ADDS
by SunRiver Data Systems

4000/110

Guide to Operations

NOTE TO INSTALLER

This equipment complies with the FCC Regulation for Class A devices, Subpart J of Part 15. Shielded, grounded interface cables were used on all ports for FCC radiated emission testing.

The manufacturer is not responsible for any violation of the FCC Regulation for Class A devices that is caused by unauthorized modification of the equipment, or caused by equipment installation not in accordance with the instructions in this manual.

This equipment generates, uses, and can radiate radio frequency energy and may cause radio or television interference. All user equipment that interfaces with other products should be connected with shielded cables. (Contact a local dealer for more information on shielded cable assemblies and their availability.)

There is no guarantee that interference will not occur. If radio or television interference occurs (this can be determined by turning the equipment off and on while the radio or television is on), the user is solely responsible for correcting the interference and is encouraged to take one or more of these measures:

1) Reorient the receiving antenna.
2) Relocate the equipment, or move the equipment away from the receiver.
3) Plug the equipment into a different outlet so the unit and receiver are on different branch circuits.
4) Consult the dealer or an experienced radio/television technician.

It is also suggested that the user read the FCC booklet entitled "How to Identify and Resolve Radio-TV Interference Problems." The booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. (When ordering the booklet, specify stock number 04-000-00345-4.)

Site Preparation

The screen display geometry on terminal products is aligned using magnetic devices. External magnetic fields created by other types of electronic equipment, such as printers, in very close proximity to the terminal, may cause minor display distortion.

Examples of display distortion include:

- Shaky video
- Wavy lines
- Tilted display

This magnetic field interaction only occurs over a very short distance, normally less than twelve inches, and can be corrected by separating the equipment and/or slightly reorienting the display.

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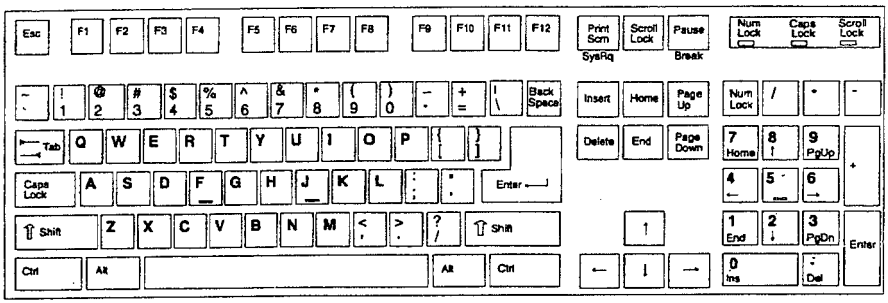
INTRODUCTION

Overview

The terminal you have purchased is a low-cost, basic terminal that provides a way to view data which resides on your host computer. It also serves as a way to enter data from your keyboard.

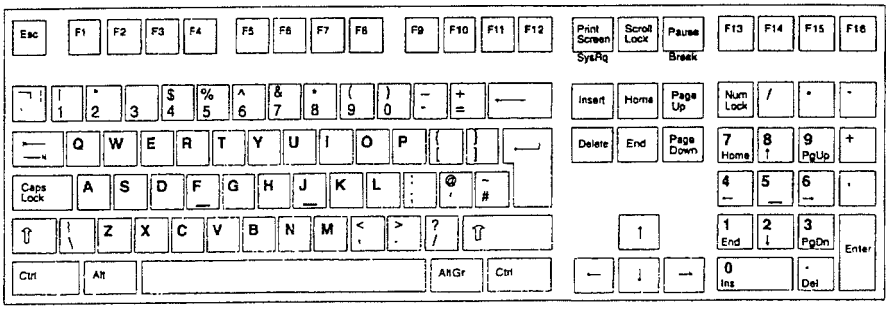
Refer to the diagrams below for the 101-key PC style keyboard used with this terminal in the U.S. and the 107-key PC style keyboard used with this terminal outside the U.S.

Although this terminal serves the basic data entry and viewing needs for which it is suited, it also has a number of other features. For example, this terminal can support a printer through either its serial or parallel interface located at the back of the terminal. It also features function and edit keys which can be programmed in both their normal and shifted states. For a full list of features, please refer to the next page.



Above - 101-key U.S. Keyboard

Below - 107-key U.K. Keyboard



Introduction

FEATURES

Compatibility:

- ADDS Viewpoint A1 and A2
- ADDS Viewpoint 3A and 3A+

Display:

- 14" Flat Face, Non-glare Screen
- 70 Hz Refresh Rate (Flicker-free)
- Green, Amber, or White Display
- Selectable Screen Saver
- 24 line display plus bottom (25th line) message line
- Selectable smooth or jump scroll
- Video attributes such as half or zero intensity, normal or reverse video, underline, and blinking
- Tilt and Swivel Base
- Small Footprint
- Overscan (bezel-to-bezel) video

Communications:

- Serial RS-232-C host port operating from 110 to 38,400 baud (bits per second)
- Serial RS-232-C printer port operating from 110 to 19,200 baud
- Parallel Centronics compatible parallel printer port

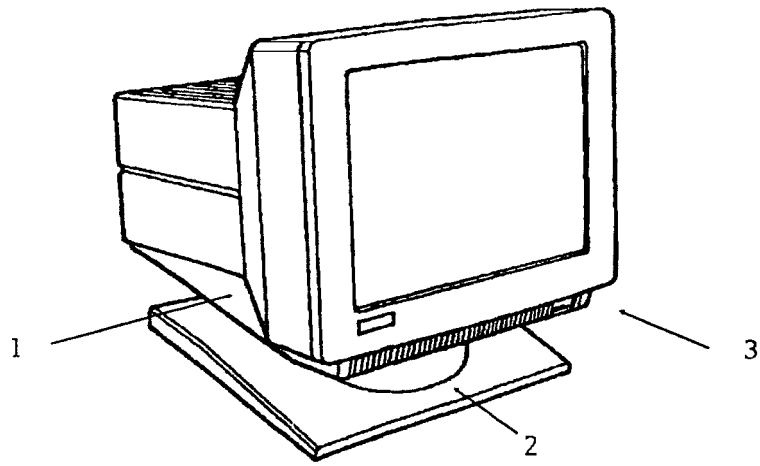
Character Sets:

- ASCII standard, PC Multinational, PC Multilingual, and National Replacement Character Sets for Danish, Finnish, French, German, Norwegian, Portuguese, Spanish, Swedish, and U.K.
- Support for 10 Different Character Sets: U.S., U.K., Danish, French, Finnish, German, Norwegian, Portuguese, Spanish, or Swedish.

Keyboards:

- Programmable keys: 12 function and 15 edit keys in both normal and shifted states for a total of 54 programmable locations.
- EPC 101-key keyboard for the U.S.
- PC/+ 107-key keyboard available for the following language sets: U.K., Danish, French, German, Norwegian, Portuguese, Spanish, or Swedish/Finnish.

PHYSICAL FEATURES



Front View of Terminal

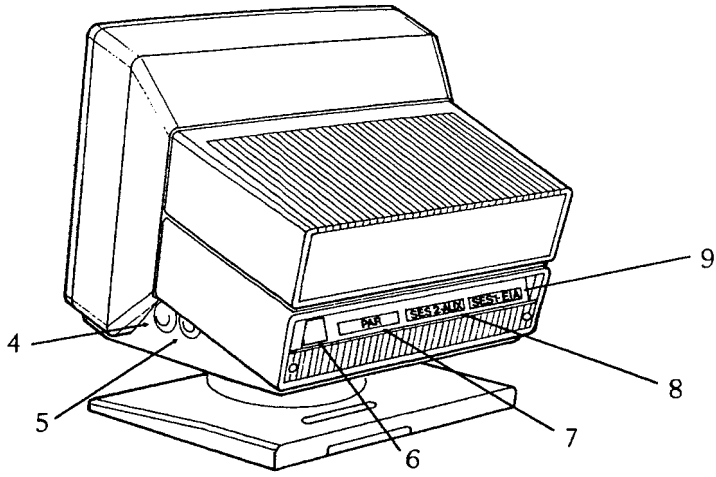
1 **Keyboard connector**: push in the keyboard connector here.

2 **Tilt and swivel base**: use the tilt and swivel arrangement to adjust the viewing angle of the terminal. Grasp the lower or upper corners of the terminal and push the terminal up or down or twist it left or right.

Note: Leave the terminal's power switch (3) in the off position "0" until power and keyboard connections are made.

3 **Power switch** - "0" is off; "1" is on.

Note: The Canadian Standards Association (CSA) recommends that the power outlet be near the terminal and easily accessible at all times.



Rear View of Terminal

4 **Contrast Dial** - adjust the contrast between characters of different intensities by rotating this dial.

5 **Brightness Control Dial** - adjust the overall screen brightness by rotating this dial.

6 **Power Connection** - plug the female end of the power cord into this connector and the male end into a properly grounded receptacle.

7 **Parallel Printer Port** - Connect the male DB25P communications cable from the Centronics compatible parallel printer to the "PAR" port.

8 **Serial Printer Port** - Connect the male DB25P communications cable from the serial printer to the "SES2-AUX" port.

