TEK USERS MANUAL

Part No. 070-4784-00
Product Group 15

4957
GRAPHICS TABLET

Please Check for
CHANGE INFORMATION
at the Rear of This Manual

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WARNING

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

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MANUAL REVISION STATUS

PRODUCT: 4957 Graphics Tablet

This manual supports the following versions of this product: Serial Numbers B010100 and up.

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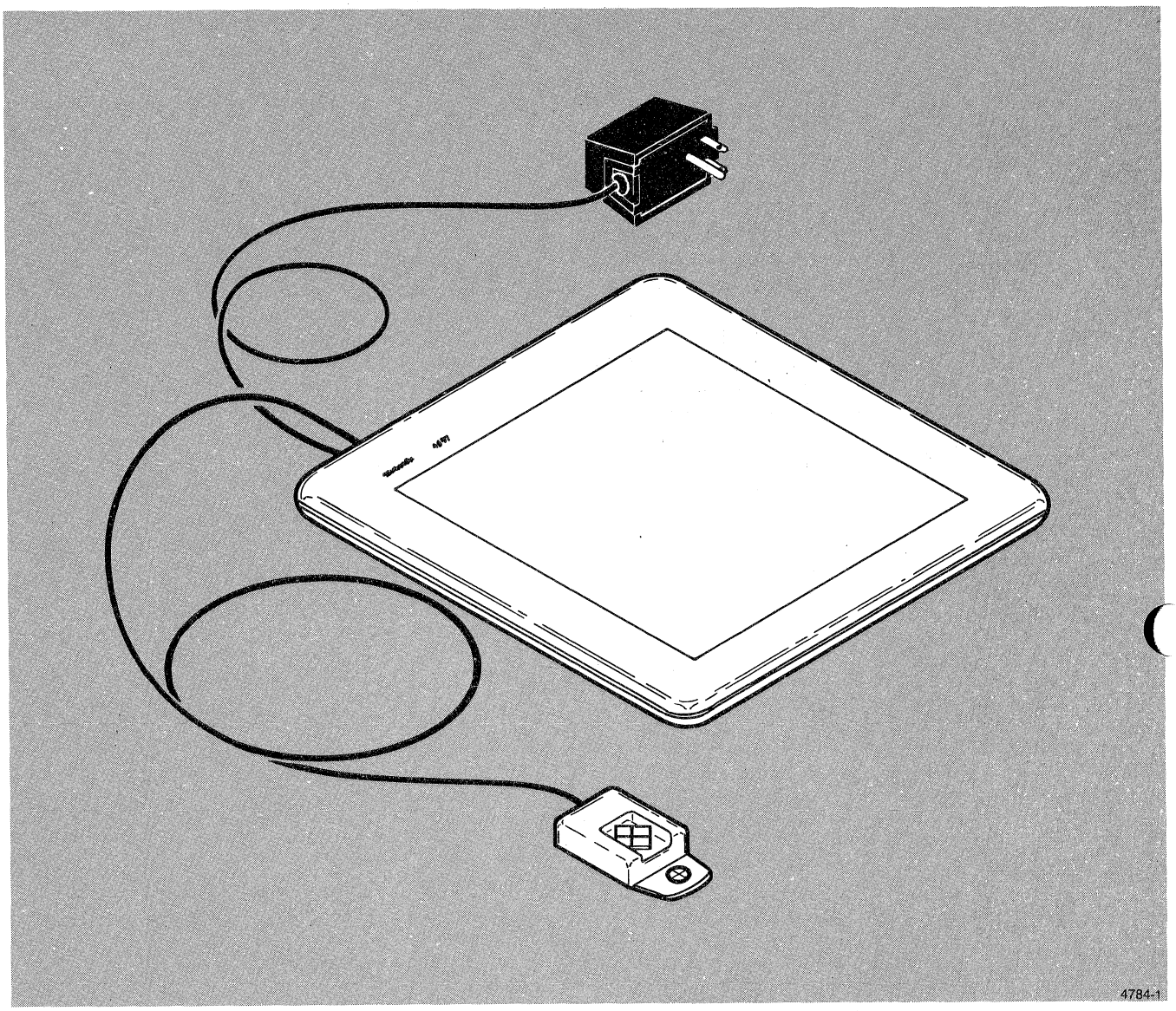


Figure 1-1. The 4957 Graphics Tablet.

Section 1

GETTING STARTED

INTRODUCTION

OVERVIEW

Welcome to the world of the 4957 Graphics Tablet!

This manual provides you with information useful in operating the 4957. Included are instructions for setting up, operating, programming, and performing basic troubleshooting.

THE 4957: WHAT IS IT?

Your TEKTRONIX 4957 Graphics Tablet converts graphic information into digital form suitable for entry into a computer. It works by letting the operator move a 4-button cursor to a position on the tablet. The tablet can then calculate the 4-button cursor location and can send the coordinates of its position to a computer terminal or processor.

Your tablet consists of three main parts. These are shown in Figure 1-2 and include:

- The tablet body: consisting of the active area where digitizing can occur and the border where the internal controller exists.
- The 4-button cursor: used in choosing the coordinate location to digitize.
- The power supply: used to supply electric energy to run the 4957.

The standard and optional accessories are listed in Appendix D.

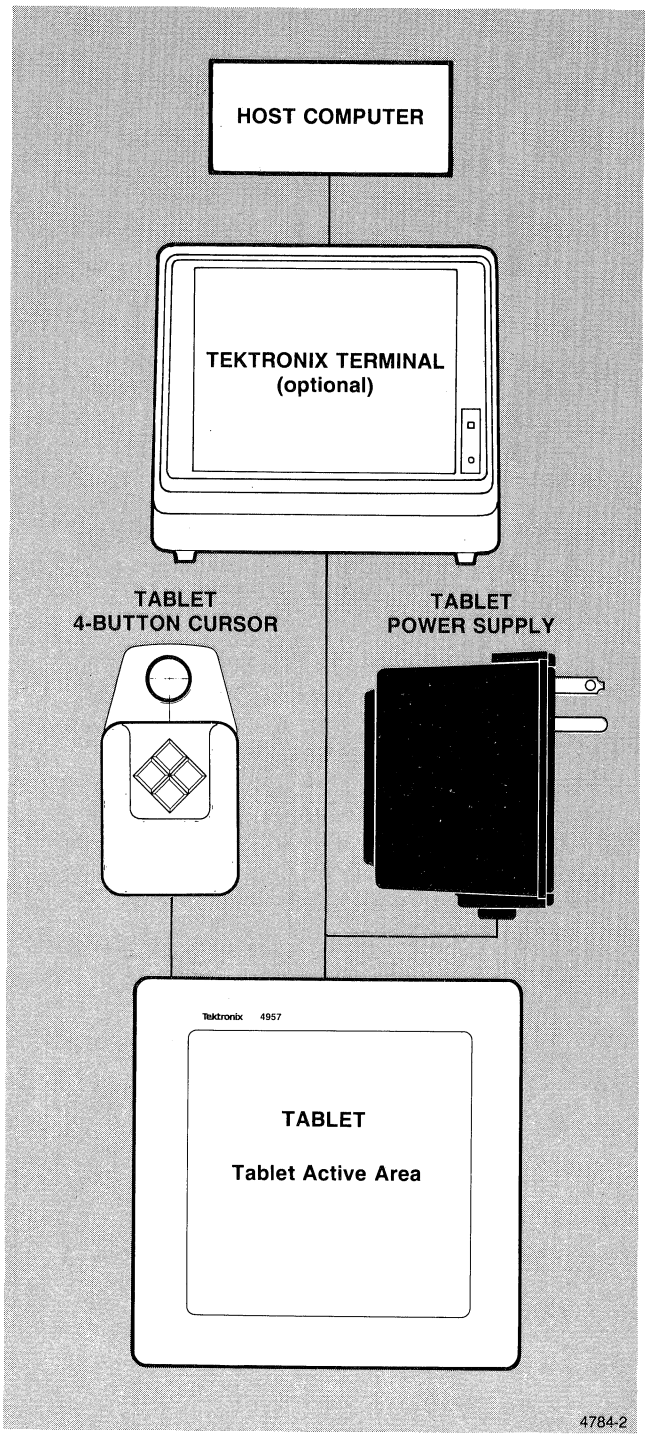


Figure 1-2. Parts of the 4957 Graphics Tablet System.

THE 4957: WHY USE IT?

The 4957 provides you with the ability to solve problems of terminal screen cursor steering, digitizing of pictures, and menu selection. These abilities are further described below.

- Terminal screen cursor steering. You can use the 4957 to move a screen cursor around a computer terminal display. You can do this in either an absolute coordinate system commonly found on a tablet, or in a relative coordinate system commonly found on a graphics "mouse" or on thumbwheels. When using the cursor steering mode, you move the tablet cursor with your hand and the display screen cursor moves in a similar manner. This offers you an easy way to move the display screen cursor.
- Digitizing of pictures. The 4957 can also help you transfer a wide variety of your drawings — including mechanical parts diagrams, floor plans, maps, architectural designs and electronic schematics — from paper to computerized graphics data bases. To accomplish this, you place the original paper drawing on the tablet's active area. Then trace the outline of the drawing — or the significant endpoints of line segments — with the 4-button cursor and its exact cross hairs. As you trace the drawing, the appropriate applications software reads the X, Y coordinates from the tablet and transfers them to your host computer and/or terminal.
- Menu selection. The 4957 can augment your terminal and/or host keyboard as a menu selection device, enabling you to call a wide range of functions directly from the tablet. In this mode the tablet is used as a custom input device. That is, you can put an overlay with a custom keyboard design on the tablet and thereby have a custom menu of additional functions. Putting extra functions on the tablet leaves more room on the screen for critical design work.

INSTALLATION

OVERVIEW

This part of the manual provides information to quickly get your tablet installed and ready to send data to the host. You may also find these procedures helpful in other circumstances such as:

- When relocating the tablet, to check that the cables are correctly reinstalled.
- If digitizing problems occur, to check that the tablet is properly installed before calling a service person.

