

# 4205/4207

## COMPUTER DISPLAY TERMINALS WITH COAX OPTION



**4205/4207**  
**COMPUTER DISPLAY**  
**TERMINALS**  
**WITH COAX OPTION**

## WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only other computing equipment (input/output devices, etc.) certified to comply with Class B limits may be connected to this terminal. Operation with non-certified equipment is likely to result in interference to radio and TV reception.

Additionally, the user of this equipment must utilize the shielded interconnect cables provided with this product or specified in this manual to ensure continued compliance with Electromagnetic Emissions Limits as stated in Subpart J of Part 15 of FCC Rules.

### CERTIFICATE OF THE MANUFACTURER/IMPORTER

We hereby certify that the **4205 and 4207/Coax Computer Display Terminals** complies with the RF Interference Suppression requirements of Amtsbl.-Vfg 1046/1984. The German Postal Service was notified that the equipment is being marketed. The German Postal Service has the right to re-test the series and to verify that it complies.

**Tektronix**  
COMMITTED TO EXCELLENCE

### BESCHEINIGUNG DES HERSTELLERS/IMPORTEURS

Hiermit wird bescheinigt, dass der/die/das **4205 und 4207/Coax Farbraster-Terminals** in Übereinstimmung mit den Bestimmungen der Amtsblatt-Verfügung 1046/1984 funktentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhalten der Bestimmungen eingeräumt.

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#### NOTICE to the user/operator:

The German Postal Service requires that Systems assembled by the operator/user of this instrument must also comply with Postal Regulation, Vfg. 1046/1984, Par. 2, Sect. 1.

#### HINWEIS für den Benutzer/Betreiber:

Die vom Betreiber zusammengestellte Anlage, innerhalb derer dies Gerät eingesetzt wird, muss ebenfalls den Voraussetzungen nach Par. 2, Ziff. 1 der Vfg. 1046/1984 genügen.

#### NOTICE to the user/operator:

The German Postal Service requires that this equipment, when used in a test setup, may only be operated if the requirements of Postal Regulation, Vfg. 1046/1984, Par. 2, Sect. 1.7.1 are complied with.

#### HINWEIS für den Benutzer/Betreiber:

Dies Gerät darf in Messaufbauten nur betrieben werden, wenn die Voraussetzungen des Par. 2, Ziff. 1.7.1 der Vfg. 1046/1984 eingehalten werden.

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**PRODUCT: 4205 and 4207 Computer Display Terminals With Coax Option**

This manual supports the following versions of this product: Firmware Version: 10 and up

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NOV 1986	Original Issue	

# CONTENTS

<b>Section 1</b>	<b>INTRODUCING THE 4205 AND 4207 TERMINALS WITH THE COAX OPTION</b>	<b>Page</b>
	Who Should Read This Manual .....	1-1
	How to Use This Manual .....	1-2
	Related Documentation .....	1-3
	Overview of the 4205 and 4207 Terminals .....	1-3
	Features .....	1-4
	Standard Accessories .....	1-9
	Optional Accessories .....	1-9
	Options .....	1-9
<b>Section 2</b>	<b>GETTING ACQUAINTED WITH YOUR TERMINAL</b>	
	Exercise 1: Getting Ready .....	2-2
	Exercise 2: Entering Commands .....	2-3
	Correcting Command Entry Mistakes .....	2-3
	Understanding Setup Commands and Rules .....	2-4
	Exercise 3: Working in the Dialog Area .....	2-5
	Changing Dialog Area Characteristics .....	2-5
	Using the Dialog Buffer and Scrolling .....	2-6
	Understanding the Status Message .....	2-7
	Getting Status for Specific Groups of Commands .....	2-7
	Exercise 4: Creating Graphics .....	2-8
	Preparing the Screen for Graphics .....	2-8
	Understanding Panels and Segments .....	2-8
	Understanding XY-Coordinates .....	2-9
	The Graphics Position .....	2-9
	Correcting Errors While Defining Panels and Segments .....	2-9
	Creating a Panel Within a Segment .....	2-10
	Creating Two Panels Within a Segment .....	2-12
	Drawing Circles and Curves .....	2-14
	Updating the Graphics Area .....	2-14
	Changing a Segment's Display .....	2-15
	Segment Visibility .....	2-15
	Segment Highlighting .....	2-16
	Getting Dialog Out of the Way of Graphics .....	2-17
	Exercise 5: Using Color .....	2-18
	Understanding Color Indices .....	2-18
	Understanding Color Definitions .....	2-18
	Entering the Set Color Function .....	2-19
	The Set Color Banner .....	2-20
	The Crosshair Cursor .....	2-21
	Using the Color Menu .....	2-22
	Changing HLS Values .....	2-24
	Using the Color Map .....	2-27

(continued)

**Section 2 (cont)****Page**

Exercise 6: Using the Zoom/Pan Function . . . . .	2-29
Entering the Zoom/Pan Function . . . . .	2-30
Using the Zoom Function . . . . .	2-31
Reshaping the Framing Box . . . . .	2-32
Using the Pan Function . . . . .	2-34
Using Other Zoom/Pan Functions . . . . .	2-34
Saving and Restoring Previous Frames . . . . .	2-34
Displaying a Border . . . . .	2-36
Selecting Views . . . . .	2-36
Controlling the Zoom/Pan Menu . . . . .	2-36
Communicating With the Host During Zoom/Pan . . . . .	2-36
Exiting Zoom/Pan . . . . .	2-37
Zoom/Pan Function Keys . . . . .	2-37
Exercise 7: Graphics Input (GIN) . . . . .	2-38
Enabling GIN . . . . .	2-38
Enabling the Keyboard . . . . .	2-38
Enabling the Mouse . . . . .	2-39
Enabling the Tablet . . . . .	2-40
Entering Points . . . . .	2-41
Your Next Step . . . . .	2-43

**Section 3****HOW-TO PROCEDURES**

How to Use Setup Commands . . . . .	3-2
Entering Setup . . . . .	3-2
Entering Commands . . . . .	3-2
Correcting Command Entry Errors . . . . .	3-4
Understanding Error Messages . . . . .	3-4
Getting Help for Setup Commands . . . . .	3-5
Getting Status for Setup Commands . . . . .	3-6
Saving Commands . . . . .	3-6
How to Reset the Terminal . . . . .	3-8
How to Switch Between Hosts . . . . .	3-9
How to Switch Between Coax DFT Sessions . . . . .	3-10
How to Select a Host Command Mode . . . . .	3-11
How to Make Copies . . . . .	3-12
Initiating a Copy Operation . . . . .	3-13
Overriding Black and White Reversal . . . . .	3-14
Making Multiple Copies . . . . .	3-14
Stopping a Copy Operation . . . . .	3-15
Making Screen Copies in Background . . . . .	3-15
Emulating Background Copying . . . . .	3-18

**Section 3 (cont)****Page**

Customizing Your Copies .....	3-19
Saving or Switching Your Settings .....	3-19
When to Issue Copy-Customizing Commands .....	3-20
HCSIZE — Image Size on a 4691, 4692, 4695, or 4696 Copier .....	3-21
HCORIENT — Image Orientation on a 4691 or 4692 Copier .....	3-22
HCDENSITY — Resolution on a 4692 Copier .....	3-23
HCREPAINT — Overwriting on a 4692 Copier .....	3-23
HCDATAIRES — Color Matching on a 4692 Copier .....	3-23
Making Transparencies on a 4692 Copier .....	3-24
HCMAP — Representing Colors on a Monochrome Graphics Printer .....	3-24
HCDAATTRIBUTES — Copying Multiple Pages From the Dialog Buffer .....	3-24
HCFEATURES — Paging for Continuous-Feed Copiers and the LaserJet .....	3-26
How to Use the Rasterizer .....	3-28
Copying From a Host to the Rasterizer .....	3-29
Customizing Rasterized Copies .....	3-29
PORIENT — Image Orientation for Rasterized Copies ..	3-30
PINVERSION — Reversing Black and White on Rasterized Copies .....	3-30
How to Use a Plotter .....	3-31
How to Copy From a Host to a Peripheral Device .....	3-32
How to Use a Graphics Tablet .....	3-33
How to Use Data Logging .....	3-34
How to Assign an Answerback Message .....	3-34
How to Create Macros .....	3-35
Using Macro Numbers .....	3-35
Using Macro Commands .....	3-36
Selecting Macro Command Syntax .....	3-36
Selecting Local or Host Macros .....	3-37
Deleting a Macro Definition .....	3-37
Macro Examples .....	3-38
Hardcopy Size Macro .....	3-38
Dialog Area Disabling and Enabling Macros .....	3-40
Host Copy Macro .....	3-41
Data Logging Macro .....	3-42
How to Control Bell Characteristics .....	3-43
How to Ensure Compatibility With Older Applications .....	3-44

**Section 4****SETUP COMMAND SUMMARY**

List of Functional Categories .....	4-2
Setup Command Summary Table .....	4-3

<b>Appendix A</b>	<b>INSTALLATION AND SETUP</b>	<b>Page</b>
	Selecting a Site .....	A-2
	Preventing Radio and Television Interference .....	A-3
	After Unpacking the Terminal .....	A-4
	Connecting the Cables .....	A-6
	Running Self Test .....	A-8
	Setting RS-232 Host Communications Parameters .....	A-9
	Setting Coax Communications Parameters .....	A-12
	Configuring the Terminal for DFT Mode .....	A-14
	Testing Communications .....	A-18
	Selecting a Host Command Mode .....	A-18
	Selecting a Host Port .....	A-19
	Host Port Operating Differences .....	A-20
	HOSTPORT COAX Power-Up .....	A-20
	HOSTPORT RS-232 Power-Up .....	A-21
	Connecting Peripheral Devices and Establishing Communications .....	A-22
	4691 and 4692 Color Graphics Copiers .....	A-23
	4695 Color Graphics Copier .....	A-23
	4696 Color Ink-Jet Printer .....	A-24
	Monochrome Printers .....	A-25
	Tektronix 4644 Dot Matrix Printer .....	A-25
	Hewlett-Packard ThinkJet .....	A-26
	Hewlett-Packard LaserJet and LaserJet Plus .....	A-27
	Other Monochrome Printers .....	A-28
	4510 Color Graphics Rasterizer .....	A-29
	4662 Interactive Digital Plotter .....	A-30
	Configuring a 4662 Plotter With Option 31 .....	A-30
	4663 Interactive Digital Plotter .....	A-31
	4957 and 4958 Graphics Tablets .....	A-32
<b>Appendix B</b>	<b>CONTROLS, KEYS, AND CONNECTORS</b>	
	Keyboard Overview .....	B-4
	Keyboard Operation in HOSTPORT COAX .....	B-5
	Keyboard Operation in HOSTPORT RS-232 .....	B-5
	Description of Keys .....	B-6
	Numeric Keypad and Program Function Keys .....	B-13
	Using the Keypad in HOSTPORT COAX .....	B-13
	Using the Keypad in HOSTPORT RS-232 .....	B-14
	Setup Commands Corresponding to 3279 Controls .....	B-14
	Switching Displayed Colors (BASECOLOR) .....	B-14
	Changing Character Case (CAPITALS) .....	B-15
	Setting Key Clicking (CLICK) .....	B-15
	Setting the Cursor Type (CURSORTYPE) .....	B-15



<b>Appendix C</b>	<b>KEYBOARD LAYOUTS, CHARACTER CODES, AND MACRO NUMBERS</b>
<b>Appendix D</b>	<b>SELF TEST DIAGNOSTIC PROGRAM</b>
<b>Appendix E</b>	<b>SPECIFICATIONS</b>
<b>Appendix F</b>	<b>TEKTRONIX COLOR STANDARD</b>
<b>Appendix G</b>	<b>PREDEFINED FILL PATTERNS</b>
<b>Appendix H</b>	<b>ORDERING INFORMATION</b>
<b>Appendix I</b>	<b>IBM STATUS SYMBOLS</b>
	<b>INDEX</b>

## ILLUSTRATIONS

<b>Figure</b>	<b>Description</b>	<b>Page</b>
2-1	Display of One Segment . . . . .	2-10
2-2	Box With Star . . . . .	2-12
2-3	Completed Graphics Display . . . . .	2-13
2-4	Display With Segment 2 Invisible . . . . .	2-15
2-5	Display With Transparent Dialog Area . . . . .	2-17
2-6	Menu Key Display . . . . .	2-19
2-7	Set Color Banner . . . . .	2-20
2-8	Using the Color Menu . . . . .	2-23
2-9	Identifying Current Colors . . . . .	2-24
2-10	Display With Modified Color . . . . .	2-26
2-11	Complete Color Map . . . . .	2-27
2-12	Zoom/Pan Menu . . . . .	2-30
2-13	Display After Zooming and Updating the View . . . . .	2-31
2-14	Reshaping Displayed Graphics . . . . .	2-33
2-15	Display With Pan . . . . .	2-35
2-16	GIN Inking — The First Two Points . . . . .	2-41
2-17	GIN Inking — Subsequent Points . . . . .	2-42
3-1	Orientation of Copier Images . . . . .	3-22
A-1	Terminal Dimensions and Clearances . . . . .	A-2
A-2	Repacking Diagram . . . . .	A-5
A-3	Keyboard Connectors . . . . .	A-6
A-4	4205 Rear Panel Connectors . . . . .	A-7
A-5	4207 Rear Panel Connectors . . . . .	A-7
A-6	Coax Configuration Summary . . . . .	A-15
A-7	Configuration Summary for DFT Mode . . . . .	A-16
B-1	Front Panel Controls and Connectors . . . . .	B-1
B-2	4205 Rear Panel Controls and Connectors . . . . .	B-3
B-3	4207 Rear Panel Controls and Connectors . . . . .	B-3
B-3	Keyboard Layout . . . . .	B-4
B-4	Character and Editing Keys . . . . .	B-6
B-5	Display Control Keys . . . . .	B-8
B-6	Editing and Cursor Control Keys . . . . .	B-10
B-7	Tektronix Function Keys . . . . .	B-12

<b>Figure</b>	<b>Description</b>	<b>Page</b>
B-8	Numeric Keypad and Program Function Keys . . . . .	B-13
C-1	Mouse Button Macro Numbers . . . . .	C-3
C-2	North American (ASCII) Keyboard Layout and Key Macro Numbers . . . . .	C-4
C-3	North American (ASCII) Code Chart . . . . .	C-5
C-4	United Kingdom Keyboard Layout and Key Macro Numbers . . . . .	C-6
C-5	United Kingdom Code Chart . . . . .	C-7
C-6	French Keyboard Layout and Key Macro Numbers . . . . .	C-8
C-7	French Code Chart . . . . .	C-9
C-8	Swedish Keyboard Layout and Key Macro Numbers . . . . .	C-10
C-9	Swedish Code Chart . . . . .	C-11
C-10	Danish/Norwegian Keyboard Layout and Key Macro Numbers . . . . .	C-12
C-11	Danish/Norwegian Code Chart . . . . .	C-13
C-12	German Keyboard Layout and Key Macro Numbers . . . . .	C-14
C-13	German Code Chart . . . . .	C-15
C-14	Supplementary Characters Code Chart . . . . .	C-16
C-15	Ruling Characters Code Chart . . . . .	C-17
C-16	Multilingual (ASCII) Code Chart . . . . .	C-18
D-1	Levels of Self Test . . . . .	D-1
F-1	HLS Color Cone . . . . .	F-1
G-1	Predefined Fill Patterns . . . . .	G-1

## TABLES

<b>Table</b>	<b>Description</b>	<b>Page</b>
2-1	Set Color Function Keys . . . . .	2-25
2-2	Zoom/Pan Function Keys . . . . .	2-37
3-1	Commands for Customizing Copies . . . . .	3-19
3-2	Using HCFEATURES for Paging . . . . .	3-26
4-1	Setup Command Summary . . . . .	4-3
A-1	RS-232 Communications Commands . . . . .	A-10
A-2	Selecting DFT Settings . . . . .	A-14
A-3	ThinkJet Switch Settings . . . . .	A-26
A-4	4662 Plotter Settings . . . . .	A-30
A-5	4663 Plotter Settings . . . . .	A-31
B-1	Character and Editing Keys . . . . .	B-7
B-2	Display Control Keys . . . . .	B-8
B-3	Editing and Cursor Control Keys . . . . .	B-11
B-4	Tektronix Function Keys . . . . .	B-12
C-1	Setup Syntax for the DLSELECTCHARSET Command . . . . .	C-1
E-1	Physical Dimensions . . . . .	E-1
E-2	Electrical Specifications . . . . .	E-1
E-3	Environmental Specifications . . . . .	E-2
E-4	Installation Requirements . . . . .	E-2
E-5	Graphics Characteristics . . . . .	E-3
E-6	Alphanumeric Character Sets . . . . .	E-3

# OPERATORS SAFETY SUMMARY

This general safety information is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

## TERMS

### IN THIS MANUAL

**CAUTION** statements identify conditions or practices that can result in damage to the equipment or other property.

**WARNING** statements identify conditions or practices that can result in personal injury or loss of life.

### AS MARKED ON EQUIPMENT

**CAUTION** indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

**DANGER** indicates a personal injury hazard immediately accessible as one reads the marking.

## SYMBOLS

### IN THIS MANUAL



This symbol indicates where applicable cautionary or other information is to be found.



Static-Sensitive Devices.

### AS MARKED ON EQUIPMENT



**DANGER** — high voltage.



Protective ground (earth) terminal.



**ATTENTION** — refer to manual.



Refer to manual.

(continued)

## **POWER SOURCE**

This product is designed to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

## **GROUNDING THE PRODUCT**

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the power input or output terminals. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

## **DANGER ARISING FROM LOSS OF GROUND**

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

## **USE THE PROPER POWER CORD**

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

Refer cord and connector changes to qualified service personnel.

## **USE THE PROPER FUSE**

To avoid fire hazard, use only the fuse specified in the parts list for your product, and which is identical in type, voltage rating, and current rating.

Refer fuse replacement to qualified service personnel.

## **DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES**

To avoid explosion, do not operate this product in an atmosphere of explosive gases unless it has been specifically certified for such operation.

## **DO NOT REMOVE COVERS OR PANELS**

To avoid personal injury, do not remove the top covers. Do not operate the product without the covers and panels properly installed.

Section **1**

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**INTRODUCING  
THE 4205 AND 4207 TERMINALS  
WITH COAX OPTION**

Section **1**

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**INTRODUCING  
THE 4205 AND 4207 TERMINALS  
WITH COAX OPTION**

The Tektronix 4205 and 4207 Computer Display Terminals are powerful desktop color graphics terminals. Both terminals can display graphics in up to 16 colors and, at the same time, display text in an additional eight colors: you can choose from your terminal's palette of 64 colors. In addition, you can connect the 4205 and 4207 to a number of copiers, printers, and plotters to produce high-quality color or monochrome copies of your graphics and text.

Both terminals are compatible with a number of graphics software packages, as well as several popular text-editing packages. Additionally, since the terminals are equipped with the coax option, they are compatible with both IBM and RS-232 hosts.

## WHO SHOULD READ THIS MANUAL

This Operators Manual was written for users who will be using the terminal to run any of a wide range of existing applications. Typical applications include programs for text editing, for engineering design and verification, and for statistical data analysis.

This manual wasn't written for programmers who will be developing or maintaining application programs for host computer systems. If you plan to write or maintain programs for the 4205 or the 4207, you should order the optional *4200 Series Programmers Manual*. (A further discussion of the Programmers Manual follows under *Related Documentation*, and you can find ordering information in Appendix H.)

## HOW TO USE THIS MANUAL

The following list describes most sections of this manual. Take a look at what is in each section — knowing how the manual is organized will help you find any specific information you are looking for.

- *Section 1* — Summarizes the terminals' features. Use this section to quickly review the capabilities of the terminal.
- *Section 2* — Includes exercises that acquaint you with your terminal's features and help you get started with some basic graphics. If you have never used a Tektronix Computer Display Terminal, we suggest that you do these exercises. (You don't need to connect the terminal to a host computer to do the exercises — just plug the terminal in and turn it on.)
- *Section 3* — Provides cookbook-like procedures for routine tasks. This section contains detailed instructions for entering and correcting commands, gives handy step-by-step procedures for making hardcopies of the screen display, and shows you how to program a key to generate a sequence of characters or commands (called a *macro*).
- *Section 4* — Lists all of the *Setup* commands that you can use to control your terminal's operating characteristics; the table describes each command, gives its parameters and their defaults, and tells you whether or not the command can be saved in the terminal's nonvolatile memory.
- *Appendix A* — Shows you how to connect your terminal to a host computer and how to establish the terminal/host communications link by setting the appropriate communications parameters. This section also helps you connect copiers and other peripheral devices to your terminal and set up communication between them.

Use the other appendices in this manual for reference as needed; be sure to scan the table of contents to find out what is in each one. Don't forget to use the index to locate any specific information you require.

After you have used this manual for a while, please fill out one of the reader reply cards (in the front of this manual) and drop it in the mail. Your response will help make future manuals more useful.



## RELATED DOCUMENTATION

The *4200 Series Reference Guide* you received with your terminal shows command syntax and condensed descriptions of all commands in a handy pocket-sized guide.

The book *An Introduction to Computer Color Graphics*, which also came with your terminal, introduces you to basic computer color graphics in easy-to-understand terms, and shows how the terminal's features support specific graphics tasks. This book also shows a variety of computer graphics applications; you will probably want to read it to become more familiar with how computer graphics are used in business and industry.

An optional *4200 Series Programmers Manual* contains host programming information and detailed descriptions of all commands. It is intended for programmers who will be writing or maintaining application programs for host computer systems. If you will be programming for the terminal, or if you need more information than is contained in your Operators Manual and Reference Guide, you will want to order this manual. (See Appendix H for ordering information.)

Service manuals are also available; refer to *Optional Accessories* later in this section.

## OVERVIEW OF THE 4205 AND 4207 TERMINALS

The 4205 and 4207 Computer Display Terminals are microprocessor-controlled terminals specially designed to display and modify color graphics and to edit text. The terminals can communicate with IBM host computers as well as emulate the alphanumeric capabilities of an IBM 3279 Display Station and the multi-session capabilities of the 3270 PC.

The terminal consists of two pieces:

- *Display Unit* — The display unit includes the display screen, most of the terminal's electronic circuits, and connectors for host computers and peripheral devices.
- *Keyboard* — The low-profile keyboard contains ASCII keys, programmable function keys, a numeric keypad, and a multipurpose Joydisk used to scroll text and control the graphics cursor. The port at the rear of the keyboard allows easy installation of the optional mouse. Snap-down legs on the keyboard adjust keyboard angle.

The differences between the 4205 and 4207 are simply that, in addition to everything the 4205 offers, the 4207 offers:

- Higher screen resolution
- More system memory
- Two additional peripheral ports
- Two additional lines in the dialog area
- A larger character size and character cell size

Despite these differences, the 4205 can use almost all the features described in this manual — any limitations are clearly noted.

## FEATURES

Briefly, the features of the 4205 and 4207 Terminals that help you create, edit, and display color graphics and text are listed here.

### Host Communications

- *Coax and RS-232 Ports* — Both terminals have two host communications ports: one for IBM 3270 coaxial communications and the other for RS-232 communications.
- *Host Port Switching* — You can easily switch between communications through the coax port (sometimes referred to as *HOSTPORT COAX*) and communications through the RS-232 port (sometimes referred to as *HOSTPORT RS-232*).
- *Multiple Sessions* — During coax communications, you can run up to five applications simultaneously.

### User-Friendly Interface

- *Setup* — *Setup* is a special operating mode that lets you enter intelligible English-style commands from the keyboard to control the terminal's operating characteristics.
- *Interactive Color Interface* — Special function keys let you enter the Set Color function to select colors and immediately see the effect of your choices in the graphics or text displayed on the screen.
- *Zoom and Pan* — Predefined function keys let you *zoom* in or *pan* across a graphics image to display different portions in more detail.
- *Help* — This easily accessible help facility gives you a quick reference to command names and the kind of parameters they require, all displayed on the terminal screen.
- *Status* — Also easily accessible, the status facility displays the terminal's current settings on the screen; you can check all settings, selected groups of settings, or just one specific setting.
- *Snoopy Mode* — This programmer's troubleshooting aid displays incoming control characters on the terminal screen instead of executing them.

### High Quality Color

- *Multicolor Palette* — You can display up to 16 colors at a time in your graphics, and up to eight colors in text, chosen from a palette of 64 colors.
- *Fill Patterns* — You can fill graphics *panels* with predefined textures and colors, chosen from several dozen patterns.

## High Performance

- *Screen Resolution* — Both the 4205 and 4207 deliver sharp alphanumerics and crisp, clean graphics. While the 4205 offers a 480x360 pixel display, the 4207 offers an even sharper display using 640x480 pixels, both on a 13" screen with a 0.31 mm dot pitch CRT.
- *Fast Refresh* — A 60-Hz noninterlaced raster-scan display eliminates flicker, resulting in bright colors and a stable image.
- *Addressable Space* — A 4096x4096 internal coordinate system provides you with over 16 million addressable data points (specified as xy-coordinates) for defining graphics.
- *Memory* — 128K bytes of memory in the 4205 and 256K bytes in the 4207 support the 4200 Series intelligent graphics functions — some of this memory is used for internal functions and the rest is available for host applications. You can increase your memory capacity by ordering an additional megabyte of memory (see *Options* later in this section for ordering information).
- *Pixel Operations* — Programs can control individual pixels on the screen to create customized images.
- *Host Communication* — Data transfer rates up to 38.4K baud (bits per second) display graphics quickly and reduce your host/terminal communication time.

## Dual Display Areas

- *Two Display Areas* — A *dialog area* and a *graphics area* let you separate non-graphics text from graphics. (Maximum dialog area size during RS-232 communications for the 4205 is 30, while the 4207 is 32. Maximum dialog area size during coax communications for the 4205 is 28 lines, while the 4207 is 32 lines.)
- *Independent Operation* — The separate dialog area lets you edit text without interfering with the graphics image.

## Versatile Text

- *Two Text Column-Widths* — You can display text in either 80 columns or 132 columns (use 132 columns during RS-232 communications only). Horizontal scrolling permits you to scroll the entire width of the 132-column format.
- *Scrolling* — In addition to horizontal scrolling, vertical scrolling lets you scroll through the dialog buffer to see lines of text that are out of view.
- *Downloadable Characters* — You can design your own characters — perhaps for displaying unique symbols used in your profession. Downloaded characters are defined through a host program and can be used in the dialog and graphics areas during RS-232 communications.
- *3279 Emulation* — During coax communications, the dialog area provides the same alphanumeric capability as the IBM 3279 Display Station. An operator information area beneath the dialog area displays status information from the host.

## Powerful Graphics Processing

- *Four Graphics Surfaces* — You can use up to four separate *surfaces* for displaying graphics. Each surface can have its own colors and its own graphics and can be displayed independently of the others; all surfaces can be overlaid on top of each other.
- *Graphics Input (GIN)* — GIN lets you easily enter graphics data — like locations on a map — required by an applications program. *Gridding, inking, rubberbanding*, and multiple *GIN windows* aid you in your input task.
- *Segments* — You can combine several individual graphics elements to create a *segment*, which you can then copy, move, scale, or rotate as a unit. Additionally, you can save segments to a host to be used repeatedly in your application.
- *Graphtext* — Commands allow scaling and rotation of text in the graphics area. *Graphtext font* commands let you define your own font styles for the graphics area.
- *Multiple Views* — An application can display up to 64 separate *views*, each with its own graphics.

## Graphics Display Support

- *TEK Mode* — This host command mode lets you run software that uses Tek-style commands (that is, 4100 and 4010 escape sequences). This means that programs written for the 4205 and 4207 are downward-compatible with Tektronix 4010 and 4100 Series Terminals, and upward-compatible with Tektronix 4110 and 4120 Series Terminals, with minimal or no modification.

## Screen Editing Support

- *ANSI Mode* — This host command mode supports many common text-editing applications that use the ANSI X3.64 Standard.
- *EDIT Mode* — This host command mode supports text editing functions for programs designed for DEC VT100 terminals.
- *VT52 Mode* — This host command mode supports text editing functions for programs designed for DEC VT52 terminals.

## Peripheral Support

- *Peripheral Ports* — You can connect a wide variety of color and monochrome copiers to the COPIER port. On the 4207, you can also connect RS-232 driven devices to the two additional ports provided by the 4207's two-port peripheral interface (2PPI). See below for a list of these devices.
- *Color Copiers* — The 4205 and 4207 Terminals can drive a wide range of color copiers to give you color hardcopies of your graphics and text. You can either connect the terminal to a Tektronix 4696 Color Ink-Jet Printer, or to Tektronix 4691, 4692, or 4695 Color Graphics Copiers.
- *Monochrome Copiers* — You can connect a variety of monochrome copiers and printers to your terminal to produce monochrome graphics copies or text-only copies. These include a Tektronix 4644 Dot Matrix Printer, a Hewlett-Packard ThinkJet, or printers that use a Centronics-style parallel interface and Epson FX-80 graphics protocol. You can make text-only copies on dot matrix text printers that use a Centronics style parallel interface. In addition, if you have a 4207, you can connect a Hewlett-Packard LaserJet to your terminal.
- *Plotters* — You can connect the 4207 Terminal to Tektronix 4662 and 4663 Plotters for large, detailed line drawings.
- *Rasterizers* — The 4207 Terminal is compatible with the Tektronix 4510 Color Graphics Rasterizer; a rasterizer can improve your hardcopy's image resolution and color quality.
- *Graphics Tablets* — You can use Tektronix 4957 and 4958 Graphics Tablets to interact with existing graphics applications on the 4207.

## Convenient Copying Features

- *Versatile Copying* — You can make copies of the entire display, just the graphics on the display, or just the text in the dialog buffer.
- *Background Copying* — The terminal can spool a graphics image to copy in the background, which frees your terminal while the copying is done.
- *Data Logging* — You can automatically send dialog text to both the screen and a printer, providing a hardcopy of all dialog between the terminal and the host.

## Built-In Reliability Checks

- **Power-Up Self Test** — This built-in program automatically checks the terminal every time you power it up. If a problem is detected, the Self Test firmware identifies the defective module.
- **Extended Self-Test** — This program, also built into the terminal's firmware, allows you to perform more extensive tests of specific parts of the terminal as well as the terminal's interaction with peripheral devices.

## Special Features

- **Mouse** — You can order an optional mouse as a GIN device — the mouse simply plugs into the back of the keyboard.
- **Automatic Screen-Dimming** — The screen automatically dims after five minutes of terminal inactivity to prolong the life of the display screen. You can press any key to restore the display intensity (the Shift key is a good choice, since it doesn't disturb the displayed image or send characters to the host).
- **Bell Control** — You can control bell volume or turn the bell off altogether. You can also specify how the terminal handles multiple Bell characters — whether it rings as one continuous bell or a series of short bells.
- **Programmable Keys** — Most keys can be programmed to generate a sequence of characters or commands (called a *macro*).
- **Nonvolatile Memory** — You can save terminal settings and macros in nonvolatile memory so you don't have to respecify them each time you turn on the terminal — once you save a setting, it will remain set even when power to the terminal is turned off.
- **Security** — Your terminal can be programmed to gain access to secured programs that use the *answerback* feature. The program simply queries the terminal for the correct password before allowing access.
- **Environments** — Once you set your terminal up for a particular configuration, you can save that *environment* so that you can later access it when you need those same settings again. You might use this feature to save a series of different settings for each terminal user, so that the terminal can be easily adapted to each user's needs, or to save settings needed for different tasks, so that you can easily switch between the environment you need for each task. The terminal can retain environments in its memory as long as the power remains on.

## STANDARD ACCESSORIES

The following items are delivered with the terminal as standard equipment:

- *4205/4207 Computer Display Terminals With Coax Option Operators Manual* (this manual)
- *An Introduction to Computer Color Graphics*
- *4200 Series Reference Guide*
- Function key overlays (contained in the back of this manual)
- RS-232-C host port cable (connects the terminal to the host or a modem)
- Power cord<sup>1</sup>
- Keyboard<sup>1</sup>

## OPTIONAL ACCESSORIES

The following optional items can be ordered separately (refer to Appendix H for ordering information):

- *4200 Series Programmers Manual*
- *4205/4207 Field Service Manual*
- *RS-232 host port cable for MicroVAX*
- RS-232 host port loopback connector (used with Extended Self Test)
- COPIER port loopback connector (used with Extended Self Test)
- Alignment graticule (for display unit calibration)

## OPTIONS

The terminal can be ordered with the following optional equipment (contact your Tektronix Sales Representative for ordering information):

### Coax Interface:

- Option CX — Coax Interface, North American keyboard
- Option CA — Coax Interface, United Kingdom keyboard
- Option CB — Coax Interface, French keyboard
- Option CC — Coax Interface, Swedish keyboard
- Option CF — Coax Interface, Danish/Norwegian keyboard
- Option CG — Coax Interface, German keyboard

The coax option provides compatibility with IBM hosts.

(continued)

<sup>1</sup> The terminal is shipped with a 115-V North American power cord (60 Hz) and a North American keyboard, unless you order otherwise.

**International Keyboards:**

- Option 4A — United Kingdom keyboard
- Option 4B — French keyboard
- Option 4C — Swedish keyboard
- Option 4F — Danish/Norwegian keyboard
- Option 4G — German keyboard

The terminal is shipped with a North American keyboard unless you order one of the international keyboards. For information on keyboards, refer to Appendix C.

**Power Cords:**

- Option A1 — European power cord (220 V)
- Option A2 — United Kingdom power cord (240 V)
- Option A3 — Australian power cord (240 V)
- Option A4 — North American power cord (240 V)
- Option A5 — Swiss power cord (240 V)

The terminal is shipped with a 115-V North American power cord unless you order one of the other optional cords.

**Optional Features:**

- Option 4M — Mouse (or F-Kit 4200F4M)
- Option 22 — Megabyte of memory (or F-Kit 4200F22)

To order either of these items for a terminal you've already purchased, use the F-Kit number given in parentheses. These *F-Kits* (for *field-installable kit*) can be installed by the customer.



Section **2**

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**GETTING ACQUAINTED WITH  
YOUR TERMINAL**

Section **2**

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**GETTING ACQUAINTED WITH  
YOUR TERMINAL**

---

This section will help you become familiar with some of the features of your 4205 or 4207 Computer Display Terminal. You do not need to be connected to a host computer, and if you are, be sure you're not logged in.

Here's what you can expect to learn through these exercises:

- Exercise 1 helps you prepare the terminal to receive commands.
- Exercise 2 teaches you how to enter commands into the terminal.
- Exercise 3 demonstrates the terminal's dialog area and shows you how to get information from the terminal.
- Exercise 4 helps you create graphics on the terminal screen.
- Exercise 5 shows you how to change the colors of the text and graphics on the screen.
- Exercise 6 helps you zoom in on and pan across the graphics displayed on the screen.
- Exercise 7 shows you how to work with graphics input devices if your host program uses *graphics input* (GIN).

Although you can complete the exercises in a single session, it's probably easier to do them in two or more sittings. You should do Exercises 1, 2, and 3 in one sitting; for Exercises 4 through 7, just follow the steps at the beginning of each one, which tell you how to prepare the terminal for that particular exercise. Some exercises will take longer than others, but all seven should require less than two hours.

## EXERCISE 1: GETTING READY

This exercise prepares the terminal for use. Always perform these steps if you take more than one session to do the exercises or if you do them out of sequence.

Check to see that the terminal is ready to use. The terminal's power cord should be plugged into a power outlet with the correct voltage, and the keyboard cable should be plugged into the keyboard connector on the front of the terminal. (If you need help, refer to the *Installation Instructions* in Appendix A.)

One feature you should know about before starting these exercises is the *automatic screen-dimming* feature — when there is no terminal activity for five minutes, the screen automatically dims. This feature prolongs the life of the display surface. To return the screen to normal brightness, press any key (we suggest the *Shift* key because it doesn't disturb the display).

First, turn on and prepare the terminal to receive your commands:

Press the OFF/ON button, which is located on the front of the terminal.

(Whenever you must do something in these exercises, the instructions will be highlighted in blue.)

A blinking underline or block, called a *cursor*, will appear on the screen in about fifteen seconds (after the terminal runs its power-up self test — discussed in Appendix A). If you don't see the cursor, adjust the BRIGHTNESS button, which is located just below the OFF/ON button, by turning it clockwise.

Looking at the top row of keys on the keyboard, locate the key labeled *Setup* at the bottom and *Cancel* at the top. When you press this key, it puts the terminal in Setup, or takes it out if it was already in Setup. Setup is a special operating mode that lets you enter intelligible English-style commands from the keyboard — typically to set the terminal's operating characteristics.

Continue by putting the terminal in Setup:

Press the Setup key.

Notice that the terminal displays an asterisk (\*), immediately followed by the cursor, in the upper-left corner of the screen. The asterisk is the *Setup prompt*, and it tells you that the terminal is ready for your Setup commands.

Locate the Enter key on the keyboard:

Press the Enter key several times.

Notice that each time you press Enter, the cursor goes to a new line and redisplay the asterisk, prompting you to enter a command. When you press the Enter key, it tells the terminal to execute the command you just entered. Always press the Enter key at the end of a command entry.

Now, to make sure these exercises will work as described, put the terminal settings at their *factory default* values. (Factory default values are settings that are predefined in the terminal before it leaves the factory.)

Enter the following command by typing it on the keyboard (you may use uppercase or lowercase letters), and remember to press Enter to terminate the command:

### **FACTORY**

The asterisk and the word *FACTORY* disappear from the screen and only the blinking cursor is left in the upper-left corner. This command resets all of the terminal's settings to their factory default values, and takes the terminal out of Setup.

Since the *FACTORY* command took the terminal out of Setup, you'll need to put it back in Setup to continue with the exercise. Go ahead and do that now:

Press the Setup key.

To make the terminal operate as described in these exercises, you need to select the RS-232 host port. This changes how the keyboard operates and turns off the display of the operator information area (the area below the blue line).

To switch to the RS-232 host port, type this command and press Enter:

### **HOSTPORT RS-232**

The blue line disappears, leaving the terminal ready for the next exercise.

## **EXERCISE 2: ENTERING COMMANDS**

In this exercise, you will learn how to enter commands. But first, we'll look at how to correct mistakes made while entering commands.

### **CORRECTING COMMAND ENTRY MISTAKES**

If you make a typing mistake while entering a command and notice it *before pressing the Enter key*, you can use one of two methods for correcting the error. First, let's type in a command — the *STATUS* command — but enter it incorrectly.

Type in these characters, but *don't press the Enter key* :

#### **SATUS DIALOG**

You can correct this error by using the Del key, which moves the cursor back and deletes individual characters. Try it now, and notice that each stroke of the Del key deletes a single character.

Press the Del key to erase each letter in the word *DIALOG*.

You could also correct the error by entering *Ctrl-X* (hold down the Ctrl key while you press and release the X key). *Ctrl-X* deletes the entire line and returns the cursor to the beginning of the line. Try that now.

Press the *Ctrl-X* key combination to erase *SATUS*.

If you make an error while entering a command and you've *already pressed the Enter key*, the terminal may display an error message. Try that now.

Type in the characters again, this time pressing the Enter key:

**STATUS DIALOG**

The asterisks in the error message underline the faulty part of the command entry.

Now let's enter the command again.

This time, enter the STATUS command correctly:

**STATUS DIALOG**

If you reenter a command and still get an error message, refer to *Correcting Command Entry Errors* in Section 3.

## UNDERSTANDING SETUP COMMANDS AND RULES

Each command starts with a *command name* and may include *parameters*. All commands must be terminated by the Enter key.

In the command you just entered, *STATUS* is the command name, which describes the command's function — in this case, the function is to obtain the status of the terminal. The word *DIALOG* is a parameter, which is a variable that represents a choice between several options — in this case, the parameter specifies a special group of commands relating to the terminal's dialog area (which you'll learn about later).

Before going on, here are some general guidelines that will help you enter commands during these exercises (or at anytime).

- Always end a command entry by pressing the Enter key.
- You can enter a command in uppercase, lowercase, or mixed case letters. For example, *STATUS*, *status*, and *Status* are all valid entries. (In this manual, we always use uppercase letters in commands so you can easily distinguish them from the surrounding text.)
- You can shorten command names and parameters to their shortest unambiguous form; for example, *STA* is the same as *STATUS*, but *ST* is not acceptable because other commands start with the letters *ST*. (In this manual, we always use the complete form of a command to avoid confusion.)
- You can use either a comma or a space to separate command parameters. (In this manual, we always use a comma between parameters to make them easier to read.)
- You can omit the parameters from a command if you want to use the *omitted default values* for the parameters. For example, the omitted parameter for *LOCAL* is *YES*; therefore, entering *LOCAL* is the same as entering *LOCAL YES*. The table of Setup commands in Section 4 shows the defaults for all the commands. (The description of Tek-style syntax in your *4200 Series Reference Guide* shows other ways to omit parameters.)

## EXERCISE 3: WORKING IN THE DIALOG AREA

In this exercise you will learn about the terminal's dialog area and how to get information from the terminal about its settings.

Think of the terminal's screen as a piece of double-paned glass. On one pane the terminal displays all *dialog* (that is, communication between you and the terminal, such as Setup commands, or between you and an applications program running on a host computer). This "front" pane is called the *dialog area*. (You used the dialog area when you entered the FACTORY and STATUS commands earlier.) The pane behind the dialog area contains the graphics and is called the *graphics area*. (You'll learn about this area in the next exercise.)

The purpose of the dialog area is to keep text that is not part of a graphics image from obscuring the graphics.

### CHANGING DIALOG AREA CHARACTERISTICS

You can change several characteristics of the dialog area. For instance one thing you might want to do is make the dialog area invisible so you can see the graphics behind it. Do that now.

Press the Dialog key at the top left of the keyboard.

The text you entered earlier is no longer displayed. If an image were in the graphics area, you could see it without the text interfering.

Now, press the Dialog key again to make the dialog area visible.

You can also decrease or increase the number of lines displayed in the dialog area.

Look at the list displayed on the screen as a result of entering the STATUS command earlier. It occupies a large part of the screen.

To change the size of the dialog area, enter the following commands:

```
DALINES 10  
STATUS DIALOG
```

The first command reduces the number of lines displayed on the screen. The second command gives you dialog area status just as it did before, but this time you can see only ten lines on the screen.

## USING THE DIALOG BUFFER AND SCROLLING

The *dialog area buffer*, or simply *dialog buffer*, is a part of the terminal's memory that stores the dialog displayed in the dialog area. After the dialog buffer fills up, the first entries are forced out to make room for subsequent entries.

You can change the size of the dialog buffer to increase or decrease the number of lines it will store. Fewer lines leaves more memory for *segments* (discussed in Exercise 4) and other terminal functions.

Reduce the size of the buffer and fill it by entering:

```
DABUFFER 25  
STATUS
```

The entire list of commands, with their current settings, *scrolls* upward on the screen. The scrolling process is probably too rapid for you to get useful information. So, when the scrolling stops, locate the hexagonal Joydisk in the upper-left corner of the keyboard. Then:

Press the bottom of the Joydisk to scroll some of the previous lines of text back into view.

Notice that you can't scroll all the way back to the beginning of the list. This is because the complete list is too long to fit in the dialog buffer at its current size. Thus, the earliest parts of the status list are not retained, and cannot be redisplayed on the screen.

Now, scroll back to the last line of the buffer:

Press the top of the Joydisk until you see the asterisk prompt.

Now, increase the dialog buffer size to hold more of the status list, and the dialog area to display more lines.

Specify enough buffer lines to hold the entire list by entering:

```
DABUFFER 200
```

Now, increase the number of lines displayed and fill the buffer again by entering:

```
DALINES 30  
STATUS
```

Go ahead and use the Joydisk to scroll in both directions through the status list.

When you have finished, scroll to the end of the list so that the asterisk prompt is displayed.



Instead of scrolling the list *after* it has printed out, you can stop and start the listing as it is printed out by using *Ctrl-S* and *Ctrl-Q*. *Ctrl-S* stops the listing and *Ctrl-Q* restarts it. (Remember, to enter *Ctrl-S* or *Ctrl-Q*, press the *Ctrl* key and hold it down while you press the *S* or *Q* key — this is similar to holding down the *Shift* key to enter a capital letter.)

Look at the keyboard and find the *Ctrl* key. Then:

Enter the **STATUS** command once again; but, after you press **Enter**, quickly press **Ctrl-S** to halt the command list. Try it now:

### STATUS

To restart the display, press **Ctrl-Q**. Try stopping and restarting the list a few times with **Ctrl-S** and **Ctrl-Q**, but be sure to end with **Ctrl-Q**.

## UNDERSTANDING THE STATUS MESSAGE

You've been using the **STATUS** command to acquaint yourself with some of the basic terminal operations. The **STATUS** command displays the current settings of all the commands that affect the terminal. Take a look at the list the terminal displays when you issue a **STATUS** command:

Ask the terminal for the status of the dialog area:

### STATUS DIALOG

Look at the screen and locate the **DALINES** command in the status list. Notice that its setting is 32, just as you set it in the last **DALINES** command. Any time you need to check the current settings of the dialog area, you can use the **STATUS DIALOG** command as you just did. There are many other commands, however, whose status you may want to check.

Ask for a status list of all Setup commands by entering:

### STATUS

Scroll through the list and note how the commands are grouped together.

## Getting Status for Specific Groups of Commands

While you were scrolling through the status list you saw that the commands are displayed in groups, called *clusters*. You can get the status of all settings for a specific cluster by using the **STATUS** command with the cluster name as its parameter. That is what you did when you entered **STATUS DIALOG** earlier.

Most commands that share a similar function have the same first two letters. You can also get the status of all these commands by issuing the first two letters as the parameter. For example, if you want to know the status of all hard copy commands, you can use **HC** as the parameter.

Try that now by entering the following command:

### STATUS HC

You'll find the **STATUS HC** command useful for checking hard copy settings before you make a copy of the screen. (Section 3 describes how to make copies.)

## EXERCISE 4: CREATING GRAPHICS

Normally, you'll create graphics using a host application program, but in this exercise you will create graphics from the keyboard while in Setup. These graphics will then be used in Exercises 5 and 6. (If you are doing this exercise out of sequence, do Exercise 1 first.)

In Exercises 2 and 3 you entered commands in the dialog area and saw the results of your commands in the dialog area. Now, you will enter commands in the dialog area that create color images in the *graphics area*. Remember, the graphics area lies "behind" the dialog area.

### PREPARING THE SCREEN FOR GRAPHICS

You'll need to see your commands as you enter them in the dialog area; at the same time, you'll want to see the graphics you are creating in the graphics area. You can see both by decreasing the size of the dialog area so it covers only a small part of the screen.

You can also change the colors of the dialog area to make a more pleasing contrast with the graphics you're going to create.

To accomplish these tasks, enter the following commands:

```
DALINES 5  
DAINDEX 0,3,3
```

The DALINES command reduces the dialog area to five lines, so it now covers less of the graphics area.

The DAINDEX command causes the dialog area to display black text on a green background (you'll learn more about changing dialog area colors in Exercise 5).

### UNDERSTANDING PANELS AND SEGMENTS

In working with graphics, you'll see the terms *panel* and *segment*.

- A *panel* is a closed polygon, like a triangle or rectangle, that can be filled with a color or a pattern. A panel normally is used to represent a single unit, such as a piece of furniture or a circuit board element, that is part of a larger graphics display. You will create several panels in this exercise.
- A *segment* is a collection of panels and other elements (including lines, curves, and text) that can be treated as a single object. For example, you could draw a picture of a car's piston as a segment, or you could draw the entire car as a segment.

Even though a segment consists of several distinct elements, you can manipulate it as a complete unit — that is, you can move, copy, rotate, or scale the segment as a whole.

## UNDERSTANDING XY-COORDINATES

To enter graphics you will be using *xy-coordinates*. These are locations in the terminal's drawing space, which is 4096 by 4096 points. To create graphics images, you must specify *xy-coordinates* ranging from 0 to 4095 on the horizontal (x) and vertical (y) axes of the screen.

### The Graphics Position

The graphics position is the last *xy-coordinate* point specified in a graphics command (in some cases, this point is implied — more on this later). The graphics position becomes the starting point that the terminal uses when executing the next graphics command.

When you turn on the terminal, the graphics position is at the upper-left corner of the screen (0,3071). When drawing an image, the first thing you must do is specify the graphics position — that is, where you want to start drawing. You can do this in a number of different ways, some of which you'll see in this exercise.

## CORRECTING ERRORS WHILE DEFINING PANELS AND SEGMENTS

When creating a segment or panel, you might enter a command with parameters that are not what you intended but that are acceptable to the terminal; for example, the color may be wrong or a line draws to the wrong point.

If you notice a wrong parameter before pressing Enter, it's easy to correct it using Del or Ctrl-X. But if you have already pressed the Enter key, you have two options:

- If the mistake is in a FILLPATTERN command (explained below), and this is the only command you have entered, then simply reenter the command correctly. The latest FILLPATTERN command setting overrides any previous settings.
- If the mistake is in an SGOPEN, BEGINPANEL, DRAW, or CURVE command (explained next), you'll have to delete that segment and begin again. To delete a segment, enter SGDELETE and the number of the segment to be deleted. For example:

### SGDELETE 1

In this command, *SGDELETE* with the parameter of *1* deletes Segment 1 and erases it from the screen.

To start over after deleting the segment, you would begin with the SGOPEN command (as described next) and reenter the entire sequence of correct commands.

### CREATING A PANEL WITHIN A SEGMENT

Begin by creating a segment consisting of a square blue panel, bordered with a white line.

Enter the following sequence of commands exactly as shown:

```
SGOPEN 1  
FILLPATTERN -4  
BEGINPANEL 500,1000,1  
DRAW 2000,1000  
DRAW 2000,2500  
DRAW 500,2500  
SGCLOSE
```

The screen should now look like Figure 2-1.

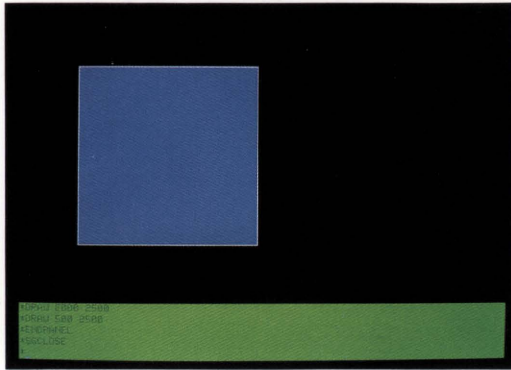


Figure 2-1. Display of One Segment.

Here's what each of these commands did:

- **SGOPEN** begins a segment and labels it with a segment identification number, in this case, Segment 1. All of the commands that follow this **SGOPEN** command continue to define parts of Segment 1 until you enter an **SGCLOSE** command to close the segment definition.
- **FILLPATTERN** selects a predefined pattern or color to fill the interior of each panel you define. This particular command sets the fill pattern to `-4`, specifying a solid blue color. The **FILLPATTERN** command can be issued at any time during a panel definition, but must precede the **ENDPANEL** command.
- **BEGINPANEL** starts a panel definition. The first two parameters specify the graphics position, which is the first corner of the panel — in this case, at xy-coordinate point `500,1000`. The final parameter, `1`, specifies that a border be drawn.
- The three **DRAW** commands continue to outline the panel. `DRAW 2000,1000` draws a line from the first corner (`500,1000`) to the point `2000,1000` on the terminal screen. This point is now the graphics position, and each succeeding **DRAW** command draws a line from the graphics position to the new point specified by the xy-coordinates.
- **SGCLOSE** instructs the terminal to end the panel and close the segment. The terminal draws the last side of the panel and fills it with blue, then closes the segment definition. In this case, because you created a panel, the graphics position is *implied* — the graphics position returns to the point specified in the **BEGINPANEL** command.

## CREATING TWO PANELS WITHIN A SEGMENT

Next, you'll draw a red star inside the blue box, using the same sequence of commands for drawing the blue box, but with different parameters. This time, you'll specify that the border not be drawn (by issuing 0 in the third parameter of the BEGINPANEL command), so you won't see anything on the screen until you end the panel.

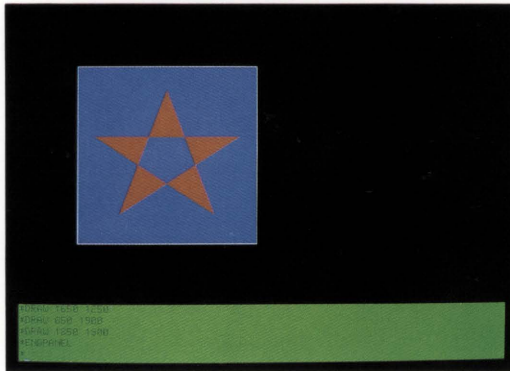
Enter the following sequence of commands:

```
SGOPEN 2
FILLPATTERN -2
BEGINPANEL 850,1250,0
DRAW 1250,2300
DRAW 1650,1250
DRAW 650,1900
DRAW 1850,1900
ENDPANEL
```

The display should now look like Figure 2-2.

Notice that you did not end the segment being defined, but did issue an ENDPANEL command. This closes the panel definition, but leaves the segment open for adding more elements. In the previous sequence of commands, you didn't need an ENDPANEL command because the SGCLOSE command closed the panel as well as the segment. Once again, the graphics position is implied and returns to the point specified in the BEGINPANEL command.

The middle of the star is not filled with red because of the way its boundaries cross. Part of the enclosed space is excluded from the panel definition.



4981-3

Figure 2-2. Box With Star.

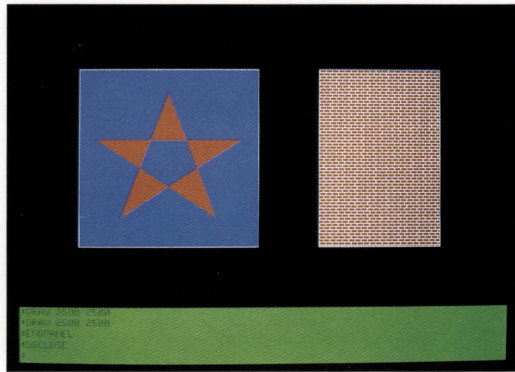
Continue defining Segment 2 by adding a rectangle beside the blue square.

Enter the following sequence of commands:

```
FILLPATTERN 6
BEGINPANEL 2500,1000,1
DRAW 3500,1000
DRAW 3500,2500
DRAW 2500,2500
SGCLOSE
```

You've drawn a rectangle and filled it with Pattern 6, a brick-like pattern, as shown in Figure 2-3. (Several dozen fill patterns are available — Appendix G shows each pattern, along with the number used to specify it. For example, you could have used Pattern 15 in the above command by entering *FILLPATTERN 15* instead of *FILLPATTERN 6*.)

Note that the *SGCLOSE* command ends the panel and closes the segment definition. Segment 2 now contains two panels: the star and the rectangle.



4981-4

Figure 2-3. Completed Graphics Display.

## DRAWING CIRCLES AND CURVES

You can draw simple curves by first specifying the graphics position with the MOVE command, then using the CURVE command with a series of xy-coordinate points.

Watch how the curve is drawn after you enter the CURVE command.

```
MOVE 1000,1000
CURVE ARC,1600,1600,2200,1000,2800,400,3400,1000
```

The MOVE command specified the graphics position. The CURVE command first specified that the type of curve to be drawn is an *arc*, then defined a series of four xy-coordinates through which the curve was drawn.

You can also create full circles using the CURVE command. In this next demonstration, you will create a circle as a panel and fill it with a pattern. This time, the panel will not be part of a segment.

Begin by entering the following command sequence (*without first entering an SGOPEN command*):

```
FILLPATTERN 15
BEGINPANEL 400,2600,1
CURVE ARC,1400,2600,400,2600
ENDPANEL
```

The first two values following *BEGINPANEL* define the graphics position (400,2600). The third parameter (1) specifies that a border be drawn.

The next four values represent two xy-coordinates that the terminal draws through, starting from the graphics position:

- The first two values (1400,2600) specify the first point to draw through — the distance between this first point and the graphics position defines the circle's diameter.
- The next two values (400,2600) specify the same point you specified in the *BEGINPANEL* command — so a circle is drawn.

Since you did not open a segment, this circle is not part of a segment definition.

You can draw other types of curves — see the DRAW CURVE command description in the *4200 Series Reference Guide*.

## UPDATING THE GRAPHICS AREA

Remember that segments are retained in memory. Watch what happens to the curve and circle you just drew when you erase (or, *update*) the graphics area.

Locate the GErAs key (the shifted version of the Dialog key) at the left end of the top row of keys. Now, watch the screen and press GErAs (remember to hold down the Shift key).

The entire display is momentarily erased; then Segments 1 and 2 (the blue panel, star, and bricks) are redrawn. Graphics that are not part of a segment (the circle in this case) are lost, while the graphics that are defined as segments are retained.



