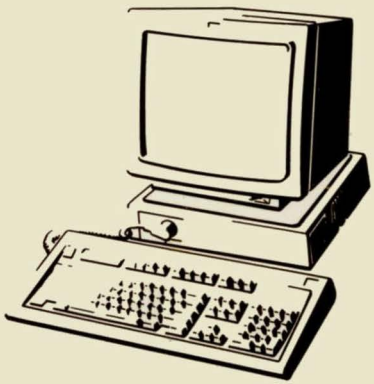
File No. S370/303X/308X/309X/4300/8100/S1-09

IBM

IBM 3162
ASCII Display Station

Using the IBM 3162 ASCII Display Station to Emulate the DEC[1] VT220



65X0038

GA18-2496-0

File No. S370/303X/308X/309X/4300/8100/S1-09

IBM 3162
ASCII Display Station

Using the IBM 3162 ASCII Display Station to Emulate the DEC[1] VT220

65X0038

GA18-2496-0

FEDERAL COMMUNICATIONS COMMISSION (FCC) STATEMENT (Applies only to those machines used in the U.S.)

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause 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 case the user at his own expense will be required to take whatever measures may be required to correct the interference.

First Edition (September 1986)

Changes are made periodically to the information herein; any such changes will be reported in subsequent revisions or Technical Newsletters.

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM program product in this publication is not intended to state or imply that only IBM's program product may be used. Any functionally equivalent program may be used instead.

Publications are not stocked at the address given below. Requests for IBM publications should be made to your IBM representative, to the IBM branch office serving your locality, or to the place of purchase.

A form for reader's comments is provided at the back of this publication. If the form has been removed, comments may be addressed to IBM Corporation, Publications Development, Department 6R1J, 180 Kost Road, Mechanicsburg, PA 17055 U.S.A. IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

[1] DEC is a trademark of Digital Equipment Corporation.

Using This Guide

This guide describes how to use an IBM 3162 ASCII Display Station with a plug-in cartridge to emulate the DEC VT220. The guide is intended for those who want to use an IBM 3162 as a DEC VT220.

The guide provides the necessary information to operate the IBM 3162 only in DEC VT220 emulation mode. You should already have a basic understanding of the DEC VT220. You may require the following manuals for reference:

- *DEC VT220 Owner's Manual*
- *DEC VT220 Programmer Reference Manual.*

This guide has four chapters:

- Chapter 1, "Introducing the DEC VT220 Emulation" describes the differences between the DEC VT220 and the IBM 3162 when operating in emulation mode.
- Chapter 2, "Set-up Procedures" describes how to install and set up the IBM 3162 in DEC VT220 emulation mode.
- Chapter 3, "Interpreting Operator Messages" describes how to interpret the operator messages that are displayed at the bottom of the screen.
- Chapter 4, "Reference Information" provides reference information when using the IBM 3162 in DEC VT220 emulation mode.

Using This Guide

Before installing the IBM 3162, read:

- Appendix A, "Installation Planning" in the *IBM 3162 ASCII Display Station Programmer's Guide and Reference Information*, GA18-2495 (orderable from your place of purchase)

- Chapter 1, "Introducing the IBM 3162" in the *IBM 3162 ASCII Display Station User's Guide*, GA18-2493 (shipped with the display station).

If you have a display-station problem, see *IBM 3162 ASCII Display Station Problem Solving Guide*, GA18-2494 (shipped with the display station).

Contents

Contents

Figures

Figures

Chapter 1. Introducing the DEC VT220 Emulation

The 3162 can emulate the DEC VT220 by using an emulation cartridge in the logic element and operating the 3162 with the program stored on the cartridge. The DEC VT220 has the following operation modes:

- VT200, 7-bit controls
- VT200, 8-bit controls
- VT100
- VT52.

Selecting the operation mode is done from a setup menu.

In most instances, you can run the same application programs that were running the DEC VT220. However, the 3162 uses a different kind of connector for the main and auxiliary ports than the DEC VT220. Therefore, a cable is necessary to connect the 3162 to a host system or a printer. These cables should be readily available from a cable vendor. Appendix A, "Installation Planning" in the *IBM 3162 ASCII Display Station Programmer's Guide and Reference Information* provides information on the main and auxiliary ports.

This chapter describes the DEC VT220 functions that are *different* or *not* supported when operating in emulation mode. It also describes the *additional* functions. Other DEC VT220 functions work as they normally do in the DEC VT220.

Functions Supported Differently in Emulation Mode

The following figure shows which DEC VT220 functions to be emulated are different and how they are different.

DEC VT220 Function	Difference in Emulation Mode
Tests (DECTST) command	Replaced with the internal check program, which is automatically run each time the display station is powered-on or test mode is started by the *Test* key.
Keyboard layout	Key caps are provided to emulate the DEC VT220 keyboard. You should change the key caps during set-up procedures. Figure 1-2 shows a DEC VT220 emulation keyboard after key caps have been changed.
Keyboard indicators; Hold Screen, Lock, Compose, and Wait	Replaced with the indications at the bottom of the screen.
Main and auxiliary port connectors	The 3162 uses a different kind of connector than the DEC VT220.
Displayed characters	Shapes and sizes are different.
Setup menus	Menu layouts and definitions are different. See "Setup Menus and Setup Values" on page 2-25 and "Equivalent Setup Parameters" on page 2-43 for more information.
Tab settings	The DEC VT220 sets tab stops from the setup menu. The 3162 provides a *Tabs* key to set tab stops.

Figure 1-1 (Part 1 of 2). Functions Supported Differently in Emulation Mode

DEC VT220 Function	Difference in Emulation Mode
Cursor type selection	The DEC VT220 selects a cursor type from the setup menu. The 3162 provides a *Alt Csr* key to select the cursor type.

Figure 1-1 (Part 2 of 2). Functions Supported Differently in Emulation Mode

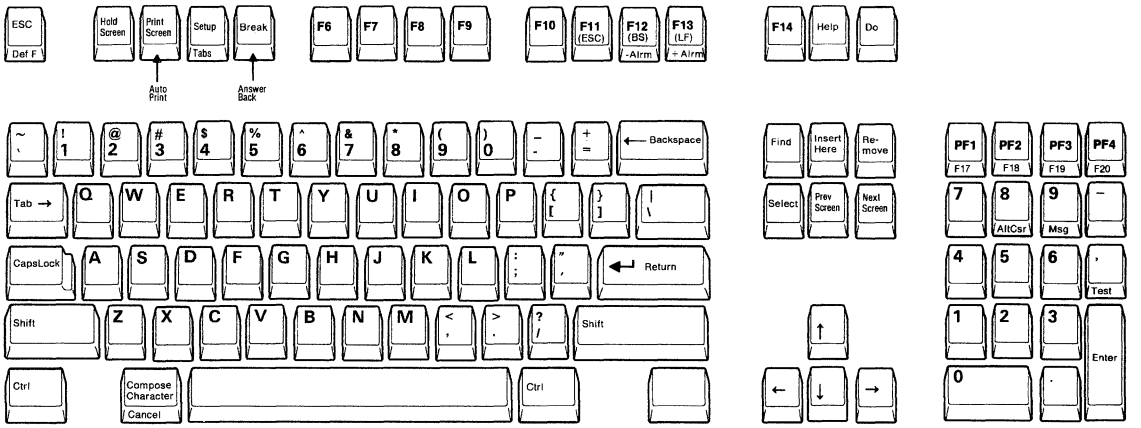


Figure 1-2. DEC VT220 Emulation Keyboard

Notes:

1. *Some labels of the keys are printed differently on the actual keyboard.*
2. *The **Break** key performs the disconnect function when pressed with the **Shift** key.*
3. *The function on the front of each key is performed when the key is pressed with the **Ctrl** key.*

Functions Not Supported in Emulation Mode

The following functions are not supported in emulation mode:

- Changeable power supply voltage
- Keyclick
- 20 mA current loop communication interface
- Speed indicator (pin 12) and speed select (pin 23) on the main port connector (EIA RS-232C interface)
- Video signal output port
- Data/Talk key

  An integrated modem cannot be attached.

Additional Functions in Emulation Mode

The 3162 provides the following additional functions:

- EIA RS-422A interface for the main port (depending on the machine model)
- Large-screen support (28 lines of 132 characters)

  You can select a screen format from a setup menu or by a CSI sequence. To use this function, see "Defining Setup Values" on page 2-18 or "Select Screen Format" on page 4-1.
- Operator information area

  The operator information area (OIA) is the bottom line of the screen where indicators and messages show the status of the display station.
- Break signal with two selectable lengths
- Keyboard functions.

Additional Keyboard Functions

Figure 1-3 on page 1-6 shows the locations of the additional keys; Figure 1-4 on page 1-6 shows their functions in emulation mode. When you use the 3162 functions, which are not explained but shown on the actual keyboard, the audible alarm will sound.

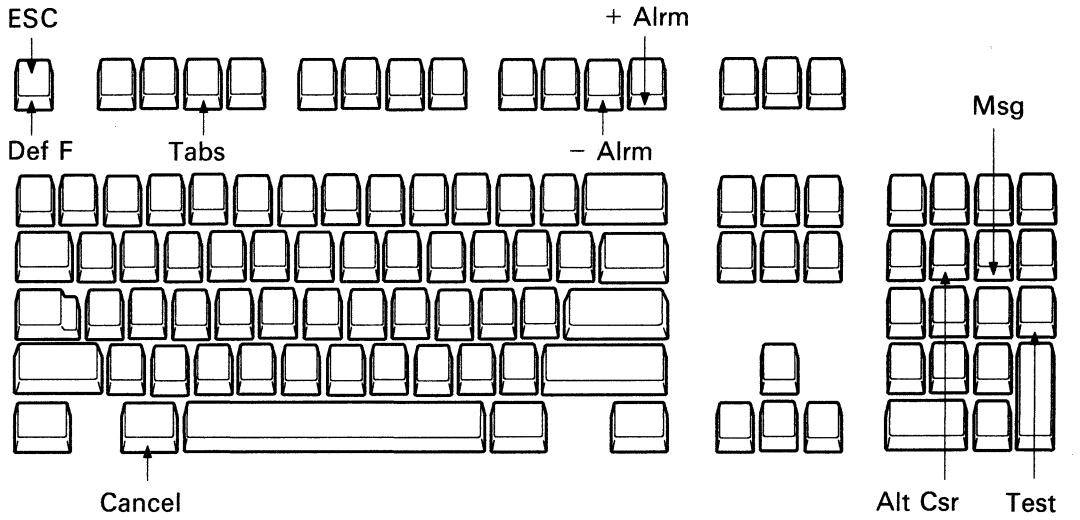


Figure 1-3. Locations of the Additional Keys

Key	Function
Alarm	Each time the – *Alrm* key is pressed while holding down the *Ctrl* key, the volume of the audible alarm decreases. Each time the + *Alrm* key is pressed while holding down the *Ctrl* key, the volume of the audible alarm increases. The alarm-level setting is saved for later use.
Alt Csr	Each time the *Alt Csr* key is pressed while holding down the *Ctrl* key, the cursor type changes to one of four types: block, blinking bar, blinking block, and bar. The selected cursor is saved and used the next time power is turned on. *Note:* This function is effective when ON is selected for the Cursor option in the DISPLAY menu.

Figure 1-4 (Part 1 of 2). Additional Keyboard Functions in Emulation Mode

Key	Function
Cancel	Cancels the print operation requested by the host command, *Print* key, or Auto Print setting. This key also erases the message AUX NOT READY in the operator information area. *Note:* This function is not effective when CONTROLLER is selected for the Print Mode option.
Def F	Defines functions from the keyboard. See "Defining Function Keys" on page 2-21.
ESC	Is used to key in an ESC sequence from the keyboard.
Msg	Each time the *Msg key* is pressed, the contents of the operator information area (OIA) change. At first the OIA contains no indicators; the first time the *Msg* key is pressed, operator messages appear; the next time the *Msg* key is pressed, the OIA contains no indicators again. The contents of the OIA are saved for later use.
Tabs	Set tab stops from the keyboard. See "Setting Tab Stops" on page 2-23.
Test	**Warning:** Do not press the *Test* key during on-line operation; data could be lost. Pressing the *Test* key while holding down the *Ctrl* key, causes the display station to enter test mode and a test pattern appears. In this mode, internal circuits are checked. You can also check the keyboard using the test pattern. See *IBM 3162 ASCII Display Station Problem Solving Guide* for more information. Pressing the *Test* key while holding down the *Ctrl* key again, causes the display station to exit this mode while initializing the display station.

