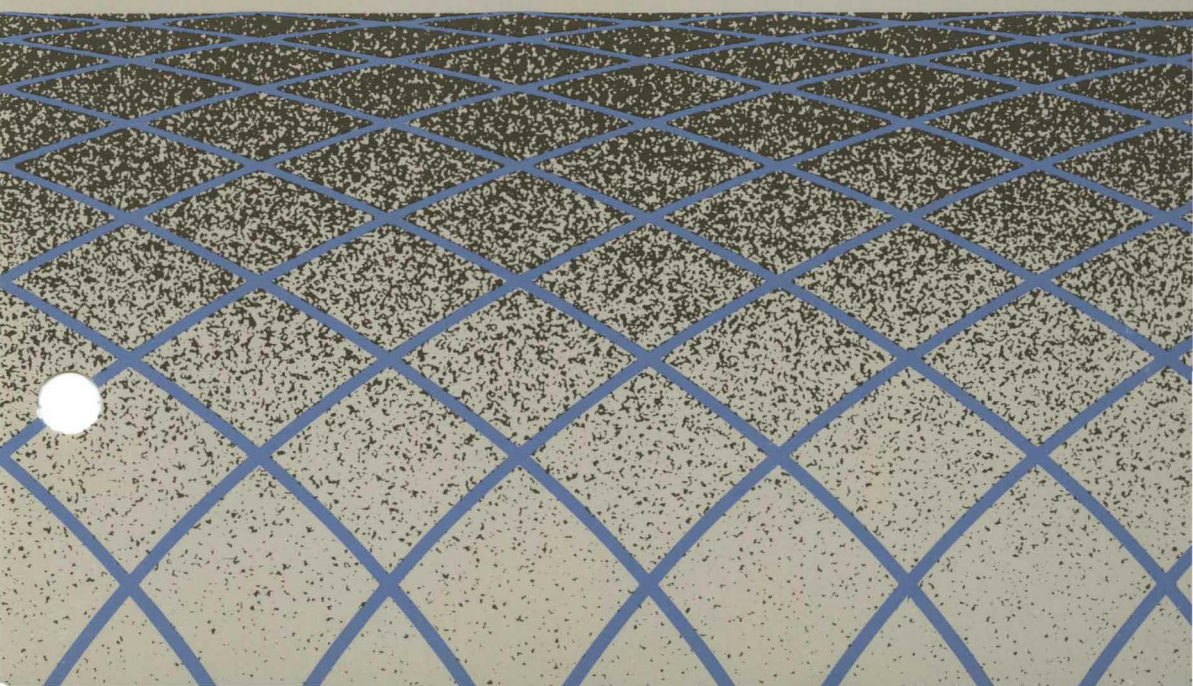
AT&T

730 Multi-Tasking Graphics Terminal

User's Guide



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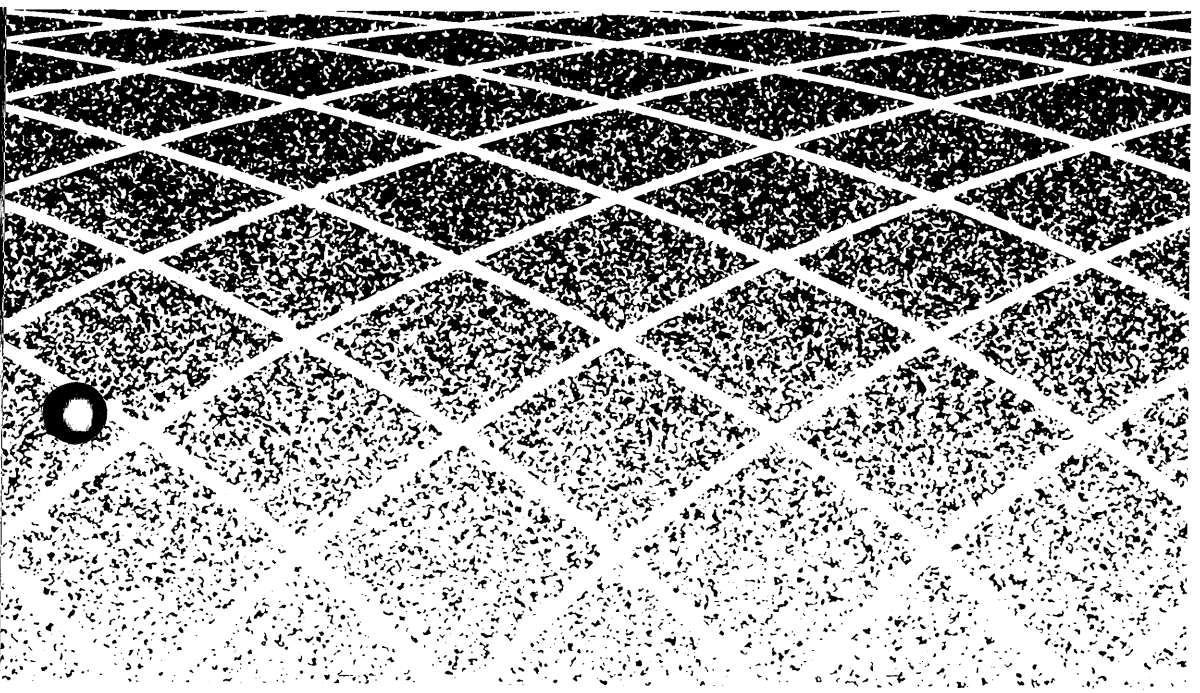

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Chapter 1: Overview

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About This Manual

The 730 Multi-tasking with Graphics (MTG) Terminal User's Guide describes how to install, operate, and care for your 730 MTG Terminal. Appendices contain information on control characters, escape sequences, font tables, keyboard layout and use, connections, software support, and options and accessories.

Audience

The intended user audience for this User's Guide is the technical professional with a broad range of experience. You could be a new user, or a software developer with previous experience using multi-tasking terminals. If you are experienced, you will notice that the 730 MTG Terminal is similar in operation to AT&T's 630 MTG Terminal. In any case, this Guide should give you enough information to learn how to use this terminal, and to supplement already existing knowledge. It is not the intent of this Guide to be a technical reference, although the Guide does contain technical information. Quick Reference pages are included in most chapters so you can begin using your terminal as quickly as possible.

730 MTG Pocket Reference Card

For those who are more experienced, the 730 MTG Pocket Reference Card contains more technical information. You will find this folded Card in the box containing this User's Guide.

Conventions

Physical switch settings are always in capital letters, such as ON or OFF.

Option settings are always in bold letters, such as **visible** or **invisible**.

Keyboard keys are capitalized or spelled outright, such as Control or CTRL.

Modes or states, such as Local Edit mode, are spelled with initial capital letters.

Items needing your special attention are called out in bold letters, such as **Note** or **Caution**.

Reader Response Card

You will find a blue Reader Response Card bound at the front of this manual. AT&T would appreciate hearing from you with your comments on and suggestions for this publication. Be sure to note the manual name and order numbers on the line provided. This card is postage-free.

Roadmap

For a New User

This manual is ordered sequentially so that if you are a new user, you can learn to operate your terminal in a stepwise fashion, from installation to use of more advanced features such as the Label Window and Dial Edit. You will encounter the following topics as you read through this Guide:

- Chapter 1, Overview (What is the 730 MTG Terminal?)
- Chapter 2, Getting Started (Installation Information is located here)
- Chapter 3, Mouse and Menu Operation (Using your Terminal tools)
- Chapter 4, Setup (Assigning values to your Terminal's options)
- Chapter 5, Windows (Using the 730's Multi-tasking features)
- Chapter 6, The Wproc+ Emulator (Your native environment)
- Chapter 7, The 4014 GS Emulator (For special graphics applications)
- Chapter 8, Printing (Printing a window or text)
- Chapter 9, Label Window and PF Edit (Programming your Function keys)
- Chapter 10, Dial Edit (Automating program sequences)
- Chapter 11, Maintenance and Troubleshooting (What to do when things go wrong)

Read Chapters 1, 2, and 3 before attempting to install and operate your terminal. Some chapters also contain exercises for practicing terminal skills.

For an Experienced User

If you have used multi-tasking terminals before, especially the AT&T 630 MTG Terminal, the operation of the 730 MTG will be easy and familiar. However, the 730 has many new features and enhancements for your convenience. Menus may contain new items you are not familiar with, and the Dial Edit feature, for instance, is totally new. Use the Quick Reference pages located at the back of many of this Guide's chapters to refresh your terminal skills. Then go on to learn new features as described in later chapters. The following chapters may be of special interest to you:

- Chapter 6, The Wproc+ Emulator
- Chapter 7, The 4014 GS Emulator
- Chapter 9, The Label Window and PF Edit
- Chapter 10, Dial Edit

More technical information is also contained in the Appendices.

About the 730 MTG Terminal

The 730 MTG Terminal is a high resolution, multi-window, multi-host, programmable graphics terminal. Its intelligence makes it ideal in application environments as diverse as software development, text preparation, engineering, and operations support systems.

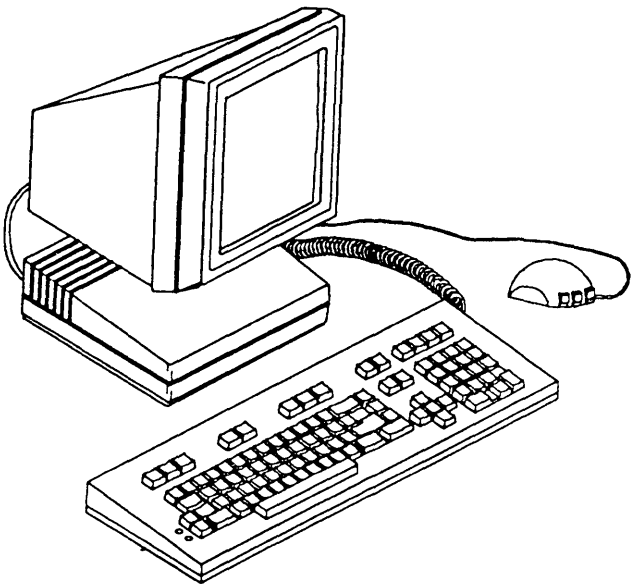

Figure 1–1 730 MTG Terminal

One of the primary features of the 730 is its support of two terminal environments: *layers* and non-*layers*. In the 730's native non-*layers* environment, no special host support is required for normal terminal operation.

On a host running the UNIX® System V, the terminal's behavior is driven by its *terminfo* program description. See terminfo(4) in the UNIX® System V Programmer Reference Manual for further information on terminfo. The terminfo description for the 730 is given in the Appendices.

In addition, software is available to allow downloading of self-contained terminal application programs. In the *layers* environment, a window manager (described in Chapter 5) supports up to seven terminal sessions over a single host connection and an error-correcting protocol provides full support of downloadable applications.

A second feature of the terminal is the ability to support multiple, concurrent host connections. The 730 supports up to three EIA host connections at any given time, any of which may be in the *layers* environment. Additional connections are available if you use an optional SSI, StarLAN 10 ISO,or TCP/IP card.

Programmability is a third feature. You can create custom applications using the 630 MTG Software Development Package (previously available for the 630 MTG Terminal).

Others features include:

- Wproc+ Emulation
- Wproc+ compatibility with all AT&T 600-family terminal applications
- 4014 Graphics System Emulation
- International features including ISO Latin-1 and French/Canadian NRCS fonts and escape sequences; compose modes; and keyboard language options
- Auto Dial feature
- Label Window for specifying supported User and System function keys
- In-window status line

- Access to StarLan 10 ISO with installation of an optional plug-in board
- Access to StarLAN 10 TCP/IP with installation of an optional plug-in board
- X-Windows capability when appropriately configured
- Mouse-operated menus for selection of terminal operations
- Text buffering and scrolling
- Selectable character sets including international fonts, and Mosaic, Securities, United Kingdom, and line drawing fonts
- Multiple resident fonts: small, medium, large and larger
- Local text printing capability
- 1024 by 1024 pixel display on a 16" CRT
- Choice of 98-, 102-, 102+1- (international), and 122-key keyboards
- Two RS 232-C ports for connection to external devices, up to three with an optional SSI card
- 10 MHz 68000 processor
- Up to 384 Kbytes of Read Only Memory (terminal control software)
- 640 Kbytes Random Access Memory standard
- 8 Kbytes non-volatile RAM for storage of terminal option
- Up to 384 Kbytes ROM in optional external cartridges for providing additional terminal capability
- RAM and I/O expansion capability via internal expansion connectors (see Options and Accessories Appendix).
- Time-selectable Screen Saver
- SSI connection with appropriate additional software.

Environment Needed

Hosts

The 730 can be used in the non-*layers* environment on any host computer or in the *layers* environment on any host that supports the AT&T Windowing Utilities package. For example, it is compatible for use in the *layers* environment on the AT&T 3B2 and 6386 families of computers.

UNIX® Releases

Although the 730 can be used without the aid of special software, it is more powerful when used with the AT&T Windowing Utilities package. The *layers* window manager, which is part of this package, is described in Chapter 5.

The AT&T Windowing Utilities package is a standard utilities package delivered with UNIX® System V Release 3 (System V Release 2.1.1 for the 3B20) and beyond. For UNIX® systems not containing the AT&T Windowing Utilities package, similar functionality can be obtained by installing the 5620 DMD Core package, described in the Appendix.

Note: For System V Release 3 and earlier releases, the AT&T Windowing Utilities is designed for RS-232 connections. To run *layers* over networks may require additional host software (e.g., *streams xt*). See the appropriate 730 Network Access Unit documentation for more details.

Software

Software available for use with the 730 MTG Terminal includes:

630 MTG Software Development Package

Originally written for the 630 MTG Terminal, this package is compatible with the 730 MTG Terminal. This package enables you to develop and execute downloadable terminal applications. It contains the 68000 C Compilation System, the application downloader, terminal-specific library functions, development tools, and sample application programs.

5620 DMD Core Package

This package provides windowing support for use with UNIX® system releases prior to those containing the AT&T Windowing Utilities package.

Hardware

Standard Components

The ordering codes for the standard 730 MTG Terminal components are listed below. Optional cards and accessories are listed in the Appendix.

Item	Comcode	PECode
White Monitor	501006241	33534 Col10
Amber Monitor	501001697	33534 Col19
Controller/Base	501013015	3344-730
Red Mouse	524594157	33536
White Mouse	524599875	33450
98-Key Keyboard	501009013	33401
102-Key Keyboard	501007421	33404
102+1-Key Keyboard	106075567	33405
122-Key Keyboard	501004881	33537

Cables

Interface cables needed for operation with the 730 MTG are described in the tables below.

Table 1–1 Main, Main2 EIA Port

To Connect to...	Cable Description	Length	Comcode	PE Code
DATAKIT, Modem	Male to Male (one-to-one)	7'	524161742	2724-14G
		12'	524161759	2724-14L
		25'	524161767	2724-14S
		50'	524161775	2724-14V
3B2	25 Pin (Male) to 8 Pin Modular Terminal/Printer Adapter		403602717	2750-C09
	8 Pin Modular Cord	7'	403600968	2725-16G
		14'	403600976	2725-16N
		25'	403600984	2725-16S
		50'	403600992	2725-16V
3B5,3B15, 3B20 5310/5320 Teleprinter	Male to Female (null modem)	6'	524163417	2724-92G

Note: In the table above, the cables can only be used for DC1/DC3 flow control. They cannot be used for RTS/CTS flow control.

Table 1–2 Auxiliary EIA Port

To Connect to...	Cable Description	Length	Comcode	PE Code
DATAKIT, Modem	Male to Male (null modem)	7'	524565959	2724-99G
		12'	524565967	2724-99L
		25'	524659975	2724-99S
		50'	524659983	2724-99V
3B2	25 Pin (Male) to 8 Pin Modular Remote Console Adapter		403434020	2750-C11
	ACU/Modem Adapter		403417538	2750-C10
	8 Pin Modular Cord	7'	403600968	2725-16G
		14'	403600976	2725-16N
		25'	403600984	2725-16S
		50'	403600992	2725-16V
3B5,3B15, 3B20	Male to Female (One to One)	12'	524080660	2724-01L
		25'	524080678	2724-01S
		50'	524080686	2724-01V
5310/5320 Teleprinters	Male to Female (One to One)	12'	524080660	2724-01L
		25'	524080678	2724-01S
		50'	524080686	2724-01V
AT&T 475,476 Printers	Male to Male (One to One)	7'	524161742	2724-14G
		12'	524161759	2724-14L
		25'	524161767	2724-14S
		50'	524161775	2724-14V

Documentation

Available documentation for the 730 MTG includes:

- 730 MTG Terminal User's Guide (999-300-652)
- 730 MTG Terminal Pocket Reference Card (999-300-653)
- 630 MTG Software Development Package Release Notes (999-300-342IS)
- 630 MTG Software Development Guide (999-300-341IS)
- 630 MTG Software Reference Manual (999-300-340)
- 630 MTG Application Toolchests (Utilities, applications, and accompanying documentation available from the AT&T UNIX System Toolchest, an electronic catalog. To browse or purchase, call the Toolchest computer on 201-522-6900. Login as **guest**.)
- 730 StarLAN 10 ISO 10 Network Access Unit User's Guide (999-300-624)
- 730 StarLAN 10 TCP/IP Network Access Unit User's Guide (999-300-660)
- 5620 Dot-Mapped Display Administrator Guide (999-801-120IS)
- 730 MTG Terminal Service Manual (available in 1990)

For pricing information on available 730-related documents, contact the Customer Information Center Commercial Sales Representative on:

1-800-432-6600

Chapter 2: Getting Started

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In This Chapter

Before you can use the 730 Multi-tasking with Graphics Terminal, you must install it. This chapter instructs you on unpacking, choosing a work site, installation, and cable connection.

Read and follow the procedures in this chapter before attempting to operate your terminal.

Installation

The sections that follow help you choose an appropriate location for your terminal, unpack and set up your terminal equipment, and make cable connections.

Inventory

Terminal equipment is packed in four separate cartons. Make sure you confirm your order with the PE Codes printed on the cartons. Observe any and all **Caution** and **Warning** labels on the cartons.

Note: To avoid condensation on the electronic components, allow the components to assume room temperature before unpacking.

The contents of the cartons correspond to items with PE Codes in the table of Standard Components in Chapter 1:

- Keyboard
- Mouse
- Controller Base/User's Guide/Pocket Reference Card
- Display

Choosing a Worksite

Choose a location for your terminal carefully. Consider its size, cable lengths, electrical requirements, and your own workspace needs. Position the display so that glare from outside or room lighting is minimized.

Try to avoid placing the terminal in dusty or dirty areas, fume-contaminated environments, or direct sunlight. Any of these factors could lead to high operating temperatures within the terminal that could result in terminal damage.

Placement within three feet of fluorescent lights or other sources of electrical interference may cause fluctuations in terminal performance.

Installation Procedure

Note: If you ordered optional accessories, refer to their User's Guides for installation information.

1. Unpack the controller base by lifting it from the carton by the foam packing pieces. Then remove the end pieces protecting the base. Place the controller/base at the location where you want the terminal.
2. If you purchased an optional accessory card, install it now. Refer to the document supplied with the card for installation procedures.
3. Attach the display to the controller/base following the steps below.
    a. Position the box with the correct side up.
    b. Remove the display (with the foam packing still around it) from its carton. Place the display with packing material next to the controller/base. Orient the display with the screen downward and the bottom facing towards you.
    c. Spread open the plastic bag covering the display so that the four rectangular cutouts on the bottom of the display are clear. The controller/base attaches to the display at these four points.
    d. Refer to Figure 2-1. Pick up the controller/base, rear side up. Insert the base swivel assembly tabs into the lower cutouts on the display. Pivot the controller base toward the display until the latches on the base snap into the upper display cutouts.
    e. Place the display and controller base in an upright position and remove the packing material and plastic bag.

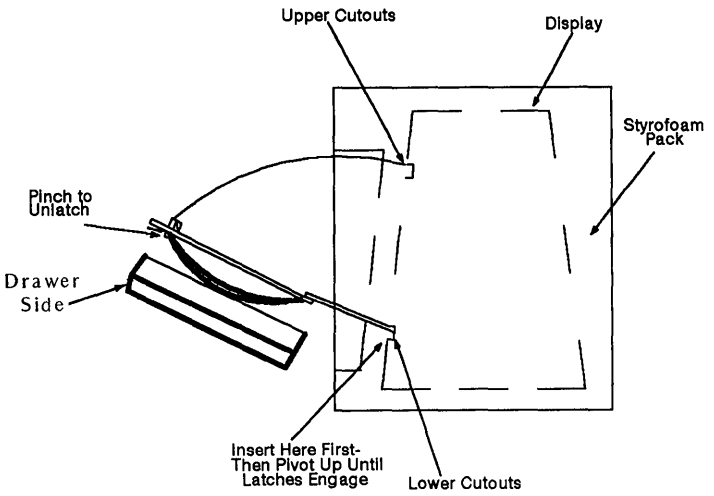


Figure 2–1 Attaching the Base to the Display

4 Connect the display cable to the connector marked VIDEO on the controller/base. Secure the cable to the controller/base by tightening the two captive screws on the connector (see Figure 2-2).

5 Unpack the AC power cord from the display carton. Connect the female end of the power cord to the AC connector on the back of the display (see Figure 2-2).

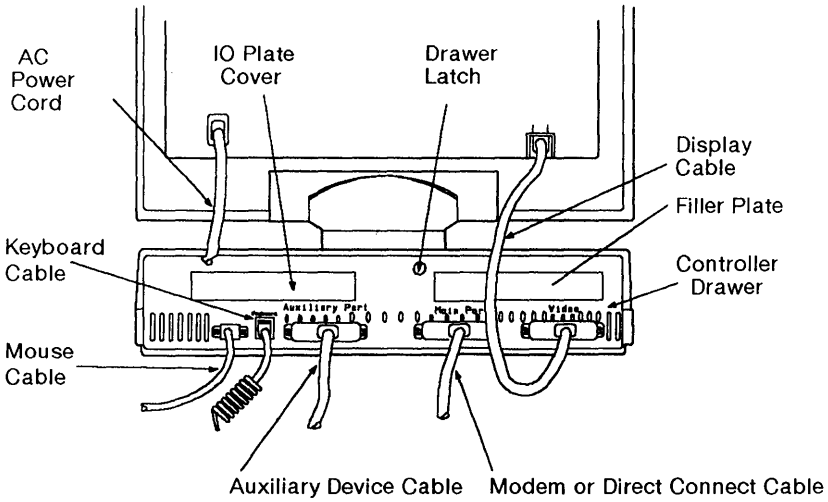


Figure 2–2 Cable Connections

6 Check that the AC power switch on the front of the display is **off** (the left side of the switch will be depressed). Insert the male end of the power cord into a 110 VAC outlet.

7 Remove the keyboard from its box and packing material. Make sure the keyboard you unpacked matches the keyboard identification codes (PE code and Comcode) on your packing slip.

8 Adjust the keyboard to the desired position by adjusting the setting of the keyboard "feet". The slope setting of the feet can be positioned (tilted) by pushing them in the direction of the arrows as indicated in Figure 2-3. Keyboards can have two or three slope setting positions. For the 98-key keyboard, simply flip the legs out to their slope position of 11°.

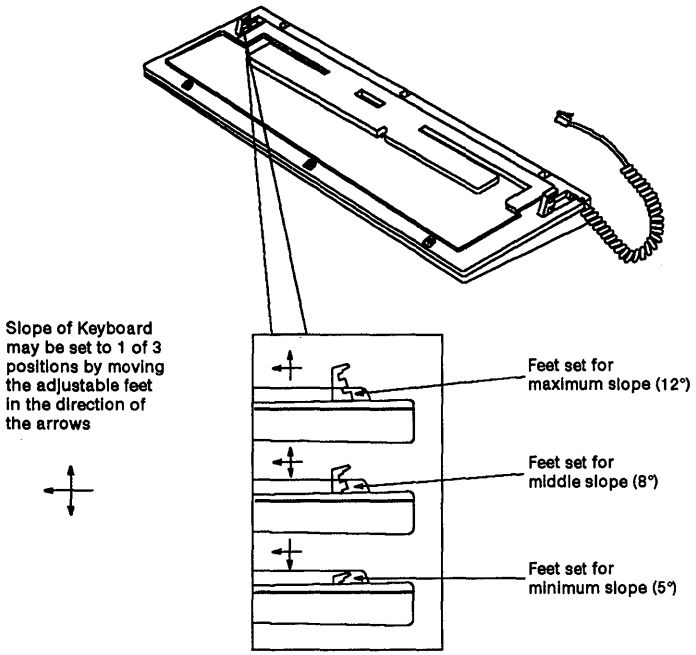


Figure 2–3 Adjusting Keyboard Position (except for 98-key Keyboard)

9 Insert the keyboard connector into the receptacle marked KEYBOARD on the rear of the controller/base (see Figure 2-2). Push the connector straight in with the latch side down.

10 Unpack the mouse from its carton. Attach the mouse cable by lining up the pins on the connector with the mouse receptacle on the rear of the controller/base (see Figure 2-2). After connecting the cable, secure it by tightening the two retaining screws on the connector.

11 Attach any interface cables to be connected to the MAINs and AUX ports by lining up the pins on the connectors with the corresponding receptacles on the rear of the controller/base. After connecting the cables, secure them by tightening the two retaining screws on each connector. Necessary interface cables were described in Chapter 1.

Power On

After connecting the terminal to a properly grounded and operating AC power source, press the right side of the ON/OFF switch. The green LED just above the ON/OFF switch will light.

If the ON/OFF switch does not light, make sure the switch is in the ON position and that the AC cord is connected at both ends. If the LED still does not light, notify your maintenance personnel.

Automatic Selftest

Immediately after you "power on" the terminal, the *automatic selftest* is executed. The terminal control software, program memory, and communication ports are tested. The time selftest lasts depends on how much memory is installed in your terminal. A few seconds after power is applied the message, "Selftest", appears in the middle of the screen along with the line, "730 MTG: Copyright (1989) - AT&T". If the selftest passes, the message, "Selftest passes", appears. Soon after, the user temporary (utemp) window and login prompt appear.

If needed, adjust brightness and/or contrast using the dials at the front of the display (rotate controls to the right to increase, to the left to decrease.)

If selftest fails, an error message describing which part of the test failed is displayed. Make a note of the error message, and refer to Chapter 11, "Maintenance and Troubleshooting", for more instructions. Selftest continues, and when completed, displays the message, "Selftest failed: Press any key to continue." If possible, the terminal resumes operations, creating a window based on Terminal Setup options. However, the portion of the terminal that failed selftest may affect the normal behavior of the terminal.

Screen Appearance

A window will appear on the screen after power on (see Figure 2-4) with an appearance determined by terminal Setup options. For more information on Setup and Windows, see Chapters 4 and 5.

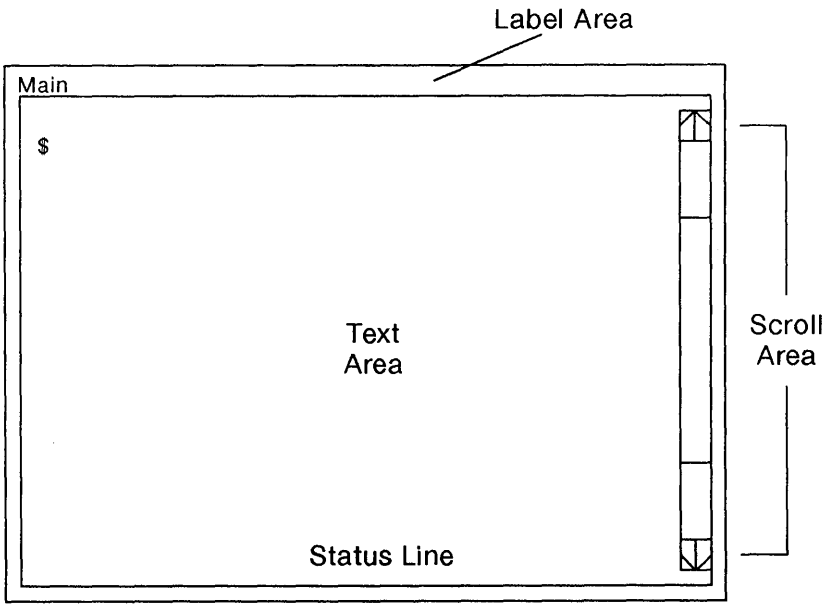


Figure 2–4 Window after Power On

Screen Saver Feature

The 730 MTG has a built-in screen-saver feature to help extend the life of the display. The display will go blank if neither the mouse nor keyboard is used for the time you select using the Screen Saver option under the Display submenu in Setup (see Chapter 4). You can elect to have your screen blanked after 1 to 60 minutes of non-use, or not at all (**off** option).

Caution: If the **off** option is selected, latent images may be permanently left on the screen. Therefore, use of the **off** option is not recommended for extended periods of time.

To make the screen "viewable" again, press any key (SHIFT suggested) or simply move the mouse.

Adjustments

Brightness and Contrast

The brightness and contrast controls are located on the lower edge of the front of the display.

To increase the screen brightness, turn the brightness control wheel to the left. To decrease the brightness, turn it to the right.

Contrast is brightness of the characters relative to the brightness of the background. To increase screen contrast, turn the contrast control wheel to the right. To decrease the contrast, turn the wheel to the left.

Setting Brightness and Contrast

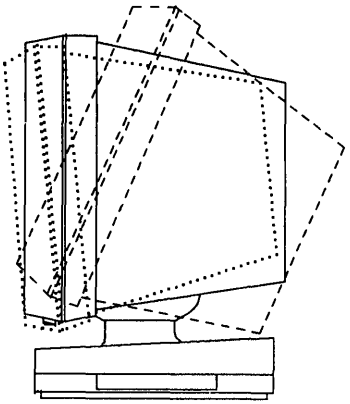
First turn the brightness and contrast wheels to their highest settings. You will see the "raster" pattern of the terminal. Next, turn the brightness wheel to the right until the raster just disappears. Finally, turn the contrast control wheel until the display shows the contrast level you desire.

Tilt and Swivel

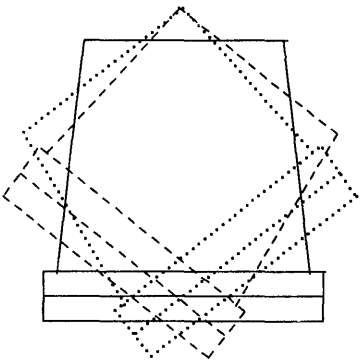
The display viewing position can be adjusted using the built-in tilt and swivel feature (see Figure 2-5).

Manually tilt the display forward or backward to a comfortable viewing position. The range of tilt motion is -5 to +20 degrees from true horizontal.

Manually swivel the display left or right to the desired position. The swivel range of motion is 45 degrees in either direction.



Tilt - View From Side



Swivel - View From Top

Figure 2–5 Tilt and Swivel

Chapter 3: Mouse and Menu Operation

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In This Chapter

The mouse is your primary tool for selecting terminal operations. Use the mouse to display menus (lists of terminal operations and options) and to select menu items. The mouse is also used as a pointing device to aid in window manipulation and scrolling (displaying menu items currently not seen).

For a New User

If you have never used a mouse before, read this chapter to familiarize yourself with mouse operation. The mouse cursor, functions, motion, and buttons are explained. The concept of menus is introduced. An exercise is provided at chapter's end to allow you to practice mouse and menu skills.

For an Experienced User

If you are familiar with mouse operation, you may want to skip this chapter. If you want to refresh mouse and menu skills, perform the exercise at the end of this chapter.

Using the Mouse

To operate the mouse, place the palm of your hand over the top of the mouse with your index, middle, and ring fingers resting on the three buttons. Without pressing any buttons, push the mouse back and forth on the work surface. It will roll on the rollerball imbedded in the bottom of the mouse.

Mouse Cursor

As you push the mouse back and forth on the work surface, notice the movement of the arrow (the *mouse cursor*) on the screen. Depending on terminal operations, the mouse cursor you see may be something besides an arrow. See Chapter 5 for a description of other mouse cursors.

Note that you can lift and reposition the mouse on the work surface without moving the mouse cursor.

To alter the perceived speed of mouse cursor movement in relation to actual mouse movement, change the Acceleration Option of the Mouse submenu under the main Setup menu. Set the option to **off** if you want the cursor to move at the same rate as the mouse itself. Set the option to **on** if you want to move the cursor across the screen with less actual mouse movement. See Chapter 4 for more information on the Acceleration option.

Mouse Buttons

There are three buttons on the mouse numbered consecutively, with button number one always associated with the index finger of the right or left hand (see Figure 3-1). To specify whether the mouse will be used with the right or left hand, set the Hand Option of the Mouse submenu under the main Setup Menu to **right** or **left**.

In general, Button 1 is used to point at and select terminal options, Button 2 is application specific and is assigned a function by the application, and Button 3 is a "command button" used to specify and select terminal/window options.

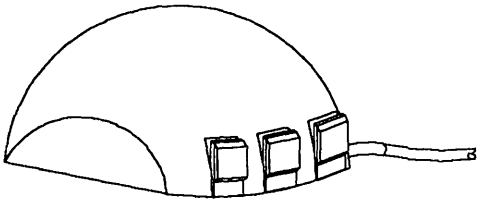


Figure 3–1 The Mouse Buttons

Mouse Actions

There are four distinct mouse actions involving movement and the mouse buttons:

- To **press** a button means to press it down and hold it
- To **release** a button means to let the button go
- To **click** a button means to press and release the button in quick succession
- To **sweep** (or "drag") the mouse means to press a mouse button; move the mouse on its roller; then release the button.

Depending on the application, you may or may not see activity on the screen corresponding to each mouse action.

Using the Menus

Menus are lists of terminal operations and options that may appear when you press mouse buttons or when you run applications (see Figure 3-2). You select menu items by positioning the mouse cursor and selecting with the mouse.

Items available for selection on the menu are displayed in normal intensity text. Items on the menu which are not allowed under the current conditions appear in grayed text. Items within a menu are highlighted in reverse video as the mouse cursor moves over them.

Menus associated with other menus in a hierarchical structure are called *submenus*. A submenu is indicated by an item name with a right-pointing arrow next to it (see Figure 3-2). To select a submenu, move the mouse cursor to highlight the desired submenu. To see and select items from a submenu, move the mouse to the right, highlighting the desired item, then release or click the appropriate mouse button. Selections are always made at the farthest right of the menu (where no more "arrowed" items appear).

Pop Up Menus

Menus that appear only while a mouse button is pressed are called *pop up menus*. For example, the Main Terminal Menu is a pop up menu. To select an item on a pop up menu, press the mouse button to display the menu, move the mouse to place the cursor over the desired menu item, which then becomes highlighted, and release the mouse button. A check may appear next to a selected item.

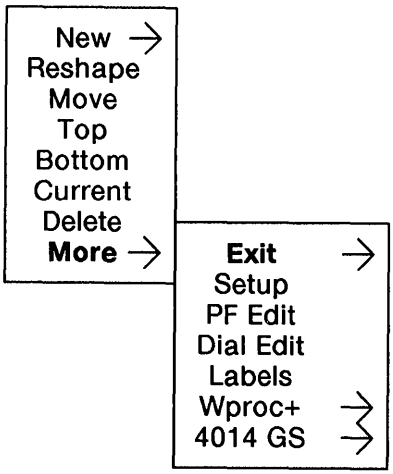


Figure 3–2 Menu and Submenus

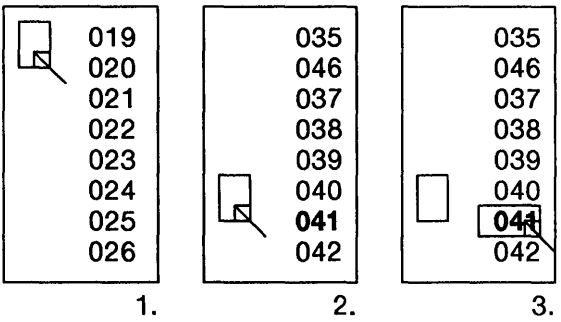
Static Menus

Menus which remain on the terminal screen after a mouse button is released are called *static menus*. For example, the terminal Setup menu is a static menu. To select an item on a static menu, press and release the appropriate mouse button to display the menu, move the mouse cursor over the desired menu item, which then becomes highlighted, and click the appropriate mouse buttom. A check may appear next to a selected item.

Scrolling Menus

Only 16 items can be displayed on a menu at one time. If more than 16 items are available on the menu, a *scroll area* and *scrolling bar* will appear on the left side of the menu (Figure 3-3). Only the first 16 items will be shown. Since an item can only be selected if it is displayed, you must "scroll" through the items to display the one you want to select.

To scroll, place the mouse cursor over the scrolling bar and move it up or down until the desired item is displayed. Then move the cursor out of the scrolling area and move it over the item to be selected, which will then be highlighted. Select the item as described for a pop-up or static menu. The selected item will then appear "checked" on the menu.



1. Place mouse cursor over scrolling bar.
2. Move scrolling bar until desired value is highlighted.
3. Select desired value.

Figure 3–3 Scrolling the Menu

Exercise

In this exercise, you will display the Setup menu (used in the next chapter) and practice making menu selections.

1. Press Button 3 to display the Main Terminal menu.
2. Move the mouse cursor until the More submenu is highlighted.
3. Move the mouse cursor to the right until the More Submenu appears.
4. Move the mouse cursor over the word Setup to highlight it. If Setup was not previously displayed, release the button to display a box outline of the Setup dialog box. Click mouse button 3 to display the Setup dialog box and the word "Setup" centered in a smaller box. If Setup was previously displayed and you release the button, the Setup box appears.
5. Click mouse button 1 with the mouse cursor on the small box labelled "SETUP" to display the Setup *static* main menu.
6. Move the cursor over the Display submenu to highlight it. Move the cursor to the right until you see the submenu appear.
7. Move the cursor over the item Background to highlight it. Move the cursor to the right until you see the selections **dark** and **light**. The current setting will have a check mark next to it.
8. To change the current Background setting, move the cursor over the desired setting to highlight it. Click mouse button 1. Your screen should be either dark or light, depending on which option was chosen.
9. To exit from Setup, delete the Setup box (see "Delete," Chapter 5) or make another window Top and Current (see "Top," Chapter 5). Also see "Exiting Setup," in Chapter 4.