PROCEDURE

The installation procedure is simple. Follow the steps listed below and illustrated in Figure 1-3:

1. Connect the 4-button cursor to the tablet.
2. Connect the tablet's asynchronous communications cable to the corresponding host computer or terminal's asynchronous communications (i.e., RS-232) port.
3. Connect the tablet power supply to the tablet.
4. Connect the tablet power supply to a wall power outlet.

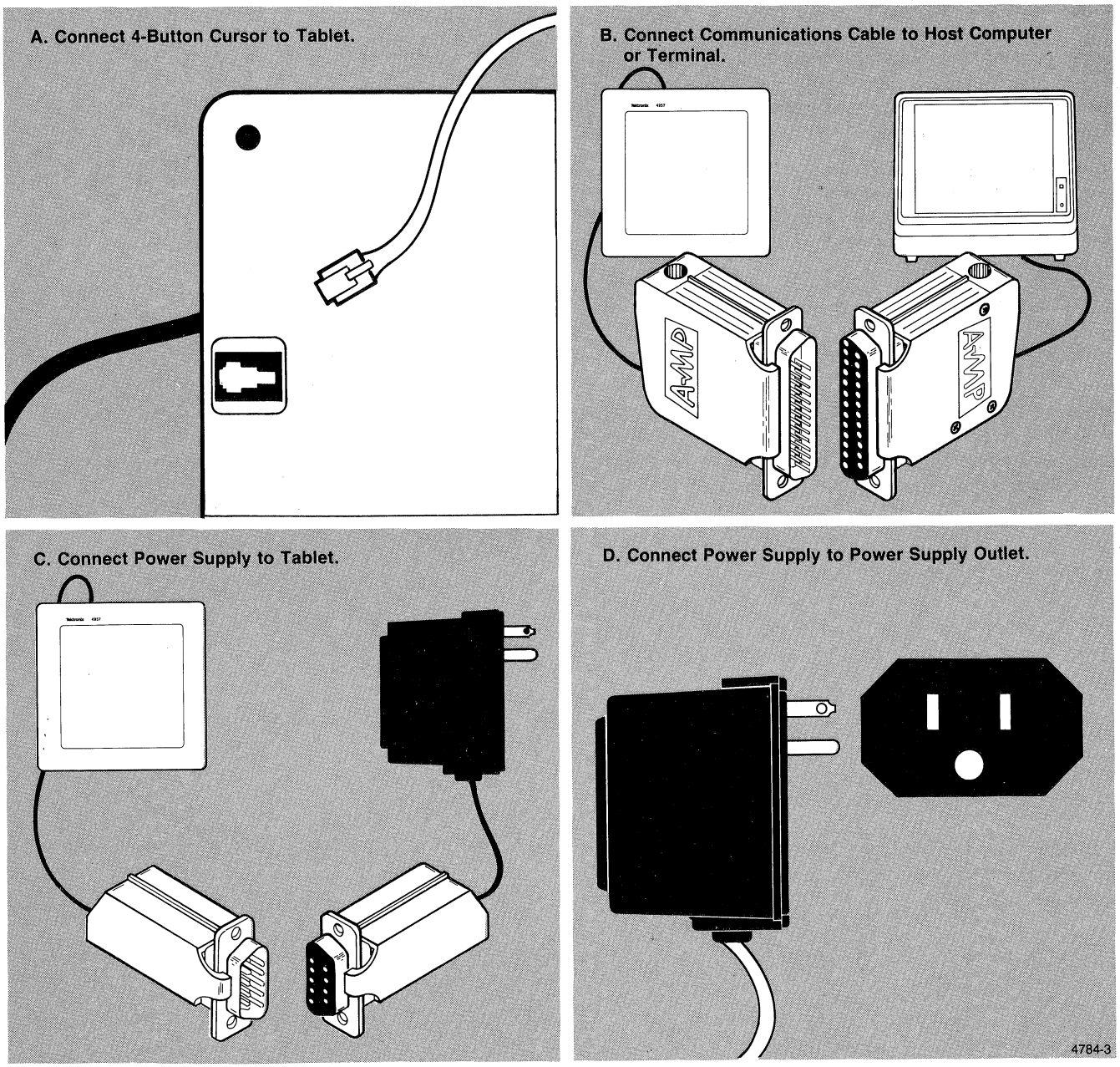


Figure 1-3. 4957 Installation.

THE TILT MECHANISM

Now is a good time to adjust your tablet's tilt. The 4957 has a tilt mechanism that lets you change the tablet's orientation from 0 to 20 degrees. To use the tilt mechanism, refer to Figure 1-4 and do the following:

- For a zero degree tilt attach the four black mounting feet to each of the four corners of the tablet. Remove the adjustable tilt mechanism by pulling it all the way forward towards the tablet end where the cursor and main cables attach.
- For a 5 degree tilt remove the mounting feet, position the side supports flush with the tablet case and extend the longitudinal support as far as possible towards the rear of the tablet (i.e. towards the end with the cables).
- For a greater than 5 degree tilt first move the longitudinal support towards the front (i.e. the X-axis) of the tablet. If an even greater tilt is desired, also move the side supports from their horizontal to their vertical orientation.

TABLET SYSTEM SELF TEST

Your 4957 should perform without trouble for many years. However, if you want to be sure the tablet is functioning correctly, it is very simple to run a self test procedure. Actually, you can run either of two types of self tests. If the tablet is connected to a Tektronix terminal that specifically supports the 4957, such as the model 4107 or 4109, run the terminal-based tablet self test. If the terminal is connected directly to a host computer, run the tablet-based self test.

For instructions on running either self test as well as on performing various other diagnostic routines, refer to Section 7, *Diagnostics*.

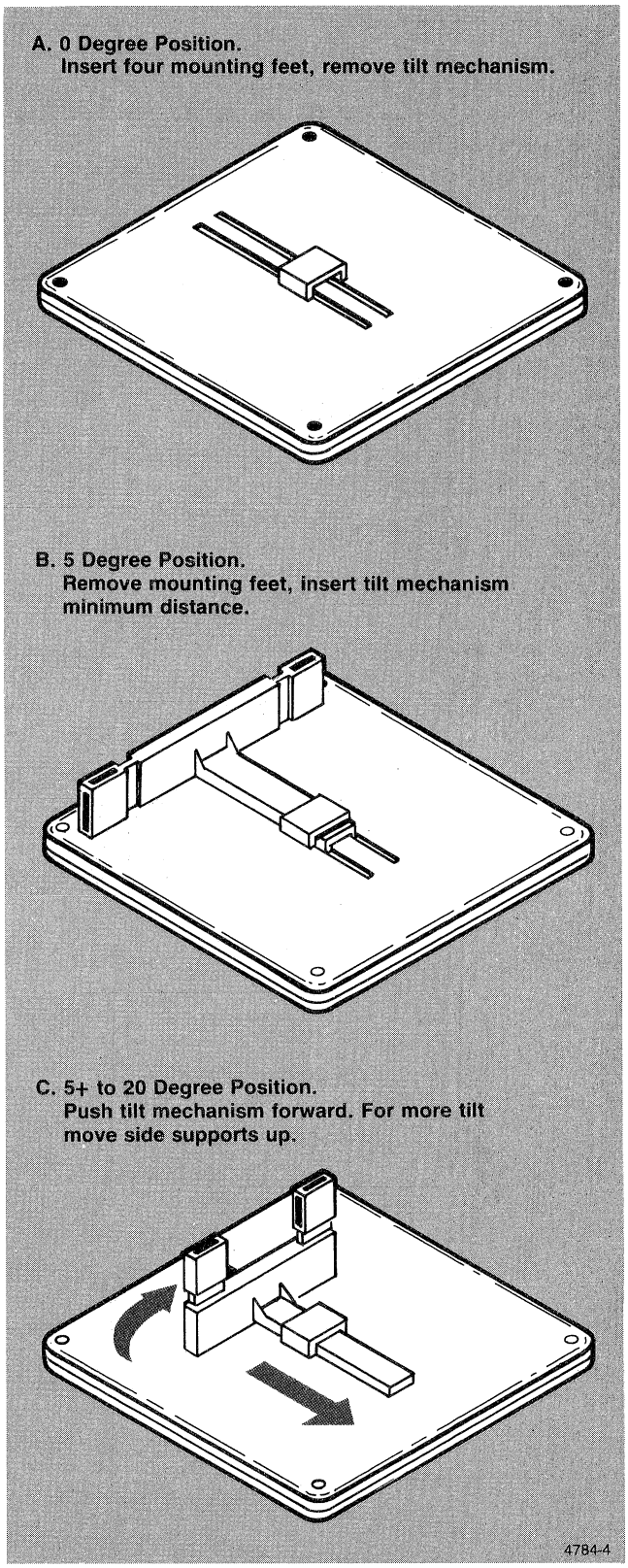


Figure 1-4. Using the 4957's Adjustable Tilt.

Section 2

OPERATING PROCEDURES

OVERVIEW

You should find the 4957 tablet simple to operate. To operate merely do the following:

1. Let your program enable one of the basic operating modes as defined further in Section 3.

2. Manipulate the 4-button cursor on the tablet surface.

The operating mode determines when data is sent, how much data is sent, and when it is necessary to press one of the cursor buttons to transmit data.

The cursor manipulation determines what data is sent.

OPERATING MODES

Two modes exist: the Tektronix terminal-based tablet modes and the tablet-based modes.

If you have a host computer that communicates with the tablet via any of the Tektronix terminals that support the 4957 (such as the 4107 and the 4109) then you can use tablet modes similar to those available on the 411X Series Tektronix terminals and their Option 13 (11″ x 11″) and Option 14 (30″ x 40″) tablets. These modes consist of the terminals' translation of tablet-based modes into standard Tektronix terminal modes.

If you have another system, such as a TEKTRONIX 405X or 4170 computer, you can use the set of modes native to the tablet to communicate directly between the tablet and that system.

NOTE

The exact Tektronix terminal-based tablet modes available on any system may vary between terminal models. Check the appropriate terminal manual for more information on the exact modes available on your own system. Table 2-1 lists the modes in each class.

Table 2-1

OPERATING MODES

Tektronix Terminal-Based Tablet Modes	Tablet-Based Modes
Stroke	Point
Locate	Stream
Pick	Switch-Stream
	Incremental
	Remote Request
	Delta
	Diagnostic

Descriptions of the modes are on the following pages.