Figure 1-4 (Part 2 of 2). Additional Keyboard Functions in Emulation Mode

Chapter 2. Set-up Procedures

This chapter provides step-by-step procedures to set up the 3162 in DEC VT220 emulation mode. Before beginning the setup, the person responsible for the installation should have completed the preparations for installing the 3162. These preparations include:

- Site preparation
- Installation of communication cables, power receptacle, and wiring
- Determination of the setup values and competition of Figure 2-17 on page 2-46.

The above information is described in:

- Appendix A, "Installation Planning" in the *IBM 3162 ASCII Display Station Programmer's Guide and Reference Information.*
- "Setup Menus and Setup Values" on page 2-25, which lists the setup menus and setup parameters, and describes the meanings of the setup values.
- "Equivalent Setup Parameters" on page 2-43, which explains the equivalent 3162 setup parameters for the DEC VT220.

Set-up Procedures

This chapter describes the following:

- Setting up the 3162, which shows the steps needed to install the 3162.
- Defining setup values, which shows the steps needed to define the setup values. You must define at least the communication values so that the display station can communicate with the host system or printer correctly.
- Defining function keys (optional), which shows the steps needed to define function keys.
- Setting tab stops (optional), which shows the steps needed to set tab stops.
- Setup menus and value descriptions, which explains the setup menus and setup values.

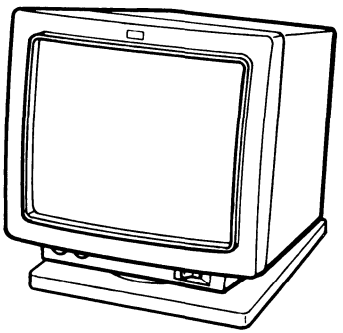
Notes:

1. *If you have any problems in the following steps, see the IBM 3162 ASCII Display Station Problem Solving Guide.*
2. *After unpacking each element, save all packing material for possible later use.*

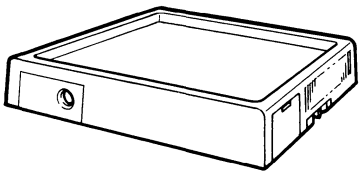
Setting up the 3162

Check each box (☐) as you unpack and identify each item. If any required items are missing, call your IBM marketing representative or place of purchase.

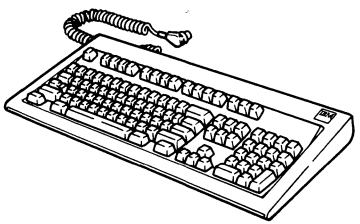
☐ Video Element



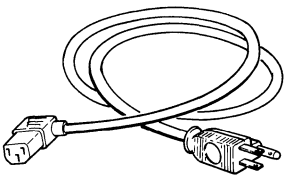
☐ Logic Element



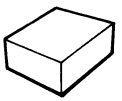
☐ Keyboard



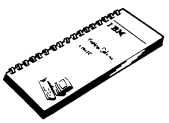
☐ Power Cord



☐ Key Caps

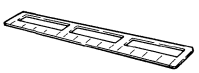


☐ Problem Solving Guide



☐ Cartridge

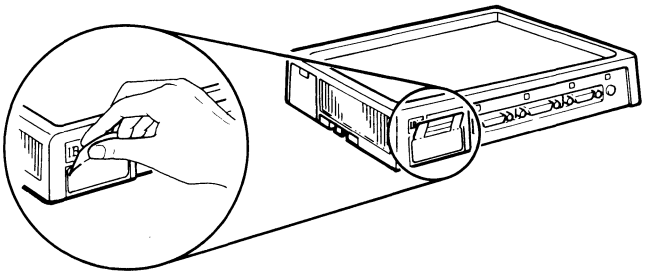
☐ Keyboard Overlay



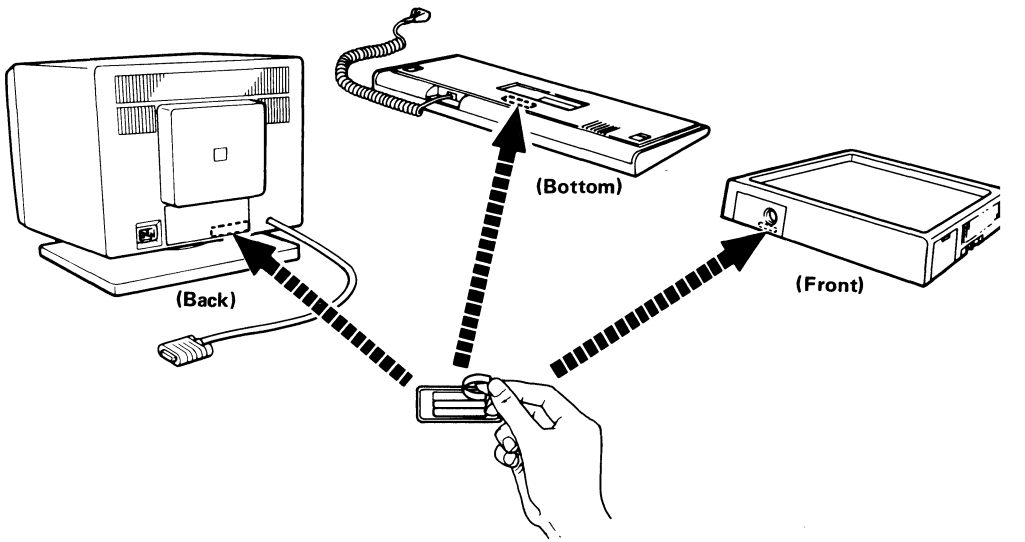
Step 2. Attaching the Labels

Important: It is important that you attach the labels to avoid possible delay if it ever becomes necessary to return the unit to IBM.

a Tear off the labels from the back of the logic element.



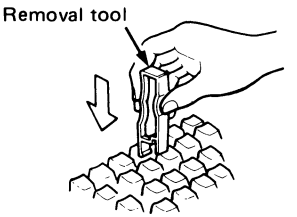
b Attach the labels to the back of the video element, the bottom of the keyboard, and the front of the logic element.



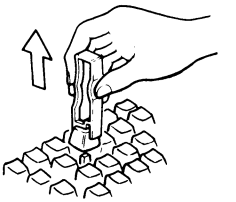
a Using the key-cap-removal tool, remove the key caps shown below (non-shaded).

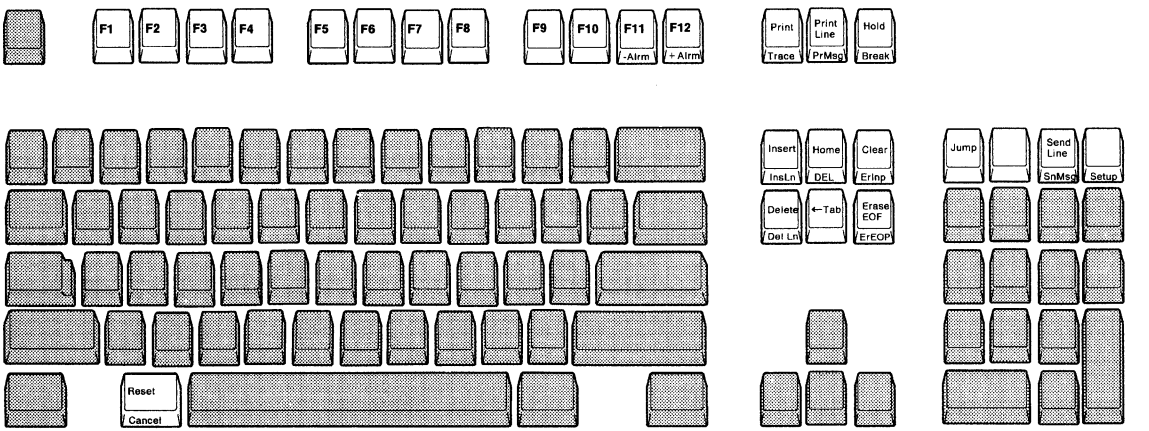
Keep **F6**, **F7**, **F8**, **F9**, *and* **F10** *for the next step, and other keys for possible later use. Key caps that you change here must be returned to their original positions before returning the keyboard to IBM.*

1.



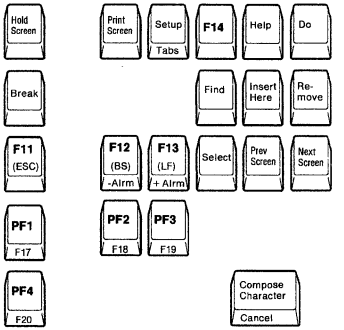
2.



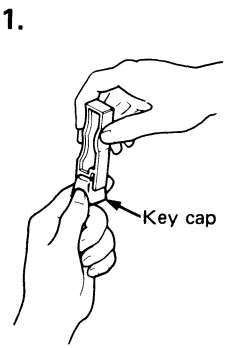


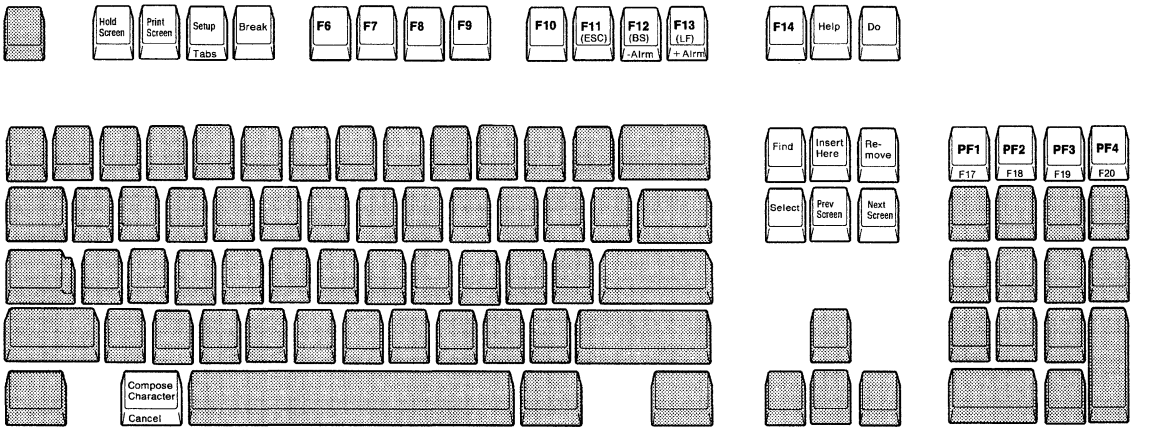
Step 3. Changing the Key Caps

b Using the key-cap-removal tool, install the 21 key caps, **F6**, **F7**, **F8**, **F9**, and **F10** in the positions shown on the keyboard below.

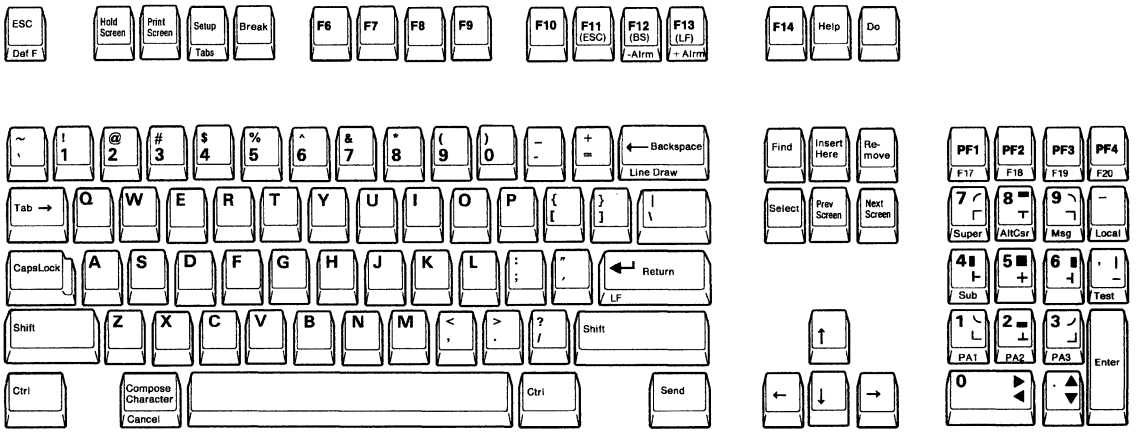


21 Key Caps



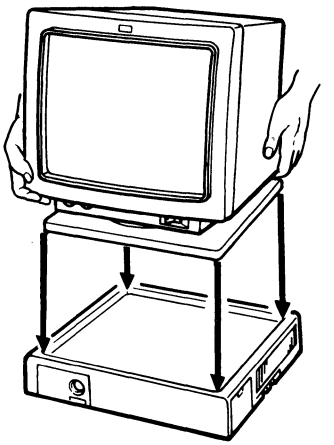


c After making the changes, your keyboard should look like this.

