4.3 Start Loopback Test

Selection 3, START LOOPBACK TEST, of the TACT Menu accesses the Loopback Test. The Loopback Test enables you to check whether a display or printer is transmitting and receiving characters correctly.

In a Loopback Test, the protocol converter receives every character typed on the keyboard and sends it back to the terminal screen.

To start the Loopback Test, select 3 at the TACT Menu and CR. The protocol converter will display every character you type until the test is ended.

To end the Loopback Test, enter BREAK.

9.4.4 Configure Using TICC

Selection 4, CONFIGURE USING TICC, of the TACT Menu accesses the Terminal-Initiated Channel Configuration (TICC) Feature. TICC enables you to control certain channel configuration parameters from a terminal or printer keyboard.

The Command Port controls whether the parameters entered with TICC become part of the configuration stored in the protocol converter's nonvolatile memory or remain in effect only during the current connection. Refer to the prompt TICC CHANGES NVRAM, found in paragraph 5.2.3.

TICC can be used from a terminal or from a printer keyboard.

Using TICC From a Terminal

To access TICC from a terminal, select 4 at the TACT Menu and CR. You will see the following prompts.

SPEED
    [AUTO]
    [600]
    [2400]
    [9600]
    [4800]
    [1200]
    [300]

Select the desired channel data rate. Make sure that the selection entered here is the same as the data rate of the attached device.

STOP BITS
  [1]
  [2]

This prompt selects the transmit stop bits on the attached device.

Make sure that the selection entered here is the same as the stop bit setting on the attached device.

PARITY
  [NONE]
  [SPACE]
  [EVEN]
  [ODD]
  [MARK]

This prompt sets the transmit parity. Received parity is not checked.

TERMINAL TYPE (BLANK FOR PROMPT)

To configure a channel to support a specific type of terminal, enter the code for the terminal, and CR. The codes for each terminal can be found in the MICOM Supported Terminal Reference Guide, stock number 800-1423.

If you do not make an entry, the terminal type selection prompt will appear during the 3270 mode entry process.

PRINTER DESTINATION - 0

Enter the number of a channel connected to a printer. Print requests from the terminal will be sent to the printer connected to the channel number entered here.

The default value 0 means the first printer configured on a higher-numbered channel.

If no screen printer is assigned to your terminal, you will be returned to the TACT Menu after making an entry for this prompt.

The following four prompts apply to the screen printer assigned to your terminal. They only appear if a printer is configured and available to your terminal.

PAGE LENGTH

Enter a number from 1 to 99 (the default is 66) to indicate the number of
lines to be printed on a page. Make certain that the page length
configuration on your printer matches the value entered here.

PRINT CASE
   [MIXED]
   [UPPER]
   [LOWER]

Select the kind of typeface you want your printer to use.

USE FORM FEED
   [NO]
   [YES]

NO means that the protocol converter sends an appropriate number of line feed
characters to a printer instead of a form feed character.

YES means that the protocol converter sends a form feed character to a
printer.

SPACING
   [SINGLE]
   [DOUBLE]
   [TRIPLE]

Select the type of line spacing that you want your printer to use.

After making your selections, you will be returned to the TACT Menu.

Using TICC From a Printer

To access TICC from a printer, enter CONFIGURE USING TICC from the TACT Menu, and CR. You will see the following prompts.

PAGE LENGTH

Enter a number from 1 to 99 (the default is 66) to indicate the number of lines to be printed on a page. Make certain that the page length configuration on your printer matches the value entered here.

PRINT CASE
   [MIXED]
   [UPPER]
   [LOWER]

Select the kind of typeface you want your printer to use.

USE FORM FEED
   [NO]
   [YES]

NO means that the protocol converter sends an appropriate number of line feed characters to a printer instead of a form feed character.

YES means that the protocol converter sends a form feed character to a printer.

SPACING
   [SINGLE]
   [DOUBLE]
   [TRIPLE]

Select the type of line spacing that you want your printer to use.

After making your selections, you will be returned to the TACT Menu.

9.4.5 Display PROM ID

Selection 5, DISPLAY PROM ID, of the TACT Menu allows you to display the identification number of the PROM set in the protocol converter.

The PROM identification number contains coded information about the features, options, and version number of the software.

To display the PROM set identification number, select 5 at the TACT Menu and CR. The protocol converter will display the identification number of the PROM set in your protocol converter.

The following is an example of a PROM set identification number.

  PROM ID # 907-XXXX-XX

The information in the PROM set identification number is primarily used by MICOM Customer Service. You will be requested to provide this information if you make inquiries about service.

After viewing the PROM set identification number, enter CR to return to the TACT Menu.

9.4.6 Send Printer Initialization

Selection 6, SEND PRINTER INITIALIZATION, of the TACT Menu sends an initialization message to the printer for your terminal.

The initialization message for a printer attached to a specific channel is entered using the Command Port. Refer to the Command Port prompt ENTER INITIALIZATION MESSAGE TEXT, found in paragraph 5.2.3.

To specify the printer for your terminal, refer to the Command Port prompt PRINTER DESTINATION, found in paragraph 5.2.3.

NOTE: The Send Printer Initialization selection does not appear on the TACT Menu for a printer.

To send a printer initialization message with TACT, select 6 at the TACT Menu and CR.

The initialization message will be printed on the local copy printer for your terminal. Enter CR to return to the TACT Menu.

9.4.7 Change Baud Rate

Selection 7, CHANGE BAUD RATE, of the TACT Menu enables you to change the data rate of the channel from a terminal or printer keyboard.

To change the data rate with TACT, perform the following procedure:

1. Select 7 at the TACT Menu and CR.

2. Change the data rate setting on the terminal. Refer to the manual provided by the terminal manufacturer for directions.

3. Enter CR. The protocol converter will change the data rate to the new selection and re-display the TACT Menu.

NOTE: If there is no activity on your terminal after you enter CR the first time, enter CR again.

SECTION 10

SECURITY FEATURES

This section describes the following protocol converter security features:

- The Automatic Logon Feature

- The Security Protection Feature

10.1 THE AUTOMATIC LOGON FEATURE

The protocol converter's Automatic Logon Feature enables display terminal users to transmit fixed messages to the host. Each channel configured to support a display terminal can have its own logon message.

A single logoff message is used for all channels. The logoff message capability is part of the Security Protection Feature.

A message may contain various segments of text, separated by wait codes. Wait codes inform the protocol converter to pause for a specified period of time or until a specific action occurs before the next message segment is transmitted.

The use of both automatic logon and automatic logoff are described in the following paragraphs.

10.1.1 Use of Automatic Logon

Depending on the configuration of the protocol converter, there are two ways to use automatic logon:

- You can enter a simple key sequence to send the logon message.

- Your channel can be configured so that the protocol converter transmits the logon message for your channel immediately after you complete the 3270 mode entry process.

As the protocol converter transmits the logon sequence, it will appear on your screen. During a logon message, wait codes may cause pauses in the transmission sequence.

During pauses, the messages shown in table 10-1 appear on the 24th line of the screen. To override a pause, type s. This action causes the protocol converter to transmit the next part of the sequence.

10.1.2 How to Abort an Automatic Logon Message

There are two ways to abort a logon message:

- Enter BREAK

- Type any character except s

When you enter BREAK, the protocol converter halts the logon message and removes your terminal from 3270 mode. To continue operation of your terminal, you must complete the 3270 mode entry process.

10.1.3 Use of the Automatic Logoff Capability

A channel can be configured so that a logoff message is automatically sent to the host when a display is disconnected or when you enter BREAK. Refer to the prompt LOGOFF MESSAGE USE, found in paragraph 5.2.3.

10.1.4 How to Code Logon and Logoff Messages

Before you can configure logon and logoff messages, you must code the message according to the rules given in the following paragraphs.

To code these messages, you must be familiar with the communications protocol, the specific read and write commands for the logon procedure of your host system, and the hexadecimal values of host transmission and cursor positioning keys on the Generic Keyboard Map (refer to appendix D).

Refer to the IBM publications listed at the end of section 2 for specific details.

NOTE: A logon or logoff message cannot exceed 38 characters. The final character must be a backslash (\\).

10.1.4.1 Rules for Coding Characters

Use the following rules to code characters:

- Enter displayable characters literally or in hexadecimal.

- Any character entered in hexadecimal must be preceded by a ' character.

- Non-displayable characters must be entered in hexadecimal (refer to appendix D).

10.1.4.2 Wait Codes

Enter wait codes in hexadecimal format. Place a ' before each wait code. During a logon message, certain wait codes cause messages to appear on the 24th line of the screen. Table 10-1 is a list of wait codes and messages.

Table 10-1. Wait Codes

Code	Logon Message	Meaning
'90	AWAITING UNLOCK WCC	If the keyboard is locked, wait for it to unlock.
'91	AWAITING UNLOCK WCC	Wait for the next time that the keyboard is unlocked even if it is currently unlocked.
'A0	AWAITING UNBIND	If the terminal is bound, wait for unbind.
'A1	AWAITING UNBIND	Wait for the next unbind even if the terminal is not currently bound.
'A2	AWAITING BIND	If the terminal is unbound, wait until a bind is received.
'A3	AWAITING BIND	Wait until a bind is received even if the terminal is currently bound.
'92	AWAITING HOST WRITE	Wait for any write from the host.
'80 through '86	AWAITING TIMEOUT	Wait three seconds.
'87	AWAITING TIMEOUT	Wait six seconds.
'88	AWAITING TIMEOUT	Wait nine seconds.
'89	AWAITING TIMEOUT	Wait 12 seconds.
'8A	AWAITING TIMEOUT	Wait 15 seconds.
'8B	AWAITING TIMEOUT	Wait 18 seconds.
'8C	AWAITING TIMEOUT	Wait 21 seconds.
'8D	AWAITING TIMEOUT	Wait 24 seconds.
'8E	AWAITING TIMEOUT	Wait 27 seconds.
'8F	AWAITING TIMEOUT	Wait 30 seconds.

10.1.4.3 Format of a Logon or Logoff Message

A logon or logoff can be in one of the three following formats.

TEXT

In this format, the line is interpreted as characters typed on the keyboard. When the protocol converter reads the end of the line, it checks if the keyboard is locked. Two possible actions may occur:

- If the keyboard is locked, the protocol converter assumes that an AID-generating key was inserted into TEXT.

