



BEEHIVE 

cap 2-14
2-15

- 1) ALT CLEAR - *examiner span*
- 2) AZT Z - *{numbers} {selftest}*
- 3) AZT F - *version number COMA protocol*
- 4) ATTW - *RTS to host for S*
- 5) ALT SYS REQ - *req for host to host BBS*
- 6) ENTER - *mess to host*
- 5) Test Key - *Program Monitor Mode (see on page 1)*
- 6) ALT ESC: - *Request display station Monitor mode -*
- 4.5.4 - *Annex B*

ATL-3270 MULTISTATION Operator's Guide

PRELIMINARY

ATL-3270

MULTISTATION

Operator's Guide



WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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DOCUMENT TM0684-0012-1 REVISED 12/84 VERSION XA

BEEHIVE

WORLDWIDE HEADQUARTERS

SALT LAKE CITY

UTAH

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The Beehive ATL-3270 Multistation stand-alone control unit display station is an enhanced emulation of the IBM* 3276. The 3270 Multistation has four control unit I/O ports and can support up to eight logical devices. In addition to the standard IBM features, the ATL-3270 Multistation includes a low-profile ergonomic keyboard and the Beehive Terminal Configuration Manager (TCM)** feature.

CAREFULLY READ THE FOLLOWING INFORMATION

1. The descriptions contained in this manual assume that you are using the ATL-3270 Multistation in an IBM 3270 environment. If you are using the ATL-3270 Multistation for some other purpose, the examples contained in this manual may not apply to you.
2. Before connecting the power to the terminal, verify that the voltage listed on the name plate located on the back of the terminal (see Figure 2-2) is the same as your power outlet.
3. Remember to disconnect the power cord whenever moving the equipment from one location to another.
4. Only an authorized service representative should remove the terminal or keyboard covers.
5. Beehive equipment complies with the following standards:
 - a. Underwriter's Laboratories (UL):
UL478 Information Processing and Business Equipment
 - b. Canadian Standards Association (CSA):
CSA 22.2 #154 Data Processing Equipment
CSA 22.2 #143 Office Equipment
 - c. International Electrotechnical Commission (IEC):
IEC 380 Safety of Electrically Energized Office Machines
 - d. Federal Communications Commission (FCC):
FCC Part 15 For Class A Computing Device
6. There are patents pending on one or more of the features of this terminal.

* IBM is a registered trademark of International Business Machines.

**TCM is a registered trademark of Beehive, International.

SECTION 1

INTRODUCTION

1.1 GENERAL

1.1.1 Scope of Manual

This manual is an operator's guide for the Beehive ATL-3270 Multistation and is written for the first-time operator. The Installation and Terminal Configuration Manager (TCM) sections of this guide provide technical information for technicians and field engineers concerning the installation and initial configuration of the terminal. A glossary provides definitions of commonly used terms. This manual provides the general information you will need to use the ATL-3270 Multistation. Consult with your systems operator for information concerning the use of the ATL-3270 Multistation with your specific applications programs.

The manual is organized into the following sections:

- Section 1 introduces the ATL-3270 Multistation, explains conventions used in the manual, and gives descriptions and specifications.
- Section 2 deals with the installation, setup, and initial checkout of the terminal and the terminal initialization procedure.
- Section 3 describes the display screen and the keyboard.
- Section 4 describes the status line communication symbols.
- Section 5 lists and describes the menus displayed by the Terminal Configuration Manager (TCM).

1.1.2 Related Documents

In addition to the Operator's Guide (TMO684-0012-1), which you are now reading, there are two other manuals in the ATL-3270 Multistation documentation package. The Maintenance Manual (TMO184-0007-2) contains specific technical data to aid both the on-site customer service engineer and the repair facility technician. The Maintenance Manual must be ordered separately.

The Illustrated Parts Manual (TMO184-0007-3) is used for component-level identification. It contains a listing of parts as the terminal logically disassembles, a list of terminal options, and parts-ordering information. This manual must be ordered separately.

Manuals may be ordered from the Field Service Department at:

Beehive International
P.O. Box 30668
Salt Lake City, Utah 84130-0668

(801) 355-6000

NOTE: Beehive appreciates your comments regarding our equipment and manuals. If you have any comments, please use the form found at the back of this manual. If the form is missing, send your remarks to Beehive Technical Documentation at the above address.

1.2 CONVENTIONS USED IN THIS MANUAL


1.2.1 Definitions

Since the ATL-3270 Multistation is compatible with either Binary Synchronous Communications (BSC) or Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) protocol, it can be connected to a large number of networks. The generic term host will be used to refer to any network or program that sends or receives commands from the main control port. The auxiliary (Aux) port is sometimes referred to as the printer port.

The ATL-3270 Multistation is an enhanced emulation of an IBM 3276 type stand-alone control unit display station. The descriptions contained in this manual assume that you are using the ATL-3270 Multistation in an IBM 3270 environment. If you are using the ATL-3270 Multistation for some other purpose, the examples contained in this manual may not apply to you.

The ATL-3270 Multistation uses a block-send method to send and receive information from the host. This means that the information you type into the terminal is not sent immediately to the host. Instead, the information is saved in a memory buffer and sent to the host as a unit for processing (see Section 3 - Data Transmission for a further explanation). For ease of explanation, the keystroke functions will be described as though the transmission and response from the host were immediate.

1.2.2 SHIFT and ALTERNATE SHIFT Functions

The SHIFT key () and the ALTERNATE SHIFT key (ALT) are both used with other keys to perform system functions. The SHIFT key is used to access the characters on the upper portion of the keycaps, or to access uppercase characters (see Figure 3-4 - SHIFT). The ALT key is used to provide the alternate functions shown on the front face of the keycaps (for example, CLEAR, TEST, PF keys, etc.) (see Figure 3-4 - ALT).

The SHIFT and ALT keys are always used in conjunction with other keys. To access a SHIFT or an ALT function, hold down the respective SHIFT or ALT key while simultaneously pressing the desired function key. For example, if you want to clear the screen, press:

ALT CLFAR

NOTE: Key sequences separated from the main body of text as shown in the above example indicate simultaneous keystrokes.

1.2.3 Displayable Characters

Displayable character codes are any codes which may be displayed on the screen. This includes the normal EBCDIC character set and eleven graphic symbols for drawing lines and tables. The graphic characters must be provided by the host; they cannot be entered from the keyboard.

1.3 OVERVIEW OF IBM NETWORKING TECHNIQUES

An IBM host does not communicate directly with each terminal or printer in a 3270 network. Instead, the terminal devices (video display terminals and printers) are grouped in "clusters" that may be local or remote from the host. Each cluster in turn has its own controller that handles all host communications for the cluster. The controllers can be located on-site with the host or remote from it. This adaptability and flexibility allows a great amount of network customization.

To accommodate a large number of LOCAL terminal devices in a single cluster, the IBM host typically communicates over a high-speed parallel channel with a local controller such as the 3274-R. This particular controller can handle communications with up to thirty-two 3270-compatible devices such as 3278 video display terminals or 3287 printers. A sample configuration is illustrated in Figure 1-1.

To accommodate a large number of REMOTE terminal devices, the IBM host typically communicates over a high-speed parallel channel with a communications controller such as the 3704 (supports 128 BiSync lines), or the 3705 (supports up to 352 BiSync or 256 SNA lines, plus four host lines). The communications controller, located on-site with the host, is a front-end processor that handles communications with each remote cluster controller. A sample configuration is shown in Figure 1-2.

Depending on the size of the remote terminal device cluster, the 3274-C or 3276 cluster controller may be used. The 3274-C is used for larger clusters; it can handle up to thirty-two 3270-compatible devices. The 3274-51C can handle up to twelve devices. The 3276 can handle up to eight 3270-compatible devices; it consists of a controller combined with a 3278 video display terminal.

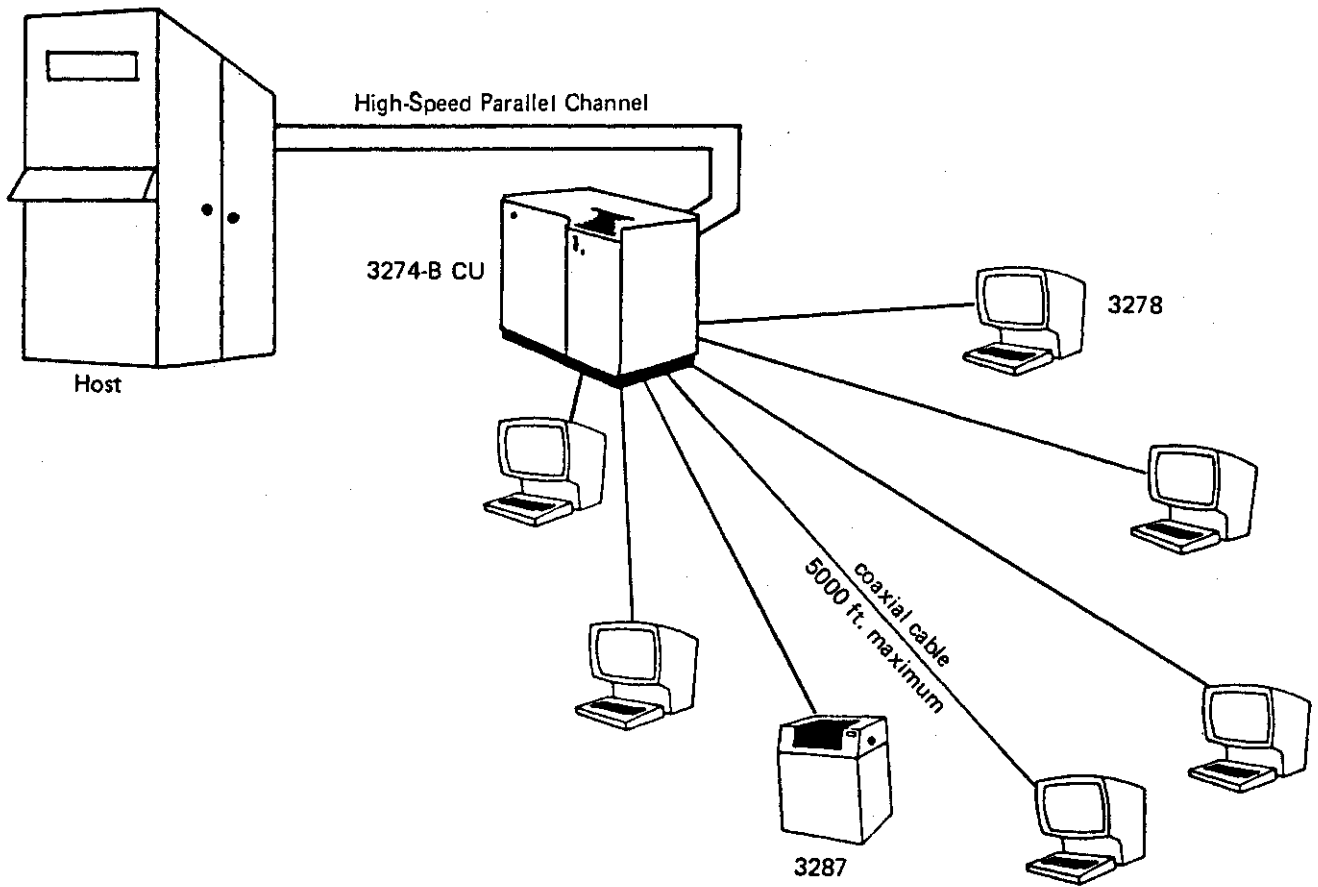


Figure 1-1
IBM Local Cluster

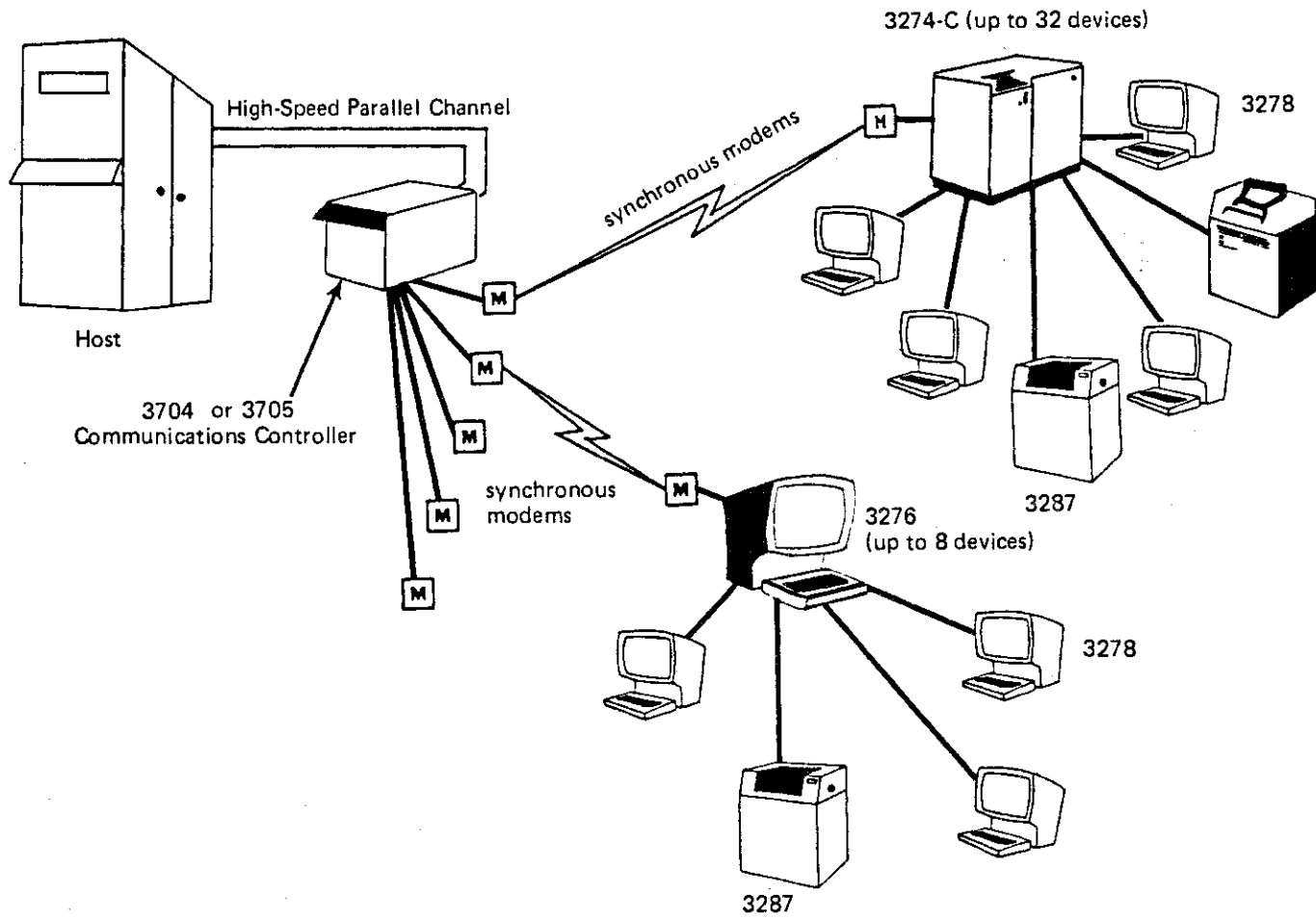


Figure 1-2
IBM Remote Cluster

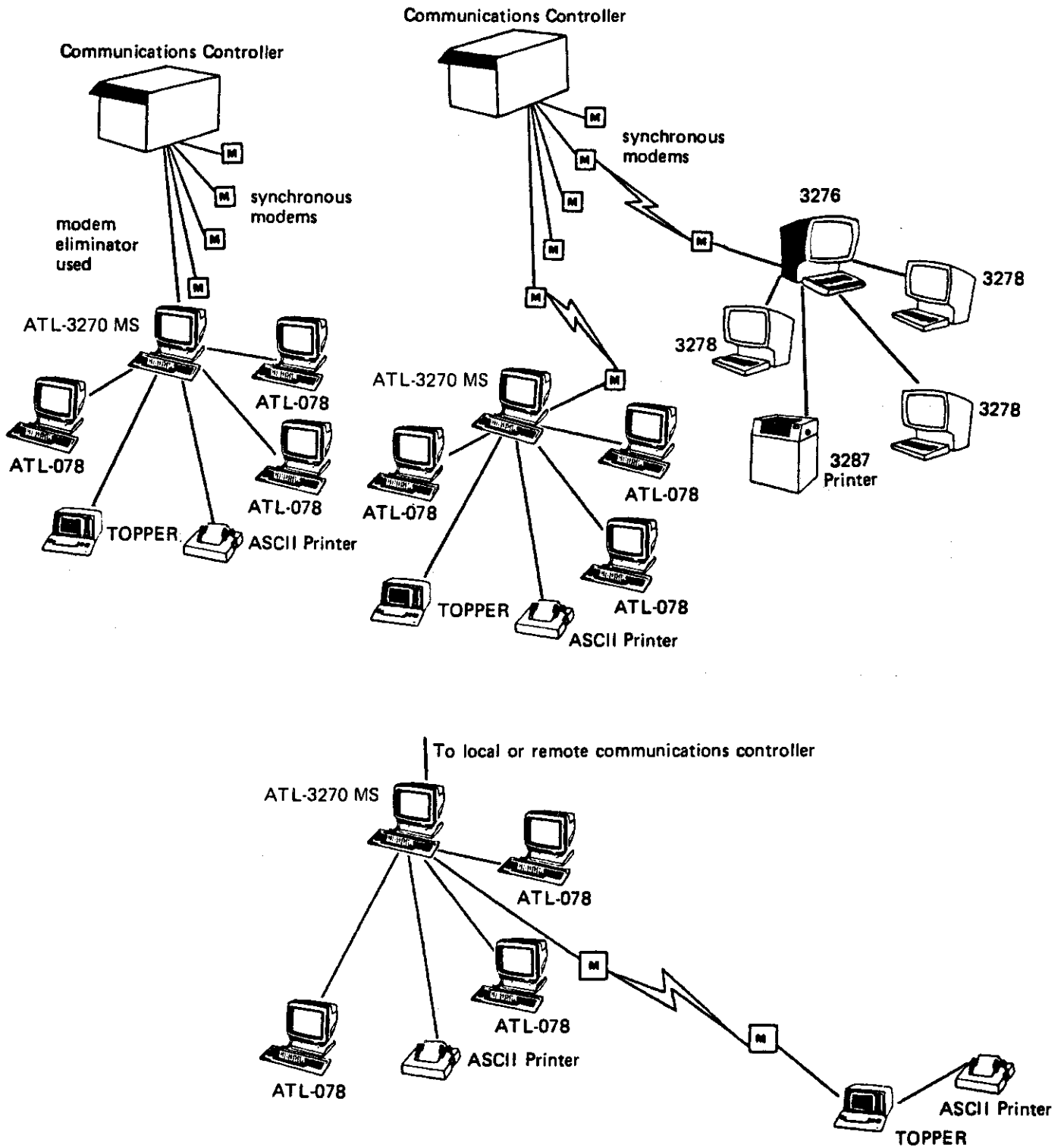


Figure 1-3
Local and Remote ATL-3270 Multistation Clusters

1.4 DESCRIPTION OF THE ATL-3270 MULTISTATION

The ATL-3270 Multistation is a synchronous EBCDIC video-display terminal with an IBM 3278-style keyboard. The terminal is designed to emulate the IBM 3276 Model 2 or 12 and incorporates many of the features found in the Beehive ATL-078 terminal and the Beehive CC74 Control Unit. The Multistation has six I/O ports, the Main port (RS232C only) connects to the host, the Aux port (RS232C only) connects to a printer, and the other four Control Unit ports connect to RS232 or RS422 devices (asynchronous terminals or printers). The communications parameters (duplex, baud rate, parity, etc.) on each of the six ports can be configured individually through TCM (Terminal Configuration Manager, see Section 5).

The four control unit ports support the Printer Port Sharing feature available on Topper and ATL-078 terminals. With this feature, the Multistation can send information directly to a terminal's printer without changing the terminal's display. For more information, see Section 2 - Printer Port Sharing.

The Multistation contains a control unit and a display station. Each unit is controlled by its own microprocessor and operates independently of the other. They communicate with each other through an internal asynchronous port.

Figure 1-4 shows the ATL-3270 Multistation Display Terminal.

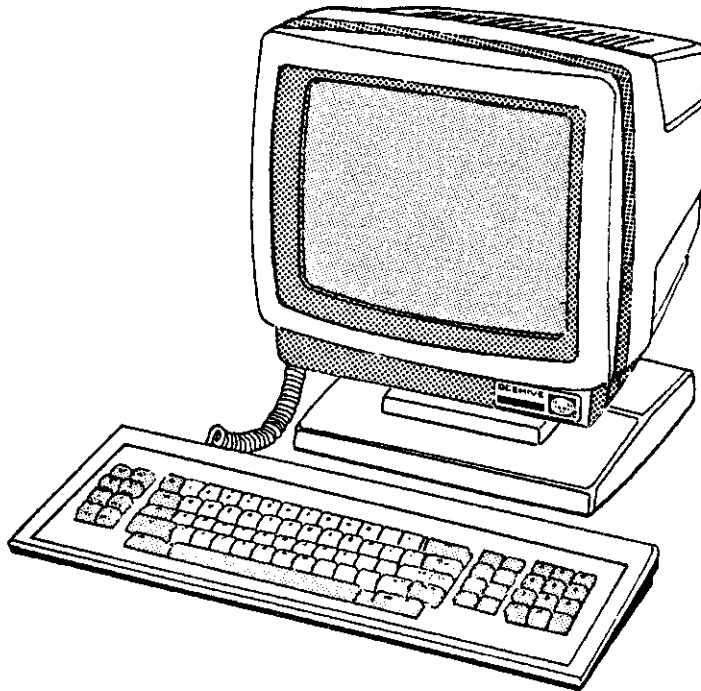


Figure 1-4
ATL-3270 Multistation Display Terminal

1.4.1 The Keyboard

The Multistation has an ergonomically designed, low-profile, detachable keyboard, shown in Figure 1-5. See Section 3 - Keyboard Overview for a discussion of the keyboard and the individual key functions.

NOTE: The examples in this manual use the ATL-078 style keyboard. Your keyboard may differ from the examples. See Appendix A.

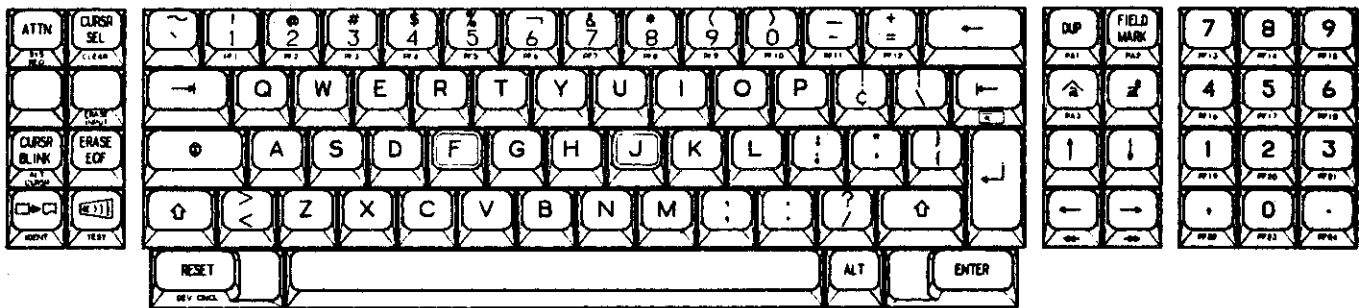


Figure 1-5
ATL-3270 Keyboard

1.4.2 The Screen

The screen display is 25 lines long by 80 columns wide. The top 24 lines on the screen are for you to enter data or text through the keyboard. Line 25 is the status line (which monitors terminal condition) and cannot be accessed by the operator (see Section 4 - Status Line Overview).

Screen Saver - In order to maintain the quality of the screen images, the Multistation is equipped with a TCM-selectable screen saver option (see Section 5 - TCM). Screen saver prevents the image of frequently displayed information, such as the status line, from being burned into the screen. If the terminal is left unused for more than 16 minutes, the screen saver will automatically turn off the screen. While the screen is off, the cursor will move back and forth across the bottom of the screen. Screen saver does not destroy data. Press any key and all of the data on the screen will be restored.

1.4.3 Communication Ports

The ATL-3270 Multistation has six serial 25-pin, D-type connector communications ports. The Main port is equipped with a synchronous RS232 interface and the Aux. port comes with an asynchronous RS232 interface. The Control Unit ports are supplied with both an RS232 and an RS422 interface. All of the ports can be independently configured via the Terminal Configuration Manager (see Section 5 - TCM). See Section 2 - Interfacing and Pin Assignments for more information on communication ports.

1.4.4 Bidirectional Serial Auxiliary Line

The auxiliary port (printer port) is a bidirectional I/O port with buffered transmit and receive lines. The buffer allows you to work on the terminal while printing is taking place. If the buffer becomes full, the terminal keyboard will be temporarily disabled until the printing is completed.

The printer (if connected) is shared by both you and the host. You can request a printout of the terminal's display buffer or the host can independently transmit data to your terminal for printing. Your display screen is unaffected by host-initiated printing requests.

1.4.5 Tone Generation

The keyboard generates three types of tones:

- Warble
- Bell
- Click

The warble (two alternating tones) sounds to indicate error conditions in the operation of the terminal such as an illegal keyboard action.

The bell (beep) sounds when the keyboard buffer is full or the transmitter buffer is full. Sixteen characters may be placed in the transmitter buffer before the tone will sound. To recover from this error, press the RESFT key.

The click tone, enabled through TCM (see Section 5 - Keyboard Click) or the keyboard (see Figure 3-7 - Click key), sounds each time a key is pressed.

The volume level of all tones can be set to either high or low through TCM (see Section 5 - Bell/Click Volume).

1.4.6 Security Options and Implementation

The Multistation has several security options available through TCM to protect it from unauthorized access through dial-up connections on its asynchronous ports (see Section 5 - TCM). Without the built-in protection options, it would be possible for an unauthorized user to use the dial-up asynchronous ports to gain access to the system. For instance, if a port were dialed by a legitimate user who for some reason is cut off, anyone with the telephone number could call in and find themselves in a user program which is normally restricted from their access.

In our example, if the authorized user were in a program such as the company payroll file, the unauthorized user would not only be tied to the company payroll file, but the Multistation would automatically re-display the screen that was being displayed when the cutoff occurred. The Multistation's security options prevent this from happening.

1.4.7 ATL-3270 Personality Features

Some of the operational features of the ATL-3270 Multistation are:

- 14-inch P31 green phosphor monitor.
- Synchronous, TCM-selectable baud rates up to 19.2 Kilobaud on the main port.
- Asynchronous, TCM-selectable parity, word length, stop bits, baud rates up 19.2 Kilobaud on the Aux port.
- TCM-selectable printer protocol on the Aux port.
- 7 x 9 dot character matrix in 9 x 12 dot cell.
- 87-key IBM-style ergonomic keyboard.
- 4K character generator
- Support for eight logical devices.
- Display station and control unit monitor modes.
- DTE/DCE configurable headers on the main and control unit ports.
- Printer Port sharing.
- Support for several Beehive display terminals including:

TOPPER I Personal Computer	
ATL-078 Terminal (IBM 3178 Emulator)	<u>See Appendix C for all</u>
ATL-004 in VT100 Mode	<u>keyboard equivalents.</u>
ATL-008 in VT100 Mode	
DM-78	
DM-310 (IBM 3101 Emulator)	

Each port works with multiple terminal types.

1.5 TECHNICAL SPECIFICATIONS

The technical specifications of the ATL-3270 Multistation terminal are shown in Table 1-1.

Table 1-1
ATL-3270 Technical Specifications

DISPLAY FORMAT	24 lines x 80 characters
STATUS LINE	25th line of display
CRT SIZE	14" measured diagonally
CHARACTER SIZE	Approximately .2" high x .1" wide
CHARACTER GENERATOR	128 displayable characters, each formed with a 7 x 9 dot matrix within a 9 x 12 cell. Descenders appear on lowercase characters.
SCREEN REFRESH RATE	60 Hz
DISPLAY TYPE	Green characters on a black background or black characters on a green background.
VISUAL ATTRIBUTES	Normal and intensified.
OTHER ATTRIBUTES	Nondisplay fields
TABULATION/BACKTAB	Positions the cursor at the next character after an attribute defining the field as unprotected.
CURSOR	Block or underline, blinking or non-blinking (TCM- and key-selectable).
CURSOR CONTROL	Up, down, left, right, high speed left and right, home, carriage return, tab, backtab, and line feed.
COMMUNICATIONS INTERFACE	Serial, RS232 - BSC or SNA/SDLC. DCE or DTF
TRANSMISSION RATE	All ports - TCM-selectable up to 19200 baud.
AUX. PORT PARITY	TCM-selectable on Aux. port: odd or even, mark or space, or none. (Mark or space only with 7-bit word length.)

Table 1-1 (Continued)

COMMUNICATION MODE	Main Port: Synchronous only. Half duplex. Aux. Port: Asynchronous. Full and half duplex. TCM-selectable. C.U. Ports: Asynchronous. Full duplex.
COMMUNICATION CODE	Main Port: EBCDIC. Aux. and Control Unit Ports: ASCII.
BELL	Audible alarm.
SELFTTEST	Performed automatically upon power-up.
POWER REQUIREMENTS	115 VAC \pm 10% at 60 Hz. 230 VAC \pm 10% at 50 Hz.
ENVIRONMENTAL SPECIFICATIONS	Altitude: Sea level to 10,000 feet. Operating Temperature: 0 to 40° C (32 to 104° F). Humidity: 0 to 80% (non-condensing).
MONITOR	
● DIMENSIONS	Height: 13.4 in (34.04 cm) Width: 14.0 in (35.56 cm)
● TILT RANGE	Forward Tilt: 5° Backward Tilt: 15° Total Range: 20°
● ROTATION	Total Rotation: 360° Depth: 15.7 in (39.88 cm)
KEYBOARD	A low-profile, ergonomic, detachable keyboard featuring IBM 3278 layout, auto repeat, n-key rollover, alpha lock, and 12-numeric keypad. Keyboard has an optional clicker to provide audible feedback of key closures. Keys with two functions have alternate symbols on the front of the keycaps.
KEYBOARD DIMENSIONS	Height: 1.5 in (3.81 cm) Width: 20.5 in (52.07 cm) Depth: 7.5 in (19.05 cm) Desk Top Depth (footprint): 23.2 in (58.93 cm)
WEIGHT	Monitor: 25.0 lb (11.34 kg) Keyboard: 4.5 lb (2.04 kg)

SECTION 2 INSTALLATION

IMPORTANT This section assumes that the four port Multistation board is installed in your ATL-3270. If the board has not been installed, see Appendix F for board installation information.

2.1 UNPACKING AND IDENTIFICATION

The model number is stamped on the outside of the box. Be sure that this is the same number as the model number on the back panel of the terminal (see Figure 2-2). Save all boxes and packing materials. You will need them if you ever return the terminal for repairs.

