

1151A/G/W ASCII Display Station

Operator's Manual

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WARNING!

This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the 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 users, at their own expense, will be required to take whatever measures may be necessary to correct the interference.

Table of Contents

	<u>Page</u>
Chapter 1. Introduction	1-1
Connectivity	1-1
Keyboard Support	1-2
Printer and Mouse Support	1-2
Additional Features	1-2
Physical Statistics	1-3
Environmental Requirements	1-3
Manual Organization	1-3
Chapter 2. Customer Installation	2-1
Back Panel Connectors	2-1
Main Serial Port	2-2
Auxiliary Serial Port	2-2
Parallel Port	2-3
Keyboard Connector	2-3
Chapter 3. Controls, Setup Menus, and Indicators	3-1
Display Station Controls	3-1
Power-On/Off	3-2
Brightness Control	3-2
Contrast Control	3-2
Setup Mode	3-3
Entering Setup Mode	3-3
Using the Setup Screens	3-3
Leaving Setup Mode	3-4
General Setup Screen	3-5
Communications Setup Screen	3-10
Display Setup Screen	3-15
Keyboard Setup Screen	3-21
ANSI Setup Screen	3-25
3151/3161 Setup Screen	3-29
Function Keys Setup Screen	3-32
Tabs Setup Screen	3-34
Answerback Setup Screen	3-35
Status Line Indicators	3-36
Location of Status Line Indicators	3-37
Chapter 4. Operating Procedures	4-1
Determining the Emulation	4-1
Key Functions	4-2
Local Keyboard Commands	4-2
Emulation-Dependent Key Functions	4-3
Compose Key	4-5
Display Configuration	4-6
Virtual Terminal Mode	4-6
Printer Control	4-7
Printer Ownership	4-7
Print Commands	4-7

Table of Contents

	<u>Page</u>
Chapter 5. Preventive Maintenance	5-1
Preventive Maintenance	5-1
Questions	5-1
Appendix A. Wyse Emulations Control Commands	A-1
Monitor Mode	A-1
Selecting Other Emulations	A-2
Communicating with the Computer	A-2
Modem Setup Parameters	A-4
Controlling the Terminal and Keyboard	A-5
Redefining the Keys	A-6
Program Function Key Definitions	A-7
Screen and Cursor Display	A-8
Displaying the Message Fields	A-8
Program Function Key Labels	A-9
Defining the Data Area	A-9
Display Memory/Split Screen	A-10
Display Attributes	A-11
Display Field Attributes	A-12
Protecting Data	A-13
Graphics Characters	A-13
Graphics Character Keys	A-13
Controlling the Cursor	A-14
Editing	A-15
Clearing Data	A-16
Sending Data	A-17
Print Functions	A-18
Character Sets	A-18
Function	A-19
Appendix B. DEC VT Emulations Control Commands	B-1
VT52 Control Commands	B-1
VT100 Control Commands	B-2
Cursor Movement Commands	B-2
Line Size Commands	B-2
Character Attributes Command	B-3
Erasing Commands	B-3
Scrolling Region Command	B-3
Tab Stops Commands	B-3
Reset Command	B-4
Character Set Commands	B-4
Mode Commands	B-4
Report Commands	B-5
Request Status Report Command	B-5
Controlling the Terminal	B-6
VT220 Control Commands	B-6
Functional Mode Commands	B-7
Cursor and Editing Commands	B-10
Miscellaneous Commands	B-11

	<u>Page</u>
Appendix C. PC Term Control Commands	C-1
Monitor Mode Commands	C-1
Selecting Other Personalities	C-1
Communicating with the Computer	C-2
Controlling the Terminal and Keyboard	C-2
Defining Screen and Cursor Appearance	C-3
Displaying the Message Fields	C-3
Defining the Data Area	C-4
Assigning Display Attributes	C-4
Protecting Data	C-5
Enabling/Disabling Graphics Mode	C-5
Controlling the Cursor	C-5
Editing	C-6
Clearing Data	C-7
Sending Data	C-7
Printing	C-8
Appendix D. IBM 3151 and 3161 Control Codes	D-1
Appendix E. Multinational Keystroke Sequences	E-1
Appendix F. ASCII Codes	F-1
Appendix G. Row/Column ASCII Codes	G-1
Appendix H. Special Key Defaults	H-1
IBM 3151/3161 Emulations	H-1
Keypad Keys	H-2
Wyse Emulations	H-3
DEC Emulations	H-5
Editing and Special Key Codes	H-5
Cursor Key Application Mode Codes	H-5
Numeric Keypad Application Mode Codes	H-6
PF Key Codes	H-6
Function Key Default Codes	H-7
Index	Index-1

List of Illustrations

	<u>Page</u>
Figure 2-1. Back Panel Connectors	2-1
Figure 2-2. Main Serial Port Pin Assignments	2-2
Figure 2-3. Auxiliary Serial Port Pin Assignments	2-2
Figure 2-4. Parallel Port Pin Assignments	2-3
Figure 3-1. 1151 Controls	3-1
Figure 3-2. General Setup Screen	3-5
Figure 3-3. Communications Setup Screen	3-10
Figure 3-4. Display Setup Screen	3-15
Figure 3-5. Keyboard Setup Screen	3-21
Figure 3-6. ANSI Setup Screen	3-25
Figure 3-7. 3151/3161 Setup Screen	3-29
Figure 3-8. Function Keys Setup Screen	3-32
Figure 3-9. Tabs Setup Screen	3-34
Figure 3-10. Answerback Setup Screen	3-35
Figure 3-11. Status Line Messages	3-37

Chapter 1. Introduction

The 1151A/G/W ASCII Display Station is a highly functional, ergonomically designed display station that features a 14-inch, high resolution monochrome CRT available in green (1151G), amber (1151A), and white (1151W) with full overscan and 60 or 78 Hz refresh rates for flicker-free performance. Normal and reverse video modes are supported. Easily accessible controls adjust brightness and contrast of the display screen.

Connectivity

The 1151 provides full ASCII, ANSI, and PC Term support with the following emulations:

- IBM 3151
- IBM 3161
- Wyse 50/50+
- Wyse 60
- DEC VT52
- DEC VT100
- DEC VT220
- PC Term

The 1151 offers RS-232 connectivity through the main port and RS-422/RS-232 connectivity through the auxiliary port. Speeds range from 50 baud to 38.4 Kb in both transmit and receive modes. The 1151 operates in Full-Duplex, Half-Duplex, Local, Block, and Monitor modes and supports a wide range of systems and super servers, including the following:

- AIX
- UNIX
- ZENIX
- Multiuser DOS environments
- Multiuser OS2 environments

Introduction

Keyboard Support

You can enter or change information on an enhanced, 102-key IBM PC style keyboard and standard PC keyboard connection. The 1151 supports the following languages:

- US English
- UK English
- Danish
- German
- French
- Spanish
- Swedish/Finnish
- Norwegian
- French/Canadian
- Italian
- Swiss (French)
- Swiss (German)
- Portuguese

Printer and Mouse Support

The 1151 supports a printer through its parallel port or through one of its serial ports. The printer can be controlled locally by the 1151 or remotely by a host. A mouse can be supported through either serial port.

Additional Features

Additional features include the following:

- Forty programmable function keys
- Seven pages of screen memory
- Full overscan
- Single or dual host operations
- Dual session capabilities

Physical Statistics

Measurement	Display Element
Weight	25 lb (11.33 kg)
Height	13.5 in (322 mm)
Depth	13.5 in (322 mm)
Width	14 in (350 mm)
Footprint	9.5 in x 9.5 in (20.90 cm x 20.90 cm)
Power Consumption	27 watts typical

Environmental Requirements

Measurement	Display Element
Clearance	Three inches on all sides of the unit. (Damage may result if all vents are blocked.)
Operating Temperature Range	32° to 105°F (0° to 40°C)
Relative Humidity	10 to 95%, noncondensing
Power	110 to 240 VAC +/- 10%

Manual Organization

In addition to the introduction, the *1151A/G/W ASCII Display Station Operator's Manual* contains the following chapters and appendixes:

Customer Installation — Provides instructions for connecting a keyboard and mouse to the 1151 and connecting the 1151 to a host or super server.

Controls, Setup Menus, and Indicators — Describes the controls and indicators and tells you how to configure the software.

Operating Procedures — Tells you how to power on the 1151 and how to use some features, such as Virtual Terminal mode.

Preventive Maintenance — Describes preventive maintenance for your 1151.

Wyse Emulations Control Commands — Contains the escape sequences for the Wyse emulations.

DEC VT Emulations Control Commands — Contains the escape sequences for the DEC VT emulations.

Introduction

PC Term Control Commands — Contains the escape sequences for the PC Term emulation.

IBM 3151 and 3161 Control Codes — Contains the control codes for the IBM 3151 and IBM 3161 emulations.

Multinational Keystroke Sequences — Contains the VT220 emulation keyboard compose sequences.

ASCII Codes — Contains the ASCII codes.

Row/Column ASCII Codes — Contains the ASCII codes for the monitor rows and columns.

Function and Arrow Key Defaults — Contains the control code defaults for the Wyse 60 emulation function and arrow keys.

Chapter 2. Customer Installation

Before you unpack the display station, inspect the carton for physical damage.

If the exterior of the package is damaged, contact the local MTX, Inc. sales office or distributor. Also contact the carrier to request examination of the damage. The carrier is required to complete and sign a damage report form.

Note: To report damage, customers in the Continental US should call MTX, Inc. toll free at 1-888-648-7826 and ask for the Customer Service Department.

If the package is not damaged, remove the package contents and save the shipping carton for returning the unit if service is required.

To install the 1151, choose a location away from direct sunlight or other sources of bright direct lighting. Place the display station on a flat, hard surface and ensure there are at least three inches on all sides for ventilation and external cabling.

Check that you have a grounded power outlet that accommodates a three-pronged plug and that the source of electricity is in the range of the voltage shown on the back of the display station.

Back Panel Connectors

The 1151 can be connected directly to a host computer or indirectly to a remote system by way of a terminal server or modem through either of the serial ports. You can also connect either a parallel or serial printer directly to the 1151.

The 1151 has two serial ports, the main serial port and the auxiliary serial port, and one parallel port. Figure 2-1, below, shows the locations of the connectors on the back panel of the 1151.

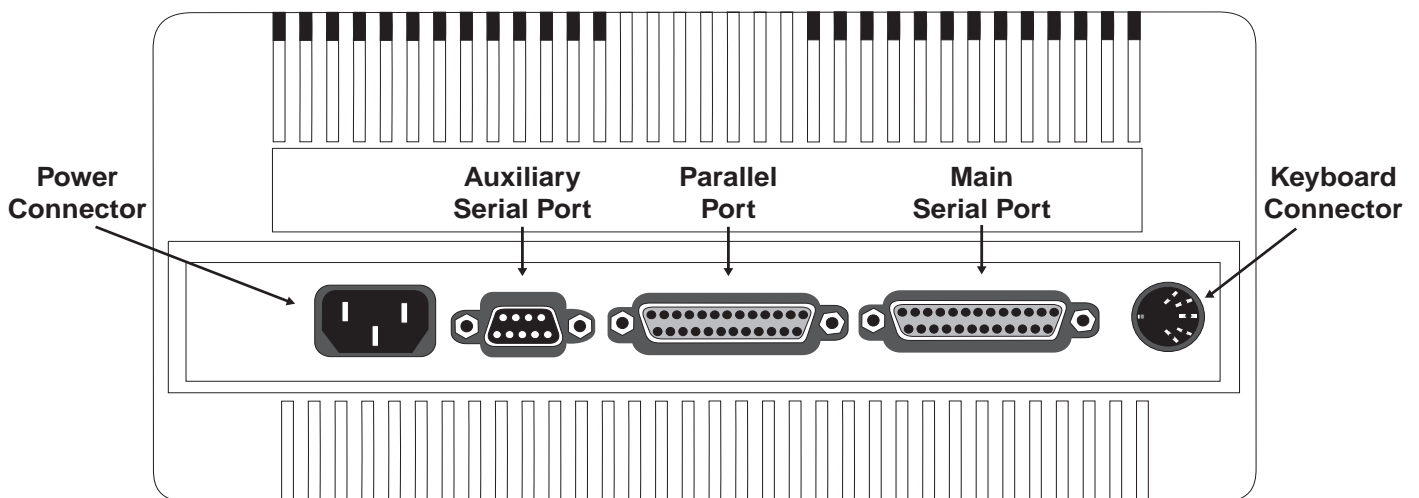


Figure 2-1. Back Panel Connectors

Customer Installation

Main Serial Port

The main serial port has a 25-pin RS-232C connector. Use a shielded serial interface cable fitted with a male 25-pin connector on the display station end. Figure 2-2, below, shows the pin assignments for the main serial port.

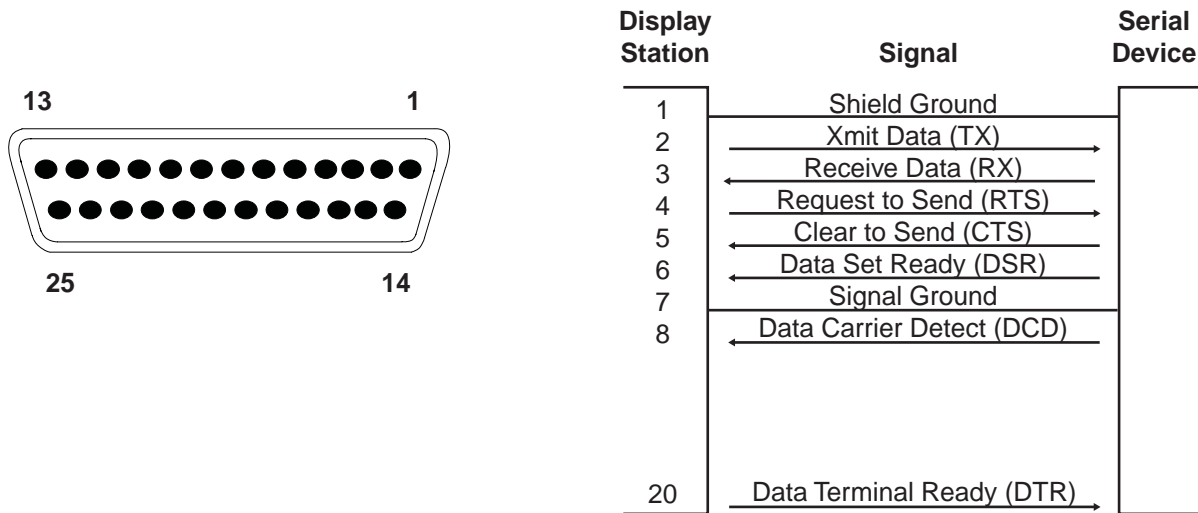


Figure 2-2. Main Serial Port Pin Assignments

Auxiliary Serial Port

The auxiliary serial port has a 9-pin RS-232C/RS-422 connector. Use a shielded serial interface cable fitted with a female 9-pin connector on the display station end. Figure 2-3, below, shows the pin assignments for the auxiliary serial port.

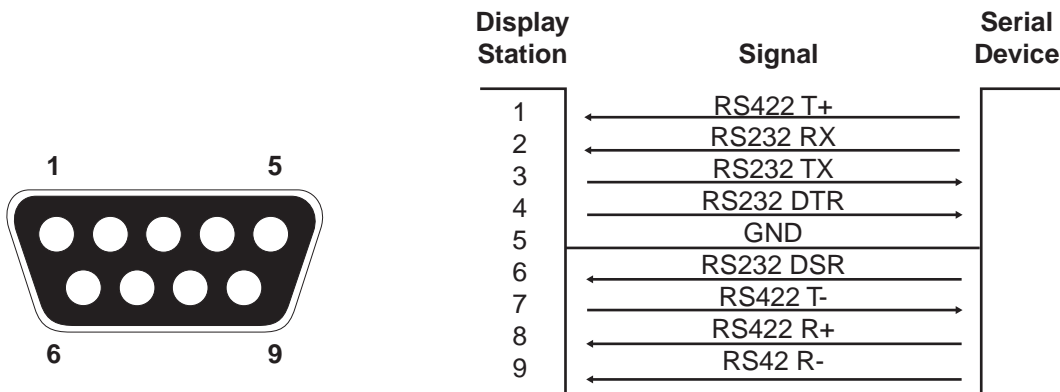


Figure 2-3. Auxiliary Serial Port Pin Assignments

Parallel Port

The parallel port is Centronics compatible. Use a shielded parallel interface cable with a male 25-pin connector on the display station end.

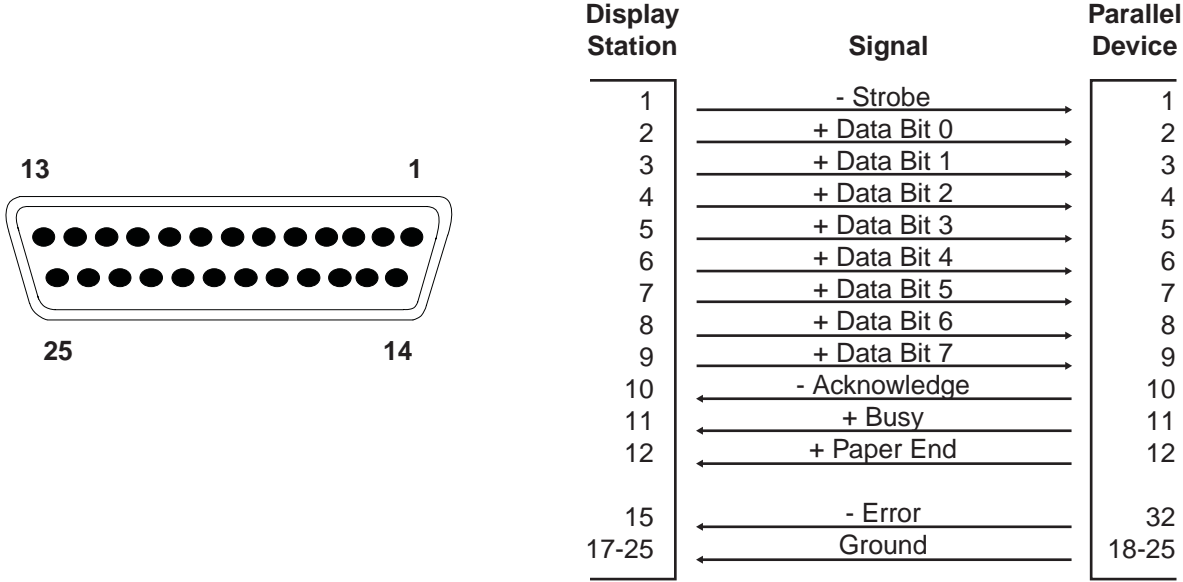


Figure 2-4. Parallel Port Pin Assignments

Keyboard Connector

Place the keyboard in front of the display station. Pull out the hinged feet on the back of the keyboard to adjust it to a higher setting, if desired. Insert the keyboard plug into the keyboard connector on the back panel (Figure 2-1 on Page 2-1).

Chapter 3. Controls, Setup Menus, and Indicators

This chapter describes the display station controls, keyboard controls, setup menus, and display indicators on the 1151A/G/W and its attached keyboard.

Display Station Controls

The Power-On/Off switch, Brightness control, and Contrast control are the only display controls located on the display station itself. All other controls are selected from the Setup mode section.

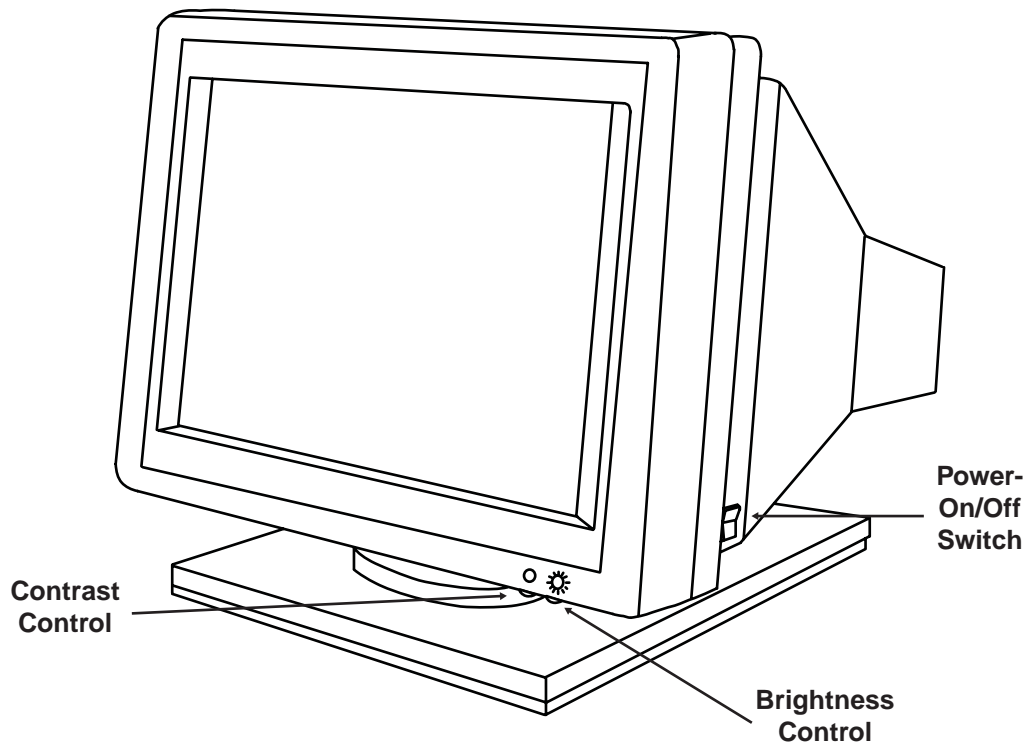


Figure 3-1. 1151 Controls

Controls, Setup Menus, and Indicators

Power-On/Off

Press the top of the Power-On/Off toggle switch to turn on power to the display station. A beep sounds, the display station executes a brief self-test, and a grid pattern is displayed on the screen. If the test completes successfully, the screen clears and a flashing cursor is displayed on the upper left corner of the screen.

If the test does not complete successfully, a tone sounds and a single character is displayed in the lower right corner of the screen. This usually means there is a hardware failure. Exit the self-test by pressing the G key, then enter Setup mode as described in “Entering Setup Mode” on Page 3-3 and ensure that your display station is properly configured.

If **K** is displayed after an unsuccessful self-test, turn the Power-On/Off switch off, then press and hold the G key while you turn the Power-On/Off switch on. If the 1151 still does not display correctly, see Chapter 5, “Problem Determination and Maintenance.”