- If the keyboard is not locked, the protocol converter performs an ENTER key sequence at the end of the message.

In both cases, the protocol converter waits for the host to unlock the keyboard again.

TEXTA!TEXTB

When a message is in this format, the protocol converter does the following:

1. It waits for a host write to unlock the keyboard.

2. When the keyboard is unlocked, the protocol converter scans the screen for TEXTA in the case in which it was input.

3. If TEXTA is found, the protocol converter sends TEXTB to the host.

4. If TEXTA is not found, the protocol converter waits for another write from the host and re-scans the screen for TEXTA.

!TEXTC

This message is the equivalent of TEXTA!TEXTB. In this instance, the protocol converter waits for the keyboard to unlock and then sends TEXTC.

10.1.5 How to Enter an Automatic Logon Message With the Command Port

To enter a logon message text for a channel which supports a display, refer to the prompt ENTER LOGON MESSAGE TEXT. When you reach this prompt, enter the text as you have coded it. Terminate the message with C9 , followed by a CR.

NOTE: Logon messages and printer initialization messages use the same storage area. If you change the configuration on a channel from display to a printer or vice versa, make sure that you change the appropriate message.

10.1.6 How to Enter a Logoff Message

To enter a logoff message, refer to the prompt ENTER LOGOFF MESSAGE TEXT (refer to paragraph 5.2.2). When you reach this prompt, enter the text as you have coded it. Terminate the message with C9 , followed by a CR.

NOTE: An unsuccessful auto logoff message may disable its associated channel until the protocol converter is reset.

10.2 THE SECURITY PROTECTION FEATURE

The Security Protection Feature provides comprehensive security protection. It includes:

- Password access for asynchronous channels

- Command Port Password Access

- Timeout Disconnect

- Automatic Logoff Messages following disconnection or BREAK

- Variable XID data for units using FEATUREPAK cartridge MB3-SPC

- Disconnect if unbound or inactive for units using FEATUREPAK cartridge MB3-SPC

- Session control disconnect

- Unbind

10.2.1 Asynchronous Channel Password Access

Asynchronous channel password access prevents unauthorized use of terminals attached to the protocol converter. The protocol converter can be configured so that each terminal user is required to enter a correct password when beginning the 3270 mode entry process.

To configure a password, refer to the prompt ENTER CHANNEL PASSWORD TEXT, found in paragraph 5.2.2.

10.2.2 Command Port Password Access

Command Port password access prevents unauthorized changes to the protocol converter configuration.

When the protocol converter is shipped, it is not configured with a password. To enter a Command Port password, refer to the prompt ENTER COMMAND PORT PASSWORD, found in paragraph 5.2.4.

Once the Command Port has been configured with a password, the password can be changed, but not removed. If you forget the Command Port password, perform a cold start (refer to paragraph 3.2.2).

10.2.3 Timeout Disconnect

Timeout disconnect enables the protocol converter to remove a terminal from 3270 mode after a specified period of inactivity. This prevents unauthorized use of an unattended terminal.

To configure timeout disconnect, refer to the prompts TIMEOUT DISCONNECT VALUE (MINUTES), found in paragraph 5.2.2, and TIMEOUT DISCONNECT USE, found in paragraph 5.2.3.

NOTES: Timeout disconnect will disconnect attached modems when configured for dial access. Timeout disconnect should be used with auto logoff when the channel is configured for dial access.

10.2.4 TACT/TICC Disable

You can disable TACT and TICC for a channel using the Command Port. This prevents unsophisticated users from entering incorrect terminal type data or altering the channel configuration.

To disable TICC and TACT for a channel, enter YES in response to the prompt DISABLE TACT/TICC (refer to paragraph 5.2.3).

10.2.5 Variable XID

Variable XID (Exchange Identifier) data is a security feature provided on units using FEATUREPAK cartridge MB3-SPC. It is used in dial environments to fix the identity of the control unit type and its serial number.

The default XID is 01700000. The first three digits (017) identify the protocol converter as an IBM 3274 control unit. The remaining five digits indicate that the unit has a serial number of 0. If you need to change the XID, enter the appropriate eight hexadecimal digits, and enter CR.

To enter an XID, refer to the prompt ENTER XID DATA, found in paragraph 5.2.2.

SECTION 11

OPTIONS AND FEATURES

This section describes the options and two of the features available for enhancing the protocol converter. These options and features are the following:

- The SyncModem Cable Option

- The SyncHost Cable Option

- The Asynchronous Host Feature

- The Graphics Pass Through Feature

11.1 THE SYNCMODEM CABLE OPTION

This option allows the protocol converter's composite to be attached to a synchronous modem, for remote connection to the IBM host.

Order this option from MICOM if your protocol converter is located remotely from the IBM host.

11.2 THE SYNCHOST CABLE OPTION

This option allows the protocol converter's composite to be attached to a communications controller or front-end processor, for local attachment to the IBM host.

Order this option from MICOM if your protocol converter is located locally to the IBM host.

11.3 THE ASYNCHRONOUS HOST FEATURE

This feature makes four channels on the protocol converter available for communications with an asynchronous host, and permits individual display terminals to switch between 3270 mode and any of four asynchronous host channels.

When a unit has this feature, the four asynchronous host channels are the four lowest-numbered channels (channels 1 through 4).

NOTES: Asynchronous host channels are transparent to both BREAK and flow control.

Asynchronous host channels maintain Clear-To-Send and Carrier Detect continuously High.

Use of asynchronous host channels limits the use of the Display/ Printer Line-Sharing Feature -- each printer must be assigned a real physical channel address.

Do not configure the four asynchronous host channels for a combined data rate of more than 9600 bps. If you do so, you could lose data.

11.3.1 Configuration of Asynchronous Host Channels

Configuration of asynchronous host channels is slightly different than configuration of standard synchronous host channels. You will see only the following prompts when configuring asynchronous host channels:

- SPEED

- STOP BITS

- PARITY

- EIA LEAD CONTROLS

- FORCE SELECT

For explanations of these prompts, refer to paragraph 5.2.3.

11.3.2 Use of Asynchronous Host Channels

To use an asynchronous host channel, you must first complete the 3270 mode entry process. When in 3270 mode, you can choose one of two ways to access an asynchronous host channel. The two ways are the following:

- Asynch port (specify) selects a specific asynchronous host channel.

- Asynch port (any) selects the first available asynchronous host channel.

Each method of accessing an asynchronous host channel is described in the following paragraphs.

Asynch port (specify)

To choose a specific asynchronous host channel, enter the asynchronous port (specify) key sequence, followed by the number of the desired asynchronous host channel. Then CR.

For example, the asynch port (specify) key sequence for most keyboard maps is Ctrl-B. To specify the first asynchronous host channel, you would enter Ctrl-B 1.

For the key sequence on your display terminal, refer to the appropriate keyboard map in the Supported Terminal Reference Guide, stock number 800-1423.

Asynch port (any)

To obtain the first not busy asynchronous host channel, enter the asynch port (any) key sequence. On most keyboard maps the asynch port (any) key sequence is Ctrl-A.

For the key sequence on your display terminal, refer to the appropriate keyboard map in the Supported Terminal Reference Guide, stock number 800-1423.

After you enter one of the key sequences, follow the directions provided at your site for logging onto the asynchronous host.

11.3.3 Disconnection From an Asynchronous Host

To disconnect from an asynchronous host, enter a null, followed by any other character except a null.

To transmit a null, use the key sequence Ctrl-@ or Ctrl-Space (the use of these keys is terminal-dependent).

After you disconnect from an asynchronous host, you will be returned to where you were before you switched to the asynchronous host.

11.4 THE GRAPHICS PASS THROUGH FEATURE

This feature provides support for graphics software such as PLOTIO and SASGRAPH on ASCII terminals attached to the protocol converter. When the protocol converter receives a special character, it goes into transparent mode.

Transparent mode means that the protocol converter passes binary data without translation from the application program to an attached terminal. The protocol converter can thus pass full 8-bit graphic or special language characters to an attached terminal.

To configure a terminal for the 8-bit capability, you must configure its channel with a parity setting of none.

There are two special characters that are available to invoke transparent mode. These are the following:

- Hex 70 -- Place this at the beginning of large blocks of data. Transparent mode will automatically terminate at the end of the frame.

- Hex 80 -- This is a toggle function. Enter it at the beginning and the ending of the block of characters you want passed. The first hex 80 will start transparent mode; the second hex 80 will terminate it.

APPENDIX A

TECHNICAL SPECIFICATIONS

A.1 PHYSICAL SPECIFICATIONS

Operating
Environment
32 to 114°F (0 to 45°C)
0 to 95 percent relative humidity (non-condensing)

Power
115 V ac +10 percent, 47 to 63 Hz
230 V ac +10 percent, 47 to 63 Hz

Size
19 inches (48.3 cm) wide
24 inches (61 cm) wide for rack-mount brackets
7 inches (17.8 cm) high
18 inches (45.7 cm) deep

A.2 CHANNEL SPECIFICATIONS

Data Rates
Selectable at rates of 300, 600, 1200, 2400, 4800, or 9600 bps; or autobaud, with the same rates available. Maximum aggregate data rate of 153,600 bps

Interface
EIA RS-232-C (CCITT V.24/V.28) serial, asynchronous; full-duplex; configured as data communications equipment (DCE)

A.3 COMMAND PORT SPECIFICATIONS

Data Rates
Autobaud, with data rates of 300, 600, 1200, 2400, 4800, and 9600 bps available

Interface
EIA RS-232-C (CCITT V.24/V.28) serial, asynchronous; full-duplex; configured as DCE

A.4 SYNCHRONOUS HOST SPECIFICATIONS

Data Rates
External: up to 19,200 bps
Internal: 1200, 2400, 4800, 9600, and 19,200 bps

Interface
EIA RS-232-C (CCITT V.24/V.28) serial, synchronous; internal or external timing; full- or half-duplex; configured as data terminal equipment (DTE)

APPENDIX B

APPLICATIONS

A basic application using the protocol converter is shown in figure 2-2. This appendix describes some sophisticated applications of the protocol converter.

B.1 REMOTE CLUSTER

The protocol converter can be used to directly replace a remote IBM 3274 Control Unit. This application is called a remote cluster.

