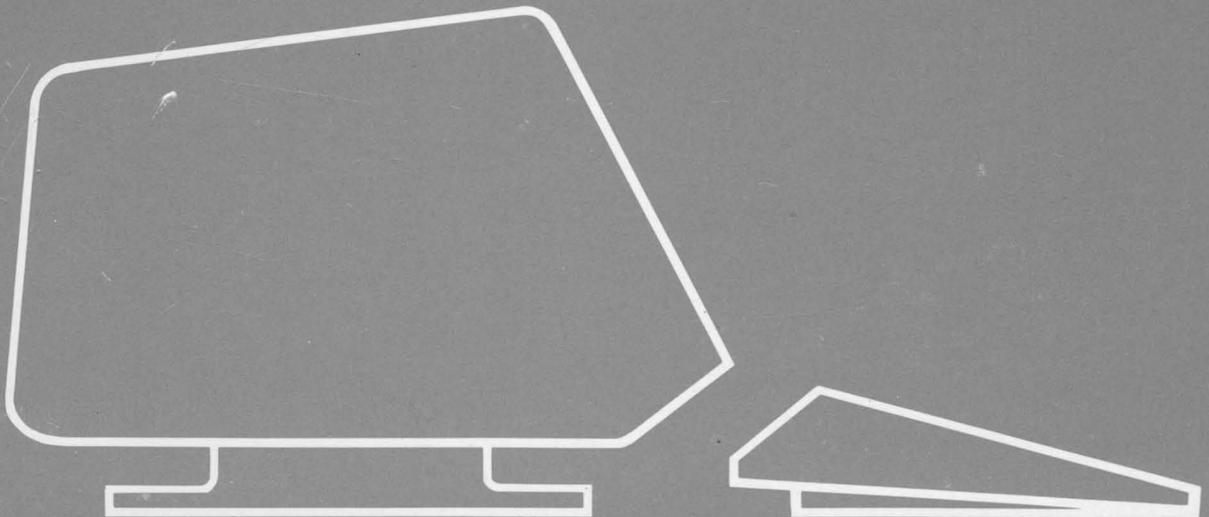


VISUAL

See for yourself

REFERENCE MANUAL

VISUAL 50/55



WARNING

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

Class A Label

V50/55
REFERENCE MANUAL

This manual is for two terminals developed by Visual Technology, the Visual 50 and the Visual 55. Shaded areas in this manual apply only to the Visual 55.

April 1983

SAFETY WARNING

Hazardous voltages 115, 220 VAC and 15 KV DC are present when the terminal is on, and may remain after power is removed. Use caution when working on internal circuits, and do not work alone.

When handling the cathode ray tube caution is required as the internal phosphor is toxic. Safety goggles and gloves must be used whenever the CRT tube is handled. Should the tube break, skin or eyes exposed to the phosphor, rinse the affected area with cold water and consult a physician.

This terminal is supplied with a cord set which includes a safety ground. Do not use this terminal with an ungrounded outlet, missing ground pin, or use any adaptor which will defeat the safety ground.

Insure that power is turned off before connecting or disconnecting the keyboard cable.

This manual is published and distributed by Visual Technology Inc. Every effort has been exercised to insure its accuracy and completeness. The contents are subject to change without notice and this manual may not reflect the latest changes. Consult the sales department for latest changes.

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1-1
1.1 COMMONLY USED TERMS	1-1
2. SPECIFICATIONS	2-1
3. START-UP PROCEDURES	3-1
3.1 UNPACKING INSTRUCTIONS	3-1
3.2 INSTALLATION	3-1
3.3 INTERFACE OPTIONS	3-2
3.3.1 Data Connectors	3-2
3.4 WORD LENGTH AND PARITY	3-2
3.5 SET-UP MODE	3-3
3.6 HOW TO ENTER BASIC SET-UP MODE; V50	3-3
3.6.1 How to Enter Basic Set-Up Mode; V55	3-3
3.7 HOW TO CHANGE BASIC SET-UP FEATURES	3-4
3.7.1 Line/Local/Line Md	3-4
3.7.2 Block/Character Mode	3-5
3.7.3 Protect/Unprotected Mode	3-5
3.7.4 Click/Silent Mode	3-5
3.7.5 Normal/Reserve	3-5
3.7.6 Jump/Smooth	3-5
3.7.7 Reset	3-5
3.7.8 Menus	3-5
3.7.9 Tabs	3-6
3.7.10 Answerback	3-7
3.7.11 Firmware Revision	3-8
3.8 HOW TO ENTER MENU SET-UP MODE	3-8
3.9 HOW TO CHANGE MENU SET-UP FEATURES	3-8
3.9.1 Menu #1	3-8
3.9.1.1 Emulation	3-9
3.9.1.2 Wrap Md	3-9
3.9.1.3 Scri/Page	3-9
3.9.1.4 Monitor Md	3-9
3.9.1.5 Tab Md	3-9
3.9.1.6 Auto LF/CR	3-10
3.9.1.7 Auto Wrap	3-10
3.9.1.8 Lead In	3-10
3.9.1.9 Language	3-10
3.9.1.10 Space/Adv	3-10
3.9.2 Select Menu #2	3-11
3.9.2.1 Xmt Rate	3-11
3.9.2.2 Recv Rate	3-11

TABLE OF CONTENTS – Continued

	Page
3.9.2.3 Stop Bits	3-11
3.9.2.4 Par Enbl	3-11
3.9.2.5 Par Sense	3-12
3.9.2.6 Data Ln/MSB	3-12
3.9.2.7 Duplex	3-12
3.9.2.8 EOM Char TACC	3-12
3.9.2.9 Bot Line MD	3-12
3.9.2.10 Xon/Xoff	3-12
3.9.2.11 Local Echo	3-12
3.9.2.12 EIA/CL	3-13
3.9.3 Menu #3	3-13
3.9.3.1 Cursor Type	3-13
3.9.3.2 Cursor Blink	3-13
3.9.3.3 Margin Bell	3-13
3.9.3.4 Refresh Rt	3-13
3.9.3.5 Scn Clear Dis	3-14
3.9.3.6 Kbd Lock Dis	3-14
3.9.3.7 Status Line	3-14
3.9.4 Program Message Framing Codes, Menu #4-V55	3-14
3.9.5 Program Function Keys, Menu #5 – V55	3-15
3.9.5.1 Limitations of the Programmable Function Keys	3-16
3.9.5.2 How to Program the Function Keys	3-16
3.9.5.3 Programmable Function Key Link	3-16
3.9.5.4 Programmable Control Codes	3-16
3.9.5.5 Local Transmit	3-17
3.10 PERFORMING A RECALL OPERATION	3-18
3.11 PERFORMING A SAVE OPERATION	3-18
3.12 SCREEN BRIGHTNESS	3-18
3.12.1 Screen Saver	3-18
4. KEYBOARD CONTROLS	4-1
4.1 GENERAL	4-1
4.2 KEY FUNCTIONS	4-2
4.2.1 Cursor Movement Keys	4-3
4.2.2 Numeric Pad Functions	4-4
4.2.2.1 Set-Up Mode and the Numeric Pad	4-4
4.2.3 Enter Key in Block Mode	4-4
4.2.3.1 XMIT Key in Block Mode	4-4
4.2.4 Function Key Usage	4-4
4.2.5 Numeric Pad Functions	4-5
4.3 FUNCTION KEYS	4-6

TABLE OF CONTENTS – Continued

	Page
5. PROGRAMMING	5-1
5.1 GENERAL	5-1
5.2 LEAD IN	5-1
5.3 EMULATION	5-1
5.4 CURSOR MOVEMENT COMMANDS	5-2
5.4.1 Home Cursor	5-2
5.4.2 Cursor Up	5-2
5.4.3 Cursor Down	5-3
5.4.4 Cursor Right	5-3
5.4.5 Cursor Left	5-3
5.4.6 Reverse Index	5-3
5.4.7 Index	5-4
5.4.8 Cursor Addressing	5-4
5.5 TAB COMMANDS	5-4
5.5.1 Field Tab	5-4
5.5.2 Columnar Tab	5-4
5.5.3 Back Tab	5-5
5.5.4 Tab	5-5
5.5.5 Field Back Tab	5-5
5.5.6 Set Tab	5-5
5.5.7 Clear Tab	5-6
5.5.8 Clear All Tabs	5-6
5.5.9 Field Tab Mode	5-6
5.5.10 Set Columnar Tab Mode	5-6
5.6 CLEAR COMMANDS	5-6
5.6.1 Clear Line	5-7
5.6.2 Clear End of Line	5-7
5.6.3 Clear Page	5-7
5.6.4 Clear End of Page	5-7
5.6.5 Clear End of Page Background	5-8
5.6.6 Clear Field	5-8
5.6.7 Clear Foreground	5-8
5.7 ERASE COMMANDS	5-8
5.7.1 Erase Line	5-8
5.7.2 Erase Page	5-9
5.7.3 Erase to End of Page	5-9
5.7.4 Erase to End of Line	5-9
5.7.5 Erase to End of Field	5-9
5.8 SET VIDEO ATTRIBUTES	5-9
5.8.1 Set Foreground Attribute "X"	5-10
5.8.2 Set Background Attribute "X"	5-10
5.8.3 Set Foreground	5-11
5.8.4 Set Background	5-11

TABLE OF CONTENTS – Continued

	Page
5.9 SELECT VIDEO ATTRIBUTES	5-11
5.9.1 Select Video Attributes	5-12
5.10 MODE COMMANDS	5-12
5.10.1 Protect Mode	5-12
5.10.2 Unprotect Mode	5-12
5.10.3 Graphics Mode	5-13
5.10.4 Monitor Mode	5-14
5.10.5 Display ASCII Pattern	5-14
5.10.6 Display Test Pattern	5-14
5.10.7 Status Line Mode	5-15
5.10.8 Define Scrolling Region	5-15
5.10.9 Origin Mode	5-16
5.10.10 Set Hold Screen	5-16
5.10.10.1 Reset Hold Screen	5-17
5.10.11 Slow Scroll	5-18
5.10.11.1 Security Mode	5-18
5.10.12 Set Modes	5-18
5.10.13 Lock Keyboard	5-19
5.11 EDITING FUNCTION COMMANDS	5-19
5.11.1 Set Insert Character	5-19
5.11.2 Reset Insert Character	5-19
5.11.3 Deleted Character	5-20
5.11.4 Insert Line	5-20
5.11.5 Delete Line	5-20
5.12 READ COMMANDS	5-20
5.12.1 Read Cursor Address	5-20
5.12.2 Read Status	5-21
5.12.2.1 Receiver Baud Rate (Byte 1)	5-21
5.12.2.2 Transmitter Baud Rate (Byte 2)	5-22
5.12.2.3 Parity (Byte 3)	5-22
5.12.2.4 Emulation (Byte 4)	5-22
5.12.2.5 Duplex (Byte 5)	5-22
5.12.2.6 Auto New Line/CR or LF Mode/Scroll (Byte 6)	5-22
5.12.2.7 Foreground Attributes (Byte 7)	5-23
5.12.2.8 Background Attributes (Byte 8)	5-23
5.12.2.9 Cursor Address (Byte 9, 10, 11)	5-23
5.12.3 Read Terminal ID	5-23
5.12.4 Read Character	5-24
5.12.5 Answerback	5-24
5.13 REMOTE PROGRAMMING OF FUNCTION KEYS	5-24
5.13.1 Program Function Key	5-24
5.13.2 Send Data to Host	5-24
5.13.3 Send Data to Screen	5-24
5.13.4 End Programming	5-25

TABLE OF CONTENTS – Continued

	Page
6. DATA TRANSMISSION	6-1
6.1 TRANSMISSION COMMANDS	6-1
6.1.1 Block Mode	6-1
6.1.2 Line Mode Transmission	6-1
6.1.3 Remote Transmit	6-2
6.1.3.1 Remote Page Transmit	6-2
6.1.3.2 Remote Field Transmit	6-2
6.2 MODE COMMANDS	6-2
6.2.1 Batch Mode Transmission	6-3
6.2.2 Page Mode Transmission	6-3
6.2.3 Set Auto Tab	6-3
6.2.4 Reset Auto-Tab	6-4
6.3 AUXILIARY COMMUNICATION PORT	6-4
6.3.1 Aux Port Data Connector	6-4
6.3.2 Aux Key	6-4
6.3.3 Aux Port Enable/Disable	6-5
6.3.4 Aux Port Enable with Display	6-5
6.3.5 Transparent On	6-5
6.3.6 Transparent Off	6-6
6.4 SET MESSAGE FRAMING CODES	6-7
6.4.1 Set Start of Message Code	6-7
6.4.2 Set Field Separator Code	6-7
6.4.3 Set First End of Line Code and Second End of Line Code	6-7
6.4.4 Set First End of Message Code and Second End of Message Code ...	6-8
6.5 COMMUNICATION INTERFACE	6-8
6.6 FULL/HALF DUPLEX MODE	6-9
6.6.1 Secondary Channel Control	6-9
6.6.2 Data Compression	6-9
6.6.2.1 Line Mode	6-9
6.6.2.2 Page Mode	6-9
6.6.2.3 Batch Mode	6-10
6.6.2.4 HZ1500+, Batch Modes	6-10
6.7 XON-XOFF CONTROL	6-10
6.8 ASYNCHRONOUS DATA	6-11
6.9 OPTIONAL CURRENT LOOP INTERFACE	6-12

TABLE OF CONTENTS – Continued

	Page
7. FIRST LEVEL MAINTENANCE	7-1
7.1 GENERAL	7-1
7.2 TOP COVER	7-1
7.2.1 Top Cover Removal	7-1
7.3 PRINTED CIRCUIT BOARD REMOVAL AND INSTALLATION	7-2
7.4 TV MONITOR PCB REMOVAL AND INSTALLATION	7-2
7.5 CRT AND FLYBACK REMOVAL AND INSTALLATION	7-3
7.6 TV MONITOR ADJUSTMENTS	7-3
7.7 110/220 VOLT SELECTION	7-5
APPENDIX I Cursor Address Values	A1-1
APPENDIX II Foreign Code Chart	A2-1
APPENDIX III Numeric Equivalent of ASCII Chart	A3-1
APPENDIX IV Emulation Set-Up Parameters	A4-1
APPENDIX V Summary of Control Codes	A5-1

LIST OF FIGURES

		Page
Figure 3-1	Byte Description	3-2
Figure 3-2	Basic SET-UP Presentation	3-4
Figure 3-3	Tab Set-Up	3-6
Figure 3-4	Answerback Screen Presentation	3-7
Figure 3-5	Screen Presentation Menu #1	3-8
Figure 3-6	Screen Presentation Menu #2	3-11
Figure 3-7	Screen Presentation Menu #3	3-13
Figure 3-8	Program Message Framing Codes Screen Presentation	3-14
Figure 3-9	Programmable Function Keys Default Sequences	3-15
Figure 3-10	Function Key Example	3-17
Figure 4-1	V50 Keyboard Layout	4-1
Figure 4-1.1	V55 Keyboard	4-1
Figure 6-1	Auxiliary Data Paths	6-6
Figure 6-2	Asynchronous Data	6-11
Figure 6-3	Current Loop Connections	6-12
Figure 7-1	Top Cover Removal	7-1
Figure 7-2	PCB Mounting	7-2
Figure 7-3	TV Monitor	7-4
Figure 7-4	110/220 Volt Selection	7-5

LIST OF TABLES

Table 4-1	Codes Generated by Cursor Positioning Keys	4-4
Table 4-2	Keypad Editor Functions	4-6
Table 4-3	Alternate Key Code Transmission	4-7
Table 4-4	Function Key Codes	4-7
Table 4-5	V55 Default Function Key Values	4-8
Table 5-1	Suggested Set-Up Mode Settings	5-2
Table 5-2	Video Attributes	5-10
Table 5-3	Line Drawing Mode Symbol Codes	5-13
Table 5-4	Scrolling Region ASCII Value of R1/R2	5-15
Table 5-5	Read Cursor Address Response	5-21
Table 5-6	Hex Value of Program Key Selection Parameter	5-25
Table 6-1	AUX Port Pin Assignments	6-4
Table 6-2	Main Port Pin Assignments	6-8
Table 7-1	V50/55 Fault Isolation Procedures	7-6

1. INTRODUCTION

The VISUAL 50/55 is a sophisticated microprocessor-based, ASCII asynchronous CRT terminal. The VISUAL 50/55 offers enhanced protocol emulation of the following products:

Dec VT52[®]
ADDS Viewpoint[®]
LSI ADM3A[®]
Hazeltine Esprit[®]
Hazeltine 1500/1510[®]
Visual 200/210

The VISUAL 50/55 delivers the latest advances in technology and human engineering. Its numerous features and enhancements, usually found only in more expensive units, give the VISUAL 50/55 a superior cost/performance rating:

- tilt and swivel screen
- detachable low profile keyboard
- menu style set-up mode
- enhanced protocol emulations
- line drawing graphics
- column and field tabbing
- video attributes
- 25th status line

This manual provides a general description of the features and operation of the V50/55 terminal. All control codes and sequences, as well as protocol differences are discussed in detail. For detailed maintenance information please consult the V50/55 maintenance manual.

1.1 COMMONLY USED TERMS

Lead in Code — The lead in code is the code that introduces all control sequences to the VISUAL 50/55. It is represented in this manual by the symbol **LI**.

Field — A field is defined as a group of contiguous characters. The first foreground character to the first background character is defined as an *unprotected field*. The first background character to the first foreground character is defined as a *protected field*.

Menu — A screen presentation that lists, in a plain English format, the options offered to the user.

Set-up Mode — A state unique to the V50/55, that allows the user to locally select the terminals operating parameters.

25th Status Line — the 25th line of the screen through which the V50/55 firmware displays modes of operation, communication protocols and cursor location to the operator.

Character Mode – A mode of operation by which the V50/55 transmits data a character at a time. Also referred to as conversational or interactive mode.

Block Mode – A mode of operation by which the V50/55 transmits data by either a line, field or page at a time. Also referred to as forms or batch mode.

Foreground Data – Unprotected data that is transmitted in block mode. Destination of a field tab command. Possesses distinct video attributes that can be saved in the non-volatile RAM.

Background Data – Protected data that is *not* transmitted in block mode. Is “skipped” over by a field tab command. Possesses distinct video attributes that can be saved in the non-volatile RAM.

2. SPECIFICATIONS

<i>Display Format</i>	– 25 X 80 characters
<i>Display Memory</i>	– One Page 1920 Characters
<i>CRT Size</i>	– 12" Measured Diagonally
<i>Image Size</i>	– 6" X 9.25" ± .25"
<i>Character Cell Size</i>	– 9 X 12
<i>Character Generation</i>	– Dot Matrix 7 X 9
<i>Screen Attributes</i>	– Normal and Reverse
<i>Video Attributes</i>	– Normal, Blink, Blank, Reverse, Half-intensity, Underline – savable in non-volatile RAM
<i>Logical Attributes</i>	– Foreground/Background
<i>Communication Interface</i>	– RS232C or optional 20MA
<i>Transmission Speed</i>	– 50 to 19.2K Baud Independent transmit and receive rate
<i>Parity</i>	– Odd, even, none, mark, space
<i>Communication Modes</i>	– Full duplex, half duplex, local, character or block.
<i>Message Framing</i>	– User defined: EOM; CR, EOT, SCH, NULL, FEOL, SEOL, FS, FETX, SETX, TACC.
<i>Status Line</i>	– Line/local, keyboard lock, convs/block, row, col, alternate keypad Emulation, insert status
<i>Keyboard</i>	– Detachable 95 key, ASCII compatible, typewriter style, auto repeat, keyclick, "N" rollover, numeric pad, caps lock, sculptured and matted keys. 79 keys on the V50.
<i>Function Keys</i>	– Three alternate keypad modes, 45 code sequences.
<i>Cursor Movement Keys</i>	– Up, down, left, right, home, CR, LF, Tab
<i>Scrolling</i>	– Smooth or jump, up or down split screen
<i>Tabulation</i>	– 80 Programmable stops, left or right, tabbing by field.
<i>Editing Functions</i>	– Insert line, delete line, insert and delete character
<i>Transmission Modes</i>	– Line, field, page, batch, and character
<i>Erase Functions</i>	– All, line, field or page. From cursor location.

- Indicators* – Caps on LED
- Programmable Function Keys* – 48 characters dynamic within 12 function keys.
- Audible Indicators* – User enabled keyclick, tone on receipt of bel code, or at col 72 if enabled.
- Self Test* – Automatic on, power on, audible tone indicates OK
- Character Set* – 128 ASCII Characters, 31 line drawing characters
- Auxiliary Interface* – Printer Port, RS232C
- Cursor* – Blinking or steady, block or underline
- External Controls* – Power on/off switch
Intensity  
savable in non-volatile RAM
- Screen Saver* – Automatic Dimming of CRT after eighteen minutes.

3. START-UP PROCEDURES

This chapter contains the information necessary to unpack, install and set up the VISUAL 50 terminal.

3.1 UNPACKING INSTRUCTIONS

The VISUAL 50/55 is packed in a reinforced carton containing the following items:

- Monitor
- Keyboard
- AC Power Cord
- Keyboard Cable
- Reference Manual
- Terminal Set-up Guide

Consult the Terminal Set-up Guide for unpacking instructions.