## CHANGING A SEGMENT'S DISPLAY

Because segments are stored in terminal memory, the terminal can highlight them, make them visible or invisible, and change them in other ways. Because the terminal is unaware of graphics that are not part of segments (like the circular panel), it can't control them once they are displayed.

### Segment Visibility

You can temporarily remove a segment from the screen without deleting it by making it invisible. Similarly, you can redisplay it by just making it visible again.

Make a segment invisible by entering:

```
SGVISIBILITY 2,NO
```

Note that the star and brick wall that comprise Segment 2 disappear (Figure 2-4). They are still in the terminal's memory, but are currently invisible.

Now, make the segment visible again by entering:

```
SGVISIBILITY 2,YES
```

Segment 2 is once again displayed on the terminal's screen.

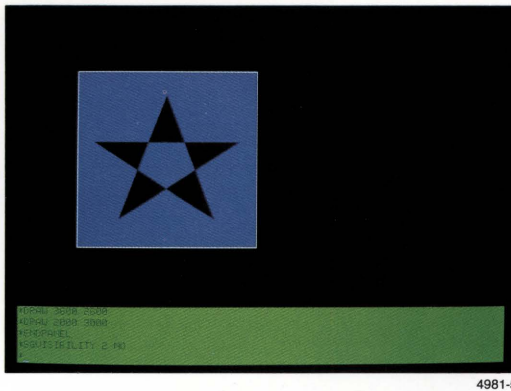


Figure 2-4. Display With Segment 2 Invisible.

## Segment Highlighting

You can highlight a segment by making it blink on and off. To see the effects of highlighting, first create another segment that is not a panel:

Draw a circle and include it in a segment by entering:

```
SGOPEN 3  
MOVE 400,2600  
CURVE ARC,1400,2600,400,2600  
SGCLOSE
```

This circle is part of a segment because you opened a segment (with *SGOPEN 3*) before you issued the rest of the commands. Since the circle is not a panel, notice that a *MOVE* command rather than a *BEGINPANEL* command specified the graphics position, that is, the circle's beginning point.

Now, highlight Segment 3 by entering:

```
SGHIGHLIGHT 3,YES
```

The circle begins to blink.

Now turn off Segment 3 highlighting and delete Segment 3 by entering:

```
SGHIGHLIGHT 3,NO  
SGDELETE 3
```

The part of the blue square where the circle overlapped was erased when you deleted Segment 3, the circle. To redisplay the square in its entirety, update the screen so the terminal redraws the segments.

Press the *GERas* key (Shift-Dialog).

In Exercise 6, you will see how the terminal can manage segments in other ways. Other terminal segment operations are usually directed by an applications program, so are not described in this manual.

## GETTING DIALOG OUT OF THE WAY OF GRAPHICS

Suppose you want to see 22 lines of dialog at a time, but still want to see the graphics behind it. Here's how you can do that:

Increase the size of the dialog area to 22 lines by entering:

**DALINES 22**

Notice that the dialog area now covers most of the screen, including the graphics.

Now, change the dialog area text color and make the background transparent, then issue **STATUS** to see the effect:

**DAINDEX 3,0,0**  
**STATUS**

As the status list scrolls up, the graphics images show through the dialog area, as though the dialog text were written on a pane of clear glass in the foreground. The display should now look similar to Figure 2-5.

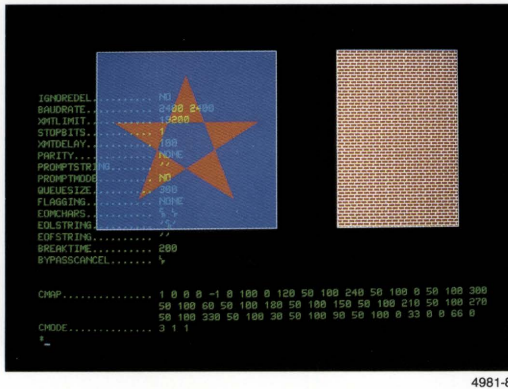


Figure 2-5. Display With Transparent Dialog Area.

Another way to get dialog out of the way of graphics is to press the Dialog key, as you did in Exercise 3. Do that again.

Press the Dialog key.

The dialog area disappears and the graphics image is completely visible. This is useful when you want a copy of the graphics that is free of dialog text. (Section 3 tells you how to make a copy.) After the copy is done, you would make the dialog area reappear by pressing the Dialog key again. Go ahead and do that now.

Press the Dialog key.

Now, decrease the size of the dialog area by entering:

**DALINES 5**

## EXERCISE 5: USING COLOR

In this exercise, you will learn to change colors using the terminal's Interactive Color Interface. (If you are doing this exercise out of sequence, do Exercise 1, do Exercise 4 from the beginning through *Creating Two Panels Within a Segment*, and then issue the Setup command `DAINDEX 3,0,0`.)

### UNDERSTANDING COLOR INDICES

Every color you can display is identified by a number called a *color index*. To select a color for text or a graphics element, you assign a color index to it.

Before creating your graphics in Exercise 4, you used the command `DAINDEX 0,3,3` to select the color indices for the dialog area. These indices specified black text (Index 0), in green *character cells* (Index 3), on a green background (Index 3). (A character cell is the rectangular area surrounding each character.)

Later, to let your graphics show through the dialog area, you changed the dialog area color indices to display green characters (Index 3), in transparent character cells (Index 0), on a transparent background (Index 0).

In both of these cases, when you changed colors, you specified a new index number. The factory default colors assigned to each index are:

0 — Black/Transparent	6 — Magenta	11 — Blue-Cyan
1 — White	7 — Yellow	12 — Blue-Magenta
2 — Red	8 — Orange	13 — Red-Magenta
3 — Green	9 — Green-Yellow	14 — Dark Gray
4 — Blue	10 — Green-Cyan	15 — Light Gray
5 — Cyan		

The dialog area uses just Indices 0 through 7; the graphics area can use all 16 indices.

This exercise will show you how to change the color assigned to each of these indices. Index 0, however, is slightly different. When you use it in the dialog area for the character cell background or the dialog area background, it is *always* transparent; when used for characters, Index 0 is just like every other index.

### UNDERSTANDING COLOR DEFINITIONS

Using the *Set Color* function you can change the *color definition* assigned to an index. For example, you could change the color definition assigned to Index 2 from red (the default) to yellow; then, every part of an image that uses Index 2 would become yellow.

The Set Color function gives you three methods for changing color definitions. In this exercise you will use all three methods so you'll be familiar with the advantages and limitations of each one. Here's what you'll learn in this exercise:

- First, you'll learn how to change a color definition by replacing it with a color definition chosen from a color menu.
- Second, you'll learn how to change a color definition by changing its *hue*, *lightness*, and *saturation* (HLS) values.
- Third, you'll learn how to display the terminal's complete color map and modify any color definition shown there.

You'll see that in all methods the color changes, but the index number remains the same.

## ENTERING THE SET COLOR FUNCTION

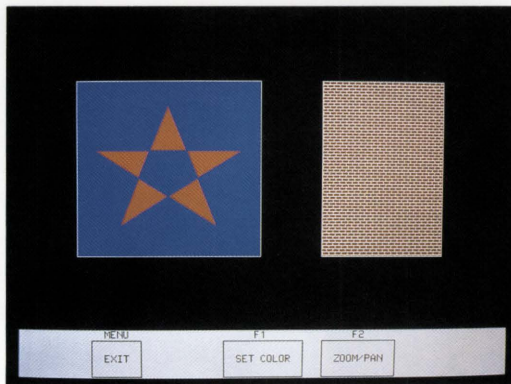
The Menu key gives you access to:

- The *Set Color* function, the terminal feature that allows you to interactively select colors
- The *Zoom/Pan* function (discussed in Exercise 6)

Locate the Menu key in the middle of the row of function keys along the top of the keyboard. Then:

**Press the Menu key.**

You'll see a menu displayed on the screen (Figure 2-6). Notice that the dialog area temporarily disappears.



4981-37

**Figure 2-6. Menu Key Display.**

While you're working with the Set Color function, you can't communicate with the host computer. If you exit the Set Color function (by pressing the Menu key again), it will redisplay the text previously displayed in the dialog area and resume communication with the host.

### The Set Color Banner

When you press the F1 key it invokes the Set Color function. You will see a flashing message on the screen that says, "**Press S ERas key to erase screen and display current colors.**" However, at this point in the exercise, *do not press S ERas now.*

Go ahead and activate the Set Color function:

Press the F1 key.

Do *not* press S ERas.

(If you inadvertently press another key at this point, simply press the Menu key twice, then the F1 key to access the Set Color function.)

Notice the banner displayed across the bottom of the screen (Figure 2-7).

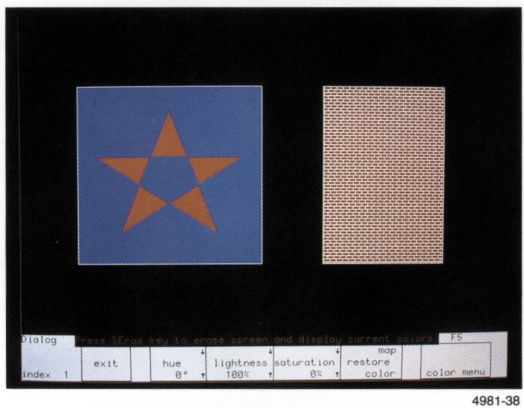


Figure 2-7. Set Color Banner.

Now, press any key to get rid of the “Press SEras key . . .” message. In the Set Color function, the terminal responds only to these keyboard keys:

- Function Keys F1, F2, F3, F4, and F5, whose purposes are identified in the banner
- The Joydisk, which moves the crosshair cursor to select colors
- The Menu and Cancel keys, which exit Set Color
- The SCopy and DCopy keys, which you can use to copy the current colors assigned to indices

### The Crosshair Cursor

At this time, you'll also see a set of perpendicular lines appear on the screen. These form the *crosshair cursor*, which you'll use while working with the Set Color function.

You can use the Joydisk to move the crosshair cursor around on the screen and select items to be changed. Position the intersection over the item you want to select.

Go ahead and try moving the crosshair cursor around now:

Press and hold down different sides of the the Joydisk to see how it controls the motion of the crosshair cursor. Notice how light and heavy pressure on the Joydisk affects the speed of the crosshair cursor.

Then, try holding down the Shift key while you lightly press the Joydisk.

Notice that using the Shift key along with light pressure on the Joydisk speeds up the motion of the crosshair cursor.

#### NOTE

*If you have the optional mouse, you can use it rather than the Joydisk to move the crosshair cursor. You can also use the mouse buttons rather than Function Keys F1, F2, and F3 on the terminal keyboard to control hue, lightness, and saturation — with your palm cupped over the thickest part of the mouse, use the left button for hue (F1), the middle button for lightness (F2), and the right button for saturation (F3).*

## USING THE COLOR MENU

The terminal can display a menu of nine predefined colors. To choose a color from the color menu, you first select the item whose color you want to change, then you select a new color from a list of nine predefined colors. Pressing Function Key F5 displays the colors that you can select. Try it now:

Use the Joydisk to move the crosshair cursor to the red star.

Take a few moments to examine the banner at the bottom of the screen. Notice the word *Graphics* at the left end of the banner. This indicates that the crosshairs are in the graphics area. Below this is a small square of red and the label *index 2*. The small red square is a sample of the color the cursor is on, and the label tells you the color is Index 2.

Continuing on now:

Press the F5 key and hold it down.

The list of nine color names is displayed beside the crosshairs, as shown in Figure 2-8a, and the message, "**Hold F5 down and place crosshairs over the color desired**" appears at the top of the banner.

While holding down F5 with one hand, press the Joydisk with your other hand to move the intersection of the crosshair cursor into the color menu. Then move the cursor up and down within the color menu.

Notice that the color of the star changes to the color selected by the cursor. At the bottom of the screen, the small colored square in the banner also changes to the selected color and informs you of the color's index number. Next:

Move the cursor to the color name *green*, as shown in Figure 2-8b. Then, release the Joydisk and the F5 key.

The star remains green because that is the color name the cursor was on when you released F5. The list of color names disappears.

You have just used the color menu to change the color definition of Index 2 from red to green. Notice that the bricks also changed to green because they also use Index 2. When you change the color definition of a color in the graphics area, all occurrences of that color are changed.



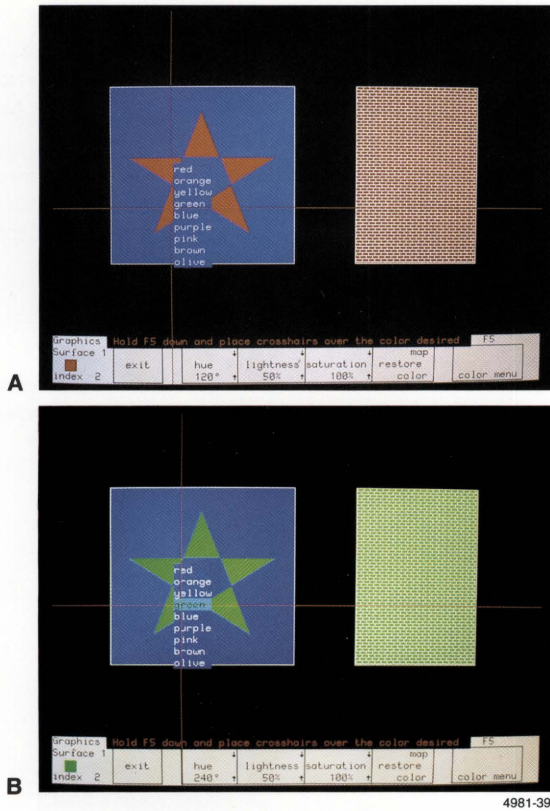


Figure 2-8. Using the Color Menu.

You now have these options:

- Without moving the crosshairs, press F4 to restore the color you just changed to its previous color definition.
- Change more colors by repeating the previous steps.
- Press the Menu key to exit the Set Color function. This automatically saves the new color for Index 2.

For these exercises, use the first option — return the star to its original color:

Press F4.

## CHANGING HLS VALUES

Colors are defined by a mixture of *hue*, *lightness*, and *saturation* (HLS) values. (Refer to the *Tektronix Color Standard* in Appendix F for an illustration of the HLS color coordinate system.) This part of the exercise will show you how to change a color by changing its HLS values.

Because you are still in the Set Color function, the crosshairs and banner are already displayed on the screen. If you weren't already in the Set Color function, you would simply press the Menu key followed by F1, which would display the banner and crosshairs.

Continue by selecting an item on the screen:

Move the crosshair cursor to the blue square.

Look at the banner at the bottom of the screen (Figure 2-9). The small blue square shows the color the cursor is on, and the label tells you the color is Index 4.

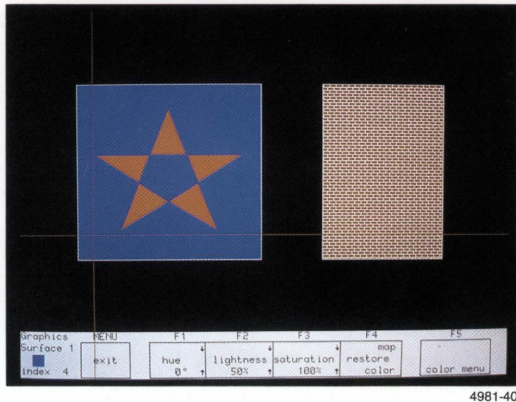


Figure 2-9. Identifying Current Colors.

The rest of the banner tells you what the function keys do. Since the terminal defines each color in terms of HLS values, you can change a color by changing these values. The boxes labeled *hue*, *lightness*, and *saturation* show the values for the color the cursor is on. The labels *F1*, *F2*, and *F3* above the boxes indicate which key to press to change each value.

### NOTE

*The displays for this exercise were prepared using a Tektronix 4109 Terminal. Therefore, some of the HLS values that you see listed in the displays may be slightly different on your 4205 or 4207.*

Try changing the hue:

Press F1 (hue) five or six times.

Notice that each time you press and release the key, the color of the box changes and the hue value changes — by 10°. The degrees indicate where you are in the color coordinate system.

Continue changing the hue:

Press and hold F1.

The hue value continues to increase by set increments and wraps around to zero when it passes 360°. You can watch the box on the screen go through the full range of hues in concert with the change in hue values. Now, try this:

Press Shift-F1 (hold down the Shift key and press F1).

Note that pressing F1 increases the hue value and pressing Shift-F1 decreases the hue value. You can change the lightness and saturation values in a similar fashion with the F2 and F3 keys.

Table 2-1 shows what each Set Color function key does when you press it. Experiment with changing HLS values by pressing Keys F1, F2, F3 and their shifted versions.

**Table 2-1**  
**SET COLOR FUNCTION KEYS**

Key	Action
F1 <sup>a</sup>	INCREASE HUE. Increases hue by 10°.
Shift-F1	DECREASE HUE. Decreases hue by 10°.
F2 <sup>a</sup>	INCREASE LIGHTNESS. Increases lightness by 10 percentage units.
Shift-F2	DECREASE LIGHTNESS. Decreases lightness by 10 percentage units.
F3 <sup>a</sup>	INCREASE SATURATION. Increases saturation by 25 percentage units.
Shift-F3	DECREASE SATURATION. Decreases saturation by 25 percentage units.
F4	RESTORE COLOR. Restores the HLS values before the last cursor movement. If the cursor has not moved since the colors have changed, F4 restores the color; if the cursor has moved, there is no effect.
Shift-F4	RESTORE COLOR MAP. Restores all color settings to their values before you entered Set Color function.
F5	COLOR MENU. Displays a menu of nine predefined colors that you can select with the crosshair cursor.

<sup>a</sup> If you have the optional mouse, you can use the mouse buttons rather than keys F1, F2, and F3 on the terminal keyboard to control hue, lightness, and saturation — with your palm cupped over the thickest part of the mouse, use the left button for hue (F1), the middle button for lightness (F2), and the right button for saturation (F3).

When you started this exercise the box on the screen was blue (hue 0°, lightness 50%, and saturation 100%). Change the box to brown by changing Index 4 to HLS values of 150,30,100:

Use F1 to set the hue to 150°.

Use F2 to change the lightness to 30%.

Leave the saturation at 100%.

You have just changed the color definition of Index 4 in the graphics area to brown, so the terminal screen should now look like Figure 2-10.

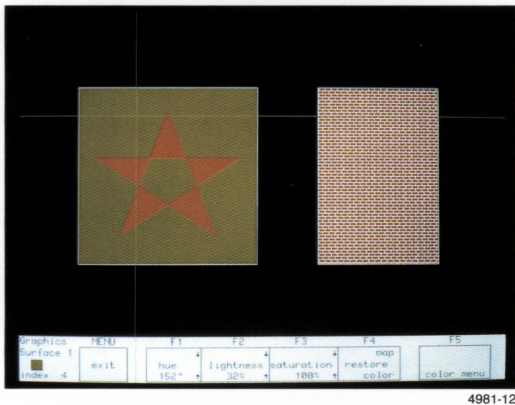


Figure 2-10. Display With Modified Color.

At this point you have several options. Among them, you could:

- Without moving the crosshairs, press F4 to restore the original color.
- Move the crosshairs to another color and modify it by changing the HLS values, or using the color menu (Key F5).
- Press the Menu key to exit from the Set Color function, which saves any colors you changed.

For these exercises, use the third option:

Press the key labeled Menu at the top of the keyboard.

This causes the terminal to exit from the Set Color function and save brown (HLS 150,30,100) as the color definition assigned to Index 4. Now, whenever you specify Index 4, it will be brown. (Color definitions are saved until you turn off the terminal or modify the colors again.)

## USING THE COLOR MAP

Another way to change colors is to modify the *color map* — the part of terminal memory that stores the color definition for all indices. When you use this method, the terminal displays each index along with its current HLS settings.

The terminal has eight predefined color definitions for the dialog area and 16 for the graphics area. It assigns each of these color definitions to a color index and displays them on the color map.

To use this method you must erase the screen. But first, activate the Set Color function:

Press the Menu key.

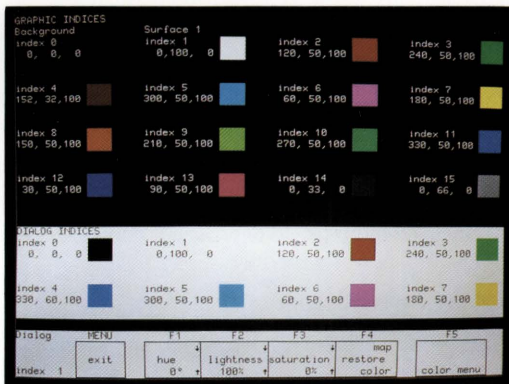
Press the F1 key.

Do not move the crosshairs.

In the first method you moved the crosshairs immediately after activating the Set Color function. In this method, you'll start by erasing the screen to display the color map. Go ahead and do that now:

Press the SEras key.

The display shown in Figure 2-11 appears on the screen. The screen is divided into three areas: the graphic indices color map, the dialog indices color map, and the Set Color function banner. The color maps show the 16 graphics indices and the eight dialog indices along with the HLS values and color samples for each index.



4981-41

Figure 2-11. Complete Color Map.

To change colors with the color map, you will use the same methods you have already learned:

- Pressing the Joydisk moves the crosshair cursor to the color you want to change.
- Pressing keys F1, F2, and F3 or the color menu changes the color.

As you're selecting colors to change, remember that you can control the crosshair cursor's speed with Joydisk pressure.

Go ahead now and change some color definitions by following these steps:

1. Position the crosshair cursor over the square sample of Index 3 in the *DIALOG INDICES* area in the lower part of the screen.
2. Use F1 to change the hue to 130°, which results in red for Color Index 3 in the dialog area.
3. Position the cursor over the square sample of Index 2 in the *GRAPHIC INDICES* in the upper portion of the screen.
4. Use F1 to change the hue value to 180°, which results in yellow for Index 2 in the graphics area.
5. Position the crosshair cursor over the square sample of Index 4 in the *GRAPHIC INDICES* in the upper area of the screen.
6. Press and hold down F5 to display the list of color names, and then use the cursor to select "olive" for Index 4 in the graphics area.
7. Release F5.

At this point, you have several options. Among them, you could:

- Press Shift-F4 to restore all colors to the HLS values they had when you activated the Set Color function.
- Without moving the crosshairs, press F4 to restore the color you just changed to its previous color definition.
- Press the Menu key to exit the Set Color function, and save the new colors you just defined.

For these exercises, use the last option:

Press the Menu key to exit the Set Color function and save your colors.

When you define colors, you'll notice that a range of HLS values result in a single color. For example, HLS values of 100°, 30%, and 100% will result in the same red color as the HLS values of 120°, 30%, and 100%. This happens because you can specify a greater number of HLS values than there are colors that the terminal can display.

Remember that how a given color is perceived depends on a number of factors, including how much of the color is displayed and which colors surround it.

After changing colors, you could make a hardcopy of the color map to show the current color assigned to each index. If you have a graphics printer attached to the terminal, you can do this by pressing the SCopy key.

## EXERCISE 6: USING THE ZOOM/PAN FUNCTION

This exercise introduces the terminal's Zoom/Pan feature. (If you are doing this exercise out of sequence, do Exercise 1, do the steps of *Creating a Graphics Image* in Exercise 4, and do the steps of *Using the Color Map* in Exercise 5.)

To fit on the terminal screen, a large image may have to be reduced so much that you can't see its detail. The Zoom/Pan functions let you select a portion of a displayed image and expand it to reveal more of its detail.

This exercise will help you:

- Use *Zoom* to expand a portion of the graphics image.
- Use *Pan* to move around the graphics image.
- Use general-purpose viewing functions to update or restore the graphics image or to select a view.

## ENTERING THE ZOOM/PAN FUNCTION

Remember from Exercise 5 that the Menu key gives you access to both the Set Color function and the Zoom/Pan function. To enter the Zoom/Pan function:

Press the Menu key.

Press the F2 key.

(If you inadvertently press the F1 key, press the Menu key twice, then the F2 key.)

When you enter the Zoom/Pan function, Setup is terminated. You can still work with your host, and all keys except F1 through F5 retain their normal function.

The terminal now displays the Zoom/Pan menu as a banner across the bottom of the screen, as shown in Figure 2-12. This menu shows the unshifted and shifted functions of each of the F1 through F5 keys: the unshifted key function is at the bottom of each box in the menu, and the shifted key function is at the top.

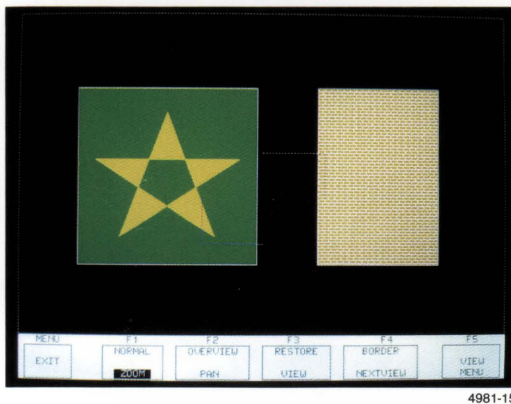


Figure 2-12. Zoom/Pan Menu.

Note the *framing box* (dotted border) displayed around the entire graphics area. This framing box represents a *window* onto your image. When you enter Zoom, the window is at its default size.

Inside the framing box and towards the center of the screen is a pair of dotted brackets that form opposite corners of a rectangle. These brackets and the word **ZOOM** highlighted in the menu indicate that Zoom is active.



## USING THE ZOOM FUNCTION

You can increase or decrease the size of the framing box to select how much of the image you want to be displayed. The larger you make the framing box, the farther away the image appears — more of the image is visible, but with less detail. The smaller you make the framing box, the closer the image appears — less of the image is visible, but with more detail.

Try exploring some of the uses of the framing box to zoom in and zoom out on displayed graphics:

Press on the top or on the right of the Joydisk.

The framing box decreases in size.

Press on the bottom or on the left of the Joydisk.

The framing box increases in size.

Use the Joydisk to decrease the framing box until it includes only part of the box and star.

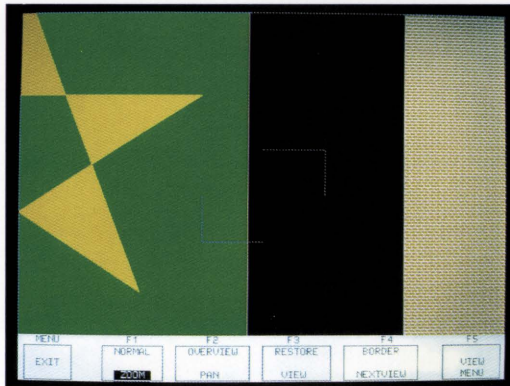
Press F3 to update the view.

The terminal redraws the image that was in the framing box, expanding it to fill the entire graphics area (Figure 2-13). Note that the framing box once again surrounds the entire graphics area. If you can't see the framing box, turn the BRIGHTNESS button clockwise.

Now, press on the left or bottom of the Joydisk to increase the size of the framing box.

The dotted border disappears, and the pair of dotted brackets expands until most of the screen is included.

Press F3 again to display the image in the zoomed-out larger window.



4981-16

Figure 2-13. Display After Zooming and Updating the View.

You can zoom out until you see the entire image on the screen.

Press the top of the Joydisk to reduce the size of the framing box.

Press F3 to update the view.

Now, press the Shift-F2 key combination to display the image in the original window.

Notice that the framing box is reduced to include only the area it encompassed before you restored the original display. This helps you switch back and forth between an expanded image and the original image:

Press the F3 key and you see the expanded image again.

Press the Shift-F2 key combination and you see the original image.

If you want to return to the original image *and* the original framing box, press Shift-F2, then press F1 twice.

### Reshaping the Framing Box

During Zoom, you can change the shape of the framing box by simultaneously pressing the Ctrl key and the Joydisk. In the previous examples, when you used the Joydisk to increase or decrease the size of the framing box, the *aspect ratio* (ratio of length to width) of the framing box remained the same.

You can increase or decrease one dimension of the framing box without changing the other dimension. Try it now:

Press and hold down the Ctrl key while you press the top of the Joydisk.

Press F3 to update your view.

You have *decreased* the height of the framing box (which increases the height of the segments in the framing box, as illustrated in Figure 2-14a).

Press Shift-F2 to display the image in the default window; notice the aspect ratio of the framing box.

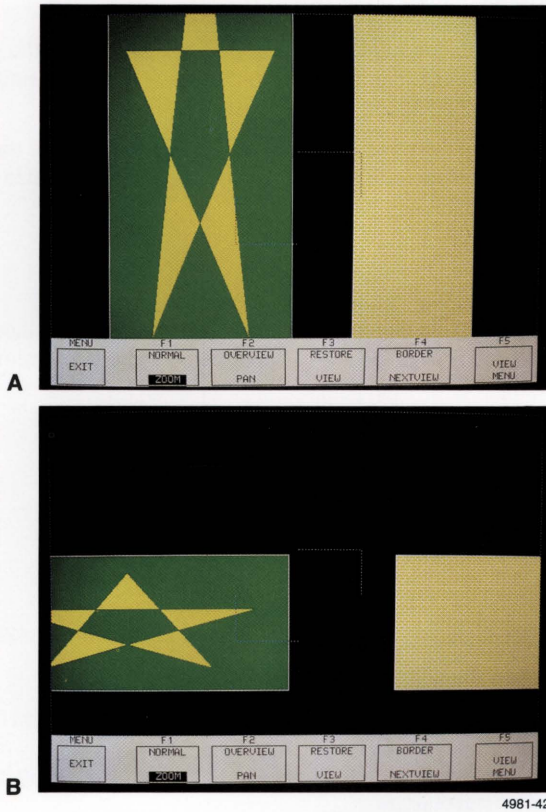
Press Shift-F1 to restore the original framing box aspect ratio.

Press the Ctrl key and the bottom of the Joydisk to *increase* the height of the framing box.

Press the F3 key to see the results of your changes (illustrated in Figure 2-14b).

Press the Ctrl key and the left side of the Joydisk to *increase* the width, or press the Ctrl key and the right side of the Joydisk to *decrease* the width.

Press the F3 key to see the results of your changes.



**Figure 2-14. Reshaping Displayed Graphics.**

Notice that a framing box of shorter height produces a longer graphics image, and a narrower framing box produces a wider graphics image.

When you are through experimenting, return to the original framing box and image:

Press Shift-F1 to restore the original aspect ratio of the framing box.

Press Shift-F2 to return to the original window size.

Press F1 twice to restore the original size of the framing box — the same size as the original window.

Now, reduce the size of the framing box so you can move it around during the Pan function:

Press the top or right of the Joydisk to make the framing box smaller.

## USING THE PAN FUNCTION

The Pan function lets you “roam around” in your image and locate the portion you want to display. In contrast to Zoom, which changes the size of the window, Pan changes the location of the window in which your graphics appear.

To change the location of the window, you’ll use the Joydisk to move the location of the framing box. To move the framing box, you must reduce the its size while in Zoom — you just did this.

Now activate Pan:

Press F2.

Note that the dotted brackets displayed during Zoom have been replaced by a cross, and that the word *PAN* in the menu is displayed. Experiment with moving the framing box around:

Press the top of the Joydisk to move the framing box up.

Press the right of the Joydisk to move the framing box to the right.

Press the left of the Joydisk to move the framing box left.

Press the bottom of the Joydisk to move the framing box down.

Now move the framing box and redraw the display:

Press the Joydisk to position the framing box over the star (Figure 2-15a).

Press F3 to redraw the display (Figure 2-15b).

When you pressed F3, the part of the image inside the framing box filled the entire screen (Figure 2-15b). If you move the cross around and press F3 again, you will see a different part of the image, but the framing box and image size do not change.

Move the framing box to the right and press F3 again.

## USING OTHER ZOOM/PAN FUNCTIONS

In addition to zooming and panning, the Zoom/Pan function offers other features useful for viewing graphics.

### Saving and Restoring Previous Frames

While in Zoom/Pan, the terminal remembers the display of the original image as well as the three most recent displays created by pressing F3 (VIEW). These displays, which include the framing box, are called *frames*. You have already created several frames as you worked with Zoom/Pan in the preceding steps.

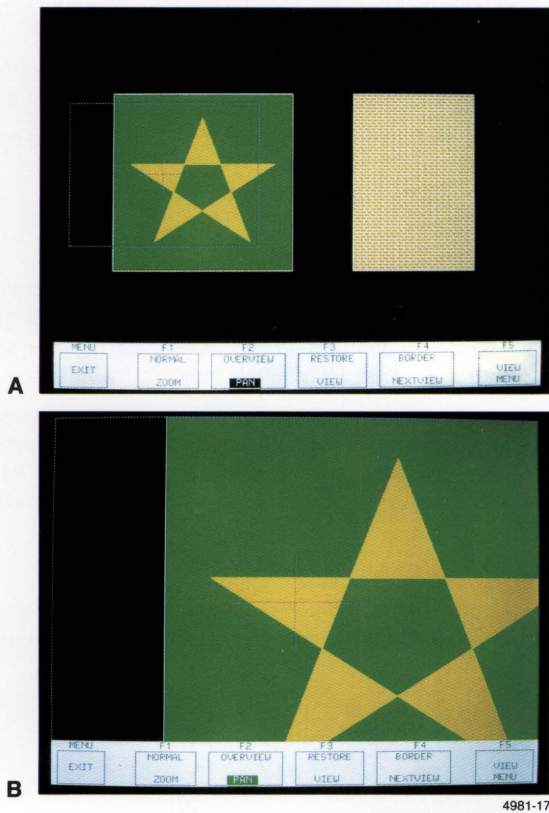


Figure 2-15. Display With Pan.

To look at the previous frames:

Press Shift-F3 to restore the most recent frame (Figure 2-15b).

Press Shift-F3 again to display the next most recent frame (Figure 2-15a).

You can move backward to a limit of three saved frames. Pressing Shift-F3 a fourth time restores the original image (the one displayed on the screen when you entered the Zoom/Pan function). The menu shows you whether the terminal was in Zoom or Pan when each frame was created.

Now return to the original image, then restore the original framing box size:

Press Shift-F2.

Press F1 twice.

## Displaying a Border

You can create a border around your graphics to complete your display before copying it. Try it now:

Press Shift-F4.

A solid border appears around the edge of the graphics area, framing the entire display. The border remains on the screen even after you exit Zoom/Pan.

The border dimensions remain fixed; altering the size or shape of the framing box has no effect on the border size.

Press Shift-F4 again to delete the border.

## Selecting Views

When you are running a host applications program, you can have from one to 64 views on the terminal's screen. A view is a snapshot of an image as it is displayed under the control of a host program. Different views can vary the size, shape, and location of the image, as well as which segments make up the image.

Zoom/Pan take place in the *current view*, that is, the view you have selected. In this exercise, you only worked with the current view. If a host program creates multiple views, you can move from one view to another by pressing F4 or Ctrl-F4 (see Table 2-2). Each time you select a view, its border blinks once, indicating that it is now the current view.

## Controlling the Zoom/Pan Menu

You can control the visibility of the Zoom/Pan menu just like you can the dialog area's visibility. To make the Zoom/Pan menu invisible, press the Dialog key. Try that now:

Press the Dialog key.

The Zoom/Pan menu disappears.

Press the Dialog key again.

The Zoom/Pan menu is restored.

This is useful if you are making a copy of the screen and don't want the menu to be part of the copy.

## Communicating With the Host During Zoom/Pan

Remember that during Zoom/Pan, the terminal can execute host commands, and all keys except F1 through F5 retain their normal function. To see your communication with the host, but still remain in the Zoom/Pan function, you need to redisplay the dialog area. Do that now:

Press the F5 key.

The Zoom/Pan menu disappears, and the dialog area reappears. The framing box remains displayed in the graphics area, indicating that Zoom/Pan is still active. As the host displays graphics on the screen, you can zoom or pan on those graphics, as well as communicate with the host.

Press F5 again to restore the Zoom/Pan menu.

## EXITING ZOOM/PAN

Finish this exercise by exiting Zoom/Pan:

Press the keyboard Menu key (not F5).

The framing box disappears, but the graphics remain as they were last displayed.

You can also exit from Zoom/Pan by pressing the Setup key, since entering Setup automatically cancels Zoom/Pan.

## ZOOM/PAN FUNCTION KEYS

Table 2-2 lists the functions of keys F1 through F5.

**Table 2-2**  
**ZOOM/PAN FUNCTION KEYS**

Key	Action
F1	ZOOM. Activates Zoom and displays the framing box. Joydisk changes size of framing box. Pressing F1 again cancels Zoom.
Shift-F1	NORMAL. Returns the framing box aspect ratio to match original window of the current view.
Ctrl-F1	FIXED ZOOM. Equivalent to pressing ZOOM (F1), decreasing the size of the framing box, then pressing VIEW (F3).
F2	PAN. Activates Pan and displays framing box. Joydisk changes location of framing box. Pressing F2 again cancels Pan.
Shift-F2	OVERVIEW. Selects default window of entire screen (4095x3130) for current view and renews current view.
Ctrl-Shift-F2	SUPER OVERVIEW. Selects "super window" that includes all of the 4096x4096 terminal space.
F3	VIEW. Sets window for the current view to match the framing box and renews the current view.
Shift-F3	RESTORE. Displays the previous frame (of the four frames that the terminal retains in memory).
Ctrl-F3	UPDATE NEXT VIEW. Equivalent to pressing NEXT VIEW (F4), VIEW (F3), then LAST VIEW (Ctrl-F4), in that order.
F4	NEXT VIEW. Saves the status of the current view and makes the next higher numbered view the current one.
Shift-F4	BORDER. Toggles the visibility of the border around the current view.
Ctrl-F4	LAST VIEW. Similar to NEXT VIEW (F4), but selects the next lower numbered view.
F5	VIEW MENU. Turns display of the ZOOM/PAN menu on or off. When the menu is turned off, the dialog area reappears.

## EXERCISE 7: GRAPHICS INPUT (GIN)

Graphics input (GIN) allows you to send graphics coordinates from the terminal to the host computer. This exercise gives you a brief introduction to GIN and two of the GIN features your application program may use: *inking* and *rubberbanding*.

(If you are doing this exercise out of sequence, do Exercise 1, do Exercise 4 from the beginning through *Creating Two Panels Within a Segment*, issue the Setup command *DAINDEX 3,0,0*, and do the steps of *Using the Color Map* in Exercise 5.)

Before starting this exercise, **be sure the terminal is not logged in to a host computer.**

### ENABLING GIN

Normally, a host program enables the keyboard, mouse, or tablet to perform specific GIN functions, and then prompts you for data. To do this exercise, however, you will enable one of these devices for GIN with Setup commands, and then select graphics coordinates by entering *points*.

First, enable your particular GIN device by following the instructions under one of the appropriate heads that follow. (If you have more than one device, just choose one of them.) Then, after your device is enabled, follow the instructions under *Entering Points*.

#### Enabling the Keyboard

Follow these instructions to enable the terminal keyboard for GIN.

Put the terminal in Setup (if it isn't already) and enter:

**GINENABLE 0,5**

Notice that when you pressed the Enter key, the *GIN cursor* (a pair of crosshairs) appeared on the terminal screen.

In the GINENABLE command, the 0 specified that you'll be using the keyboard, and the 5 means that the terminal will accept five points.

Now enable GIN inking and rubberbanding:

**GININKING 0,2**  
**GINRUBBERBAND 0,2**

Press the Setup key to remove the terminal from Setup.

The terminal exits Setup and begins responding to your GIN operations.

You will be controlling the GIN cursor's movement on the screen by pressing the Joydisk. Try it now:

Press different sides of the Joydisk to move the crosshair cursor around.



Notice that the speed of the cursor is controlled by the pressure on the Joydisk. A light pressure causes the cursor to move slowly; heavier pressure speeds the cursor up. You can also speed up the cursor during light pressure by pressing the Shift key as you press the Joydisk. (The GSPEED command can also change the speed — Section 4 has information about this command.)

Now, proceed to the instructions under *Entering Points*.

### Enabling the Mouse

Make sure the mouse is connected to the port at the rear of the keyboard. (The mouse is available as an option).

Put the terminal in Setup (if it isn't already) and enter:

**GINENABLE 64,5**

Notice that when you pressed the Enter key, the *GIN cursor* (a pair of crosshairs) appeared on the terminal screen.

In the GINENABLE command, the 64 specified that you'll be using the mouse, and the 5 means that the terminal will accept five points.

Now enable GIN inking and rubberbanding:

**GININKING 64,2**

**GINRUBBERBAND 64,2**

Press the Setup key again.

The terminal leaves Setup and begins responding to your GIN operations.

To use the mouse, lay it on your desk top or other flat surface so that its black rubber ball faces down and its buttons face up. Then, place your hand over the mouse so that the thickest side of the mouse is cupped in your palm and your fingers rest lightly over the buttons. As you move the mouse, the crosshair cursor on the screen moves in the same direction.

Try it now:

Use the mouse to move the crosshair cursor around.

Now, proceed to the instructions under *Entering Points*.

#### NOTE

*If you have the optional mouse and you are running a 4107 application that uses GIN and the keyboard to move the GIN cursor about on the screen, you can now use the mouse instead of the Joydisk. See **How to Ensure Compatibility With Older Applications** in Section 3.*

## Enabling the Tablet

The Tektronix 4957 and 4958 Graphics Tablets consist of a tablet surface and an attached puck or stylus. (Graphics tablets are available as options to the 4207.)

Make sure the tablet is connected either to PORT 0 or PORT 1 at the rear panel of the terminal. If it is not, refer to the installation instructions in Appendix A of this manual and connect the cable.

Put the terminal in Setup (if it isn't already) and enter:

**GINENABLE 8,5**

Notice that when you pressed the Enter key, the *GIN cursor* (a pair of crosshairs) appeared on the terminal screen.

In the GINENABLE command, the 8 specified that you'll be using the tablet, and the 5 means that the terminal will accept five points.

Now enable GIN inking and rubberbanding:

**GININKING 8,2**

**GINRUBBERBAND 8,2**

Press the Setup key again.

The terminal leaves Setup and begins responding to your GIN operations.

When you use the stylus, hold it as you would a ballpoint pen, with the tip resting on the tablet. The tablet can keep track of the stylus and send its location to the terminal as long as the stylus is within 1/2" of the tablet surface.

When you use the puck, lay it flat on the tablet surface with the buttons facing up.

Try it now:

Use the stylus or puck to move the crosshair cursor around.

Now, proceed to the instructions under *Entering Points*.

## ENTERING POINTS

When you move the cursor around, notice the elastic line that tracks the GIN cursor as it moves from the original point — this is *rubberbanding*. After moving the cursor around some:

Enter a graphics point by pressing any keyboard key, mouse button, or puck button, or by pressing down on the stylus.

The GIN cursor blinks momentarily as the terminal accepts the point.

Move the crosshair to a new location and again enter a point.

Since you have enabled *inking*, the terminal draws a line on the terminal screen from the first point to the second point (see Figure 2-16).

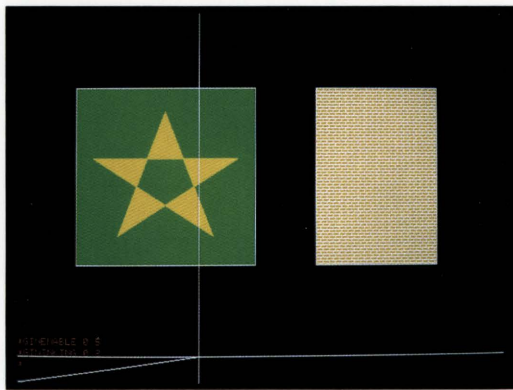


Figure 2-16. GIN Inking — The First Two Points.

Each time you enter a point, another line is drawn from the previous location to the current one (see Figure 2-17).

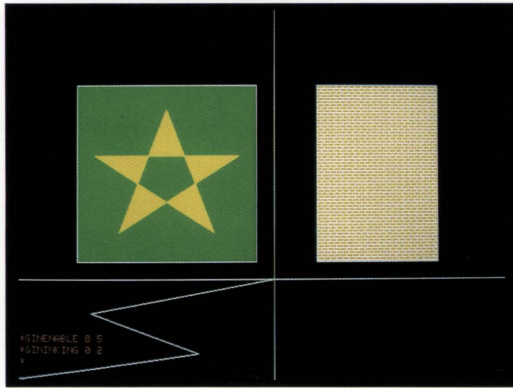


Figure 2-17. GIN Inking — Subsequent Points.

Go ahead and enter three more points.

After you enter the fifth point, the terminal exits from GIN and the GIN cursor disappears from the screen. Remember that in the GINENABLE command you specified that GIN was to be enabled for only five points.

To finish:

Press the GErAs key.

Since the inked lines displayed on the screen are not part of a segment definition, they are erased.

Normally, the graphics coordinates are processed by the host application program. The lines you drew and displayed on the screen were simply to acquaint you with GIN.

## YOUR NEXT STEP . . .

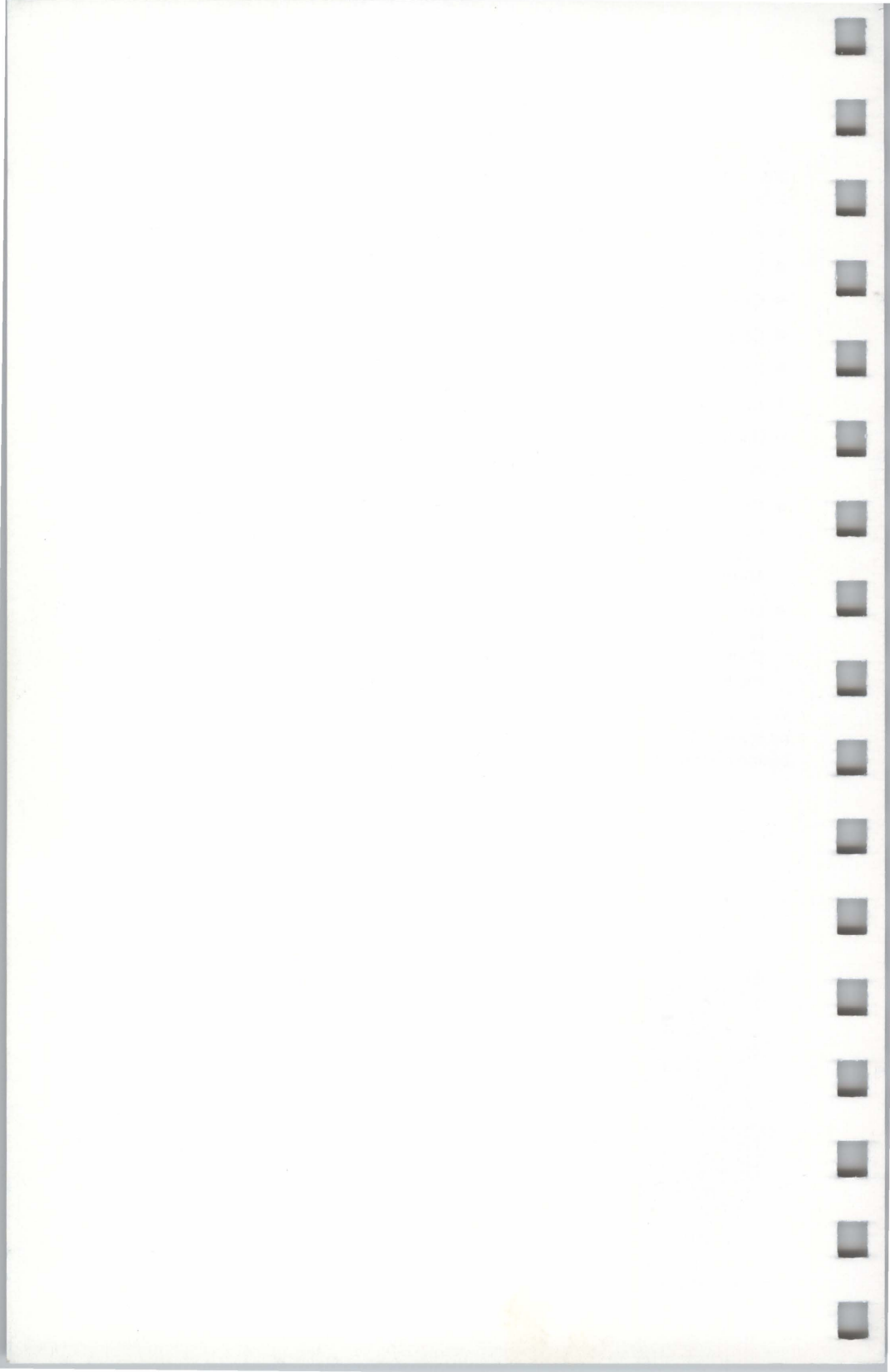
You have now completed your introduction to using the terminal for routine graphics operations. By this time, you should have a basic understanding of how to:

- Enter commands
- Use the dialog and graphics areas
- Create graphics
- Change color definitions
- Use the Zoom/Pan function
- Enter graphics points for graphics input (GIN)

At this point you may want to:

- Go on to Section 3 and try some of the specific tasks that are explained there.
- Continue entering Setup commands. For reference you can use the *Setup Command Summary* in Section 4 of this manual. Or you might look through the *4200 Series Reference Guide*. If you have the optional *4200 Series Programmers Manual*, you may want to review it.
- Log on to your host computer and run an application program. Before you do so, however, make sure the terminal's communications parameters have been set to the requirements of your host computer (refer to Appendix A for connecting the terminal to a host).

When you're finished, turn the terminal off or reset it for the convenience of the next user. (To reset the terminal, enter a RESET command or press the RESET button on the front of the display unit.)



Section **3**

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**HOW-TO PROCEDURES**

Section **3**

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**HOW-TO PROCEDURES**



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Use this section like recipes in a cookbook — just locate the heading that covers the task you need to accomplish, then follow the step-by-step procedures.

We've included procedures for these tasks:

- How to Use Setup Commands
- How to Reset the Terminal
- How to Switch Between Hosts
- How to Switch Between Coax DFT Sessions
- How to Select a Host Command Mode
- How to Make Copies
- How to Use the 4510 Rasterizer
- How to Use a 4662 or 4663 Plotter
- How to Copy From a Host to a Peripheral Device
- How to Use a Graphics Tablet
- How to Use Data Logging
- How to Assign an Answerback Message
- How to Create Macros
- How to Control Bell Characteristics
- How to Ensure Compatibility With Older Applications

The following procedures rely on your understanding of terms and terminal functions described in the exercises in Section 2.

## HOW TO USE SETUP COMMANDS

When the terminal is in Setup, you can enter commands to change terminal settings, display status or help messages, and make copies of the display — in other words, you can use any command that has Setup syntax. These commands have English-style names that describe their purpose, such as *DALINES*, which sets the number of lines displayed in the dialog area.

### ENTERING SETUP

Press the Setup key to enter Setup. When you see the asterisk prompt followed by the blinking underline or block cursor, you know you're in Setup.

#### NOTE

*If your host also uses the asterisk as a prompt, it may be difficult to tell whether you are in Setup or communicating with your host. Press the Setup key again — if the cursor moves to a new line and displays the asterisk, you're in Setup. If a new asterisk is not displayed, press the Setup key again to enter Setup.*

During Setup, control characters that don't have editing functions in Setup are displayed rather than executed. For example, pressing the Escape key would display  $\text{c}$ , but pressing the Enter key would execute a Carriage Return, one of the terminal's editing characters.

If you enter Setup from the Zoom/Pan function, Zoom/Pan is terminated. Any other terminal operation (such as host communication) will be suspended when you enter Setup and resumed when you exit.

### ENTERING COMMANDS

You enter a command by typing it on the keyboard and pressing the Enter key. (Section 2, *Getting Acquainted With Your Terminal*, gives you experience in entering commands.)

Most Setup commands consist of three parts:

- The *command name*, which is the part of the command that specifies the operation you want the terminal to perform or the type of setting you want to change.
- One or more *parameters*, which are words or integers that define the exact action of a command; parameters always follow the command name.

A parameter can be a keyword, such as *YES* or *NO*, or an integer value, such as 1, 2, or 3.

- The *command terminator*, which is the  $\text{c}_R$  (Carriage Return) control character entered by pressing the Enter key. (In Setup, either the Enter key or the New Line key will terminate a command.)

Some Setup commands perform a particular action in the terminal, like drawing a line. Other Setup commands establish the terminal's *settings*, like the maximum number of lines the terminal can display in its dialog area. (Section 4 describes the function of each Setup command.)

When all the settings have been established, they determine the terminal's *operating characteristics*, that is, how the terminal responds to commands and displays information.

Here's an example of a typical Setup command:

```
DAINDEX 1,3,0
```

*DAINDEX* is the command name. Its function is to set the color indices of the dialog area. *1*, *3*, and *0* are parameters. Each parameter in this command is a number that corresponds to a specific color index.

To specify more than one parameter in a command, use one or more spaces or a comma to separate the parameters. For example, the following commands both correctly specify the same settings:

```
DAINDEX 1,3,0
```

```
DAINDEX 1 3 0
```

(For clarity in this manual, we've used commas to separate parameters.)

If you don't enter all the required parameter values, the omitted parameters assume their *omitted* default values:

- If the parameter is the only one in the command, or is the last of two or more parameters, you simply omit it. For instance, since 0 is the omitted default for the third parameter in the *DAINDEX* command, these two entries specify exactly the same settings:

```
DAINDEX 1,3,0
```

```
DAINDEX 1,3
```

- To omit a parameter other than the last one, use commas to separate the location of the omitted parameter from adjacent parameters. For example, to omit the first parameter of the *DAINDEX* command, you would enter:

```
DAINDEX ,3,0
```

To omit the second parameter, you would enter:

```
DAINDEX 1,,0
```

Section 4, *Setup Command Summary*, shows the defaults for all Setup commands.

Each time you press the Enter key to end a command, the terminal executes the command, goes to a new line, and displays an asterisk to prompt for the next command.

## CORRECTING COMMAND ENTRY ERRORS

If you notice a mistake in a Setup command before you press the Enter key, press the Del key to back up and erase the error. You can also enter Ctrl-X to erase the entire command line, and then reenter the command. To enter *Ctrl-X*, hold down the Ctrl key and press the X key — don't type the hyphen.

If you make a mistake and you've already pressed the Enter key, just reenter the command correctly. For instance, if you discover that you entered the wrong parameters for a command, simply enter the command again with the correct parameters. The last entry overrides any previous entry for the same command (unless it is a DRAW or BEGINPANEL command — see *Correcting Segment and Panel Definition Errors* in Section 2).

## UNDERSTANDING ERROR MESSAGES

When you enter a Setup command incorrectly, the terminal displays an error message that helps you identify the type of error. In many cases, the terminal displays a string of asterisks below the incorrect portion of the command to help you locate the error.

### NOTE

*For errors that appear in the operator information area during coax communications, see Appendix I.*

For example, suppose you want to change the size of the dialog area and you accidentally enter *DALANES* instead of *DALINES*. The terminal would display the following error message:

```
*DALANES 6
*****
>> Terminal Detects Error : Nonexistent Command
```

Should you make an error entering the parameters of a command, the terminal may display asterisks below the parameter that caused the error. For example, say you enter a *DALINES* command with two parameters instead of one. *DALINES* requires only one parameter, so the error message appears as follows:

```
*DALINES 20,8
**
>> Terminal Detects Error : Extraneous Input
```

The message tells you that you entered too many parameters for the command; the asterisks locate the extraneous input — the comma and the 8.

Now, suppose you accidentally enter a parameter value that is out of the range for the command. To illustrate, assume you want to set the size of the dialog area to 20 lines, and you enter 200 for the parameter value instead of 20. The following error message would appear:

```
*DALINES 200
>> Terminal Detects Error LL11:
>> Invalid Value in Parameter 1 of (ESC)(L)(L) Command.
```

In this case, the terminal displays an error code (LL11) instead of asterisks to identify the parameter error. If you need more information about valid values for a parameter, refer to your *4200 Series Reference Guide*.

## GETTING HELP FOR SETUP COMMANDS

The terminal can display a one-line help message for each Setup command. This message can help you recall Setup command names and the kind of parameters you need to enter. (The HELP message also gives the command's opcode, which is used for host syntax.)

The HELP command has several variations (the terminal must be in Setup):

- You can ask for all help messages by entering just:

### HELP

Since the complete help message is rather lengthy, you can use Ctrl-S to temporarily stop scrolling of the help message, and Ctrl-Q to resume scrolling.

- If you want the help message for a specific Setup command, you can either:
  - Enter *HELP* followed by the command name — for example:

### HELP FILLPATTERN

- Enter enough characters to uniquely identify the command — for example:

### HELP FIL

- Most commands that share a similar function have the same first two letters. When you want help for all commands that begin with the same two letters, enter the HELP command followed by the first two letters of the commands — for example:

### HELP DA

This example would display the status of all *dialog area* commands. Other combinations include *HC* for hard copy commands, *SG* for segment commands, *GI* for graphics input commands, *GT* for graphtext commands, and *PX* for pixel commands.