Mouse and Menu Quick Reference

If you are familiar with mouse and menu operation, use this quick reference page to remind you of basic procedures. For more detail, refer to the information in this chapter.

To	Procedure
Change speed of mouse cursor	Change the setting of the Acceleration option on the Mouse submenu under the main Setup menu.
Change to a Right- or Left-hand Mouse	Set the Hand option of the Mouse submenu under the main Setup Menu to **right** or **left**.
PRESS a Mouse button	Press *and hold* the Mouse button.
RELEASE a Mouse button	Let a Mouse button go.
CLICK a Mouse button	Press and release the button in quick succession.
Sweep ("Drag") the Mouse	Press a mouse button, move the mouse on its roller, then release the button.
Display a Menu	Press the appropriate Mouse button

To	Procedure
Display a Submenu	Highlight the submenu name; move the mouse cursor in the direction of the arrow.
Select a Pop-up Menu item	Press the appropriate mouse button to display the menu; move the mouse to place the cursor over the menu item; release the mouse button.
Select a Static Menu item	Press and release the appropriate mouse button to display the menu; move the mouse to place the cursor over the menu item; click the appropriate mouse button.
Scroll a Menu	Place the mouse cursor over the scrolling bar and move the mouse cursor up or down until the desired item is displayed.

Chapter 4: Setup

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In This Chapter

You may customize your terminal's functionality before you use it. This is called Setup. The terminal is already set with factory default characteristics (options) which may require modification to take your network, hosts, and peripherals (such as printers) into account.

For a New User

This chapter uses mouse skills to set the options relating to your terminal's functionality. If you need to refresh mouse skills, review Chapter 3. You do not need window skills to use Setup; however, if you wish to modify the Setup window you must know how to manipulate windows (Chapter 5). Before making changes to the Setup options, make sure you know about your network or host configuration. Contact your System Administrator if you need help with this information.

For an Experienced User

If you are familiar with terminal option setup, this chapter will help you set the terminal's options using menus and the mouse as a pointing device.

What is Setup?

Setup is the feature that allows you to define your terminal's options and general operability. Items such as host and printer connections, keyboard functionality, and window and display appearance are determined using Setup. For instance, terminal option settings determine the appearance of the screen after the terminal is powered on.

Setup is a menu-driven window and is available from the Main Terminal Menu under the More submenu. You set your terminal options by displaying the Setup window and its static menu and making selections.

To Initiate Setup

To display the Setup menu, follow the steps below.

1. Press and hold mouse button 3 to display the Main Terminal Menu.
2. Position the mouse cursor over the More submenu, highlighting it.
3. Slide the mouse to the right until the More submenu is displayed.
4. Position the mouse cursor over the selection Setup, highlighting it. Release mouse button 3 (see Figure 4-1).

   The outline of the Setup window will appear. If the Setup window was displayed previously, the Setup window appears immediately (becomes top and current.)
5. Move the mouse to position the window in the desired location. Since Setup menus are read from left to right, it is generally preferable to position the Setup window near the left side of the screen.

Note: If desired, reshape the Setup window as explained in Chapter 5. If you reshape it to a size smaller than the minimum size, the message box, "Swept window too small" will be displayed. Reshape the window to a larger size and click mouse button 3 again.

6 Click mouse button 3. The word "Setup" (centered in a small box in the window), terminal firmware date and version, and total amount of RAM will be displayed in the window (see Figure 4-1). The Setup window is top and current.

7 To display the Setup Main Menu, position the mouse cursor over the boxed word "Setup" and click mouse button 1.

The Setup Main Menu appears (see Figure 4-2). This menu, as well as its submenus, are *static*, which means they do not disappear when mouse buttons are released.

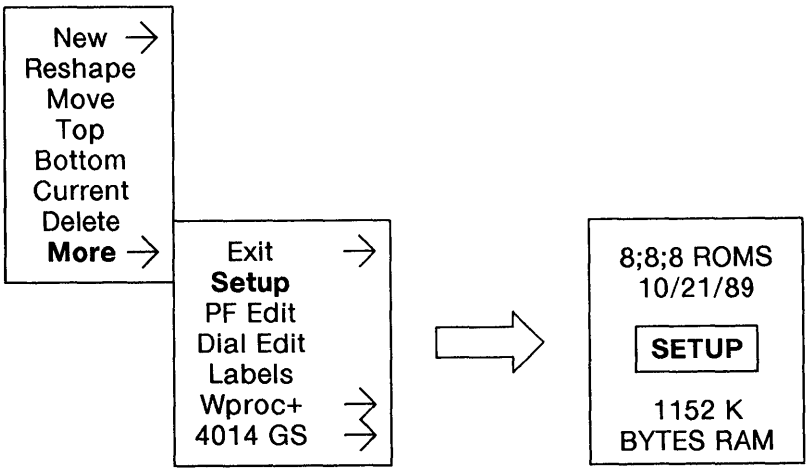

Figure 4–1 Selecting Setup and the Setup Window

Setup Main Menu

The Setup Main Menu consists of seven submenus that allow you to display the terminal options available and change them if desired. These submenus are Ports, Printer, Display, Keyboard, Mouse, Selftest, and Default.

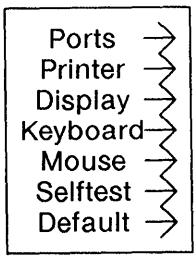

Figure 4–2 The Setup Main Menu

Viewing and Modifying Options

To see a submenu, position the mouse cursor on the submenu of choice, highlighting it. Then slide the mouse in the direction of the arrow. The submenu will appear.

The items in the submenu consist of either other submenus or actual option choices. Slide the mouse in the direction of the arrow to display further submenus or option settings, such as **on** or **off**. The current setting for an option is indicated by a check mark in the menu next to the setting (see Figure 4-3).

To change a setting, position the mouse cursor over the desired setting, highlighting it, and click mouse button 1. A check will appear next to this setting. The new setting becomes active immediately unless otherwise noted in the option descriptions later in this chapter. Unavailable settings will appear in "grayed" text.

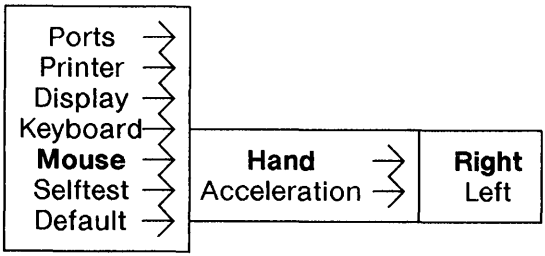

Figure 4–3 Submenu and Settings

Ports

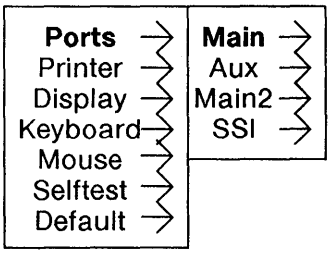

Figure 4–4 Ports Submenu

The Ports submenu allows you to define options for the selected physical ports. A port can be either a *host* port or a *printer* port. The Printer submenu maps the physical port as a printer port. **Main** and **Main21 default to Host ports. Aux** defaults to a printer port.

Host Port (default for Main, Main2)

Main is the main EIA port. *Main2* is the additional main EIA port for a second host associated with the SSI card.

Note: Options marked with a † only apply to Wproc+ windows (see Chapter 6).

Speed is the operational speed of the port in bits per second. Match the selected speed with the speed of the attached modem or host. Speed ranges from 300 to 19200 bits per second. The default setting is **9600**.

Send Parity determines the state of the eighth or ninth bit of sent data depending on the setting of the Bits/Character option. If parity=**none**, only the number of bits selected by the Bits/Character option is transmitted. If parity=**odd** or **even**, an additional bit is transmitted that indicates the parity of the data. If parity = **mark**, the additional bit is transmitted as a one. If parity = **space**, the additional bit is transmitted as a zero. The default setting is **space**.

Bits/Character determines the size of the data portion of each character (not including parity or start/stop bits). Characters can be 7 or 8 bits long. The default setting is **7**.

Receive Flow

Receive Flow selects whether Xon/Xoff or CTS are to be used as flow control. If Xon/Xoff is selected, software flow control is used. The terminal will stop sending characters when it receives a DC3 and resume sending characters when a DC1 is received.

When CTS is selected, hardware flow control is used. The CTS lead will be used to send data. CTS is not selectable on the Aux or Main2 port.

The default setting for this option is **none.**

In *layers*, the Receive Flow option is ignored unless the Encoding option is also enabled.

Caution: The Receive Flow option should normally be set to **none** unless the terminal is attached to a network or host which generates DC1/DC3 flow control. If this option is set to **on** and flow control is not available, an unintentional DC3 character may cause the terminal stop sending data to the host. If this occurs, set the option to **none** to restart transmission to the host.

Generate Flow

Generate Flow selects Xon/Xoff or RTS to generate flow control for data transmission from a host or communications controller when in the non-layers environment. If Xon/Xoff is selected, the terminal automatically generates software flow control: an ASCII DC3 character when the internal buffer is almost full and an ASCII DC1 character when the buffer is almost empty.

When RTS is selected, hardware flow control is used. The RTS lead is used to receive data. RTS is not selectable on the Aux or Main2 port.

The default setting for this option is **xon/xoff**.

Generate Flow should be set to **xon/xoff** unless the host cannot handle DC1/DC3 characters. If this option is set to **none**, or if the host does not recognize flow control, data may be lost due to buffer overrun. When this happens, the terminal bell will ring.

Local Echo

Set this option to **on** if you want keyboard data sent to the line and to the display at the same time. If **off**, keyboard data is sent to the host line only and must be "echoed back" by the host to be seen on the terminal. When local echo is off and there is no host connection, escape sequences are ignored. The default setting is **off**.

UNIX operating system hosts generally require Local Echo set to **off** (or full duplex). For non-UNIX operating system hosts, change this option only if you are certain your host requires it. In *layers*, this option is ignored.

Encoding selects whether the data communications path will reliably transmit all 8-bit ASCII characters. Set Encoding to **on** if the communications system always transmits all 8-bit characters and uses ASCII DC1/DC3 or ENQ/ACK control characters for internal flow control. The default setting is **off.**

Certain local area networks use ASCII control characters for internal signalling, and will not reliably transmit these characters. In *layers*, the protocol embeds ASCII control characters within messages. The communications system must be prevented from interpreting these characters. When Encoding is set to **on**, data transmitted by the terminal in *layers* is encoded to prevent any ASCII control characters from occurring. Data arriving from the host is also assumed to be encoded and is automatically decoded by the low level terminal I/O system.

Note: Data encoding reduces system throughput since it requires additional data transmission.

Return determines what character is sent when the Return key is pressed. **CR** sends a carriage return (ASCII 0x0d). **CR/LF** sends a carriage return followed by a line feed (ASCII 0x0d0x0a). **LF** sends a line feed (ASCII 0x0a). The default setting is **CR.**

The corresponding UNIX operating system stty flags are: for **CR, -igncr icrnl;** for **CR/LF, igncr icrnl;** and for **LF, -inlcr.**

Received Newline† determines what happens when a newline character (ASCII 0x0a) is received by the terminal. If this option is set to **LF**, the cursor will advance to the same position on the next screen line. If this option is set to **CR/LF**, the cursor will advance to the beginning of the next screen line. The default setting is **LF**.

Power-on Position allows you to create a window that automatically appears if you select the **power-on/menu** setting for the Presence option (below). When you select Power-on Position, a window outline appears based on the current default font and emulator. Move this window to the desired position on the screen. To save the window position, press mouse button 1 or 3. To cancel the operation, press mouse button 2.

Presence allows you to select the appearance of your terminal on power-on. If Presence = **Power-on/Menu**, the window created using the Power-on Position option (described above) appears and the name of the host port is displayed on the New and Exit Setup submenus on power-on. If Presence = **Menu**, the name of the host port appears on the New and Exit Setup submenus on power-on. If Presence = **None**, no window and no host name appears on power-on. The default setting for this option in Main is **Power-on/Menu**. The default setting for this option in Main2, SSI, or Aux is **Menu**.

Default Emulator determines what emulation is active on power on. If the Default Emulator is set to **wproc+**, the Wproc+ emulator will be active (see Chapter 6). If the Default Emulator is set to **4014GS**, the Tektronix-type 4014GS emulator will be active (see Chapter 7). The default setting is **wproc+**.

Default Font† allows you to choose what font size is displayed on power-up. Choose from **small**, **medium**, **large**, and **larger** font sizes. The default setting for this option is **large**.

Layers Columns† defines the number of columns of text displayed in new *layers* windows. The valid column range depends on the current font setting. This option also defines the number of columns used when determining the outline size for reshaped *layers* windows. The default column setting is **80**.

Layers Rows† defines the number of rows of text displayed in new *layers* windows. The valid row range depends on the current font setting. This option also defines the number of rows used when determining the outline size for reshaped or *layers* windows. The default row setting is **24**.

Non-layers Columns† defines the number of columns of text displayed in a new non-*layers* window. The valid column range depends on the current font setting. This option also defines the number of columns used when determining the outline size for a reshaped or peeled non-*layers* window. The default column setting is **80**.

Changing the Non-layers Columns option will cause programs relying on *terminfo* to work incorrectly. See Appendix I for information on how to write a local *terminfo* to correct this.

Non-layers Rows† defines the number of rows of text displayed in a new non-*layers* window. The valid row range depends on the current font setting. This option also defines the number of columns used when determining the outline size for a reshaped or peeled non-*layers* window. The default row setting is **60**.

Changing the Non-layers Rows option will cause programs relying on *terminfo* to work incorrectly. See Appendix I for information on how to write a local *terminfo* to correct this.

Fixed Non-layers†

determines if a non-*layers* window can be reshaped. This option is provided because with some applications (for example, *vi*), reshaping can cause the application to work incorrectly. With this option set to **yes**, the non-layers window cannot be reshaped. With this option set to **no**, the non-layers window can be reshaped. The default setting is **yes**.

This option goes into effect on the next reinitialization of non-*layers* (at power on, after selftest, or upon exit of *layers* or non-*layers* on the host).

To override this option when it is set to **yes**, press the escape sequence **ESC [? 1 r**.

Caution: Programs which rely on *terminfo* will work incorrectly if the non-*layers* window they are running in is reshaped. A local *terminfo* program will not correct this problem.

Printer Port (Default for Aux)

Aux is the auxiliary EIA port. It is intended for use with a printer or other EIA connection.

Speed See the description under Main, Main2. Match the selected speed with the speed of the attached printer.

Send Parity See the description under Main, Main2.

Bits/Char See the description under Main, Main2.

Presence See the description under Main, Main2. The Power-on/Menu option is grayed.

Expand Tabs determines whether or not to replace tabs sent to the printer with an equivalent number of spaces. If Expand Tabs=**yes**, a tab sent to the printer will be replaced with a number of spaces equivalent to the number of characters to the next tab stop. The default setting is **yes**.

Tab stops are assumed to be 8 spaces apart at columns 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, and 88.

Note: This option is ignored if the printer is in Media Copy mode.

Filter Escapes determines whether to remove (filter) or retain escape characters. If Filter Escapes=**yes**, all ESC characters (ASCII 0x33) are removed from data sent to the printer. The default setting is **yes**.

Note: This option is ignored if the printer is in Media Copy mode.

SSI

SSI is the Standard Serial Interface port. This selection appears if an SSI card is installed.

Power-on Position See description under Main, Main2.

Presence See description under Main, Main2.

Default Font allows you to choose what font size is displayed on power-up. Choose from **small**, **medium**, **large**, and **larger** font sizes. The default setting for this option is **large**.

Layers Columns See description under Main, Main2.

Layers Rows See description under Main, Main2.

Non-layers Columns See description under Main, Main2.

Non-layers Rows See description under Main, Main2.

Printer

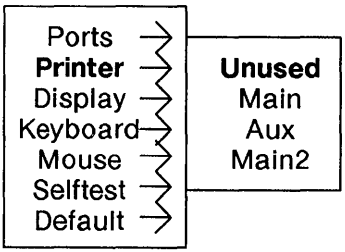

Figure 4–5 Printer Submenu

The options on this submenu allow you to specify through which port the terminal communicates with the printer. Port choices include: **Main**, **Aux**, or **Main2**. If no printer is attached, or if you wish to disable the printer, select the choice **Unused**.

For instructions on making selections, see "Viewing and Modifying Options".

Display

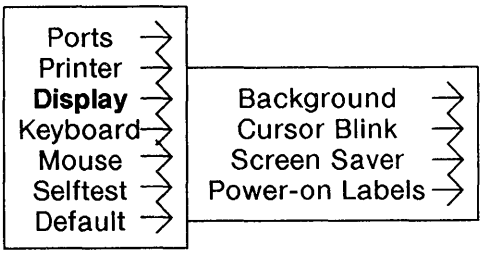

Figure 4–6 The Display Submenu

The Display submenu allows you to specify how your screen will appear during terminal use.

Background determines whether the screen background will be **light** (white) or **dark** (black).

Cursor Blink determines whether or not the text cursor used in Wproc+ and PF Edit will blink. Set Cursor Blink=**on** if you want the cursor to flash on and off. The default setting is **off**.

Screen Saver determines how soon your screen will go blank when the mouse or keyboard is not used. Set Screen Saver = 1, 5, 15, 30, 60 minutes, or to off if you don't want the screen blanked at all. The default setting for this option is 15 minutes.

Caution: If the **off** option is selected, latent images may be permanently left on the screen. Therefore, use of the **off** option is not recommended for extended periods of time.

Power-On Labels determines whether the Label Window is displayed (see Chapter 9). To display the Label Window, set this option to **yes**. The default setting is **no**.

Keyboard

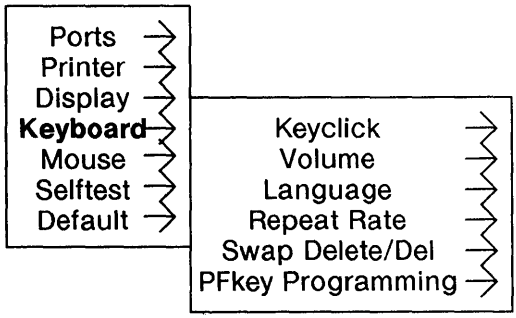

Figure 4–7 Keyboard Submenu

The Keyboard Submenu allows you to tailor keyboard operation to your needs.

Key Click determines whether or not an audible click is produced when you press a key. To turn audible click on, set this option to **on**. The default setting for this option is **off**.

Volume determines the volume of the keyboard click and bell. Volume settings range from **off, Level 1** (softest) to **Full volume** (loudest). The default setting for this option is **Level 4**.

Language allows you to select **U.S.** or **French/Canadian** functionality for the 102- and 102+1-key keyboards. The default setting for this option is **U.S.**. For other keyboards, this option is grayed.

Repeat Rate determines how fast keys repeat when pressed and held (in characters per second). Repeat Rate ranges from **15** to **60** characters per second, including **none** (no repeat). The default setting for this option is **15** characters per second.

Swap Delete/Del allows you to exchange unshifted and control functions of the Delete key on the 102-key and 102+1-key keyboards. To exchange key functions, set this option to **yes**. The default setting for this option is **yes**. For other keyboards, this option is grayed.

PFkey Programming allows you to select 730 MTG (600-type family) escape sequences for User Fkeys, or 630 MTG-type escape sequences for User Fkeys. The default setting for this option is **730 MTG**.

Mouse

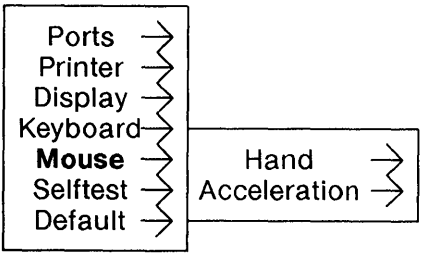

Figure 4–8 Mouse Submenu

This submenu allows you to specify which hand you will use the mouse with and speed of the mouse cursor.

Hand determines the orientation of the mouse buttons for either left- or right-handed use. Position the mouse comfortably under your hand. The button closest to your index finger is mouse button 1. The default setting for this option is **right**.

Acceleration determines the speed of the mouse cursor movement in relation to movement of the mouse itself. Set this option to **off** if you want the cursor to move at the same speed as the mouse. Set this option to **on** if you want the cursor to move *faster* than the actual speed of the mouse. This in effect enables you to move the mouse cursor across the screen with less actual mouse movement. The default setting for this option is **off**.

Selftest

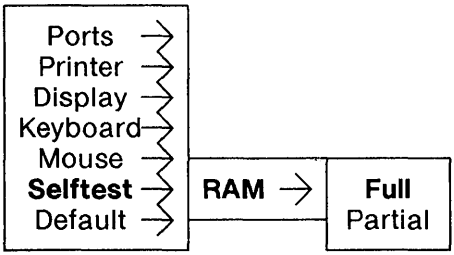

Figure 4–9 Selftest Submenu

This submenu allows you to select how RAM is tested during selftest. With RAM = **full**, all of RAM is tested and the duration of selftest is longer. With RAM = **partial**, only the first word of every data block is tested, and the duration of selftest is shortened. The default setting for this option is **full**.

Default

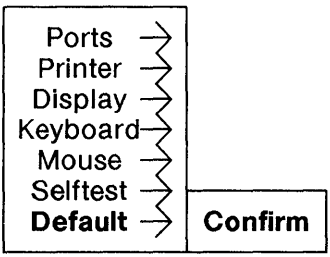

Figure 4–10 Default Submenu

allows you to reset terminal options to their factory default values (see table below).

Caution: Choosing this option causes a re-initialization of the terminal. Re-initialization of the terminal causes any current host sessions to be terminated and the screen to appear as it does after the terminal is powered on. Before choosing this option, make sure you are logged off from all host connections.

Table of Terminal Option Defaults

Submenu	Option	Default Value
Host Ports	Speed	9600
	Send Parity	Space
	Bits/Char	7
	Receive Flow	None
	Generate Flow	Xon/Xoff
	Local Echo	Off
	Encoding	Off
	Return	CR
	Received Newline	LF
	Power-on Position	--
	Presence	Power-on/Menu (Main)
	Presence	Menu (Main2)
	Default Emulator	Wproc+
	Default Font	Large
	Layers Columns	80
	Layers Rows	24
	Non-layers Columns	80
	Non-layers Rows	60
	Fixed Non-layers	Yes
Printer Ports	Speed	9600
	Send Parity	Space
	Bits/Char	7
	Presence	Menu
	Expand Tabs	Yes
	Filter Escapes	Yes
Ports-SSI	Power-on Position	--
	Presence	Menu
	Default Font	large
	Layers Columns	80
	Layers Rows	24
	Non-layers Columns	80
	Non-layers Rows	24

Table of Terminal Option Defaults, continued

Submenu	Option	Default Value
Printer	---	Aux
Display	Background	Dark
	Cursor Blink	Off
	Screen Saver	15 min
	Power-On Labels	No
Keyboard	Key Click	Off
	Volume	Level 4
	Language	U.S.
	Repeat Rate	15 cps
	Swap Delete/Del	Yes
	PFkey Programming	730 MTG
Mouse	Hand	Right
	Acceleration	Off
Selftest	RAM	Full
Default	Confirm	--

Exiting Setup

To exit the Setup menu without deleting the Setup window, click button 1 with the mouse cursor positioned outside the Setup window. To delete the Setup window, use the Delete command on the Main Terminal Menu.

Exercise

In this exercise, you will configure your terminal so that one host is connected to the Main EIA port, a second host is connected to the Main2 EIA port, and a printer is connected to the Aux EIA port.

The requirements for Host 1 are: 9600 bps, even parity, and seven bit characters. The requirements for Host 2 are: 1200 bps, full screen *layers* windows, and encoding. The requirements for the printer are: 1200 bps.

To setup the terminal:

1. Use mouse button 3 to choose Setup under the Main Terminal Menu and display the Setup window.
2. Click mouse button 1 on the Setup icon to display the Setup menu.
3. Position the mouse cursor to highlight the Ports submenu. Slide the mouse to the right to display the submenu. Slide the mouse to the right to highlight the Main submenu. Continue sliding the mouse to the right until the Main submenu is displayed.
4. Position the mouse cursor over the option Send Parity, and slide the mouse to the right to display the Send Parity selections. Click mouse button 1 after highlighting **even**. Note that the check mark changes to reflect the new setting.
5. Position the mouse cursor over the option Bits/Char, and slide the mouse to the right to display the Bits/Char selections. Click mouse button 1 after highlighting **7**.
6. Slide the mouse back to the Ports submenu. Position the mouse cursor to highlight the Main2 submenu. Slide the mouse to the right to display the Main2 submenu.
7. Position the mouse cursor over the option Speed, and slide the mouse to the right to display the Speed selections. Click mouse button 1 after highlighting **1200**.

8 Position the mouse cursor over the Encoding option, and slide the mouse to the right to display the Encoding selections. Click mouse button 1 after highlighting **on**.

9 Position the mouse cursor over the option Layers Columns, and slide the mouse to the right to display the Layers Columns selections. Click mouse button 1 after highlighting **140**. **Note:** Default font must be **small**.

10 Position the mouse cursor over the option Layers Rows, and slide the mouse to the right to display the Layers Rows selections. Click mouse button 1 after highlighting **60**.

11 Slide the mouse back to the Setup Main Menu, and then onto the Ports submenu. Slide the mouse to the right, positioning the mouse cursor over the Aux submenu, highlighting it. Slide the mouse to the right to display the Aux submenu.

12 Position the mouse cursor over the Speed option, and slide the mouse to the right to display the Speed selections. Click mouse button 1 after highlighting **1200**.

13 To exit Setup, click mouse button 1 with the mouse cursor positioned outside the Setup window. Use the Delete command on the Main Terminal Menu to remove the Setup window. New Setup options go into effect immediately.

Setup Quick Reference

If you are familiar with setting up your terminal options, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Display Main Setup Menu	Display Main Terminal Menu. Display More submenu. Highlight Setup and release mouse button 3. Click button 1 over SETUP box icon.
View Submenus or Options	Highlight a submenu or option selection using the mouse cursor. Slide mouse cursor in direction of arrow. Submenu or option selections should appear.
Change Option setting	Position mouse cursor over desired setting. Click mouse button 1. A check will appear next to this setting.
Set up communication Ports	Choose Ports submenu on Main Setup Menu. Select Main, Main2, Aux, or SSI. Set options.
Connect a Printer	Choose Printer submenu on Main Setup Menu to assign a port for the printer. Then set that port's options.
Change screen appearance	Choose Display submenu on Main Setup Menu. Set options.

To	Procedure
Tailor Keyboard operation	Choose Keyboard submenu from Main Setup Menu. Set options.
Change Mouse handedness or speed	Choose Mouse submenu from Main Setup Menu. Set options.
Check RAM setting	Display Setup box.
Reset options to factory values	Choose Default submenu from Main Setup Menu. Position mouse cursor on **confirm**. Click button 1.

Chapter 5: Windows

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In This Chapter

All work done on the 730, whether keyboard input, screen output, or host communications, is done within a *window*. A window is an independently behaved rectangular area of the screen in which a separate, unique application is running. possibly overlapping each other. Windows therefore allow you to have several applications running at the same time.

For a New User

If you are unfamiliar with the concept of windows and how to manipulate them, this chapter will introduce you to windows: how to create them, reshape and move them, work in them, and delete them. You will learn about the layers window manager and how to create multiple sessions connected to the same host. An exercise at the end of the chapter allows you to practice window skills.

For an Experienced User

If you are an experienced windows user, you may wish to refresh window skills using the exercise at the end of this chapter. You may also wish to learn about *Automatic Windows Screen Configuration*, where you can create a program (a "configuration file") to automatically define several windows and execute programs in them. If these topics are not new to you, go on to Chapter 6.

Windows

Layers versus Non-Layers

Layers refers to the application that allows you to have multiple windows on your terminal from the same physical connection. When you power on, and after Selftest, you will begin a non-layers session unless your terminal has been otherwise programmed.

When you initially begin a terminal session, a window appears as illustrated in Figure 5-1. This is called the *utemp*, or user temporary window. This window always receives host status messages. Try not to hide this window so that host messages are viewable at all times.

Each window consists of label, text, and scroll areas. The *label area* gives you important information on the status of the window and its host connection. The *text area* is the interactive area of your screen where text is displayed and applications performed. The *scroll area* enables you to view text that is not currently on the screen.

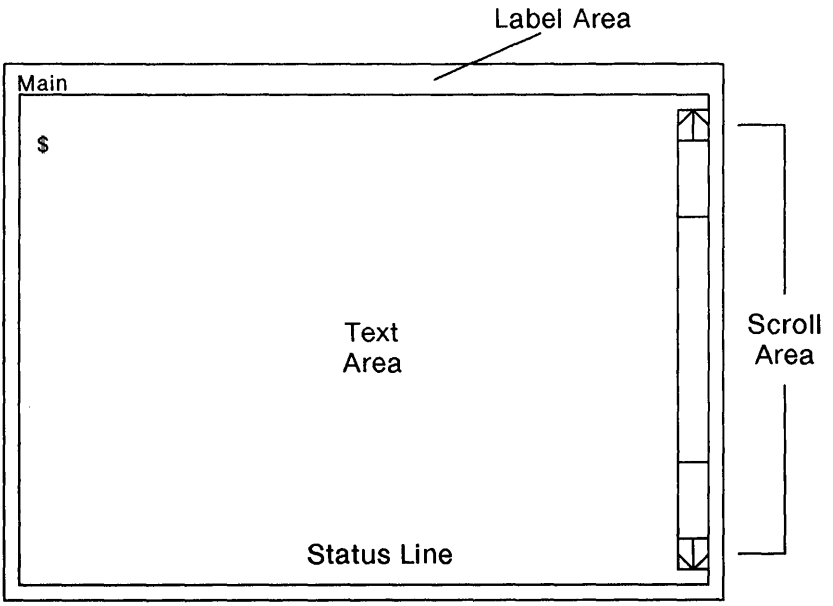

Figure 5–1 The Window

Multiple Windows

Multiple windows all connected to the same host are possible through *layers*. The terminal supports up to seven windows per layers host session. Each window can be created with a different size, can be reshaped, and can display a different font. All hosts may simultaneously run a *layers* session.

Run layers on your host with the **AT&T Windowing Utilities** software package. It may already be installed on your computer. To enter layers, type

layers

in a non-layers Wproc+ window. (Wproc+ is the program automatically running on your 730 after power up; it enables communication between you and the host computer and defines the terminal's response to certain character sequences. The first window you see is a non-layers window.)

If you receive an error message after typing this command, the Windowing Utilities package may not be installed on your host computer. Contact your System Administrator and see the Appendix, "Software Support".

After entering layers, the *layers icon* will appear in the window's label area (see Figure 5-2).

To create each window of a multi-window session, use the New command on the Main Terminal menu. (See a description of New later in this chapter.) In *layers*, the maximum number of windows per host connection is 7. In non-layers, the maximum number of windows per host connection is 1.

Note: Entering *layers* over a network may require additional host software. See your 730 Network Access Unit user's guide for more information.

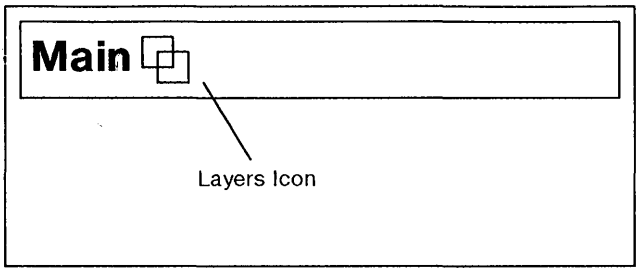

Figure 5–2 The Layers Icon

Current Window

You may have more than one window on the screen at a time. The *current window*, the only one which can receive input from the keyboard or mouse, is indicated by a highlighted (thicker and brighter) border. Other windows are *non-current* and are indicated by a thin border. Both current and non-current windows can receive and display data from the hosts they are connected to.

You can make a window current by using the mouse, the Jump key (on the 122-key keyboard), or the Current command. For more details, see the section on the Current command later in this chapter.

Mouse Cursors in Windows

The mouse cursor may change from the usual arrow to one of the other symbols below, depending on the windowing operation in effect.

Symbol	Name	Meaning
	Arrow	Usual pointer mouse cursor.
	Dead Mouse	Dead screen.
	Coffee Cup	Please wait.
	Sweep Cursor	Used for New and Reshape.
	Target Cursor	Used for selecting a window.
	Skull	Used for Exit. Process is killed.
	Garbage Can	**Window will be deleted.**

Figure 5–3 Mouse Cursors in Windows

Message boxes may also replace the mouse cursor. Messages usually refer to failed operations or operations that are not possible. To remove a message box and return the mouse to its normal state, click any mouse button. Refer to the table in Chapter 11 for message boxes and their explanation.

The Main Terminal Menu

Windowing operations are selected from the *Main Terminal Menu* (Figure 5-5). To display this menu, press **and hold** mouse Button 3. The menu "pops up" at the current mouse position.

To select an item from the menu, move the mouse cursor over it, highlighting the item, and release the mouse button. If the item selected is a submenu, slide the mouse in the direction of the arrow and another menu will appear.

If you do not wish to make a selection, slide the mouse (arrow) cursor off the Main Terminal Menu and release mouse button 3. The Main Terminal Menu disappears.

In any other case, when you release mouse Button 3, the Main Terminal Menu disappears.

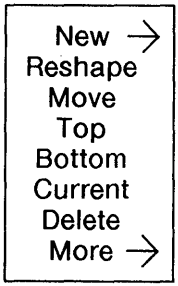

Figure 5–4 The Main Terminal Menu

Window Commands

New

allows you to create a new window for any host (Main, Main2, Aux, StarLAN, Telnet). Follow the steps below to create a new window (Figure 5-6).

Note: Click button 1 or 2 to cancel the New operation at any time.

1 Press mouse button 3 to display the Main Terminal Menu, positioning the mouse cursor over the New submenu. New will be highlighted.

2 Slide the mouse to the right to highlight any of the host specifications and release the mouse button. The arrow cursor changes to the sweep cursor. An outline of a new window, of a default size specified in Setup (see Chapter 4), appears. For a non-layers window, only an outline appears if the Fixed Non-layers window Setup option is **yes**.

Note: If a host name appears as dimmed text, it is not available for selection. This occurs when that host is not connected to the terminal, or when no more windows are available to that host.

3 Without pressing a mouse button, position the window by moving the mouse, placing the sweep cursor and outline at the desired place on your display.

To create a window of default size, click button 3.

To create a window of variable size, move the mouse **while pressing button 3** to "sweep out" a window of desired size. Releasing button 3 fixes the window and its location.

The window is created and the default emulator begins executing in the window.

If there is not enough memory to create a window, the message box, "No memory", appears and no window is created.

If the window swept out is smaller than the minimum size (32 by 32 pixels), the message box, "Swept window too small", appears and no window is created.

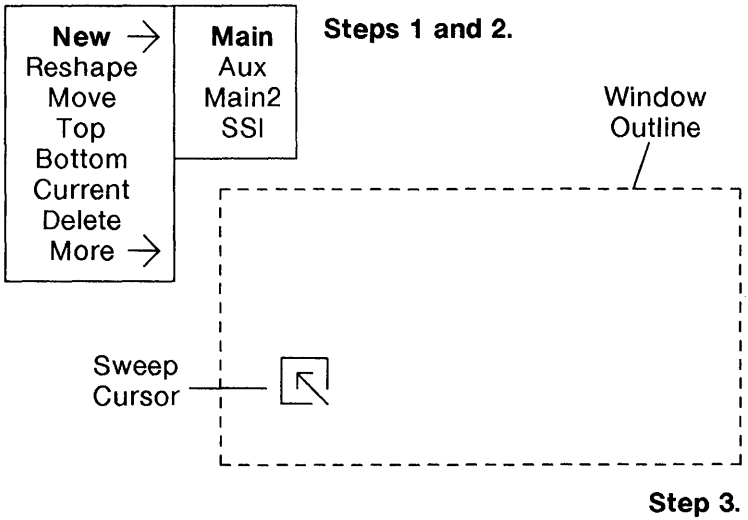

Figure 5–5 Creating a New Window

Reshape

allows you to change the shape and location of a window on your display (Figure 5-7). If a window cannot be reshaped, the message box, "Fixed size window: cannot be reshaped", appears.

Note: Click button 1 or 2 to cancel Reshape at any time.

To reshape a window,

1 Press mouse button 3 to display the Main Terminal Menu. Position the cursor over Reshape and release button 3. The arrow cursor changes to the target cursor. Place the target over the desired window and click mouse button 3. The sweep cursor appears and an outline of a window of default window size appears.

   Note: If the window is local or no default size was specified, only the sweep cursor will appear.

2 Move the mouse to place the outline and sweep cursor at the desired place on your display.

   To reshape the window to default size, click button 3.

   To reshape the window to a variable size, move the mouse while pressing button 3 to "sweep out" a window of desired size. Release button 3 when the desired size is achieved. The window is now reshaped.

Local or *layers* windows can be reshaped. If you wish to reshape a non-layers window, set the Fixed Non-layers Window Setup option to **no** (see Chapter 7).

Caution: Some programs, like *vi*, will not operate properly if the window is reshaped while they are running.

Reshaping a window to a very narrow size can take several seconds because of the time necessary to reformat the buffer lines.