3.2 INSTALLATION

Refer to Chapter 2 specifications for external dimensions and environmental considerations.

- a. Place the monitor on a level surface. A desk or table is satisfactory. However, most operators prefer a lower surface such as a typewriter stand.
- b. Connect the keyboard to the monitor using the coiled cable provided.

WARNING

The VISUAL 50/55 can be wired for 120/240 VAC and 50/60 Hz power. The V50/55 Maintenance Manual details the conversion steps for each.

- c. Plug the terminal into a compatible ac power source.
- d. Power on the terminal.
- e. The terminal will perform initial power on tests. A successful power on test will be indicated by a short audible tone. If the power on tests are unsuccessful refer to the V50/55 Maintenance Manual.

3.3 INTERFACE OPTIONS

The VISUAL 50/55 is designed to exchange data through several approved hardware protocols.

- RS232-CCITT
- Passive Current Loop (Optional)
- Bell 202 Interface

The appropriate interface protocol is selected via a menu set-up mode.

3.3.1 Data Connectors

Data connections to the VISUAL 50/55 are provided through two female 25 pin EIA connectors located on the rear of the terminal. The pin definitions of these connectors are summarized in Table 6-1.

The connector labeled model is for connection to the host or data set.

The connector labeled aux port is for connection to an external device under the V50/55 control, such as a printer.

3.4 WORD LENGTH AND PARITY

The VISUAL 50/55 may be configured to 7 or 8 bit ASCII code and mark, space, odd, even or no parity. The byte description for each configuration is shown in Figure 3-1.

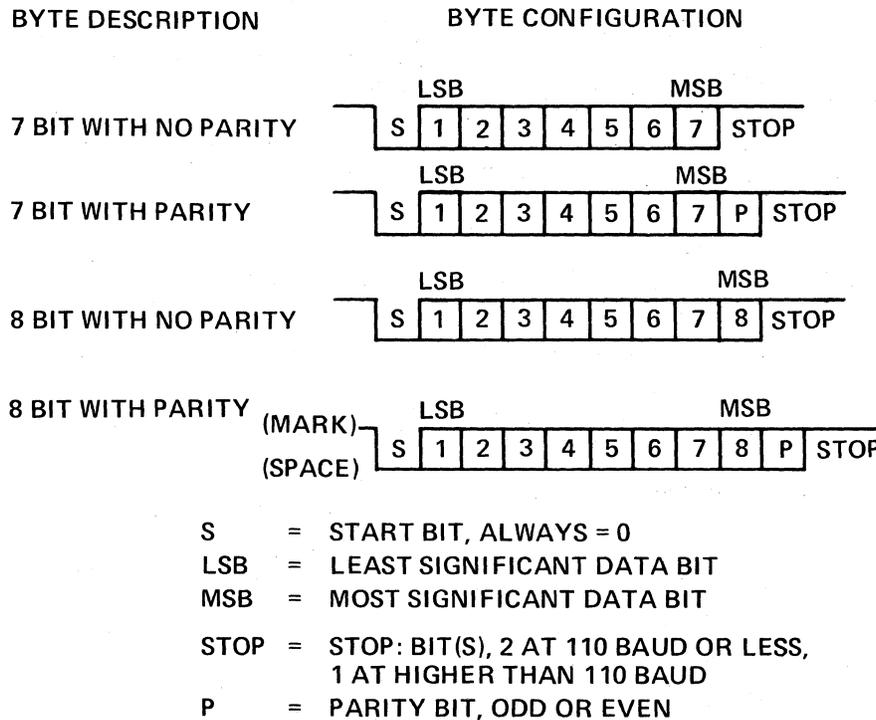


Figure 3-1. Byte Description

3.5 SET UP MODE

The VISUAL 50/55 employs a sophisticated, easy to use MENU-STYLE parameter selection method that allows the user to define the terminals' characteristics from the keyboard in single keystrokes. The terminals' features and modes are selected and stored in a special mode called set-up mode.

Terminal features and modes are stored (remembered) in a non-volatile ram memory. Once the desired parameters have been selected the terminal will function per the new configuration. The new configuration will be considered temporary, unless a SAVE operation is performed, and a subsequent RECALL or POWER ON operation will return the terminal to the previously saved characteristics. If the SAVE operation is performed, the new configuration is considered permanent and will be recalled on subsequent RECALL or POWER UP operations. A RECALL operation will set the terminal parameters to the previously saved state.

Set-Up mode is divided into two groups, Basic and Menu Set-Up modes.

In the Basic Set-Up mode the user selects status line modes, columnar tab stops, answer back message, reset function or menu mode. Each Basic Set-Up Mode feature is described in Section 3.7.

In Menu Set-Up mode the user selects one of three (Five) programming menus.

Each menu set-up mode is described in Section 3.9.

3.6 HOW TO ENTER BASIC SET-UP MODE; V50

BASIC SET-UP MODE is entered by depressing the **FUNCTION** and **SET-UP** keys simultaneously on the keyboard. When the BASIC SET-UP MODE is entered, the screen displays a presentation as shown in Figure 3-2. Subsequent depressions of the **FUNCTION** AND **SET-UP** keys simultaneously causes the VISUAL 50 to alternately exit and enter BASIC SET-UP MODE.

3.6.1 How to Enter Basic Set-Up Mode; V55

Basic Set-Up Mode is entered by depressing the **SET-UP** key on the keyboard. When Basic Set-Up Mode is entered, the screen displays a presentation as shown in Figure 3-2. To exit a set-up mode, depress the **SET-UP** key.

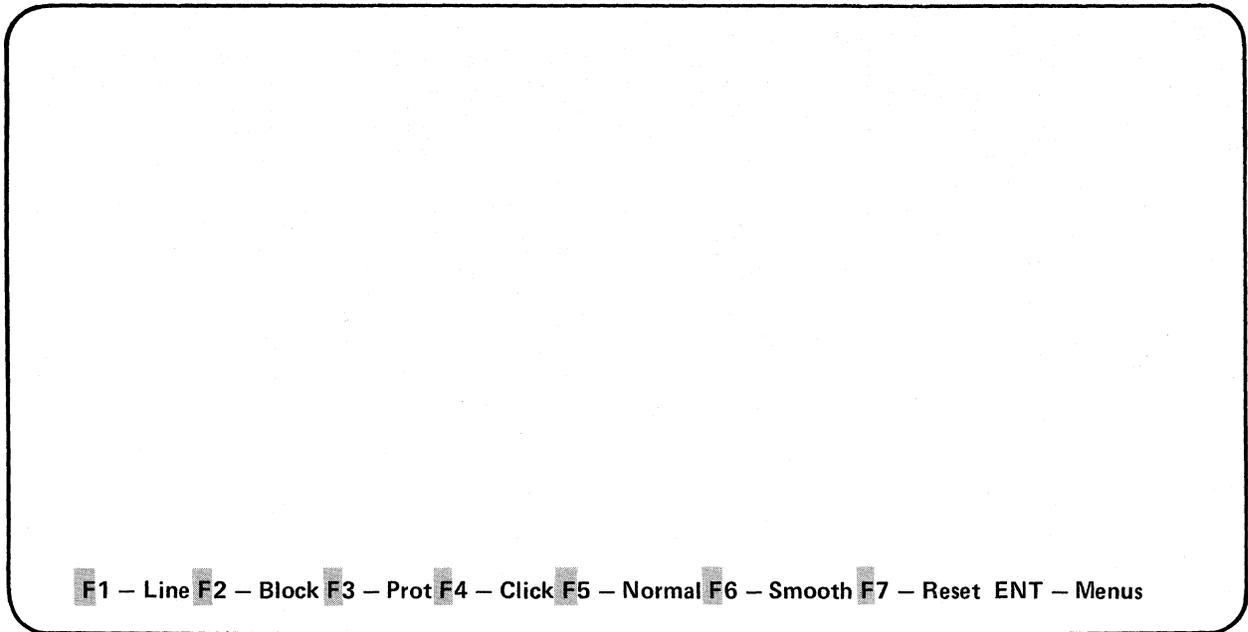


Figure 3-2. Basic SET-UP Presentation

3.7 HOW TO CHANGE BASIC SET-UP FEATURES

Once BASIC SET-UP MODE has been entered any BASIC SET-UP feature may be changed from the keyboard by depressing a single key. Some BASIC SET-UP features may also be changed by the host computer via control sequence function.

3.7.1 Line/Local/Line Md (1) (F1)

On LINE or LOCAL operation is selected by depressing the 1 key on the numeric pad. Key F1 on the V55.

Subsequent depressions of the 1 key alternates between Local and Line operation.

When on Line, the terminal may send or receive data from the host computer. When in Local (Off Line) the terminal is electrically disconnected from the host computer. Any data entered at the keyboard is looped back through the terminal receiver and displayed on the screen.

When Block Mode is selected the V50/55 is always on line. Block Line Mode is selected by depressing key 1 on the numeric pad. Subsequent depressions of the 1 key alternates between on-line and block line modes. See Section 6.1.2.

3.7.2 Block/Character Mode (2) (F2)

BLOCK or CHARACTER mode is selected by depressing key on the numeric pad. Subsequent depressions of the key alternates between Character and different types of Block mode. Key on the V55.

This feature determines whether the terminal operates in a Block Transmission mode or a Character Transmission mode as described in Section 6.1.1 Block/Character mode may also be changed by the host. See Section 6.1.

3.7.3 Protect/Unprotected Mode (3) (F3)

PROTECT or UNPROTECT mode is selected by depressing the key on the numeric pad. Subsequent depressions of the key alternates between Protect and Unprotect mode. Key on the V55. This feature determines whether background data is protected or not. See Section 5.10.

3.7.4 Click/Silent Mode (4) (F4)

CLICK or SILENT mode is selected by depressing key on the numeric pad. Subsequent depressions of the key alternates between Silent and Click mode. Key with the V55.

When Click is selected, an audible key click tone will be generated by the VISUAL 50/55 for each code generating key depression.

3.7.5 Normal/Reverse (5) (F5)

NORMAL or REVERSE SCREEN mode is selected by depressing key on the numeric pad. Subsequent depressions of the key alternates between Reverse and Normal Screen mode. Key on the V55.

Normal mode characters are formed by white dots on a black background.

Reverse mode characters are formed by black dots on a white background.

3.7.6 Jump/Smooth (6) (F6)

JUMP or SMOOTH scrolling is selected by depressing the key on the numeric pad. Subsequent depressions of the key alternates between Jump and Smooth Scroll modes. Key on the V55.

3.7.7 Reset (7) (F7)

Depressing key causes the VISUAL 50/55 to execute a reset command. Key on the V55.

The reset operation has the same effect as powering-down then powering-up the terminal and is used to run the self test. The reset command returns the terminals' parameters to their "saved" state. This operation clears the screen of all data.

3.7.8 Menus

Depressing key causes the terminal to enter the first of three (four) menus.

WARNING

Entering menu set-up mode clears the screen of all data, even in protected mode.

3.7.9 Tabs

Depressing the shift **T** keys in Basic Set-up Mode causes the screen presentation shown in Figure 3-3 to be displayed.

The location of each columnar tab stop is indicated by a "T" in Figure 3-3.

All tab stops may be cleared by depressing the **SHIFT** and **TAB** keys simultaneously.

To set or clear tab stops on an individual basis the following procedure is used:

1. Position the cursor using tab, cursor control keys **←** , **→** or return to the tab stop to be set or cleared.
2. Depress the **T** key to select/clear the tab stop at the cursor location.

Subsequent depressions of the **T** key will alternately CLEAR/SET the tab at the cursor location.

NOTE

Tab stops indicated by "T" apply in column mode only.

Tab set up mode is exited by depressing the set-up **FUNCTION** and **SET-UP** key simultaneously on the V50.

Tab set up mode is exited by depressing the **set-up** key on the keyboard on the V55.

12345678T0 1234567T90 123456T890 12345T7890 1234T67890 123T567890 12T4567890 1T34567890

Figure 3-3. Tab Set-Up

3.7.10 Answerback

Depressing the shift  keys in basic set-up mode causes the screen presentation shown in Figure 3-4 to be displayed.

The answerback message of up to 16 characters is programmed at cursor location by typing a user defined delimiter followed by the text of the message and ended with the defined delimiter.

NOTE

The delimiter may be an ASCII character not used in the message. If any control codes are used as part of the message, the code is displayed as the character ↓. Delimiters are not counted in the 16 character limit.

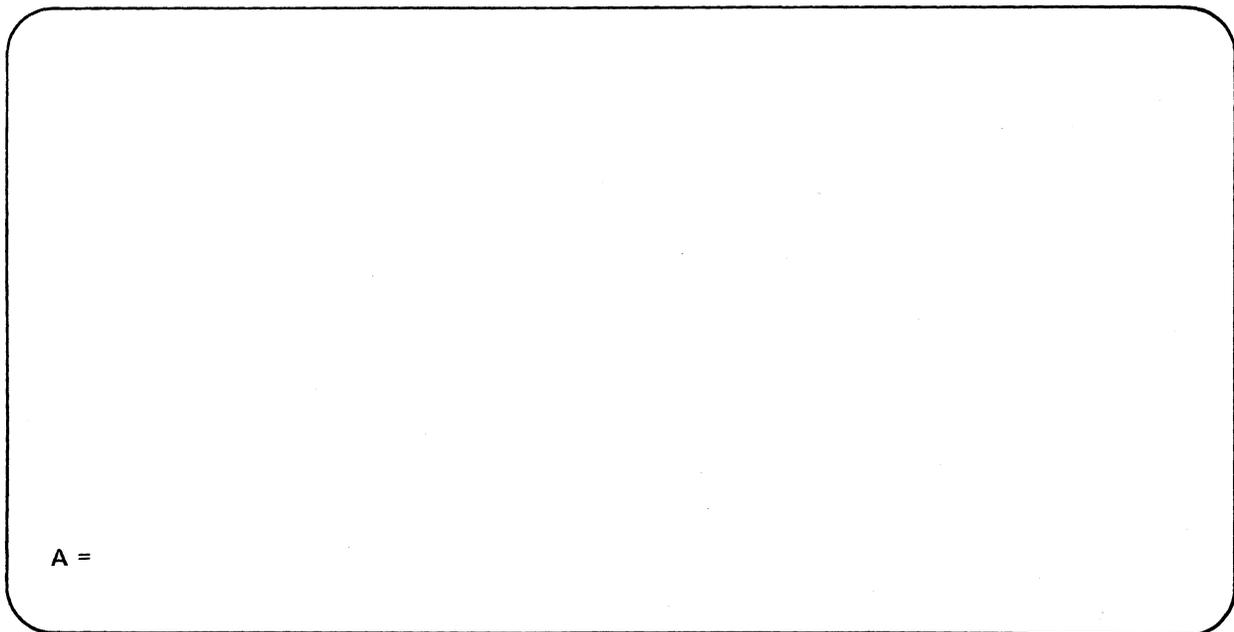
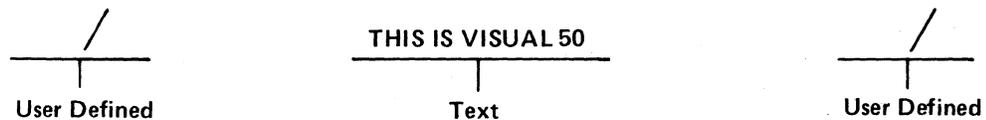


Figure 3-4. Answerback Screen Presentation

EXAMPLE:



When the ending delimiter is typed or upon exceeding 16 characters the terminal exits answerback mode and returns to the basic set-up mode. The answerback message is considered temporary unless a save operation is performed.

3.7.11 Firmware Revision

Depressing the shift and **V** keys simultaneously causes the firmware revision message to be displayed. To exit depress shift and **V** keys simultaneously.

3.8 HOW TO ENTER MENU SET-UP MODE

Once in basic set-up mode, menu set-up mode is entered by depressing the **ENT** key. When the Menu Set-Up Mode is entered, the screen will display the first of three Set-Up Menus (Figure 3-5). Subsequent depressions of the **ENT** key causes the terminal to step through the three (four) available menus. Menu Set-Up mode is exited by depressing the **FUNCTION** and **SET-UP** keys simultaneously on the keyboard on the V50, just the **SET-UP** key on the V55.

WARNING
 Entering the MENU SET-UP MODE clears the screen of all data, even when in PROTECTED mode.

3.9 HOW TO CHANGE MENU SET-UP FEATURES

3.9.1 Menu #1

The Menu #1 screen presentation is shown in Figure 3-5.

Emulation	V50	0
Wrap Md	HOR	1
Scrl/Page	SCRL	2
Monitor Md	ON	3
Tab Mode	COL	4
Auto LF/CR	ON	5
Auto Wrap	ON	6
Lead In	ESC	7
Language	US	8
Space/Adv	SPC	9
Next Menu		ENT

Figure 3-5. Screen Presentation MENU #1

3.9.1.1 Emulation (0)

Depressing key on the numeric pad sequentially enables the available emulation modes of the V50.

- V50 — VISUAL 50, or DEC VT52
- LSI — LSI ADM3A
- ADDS — ADDS Viewpoint
- ESP — Hazeltine Esprit
- 1510 — Hazeltine 1510
- V210 — Visual Technology V210

NOTE

Please refer to Appendix IV for the suggested setting of terminal parameters.

3.9.1.2 Wrap Md (1)

Depressing key sequentially enables the wrap modes of the Visual 50/55.

- HOR — Allows the commands cursor right, left, tab, or back tab to wrap.
- VER — Allows the commands cursor up or down to wrap.
- BOTH — Enables both horizontal and vertical wrap modes.
- OFF — Disables both horizontal and vertical wrap modes.

3.9.1.3 Scrl/Page (2)

Depressing key on the numeric pad alternately enables PAGE or SCROLL mode.

Scroll Mode: When data entering the bottom line is finished (line feed or entering the 80th character with Auto New Line enabled) the screen is scrolled up one line. The previous top line is lost, and the bottom line is blank. If Auto New Line is not enabled then line feed is required to scroll.

Page Mode: Data is entered proceeding from the top to the bottom. Upon completion of the bottom line the cursor is returned to the top of the display and data entry overwrites previous data.

3.9.1.4 Monitor Md (3)

Depressing key on the numeric pad alternately enables the disables MONITOR

MODE. Monitor mode, when enabled, causes received control codes to be displayed as half intensity, upper case and underlined characters. Control codes are not acted upon in monitor mode, except CR in hazeltine mode.

3.9.1.5 Tab Md (4)

Depressing key on the numeric pad alternately select COLUMN or FIELD tabbing mode.

- COL — Enables tabbing by columnar tab stops
- FLD — Enables tabbing over background data (field's)

3.9.1.6 Auto LF/CR (5)

Depressing key on the numeric pad alternately selects the NEW LINE mode.

ON — The key also generates a new line function. A received CR generates CRLF.

OFF — The key generates a CR only. A received LF causes a line feed only. A received CR generates a CR only.

3.9.1.7 Auto Wrap (6)

Depressing key on the numeric pad alternately enables or disables the AUTO-WRAP mode.

When on, this mode causes the cursor to automatically advance to the first position of the next line upon entering characters beyond the last position of the present line.

When off, the cursor does not wrap around automatically. Any characters entered overlay the last character on the line.

3.9.1.8 Lead In (7)

Depressing key on the numeric alternately selects the ESC or the ~ as the control sequence introducer (lead in character) that introduces each multi character control sequence.

3.9.1.9 Language (8)

Depressing key sequentially configures the keyboard to the 9 optionally available foreign national character sets.

NOTE

This selection of a foreign national language immediately configures the keyboard to generate codes per Appendix IV. Optional key cap sets are available for the VISUAL 50/55. A optional foreign character generator PROM must also be installed in order to display foreign characters.

3.9.1.10 Space/Adv (9)

Depressing key on the numeric pad alternately selects SPACE or ADVANCE.

NOTE

The ADV feature is only recognized if the LSI protocol is selected.

ADV — Upon receipt of a return and until a subsequent line feed, a space code moves the cursor right non-destructively. Data is not overwritten. Upon receipt of a line feed the cursor is advanced to the next line and a space code moves the cursor right destructively. Data is replaced with a space.

SPACE — A space code moves the cursor right destructively.

Depressing the key causes the V50/55 to enter the second menu.

3.9.2 Select Menu #2

The screen presentation for Menu #2 is shown in Figure 3-6.

XMT RATE	9600	0
REC RATE	9600	1
STOP BITS	1	2
PAR ENLB	ON	3
PAR SENSE	OFF	4
DATA LN/MSB	7/0	5
DUPLEX	FULL	6
EOM CHAR TACC	CR	7
BOT LINE MOD	OFF	8
XON/OFF	OFF	9
LOCAL ECHO	ON	'
EIA/CL	EIA	-
NEXT MENU		ENT

Figure 3-6. Screen Presentation Menu #2

3.9.2.1 Xmt Rate (0)

Depressing key on the numeric pad causes the terminal to step through and select the TRANSMITTER baud rate.

3.9.2.2 Recv Rate (1)

Depressing key on the numeric pad causes the terminal to step through and select the RECEIVER baud rate.

3.9.2.3 Stop Bits (2)

Depressing key on the numeric pad alternately selects one or two stop bits.