Figure B-1 is an example of using the protocol converter to replace an IBM 3274 Control Unit.
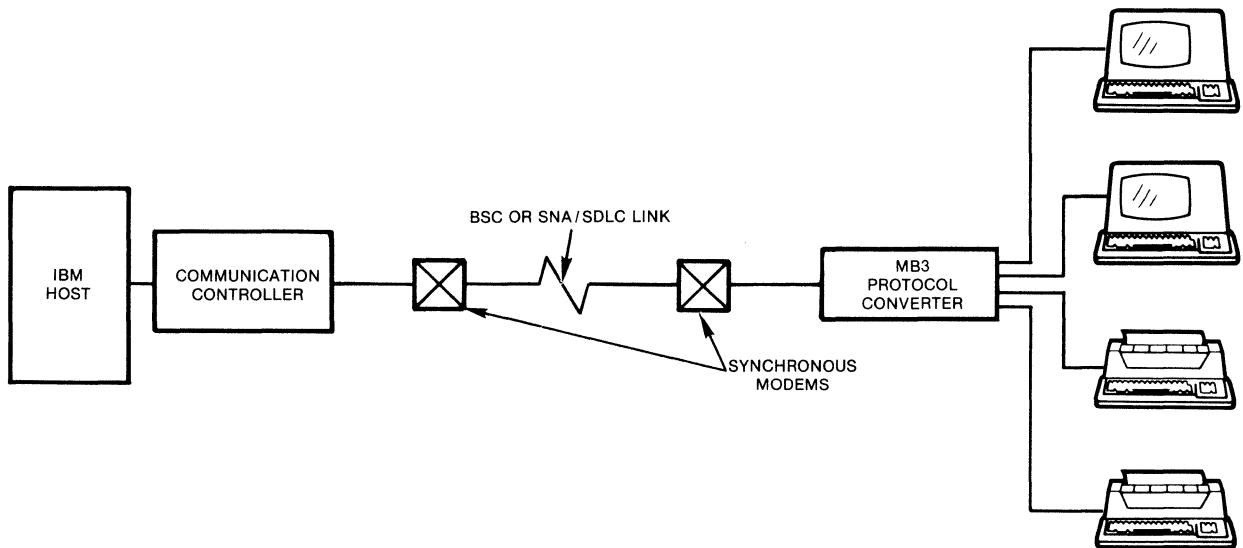
MI-1386-1a-03

Figure B-1. Remote Cluster

B.2 REMOTE DIAL ACCESS

One of the most cost-effective uses of the protocol converter is dial access to an IBM host. At the host end of the link, the protocol converter is attached directly to the communication controller.

In this type of application the protocol converter emulates a synchronous modem and provides all of the required clocking. Asynchronous modems attached to channels of the protocol converter allow terminals with asynchronous modems to access the IBM host over a telephone line.

For sites not requiring full-time use of the host system, dial access saves the cost of a dedicated, leased line.

Figure B-2 is an example of using the protocol converter for remote dial access to an IBM host.
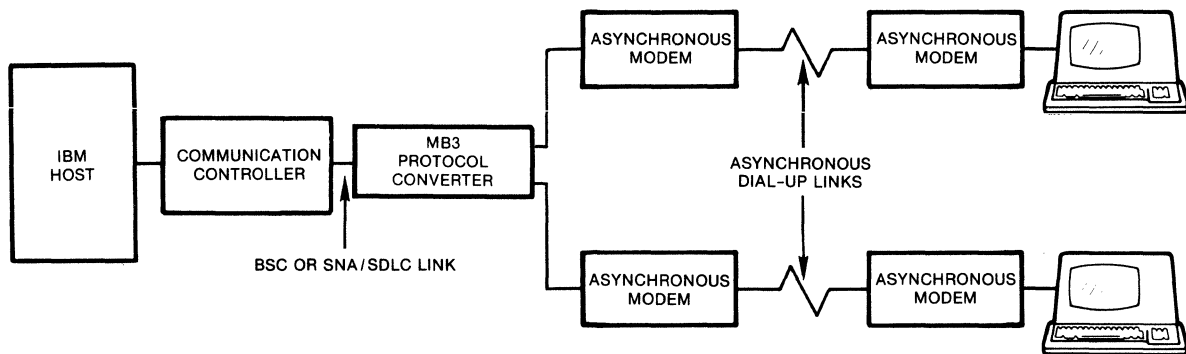
MI-1386-1a-04

Figure B-2. Remote Dial Access

B.3 MULTIPOINT LINK

In a multipoint link, the communication controller regulates all transmissions within the link, which is established over nonswitched lines.

The communication controller maintains the flow of data between itself and all control units on the link.

Figure B-3 is an example of a multipoint link application.

MI-1386-1a-05
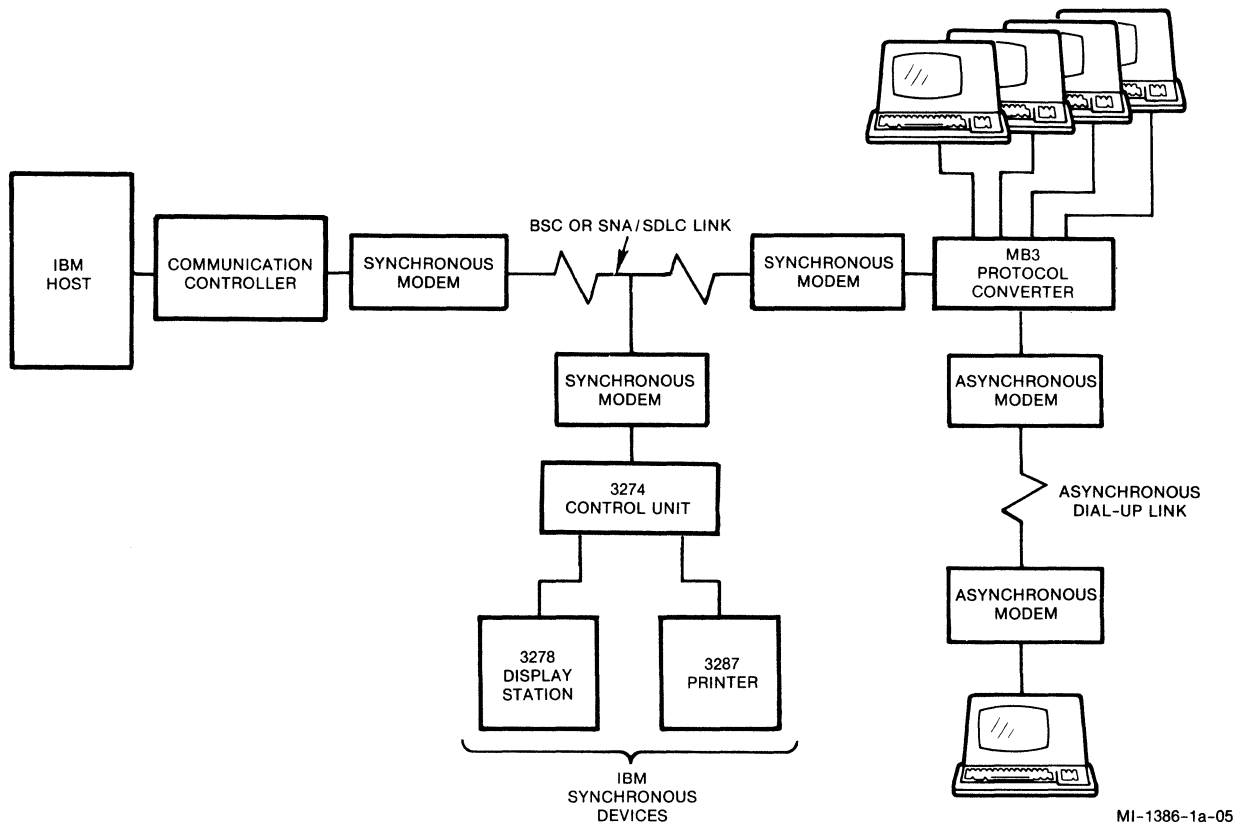
Figure B-3. Multipoint Link

B.4 PORT SELECTION

The protocol converter, when used in conjunction with MICOM's Micro600, INSTANET6000, or INSTANET6600 Data PABXs, offers the user the ability to select among the various host systems attached to the Data PABX. The protocol converter can convert asynchronous ASCII communications from the Data PABX into the appropriate IBM protocol.

A user can, from a single terminal, communicate with IBM or non-IBM hosts attached to the same Data PABX.

Figure B-4 is an example of a port selection application using a MICOM Data PABX.
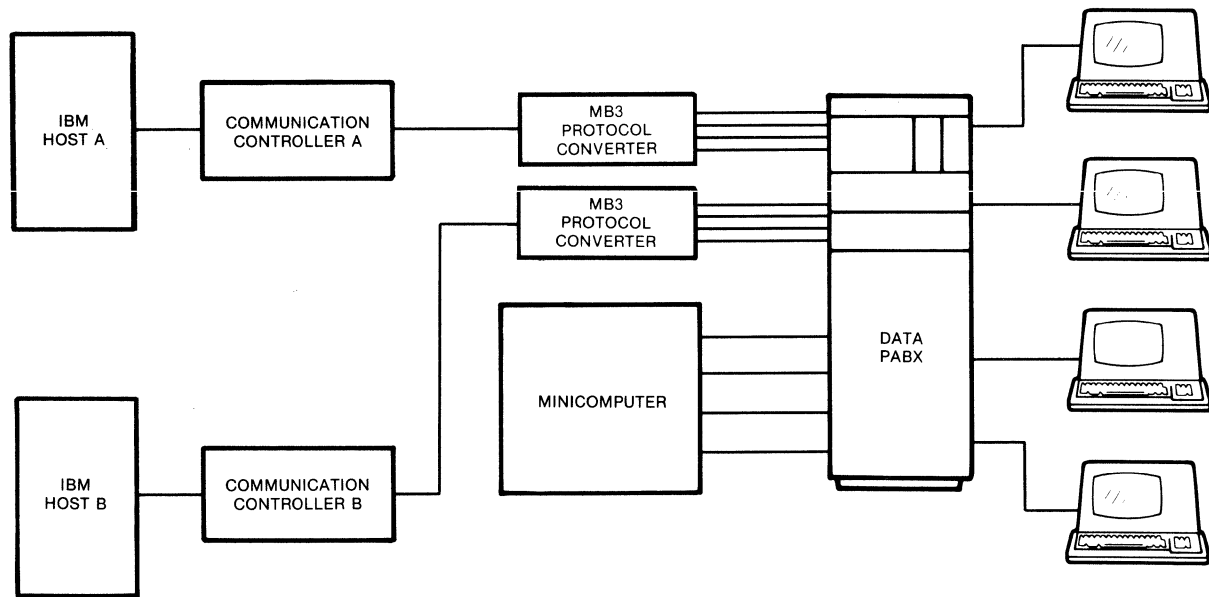
MI-1386-1a-06

Figure B-4. Port Selection With a MICOM Data PABX

B.5 ASYNCHRONOUS HOST COMMUNICATIONS

Optional asynchronous host ports on the protocol converter enable a terminal user to switch between 3270 emulation and communications with asynchronous mini or microcomputers.