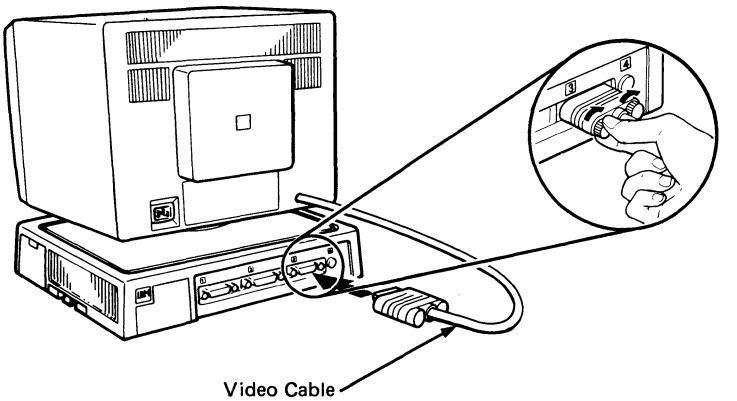


Step 4. Connecting the Cables

a Place the video element on the logic element.



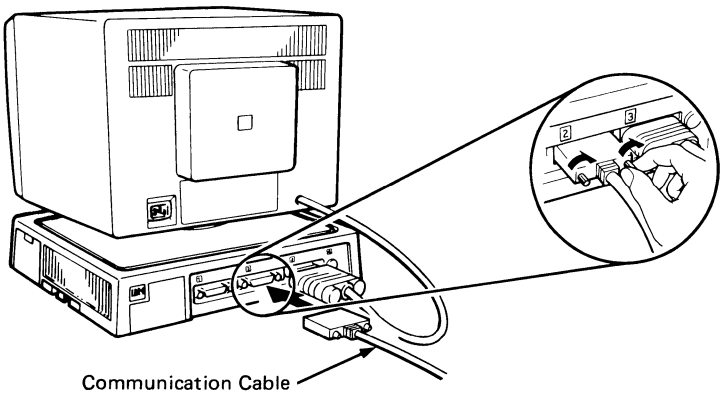
b Insert the video cable fully into the logic element (position 3), and tighten the screws.



c

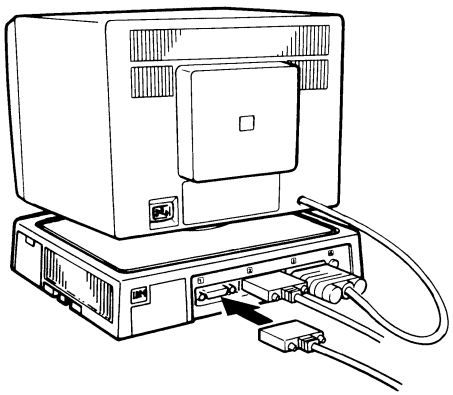
DANGER
Do not perform this step during an electrical storm. Communication cables can conduct lethal charges of electricity.

Insert the communication cable fully into the logic element (position 2), and tighten the screws.



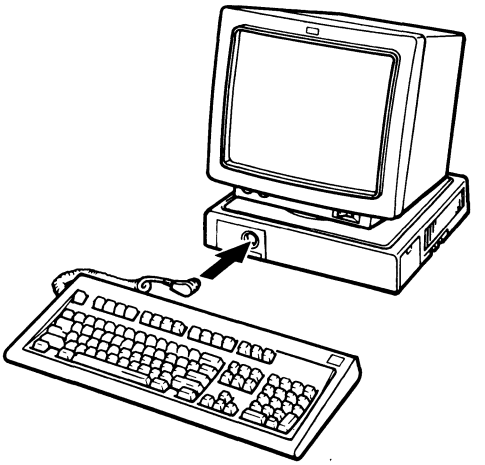
d

To connect a printer or any other optional device, insert its cable into the logic element (position 1), and tighten the screws.



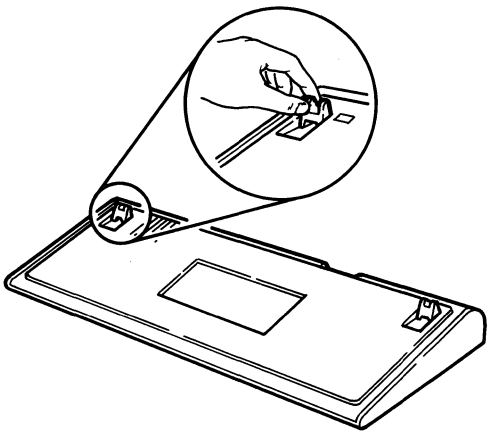
Step 4. Connecting the Cables

e Insert the keyboard cable into the logic element.



Step 5. Setting the Keyboard Angle

Adjust the legs as needed.



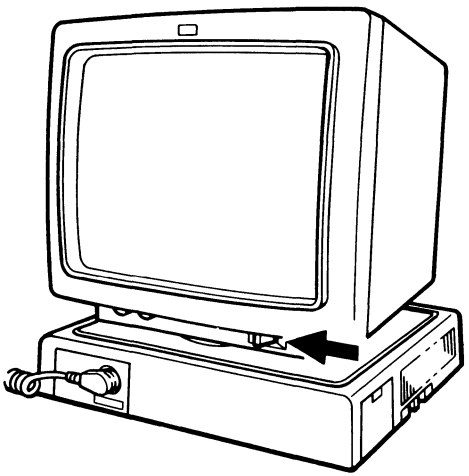
CAUTION

The power cord plug (when supplied) is approved for use with this display station and meets the relevant testing laboratory, country, or test-house standards. For your safety, the plug must be connected to a properly wired and grounded receptacle. An improperly wired receptacle could place a hazardous voltage on accessible metal parts of the display station. The customer is responsible for receptacle wiring.

Notice for Customers in Chicago, Illinois: Two, different-length power cords are shipped with the 3162; 1.8 m (5.9 ft) and 2.8 m (9.2 ft). Do not use the 2.8 m (9.2 ft) power cord; use the 1.8 m (5.9 ft) power cord.

---

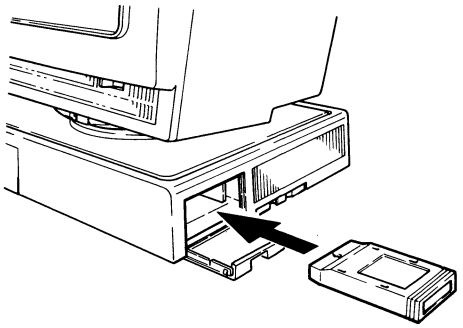
a Make sure the Power switch is set to O (Off).



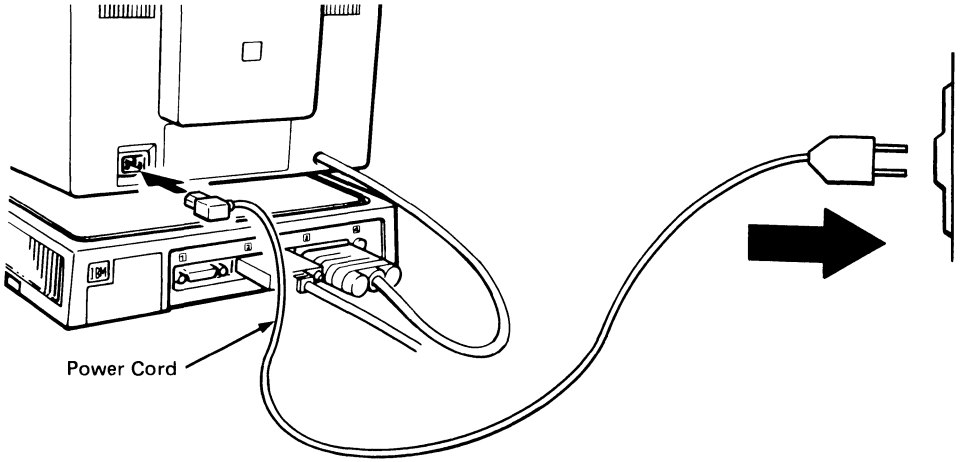
b

Warning: Do not remove or insert the cartridge when the display station is powered-on. Damage to the display station may result.

Open the small door and fully insert the cartridge into the slot of the logic element; then close the door.

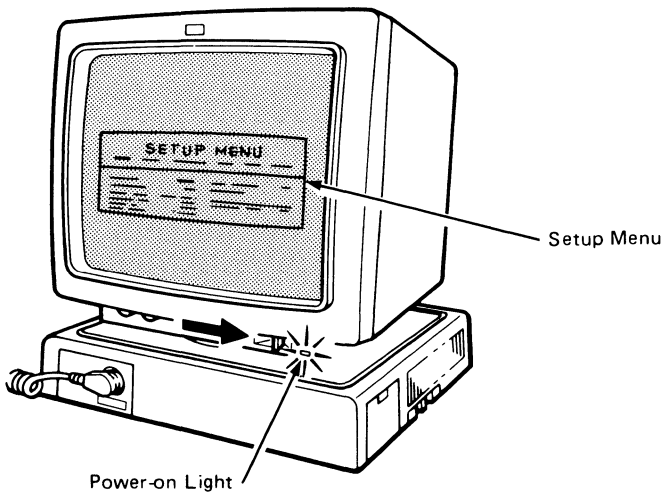


c Insert the power cord into the video element; insert the other end into a power outlet.



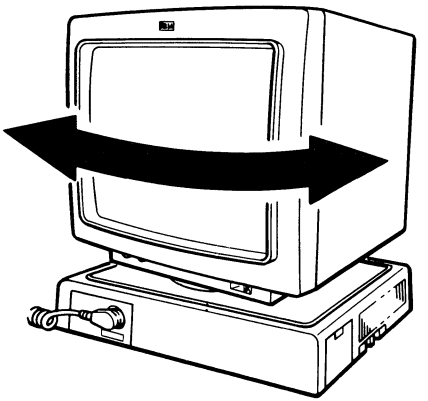
d Set the Power switch to I (On).

The power-on light should come on; the setup menu should appear; and the audible alarm should sound.

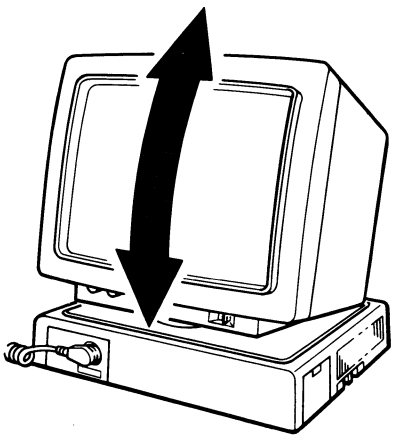


Step 7. Positioning the Video Element for Viewing Comfort

a Swivel the video element as needed.

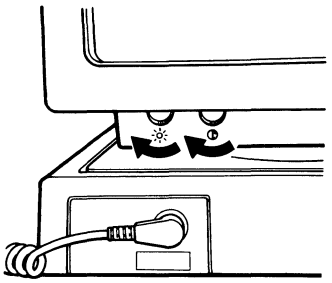


b Tilt the video element as needed.



Step 8. Adjusting the Screen Brightness and Contrast

a Turn the brightness (☼) and contrast (◑) control knobs fully clockwise.



b Slowly turn the knobs (☼ for brightness and ◑ for contrast) counterclockwise until the high-intensity box becomes brighter than the other characters.