If there is not enough memory to reshape a window, the message box, "No Memory", will appear and the window will be reshaped to its original size and position. In rare cases, there may not be enough memory to restore the window to its original size. A 32 by 32 pixel window will be created instead. If the window swept out is smaller than 32 by 32 pixels, the message box, "Swept window too small", appears and the window will not be reshaped.

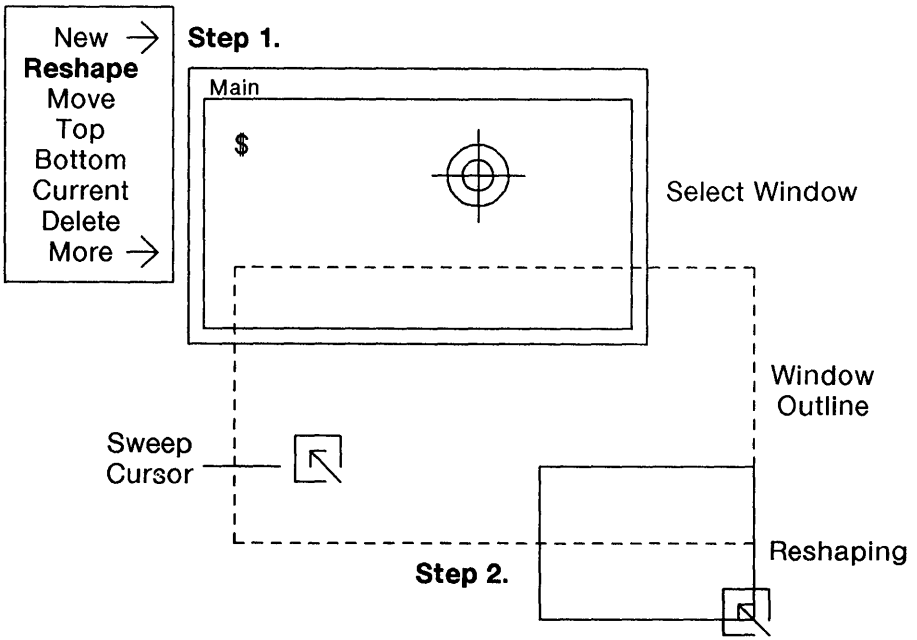

Figure 5–6 Reshaping a Window

Move

allows you to move a window to a different place on the screen (Figure 5-9). The window's size and shape remains the same. Follow the steps below to move a window.

Note: Click mouse button 1 or 2 to cancel the Move operation at any time.

1. Press button 3 to display the Main Terminal Menu. Position the cursor over the selection Move, which becomes highlighted. The arrow cursor changes to the target cursor.
2. By moving the mouse, place the target cursor over the window you want to move.
3. Press **and hold** mouse button 3. The target cursor changes to the 4-directional arrow cursor.
4. To move the window, move the mouse. An outline of the selected window moves with the cursor. Release mouse button 3 when you reach the desired window position.

If there is not enough memory to move a window, the message box, "No Memory", appears and the selected window stays in its original position.

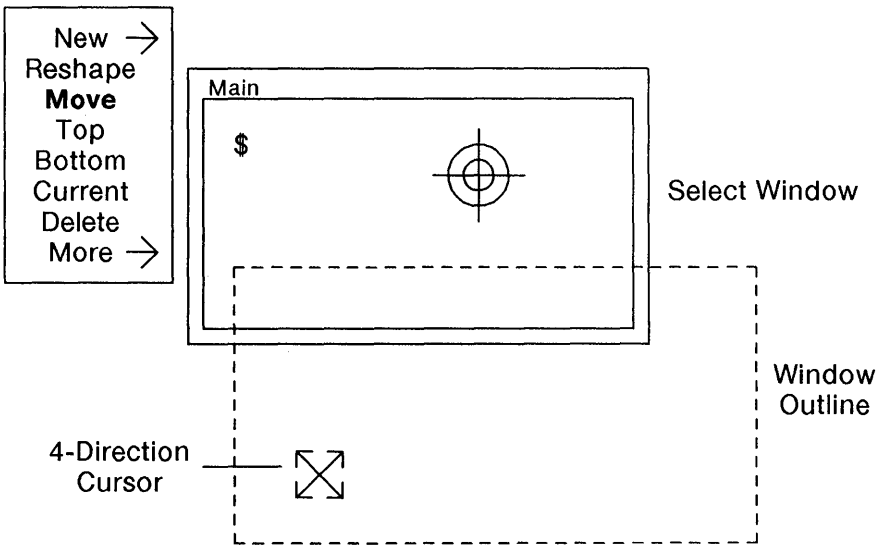

Figure 5–7 Moving a Window

Top

allows you to bring a selected window to the front of the screen. Other windows retain their relative positions.

To bring a window to the top:

1. Press mouse button 3 to display the Main Terminal Menu. Position the cursor over the selection Top, which becomes highlighted. The arrow cursor changes to the target cursor.
2. Choose the window to be placed on top. Place the target cursor over this window and click mouse button 3. The window is brought to the front of the screen.

   Note: The window is not current. Use the Current operation to make the window current, or click mouse button 1 while the arrow cursor lies on the window.

To cancel the Top operation at any time, click button 3 over the screen background or click buttons 1 or 2.

Bottom

allows you to move a selected window to the "back" of the screen (behind all other windows). Other windows retain their relative positions.

To move a window to the bottom:

1. Press mouse button 3 to display the Main Terminal Menu. Position the cursor over the selection Bottom, which becomes highlighted, and release mouse button 3. The arrow cursor changes to the target cursor.
2. Choose the window to be moved to the bottom. Place the target cursor over the window and click mouse button 3. The window is placed at the back of the screen, "behind" other windows.

To cancel the Bottom operation at any time, click button 3 over the screen background or click buttons 1 or 2.

Note: The window on the bottom may still be current. To make another window current, use the Current operation or click mouse button 1 after placing the arrow cursor on the window you want current.

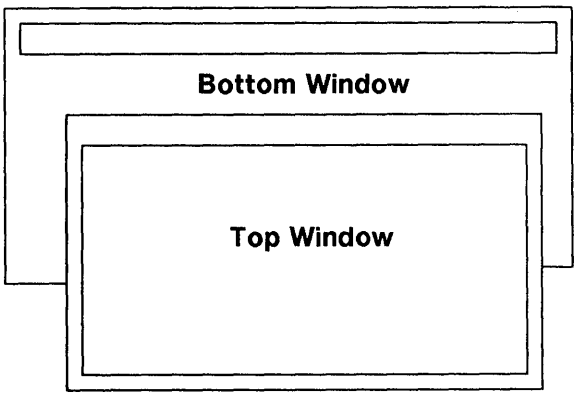

Figure 5–8 Top and Bottom Windows

Current

allows you to make a selected window active so that all keyboard and mouse input is directed to that window and its application. A current window has a highlighted (thicker, brighter) border.

To make a window current:

1. Press mouse button 3 to display the Main Terminal Menu. Position the cursor over the selection Current, which becomes highlighted, and release mouse button 3. The arrow cursor changes to the target cursor.
2. Choose the window to be made current. Place the target cursor over the window and click mouse button 3. The window's border becomes highlighted. The window is now current.

To cancel the Current operation at any time, click button 3 over the screen background or click buttons 1 or 2.

Top and Current

To make a non-current window Top and Current simultaneously, place the arrow cursor over a visible part of the desired window and click mouse button 1.

If you have a 122-key keyboard, you can make windows Top and Current using the Jump key. Each time you press the Jump key, the next window becomes top and current. Successively pressing the Jump key cycles through all available windows, making them top and current one at a time.

Delete

allows you to remove a local or *layers* window.

Caution: Deleting a window kills any process or application running in it. Be sure you have finished your application task or saved files before deleting that window.

To delete a window,

1. Press mouse button 3 to display the Main Terminal Menu. Position the cursor over the selection Delete, which becomes highlighted. The arrow cursor changes to the target cursor.
2. Choose the window to be deleted. Place the target cursor over the window and click mouse button 3. The window becomes shaded and the target cursor changes to a trash can cursor.
3. To confirm that you indeed want to delete this window, click mouse button 3 again. The window is deleted.

To cancel Delete at any time, click mouse buttons 1 or 2.

You cannot delete the last window of a host. If you try to delete this window, the message box, "Delete not allowed: Sole window of active host", is displayed. Use the Exit command to "delete" the last window (see Exit, below).

Exit

allows you to end an active layers session; or, in a non-layers session, to end the host connection itself ("logging off"). The Exit submenu is found under the More Submenu on the Main Terminal Menu. If layers is active, the layers icon appears beside the logical host name in the Exit Submenu.

When you exit a layers session, you enter a non-layers session. All windows associated with the layers session are deleted and you are left with a non-layers window on the screen which has attributes selected in Setup.

When you exit a non-layers session, your host session is terminated. The non-layers window disappears and you are "logged off" the host (the Data Terminal Ready signal on the physical connection is dropped).

To cancel the Exit operation at any time, click mouse buttons 1 or 2.

To Exit,

1. Press mouse button 3 to display the Main Terminal Menu. Slide the arrow cursor over the More submenu, highlighting it.
2. Slide the mouse to the right until the More submenu appears, and move the cursor until the Exit submenu is highlighted.
3. Slide the mouse further to the right until the Exit submenu appears. Position the arrow cursor over the host designation you wish to exit. Release mouse button 3.

   The window or windows associated with that host become shaded. The arrow cursor will change to the skull-and-crossbones cursor.
4. Click mouse button 3 to continue the Exit operation. All windows (if a layers session) are deleted. If a non-layers session, the host connection is terminated.

Local Windows

Local windows are windows without a host connection. Local windows are used by programs that do not need a host communication. Setup and PFEdit, as well as Wproc's Peel operation, are examples of applications that use local windows. Local windows are surrounded by a textured border (Figure 5-10).

The maximum number of local windows you can create is limited only by the terminal's memory.

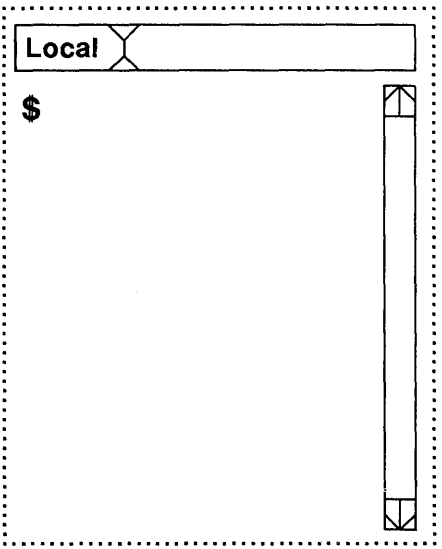

Figure 5–9 Local Windows

Automatic Windows Screen Configuration

The *-f* option of *layers* allows you to automatically define windows and automatically execute programs in those windows when you type the layers command. Before you do this, you must write a *config* program file which describes how the windows will look when layers is executed.

An example of a *config* program file may be:

```
917     6   1018   135   dmddemo clock
  6     6    915   512   exec sh
 58   325    967   825   exec sh
109   514   1018  1018   echo "This layer is current!";exec sh
```

Note: To execute the *dmddemo clock* program line, you must have the 630 MTG Software Development Package running on your host processor. If you do not have this package, delete the first line containing *dmddemo clock*.

When you type

layers -f config

using the *config* file above, the windows shown in Figure 5-11 will be displayed on the screen.

Caution: If you have an early version of layers host software, do not press any mouse buttons while windows from a config file are created. Pressing mouse buttons may interfere with the terminal's operation.

Note: The coordinates for a window must include the status line. For example, to create a 24 by 80 pixel window at origin (6,6) with large font, the coordinates would be (6,6,915,440).

The original non-layers window remains, becoming a window in the layers session. Any windows from another host are not affected, although they may be hidden by newly created windows. The last window created becomes current.

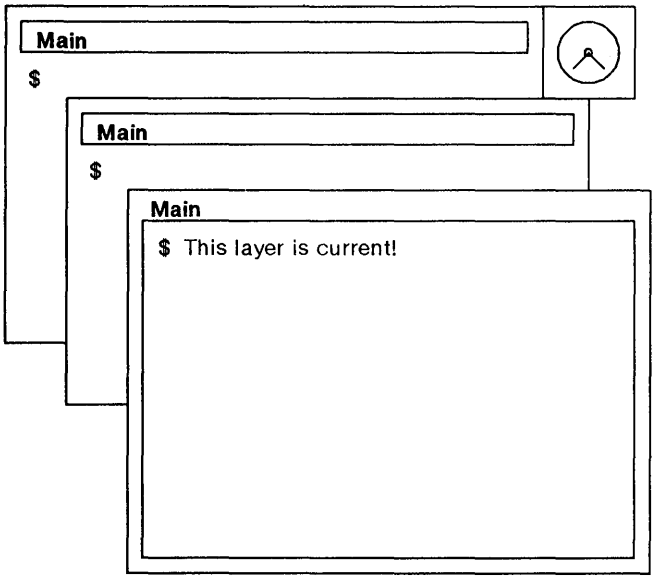

Figure 5–10 Windows generated by example *config* file

The Config File

Note: An error in a line of a config file will cause that line and all remaining lines to be ignored and not executed.

Coordinates define the borders of each window. The four numbers on each line of a configuration ("config") file are two x,y coordinate pairs. The first pair represents the pixel coordinates of the upper left hand window corner. The second pair represents the pixel coordinates of the lower right hand corner of the window. The remainder of each line contains commands to be executed once the window is created. Use spaces or tabs as separators within lines of a config file.

The valid coordinate range is (6,6) for the upper left screen corner through (1018,1018), the lower right screen corner. If you specify coordinates outside this range, the coordinates will be "clipped", or brought within screen range. If all four coordinates are 0, the sweep cursor will appear, prompting you to define the size and position of the window as in the New operation.

The windows defined in the config file must be at least as large as the minimum window size (32 by 32 pixels). To determine the pixel size of a window *m* lines by *n* columns in size, use the following formula:

(*n**font width) + 29
(*m**font height) + 34

where the font height and font width is determined by the font size option for the host (see Chapter 6, *Wproc+*, for more information on fonts). The available font sizes are:

- Small; 7 pixels wide by 14 pixels high
- Medium; 9 pixels wide by 14 pixels high
- Large; 11 pixels wide by 16 pixels high.
- Larger; 12 pixels wide by 20 pixels high.

Windows Quick Reference

If you are familiar with windows and 730 mouse operation, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Enter *layers*	Type "layers" and press RETURN.
Display Main Terminal Menu	Press and hold mouse button 3.
Scroll	Place mouse cursor on scroll bar. Press mouse button 1. Move mouse (and hence, cursor) up and down to scroll.
Create a NEW Window	Select NEW on the Main Terminal Menu. Display submenu and select host. Release, then click button 3 to create window of default size.
RESHAPE a Window	Select RESHAPE on the Main Terminal Menu. Place target cursor on window. Click button 3. Press and hold mouse button 3 to reshape. Release button to fix size.
MOVE a Window	Select MOVE on the Main Terminal Menu. Place target cursor on window. Press and hold mouse button 3. Move mouse to move window. Release button 3 to fix location.

To	Procedure
Make a window TOP	Select TOP on the Main Terminal Menu. Place target cursor on window. Click button 3.
Make a window BOTTOM	Select BOTTOM on the Main Terminal Menu. Place target cursor on window. Click button 3.
Make a window CURRENT	Select CURRENT on the Main Terminal Menu. Place target cursor on window. Click button 3.
Make a window TOP AND CURRENT	Place arrow cursor over window. Click button 1. **or** On 122-key keyboard, use JUMP key to cycle through windows.
DELETE a window	Select DELETE on the Main Terminal Menu. Place target cursor on window. Click button 3. To confirm delete, click button 3 again.
EXIT from *layers*	Select MORE on the Main Terminal Menu. Select EXIT from the MORE submenu. Place arrow cursor over selected HOST to exit. Release button 3 to select. Click button 3 to confirm EXIT.

Chapter 6: The Wproc+ Emulator

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In This Chapter

Wproc+ is one of the emulators available on your terminal. A *terminal emulator* is a program which provides basic communication facilities between your terminal and the host computer. An emulator also defines the way your terminal responds to character ("escape") sequences. An emulator runs in every window created by New.

For a New User

This chapter introduces you to the anatomy of a Wproc+ window and how its screen areas (label, status line, scroll) help you use your applications better. Screen text can be manipulated in Edit mode using Wproc+'s operations. Read this chapter in the order written to learn about all Wproc+ features.

For an Experienced User

If you are familiar with the 630 MTG's Wproc emulator, the original Wproc emulator, use this chapter to learn about new features and upgrades incorporated in Wproc+ including

- a new Wproc+ Menu arrangement
- an In-window Status Line
- Keyboard Language, character attributes, and other options
- additional escape sequence compatibility (see Appendix B)
- Compose Modes (see Appendices F, and G).

A quick reference is provided at the end of this chapter for your convenience in remembering Wproc+ functions.

What is Wproc+?

Wproc+ is the *default emulator* on your terminal. When you received your terminal from the factory, set it up, and powered on, the window you first saw was a Wproc+ window.

Wproc+ provides

- a Window Label
- Screen area for text
- Text printing
- Choice of fonts
- Local editing
- Off-screen text buffering and scrolling
- Ability to resend text to the host or another window
- Ability to create a "Local" copy of the window.

The character ("escape") sequences recognized by Wproc+ are a subset of the ANSI 3.64 ASCII sequences listed in Appendix B. Each Wproc+ window displays characters received from the host and saves the ASCII text in a character buffer. Only displayed characters, tabs, and newlines are saved in the buffer. Monitor Mode affects what characters are displayed. When the buffer is full, a new line added at the bottom of the buffer causes the top line to be discarded.

Entering Wproc+

From Power On

If, for the port you choose, you select Wproc+ in Setup under the Default Emulator option, and Power-on/Menu is selected under the Presence option, the window that appears for that port is running the Wproc+ emulator.

From New on the Main Terminal Menu
With Wproc+ selected in Setup under the Default Emulator option, each time you create a window using the New command on the Main Terminal Menu, a window appears running the Wproc+ emulator.

From More on the Main Terminal Menu
If you are in a 4014 GS or Wproc+ window running *layers*, you can generate another Wproc+ window by selecting Wproc+ from the More submenu under the Main Terminal Menu. To see the More submenu, press and hold mouse button 3 to display the Main Terminal Menu. Move the mouse cursor over the selection More, and then slide the cursor to the right to display the submenu (see Figure 6-1). Again, move the mouse cursor over the selection Wproc+. Release mouse button 3. A new window is created running the Wproc+ emulator.

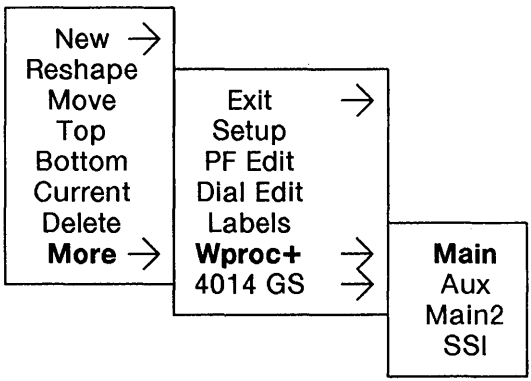

Figure 6–1 More Submenu

From the 4014 GS Emulator
If you are in a 4014 GS window, you can change the emulator within that window to Wproc+. To do so, use the escape sequence

ESC [? 1 f

The Enter Wproc+ escape sequence will cause the 4014 GS window to become a Wproc+ window. If the 4014 GS window was previously emulation switched from Wproc+, the window reshapes to the size of the previous Wproc+ window.

If you are switching from a newly created 4014 GS window (not emulation switched) to Wproc+, the 4014 GS window becomes a Wproc+ window with a shape as specified in the Setup options.

Setup Options

Various Setup options directly affect Wproc+ windows. These are listed below. For more information on Setup, see Chapter 4.

Layers Cols

The Layers Columns option under the Ports submenus defines the number of columns of text displayed in new *layers* windows. The default setting for this option is **80**.

Layers Rows

The Layers Rows option under the Ports submenus defines the number of rows of text displayed in new *layers* windows. The default setting for this option is **24**.

Non-layers Cols

The Non-layers Columns option under the Ports submenus defines the number of columns of text displayed in a new non-*layers* window. The default setting for this option is **80**.

Non-layers Rows

The Non-layers Rows option under the Ports submenus defines the number of rows of text displayed in a new non-*layers* window. The default setting for this option is **60**.

Fixed Non-layers

The Fixed Non-layers option under the Ports submenus determines whether a non-*layers* window can be reshaped. With this option set to *yes* (the default), the non-layers window cannot be reshaped.

Caution: Reshaping may cause some applications (for instance, *vi* or programs which rely on *terminfo*) to work incorrectly.

Escape Sequences

Escape sequences allow you to define Wproc+ characteristics from the keyboard or within a program. The character (ESC, or escape) sequences recognized by Wproc+ are a subset of the ANSI 3.64 ASCII sequences listed in Appendix B.

To use an escape sequence, press the keyboard keys that represent the sequence in order. This sends the command represented by the sequence to your terminal.

For example, to execute the escape sequence

ESC [? 1 f

press the keyboard keys ESC, [, ?, 1, f in sequence. This sends the command, "Enter Wproc+" to your terminal.

Note: If you execute the Monitor Mode On escape sequence

ESC [13 h

all escape sequences are displayed in the Wproc+ window, but are not acted on. With Monitor Mode off, escape sequences are acted on but not displayed.

Window Appearance

All Wproc+ windows are divided into four distinct areas: the text area, the label area, the in-window status line, and the scroll area (see Figure 6-2). Wproc+ also gives you the option of defining your own scrolling region with the Split Screen feature.

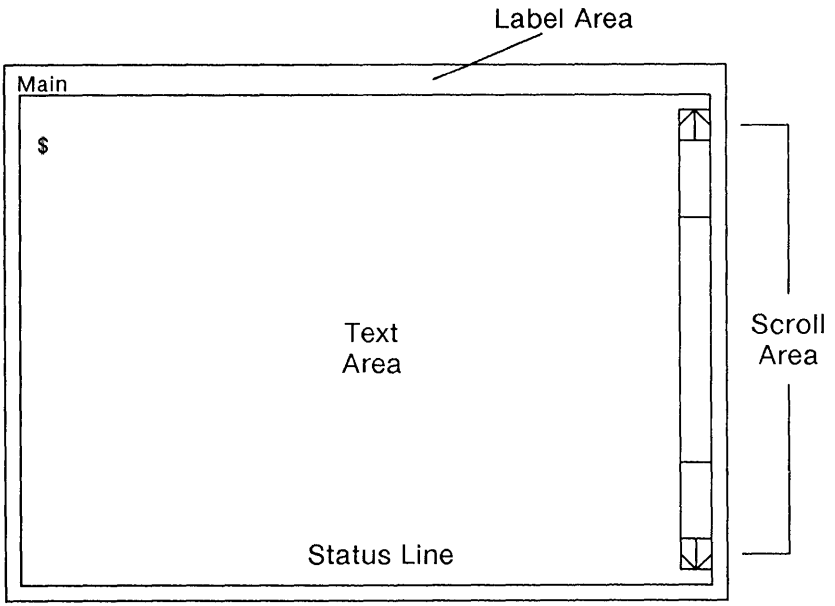

Figure 6–2 A Wproc+ Window

Text Area

The text area extends from the upper left corner of the window (below the label area) to the second-to-last line (as defined by the font and window size) of the window. The number of characters displayed in the text area depends on the window size and the font in use.

Label Area

The label area (see Figure 6-3) is divided into two regions. The first region, on the left, uses icons to indicate the current status of the window. The second region, on the right, can contain text which you programmed using a special escape sequence. If the window is too small, the whole label area might not be displayed (see Figure 6-3).

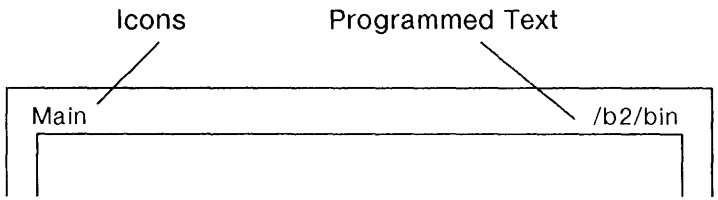

Figure 6–3 The Label Area

Icons

in the left label area are used to indicate the current status of the window. The first two icons (or symbols) in this area describe the host connection. Depending on the host connection, these icons may indicate Main, Main2, SSI, or any other connection available in the Setup Ports submenu. A second icon appears if the window is part of a *layers* session.

Other icons may appear (see Figure 6-4). The printer icon appears if the window has requested and has access to a printer. The scroll lock icon appears if that feature is active for that window. The caps lock icon appears if that feature is active for that window. The edit icon appears if the window is in local edit mode.

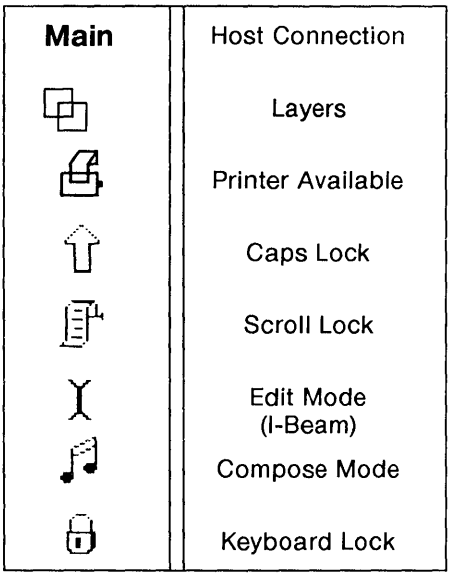

Figure 6–4 Icons used in the Label Area

User Programmable Text
appears in the right label area if you wrote a program using the escape sequence **ESC [? v** to display text in that area. For an example of programming the label area, see the end of this chapter.

In-Window Status Line

In a Wproc+ window, the bottom line is reserved for status messages. The status line is not considered part of the text area. For example, a window defined in Setup with 24 lines actually has 25 lines, where the 25th line is the status line. The host or application can send a message to this line using the escape sequence, **ESC [rows; columns x** (see Appendix B).

The Scroll Area and Scrolling

The scroll area appears along the right edge of Wproc+ windows (see Figure 6-5). The scroll area indicates that off-screen memory buffer space in your terminal is available. The scroll area contains the scroll bar and arrow icons. The bar and icons are used to select which part of the text buffer is displayed in the window. The mouse cursor is placed over the bar or arrows and mouse button 1 is used to activate scrolling.

In the scroll bar, the current position rectangle shows which part of the text buffer is displayed in the window. The textured region above and within the current position rectangle shows how much of the buffer can store text. When the textured region reaches the bottom of the scroll bar, the buffer is full. Text is discarded from the top of the buffer as needed to make room for new lines.

For basic Wproc+ windows and enhanced Wproc+ windows with buffering disabled, the scroll area is grayed.

Scrolling places a window in Edit mode. The mouse cursor changes to an "I-beam" cursor and the text cursor changes to an "insert" cursor. The Edit icon appears in the window label area. To exit edit mode, press the escape (ESC) key or click mouse button 1 twice with the mouse cursor in the same position in the text area. Selecting Mode on the button 2 Edit menu will also allow you to exit Edit Mode.

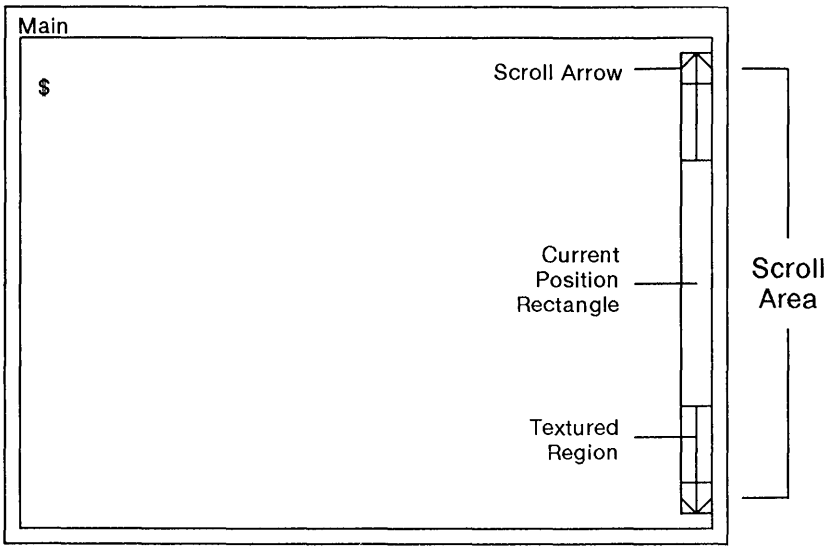

Figure 6–5 The Scroll Area

Line Scrolling

To scroll by lines, use the arrows in the scroll area. If the mouse cursor is over the up arrow, pressing mouse button 1 will cause a line of text from the buffer to be added to the top of the text area. All the lines in the text area move down. If the mouse cursor is over the down arrow, pressing mouse button 1 will cause a line of text from the buffer to be added to the bottom of the text area. All the lines in the text area move up.

Page (Screen) Scrolling

To scroll by pages (screens), place the mouse cursor within the textured area above the current position rectangle. Press **and hold** mouse button 1. The window will scroll upward by pages until the top of the buffer is reached. To stop scrolling, release mouse button 1. If the mouse cursor is within the textured area below the current position rectangle, the window will scroll downward until the end of the buffer is reached.

If the mouse cursor is within the current position rectangle itself when button 1 is pressed, the rectangle will assume the same position as the mouse cursor on the scroll bar. When you release mouse button 1, the window will display that area of the buffer contained in the current position rectangle.

Split Screen Feature

This feature allows you to split your screen into scrolling and static regions. A split screen is desirable when you need to see different parts of a file at the same time, or when an application, such as a spreadsheet, calls for the ability to see different parts of the screen at one time.

To split the screen, use the escape sequence

ESC [top line; bottom line r

where *top line* and *bottom line* are line numbers. These variables define the top line and the bottom line of the scrolling region. The scrolling region must contain at least 2 lines. If the top line and bottom line values are missing, the values default to top line equal to one, and bottom line equal to the bottom of the window text region. If you reshape the window so that a coordinate does not exist, the scrolling region becomes as big as the full Wproc+ window.

With Origin Mode set to **off**, the cursor moves to the top left corner of the window when this escape sequence is used. The cursor can move anywhere within the scrolling and non-scrolling regions using cursor addressing escape sequences (see Appendix B). The top left corner of the Wproc+ window is considered line 1,column 1.

With Origin Mode set to **on**, the cursor moves to the top left corner of the scrolling region when this escape sequence is used. The cursor cannot leave the scrolling region. The top left corner of the scrolling region is considered line 1, column 1.

Use of the scroll bar in a split screen causes the whole screen (scrolling and non-scrolling regions) to scroll as described earlier in this chapter. Line insert and line delete escape sequences only work in the scrolling region. With Autowrap **on** and the cursor on the last line of the screen in a non-scrolling region, newline-generating operations cause the cursor to move to the beginning of that line.

To exit the split screen mode, use the escape sequence

ESC [r

which sets the scrolling region to the full size of the Wproc+ window. The cursor moves to the top left corner of the window.

Using the Mouse in Wproc+

The mouse and mouse buttons are used to select and activate Wproc+ functions. Button 1 is used primarily for scrolling and edit mode functions. Button 2 displays the Wproc+ menu. Button 3 displays the Main Terminal Menu as described in Chapter 5.

Button 1

Scrolling

Mouse button 1 is used to activate scrolling, and the mouse cursor is used to select scrolling functions as described in the previous section.

Making a Window Top and Current

Position the cursor over the window you wish to make top and current. Click mouse button 1. The selected window becomes top and current and is surrounded by a highlighted border.

Note: If text is highlighted in another window when mouse button 1 is clicked, it is saved in a global text buffer.

Edit Mode

You can activate and use Edit mode using mouse button 1. In Edit mode, you can "locally" edit the window's text buffer. To use edit, the Window option on the Options submenu of the mouse button 2 Wproc+ menu should be set to **enhanced**. For instructions on using Edit mode, see "Wproc+ Operations", below.

Button 2

When you press mouse button 2, the Wproc+ menu is displayed (see Figure 6-6). Select functions and display menus as explained in Chapter 5. Specific Wproc+ operations are explained later in this chapter.

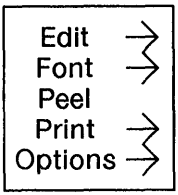

Figure 6–6 Wproc+ Menu

Button 3

When you press mouse button 3, the Main Terminal Menu is displayed (see Chapter 5).

Wproc+ Operations

Wproc+ operations are available from the Wproc+ menu (see Figure 6-6), with the exception of Edit mode. Most Wproc+ operations are editing functions that take place in Edit mode. To display the Wproc+ menu, press mouse button 2. Select functions and submenus as instructed in Chapter 5. Wproc+ features and functions are described below.

Edit

Edit mode allows you to do editing on a window's text buffer (window screen text). In this mode, Wproc+ is not communicating with the host. Local windows are always in Edit mode.

Entering Edit Mode

To enter Edit mode, position the mouse cursor in the text area of the window and click mouse button 1. The mouse cursor changes to the "I-beam" text cursor and the "insert" (caret) cursor replaces the line or block cursor. The "I-beam" icon appears in the window's label area. You can also enter Edit mode using the Mode operation (see description below) if you were in Edit mode previously.

Note: If you have blinking text in the window, it will stop blinking while you remain in Edit mode.

To return a window to the last editing mode it was in, select the Mode operation from the Edit submenu by pressing mouse button 2 (to display the Wproc+ menu).

Selecting and Typing Text

To select text, place the "I-beam" cursor at the beginning of the text (see Figure 6-7). Press and hold mouse button 1, at the same time moving the mouse to "drag" a highlight of reverse video text over the text you want to select. You can drag from right/left or up/down, depending on what you want to highlight. Highlight as much text as you want, releasing mouse button 1 when you are finished. The text you selected remains highlighted.

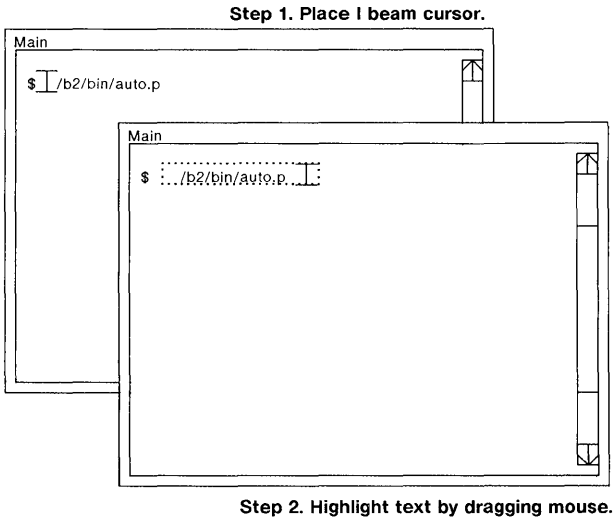

Figure 6–7 Selecting Text in Edit

Lines ending with a carriage return will show a more textured highlight at the end of the line. Lines which do not end in a carriage return will "wrap around" to the next line on the screen.

When you type characters in Edit mode, the characters are inserted at the insert cursor position and text lines are discarded from the top of an off-screen text buffer as needed. If text is highlighted in a window, typing characters causes the highlighted text to be saved in a "global save buffer" and deleted from the screen and text buffer before the typed characters are inserted.

Control characters typed in Edit mode are interpreted by the terminal as coming from a host. The only exceptions to this rule are ESC (escape; takes window out of edit mode), CR (carriage return; inserts a newline), and any character preceded by a backslash. Control characters not ordinarily interpreted by the terminal are displayed.

Edit Affects the Global Save Buffer

Most local edit operations affect the global save buffer. The global save buffer is an area of memory in the terminal which can be used by all Wproc+ windows and the PF Edit window. Text can be saved here for use in Paste or Send operations under the Edit submenu available by pressing mouse button 2 (see descriptions that follow).

Exiting Edit Mode

To exit Edit mode, position the mouse cursor (the "I-beam" cursor) and click mouse button 1 again. The mouse cursor changes back to an arrow cursor, and the line or block cursor returns. Unless it is a local window, a window in Edit mode is automatically taken out of this mode when the window is made current.

Edit mode can also be exited by selecting the Mode operation from the Edit submenu available by pressing mouse button 2 (which displays the Wproc+ menu). Edit mode can additionally be exited by pressing the ESC (escape) key.

Edit Operations

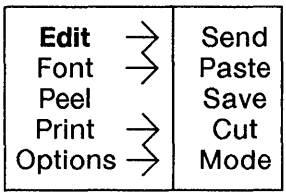

Figure 6–8 Edit Submenu

Edit functions are available from the Edit submenu on the mouse button 2 Wproc+ menu. See Figure 6-8.

Send

The Send operation (Figure 6-9) allows you to send selected text (highlighted in Edit mode) to the host. The text is placed at the position of the line or block cursor (the host "prompt"). To use Send, highlight text in Edit mode. Press and hold mouse button 2 to display the Wproc+ menu. Position the mouse cursor over the selection Send to highlight it and release mouse button 2. You will see the text previously highlighted in Edit placed at the current cursor position.