Press the bottom of the Power-On/Off toggle switch to turn off power to the display station.

Brightness Control

Turn the Brightness control clockwise to increase brightness or counterclockwise to decrease brightness.

Contrast Control

Turn the Contrast control clockwise to increase contrast or counterclockwise to decrease contrast.

Setup Mode

In Setup mode, you can configure the 1151's operating parameters and redefine the keyboard keys. Setup parameters fall into the following three groups:

- Setup parameters that must be set to match the requirements of the computer or other connected device for communication to be successful. For example, the display station and the computer must agree on the rules for the speed (baud rate) at which they send and receive data or they won't be able to communicate at all.
- Setup parameters that must be set to match the requirements of particular application programs. For example, some applications require that tabs be set before they are installed.
- Setup parameters that you can set to suit your personal preferences. For example, you can select a block or underline cursor or a blinking or nonblinking cursor.

Entering Setup Mode

To enter Setup mode, hold down the right Control key while you press the Scroll Lock key. The General Setup screen is displayed (Figure 3-2 on Page 3-5).

Note: If handshaking is not enabled, data may be lost if you enter Setup mode while the display station is receiving data from the host.

Using the Setup Screens

Use the Up or Down Arrow key to scroll through the options on the setup screen. The selected option is highlighted. To change an option setting, press the Left or Right Arrow key to cycle through the settings for the highlighted option.

Note: Not all setup parameters apply to every personality. If you select a parameter setting that is invalid for the current personality, the display station defaults to a valid setting when you leave Setup mode.

Resetting the Default Values

To return all the parameters to the factory-set defaults, press the D key.

Note: When you reset the parameters to their default values, any programmable Function keys you have changed also return to their factory-set defaults.

Restoring Setup Parameters

To restore the last saved setup parameters, press the R key.

Controls, Setup Menus, and Indicators

Changing the Serial Port

The serial port selected for the host connection is displayed on the bottom center of all the setup screens. To change the selected serial port, press the P key.

Saving Setup Parameters

Before you leave Setup mode, you can save any changed setup parameters to nonvolatile memory by pressing the S key. If you do not save your changes before you turn off power to the display, the next time you power on, the last settings saved are restored.

Note: Key definitions and answerback messages do not have to be saved by pressing the S key. They are automatically saved in nonvolatile memory as they are entered.

Leaving Setup Mode

To leave Setup mode, press the F10 key or the E key. The screen returns to the data that was displayed before you entered Setup mode.

General Setup Screen

The General Setup screen is displayed when you enter Setup mode. You can also display the General Setup screen from any other setup screen by pressing the F1 key.

General Setup				14 Apr 1992 Ver 1.00x04													
Emulation	3151	Auto Page	Off														
Enhancements	Off	Warning Bell	On														
Virtual Terminal	Off	Margin Bell	Off														
Scroll Style	Jump	Bell Sound	1														
Auto Scroll	On	Block Terminator	US/CR														
Auto Wrap	On	Send ACK	Off														
Received CR	CR	Monitor Mode	Off														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">3151</td> <td style="width: 10%;">3161</td> <td style="width: 10%;">VT220-7</td> <td style="width: 10%;">VT220-8</td> <td style="width: 10%;">VT100</td> <td style="width: 10%;">VT52</td> <td style="width: 10%;">Wyse 60</td> <td style="width: 10%;">Wyse 50/50+</td> <td style="width: 10%;">PC Term</td> </tr> </table>								3151	3161	VT220-7	VT220-8	VT100	VT52	Wyse 60	Wyse 50/50+	PC Term	
3151	3161	VT220-7	VT220-8	VT100	VT52	Wyse 60	Wyse 50/50+	PC Term									
Host is on Main Port						<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">F1 Gen</td> <td style="width: 50%;">F6 3151</td> </tr> <tr> <td>F2 Comm</td> <td>F7 FKeys</td> </tr> <tr> <td>F3 Disp</td> <td>F8 Tabs</td> </tr> <tr> <td>F4 Kbd</td> <td>F9 Ansbk</td> </tr> <tr> <td>F5 ANSI</td> <td>F10 Exit</td> </tr> </table>		F1 Gen	F6 3151	F2 Comm	F7 FKeys	F3 Disp	F8 Tabs	F4 Kbd	F9 Ansbk	F5 ANSI	F10 Exit
F1 Gen	F6 3151																
F2 Comm	F7 FKeys																
F3 Disp	F8 Tabs																
F4 Kbd	F9 Ansbk																
F5 ANSI	F10 Exit																

Figure 3-2. General Setup Screen

Emulation

Select the display station's operational mode. The display station may clear the entire display memory when you change the emulation.

Selection	Description
3151	IBM 3151. This is the default setting.
3161	IBM 3161.
VT220-7	Digital Equipment VT220, 7-bit mode.
VT220-8	Digital Equipment VT220, 8-bit mode.
VT100	Digital Equipment VT100.
VT52	Digital Equipment VT52.
Wyse 60	Wyse WY-60.
Wyse 50/50+	Wyse WY-50/WY-50+
PC Term	PC terminal.

Controls, Setup Menus, and Indicators

Enhancements

The **Enhancements** option enables the PC Term emulation to have an enhanced set of Wyse 60 codes. These codes are not otherwise available for the PC Term emulation.

Selection	Description
Off	The Wyse 60 enhanced codes are not available for the PC Term emulation. This is the default setting.
On	The Wyse 60 enhanced codes are available for the PC Term emulation.

Virtual Terminal

If **Virtual Terminal** is turned on, the display station can be configured as two independent terminal types. Each terminal type is assigned to a specific port (main or auxiliary). The display station functions according to the configuration of the active port.

Selection	Description
Off	The terminal can access only one host during a session. This is the default setting.
On	The display station can access two hosts.

Scroll Style

Scroll Style selects the display station's scroll rate.

Selection	Description
Jump	Data is displayed at the rate it is received over the communications line. This is the default setting.
Smooth-8	The scroll rate is 8 scan lines per second.
Smooth-4	The scroll rate is 4 scan lines per second.
Smooth-2	The scroll rate is 2 scan lines per second.
Smooth-1	The scroll rate is 1 scan line per second.

Auto Scroll

The **Auto Scroll** options determine where the cursor is placed after it moves past the last line on the page.

Selection	Description
Off	The cursor wraps to the beginning of the same page.
On	The data scrolls up one line and the cursor moves to the beginning of the last line. This is the default setting.

Auto Wrap

Selection	Description
On	When characters are entered at the end of a line, the cursor wraps to the start of the next line. This is the default setting. If Auto Page is set to On, at the bottom of the page the cursor moves to the beginning of the next page without sending a carriage return or any signal to the host. It stays local on the screen.
Off	When characters are entered at the end of a line, additional characters overwrite the last character.

Received CR

Selection	Description
CR	When the display station receives an ASCII CR character, the cursor moves to the beginning of the current line. This is the default setting.
CRLF	When the display station receives an ASCII CR character, the cursor moves to the beginning of the next line.

Auto Page

Selection	Description
Off	Each page of memory is addressed separately. When the cursor reaches the bottom of the page: <ul style="list-style-type: none">• If Auto Scroll is turned on, the cursor scrolls the top line off the screen and inserts a new line at the bottom of the screen. The cursor stays on the new bottom line.• If Auto Scroll is turned off, the cursor wraps to the top left of the existing page and overwrites existing data. This is the default setting.
On	All display memory is treated as one continuous page. When the cursor reaches the bottom of the page, a new page of memory moves onto the screen.

Controls, Setup Menus, and Indicators

Warning Bell

When enabled, the warning bell sounds when the display station receives the ASCII BEL character.

Selection	Description
Off	The warning bell is disabled.
On	The warning bell is enabled. This is the default setting.

Margin Bell

When enabled, the margin bell sounds when the cursor reaches the column where the bell is set. For 80-Column mode, the margin bell is set at the 72nd column; for 132-Column mode, the margin bell is set at the 124th column.

Note: In some emulations, the host can change the column setting.

Selection	Description
Off	The margin bell is disabled. This is the default setting.
On	The margin bell is enabled.

Bell Sound

Use the Bell Sound option to select the tone for the warning and margin bell.

Selection	Description
Off	The bell is disabled. This setting overrides an On setting for either Warning Bell or Margin Bell , above.
1	The bell sounds a low tone. This is the default setting.
2	The bell sounds a medium tone.
3	The bell sounds a loud tone.

Block Terminator

Use the **Block Terminator** option to select the end-of-line and end-of-block character the display station sends when the **Comm Mode** option (on the Communications Setup screen) is set to **Block**.

Selection	Description
US/CR	The display station sends an ASCII unit separator (US) code as the end-of-line character and an ASCII carriage return (CR) as the end-of-block character. This is the default setting.
CRLF/ETX	The display station sends an ASCII carriage return and line feed (CRLF) code as end-of-line characters and an ASCII end-of-text (ETX) code as the end-of-block character.

Send ACK

When the **Send ACK** option is enabled, the display station sends the ASCII ACK character to the host when the display station receives a CTRL E or after executing one of the following:

- Commands that change a port's operating parameters
- Page print commands
- Font load or clear commands

Selection	Description
Off	The Send ACK option is disabled. This is the default setting.
On	The Send ACK option is enabled.

Monitor Mode

Selection	Description
Off	The display station interprets and acts on the control codes, but does not display them. This is the default setting.
On	The display station shows escape sequences and two-character mnemonics for control codes without interpreting them. Appendix F, "ASCII Codes," shows the seven- and eight-bit ASCII control codes.

Controls, Setup Menus, and Indicators

Communications Setup Screen

Press the F2 key from any screen in Setup mode to display the Communications Setup screen.

Communications Setup		14 Apr 1992 Ver 1.00x04	
Main Baud	9600	Aux Baud	9600
Main Data/Parity	8/None	Aux Data/Parity	8/None
Main Stop Bits	1	Aux Stop Bits	1
Ignore 8th Bit	Off	Aux RcvHndsk	XON/XOFF
Main Rcv Hndsk	XON/XOFF	Aux Xmt Hndsk	None
Main Xmt Hndsk	None	Aux Interface	RS232
Comm Mode	Full Duplex	Printer	Parallel
Disconnect	2 sec		
50 73 110 134.5 150 300 600 1200 1800 2400 3600 4800 9600 19200 38400			
Host is on Main Port		F1 Gen	F6 3151
		F2 Comm	F7 FKeys
		F3 Disp	F8 Tabs
		F4 Kbd	F9 Ansbk
		F5 ANSI	F10 Exit

Figure 3-3. Communications Setup Screen

Main Baud

Selection	Description
50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 9600, 19200, 38400	Select the main port baud rate. The default setting is 9600 .

Main Data/Parity

Select 7- or 8-bit data format and the type of parity for data sent through the main port.

Selection	Description
8/None	8-bit data, no parity. This is the default setting.
7/None	7-bit data, no parity.
7/Spce	7-bit data, space parity. The parity bit is forced to 0.
7/Odd	7-bit data, odd parity.
7/Even	7-bit data, even parity.
7/Mark	7-bit data, mark parity. The parity bit is forced to 1.

Main Stop Bits

Select the number of stop bits for the main port.

Selection	Description
1	1 stop bit. This is the default setting.
2	2 stop bits.

Ignore 8th Bit

Selection	Description
Off	The 8th bit is not truncated. This is the default setting.
On	The 8th bit is truncated before the byte is processed.

Main Rcv Hndsk

Select the handshaking protocol for data received from a device connected to the main port.

Selection	Description
None	No handshaking protocol is selected.
XON/XOFF	XON/XOFF handshaking protocol is selected. This is the default setting. Note: XON/XOFF usually uses the ASCII DC3 and DC1 characters.
DTR	DTR handshaking is selected (the voltage on the DTR line is raised and lowered).
DTR/XOFF	DTR/XOFF handshaking protocol is selected.
XPC	XPC handshaking protocol is selected. This selection is valid only if the emulation type is PC Term .
DTR/XPC	DTR/XPC handshaking protocol is selected. This selection is valid only if the emulation type is PC Term .

Main Xmt Hndsk

Select what the display station does in response to incoming handshaking signals while it is transmitting data from the main port.

Selection	Description
None	The display station ignores all incoming handshaking signals while it is transmitting data from the main port. This is the default setting.
XON/XOFF	The terminal responds to incoming handshaking signals while it is transmitting data from the main port.

Controls, Setup Menus, and Indicators

Comm Mode

Select the display station's host port communication mode.

Selection	Description
Full-Duplex	Data is sent to the host and echoed back to the display screen. FDX is displayed on the status line. This is the default setting.
Block	Local Editing mode. Data is sent to the host in a block rather than character by character. Incoming data is displayed. BLK is displayed on the status line. To use this option, the host software must support Block mode.
Half-Duplex	Data is sent to the host computer and to the display screen. HDX is displayed on the status line. Do not select Half Duplex unless you know it is required. Duplicated characters can be displayed on the screen if the host echoes the data.
Half-Block	Half-Block mode is like Block mode, except the display station can control the receipt and transmission of data with its Request to Send and Clear to Send lines. Select this option if a modem is connected to the display station. BLK is displayed on the status line.
Local	Data is sent to the screen only. It is not transmitted to the host. LCL is displayed on the status line.

Disconnect

Use this option to select the time the display station takes to disconnect from the host after losing the carrier detect signal. Most countries use the 2-second setting except for the United Kingdom, which uses 60 milliseconds.

Use this option only if you are connected to the host with a modem.

Selection	Description
2 sec	The display station disconnects from the host after losing the carrier detect signal for 2 seconds. This is the default setting.
60 msec	The display station disconnects from the host after losing the carrier detect signal for 60 milliseconds.

Aux Baud

Selection	Description
50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400	Select the auxiliary port baud rate. The default setting is 9600 .

Aux Data/Parity

Select 7- or 8-bit data format and the type of parity for data sent through the auxiliary port.

Selection	Description
8/None	8-bit data, no parity. This is the default setting.
7/None	7-bit data, no parity.
7/Spce	7-bit data, space parity. The parity bit is forced to 0.
7/Odd	7-bit data, odd parity.
7/Even	7-bit data, even parity.
7/Mark	7-bit data, mark parity. The parity bit is forced to 1.

Aux Stop Bits

Select the number of stop bits for the auxiliary port.

Selection	Description
1	1 stop bit. This is the default setting.
2	2 stop bits.

Aux Rcv Hndsk

Select the handshaking protocol for data received from a device connected to the auxiliary port.

Selection	Description
None	No handshaking protocol is selected.
XON/XOFF	XON/XOFF handshaking protocol is selected. This is the default setting.
DTR	DTR handshaking is selected (the voltage on the DTR line is raised and lowered).
DTR/XOFF	DTR/XOFF handshaking protocol is selected.
XPC	XPC handshaking protocol is selected. This selection is valid only if the emulation type is PC Term .
DTR/XPC	DTR/XPC handshaking protocol is selected. This selection is valid only if the emulation type is PC Term .

Controls, Setup Menus, and Indicators

Aux Xmt Hndsk

Select what the display station does in response to incoming handshaking signals while it is transmitting data from the auxiliary port.

Selection	Description
None	The display station ignores all incoming handshaking signals while it is transmitting data from the auxiliary port. This is the default setting.
XON/XOFF	The terminal responds to incoming handshaking signals while it is transmitting data from the auxiliary port.

Aux Interface

Select the communications protocol for the auxiliary serial port.

Selection	Description
RS232	RS-232 communications protocol. This is the default setting.
RS422	RS-422 communications protocol.

Printer

Select the port to which printer output is directed.

Selection	Description
Parallel	Printer output is directed to the Centronics parallel port. This is the default setting.
Serial	Printer output is directed to whichever serial port the host is not using. Note: In IBM 3151/3161 mode, there can be no dual host use (Virtual Terminal = Off) and no mouse use (Mouse = Off).

Display Setup Screen

Press the F3 key from any screen in Setup mode to display the Display Setup screen.

Display Setup		14 Apr 1992 Ver 1.00x04	
Columns	80	Background	Dark
80/132 Clear	On	Attributes	Char
Lines	24	Wprt Intensity	Dim
Pages	1 x Lines	Wprt Reverse	Off
Status Line	Ext	Wprt Underline	Off
Cursor Style	Blink Block	Refresh Rate	60 Hz
Cursor	On	Pound Char	US
Screen Saver	15 Min	Auto Font Load	On
80 132 Econ-80			
Host is on Main Port		F1 Gen	F6 3151
		F2 Comm	F7 FKeys
		F3 Disp	F8 Tabs
		F4 Kbd	F9 Ansbk
		F5 ANSI	F10 Exit

Figure 3-4. Display Setup Screen

Columns

For a comparison of the pages of memory available for the different column settings, see Page 3-16.

Selection	Description
80	The screen displays 80 columns. This is the default setting.
132	The screen displays 132 columns.
Econ-80	The screen displays 80 columns and 132 columns is disabled to increase the available pages of memory in 80 columns.

80/132 Clear

Select whether the display station clears the screen when it changes the number of columns on the screen.

Selection	Description
Off	The display station does not clear the screen when it changes the number of columns on the screen.
On	The display station clears the screen when it changes the number of columns on the screen. This is the default setting.

Controls, Setup Menus, and Indicators

Lines

Select the number of lines displayed on the screen. If 25 or 43 is selected, the Function key label line is turned off and any data currently on the Function key label line is erased.

Selection	Description
24	A status line, 24 scrollable lines, and a 26th user line (Function key label line) are displayed. This is the default setting.
25	A status line and 25 scrollable lines are displayed.
42	A status line, 42 scrollable lines, and a 44th user line (Function key label line) are displayed.
43	A status line and 43 scrollable lines are displayed.

Pages

Select the length of display memory through which you can scroll.

Selection	Description
1 x Lines	The buffer page length equals the number of lines selected in the Lines option. This is the default setting.
2 x Lines	The buffer page length equals twice the number of lines selected in the Lines option.
4 x Lines	The buffer page length equals four times the number of lines selected in the Lines option.
*	The buffer page length equals the number of lines selected in the Lines option (24, 25, 42, or 43) plus a second page with a length of all remaining memory.

Page/Embedded Attributes

Data Lines	Multiplier	80/132 Column Lines per Page	Number of Pages	Econ 80 Lines per Page	Econ 80 Number of Pages
24	1 x lines	24	4	24	7
	2 x lines	48	2	48	3
	4 x lines	96	1	96	1
	* (page 1/page 2)	24/76	2	24/144	2
25	1 x lines	25	4	25	6
	2 x lines	50	2	50	3
	4 x lines	100	1	100	1
	* (page 1/page 2)	25/75	2	25/143	2
42	1 x lines	42	2	42	4
	2 x lines	84	1	84	2
	4 x lines	n/a	n/a	168	1
	* (page 1/page 2)	42/58	2	42/126	2
43	1 x lines	43	2	43	3
	2 x lines	86	1	86	1
	4 x lines	n/a	n/a	n/a	n/a
	* (page1/page 2)	43/57	2	43/125	2

Character Attributes

Data Lines	Multiplier	80/132 Column Lines per Page	Number of Pages	Econ 80 Lines per Page	Econ 80 Number of Pages
24	1 x lines	24	2	24	3
	2 x lines	48	1	48	1
	4 x lines	n/a	n/a	n/a	n/a
	* (page 1/page 2)	n/a	n/a	24/56	2
25	1 x lines	25	2	25	3
	2 x lines	n/a	n/a	50	1
	4 x lines	n/a	n/a	n/a	n/a
	* (page 1/page 2)	n/a	n/a	25/55	2
42	1 x lines	42	1	42	1
	2 x lines	n/a	n/a	n/a	n/a
	4 x lines	n/a	n/a	n/a	n/a
	* (page 1/page 2)	n/a	n/a	n/a	n/a
43	1 x lines	43	1	43	1
	2 x lines	n/a	n/a	n/a	n/a
	4 x lines	n/a	n/a	n/a	n/a
	* (page1/page 2)	n/a	n/a	n/a	n/a

Status Line

See “Status Line Indicators” on Page 3-36 for more information about the status line.

Selection	Description
Ext	<p>An extended status line. The status line displays the following information:</p> <ul style="list-style-type: none"> • Communications mode • Caps lock • Num lock • Keyboard lock • Display page number • Print status • Monitor mode status • Row/Column position of cursor <p>This is the default setting.</p>
On	<p>The status line displays the following information:</p> <ul style="list-style-type: none"> • Communications mode • Caps lock • Num lock • Keyboard lock • Protect and Write Protect mode • Insert Mode • Display page number • Print status • Monitor mode status
Off	<p>The status line is turned off.</p>

Controls, Setup Menus, and Indicators

Cursor Style

Selection	Description
Blink Block	The cursor is a blinking rectangle. This is the default setting.
Steady Block	The cursor is a steady rectangle.
Blink Line	The cursor is a blinking line.
Steady Line	The cursor is a steady line.

Cursor

Selection	Description
On	The cursor is visible. This is the default setting.
Off	The cursor is not visible.

Screen Saver

The **Screen Saver** option extends the life of the CRT by blanking the screen if no signal is sent to the display station during the specified amount of time.

Selection	Description
Off	The screen does not blank.
15 Min	The screen blanks after 15 minutes if no signal is sent to the display station from the host or keyboard during that time. This is the default setting.
30 Min	The screen blanks after 30 minutes if no signal is sent to the display station from the host or keyboard during that time.
60 Min	The screen blanks after 60 minutes if no signal is sent to the display station from the host or keyboard during that time.

Background

Selection	Description
Dark	The screen displays amber, green, or white characters on a black background. This is the default setting.
Light	The screen displays black characters on an amber, green, or white background. This configuration is sometimes called reverse video.

Attributes

Select the attribute type that ensures host software compatibility.

Selection	Description
Char	A defined attribute does not occupy a space on the screen. It is defined on a character-by-character basis. This is the default setting for all emulations except WY50/50+.
Line	A defined attribute occupies a space on the screen. It affects only the line in which it is defined or until another attribute is defined, whichever comes first.
Page	A defined attribute occupies a space on the screen. The attribute is in effect until the next attribute type or the end of the page. This is the default setting for WY50/50+.

Wprt Intensity

Select the intensity for write-protected characters.

Selection	Description
Normal	Write-protected characters are displayed in normal intensity.
Blank	Write-protected characters are replaced by blanks.
Dim	Write-protected characters are displayed in dim intensity. This is the default setting.