Unpack or repack the terminal, referring to Figure 2-1.

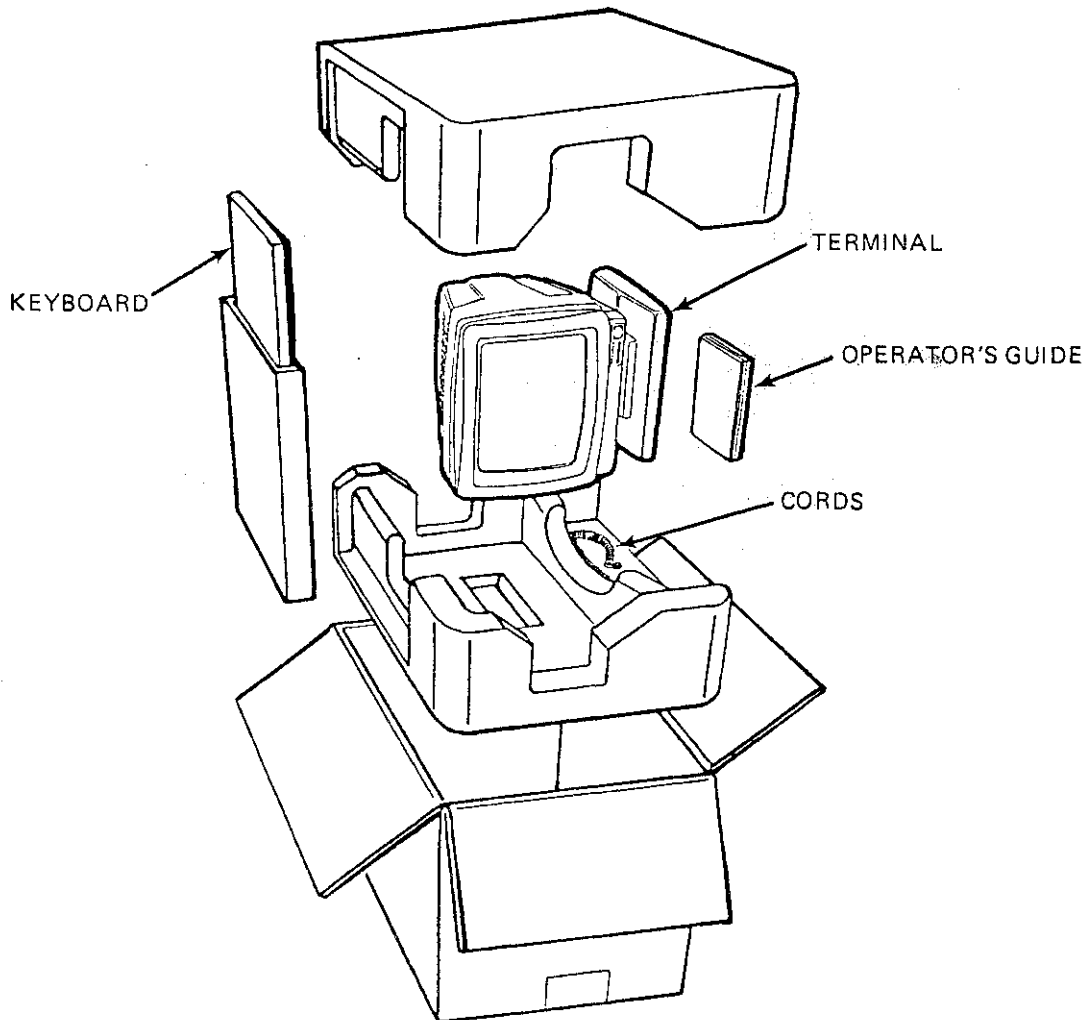


Figure 2-1
Unpacking or Repacking the ATL-3270 Terminal

The model number, part number, serial number, voltage and current requirements, and frequency/power classifications are located on the identification label on the back of the terminal (see Figure 2-2). Make sure you have the correct model with the correct options by looking at the part number on the identification label. Figure 2-2 shows what each character means on the part number.

NOTE: If you have installed the Multistation kit in an existing ATL-3270, be sure that you have placed the new label on the back panel.

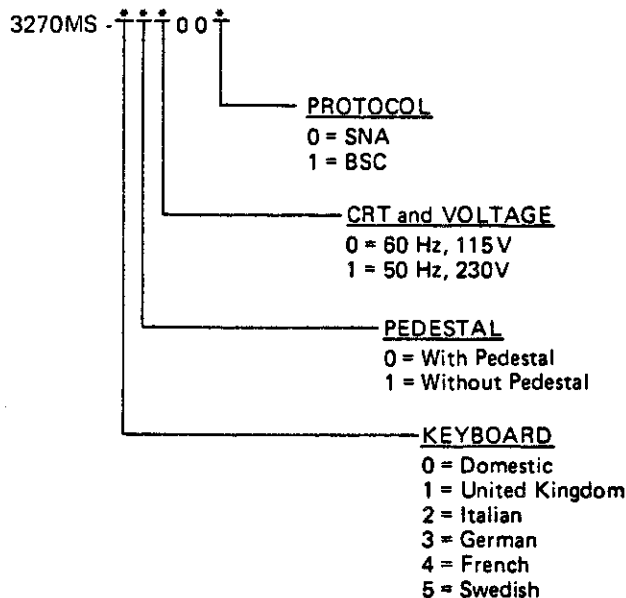
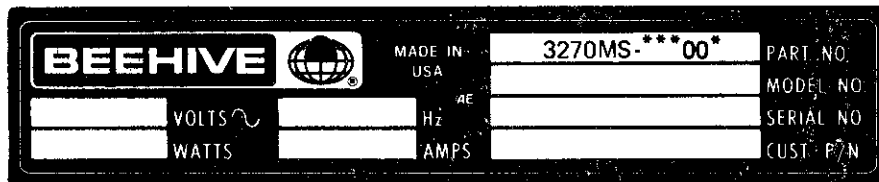
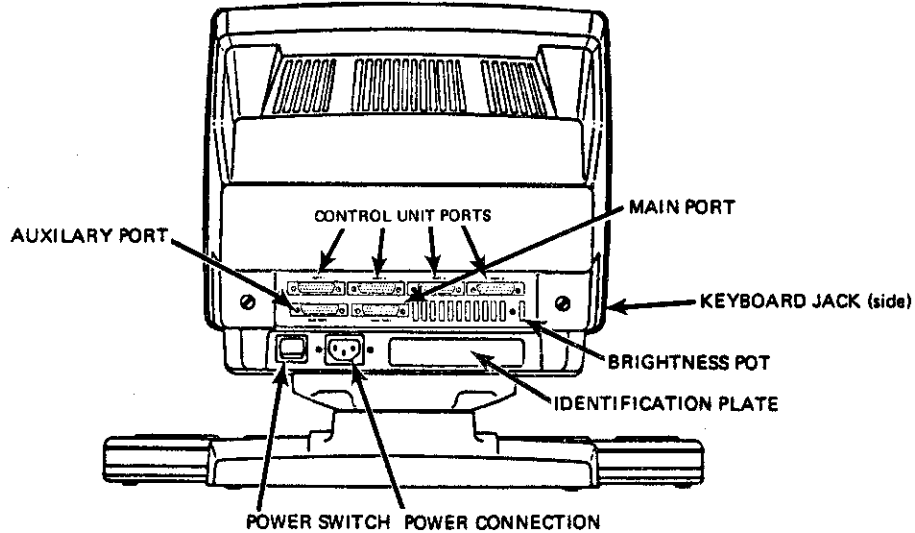
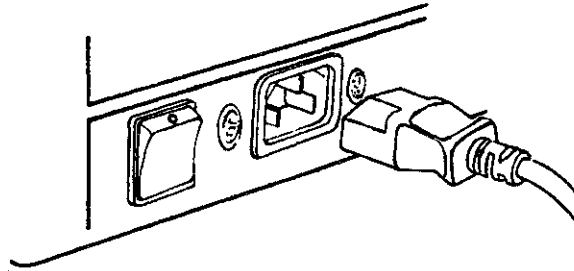


Figure 2-2
ATL-3270 Rear Panel & Identification Label



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Figure 2-4
Connecting the Power Cord

To prevent the power cord from being accidentally pulled from the power plug, you may attach the strain-relief clamp as shown in Figure 2-5.

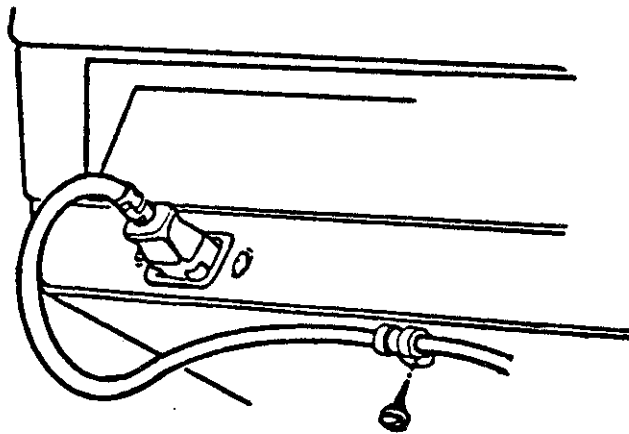


Figure 2-5
Attaching the Strain-Relief Clamp

Table 2-1
Main Port RS232C Pin Descriptions
(DTE Header)

<u>PIN #</u>	<u>CIRCUIT NAME</u>	<u>DESCRIPTION</u>
1	AA	A direct connection to the Multistation frame called CHASSIS GROUND.
2	BA	TRANSMITTED DATA from Multistation to host. (DTE)
3	BB	RECEIVED DATA which comes from the host to the Multistation. (DTE)
4	CA	REQUEST TO SEND, a control signal that originates in the Multistation and is sent to the host. The signal is lo until data transmission, goes hi during data transmission, and returns to lo after data transmission.
5	CB	CLEAR TO SEND, a control signal which comes from the host. When hi, it enables data transmission by the Multistation.
6	CC	DATA SET READY, a control signal which comes from the modem and indicates that the data set is ready for transmission to or from the Multistation. A hi to lo transition indicates a host disconnect to the Multistation.
7	AB	SIGNAL GROUND, which has the same potential as Pin 1.
8	CF	DATA CARRIER DETECT (DCD) - not monitored.
15	DS	TRANSMITTER CLOCK, a clock signal provided by the modem.
17	DD	RECEIVER CLOCK, a clock signal provided by the modem.
20	CD	DATA TERMINAL READY, a hi signal that indicates that the Multistation is powered up. It is held hi except during RESET.

Table 2-2
Main Port RS232C Pin Descriptions
(DCE Header)

<u>PIN #</u>	<u>CIRCUIT NAME</u>	<u>DESCRIPTION</u>
1	AA	A direct connection to the Multistation frame called CHASSIS GROUND.
2	BA	RECEIVED DATA which comes from the host to the Multistation. (DCF)
3	BB	TRANSMITTED DATA from Multistation to host. (DCF)
4	CA	REQUEST TO SEND, a control signal that originates in the Multistation and is sent to the host. The signal is lo until data transmission, goes hi during data transmission, and returns to lo after data transmission.
5	CB	CLEAR TO SEND, a control signal which comes from the host. When hi, it enables data transmission by the Multistation.
6	CC	DATA SET READY, a control signal which comes from the modem and indicates that the data set is ready for transmission to or from the Multistation. A hi to lo transition indicates a host disconnect to the Multistation.
7	AB	SIGNAL GROUND, which has the same potential as Pin 1.
8	CF	DATA CARRIER DETECT (DCD) - not monitored.
15	DS	TRANSMITTER CLOCK, a clock signal provided by the modem.
17	DD	RECEIVER CLOCK, a clock signal provided by the modem.
20	CD	DATA TERMINAL READY, a hi signal that indicates that the Multistation is powered up. It is held hi except during RESET.

Table 2-3
Auxiliary & Control Unit Port RS232 Pin Descriptions
(DCE Header)

<u>PIN #</u>	<u>CIRCUIT NAME</u>	<u>DESCRIPTION</u>
1	AA	A direct connection to the Multistation frame called CHASSIS GROUND.
2	BA	TRANSMITTED DATA from the printer or terminal to the Multistation.
3	BB	RECEIVED DATA which comes from the Multistation to the terminal or printer.
4	CA	REQUEST TO SEND, a control signal which is sent from the printer to the Multistation. This signal is ignored by the Multistation.
5	CB	CLEAR TO SEND, a control signal sent from the Multistation to the printer which remains hi at all times. It echoes the REQUEST TO SEND signal on the Control Unit Ports.
6	CC	DATA SET READY, a control signal from the terminal to the printer, is hi at all times.
7	AB	SIGNAL GROUND, which has the same potential as Pin 1.
8	CF	CARRIER DETECT, a control signal which is the same as Pin 6.
11	(Aux. Port)	READY-BUSY, a control signal which is TCM-selectable so that either hi or lo level can enable transmissions from the Multistation.
15	(C.U. Ports)	RS422 Receive (-)
17	(C.U. Ports)	RS422 Receive (+)
19	(C.U. Ports)	RS422 Transmit (-)
19	SCA (Aux. Port)	SECONDARY REQUEST TO SEND, a control signal which is TCM-selectable so that either hi or lo level can enable transmission from the Multistation.
20	CD	DATA TERMINAL READY, a control signal that comes from the printer or terminal to the Multistation. Lo is interpreted as a busy signal, indicating that data cannot be received from the Multistation.
25	(C.U. Ports)	RS422 Transmit (+).

Table 2-4
Auxiliary & Control Unit Port RS232 Pin Descriptions
(DTE Header)

<u>PIN #</u>	<u>CIRCUIT NAME</u>	<u>DESCRIPTION</u>
1	AA	A direct connection to the Multistation frame called CHASSIS GROUND.
2	BA	RECEIVED DATA which comes from the Multistation to the terminal or printer.
3	BB	TRANSMITTED DATA from the printer or terminal to the Multistation.
4	CA	REQUEST TO SEND, a control signal which is sent from the printer to the Multistation. This signal is ignored by the Multistation.
5	CB	CLEAR TO SEND, a control signal sent from the Multistation to the printer which remains hi at all times. It echoes the REQUEST TO SEND signal on the Control Unit Ports.
6	CC	DATA SFT READY, a control signal from the terminal to the printer, is hi at all times.
7	AB	SIGNAL GROUND, which has the same potential as Pin 1.
8	CF	CARRIER DETECT, a control signal which is the same as Pin 6.
11	(Aux. Port)	READY-BUSY, a control signal which is TCM-selectable so that either hi or lo level can enable transmissions from the Multistation.
15	(C.U. Ports)	RS422 Receive (-)
17	(C.U. Ports)	RS422 Receive (+)
19	(C.U. Ports)	RS422 Transmit (-)
19	SCA (Aux. Port)	SECONDARY REQUEST TO SEND, a control signal which is TCM-selectable so that either hi or lo level can enable transmission from the Multistation.
20	CD	DATA TERMINAL READY, a control signal that comes from the printer or terminal to the Multistation. Lo is interpreted as a busy signal, indicating that data cannot be received from the Multistation.
25	(C.U. Ports)	RS422 Transmit (+).

2.4.2 RS422 Interface

This is a balanced, differential-voltage interface whose signal channels are included on the same 25-pin, D-type connector as the RS232C interface (using four pins). This interface protocol is available on the Control Unit ports (the assigned pins and respective signals are shown in the chart below and in Tables 2-1 to 2-4).

The RS422 interface has the following features:

- Compatibility with many systems
- Possible cable lengths of up to 4000 feet (1.2 km)
- Baud rates of up to 19.2 K bps

RS422 Active Pin Locations
Control Unit Ports

<u>Location</u>	<u>Signal</u>
15	RCVR -
17	RCVR +
19	XMIT -
25	XMIT +

If you provide your own cables for the transmit and receive lines, use 24 AWG copper, twisted pair, shielded cables. Some control lines at RS232C voltage levels are available.

In doing your own cabling, you will have to ensure that there is a good path between the terminal and the host. Two different methods of wiring this path are described below. Regardless of the wiring method, the first step is to connect the shielding of the two cables (transmit and receive) at both ends. See Figure 2-7.

Method 1 - When the terminal chassis ground (Pin 1 of the control unit port) and the chassis ground of the other device have a potential difference of less than 4 V, connect both ends of the shielding to a chassis ground.

Method 2 - When the potential difference is greater than 4 V RMS, test the chassis grounds with an oscilloscope to see which is the quieter. The shielding of the quieter end should be connected to its chassis ground and the shielding of the noisier end should be connected to its respective signal ground. In the equipment of the noisier end, the signal and chassis grounds must be separated and the circuitry must be able to withstand the resulting potential difference.

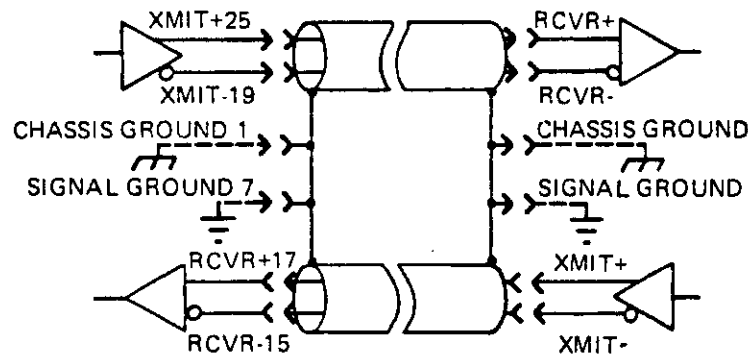


Figure 2-7
Wiring the Host/Terminal Path

2.4.3 Configuration Headers

As you install your Multistation, you must be sure that the Multistation's main RS232 port and Control Unit ports are properly configured. The Main port must be configured to communicate with the host system. The control unit ports must be individually configured to communicate with any connected devices. The Aux. port does not have a configuration header.

Each pin on a port serves a specific function (see Tables 2-1 to 2-4). For example, on the main port Pins 2 and 3 send and receive data between the terminal and the host. If the terminal sends data on Pin 2 and receives data on Pin 3, then the host must receive data on Pin 2 and send data on Pin 3. Incorrect configuration of the port could result in both the terminal and the host trying to send information on the same pin.

The communications configuration of the ports is determined by the configuration headers, which are attached to the logic board. The ports can be configured to communicate either as Data Terminal Equipment (DTE) or Data Communication Equipment (DCE). Generally, modems and other communications equipment are configured as DCE, while devices such as computers, terminals, and printers are configured DTE.

Main Port - Standard communication between two RS232 devices requires that one be configured DCE and the other DTE (see Figure 2-8). Since the default RS232 port configuration of the main port is DTE, you will need to connect the main port to a device that is configured DCE or change your configuration. You can change the port configuration to DCE by modifying the configuration header or by using cross-over (modem eliminator) cables (available at most computer supply stores). If you configure the Multistation as DCE, the 3270 will provide its own clock and not need a modem eliminator. See Appendix B.

Control Unit Ports - Each of the four Control Unit ports can be configured individually by changing the appropriate configuration header. (Appendix B contains specific information concerning the locations and installation of the control unit configuration headers.) As a general rule, if you are connecting a terminal or printer directly to the port, the port should be configured as DCE. If a modem is connected to the port, configure the port as DTE. See your systems operator for information regarding your configuration needs.

NOTE: The configuration header should only be changed by a qualified service technician. See Appendix B for specific details concerning the location and modification of the configuration header.

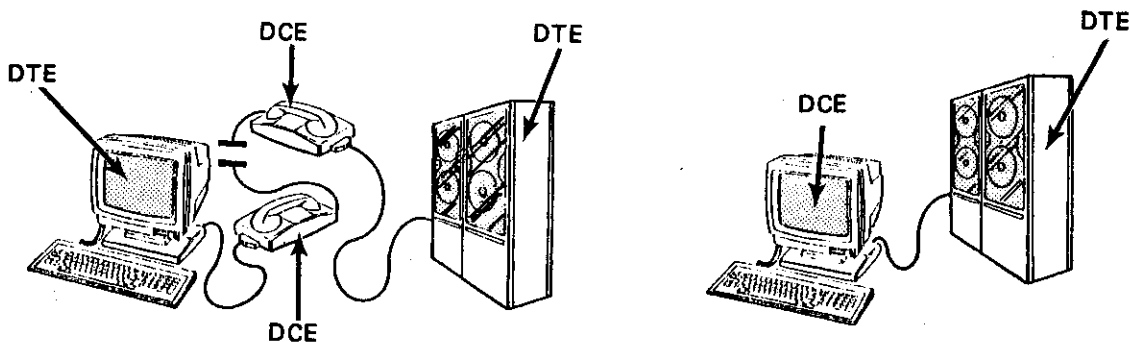


Figure 2-8
DTE - DCE Communications

2.4.4 Asynchronous Host Support

The Multistation provides an option which allows an attached asynchronous terminal to communicate with a separate asynchronous host (that is, a minicomputer). This option requires the use of an asynchronous line to connect the Multistation to the asynchronous host equipment.

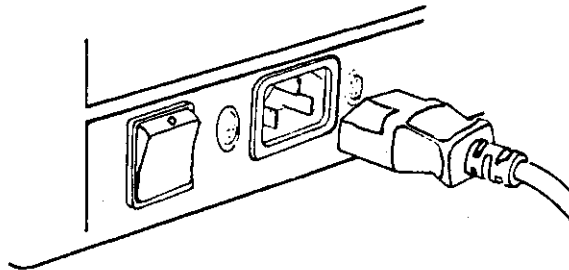
The asynchronous host line must be connected to the fourth (far right) control unit port. The user can request a connection between any terminal connected to the Multistation and the asynchronous host by using terminal-specific keystrokes. (In order to determine the keystrokes needed for your terminal, refer to the ASYCH SW OUT function on the appropriate Keyboard Map in Appendix A.) If the port is not available, the Multistation will ring the terminal bell. If the port is available, a connection will be made between that port and the user's terminal until this connection is broken by typing the null character (either ATTN, CONTROL SHIFT @ or CONTROL SPACE, depending on the particular terminal), followed by any non-null character. All characters arriving at one port are immediately sent out the other one. The unit behaves transparently except for the null character. If the Multistation receives a null from the terminal, it waits for the next character. If it is another null, it sends a single null to the asynchronous host. If it is not a null, it breaks the connection and restores the emulated 3278 screen.

NOTE: The Asynchronous host must have the ability to respond to XON/XOFF signals from the Multistation.

2.5 TURNING ON THE TERMINAL

Before the terminal is used, it must be properly installed and configured in accordance with the appropriate sections of this manual by qualified personnel.

Set the rear panel power switch to ON. (See Figure 2-9.)



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Figure 2-9
ATL-3270 Power Switch

After a short warm-up period, the cursor and status line will appear on the screen. The cursor appears at the upper left-hand corner of the screen as a blinking rectangle. The status line appears on line 25. The internal control unit will provide necessary status messages (see Section 4 - Status Line Symbols).

2.5.1 Brightness Pot

The brightness of the screen can be controlled by using the brightness pot on the back of the terminal (see Figure 2-2). The brightness pot works in the same way as the brightness controls on a standard television set. A small flat-bladed screwdriver is needed to make the adjustment.

2.5.2 Terminal Selftest

The Multistation contains a control unit and a display station. Each unit is controlled by its own microprocessor and operates independently of the other. They communicate with each other through an internal asynchronous port.

Control Unit - On powering up, the display station and control units perform independent selftests. If the control unit selftest is successful, the screen remains blank. If there is a failure, one or more of the messages in Figure 2-10 will appear on the screen following the "SFLF TEST RESULTS" line:

```
ATL3270 MS      SNA or BSC                REV.XXX      : COPYRIGHT 1984 BEEHIVE

SELF TEST RESULTS
RAM ERROR ADDRESS=
ROM ERROR
CTC ERROR
PIT ERROR: X (X represents the number of the port that failed (0 = Host))
LAST CRASH ADDRESS=
```

Figure 2-10
Selftest Results - Errors

- The RAM ERROR ADDRESS is the lowest RAM address experiencing an error.
- The ROM ERROR message will be followed by a series of two-digit Hex codes.
- The CTC ERROR signals an error with the timing unit of the Host Port Interface.
- The PIT ERROR means an error has been found during the Port Interface Test.
- The LAST CPASH ADDRESS displays the Hex code address where a fault occurred in the control unit firmware. This is not a result of the selftest, but is a fault in the emulation. When a fault occurs, the firmware saves the fault address and restarts (including rerunning the selftest).

You can recall the results of the selftest at any time by pressing

ALT Z

When you do this, the screen-display will be replaced by the selftest results. If there are errors, the screen will be similar to Figure 2-10. If there are no errors, the screen will display the "NO ERROPS" message (Figure 2-11). To restore the screen display, press any alphameric or program attention key.

```
ATL3270 MS      SNA or BSC                REV. XXX      : COPYRIGHT 1984 BEEHIVE
SELF TEST RESULTS
NO ERRORS
```

Figure 2-11
Selftest Results - No Errors

NOTE: See the Maintenance Manual for additional information.

Display Station - If the display station selftest is successful, the screen will remain blank. If an error is found, an error message will appear in columns 73 to 80 of the status line. The possible error messages are:

- ROM ERROR A problem exists in the Read Only Memory.
- RAM ERROR There is a problem in the Random Access Memory.
- NVR ERROR A problem exists in the Non-Volatile RAM. Try turning the power off and on.
- UPI ERROR The 8041 chip is not working.
- KBD ERROR An error was found on the keyboard selftest. Check the keyboard cable connection.

NOTE: The display station selftest errors represent problems that should be handled by a qualified service representative. If one of these messages appear, try turning the terminal off and on. If the message reappears, call your service representative.

2.6 PRINTER SUPPORT

Any of the four Multistation control unit ports can be configured to emulate an IBM 3287 printer. When a control unit port is configured through TCM as a printer, any asynchronous serial printer can be used.

All terminals attached to the devices numbered below the printer's assigned device will use the same printer for local copies. For instance, if the printer is on control unit port #4, then the terminals on devices 2 and 3 will use device 4 and its associated port for hard copies. (See Figure 2-12).

2.6.1 Printer Port Sharing

In addition to supporting printers on the Aux. port and the Control Unit ports, the Multistation also has a shared print capability when used with a Beehive ATL-078 terminal. Simply stated, shared print means that an ATL-078 and ASCII printer can share the same transmission line. This allows the ATL-078 to receive data intended for a printer and pass the data directly to the printer without altering the data or changing the terminal's display. Printer port sharing does not interfere with the terminal's ability to communicate. Beehive's TOPPER and TOPPER I personal computers appear as an ATL-078 to the Multistation and have transparent print capabilities.

The advantage of shared print becomes obvious when an ATL-078 or TOPPER/TOPPER I is remotely tied to a Multistation port using modems. If a printer that can be accessed by the IBM host is required at that location, another set of modems and a separate transmission line would normally be required. Using shared print, however, the printer can be connected to the Auxiliary port on the TOPPER/TOPPER I or ATL-078, and the Multistation can access the printer for both local and host-initiated prints as though the connection were direct. Thus there is no requirement for additional modems or another transmission line when shared print is used. Figures 2-12 & 2-13 illustrates two typical shared print examples.

The following rules and notes apply to shared print:

1. The devices designated as logical printers may not be used for other devices.
2. Printer Port Sharing must be selected through TCM (see Section 5 - TCM).

If printer port sharing has not been enabled, terminals will use the ports designated as printers on the Multistation for local hardcopy. If printer port sharing is enabled through TCM, each attached terminal receives this printer port sharing prompt when the cluster is activated:

"PRINTER PORT SHARING AVAILABLE. ATTACH PRINTER?"

Only three responses are valid:

1. Y or y indicates yes
2. N or n indicates no
3. ? redisplay the prompt line.

The terminal will beep if any other key is pressed.

NOTE: The operator must be respond to this prompt before the terminal or printer can communicate with the host.

- ? This response redisplay the prompt line. In some configurations, the Multistation is not set up to detect whether a device is connected (see Section 5 TCM - Control Unit Device Detection). This prompt will not be redisplayed when a reconnection takes place. Therefore, if the Multistation is unresponsive when initiating a dial-up connection from the terminal to the control unit, press ? to see if the printer port sharing prompt is there. This may happen if you just dial in and only get beeps.
- Y Upon receipt of a Y (uppercase or lowercase), the printer designated for local prints for this terminal (which is the next printer in the cluster--ascending order), will be logically assigned to this communications line. All print functions directed to this printer, whether from another terminal in this cluster or from the host, will be directed through the responding terminal's Auxiliary port. If this response is answered with a beep, the designated printer has already been assigned to another terminal in the cluster and is not available. When this happens, you must answer the prompt with an N and either 1) wait, or 2) use the IDENT key to select another printer for your local prints and attempt to assign the newly selected printer to yourself by means of the Force Select function described below.
- N Always a valid response. This is the only proper response if you do not have a printer attached to the terminal's Aux port.

Note: If a terminal's local printer is not logically assigned by this process to a terminal in the cluster, that printer's local and host initiated prints are sent out the appropriate Multistation port.

To receive the printer port sharing prompt at your terminal sometime after the cluster has been powered-up or reset, use force select (ALT F) command.

2.6.2 Force Select

The force select sequence is:

ALT F

ALT F displays the firmware version number, indicates which communications protocol is operating (BSC or SNA), and allows you to select a terminal type other than the default selected through TCM. Upon answering the terminal type prompt, either the screen displayed prior to using force select will reappear, or the printer port sharing prompt will be displayed.

If the screen reappears, either printer port sharing has not been enabled through TCM, or your current logically assigned printer is not available (assigned to another terminal). Otherwise, the printer port sharing prompt appears.

If the printer port sharing prompt appears, respond as described above.

Any logical connection to a printer assigned to your terminal is broken as soon as the ALT F is pressed and that printer becomes available for assignment to other terminals in the cluster.

Figures 2-12 & 2-13 show a few of the configuration permutations available with the Multistation.