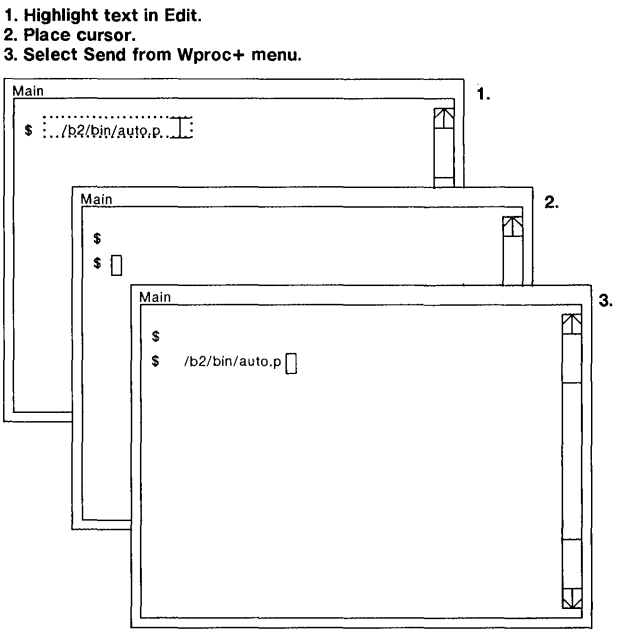

Figure 6–9 The Send Operation

In the Send operation, highlighted text is first copied to the global save buffer and then sent to the host. The text placed at the host cursor is actually echoed back from the host. The effect of a carriage return depends on the value of the Setup option, Return.

Note: Characters will be redrawn in the receiving window's character set.

Paste

The Paste operation inserts the contents of the global save buffer at the location of the edit (caret) or host (line or block) cursor, depending on whether the window is in Edit or non-Edit mode. To paste, first select the text you wish to paste in Edit mode. Use the Save operation (described below) to save highlighted text in the global save buffer. Then select Paste from the Wproc+ menu, displayed by pressing and holding mouse button 2. The contents of the buffer is inserted at the location of the cursor.

If you paste when there is highlighted text in the window, the contents of the global save buffer (if any) replaces the highlighted text. The pasted text appears highlighted.

Pasted text is not sent to the host. Escape sequences are displayed but not acted on. The message box, "No Memory", is displayed if a paste operation cannot be completed due to lack of memory.

Note: Characters will be redrawn in the receiving window's character set.

Save

The Save operation copies highlighted text to the global save buffer. The text is not changed, and after saving, the text becomes unhighlighted. To Save, select text in Edit mode by highlighting it. Then choose Save from the Wproc+ menu (displayed by pressing mouse button 2). When mouse button 2 is released, the text is saved.

Highlighted text in a current windows is automatically saved when another window is made current.

The message box, "No Memory", is displayed if there is insufficient memory for text to be saved. No message is displayed if an automatic Save fails because of insufficient memory.

Cut

The Cut operation copies highlighted text to the global save buffer and deletes the text from the screen. The text is not sent to the host. To Cut, select text in Edit mode by highlighting it. Then choose Cut from the Wproc+ menu (displayed by pressing mouse button 2). When mouse button 2 is released, the text is cut.

Mode

Mode allows you to enter or exit Edit mode. The Mode operation is not selectable if the window is a local window or if the window has not previously been in Edit mode.

To enter Edit mode, select Mode from the Wproc+ menu (displayed by pressing mouse button 2). The mouse cursor changes to an "I-beam" cursor and the host cursor changes to the insert (caret) cursor. The "I-beam" icon appears in the window's label area.

To exit Edit mode, select Mode from the Wproc+ menu. The "I-beam" cursor changes back to the arrow mouse cursor. The caret cursor changes back to the line or block cursor. The line or block cursor is placed at the buffer and screen position it was last in when the last edit operation was performed.

Font

The Font submenu determines what font is used in displaying text in a Wproc+ window (see Figure 6-10). The Font submenu lists a **small**, **medium**, **large**, and **larger** (with a 12 by 20 cell size) font as well as any downloaded fonts. When possible, the font names are listed in the exact size they represent. When a font is selected, the window is cleared and redrawn with that font. If a window is narrow, a font change may take several seconds to complete. Font changes are not allowed in windows that are not reshapable. The default setting for this option is **large**. This default can be changed via the Setup window.

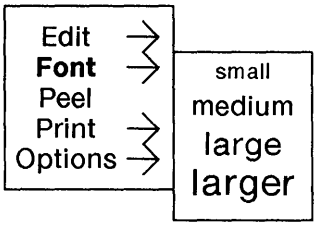

Figure 6–10 Font Submenu

Peel

Use the Peel operation to create a local Wproc+ window which is a copy of an existing window. A local Wproc+ window is always in Edit mode. There is no host connection. To Peel, select Peel from the Wproc+ menu (displayed by pressing mouse button 2). When Peel is selected, the mouse cursor will change to the sweep cursor and an outline of a window of default size appears. Click mouse button 2 or sweep out a new window while pressing and holding mouse button 2. A window is created that contains a copy of the current window's buffer. Move the peeled window to another screen area for convenient referencing.

Note: After a Peel, your original window is still current and will appear blank. However, your window's contents still exists in the peeled window. Use your application's screen redraw or refresh feature to bring back the window's contents. For example, if you are using the program *vi*, use **CTRL-L** (Control-L) to rewrite the screen.

Print

The Print Submenu allows you to print the contents of your Wproc+ window (see Figure 6-11). To display the Print submenu, press button 2 to display the Wproc+ menu. Position the mouse cursor so that Print is highlighted and slide the mouse to the right until the Print submenu is displayed. Make your menu selections as described in Chapter 3. Printing operations are described in detail in Chapter 8.

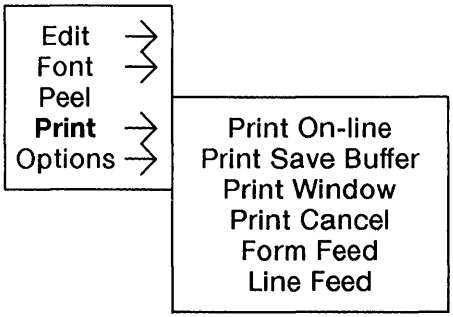

Figure 6–11 Print Submenu

Options

The Options submenu (Figure 6-12) allows you to specify miscellaneous Wproc+ options as described on the following pages. To display the Options submenu, press mouse button 2 to display the Wproc+ menu. Position the mouse cursor so that Options is highlighted, and slide the mouse to the right until the Options submenu is displayed. Specific option settings can be displayed by sliding the mouse even further to the right to display setting values. Make your menu selections as described in Chapter 3.

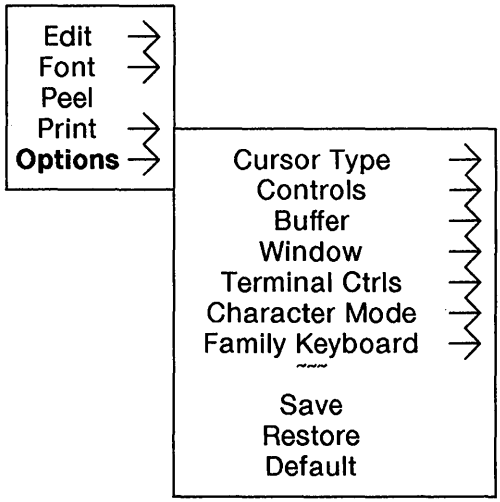

Figure 6–12 Options Submenu

Cursor Type determines what style of host cursor is displayed. The cursor can be either a **line** or a **block**. The default setting for this option is **block**.

Controls determines what happens to control characters when they are received by the terminal. The default setting for this option is **invisible**.

With this option set to **visible**, all control characters that do not produce an action are displayed (for example, ACK).

With this option set to **Monitor Mode**, all control characters are displayed except for NULL.

With this option set to **invisible**, no control characters are displayed. This is equivalent to turning Monitor Mode off.

With this option set to **space**, all control characters are translated to space characters and are displayed.

Buffer turns off-screen buffering for the window **on** or **off**. With Buffer set to **off**, any off-screen text is discarded and the scrolling area is grayed. When this option is set to **off**, a window also exits to local edit mode.

With this option set to **on**, data scrolled off the screen is saved, and the scroll area is again active. Up to 10,240 characters can be saved in the buffer. The default setting for this option is **on**.

Window determines edit capability. With window = **enhanced**, edit is possible. With window = **basic**, edit is not possible. The default setting for this option is **enhanced**.

Terminal Ctrls (along with the Setup option, Bits/Char) determines whether 7- or 8-bit controls are sent for keys such as ↑ , ↓ , ← , → , Clear, etc. This option also determines the responses to escape sequences that require responses, such as *ESC [C, Request Terminal Type*. Control characters and escape sequences are sent out either as 8-bit codes or 7-bit escape sequences. The default setting for this option is **7**.

Character Mode determines which characters can be composed and which character sets (depending on the Keyboard Language option) can be mapped to G0, G1, G2, or G3. If the keyboard language is U.S., then only the **multinational** character mode can be selected. For more information on character sets, see Appendix B. For information on compose mode, see Appendices E and F. For the keyboard language option, Canadian/French, both **multinational** and **national** settings are available. The default setting for this option is **multinational**.

Family Keyboard determines what keyboard will be simulated. When this option is set to **yes**, the keyboard will behave like a 600 family keyboard (for example, like a 615 MT keyboard). When this option is active, the system function keys operate like 600 family default system function keys, with the appropriate strings and labels. The default setting for this option is **yes**.

When this option is set to **no**, the keyboard behaves like a DEC keyboard. System function keys operate like default DEC function keys, with the appropriate strings and labels.

Save allows you to save all option values described above. Simply highlight this option and release mouse button 2 to save the current settings. These settings will be active in all new wproc+ windows even after the terminal is powered off.

Restore restores all the option values described above to the settings saved by the last Save operation.

Default restores all the option values described above to their default settings.

Examples of Programming in Wproc+

Note: Programming Wproc+ features assumes you are familiar with the *UNIX®* operating system and with shell programming.

Wproc+ allows you to customize various features including the Enter key, PF keys, Menus, and the Label Area. This is done by writing *UNIX®* operating system *shell programs* to execute special escape sequences in Wproc+. The escape sequences to customize these features are detailed in Appendix B.

Below are examples of how you can use the programmable features of Wproc+ to print text in the label area and to add custom commands to the Wproc+ menu (available by pressing mouse button 2).

Running programs in Wproc+ depends on having enough terminal memory to do so. When the terminal runs out of memory, the program will be ignored by Wproc+.

Programming the Label Area

The following program, when executed, displays the current directory in the label area. This program is based on the escape sequence **ESC [? ps1;ps2 v <text>** for programming the label area.

1 In your $HOME/bin directory, create and make executable the program called *setpd* listed below:

```
cd $1
dir=‘pwd‘
size=‘expr $dir  :  ’.*’‘
echo "\033[?$size;2v$dir\c"
```

2 In your *.profile*, insert or change the PATH line to read

PATH=$PATH;$HOME/bin

Also insert the line

export PATH

3 Finally, insert the line

. setpd

4 To run the program, at the host prompt type

setpd

after you open a new window. The current directory will be displayed in the right hand corner of the label area.

Use the new *setpd <directory name>* command to change directories to continue displaying the current directory in the label area.

Programming the Wproc+ Menu

The following program, when executed, adds custom commands to the Wproc+ menu. In this example, the Wproc+ menu is modified to include *vi* commands for moving the cursor. This program is based on the escape sequence **ESC [? ps1;ps2;ps3 x <item> <string>** for programming the menu.

1 In your $HOME/bin directory, create the program called *setmenu* listed below:

```
# Program Vi Commands for Cursor Movement
echo "\033[?0;0;0x\c"
echo "\033[?2;0;0xVi\c"
echo "\033[?2;1;1xUpk\c"
echo "\033[?4;1;1xDownj\c"
echo "\033[?4;1;1xLefth\c"
```

```
echo "\033[?5;1;1xRightl\c"
```

2 In your *.profile*, insert or change the PATH line to read

PATH=$PATH;$HOME/bin

Also insert the line

export PATH

3 Finally, insert the line

. setmenu

4 To run the program, at the host prompt type

setmenu

after you open a new window. The *vi* commands will appear in the Wproc+ menu (see Figure 6-13). To display the Wproc+ menu, press and hold mouse button 2.

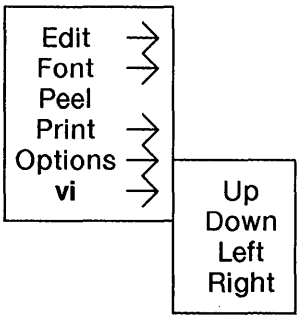

Figure 6–13 Vi Commands in the Wproc+ Menu

Wproc+ Quick Reference

If you are familiar with Wproc+ emulator features, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Display Wproc+ Menu	Press **and hold** mouse button 2.
Display the Main Terminal Menu	Press **and hold** mouse button 3.
Enter Wproc+ from 4014 GS	Use the escape sequence, **ESC [? 1 f.**
Split Screen	Use the escape sequence, **ESC [topline; bottomline r** where topline is the top line number of the scrolling region and bottomline is the bottom line number of the scrolling region.
Exit Split Screen	Use the escape sequence, **ESC [r.**
Make a window top and current	Place arrow cursor over window. Click mouse button 1.
Scroll by lines	Place the mouse cursor over the arrows in the scroll area. Press mouse button 1.

To	Procedure
Scroll by pages	Place the mouse cursor over the textured bar in th scroll area. Press mouse button 1.
Enter Edit Mode	Make desired window top and current. Place arrow cursor over current window and click mous button 1 **or** Use Mode on the Wproc+ menu.
Send selected text to host	Highlight text in Edit mode. Use Send on the Wproc+ menu.
Insert saved text at cursor location	Place cursor by entering Edit mode. Use Paste on the Wproc+ menu.
Copy text to the buffer	Highlight text in Edit mode. Use Save on the Wproc+ menu.
Delete selected text	Highlight text in Edit mode. Use Cut on the Wproc+ menu.
Create a local copy of a window	Make desired window top and current. Use Peel on the Wproc+ menu.
Set character and keyboard options	Use Options submenu on the Wproc+ menu.

Chapter 7: The 4014 GS Emulator

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In This Chapter

The 4014 GS is another emulator available on your terminal. It supports Tektronix 4010/4014-type commands for text or drawing. This emulation does not support all 4014 features in the same way they are supported on the Tektronix.

This chapter assumes that you are familiar with the Tektronix 4014 and its applications. It will familiarize you with 4014 features and functions as they are available on this terminal, the 730 MTG. Control codes and escape sequences are listed in Appendix B. A coordinate conversion chart is located at the end of this chapter.

For a New User

This chapter will acquaint you with features and functions of a 4014 terminal as emulated on the 730 MTG. Screen format and commands are explained. For more information on using these features for text and drawing, refer to the manual of your specific 4014 GS application.

For an Experienced User

If you are familiar with the Tektronix 4014 or the 4014 emulator on the 620 MTG, this chapter will show you how this emulation is implemented on the 730 MTG. Refer to your application's manual for actual use of these features. A quick reference is provided at the end of this chapter to remind you of 4014 commands.

Some differences exist between this emulation and the one on Tektronix terminals. On the 730 MTG,

- All points drawn in special point plot mode will have normal intensity, with a varying number of pixels turned on based on the desired intensity.
- No more than 1024x1024 pixels will appear on the screen.

- Not all character formats are supported in all window sizes.
- A plotter/printer interface is not available.

What is the 4014 GS Emulator?

The 4014 GS emulator supports Tektronix 4010/4014 commands for text or drawing. Select this emulator under New on the Main Terminal Menu if 4014 GS is selected as the default emulator in Setup. You can also select this emulator using an escape sequence, or select 4014 GS on the Main Terminal Menu under More.

Tektronix escape sequence commands are recognized by the 4014 GS. Some are explained in this chapter, and all are listed in Appendix B.

Entering the 4014 GS Emulator

From Power On

With 4014 GS selected in Setup under the Default Emulator option, each time you power on your terminal, all windows appearing after selecting New on the Main Terminal Menu are running the 4014 GS emulator. A *scaled* 4014 GS window in Alpha Mode will appear with window size as defined in the Window Size option on the mouse button two 4014 GS menu.

From New on the Main Terminal Menu

With 4014 GS selected in Setup under the Default Emulator option, each time you create a window using the New command on the Main Terminal Menu, a window appears running the 4014 GS emulator. A *scaled* 4014 GS window will appear in Alpha Mode with window size as defined in the Window Size option on the mouse button two 4014 GS menu.

From More on the Main Terminal Menu

A 4014 GS window can also be created by selecting 4014 GS from the More submenu under the Main Terminal Menu. To see the More submenu, press and hold mouse button 3 to display the Main Terminal Menu. Move the mouse cursor over the selection More, and then slide the cursor to the right to display the submenu (see Figure 7-1). Again, move the mouse cursor over the selection 4014 GS. Release mouse button 3. A new window is created running the 4014 GS emulator. A *scaled* 4014 GS window will appear in Alpha Mode with window size

as defined in the Window Size option on the mouse button two 4014 GS menu.

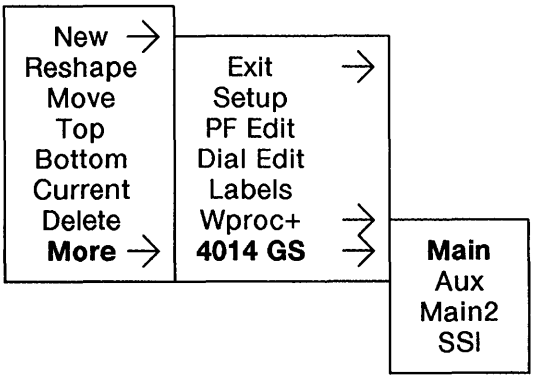

Figure 7–1 More Submenu

From the Wproc+ Emulator

If you are in a Wproc+ window, you can change the emulator within that window to a 4014 GS scaled or clipped window emulation. To enter a clipped 4014 window, use the escape sequence

ESC [? 2 g

The window size will remain the same and the window will not be cleared.

(To use an escape sequence, press the keyboard keys ESC, [, ?, 2, g in sequence. This sends the command, "Enter Clipped 4014 Window" to your terminal.)

To enter a scaled 4014 window, use the escape sequence

ESC [? 2 f

The window will be reshaped according to the Window Size option under the mouse button 2 4014 GS menu. The window will also be cleared.

Escape Sequences

Escape sequences allow you to define 4014 GS characteristics and execute 4014 GS commands from the keyboard or within a program. The character (ESC, or escape) sequences recognized by the 4014 GS are based on Tektronix 4010/4014 escape sequences with some ANSI 3.64 ASCII and private enhancement sequences.

To use an escape sequence, press the keyboard keys that represent the sequence in order. This sends the command represented by the sequence to your terminal.

For example, to execute the escape sequence

ESC [? 2 g

press the keyboard keys ESC, [, 2, g in sequence. This sends the command, "Enter Clipped 4014 Window" to your terminal.

Exiting the 4014 GS Emulator

You can exit a 4014 GS window by either deleting the window or by using an escape sequence to enter Wproc+.

To delete a 4014 GS window, use the Delete operation on the Main Terminal Menu. Display this menu by pressing mouse button 3. Select Delete as explained in Chapter 3.

To exit the 4014 GS by entering a Wproc+ window, use the escape sequence

ESC [? 1 f

This sends the command, "Enter Wproc+" to your terminal. The window enters Wproc+ and reshapes to the size of the previous Wproc+ window.

If this is the first time in a session you have switched emulations, the 4014 GS window becomes a Wproc+ window with a shape as specified in Setup.

Window Appearance

The 4014 GS supports two types of windows, **scaled** and **clipped**. The scaled 4014 GS window has a general window appearance as seen in Figure 7-2. A clipped 4014 GS window does not have a label area. The window is divided into a label area and a text/drawing area.

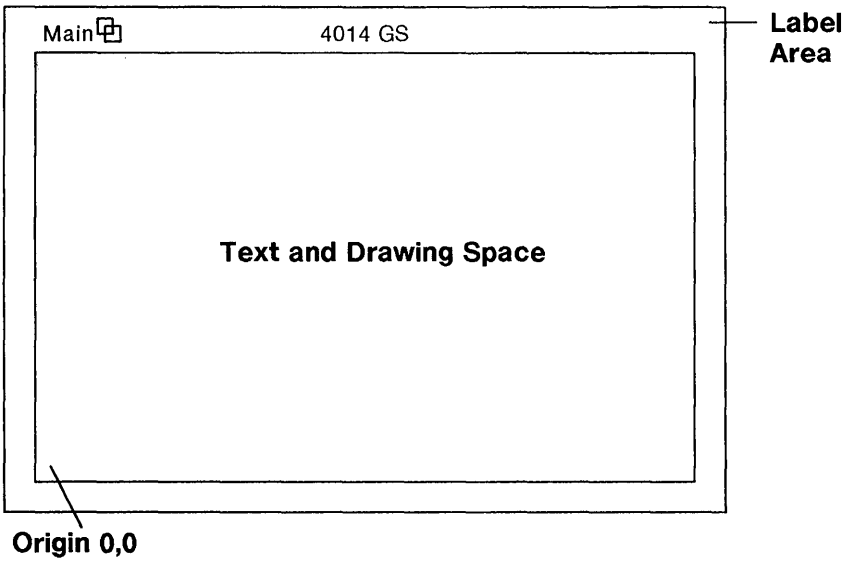

Figure 7–2 A 4014 GS Window

Scaled Windows

Scaled windows size the entire available 10- or 12-bit xy-coordinate space to the size of a window. (For more on the xy-coordinate space, later in this chapter.)

Scaled windows are available in full- or half-screen sizes. A full-size window is 1024 by 780 pixels. A half-size window is 512 by 390 pixels. The full-screen window is borderless. The window sizes are approximate and only include the text/drawing area. They do not include window borders, margins, or label areas.

Clipped Windows

Clipped windows map each address of the 10- or 12-bit xy-coordinate space to a 730 MTG pixel. If the terminal receives an address which falls outside the window space, it is discarded. Clipped windows are only available by using the command, "Enter Clipped 4014 Window", **ESC [? 2 g**.

Note: Addressing in a clipped window uses the same spatial scale as a full screen scaled window.

Alpha Mode 2-Column Display

In Alpha Mode, two margins are used (see Figure 7-3). Margin 1 is located at the left edge of the window. Margin 2 is located halfway across the window. Initially, Margin 1 is active. Line feeds/carriage returns occur automatically after displaying a character or a space in the last character position of a line. When a line feed occurs past the bottom of the screen, Margin 2 becomes active and text is displayed there. The screen is not cleared. To page using the full screen, see "Page Full", under the section, "Using the Mouse", in this chapter.

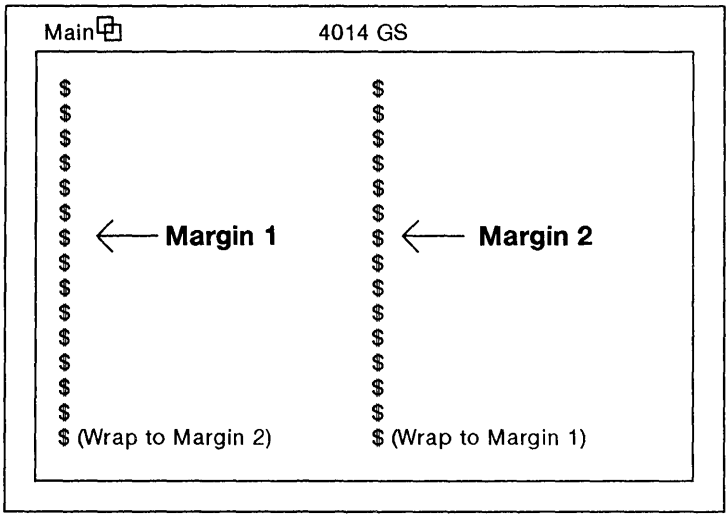

Figure 7–3 Alpha Mode 2-Column Display

Drawing Space Origin

Point 0,0 of the text/drawing space, or the **origin**, is located in the lower left corner of the 4014 GS window. The X-axis maximum is located at the far right of the screen. The Y-axis maximum is located at the top of the screen.

The XY-Coordinate Space

The drawing area is defined in xy-coordinates. Each xy-coordinate corresponds to a display address. Each unit of terminal memory can be accessed using 10- or 12-bit addresses. To "draw" on the screen, you issue drawing commands to the terminal using x,y addresses to designate where lines should begin and end.

Of this space, the actual *viewable* space (what is seen on the terminal display) is smaller than the addressable space. When 10-bit addressing is used, viewable space is 1024X by 780Y units. When 12-bit addressing is used, viewable space is 4096X by 3120Y units.

When 10-bit addressing is used, *addressable* space is 1024X by 1024Y units. The binary X and Y addresses are separated into two bytes, one byte containing the five most significant (MSB) bits and one byte containing the five least significant bits (LSB). A complete 10-bit address consists of four data bytes: High Y, Low Y, High X, and Low X, received in that order.

Ten-bit addresses must be converted to ASCII data addresses for you to use them in graphics commands. Use the table at the end of this chapter for converting addresses.

When 12-bit addressing is used, *addressable* space is 4096X by 4096Y units. The binary X and Y addresses are separated into the 5 most significant bits (MSB), the next 5 most significant bits, and the 2 least significant bits (LSB). A complete 12-bit address consists of five data bytes: High Y, Low Y, Extra, High X, and Low X, received in that order.

Resolution

In half-size scaled windows, the display resolution is coarser than the addressing resolution. Viewable addresses are scaled so that two points are mapped to one pixel. In Point Plot Mode, this may result in an undesirable screen appearance. The 4014 GS menu option, Intensity, can be used to minimize the effects.

Text, Vectors, Cursors, and Patterns

Text can be displayed in four character sizes: Large, Medium, Small, and Tiny. The character size can be selected from the menu 2 button 4014 GS menu.

Note: Small and Tiny are not available in half-size windows.

Five different *vector*, or line styles can be displayed: solid, dotted, dot-dashed, dashed, and long-dashed. These are selected by using the escape sequences listed in Appendix B.

The mouse cursor will always be an arrow unless you enter GIN Mode. The cursor will then turn into a *cross-hair*. The cross-hair cursor can be large or small as selected in the mouse 2 button 4014 GS menu. See the section, "GIN Mode", later in this chapter.

A rectangle drawn using the Rectangle Draw and Fill command can be filled with a solid, grey, slope-up, slope-down, horizontal line, vertical line, slant cross-hatch, or vertical cross-hatch pattern. See the section, "Drawing Features", later in this chapter.

Using the Keyboard in the 4014 GS

Certain keyboard keys have defined functions in the 4014 GS emulation. These are described below.

Return Key	executes a carriage return.
Enter Key	executes a carriage return.
Break Key	Pressing this key causes a line break of approximately 280 ms.
Disconnect Key	Pressing this key causes the terminal to turn off the Data Terminal Ready Lead (DTR) for 2.5 seconds. This causes the line to drop.
User Fkeys	To display the User Fkeys, press the F6 key while holding down the CTRL (Control) key. User Fkeys are only operational in Alpha Mode.
System Fkeys	To display the System Fkeys, press the F8 key while holding down the CTRL (Control) key. System Fkeys are only operational in Alpha Mode.
Cursor Up (↑)	In GIN Mode, pressing the up arrow key causes the crosshair cursor to move up one pixel at a time until the top of the window is reached. Cursor Up does not work outside GIN Mode.

Cursor Down (↓)

In GIN Mode, pressing the down arrow key causes the crosshair cursor to move down one pixel at a time until the bottom of the window is reached. Cursor Down does not work outside GIN Mode.

Cursor Right (→)

In GIN Mode, pressing the right arrow key causes the crosshair cursor to move right one pixel at a time until the right side of the window is reached. Cursor Right does not work outside GIN Mode.

Cursor Left (←)

In GIN Mode, pressing the left arrow key causes the crosshair cursor to move left one pixel at a time until the left side of the window is reached. Cursor Left does not work outside GIN Mode.

Reset

When this key is pressed, the Alpha cursor (block or line text cursor) is homed, the addressing extra byte is cleared, GIN Mode is terminated, and any bypass condition is cleared.

Scroll Lock

When this key is pressed, display activity (new data display, cursor movement, etc.) stops. When it is pressed a second time, display activity resumes.

Clear

When this key is pressed, a Page command is executed. In a Page command, the current layer is cleared, the screen enters Alpha Mode, and the Alpha cursor is homed.

Backspace

In Alpha Mode, pressing this key moves the text cursor to the left one space. If the cursor is at the beginning of a line when Backspace is pressed, the cursor moves up one line to the last character position on that line.

Using the Mouse in the 4014 GS

The mouse and mouse buttons are used to select and activate 4014 GS functions. Button 1 is used to send GIN data to the host in GIN Mode. Button 2 displays the 4014 GS menu. Button 3 displays the Main Terminal Menu as described in Chapter 5.

Button 1

GIN Mode

Use Button 1 to send GIN data to the host when the terminal is in GIN Mode (see the section, "GIN Mode", later in this chapter). When you click mouse button 1, the GIN character (set in Options, below) is sent to the host, along with the GIN address of the crosshair cursor and GIN terminator.

Making a Window Top and Current

If the terminal is not in GIN Mode, use button 1 to make a window top and current. Position the cursor over the window you wish to make top and current. Click mouse button 1. The selected window becomes top and current and is surrounded by a highlighted border.

Page Full in Alpha Mode

In Alpha Mode (see "Drawing Functions" in this chapter), when the message, "Page Full" is displayed in the right hand side of the 4014 label area, you must clear the screen to continue displaying characters. If the Page Full Break option is **on** (see "The 4014 GS Menu" in this chapter), you can clear the screen by clicking mouse button 1.

Button 2

When you press mouse button 2, the 4014 GS menu is displayed (see Figure 7-4). Select functions and display menus as explained in Chapter 5. Specific menu items are described later in this chapter.

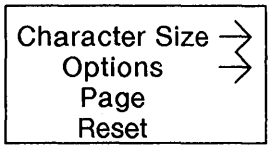

Figure 7–4 The 4014 GS Menu

Button 3

When you press mouse button 3, the Main Terminal Menu is displayed (see Chapter 5).

The 4014 GS Menu

Some 4014 GS settings and operations are available from the 4014 GS menu (see Figure 7-4). To display the 4014 GS Menu, press mouse button 2 and select functions and submenus as instructed in Chapter 5. Menu settings and operations are described below.

Character Size

Character size is selected via a submenu on the 4014 GS Menu (Figure 7-5). To select the Character Size submenu, display the 4014 GS Menu. Slide the mouse cursor over the selection Character Size to highlight it. With mouse button 2 *still depressed*, slide the mouse cursor to the right (in the direction of the arrow) to display the Character Size submenu. To select a character size, slide the mouse cursor over the desired setting and release mouse button 2.

For full-size scaled and clipped windows, the entire character size range is available. For half-size scaled windows, only the **Large** and **Medium** character sizes are available.

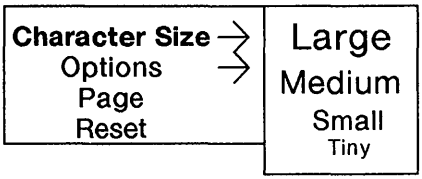

Figure 7–5 Character Size Submenu

Options

Option settings affecting the 4014 GS are selected via a submenu on the 4014 GS Menu (see Figure 7-6). To select the Options submenu, display the 4014 GS Menu. Slide the mouse cursor over the selection Options to highlight it. With mouse button 2 *still depressed*, slide the mouse cursor to the right (in the direction of the arrow) to display the Options submenu. To select an option and its submenu of settings, slide the mouse cursor over the desired option and then slide it further in the direction of the arrow to display its settings. Release mouse button 2 when the desired setting is highlighted.

Options and their settings are described below.

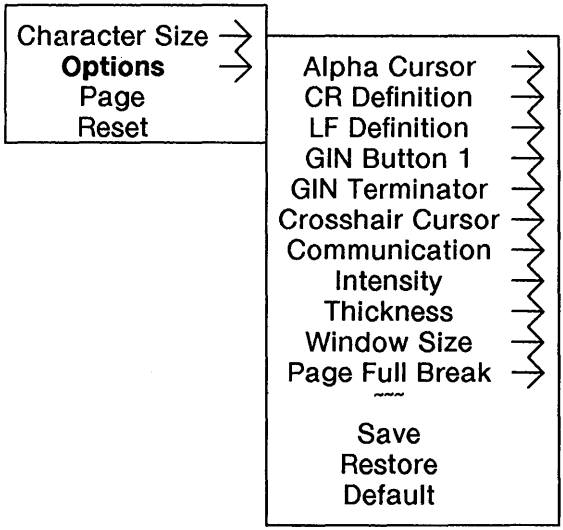

Figure 7–6 Options Submenu

Alpha Cursor The Alpha Cursor, or text cursor, is displayed as a block. This cursor is only available in Alpha Mode. Set the cursor to **visible** or **invisible**. The default setting for this option is **visible**.

CR Definition The Carriage Return Definition determines what happens when a carriage return is received. If this option is set for **CR/LF**, a carriage return causes the Alpha Cursor to move to the beginning of the next line. If this option is set for **CR**, a carriage return causes the Alpha Cursor to move to the beginning of the same line in the same column. The default setting for this option is **CR**.

LF Definition The Line Feed Definition determines what happens when a line feed is executed. If this option is set for **CR/LF**, a line feed causes the Alpha cursor to move to the beginning of the next line. If this option is set for **LF**, a line feed causes the Alpha Cursor to move down one line in the same column. The default setting for this option is **LF**.

GIN Button 1

This option determines what character is sent to the host when mouse button 1 is clicked in GIN Mode. The GIN Button 1 option is actually a submenu listing all available keyboard characters that can act as GIN characters. To see this submenu, slide the mouse cursor to the right with mouse button 2 depressed. Select the option setting by highlighting the desired character in the submenu list. The default setting for this option is the **space** character.

This option can also be set using the escape sequence

ESC / G *char*

where *char* is the character sent when button 1 is clicked in GIN mode.

GIN Terminator

This option determines what characters are sent at the end of a GIN data transmission. If this option is set to **CR**, a carriage return is sent after the data. If this option is set to **CR/EOT**, both a carriage return and an end-of-transmission character are sent after the data. If this option is set to **none**, no characters are sent after the GIN data. The default setting for this option is **CR**.

Crosshair Cursor sets the size of the crosshair cursor. If **large** is selected, the crosshairs extend the entire height and width of the window. If **small** is selected, the crosshairs are about one-half inch long. The default setting for this option is **large**.

Communication determines whether the 4014 GS communicates with the host. If this option is set to **line**, the 4014 GS will send data to the host. If this option is set to **local**, the 4014 GS will send data to the terminal. The default setting for this option is **line**.

Intensity

This option works in conjunction with the Thickness option to simulate the point plot beam intensity used in Special Point Plot mode (see the next section, "Drawing Functions"). See the description of the Thickness option, for an explanation of Intensity/Thickness combinations. The default setting for this option is **dither**.

Beam intensity is simulated by drawing a varying number of dots on the display for each point address received. **Dither** uses a fixed algorithm to determine the number of dots to draw. As a result, unwanted dot patterns may appear. **Random** uses a variable algorithm to determine the number of dots to draw. Unwanted patterns will be avoided but accuracy is decreased.

Thickness

This option works in conjunction with the Intensity option to simulate the point plot beam intensity used in Special Point Plot mode (see "Drawing Functions", below). Thickness is used to adjust the thickness of points drawn. Using **focus**, only one pixel per point is activated. Using **smear**, up to four pixels are activated for each point plotted. The default setting for this option is **focus**.

The various setting combinations include:

Dither/Focus
are the default settings for Intensity and Thickness. With this combination, a single dot is drawn for each point address with an intensity of *off* or *on* depending on the beam intensity character sent in Special Point Plot mode.

Dither/Smear
causes 0 to 4 dots to be drawn using a fixed algorithm (depending on the beam intensity character) for each point address.

Random/Focus
causes a single dot to be drawn (depending on the beam intensity character) for each point address.

Random/Smear
causes a random number of dots between 0 and 4 to be drawn using a random algorithm for each point address.

Window Size determines the size of 4014 GS windows. If this option is set to **full size**, then a 1024 by 780 pixel window is used. If this option is set to **half size**, then a 512 by 390 pixel window is used. The window size does not include borders, margins, and label area. The window size can be changed after entering the 4014 GS emulation. The default setting for this option is **full size**.

Page Full Break allows you to view multiple pages of text. With this option set to **on**, only margin 1 is active and "paging" is possible. This option does not affect clipped windows. To page, see "Using the Mouse", above. The default setting for this option is **off**.

Save allows you to save the current option settings in memory. The settings will remain in effect even when you turn the terminal off and will be the settings used in all new 4014 GS windows.

Restore allows you to regain the option settings saved in memory using the Save option.

Default allows you to set all options to their factory default values.

Drawing Functions

With the 4014 GS, you can enter text in Alpha Mode. You can draw in Graph Mode using three types of operations: Point Plot Mode, Special Point Plot Mode, and Incremental Point Plot Mode.

Pixel Operations

Before drawing, you may specify what kind of drawing you want to do on the terminal screen. To do this, use the Pixel Op (Pixel Operation) command. Issue a Pixel Op command before drawing. Send the sequence

ESC / *ps* **d**

where *ps* is a number from 0 to 3 designating the pixel operation.

When **ps = 0**, a new image is drawn over the old image (the **OR** operation). The default drawing mode is the **OR**.

When **ps = 1**, the new image clears the old image (the **CLR** operation).

When **ps = 2**, the current image is exclusively or'd with a new image (the **XOR** operation).

When **ps = 3**, the current image is replaced with the new image (the **STORE** operation).

Alpha Mode

Entering Alpha Mode

Alpha Mode allows you to enter and display text on the screen. Alpha Mode is active when you initially enter the 4014 GS. Text is entered at the Alpha Cursor, indicated by a block. You may elect to not display a cursor by setting the Alpha Cursor option (on the Options submenu of the 4014 GS button 2 menu) to **off**. Text can be displayed in several character formats (see "Using the Mouse", above.)