Note: At any given time, only one printer can be supported by this terminal, either serial or parallel.

9 **Host port** - connect the male DB25P communications cable from the host computer or modem to the "SES1-EIA" port.

USAGE NOTES

In this manual, the following symbols and notations are used:

Ctrl-SysRq: the two keys *Ctrl* and *SysRq* are to be pressed at the same time.

F12, Y: the two keys are to be pressed in succession. First press *F12* then press *Y*.

1 (num): specifies that the character must be generated from the numeric keypad. The numeric keypad refers to the island of keys found on the right-hand side of the keyboard.

Scroll - [**On**, Off]: indicates that the parameter "Scroll" has two settings: on and off. The boldface indicates that **On** is the default setting.

7Fh: the "h" indicates that the "number" preceding it (7F) is in hexadecimal notation, a base-16 number system used by computers.

 CAUTION: a warning that, if not heeded, could result in damage to the terminal or loss of data.

3A only: a note that indicates that the information applies only when a certain terminal mode (in this case, 3A) is selected.

R24,C80: a notation which indicates the position on the screen in terms of horizontal rows (R) and vertical columns (C).

Introduction

COMMUNICATIONS

Overview

This terminal is equipped with three ports. The first serial port is intended for connection to the host computer. Either of the two remaining ports can be used with a printer dedicated to your terminal. The port you use for the printer depends on whether you have a serial or parallel interface to the printer.

The host serial port can communicate with your computer from 110 to 38,400 baud (bits per second). This port can be used to connect to the host computer or modem.

Two ports (one serial and one parallel) are also supplied to connect the terminal to a printer. Either of the two ports (but not both) can be used to suit the interface of the printer. The serial port can operate from 110 to 19,200 baud. The parallel port is Centronics compatible. Refer to the following sections for further information on these ports.

Flow Control

Because devices may receive data faster than they can process it, data flow control (selectable in the Communications menu of Setup) should be used to prevent data loss. Software flow control relies on the Xon and Xoff characters to indicate when the terminal is able or unable to store further data. The Xon signal is sent by the DC1 character (11h) and the Xoff signal is sent by DC3 (13h).

This terminal has a receive buffer capable of holding 256 bytes (or characters). When the buffer becomes half full (128 bytes), and the "EIA Protocol" in Setup menu for "Communications" is "Xon-Xoff," the terminal issues an Xoff character, indicating to the host that it should stop transmitting data. The terminal will then continue to process data until its receive buffer holds only 32 bytes. It will then issue an Xon character to the host, indicating that it can resume sending data to the terminal.

> Note: If the "EIA Protocol" is "None" in Setup, the terminal will continue to accept characters into its receive buffer until it is full. Additional characters will be lost. Xon/Xoff must also be set on the host computer for proper handshaking.

Likewise, the terminal will understand the Xon and Xoff requests from the host when it is transmitting data (provided the "EIA Protocol" is "Xon-Xoff").

This terminal will stop transmitting data to the host when it receives an Xoff (DC3) code. If, however, the terminal needs to send a receive protocol character, it will transmit that character even if it has received an Xoff code. When the terminal stops transmitting, the data will be buffered in the transmit buffer (64 characters for the host and 64 characters for the serial printer). Once the buffer is full, additional data will be lost. When an Xon (DC1) character is received, the terminal can again send data to the attached serial device.

Note: Flow control is a form of handshaking; both the terminal and the host should be set for Xon/Xoff protocol for flow control to work effectively.


CAUTION: Use flow control to avoid losing data.

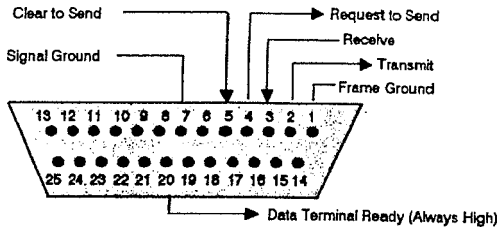
Printer Flow Control

Similarly for the serial printer, data coming from the computer and being sent to the printer by the terminal may be too fast for the printer. This can be monitored by the transmit buffer for the serial printer port. If the buffer becomes half full and the "AUX Protocol" parameter in the Communications menu of Setup is "Xon-Xoff" or "Both," the terminal will send an Xoff to the host to prevent data from overflowing. When the printer has caught up with the data, an Xon will be sent to the computer indicating that it may restart the transmission.

In addition to software flow control (Xon/Xoff), the serial printer port has an incoming DTR (Data Terminal Ready) signal. If DTR is low on the printer, (depending on the printer's polarity, DTR could also be high), then the AUX port will stop sending to the printer.

For parallel printers, this terminal monitors the BUSY and ERROR signals which are sent by the printer to determine when data transmission should be stopped or resumed.

Introduction



Host Port

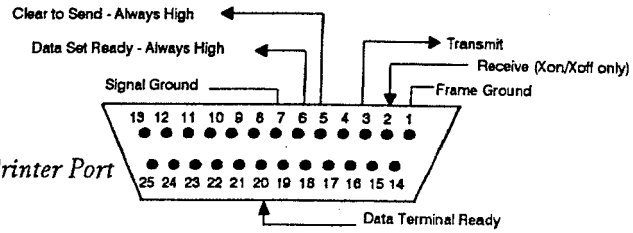
NOTE: Pin 8, Carrier Detect (CD) and
Pin 6, Data Set Ready (DSR) are Not Supported.

Host Port

This port, labeled "SES1 - EIA" is designed for connection to the host (computer or modem) via a 25-pin D-shell (DB25P) female connector. This port uses an RS-232-C communication interface and is configured as a DTE (Data Terminal Equipment) device and can operate from 110 to 38,400 baud. The pins supported are shown above.

Serial Printer Port

This port, labeled "SES2 - AUX" is designed for connection to a serial printer which can operate from 110 to 19,200 baud. This port, like the host port, also uses an RS-232-C interface via a DB25P female connector but is configured as a Data Communication Equipment (DCE) device. The pins supported are shown below. This port is practically unidirectional; this means that it serves only to output data to the printer and only receives flow control characters (Xon/Xoff) from the serial device.



Serial Printer Port

NOTE: Pin 8, Carrier Detect (CD) and
Pin 6, Request to Send (RTS) are Not Supported

KEYBOARD

Parallel Printer Port

This port, labeled "PAR" is designed for connection to a parallel printer which has a Centronics interface with a 25-pin D-shell female connector. The pins and signals supported are shown below. This, like the serial printer port, is also a unidirectional device which means that it only serves to output data to the printer, and cannot receive.

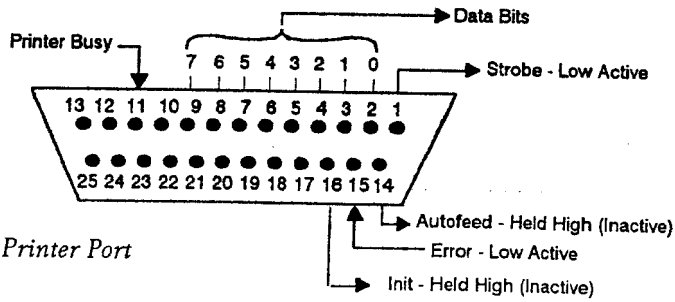
Repeating Keys

When any key is pressed for longer than one-quarter of a second, the character will begin to repeat at a rate of 20 characters per second until the key is released. Non-repeating keys are listed below:

Lock	Scroll-Lock[1]
Num-Lock	Shift keys
Ctrl keys	Alt keys
Pause/Break	Prt Sc/Sys Rq
Return	Enter
Esc	Edit keys[2]
Function keys[2]	

[1]Note: The Scroll-Lock key is not functional for this terminal.

[2]Note: See pages 2-10 and 2-11 for a list of all programmable keys.



Parallel Printer Port

Introduction

Local Keys

Local keys are keystrokes which affect only the operating state of the terminal. No data is sent to the host or printer, and applications are not affected by local keys. (The only local keys that may send data to the printer or affect the screen are the Print and Break keys.)

Keystroke	*Local-Function*
Lock	Toggle CapsLock
NumLock	Toggle NumLock
Ctrl-1(num)	Monitor Mode On[1]
Ctrl-2(num)	Monitor Mode Off
Ctrl-Pause	Break[2]
Print	Print-Screen
Shift-Print	Cancel Print
Ctrl-Shift-↓	Smooth Scroll[3]
Ctrl-Shift-↑	Jump Scroll
Ctrl-SysRq	Enter Setup

[1]Note: Monitor mode is useful when debugging programs; control codes are displayed instead of being executed.

[2]Note: The *Break* signal activates the transmit (TD) signal for 500 ms.

[3]Note: Smooth scroll is available only when Screen Type = 24 in the General menu of Setup. See p. 2-4.

Keyboard Lock

The keyboard can be "locked" by control codes to prevent the terminal from accepting any inputs through the keyboard. With the exception of the few keys listed below, all other inputs from the keyboard are discarded when they are received.

- Mode keys: *Shift*, *Ctrl*, and *Alt*.
- Local keys: *CapsLock*, *NumLock*, and *Ctrl-SysRq* (to enter Setup).