- Cluster names identify specific categories of commands. To display messages for these related commands, enter one of the *cluster names* that appear in the complete help message. The cluster names are:

- |                  |                |
|------------------|----------------|
| • ANSI           | • Keyboard     |
| • Coax           | • Pixels       |
| • Communications | • Report/Input |
| • Dialog         | • Segments     |
| • General        | • Surfaces     |
| • Graphics       | • Views        |
| • Hardcopy       | • 2PPI         |

For example, to get help for all commands affecting the keyboard, you would enter:

### HELP KEYBOARD

## GETTING STATUS FOR SETUP COMMANDS

You can display the settings of commands that control the terminal by using the STATUS command. This command displays the Setup command name, and the current settings of that command.

The STATUS command works just like the HELP command. See the previous discussion for the various ways you can query the terminal for its status.

## SAVING COMMANDS

*Nonvolatile commands* are commands whose settings you can save in the terminal's *nonvolatile memory* — memory that is retained even when you turn off the terminal. Saved commands are automatically in effect whenever you turn on or reset the terminal. (You can reset the terminal by pressing the RESET button on the front of the terminal, by issuing a RESET command, or by turning the terminal off and on again. See the next discussion, *How to Reset the Terminal*.)

During installation, you usually save all the communications commands that establish the communications link between the terminal and the host computer and between the terminal and peripheral devices (see Appendix A).

You can save additional nonvolatile commands during installation or at some later date. To save commands in nonvolatile memory, enter an NVSAVE command after issuing the commands you want to save. Entering an NVSAVE command at the end of the following command sequence would store the three commands above it in nonvolatile memory:

```
ACURSOR 3,6
DAINDEX 0,3,3
DIM NO
NVSAVE
```

The settings established by the three saved commands — the dialog area cursor color, the dialog area colors, and whether the screen automatically dims after five minutes — would be in effect whenever you turn on or reset the terminal.

You can temporarily change the settings of any of these commands by entering the command with different parameters, but not issuing NVSAVE. Suppose you are working with an application where there is little terminal activity, so you want to activate automatic screen-dimming — you would simply enter the command:

```
DIM YES
```

Screen dimming would be in effect until you change it again with another DIM command or turn off or reset the terminal.

Whenever you issue an NVSAVE command, it saves the most recent settings of *all* commands that can be saved in nonvolatile memory and that have changed since the last NVSAVE. Therefore, before issuing NVSAVE, consider *all* the commands you used during a session. Keep in mind that if you issue NVSAVE after running a host application program, you may be saving some commands that the application issues, making the terminal incompatible with other applications. Further, you may inadvertently override some of your saved commands as well.

The NVSAVE command also saves any nonvolatile *macros* that have been defined since the last NVSAVE. (Macros are discussed later in this section.)

**CAUTION**

*After you enter an NVSAVE command, wait for the asterisk (\*) to appear before taking any further action. If you turn off or reset the terminal while NVSAVE is working, all parameters will be reset to their factory default values.*

The terminal's nonvolatile memory can be changed approximately 10,000 times with the NVSAVE command. This should be sufficient for many years of normal terminal operation. However, to prolong the life of the memory, it's best to use NVSAVE only when necessary.

There are many settings that cannot be saved with an NVSAVE command. Turning the terminal off or resetting it causes these commands to return to their factory default values. Section 4 shows which commands can be saved in nonvolatile memory.

## HOW TO RESET THE TERMINAL

You can use the **FACTORY** or **RESET** command or the **RESET** button to restore terminal settings to their default values. Here are a few considerations to keep in mind when using these commands:

- When you issue a **RESET** command, the terminal assumes its *power-up condition*, which is a combination of the factory default settings and the settings that have been saved in nonvolatile memory.
- Pushing the **RESET** button performs the same function as issuing a **RESET** command. Use the **RESET** button when the terminal won't respond to the **RESET** command.
- When you issue a **FACTORY** command, *all* settings revert to their *factory* default values. (Section 4 shows the factory default value for each command.) The next time you turn on or reset the terminal, it will assume its power-up condition, using settings saved in nonvolatile memory and using factory defaults for all other settings.

The **FACTORY** command also selects the factory default host port setting — **HOSTPORT COAX** — and configures the terminal for **CUT** mode. If you are connected to an IBM host when you issue the **FACTORY** command, the terminal will log you off. (Current applications are either terminated or suspended, depending on your operating system.)

If your terminal is configured for **DFT** mode when you issue the **FACTORY** command, you'll need to return to the Coax Configuration Summary menu and save your **DFT** settings again (see Appendix A).

### NOTE

*In addition to selecting **HOSTPORT COAX**, the **FACTORY** command could change your communications parameters and prevent communications between the terminal and either or both host ports. If this happens, refer to Tables A-1 and A-2 in Appendix A for your host settings and use this information to restore terminal/host communications.*

- When you enter a **FACTORY** command and follow it immediately with an **NVSAVE** command, *all* commands revert to their factory default settings, and any commands that have been saved in nonvolatile memory are lost.



## HOW TO SWITCH BETWEEN HOSTS

Your terminal can be connected to both a coax (IBM) host and an RS-232 host through the terminal's COMM and COMPUTER ports. While you can be logged on to both hosts simultaneously, the terminal's screen can display information from only one host at a time. To switch between hosts, use either of the following methods.

- Use the Shift-Jump key combination — just hold down the Shift key while pressing the Jump key. This method will toggle you between coax and RS-232 hosts.
- Use the HOSTPORT command:
  1. Put the terminal in Setup (use the Setup key).
  2. Define which host the terminal will communicate with by entering a HOSTPORT command with the appropriate keyword:
    - To communicate with a coax host, enter:  
**HOSTPORT COAX**
    - To communicate with an RS-232 host, enter:  
**HOSTPORT RS-232**
  3. Press the Setup key again. Your terminal can now display information from with whichever host you specified.

When you switch connection to one host port or the other, the keyboard functions immediately change to match the needs of the corresponding host system. (See Appendix B for a description of how selecting a host port changes the keyboard's operation.)

## HOW TO SWITCH BETWEEN COAX DFT SESSIONS

The terminal can be configured for *DFT* mode, which allows you to specify up to five *sessions*. (A *session* is an independent connection between the terminal and an IBM host.) Appendix A shows you how to configure the terminal for DFT mode and multiple sessions.

Once the terminal is configured for multiple sessions, use the Jump key to cycle you through to each session. The five sessions are denoted by the letters A through E.

For example:

- If you are in SESSION A and want to jump to SESSION B, press the Jump key once.
- If you are in SESSION B and want to jump to SESSION D, press the Jump key twice.
- If you are in SESSION D and want to jump to SESSION B, press the Jump key three times.

The current session is shown in the operator information area after the word *SESSION*.

### NOTE

*Once you begin a graphics application, the Jump key is disabled. You cannot switch to another session until you exit the current graphics application, which frees the Jump key and allows you to switch sessions.*

## HOW TO SELECT A HOST COMMAND MODE

Four host command modes allow communication between the terminal and host — the terminal must be in the proper mode to understand the host program's commands. The modes are:

- TEK — For programs that use Tek-style graphics and terminal control commands (that is, 4100 and 4010 escape sequences).
- ANSI — For programs that use ANSI Standard X3.64 text-editing commands.
- EDIT — For DEC VT100 applications programs.
- VT52 — For DEC VT52 applications programs.

Follow these steps to set the terminal to the proper mode for your application:

1. Check with your computer center staff or your systems programmer to determine which mode you should use to run your application.
2. Put the terminal in Setup (press the Setup key) and select the operating mode with the CODE command.
  - To select TEK mode, enter:  
**CODE TEK**
  - ⊗ To select ANSI mode, enter:  
**CODE ANSI**
  - To select EDIT mode, enter:  
**CODE EDIT**
  - To select VT52 mode, enter:  
**CODE VT52**
3. If you want to save this setting so that the terminal always powers up in this mode, issue:  
**NVSAVE**
4. Now exit Setup (press the Setup key again).

### NOTE

*Regardless of which host command mode the terminal is in, it can understand and execute all Setup commands while in Setup.*

## HOW TO MAKE COPIES

The following procedures show you how to make both color and monochrome hardcopies of the display. (If you are using a host program that selects copier attributes or initiates copies for you, you should follow the host program's procedures instead.)

A copy of text from the dialog buffer is called a *dialog copy*; a copy of everything that is currently displayed on the screen — be it graphics, a screen of dialog text, or both — is called a *screen copy*.

You can make color dialog and screen copies on these hardcopy devices:

- Tektronix 4691 Color Graphics Copier
- Tektronix 4692 Color Graphics Copier
- Tektronix 4695 Color Graphics Copier
- Tektronix 4696 Color Ink-Jet Printer

You can make monochrome (black-and-white) dialog and screen copies on these printers:

- Tektronix 4644 Dot Matrix Printer
- Hewlett-Packard ThinkJet Printer
- Hewlett-Packard LaserJet Printer
- Other Centronics-style printers that use Epson FX-80 graphics protocol

Additionally, you can make dialog-only copies on most Centronics-style printers that don't have graphics capability (that is, without Epson-style graphics protocol).

## INITIATING A COPY OPERATION

To make a copy, first display on the terminal screen what you want to copy. Then follow the instructions for copying either text or graphics, depending on what you want to copy.

### Copying Graphics

You can copy the entire screen — both the graphics and the dialog, or just the graphics:

- To copy the entire screen — both the dialog area and the graphics — press the SCopy key.
- To copy just the graphics (if both the graphics area and dialog area are displayed):
  1. If the dialog area is visible, press the Dialog key to make the dialog area invisible. (The Dialog key acts as a toggle — pressing it again will redisplay the dialog area.)
  2. Press the SCopy key.

### Copying Text

You can copy just one page or several pages of text — or you can copy just the text on the screen:

- To copy a page of dialog text that appears on the screen (that is, 60 lines of text beginning at the top of the screen, extending down and including text off the screen), press the DCopy (Shift-SCopy) key.
- To copy multiple pages from the dialog buffer:
  1. Issue the HCDAATTRIBUTES command, which controls how much of the dialog buffer is copied and how the pages break (see the discussion *HCDAATTRIBUTES — Copying Multiple Pages From the Dialog Buffer* later in this section).
  2. Press the DCopy (Shift-SCopy) key.
- To copy only dialog on the screen, press SCopy (not valid for monochrome text-only printers, since the only valid copy key is DCopy).

(continued)

## Overriding Black and White Reversal

When you press SCopy or DCopy, black and white on your screen are reversed on your hardcopy. That is, black on the screen is not inked on the paper, while white on the screen is inked in black. For dialog copies, this makes your hardcopy appear like normal typewriter copy.

For graphics copies, keep in mind that many graphics applications use black as a background color. Typically, you do not want this black graphics background to print on your hardcopy. However, if you do want the black on the screen to print on your hardcopy, you can stop black and white from reversing — just hold down the Ctrl key while you press the SCopy key. This will make your hardcopy appear exactly as it does on the screen.

Keep in mind that pressing *Ctrl-SCopy* overrides black and white reversal only on screen copies.

## MAKING MULTIPLE COPIES

There are two easy methods to make multiple copies; choose whichever method best suits your situation.

- Just press the SCopy or DCopy key once for each copy you need. For instance, to make four copies of the entire screen display, press the SCopy key four times.

You can queue up to 32 copies using this method.

- Increase the number of copies printed each time you press the SCopy or DCopy key. For instance, if you want three copies every time you press SCopy or DCopy, follow this procedure:

1. Put the terminal in Setup.
2. Issue the following command:

**HCCOPIES 3**

The 3 specifies that three copies are printed each time you press a copy key. You can queue up to 64 copies using this method.

## STOPPING A COPY OPERATION

To stop a copy operation in process, press the Cancel key (Shift-Setup), which is located in the top row of keys on the terminal's keyboard.

You can also stop a copy operation by pressing the RESET button or turning off the terminal, but these methods erase your graphics and text from memory and the screen.

Stopping a copy operation by either method will also cancel any copy requests that are queued for background copying.

### NOTE

*Some copiers will continue to print for a few seconds until their buffers are empty; this is more likely to occur with a dialog copy than with a screen copy.*

## MAKING SCREEN COPIES IN BACKGROUND

Normally, the terminal processes copy requests in the *foreground*; that is, the terminal is busy driving the printer and cannot be used for anything else until the copy is finished. However, you can use the HCBACKGROUND command to change the terminal's factory default settings to allow you to do screen copying in the *background*, which frees the terminal and allows you to use it while the copying is done. Keep in mind that you can use background copying only for screen copies; dialog copies always print in the foreground.

### NOTE

*Background copying has two limitations: 1) it requires substantial memory and 2) you cannot make background copies on the LaserJet. If you want to make copies in the background and you have a terminal with limited memory or you are copying to a LaserJet, see **Emulating Background Copying** later in this discussion.*

The HCBACKGROUND command turns background copying on or off and allocates the terminal memory that background copying requires. When you use this command, you must specify both the *complexity* of the image as well as the number of *different* images that you wish to spool.

(continued)

To specify an image's complexity, you must choose between three keywords — *SIMPLE*, *AVERAGE*, or *COMPLEX* — each of which allocates the appropriate amount of memory. If the amount of memory you allocate isn't enough for a particular copy, the terminal will issue an error message when you press the SCopy key. If this happens, simply go back into Setup and allocate more memory with *HCBACKGROUND*.

For most business graphics, such as graphs and charts, you will probably need to choose *AVERAGE*. For more detailed engineering schematics, you will probably need to choose *COMPLEX*.

Background copying on a 4205 may be limited, unless the terminal is equipped with the optional megabyte of memory. Without the extra memory, you cannot use the keyword *COMPLEX* and you can only allocate enough memory for one *AVERAGE* copy or up to three *SIMPLE* copies. However, depending on how memory was allocated when your terminal was configured, your 4205 may not have enough memory to support background copying at all. If you are having difficulty using background copying, you might try freeing up memory from other functions and reserve more for background copying, or you might order the optional extra megabyte of memory option (see Appendix H for ordering information). If you can't do background copying at all, see *Emulating Background Copying* just ahead.

As an example that illustrates how to spool *one average* graphics image for background copying, you would follow this procedure:

1. Put the terminal in Setup.
2. Enter the following command:

**HCBACKGROUND AVERAGE,1**

This command allocates enough memory for one average image. If you want more than one copy of the image, you don't need to allocate any more memory — just follow the procedures under *Making Multiple Copies*, which is discussed earlier in this section.

3. Display on the terminal screen the image that you want copied. If dialog text appears on the screen and you don't want it in your hardcopy, press the Dialog key to toggle it off the screen.
4. Press the SCopy key. The terminal takes less than 20 seconds to spool the image, and then beeps when it's free again.

#### NOTE

*If you have not allocated enough memory for an image, the terminal will issue an error message; however, if you toggled the dialog area off the screen you won't be able to see the message. You can check for a memory error by pressing the Dialog key to redisplay the dialog area.*

If there is a memory error, enter Setup and allocate more memory. For instance, if you had specified *AVERAGE 1*, now specify *COMPLEX 1*. (You can also allocate more memory by specifying multiple images — that is, *AVERAGE 2* reserves twice as much memory as *AVERAGE 1*.)



To spool two or more different images, simply allocate more memory for background copying. For example, to spool *two simple* images, follow this procedure:

1. Put the terminal in Setup, if it's not already.
2. Enter the following command:

**HCBACKGROUND SIMPLE,2**

3. Display on the terminal screen the image that you want copied. If dialog text appears on the screen and you don't want it in your hardcopy, press the Dialog key to toggle it off the screen.
4. Press the SCopy key.
5. When the image begins to copy and the terminal is free, display the next image on the terminal's screen.
6. Press the SCopy key again.

#### NOTE

*If you run out of memory while spooling multiple images, only the image that caused the memory error is affected. That is, once an image has successfully spooled it is not affected by any subsequent memory errors.*

*If you do run out of memory, you will have to respool the image after either (1) allocating more memory for background copying or (2) waiting for the terminal to free some memory by finishing a copy.*

Most likely, you will want to determine how much memory your typical copying requires and then save those settings in nonvolatile memory. You can override those settings later if you receive an error message caused by an image that is more complex than usual.

To save the background copying settings in nonvolatile memory, enter the following command:

**NVSAVE**

To turn off background copying, enter:

**HCBACKGROUND NONE**

To make multiple copies of an image in the background, refer back to *Making Multiple Copies*.

(continued)

## Emulating Background Copying

If you cannot use the terminal's background copying feature, this procedure will allow you to closely emulate background copying of graphics images. This procedure works with applications that use the dialog area for host communication. This procedure is especially useful if you have a terminal with limited memory (such as a 4205 without the extra megabyte of memory) or if you are copying to a LaserJet (which cannot use background copying).

### NOTE

*This procedure is not valid for any application that does not use the terminal's dialog area. This includes PLOT 10 TekniCAD and all 4010-style applications.*

To emulate background copying during a screen copy:

1. Press the Dialog key to toggle dialog area visibility off. (You need to do this step even if there is no dialog text on the screen.)
2. Press the SCopy key to begin copying the graphics area.
3. Press the Dialog key again.

You can now continue communicating with the host or interacting with your application while the copying is done. Note, however, that any commands that affect the graphics area will suspend all communications until the copying is finished.

### WARNING

*While the copy is being made, don't use any commands that affect the graphics area — that is, any commands that redraw the screen or in any manner affect the graphics display. If you do, the terminal temporarily locks the keyboard. When the copy is completed, the terminal will unlock the keyboard and execute the command.*

## CUSTOMIZING YOUR COPIES

You can use the terminal's factory default settings to make copies, or you can change the settings to fit your copy needs. The next few pages describe the commands you can use; Table 3-1 shows which commands apply to which copiers. Be sure to enter Setup before issuing these commands.

### Saving or Switching Your Settings

You can save the settings made with these commands (see *Saving Commands* earlier in this section), or you can reissue them whenever you make a copy. If you need to switch frequently from one set of copy attributes to another, you could:

- Program keys to select the different settings you need (see *How to Create Macros* later in this section for information on programming keys).
- Save the settings in an *environment* by using the SAVE and LOAD commands — the terminal can retain environments in its memory as long as the power remains on (see the Programmers Manual for how to use these commands).

(continued)

**Table 3-1**  
**COMMANDS FOR CUSTOMIZING COPIES**

	Tektronix 4691	Tektronix 4692	Tektronix 4695, 4696	Tektronix 4644 and Similar Monochrome Graphics Printers	LaserJet	ThinkJet	Monochrome Text-Only Printers
HCSIZE	✓	✓	✓				
HCORIENT	✓	✓					
HCDENSITY		✓					
HCREPAINT		✓					
HCDATARES		✓					
HCMAP				✓	✓	✓	
HCDAATTRIBUTES	✓	✓	✓	✓	✓	✓	✓
HCFEATURES <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> Not all of the HCFEATURES command parameters apply to all devices. See Table 3-2 in the discussion *HCFEATURES — Paging for Continuous-Feed Copiers and the LaserJet* for a further explanation of this command.

### When to Issue Copy-Customizing Commands

It's best to issue copy-customizing commands *before* you display the text or graphics you want to copy, since the commands are written to a portion of the screen, typically the dialog area. If you are copying graphics from most applications, this is not a problem — you can use the Dialog key to toggle the dialog area off the screen.

For instance, to customize a screen copy after your graphics are displayed, follow this procedure:

1. Enter Setup and issue the commands to customize your copy.
2. Press the Dialog key to toggle the dialog area off the screen.
3. Press the SCopy key.

**Special Considerations for Dialog Copies.** Since Setup commands are typically written to the terminal's dialog area, if the text that you want to copy is already on the screen you will have to disable the dialog area before customizing your hardcopy. This will cause the commands to write in the graphics area, keeping your text uncluttered.

- To avoid cluttering the dialog area, disable it before entering the commands:

**DAENABLE NO**

**Special Considerations for 4010-Style Graphics Applications.** If you want to customize a copy of a 4010-style graphics application after the image is displayed, you might have to enable the dialog area before customizing the hardcopy. (4010 applications typically don't use the dialog area, and the commands would write over your graphics.)

- To avoid cluttering the graphics area of a 4010-style application, enable the dialog area before entering the commands:

**DAENABLE YES**

#### NOTE

*Since the DAENABLE command is displayed before it is executed, it will appear in the area that you are trying to keep free of text. If this is not suitable to your particular situation, you can avoid this by creating a key macro to execute the command for you. (See **Dialog Area Disabling and Enabling Macros** later in this section for procedures to create the necessary macros.)*

## HCSIZE — Image Size on a 4691, 4692, 4695, or 4696 Copier

Use the HCSIZE command to select the size of the image sent to a color copier. If you are copying to a Tektronix 4695 Color Copier or 4696 Color Ink-Jet Printer, this command controls both screen and dialog copy sizes. If you are copying to a 4691 or 4692 Copier, it controls only dialog copy size.

You can select either standard (the factory default setting) or small copies. Standard-sized copies print in *landscape format*, that is, the long axis of the image is printed on the long axis of the paper. (Figure 3-1 shows both formats.) Small copies are printed in *portrait format*, that is, the long axis of the image is copied on the short axis of the copier paper. Small copies made on a 4695 or 4696 are one-half standard size (standard size is 8x10<sup>1/8</sup>" ). Small dialog copies from a 4691 or 4692 Copier are slightly larger than one-half standard size.

One benefit of choosing the small copy size is speed; since the image is smaller, the copy takes less time. A standard-sized copy has greater resolution and color range, but takes longer.

The small copy also allows you to copy 132 columns on the same line. In a standard-sized copy of text with a 132-character line, the copier will print only as many characters as it can on one line, and the remaining characters wrap to the next line (the actual number that wraps depends on the copier attached).

Here's how to specify the copy size:

- To select the small copy size, enter:

**HCSIZE 1**

- To select the standard copy size (the factory default), enter:

**HCSIZE 0**

### NOTE

*When you specify the small copy size for dialog copies on a 4695 or 4696, the copy prints on a smaller area of paper — that is, there are fewer blank lines after the copy, which reduces the size of the output. If you want the small copy to print on standard-sized output, you must also issue this command:*

**HCFEATURES 2,3,3,47,4,60**

*The HCFEATURES command is described later in this discussion.*

### HCORIENT — Image Orientation on a 4691 or 4692 Copier

When you are using a 4691 or 4692 Color Graphics Copier, you can select from four image positions, as illustrated in Figure 3-1.

- To align the long axis of the image on the long axis of the paper (*landscape format* — the factory default), enter:

**HCORIENT HORIZONTAL**

- To align the long axis of the image on the short axis of the paper (*portrait format*), enter one of the following:

**HCORIENT VTOP**

**HCORIENT VCENTER**

**HCORIENT VBOTTOM**

These three commands place the image at the top, center, or bottom of the paper, respectively.

#### NOTE

*When you specify any HCORIENT setting other than HORIZONTAL (the factory default), the copy is automatically reduced to fit the screen image to the narrower width of the paper.*

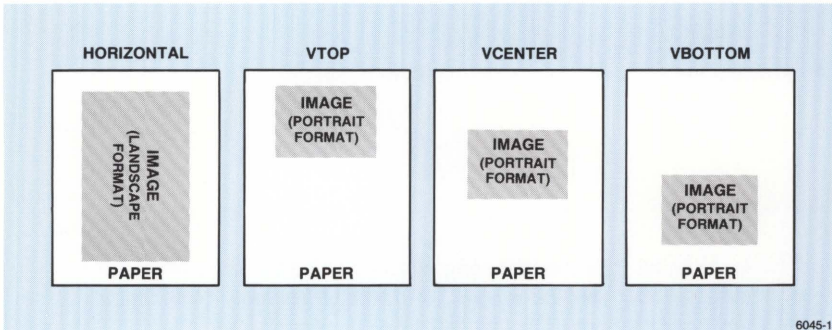


Figure 3-1. Orientation of Copier Images.

### **HCDENSITY — Resolution on a 4692 Copier**

If you are copying to a 4692 Copier, you can select the dot density (that is, the resolution) of the copy. High-density copies are sharp and detailed; low-density copies are faster.

- To produce higher density copies (the factory default), enter:

**HCDENSITY HIGH**

- To produce lower density copies, enter:

**HCDENSITY LOW**

#### *NOTE*

*When you select high density, the copied image will be slightly smaller than a lower density copy.*

### **HCREPAINT — Overwriting on a 4692 Copier**

On the 4692 Copier, you can choose how many times (from one to four) the copier overwrites the image in a copy. Writing the same image several times in the same copy adds a heavier concentration of ink. You might find this useful when you create transparencies, since more ink produces more intense colors.

For example, to overwrite an image two times, enter the following command:

**HCREPAINT 2**

The image is overwritten twice, which produces a more saturated copy of the image.

### **HCDATARES — Color Matching on a 4692 Copier**

When you make a copy on a 4692, the colors on the copy match the color on the terminal's screen colors. This command allows you to change that default — and is provided for compatibility with other Tektronix terminals.

For the 4205 and 4207, the only recommended setting is the factory default setting:

**HCDATARES 2**

## Making Transparencies on a 4692 Copier

To make high-quality transparencies on a 4692 Copier, use this sequence of settings:

```
HCORIENT HORIZONTAL
HCDENSITY HIGH
HCREPAINT 2
HCDAARES 2
```

## HCMAP — Representing Colors on a Monochrome Graphics Printer

On a monochrome graphics printer, all indices except Index 0, which is usually the background color, print in black ink. If this makes your screen copy hard to read, use the HCMAP command to suppress the printing of selected indices.

To suppress printing of an index, issue *HCMAP* followed by the index and then a 0 — 0 specifies “no print”, while 1 specifies “print.” (Since all indices except Index 0 print by factory default, you need only specify those indices that you don’t want to print.)

For example, to suppress printing of Indices 5, 6, and 7, enter:

```
HCMAP 5,0,6,0,7,0
```

Now, everything displayed in Indices 5, 6, and 7 on the screen is not printed on your hardcopy, while all other indices print. (You can find the index number of a color by using the Set Color Function, which is described in Section 2.)

## HCDAATTRIBUTES — Copying Multiple Pages From the Dialog Buffer

The HCDAATTRIBUTES command lets you copy to a color copier or monochrome printer more of the dialog buffer text than just that displayed on the terminal’s screen. (This procedure is more applicable when your terminal is in HOSTPORT RS-232 — in HOSTPORT COAX, the dialog buffer is limited to 32 lines.)

The HCDAATTRIBUTES command has three parameters:

1. *Number of pages to be copied.* (The factory default is 1, but you can copy as many pages as your buffer will hold.)
2. *Starting page to begin the copy.* (The copy can begin at either the beginning or end of the dialog buffer, or at the beginning of the text displayed on the screen.)

Your options are:

- 0 — To start copying from the first line on the screen (the factory default)
- 1 — To start copying from the top of the dialog buffer
- 2 — To copy from the bottom of the dialog buffer



3. *When to begin a new page.* (You can specify a page break after each 60 lines of text, wherever a Form Feed character occurs, or both.) For some copiers, this parameter is affected by the HCFEATURES command, which is described on the next page.

Your options are:

- 0 — If you are using a 4691 or 4692, breaks pages every 66 lines (60 lines of text plus three blank lines each at the top and bottom margins, making a total page length of 66 lines) — this is the default  
If you are using a continuous-feed copier or the LaserJet<sup>1</sup>, breaks pages at the current HCFEATURES setting for page length (66 lines by default)
- 1 — Breaks pages as though this parameter were set to 0, but also breaks pages at Form Feed characters (all copiers)
- 2 — Breaks pages only at Form Feed characters (all copiers)

The following examples show how the HCDAATTRIBUTES command works (for copiers that are affected by the HCFEATURES command, these examples assume the command is at its factory default values):

- To copy the three most recent pages, ignore Form Feeds, and page the copy every 60 lines, enter:

**HCDAATTRIBUTES 3,2,0**

The 3 (first parameter) specifies three pages to be copied. The 2 (second parameter) causes the page count to start from the last line (most recently entered) of the dialog buffer. The 0 (third parameter) causes a new page to begin every 60 lines of text (66 lines total — 60 text plus 3 lines each at the top and bottom of a page).

- To copy two pages starting from the first line displayed on the screen and to start a new page every 60 lines of text or wherever a Form Feed occurs, enter:

**HCDAATTRIBUTES 2,0,1**

- To copy the five oldest pages and start a new page only at every Form Feed, enter:

**HCDAATTRIBUTES 5,1,2**

Keep in mind that the first setting (the number of pages) and the last setting (whether Form Feeds are ignored) affect one another. If the dialog buffer begins with four Form Feeds, and you specify that the copier or printer should print four pages and break pages only at Form Feeds, you would get four blank pages.

Or, assume you set the terminal to page only on Form Feeds and you set the number of pages to 1. If there are no Form Feeds in the text, the entire dialog buffer will be copied without page breaks, regardless of the number of lines.

<sup>1</sup> The LaserJet inserts an additional three lines each at the top and bottom of each page — see *Special Considerations for the LaserJet* later in this section.

**HCFEATURES — Paging for Continuous-Feed Copiers and the LaserJet<sup>1</sup>**

If you are using a continuous-feed copier or a LaserJet for dialog copying, you can specify how many lines of text should be on each page as well as how many blank lines you want at the top and bottom margins. If you are using a continuous-feed copier for screen copying, you can specify a paper advance between each copy. (Continuous-feed copiers, such as the Tektronix 4644, 4695, and 4696, feed paper from one continuous roll or a stack of perforated paper.)

The HCFEATURES command gives you these capabilities. This command works differently than most of the other commands we've shown in this manual. To use the command, enter both a *feature number* and the value you want to assign to it. Table 3-2 describes each feature number, what devices and types of copying each feature controls, and the values for each feature.

**Table 3-2  
USING HCFEATURES FOR PAGING**

Feature	Function	Type of Copy	Type of Copier	Valid Values <sup>a</sup>	Default Value
1 <sup>b</sup> Memory for Background Copying	Turns background copying on and off	Screen	All except LaserJet	0 — 65536	0
2 <sup>c</sup> Top Margin	Controls the number of blank lines at the top of each page	Dialog	Continuous feed and LaserJet	0 — 32767	3
3 <sup>c</sup> Bottom Margin	Controls the number of blank lines at the bottom of each page	Dialog	Continuous feed and LaserJet	0 — 32767	3
4 <sup>c</sup> Text Length	Controls the number of lines of text on each page	Dialog	Continuous feed and LaserJet	0 — 32767	60
5 Advance	Controls whether paper should advance between each screen copy	Screen	Continuous feed only	0 (no advance) 1 (advance)	0

<sup>a</sup> The valid values shown can be issued without generating an error, but they are not necessarily reasonable values. Margins and page length together generally shouldn't exceed 66 lines.

<sup>b</sup> Although this parameter can be used to control background copying, we suggest that you use the Setup command HCBACKGROUND instead, which is described in *Making Screen Copies in Background* (earlier in this section).

<sup>c</sup> The LaserJet inserts an additional three lines each at the top and bottom of each page — see *Special Considerations for the LaserJet* later in this discussion.

<sup>1</sup> The LaserJet operates only with the 4207.

The following examples help illustrate how to use HCFEATURES for paging:

- To specify four lines each at the top and bottom margins, enter:

**HCFEATURES 2,4,3,4**

The 2 identifies which feature you are specifying (in this case, top margin), the 4 that follows specifies that you want four lines at the top margin. The next 3 and 4 specify a bottom margin of four lines.

- To specify a six-line top and bottom margin with 44 lines of text (for a typical 66-line copy), enter the following command:

**HCFEATURES 2,6,3,6,4,44**

- To advance the paper after a screen copy, enter the following command:

**HCFEATURES 5,1**

You will probably want to figure out how you want copies paged and then save those settings. After you have issued the HCFEATURES command settings you want, just enter:

**NVSAVE**

Of course, any time you want to temporarily override those settings, just reissue HCFEATURES with the new settings. The next time you turn the terminal on, HCFEATURES settings will revert back to those saved in nonvolatile memory.

#### NOTE

*Procedures to paginate dialog copies are more applicable when the terminal is in HOSTPORT RS-232, since this host port setting allows you to specify large dialog buffers. In HOSTPORT COAX, the dialog buffer is limited to 32 lines (although you can still use this command to break the 32 lines into pages).*

**Special Considerations for the LaserJet (4207 Only).** The LaserJet automatically inserts three lines for top and bottom margins; this means that any margins you specify with HCFEATURES are added to these initial three lines. Therefore, to paginate 60 lines of text per page (for a typical 66-line page), set the HCFEATURES margin settings to 0 and the text length to 60. That is, enter:

**HCFEATURES 2,0,3,0,4,60**

## HOW TO USE THE RASTERIZER (4207 Only)

Using the Tektronix 4510 Rasterizer, you can copy the graphics area to a 4691 or 4692 Copier with greater resolution than when copying directly from the screen to the copier. The rasterizer also gives you a wider color selection.

You can use the rasterizer only on images that were created as segments. If you aren't sure of what a segment is, you may want to refer to *Exercise 4: Creating Graphics* in Section 2. If the image was not created as segments, you can use Setup commands to display the image as a segment (explained below).

Follow these steps for making a rasterized copy:

1. Be sure the rasterizer is connected to the terminal, the color copier is connected to the rasterizer, and all are powered on. (Appendix A tells you how to connect the rasterizer and a color copier.)
2. Put the terminal in Setup, if it isn't already.
3. Be sure the dialog area is enabled so your commands won't clutter the graphics:

**DAENABLE YES**

4. Display your image and be sure it is comprised of segments.

If your host program does not display graphics as segments, you can make a segment out of the entire display by opening a segment before the host displays the graphics, then closing the segment after the graphics are drawn. Like this:

- a. Open a segment (in this case, Segment 1) by entering:

**SGOPEN 1**

- b. Take the terminal out of Setup.
- c. Enter the commands required by your host to display graphics on the terminal.
- d. After the image is on the screen, return the terminal to Setup.
- e. Close the segment by entering:

**SGCLOSE**

5. Make sure your image is in the current view.

If you have more than one view on the screen, the image in the current view will be sent to the rasterizer. Refer to *Exercise 6: Using the Zoom/Pan Function* in Section 2 of this manual for instructions on entering the Zoom and Pan function, selecting views, and returning to Setup.

6. Specify the number of copies. For example, if you want three copies, enter:

**PCOPIES P0:,3**

If the rasterizer is connected to PORT 1, use *P1* instead of *P0* in the commands you enter for both Steps 6 and 7.

7. Start the copy process by entering:

**PLOT TO,P0:**

The preceding steps use existing settings for copy orientation and appearance, but you can change these settings to fit your copy needs. The commands to do so are discussed under *Customizing Rasterized Copies*, just ahead.

### Copying From a Host to the Rasterizer

You can use the COPY command to send graphics from a host directly to the rasterizer without displaying the graphics on the screen. Use the method described under *Copying From a Host to a Peripheral* (later in this section) as a guide.

#### NOTE

*Because the data will not be processed by the terminal's device driver, the host must send it in the proper format for the rasterizer.*

## CUSTOMIZING RASTERIZED COPIES

You can control how your rasterized copy is oriented on the paper (or other media) and whether black and white are reversed. The commands to change the default settings are described next.

You can save the settings made with these commands (see *Saving Commands* earlier in this section), or you can reissue them whenever you make a copy. If you need to switch frequently from one type of copy to another, you can program keys to select the different settings you need. (See *Creating Macros* later in this section.)

Because the rasterizer takes care of other copier details, such as resolution, color matching, and so forth, you don't need to adjust these settings as you do when you send copies directly to the color copiers.

(continued)

### **PORIENT — Image Orientation for Rasterized Copies**

You can select the orientation of the screen image on the copier paper using one of the following commands.

This procedure assumes the rasterizer is connected to PORT 0. If it is connected to PORT 1, substitute *P1* wherever *P0* is shown in a command.

- To align the long axis of the image with the long axis of the media, enter:

**PORIENT P0:,HORIZONTAL**

- To align the long axis of the image on the short axis of the paper, enter one of these commands:

**PORIENT P0:,VTOP**

**PORIENT P0:,VCENTER**

**PORIENT P0:,VBOTTOM**

The three preceding commands place the image at the top, center, or bottom of the copier paper, respectively.

### **PINVERSION — Reversing Black and White on Rasterized Copies**

You can select how black and white colors in the image will be copied by entering one of these commands. Reversing black and white may be useful when your screen text is white on a black background. The text will print as black on a white background, like normal typewriter or printer copies, and it will save black ink. Be aware, however, that all black and white colors in the screen image will be reversed. Other colors are not affected.

This procedure assumes the rasterizer is connected to PORT 0. If it is connected to PORT 1, substitute *P1* wherever *P0* is shown in a command.

- To make a copy with black and white reversed, enter:

**PINVERSION P0:,NEGATIVE**

- To keep the image's blacks and whites as displayed on the screen, enter:

**PINVERSION P0:,POSITIVE**

## HOW TO USE A PLOTTER (4207 Only)

You can use a Tektronix 4662 or 4663 Interactive Digital Plotter to create a plot of all graphics segments that are currently visible and in the current view. (Refer to the discussion on segments and the current view at the beginning of the previous discussion, titled *How to Use the Rasterizer*.)

1. Be sure the plotter is connected and configured for the terminal and both are powered on. (Appendix A tells you how to install and prepare your plotter for use.)

These procedures assume the plotter is connected to PORT 0. If it is connected to PORT 1, substitute *P1* wherever *P0* is shown in a command.

2. Install the plotter pen or pens, and place your paper or transparency on the plotter's surface.
3. If your plotter has multiple pens, you can assign color indices to particular pens. Here are three examples:

- To map all displayed color indices (-1) to a single pen (Pen 1), enter:

```
PMAP P0:,-1,1
```

- To map graphics displayed in Index 3 to Pen 2, enter:

```
PMAP P0:,3,2
```

Reissue this command for each index you want to map.

- To suppress plotting graphics displayed in a particular color, map that index to Pen 0 — that is, no pen.

This is useful when you want a multicolored plot but have a plotter with only one or two pens. The following commands illustrate how you can plot one color at a time.

First, map all color indices to Pen 0:

```
PMAP P0:,-1,0
```

Then, select a pen color, install the pen, and map one index to that pen. For example:

```
PMAP P0:,8,1
```

After plotting (Step 4) the graphics displayed in Index 8, install a pen with another color. Then map another index to that pen and remap the index just plotted so that it won't plot. For example:

```
PMAP P0:,5,1
```

```
PMAP P0:,8,0
```

Replot the image for each index you want to show.

4. Plot your screen image by entering:

```
PLOT TO,P0:
```

## HOW TO COPY FROM A HOST TO A PERIPHERAL DEVICE

You can send text or graphics directly from the host to a peripheral device, without displaying the image on the terminal screen. This is convenient for sending program listings from the host to a monochrome copier or sending graphics from the host to the rasterizer.

To route a copy from the host directly to a peripheral device, follow these steps:

1. Make sure the terminal is connected to the host and to the peripheral, and both are powered on. (Appendix A tells you how to install and prepare your peripherals for use.)
2. Before entering Setup, type whatever command the host requires to send text to the terminal, but do not type the key the host needs to terminate the command (usually the New Line or Enter key).
3. Enter Setup.
4. Type in the COPY command and the desired destination. For example, this command would send data from the host to a device connected to the COPIER port:

**COPY HO:,TO,HC:**

(Be sure to press the Enter key to terminate this command.)

If you are using a 4207 to send the host data to a device connected to PORT 0 or PORT 1, substitute *P0* or *P1* for *HC* in the command.

4. Exit Setup.
5. Now terminate the host command you entered in Step 2.

### NOTE

*Because the terminal does not process the data, it is the responsibility of the host to send it in a format acceptable to the receiving peripheral.*

To avoid switching in and out of Setup to enter the commands for copying directly from the host, you can program a key to simplify the process. Refer to *Host Copy Macro* later in this section for the procedure.

### NOTE

*While the terminal is in HOSTPORT COAX, you cannot send 3270-style alphanumeric characters from a host directly to a peripheral. The terminal can, however, pass graphics from the host directly to a peripheral. Refer to the **4200 Series Programmers Manual** for details about Tektronix graphics and 3270 communications.*



## HOW TO USE A GRAPHICS TABLET (4207 Only)

Connecting the terminal to a Tektronix 4957 or 4958 Graphics Tablet provides a method for you to conveniently transfer drawings from paper to a computer data base. Using a stylus or puck, you simply trace your drawing; the tablet and terminal automatically send the graphics coordinates to the host computer. You can also use the stylus or puck to select from a menu of items or send other graphics choices to your host program.

This section will tell you only how to use the stylus or puck. Any other instructions should come from your host program. The program will probably tell you to choose a certain item or part of the picture, to enter a certain number of points on the screen, or to enter points continuously.

To use a stylus:

- Hold it as you would a ballpoint pen, with the tip resting on the tablet. The tablet can keep track of the stylus and send its location to the terminal as long as the stylus is within  $\frac{1}{2}$ " of the tablet surface.
- To pick an item or enter individual points, press down on the stylus tip (or press the button on the barrel, if it has one). The screen cursor will blink momentarily as the location is transmitted.
- To enter continuous points, press down on the stylus tip (or hold down the button on the barrel), and move it across the tablet surface as if you were drawing on the tablet. A steady stream of points is entered as you move the stylus until you lift the tip or release the button.

To use the puck:

- Lay the puck flat on the tablet surface with the buttons facing up.
- To pick an item or enter individual points, press one of the buttons on a puck. The screen cursor will blink momentarily as the location is transmitted.
- To enter continuous points, hold down a puck button and move the puck across the tablet surface. A steady stream of points is entered as you move the puck until you release the button.

## HOW TO USE DATA LOGGING

You can create a hardcopy log of all text in the dialog area — this is known as *data logging*. The AUTOPRINT command simultaneously copies text in the dialog area to a hardcopier as it's being displayed on the screen. You can use data logging with a monochrome printer, a 4695 Copier, or a 4696 Ink-Jet Printer.

To turn on data logging, follow these steps:

1. Be sure the printer or copier is connected to the terminal's COPIER port and both are turned on. (Appendix A tells you how to install your printer or copier.)
2. Put the terminal in Setup.
3. Activate data logging by entering:

**AUTOPRINT YES**

4. Now when you use the dialog area, all text will be logged. You can exit Setup and communicate with your host — this text will also be logged.
5. To turn data logging off, be sure the terminal is in Setup and enter:

**AUTOPRINT NO**

When the terminal is in ANSI mode, you can toggle data logging without entering Setup by programming a key to send host syntax commands. See the *Data Logging Macro* in the macro examples later in this section.

## HOW TO ASSIGN AN ANSWERBACK MESSAGE

The terminal can store a password-like message that a host can verify before releasing restricted information. The message has to be entered from the terminal's keyboard (it can't be sent from the host). *Before assigning an answerback message to your terminal, consult your systems programmer.*

To assign the message to your terminal, follow these steps.

1. Put the terminal in Setup.
2. Enter the ANSWERBACK command, a beginning delimiter, the message, and an ending delimiter. For example:

**ANSWERBACK /PASSWORD/**

3. Now save this setting so the terminal will retain the answerback string in its memory. Enter:

**NVSAVE**

## HOW TO CREATE MACROS

A *macro* is a sequence of characters stored in the terminal as a single group. By assigning these characters to a key (known as *programming a key* or *creating a key macro*), you can recall them by simply pressing that key (known as *expanding a macro*).

Macros provide a shortcut for entering commands and text that you use frequently. When you need to enter a particular set of commands or block of text repeatedly, you can create a key macro that contains the commands or text. The terminal saves the macro in its memory so that whenever you need it all you need to do is press the programmed key.

All keys except Shift, Ctrl, and Caps Lock can be programmed.

### NOTE

*Avoid programming keys that you normally use to enter commands. For example, if you program the Enter key, you cannot use it to terminate a command.*

The following overview describes the methods for creating macros. Next, we've provided several macros that perform functions you may find useful to have programmed into your terminal keyboard. By programming one or two of these macros into your keyboard, you'll also learn the sequence for creating your own macros.

## USING MACRO NUMBERS

Key macros are identified by *macro numbers* that correspond to keys on the keyboard. Each key has four numbers assigned to it:

- One number for the key pressed by itself
- One number for the key pressed in combination with the Shift key
- One number for the key pressed in combination with the Ctrl key
- One number for the key pressed in combination with the Ctrl and Shift keys

These macro numbers range from -230 through 143. (Appendix C shows the macro numbers assigned to individual keys.)

## USING MACRO COMMANDS

There are four different commands you can use to create a macro:

- *LEARN* helps you program keys (identified by macro numbers –150 through 143). When you enter the *LEARN* command, the terminal prompts you for your subsequent entries to define the macro. Macros defined with *LEARN* are lost when the terminal is turned off or reset, or when you issue a *FACTORY* command.
- *NVLEARN* works like *LEARN*, except that *NVLEARN* macros can be saved in nonvolatile memory by issuing *NVSAVE* following the macro definition.
- *DEFINE* lets you define a macro for any key or macro number (including macros 144 and up, which do not correspond to any keys). A macro created with *DEFINE* is lost when you turn off or reset the terminal, or when you issue a *FACTORY* command. The *DEFINE* command is primarily for defining macros from the host and is not further described in this manual — for more information about the *DEFINE* command, refer to the *4200 Series Programmers Manual*.
- *NVDEFINE* works just like *DEFINE* except that *NVDEFINE* macro can be saved in nonvolatile memory by issuing *NVSAVE* following the macro definition. The *NVDEFINE* command is primarily for defining macros from the host and is not further described in this manual — for more information about the *NVDEFINE* command, refer to the *4200 Series Programmers Manual*.

### CAUTION

*A macro created by NVLEARN or NVDEFINE is not automatically saved in nonvolatile memory. If you want to save the macro, you must enter an NVSAVE command before turning off the power, issuing a RESET command, or issuing a FACTORY command. A limited amount of memory is available to save nonvolatile macros.*

## SELECTING MACRO COMMAND SYNTAX

Commands within a macro are usually in *host syntax*, rather than in *Setup syntax* (your *4200 Series Reference Guide* explains host syntax). This allows you to use the macro while you are communicating with the host — remember that the terminal only understands *Setup syntax* when it is in *Setup*. When you use host syntax commands in a macro, be sure the terminal is not in *Setup* when you press the programmed key.

Commands to the terminal in a macro can be *Setup* commands. This, however, requires the terminal to be in *Setup* before you press the programmed key. (Remember that you cannot communicate with the host while in *Setup*.)

## SELECTING LOCAL OR HOST MACROS

Normally, when you press a programmed key, the macro defined for that key is sent to the host computer — just as if you had entered that sequence of characters on the keyboard. This allows you to avoid typing a sequence of commands you frequently use with your host.

However, you might want a macro to be interpreted as a sequence of commands to the terminal (rather than the host). For instance, if you frequently use a particular sequence of commands to change a terminal characteristic — like, the size of the dialog area or size of your hard copies — you could program a key to execute that sequence of commands. In a case like this, you do not want the macro sent to the host, but you do want it executed by the terminal.

To construct a macro to be executed by the terminal, you must include a pair of *key-execute characters* at the beginning and at the end of the macro. The default key-execute character is `␣`, which you type as *Ctrl-P*. (If you need to use the `␣` character within a macro, you'll need to change the default key-execute character — see the SET KEY EXECUTE CHARACTER command description in your *4200 Series Reference Guide*.)

The key-execute character acts like a switch that sends the contents of the macro either to the terminal or to the host. The first time the key-execute character appears in the macro, it switches to the terminal. The next time it appears in the macro, it switches back to the host.

## DELETING A MACRO DEFINITION

You can delete a macro and return a key to its default meaning by reissuing the command you issued to create the macro — either LEARN or NVLEARN. In response to the prompt, press the key that contains the macro you want to delete, then press F1. If the macro has been saved in nonvolatile memory (that is, created with the NVLEARN command and followed by an NVSAVE), you would also reissue the NVSAVE command.

For example, to delete a macro that was assigned to the F6 key and was saved in nonvolatile memory, put the terminal in Setup and enter:

**NVLEARN**

The terminal responds with its prompt:

**Press the key to be defined :**

Press the F6 key, then press the F1 key. The F6 key is now back to its default meaning. (With the exception of the function keys, the keycap label on each key identifies its default meaning.)

Finally, issue:

**NVSAVE**

## MACRO EXAMPLES

Here are several macros you might find helpful in your day-to-day work with your terminal. By following the step-by-step procedures for one or two of these examples, you'll also learn the sequence for creating your own macros.

The macros shown here are:

- *Hardcopy Size* — This macro lets you specify one of two different size copies.
- *Dialog Area Enabling and Disabling* — This macro allows you to disable the dialog area so that you can make clean dialog copies, then reenable it.
- *Host Copy Macro* — This macro allows you to easily queue a copy from the host directly to a copier, without displaying the file on the terminal screen.
- *Data Logging Macro* — This macro allows you to turn data logging on and off without going into Setup.

These examples use the NVLEARN command rather than the LEARN command so that you can save these macros in nonvolatile memory. You could substitute LEARN wherever you see NVLEARN.

If you begin a macro definition with the LEARN or NVLEARN command and want to abort it before completing it, press the Cancel key. If you have completed the macro definition and want to delete it, follow the instructions under *Deleting A Macro Definition* earlier in this discussion.

### Hardcopy Size Macro

Assume you frequently need to change the setting of the HCSIZE command. You can program two keys — one to specify the smaller size copy and one to specify the larger size — so that you can easily switch between them. Here's how to set up the macro that selects the smaller size:

1. Put the terminal in Setup.
2. To start the programming process for a nonvolatile macro, enter this command:

#### NVLEARN

The terminal displays the following prompt:

**Press the key to be defined :**

3. Press the F5 function key, located in the top-right row of keys. The screen displays the number 132 (the macro number for the F5 key) after the colon, and the following message appears on the next line:

**Enter definition. (F1 terminates definition, F2 deletes last character)**

- Now you can enter the contents of the macro. Assuming that the key-execute character is  $\rho_L$  (the default key-execute character), you'll enter it by holding down the Ctrl key and pressing the P key; this is shown in this manual as *Ctrl-P*. Use the F2 key to correct any errors you make while entering the macro.

Since this example uses the host syntax of the HCSIZE command, be sure to enter the command in uppercase letters (as shown) and without any spaces between characters:

**Ctrl-P** **Esc** **QA1** **Ctrl-P**

As you enter the macro, it is displayed on the screen like this:

$\rho_L \text{EscQA1} \rho_L$

- Press the F1 key to end the macro definition.
- If you want to save the macro in the terminal's nonvolatile memory, put the terminal in Setup and enter:

**NVSAVE**

Now, verify that the macro is correct:

- Check the contents of the macro by entering the following command:

**MACROSTATUS 132**

The value 132 is the macro number for the F5 key that was displayed earlier (in Step 3 of this procedure). If you entered the macro definition correctly, the following message appears:

**132 "  $\rho_L \text{EscQA1} \rho_L$  "**

- To use the macro definition, press the Setup key to take the terminal out of Setup and then press the F5 function key.
- To see the effect of the macro, press the Setup key and enter:

**STATUS HCSIZE**

The terminal should display:

**HCSIZE .....1**

Now, simply follow the same steps to program another key to select the larger size.

You could add other commands to this simple macro so that pressing a single key sets up all your copy specifications.

## Dialog Area Disabling and Enabling Macros

When copying the dialog buffer, you can avoid cluttering up the copy with the commands that set the copy format by disabling the dialog area and making it invisible. Then, when you issue your commands, they'll appear in the graphics area, and won't appear on your hardcopy.

Here's how to set up the macro:

1. Put the terminal in Setup.
2. Since you may want to save this macro in nonvolatile memory, start the programming process by entering this command:

### NVLEARN

The terminal displays the following prompt:

**Press the key to be defined :**

3. Press the F3 function key. The screen displays the macro number for the F3 key (130), and the following message appears on the next line:

**Enter definition. (F1 terminates definition, F2 deletes last character)**

4. Assuming the key-execute character is  $\rho_L$  (entered as *Ctrl-P*), type in this macro definition (using uppercase letters as shown, and without any spaces between characters):

**Ctrl-P** **Esc** **KA0** **Esc** **LV0** **Ctrl-P**

Your command appears like this on the screen:

$\rho_L$ Esc**KA0**Esc**LV0** $\rho_L$

5. Press the F1 key to end the macro definition.
6. If you want to save the macro in the terminal's nonvolatile memory, put the terminal in Setup and enter:

### NVSAVE

Now you can disable the dialog area and make it invisible without the command appearing on the screen:

1. Take the terminal out of Setup.
2. Press F3.

To create a macro to enable the dialog area and make it visible again, follow the previous steps, but assign the macro to a different function key (consider Shift-F3), and substitute *KA1* for *KA0* and *LV1* for *LV0* when you type in the macro definition:

**Ctrl-P** **Esc** **KA1** **Esc** **LV1** **Ctrl-P**



## Host Copy Macro

You can route text from the host directly to a printer or copier attached to the COPIER port. In this case, you must use the COPY command instead of the SCopy or DCopy key. (During this type of copy, the terminal does not process or change the text in any way; so if the printer requires initialization commands, such as page size, the host must send them.)

To program the F6 key to issue a COPY command, follow these steps:

1. Put the terminal in Setup.
2. Enter this command:

**NVLEARN**

The terminal displays the following prompt:

**Press the key to be defined :**

3. Press the F6 function key. The screen displays the number 133 (the macro number for the F6 key) after the colon, and the following message appears on the next line:

**Enter definition. (F1 terminates definition, F2 deletes last character)**

4. Assuming that the key-execute character is  $\rho_L$  (entered as *Ctrl-P*), enter the macro definition using the host syntax for the COPY command:

**Ctrl-P** **Esc** **JC3HO:2TO3HC:** **Ctrl-P**

As you enter it, the macro string is displayed on the screen like this:

$\rho_L$ Esc**JC3HO:2TO3HC:** $\rho_L$

5. To end the macro definition, press the F1 key.
6. If you want to save the macro in nonvolatile memory, enter:

**NVSAVE**

Now, whenever you want to make a hard copy of a file without displaying it on the screen, you can just follow these steps:

1. Press the Setup key again to take the terminal out of Setup.
2. Enter a command that instructs your host to send text to the terminal, but do not press Enter to terminate the command.
3. Press the F6 function key — this causes the terminal to execute the macro — then press Enter to terminate the command to the host.

The printer should begin to print whatever the host sent to the terminal. If you do not have a printer connected to the terminal, it will display an error message.

4. When the copy is done, press the Cancel key to end the copy process.

You can also use these steps on the 4207 to send data directly from the host to one of the peripheral ports, for instance, to the rasterizer or a plotter. Substitute either *P0* or *P1* (depending on which port the device is connected to) for *HC* in the macro.

Be sure that the file you're sending is formatted for the device connected to the COPIER port — see your systems programmer.

## Data Logging Macro

You can program a single key to turn data logging on or off (that is, *toggle* data logging) rather than having to enter Setup and explicitly issue the AUTOPRINT command.

Here's how:

1. Put the terminal in Setup.
2. Enter this command:

**NVLEARN**

The terminal displays the following prompt:

**Press the key to be defined :**

3. Press the F8 function key. The screen displays the number 135 (the macro number for the F8 key) after the colon, and the following message appears on the next line:

**Enter definition. (F1 terminates definition, F2 deletes last character)**

4. Assuming the key-execute character is  $\rho_L$  (entered as *Ctrl-P*), enter this macro definition using the host syntax for data logging:

**Ctrl-P** **Esc** **[?3i** **Ctrl-P**

Your command appears on the screen like this:

$\rho_L$ Esc[?3i $\rho_L$

5. To end the macro definition, press the F1 key.
6. If you want to save the macro in nonvolatile memory, enter:

**NVSAVE**

You can test this macro without a host, but be sure a printer is connected to the terminal and turned on, then:

1. Check that your terminal is in Setup, then put the terminal in ANSI mode by entering:

**CODE ANSI**

2. Then check the data logging status by entering:

**STATUS AUTOPRINT**

3. Noting whether the status message says *AUTOPRINT . . . NO* or *AUTOPRINT . . . YES*, take the terminal out of Setup.
4. Press F8.
5. Enter Setup again and check the data logging status:

**STATUS AUTOPRINT**

The data logging status should be the reverse of what it was in Step 2. When data logging is active, all text and dialog in the dialog area will be printed on the printer.

## HOW TO CONTROL BELL CHARACTERISTICS

You can control the terminal bell's volume (or turn it off entirely), and you can control the type of bell that is sounded when the terminal receives multiple Bell characteristics.