Keyboard commands enable a user to select a specific asynchronous channel or the first available asynchronous host channel.

Figure B-5 is an example of an asynchronous host communications application.
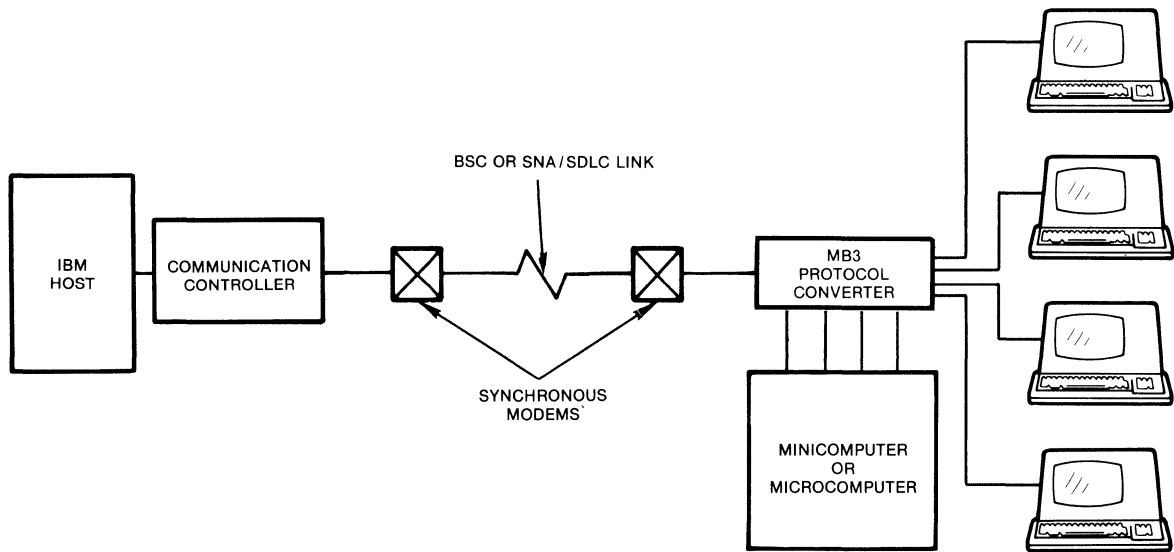
MI-1386-1a-07

Figure B-5. Asynchronous Host Communications

APPENDIX C

MECHANICAL PROCEDURES

This appendix explains the procedures for opening and closing the enclosure, removing and installing expansion modules, installing and removing the FEATUREPAK cartridge, and checking the ac power input voltage.

C.1 OPENING AND CLOSING THE ENCLOSURE

To gain access to the switches, the slot for the FEATUREPAK cartridge, and the expansion modules it is necessary to open the enclosure. The following paragraphs describe how to do this.

To open the enclosure, perform the following procedure:

1. Release the locking clips (see figure C-1) using the MICOM user key or a screwdriver.

   Insert the blade of the key into the slots on the sides of the unit (four slots in all). Pry the cover up with the key in each of the four slots to release the clips.

2. Lift off the cover when all four clips are released.

To close the enclosure, perform the following procedure:

1. Align the front of the cover with the front of the base and place the cover over the base (see figure C-1).

2. Align the slots in the cover edges with the tabs on the base edges.

3. Push in the edge of the cover over the alignment tabs as you press down. The locking clips will lock the cover in place.

COVER

SLOT FOR
MICOM USER KEY
(4 PLACES)

BASE

BLADE

MICOM USER
KEY

HALFWAY
POINT

INSERT MICOM USER
KEY APPROXIMATELY
HALF OF BLADE LENGTH

LIFT TO REMOVE COVER

COVER

ALIGNMENT SLOT
(4 PLACES)

BASE

LOCKING CLIP
(4 PLACES)

ALIGNMENT TAB
(4 PLACES)
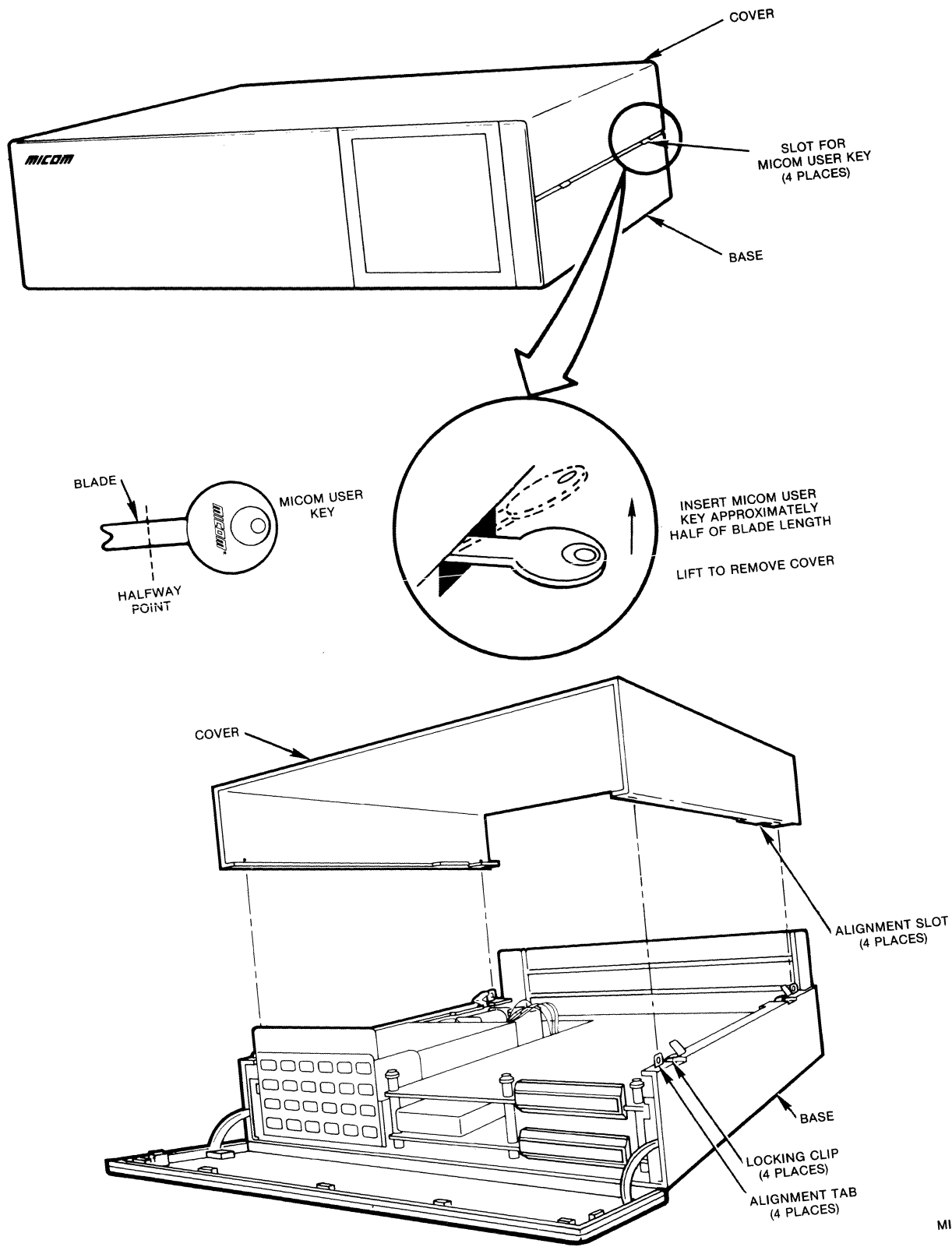
MI-1407-1a-16

Figure C-1. Opening and Closing the Enclosure

800-1386-1a

C.2 INSTALLING AND REMOVING EXPANSION MODULES

Expansion modules provide additional channels. Up to two expansion modules may be installed in an MB3 unit.

The following paragraphs describe how to install and remove expansion modules.

NOTE: Each module has a panel attached to it. When modules are inserted correctly, these panels form the back of the enclosure. Filler panels are used if the panels of the expansion modules do not fully form the back of the enclosure. These filler panels should be removed before you remove any expansion modules.

To install an expansion module, perform the following procedure:

1. Slide the module's panel into the guides (see figure C-2). Make sure that it couples with the panel below it.

2. Connect the shroud of the stacking connector to the block of the stacking connector below it.

3. Connect the male portions of the three snap-together standoffs on the module to the female portions of the snap-together standoffs on the module below.

   The MICOM User Key that comes with your unit can be used for this. Place the User Key over the standoff and press down until the standoffs snap together.

4. Insert filler panels into the guides to form the back of the enclosure.

To remove an expansion module, perform the following procedure:

1. Slide the filler panels out of the guides.

2. Separate the three standoffs on the module from the standoffs on the module below (see figure C-2). You can do this using the MICOM User Key or a screwdriver.

   Insert the key between the module edge and the standoff below. When the key is inserted, twist it to one side. This will separate the standoffs.

3. Separate the shroud of the stacking connector on the module from the block of the stacking connector below it.

4. Slide the module's panel out of the guides.

MICOM USER KEY

PRESS DOWN TO SNAP TOGETHER

GUIDE

BACK OF THE ENCLOSURE

GUIDE

SNAP-TOGETHER STANDOFF (MALE)

SNAP-TOGETHER STANDOFF (FEMALE)

STACKING CONNECTOR (SHROUDS)

J1 STACKING CONNECTOR (BLOCKS)

HEADER E3 (INSTALL JUMPER TO ENABLE CHANNELS 5 THROUGH 10 ON FIRST EXPANSION MODULE)

HEADER E1 (INSTALL JUMPER TO ENABLE CHANNELS 11 THROUGH 16 ON SECOND EXPANSION MODULE)

MICOM USER KEY

TWIST TO SEPARATE

MI-1386-1a-22

Figure C-2.   Installation and Removal of Expansion Modules

C.3 INSTALLING AND REMOVING FEATUREPAK CARTRIDGES

The functionality of the MB3 unit is dependent on the FEATUREPAK cartridge. As there are several FEATUREPAK cartridges that can be used with your MB3 unit, it will be necessary to know how to install and remove the cartridges.