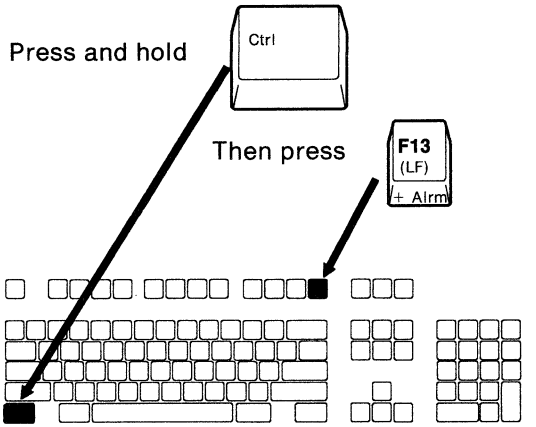
```
                    S E T U P      M E N U

GENERAL   DISPLAY   COMMUNICATION   KEYBOARD   PRINTER   FUNCTION

On-Line/Local                ON-LINE   Auto Answerback          OFF
Transparent Mode               OFF     Answerback
Machine Mode      VT200 CONTROL 7      ____________________________
Operation Mode                ECHO     Answerback Concealed     OFF
VT100 ID                     VT220
User Features                UNLOCK
```

High-intensity Box

Step 9. Adjusting the Audible Alarm Sound

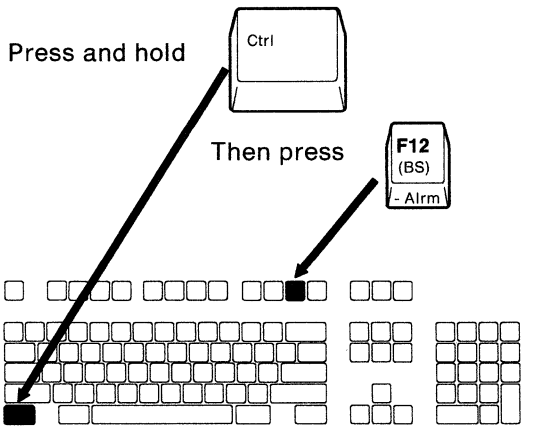
a

To increase the sound of the audible alarm:



b

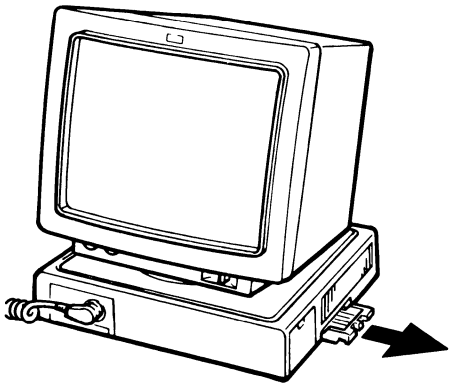
To decrease the sound of the audible alarm:



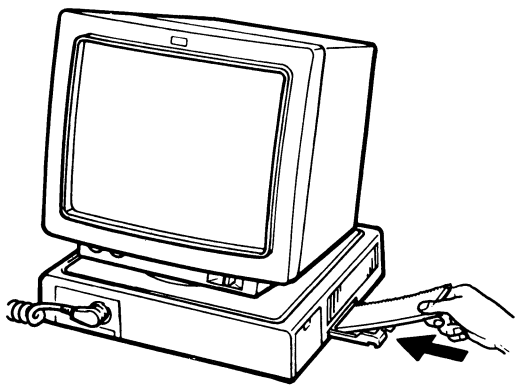
Repeat these steps until the alarm is set at a comfortable level.

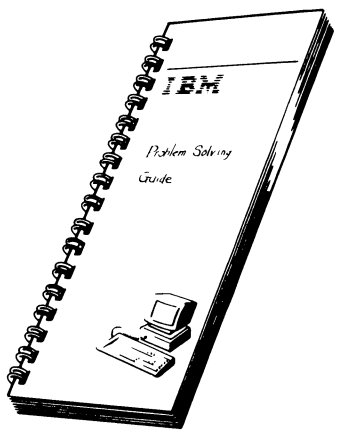
Step 10. Placing the Problem Solving Guide in the Drawer

a Pull out the drawer.



b Place the *problem solving guide* in the drawer.





Defining Setup Values

You must define the setup values so that the display station can correctly communicate with the host system or printer. The person who is responsible for setting up the display station should have selected the values for your installation and should have completed Figure 2-17 on page 2-46. Refer to it and do the following steps.

If Figure 2-17 on page 2-46 is not completed and you must define setup values, see "Setup Menus and Setup Values" on page 2-25 for more information.

a Set the power switch to I (On), if set to O (Off) .

The GENERAL *menu will appear as shown below.*

Note: If you have already defined the setup values, the GENERAL menu will not appear. In this case, press the *Setup* key.

```
                        S E T U P    M E N U

 GENERAL  DISPLAY   COMMUNICATION   KEYBOARD  PRINTER   FUNCTION

On-Line/Local              ON-LINE   Auto Answerback          OFF
Transparent Mode              OFF    Answerback
Machine Mode       VT200 CONTROL 7   ____________________________
Operation Mode               ECHO    Answerback Concealed     OFF
VT100 ID                     VT220
User Features               UNLOCK
```

b Refer to Figure 2-17 on page 2-46; select the field and change the value, if needed.

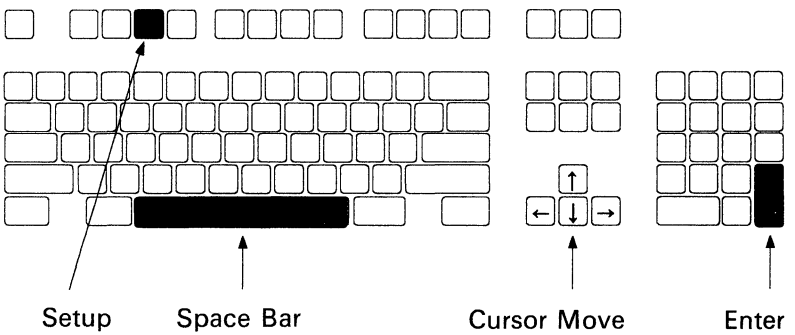
1 Using the *Cursor Move* keys (↑ ↓ ← →), select any field (high-intensity box) whose value you want to change.

2 Press the *Space Bar* until the desired value appears.

3 Repeat steps **1** and **2** until you have changed all necessary values.

Note: For the answerback message, key in the characters instead of pressing the *Space Bar*.

4 Select the next menu by pressing the *Enter* key, and change all necessary values. Follow the same procedures for all menus (GENERAL, DISPLAY, COMMUNICATION, KEYBOARD, PRINTER), except the FUNCTION menu, which has different purposes.



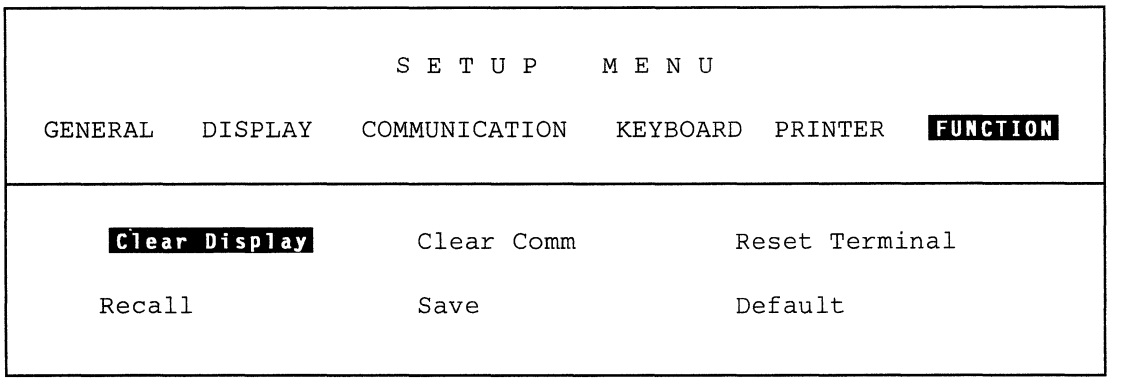
If You Need Help

If you do not understand the above procedures, see "How to Define Setup Values" on page 2-48 for a more detailed explanation.

C Select the FUNCTION menu to save the definitions that you have made on the GENERAL, DISPLAY, COMMUNICATION, KEYBOARD, and PRINTER menus.

1 Select the FUNCTION menu by pressing the *Enter* key from the PRINTER menu.

The FUNCTION *menu should look like this.*



2 Select the Save field using the *Cursor Move* keys (↑ ↓ ← →).

3 Press the *Space Bar*.

A Completed *(blinking) should appear telling you that the setup-value definitions are saved.*

4 Press the *Setup* key to exit this mode.

Set-up Procedures are now complete.

Defining Function Keys

You can define function keys *F6* through *F20* from the keyboard or by the host command, however, the definitions will be lost when power is turned off. Each function-key definition you have made here is used when the respective key is pressed with the *Shift* key. ESC sequences, CSI sequences in 7-bit extended form, or character strings can be assigned to each function key. Figure 2-1 shows the locations of the keys used for this step.

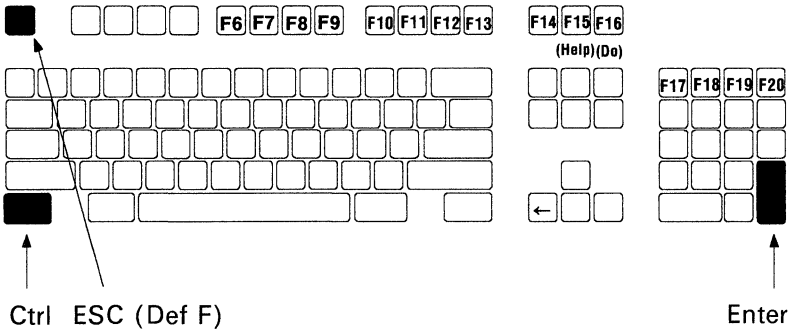
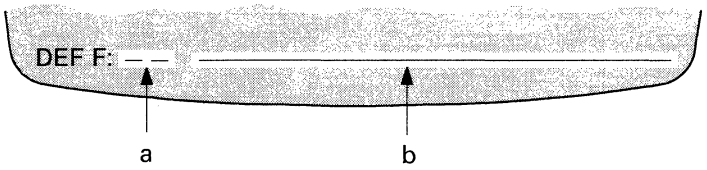


Figure 2-1. Keys Used for Defining Function Keys

a Press and hold the *Ctrl* key; then press the *Def F* key.

The function key menu should appear as shown below.



a: A two-digit number (06 through 20) of a function key is entered here.
b: The function is entered here (up to 70 characters).

b In area **a**, type a two-digit key number and press the *Enter* key.

c In area **b**, type one or more ESC sequences, CSI (ESC [) sequences, or a character string; then press the *Enter* key. (Use the ← key to move the cursor to the left to erase unwanted characters.)

The defined function key is stored.
Repeat steps **b** and **c** until you define all necessary function keys.

d To exit this mode, press and hold the *Ctrl* key; then press the *Def F* key.

Notes:

1. *You cannot define function keys if you select* LOCK *for the User Defined Key option in the KEYBOARD menu.*

2. *The display station can store up to 256 characters for all function-key definitions. If the total exceeds 256, overflow characters are discarded, and area **a** will blink at step **c**.*

3. *If you assigned more than 70 characters to a function key by the host command and display them in step **b**, area **a** will blink. If you have changed the definition at this point but do not want to save the definition, press the **Def F** key while holding down the **Ctrl** key. If you have changed the definition and press the **Enter** key, only 70 characters will be stored in the display station.*

Setting Tab Stops

You can set tab stops for later use from the keyboard or by a host command. Figure 2-2 shows the locations of the keys used for this step.

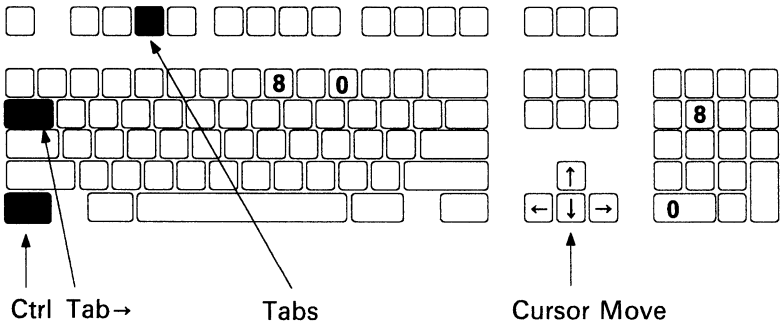


Figure 2-2. Keys Used for Setting Tab Stops

Do the following to set the tab stops using the *Tabs* key.

---

a Press and hold the *Ctrl* key; then press the *Tabs* key.

The following scale line should appear on the current line. You can move the scale line to any line using the Cursor Move keys (↑ ↓). The instructions also appear at the bottom of the screen.

< --- + ----1---- + ----2---- + ----3---- + ----4---- + ----5---- + ----6---- + ----7---- + ---- >

Setting tab stops.

1 Using the *Cursor Move* keys (← →), move the cursor to the desired tab-stop location on the scale line.

2 Then press the *Tab* → key.

A tab stop is set and displayed in reverse video.

Resetting tab stops

1 Using the *Cursor Move* keys (← →), move the cursor to the desired tab-stop location on the scale line (displayed in reverse video).

2 Then press the *Tab* → key.

The tab stop is cleared and the video returns to normal.

Clearing all tab stops

Press either *Numeric 0* key.

Setting default tab stops

Press either *Numeric 8* key.

Tab stops are set every eight columns.

b To exit this mode, press and hold the *Ctrl* key; then press the *Tabs* key.

If you want to save the tab settings that you have made here, perform the Save operation in the FUNCTION menu.

Setup Menus and Setup Values

Before you can use the display station in emulation mode, certain information (such as the type of communication interface, line speed, and parity) must be set correctly. Such information, called *setup values*, is necessary before you can communicate with a host system or an optional device (such as a printer) on the auxiliary port. You may also want to define the type of scrolling or screen appearance (normal or reverse video) to be used. You can define setup values from the setup menus. Most setup values can also be defined by host commands.

This section describes setup menus; what the setup menus are; what the setup values mean; and how you can change the setup values.