Unlocking the Keyboard

There are two ways to unlock the keyboard:

- By entering Setup and executing "Reset Terminal" in the Operations menu (press *Ctrl-SysRq*, *F11*).
- By pressing *Ctrl-Break* (A2 mode only).
- By issuing the unlock command from the keyboard or computer. See page 4-11 of the Programming Chapter for the commands. Unlock keyboard commands are executed locally in Half Duplex and Full Duplex.

SETUP

Overview

The Setup menu is your control panel for this terminal. It permits you to select the operating parameters of the terminal so that it is compatible with the host computer, printer, or other connecting device.

Setup selections can be made using one of four menus. The menus are listed below.

- General
- Communications
- Programmable Keys
- Operations

Setup is transparent to the terminal. When you exit Setup, the screen will be restored to its previous display unless any of the actions below were performed:

- "Clear Screen" in the Operations menu.
- "Reset Terminal" in the Operations menu.
- "Default Terminal" in the Operations menu.
- Changing the "Mode" in the General menu.

Entry And Exit

To enter Setup, press *Ctrl-SysRq*. To exit Setup, press either *F12* or *Ctrl-SysRq* again. The message "Save All (Y/N)" blinks at the top right (next to the "Parameters" heading). Press *Y* or *y* to save the current settings in non volatile RAM (permanent memory). When saved this way, the settings remain even after the terminal is powered off and then on again.

To remain in Setup and cancel the request to exit, press *c* or C. Pressing any character other than *Y*, *y*, C, or *c* will exit Setup without storing the current selections in permanent memory. That is, although the current settings will take effect outside of Setup, they will be lost if the terminal is powered off.

> Note: An exception to this is edit key and function key programming. Once edited in Setup, the changes are saved in non volatile memory regardless of the way in which you exit Setup.

Setup

Movement Inside Menus

Use the following keys to control menu selection within Setup.

- *F1* - General menu.
- *F2* - Communications menu.
- *F3* - Programmable Keys menu.
- *F11* - Operations menu.
- *F12* - request to exit Setup.

Cursor control keys (↑, →, ↓,←) - control movement to parameters in the menu. The current selection is indicated by a highlighted selection bar. For each parameter, there are usually at least two valid selections. As the parameter is highlighted, the available selections appear under the "Choices" heading.

> Note: Some parameters are action fields and have no choices. See the Action Fields section at right.

Enter and *Shift-Enter* or *Space* and *Shift-Space* - cycle through the choices for a given parameter. Use *Enter* or *Space* to cycle forward through the choices, *Shift-Enter* or *Shift-Space* to move backward.

Tab and *Shift-Tab* - move from menu to menu, forward and backward, without using the function keys.

> Note: Parameters that are changed in Setup are executed as soon as the selection bar is moved from that field. If choices are made in Setup that require the terminal to perform certain actions, the screen may temporarily become blank while the terminal processes the changes.

Action Fields

Certain parameters are not selections but action fields. When the action field is highlighted and then selected using the *Enter* key, the action is taken. A "WAIT" message may appear at the top right portion of the screen, and when the action is completed, a "DONE" message will appear. These messages are cleared when the selection bar is placed on another parameter.

GENERAL MENU

This is the first menu displayed in Setup, and can be accessed by pressing *F1*. This menu contains the following parameters:

Mode	CRT Save
Keyclick	Screen Type
Cursor	Language
3A Mode Ctrl-Z	Light Screen
Char Set	Scroll
3A Mode Space Adv	Print
Auto LF	Bell Volume

For an explanation of these parameters and a list of their selections, refer to the following paragraphs.

Mode - [A1, A2, 3A, 3A+] - Select the "personality" of the terminal (the way in which it will respond to certain commands). Select from any of the four ADDS Viewpoint emulations: A1, A2, 3A, and 3A+.

F1 General	F2 Communications	F3 Programmable Keys	F11 Operations
Parameters			
Mode = A2	CRT Save = Off		Keyclick = Off
Screen Type = Normal	Cursor = Block Blink		Language = US
Light Screen = Off	3A Mode CTRL-Z = Off		Char Set = National
Scroll = On	3A Mode Space Adv = Off		Print = Off
Auto LF = Off	Bell Volume = 06		
Choices			
A1 A2 3A 3A+			
Select			
↑ → ↓ ← : Parameter	Enter/S-Enter: Next/Prev Choice		Exit: F12

Setup Menu - General (F1)

Setup

Screen Type - [**Normal**, 24, 25] - Select the screen type according to your need for a message line (the 25th line) or smooth scroll.

- In "Normal" mode, 24 lines of display are allowed but smooth scroll is not permitted and the message line cannot be displayed.
- The "24" Line mode allows display and smooth scrolling of 24 lines. The message line can only be displayed temporarily. That is, it is erased when the message line is exited.
- In "25" Line mode, the message line is available, but smooth scroll is not. The message line is not affected when data scrolls on lines 1-24.

Light Screen - [On, **Off**] - Choose whether to use your terminal in normal video "Off" (the screen is dark and the characters are bright) or in reverse video "On" (the screen is bright and the characters are dark).

Overscan is "tied to" light screen. It will be enabled every time Light Screen is "On."

Scroll - [**On**, Off] - Determine what action will be taken when the cursor is on the last data line (Row 24) and an additional line is required for data. The need for an additional line depends on Auto LF and the mode, and occurs when 80 characters are entered (the length of a line), or a line feed (LF, 0Ah) is received, or *Return** is entered.

When the cursor is on Row 24, and an additional line is required (as defined above) and ...

- Scroll is "On," all data displayed will move up one line; the first line is erased and Row 24 is cleared.
- Scroll is "Off," the cursor will wrap back to R1,C1 and replace existing data with new data entered.

Auto LF - [On, **Off**] - Determine what action will be taken when the terminal receives a *Return** or generates an internal Line Feed. An internal Line Feed, for example, is generated when the cursor advances beyond the end of a row. When Auto LF is "On" and a return is detected, the cursor will move to the beginning of the next row. Under the same conditions, when Auto LF is "Off," the cursor will move to the beginning of the current row.

*Note: The *Return* key, in 3A mode only, will not cause the cursor to move to R1 of the next column, even if Auto LF is "On." Only an internal linefeed (for wrapping data) will.

CRT Save - [**Off**, 2-min, 5-min, 15-min, 30-min] - Select whether the screen will go blank after a lack of activity from the keyboard or host after the chosen period of time. The first key typed when the screen is blank will reactivate the display but will not be transmitted to the host computer. Also, data from the host will re-enable video, and that data will be accepted. The NumLock LED will flash while the screen is timed out as a result of CRT Save in progress.

CAUTION: Use CRT Save to prevent "phosphor burn" on the screen which can occur when the display on the terminal is left unchanged for an extended time period.

Cursor - [**Block Blink**, Block Steady, Line Blink and Line Steady] - Choose the appearance of the cursor. Certain cursor control commands are ignored when an underline ("Line Blink" or "Line Steady") cursor is used in 3A mode. For details, see page 4-7.

3A Mode CTRL-Z - [On, **Off**] - (3A/3A+ mode only) - When "On" is selected, a *Ctrl-Z* will cause the data on the screen to be erased. When this selection is "Off," a *Ctrl-Z* command will be ignored.

3A Mode Space Adv - [On, **Off**] - (3A mode only) - Determine the way in which the space character advances. If space advance is "On," the cursor will be non-destructive after a *Return* is received. That is, the cursor can be advanced by the space character and the data on the current cursor row will not be erased. If space advance is "Off," the space character will replace data on the screen.

Bell Volume - [0,1,2,3,4,5,**6**,7,8,9] - Select the bell volume where 0 is the lowest and 9 is the highest.

Keyclick - [On, **Off**] - Enable or disable key click tones. When "On," an audible tone will be emitted from the terminal each time a key (other than *Shift* or *Ctrl*) is pressed. When "Off," no tone will be generated. The volume of the tone can be controlled using the Bell Volume parameter above.

Language - [U.S., U.K., Danish, French, Finnish, German, Norwegian, Portuguese, Spanish, Swedish] - Select the language type that matches your keyboard's layout.

Charset - [**National**, Multinational] - Select the character set that is loaded into the primary font bank. This terminal can access two font banks (0 and 1, called primary and secondary, respectively) of 128 characters each. Font bank 0 contains 7-bit characters accessed by 00h - 7Fh while font bank 1 contains 8-bit characters 80h - FFh.

These font banks allow the terminal to display characters and symbols that may be specific to the languages supported. This association with the selected language is evident in the way in which the font banks are loaded.

CAUTION: "EIA Data Format" in the Communications menu of Setup must be set to 8 data bits for the host to access the secondary font bank (1).

National Replacement Character sets (NRCs) are small sets of characters (usually, 1-15) that are specific to a language but not normally found in American English. These small NRC sets are a convenient way of loading only a few needed characters into a standard ASCII character set.

The less frequently used ASCII characters are replaced by ones needed in a particular language. There are a number of NRCs for various languages. For details, see page A-4.