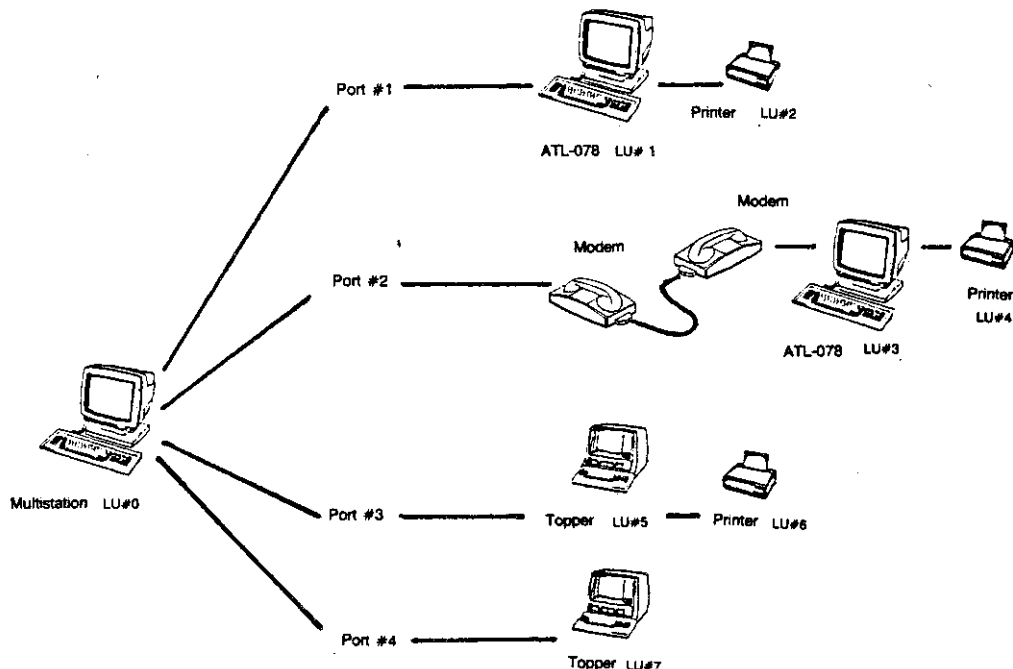


Figure 2-12
Printer Port Sharing

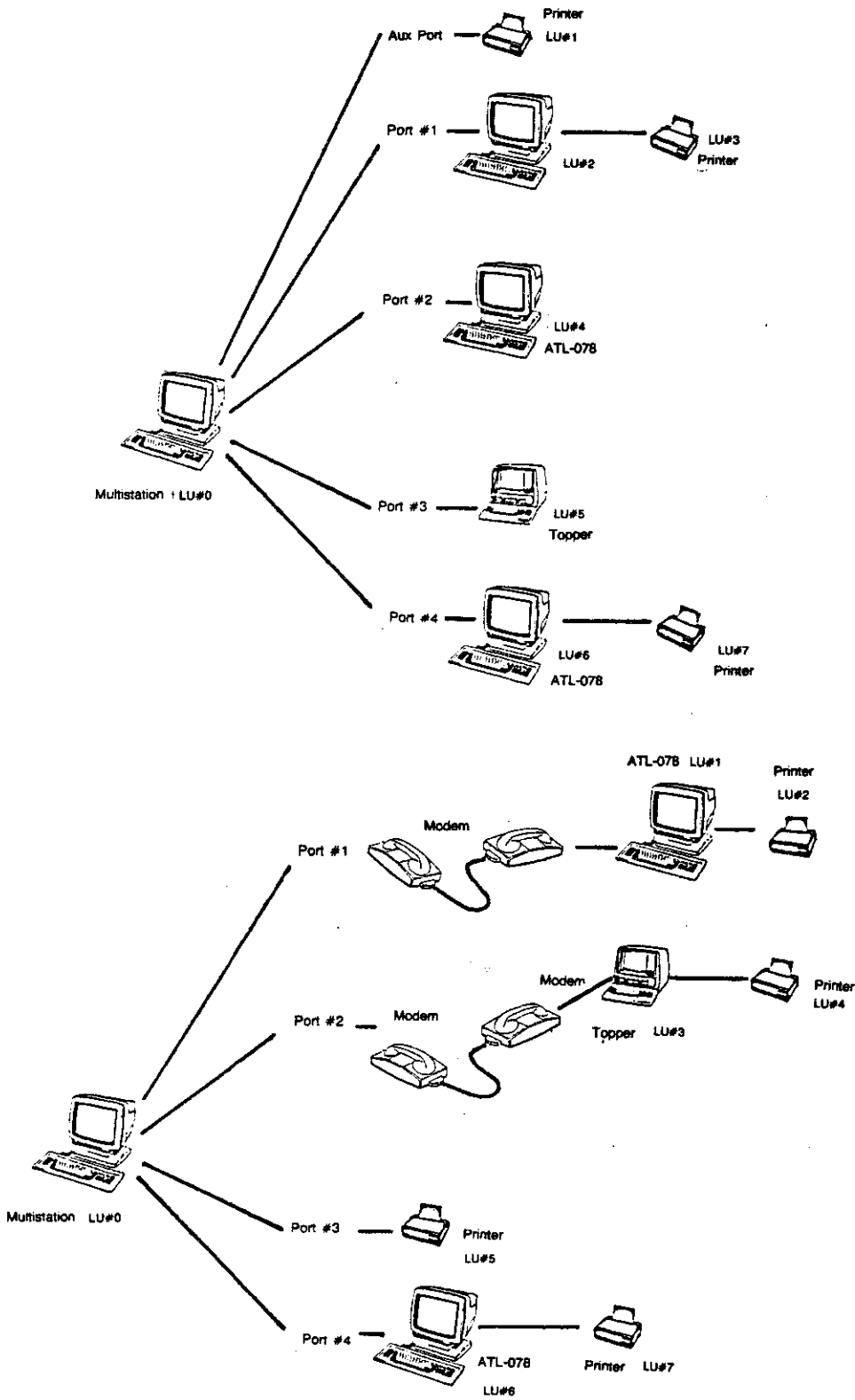


Figure 2-13
Multistation Configuration Examples

2.7 LOGICAL PLANNING2.7.1 Software Considerations

At this writing, the Multistation is software compatible with IBM 3270 devices. However, Beehive International is not responsible for any incompatibility that may result from future IBM hardware or software changes. As IBM makes these changes, Beehive will monitor the current degree of compatibility and make the necessary changes available to present customers.

This means that any valid combination of software generation and setup parameters which work with a 3274-51C cluster controller will also operate with the Multistation. Actual coding and assembly of the various generations is a responsibility of the user.

2.7.2 VTAM, NCP and VTAME Parameters

The parameters needed to generate a BiSync or SNA communication line are well-covered in IBM documentation, but it is often difficult to determine what a proper set of macros should look like. Table 2-5 is an example of a set of macros used to generate a BiSync line; Tables 2-6 and 2-9 show typical macros used to generate an SNA line.

Be sure to make a note of the GPOLL operand, and save it for reference.

NRZI is set in the host either in the NCP definition or (on a 4331) at the system console. Make a note of this configuration, and save it for reference. Do the same with the PU ADDR operand.

Table 2-5
BiSync VTAME Line-Generation Macros

```

V1XX LINE ADDRESS=030,INBFRS=(1,2),
      RETRIES=7,SERVLIM=1
V1AX CLUSTER GPOLL=40,CUTYPE=3271
V1A@ TERMINAL ADDR=40,TERM=3277,FEATUR2=(MODEL2)
V1AA TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AB TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AC TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AD TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AE TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AF TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)
V1AG TERMINAL ADDR=40,TERM=3284,FEATUR2=(MODEL2)

```

Table 2-6
SNA VTAME Line-Generation Macros

V1XX	LINE	ADDRESS=030, INBFRS=(4,8), PAUSE=0.1, RETRIES=7, SERVLIM=4, ISTATUS=ACTIVE
V1AX	PU	ADDR=C1, PUTYPE=2, MAXDATA=262, MAXOUT=7
V1A2	LU	LOCADDR=2
V1A3	LU	LOCADDR=3
V1A4	LU	LOCADDR=4
V1A5	LU	LOCADDR=5
V1A6	LU	LOCADDR=6
V1A7	LU	LOCADDR=7
V1A8	LU	LOCADDR=8
V1A9	LU	LOCADDR=9

Table 2-7
SNA NCP Line-Generation Macros

V1XX	LINE	ADDRESS=030, NRZI=NO, MAXPU=10
V1AX	PU	ADDR=C1, PUTYPE=2, MAXDATA=262, MAXOUT=7, PASSLIM=1
V1A2	LU	LOCADDR=2, PACING=(1,1), VPACING=(1,1)
V1A3	LU	LOCADDR=3, PACING=(1,1), VPACING=(1,1)
V1A4	LU	LOCADDR=4, PACING=(1,1), VPACING=(1,1)
V1A5	LU	LOCADDR=5, PACING=(1,1), VPACING=(1,1)
V1A6	LU	LOCADDR=6, PACING=(1,1), VPACING=(1,1)
V1A7	LU	LOCADDR=7, PACING=(1,1), VPACING=(1,1)
V1A8	LU	LOCADDR=8, PACING=(1,1), VPACING=(1,1)
V1A9	LU	LOCADDR=9, PACING=(1,1), VPACING=(1,1)

2.7.3 CICS Parameters

In the BiSync environment, the Multistation can be entered into the CICS TCT in several ways. Three different access methods (VTAM, TCAM and BTAM) support BiSync 3270-type devices. The access method used affects the CICS TCT generation. (Tables 2-8 through 2-10 are examples that may not include all parameters needed at a given installation.)

In the SNA environment, the Multistation can be entered into the CICS TCT in one of three ways. Ports that emulate terminals (3278s) are entered as LUTYPE2, as shown in Table 2-10. Ports that emulate printers (3287s) may be entered as either data stream compatibility LUs (LU type 3), as shown in Table 2-12, or as SNA character set LUs (LU type 1), as shown in Table 2-13. (These examples may not include all parameters needed at a given installation.)

Table 2-8
BiSync CICS 3278 Generation Macro for VTAM

```
V1A2 DFHTCT TYPE=TERMINAL,ACCMETH=VTAM,TRMTYPE=3277,  
      TRMSTAT=TRANSCIVE,TRMIDNT=V1A2,TRMMODL=2,  
      RELREQ=(YES,YES)
```

Table 2-9
BiSync CICS 3287 VTAM Generation Macro

```
V1A2 DFHTCT TYPE=TERMINAL,ACCMETH=VTAM,TRMTYPE=3284,  
      TRMSTAT=RECEIVE,TRMIDNT=V1A2,TRMMODL=2,  
      RUSIZE=256,RELREQ=(YES,YES)
```

Table 2-10

BiSync CICS 3278 and 3287 BTAM Generation Macros

```

DSN   DFHTCT TYPE=SDSCI,DSCNAME=DSN,ERROPT=E,
        SWITCH=NO,DEVICE=3277,LERBADR=RMSRR1,
        BSCCODE=EBCDIC,CONFIG=MPT,CU=2703,
        FEATURE=(BSC),LINELST=(030),
        MODELST=(0),RETRY=7
RLAB1 DFTRMLST AUTOWLST,3732,40407F7F2D
RL2TO DFTRMLST OPENLST,(606040402D)
RL2T1 DFTRMLST OPENLST,(6060C1C12D)
        DFHTCT TYPE=LINE,ACCMETH=BTAM,DSCNAME=DSN,
        TRMTYPE=3277,BSCCODE=EBCDIC,
        BTAMRLN=1,CLASS=BISYNC,
        FEATURE=(AUTOPOLL),GENPOLL=YES,
        LISTADDR=(RLAB1,WRAP)
L2TO  DFHTCT TYPE=TERMINAL,COMPAT=NO,
        FEATURE=(AUDALARM,DCKYBD),
        TRMMODL=2,PGESTAT=PAGE,
        PGESIZE=(24,80),TRMSTAT=TRANSCEIVE,
        TRMIDNT=L2TO,POLLPOS=1,
        TRMADDR=RL2TO,TRMTYPE=3277
L2T1  DFHTCT TYPE=TERMINAL,COMPAT=NO,
        FEATURE=(PRINT,TEXTPRINT),
        TRMMODL=2,PGESTAT=AUTOPAGE,
        PGESIZE=(24,80),TRMSTAT=RECEIVE,
        TRMIDNT=L2T1,POLLPOS=1,
        TRMADDR=RL2T1,TRMTYPE=3284

```

Table 2-11

SNA CICS 3278 Generation Macro

```

V1A2  DFHTCT TYPE=TERMINAL,ACCMETH=VTAM,TRMTYPE=LUTYPE2,
        TRMSTAT=TRANSCEIVE,TRMIDNT=V1A2,TRMMODL=2,
        CHNASSY=YES,RUSIZE=256,RELREQ=(YES,YES)

```

Table 2-12SNA CICS 3287 DSC Generation Macro

V1A2 DFHTCT TYPE=TERMINAL,ACCMETH=VTAM,TRMTYPE=LUTYPE3,
TRMSTAT=RECEIVE,TRMIDNT=V1A2,TRMMODL=2,
CHNASSY=YES,RUSIZE=256,RELREQ=(YES,YES)

Table 2-13SNA CICS 3287 SCS Generation Macro

V1A2 DFHTCT TYPE=TERMINAL,ACCMETH=VTAM,TRMTYPE=SCSPRT,
TRMSTAT=RECEIVE,TRMIDNT=V1A2,TRMMODL=2,
CHNASSY=YES,RUSIZE=256,RELREQ=(YES,YES)

2.8 TROUBLESHOOTING

Most of the problems that occur soon after installation are due to the operator's unfamiliarity with the machine. Some problems appear to be a Multistation malfunction when, in fact, an improper mode or function has been selected by the operator. These mistakes can usually be corrected by changing a TCM setting. Table 2-14 describes the corrective action required in several common situations.

If you are unable to diagnose a hardware problem through the use of selftest, or if you have problems interfacing the Multistation to your system, call Beehive International's Technical Support Department at (801) 355-6000 for assistance.

Table 2-14
Troubleshooting (ATL-3270)

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>SOLUTION</u>
Screen is blank	Terminal unplugged Power not on Screen Saver option on	Plug in terminal Turn power on Press any key
Cursor is present and no data can be entered from the keyboard	Keyboard locked	Cycle main power
Characters enlarged horizontally Characters in reverse fields obliterated	Contrast control out of adjustment	Adjust contrast pot on the back of the terminal
Continuous alarm bell No response from host CPU	Alarm has been set by code Incorrect baud rate, NRZI, or Control Unit Address I/O cable faulty or disconnected Configured incorrectly	Press any key Verify TCM settings Check the cable connections Change the configuration header
Uppercase characters only	Shift lock pressed Lowercase enable set to NO (TCM)	Release shift lock Set lowercase enable to YES (TCM)

SECTION 3 OPERATION

3.1 INTRODUCTION

3.1.1 Terminal Display

The Multistation sends and receives data from the host. The screen (terminal display) provides a window into the host's memory. The manner in which the information is displayed in the window depends upon the program you are using. In order to provide an orderly method of presenting and requesting data, programmers use formatted and unformatted displays, protected and unprotected fields, and nondisplayable, input, and numeric fields. The relationship of these concepts to one another is shown in Figure 3-1 and described in the following subsections.

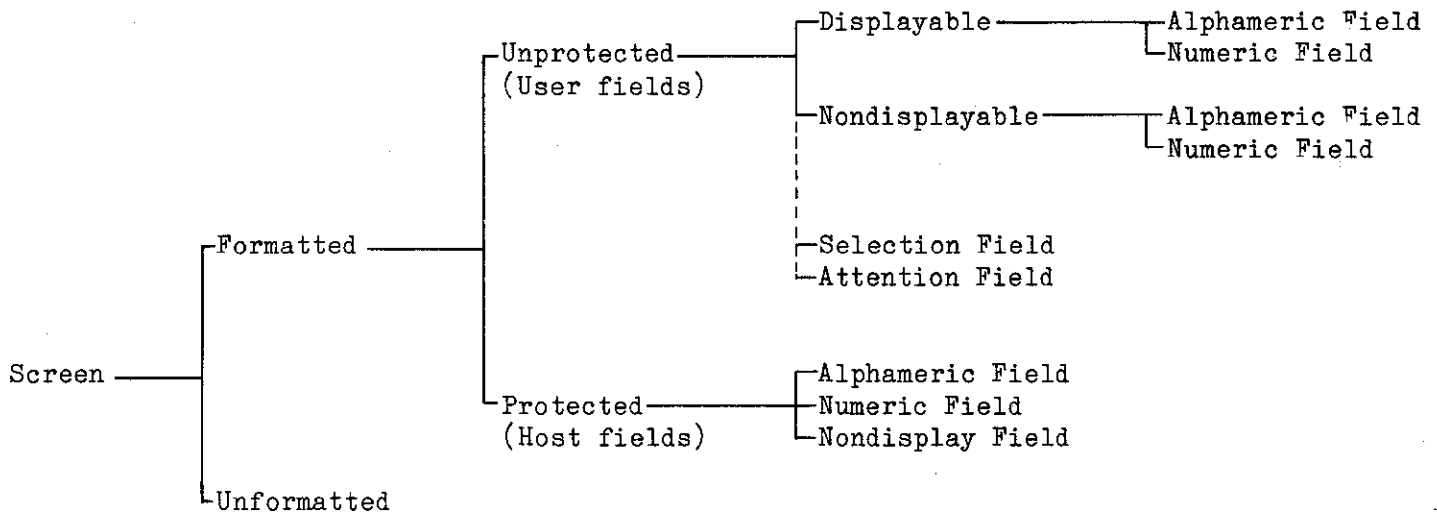


Figure 3-1
Screen Format Tree

Formatted and Unformatted Displays

The screen display can be either formatted or unformatted. Formatting requires that the screen be divided into several sections (fields). Some of the fields are reserved for output from the host program, while other fields are reserved for input from the operator. For example, one section of the

screen may be reserved for the host program to write a question, while another section of the screen may be reserved for your answer. Formatting the screen allows the host program to know exactly where to write the questions, and exactly where to look for your responses.

As part of the formatting process, the fields in the display are separated from one another by nondisplayable attribute characters (they appear as a space on the screen). Attribute characters mark the beginning and end of each field. The length of the field is determined by the distance between the two attribute characters. The attribute characters at the beginning of the field dictate whether the field will be protected or unprotected; displayable or nondisplayable; and alphameric, numeric, or attention/selection.

Sometimes the screen will be formatted as a menu, such as the TCM menu described in Section 2. More often, several questions or prompts will appear on the screen and you will be asked to fill in the missing information. Figure 3-2 represents a formatted display requesting a person's name, address and phone number.

An unformatted display has no format and therefore allows you to enter data in any area of the screen. The unformatted display is generally used for word processing and programming operations.

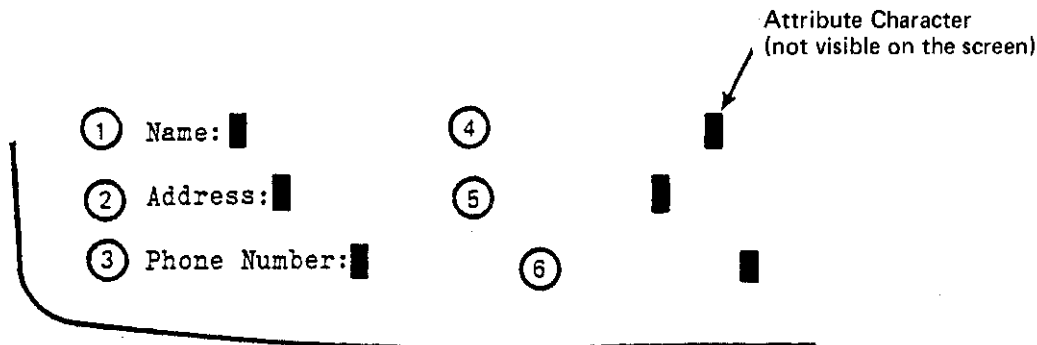


Figure 3-2
Formatted Display Screen

Protected and Unprotected Fields

A typical screen format will include both prompts (questions) from the host and places (fields) for you to type in the response. For example, there are six fields on the display screen in Figure 3-2. The labels Name, Address, and Phone Number represent three fields (numbered 1 to 3 respectively), while the spaces reserved for the answers to those questions represent the other three fields (numbered 4 to 6). When the host looks for the answers to the questions, it will scan the fields reserved for the answers (fields 4 to 6). If you accidentally type your answers over the top of the questions (fields 1 to 3) or in some other part of the screen not reserved for answers, your answers may not be read correctly by the host.

To prevent you from accidentally typing the answers in the wrong screen location, some of the fields on the screen are protected. You can not write data into a protected field. In Figure 3-2 the questions Name, Address and Phone Number (fields 1 to 3) would be protected, so that no data could be entered in those fields. Your system could respond in a variety of ways if you attempt to enter illegal information into a protected field. The two most common methods that systems use to deal with an attempted illegal data entry are described below:

- The cursor will not move into the protected field. If you try to move the cursor into a protected field, the cursor will skip over the protected field to the next unprotected field.
- The cursor can enter the protected field. If you attempt to enter data into a protected field, the keyboard will be disabled and no data can be entered. A GO ELSEWHERE symbol $\times \leftarrow \rightarrow$ will be displayed on the status line. Pressing the RESET key will enable the keyboard and allow you to move the cursor from the protected field.

NOTE: Since protected fields can not be accessed, only the unprotected user input fields will be discussed.

User Input Fields

NOTE: The input fields can be either displayable or nondisplayable. Unless otherwise noted, the following descriptions refer to displayable fields.

Alphanumeric Fields - Unprotected data fields provide a place for you to enter data into the terminal. As you key in the information, you will see the characters appear on the screen. An alphanumeric field accepts and displays all the keyboard characters.

NOTE: Since the length of the input fields is defined by nondisplayable attribute characters, you will need to consult with your systems operator to determine the length of the input fields.

Numeric Fields - A numeric field is a specialized type of input field that only expects the numbers 0 to 9, DUP, the minus sign (-), and the decimal point (.). When you enter a numeric field, all the non-numeric keys will be rejected by the system. In the example in Figure 3-2, the input field for the phone number (field 3) would probably be numeric. If you attempted to enter non-numeric characters into this field, the NUMERIC DATA ONLY symbol $\times \#NUM$ would appear on the status line. (See Section 4 - Numeric Only.)

Nondisplay Fields - Nondisplayable fields allow you to enter data, but the characters you type on the keyboard are not displayed on the screen. This is helpful if you are typing in a password or other private information. A nondisplayable field can be either alphanumeric or numeric.

Selection Fields - A commonly used screen format is the menu. Rather than presenting open-ended questions such as those in Figure 3-2, the program will sometimes offer a menu in which you are offered a limited number of choices (as in the Message Manager Menu shown in Figure 3-3). In this menu, the nine names across the middle of the screen are the selection fields. The question marks (?) in front of each name are known as designator characters (another symbol may be used on your system). One or more names can be chosen from the selection fields. Select the fields by moving the cursor over the designator character and pressing the CURSR SEL key. When the selection field is chosen, the designator character changes to a greater-than sign (>), indicating that the field has been selected. As shown in Figure 3-3, more than one selection field (Ed, Cathy, and Mark) may be chosen during this step. After choosing the desired selection fields, move the cursor to the attention fields.

NOTE: For a further discussion of selection and attention fields, see Figure 3-6 - CURSR SEL.

Attention Fields - The attention fields work in conjunction with the selection fields. The attention field is used to signal the host that you have finished making your selections. In the example of the Message Manager Menu (Figure 3-3), there are three attention fields from which to choose: Display Screen, Electronic Mail, or Hard Copy. As with the selection field, move the cursor over the designator character and press the CURSR SEL (or the appropriate key for your applications program). When you select the attention field, the ampersand (&) in front of the field changes to a blank space and the selection fields are sent to the host where the appropriate function is performed.

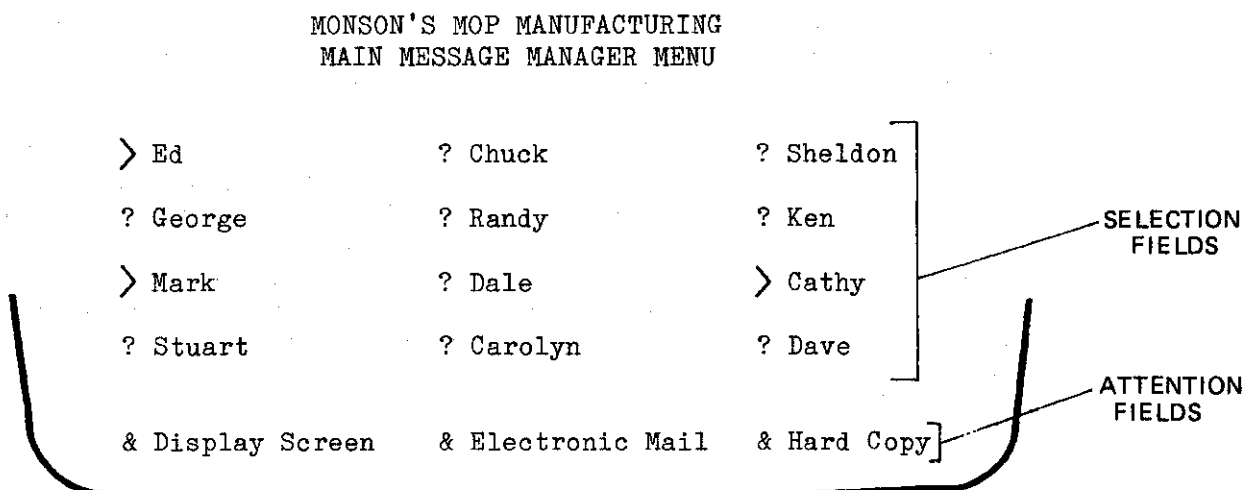


Figure 3-3
Selection and Attention Fields

3.1.2 Data Transmission

The ATL-3270 is a remote terminal that operates with either BSC or SNA protocol. Communications may be over either dedicated communication lines or through a dial-up modem.

The terminal does not communicate with the host as each key on the keyboard is pressed. Instead, the data you enter on the keyboard is put into the terminal's display buffer and then sent to the host as a block (logical set) of data. This block-send method allows the host to operate more efficiently. A block of data can consist of several paragraphs of text (unformatted data), answers to questions asked by the host application program (formatted data), or the selection of an item from a displayed menu.

After you have entered the data into the display buffer, use the ENTER key or one of the program attention keys (see Figure 3-6 - Program Attention keys) to tell the terminal to transmit the data to the host. At the next request from the host for data transmission, the terminal's display buffer is transmitted to the host. You then wait until the host program processes your data and generates a response, which is usually displayed on the screen. The response may include a request for more data. A typical application will include a series of such operations.

3.2 KEYBOARD OVERVIEW

The keyboard is equivalent to a standard IBM typewriter keyboard. The following figures briefly describe the function of each key. The descriptions are grouped by key function and location on the keyboard. The keys are grouped as follows:

- Shift Keys Figure 3-4
- Alphameric Keys Figure 3-4
- Cursor Movement Keys Figure 3-5
- Program Attention Keys Figure 3-6
- Utility Keys Figure 3-7

NOTE: The words ALT or SHIFT following a heading means that the key must be used with the ALT or SHIFT keys (see Figure 3-4 - ALT and Figure 3-4 - SHIFT).

NOTE: The examples and explanations used in this manual pertain to the Beehive 078 keyboard. Your keyboard layout may differ from the examples. See Appendix A.

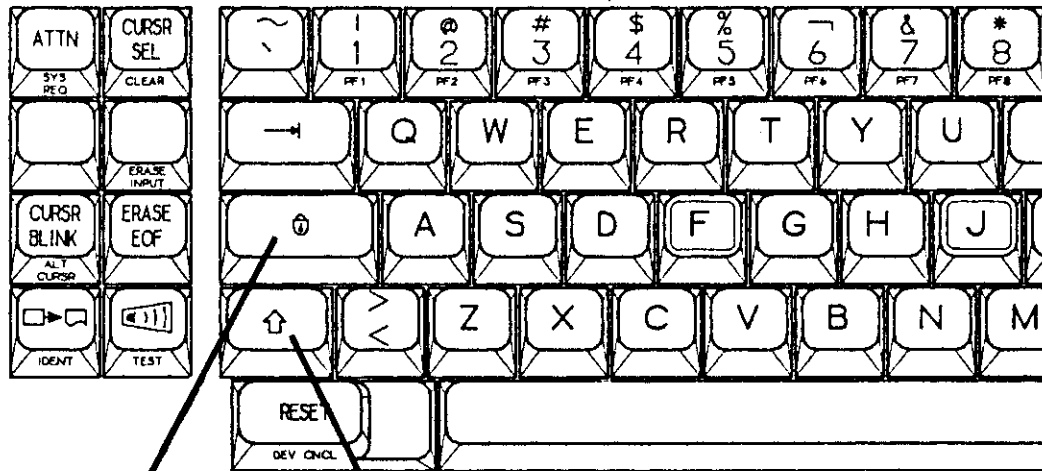
ALPHAMERIC KEYS

The ATL-3270 keyboard works like a standard typewriter keyboard with capitalization, punctuation, and a ten-key pad. The J and F keycaps are indented for ease in touch typing.



All the alphameric keys on the main keyboard are typamatic (they will repeat the same character if held down). The keys on the ten-key pad are *not* typamatic. All the keys that are *not* typamatic are listed below. See Section 5 - Keyboard Auto Repeat Rate for more information on typamatic keys.

ATL-3270 Nonrepeating Keys

Left Utility Keypad	Keyboard	Right Utility Keypad	Numeric Keypad
All keys	SHIFT LOCK SHIFT RESET ALT ENTER	DUP FIELD MARK INSERT	All keys



SHIFT LOCK

The SHIFT LOCK key causes the SHIFT key to be locked. The  symbol will appear in the status line. Pressing either SHIFT key disables the SHIFT LOCK and removes the  symbol from the status line.

SHIFT


The SHIFT keys are used to access the characters on the upper portion of the keycaps, or to access uppercase characters. The SHIFT keys function in the same manner as the SHIFT keys on a standard typewriter keyboard. A SHIFT symbol () will appear in the status line.

Figure 3-4
Alphameric and Shift Keys

DUP

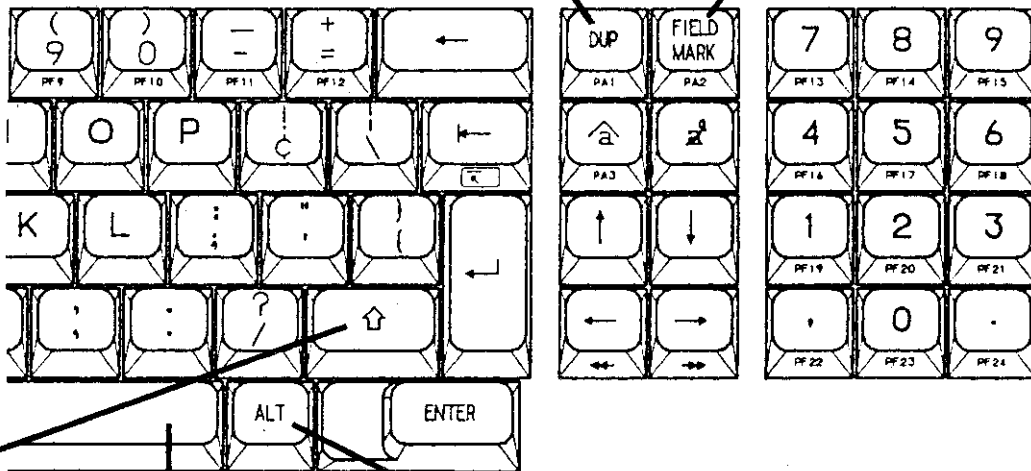
When the DUP key is pressed, a DUP code is placed in the field at the cursor location and the cursor is tabbed to the next unprotected field. The DUP code tells the application program that a duplicate operation should be performed in that field. The meaning of the DUP code is dependent on the application program; contact your systems operator to determine the exact use of this key with your system.