Warning: The setup values are stored in the logic element, which means that when you first install the display station or if you ever replace the logic element, you must define these values. Otherwise, the display station may not work correctly.

Setup Menus

In emulation mode the IBM 3162 provides six setup menus that you use to define setup values.

- GENERAL
- DISPLAY
- COMMUNICATION
- KEYBOARD
- PRINTER
- FUNCTION.

Each menu, except the FUNCTION menu, contains the setup-value-definition fields. The FUNCTION menu is used, for example, to save the setup-value definitions or to reset the setup-value definitions to the factory-set default values.

When you power-on the display station the first time with the emulation cartridge inserted, the GENERAL menu appears informing you to define the setup values. You can also display the menu by pressing the *Setup* key.

Some setup parameters are different in emulation mode. These differences are described in "Equivalent Setup Parameters" on page 2-43. This section describes the meanings of the setup parameters in the menus.

Note: During setup mode,

- the instructions for the menu are displayed at the bottom of the screen.
- on-line operations are suspended (the incoming data is stored in the display station).

GENERAL Menu

Figure 2-3 shows the GENERAL menu. Figure 2-4 on page 2-28 explains the setup parameters, their possible values, and their meanings.

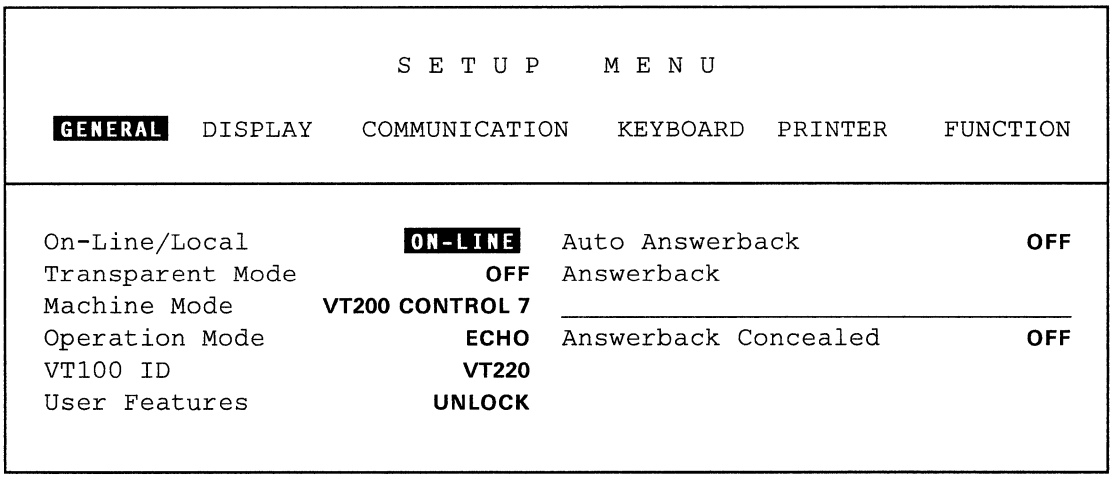


Figure 2-3. GENERAL Menu

Setup Parameters	Possible Values	Meanings
On-Line/Local	ON-LINE	The display station operates in on-line mode and can communicate with a host system.
	LOCAL	The display station operates in local mode. Data entered from the keyboard is displayed only on the screen. Data cannot be sent, and data received from the host system is not displayed until ON-LINE is selected.
Transparent Mode	OFF | ON	Transparent mode is equivalent to display control mode in the DEC VT220. When ON is selected, commands are handled as character strings. This means that the control characters (except the LF, VT, and FF characters) are displayed on the screen without performing their functions. This mode may be used for debugging programs.
Machine Mode	VT200 CONTROL 7 VT200 CONTROL 8 VT100 VT52	The display station operates in the selected machine mode.
Operation Mode	ECHO	Data entered from the keyboard is sent only to the host system; it is not displayed. Echo mode is equivalent to no local echo mode in the DEC VT220.
	CHAR	Data entered from the keyboard is sent to the host system and displayed on the screen. Character mode is equivalent to local echo mode in the DEC VT220.
VT100 ID	VT220 VT100 VT101 VT102	This parameter is only effective when you select VT100 for the machine mode. The display station returns the selected response for the Device Attribute command.

Figure 2-4 (Part 1 of 2). Setup Parameters in the GENERAL Menu

Setup Parameters	Possible Values	Meanings
User Features	UNLOCK LOCK	When LOCK is selected, an application program cannot define the following setup parameters: • Auto Repeat • Scroll • Screen • Tab Stops • Keyboard Lock.
Auto Answerback	ON | OFF	When ON is selected, the answerback message is automatically sent to the host system when the communication is started.
Answerback		You can specify up to 20 characters for the answerback message.
Answerback Concealed	ON | OFF	When ON is selected, the answerback-message entry is not displayed on the screen.

Figure 2-4 (Part 2 of 2). Setup Parameters in the GENERAL Menu

DISPLAY Menu

Figure 2-5 shows the DISPLAY menu. Figure 2-6 on page 2-31 explains the setup parameters, their possible values, and their meanings.

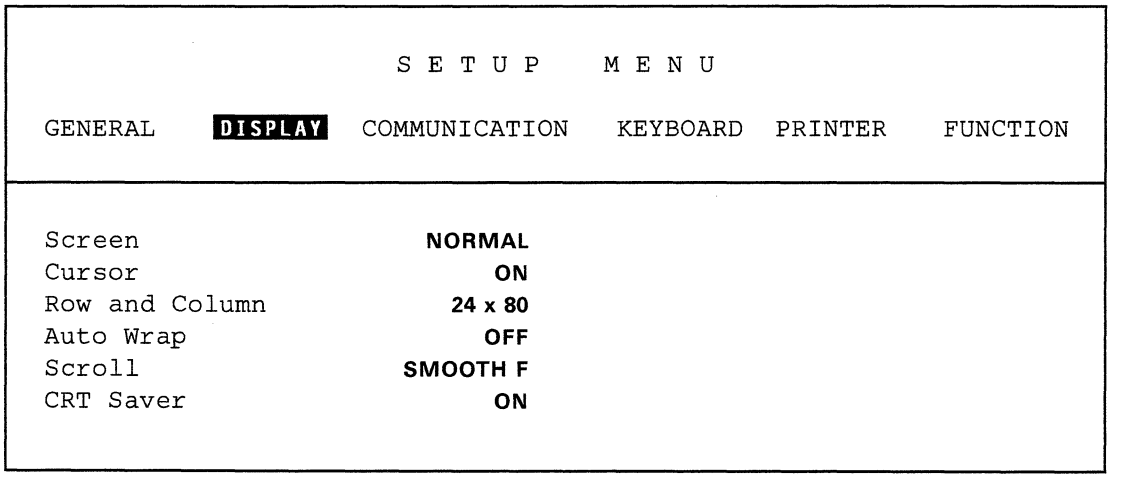


Figure 2-5. DISPLAY Menu

Setup Parameters	Possible Values	Meanings
Screen	NORMAL	The whole screen is displayed in normal video.
	REVERSE	The whole screen is displayed in reverse video.
Cursor	ON | OFF	When OFF is selected, the cursor is not displayed.
Row and Column	24 x 80 24 x 132 28 x 80 28 x 132	The display station uses a screen size based on the selected rows (lines) and columns (characters). The contents of the screen are cleared when the value is changed.
Auto Wrap	ON	A character received beyond the right margin is displayed at the first position of the next line.
	OFF	A character received beyond the right margin is written over the last character of the current line.
Scroll	SMOOTH F	For example, when the last character of the last line is entered or received, all lines move up slowly.
	SMOOTH S	For example, when the last character of the last line is entered or received, all lines move up slowly (slower than SMOOTH F).
	JUMP	For example, when the last character of the last line is entered or received, all lines move up rapidly.
CRT Saver	ON | OFF	When ON is selected, the screen goes blank if no data is received from the host system or entered from the keyboard for 15 minutes. When data is received or entered and this function is active, the screen displays the data again. *Note:* CRT means cathode-ray tube.

Figure 2-6. Setup Parameters in the DISPLAY Menu

COMMUNICATION Menu

Figure 2-7 shows the COMMUNICATION menu. Figure 2-8 on page 2-33 explains the setup parameters, their possible values, and their meanings.

Notes:

1. *RS-422A cannot be selected on some models.*

2. *The Line Control option is not effective when RS-422A is selected for the interface.*

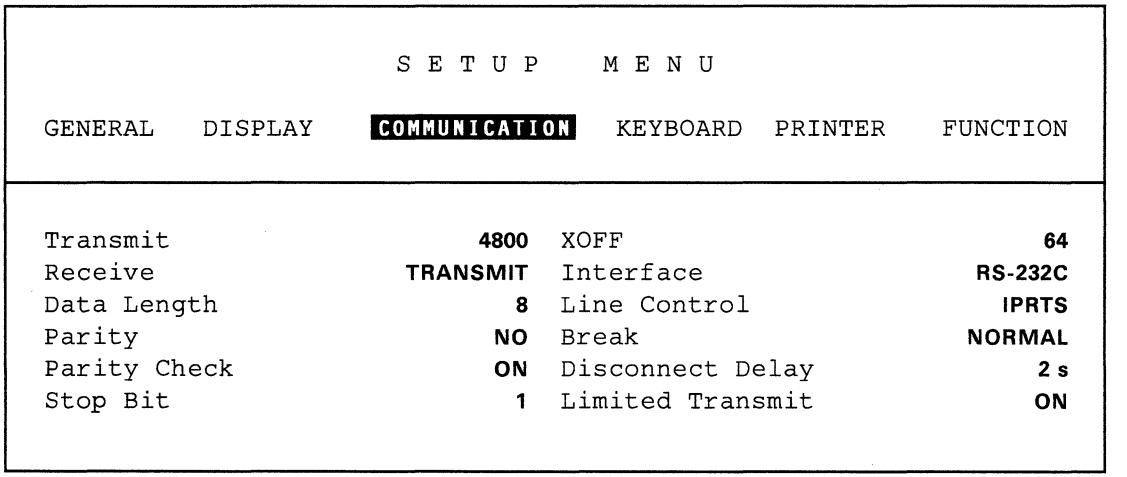


Figure 2-7. COMMUNICATION Menu

Setup Parameters	Possible Values	Meanings
Transmit	See page 2-46	The display station sends data to the host system at the selected line speed (bps).
Receive	See page 2-46	The display station receives data from the host system at the selected line speed (bps). When TRANSMIT is selected, the transmit line speed is used for the receive line speed.
Data Length	8 | 7	The display station uses the selected data length (7-bit or 8-bit).
Parity	NO EVEN ODD MARK SPACE	The display station uses the selected parity. Parity is not added when NO is selected.
Parity Check	ON | OFF	When ON is selected, parity is checked.
Stop Bit	1 | 2	The display station places one or two bits after each data character.
XOFF	64 128 600 NO	The display station sends an XOFF character to the host system when the buffer of the display station is filled with the selected number of characters, or no XOFF character is sent (when NO is selected).
Interface	RS-232C RS-422A	The display station communicates with the host system using the EIA RS-232C or RS-422A interface.

Figure 2-8 (Part 1 of 2). Setup Parameters in the COMMUNICATION Menu

Setup Parameters	Possible Values	Meanings
Line Control	IPRTS	The display station controls the RS-232C signal line using IPRTS (induced permanent request to send). IPRTS handles the CTS (clear to send), RLSD (received line signal detect), and DSR (data set ready) signals as if the signals were always on. This parameter is effective when RS-232C is selected for the interface. IPRTS is equivalent to "EIA Port, Data Leads Only" in the DEC VT220.
	PRTS	The display station controls the RS-232C signal line using PRTS (permanent request to send). PRTS handles the CTS, RLSD, and DSR as modem signals. This parameter is effective when RS-232C is selected for the interface. PRTS is equivalent to "EIA Port, Modem Control" in the DEC VT220.
Break	NORMAL	The display station sends a 300 ms break signal to the host system when the *Break* key is pressed.
	SHORT	The display station sends a 170 ms break signal to the host system when the *Break* key is pressed.
	NO	The display station does not send a break signal to the host system when the *Break* key is pressed.
Disconnect Delay	2 s | 60 ms	Communication with the host system is disabled for the selected period after the RLSD signal is lost.
Limited Transmit	ON | OFF	When ON is selected, the number of characters sent to the host system is limited to 150 to 180 per second, regardless of the line speed.