Font bank 0 contains:

- When *Char Set* is "National," ASCII Standard Character set modified by the NRC for the selected language. Note that no NRC is needed for "U.S." language since the unmodified ASCII set contains its characters.
- When *Char Set* is "Multinational," ASCII Standard Character set regardless of the language selected.

Font bank 1 contains:

- Multinational Character set - for U.S. and U.K. language selections, page A-2.
- Multilingual Character set for all other language selections, page A-3.

Print - [**Off**, CR/LF, CR, None] - This selection should be set to "Off" if no printer is attached. "CR/LF" and "CR" allow you to choose the line terminator sent to the printer when a Print Screen is performed. Select "None" if no line terminator is desired. See the "Print Screen" section on page 4-12 for more details. If a printer is attached, the "Printer" parameter should specify the printer type in the Communications menu.

COMMUNICATIONS MENU

This menu allows control of selections which affect the three communication ports. It contains these parameters:

EIA Baud Rate
EIA Data Format
EIA Parity Check
EIA Protocol
AUX Baud Rate
AUX Data Format
AUX Protocol
Comm Mode
Printer

EIA Baud - [110, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, **9600**, 19200, 38400] - Select the number of bits communicated per second. This setting should match the speed at which the host expects to communicate.

EIA Data Format - [7/1/N, **7/1/O**, 7/1/E, 7/1/M, 7/1/S, 7/2/N, 7/2/O, 7/2/E, 7/2/M, 7/2/S, 8/1/N, 8/1/O, 8/1/E, 8/1/M, 8/2/N, 8/2/O, 8/2/E] - Each choice specifies the combination of data bits / stop bits / and type of parity bit to match the format in which the host expects to communicate. The abbreviations for parity bits are: N = none, E = even, O = odd, S = space, M = mark.

F1 General	F2 Communications	F3 Programmable Keys	F11 Operations
Parameters			
EIA Baud = 9600	EIA Data Format = 7/1/O		EIA Parity Check=Off
Aux Baud = 9600	Aux Data Format = 7/1/O		Aux Protocol = None
Comm Mode=Half Duplex	Printer = Parallel		EIA Protocol = None
Choices			
110 150 300 600 1200 1800 2000 2400 4800 **9600** 19200 38400			
Select			
↑ → ↓ ← : Parameter	Enter/S-Enter: Next/Prev Choice		Exit: F12

Setup Menu - Communications (F2)

EIA Parity Check - [On, Off] - Parity checking is a process that allows the terminal to determine if an error has occurred while data was being transmitted. When "On," and an error is detected by comparing the parity bit in a received character, an "*" will be displayed at that character position. When "Off" the terminal will display all characters, even if an error is detected by the parity bit.

EIA Protocol - [None, Xon-Xoff] - Choose whether the terminal and the host computer will engage in software flow control. When "Xon-Xoff" is selected, the terminal will issue an Xoff command to the host when its receive buffer is half full and an Xon command when it is ready to resume handling data. Likewise, the terminal will respond to Xon and Xoff requests from the host computer. When "None" is chosen, the terminal will not have flow control, and when its receive or transmit buffers become full, additional data will be lost. For more details, see the "Flow Control" section starting on page 1-6.

Note: In A2 mode, the Xon and Xoff characters (DC1 and DC3) from the host will be ignored by the terminal unless they are part of the cursor addressing command on pages 4-9 and 4-10.

Comm Mode - [Full Duplex, **Half Duplex**] - Choose "Full Duplex" (FDX) when the terminal is connected to a host capable of simultaneous two-way communication. Keyboard entries will be transmitted directly to the host computer without being displayed. Generally, the host will echo the characters back to the terminal and terminal will display the received data.

Use "Half Duplex" (HDX) when the terminal is not connected to a host computer, or when the host system is incapable of simultaneous two-way communication. Data entered on the keyboard is displayed immediately and also transmitted to the host port.

AUX Baud - [110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600 or 19200] - Select the number of bits communicated per second through the serial printer port. This setting should match the speed at which the printer expects to receive data.

AUX Data Format: [7/1/O, 7/1/E, 7/1/M, 7/1/S, 7/2/N, 7/2/O, 7/2/E, 7/2/M, 7/2/S, 8/1/N, 8/1/O, 8/1/E, 8/1/M, 8/1/S, 8/2/N] - Each choice specifies the combination of data bits / stop bits / and type of parity bit to match the format in which the serial printer will communicate. The abbreviations for parity bits are: N = none, E = even, O = odd, S = space, M = mark.

AUX Protocol - [**None**, Xon-Xoff, DTR, Both] - Choose whether flow control will be used with the serial printer and, if used, the type of flow control. For more details, see the "Printer Flow Control" section on page 1-7.

- None - no form of flow control will be used.
- Xon-Xoff - the Xoff character (DC3) will be issued to the host when the transmit buffer for the printer is half full. Once the printer has accepted enough of the data in the buffer, an Xon (DC1) will be sent to the host to resume sending data.
- DTR - the terminal will monitor the Data Terminal Ready signal on pin 20. If DTR is low (depending on the printer's polarity, it could also be high), the Aux port will stop sending to the printer.
- Both - *both* software (Xon-Xoff) and hardware (DTR) means of flow control will be used.

Printer - [Serial, **Parallel**] - Specify the port to which the printer is connected: parallel for the "PAR" port or serial for the "SES2-AUX" port. If no printer is attached to the terminal, make sure the Print parameter in the General menu is "Off."

Setup

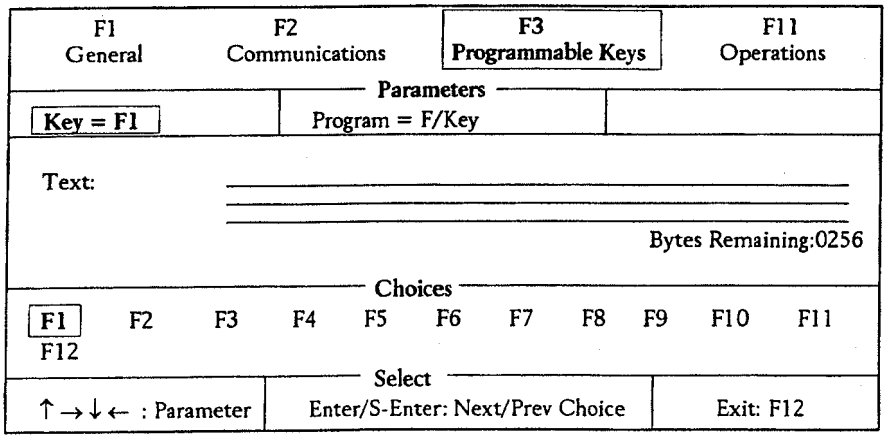
PROGRAMMABLE KEYS MENU

This menu allows you to program the contents of the function and edit keys in their normal or shifted states. There are 12 function keys (F1-F12) and 15 edit keys. In the two states, function keys provide 24 locations to hold strings and edit keys provide 30 locations.

> Note: Function keys F13-F16 on international language keyboards are not programmable.

These keys can only be programmed through Setup, and are accessible in any terminal mode. A total of 256 bytes (or characters) can be programmed in all of the key locations, but the maximum number of characters that can be programmed in any one location (whether shifted or normal) is 255.

Program - [**F/Key**, Sh-F/Key, Edit-Key, Sh-Edit-Key] - Select whether the key to be programmed is a function key in the normal state (F/Key), in the shifted state (Sh-F/Key) or an edit key in its normal (Edit-Key) or its shifted state (Sh-Edit-Key).



Setup Menu - Programmable Keys (F3)

Key - The selections for this parameter depend on the "Program" parameter above.

- When Program = "F/Key" or "Sh-F/Key," the selections are: [F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12].
- When Program = "Edit-Key" or "Sh-Edit-Key," the selections are: [Tab, Esc, Backspace, Delete, Return, Home, Enter(kpd), Insert, PageDown, PageUp, End, ↑, ↓, ←, →].

> Note: The "Enter (kpd)" selection refers to the *Enter* key on the numeric keypad.

Once a key is programmed, it will keep the programmed contents until either a "Default Terminal" or "Default UDKs" is performed in the Operations menu or until that key is modified again in Setup. In other words, the contents of the function and edit keys are stored in permanent memory regardless of the way in which you exit Setup. See page 2-1 for more details.

All of the function and edit keys have default values (which may vary with the terminal's mode selected). When a key contains its default value, the edit field for that key appears to be empty, since, technically, it has not been edited. If it has been programmed, the contents appear in the text area.

To restore the factory-set defaults of all function and edit keys, you may do one of the following things:

- Execute the "Default UDKs" (user defined keys) parameter in the Operations Menu.
- Execute the "Default Terminal" parameter in the Operations Menu.

To restore the default contents of an individual key:

- Press *Shift-Backspace* in the edit field for that key.

For a list of the default contents of these keys, refer to Chapter 3, Default Strings.

To program a function or edit key (or to edit its contents) use the guidelines on the next page. Note that editing can only be performed in the overwrite mode. That is, the *Backspace* key can be used to delete text to the left of the cursor, but all other entries will replace existing text.