NOTE

Normally two stop bits are selected for baud rates at or below 134.5 baud.

3.9.2.4 Par Enbl (3)

Depressing key enables or disables parity sensing.

3.9.2.5 Par Sense (4)

Depressing key on the numeric pad alternately selects odd or even parity sensing. If parity sensing is disabled OFF is displayed.

3.9.2.6 Data Ln/MSB (5)

Depressing key on the numeric pad alternately selects the length of the data word and state of the most significant bit (MSB).

NOTE

8 bit mark – MSB = 1

8 bit space – MSB = 0

3.9.2.7 Duplex (6)

Depressing key on the numeric pad selects FULL or HALF DUPLEX operation. See Section 6.3 for a detailed description of duplex mode.

3.9.2.8 EOM Char (7) TACC

Depressing key on the numeric pad sequentially sets the end of message character (EOM). Turn around control code (TACC). Please refer to Section 6.2 for a detailed description of communication protocols.

3.9.2.9 Bot Line MD (8)

Depressing key on the numeric pad alternately enables or disables the bottom line line mode of the VISUAL 50/55. BOT LINE MD is only valid in LSI mode.

3.9.2.10 Xon/Xoff (9)

Depressing key on the numeric pad sequentially enables or disables the transmit and/or receive Xon-Xoff protocol.

OFF – Disabled
 XMT – Transmitter Enabled
 RCV – Receiver Enabled
 BOTH – Enabled

Please refer to Section 6.7 for a detailed description of the XON-XOFF protocol.

3.9.2.11 Local Echo (,)

Depressing key alternately enables or disables the Local Echo feature.

The Local Echo feature provides for an automatic “enabling” of transmitted data back to the screen. If an echoing of transmitted data is not desired, the terminal is set for half duplex, or the host computer or modem provides an echo, this feature should be disabled.

3.9.2.12 EIA/CL (-)

Depressing key on the numeric pad selects the hardware protocol for communication to be either EIA (RS 232) or 20 MA current loop.

Depressing the key causes the V50/55 to enter the third menu.

3.9.3 Menu #3

Cursor Type	BLK	0
Cursor Blink	OFF	1
Margin Bell	OFF	2
Refresh Rate	60 Hz	3
Scn Clear Dis	OFF	4
Kbd Lock Dis	OFF	5
Status Line	ON	6
Next Menu		ENT

Figure 3-7. Screen Presentation Menu #3

3.9.3.1 Cursor Type (0)

Depressing key on the numeric pad alternately selects a blinking block or blinking underline cursor style.

3.9.3.2 Cursor Blink (1)

Depressing key on the numeric pad alternately selects between blinking or steady cursor display style.

3.9.3.3 Margin Bell (2)

Depressing key on the numeric pad alternately enables or disables a warning tone at column 72.

3.9.3.4 Refresh Rt (3)

Depressing key on the numeric pad alternately selects 50 Hz or 60 Hz. The refresh rate should match the frequency to the terminals power supply.

3.9.3.5 Scn Clear Dis (4)

Depressing key on the numeric pad alternates between disabling and enabling clear screen functions being valid in ADM 3A mode.

3.9.3.6 Kbd Lock Dis (5)

Depressing key on the numeric key pad alternately enables or disables the keyboard being locked.

3.9.3.7 Status Line (6)

Depressing key on the numeric pad alternately turns the status line on or off on the 25th line.

Depressing the key on the VISUAL 50 causes the terminal to return to Menu #1.

Depressing the key on the VISUAL 55 causes the terminal to enter Menu #4.

3.9.4 Program Message Framing Codes

Figure 3-8 shows the Fourth Menu on the V55

PROGRAM MESSAGE FRAMING CODES		
Start of Message	002	F1
Area Separator	031	F2
First End of Line	013	F3
Second End of Line	010	F4
First End of Message	003	F5
Second End of Message	004	F6
Next Menu		ENT

Figure 3-8. Program Message Framing Codes Screen Presentation

DEFAULT CODES MESSAGE FRAMING

Message Framing Codes	
Type	Default Code in Decimal
SOM	002
AS	031
FEOL	013
SEOL	010
FEOM	003
SEOM	004

NOTE

For definitions of the codes listed, see Section 6.4.

3.9.5 Programmable Function Keys, Menu #5 – V55

Figure 3-9 shows the default values of the programmable function keys.

To enter programmable function keys menu, depress the **FUNCTION** Key and the **SET-UP** Key simultaneously.

01	(LI) P	F1
02	(LI) Q	F2
03	(LI) R	F3
04	(LI) SPACE	F4
05	(LI) !	F5
06	(LI) "	F6
07	(LI) #	F7
08	(LI) \$	F8
09	(LI) %	F9
10	(LI) &	F10
11	(LI) .	F11
12	(LI) (	F12

Figure 3-9. Programmable Function Keys Default Sequences

The V55 has 12 user programmable, dynamic, savable function keys.

Dynamic meaning there are 72 characters that can be programmed into 1 (through 12) function key(s) with the sum equal to or below 72.

3.9.5.1 Limitations of the Programmable Function Keys

1. There are 72 character locations.
2. The message may be sent to the host and/or to the screen with one key depression.
3. To enable a screen routed message, depress the FUNCTION key next to the space bar, like a shift key, while entering the message. The message appears half-intensity and underlined, signifying a local transmit.
4. Data entered without the FUNCTION key depressed is sent to the host.
5. The lead in character to be sent on transmission can be escape or tilda depending on what is selected at the time.
6. Programming a function key is also possible via a remote command. See Section 5.
7. Once programmed, the message can be saved by performing a save operation.

3.9.5.2 How to Program the Function Keys

Select the function key to be programmed by depressing the corresponding function key (F1 – F12) on the keyboard. The selected function key's program is cleared and the cursor is positioned for the first character input. Up to 72 characters may then be programmed by typing the message on the keyboard. The function key message is terminated by depressing the same selected function key on the keyboard. The cursor then disappears.

3.9.5.3 Programmable Function Key Link

To automatically link one function key to another, depress the FUNCTION key next to the space bar and the function key desired to link to simultaneously at the end of the entered message. The link is also considered by the terminal as that function key's terminator.

The terminal displays the number of the key being linked to in half intensity at the end of the function key's programmed message.

3.9.5.4 Programmable Control Codes

Control codes appear as a right arrow followed by the character.

Example: Escape = \longrightarrow [(CTRL [)
 Bell = \longrightarrow G (CTRL G)

3.9.5.5 Local Transmit

To send the message to the screen, depress the **FUNCTION** key while programming the message. The screen routed data appears underlined and in half intensity.

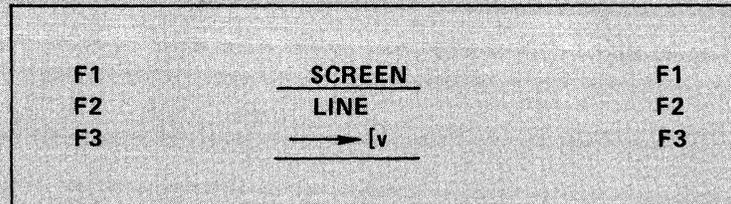


Figure 3-10. Function Key Example

Key Stroke	Action
F1	Selects and clears Function Key 1 for programming.
FUNCTION and S C R E E N	Enters the message "SCREEN" underlined and in half-intensity, signifying a local transmit to the screen.
F1	Terminator for Function Key 1.
F2	Selects and clears Function Key 2 for programming.
L I N E	Enters the message "LINE" into Function Key 2. This is a transmission to the Host. No Function Key depression needed.
F2	Terminator for Function Key 2.
F3	Selects and clears Function Key 3 for programming.
FUNCTION and ESC V	Enters the message "ESCAPE v" into Function Key 3. This appears underlined and in half-intensity, signifying a local transmit.
F3	Terminator for Function Key 3.

Example Explanation: Once out of SET-UP Mode,

When **F1** is depressed, the message "SCREEN" appears on the V55 screen.

When **F2** is depressed, the message "LINE" is sent to the host computer.

When **F3** is depressed, the message "ESCAPE v" is sent as a local transmit. If the V55 is set in V52 mode, a clear screen command is performed.

3.10 PERFORMING A RECALL OPERATION

The stored set-up features may vary from the set-up features currently selected. If it is desired to return to the stored features, the recall operation should be performed per the following:

1. ENTER SET-UP Mode
2. DEPRESS the **SHIFT** and **R** Keys simultaneously.

3.11 PERFORMING A SAVE OPERATION

The SAVE Operation is used to store all current SET-UP features, and is performed per the following:

1. ENTER SET-UP Mode
2. DEPRESS the **SHIFT** and **S** Keys simultaneously.

NOTE

After performing the SAVE Operation the current SET-UP features are stored. To select the SET-UP features temporarily, do not use the SAVE Operation, simply EXIT SET-UP Mode. Once a SAVE Operation is completed, the terminal automatically exits set-up mode.

3.12 SCREEN BRIGHTNESS

Screen brightness may be adjusted up or down in any SET-UP mode. Screen brightness is decreased by depressing the **↓** key, and increased by depressing the **↑** key.

3.12.1 Screen Saver

A unique CRT feature provides for increased phosphor life by reducing screen intensity if the terminal is inactive for 18 minutes. Striking any key or receiving data causes the screen to return to normal intensity.

4. KEYBOARD CONTROLS

4.1 GENERAL

This section describes the function of and the codes transmitted by each key on the VISUAL 50/55 keyboard. Each key as defined in terms of its legend, ASCII representation and code transmitted.

In character transmission mode, most key depressions cause characters to be transmitted as each key is depressed. The character is displayed only when echoed back from the host. The terminal may be set to local echo mode to automatically enable transmitted data to be displayed. In block transmission mode most key depressions do not transmit to the host. As each key is depressed the character is displayed. The completed page, line or field is sent to the host by the **ENTER** key or by request from the host on the V50

The **XMIT** key on the V55.

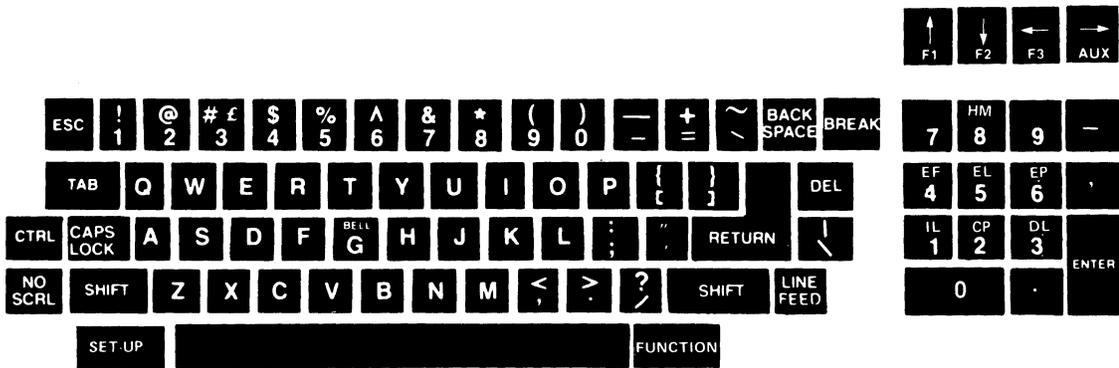


Figure 4-1. V50 Keyboard Layout

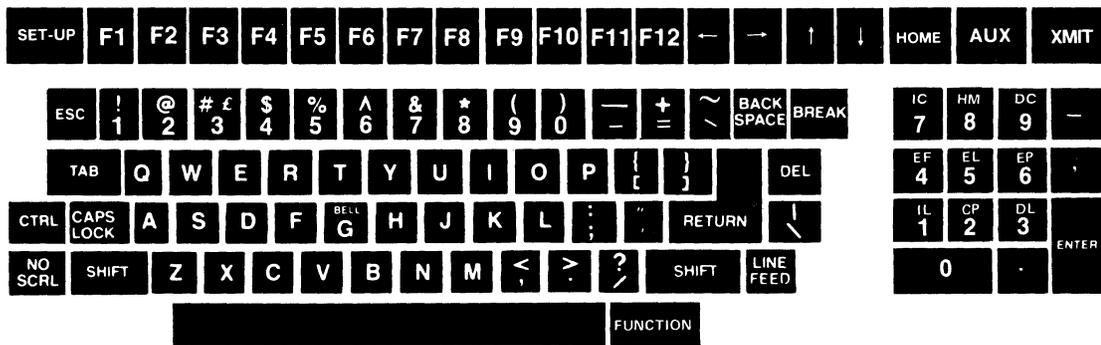


Figure 4-1.1. V55 Keyboard

4.2 KEY FUNCTIONS

FUNCTION and **SET-UP** (V50). These keys used simultaneously to alternately enter and exit the "Menu Style" set-up mode and will transmit an XON/XOFF sequence when XON/XOFF is enabled. Just the **SET-UP** key is necessary on the V55.

ESC The ESC code is used to initiate all control sequences. In CHARACTER mode, depressing the ESC key causes the terminal to transmit the ESC control code (HEX 1B). In BLOCK mode the ESC code causes the terminal to interpret the next received character as opposed to displaying it.

CTRL The CTRL key does not produce a code by itself. It is depressed in conjunction with other keys to produce the control codes as described in Section 5.

SHIFT The shift key does not produce a code by itself. When depressed in conjunction with alpha-numeric keys, it causes generation of the corresponding upper case alpha code or the code whose symbol appears on the upper part of the key. Two shift keys are on the keyboard for operator convenience.

CAPS LOCK The CAPS LOCK does not produce a code when depressed. This key enables the generation and display of only upper case alpha characters. The numeric and special keys are not affected by the caps lock key.

NO SCRL The NO SCROLL KEY alternately transmits the XOFF (DC3) and XON(DC1) control codes. If the transmitter XON/XOFF feature is disabled the no scroll key will transmit no codes. On the V55, one line scrolls up when hold screen mode is set. See Section 5.10.10.1 for details.

NOTE

When the transmitter XON/XOFF feature is enabled, the no scroll key will be synchronized with the use of XON/XOFF codes generated by the terminal.

TAB The TAB KEY moves the cursor to the next COLUMNAR or FIELD tab stop as selected by the set-up parameter tab mode (Section 3.9.1.5). In hazeltine mode

TAB always causes a FIELD tab.

BACK SPACE Depressing the BACKSPACE key generates the BS (08) control code. The cursor moves one space to the left.

RETURN In Character mode, depressing the RETURN key causes transmission of the CR control code (0D), and causes the cursor to move to the first column of the present line if the transmitted code is echoed. If the New Line feature is enabled, the RETURN key will transmit the CR and LF control codes, and will cause the cursor to move to the first

column of the next line if the transmitted codes are echoed. In Block mode the cursor will move to the first column of the present line or the first column of the next line.

LINE FEED In Character mode, depressing the LINEFEED key causes transmission of the LF control code (0A) and causes the cursor to move down one line if the transmitted codes are echoed except in Haz mode. If Auto LF/CR is enabled line feeds are ignored in Hazeltine mode. In Block mode the cursor moves down one line.

BREAK Depressing the BREAK key causes a 250 millisecond spacing condition on the data line. Depressing CTRL-BREAK causes transmission of the Answer-back Message.

DEL Depressing the DELETE key causes the DEL code (7F) to be generated.

AUX Depressing the AUX key alternately enables and disables the AUX port on the V55. See Section 6.3 for details.

SPACE BAR In Character mode, depressing the SPACE BAR causes the SP code (20) to be transmitted, and causes the character at the cursor location to be erased and the cursor advanced one position if the transmitted code is echoed.

If the LSI emulation mode is selected and the Set-Up feature ADV is enabled (Section 3.9.1.10) then the cursor moves *non-destructively* between the receipt of a CR and a subsequent LF code.

4.2.1 Cursor Movement Keys



In Character mode, depressing a cursor positioning key causes transmission of its corresponding control sequence and causes the cursor to move one position in the direction indicated on the key if the transmitted sequence is echoed. The codes transmitted by these keys are summarized in Table 4-1.

In Block mode the cursor moves one position in the direction indicated on the key.

In SET-UP mode, the depressing of the  key increases the intensity of the display.

The depressing of the  key lowers the intensity of the display.

**TABLE 4-1
CODES GENERATED BY CURSOR POSITIONING KEYS (VT-52 MODE)**

Key Depressed	Sequence Generated	Code Generated
↑	L1 A	L1 41
↓	L1 B	L1 42
←	L1 C	L1 43
→	L1 D	L1 44
HOME	L1 H	L1 48

L1 – Lead in character as defined in set-up mode
 ESC or ~ (tilde)
 1B or 7E

4.2.2 Numeric Pad Functions

Depressing any key on the numeric pad causes the associated character to be displayed and/or transmitted. These keys are unaffected by SHIFT, CAPS LOCK or CTRL keys. The ENTER key causes the same action as the return key.

4.2.2.1 Set-Up Mode and the Numeric Pad

In set-up mode (section 3.7), the numeric pad is used to modify the menu selectable parameters of the V50.

4.2.3 **ENTER** Key in Block Mode

ENTER This key applies to Block mode only and causes a block transmission to begin when depressed. On the V50 the portion of the screen to be transmitted depends upon the various transmission modes then enabled. In Character mode, this key generates a CR.

4.2.3.1 **XMIT** Key in Block Mode

This causes a block mode transmission to begin when depressed on the V55.

4.2.4 Function Key Usage

FUNCTION Depressing the FUNCTION key in conjunction with certain keys on the numeric keypad allows for editing functions to be performed from the keyboard. In Character mode, the code sequence associated with each editing function will be transmitted

and the editing function will be performed on the screen only if the transmitted code sequence is echoed.

In Block mode the editing function will be local only and no transmission will occur. Table 4-2 lists the codes transmitted and the editing functions performed for each depression of the FUNCTION key with keys on the numeric keypad.

4.2.5 Numeric Pad Functions

IC 7	HM 8	DC 9	-
EF 4	EL 5	EP 6	,
1L 1	CP 2	DL 3	ENTER
0		.	

**TABLE 4-2
KEYPAD EDITOR FUNCTIONS**

Keys Depressed	Action Caused in Block Mode or in Character Mode if Sequence Echoed
FUNCTION with 	Insert Line
FUNCTION with 	Clear Page (Must be Enabled In Set-up Mode)
FUNCTION with 	Delete Line
FUNCTION with 	Erase Field
FUNCTION with 	Erase Line
FUNCTION with 	Erase Page
FUNCTION with 	Cursor Home
FUNCTION with 	Insert Character Enable
FUNCTION with 	Delete Character
FUNCTION with 	Transmission of Field

4.3 FUNCTION KEYS

The numeric pad can be configured to generate function key messages by enabling one of three modes and depressing the appropriate key. Codes generated in each mode are summarized in Table 4-3.

The lead in code **L1** can be either ESC or ~ as selected in set-up mode.

The control sequence to enable Mode 1, Mode 2 or Mode 3 is described in Section 5-11.

**TABLE 4-3
ALTERNATE KEY CODE TRANSMISSION**

KEYSTROKE	MODE 1	MODE 2	MODE 3*
0	 0	STX 0 CR	 ? p
1	 1	STX 1 CR	 ? q
2	 2	STX 2 CR	 ? r
3	 3	STX 3 CR	 ? s
4	 4	STX 4 CR	 ? t
5	 5	STX 5 CR	 ? u
6	 6	STX 6 CR	 ? v
7	 7	STX 7 CR	 ? w
8	 8	STX 8 CR	 ? x
9	 9	STX 9 CR	 ? y
.	 .	STX . CR	 ? n
,	 ,	STX , CR	 ? l
—	 —	STX — CR	 ? m
ENTER			 ? M

**TABLE 4-4
FUNCTION KEY CODES**

KEYSTROKE	VT52 & V210	ADDS, ESPRIT, LSI	HAZELTINE 1510
Function, F1	 P	STX 1	~ 1
Function, F2	 Q	STX 2	~ 2
Function, F3	 R	STX 3	~ 3
Function, Shift, F1	 P	STX !	~ a
Function, Shift, F2	 Q	STX "	~ b
Function, Shift, F3	 R	STX #	~ c
Function, Aux	Alternately disables and enables auxiliary port		

*MODE 3 is the equivalent to the VT52 Alternate Keypad Mode.