TEKTRONIX TERMINAL-BASED TABLET MODES

The appropriate Tektronix terminal manual describes these modes in detail. However, for expediency, here is a brief generalized description.

Stroke

This mode causes the display cursor to appear at a point on the screen which corresponds to the position of the tablet 4-button cursor on the tablet active area. Begin a stroke by pressing any button on the tablet cursor. Then move the cursor across the tablet surface and end the stroke by releasing pressure on the cursor button. Each stroke consists of many graphic input events. Each event causes the terminal to send a special report to the host computer.

Locate

When using the Locate mode, move the cursor to a point on the tablet and press a button on the cursor. In response, the terminal sends a report to the host that describes (a) which key was pressed and (b) the location of the cursor in the tablet/terminal address space. Also, as the tablet cursor is moved the screen cursor moves.

Pick

Moving the cursor on the tablet causes the cursor on the display to move in a similar manner. When the display cursor touches a desired segment (or part of a segment) on the screen, press a button on the tablet cursor. This signals a graphic input event. A report is sent from the terminal to the host that includes (a) which key was pressed, (b) where the cursor was when you pressed that key, (c) which segment was picked, and (d) what part of that segment was picked.

A FEW WORDS ABOUT COORDINATE SYSTEMS

You can use the modes described above with either an absolute or a relative coordinate system.

The absolute provides a one-to-one relationship between the tablet's active area and the terminal's display. If the tablet cursor is in the lower left corner of the tablet, then the display cursor will be in the lower left corner of the display.

The relative mode provides a relative relationship between the tablet cursor and the display cursor. If you move the tablet cursor to the right, then the display cursor also moves to the right. However, the display cursor can be anywhere on the screen independent of the tablet cursor.

TABLET-BASED MODES

Point

A single coordinate pair is digitized when you press a button on the cursor. You must push a button for every data point collected in the Point mode.

Stream

The tablet outputs coordinates continuously as long as the cursor is within the active area and in proximity of the tablet. If the cursor leaves the active area, the tablet stops sending data points to the host, unless a cursor button is pushed. If a button is pressed, the last valid point taken will stream in with an Out of Proximity flag set as long as the button stays pushed.

Switch-Stream

This is similar to the Stream mode except the tablet transmits data to the host computer only when a cursor button is pushed.

Incremental

The Incremental mode sets the distance that the cursor must be moved before the tablet sends a new coordinate to the host. When the change in the position of the cursor satisfies the increment set *in either the X or Y direction or both*, the tablet sends a new coordinate pair to the host with the new X, Y position. This mode is especially useful in curve tracing operations. The Incremental mode reduces the amount of data sent to the host. You may enter different values for X and Y.

Remote Request

In this mode, the tablet sends the host a single coordinate point after receiving a REMOTE TRIGGER command (^{E}C **G** ^{C}R).

Delta

In this mode the tablet sends only the change in coordinate values and is useful for steering the display cursor. It can operate with the Stream and Switch-Stream modes. By changing the rate of coordinate pairs/second transmitted, you can control the fineness or coarseness of movement of the screen cursor.

Diagnostic

In this mode the tablet can record and/or send various pieces of information on the status of the tablet.

USING THE 4-BUTTON CURSOR

To activate the cursor, depress one of the four cursor buttons. The tablet can recognize which button is pressed and can output that information in a usable format. (If you want more details on the output format, please see Section 4.)

The lower left of the tablet is the default coordinate origin. That means if you move the cursor to the lower left corner and have the tablet read a point, the tablet will read the X, Y coordinates 0,0. If you move the cursor to the right, the X value will increase and the Y value will remain constant. If you move the cursor up, the X value will remain constant and the Y value will increase. This is illustrated in Figure 2-1.

When lifting the cursor off the active area or lowering it onto the active area, the data transmitted while the cursor is in transit may be erroneous. For best results, use data generated when the cursor is resting on the tablet.

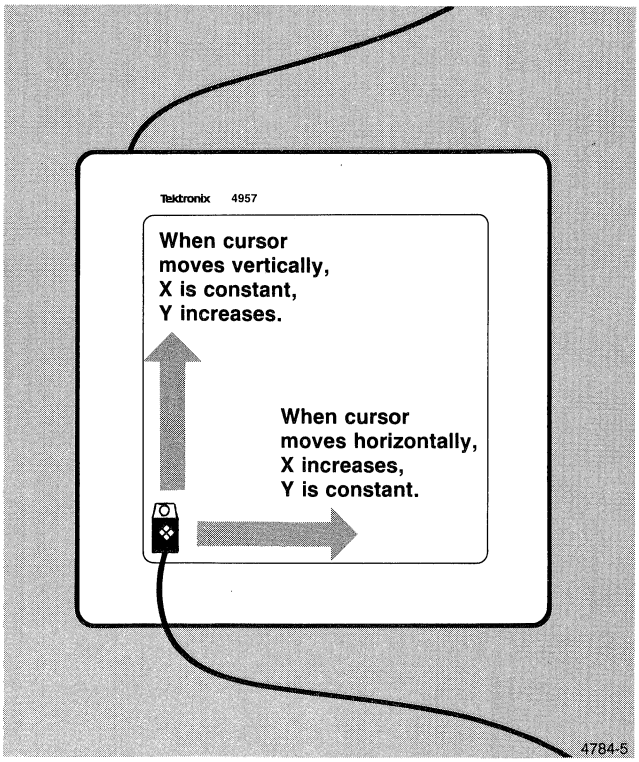


Figure 2-1. Using the 4-Button Cursor.

USING THE ACTIVE AREA

You should know where on the tablet surface the cursor can actually measure points. This location is known as the tablet's active area.

Figure 2-2 shows the position of the active area on the tablet. The dashed line in the figure identifies the invisible border of the active area.

Notice that a physical groove in the tablet defines the active area roughly, but not exactly. A margin of roughly 0.3 inches exists between the grooves vertical edge, the groove's bottom edge, and the active area.

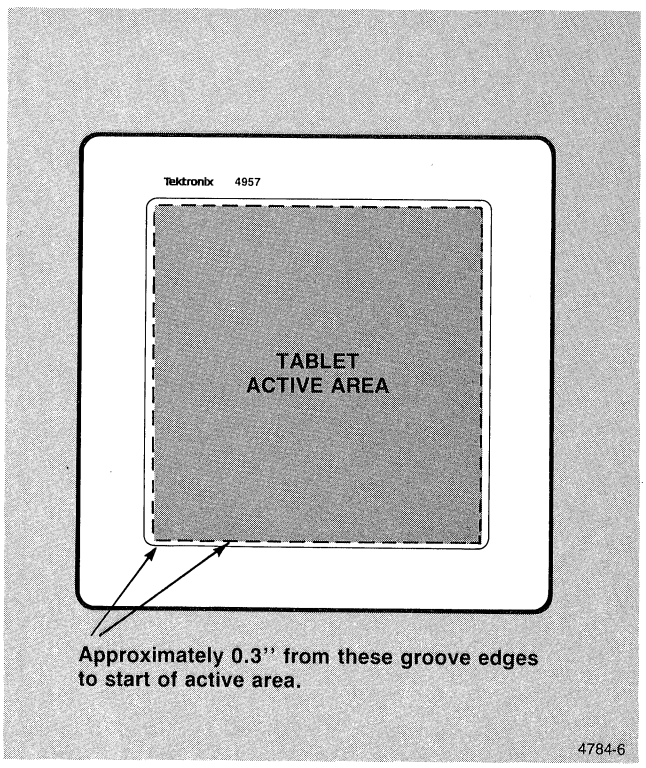


Figure 2-2. The Tablet's Active Area.

Section 3

COMMANDS

OVERVIEW

This section will help you write applications programs for the 4957. The first step in programming the tablet is to decide what class of commands to use. Two classes of commands exist. These are Tektronix terminal-based tablet commands and tablet-based commands.

TEKTRONIX TERMINAL-BASED TABLET COMMANDS

If you have a Tektronix terminal with 4957 Tablet firmware drivers (such as the 4107 and 4109 terminals) you can use a set of terminal commands compatible with the commands that are used on the 411X Series of Tektronix terminals and their Option 13 (11″ x 11″) and Option 14 (30″ x 40″) tablets. These commands are terminal-based and utilize, invisible to you the user, a chain of tablet-based commands to control the tablet.

TABLET-BASED COMMANDS

Users of host systems without special tablet driver firmware can use a set of commands native to the tablet to communicate directly from the host to the tablet.

A COMPARISON OF THE TWO COMMAND SETS

In deciding which command set to use, you should consider that the Tektronix terminal-based tablet commands offer (1) greater simplicity of use and (2) software compatibility with previous Tektronix tablet offerings. It is usually the set of choice for use for those with terminals which possess firmware to support the 4957 tablet. On the other side, the tablet-based commands offer you the potential to (1) use your tablet on hosts that do not offer 4957 firmware support and/or (2) take advantage of greater tablet power such as added resolution (1,000 points per inch versus 4,096 points maximum on certain terminals) and more speed (up to 90 coordinates per second versus 30 per second when the tablet is used with certain terminals).

Both classes of commands are described further on the following pages.

TEKTRONIX TERMINAL-BASED TABLET COMMANDS

For detailed descriptions of these commands please refer to the manual of the appropriate Tektronix terminal. A brief overview of the general command syntax and major commands is included here. Also Section 6 offers sample programs.

A Tektronix 41XX Series terminal command sequence consists of a group of ASCII characters in the form:

$^{E}_{C}$ **I ?** a b c

where:

$^{E}_{C}$ = sent from the host computer or the "ESCAPE" key on the terminal keyboard.

I = A capital "I".

? = A capital ASCII letter that stands for a particular function.

a b c = One or more options on a function code.

Table 3-1 lists some common Tektronix terminal to tablet commands and also provides short command descriptions.