**Controlling Volume.** You control the terminal bell's volume with the `BELLVOLUME` command. The command has four parameters:

- *OFF* — Turns off the bell
- *LOW* — Sets bell volume to *low*
- *MEDIUM* — Sets bell volume to *medium* (the factory default)
- *HIGH* — Sets bell volume to *high*

For example, to set the bell volume to *low*, you would follow this procedure:

1. Put the terminal in Setup.
2. Enter this command:

**BELLVOLUME LOW**

3. If you want to keep the bell volume at this level, save the setting by issuing:

**NVSAVE**

**Controlling Type.** You control the terminal's bell type with the `BELLTYPE` command. Each bell responds differently when sent multiple Bell characters. You can choose from two bells:

- *CONTINUOUS* — Sounds a single, unbroken bell tone (the factory default)
- *DISCRETE* — Sounds a separate bell tone for each Bell character

For example, to set the bell type to *discrete*, you would follow this procedure:

1. Put the terminal in Setup.
2. Enter this command:

**BELLTYPE DISCRETE**

3. If you want to save the bell type, enter:

**NVSAVE**

## HOW TO ENSURE COMPATIBILITY WITH OLDER APPLICATIONS

The 4205 and 4207 Terminals will run most applications written for older Tektronix terminals:

- If the application queries for terminal type but has not been modified to recognize the 4205 and 4207, you can use the **TERMINAL** command to change how your terminal reports terminal type.
- If the application uses GIN and the program controls cursor movement with the Joydisk, you can use the **MOUSEMAP** command to allow you to use the mouse instead of the Joydisk to move the cursor.

**Changing Terminal Type.** If you are running an application that recognizes a 4010 or 4100 Series Terminal but not a 4200 Series Terminal, follow this procedure:

1. Put the terminal in Setup.
2. Enter the **TERMINAL** command with the appropriate terminal model number. For example, to run a 4107 application, you would enter:

**TERMINAL 4107**

Now, when queried by an application, the terminal would report *4107*, allowing you to run the application without modifying the program.

3. If you want to save this setting so that the terminal *always* reports that terminal type, issue this command:

**NVSAVE**

**Using the Mouse in GIN Applications.** If you're running an application that uses GIN (graphics input) and the program uses the Joydisk to move the cursor, you can use the mouse instead. Follow this procedure before you run the application:

1. Put the terminal in Setup.
2. Enter the following command:

**MOUSEMAP YES**

Now you can use the mouse to move the cursor (don't use the Joydisk). You can also program macros on the mouse buttons — you might consider programming them with macros that contain the meanings of the keys you use most in your application, thus allowing you to keep your hand on the mouse (see *How to Create Macros* earlier in this section).

You will need to reissue this command each time you run a GIN application and you must issue it *before* you start the application up.

Section **4**

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**SETUP COMMAND SUMMARY**

Section **4**

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**SETUP COMMAND SUMMARY**

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Table 4-1 on the following pages shows all of the terminal's Setup commands. The table is arranged by function, listing all commands that affect that function. You'll find Table 4-1 convenient for verifying a Setup command's syntax, identifying its function, checking its defaults, or determining whether it can be saved in nonvolatile memory.

See Section 3 for how to enter Setup commands, correct entry errors, and understand error messages.

The column headings and subheadings in Table 4-1 have the following meanings:

- **Setup Name** — Specifies the Setup command name as you actually type it.
- **Parameters** — Defines parameter functions. Although the complete range of parameters for each command is not shown, all permissible keywords are listed (in bold type). Just enter the keyword that describes the setting you want. For commands that do not have keywords, the example (in the righthand column) gives you an idea of the kind of parameter entry the command requires. You can find all parameter values for each command in your Reference Guide.
- **Defaults** — Specifies the parameter setting the terminal assumes when a value or keyword is not explicitly entered. There are two kinds of defaults:
  - *Factory* — Refers to the setting made when the terminal is manufactured.
  - *Omitted* — Refers to the setting assumed when you enter a command but do not specify a keyword or value for the parameter.

Blank entries under the *Defaults* column indicate that there is no default value for the parameter.

- **Saved** — Specifies whether or not a command's parameters can be saved with an NVSAVE command. Those not saved either revert to the factory default or have no power-up value.
- **Description** — Provides a brief summary description of the command's function. Where appropriate, examples (in bold type) show how you would enter the command.

## FUNCTIONAL CATEGORIES

Each command is listed under one or more of these functional categories; each functional category begins at the page number given.

Alphatext 4-3

Color 4-4

Dialog Area

Graphics Area

Command Settings 4-6

Reporting

Resetting

Saving

Communications 4-8

Host

COPIER Port

PORT 0 and PORT 1

Copies 4-13

Making Copies

Setting Attributes for PORT 0 and PORT 1

Setting Color Copy Attributes for COPIER Port

Setting Monochrome Copy Attributes for

COPIER Port

Curves 4-17

Dialog Area 4-17

Controlling Attributes

Controlling Text

Graphics Input (GIN) 4-21

Enabling and Disabling

Setting Display Characteristics

Controlling Reports

Graphics Primitives 4-23

Alphatext

Curves

Graptext

Lines

Markers

Panels

Graptext 4-28

Help 4-30

Keyboard 4-31

Lines 4-32

Macros 4-32

Markers 4-33

Modes 4-33

Panels 4-33

Pixel Operations 4-34

Initializing

Writing Pixels

Reports 4-34

Screen Dimming 4-36

Security 4-36

Segments 4-36

Defining

Saving

Displaying

Transforming

Setting Attributes

Assigning Classes

Editing

Surfaces 4-41

Text 4-42

Displaying Alphatext

Displaying Graptext

Downloading Character Sets

Views 4-45

Controlling Multiple Views

Zoom and Pan

Coax 4-46



Table 4-1  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>ALPHATEXT</b>					
BACKINDEX	text-background-index	-1	0	No	Specifies color indices for the character backgrounds of string precision graphtext and alpha text in the graphics area; also specifies the index for the gaps in dashed lines <b>BACKINDEX 0,-1</b>
	dash-gap-index	-1	0		
DAENABLE	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Enables or disables the dialog area
DLCHARSET	mode <b>no</b> <b>yes</b>	no	yes	No	Enables or disables the display of downloadable character sets and the Multilingual character set
DLSELECTCHARSET	set-selector <b>g0</b> <b>g1</b>	g0		No	Designates a predefined or downloadable character set as the G0 or G1 character set (also used as string-precision graphtext) <b>DLSELECTCHARSET G0,3,94</b>
	character-set <b>A</b> United Kingdom <b>B</b> North American (ASCII) <b>G</b> Swedish <b>K</b> German <b>f</b> French <b>\</b> Danish/Norwegian <b>0</b> Rulings <b>3</b> Supplementary <b>A</b> Multilingual (ASCII)	Depends on keyboard			
	set-size <b>94</b> <b>96</b>	94	94		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

Table 4-1 (cont)  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>ALPHATEXT (continued)</b>					
GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces characters in the graphics area
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphatext in the graphics area <b>GTINDEX 2</b>
<b>COLOR: Dialog Area</b>					
ACURSOR	first-index	0	0	Yes	Assigns color indices to the alpha cursor <b>ACURSOR 3,6</b>
	second-index	1	0		
DACMAP	color-mixture	Index 0 Black 1 White 2 Red 3 Green 4 Blue 5 Cyan 6 Magenta 7 Yellow	Error	Yes	Specifies the color assigned to color indices in the dialog area <b>DACMAP 3,0,100,0</b>
DAINDEX	character-index	1	0	Yes	Specifies the color index for alphatext characters, character-cell background, and dialog area background <b>DAINDEX 3,4,5</b>
	character-background-index	0	0		
	dialog-background-index	0	0		
SCREENMODE	mode <b>normal</b> <b>reverse</b>	normal	normal	Yes	Reverses the hues in the graphics area and changes Index 0 to opaque
TEXTRENDITION	graphic-rendition	0	0	No	Selects character color, cell background color, blink, bold, underscore, etc.

**COLOR: Graphics Area**

ACURSOR	first-index	0	0	Yes	Assigns color indices to the alpha cursor <b>ACURSOR 3,6</b>																															
	second-index	1																																		
BACKINDEX	text-background-index	-1	0	No	Specifies color indices for the character backgrounds of string precision graphtext and alpha text in the graphics area; also specifies the index for the gaps in dashed lines <b>BACKINDEX 0,-1</b>																															
	dash-gap-index	-1	0																																	
CBACKGROUND	first-color-coordinate	0	0	No	Sets the color of the background surface <b>CBACKGROUND 120,50,100</b>																															
	second-color-coordinate	0	0																																	
	third-color-coordinate	0	0																																	
CMAP	surface-number		Error TG11	No	Defines the color map for a graphics writing surface <b>CMAP 1,3,0,100,0</b>																															
	color-mixture	<table border="1"> <thead> <tr> <th>Index</th> <th>Color</th> </tr> </thead> <tbody> <tr><td>0</td><td>Black</td></tr> <tr><td>1</td><td>White</td></tr> <tr><td>2</td><td>Red</td></tr> <tr><td>3</td><td>Green</td></tr> <tr><td>4</td><td>Blue</td></tr> <tr><td>5</td><td>Cyan</td></tr> <tr><td>6</td><td>Magenta</td></tr> <tr><td>7</td><td>Yellow</td></tr> <tr><td>8</td><td>Orange</td></tr> <tr><td>9</td><td>Grn-Ylw</td></tr> <tr><td>10</td><td>Grn-Cyan</td></tr> <tr><td>11</td><td>Blue-Cyan</td></tr> <tr><td>12</td><td>Blu-Mgnta</td></tr> <tr><td>13</td><td>Rd-Mgnta</td></tr> <tr><td>14</td><td>Dk Gray</td></tr> <tr><td>15</td><td>Lt Gray</td></tr> </tbody> </table>	Index			Color	0	Black	1	White	2	Red	3	Green	4	Blue	5	Cyan	6	Magenta	7	Yellow	8	Orange	9	Grn-Ylw	10	Grn-Cyan	11	Blue-Cyan	12	Blu-Mgnta	13	Rd-Mgnta	14	Dk Gray
Index	Color																																			
0	Black																																			
1	White																																			
2	Red																																			
3	Green																																			
4	Blue																																			
5	Cyan																																			
6	Magenta																																			
7	Yellow																																			
8	Orange																																			
9	Grn-Ylw																																			
10	Grn-Cyan																																			
11	Blue-Cyan																																			
12	Blu-Mgnta																																			
13	Rd-Mgnta																																			
14	Dk Gray																																			
15	Lt Gray																																			
CMODE	color-specifying-mode	3	0	No	Specifies which color coordinate system to use for color graphics: HLS, RGB, or CMY <b>CMODE 1,3,0</b>																															
	color-overlay-mode	1	0																																	
	gray-mode	1	0																																	
FILLPATTERN	fill-pattern-number	-1	0	No	Specifies the fill pattern for panel definitions <b>FILLPATTERN 16</b>																															

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)  
SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COLOR: Graphics Area (continued)</b>					
G_CURSOR	first-color-coordinate	0	0	Yes	Specifies the color mixture for the GIN crosshair cursor <b>G_CURSOR 150,50,90</b>
	second-color-coordinate	100	0		
	third-color-coordinate	0	0		
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphanet in the graphics area <b>GTINDEX 2</b>
LINEINDEX	line-index	1	0	No	Specifies the color index for all subsequent lines, panel boundaries, and markers <b>LINEINDEX 4</b>
VATTRIBUTES	surface-number	1	0	No	Sets the surface, wipe index, and border index for the current view <b>VATTRIBUTES 0,0,2</b>
	wipe-index	0	0		
	border-index	1	0		
<b>COMMAND SETTINGS: Reporting</b>					
DECODE	parameter-type int rint real rreal xy rxy 4010xy r4010xy		Error	No	Displays the decoded value of encoded host parameters or terminal reports <b>DECODE INT,/B@0/</b>
	input-string		Error		

ENCODE	parameter-type <b>int</b> <b>real</b> <b>xy</b> <b>4010xy</b>		Error	No	Displays the encoded values of integer, xy-coordinate, and real parameters for host syntax <b>ENCODE INT,/2048/</b>
	input-string		Error		
STATUS	name <b>ANSI</b> <b>communications</b> <b>dialog</b> <b>general</b> <b>graphics</b> <b>hardcopy</b> <b>keyboard</b> <b>level</b> <b>memoryblocks</b> <b>pixels</b> <b>pmemoryblocks</b> <b>report/input</b> <b>segments</b> <b>surfaces</b> <b>terminal</b> <b>version</b> <b>views</b> <b>2PPI</b>		All commands	No	Displays the current parameter values for a command or a cluster of commands (cluster names and special inquiry names are listed as keywords under the <i>Parameters</i> column)

**COMMAND SETTINGS: Resetting**

FACTORY				No	Sets all parameters to their factory default values and takes the terminal out of Setup
RESET				No	Resets the terminal to its power-up condition

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

Table 4-1 (cont)  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COMMAND SETTINGS: Saving</b>					
LOAD	pseudofile-specifier		Error JL11	No	Either (1) restores the previously saved command settings that make up the terminal environment (used with SAVE command), or (2) restores all terminal settings except critical communications settings to factory default values <b>LOAD M1:ENV</b>
NVSAVE				Yes	Saves the parameter values of those commands whose settings can be saved in nonvolatile memory; also saves all nonvolatile macros
SAVE	object-saved <b>seg</b> <b>env</b>		Error JV11	No	Either (1) sends a segment definition to the host port or to one of the 2PPI ports, or (2) saves the terminal environment to the host port or to the terminal's memory (used with LOAD command) <b>SAVE SEG,1,TO,HO:</b>
	object-number		Error JV21		
	separator <b>to</b>		to		
	destination-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error JV41		
<b>COMMUNICATIONS: Host</b>					
ANSWERBACK	answerback-string			Yes	Assigns the terminal's answerback string <b>ANSWERBACK /PASSKEY/</b>
BAUDRATE	transmit-data-rate	2400	Error NR11	Yes	Sets the terminal's transmit and receive baud rates <b>BAUDRATE 600,300</b>
	receive-data-rate	2400	Same as <i>transmit- baud-rate</i>		

BREAKTIME	break-time	200	0	Yes	Sets the duration (in milliseconds) of the break signal that the terminal sends when a user presses the terminal's Break key <b>BREAKTIME 25</b>
BYPASSCANCEL	bypass-cancel-character	L <sub>F</sub> (ADE 10)	N <sub>U</sub> (ADE 0)	Yes	Specifies the character that causes the terminal to terminate Bypass mode <b>BYPASSCANCEL 10</b>
CANCEL				No	Stops terminal activity and resets several terminal parameters and modes to their default values
ECHO	echo-mode <b>no</b> <b>yes</b>	no	yes	Yes	Specifies whether the terminal echoes characters it transmits to the host
EOFSTRING	EOF-string			Yes	Specifies the terminal's end-of-file string <b>EOFSTRING /XYZ/</b>
EOLSTRING	EOL-string	C <sub>R</sub> (ADE 13)		Yes	Specifies the terminal's end-of-line string <b>EOLSTRING / ~ C<sub>R</sub>/</b>
EOMCHARS	first-EOM-indicator	C <sub>R</sub> (ADE 13)	N <sub>U</sub> (ADE 0)	Yes	Specifies two characters that the terminal can use to mark the end of a line of data sent to the host <b>EOMCHARS 13,10</b>
	second-EOM-indicator	L <sub>F</sub> (ADE 10)	N <sub>U</sub> (ADE 0)		
ERRORLEVEL	error-threshold-level	2	0	No	Specifies the levels of error messages the terminal displays <b>ERRORLEVEL 3</b>
FLAGGING	flagging-mode <b>none</b> <b>input</b> <b>output</b> <b>in/out</b> <b>dtr/cts</b>	none	none	Yes	Specifies the kind of flagging the terminal uses
IGNOREDEL	ignore-deletes-mode <b>no</b> <b>yes</b>	no	yes	Yes	Determines whether the terminal ignores the D <sub>T</sub> (Delete) character

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)  
SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COMMUNICATIONS: Host (continued)</b>					
PARITY	parity-mode <b>none</b> <b>odd</b> <b>even</b> <b>high</b> <b>data</b>	none	none	Yes	Specifies the kind of parity the terminal uses when it transmits to the host
PCOPY	source-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error PC11	No	Establishes two-way communications between the host and a 2PPI port or between two 2PPI ports <b>PCOPY H0:,TO,P0:</b>
	separator <b>to</b>		to		
	destination-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error PC31		
PROMPTMODE	prompt-mode <b>no</b> <b>yes</b>	no	yes	No	Turns Prompt mode on or off
PROMPTSTRING	prompt-string			Yes	Specifies the string that initiates the terminal's Prompt mode <b>PROMPTSTRING /ABC/</b>
QUEUESIZE	queue-size	300	Error NQ11	Yes	Specifies the size (in bytes) of the terminal's input queue <b>QUEUESIZE 900</b>
REOM	EOM-frequency	1	1	Yes	Specifies how often the terminal sends an EOL string to the host <b>REOM 0</b>



RLINELENGTH	maximum-line-length	0	0	No	Specifies the maximum number of characters per line the terminal sends to the host <b>RLINELENGTH 100</b>
STOPBITS	number-of-stop-bits	1	Error NB11	Yes	Specifies number of stop bits appended to each character the terminal transmits <b>STOPBITS 2</b>
XMTDELAY	transmit-delay	100	0	Yes	Specifies the terminal's delay between transmitting lines of text <b>XMTDELAY 200</b>
XMTLIMIT	rate-limit	19200	Error NL11	Yes	Specifies the effective transmit baud rate limit <b>XMTLIMIT 900</b>

**COMMUNICATIONS: COPIER Port**

HCINTERFACE	copier-type	2	0	Yes	Identifies the type of copier connected to the terminal <b>HCINTERFACE 2</b>
HCMONOCHROME	monochrome-attributes	1	0	Yes	Specifies the line termination ( $C_R$ or $C_{R-F}$ ) that the terminal sends to a monochrome printer <b>HCMONOCHROME 0</b>

**COMMUNICATIONS: PORT 0 and PORT 1 (4207 Only)**

PASSIGN	port-identifier <b>P0:</b> <b>P1:</b>		Error PA11	Yes	Assigns a device protocol to PORT 0 or PORT 1 (4207 only) <b>PASSIGN P0:,4510</b>
	protocol-identifier <b>pport</b> <b>4510</b> <b>4662</b> <b>4662/mp</b> <b>4663</b>	PPORT	Error PA21		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COMMUNICATIONS: PORT 0 and PORT 1 (continued)</b>					
PBAUD	port-identifier <b>P0:</b> <b>P1:</b>		Error PR11	Yes	Specifies the baud rate for PORT 0 or PORT 1 (4207 only) <b>PBAUD P0:;2400</b>
	baud-rate	2400	Error PR21		
PBITS	port-identifier <b>P0:</b> <b>P1:</b>		Error PB11	Yes	Sets the number of stop bits and the number of data bits in characters sent to the specified port (4207 only) <b>PBITS P0:;2,7</b>
	number-of-stop-bits	1	Error PB21		
	number-of-data-bits	8	Error PB31		
PCOPY	source-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error PC11	No	Establishes two-way communications between the host and a 2PPI port or between two 2PPI ports (4207 only) <b>PCOPY P0:;TO,P1:</b>
	separator <b>to</b>		to		
	destination-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error PC31		
PEOF	port-identifier <b>P0:</b> <b>P1:</b>		Error PE11	Yes	Sets the end-of-file string for PORT 0 or PORT 1 (4207 only) <b>PEOF P0:;"/φ"</b>
	EOF-string				
PFLAG	port-identifier <b>P0:</b> <b>P1:</b>		Error PF11	Yes	Sets the flagging mode for PORT 0 or PORT 1 (4207 only) <b>PFLAG P0:;CHAR, <span style="border: 1px solid black; padding: 0 2px;">Ctrl-Q</span>, <span style="border: 1px solid black; padding: 0 2px;">Ctrl-S</span></b>

	flagging-mode <b>none</b> <b>char</b> <b>dtr/cts</b>	none	char		
	go-character		D <sub>1</sub> (ADE 17)		
	stop-character		D <sub>3</sub> (ADE 19)		
PPARITY	port-identifier <b>P0:</b> <b>P1:</b>		Error PP11	Yes	Specifies the parity scheme for output to PORT 0 or PORT 1 (4207 only) <b>PPARITY P1:,ODD</b>
	parity-mode <b>low</b> <b>odd</b> <b>even</b> <b>high</b> <b>none</b>	none	low		

**COPIES: Making Copies**

AUTOPRINT	copy-option <b>no</b> <b>yes</b> <b>toggle</b>	no	yes	No	Sends dialog to the printer at the same time it is written to the screen
COPY	source <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error JC11	No	Sends data (1) from the host port to the COPIER port or one of the 2PPI ports, or (2) from a 2PPI port to the host port, COPIER port, or the other 2PPI port <b>COPY HO:,TO,HC:</b>
	separator <b>to</b>		to		
	destination <b>HC:</b> <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error JC31		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COPIES: Making Copies (continued)</b>					
HCBACKGROUND	image-complexity <b>simple</b> <b>average</b> <b>complex</b> <b>none</b>	none	average	Yes	Allocates memory for background copies based on image complexity and number of images <b>HCBACKGROUND COMPLEX,2</b>
	number-of-images		1		
HCCOPIES	number-of-copies	1	1	No	Specifies the number of copies queued for each copy request
HCSTATISTICS				No	Displays (1) how much terminal memory was used for the most recent background copy, and (2) the number of background copies currently spooled in memory
PLOT	separator <b>to</b>		to	No	Sends all visible segments from the current view to the host port or to one of the 2PPI ports <b>PLOT TO,P0:</b>
	port <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error PL21		
SAVE	object-saved <b>seg</b> <b>env</b>		Error JV11	No	Either (1) sends a segment definition to the host port or to one of the 2PPI ports, or (2) saves the terminal environment to the host port or to the terminal's memory (used with the LOAD command) <b>SAVE SEG,1,TO,HO:</b>
	object-number		Error JV21		
	separator <b>to</b>		to		
	destination-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error JV41		

**COPIES: Setting Attributes for PORT 0 and PORT 1 (4207 Only)**

PCOPIES	port-identifier <b>P0:</b> <b>P1:</b>		Error PN11	Yes	Selects the number of copies produced on the 4510 Rasterizer (4207 only) <b>PCOPIES P1:,5</b>
	number-of-copies	1	0		
PINVERSION	port-identifier <b>P0:</b> <b>P1:</b>		Error PJ11	Yes	Instructs the rasterizer to reverse the black and white colors in a copy image (4207 only) <b>PINVERSION P0:,NEGATIVE</b>
	image-polarity <b>negative</b> <b>positive</b>	negative	negative		
PMAP	port-identifier <b>P0:</b> <b>P1:</b>		Error PI11	No	Assigns a color index to a plotter pen (4207 only) <b>PMAP P0:,5,2</b>
	index	-1 (all indices)	0		
	pen-ID-number	1	0		
PORIENT	port-identifier <b>P0:</b> <b>P1:</b>		Error PO11	Yes	Specifies whether the long axis of an image aligns with the long or short axis of a hard copy on the 4510 Rasterizer (4207 only) <b>PORIENT P0:,VCENTER</b>
	orientation <b>horizontal</b> <b>vbottom</b> <b>vcenter</b> <b>vtop</b>	horizontal	horizontal		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COPIES: Setting Color Copy Attributes for the COPIER Port</b>					
HCDAATTRIBUTES	number-of-pages	1	Unchanged	Yes	Specifies the number of pages to be copied, the starting page, and how Form Feed is interpreted <b>HCDAATTRIBUTES 2,1,1</b>
	page-origin	0	0		
	Ff-interpretation	0	0		
HCDATARES	number-of-bytes	2	Error QB11	Yes	Selects the color resolution of data sent from the terminal to a 4691 and 4692 Color Copier <b>HCDATARES 2</b>
HCDENSITY	density-code <b>low</b> <b>high</b>	high	high	Yes	Selects either low-density or high-density copies
HCFEATURES	features-array: 1 background-copy 2 top-margin 3 bottom-margin 4 text-length 5 paper-advance	0 3 3 60 0	Error QX11	Yes	Selects background copying and controls margins and pagination of copies made on continuous-feed copiers and the LaserJet <b>HCFEATURES 2,8,3,8,4,50</b>
HCINTERFACE	copier-type	2	0	Yes	Identifies the type of copier connected to the terminal <b>HCINTERFACE 2</b>
HCORIENT	orientation <b>horizontal</b> <b>vbottom</b> <b>vcenter</b> <b>vtop</b>	horizontal	horizontal	Yes	Specifies whether the long axis of an image aligns with the long or short axis of a hard copy on a 4691 or 4692 Copier
HCREPAINT	repaint-count	1	1	Yes	Sets the number of times the 4692 Color Copier will repaint an image <b>HCREPAINT 4</b>
HCSIZE	size	0	0	Yes	Selects a standard-size or small-size copy image <b>HCSIZE 1</b>

**COPIES: Setting Monochrome Copy Attributes for the COPIER Port**

HCDAATTRIBUTES	number-of-pages	1	Unchanged	Yes	Specifies the number of pages to be copied, the starting page, and how Form Feed is interpreted <b>HCDAATTRIBUTES 2,1,1</b>
	page-origin	0	0		
	Ff-interpretation	0	0		
HCFEATURES	features-array:		Error QX11	Yes	Selects background copying and controls margins and pagination of copies made on continuous-feed copiers and the LaserJet <b>HCFEATURES 2,8,3,8,4,50</b>
	1 background-copy	0			
	2 top-margin	3			
	3 bottom-margin	3			
	4 text-length	60			
5 paper-advance	0				
HCMAP	monochrome-values	All indices print except Index 0	Error QI11	No	Specifies which graphics color indices print and which do not print on monochrome printers <b>HCMAP 2,0,3,0,4,0</b>
HCMONOCHROME	monochrome-attributes	0	1	Yes	Specifies the line termination (C <sub>R</sub> or C <sub>R</sub> L <sub>F</sub> ) that the terminal sends to a monochrome printer

**CURVES**

CURVE	curve-type <b>arc</b> <b>chord</b> <b>pie</b>		Error UC11	No	Draws a curve through a list of points, starting at the current graphics position <b>CURVE ARC,500,1500,2000,3000</b>
	list-of-points		Error UC21		
CSMOOTH	smoothness <sup>c</sup>	0.0909 . . . (5° per vector)	0.0	No	Determines the smoothness of curves drawn with the CURVE command <b>CSMOOTH 1,0</b>

**DIALOG AREA: Controlling Attributes**

ACURSOR	first-index	1	0	Yes	Assigns color indices to the alpha cursor <b>ACURSOR 3,6</b>
	second-index	0	0		
AUTOWRAP	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Specifies whether newly entered characters in the rightmost column overwrite existing characters or wrap around to next line

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.<sup>c</sup> This parameter must be encoded as a *real* parameter — see the *4200 Series Reference Guide*.

(continued)

Table 4-1 (cont)  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )																		
		Factory	If Omitted																				
<b>DIALOG AREA: Controlling Attributes (continued)</b>																							
CLEARIALOG				No	Erases the dialog buffer																		
COLUMNMODE	mode <b>80</b> <b>132</b>	80	80	Yes	Specifies a dialog area buffer width of 80 or 132 columns																		
CURSORTYPE	cursor-mode <b>underline</b> <b>block</b>	underline	Unchanged	Yes	Selects a block or an underscore as the alpha cursor																		
DABUFFER	number-of-lines	32 (coax) <sup>c</sup> 49 (RS-232) <sup>f</sup>	Error LB11	Yes	Specifies the number of lines available for storing text in the dialog area buffer <b>DABUFFER 30</b>																		
DACMAP	color-mixture	<table border="0"> <tr><td><u>Index</u></td><td><u>Color</u></td></tr> <tr><td>0</td><td>Black</td></tr> <tr><td>1</td><td>White</td></tr> <tr><td>2</td><td>Red</td></tr> <tr><td>3</td><td>Green</td></tr> <tr><td>4</td><td>Blue</td></tr> <tr><td>5</td><td>Cyan</td></tr> <tr><td>6</td><td>Magenta</td></tr> <tr><td>7</td><td>Yellow</td></tr> </table>	<u>Index</u>	<u>Color</u>	0	Black	1	White	2	Red	3	Green	4	Blue	5	Cyan	6	Magenta	7	Yellow	Error	Yes	Specifies the colors assigned to color indices in the dialog area <b>DACMAP 3,0,100,0</b>
<u>Index</u>	<u>Color</u>																						
0	Black																						
1	White																						
2	Red																						
3	Green																						
4	Blue																						
5	Cyan																						
6	Magenta																						
7	Yellow																						
DAENABLE	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Enables or disables the dialog area																		
DAINDEX	character-index	1	0	Yes	Specifies the color index for alphanumerical characters, character-cell background, and dialog area background <b>DAINDEX 3,4,5</b>																		
	character-background-index	0	0																				
	dialog-background-index	0	0																				
DALINES	number-of-lines	32 (RS-232 and coax) <sup>g</sup>	Error LL11	Yes	Specifies the number of lines visible in the dialog area <b>DALINES 15</b>																		
DAMODE	writing-mode <b>replace</b> <b>overstrike</b>	replace	replace	Yes	Specifies whether the Space and Underscore characters can be used to add and delete underscoring in existing text or are to be treated as ordinary characters																		



DAVISIBILITY	visibility-mode <b>no</b> <b>yes</b>	yes	yes	Yes	Specifies whether the dialog area is visible
HCDAATTRIBUTES	number-of-pages	1	Unchanged	Yes	Specifies the number of pages to be copied, the starting page, and how Form Feed is interpreted <b>HCDAATTRIBUTES 2,1,1</b>
	page-origin	0	0		
	Ff-interpretation	0	0		
<b>DIALOG AREA: Controlling Text</b>					
CRLF	crlf-mode <b>no</b> <b>yes</b>	no	yes	Yes	Specifies whether a <b>C</b> R character sent to the terminal also implies a <b>L</b> F
DLCHARSET	mode <b>no</b> <b>yes</b>	no	yes	No	Enables or disables the display of downloadable character sets and the Multilingual character set
DLSELECTCHARSET	set-selector <b>g0</b> <b>g1</b>	g0		No	Designates a predefined or downloadable character set as the G0 or G1 character set (also used as string-precision graphtext) <b>DLSELECTCHARSET G0,3,94</b>
	character-set <b>A</b> United Kingdom <b>B</b> North American (ASCII) <b>G</b> Swedish <b>K</b> German <b>f</b> French <b>1</b> Danish/Norwegian <b>0</b> Rulings <b>3</b> Supplementary <b>A</b> Multilingual (ASCII)	Depends on keyboard			
	set-size <b>94</b> <b>96</b>	94	94		
ECHO	echo-mode <b>no</b> <b>yes</b>	no	yes	Yes	Specifies whether the terminal echoes characters it transmits to the host

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

<sup>c</sup> On the 4205, the factory default dialog buffer size is 28 lines in coax and 49 lines in RS-232.

<sup>d</sup> On the 4205, the factory default dialog area size is 28 lines in coax and 30 lines in RS-232.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>DIALOG AREA: Controlling Text (continued)</b>					
EDITCHARS	character-delete	Pr (ADE 127)	Unchanged	Yes	Specifies the special text-editing characters used while in Setup <b>EDITCHARS</b> <input type="text" value="Back Space"/> ,?,#
	line-delete	CN (ADE 24)	Unchanged		
	literal	~ (ADE 126)	Unchanged		
EDITMARGIN	top-margin	1	1	No	Sets the dialog area's edit margins <b>EDITMARGIN</b> 5,25
	bottom-margin	32	Same as DALINES		
INSERTREPLACE	mode <b>replace</b> <b>insert</b>	replace	replace	No	Specifies whether newly entered characters overwrite or replace existing characters
LFCR	lfcrc-mode <b>no</b> <b>yes</b>	no	yes	Yes	Specifies whether an LF character sent to the terminal also implies a CR
ORIGINMODE	mode <b>absolute</b> <b>relative</b>	relative	relative	Yes	When edit margins are set, specifies whether cursor origin is first line of buffer or first line of scrolling region
SNOOPY	snoopy-mode <b>no</b> <b>yes</b> <b>on</b>	no	yes	No	Specifies whether the terminal displays ANSI control characters or treats them as commands
TABS	tab-positions	Every eighth column (1,9,17...)	0	Yes	Sets tab stops at the specified positions (for use with the Tab key) <b>TABS</b> 5,10,15
TEXTRENDITION	graphic-rendition	0	0	No	Selects character color, background color, erase color, blink, bold, underscore, etc.

**GRAPHICS INPUT (GIN): Enabling and Disabling**

CANCEL				No	Stops terminal activity and resets several terminal parameters and modes to their default values
GINDISABLE	device-function-code		0	No	Disables graphics input (GIN) <b>GINDISABLE 0</b>
GINENABLE	enable-code		0	No	Enables the terminal for graphics input (GIN) <b>GINENABLE 0,5</b>
	number-of-GIN-reports	0 (same as 65536)	65536		
MOUSEMAP	mode <b>no</b> <b>yes</b>	no	yes	No	Allows the mouse and the keyboard to be used as a GIN device in older applications

**GRAPHICS INPUT (GIN): Setting Display Characteristics**

GCURSOR	first-color-coordinate	0	0	Yes	Specifies the color mixture for the GIN crosshair cursor <b>GCURSOR 150,50,90</b>
	second-color-coordinate	100	0		
	third-color-coordinate	0	0		
GINAREA	device-function-code	All devices	0	No	Defines GIN area on the graphics tablet and maps the GIN area into terminal space <b>GINAREA 8,50,50,200,200</b>
	window-specifier	-1	0		
	GIN-lower-left-corner	0,0	0,0		
	GIN-upper-right-corner	4095,4095	4095,4095		
GINCURSOR	device-function-code	0	Error IC20	No	Selects a segment for use as the GIN cursor <b>GINCURSOR 0,15</b>
	segment-number	0	Error IC20		
GINGRIDDING	device-function-code		0	No	Restricts the set of possible GIN positions for Locate or Pick functions <b>GINGRIDDING 0,25,25</b>
	x-grid-spacing	0	0		
	y-grid-spacing	0	0		
GININKING	device-function-code		0	No	Turns inking on or off for subsequent Locate or Stroke operations <b>GININKING 0,2</b>
	inking-mode	0	0		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>GRAPHICS INPUT (GIN): Setting Display Characteristics (continued)</b>					
GINPICKAPERTURE	aperture-width	8	0	No	Sets the size of a square aperture in terminal space used to Pick graphics segments <b>GINPICKAPERTURE 8</b>
GINRATES	rate-array:			No	Specifies the scaling factors the terminal uses to translate movement of relative GIN devices to GIN cursor movement <b>GINRATES 8,0,16,32,48,64,80,96,112,128</b>
	• device-code		Error IU10		
	• subdevice-code		Error IU10		
	• GIN-rates	Scale factor of 4	Scale factor of 4		
GINRUBBERBAND	device-function-code		0	No	Turns rubberbanding on or off for subsequent GIN Stroke operations <b>GINRUBBERBAND 0,1</b>
	rubberband-mode	0	0		
GINSTARTPOINT	device-function-code		0	No	Specifies an initial point for GIN inking or rubberbanding <b>GINSTARTPOINT 0,53,1000</b>
	start-point		0,0		
GINWINDOW	lower-left-corner	0,0	0,0	No	Creates a window in terminal space for use by the SET GIN AREA command <b>GINWINDOW 359,479</b>
	upper-right-corner	4095,4095	4095,4095		
GSPEED	normal-speed	4	1	Yes	Determines how fast the GIN cursor moves across the screen when the user presses the Joydisk <b>GSPEED 4,156</b>
	composite-speed	8	1		

**GRAPHICS INPUT (GIN): Controlling Reports**

BYPASSCANCEL	bypass-cancel-character	L <sub>F</sub> (ADE 10)	N <sub>U</sub> (ADE 0)	Yes	Specifies the character that causes the terminal to terminate Bypass mode <b>BYPASSCANCEL 10</b>
EOFSTRING	EOF-string			Yes	Specifies the terminal's end-of-file string <b>EOFSTRING /XYZ/</b>
EOLSTRING	EOL-string	C <sub>R</sub> (ADE 13)		Yes	Specifies the terminal's end-of-line string <b>EOLSTRING /~C<sub>R</sub>/</b>

EOMCHARS	first-EOM-indicator	C <sub>R</sub> (ADE 13)	N <sub>U</sub> (ADE 0)	Yes	Specifies two characters that the terminal can use to mark the end of a line of data sent to the host <b>EOMCHARS 13,10</b>
	second-EOM-indicator	L <sub>F</sub> (ADE 10)	N <sub>U</sub> (ADE 0)		
ERRORLEVEL	error-threshold-level	2	0	No	Specifies the levels of error messages the terminal displays
GINFILTERING	device-function-code		Error IF10	No	Restricts the number of GIN Stroke Reports sent to the host <b>GINFILTERING 10,24,2</b>
	distance-filter	0	0		
	time-filter	0	0		
GINREPORT	report-format	0	0	No	Specifies the amount of information returned to the host in each GIN report <b>GINREPORT 4</b>
GINHEADERCHARS	key-characters <b>letters</b> <b>control</b>	letters	letters	Yes	Selects the key characters used in GIN Stroke Reports (4207 only)
REOM	EOM-frequency	1	1	Yes	Specifies how often the terminal sends an EOL string to the host <b>REOM 0</b>
RLINELENGTH	maximum-line-length	0 (no maximum)	0 (no maximum)	No	Specifies the maximum number of characters per line the terminal sends to the host <b>RLINELENGTH 100</b>
RSIGCHARS	report-type-code		0	No	Assigns signature characters used in reports <b>RSIGCHARS 8,X,Y</b>
	signature-character	0	0		
	terminating-signature-character	0	0		

**GRAPHICS PRIMITIVES: Alphatext**

BACKINDEX	text-background-index	-1	0	No	Specifies color indices for the character backgrounds of string precision graphtext and alpha text in the graphics area; also specifies the index for the gaps in dashed lines <b>BACKINDEX 0,-1</b>
	dash-gap-index	-1	0		
DAENABLE	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Enables or disables the dialog area

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>GRAPHICS PRIMITIVES: Alphatext (continued)</b>					
DLCHARSET	mode no yes	no	yes	No	Enables or disables the display of downloadable character sets and the Multilingual character set
DLSELECTCHARSET	set-selector g0 g1	g0		No	Designates a predefined or downloadable character set as the G0 or G1 character set (also used as string-precision graphtext) <b>DLSELECTCHARSET G0,3,94</b>
	character-set A United Kingdom B North American (ASCII) G Swedish K German f French \ Danish/Norwegian 0 Rulings 3 Supplementary A Multilingual (ASCII)	Depends on keyboard			
	set-size 94 96	94	94		
GAMODE	writing-mode replace overstrike	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces characters in the graphics area
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphetext in the graphics area <b>GTINDEX 2</b>

**GRAPHICS PRIMITIVES: Curves**

CURVE	curve-type <b>arc</b> <b>chord</b> <b>pie</b>		Error UC11	No	Draws a curve through a list of points, starting at the current graphics position <b>CURVE ARC,500,1500,2000,3000</b>
	list-of-points		Error UC21		
CSMOOTH	smoothness <sup>c</sup>	0.0909 . . . (5° per vector)	0.0	No	Determines the smoothness of curves drawn with the CURVE command <b>CSMOOTH 1,0</b>

**GRAPHICS PRIMITIVES: Graphtext**

GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces a character in the graphics area
GTBEGIN	font-number		0	No	Starts the definition of a graphtext character <b>GTBEGIN 4,65</b>
	character-number		Error ST21		
GTDELETE	font-number		0	No	Deletes a user-defined character from a graphtext font <b>GTDELETE 4,65</b>
	character-number		Error SZ21		
GTEND				No	Concludes a graphtext character definition
GTEXT	text			No	Writes a string of graphtext starting at the current graphics position <b>GTEXT /UNICORN/</b>
GTFONT	font-number <b>0</b> North American (ASCII) <b>1</b> Swedish <b>2</b> German <b>3</b> United Kingdom <b>9</b> Danish/Norwegian <b>12</b> French	Depends on keyboard	0	No	Selects a character font displaying stroke-precision graphtext <b>GTFONT 12</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.<sup>c</sup> This parameter must be encoded as a *real* parameter — see the *4200 Series Reference Guide*.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>GRAPHICS PRIMITIVES: Graphtext (continued)</b>					
GTGRID	font-number		0	No	Creates a graphtext font and specifies the dimensions of the invisible grid used for defining characters in the font <b>GTGRID 4,30,40</b>
	grid-width		Error SG21		
	grid-height		Error SG31		
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphanetext in the graphics area <b>GTINDEX 2</b>
GTPATH	direction <b>right</b> <b>left</b> <b>up</b> <b>down</b>	right	right	No	Selects a direction (right, left, up, down) to move after writing a graphtext character
GTPRECISION	precision <b>string</b> <b>stroke</b>	stroke	stroke	No	Selects string-precision or stroke-precision to draw graphtext characters
GTROTATION	angle <sup>c</sup>	0.0	0.0	No	Specifies the rotation angle (in degrees) for all subsequent graphtext strings <b>GTROTATION -77,-1</b>
GTSIZE	width	39	39	No	Sets the size of subsequent graphtext strings <b>GTSIZE 30,40,10</b>
	height	59	59		
	spacing	12	12		
GTSLANT	slant-angle <sup>c</sup>	0.0	0.0	No	Specifies how much each stroke-precision graphtext character slants from the vertical <b>GTSLANT 10,0</b>



**GRAPHICS PRIMITIVES: Lines**

DRAW	position		0,0	No	Draws a vector from the current graphics position to a new position <b>DRAW 52,1000</b>
LINEINDEX	line-index	1	0	No	Specifies the color index for all subsequent lines, panel boundaries, and markers <b>LINEINDEX 4</b>
LINestyle	line-style	0	0	No	Specifies the line style for subsequent lines and panel boundaries <b>LINestyle 1</b>
MOVE	position		0,0	No	Moves the graphics position without drawing a vector <b>MOVE 52,1000</b>

**GRAPHICS PRIMITIVES: Markers**

GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces a character in the graphics area
MARKER	position		0,0	No	Draws a marker at a specified location <b>MARKER 52,1000</b>
MARKERTYPE	marker-number	0	0	No	Specifies a marker type <b>MARKERTYPE 10</b>

**GRAPHICS PRIMITIVES: Panels**

BEGINPANEL	first-point		0,0	No	Starts a panel boundary definition <b>BEGINPANEL 52,1000,1</b>
	draw-boundary		0		
ENDPANEL				No	Ends a panel definition
FILLPATTERN	fill-pattern-number	-1	0	No	Specifies the fill pattern for panel definitions <b>FILLPATTERN 16</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

<sup>c</sup> This parameter must be encoded as a real parameter — see the 4200 Series Reference Guide.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>GRAPHTEXT</b>					
DLCHARSET	mode <b>no</b> <b>yes</b>	no	yes	No	Enables or disables the display of downloadable character sets and the Multilingual character set
DLSELECTCHARSET	set-selector <b>g0</b> <b>g1</b>	g0		No	Designates a predefined or downloadable character set as the G0 or G1 character set (also used as string-precision graphtext) <b>DLSELECTCHARSET G0,3,94</b>
	character-set <b>A</b> United Kingdom <b>B</b> North American (ASCII) <b>G</b> Swedish <b>K</b> German <b>f</b> French <b>\</b> Danish/Norwegian <b>0</b> Rulings <b>3</b> Supplementary <b>A</b> Multilingual (ASCII)	Depends on keyboard			
	set-size <b>94</b> <b>96</b>	94	94		
GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces a character in the graphics area
GTBEGIN	font-number		0	No	Starts the definition of a graphtext character <b>GTBEGIN 4,65</b>
	character-number		Error ST21		
GTDELETE	font-number		0	No	Deletes a user-defined character from a graphtext font <b>GTDELETE 4,65</b>
	character-number		Error SZ11		
GTEND				No	Concludes a graphtext character definition

GTGRID	font-number		0	No	Creates a graphtext font and specifies the dimensions of the invisible grid used for defining characters in the font <b>GTGRID 4,30,40</b>
	grid-width		Error SG21		
	grid-height		Error SG31		
GTEXT	text			No	Writes a string of graphtext starting at the current graphics position <b>GTEXT /UNICORN/</b>
GTFONT	font-number <b>0</b> North American (ASCII) <b>1</b> Swedish <b>2</b> German <b>3</b> United Kingdom <b>9</b> Danish/Norwegian <b>12</b> French	Depends on keyboard	0	No	Selects a character font displaying stroke-precision graphtext <b>GTFONT 12</b>
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphanet in the graphics area <b>GTINDEX 2</b>
GTPATH	direction <b>right</b> <b>left</b> <b>up</b> <b>down</b>	right	right	No	Selects a direction (right,left,up, down) to move after writing a graphtext character
GTPRECISION	precision <b>string</b> <b>stroke</b>	stroke	stroke	No	Selects string-precision or stroke-precision to draw graphtext characters
GTROTATION	angle <sup>c</sup>	0.0	0.0	No	Specifies the rotation angle (in degrees) for all subsequent graphtext strings <b>GTROTATION -77,-1</b>
GTSIZE	width	39	39	No	Sets the size of subsequent graphtext strings <b>GTSIZE 30,40,10</b>
	height	59	59		
	spacing	12	12		
GTSLANT	slant-angle <sup>c</sup>	0.0	0.0	No	Specifies how much each stroke-precision graphtext character slants from the vertical <b>GTSLANT 10,0</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

<sup>c</sup> This parameter must be encoded as a *real* parameter — see the *4200 Series Reference Guide*.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>HELP</b>					
HELP	name ANSI communications dialog general graphics hardcopy keyboard pixels report/input segments surfaces views 2PPI		All commands	No	Displays the host escape sequence, Setup name, and command or cluster of commands (cluster names are listed as keywords under the <i>Parameters</i> column), and parameter types for each command
STATUS	name ANSI communications dialog general graphics hardcopy keyboard level memoryblocks pixels pmemoryblocks report/input segments surfaces terminal version views 2PPI		All commands	No	Displays the current parameter values for a (cluster names and special inquiry codes are listed as keywords under the <i>Parameters</i> column)

## KEYBOARD

BELLTYPE	type <b>continuous</b> <b>discrete</b>	continuous	continuous	Yes	Controls whether the terminal bell rings continuously or emits separate tones in response to a series of <b>B</b> L (Bell) characters sent from the host
BELLVOLUME	volume <b>off</b> <b>low</b> <b>medium</b> <b>high</b>	medium	medium	Yes	Turns the terminal bell on and off and controls the bell volume
CLICK	click-mode <b>no</b> <b>yes</b>	no	no	Yes	Turns the keyboard key click on or off
CURSORKYMODE	mode <b>no</b> <b>yes</b>	no	yes	No	Specifies whether Function Keys F1 — F4 transmit cursor movement commands or programmed values
KEYEXPAND	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Enables or disables key macros
KEYPADMODE	keypad-mode <b>application</b> <b>numeric</b>	numeric	numeric	No	Specifies whether the numeric keypad sends numeric values or application codes
LOCAL	local-mode <b>no</b> <b>yes</b>	no	yes	No	Specifies whether the terminal responds to commands from the host or to commands from its own keyboard
LOCKVIEWINGKEYS	locking-mode <b>no</b> <b>yes</b>	no	no	No	Locks or unlocks the viewing keys used for Zoom and Pan modes
TABS	tab-positions	Every eighth column (1,9,17 . . .)	0	Yes	Sets tab stops at the specified positions (for use with the Tab key) <b>TABS 5,10,15</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>LINES</b>					
DRAW	position		0,0	No	Draws a vector from the current graphics position to a new position <b>DRAW 52,1000</b>
LINEINDEX	line-index	1	0	No	Specifies the color index for all subsequent lines, panel boundaries, and markers <b>LINEINDEX 4</b>
LINestyle	line-style	0	0	No	Specifies the line style for subsequent lines and panel boundaries <b>LINestyle 1</b>
MOVE	position		0,0	No	Moves the graphics position without drawing a vector <b>MOVE 52,1000</b>
<b>MACROS</b>					
DEFINE	macro-number		0	No	Creates or deletes a macro <b>DEFINE F1,/XYZ/</b>
	string				
EXPAND	macro-number		0	No	Expands a macro <b>EXPAND 128</b>
KEYEXCHAR	key-execute-character	P <sub>L</sub> (ADE 16)	M <sub>U</sub> (ADE 0)	Yes	Specifies the character used in macro definitions to switch between sending characters to the host and processing them at the terminal <b>KEYEXCHAR 24</b>
KEYEXPAND	mode no yes	yes	yes	Yes	Enables or disables key macros
LEARN				No	Programs a key from the keyboard
MACROSTATUS	macro-number		0	No	Displays a macro definition

NVDEFINE	macro-number		0	Yes	Creates or deletes both the volatile and nonvolatile version of a macro <b>NVDEFINE F1, /XYZ/</b>
	macro-contents				
	string				
NVLEARN				Yes	Programs a key from the keyboard so that the definition can be stored
NVSAVE				Yes	Saves the parameter values of those commands whose settings can be saved in nonvolatile memory; also saves all nonvolatile macros

**MARKERS**

GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces a character in the graphics area
MARKER	position		0,0	No	Draws a marker at a specified location <b>MARKER 52,1000</b>
MARKERTYPE	marker-number	0	0	No	Specifies a marker type <b>MARKERTYPE 10</b>

**MODES**

CODE	syntax <b>TEK</b> <b>ANSI</b> <b>EDIT</b> <b>VT52</b>	TEK	TEK	Yes	Causes the terminal to recognize ANSI, EDIT, TEK, or VT52 mode command syntax
------	---	-----	-----	-----	---

**PANELS**

BEGINPANEL	first-point		0,0	No	Starts a panel boundary definition <b>BEGINPANEL 52,1000,1</b>
	draw-boundary		0		
ENDPANEL				No	Concludes a panel definition
FILLPATTERN	fill-pattern-number	-1	0	No	Specifies the fill pattern for panel definitions <b>FILLPATTERN 16</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)  
SETUP COMMAND SUMMARY**

4-34

SETUP COMMAND SUMMARY

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>PIXEL OPERATIONS: Initializing</b>					
PXBEGIN	surface-number	1	0	No	Specifies surface number, ALU mode, and bits per pixel for use by subsequent pixel operations <b>PXBEGIN 1,12,6</b>
	ALU-mode	11	0		
	bits-per-pixel	6	0		
PXPOSITION	beam-position	0,359 (4205) 0,479 (4207)	0,0	No	Sets the position of the pixel beam in the pixel viewport for use by subsequent pixel commands <b>PXPOSITION 0,0</b>
PXVIEWPORT	lower-left	0,0	0,0	No	Sets the pixel viewport position in the graphics area <b>PXVIEWPORT 0,0,200,200</b>
	upper-right	479,359 (4205) 639,479 (4207)	0,0		

**PIXEL OPERATIONS: Writing Pixels**

PXCOPY	destination-surface		0	No	Copies pixels from one region of the graphics area to another <b>PXCOPY 10,10,50,50,80,80</b>
	destination-lower-left-corner		0,0		
	first-source-corner		0,0		
	second-source-corner		0,0		
PXRASTERWRITE	number-of-pixels		Error RP11	No	Specifies a color index for each of a specified number of pixels in the pixel viewport <b>PXRASTERWRITE 4,/2233/</b>
	color-index-codes		0,0		
PXRECTANGLE	lower-left-corner		0,0	No	Sets all the pixels in a rectangle to the same color <b>PXRECTANGLE 10,10,90,90</b>
	upper-right-corner		0,0		
	fill-index		0		
PXRUNLENGTHWRITE	runcode-array			No	Loads color indices into the pixel viewport <b>PXRUNLENGTHWRITE 84</b>

**REPORTS**

BYPASSCANCEL	bypass-cancel-character	⌘ (ADE 10)	Empty string	Yes	Specifies the character that causes the terminal to terminate Bypass mode <b>BYPASSCANCEL 10</b>
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4205/4207/COAX OPERATORS



COORDINATEMODE	coordinate-mode	0	Error UX11	No	Specifies the range of values that the terminal sends to the host in an integer report <b>COORDINATEMODE 0,4</b>
	integer-report-size	3	Error UX21		
EOLSTRING	EOL-string	$C_R$ (ADE 13)	Empty string	Yes	Specifies the terminal's end-of-line string <b>EOLSTRING / ~ <math>C_R</math></b>
EOMCHARS	first-EOM-indicator	$C_R$ (ADE 13)	Empty string	No	Specifies the characters used to terminate messages <b>EOMCHARS 13,10</b>
ERRORLEVEL	error-threshold-level	2	0	No	Specifies the levels of error messages the terminal displays <b>ERRORLEVEL 3</b>
GINFILTERING	device-function-code		Error IF10	No	Restricts the number of GIN Stroke Reports sent to the host <b>GINFILTERING 10,24,2</b>
	distance-filter	0	0		
	time-filler	0			
GINREPORT	report-format	0	0	No	Specifies the amount of information returned to the host in each GIN report <b>GINREPORT 4</b>
GINHEADERCHARS	key-characters <b>letters control</b>	letters	letters	Yes	Selects the key characters used in GIN Stroke Reports
REOM	EOM-frequency	1	1	Yes	Specifies how often the terminal sends an EOL string to the host <b>REOM 0</b>
RLINELENGTH	maximum-line-length	0 (no maximum)	0 (no maximum)	No	Specifies the maximum number of characters per line the terminal sends to the host <b>RLINELENGTH 100</b>
RSIGCHARS	report-type-code		0	No	Assigns signature characters used in reports <b>RSIGCHARS 8,X,Y</b>
	signature-character	0	0		
	terminating-signature-character	0	0		
TERMINAL	model-number	4205 (if 4205) 4207 (if 4207)	4205 (if 4205) 4207 (if 4207)	Yes	Specifies the model number that the terminal returns to the host in response to a REPORT TERMINAL SETTINGS command (provides compatibility with applications written for other Tektronix terminals) <b>TERMINAL 4107</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)  
SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>SCREEN DIMMING</b>					
DIM	dim-code no yes	yes	no	Yes	Turns the automatic screen-dimming feature on or off
<b>SECURITY</b>					
ANSWERBACK	answerback-string			Yes	Assigns the terminal's answerback string <b>ANSWERBACK /PASKEY/</b>
ECHO	echo-mode no yes	no	yes	Yes	Specifies whether the terminal echoes characters it transmits to the host
<b>SEGMENTS: Defining</b>					
SGCALL	segment-number		Error SF11	No	Calls a segment as a subroutine <b>SGCALL 16,500,500,NONE</b>
	position		0,0		
	attributes none modify reset both	none	none		
SGCLOSE				No	Concludes a segment definition
SGDOWN				No	Ends the current segment definition and begins a new segment; the pivot point is set to the current graphics position and the segment number is one lower than the segment just ended
SGINCLUDE	segment-number		Error LK11	No	Copies another segment into the segment currently being defined <b>SGINCLUDE 16</b>
SGNEW	segment-number		Error SE11	No	Starts a new segment definition, closing the current segment definition if one is open; the pivot point is set to the current graphics position <b>SGNEW 16</b>

SGOPEN	segment-number		Error SO11	No	Starts a new segment definition, setting the pivot point at the location set by the most recent SET PIVOT POINT command <b>SGOPEN 32</b>
SGPICKID	pick-ID-number	1	0	No	Assigns an identification number to subsequent graphics primitives drawn in a currently open segment for GIN Pick operations
SGPIVOT	pivot-point	0,0	0,0	No	Specifies the pivot point used for segments defined with BEGIN SEGMENT commands and for user-defined graph text characters <b>SGPIVOT 2841,412</b>
SGUP				No	Ends the current segment definition and begins a new segment definition; the pivot point is set to the current graphics position and the segment number becomes the next higher sequential number