Editing a Key Field:

When a programmable key is selected, the "Choices" field will indicate the edit keystrokes to be used. Once inside the edit field, the cursor will appear on the first available position after the last programmed character. The following edit capabilities are available.

- *Backspace* - move the cursor left and delete character at that location
- *Shift-Backspace* - reset the key to its default value.
- Text - enter alphanumeric text in its normal or shifted state.
- Control codes - enter control codes via their keyboard equivalents. The control codes are 00h - 1Fh (NUL - US) on the ASCII Chart, page A-1. To generate a control character, add 40h to the value of the chosen control character. The values will now fall in the range 40h-5Fh which are "@" through "_" on the ASCII chart. Use the *Ctrl* key with the new character you have located. For example, to enter CR LF (0Dh 0Ah), press *Ctrl-M* and then *Ctrl-J* (4Dh 4Ah).
- Eight-bit codes - (Multinational or Multilingual, as explained on page 2-6) - to generate 8-bit characters, find the value of your character from page A-2 if the Language selection is "US" or "UK," or page A-3 for all others. The character will fall in the range 80h - FFh. First subtract 80h to get a new value in the range 00h - 7Fh. Use page A-1 to locate the corresponding ASCII character. If the new character happens to be a control code in the range of 00h-1Fh, use the steps at left under "Control codes" to create it. Then do the following:

1 Press the left *Alt* key.

2 Press the key (with *Shift* and/or *Ctrl*, if necessary) to create the ASCII character that corresponds to the 8-bit character you selected.

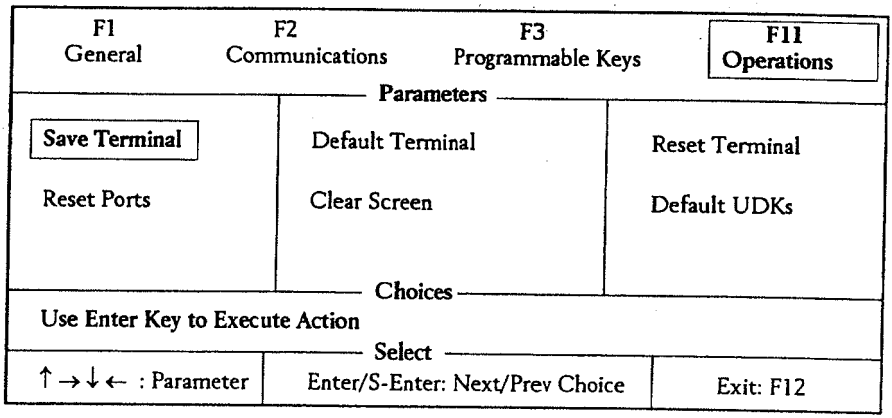
Function and edit keys can be executed outside of Setup. To execute a key (whether it is programmed or at its default), press the key alone for the normal state or in conjunction with the *Shift* key for its shifted state.

OPERATIONS MENU

This menu has only executable parameters that perform specific operations. The following things can be done by using this menu:

To execute any operation when that parameter (or action) is highlighted, press the *Enter* key. To move to a different parameter, use the arrow keys.

Save Terminal
Default Terminal
Reset Terminal
Reset Ports
Clear Screen
Defualt UDKs



Setup Menu - Operations (F11)

Save Terminal - when executed, stores the newly changed values to non volatile (permanent) memory. Exiting without doing the "Save Terminal" operation can cause the changed parameters to be lost if the terminal is powered off. Any time you exit Setup by pressing the *F12* key, the "SAVE ALL (Y/N)" message will blink. Responding with a *Y* or *y* is equivalent to performing the "Save Terminal" operation here.

Default Terminal - when executed, all factory-set defaults are set. This includes function and edit keys. The screen outside of Setup is cleared. The default settings are in **bold**face type in the list of choices for each parameter in this chapter.

Reset Terminal - when executed, all terminal modes and data structures based on the currently selected setup parameters are initialized, and the keyboard is unlocked.

Default UDKs - when executed, all user-defined keys (function and edit keys) in the normal and shifted states are reset to the factory-set defaults.

Reset Ports - when executed, the terminal will do the following:

- Clear all transmit buffer data for all 3 ports.
- Generate any needed transmit (Xon/Xoff) protocol, as selected.
- Clear all receive buffer data on the Host Port.
- Generate any needed receive (Xon/Xoff) protocol, as selected.
- Clear all keyboard buffer data.

DEFAULT STRINGS

Overview

This chapter lists all the strings sent by function keys, edit keys, and the numeric keypad keys as well as special keys such as ESC, Tab, Shift, Ctrl, Alt, etc. Depending on the mode used and sometimes on the state of the Shift or NumLock keys, the default strings may vary.

Cursor-Keypad Key Codes

Key	A1	A2	3A/3A+
↑	Ctrl-Z	Ctrl-Z	Ctrl-K
↓	Ctrl-J	Ctrl-J	Ctrl-J
→	Ctrl-F	Ctrl-F	Ctrl-L
←	Ctrl-U	Ctrl-U	Ctrl-H

Default Strings

Numeric-Keypad Key Codes

Key	A1	A2	3A/3A+	Numlock On
/	/	/	/	/
*	*	*	*	*
-	-	-	-	-
+	+	+	+	+
Comma*	,	,	,	,
Enter	Ctrl-M	Ctrl-M	Ctrl-J	Ctrl-M (A1 & A2)
Enter	Ctrl-M	Ctrl-M	Ctrl-J	Ctrl-J (3A & 3A+)
.\Del	7Fh	7Fh	7Fh	.
0\Ins				0
1\End				1
2\↓	Ctrl-J	Ctrl-J	Ctrl-J	2
3\PgDn				3
4\←	Ctrl-U	Ctrl-U	Ctrl-H	4
5				5
6\→	Ctrl-F	Ctrl-F	Ctrl-L	6
7\Home	Ctrl-A	Ctrl-A	Ctrl-^	7
8\↑	Ctrl-Z	Ctrl-Z	ESC {	8
9\PgUp				9

*Note: The numeric keypad *comma* (,) key is not available on the 101-key U.S. keyboard.

Default Strings

Special-Key Key Codes (Normal, Unshifted State)

Key	A1/A2	3A	3A+
Esc	Ctrl-[	Ctrl-[	Ctrl-[
Tab	Ctrl-I	Ctrl-I	Ctrl-I
Backspace	Ctrl-H	Ctrl-H	Ctrl-H
Enter	Ctrl-M	Ctrl-M	Ctrl-M
Insert	---	---	---
Delete	7Fh	7Fh	7Fh
Home	Ctrl-A	Ctrl-^	Ctrl-^
End	---	---	---
PageUp	---	---	---
Page Dn	---	---	---

Function-Key Key Codes (Normal, Unshifted State)

Key	A1	A2	3A/3A+
F1	STX 1	STX 1 CR	SOH @ CR
F2	STX 2	STX 2 CR	SOH A CR
F3	STX 3	STX 3 CR	SOH B CR
F4	STX 4	STX 4 CR	SOH C CR
F5	STX 5	STX 5 CR	SOH D CR
F6	STX 6	STX 6 CR	SOH E CR
F7	STX 7	STX 7 CR	SOH F CR
F8	STX 8	STX 8 CR	SOH G CR
F9	STX 9	STX 9 CR	SOH H CR
F10	STX :	STX : CR	SOH I CR
F11	STX ;	STX ; CR	SOH J CR
F12	STX <	STX < CR	SOH K CR
F13	STX =	STX = CR	SOH L CR
F14	STX >	STX > CR	SOH M CR
F15	STX ?	STX ? CR	SOH N CR
F16	STX @	STX @ CR	SOH O CR

Default Strings

Special-Key Key Codes (Shifted State)

Key	A1/A2	3A	3A+
Esc	Ctrl-[	Ctrl-[	Ctrl-[
Tab	Esc I	Ctrl-I	Ctrl-I
Backspace	Ctrl-H	Ctrl-H	Ctrl-H
Enter	Ctrl-M	Ctrl-M	Ctrl-M
Insert	---	---	---
Delete	7Fh	7Fh	7Fh
Home	Ctrl-A	Ctrl-^	Ctrl-^
End	Ctrl-L	Ctrl-Z	Ctrl-Z
PageUp	---	---	---
Page Dn	---	---	---

Function-Key Key Codes (Shifted State)

Key	A1	A2	3A/3A+
F1	STX !	STX ! CR	SOH ' CR
F2	STX "	STX " CR	SOH a CR
F3	STX #	STX # CR	SOH b CR
F4	STX $	STX $ CR	SOH c CR
F5	STX %	STX % CR	SOH d CR
F6	STX &	STX & CR	SOH e CR
F7	STX '	STX ' CR	SOH f CR
F8	STX (	STX (CR	SOH g CR
F9	STX)	STX) CR	SOH h CR
F10	STX *	STX * CR	SOH i CR
F11	STX +	STX + CR	SOH j CR
F12	STX ,	STX , CR	SOH k CR
F13	STX -	STX - CR	SOH l CR
F14	STX .	STX . CR	SOH m CR
F15	STX /	STX / CR	SOH n CR
F16	STX 0	STX 0 CR	SOH o CR

Programming

PROGRAMMING

OVERVIEW

This terminal can be controlled by sending special sequences of characters. These escape or control sequences can be sent by the host (via software) or through the keyboard as a series of keystrokes while Comm Mode in the Communications menu of Setup is "Half Duplex."