To install a FEATUREPAK cartridge, perform the following procedure:

1. Open the front panel by pulling it out and down.

2. Insert the FEATUREPAK cartridge into its slot (see figure C-3) with the connector pins going in first.

    Tracks on the cartridge will mate with the slides inside the slot.

3. Push the cartridge in until the connector pins are firmly seated.

CONNECTOR

FEATUREPAK CARTRIDGE
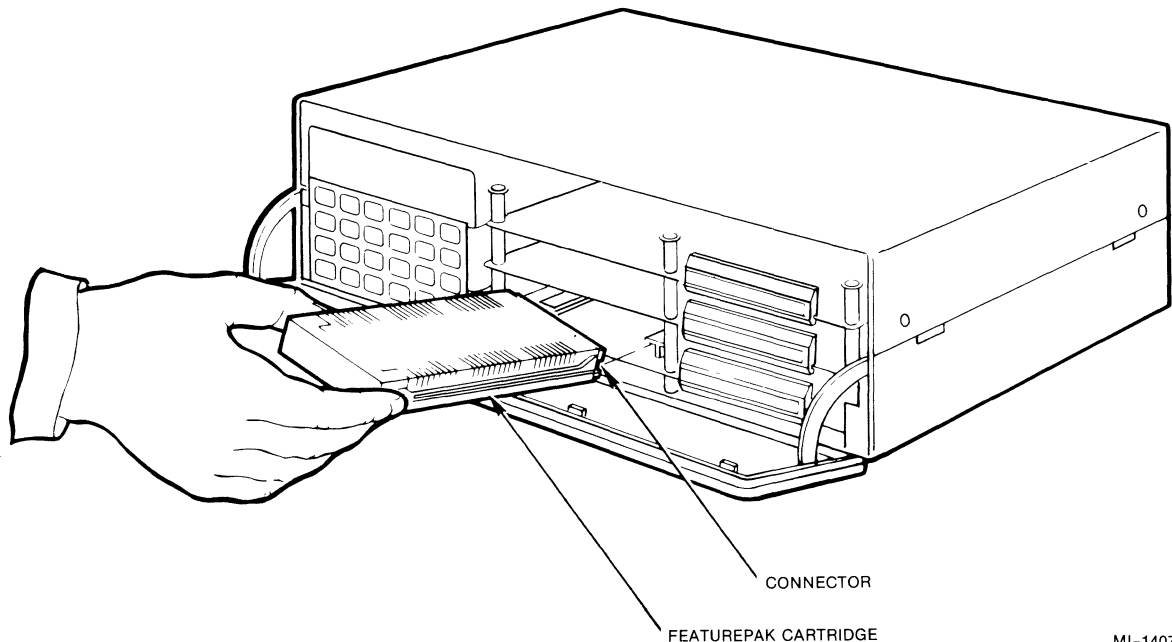
MI-1407-1a-20

Figure C-3. Installing the FEATUREPAK Cartridge

To remove a FEATUREPAK cartridge, grip the cartridge firmly on the sides and pull until the connector pins are freed.

C.4 CHECKING THE AC POWER INPUT VOLTAGE

A multi-output ac power supply is installed in your unit prior to shipping. The input voltages for this supply are 115 or 230 V ac, 50 to 60 Hz. Output voltages are +5, +12, and -12 V dc.

Before applying power to your unit, verify that the power supply is set for the voltage in your area. If it is not, contact MICOM Customer Service for further instructions.

To check the voltage setting of your unit, perform the following procedure:

1. Open the enclosure (refer to paragraph C.1).

2. Check to see what voltage your unit is set for. The voltage setting is located on the side of the power supply.

    Your unit should be set for 115 V ac for U.S.A. operation. It should be set for 230 V ac for international operation.

3. If the setting is correct, close the enclosure and begin operation of your unit. If the setting is incorrect, contact MICOM Customer Service.

APPENDIX D

KEYBOARD MAPS AND THE CODE CONVERSION TABLES

This appendix shows both the generic and hardcopy terminal keyboard maps, as well as the EBCDIC-to-ASCII and ASCII-to-EBCDIC code conversion tables.

D.1 THE GENERIC KEYBOARD MAP

Table D-1 shows the protocol converter key functions for a generic terminal.

Table D-1. Generic Terminal: MB3 Protocol Converter Key Functions

To perform these MB3 functions:	Type these keys or sequences:	Hex Code Sent:
SSCP sel	ESC S	1B 53 or 1B 73
PLU sel	ESC L	1B 4C or 1B 6C
autologon	ESC U	1B 55 or 1B 75
async port (any)	Ctrl-A	01
async port (specify)	Ctrl-B n	02 3x
alternate sync host	Ctrl-L	0C
status inquire	ESC ?	1B 3F
refresh	ESC R	1B 52 or 1B 72
force select	Ctrl-F	06
force disconnect	ESC Ctrl-D	1B 04

Table D-2 shows the cursor movement keys for a generic terminal.

Table D-2. Generic Terminal: Cursor Movement Keys

To perform these IBM 3270 functions:	Type these keys or sequences:	Hex Code Sent:
Tab	TAB or Ctrl-I	09
Backtab	BACKSPACE or Ctrl-H	08
Newline	LINEFEED or Ctrl-J	0A
Home	ESC H	1B 48 or 1B 68
Up arrow	ESC A	1B 41 or 1B 61
Down arrow	ESC B	1B 42 or 1B 62
Right arrow	ESC C	1B 43 or 1B 63
Left arrow	ESC D	1B 44 or 1B 64
Fast right	Ctrl-U	15
Fast left	Ctrl-V	16

Table D-3 shows the IBM key functions for a generic terminal.

Table D-3. Generic Terminal: IBM Key Functions

To perform these IBM 3270 functions:	Type these keys or sequences:	Hex Code Sent:
ENTER	Ctrl-M	0D
CLEAR	Ctrl-C	03
Delete	DEL or RUBOUT	7F
ERASE EOF	ESC K	1B 4B or 1B 6B
ERASE INPUT	ESC I	1B 49 or 1B 69
Insert mode	ESC M	1B 4D or 1B 6D
RESET	Ctrl-R	12
PF1	ESC 1	1B 31
PF2	ESC 2	1B 32
PF3	ESC 3	1B 33
PF4	ESC 4	1B 34
PF5	ESC 5	1B 35
PF6	ESC 6	1B 36
PF7	ESC 7	1B 37
PF8	ESC 8	1B 38
PF9	ESC 9	1B 39
PF10	ESC 0	1B 30
PF11	ESC -	1B 2D
PF12	ESC =	1B 3D
PF13	ESC !	1B 21
PF14	ESC @	1B 40
PF15	ESC #	1B 23
PF16	ESC $	1B 24
PF17	ESC %	1B 25
PF18	ESC Caret	1B 5E
PF19	ESC &	1B 26
PF20	ESC *	1B 2A
PF21	ESC (	1B 28
PF22	ESC)	1B 29
PF23	ESC _	1B 5F
PF24	ESC +	1B 2B
PA1	ESC ,	1B 2C
PA2	ESC .	1B 2E
PA3	ESC /	1B 2F
SYS REQ	ESC E	1B 45 or 1B 65
ATTN	Ctrl-N	0E
CURSR SEL	Ctrl-X	18
Print	ESC P	1B 50 or 1B 70
DUP	Ctrl-D	04
FIELD MARK	ESC F	1B 46 or 1B 66

D.2 THE HARDCOPY TERMINAL KEYBOARD MAP

Table D-4 shows the protocol converter key functions for a hardcopy terminal.

Table D-4. Hardcopy Terminal: MB3 Protocol Converter Key Functions

To perform these MB3 functions:	Type these keys or sequences:
SSCP sel	ESC S
PLU sel	ESC P
autologon	ESC U
async port (any)	Ctrl-A
async port (specify)	Ctrl-B 3x
alternate sync host	Ctrl-L
status inq	ESC ?
refresh	ESC R
force select	Ctrl-F
erase Field	ESC E
seize tube	Ctrl-T
seize printer	Ctrl-U

Table D-5 shows the cursor movement keys for a hardcopy terminal.

Table D-5. Hardcopy Terminal: Cursor Movement Keys

To perform these IBM 3270 functions:	Type these keys or sequences:
Tab	TAB or Ctrl-I
Newline	Ctrl-J
Home	ESC H
Backspace	Ctrl-H

Table D-6 shows the IBM key functions for a hardcopy terminal.

Table D-6. Hardcopy Terminal: IBM Key Functions

To perform these IBM 3270 functions:	Type these keys or sequences:
ENTER	RETURN or Ctrl-M
CLEAR	Delete or RUBOUT
Delete	
ERASE EOF	
ERASE INPUT	ESC I
Insert mode	
RESET	Ctrl-R
PF1	ESC 1
PF2	ESC 2
PF3	ESC 3
PF4	ESC 4
PF5	ESC 5
PF6	ESC 6
PF7	ESC 7
PF8	ESC 8
PF9	ESC 9
PF10	ESC 0
PF11	ESC -
PF12	ESC =
PF13	ESC !
PF14	ESC @
PF15	ESC #
PF16	ESC $
PF17	ESC %
PF18	ESC Caret or ESC
PF19	ESC &
PF20	ESC *
PF21	ESC (
PF22	ESC)
PF23	ESC _
PF24	ESC +
PA1	ESC A
PA2	ESC B
PA3	ESC C
SYS REQ	Use SSCP/PLU sel
ATTN	Ctrl-N
CURSR SEL	
Print	Ctrl-P
DUP	ESC D
FIELD MARK	ESC F

NOTE: A blank entry indicates that the Hardcopy Terminal Map does not support this key function.

D.3 CODE CONVERSION TABLES

Tables D-7 and D-8 list the hexadecimal conversions that the protocol
converter makes between EBCDIC and ASCII characters. Control characters that
the protocol converter uses internally are not shown.