**SEGMENTS: Saving**

PLOT	separator <b>to</b>		to	No	Sends all visible segments from the current view to the host port or to one of the 2PPI ports <b>PLOT TO,P0:</b>
	port <b>H0:</b> <b>P0:</b> <b>P1:</b>		Error PL21		
SAVE	object-saved <b>seg</b> <b>env</b>		Error JV11	No	Either (1) sends a segment definition to the host port or to one of the 2PPI ports, or (2) saves the terminal environment to the host port or to the terminal's memory (used with the LOAD command) <b>SAVE SEG,1,TO,HO:</b>
	object-number		Error JV21		
	separator <b>to</b>		to		
	destination-device <b>HO:</b> <b>P0:</b> <b>P1:</b>		Error JV41		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>SEGMENTS: Displaying</b>					
FIXUP	fixup-level	6	0	No	Specifies what operations cause the terminal to refresh the display <b>FIXUP 2</b>
RENEW	view-number		0	No	Erases a view and redraws all segments visible in that view <b>RENEW 32</b>
SGMODE	segment-number		0	No	Selects the writing mode used to display a segment <b>SGMODE 16,SET</b>
	writing-mode and or set xor	set	Error SM21		
SGVISIBILITY	segment-number		0	No	Sets the visibility of a segment <b>SGVISIBILITY 16,YES</b>
	visibility no yes	yes	no		
<b>SEGMENTS: Transforming</b>					
SGPOSITION	segment-number		0	No	Moves a segment's pivot point to a specified location in terminal space <b>SGPOSITION 1000,1500</b>
	position	0,0	0,0		
SGSCALEROTATE	segment-number		Error SJ11		Scales or rotates a segment <b>SGSCALE -5,1,0,2,0,1000,1500</b>
	x-scale-factor <sup>c</sup>	1.0	0.0		
	y-scale-factor <sup>c</sup>	1.0	0.0		
	rotation-angle <sup>c</sup>	0.0	0.0		
SGTRANSFORM	segment-number		Error SI11	No	Scales, rotates, and positions a segment <b>SGTRANSFORM 1,2,0,7,-1,45,0,500,500</b>
	x-scale-factor <sup>c</sup>	1.0	0.0		
	y-scale-factor <sup>c</sup>	1.0	0.0		

rotation-angle <sup>c</sup>	0.0	0.0
position		

**SEGMENTS: Setting Attributes**

SGDETECT	segment-number		Error SD11	No	Specifies whether a segment is detectable in a GIN Pick operation <b>SGDETECT 16,YES</b>
	detectability <b>no</b> <b>yes</b>	yes	no		
SGHIGHLIGHT	segment-number		Error SH11	No	Turns highlighting (blinking) on or off for one or more segments <b>SGHIGHLIGHT 16,NO</b>
	highlighting <b>no</b> <b>yes</b>	no	no		
SGPIVOT	pivot-point	0,0	0,0	No	Specifies the pivot point used for segments defined with BEGIN SEGMENT commands and for user-defined graphtext characters <b>SGPIVOT 2841,412</b>
SGPRIORITY	segment-number		Error SS11	No	Sets a segment's display and GIN pick priority <b>SGPRIORITY 32,4</b>
	priority-number		0		
SGVISIBILITY	segment-number		0	No	Sets the visibility of a segment <b>SGVISIBILITY 16,YES</b>
	visibility <b>no</b> <b>yes</b>	yes	no		

**SEGMENTS: Assigning Classes**

SGCLASS	segment-class		Error SA11	No	Assigns a segment to one or more classes for use in segment class matching operations <b>SGCLASS 2,&lt;13,14&gt;,&lt;3,4,5&gt;</b>
	removal-array				
	addition-array				
SGMATCHINGCLASS	inclusion-set			No	Defines inclusion and exclusion sets used in matching operations <b>SGMATCHINGCLASS &lt;13,14&gt;,&lt;3,4,5&gt;</b>
	exclusion-set				

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.<sup>c</sup> This parameter must be encoded as a *real* parameter — see the 4200 Series Reference Guide.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>SEGMENTS: Editing</b>					
SGEDIT	edit-mode <b>none</b> position attribute <b>both</b>	none	none	No	Specifies how segment editing affects the rest of the segment
SGDELETE	segment-number		Error SK11	No	Deletes a segment from memory <b>SGDELETE 16</b>
SGINSERT	segment-number		Error UI11	No	Opens an existing segment so you can insert new primitives and primitive attributes <b>SGINSERT 16,3,BEFORE</b>
	Pick-ID		Error UI21		
	sequence <b>before</b> end <b>after</b>	before	before		
SGREMOVE	segment-number		Error UD11	No	Deletes Pick groups from segment <b>SGREMOVE 16,3,4</b>
	first-Pick-ID		Error UD21		
	last-Pick-ID		Error UD31		
SGRENAME	old-segment-number		Error SR11	No	Assigns a new segment number to an existing segment <b>SGRENAME 16,39</b>
	new-segment-number		Error SR21		
SGREPLACE	segment-number		Error UE11	No	Deletes Pick groups from an existing segment and leaves the segment open <b>SGREPLACE 3,7,7</b>
	first-Pick-ID		Error UE21		
	last-Pick-ID		Error UE31		

## SURFACES

CBACKGROUND	first-color-coordinate	0	0	No	Sets the color of the background surface <b>CBACKGROUND 120,50,100</b>																															
	second-color-character	0	0																																	
	third-color-character	0	0																																	
CMAP	surface-number		Error TG11	No	Defines the color map for the graphics region <b>CMAP 1,3,0,100,0</b>																															
	color-mixtures	<table border="1"> <thead> <tr> <th>Index</th> <th>Color</th> </tr> </thead> <tbody> <tr><td>0</td><td>Black</td></tr> <tr><td>1</td><td>White</td></tr> <tr><td>2</td><td>Red</td></tr> <tr><td>3</td><td>Green</td></tr> <tr><td>4</td><td>Blue</td></tr> <tr><td>5</td><td>Cyan</td></tr> <tr><td>6</td><td>Magenta</td></tr> <tr><td>7</td><td>Yellow</td></tr> <tr><td>8</td><td>Orange</td></tr> <tr><td>9</td><td>Grr-Ylw</td></tr> <tr><td>10</td><td>Grr-Cyan</td></tr> <tr><td>11</td><td>Blue-Cyan</td></tr> <tr><td>12</td><td>Blu-Mgnta</td></tr> <tr><td>13</td><td>Rd-Mgnta</td></tr> <tr><td>14</td><td>Dk Gray</td></tr> <tr><td>15</td><td>Lt Gray</td></tr> </tbody> </table>	Index			Color	0	Black	1	White	2	Red	3	Green	4	Blue	5	Cyan	6	Magenta	7	Yellow	8	Orange	9	Grr-Ylw	10	Grr-Cyan	11	Blue-Cyan	12	Blu-Mgnta	13	Rd-Mgnta	14	Dk Gray
Index	Color																																			
0	Black																																			
1	White																																			
2	Red																																			
3	Green																																			
4	Blue																																			
5	Cyan																																			
6	Magenta																																			
7	Yellow																																			
8	Orange																																			
9	Grr-Ylw																																			
10	Grr-Cyan																																			
11	Blue-Cyan																																			
12	Blu-Mgnta																																			
13	Rd-Mgnta																																			
14	Dk Gray																																			
15	Lt Gray																																			
SDEFINITIONS	surface-definitions	4	Error RD11	No	Erases the screen and sets the number of surfaces and the number of bit planes in each surface <b>SDEFINITIONS 2,1,1</b>																															
SPRIORITIES	surface-numbers-and-priorities	1,1	Error RN11	No	Sets the priority of one or surfaces <b>SPRIORITIES 1,4,2,3,3,2,4,1</b>																															
SVISIBILITY	surface-numbers-and-visibilitys	1,1	Error RI11	No	Sets the visibility of one or more surfaces without affecting surface priorities <b>SVISIBILITY 1,0,2,1,3,2,4,1</b>																															
VATTRIBUTES	surface-number	1	0	No	Sets the surface, wipe index, and border index for the current view <b>VATTRIBUTES 0,0,2</b>																															
	wipe-index	0	0																																	
	border-index	1	0																																	
VSELECT	view-number	1	0	No	Specifies which view will be the current view <b>VSELECT 48</b>																															

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

(continued)

Table 4-1 (cont)  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>TEXT: Displaying Alphanext</b>					
BACKINDEX	text-background-index	-1	0	No	Specifies color indices for the character backgrounds of string-precision graphtext and alphanext in the graphics area; also specifies the index for the gaps in dashed lines <b>BACKINDEX 0,-1</b>
	dash-gap-index	-1	0		
DAENABLE	mode <b>no</b> <b>yes</b>	yes	yes	Yes	Enables or disables the dialog area
GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces characters in the graphics area
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphanext in the graphics area <b>GTINDEX 2</b>
<b>TEXT: Defining Graphtext Characters</b>					
GTBEGIN	font-number		0	No	Starts the definition of a graphtext character <b>GTBEGIN 4,65</b>
	character-number		Error ST21		
GTDELETE	font-number		0	No	Deletes a user-defined character from a graphtext font <b>GTDELETE 4,65</b>
	character-number		Error SZ11		
GTEND				No	Concludes a graphtext character definition
GTGRID	font-number		0	No	Creates a graphtext font and specifies the dimensions of the invisible grid used for defining characters in the font <b>GTGRID 4,30,40</b>
	grid-width		Error SG21		
	grid-height		Error SG31		



**TEXT: Displaying Graphtext**

BACKINDEX	text-background-index	-1	0	No	Specifies color indices for the character backgrounds of string-precision graphtext and alphanthtext in the graphics area; also specifies the index for the gaps in dashed lines <b>BACKINDEX 0,-1</b>
	dash-gap-index	-1	0		
GAMODE	writing-mode <b>replace</b> <b>overstrike</b>	overstrike	replace	Yes	Specifies whether the terminal overwrites or replaces a character in the graphics area
GTEXT	text			No	Writes a string of graphtext starting at the current graphics position <b>GTEXT /UNICORN/</b>
GTFONT	font-number <b>0</b> North American (ASCII) <b>1</b> Swedish <b>2</b> German <b>3</b> United Kingdom <b>9</b> Danish/Norwegian <b>12</b> French	Depends on keyboard	0	No	Selects a character font displaying stroke-precision graphtext <b>GTFONT 12</b>
GTINDEX	text-index	1	0	No	Specifies the color index for graphtext and alphanthtext in the graphics area <b>GTINDEX 2</b>
GTPATH	direction <b>right</b> <b>left</b> <b>up</b> <b>down</b>	right	right	No	Selects a direction (right,left,up, down) to move after writing a graphtext character
GTPRECISION	precision <b>string</b> <b>stroke</b>	stroke	stroke	No	Selects string-precision or stroke-precision to draw graphtext characters
GTROTATION	angle <sup>c</sup>	0.0	0.0	No	Specifies the rotation angle (in degrees) for all subsequent graphtext strings <b>GTROTATION -77,-1</b>

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.<sup>c</sup> This parameter must be encoded as a *real* parameter — see the *4200 Series Reference Guide*.

(continued)

**Table 4-1 (cont)**  
**SETUP COMMAND SUMMARY**

Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>TEXT: Displaying Graphtext (continued)</b>					
GTSIZE	width	39	39	No	Sets the size of subsequent graphtext strings <b>GTSIZE 30,40,10</b>
	height	59	59		
	spacing	12	12		
GTSLANT	slant-angle <sup>c</sup>	0.0	0.0	No	Specifies how much each stroke-precision graphtext character slants from the vertical <b>GTSLANT 10,0</b>
<b>TEXT: Downloading Character Sets</b>					
DLCHARSET	mode <b>no</b> <b>yes</b>	no	yes	No	Enables or disables the display of downloadable character sets and the Multilingual character set
DLSELECTCHARSET	set-selector <b>g0</b> <b>g1</b>	g0		No	Designates a predefined or downloadable character set as the G0 or G1 character set (also used as string-precision graphtext) <b>DLSELECTCHARSET G0,3,94</b>
	character-set <b>A</b> United Kingdom <b>B</b> North American (ASCII) <b>G</b> Swedish <b>K</b> German <b>f</b> French <b>\</b> Danish/Norwegian <b>0</b> Rulings <b>3</b> Supplementary <b>A</b> Multilingual (ASCII)	Depends on keyboard			
	set-size <b>94</b> <b>96</b>	94	94		

**IEWS: Controlling Multiple Views**

BORDER	border-visibility-mode <b>no</b> <b>yes</b> <b>toggle</b>	no	no	No	Controls the visibility of a the current viewport's border
RENEW	view-number		0	No	Erases a view and redraws all segments visible in that view <b>RENEW 32</b>
VATTRIBUTES	surface-number	1	0	No	Sets the surface, wipe index, and border index for the current view <b>VATTRIBUTES 0,0,2</b>
	wipe-index	0	0		
	border-index	1	0		
VCLUSTER	view-numbers		Remove all views from all clusters	No	Defines a group of views that are to have identical windows <b>VCLUSTER 2,8,16</b>
VDELETE	view-number		0	No	Deletes a view <b>VDELETE 16</b>
VIEWPORT	first-corner	0,0	0,0	No	Sets the size and position of the current view's viewport on the terminal screen <b>VIEWPORT 50,100,200,300</b>
	second-corner	4095,3071	0,0		
VSELECT	view-number	1	0	No	Specifies which view will be the current view <b>VSELECT 48</b>
WINDOW	first-corner	0,0	0,0	Yes	Sets the boundaries of the current view's window in terminal space <b>WINDOW 50,100,2372,2800</b>
	second-corner	4095,3130	4095,3130		

**IEWS: Zoom and Pan**

LOCKVIEWINGKEYS	locking-mode <b>no</b> <b>yes</b>	no	no	No	Locks or unlocks the viewing keys used for Zoom and Pan modes
WINDOW	first-corner	0,0	0,0	Yes	Sets the boundaries of the current view's window in terminal space <b>WINDOW 50,100,2372,2800</b>
	second-corner	4095,3130	4095,3130		

<sup>a</sup> For commands that require keywords, we've listed the keywords in bold type below the parameter name.<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.<sup>c</sup> This parameter must be encoded as a *real* parameter — see the *4200 Series Reference Guide*.

(continued)

Table 4-1 (cont)  
**SETUP COMMAND SUMMARY**

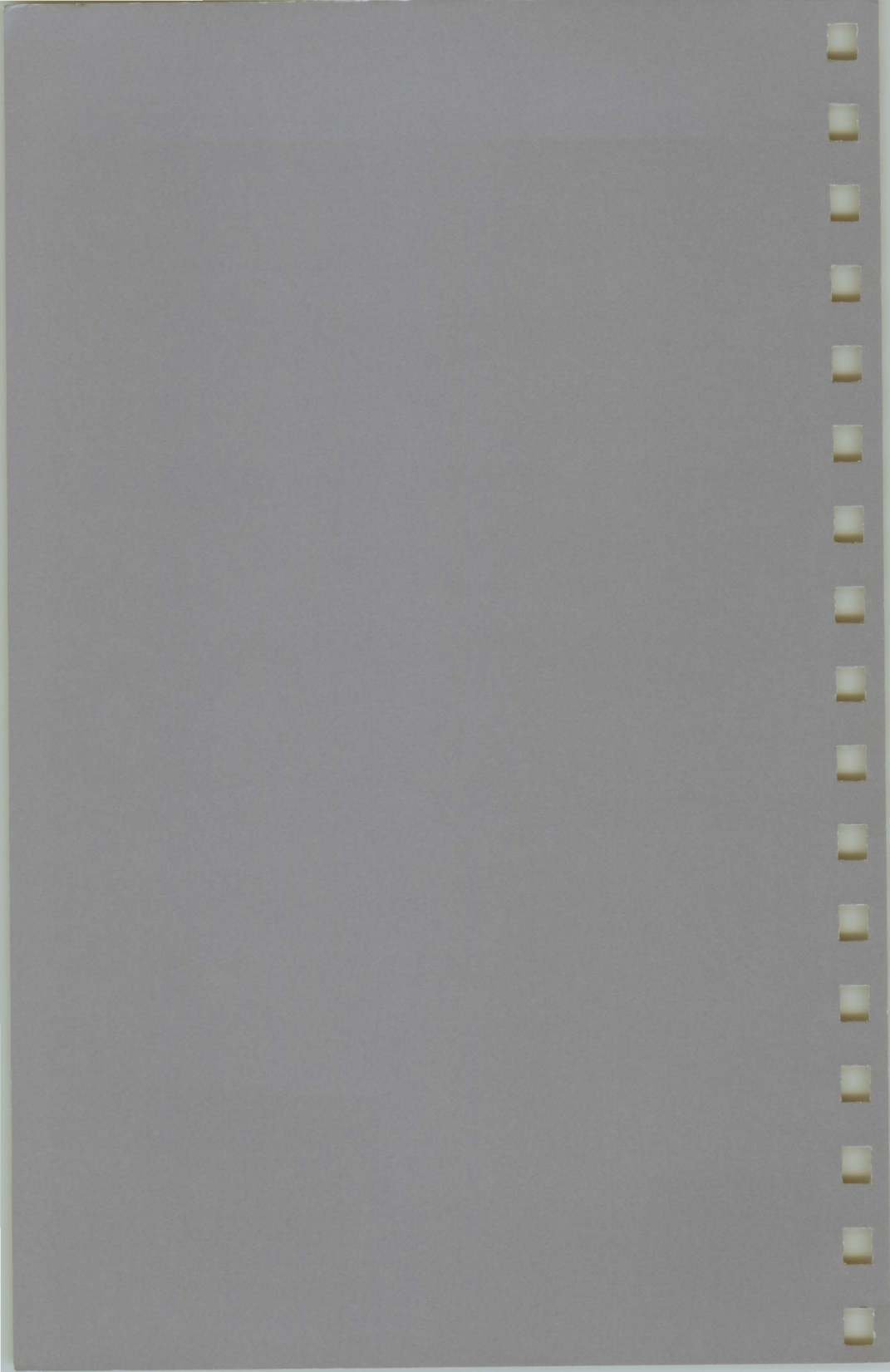
Setup Command (Grouped by Function)	Parameters (Keywords <sup>a</sup> )	Defaults		Saved	Description (Examples <sup>b</sup> )
		Factory	If Omitted		
<b>COAX</b>					
BASECOLOR	color-mode <b>monochrome</b> <b>base</b>	base	no change	Yes	For terminals with the coax option, determines whether the terminal displays information in two or four colors; acts like the Base Color switch of the IBM 3279 terminal
CAPITALS	capitals-mode <b>no</b> <b>yes</b>	no	no	Yes	For terminals with the coax option, selects display of uppercase-only text or both upper case and lower case; acts like Dual Case/Mono switch of IBM 3279 terminal
CXKEYPAD	keypad-mode <b>pf</b> <b>numeric</b> <b>both</b>	pf	pf	Yes	For terminals with the coax option, determines whether the numeric keypad transmits numbers or programmed functions while in HOSTPORT COAX
HOSTPORT	port <b>coax</b> <b>RS-232</b>	coax	RS-232	Yes	For terminals with the coax option, selects the port to be used for host-to-terminal communications
TEKHEADER	header	112	0	Yes	For terminals with the coax option, specifies (by EBCDIC value) the header character that identifies Tek commands in the 3270 data stream
TMETHOD	translation-method	1	1	Yes	For terminals with the coax option, specifies the method used to translate EBCDIC data to ASCII

<sup>a</sup> For commands that require keywords, we've listed the keywords below the parameter.

<sup>b</sup> Examples of command syntax appear in bold type following some descriptions.

---

***APPENDICES***



## Appendix A

# INSTALLATION AND SETUP

This appendix guides you through the installation and set up of your terminal, which includes these steps:

1. Selecting a site.
2. Unpacking the terminal, checking the accessories, and checking the voltage settings.
3. Connecting the keyboard and host computer cables.
4. Running the terminal's Self Test diagnostic program.
5. Setting the terminal's communications parameters.
6. Testing the communications link between the terminal and host computer (including how to select the terminal's operating mode).
7. Connecting the peripherals.

The only tools you need to install the terminal are a box opener or knife and a small, flat-bladed screwdriver.

## SELECTING A SITE

The installation site you select for the terminal should meet the following requirements.

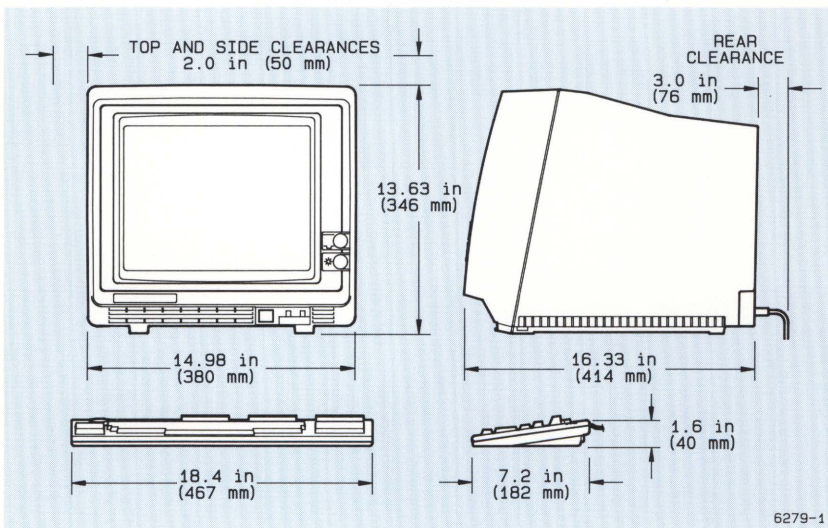
**CAUTION**

*Do not block air flow or cover the terminal's air vents in any way. This could cause overheating and result in circuit damage.*

- **The site should provide enough room for adequate ventilation and cable routing.** The terminal's air vents should be at least 2 in. (50 mm) from the nearest wall or surface. Allow at least 3 in. (75 mm) at the rear of the terminal for cable routing. Use Figure A-1 (later in this appendix) as a guide.
- **The site should provide a stable environment.** While the terminal is operating, the ambient temperature should stay within 50 to 104° F (+10 to +40° C).

Relative humidity should stay between 0 and 75%. Do not operate the terminal at an altitude greater than 15,000 ft (4500 m).

If any of these operating limits are exceeded, the terminal may not operate properly.



**Figure A-1. Terminal Dimensions and Clearances.**



## PREVENTING RADIO AND TELEVISION INTERFERENCE

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply within the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the terminal with respect to the receiver.
- Move the terminal away from the receiver.
- Plug the terminal into a different outlet so that it and the receiver are on different branched circuits.

If necessary, you should consult the dealer or an experienced radio/television technician for additional suggestions. You may find the following booklet prepared by the Federal Communications Commission helpful:

*How to Identify and Resolve Radio-TV Interference Problems*

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

## AFTER UNPACKING THE TERMINAL

After you have followed the unpacking instructions on the shipping carton, continue with the following procedure:

1. Check the equipment you received against the accessories list in Section 1 of this manual. If any items are missing, notify your Tektronix sales representative immediately.
2. Inspect the equipment for any signs of damage. Report any damage to the carrier and contact your Tektronix sales representative immediately. Retain all packing material in case you need to move or ship the terminal in the future. Use Figure A-2 as a guide to help you repack the terminal.
3. Check that you have received the correct power cord (voltage and plug type) for your ac power source. The plug should fit securely into the power outlet.

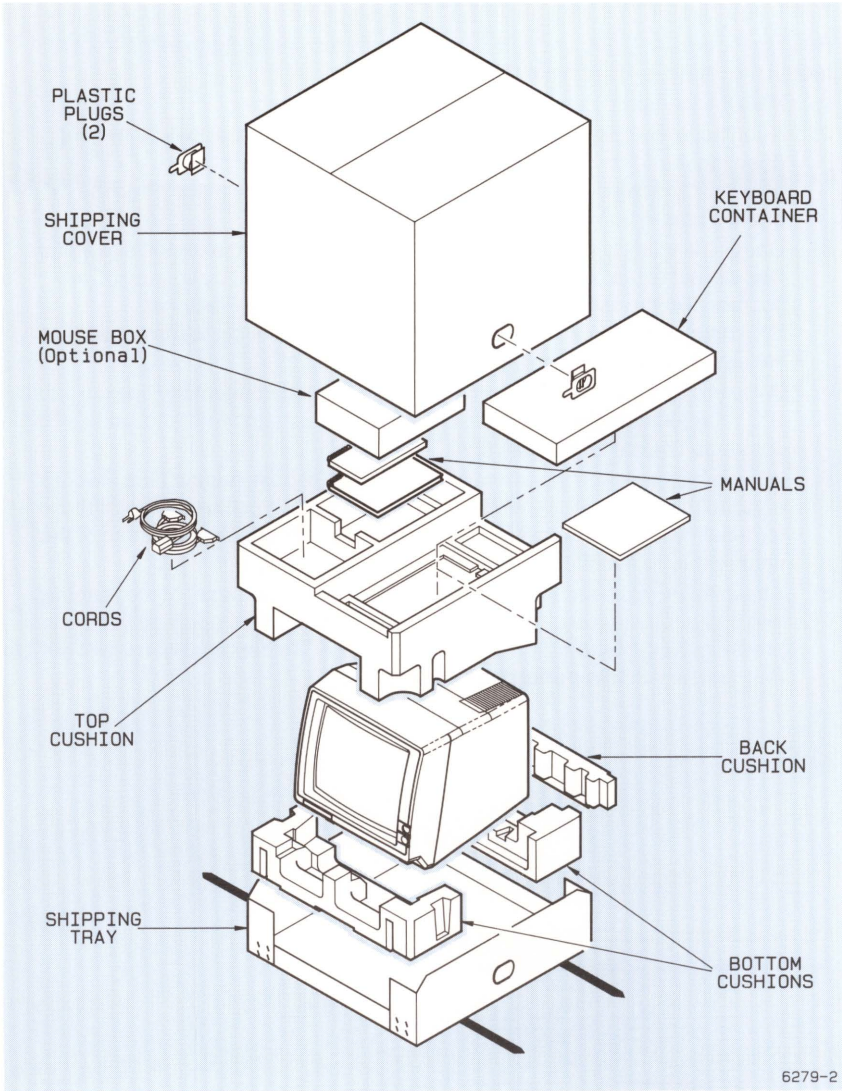


Figure A-2. Repacking Diagram.

## CONNECTING THE CABLES

Refer to Figures A-3, A-4, and A-5, which identify the connectors on the front and rear of the terminal, then make these connections:

1. Plug the keyboard cable into the *KEYBOARD* connector.
2. If you have the optional mouse, install the mouse's rubber ball by twisting open the round cover on the bottom of the mouse, placing the ball in the opening, and twisting the cover back on until it snaps in place. Plug the mouse into the port at the rear of the keyboard.
3. Check the voltage selector switch on the rear panel of the terminal to ensure that it is set to the proper operating voltage, as required by your ac power source. (For the terminal's voltage ranges, refer to the Electrical Specifications table in Appendix F.) If the switch is not set to the proper voltage, simply move it to the correct setting.
4. If you are connecting your terminal to an IBM host, connect the coaxial cable's BNC connector to the terminal's *COMM* port. Push and twist the cable's BNC connector into its locked position.
5. If you are connecting your terminal to an RS-232 host, connect the RS-232 cable to the terminal's *COMPUTER* port. Secure the cable connector to the terminal with the two small connector screws. Connect the other end of the cable either to a modem or directly to your host computer.
6. Attach the female end of the ac power cord to the rear panel of the terminal, and insert the male end into the ac power source. Then, apply power by pressing the *OFF/ON* button on the front panel. The terminal will run Power-Up Self Test, which takes about 15 seconds.

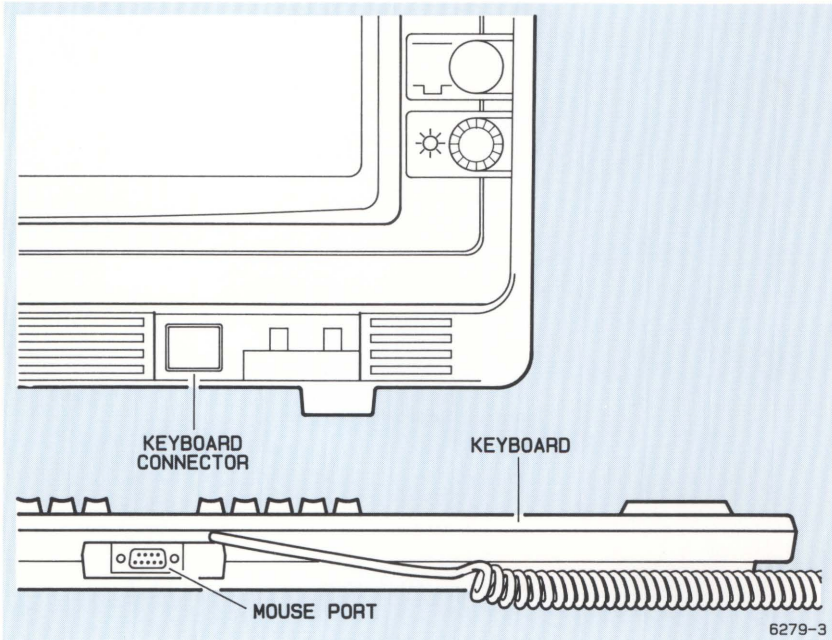


Figure A-3. Keyboard Connectors.

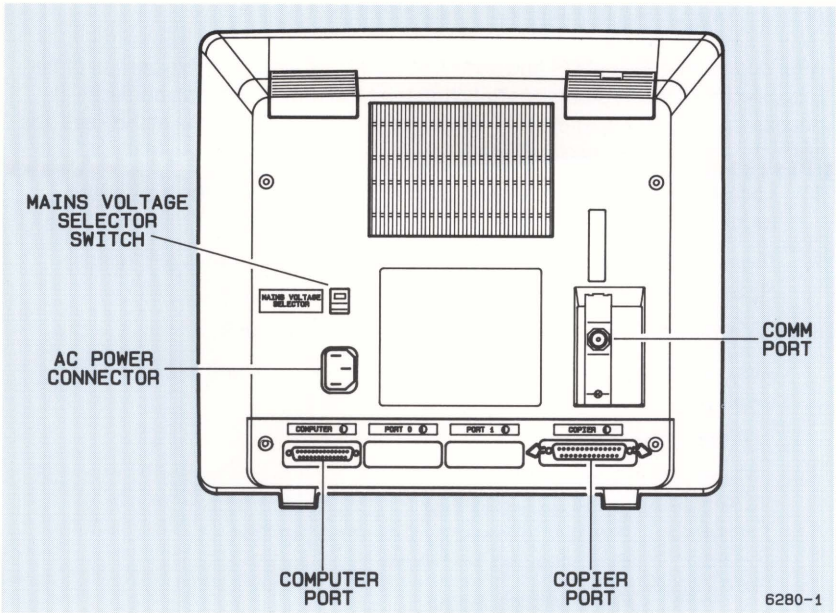


Figure A-4. 4205 Rear Panel Connectors.

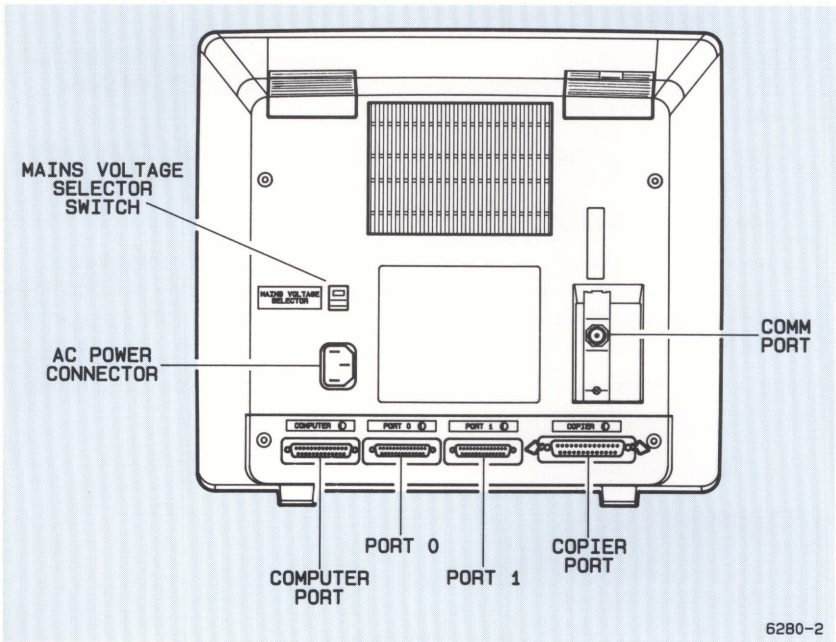


Figure A-5. 4207 Rear Panel Connectors.

## RUNNING SELF TEST

After connecting the cables and powering up the terminal, run this portion of the Extended Self Test program to verify that the terminal is operating correctly (if necessary, refer to Appendix B for photographs and explanations of the keys and controls you'll need to use in these steps):

1. Locate the S TEST (for *Self Test*) and RESET buttons on the front of the terminal.
2. Press S TEST and hold it in. While holding in S TEST, press and release RESET.
3. Hold in S TEST for another two seconds, then release it.

After about 7 seconds, the keyboard bell beeps once and this menu is displayed:

### Main Self Test Menu

<b>F2</b>	<b>Self Test</b>
<b>F3</b>	<b>Continuous Self Test</b>
<b>F4</b>	<b>Self Test followed by Extended Self Test</b>
<b>F5</b>	<b>Extended Self Test Menu</b>

**Sh F1**    **Factory Mode Menu**

<b>F7</b>	<b>Redisplay Main Menu</b>
<b>F8</b>	<b>Enter Terminal Mode</b>

### Selection:

4. Press Function Key F2 (at the top right of the keyboard) to continue Self Test. (If you don't press a key within 20 seconds after the Main Self Test Menu appears, Self Test continues automatically.)

After about 12 minutes, if no errors are detected, the Main Self Test Menu is redisplayed.

5. Press Function Key F8 to exit Self Test and return normal terminal operations.

If the terminal does detect an error, it rings the keyboard bell twice, or writes a message on the screen, or both. (If no message appears, try turning the Brightness button.) If an error is indicated, refer to the discussion *Error Reporting* in Appendix D, which tells you what to do.

After you have verified that the terminal is functioning properly, you can continue with these installation procedures.

## SETTING RS-232 HOST COMMUNICATIONS PARAMETERS

If this is the first time you have used a Tektronix terminal, or if you need instructions for entering Setup commands, we suggest that you go back to Section 2, *Getting Acquainted With Your Terminal*, and complete those exercises before continuing with these setup procedures.

The terminal is already configured by the factory for typical RS-232 host communications; however, you probably need to change some of the terminal's settings to match the settings of your host computer.

Table A-1 lists the commands that set up RS-232 communications with your host computer. The third column, *Available Settings*, lists the available settings (parameters), and the fourth column lists the *factory defaults* (the terminal settings already built into the terminal). The last column is empty so that you can list the settings required by your host computer.

Follow these steps to configure the terminal for communication with your host:

1. Find out what settings are required by your host computer. Consult your host computer manuals, your computer center staff, or your system programmer for this information. Then, fill in these requirements in the last column of Table A-1. (The optional *4200 Series Programmers Manual* describes RS-232 communications concepts and gives more detail about individual commands.)
2. Put the terminal in Setup and enter the required communications commands using Table A-1. You only need to enter those commands whose factory default settings are different from your host computer's requirements.
3. Display the terminal's communications settings by entering:

### STATUS COMM

Check the list to make sure it matches the settings you listed in the last column of Table A-1.

4. After you set the terminal's communication parameters, save them in nonvolatile memory by entering:

### NVSAVE

Nonvolatile memory is not erased when the terminal is turned off. Every time you turn on the terminal, it automatically sets its communications parameters to these saved values.

During future use of the terminal, you can temporarily change the communications settings without altering the nonvolatile (remembered) settings. The terminal reverts to the nonvolatile settings when you reset it or turn it off and back on.

**Table A-1**  
**RS-232 COMMUNICATIONS COMMANDS**

<b>Command Name</b>	<b>Description</b>	<b>Available Settings</b>	<b>Factory Default Setting</b>	<b>Your Host Settings (fill in)</b>
BAUDRATE	Sets the transmit and receive rates for host communications	1, 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19200, 38400	2400, 2400	
BREAKTIME	Sets the length of the interrupt signal (in milliseconds) generated by the Break key	0 — 65535	200	
BYPASSCANCEL	Sets the bypass cancel character	Any ASCII character	LF (ADE 10)	
CRLF	Specifies whether Carriage Return implies Line Feed	NO, YES	NO	
ECHO	Specifies whether the terminal provides the echo to the screen	NO, YES	NO	
EOFSTRING	Specifies the string that the terminal uses to mark the end of a file transmission	Any ASCII character	Empty array	
EOLSTRING	Specifies the string the terminal sends to the host in reports	Any ASCII character	CR (ADE 13)	
EOMCHARS	Specifies the character(s) sent by the terminal at the end of each line of data	Any ASCII character	CR (ADE 13) and LF (ADE 10)	
FLAGGING	Specifies the handshaking protocol between the terminal and the host	NONE, INPUT, OUTPUT, IN/OUT, DTR/CTS	NONE	
IGNOREDEL	Specifies whether the terminal ignores incoming Delete characters	NO, YES	NO	
LFCR	Specifies whether Line Feed implies Carriage Return	NO, YES	NO	



**Table A-1 (cont)**  
**RS-232 COMMUNICATIONS COMMANDS**

Command Name	Description	Available Settings	Factory Default Setting	Your Host Settings (fill in)
PARITY	Specifies how the parity bit is set on characters sent to the host	NONE, ODD, EVEN, HIGH, DATA	NONE (set to 0)	
PROMPTSTRING	Specifies the string that the host sends to the terminal to initiate Prompt mode	Any ASCII character	Empty array	
QUEUESIZE	Sets the number of bytes reserved for the input queue	1 — 65535	300	
STOPBITS	Sets the number of stop bits sent to the host after each character	1, 2	1	
XMTDELAY	Sets the transmit delay (in milliseconds) after an end-of-message character	0 — 65535	100	
XMTLIMIT	Sets an upper limit on the terminal's transmit rate to the host	110 — 65535	19200	

**NOTE**

*The queue size setting required for coax communications may be different from the queue size setting required for RS-232 communications. Be sure to check with your systems programmer for a queue size that is compatible with both types of host communications.*

## SETTING COAX COMMUNICATIONS PARAMETERS

If you need instructions for entering Setup commands, we suggest that you go back to Section 2, *Getting Acquainted With Your Terminal*, and complete those exercises before continuing with these procedures.

To configure your terminal for Tektronix graphics on an IBM host system, you need to define only two communications settings, set by the TEKHEADER and TMETHOD commands. The appropriate settings made by these commands depend entirely on your host's operating characteristics.

Here's what you need to do to configure your terminal for HOSTPORT COAX communications:

- Your terminal needs to interpret an incoming header character so that it will recognize non-IBM commands. The header character is defined by an integer value. Get this integer value from your systems programmer (the factory default value is 112). Refer to the *4200 Series Programmers Manual* for more information regarding the TEKHEADER command.
- Find out from the systems programmer which character translation method (either ASCII-to-EBCDIC translation table or ASCII plus-constant) is being used by host applications. Refer to the *4200 Series Programmers Manual* for more information regarding EBCDIC and ASCII translation tables and the ASCII data transmission algorithm.

In addition, you should make sure that the terminal's queue size setting is compatible with your IBM host. The QUEUESIZE command is described earlier in this section.

Once you've assembled the required information from your systems programmer, you're ready to perform the following steps:

1. Put the terminal in Setup, if it isn't already.
2. Enter the TEKHEADER command, using the integer value supplied by your computer center. For example, if the value were 112, you would enter:

**TEKHEADER 112**

3. Enter either of the following commands according to the information supplied by your computer center personnel:

- If the host computer uses the ASCII-to-EBCDIC translation-table method to convert ACSII data to EBCDIC characters, enter the following command:

**TMETHOD 0**

- If the host computer uses the ASCII plus-constant method to convert ASCII data to EBCDIC character, enter the following command:

**TMETHOD 1**

4. Store your new terminal configuration in nonvolatile memory by entering:

**NVSAVE**

5. Press the Setup key to take the terminal out of Setup.

All other terminal communications settings for HOSTPORT COAX are predefined by the factory for correct operation with an IBM 3274 or 3276 Control Unit.

## CONFIGURING THE TERMINAL FOR DFT MODE

Your terminal can communicate with an IBM control unit in one of two *attachment modes*:

- *Control Unit Terminal mode (CUT for short)*. In CUT mode, the control unit handles host commands and works with the terminal to handle user keystrokes. CUT mode is the factory default.
- *Distributed Function Terminal mode (DFT for short)*. In DFT mode, the terminal (rather than the control unit) is responsible for carrying out host commands and handling user keystrokes.

Follow this procedure if you will be using DFT mode to communicate with the IBM control unit. One particular advantage of DFT mode is that it allows you to use *multiple sessions* — a *session* is an independent connection between the terminal and a host.

While this procedure shows you how to access the Coax Configuration Summary menu and select DFT settings, you must consult your systems programmer for the appropriate settings for your terminal. The settings that you will need to select are listed in Table A-2 (on the 4205, the only settings you will select are the first 3). The last column of the table is empty so that you can list the appropriate settings for your terminal, as provided by your systems programmer.

**Table A-2**  
**SELECTING DFT SETTINGS**

DFT Feature		Default Setting	Alternate Setting	Your DFT Setting (fill in)
Number of Host Sessions?		1	1 — 5	
Key Click at Power-Up?		Yes	No	
Invalid Ctrl Codes Returned as Op-Check?		Yes	No	
Clear Key Resets Screen Size? <sup>a</sup> (4207 only)		Yes	No	
Screen Size for Each Host Session? <sup>a</sup> (4207 only)	Session A	32x80	24x80	
	Session B	32x80	24x80	
	Session C	32x80	24x80	
	Session D	32x80	24x80	
	Session E	32x80	24x80	

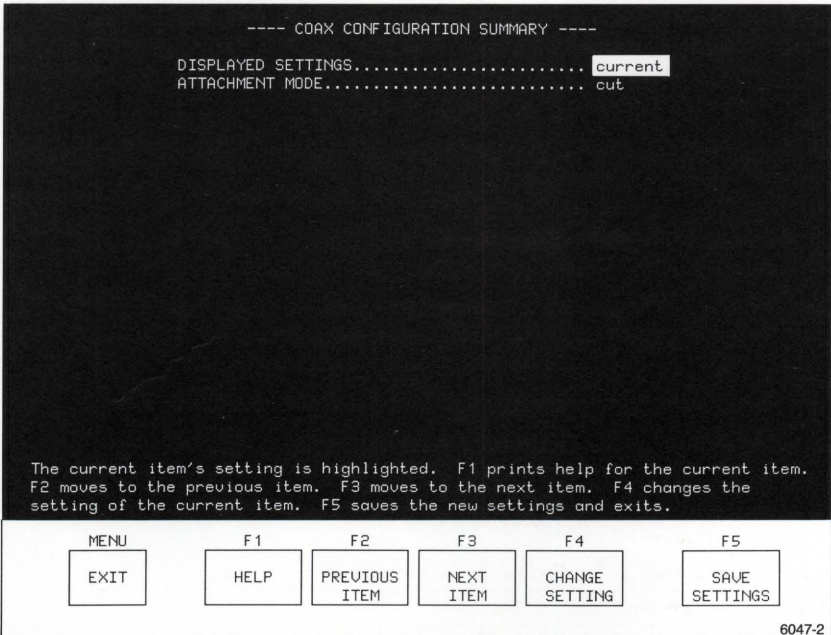
<sup>a</sup> On the 4205, the only screen size available in DFT mode is 24x80. Therefore, this question is not part of the 4205 DFT configuration.

After you have obtained the appropriate settings, you are ready to begin this procedure.

Start by accessing the Coax Configuration Summary menu:

1. Press the Menu key.
2. Press the F3 key. Notice the banner that appears at the bottom of the screen.
3. Press the Space Bar.

The menu is displayed on the screen. Figure A-6 shows how the menu should look.



**Figure A-6. Coax Configuration Summary.**

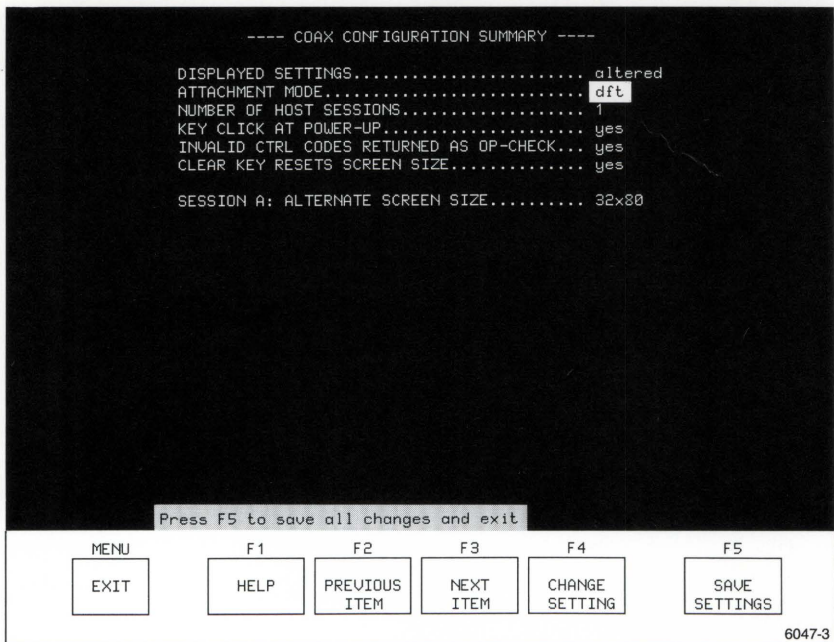
The first line of the menu is a status line that shows you what the terminal's current settings are before beginning the configuration process. Notice that the word *current* is highlighted; when you change any settings, this setting will automatically change to *altered* to show that you have made a change.

The help message near the bottom banner shows which keys to use to cycle through the summary, select settings, and save those settings in the terminal's nonvolatile memory.

Now, continue this procedure by selecting DFT mode:

4. Press F3 to go to the next line.
5. Press F4 to change the attachment mode to DFT (notice that the setting in the first status line has changed to *altered*).

The menu for DFT mode now appears on the screen. On the 4207, the display should appear similar to Figure A-7. On the 4205, the *CLEAR KEY RESETS SCREEN SIZE* and the *ALTERNATE SCREEN SIZE* lines do not appear because the 4205 uses only the 24x80 screen size.



6047-3

Figure A-7. Configuration Summary for DFT Mode.

Continue by selecting settings for DFT mode:

6. Using the appropriate function keys, cycle through the menu and select the DFT settings that have been provided by your systems programmer.

If you select multiple sessions (you can select up to five), each session is listed at the bottom of the summary and is denoted by the letters *A* through *E*. If you're configuring a 4207, cycle through each session and select the appropriate alternate screen size for each one. (Since there's only one screen size available on the 4205 — 24x80 — this setting is not part of your configuration.)

*NOTE*

*Each DFT session reserves memory that could otherwise be used for terminal features such as background copying or segment definitions. Therefore, it is best to select only the number of sessions that you would typically use — this will lessen the likelihood that any of the terminal's features are affected by a lack of memory.*

7. Press F5 to save the settings (if you want to exit without saving the new settings, press the Menu key instead).
8. Press F1 to restart the terminal with the new settings (if you want to continue with the old settings, press the Menu key; the new settings are still saved in nonvolatile memory and will take effect the next time the terminal is reset or powered down and then back up).

Once you have saved the settings, those settings are listed as *current* on the Coax Configuration Summary menu.

*NOTE*

*Once the terminal is configured for DFT mode, the terminal powers up in SESSION A. Section 3 shows you how to use the Jump key to select other sessions.*

## TESTING COMMUNICATIONS

After you have set the communications parameters, you'll want to log on to the host computers you're connected to so you can ensure that you've set the parameters correctly. (The procedure for logging on depends on each particular computer — if you are not familiar with the procedure for your hosts, consult your systems programmer.)

Once you are logged on, test the terminal/host communications by issuing commands that require a host response. For example, get a listing of files or directories, create a file and edit it, or run an applications program.

If you plan to test communications by running an application, you will probably need to select a host command mode — the procedure under *Selecting a Host Command Mode* shows you how to select a mode for your application. If you need to test communications between the terminal and both IBM and RS-232 hosts, you will need to switch host ports — just follow the procedure under *Selecting a Host Port*.

### Selecting a Host Command Mode

Four host command modes allow communication between the terminal and host — the terminal must be in the proper mode to understand the host program's commands. The modes are:

- TEK — For programs that use Tek-style graphics and terminal control commands (that is, 4100 and 4010 escape sequences).
- ANSI — For programs that use ANSI Standard X3.64 text editing commands.
- EDIT — For DEC VT100 applications programs.
- VT52 — For DEC VT52 applications programs.

Follow these steps to set the terminal to the proper mode:

1. Check with your computer center staff or your systems programmer to determine which mode you should use to communicate with your host application.
2. Put the terminal in Setup (press the Setup key) and select the host command mode with the CODE command.
  - To select TEK mode, enter:  
**CODE TEK**
  - To select ANSI mode, enter:  
**CODE ANSI**
  - To select EDIT mode, enter:  
**CODE EDIT**
  - To select VT52 mode, enter:  
**CODE VT52**
3. If you want to save this setting so that the terminal always powers up in this mode, issue:  
**NVSAVE**
4. Remove the terminal from Setup (press the Setup key again).



## Selecting a Host Port

Your terminal can be connected to both a coax (IBM) host and an RS-232 host through the terminal's COMM and COMPUTER ports. While you can be logged on to both hosts simultaneously, the terminal's screen can display information from only one host at a time. To switch between hosts, use either of the following methods.

- Use the Shift-Jump key combination — just hold down the Shift key while pressing the Jump key. This method will toggle you between coax and RS-232 hosts.
- Use the HOSTPORT command:
  1. Put the terminal in Setup (use the Setup key).
  2. Define which host the terminal will communicate with by entering a HOSTPORT command with the appropriate keyword:
    - To communicate with a coax host, enter:  
**HOSTPORT COAX**
    - To communicate with an RS-232 host, enter:  
**HOSTPORT RS-232**
  3. If you want to save the host port setting in nonvolatile memory, enter:  
**NVSAVE**
  4. Press the Setup key again. Your terminal can now display information from with whichever host you specified.

## HOST PORT OPERATING DIFFERENCES

Once your terminal is configured, it automatically selects its host port connection according to the nonvolatile setting of the HOSTPORT command each time you power up your terminal. The format of the display will reflect the host port to which the terminal is logically connected. (Any other information on the display is dependent on the host system.)

### HOSTPORT COAX POWER-UP

The following processes take place when your terminal enters HOSTPORT COAX:

- The terminal selects the BNC coax connector (COMM), located on the rear panel, for communication with the host computer. The terminal will now communicate with the IBM host over the coax cable via the IBM 3274 or 3276 Control Unit.
- The keyboard emulates the IBM 3279 keyboard. The alphanumeric keys take on their EBCDIC meanings. All IBM function keys take on their IBM meanings. The Tektronix Joydisk takes on the definitions of IBM arrow keys, and keys F1 through F8 serve as additional function keys. Other Tektronix function keys operate according to their labels. All keys can be used as programmable function keys. The Joydisk can be used to control a cursor for graphics input (GIN). Most keys can be programmed to give them other functions.
- The display screen's dialog area expands to 32 visible lines, with an additional two-line operator information area (separated from the dialog area by a blue line) displayed at the bottom of the screen. This area provides status information about the current operation in the form of status symbols, either singly or in combination. A table that lists all of the displayed status symbols and their meaning is provided in Appendix I.
- The terminal's viewport extends to 4095 units in the x direction and 3045 in the y direction to fit the 34-line format.
- When you enter Setup, the Setup prompt (\*) is displayed. When you leave Setup, the screen displays the dialog that was displayed before you put the terminal in Setup.

## HOSTPORT RS-232 POWER-UP

The following processes take place when the terminal enters HOSTPORT RS-232:

- The terminal selects the RS-232 COMPUTER port, located on the rear panel, for communications with the host computer.
- The terminal keys assume their ASCII meanings, and any macros that are defined can be used (unless the key macros are disabled with the KEYEXPAND command). Function Keys F1 through F8 assume their RS-232 functions, as does the Joydisk. The IBM function keys serve as additional programmable function keys for RS-232 applications.
- The display screen's dialog area provides a maximum of 32 visible lines.

The terminal continues to respond to the IBM 3274 or 3276 Control Unit so that it can recognize that the terminal is connected. This allows you to switch back to the HOSTPORT COAX connection without executing a RESET command or losing the connection. When the terminal is connected to HOSTPORT RS-232, data coming in from the IBM host is queued and does not interfere with the current screen display.

## CONNECTING PERIPHERAL DEVICES AND ESTABLISHING COMMUNICATIONS

The following instructions help you connect peripheral devices to the terminal and set their communications parameters. You should also follow any other installation instructions provided with the peripheral device.

The rest of this appendix contains installation procedures for:

- 4691 and 4692 Color Graphics Copiers
- 4695 Color Graphics Copier
- 4696 Color Ink-Jet Printer
- 4644 Dot Matrix Printer and other monochrome printers
- 4510 Color Graphics Rasterizer
- 4662 Interactive Digital Plotter
- 4663 Interactive Digital Plotter
- 4957 and 4958 Graphics Tablets

You need only refer to those procedures that apply to the device you want to install.

### NOTE

*Some applications programs running on a host computer may require that some peripherals, such as a 4662 Plotter, be connected to a specific port. Check with your systems programmer.*

Section 3 of this manual explains how to make copies and how to use a graphics tablet. Section 2 explains how to install and use the optional mouse.

## 4691 AND 4692 COLOR GRAPHICS COPIERS

1. Plug the copier cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup and enter the following command:

### HCINTERFACE 2

The parameter value (2) tells the terminal you are using a Tektronix 4691, 4692, 4695, or 4696.

3. Save the setting in nonvolatile memory by entering:

### NVSAVE

## 4695 COLOR GRAPHICS COPIER

1. Plug the copier cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup and enter the following command:

### HCINTERFACE 2

The parameter value (2) tells the terminal you are using a Tektronix 4691, 4692, 4695, or 4696.

3. Save the setting in nonvolatile memory by entering:

### NVSAVE

4. You may also need to set the *C* and *M ADJUST* switches on the rear panel of the 4695.
  - Switch *C* tells the copier whether to ignore Carriage Returns from the terminal. If the copier double-spaces lines of text or prints a new line of text on top of the previous line, change the switch setting.
  - Switch *M* tells the copier whether to print in one direction or in two directions. Bidirectional printing is faster, but the dot alignment is better with one-directional printing. For highest quality copies, use the slower, one-directional setting.

## 4696 COLOR INK-JET PRINTER

1. Plug the copier cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup and enter the following command:

### HCINTERFACE 2

The parameter value (2) tells the terminal you are using a Tektronix 4691, 4692, 4695, or 4696.

3. Save the setting in nonvolatile memory by entering:

### NVSAVE

4. You may also need to set Switch 4 on the rear panel, and press the *MEDIA* button on the front of the printer.
  - Switch 4 tells the copier whether to ignore Carriage Returns from the terminal. If the copier double-spaces lines of text or prints a new line of text on top of the previous line, change the switch setting.
  - The *MEDIA* button selects the type of media — paper or film (transparency) — to be copied on. When set to *PAPER*, the printer prints bidirectionally. When set to *FILM*, the printer prints monodirectionally, allowing more time for the ink to dry on the film and providing slightly better dot alignment.

## MONOCHROME PRINTERS

You can connect your terminal to a wide variety of monochrome graphics and text printers; follow whichever of the installation procedures applies to your printer. You can connect these monochrome printers to the terminal:

- Tektronix 4644 Dot Matrix Printer
- Hewlett-Packard ThinkJet
- Hewlett-Packard LaserJet (4207 only)
- Monochrome text-only printers with a Centronics-style interface
- Monochrome graphics printers with a Centronics-style interface and Epson FX-80 graphics protocol

If you don't find your printer listed by name, or if you need more information than is provided here, the manual accompanying your printer should tell you its type of interface and graphics protocol; this should enable you to determine if your printer is compatible with this terminal.

### Tektronix 4644 Dot Matrix Printer

Follow this procedure to connect the terminal to a Tektronix 4644 Dot Matrix Printer:

1. Plug the printer cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup, and then tell the terminal which printer is connected to it by entering:

**HCINTERFACE 3**

3. Instruct the terminal to send a Carriage Return (↵) at the end of each line by entering:

**HCMONOCHROME 0**

4. Save the settings in nonvolatile memory by entering:

**NVSAVE**

## Hewlett-Packard ThinkJet

Follow this procedure to connect the terminal to a ThinkJet Printer:

1. Plug the printer cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup, and then tell the terminal which printer is connected to it by entering:

**HCINTERFACE 4**

3. Instruct the terminal to send a Carriage Return/Line Feed combination (CR LF) at the end of each line by entering:

**HCMONochrome 1**

4. Save the settings in nonvolatile memory by entering:

**NVSAVE**

5. Now, set the Mode Select switch settings at the back of the printer to the positions shown in Table A-3:

**Table A-3  
THINKJET SWITCH SETTINGS**

Switch	1	2	3	4	5	6	7	8
Setting	down	up	down	down	up	up	down	down



## Hewlett-Packard LaserJet and LaserJet Plus Printers (4207 Only)

Follow this procedure to connect the terminal to a LaserJet or a LaserJet Plus Printer:

1. Connect the printer's RS-232 communications cable to the terminal's PORT 0 or PORT 1. Secure the RS-232 cable connector to the port by tightening the two small connector screws.