2-Column Format

In Alpha Mode, two margins are used (see Figure 7-3). Margin 1 is located at the left edge of the window. Margin 2 is located halfway across the window. Initially, Margin 1 is active. Line feeds/carriage returns occur automatically after displaying a character or a space in the last character position of a line. When a line feed occurs past the bottom of the screen, Margin 2 becomes active and text is displayed To clear the screen, use the Page command. To display multiple pages, set the Page Full Break option to **on**.

Displaying Text

To display text, simply type from the keyboard. Text is entered at the cursor position in the character size you selected beginning at Margin 1.

Entering Alpha Mode from Graph Mode

To enter Alpha Mode from Graph Mode, press the Enter or Return keys.

Graph Mode

In Graph Mode, as an xy-coordinate address is received, a line is drawn from the current drawing position to the new address.

Entering Graph Mode from Alpha Mode

To enter Graph Mode from Alpha Mode, use **GS**, the Graph Mode command. The first address received by the emulator after entering Graph Mode is invisible. This allows drawing to begin at that address location. Any subsequent addresses received by the terminal are drawn.

Note: If the first address received is preceded by the BEL control character, it will be visible.

When the terminal receives the same address twice in succession, a point is drawn. If the terminal receives two different addresses in succession, a line is drawn from the first address position to the second address position.

Line Styles

Lines can be drawn as solid, dotted, dot-dashed, dashed, or long-dashed. To select a vector style, execute the appropriate escape sequence before entering addresses to draw the line. See Appendix B for the accepted escape sequences for each line style. A line style remains in effect until it is changed by an escape sequence.

For example, to select a dotted line style, use the escape sequence

ESC a

A dotted line will be drawn from one coordinate to another when addresses are received.

Note: Defocussed lines as implemented on a Tektronix 4014 are drawn as solid lines on the 4014 GS. Write-Thru lines as implemented on a Tektronix 4014 are invisible on the 4014 GS.

Point Plot Mode

In Point Plot Mode, one command causes a point to be drawn for every xy-coordinate received. To enter this mode, use the **FS** command when you are in Graph Mode *or* Alpha Mode. Then send your xy-coordinate.

To exit Point Plot Mode, press **Enter**, or **Return**.

Special Point Plot Mode

In Special Point Plot Mode, one command causes a point of varying beam intensity to be drawn for every xy-coordinate received. Beam intensity variations are simulated by activating from 0 to 4 pixels for each point. A beam intensity character preceding the point address selects the beam intensity. This beam intensity character is a hex number ranging from hex 20 to hex 7D. If a beam intensity is selected in Special Point Plot Mode and the emulation enters Incremental Point Plot or Point Plot modes, that intensity will remain in effect. Beam intensity does not affect text or line drawing. The number of pixels activated depends on the setting of the Thickness and Intensity options (see "Options", above).

To enter Special Point Plot Mode, use **ESC FS** when you are in Alpha Mode, Graph Mode, or Point Plot Mode. Then send your xy-coordinate preceded by the beam intensity character.

To exit Special Point Plot Mode, press **Enter**, or **Return.**

Incremental Point Plot Mode

This mode allows you to draw in one point increments in any of eight directions. To draw in Incremental Point Plot Mode, you execute the appropriate command followed by a writing on/off (pen down/pen up) character and a direction character (see Figure 7-7). This mode uses relative addressing with respect to the last point drawn, and the "pen" does not move until a different plotting command is received.

For example, to draw (pen down) in a "northwest" direction, use the command, **RS P F** with no spaces in between characters. The "pen" moves from the previous point position in a one point increment in its northwest direction.

If you only want to move in the northwest direction, execute the command **RS F**, inserting a *space* before the F.

SPACE - Writing Off / Pen Up
P - Writing On / Pen Down

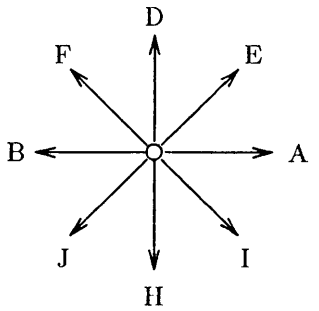

Figure 7–7 Incremental Point Plot Mode Direction Characters

Rectangle Draw

Rectangles

You can draw rectangles by specifying the rectangle's origin (lower-left hand corner), its width along the x-axis, and its height along the y-axis in a Rectangle Draw command. Rectangles are "clipped" to fit in the 10-bit xy-coordinate address space.

To draw a rectangle, execute the command

ESC / x#; y#; w; h x

where **x#** and **y#** specify the rectangle's origin, **w** specifies the width, and **h** specifies the height. All variables (x, y coordinates; width; and height) are integers.

Filled Rectangles

You can draw rectangles filled with a pattern by using the Rectangle Draw and Fill command. The rectangle can be filled with solid, grey, slope-up, slope-down, horizontal line, vertical line, slant cross-hatch, or vertical cross-hatch patterns. The pattern must be selected before executing the Rectangle Draw and Fill command.

To select a pattern, type the appropriate escape sequence for the pattern you select (see Figure 7-8).

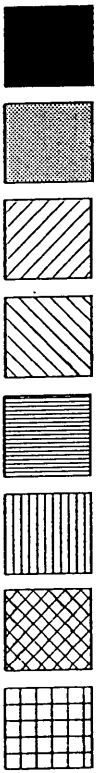

Figure 7–8 Rectangle Fill Patterns

Then execute the command to draw a rectangle filled with this pattern:

ESC / x#; y#; w; h y

where **x#** and **y#** specify the rectangle's origin, **w** specifies the width, and **h** specifies the height. All variables (x, y coordinates; width; and height) are integers.

Note: If a pattern was not selected, the pattern defaults to the solid fill pattern.

Un-outlined Filled Rectangles
If the command

ESC /x#; y#; w; h z

is used, a rectangle is not outlined but only *filled* with a previously selected pattern.

Example
To draw a rectangle at the origin of height 5 and width 10 with slant cross-hatch fill, use the command

ESC F

to specify the slant cross-hatch pattern. Then, execute the Rectangle Draw and Fill command

ESC / 0; 0; 5; 10 y

which creates a rectangle of height 5, width 10 at the origin. The rectangle will be filled with slant cross-hatch.

Graphic Input (GIN)

The Graphic Input feature of the 4014 allows you to send the current cursor or drawing position to the host when your application asks for it. The *GIN Request* command coming from the host causes the terminal to send position information depending on which mode (Alpha Mode, Graph Mode, or GIN Mode) the terminal is in. Position information is sent as the *GIN Address* in a *GIN Data* format.

GIN Data

For Alpha and Graph modes, GIN Data consists of the Terminal Status Byte, the GIN Address of position (see this section), and the GIN Terminator, sent in that order. For GIN Mode, GIN Data consists of the GIN Address of the crosshair cursor followed by the GIN Terminator.

Bypass Condition

After GIN Data is sent, the *Bypass Condition* goes into effect. The Bypass Condition prevents GIN Data from being recognized by the 4014 emulator when it is echoed back from the host. Bypass is also active when the Communication option on the Options submenu of the 4014 GS menu is set to **local**. Bypass can also be activated with the Bypass Condition command, **ESC CAN**.

Bypass must be cleared before host communications can resume. To do so, you can either set the GIN Terminator to be a **CR** (carriage return), press the Carriage Return, or send the **US** command to the terminal from the host.

The Terminal Status Byte
consists of 8 bits with values as follows:

Bit	Value
7	Always 0; reserved for future use
6	Always 0
5	Always 1
4	Always 1; no hardcopy device available
3	Vector Bit; 1 = Graph Mode active
2	Vector Bit; 1 = Alpha Mode active
1	Margin Bit; 1 = Margin 2 active
0	Always 1; no auxiliary device available

The GIN Address
consists of four bytes representing the x,y coordinate: the 5 most significant X bits, the 5 least significant X bits, the 5 most significant Y bits, and the 5 least significant Y bits, in that order. Each address byte includes 0 and 1 as bits 6 and 5, respectively.

Address Accuracy
With 10-bit addressing and full size scaled or clipped windows, the address will be completely accurate with reference to the 1024X by 1024Y grid. With half size windows, the address is accurate within $\pm$ 2 points on this grid.

With 12-bit addressing and full size scaled or clipped windows, the address is accurate within $\pm$ 4 points with reference to the 4096X by 4096Y grid. With half size scaled windows, the address is accurate within $\pm$ 8 points on this grid.

The GIN Terminator
consists of characters sent at the end of the GIN Data transmission. Select the terminator using the GIN Terminator option on the Options submenu of the 4014 GS menu explained earlier in this chapter.

GIN Request Command

The GIN Request command is sent from the host to the terminal. The GIN Request command can be sent using **ESC ENQ**. Do not send this command when the Communication option on the 4014 GS menu is set to **local**.

GIN Request in Alpha Mode

If the terminal receives the GIN Request command while in Alpha Mode, the GIN address of the lower left-hand corner of the Alpha cursor is sent to the host. The emulator returns to Alpha Mode after the address is transmitted to the host.

GIN Request in Graph Mode

If the terminal receives the GIN Request command while in Graph Mode, Point Plot Mode, or Special Point Plot Mode, the GIN address of the current drawing position is sent to the host. The emulator returns to the previous mode after the address is transmitted to the host.

GIN Request in GIN Mode

If the terminal receives the GIN Request command while in GIN Mode, the GIN address of the crosshair cursor is sent to the host. The emulator returns to Alpha Mode after the address is transmitted to the host.

GIN Mode

GIN Mode allows you to send GIN Data (including the GIN Address of the crosshair cursor) to the host. After entering GIN Mode, GIN Data is sent to the host after mouse button 1 is pressed or when a character is entered from the keyboard. When mouse button 1 is pressed, a "lead in" character is sent, followed by the GIN Data. When a character is entered from the keyboard, that character is sent, followed by the GIN Data.

After transmitting the GIN Data, the emulator leaves GIN Mode and returns to Alpha Mode.

Entering GIN Mode

To enter GIN mode, use the command

ESC SUB

The crosshair cursor appears and the Bypass condition is active. The GIN Mode command should not be used when the Communication option of the Options submenu is set to **local.**

Exiting GIN Mode

GIN Mode is automatically exited after transmitting GIN Data. GIN Mode can also be terminated without sending GIN Data. To do so, sent either the sequence **ESC FF** or **ESC US.**

The GIN Button 1 Character

is sent when mouse button 1 is clicked in GIN Mode. The default character is the **space;** however, another character can be set using the GIN Button 1 option on the Options submenu of the 4014 GS menu. The GIN Button 1 Character can also be set using the GIN Button 1 command. Use the command,

ESC / G *char*

where **char** is the character you wish to send when mouse button 1 is clicked in GIN Mode.

This also allows keyboard-free drawing in some applications. Simply set this option to the keyboard character requested by your application.

The Crosshair Cursor

is illustrated in Figure 7-9. To select its size, use the Crosshair Cursor option on the Options submenu of the 4014 GS menu, explained earlier in this chapter.

To position the crosshair cursor, simply move the mouse. You may also use the keyboard cursor keys: left, right, up, and down arrow keys.

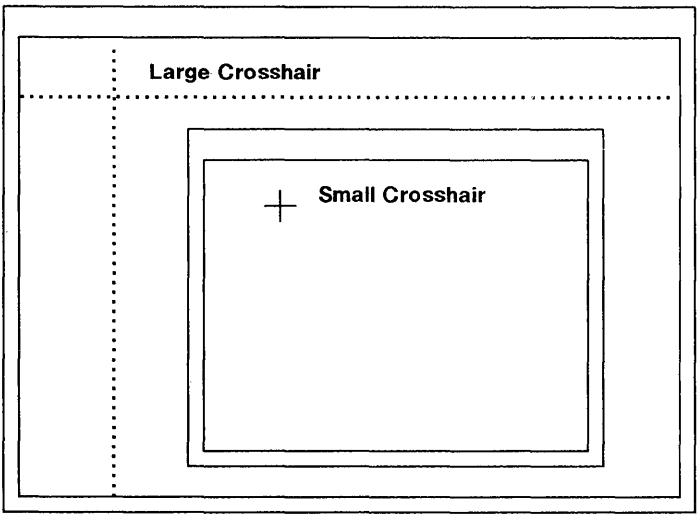

Figure 7–9 The Crosshair Cursor

Coordinate Conversion

The following Coordinate Conversion Chart for 10-bit addressing is used to encode decimal graphics addresses into ASCII data addresses.

Find your coordinate value in the chart. Follow that column to the bottom of the chart to find the decimal value or ASCII character which represents the High Y or High X byte. Go to the right in the row containing the coordinate value to find the Low Y byte, or go to the left to find the Low X byte. For example, 200Y, 48X equals 38 104 33 80 in decimal code, and equals & h ! P in ASCII code.

Table 7–1 Coordinate Conversion Chart

Low Order X									Low Order Y	
ASCII	DECMAL	X or Y COORDINATE							DECMAL	ASCII
@	64	0	32	64	96	128	160	192	224	96	`
A	65	1	33	65	97	129	161	193	225	97	a
B	66	2	34	66	98	130	162	194	226	98	b
C	67	3	35	67	99	131	163	195	227	99	c
D	68	4	36	68	100	132	164	196	228	100	d
E	69	5	37	69	101	133	165	197	229	101	e
F	70	6	38	70	102	134	166	198	230	102	f
G	71	7	39	71	103	135	167	199	231	103	g
H	72	8	40	72	104	136	168	200	232	104	h
I	73	9	41	73	105	137	169	201	233	105	i
J	74	10	42	74	106	138	170	202	234	106	j
K	75	11	43	75	107	139	171	203	235	107	k
L	76	12	44	76	108	140	172	204	236	108	l
M	77	13	45	77	109	141	173	205	237	109	m
N	78	14	46	78	110	142	174	206	238	110	n
O	79	15	47	79	111	143	175	207	239	111	o
P	80	16	48	80	112	144	176	208	240	112	p
Q	81	17	49	81	113	145	177	209	241	113	q
R	82	18	50	82	114	146	178	210	242	114	r
S	83	19	51	83	115	147	179	211	243	115	s
T	84	20	52	84	116	148	180	212	244	116	t
U	85	21	53	85	117	149	181	213	245	117	u
V	86	22	54	86	118	150	182	214	246	118	v
W	87	23	55	87	119	151	183	215	247	119	w
X	88	24	56	88	120	152	184	216	248	120	x
Y	89	25	57	89	121	153	185	217	249	121	y
Z	90	26	58	90	122	154	186	218	250	122	z
[	91	27	59	91	123	155	187	219	251	123	{
\	92	28	60	92	124	156	188	220	252	124	|
]	93	29	61	93	125	157	189	221	253	125	}
^	94	30	62	94	126	158	190	222	254	126	~
_	95	31	63	95	127	159	191	223	255	127	DEL
DECIMAL-->		32	33	34	35	36	37	38	39		
ASCII --->		SP	!	"	#	$	%	&	'		
		High Order X & Y									

Table 7–2 Coordinate Conversion Chart

Low Order X									Low Order Y	
ASCII	DECMAL	X or Y COORDINATE							DECMAL	ASCII
@	64	256	288	320	352	384	416	448	480	96	`
A	65	257	289	321	353	385	417	449	481	97	a
B	66	258	290	322	354	386	418	450	482	98	b
C	67	259	291	323	355	387	419	451	483	99	c
D	68	260	292	324	356	388	420	452	484	100	d
E	69	261	293	325	357	389	421	453	485	101	e
F	70	262	294	326	358	390	422	454	486	102	f
G	71	263	295	327	359	391	423	455	487	103	g
H	72	264	296	328	360	392	424	456	488	104	h
I	73	265	297	329	361	393	425	457	489	105	i
J	74	266	298	330	362	394	426	458	490	106	j
K	75	267	299	331	363	395	427	459	491	107	k
L	76	268	300	332	364	396	428	460	492	108	l
M	77	269	301	333	365	397	429	461	493	109	m
N	78	270	302	334	366	398	430	462	494	110	n
O	79	271	303	335	367	399	431	463	495	111	o
P	80	272	304	336	368	400	432	464	496	112	p
Q	81	273	305	337	369	401	433	465	497	113	q
R	82	274	306	338	370	402	434	466	498	114	r
S	83	275	307	339	371	403	435	467	499	115	s
T	84	276	308	340	372	404	436	468	500	116	t
U	85	277	309	341	373	405	437	469	501	117	u
V	86	278	310	342	374	406	438	470	502	118	v
W	87	279	311	343	375	407	439	471	503	119	w
X	88	280	312	344	376	408	440	472	504	120	x
Y	89	281	313	345	377	409	441	473	505	121	y
Z	90	282	314	346	378	410	442	474	506	122	z
[	91	283	315	347	379	411	443	475	507	123	{
\	92	284	316	348	380	412	444	476	508	124	|
]	93	285	317	349	381	413	445	477	509	125	}
^	94	286	318	350	382	414	446	478	510	126	~
_	95	287	319	351	383	415	447	479	511	127	DEL
DECIMAL-->		40	41	42	43	44	45	46	47		
ASCII --->		(	)	*	+	,	-	.	/		
		High Order X & Y									

Table 7–3 Coordinate Conversion Chart

Low Order X									Low Order Y	
ASCII	DECMAL	X or Y COORDINATE							DECMAL	ASCII
@	64	512	544	576	608	640	672	704	736	96	`
A	65	513	545	577	609	641	673	705	737	97	a
B	66	514	546	578	610	642	674	706	738	98	b
C	67	515	547	579	611	643	675	707	739	99	c
D	68	516	548	580	612	644	676	708	740	100	d
E	69	517	549	581	613	645	677	709	741	101	e
F	70	518	550	582	614	646	678	710	742	102	f
G	71	519	551	583	615	647	679	711	743	103	g
H	72	520	552	584	616	648	680	712	744	104	h
I	73	521	553	585	617	649	681	713	745	105	i
J	74	522	554	586	618	650	682	714	746	106	j
K	75	523	555	587	619	651	683	715	747	107	k
L	76	524	556	588	620	652	684	716	748	108	l
M	77	525	557	589	621	653	685	717	749	109	m
N	78	526	558	590	622	654	686	718	750	110	n
O	79	527	559	591	623	655	687	719	751	111	o
P	80	528	560	592	624	656	688	720	752	112	p
Q	81	529	561	593	625	657	689	721	753	113	q
R	82	530	562	594	626	658	690	722	754	114	r
S	83	531	563	595	627	659	691	723	755	115	s
T	84	532	564	596	628	660	692	724	756	116	t
U	85	533	565	597	629	661	693	725	757	117	u
V	86	534	566	598	630	662	694	726	758	118	v
W	87	535	567	599	631	663	695	727	759	119	w
X	88	536	568	600	632	664	696	728	760	120	x
Y	89	537	569	601	633	665	697	729	761	121	y
Z	90	538	570	602	634	666	698	730	762	122	z
[	91	539	571	603	635	667	699	731	763	123	{
\	92	540	572	604	636	668	700	732	764	124	|
]	93	541	573	605	637	669	701	733	765	125	}
^	94	542	574	606	638	670	702	734	766	126	~
_	95	543	575	607	639	671	703	735	767	127	DEL
DECIMAL-->		48	49	50	51	52	53	54	55		
ASCII --->		0	1	2	3	4	5	6	7		
		High Order X & Y									

Table 7–4 Coordinate Conversion Chart

Low Order X									Low Order Y	
ASCII	DECMAL	X or Y COORDINATE							DECMAL	ASCII
@	64	768	800	832	864	896	928	960	992	96	`
A	65	769	801	833	865	897	929	961	993	97	a
B	66	770	802	834	866	898	930	962	994	98	b
C	67	771	803	835	867	899	931	963	995	99	c
D	68	772	804	836	868	900	932	964	996	100	d
E	69	773	805	837	869	901	933	965	997	101	e
F	70	774	806	838	870	902	934	966	998	102	f
G	71	775	807	839	871	903	935	967	999	103	g
H	72	776	808	840	872	904	936	968	1000	104	h
I	73	777	809	841	873	905	937	969	1001	105	i
J	74	778	810	842	874	906	938	970	1002	106	j
K	75	779	811	843	875	907	939	971	1003	107	k
L	76	780	812	844	876	908	940	972	1004	108	l
M	77	781	813	845	877	909	941	973	1005	109	m
N	78	782	814	846	878	910	942	974	1006	110	n
O	79	783	815	847	879	911	943	975	1007	111	o
P	80	784	816	848	880	912	944	976	1008	112	p
Q	81	785	817	849	881	913	945	977	1009	113	q
R	82	786	818	850	882	914	946	978	1010	114	r
S	83	787	819	851	883	915	947	979	1011	115	s
T	84	788	820	852	884	916	948	980	1012	116	t
U	85	789	821	853	885	917	949	981	1013	117	u
V	86	790	822	854	886	918	950	982	1014	118	v
W	87	791	823	855	887	919	951	983	1015	119	w
X	88	792	824	856	888	920	952	984	1016	120	x
Y	89	793	825	857	889	921	953	985	1017	121	y
Z	90	794	826	858	890	922	954	986	1018	122	z
[	91	795	827	859	891	923	955	987	1019	123	{
\	92	796	828	860	892	924	956	988	1020	124	|
]	93	797	829	861	893	925	957	989	1021	125	}
^	94	798	830	862	894	926	958	990	1022	126	~
_	95	799	831	863	895	927	959	991	1023	127	DEL
DECIMAL-->		56	57	58	59	60	61	62	63		
ASCII --->		8	9	:	;	<	=	>	?		
		High Order X & Y									

4014 GS Quick Reference

If you are familiar with 4014 GS emulator features, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Display 4014 GS Menu	Press **and hold** mouse button 2.
Display the Main Terminal Menu	Press **and hold** mouse button 3.
Enter a clipped 4014 GS window from Wproc+	Use the escape sequence **ESC [? 2 g**.
Enter a scaled 4014 GS window from Wproc+	Use the escape sequence **ESC [? 2 f**.
Exit 4014 GS to Wproc+	Use the escape sequence **ESC [? 1 f**.
Make a window top and current (when not in GIN Mode)	Place mouse cursor over window. Click mouse button 1.
Clear screen in Alpha Mode	Use the Page command or the Clear key. For multiple pages, set the Page Full Break option to **on**.

To	Procedure
Set character size	Use Character Size submenu on 4014 GS menu.
Set keyboard options	Use Options submenu on 4014 GS menu.
Set GIN options	Use Options submenu on 4014 GS menu.
Set point plot beam intensity	Set Intensity and Thickness options on Options submenu of 4014 GS menu.
Set window size or reshape window	Use Options submenu on 4014 GS menu.
Set pixel operation	Use the sequence **ESC / ps d** where ps = 0 is **OR** operation, ps = 1 is **CLR** operation, ps = 2 is **XOR** operation, and ps = 3 is **STORE** operation.
Enter Alpha Mode from Graph Mode	Press ENTER or RETURN, or use **US.**
Enter Graph Mode from Alpha Mode	Use **GS.**
Set line style	Use an escape sequence in Appendix B.
Enter Point Plot Mode	Use **FS.**
Enter Special Point Plot Mode	Use **ESC FS.**

To	Procedure
Draw in Incremental Point Plot Mode	Use **RS P** (direction).
Move in Incremental Point Plot Mode	Use **RS** *space* (direction).
Draw a rectangle	Use the escape sequence **ESC / x#;y#;w;h x.**
Select a Fill pattern	Use the escape sequence, **ESC** *fill pattern character.*
Draw a filled rectangle	Select a Fill pattern. Use the escape sequence, **ESC / x#;y#;w;h y.**
Draw a filled unoutlined rectange	Select a Fill pattern. Use the escape sequence, **ESC / x#; y#; w; h z.**
Enter GIN Mode	Use **ESC SUB.**
Enter a GIN Request command	Use **ESC ENQ.**
Exit GIN Mode without sending GIN Data	Use **ESC FF** or **ESC US.**
Select crosshair cursor size	Use Crosshair Cursor option on Options submenu of 4014 GS menu.

Chapter 8: Printing

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Printing Quick Reference 8–20

In This Chapter

Using Wproc+, you can print directly to up to three printers attached to the Main, Main2, or Auxiliary (AUX) ports. However, only one printer can be active at a time. Any printer must have a serial or serial to parallel RS232C-compatible interface for direct attachment to these ports.

Before printing, connect your printer and set up the port with the correct printer configuration. Then, print using commands on the Print submenu of the Wproc+ menu, or issue the appropriate escape sequence as listed in this chapter.

Note: Printing is not supported for the 4014 GS emulation. In particular, the Tektronix escape sequence, **ESC ETB**, is not supported. To print, you must use the features provided by your application, or see your System Administrator.

For a New User

Use this chapter to learn how to print using a printer connected to the Main, Main2, or Auxiliary (AUX) port. Printing commands can be issued using the mouse or by using escape sequences.

For an Experienced User

Printing functions on the 730 MTG Terminal do not differ significantly from those on the 630 MTG Terminal. The main difference between the 630 MTG and the 730 MTG is that on the 730 MTG you can connect a printer or printers to any of three ports. Use this chapter to refresh your printing skills. A printing quick reference is provided at the end of this chapter.

Printer Installation

Unpack and install your printer according to the instructions provided in your printer's User's Guide. Printers supported by the 730 MTG terminal are listed at the end of this chapter. The printer must have a serial or serial to parallel RS232C-compatible interface for direct attachment to 730 MTG ports. Connect your printer to the Main, Main 2, or Auxiliary (AUX) port of the 730 MTG. A different cable is needed to connect a printer to the Main and Main2, or Auxiliary ports. Information on cabling needed to interface your printer with the 730 MTG is available in Chapter 1.

Printer Setup

After connecting the printer to a port, you must assign that Port to be a printer port. To do so, display the Printer submenu of the Setup Main Menu (see Figure 8-1). Setup is described in detail in Chapter 4 of this Guide. Select the port you have your printer connected to by highlighting the port name and clicking mouse button 1. The port you select will have a checkmark next to it.

From the Setup Menu, display the Ports submenu (Figure 8-2). Select the selected printer port submenu to view and modify the options applicable to printing. These options are briefly reviewed below. For more details, see Chapter 4.

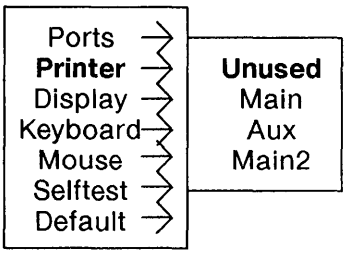

Figure 8–1 Setup Main Menu and Printer Submenu

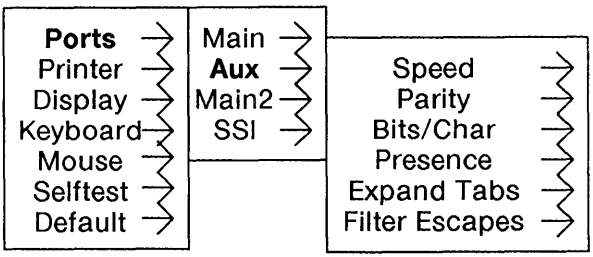

Figure 8–2 Ports Submenu

Note: Options marked with a † only apply to printer connections.

Speed is the speed of the attached printer in bits per second.

Parity determines the state of the eighth or ninth bit of sent data depending on the setting of the Bits/Character option.

Bits/Char determines the size of the data portion in bits of each character (not including parity or start/stop bits).

Presence allows you to select the appearance of your terminal on power-on. As in the corresponding Setup option for the other ports, this option determines whether the port assigned to the printer appears in the More and Exit submenus.

Expand Tabs† determines whether or not to replace tabs sent to the printer with an appropriate number of spaces.

Filter Escapes† determines whether to remove (filter) or retain escape characters.

Note: This option is ignored if the printer is in Media Copy mode.

Printing Using the Menu

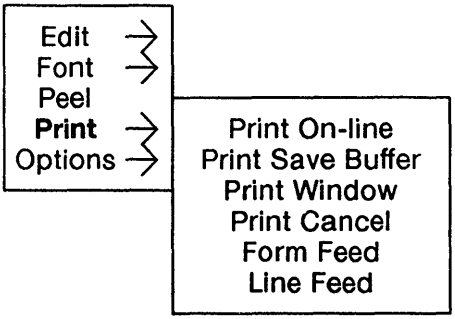

Figure 8–3 The Print Submenu

You can print using commands from a menu. The Print menu is actually a submenu of the Wproc+ mouse button 2 menu. To display the Print submenu, press mouse button 2 (Figure 8-3). While still pressing mouse button 2, slide the mouse (thus moving the mouse cursor) to highlight Print. Slide the mouse further to the right to display the Print submenu options. Select a command by sliding the mouse cursor to highlight the desired command and release mouse button 2. The selected command will appear with a checkmark beside it. Commands in "grayed" text are not available. The commands are:

Print On-line causes host data received in the active window to be sent to the printer. Data is printed until the Print Cancel option is selected or the host sends the reset escape sequence. Other print operations such as Print Window, Print Save Buffer, Form Feed, and Line Feed can be selected while Print On-line is active.

Print Save Buffer causes the current contents of the Save Buffer to be sent to the printer. If data is swept out of the window first, this data is place in the Save Buffer and sent to the printer.

Print Window causes the on-screen contents of the current window to be printed.

Print Cancel cancels any previous print command.

Form Feed sends a form feed and carriage return to the printer.

Line Feed sends a carriage return and line feed to the printer.

The message box, "No Memory", will be displayed if there is not enough memory to perform one of the printing operations.

Note: The printer icon in the window label is turned on while data is being sent to the printer. The icon remains in the label area until printing is terminated.

Printing Escape Sequences

Only one window at a time may use the printer. Control characters and escape sequences are used to enable and disable the printer, initiate printing, and determine printer status. These are listed below.

Printer On

DC2
turns the printer on-line. Text will be displayed in the window as well as being sent to the printer.

ESC [? 5 i
turns the printer on-line. Text will be displayed in the window as well as being sent to the printer.

ESC [? 5;1 i
turns the printer on-line. Text will be displayed in the window as well as being sent to the printer. Also returns the response, **ESC ? ps i**, where ps = 0 indicates the printer is available, and ps = 1 indicates the printer is not available.

Printer Off

DC4
turns the printer off-line if turned on-line by DC2.

ESC [? 4 i
turns the printer off-line if turned on-line by **ESC [? 5 i** or **ESC [5;1 i.**

Media Copy On

ESC [5 i
turns the printer on-line in Media Copy mode. In this mode, all keystrokes are sent to the host which determines whether the keystrokes are echoed to the printer. Received text is not displayed in the window but is sent directly to the printer port. The Expand Tabs and Filter Escape options are ignored.

ESC [? 5;2 i
performs the same function as ESC [? 5 i, but also returns the response, **ESC ? ps i**, where ps = 0 indicates the printer is available, and ps = 1 indicates the printer is not available.

Media Copy Off

ESC [4 i
turns Media Copy off without forwarding the sequence to the printer.

Print Window

The escape sequence, **ESC [0 i** causes the Wproc+ window to be printed.

Print Termination Mode

Print Termination Mode determines if the control character FORMFEED is sent to the printer at the finish of the print screen or print window command. Print Termination Mode is reset at power-up and after a reset.

ESC [? 18 h
sets print termination mode which causes a form feed to be sent after a print window command.

ESC [? 18 l
resets print termination mode which causes no form feed to be sent after a print window command.

Printer Extent Mode

Printer Extent Mode selects whether the full window or the scrolling region will be printed during a print window command. When the mode is set, the full window is printed with the Print Window command. When the mode is reset, only the scrolling region is printed with a Print Window command. Printer Extent Mode is set at power-up and after a reset.

ESC [? 19 h
sets the Printer Extent Mode (full window is printed).

ESC [? 19 l
resets the Printer Extent Mode (scroll region is printed).

Printer Status Request

The host can request the printer's status with the escape sequence, **ESC [? 15 n**. If the printer is ready, the terminal answers by sending the sequence, **ESC [? 10 n**. If the printer is not ready, the terminal responds with the sequence, **ESC [? 11 n**.

Supported Printers

The 730 MTG Terminal will operate with these AT&T Printer products:

- 5310/5320 Teleprinters
- 475 and 476 Printers
- 572 and 573 Printers
- 580, 581, 582, 583, and 593 Printers

Option settings for the 5310/5320 Teleprinters and the 475/476, 572/573, 582/583, 593 Printers are given below. For printer settings not covered in this chapter, see your printer's User's Guide.

AT&T 5310/5320 Teleprinters

Options for the 5310/5320 Teleprinters are set with the LCD display and buttons on the front of the printer. See the User's Guide for each printer for information about setting options. When using these printers, set the printer port to **no parity, 9600 baud**, and **8-bit** characters. If **even** or **odd** parity is selected, **7-bit** characters must be used.

Table 8–1 5310/5320 Options

Options	Settings	Notes
CPI	10	4
LPI	6	4
FLGT	66	4
LGMN	1	4
RMGN	80 132	Narrow paper Wide paper
TMGN	1	4
BMGN	66	4
CHAR	ASCII	4
ALTF	LINE	4
WRAP	YES	4
PCTL	NO	2
EMUL	ANSI	2
VIEW	MAN	2
LFON	NO	1
CRON	NO	1
CLHT		3
CLVT		3
HTAB	Don't care	4
VTAB		3
CMOD	NOMD	1
PRTY	NONE	2
BAUD	9600	2
FLOW	CHAR	1
SRTS	EIA	3
DC24	NO	1
DALM	NO	4
DEOT	NO	4
LP	NO	4

Options	Settings	Notes
ECHO	NO	1
RTRN		3
AUT1		3
AUT2		3
AUT3		3
AUT4		3
AUT5		3
AUT6		3

Notes:

1 Mandatory

2 Recommended

3 Not Applicable

4 Your choice (defaults listed).

AT&T 475 and AT&T 476

Options for the AT&T 475 and 476 are set by changing two sets of dip switches inside the top of the printer. See the User's Guide for each printer for information on dip-switch location and setting options. When using these printers, set the printer port to **even parity, 9600 baud**, and **8-bit characters.**

Table 8–2 475/476 Options

Options	Settings	Notes
SW1-1	OPEN	2
SW1-2	CLOSED	2
SW1-3	OPEN	2
SW1-4	OPEN	2
SW1-5	CLOSED	2
SW1-6	CLOSED	2
SW1-7	CLOSED	2
SW1-8	OPEN	1
SW2-1	CLOSED	2
SW2-2	OPEN	1
SW2-3	OPEN	2
SW2-4	OPEN	2
SW2-5	OPEN	2
SW2-6	OPEN	1
SW2-7	CLOSED	3
SW2-8	OPEN	1
SW21-1	OPEN	1
SW21-2	OPEN	1
SW21-3	OPEN	1
SW21-4	OPEN	1
SW21-5	DON'T CARE	3
SW21-6	CLOSED	1
SW21-7	OPEN	1
SW21-8	CLOSED	1
SW22-1	OPEN	1
SW22-2	OPEN	1
SW22-3	OPEN	1
SW22-4	Don't care	3

Options	Settings	Notes
SW23-1	CLOSED	1
SW23-2	OPEN	1
SW23-3	OPEN	2
SW23-4	OPEN	2
SW23-5	CLOSED	2
SW23-6	Don't care	3
SW24-1	OPEN	2
SW24-2	CLOSED	2
SW24-3	OPEN	2
SW24-4	CLOSED	2
SW24-5	CLOSED	2
SW24-6	OPEN	2
SW24-7	OPEN	2
SW24-8	CLOSED	2

Notes:

1 Mandatory

2 Recommended

3 Your choice

AT&T 572/573

Table 8–3 572/573 Options

FUNCTION NO.	OPTION	NOTES	MENU NO.	STATUS	NOTES
01	FORM LENGTH		09	11	
02	LPI		01	6	
03	CPI		01	10	
04	LQ OR NLQ		01	LQ	
05	BUZZER		01	ON	
06	FONT		02	FONTCART	
07	RESOLUTION		01	144	
11	BUFFER		02	N-LINE	
13	PW ON MODE		01	ON-LINE	
14	DIRECTION		01	BI-DIR.1	
15	BUF.FULL		02	LF + CR	
16	P.E.		01	ACTIVE	
17	AUTO CR		01	CR + LF	
18	ZERO		01	0	
22	AUTO LF		01	CR ONLY	
31	1" SKIP		01	OFF	
32	CHAR. SET (G0,GL)		02	USA	
33	CHAR. SET (G1,GR)		01	UK	
34	CHAR. SET (G2)		03	GE	
35	CHAR. SET (G3)		07	LINE DRAWING	
81	OFF-LINE STATE		01	ALL RECEIVE	
82	DSR		02	OFF	
83	RTS TIMING		01	RTS	
84	CD		02	OFF	
85	CTS		02	OFF	
91	OVER RUN		02	256	
92	DATA BIT		02	8	
93	PROTOCOL		03	XON/XOFF	
94	STOP BIT		01	1	
95	PARITY		01	NON	
96	BPS		01	9600	

AT&T 582/583

Table 8–4 582/583 Options

Opt No	Option Name	Table1	Table2	Notes
	PRINT-OUT SETTINGS			
01	EMULATION	LQ2500	PROPRINTER-XL24	
02	PRINT QUALITY	DRAFT	DRAFT	
03	LQ FONT	EXTERNAL	EXTERNAL	
04	SHAPE OF ZERO	0	0	
05	EPSON CHAR SET	USA	USA	
06	IBM CHAR SET	SET1	SET1	
07	POWER ON STAT	ON-LINE	ON-LINE	
08	BUZZER	ON	ON	
09	PER DIRECTION	BI1	BI1	
10	PRINT MODE	NOR	NOR	
11	DOUBLE HEIGHT	LOWER	LOWER	
12	CAN CODE	ON	ON	
13	IBM AGM SUPPET	OFF	OFF	
	FORMS SETTINGS			
01	PAGE LENGTH	11	11	
02	LPI	6	6	
03	CPI	10	10	
04	AUTO LF	OFF	OFF	
05	AUTO CR	OFF	OFF	
06	PRINT WIDTH	13.6	13.6	
07	1" SKIP	OFF	OFF	
08	BUFF. FULL LF	LF	LF	
09	PE DETECT	ON	ON	
10	LEFT MARGIN	0.00 INCHES	0.00 INCHES	
11	RIGHT MARGIN	13.60 INCHES	13.6 INCHES	
	INTERFACE SETTINGS			
01	I/F MODE	SERIAL	SERIAL	
02	BUFFER SIZE	16KB	16KB	
03	SELECT IN	ON	ON	
04	AUTO FEED XT	ON	ON	
05	PROTOCOL	XON/XOFF	XON/XOFF	
06	BAUD RATE	9600	9600	
07	DATA BITS	8	8	
08	PARITY CHECK	NONE	NONE	
09	STOP BITS	1	1	
10	CER SIGNAL	OFF	OFF	
11	CTS SIGNAL	OFF	OFF	
12	CD SIGNAL	OFF	OFF	
13	RTS TIMING	ON/OFF-LINE	ON/OFF-LINE	
14	DSR SIGNAL	OFF	OFF	
15	OVER-RUN BUFF	256	256	
16	RECEIVE DATE	MODE1	MODE1	
	DEFAULT SETTING			
01	DEFAULT SET	OFF	OFF	

AT&T 593

Table 8–5 593 Options

Control Panel Menu Status

Copies	1	Interface	Serial	
Paper Set	Letter		Baud Rate 9600	
Paper Thickness	Normal		Protocol XON/XOFF	
Orientation	Portrait		Data Bit 8 Bits	
Auto Continue	OFF		Parity Ignore	
Emulation	HPLJ2		Stop Bit 1 Bit	
Interface	Serial		Robust-XON ON	
Auto CR	LF + CR			
Auto LF	CR ONLY			
Hex Dump	OFF			
Data Buffer	8K Bytes			
Over Load Buffer	10 %			
Buzzer	OFF			

Table 8–6 593 Options, continued

HP Emulation Version 3.00A Status

Sub Function Menu Current Settings

Font Source	Internal	Copies	1	
Font Number	00	Paper Thickness	Normal	
Form Length	60 Lines	Orientation	Portrait	
Symbol Set	Roman-8	Line Termination	CR=CR	
			LF=CR+LF	
			FF=CR+FF	
		End of Line Wrap	Disable	
		Perforation Skip	Enable	

Current Page Format

Letter 8.5 x 11 inch

Vertical Horizontal

Page Length	66 Lines	Left Margin	0 Columns	
Top Margin	3 Lines	Right Margin	80 Columns	
Text Length	60 Lines	Current CPI	10 CPI	
Current LPI	6 LPI	Printable Chara	80 Characters	

Printing Quick Reference

If you are familiar with printing features, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Assign a printer port	Use the Printer submenu on the Main Terminal Menu.
Modify port options	Use Ports submenu on Setup Main Menu.
Print window	Use **Print Window** on Print submenu or use the escape sequence, **ESC [0 i**.
Print received data	Use **Print On-line** on Print submenu or use control characters or escape sequences.
Print Save Buffer	Use **Print Save Buffer** on Print submenu.
Cancel printing	Use **Print Cancel** on Print submenu or use control characters or escape sequences.
Media Copy On	Use the escape sequence, **ESC [5 i**.
Media Copy Off	Use the escape sequence, **ESC [4 i**.