NOTE: To set the Alternate Functions in table 4-3, see Section 5.11

**TABLE 4-5
V55 DEFAULT FUNCTION KEY VALUES**

Keystroke	Emulations		
	VT52 and V210	ESPRIT, ADDS and LSI	1510
Shift-F1	ESC P	STX !	~a
Shift-F2	ESC Q	STX "	~b
Shift-F3	ESC R	STX #	~c
Shift-F4	ESC d	STX \$	~d
Shift-F5	ESC e	STX %	~e
Shift-F6	ESC f	STX &	~f
Shift-F7	ESC g	STX '	~g
Shift-F8	ESC h	STX (	~h
Shift-F9	ESC i	STX)	~i
Shift-F10	ESC j	STX *	~j
Shift-F11	ESC k	STX +	~k
Shift-F12	ESC l	STX ' (grave)	~l
Function-F1	ESC P	STX 1	~1
Function-F2	ESC Q	STX 2	~2
Function-F3	ESC R	STX 3	~3
Function-F4	ESC 4	STX 4	~4
Function-F5	ESC 5	STX 5	~5
Function-F6	ESC 6	STX 6	~6
Function-F7	ESC 7	STX 7	~7
Function-F8	ESC 8	STX 8	~8
Function-F9	ESC 9	STX 9	~9
Function-F10	ESC :	STX :	~:
Function-F11	ESC ;	STX ;	~;
Function-F12	ESC <	STX <	~<

Keystroke	All Emulations	Keystroke	All Emulations
Control-F1	STX A	Shift-Control-F1	STX Q
Control-F2	STX B	Shift-Control-F2	STX R
Control-F3	STX C	Shift-Control-F3	STX S
Control-F4	STX D	Shift-Control-F4	STX T
Control-F5	STX E	Shift-Control-F5	STX U
Control-F6	STX F	Shift-Control-F6	STX V
Control-F7	STX G	Shift-Control-F7	STX W
Control-F8	STX H	Shift-Control-F8	STX X
Control-F9	STX I	Shift-Control-F9	STX Y
Control-F10	STX J	Shift-Control-F10	STX Z
Control-F11	STX K	Shift-Control-F11	STX [
Control-F12	STX L	Shift-Control-F12	STX \

5. PROGRAMMING

5.1 GENERAL

This section contains detailed information on the operation and programming of each of the commands and control sequences of the VISUAL 50/55.

5.2 LEAD IN

Each command sequence is initiated by a lead in code which is selected to be either escape (ESC) or ~ (tilde). This lead in code is selected in set-up mode (Section 3.9.1.8) and introduces all control functions.

EXAMPLE:

ESC
|
Lead in sequence as
specified by set-up mode

F
|
Termination character of
sequence specifying the
function to be performed.
This character varies
with each function and
emulation.

The preferred lead in the Hazeltine emulations is ~. For V50, ADM, LSI, V210 and V55 emulations, the preferred lead in is ESC.

NOTE

The lead in code is represented in this manual by the use of the symbol **U**

5.3 EMULATION

The V50/55 is soft configurable to emulate the private protocols of the following products:

DEC VT52[®] (V50[®])
Hazeltine Esprit[®]
LSI ADM 3A[®]
ADDS Viewpoint[®]
Hazeltine 1510
Visual Technology V210[®]

The emulation parameters are selected in set-up mode and the preferred settings are detailed in Table 5-1.

**TABLE 5-1
SUGGESTED SET-UP MODE SETTINGS**

Parameter	Product			
Emulation	VT52 AND V210	ADDS	LSI	HAZELTINE ESPRIT AND 1510
Wrap Md	OFF	BOTH	HOR	HOR
Scrl/Page	SCRL	SCRL	SCRL	SCRL
Tab Md	COL	COL	COL	COL
Auto LF/CR	ON	OFF	OFF	OFF
Auto Wrap	OFF	ON	ON	ON
Lead In	ESC	ESC	ESC	~
Space/Adv	SPC	SPC	SPC	SPC
Bot Line MD	OFF	OFF	OFF	OFF
XON/XOFF	BOTH	OFF	BOTH	OFF
Local Echo	OFF	OFF	OFF	OFF
Scn/Kb Dis	OFF	OFF	OFF	OFF

5.4 CURSOR MOVEMENT COMMANDS

NOTE: Alphabet *CONTROL* characters only can be upper or lower case.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CURSOR HOME	LI H	LI H or CTRL ^	LI H or CTRL A	LI CTRL R	LI CTRL R	LI H

5.4.1 Home Cursor

VT52, Hazeltine and ADM3A (non-bottom line mode) always goes to (Col 0, row 0).
ADM3A (bottom line mode) and Adds Viewpoint goes to (Col 0, Row 24)

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CURSOR UP	LI A	LI A or CTRL K	LI A or CTRL Z	LI CTRL L	LI CTRL L	LI A

5.4.2 Cursor Up

Moves the cursor up one line. The cursor does not wrap beyond the top line unless vertical wrap mode is enabled.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CURSOR DOWN	U B	U B or CTRL J	U B or CTRL J	U CTRL K	U CTRL K	U B

5.4.3 Cursor Down

Moves the cursor down one line. If VERTICAL WRAP mode is enabled the cursor wraps from the bottom to the top line. In SCROLL mode with VERTICAL WRAP enabled a cursor down on line 24 causes the V50/55 to scroll.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CURSOR RIGHT	U C	U C or CTRL L	U C or CTRL F	U C or CTRL P	U C CTRL P	U C

5.4.4 Cursor Right

Moves the cursor one character position to the right. The cursor does not move beyond column 80 unless HORIZONTAL WRAP is enabled. If HORIZONTAL WRAP is enabled the cursor wraps from col 80 to col 1 of the next line. If the cursor is at col 80 line 24 then the cursor wraps from col 80 row 24 to col 1 row 1.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CURSOR LEFT	U D or CTRL H	U D or CTRL H	U D or CTRL U	U D or CTRL H	U D or CTRL H	U D or CTRL H

5.4.5 Cursor Left

Moves the cursor one character position to the left. The cursor does not move beyond col 1 unless HORIZONTAL WRAP is enabled. If HORIZONTAL WRAP is enabled the cursor wraps from col 1 to col 80 of the previous line. If the cursor is at col 1 line 1 then the cursor wraps from col 1 row 1 to col 80 row 24.

COMMAND	ALL EMULATIONS
REVERSE INDEX	U I

5.4.6 Reverse Index

Moves the cursor up one line, if the cursor is positioned on row 1 and scroll mode is enabled, then this command causes the V50/55 to scroll down one line. A blank line appears on row 1 and the data contained on row 24 is lost.

If PAGE MODE is enabled and the cursor is positioned on row 1 then this command causes the cursor to wrap to row 24.

COMMAND	ALL EMULATIONS
INDEX	CTRL J

5.4.7 Index

Moves the cursor down one line. If the cursor is positioned on row 24 and SCROLL MODE is enabled, then this command causes the V50 to scroll up one line. A blank line appears on row 24 and the data contained on row 1 is lost.

If PAGE MODE is enabled and the cursor is positioned on row 24 then this command causes the cursor to wrap to row 1.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
DIRECT CURSOR ADDRESSING	L Yrc	L = rc	L Yrc	L CTRL Qcr	L CTRL Qcr	L Yrc

r = row c = column

5.4.8 Cursor Addressing

Positions the cursor to the coordinate locations specified by the row and column (r,c).

The column and row coordinates are specified as ASCII characters defined in Appendix I.

5.5 TAB COMMANDS

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
FIELD TAB	N/A	N/A	N/A	CTRL I	N/A	N/A

5.5.1 Field Tab

A Hazeltine emulation command equivalent to a tab command with field mode enabled.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
COLUMNAR TAB	N/A	N/A	N/A	LI :	N/A	N/A

5.5.2 Columnar Tab

A Hazeltine command equivalent to a tab command with Field Mode DISABLED.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
BACK TAB	L z	L z	L z	L z	L CTRL T	L z

5.5.3 Back Tab

Causes the cursor to move left one tab stop. If field mode is selected the cursor moves to the first character of the previous foreground field. If no field tab stops exist to the left of the cursor, then the cursor does not move and a warning tone is sounded.

In col mode, if no tab stops exist to the left of the cursor then a back tab causes the cursor to move to col 1 of the current line. In col mode with horizontal wrap enabled, if no tab stops exist to the left of the cursor then a back tab causes a wrap to the last character of the previous line.

NOTE

A back tab can be initiated from the keyboard by depressing

SHIFT

TAB

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
TAB	CTRL I	CTRL I	CTRL I	N/A	CTRL I	CTRL I

5.5.4 Tab

Moves the cursor right to the next tab stop. If COL MODE is enabled then the cursor moves to the next columnar tab stop. If HORIZONTAL WRAP is disabled and there are no tab stops to the right of the cursor then the cursor moves to col 80 of the current line. If HORIZONTAL WRAP is enabled and there are no tab stops to the right of the cursor then the cursor moves to the first position on the next line. If the cursor is positioned on line 24 and there are no tab stops to the right of the cursor the HORIZONTAL WRAP enabled causes the tab command to wrap the cursor to line 1.

If FIELD MODE is enabled then the cursor moves to the first character of the next Foreground Field. If no field tab stops exist to the right of the cursor then an audible tone is sounded and the cursor does not move.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
FIELD BACK TAB	N/A	N/A	N/A	␣ CTRL T	N/A	N/A

5.5.5 Field Back Tab

A Hazeltine emulation command equivalent to a Back Tab command with FIELD MODE enabled.

COMMAND	ALL EMULATIONS
SET TAB	␣ 1

5.5.6 Set Tab

Sets a columnar tab stop at the cursor position.

COMMAND	ALL EMULATIONS
CLEAR TAB	LI 2

5.5.7 Clear Tab

Clears a columnar tab stop at the cursor position.

COMMAND	ALL EMULATIONS
CLEAR ALL TABS	LI g

5.5.8 Clear All Tabs

Clears all columnar tab stops regardless of the cursor location.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET FIELD TAB MODE	LI o	LI o	LI o	LI o	LI o	N/A

5.5.9 Field Tab Mode

Causes the tab commands to move from field tab to field tab. This mode is also selectable in set-up mode.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET COLUMNAR TAB MODE	LI p	LI p	LI p	LI p	LI p	N/A

5.5.10 Set Columnar Tab Mode

Causes the tab commands to move from columnar tab stops to columnar tab stops. This mode is also selectable in set-up mode.

5.6 CLEAR COMMANDS

NOTE

All clear commands, unless otherwise noted, clear by setting the data to foreground spaces.

All clear commands clear both foreground and background data. If protect mode is enabled then the clear commands clear only foreground data. Except 1510 and 210 where all data is cleared.

COMMAND	ALL EMULATIONS
CLEAR LINE	LI t

5.6.1 Clear Line

Clears all data on the current line. The cursor returns to col 1 of the current line.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
CLEAR TO END OF LINE	LI K	LI K	LI K	LI CTRL O	LI CTRL O	LI x

5.6.2 Clear End of Line

Clears all data from the cursor position (inclusive) to the end of line. The cursor does not move.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
CLEAR PAGE	LI v	LI v or CTRL Z	LI v or CTRL L	LI CTRL \	LI CTRL \	LI v

5.6.3 Clear Page

Clears all data on the current page. The cursor moves to the home position.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
CLEAR TO END OF PAGE	LI k or LI J	LI k or LI J	LI k or LI J	LI k or LI CTRL x	LI CTRL x	LI y

5.6.4 Clear End of Page

Clears all data from the cursor location (inclusive) to the end of page. The cursor does not move.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
CLEAR BACK-GROUND TO END OF PAGE	LI u	LI u	LI u	LI CTRL W	LI CTRL W	LI U

5.6.5 Clear End of Page Background

Clears all data from the cursor location (inclusive) to the end of page. The cursor does not move.

The data cleared is set to background spaces.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
CLEAR FIELD	LI V	LI V	LI V	LI CTRL V	LI CTRL V	LI CTRL V

5.6.6 Clear Field

Clears all data contained in the foreground field. If the cursor is positioned in a foreground field then the data contained in that field is cleared and the cursor moves to the first character position of the current field.

If the cursor is positioned in a background field then the cursor moves to the next foreground field.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
CLEAR FOREGROUND	LI]	LI]	LI]	LI CTRL]	LI CTRL ^	LI CTRL]

5.6.7 Clear Foreground

Clears all foreground data on the screen. The cursor moves to the first character of the first foreground field.

5.7 ERASE COMMANDS

COMMAND	ALL EMULATIONS
ERASE LINE	LI E

5.7.1 Erase Line

Erases the current line of all foreground data. This command is unaffected by protect/unprotect. Cursor returns to first location in foreground field.

The line is erased by setting the data to foreground spaces.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
ERASE PAGE	LI CTRL Z	LI R	LI R	LI R	LI CTRL]	LI w

5.7.2 Erase Page

Erases the page of all Foreground Data. Homes the cursor into the First Foreground Location on the page.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
ERASE TO END OF PAGE	LI CTRL _	LI [	LI [	LI J	LI J	LI J

5.7.3 Erase to End of Page

Erases all foreground data from the cursor to the end of page. The cursor remains in present position.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
ERASE TO END OF LINE	LI CTRL]	LI P	LI P	LI K	LI K	LI K

5.7.4 Erase to End of Line

Erases all Foreground Data from cursor to the End of Line. Leaves the cursor in the present location.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
ERASE TO END OF FIELD	LI CTRL \	LI Q	LI Q	LI f	LI f	LI f

5.7.5 Erase to End of Field

Erases all Foreground Data from cursor to the End of Field. Cursor remains in present location.

5.8 SET VIDEO ATTRIBUTES

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET FOREGROUND ATTRIBUTE "X"	LI 0x	LI 0x	LI 9x	LI 0x	LI] x	LI CTRL Yx

5.8.1 Set Foreground Attribute "X" (See Table 5.1 for "X")

This command sets the foreground attribute. All foreground data is affected by the parameter "X" selected, regardless as to when the command is received.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET BACKGROUND ATTRIBUTE "X"	LI 9x	LI 9x	LI 0x	LI 9x	LI ^ x	LI CTRL Zx

5.8.2 Set Background Attribute "X" (See Table 5.1 for "X")

This command sets the background attribute. All background data is affected by the parameter "X" selected, regardless as to when the command is received.

TABLE 5-2
VIDEO ATTRIBUTES (ALL EMULATIONS)

Attribute	X = ASCII Code	Hex Code
Normal*	@	40
Half Intensity	A	41
Blinking	B	42
Half Intensity, Blinking	C	43
Reverse Video	P	50
Rev. Video, Half Intensity	Q	51
Rev. Video, Blinking	R	52
Rev. Video, Half Intensity, Blinking	S	53
Underlined	'	60
Underlined, Half Intensity	a	61
Underlined, Blinking	b	62
Underlined, Half Intensity, Blinking	c	63
Blanking	D	44

*Normal (black or white characters) is selectable in set-up mode.

Example: Set foreground data to blinking in VT52 mode:

LI 0 B

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET FOREGROUND	LI T	LI T	LI T or CTRL O	LI CTRL _	LI CTRL _	LI 3

5.8.3 Set Foreground

Defines the beginning of foreground data. All data received following this command is displayed as foreground data until a set background command is received.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET BACKGROUND	LI U	LI U	LI U or CTRL N	LI CTRL Y	LI CTRL Y	LI 4

5.8.4 Set Background

Defines the beginning of background data. All data received following this command is displayed as background data until a set foreground command is received.

5.9 SELECT VIDEO ATTRIBUTES

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SELECT NORMAL	LI W	LI W	LI W	LI W	LI W	LI CTRL W
SELECT HALF INTENSITY	LI O	LI O	LI O	LI O	LI T	LI CTRL T
SELECT REVERSE VIDEO	LI j	LI j	LI j	LI j	LI V	LI CTRL V
SELECT UNDERLINE	LI S	LI S	LI S	LI S	LI S	LI CTRL R
SELECT BLANK	LI h	LI h	LI h	LI h	LI X	LI CTRL X
SELECT BLINK	LI i	LI i	LI i	LI i	LI U	LI CTRL U
STOP BLINK	N/A	N/A	N/A	N/A	LI k	LI k

5.9.1 Select Video Attributes

The above commands select the desired attribute for foreground data *only*. The commands effect every foreground character on the screen regardless of when the character is received.

The select video commands override the set foreground attribute command and conversely the set foreground attribute command overrides the select video attributes command.

5.10 MODE COMMANDS

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET PROTECT	L1 q	L1 q	L1 q	L1 q	L1 + (1)	L1 6

(1) Functional in Block mode only.

5.10.1 Protect Mode

When enabled, background data on the screen is protected.

- protected data is not alterable by the operator
- protected data is not transmitted.

This mode is also selectable in set-up mode. Refer to Section 6.0 for a detailed discussion of protect mode.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET UNPROTECT	L1 s	L1 s	L1 s	L1 s	L1 * (1)	L1 7

(1) Functional in Block mode only.

5.10.2 Unprotect Mode

When enabled, background data on the screen is unprotected.

- unprotected data is alterable by the operator
- unprotected data can be transmitted.

This mode is also selectable in set-up mode.

COMMAND	ALL EMULATIONS
SET GRAPHICS	L1 F
RESET GRAPHICS	L1 G

5.10.3 Graphics Mode

The set graphics and reset graphics command set and reset a mode whereby subsequently received characters from column 6 and 7 (lower case codes) of the ASCII chart are displayed as graphic elements rather than characters. Table 5-3 defines the graphics elements found in the VISUAL 50/55. The numeric digits found in this chart are subscripts. Please note that each character location on the screen can contain only one code (a graphic symbol cannot simultaneously occupy the same location as an alpha or numeric).

TABLE 5-3
LINE DRAWING MODE SYMBOL CODES

<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>B</td> <td>b7</td> </tr> <tr> <td>I</td> <td>b6</td> </tr> <tr> <td>T</td> <td>b5</td> </tr> <tr> <td>S</td> <td></td> </tr> </table>					B	b7	I	b6	T	b5	S		1 0 1	1 1 0	1 1 1
					B	b7									
I	b6														
T	b5														
S															
b4	b3	b2	b1	ROW COL	5	6	7								
0	0	0	0	0		~	-	p	¥						
0	0	0	1	1		a		q	¢						
0	0	1	0	2		b	+	r	ƒ						
0	0	1	1	3		c	⊥	s	□						
0	1	0	0	4		d	⊥	t	0						
0	1	0	1	5		e	└	u	1						
0	1	1	0	6		f	°	v	2						
0	1	1	1	7		g	±	w	3						
1	0	0	0	8		h	→	x	4						
1	0	0	1	9		i	∴	y	5						
1	0	1	0	10		j	÷	z	6						
1	0	1	1	11		k	↓	}	7						
1	1	0	0	12		l	└		8						
1	1	0	1	13		m	└	}	9						
1	1	1	0	14		∧	⊥	n	~						
1	1	1	1	15		-	Space	o	→						

Note: Shaded area characters are subscripts for the V50/55.

NOTE

Only lower case characters are interpreted as graphic characters.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
MONITOR MODE ENABLE	LI x	LI x	LI x	LI x	LI x	LI CTRL C
MONITOR MODE DISABLE	LI y	LI y	LI y	LI y	LI y	LI CTRL D

5.10.4 Monitor Mode

The set monitor mode command enables the V50/55 to display received control codes as half intensity, underlined and upper case characters.

The received control codes or commands are *not* acted upon. In Hazeltine emulation mode a received CR code is acted upon.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
DISPLAY ASCII PATTERN	LI 8	LI 8	LI 8	LI 8	LI 5	LI *

5.10.5 Display ASCII Pattern

Displays a test pattern of the ASCII characters.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
DISPLAY TEST PATTERN	LI "X	LI +X	LI "X	LI "X	LI "X	LI +X

5.10.6 Display Test Pattern

"X" being a displayable ASCII character, 1,920 characters appear on the screen when this command is issued. This command is used in the factory for screen alignment.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
TURN ON STATUS LINE	LI d	LI d	LI d	LI d	LI &	LI ?
BLANK STATUS LINE	LI c	LI c	LI c	LI c	LI h	LI -

5.10.7 Status Line Mode

The status line can be on or off. This is for operator comfort only. This parameter can be changed in set-up mode also.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
DEFINE SCROLLING REGION	LI _r1 r2	LI CTRL _r1 r2				

5.10.8 Define Scrolling Region

Where: R₁ and R₂ define the first and last lines of the scrolling region. The ASCII values of R₁ and R₂ are defined in Table 5-4.

TABLE 5-4
SCROLLING REGION ASCII VALUE OF R1/R2

Line	R1/R2	Line	R1/R2
1	A	13	M
2	B	14	N
3	C	15	O
4	D	16	P
5	E	17	Q
6	F	18	R
7	G	19	S
8	H	20	T
9	I	21	U
10	J	22	V
11	K	23	W
12	L	24	X

For example: To define a scrolling region of lines 5 through lines 15, the following command would be used in VT52 mode: LI E O

NOTE

In Table 5-4, lower case letters are also valid.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET ORIGIN MODE	LI 7	LI 7	LI 7	LI CTRL A	LI CTRL A	LI CTRL A
RESET ORIGIN MODE	LI :	LI :	LI :	LI CTRL B	LI CTRL B	LI CTRL B

5.10.9 Origin Mode

This mode applies only to Character mode and determines whether or not line numbers are dependent on the selected scrolling region.

When set, this mode causes line numbers to be dependent on the selected scrolling region of the screen. Column 1, line 1 will be the upper left-hand corner of the *scrolling region*.

When reset, line numbers will be independent of the selected scrolling region. Column 1, line 1 will be the upper left-hand corner of the *screen*.

NOTE

With origin mode set, the terminal cannot cursor address out of the scrolling region.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET HOLD SCREEN MODE	LI CTRL H	LI CTRL H	LI CTRL H	LI [	LI [	LI [

5.10.10 Set Hold Screen

This command places the terminal in the hold screen mode. After entering the mode, data will be displayed until the point when the screen would normally scroll (LF, Cursor Down in ADM-3A+ mode, receipt of the 80th character on the bottom line with Auto Line Wrap set, or receipt of CR with Auto New Line set). The character which would cause the scroll is stored in the buffer and an XOFF (DC3) code is transmitted. Data received from this point on is also stored in the buffer.