When you press the DUP key, an asterisk (*) will be displayed at the cursor position.

FIELD MARK

When the FIELD MARK (FM) key is pressed, an FM code is placed at the cursor location. The use of the FIELD MARK key is dependent on the application program, but it is generally used to provide the application program with a way of identifying the end of a field in an unformatted buffer or the end of a subfield in a formatted buffer.

When you press the FIELD MARK key, a semicolon (;) will be displayed at the cursor position.



SPACE BAR

The SPACE BAR writes a space into display memory and moves the cursor one character position to the right. The SPACE BAR is a destructive key, and if it is used to move the cursor over displayed data, the data will be deleted from the display and lost from memory.

When a space is written in column 80 of a line, the cursor wraps to column 1 of the next line. If the SPACE BAR is pressed when the cursor is in column 80 of the bottom line, the cursor moves to the Home location (row 1, column 1).

ALT

The ALT key is an alternate shift key used to access functions that are printed on the face of the keycaps (for example, CLEAR, TEST, PF keys, etc.). This key is used in the same way as the SHIFT key. For example, to clear the screen, you would hold down the ALT key and press the CLEAR key.

**Figure 3-4 (cont.)
Alphameric and Shift Keys**

CURSOR MOVEMENT KEYS

The cursor is a visual indicator that shows the location where information will be written on the display. The display is divided into line and column locations: lines are numbered as they descend vertically, from 1 to 24; columns are numbered left to right, from 1 to 80.

The shape of the cursor can be defined by the user to be either a blinking or nonblinking block or a blinking or nonblinking underline (see CURSR BLINK and ALT CURSR in Figure 3-7). Cursor controls are provided to help you move the cursor to areas where information needs to be entered or manipulated.

The cursor can be placed at any character position in the buffer under keyboard control (including protected fields) and may be moved freely without loss of data, because the cursor is nondestructive. All these keys have typamatic capability.

NEW LINE/CARRIAGE RETURN

Moves the cursor to column 1 (or the first unprotected character position) of the next line that contains an unprotected position. If the cursor is on the bottom line, it moves to the Home position.



TAB

Pressing the TAB key moves the cursor to the first character location of the next unprotected data field. If no unprotected lines are below the cursor, it advances to the first unprotected location on the screen (Home).

CURSOR LEFT

The cursor control functions of the CURSOR LEFT and BACKSPACE keys are identical. When either of these keys is used, the cursor moves one character position (one column) to the left. If these keys are used when the cursor is in column 1 of a line, the cursor wraps to column 80 of the previous line. If the Left keys are activated when the cursor is at Home (column 1, row 1), it wraps to column 80 of the last line.

Figure 3-5
Cursor Movement Keys

HOME (ALT)

Using this key moves the cursor to the first unprotected character position on the display screen (Home position). In an unformatted display, the cursor is moved to the first column of the first row of the display.

Note: The word (ALT) following the heading means that the key must be used with the ALT key (see Figure 3-4 - ALT).

BACKTAB

If the cursor is in an unprotected field (but not in the first location of the field), it will move to the beginning of that field. If the cursor is in the first unprotected location of a field, it will move to the first character location of the previous unprotected data field. If the display has no unprotected fields, the cursor will move to the Home position.

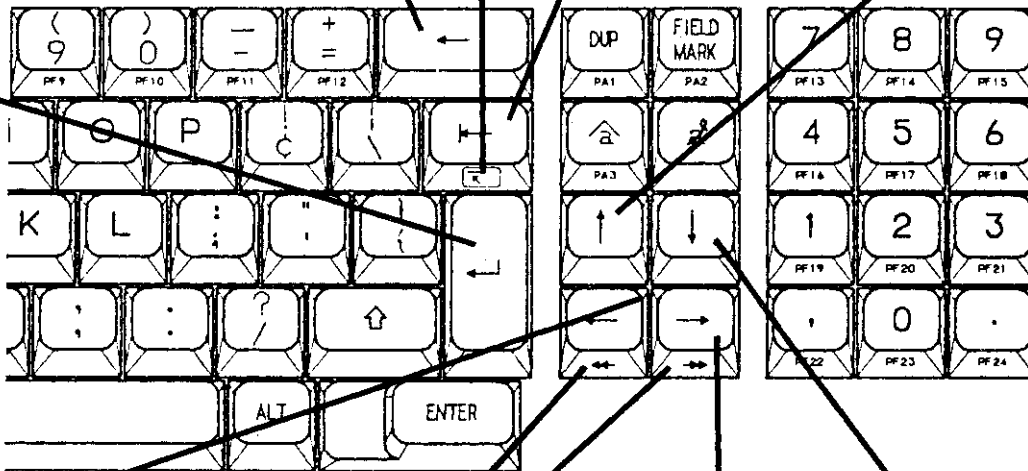
If a BACKTAB is executed with the cursor in the Home position, the cursor will move to the beginning of the last unprotected field on the screen.

BACKSPACE

See the explanation for CURSOR LEFT.

CURSOR UP

When this key is activated, the cursor moves up to the next line, maintaining the same column position. If the cursor is on line 1, it wraps to line 24.



FAST SCAN LEFT and FAST SCAN RIGHT (ALT)

These two keys operate in the same manner as the CURSOR LEFT and CURSOR RIGHT keys except that the cursor moves two character positions at a time.

CURSOR RIGHT

The CURSOR RIGHT key makes the cursor move one character position to the right, while remaining on the same line. If it is used when the cursor is in column 80 of a line, the cursor wraps to column 1 of the next line. If it is used when the cursor is in column 80 of the bottom line, the cursor wraps to the Home position.

CURSOR DOWN

This key causes the cursor to move down one line, while maintaining the same column position. If the cursor is on line 24, the cursor moves to line 1.

**Figure 3-5 (cont.)
Cursor Movement Keys**

CURSR SEL

This key allows the operator to select certain fields to be displayed on the screen for action by the host program. In a typical application, a menu of items is displayed and you select one or more items from the menu.

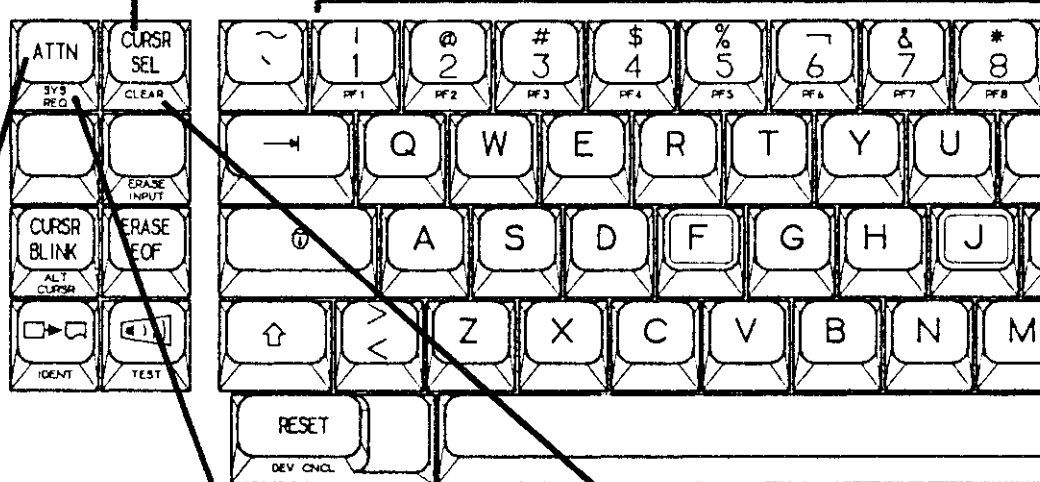
Two types of selectable fields can be displayed on the screen: selection and attention fields. The CURSR SEL key is used to access both of these fields. The selection field(s) are chosen from the menu and then sent to the host by means of the attention field. The CURSR SEL key acts like a program attention key when selecting an attention field.

Each selectable field on the screen is preceded by a designator character. The designator character for a selection field is generally either a question mark (?) or a greater-than sign (>). The designator field for the attention field is usually either an ampersand (&) or a blank space.

If you are using standard IBM protocol, the designator characters in the selection fields will be question marks (?). To choose a menu item (field), move the cursor to the beginning of the field and press the CURSR SEL. The designator will change to a greater-than sign (>), indicating that the menu item has been selected. If the wrong field is selected, the designator can be toggled back to a question mark (?) by pressing CURSR SEL again.

When you have chosen the selection field(s), move the cursor to the attention field and press CURSR SEL. The attention field signals the host that the information is being transmitted. The keyboard will be disabled until the host responds.

Depending on the host, you can end the CURSR SEL operation in a variety of ways. Refer to the program user's manual or consult with your systems operator to determine the specific sequence for your system. (See Section 3 - Terminal Display and Figure 3-6 - Program Attention Keys.)



ATTN

The ATTN key is provided for use with SNA protocol and is used to transmit a signal request to the host. The MINUS FUNCTION symbol (see Section 4 - Minus Function) will be displayed in the status line if you use this key with BSC protocol.

SYS REQ (ALT)

In BSC, the SYS REQ key sends a test request message to the host. Use this function when your terminal experiences problems and you want the system to perform a test of the terminal. Consult with your systems operator to determine the procedures for using this key.

In SNA, this key is used to switch between the SSCP-LU (System Service Control Point - Logical Unit) and LU-LU sessions.

CLEAR (ALT)

Pressing the CLEAR key erases the screen, returns the cursor to the Home position, and sends an attention code to the host. The CLEAR key does not change the keyboard shift status of the terminal.

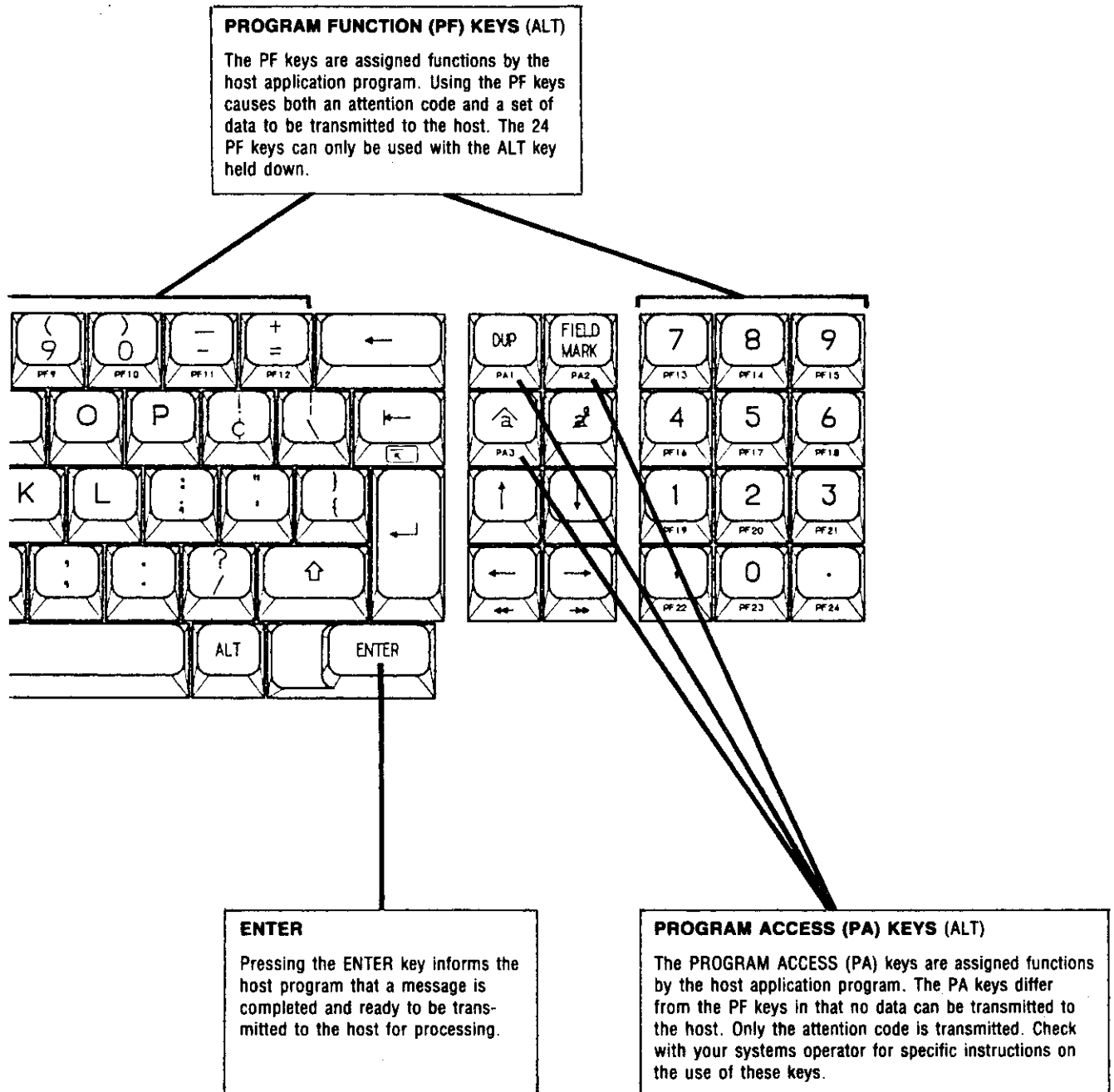
All protected and unprotected lines, except the status line, are cleared and the cursor moves to the Home position. The TIME symbol appears in the status line and the keyboard is disabled until the host responds to the attention code.

**Figure 3-6
Program Attention Keys**

PROGRAM ATTENTION KEYS

The program attention keys solicit host program action by causing an I/O pending condition to occur at the controller. When the next poll is received from the host, the controller transmits a code identifying the particular attention key that was pressed. Some data may also be transmitted, depending on the type of attention key that was pressed.

The program attention keys are CLEAR, ENTER, the PROGRAM FUNCTION (PF) keys and the PROGRAM ACCESS (PA) keys. Also, CURSR SEL may act as an attention key, depending on the contents of the display buffer (see CURSR SEL).



**Figure 3-6 (cont.)
Program Attention Keys**

ERASE INPUT (ALT)

The ERASE INPUT key erases all unprotected characters and repositions the cursor to the first unprotected location on the screen. In a buffer with only protected data fields, no character locations are erased and the cursor moves to the Home position.

ERASE EOF

To clear the area from the position of the cursor to the beginning of the next protected field, press ERASE EOF (Erase End of Field). If the cursor is in an unprotected data field, the character in the cursor location and all remaining characters to the end of the field are erased. The cursor does not move.

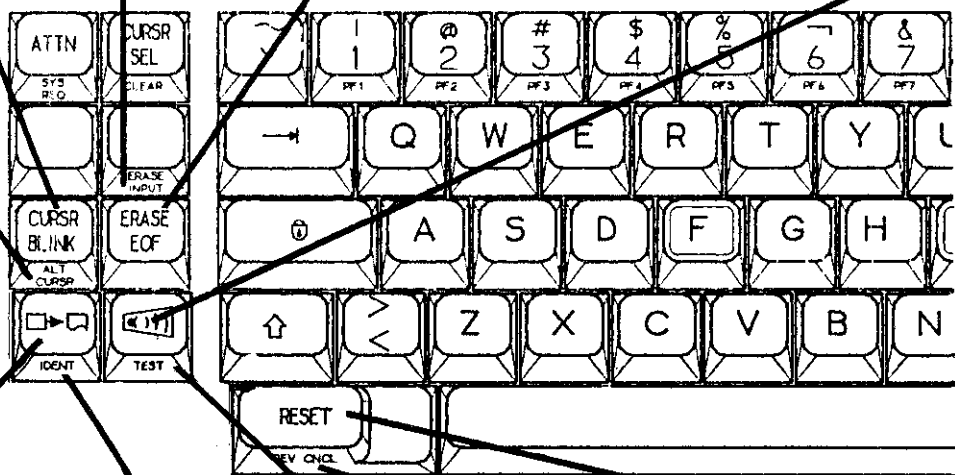
Note: Protected fields are unaffected by the ERASE EOF key. Using this key when the cursor is in a protected location will disable the keyboard. Press RESET to enable the keyboard.

CURSR BLINK

Pressing this key changes the cursor status from solid to blinking. The cursor can be changed back by pressing the CURSR BLINK key again. This option can also be changed through TCM (see Section 5 - Screen Cursor Blink).

ALT CURSR (ALT)

Pressing this key changes the shape of the cursor. The underline will be changed to a rectangular block and vice-versa. This option can also be chosen through TCM (see Section 5 - Screen Block Cursor).



PRINT OPERATION

The PRINT key is used to send information from the screen to the printer. The keyboard, disabled while the screen is copied into the printer's memory buffer, will be restored when the transfer to the printer's buffer is completed. If the printer is already in use when you send the information, the terminal will wait until the printer is free and then send the data to the printer. The keyboard will, however, be disabled during this time. If you choose not to wait for the printer, this command can be cancelled by pressing DEV CNCL (device cancel).

IDENT (ALT)

The IDENT command is used to send the host information identifying the printer you wish to use. After you send the IDENT command, the Printer Assignment symbol will appear on the status line and wait for you to enter a two-digit printer identification number (see Section 4 - Printer Assignment). The specific function of the IDENT key varies from control unit to control unit. Contact your systems operator to determine the specific use of this key.

DEV CNCL (ALT)

Use the DEV CNCL (device cancel) key to cancel the current printing operation.

TEST (ALT)

When the Monitor Mode option is enabled through TCM (see Section 2 - Control Unit Monitor Mode), the TEST key allows you to enter monitor mode.

**Figure 3-7
Utility Keys**

CLICK

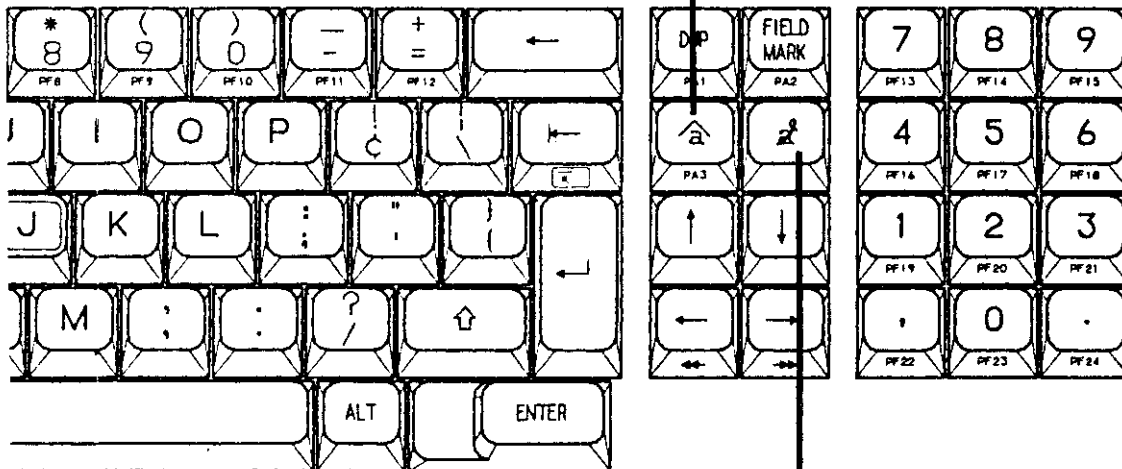
The CLICK key toggles the keyboard between *click* and *silent* options. If you hear a clicking sound in the silent option or silence in the click option, you should check to see if your data is being accepted by the host. This option is also TCM-selectable (see Section 5 - Keyboard Click). The volume of the click can be modified through TCM (see Section 5 - Keyboard Bell/Click Volume).

INSERT

The INSERT key causes the terminal to enter insert mode. The insert mode is indicated by the insert symbol (^) on the status line. If the cursor is in an unprotected location, using an alphanumeric key causes the character to be entered at the cursor position. The character formerly occupying the cursor location and all remaining characters within the field are shifted one character location to the right until the last character is shifted onto a null character. The null character is not shifted. If the field is more than one row long, the character at the end of the row may be moved to the beginning of the next row.

When the field is completely filled with non-null characters, using an alphanumeric key will disable the keyboard and the character will not be inserted. Field attribute characters are not shifted as part of the insert operation. Pressing RESET will restore the keyboard and turn off the insert mode.

The insert mode remains on until toggled off by pressing the RESET key or another host communications key.

**RESET**

Use the RESET key if the keyboard becomes disabled for any reason. The RESET key cannot reset a disabled keyboard when the terminal is sending data to, or receiving data from, the host. The RESET key is also used to terminate an insert operation.

DELETE

If the cursor is in an unprotected field, the DELETE key removes one character. The cursor does not move. All the characters in the unprotected field to the right of the cursor will be shifted one character location to the left. Character locations at the end of the field will be filled with nulls. If the unprotected field fills more than one row, characters in the other rows are not affected.

If you use this key when the cursor is in a protected location, the keyboard will be disabled.

The deletion of one character disables the delete character mode.

Visual attributes are not affected by the delete action and remain fixed.

Figure 3-7 (cont.)
Utility Keys

3.3 MONITOR MODE

The monitor mode is a diagnostic function that allows you to view the messages that are being transmitted and received by the Multistation. This function is used by technicians for troubleshooting and is not meant to be used in normal communications.

The Multistation uses a series of codes to send and receive messages from the host. These codes can be divided into two categories: displayable and nondisplayable. The displayable codes (see Section 1 - Displayable Characters) can generally be identified as being the alphameric characters. The nondisplayable codes, such as those sent by carriage returns, tabs, and program function and program access keys, are sent between the host and the terminal but do not appear on the screen. Monitor mode allows you to see both displayable and nondisplayable codes on the screen.

The Multistation consists of four major components: the control unit, the display station, the keyboard, and the screen. The control unit, display station, and screen are all contained within the terminal case. Figure 3-8 shows these units and how they are connected.

A message from the host goes to the control unit, and then to the display station. If the message contains displayable characters, they are sent from the display station to the screen. Messages from the keyboard go to the display station and screen, through the control unit and out to the host.

Monitor mode causes all messages, displayable and nondisplayable, to be sent to the screen. In this way, you can see if the messages being sent by the host are being properly interpreted by the Multistation.

There are two places that messages could be misinterpreted: between the host and the control unit (A), and between the control unit and the display station (B). The Multistation is therefore equipped with two monitor modes: control unit monitor mode and display station monitor mode.

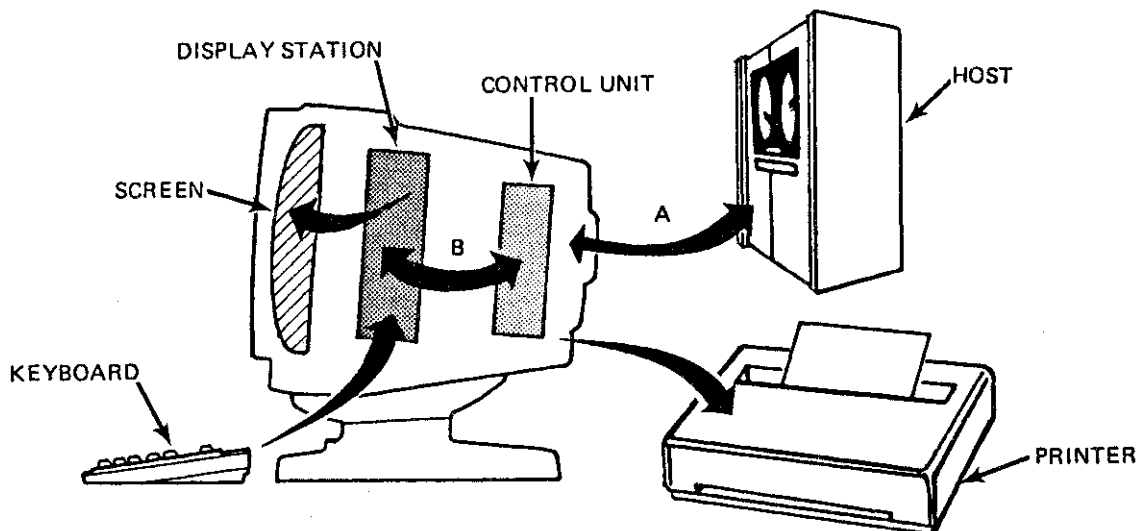


Figure 3-8
ATL-3270 Internal Communications

3.3.1 Control Unit Monitor Mode

Control unit monitor mode displays on the screen all the messages transmitted between the control unit and the host (see A in Figure 3-8). The codes that are transmitted to and from the terminal will be displayed on the screen as two-digit Hex codes. The messages received from the host will be displayed in normal video, while the messages transmitted from the terminal to the host will appear on the screen in reverse video.

NOTE: All SNA and BSC messages contain synchronization, check, and termination characters. These characters are not displayed in monitor mode.

When the Multistation uses either SNA or BSC (Bisync) protocol, all messages on the communications line, including those of other control units, will be displayed. Text messages for the other control units will be truncated, so only the first five characters (control information) of the message will be displayed. Truncated messages will be identified by the # symbol at the beginning of the message.

Control Unit Monitor Mode must be enabled through TCM (see Section 5 - Control Unit Monitor Mode). After the selection has been made in TCM, press the TEST key to enter control unit monitor mode. The word MONITOR will be displayed in reverse video in columns 73 to 80 of the status line. Press the TEST key again to exit control unit monitor mode.

NOTE: If the TCM selection is not enabled, the TEST key will cause the terminal to beep.

Monitor mode does not interfere with information going to and from the host, but input from the display station to the control unit is inhibited. All program attention keys can be used, but data cannot be entered into the display. Monitor mode does not interfere with the processing of data received from the host. That information is processed in the normal manner, but is saved in the display buffer until you exit monitor mode. When you exit monitor mode, the display buffer will automatically update the screen.

If the terminal receives a message error while in monitor mode, the message will be preceded by an asterisk (*). To temporarily stop messages from being displayed, press

ALT S

Press any key to resume display.

NOTE: Any messages transmitted or received while the display is stopped will not be displayed.

3.3.2 Display Station Monitor Mode

Display Station Monitor Mode displays all the messages sent between the control unit and the display station (see B in Figure 3-8). The alphameric characters are displayed as normal on the screen, while the nondisplayable characters are represented by two small characters displayed within the normal character cell.

You can enter Display Station Monitor Mode by pressing

ALT ESC :

When you enter display station monitor mode, the word MONITOR will appear on the status line and blink. This mode may be exited by pressing

ALT ESC *

NOTE: The ESC (Escape) key is the blank key located between the ATTN and CURSR BLINK keys.

SECTION 4

STATUS LINE SYMBOLS

4.1 OVERVIEW

The status line (operator information area) is located at the bottom of the screen on line 25. The status line remains on the screen at all times and is unaffected by normal screen commands such as CLEAR and ERASE EOF. The status line is inaccessible to the operator and is separated from the text screen by a solid line.

The status line uses a variety of symbols to give information about your communications status with the host computer and the operational status of the terminal. The status line is divided into the six areas shown in Figure 4-1.

<u>System Connection Status</u>		<u>Do Not Enter Warnings</u>		<u>Reminders</u>		<u>Shift Status</u>		<u>Printer Status</u>		<u>Monitor Mode Status</u>	
<u>1</u>	<u>6</u>	<u>9</u>	<u>17</u>	<u>21</u>	<u>27</u>	<u>37</u>	<u>41</u>	<u>60</u>	<u>64</u>	<u>73</u>	<u>80</u>

Figure 4-1
Status Line Areas and Column Assignments

NOTE: The descriptions of the status line symbols that follow assume that the terminal is being used to emulate the IBM 3276 and that you are using either BSC or SNA communications protocol. If your terminal is connected to any other system, consult with your systems operator for the exact meaning of the status symbols.

NOTE: Because many users of the Beehive ATL-3270 have had prior experience with IBM equipment, an effort has been made to use IBM terminology whenever possible.

4.2 SYSTEM CONNECTION STATUS

4.2.1 ■ READY

A ■ symbol in column one signals that the selftest has been completed and that the ATL-3270 is ready.

4.2.2 A ONLINE A (BSC) B ONLINE B (SNA)

After the status line displays the READY signal, the host will display the ONLINE symbol in column two. The ONLINE symbol tells you which rules (A or B) are in operation on your system. The meaning of certain keys (ATTN) and status line symbols are determined by the set of rules used by the host.

The A symbol means that the terminal is being governed by BSC (Binary Synchronous Communication) protocol. The A may occasionally appear to blink or momentarily disappear during normal operations.

The B appears when the terminal is operating under SNA (Systems Network Architecture) protocol.

NOTE: Both ONLINE A and B are turned off when the TEST key is used.

4.2.3 ■ MY JOB

The MY JOB symbol ■ is displayed in column three when your terminal is connected to the host's application program. When you are using SNA protocol, two other symbols may appear in the third column: SYSTEM OPERATOR and UNOWNED.

4.2.4 ■ SYSTEM OPERATOR

The SYSTEM OPERATOR symbol ■ will only appear if your system is using SNA protocol. This symbol means that the screen is being controlled by the system service control point (SSCP). When this symbol is on the screen, the program attention keys (except the ENTER key) will not function.

4.2.5 ■ UNOWNED

UNOWNED ■ , an SNA-protocol-related symbol, tells you that the terminal is connected to the system, but not to the system service control point (SSCP) or the application program. To log on, press the SYS REQ key.

4.3 DO NOT ENTER WARNINGS

This section includes all the warning messages that appear in columns nine through 17. In all instances, a block X (X) meaning Do Not Enter Data will appear in column nine. The X will be followed by a variety of symbols, which are explained below. When the X appears, most of the keyboard will be disabled and the keyboard click option (see Figure 3-7 - Click) will be temporarily toggled.

The keys not affected by the Do Not Enter Warnings are ALT CURSR, ATTN, CURSR BLINK, DEV CNCL, RESET, SYS REQ, CLICK, and SHIFT. The RESET key will restore the keyboard unless one of the printer symbols or the TIME symbol is displayed (see Section 4 - Printer Status or Section 4 - Time).

Although the keyboard is disabled, under certain conditions it is possible to send a limited number of keyboard commands to the host for processing. You can send up to two keystrokes when sending data from the display buffer to the printer buffer via a BSC copy command.

NOTE: The keystrokes will not be accepted if you exceed the queue capacity of the host. If the keystrokes are discarded, a WHAT symbol (X?+) will be displayed.

4.3.1 X⊙ TIME

A small clock (X⊙) is used by the host to indicate that time is needed to complete a processing function. The TIME symbol may appear for a variety of reasons, including line protocol requirements, operations dealing with printers and printer authorization matrices, or operations specific to the programs you are using. The TIME symbol also appears in association with the SNA and BSC protocols.

4.3.2 XSYSTEM SYSTEM LOCK

If you see this message after entering data, the operating system has locked your keyboard. If, after a short period of time, an explanation does not appear on the status line, press the RESET key to unlock the keyboard.

If you are using SNA protocol, the appearance of the SYSTEM message means that the host has responded to your previous input and is available for additional input.