Wprt Reverse

Selection	Description
Off	Write-protected characters are displayed in normal video (amber, green, or white characters on a black background). This is the default setting.
On	Write-protected characters are displayed in reverse video (black characters on an amber, green, or white background).

Wprt Underline

Selection	Description
Off	Write-protected characters are not underlined. This is the default setting.
On	Write-protected characters are underlined.

Controls, Setup Menus, and Indicators

Refresh Rate

The refresh rate is the screen retrace frequency. For screens configured with **42** or **43 Lines**, you must select **60 Hz** refresh rate.

Selection	Description
60 Hz	The screen refreshes at 60 Hz. Sixteen scan lines are available (10 x 16 character cell). This is the default setting.
78 Hz	The screen refreshes at 78 Hz. Thirteen scan lines are available (10 x 13 character cell).

Pound Char

Selection	Description
US	The pound character is set to the US #. This is the default setting.
British	The pound character is set to the British £.

Auto Font Load

Each emulation has a set of characters specific to that emulation. With the Auto Font Load option, you can select to have the default character set for the selected emulation automatically loaded.

Selection	Description
Off	The default character set for the selected emulation is not automatically loaded into the character generator RAM. The character set previously loaded remains resident.
Select	The default character sets for the selected emulation are automatically loaded into the character generator RAM except for font bank 3. Font bank 3 is only loaded if a soft font has not been previously defined.
On	The default character set for the selected emulation is automatically loaded into the character generator RAM. This is the default setting.

Keyboard Setup Screen

Press the F4 key from any screen in Setup mode to display the Keyboard Setup screen.

Keyboard Setup		14 Apr 1992 Ver 1.00x04	
Key Click	On	Left Alt Key	Funct
Key Repeat	On	Break	250 ms
Key Lock	Caps	Xmt Limit	None
Return Key	CR	FKey Xmt Limit	None
Enter Key	CR	Key Code	ASCII
Back Space Key	DEL/BS	Language	US
On Off			
Host is on Main Port		F1 Gen F2 Comm F3 Disp F4 Kbd F5 ANSI	F6 3151 F7 FKeys F8 Tabs F9 Ansbk F10 Exit

Figure 3-5. Keyboard Setup Screen

Key Click

Selection	Description
On	An audible click is generated with each keystroke. This is the default setting.
Off	No sound is generated with the keystrokes.

Key Repeat

Selection	Description
Off	When held down for more than a half second, the keys do not repeat.
On	When held down for more than a half second, the keys repeat. This is the default setting.

Controls, Setup Menus, and Indicators

Key Lock

Selection	Description
Caps	The alphabetic keys generate only uppercase characters. Number and symbol keys are not affected. Pressing the Shift key has no effect on the alphabetic keys, but does affect the top numeric/symbol keys. This is the default setting.
Reverse	The alphabetic keys generate only uppercase characters. Pressing the Shift key reverses the status of both alphabetic and numeric/symbol keys, but does not affect the Caps Lock status.
Shift	All keys generate shifted characters. Press the Shift key to reset the Caps Lock status.

Return Key

This option defines the Enter key on the main keypad of the enhanced PC-style keyboard.

Selection	Description
CR	Pressing the Enter key executes a carriage return. This is the default setting.
CRLF	Pressing the Enter key executes a carriage return with a line feed.

Enter Key

This option defines the Enter key on the numeric keypad of the enhanced PC-style keyboard.

Selection	Description
CR	Pressing the numeric keypad Enter key executes a carriage return. This is the default setting.
CRLF	Pressing the numeric keypad Enter key executes a carriage return with a line feed.
+	Pressing the numeric keypad Enter key produces a plus character.

Back Space Key

Selection	Description
DEL/BS	Pressing the Backspace key sends a delete command. Pressing the Shift key and the Backspace key together sends a backspace command. This is the default setting.
BS/DEL	Pressing the Backspace key sends a backspace command. Pressing the Shift key and the Backspace key together sends a delete command.

Left Alt Key

Use this option to define the function of the left Alt key. This option does not apply to the IBM modes.

Selection	Description
Funct	When the left Alt key is pressed together with an alphanumeric key, the 1151 sends a set of codes whose operation is determined by the application program. The format is: The ASCII SOH character; the application program's code for the alphanumeric key; the ASCII CR character. This is the default setting.
Hold	When the left Alt key is pressed, incoming data is frozen on the screen so it can be read. Press the Left Alt key again to release the screen.
Meta	Pressing the left Alt key sets the eighth bit. The ASCII character set has 256 characters. Usually only seven bits are used, which enables the use of only 128 characters. By setting the eighth bit, all 256 characters can be used.
Compose	Pressing the left Alt key in VT220 emulation enables the construction of three-stroke multinational characters. See Appendix E, "Multinational Keystroke Sequences," for a table of the multinational characters the keystrokes use to create them.

Break

Use this option to define the signal the Break key sends to the host port. The effect of the signal depends on the operation system.

Selection	Description
170 ms	Pressing the Break key sends a 170-millisecond break signal.
250 ms	Pressing the Break key sends a 250-millisecond break signal. This is the default setting.
500 ms	Pressing the Break key sends a 500-millisecond break signal.
Off	Pressing the Break key does not send a break signal.

Controls, Setup Menus, and Indicators

Xmt Limit

If your host system cannot process data at full speed, use this option to select the maximum speed the display station sends data to the host.

Selection	Description
None	The display station sends data through the main port as fast as the baud rate allows. This is the default setting.
60 cps	The display station sends data at a maximum speed of 60 characters per second.
150 cps	The display station sends data at a maximum speed of 150 characters per second.

FKey Xmt Limit

If your host system cannot process data at full speed, use this option to select the maximum speed the display station sends Function key definitions to the host.

Selection	Description
None	The display station sends Function key definitions through the main port as fast as the baud rate allows. This is the default setting.
60 cps	The display station sends Function key definitions at a maximum speed of 60 characters per second.
150 cps	The display station sends Function key definitions at a maximum speed of 150 characters per second.

Key Code

Selection	Description
ASCII	The display station sends ASCII characters. This is the default setting for all emulations except PC Term.
Scan	The display station sends IBM PC-compatible scan codes. This is the default setting for PC Term emulations.

Language

Select one of the following keyboard layout languages.

Selection	Description
US, UK, Danish, German, French, Spanish, Swedish/Finnish, Norwegian, French/Canadian, Italian, Swiss (French), Swiss (German), Portuguese	The default setting is US .

ANSI Setup Screen

Most of the options in ANSI setup affect only the ANSI emulations (VT220-8, VT220-7, VT100, and VT52). Press the F5 key from any screen in Setup mode to display the ANSI Setup Screen

ANSI Setup		14 Apr 1992 Ver 1.00x04	
FKey Lock	Off	Print	National
Feature Lock	Off	Send	All
KeyPad	Application	Send Area	Screen
Cursor Keys	Normal	Print Area	Screen
Xfer Term	EOS	Send Term	None
Char Mode	Multinational	Print Term	None
Keys	Typewriter	Print Mode	Normal
VT100 ID	VT100	Auto Answerback	Off
Off <input type="checkbox"/> On <input type="checkbox"/>			
Host is on Main Port		F1 Gen F2 Comm F3 Disp F4 Kbd F5 ANSI	F6 3151 F7 FKeys F8 Tabs F9 Ansbk F10 Exit

Figure 3-6. ANSI Setup Screen

FKey Lock

Selection	Description
Off	Function keys can be redefined. This is the default setting.
On	Function keys cannot be redefined.

Feature Lock

When the feature lock is enabled, the host cannot change or affect the following features: auto repeat, smooth/jump scroll, light/dark screen, tab stops, and keyboard lock.

Selection	Description
Off	The feature lock is not enabled. This is the default setting.
On	The feature lock is enabled.

Controls, Setup Menus, and Indicators

KeyPad

Selection	Description
Numeric	The numeric keypad sends the ASCII character codes corresponding to the characters displayed on the keycaps.
Application	The numeric keypad sends application-specific control codes and escape sequences. This is the default setting.

Cursor Keys

Selection	Description
Normal	The Arrow keys send normal ANSI cursor movement commands. This is the default setting.
Application	The Arrow keys send application-specific control codes.

Xfer Term

To transmit blocks of data, the display station must be in Block mode.

Selection	Description
EOS	The display station transmits blocks of data to the host starting at column 1, row 1 and ending at the end of the screen. This is the default setting.
Cursor	The display station transmits blocks of data to the host starting at column 1, row 1 and ending at the cursor position.

Char Mode

Selection	Description
Multinational	The display station displays characters from the 8-bit extended ASCII multinational character set. The display station must be set to VT220 mode. This is the default setting.
ISO Latin-1	The display station displays ISO 8859-1, Latin Alphabet Number 1.

Keys

Selection	Description
Typewriter	Standard typewriter character codes are sent. This is the default setting.
Data Processing	Optional multinational character codes are sent instead of typewriter character codes.

VT100 ID

In response to a host request, the display station sends the device attributes of the terminal type you select.

Selection	Description
VT100, VT101, VT102, VT220	Select a terminal type. The default setting is VT100 .

Print

Selection	Description
Multinational	Escape sequences and control codes are sent so that ASCII, line drawing, multinational, and soft font characters and character and line attributes can be printed.
National	Escape sequences are not sent. Non-ASCII characters are replaced with ASCII underline characters. This is the default setting.
Line Drawing	Escape sequences and control codes are sent so that ASCII and line drawing graphics characters and character and line attributes are printed.

Send

Selection	Description
All	In block transmissions, erasable and nonerasable data is sent to the host. This is the default setting.
Eraseable	In block transmissions, only erasable data is sent.

Send Area

Add Block mode reference.

Selection	Description
Screen	In Block mode, the display station sends all the data within the screen area to the host. This is the default setting.
Scroll Rgn	In Block mode, the display station sends all the data within the defined scrolling region to the host.

Controls, Setup Menus, and Indicators

Print Area

Selection	Description
Screen	In a page print operation, the display station sends all the data within the screen area to the printer port. This is the default setting.
Scroll Rgn	In a page print operation, the display station sends all the data within the defined scrolling region to the printer port.

Send Term

Selection	Description
None	The display station does not send a character after a send transmission in Block mode. This is the default setting.
FF	The display station sends an FF (form feed) character after a send transmission in Block mode.

Print Term

Selection	Description
None	The display station does not send a character after a print function. This is the default setting.
FF	The display station sends an FF (form feed) character after a print function.

Print Mode

Selection	Description
Normal	Invoke printing functions by pressing the Print key. This is the default setting. Note: If the display is operating in Full-Duplex mode, the host must echo this command back to the display.
Auto	Data sent to the display are also sent to the printer.
Ctrl	Data is transferred directly to the printer from the host without being displayed on the screen.
Bi-Dir	Data can be transferred to the host from the printer without being interpreted by the display station.

Auto Answerback

Selection	Description
Off	The display station does not respond to a communication line connection. This is the default setting.
On	The display station automatically sends the answerback message to the host after a communication line connection.

3151/3161 Setup Screen

Press the F6 key from any screen in Setup mode to display the 3151/3161 Setup screen.

3151/3161 Setup		14 Apr 1992 Ver 1.00x04	
Turn Around	ETX	Print	Viewport
Send	Page	Print NULL	Off
Send NULL	On	Print Line End	CR
Return	Field	Print EOL	Off
Tab	Field	Insert	Mode
Enter	Return	Mouse Input	Off
CR ETX XOFF EOT			
Host is on Main Port		F1 Gen F2 Comm F3 Disp F4 Kbd F5 ANSI	F6 3151 F7 FKeys F8 Tabs F9 Ansbk F10 Exit

Figure 3-7. 3151/3161 Setup Screen

Turn Around

Select the turnaround character that is sent at the end of a datastream.

Selection	Description
CR	The turnaround character is CR (carriage return).
ETX	The turnaround character is ETX (end of text). This is the default setting.
XOFF	The turnaround character is XOFF (DC 3 - device control 3).
EOT	The turnaround character is EOT (end of transmission).

Send

This option defines the functions of the Send and Send Line keys.

Selection	Description
Page	When the Send key is pressed, the current page is sent to the host. When the Send Line key is pressed, the contents of the current line are sent to the host. This is the default setting.
Line	When the Send key is pressed, the contents of the current page are sent to the host. When the Send Line key is pressed, the current page is sent to the host.

Controls, Setup Menus, and Indicators

Send NULL

Selection	Description
On	Trailing characters are removed when data is sent to the host. This is the default setting.
Off	Trailing characters are converted to spaces when data is sent to the host.

Return

This option defines the function of the Return key. (The Enter key on the main typewriter of the keyboard functions as the Return key.)

Selection	Description
Field	The functions specified in the New Line parameter are performed. If the target line is within a protected field, the cursor moves to the first character position of the next unprotected field. This is the default setting.
Return	The functions specified in the New Line parameter are performed.

Tab

Selection	Description
Field	The tab stops provided by the field attribute characters are used regardless of the column tab definitions. This is the default setting.
Column	The column tab stops are used and the field attribute characteristics are ignored.

Enter

This option defines the function of the Enter key. (The Enter key is on the numeric keypad.)

Selection	Description
Return	The Enter key functions as the Return key. This is the default setting.
Send	The Enter key functions as the Send key.

Print

Selection	Description
Viewport	The print command prints from the active viewport or partition. This is the default setting.
Screen	The print command prints the contents of the screen.

Print NULL

Selection	Description
Off	Trailing characters are converted to spaces when data is sent to the printer. This is the default setting.
On	Trailing characters are removed when data is sent to the printer.

Print Line End

Selection	Description
CRLF	A carriage return and a line feed are executed at the end of a print line.
CR	A carriage return is executed at the end of a print line. This is the default setting.

Print EOL

Selection	Description
Off	A line-end character is not generated at the end of a printed line. This is the default setting.
On	A line-end character is generated at the end of a print line.

Insert

This option defines what the keyboard does when it is in Insert mode.

Selection	Description
Mode	Characters are inserted at the cursor and characters to the right of the cursor are moved one character to the right for each character inserted.
Space	Spaces are inserted at the cursor and characters to the right of the cursor are moved one character to the right for each space inserted. This is the default setting.

Mouse Input

Selection	Description
Off	The terminal does not accept input from a mouse. This is the default setting.
On	The terminal accepts input from a mouse.

Controls, Setup Menus, and Indicators

Function Keys Setup Screen

Press the F7 key from any screen in Setup mode to display the Function Keys Setup screen.

Function Keys Setup				14 Apr 1992 Ver 1.00x04			
Direction: Remote							
sF1 = F1 =							
CTRL+Key	..	Select Key				F1	Gen
↑ ↓	..	Select Field	←	..	Erase Char	F2	Comm
End	..	Default Keys	Home	..	Erase Field	F3	Disp
			Enter	..	Change Dir	F4	Kbd
						F5	ANSI
						F6	3151
						F7	FKeys
						F8	Tabs
						F9	Ansbk
						F10	Exit

Figure 3-8. Function Keys Setup Screen

Function Keys Setup Screen Fields

Selection	Description
sFn	The Shifted Function key. The following shifted keys can be defined: F1 through F12 Up Arrow Down Arrow Left Arrow Right Arrow Backspace Delete End Enter (both Enter keys) Escape Home Insert Page Down Page Up Print Screen Tab
Fn	The Function key. All the keys listed in the sFn selection, above, can be defined.

Selection	Description
Direction	<p>The key's direction. One of the following directions is displayed:</p> <p>Remote – Data is sent to the host only, regardless of the display station's communication mode. This is the default direction.</p> <p>Local – Data is sent to the display station only, regardless of the display station's communication mode.</p> <p>Normal – Data is sent to the host and/or the display station, depending on the display station's communication mode.</p> <p>Press the Enter key on the numeric keypad to cycle through the direction choices.</p>

Defining Function Keys

To define a Function key or a shifted Function key, follow these steps:

- 1) Press and hold down the Ctrl key while you press the key you want to define. Both the Function key and the shifted Function key fields display the key you select (for example, **sF12** and **F12**).
- 2) Press the Up or Down Arrow key to toggle between the Function key field and the shifted Function key field. The selected field is highlighted and the cursor is displayed to the right of the selected field.
- 3) Enter the definition for the Function key or the shifted Function key beginning at the cursor.

Use the Left Arrow key to delete a character in the definition field or press the Home key to erase the entire definition field.

Key definitions and answerback messages do not have to be saved by pressing the S key. They are automatically saved in nonvolatile memory as they are entered.

Returning Function Keys to the Default Values

To return the Function keys and the shifted Function keys to the default values, press the End key. The default values for the Function and shifted Function keys depend on the selected emulation. See Appendix H, "Function and Arrow Key Defaults," for the default definitions of the Function keys for each supported emulation.

Controls, Setup Menus, and Indicators

Tabs Setup Screen

Press the F8 key from any screen in Setup mode to display the Tabs Setup screen. Columns with tabs are identified with **T**.

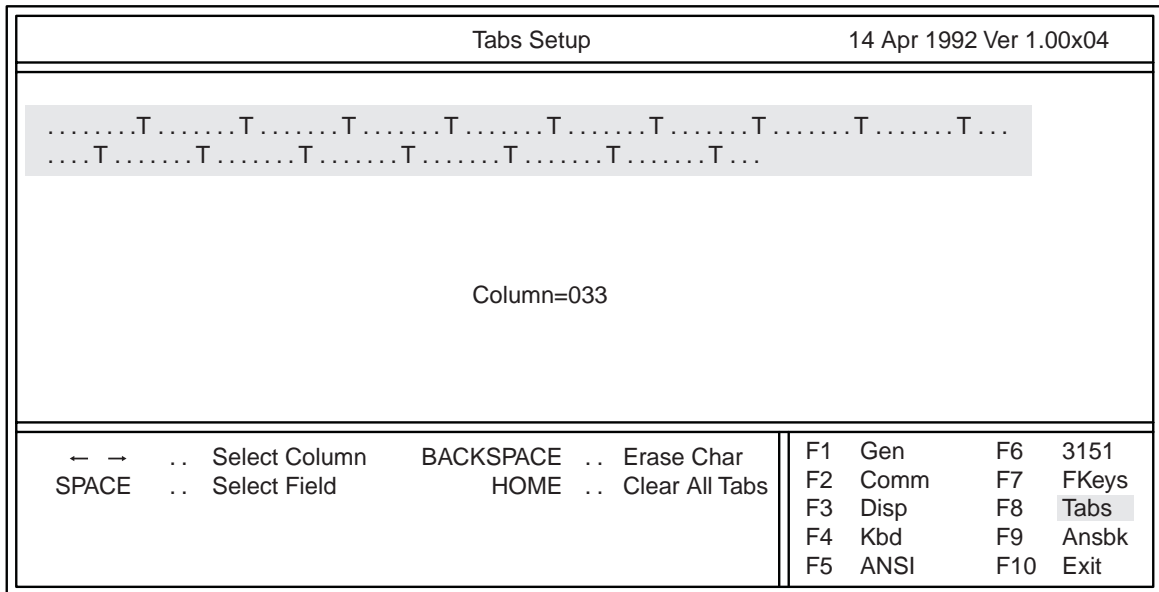


Figure 3-9. Tabs Setup Screen

Tabs Setup Screen Keys

Key	Function
Left and Right Arrow keys	Press the Left or Right Arrow key to move the cursor to a column on the screen. The column location of the cursor is displayed in the Column= field.
Space bar	Press the space bar to add or clear a tab. If the cursor is in a column that does not have a tab set, press the space bar to set a tab in that column. If the cursor is in a column that has a tab set, press the space bar to clear the tab.
Backspace key	Press the Backspace key to set the tabs to the default setting.
Home key	Press the Home key to clear all tabs.

Saving the Tab Settings

To save the tab settings, press the F1 key to return to the General Setup screen, then press the S key to save the tab settings.

Answerback Setup Screen

You can use the Answerback Setup screen to program a message of up to 32 characters to identify the display station to the computer. The answerback message shares approximately 500 bytes of nonvolatile memory with key redefinitions.

The answerback message is sent to the computer when the **Auto Answerback** option on the ANSI Setup screen is turned **On** and the display station receives an ASCII ENQ code (05H) (or, in IBM modes, the Read Terminal ID command [ESC ! 6]).

If the **Send ACK** option on the General Setup screen is turned **On**, an ACK code (06H) is sent to the computer following the answerback message (in IBM, Wyse and PC Term modes only).

Press the F9 key from any screen in Setup mode to display the Answerback Setup screen.

Answerback Setup				14 Apr 1992 Ver 1.00x04			
Answerback Definition:							
<input type="text"/>				Conceal: No			
← .. Erase Char HOME .. Clear				F1 Gen		F6 3151	
ENTER .. Conceal				F2 Comm		F7 FKeys	
				F3 Disp		F8 Tabs	
				F4 Kbd		F9 Ansbk	
				F5 ANSI		F10 Exit	

Figure 3-10. Answerback Setup Screen

Entering an Answerback Message

Enter an answerback message of up to 32 characters in the **Answerback Definition** field of the Answerback Setup screen. Press the Left Arrow key to erase a character or press the Home key to clear the definition.

Concealing the Answerback Message

To conceal the answerback message so it is not displayed in Setup mode, press the Enter key. Once the answerback message is concealed, it cannot be displayed again.

Saving an Answerback Message

Answerback messages do not have to be saved by pressing the S key. They are automatically saved in nonvolatile memory as they are entered.

Status Line Indicators

The status line is the area above the first data row and is separated from the rest of the screen by one nonintensified line. When the **Status Line** option on the Display Setup screen is turned **On**, the following messages are displayed:

Message	Description
LOCK	The keyboard lock message takes precedence over the CAPS LOCK, NUM, and COMP messages.
COMP	Indicates a Compose sequence is in progress in DEC or Wyse 60 mode. This message takes precedence over the NUM and CAPS messages.
NUM	Num lock is enabled. This message takes precedence over the caps lock message.
CAPS	Caps lock is enabled.
LINE	Indicates the keyboard is in Line Drawing mode. This message takes precedence over the CAPS message. IBM 3151/3161 modes only.
SUBS	Indicates a numeric subscript character is expected as the next keystroke. This message takes precedence over the LINE and CAPS messages. IBM 3151/3161 modes only.
SUPR	Indicates a numeric superscript character is expected as the next keystroke. This message takes precedence over the LINE and CAPS messages. IBM 3151/3161 modes only.
<FDX	The display station is sending data to the host in Full-Duplex mode. This message takes precedence over the Communication mode message.
<HDX	The display station is sending data to the host in Half-Duplex mode. This message takes precedence over the Communication mode message.
<BLK	The display station is sending data to the host in Block mode. This message takes precedence over the Communication mode message.
HLD	Data is being held on the screen. This message takes precedence over the Communication mode message.
FDX	The Communication mode is Full-Duplex.
HDX	The Communication mode is Half-Duplex.
BLK	The Communication mode is Block or Half Block.
>AUX	The display station is in Auxiliary Print or Transparent Print mode.
%AUX	The printer port is receiving data from the display station's memory (page print).
PROT	Protect mode is on. Not displayed if the status line is set to Ext.
WPT	Write Protect mode is on. Not displayed if the status line is set to Ext.