When the operator types the NO SCRL key, the scrolling character is extracted from the buffer, causing the screen to scroll. Data continues to be extracted from the buffer and displayed until the next scrolling character is encountered or until the buffer empties. If the buffer empties, an XON (DC1) code is transmitted. If another scrolling character is encountered, the emptying of the buffer halts with that scrolling character as the first character remaining in the buffer. When the operator again types the NO SCRL key, extraction begins and continues line by line until the buffer empties.

Using the shift key with the NO SCRL key modifies the operation from a line by line basis to a page (24 line) basis. When shifted scroll is used, all data from the buffer is scrolled onto the screen, an XON (DC1) is sent at the time the buffer empties, and new data is scrolled onto the screen as received, until a total of 24 lines have been displayed. When the 24th line is displayed, the terminal transmits an XOFF (DC3) and places subsequent data into the buffer. Scroll or shifted scroll functions are then repeated.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
RESET HOLD SCREEN MODE	␣ CTRL I	␣ CRTLI	␣ CTRL I	␣ CTRL I	␣ \	␣ \

5.10.10.1 Reset Hold Screen

This command resets the hold screen mode immediately if the operator has previously scrolled all buffer data onto the screen (the computer has received an XON). If buffered data has not been scrolled onto the screen when the command is received, the command will be stored in the buffer and acted upon only when the operator has scrolled that line onto the screen.

WARNING

Smooth scrolling requires terminal processing time and should not be used above 4800 baud communication rates unless XON-XOFF flow control is enabled.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SLOW SCROLL ENABLE	␣ CTRL C	␣ CTRL C	␣ CTRL C	␣ CTRL C	␣ c	␣ c
SLOW SCROLL DISABLE	␣ CTRL D	␣ CTRL D	␣ CTRL D	␣ CTRL D	␣ d	␣ d

5.10.11 Slow Scroll

When enabled, with scroll enabled in set up mode, data scrolls up the page a raster line at a time.

When disabled, data jumps up the page a line at a time.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET SECURITY	N/A	N/A	N/A	N/A	␣ a	␣ a
RESET SECURITY	N/A	N/A	N/A	N/A	␣ b	␣ b

5.10.11.1 Security Mode

When enabled, typed data and incoming data will not be displayed.

When disabled, normal operation occurs.

NOTE

Same as blank mode.

COMMAND	ALL EMULATIONS
SET FUNCTION PAD 1	[F1] ;

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET FUNCTION PAD MODE 2	[F1] f	[F1] f	[F1] f	[F1] <	[F1] <	[F1] <

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET FUNCTION PAD MODE 3	[F1] =	[F1] n	[F1] =	[F1] =	[F1] =	[F1] =

COMMAND	ALL EMULATIONS
RESET FUNCTION	[F1] >

5.10.12 Set Modes

This command conditions the numeric pad keys to generate codes as defined in Table 4-3.

The function keys F1, F2, and F3 are unaffected by the set function mode commands.

NOTE

1. The alternate key pad mode entered displays in the status line as "AKP X". X is 1, 2, or 3.
2. Alternate key pad 3 is DEC VT52 mode.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
LOCK KEYBOARD	LI 5	LI 5 or CTRL O	LI 5	LI CTRL u	LI CTRL u	LI h
UNLOCK KEYBOARD	LI 6	LI 6 or CTRL N	LI 6	LI CTRL F	LI CTRL F	LI &

5.10.13 Lock Keyboard

When enabled, any entry to the keyboard is ignored, except entering set up mode. This disables keyboard lock. A remote transmit of "Unlock Keyboard" command unlocks the keyboard. When disabled, the keyboard functions normally.

5.11 EDITING FUNCTION COMMANDS

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET INSERT CHARACTER	LI a	LI a	LI a	LI a	LI i	LI i

5.11.1 Set Insert Character

When enabled, characters enter to the left of the cursor. All Foreground Data shifts to the right. The characters at the end of the line or adjacent to a Background Field on the cursor line is lost.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
RESET INSERT CHARACTER	LI b	LI b	LI b	LI b	LI j	LI j

5.11.2 Reset Insert Character

When reset, all characters enter as normal. The cursor moves distinctly to the right.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
DELETE CHARACTER	LI w	LI w	LI w	LI w	LI O	LI O

5.11.3 Delete Character

The delete character command deletes the character at the cursor location and moves in Foreground data located to the right of the cursor one position to the left. Only data on the line which contains the cursor is affected.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
INSERT LINE	LI L	LI L	LI L	LI CTRL Z	LI CTRL Z	LI L

5.11.4 Insert Line

The insert line command causes the data on the entire line in which the cursor is located and all lines below this line to move down one line. The bottom line is lost and the line where the cursor is located is blank. The cursor is positioned at the beginning of the blank line.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
DELETE LINE	LI M	LI M	LI M	LI CTRL S	LI CTRL S	LI M

5.11.5 Delete Line

The delete line command deletes the line in which the cursor is located, moves all lines below this line up one line, and places the cursor on the left margin.

5.12 READ COMMANDS

NOTE

The following read command descriptions assume that the terminal is operating in full duplex. If the terminal is operated in half duplex the computer must send the selected turn-around character after the read command before the terminal will transmit the requested message.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
READ CURSOR ADDRESS	LI r	LI r	LI r	LI CTRL E	LI CTRL E	LI r

5.12.1 Read Cursor Address

This command causes the V50/55 to transmit a message indicating the current cursor location. The response for each emulation is listed in Table 5-5.

**TABLE 5-5
READ CURSOR ADDRESS RESPONSE**

EMULATION MODE	RESPONSE	
	FDX	HDX
V50, VT 52	y x	y x TACC
LSI	y x CR	y x TACC
ADDS	y x CR	y x TACC
Hazeltine	x y CR	x y TACC

x, y - ASCII character as defined in Appendix 1
TACC - CR, EOT, NULL SCH or ETX as defined in set-up mode.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
READ STATUS	LI e	LI e	LI e	LI e	LI -	LI e

5.12.2 Read Status

READ TERMINAL STATUS: The read terminal status command causes the terminal to transmit a message which defines the current configuration of the terminal including: data rate, parity, emulation mode, communications configuration, present cursor position, scroll mode, and screen mode. The format and values of each character of the message is detailed. If the terminal is operating in half duplex mode, it is necessary for the computer to end the read terminal status command with a turnaround code before the terminal will transmit the status.

5.12.2.1 Receiver Baud Rate (Byte 1)

Transmitted ASC Char	Defined Baud Rate
0	75
1	110
2	134.5
3	150
4	200
5	300
6	600
7	1200
8	1800
9	2000
A	1800
B	3600
C	4800
D	7200
E	9600
F	19200

5.12.2.2 Transmitter Baud Rate (Byte 2)

Transmitted ASCII character defines the transmitter baud rate as defined in 5.12.2.1

5.12.2.3 Parity (Byte 3)

<u>Transmitted ASC Char</u>	<u>Defined Parity</u>
@	ODD
A	EVEN
B	MARK
C	SPACE

5.12.2.4 Emulation (Byte 4)

<u>Transmitted</u>	<u>Defined Emulation</u>
0	V50/55 or VT52
1	LSI
2	ADDS
3	Hazeltine

5.12.2.5 Duplex (Byte 5)

<u>Transmitted</u>	<u>Defined Emulation</u>
@	HDX CR
A	HDX ETX
B	HDX EOT
C	HDX SCH
D	HDX NULL
H	FDX CR
I	FDX ETX
J	FDX EOT
K	FDX SCH
L	FDX NULL

5.12.2.6 Auto New Line/CR or LF Mode/Scroll (Byte 6)

<u>Transmitted ASC Character</u>	<u>Defined Mode</u>
0	Alone
1	Scroll Mode
2	Auto CR/LF
3	Scroll and Auto CR/LR
4	Auto New Line
5	Auto New Line and Scroll
6	Auto New Line and Auto CR/LF
7	All

5.12.2.7 Foreground Attributes (Byte 7)

<u>Transmitted ASC CODE</u>	<u>Defined Foreground attributrs</u>
@	Normal
A	Half Intensity
B	Blinking
C	Half Intensity and Blinking
P	Reverse
Q	Reverse and Half Intensity
R	Reverse and Blinking
S	Reverse, Half Intensity, Blinking,
` (Hex 60)	Underline
a	Underline and Half Intensity
b	Underline and Blinking
c	Underline, Half Intensity, Blinking
D	Blinking

5.12.2.8 Background Attributes (Byte 8)

Transmitted ASC II character defines background attributes as defined in 5.12.2.7.

5.12.2.9 Cursor Address (Byte 9, 10, 11)

Transmitted ASCII character defines cursor address as defined in 5.12.1

COMMAND	ALL EMULATIONS
READ TERMINAL ID	L Z

5.12.3 Read Terminal ID

This command causes the terminal to transmit a fixed ID message.

EMULATION	ID MESSAGE	
	FDX	HDX
V210,V50 or VT52	L /K	L /K CR
ADDS	L /K CR	L /K CR
LSI	L /K CR	L /K CR
Hazeltines	L /K CR	L /K CR

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
READ CHARACTER AT CURSOR	L !	L !	L !	L !	L !	L /

5.12.4 Read Character

Causes the V50 to transmit the ASCII character at the cursor location.

COMMAND	ALL EMULATIONS
ANSWER BACK	CTRL E

5.12.5 Answerback

Causes the terminal to transmit the 16 character answerback message. The Answerback message is programmed in set-up mode.

5.13 REMOTE PROGRAMMING OF FUNCTION KEYS

The same rules apply to remotely programming the Function Keys found in Section 3.

COMMAND	ALL EMULATIONS
PROGRAM FUNCTION KEY	[F] @ X
SEND DATA TO HOST	[F] {
SEND DATA TO SCREEN	[F] }
END PROGRAMMING	[F] |

NOTE

"X" is a function key number.

5.13.1 Program Function Key

Selects the function key to be programmed according to the value of "X." Table 5-6 defines value of the function key number.

5.13.2 Send Data to Host

This command assigns an attribute to the subsequent function key programming data that causes that data to be transmitted to the host when the function key is depressed or called remotely.

5.13.3 Send Data to Screen

This command assigns an attribute to the subsequent function key programming data that causes that data to be screen routed (local action) when the function key is depressed called remotely.

5.13.4 End Programming

Completes the programming of the selected function key.

**TABLE 5-6
HEX VALUE OF PROGRAM KEY
SELECTION PARAMETER**

Function Key	Hex Value X
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C

NOTE

Data sent to the terminal subsequent to a program function key command and before an end programming command is transparent to the terminal.

Example:

Command	Action
ESC @ B	Open Function Key 11
ESC {	Send Data to the Host
ESC Y	Data
ESC :	Terminate Function Key 11

6. DATA TRANSMISSION

The VISUAL 50/55 supports both character by character and block transmission. This section deals with communication protocols and the optional auxiliary port.

6.1 TRANSMISSION COMMANDS

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET BLOCK MODE	[F] #	[F] m				
RESET BLOCK MODE	[F] $	[F] $	[F] $	[F] $	[F] \$	[F] n

6.1.1 Block Mode

This mode determines whether the terminal operates in block or character mode.

When set, the terminal operates in block mode and transmission does not occur until the operator depresses the key **[ENTER]** or transmission is initiated by a remote transmit command. "BLOCK" is displayed on the 25th status line. Transmission is initiated by depressing the **[XMIT]** key on the V55.

When reset, the terminal operates in character mode (conversational) and transmission occurs on a character by character basis. "CONVRS" is displayed on the 25th status line.

Resetting block mode also resets line mode on the V50.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET LINE MODE	[F] .	[F] .	[F] .	[F] .	[F] .	[F] o

6.1.2 Line Mode Transmission

When Line Mode is set, and transmission is initiated, only the data on the line specified by the cursor will be transmitted. Data compression deletes spaces of the last field and only those spaces from the last character to the end of the line. The start of Message code, if any, is appended at the beginning of the transmitted line. Because the maximum length of transmitted data is one line, the End of Line code (s), if any, are not used and the transmission is terminated with the End of Message code (s).

When transmission ends, the cursor is placed at the left-hand margin of the next line. In HZ1500+ mode, the cursor is placed in the same column, one line below the transmitted line, except when the last line has been transmitted, when the cursor will be placed at the left margin.

NOTE

If the last line is transmitted while the terminal is in Unprotect mode and Scroll mode, the screen will scroll-up one line.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
REMOTE TRANSMIT	LI N	LI N	LI N	LI CTRL N	LI CTRL N	LI 5

COMMAND	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
REMOTE FIELD TRANSMIT	LI)	LI)	LI)	LI)	N/A	N/A

6.1.3 Remote Transmit

Depending on the State of the Block transmission mode, the V50/55 transmits under the following conditions:

6.1.3.1 Remote Page Transmit

This command initiates a transmission of block mode data from the V50 to the host. The state of line mode determines whether the current cursor line or the entire page is sent.

6.1.3.2 Remote Field Transmit

This command initiates a transmission of block mode data. Unprotected data contained in the current cursor field is transmitted and the cursor moves to the next unprotected field. If the cursor is positioned in a protected field (background), transmission does not occur and the cursor moves to the next unprotected field. Transmitted messages are ended with the selected EOM code.

6.2 MODE COMMANDS

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET BATCH MODE	N/A	N/A	N/A	N/A	LI %	LI 8

6.2.1 Batch Mode Transmission

When Batch mode is set, and transmission is initiated, all data from the beginning of the line following the previous transmit symbol, up to, but not including the cursor location, will be transmitted. The transmit symbol is a full-intensity solid rectangle (rub-out) which is stored on the screen to mark the end of transmission. A new transmit symbol is stored at the end cursor location to mark the new last point of transmission and the cursor is advanced to the left-hand margin of the next line. If no transmit symbol was previously on the screen, the transmission will occur from the home position, up to, but not including the cursor location. The Start of Message, End of Line, and End of Message codes will be appended at the Start of Message, End of Lines and End of Message respectively provided the terminal is *not set* to HZ1500+ mode. In HZ1500+ Batch mode, the Start of Message code will not be appended.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET PAGE MODE	␣ \	␣ \	␣ \	␣ \	␣ (	␣ 9

6.2.2 Page Mode Transmission

When Page mode is set, and transmission is initiated, all data on the screen will be transmitted. (If Protect mode is set, only the unprotected fields will be transmitted). Spaces to the right of the last character on each line are suppressed, just as in Line mode. The start of the Message code, if any, is appended to the beginning of the transmitted page. At the end of each line, the End of Line code (s) are appended. End of Message codes are appended for the last line.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET AUTO TAB	␣ CTRL V	␣ +	␣ +	␣ +	␣ 8	␣ q

6.2.3 Set Auto Tab

When Auto-Tab is set (allowed in Protect mode only) attempted *keyboard* data entry into a protected field results in the following events:

1. The bell is sounded.
2. The cursor is moved to the right and down to the first unprotected position.
3. The keyboard character is entered at this unprotected position.
4. The cursor is advanced one position.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
RESET AUTO TAB	␣ CTRL W	␣ ,	␣ ,	␣ ,	␣ 9	␣ S

6.2.4 Reset Auto-Tab

When Auto-Tab is reset, attempted *keyboard* data entry into a protected field results in the following events.

1. The bell is sounded.
2. The cursor is not moved.
3. The keyboard character is not entered on the screen.

6.3 AUXILIARY COMMUNICATION PORT

The VISUAL 50/55 is equipped with a RS 232 Auxiliary communication port. The "Aux Port" is bidirectional and operates in two modes: transparent on or transparent off.

6.3.1 Aux Port Data Connector

The Aux Port Data Connector provides the EIA RS232C voltage level signals listed below in Table 6-1. Data is received and transmitted at the selected baud rates of the main port.

**TABLE 6-1
AUX PORT PIN ASSIGNMENTS**

Pin	Direction	Designation	Function
1	—	Aux AA	Protective Ground (Chassis)
2	To Terminal	Aux BB	Auxiliary Data In
3	From Terminal	Aux BA	Auxiliary Data Out
4	To Terminal	Aux CA	Auxiliary Request To Send
5	From Terminal	Aux CB	Auxiliary Clear To Send (See Note)
6	From Terminal	Aux CC	Auxiliary Data Set Ready
7	—	Aux AB	Signal Ground
8	From Terminal	Aux CF	Data Carrier Detect

6.3.2 Aux Key

The Aux Key is only on the V55. Depressing the aux key alternately enables and disables the aux port. When enabled, "Aux" displays on the status line.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
AUX PORT ENABLE	L1 *	L1 *	L1 *	L1 *	L1 CTRL M	L1 CTRL M
AUX PORT DISABLE	L1 ?	L1 ?	L1 ?	L1 ? or CTRL T	L1 CTRL <input type="checkbox"/>	L1 CTRL <input type="checkbox"/>

6.3.3 Aux Port Enable/Disable

Upon receipt of the aux port enable command, data received via the primary port is output to the auxiliary port without being acted on or displayed by the V50. Data received by the auxiliary port is outputted via the primary port without being acted on or displayed.

Upon receipt of the aux port disable command, the auxiliary port is disabled and no data is output.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
AUX PORT ENABLE WITH DISPLAY	L1 /	L1 /	L1 /	L1 / or CTRL R	L1 CTRL P	L1 CTRL P

6.3.4 Aux Port Enable with Display

Upon receipt of this command, data received via the primary port is output to the auxiliary port. Output data is displayed and acted on by the VISUAL 50.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
TRANSPARENT ON	L1 3	L1 3	L1 3	L1 3	L1 * L1 5 (1)	L1 3

(1) Functional in Block mode only.

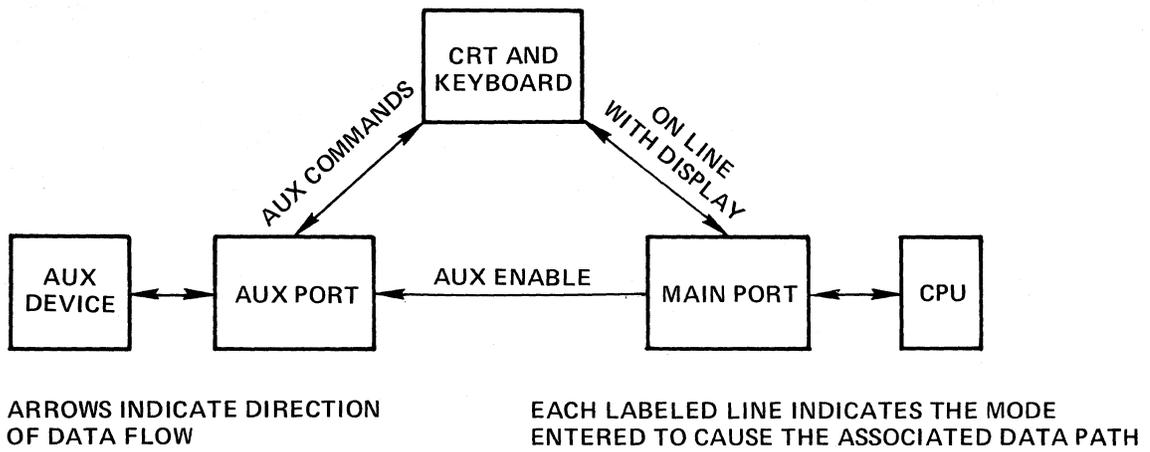
6.3.5 Transparent On

This command is functionally identical to the Aux Port Enable command and is included for ADM-3A compatibility.

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
TRANSPARENT OFF	L1 4	L1 4	L1 4	L1 4	L1 ?	L1 X

6.3.6 Transparent Off

This command is functionally identical to the Aux Port Enable Command and is included for ADM 3A compatibility.



AUXILIARY DATA PATHS

Figure 6-1. Auxiliary Data Paths

NOTE

In order to prevent interruption of the data flow, it is recommended that the keyboard be locked whenever the aux port is enabled without display (pass thru).

6.4 SET MESSAGE FRAMING CODES

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET START OF MESSAGE CODE	N/A	N/A	N/A	N/A	LI Nxx	LI Nxx

6.4.1 Set Start of Message Code

The Start of Message Code (SOM) precedes all block transmissions from the Visual 50/55 including function key transmissions and status transmissions. Receipt of a Start of Message Code will LOCK the keyboard. See Section 6.4.4 for RESET of lock.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET FIELD SEPARATOR	N/A	N/A	N/A	N/A	LI .XX	LI 7xx

6.4.2 Set Field Separator Code

The Field Separator code (FS) is inserted into all block transmission data streams to separate each unprotected area transmitted. If protected data is transmitted, the (FS) is not used.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET FEOL	N/A	N/A	N/A	N/A	LI Uxx	LI 4xx

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET SEOL	N/A	N/A	N/A	N/A	LI 6xx	LI Vxx

6.4.3 Set First End of Line Code and Second End of Line Code

The First End of Line Code (FEOL) and the Second End of Line Code (SEOL) are inserted into block transmission data streams to signify the end of data on each line.