Table 3-1

SOME COMMON TEKTRONIX TERMINAL-BASED COMMANDS

Command	Syntax	Description
ENABLE GRAPHICS INPUT	$^{E}_{C}$ **IE** a	Enables the graphic input function on the tablet.
SET GRAPHIC INPUT STROKE FILTERING	$^{E}_{C}$ **IF** abc	Enhances the operation of the stroke function by defining the distance a cursor must be moved or the time one must wait between the values the terminal sends to the host.
SET GRAPHIC INPUT GRIDDING	$^{E}_{C}$ **IG** abc	Causes the application of gridding to all subsequent operations of the specified locate or pick functions.
SET INPUT INKING	$^{E}_{C}$ **II** ab	Enables the terminal to draw line tablet strokes.
SET GRAPHIC INPUT RUBBERBANDING	$^{E}_{C}$ **IR** ab	Turns rubberbanding on or off for all subsequent operations of the locate function.
DISABLE GRAPHIC INPUT	$^{E}_{C}$ **ID** ab	Permits one to disable graphic input from the terminal-host combination and the device function combination before all the graphic input events called for in the last ENABLE-GRAPHICS-INPUT command have occurred.

TABLET-BASED COMMANDS

OVERVIEW

Your 4957's internal firmware is programmed to respond in certain ways to commands sent directly from a host computer or terminal. A command sequence consists of a group of ASCII characters in the form:

^{E_C} **ab** ^{C_R}

where:

^{E_C} = sent by the host computer or the "ESCAPE" key on the terminal keyboard.

a = a function code.

b = an option of the function.

^{C_R} = sent by the host computer or the "Carriage Return" key on the terminal keyboard. This character is optional and not a requirement for command execution.

BUFFERING

Your tablet has an input buffer of 20 bytes. This does not affect the 4957's performance when it is controlled by a Tektronix terminal with special tablet drivers — that is, when you use the Tektronix terminal-based commands. However this small buffer may cause trouble for those of you programming the tablet yourself with the tablet-based command set. Send no more bytes of command at one time than there are bytes of buffer without providing enough delay for the tablet to free up some of the buffer. Commands that overrun the buffer will be lost.

COMMAND DESCRIPTIONS

Table 3-2 lists the tablet-based commands. Detailed descriptions of the commands, their functions and options are given on the following pages.

Table 3-2

TABLET-BASED COMMANDS

Command	Syntax
Set-Up Parameter Commands:	
RESET/CLEAR	^{E_C} **Z**
SET FORMAT TO ASCII	^{E_C} **Q**
SET DATA COLLECTION MODE	^{E_C} **M** b
SET DATA RATE	^{E_C} **R** b
SET DELINEATOR	^{E_C} **D** b
SET INCREMENT	^{E_C} **I** bbb
SET AXIS UPDATE	^{E_C} **g** bbb
SET ORIGIN	^{E_C} **F** b
SET RESOLUTION	^{E_C} **C** b
SET TABLET ID	^{E_C} **T** b
PERFORM SELF TEST AND STORE RESULTS	^{E_C} **t**
XOFF	CONTROL S
XON	CONTROL Q
FACTORY TEST	^{E_C} **z** ^{E_C} **z**
Send-Data Commands:	
SEND CODE CHECK	^{E_C} **x**
SEND CONFIGURATION	^{E_C} **a**
SEND POINT	^{E_C} **G**
SEND SELF TEST RESULT	^{E_C} **w**

RESET/CLEAR

^{E}C **Z** ^{C}R

Description

This reset command sequence erases all entered command sequences. The tablet will revert to the default settings that are pre-set when the tablet powers up. The default settings are listed below:

Resolution	= 500 points per inch
Mode	= Remote Request mode
Increment	= 0
Axis Update	= 0
Output Sample Rate	= 90 coordinate pairs/second
Tablet ID	= 0
Self Test	= Results are stored in tablet
Origin	= Lower left corner
Delineator	= ,
Format	= Binary

This command is particularly useful in cases where the tablet gets hung up. RESET/CLEAR will almost always unhang the tablet. However, be aware that you may need to send more than one RESET/CLEAR for the tablet to get its bearings and operating as you like. Also you should insert at least a short delay between each RESET/CLEAR you send.

If the auto-baud function is being used, the baud rate will not be changed by the RESET/CLEAR command. See Section 5 if you desire more details on the auto-baud function.

SET FORMAT TO ASCII

^{E}C **Q** ^{C}R

Description

This command causes the tablet to send data in an ASCII format. To change the tablet's data output format from ASCII back to binary, a RESET/CLEAR (^{E}C **Z**) command must be sent.

SET DATA COLLECTION MODE

^{E_C} **M** b ^{C_R}

Parameters

Where b can equal 0 to 4.

If b = 0, Stream mode is selected.

If b = 1, Point mode is selected.

If b = 2, Switch-Stream mode is selected.

If b = 3, Remote Request mode is selected.

If b = 4, Delta mode is selected.

Description

- Stream: In this mode the tablet outputs coordinates continuously as long as the cursor is within the active area and in proximity of the tablet. If the cursor leaves the active area, the tablet will send three additional coordinate pairs with the out of proximity bit set and then stop sending data points to the host, unless a cursor button is pushed. In that case, the last valid point taken will stream in with the out of proximity flag set as long as the button is pushed.
- Point: With this mode, a single coordinate pair is sent to the host only when a cursor button is pushed.

NOTE

SET AXIS and SET INCREMENT commands are not operable in the Point mode. However, those settings are not affected by going to Point mode and then back to one of the other modes where they do operate (Stream, Switch-Stream, and Remote Request).

- Switch-Stream: This mode works like the Stream mode except data is transmitted to the host only when a cursor button is pushed.
- Remote Request: In this case a single coordinate point will be determined by the tablet and returned to the host after receiving a REMOTE TRIGGER command (^{E_C} **G** ^{C_R}).
- Delta: This is the mode where the tablet sends only the change in coordinate values. It can operate with the Stream and Switch-Stream modes. This mode is useful for cursor steering. By changing the rate of coordinate pairs/second transmitted, one can control the fineness or coarseness of the movement of the screen cursor.

SET DATA RATE

^{E_C} **R** b ^{C_R}

Parameters

Where b can equal 1, 3, 4, 5 or 6.

If b = 1, the data rate = 2 coordinate pairs per second.

If b = 3, the data rate = 10 coordinate pairs per second.

If b = 4, the data rate = 30 coordinate pairs per second.

If b = 5, the data rate = 60 coordinate pairs per second.

If b = 6, the data rate = 90 coordinate pairs per second.

Description

This command determines the rate at which coordinate pairs are sent to the host computer or terminal from the tablet.

NOTE

These rates are valid for output in binary format at the standard 9600 baud rate. If the output is in ASCII format or sent at slower baud rates (via the auto-baud option), the system may not achieve, but will still accept, all the data rates settable by the SET DATA RATE command.

SET DELINEATOR

^{E_C} **D** b ^{C_R}

Parameters

Where b is the desired delineator character. The delineator can be any ASCII character from NUL through RUBOUT.

Description

This command defines the character that separates fields of information contained in the ASCII report format. This character defaults at power-up and at the RESET/CLEAR command to an ASCII "," and may be observed in the report format:

SXXXX,SYYYY,FF,T ^{L_F} ^{C_R}

This report format is explained in greater detail in Section 4, *Report Formats.*

SET INCREMENT

$^{E}_{C}$ **I** bbb $^{C}_{R}$

Parameters

Where bbb can equal 000 to 255 coordinate units. Leading zeros are required.

Description

This instruction sets the distance in resolution elements (at the set resolution) that the cursor must be moved before a new coordinate is sent to the host. When the change in the position of the cursor satisfies the increment parameter (bbb) *in either the X or Y direction or both,* or if a cursor/stylus button is either depressed or released, a new coordinate pair is sent to the host with the new X, Y position. This mode is especially useful in curve tracing operations. The SET INCREMENT command can help reduce the amount of data being sent to the host.

SET AXIS UPDATE

$^{E}_{C}$ **g** bbb $^{C}_{R}$

Parameters

Where bbb can equal 000 to 255 coordinate units. Leading zeroes are required. For example, when resolution is set to 1000 points per inch, one would write five thousandths of an inch as 025 instead of 25.

Description

This is similar to the SET INCREMENT command except that direction must be satisfied in addition to distance. A new point is sent to the terminal or host when the cursor/stylus has been moved far enough in the X and Y directions to satisfy the increment parameter (bbb) of the SET AXIS UPDATE command, or if a cursor/stylus button is either depressed or released.

SET ORIGIN

$^{E}_{C}$ **F** b $^{C}_{R}$

Parameters

Where b is either 0 or 3.

If b = 0, the tablet sets the 0,0 coordinate origin to the lower left corner of the active area.

If b = 3, the tablet sets the 0,0 coordinate origin to the upper left corner of the active area.

Description

This command defines where on the active area the 0,0 coordinate origin begins.

SET RESOLUTION

$^{E}_{C}$ **C** b $^{C}_{R}$

Parameters

Where b can be 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, or B.

If b = 0, the tablet resolution is 200 points per inch (0.005 inches/point).

If b = 1, the resolution is 254 points per inch (0.1 mm/point).

If b = 2, the resolution is 1000 points per inch (0.001 inches/point).

If b = 3, the resolution is 1016 points per inch (0.025mm/point).

If b = 4, the resolution is 500 points per inch (0.002 inches/point).

If b = 5, the resolution is 508 points per inch (0.05 mm/point).

If b = 6, the resolution is 400 points per inch (.0025 inches/point).

If b = 7, the resolution is 100 points per inch (0.01 inches/point).

If b = 8, the resolution is 1 line/inch (1" blocks) grid round off mode.

If b = 9, the resolution is 2 lines/inch (½" blocks) grid round off mode.

If b = A, the resolution is 4 lines/inch (¼" blocks) grid round off mode.

If b = B, the resolution is 4,096 points over the entire active area. For the 4957 with its 11.7 inch active area, this means 4,096/11.7 or roughly 350 points per inch.

SET TABLET ID

$^{E}_{C}$ **T** b $^{C}_{R}$

Parameters

If b = 0, the tablet ID is set to 0.

If b = 1, the tablet ID is set to 1.

Description

This command gives the tablet an identification number to allow the host to distinguish a menu tablet from the main tablet. This information is contained in the first byte of the tablet output. See Section 4 for more details on the output format.