Chapter 9: Label Window and PF Edit

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In This Chapter

The *Label Window* feature of the 730 MTG Terminal allows you to view User and System Function Key labels for the 98-, 102-, 102+1-, and 122-key keyboards. This enables the 730 MTG Terminal to be compatible with the 600 family of terminals. The Label Window can be moved and deleted just like any other window. Labels in the window can be programmed via escape sequences and User Fkeys also through *PF Edit* and its window, the other major topic in this chapter.

For a New User

This chapter will teach you how to display the Label Window, the PF Edit window, and how to program function keys for your terminal.

For an Experienced User

The Label Window is a new feature, so use this chapter to familiarize yourself with the new capabilities for displaying Function keys. PF Edit has also been expanded to allow programming of more Function keys and labels. A quick reference is provided at the end of this chapter.

Label Window Description

The Label Window is a *local window* that is the width of the screen (see Figure 9-1). Displayed in it are the labels for User or System Function keys (Fkeys) as selected for a current window. The number of Fkeys displayed depends on the keyboard being used and your preference.

Note: The Label Window is not reshapable.

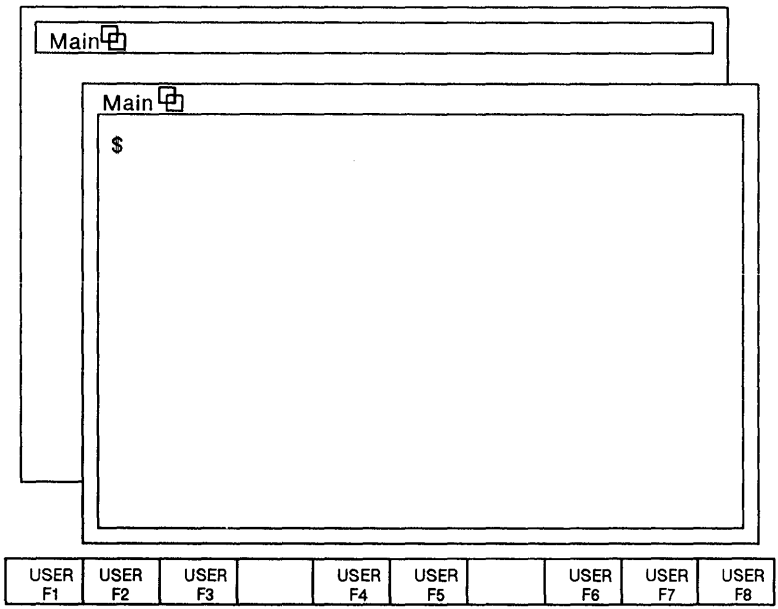

Figure 9–1 Label Window (general appearance)

Fkey Ranges

For the **122-key keyboard**, 24 Fkey labels are possible (Figure 9-2). For the **98-key keyboard**, 8, 10, or 14 Fkey labels are possible (Figure 9-3). For the **102- and 102+1-key keyboard**, 8, 12, or 14 Fkey labels are possible (Figure 9-4).

Switch Number of Labels

You can display each range of Fkey labels by clicking mouse button 2 with the mouse cursor within the label window. For example, when using the 98-key keyboard, to switch from displaying 8 Fkey labels to displaying 10 Fkey labels, click mouse button 2 once. To switch from 8 labels to 14 labels, click mouse button 2 twice. Your preference is automatically saved and is available the next time you power on.

USER PF13	USER PF 14	USER PF 15	USER PF 16	USER PF 17	USER PF 18	USER PF 19	USER PF 20	USER PF 21	USER PF 22	USER PF 23	USER PF 24
USER PF 1	USER PF 2	USER PF 3	USER PF 4	USER PF 5	USER PF 6	USER PF 7	USER PF 8	USER PF 9	USER PF 10	USER PF 11	USER PF 12

Figure 9–2 122-Key Keyboard Labels

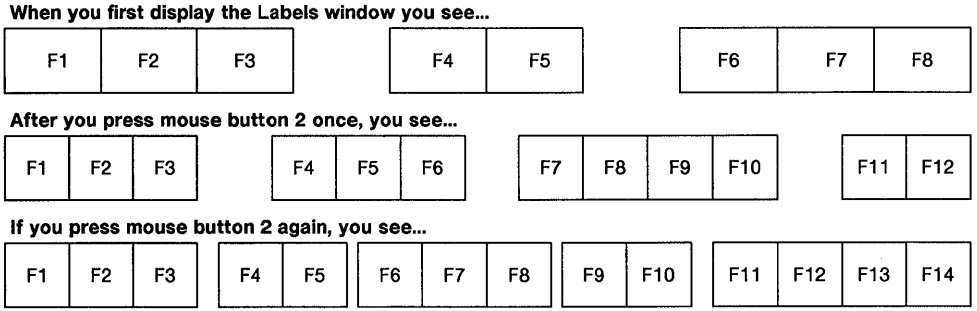

Figure 9–3 98-Key Keyboard Labels

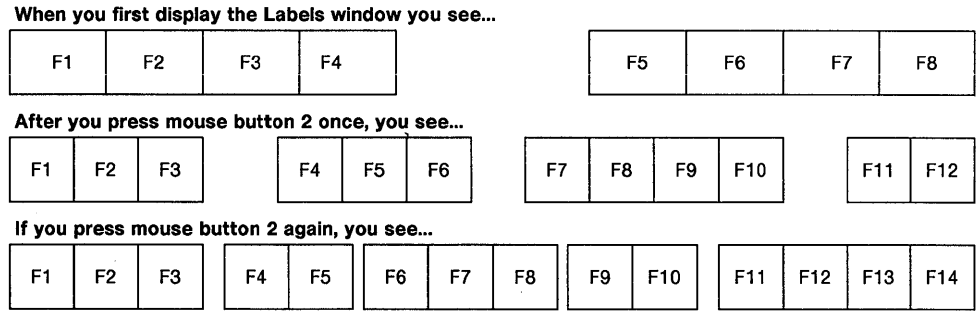

Figure 9–4 102- and 102+1-Key Keyboard Labels

User and System Fkeys

You can program User and System Fkeys. System Fkeys come programmed for you with 600-family terminal values. User Fkey values are initially all blank. Program User Fkeys using PFEdit or escape sequences. Program System Fkeys using escape sequences only. To display User Fkeys, press **CTRL-F6** (press the F6 key with the Control key depressed) on the 98-key keyboard. On the 102-, 102+1-, and 122-key keyboards, press **CTRL-F7**. To display System Fkeys, press **CTRL-F8** on all keyboards. Other CTRL-Fkeys do not have assigned functions.

You can also select which labels set to display using the escape sequence,

ESC [ps p

where **ps = 0** for System labels, **ps = 1** for User labels, and **ps = 2** for blank labels.

Definitions for User Fkey labels, after programming, are not changed when any window is deleted. System Fkey labels are lost when that window is deleted.

Note: User Fkeys do not support operations needing the Shift key.

Displaying the Label Window

On Power Up

On Power up, the Labels Window will be displayed if the Setup option, Power-on Labels, is set to **yes** (see Chapter 4, "Setup", for more information). This option is located under the Display submenu of the Setup main menu. The Label Window will appear at the bottom of the screen as shown in Figure 9-5. If the Power on window overlaps the Label Window, the Label Window will be Top. Make the Label Window current by clicking mouse button 1 when the mouse cursor is on top of the Label Window. On Power up and for new windows, the User Fkeys are displayed.

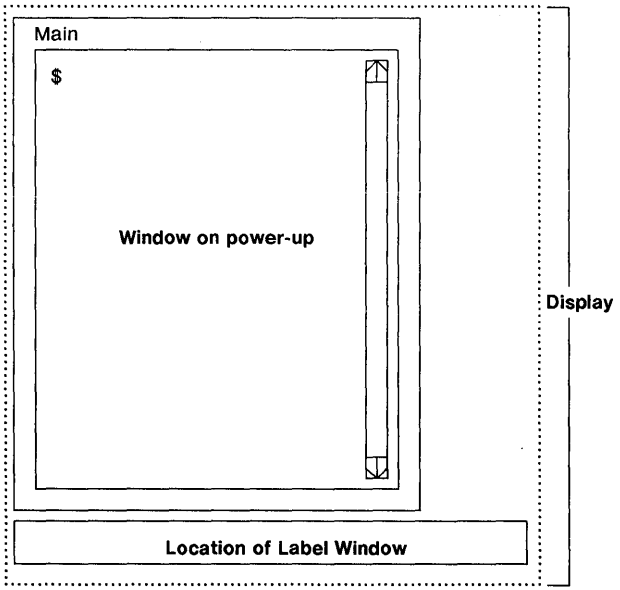

Figure 9–5 Location of Label Window on Power Up

From the More Submenu

If the Label Window is not displayed, you can create the Label Window using the Labels option on the More submenu of the Main Terminal Menu (see Figure 9-6). To select the Labels option, use the procedure described in Chapter 3. When mouse button 3 is released, the outline of the Label Window appears at the mouse cursor position. Click mouse button 3 to create the Labels Window. It will be Top and Current and display the User Fkey labels. Cancel Label Window creation at any time by clicking mouse buttons 1 or 2.

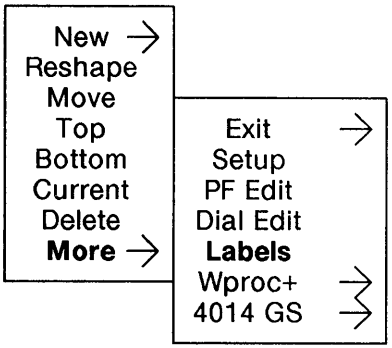

Figure 9–6 More Submenu and Labels Option

If the Labels Window was not previously displayed, the default number of labels is displayed depending on the keyboard in use. If the 98-key keyboard is in use, **8** Fkey labels are displayed. If the 102- or 102+1-key keyboard is in use, **8** Fkey labels are displayed. If the 122-key keyboard is in use, **24** Fkey labels are displayed.

Making the Labels Window Top and Current

If the Label Window is already displayed, selecting Labels from the More submenu will make the Labels Window Top and Current. You can also click mouse button 1 when the mouse cursor is over a visible part of the Labels Window.

If you are using the 730 MTG terminal with the 122-key keyboard, you can make the Labels Window Top and Current by using the Jump key on the keyboard.

Moving and Deleting the Labels Window

The Labels Window can be moved or deleted just like any other window. The Labels Window cannot be reshaped. If you try to reshape the Labels window, the message box, "Fixed size window: Cannot be reshaped", appears.

Programming the Fkeys

Program User Fkeys using PF Edit or escape sequences. Program System Fkeys using escape sequences only.

Using PF Edit

User Fkey labels can be defined using PF Edit. See the section at the end of this chapter.

Using Escape Sequences

Escape sequences can be used to program User and System Fkey labels and strings. Both 600 family and 630 MTG Version 1.1 User Fkey escape sequences will be supported. To select which group of escape sequences will be supported, use the Setup option PFkey Programming on the Keyboard submenu (see Figure 9-7). The following escape sequences are supported by the 730 MTG:

Download Labels and Strings (600 Family)
To define Labels and strings for the 600 family of terminals, first set the PFKey Programming option to **730 MTG**. Then use the escape sequence,

ESC [ps1;pn;ps2;ps3 q <label> <string>

where ps1 = Fkey Number, pn = String Length, ps2 = ignored, ps3 = 0 for System Fkeys, ps3 = 1 for User Fkeys, ps = 3 for Shifted System Fkeys, <label> = Label you want displayed, and <string> = string you want to download.

Note: A System Fkey string cannot be more than 8 characters long. If more than 8 characters are defined, the string length defaults to 8 characters.

The Label is a fixed length string of 16 characters except when a shifted System Fkey is programmed. Shifted System Fkeys cannot have labels. When programming a System Fkey, omit the <label> field when using the escape sequence above.

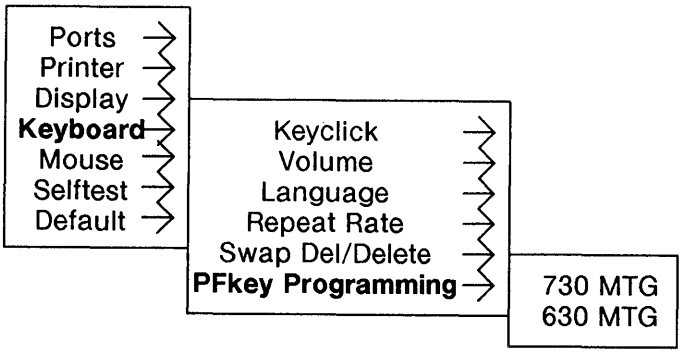

Figure 9–7 Keyboard Submenu

Download Strings (630 MTG Version 1.1)
To define User Fkey strings for the 630 MTG Version 1.1, first set the PFKey Programming option to **630 MTG**. Then use the escape sequence,

ESC [ps1;ps2 q <string>

where ps1 = Fkey Number, ps2 = String Length, and <string> = string you want to download.

Select Labels for Display
To display System or User Labels, use the escape sequence,

ESC [ps p

where ps = 0 for System Labels, ps = 1 for User Labels, and ps = 2 for Blank Labels.

Turn Labels On
To display labels, use the escape sequence,

ESC [? 13 l

Turn Labels Off
To blank labels, use the escape sequence,

ESC [? 13 h

PF Edit

Depending on the keyboard you are using (98-, 102-, 102+1-, or 122-key keyboard), you can program up to 24 User Fkeys on the 730 MTG Terminal. When the 98-, 102+1-, or 102-key keyboards are in use, up to 14 User Fkeys can be defined. When the 122-key keyboard is in use, up to 24 User Fkeys can be defined. User Fkeys can be programmed using the PF Edit Window (see Figure 9-8). The window can be moved or deleted like any other window, but it cannot be reshaped.

LABELS		USER	STRINGS
LINE 1	LINE 2	PFKEY	
USER	F1	PF1	
USER	F2	PF2	
USER	F3	PF3	
USER	F4	PF4	
USER	F5	PF5	
USER	F6	PF6	
etc.	*etc.*	*etc.*	

Figure 9–8 PF Edit Window showing Default User Fkeys

Each Fkey has a string and a label. The string is the sequence of characters transmitted when an Fkey is pressed. It can be up to 80 characters in length. The label is the text that appears for that Fkey in the Label Window. It can be up to 16 characters in length, defined in 2 lines of up to 8 characters each.

Entering PF Edit

From the More Submenu

To enter PF Edit when the PF Edit Window is not displayed, highlight the PF Edit option on the More submenu of the Main Terminal Menu (see Figure 9-9 and Chapter 3 for more instructions).

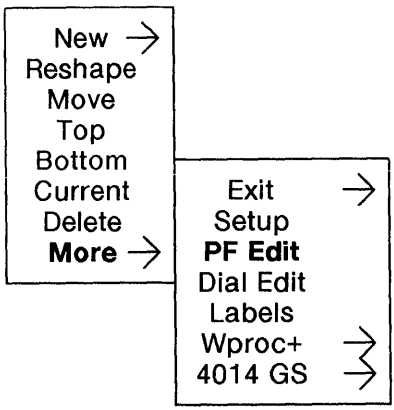

Figure 9–9 PF Edit Option on the More Submenu

When you release mouse button 3, the outline of the PF Edit Window appears. Position the window in the desired location. When you click mouse button 3, the PF Edit Window appears with the default (or current) label and string values for the User Fkeys. The mouse cursor changes to the I-beam cursor.

Making the PF Edit Window Top and Current

To enter PF Edit when the PF Edit Window is already displayed, highlight the PF Edit option on the More submenu of the Main Terminal Menu. The PF Edit Window will become Top and Current. Alternatively, click mouse button 1 while the mouse cursor is over a visible part of the PF Edit Window.

Exiting PF Edit

To exit PF Edit, delete the window using Delete on the Main Terminal Menu. Changes to Fkey definitions go into effect immediately.

Note: PF Edit only supports ASCII (GL) and ISO character sets.

Defining Labels and Strings

Defining with Default Values

Default label and string values are displayed on power up assuming you have not made any changes to labels and strings. Selecting a reset to default values from the Setup Menu does not reset the Fkey strings and labels to their default values. Use the Default option on the mouse button 2 PF Edit menu to reset the default values. Default values for the 600 family of terminals are shown in Figure 9-8.

Defining with Escape Sequences

See the section, "Using Escape Sequences", for a listing of escape sequences you can use to change User Fkey labels and strings.

Defining from the Keyboard

To change the values of strings or labels, the PF Edit cursor (the caret, or insert character) must be in the appropriate string or label field. When the PF Edit window is initially brought up, the text cursor will be placed at the beginning of the string for F1. To switch the cursor between label and string areas, click mouse button 1 when the mouse

cursor is placed on the desired area. The appropriate LABELS or STRINGS heading will appear in reverse video when that area is active.

To position the PF Edit cursor, position the mouse cursor on the word, line, or character at which you want to begin inserting text and click mouse button 1. Position the mouse cursor using the mouse. The PF Edit cursor can also be positioned using the arrow keys or the PF keys.

If text is located under the mouse cursor and mouse button 1 is clicked, the PF Edit cursor is placed to the side of the character (left or right) closest to the mouse cursor. If there is currently no text for the Fkey and mouse button 1 is clicked, the PF Edit cursor is placed at the beginning of the line for that key. If the mouse cursor is positioned past the end of the text and mouse button 1 is clicked, the PF Edit cursor is placed after the last character of the text.

When typing text for a label, the PF Edit cursor will advance to the start of line 2 when a character is typed in the last position of line 1. When a character is typed in the last position of line 2, and another character is typed, the last character in the label will be replaced, and the PF Edit cursor will remain in the same position. If text is entered when the PF Edit cursor is to the left of any existing label text, each new character entered causes the text to the right of the cursor to shift one position to the right.

If you make a mistake typing text, sweep text and use the Cut feature on the mouse button 2 menu.

Defining Using Cut and Paste

You may also insert label and string text using mouse button 2 cut and paste features (see Chapter 5). Use mouse button 1 to sweep out text, then cut as usual. Paste text after positioning the PF Edit Cursor in the desired location.

Label Window/PF Edit Quick Reference

If you are familiar with the Label Window and PF Edit, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Display Label Window from Power Up	Set Power-On Labels option to **yes**.
Display Label Window	Use Labels option on the More submenu.
Make Label Window top and current	Select Labels option from the More submenu **or** click mouse button 1 with mouse cursor over Label Window.
Switch number of labels	Click mouse button 2 when Label Window is current.
Display User Fkeys (98- and 122-key keyboards)	Press **CTRL-F6** or use the escape sequence **ESC [1 p**.
Display User Fkeys (102-key keyboard)	Press **CTRL-F7** or use the escape sequence **ESC [1 p**.
Display System Fkeys	Press **CTRL-F8** or use the escape sequence **ESC [0 p**.

To	Procedure
Download Labels and Strings (600 family)	Use the escape sequence **ESC [ps1;pn;ps2;ps3 q <label> <string>.**
Download Strings (630 V1.1)	Use the escape sequence **ESC [ps1;ps2 q <string>.**
Turn Labels On	Use the escape sequence **ESC [? 13 l.**
Turn Labels Off	Use the escape sequence **ESC [? 13 h.**
Display PF Edit Window	Use the PF Edit option on the More submenu.
Make PF Edit window top and current	Use the PF Edit option on the More submenu **or** click mouse button 1 when the mouse cursor is over the PF Edit window.
Switch PF Edit cursor between string and label field	Click mouse button 1 when the text cursor is in the desired field.
Exit Label or PF Edit Window	Delete the Label or PF Edit window.

Chapter 10: Dial Edit

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In This Chapter

This chapter outlines the *Dial Edit* feature for automating routine steps such as are used with modems or login procedures. The Dial Edit Window allows you to enter and edit scripts which automate these procedures.

For a New or Experienced User

Dial Edit is a new feature on the 730 MTG. Use this chapter and the accompanying quick reference to learn about this feature.

Introducing Dial Edit

The *Dial Edit* feature allows you to automate certain routine steps when using your modem or "logging in" to your host. For example, you can program your terminal to watch for the login prompt coming from the host and then automatically send your login information, relieving you from entering this yourself.

You automate these procedures by writing a *script* and storing it in the terminal memory. The script is an instruction or instructions to the terminal composed of pairs of **Rcv** strings (the pattern of characters the terminal is watching for) and **Send** strings (the group of characters the terminal will send back to the host when the Rcv pattern is matched). You can store up to 5 scripts in memory. Scripts are entered and edited in the Dial Edit Window.

The Dial Edit feature is available for use by the Main, Main2, TCP/IP, Aux, and StarLAN ports. It is not supported by the SSI port.

Entering Dial Edit

To enter Dial Edit and display the Dial Edit Window, select the Dial Edit option from the More submenu of the Main Terminal Menu (see Figure 10-1), using the procedures described in Chapter 3 of this User's Guide.

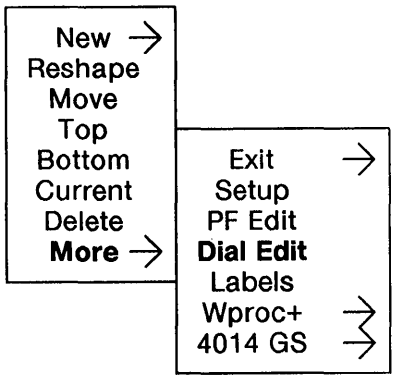

Figure 10–1 The More Submenu and Dial Edit Option

When mouse button 3 is released, the outline of the Dial Edit Window appears. Position the window as desired, then click mouse button 3. The Dial Edit Window is displayed (Figure 10-2). The mouse cursor changes to the "I-beam" cursor when positioned inside the Dial Edit Window. The Dial Edit editing cursor, the caret, appears on a Dial Edit script location.

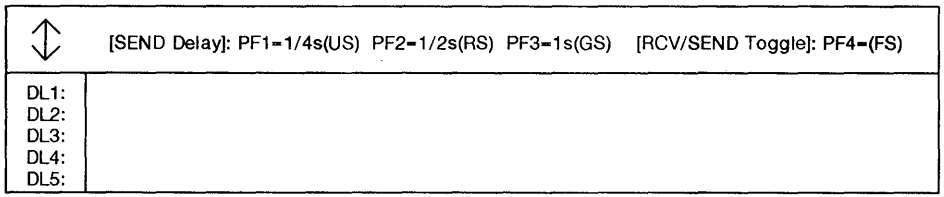

Figure 10–2 The Dial Edit Window

Exiting Dial Edit

To remove the Dial Edit Window, simply use the Delete command on the Main Terminal Menu, and delete as with all other windows.

Mouse Functions in Dial Edit

Button 1

Mouse button 1 is used to move the editing (caret) cursor or to sweep out text in a way similar to Wproc+ or PF Edit.

To move the cursor (caret) location, position the mouse (I-beam) cursor where you want to place the caret, and click mouse button 1.

To sweep out text, position the mouse cursor at the beginning of the text you wish to sweep. Press and hold mouse button 1 while dragging the mouse to highlight the desired text from left to right. When you are done highlighting, release mouse button 1. Save or cut this text as desired. Saved text can be pasted at the position of the caret cursor by choosing Paste from the button 2 menu.

Button 2

Mouse button 2 is used to display the Dial Edit menu (Figure 10-3). Press and hold mouse button 2 to display the menu. From this menu you can Paste, Save, and Cut text as in Wproc+ and PF Edit. You can also Monitor and Cancel script procedures (described below).

Figure 10–3 Dial Edit Menu

Button 3

Mouse button 3 is used to display the Dial Edit Port Menu (Figure 10-4). Press and hold mouse button 3 while the mouse is in the Dial Edit window to display the menu. From this menu you can set a script to run on the Main, Main2, StarLAN, TCP/IP or Aux ports (described below).

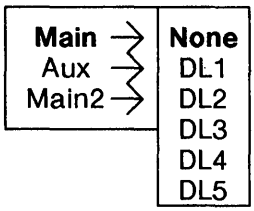

Figure 10–4 Dial Edit Port Menu

The Dial Edit Script

To create a script, enter alternating **Rcv** (Receive) and **Send** (Send) substrings separated by end-of-string characters. These are entered at the location of the caret cursor in the Dial Edit window. Delays can also be part of the Send string.

Note: Only ASCII (GL) and ISO (GR) character sets are supported.

Rcv and Send Strings

A script is a string of characters made up of **Rcv** and **Send** substrings. Each script can be up to 80 characters long. The Dial Edit Window can display up to 5 scripts, each to a line.

A script **always** starts with a Rcv string followed by its corresponding Send string. Both strings could be null strings. The delimiter used to indicate the end-of-string (between a Rcv and a Send), the character FS, is entered by pressing F4 on the keyboard. This character **cannot** be part of a string.

Note: To start a script with a Send, you must first enter a null Rcv string, then the Send string.

Inserting a Delay

When a Rcv string is matched, you may not want the terminal to send the corresponding Send string right away, since the host may not be ready to accept the string. Press F1, F2, or F3 to insert delays into a Send string of a script. These correspond to:

Press	Delay	Delay Character
F1	.25 second	US
F2	.5 second	RS
F3	1 second	GS

Delays are not sent to the host. You may specify a sequence of delays by using combinations of available delays to achieve longer times.

Simultaneous Keyboard Use

The keyboard can be used at the same time that a script is being used. For security reasons, never include passwords or other confidential information in scripts.

Editing a Script

You can modify Dial Edit scripts using local edit operations similar to those used in Wproc+. The edit cursor, or caret, serves as an insertion point for new characters entered from the keyboard. Characters will be entered before the current character. Insert the end-of-string character or any delay character by pressing the appropriate Fkey on the keyboard.

Use the Paste, Save, and Cut features on the Dial Edit mouse button 2 menu to paste, save, and cut text as in Wproc+ and PF Edit. To display the Dial Edit menu, press and hold mouse button 2 while the mouse cursor is over the dial edit window.

Dial Edit Operations

After creating a script, you may apply it to the Main, Main2, StarLAN, TCP/IP, or Aux ports. You may Run a script, Cancel/Terminate a script, or Monitor a script.

Running a Script

To run a script, use the Dial Edit Port menu on mouse button 3. Press and hold button 3 to display this menu. Highlight the desired Port, then slide the mouse to the right to display the option submenu for that port (Figure 10-5). Highlight the DL option (Dial Edit string you want to execute). If you select **none**, you will cancel Dial Edit for that port. Release button 3 when the desired script is highlighted. The message box, "Set *portname* DL*script number*", will appear. (For example, the message box, "Set Main DL1," indicates that the Main port will be running the script designated 1.)

Scripts only run in the initial window created from a port. Scripts start running when a port is opened. For example, if you run a script to log in, log out, and then log in again, the script will not run for the second login procedure. You must exit the host and use the New command on the Main Terminal Menu to re-create the initial window connected to that port. Then the script will run when the window is created. For the StarLAN port, the script is run whenever a new StarLAN port is opened. StarLAN supports up to 8 ports.

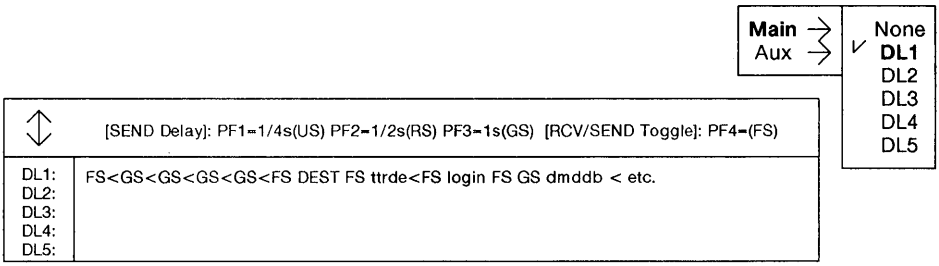

Figure 10–5 Running a Script

Cancel/Terminate a Script

Cancel a Currently Running Script

To cancel a currently running script, select the Cancel command on the Dial Edit button 2 menu. The mouse cursor is changed to the target cursor. Place the target cursor over the window for which you want to cancel a Dial Edit script. Click mouse button 2 to cancel the currently running script. The window will flash and the message box, "Dial Cancelled," will appear confirming the cancel operation. Click any mouse button to make the message box disappear.

Click mouse button 1 or 3, or click any mouse button with the target over the screen background to terminate a Cancel operation.

Note: If the target cursor is over a window not running a Dial Edit script, and mouse button 2 is clicked, the message box, "No Dial Running: Invalid Window," will be displayed. Click any mouse button to make the message box disappear.

Terminate a Script

To terminate a script, several options are available, including:

- Cancel the script using the Cancel command described above
- Run the script to the last Rcv/Send pair
- Invoke a download
- Invoke *layers*.

When a script is terminated, the monitor window (described below) is also deleted from the display.

Discontinue Dial Edit on a Port

To turn off the Dial Edit feature on a port, select the **none** option on the Dial Edit Port menu for the desired port. The Dial Edit feature for that port will be discontinued the next time that port is selected.

Monitoring a Script

The Monitor option on the mouse button 2 menu of Dial Edit allows you to monitor a running script to see what Rcv/Send pairs were processed and what pairs remain active.

To monitor a script, select the Monitor option on the button 2 menu. The mouse cursor will change to a target cursor. Position the target cursor over the window you wish to monitor. Click mouse button 2. The outline of the Monitor Window will appear (see Figure 10-6). Position the outline in the desired area of the display. Click mouse button 2 again to display the Monitor Window. If the target cursor is placed over a window not running a Dial Edit script, the message box, "No Dial Running: Invalid Window," will be displayed. To remove the message box, click any mouse button.

To cancel the Monitor operation, click mouse button 1 or 3, or click a mouse button with the target cursor over the screen background. When a script is finished running, the Monitor Window is automatically deleted.

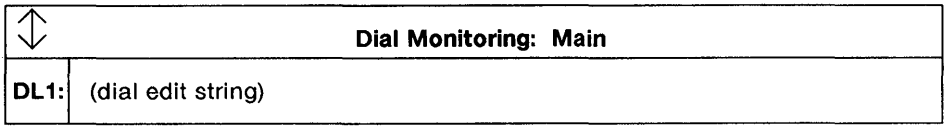

Figure 10–6 The Monitor Window

The Monitor Window consists of a label area, reverse video script number area, and the script area.

The label area contains the name of the port whose script is being monitored. The reverse-video script number area contains the script number. The script area contains the script. Script elements which have been already processed are displayed with normal intensity. Script elements yet to be processed are displayed in a "grayed" intensity.

Note: Characters after a timing delay are un-greyed after they are processed but before they are transmitted.

Dial Edit Quick Reference

When you are familiar with the Dial Edit feature, use this quick reference page to remind you of basic procedures. For more detail, refer to the appropriate section in this chapter.

To	Procedure
Enter Dial Edit	Use the Dial Edit option on the More submenu of the Main Terminal Menu.
Exit Dial Edit	Delete Dial Edit window.
Move caret cursor	Use mouse button 1.
Sweep out text	Use mouse button 1.
Display Dial Edit menu	Press **and hold** mouse button 2.
Display Dial Edit Port menu	Press **and hold** mouse button 3.
Insert a delay	Press F1 for .25 second. Press F2 for .5 second. Press F3 for 1 second.
Insert an end-of-string character	Press F4.

To	Procedure
Paste, Save, or Cut text	Use options on mouse button 2 Dial Edit menu.
Run a script	Use mouse button 3 Dial Edit Port menu. Select port. Select script (DL).
Cancel a script	Use the cancel command on the Dial Edit menu.
Turn off Dial Edit	Use the **none** option on the Dial Edit Port menu.
Display the Monitor Window	Use the **monitor** option on the Dial Edit menu.

Chapter 11: Maintenance and Troubleshooting

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In This Chapter

This chapter describes care of your 730 MTG terminal; testing the operability of the terminal, mouse, and keyboard; troubleshooting hints and techniques; and message boxes. Customer service information is listed in the last section of this chapter.

Care of the Terminal

Cleaning

Clean the display screen by dusting with a dry, soft cloth. Heavier contaminants such as fingerprints may be removed with detergent or glass cleaner.

Caution: Scouring pads, adhesives, abrasive cleaners, acid, cosmetics, and chlorinated solutions may damage the screen and the painted and unpainted parts of the terminal.

Spills

Be careful not to spill any liquid into the keyboard. **If a spill occurs, turn off the terminal immediately.** Disconnect the keyboard and turn it upside down to allow any liquid inside to drain. Leave the keyboard upside down for several hours until completely dry. After the drying time, go through a keyboard selftest. If the selftest fails, call your service representative.

Testing the Terminal

Automatic Selftest

The automatic selftest is executed each time you power on your terminal. The selftest checks the terminal control software, program memory, and communication ports.

When the test begins, the messages, "Selftest" and "730 MTG: Copyright 1989 - ATT" are displayed. The length of the selftest depends on the amount of RAM in your terminal (see the section, "Selftest Option in Setup," below). If the terminal passes selftest, the message, "Selftest Passed", appears on the screen.

If the terminal does not pass selftest, an error message (see below) describing which part of the test failed is displayed at the end of that failed test. At the end of all selftest procedures, the message, "Selftest Failed/Press any Key to Continue,"is displayed. Press any key. When possible, the terminal will then resume normal operation, creating the utemp window as described at the beginning of this User's Guide.

User-Initiated Selftest

You can perform the same tests on your terminal as the automatic selftest by simultaneously pressing the Shift, Control (CTRL), and Escape (ESC) keys on the keyboard.

When the test is completed, the terminal screen will appear as it does after power up.

Caution: This selftest causes a reset of the terminal. The reset will terminate all applications.

Selftest Option in Setup

Set this option on the Setup Ports submenu to determine how RAM is tested. With this option set to **full**, all of RAM is tested. With this option set to **partial**, only the first word of every block of data is tested. See Chapter 4, "Setup," for more information on this option.

Selftest Error Messages

If any portion of the selftest fails, an error message is displayed indicating the hardware failure. Possible messages are listed below.

Message	Meaning
Base ROM Checksum Error	The 256 standard EPROM failed. Replace the standard EPROM.
Personality ROM Checksum Error	The 128K Personality EPROM failed. Replace the Personality EPROM.
Expansion ROM Checksum Error	The EPROM on the expansion memory I/O failed. Replace the EPROM on the expansion card.
Cartridge ROM Checksum Error	The EPROM on the Append-mode cartridge failed. Replace the cartridge EPROM.
Base RAM Test Failed at 0xxxx	The 512K standard RAM failed, beginning at address Oxxxx. Replace your terminal.