COMMAND	DEC VT52	LSI ADM3A	Adds Viewpoint	Hazeltine Esprit	Hazeltine 1500	Visual 210
SET FIRST END OF MESSAGE CODE	N/A	N/A	N/A	N/A	LI 3xx	LI ,xx

COMMAND	COMMAND CODE					
	VT52	LSI	ADDS	ESPRIT	HAZ 1500	V210
SET SECOND END OF MESSAGE CODE	N/A	N/A	N/A	N/A	LI 0xx	LI 0xx

6.4.4 Set First End of Message Code and Second End of Message Code

The First End of Message Code (FEOM) and Second End of Message Code (SEOM) will terminate all block transmissions from the VISUAL 50/55 including function key transmissions and status transmissions. Receipt of either a FEOM or SEOM will clear a keyboard locked condition previously caused by receipt of the Start of Message (SOM) code.

6.5 COMMUNICATION INTERFACE

Table 6-2 defines the pin connections for the communications interface connector. Both RS 232 and Current Loop connections are present on this connector, however only one interface may be used.

TABLE 6-2
MAIN PORT PIN ASSIGNMENTS

PIN	RS 232C MNEMONIC	CCITT V24 MNEMONIC	DEFINITION
1	AA	101	Protective Ground
2	BA	103	Transmit Data to Modem
3	BB	104	Receive Data from Modem
4	CA	105	Request-to-Send
5	CB	106	Clear-to-Send
6	CC	107	Data Set Ready
7	AB	102	Signal Ground
8	CF	109	Carrier Detect
11	SCA	—	Secondary Channel Request-to-Send (202 modem)
12	SCF	122	Secondary Channel Carrier Detect
13			
17	—	—	Current Loop Receive —
18	—	—	Current Loop Receive +
19	SCA	120	Secondary Channel Request-to-Send (RS 232, V24 modem)
20	CD	108.2	Data Terminal Ready
21	—	—	Current Loop Transmit +
25	—	—	Current Loop Transmit —

6.6 FULL/HALF DUPLEX MODE

Full Duplex — Data can be transmitted and received simultaneously. The V50 supports independent transmit and receive baud rates.

Half Duplex — Data is transmitted or received in one direction at a time. Upon power up the V50 is set to receive mode. Upon depressing the first key the V50 is set to transmit mode.

6.6.1 Secondary Channel Control

If secondary channel mode (SCH) is enabled, the V50 monitors the secondary channel for turnaround control. When a "break" is detected, the V50 switches to the receive state and monitors "carrier detect" for incoming data. If the carrier is absent for approximately 500 msec then the V50 switches to the transmit state. Secondary channel is used primarily in applications requiring connection to low speed modems.

In full duplex the EOM code is appended to all block mode communication messages to indicate the end of message. The V50 can send or receive data simultaneously and request to send is always high.

6.6.2 Data Compression

When transmitting a buffered message, the V50/55 will automatically delete insignificant spaces depending on the emulation mode, and transmission mode selected.

The following descriptions of data compression apply to all emulation modes except when HZ1500+ *and* Batch modes are selected.

6.6.2.1 Line Mode

Spaces to the right of the last character on the line are suppressed. The End of Message code(s) if any, are immediately appended to the last character.

6.6.2.2 Page Mode

Spaces to the right of the last character on each line are suppressed, the End of Line code(s), if any, are appended to the last character of each line. Spaces to the right of the last character of the last line are suppressed, followed by the End of Message code(s), if any.

6.6.2.3 Batch Mode

Data compression is the same as for Page mode, however, in this mode the "last" line is the line in which the cursor was located when transmission was initiated. This "last" line may or may not be the 24th line of the screen.

6.6.2.4 HZ1500+, Batch Modes

If HZ1500+ emulation mode is selected, no automatic data compression will occur when transmitting in Batch mode. Data compression in this case is accomplished by using a stored CR (carriage return) code. The stored CR code is displayed as a half-intensity solid rectangle (rub-out code) and marks the point where data compression is to begin on any particular line.

6.7 XON-XOFF CONTROL

The terminal can operate at transmission speeds up to 19,200 baud. However the terminal may not be able to keep up with incoming data. The terminal stores incoming characters in a buffer called the FIFO, and processes them on first-in/first-out basis. When the FIFO begins to fill up, the terminal will transmit an XOFF (DC 3) code. On this signal, the host is supposed to suspend its transmission to the V50. Eventually, if the host stops transmitting, the V50 will process all of the characters out of the FIFO. When the FIFO is nearly empty, the V50 will transmit and XON (DC 1) code to signal the host it may resume transmission.

If the FIFO overflows, characters will be lost.

The following is a summary of the various interactions of these occurrences assuming the Transmitter XON/XOFF feature is enabled.

Sending XOFF – the first occurrence of:

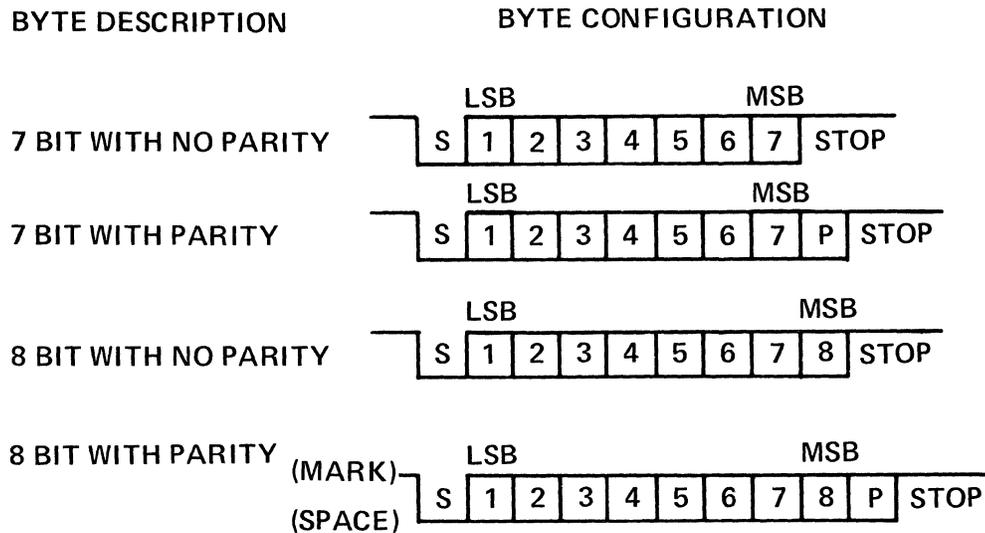
1. FIFO filling condition
2. Pressing the NO SCROLL key
3. Pressing Control S

6.8 ASYNCHRONOUS DATA

The VISUAL 50/55 communicates using the standard 7 or 8 bit ASCII code format shown in Figure 6-2. Communications is in the start stop asynchronous serial mode.

Transmitted and received data is formatted into a 10 or an 11 bit word containing a start bit, 7 ASCII data bits, a parity bit and one or two stop bits. The start bit is always a spacing (zero) bit, followed by the 7 data bits with the least significant bit first. The single parity bit is next and can be odd, even, mark (always a one) or space (always a zero). Each character ends with one or two stop bits.

Received data is monitored to detect parity errors and framing errors. If the terminal has Even parity selected and the received character parity is odd, or when Odd parity is selected and the received character is even a parity error symbol (P_E) is displayed in place of the received character. Framing errors are detected by determining the number of stop bits received as compared to the number selected by the baud rate. Framing errors display as the parity error symbol.



- S = START BIT, ALWAYS = 0
- LSB = LEAST SIGNIFICANT DATA BIT
- MSB = MOST SIGNIFICANT DATA BIT
- STOP = STOP: BIT(S), 2 AT 110 BAUD OR LESS,
1 AT HIGHER THAN 110 BAUD
- P = PARITY BIT, ODD OR EVEN

Figure 6-2. Asynchronous Data

6.9 OPTIONAL CURRENT LOOP INTERFACE

The V50/55 current loop interface is designed to operate at 20 ma. in either full or half duplex with the modem or computer supplying the current source. A marking condition (logical 1) is 20 ma. flowing in the circuit, while a spacing condition (logical 0) is no current flowing. Full and half duplex configurations are determined by the wiring of the interface. The V50 should always remain in the full duplex when using the current loop interface. Figure 6-3 illustrates the current loop connections.

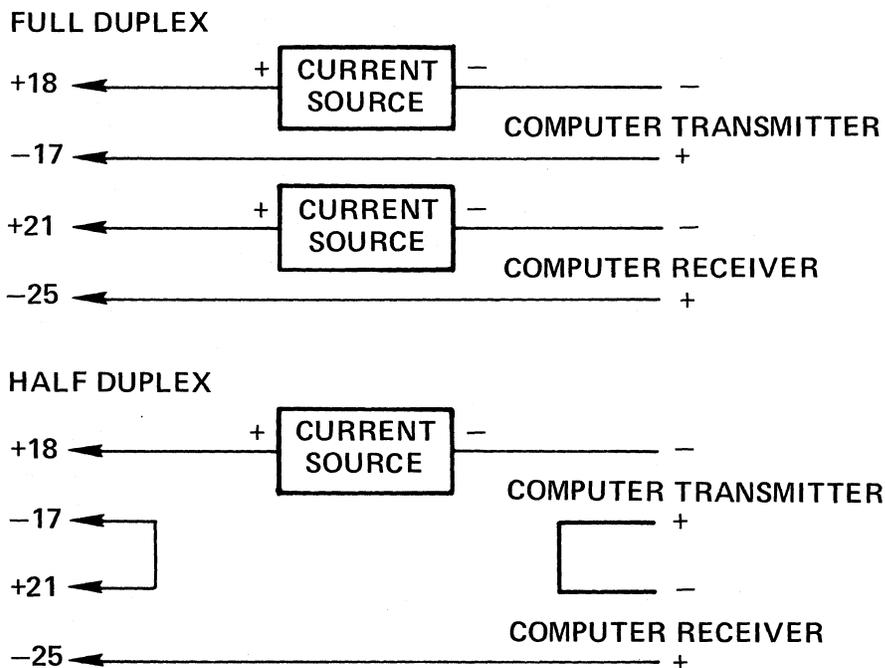


Figure 6-3. Current Loop Connections

7. FIRST LEVEL MAINTENANCE

7.1 GENERAL

The Visual 50/55 terminal has been designed with subassembly exchange as the prime mode of service. Fault isolation is provided in this section to identify the failing subassembly. Unless otherwise noted the power cord should be disconnected before disassembly of the terminal. Hazardous voltages may be present.

7.2 TOP COVER

The removal of the top cover will allow the removal of the logic printed circuit board, removal of the TV monitor printed circuit board, and access to the AC terminal block allowing rewiring from 110 volts to 220 volts.

7.2.1 Top Cover Removal

Consult Figure 7-1 to locate the three screws which attach the top cover to the base at the rear. Loosen these screws and simply rotate top cover off by lifting at the rear of unit.

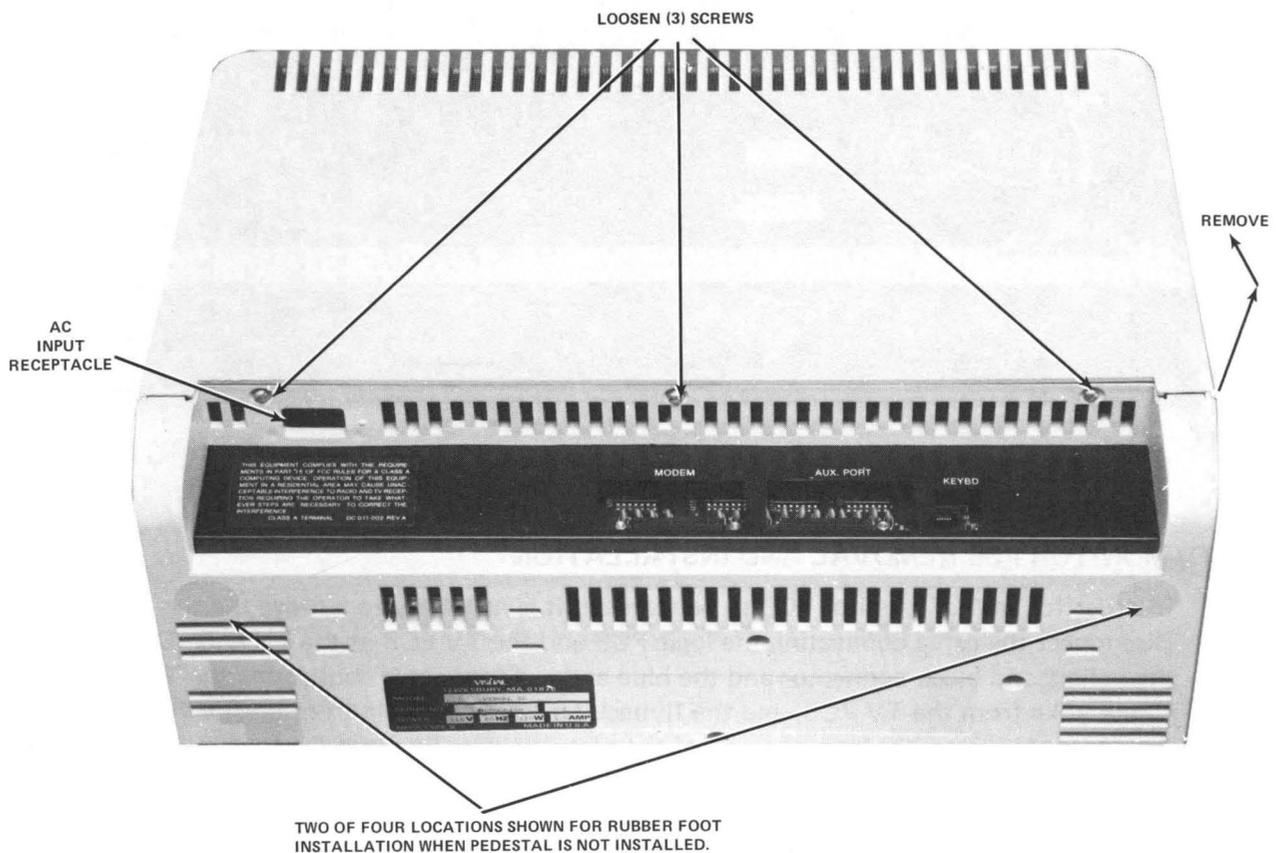


Figure 7-1. Top Cover Removal

7.3 PRINTED CIRCUIT BOARD REMOVAL AND INSTALLATION

Once the top cover has been removed, the main logic PCB may be removed by removing two screws shown in Figure 7-2, unplugging any modem cables and keyboard cable and by rotating the top of the PCB toward the rear while lifting it carefully out of the housing.

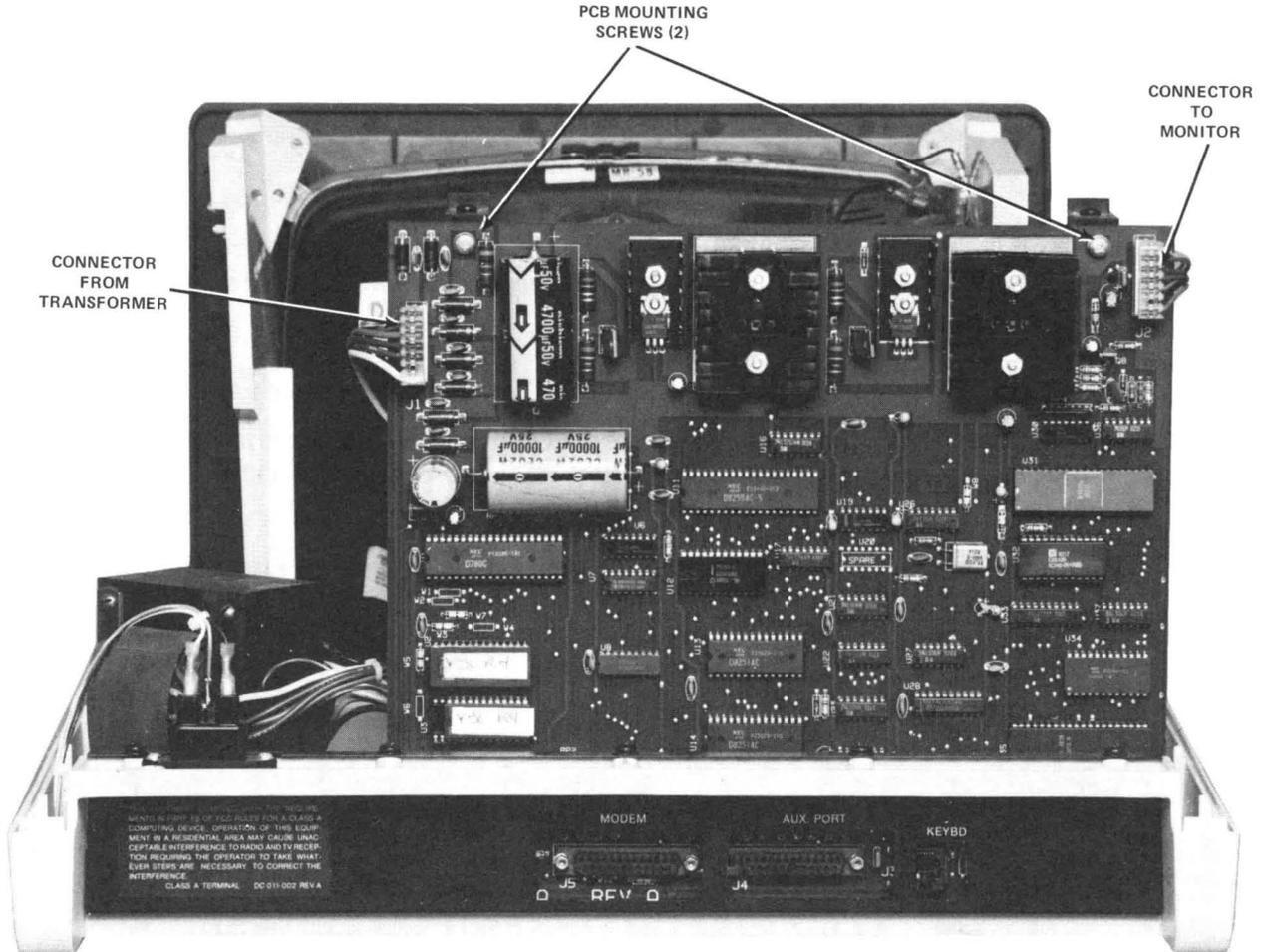


Figure 7-2. PCB Mounting

7.4 TV MONITOR PCB REMOVAL AND INSTALLATION

In order for the TV monitor PCB to be removed it is necessary to remove the top cover. Disconnect the cable connecting the logic PCB and the TV PCB at the TV end. Disconnect the yellow and black connector and the blue and red connector connecting the TV PCB to the yoke from the TV PCB, and the flyback transformer cable from the TV PCB. Unplug the connector assembly from the end of the picture tube. Squeeze the four nylon post locking levers one at a time (a Bic pen is an ideal tool) while carefully lifting the TV PCB nearby. Repeat until all four corners are free.

7.5 CRT AND FLYBACK REMOVAL AND INSTALLATION

Before removing the picture tube it is necessary to discharge the tube. With an insulated handled screwdriver short out the high voltage lead to the tube. Carefully lift the top edge of the high voltage connector and insert the end of the screwdriver. Cause the screwdriver shaft to touch the sheet metal bracket and the contact of the high voltage connector simultaneously. The high voltage connector can now be removed by rocking it while pulling it up. Disconnect the yoke, ground wire, and the tube socket assembly as described in Section 4. While holding the lower front edge of the picture tube in one hand, remove the four mounting screws, and remove the picture tube. The picture tube neck should not be subjected to any pressure or shock. Store the picture tube on its face. The flyback transformer can now be removed by unplugging it from the TV PCB and removing two mounting screws. When installing the picture tube install the lower two screws first. Insert the ground finger between the mounting bracket and the top picture tube mounting tab. Install the top two screws and connect the cables. Be sure that the black ground wire is installed!

7.6 TV MONITOR ADJUSTMENTS

Refer to Figure 7-3 for the location of the adjustments.

Adjust intensity to highest level.

Set terminal to reverse video.

Brightness Control: Adjust it so that the raster lines are visible.

Horizontal Phasing Control: Adjust the phasing control so that the video area is centered horizontally within the raster area.

Brightness Control: Reduce the brightness until the raster just disappears.

Reduce the screen intensity to a comfortable level.

Focus: Adjust the focus control for the best focus over the entire screen.

Set the terminal to local mode.

Fill the screen with E's.

Vertical Size: Adjust so that the total height is 6.00 ± 0.25 inches (152.4 ± 6.4 mm).

Horizontal Size: Adjust so that the total width of the screen of data is 8.25 ± 0.25 inches (209.5 ± 6.4 mm).