Cursor movement, screen configurations, visual attributes, and commands to the message line are just a few examples of the controls that can be accomplished in this way.

Commands begin with either a control or escape character and contain a string of characters that specify the action to be taken. These escape sequences may vary somewhat among modes, but in general, follow a certain protocol.

The rest of this chapter contains the command sequences for the given modes of terminal operation. Refer to these sections for a list of the commands:

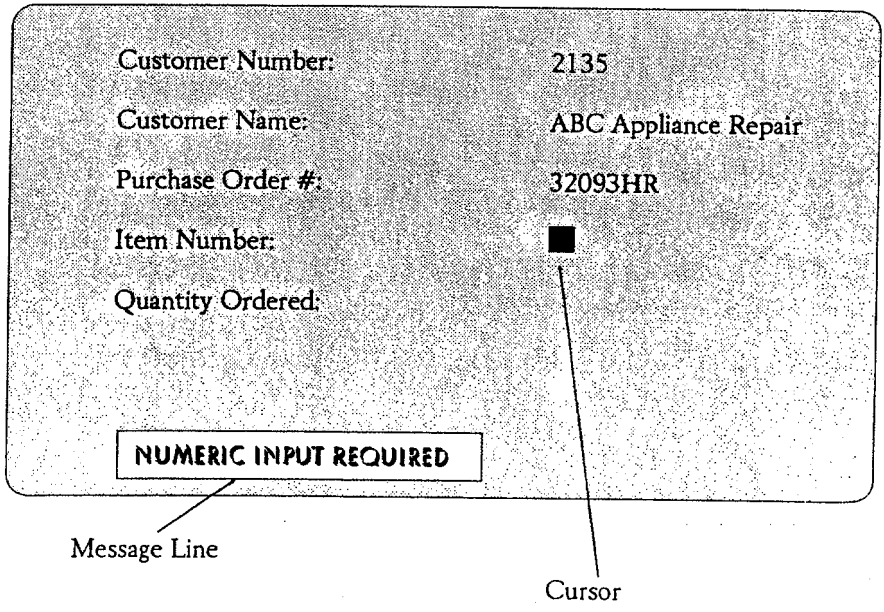
- Display Fields
- Visual Attributes
- Cursor Addressing
- Cursor Display
- Erase Commands
- Keyboard Commands
- Printer Commands
- Screen Configuration Commands
- Scroll Commands
- Message Line Commands

Programming

DISPLAY FIELDS

This terminal has 25 horizontal rows and 80 vertical columns. Each character location can be specified in terms of its row and column coordinates, where the top left position is R1,C1 and the bottom right position is R25, C80. Data can be displayed in the first 24 rows.

The lowest (25th) line can serve as the Message Line when the screen configuration is selected in order to allow it. (When ScreenType = 25 lines, the message line is available; when it is set to 24 lines, it can be displayed temporarily).



VISUAL ATTRIBUTES

There are a number of highlights, or visual attributes, available which can be ascribed to certain fields on the terminal. These attributes (such as normal or reverse video, blinking, underline, half or zero intensity, and different combinations of these) can be assigned to areas of the screen. See the Video Attribute Chart on the next page for all of the highlight selections.

These fields are called "tagged" and can be anywhere on the screen that normal text can be displayed. To start the attribute, the cursor should be placed at the beginning of the desired position and the TAG ON command must be issued. To end the field, the TAG OFF command should be issued while the cursor is at the ending point for the highlight. The positions between the cursor location from the Tag On to the Tag Off command will be tagged. Multiple locations on the screen can be selected in this way. To set a video highlight to all tagged fields, the Select Highlight command should be used with the ATTR parameter replaced by the code in the Video Attribute Chart on the next page that corresponds to the desired highlight. This command can be repeated to change the highlight to be displayed. Note that Video Tagging is not available in 3A mode, and in 3A+ mode, the default video selection for tagged fields is half intensity.

Note: The main display area (Rows 1-24) and the message line (Row 25) may have different tag video selections.

VISUAL COMMANDS

Command	A1/A2*	3A	3A+
Select Highlight (codes on p. 4-4)	Esc 0 *attr code*	---	Esc 0 *attr code*
Tag on (Start)	SO (Ctrl N)	---	Esc)
Tag off (Stop)	SI (Ctrl O)	---	Esc (

*Note: In A2 mode, characters 80h-9Fh cannot be tagged. They will appear as normal text even if they are in a field which is tagged with any other attribute.

VIDEO ATTRIBUTE CHART

DISPLAY ATTRIBUTES	ATTR CODE
Normal	@
Half Intensity	A
Blinking	B
Half Intensity, Blinking	C
Reverse Video	P
Reverse Video, Half Intensity	Q
Reverse Video, Blinking	R
Reverse Video, Half Intensity, Blinking	S
Underlined	`
Underlined, Half Intensity	a
Underlined, Blinking	b
Underlined, Half Intensity, Blinking	c
Underlined, Reverse Video	p
Underlined, Reverse Video, Half Intensity	q
Underlined, Reverse Video, Blinking	r
Underlined, Reverse Video, Blinking, Half Intensity	s
Video Suppress	D

CURSOR ADDRESSING

Cursor commands allow full control over cursor movement. The cursor can be positioned absolutely (by specifying the row and column coordinates), or horizontally or vertically (by addressing only the column to which it should move along its current row or vice versa). The cursor can also be given commands that control relative movement such as move left, right, up, or down as well as to backspace, carriage return, or return to the home position (top left of screen).

Many of the commands may require that the cursor move beyond its current bounds. That is, the cursor may be at column 80 when it receives a Cursor Right command. In many of these conditions, the cursor may wrap so that movement does occur. Rules for wrapping are listed below. The cursor will follow the wrapping rules listed on the next page except when noted otherwise in the tables.

CURSOR WRAPPING RULES

Cursor Up

When at Row 1, the cursor wraps to the bottom (Row 24).

Cursor Down

When at Row 24, the cursor wraps to Row 1 if Scroll (in Setup, General menu) is OFF. When Scroll is ON, the cursor remains stationary, and all data shifts up by one row, causing the original Row 1 to be lost.

Cursor Left and Backspace

When at Column 1, the cursor wraps to the end of the previous line. If the cursor is at R1,C1, it will wrap to R24,C80.

Cursor Right

For A1, A2, and 3A+ modes, when the cursor is at Column 80, it wraps to Column 1 of the next line. When Scroll is ON, the cursor wraps from R24,C80 to the beginning of Row 24, and all data shifts up by one row, causing the original Row 1 to be lost. When Scroll is OFF, the cursor wraps from R24,C80 to R1,C1.

In 3A mode only,.the cursor will remain at Column 80 if Auto LF is OFF. It will only wrap when Auto LF is ON. When Scroll is ON, the cursor wraps from R24,C80 to the beginning of Row 24, and all data scrolls up by one row, causing the original Row 1 to be lost. When Scroll is OFF, the cursor wraps from R24,C80 to R1,C1.

Carriage Return

When AutoLF (in Setup, General menu) is ON, the cursor moves to Column 1 of the next line. If the cursor is on Row 24, and Scroll is also ON, the cursor wraps from R24 to the beginning of Row 24, and all data scrolls up one row. (The original Row 1 is lost). If Scroll is OFF, the cursor wraps from Row 24 to R1,C1. When AutoLF is OFF, the cursor moves to Column 1 of current line.

CURSOR COMMANDS

Command	A1/A2	3A	3A+
Cursor Display On	CAN (A2 only)	---	CAN
Cursor Display Off	ETB (A2 only)	---	ETB
Cursor to Row,Col (codes on p. 4-8)	Esc Y *Row Col*	Esc = *Row Col*	Esc = *Row Col*
Cursor Horizontal (codes on p. 4-9)	DLE *Col* (A2 only)	---	---
Cursor Vertical (codes on p. 4-10)	VT *Row* (A2 only)	---	---
Cursor Home (Top Left - R1,C1)	SOH (when Scroll is ON, home = R24,C1)	RS (if cursor = underline, ignored)	RS
Backspace	BS	BS (if cursor is at column 1, ignored)	BS
Cursor ←	NAK	BS (if cursor is at column 1, ignored)	BS
Cursor →	ACK	FF (if cursor = underline, ignored; if AutoLF is off, will not wrap at column 80.)	FF
Cursor ↑	SUB	VT (if cursor = underline, ignored; ignored at row 1.)	VT
Cursor ↓	LF	LF	LF
Carriage Return	CR	CR (always moves to column 1 of current line)	CR

Absolute Cursor Addressing (Row & Column Codes)

ROW/ COL	CODE	COL	CODE	COL	CODE
1	SPACE	28	;	55	V
2	!	29	<	56	W
3	"	30	=	57	X
4	#	31	>	58	Y
5	$	32	?	59	Z
6	%	33	@	60	[
7	&	34	A	61	\
8	'	35	B	62	]
9	(	36	C	63	^
10	)	37	D	64	_
11	*	38	E	65	`
12	+	39	F	66	a
13	,	40	G	67	b
14	-	41	H	68	c
15	.	42	I	69	d
16	/	43	J	70	e
17	0	44	K	71	f
18	1	45	L	72	g
19	2	46	M	73	h
20	3	47	N	74	i
21	4	48	O	75	j
22	5	49	P	76	k
23	6	50	Q	77	l
24	7	51	R	78	m
25	8	52	S	79	n
26	9	53	T	80	o
27	:	54	U		

Note: Values out of range (such as 27 for row) are ignored.