Message	Description
INS	Insert mode is on. Not displayed if the status line is set to Ext.
1...6	The page number.
*	Monitor mode is on.
<i>nn-nnn</i>	The row and column position of the cursor. The status line must be set to Ext.
<i>nn:nn</i>	The time is displayed in 24-hour format. The time is not displayed unless it has been set by a host command in one of the Wyse or DEC modes. The status line must be set to Ext.

Location of Status Line Indicators

Figure 3-11, below, illustrates the positions of the status line messages.

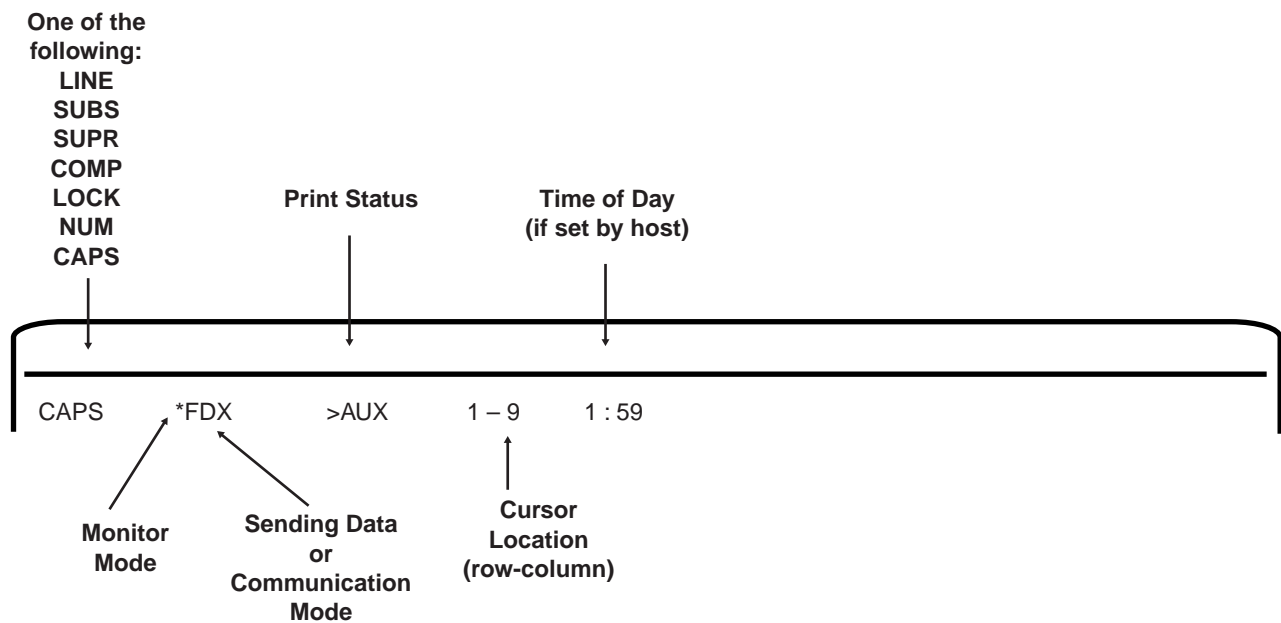


Figure 3-11. Status Line Messages

Chapter 4. Operating Procedures

After the 1151 has been properly installed and connected to a host, it is ready to operate online. Follow these steps to turn on the display station:

- 1) Set the Power-On/Off switch to On. A tone sounds to indicate the display station is receiving power.

The 1151 executes a brief self-test. When the self-test completes, the top of the screen shows a flashing cursor. If the **Status Line** option on the Display Setup screen is set to **On** or **Ext**, the status line is displayed at the top of the screen.

If the self-test does not complete successfully, a bell sounds and a single character is displayed on the lower right quadrant of the screen. Exit the self-test by pressing the G key, enter Setup mode to check all selections (see Chapter 3, “Controls, Setup Menu, and Indicators,” for information about the setup selections), and power on again.

If the self-test fails again, refer to Chapter 5, “Problem Determination and Maintenance.”

If **K** is displayed in the lower right quadrant of the screen after the self-test, turn the Power-On/Off switch off and press and hold down the G key while you turn the Power-On/Off switch back on. If the 1151 still does not display properly, this could indicate a low battery condition for the setup memory. Refer to Chapter 5.

- 2) Adjust the Contrast and Brightness controls, if necessary.

Determining the Emulation

To determine the current emulation mode, press and hold the left Shift key while you press the left Control key. The firmware version and current emulation are displayed on the status line while these keys are pressed.

Key Functions

While the 1151 is communicating with the host in full- or half-duplex mode, most keys perform remote functions. That is, they send codes that are interpreted and acted on by the host's operating system and application programs. The alphanumeric keys send the ASCII characters shown on the keycaps. The codes sent by the other keys depend on the 1151's emulation, the setting of the **Keycode** option on the Keyboard Setup screen, and on other keyboard-related setup parameters.

Local Keyboard Commands

Certain keys and key combinations perform local command functions that initiate actions by the 1151.

The following table describes some local keyboard commands:

Function	Key Sequence
Turn Monitor mode on/off	Press and hold down the Shift and Ctrl keys while you press the 1 key on the numeric keypad. When you release the keys, an asterisk (*) is displayed above the status line to indicate Monitor mode is on. This works in all modes except PC Term.
Home cursor and clear page	Press and hold down the Shift and Ctrl keys while you press the Home key. This works in IBM and Wyse modes only.
Display page of memory <i>n</i> = the page number (0, 1, or 2)	Press and hold the Ctrl key while you press the <i>n</i> key on the numeric keypad. This works in Wyse and DEC modes only.
Display next page	Press and hold down the Ctrl key while you press the Page Down key. This works in Wyse modes only.
Display previous page	Press and hold down the Ctrl key while you press the Page Up key. This works in Wyse modes only.
Toggle between Scan Code mode and ASCII mode	Press and hold the Shift key while you press the Pause key. This works in PC Term mode only.
Reset display station	Press and hold down the Control, Alt, and Enter keys.
Select scroll style	Press and hold down the Control, Shift, and Arrow Up or Arrow Down keys at the same time to cycle through the Jump, Smooth-8, Smooth-4, Smooth-2, and Smooth-1 scroll styles. This works in Wyse and DEC modes only.

Emulation-Dependent Key Functions

There are a few emulation-dependent key functions that may not be shown correctly on your keyboard. This is a result of using one keyboard with many different emulations. Refer to the following tables to select the proper key to use for these functions.

IBM 3151/3161 Key Functions

IBM 3151/3161 Key Function	101/102 Keyboard Key Sequence
Top Row	
Print	Print Screen
Print Line	/ (on numeric keypad)
Hold	Pause
Main Keyboard	
Return	Enter
Reset	Left Alt
Send	Right Alt
Edit Keys	
← Tab	End
Clear	Page Up
Erase EOF	Page Down
Numeric Keypad	
Jump	Num Lock
Send Line	* (on numeric keypad)
Setup (enter setup)	Ctrl + Scroll Lock
, (comma)	+ (plus)

Operating Procedures

DEC VT 52/100/220 Key Functions

DEC VT 52/100/220 Key Function	101/102 Keyboard Key Sequence
Top Row	
PF1, PF2, PF3, PF4	F1, F2, F3, F4
Edit Keys	
Find	Insert
Insert Here	Home
Remove	Page Up
Select	Delete
Previous Screen	End
Next Screen	Page Down

Wyse 50/50+/60 Key Functions

Wyse 50/50+/60 Key Functions	101/102 Keyboard Key Sequence
Edit Keys	
Backspace	Backspace*
Del	Shift + Backspace*
Send	Not supported
Ins Char	Not supported
Ins Line	Not supported
DEL Char	Delete
DEL Line	Shift + Delete
Repl	Shift + Insert
Ins	Insert
Numeric Keypad	
PAGE Next	Page Down
PAGE Prev	Page Up
CLR Line	End
CLR Scrn	Shift + End

* The Unshifted/Shifted Backspace key can correspond to either BS/DEL or DEL/BS, depending on the setting selected for the **Back Space Key** option on the Keyboard Setup menu. See “Back Space Key” on Page 3-22 for more information about this option.

Compose Key

The left Alt key is the Compose key. In Wyse 60 and DEC modes, the Compose key can send 2- and 3-stroke compose sequences from the keyboard to create composite characters. See Appendix E, “Multinational Keystroke Sequences,” for a list of the composite characters and their compose sequences.

Display Configuration

The 1151 displays a total of 26 or 44 lines down the screen and 80 or 132 columns across the screen. The number of lines and columns is selected on the Display Setup screen. The default screen configuration is an 80-column display divided into two display areas, the status line and the data area.

Virtual Terminal Mode

In Virtual Terminal mode, two sessions are available, one on the main port and the other on the auxiliary port. Each session can have independent setup selections. While in Virtual Terminal mode, both sessions continually accept updated data from their connected hosts.

To enter Virtual Terminal mode, ensure that the **Virtual Terminal** option on the General Setup screen is set to **On**.

To toggle back and forth between the two sessions, press and hold down the right Ctrl key while you press the right Alt key.

Notes: Be sure you configure both sessions before you use them. When in Setup mode, press the P key to toggle between the main and auxiliary setup menus.

When switching to the other session from an IBM mode, it is important to press the right Ctrl key *first*, then press the right Alt key. The right Alt key functions as the IBM Send key (as described in “IBM 3151/3161 Key Functions” on Page 4-3), and if you press it first, a Send function is initiated.

Printer Control

The 1151 supports a printer through its parallel printer port or through its auxiliary serial port. The printer can be controlled locally by the display station or remotely by a host.

Printer Ownership

When operating in Virtual Terminal mode, both hosts share the same printer. The active session owns the printer.

Print Commands

All Emulations Except PC Term

Function	Key Sequence
Print Screen	Press and hold down the Shift key while you press the Print Screen key. Note: If your communications mode is full-duplex, the host must echo back the command in order for the print to work.
Extension Print On/Off	Press and hold down the Shift and Ctrl keys while you press the Print Screen key.

Local Keyboard Commands

The following information applies to Wyse and DEC modes only.

Function	Key Sequence
Print Screen Formatted (Local screen print)	Press and hold down the Shift and Ctrl keys while you press the Period (.) key on the numeric keypad.

Chapter 5. Preventive Maintenance

Preventive Maintenance

Preventive maintenance for the 1151 is limited to keeping the display station clean and dust-free. Use a nonabrasive solution such as alcohol or window cleaner and a soft, lint-free cloth to clean the screen. Do not spray cleaner directly on the display station. Spray on a cloth and use the cloth to clean the display station. All ventilation ports must be kept free of dirt and dust.

Questions

If you have any additional questions about the 1151, please call your Sales Representative. He or she will be glad to assist with any need.

Appendix A. Wyse Emulations

Control Commands

This appendix contains the escape sequences for the Wyse emulations. The following conventions are followed:

- **ESC** is the escape character.
- **CTRL** is the control key.
- **CR** is a carriage return character.
- **Space** is the space character.
- Variable entries are presented in *italic* font. Sometimes a descriptive noun is used, such as *row* or *attribute*, and sometimes an abbreviation is used, such as *p* (for parameter) or *fkey* (for Function key).
- When more than one variable of the same type can be used, the variables are numbered (for example, *p1 p2 ... p9* means up to nine variables can be entered).

Monitor Mode

Function	Wyse 60	Wyse 50/50+
Monitor Mode On	ESC U	ESC U
Monitor Mode Off	ESC u or ESC X	ESC u or ESC X
Toggle Monitor Mode On/Off (local keyboard command)	Shift + CTRL + Keypad 1	Shift + CTRL + Keypad 1

Wyse Emulations Control Commands

Selecting Other Emulations

Function	Wyse 60	Wyse 50/50+
Select Wyse 50/50+ Mode	ESC ~ "	ESC ~ " (see note below)
Select PC Term Mode	ESC ~ 5	ESC ~ 5
Select VT52 Mode	ESC ~ 6	ESC ~ 6
Select VT100 Mode	ESC ~ ;	ESC ~ ;
Select VT220-7 Mode	ESC ~ <	ESC ~ <
Select VT220-8 Mode	ESC ~ =	ESC ~ =
Select Wyse 60 Mode	ESC ~ 4 (see note below)	ESC ~ 4
Select IBM 3151 Mode	ESC ~ @	ESC ~ @
Select IBM 3161 Mode	ESC ~ 9	ESC ~ 9

Note: This selection keeps the same emulation, but clears the screen, resets attributes to normal, and puts the cursor in the Home position.

Communicating with the Computer

Function	Wyse 60	Wyse 50/50+
Send Terminal ID	ESC space	ESC space
Enable Transmission	CTRL Q	CTRL Q
Stop Transmission	CTRL S	CTRL S
Send Answerback	CTRL E	CTRL E
ACK Mode Off	ESC e 6	ESC e 6
ACK Mode On	ESC e 7	ESC e 7
Full Duplex Mode On	ESC D F	ESC D F
Half Duplex Mode On	ESC D H	ESC D H
Set Conversation Mode	ESC C	ESC C
Block Mode On	ESC B	ESC B
Half Duplex Block Mode On (set half/full)	ESC D H ESC B	ESC D
Set Modem Port for Data Communications	ESC e 8	ESC e 8
Select Aux Port for Data Communications	ESC e 9	ESC e 9
Set Modem Port Operating Parameters See "Modem Setup Parameters" on Page A-4 for the four modem parameters	ESC c 0 p1 p2 p3 p4	ESC c 0 p1 p2 p3 p4

Wyse Emulations Control Commands

Function	Wyse 60	Wyse 50/50+
Set Aux Port Operating Parameters See "Modem Setup Parameters" on Page A-4 for the four modem parameters	ESC c 1 <i>p1 p2 p3 p4</i>	ESC c 1 <i>p1 p2 p3 p4</i>
Set Modem Port Receive Handshaking <i>p:</i> 0 – Receive None 1 – Receive XON/XOFF 2 – Receive Dir 3 – Receive Both	ESC c 2 <i>p</i>	ESC c 2 <i>p</i>
Set Aux Port Receive Handshaking <i>p:</i> 0 – Receive None 1 – Receive XON/XOFF 2 – Receive DTR 3 – Receive Both	ESC c 3 <i>p</i>	ESC c 3 <i>p</i>
Set Modem Port Transmit Handshaking <i>p:</i> 0 – Transmit None 1 – Transmit XON/XOFF	ESC c 4 <i>p</i>	ESC c 4 <i>p</i>
Set Aux Port Transmit Handshaking <i>p:</i> 0 – Transmit None 1 – Transmit XON/XOFF	ESC c 5 <i>p</i>	ESC c 5 <i>p</i>
Set Maximum Data Transmission Speed 1 – Maximum Speed = 60 characters per second 2 – Maximum Speed = None 3 – Maximum Speed = 150 characters per second	ESC c 6 <i>maximum speed</i>	ESC c 6 <i>maximum speed</i>
Program Answerback Message (<i>answer</i> = up to 20 characters to define answerback message)	ESC c ; <i>answer</i> CTRL Y	ESC c ; <i>answer</i> CTRL Y
Send Answerback Message	ESC c <	ESC c <
Conceal Answerback Message	ESC c =	ESC c =
Answerback Mode Off	ESC e Space	ESC e Space
Answerback Mode On	ESC e !	ESC e !
Load Time of Day <i>hh</i> = Hour (2-digit decimal number 00-23) <i>mm</i> = Minutes (2-digit decimal number 0-59)	ESC c 8 <i>hh mm</i>	ESC c 8 <i>hh mm</i>

Wyse Emulations Control Commands

Modem Setup Parameters

There are four modem setup parameters, baud, stop, parity, and word.

Baud Parameter

Baud Parameter	Modem Port	Auxiliary Port
0	38400	19200
1	19200	9600
2	9600	4800
3	4800	4800
4	2400	2400
5	1800	2400
6	1800	1800
7	1200	1800
8	600	1200
9	300	600
:	150	300
;	134.5	150
<	110	134.5
=	75	110
>	50	

Stop Parameter

Stop Parameter	Stop Bit
0	1
1	2

Parity Parameter

Parity Parameter	Parity Bit
0	None
1	Odd
2	Mark
3	Even

Word Parameter

Word Parameter	Data Word
0	7 bits
1	8 bits

Controlling the Terminal and Keyboard

Function	Wyse 60	Wyse 50/50+
Local Edit Mode On	ESC k	ESC k
Duplex Edit Mode On	ESC I	ESC I
Sound Bell	CTRL G	CTRL G
Unlock Keyboard	SO or ESC "	SO or ESC "
Lock Keyboard	CTRL O or ESC #	CTRL O or ESC #
Keyclick Off	ESC e \$	ESC e \$
Keyclick On	ESC e %	ESC e %
Caps Lock On	ESC e &	ESC e &
Caps Lock Off	ESC e '	ESC e '
Margin Bell Off	ESC e L	ESC e L
Set Margin Bell at Cursor Position	ESC ' J	ESC ' J
Margin Bell On	ESC e M	ESC e M
Key Repeat Off	ESC e ,	ESC e ,
Key Repeat On	ESC e -	ESC e -
Define Caps Lock Key as Caps Lock	ESC e T	ESC e T
Define Caps Lock Key as Rev	Esc e U	Esc e U
Keyclick On	ESC >	ESC >
Keyclick Off	ESC <	ESC <

Wyse Emulations Control Commands

Redefining the Keys

Function	Wyse 60	Wyse 50/50+
Program Function Key Definition (Sequence = up to 64 bytes to be loaded in Function key). See "Program Function Key Definitions" on Page A-7 for the <i>fkey</i> values.	ESC z <i>fkey sequence</i> DEL	ESC z <i>fkey sequence</i> DEL
Program Key Direction and Definition Sequence = up to 64 bytes to be loaded in Function key. See "Program Function Key Definitions" on Page A-7 for the <i>fkey</i> values. <i>dir</i> – Direction 0 – Normal 1 – Remote 2 – Local	ESC Z <i>dir fkey sequence</i> DEL	ESC Z <i>dir fkey sequence</i> DEL
Program Key Direction and Definition (alternate) Sequence = up to 64 bytes to be loaded in Function key. See "Program Function Key Definitions" on Page A-7 for the <i>fkey</i> values. <i>dir</i> – Direction 1 – Remote 2 – Local 3 – Normal	ESC | <i>fkey dir sequence</i> CTRL Y	ESC | <i>fkey dir sequence</i> CTRL Y
Default all Programmable Keys	ESC \ or ESC c U	ESC \ or ESC c U
Set Maximum Function Key Transmission Speed Maximum Speed – 60 Characters per Second Maximum Speed – None Maximum Speed – 150 Characters per Second	ESC c 7 <i>maximum speed</i>	ESC c 7 <i>maximum speed</i>

Program Function Key Definitions

Function Key Definitions for ESC | Commands

Key	Unshifted	Shifted	Key	Unshifted	Shifted
F1	1	A	F9	9	I
F2	2	B	F10	:	J
F3	3	C	F11	;	K
F4	4	D	F12	<	L
F5	5	E	↑	-)
F6	6	F	↓	.	*
F7	7	G	→	0	'
F8	8	H	←	/	+

Function Key Definitions for ESC z and ESC Z Commands

Key	Unshifted	Shifted	Key	Unshifted	Shifted
F1	@	'	F7	F	f
F2	A	a	F8	G	g
F3	B	b	F9	H	h
F4	C	c	F10	I	i
F5	D	d	F11	J	j
F6	E	e	F12	K	k

Wyse Emulations Control Commands

Screen and Cursor Display

Function	Wyse 60	Wyse 50/50+
Screen Display Off	ESC ' 8	ESC ' 8
Screen Display On	ESC ' 9	ESC ' 9
Screen Saver Off	ESC e P	ESC e P
Screen Saver On	ESC e Q	ESC e Q
Reverse Screen	ESC ^ 1	ESC ^ 1
Restore Normal Screen	ESC ^ 0	ESC ^ 0
Set Scrolling Speed and Type @ – Jump Scroll < – Smooth Scroll 1 Line per Second = – Smooth Scroll 2 Lines per Second > – Smooth Scroll 4 Lines per Second ? – Smooth Scroll 8 Lines per Second	ESC ' <i>scroll</i>	ESC ' <i>scroll</i>
Set Cursor Display Features 0 – Cursor Display Off 1 – Cursor Display On 2 – Steady Block Cursor 5 – Blinking Block Cursor 4 – Steady Line Cursor 3 – Blinking Line Cursor	ESC ' <i>cursor</i>	ESC ' <i>cursor</i>

Displaying the Message Fields

Function	Wyse 60	Wyse 50/50+
Extended Status Line On	ESC ' a	ESC ' a
Standard Status Line On	ESC ' b	ESC ' b
Load 26th Line	ESC f <i>message</i> CR	ESC f <i>message</i> CR
Status Line Off	ESC ' c	ESC ' c
Program/Display Computer Message on Status Line message = 46 characters on 80-column screen or 98 characters on 132-column screen	ESC F <i>message</i> CR	ESC F <i>message</i> CR
Program Computer Message on Unshifted Label Line Automatically displayed in Native mode. May be hidden by assigning blank attribute (ESC A 1 1) Text = 78 characters on 80-column screen or 130 characters on 132-column screen	ESC z (<i>text</i> CR	ESC z (<i>text</i> CR
Program Computer Message on Shifted Label Line	ESC (z) <i>text</i> CR	ESC (z) <i>text</i> CR
Turn Off Unshifted Label Line	ESC A 1 1	ESC A 1 1
Display Shifted Label Line	ESC z P CR	ESC z P CR

Wyse Emulations Control Commands

Function	Wyse 60	Wyse 50/50+
Turn Off Shifted Label Line	ESC z DEL	ESC z DEL
Clear Unshifted Label Line	ESC z (CR	ESC z (CR
Clear Shifted Label Line	ESC z) CR	ESC z) CR
Program/Display Function Key Label (See "Program Function Key Labels," below, for the <i>fkey label</i> values.) Label – User-defined. Nine characters on 80-column screen or seven characters on 132-column screen.	ESC z <i>fkey label</i> CR	ESC z <i>fkey label</i> CR
Clear Function Key Label (See "Program Function Key Labels," below, for the <i>fkey</i> values.)	ESC z <i>fkey</i> CR	ESC z <i>fkey</i> CR