Message	Meaning
Expansion RAM Test failed at 0xxxx	The expansion RAM failed, beginning at address 0xxxx. If the expansion RAM comes from the expansion RAM card, replace the card. If expansion RAM comes from the StarLAN or TCP/IP Network Access Unit, have the corresponding memory kit replaced based on the address reported on the error message (see figure, below). **Note:** In the case of the StarLAN or TCP/IP Network Access Units, replace the whole memory unit.
Battery RAM Test Failed	The 8K BRAM failed. Replace your terminal.
DUART Test Failed.	The Main and Aux ports failed. Replace your terminal.
SSI Test Failed.	The SSI/SIO card failed. Replace the card.

Address	Memory Configuration 0.5M	1M	2M	2.5M	4M
0x800000<=X<0x880000	1	1	1	1	1
0x880000<=X<0x900000	-	2	1	1	1
0x900000<=X<0xa00000	-	-	1	1	1
0xa00000<=X<0xa80000	-	-	-	2	2
0xa80000<=X<0xc00000	-	-	-	-	2

Figure 11–1 Expansion RAM Addresses

Note: For the above figure,

1 Replace the Memory Kit (2 SIMMs) nearest the edge of the NAU card.

2 Replace the Memory Kit (2 SIMMs) farthest from the edge of the NAU card.

Testing the Mouse

To test that the mouse is functioning properly, follow the steps below.

1. Move the mouse back and forth on your work surface. The arrow cursor on the screen should mimic the movement of the mouse.
2. Move the mouse cursor so that it is positioned over the screen background.
3. Press and hold mouse button 3. The Main Terminal Menu should appear.
4. Continuing to hold mouse button 3, move the mouse so that the arrow cursor is outside the menu.
5. Release mouse button 3. The menu will disappear.

Testing the Keyboard

To test the keyboard, click mouse button 1 with the mouse cursor over a wproc+ window. The window will be made top and current. Then click mouse button 1 again to put the window in Local Edit mode. If the keyboard is operating properly, typed characters will be echoed in the window. Control characters will only be visible if the Controls option (under the Display submenu of the Setup Main Menu) is set to **visible**. Press the Escape key (ESC) to return the window to normal operating mode.

Troubleshooting

Before calling for service, check the general operability of the terminal using the procedures described above. In addition,

- Make sure the AC power cord is plugged in
- Make sure the power switch is ON
- Verify that the video connector is fitted properly
- Check if other terminals at your location are having the same problem
- Make sure brightness and contrast are turned up.

If trouble still exists after checking the items above and performing the selftest, report the trouble to your service representative, giving as much information about the problem as possible. Some common problems and their solutions are described on the next two pages.

Condition	Solutions
Screen is blank	Press any key to redraw the screen. Adjust brightness and contrast. Check that the AC power cord is connected and that the AC power switch is ON.
No keyboard response in the *utemp* window	Check that the keyboard is connected to the terminal. Check that the modem cable (if used) is connected to the selected physical port. Check that the Scroll Lock key is **off** (the LED will not be lit).
No keyboard response in other *layers* windows	Peel any windows to that host that contain text you want to keep, then use the Exit option on the More submenu of the Main Terminal menu.
Device Busy message after typing *layers*	Check that the Parity and Bits/Char options match the stty option. Otherwise, set Parity = **space** and Bits/Char = **7**.

Condition	Solutions
Firmware Mismatch message after typing *layers*	See Appendix I, "Software Support", for more instructions.
Bell rings when typing	Check that a Current window exists. Check that the current window is not the Setup Icon window.
Process Exception message in the bottom of a window	Make that window Current and press any key to continue.
System Exception message	Press any key to reset the terminal. All host sessions and currently running applications are terminated.
Ghost menu caused by insufficient memory	Delete a window and try again.
Sluggish performance	Reduce the number of overlapping windows. Non-overlapping windows are more efficient than overlapping ones.
Terminal appears stopped	Complete the current window operation or release the mouse button.
All solutions fail	Turn the terminal off. Power on after 30 seconds have elapsed.

Condition	Solutions
ASCII rather than ISO or special character displayed	If using a downloaded font, add the ISO or Special Character set for that font. Downloaded fonts greater than 128 characters are loaded into G0 and G2 with GL mapped to G0 and GR mapped to G2.
Main2 or SSI malfunction	Ensure that the SSI/EIA card ribbon cable is securely connected.
Unexpected character attributes at Send/Paste destination	**Reminder:** Destination receives characters without attributes.
Unexpected character attributes during scrolling	**Reminder:** Blinking stops. Bold and subdued attributes are maintained.
Unexpected character attributes after a Peel	**Reminder:** A Peeled window behaves similarly to a scrolling window. See reminder, above. The original window returns to an attributes **off** state.
Attributes lost when switching between emulations	Your application must re-set character attributes upon return from another emulation.
Strange results when downloading into a 4014 GS window	Download is only successful in Wproc+ windows.

Message Boxes

Message boxes usually refer to failed operations or operations that are not possible. They will appear to replace the mouse cursor after the operation is attempted. They are a useful source of troubleshooting information. To remove a message box and return the mouse to its normal state, click any mouse button. The most commonly appearing message boxes are listed below, along with their explanation and recovery procedure.

Message Box	Meaning
Swept window too small	A swept or reshaped window is smaller than the minimum size. Re-sweep or reshape the window.
No memory	A number of errors include: Not enough memory to create a window. Not enough memory to reshape a window. Not enough memory to move a window. Not enough memory to complete a Paste. Not enough memory to save text. Not enough memory to print a window or text. To recover, delete some open applications or terminate an on-going operation. Then try your feature again.
Fixed size window: cannot be reshaped	A reshape operation is not allowed, as with the Label Window. Do not attempt to reshape.
Delete not allowed: sole window of active host	This is the last window on the display. To delete this window, use Exit on the More submenu of the Main Terminal Menu.

Message Box	Meaning
Set *port*/DL*x* (where *port* is the port name and *x* is a Dial Edit script number)	Appears after a Dial Edit script is selected to run in a window. Click any button to continue.
No Dial running: invalid window	No Dial Edit script is running in the targeted window. To recover, click any button to continue, then assign a script to that window if desired.
Dial Cancelled	Appears when a Dial Edit Cancel is called. Click to confirm.

Customer Service Information

If you continue having a problem with your 730 MTG terminal that is not covered by information in this chapter, or if the troubleshooting techniques in this chapter identified a problem needing outside service, contact either of the following ATT Information Systems Service Organizations.

For terminals connected to an ATT processor, contact the National Software Support Center (NSSC) on:

1-800-922-0354

For terminals connected to a non-ATT processor, contact the Customer Service Support Organization (CSSO) on:

1-800-242-2121

Appendix A: Control Characters

Contents

Wproc+ Control Characters A–1

4014 GS Control Characters A–4

Appendix A: Control Characters

Wproc+ Control Characters

In the tables that follow, "No action" implies that the control character is displayed, but not acted on by the terminal. The way in which control characters are displayed depends on the setting of the Controls option on the Options submenu of the Wproc+ mouse button 2 menu.

Table A–1 Wproc+ Control Characters

Character	Action
NUL	No action
SOH	No action
STX	No action
ETX	No action
EOT	No action
ENQ	No action
ACK	No action
BEL	Rings the bell
BS	Backspace
HT	Horizontal tab
LF	Action depends on Received Newline option setting
VT	Action depends on Received Newline option setting
FF	Action depends on Received Newline option setting
CR	Carriage Return
SO	Map G0 into GL
SI	Map G1 into GL

Table A–2 Wproc+ Control Characters

Character	Action
DLE	No action
DC1	Flow Control Setup Option has affect
DC2	Turn Printer on-line
DC3	Flow Control Setup Option has affect
DC4	Turn Printer off-line
NAK	No action
SYN	No action
ETB	No action
CAN	Cancel escape sequence parsing
EM	No action
SUB	Cancel escape sequence parsing
ESC	Begin escape sequence parsing
FS	No action
GS	No action
RS	No action
US	No action
C1 Control Characters (8-bit)	
IND	Index
NEL	New line -- move cursor to column 1 of next line
RI	Reverse Index
SS2	Single shift G2 to GL
SS3	Single shift G3 to GL
CSI	Begin control sequence parsing (same as ESC [)

4014 GS Control Characters

In the tables that follow, "No action" implies that the control character is displayed, but not acted on by the terminal.

Table A–3 4014 GS Control Characters

Character	Action
ACK	No action
BEL	*In Alpha Mode* Rings bell *In Graph Mode* Rings bell *In Bypass Condition* Rings bell; clears Bypass Condition *Following ESC Character* Rings bell
BS (Backspace)	*In Alpha Mode* Causes the cursor to move left one character space. Backspacing past the left margin causes the cursor to move to the right side of the screen. *Following ESC Character* Moves one space left

Character	Action
CAN (Bypass Condition)	*Following ESC Character* Activates Bypass Mode to inhibit emulator response to echoed data.
CR (Return)	*In Alpha Mode* Returns cursor to the left margin (Margin 1 or Margin 2, whichever is active). If the CR definition option is set to CR/LF, CR causes LF in addition to CR. If in another mode, CR sets Alpha Mode, cancels the crosshair cursor, and leaves the terminal with either Margin 1 or Margin 2 active. *In Graph Mode* Resets emulator to Alpha Mode, cancels crosshair cursor, sets the Alpha cursor to the next text line of Margin 1 if a vector has been executed while in Graph Mode *In Bypass Condition* Clears Bypass Condition *Following ESC Character* Instructs emulator to ignore any further CRs. To get out of this mode, send BEL, or some other non-operative control character that will change the mode selected. *In Point Plot Mode* Resets emulator to Alpha Mode, sets the Alpha cursor to the next text line of margin 1 if a point was executed while in Point Plot.

Character	Action
CR, cont'd (Return)	*In Incremental Point Plot Mode* Resets emulator to Alpha Mode, sets the Alpha cursor to the next text line of margin 1 if a point was executed while in Incremental Point Plot.
DC1	No action
DC2	No action
DC3	No action
DC4	No action
DLE	No action
EM	No action
ENQ (GIN Request)	*Following ESC Character in Alpha Mode* Sends emulator status and address of lower left corner of the Alpha cursor to the host. *Following ESC Character in Graph Mode* Sends emulator status and address of the current drawing position to the host. *Following ESC Character in GIN Mode* Sends emulator status and address of the crosshair cursor to the host.
EOT	No action
ESC	*In Alpha Mode* Emulator "arming" character which makes the emulator sensitive to certain control characters received immediately after the ESC.

Character	Action
ETB	*Following ESC Character* Hardcopy Request: This is not supported on the 730 MTG.
ETX	No action
FF (Page)	*Following ESC Character in Bypass Condition* Clears Bypass Condition *Following ESC Character in Alpha Mode* Homes the 4014 Alpha cursor and erases the screen. *Following ESC Character in Graph Mode* Erases the screen, selects Alpha Mode, sets the cursor to home position, and sets Margin 1.
FS (Point Plot)	*In Alpha Mode* Enter Point Plot Mode *In Graph Mode* Enter Point Plot Mode
FS (Special Point Plot)	*Following ESC Character in Alpha Mode* Enter Special Point Plot Mode *Following ESC Character in Point Plot Mode* Enter Special Point Plot Mode *In Graph Mode* Enter Special Point Plot Mode
GS (Graph Mode)	*In Alpha Mode* Enter Graph Mode and set for dark vector

Character	Action
GS,cont'd (Graph Mode)	*In Graph Mode* Set for dark vector *In Bypass Condition* Enter Graph Mode and set for dark vector *Following ESC Character* Enter Graph Mode and set for dark vector
HT	*In Alpha Mode* Move one space right - spacing past end of a line causes an automatic line feed/carriage return. *Following ESC Character* Move one space right - spacing past end of a line causes an automatic line feed/carriage return.
LF	*In Alpha Mode* Move cursor down one line - if cursor moves past the bottom of the display, it "wraps around" and appears at the top of the display, selecting the alternate margin. If the CR/LF on LF option is selected, LF causes CR in addition to LF. *In Bypass Condition* Same as Alpha Mode. Clears Bypass Condition. *Following ESC Character* Same effect as CR.
NAK	No action
NUL	No action

Character	Action
RS (Incremental Point Plot)	*In Alpha Mode* Enter Incremental Plot Mode.
	In Graph Mode Enter Incremental Plot Mode
	In Bypass Condition Enter Incremental Plot Mode
SI	*In Bypass Condition* Clears Bypass Condition
SOH	No action
STX	No action
SUB (GIN Mode)	*Following ESC Character* Sets GIN Mode, starts the crosshair cursor and activates Bypass Condition.
SYN	No action

Character	Action
US	*In Alpha Mode* No action *In Graph Mode* Reset to Alpha Mode leaving the Alpha cursor at the last Vector substate address. or at the last Point Plot substate address. *In Bypass Condition* Clears Bypass Condition *Following ESC Character* Reset to Alpha Mode.
VT	*In Alpha Mode* Causes reverse line feed until the top of the window is reached.

Appendix B: Escape Sequence Reference

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Appendix B: Escape Sequence Reference

Wproc+ Escape Sequence Listing

Character Attributes

Character Attributes	ESC [ps m where ps = 0, Normal ps = 1, Bold ps = 2, Subdued ps = 4, Underline ps = 5, Blink ps = 7, Reverse Video ps = 8, Blank ps = 22, No Bold, Subdued, or Blank ps = 24, No Underline ps = 25, No Blink ps = 27, No Reverse Video ps = 28, No Blank, Bold, or Subdued

Note: Bold, subdued, and blank are mutually exclusive.

Cursor Contents Report

ESC [? 7 n

Response is
ESC P f;c1;c2;sa;ga;ca ESC
with parameters explained below.

Parameter	Value	Description
f (Font)	A	United Kingdom
	B	ASCII
	9 or Q	Canadian/French
	0	Special Line Drawing
	1	Securities Industry
	}	Mosaic
	<	ISO Latin-1
c1 (Hex Digit)	[0 to 9], [A to F]	ASCII encoded hex digit
c2 (Hex Digit)	[0 to 7], [A to F]	ASCII encoded hex digit
sa (Line Size)	3	Top, double high double wide
	4	Bottom, double high double wide
	5	Single high single wide
	6	Single high double wide
ga (General Attributes)	Bits 1-5	Reserved
	Bit 6	Extension Indicator = 0
		0 = No more ga data
		1 = Another byte follows
	Bit 7	1
	Bit 8	0 = 8-bit environment
		Parity in 7-bit environment

Parameter	Value	Description
ca (Character Attributes, byte 1)	Bit 1 *Bold*	0 = off, 1 = on
	Bit 2 *Underline*	0 = off, 1 = on
	Bit 3 *Blinking*	0 = off, 1 = on
	Bit 4 *Reverse Video*	0 = off, 1 = on
	Bit 5	0
	Bit 6 *Extension Indicator*	0 = No more ca data
		1 = One byte follows
	Bit 7	1
	Bit 8	7-bit environ. = Parity
		8-bit environ. = 0
ca (Character Attributes, byte 2)	Bit 1 *Subdued*	0 = off, 1 = on
	Bit 2 *Blank*	0 = off, 1 = on
	Bit 6 *Extension Indicator*	0 = No more ca data
		1 = One byte follows
	Bit 7	1
	Bit 8	7-bit environment = Parity
		8-bit environ. = 0

Cursor Information Report

ESC [1 $ w

Response is
ESC P 1 $ u Pr;
Pc;Pp;Srend;Satt;Sflag;
Pgl;Pgr;Scss;Sdesig ESC
with parameters described below.

Parameter	Value	Description
Pr (Cursor Row Number)	1	First row
Pc (Cursor Col Number)	1	First column
Pp (Cursor Page Number)	1	First or only page
Srend (Character Attributes)	Bit 1 *Bold*	0 = off, 1 = on
	Bit 2 *Underline*	0 = off, 1 = on
	Bit 3 *Blinking*	0 = off, 1 = on
	Bit 4 *Reverse Video*	0 = off, 1 = on
	Bit 5	0
	Bit 6 *Extension Indicator*	0 = No more ca data
		1 = One byte follows
	Bit 7	1
	Bit 8	7-bit environ. = Parity
		8-bit environ. = 0
Satt (Selective Erase Attributes)	Bit 1 *Selective Erase*	0 = off, 1 = on
	Bit 6 *Extension Indicator*	0 = no more data
		1 = one more byte of data
	Bit 7	1
	Bit 8 *7-bit environ.*	Parity bit
	Bit 8 *8-bit environ.*	0

Parameter	Value	Description
Sflag (Status Flags)	Bit 1 *Origin Mode*	0 = reset
		1 = set
	Bit 2 *Single Shift 2*	0 = not pending
		1 = pending
	Bit 3 *Single Shift 3*	0 = not pending
		1 = pending
	Bit 4 *Autowrap*	0 = not pending
		1 = pending
	Bit 5	0
	Bit 6 *Extension Indic.*	0 = no more data
		1 = one more byte of data
	Bit 7 *7-bit environ.*	Parity bit
	Bit 8 *8-bit environ.*	0
Pgl (Graphics Left Mapping)	space	Terminal with no GL
	0	G0 mapped to GL
	1	G1 mapped to GL
	2	G2 mapped to GL
	3	G3 mapped to GL
Pgr (Graphics Right Mapping)	space	Terminal with no GR
	0	G0 mapped to GR
	1	G1 mapped to GR
	2	G2 mapped to GR
	3	G3 mapped to GR

Parameter	Value	Description
Scss (Status Flags)	Bit 1 *GO Size*	0 = 94 chars. 1 = 96 chars.
	Bit 2 *G1 Size*	0 = 94 chars. 1 = 96 chars.
	Bit 3 *G2 Size*	0 = 94 chars. 1 = 96 chars.
	Bit 4 *G3 Size*	0 = 94 chars. 1 = 96 chars.
	Bit 5	0
	Bit 6 *Extension Indic.*	0 = no more data 1 = one more byte of data
	Bit 7 *7-bit environ.*	Parity bit
	Bit 8 *8-bit environ.*	0
Sdesig (Character Set)	space	Terminal with no Gx
	}	Mosaic
	1	Securities
	0,1, or 2 intermediate characters (20-2F hex) and a final character (30-7E hex)	Downloaded font
	B	US ASCII
	<	ISO Latin-1
	0	Special
	A	UK
	9 or Q	CAN/French

Editing Functions

Insert Mode	ESC [4 h *to enter mode* ESC [4 l *to exit mode*
Newline	ESC E
Autowrap	ESC [? 7 h *for on* ESC [? 7 l *for off*
Cursor Positioning	ESC [line;column H *or* ESC [line;column f
Cursor Up	ESC [pn A where pn = number of lines
Cursor Down	ESC [pn B where pn = number of lines
Cursor Right	ESC [pn C where pn = number of spaces
Cursor Left	ESC [pn D where pn = number of spaces
Index	ESC D
Reverse Index	ESC M
Backtab	ESC [pn Z pn = number of backtabs
Clear Window	ESC [ps J where ps = 0, cursor to end of buffer ps = 1, beginning of window to cursor ps = 2, entire window and buffer
Cursor Save/Recall	ESC 7 *for save* ESC 8 *for recall*

Line Insert	ESC [pn L where pn = number of lines
Line Delete	ESC [pn M pn = number of lines
Repeat Character	ESC [pn b where pn = number of repeats of last character received
Clear Line	ESC [ps K where ps = 0, cursor to end of line ps = 1, beginning of line to/and cu ps = 2, clear entire line
Character Delete	ESC [pn P pn = number of characters with default of 1
Character Insert	ESC [pn @ pn = number of characters with default of 1

Emulation Entrance

Scaled 4014 Emulation	ESC [? 2 f
Clipped 4014 Emulation	ESC [? 2 g

Font

Inquire Terminal Fonts	ESC [? 0;ps2 u *font name* where ps2 = length of font name Terminal responds with ESC [? ps1;ps2 w *font name* ps1 = 0, font not available ps1 = 1, font in terminal ps1 = 2, font in current use in the window ps2 = length of font name
Set Terminal Fonts	ESC [? 1;ps2 u *font name* ps2 = length of font name

Keyboard Support

Alternate Keypad Mode	ESC =
Numeric Keypad Mode	ESC >
Keyboard Lock/Unlock	ESC [2 h *for lock* ESC [2 l *for unlock*
Key Click	ESC [? 16 h *for on* ESC [? 16 l *for off*

Labels Window

Select Function Labels	ESC [ps p where ps = 0, System labels ps = 1, User labels ps = 2, Blank labels
Labels On/Off	ESC [? 13 l *for on* ESC [? 13 h *for off*

Line Attributes

Single Wide Line	ESC # 5
Double Wide Line	ESC # 6
Double High Double Wide Line	ESC # 3 *for top half* ESC # 4 *for bottom half*

Programmable Options

Select 7-bit Controls	ESC [? 31 l
Select 8-bit Controls	ESC [? 31 h

Program

Program Enter Key	ESC [25;ps2 | *string* where ps2 = number of characters, max of 4
Program PF key (with PF key Programming option set to **630 MTG**)	ESC [ps1;ps2 q *string* where ps1 = key number (1-8) ps2 = length of string, max of 80

Program, continued

Program PF key (with PF key Programming option set to **730 MTG**)	ESC [ps1;pn;ps2;ps3 q *label string* ps1 = key number pn = string length for System and Shifted System, maximum of 8 characters for User, maximum of 80 ps2 = ignored ps3 = 0, program Sys Fkey ps3 = 1, program User Fkey ps3 = 2, program Shifted System Fkey (no label) *label* = 16 chars
Program Menu	ESC [? ps1;ps2;ps3 x *item string* where ps1 = length of item ps2 = length of string ps3 = menu depth (0-3) **Note:** First item must be depth 0. If all psX = 0, all previous menu items cleared.
Program Label Area	ESC [? ps1;ps2 v *text* ps1 = length of text ps2 = 0, left justify text ps2 = 1, center justify text ps2 = 2, right justify text

Download of Options ESC [ps1;ps2 | Return	ESC [8;ps2 | where ps2 = 0, CR ps2 = 1, LF ps2 = 2, CR and LF
Local Echo	ESC [12 h *for off* ESC [12 l *for on*
Monitor Mode	ESC [13 h *for on* ESC [13 l *for off*
Newline on Linefeed	ESC [20 h *for yes* ESC [20 l *for no*
Columns	ESC [? 3 h *for 132 columns* ESC [? 3 l *for 80 columns*
Reverse Video	ESC [? 5 h *for on* ESC [? 5 l *for off*
Block/Underline Cursor	ESC [? 11 h *for underscore* ESC [? 11 l *for block*
Cursor Steady/Blink	ESC [? 12 h *for blink* ESC [? 12 l *for steady*
Cursor On/Off	ESC [? 25 h *for visible* ESC [? 25 l *for invisible*
Set Character Set	ESC [? 42 h *for National* ESC [? 42 l *for Multinational*

Speed	ESC [1;ps2 | where ps2 = 0, 1200 Baud ps2 = 1, 2400 Baud ps2 = 2, 4800 Baud ps2 = 3, 9600 Baud ps2 = 4, 19200 Baud ps2 = 6, 300 Baud
Send Parity	ESC [3;ps2 | where ps2 = 0, Even ps2 = 1, Odd ps2 = 2, Mark ps2 = 3, Space ps2 = 4, None
Bits/Char	ESC [? 17 h for 8 bits ESC [? 17 l for 7 bits
Generate Flow	ESC [? 21 h *for on* ESC [? 21 l *for off*
Receive Flow	ESC [? 22h *for on* ESC [? 22 l *for off*
Upload Options	ESC [ps1 ps2 ... ps40 s where ps1 = I/O card option value ps1 = 0, Option does not exist ps2 = 1, 1200 baud ps2 = 2, 2400 baud ps2 = 3, 4800 baud ps2 = 4, 9600 baud ps2 = 5, 19200 baud ps2 = 7, 300 baud ps3 = 1, even parity ps3 = 2, odd parity ps3 = 3, mark parity ps3 = 4, space parity

ps3 = 5, no parity

ps4 = 1, no check parity
ps4 = 2, check parity

ps5 = 1, local echo off
ps5 = 2, local echo on

ps6 = 1, monitor mode off
ps6 = 2, monitor mode on

ps7 = 1, autowrap on
ps7 = 2, autowrap off

ps8 = 1, no newline on LF
ps8 = 2, newline on LF

ps9 = 1, return key, CR
ps9 = 2, return key, LF
ps9 = 3, return key, CR/LF

ps10 = cartridge option value
ps10 = 0, no option

ps11 = 0, if not 80 or 132
ps11 = 1, 80
ps11 = 2, 132

ps12 = scrolling option value
ps12 = 0, no option

ps13 = 1, normal video
ps13 = 2, reverse video

ps14 = 1, kboard volume 4
ps14 = 2, kboard volume 5
ps14 = 3, kboard volume 6
ps14 = 4, kboard volume 7
ps14 = 5, kboard volume off

ps14 = 6, kboard volume 1
ps14 = 7, kboard volume 2
ps14 = 8, kboard volume 3

ps15 = 1, key click off
ps15 = 2, key click on

ps16 = 1, block cursor
ps16 = 2, line cursor

ps17 = 1, nonblink cursor
ps17 = 2, blink cursor

ps18 = 1, labels on
ps18 = 2, labels off

ps19 = 7 bits/character
ps19 = 8 bits/character

ps20 = transmission value
ps20 = 0, no option

ps21 = edit keys
ps21 = 0, no option

ps22 = number of stop bits
ps22 = 0, no option

ps23 = 1, encoding off
ps23 = 2, encoding on

ps24 = 0, gen flow RTS
ps24 = 1, gen flow Xon/Xoff
ps24 = 2, gen flow off

ps25 = 0, rec flow CTS
ps25 = 1, rec flow off
ps25 = 2, rec flow Xon/Xoff

ps26 = pass flow value
ps26 = 0, no option

ps27 = mouse movmt option
ps27 = 0, no option

ps28 = 0, no swap/sw del option
ps28 = 1, no swap/sw del
ps28 = 2, yes swap/sw del

ps29 = printer opt. value
ps29 = 0, no option

ps30 = alarm option value
ps30 = 0, no option

ps31 = printer speed
ps31 = 0, no option

ps32 = printer parity
ps32 = 0, no option

ps33 = Aux port data bits
ps33 = 0, no option

ps34 = Terminal mode option
ps34 = 0, no option

ps35 = same as ps28

ps36 = Backspace Mode option
ps36 = 0, no option

ps37 = Main Flow Type option
ps37 = 0, no option

ps38 = Kboard Language
ps38 = 0, no option
ps38 = 1, US

ps38 = 3, CAN/French

ps39 = Char Set Option
ps39 = 0, no option
ps39 = 1, Multinational
ps39 = 2, National

ps40 = 0, option does not exist
ps40 = 1, 7-bit controls
ps40 = 2, 8-bit controls

Save/Restore Options

ESC Q *for saving*
ESC R *for restored, saved options*

Printer

Printer On	ESC [? 5 i
Printer On Request	ESC [? 5;1i
Printer Off	ESC [? 4i
Media Copy On	ESC [5 i
Media Copy On Request	ESC [5;2i
Media Copy Off	ESC [4i
Print Termination Mode	ESC [? 18 l *for no form feed* ESC [? 18 h *for form feed*
Printer Extent Mode	ESC [? 19 l *for scroll region* ESC [? 19 h *for full window*
Printer Status Request	ESC [? 15 n Response is: ESC [? 10 n *for printer ready* ESC [? 11 n *for printer not ready*
Print Window	ESC [0 i

Requests, Reports, Resets

Request Terminal Configuration

ESC [> c *or*
ESC [0 c

Response is
ESC [> ps1
ps1 = 0, No Keyboard
ps1 = 2, 98-key Keyboard
ps1 = 3, 122-key Keyboard
ps1 = 4, 102-key Keyboard
ps1 = 5, 102+1-key Keyboard

pn1 = 0, No cartridge
pn1 = 7b, Overlay Mode cart.

pn2 = Expansion Card ID byte
where
bits 0-2 = 000, No card in I/O
bits 0-2 = 001, SSI/SIO card

bit 3 = 1,
if Request Terminal
Configuration
is received via I/O or SSI

bits 4-6 = 000, No mem. expansion
bits 4-6 = 001, 512K memory
bits 4-6 = 010, StarLAN card
bits 4-6 = 011, TCP/IP card

bit 7 = 1,
if Request Terminal
Configuration
is received via Memory slot

ps2 = RAM available in Kbytes

Request Device Status	ESC [5 n Response is ESC [0 n *for terminal OK* ESC [3 n *for terminal error*
Request If Encoding Set	ESC [F
Request Terminal Type	ESC [c Response is ESC [? 8;8;8 c
Request Logical Name	ESC [? *length string* Response is ESC [? *length string*
Report Window Size	ESC [? 6 n Response is ESC [? rows;columns R
Reset Window	ESC c
Reshape	ESC [? ps r where ps = 0, make window non-reshapable ps = 1, make window reshapable ps = 2, is window reshapable? If ps = 2, response is ESC [? ps r where ps = 0, non-reshapable ps = 1, reshapable

Scrolling Region

Split Screen	ESC [top line;bottom line r
Origin Mode	ESC [? 6 h *for on* ESC [? 6 l *for off*
Scroll Up	ESC [pn S where pn = number of lines
Scroll Down	ESC pn T where pn = number of lines

Status Line

Cursor Positioning to Status Line	ESC [rows; cols x

4014 GS Escape Sequences

Enter Wproc+	ESC [? 1 f
Enter Clipped 4014 Window	ESC [? 2 g
Enter Scaled 4014 Window	ESC [? 2 f
Large Font	ESC 8
Medium Font	ESC 9
Small Font	ESC :
Tiny Font	ESC ;
Solid Vector	ESC ' ESC e ESC h ESC f ESC g ESC m ESC n ESC o ESC p ESC u ESC v ESC w
Dotted Vector	ESC a ESC i ESC q
Dot-dashed Vector	ESC b ESC j ESC r

Dashed Vector	ESC c ESC k ESC s
Long-dashed Vector	ESC d ESC l ESC t
Rectangle Draw	ESC / x0;y0;w;h x
Rectangle Draw Fill	ESC / x0;y0;w;h y
Rectangle Fill	ESC / x0;y0;w;h z
Solid Fill	ESC @
Grey Fill	ESC A
Slope Up Fill	ESC B
Slope Down Fill	ESC C
Horizontal Fill	ESC D
Vertical Fill	ESC E
Slant Cross-hatch Fill	ESC F
Vertical Cross-hatch Fill	ESC G
Pixel Operation	ESC / Ps d where Ps = 0 *OR new image over old* Ps = 1 *clear old image* Ps = 2 *X'OR old and new images* Ps = 3 *replace old image with new*
GIN Button 1	ESC / G char

Appendix C: Character Sets and Fonts

Contents

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Mapping a Character Set to GL or GR C–4
Character Set Tables C–6

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Appendix C: Character Sets and Fonts

Character Sets

The available character sets are:

- United States
- United Kingdom
- Canadian/French
- Special Character and Line Drawing
- Securities Industry
- Mosaic
- ISO Latin-1

These are illustrated in the "Character Set Tables" section in this chapter.

Two character sets are active at any one time. They are designated GL (left) and GR (right). To display a character from a given set, you must designate the character set as a *logical set*, and then assign ("map") it to GL or GR.

Designating a Logical Set

There are four logical sets: G0, G1, G2, and G3. To designate a logical set, follow the steps below:

1. Select a character set.
2. Determine which logical set you want to designate it as. (Pick G0, G1, G2, or G3.)
3. Locate the ESC sequence in Table C-1 that corresponds to that character and logical set combination.

   Note: Table 1 lists escape sequences for Wproc+. Wproc+ supports all resident character sets of the 600-series family of terminals, plus the ISO character set. However, when the Character Mode option on the Options submenu of the Wproc+ Menu is set to **national**, ISO Latin-1 cannot be designated as G0, G1, G2, or G3. When that option is set to Multinational, CAN/French cannot be designated as G0, G1, G2, or G3.

4. Execute that escape sequence to designate the character set.

   For example, to designate the Securities Industry character set as the G2 logical set, execute the sequence, **ESC) 1**.

Table C–1 Character Set/Logical Set Escape Sequences

Set	G0	G1	G2	G3
US ASCII	ESC (B	ESC) B	ESC * B	ESC + B
UK	ESC (A	ESC) A	ESC * A	ESC + A
CAN/French	ESC (Q or ESC (9	ESC) Q or ESC) 9	ESC * Q or ESC * 9	ESC + Q or ESC + 9
Special/Line	ESC (0	ESC) 0	ESC * 0	ESC + 0
Securities	ESC (1	ESC) 1	ESC * 1	ESC + 1
Mosaic	ESC (}	ESC) }	ESC * }	ESC + }
ISO Latin	ESC (<	ESC - A or ESC) <	ESC . A or ESC * <	ESC / A or ESC + <

Mapping a Character Set to GL or GR

G1, G2, and G3 can be assigned ("mapped") to GL or GR. G0 can only be mapped to GL.

After you designate a logical set, you can map that set to GL or GR. GL is used when the high order of the received data is zero. GR is used when the high order of the received data is one.

To map a character set, execute the appropriate control function code in Table C-2. The control function codes are divided into *locking shift* and *single shift* functions.

When you use the locking shift function to map a logical set, that set remains current until another set is mapped.

When you use the single shift function to map a logical set, that set is active for just one character. This allows you to obtain a character that is not in the current set.

For example, to map G3 into GL, use the *locking shift 3* control function. Execute the code **ESC o**.

Note: Wproc+ always displays the data after the single shift from GL regardless of whether the high order bit is zero or one.

Table C–2 Control Functions for Mapping Logical Sets

To...	Use Control Function	Execute Code
Map GO into GL	Locking Shift 0	SI
Map G1 into GL	Locking Shift 1	SO
Map G1 into GR	Locking Shift 1 Right	ESC ~
Map G2 into GL	Locking Shift 2	ESC n
Map G2 into GR	Locking Shift 2 Right	ESC }
Map G3 into GL	Locking Shift 3	ESC o
Map G3 into GR	Locking Shift 3 Right	ESC |
Map G2 into GL for the next character	Single Shift 2	ESC N
Map G3 into GL for the next character	Single Shift 3	ESC O

Character Set Tables

The tables on the following pages illustrate the available character sets.