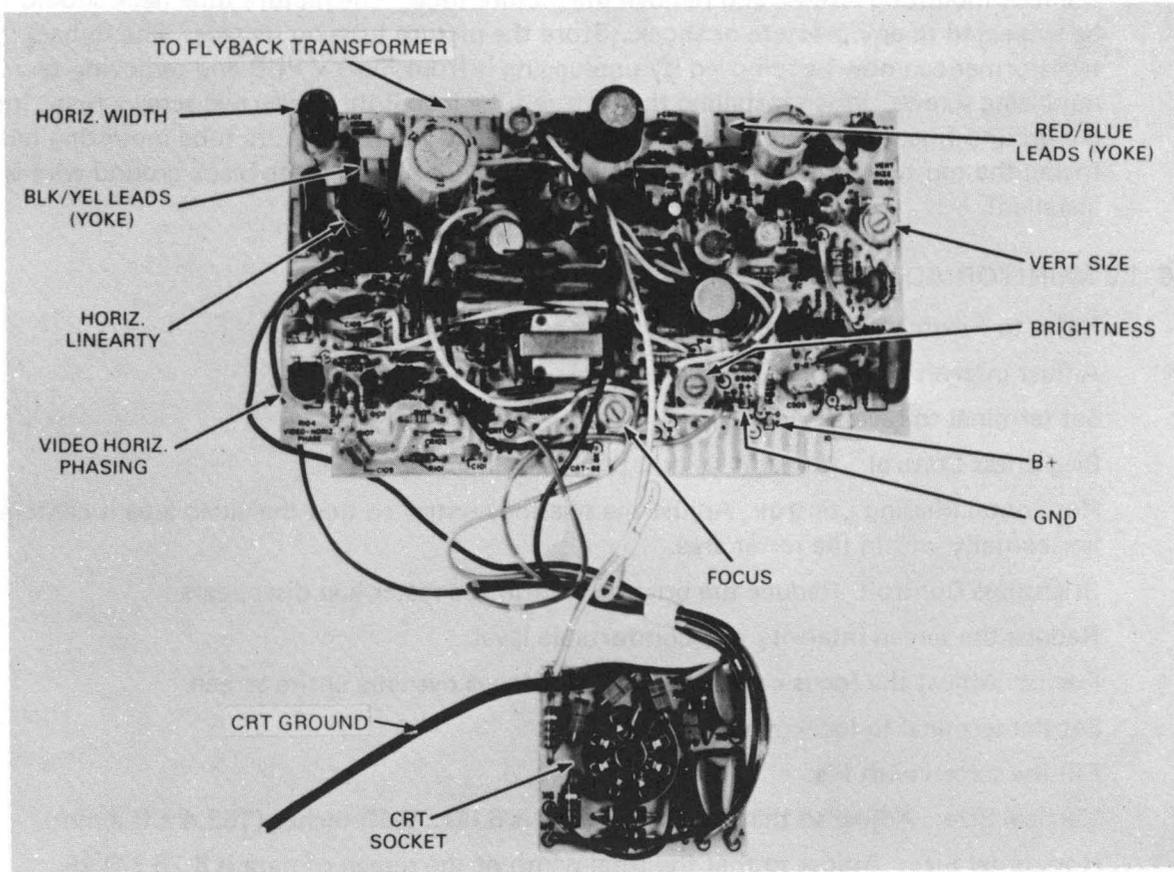


Figure 7-3. TV Monitor

7.7 110/220 VOLT SELECTION

Remove the top cover. **MAKE SURE THE LINE CORD IS DISCONNECTED!** Refer to Figure 7-4 for new connection. 220 volt units are provided with two inputs, 220 volts nominal, and 250 volts nominal. The highest input resulting in satisfactory operation should be used.

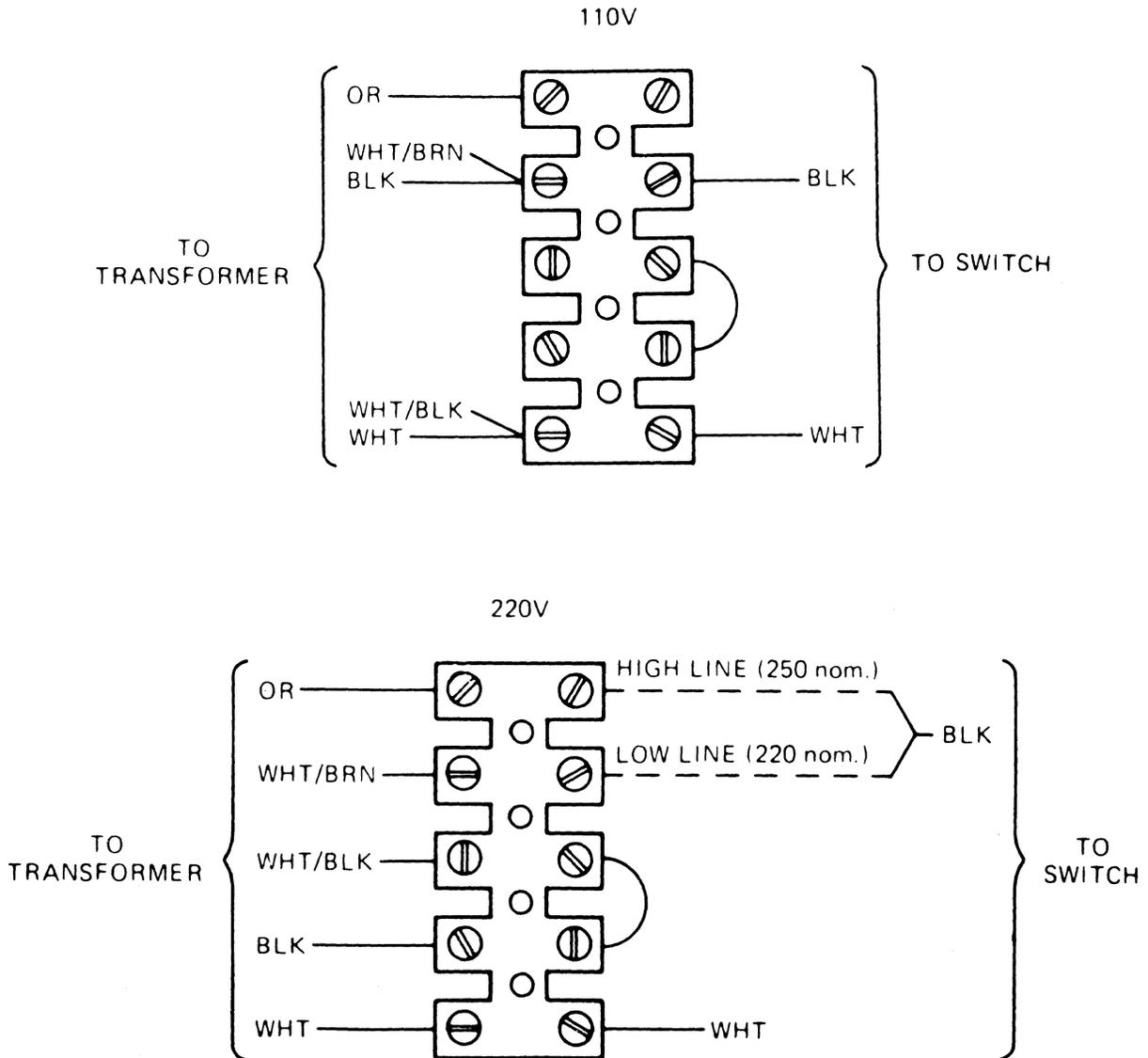


Figure 7-4. 110/220 Volt Selection

TABLE 7-1
V50/55 FAULT ISOLATION PROCEDURES

The Visual 50/55 contains a self test which is activated each time the terminal is turned on. The RAMs and ROMs are checked upon successful completion of self test, the bell sounds once and the screen is initialized (cursor displayed).

Operation	Fault	Probable Cause	Remedy
Turn on	No bell but cursor appears on screen	Keyboard not plugged in or Defective keyboard	Plug in keyboard Replace keyboard
Turn on	No cursor or bell	Unit not plugged in Circuit breaker tripped Defective main logic board	Plug unit in Reset circuit breaker Replace board
Self test completed	No cursor	Brightness too low TV cable not connected	Adjust in setup using the  key Plug cable in
Self test completed	Bell sounds 4 times	A. Non-volatile RAM failure or B. New firmware installed and never saved	A. Manually alter setup configuration and have PCB repaired in the future B. Manually establish set-up configuration and save cycle power to verify
No height	Horizontal line on TV	Yoke disconnected Monitor board	Plug in yellow-black connector Replace board
No width	Vertical line on TV	Yoke disconnected Monitor board	Plug in blue-red connector Replace board
Video tilted	Yoke adjustment	Yoke rotated from normal position	Adjust yoke
Video jittering	Wrong frequency	50/60 Hz parameter incorrect	Set up Select Menu 1 Set refresh rate

TABLE 7-1 (Cont.)

Operation	Fault	Probable Cause	Remedy
No data	Line or local	Keyboard disconnected Keyboard defective Logic PCB defective	Plug in Replace Replace
On line	Parity errors	Wrong data rate Wrong Parity setting Wrong # of bits/character Defective logic PCB	Select Communication Menu Replace logic
On line or local	Wrong characters	Defective keyboard Defective Logic PCB	Replace Replace
On line or local	Snapping sound	CRT ground wire not connected	Connect

APPENDIX I CURSOR ADDRESS VALUES

Read and Write Coordinates for Adds Viewpoint, LSI ADM 3, Visual 210, and DEC VT 52 (V50)					Hazeltine Write Coordinates		Hazeltine Read Coordinates		Adds Viewpoint Coordinates	
Dec. Value	ASCII Char.	Key Stroke	Row	Col.	Col.	Row	Col.	Row	Vertical	Horizontal
0	NUL	c@			0	0			0	0
1	SOH	cA			1	1			1	1
2	STX	cB			2	2			2	2
3	ETX	cC			3	3			3	3
4	EOT	cD			4	4			4	4
5	ENQ	cE			5	5			5	5
6	ACK	cF			6	6			6	6
7	BEL	cG			7	7			7	7
8	BS	cH			8	8			8	8
9	NT	cI			9	9			9	9
10	LF	cJ			10	10			10	0
11	VT	cK			11	11			11	0
12	FF	cL			12	12			12	0
13	CR	cM			13	13			13	0
14	SO	cN			14	14			14	0
15	SI	cO			15	15			15	0
16	DLE	cP			16	16			16	10
17	DC1	cQ			17	17			17	11
18	DC2	cR			18	18			18	12
19	DC3	cS			19	19			19	13
20	DC4	cT			20	20			20	14
21	NAK	cU			21	21			21	15
22	SYN	cV			22	22			22	16
23	ETB	cW			23	23			23	17
24	CAN	cX			24				8	18
25	EM	cY			25				9	19
26	SUB	cZ			26				10	10
27	ESL	c[			27				11	10

Read and Write Coordinates for Adds Viewpoint, LSI ADM 3, Visual 210, and DEC VT 52 (V50)					Hazeltine Write Coordinates		Hazeltine Read Coordinates		Adds Viewpoint Coordinates	
Dec. Value	ASCII Char.	Key Stroke	Row	Col.	Col.	Row	Col.	Row	Vertical	Horizontal
28	FS	c\			28				12	10
29	GS	cJ			29				13	10
30	RS	c^			30				14	10
31	US	c_			31				15	10
32	SP	SP	0	0	32		32		0	20
33	!	!	1	1	33		33		1	21
34	"	"	2	2	34		34		2	22
35	#	#	3	3	35		35		3	23
36	\$	\$	4	4	36		36		4	24
37	%	%	5	5	37		37		5	25
38	&	&	6	6	38		38		6	26
39	'	'	7	7	39		39		7	27
40	(	(	8	8	40		40		8	28
41	)	)	9	9	41		41		9	29
42	*	*	10	10	42		42		10	20
43	+	+	11	11	43		43		11	20
44	,	,	12	12	44		44		12	20
45	-	-	13	13	45		45		13	20
46	.	.	14	14	46		46		14	20
47	/	/	15	15	47		47		15	20
48	0	0	16	16	48		48		16	30
49	1	1	17	17	49		49		17	31
50	2	2	18	18	50		50		18	32
51	3	3	19	19	51		51		19	33
52	4	4	20	20	52		52		20	34
53	5	5	21	21	53		53		21	35
54	6	6	22	22	54		54		22	36
55	7	7	23	23	55		55		23	37
56	8	8		24	56		56		8	38
57	9	9		25	57		57		9	39
58	:	:		26	58		58		10	30
59	;	;		27	59		59		11	30
60	<	<		28	60		60		12	30
61	=	=		29	61		61		13	30

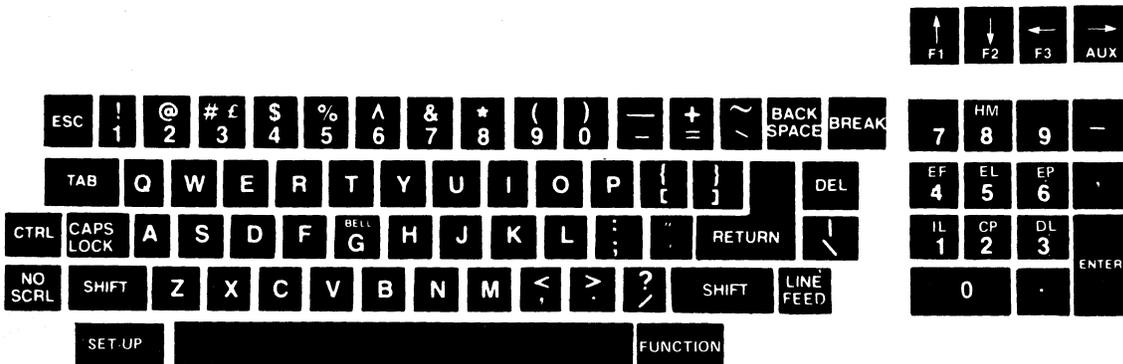
Read and Write Coordinates for Adds Viewpoint, LSI ADM 3, Visual 210, and DEC VT 52 (V50)					Hazeltine Write Coordinates		Hazeltine Read Coordinates		Adds Viewpoint Coordinates	
Dec. Value	ASCII Char.	Key Stroke	Row	Col.	Col.	Row	Col.	Row	Vertical	Horizontal
62	>	>		30	62		62		14	30
63	?	?		31	63		63		15	30
64	@	@		32	64		64		0	40
65	A	A		33	65		65		1	41
66	B	B		34	66		66		2	42
67	C	C		35	67		67		3	43
68	D	D		36	68		68		4	44
69	E	E		37	69		69		5	45
70	F	F		38	70		70		6	46
71	G	G		39	71		71		7	47
72	H	H		40	72		72		8	48
73	I	I		41	73		73		9	49
74	J	J		42	74		74		10	40
75	K	K		43	75		75		11	40
76	L	L		44	76		76		12	40
77	M	M		45	77		77		13	40
78	N	N		46	78		78		14	40
79	O	O		47	79		79		15	40
80	P	P		48					16	50
81	Q	Q		49					17	51
82	R	R		50					18	52
83	S	S		51					19	53
84	T	T		52					20	54
85	U	U		53					21	55
86	V	V		54					22	56
87	W	W		55					23	57
88	X	X		56					8	58
89	Y	Y		57					9	59
90	Z	Z		58					10	50
91	[	[		59					11	50
92	\	\		60					12	50
93	]	]		61					13	50
94	^	^		62					14	50

Read and Write Coordinates for Adds Viewpoint, LSI ADM 3, Visual 210, and DEC VT 52 (V50)					Hazeltine Write Coordinates		Hazeltine Read Coordinates		Adds Viewpoint Coordinates	
Dec. Value	ASCII Char.	Key Stroke	Row	Col.	Col.	Row	Col.	Row	Vertical	Horizontal
95	—	—		63					15	50
96	`	`		64			0	0	0	60
97	a	a		65			1	1	1	61
98	b	b		66			2	2	2	62
99	c	c		67			3	3	3	63
100	d	d		68			4	4	4	64
101	e	e		69			5	5	5	65
102	f	f		70			6	6	6	66
103	g	g		71			7	7	7	67
104	h	h		72			8	8	8	68
105	i	i		73			9	9	9	69
106	j	j		74			10	10	10	60
107	k	k		75			11	11	11	60
108	l	l		76			12	12	12	60
109	m	m		77			13	13	13	60
110	n	n		78			14	14	14	60
111	o	o		79			15	15	15	60
112	p	p					16	16	16	70
113	q	q					17	17	17	71
114	r	r					18	18	18	72
115	s	s					19	19	19	73
116	t	t					20	20	20	74
117	u	u					21	21	21	75
118	v	v					22	22	22	76
119	w	w					23	23	23	77
120	x	x					24		8	78
121	y	y					25		9	79
122	z	z					26		10	70
123	{	{					27		11	70
124	:	:					28		12	70
125	}	}					29		13	70
126	~	~					30		14	70
127	DEL	DEL					31		15	70

APPENDIX II U.S./U.K. CODE CHART

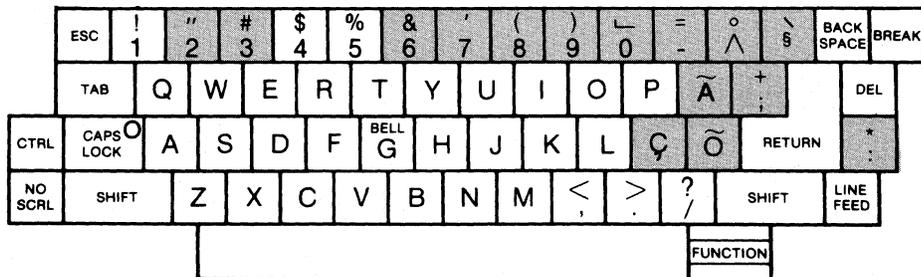
					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT	BIT	BIT	BIT	COL	0	1	2	3	4	5	6	7	
4	3	2	1	ROW									
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5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

U.K. version uses £ in Column 2 Row 3 in place of #



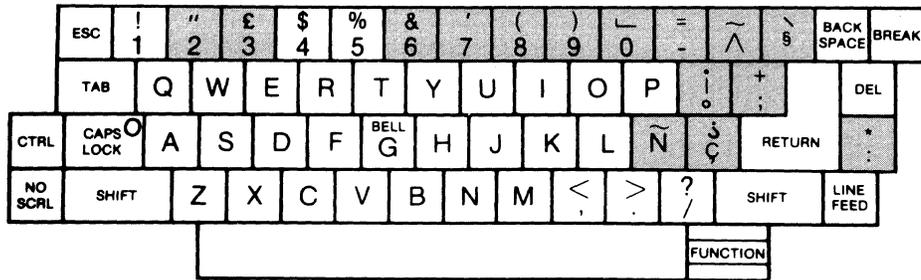
APPENDIX II PORTUGUESE CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	§	P	`	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	Ã	k	ã	
1	1	0	0	C	FF	FS	,	<	L	Ç	l	ç	
1	1	0	1	D	CR	GS	-	=	M	Õ	m	õ	
1	1	1	0	E	SO	RS	.	>	N	^	n	°	
1	1	1	1	F	SI	US	/	?	O		o	DEL	



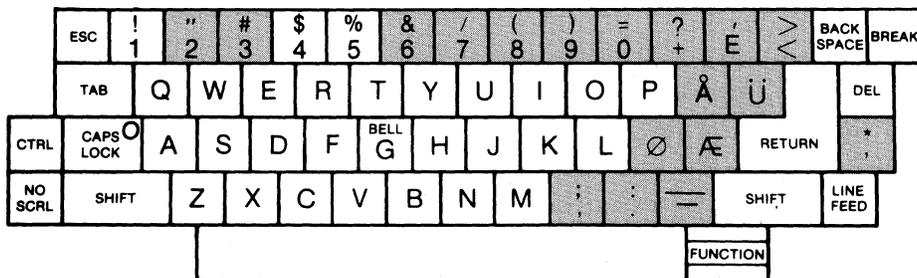
APPENDIX II SPANISH CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	§	P	`	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	£	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	ı	k	°	
1	1	0	0	C	FF	FS	,	<	L	Ñ	ı	ñ	
1	1	0	1	D	CR	GS	-	=	M	ş	m	ç	
1	1	1	0	E	SO	RS	.	>	N	^	n	~	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



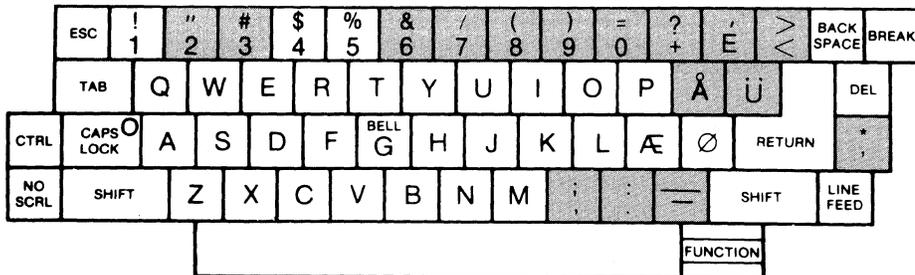
APPENDIX II NORWEGIAN CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	É	P	é	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	AE	k	ae	
1	1	0	0	C	FF	FS	,	<	L	Ø	l	ø	
1	1	0	1	D	CR	GS	-	=	M	Å	m	å	
1	1	1	0	E	SO	RS	.	>	N	Ü	n	ü	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