PERFORM SELF TEST AND STORE RESULTS

$^{E}_{C}$ **t** $^{C}_{R}$

Description

This command will activate the tablet self test and store the resultant data in its memory. No data is sent to the host. The description of the SEND SELF TEST RESULTS command given later in this section explains the format of these self test results.

XOFF

CONTROL S (ASCII D_3)

Description

This command places the tablet in a standby condition that stops internal scanning and transmission to the host.

This command is particularly useful in Stream and Switch-Stream mode applications where the tablet transmits data faster than the host processor can utilize it. The command can temporarily stop the tablet's transmissions and give the host processor time to empty its buffer. Without this command, the host's communications buffer might overflow and data would be lost.

XON

CONTROL Q (ASCII D_1)

Description

This command restarts the tablet after it has been put into standby by the XOFF command.

FACTORY TEST

^{E}C **z** ^{E}C **z**

This command is for factory test and should only be used by qualified service technicians. If this command is run, the tablet will hang up. To continue to use the tablet after it has hung up, one should cycle the power. That is — pull the power plug and then put the plug back in the power socket.

SEND CODE CHECK

^{E}C **x** ^{C}R

Description

This command is available to check that the program in ROM is valid. The output is the two's complement checksum for the code in ROM.

SEND CONFIGURATION

$^{E}_{C}$ **a** $^{C}_{R}$

Description

The tablet will send back to the host a report word that contains the maximum values for the (X and Y) set resolution, and flags that give additional information and status of the tablet. It can be sent in either binary or ASCII code, depending on the way the tablet is set up. Also, the number returned depends on the current tablet's resolution. For example, when the RESOLUTION = 100 points per inch, $^{E}_{C}$ **a** $^{C}_{R}$ will return the product of 11.7 inches times 100 points per inch, or 1170.

SEND POINT

$^{E}_{C}$ **G** $^{C}_{R}$

Description

This command sequence will cause one coordinate pair to be transmitted to the host or terminal.

NOTE

Use of this command implies that the tablet has been previously programmed to be in its Remote Request mode.

SEND SELF TEST RESULTS

$^{E}{}_{C}$ **w** $^{C}{}_{R}$

Description

When the host is ready to examine the results of the self test, this command will cause the tablet microprocessor to transmit the data. It is sent in the form of a single byte followed by a byte for carriage return.

It uses the following format:

Bit #	Pass/Fail		Definition
0	1	0	Analog test result
1	1	0	Cursor connection/operation test result
2	1	0	Digital test result
3	1 (on)	0 (off)	Cursor/stylus on/off tablet
4	0		Internal use only
5	0		Always transmitted as 0
6	1	0	Total test results
7	—		Parity — Odd is standard

The diagnostic word is sent least significant bit first.

Section 4

REPORT FORMATS

OVERVIEW

This section will further help you write applications programs that use the 4957 tablet. It describes the data the tablet sends to a host computer and/or display terminal.

Just as Section 3 showed you how to control the 4957 Graphics Tablet with two classes of commands, Section 4 shows how those classes cause the host to receive either of two classes of output reports. These are:

1. Output from tablet to host by way of a Tektronix terminal.

2. Output from tablet direct to host.

OUTPUT FROM TABLET TO HOST USING A TEKTRONIX TERMINAL

Your 4957 can use a series of Tektronix standard graphic input reports to communicate to a host computer by way of Tektronix terminals that offer 4957 support. Command reference manuals of various Tektronix terminals describe these reports in considerably more detail than this manual will. Thus, for a more detailed explanation please consult the terminals' manuals.

This manual provides you with a brief introduction of the general Tektronix terminal report format as it relates to tablets. In particular, this section will touch on the following:

- The general graphic input report format
- The specific Pick report format
- The specific Locate report format
- The specific Stroke report format

THE GENERAL GRAPHIC INPUT REPORT FORMAT

The tablet sends the graphic input report to the host after the terminal receives a message from the tablet. The report contains the tablet's reply to an ENABLE GRAPHIC INPUT command sent from the host to the tablet by way of the terminal.

The general graphic input report comes in three forms. A tablet can cause a terminal to send a Graphic Input Locate report, a Graphic Input Pick report, or a Graphic Input Stroke report. The following descriptions explain these reports in more detail.

GRAPHIC INPUT LOCATE REPORT

The terminal sends this report to the host computer in response to a tablet Locate graphic input event.

GRAPHIC INPUT PICK REPORT

The terminal sends this report to the host computer in response to a tablet Pick graphic input event.

When the operator signals a pick event, the terminal returns a Graphics Input Pick Report to the host computer. This occurs regardless of whether there actually is a visible, detectable segment with the current Pick aperture. If there is no such segment to be picked the terminal returns zero as the segment number.

GRAPHIC INPUT STROKE REPORT

The terminal sends this report to the host computer in response to a Stroke graphic input event. For each stroke that the operator performs at the tablet, many graphic input stroke reports are usually generated and sent to the host computer.

OUTPUT FROM TABLET DIRECT TO HOST

The 4957 communicates in this direct class with a format known as the Universal Input Output Format (UIOF).

The 4957 uses either of two types of UIOF formats. These are (1) ASCII format and (2) binary format. The ASCII format offers the advantage of ease of use. It's easy to interpret the results. The binary format offers the advantage of speed. It requires only 8-bytes per coordinate whereas the ASCII format requires 18 or more bytes.

ASCII FORMAT

ASCII data format has an 18 or 20-byte 8-bit output.

For resolutions of 1 line per inch to 508 points per inch, the format syntax is:

SXXXX,SYYYY,FF,T ^{C_R} ^{L_F}

For resolutions of 1,000 and 1,016 points per inch, the format syntax is:

SXXXXX,SYYYYY,FF,T ^{C_R} ^{L_F}

Where:

S = The coordinate sign. It's positive (i.e. +) for all modes except Delta mode. When using Delta mode the coordinate sign may be positive or negative (i.e. + or –).

X = A digit of the X coordinate. Each digit is an ASCII character in the range of 0 through 9.

Y = A digit of the Y coordinate. Each digit is an ASCII character in the range of 0 through 9.

, = The default delineator character. It serves to distinguish between fields. The exact character used can be changed using the SET DELINEATOR command (see section 3 for more details).

FF = The flag being used. That is the status of the cursor or stylus being used. FF can equal any of the following ASCII codes:

Flag	Cursor Status
00	No buttons pressed
01	Button #1 pressed
02	Button #2 pressed
03	Button #3 pressed
04	Button #4 pressed
32	Cursor is out of proximity, no buttons pressed
33	Out of proximity, button #1 pressed
34	Out of proximity, button #2 pressed
35	Out of proximity, button #3 pressed
36	Out of proximity, button #4 pressed

T = Tablet in use where:
If T = 0, this is the main tablet.
If T = 1, this is the menu tablet.

^{C_R} = Carriage return

^{L_F} = Line feed

BINARY FORMAT

Binary data format has an 8-byte 8-bit output. An advantage of the binary format over ASCII format is speed. Eight characters are transmitted in lieu of 18 or more with ASCII.

Table 4-1 shows the format syntax.

Table 4-1

UNIVERSAL INPUT-OUTPUT FORMAT

Byte[a]	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1[b]	P	1	0	0	TYPE1	TYPE 2	ID	PROX
2[c]	P	0	0	0	F3	F2	F1	F0
3[d]	P	0	X5	X4	X3	X2	X1	X0
4[d]	P	0	X11	X10	X9	X8	X7	X6
5[d]	P	0	0	Xs	X15	X14	X13	X12
6[d]	P	0	Y5	Y4	Y3	Y2	Y1	Y0
7[d]	P	0	Y11	Y10	Y9	Y8	Y7	Y6
8[d]	P	0	0	Ys	Y15	Y14	Y13	Y12

[a] All Bytes: P = Parity Bit.

[b] Byte 1: TYPE1 and TYPE2 indicate the graphic input peripheral that is attached. If TYPE1, TYPE2 = 0 1 then a 4957 tablet is attached.

ID is used to help identify which tablet is which in a multiple tablet set up. You can set the ID with the SET TABLET ID command described in Section 3.

PROX = Bit that indicates if the data being collected is in or out of tablet proximity.

0 = in proximity

1 = out of proximity

[c] Byte 2: F0 through F3 = the coding of the cursor buttons. Table 4-2 shows the exact codes used.

[d] Bytes 3 through 8: Xs = Sign Bit for X Coordinate:

0 is + value

1 is – value

Ys = Sign Bit for Y Coordinate:

0 is + value

1 is – value

X0 — X15 = Location for X coordinate.

Y0 — Y15 = Location for Y coordinate.

Table 4-2

CODING OF CURSOR BUTTONS

4-Button Cursor	1-Button Stylus	P	6	5	4	F3 3	F2 2	F1 1	F0 0
1	Pen	P	0	0	0	0	0	0	1
2	Button	P	0	0	0	0	0	1	0
3		P	0	0	0	0	0	1	1
4		P	0	0	0	0	1	0	0

NOTE

Pressing more than one button at the same time produces an "ORed" output. For example, if you simultaneously press button 1 (Bit-0 = 1) and button 2 (Bit-1 = 1) then both Bit-0 and Bit-1 equal 1. The output would be the same as if button 3 alone was pressed.

Digit subscript priority is 0 for the Least Significant Digit (LSD), to 15 for the Most Significant Digit (MSD).

NOTE

In binary format the coordinate reports can contain all the ASCII control characters. You must be able to program your host computer to not react to control characters to be able to use binary format.

NOTE

When using the optional 1-Button Stylus, the tablet should be powered down, the stylus plugged in, and then the tablet powered-up again. This enables the tablet to give maximum performance with the stylus. When changing back to the 4-button cursor, the power-down power-up procedure should be repeated.

Section 5

COMMUNICATIONS

OVERVIEW

This section describes the connections between the tablet and host computer and/or terminal. There are two parts to this section. These are the communications software and the communications hardware.

SOFTWARE

The 4957 communicates with asynchronous serial transmissions. It receives commands in ASCII 7-bit data format and sends in binary 7-bit ASCII format, as shown in Figure 5-1. All of the 4957's communications use an eighth bit as an odd parity bit. Commands are ignored if the parity bit is wrong.