4.3.3 Xⁿnn MACHINE CHECK

Check your terminal to see if it is operating correctly. This symbol tells you that the terminal has determined that it is not working properly. The n's stand for numbers that will appear on your status line. Press the RESET key and control of the keyboard will be returned to you.

If the problem continues, consult with your systems operator.

4.3.4 X^znn COMMUNICATION CHECK

An X^znn represents a problem in the communications link between your terminal and the host. The terminal cannot send data to the host. To correct this problem, press the RESET, or TEST key. If you are using SNA protocol, you may also press the SYS REQ key.

If the problem continues, consult with your systems operator.

4.3.5 X^{PROG}nn PROGRAM CHECK

You have a programming error in the data that is being sent to you by the host program. Press RESET to regain control of your keyboard.

If this warning continues to appear, notify your systems operator.

4.3.6 X?⁺ WHAT?

The last keyboard input was not understood by the control unit. This problem could have been caused by several factors including:

You pressed the ATTN or SYS REQ key during a TIME (X^o) condition.

You typed in information when a TIME, PRINTER BUSY or PRINTER NOT WORKING message was displayed on the status line.

The host was told to perform two functions at the same time.


Sometimes you can not easily identify the nature of the problem. As a general practice, if you used an ALT or SHIFT before the WHAT? message appeared, go back and press the ALT or SHIFT key again. After toggling these keys, press the RESET key and enter the data again.


If you have attempted to send an ATTN or SYS REQ command after resetting, you may have to press the ATTN or the SYS REQ key repeatedly before the system will accept the command.

4.3.7 X-f MINUS FUNCTION


A MINUS FUNCTION symbol signifies that you have requested a function that is not available on your system. To enable the keyboard, press RESET. Some of the commands that will cause a MINUS FUNCTION symbol to be displayed are discussed below.


ONLINE A (BSC) - If the MINUS FUNCTION appears in the status line while in BSC, it means that the function you selected is permanently unavailable. This does not apply to the SYS REQ command.

ONLINE B (SNA) - If the SYSTEM OPERATOR symbol () or UNOWNED character (?) are displayed, you may not use the program attention, PROGRAM ACCESS, ATTN, or CURSR SEL keys. The ENTER key should not be used when the UNOWNED symbol is present.

If you are ONLINE B and the message  appears, the function you have requested is temporarily unavailable. Press RESET to enable the keyboard, and resubmit your request.

4.3.8 X PRINTER NOT WORKING

If the PRINTER NOT WORKING symbol is displayed after you press the  key, press DEV CNCL to restore the keyboard and remove the PRINTER NOT WORKING symbol from the status line.

If the PRINTER FAILURE () symbol is simultaneously displayed in the printer status section, the printer stopped before the previous print request was completed.

NOTE: The PRINTER NOT WORKING symbol may appear on your status line before the printer actually stops working. This means that the printer has stopped accepting data from the terminal, but will finish printing the information that is currently in its memory buffer.

4.3.9 X PRINTER BUSY

The printer is busy. If you do not wish to wait, press DEV CNCL to restore the keyboard and cancel the print request. If you choose to wait, your document will be printed as soon as the printer becomes available.

4.3.10 X PRINTER VERY BUSY

The PRINTER VERY BUSY symbol has the same meaning as PRINTER BUSY, except that it will take more time. If you do not wish to wait, press DEV CNCL to restore the keyboard and cancel the print request. If you choose to wait, your document will be printed as soon as the printer becomes available.

4.3.11 X*X OPERATOR UNAUTHORIZED

Access to the printers connected to your system can be restricted by the host. If you attempt to access a printer that you are not authorized to use, the OPERATOR UNAUTHORIZED symbol will appear on the status line. Press RESET to enable the keyboard.

4.3.12 X+!+ GO ELSEWHERE

The GO ELSEWHERE symbol is displayed if you try to perform an illegal function. The symbol will appear if you attempt to alter or enter data into a protected field or try to use the CURSR SEL key outside a selection field (see Section 3 - Protected fields).

4.3.13 X!> MORE THAN

The MORE THAN symbol means that you have tried to put too much information into an unprotected field. An unprotected field (see Section 3 - Protected fields) is assigned a specific number of spaces by the program. If you fill the allocated space, the MORE THAN symbol will appear and the keyboard will be disabled. Press RESET to restore the keyboard and retype your entry.

4.3.14 X!NUM NUMERIC ONLY

If you try to input non-numeric characters into a numeric field, the NUMERIC ONLY symbol will be displayed (see Section 3 - Numeric fields). Press RESET to restore the keyboard and retype your entry.

4.3.15 X!#? WHAT NUMBER

The WHAT NUMBER symbol is displayed if you enter an incorrect number in response to an inquiry from the host. This most commonly appears when you type in an incorrect number or character in response to a printer ID request. This symbol will also appear if you make an unacceptable entry in the test mode. Press RESET to enable the keyboard and retype your entry.

4.3.16 X-s MINUS

The MINUS symbol means that you have entered a keyboard character that is not recognized by the host. Press RESET to restore the keyboard.

4.3.17 X← MESSAGE RECEIVED AND REJECTED

You will see the X← symbol when the host program has attempted to send a message that was not understood by your terminal. Press RESET to restore the keyboard.

4.4 REMINDERS

4.4.1 ↔ COMMUNICATION

The COMMUNICATION reminder will appear in columns 21 to 27. This symbol means that there are problems in the communications lines connecting you to the host. If you continue to communicate with the host, there is a possibility that data will be lost in transmission. The number following the symbol is an error code (consult with your systems operator). This message will remain on the screen until the communications lines have been reestablished.

4.5 SHIFT STATUS

4.5.1 ↑ SHIFT

The SHIFT symbol (↑) in the shift status section (columns 37 to 41) is displayed when you use the SHIFT or SHIFT LOCK key. All the alphameric characters you type on the keyboard will be displayed in uppercase. This symbol is generated by the terminal and can be displayed even when you are not connected to the host.

4.5.2 ^ INSERT

The INSERT symbol appears on the status line after you enter the insert mode by pressing the INSERT key (^). See Figure 3-7 - Insert Key.

4.5.3 NUM NUMERIC FIELD

The NUMERIC FIELD symbol appears on the status line as a reminder that the cursor is in a numeric field (see Section 3 - Numeric Fields). Only the numeric characters 0 to 9, DUP, the minus sign (-), and the decimal point (.) may be entered into a numeric field. If you attempt to enter non-numeric characters into the field, the NUMERIC ONLY symbol will appear in the status line (see Section 4 - Numeric Only).

NOTE: Alpha characters can be entered into numeric fields. Hold the SHIFT key down to enter alpha characters into the field.

4.6 PRINTER STATUS

4.6.1 □-□nn PRINTER ASSIGNMENT

The PRINTER ASSIGNMENT symbol is used to identify the printer that you are authorized to use. You can select the device number of your printer through TCM (see Section 2 - Control Unit Printer Device Number).

NOTE: If there is no symbol or number displayed in this section, you do not have a printer assigned to you.

4.6.2 □-■nn PRINTER PRINTING

Your assigned printer is printing your job. The two numbers following the symbol identify the printer.

4.6.3 □-■nn PRINTER FAILURE

This symbol in the status line means that your printer failed while printing your job (see Section 4 - Printer Not Working).

4.7 MONITOR MODE STATUS

If the word MONITOR is displayed in reverse video, the ATL-3270 is in control unit monitor mode (see Section 3 - Control Unit Monitor Mode). If the word MONITOR is blinking, the terminal is in display station monitor mode (see Section 3 - Display Station Monitor Mode). In normal operation, the monitor mode status line remains blank.

NOTE: The display station selftest errors are displayed in the monitor mode section of the status line. See Section 2 - Terminal Selftest.

SECTION 5

TERMINAL CONFIGURATION MANAGER

5.1 OVERVIEW

There are no switches on the Multistation terminal. In order to configure screen and keyboard settings, communications protocols, and other installation settings, the Multistation is equipped with the Terminal Configuration Manager* (TCM). TCM is a menu-driven program which allows you (or a host computer) to set the terminal's parameters to meet your operating needs and the installation requirements of the host system.

The TCM default settings are stored in ROM (Read Only Memory). As you change the default settings, the changes are stored in NVRAM (Non-Volatile Random Access Memory); this means that your changes will be saved, even when the terminal is turned off. Each time the terminal is turned on, TCM is copied from NVRAM into RAM (Random Access Memory), thus restoring your TCM selections.

NOTE: Most TCM parameter selections become active as soon as they are selected. The control unit selections become active after you exit TCM.

5.1.1 Entering and Exiting TCM

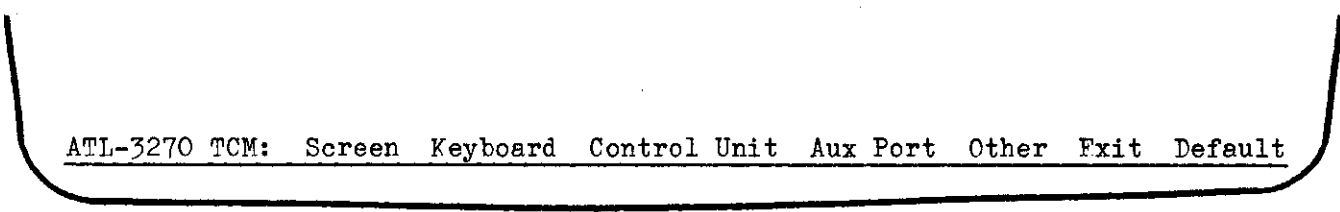
You may enter TCM by simultaneously pressing and holding down the left SHIFT, ALT, and ENTER keys.

left SHIFT ALT ENTER

NOTE: Although the left and right SHIFT keys can be used interchangeably for most functions, only the left SHIFT key can be used to enter TCM.

When you press these keys, the main menu shown in Figure 5-1 appears on the 25th line of the display. The Multistation remains online with the host while you are in TCM.

To exit TCM, move the cursor to Exit and press the ENTER key (see Section 5 - Using TCM for information concerning cursor movement). The terminal will return to system level and the information that was on the screen before you entered TCM will be restored. Any additional messages received from the host while you were in TCM will also be displayed on the screen.



```
ATL-3270 TCM:  Screen  Keyboard  Control Unit  Aux Port  Other  Exit  Default
```

Figure 5-1
TCM Main Menu

* TCM is a registered trademark of Beehive International.

5.1.2 Using TCM

When you first enter TCM, the cursor (as shown in Figure 5-1) will be positioned over the "T" in TCM. Using the cursor movement keys listed in Table 5-1, you may move the cursor to any of the menu headings (Screen, Keyboard, Control Unit, etc.). As in all menu-driven systems, these headings may lead to additional submenus. A menu tree of all the TCM-selectable items is presented in Table 5-3.

Making your way around the various submenus is relatively simple. The horizontal cursor movement keys (left and right) are used to select the menu headings, while the vertical cursor movement keys (up and down) are used to access the submenus under those headings. For example, with the cursor over the T in TCM, pressing the CURSOR RIGHT key twice will move the cursor to the Keyboard menu heading. With the cursor over the K in Keyboard, pressing the CURSOR DOWN key twice will move the cursor to the Keyboard Bell/Click Volume submenu. To exit from a submenu, press the HOME key or hold down either the CURSOR UP or CURSOR DOWN key until you return to your entry point. Table 5-1 describes the cursor movement keys and their respective functions.

NOTE: You don't necessarily have to progress through a submenu in the correct order. If you hold down a cursor key, you will pass through every submenu and eventually return to your original location. This makes it possible to take the back door into a submenu.






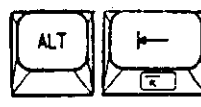
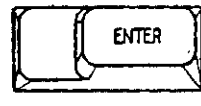



5.1.3 Changing Parameter Settings

As you enter each submenu, you will see that a default parameter selection (highlighted in reverse video) has already been entered. Unless changed, this default parameter setting will be loaded into the terminal's memory each time you turn on the terminal.

To change the default parameters, use the CURSOR RIGHT or CURSOR LEFT key to place the cursor over the new selection and then press the ENTER key. The reverse video block will move to the new selection and will be placed in the terminal's memory.

NOTE: The TCM default parameters are printed in bold letters in Table 5-3.

Table 5-1
TCM Key Functions

	<u>Key</u>	<u>Function</u>
left		Enter TCM
		Move to the next selection on the right.
		Move to the next selection on the left.
		Move to the next submenu.
		Move to the previous submenu.
		Return to the Main Menu or exit selection.
		Select the current item.
		Clear Text Entry (when in a text selection).
		Insert Text (when in a text entry area).
		Delete Text (when in a text entry area).

All others keys sound a bell.

5.1.4 Operator and Installation TCM

TCM can be divided into two parts, Operator TCM and Installation TCM. Operator TCM controls the Screen and Keyboard functions. These are the settings that can be changed to meet the operator's individual preferences (cursor blink, screen intensity, click volume, etc.).

Installation TCM controls the settings used for the communications ports (Control Unit, Aux Port, Other, and Default). Generally, these settings are made at the time you install the terminal and are seldom changed again.

5.1.5 Password Protecting TCM

To protect the communications settings from accidentally being changed, installation TCM can be password protected. Password protection restricts access to installation TCM parameters so that only those people knowing the password can change the settings (see Section 5 - Operator and Installation TCM.)

To restrict access to installation TCM, go to the TCM password submenu (see Table 5-3). The password submenu looks like this:

```
TCM Password Required: NO YES TEXT< >
```

Place the cursor over YES and press ENTER. After the YES block is highlighted, use the CURSOR RIGHT key to move the cursor to the first underlined space between the two brackets. The password can be from one to four characters long. Type in the password, press ENTER and installation settings will be password protected as soon as you exit TCM.

To access installation TCM, place the cursor over any installation TCM heading (Control Unit, Aux Port, Other, or Default) and press ENTER. The following message will appear.

```
ATL-3270 TCM Password Required: TEXT [ ]
```

Type in the password and press ENTER. You will have complete access to all TCM submenus.

NOTE: There is way to enter password protected TCM without using the password. For specific instructions, see the Maintenance Manual or call Beehive International's Technical Support Department at (801) 355-6000.

5.2 MULTISTATION TCM - SCREEN5.2.1 Screen Block Cursor: YES NO

YES = Block NO = Underline This menu choice allows you to change the shape of the cursor. See Figure 3-4 - ALT CURSR.

5.2.2 Screen Cursor Blink: YES NO

YES = Blink NO = No Blink You can switch the cursor between blinking and nonblinking. See Figure 3-7 - CURSR BLINK.

5.2.3 Screen Half-Intensity: NO YES

YES = Half-Intensity NO = Full Intensity This option adjusts the brightness of the display.

5.2.4 Screen Reverse Video: NO YES

NO = Normal YES = Reverse The character versus background default is light letters on a dark background. This option allows you to make the background light, and the characters dark (reverse video).

5.2.5 Screen Saver: NO YES

NO = Disabled YES = Enabled See Section 1 - Screen.

5.3 KEYBOARD5.3.1 Keyboard Click: NO YES

NO = Silent YES = Click See Figure 3-7 - Click Key.

5.3.2 Keyboard Bell/Click Volume: LOW HIGH

Use this option to select the volume of the bell and click sounds.

5.3.3 Keyboard Lowercase Inhibit: NO YES

NO = Upper and lowercase YES = Uppercase only If you inhibit lowercase (YES), all the alpha characters will be capitalized. NO means the characters you type on the screen will be in uppercase and lowercase.

5.3.4 Keyboard Auto Repeat Rate (Keys/Second): 7.5 8.5 10 12 15 20 30 60

These choices represent the number of times per second you want your typamatic keys to repeat when you hold them down.

Not all the keys on the Multistation keyboard will repeat. See Figure 3-4 for a list of those keys that will not repeat.

5.3.5 Keyboard Hold Down Delay (Seconds): .25 .50 .60 .80 1.0 1.2 1.4 1.6

This determines how long a key must be held down before it starts repeating (see the previous command).

5.4 CONTROL UNIT5.4.1 Control Unit Host Port Connected to Modem: NO YES

YES = Connected to a modem NO = Not connected to a modem

NO = DCE YES = DTE This option must match the header configuration (see Section 2 - Configuration Headers).

5.4.2 Control Unit Tx/Rx Host Port Baud Rate: 1200 2400 4800 9600 192005.4.3 Control Unit Host Line Configuration: Half Duplex Full Duplex

These options will only be displayed if the host port is not connected to a modem. Consult with your systems operator in order to determine the correct configuration for your system.

5.4.4 Control Unit Host Port NRZI: NO YES

NO = Disabled YES = Enabled Non-return to zero-inverted (NRZI) is available if required by your system (SNA only).

5.4.5 Control Unit Host Port Address: <HEX 40>

Check with your systems operator to determine the correct address for your system.

5.4.6 Control Unit Monitor Mode: NO YES

NO = Disabled YES = Enabled When enabled, this option will allow access to monitor mode(see Section 3 - Monitor Mode).

5.4.7 Control Unit Device (1-7): TERMINAL PRINTER

There are eight logical devices. The built-in terminal is permanently assigned as logical device #0. The remaining seven logical devices can be assigned to either terminals or printers. Every device on the system, including printers using printer port sharing, must be assigned a device number.

5.4.8 Control Unit Device (1-7) Port No.: NONE 1 2 3 4

Only one device, terminal or printer, may be assigned to a port. Since there are only four ports and seven devices, at least three devices must be assigned a port of NONE. The three unassigned devices can only be used as port shared printers. (See Section 2 - Printer Port Sharing).

If the device number is not being using used, select NONE.

5.4.9 Control Unit Port (1-4) Connected to Modem: NO YES

YES = (DTE) Connected to a modem NO = (DCE) Not connected to a modem
This option must match the header configuration (See Section 2 - Configuration Headers.)

5.4.10 Control Unit Port (1-4) Baud Rate: 150 300 600 1200 2400 4800 9600 19200

Select the baud rate compatible with your equipment.

5.4.11 Control Unit Port (1-4) Device Detection: NO YES

YES = Check for a device on the port NO = Don't check for a device
When YES is selected, the Multistation will detect whether or not a locally attached device or modem is powered up and ready to communicate. For a modem, DSR must be asserted (the modem-modem connection must be intact). For terminals, DTR must be asserted.

When a disconnection occurs, an IR S/S (Intervention Required Status) is posted for that device. This also triggers the message option described below. Reconnection of the device posts a Device End Status (DE S/S).

5.4.12 Control Unit Port (1-4) Parity: EVEN ODD NONE

Select the appropriate parity.

5.4.13 Control Unit Port (1-4) Electrical Interface: RS232 RS422

Select the appropriate interface.

5.4.14 Control Unit Printer Port Sharing Allowed: NO YES

NO = Disable Printer Port Sharing YES = Enable Printer Port Sharing See Section 2 - Printer Port Sharing for additional information.

5.4.15 Control Unit Disconnect on Timeout: NO YES

NO = Do not disconnect YES = Disconnect This security option prevents the user from leaving a dialed-up, active terminal unattended. When this option is enabled (YES), the Multistation disconnects the modem (hangs up) if there has been no keyboard action for five to ten minutes. The Multistation accomplishes this by dropping the DTR line going to the modem. The modem then disconnects and responds by dropping DCD.

If the log-off message option has been enabled (see TCM - Control Unit Standard Logoff Message), then dropping DCD triggers transmission of the log-off message and clears the internal screen buffer of the affected device. Dropping DCD is not required to reenable another dial-up connection. If no other security option is selected, the port will be reactivated when the user dials in again. When the user redials, the Multistation will display the screen as it was prior to the disconnect.

NOTE: The Device Detection option must be enabled.

5.4.16 Control Unit LU Disconnect: NONE INACTIVE UNBOUND

This option is only used with SNA protocol.

NONE- If no other security option is selected, the port will be reactivated when the user dials in again. When the user redials, the Multistation will display the screen as it was prior to the disconnect.

INACTIVE - This option causes a disconnection if a DACTLU (deactivated LU) signal is received.

UNBOUND - This option causes a disconnection if an UNBIND signal is received for the device. The user will not be able to dial in if the LU has not been pre-bound to an application program.

5.4.17 Control Unit Logoff Message Enabled: NO YES

NO = No message YES = Use a message This option sends one or more user-defined message(s) to the host whenever DCD drops from the modem, whether this is caused from accidental disconnect or a disconnect from timeout. An operator calling in after disconnect will have to completely re-log in. The messages to the host can be entered through TCM, see TCM - Control Unit Logoff.

5.4.18 Control Unit Async Host Port Available: NO YES

NO = Asynchronous Host Port is not available

YES = Asynchronous Host Port is available

Control Unit port #4 is the only asynchronous port that can be used as a host port. Select YES if port #4 is used as an asynchronous host port. See Section 1 - Asynchronous Host Port for additional information.

5.4.19 Control Unit Type: 3274 3276

This command is used with the XID address and does not affect the operation of the controller. will continue to appear on the status line. Selecting 3274 changes the seventh digit in the XID address to a 7. Selecting the 3276 option sets the seventh digit in the XID address to an 8.

5.4.20 Control Unit XID Address: HEX <00000>

The XID (eXchange IDentification) is a series of bits which the host can request from the controller to assist in determining the basic security level of a given cluster. The XID consists of both fixed and variable bits. The current Multistation comes with an XID address of:

020001800000

The last five digits of the address can be set to any hex value through this option. The seventh digit can be changed to the number 7 by selecting the 3274 option under Control Unit Type in TCM.

NOTE: This code system is only used with systems that operate under SNA protocol and use dial-up phone lines.

5.4.21 Control Unit Logoff: HEX < >

Enter the logoff message(s) to the host between the two markers. There is space provided for 125 Hex pairs.

NOTE: There is only space in the status line to display 16 hex pairs (with intervening spaces) at a time. As the hex pairs are enter on the right, the displayed characters will scroll to the left.

5.4.22 Control Unit Auto Disconnect Message: TEXT < >

The message you type in will be displayed on the user's screen when the terminal is disconnected. Type in the message between the two markers. There are 21 spaces.

5.4.23 Control Unit Timeout Disconnect Message: TEXT <

The message you type into this space will be displayed on the user's screen after a timeout disconnect (see TCM Description - Control Unit Timeout Disconnect). Type in the message between the two markers. There are 21 spaces.

5.5 AUX PORT5.5.1 Aux Port Baud Rate: 150 300 600 1200 2400 4800 9600 192005.5.2 Aux Port Word Length: 7-BITS 8-BITS5.5.3 Aux Port Parity: EVEN SPACE ODD MARK NONE5.5.4 Aux Port Stop Bits: 1 1.5 25.5.5 Aux Port Received Data Error Check: NO YES5.5.6 Aux Port Duplex: HALF FULL

The Auxiliary port is provided so that a serial (RS232) printer can be connected to the terminal. The Aux port can be configured to communicate with almost any standard printer. Check the operator's manual that came with the printer or contact your systems operator to determine the exact configuration needed for your equipment.

5.5.7 Aux Port Protocol: MORE DTR 11-19(READY) 11-19(BUSY) ETX/ACK XON/XOFF

Aux Port Protocol: ACK/NAK TTY DTR(SINGLE BUFFER TRANSMITTER)

The Aux port protocol gives you eight possible choices. The first five choices are on the first screen. To see the other three choices, select MORE. When you select MORE, the second screen will be displayed. A brief description of the protocol options is presented in Table 5-2. In all cases except DTR (SBT), the transmitted characters are double buffered.

Table 2-6
Aux Port Protocol Description

• DTR	When DTR is used, data transmission out the AUX port is enabled.
• 11/19 Ready	When Pin 11/19 is negated, data transmission is disabled. When Pin 11/19 is asserted, data transmission is enabled.
• 11/19 Busy	When Pin 11/19 is asserted, data transmission is disabled. When Pin 11/19 is negated, data transmission is enabled.
• ETX/ACK	After each block of 78 characters is transmitted, an ETX is transmitted. An ACK is expected for each ETX. If there are two outstanding ETXs which have not been ACKed, the terminal will cease transmission until an ACK is received.
• XON/XOFF	The printer sends XON and XOFF characters to the Aux port to start and stop transmission.
• ACK/NAK	This is identical to XON/XOFF except that ACK is the XON code and NAK is the XOFF code.
• TTY	Each transmission ends with three DEL (ASCII) pad characters.
• DTR (SBT)	This operates in the same way as DTR, except the characters are single buffered for transmission.

5.5.8 Aux Port Transmit Delay: NO YES

NO = Standard transmission rate YES = Transmits a delay See your systems operator.

5.5.9 Aux Port Set Printer Line Density Command (6 LPI): TEXT < >5.5.10 Aux Port Set Printer Line Density Command (8 LPI): TEXT < >

If the line density can be changed, type in the necessary ASCII code in the Text area. A toggle function will not work. Neither DC3 nor DC4 will work with this option.

5.6 OTHER5.6.1 TCM Password Required: NO YES TEXT < >

NO = No Password required YES = Installation TCM will be password protected See Section 5 - TCM Password Protection.

5.6.2 Keyboard Model: ATL-3270 C2 C3 C4

Four keyboard styles are supported by the Multistation. The standard, default keyboard is the Beehive ATL-078 which is described in Section 2 of this manual. The Multistation also supports the IBM 3178 C2, C3, and C4 keyboard configurations. (see Appendix A)

5.6.3 Nationality: US UK AUSTRIAN/GERMAN FRENCH/(AZERTY) ITALIAN SWEDISH

Choose the nationality that corresponds with the keyboard configuration that you are using (see Appendix A).

5.7 EXIT

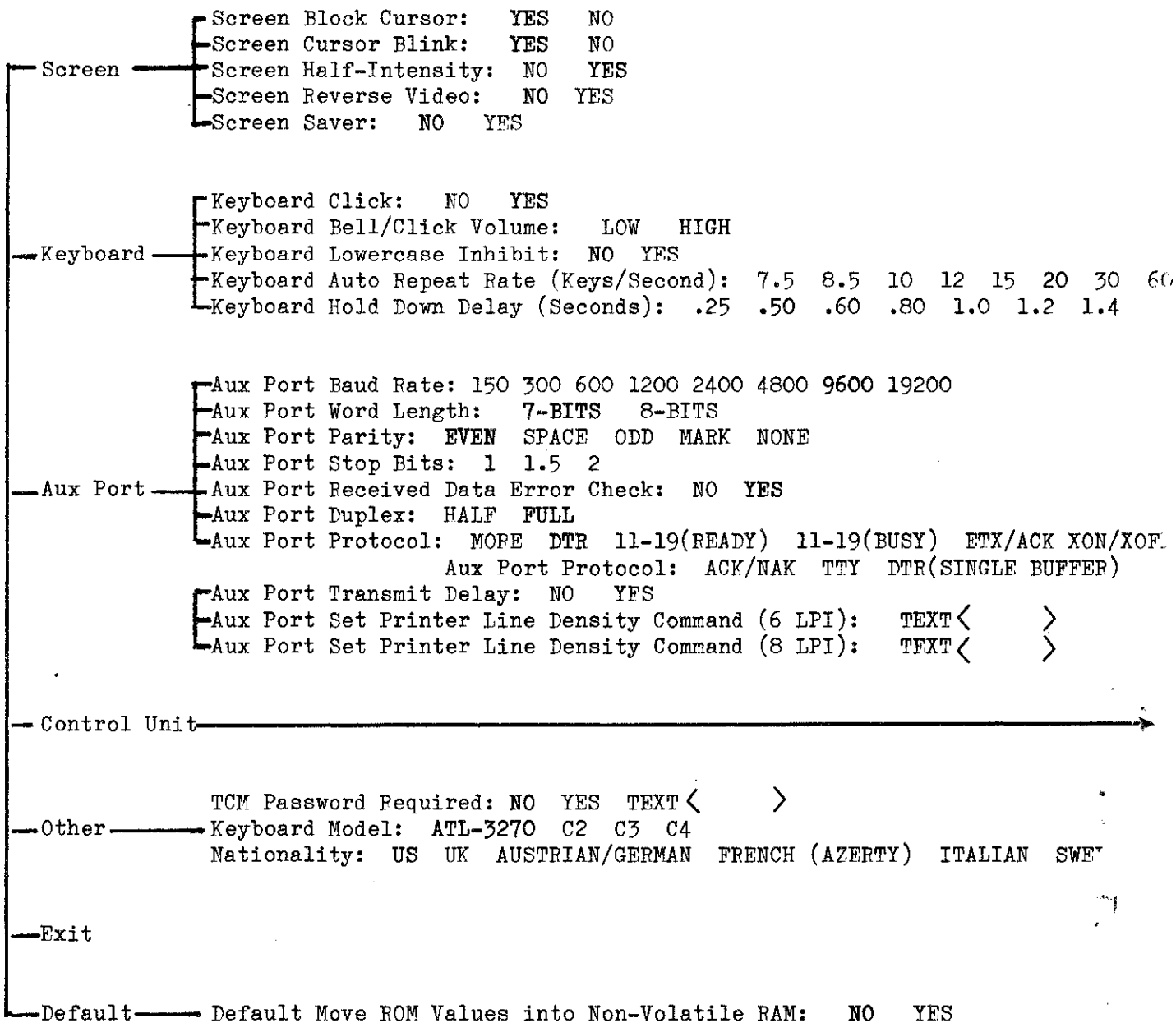
Store the changes in memory (NVRAM) and exit from TCM.

5.8 DEFAULT5.8.1 Default Move ROM Values into Non-Volatile RAM: NO YES

NO = Keep your current TCM settings YES = Reset TCM to factory default Great care should be used before selecting this option. Selecting YES will erase your current TCM settings and cause all of the TCM settings in your terminal to be restored to the factory default parameters described in this manual. The TCM default parameters are shown in bold type on the menu tree.

NOTE: The TCM selections in Non-Volatile RAM will be stored in static RAM.

Table 5-3
TCM Menu Tree and Descriptions



NOTE: The default parameters are shown in bold type.