Program Function Key Labels

Function Key	Unshifted	Shifted	Function Key	Unshifted	Shifted
F1	0	P	F7	6	V
F2	1	Q	F8	7	W
F3	2	R	F9	8	X
F4	3	S	F10	9	Y
F5	4	T	F11	:	Z
F6	5	U	F12	;	[

Defining the Data Area

Function	Wyse 60	Wyse 50/50+
Select 80-Column Display	ESC ' :	ESC ' :
Select 132-Column Display	ESC ' ;	ESC ' ;
Width Change Clear Mode Off	ESC e.	ESC e.
Width Change Clear Mode On	ESC e /	ESC e /
Display 24 Data Lines	ESC e (	ESC e (
Display 25 Data Lines	ESC e)	ESC e)
Display 42 Data Lines	ESC e *	ESC e *
Display 43 Data Lines	ESC e +	ESC e +

Wyse Emulations Control Commands

Display Memory/Split Screen

Function	Wyse 60	Wyse 50/50+
Display Previous Page (if screen is not split)	ESC w B or ESC J	ESC w B or ESC J
Display Next Page (if screen is not split)	ESC w C or ESC K	ESC w C or ESC K
Display Page 0	ESC w 0	ESC w 0
Display Page 1	ESC w 1	ESC w 1
Display Page 2 (In Wyse 60 emulation, Columns must be set to Econ-80)	ESC w 2	ESC w 2
Activate Upper Window	ESC]	ESC]
Activate Lower Window	ESC }	ESC }
Activate Other Window (or Page)	ESC J or ESC K	ESC J or ESC K
Lower Horizontal Split (set screen format)	ESC x P	ESC x P
Raise Horizontal Split	ESC x R	ESC x R
Roll Window Up in Page	ESC w E	ESC w E
Roll Window Down in Page	ESC w F	ESC w F
Redefine Screen as One Window	ESC x @	ESC x @
Redefine Screen as One Window and Clear Pages	ESC x 0	ESC x 0
Configure display pages as a multiple of the number of data lines per page <i>page</i> is: G – 1 x number of lines H – 2 x number of lines I – 4 x number of lines (Wyse 50/50+ emulations only) J – *	ESC w <i>page</i>	ESC w <i>page</i>
Display Page 3		ESC w 3
Display Page 4 (Columns must be set to Econ-80)		ESC w 4
Display Page 5 (Columns must be set to Econ-80)		ESC w 5
Display Page 6 (Columns must be set to Econ-80)		ESC w 6
Split single page horizontally (See Appendix G, "Row/Column ASCII Codes," for the <i>line</i> values.)	ESC x A <i>line</i>	ESC x A <i>line</i>
Split single page horizontally and clear pages (See Appendix G, "Row/Column ASCII Codes," for the <i>line</i> values.)	ESC x 1 <i>line</i>	ESC x 1 <i>line</i>
Split screen horizontally into two scrollable pages (See Appendix G, "Row/Column ASCII Codes," for the <i>line</i> values.)	ESC x C <i>line</i>	ESC x C <i>line</i>
Split screen horizontally into two scrollable pages and clear pages (See Appendix G, "Row/Column ASCII Codes," for the <i>line</i> values.)	ESC x 3 <i>line</i>	ESC x 3 <i>line</i>

Display Attributes

Function	Wyse 60	Wyse 50/50+
Assign Display Attribute to a Message Field (See "Display Field Attributes" on Page A-12 for the <i>attribute</i> value.) <i>n</i> <u>Screen Area</u> 0 Data area (see note, below) 1 Function key label line 2 Terminal message field 3 Computer message field	ESC A <i>n attribute</i>	ESC A <i>n attribute</i>
Assign Character Display Attribute (See "Display Field Attributes" on Page A-12 for the <i>attribute</i> value.)	ESC G <i>attribute</i>	ESC G <i>attribute</i>
Character Attribute Mode Off	ESC e 0	
Character Attribute Mode On	ESC e 1	
Page Attribute Mode On	ESC e 2	ESC e 2
Line Attribute Mode On	ESC e 3	ESC e 3
Assign Write-Protected Character Display Attribute <u>attributes:</u> 6 – Reverse (clears other write-protected attributes) 7 – Dim (clears other write-protected attributes) A – Normal (clears other write-protected attributes) B – Blink On C – Invisible On E – Underline On F – Reverse On G – Dim On	ESC ' <i>attribute</i>	ESC ' <i>attribute</i>
Assign Line Attribute <u>attributes:</u> @ – Single-high, single-wide characters A – Single-high, double-wide characters B – Top half of double-high, single-wide character C – Bottom half of double-high, single-wide character D – Top half of double-high, double-wide character E – Bottom half of double-high, double-wide character	ESC G <i>attribute</i>	ESC G <i>attribute</i>

Note: In Wyse 60 mode, only the Reverse and Normal attributes can be assigned as attributes for the data area.

Wyse Emulations Control Commands

Display Field Attributes

Attribute Variable	Description
0	Normal video (default)
1	Blank
2	Blink
3	Blank blink
4	Reverse video (default reverse)
5	Blank/reverse
6	Reverse and blink
7	Blank/reverse and blink
8	Underline
9	Underline and blank
:	Blink/underline
;	Blank, underline, and blink
<	Reverse and underline
=	Blank/reverse and underline
>	Reverse, underline, and blink
?	Blank/reverse, underline, and blink
p	Half intensity
q	Half intensity and blank
r	Half intensity and blink
s	Half intensity, blank, and blink
t	Half intensity and reverse
u	Half intensity, reverse, and blank
v	Half intensity, reverse, and blink
w	Half intensity, reverse, blank, and blink
x	Half intensity and underline
y	Half intensity, underline, and blank
z	Half intensity, underline, and blink
{	Half intensity, underline, blink, and blank
|	Half intensity, underline, and reverse
}	Half intensity, underline, reverse, and blank
~	Half intensity, underline, reverse, blink
DEL	Half intensity, underline, reverse, blink, and blank

Protecting Data

Function	Wyse 60	Wyse 50/50+
Write Protect Mode Off	ESC (	ESC (
Write Protect Mode On	ESC)	ESC)
Clear Cursor Column to Write Protected Spaces	ESC V	ESC V
Protect Mode Off	ESC '	ESC '
Protect Mode On	ESC &	ESC &

Graphics Characters

Function	Wyse 60	Wyse 50/50+
Graphics Mode On	ESC H CTRL B	ESC H CTRL B
Graphics Mode Off	ESC H CTRL C	ESC H CTRL C
Display Graphics Character (See "Graphics Character Keys," below.)	ESC H <i>key</i>	ESC H <i>key</i>

Graphics Character Keys

Key Variable	Graphics Character	Key Variable	Graphics Character
0	┐	8	+
1	└	9	┌
2	┌	:	—
3	└	;	█
4	┌	<	=
5	└	=	⊥
6	|	>	||
7	█	?	▒

Wyse Emulations Control Commands

Controlling the Cursor

Function	Wyse 60	Wyse 50/50+
Escape Lead In	CTRL [	CTRL [
Cursor Left (backspace)	CTRL H	CTRL H
Cursor Right	CTRL L	CTRL L
Cursor Up; No Scroll	CTRL K	CTRL K
Cursor Up; Scroll (reverse line feed)	ESC j	ESC j
Cursor Down; No Scroll (shift down arrow)	CTRL V	CTRL V
Cursor Down; Scroll (linefeed; Down Arrow key)	CTRL J	CTRL J
Tab	CTRL I	CTRL I
Cursor to Start of Line	CTRL M	CTRL M
Cursor to Start of Next Line (new line)	CTRL _	CTRL _
Home Cursor	ESC { or CTRL ^	ESC { or CTRL ^
End of Line Wrap Off	ESC d .	ESC d .
End of Line Wrap On	ESC d /	ESC d /
Received CR Mode Off	ESC e 4	ESC e 4
Received CR Mode On	ESC e 5	ESC e 5
Autopage Mode Off	ESC d *	ESC d *
Autopage Mode On	ESC d +	ESC d +
Autoscrolling Mode Off	ESC N	ESC N
Autoscrolling Mode On	ESC O	ESC O
Line Lock Mode On	ESC ' H	ESC ' H
Line Lock Mode Off	ESC ' I	ESC ' I
Address Cursor in 80-Column Current Page (See Appendix G, "Row/Column ASCII Codes," for <i>row</i> and <i>column</i> values.)	ESC = <i>row column</i>	ESC = <i>row column</i>
Address Cursor in Specific 80-Column Page 0 – Page 0 or upper window 1 – Page 1 or lower window 2 – Page 2 3 – Page 3 4 – Page 4 5 – Page 5 6 – Page 6 7 – Page 7 (See Appendix G, "Row/Column ASCII Codes," for <i>row</i> and <i>column</i> values.)	ESC w @ <i>page row column</i>	ESC w @ <i>page row column</i>

Wyse Emulations Control Commands

Function	Wyse 60	Wyse 50/50+
Address Cursor in Specific 80-Column Window/Page (if screen is not split) (See Appendix G, "Row/Column ASCII Codes," for <i>row</i> and <i>column</i> values and "Address Cursor in Specific 80-Column Page," on Page A-14, for <i>page</i> values.)	ESC – <i>page row column</i>	ESC – <i>page row column</i>
Address Cursor in 80/132-Column Current Page <i>lll</i> = 1 to 3 decimal value of line relative to home <i>ccc</i> = 1 to 3 decimal value of column relative to home	ESC a <i>lll</i> R <i>ccc</i> C	ESC a <i>lll</i> R <i>ccc</i> C
Read Cursor Address in 80/132 Column Page	ESC b	ESC b
Read Cursor Address in 80-Column Current Page	ESC ?	ESC ?
Read 80-Column Page Number and Cursor Address	ESC w ‘	ESC w ‘
Read 80-Column Window/Page Number and Cursor Address	ESC /	ESC /
Address Row (See Appendix G, "Row/Column ASCII Codes," for <i>row</i> values.)	ESC m <i>row</i>	ESC m <i>row</i>
Address Column (See Appendix G, "Row/Column ASCII Codes," for <i>column</i> values.)	ESC n <i>column</i>	ESC n <i>column</i>

Editing

Function	Wyse 60	Wyse 50/50+
Clear All Tab Stops	ESC 0	ESC 0
Set Tab Stop	ESC 1	ESC 1
Clear Tab Stop	ESC 2	ESC 2
Tabulate Cursor	ESC i or CTRL I	ESC i or CTRL I
Backtab	ESC I	ESC I
Insert Mode On; Replace Mode Off	ESC q	ESC q
Insert Mode Off; Replace Mode On	ESC r	ESC r
Page Edit Mode Off	ESC e "	ESC e "
Page Edit Mode On	ESC e #	ESC e #
Insert Space Character	ESC Q	ESC Q
Insert Line of Spaces	ESC E	ESC E
Insert Column of Nulls	ESC c M	ESC c M
Delete Cursor Character	ESC W	ESC W
Delete Cursor Column	ESC c J	ESC c J

Wyse Emulations Control Commands

Clearing Data

Function	Wyse 60	Wyse 50/50+
Clear Page to Nulls	ESC *	ESC *
Clear Page to Spaces	ESC +	ESC +
Clear Page to Write Protected Spaces	ESC ,	ESC ,
Clear Unprotected Page to Spaces	ESC ; or CTRL Z	ESC ; or CTRL Z
Clear Unprotected Page to Nulls	ESC :	ESC :
Clear Unprotected Page to a Specific Character	ESC . <i>character</i>	ESC . <i>character</i>
Clear Unprotected Page to Spaces from Cursor	ESC Y	ESC Y
Clear Unprotected Page to Nulls from Cursor	ESC y	ESC y
Clear Unprotected Page Foreground to Spaces	ESC c P	ESC c P
Clear Unprotected Page Foreground to Nulls	ESC c Q	ESC c Q
Clear Unprotected Line to Spaces from Cursor	ESC T	ESC T
Clear Unprotected Line to Nulls from Cursor	ESC t	ESC t
Clear Unprotected to End of Line with Spaces	ESC c O	ESC c O
Clear Unprotected to End of Line with Nulls	ESC c L	ESC c L
Clear Unprotected Line Foreground to Spaces	ESC c R	ESC c R
Clear Unprotected Line Foreground to Nulls	ESC c S	ESC c S
Clear Unprotected Column to Nulls	ESC c K	ESC c K
Clear Unprotected Column to Specific Character	ESC c I <i>character</i>	ESC c I <i>character</i>
Box Rectangle to Right of Cursor <i>width</i> = column; <i>height</i> = row (See Appendix G, "Row/Column ASCII Codes," for the <i>width</i> and <i>height</i>)	ESC c N <i>width height</i>	ESC c N <i>width height</i>
Box Rectangle in 80-Column Page (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c G <i>row column</i>	ESC c G <i>row column</i>
Box Rectangle in 132-Column Page (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c G <i>row ~ column</i>	ESC c G <i>row ~ column</i>
Clear Unprotected Rectangle in 80-Column Page <i>character</i> = character to replace unprotected characters (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c F <i>row column character</i>	ESC c F <i>row column character</i>
Clear Unprotected Rectangle in 132-Column Page <i>character</i> = character to replace unprotected characters (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c F <i>row ~ column character</i>	ESC c F <i>row ~ column character</i>

Wyse Emulations Control Commands

Function	Wyse 60	Wyse 50/50+
Clear Entire Rectangle in 80-Column Page <i>character</i> = character to replace unprotected characters (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c H <i>row column</i> <i>character</i>	ESC c H <i>row column</i> <i>character</i>
Clear Entire Rectangle in 132-Column Page <i>character</i> = character to replace unprotected characters (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC c H <i>row ~ column</i> <i>character</i>	ESC c H <i>row ~ column</i> <i>character</i>

Sending Data

Function	Wyse 60	Wyse 50/50+
Begin Print/Send at Top of Page	ESC d '	ESC d '
Begin Print/Send at Top of Screen	ESC d &	ESC d &
Send Cursor Character	ESC M	ESC M
Send Entire Cursor Line	ESC 6	ESC 6
Send Unprotected Line	ESC 4	ESC 4
Send Entire Page	ESC 7	ESC 7
Send Unprotected Page	ESC 5	ESC 5
Mark Block Beginning (embed STX)	ESC 8	ESC 8
Mark Block End (embed ETX)	ESC 9	ESC 9
Send Entire Block	ESC s	ESC s
Send Unprotected Characters in Block	ESC S	ESC S
Select Print Termination Character	ESC o <i>character</i>	ESC o <i>character</i>

Wyse Emulations Control Commands

Print Functions

Function	Wyse 60	Wyse 50/50+
Print Formatted Page	ESC P	ESC P
Print Formatted Unprotected Page	ESC @	ESC @
Print Unformatted Page	ESC p or ESC L	ESC p or ESC L
Auxiliary Print Mode Off (extension print off)	CTRL T	CTRL T
Auxiliary Print Mode On (extension print on)	CTRL R	CTRL R
Transparent Print Mode Off (disable)	CTRL T	CTRL T
Transparent Print Mode On (enable)	ESC d # or CTRL X	ESC d # or CTRL X
Secondary Receive Mode Off	ESC d Space	ESC d Space
Secondary Receive Mode On	ESC d !	ESC d !
Bidirectional Mode Off	ESC d \$	ESC d \$
Bidirectional Mode On	ESC d %	ESC d %

Character Sets

Function	Wyse 60	Wyse 50/50+
Select Primary Character Set	ESC c D	ESC c D
Select Secondary Character Set	ESC c E	ESC c E
Define Primary Character Set <i>bank</i> = font bank that holds the predefined character set 0 – font bank 0 1 – font bank 1 2 – font bank 2 3 – font bank 3	ESC c B <i>bank</i>	ESC c B <i>bank</i>
Define Secondary Character Set (See “Define Primary Character Set,” above, for <i>bank</i> values)	ESC c C <i>bank</i>	ESC c C <i>bank</i>
Automatic Font Loading Off	ESC e N	ESC e N
Automatic Font Loading On	ESC e O	ESC e O

Wyse Emulations Control Commands

Function	Wyse 60	Wyse 50/50+
Load Font Bank with Predefined Character Set (See "Define Primary Character Set" on Page A-18 for <i>bank</i> values) <i>set</i> = predefined character set @ – Native mode A – Multinational B – Standard ASCII C – Graphics 1 D – PC equivalent E – Graphics 2 F – Graphics 3 G – Standard ANSI ‘ – 44-Line Native Mode a – 44-Line Multinational b – 44-Line PC equivalent c – 44-Line Standard ASCII d – 44-Line Standard ANSI	ESC c @ <i>bank set</i>	ESC c @ <i>bank set</i>
Clear Font Bank (See "Define Primary Character Set" on Page A-18 for <i>bank</i> values)	ESC c ? <i>bank</i>	ESC c ? <i>bank</i>
Define and Load Character (See "Define Primary Character Set" on Page A-18 for <i>bank</i> values) <i>pp</i> = 2-byte hex value of character position <i>bb</i> = 32-byte character string defining bit pattern of character	ESC c A <i>bank pp bb ... bb</i> CTRL Y	

Function

Function	Wyse 60	Wyse 50/50+
Economy 80 Mode Off	ESC e F	
Economy 80 Mode On	ESC e G	ESC e G
Set Time <i>hh</i> = hour (two-digit decimal number from 00-23) <i>mm</i> = minutes (two-digit decimal number from 00-59)	ESC c 8 <i>hh mm</i>	

Appendix B. DEC VT Emulations Control Commands

This appendix contains the escape sequences for the DEC VT emulations. The following conventions are followed:

- **ESC** is the escape character.
- **CTRL** is the control key.
- **Space** is the space character.
- Variable entries are presented in *italic* font. Sometimes a descriptive noun is used, such as *row* or *attribute*, and sometimes an abbreviation is used, such as *p* (for parameter) or *fkey* (for Function key).
- When more than one variable of the same type can be used, the variables are numbered (for example, *p1 p2 ... p9* means up to nine variables can be entered).

VT52 Control Commands

Function	VT 52 Command
Cursor Up	ESC A
Cursor Down	ESC B
Cursor Right	ESC C
Cursor Left	ESC D
Cursor Home	ESC H
Reverse Line Feed	ESC I
Direct cursor address (See Appendix G, "Row/Column ASCII Codes," for the <i>row</i> and <i>column</i>)	ESC Y
Enter Graphics Mode	ESC F
Exit Graphics Mode	ESC G
Erase to End of Screen	ESC J
Erase to End of Line	ESC K
Identify Terminal	ESC Z
Enter Alternate Keypad Mode	ESC =
Exit Alternate Keypad Mode	ESC >
Enter ANSI Mode	ESC <
Enter Auto Print Mode	ESC ^

DEC VT Emulations Control Commands

Function	VT 52 Command
Exit Auto Print Mode	ESC _
Enter Printer Controller Mode	ESC W
Exit Printer Controller Mode	ESC X
Print Screen	ESC]
Print Cursor Line	ESC V

VT100 Control Commands

Cursor Movement Commands

Function	VT 100 Command
Cursor Up <i>number</i> Lines	ESC [<i>number</i> A
Cursor Down <i>number</i> Lines	ESC [<i>number</i> B
Cursor Forward (right) <i>number</i> Characters	ESC [<i>number</i> C
Cursor Backward (left) <i>number</i> Characters	ESC [<i>number</i> D
Move Cursor to <i>row row column column</i>	ESC [<i>row</i> ; <i>column</i> H or ESC [<i>row</i> ; <i>column</i> f
Index	ESC D
Reverse Index	ESC M
Save Cursor and Attributes	ESC 7
Restore Cursor and Attributes	ESC 8

Line Size Commands

Function	VT 100 Command
Change This Line to Double-Height Top Half	ESC # 3
Change This Line to Double-Height Bottom Half	ESC # 4
Change This Line to Single-Width Single-Height	ESC # 5
Change This Line to Double-Width Single-Height	ESC # 6
Enable Top Half of Double-High Single-Wide Line	ESC # :
Enable Bottom Half of Double-High Single-Wide Line	ESC # ;

Character Attributes Command

Function	VT 100 Command
<p><i>P</i>_s refers to a selective parameter. Multiple parameters are separated by the semicolon character. The parameters are executed in order and have the following meanings:</p> <ul style="list-style-type: none"> 0 or None – All attributes off 1 – Bold on 4 – Underscore on 5 – Blink on 7 – Reverse video on <p>Any other parameters are ignored</p>	ESC [<i>P</i> 1; <i>P</i> 2; ...; <i>P</i> <i>n</i> <i>m</i>

Erasing Commands

Function	VT 100 Command
From Cursor to End of Line	ESC [K or ESC [OK
From Beginning of Line to Cursor	ESC [1K
Entire Line Containing Cursor	ESC [2K
From Cursor to End of Screen	ESC [J or ESC [0J
From Beginning of Screen to Cursor	ESC [1J
Entire Screen	ESC [2J

Scrolling Region Command

Function	VT 100 Command
<p><i>Top</i> is the number of the top line of the scrolling region; <i>bottom</i> is the number of the bottom line of the scrolling region and must be greater than <i>top</i>.</p>	ESC [<i>top</i> ; <i>bottom</i> r

Tab Stops Commands

Function	VT 100 Command
Set Tab at Current Column	ESC H
Clear Tab at Current Column	ESC [g or ESC [0g
Clear All Tabs	ESC [3g

DEC VT Emulations Control Commands

Reset Command

Function	VT 100 Command
Reset (causes the power-up reset routine to be executed)	ESC c

Character Set Commands

Character Set	VT100 G0 Designator	VT100 G1 Designator
United Kingdom (UK)	ESC (A	ESC) A
United States	ESC (B	ESC) B (USASCII)
Special graphics characters and line drawing set	ESC (0	ESC) 0

Note: The G1 set is invoked for use by the control code SO (Shift Out). The G0 set is invoked by the control code SI (Shift In).