Figure 2-8 (Part 2 of 2). Setup Parameters in the COMMUNICATION Menu

KEYBOARD Menu

Figure 2-9 shows the KEYBOARD menu. Figure 2-10 on page 2-36 explains the setup parameters, their possible values, and their meanings.

```
                    S E T U P    M E N U

GENERAL   DISPLAY   COMMUNICATION   KEYBOARD   PRINTER   FUNCTION

New Line                    CR    Numeric Keypad        NORMAL
Keys                TYPEWRITER    Cursor Keys           NORMAL
Lock                      CAPS    User Defined Key      UNLOCK
Auto Repeat                ON
Margin Bell                ON
Warning Bell               ON
```

Figure 2-9. KEYBOARD Menu

Setup Parameters	Possible Values	Meanings
New Line	CR	A CR (carriage return) character is generated when the *Return* key is pressed.
	CR/LF	Both the CR and LF (line feed) characters are generated when the *Return* key is pressed.
Keys	TYPEWRITER DATA PROCESSING	TYPEWRITER is assumed regardless of the setting.
Lock	CAPS	The alphabetic keys generate uppercase characters only.
	SHIFT	The alphabetic keys generate uppercase characters only and numeric/symbol keys generate the upper half label of each key.
Auto Repeat	ON | OFF	When ON is selected, most keys continue to generate the character while being pressed.
Margin Bell	ON | OFF	When ON is selected, an audible alarm will sound when the cursor reaches the right margin; either column 73 (80-column mode) or column 125 (132-column mode).
Warning Bell	ON | OFF	When ON is selected, an audible alarm will sound when an operation error occurs or the display station receives the control-G code.
Numeric Keypad	NORMAL	The display station sends the corresponding ASCII character when a numeric keypad key is pressed.
	APPLICATION	The display station performs the application control function when a numeric keypad key is pressed.
Cursor Keys	NORMAL	The display station sends the corresponding ASCII character when a cursor key is pressed.
	APPLICATION	The display station performs the application control function when a cursor key is pressed.
User Defined Keys	UNLOCK LOCK	When LOCK is selected, neither an application program nor the *Def F* key can define the function keys.

Figure 2-10. Setup Parameters in the KEYBOARD Menu

PRINTER Menu

Figure 2-11 shows the PRINTER menu. Figure 2-12 on page 2-38 explains the setup parameters, their possible values, and their meanings.

```
                    S E T U P    M E N U

GENERAL   DISPLAY   COMMUNICATION   KEYBOARD   PRINTER   FUNCTION

Speed                          4800   Print Mode              NORMAL
Data Length                       8   Print Terminator            NO
Parity                           NO
Stop Bit                          1
Print Region              FULL SCREEN
Data                   NATIONAL ONLY
```

Figure 2-11. PRINTER Menu

Setup Parameters	Possible Values	Meanings
Speed	See page 2-47	The display station sends data to the optional device on the auxiliary port at the selected line speed (bps).
Data Length	8 | 7	The display station uses the selected data length (7-bit or 8-bit).
Parity	NO EVEN ODD MARK SPACE	The display station uses the selected parity. Parity is not added when NO is selected.
Stop Bit	1 | 2	The display station places one or two bits after each data character.
Print Region	FULL SCREEN	The display station sends the complete screen data to the printer (optional device) when a print operation is requested.
	SCROLL REGION	The display station sends a part of the screen data (top margin through bottom margin) to the printer (optional device) when a print operation is requested.
Data	NATIONAL ONLY	The display station uses the national language code page (NLC) to map the code to the character and the resulting character is sent to the printer (optional device). For example, Ä is regarded as A.
	NATIONAL & LINE DRAWING	The display station uses NLC to map the code to the character and the resulting character is sent to the printer (optional device). The DEC line-drawing characters are also sent to the printer (optional device).
	ALL	The display station sends all characters, including the control characters and diacritical characters (for example, Ä), to the printer (optional device).

Figure 2-12 (Part 1 of 2). Setup Parameters in the PRINTER Menu

Setup Parameters	Possible Values	Meanings
Print Mode	NORMAL	A print operation is performed when requested from the keyboard.
	AUTO	The current line is sent to the printer (optional device) when a line feed, a form feed, or a vertical tab character is received from the host system; or an auto wrap condition occurs.
	CONTROLLER	Data from the host system is sent to the printer (optional device), but not displayed on the screen.
Print Terminator	NO | FF	When FF is selected, the form feed character is sent to the printer (optional device) after the screen data is printed. *Note:* This option is effective only for the print screen operation.

Figure 2-12 (Part 2 of 2). Setup Parameters in the PRINTER Menu

Note: The IBM 4201 Proprinter (or IBM 4202 Proprinter XL) with a serial interface can be attached to the 3162 via an I/O cable (part 6343373).
Figure 2-13 on page 2-40 shows an example of the printer switch settings (on the serial interface module) when the Proprinter is attached to the 3162. Switches A7, B3, B4 must be set as in Figure 2-13 on page 2-40; other switches may be set differently.

Parameter	Switch	Setting
Line Speed (19200)	A1	On
	A2	On
	A3	On
Parity (EVEN)	A4	On
	A5	On
Pacing (enable)	A6	Off
-	A7	Off
Word Length (8 bit)	B1	Off
Stop Bit (1)	B2	Off
Mode (Normal)	B3	Off
-	B4	Off

Figure 2-13. Example of the Proprinter (XL) Switch Settings

In this case, the setup parameters for the printer must be set in the PRINTER menu as follows:

- **Speed**: 19200
- **Data Length**: 8
- **Parity**: EVEN
- **Stop Bit**: 1
- **Print Region**: FULL SCREEN or SCROLL REGION
- **Data**: NATIONAL ONLY (always)
- **Print Mode**: NORMAL, AUTO, or CONTROLLER
- **Print Terminator**: NO (always)

FUNCTION Menu

Figure 2-14 shows the FUNCTION menu. Figure 2-15 explains each function.

The 3162 has two storage areas for saving the setup-value definitions; VM (volatile memory) and NVM (non-volatile memory). The contents of VM are lost when the power is turned off; the contents of NVM are retained.

When you power-on the 3162 for the first time, NVM contains no values and factory-set setup-value definitions are copied to VM. These are called *default* values and are used unless you redefine them.

When you power-on the 3162 after saving your setup-value definitions (in NVM), the contents of NVM are copied to VM. The 3162 operates **using the setup values in VM.** The contents of VM are immediately changed when you select the other setup value by pressing the *Space Bar* in the setup menus. When you perform the save function at this point, the contents of VM are copied to NVM enabling them to be used later.

```
                    S E T U P    M E N U

GENERAL   DISPLAY   COMMUNICATION   KEYBOARD   PRINTER   FUNCTION

   Clear Display        Clear Comm          Reset Terminal

   Recall               Save                Default
```

Figure 2-14. FUNCTION Menu

If you select this field and press the space bar	this will occur
Clear Display	Screen is erased.
Recall	The contents of NVM are copied to VM and the screen is erased. Power-on reset (except checking the internal circuits) is performed.
Clear Comm	Communications are initialized.
Save	The setup-value definitions and tab settings (defined now and saved in VM) are also saved in NVM.
Reset Terminal	The display station's operating parameters (such as the scroll region and the character set) are reset to their default values. Some setup-value definitions in NVM are also changed, but communications are not initialized.
Default	The setup-value definitions and tab settings set in the factory are copied to VM.

Figure 2-15. Functions in the FUNCTION Menu

Equivalent Setup Parameters

The center column in Figure 2-16 shows the DEC VT220 setup parameters and the right column shows their equivalent ones in emulation mode.

Note: DEC VT220 does not define CRT Saver and Interface. CRT Saver is always on and RS-232C is used for the interface.

DEC VT220 Menus	DEC VT220 Parameters	3162 Parameters
Set-Up Directory	On-Line/Local	On-Line/Local in the GENERAL menu
	Set-Up	Not available
	Keyboard	Not available
Display Set-Up	Columns	Row and Column
	Controls	Transparent Mode in the GENERAL menu
	Auto Wrap	Auto Wrap
	Scroll	Scroll
	Text/Screen	Screen
	Text Cursor	Cursor
	Cursor Style	*Alt Csr* key
General Set-Up	Mode	Machine Mode
	VT100	VT100 ID
	User Defined Keys	User Defined Keys in the KEYBOARD menu
	User Features	User Features
	Keypad	Numeric Keypad in the KEYBOARD menu

Figure 2-16 (Part 1 of 3). Equivalent Setup Parameters

Equivalent Parameters

DEC VT220 Menus	DEC VT220 Parameters	3162 Parameters
General Set-Up	Cursor Keys	Cursor Keys in the KEYBOARD menu
	New Line	New Line in the KEYBOARD menu
	Multinational/National	Not available
Communications Set-Up	Transmit	Transmit
	Receive	Receive
	XOFF	XOFF
	Bits/Parity	Data Length, Parity, and Parity Check
	Stop Bit	Stop Bit
	Local Echo	Operation Mode
	Port	Line Control
	Disconnect Delay	Disconnect Delay
	Limited Transmit	Limited Transmit
Printer Set-Up	Speed	Speed
	Mode	Print Mode
	Bits/Parity	Data Length and Parity
	Stop Bit	Stop Bit
	Print	Print Region
	Printed Data Type	Data
	Print Terminator	Print Terminator

Figure 2-16 (Part 2 of 3). Equivalent Setup Parameters

DEC VT220 Menus	DEC VT220 Parameters	3162 Parameters
Keyboard Set-Up	Keys	Keys
	Lock	Lock
	Auto Repeat	Auto Repeat
	Keyclick	Not available
	Margin Bell	Margin Bell
	Warning Bell	Warning Bell
	Break	Break in the COMMUNICATION menu
	Auto Answerback	Answerback in the GENERAL menu
	Answerback =	Answerback entry in the GENERAL menu
	Concealed	Answerback Concealed in the GENERAL menu
Tab Set-Up	Clear All Tabs Set 8 Column Tabs Tab Fields and Ruler	*Tabs* key

Figure 2-16 (Part 3 of 3). Equivalent Setup Parameters

Setup Parameters List

Circle the selected value for each parameter in the following list. This information will be the source used to define the setup values.

GENERAL	
On-Line/Local	ON-LINE* | LOCAL
Transparent Mode	OFF* | ON
Machine Mode	VT200 CONTROL 7* | VT100 | VT52 | VT200 CONTROL 8
Operation Mode	ECHO* | CHAR
VT100 ID	VT220* | VT100 | VT101 | VT102
User Features	UNLOCK* | LOCK
Auto Answerback	OFF* | ON
Answerback	_____
Answerback Concealed	OFF* | ON
DISPLAY	
Screen	NORMAL* | REVERSE
Cursor	ON* | OFF
Row and Column	24 x 80* | 24 x 132 | 28 x 80 | 28 x 132
Auto Wrap	OFF* | ON
Scroll	SMOOTH F* | SMOOTH S | JUMP
CRT Saver	ON* | OFF
COMMUNICATION	
Transmit	75 | 110 | 134.5 | 150 | 300 | 600 | 1200 | 1800 | 2400 | 4800* | 9600 | 19200
Receive	TRANSMIT* | 75 | 110 | 134.5 | 150 | 300 | 600 | 1200 | 1800 | 2400 | 4800 | 9600 | 19200
Data Length	8* | 7
Parity	NO* | EVEN | ODD | MARK | SPACE
Parity Check	ON* | OFF
Stop Bit	1* | 2
XOFF	64* | 128 | 600 | NO
Interface	RS-232C* | RS-422A
Line Control	IPRTS* | PRTS
Break	NORMAL* | SHORT | NO
Disconnect Delay	2 s* | 60 ms
Limited Transmit	ON* | OFF

* Indicates the default values (same values as set in the factory).

Figure 2-17 (Part 1 of 2). Setup Parameters and Their Possible Values

KEYBOARD

New Line	CR* | CR/LF
Keys	TYPEWRITER* | DATA PROCESSING
Lock	CAPS* | SHIFT
Auto Repeat	ON* | OFF
Margin Bell	ON* | OFF
Warning Bell	ON* | OFF
Numeric Keypad	NORMAL* | APPLICATION
Cursor Keys	NORMAL* | APPLICATION
User Defined Keys	UNLOCK* | LOCK

PRINTER

Speed	75 | 110 | 134.5 | 150 | 300 | 600 | 1200 | 1800 | 2400 | 4800* | 9600 | 19200
Data Length	8* | 7
Parity	NO* | EVEN | ODD | MARK | SPACE
Stop Bit	1* | 2
Print Region	FULL SCREEN* | SCROLL REGION
Data	NATIONAL ONLY* | NATIONAL & LINE DRAWING | ALL
Print Mode	NORMAL* | AUTO | CONTROLLER
Print Terminator	NO* | FF

* Indicates the default values (same values as set in the factory).

Figure 2-17 (Part 2 of 2). Setup Parameters and Their Possible Values

How to Define Setup Values

This section describes how the setup menus are organized and how you can change the setup values through the menus.