The 4957 normally transmits at 9600 baud. Tektronix terminal-based tablet commands support this rate. It is the rate set at the factory and the only rate most users should require from their 4957.

For those individuals that want to use different baud rates, the 4957 offers a special "autobaud" feature that permits the tablet to run at any of the following speeds: 19200, 9600, 4800, 2400, 1200, 600, 300, 150, or 75 baud. You enable the autobaud feature by opening the tablet case and removing Jumper BDR. Then reassemble the case.

To operate autobaud make the first character you send to the tablet an ASCII space (S_P)character. The tablet will analyze the space character and determine the speed at which the space was sent. Then the tablet will expect all following communications to take place at the same speed at which the space character was sent.

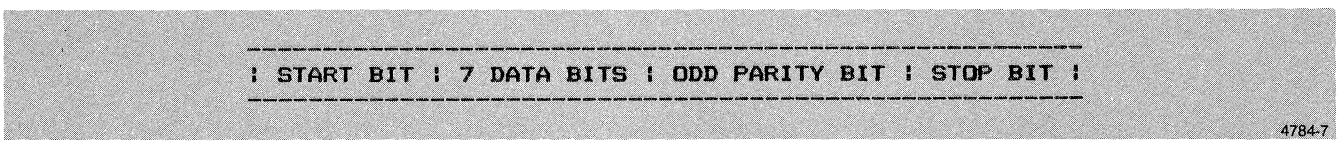


Figure 5-1. The Data Format.

HARDWARE

The tablet and host communicate through 25-pin "D" shell connectors. The connector at the tablet side has pins. The connector at the host side should have sockets. If it doesn't you'll have to buy or make an adapter. Figure 5-2 shows the purpose of each pin in the tablet's 25-pin connector.

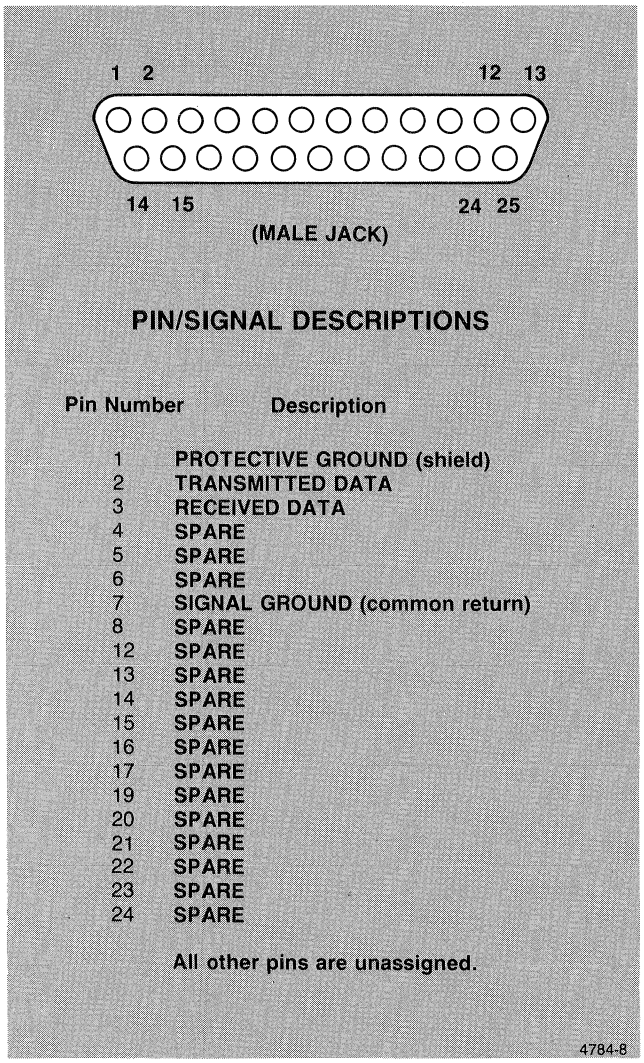


Figure 5-2. RS-232 Connector.

Section 6

PROGRAMMING EXAMPLES

The following section contains sample programs that use the 4957 Graphics Tablet. These are useful for testing your system or as examples to help demonstrate how you can program the 4957.

The sample programs include:

- Tablet to Local TEKTRONIX 4107 Terminal Demonstration. The Tektronix terminal-based tablet instruction set is demonstrated with a simple set of commands entered from the keyboard. No host processing is required.
- Tablet to TEKTRONIX 4052 Computer Demonstration. The direct tablet-based instruction set is demonstrated.

TEKTRONIX 4107 TERMINAL EXAMPLE

EQUIPMENT REQUIRED

- TEKTRONIX 4107 Terminal
- TEKTRONIX 4957 Graphics Tablet

INSTRUCTIONS

1. Connect the tablet to the terminal as described in Section 1 of this manual.
2. Turn on the power to the 4107 terminal.
3. On the 4107 press the button labelled: Setup.

NOTE

Steps 4, 5, and 8 are valid as written if the tablet is connected to the 4107 via port 0. If the tablet is connected to port 1, replace the number 10 with 18.

4. Enable inking by typing: GININK 10 1. Press RETURN.
5. Enable the tablet for multiple points by typing: GINENABLE 10. Press RETURN.
6. Turn off the set up mode by pressing the button labelled: Setup. (Be sure to leave Setup mode. GIN is suspended in Setup mode.)
7. Write a name (or anything else) on the screen by moving the tablet cursor and pressing any cursor button.
8. To disable GIN re-enter set up mode by pressing Setup. Then type: GINDISABLE 10. Press RETURN.

NOTE

To type the character ^{E}C, press the 410X key labelled ESC.

TEKTRONIX 4052 EXAMPLE

EQUIPMENT REQUIRED

- TEKTRONIX 4052 Desktop Computer with Option 01 Data Communications
- TEKTRONIX 4957 Graphics Tablet

INSTRUCTIONS

1. Connect the 4957 graphics tablet to the 4052 Desktop Computer as described in Section 1 of this manual.
2. Turn on the power to the computer.
3. Type in the program given on the following page or insert a tape with the program already input and load in the program.
4. Type: RUN and press RETURN.
5. Write a name (or anything else) on the screen by moving the tablet cursor and pressing one of the tablet cursor buttons. Notice each button does something different. Several buttons use different symbols for the screen cursor. One button even erases the screen.

Tektronix 4052 Example Program

```
100 REM 4957 TABLET DRIVER PROGRAM FOR 4050 SERIES
110 INIT
120 REM INITIALIZE THE 4050 COMMUNICATIONS INTERFACE (OPTION 1)
130 CALL "CMINIT"
140 REM SET BAUD RATE TO 9600, 7 DATA BITS, 1 STOP BIT AND ODD PARITY
150 CALL "RATE",9600,3,2
160 REM NOTE THAT THE 4051 SHOULD USE:
170 REM      CALL "RATE",2400,3,2
180 REM AND THE AUTOBAUD FEATURE OF THE TABLET SHOULD BE ENABLED
190 REM (REFER TO SECTION 5 OF THE 4957 MANUAL)
200 REM RESET THE COMMUNICATIONS INTERFACE BUFFER
210 PRINT @40,30:
220 REM IF USING A 4052A OR 4054A INCLUDE THE FOLLOWING:
230 REM CALL "CMFLAG",1
240 REM THE CMFLAG SETS INPUT FLAGGING FROM THE TABLET
250 REM PRINT A SPACE TO THE TABLET TO SET AUTOBAUD FOR THE 4051
260 PRINT @40:" "
270 REM SEND RESET/CLEAR COMMAND
280 PRINT @40:"ZZ"
290 REM WAIT A FRACTION OF A SECOND FOR THE RESET OPERATION
300 CALL "wait",0.2
310 REM SEND SET FORMAT TO ASCII COMMAND
320 PRINT @40:"Q"
330 REM SET RATE TO 10 COORDINATE PAIRS PER SECOND
340 PRINT @40:"R3"
350 REM IF USING A 4052A/4054A THE RATE CAN BE SET AT 90 PAIRS/SEC:
360 REM PRINT @40:"R6"
370 REM SET DATA COLLECTION MODE TO STREAM MODE
380 PRINT @40:"M0"
390 WINDOW 0,5850,0,5850
400 REM RING BELL
410 PRINT "G";
420 REM SET THE 4050 CHARACTER FONT TO 5 (GRAPHIC)
430 PRINT @32,18:5
450 INPUT @40:X,Y,F,T
460 MOVE X,Y
470 INPUT @40:X,Y,F,T
480 GOSUB F+1 OF 510,550,580,620,660
490 GO TO 470
500 REM NO KEY PRESSED - PRINT CHARACTER (IN REFRESH)
510 MOVE X,Y
520 PRINT @32,24:"|"
530 RETURN
540 REM KEY #1 - DRAW LINE
550 DRAW X,Y
560 RETURN
570 REM KEY #2 - PRINT ASTERISK
580 MOVE X,Y
590 PRINT "*";
600 RETURN
610 REM KEY #3 - PRINT A DOT
620 MOVE X,Y
630 PRINT ".";
640 RETURN
650 REM KEY #4 - PRINT X
660 MOVE X,Y
670 PRINT "x";
680 RETURN
```

Section 7

DIAGNOSTIC CHECKS

This section includes information to aid in locating faults. Three topics are covered: No Data, Garbled Data, and the 4957 self tests. The *4957 Service Manual* provides information for the qualified service person who may be required to perform component level repairs.

NO DATA

In case no data is being received by the host computer/ terminal, you can:

1. Check that all connections are tight including:
   - Tablet to cursor connection
   - Tablet to RS-232 connection
   - Tablet to power supply connection
2. Check that the terminal is on and is not in a "local" state.
3. Check that the power socket has power.
4. Check that the tablet transmissions haven't been stopped by an XOFF command.

GARBLED DATA

In case garbled data is being received by the host, you can:

1. Check that the host is using the proper data format. The proper format to use with the 4957 is odd parity with 1 start bit, 7 data bits, and 1 stop bit.
2. Check that the host is running at the proper speed. If your 4957 is not using autobaud, the host should be communicating at 9600 baud. If autobaud is in use, the speed can vary from 19200 to 75 baud. You may wish to double check that your 4957 is at the same speed as the host. You can check this by cycling the power (i.e. turning the power off then on) and then sending a space (^{S}P) character to the 4957.