Since very few ASCII terminals provide the complete EBCDIC character set, some
terminals may not have key caps with EBCDIC equivalents.

Table D-7 provides an EBCDIC-to-ASCII conversion table, and table D-8 provides
an ASCII-to-EBCDIC conversion table. In both tables, the first hexadecimal
digit is in the top row, and the second hexadecimal digit is in the first
column on the left.

Table D-7. EBCDIC-to-ASCII Code Conversion

	4	5	6	7	8	9	A	B	C	D	E	F
0	20 SP	26 &	2D –						7B {	7D }	5C \	30 0
1			2F /		61 a	6A j	7E ~		41 A	4A J		31 1
2					62 b	6B k	73 s		42 B	4B K	53 S	32 2
3					63 c	6C l	74 t		43 C	4C L	54 T	33 3
4					64 d	6D m	75 u		44 D	4D M	55 U	34 4
5					65 e	6E n	76 v		45 E	4E N	56 V	35 5
6					66 f	6F o	77 w		46 F	4F O	57 W	36 6
7					67 g	70 p	78 x		47 G	50 P	58 X	37 7
8					68 h	71 q	79 y		48 H	51 Q	59 Y	38 8
9				60 `	69 i	72 r	7A z		49 I	52 R	5A Z	39 9
A	5B ¢	21 !	7C |	3A :								
B	2E .	24 $	2C ,	23 #								
C	3C <	2A *	25 %	40 @								
D	28 (	29)	5F _	27 '								
E	2B +	3B ;	3E >	3D =								
F	5D]	5E ^	3F ?	22 "								

Table D-8. ASCII-to-EBCDIC Code Conversion

	2	3	4	5	6	7
0	40 SP	F0 0	7C @	D7 P	79 \	97 p
1	5A !	F1 1	C1 A	D8 Q	81 a	98 q
2	7F "	F2 2	C2 B	D9 R	82 b	99 r
3	7B #	F3 3	C3 C	E2 S	83 c	A2 s
4	5B $	F4 4	C4 D	E3 T	84 d	A3 t
5	6C %	F5 5	C5 E	E4 U	85 e	A4 u
6	50 &	F6 6	C6 F	E5 V	86 f	A5 v
7	7D '	F7 7	C7 G	E6 W	8 g	A6 w
8	4D (	F8 8	C8 H	E7 X	88 h	A7 x
9	5D)	F9 9	C9 I	E8 Y	89 i	A8 y
A	5C *	7A :	D1 J	E9 Z	91 j	A9 z
B	4E +	5E ;	D2 K	4A [	92 k	C0 {
C	6B ,	4C <	D3 L	E0 \	93 l	6A ¦
D	60 -	7E =	D4 M	4F]	94 m	D0 }
E	4B .	6E >	D5 N	5F ¬	95 n	A1	
F	61 /	6F ?	D6 0	6D _	96 o	

APPENDIX E

IBM SYSTEM SOFTWARE AND PROGRAMMING SUPPORT

This appendix lists IBM publications that describe IBM software, as well as IBM programming support that is available.

E.1 IBM SYSTEM SOFTWARE

The MB3 Protocol Converter is software-compatible with the IBM 3270 family of devices.

The protocol converter can operate with the same software generation and set-up parameters as an IBM 3274 control unit.

For detailed information, refer to the following IBM publications:

- ACF/NCP/VC SSP Installation NCP

- CICS System Programmer's Reference Manual

- OS/VS TCAM 4 Programmer's Guide (GC30-2034)

- OS/VS TCAM 6 Programmer's Guide (GC30-2044)

- OC/VS TCAM 8 Programmer's Guide (G30-2041)

- VM/SP Programmer's Guide (SC19-6203)

- VM/370 Programmer's Guide (GC20-1807)

- VTAM Programmer's Guide (SX27-0611)

E.2 PROGRAMMING SUPPORT

Standard IBM operating system software supports the use of the IBM 3270 IDS including the following:

- OS

- DOS/VS

- DOS/VSE

- OS/VS1

- OS/VS2

- OS/MVS

- VM/370

The protocol converter is compatible with standard IBM system software, IBM-compatible operating systems, and applications designed to support the IBM 3270, including the following:

- CICS

- IMS

- CMS

- TSO

Access methods that are available under IBM operating systems provide a communications interface between host application programs and any terminals or printers attached to a 3270 IDS.

The protocol converter is compatible with all standard access methods, including the following:

- BTAM

- TCAM

- VTAM

- VTAM/E

APPENDIX F

DEFAULT VALUES

Default values are configuration values that reside in nonvolatile memory in the protocol converter. These values are present when you first receive your unit, and they are the values to which the protocol converter will revert if a cold start is performed.

Table F-1 shows both the prompts you will see using the Command Port, and the default value for each prompt. The other values available for each prompt are described in section 5.

Table F-1. Default Values

Prompts	Default Value
Line Prompts:	
HOST A SPEED	KEYPAD
Controller Prompts:	
ENTER CONTROL UNIT ADDRESS	00
*ENTER XID DATA	01700000
*NRZI	AUTO
DISPLAY/PRINTER LINE-SHARING	NO
SYNCH PORT EIA LEADS	SWITCHED
CR DELAY	0
LF DELAY	0
FF DELAY	0
ENTER HIGHLIGHT INDICATOR	blank
TIMEOUT DISCONNECT VALUE (MINUTES)	5
USE COMMA INSTEAD OF PERIOD IN NUMERIC FIELD	NO

* This prompt appears only if you are using FEATUREPAK cartridge MB3-SPC.

Table F-1. Default Values (continued)

Prompts	Default Value
Controller Prompts (continued):	
ASYNC HOST	NO
COPY CHANNEL 1 CONFIGURATION TO ALL	NO
SEND FF BEFORE LOCAL COPY	NO
ENTER CHANNEL PASSWORD TEXT	blank
ENTER LOGOFF MESSAGE TEXT	LOGOFF'OD
ENTER TIMEOUT WARNING MESSAGE TEXT	THIS TERMINAL WILL BE DISCONNECTED IN 30 SECONDS
ENTER TIMEOUT DISCONNECT MESSAGE TEXT	THIS TERMINAL WAS INTENTIONALLY DISCONNECTED
*ENTER SESSION CONTROL DISCONNECT MESSAGE TEXT	blank
ENTER BANNER MESSAGE TEXT	blank
*UNBIND PARAMETER	OF
Channel Prompts:	
EMULATION	DISPLAY
SPEED	AUTO
STOP BITS	1
PARITY	SPACE
BUSY OUT	NO
PRIORITY	LOW
DISABLE TACT/TICC	NO

* This prompt appears only if you are using FEATUREPAK cartridge MB3-SPC.

Table F-1. Default Values (continued)

Prompts	Default Value
Channel Prompts (continued):	
TICC CHANGES NVRAM	YES
EIA LEAD CONTROLS	LEASED
FORCE SELECT	YES
PASSWORD USE	NO
LOGON MESSAGE USE	NO
LOGOFF MESSAGE USE	NO
TIMEOUT DISCONNECT USE	NO
*SESSION CONTROL DISCONNECT IF	NONE
SPECIFIC KEYBOARD MAP PROMPT	NO
TERMINAL TYPE (BLANK FOR PROMPT)	blank
ATTACH LINE SHARING PRINTER	ASK
PRINTER DESTINATION	0
ENTER LOGON MESSAGE TEXT	blank
PAGE LENGTH	66
PRINT CASE	MIXED
USE FORM FEED	NO
SPACING	SINGLE
INITIALIZATION MESSAGE USE	NO
ENTER INITIALIZATION MESSAGE TEXT	blank
*SEND UNBIND	NO
ENTER COMMAND PORT PASSWORD	blank

* This prompt appears only if you are using FEATUREPAK cartridge MB3-SPC.

APPENDIX G

CABLES

The figures in this appendix show the pin assignments of the cables that are used with your protocol converter.

User-supplied cables must have the same pin assignments to ensure that they will work with the protocol converter.
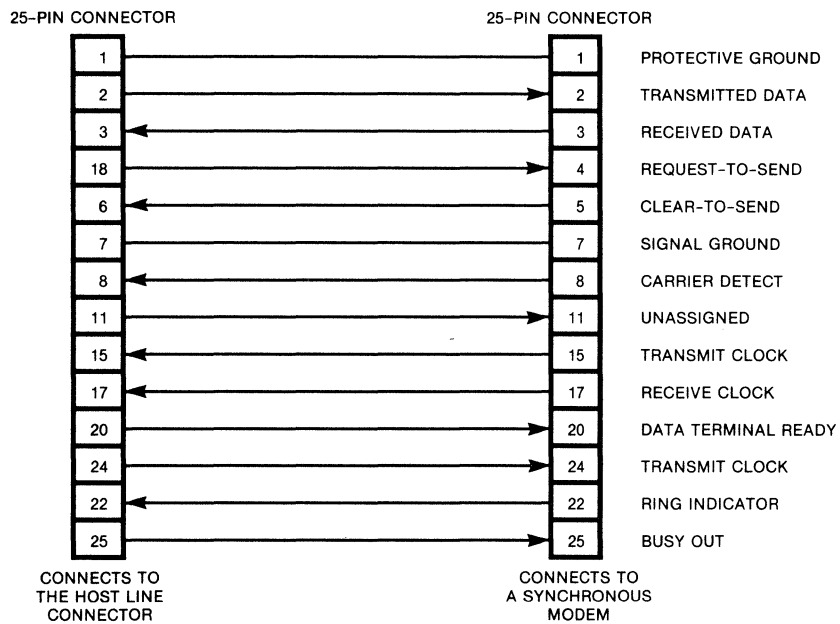
Figure G-1.   The Synchronous Modem Cable
(MICOM Part Number 345-5150-xx)