NOTE: The Control Unit parameters for baud rate, NRZI, and control unit address must be set before host communications have been established.

```

Control Unit Host Port Connected to Modem: NO YES
Control Unit Tx/Rx Host Port Baud Rate: 1200 2400 4800 9600 19200
Control Unit Host Line Configuration: Half Duplex Full Duplex
Control Unit Host Port NRZI: NO YES
Control Unit Host Port Address: HEX <40 >
Control Unit Monitor Mode: NO YES

Control Unit Device 1: TERMINAL PRINTER
Control Unit Device 1 Port No.: NONE 1 2 3 4
Control Unit Device 2: TERMINAL PRINTER
Control Unit Device 2 Port No.: NONE 1 2 3 4
Control Unit Device 3: TERMINAL PRINTER
Control Unit Device 3 Port No.: NONE 1 2 3 4
Control Unit Device 4: TERMINAL PRINTER
Control Unit Device 4 Port No.: NONE 1 2 3 4
Control Unit Device 5: TERMINAL PRINTER
Control Unit Device 5 Port No.: NONE 1 2 3 4
Control Unit Device 6: TERMINAL PRINTER
Control Unit Device 6 Port No.: NONE 1 2 3 4
Control Unit Device 7: TERMINAL PRINTER
Control Unit Device 7 Port No.: NONE 1 2 3 4

Control Unit Port 1 Connected to Modem: NO YES
Control Unit Port 1 Baud Rate: 150 300 600 1200 2400 4800 9600 19200
Control Unit Port 1 Device Detection: NO YES
Control Unit Port 1 Parity: EVEN ODD NONE
Control Unit Port 1 Electrical Interface: RS232 RS422
Control Unit Port 2 Connected to Modem: NO YES
Control Unit Port 2 Baud Rate: 150 300 600 1200 2400 4800 9600 19200
Control Unit Port 2 Device Detection: NO YES
Control Unit Port 2 Parity: EVEN ODD NONE
Control Unit Port 2 Electrical Interface: RS232 RS422
Control Unit Port 3 Connected to Modem: NO YES
Control Unit Port 3 Baud Rate: 150 300 600 1200 2400 4800 9600 19200
Control Unit Port 3 Device Detection: NO YES
Control Unit Port 3 Parity: EVEN ODD NONE
Control Unit Port 3 Electrical Interface: RS232 RS422
Control Unit Port 4 Connected to Modem: NO YES
Control Unit Port 4 Baud Rate: 150 300 600 1200 2400 4800 9600 19200
Control Unit Port 4 Device Detection: NO YES
Control Unit Port 4 Parity: EVEN ODD NONE
Control Unit Port 4 Electrical Interface: RS232 RS422

Control Unit Printer Port Sharing Allowed: NO YES
Control Unit Disconnect on Timeout: NO YES
Control Unit LU Disconnect: NONE INACTIVE UNBOUND
Control Unit Logoff Message Enabled: NO YES
Control Unit Async Host Port Available: NO YES
Control Unit Type: 3274 3276
Control Unit XID Address: HEX <00000 >
Control Unit Logoff: HEX < > >
Control Unit Auto Disconnect Message: TEXT < > >
Control Unit Timeout Disconnect Message: TEXT < > >

```

APPENDIX A

KEYBOARD CONFIGURATIONS

Four different keyboard configurations are supported by the Multistation. The keyboard described in this manual is the ATL-078. The IBM 3178 C2, C3, and C4 keyboard configurations are also supported. The keys that differ from the ATL-078 keyboard are shaded.

In addition to the US configuration, the ATL-078 keyboard can be configured for five other nationalities. Examples of these keyboards can be found in Figures A-5 through A-9.

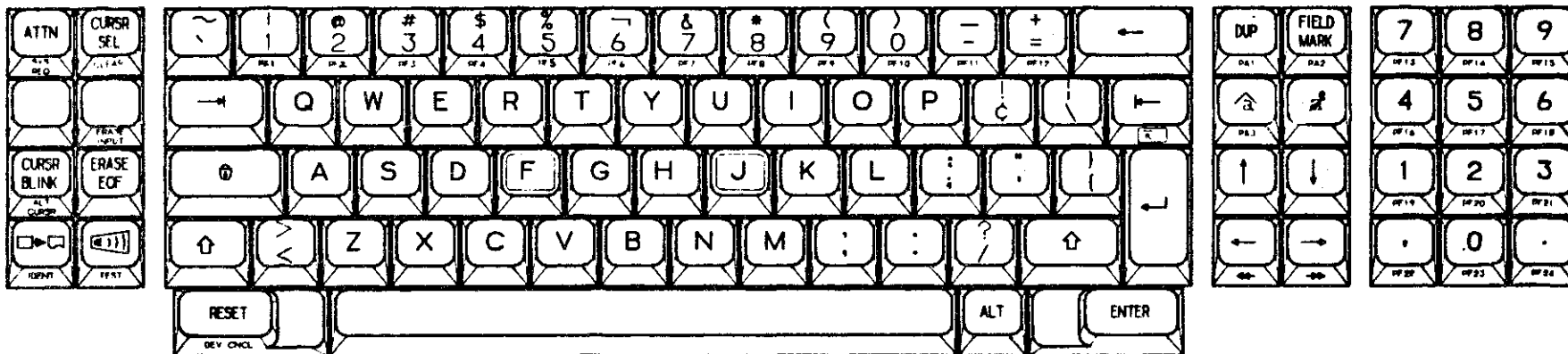


Figure A-1
ATL-078 (C2A) Keyboard Configuration

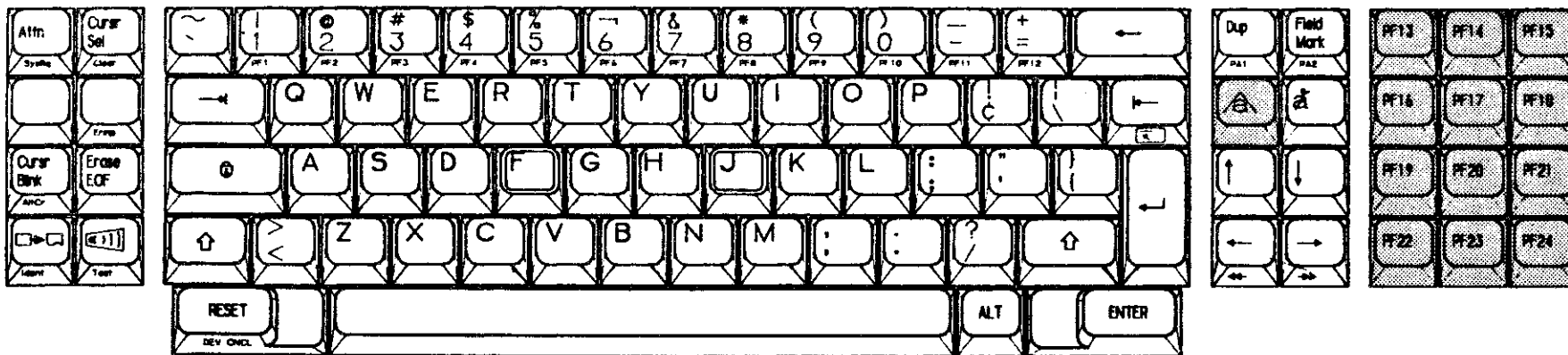


Figure A-2
C2 Keyboard Configuration

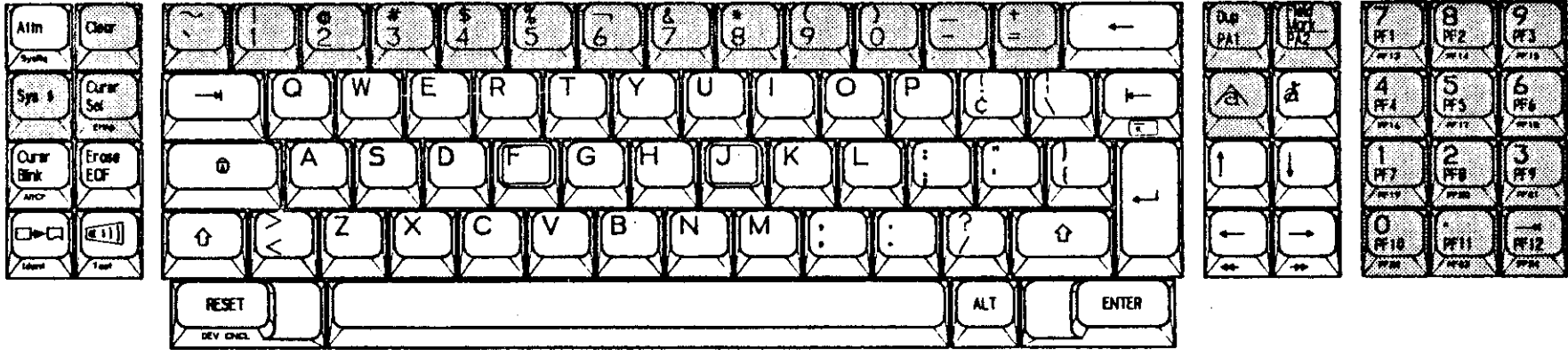


Figure A-3
C3 Keyboard Configuration

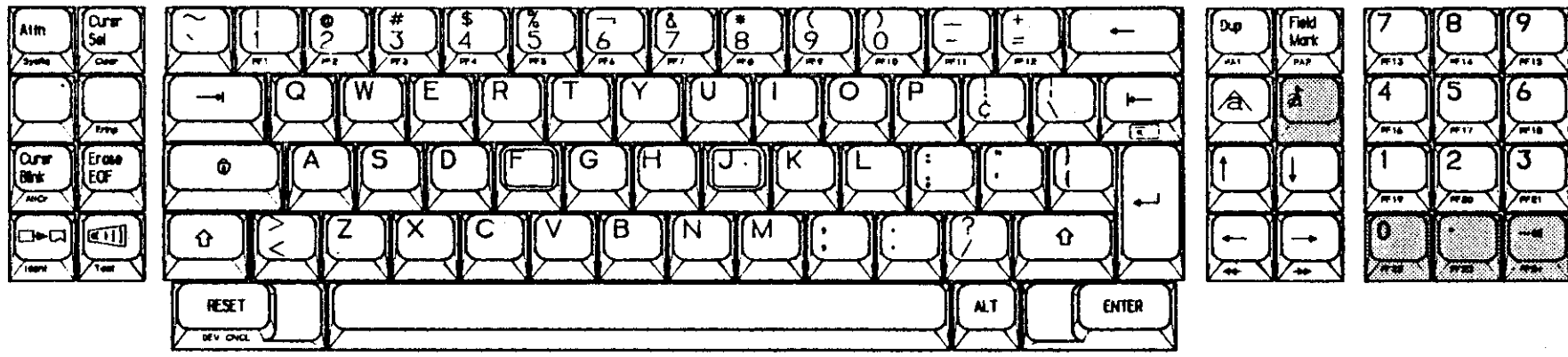


Figure A-4
C4 Keyboard Configuration

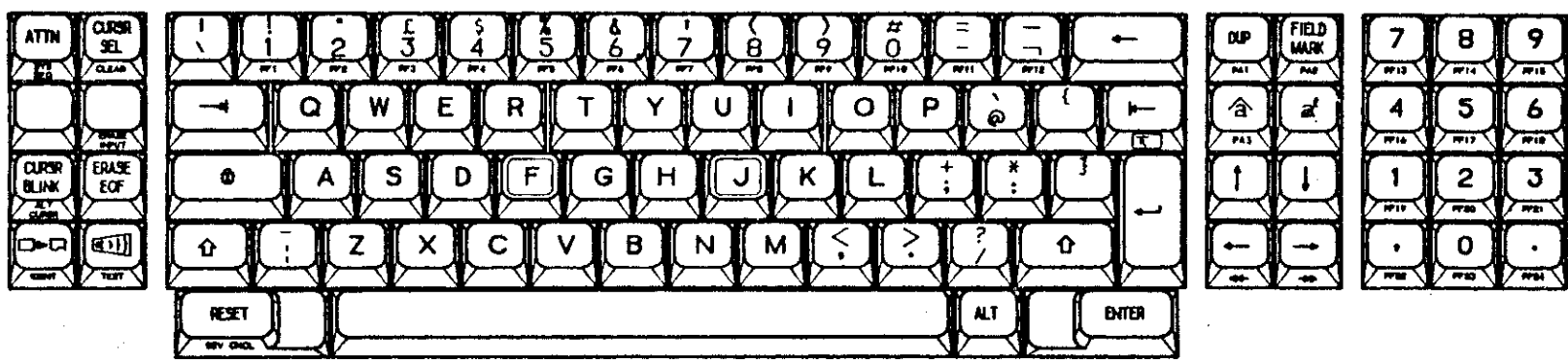


Figure A-5
078-Keyboard UK

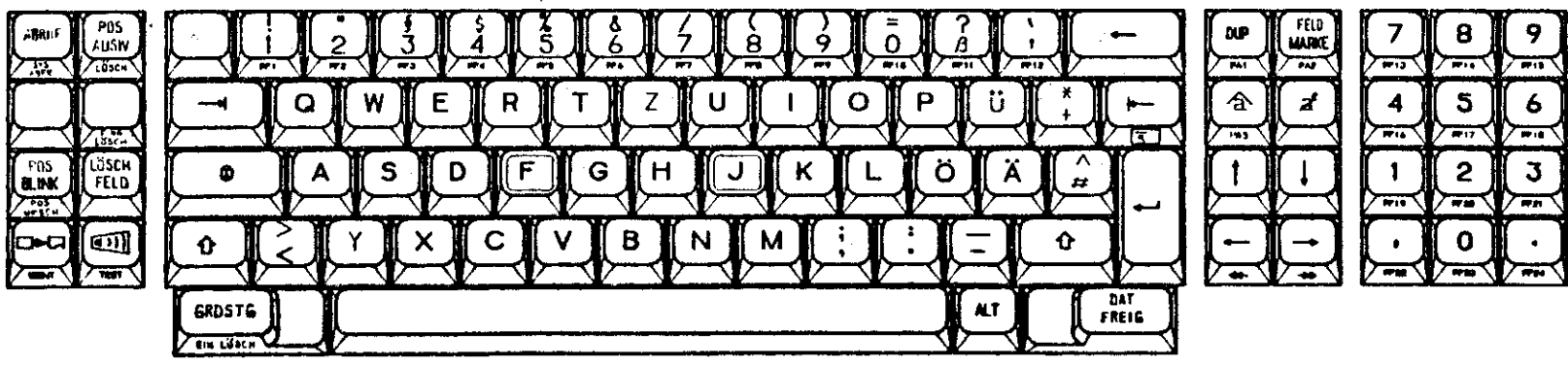


Figure A-6
078-Keyboard Austrian/German

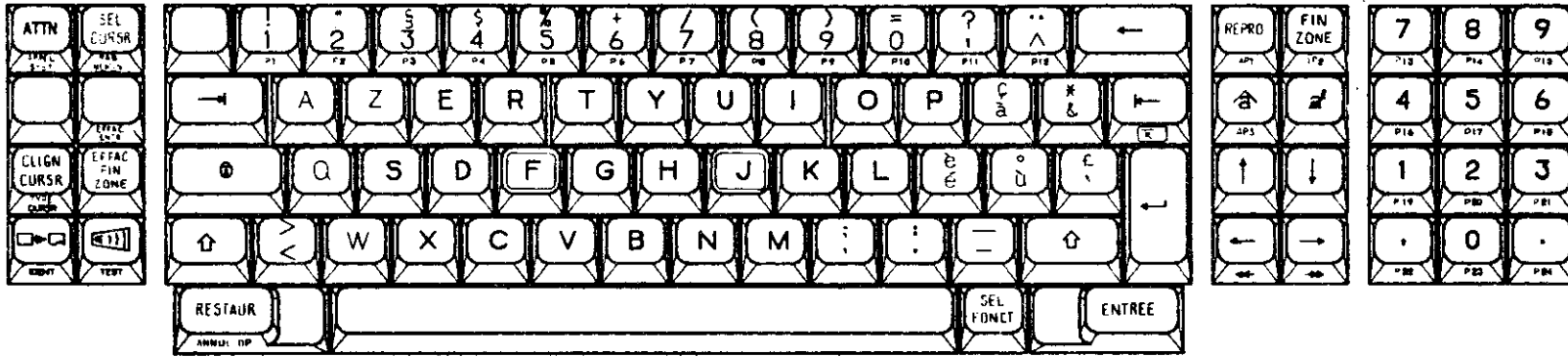


Figure A-7
078-Keyboard French (AZERTY)

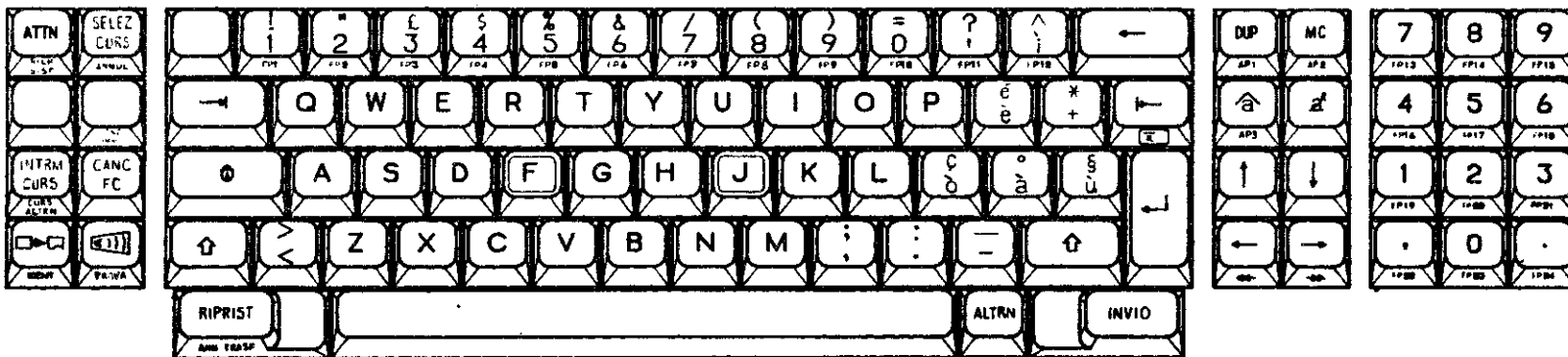


Figure A-8
078-Keyboard Italian

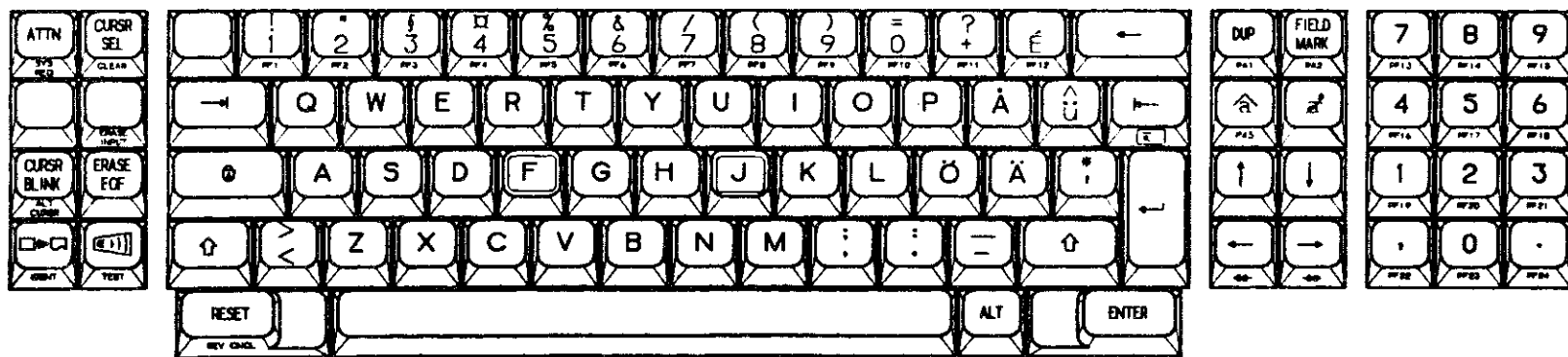


Figure A-9
078-Keyboard Swedish

APPENDIX B

CONTROL UNIT PORT CONFIGURATION HEADERS

CONTROL UNIT PORT CONFIGURATION HEADERS

WARNING: The information contained in this section is not for the user.

CAUTION: The instructions require the removal of the terminal cover, which should only be done by a trained service technician. There is a danger of electrical shock, which is harmful to both you and the Multistation's electronic components.

NOTE: If you have not read Section 2 - Configuration Headers, do so now.

Preparations

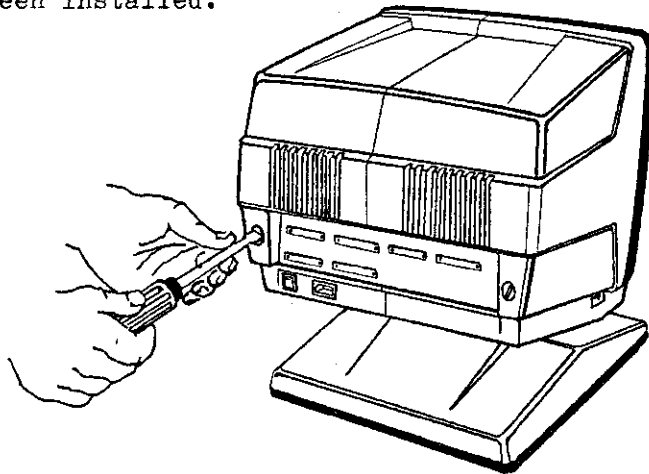
Reconfiguring the Multistation requires the removal of the terminal cover and switching one or more resistor packs to other sockets. The only tool needed for this procedure is a flat-bladed screw driver. Before starting, read this section completely.

Use an antistatic mat to protect sensitive integrated circuits. Effect all repairs in a well-lit work area with enough room to accommodate the terminal and the cover. Tilting the screen can sometimes make the procedure easier.

Removing the Cover

The rear cover must be removed as follows:

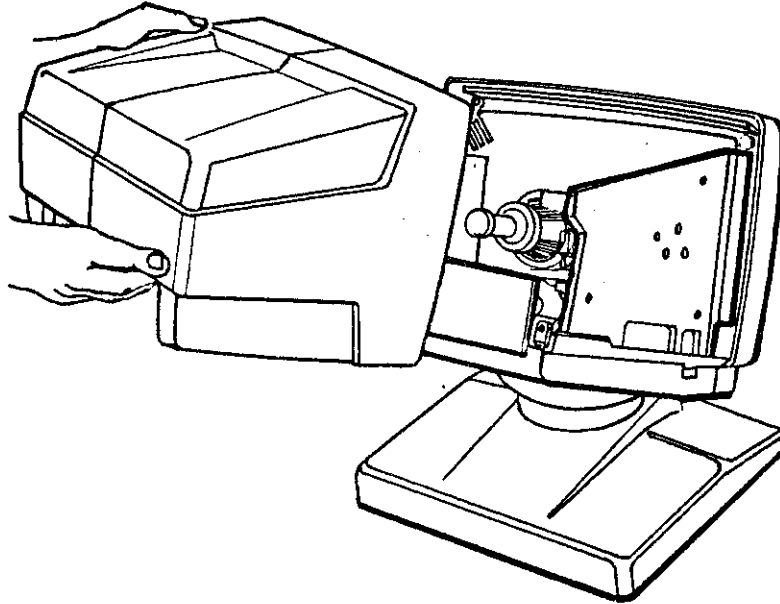
1. Turn the terminal off and remove the power cord from the rear panel. You may also wish to remove the strain relief from the bottom of the terminal if it has been installed.



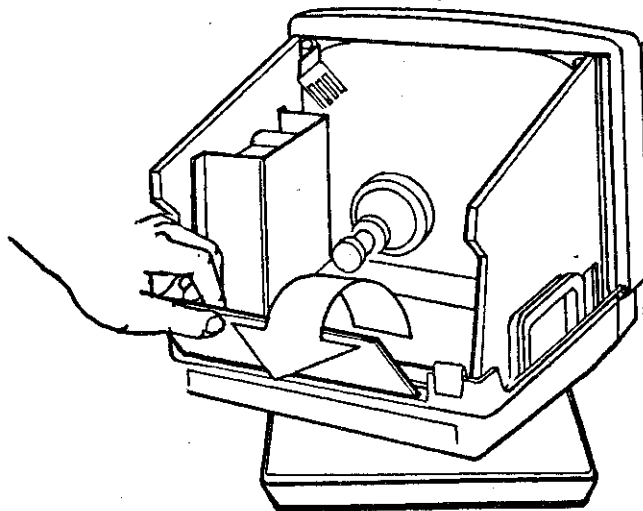
2. Remove the two cover retaining screws with a flat-bladed screwdriver.

- Slide the cover away from the front bezel and take it off of the terminal. ATL covers fit quite tightly, so it may be necessary to use a bit of force to remove the cover.

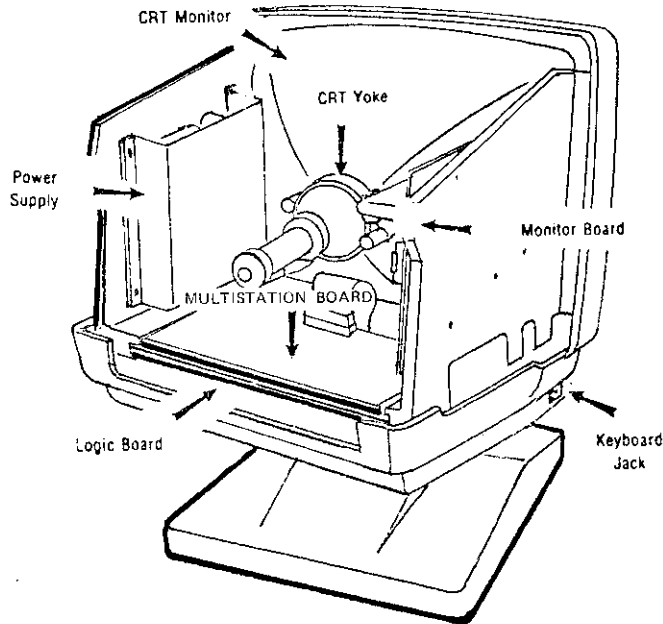
NOTE: Prying with a screwdriver may damage the cover. Your bare hands should suffice.



- Tilt the rear panel as illustrated and lift it out of the groove that it normally occupies. It may usually be left attached by its ground wire.

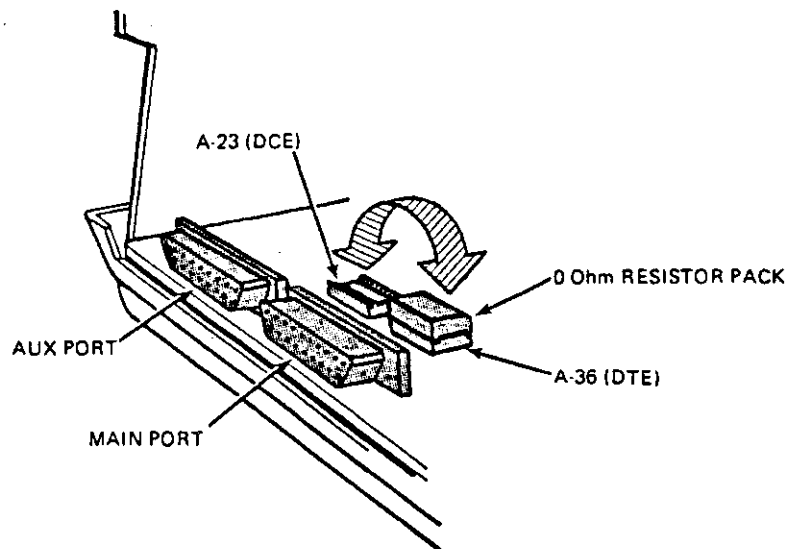


Once the cover is off, the remaining subassemblies of the screen enclosure are readily identified as in this illustration:



Changing the Main Port Configuration Header

The main port communications configuration of the Multistation is determined by the placement of a 0-Ohm resistor pack in one of two sockets on the main logic board. The Multistation is shipped from the factory with the resistor pack in socket A-36 (DTE). To reconfigure the terminal to DCE, carefully remove the resistor pack from socket A-36 and insert it into socket A-23. Refer to the following illustrations to locate the board and sockets.



Changing the Control Unit Configuration Headers

The control unit configuration headers are located on the upper Multistation board. As shown in this figure, the configuration headers are located immediately behind the four control unit ports. The configuration of each port is individually determined by the placement of a 0-Ohm resistor pack. Table B-1 lists the socket locations and other necessary information needed for configuring the four control unit ports.

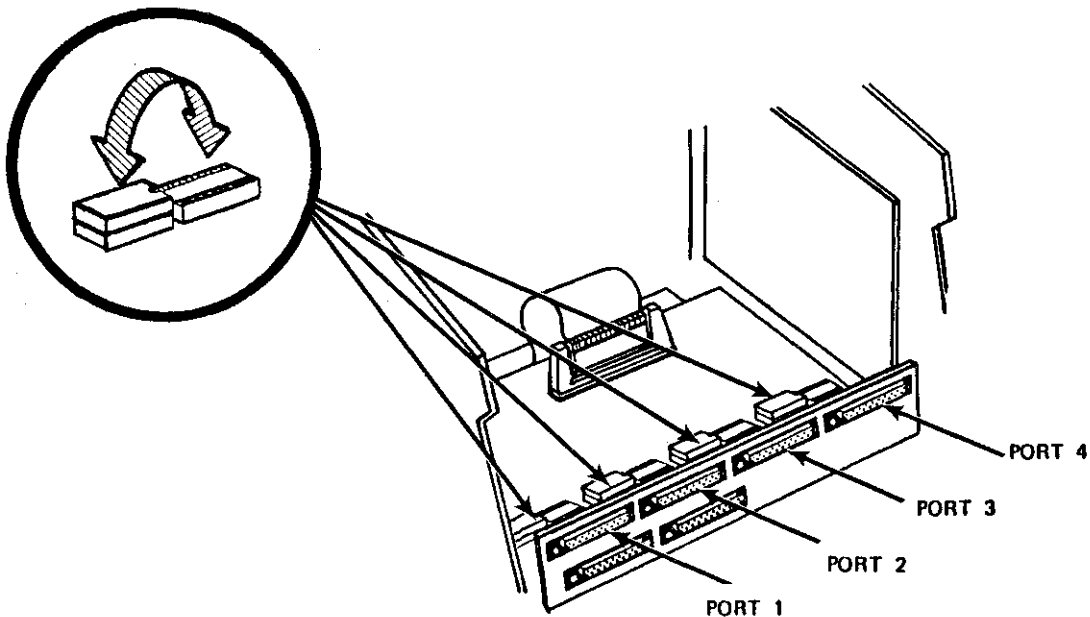


Table B-1
Control Unit Configuration Header Socket Locations

<u>PORT NUMBER</u>	<u>SOCKET LOCATION</u>
Port #1	215 - DTE 214 - DCE
Port #2	212 - DTE 211 - DCE
Port #1	314 - DTE 313 - DCE
Port #2	311 - DTE 316 - DCE

Replacing the Cover

Replacing the cover is the reverse process. The only difficulty that may occur is the proper alignment of the cover with the front bezel. Be sure that they are aligned as you slide the cover back on and you should not have any trouble.

Before replacing the cover, make a final inspection of all wires and cables to be sure that everything is properly connected.

APPENDIX C

SUPPORTED TERMINAL INFORMATION

INTRODUCTION

The following Beehive International products are supported by the Multistation:

DM78
ATL-078
TOPPER
ATL-004 (in VT100 mode)
ATL-008 (in VT100 mode)
DM310 (IBM 3101 Emulation)

In addition, two hardcopy devices (non-Beehive) are supported:

Hardcopy One
Hardcopy Two

This appendix will provide a keyboard map and setup information for each of these terminals.

A keyboard map is a list of 3270-type functions and the corresponding keys or key sequences that are used to emulate them. This information is valuable operator information. The first column is the 3270 function to be performed. The second column lists the keys to use to perform that function. The third column lists the actual hex characters which should then be sent.

The terminal setup information describes what sequences the Multistation can send to the terminal as well as how the terminal should be set up.

NOTE: The default selection of the terminal type may be overridden on a port by port basis by using the Force Select sequence.