SELF TESTS

You can run two types of automatic self tests. If the tablet is connected to a Tektronix terminal that specifically supports the 4957, such as the model 4107 or 4109, run the terminal-based tablet self test. You can also run the native tablet-based self test directly from a host computer or terminal.

The instructions for running both tests are given below.

TABLET-BASED SELF TEST

Run this self test by doing the following:

1. Connect the tablet to the host computer as described earlier in this section.
2. Press the ^{E}C key and then the letter "t" on the computer keyboard. This tells the tablet to run the self test.
3. Press the ^{E}C key and then the letter "w". This causes the tablet to transmit the self test result to the host in the form of a single 8-bit byte.
4. Examine the self test results. A description of what they should look like is shown in Table 7-1.

Table 7-1

RESULTS OF THE TABLET-BASED SELF TEST

Bit #	Pass/Fail		Definition
0	1	0	Analog test result
1	1	0	Cursor connection/operation test result
2	1	0	Digital test result
3	1 (on)	0 (off)	Cursor/stylus on/off tablet
4	0		Internal use only
5	0		Always transmitted as 0
6	1	0	Total test results
7	—		Parity — Odd is standard

The diagnostic word is sent least significant bit first.

TEKTRONIX TERMINAL-BASED TABLET SELF TEST

The following instructions describe how to run the 4957 tablet self test from a Tektronix terminal that supports the tablet such as the TEKTRONIX 4107 or the 4109.

To run this test use the model 4107/4109 terminal self test routine. This is described in detail in the *4107 Users Manual* and *4109 Users Manual*. However, for those without ready access to such a document, the following notes explain how to run the routine.

1. To start the test, press both the terminal's RESET and SELF TEST switches, release the RESET switch, and then release the SELF TEST switch one second later.

2. The terminal keyboard CAPS LOCK light (LED) will flash on and off until the keyboard test is done. If the keyboard is good, the LED will turn off at the end of the test. If bad, the LED will remain on.

3. The terminal's bell will ring once and a self test menu will appear on the terminal display screen. You should select the Adjustment Procedures item on the menu at this point. If you do not respond in 20 seconds, the self test will proceed without waiting further for a reply. Do not assume the self test procedure will automatically choose your selection. If self test errors in the terminal have occurred before this step, the menu will not be displayed.

4. The self test menu is shown in Figure 7-1. Pressing Function Key F6 will enable you to enter the Adjustment Procedures section of the self test.

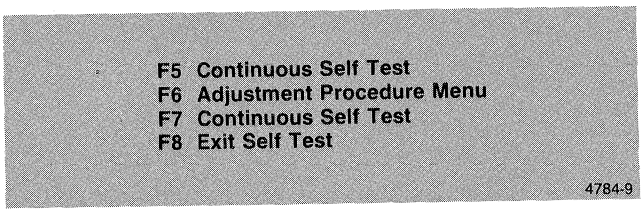


Figure 7-1. The 4107/4109 Self Test Menu.

5. When the Adjustment Procedures option is selected from the self test, a menu will appear on the display as shown in Figure 7-2. The Graphics Tablet self test can be selected by pressing Function Key F6.

6. After selecting the Graphics Tablet Test, the following message appears:

   Connect Tablet to Port 1. Press Space Bar.

After the space bar is depressed, one of the following messages will be displayed if the tablet self test passes:

Tablet Self Test Passed — Cursor on Tablet
Tablet Self Test Passed — Cursor off Tablet

If the tablet self test fails, the following message will be displayed:

Tablet Self Test Failed.

If there is no response from the tablet when self test results are requested, the following message will be displayed:

No Response from Tablet.

Any of the above messages will be followed by the prompt:

Selection

You can then make another selection from the Adjustment Procedures menu. To exit the self test procedure press function key F8.

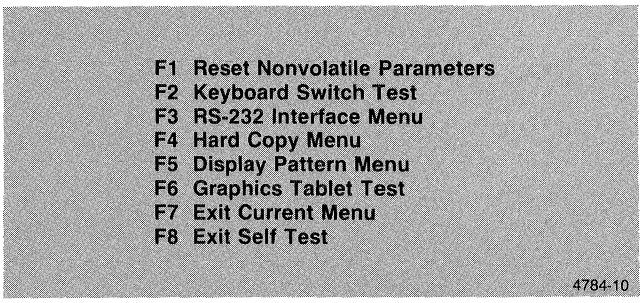


Figure 7-2. Adjustment Procedures Menu.

Section 8

MAINTENANCE

CLEANING THE TABLET SURFACE

Use a dry cloth to remove dust or dirt.

Periodically clean the surface with a soft cloth dampened in a gentle detergent solution and well wrung out.

Never use an abrasive cleaner as abrasives can scratch the active area.

PERIODIC MAINTENANCE

The 4957 requires no periodic adjustments.

Appendix A

SPECIFICATIONS

FUNCTIONAL CHARACTERISTICS

Resolution

Stand-alone user selectable at 100, 200, 400, 500 or 1000 points per inch; 10, 20, or 40 points per mm (254, 508 , or 1016 points per inch); or 4,096 points across the entire active area (roughly 350 points/inch); or 1, 2, or 4 points per inch.

Accuracy

± .625 mm (0.025 inch) nominal over active area.

Jitter

± 1 least significant bit.

Proximity

12.5 mm (or .5 inch) nominal or better, cursor above the active area of the tablet.

Repeatability

± .254 mm (0.010 inch).

Speed

Stand alone user selectable at 2, 15, 30, 60 or 90 X,Y coordinate pairs per second. Tektronix terminals that support the 4957 call for 60 coordinate pairs per second. This matches their display refresh rate.

ELECTRICAL CHARACTERISTICS

Tablet Input Power Requirements

+ 12 VDC @ 0.3 A 10% or better regulation and –12 VDC @ 0.1 A 10% regulation.

Power Supply Input Voltage Requirements

Standard = 104 to 127 VAC at 58 to 62 Hz.

Options A1 to A5 = 200 to 260 VAC at 48 to 52 Hz.

Power Consumption

3.5 watts.

Power plug options for various locales are available with the 4957. Figure A-1 provides further details on these options.

PHYSICAL CHARACTERISTICS

Tablet

Size: 406.4 mm x 412.75 mm x 20 mm (16 inch x 16.25 inch x .80 inch).

Weight: 1.8 kg (4 lbs).

Active area: 297.2 mm x 297.2 mm (11.7 inch x 11.7 inch).

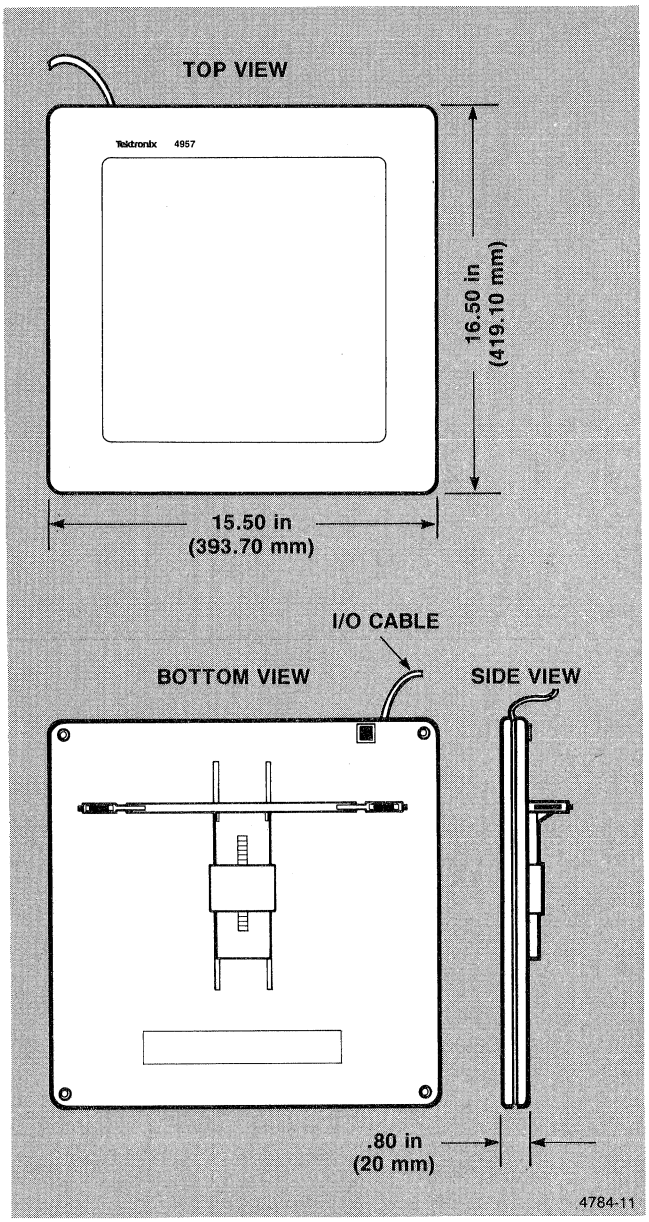


Figure A-1. Tablet Surface Dimensions.

Cursor

Size: 111.3 mm x 63.5 mm 21.0 mm (4.38 inch x 2.50 inch x .825 inch).

Weight: .142 kg (.31 lb).

Physical dimensions are also shown in Figures A-1 and A-2.