Selecting a Menu

The GENERAL menu appears whenever you press the *Setup* key. You can select the next menu by pressing the *Enter* key. Each menu appears in the order as shown in Figure 2-18. The current menu appears in reverse video on the second line of each menu. To quit a menu without saving the definitions, press the *Setup* key while holding down the *Ctrl* key.

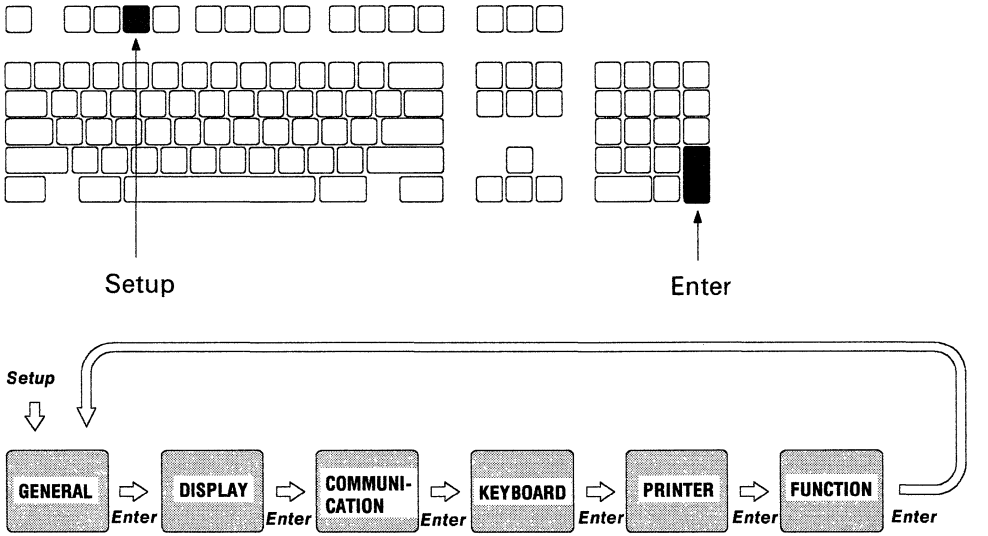


Figure 2-18. Selecting a Menu

Selecting a Field in the Menu

You can select a field using the *Cursor Move* keys. The setup value of the current field is displayed in high-intensity, reverse video.

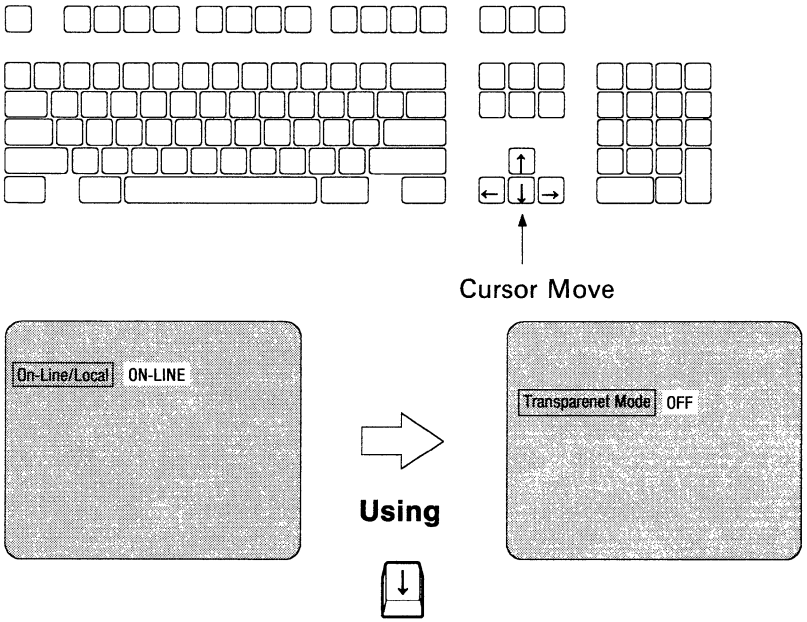


Figure 2-19. Selecting a Field

Selecting Values in the Fields

You can select a value for any field using the *Space Bar*. Press the *Space Bar* until the desired value appears. You only key in characters when defining the answerback message. If you try to key in characters in any other field, the audible alarm will sound.

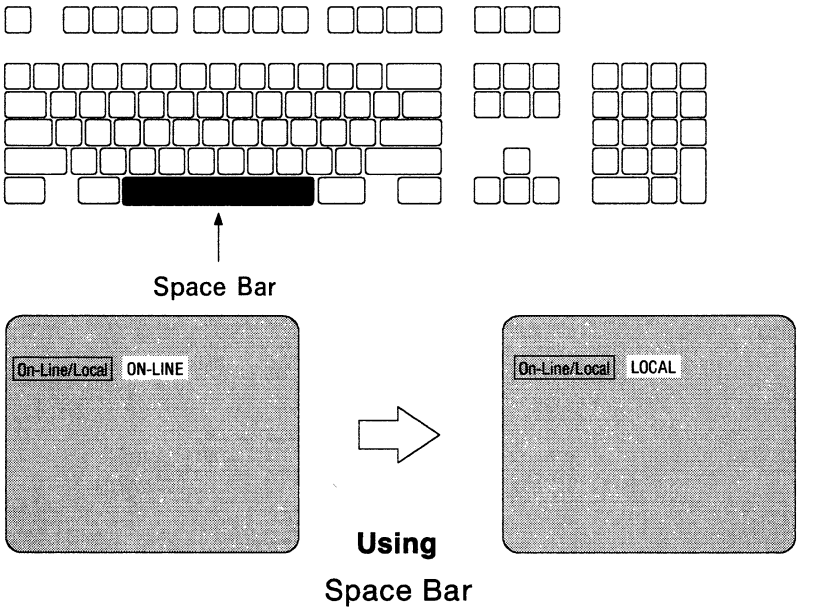


Figure 2-20. Selecting Values

Saving the Definitions

When you complete the setup-value definitions for each menu, select the FUNCTION menu to save those values. Select the Save field and then press the *Space Bar*. When the save operation successfully completes, Completed is displayed (blinking). Notice that the function of the *Space Bar* is different here from the other menus.

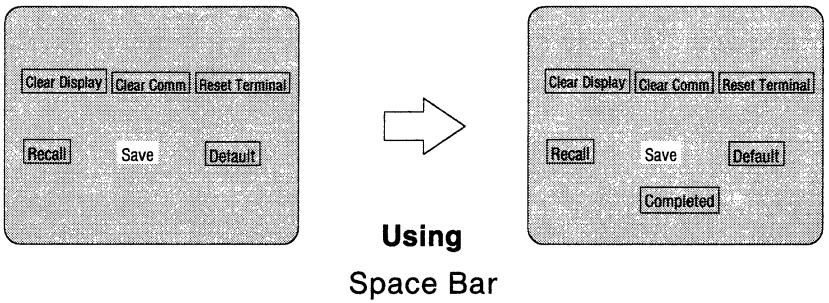


Figure 2-21. Saving the Definitions

Chapter 3. Interpreting Operator Messages

This chapter describes the messages displayed at the bottom of the screen (operator information area). This area is used to display:

- The operating status of the display station
- The communication status
- Warning messages if a problem is detected.

Messages are displayed in predefined areas depending on their type. Figure 3-1 on page 3-2 shows the operator information area, and Figure 3-2 on page 3-2 explains what the operator messages are, what they mean, and what action, if any, is required for each.

Notes:

1. *The operator information area is not displayed when you power-on the display station the first time after installation. You can turn on the indications of this area by pressing the* ***Msg*** *key while holding down the* ***Ctrl*** *key.*

2. *The operator information area is also used to display one-line menus for defining setup values, function keys, and tab stops.*

3. *If two or more messages exist in each area, the message with the higher priority is displayed. Messages in area 3 are displayed in the following order:*

   a. PROBLEM IN LOGIC ELEMENT
   b. PROBLEM IN LOGIC ELEMENT OR KEYBOARD
   c. PROBLEM IN KEYBOARD
   d. COMM NOT READY 2
   e. COMM NOT READY 1
   f. AUX NOT READY

g. AUX NONE
h. KEYS LOCKED
i. HOST BUSY
j. AUX BUSY
k. HOLD SCREEN
l. PRINTING
m. INVALID KEY
n. KEYBOARD ERROR
o. PRINT CONTROLLER
p. AUTO PRINT.

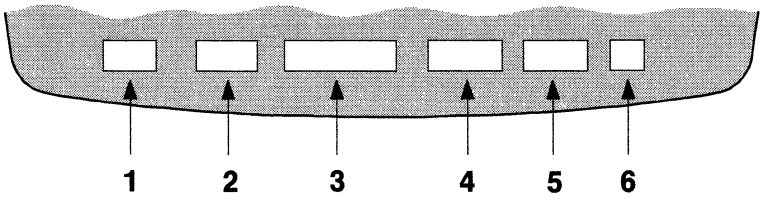


Figure 3-1. Operator Information Area

Area	Message	Meaning	Action
1	CHAR ECHO LOCAL TEST	Shows the current operating mode. *Note:* CHAR is equivalent to local echo mode in the DEC VT220.	None.
2	TRANSP	Shows that the display station is in display control mode.	None.

Figure 3-2 (Part 1 of 7). Operator Messages

Area	Message	Meaning	Action
3	AUX BUSY	Appears when an XOFF condition occurs at the optional device on the auxiliary port.	Wait. This message disappears when the display station receives an XON character or you perform Clear Comm in the FUNCTION menu.
	AUX NONE	Appears when an operator or an application program tries to send data to the optional device while it is not attached to the auxiliary port, or has not been powered-on since the display station was last powered-on.	This message disappears (1) when the optional device becomes ready, (2) you perform Clear Comm in the FUNCTION menu, (3) or you press the *Cancel* key. Check the optional device. If the message appears again, see *IBM 3162 ASCII Display Station Problem Solving Guide*.

Figure 3-2 (Part 2 of 7). Operator Messages

Area	Message	Meaning	Action
3	AUX NOT READY	Appears when an operator or an application program tries to send data to the optional device on the auxiliary port while the optional device is not ready to operate (DTR signal of the optional device is off).	This message disappears (1) when the optional device becomes ready, (2) you perform Clear Comm in the FUNCTION menu, (3) or you press the *Cancel* key. Check the optional device. If the message appears again, see *IBM 3162 ASCII Display Station Problem Solving Guide*.
	AUTO PRINT	Shows that the display station is in auto print mode. The display station enters this mode when (1) AUTO is selected for the Print Mode in the PRINTER menu, (2) receiving the Auto Print Mode command, or (3) the *Auto Print* key is pressed.	None.

Figure 3-2 (Part 3 of 7). Operator Messages

Area	Message	Meaning	Action
3	COMM NOT READY 1	Appears when the DTR (data terminal ready) signal is turned on and the DSR (data set ready) signal is present, but the RLSD (received line signal detector) or CTS (clear to send) signal or both of them are not present on the main port. *Note:* This message does not appear if both RS-232C and PRTS are not selected for the Interface and Line Control, respectively, in the COMMUNICATION menu.	See *IBM 3162 ASCII Display Station Problem Solving Guide.*
	COMM NOT READY 2	Appears when the DTR signal is turned on and the DSR signal is not present on the main port. *Note:* This message does not appear if both RS-232C and PRTS are not selected for the Interface and Line Control, respectively, in the COMMUNICATION menu.	See *IBM 3162 ASCII Display Station Problem Solving Guide.*

Figure 3-2 (Part 4 of 7). Operator Messages

Area	Message	Meaning	Action
3	HOLD SCREEN	Shows that the screen update is suspended when the *Hold* key is pressed. *Note:* This message does not appear if NO is selected for the XOFF option. In this case, the screen update cannot be suspended.	To release the hold-screen status, press the *Hold* key again.
	HOST BUSY	Appears when an XOFF condition occurs at the host system. *Note:* This message does not appear if NO is selected for the XOFF option.	Wait. This message disappears when the display station receives an XON character or you perform Clear Comm in the FUNCTION menu.
	INVALID KEY	Appears when you press any invalid key.	Press any valid key.
	KEYBOARD ERROR	Appears when any key is pressed and a keyboard scan code error or keyboard overrun occurs.	Retry the operation.
	KEYS LOCKED	Appears when the keyboard is locked by the Set Keyboard Action Mode command or when the keyboard buffer becomes full.	None. This status is removed by the Reset Keyboard Action Mode command or the keyboard-buffer-full condition is removed.