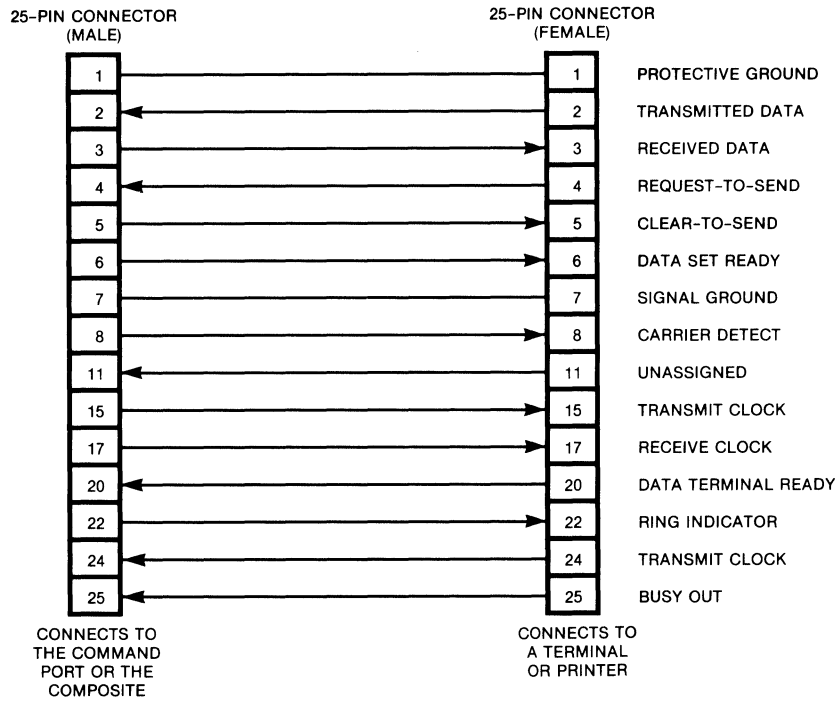25-PIN CONNECTOR
(FEMALE)

25-PIN CONNECTOR
(FEMALE)

3	←	2	TRANSMITTED DATA
2	→	3	RECEIVED DATA
8	←	4	REQUEST-TO-SEND
	→	5	CLEAR-TO-SEND
20	→	6	DATA SET READY
7	—	7	SIGNAL GROUND
4	→	8	CARRIER DETECT
24	→	15	TRANSMIT CLOCK
	→	17	RECEIVE CLOCK
6	←	20	DATA TERMINAL READY

CONNECTS TO
HOST LINE
CONNECTOR ON
THE MB3 PROTOCOL
CONVERTER

CONNECTS TO
COMMUNICATION
CONTROLLER
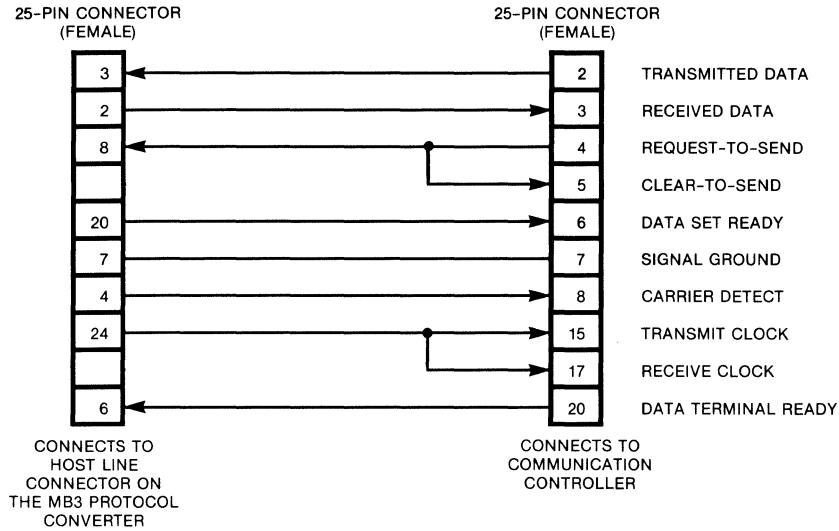
MI-1386-1a-17

Figure G-2. The Synchronous Host Cable
(MICOM Part Number 345-5151-xx)

25-PIN CONNECTOR
(MALE)

25-PIN CONNECTOR
(MALE)

1	—	1	PROTECTIVE GROUND
3	→	2	TRANSMITTED DATA
2	←	3	RECEIVED DATA
8	→	4	REQUEST-TO-SEND
11	←	5	CLEAR-TO-SEND
20	←	6	DATA SET READY
7	—	7	SIGNAL GROUND
4	←	8	CARRIER DETECT
5	→	11	UNASSIGNED
18	←	15	TRANSMIT CLOCK
24	←	17	RECEIVE CLOCK
15	—	18	NOT USED
6	→	20	DATA TERMINAL READY
25	←	22	RING INDICATOR
17	→	24	TRANSMIT CLOCK
22	→	25	BUSY OUT

CONNECTS TO AN MB3
PROTOCOL CONVERTER
ASYNCHRONOUS CHANNEL

CONNECTS TO AN
ASYNCHRONOUS DCE

MI-1386-1a-19

Figure G-3. The Crossover Cable
(MICOM Part Number 100-2219-xx)

25-PIN CONNECTOR (MALE)

Pin		Pin	Signal
1	────────────────	1	PROTECTIVE GROUND
2	◄────────────────	2	TRANSMITTED DATA
3	────────────────►	3	RECEIVED DATA
4	◄────────────────	4	REQUEST-TO-SEND
5	────────────────►	5	CLEAR-TO-SEND
6	────────────────►	6	DATA SET READY
7	────────────────	7	SIGNAL GROUND
8	────────────────►	8	CARRIER DETECT
11	◄────────────────	11	UNASSIGNED
15	────────────────►	15	TRANSMIT CLOCK
17	────────────────►	17	RECEIVE CLOCK
20	◄────────────────	20	DATA TERMINAL READY
22	────────────────►	22	RING INDICATOR
24	◄────────────────	24	TRANSMIT CLOCK
25	◄────────────────	25	BUSY OUT

25-PIN CONNECTOR (FEMALE)

CONNECTS TO THE COMMAND PORT OR THE COMPOSITE

CONNECTS TO A TERMINAL OR PRINTER

MI-1386-1a-58

Figure G-4. The Male-to-Female Straight-Through Cable (MICOM Part Number 100-2200-xx)

25-PIN CONNECTOR (MALE)

Pin		Pin	Signal
1	────────────────	1	PROTECTIVE GROUND
2	────────────────►	2	TRANSMITTED DATA
3	◄────────────────	3	RECEIVED DATA
4	────────────────►	4	REQUEST-TO-SEND
5	◄────────────────	5	CLEAR-TO-SEND
6	◄────────────────	6	DATA SET READY
7	────────────────	7	SIGNAL GROUND
8	◄────────────────	8	CARRIER DETECT
11	────────────────	11	UNASSIGNED
15	◄────────────────	15	TRANSMIT CLOCK
17	◄────────────────	17	RECEIVE CLOCK
20	────────────────►	20	DATA TERMINAL READY
22	◄────────────────	22	RING INDICATOR
24	────────────────►	24	EXTERNAL TRANSMIT CLOCK
25	────────────────►	25	BUSY OUT

25-PIN CONNECTOR (MALE)

CONNECTS TO A TERMINAL OR A PRINTER

CONNECTS TO THE COMMAND PORT OR THE COMPOSITE

MI-1386-1a-60

Figure G-5. The Male-to-Male Straight-Through Cable (MICOM Part Number 100-2645-xx)

GLOSSARY

The glossary defines some of the terms found in this manual.

ABR, autobaud, automatic baud rate detection

A process by which a receiving device determines the data rate, code level, and stop bits of incoming data by examining the first character -- usually a preselected sign-on character.

ABR allows the receiving device to accept data from a variety of transmitting devices operating at different data rates without needing to configure the receiver for each specific data rate in advance.

aggregate input

The sum of all terminal (or computer port) data rates connected to a device.

application program

A program used to connect and communicate with terminals to perform a set of specified activities for the user.

ASCII, American Standard Code for Information Interchange

A 7-bit-plus-parity character set or code established to achieve compatibility between data services; sometimes called USASCII, the USA Standard Code for Information Interchange; normally used for asynchronous transmission.

asynchronous, asynchronous transmission

Method of sending data in which the interval between characters may be of unequal length; since asynchronous characters are used, no additional synchronizing or timing information need be sent. Also called start-stop transmission. Contrast with synchronous transmission.

back panel

A metal sheet that forms the back of a unit. It usually has identifications of connectors printed on it. Contrast with backplane.

backplane

A circuit board that interconnects modules, distributes power, and houses the connectors that connects the unit to outside devices. Contrast with back panel.

baud

Unit of signaling speed. The speed in baud is the number of discrete conditions or signal events per second. If each signal event represents only one bit, the baud rate is the same as bits per second (bps); if each signal event represents more than one bit (such as in a dibit), the baud rate is less than bps.

bit

Contraction of binary digit; smallest unit of information and basic unit in digital data communications. A bit can have a 1 or a 0 value (a mark or space in data communications terminology).

bps, bits per second

A measure of speed or data rate. Often combined with metric prefixes as in kbps for thousands of bits per second (k for kilo) and in Mbps for millions of bits per second (M for mega).

BREAK

A space (or spacing) condition that exists longer than one character time (typical length is 110 milliseconds). Often used by a receiving terminal to interrupt (break) the sending device's transmission, to request disconnection, or to terminate computer output.

BSC, Bisync, Binary Synchronous Communications

An IBM communications protocol that has become an industry standard. It uses a defined set of control characters and control character sequences for synchronized transmission of binary coded data between stations in a data communications system.

buffer

A temporary storage area used to compensate for a difference in either the rate of data flow or the time of occurrence of events in transmissions from one device to another.

byte

A collection of bits operated upon as a unit; most are eight bits long; and most character sets use one byte per character. The capacity of storage devices is frequently given in bytes or in K bytes (K meaning 1024 bytes).

cabinet

A physical enclosure for rack-mount equipment; standard cabinets have 1 3/4 inches vertical spacing between mounting holes and 19-inch wide horizontal spacing between mounting rails.

CCITT

Stands for Comite Consultif Internationale de Telegraphie et Telephonie, an international consultative committee that sets international communications standards.

channel

A path for electrical transmission between two or more points without common carrier-provided terminal equipment, such as a local connection to DTE. Also called circuit, line, data link, path, or facility.

channel loopback

A diagnostic test that forms the loop at the multiplexor's channel interface. See also loopback.

character

Letter, number, punctuation, or other symbol contained in a message. See also control character.

circuit

A means of two-way communications between two points, consisting of transmit and receive channels.

circuit board

A component consisting of the logic and support circuitry that is necessary for operation.

clock

The timing signal used in synchronous transmission or the source of such timing signals.

code

A set of unambiguous rules that specify the way data is represented, such as ASCII or EBCDIC.

code level

The number of bits used to represent characters.

cold start

A reset of the unit that reverts to the default values. Contrast with warm start.