Mode Commands

Mode Name	Mode	VT100 to Set Sequence	Mode	VT100 to Reset Sequence
Line Feed/New Line	New line	ESC [20h	Line feed	ESC [20 |
Cursor Key Mode	Application	ESC [? 1h	Cursor	ESC [? 1 |
ANSI/VT52 Mode	ANSI	N/A	VT52	ESC [? 2 |
Column Mode	132 Column	ESC [? 3h	80 Column	ESC [? 3 |
Scrolling Mode	Smooth	ESC [? 4h	Jump	ESC [? 4 |
Screen Mode	Reverse	ESC [? 5h	Normal	ESC [? 5 |
Origin Mode	Relative	ESC [? 6h	Absolute	ESC [? 6 |
Wraparound	On	ESC [? 7h	Off	ESC [? 7 |
Auto Repeat	On	ESC [? 8h	Off	ESC [? 8 |
Keypad Mode	Application	ESC =	Numeric	ESC >

Report Commands

Report	Invoked By	Response is
Cursor Position	ESC [6 n	ESC [<i>row</i> ; <i>column</i> R
What Are You (See "Option Present Parameters," below, for the option present parameter values)	ESC [c or ESC [0 c	ESC [? 1 ; <i>option present parameter c</i>

Option Present Parameters

The option present parameters can be invoked with the ESC Z command as well as the ESC [c and ESC [0 c commands, but it is not recommended that you use ESC Z.

Option Present Parameter	Meaning
0	Base VT100, no options
1	Processor option (STP)
2	Advanced video option (AVO)
3	AVO and STP
4	Graphics processor option (GO)
5	GO and STP
6	GO and AVO
7	GO, STP, and AVO

Request Status Report Command

Request	VT100 Command	Report
Request Status Report 5 – Terminal status 15 – Printer status	ESC [<i>status n</i>	Terminal Ready: ESC [0 n Printer Ready: ESC [? 10 n Printer Busy: ESC [? 11 n Printer Not Connected: ESC [? 13 n

DEC VT Emulations Control Commands

Controlling the Terminal

Function	VT100 Command
Select bell volume ? Loud > Medium = Low < Off	ESC # <i>volume</i>
Set Time of Day <i>hh</i> = 0 - 23 <i>mm</i> = 0 - 59 <i>ss</i> = 0 - 59	ESC [<i>hh; mm; ss t</i>

VT220 Control Commands

In the VT220 control commands tables, *csi* is the control sequence indicator. In 7-bit mode (VT220-7), the *csi* is **ESC [**. In 8-bit mode, the *csi* can be either 9B hexadecimal or **ESC [**, but it is recommended that you use 9B hexadecimal.

The VT220-7 mode requires 7-bit format for command sequences. Although the VT220-8 mode can use either format, it is recommended you use 8-bit format for faster throughput.

In general, an equivalent 7-bit command can be produced by making the first character an ESC (1B) and subtracting 40 hexadecimal from the 8-bit code to produce the second character. The following table shows the 8-bit control codes and their 7-bit equivalents. See Appendix F, "ASCII Codes," for a table of the ASCII codes.

8-Bit Control Character	Hexadecimal Value	7-Bit Equivalent
IND	84	ESC D
NEL	85	ESC E
HTS	88	ESC H
RI	8D	ESC M
SS2	8E	ESC N
SS3	8F	ESC O
DCS	90	ESC P
CSI	9B	ESC [
ST	9C	ESC \
OSC	9D	ESC]
PM	9E	ESC ^
APC	9F	ESC _

Functional Mode Commands

There are two sets of Functional Mode commands, commands that do not use a question mark (?) to turn functions on and off and commands that use a question mark to turn a function on and off.

Although you can combine up to 16 parameters in one command sequence, as described below, you cannot mix functions from commands requiring a question mark with functions from commands that do not require a question mark.

Functional Commands Without a Question Mark

One command turns the Functional mode on and another command turns the Functional mode off. They are:

- **CSI *p*; ...; *p* h** – Turns the Functional mode on
- **CSI *p* ; ...; *p* l** – Turns the Functional mode off

where *p* is a parameter that is specific for a particular function. The table below lists the functions that can be turned on and off with these commands, along with the parameter value for each function.

You can set or reset up to 16 functions in a single command by entering multiple numeric parameters separated by semicolons. For example, to turn on only the keyboard lock, enter the following command: **CSI 2 h**. To turn on the keyboard lock, Monitor mode, and Insert mode, enter the following command: **CSI 2; 3; 4 h**. You cannot mix set and reset sequences in one command.

Function	Parameter (p)	Set Commands CSI <i>p</i> ; ...; <i>p</i> h	Reset Commands CSI <i>p</i> ; ...; <i>p</i> l	Notes
Keyboard Lock	2	On	Off	
Monitor Mode	3	On	n/a	Monitor mode can be turned off from the keyboard by pressing and holding down the Shift and Ctrl keys while you press the 1 key on the numeric keypad.
Insert Mode	4	On	Off (Replace Mode)	
Local Echo Disable	12	On (Full Duplex)	Off (Half Duplex)	
Transfer Termination	16	Cursor	End of line/screen	
Auto Page	19	On	Off	
Newline	20	Newline	Linefeed	
Cursor Key	21	Application	Normal	
Screen Display	30	Off	On	

DEC VT Emulations Control Commands

Function	Parameter (p)	Set Commands CSI <i>p</i> ; ...; <i>p</i> h	Reset Commands CSI <i>p</i> ; ...; <i>p</i> l	Notes
Status Line Display	31	On	Off	
Screen Saver	32	On	Off	
Steady Cursor	33	On (Steady)	Off (Blink)	
Underline Cursor	34	On (Underline)	Off (Block)	
Width Change Clear	35	Off	On	
25 Data Lines	40	25 Data Lines	24 Data Lines	
43 Data Lines	41	43 Data Lines	42 Data Lines	
Wyse 60 Mode	42	Select Wyse 60	n/a	DEC modes can be selected from Wyse 60 mode as described in "Selecting Other Emulations" on Page A-2.
Character Cell Size	53	10 x 16 (60 Hz)	10 x 13 (78 Hz)	
ASCII Key Codes	54	ASCII Key Codes	PC Scan Codes	

Functional Commands With a Question Mark

One command turns a function on and another command turns a function off. They are:

- **CSI ? *p*; ...; *p* h** – Turns the Functional mode on
- **CSI ? *p*; ...; *p* l** – Turns the Functional mode off

where *p* is a parameter that is specific for a particular function. The table on Page B-9 lists the functions that can be turned on and off with these commands along with the parameter value for each function.

You can set or reset up to 16 functions in a single command by entering multiple numeric parameters, separated by semicolons. For example, to turn on only the Cursor key, enter the following command: **CSI ? 1 h**. To turn on the Cursor key, ANSI/VT52 mode, and columns, enter the following command: **CSI ? 1; 2; 3 h**. You cannot mix set and reset sequences in one command.

DEC VT Emulations Control Commands

Function	Parameter (<i>p</i>)	Set Commands CSI ? <i>p</i> ; ...; <i>p</i> h	Reset Commands CSI ? <i>p</i> ; ...; <i>p</i> l	Notes
Cursor Key	1	Application	Normal	
ANSI/VT52 Mode	2	n/a	VT52	VT100 mode can be selected from VT52 mode with the Enter ANSI command (ESC <). Once in VT100 mode, use the Compatibility Level command, as described on Page B-12, to select VT220 mode.
Columns	3	132	80	
Scrolling	4	Smooth	Jump	
Video Display	5	Reverse	Normal	
Origin Mode	6	Scroll Region	Screen	
Auto Wrap	7	On	Off	
Auto Repeat	8	On	Off	
Block Mode	10	On	Off (Full Duplex)	
Caps Lock	12	On	Off	
Print Form Feed	18	On	Off	
Print Extent	19	Screen	Scroll Region	
Printer Type	24	Serial	Parallel	
Cursor Display	25	On	Off	
National Replacement Character Set Mode	42	On	Off	National Replacement Character Set mode is only allowed if the keyboard language is set to a foreign keyboard (not a US keyboard).

DEC VT Emulations Control Commands

Cursor and Editing Commands

Function	VT220 Command	Description
Cursor Up	csi <i>lines</i> A	<i>lines</i> is the number of lines to move the cursor up.
Cursor Down	csi <i>lines</i> B	<i>lines</i> is the number of lines to move the cursor down.
Cursor Forward	csi <i>number</i> C	<i>number</i> is the number of spaces to move the cursor forward.
Cursor Backward	csi <i>number</i> D	<i>number</i> is the number of spaces to move the cursor backward.
Cursor Horizontal Absolute	csi <i>number</i> G	Move the cursor to column <i>number</i> .
Cursor Position Absolute	csi <i>row</i> ; <i>column</i> H or csi <i>row</i> ; <i>column</i> f	Move cursor to <i>row</i> and <i>column</i> .
Report Cursor Position	csi 6 n	Response is CSI <i>row</i> , <i>column</i> R where <i>row</i> and <i>column</i> are the reported row and column values.
Index	IND or ESC D	Move cursor down one line in current column or scroll up if at bottom line of scroll region.
Reverse Index	RI or ESC M	Move cursor up one line in current column or scroll down if at top line of scroll region.
Next Line	NEL or ESC E	Move cursor down one line and to column 1.
Horizontal Tab Set	HTS or ESC H	Set tab at current column.
Tab Clear	csi g csi 0 g	Clear tab at current column.
Clear All Tabs	csi 3 g	Clear all tabs.
Delete Character	csi <i>number</i> P	<i>number</i> is the number of characters to delete.
Delete Line	csi <i>number</i> M	<i>number</i> is the number of lines to delete.
Erase in Display	csi J csi 0 J csi 1 J csi 2 J	Cursor to end of screen Cursor to end of screen Beginning of screen to cursor Complete display
Insert Character	csi <i>number</i> @	<i>number</i> is the number of characters to insert.
Insert Line	csi <i>number</i> L	<i>number</i> is the number of lines to insert.
Erase in Line	csi K csi 0 K csi 1 K csi 2 K	Cursor to end of line Cursor to end of line Beginning of line to cursor Complete line
Erase Character	csi <i>number</i> X	<i>number</i> is the number of characters to erase.

DEC VT Emulations Control Commands

Function	VT220 Command	Description
Selective Erase in Display (erasable characters only)	csi ? J csi ? 0 J csi ? 1 J csi ? 2 J	Cursor to end of screen Cursor to end of screen Beginning of screen to cursor Complete display
Selective Erase in Line (erasable characters only)	csi ? K csi ? 0 K csi ? 1 K csi ? 2 K	Cursor to end of line Cursor to end of line Beginning of line to cursor Complete line
Next Page	csi U	
Previous Page	csi V	

Miscellaneous Commands

Function	VT220 Command	Description																								
Define Character Attributes	csi <i>attribute</i> ; ...; <i>attribute m</i>	Up to 16 attributes can be combined by separating the attribute parameters with semicolons. <table style="margin-left: 20px;"> <thead> <tr> <th><i>attribute</i></th> <th>Effect</th> </tr> </thead> <tbody> <tr><td>0</td><td>Normal (all attributes off)</td></tr> <tr><td>1</td><td>Bold (dim, blank off)</td></tr> <tr><td>2</td><td>Dim (bold, blank off)</td></tr> <tr><td>4</td><td>Underline</td></tr> <tr><td>5</td><td>Blink</td></tr> <tr><td>6, 8</td><td>Blank (bold, dim off)</td></tr> <tr><td>7</td><td>Reverse</td></tr> <tr><td>22, 26, 28</td><td>Normal Intensity (bold, dim, blank off)</td></tr> <tr><td>24</td><td>Underline off</td></tr> <tr><td>25</td><td>Blink off</td></tr> <tr><td>27</td><td>Reverse off</td></tr> </tbody> </table>	<i>attribute</i>	Effect	0	Normal (all attributes off)	1	Bold (dim, blank off)	2	Dim (bold, blank off)	4	Underline	5	Blink	6, 8	Blank (bold, dim off)	7	Reverse	22, 26, 28	Normal Intensity (bold, dim, blank off)	24	Underline off	25	Blink off	27	Reverse off
<i>attribute</i>	Effect																									
0	Normal (all attributes off)																									
1	Bold (dim, blank off)																									
2	Dim (bold, blank off)																									
4	Underline																									
5	Blink																									
6, 8	Blank (bold, dim off)																									
7	Reverse																									
22, 26, 28	Normal Intensity (bold, dim, blank off)																									
24	Underline off																									
25	Blink off																									
27	Reverse off																									
Define Erasable Character	csi 0 " q or csi 2 " q	Subsequent characters are erased during a Selective Erase in Line/Page command.																								
Define Nonerasable Character	csi 1 " q	Subsequent characters are not erased during a Selective Erase in Line/Page command.																								
Set Top and Bottom Margins	csi <i>top</i> ; <i>bottom r</i>	<i>Top</i> is the number of the top line of the scrolling region; <i>bottom</i> is the number of the bottom line of the scrolling region and must be greater than <i>top</i> .																								
Single Wide Line	ESC # 5	Change this line to single-width, single-height.																								
Single Wide Line Top	ESC # :	Enable top half of double-high, single-wide line.																								
Single Wide Line Bottom	ESC # ;	Enable bottom half of double-high, single-wide line.																								
Double Wide Line	ESC # 6	Change this line to double-width, single-height.																								
Double Wide Line Top	ESC # 3	Change this line to double-height top half.																								
Double Wide Line Bottom	ESC # 4	Change this line to double-height bottom half.																								
Address 26th Line	csi <i>column p text st</i>	Write the specified text to the bottom label line beginning at <i>column</i> .																								
Reset Terminal	ESC c																									

DEC VT Emulations Control Commands

Function	VT220 Command	Description																											
Program Function Keys	<p>DSC <i>clear</i> ; <i>lock</i> <i>keycode</i> / <i>p</i> ST</p> <p><i>clear</i> <u>Meaning</u> 0 Clear all key definitions 1 Clear key definitions only as they are defined</p> <p><i>lock</i> <u>Meaning</u> 0 Lock key definitions 1 Don't lock key definitions</p> <p style="text-align: center;"><i>keycode</i></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>key</u></th> <th style="text-align: center;"><u>Unshifted</u></th> <th style="text-align: center;"><u>Shifted</u></th> </tr> </thead> <tbody> <tr><td>F5</td><td style="text-align: center;">36</td><td style="text-align: center;">16</td></tr> <tr><td>F6</td><td style="text-align: center;">37</td><td style="text-align: center;">17</td></tr> <tr><td>F7</td><td style="text-align: center;">38</td><td style="text-align: center;">18</td></tr> <tr><td>F8</td><td style="text-align: center;">39</td><td style="text-align: center;">19</td></tr> <tr><td>F9</td><td style="text-align: center;">40</td><td style="text-align: center;">20</td></tr> <tr><td>F10</td><td style="text-align: center;">41</td><td style="text-align: center;">21</td></tr> <tr><td>F11</td><td style="text-align: center;">43</td><td style="text-align: center;">23</td></tr> <tr><td>F12</td><td style="text-align: center;">44</td><td style="text-align: center;">24</td></tr> </tbody> </table> <p><i>p</i> is the hexadecimal representation of the string assigned to the function key. For example, the hexadecimal representation of Hello is 48656C6C6F.</p> <p>You can enter multiple key definitions by entering multiple <i>keycode</i> and <i>p</i> parameters separated by semicolons.</p>		<u>key</u>	<u>Unshifted</u>	<u>Shifted</u>	F5	36	16	F6	37	17	F7	38	18	F8	39	19	F9	40	20	F10	41	21	F11	43	23	F12	44	24
<u>key</u>	<u>Unshifted</u>	<u>Shifted</u>																											
F5	36	16																											
F6	37	17																											
F7	38	18																											
F8	39	19																											
F9	40	20																											
F10	41	21																											
F11	43	23																											
F12	44	24																											
Set Time of Day	<p><i>csi hh ; mm ; ss t</i> <i>hh</i> = 0-23 <i>mm</i> = 0-59 <i>ss</i> = 0-59</p>																												

Appendix C. PC Term Control Commands

This appendix contains the escape sequences for the PC Term emulation. The following conventions are followed:

- **ESC** is the escape character.
- **CTRL** is the control key.
- **Space** is the space character.
- Variable entries are presented in *italic* font. Sometimes a descriptive noun is used, such as *row* or *attribute*, and sometimes an abbreviation is used, such as *p* (for parameter) or *fkey* (for Function key).
- When more than one variable of the same type can be used, the variables are numbered (for example, *p1 p2 ... p9* means up to nine variables can be entered).

Monitor Mode Commands

Function	Command
Monitor Mode On	ESC U
Monitor Mode Off	ESC u or ESC X

Selecting Other Personalities

Function	Command
Select Wyse 50/50+ Mode	ESC v "
Select Wyse 60 Mode	ESC v 4
Select PC Term Mode	ESC v 5
Select VT52 Mode	ESC v 6
Select IBM 3161 Mode	ESC v 9
Select VT100 Mode	ESC v ;
Select VT220-7 Mode	ESC v <
Select VT220-8 Mode	ESC v =
Select IBM 3151 Mode	ESC v @

PC Term Control Commands

Communicating with the Computer

Function	Command
Enable Transmission	CTRL Q
Stop Transmission	CTRL S
Send ACK (if ACK mode on)	CTRL E
Full Duplex Mode On	ESC }
Half Duplex Mode On	ESC {
Block Mode On	ESC B
Block Mode Off (conversation)	ESC C
Enable DTR Handshaking	CTRL N
Enable XON/XOFF Handshaking	CTRL O
Program Answerback Message	ESC] <i>answer</i> CR <i>answer</i> is a string of up to 32 characters

Controlling the Terminal and Keyboard

Function	PC Term Command
Local Edit Mode On	ESC k
Duplex Edit Mode On	ESC I
Sound Bell	CTRL G
Unlock Keyboard	ESC "
Lock Keyboard	ESC #
Keyclick Off	ESC <
Keyclick On	ESC >
Margin Bell On (at current column)	ESC n
Margin Bell Off	ESC o

PC Term Control Commands

Function	PC Term Command																		
Transmit Keyboard Status The data bytes are sent in response. The first byte is formed as follows: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"><u>Bit</u></td> <td><u>Meaning if Set</u></td> </tr> <tr> <td>7</td> <td>Shift key held down</td> </tr> <tr> <td>6</td> <td>Num Lock is on</td> </tr> <tr> <td>5</td> <td>Ctrl key held down</td> </tr> <tr> <td>4</td> <td>Alt key held down</td> </tr> <tr> <td>3</td> <td>Always 0</td> </tr> <tr> <td>2</td> <td>Always 0</td> </tr> <tr> <td>1</td> <td>Always 0</td> </tr> <tr> <td>0</td> <td>Caps Lock is on</td> </tr> </table> The second byte is always a (61 hexadecimal)	<u>Bit</u>	<u>Meaning if Set</u>	7	Shift key held down	6	Num Lock is on	5	Ctrl key held down	4	Alt key held down	3	Always 0	2	Always 0	1	Always 0	0	Caps Lock is on	ESC [
<u>Bit</u>	<u>Meaning if Set</u>																		
7	Shift key held down																		
6	Num Lock is on																		
5	Ctrl key held down																		
4	Alt key held down																		
3	Always 0																		
2	Always 0																		
1	Always 0																		
0	Caps Lock is on																		
Turn ASCII Keycode Mode On (Scancode mode off)	ESC c																		
Reset Terminal	ESC m																		

Defining Screen and Cursor Appearance

Function	PC Term Command												
Screen Display On	ESC N												
Screen Display Off	ESC O												
Reverse Video Screen	ESC b												
Normal Video Screen	ESC d												
Set Cursor Display Features	ESC . <i>cursor</i> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"><u><i>cursor</i></u></td> <td><u>Meaning</u></td> </tr> <tr> <td>0</td> <td>Cursor display off</td> </tr> <tr> <td>1 or 5</td> <td>Blinking block cursor</td> </tr> <tr> <td>2</td> <td>Steady block cursor</td> </tr> <tr> <td>3 or 6</td> <td>Blinking line cursor</td> </tr> <tr> <td>4</td> <td>Steady line cursor</td> </tr> </table>	<u><i>cursor</i></u>	<u>Meaning</u>	0	Cursor display off	1 or 5	Blinking block cursor	2	Steady block cursor	3 or 6	Blinking line cursor	4	Steady line cursor
<u><i>cursor</i></u>	<u>Meaning</u>												
0	Cursor display off												
1 or 5	Blinking block cursor												
2	Steady block cursor												
3 or 6	Blinking line cursor												
4	Steady line cursor												

Displaying the Message Fields

Function	PC Term Command
Turn Message Line Off	ESC e
Turn Message Line On and Display the specified <i>message</i>	ESC f <i>message</i> CR

PC Term Control Commands

Defining the Data Area

Function	PC Term Command
Display 25 Lines	ESC ^
Display 43 Lines	ESC _

Assigning Display Attributes

Function	PC Term Command
Assign Character Display Attributes	ESC G <i>attribute</i> <u>Characteristic</u>
	0 Normal (all attributes off)
	1 Blank
	2 Blink
	3 Blank, blink
	4 Reverse video
	5 Blank, reverse
	6 Blink, reverse
	7 Blank, blink, reverse
	8 Underline
	9 Blank, underline
	: Blink, underline
	; Blank, blink, underline
	< Reverse, underline
	= Blank, reverse, underline
	> Blink, reverse, underline
	? Blank, blink, reverse, underline
	@ Dim
	A Blank, dim
	B Blink, dim
	C Blank, blink, dim
	D Reverse, dim
	E Blank, reverse, dim
	F Blink, reverse, dim
	G Blank, blink, reverse, dim
	H Underline, dim
	I Blank, underline, dim
	J Blink, underline, dim
	K Blank, blink, underline, dim
	L Reverse, underline, dim
	M Blank, reverse, underline, dim
	N Blink, reverse, underline, dim
	O Blank, blink, reverse, underline, dim

Protecting Data

Function	PC Term Command
Write-Protect Mode On	ESC)
Write-Protect Mode Off	ESC (
Protect Mode On	ESC &
Protect Mode Off	ESC '

Enabling/Disabling Graphics Mode

Function	Command
Graphics Mode On	ESC \$
Graphics Mode Off	ESC %

Controlling the Cursor

Function	Command
Cursor Left	CTRL H
Cursor Right	CTRL L
Cursor Up; No Scroll	CTRL K
Cursor Up; Scroll (reverse linefeed)	ESC j
Cursor Down; No Scroll	CTRL V
Cursor Down; Scroll (linefeed)	CTRL J
Cursor to Start of Line	CTRL M
Cursor to Start of Next Line	CTRL _
Home Cursor	CTRL ^
Autowrap On	ESC ~
Autowrap Off	ESC 0
Auto Linefeed On	ESC 8
Auto Linefeed Off	ESC 9
Address Cursor in Current Page	ESC = <i>row column</i> See Appendix G, "Row/Column ASCII Codes," for <i>row</i> and <i>column</i> values.