### NOTE

*The LaserJet and LaserJet Plus require an RS-232 C cable with male connectors on both ends; Pins 1, 2, 3, and 7 must be straight-wired — that is, Pin 3 on one connector must be wired to Pin 3 on the opposite connector. You can order a suitable cable through Hewlett-Packard.*

2. Put the terminal in Setup, and then tell the terminal that the printer is connected to it through either PORT 0 or PORT 1:
  - To connect to PORT 0, enter:  
**HCINTERFACE 5**
  - To connect to PORT 1, enter:  
**HCINTERFACE 6**
3. Enter the following communications commands (For this discussion, we'll assume that you are connecting the printer to PORT 1; if you are connecting to PORT 0, substitute *P0* wherever you see *P1*):

```
PASSIGN P1:;PPORT
PBAUD P1:;9600
PBITS P1:;1,8
PPARITY P1:;NONE
PFLAG P1:;CHAR
```

4. Save the setting in nonvolatile memory by entering:

```
NVSAVE
```

**Considerations for a LaserJet Plus Printer.** The LaserJet Plus has both a Centronics-type port and an RS-232 port. You can only connect the printer to the terminal using the printer's RS-232 port and one of the terminal's 2PPI ports (PORT 0 or PORT 1).

## Other Monochrome Printers

If you are connecting the terminal to some other monochrome graphics printer that has a Centronics-style printer interface and supports Epson FX-80 graphics protocol, or to a monochrome text printer with a Centronics-style printer interface, follow this procedure:

1. Plug the printer cable into the COPIER port. Secure the cable connector with the two clips attached to the port.
2. Put the terminal in Setup, and then tell the terminal which printer is connected to it.
  - For a graphics printer, enter:  
**HCINTERFACE 3**
  - For a text-only printer, enter:  
**HCINTERFACE 0**
3. Now, make sure the terminal sends the proper line endings for whatever printer you are using. Find out what the printer expects by either checking the printer's manual or, if the printer has a line-ending switch, by checking the printer's switch setting.

Match what the terminal sends to what the printer expects. You can either change the printer's switch (if it has one) or change what the terminal sends.

- To instruct the terminal to send a Carriage Return/Line Feed combination (␣␣) at the end of each line (this is the default and is appropriate in most cases), enter:

**HCMONOCHROME 1**

If you choose 1 and it's the wrong setting for your printer, the copies you make will have an extra blank line following each line of characters (that is, single-spaced text will be double-spaced, and graphics will have an extra blank line after each printed line).

- To instruct the terminal to send just a Carriage Return at the end of each line, enter:

**HCMONOCHROME 0**

If you choose 0 and it's the wrong setting for your printer, all your lines of text or graphics will print on the same line — resulting in one unreadable black line.

4. Now, save the settings in nonvolatile memory by entering:

**NVSAVE**

## 4510 COLOR GRAPHICS RASTERIZER (4207 Only)

1. Connect the rasterizer's RS-232 communications cable to one of the terminal's 2PPI ports (PORT 0 or PORT 1). (For this discussion, we'll assume the rasterizer is connected to PORT 0; if you are connecting to PORT 1, substitute *P1* wherever you see *P0*.) Secure the RS-232 cable connector to the port by tightening the two small connector screws.
2. Connect the 4691 or 4692 Copier to the rasterizer, and turn on both the rasterizer and copier.

3. Put the terminal in Setup and enter:

```
PASSIGN P0:,4510
PBAUD P0:,19200
PPARITY P0:,NONE
PFLAG P0:,CHAR,Ctrl-Q,Ctrl-S
PBITS P0:,1,8
```

(*Ctrl-Q* and *Ctrl-S* mean to hold down the Ctrl key while pressing the Q or S key. Don't type the hyphen.)

4. Save the setting in nonvolatile memory by entering:

```
NVSAVE
```

5. The rasterizer's communications parameters must match those of the terminal's port. Refer to the manual accompanying the rasterizer and set its parameters as shown here:
  - Set transmit and receive baud rate to *19200*
  - Set parity to *no parity* (indicator should read *0*)
  - Set flagging to *P<sub>1</sub>/P<sub>3</sub>, bidirectional*
  - Set stop bits to *1*

## 4662 INTERACTIVE DIGITAL PLOTTER (4207 Only)

1. Connect the plotter's RS-232 cable from the modem connector on the rear of the plotter to the terminal's PORT 0 or PORT 1 port. (For this discussion, we'll assume the plotter is connected to PORT 0.)
2. Set the plotter switches. Table A-4 shows one way to set the 4662 Plotter's switches; this configuration is recommended for communicating with the terminal. The settings not shown in the table use the plotter's power-up defaults.

**Table A-4**  
**4662 PLOTTER SETTINGS**

Switch	Setting	Communications Parameter <sup>a</sup>
A	3	CR generates LF No flagging
B	3	Number of stop bits is 1
C	2	Address is A No parity
D	3	Baud rate is 1200

<sup>a</sup> Each plotter switch controls more than one communications parameter.

3. Power up the terminal.
4. Use Setup commands to configure the peripheral port. Put the terminal in Setup and enter these commands:

```
PASSIGN P0:,4662
PFLAG P0:;NONE
PBITS P0:;1,8
PPARITY P0:;NONE
PBAUD P0:;1200
NVSAVE
```

If the plotter is connected to PORT 1, use *P1* instead of *P0* in the above commands.

5. Power up the plotter and prepare its pen and paper for use.

Other plotter settings may be used; check with your systems programmer. Be sure to configure the terminal's port to match the plotter settings.

### Configuring a 4662 Plotter With Option 31

If you have a 4662 with Option 31, the multiple-pen plotter, follow the steps for the 4662, but use this PASSIGN command instead:

```
PASSIGN P0:;4662/MP
```

If the plotter buffer overflows, you should use DC1/DC3 flagging (available only if you have Option 31). Enter this PFLAG command instead:

```
PFLAG P0:;CHAR
```

If you use other plotter settings, be sure to configure the terminal's port to match.

## 4663 INTERACTIVE DIGITAL PLOTTER (4207 Only)

1. Connect the plotter's RS-232 cable from the modem connector on the rear of the plotter to one of the terminal's 2PPI ports (PORT 0 or PORT 1). (For this discussion, we'll assume the plotter is connected to PORT 0.)
2. Set the plotter switches. Table A-5 shows one sequence of 4663 parameter settings for communicating with the terminal. The settings not shown use the plotter's power-up defaults. (The *4663 Operators Manual* tells you how to enter the parameter settings.)

**Table A-5**  
**4663 PLOTTER SETTINGS**

Parameter	Setting
Output Terminator	CR
Attention Character	<ESC>
Interface Functions	CR GENERATES LF DEL IGNORE
Communications Control Mode	FULL DUPLEX
Receive Parity	IGNORE
Transmit Parity	LOGIC 0
Character Format	8 DATA BITS 1 STOP BIT
Transmit Baud Rate	9600
Receive Baud Rate	9600
Serial Device Address	A
Initial Command/Response Format	3 (emulates a 4662)
Interface Select	1 (RS-232 interface)
Initial Axis Orientation	Y vertical, X horizontal
Initial Aspect Ratio	4X:3Y

3. Power up the terminal.
4. Use Setup commands to configure the peripheral port. Put the terminal in Setup and enter the following commands:

```
PASSIGN P0:,4663
PFLAG P0:,NONE
PPARITY P0:,NONE
PBITS P0:,1,8
PBAUD P0:,9600
NVSAVE
```

If the plotter is connected to PORT 1, use *P1* instead of *P0* in the above commands.

5. Power up the plotter and prepare its pen and paper for use.

Other plotter settings may be used; for example, you could use DC1/DC3 flagging. If you use other plotter settings, be sure to configure the terminal's port to match.

### **4957 AND 4958 GRAPHICS TABLETS (4207 Only)**

1. Connect the puck or stylus cable to the tablet.
2. Connect the tablet's communications cable to either the PORT 0 or PORT 1 connector on the rear of the terminal.
3. Plug in the tablet's power cord to a standard power outlet.

That's all there is to it. The terminal automatically sets the proper communications parameters between itself and the tablet.

## Appendix B

# CONTROLS, KEYS, AND CONNECTORS

This appendix describes the external controls and connectors on the display unit and keyboard. It also shows the keyboard layout and discusses the function of the keys.

Figure B-1 shows the location of the front panel controls and connectors on the display unit and keyboard. They are:

- *OFF/ON (power) button* — Turns the terminal on or off.
- *BRIGHTNESS button* — Increases or decreases brightness of the display.
- *RESET button* — Resets the terminal to its power-up condition (equivalent to turning the power off, then back on). When used with the S TEST button, it starts Main Self Test (refer to Appendix D).
- *S TEST button* — When used with RESET, starts Main Self Test (refer to Appendix D).
- *KEYBOARD connector* — Connects the keyboard cable to the terminal.
- *MOUSE port* — Connects the optional mouse to the keyboard.

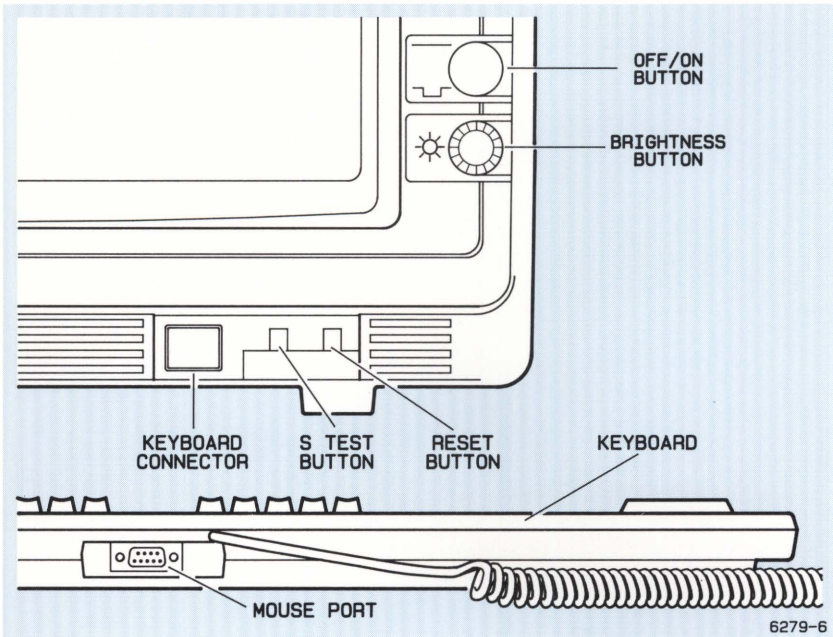
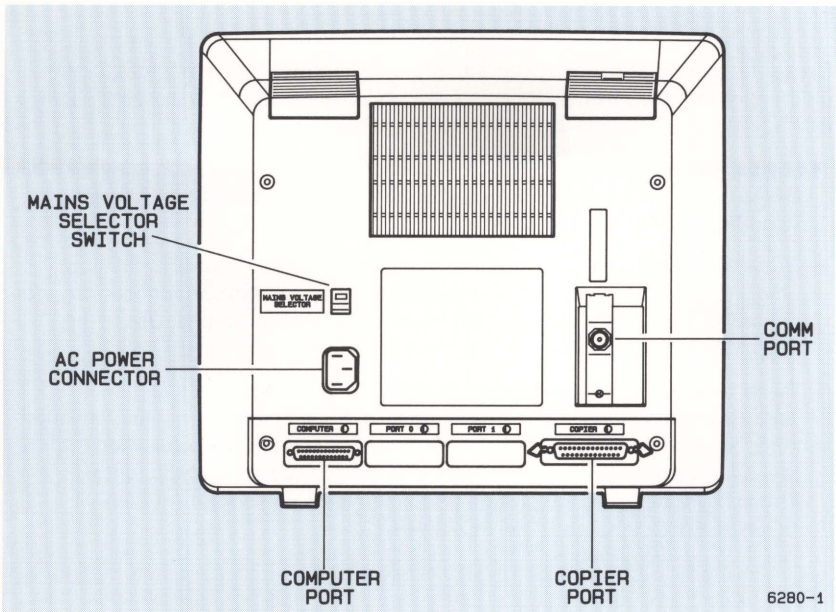


Figure B-1. Front Panel Controls and Connectors.

Figures B-2 and B-3 show the location of the display units' rear panel controls and connectors. They are:

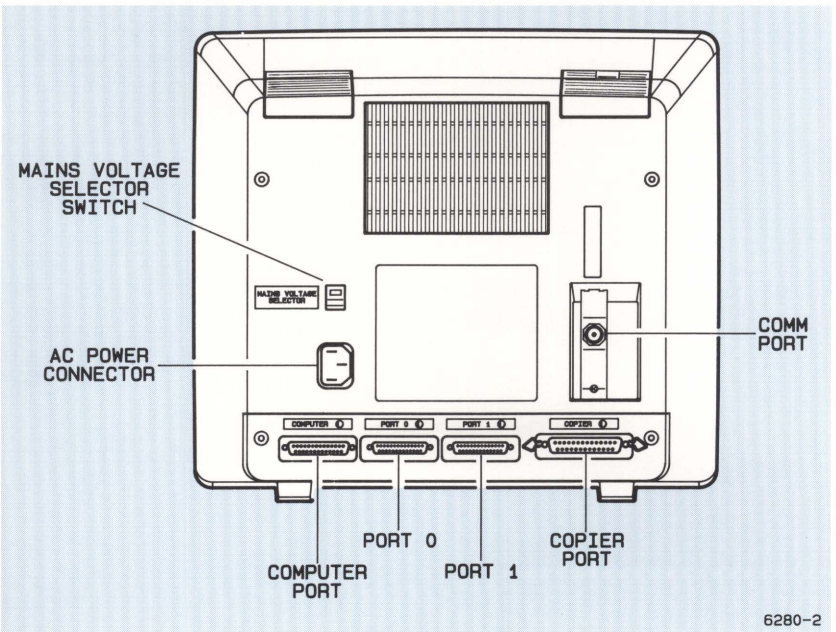
- *MAINS VOLTAGE SELECTOR switch* — Sets the terminal's operating line voltage.
- *AC POWER connector* — Accepts power from a standard ac power source. The voltage rating of the source should be consistent with the setting of the VOLTAGE SELECTOR switch.
- *COPIER port* — Provides a Centronics-style interface to (1) Tektronix 4691, 4692, and 4695 Color Graphics Copiers and the Tektronix 4696 Color Ink-Jet Printer, (2) monochrome graphics printers that use Epson FX-80 graphics protocol, such as the Tektronix 4644 Dot Matrix Printer and Hewlett-Packard ThinkJet, and (3) some monochrome text printers.
- *COMPUTER port* — Provides RS-232 connection to a host computer.
- *COMM port* — Provides coaxial cable connection to an IBM 3274 or 3276 Control Unit for connection to an IBM host computer.
- *PORT 0 and PORT 1 (4207 only)* — Provide standard RS-232-C signals to Tektronix peripheral devices such as the 4510 Rasterizer, 4662 and 4663 Plotters, 4957 and 4958 Graphics Tablets, as well as the Hewlett-Packard LaserJet Printer.





6280-1

Figure B-2. 4205 Rear Panel Controls and Connectors.



6280-2

Figure B-3. 4207 Rear Panel Controls and Connectors.

## KEYBOARD OVERVIEW

Except for extra sets of keys used with graphics features and minor functional differences in some keys, the layout and function of the keyboard resembles an IBM 3279 keyboard (see Figure B-4). Here are the exceptions:

- *Joydisk* — In HOSTPORT RS-232, scrolls text in the dialog area. In HOSTPORT COAX or HOSTPORT RS-232, moves cursor when the Set Color function, the Zoom/Pan function, or *graphics input* (GIN) is enabled.
- *Numeric keypad* — A set of number keys that make numeric data easier to enter. The keys can also be used as additional programmable function keys for either HOSTPORT COAX or HOSTPORT RS-232 connections. Use of the keypad is described later in this appendix.
- *Tektronix function keys* — Top row of keys that control graphics and Tektronix-unique functions. Keys F1 through F8 are programmable function keys. These function keys temporarily take on special definitions when the Menu function is active. See Section 2 for details about the Menu function. These keys (including the programmable function set) operate in both HOSTPORT COAX and HOSTPORT RS-232.

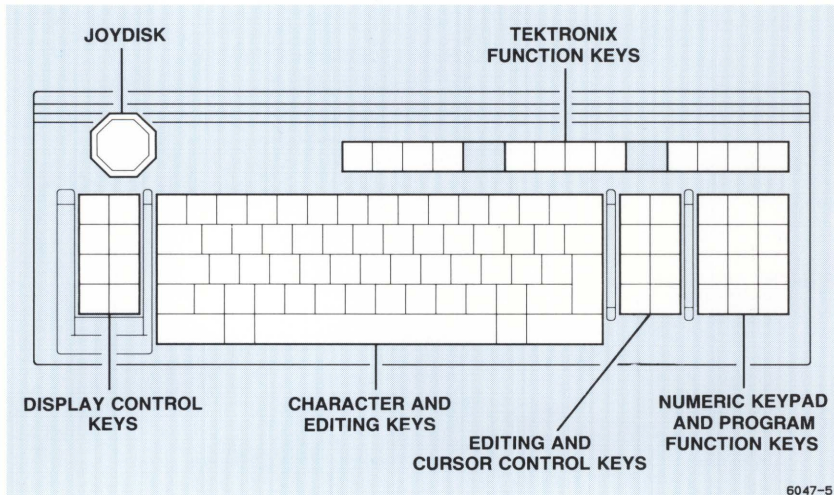


Figure B-4. Keyboard Layout.

## KEYBOARD OPERATION IN HOSTPORT COAX

In HOSTPORT COAX, all keys take on their standard 3279 meanings according to their legends or symbols. Function keys unique to Tektronix terminals operate the same in HOSTPORT COAX as they do in HOSTPORT RS-232.

Color-coded legends on some keys indicate functions that are unique to HOSTPORT COAX or HOSTPORT RS-232. Here's the explanation of the colors that apply in HOSTPORT COAX:

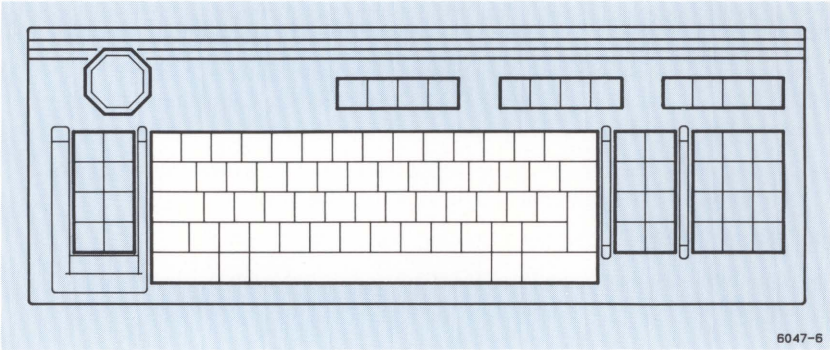
- *Black only* — Operates similarly to IBM 3279 key or has a Tektronix-unique function that is the same for both host port connections.
- *Blue and black* — Operates according to the legend in black.
- *Blue only* — Has no predefined function; can be programmed with macro functions.

## KEYBOARD OPERATION IN HOSTPORT RS-232

In HOSTPORT RS-232, all keys take on the same functions as a standard Tektronix 4200 Series Terminal keyboard. Here's the explanation of the color-codes that apply in HOSTPORT RS-232:








- *Black only* — Operates as typical Tektronix 4200 Series key or is available as an extra programmable function key if legend is relevant only to IBM 3279 emulation.
- *Blue and black* — Operates according to the legend in blue.
- *Blue only* — Operates according to legend.

**DESCRIPTION OF KEYS**

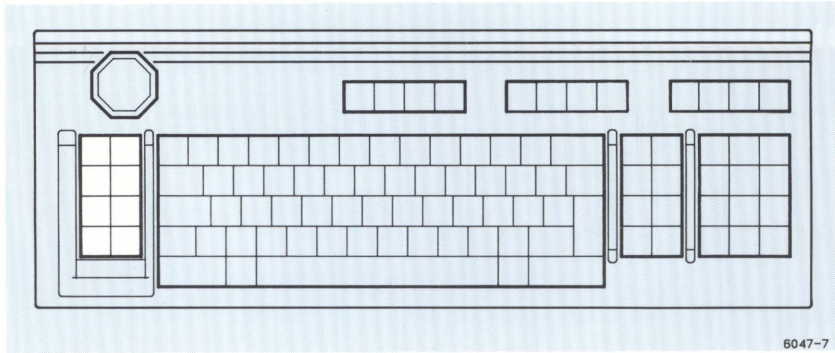


**Figure B-5. Character and Editing Keys.**

**Table B-1**  
**CHARACTER AND EDITING KEYS**

Legend	HOSTPORT COAX	HOSTPORT RS-232
 (Tab)	Moves cursor to right of first character location of next input field	Same as HOSTPORT COAX
 (Shift)	Selects uppercase symbol of typed key or shifted function of key. Unlocks shift function if previously locked	Selects uppercase symbol or shifted function of typed key
 (Lock)	Locks Shift key to select uppercase character keys (alphabetic and symbol)	Caps Lock key (selects uppercase for alphabetic keys only); selects lowercase when pressed again to unlock
Reset	Restores terminal to its status prior to last key entry error	Available as extra programmable function key
Dev Cncl	[Alt] <sup>a</sup> In CUT mode, recovers from invalid or improper Print key operation. Ignored in DFT mode	Available as extra programmable function key
Alt	When pressed with some other key, enables Alt (Alternate) function	Functions as Ctrl key
Ctrl	Functions as Alt key	When pressed with some other key, defines control functions for that key (can be combined with Shift key to access third function of key)
Enter	Causes typed data to be sent to host (can also be used to end Setup commands)	Acts as Carriage Return for Numeric Keypad entries and Setup commands
 (New Line)	Moves cursor to extreme left on the next line on which you can type (also, Setup command terminator)	Acts as Carriage Return key
 (Back Tab)	Tabs the cursor back to the first character in an input field	Acts as Delete key
Del	Acts as Back Tab key	Sends ASCII Del (delete) character to host computer (in Setup, erases last typed character in Setup commands)
 (Back Space)	Moves cursor one location left each time key is pressed	Same as HOSTPORT COAX
 (Home)	[Alt] <sup>a</sup> Homes cursor to first unprotected field	Available as extra function key

<sup>a</sup> A key name in square brackets means you must press that key and the key listed in the *Legend* column to get the described function.



6047-7

Figure B-6. Display Control Keys.



**Table B-2**  
**DISPLAY CONTROL KEYS**

Legend	HOSTPORT COAX	HOSTPORT RS-232
Attn	Requests host program's attention. This key works only when <i>B</i> symbol is displayed in the operator information area	Available as extra programmable function key
Sys Req	[Alt] <sup>a</sup> When <i>A</i> symbol is displayed, signals host that terminal may be failing and you have keyed a Test Request message  When <i>B</i> symbol is displayed, clears screen and switches terminal between application and control programs	Available as extra programmable function key
Clear	Clears screen, sets up unformatted display, and positions cursor at first location of Line 1 (on the 4207, may reset screen size to 24x80, if configured for DFT mode)	Available as extra programmable function key
Cr Sel	[Alt] <sup>a</sup> Moves cursor across formatted, displayed list to make selections from list of alternate items (replaces Light Pen)	Available as extra programmable function key
SEras	Unspecified IBM function (application-dependent)	Erases entire screen display and dialog buffer (if views have been defined, erases the <i>current view</i> <sup>b</sup> and the dialog buffer)
DEras	Unspecified IBM function (application-dependent)	[Shift] <sup>a</sup> Erases only the dialog area

<sup>a</sup> A key name in square brackets means you must press that key and the key listed in the *Legend* column to get the described function.

<sup>b</sup> See the *Programmers Reference Manual* for information on defining views.

**Table B-2 (cont)**  
**DISPLAY CONTROL KEYS**

<b>Legend</b>	<b>HOSTPORT COAX</b>	<b>HOSTPORT RS-232</b>
Esc	Unspecified IBM function (application-dependent)	Enters escape character
Er Inp	[Alt] <sup>a</sup> Erases or blanks all displayed input fields	Available as extra programmable function key
Jump	Switches to next sequential session (DFT only) [Shift] <sup>a</sup> Pressing Shift key with Jump key switches host ports (DFT or CUT)	Available as extra programmable function key [Shift] <sup>a</sup> Pressing Shift key with Jump key switches host ports
Alt Cr	[Alt] <sup>a</sup> Toggles cursor displayed to be either (1) block, (2) blinking block, (3) blinking underline, or (4) nonblinking underline	Available as extra programmable function key (use Setup command CURSOR TYPE to select a cursor shape; use ACURSOR to select blinking or nonblinking cursor)
 (Print)	In CUT mode, prints displayed information on printer connected to IBM control unit	Available as extra programmable function key
Ident	[Alt] <sup>a</sup> In CUT mode, either (1) requests or changes Printer ID for printing operation, or (2) displays current print authorization, depending on Printer Status display	Available as extra programmable function key
 (Key Click)	Turns key click on or off	Acts as Break key (use CLICK Setup command to turn click on or off)
Break	Acts as Key Click key	Sends an interrupt signal to host computer
Test	[Alt] <sup>a</sup> In CUT mode, prepares terminal for testing by control unit (refer to IBM Control Unit Problem Determination Guide)	Available as extra programmable function key

<sup>a</sup> A key name in square brackets means you must press that key and the key listed in the *Legend* column to get the described function.

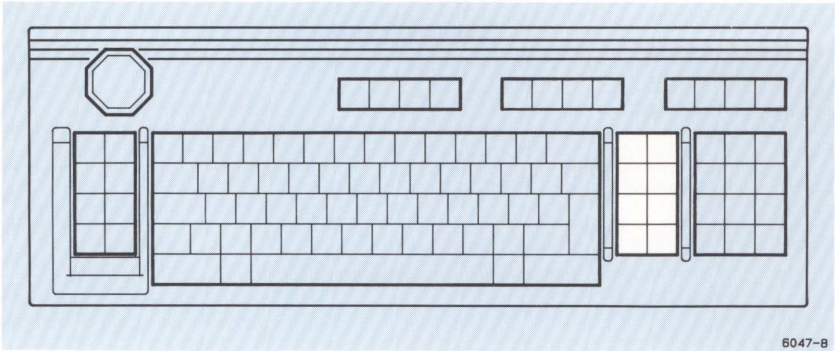




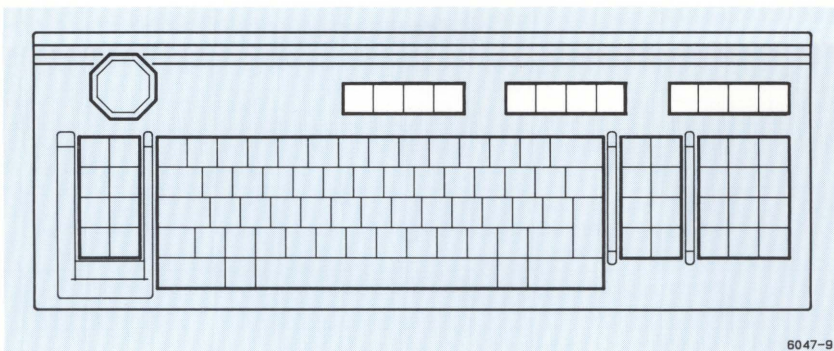
Figure B-7. Editing and Cursor Control Keys.



**Table B-3**  
**EDITING AND CURSOR CONTROL KEYS**

<b>Legend</b>	<b>HOSTPORT COAX</b>	<b>HOSTPORT RS-232</b>
PA1	Signals applications program (refer to IBM User's Program Guide)	Available as extra programmable function key
Dup	[Shift] <sup>a</sup> Displays an overscored asterisk, which indicates you requested an application program to duplicate a field entry	Available as extra programmable function key
PA2	Signals application program (refer to IBM User's Program Guide)	Available as extra programmable function key
Field Mark	[Shift] <sup>a</sup> Displays an overscored semicolon, which tells application program you sent an end of field mark	Available as an extra programmable function key
 (Insert)	Inserts one or more characters in input field without replacing displayed characters (press Reset key to exit insert)	Available as extra programmable function key
 (Delete)	Deletes character at cursor position within input field, without leaving blank space	Acts as Minus Sign key
- (Minus Sign)	Acts as Delete key	Inserts a minus sign for Numeric Keypad entries
↓ (Down Arrow)	Moves cursor downward	Has same default meaning as F1 programmable function key (however, can be programmed independently of F1 function key)
↑ (Up Arrow)	Moves cursor upward	Has same default meaning as F2 programmable function key (however, can be programmed independently of F2 function key)
← (Left Arrow)	Moves cursor across screen to left	Has same default meaning as F3 programmable function key (however, can be programmed independently of F3 function key)
←← (Dbl-speed left)	[Alt] <sup>a</sup> Moves cursor to left at twice normal speed	Available as extra programmable function key
→ (Right Arrow)	Moves cursor across screen to right	Has same default meaning as F4 programmable function key (however, can be programmed independently of F4 function key)
→→ (Dbl-speed right)	[Alt] <sup>a</sup> Moves cursor to right at twice normal speed	Available as extra programmable function key

<sup>a</sup> A key name in square brackets means you must press that key and the key listed in the *Legend* column to get the described function.



6047-9

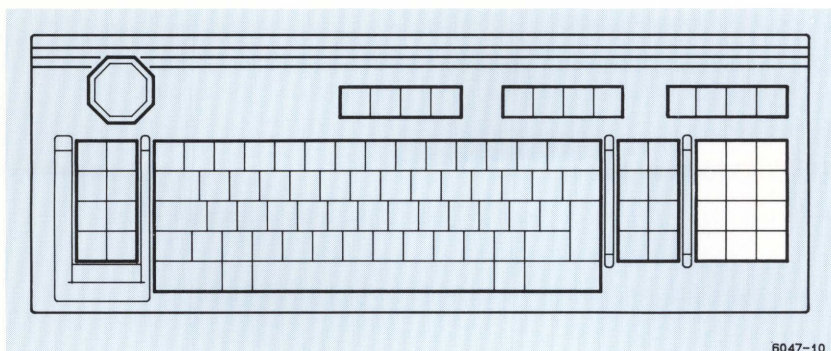
Figure B-8. Tektronix Function Keys.

**Table B-4**  
**TEKTRONIX FUNCTION KEYS**

Legend	HOSTPORT COAX	HOSTPORT RS-232
Dialog	Makes the dialog area visible or invisible	Same as HOSTPORT COAX
GEras	[Shift] <sup>a</sup> Erases the graphics area (or, if views <sup>b</sup> have been defined, erases the current view)	Same as HOSTPORT COAX
Setup	Puts terminal in or out of Setup	Same as HOSTPORT COAX
Cancel	[Shift] <sup>a</sup> Cancels terminal operation in process	Same as HOSTPORT COAX
SCopy	Copies displayed screen contents on terminal printer; prints extra copy each time is pressed (does not copy status line)	Same as HOSTPORT COAX
DCopy	[Shift] <sup>a</sup> Copies displayed dialog area on terminal printer (does not copy status line)	[Shift] <sup>a</sup> Copies from the dialog buffer to a terminal printer
Menu	Displays menu that allows you to activate color interface, Zoom/Pan viewing functions, or coax configuration (see Section 2 for operating details)	Same as HOSTPORT COAX
F1 — F8	Used with the Set Color and Zoom/Pan functions; can also be programmed with macros	Same as HOSTPORT COAX

<sup>a</sup> A key name in square brackets means you must press that key and the key listed in the *Legend* column to get the described function.

<sup>b</sup> See the *Programmers Reference Manual* for information on defining views.



6047-10

Figure B-9. Numeric Keypad and Program Function Keys.

## NUMERIC KEYPAD AND PROGRAM FUNCTION KEYS

You can select between two ways of using the keypad — to enter numbers, or to access functions provided by an applications program. The following topics show how to control the functions of the keypad.

### Using the Keypad In HOSTPORT COAX

To control keypad operation, put the terminal in Setup and enter the CXKEYPAD Setup command according to the following examples:

- To use the keypad as IBM function keys PF13 through PF24, enter:

**CXKEYPAD PF**

- To use the keypad to enter the numbers 0 through 9, the period (.), and the comma (,), enter:

**CXKEYPAD NUMERIC**

- To use the Shift or Shift Lock key to define whether the keypad is to be used as an alphanumeric keypad (shifted) or as a pad of Programmed Function keys (unshifted), enter:

**CXKEYPAD BOTH**

Remember to press the Setup key again so that you can begin using the keypad.

(continued)

### Using the Keypad In HOSTPORT RS-232

To control keypad operation, put the terminal in Setup and enter the KEYPADMODE Setup command according to the following examples:

- To use the keypad as numeric keys, enter:

**KEYPADMODE NUMERIC**

- To use the keypad as function keys for an applications program, enter:

**KEYPADMODE APPLICATIONS**

Remember to take the terminal out of Setup to use the keypad.

## SETUP COMMANDS CORRESPONDING TO 3279 CONTROLS

The following commands perform functions that are controlled by keys or switches on the IBM 3279. To use these commands, be sure the terminal is in Setup, enter the commands, and then press the Setup key once again. For more information about entering Setup commands, refer to Section 3.

To display the current settings for one of these commands before you enter it, enter the STATUS command followed by the first few letters of the command that you want to check. For example, if you wanted to check the setting for the BASECOLOR command, enter the STATUS command in the following form:

**STATUS BASECOLOR**

### Switching Displayed Colors (BASECOLOR)

In HOSTPORT COAX, this Setup command emulates the BASE COLOR switch on IBM 3279 Terminals. The command lets you specify whether characters in formatted input fields are to be displayed in just one color or multiple colors:

- To display text in green with white intensified fields, enter:

**BASECOLOR MONOCHROME**

- To display formatted fields in red, green, blue, and white characters, enter:

**BASECOLOR BASE**

You can use the Set Color function to select different colors (see Section 2). For example, if you changed the color definition for items currently displayed in green to be displayed in orange, a BASECOLOR MONOCHROME command would give you a display of orange and/or white text.

The BASECOLOR command has no effect when the host has selected an extended menu of colors.

### Changing Character Case (CAPITALS)

In HOSTPORT COAX, this command selects whether alpha characters are displayed as all uppercase or as mixed uppercase and lowercase characters. Unlike the effect of the Caps Lock key, the CAPITALS command does not affect the characters sent to the host. In other words, regardless of how the characters are displayed locally on the terminal, they are transmitted to the host in the same case in which you type them.

Here's how to set the display of character casing:

- To display text as all uppercase characters, enter:

**CAPITALS YES**

- To display text as a mix of uppercase and lowercase characters, enter:

**CAPITALS NO**

### Setting Key Clicking (CLICK)

In HOSTPORT RS-232, this Setup command enables or disables the key click sound. (When in HOSTPORT COAX, use the Key Click key to perform the same function — but not in Setup). Set keyboard clicking on or off by entering one of these examples:

- To turn off the key click sound (the factory default), enter:

**CLICK NO**

- To turn on the key click sound, enter:

**CLICK YES**

### Setting the Cursor Type (CURSORTYPE)

In HOSTPORT RS-232, this Setup command sets the alphanumeric cursor either to an underlined cursor or to a block cursor (when in HOSTPORT COAX, use the Alt Cursor key to perform the same function).

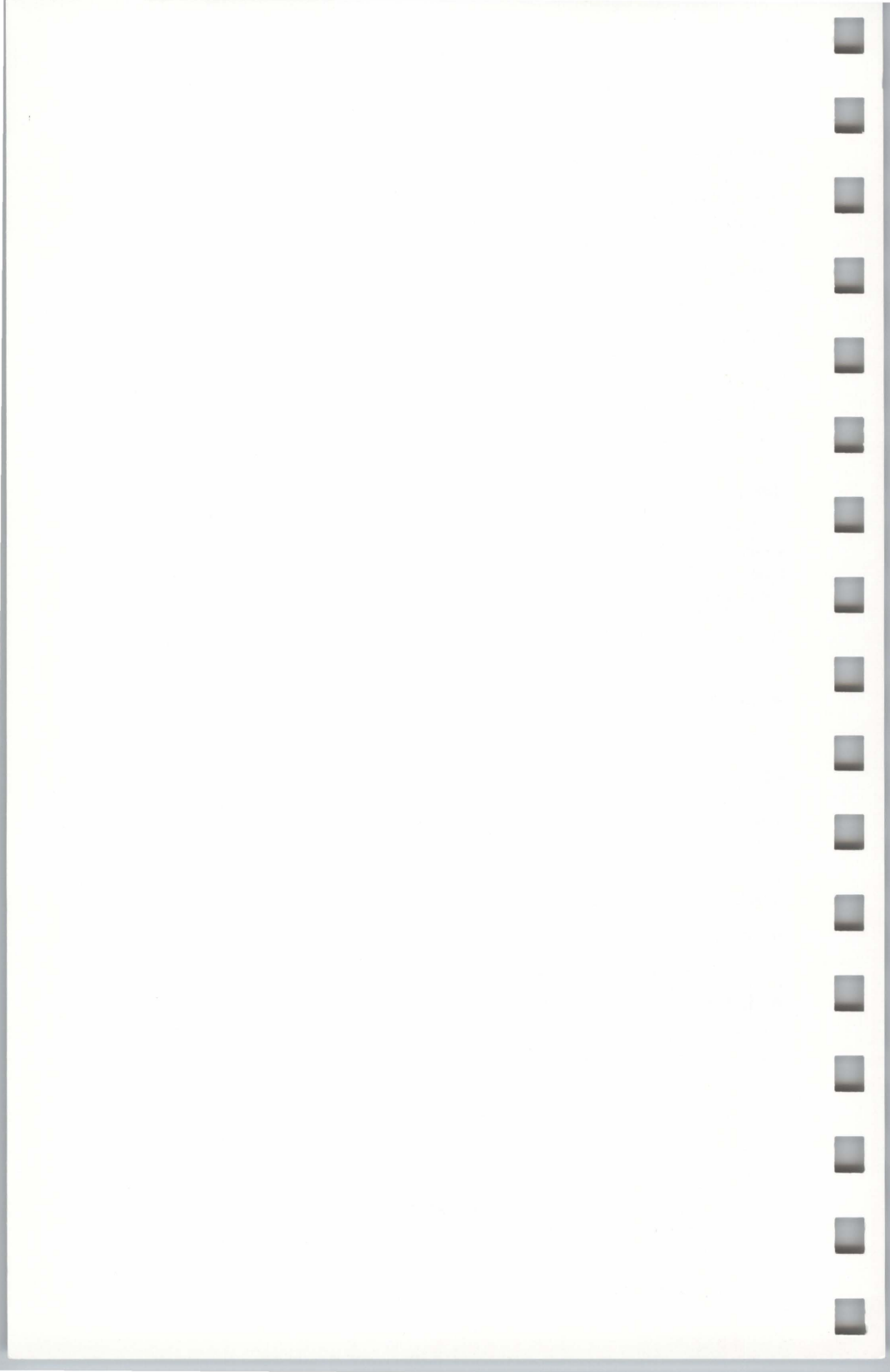
Here's how to select the cursor's appearance:

- To display the cursor as an underscore, enter:

**CURSORTYPE UNDERLINE**

- To display the cursor as a block character, enter:

**CURSORTYPE BLOCK**



## Appendix C

# KEYBOARD LAYOUTS, CHARACTER CODES, AND MACRO NUMBERS

When you plug in your keyboard, the terminal uses the character set corresponding to that keyboard to display text on your terminal screen. In HOSTPORT COAX, the terminal uses the EBCDIC character set associated with the keyboard; in HOSTPORT RS-232, the terminal uses the ASCII character set associated with the keyboard.

In HOSTPORT RS-232, the terminal can display nine different character sets, all of which are stored in the terminal's firmware. Six character sets support the terminal's international keyboards (North American, United Kingdom, French, Swedish, Danish/Norwegian, and German), and three character sets provide supplementary symbols, ruling characters, and the ASCII Multilingual characters.

In Setup, your terminal always displays the character set associated with your keyboard. However, if you want to use other character sets while in HOSTPORT RS-232, you can do so when the terminal is *not* in Setup — that is, when displaying data from an RS-232 host or data entered at the keyboard while communicating with the host.

Use the Setup command `DLSELECTCHARSET` (an ANSI command) to select another character set for use with a host program. Table C-1 shows the command entry required to select each character set — you can select a character set to be the *primary* (G0) or *alternate* (G1) set. For example, to select the Supplementary character set as the primary set, enter Setup and issue:

```
DLSELECTCHARSET G0,/3/
```

(continued)

Table C-1  
SETUP SYNTAX FOR THE DLSELECTCHARSET COMMAND

Character Set	To Assign as G0 (Primary Set)	To Assign as G1 <sup>a</sup> (Alternate Set)
United Kingdom	DLSELECTCHARSET G0,/A/	DLSELECTCHARSET G1,/A/
North American (ASCII)	DLSELECTCHARSET G0,/B/	DLSELECTCHARSET G1,/B/
Swedish	DLSELECTCHARSET G0,/G/	DLSELECTCHARSET G1,/G/
German	DLSELECTCHARSET G0,/K/	DLSELECTCHARSET G1,/K/
French	DLSELECTCHARSET G0,/f/	DLSELECTCHARSET G1,/f/
Danish/ Norwegian	DLSELECTCHARSET G0,/ \ /	DLSELECTCHARSET G1,/ \ /
Ruling	DLSELECTCHARSET G0,/0/	DLSELECTCHARSET G1,/0/
Supplementary	DLSELECTCHARSET G0,/3/	DLSELECTCHARSET G1,/3/
Multilingual (ASCII)	(none)	DLSELECTCHARSET G1,/A/,96

<sup>a</sup> Selecting a character set as an alternate set requires you to use the ANSI SO (SHIFT OUT) command in host syntax. Consult the *4200 Series Programmers Manual* for a description of this command.

Once you select a character set other than the one that goes with your keyboard, you'll need to use the code charts to determine how to generate the new characters. First, find the character on the code chart of the new character set and note the number in the lower right corner of the box; then, go to the code chart for your keyboard, find the box with that number, and press the key that is labeled with that character.

For example, if you want the "omega" character (which is ADE 90) in the Supplementary character set, press the key that maps to ADE 90 (shifted "Z" keycap on any of the keyboards).

Remember, since Setup always uses the character set associated with your keyboard, you won't be able to see the new characters until you exit Setup and start work with your host.

This appendix shows each character set's code chart and each keyboard's layout:

- The code charts list the binary and ADE (ASCII decimal equivalent) values for the characters and control codes in each character set. (Code charts for the Supplementary, Ruling, and Multilingual character sets are at the end of this appendix.)
- The keyboard layouts show the location of the keys on each keyboard, as well as the macro numbers invoked by each key and key combination. For more information about macros, refer to Section 3.

#### NOTE

*The DLSELECTCHARSET command only selects character sets for display when the terminal is in HOSTPORT RS-232. In HOSTPORT COAX, the terminal always uses the EBCDIC character set corresponding to the attached keyboard. See the Programmers Reference Manual for EBCDIC code charts.*



## MOUSE (Option 4M for All Keyboards)

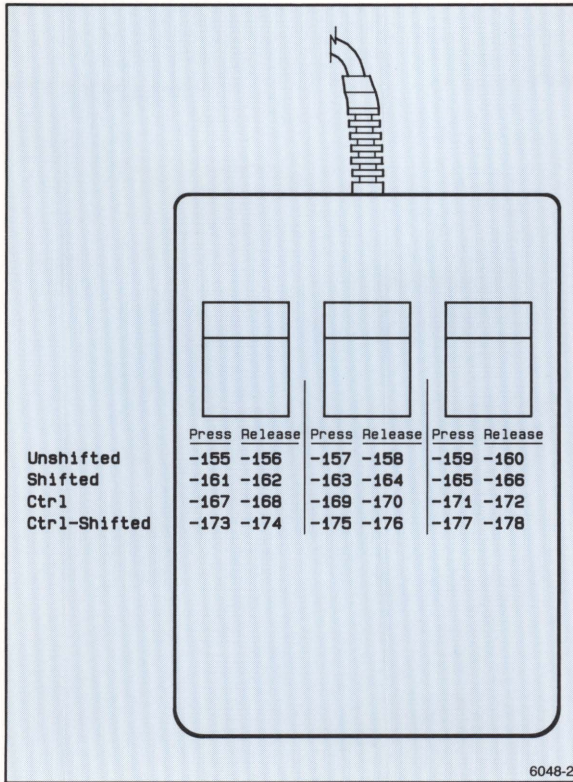


Figure C-1. Mouse Button Macro Numbers.

## NORTH AMERICAN (ASCII) CHARACTER SET

		Right Up	Left Down	6 Erase Dialog	Cancel Setup	D Copy S Copy	Menu	F1	F2	F3	F4	F5	F6	F7	F8						
Unshifted		-135	-136	-137	-138	-111	-112	-113	-114	128	129	130	131	132	133	134	135				
Shifted		-139	-140	-141	-142	-117	-118	-119	-120	136	137	138	139	140	141	142	143				
Control		-143	-144	-145	-146	-123	-124	-125	-126	-2	-3	-4	-5	-6	-7	-8	-9				
Ctrl-Shifted		-147	-148	-149	-150	-129	-130	-131	-132	-10	-11	-12	-13	-14	-15	-16	-17				
	Attn Sys Rq	Clear Cr Sel	~ `	! 1	@ 2	# 3	\$ 4	% 5	^ 6	& 7	* 8	( 9	) 0	- -	+ =	← ←	Dup PA1	Field Mark PA2	7 PF13	8 PF14	9 PF15
Unshifted	-179	-180	96	49	50	51	52	53	54	55	56	57	48	45	61	8	-199	-200	-62	-63	-64
Shifted	-184	-185	126	33	64	35	36	37	94	38	42	40	41	95	43	-40	-206	-207	-76	-77	-78
Control	-189	-190	96	49	50	51	52	53	54	55	56	57	48	45	61	-41	-213	-214	-90	-91	-92
Ctrl-Shifted	-194	-195	126	33	0	35	36	37	30	38	42	40	41	31	43	-42	-220	-221	-104	-105	-106
	DErase S Erase	Esc Er Ind	→	Q	W	E	R	T	Y	U	I	O	P	]	[	Del X	↻	↵	4 PF16	5 PF17	6 PF18
Unshifted	-115	27	9	113	119	101	114	116	121	117	105	111	112	91	92	127	-201	-67	-59	-60	-61
Shifted	-121	-37	-46	81	87	69	82	84	89	85	73	79	80	93	124	-34	-208	-81	-73	-74	-75
Control	-127	-38	-47	17	23	5	18	20	25	21	9	15	16	27	28	-35	-215	-95	-87	-88	-89
Ctrl-Shifted	-133	-39	-48	17	23	5	18	20	25	21	9	15	16	29	28	-36	-222	-109	-101	-102	-103
	Jump Alt Cr	Erns Er	␣	A	S	D	F	G	H	J	K	L	:	"	)	(	↑	↓	1 PF19	2 PF20	3 PF21
Unshifted	-181	-182		97	115	100	102	103	104	106	107	108	59	39	123		-202	-203	-56	-57	-58
Shifted	-186	-187		65	83	68	70	71	72	74	75	76	58	34	125		-209	-210	-70	-71	-72
Control	-191	-192		1	19	4	6	7	8	10	11	12	59	39	123		-216	-217	-84	-85	-86
Ctrl-Shifted	-196	-197		1	19	4	6	7	8	10	11	12	58	34	125		-223	-224	-98	-99	-100
	Ident	Break Test	↑	>	Z	X	C	U	B	N	M	,	.	?	↑	↵	←	→	0 PF22	PF23	PF24
Unshifted	-183	-116		60	122	120	99	118	98	110	109	44	46	47	13		-204	-205	-55	-65	-66
Shifted	-188	-122		62	90	88	67	86	66	78	77	44	46	63	-49		-211	-212	-69	-79	-80
Control	-193	-128		60	26	24	3	22	2	14	13	44	46	47	-50		-218	-219	-83	-93	-94
Ctrl-Shifted	-198	-134		62	26	24	3	22	2	14	13	44	46	63	-51		-225	-226	-97	-107	-108
	Reset Dev Onl	Alt Ctrl																			
Unshifted	-227					32															-68
Shifted	-228					-52															-82
Control	-229					-53															-96
Ctrl-Shifted	-230					-54															-110

5256-12A

Figure C-2. North American (ASCII) Keyboard Layout and Key Macro Numbers.

BITS				0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
B7	B6	B5		CONTROL				FIGURES				UPPERCASE				LOWERCASE			
B4	B3	B2	B1																
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	@ <sub>64</sub>	P <sub>80</sub>	\ <sub>96</sub>	p <sub>112</sub>								
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>								
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>								
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	# <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>								
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>								
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>								
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>								
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	' <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>								
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>								
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>								
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>								
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	[ <sub>91</sub>	k <sub>107</sub>	{ <sub>123</sub>								
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	\ <sub>92</sub>	l <sub>108</sub>	<sub>124</sub>								
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	] <sub>93</sub>	m <sub>109</sub>	} <sub>125</sub>								
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	~ <sub>126</sub>								
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	_ <sub>95</sub>	o <sub>111</sub>	DT <sub>127</sub>								

(4526)4893-18A

Figure C-3. North American (ASCII) Code Chart.

## UNITED KINGDOM CHARACTER SET

		Right Up	Left Down	G Erase Dialog	Cancel Setup	D Copy S Copy	Menu	F1	F2	F3	F4	F5	F6	F7	F8							
Unshifted		-135	-136	-137	-138	-111	-112	-113	-114	128	129	130	131	132	133	134	135					
Shifted		-139	-140	-141	-142	-117	-118	-119	-120	136	137	138	139	140	141	142	143					
Control		-143	-144	-145	-146	-123	-124	-125	-126	-2	-3	-4	-5	-6	-7	-8	-9					
Ctrl-Shifted		-147	-148	-149	-150	-129	-130	-131	-132	-10	-11	-12	-13	-14	-15	-16	-17					
	Attn Sys Rq	Clear CR Sel	1	2	3	4	5	6	7	8	9	0	=	-	←	Dup PA1	Field MCK PAZ	7 PF13	8 PF14	9 PF15		
Unshifted	-179	-180	92	49	50	51	52	53	54	55	56	57	48	45	95	8	-199	-200	-62	-63	-64	
Shifted	-184	-185	124	33	34	35	36	37	38	39	40	41	94	61	95	-40	-206	-207	-76	-77	-78	
Control	-189	-190	28	49	50	51	52	53	54	55	56	57	48	45	31	-41	-213	-214	-90	-91	-92	
Ctrl-Shifted	-194	-195	28	33	34	35	36	37	38	39	40	41	30	61	31	-42	-220	-221	-104	-105	-106	
	D Erase S Erase	Esc EF Inv	→	Q	W	E	R	T	Y	U	I	O	P	⌘	[	← Del	⌘	-	4 PF16	5 PF17	6 PF18	
Unshifted	-115	27	9	113	119	101	114	116	121	117	105	111	112	64	91	127	-201	-67	-59	-60	-61	
Shifted	-121	-37	-46	81	87	69	82	84	89	85	73	79	80	96	123	-34	-208	-81	-73	-74	-75	
Control	-127	-38	-47	17	23	5	18	20	25	21	9	15	16	0	27	-35	-215	-95	-87	-88	-89	
Ctrl-Shifted	-133	-39	-48	17	23	5	18	20	25	21	9	15	16	96	123	-36	-222	-109	-101	-102	-103	
	Jump Alt Cr	Erase EOF	Ⓜ	A	S	D	F	G	H	J	K	L	+	*	}		↑	↓	1 PF19	2 PF20	3 PF21	
Unshifted	-181	-182		97	115	100	102	103	104	106	107	108	59	58	93		-202	-203	-56	-57	-58	
Shifted	-186	-187		65	83	68	70	71	72	74	75	76	43	42	125		-209	-210	-70	-71	-72	
Control	-191	-192		1	19	4	6	7	8	10	11	12	59	58	29		-216	-217	-84	-85	-86	
Ctrl-Shifted	-196	-197		1	19	4	6	7	8	10	11	12	43	42	125		-223	-224	-98	-99	-100	
	Ident	Break Test	↑	1	Z	X	C	V	B	N	M	<	>	?	⇧		←	→	0 PF22	.	/ PF23	, PF24
Unshifted	-183	-116		124	122	120	99	118	98	110	109	44	46	47	13		-204	-205	-55	-65	-66	
Shifted	-188	-122		126	90	88	67	86	66	78	77	60	62	63	-40		-211	-212	-69	-79	-80	
Control	-193	-128		124	26	24	3	22	2	14	13	44	46	47	-50		-218	-219	-83	-93	-94	
Ctrl-Shifted	-198	-134		126	26	24	3	22	2	14	13	60	62	63	-51		-225	-226	-97	-107	-108	
	Reset Dev Cncl	Alt Ctrl															Alt Ctrl	Enter				
Unshifted	-227					32															-68	
Shifted	-228					-52															-82	
Control	-229					-53															-96	
Ctrl-Shifted	-230					-54															-110	

5256-13A

Figure C-4. United Kingdom Keyboard Layout and Key Macro Numbers.

BITS B7 B6 B5 B4 B3 B2 B1				0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
				CONTROL		FIGURES		UPPERCASE		LOWERCASE	
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	@ <sub>64</sub>	P <sub>80</sub>	\ <sub>96</sub>	p <sub>112</sub>
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	£ <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	/ <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	[ <sub>91</sub>	k <sub>107</sub>	{ <sub>123</sub>
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	\ <sub>92</sub>	l <sub>108</sub>	<sub>124</sub>
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	] <sub>93</sub>	m <sub>109</sub>	} <sub>125</sub>
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	~ <sub>126</sub>
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	_ <sub>95</sub>	o <sub>111</sub>	DT <sub>127</sub>

(4526)4893-20C

Figure C-5. United Kingdom Code Chart.

## FRENCH CHARACTER SET

	Right Up	Left Down	G Eras Dialog	Cancel Setup	D Copy S Copy	Menu	F1	F2	F3	F4	F5	F6	F7	F8		
Unshifted	-135	-136	-137	-138	-111	-112	-113	-114	128	129	130	131	132	133	134	135
Shifted	-139	-140	-141	-142	-117	-118	-119	-120	136	137	138	139	140	141	142	143
Control	-143	-144	-145	-146	-123	-124	-125	-126	-2	-3	-4	-5	-6	-7	-8	-9
Ctrl-Shifted	-147	-148	-149	-150	-129	-130	-131	-132	-10	-11	-12	-13	-14	-15	-16	-17
	Attn Sys Req	Clear Cr Sel	1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9	0 0	1 1	2 2	3 3	4 4
Unshifted	-179	-180	-43	49	50	51	52	53	54	55	56	57	48	39	94	8
Shifted	-184	-185	-44	33	34	93	36	37	43	47	40	41	61	63	126	-40
Control	-189	-190	-45	49	50	51	52	53	54	55	56	57	48	39	30	-41
Ctrl-Shifted	-194	-195	-45	33	34	29	36	37	43	47	40	41	61	63	126	-42
	D Eras S Eras	Esc Er Ind	←	A	Z	E	R	T	Y	U	I	O	P	C Ct	* B	← Del
Unshifted	-115	27	9	97	122	101	114	116	121	117	105	111	112	64	38	127
Shifted	-121	-37	-46	65	90	69	82	84	89	85	73	79	80	92	42	-34
Control	-127	-38	-47	1	26	5	18	20	25	21	9	15	16	0	38	-35
Ctrl-Shifted	-133	-39	-48	1	26	5	18	20	25	21	9	15	16	28	42	-36
	Jump Alt Cr	Eras EOF	␣	Q	S	D	F	G	H	J	K	L	é é	° ù	£ µ	
Unshifted	-181	-182		113	115	100	102	103	104	106	107	108	123	124	96	
Shifted	-186	-187		81	83	68	70	71	72	74	75	76	125	91	35	
Control	-191	-192		17	19	4	6	7	8	10	11	12	123	124	96	
Ctrl-Shifted	-196	-197		17	19	4	6	7	8	10	11	12	125	27	35	
	Ctrl- Ident	Break Test	⇧	>	W	X	C	U	B	N	M	;	:	-	⇧	
Unshifted	-183	-116		60	119	120	99	118	98	110	109	44	46	45		13
Shifted	-188	-122		62	87	88	67	86	66	78	77	59	58	95		-49
Control	-193	-128		60	23	24	3	22	2	14	13	44	46	45		-50
Ctrl-Shifted	-198	-134		62	23	24	3	22	2	14	13	59	58	31		-51
	Reset Dev Cncl	Alt Ctrl														
Unshifted	-227															-68
Shifted	-228															-82
Control	-229															-96
Ctrl-Shifted	-230															-110
	Dup PA1	Field PA2	7 PF13	8 PF14	9 PF15											
Unshifted	-199	-200	-62	-63	-64											
Shifted	-206	-207	-76	-77	-78											
Control	-213	-214	-90	-91	-92											
Ctrl-Shifted	-220	-221	-104	-105	-106											
			4 PF16	5 PF17	6 PF18											
Unshifted	-201	-67	-59	-60	-61											
Shifted	-208	-81	-73	-74	-75											
Control	-215	-95	-87	-88	-89											
Ctrl-Shifted	-222	-109	-101	-102	-103											
	↑	↓	1 PF19	2 PF20	3 PF21											
Unshifted	-202	-203	-56	-57	-58											
Shifted	-209	-210	-70	-71	-72											
Control	-216	-217	-84	-85	-86											
Ctrl-Shifted	-223	-224	-98	-99	-100											
	←	→	0 PF22	PF23	PF24											
Unshifted	-204	-205	-55	-65	-66											
Shifted	-211	-212	-69	-79	-80											
Control	-218	-219	-83	-93	-94											
Ctrl-Shifted	-225	-226	-97	-107	-108											

NOTE: When in HOSTPORT RS-232, the unlabeled key to the left of the 1 key transmits a Line Feed (LF) character.