Command Mode

The mode a user is in when using any of the three submenus of the Command Mode Menu.

Command Port

The interface to the Command Mode. The physical device using this interface is usually a terminal or printer.

Command Port connector

The physical connector on the back of the unit.

communication controller

A communications computer, often a minicomputer, that handles communications functions for the mainframe. It may perform such tasks as message handling, code conversion, error control, and applications functions such as control and operation of special-purpose terminals.

communications protocol

The means used to control the orderly exchange of information between stations on a data link or on a data communications network or system. Also called line discipline or protocol.

composite

The output signal that contains the concentrated data.

composite loopback

A diagnostic test that forms the loop at the line side (output) of a multiplexor. Refer also to loopback.

concentration

Collection of data at an intermediate point from several low- and medium-speed lines for transmission across one high-speed link.

concentrator

See multiplexor.

connection

An established data communications path, the process of establishing that path, or a point of attachment for that path.

connector

An electrical device for making one or more connections.

control character

A non-printing character used to start, stop, or modify a function; CR is an example of a control character.

control unit

Equipment in an IBM host system that coordinates the operation of the input/output device and the mainframe. A communication controller is one type of control unit.

CPU, central processing unit

Actually the heart of a computer, but often used as a synonym for computer.

CR, carriage return

An ASCII or EBCDIC control character used to position the print mechanism at the left margin on a printer -- or the cursor at the left margin on a display terminal.

cursor

A movable underline, rectangular-shaped block of light, or an alternating block of reversed video on the screen of a display device, usually indicating where the next character will be entered.

data

Pieces of information.

data communications

The processes, equipment, and/or facilities used to transport signals from one data processing device at one location to another data processing device at another location.

data rate

A measure of how quickly data is transmitted, expressed in bps. Also commonly, but often incorrectly, expressed in baud. Sometimes called speed.

db, deciBel

Comparative (logarithmic) measure of signal power (strength or level): +10 dB (or +1 Bel) represents a gain of 10:1; -3 dB represents a 50 percent loss of power. Contrast with dBm.

dBm

Absolute measure of signal power where 0 dBm is equal to one milliwatt. Contrast with dB.

DCE, data communications equipment

The equipment that provides the functions required to establish, maintain, and terminate a connection as well as the signal conversion required for communications between the DTE and the telephone line or data circuit. See also modem.

default values

Configuration parameters preset by MICOM. When powered-up or cold started, the multiplexor will initialize itself to these values. They can be changed using Command Mode or the hardware switches.

diagnostics

Programs or procedures used to test a device, a communications link or network, or any similar system.

DLC, data link control

The non-information exchanges that set up, control, check, and terminate the information exchange between two stations on a data link.

downline loading

The process of sending configuration parameters, operating software, or related data from a central source to individual stations.

DTE, data terminal equipment

The equipment serving as the data source, the data sink, or both. Refers to both terminals and computer ports.

EBCDIC, Extended Binary Coded Decimal Interchange Code

An 8-bit character code used primarily in IBM equipment. The code provides for 256 different bit patterns.

echo

The return of transmitted data.

EIA, Electronics Industries Association

A consultative organization of manufacturers writing the standards for electronic equipment in the U.S.A. Compare with CCITT.

EIA controls

Control signals defined by the EIA.

ENQ/ACK protocol

A Hewlett-Packard communications protocol: The HP3000 computer follows each transmission block with ENQ to determine if the destination terminal is ready to receive more data; the destination terminal indicates its readiness by responding with ACK.

error detection

An arrangement that senses flaws in received data by examining parity bits, verifying block check characters, or using other techniques.

expansion module

A module that adds channels to the capacity of the unit.

FEATUREPAK, FEATUREPAK cartridge

A small cartridge that contains the firmware that determines the functionality of the hardware.

FF, form feed

An ASCII or EBCDIC printer control character used to skip to the top of the next page (or form).

firmware

A computer program or software stored permanently in PROM or ROM, or semi-permanently in EPROM or EEPROM.

flow control

The procedure for controlling the transfer of messages or characters between two points in a data network -- such as between a protocol converter and a printer -- to prevent loss of data when the receiving device's buffer begins to reach its capacity.

front panel

The front piece of the hardware unit. It opens to allow access to the switches, modules, and the power supply. The indicators can be seen through the non-metal portion of the front panel.

hardware

Equipment (as opposed to a computer program or a method of use), such as mechanical, electrical, magnetic, or electronic devices. Compare with firmware and software.

hexadecimal

A digital system that has 16 states, 0 through 9 followed by A through F. Any 8-bit byte can be represented by two hexadecimal digits.

host computer

The central computer (or one of a collection of computers) in a data communications system that provides the primary data processing functions such as computation, data base access, or special programs or programming languages; often shortened to host.

indicator

A semiconductor device, much more reliable than an incandescent lamp, used for status display purposes in electronic equipment. Often called an LED, for light-emitting diode.

latched alarm

A latched alarm condition describes the situation where an indicator goes ON to indicate a problem, and stays on after the problem no longer exists to show that the problem did at one time exist.

LF, line feed

An ASCII or EBCDIC control character used to move to the next line of a
printer or display terminal.

link

Communications circuit or transmission path connecting two points.

local channel loopback

A channel loopback test that forms the loop at the input (channel side) to the
local multiplexor.

local composite loopback

A composite loopback test that forms the loop at the output (composite side)
of the local multiplexor.

loopback, loopback test

Type of diagnostic test in which the transmitted signal is returned to the
sending device, after passing through all of or a portion of a data
communications link or network; this allows a technician (or a built-in
diagnostic circuit) to compare the returned signal with the transmitted
signal. This comparison provides the basis for evaluating the operational
status of the equipment and the transmission paths through which the signal
traveled.

mainframe, mainframe computer

A large-scale computer normally supplied complete with peripherals and
software by a single large vendor. Also called host or CPU. Contrast with
minicomputer.

MICOM Systems, Inc.

MICOM Systems, Inc. is a leading manufacturer of data communications
equipment.

MICOM BOX

The MICOM BOX is a modular system of data communications that permits software
flexibility and channel expansion while still using the same hardware.

microcomputer

A desktop or personal computer.

microprocessor

A computer on a chip.

minicomputer

A small- or medium-scale computer usually operated with interactive dumb terminals. Also called mini for short. Contrast with mainframe computer and micro-computer.

module

A printed circuit board that plugs into an equipment chassis.

multiplexor

A device used to divide a data channel into two or more channels of lower average data rate, dynamically allocating channel space according to demand in order to maximize data throughput at all times. Also called a concentrator or statistical multiplexor.

network

An interconnection of computer systems, terminals, or data communications facilities.

noise

Random electrical signals, generated by circuit components or by natural disturbances, that corrupt the data by introducing errors.

nonvolatile

A term used to describe a data storage device (memory) that retains its contents when power is lost.

parity, parity check

Addition of overhead bits to ensure that the total number of 1s in a grouping of bits is either always even (for even parity) or always odd (for odd parity). This permits detection of single errors. It may be applied to characters, transmission blocks, or any convenient bit grouping.

parity bit

The bit that is set to 1 or 0 in a character to ensure that the total number of 1 bits in the data field is even or odd. Or may be fixed at 1 (mark parity), fixed at 0 (space parity), or ignored (no parity).

personal computer

A microcomputer with an end user-oriented application program for an assortment of functions.

port

A computer interface capable of attaching to another device.

port concentrator, port concentration

A device that allows several terminals to share a single computer port; a concentrator link in which the port concentrator simplifies the software demultiplexing used in lieu of the demultiplexing normally performed by the computer-site concentrator.

program

A set of instructions for a computer; see also software and firmware.

PROM, programmable read-only memory

Permanently stored data in a nonvolatile semi-conductor device.

protocol

See communications protocol.

protocol converter

A device that translates from one communications protocol into another.

rack

Same as cabinet.

rack-mount

Designed to be installed in a cabinet.

RAM, random access memory

A storage device into which data can be entered (written) and read; usually (but not always) a volatile semiconductor memory.

remote channel loopback

A channel loopback test that forms the loop at the input (channel side) of the remote multiplexor.

remote composite loopback

A composite loopback test that forms the loop at the output (composite side) of the remote multiplexor.

reset

To restart the unit. There are two types: warm start and cold start. A warm start resets the unit, retaining the current configuration. A cold start resets the unit, reverting to the default values.

ROM, read-only memory

Nonvolatile semiconductor storage device manufactured with predefined contents.

RS-232, RS-232-C

An EIA recommended standard (RS); most common standard for connecting data processing devices. RS-232 defines the electrical characters of the signals in the cables that connect DTE with DCE; it specifies a 25-pin connector (the DB-25 connector is almost universally used in RS-232 applications); and it is functionally identical to CCITT V.24/V.28.

RTS, Request-To-Send

An RS-232 modem interface signal (sent from the DTE to the modem on pin 4) that indicates that the DTE has data to transmit.

SDLC, Synchronous Data Link Control

An IBM communications protocol, commonly used in an SNA environment.

sign-on character

The first character sent on an ABR circuit; used to determine the data rate.

SNA, Systems Network Architecture

IBM's total description of the logical structure, formats, protocols, and operational sequences for transmitting information units between IBM software and hardware devices.

software

A computer program or set of computer programs held in some kind of storage medium and loaded into read/write memory (RAM) for execution. Compare with firmware and hardware.

space

An ASCII or EBCDIC character that results in a one-character wide blank when printed. Also represents a binary 0.

speed

Informal usage of data rate.

TD, Transmitted Data

An RS-232 data signal (sent from DTE to DCE on pin 2).

telco

Short for telephone company.

terminal

Any device capable of sending or receiving data over a data communications channel.

volatile

A term used to describe a data storage device (memory) that loses its contents when power is lost. Contrast with nonvolatile.

warm start

A reset of the unit that retains the current configuration. Contrast with cold start.

XON/XOFF

Control characters used for flow control.

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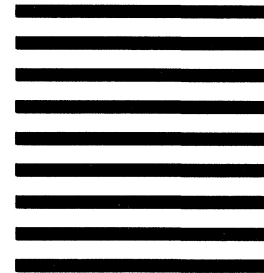*MICOM Technical Publications*

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