PC Term Control Commands

Function	Command
Address Cursor in Specific Page	ESC – <i>page row column</i> <i>page</i> is either 0 or 1 See Appendix G, “Row/Column ASCII Codes,” for <i>row</i> and <i>column</i> values.
Read Cursor Address in Current Page Response: <i>row column</i> CR See Appendix G, “Row/Column ASCII Codes,” for <i>row</i> and <i>column</i> values.	ESC ?
Read Current Page and Cursor Address Response: <i>page row column</i> CR <i>page</i> is either 0 or 1 See Appendix G, “Row/Column ASCII Codes,” for <i>row</i> and <i>column</i> values Current Page and Cursor Address.	ESC /

Editing

Function	Command
Set Tab Stop in Current Column	ESC 1
Clear Tab Stop in Current Column	ESC 2
Clear All Tab Stops	ESC 3
Tabulate Cursor	CTRL I
Backtab Cursor	ESC I
Field Tab	ESC i
Insert Mode On	ESC Z
Insert Mode Off	ESC r
Insert Space	ESC Q
Insert Line	ESC E
Delete Character	ESC W
Delete Line	ESC R

Clearing Data

Function	Command
Clear Page to Nulls	ESC *
Clear Page to Write-Protected Spaces	ESC ,
Clear Unprotected Page to Nulls	ESC :
Clear Unprotected Page to Spaces	ESC ; or ESC + or CTRL Z
Clear Unprotected Page to Nulls from Cursor	ESC y
Clear Unprotected Page to Spaces from Cursor	ESC Y
Clear Unprotected Line to Nulls from Cursor	ESC t
Clear Unprotected Line to Spaces from Cursor	ESC T
Fill Page with Hs	ESC F

Sending Data

Function	Command																		
Send Line until Cursor	ESC 6																		
Send Unprotected Line until Cursor	ESC 4																		
Send Page until Cursor	ESC 7																		
Send Unprotected Page until Cursor	ESC 5																		
Send Characters n Block	ESC s																		
Send Unprotected Characters in Block	ESC S																		
Report Attribute Under Cursor Two data bytes are sent in response. The first byte is formed as follows: <table border="1"> <thead> <tr> <th>Bit</th> <th>Attribute If Set</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>Dim</td> </tr> <tr> <td>6</td> <td>Always 0</td> </tr> <tr> <td>5</td> <td>Always 0</td> </tr> <tr> <td>4</td> <td>Always 0</td> </tr> <tr> <td>3</td> <td>Blank</td> </tr> <tr> <td>2</td> <td>Blink</td> </tr> <tr> <td>1</td> <td>Reverse</td> </tr> <tr> <td>0</td> <td>Underline</td> </tr> </tbody> </table> The second byte is always a (61 hexadecimal)	Bit	Attribute If Set	7	Dim	6	Always 0	5	Always 0	4	Always 0	3	Blank	2	Blink	1	Reverse	0	Underline	ESC D
Bit	Attribute If Set																		
7	Dim																		
6	Always 0																		
5	Always 0																		
4	Always 0																		
3	Blank																		
2	Blink																		
1	Reverse																		
0	Underline																		

PC Term Control Commands

Printing

Function	Description																												
Set Print Terminator	ESC p <i>terminator</i> <i>terminator</i> is the value sent to the host following a page print operation.																												
Define Delimiters	ESC x <i>delimiter d1 d2</i> <table border="0"> <thead> <tr> <th><i>delimiter</i></th> <th>Meaning</th> <th colspan="2">Defaults</th> </tr> <tr> <th></th> <th></th> <th><i>d1</i></th> <th><i>d2</i></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Field Separator</td> <td>FS</td> <td>NULL</td> </tr> <tr> <td>1</td> <td>EOL Terminator</td> <td>US</td> <td>NULL</td> </tr> <tr> <td>2</td> <td>Start Protected Field</td> <td>ESC</td> <td>)</td> </tr> <tr> <td>3</td> <td>End Protected Field</td> <td>ESC</td> <td>(</td> </tr> <tr> <td>4</td> <td>EOT Terminator</td> <td>CR</td> <td>NULL</td> </tr> </tbody> </table>	<i>delimiter</i>	Meaning	Defaults				<i>d1</i>	<i>d2</i>	0	Field Separator	FS	NULL	1	EOL Terminator	US	NULL	2	Start Protected Field	ESC)	3	End Protected Field	ESC	(4	EOT Terminator	CR	NULL
<i>delimiter</i>	Meaning	Defaults																											
		<i>d1</i>	<i>d2</i>																										
0	Field Separator	FS	NULL																										
1	EOL Terminator	US	NULL																										
2	Start Protected Field	ESC)																										
3	End Protected Field	ESC	(
4	EOT Terminator	CR	NULL																										
Print Formatted Page to Cursor	ESC P																												
Print Unprotected Page to Cursor	ESC L																												
Auxiliary Print Mode On	ESC @																												
Auxiliary Print Mode Off	ESC A																												
Transparent Print Mode On	ESC '																												
Transparent Print Mode Off	ESC a																												
Bidirectional Mode On	CTRL R																												
Bidirectional Mode Off	CTRL T																												

Appendix D. IBM 3151 and 3161 Control Codes

This appendix contains the escape sequences for the IBM 3151 and IBM 3161 emulations. The following conventions are followed:

- **ESC** is the escape character.
- **CTRL** is the control key.
- **Space** is the space character.
- Variable entries are presented in *italic* font. Sometimes a descriptive noun is used, such as *row* or *attribute*, and sometimes an abbreviation is used, such as *p* (for parameter) or *fkey* (for Function key).
- When more than one variable of the same type can be used, the variables are numbered (for example, *p1 p2 ... p9* means up to nine variables can be entered).

For more information about the parameters in these control codes, refer to the *IBM 3151 ASCII Display Station Reference Manual* (GA18-2634-01).

Note: All the commands in the following table are valid for the IBM 3151. The commands that are also valid for the IBM 3161 are checked in the “3161” column.

Function	Command	3161
Null	CTRL 2	✓
Turnaround Character	CTRL C	✓
Turnaround Character	CTRL D	✓
Bell	CTRL G	✓
Backspace	CTRL H	✓
Tab	CTRL I	✓
Line Feed or New Line (LF)	CTRL J or CTRL Return	✓
Line Feed (VT)	CTRL K	✓
Line Feed or Erase Input (FF)	CTRL L	✓
Carriage Return, New Line, or Turnaround Character	CTRL M	✓
Select G1	CTRL N	✓
Select G0	CTRL O	✓
Enter Transparent Mode	CTRL P; CTRL B	✓
Exit Transparent Mode	CTRL P; CTRL C	✓

IBM 3151 and 3161 Control Codes

Function	Command	3161
Mandatory Disconnect	CTRL P; CTRL D	✓
Begin Pass Through Datastream	CTRL P; CTRL R	✓
End Pass Through Datastream	CTRL P; CTRL T	✓
Restart Transmission (pacing)	CTRL Q	✓
Stop Transmission (pacing)	CTRL S	✓
Cancel	CAN	✓
Set Column Tab	ESC 0	✓
Clear Column Tab	ESC 1	✓
Clear All Column Tabs	ESC SP 1	✓
Back Tab	ESC 2	✓
Set Field Attribute	ESC 3 <i>p1 p2 operation specifier</i>	✓
Set Field Attribute Response	ESC 3 <i>p1 p2</i>	✓
Set Character Attribute	ESC 4 <i>p operation specifier</i>	✓
Read Cursor Address	ESC 5	✓
Read Status	ESC 6	✓
Read Status Response	ESC 6 <i>p1 p2 turnaround character</i>	✓
Read Model	ESC Space 6	✓
Read Model Response	ESC Space 6 <i>p turnaround character</i>	✓
Read Model (extended)	ESC " 6	
Read Model (extended) Response	ESC " 6 <i>p1 p2 p3 p4</i>	
Read Terminal ID	ESC ! 6	✓
Read Terminal ID Response	ESC ! 6 <i>p ESC 6 turnaround character</i>	✓
Read Control 1	ESC Space 7	✓
Read Control 1 Response	ESC Space 7 <i>p1 p2 turnaround character</i>	✓
Read Control 2	ESC ! 7	✓
Read Control 2 Response	ESC ! 7 <i>p1 p2 turnaround character</i>	✓
Read Control 3	ESC " 7	✓
Read Control 3 Response	ESC " 7 <i>p1 p2 turnaround character</i>	✓
Read Control 4	ESC # 7	✓
Read Control 4 Response	ESC # 7 <i>p turnaround character</i>	✓
Read Control 5	ESC \$ 7	✓
Read Control 5 Response	ESC \$ 7 <i>p1 p2 p3 p4 turnaround character</i>	✓

IBM 3151 and 3161 Control Codes

Function	Command	3161
Read Control 6	ESC % 7	✓
Read Control 6 Response	ESC % 7 <i>p1 p2 p3 p4 turnaround character</i>	✓
Read Control 7	ESC & 7	✓
Read Control 7 Response	ESC & 7 <i>p1 p2 p3 p4 turnaround character</i>	✓
Read Page/Send Page	ESC 8	✓
Read Message/Send Message	ESC Space 8	✓
Read Line/Send Line	ESC ! 8	✓
Read All	ESC # 8	✓
Set Control 1	ESC Space 9 <i>p1 p2 operation specifier</i>	✓
Set Control 2	ESC ! 9 <i>p1 p2 operation specifier</i>	✓
Set Control 3	ESC " 9 <i>p1 p2 operation specifier</i>	✓
Set Control 4	ESC # 9 <i>p operation specifier</i>	✓
Set Control 5	ESC \$ 9 <i>p1 p2 p3 p4 operation specifier</i>	✓
Set Control 6	ESC % 9 <i>p1 p2 p3 p4 operation specifier</i>	✓
Set Control 7	ESC & 9 <i>p1 p2 p3 operation specifier</i>	✓
Keyboard Lock	ESC :	✓
Keyboard Unlock	ESC ;	✓
Begin Outbound Trace	ESC Space :	✓
End Outbound Trace	ESC Space ;	✓
Enable Read Unprotected Field	ESC % :	
Disable Read Unprotected Field	ESC % ;	
Enable Host Protect	ESC & :	
Disable Host Protect	ESC & ;	
Enable Default Field Attribute	ESC ' :	
Disable Default Field Attribute	ESC ' ;	
Enable Write Null	ESC " :	
Disable Write Null	ESC " ;	
Enable Print Key Attention	ESC) :	
Disable Print Key Attention	ESC) ;	
Enable Reset Key Attention	ESC (:	
Disable Reset Key Attention	ESC (;	
Select Character Set G0	ESC < <i>p</i>	✓

IBM 3151 and 3161 Control Codes

Function	Command	3161
Select Character Set G1	ESC > <i>p</i>	✓
Write Host Message	ESC = <i>message</i> ESC =	
Display Host Message	ESC # ;	
Display Machine Status	ESC # :	
Enable Field Attribute Visible Renditions	Not supported	
Disable Field Attribute Visible Renditions	Not supported	
Enable Partition Separate Line	Not supported	
Disable Partition Separate Line	Not supported	
Enable OIA Divide Line	Not supported	
Disable OIA Divide Line	Not supported	
Enable Mouse Attach	ESC – :	
Disable Mouse Attach	ESC – ;	
Cursor Up	ESC A	✓
Jump Partition	ESC " A	✓
Cursor Down	ESC B	✓
Cursor Right	ESC C	✓
Cursor Left	ESC D	✓
Write Send Mark	ESC E	✓
Cursor Home	ESC H	✓
Erase EOL/F	ESC I	✓
Erase EOP	ESC J	✓
Erase Input	ESC K	✓
Clear Page	ESC L	✓
Clear All	ESC ! L	✓
Next Line	ESC M	
Index	ESC <i>Space</i> M	
Reverse Index	ESC ! M	
Insert Line	ESC N	✓
Delete Line	ESC O	✓
Insert Character	ESC P <i>p</i>	✓
Delete Character	ESC Q	✓
Cancel	ESC S	✓

IBM 3151 and 3161 Control Codes

Function	Command	3161
Reset to Initial State	ESC Space S	✓
Reset Keyboard Lock and Keep MDT Bit	ESC ! S	
Print Line	ESC U	✓
Print Message	ESC V	✓
Print Viewport	ESC W	✓
Print Screen	ESC Space W	✓
Set Buffer Address	ESC X <i>row column</i>	✓
Set Buffer Address (extended)	ESC x <i>high byte row low byte row high byte column low byte column</i>	
Set Cursor Address	ESC Y <i>row column</i>	✓
Set Cursor Address (extended)	ESC y <i>high byte row low byte row high byte column low byte column</i>	
Insert Cursor	ESC Z	✓
Reset Buffer Address Mode	ESC <i>Space Z</i>	✓
F1 AID (default format)	ESC a	✓
F13 AID (default format)	Esc ! a	✓
F25 AID (default format)	ESC " a	✓
F2 AID (default format)	ESC b	✓
F14 AID (default format)	ESC ! b	✓
F26 AID (default format)	ESC " b	✓
F3 AID (default format)	ESC c	✓
F15 AID (default format)	ESC ! c	✓
F27 AID (default format)	ESC " c	✓
F4 AID (default format)	ESC d	✓
F16 AID (default format)	ESC ! d	✓
F28 AID (default format)	ESC " d	✓
F5 AID (default format)	ESC e	✓
F17 AID (default format)	ESC ! e	✓
F29 AID (default format)	ESC " e	✓
F6 AID (default format)	ESC f	✓
F18 AID (default format)	ESC ! f	✓
F30 AID (default format)	ESC " f	✓
F7 AID (default format)	ESC g	✓

IBM 3151 and 3161 Control Codes

Function	Command	3161
F19 AID (default format)	ESC ! g	✓
F31 AID (default format)	ESC " g	✓
F8 AID (default format)	ESC h	✓
F20 AID (default format)	ESC ! h	✓
F32 AID (default format)	ESC " h	✓
F9 AID (default format)	ESC i	✓
F21 AID (default format)	ESC ! i	✓
F33 AID (default format)	ESC " i	✓
F10 AID (default format)	ESC j	✓
F22 AID (default format)	ESC ! j	✓
F34 AID (default format)	ESC " j	✓
F11 AID (default format)	ESC k	✓
F23 AID (default format)	ESC ! k	✓
F35 AID (default format)	ESC " k	✓
F12 AID (default format)	ESC l	✓
F24 AID (default format)	ESC ! l	✓
F36 AID (default format)	ESC " l	✓
PA1 AID	ESC ! m	✓
PA2 AID	ESC ! n	✓
PA3 AID	ESC ! o	✓
Select Host Partition A – Viewport 1 B – Viewport 2 C – Viewport 3	ESC Space q <i>viewport</i>	✓
Select Active Partitioin (See “Select Host Partition,” above, for the viewport values.)	ESC ! q <i>viewport</i>	✓
Create Viewport	ESC Space r	✓
Load Programmable Function Key	ESC ! = p1 p2 p3 p4 ESC =	
Set Default Function Keys	ESC t p1 p2	
Set All Default Function Keys	ESC Space t	

Appendix E. Multinational Keystroke Sequences

In VT220-7 and VT220-8 bit mode, the 1151 can send compose sequences from the keyboard.

To create these composite characters, the Compose key must be activated by selecting the left Alt key as the Compose key. Do this by setting the **Left Alt Key** option on the Keyboard Setup screen to **Compose**.

Press the Compose key, then press the keys from the table below to create the character. If you attempt to create an invalid character sequence, the bell sounds and the sequence is terminated. If you accidentally press the Compose key, press the Delete key to terminate the sequence.

Note: Characters apply in upper- and lowercase.

Composite Character	Multinational and National Character Set Modes	National Character Set Mode
Ã (A tilde)	A ~	~ A
Ä (A umlaut)	" A or A "	" A
À (A grave)	A `	grave A
Á (A acute)	A '	' A
Â (A circumflex)	A ^	^ A
Å (A ring)	A * or A °	° A
Æ (A E ligature)	A E	
Ç (C cedilla)	C ,	
Ë (E umlaut)	E " or E "	" E
È (E grave)	E grave	grave E
É (E acute)	E '	' E
Ê (E circumflex)	E ^	^ E
Ï (I umlaut)	I " or I "	" I
Ì (I grave)	I grave	grave I
Í (I acute)	I '	' I
Î (I circumflex)	I ^	^ I
Ñ (N tilde)	N ~	~ N
Õ (O tilde)	O ~	~ O
Ò (O grave)	O '	' O

Multinational Keystroke Sequences

Composite Character	Multinational and National Character Set Modes	National Character Set Mode
Ó (O acute)	O apostrophe	apostrophe O
Ô (O circumflex)	O ^	^ O
Ö (O umlaut)	O " or O "	" O
Ò (O grave)	O '	' O
Œ (O E ligature)	O E	
Ù (U grave)	U '	' U
Ú (U acute)	U apostrophe	apostrophe U
Û (U circumflex)	U ^	^ U
Ü (U umlaut)	U " or U "	" U
ÿ (Y umlaut)	Y " or Y "	" Y
ß (German sharp S)	ss	
Ø (O slash)	O /	
# (number sign)	+ +	
£ (pound sign)	l - or L - or l = or L =	
¢ (cent sign)	c / or C / or c | or C |	
§ (section sign)	s o or S O or s | or S | or s 0 or S 0	
¶ (paragraph sign)	p ! or P !	
^a (feminine ordinal)	a _ or A _	
^o (masculine ordinal)	o _ or O _	
¥ (yen sign)	y - or Y - or y = or Y =	
^ (circumflex)	^ Space	^ Space
[(open bracket)	((
] (close bracket)))	
{ (open brace)	(-	
} (close brace))-	
apostrophe (apostrophe)	apostrophe Space	apostrophe Space
@ (at sign)	aa or AA	
\ (back slash)	// or / <	
| (vertical bar)	/ ^	
~ (tilde)	~ Space	~ Space
© (copyright sign)	c o or C O or c 0 or C 0	
µ (micro sign)	/ u or / U	

Multinational Keystroke Sequences

Composite Character	Multinational and National Character Set Modes	National Character Set Mode
¿ (inverted ?)	??	
± (plus/minus sign)	+ -	
” (right angle quotation)	>>	
“ (left angle quotation)	<<	
apostrophe (single quote)	apostrophe Space	apostrophe Space
° (degree sign)	0 ^ or Space # or Space o	° Space
" (quotation mark)	" Space	" Space
¡ (inverted !)	!!	
· (middle dot)	. ^	
¹ (superscript 1)	1 ^	
² (superscript 2)	2 ^	
³ (superscript 3)	3 ^	
½ (one half)	1 2	
¼ (one fourth)	1 4	
¤ (currency sign)	x o or X O or x 0 or X 0	
UK keyboard £	| - or L - or | = or L =	
French Canadian keyboard à â ç ê î ô ù û	' a ^ a , c ^ e ^ i ^ o ' u ^ u	' a ^ a ^ e ^ i ^ o ' u ^ u
German keyboard Ä Ü ä ü	" A " U " a " u	
Italian keyboard £ § à ç é	- L or - l or = L or = l ! s or ! S or o s or o S or O s or O S or 0 S ' a , c ' e	

Appendix F. ASCII Codes

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	'	p		DCS		°	À		à	
1	SOH	DC1	!	1	A	Q	a	q		PU1	/	±	Á	Ñ	á	ñ
2	STX	DC2	"	2	B	R	b	r		PU2	¢	²	Â	Ò	â	ò
3	ETX	DC3	#	3	C	S	c	s		STS	£	³	Ã	Ó	ã	ó
4	EOT	DC4	\$	4	D	T	d	t	IND	CCH			Ä	Ô	ä	ô
5	ENQ	NAK	%	5	E	U	e	u	NEL	MW	¥	µ	Æ	Ö	æ	ö
6	ACK	SYN	&	6	F	V	f	v	SSA	SPA		¶	Å	Õ	æ	ö
7	BEL	ETB	'	7	G	W	g	w	ESA	EPA	§	·	Ç	Œ	ç	œ
8	BS	CAN	(	8	H	X	h	x	HTS		¤		É	Ø	è	ø
9	HT	EM	)	9	I	Y	i	y	HTJ		©	'	È	Ù	é	ù
A	LF	SUB	*	:	J	Z	j	z	VTS			°	Ê	Ú	ê	ú
B	VT	ESC	+	;	K	[	k	{	PLD	CSI	«	»	Ë	Û	ë	û
C	FF	FS	,	<	L	\	l	|	PLU	ST		¼	Ì	Ü	ì	ü
D	CR	GS	-	=	M	]	m	]	RI	OSC		½	Í	Ý	í	ÿ
E	SO	RS	.	>	N	^	n	~	SS2	PM			Î		î	
F	SI	US	/	?	O	_	o	DEL	SS3	APC		¿	Ï	ß	ï	

Control Character Representations

Mnemonic	Meaning	Displayed Character in Monitor Mode	Keyboard Code
NUL	Null	NL	CTRL @
SOH	Start of header	S _H	CTRL A
STX	Start of text	S _X	CTRL B
ETX	End of text	E _X	CTRL C
EOT	End of transmission	E _T	CTRL D
ENQ	Enquiry	E _Q	CTRL E
ACK	Acknowledge	A _K	CTRL F
BEL	Bell	B _L	CTRL G
BS	Backspace	B _S	CTRL H
HT	Horizontal tab	H _T	CTRL I

ASCII Codes

Mnemonic	Meaning	Displayed Character in Monitor Mode	Keyboard Code
LF	Line feed	L _F	CTRL J
VT	Vertical tab	V _T	CTRL K
FF	Form feed	F _F	CTRL L
CR	Carriage return	C _R	CTRL M
SO	Shift out	S _O	CTRL N
SI	Shift in	S _I	CTRL O
DLE	Data link escape	D _L	CTRL P
DC1	Device Control 1	D ₁	CTRL Q
DC2	Device Control 2	D ₂	CTRL R
DC3	Device Control 3	D ₃	CTRL S
DC4	Device Control 4	D ₄	CTRL T
NAK	Negative acknowledge	N _K	CTRL U
SYN	Synchronous	S _N	CTRL V
ETB	End of transmission block	E _B	CTRL W
CAN	Cancel	C _N	CTRL X
EM	End of medium	E _M	CTRL Y
SUB	Substitute	?	CTRL Z
ESC	Escape	E _C	CTRL [
FS	File separator	F _S	CTRL \
GS	Group separator	G _S	CTRL]
RS	Record separator	R _S	CTRL ^
US	Unit separator	U _S	CTRL -
DEL	Delete	␣	

Appendix G. Row/Column ASCII Codes

Row/Column	ASCII Code	Row/Column	ASCII Code	Row/Column	ASCII Code
1	Space	33	@	65	'
2	!	34	A	66	a
3	"	35	B	67	b
4	#	36	C	68	c
5	\$	37	D	69	d
6	%	38	E	70	e
7	&	39	F	71	f
8	'	40	G	72	g
9	(	41	H	73	h
10	)	42	I	74	i
11	*	43	J	75	j
12	+	44	K	76	k
13	,	45	L	77	l
14	-	46	M	78	m
15	.	47	N	79	n
16	/	48	O	80	o
17	0	49	P	81	p
18	1	50	Q	82	q
19	2	51	R	83	r
20	3	52	S	84	s
21	4	53	T	85	t
22	5	54	U	86	u
23	6	55	V	87	v
24	7	56	W	88	w
25	8	57	X	89	x
26	9	58	Y	90	y
27	:	59	Z	91	z
28	;	60	[	92	{
29	<	61	\	93	|
30	=	62	]	94	}
31	>	63	^	95	~
32	?	64	-	96	DEL/RUB

Appendix H. Special Key Defaults

This appendix lists the function, arrow, numeric keypad, and edit key defaults for the IBM 3151/3161, Wyse 50/50+/60, and DEC terminals. See “Emulation-Dependent Key Functions” on Page 4-3 for additional information.