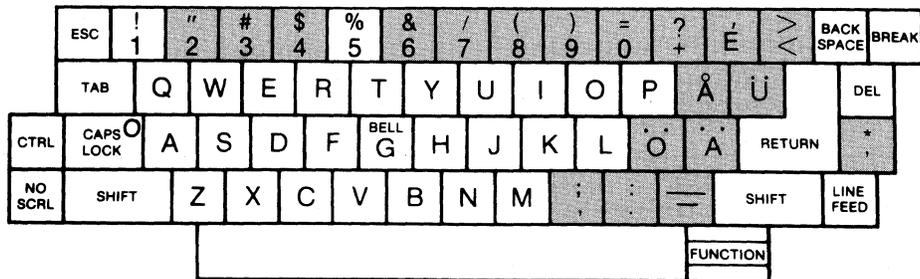
APPENDIX II DANISH CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	É	P	é	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	AE	k	ae	
1	1	0	0	C	FF	FS	,	<	L	Ø	l	ø	
1	1	0	1	D	CR	GS	-	=	M	Å	m	å	
1	1	1	0	E	SO	RS	.	>	N	Ü	n	ü	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



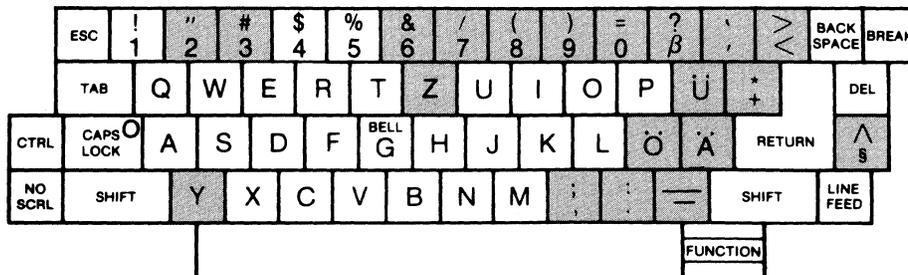
APPENDIX II SWEDISH/FINNISH CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	É	P	e'	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	Ä	k	ä	
1	1	0	0	C	FF	FS	,	<	L	Ø	l	ø	
1	1	0	1	D	CR	GS	-	=	M	Å	m	å	
1	1	1	0	E	SO	RS	.	>	N	Ü	n	ü	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



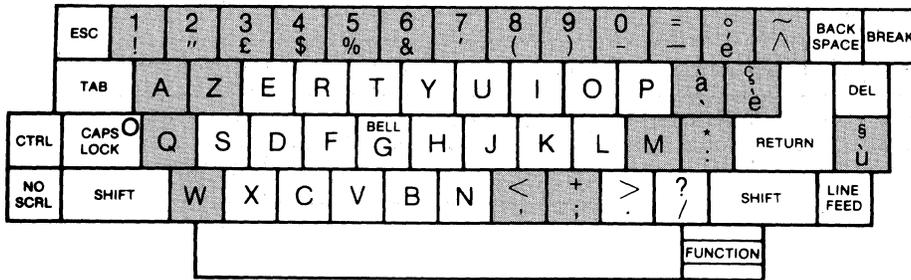
APPENDIX II GERMAN CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	§	P	`	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	Ä	k	ä	
1	1	0	0	C	FF	FS	,	<	L	Ö	l	ö	
1	1	0	1	D	CR	GS	-	=	M	Ü	m	ü	
1	1	1	0	E	SO	RS	.	>	N	^	n	β	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



APPENDIX II FRENCH CODE CHART

					BIT 7	0	0	0	0	1	1	1	1
					BIT 6	0	0	1	1	0	0	1	1
					BIT 5	0	1	0	1	0	1	0	1
BIT 4	BIT 3	BIT 2	BIT 1	COL ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0	NUL	DLE	SP	0	à	P	`	p	
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q	
0	0	1	0	2	STX	DC2	"	2	B	R	b	r	
0	0	1	1	3	ETX	DC3	£	3	C	S	c	s	
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t	
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u	
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v	
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x	
1	0	0	1	9	HT	EM	)	9	I	Y	i	y	
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z	
1	0	1	1	B	VT	ESC	+	;	K	°	k	é	
1	1	0	0	C	FF	FS	,	<	L	Ç	l	ù	
1	1	0	1	D	CR	GS	-	=	M	§	m	è	
1	1	1	0	E	SO	RS	.	>	N	^	n	~	
1	1	1	1	F	SI	US	/	?	O	—	o	DEL	



APPENDIX III NUMERIC EQUIVALENT OF ASCII CHART

ASCII	Decimal	Octal	Hexa-Decimal	ASCII	Decimal	Octal	Hexa-Decimal
NUL	0	0	0	SP	32	40	20
SOH	1	1	1	!	33	41	21
STX	2	2	2	"	34	42	22
ETX	3	3	3	#	35	43	23
EOT	4	4	4	\$	36	44	24
ENQ	5	5	5	%	37	45	25
ACK	6	6	6	&	38	46	26
BEL	7	7	7	'	39	47	27
BS	8	10	8	(	40	50	28
HT	9	11	9	)	41	51	29
LF	10	12	A	*	42	52	2A
VT	11	13	B	+	43	53	2B
FF	12	14	C	,	44	54	2C
CR	13	15	D	-	45	55	2D
S0	14	16	E	.	46	56	2E
S1	15	17	F	/	47	57	2F
DLE	16	20	10	0	48	60	30
DC1	17	21	11	1	49	61	31
DC2	18	22	12	2	50	62	32
DC3	19	23	13	3	51	63	33
DC4	20	24	14	4	52	64	34
NAK	21	25	15	5	53	65	35
SYN	22	26	16	6	54	66	36
ETB	23	27	17	7	55	67	37
LAN	24	30	18	8	56	70	38
EM	25	31	19	9	57	71	39
SUB	26	32	1A	:	58	72	3A
ESC	27	33	1B	;	59	73	3B
FS	28	34	1C	<	60	74	3C
GS	29	35	1D	=	61	75	3D
RS	30	36	1E	>	62	76	3E
US	31	37	1F	?	63	77	3F

NUMERIC EQUIVALENT OF ASCII CHART (Cont.)

ASCII	Decimal	Octal	Hexa- Decimal	ASCII	Decimal	Octal	Hexa- Decimal
@	64	100	40	`	96	140	60
A	65	101	41	a	97	141	61
B	66	102	42	b	98	142	62
C	67	103	43	c	99	143	63
D	68	104	44	d	100	144	64
E	69	105	45	e	101	145	65
F	70	106	46	f	102	146	66
G	71	107	47	g	103	147	67
H	72	110	48	h	104	150	68
I	73	111	49	i	105	151	69
J	74	112	4A	j	106	152	6A
K	75	113	4B	k	107	153	6B
L	76	114	4C	l	108	154	6C
M	77	115	4D	m	109	155	6D
N	78	116	4E	n	110	156	6E
O	79	117	4F	o	111	157	6F
P	80	120	50	p	112	160	70
Q	81	121	51	q	113	161	71
R	82	122	52	r	114	162	72
S	83	123	53	s	115	163	73
T	84	124	54	t	116	164	74
U	85	125	55	u	117	165	75
V	86	126	56	v	118	166	76
W	87	127	57	w	119	167	77
X	88	130	58	x	120	170	78
Y	89	131	59	y	121	171	79
Z	90	132	5A	z	122	172	7A
[	91	133	5B	{	123	173	7B
\	92	134	5C	/	124	174	7C
[	93	135	5D	}	125	175	7D
^	94	136	5E	~	126	176	7E
-	95	137	5F	DEL	127	177	7F

APPENDIX IV EMULATION SET-UP PARAMETERS

	VISUAL 210®	ADDS VIEWPOINT®	LSI ADM-3A®	HAZELTINE 1510®
WRAP MODE	OFF	BOTH	HOR	HOR
SCROLL/PAGE	—	SCRL	SCRL	SCRL
MONITOR MODE	OFF	OFF	OFF	OFF
TAB MODE	COL	COL	COL	COL
AUTO LF/CR	ON	OFF	OFF	OFF
AUTO WRAP	OFF	ON	ON	ON
LEAD IN	ESC	ESC	ESC	
REFRESH RATE	—	—	—	—
LANGUAGE	US	US	US	US
CURSOR TYPE	—	—	—	—
MARGIN BELL	—	—	—	—
SPACE/ADV	SPC	SPC	SPC	SPC
XMT RATE	—	—	—	—
RCV RATE	—	—	—	—
STOP BITS	—	—	—	—
PARITY ENBL	—	—	—	—
PARITY SENSE	—	—	—	—
DATA LN/MSR	—	—	—	—
DUPLEX MODE	—	—	—	—
EOM CHAR	—	—	—	—
BOT LINE MD	OFF	OFF	OFF	OFF
XON/XOFF	BOTH	OFF		OFF
LOCAL ECHO	OFF	OFF	OFF	OFF
EIA/20 mA CL	EIA	EIA	EIA	EIA
SCN/KYBD DI	OFF	OFF	OFF	OFF

LINE CONVS UNPROT

APPENDIX V SUMMARY OF CONTROL CODES

Command	DEC VT 52	ADDS VIEWPOINT	LSI ADM-3A	ESPRIT HAZELTINE
Home	␣ H	␣ H, CTRL-A	␣ H, CTRL-^	␣ CTRL-R
Cursor Up	␣ A	␣ A, CTRL-Z	␣ A, CTRL-K	␣ CTRL-L
Cursor Down	␣ B	␣ B, CTRL-J	␣ B, CTRL-J	␣ CTRL-K
Cursor Right	␣ C	␣ C, CTRL-F	␣ C, CTRL-L	␣ CTRL, CTRL-P
Cursor Left	␣ D, CTRL-H	␣ D, CTRL-U	␣ D, CTRL-H	␣ D, CTRL-H
Reverse Index	␣ I	␣ I	␣ I	␣ I
Index	CTRL-J	CTRL-J	CTRL-J	CTRL-J
Direct Cursor Addressing	␣ Y r c	␣ Y r c	␣ = r c	␣ CTRL-Q c r
Field Tab				CTRL-I
Columnar Tab				␣ :
Backtab	␣ z	␣ z	␣ z	␣ z
Tab	CTRL-I	CTRL-I	CTRL-I	
Field Backtab				␣ CTRL\ ␣
Set Tab	␣ 1	␣ 1	␣ 1	␣ 1
Clear Tab	␣ 2	␣ 2	␣ 2	␣ 2
Clear All Tabs	␣ g	␣ g	␣ g	␣ g
Clear Line	␣ t	␣ t	␣ t	␣ t
Clear End of Line	␣ K	␣ K	␣ K	␣ CTRL-O
Clear Page	␣ v	␣ v, CTRL-L	␣ v, CTRL-Z	␣ CTRL\ ␣
Clear End of Page	␣ k, ␣ J	␣ k, ␣ J	␣ k, ␣ J	␣ k, ␣ CTRL X
Clear End of Page — Background	␣ u	␣ u	␣ u	␣ CTRL-W
Clear Field	␣ V	␣ V	␣ V	␣ CTRL-V
Clear Foregnd	␣]	␣]	␣]	␣ CTRL-]
Erase Line	␣ E	␣ E	␣ E	␣ E

Command	DEC VT 52	ADDS VIEWPOINT	LSI ADM-3A	ESPRIT HAZELTINE
Set Field Tab Mode	o	o	o	o
Set Columnar Tab Mode	p	p	p	p
Set Prot Mode	q	q	q	q
Set Unprot Mode	s	s	s	s
Set Graphics Mode	F	F	F	F
Reset Graphics Mode	G	G	G	G
Insert Line	L	L	L	CTRL-Z
Delete Line	M	M	M	CTRL-S
Set Foregnd	T	T, CTRL-O	T	CTRL_
Set Backgnd	U	U, CTRL-N	U	CTRL-Y
Set Foregnd ATT.	Ø x	9 x	Ø x	Ø x
Set Backgnd ATT.	9 x	Ø x	9 x	9 x
Select Half-Intensity	O	O	O	O
Select Blank	h	h	h	h
Select Blink	i	i	i	i
Select Reverse Video	j	j	j	j
Select Underline	S	S	S	S
Select Normal	W	W	W	W
Lock Keyboard	5	5	5, CTRL-O	CTRL-U
Unlock Keyboard	6	6	6, CTRL-N	CTRL-F
Set Function Pad – Mode 1	;	;	;	;
Set Function Pad – Mode 2	f	f	f	<
Set Function Pad – Mode 3	=	=	n	=
Reset Function Pad Modes	>	>	>	>
Read Cursor Address	r	r	r	CTRL-R
Read Status	e	e	e	e
Read Terminal ID	Z	Z	Z	Z
Read Char at Cursor	!	!	!	!
Answerback (C-Break)	CTRL-E	CTRL-E	CTRL-E	CTRL-E

Command	DEC VT 52	ADDS VIEWPOINT	LSI ADM-3A	ESPRIT HAZELTINE
Display Test Pattern	Ⓛ "x	Ⓛ ", x	Ⓛ "x	Ⓛ "
Display ASCII Pattern	Ⓛ 8	Ⓛ 8	Ⓛ 8	Ⓛ 8
Monitor Mode Enable	Ⓛ x	Ⓛ x	Ⓛ x	Ⓛ x
Monitor Mode Disable	Ⓛ y	Ⓛ y	Ⓛ y	Ⓛ y
Set Block Mode	Ⓛ #	Ⓛ #	Ⓛ #	Ⓛ #
Reset Block Mode	Ⓛ \$	Ⓛ \$	Ⓛ \$	Ⓛ \$
Remote Page Transmit	Ⓛ N	Ⓛ N	Ⓛ N	Ⓛ CTRL-N
Remote Field Transmit	Ⓛ)	Ⓛ)	Ⓛ)	Ⓛ)
Set Line Mode	Ⓛ .	Ⓛ .	Ⓛ .	Ⓛ .
Aux Port Only Enable	Ⓛ *	Ⓛ *	Ⓛ *	Ⓛ *
Aux Port Enable	Ⓛ /	Ⓛ /, CTRL-R	Ⓛ /	Ⓛ /
Aux Port Disable	Ⓛ ?	CTRL-T	Ⓛ ?	Ⓛ ?
Transparent Print On	Ⓛ 3	Ⓛ 3	Ⓛ 3	Ⓛ 3
Transparent Print Off	Ⓛ 4	Ⓛ 4	Ⓛ 4	Ⓛ 4
Display Status Line	Ⓛ d	Ⓛ d	Ⓛ d	Ⓛ d
Blank Status Line	Ⓛ c	Ⓛ c	Ⓛ c	Ⓛ c
Cursor Enable	Ⓛ x	CTRL-X	Ⓛ x	Ⓛ x
Cursor Disable	Ⓛ m	CTRL-W	Ⓛ m	Ⓛ m

APPENDIX V V55 COMMAND SUMMARY BY FUNCTION

EMULATIONS	HZ 1500	VISUAL 210
CURSOR MOVEMENTS		
CURSOR HOME	U CTRL-R	U H
CURSOR UP	U CTRL-L	U A
CURSOR DOWN	U CTRL-K	U B
CURSOR RIGHT	U C, CTRL-P	U C
CURSOR LEFT	U D, CTRL-H	U O, CTRL-H
REVERSE INDEX	U I	U I
INDEX	CTRL-J	CTRL-J
DIRECT CURSOR ADDRESSING	U CTRL-Q cr	U Y rc
TABBING COMMANDS		
FIELD TAB	—	—
COLUMNAR TAB	—	—
TAB	CTRL-I	CTRL-I
BACK TAB	CTRL-T	U z
FIELD BACKTAB	—	—
SET TAB	U 1	U 1
CLEAR TAB	U 2	U 2
CLEAR ALL TABS	U g	U g
SET FIELD TAB MODE	—	—
SET COLUMNAR TAB MODE	—	—
ERASE FUNCTIONS		
ERASE ENTIRE PAGE	U CTRL]	U w
ERASE LINE	U E	U E
ERASE TO END OF FIELD	U f	U f
ERASE TO END OF LINE	U K	U K
ERASE TO END OF PAGE	U J	U J
CLEAR FIELD	U CTRL-V	U CTRL-\
CLEAR LINE	U t	U t
CLEAR PAGE	U CTRL \	U v
CLEAR BKGND TO EOP	U CTRL w	U u
CLEAR TO END OF LINE	U CTRL-O	U x
CLEAR TO END OF PAGE	U CTRL-X	U y
CLEAR FOREGROUND	—	U CTRL]
	U CTRL ^	

**APPENDIX V
V55 COMMAND SUMMARY BY FUNCTION (CONT.)**

EMULATIONS	HZ 1500	VISUAL 210
ATTRIBUTE FUNCTIONS		
SET FOREGROUND	 ^	 3
SET BACKGROUND	 CTRL-Y	 4
SELECT UNDERLINE	 S	 CTRL-S
SELECT NORMAL	 W	 CTRL-W
SELECT HALF-INTENSITY	 T	 CTRL-T
SELECT BLINK	 U	 CTRL-U
SELECT REVERSE VIDEO	 V	 CTRL-V
SELECT BLANK	 X	 CTRL-X
SET FOREGRND ATT x	]x	 CTRL Y x
SET BACKGRND ATT x	 CTRL x	 CTRL Z x
SET GRAPHICS	 F	 F
RESET GRAPHICS	 G	 G
SET SECURITY	 a	 a
RESET SECURITY	 b	 b
SCROLL FUNCTIONS		
DEFINE SCROLLING REGION	 _ ri r2	 CTRL _ ri r2
SET ORIGIN MODE	 CTRL-A	 CTRL-A
RESET ORIGIN MODE	 CTRL-B	 CTRL-B
SLOW SCROLL DISABLE	 d	 d
SLOW SCROLL ENABLE	 c	 c
SET HOLD SCREEN	 [ [
RESET HOLD SCREEN	 \	 \
FUNCTION-KEY PROGRAMMING SEQUENCES		
PROGRAM FUNCTION KEY	 @ x	 @ x
SEND DATA TO HOST	 {	 {
SEND DATA TO SCREEN	 }	 }
END PROGRAMMING	 :	 :
EDITING FUNCTIONS		
INSERT LINE	 CTRL-Z	 L
DELETE LINE	 CTRL-S	 CTRL-S
DELETE CHARACTER	 O	 O
SET INSERT CHARACTER	 i	 i
RESET INSERT CHARACTER	 j	 j

**APPENDIX V
V55 COMMAND SUMMARY BY FUNCTION (CONT.)**

EMULATIONS	HZ 1500	VISUAL 210
PRINTER FUNCTIONS		
AUX PORT ONLY ENABLE	[U] CTRL-M	[U] CTRL-M
AUX PORT ENABLE	[U] CTRL-P	[U] CTRL-P
AUX PORT DISABLE	[U] CTRL [	[U] CTRL [
TRANSPARENT ON	[U] *	[U] W
TRANSPARENT OFF	[U] ?	[U] X
KEYBOARD FUNCTIONS		
LOCK KEYBOARD	[U] CTRL-U	[U] h
UNLOCK KEYBOARD	[U] CTRL-F	[U] l
SET FUNCTION PAD MODE 1	[U] ;	[U] ;
SET FUNCTION PAD MODE 2	[U] <	[U] <
SET FUNCTION PAD MODE 3	[U] =	[U] =
RESET FUNCTION PAD MODES	[U] >	[U] >
BLOCK MODE FUNCTIONS		
SET BLOCK MODE	[U] #	[U] m
RESET BLOCK MODE	[U] \$	[U] n
SET LINE MODE	[U] .	[U] o
SET PAGE MODE	[U] (	[U] q
SET BATCH MODE	[U] %	[U] 8
SET PROTECT	[U] +	[U] 6
SET UNPROTECT	[U] *	[U] 7
SET AUTO-TAB	[U] 8	[U] q
RESET AUTO-TAB	[U] 9	[U] S
SET STX CODE	[U] -	[U] N
SET FIELD SEPARATOR	[U] 700	[U] .00
SET FIRST EOL CODE	[U] 400	[U] U00
SET SECOND EOL CODE	[U] 600	[U] V00
SET FIRST ETX CODE	[U] 300	[U] .00
SET SECOND ETX CODE	[U] 000	[U] 000
TRANSPARENT ON	[U] 5	[U] W
REMOTE TRANSMIT	[U] CTRL-N	[U] 5
DEVICE STATUS FUNCTIONS		
READ CURSOR ADDRESS	[U] CTRL-E	[U] r
READ STATUS	[U] -	[U] e
READ TERMINAL ID	[U] Z	[U] Z

**APPENDIX V
V55 COMMAND SUMMARY BY FUNCTION (CONT.)**

EMULATIONS	HZ 1500	VISUAL 210
READ CHAR AT CURSOR	[L] !	[L] /
ANSWERBACK	CTRL-E	CTRL-E
DISPLAY TEST PATTERN	[L] ", x	[L] +, x
DISPLAY ASCII PATTERN	[L] 5	[L] *
MONITOR MODE ENABLE	[L] x	[L] CTRL-C
MONITOR MODE DISABLE	[L] y	[L] CTRL-D
STATUS LINE FUNCTIONS		
BLANK STATUS LINE	[L] h	[L] -
VISIBLE STATUS LINE	[L] l	[L] ?
OTHER V210 FUNCTIONS		
STOP BLINK	[L] k	[L] k

VISUAL TECHNOLOGY INCORPORATED

540 MAIN STREET, TEWKSBURY, MA 01876, TELEPHONE (617) 851-5000, TELEX 951-539

REFERENCE MANUAL/**VISUAL 50/55**

UM-055-001-0A
April 1983