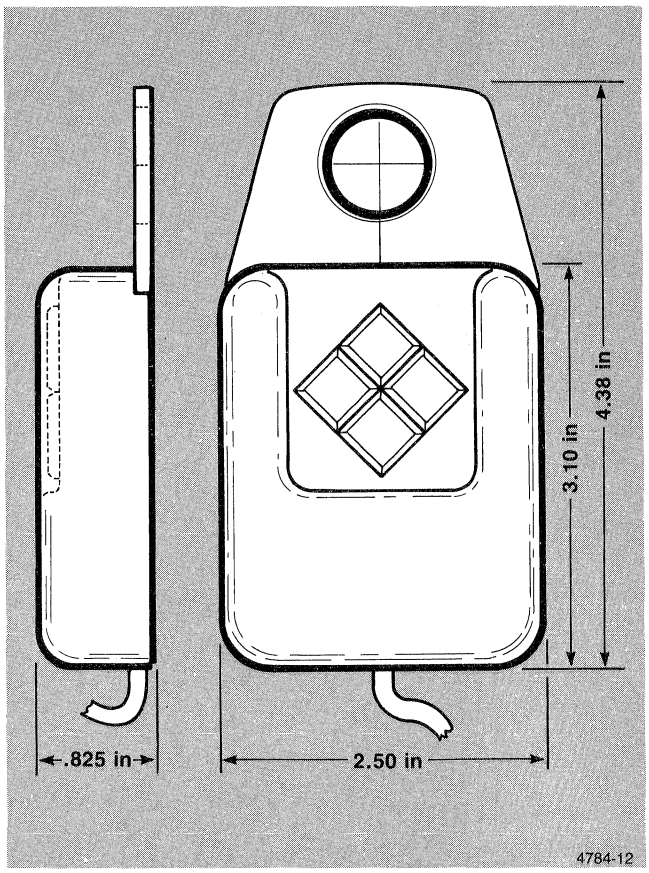


Figure A-2. 4-Button Cursor Dimensions.

Appendix B

ASCII CODE CHART

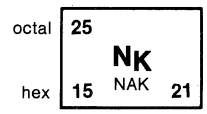
Table B-1

ASCII CODE CHART

B7 B6 B5 / BITS / B4 B3 B2 B1	Ø Ø Ø	Ø Ø 1	Ø 1 Ø	Ø 1 1	1 Ø Ø	1 Ø 1	1 1 Ø	1 1 1
	CONTROL		NUMBERS SYMBOLS		UPPERCASE SYMBOLS		LOWERCASE SYMBOLS	
Ø Ø Ø Ø	0 NU 0 NUL 0	20 DL 10 DLE 16	40 SP 20 32	60 0 30 48	100 @ 40 64	120 P 50 80	140 ` 60 96	160 p 70 112
Ø Ø Ø 1	1 SH 1 SOH 1	21 D1 11 DC1 17	41 ! 21 33	61 1 31 49	101 A 41 65	121 Q 51 81	141 a 61 97	161 q 71 113
Ø Ø 1 Ø	2 SX 2 STX 2	22 D2 12 DC2 18	42 " 22 34	62 2 32 50	102 B 42 66	122 R 52 82	142 b 62 98	162 r 72 114
Ø Ø 1 1	3 EX 3 ETX 3	23 D3 13 DC3 19	43 # 23 35	63 3 33 51	103 C 43 67	123 S 53 83	143 c 63 99	163 s 73 115
Ø 1 Ø Ø	4 ET 4 EOT 4	24 D4 14 DC4 20	44 $ 24 36	64 4 34 52	104 D 44 68	124 T 54 84	144 d 64 100	164 t 74 116
Ø 1 Ø 1	5 EQ 5 ENQ 5	25 NK 15 NAK 21	45 % 25 37	65 5 35 53	105 E 45 69	125 U 55 85	145 e 65 101	165 u 75 117
Ø 1 1 Ø	6 AK 6 ACK 6	26 SY 16 SYN 22	46 & 26 38	66 6 36 54	106 F 46 70	126 V 56 86	146 f 66 102	166 v 76 118
Ø 1 1 1	7 BL 7 BEL 7	27 EB 17 ETB 23	47 ' 27 39	67 7 37 55	107 G 47 71	127 W 57 87	147 g 67 103	167 w 77 119
1 Ø Ø Ø	10 BS 8 8	30 CN 18 CAN 24	50 (28 40	70 8 38 56	110 H 48 72	130 X 58 88	150 h 68 104	170 x 78 120
1 Ø Ø 1	11 HT 9 9	31 EM 19 25	51) 29 41	71 9 39 57	111 I 49 73	131 Y 59 89	151 i 69 105	171 y 79 121
1 Ø 1 Ø	12 LF A 10	32 SB 1A SUB 26	52 * 2A 42	72 : 3A 58	112 J 4A 74	132 Z 5A 90	152 j 6A 106	172 z 7A 122
1 Ø 1 1	13 VT B 11	33 EC 1B ESC 27	53 + 2B 43	73 ; 3B 59	113 K 4B 75	133 [5B 91	153 k 6B 107	173 { 7B 123
1 1 Ø Ø	14 FF C 12	34 FS 1C 28	54 , 2C 44	74 < 3C 60	114 L 4C 76	134 \ 5C 92	154 l 6C 108	174 | * 7C 124
1 1 Ø 1	15 CR D 13	35 GS 1D 29	55 - 2D 45	75 = 3D 61	115 M 4D 77	135] 5D 93	155 m 6D 109	175 } 7D 125
1 1 1 Ø	16 SO E 14	36 RS 1E 30	56 . 2E 46	76 > 3E 62	116 N 4E 78	136 ^ 5E 4	156 n 6E 110	176 ~ 7E 126
1 1 1 1	17 SI F 15	37 US 1F 31	57 / 2F 47	77 UNL ? 3F 63	117 O 4F 79	137 UNT _ 5F 95	157 o 6F 111	177 DT DEL RUBOUT 7F 127

* | on some keyboards or systems

KEY



3806-60

Appendix C

GLOSSARY

This section explains many of the more technical terms you may come across while reading this manual.

active area
The area on the tablet surface that can measure points. The area of the coordinate system.

accuracy
The similarity of a distance measured across the surface of the digitizer with a reference distance.

ASCII
A representation of characters in computer storage. This format gives each character a unique number between 0 and 127. The first 32 of these numbers stand for control characters such as $^{L}_{F}$ (linefeed) and $^{E}_{C}$ (escape). The remaining 96 are displayable characters. Each control or displayable character is stored in a single 8-bit byte. One of those bits is the parity bit and the other seven code the character. Appendix B contains a chart of the ASCII character codes.

baud
The rate of speed which data can flow between a computer device and the tablet. Baud refers to the number of discrete signal events or discrete conditions each second. In the 4957, baud is stated in bits per second.

bit
A binary digit. It can be either a 1 or a 0. It is the smallest unit of information in the 4957.

byte
A group of bits that acts as a single unit of information. In the 4957 a byte includes seven data bits, one parity bit, one start and one stop bit.

cursor
The tablet cursor is the device that you can hold in one hand and move over the graphic information you wish to digitize. In the 4957 it has 4 buttons. It also has a clear window with cross hairs called a reticle that you may use for viewing graphics information. The screen or display cursor is a symbol on the display screen. A common display cursor is an underline character. The cursor serves as a pointer. Many times the tablet cursor and the display cursor are used in conjunction with each other. As you move the tablet cursor, the display cursor may also move in a related manner.

electromagnetic technology
A tablet technology that uses a principle of magnetic coupling between the cursor and the active area.

GIN mode
An interactive mode in which a computer request causes the terminal to respond with graphic information. Status information and/or control characters may be part of the transmission.

jitter
One form of repeatability error. It is usually caused by electrical noise. Jitter is a form of error of relatively short duration — perhaps of no more than a few seconds.

linearity
The straightness of a line obtained by moving the cursor across the active area. In particular the straightness of a line drawn from one corner to the opposite corner, such as from the lower left to the upper right corner.

parity check
A technique to help locate errors in the transmission of data between computer devices and the tablet. In the 4957, which uses odd parity, if the total number of bits in a byte with value 1, including the parity bit, is odd, the tablet records the byte as being correctly transmitted.

proximity
The distance outside the active area that the cursor or stylus can still detect tablet coordinates.

repeatability
The tablet's ability to report the same position on the active area repeatedly with the same coordinates.

resolution
The smallest distance that the tablet can detect and output. It's a measure of how fine a distinction can be made between adjacent points. This is usually expressed as the number of points per millimeter or per inch.

stylus
A device that is similar to the 4-button cursor in that it helps the user input data, but different in that it looks like a pen.

Appendix D

ACCESSORIES

STANDARD ACCESSORIES

Power Supply and Power Cord 119-1748-00
4-Button Cursor..... 119-1775-00
Users Manual 070-4784-00
Cabinet Feet, set of four 118-3754-00

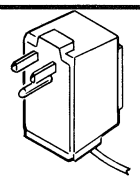
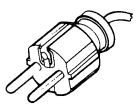
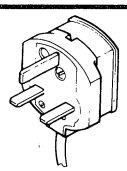
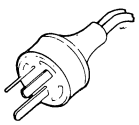
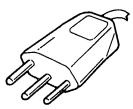
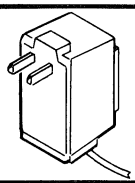
OPTIONAL ACCESSORIES

1-Button Stylus 119-1776-00
Service Manual..... 070-4984-00

OPTIONS

Power Supply and Power Cord Assembly

Option A1, European 119-1748-01
Option A2, United Kingdom..... 119-1748-02
Option A3, Australian 119-1748-03
Option A5, Swiss 119-1748-05
Option 48, Japanese..... 119-1748-06

Plug/Power Supply Configuration	Usage	Nominal Line Voltage (AC)	Reference Standards	Option Number
	North American	120V, 60Hz	ANSI C73.11[1] NEMA 5-15-P[2] IEC 83[3]	STANDARD
	Universal European	220V, 50Hz	CEE (7), II, IV, VII[4] IEC 83[3]	A1
	United Kingdom	240V, 50Hz	BS 1363[5] IEC 83[3]	A2
	Australian	240V, 50Hz	AS C112[6]	A3
	Swiss	220V,50Hz	SEV	A5
	Japanese	100V, 50/60Hz	ANSI C73.10[1] NEMA 1-15-P[2] IEC 83[3]	48

[1] ANSI—American National Standards Institute
[2] NEMA— National Electrical Manufacturer's Association
[3] IEC—International Electrochemical Commission
[4] CEE—National Commission on Rules for the Approval of Electrical Equipment
[5] BS—British Standards Institution
[6] AS—Standards Association of Australia

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Figure D-1. Tektronix Power Plug Options.

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