IBM 3151/3161 Emulations

The following table describes the function, edit, arrow, and numeric keypad defaults for the IBM 3151/3161 terminal.

Key	Unshifted	Shifted	Ctrl	Ctrl/Shift
F1	ESC a LTA	ESC ! a LTA		ESC " a LTA
F2	ESC b LTA	ESC ! b LTA		ESC " b LTA
F3	ESC c LTA	ESC ! c LTA		ESC " c LTA
F4	ESC d LTA	ESC ! d LTA		ESC " d LTA
F5	ESC e LTA	ESC ! e LTA		ESC " e LTA
F6	ESC f LTA	ESC ! f LTA		ESC " f LTA
F7	ESC g LTA	ESC ! g LTA		ESC " g LTA
F8	ESC h LTA	ESC ! h LTA		ESC " h LTA
F9	ESC i LTA	ESC ! i LTA		ESC " i LTA
F10	ESC j LTA	ESC ! j LTA		ESC " j LTA
F11	ESC k LTA	ESC ! k LTA		ESC " k LTA
F12	ESC l LTA	ESC ! l LTA		ESC " l LTA
ESC	ESC	ESC		
Print	Local Print	Local Print	Toggle Trace	Toggle Trace
PrintLine	Print Line	Print Line	Print Msg	Print Msg
Hold	Screen Hold	Screen Hold	Break	
Insert	Toggle Insert	Toggle Insert	ESC N	ESC N
Home	ESC H	ESC H	DEL	DEL
Clear	ESC L LTA	ESC L LTA	ESC K	ESC K
Delete	ESC Q	ESC Q	ESC O	ESC O
← Tab	ESC 2	ESC 2		
Erase EOF	ESC I	ESC I	ESC J	ESC J
Up Arrow	ESC A	ESC A		

Special Key Defaults

Key	Unshifted	Shifted	Ctrl	Ctrl/Shift
Dn Arrow	ESC B	ESC B		
→ Arrow	ESC C	ESC C		
← Arrow	ESC D	ESC D		
Tab	HT	ESC 2		
Backspace	BS	BS	Line Draw	Line Draw
Return	CR	CR	LF	LF
Reset	Reset	Reset	Cancel	Cancel
Send	ESC 8 LTA	ESC 8 LTA		
Jump	ESC " A	ESC " A		
Send Line	ESC ! 8 LTA	ESC ! 8 LTA	ESC space 8 LTA	ESC space 8 LTA
Setup			Enter Setup	
Enter	CR	CR		

Keypad Keys

Key	Unshifted		Shifted		Ctrl	Ctrl/Shift
	Norm	Line Draw (Hex)	Norm	Line Draw (Hex)		
0	0	BD	0	BC		
1	1	ED	1	FC	ESC ! m LTA	ESC ! m LTA
2	2	F6	2	F2	ESC ! n LTA	ESC ! n LTA
3	3	EA	3	FB	ESC ! o LTA	ESC ! o LTA
4	4	F4	4	EF	Subscript	Subscript
5	5	EE	5	FE		
6	6	F5	6	F5		
7	7	EC	7	FD	Superscript	Superscript
8	8	F7	8	F3	Cursor Style	Cursor Style
9	9	EB	9	FA	Status Disp	Status Disp
.	.	BF	.	BE		
–	–		–		Local/Online	Local/Online
,	,	F1	,	F8		

Wyse Emulations

The following table describes the ASCII keyboard function, editing, and special key defaults for the Wyse 50/50+/60 terminals and the 1151's emulation.

ASCII Key	EPC Key	Default Codes	Hexadecimal Values
F1	F1	SOH @ CR	01 40 0D
F2	F2	SOH A CR	01 41 0D
F3	F3	SOH B CR	01 42 0D
F4	F4	SOH C CR	01 43 0D
F5	F5	SOH D CR	01 44 0D
F6	F6	SOH E CR	01 45 0D
F7	F7	SOH F CR	01 46 0D
F8	F8	SOH G CR	01 47 0D
F9	F9	SOH H CR	01 48 0D
F10	F10	SOH I CR	01 49 0D
F11	F11	SOH J CR	01 4A 0D
F12	F12	SOH K CR	01 4B 0D
F13	not supported	SOH L CR	01 4C 0D
F14	not supported	SOH M CR	01 4D 0D
F15	not supported	SOH N CR	01 4E 0D
F16	not supported	SOH O CR	01 4F 0D
SHIFT F1	SHIFT F1	SOH ' CR	01 60 0D
SHIFT F2	SHIFT F2	SOH a CR	01 61 0D
SHIFT F3	SHIFT F3	SOH b CR	01 62 0D
SHIFT F4	SHIFT F4	SOH c CR	01 63 0D
SHIFT F5	SHIFT F5	SOH d CR	01 64 0D
SHIFT F6	SHIFT F6	SOH e CR	01 65 0D
SHIFT F7	SHIFT F7	SOH f CR	01 66 0D
SHIFT F8	SHIFT F8	SOH g CR	01 67 0D
SHIFT F9	SHIFT F9	SOH h CR	01 68 0D
SHIFT F10	SHIFT F10	SOH i CR	01 69 0D
SHIFT F11	SHIFT F11	SOH j CR	01 6A 0D
SHIFT F12	SHIFT F12	SOH k CR	01 6B 0D

Special Key Defaults

ASCII Key	EPC Key	Default Codes	Hexadecimal Values
SHIFT F13	not supported	SOH I CR	01 6C 0D
SHIFT F14	not supported	SOH m CR	01 6D 0D
SHIFT F15	not supported	SOH n CR	01 6E 0D
SHIFT F16	not supported	SOH o CR	01 6F 0D
Esc	Esc	ESC (CTRL [)	1B
Backspace	SHIFT Backspace	BS (CTRL H)	08
Del	Backspace	DEL	7F
Tab	Tab	HT (CTRL I)	09
SHIFT Tab	SHIFT Tab	ESC I	1B 49
Send	not supported	ESC 7	1B 37
Print	Print Scrn	ESC P	1B 50
PAGE Next	Page Down	ESC K	1B 4B
PAGE Prev	Page Up	ESC J	1B 4A
Home	Home	RS (CTRL ^)	1E
SHIFT Home	SHIFT Home	ESC {	1B 7B
INS Char	not supported	ESC Q	1B 51
INS Line	not supported	ESC E	1B 45
DEL Char	Delete	ESC W	1B 57
DEL Line	SHIFT Delete	ESC R	1B 52
CLR Line	End	ESC T	1B 54
CLR Scrn	SHIFT End	ESC Y	1B 59
Repl	SHIFT Insert	ESC r	1B 72
Ins	Insert	ESC q	1B 71
Up Arrow	Up Arow	CTRL K	0B
Down Arrow	Down Arrow	CTRL J	0A
Right Arrow	Right Arrow	CTRL L	0C
Left Arrow	Left Arrow	CTRL H	08
Return	← Enter (Return)	CR (CTRL M)	0D
Enter	Enter	CR (CTRL M)	0D

Note: There are setup options that affect the codes sent by the Backspace/Shift Backspace, Return, and Enter keys.

DEC Emulations

The following tables describe the defaults for the editing and special function keys, the cursor keys and numeric keypad keys in Application mode, the PF keys, and the function keys.

Editing and Special Key Codes

ANSI Key	EPC Key	VT220-7	VT220-8	VT100	VT52
Up Arrow	Up Arrow	ESC [A	csi A	ESC [A	ESC A
Down Arrow	Down Arrow	ESC [B	csi B	ESC [B	ESC B
Right Arrow	Right Arrow	ESC [C	csi C	ESC [C	ESC C
Left Arrow	Left Arrow	ESC [D	csi D	ESC [D	ESC D
< X]	Backspace	DEL	DEL	DEL	DEL
Find	Insert	ESC [1 ~	csi 1 ~		
Insert Here	Home	ESC [2 ~	csi 2 ~		
Remove	Page Up	ESC [3 ~	csi 3 ~		
Select	Delete	ESC [4 ~	csi 4 ~		
Prev Screen	End	ESC [5 ~	csi 5 ~		
Next Screen	Page Down	ESC [6 ~	csi 6 ~		
Tab	Tab	HT	HT	HT	HT
SHIFT Tab	SHIFT Tab	ESC [Z	csi Z	ESC [Z	HT
Return	← Enter	CR	CR	CR	CR

Cursor Key Application Mode Codes

ANSI Key	EPC Key	VT220-7	VT220-8	VT100	VT52
Up Arrow	Up Arrow	ESC O A	SS3 A	ESC O A	
Down Arrow	Down Arrow	ESC O B	SS3 B	ESC O B	
Right Arrow	Right Arrow	ESC O C	SS3 C	ESC O C	
Left Arrow	Left Arrow	ESC O D	SS3 D	ESC O D	

Special Key Defaults

Numeric Keypad Application Mode Codes

ANSI Key	EPC Key	VT220-7	VT220-8	VT100	VT52
–	–	ESC O m	SS3 m	ESC O m	ESC ? m
,	*	ESC O l	SS3 l	ESC O l	ESC ? l
.	.	ESC O n	SS3 n	ESC O n	ESC ? n
0	0	ESC O p	SS3 p	ESC O p	ESC ? p
1	1	ESC O q	SS3 q	ESC O q	ESC ? q
2	2	ESC O r	SS3 r	ESC O r	ESC ? r
3	3	ESC O s	SS3 s	ESC O s	ESC ? s
4	4	ESC O t	SS3 t	ESC O t	ESC ? t
5	5	ESC O u	SS3 u	ESC O u	ESC ? u
6	6	ESC O v	SS3 v	ESC O v	ESC ? v
7	7	ESC O w	SS3 w	ESC O w	ESC ? w
8	8	ESC O x	SS3 x	ESC O x	ESC ? x
9	9	ESC O y	SS3 y	ESC O y	ESC ? y
Enter	Enter	ESC O M	SS3 M	ESC O M	ESC ? M

Note: In numeric mode, these keys generate a keycode that matches the character on the keycap; Enter sends a CR, CRLF, or +, depending on the value(s) selected in Setup.

PF Key Codes

ANSI Key	EPC Key	VT220-7	VT220-8	VT100	VT52
PF1	F1	ESC O P	SS3 P	ESC O P	ESC P
PF2	F2	ESC O Q	SS3 Q	ESC O Q	ESC Q
PF3	F3	ESC O R	SS3 R	ESC O R	ESC R
PF4	F4	ESC O S	SS3 S	ESC O S	ESC S
	SHIFT F1	ESC O T	SS3 T	ESC O T	ESC T
	SHIFT F2	ESC O U	SS3 U	ESC O U	ESC U
	SHIFT F3	ESC O V	SS3 V	ESC O V	ESC V
	SHIFT F4	ESC O W	SS3 W	ESC O W	ESC W

Function Key Default Codes

ANSI Key	EPC Key	VT220-7	VT220-8	VT100	VT52
	F5	ESC [16 ~	csi 16 ~		
F6	F6	ESC [17 ~	csi 17 ~		
F7	F7	ESC [18 ~	csi 18 ~		
F8	F8	ESC [19 ~	csi 19 ~		
F9	F9	ESC [20 ~	csi 20 ~		
F10	F10	ESC [21 ~	csi 21 ~		
F11	F11	ESC [23 ~	csi 23 ~		
F12	F12	ECS [24 ~	csi 24 ~		
F13	n/a	ESC [25 ~	csi 25 ~		
F14	n/a	ESC [26 ~	csi 26 ~		
Help	n/a	ESC [28 ~	csi 28 ~		
Do	n/a	ESC [29 ~	csi 29 ~		
F17	n/a	ESC [31 ~	csi 31 ~		
F18	n/a	ESC [32 ~	csi 32 ~		
F19	n/a	ESC [33 ~	csi 33 ~		
F20	n/a	ESC [34 ~	csi 34 ~		

Note: Function keys send no default codes for VT100 and VT52 modes. Shifted function keys send no default codes in any ANSI mode. F1 through F4 on the EPC keyboard function as PF1 through PF4 keys. Both shifted and unshifted function keys can be reprogrammed. Reprogrammed function keys transmit the reprogrammed codes in all ANSI modes.

Symbols

80/132 Clear option, 3-15

A

ASCII codes

Characters, F-1

Row/column, G-1

Attribute option, 3-19

Auto Answerback option, 3-28

Auto Font Load option, 3-20

Auto Page Option, 3-7

Auto Scroll option, 3-7

Auto Wrap option, 3-7

Aux Baud option, 3-12

Aux Data/Parity option, 3-13

Aux Interface option, 3-14

Aux Rcv Hndsk option, 3-13

Aux Stop Bits option, 3-13

Aux Xmt Hndsk option, 3-14

B

Back Space Key option, 3-22

Background option, 3-18

Baud rate, setting, 3-10, 3-12

Bell

Margin, enabling, 3-8

Sound, setting, 3-8

Warning, enabling, 3-8

Block communication mode, 3-12

Block mode terminator, 3-8

Break option, 3-23

Brightness Control, 3-2

C

Char Mode option, 3-26

Character mode, selecting, 3-26

Character set, loading, 3-20

Columns option, 3-15

Comm Mode option, 3-12

Communication mode, selecting, 3-12

Connectors

Keyboard, 2-1, 2-3

Parallel port, 2-1

Power, 2-1

Serial ports, 2-1

Contrast control, 3-2

Control codes, displaying, 3-9

Control commands

IBM 3151 emulation, D-1

IBM 3161 emulation, D-1

PC Term emulation, C-1

VT100 commands, B-2

VT220 commands, B-6

VT52 emulation, B-1

Wyse emulation, A-1

Controls

Brightness, 3-2

Contrast, 3-2

Power-On/Off, 3-2

Cursor Keys option, 3-26

Cursor option, 3-18

Cursor Style option, 3-18

D

Data format, selecting, 3-10, 3-13

Defaults, Setup, 3-3

Disconnect option, 3-12

Display emulation, selecting, 3-5

Dual sessions, configuring for, 3-6

E

Emulation, identifying, 4-1

Emulation option, 3-5

Emulations supported, 1-1

Enhancements option, 3-6

Enter Key option, 3-22

Enter option, 3-30

Escape sequences, displaying, 3-9

F

Feature Lock option, 3-25

FKey Lock option, 3-25

FKey Xmt Limit option, 3-24

Full-duplex, 3-12

Function keys, defining, 3-33

H

Half-block, 3-12

Half-duplex, 3-12

Handshaking protocol, selecting, 3-11, 3-13

Help, 5-1

Index

I

IBM 3151 emulation, 3-5
IBM 3161 emulation, 3-5
Ignore 8th Bit option, 3-11
Insert option, 3-31

K

Key Click option, 3-21
Key Code option, 3-24
Key Lock option, 3-22
Key Repeat option, 3-21
Keyboard
 Connector, 2-1, 2-3
 Local commands, 4-2
Keyboards supported, 1-2
KeyPad option, 3-26
Keys
 3151/3161 functions, 4-3
 Alt, left, 3-23
 Arrow, 3-26
 Backspace, 3-22
 Break, 3-23
 Compose, 4-5
 DEC VT 52/100/220 functions, 4-4
 Emulation dependent, 4-3
 Enter, 3-22
 Function, 3-25, 3-32
 Redefining, A-6
 Return, 3-22
 Wyse 50/50+/60 functions, 4-5
Keys option, 3-26

L

Left Alt Key option, 3-23
Lines option, 3-16
Local communication mode, 3-12
Local keyboard print command, 4-7

M

Main Baud option, 3-10
Main Data/Parity option, 3-10
Main Rcv Hndsk option, 3-11
Main Stop Bits option, 3-11
Main Xmt Hndsk option, 3-11
Maintenance, 5-1
Memory, selecting pages of, 3-16
Monitor Mode option, 3-9
Multinational characters, E-1

P

Pages option, 3-16
Parity, selecting, 3-10, 3-13
PC Term emulation, 3-5
Ports
 Location of, 2-1
 Parallel, 2-3
 Serial, auxiliary, 2-2
 Serial, main, 2-2
Ports, serial, changing, 3-4
Pound Char option, 3-20
Power-On/Off switch, 3-2
Powering on, 4-1
Print Area option, 3-28
Print commands
 All emulations, 4-7
 Local keyboard, 4-7
 Wyse emulation, A-18
Print EOL option, 3-31
Print Line End option, 3-31
Print Mode option, 3-28
Print NULL option, 3-31
Print option, 3-30
Print setup option, 3-27
Print Term option, 3-28
Printer
 Ownership, 4-7
 Port, selecting, 3-14
Printer option, 3-14

R

Received CR option, 3-7
Refresh Rate option, 3-20
Return Key option, 3-22
Return option, 3-30
Row/column ASCII codes, G-1

S

Screen, default format, 4-6
Screen Saver option, 3-18
Screen size
 Columns, 3-15
 Lines, 3-16
Screens
 ANSI Setup, 3-25
 Answerback Setup, 3-35
 Communications Setup, 3-10
 Display Setup, 3-15

Screens, continued

- Function Keys Setup, 3-32
- General Setup, 3-5
- IBM Setup, 3-29
- Keyboard Setup, 3-21
- Tabs Setup, 3-34
- Scroll rate, selecting, 3-6
- Send ACK option, 3-9
- Send Area option, 3-27
- Send NULL option, 3-30
- Send option, 3-27
- Send Term option, 3-28
- Serial ports, changing, 3-4
- Setup mode
 - 80/132 Clear, 3-15
 - Attribute, 3-19
 - Auto Answerback, 3-28
 - Auto Font Load, 3-20
 - Auto Page, 3-7
 - Auto Scroll, 3-7
 - Auto Wrap, 3-7
 - Aux Baud, 3-12
 - Aux Data/Parity, 3-13
 - Aux Interface, 3-14
 - Aux Rcv Hndsk, 3-13
 - Aux Stop Bits, 3-13
 - Aux Xmt Hndsk, 3-14
 - Back Space Key, 3-22
 - Background, 3-18
 - Bell Sound, 3-8
 - Block Terminator, 3-8
 - Break, 3-23
 - Char Mode, 3-26
 - Columns, 3-15
 - Comm Mode, 3-12
 - Cursor, 3-18
 - Cursor Keys, 3-26
 - Cursor Style, 3-18
 - Defaults, 3-3
 - Disconnect, 3-12
 - Emulation, 3-5
 - Enhancements, 3-6
 - Enter, 3-30
 - Enter Key, 3-22
 - Entering, 3-3
 - entering, 3-3
 - Feature Lock, 3-25
 - FKey Lock, 3-25
 - FKey Xmt Limit, 3-24
 - Insert, 3-31
 - Key Click, 3-21
 - Key Code, 3-24

Setup mode, continued

- Key Lock, 3-22
- Key Repeat, 3-21
- KeyPad, 3-26
- Leaving, 3-4
- Left Alt Key, 3-23
- Lines, 3-16
- Main Baud, 3-10
- Main Data/Parity, 3-10
- Main Rcv Hndsk, 3-11
- Main Stop Bits, 3-11
- Main Xmt Hndsk, 3-11
- Margin Bell, 3-8
- Monitor Mode, 3-9
- Pages, 3-16
- Pound Char, 3-20
- Print, 3-27, 3-30
- Print Area, 3-28
- Print EOL, 3-31
- Print Line End, 3-31
- Print Mode, 3-28
- Print NULL, 3-31
- Print Term, 3-28
- Printer, 3-14
- Received CR, 3-7
- Refresh Rate, 3-20
- Return, 3-30
- Return Key, 3-22
- Saving parameters, 3-4
- Screen Saver, 3-18
- scroll, 3-3
- Scroll Style, 3-6
- Send, 3-27
- Send ACK, 3-9
- Send Area, 3-27
- Send NULL, 3-30
- Send Term, 3-28
- Tab, 3-30
- Turn Around, 3-29
- Using screens, 3-3
- Virtual Terminal, 3-6
- VT100 ID, 3-27
- Warning Bell, 3-8
- Wprt Intensity, 3-19
- Wprt Reverse, 3-19
- Wprt Underline, 3-19
- Xfer Term, 3-26
- Xmt Limit, 3-24
- Setup modes, keys, 3-26
- Status line
 - Indicators, 3-36
 - Selecting, 3-17

Index

Stop bits, selecting number of, 3-11, 3-13
Systems supported, 1-1

T

Tab option, 3-30
Tabs, setting up, 3-34
Turn Around option, 3-29

V

Virtual Terminal mode, 4-6
Virtual Terminal option, 3-6
VT100 emulation, 3-5
VT100 ID mode, 3-27
VT200 emulation, 3-5
VT52 emulation, 3-5

W

Wprt Intensity option, 3-19
Wprt Reverse option, 3-19
Wprt Underline option, 3-19
Write-protected characters
 Intensity of, setting, 3-19
 Reverse video, 3-19
 Underlining, 3-19
Wyse 50/50+ emulation, 3-5
Wyse 60 emulation, 3-5

X

Xfer Term option, 3-26
Xmit Limit option, 3-24