Figure 3-2 (Part 5 of 7). Operator Messages

Area	Message	Meaning	Action
3	PRINT CONTROLLER	Shows that the display station is in printer controller mode when ON-LINE is selected for the On-Line/Local option. Shows that the display station is in local controller mode when LOCAL is selected for the On-Line/Local option.	None.
	PRINTING	Shows that data is being sent to the optional device on the auxiliary port. *Note:* This message does not appear in printer control mode.	None.
	PROBLEM IN KEYBOARD	Shows that a problem was detected in the keyboard.	See *IBM 3162 ASCII Display Station Problem Solving Guide.*
	PROBLEM IN LOGIC ELEMENT	Shows that a problem was detected in the logic element.	See *IBM 3162 ASCII Display Station Problem Solving Guide.*
	PROBLEM IN LOGIC ELEMENT OR KEYBOARD	Shows that a problem was detected in the logic element or keyboard.	See *IBM 3162 ASCII Display Station Problem Solving Guide.*

Figure 3-2 (Part 6 of 7). Operator Messages

Area	Message	Meaning	Action
4	INSERT	Shows that insert mode was selected by the Set Insert Mode command. The display station exits this mode by the Reset Insert Mode command.	None.
5	CAPS LOCK	Shows that caps-lock mode is selected when the *Caps Lock* key is pressed.	To exit this mode, press the *Caps Lock* key again.
	COMPOSE	Shows that compose-key mode is selected when the *Compose* key is pressed. This message disappears after the completion of the compose-sequence creation.	None.
	CONTROL	Appears when the *Ctrl* key is pressed and held down.	None.
	SHIFT LOCK	Shows that shift-lock mode is selected when the *Caps Lock* key is pressed.	To exit this mode, press the *Caps Lock* key again.
	UP SHIFT	Appears when the *Shift* key is pressed and held down.	None.
6	(xxx,yyy)	*xxx* and *yyy* indicate the row and column addresses of the cursor, respectively.	None.

Figure 3-2 (Part 7 of 7). Operator Messages

Chapter 4. Reference Information

This chapter provides information that is useful when writing or modifying application programs that are used with the 3162 in emulation mode. It describes the use of the Select Screen Format and Down-Line Loading Characters (DRCS) commands.

Select Screen Format

The 3162 provides the following four screen formats:

- 80 columns and 24 rows (1920 characters)
- 80 columns and 28 rows (2240 characters)
- 132 columns and 24 rows (3168 characters)
- 132 columns and 28 rows (3696 characters).

You can select a screen format by using the Select Screen Format or Column Mode (DECCOLM) command, or from the DISPLAY menu. When this function is performed, the contents of the screen are erased, the scroll region is reset to full screen, and all line attributes are reset to single-width and single-height.

Using the Select Screen Format Command

The following CSI (control sequence introducer) format is provided in emulation mode for selecting a screen format.

```
CSI Pr ; Pc p
```

Parameter	Name	Description
Pr	Number of Rows	Specifies the height of the screen. **0** Default (24 rows) **1** 24 rows **2** 28 rows
Pc	Number of Columns	Specifies the width of the screen. **0** Default (80 columns) **1** 80 columns **2** 132 columns

Figure 4-1. Select Screen Format Parameters

Note: This CSI sequence operates when you select VT200 or VT100 for the Machine Mode option in the GENERAL menu. If you select VT52 but want to change the screen format, select VT200 or VT100 to change the screen format. To return to VT52 mode, select VT52 again.

Using the Column Mode Command (DECCOLM)

The Column Mode CSI sequence operates the same as the DEC VT220. The following Select 80 Column Mode CSI format is used for selecting a screen format of 80 columns and 24 rows.

```
CSI ? 3 l
```

The following Select 132 Column Mode CSI format is used for selecting a screen format of 132 columns and 24 rows.

```
CSI ? 3 h
```

In both CSI formats, the 28-row selection cannot be specified.

Dynamically Re-definable Character Set

The dynamically re-definable character set (DRCS) is a set of 94 characters that you can create for your own purposes. You can load them into the display station from the host system or the keyboard by using the DECDLD device control string. You can use this function also in emulation mode, but two differences exist because of the different sizes of a cell[1] between the DEC VT220 and 3162. They are:

- Designing a DRCS character
- Loading a DRCS character.

Designing Your DRCS Characters

The 3162 uses 8 dots in width and 15 dots in height to display each character. The area represented by these dots is called a cell. Figure 4-2 shows a cell used in the 3162. The DEC VT220 uses an 8 by 10 dot arrangement for each cell. Figure 4-3 on page 4-5 shows a cell used in the DEC VT220.

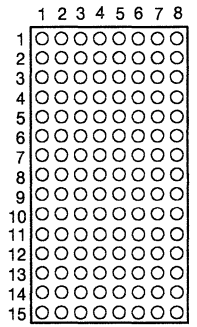


Figure 4-2. Cell Used in 3162

[1] A cell is a box area in which specified dots exist to form a character.

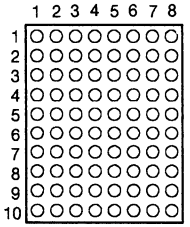


Figure 4-3. Cell Used in DEC VT220

Using characters created for the DEC VT220 will not cause any problems when used in emulation mode, because a large cell (8 by 15 dots) can hold a small cell (8 by 10). You can load the DRCS characters in the same way as you do when using a DEC VT220. A DEC VT220 DRCS character is automatically placed in the DEC VT220 area as shown in Figure 4-4. This area is equivalent to a DEC VT220 cell.

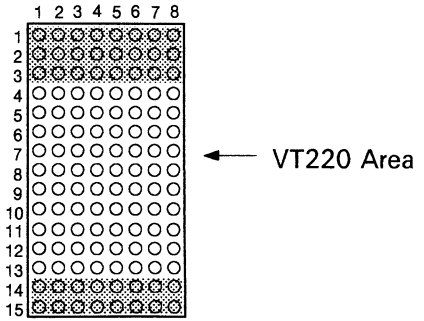


Figure 4-4. DEC VT220 Cell Area in 3162 Cell

A large cell can provide enhanced capability. You can use the additional dots in Figure 4-4 to design a more complex character. When designing characters using additional dots, note that:

- Dots in column 8 of the previous character continue to the dots in column 1 of the next character on the screen

- 28-row mode does not display rows 1 and 15 of the character.

Figure 4-5 shows an example of a character (a musical note) that uses the whole area of a cell. To load this type of character, you must use a different form of dot pattern definition in the DECDLD device control string as shown in the next section.

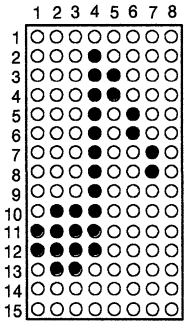


Figure 4-5. Designing a Musical Note

Loading Your DRCS Characters

To load DRCS characters, you can use the following DECDLD device control string.

```
DCS Pfn;Pcn;Pe { Dscs Sxbp1;Sxbp2;...;Sxbpn ST
```

The format and the definition of each parameter is the same as DEC VT220.

Note: Parameters Pcms, Pw, and Pt are not used and ignored if they are specified. The form for Sxbp1, Sxbp2, ..., Sxbpn is also different.

DEC VT220 Type DRCS Character

When you load a DEC VT220 type DRCS character, the dot pattern for the DRCS character, which is represented as Sxbp1, Sxbp2, ..., Sxbpn (n is up to 94), has the following form.

```
uc1 uc2 ... uc8 / lc1 lc2 ... lc8
```

A dot pattern is divided into 8-upper and 8-lower columns as shown in Figure 4-6. Each upper column consists of 6 dots (6 bits) and each lower column consists of 4 dots (4 bits). You should convert the binary value of each column into an equivalent graphic character to be used in the DECDLD device control string. Use the same converting procedures as you do in the DEC VT220.

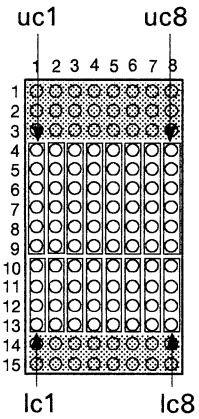


Figure 4-6. Column Definition in DEC VT220 Type DRCS Character

DRCS Character using the Whole Area of a Cell

When you want to design and load a 3162 enhanced type DRCS character, the following different form for Sxbp1, Sxbp2, ..., Sxbpn should be used while using the same DECDLD device control string.

```
uc1 uc2 ... uc8 / mc1 mc2 ... mc8 / lc1 lc2 ... lc8
```

A dot pattern is divided into 8-upper, 8-middle, and 8-lower columns as shown in Figure 4-7. Each upper and middle columns consists of 6 dots (6 bits) and each lower column consists of 3 dots (3 bits). Figure 4-7 also shows a musical note character.

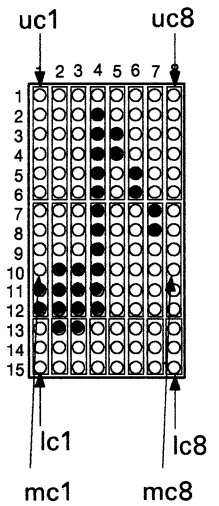


Figure 4-7. Column Definition and Musical Note in DRCS Character Using the Whole Area of a Cell

The following shows how you should convert a dot pattern of a musical note into the form used in the DECDLD device control string.

Note: In this example, column 8 is not used.

Step 1 Divide the dot pattern into 7-upper, -middle, and -lower columns.

Figure 4-7 on page 4-8 shows the divided columns.

Step 2 Represent the contents (dot pattern) of each column in the form of binary bits.

Note: The top dot of each column is the least significant bit.

In this case, the results are:

```
uc1 = B'000000' mc1 = B'110000' lc1 = B'000'
uc2 = B'000000' mc2 = B'111000' lc2 = B'001'
uc3 = B'000000' mc3 = B'111000' lc3 = B'001'
uc4 = B'111110' mc4 = B'111111' lc4 = B'000'
uc5 = B'001100' mc5 = B'000000' lc5 = B'000'
uc6 = B'110000' mc6 = B'000000' lc6 = B'000'
uc7 = B'000000' mc7 = B'000011' lc7 = B'000'
```

Step 3 Convert the binary form into the hexadecimal form; then add an offset value of X'3F'.

Note: The offset value is necessary to assign the hexadecimal code to the DRCS character that can be began from X'3F'.

In this case, the results are:

```
uc1 = X'3F'   mc1 = X'6F'   lc1 = X'3F'
uc2 = X'3F'   mc2 = X'77'   lc2 = X'40'
uc3 = X'3F'   mc3 = X'77'   lc3 = X'40'
uc4 = X'7D'   mc4 = X'7E'   lc4 = X'3F'
uc5 = X'4B'   mc5 = X'3F'   lc5 = X'3F'
uc6 = X'6F'   mc6 = X'3F'   lc6 = X'3F'
uc7 = X'3F'   mc7 = X'42'   lc7 = X'3F'
```

Step 4 Convert the resultant hexadecimal code to an equivalent graphic character.

In this case, the results are:

```
uc1 = ?    mc1 = o    lc1 = ?
uc2 = ?    mc2 = w    lc2 = @
uc3 = ?    mc3 = w    lc3 = @
uc4 = }    mc4 = ~    lc4 = ?
uc5 = K    mc5 = ?    lc5 = ?
uc6 = o    mc6 = ?    lc6 = ?
uc7 = ?    mc7 = B    lc7 = ?
```

The form used in the DECDLD device control string for representing a musical note are:

```
???}Ko?/oww~??B/?@@????
```

Index

Special Characters

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

Using the IBM 3162 ASCII Display Station
To Emulate the DEC VT220
Order No. GA18-2496-0

READER'S COMMENT FORM

This manual is part of a library that serves as a reference source for systems analysts, programmers, and operators of IBM systems. You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

Your comments will be sent to the author's department for whatever review and action, if any, are deemed appropriate. Comments may be written in your own language; English is not required.

Note: Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system, to your IBM representative or to the IBM branch office serving your locality.

Your comments:

Note: **Staples can cause problems with automated mail sorting equipment. Please use pressure sensitive or other gummed tape to seal this form.**

If you would like a reply, please supply your name and address on the reverse side of this form.

Than you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments or you may mail directly to the address in the Edition Notice on the back of the title page.)

GA18-2496-0

Reader's Comment Form

CUT
OR
FOLD
ALONG
LINE

Fold and tape **Please Do Not Staple** Fold and tape

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 40 ARMONK, N.Y. U.S.A.

POSTAGE WILL BE PAID BY ADDRESSEE:

INTERNATIONAL BUSINESS MACHINES CORPORATION
DEPARTMENT 6R1J
180 KOST ROAD
MECHANICSBURG, PA 17055

Fold and tape **Please Do Not Staple** Fold and tape

If you would like a reply, please print:

Your Name _____

Company Name _____ Department _____

Street Address _____

City _____

State _____ Zip Code _____

IBM Branch Office serving you _____

IBM®

Using the IBM 3162 ASCII Display Station to Emulate the DEC VT220 Printed in U.S.A. GA18-2496-0

GA18-2496-0