5256-14B

Figure C-6. French Keyboard Layout and Key Macro Numbers.

BITS				0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
B7	B6	B5		CONTROL		FIGURES		UPPERCASE		LOWERCASE	
B4	B3	B2	B1								
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	à <sub>64</sub>	P <sub>80</sub>	μ <sub>96</sub>	p <sub>112</sub>
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	£ <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	' <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	° <sub>91</sub>	k <sub>107</sub>	é <sub>123</sub>
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	ç <sub>92</sub>	l <sub>108</sub>	ù <sub>124</sub>
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	§ <sub>93</sub>	m <sub>109</sub>	è <sub>125</sub>
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	" <sub>126</sub>
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	— <sub>95</sub>	o <sub>111</sub>	D <sub>T</sub> <sub>127</sub>

(4526)4893-22C

Figure C-7. French Code Chart.

## SWEDISH CHARACTER SET

		Right Up	Left Down	G Eras Dialog	Cancel Setup	D Copy S Copy	Menu	F1	F2	F3	F4	F5	F6	F7	F8								
Unshifted		-135	-136	-137	-138	-111	-112	-113	-114	128	129	130	131	132	133	134	135						
Shifted		-139	-140	-141	-142	-117	-118	-119	-120	136	137	138	139	140	141	142	143						
Control		-143	-144	-145	-146	-123	-124	-125	-126	-2	-3	-4	-5	-6	-7	-8	-9						
Ctrl-Shifted		-147	-148	-149	-150	-129	-130	-131	-132	-10	-11	-12	-13	-14	-15	-16	-17						
	Attn Sys Rq	Clear Cr Sel	1	2	3	4	5	6	7	8	9	=	?	\	@	←	Dup PA1	Field Back PA2	7 PF13	8 PF14	9 PF15		
Unshifted	-179	-180	-43	49	50	51	52	53	54	55	56	57	48	43	64	8	-199	-200	-62	-63	-64		
Shifted	-184	-185	-44	33	34	35	36	37	38	47	40	41	61	63	96	-40	-206	-207	-76	-77	-78		
Control	-189	-190	-45	49	50	51	52	53	54	55	56	57	48	43	0	-41	-213	-214	-90	-91	-92		
Ctrl-Shifted	-194	-195	-45	33	34	35	36	37	38	47	40	41	61	63	96	-42	-220	-221	-104	-105	-106		
	D Eras S Eras	Esc Er Imp	→	Q	W	E	R	T	Y	U	I	O	P	A	^	Del	↶	↷	4 PF16	5 PF17	6 PF18		
Unshifted	-115	27	9	113	119	101	114	116	121	117	105	111	112	125	126	127	-201	-67	-59	-60	-61		
Shifted	-121	-37	-46	81	87	69	82	84	89	85	73	79	80	93	94	-34	-208	-81	-73	-74	-75		
Control	-127	-38	-47	17	23	5	18	20	25	21	9	15	16	29	126	-35	-215	-95	-87	-88	-89		
Ctrl-Shifted	-133	-39	-48	17	23	5	18	20	25	21	9	15	16	29	30	-36	-222	-109	-101	-102	-103		
	Jump Alt Cr	Eras EOF	Ⓢ	•	A	S	D	F	G	H	J	K	L	Ü	Ä	*	↑	↓	1 PF19	2 PF20	3 PF21		
Unshifted	-181	-182		97	115	100	102	103	104	106	107	108	124	123	39		-202	-203	-56	-57	-58		
Shifted	-186	-187		65	83	68	70	71	72	74	75	76	92	91	42		-209	-210	-70	-71	-72		
Control	-191	-192		1	19	4	6	7	8	10	11	12	28	27	39		-216	-217	-84	-85	-86		
Ctrl-Shifted	-196	-197		1	19	4	6	7	8	10	11	12	28	27	42		-223	-224	-98	-99	-100		
	Ident	Break Test	↑	>	Z	X	C	U	B	N	M	;	:	-	↓	↶	↷	0 PF22	,	PF23	.	PF24	
Unshifted	-183	-116		60	122	120	99	118	98	110	109	44	46	45	13		-204	-205	-55	-65	-66		
Shifted	-188	-122		62	90	88	67	86	66	78	77	59	58	95	-49		-211	-212	-69	-79	-80		
Control	-193	-128		60	26	24	3	22	2	14	13	44	46	45	-50		-218	-219	-83	-93	-94		
Ctrl-Shifted	-198	-134		62	26	24	3	22	2	14	13	59	58	31	-51		-225	-226	-97	-107	-108		
	Reset Dev Cncl	Alt Ctrl															Alt Ctrl	Enter					
Unshifted	-227					32																-68	
Shifted	-228					-52																	-82
Control	-229					-53																	-96
Ctrl-Shifted	-230					-54																	-110

NOTE: When in HOSTPORT RS-232, the unlabeled key to the left of the 7 key transmits a Line Feed (LF) character.

5256-15B

Figure C-8. Swedish Keyboard Layout and Key Macro Numbers.



BITS				0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
B7	B6	B5		CONTROL				FIGURES				UPPERCASE				LOWERCASE			
B4	B3	B2	B1																
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	@ <sub>64</sub>	P <sub>80</sub>	\ <sub>96</sub>	p <sub>112</sub>								
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>								
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>								
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	# <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>								
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	α <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>								
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>								
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>								
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	' <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>								
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>								
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>								
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>								
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	Ä <sub>91</sub>	k <sub>107</sub>	ä <sub>123</sub>								
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	Ö <sub>92</sub>	l <sub>108</sub>	ö <sub>124</sub>								
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	Å <sub>93</sub>	m <sub>109</sub>	å <sub>125</sub>								
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	- <sub>126</sub>								
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	_ <sub>95</sub>	o <sub>111</sub>	DT <sub>127</sub>								

(4526)4893-24A

Figure C-9. Swedish Code Chart.



BITS B7 B6 B5 B4 B3 B2 B1				0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
				CONTROL		FIGURES		UPPERCASE		LOWERCASE	
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	@ <sub>64</sub>	P <sub>80</sub>	\ <sub>96</sub>	p <sub>112</sub>
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	# <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	' <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	Æ <sub>91</sub>	k <sub>107</sub>	æ <sub>123</sub>
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	Ø <sub>92</sub>	l <sub>108</sub>	ø <sub>124</sub>
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	Å <sub>93</sub>	m <sub>109</sub>	å <sub>125</sub>
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	— <sub>126</sub>
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	_ <sub>95</sub>	o <sub>111</sub>	DT <sub>127</sub>

(4526)4893-26A

Figure C-11. Danish/Norwegian Code Chart.



BITS				0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
B7	B6	B5		CONTROL				FIGURES				UPPERCASE				LOWERCASE			
B4	B3	B2	B1																
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	§ <sub>64</sub>	P <sub>80</sub>	\ <sub>96</sub>	p <sub>112</sub>								
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	a <sub>97</sub>	q <sub>113</sub>								
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	b <sub>98</sub>	r <sub>114</sub>								
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	# <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	c <sub>99</sub>	s <sub>115</sub>								
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	d <sub>100</sub>	t <sub>116</sub>								
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	e <sub>101</sub>	u <sub>117</sub>								
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	f <sub>102</sub>	v <sub>118</sub>								
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	/ <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	g <sub>103</sub>	w <sub>119</sub>								
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	h <sub>104</sub>	x <sub>120</sub>								
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	i <sub>105</sub>	y <sub>121</sub>								
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>	j <sub>106</sub>	z <sub>122</sub>								
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	Ä <sub>91</sub>	k <sub>107</sub>	ä <sub>123</sub>								
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	Ö <sub>92</sub>	l <sub>108</sub>	ö <sub>124</sub>								
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	Ü <sub>93</sub>	m <sub>109</sub>	ü <sub>125</sub>								
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>	n <sub>110</sub>	ß <sub>126</sub>								
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>	_ <sub>95</sub>	o <sub>111</sub>	DT <sub>127</sub>								

(4526)4893-28B

Figure C-13. German Code Chart.













































































































































## SUPPLEMENTARY CHARACTER SET

BITS B7 B6 B5 B4 B3 B2 B1				0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
				CONTROL		FIGURES		UPPERCASE		LOWERCASE	
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	SP <sub>32</sub>	0 <sub>48</sub>	— <sub>64</sub>	Ñ <sub>80</sub>	◆ <sub>96</sub>	☐ <sub>112</sub>
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	Ä <sub>33</sub>	1 <sub>49</sub>	¢ <sub>65</sub>	ñ <sub>81</sub>	■ <sub>97</sub>	☐ <sub>113</sub>
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	ä <sub>34</sub>	2 <sub>50</sub>	¡ <sub>66</sub>	¿ <sub>82</sub>	HT <sub>98</sub>	☐ <sub>114</sub>
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	À <sub>35</sub>	3 <sub>51</sub>	† <sub>67</sub>	ì <sub>83</sub>	FF <sub>99</sub>	☐ <sub>115</sub>
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	à <sub>36</sub>	4 <sub>52</sub>	□ <sub>68</sub>	α <sub>84</sub>	CR <sub>100</sub>	☐ <sub>116</sub>
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	Æ <sub>37</sub>	5 <sub>53</sub>	■ <sub>69</sub>	σ <sub>85</sub>	LF <sub>101</sub>	☐ <sub>117</sub>
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	æ <sub>38</sub>	6 <sub>54</sub>	● <sub>70</sub>	τ <sub>86</sub>	° <sub>102</sub>	☐ <sub>118</sub>
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	à <sub>39</sub>	7 <sub>55</sub>	Δ <sub>71</sub>	ψ <sub>87</sub>	± <sub>103</sub>	☐ <sub>119</sub>
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	ç <sub>40</sub>	8 <sub>56</sub>	ð <sub>72</sub>	μ <sub>88</sub>	NL <sub>104</sub>	☐ <sub>120</sub>
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	é <sub>41</sub>	9 <sub>57</sub>	λ <sub>73</sub>	Σ <sub>89</sub>	VT <sub>105</sub>	≤ <sub>121</sub>
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	è <sub>42</sub>	ù <sub>58</sub>	∟ <sub>74</sub>	Ω <sub>90</sub>	☐ <sub>106</sub>	≥ <sub>122</sub>
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	ö <sub>43</sub>	β <sub>59</sub>	L <sub>75</sub>	∫ <sub>91</sub>	☐ <sub>107</sub>	π <sub>123</sub>
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	ö <sub>44</sub>	ø <sub>60</sub>	∟ <sub>76</sub>	∫ <sub>92</sub>	☐ <sub>108</sub>	≠ <sub>124</sub>
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	ø <sub>45</sub>	α <sub>61</sub>	∟ <sub>77</sub>	÷ <sub>93</sub>	☐ <sub>109</sub>	·£ <sub>125</sub>
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	ü <sub>46</sub>	§ <sub>62</sub>	∟ <sub>78</sub>	≈ <sub>94</sub>	☐ <sub>110</sub>	• <sub>126</sub>
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	ü <sub>47</sub>	•• <sub>63</sub>	∞ <sub>79</sub>	√ <sub>95</sub>	☐ <sub>111</sub>	DT <sub>127</sub>

(4526)4893-29D

Figure C-14. Supplementary Characters Code Chart.

## RULING CHARACTER SET

BITS				0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
B7	B6	B5		CONTROL				FIGURES				UPPERCASE				LOWERCASE			
0	0	0	0																
B4	B3	B2	B1																
0	0	0	0	NU <sub>0</sub>	DL <sub>16</sub>	Sp <sub>32</sub>	0 <sub>48</sub>	@ <sub>64</sub>	P <sub>80</sub>	◆ <sub>96</sub>									
0	0	0	1	SH <sub>1</sub>	D1 <sub>17</sub>	! <sub>33</sub>	1 <sub>49</sub>	A <sub>65</sub>	Q <sub>81</sub>	■ <sub>97</sub>									
0	0	1	0	SX <sub>2</sub>	D2 <sub>18</sub>	" <sub>34</sub>	2 <sub>50</sub>	B <sub>66</sub>	R <sub>82</sub>	HT <sub>98</sub>									
0	0	1	1	EX <sub>3</sub>	D3 <sub>19</sub>	# <sub>35</sub>	3 <sub>51</sub>	C <sub>67</sub>	S <sub>83</sub>	FF <sub>99</sub>									
0	1	0	0	ET <sub>4</sub>	D4 <sub>20</sub>	\$ <sub>36</sub>	4 <sub>52</sub>	D <sub>68</sub>	T <sub>84</sub>	CR <sub>100</sub>									
0	1	0	1	EQ <sub>5</sub>	NK <sub>21</sub>	% <sub>37</sub>	5 <sub>53</sub>	E <sub>69</sub>	U <sub>85</sub>	LF <sub>101</sub>									
0	1	1	0	AK <sub>6</sub>	SN <sub>22</sub>	& <sub>38</sub>	6 <sub>54</sub>	F <sub>70</sub>	V <sub>86</sub>	° <sub>102</sub>									
0	1	1	1	BL <sub>7</sub>	EB <sub>23</sub>	' <sub>39</sub>	7 <sub>55</sub>	G <sub>71</sub>	W <sub>87</sub>	± <sub>103</sub>									
1	0	0	0	BS <sub>8</sub>	CN <sub>24</sub>	( <sub>40</sub>	8 <sub>56</sub>	H <sub>72</sub>	X <sub>88</sub>	NL <sub>104</sub>									
1	0	0	1	HT <sub>9</sub>	EM <sub>25</sub>	) <sub>41</sub>	9 <sub>57</sub>	I <sub>73</sub>	Y <sub>89</sub>	VT <sub>105</sub>									
1	0	1	0	LF <sub>10</sub>	SB <sub>26</sub>	* <sub>42</sub>	: <sub>58</sub>	J <sub>74</sub>	Z <sub>90</sub>										
1	0	1	1	VT <sub>11</sub>	EC <sub>27</sub>	+ <sub>43</sub>	; <sub>59</sub>	K <sub>75</sub>	[ <sub>91</sub>										
1	1	0	0	FF <sub>12</sub>	FS <sub>28</sub>	, <sub>44</sub>	< <sub>60</sub>	L <sub>76</sub>	\ <sub>92</sub>										
1	1	0	1	CR <sub>13</sub>	GS <sub>29</sub>	- <sub>45</sub>	= <sub>61</sub>	M <sub>77</sub>	] <sub>93</sub>										
1	1	1	0	SO <sub>14</sub>	RS <sub>30</sub>	. <sub>46</sub>	> <sub>62</sub>	N <sub>78</sub>	^ <sub>94</sub>										
1	1	1	1	SI <sub>15</sub>	US <sub>31</sub>	/ <sub>47</sub>	? <sub>63</sub>	O <sub>79</sub>											

(4526)4893-30A

Figure C-15. Ruling Characters Code Chart.

## MULTILINGUAL (ASCII) CHARACTER SET

BITS				0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1	
B7	B6	B5		CONTROL				FIGURES				UPPERCASE				LOWERCASE			
B4	B3	B2	B1																
0	0	0	0	0	16	Sp	32	°	48	À	64	Ð	80	à	96	ä	112		
0	0	0	1	1	17	í	33	±	49	Á	65	Ñ	81	á	97	ñ	113		
0	0	1	0	2	18	φ	34	²	50	Â	66	Ò	82	â	98	ò	114		
0	0	1	1	3	19	£	35	³	51	Ã	67	Ó	83	ã	99	ó	115		
0	1	0	0	4	20	¤	36	/	52	Ä	68	Ö	84	ä	100	ö	116		
0	1	0	1	5	21	¥	37	µ	53	Å	69	Õ	85	å	101	õ	117		
0	1	1	0	6	22	:	38	¶	54	Æ	70	Ö	86	æ	102	ö	118		
0	1	1	1	7	23	§	39	·	55	Ç	71	×	87	ç	103	÷	119		
1	0	0	0	8	24	¨	40	¸	56	È	72	Ø	88	è	104	ø	120		
1	0	0	1	9	25	©	41	¹	57	É	73	Ù	89	é	105	ù	121		
1	0	1	0	10	26	ª	42	º	58	Ê	74	Ú	90	ê	106	ú	122		
1	0	1	1	11	27	«	43	»	59	Ë	75	Û	91	ë	107	û	123		
1	1	0	0	12	28	¬	44	¼	60	Ì	76	Ü	92	ì	108	ü	124		
1	1	0	1	13	29	–	45	½	61	Í	77	Ý	93	í	109	ý	125		
1	1	1	0	14	30	®	46	¾	62	Î	78	Þ	94	î	110	þ	126		
1	1	1	1	15	31	—	47	¿	63	Ï	79	ß	95	ï	111	ÿ	127		

NOTES: • This character set can only be specified as a G1 character set with 96 characters.  
 • ADE 32, shown here as Sp, is the *no-break space*.  
 • ADE 45, shown here as -, is the *soft hyphen*.  
 • ADE 56, shown here as ¸, is the *cedilla*.

6048-1

Figure C-16. Multilingual (ASCII) Code Chart.



## Appendix D

# SELF TEST DIAGNOSTIC PROGRAM

The Self Test diagnostic programs allow you to test the terminal and its interaction with peripherals. The Self Test program reports any errors on the terminal screen; these error messages help locate the probable source of the problem.

See *Error Reporting* (just ahead) for how the terminal reports errors and what action you should take if it does.

### LEVELS OF SELF TEST

The terminal has three Self Test levels:

- *Power-Up Self Test* — Power-Up Self Test runs automatically every time the terminal is turned on or reset. It performs a quick check of terminal circuitry before allowing the terminal to be used. Power-Up Self Test takes approximately 15 seconds to complete, and requires no user interaction.
- *Main Self Test* — Contains all the tests performed by Power-Up Self Test, plus more extensive tests of terminal circuitry, particularly memory. Main Self Test displays a menu from which you can enter Extended Self Test.
- *Extended Self Test* — Provides interactive tests that allow you to check the keyboard and the terminal's interaction with peripherals. Portions of Extended Self Test are also used by service technicians to adjust and calibrate the terminal's display.

Figure D-1 illustrates how the three levels of Self Test are related.

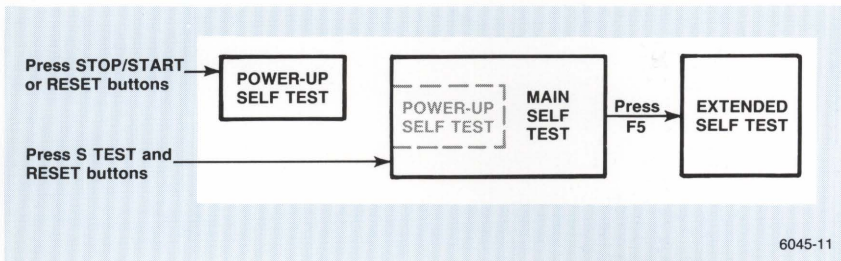


Figure D-1. Levels of Self Test.

## ERROR REPORTING

When Self Test detects an error, it writes a message on the screen or rings the terminal's bell twice, or both. If the test detects a keyboard error, the small light in the Caps Lock key remains lit.

Self Test errors are listed as bulleted items on the screen.

If a Self Test error message appears on the screen, write it down. These error messages will help you or a service technician diagnose the problem more quickly.

## USER INTERACTION

When Self Test displays a Menu on the screen followed by the prompt *Selection:*, the terminal is waiting for your input before continuing. Just press the appropriate function key from those listed on the menu. In addition, some tests ask you to connect peripheral devices or connectors to the terminal's ports; for these tests, just follow the instructions that appear on the screen.

## POWER-UP SELF TEST

Power-Up Self Test runs every time you turn on the terminal or push the RESET button. This test checks the keyboard first (if it is connected), then checks the circuitry in the display unit.

During the keyboard test, the light in the Caps Lock key blinks on once and then stays off. If the keyboard test fails, the Caps Lock light stays on. A message may also be written on the screen.

If there is a problem in the display unit, the terminal writes a message on the screen and rings the bell twice. (If the bell rings twice and no message appears, try turning up the Brightness button.)

If Power-Up Self Test does not detect any errors, the terminal displays an underline or block cursor when the test is complete.

## POWER-UP SELF TEST ERRORS

All Power-Up Self Test errors are listed as bulleted items after the words *Self Test Error*. If a Self Test error occurs during power-up, follow these procedures:

1. Press the Reset button on the front of the terminal. This causes the terminal to rerun Power-Up Self Test. If no errors are detected, the terminal is operating normally.
2. If a Self Test error occurs during the second Power-Up Self Test, note the message — then:
  - If the message includes the words *Keyboard Self Test failed*, check the keyboard cable connection on the front of the terminal.
  - If the message includes the words *Nonvolatile Parameters Load* and *Parameters reset to factory defaults*, you may have to reset some operating parameters before running an applications program. Consult the communications command table in Appendix A of this manual for the proper settings.
  - If you've just installed new ROMs but the terminal doesn't operate normally and no messages appear, follow the instructions at the end of the ROM installation procedures you received with the new ROMs.

If these methods fail, or if any other messages appear, write them down and call your Tektronix service center. The service technician may ask you to remove the circuit board access door and note the status of certain LED indicator lights on some terminal components.

You can still use the terminal if the failure does not affect your application. For example, if one of the peripheral ports failed and your application doesn't require that port, you could go ahead and use the terminal until the problem is fixed.

## MAIN SELF TEST

Main Self Test contains a number of tests, some of which are only run by service technicians. If you simply need to verify that the terminal is functioning properly, run the portion of Main Self Test that we show you here. (If necessary, refer to Appendix B for photographs and explanations of the keys and controls you will use in these steps.)

1. Locate the S TEST and RESET buttons on the front of the terminal.
2. Press S TEST and hold it in. While holding in S TEST, press and release RESET. Continue to hold in S TEST for another two seconds, and then release it.

After about seven seconds, the keyboard bell beeps once and this menu is displayed:

### Main Self Test Menu

<b>F2</b>	<b>Self Test</b>
<b>F3</b>	<b>Continuous Self Test</b>
<b>F4</b>	<b>Self Test followed by Extended Self Test</b>
<b>F5</b>	<b>Extended Self Test Menu</b>
<b>Sh F1</b>	<b>Factory Mode Menu</b>
<b>F7</b>	<b>Redisplay Main Menu</b>
<b>F8</b>	<b>Enter Terminal Mode</b>

### Selection:

3. Press Function Key F2 (at the top right of the keyboard) to continue Self Test. (If you don't press a key within 20 seconds after the Main Self Test Menu appears, Self Test continues automatically.)

After about 12 minutes, if no errors are detected, the Main Self Test Menu is redisplayed. At this point, you can exit this portion of Main Self Test or continue to test the terminal:

- Pressing F3 causes Self Test to execute repeatedly. To get out of this continuous testing mode, you must press the RESET button or turn the terminal off. Normally, you should not use this test cycle.
- Pressing F4 cycles you through a portion of Extended Self Test that the factory uses to test the terminal. Normally, you should not use this test cycle.

- Pressing F5 displays the Extended Self Test Menu. It is from this menu that you select specific peripheral devices and terminal components to test.
  - Pressing Sh F1 (Shift-F1) displays the Factory Mode Menu, which is used only in the manufacturing process. This menu is only used by trained service personnel.
  - Pressing Function Key F7 blanks the screen and then redisplay the Main Self Test Menu.
  - Pressing Function Key F8 exits Main Self Test and returns the terminal to normal operations.
4. Press F8 to exit Main Self Test and return the terminal to normal operations, or press F5 to access the Extended Self Test Menu, which allows you to test the keyboard and peripherals.

If the terminal does detect an error, it rings the keyboard bell twice, or writes a message on the screen, or both. (If no message appears, try turning up the Brightness button.)

## EXTENDED SELF TEST

Use Extended Self Test to test specific parts of the terminal as well as test the terminal's interaction with peripheral devices.

If the Extended Self Test Menu is not already displayed on the terminal screen, you will need to rerun a portion of Main Self Test. Just press in the S TEST button and hold it in while you press and release RESET, then hold in S TEST for another two seconds and release it. Then, when you see the Main Self Test menu appear, press Function Key F5, which displays the Extended Self Test Menu:

### Extended Self Test Menu

- F1**      **Reset Nonvolatile Parameters (to Factory Settings)**
- F2**      **Keyboard Menu**
- F3**      **RS-232 Interface Menu**
- F4**      **Hardcopy Menu**
- F5**      **Display Pattern Menu**
- F6**      **Graphics Tablet Test<sup>1</sup>**
  
- Sh F1**   **Coax Interface Test**
  
- F7**      **Exit Current Menu**
- F8**      **Enter Terminal Mode**

### Selection:

Once the Extended Self Test Menu is displayed, the terminal waits for you to press one of the function keys:

- Pressing F1 resets all parameters to their factory default values. Don't press F1 unless you are sure you don't want to keep settings saved in nonvolatile memory.
- Pressing F2 through F5 displays the menu indicated by its title.
- Pressing F6 begins the graphics tablet test (this test only applies to the 4207).
- Pressing Sh F1 (Shift-F1) begins the coax interface test.
- Pressing F7 redisplayes the Main Self Test Menu.
- Pressing F8 exits Extended Self Test and returns normal terminal operations.

To start one of the tests or to display another menu, just press the appropriate function key. The rest of this appendix describes each of these menu items.

### NOTE

*This discussion only covers the areas of Extended Self Test that typical users need. Some menu items are for internal adjustment of the terminal and are normally performed by service personnel. For a discussion of these parts of Extended Self Test, refer to the service manual for your terminal.*

<sup>1</sup> This line only appears on the 4207.

## F1: RESET NONVOLATILE PARAMETERS

**CAUTION**

*Pressing F1 resets all parameters — including the communications parameters — to their factory defaults. Unless you want all parameters reset to their factory defaults, do not press F1.*

Pressing F1 from the Extended Self Test Menu resets all terminal parameters to their factory defaults, just as the FACTORY command followed by an NVSAVE command does. Then this message is displayed:

**Nonvolatile Parameters Load  
Parameters Reset to Factory Defaults**

**Selection:**

Now all volatile and nonvolatile parameters are at factory default, and the terminal prompts you for another selection from the Extended Self Test Menu.

**CAUTION**

*The terminal's nonvolatile memory will sustain approximately ten thousand resets. This should be sufficient for many years of normal terminal operation. However, to prolong the life of the memory, it is best to reset nonvolatile parameters only when necessary.*

## F2: KEYBOARD MENU

Pressing F2 from the Extended Self Test Menu displays the Keyboard Menu:

### Keyboard Menu

<b>F1</b>	<b>Keyboard Echo</b>
<b>F2</b>	<b>Mouse Verification</b>
<b>F3</b>	<b>Bell Test</b>
<b>F7</b>	<b>Exit Current Menu</b>
<b>F8</b>	<b>Enter Terminal Mode</b>

### Selection:

Just select the item from the menu that you want to test, press the appropriate function key, and then follow the instructions that appear on the terminal's screen.

### Mouse Verification Test

Pressing F2 from the Keyboard Menu starts the Mouse Verification Test, which displays an abbreviated set of instructions for testing the operation of the mouse. You can use the instructions here to supplement those on the screen.

You will be using the mouse to draw lines on the screen — first, you'll draw lines to each corner of the screen and then you'll draw a circle in the center of the screen. The lines should match the direction and movement of the mouse as you move it around on your desk (or other flat surface).

The keys you will use during this verification test are:

- **Menu key** — Use this key to toggle the instructions on and off the screen so you can see more of what you're drawing.
- **SEras key** — Use this key to erase the screen. If you make an error during the test (the terminal will beep twice), pressing SEras will erase the screen and allow you to continue the mouse test.
- **F7 key** — Use this key to exit and return to the Keyboard Menu when you've completed the test. During the line drawing section of this test (the first four steps), pressing this key will put the terminal in Free Draw mode.



To use the mouse, lay it on your desk top or other flat surface (at least 8½x11" of space) — the black rubber ball on the bottom of the mouse should face down and the buttons should face up. Then, place your hand over the mouse so that the thickest side (the bigger wedge) of the mouse is cupped in your palm and your fingers rest lightly over the buttons. When you move the mouse along the flat surface, it will draw a corresponding line on the screen.

The test is successful if the lines you draw are smooth and consistent and they correspond with the movement of the mouse.

#### NOTE

*If the terminal beeps twice, it indicates that there is an error, which may be because you did not execute the task properly or because Self Test detected a hardware error. Press the SERas key and start again at the beginning of the line you were attempting to draw when the terminal beeped twice. If you still are unable to execute the task and the error message reappears, write the message down and contact your Tektronix service technician.*

Now begin the test — be sure to read each step completely before taking the action described:

1. Move the mouse diagonally across your desk to draw a line from the lower-left corner to the upper-right corner of the screen (the terminal will beep once to indicate that you have moved far enough). *Do not press any buttons on the mouse during this step.*
2. Press the left button and move the mouse horizontally to draw a line to the upper-left corner of the screen (again, the terminal will beep once to indicate that you have moved far enough).
3. Press the middle button and move the mouse to draw a line down to the lower-left corner of the screen (the terminal will beep once when you've reached the corner).
4. Press the right button and move the mouse horizontally to draw a line to the lower-right corner of the screen (listen for the beep).
5. Release the right button; this puts the mouse in Free Draw mode.
6. Your cursor will be at the lower-left corner of the screen. Now, press and hold down any mouse button while moving the crosshair cursor to the upper-middle of the screen; then release the mouse button. You will see a small dot on the screen which will be the starting point for your circle.
7. Draw a large circle on the screen and watch to see that the figure you draw follows the mouse's movement.
8. Press F7 to exit the Mouse Verification Test and return to the Keyboard Menu.

### F3: RS-232 INTERFACE MENU

#### NOTE

*To run these tests, you need an RS-232 loopback connector. This is not a standard accessory to the terminal, but can be ordered as an optional accessory (see Appendix H for ordering information).*

Pressing F3 from the Extended Self Test Menu displays the RS-232 Interface Menu:

#### RS-232 Interface Menu

<b>F1</b>	<b>Computer (Host) Port Test</b>
<b>F2</b>	<b>Port 0 Test<sup>1</sup></b>
<b>F3</b>	<b>Port 1 Test<sup>1</sup></b>
<b>F7</b>	<b>Exit Current Menu</b>
<b>F8</b>	<b>Enter Terminal Mode</b>

#### Selection:

The following paragraphs describe each part of the RS-232 Interface Menu.

#### COMPUTER Port Test

Pressing F1 from the RS-232 Interface Menu starts the Host Port Test, and displays this message:

**Install Computer Port Loopback...**  
**Press any key to continue**

Disconnect the cable connected to the COMPUTER port and connect the host port loopback connector in its place. Then press any key to start the test.

If the test finishes with no errors detected, the terminal displays the following message and prompts you for another selection from the RS-232 Interface Menu:

**Test Completed**

**Selection (Press SEras for Menu):**

If an error is detected, the bell rings twice, and the terminal displays the error as a bulleted item followed by this message:

**Error(s) Detected**  
**Test Completed**

**Selection (Press SEras for Menu):**

<sup>1</sup> This line only appears on the 4207.

**PORT 0 and PORT 1 Tests (4207 Only)**

Pressing F2 from the RS-232 Interface Menu starts the PORT 0 Test, and pressing F3 starts the PORT 1 Test. In this discussion, we will assume that you have pressed F2, in which case the terminal displays this message:

**Peripheral Port Test**

**Connect Computer (Host) Port cable to Port 0...**  
**Press any key to continue**

Connect an RS-232 cable to PORT 0, making sure the cable is also connected to the host port (labeled *COMPUTER*). Press any key to execute the test.

If the test finishes with no errors detected, the terminal displays the following message and prompts you for another selection from the RS-232 Interface Menu:

**Test Completed**

**Selection (Press SEras for Menu):**

If an error is detected, the bell rings twice, and the terminal displays the error as a bulleted item followed by this message:

**Error(s) Detected**

**Test Completed**

**Selection (Press SEras for Menu):**

## F4: HARDCOPY MENU

Pressing F4 from the Extended Self Test Menu displays the Hardcopy Menu:

### Hardcopy Menu

- F1**      **Loopback Test**
- F2**      **4695/4696 Copier Pattern**
- F3**      **4691/4692 Copier Pattern**
  
- F7**      **Exit Current Menu**
- F8**      **Enter Terminal Mode**

### Selection:

The following paragraphs describe each part of the Hardcopy Test.

## COPIER Port Loopback Test

### NOTE

*To run the COPIER port loopback test, you must have a COPIER port loopback connector. This is not a standard accessory to the terminal, but may be ordered as an optional accessory (see Appendix H for ordering information).*

Pressing F1 from the Hardcopy Menu starts the COPIER port loopback test and displays the following message:

### Copier Port Test

**Install Copier Port Loopback...**  
**Press any key to continue**

Disconnect any cable connected to the COPIER port and connect the COPIER port loopback connector. Then press any key to start the test.

If the test finishes with no errors detected, the terminal displays the following message and prompts you for another selection from the Hardcopy Menu:

### Test Completed

**Selection (Press SEras for Menu):**

If an error is detected, the bell rings twice, and the terminal displays the error as a bulleted item followed by this message:

**Error(s) Detected**  
**Test Completed**

**Selection (Press SEras for Menu):**

### 4695/4696 Color Copier Pattern

This test outputs a color pattern through the COPIER port to a 4695 Color Copier or a 4696 Color Ink-Jet Printer; use this test to verify that a 4695 or 4696 is accurately reproducing the screen display.

Pressing F2 from the Hardcopy Menu starts the 4695/4696 Copier Pattern Test and displays the following message:

**4695/4696 Copier Pattern Test**

**Connect Copier. Check that the copier ready light is on...  
Press any key to continue**

Be sure the copier is connected and turned on. If the copier is functioning properly, the terminal displays a color pattern preceded by this message:

**This pattern should be on both the copier and display:**

The pattern consists of eight adjacent vertical bars, each a different color: black, blue, red, magenta, green, cyan, yellow, and white (each vertical bar is 10 character-cells wide).

The test then prints the following message, prompting you to return to the Hardcopy Menu to make another selection:

**Test Completed.**

**Selection (Press SEras for Menu):**

If the copier is not connected or not functioning when you press a key to continue, the terminal beeps twice and then displays the following message, prompting you to return to the Hardcopy Menu for another selection:

**4695/4696 Copier  
o Copier not ready**

**Error(s) Detected  
Test Completed**

**Selection (Press SEras for Menu):**

### 4691/4692 Color Copier Pattern

This test outputs a color pattern to a 4691 or 4692 Color Copier connected to the COPIER port to check the interface connection between the terminal and the copier. You can use this test to verify that the copier is accurately reproducing the screen display.

Pressing F3 from the Hardcopy Menu starts the 4691/4692 Pattern Test and displays the following message:

**Connect Copier. Check that the copier is ready.  
Press any key to continue**

Be sure the copier is connected and turned on. If the copier is functioning, the terminal displays a color pattern preceded by this message:

**This pattern should be on both the copier and display:**

The pattern consists of eight adjacent vertical bars, each a different color: black, blue, red, magenta, green, cyan, yellow, and white (each vertical bar is 10 character-cells wide).

The test then prints the following message, prompting you to return to the Hardcopy Menu to make another selection:

**Test Completed.  
Selection (Press SEras for Menu):**

If the copier is not connected or not functioning when you press a key to continue, the terminal beeps twice and then displays the following message, prompting you to return to the Hardcopy Menu for another selection:

**4691/4692 Copier  
o Copier not ready  
Error(s) Detected  
Test Completed  
Selection (Press SEras for Menu):**

### F5: DISPLAY PATTERN MENU

Pressing F5 from the Extended Self Test Menu displays the Display Pattern Menu. The patterns in this menu are used primarily for making internal adjustment to the terminal and are discussed in detail in the service manual for your terminal.

## F6: GRAPHICS TABLET TEST (4207 Only)

This test checks the terminal's interaction with a Tektronix 4957 or 4958 Graphics Tablet. Pressing F6 from the Extended Self Test Menu starts the Tablet Test and displays the following message:

**Graphics Tablet Test**

**Connect Tablet to Port 1...**

**Press any key to continue**

Connect the tablet to PORT 1 (if it's not already), then press any key to start the test. If the test finishes with no errors detected, one of these messages is displayed on the screen (for this discussion, we'll assume that the terminal is connected to a 4957 Tablet):

**4957 Tablet**

**Passed - Cursor on Tablet [4F].**

**Test Completed**

**Selection (Press SEras for Menu):**

Or:

**4957 Tablet**

**Passed - Cursor off Tablet [47].**

**Test Completed**

**Selection (Press SEras for Menu):**

If an error is detected, the bell rings twice, and the terminal displays the error as a bulleted followed by this message:

**Error(s) Detected**

**Test Completed**

**Selection (Press SEras for Menu):**

## SH F1: COAX INTERFACE TEST

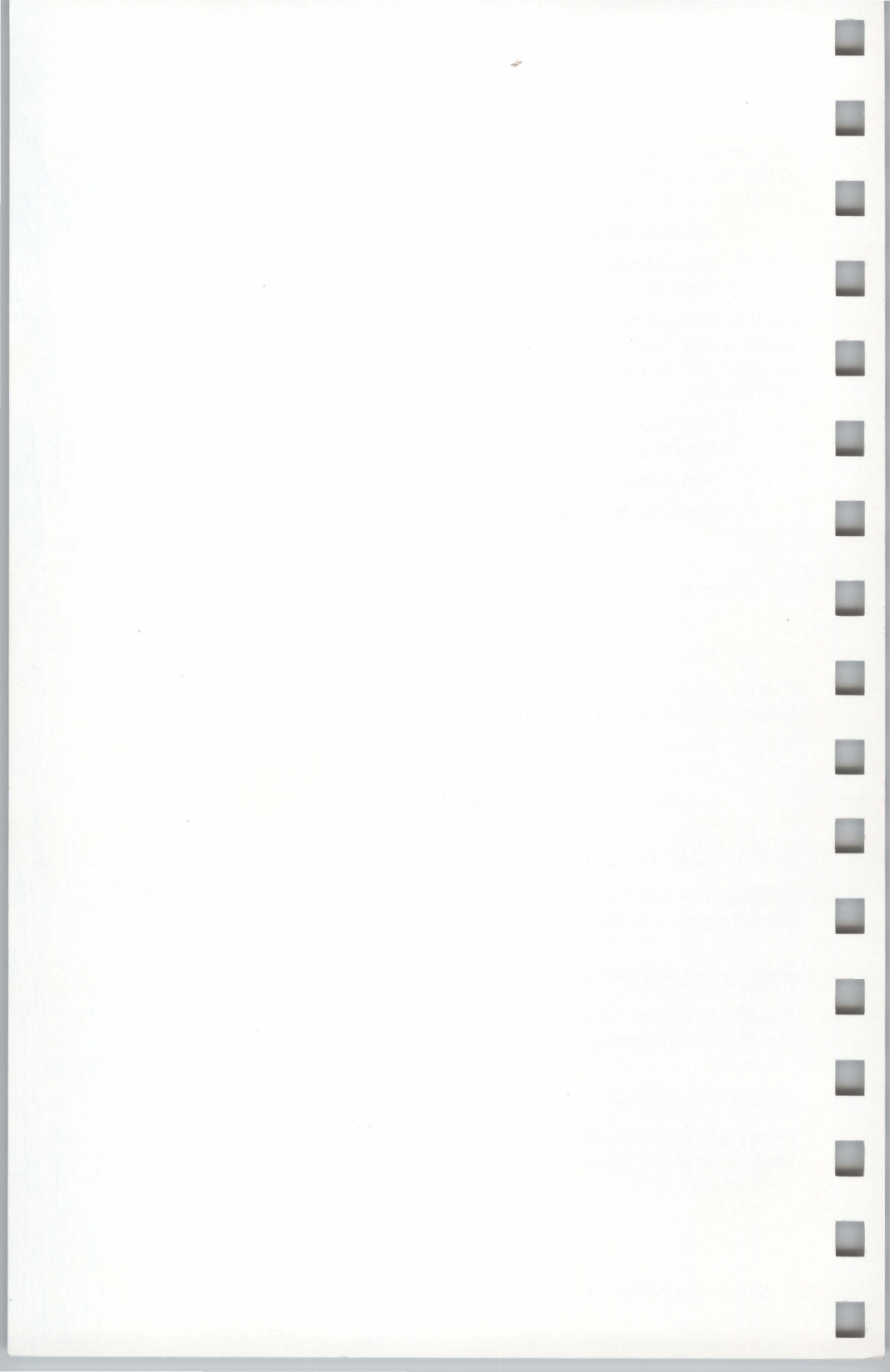
Pressing Sh F1 (Shift-F1) begins the Coax Interface Test. Just press Sh F1 and follow the directions that appear on the screen.

## F7: EXIT CURRENT MENU

Pressing F7 always redisplay the previous menu. When pressed in the Main Self Test Menu, it simply blanks the screen and redisplay the Main Self Test Menu.

## F8: ENTER TERMINAL MODE

Pressing F8 exits Main Self Test or Extended Self Test. the terminal's underline or block cursor is displayed and the terminal is ready to use, as if it had just been powered up.





# Appendix E

## SPECIFICATIONS

This section contains specifications that relate to the installation and use of the terminal. A complete list of specifications is included in the terminal's *Service Manual*.

The following terms are used in these specification tables:

- *Performance Requirement* — Statements that define characteristics essential to the intended application of the product. Self Test verifies many of these characteristics.
- *Supplemental Information* — Statements that describe typical performance for characteristics of secondary importance, or that further explain related performance requirements.

The following specifications apply to both the 4205 and 4207 Terminals unless otherwise indicated.

**Table E-1**  
**PHYSICAL DIMENSIONS<sup>a</sup>**

Characteristic	Performance Requirement
Weight	43 lbs (19.5 kg)
Length	16.33 in. (414.8 mm)
Width	14.98 in. (380.7 mm)
Height	13.63 in. (346.2 mm)
Display Area	9.4x7.1 in. (240x180 mm)

<sup>a</sup> These specifications do not include the keyboard. See Figure A-1 for dimensional drawings of the terminal and keyboard.

**Table E-2**  
**ELECTRICAL SPECIFICATIONS**

Characteristic	Performance Requirement
Nominal Input Voltages	
115V	87 — 128V
230V	174 — 250V
Main Fuse (for 115V or 230V)	5A (medium blow)
Maximum Input Power	170 W
Frequency Range	48 — 66 Hz

**Table E-3**  
**ENVIRONMENTAL SPECIFICATIONS**

Characteristic	Performance Requirement
Temperature	
Power on	+ 50 through + 104°F (+ 10 through + 40°C)
Power off	- 40 through + 149°F (- 40 through + 65°C)
Altitude	
Power on	To 10,000 ft (3,050 m)
Power off	To 40,000 ft (12,200 m)
Humidity	
Power on	10 through 75% relative humidity (noncondensing)
Power off	10 through 95% relative humidity (noncondensing)
Vibration	Withstands 0 to .010 in. displacement, at 10 to 55 to 10 Hz (all three major axes)
Shock	Main cabinet withstands a 20-g shock (at 11 msec) to all faces
Electrostatic Immunity	
Power on	No interruption of operation, loss of data, or change of operating mode from 15-kV discharge (mouse withstands 12.5 Kv)
Power off	No damage to terminal from 20-kV shock

**Table E-4**  
**INSTALLATION REQUIREMENTS**

Characteristic	Supplemental Information
Heat Dissipation	
Typical	375 BTU/hr
Max load	480 BTU/hr
Surge Current	37 A
Cooling Clearance	3 in. rear 2 in. top and sides
Distance from EMI sources	The terminal's display should be as far removed from motors, fans, or other electromagnetic devices as possible

**NOTE**

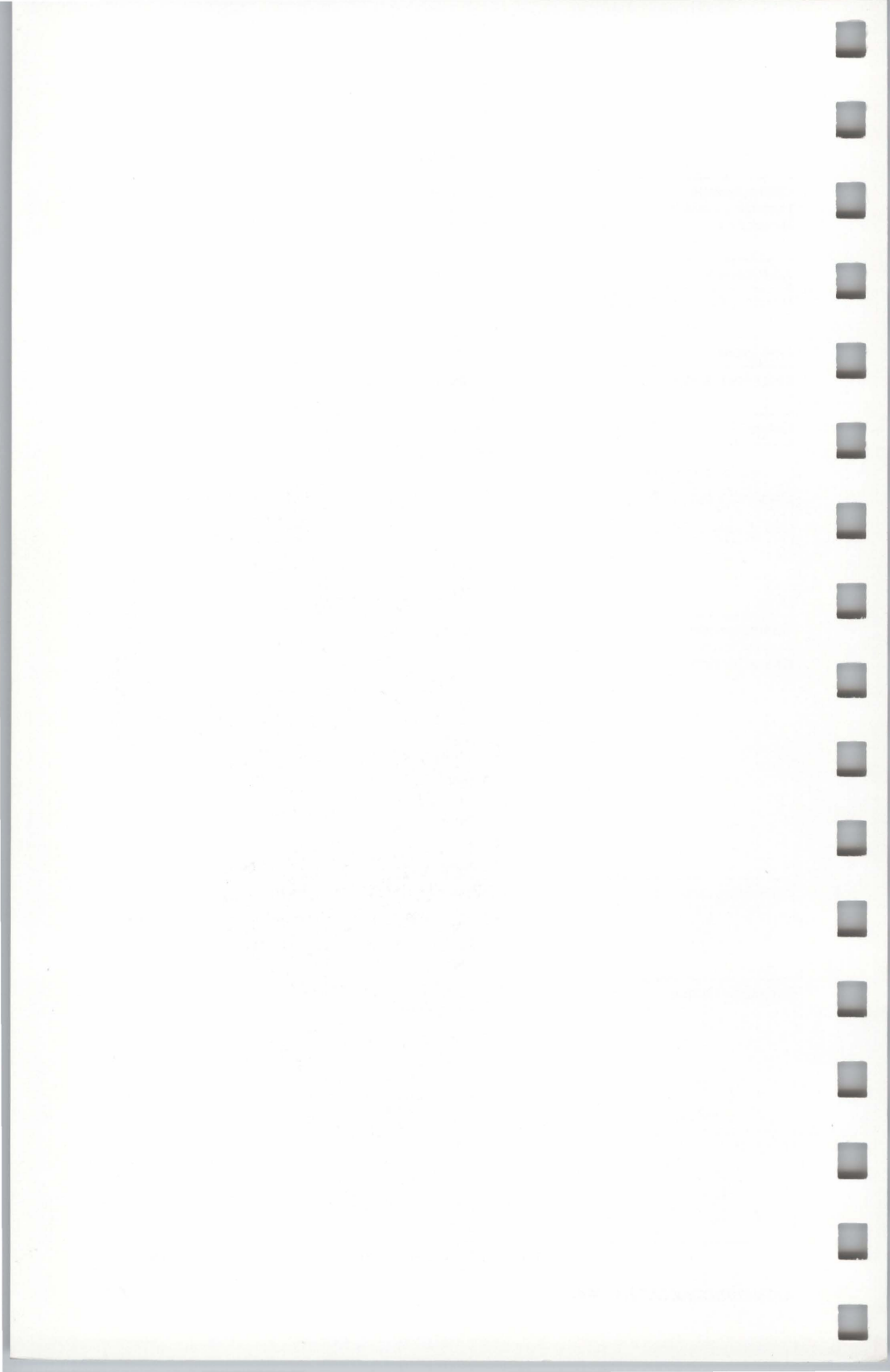
*The 4205 and 4207 Terminals have been certified as Class B computing devices/peripherals (FCC and VDE rules). Operation with noncertified peripherals may result in interference to radio and TV reception (see **Preventing Radio and Television Interference** in Appendix A for more information).*

**Table E-5**  
**GRAPHICS CHARACTERISTICS**

<b>Characteristic</b>	<b>Performance Requirement</b>
Resolution	On the 4205, 480 (horizontal) by 360 (vertical) resolvable pixels On the 4207, 640 (horizontal) by 480 (vertical) resolvable pixels
Addressability	4096x4096 points
Graphics Command Syntax	Compatible with Tek-style commands (that is, 4010, 4100, and 4110 escape sequences)
Line Types	Solid, dashed (various styles)
Graphics Primitives	Vectors, panels (polygons), text, markers, arcs, alphanum, graphnum, and called segments
Colors	64 possible color mixtures. In graphics area, 16 colors displayed at one time; in dialog area, eight colors displayed at one time
Graphics Input (GIN)	GIN cursor controlled by Joydisk, mouse, or a graphics tablet puck or stylus

**Table E-6**  
**ALPHANUMERIC CHARACTER SETS**

<b>Characteristic</b>	<b>Performance Requirement</b>
Character Sets	International character sets: North American (ASCII) United Kingdom French Swedish Danish/Norwegian German  Special character sets: Supplementary Ruling Multilingual (ASCII)
Characters Displayed	Corresponds to the terminal keyboard  94 or 96 displayable characters, depending on the character set  128 characters displayable in Snoopy mode (includes control characters)
Character Format	On the 4205, screen display of 80 columns by 28 lines in coax, and 80 or 132 columns by 30 lines in RS-232  On the 4207, screen display of 80 columns by 32 lines in coax, and 80 or 132 columns by 32 lines in RS-232  On the 4205, 5x7 pixel character in a 6x12 character cell (including descenders) in both coax and RS-232  On the 4207, 7x9 pixel character in an 8x14 character cell during coax, and 7x9 in an 8x15 cell in RS-232  Graphic representations of control characters conform to ANSI X3.32



# Appendix F

## TEKTRONIX COLOR STANDARD

In the **HLS** color coordinate system, the color space is represented as a double-ended cone.

The **HUE** coordinate runs counterclockwise around the cone. (0 to 360 degrees.)

The **LIGHTNESS** coordinate runs vertically up the cone. (0% to 100%.)

The **SATURATION** coordinate runs radially outward from the axis of the cone. The **SATURATION** coordinate is a percentage of the maximum possible saturation at a particular **LIGHTNESS** level. (0% to 100%.)

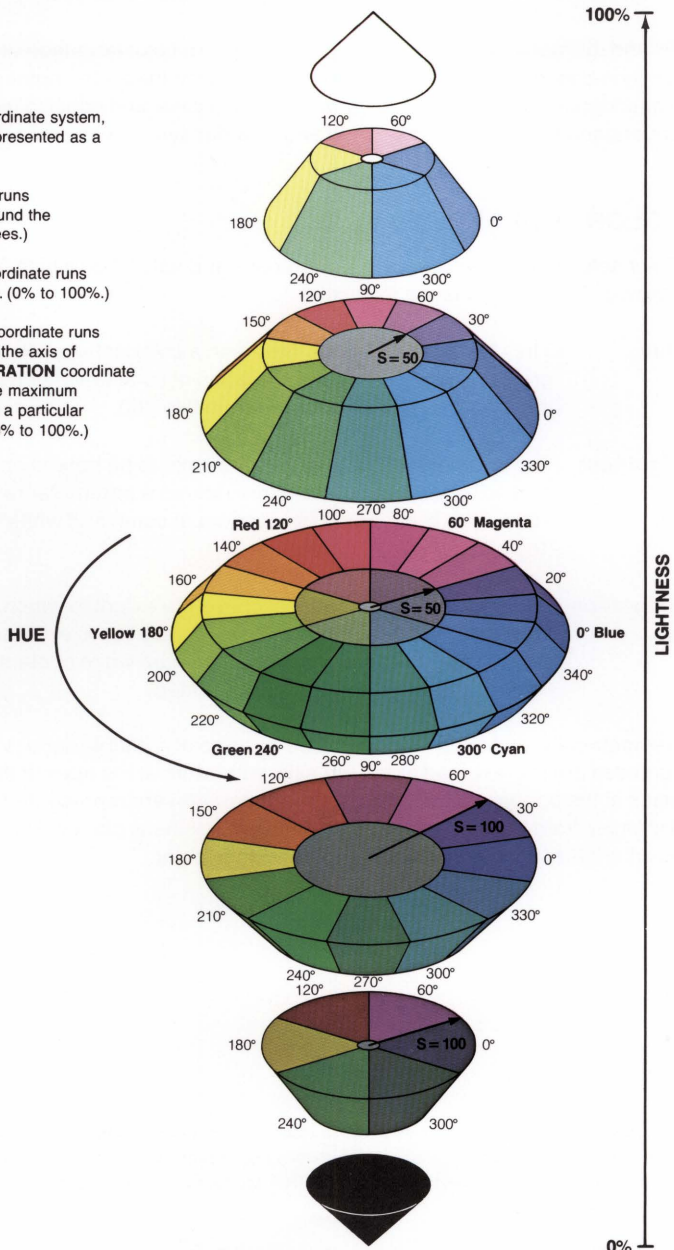


Figure F-1. HLS Color Cone.

(continued)

## OVERVIEW

The world of color is filled with ambiguous terminology, i.e. intensity, purity, value, etc. Many color users feel that "color theory" is a prerequisite to operating color systems; T.V., Videotaping, Photography, Computer Graphics.

To end this confusion, Tektronix has developed a color language and function based on human engineering, rather than machine engineering. Below is a description of this system, which will provide a clear and concise means for understanding how color is defined and how our syntax was derived.

## COLOR CONCEPTS

Color selection is specified by hue, lightness and saturation which is the HLS method. The definitions are as follows:

**Hue:** The characteristic associated with a color name such as red, yellow, green, blue, etc. Hue is a gradation of color advanced by degrees, thus represented as an angle from 0 to 360.

**Lightness:** The characteristic that allows the color to be ranked on a scale from dark to light. Lightness is expressed as a parameter ranging from 0 to 100% with black being 0% (bottom of cone) and white being 100% (top of cone).

**Saturation:** The characteristic which describes the extent to which a color differs from a gray of the same lightness. Saturation is expressed as percentage, ranging from 0% (maximum white content at that lightness level) to 100% (fully saturated).

Geometrically, colors can be described in terms of a double cone. Variations in lightness are represented along the axis, with white at the apex of the cone and black at the opposite apex. Variations in saturation are represented by radial distances from the lightness axis, in constant lightness planes. Hue is represented as an angular quantity from a known reference point.

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## Appendix G

# PREDEFINED FILL PATTERNS

Your terminal contains predefined patterns for filling panels (polygons). To use one of these patterns, enter the `FILLPATTERN` command and specify the appropriate pattern number as a command parameter. The next panel drawn will be filled with the specified pattern.

The patterns shown on this foldout page are mixtures of colors from the terminal's factory default color map. If the color map is changed, the appearance of some or all of these patterns will change accordingly.

◀ **FOLDOUT**

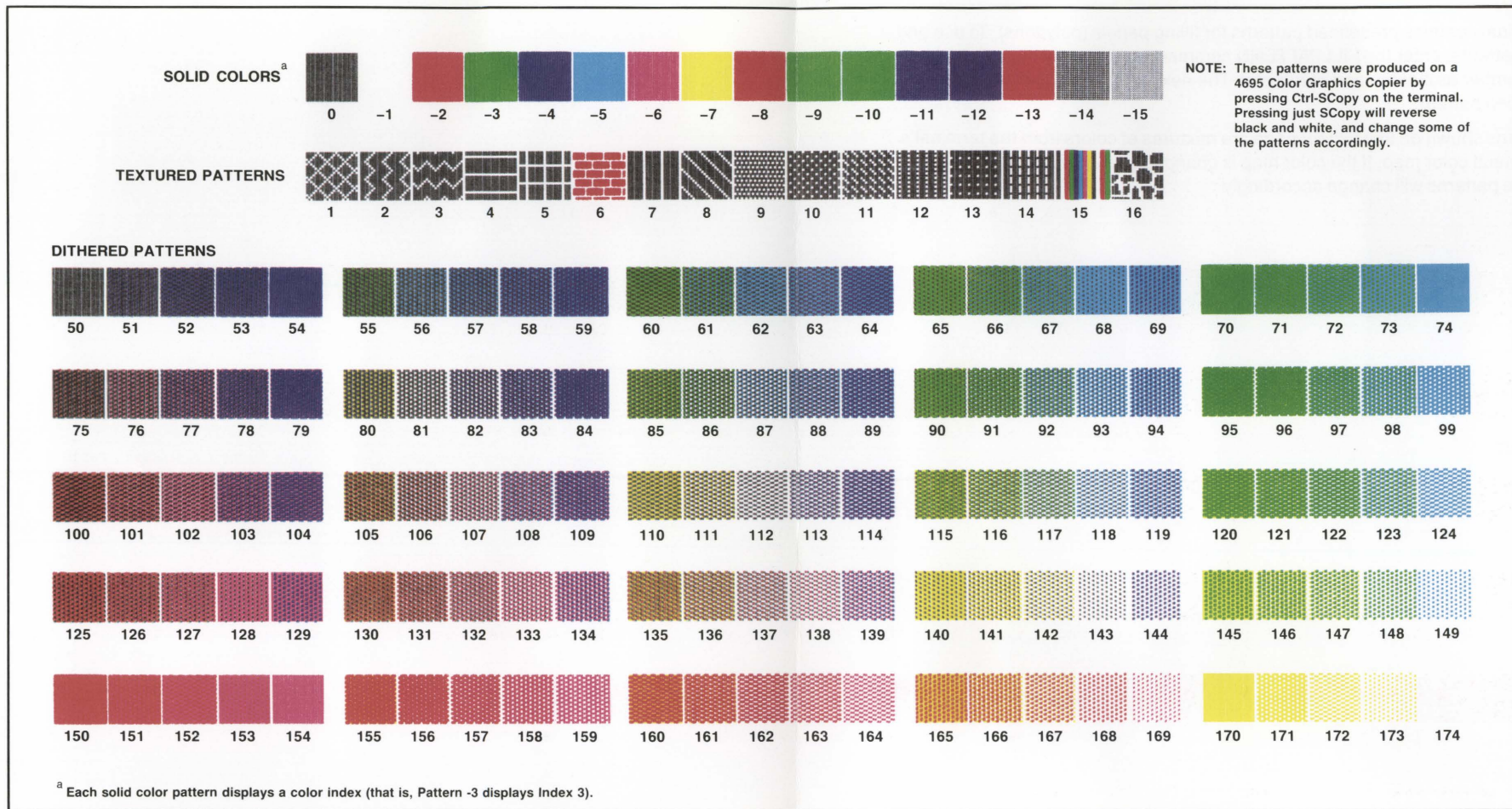


Figure G-1. Predefined Fill Patterns.