Horizontal Cursor Addressing (Col Codes)

COL	CODE	COL	CODE	COL	CODE
1	NUL	28	'	55	T/N
2	SOH	29	(	56	U/O
3	STX	30	)	57	V
4	ETX	31	0/*	58	W
5	EOT	32	1/+	59	X
6	ENQ	33	2/,	60	Y
7	ACK	34	3/-	61	'/Z
8	BEL	35	4/.	62	a/[
9	BS	36	5//	63	b/\
10	HT	37	6	64	c/]
11	DLE/LF	38	7	65	d/^
12	DC1/VT	39	8	66	e/_
13	DC2/FF	40	9	67	f
14	DC3/CR	41	@/:	68	g
15	DC4/SO	42	A/;	69	h
16	NAK/SI	43	B/<	70	i
17	SYN	44	C/=	71	p/j
18	ETB	45	D/>	72	q/k
19	CAN	46	E/?	73	r/l
20	EM	47	F	74	s/m
21	SP/SUB	48	G	75	t/n
22	!/ESC	49	H	76	u/o
23	"/FS	50	I	77	v
24	#/GS	51	P/J	78	w
25	$/RS	52	Q/K	79	x
26	%/US	53	R/L	80	y
27	&	54	S/M		

Note: Entries separated by a "/" mean that either value can be accepted.

Vertical Cursor Addressing (Row Codes)

ROW	CODES	ROW	CODES
1	Nul, SP, @,'	13	FF,,,L,l
2	SOH,!,A,a	14	CR,-,M,m
3	STX,",B,b	15	SO,.,N,n
4	ETX,#,C,c	16	SI,/,O,o
5	EOT,$,D,d	17	DLE,0,P,p
6	ENQ,%,E,e	18	DC1,1,Q,q
7	ACK,&,F,f	19	DC2,2,R,r
8	BEL,',G,g	20	DC3,3,S,s
9	BS,(,H,h	21	DC4,4,T,t
10	HT,),I,i	22	NAK,5,U,u
11	LF,*,J,j	23	SYN,6,V,v
12	VT,+,K,k	24	ETB,7,W,w

Note: Entries in this table are separated by commas "," which means that any of the values in that list can be used. Values between space (20h) and the number 8 (38h) can also be used in conjunction with control (Ctrl) on.

ERASE COMMANDS

Command	A1/A2	3A	3A+
Erase Screen	FF (Ctrl L)	SUB (Ctrl :)	SUB or Esc *
Erase to EOL	Esc K	---	Esc T
Erase to End Screen	Esc k	---	Esc Y

Note: In Erase Screen, the cursor is restored to the upper left hand corner. If Y was selected for Disable CTRL-Z (in Setup, General menu), CTRL-Z will be ignored in the 3A and 3A+ modes.

KEYBOARD COMMANDS

Command	A1/A2	3A	3A+
Ring Bell	BEL (Ctrl G)	BEL (Ctrl G)	BEL (Ctrl G)
Lock Keyboard	Esc 5 or EOT (EOT for A2 only)	SI	Esc #
Unlock Keyboard	Esc 6 or STX	SO	Esc "

Note: In all modes, the keyboard can be unlocked by entering Setup, resetting the terminal, and exiting Setup (*Ctrl-SysRq, F11*, Reset Terminal, *F12, Y*).

Note: In A1/A2 modes, since all function keys contain STX by default, any function key (F1-F12) can also be used to unlock the keyboard. In A2 mode only, Ctrl-Break will also unlock the keyboard.

PRINT MODES

In order to print to an attached printer, two selections need to be made in Setup. First, the PRINT parameter in the General menu must not be "OFF." (To understand the other CR, CR/LF, and NONE choices, refer to the Print Screen section below.) Secondly, the PRINTER parameter in the Communications menu should be set to SERIAL if the printer is attached to the port labeled "SES2-AUX" or PARALLEL if it is attached to the port labeled "PAR."

Print Screen

This command will print the entire screen, and depends on the PRINT selection in the General menu of Setup. If PRINT is OFF, the terminal will ignore print commands. Any of the other selections will cause the cursor to sweep over the entire screen, transmitting data to the printer port, and will end with the cursor's original position being restored.

If PRINT is set to CR or CR/LF, the terminal will transmit data from each row up to the last character that is not a space. (Note that when a screen is erased, every character position contains a space character.) At the end of each line, the terminal will send a space character and either a CR or CR/LF to the printer, depending on the selection.

If PRINT is set to NONE, all data from every row is sent, including the trailing space characters. No line terminator is sent.

Pass Through (Transparent) Mode

When this mode is on, data received from the host port bypasses the screen and is routed directly to the selected printer port. In HDX mode (where data from the keyboard is normally sent to the host and to the screen), the data intended for the screen will be routed to the printer port instead. Since this print mode does not affect the display, it is also referred to as transparent printing.

Copy Mode

Data received from the host is displayed and copied to the printer port. In HDX mode, keyboard data is displayed and also routed to the printer. In A1 and 3A modes, Copy Mode is always on.

PRINTER COMMANDS

Command	A1/A2	3A	3A+
Print Screen	Esc X	Esc X	Esc X
Pass Through On	Esc 3	---	Esc 3
Pass Through Off	Esc 4	---	Esc 4
Copy Mode On	DC2 (A2 only, copy mode always on in A1)	--- (copy mode always on in 3A)	Esc @
Copy Mode Off	DC4 (A2 only, copy mode always on in A1)	--- (copy mode always on in 3A)	Esc A

Note: A "Transmit Condition" message will appear in the error message line if an attempt is made to print when the printer is not "On Line." This condition is detected when DTR is low (in the case of a serial printer - depending on the printer's polarity, DTR could also be high) or if BUSY is high in the case of a parallel printer.

SCREEN CONFIGURATIONS

Screen configurations determine if the Message Line (the 25th line) can be used and if smooth scroll is allowed. After any screen configuration command is issued, the screen is erased and the cursor is placed at R1,C1. The Screen Type option in the General menu of Setup is updated reflect the mode selected: Normal, 24-Line, or 25-Line.

Normal Mode

Smooth scroll is not allowed and the message line cannot be accessed.

24-Line Mode

Smooth scroll is allowed, and the message line can be written to and displayed temporarily using the "Esc N" command, but it will be erased when exited.

25-Line Mode

Smooth scroll is not allowed, but the message line can be fully accessed. It will not affected by scrolling of data on lines 1-24.

SCREEN CONFIGURATION COMMANDS

Command	A1/A2	3A	3A+
Screen Type = 25 line	Esc s	Esc s	Esc s
Screen Type = Normal	Esc F	Esc F	Esc F
Screen Type = 24 line	Esc S	Esc S	Esc S

SCROLL COMMANDS

Command	A1/A2	3A	3A+
Smooth Scroll*	Esc j	Esc j	Esc j
Jump Scroll	Esc J	Esc J	Esc J

*Note: Smooth Scroll is only available when Screen Type = 24-Line Mode.

Programming

MESSAGE LINE

The message line (25th line) is fully available when Screen Type = 25-Line and temporarily available when Screen Type = 24 Line. That is, in 24-Line mode, the message line is erased by data scrolling on lines 1-24 or by a carriage return. In 24-Line mode, the only command available is "Display Message Line" (Esc N followed by *text*) which combines the write and display functions. In 25-Line mode, the Write, Display, and Hide commands are independent of each other. As a result, the Hide Message Line and Write to Message Line commands are valid for 25-Line mode only. The Hide Message Line leaves the message content intact and merely removes it from view. It can be redisplayed using "Esc N." Upon exiting the message line, the cursor goes to R24,C1.

A number of commands can be used when writing to the message line. Refer to the next page, "Commands when Writing to the Message Line" for details.

MESSAGE LINE COMMANDS

Command	A1/A2	3A	3A+
Display Message Line	Esc N	Esc N	Esc N
Hide Message Line	Esc n	Esc n	Esc n
Write to Message Line*	Esc c *text*	Esc c *text*	Esc c *text*

*Note: This command is only valid for 25-Line mode. Cursor up, cursor down, CR, or passing the 80th column will end the write command. Erase to end of line, Tag on, Tag off and Select Highlight are available when writing to the message line. In A1 and A2 modes, erase to the end of page erases the entire application area (rows 1-24) and in the 25th line, it erases from the cursor position to the end of the message line. The message line can have a different video highlight attribute than the application area.