"78" DEVICES

<u>Character Selection</u>	I
<u>Selection Name</u>	ATL-078

The following Beehive products are considered to be "78" devices when attached to a Multistation operating in an IBM network:

DM78
ATL-078
TOPPER

These terminals must be operating in 78 mode in order for the following keyboard map and set up table to be applicable.

NOTE:

The following keyboard commands are commonly entered by a "78" device operator when using the Multistation:

ALT F or ESC F (depending on the default terminal type selection) calls up the terminal emulation menu. When the menu is displayed, entering an I selects the ATL-078 emulation.

ALT L redisplayes the contents of the buffer that contains the screen image.

ESC ? calls up the status of the port being used. What is displayed depends upon the protocol configuration of the Multistation (SNA/SDLC or BiSync).

The ATL-078 port that connects to an asynchronous port on the Multistation should be set up as follows:

1. Parity = Odd, Even, or Space
2. Full Duplex
3. The recommended baud rate for a direct connection is 9600. The speed used for a remote connection depends on the modems, but is usually 300 or 1200 baud.

FUNCTION OR CLASS	KEY SEQUENCE	CHARACTER(S) SENT (HEX)
--->	--->	09
k---	K---	1B 3E
<---	CTRL N or ERASE EOS	0E
home	HOME	1B 48
up	UP	1B 41
down	DOWN	1B 42
right	RIGHT	1B 43
fast right	FAST RIGHT	1B 68
left	LEFT	1B 44
fast left	FAST LEFT	1B 69
AID GEN		
<u>enter</u>	ENTER	17
clear	CLEAR	1B 45
pf1	PF1	1B 70
pf2	PF2	1B 71
pf3	PF3	1B 72
pf4	PF4	1B 73
pf5	PF5	1B 74
pf6	PF6	1B 75
pf7	PF7	1B 76
pf8	PF8	1B 77
pf9	PF9	1B 78
pf10	PF10	1B 79
pf11	PF11	1B 7A
pf12	PF12	1B 7B
pf13	PF13	1B 7C
pf14	PF14	1B 7D
pf15	PF15	1B 7E
pf16	PF16	1B 7F
pf17	PF17	1B 67
pf18	PF18	1B 3D
pf19	PF19	1B 34
pf20	PF20	1B 35
pf21	PF21	1B 36
pf22	PF22	1B 37
pf23	PF23	1B 26
pf24	PF24	1B 30
pa1	PA1	1B 20
pa2	PA2	1B 21
pa3	PA3	1B 22
SNA		
sys req	SYS REQ	1B 2B
attn	ATTN	00
EDITING		
erase eof	ERASE EOF/EOP	1B 4A
erase input	ERASE INPUT	1B 28
del	DEL	1B 50
ins mode	INS MODE	19
reset	RESET	1B 56
OTHER		
<u>dup</u>	DUP	1B 25
field mark	FIELD MARK	1B 27
cursor sel	CURSR SEL	1B 24
print	PRINT	1B 33
async sw out	ALT d	04
sync sw	ALT e	01
status inq	ESC ?	1B 3F
refresh	ALT I	0C
force select	ALT f	06
device cancel	DEVICE CANCEL	1B 29

Figure C-1
"78" Devices Keyboard Map

Terminal: Beehive "78" Devices

Selection Char.: I

Number: 8

<u>FUNCTION</u>	<u>CHARACTERS</u>	<u>HEX</u>
Load Cursor	esc F row col	1B 46 row col
Erase EOL	esc K	1B 4B
Erase EOS	esc J	1B 4A
Indicator 1 on	esc ; esc d @ eot starts	1B 3B 1B 64 40 04
Indicator 2 on	esc 8 F so gs terminates	1B 5E 38 46 0E 1D
Indicator 3 on		
Indicator 4 on		
Indicator 1 off		
Indicator 2 off		
Indicator 3 off		
Indicator 4 off		
Video Enhance on		
Video Enhance off		
Terminal reset 1	esc " * e 0 1	1B 22 2A 65 30 31
Terminal reset 2	esc ; esc d @ ack gs	1B 3B 1B 64 40 06 1D
Terminal reset 3	esc H	1B 48
Terminal reset 4	esc E	1B 45

***WRAPPING CHARACTERISTICS

Automatic line wrap? Yes
 If not, does the carriage return do newline?
 Automatic scrolling? No
 If not, automatic screen wrap? Yes
 If neither, cursor home sequence:

***LOCAL TERMINAL SETUP (for ATL-078, DM78, and TOPPER)

Set the terminal to the "78" mode.
 Set the following parameters on the terminal using the configuration instructions found in your respective User's Manual.

Autoline Feed.....	Disabled
Duplex.....	Full
Parity.....	Even
Baud.....	Speed
Current Loop.....	Disabled
Video.....	Normal
Termination Char.....	CR

Aux. Baud Rate.....	Speed
Aux. Port Duplex.....	Full
Aux. Port Protocol.....	DTR (Pin 20)
Main Port RS422.....	Disabled
Aux. Port RS422.....	Disabled
Main Port Xon/Xoff.....	Enabled
Keyboard.....	Upper & Lowercase

***OTHER NOTES AND COMMENTS

Escape sequences accept lower as well as uppercase letters.
 Switch positions are subject to change by Beehive.

Figure C-2
"78" Devices Set-up Information

ATL-008/ATL-004

<u>Character Selection</u>	B
<u>Selection Name</u>	ATL-008

ATL-008 and ATL-004, when used in IBM networks and attached to a Multistation, must be operated in 100 mode. The keyboard map and set up information necessary for attaching these devices to a Multistation is found in the following tables.

NOTES:

The following keyboard commands are commonly entered by an ATL-008/ATL-004 operator when using the Multistation:

CTRL F or ESC F (depending on the default terminal type selection) calls up the terminal emulation menu. When the menu is displayed, entering a "B" selects the ATL-008 emulation.

ESC R redisplay the contents of the buffer that contains the screen image.

ESC ? calls up the status of the port being used. What is displayed depends upon the protocol configuration of the Multistation (SNA/SDLC or BiSync).

The ATL-008/ATL-004 port that connects to an asynchronous port on the Multistation should be set up as follows:

1. Parity = Odd, Even, or Space
2. Full Duplex
3. The recommended baud rate for a direct connection is 9600. The speed used for a remote connection depends on the modems, but is usually 300 or 1200 baud.

FUNCTION OR CLASS	KEY SEQUENCE	CHARACTER(S) SENT (HEX)
--->	--->	09
<---	<---	08
<---	RETURN	0D
home	ESC H	1B 68
up	UP	1B 4F 41
down	DOWN	1B 4F 42
right	RIGHT	1B 4F 43
left	LEFT	1B 4F 44
AID GEN		
enter	ENTER or LINEFEED	1B 4F 4D or 0A
clear	NUMERIC* COMMA	1B 4F 6C
pf1	NUMERIC 1	1B 4F 71
pf2	NUMERIC 2	1B 4F 72
pf3	NUMERIC 3	1B 4F 73
pf4	NUMERIC 4	1B 4F 74
pf5	NUMERIC 5	1B 4F 75
pf6	NUMERIC 6	1B 4F 76
pf7	NUMERIC 7	1B 4F 77
pf8	NUMERIC 8	1B 4F 78
pf9	NUMERIC 9	1B 4F 79
pf10	PF1	1B 4F 50
pf11	PF2	1B 4F 51
pf12	PF3	1B 4F 52
pf13	ESC NUMERIC 1	1B 1B 4F 71
pf14	ESC NUMERIC 2	1B 1B 4F 72
pf15	ESC NUMERIC 3	1B 1B 4F 73
pf16	ESC NUMERIC 4	1B 1B 4F 74
pf17	ESC NUMERIC 5	1B 1B 4F 75
pf18	ESC NUMERIC 6	1B 1B 4F 76
pf19	ESC NUMERIC 7	1B 1B 4F 77
pf20	ESC NUMERIC 8	1B 1B 4F 78
pf21	ESC NUMERIC 9	1B 1B 4F 79
pf22	ESC PF1	1B 1B 4F 50
pf23	ESC PF2	1B 1B 4F 51
pf24	ESC PF3	1B 1B 4F 52
pa1	NUMERIC 0	1B 4F 70
pa2	NUMERIC PERIOD	1B 4F 6E
SNA		
sscp sel	ESC 1	1B 31
plu sel	ESC 2	1B 32
attn	ESC 3	1B 61
EDITING		
erase eof	NUMERIC MINUS	1B 4F 6D
erase input	PF4	1B 4F 53
del	DELETE	7F
ins mode	ESC 6 or ESC ^	1B 36 or 1B 5E
reset	CRTL R	12
OTHER		
dup	ESC = or ESC +	1B 3D or 1B 5E
field mark	ESC f	1B 46 or 1B 66
cursor sel	ESC c	1B 63
print	ESC p	1B 70
async sw out	CTRL d	04
sync sw	ESC w	1B 77
status Inq	ESC ?	1B 3F
refresh	ESC r	1B 72
force select	ESC f	1B 66
device cancel	ESC d	1B 29

*NUMERIC means keys on the numeric pad to the right of the keyboard

Figure C-3
ATL-008/ATL-004 Keyboard Map

Terminal: Beehive ATLO08 Selection Character: B Number: 0

<u>FUNCTION</u>	<u>CHARACTERS</u>	<u>HEX</u>
Load Cursor	esc] row ; col H	1B 5B row 3B col 48
Erase EOL	esc] K	1B 5B 4B
Erase EOS	esc] c	1B 5B 63
Indicator 1 on	esc] 1 q	1B 5B 31 71
Indicator 2 on	esc] 2 q	1B 5B 32 71
Indicator 3 on	esc] 3 q	1B 5B 33 71
Indicator 4 on	esc] 4 q	1B 5B 34 71
Indicator 1 off	off	
Indicator 2 off	"" esc] 0 q	1B 5B 34 71
Indicator 3 off	""	
Indicator 4 off	""	
Video Enhance on	esc] 1 m	1B 5B 6C 6D
Video Enhance off	esc] 0 m	1B 5B 30 6D
Terminal reset 1	esc] ? 1 ; 2h	1B 5B 3F 31 3B 32 68
Terminal reset 2	esc] ? 3 ; 7 ; 8 1	1B5B3F333B373B386C
Terminal reset 3	esc = esc] 0 q	1B 3D 1B 5B 30 71
Terminal reset 4	esc] 0 m	1B 5B 30 6D
Terminal reset 5	esc] H esc] J	1B5B481B5B4A

***WRAPPING CHARACTERISTICS

Automatic line wrap? No
 If not, does the carriage return do newline? No
 Automatic scrolling? No
 If not, automatic screen wrap? No
 If neither, cursor home sequence: esc] H 1B 5B 48

***LOCAL TERMINAL SETUP (ATL-004 and ATL-008)

Enable 100 mode (Set-Up B).
 Set the following parameters on the terminal using the TCM
 configuration instructions found in your respective User's Manual.

Xon/Xoff.....Enabled
 100 mode (ANSI).....Enabled
 8 bit per Char.....Enabled
 Margin Bell.....Disabled

Autowrap..... Disabled
 Newline.....Disabled
 Interlace.....Disabled
 Parity..... Disabled

***UNUSABLE KEYS

Break Reason - Z80 SIO bug

DM310

<u>Character Selection</u>	A
<u>Selection Name</u>	DM310

The DM310 operates similar to an IBM 3101 when used in an IBM network. Following are the keyboard map and set up information necessary for the operator when using one this device attached to a Multistation.

NOTES:

The following keyboard commands are commonly entered by a DM310 operator when using the Multistation:

ESC F or CTRL F (depending on the default terminal type selection) calls up the terminal emulation menu. When the menu is displayed, entering a "B" selects the DM310 emulation.

ESC R redisplay the contents of the buffer that contains the screen image.

ESC ? calls up the status of the port being used. What is displayed depends upon the protocol configuration of the Multistation (SNA/SDLC or BiSync).

The DM310 port that connects to an asynchronous port on the Multistation should be set up as follows:

1. Parity = Odd, Even, or Space
2. Full Duplex
3. The recommended baud rate for a direct connection is 9600. The speed used for a remote connection depends on the modems, but is usually 300 or 1200 baud.

FUNCTION OR CLASS	KEY SEQUENCE	CHARACTER(S) SENT (HEX)
--->	----->	09
<---	<-----	08
<----'	CTRL N or ERASE EOS	0E or 1B 4A
home	HOME	1B 48
up	up arrow	1B 41
down	down arrow	1B 42
right	right arrow	1B 43
left	left arrow	1B 44
<u>AID GEN</u>		
<u>enter</u>	<----'	0D
clear	CLEAR	1B 4C
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 ^	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	PF1	1B 61
pa2	PF2	1B 62
<u>SNA</u>		
<u>sscp sel</u>	PF7	1B 67
<u>plu sel</u>	PF8	1B 68
<u>EDITING</u>		
<u>erase eof</u>	ERASE EOF/EOP	1B 49
<u>erase input</u>	ERASE INPUT	1B 4B
<u>del</u>	DEL	7F
<u>ins mode</u>	ESC m	1B 6D
<u>reset</u>	ALT r	12
<u>OTHER</u>		
<u>dup</u>	ALT d	04
<u>field mark</u>	ALT f	06
<u>cursor sel</u>	ALT c	03
<u>print</u>	print	1B 57
<u>async sw out</u>	ALT a	01
<u>sync sw</u>	ALT l	0C
<u>status inq</u>	ESC ?	1B 3F
<u>refresh</u>	ESC r	1B 72
<u>force select</u>	ESC f	1B 66
<u>device cancel</u>	CANCEL	1B 53

Figure C-5
DM310 Keyboard Map

Terminal: DM 310 Selection Char.: A Number: 1
 characters hex

Load cursor: esc Y row col 1B 59 row col
 Erase EOL: esc I 1B 49
 Erase EOS: esc J 1B 4A
 Indicator 1 on:
 Indicator 2 on:
 Indicator 3 on:
 Indicator 4 on:
 Indicator 1 off:
 Indicator 2 off:
 Indicator 3 off:
 Indicator 4 off:
 Video enhance on:
 Video enhance off:
 Terminal reset 1: esc 9 ? 1B 39 3F
 Terminal reset 2: esc H esc J 1B 48 1B 4A
 Terminal reset 3:
 Terminal reset 4:
 Terminal reset 5:

***WRAPPING CHARACTERISTICS

Automatic line wrap? No
 If not, does carriage return do newline? No
 Automatic scrolling? No
 If not, automatic screen wrap? No
 If neither, cursor home sequence: esc H 1B 48

***LOCAL TERMINAL SETUP

(switches, straps, options, etc)
 DIP switch settings (top of keyboard) :
 group 1 : 001x x00x 0 = down
 group 2 : 00xx xxxx 1 = up
 group 3 : 0010 xxxx x = don't care
 group 4 : yyyy xxxx y = speed

***UNUSABLE KEYS

keycaps	reasons
Break	Z80 S I/O bug
Attr, Prgm mode, Send, Send Msg/Line, Aux, Local, Ins Line, Del- char/Line, <----, Msg/Line	local effects

HARDCOPY DEVICES

Introduction

Interactive support for hardcopy terminals gives keyboard/printer asynchronous terminals access to applications meant for 3270 display terminals. Data destined for the 3270 CRT screen is printed and data from the keyboard is packaged for transmission to the host.

Interactive hardcopy terminal support is of necessity vastly different from interactive CRT support. The hardcopy terminal is fundamentally different from a full-screen CRT terminal. It is a less flexible medium for the dynamic display of data; there is no editing capability, there is no way to make incremental changes to a displayed image, and cursor movement is much more heavily restricted.

To overcome these difficulties, the Multistation provides two types of interactive hardcopy support for 3278 emulation. They are accessed in the same way as any other terminal type, that is, through keyboard selection.

Hardcopy One

Operation of type 1 hardcopy support consists of two phases. The first phase is composition of the screen image to be displayed at the terminal. The emulator will build an internal screen image from data sent by the host. When that image is complete and the host sends an instruction to unlock the keyboard, those lines which are not blank are transmitted to the hardcopy terminal. Each line of the output is labelled with a line number for use in the second phase, and the printout is preceded by a scale line showing column numbers.

Once the display image has been transmitted to the hardcopy device, the second phase begins, which is acceptance of operator input from the keyboard. In order to handle multiple fields per screen, the emulator prompts the operator for data one field at a time. Each field is identified in the prompt by its line and column numbers, so the operator can refer to the display image just printed and know where the keyed data is going on the "display." When the operator has keyed enough data to fill the current field, the emulator prints a prompt for the next field and begins to take keyboard input for that one. This continues until the operator uses a key to transmit the modified screen contents back to the host.

Limited editing functions are available. The operator need not type to the end of a field to leave it; there is a TAB key which moves the input location to the next field. There is also a HOME key, which moves the input location to the first field on the screen. When the operator types either of these keys, the emulator responds by printing a prompt for the new field.

For removing data already entered on the screen, the Multistation provides three erasing functions. The first of these is BACKSPACE, which deletes the character most recently entered in the current field from the keyboard, and moves the input location backward so that a new character may be entered in its place. This key has effect only if characters have been keyed into the current field and if the input position is beyond the first position of a field. The second editing function is ERASE INPUT, which clears all data from all fields in the screen buffer. When the data has been cleared, the emulator prints a prompt for the first field on the screen and key entry begins again. ERASE FIELD does the same thing as ERASE INPUT, but only for the current field. When the field has been cleared, a prompt is made for data at the start of the current field.

Hardcopy Two

Type 2 hardcopy support is somewhat different. It is designed for communication with applications which do not require the complex full-screen operator interactions. It is simpler and not as general.

Type 2 support has two phases, similar to type 1. In the display phase, there are no line or column indices - only the raw contents of each line are printed. Also, only lines which are modified by host action are printed.

In the second phase, only the transmission keys are available to the operator, as is the TAB function. There is no editing and there is no prompting. This makes this emulation difficult to use with more than one input field.

Type 1 hardcopy support is best suited for full-screen applications in which the operator must enter and modify data in more than one field. Type 1 is best for simpler applications which require only one or two fields of input and simple interactions by the operator.

If the operator needs to switch emulation types, the Force Select function is available.

Key sequences used by both types of interactive hardcopy terminal support are shown in the following tables.

Hardcopy Support Display Format

The operator of a hardcopy terminal support has to have an idea of where fields are on the logical screen. To help, a set of coordinates by which to identify screen locations is provided. The printout will look like this:

```
.....1.....2.....//.....//.....8
01 (contents of line 1)
02 (contents of line 2)
.
.
.
.
```

Hardcopy Terminal Prompts

Whenever the emulator's input location moves to a new field, the emulator issues a prompt to the operator to identify the new field and to request input for it. This prompt has the format:

```
Lmm Cnn? *>
```

Where "mm" is a line number (01 through 24) and "nn" is a column number (01 through 80). The "L" is preceded by an ASCII newline sequence (crLf). The cursor is immediately left of the greater-than character (>).

FUNCTION OR CLASS	KEY SEQUENCE	CHARACTER(S) SENT	
		ASCII	HEX
TAB	horiz. tab	CTRL I 09	
HOME	form feed	CTRL L 0C	
BACKSPACE	backspace	CTRL H 08	
ERASE INPUT	ESC I		1B 49
ERASE FIELD	ESC F		1B 46
ENTER	carriage return	CTRL M	0D
CLEAR	del		7F
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
PA1	ESC A		1B 41
PA2	ESC B		1B 42
ATTN	ESC !		1B 33
SEIZE PRINTER	nak	CTRL U	15
SEIZE TUBE	dc4	CTRL T	14
PLU SEL	ESC P		1B 50
SSCP SEL	ESC S		1B 53
RESET	dc2	CTRL R	12
REFRESH	ESC R		1B 52
STATUS INQUIRE	ESC ?		1B 3F
FORCE SELECT	ak	CTRL F	06
DUP	ESC *		1B 2A
FIELD MARK	ESC ;		1B 3B
PRINT	dle	CTRL P	10
ASYNC SW OUT	soh	CTRL A	01
SYNC SW	em	CTRL Y	19
DEVICE CANCEL	EOT	CTRL D	04

Figure C-7
Hardcopy Devices Keyboard Map

APPENDIX D

CODE CONVERSION TABLES

Table C-1 is an EBCDIC-to-ASCII conversion table, and Table C-2 is an ASCII-to-EBCDIC conversion table.

To determine an equivalent ASCII character for a given EBCDIC character, first locate the EBCDIC character by column and then row in Table C-1, where the equivalent ASCII character will be found. For example, the EBCDIC character E8 has an ASCII equivalent of 59 or "Y".

To determine an equivalent EBCDIC character for an ASCII character, use a similar procedure and refer to Table C-2. For example, to verify that an ASCII "Y" (hex 59) is equivalent to an EBCDIC E8, locate the ASCII character by column and then row in Table C-2. You will find that the EBCDIC equivalent is "Y" (hex E8).

EBCDIC TO ASCII CONVERSION

MOST SIGNIFICANT EBCDIC BIT

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
L E A S T S I G N I F I C A N T E B C D I C B I T	0	•10 DLE			20 SP	26 &	2D -		1B ESC				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	1A LF							64 d	6D m	75 u		44 D	4D M	55 U	34 4	
	5	•19 EM	15 (#1)	1A LF	•11 DC1				65 e	6E n	76 v		45 E	4E N	56 V	35 5	
	6		•16 SYN						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	•18 CAN							68 h	71 q	79 y		48 H	51 Q	59 Y	38 8	
	9		•13 ETX					60 	69 i	72 r	7A z		49 I	52 R	5A Z	39 9	
	A					5B 	21 !	7C 	3A :								
	B	•12 DC2		•14 DC4		2E .	24 \$	2C ,	23 #								
	C	1C FS	•1E RS			3C <	2A *	25 %	40 @								
	D	1D GS				28 (29)	5F _	27 '								
	E		•1F US			2B +	3B ;	3E >	3D =								
	F			17 BEL		5D] #2	5E '	3F ?	22 "								

#1 Actual character is EM, but is translated as CR LF

#2 If receive device is printer rather than display terminal, this will translate as ASCII 7CH(!).

- These control characters are not passed through to the terminal. CC74 takes action on them directly.

ASCII TO EBCDIC CONVERSION

	0	1	2	3	4	5	6	7
0	40 SP	00 NUL	40 SP	F0 O	7C @	D7 P	79 █	97 p
1	44 D	35 TRN	5A !	F1 1	C1 A	D8 Q	81 a	98 q
2	C8 H	0B VT	7F "	F2 2	C2 B	D9 R	82 b	99 r
3	4C <	19 EM	7B #	F3 3	C3 C	E2 S	83 c	A2 s
4	50 &	04 VCS	5B \$	F4 4	C4 D	E3 T	84 d	A3 t
5	D4 M	15 NL	6C %	F5 5	C5 E	E4 U	85 e	A4 u
6	D8 Q	16 BS	50 &	F6 6	C6 F	E5 V	86 f	A5 v
7	5C *	2F BEL	7D '	F7 7	C7 G	E6 W	87 g	A6 w
8	60 -	08 GE	4D (F8 8	C8 H	E7 X	88 h	A7 x
9	E4 U	05 HT	5D)	F9 9	C9 I	E8 Y	89 i	A8 y
A	E8 Y	25 LF	5C *	7A :	D1 J	E9 Z	91 j	A9 z
B	6C %	2B SET	4E +	5E ;	D2 K	4A █	92 k	C0 █
C	F0 O	0C FF	6B ,	4C <	D3 L	E0 █	93 l	6A █
D	F4 4	0D CR	60 -	7E =	D4 M	4F █	94 m	D0 █
E	F8 8	1C DUP	4B .	6E >	D5 N	5F ~	95 n	A1 █
F	7C '	1E FM	61 /	6F ?	D6 O	6D -	96 o	

APPENDIX E

STATUS LINE MESSAGES

NOTE: Some of these symbols may not be applicable to your terminal.

System Connection Status (Positions 1-6)

<p>4 or 6 A and B [] [] [] TEST</p>	<p>Ready Online My Job System Operator Unowned Test</p>	<p>Signals that the ATL terminal is ready (4 = 3274, 6 = 3276). Identifies the communications protocol (A = BSC, B = SNA). The terminal is connected to the application program. The screen is being controlled by the SSCP (SNA only). The host is connected, but not to the SSCP or application program (SNA only). An online test is being performed.</p>
--	---	--

Do-Not-Enter Warnings* (Positions 9-17)

<p>X [] X SYSTEM X nnn X - n n X PRG n n X ? + X - f X [] - [] X [] - [] [] X [] - [] [] [] X [] X X + [] + X [] > X [] NUM X [] # ? X - S X [] ← [] X [] ← []</p>	<p>Time System Lock Machine Check Communication Check Program Check What? Minus Function Printer Not Working Printer Busy Printer Very Busy Operator Unauthorized Go Elsewhere More Than Numeric Only What Number Minus Message Received Operator Comm. Check</p>	<p>Time is needed to complete a processing function. Your system has been locked by the operating system. Check your terminal to see if it is operating correctly. There is a line problem between the terminal and the host. An error exists in the data coming from the host. The keyboard input was not understood by the control unit. You have requested a function unavailable on the system. The printer is not working. The printer is busy. Same as preceding, only more time is needed. You are unauthorized to use the printer. You cannot take that action at this location. You have tried to put too much information into a field. Only numeric data can be entered in this field. An incorrect number has been entered in the field. You have sent an unrecognizable character to the host. The host program did not understand the message. (X.21 only) You requested an illegal function.</p>
--	---	---

Reminders (Positions 21-27)

<p>- n n [] ← []</p>	<p>Communication Reserved</p>	<p>Errors are being produced by the communication lines between your terminal and the host system. This symbol is reserved for future use.</p>
----------------------------	-----------------------------------	--

Shift and Mode Messages (Positions 37-41)

<p>↑ ^ NUM</p>	<p>Shift Insert Numeric Field</p>	<p>The keyboard is in shift lock. The host is in insert mode. The cursor is in a numeric field.</p>
------------------------	---	---

Printer Status Messages (Positions 60-64)

<p>[] - [] n n [] - [] _ _ [] - [] n n [] - [] n n [] - [] ? ?</p>	<p>Printer Assignment Printer Selection Printer Printing Printer Failure Printer Changed</p>	<p>Identifies the printers you are authorized to use. Responds to the IDENT key command. Your job is being printed by the selected printer. The printer stopped while printing your job. Your printer assignment has been changed by the host.</p>
--	--	--

* The Do-Not-Enter Warning messages disable the keyboard. Press RESET to enable the keyboard.

GLOSSARY

- Absolute Cursor Address:** The physical cursor location relative to the top left corner of the screen (Home).
- AC:** Alternating Current. Electricity which pulses back and forth along a line. Same as household current. Contrast with DC.
- ACK:** Positive acknowledgement. It is sent by the receiving device to indicate that no errors were detected in the data block it just received. Contrast with NAK.
- Address Bus:** A multiple-circuit path that carries address information. See also Bus.
- Alphameric or Alphanumeric:** Describes a character set containing letters, digits and, usually, other characters such as punctuation marks and symbols.
- ALT:** Alternate Shift Key. Analogous to the Control Key, it initiates various functions if pressed in conjunction with another key.
- Alternate Character Set:** "Uppercase" characters rather than "lowercase" ones; that is, # instead of 3, \$ instead of 4, % instead of 5, etc., on the upper row of keys, or some other analogous character set (control, ALT, super shift, S0, SI, etc.).
- Antistatic Mat:** A covering for a worktable. The technician is connected by means of a conductive wrist strap to the mat, as is the equipment. In this way, static potentialities are equalized, greatly reducing the risk of damage from the discharge of static electricity.
- Antistatic Shroud:** A covering that drapes the terminal or keyboard to keep away dust and static electricity.
- ASCII:** American Standard Code for Information Interchange. Also known as USASCII. Code for data transfer adopted by ANSI to achieve better compatibility between data devices. Consists of 128 control and data characters represented by 7 bits plus parity. Current standard is: x3.4-1968.

- Asynchronous:** A term meaning that signals are sent between machines one character at a time without a definite rate per unit time. Contrast with Synchronous, Isochronous.
- ATL:** The term used by Beehive International to describe its Advanced Terminal product line.
- Attention:** A circumstance which is not a part of an operation, but which can cause an interruption of the operation. Attention codes are used in the IBM 3270 operating environment.
- Attribute:** A display field characteristic. Display field attributes include the following: protected or unprotected; numeric-only or alphanumeric input control; displayed, non-displayed, or display intensified; and modified or non-modified.
- Attribute Character:** An attribute character modifies how the characters that follow it appear on the screen. Examples: Reverse Video, Secure, Blink, Underline.
- Attributes, Visual:** See Visual Attributes.
- Auto Repeat:** Keys that repeat automatically if the key is held down.
- Autowrap:** Describes the action of the cursor on some terminals. When the cursor reaches the right margin, it "wraps" to the next line for subsequent characters without need for anyone to press RETURN. See also CR/LF.
- AUX PORT:** See Auxiliary Port.
- Auxiliary Device:** See Peripheral Device.
- Auxiliary Port:** An external communication port for transmission and reception of data. Primarily intended for use as a printer port.
- Baud Rate:** Loosely used as a synonym for the rate in "bits per second" in which data is transmitted between a DCE and a DTE device. Originally, it meant "rate of signal changes using the shortest signal element as the base."
- BiSync:** See BSC.

Bit:	Abbreviation for Binary Digit. A unit of data in machine-readable form. Either of the characters 0 or 1, the smallest units of information in a binary system of notation.
Bit Rate:	The number of bits transferred per unit of time. Usually it refers to bits per second (BPS).
Block:	A group of data stored and transmitted as a unit.
Block Send:	Transmission of a block of data, rather than of every character individually.
BPS:	Bits per second. Speed of Information Transfer. <u>Compare</u> Baud.
Break:	A spacing signal. Usually invoked by an individual key. Used to interrupt transmission.
BS:	Back Space.
BSC:	Binary Synchronous Communications. A communications protocol used in non-SNA IBM networks.
Buffer:	A temporary or dynamic storage facility. Usually connotes a transfer of data between two places.
Character:	An information element, letter, figure, number, punctuation mark or special symbol. In some cases this includes graphic and communication control codes. A character can also be defined by the group of bits or pulses which occur in a time period.
Character Generator:	Chip that stores the information needed to display a character on the CRT.
Character Set:	All characters available for printing on a screen or on a printer.
Chips:	Common name for integrated circuits.
Clock:	A source of precisely spaced timing pulses.
Cluster Controller:	See Control Unit.