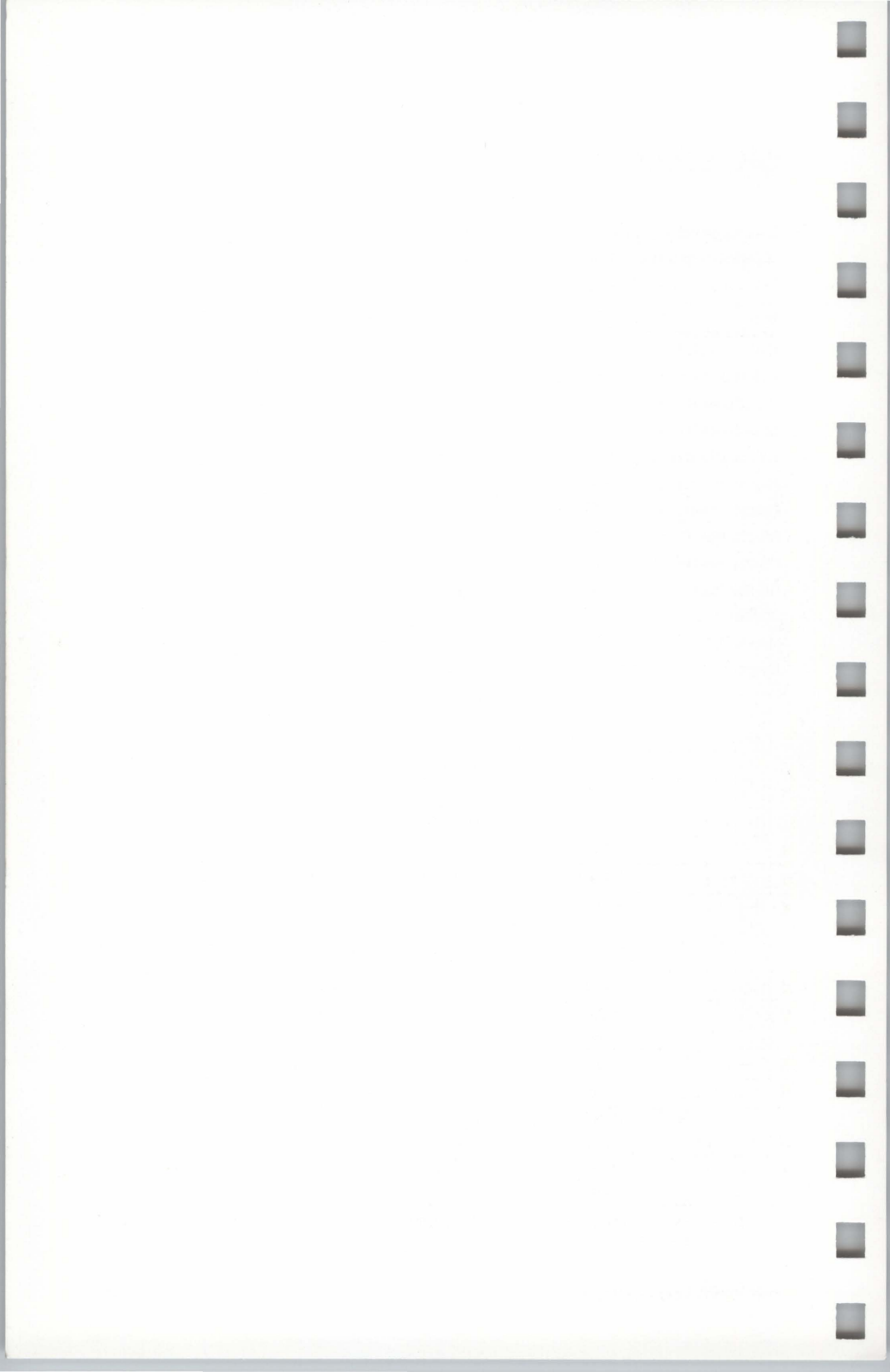


## Appendix H

### ORDERING INFORMATION

This appendix contains part numbers for ordering replacement or optional accessories used with the 4205 and 4207 Terminals.

Item	Part Number
<i>4205/4207 With Coax Option Operators Manual</i>	070-6280-00
<i>An Introduction to Computer Color Graphics</i>	070-5239-00
<i>4200 Series Reference Guide</i>	070-6046-01
<i>4200 Series Programmers Manual</i>	070-6048-01
<i>4205/4207 Field Service Manual</i>	070-6283-00
Alignment Graticule	067-1181-00
Function Key Overlays (set of 6)	334-5164-00
RS-232 Host Port Cable	012-0911-00
RS-232 Host Port Cable for MicroVAX	012-1121-00
RS-232 Host Port Loopback Connector (can be used for Self Test)	067-1043-00
COPIER Port Loopback Connector (can be used for Self Test)	013-0214-00
Mouse Option	4200F4M
Megabyte of Memory Option	4200F22



# Appendix I

## IBM STATUS SYMBOLS

When the terminal is in HOSTPORT COAX, symbols or a combination of symbols are displayed in the operator information area to show the current status of the terminal and the 3274/3276 Control Unit. A list of the symbols and their explanations is provided in Table I-1. Your IBM documentation explains these symbols in greater detail.





























**Table I-1**  
**COAX STATUS SYMBOLS**

Symbol <sup>a</sup>	Explanation
	3274 Control Unit is ready.
	3276 Control Unit is ready.
I	4331 Unit is ready.
A	Control Unit connected online to host.
B	Control Unit connected online to host.
	Terminal busy with application job.
	Terminal connected to system operator (control program).
	Terminal connected to host but not to application or control program.
TEST	Terminal is in Online Test mode.
N	Terminal connected to host through X.21 switched network.
	Wait for system to perform a function (system is busy).
C	DFT session is not configured in the 3274.
SESSION: a	Session a is currently displayed (DFT only).
?+	Press RESET and retry operation.
SYSTEM	Keyboard locked by host. Wait for message, or press RESET.
← ? →	Move to other screen location for function. Press RESET, or take alternative action.
? >	Too much data for field. Press RESET and reenter less data.
? NUM	Enter only numerals in this field. Press RESET and enter numerals.
? *	Can only enter certain numerals. Press RESET and enter correct numerals.
? —	Terminal is in Local mode and communication not allowed. Press RESET.
- f or  C - f	Requested function not available.
nn or nnn	Terminal not operating properly. Try running Self Test diagnostics or refer to your IBM documentation.
nn or nnn	Problem with communication line between host and terminal. Refer to your IBM documentation.

<sup>a</sup> In the Symbol column, *n* refers to an integer variable; *a* refers to a letter in the range A through E and denotes the current host session.

(continued)

**Table I-1 (cont)**  
**COAX STATUS SYMBOLS**

Symbol <sup>a</sup>	Explanation
<b>X</b> PROG nn or <b>X</b> PROG nnn	Detected programming error in host data. Press RESET. If problem continues, refer to your IBM documentation.
<b>X</b> 	Printer connected to terminal is busy. Either wait for printer to complete task or press Dev Cncl key to cancel pending print request. (Pressing Dev Cncl does not cancel printing operation currently in progress.)
<b>X</b> 	Message identical to previous one but will be busy for a longer time.
<b>X</b> 	Printer connected to terminal is not working. Either wait or press Dev Cncl key to cancel print request.
<b>X</b>  <b>X</b>	Not authorized to perform function. Press RESET.
<b>X</b>  +? <b>X</b>  +? <b>X</b>  ^ +? <b>X</b>  ' +? <b>X</b>  , +?	(French keyboard only) Entered an invalid accent and character combination. Press RESET and enter correct accented character.
<b>X</b> - S	Pressed an unavailable symbol key. Press RESET.
<b>X</b> 	Requested message from control operator. Press RESET.
<b>X</b> - f  <b>X</b>	Attempted to make an unauthorized Color, PS, or Highlighting Selection.
 99 or  599	Control unit is in Local mode.
 nn or  nnn	Communication link between Control Unit and host producing errors.
SO	The base symbol set was selected.
NUM	Terminal keyboard has been placed in Numeric mode. Only the characters 0 through 9, minus sign (-), and Dup will be accepted.
TEXT	Terminal keyboard has been placed in Text mode.
	The terminal keyboard is in the upshifted position.
^	Terminal in Insert mode.
	Reverse video selected for screen display.
	Blinking character has been selected for cursor location.
	Underscored character has been selected for cursor location.
	Displayed color has been selected.
	Selected color is one of the following by default: red, green, or white by default.
 _ _	Displays selected numerals when changing the Printer ID/Class.
 nn	Terminal authorized to use Printer ID/Class nn.
 ■ nn	Selected printer currently is printing requested work.
  nn	Printer stopped while printing current job.
  ??	Printer assignment changed.

<sup>a</sup> In the *Symbol* column, *n* refers to an integer variable; *a* refers to a letter in the range A through E and denotes the current host session.

# INDEX

## 0 — 9

- 2PPI. See *PORT 0/PORT 1*
- 64-color palette, 1-4
- 80-column format, 1-5, 4-15
- 132-column format, 1-5, 4-15
- 4510 Color Graphics Rasterizer
  - copy procedures for, 3-28 — 3-30
  - installing, A-29
- 4644 Dot Matrix Printer
  - copy procedures for, 3-13 — 3-18
  - customizing output, 3-19, 3-24 — 3-27
  - installing, A-25
- 4662 Interactive Digital Plotter
  - copy procedures for, 3-31
  - installing, A-30
- 4663 Interactive Digital Plotter
  - copy procedures for, 3-31
  - installing, A-31
- 4691 Color Graphics Copier
  - copy procedures for, 3-13 — 3-18
  - customizing output, 3-19 — 3-22, 3-24 — 3-27
  - installing, A-23
  - testing, D-14
- 4692 Color Graphics Copier
  - copy procedures for, 3-13 — 3-15
  - customizing output, 3-19 — 3-27
  - installing, A-23
  - testing, D-14
- 4695 Color Graphics Copier
  - copy procedures for, 3-13 — 3-18
  - customizing output, 3-19 — 3-20, 3-24 — 3-27
  - installing, A-23
  - testing, D-13
- 4696 Color Ink-Jet Printer
  - copy procedures for, 3-13 — 3-18
  - customizing output, 3-19 — 3-20, 3-24 — 3-27
  - installing, A-24
  - testing, D-13
- 4957 Graphics Tablet
  - enabling, 2-40
  - installing, A-32
  - testing, D-15
  - using a puck or stylus, 3-33
- 4958 Graphics Tablet
  - enabling, 2-40
  - installing, A-32
  - testing, D-15
  - using a puck or stylus, 3-33

## A

- ac power, 2-2, A-6, B-2
- AC POWER connector, B-2, B-3
- accessories
  - optional, 1-10, H-1
  - standard, 1-10
- ACURSOR command, 4-4, 4-5, 4-17
- ADE (ASCII decimal equivalent), C-2
- alignment graticule, H-1
- alpha cursor. See *ACURSOR command*
- alphanumeric character sets, C-1, E-3
- alphatext, commands for, 4-3
- alternate and primary character sets, C-1
- alternate screen size, A-14, A-16
- ANSI mode, 3-11, A-18
- ANSI Standard X3.64, 1-6, 3-11, A-18
- answerback, 3-34, 4-8, 4-36
- ANSWERBACK command, 4-8, 4-36
  - how to use, 3-34
- ASCII (North American) character set
  - code chart for, C-5
  - keyboard layout for, C-4
  - macro numbers for, C-4
- ASCII (Multilingual) character set
  - code chart, C-18
- aspect ratio, 2-32, 2-33, 2-37
- asterisk
  - as Setup prompt, 2-2, 3-2, 3-3
  - in error messages, 3-4
- automatic screen-dimming, 2-2, 4-36
- AUTOPRINT command, 4-13
  - macro for, 3-42
  - See also *data logging*
- AUTOWRAP command, 4-17

**B**

- background copying, 3-15 — 3-18
- BACKINDEX command, 4-3, 4-5, 4-23, 4-42, 4-43
- banner, Set Color function, 2-20, 2-24
- BASECOLOR Command, 4-46, B-14
- baud rate
  - for 4510 Rasterizer, 4-12, A-29
  - for 4662 Plotter, 4-12, A-30
  - for 4663 Plotter, 4-12, A-31
  - for host communications, 1-5, 4-7, A-10
- BAUDRATE command, 4-8
  - and installation, A-10
- BEGINPANEL command, 4-27, 4-33
  - in tutorial, 2-10
- bell, controlling, 3-43, 4-31
- BELLTYPE command, 3-43, 4-31
- BELLVOLUME command, 3-43, 4-31
- BNC connector. *See coaxial cable*
- borders
  - around graphics display, 2-36
  - around panels, 2-11, 2-12, 2-14
- BORDER command, 4-45
- BREAKTIME command, 4-9, A-10
- BRIGHTNESS button, 2-2, B-1
- brightness, screen
  - adjusting, 2-2, B-1
  - auto-dimming, 2-2
  - and DIM command, 4-36
- buttons
  - BRIGHTNESS button, 2-2, B-1
  - RESET button, 3-8, 3-15, A-8, B-2, B-3, D-3
  - S TEST button, A-8, B-1, D-4, D-6
  - ON/OFF button, A-6, B-1
- bypass-cancel character. *See BYPASSCANCEL command*
- BYPASSCANCEL command, 4-9, 4-22, 4-34
  - and installation, A-10

**C**

- cable routing, A-6
- CANCEL command, 4-9
- Cancel key, 2-2, 3-15
- CAPITALS command, 4-42, B-15
- Carriage Return
  - and Line Feed. *See CRLF command*
  - to terminate commands, 2-2, 3-2
  - with 4695 Copier, A-23
  - with 4696 Printer, A-24
  - with monochrome printers, A-25, A-26, A-27, A-28
- Caps Lock key, B-7, D-2, D-3
- CBACKGROUND command, 4-5, 4-41
- Centronics-style printers, 3-12, A-28
- character cell, 2-18
- character sets
  - charts for C-4 — C-18
  - how to select, 4-19, C-1, C-2
- character sets, downloadable, 4-44
- circles, 2-14
- CLEARDIALOG command, 4-18
- CLICK command, 4-31
- clusters, for help and status, 2-7, 3-5
- CMAP command, 4-5, 4-41
- CMODE command, 4-5
- coax commands, 4-46
- Coax Configuration Summary menu, A-14, A-15, A-16, A-17
- coaxial cable, A-6, A-7, B-2, B-3
- coax option, ordering, 1-11
- CODE command, 4-33
  - selecting modes, 3-34, A-18
- color
  - and HLS values, 2-24 — 2-26, 2-27 — 2-29
  - commands for, 4-3, 4-4, 4-5, 4-6
  - concepts of, 2-18
  - cone, F-1
  - in dialog area, 2-8, 2-18, 2-27, 2-28
  - in graphics area, 2-18 — 2-29
  - index, 2-18
  - interface. *See Set Color function*
  - map, 2-27 — 2-29
  - perception of, 2-29
  - standard for HLS, F-1 — F-2
- color copiers. *See peripheral devices*
- color menus
  - list of predefined colors, 2-18
  - Set Color function menu, 2-22 — 2-23
- colors
  - modifying, 2-24 — 2-26, 2-27 — 2-29
  - restoring, 2-23, 2-26, 2-28
  - saving, 2-22, 2-26, 2-28

- column width, 1-5, 4-18
- COLUMNMODE command, 4-18
- COMM port, A-6, A-7, B-2
  - and installation, A-6, A-7
  - See also *communications, coax*
- command entry, 2-3 — 2-4, 3-2 — 3-3
- command names, 2-4, 3-2, 3-3
- command parameters. See *parameters*
- command settings, commands for, 4-6 — 4-8
- command structure, 2-4
- command terminator, 3-2
- commands
  - clusters of, for help and status, 2-7, 3-5
  - correcting, 2-3, 2-4, 3-4
  - entering, 2-3 — 2-4
  - functional groupings of, 4-2
  - saving, 3-6, 3-7
  - shortening, 2-4, 3-5,
- communications, coax host
  - and COMM port, A-6, A-7
  - and resetting the terminal, 3-8
  - selecting, 3-9
  - setting up, A-6 — A-8, A-11 — A-19
  - switching between coax and RS-232 hosts, 3-9
  - switching between DFT sessions, 3-10
  - testing, A-18 — A-19, D-15
  - See also *communications, host*
- communications, COMPUTER port. See *communications, RS-232 host*
- communications, commands for, 4-8 — 4-13, A-10 — A-11
- communications, COPIER port
  - connecting to, A-23, A-24, A-25, A-26, A-28
  - testing, D-12
- communications, differences between hosts, A-12 — A-17
- communications, host
  - during screen copy, 3-15 — 3-18
  - during Zoom/Pan, 2-30
  - selecting mode for, 3-9
  - setting up, A-9 — A-18
  - switching between coax and RS-232 hosts, 3-9
  - testing, A-18, A-19, D-10
  - with the Set Color function, 2-19
  - See also *communications, coax host* and *communications, RS-232 host*
- communications, IBM. See *communications, coax host*
- communications, PORT 0/PORT 1
  - connecting to, A-27, A-29, A-30, A-31, A-32
  - testing, D-11
- communications parameters, setting up, A-9 — A-32
  - for coax (IBM) host, A-12 — A-18
  - for peripherals, A-22 — A-32
  - for RS-232 host, A-9 — A-11
- communications, RS-232 host
  - selecting, 3-9
  - setting up, A-9 — A-11
  - switching between coax and RS-232 hosts, 3-9
  - testing, A-18, A-19, D-10
  - See also *communications, host*
- COMPUTER port, B-2, B-3
  - and installation, A-6
  - See also *communications, RS-232*
- configuration
  - for coax host, A-12 — A-18
  - for DFT mode, A-14 — A-17
  - for RS-232 host, A-9 — A-11
  - for peripheral devices, A-22 — A-32
- connectors, B-1, B-2, B-3
  - and installation, A-6
- Control Unit Terminal mode. See *CUT mode*
- control units, IBM 3274/3276, A-13, A-20, A-21
- continuous-feed copiers
  - definition of, 3-26
  - paging for, 3-26 — 3-27
- controls, B-1, B-2, B-3
- COORDINATEMODE command, 4-35
- COPIER port, B-2, B-3
  - connecting to, A-23, A-24, A-25, A-26, A-28
- copiers, color. See *peripheral devices*
- copiers, monochrome
  - installing, A-25, A-26, A-27, A-28
  - See also *copies, monochrome*
- copies, commands for, 4-13 — 4-17
- copies, color
  - background copying, 3-15 — 3-17
  - customizing, 3-19 — 3-27
  - dot density (4692), 3-23, 4-14
  - from a host, 3-32
  - initiating, 3-13 — 3-14
  - matching colors (4692), 3-23, 4-14
  - multiple copies, 3-14, 3-16
  - orienting the image (4691, 4692), 3-22, 4-16
  - overwriting (4692), 3-23, 4-16
  - pages of dialog buffer, 3-24 — 3-27, 4-17
  - reversing black and white, 3-14
  - size (4691, 4692, 4695, 4696), 3-21, 4-16
  - stopping, 3-15
  - transparencies (4692), 3-23, 3-24, 4-16

- copies, monochrome
    - and host communication, 3-15 — 3-17
    - from a host, 3-32
    - initiating, 3-13 — 3-14
    - mapping colors, 3-24
    - multiple copies, 3-14, 3-16
    - pages of dialog buffer, 3-24 — 3-27, 4-17
    - reversing black and white, 3-14
    - stopping, 3-15
  - copies, for a plotter
    - from a host, 3-32
    - initiating, 3-31
    - mapping pens, 3-31
  - copies, for the rasterizer
    - copying from a host, 3-29
    - image orientation, 3-30, 4-15
    - initiating, 3-28
    - reversing black and white, 3-30, 4-15
  - copies, spooling. *See background copying*
  - copies, types of
    - dialog. *See dialog copies*
    - screen. *See screen copies*
    - from a host to a peripheral, 3-32
    - from a host to the rasterizer, 3-29
  - COPY command, 4-13
    - and copy procedures, 3-29, 3-32, 3-41
  - CRLF command, 4-19
    - and installation, A-10
  - crosshair cursor, 2-21, 2-27, 2-28
  - CSMOOTH command, 4-17, 4-25
  - Ctrl key, 2-3, 3-35, B-7
    - Ctrl-P, 3-37, 3-39, 3-40, 3-41, 3-42
    - Ctrl-Q, 2-7, 3-5
    - Ctrl-S, 2-7, 3-5
    - Ctrl-X, 2-3, 2-9, 3-4
  - current view, 2-36, 3-28, 3-31
  - cursor
    - alpha. *See ACURSOR command*
    - blinking, 2-2, 3-2
    - crosshair, 2-21, 2-27, 2-28
    - GIN, 2-38
  - CURSORKEYMODE command, 4-31
  - CURSORTYPE command, 4-18
  - CURVE command, 4-17, 4-25
    - in tutorial, 2-14, 2-16
  - curves
    - commands for, 4-25
    - drawing, 2-14
    - in a segment, 2-16
  - CUT mode
    - as factory default, A-14, A-15
    - understanding, A-14
    - See also DFT mode*
  - CXKEYPAD command, 4-46, B-13
- D**
- DABUFFER command, 4-18
    - in tutorial, 2-6
  - DACMAP command, 4-4, 4-18
  - DAENABLE command, 4-3, 4-18, 4-23, 4-42
    - before making copies, 3-20, 3-28, 3-40
    - macro for, 3-40
  - DAINDEX command, 4-4, 4-18
    - in tutorial, 2-8, 2-17
  - DALINES command, 4-18
    - in tutorial, 2-5, 2-8, 2-17
  - DAMODE command, 4-18
  - Danish/Norwegian character set
    - code chart for, C-13
    - keyboard layout, C-12
    - macro numbers, C-12
  - data logging
    - command for, 4-13
    - how to use, 3-34
    - macro for, 3-42
  - DAVISIBILITY command, 4-19
    - See also Dialog key*
  - DCopy key, B-12
    - and copy procedures, 3-13, 3-14
  - DEC VT52-style editors, 1-6, 3-11, A-18
  - DEC VT100-style editors, 1-6, 3-11, A-18
  - DECODE command, 4-6
    - default, key-execute character, for macros, 3-37
  - default, window size, in Zoom/Pan, 2-30
  - defaults, 4-1
    - for communications commands, A-10, A-11
    - omitted, 2-4, 4-1
    - resetting factory defaults, 2-3, 3-8, 4-7
  - DEFINE command, 4-32
    - how to use, 3-36
  - Del key, B-6, B-7
    - for correcting errors, 2-3, 2-9, 3-4
  - deletions
    - commands, 2-3, 3-4
    - macros, 3-37
    - segments, 2-9
  - DEras key, B-7, B-8
  - density, dot, 3-18, 4-16
  - DFT mode
    - and Jump key, 3-10
    - and memory, A-17
    - and multiple sessions, A-14, A-17
    - and power-up, A-17
    - during installation, A-14 — A-17
    - switching sessions, 3-10
    - understanding, A-14
    - See also CUT mode*



- dialog area
  - buffer, 2-6, 3-20
  - colors, 2-8, 2-18, 2-27, 2-28
  - commands for, 2-5 — 2-6, 3-18, 3-20, 4-17 — 4-20
  - indices, 2-18, 2-27, 2-28, 2-29
- dialog area, changing characteristics
  - changing size, 2-5, 2-8, 2-17, 4-18
  - controlling transparency, 2-17, 2-18
  - enabling and disabling, 3-18, 3-20, 3-28, 3-40
  - making invisible, 2-5, 2-17
- dialog copies
  - procedures for, 3-13, 3-14
  - multi-page buffer copies, 3-24 — 3-27
- Dialog key, 2-5, 2-17, B-12
- DIM command, 4-36
- dimensions, terminal, A-3, E-1
- dimming, auto, 2-2, 4-36
- Distributed Function Terminal mode. See *DFT mode*
- DLCHARSET command, 4-3, 4-19, 4-24, 4-28, 4-44
- DLSELECTCHARSET, C-1, 4-3, 4-19, 4-24, 4-28, 4-44
  - Setup syntax for, C-1
- documentation, related, 1-3, H-1
- Dot Matrix Printer (4644)
  - copy procedures for, 3-13 — 3-18
  - customizing output, 3-19, 3-24 — 3-27
  - installing, A-25
- downloadable character sets, commands for, 4-44
- DRAW command, 4-27, 4-32
  - in tutorial, 2-10, 2-11, 2-12, 2-13
- E**
  - EBCDIC character set, A-12, A-13, C-1
  - ECHO command, 4-9, 4-19, 4-36
    - and installation, A-10
  - EDIT mode, 3-11, A-18
  - EDITCHARS command, 4-20
  - editing characters, 3-2
  - EDITMARGIN command, 4-20
  - 80-column format, 1-5, 4-18
  - electrical specifications, E-1
  - ENCODE command, 4-7
  - ENDPANEL command, 4-27, 4-33
    - in tutorial, 2-12, 2-14
  - Enter key, B-7
    - for terminating commands, 2-2, 2-4, 3-2, 3-3
  - environment, requirements for, A-1
  - environments, saving, 3-19
  - environmental specifications, E-2
  - EOFSTRING command, 4-9, 4-22
    - and installation, A-10
  - EOLSTRING command, 4-9, 4-22, 4-35
    - and installation, A-10
  - EOMCHARS command, 4-9, 4-23, 4-35
    - and installation, A-10
  - Epson-style graphics, 3-12, A-28
  - erasures, graphics, 2-14
    - See also *deletions* and *refresh*
  - error messages
    - in commands, 2-4, 3-4
    - in Self Test, D-2, D-3
  - errors
    - in commands, 2-3, 2-4, 3-4
    - in panel definitions, 2-9
    - in segment definitions, 2-9
    - in Self Test, D-2, D-3
  - ERRORLEVEL command, 4-9, 4-23, 4-35
  - EXPAND command, 4-32
  - Extended Self Test, A-8, D-6 — D-15

**F**

- FACTORY command, 4-7
  - and coax communications, A-8
  - and macros, 3-8, 3-36
  - for resetting terminal, 3-8, 3-36
  - in tutorial, 2-3
- factory defaults. *See defaults*
- features, terminal, 1-4 — 1-9
- fill patterns, 2-11, 2-13, G-1
- FILLPATTERN command, 4-27, 4-33
  - in tutorial, 2-10, 2-11, 2-12, 2-13, 2-14
- FIXUP command, 4-38
- FLAGGING command, 4-9
  - and installation, A-10
- fonts. *See character sets*
- Form Feeds
  - during dialog copy, 3-24, 3-25
  - with monochrome printers, A-28
- frames, 2-34, 2-35
- framing box, in Zoom/Pan
  - changing size of, 2-31, 2-32
  - reshaping, 2-32 — 2-33
  - understanding, 2-30
- French character set
  - code chart for, C-9
  - keyboard layout, C-8
  - macro numbers for, C-8
- function key overlays, at back of manual
- function keys, Tektronix, B-4, B-12
  - for the Set Color function, 2-25
- functional categories, list of, 4-2

**G**

- G0, G1 character sets, C-1
- GAMODE command, 4-4, 4-24, 4-25, 4-27, 4-28, 4-33, 4-42, 4-43
- GCURSOR command, 4-6, 4-19
- GEras key, 2-14, B-12
- German character set
  - code charts for, C-15
  - keyboard layout, C-14
  - macro numbers for, C-14
- Getting Acquainted (tutorial), 2-1 — 2-43
- GIN (graphics input)
  - commands for, 4-21 — 4-23
  - cursor, 2-38
  - entering points, 2-41 — 2-42
  - exiting, 2-42
  - inking, 2-38, 2-41, 2-42
  - rubberbanding, 2-38, 2-41
- GIN, enabling, 2-38
  - for graphics tablet, 2-40
  - for keyboard, 2-38
  - for mouse, 2-39
- GIN devices, 2-38 — 2-42
  - and keyboard, 2-38
  - and mouse, 2-39
  - and puck, 2-40, 2-41
  - and stylus, 2-40, 2-41
  - and tablet, 2-40
- GINAREA command, 4-21
- GINCURSOR command, 4-21
- GINDISABLE command, 4-21
- GINENABLE command, 4-21
  - in tutorial, 2-38, 2-39, 2-40
- GINFILTERING command, 4-23, 4-35
- GINGRIDDING command, 4-21
- GININKING command, 4-21
  - in tutorial, 2-38, 2-39, 2-40
- GINPICKAPERTURE command, 4-22
- GINRATES command, 4-22
- GINREPORT command, 4-23, 4-35
- GINRUBBERBAND command, 4-22
  - in tutorial, 2-38, 2-39, 2-40
- GINHEADERCHARS command, 4-23
- GINSTARTPOINT command, 4-22
- GINWINDOW command, 4-22

- graphics area
    - and dialog area, 2-8
    - color, changing, 2-18 — 2-29
    - copy of, 3-13
    - erasing, 2-14
    - indices, 2-27 — 2-28
    - updating, 2-14
  - graphics input. *See G/I/N*
  - graphics position, 2-9
  - graphics primitives, commands for, 4-23 — 4-27
    - in segments, 2-8
  - graphics surfaces, 1-6
  - graphics tablet. *See peripheral devices*
  - graphtext, commands for, 4-28 — 4-29
  - groups of commands (clusters), 2-7, 3-5
  - GSPEED command, 4-22
  - GTBEGIN command, 4-25, 4-28, 4-42
  - GTDELETE command, 4-25, 4-28, 4-42
  - GTEND command, 4-25, 4-28, 4-42
  - GTEXT command, 4-25, 4-29, 4-43
  - GTFONT command, 4-25, 4-29, 4-43
  - GTGRID command, 4-26, 4-29, 4-42
  - GTINDEX command, 4-4, 4-6, 4-24, 4-26, 4-29, 4-42, 4-43
  - GTPATH command, 4-26, 4-29, 4-43
  - GTPRECISION command, 4-29, 4-43
  - GTROTATION command, 4-29, 4-43
  - GTSIZE command, 4-26, 4-29, 4-44
  - GTSLANT command, 4-26, 4-29, 4-44
  - guidelines for entering Setup commands, 2-4, 3-2 — 3-3, 4-1
- H**
- handshaking protocol, A-10
  - hardcopy devices, 3-12 — 3-24, A-22 — A-32
  - hardcopy size, 3-21
  - HCBACKGROUND command, 4-14
    - and copy procedures, 3-15, 3-16, 3-17
  - HCCOPIES command, 4-14
    - and copy procedures, 3-14
  - HCDAATTRIBUTES command, 4-16, 4-17
    - and copy procedures, 3-19, 3-24, 3-25
  - HCDATARES command, 4-16
    - and copy procedures, 3-19, 3-23, 3-24
  - HC DENSITY command, 4-16
    - and copy procedures, 3-19, 3-23, 3-24
  - HCFEATURES command, 4-16, 4-17
    - and copy procedures, 3-19, 3-26 — 3-27
  - HCINTERFACE command, 4-11, 4-16
    - and installation, A-23, A-24, A-25, A-26, A-27, A-28
  - HCMAP command, 4-17
    - and copy procedures, 3-19, 3-24
  - HCMONOCHROME command, 4-11, 4-17
    - and installation, A-25, A-26, A-28
  - HCORIENT command, 4-16
    - and copy procedures, 3-19, 3-22, 3-24
  - HCREPAINT command, 4-16
    - and copy procedures, 3-19, 3-23, 3-24
  - HCSIZE command, 4-16
    - and copy procedures, 3-19, 3-21
  - HCSTATISTICS command, 4-14
  - HELP command, 3-5, 4-30
  - help, commands for, 4-30
  - help messages, 3-5
  - Hewlett-Packard LaserJet. *See peripheral devices*
  - Hewlett-Packard ThinkJet. *See peripheral devices*
  - HLS values, 2-24 — 2-26, F-1 — F-2
  - horizontal scrolling, 1-5
  - host command mode, how to select, 3-11, A-18
  - host communication
    - difference between coax and RS-232, A-12 — A-17
    - during screen copy. *See background copying*
    - during Zoom/Pan, 2-30
    - with the Set Color function, 2-19
  - host syntax
    - and macros, 3-36, 3-39, 3-41
    - selecting mode for, 3-9
  - HOSTPORT COAX, 3-9, A-12, A-13
  - HOSTPORT command, 3-9, A-19, 4-46
  - HOSTPORT RS-232, 3-9, A-8, A-9, A-10
    - in tutorial, 2-3
  - hue. *See HLS values*

## I

- IBM. See *communications, coax*
- IGNOREDEL command, 4-9
  - and installation, A-10
- index, color
  - and dialog area color map, 2-27 — 2-29
  - and graphics area color map, 2-27 — 2-29
  - and predefined color menu, 2-22 — 2-23
  - changing HLS value of, 2-24 — 2-26, 2-27 — 2-29
  - default colors, 2-18, 2-27
  - defined, 2-18
  - mapping to monochrome values, 3-24
  - mapping to plotter pens, 3-31
- indices. See *index, color*
- inking. See *GIN*
- INSERTREPLACE command, 4-20
- installation requirements, E-1, E-2
- installation, A-1 — A-32
  - coax hosts, A-12 — A-18
  - peripherals, A-22 — A-32
  - RS-232 hosts, A-8 — A-11
  - terminal, A-1 — A-8
- Interactive Color Interface. See *Set Color function*
- interference, radio or television, A-2
- invisible dialog area, 2-5, 2-17
  - and screen copies, 3-13

## J

- Joydisk, B-4
  - for scrolling, 2-6
  - with Pan, 2-34
  - with Set Color, 2-21
  - with Zoom, 2-31, 2-32
- Jump key, 3-9, 3-10, A-19, B-8, B-9

## K

- key, programming. See *macros*
- key combinations. See *Ctrl key*
- key-execute character
  - default, 3-37
  - in macro examples, 3-37, 3-39, 3-40, 3-41, 3-42

## keyboard

- adjusting tilt, 1-3
- description, 1-3
- enabling for GIN, 2-38
- layout and keys, standard, B-3, C-4
- operating in HOSTPORT COAX, A-20, B-5
- operating in HOSTPORT RS-232, A-21, B-5
- testing, D-7
  - See also *character sets*
- keyboard, commands for, 4-31
- KEYBOARD connector, A-6, B-1
- keyboard macros
  - deleting, 3-37
  - examples of, 3-38 — 3-42
  - numbers for, C-4, C-6, C-8, C-10, C-12, C-14
  - understanding, 3-35 — 3-37
- keyboard overlays, at back of manual
- KEYEXCHAR command, 4-32
- KEYEXPAND command, 4-31, 4-32
- KEYPADMODE command, 4-31
- keys
  - Cancel, 2-21, 3-15
  - Caps Lock, B-7, D-2, D-3
  - Ctrl, 2-7, 2-36, B-7
  - DCopy, 2-21, 3-13, 3-14, B-12
  - DEras, B-8
  - Dialog, 2-5, 2-17, 2-36, B-12
  - Enter, 2-2, 2-4, 3-2, 3-3
  - GEras, 2-14, 2-16, 2-40, B-12
  - Jump, 3-9, 3-10, A-19, B-8, B-9
  - Menu, 2-19, 2-21, 2-26, 2-27, 2-37, B-12
  - Rub Out. See *Del Key*
  - SCopy, 2-21, 3-13, 3-14, B-12
  - SEras, 2-20, B-8
  - Setup, 2-2, 3-2, B-12
  - See also *buttons*
- keys, descriptions of, B-6 — B-12
  - character keys, B-6, B-7
  - cursor control keys, B-10, B-11
  - display control keys, B-8, B-8, B-9
  - editing keys, B-6, B-7, B-10, B-11
  - function keys, B-4, B-12
- keys, special function, B-12
  - for Set Color, 2-25
  - for Zoom/Pan, 2-37
- keywords, 3-2, 4-1

**L**

landscape format, 3-21, 3-22  
 LaserJet. See *peripheral devices*  
 LEARN command, 4-32  
     and macro examples, 3-36, 3-37, 3-38  
 LFCR command, 4-20  
     and installation, A-10  
 lightness. See *HLS values*  
 Line Feed  
     and Carriage Return. See *LFCR command*  
     and HCDAATTRIBUTES command, 3-24, 3-25  
     during dialog copy, 3-24, 3-25  
     with monochrome printers, A-28  
 line voltage, how to set, A-4  
 lines, commands for, 4-32  
 LINEINDEX command, 4-6, 4-27, 4-32  
 LINESTYLE command, 4-27, 4-32  
 LOAD command, 4-8  
 LOCAL command, 4-31  
 LOCKVIEWINGKEYS command, 4-31, 4-45  
 loopback connector, D-10, D-12, H-1

**M**

macros, commands for, 4-32 — 4-33  
     creating, 3-35 — 3-37  
     default key-execute character for, 3-37  
     deleting, 3-37  
     examples of, 3-38 — 3-42  
     expanding, 3-35  
     selecting command syntax, 3-36  
     selecting local or host, 3-37  
     saving, 3-33, 3-34, 3-35, 3-36  
 macros, numbers for  
     and character sets, C-4, C-6, C-8, C-10, C-12, C-14  
     and programmable function keys, 3-35  
 macros, nonvolatile, 3-36  
 MACROSTATUS command, 3-39, 4-32  
 Main Self Test, D-4 — D-5  
 MAINS VOLTAGE SELECTOR switch, A-4, B-2, B-3  
 manuals, related, 1-3, H-1  
 map, color, 2-27 — 2-29  
 margins, dialog area. See *EDITMARGINS command*  
 margins, top and bottom for hardcopy, 3-26, 3-27  
 MARKER command, 4-27, 4-33  
 markers, commands for, 4-33  
 MARKERTYPE command, 4-27, 4-33  
 MEDIA COPY command. See *AUTOPRINT command*

Megabyte RAM board. See *RAM board menus*  
     Coax Configuration Summary menu, A-14, A-15, A-16, A-17  
     Set Color function, 2-19 — 2-20  
     predefined colors, 2-22 — 2-23  
     Zoom/Pan, 2-30, 2-31, 2-33, 2-35, 2-36

Menu key, 2-19, 2-30, B-12  
 modes, selecting  
     ANSI, 3-11, A-18  
     EDIT, 3-11, A-18  
     TEK, 3-11, A-18  
     VT52, 3-11, A-18  
 monochrome printers  
     installing, A-25 — A-28  
     See also *copies, monochrome*

mouse  
     installing, A-6  
     macro numbers, C-3  
     self-test for, D-8  
     using with GIN, 2-39, 3-44  
     using with Set Color, 2-21  
 MOUSEMAP command, 4-21  
     and older applications, 3-44, 2-21  
 MOUSE port, 1-8, A-6, B-1  
 MOVE command, 4-27, 4-32  
 multiple sessions, 3-10, A-14  
     and power-up, A-17  
 multi-page dialog copies, 3-24 — 3-27  
 Multilingual (ASCII) character set, C-18  
     code chart, C-18  
 multiple copies, making, 3-14

**N**

New Line key, 3-2, B-7  
 nonvolatile  
     commands, 3-6, 3-7  
     macros, 3-33, 3-34, 3-35, 3-36  
     memory, 3-6, 3-7, A-9, D-7  
     See also *NVSAVE command*  
 North American (ASCII) character set  
     code chart for, C-5  
     macro numbers for, C-4  
     keyboard layout for, C-4  
 numeric keypad, B-4  
 NVDEFINE command, 3-36, 4-33  
 NVLEARN command, 4-33  
     examples of, 3-38, 3-39, 3-40, 3-41  
     how to use, 3-36, 3-37  
 NVSAVE command, 3-6, 3-7, 3-8, 4-8, 4-33, A-9  
     and coax communications, A-13, A-19  
     and macros, 3-36, 3-37  
     and RS-232 communications, A-9  
     in macro examples, 3-39, 3-40, 3-41, 3-42

## O

omitted parameters, 2-4, 4-1  
 132-column format, 1-5, 4-18  
 operating differences, host, A-20 — A-21  
 operating mode. See *host command mode*  
 operator information area, 2-3, A-20, I-1  
 optional accessories, 1-10, H-1  
 optional keyboards, 1-11  
   layouts for, C-4 — C-15  
 options, 1-11  
 ORIGINMODE command, 4-20  
 overheads. See *transparencies*  
 overlays (keyboard), at back of manual  
 overview, of terminal features, 1-4 — 1-9

## P

paging hardcopies, 3-24 — 3-27  
 palette, color, 1-4  
 Pan. See *Zoom/Pan function*  
 panels, 2-8  
   correcting errors, 2-9  
   creating, 2-10 — 2-13  
 panels, commands for, 4-33  
 parameters  
   as keywords, 3-2, 4-1  
   entering, 2-4, 3-2, 3-3  
   omitting, 2-4, 3-3  
   saving, 3-6, 3-7  
   separating, 2-4, 3-3  
 parameters, communications, A-9 — A-11  
 PARITY command, 4-10  
   and installation, A-11  
 parity. See *communications parameters*  
 PASSIGN command, 4-11  
   and installation, A-29, A-30, A-31  
 patterns, fill, 2-11, 2-13, G-1  
 PBAUD command, 4-12  
   and installation, A-29, A-30, A-31  
 PBITS command, 4-12  
   and installation, A-29, A-30, A-31  
 PCOPIES command, 4-15  
   and copy procedures, 3-29  
 PCOPY command, 4-10, 4-12  
 PEOF command, 4-12  
 peripheral devices  
   4510 Rasterizer, installing, A-29  
     copy procedures for, 3-28 — 3-30  
   4644 Printer, installing, A-25  
     copy procedures for, 3-13 — 3-18  
     customizing output, 3-19,  
       3-24 — 3-27  
   4662 Plotter, installing, A-30  
     copy procedures for, 3-31  
   4663 Plotter, installing, A-31  
     copy procedures for, 3-31  
   4691 Copier, installing, A-23  
     copy procedures for, 3-13 — 3-18  
     customizing output, 3-19 — 3-22,  
       3-24 — 3-27  
     testing, D-14  
   4692 Copier, installing, A-23  
     copy procedures for, 3-13 — 3-18  
     customizing output, 3-19 — 3-27  
     testing, D-14  
   4695 Copier, installing, A-23  
     copy procedures for, 3-13 — 3-18  
     customizing output, 3-19 — 3-20,  
       3-24 — 3-27  
     testing, D-13  
   4696 Printer, installing, A-24  
     copy procedures for, 3-13 — 3-18  
     customizing output, 3-19 — 3-20,  
       3-24 — 3-27  
     testing, D-13  
   4957 Graphics Tablet, installing, A-32  
     and puck, 2-40, 3-33  
     and stylus, 2-40, 3-33  
     enabling, 2-40  
     testing, D-15  
   4958 Graphics Tablet, installing, A-32  
     and puck, 2-40, 3-33  
     and stylus, 2-40, 3-33  
     enabling, 2-40  
     testing, D-15  
 Hewlett-Packard LaserJet, installing,  
 A-27  
   copy procedures for, 3-13 — 3-15  
   customizing output, 3-19,  
     3-24 — 3-25  
   emulating background copying with,  
     3-18  
 Hewlett-Packard ThinkJet, installing,  
 A-26  
   copy procedures for, 3-13 — 3-18  
   customizing output, 3-19,  
     3-24 — 3-27  
 monochrome printers, other, installing,  
 A-25 — A-28  
   copy procedures for, 3-13 — 3-15  
   customizing output, 3-19,  
     3-24 — 3-27  
 mouse  
   enabling, 2-39  
   installing, A-6  
   using, 2-39, 2-41

PFLAG command, 4-12  
 and installation, A-29, A-30, A-31  
 physical dimensions, A-3, E-1  
 PINVERSION command, 4-15  
 and copy procedures, 3-30  
 pixel operations, commands for, 4-34  
 PLOT command, 4-14, 4-37  
 and plotting procedures, 3-29, 3-31  
 plotters. *See peripheral devices*  
 plotting. *See copies, for a plotter*  
 PMAP command, 4-15  
 and copy procedures, 3-31  
 points, entering for GIN, 2-41 — 2-42  
 polygon. *See panels*  
 PORIENT command, 4-15  
 and copy procedures, 3-30  
 PORT 0/PORT 1, B-2, B-3  
 and 4662 Plotter, 3-31, A-30  
 and 4663 Plotter, 3-31, A-31  
 and graphics tablets, A-32  
 and rasterizer, 3-28, A-29  
 copying from a host to, 3-32  
 enabling GIN for, 2-40  
 testing, D-11  
 portrait format, 3-21, 3-22  
 power button. *See ON/OFF button*  
 power connection, A-6  
 Power-Up Self Test, 2-2, D-1, D-3  
 PPARITY command, 4-13  
 and installation, A-29, A-30, A-31  
 predefined settings. *See defaults*  
 primary and alternate character sets, C-1  
 program function keys, B-4  
 programming keys. *See macros*  
 prompt, Setup, 2-2, 3-2, 3-3  
 prompt, Self Test, D-2  
 PROMPTMODE command, 4-10  
 PROMPTSTRING command, 4-10  
 and installation, A-11  
 puck. *See GIN*  
 PXBEGIN command, 4-34  
 PXCOPY command, 4-34  
 PXPOSITION command, 4-34  
 PXRASTERWRITE command, 4-34  
 PXRECTANGLE command, 4-34  
 PXRUNLENGTHWRITE command, 4-34  
 PXVIEWPORT command, 4-34

## Q

QUEUESIZE command, 4-10  
 and coax installation, A-11, A-12  
 and RS-232 installation, A-11  
 queue size setting. *See QUEUESIZE command*

## R

rasterizer. *See peripheral devices*  
 receive rate. *See BAUDRATE command*  
 refresh, screen, 1-5  
 screen-dimming, 2-2  
 updating graphics area, 2-14, 2-16, 2-42  
 related manuals, 1-3, H-1  
 RENEW command, 4-45  
 REOM command, 4-10, 4-23, 4-35  
 repacking the terminal, A-4, A-5  
 reports, commands for, 4-34, 4-35  
 RESET button, B-2, B-3  
 to reset parameters, 3-8  
 to run Self Test, A-8, D-3, D-4,  
 to stop a copy, 3-15  
 RESET command, 3-6, 3-8, 4-7  
 resetting the terminal, 3-8  
 Return key. *See Enter key*  
 RLINELNGTH command, 4-11, 4-23, 4-35  
 routing cable, A-6  
 RSIGCHARS command, 4-23, 4-35  
 RS-232 communications  
 for host, A-9 — A-11  
 for PORT 0/PORT 1, A-29 — A-32  
 testing, D-10, D-11  
 RS-422 communications. *See MOUSE port*  
 Rub Out key. *See Del Key*  
 rubberbanding. *See GIN*  
 Rulings character set  
 code chart for, C-17

## S

- saturation. *See* *HLS values*
- SAVE command, 4-8, 4-13, 4-37
- saving copier settings, 3-17, 3-19
- saving macros, 3-36
- saving parameters (settings), 3-6 — 3-7, 4-1
- saving terminal/host communications settings, A-9
- SCopy key, B-12
  - and copy procedures, 3-13, 3-14, 3-16, 3-17
- screen
  - auto-dimming, 2-2, 4-36
  - brightness, 2-2, B-1
  - scrolling, 1-5, 2-6, 2-7, 3-5
- screen copies
  - procedures for, 3-13 — 3-18
  - customizing output, 3-19 — 3-24, 3-26 — 3-27
- screen-dimming, automatic, 2-2
  - command to control, 4-36
- screen editors, 1-6
  - selecting mode for, 3-11, A-18
- screen size, alternate, A-14
- SCREENMODE command, 4-4
- scrolling, dialog area
  - Ctrl-S and Ctrl-Q, 2-7, 3-5
  - Joydisk, 2-6
- SDEFINITIONS command, 4-41
- security. *See* *answerback*
- segments
  - commands for, 4-36 — 4-40
  - correcting errors, 2-9
  - creating, 2-8 — 2-13
  - defining, 2-10 — 2-13
  - definition of, 2-8
  - highlighting, 2-16
  - in rasterized copies, 3-28
  - setting attributes, 2-15 — 2-16
  - updating, 2-14
  - visibility, 2-15
- S TEST button, A-8, B-1, D-4, D-6
- Self Test
  - during installation, A-8
  - error reporting, D-2
  - levels, D-1
  - user interaction, D-2
- Self Test programs
  - Extended, A-8, D-6 — D-15
  - Main, D-4 — D-5
  - Mouse Verification, D-8
  - Power-Up, 2-2, D-3
- SEras key, B-7, B-8
  - in tutorial, 2-20
- sessions, multiple DFT, 3-10, A-14
  - and power-up, A-17
- Set Color function, 2-18 — 2-29
  - and mouse, 2-21
  - banner (menu), 2-20, 2-24
  - function keys, 2-25
- settings
  - and saving parameters, 3-6 — 3-7, 4-1
  - checking status, 2-7, 3-6
  - saving copier settings, 3-17, 3-19
  - saving terminal/host communications settings, A-9
- Setup
  - entering, 2-2, 3-2
  - explanation of, 1-4, 2-2, 3-2
  - in HOSTPORT COAX, A-20
- Setup commands
  - correcting errors in, 2-3, 3-4
  - defaults for, 2-4, 4-1
  - functional summary of, 4-2 — 4-45
  - guidelines for entering, 2-4, 3-2 — 3-3, 4-1
  - parameters for, 2-4, 3-2, 3-3, 4-1
  - saving, 3-6 — 3-7, 4-1
  - syntax for, 3-2, 3-9, 4-1
- Setup key, 2-2, 3-2, B-12
- Setup prompt, 2-2, 3-2
- Setup syntax, 2-4, 3-2, 4-1
  - and key macros, 3-36
- SGCALL command, 4-36
- SGCLASS command, 4-39
- SGCLOSE command, 4-36
  - in tutorial, 2-10, 2-13, 2-16
- SGDELETE command, 4-40
  - in tutorial, 2-9
- SGDETECT command, 4-39
- SGDOWN command, 4-36
- SGEDIT command, 4-40
- SGHIGHLIGHT command, 4-39
  - in tutorial, 2-16
- SGINCLUDE command, 4-36
- SGINSERT command, 4-40
- SGMATCHINGCLASS command, 4-39
- SGMODE command, 4-38
- SGNEW command, 4-36
- SGOPEN command, 4-37
  - in tutorial, 2-10, 2-12, 2-16
- SGPICKID command, 4-37
- SGPIVOT command, 4-37, 4-39
- SGPOSITION command, 4-38
- SGPRIORITY command, 4-39



SGREMOVE command, 4-40  
 SGRENAME command, 4-40  
 SGREPLACE command, 4-40  
 SGSCALEROTATE command, 4-38  
 SGTRANSFORM command, 4-38  
 SGUIP command, 4-37  
 SGVISIBILITY command, 4-38, 4-39  
   in tutorial, 2-15  
 Shift key, B-12  
   and screen-dimming, 2-2  
   shortened command name, 2-4, 3-5  
 site, selecting for terminal, A-2  
 SNOOPY command, 4-20  
 special function keys, B-4  
   defined for Set Color, 2-25  
   defined for Zoom/Pan, 2-37  
 specifications, E-1 — E-3  
 spooling copies. See *background copying*  
 SPRIORITIES command, 4-41  
 ON/OFF button, A-6, B-1  
 standard accessories, 1-10, H-1  
 STATUS command, 4-7  
   during installation, A-9  
   how to use, 3-6  
   in tutorial, 2-6, 2-7  
 status message, 2-7, 3-6  
   for specific groups of commands, 2-7  
 status symbols, IBM, A-20, I-1 — I-2  
 STOPBITS command, 4-11  
   and installation, A-11  
 stylus. See *GIN*  
 Supplementary character set  
   code chart for, C-16  
 surfaces, commands for, 4-41  
 SVISIBILITY command, 4-41  
 Swedish character set  
   code chart for, C-11  
   keyboard layout, C-10  
   macro numbers, C-10  
 symbols, for IBM keyboard, A-20, I-1 — I-2  
 syntax, host  
   and macros, 3-36  
   selecting mode for, 3-11  
 syntax, Setup, 3-2, 3-11  
   and macros, 3-36  
 system connection, A-6 — A-11

## T

tablet, graphics. See *peripheral devices*  
   enabling for GIN, 2-40  
 TABS command, 4-20, 4-31  
 TEK mode, 1-6, 3-11, A-18  
 TEKHEADER command, 4-46, A-22, A-23  
 Tektronix Color Standard, 2-24, F-1 — F-2  
 television or radio interference, A-3  
 TERMINAL command, 4-35  
   procedure to ensure 4107 compatibility,  
   3-44  
 terminal configuration, A-9 — A-11  
 terminal connections  
   AC POWER connector, B-2, B-3  
   cables, A-6  
   color copiers, A-23, A-24  
   COPIER port, A-23, A-24, A-25, A-26,  
   A-28, B-2, B-3  
   KEYBOARD connector, A-6, B-1  
   MOUSE port, A-6, B-1  
   See also *PORT 0/PORT 1*  
 terminal installation, A-6 — A-18  
   inspecting, A-3  
   operating modes, A-18  
   selecting site for, A-2  
   testing communication parameters, A-18  
   repacking, A-3  
   running Self Test, A-8  
 terminal specifications, E-1 — E-3  
 text, commands for, 4-42 — 4-44  
 text printers. See *monochrome printers*  
 TEXTRENDITION command, 4-4, 4-20  
 ThinkJet. See *peripheral devices*  
 TMETHOD command, 4-46, A-22, A-23  
 transmit rate. See *BAUDRATE command*  
 transparencies  
   how to create, 3-24  
   overwriting on, 3-23  
 transparent dialog area, 2-17, 2-18  
 tutorial, 2-1 — 2-43

## U

United Kingdom character set  
   code chart for, C-7  
   keyboard layout, C-6  
   macro numbers, C-6

**V**

VATTRIBUTES command, 4-6, 4-41, 4-45  
 VCLUSTER command, 4-45  
 VDELETE command, 4-45  
 ventilation, A-1  
 verification programs. *See Self Test*  
 viewing keys. *See Zoom/Pan function keys*  
 VIEWPORT command, 4-45  
 views, in Zoom/Pan, 2-36  
   and rasterizer, 3-28  
   commands for, 4-45  
   frames, 2-34  
 voltage selection, A-4  
   specifications for, E-1, E-2  
 voltage selector switch, A-4, B-2, B-3  
 VSELECT command, 4-41, 4-45  
 VT52 mode, 1-6, 3-11, A-18

**W**

WINDOW command, 4-45  
 window, in Zoom/Pan, 2-30, 2-34  
   default size, 2-30

**X**

XMTDELAY command, 4-11 A-11  
 XMTLIMIT command, 4-11, A-11  
 xy-coordinates, 2-9

**Z**

Zoom/Pan function, 2-29 — 2-37  
   communicating with the host, 2-36  
   controlling menu visibility, 2-36  
   creating borders, 2-36  
   entering, 2-30  
   exiting, 2-37, 3-2  
   saving and restoring frames,  
     2-34 — 2-35  
   selecting views, 2-36  
   using Pan, 2-34 — 2-36  
   using Zoom, 2-31 — 2-33  
 Zoom/Pan function keys, 2-37  
 Zoom/Pan menu, 2-30, 2-31, 2-33, 2-35, 2-36