Compose Characters

COMPOSE CHARACTERS

Overview

This chapter explains the use of the Alt Gr key (the right Alt key) on international language keyboards and the Compose sequences which allow for the creation of certain 8-bit characters. (Any 8-bit character in your secondary font bank can be created using the left Alt key and the instructions on page 2-12 of this manual, but the compose characters provide an easy way to create characters without knowing the hexadecimal value of the character.)

Characters on the Keyboard

All of the international language keyboards have at least one key which has three characters imprinted on its face. The three-character keys will create: the lower character when that key is pressed alone, the top character when pressed in conjunction with the *Shift* key, and the third character on the right-side when pressed with the *Alt Gr* (right Alt) key.

Example using a French Keyboard:

Press 

⇒ $

Press 

+ Shift ⇒ £

Press 

+ Alt Gr ⇒ ¤

Compose Characters

Characters not on the Keyboard

If a character exists in either the primary or secondary character sets (font banks), but is not displayed on the keyboard, it can be "composed" using a sequence of two keystrokes. These are called compose sequences.

The sequence consists of a standard lead-in followed by a specifier which is unique. The lead-in is one of the following diacritic marks: grave accent (`), acute accent (´), circumflex (^), umlaut(¨), or tilde(~). In some keyboard languages, a few diacritic marks may not be available. The lead-in indicates the start of a compose sequence and the specifier names the character to be composed.

Only the composed character is displayed at the end of the sequence. If the sequence attempts to access a character which is not available in the active character set(s), a bell tone sounds and the sequence terminates.

> Note: To compose characters, the "EIA Data Format" selection in Setup's Communication menu should have 8-bits for data. Also, if the "Char Set" selection is set to "Multinational" in the General menu, both the Multinational and the National compose sequences can be accessed for the selected language. However, if "Char Set" is "National," only the National compose sequences for the given language will be available.

Example using a German Keyboard

1 Press the acute mark (´) key located at the immediate left of the Backspace key on a German keyboard while "Language" in the General Setup menu is German.

2 Press *e*.

3 The letter é appears.

Compose Characters

MULTINATIONAL COMPOSE SEQUENCES

Diacritic Characters

Character	Description	Compose Sequence
"	Quotation Mark[1]	" *Space*
'	Apostrophe[2]	' *Space*
^	Circumflex[1]	^ *Space*
\	Grave accent[2]	\ *Space*
|	Pipe[1]	^ /
~	Tilde[3]	~ *Space*

Notes: [1]Not available in German. [2]Not available in French. [3]Not available in French, German, or Spanish.

Acute Accent Characters - (not available for French)

Character	Description	Compose Sequence
Á	A acute	' A
É	E acute	' E
Í	I acute	' I
Ó	O acute	' O
Ú	U acute	' U
á	a acute	' a
é	e acute	' e
í	i acute	' i
ó	o acute	' o
ú	u acute	' u

Compose Characters

Grave Accent Characters - (not available for French)

Character	Description	Compose Sequence
À	A grave	` A
È	E grave	` E
Ì	I grave	` I
Ò	O grave	` O
Ù	U grave	` U
à	a grave	` a
è	e grave	` e
ì	i grave	` i
ò	o grave	` o
ù	u grave	` u

Circumflex Characters - (not available for German)

Character	Description	Compose Sequence
Â	A Circumflex	^ A
Ê	E Circumflex	^ E
Î	I Circumflex	^ I
Ô	O Circumflex	^ O
Û	U Circumflex	^ U
â	a Circumflex	^ a
ê	e Circumflex	^ e
î	i Circumflex	^ i
ô	o Circumflex	^ o
û	u Circumflex	^ u

Compose Characters

Tilde Characters - (not available for French, German, or Spanish)

Character	Description	Compose Sequence
Ã	A tilde	~ A
Ñ	N tilde	~ N
Õ	O tilde	~ O
ã	a tilde	~ a
ñ	n tilde	~ n
õ	o tilde	~ o

Umlaut Characters - (not available for German)

Character	Description	Compose Sequence
Ä	A umlaut	" A
Ë	E umlaut	" E
Ï	I umlaut	" I
Ö	O umlaut	" O
Ü	U umlaut	" U
Ÿ	Y umlaut	" Y
ä	a umlaut	" a
ë	e umlaut	" e
ï	i umlaut	" i
ö	o umlaut	" o
ü	u umlaut	" u
ÿ	y umlaut	" y

Compose Characters

NATIONAL COMPOSE SEQUENCES

Finnish National Compose Sequence

Character	Description	Compose Sequence
Ä	A umlaut	¨ A
Ö	O umlaut	¨ O
Ü	U umlaut	¨ U
ä	a umlaut	¨ a
ö	o umlaut	¨ o
ü	u umlaut	¨ u

Portuguese National Compose Sequence

Character	Description	Compose Sequence
~	Tilde	~ *Space*
Ã	A tilde	~ A
Õ	O tilde	~ O
ã	a tilde	~ a
õ	o tilde	~ o

Appendix

ASCII STANDARD CHARACTER SET

HEX	00h	10h	20h	30h	40h	50h	60h	70h
00h	NUL	DLE	SPACE	0	@	P	`	p
01h	SOH	DC1	!	1	A	Q	a	q
02h	STX	DC2	"	2	B	R	b	r
03h	ETX	DC3	#	3	C	S	c	s
04h	EOT	DC4	$	4	D	T	d	t
05h	ENQ	NAK	%	5	E	U	e	u
06h	ACK	SYN	&	6	F	V	f	v
07h	BEL	ETB	'	7	G	W	g	w
08h	BS	CAN	(	8	H	X	h	x
09h	HT	EM	)	9	I	Y	i	y
0Ah	LF	SUB	*	:	J	Z	j	z
0Bh	VT	ESC	+	;	K	[	k	{
0Ch	FF	FS	,	<	L	\	l	|
0Dh	CR	GS	-	=	M	]	m	}
0Eh	SO	RS	.	>	N	^	n	~
0Fh	SI	US	/	?	O	_	o	DEL

7-bit ASCII Code Chart

Appendix

PC MULTINATIONAL CHARACTER SET

HEX	80h	90h	A0h	B0h	C0h	D0h	E0h	F0h
00h	Ç	É	á	▒	└	╨	α	≡
01h	ü	æ	í	▓	┴	╤	β	±
02h	é	Æ	ó	▓	┬	╥	Γ	≥
03h	â	ô	ú	┤	├	╙	π	≤
04h	ä	ö	ñ	┤	─	╘	Σ	⌠
05h	à	ò	Ñ	╡	┼	╒	σ	⌡
06h	å	û	ª	╢	╞	╓	µ	÷
07h	ç	ù	º	╖	╟	╫	τ	≈
08h	ê	ÿ	¿	╕	╚	╪	Φ	°
09h	ë	Ö	⌐	╣	╔	┘	θ	•
0Ah	è	Ü	¬	║	╩	┌	Ω	·
0Bh	ï	¢	½	╗	╦	■	δ	√
0Ch	î	£	¼	╝	╠	▬	∞	n
0Dh	ì	¥	¡	╜	═	▌	ø	2
0Eh	Ä	Pt	«	╛	╬	▐	∈	■
0Fh	Å	ƒ	»	┐	╧	▀	∩	

Appendix

PC MULTILINGUAL CHARACTER SET

HEX	80h	90h	A0h	B0h	C0h	D0h	E0h	F0h
00h	Ç	É	á	▒	└	ð	Ó	—
01h	ü	æ	í	▓	┴	Đ	ß	±
02h	é	Æ	ó	▓	┬	Ê	Ô	=
03h	â	ô	ú	┃	├	Ë	Ò	¾
04h	ä	ö	ñ	┤	─	È	õ	¶
05h	à	ò	Ñ	Á	┼	ı	Õ	§
06h	å	û	ª	Â	ã	Í	µ	÷
07h	ç	ù	º	À	Ã	Î	Þ	¸
08h	ê	ÿ	¿	©	╚	Ï	þ	°
09h	ë	Ö	®	╣	╔	┘	Ú	¨
0Ah	è	Ü	¬	║	╩	┌	Û	·
0Bh	ï	ø	½	╗	╦	■	Ù	¹
0Ch	î	£	¼	╝	╠	▬	ý	³
0Dh	ì	Ø	¡	¢	═	¦	Ý	²
0Eh	Ä	×	«	¥	╬	Ì	-	■
0Fh	Å	ƒ	»	┐	¤	▬	´	

Appendix

NATIONAL REPLACEMENT CHARACTERS

Keyboard Language	23h #	3Ch <	3Eh >	40H @	5Bh [	5Ch \	5Dh]	5Eh ^	60h `	7Bh {	7Ch |	7Dh }	7Eh ~
Danish					Æ	Ø	Å			æ	ø	å	
Finnish*					Ä	Ö	Å	Ü	é	ä	ö	å	ü
French	£			à	°	ç	§			é	ù	è	¨
German				§	Ä	Ö	Ü			ä	ö	ü	β
Norwegian					Æ	Ø	Å			æ	ø	å	|
Portuguese					Ã	Ç	Õ			ã	ç	õ	
Spanish					¡	Ñ	¿			°	ñ	ç	l·
Swedish				É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
U.K.	£												

*Note: Both of the umlaut U characters (ü and Ü) in the Finnish NRC can only be generated by the host.