Code:	1) A set of clear rules specifying the way data may be represented; for example, ASCII. 2) In data communications, a system of rules and conventions describing data signal formation, transmission, reception and processing protocols. 3) In data processing, a system representing data in a symbolic form that can be accepted by a data processor.
Code Transparent Transmission:	A transmission process which is capable of handling any character set or binary arrangement.
Column-Row Addressing:	An addressing system, usually for a display cursor, in which the first coordinate specifies the column and the second specifies the row on which the cursor is to be found. <u>Contrast with Row-Column Addressing.</u>
Communication Control Character:	A functional character intended to control or facilitate transmission over data networks. ASCII has ten: ACK, DLE, ENQ, EOT, ETB, ETX, NAK, SOH, STX, and SYN. <u>See also Control Character.</u>
Communications Front-End Equipment:	Equipment located between a central computer and its communication line or lines. Generally controls communications in order to alleviate overhead for the main processor.
Communications Port:	Auxiliary, main or chain port. A place suitable for attaching a signal-transmission line between two devices.
Communications Protocol:	<u>See Protocol.</u>
Compatibility:	A measure of the degree of similarity of functional and/or operational characteristics of two devices, such as a computer and a peripheral, that determines how well they will function together if interconnected. The term is also applied to software and its interaction with other software and hardware.
Composite Video:	A technique for combining horizontal sync, vertical sync, and video signals so that they may be transmitted over a single coaxial cable to a display monitor.
Computer Network:	An interconnection of computer systems, terminals and communications facilities.

Confidence Test:	<u>See</u> Selftest.
Configure:	To set up in a certain working order.
DTR:	Data Terminal Ready. The DTE device is up and ready to accept data from the host.
Control Character:	1) A character whose occurrence in a particular context initiates, modifies or stops a control function. 2) In the ASCII mode, any of the 32 characters in the first two columns of the standard code table. <u>See also</u> Communication Control Character.
Controller:	See Control Unit.
Control Station:	The station on a data communication link with the overall responsibility of initiating recovery procedures in the event of abnormal conditions on the link.
Control Unit:	A device which controls the input/output operations of one or more devices.
Conversational:	Descriptive term pertaining to processing that involves a step-by-step dialog between a user (at a terminal by a means of keyboard and display) and a computer. Also called Interactive.
CPR:	Cursor Position Report. The CPP sequence is the means by which the terminal reports the position of the cursor.
CPS:	Characters per Second. Communications speed in characters per second.
CPU:	Central Processing Unit.
CR:	Carriage Return. Control character that moves the cursor to the first position of the active line.
CRC:	Cyclic Redundancy Check. A method of error detection using Cyclic Redundancy Check character(s). A CRC character is generated at the transmitting terminal based on the contents of the message transmitted. A similar CRC generation is performed at the receiving terminal. If the two characters match, the message was received correctly.

CR/LF:	Carriage Return/Line Feed.
Cross-over Capability:	The ability to connect various pins between a receiver and a transmitter.
Current Loop:	An interface that recognizes current flows rather than voltage levels. It is immune to noise and therefore desirable when communicating over long distances.
Cursor:	A moveable marker, visible on the screen, positioned at the location of the next operation (insertion, replacement or erasure of a character).
Data:	A representation of facts, concepts or instructions in a formalized manner suitable for communication, interpretation, or processing by human beings or automatic means; any representation, such as characters, to which meaning might be assigned.
Data Bit:	Smallest discrete unit of computer information.
Data Communications Link:	A processor or terminal.
Data File:	A file which contains information to be processed locally or transferred to a host. <u>Contrast with Program File.</u>
Data Integrity:	A performance measure based on the rate of undetected errors.
Data Set:	In IBM nomenclature, it refers to a data file.
DC1:	XON (Transmit On) control character for xon/xoff.
DC3:	XOFF (Transmit Off) control character for xon/off.
DCD:	Data Carrier Detect. An RS232 signal that indicates that the Data Carrier signal is present.
DCE:	Data Communications Equipment. Control unit or modem that transmits signals along cables connecting data terminal equipment. In general, a data transmitter. In specific usage, the communications side of the interface defined by ANSI Standard V24 and Abbreviated DTE. <u>Contrast with DTE (Data Terminal Equipment).</u>

Dedicated:	Specialized for use in one way.
Default:	Preset value in the absence of any other specification.
DEL:	Delete Character.
Delimiter:	A control character that separates and organizes a string of characters. Spaces are used as delimiters between words on this page. Periods delimit sentences.
Destructive:	Refers to the loss from computer memory of text that, through one key manipulation or another, disappears from the screen. Example: destructive scrolling mode.
Disconnect:	The disassociation or release of a switched circuit between two stations.
Display Area:	The portion of the raster where active video is capable of producing characters on the screen.
Display Field:	An area in the display buffer or on a display surface, which contains a set of characters that is acted upon as a unit.
Displayable Characters:	Character visible on the CRT. <u>Contrast with Undisplayable Characters.</u>
Distributed Network Processing:	A general philosophy usually referring to the use of intelligent or programmable equipment at sites remote from a company's main computer facility and linked by a communications network.
DL:	Delete Line.
DLE:	Data Link Escape. A control character used exclusively to provide supplementary line-control signals.
Download:	Data transfer from host to terminal.
DSR:	Data Set Ready. An EIA RS232C-defined signal generated by a terminal or computer to tell its modem that the terminal or computer is ready for operation. In some applications, the circuit is used to enable the modem to answer or terminate calls.

- DTE:** Data Terminal Equipment. The terminal, the host, or the printer. In general, the data source and/or data sink. In specific usage, the non-communications side of the interface defined by ANSI Standard V24 and Abbreviated DTE. Contrast with DCE (Data Communications Equipment).
- DTR:** Data Terminal Ready. A signal generated by a terminal or computer to tell its modem that the terminal or modem is ready for operation.
- Dump:** Generally refers to the print-out of a file of either data or programming information.
- Duplex:** Simultaneous transmission in both directions; synonymous with full-duplex. Contrast with Simplex and Half-Duplex.
- 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.
- Effective Speed:** The average speed that can be maintained by a device over a sustained period of time. Because of unavoidable factors such as start and stop times and interblock gaps, a device's effective speed may be far lower than its peak speed.
- EIA:** Electronic Industries Association, a standards organization specializing in the electrical and functional characteristics of communications interfaces.
- EMI:** Electro-Magnetic Interference.
- Emulator:** A piece of computer equipment that functions the same as another of dissimilar design, without reprogramming. The emulator usually consists of ROM-based logic that interprets and simulates the functions of the original equipment.
- ENQ:** Enquiry. Used as a request for response to obtain identification for an indication of station status. In Binary Synchronous (BSC) transmission, ENQ is transmitted as part of an initialization sequence (line bid) in point-to-point operation, and as the final character of a selection or polling sequence in multipoint operation.

ETB:	End of Block. <u>See</u> Block.
EOF:	End of File. <u>See</u> File.
EOL:	End of Line.
EOM:	End of Message.
EOT:	End of Transmission. (BSC, ASCII Only) Used to indicate the end of a communication sequence. EOT also may be transmitted by a master station to abort a transmission sequence. It may precede a communication control sequence to ascertain that terminals are in a control state. It is transmitted by remote terminals as a "no traffic" response to a poll.
ESC:	Escape key, or sequence/reference ASCII chart.
External Clocking:	In synchronous communication, a terminal or computer is externally clocked when the bit-timing signal is provided by the modem.
FCC:	U.S. Federal Communications Commission
FD or FDX (Full Duplex):	<u>See</u> Duplex.
FF:	Form Feed.
Field:	A portion of the screen area, defined by row, column and length, whose first position is occupied by an attribute character. It may set visual attributes, receive or send data, and contain an initial value. <u>See also</u> File.
Field Attribute:	An attribute that applies to all characters in a field.
File:	A set of records, in turn composed of sets of fields. <u>See also</u> Field, Record.
Firmware:	That portion of memory-control hardware which can be tailored to create microprograms. Works faster than software. Usually implies program storage in PROMs of some sort.
Flag:	A character bit set to a value to indicate some condition.

Front End Processor:	A communications computer associated with a host computer. It may perform line control, message handling, code conversion, error control and applications functions such as control and operation of terminals.
Full-Duplex:	<u>See Duplex.</u>
Function Keys:	Keys specifically designed to take on different duties depending upon the application being used by the terminal.
Graphic Character:	Any displayable character, but often used to indicate non-alphanumeric characters such as line drawing characters or bar chart graphics.
Group Address:	An address assigned to a group of terminals sharing a single communication channel.
Half-Duplex:	A circuit designed for transmission in either direction but not both directions simultaneously. <u>Contrast with Duplex, Simplex.</u>
Handshaking:	An exchange of control sequences to set up transmission.
Hard Reset:	The same reset that occurs when the computer's power is turned off, then on again.
Hardware:	A computer's physical equipment, whether mechanical, electrical, magnetic, or electronic, as opposed to a computer program or method of use. <u>Compare with Software.</u>
Heading:	A sequence of characters constituting a machine-readable address.
HEX:	Hexadecimal. The base 16 numbering system, commonly used when programming in machine language.
Holding Time:	Message time plus operating time: the length of time a communication channel is in use for each transmission.
Host Computer:	The central computer in a network. It provides such primary service as computation, data base access, or special programs or programming languages.

HT:	Horizontal Tab.
Hz:	Hertz - A frequency rating of the number of electrical vibrations (cycles) per second.
Identifier:	A sequence of one or more characters transmitted by a station in order to identify itself.
Input Device:	Device used to provide programs or data to a computer (i.e., keyboard, modem, magnetic tape, magnetic disk, paper tape reader, card reader, optical scanner or a television camera, etc.).
Intelligent Terminal:	A terminal that can perform some offline processing.
Interactive:	<u>See</u> Conversational.
Interface:	The connection point where one device "ends" and another "begins."
I/O:	Input/Output.
Isochronous:	A method of synchronizing all elements of a data-communications network, in which the timing signals are furnished by the network itself. All devices connected to the network pick up the timing signal from communications lines and coordinate their transmissions accordingly. <u>Contrast with</u> Synchronous, Asynchronous.
Kilobyte (kbyte):	1000 bytes. Often used as a unit of measure for memory storage capacity.
LED:	Light-Emitting Diode.
LF:	Line Feed. Moves the cursor downward one line without changing the horizontal position.
Line Adapter:	A communications interface between the bit-parallel I/O format of a computer and the bit-serial format of a communication channel.
Line Feed:	<u>See</u> LF.
Line Speed:	The maximum data rate that can be reliably transmitted over a line. Varies with the capability of the data set used.

Link:	Any specified relationship between two nodes in a network. A communications path between two nodes. A Data Link.
Lo:	A low electrical pulse corresponding to a bit equal to 0. <u>Contrast with Hi.</u>
Local:	Offline; in other words, the terminal is not communicating with a host.
Log On/Off:	Log on identifies yourself acceptably to the computer so it will work with you. To log off is to type an acceptable (generally different) sequence of keystrokes indicating to the computer that you are through using it.
Logical Unit:	(1) In VTAM this is the combination of programming and hardware which constitutes a station. (2) In SNA, it is one of three types of Network Addressable Units. It is the port through which an end user accesses function management in order to communicate with another end user. It is also the port through which the end user accesses the services provided by the System Services Control Point (SSCP). It is capable of supporting two sessions: one with the SSCP, and one with another logical unit. It may be capable of supporting sessions with other logical units.
Logic Analyzer:	A device (frequently programmable) used to send and receive bit patterns for diagnostic purposes.
LU:	<u>See</u> Logical Unit.
Main Port:	An external communication port allowing transmission and reception of data. Primarily intended for communications to a computer system.
Mainframe:	Large computer.
Memory Address Pointer:	An indicator analogous to a cursor, used to determine the location of the next operation in memory.
Microprocessor:	A single I.C., functioning as a CPU, which contains all the electronics of a minicomputer and is used in devices under program control.

Modem:	Device permitting transfer of signals between computers over telephone lines. <u>See also</u> Line Adapter and Data Set.
Monitor:	1) The supervision of system activities. 2) On Beehive terminals, the ability to display the activity of the main port. All the commands and text sent through the main port are displayed on the screen. 3) A term for a CRT.
Monocase:	A function that shifts alphabetic characters into uppercase.
Multipoint Link:	A data communications link connecting two or more stations.
NAK:	"Negative Acknowledgement," an indication by a receiving terminal that a block of data was not received correctly. <u>Contrast with</u> ACK.
NRZI:	Non-Return to Zero Inverted. A signal handling option used with SMA protocol.
Nul Character:	Usually used as a filler character or for timing. Nothing (no movement of the cursor).
NVRAM:	Non-Volatile Random Access Memory. Information stored in this memory is not erased if the electric power is shut off. Beehive TCM parameters are stored in this type of memory. <u>See also</u> RAM.
Offline:	Local (not communicating with a host computer).
Online:	Communicating with a host computer.
Output Device:	A device that presents data or programs from the computer.
PA key:	Program Access key. <u>See</u> Program Access.
Parameter:	An extension of a command, specifying how the command is to be executed.
Parity:	An element added to the basic message or character for the purpose of checking correctness of the data.
Peripheral Device:	A device connected to a computer. Terminals, printers and memory drives are peripheral devices.

PF key:	Program Function Key.
Point-to-Point Link:	A data communication link connecting only one station.
Polling:	A technique for inviting a data communications terminal system to transmit status or messages at a given time.
Power On:	Turn on.
Printer Port:	<u>See</u> Auxiliary Port.
Printer Port Sharing:	<u>See</u> Transparent Print.
Processor:	<u>See</u> Microprocessor.
Program Access:	A program attention key which can be defined to request program action not requiring data to be read from the display station buffer.
Program Function Key:	A key that may send a unique code whose meaning depends on the application.
PROM:	Programmable Read-Only Memory. A semiconductor diode array, programmed by fusing or burning out diode junctions, which can thereafter only read. <u>Contrast with</u> ROM, RAM.
Protected field:	A display field in which the user is prevented from entering, modifying, or erasing data from the keyboard.
Protocol:	The manner in which two machines communicate. A set of conventions between communicating processes on the format and content of messages to be exchanged. For example, it determines baud rate, data length,.... In sophisticated networks, higher-level protocols may use lower-level protocols in layered fashion for greater convenience.
Protocol Converter:	A device which translates from one communication protocol to another.
RAM:	Random Access Memory. A semiconductor diode system where stored bits can be read and rewritten as desired. <u>See also</u> NVRAM.
Raster:	Portion of the CRT that contains the visible display.

Refresh Rate:	The speed at which complete raster frames are "painted" on a screen by a scanning electron beam. This is usually 50 or 60 Hz.
Reverse Video:	Normal video characters are lighted characters on a dark background. Reverse video characters are left dark, and the background is lighted.
ROM:	Read-Only Memory. A chip whose information content cannot be changed. <u>Contrast with PROM.</u>
Row-Column Addressing:	An addressing system, usually for a display cursor, in which the first coordinate specifies the row and the second specifies the column on which the cursor is to be found. <u>Contrast with Column-Row Addressing.</u>
RS232C:	A technical specification published by the Electronic Industries Association that establishes interface requirements between modems, terminals or computers, and communications lines.
RTS:	Request to Send. The signal originates in the terminal and goes to the host: "I have data and request permission to send it to you."
Screen Saver:	Facility to blank the screen without erasing data after a predetermined amount of time with no activity. Intended to increase phosphor life for CRTs.
Scroll:	To move the cursor beyond the corner of the screen in a given direction (up, down, left, or right) so that any portion of text found there is brought into view.
SDLC:	Synchronous Data Link Control. The communications protocol used within SNA networks.
Secondary Logical Unit	In SNA, this is the logical unit (LU) which contains the secondary half-session of a particular LU-LU session.
Security Fields:	Invisible fields used primarily as an input area for passwords or other confidential information. Not to be confused with Locked Fields.

- Selftest:** A test performed by a device to ascertain whether the device itself works properly.
- Serial Transmission:** A method of transmission where each bit of information is sent one after the other on a single channel rather than simultaneously as in parallel transmission.
- Simplex:** A communications link capable of transmitting data in only one direction. Contrast with Duplex, Half-Duplex.
- SNA:** Systems Network Architecture. A specification governing the design of IBM products for distributed processing, and a plan for structuring a network. SNA defines both the functional responsibilities of each network component and the rules for communication between these components.
- Soft Reset:** A reset that allows the processor under program control to reinitialize given parameters and circuits.
- Software:** A set of computer programs, procedures, rules and associated documentation, such as compilers, monitors, editors and utility programs, concerned with the operation of network computers. Compare with Hardware.
- SOH:** ASCII mnemonic for Start of Header. A communication control character used at the beginning of a heading.
- Space:** One of the two possible conditions of an information element (bit). An open line in an information circuit. Equivalent to a binary zero.
- Split Baud Rate:** This condition exists when the receive and transmit baud rates differ. Occurs when a signal is sent out at one baud rate and is received at another baud rate.
- SSCP:** System Services Control Point.
- Start Bit:** In asynchronous transmission, actually a change in channel state from the quiescent state. It normally persists for one bit time (hence start bit) and signals the beginning of a character.

Start of Text:	<u>See</u> STX.
Start-Stop Transmission:	Asynchronous transmission of a character signal composed of a group of code elements which are preceded by a start element and followed by a stop element.
Stop Bit:	The last element of a character in asynchronous serial transmissions, used to ensure recognition of the next start element. <u>See</u> Start-Stop Transmission.
Strap:	A wired connection.
Stream, Bit:	<u>See</u> Bit Stream.
STX:	ASCII mnemonic for Start of Text. Terminates a heading; precedes a transmission text.
SUB:	Substitute character.
Supervisory Sequence:	In data communications, it is a sequence of communication control characters, and possibly other characters, that perform a defined control function.
Support:	To make a certain feature workable on a given piece of equipment.
Sweep:	One horizontal stroke of the electron gun across the screen.
SYN:	<u>See</u> Synch Character
Sync Character:	A character of defined bit pattern that is used by the receiving terminal to adjust its clock and achieve synchronization.
Synchronous:	Refers to a constant time interval between successive bits, characters or events transmitted across a line between machines. Synchronization between the transmitting and receiving machines is achieved by a secondary frequency, called a clock signal, sent by the transmitting machine across the line along with the data. <u>Contrast with</u> Asynchronous, Isochronous.
TCM:	Terminal Configuration Manager, firmware used to configure Beehive terminals.

Terminal:	Machine that terminates a line or link used for data input and retrieval.
Time Out:	A system action based upon the absence of an expected event during a prescribed time interval.
Transceiver:	A terminal that can transmit and receive traffic.
Transparent Print:	The ability to allow data transfer between the main and auxiliary port independent of (without affecting) display or keyboard entries. Sometimes called printer port sharing.
TTY:	Teletypewriter Equipment. Each transmission end with three DEL (ASCII) pad characters.
Two-Way Alternate Transmission:	A type of transmission through which messages or transmission blocks may be sent in either one direction or another, but not in both directions simultaneously. Also called Half-Duplex.
Tx/Rx:	Transmission/Receive
Typamatic:	Refers to a character which repeats automatically if held down.
Undisplayable Characters:	Characters not seen on the screen, but which nevertheless exist. Example: CR is usually an undisplayable character even though its effect is evident. <u>Contrast with</u> Displayable Characters.
Unprotected Field:	A display field in which the user is permitted to enter, modify, or erase data from the keyboard.
USASCII:	<u>See</u> ASCII.
Visual Attributes:	Additional bits, added to the character dot pattern, that determine the type of display, such as Reverse Video, Security, etc.
VRC:	Vertical Redundancy Check. A check or parity bit added to each character in a message such that the number of bits in each character, including the parity bit, is odd (odd parity) or even (even parity).

VT:	Vertical Tab. Moves the cursor to the same character position on the next line containing a vertical tab stop. The horizontal position of the cursor is not changed.
VTAM:	Virtual Telecommunications Access Method (IBM terminology).
Warmboot:	Soft reset.
XID:	Extended Identification. An identification code used for addressing systems using SNA protocol. The code identifies the device and specifies the type of access the device has to the host system.
XOFF:	(Pronounced "x-off") Transmitter Off. A "shut up" signal sent by a receiving machine to a transmitter, telling it to stop sending if it is sending, or not to send if it is preparing to do so.
XON:	(Pronounced "x-on") Transmitter On. A "ready to receive" signal sent by a receiving machine to a transmitter, telling it to go ahead if it has anything to send.



ADDENDUM

ATL-3270 MULTISTATION
Version XA
April 1985

The following changes have been made to version XA of the ATL-3270 Multistation Operator's Guide.

Replace Section 2.6 with the following information.

Any of the four Multistation control unit ports can be configured to emulate an IBM 3287 printer. When a control unit port is configured through TCM as a printer, any asynchronous serial printer can be used.

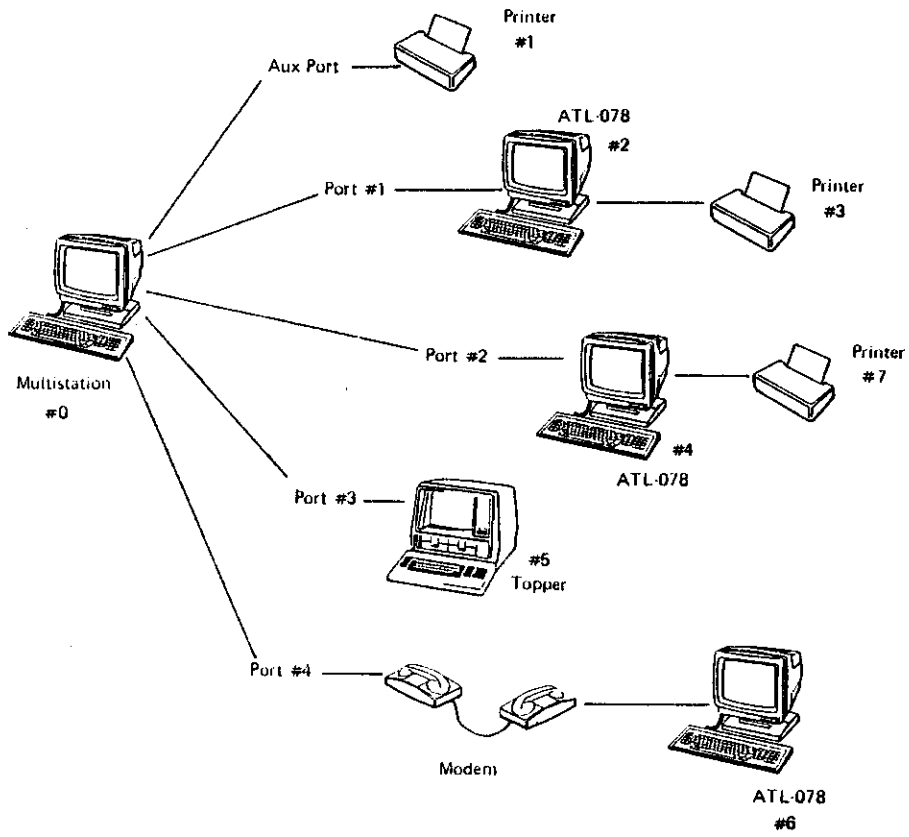
All the logical devices attached to the Multistation have a device number. Printers will be assigned to the unassigned terminals (for local prints) with device numbers lower than their own. For instance, if the printer is assigned as Device #2, then the terminals assigned as Devices #0 and #1 will use Device #2 and its associated port for hard copies. (See Figure 2-12).

This description and the two figures shown on the next page should be inserted on page 2-17.

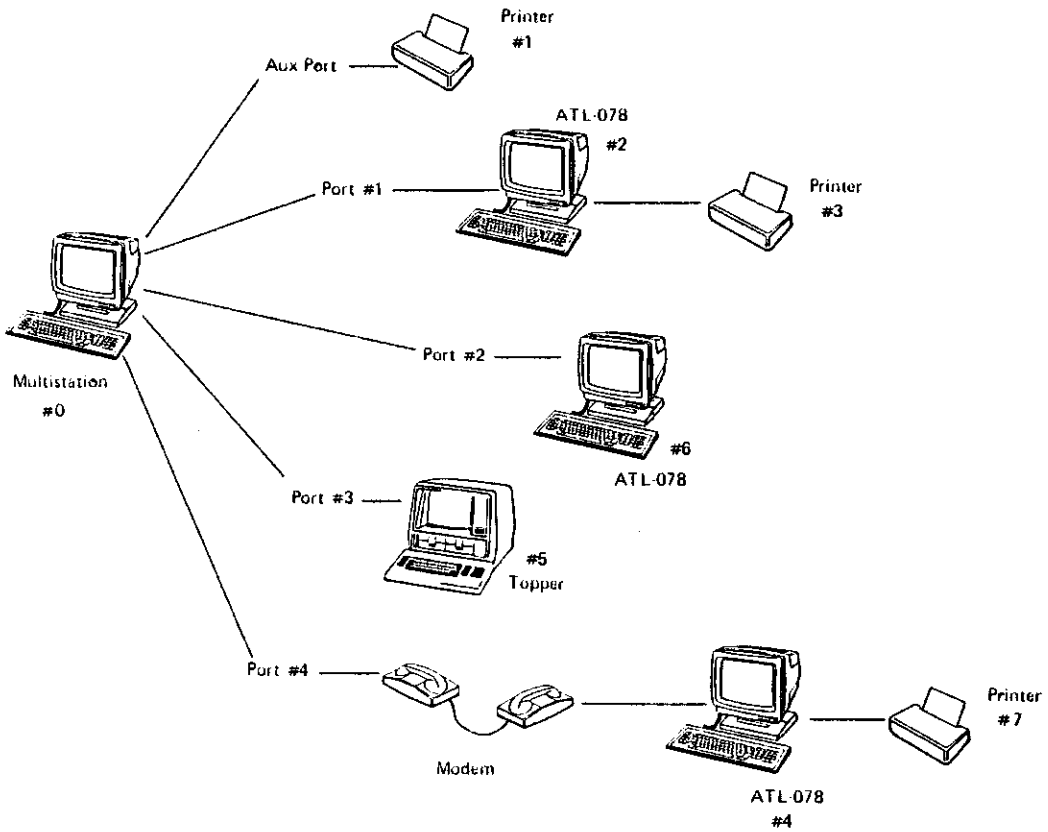
The Automatic Printer Port Assignment option can only be used if you have previously selected the Printer Port Sharing option (See Section 2 - Printer Port Sharing). Selecting the Automatic Printer Port Assignment option makes it possible for the shared printers to be assigned automatically when the cluster is initialized. With the Automatic Printer Port Assignment option selected, the Printer Port Sharing prompt will not appear on the terminal screen, and the printers in the cluster will automatically be assigned to the Aux. port of the terminal with the lowest device number logically preceding the printer in the cluster. For example, using the configuration of Example A shown on the following page, the printer at the Multistation Aux. port (Device #1) will be assigned to the Multistation (Device #0); the printer attached to the ATL-078 Aux. port on Port 1 (Device #3) will be assigned to the terminal on Port 1 (Device #2); and the printer on Port 2 (Device #7) will be assigned to the Aux. port of the terminal on Port 2 (Device #4). In each case, the printer is also available for use by the host.

If you wanted to change the configuration of Example A to look like Example B, you would need to move the printer (Device #7) from the Aux. port of the ATL-078 on Port 2 to the Aux. port of the ATL-078 on Port 4. However, if you tried to use the Automatic Printer Port Assignment option, the Multistation would try to assign the printer to the Aux. port of the terminal on Port 2 because the terminal on Port 2 is still the lowest unassigned terminal in the cluster. You can remedy the situation by changing the device numbers of the terminals on Ports 2 and 4 as shown in Example B.

IMPORTANT: The Multistation will always assign the printer to the Aux. port of the lowest numbered unassigned terminal in the cluster, whether the printer is actually attached to that terminal or not.



EXAMPLE A



EXAMPLE B

Page 4-8 PRINTFR ASSIGNMENT

Replace the information in Section 4.6.1 with the following:

The PRINTER ASSIGNMENT symbol is used to identify the printers that you are authorized to use. You may access any printer in the cluster that has a Device # assigned to it. You can select a specific printer by using the IDENT key (see Figure 3-7 - IDENT and Section 4 - Printer Selection). The numbers 1 to 7 are valid printer device numbers.

Pages 5-6 to 5-10 Sections 5.4 to 5.4.23

The section covering Control Unit TCM has undergone a cosmetic change. The words "Control Unit" have been removed from the TCM submenus. For example, "Control Unit Host Port Connected to Modem:", now reads "Host Port Connected to Modem".

Page 5-7 Control Unit Port (1-4) Device Detection: NO YFS

The following changes have been made to the second paragraph of the section.

When a disconnection occurs, an IR S/S (Intervention Required Status - BSC) or an LUSTAT (Logical Unit Status - SNA) message is posted for that device for transmission to the host. This may also trigger the Logoff Message option described in 5.4.17 below. Reconnection of the device posts a Device Fnd Status (DF S/S - BSC) or a Logical Unit Status (LUSTAT - SNA) message.

Page 5-8 Insert between 5.4.14 and 5.4.15

Automatic Printer Port Assignment: NO YFS

NO = Do not assign printers.
YFS = Automatically assign printers to the terminals.

This section only appears on the TCM line if Printer Port Sharing has been selected. See Section 2 - Printer Port Sharing and Section 2 - Automatic Printer Port Assignment for more information.

Page 5-8 Control Unit Disconnect on Timeout: NO YFS

The reference in the second paragraph, "(See TCM - Control Unit Standard Logoff Message), should read "(See TCM - Control Unit Logoff Message).

Page 5-9 Control Unit Type: 3274 3276

Replace the information in Section 5.4.19 with the following:

XID Block: 017 018

Selecting 017 changes the seventh digit in the XID address to a 7. Selecting the 018 option sets the seventh digit in the XID addresss to an 8.

Page 5-9 Control Unit XID Address: HEX <00000 >

Replace the information in Section 5.4.20 with the following:

XID Number: HEX <00000 >

The XID (eXchange IDentification) is a series of bits which the host can request from the controller to assist in determining the basic security level of a given cluster. The XID consists of both fixed and variable bits. The current Multistation comes with an XID message of:

020001800000

The last five digits of the message can be set to any hex value through this option. The seventh digit can be changed to the number 7 by selecting the 017 option under XID Block in TCM.

NOTE: This response must be used with systems that operate under SNA/SDLC protocol and using dial-up phone lines.

Page 5-13 Table 5-3 - TCM Menu Tree and Descriptions

Replace the information at the bottom of page 5-13 with the following:

Printer Port Sharing Allowed: NO YFS
Automatic Printer Port Assignment: NO YFS
Disconnect on Timeout: NO YFS
IU Disconnect: NONE INACTIVE UNBOUND
Logoff Message Enabled: NO YFS
Async Host Port Available: NO YFS
XID Block: 017 018
XID Number: HEX <00000 >
Logoff: HEX < >
Auto Disconnect Message: TFXT < >
Timeout Disconnect Message: TFXT < >

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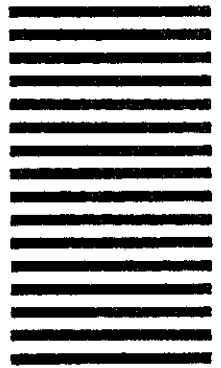


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- c. Components (if any) which are specified in the Maintenance Guide or Operating Manual as being excluded from warranty.
- d. Malfunctions which occur as a result of customer supplied interfacing.

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In some cases Beehive's direct customer has, by written contract, waived all warranties, express and implied, in exchange for an additional discount.