Table C–3 United States ASCII Set

HEX	0	1	2	3	4	5	6	7
0	$^{N}_{U}$	$^{D}_{L}$		0	@	P	`	p
1	$^{S}_{H}$	$^{D}_{1}$	!	1	A	Q	a	q
2	$^{S}_{X}$	$^{D}_{2}$	"	2	B	R	b	r
3	$^{E}_{X}$	$^{D}_{3}$	#	3	C	S	c	s
4	$^{E}_{T}$	$^{D}_{4}$	$	4	D	T	d	t
5	$^{E}_{Q}$	$^{N}_{K}$	%	5	E	U	e	u
6	$^{A}_{K}$	$^{S}_{N}$	&	6	F	V	f	v
7	🔔	$^{E}_{B}$	'	7	G	W	g	w
8	$^{B}_{S}$	$^{C}_{N}$	(	8	H	X	h	x
9	→	$^{E}_{M}$	)	9	I	Y	i	y
A	☰	$^{S}_{B}$	*	:	J	Z	j	z
B	$^{V}_{T}$	$^{E}_{C}$	+	;	K	[	k	{
C	$^{F}_{F}$	$^{F}_{S}$	,	<	L	\	l	¦
D	←	$^{G}_{S}$	-	=	M	]	m	}
E	$^{S}_{O}$	$^{R}_{S}$	.	>	N	^	n	~
F	$^{S}_{I}$	$^{U}_{S}$	/	?	O	_	o	▨

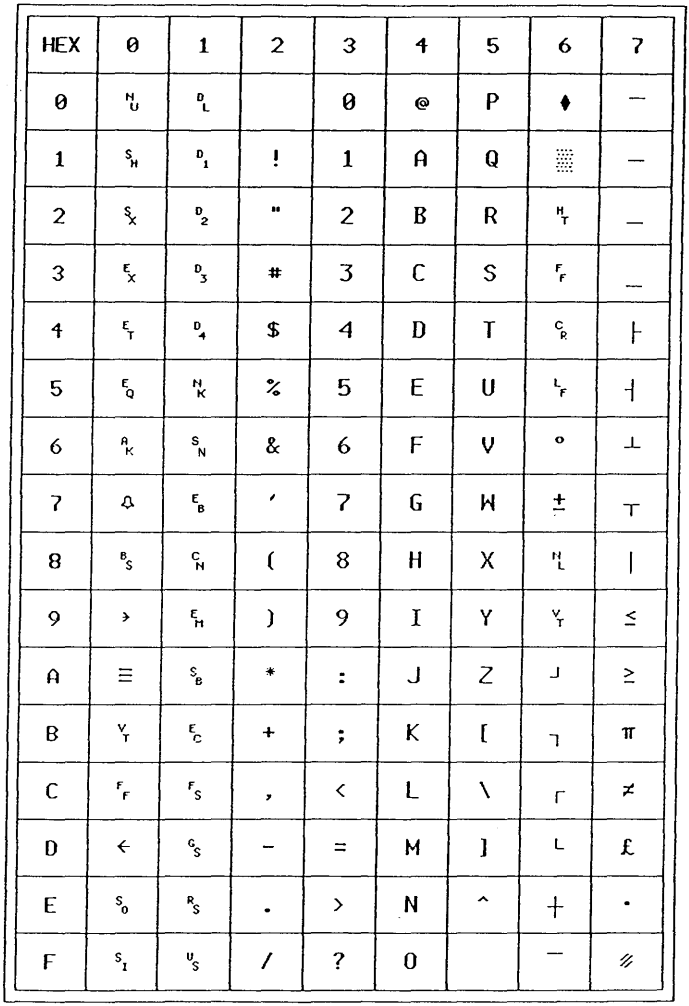
Table C–4 United Kingdom Set

HEX	0	1	2	3	4	5	6	7
0	NU	DL		0	@	P	`	p
1	SH	D1	!	1	A	Q	a	q
2	SX	D2	"	2	B	R	b	r
3	EX	D3	£	3	C	S	c	s
4	ET	D4	$	4	D	T	d	t
5	EQ	NK	%	5	E	U	e	u
6	AK	SN	&	6	F	V	f	v
7	BL	EB	'	7	G	W	g	w
8	BS	CN	(	8	H	X	h	x
9	→	EM	)	9	I	Y	i	y
A	≡	SB	*	:	J	Z	j	z
B	VT	EC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	¦
D	←	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	▨

Table C–5 Canadian/French Set

HEX	0	1	2	3	4	5	6	7
0	NU	DL		0	à	P	ô	p
1	SH	D1	!	1	A	Q	a	q
2	SX	D2	"	2	B	R	b	r
3	EX	D3	#	3	C	S	c	s
4	ET	D4	$	4	D	T	d	t
5	EQ	NK	%	5	E	U	e	u
6	AK	SN	&	6	F	V	f	v
7	🔔	EB	'	7	G	W	g	w
8	BS	CN	(	8	H	X	h	x
9	→	EM	)	9	I	Y	i	y
A	☰	SB	*	:	J	Z	j	z
B	VT	EC	+	;	K	â	k	é
C	FF	FS	,	<	L	ç	l	ù
D	←	GS	-	=	M	ê	m	è
E	SO	RS	.	>	N	î	n	û
F	SI	US	/	?	O	_	o	//

Table C–6 Special Character and Line Drawing Set

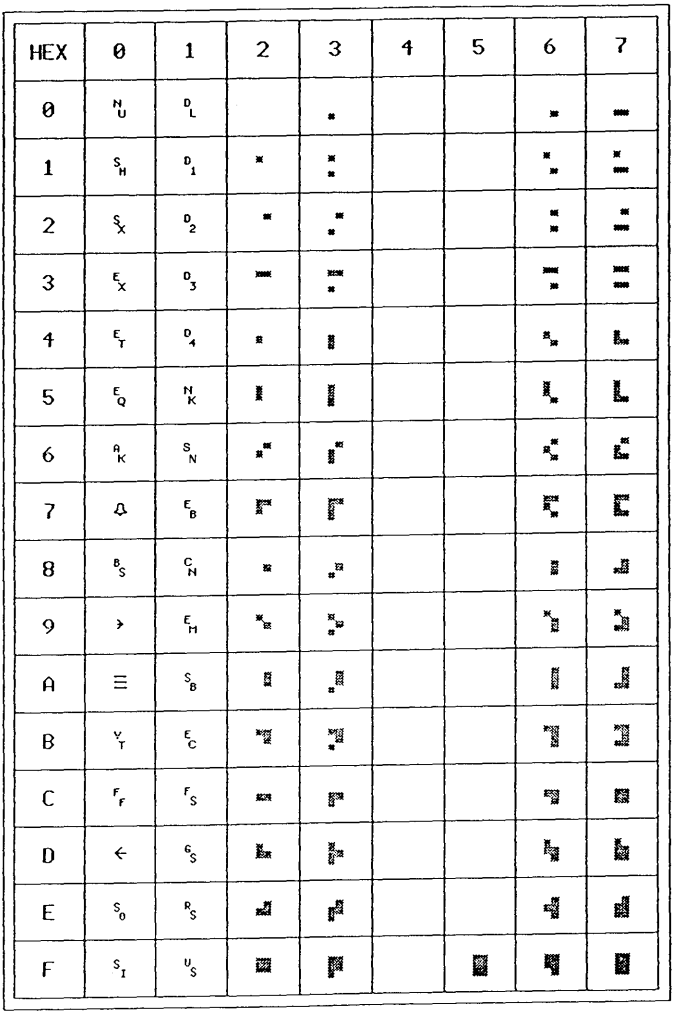


HEX	0	1	2	3	4	5	6	7
0	NU	DL		0	@	P	♦	─
1	SH	D1	!	1	A	Q	▒	─
2	SX	D2	"	2	B	R	HT	─
3	EX	D3	#	3	C	S	FF	─
4	ET	D4	$	4	D	T	CR	├
5	EQ	NK	%	5	E	U	LF	┤
6	AK	SN	&	6	F	V	°	┴
7	🔔	EB	'	7	G	W	±	┬
8	BS	CN	(	8	H	X	NL	│
9	→	EM	)	9	I	Y	VT	≤
A	☰	SB	*	:	J	Z	┘	≥
B	VT	EC	+	;	K	[	┐	π
C	FF	FS	,	<	L	\	┌	≠
D	←	GS	-	=	M	]	└	£
E	SO	RS	.	>	N	^	┼	·
F	SI	US	/	?	O		─	▨

Table C–7 Securities Industry Set

HEX	0	1	2	3	4	5	6	7
0	$^{N}_{U}$	$^{D}_{L}$		0	¼	P	`	p
1	$^{S}_{H}$	$^{D}_{1}$	⅛	1	A	Q	a	q
2	$^{S}_{X}$	$^{D}_{2}$	"	2	B	R	b	r
3	$^{E}_{X}$	$^{D}_{3}$	#	3	C	S	c	s
4	$^{E}_{T}$	$^{D}_{4}$	$	4	D	T	d	t
5	$^{E}_{Q}$	$^{N}_{K}$	%	5	E	U	e	u
6	$^{A}_{K}$	$^{S}_{N}$	&	6	F	V	f	v
7	🔔	$^{E}_{B}$	'	7	G	W	g	w
8	$^{B}_{S}$	$^{C}_{N}$	(	8	H	X	h	x
9	→	$^{E}_{M}$	)	9	I	Y	i	y
A	☰	$^{S}_{B}$	½	:	J	Z	j	z
B	$^{V}_{T}$	$^{E}_{C}$	+	;	K	⅞	k	{
C	$^{F}_{F}$	$^{F}_{S}$	,	<	L	\	l	¦
D	←	$^{G}_{S}$	-	=	M	¾	m	}
E	$^{S}_{O}$	$^{R}_{S}$	.	>	N	⅜	n	~
F	$^{S}_{I}$	$^{U}_{S}$	/	?	O	⅝	o	⁄⁄

Table C–8 Mosaic Set



HEX	0	1	2	3	4	5	6	7
0	NU	DL						
1	SH	D1						
2	SX	D2						
3	EX	D3						
4	ET	D4						
5	EQ	NK						
6	AK	SN						
7	BL	EB						
8	BS	CN						
9	HT	EM						
A	LF	SB						
B	VT	EC						
C	FF	FS						
D	CR	GS						
E	SO	RS						
F	SI	US						

Table C–9 ISO Latin-1 Set

HEX	0	1	2	3	4	5	6	7
0	$^{8}_{0}$	$^{D}_{C}$		°	À	Ð	à	ð
1	$^{8}_{1}$	$^{P}_{1}$	¡	±	Á	Ñ	á	ñ
2	$^{8}_{2}$	$^{P}_{2}$	¢	²	Â	Ò	â	ò
3	$^{8}_{3}$	$^{S}_{E}$	£	³	Ã	Ó	ã	ó
4	$^{I}_{N}$	$^{C}_{C}$	¤	´	Ä	Ô	ä	ô
5	$^{N}_{L}$	$^{M}_{W}$	¥	µ	Å	Õ	å	õ
6	$^{S}_{S}$	$^{S}_{P}$	¦	¶	Æ	Ö	æ	ö
7	$^{E}_{S}$	$^{E}_{P}$	§	·	Ç	×	ç	÷
8	$^{H}_{S}$	$^{9}_{8}$	¨	¸	È	Ø	è	ø
9	$^{H}_{J}$	$^{9}_{9}$	©	¹	É	Ù	é	ù
A	$^{V}_{S}$	$^{9}_{A}$	ª	º	Ê	Ú	ê	ú
B	$^{P}_{D}$	$^{C}_{S}$	«	»	Ë	Û	ë	û
C	$^{P}_{U}$	$^{S}_{T}$	¬	¼	Ì	Ü	ì	ü
D	$^{R}_{I}$	$^{0}_{S}$		½	Í	Ý	í	ý
E	$^{S}_{2}$	$^{P}_{M}$	®	¾	Î	Þ	î	þ
F	$^{S}_{3}$	$^{A}_{P}$	¯	¿	Ï	ß	ï	ÿ

Font Information

Resident Fonts

The 730 provides four resident fonts as described in the chapter, "The Wproc+ Emulator," in this Guide. They are displayed for selection in the Wproc+ menu. The fonts are named **small**, **medium**, **large**, and **larger**. These fonts all supply the standard set of ASCII characters (see Table C-10).

Font	Size
Small	7 by 14 pixels 132 columns Default: 60 by 80
Medium	9 by 14 pixels (Intermediate) Default: 60 by 80
Large	11 by 16 pixels 80 columns Default: 60 by 80
Larger	12 by 20 pixels (DIN size) Default: 41 by 80

Table C–10 ASCII Characters and Codes

1st Hexidecimal Character

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

Column	BITS 1	BITS 2	BITS 3	BITS 4
Ø	Ø	Ø	Ø	Ø
1	1	Ø	Ø	Ø
Ø	Ø	1	Ø	Ø
1	1	1	Ø	Ø
Ø	Ø	Ø	1	Ø
1	1	Ø	1	Ø
Ø	Ø	1	1	Ø
1	1	1	1	Ø
Ø	Ø	Ø	Ø	1
1	1	Ø	Ø	1
Ø	Ø	1	Ø	1
1	1	1	Ø	1
Ø	Ø	Ø	1	1
1	1	Ø	1	1
Ø	Ø	1	1	1
1	1	1	1	1

Column	Ø	1	Ø	1	Ø	1	Ø	1
5	Ø		1		Ø		1	
6	Ø				1			
7	Ø							

BITS 5, 6, 7

NUL ● Null
SOH ● Start of Heading
STX ● Start of Text
ETX ● End of Text
EOT ● End of Transmis'n
ENQ ● Enquiry
ACK ● Acknowledge
BEL ● Bell
BS ● Back Space
HT ● Horizontal Tab
LF ● Line Feed
VT ● Vertical Tab
FF ● Form Feed
CR ● Carriage Ret
SO ● Shift-Out
SI ● Shift-In
SP ● Space
DLE ● Data Link Escape
DC1 ● Device Control 1
DC2 ● Device Control 2
DC3 ● Device Control 3
DC4 ● Device Control 4
NAK ● Negative Acknowledge
SYN ● Synchronous
ETB ● End of Trans'n Block
DEL ● Delete
CAN ● Cancel
EM ● End of Media
SUB ● Substitute
ESC ● Escape
FS ● Field Separator
GS ● Group Separator
RS ● Record Separator
US ● Unit Separator

Downloaded Fonts

Other fonts can be *downloaded* from application programs. These downloads are supported by Wproc+ and the fonts will appear for selection in the Wproc+ menu. Once a font is downloaded, it can be used by other programs without reloading. The number of fonts which can be downloaded depends on the amount of memory available and on the size of the fonts.

For information on downloading fonts, see the documentation pertaining to your specific application program.

When a downloaded font is selected, certain conditions are in effect. These are:

- When switching to a different character set, the current font is used if the character set of the same size is not available.
- When the font has 128 characters or less, the font is designated logical set G0 and mapped into GL.
- When the font has more than 128 characters, the lower 128 characters (ASCII 0 to 127) are designated logical set G0 and mapped into GL. The upper 128 characters (ASCII 128 to 255) are designated logical set G2 and mapped into GR.

Appendix D: EIA Connections

Contents

Main and Main2 EIA Communications Interface D–1

Aux EIA Communications Interface D–3

SSI Port D–5

LAN Port D–6

Appendix D: EIA Connections

Main and Main2 EIA Communications Interface

You can connect your 730 MTG Terminal to a host computer using the terminal's EIA RS232 interface ports. The interface ports are capable of operating at speeds up to 19200 bits per second. Speed is selectable from the Setup Menu and the baud setting you choose takes effect immediately (see Chapter 4, "Setup," for more information). The six selectable speeds are 300, 1200, 2400, 4800, 9600, and 19200. The default speed setting is **9600**.

The output signals of this interface are +5V dc to +12V dc for an **on** or a **space** condition. The **off** or **mark** condition is signalled by a voltage level of -5V dc to -12V dc with respect to ground. All input lines respond to normal EIA RS232 voltages.

Each port uses half of a DUART. The DUART provides input lines for CTS (Clear to Send), DSR (Data Set Ready), DCD (Data Carrier Detect), and RD (Receive Data); and an output line for RTS (Request to Send), DTR (Data Terminal Ready), and TD (Transmit Data). RTS/CTS hardware flow control is only supported on Main. See the table on the next page for pin definitions.

For cabling information, refer to Chapter 1 of this User's Guide.

Table D–1 Main/Main2 Port Pin Definitions

Pin	Signal	Direction
1	Frame	To Host
2	TD	To Host
3	RD	From Host
4	RTS	To Host
5	CTS	From Host
6	DSR	From Host
7	Gnd	To Host
8	DCD	From Host
20	DTR	To Host

Aux EIA Communications Interface

You can connect your 730 MTG Terminal to a printer or similar output device, or to a host computer port using the terminal's Auxiliary EIA RS232 interface port. This port has similar functionality to the Main port. The Aux port is capable of operating at speeds up to 19200 bits per second. Speed is selectable from the Setup Menu and the baud setting you choose takes effect immediately (see Chapter 4, "Setup," for more information). The six selectable speeds are 300, 1200, 2400, 4800, 9600, and 19200. The default speed setting is **9600.**

The output signals of this interface are +5V dc to +12V dc for an **on** or a **space** condition. The **off** or **mark** condition is signalled by a voltage level of -5V dc to -12V dc with respect to ground. All input lines respond to normal EIA RS232 voltages.

The port uses half of a DUART. The DUART provides input lines for CTS (Clear to Send), DSR (Data Set Ready), DCD (Data Carrier Detect), and RD (Receive Data); and an output line for RTS (Request to Send), DTR (Data Terminal Ready), and TD (Transmit Data). The Aux EIA port does not support RTS/CTS hardware flow control. See the table on the next page for pin definitions.

For cabling information, refer to Chapter 1 of this User's Guide.

Table D–2 Auxiliary Port Pin Definitions

Pin	Signal	Direction
1	Frame	To Printer
2	RD	From Printer
3	TD	To Printer
4	RTS	Tied to 5
5	CTS	Tied to 4
6	DSR	To Printer
7	Gnd	To Printer
8	DCD	To Printer
20	DTR	From Printer

SSI Port

The SSI/SIO card provides both the Main2 port and the SSI port.

For information on the SSI/EIA Interface Card pin assignments, refer to the User's Guide for that Card.

LAN Port

The 730 MTG controller provides a connector slot for an optional memory or LAN card. Either the 512K Memory Expansion Card or a 730 MTG Network Access Unit (StarLAN 10 ISO or TCP/IP) are available.

For information on the 730 StarLAN 10 ISO or 730 StarLAN 10 TCP/IP Network Access Units, see the User's Guides for those cards.

Appendix E: 98-Key Keyboard

Contents

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Numeric Keypad Transmitted Codes E–8

Appendix E: 98-Key Keyboard

Keyboard Layout

The layouts on the following pages use position numbers on the keytops instead of keytop labels.

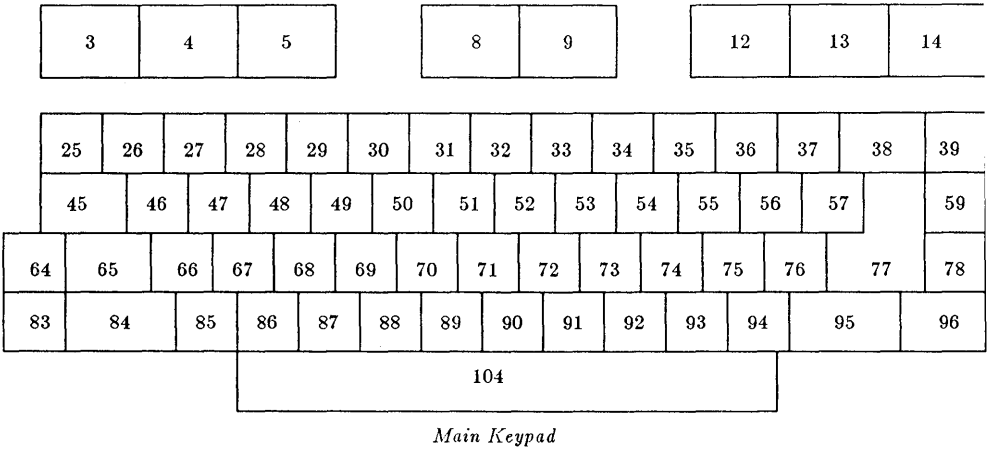

Figure E–1 98-key Keyboard -- Main Keypad

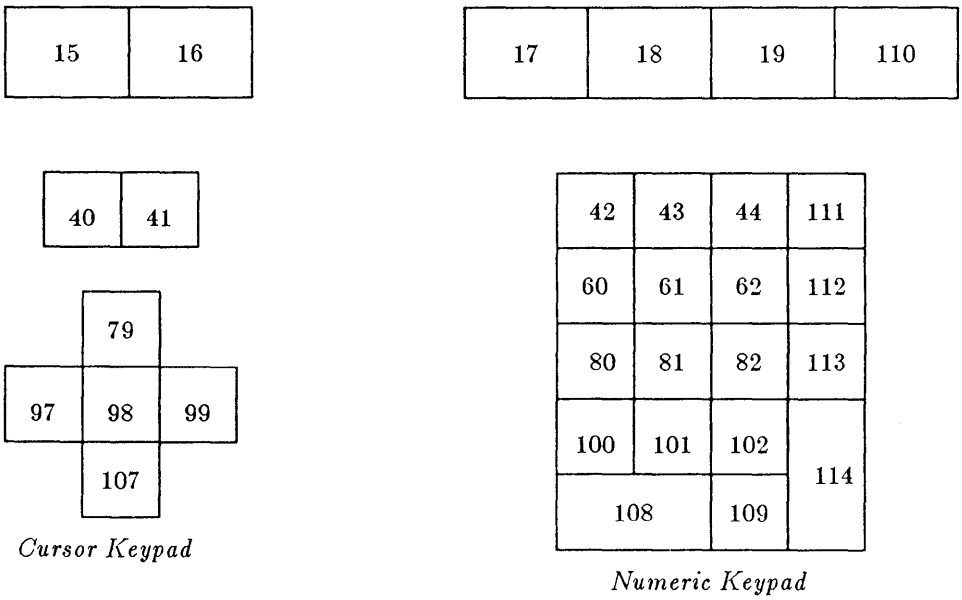

Figure E–2 98-key Keyboard -- Keypads

Transmitted Codes

Table E–1 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
3	F1	Programmable (1)	Programmable (1)	
4	F2	Programmable (1)	Programmable (1)	
5	F3	Programmable (1)	Programmable (1)	
8	F4	Programmable (1)	Programmable (1)	
9	F5	Programmable (1)	Programmable (1)	
12	F6	Programmable (1)	Programmable (1)	User Fkey
13	F7	Programmable (1)	Programmable (1)	
14	F8	Programmable (1)	Programmable (1)	Sys Fkey
15	F9	Programmable (1)	Programmable (1)	
16	F10	Programmable (1)	Programmable (1)	
17	F11	Programmable (1)	Programmable (1)	
18	F12	Programmable (1)	Programmable (1)	
19	F13	Programmable (1)	Programmable (1)	
25	ESC	1b	1b	1b
26	1 !	31	21	
27	2 @ NULL	32	40	00
28	3 #	33	23	
29	4 $	34	24	
30	5 %	35	25	
31	6 RS	36	5e	1e
32	7 &	37	26	
33	8 *	38	2a	
34	9 (	39	28	
35	0)	30	29	
36	- _ US	2d	5f	1f
37	= +	3d	2b	
38	BACK SPACE	08	08	08
39	DLETE	7f	7f	7f
40	BREAK DISCON	break		disconnect

Table E–2 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
41	CLEAR RESET	ESC [2J	local clear	ESC c
42	= ((pad)	3d (2)	28 (2)	28 (2)
43	*) (pad)	2a (2)	29 (2)	29 (2)
44	/ (pad)	2f (2)	2f (2)	2f (2)
45	TAB	09	ESC [Z	ESC [Z
46	Q DC1	71	51	11
47	W ETB	77	57	17
48	E ENQ	65	45	05
49	R DC2	72	52	12
50	T DC4	74	54	14
51	Y EM	79	59	19
52	U NAK	75	55	15
53	I HT	69	49	09
54	O SI	6f	4f	0f
55	P DLE	70	50	10
56	[{ ESC	5b	7b	1b
57	] } GS	5d	7d	1d
59	‘	60	7e	
60	7 (pad)	37 (2)	37 (2)	37 (2)
61	8 (pad)	38 (2)	38 (2)	38 (2)
62	9 (pad)	39 (2)	39 (2)	39 (2)
64	CAPS LOCK	71		
65	CTRL	65		
66	A SOH	61	41	01
67	S DC3	73	53	13
68	D EOT	64	44	04
69	F ACK	66	46	06
70	G BEL	67	47	07
71	H BS	68	48	08

Table E–3 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
72	J LF	6a	4a	0a
73	K VT	6b	4b	0b
74	L FF	6c	4c	0c
75	; :	3b	3a	
76	' "	27	22	
77	RETURN	CR or LF or CR-LF		
78	| FS	5c	7c	1c
79	↑	ESC [A	ESC [A	ESC [A
80	4 (pad)	34 (2)	34 (2)	34 (2)
81	5 (pad)	35 (2)	35 (2)	35 (2)
82	6 (pad)	36 (2)	36 (2)	36 (2)
83	SCROLL LOCK	83		
84	SHIFT	84		
85	Z SUB	7a	5a	1a
86	X CAN	78	58	18
87	C ETX	63	43	03
88	V SYN	76	56	16
89	B STX	62	42	02
90	N SO	6e	4e	0e
91	M CR	6d	4d	0d
92	, < NUL	2c	3c	00
93	. > RS	2e	3e	1e
94	/ ? US	2f	3f	1f
95	SHIFT	95		
96	ENTER	Up to 4 programmed characters		
97	←	ESC [D	ESC [D	ESC [D
98	HOME	ESC [H	ESC [H	ESC [H
99	→	ESC [C	ESC [C	ESC [C
100	1 (pad)	31 (2)	31 (2)	31 (2)

Table E–4 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
101	2 (pad)	32 (2)	32 (2)	32 (2)
102	3 (pad)	33 (2)	33 (2)	33 (2)
104	SPACE	20	20	20
107	↓	ESC [B	ESC [B	ESC [B
108	0 (pad)	30 (2)	30 (2)	30 (2)
109	. (pad)	2e (2)	2e (2)	2e (2)
110	F14	Programmable (1)	Programmable (1)	
111	+ (pad)	2b (2)	2b (2)	2b (2)
112	- (pad)	2d (2)	2d (2)	2d (2)
113	, (pad)	2c (2)	2c (2)	2c (2)
114	ENTER (pad)	Up to 4 programmed characters (2)		

Notes

(1) The code generated depends on the 600 Family Keyboard option.

(2) The code generated depends on the alternate keypad mode setting. See Table E-5.

Numeric Keypad Transmitted Codes

Table E–5 Numeric Keypad Codes

Key	Numeric Keypad Mode	Alt. Keypad Mode	
		7-bit Mode	8-bit Mode
0	0	ESC O p	SS3 p
1	1	ESC O q	SS3 q
2	2	ESC O r	SS3 r
3	3	ESC O s	SS3 s
4	4	ESC O t	SS3 t
5	5	ESC O u	SS3 u
6	6	ESC O v	SS3 v
7	7	ESC O w	SS3 w
8	8	ESC O x	SS3 x
9	9	ESC O y	SS3 y
-	minus	ESC O m	SS3 m
,	comma	ESC O l	SS3 l
.	period	ESC O n	SS3 n
Enter	CR	ESC O M	SS3 M
=(	equal/left parenthesis	ESC O P	SS3 P
*)	asterisk/right parenthesis	ESC O Q	SS3 Q
/	slash	ESC O R	SS3 R
+	plus	ESC O S	SS3 S

Note: The ENTER key can be programmed with up to four characters.

Appendix F: 102-Key Keyboard

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Appendix F: 102-Key Keyboard

Keyboard Layouts

The layouts on the following pages use position numbers on the keytops instead of keytop labels.

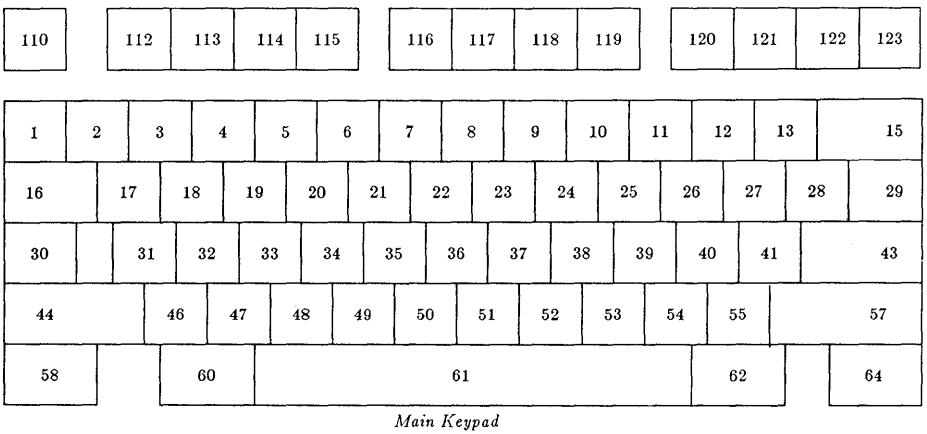

Figure F–1 102-key Keyboard -- Main Keypad

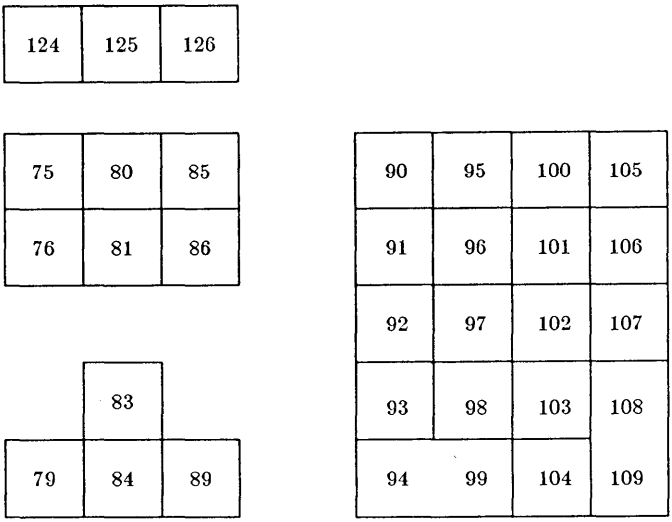

Figure F–2 102-key Keyboard -- Keypads

Transmitted Codes

Table F–1 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
1	`	60	7e	
2	1 !	31	21	
3	2 @	32	40	00
4	3 #	33	23	
5	4 $	34	24	
6	5 %	35	25	
7	6 RS	36	5e	1e
8	7 &	37	26	
9	8 *	38	2a	
10	9 (	39	28	
11	0)	30	29	
12	- _ US	2d	5f	1f
13	= +	3d	2b	
15	BACK SPACE	08	08	08
16	TAB	09	ESC [Z	ESC [Z
17	Q DC1	71	51	11
18	W ETB	77	57	17
19	E ENQ	65	45	05
20	R DC2	72	52	12
21	T DC4	74	54	14
22	Y EM	79	59	19
23	U NAK	75	55	15
24	I HT	69	49	09
25	O SI	6f	4f	0f
26	P DLE	70	50	10
27	[{ ESC	5b	7b	1b
28	] } GS	5d	7d	1d
29	| FS	5c	7c	1c
30	CAPS LOCK			

Table F–2 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
31	A SOH	61	41	01
32	S DC3	73	53	13
33	D EOT	64	44	04
34	F ACK	66	46	06
35	G BEL	67	47	07
36	H BS	68	48	08
37	J LF	6a	4a	0a
38	K VT	6b	4b	0b
39	L FF	6c	4c	0c
40	; :	3b	3a	
41	' "	27	22	
43	RETURN		CR or LF or CR-LF	
44	Shift			
46	Z SUB	7a	5a	1a
47	X CAN	78	58	18
48	C ETX	63	43	03
49	V SYN	76	56	16
50	B STX	62	42	02
51	N SO	6e	4e	0e
52	M CR	6d	4d	0d
53	, <	2c	3c	
54	. >	2e	3e	
55	/ ? US	2f	3f	1f
57	Shift			
58	Ctrl			
60	Alt/Compose	f2 (1)	f2 (1)	f2 (1)
61	SPACE	20	20	
62	Alt			
64	Ctrl			

Table F–3 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
75	Insert	ESC [@	ESC [L	
76	Delete	ESC [P 7f	ESC [M ESC [M	7f (Swap Delete = No) ESC [P (Swap Delete = Yes)
79	← Left	ESC [D	ESC [♭A	ESC [♭A
80	Home Clear	ESC [H	ESC [2 J	f3 (1)
81	End	ESC [24 ; 1 H		
83	↑ Up	ESC [A	ESC [T	ESC [T
84	↓ Down	ESC [B	ESC [S	ESC [S
85	Page Up/Disc	ESC [V		disconnect
86	Page Down/Reset	ESC [U		ESC c
89	→ Right	ESC [C	ESC ♭@	ESC ♭@
90	Num Lock (pad)		See Table F-5 (3)	
91	7 Home (pad)		See Table F-5 (3)	
92	4 ← (pad)		See Table F-5 (3)	
93	1 End (pad)		See Table F-5 (3)	
95	/ (pad)		See Table F-5 (3)	
96	8 ↑ (pad)		See Table F-5 (3)	
97	5 (pad)		See Table F-5 (3)	
98	2 ↓ (pad)		See Table F-5 (3)	
99	0 Ins (pad)		See Table F-5 (3)	
100	* (pad)		See Table F-5 (3)	
101	9 Pg Up (pad)		See Table F-5 (3)	
102	6 → (pad)		See Table F-5 (3)	
103	3 PgDn (pad)		See Table F-5 (3)	
104	. Del (pad)		See Table F-5 (3)	
105	- (pad)		See Table F-5 (3)	

Table F–4 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
106	+ (pad)	See Table F-5 (3)		
107	' (pad)	See Table F-5 (3)		
108	Enter (pad)	Up to 4 characters (3)		
110	Esc	1b	1b	1b
112	F1	Programmable (2)	Programmable (2)	
113	F2	Programmable (2)	Programmable (2)	
114	F3	Programmable (2)	Programmable (2)	
115	F4	Programmable (2)	Programmable (2)	
116	F5	Programmable (2)	Programmable (2)	
117	F6	Programmable (2)	Programmable (2)	
118	F7	Programmable (2)	Programmable (2)	User Fkey
119	F8	Programmable (2)	Programmable (2)	Sys Fkey
120	F9	Programmable (2)	Programmable (2)	
121	F10	Programmable (2)	Programmable (2)	
122	F11	Programmable (2)	Programmable (2)	
123	F12	Programmable (2)	Programmable (2)	
124	F13 Pr Scr	Programmable (2)	Programmable (2)	
125	F14	Programmable (2)	Programmable (2)	
126	Scroll Lock/ Pause/Break	scroll lock		break

Notes

(1) This code is received by wproc+ only if the keyboard is requested.

(2) The code generated depends on the 600 Family Keyboard option.

(3) The code generated depends on the alternate keypad mode setting. See Table F-5.

Numeric Keypad Transmitted Codes

Table F–5 Numeric Keypad Codes

Key	Num Lock Off	Num Lock On	Alt. Keypad	
			7-bit Mode	8-bit Mod
0 Ins	ESC [@	0	ESC O p	SS3 p
1 End	ESC [24; 1 H	1	ESC O q	SS3 q
2 ↓	ESC [B	2	ESC O r	SS3 r
3 PgDn	ESC [U	3	ESC O s	SS3 s
4 ←	ESC [D	4	ESC O t	SS2 t
5	5	5	ESC O u	SS3 u
6 →	ESC [C	6	ESC O v	SS3 v
7 Home	ESC [H	7	ESC O w	SS3 w
8 ↑	ESC [A	8	ESC O x	SS3 x
9 PgUp	ESC [V	9	ESC O y	SS3 y
+	+	+	ESC O S	SS3 S
,	,	,	ESC O l	SS3 l
Del	ESC [P	period	ESC O n	SS3 n
ENTER	CR	CR	ESC O M	SS3 M
Num Lock	Num Lock On	Num Lock Off	ESC O P	SS3 P
/	/	/	ESC O R	SS3 R
*	*	*	ESC O Q	SS3 Q
-	-	-	ESC O m	SS3 m

Note: The ENTER key can be programmed with up to four characters.

Compose Mode

Special symbols and international characters are available on the 102-key (and 102+1-key) keyboard by using Compose Mode. In Compose Mode, a special character is generated when the Compose key is pressed followed by a two key sequence representing the character.

To enter Compose Mode, press the Compose key. The Compose icon is displayed in the window label area. After pressing the Compose key, press the two character sequence corresponding to the character you wish to type (see the tables in Appendices E and F for compose sequences). The character will be generated and Compose Mode is exited. If you make an error, the bell will ring. You may also exit Compose Mode by pressing the Delete, Tab, Return, Enter, PF-, Arrow, or editing keys.

Example: To generate the one-quarter (¼) sign, press the Compose key followed by the 2 characters **1 4**.

Note: On the 102+1-key keyboard, pressing the caret or single quote key is the same as pressing the Compose caret or Compose single quote key.

Table F–6 Multinational Compose Characters

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
"	quotation mark	¨ ⌫	
#	number sign	++	
'	apostrophe	' ⌫	
@	at sign	aa	
[	open bracket	((	
\	backslash	// or /<	
]	close bracket	))	
^	circumflex accent	^ ⌫	
`	grave accent (single quote)	` ⌫	
{	open brace	(-	
|	vertical line	/^	
}	close brace	)-	
~	tilde	~ ⌫	
¡	inverted !	!!	
¢	cent sign	c/ or c|	
£	English pound	L- or L=	
¥	yen sign	Y- or Y=	
§	section sign	so or s! or s0	
¤	currency sign	xo or x0	
©	copyright sign	co or c0	
ª	feminine ordinal	a_	

Table F–7 Multinational Compose Characters, continued

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
º	masculine ordinal	o_	
«	dbl open angle bracket	<<	
»	dbl close angle bracket	>>	
°	degree sign	0^ or ⌀°	
±	plus or minus	+-	
¹	superscript 1	1^	
²	superscript 2	2^	
³	superscript 3	3^	
µ	micro sign	/u	Order
¶	paragraph sign	p! or P!	
·	middle dot	.^	
¼	one-quarter	14	Order
½	one-half	12	Order
¾	three-quarters	34	Order
¿	inverted ?	??	
À	grave A	A`	Case
Á	acute A	A´	Case
Â	circumflex A	A^	Case
Ã	tilde A	A~	Case
Ä	umlaut A	A" or A¨	Case
Å	ring A	A* or A°	Case

Table F–8 Multinational Compose Characters, continued

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
Æ	A E diphthong	AE	Both
Ç	cedilla C	C,	Case
È	grave E	E`	Case
É	acute E	E´	Case
Ê	circumflex E	E^	Case
Ë	umlaut E	E" or E¨	Case
Ì	grave I	I`	Case
Í	acute I	I´	Case
Î	circumflex I	I^	Case
Ï	umlaut I	I" or I¨	Case
Ñ	tilde N	N~	Case
Ò	grave O	O`	Case
Ó	acute O	O´	Case
Ô	circumflex O	O^	Case
Õ	tilde O	O~	Case
Ö	umlaut O	O" or O¨	Case
Ø	slash O	O/	Case
Ù	grave U	U`	Case
Ú	acute U	U´	Case
Û	circumflex U	U^	Case

Table F–9 Multinational Compose Characters, continued

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
Ü	umlaut U	U" or U¨	Case
Ý	acute Y	Y'	Case
ß	German sharp s	ss	Case
à	grave a	a`	Case
á	acute a	a´	Case
â	circumflex a	a^	Case
ä	umlaut a	a" or a¨	Case
ã	tilde a	a~	Case
å	ring a	a* or a °	Case
æ	a e diphthong	ae	Both
ç	cedilla c	c,	Case
è	grave e	e`	Case
é	acute e	e´	Case
ê	circumflex e	e^	Case
ë	umlaut e	e" or e¨	Case
ì	grave i	i`	Case
í	acute i	i´	Case
î	circumflex i	i^	Case
ï	umlaut i	i" or i¨	Case
ñ	tilde n	n~	Case
ò	grave o	o`	Case

Table F–10 Multinational Compose Characters, continued

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
ó	acute o	o´	Case
ô	circumflex o	o^	Case
õ	tilde o	o~	Case
ö	umlaut o	o" or o¨	Case
ø	slash o	o/	Case
ù	grave u	u`	Case
ú	acute u	u´	Case
û	circumflex u	u^	Case
ü	umlaut u	u" or u¨	Case
ý	acute y	y'	Case
ÿ	umlaut y	y" or y¨	Case
NBSP	No Break Space	SPACE SPACE	
¦	vertical bar	|| or !^	
¬	logical not	-,	Order
—	soft (syllable) hyphen	--	
®	registered sign	ro	
¯	macron	-^ or _^	
÷	divide sign	-:	
×	multiply sign	xx	Case
´	acute accent	''	

Table F–11 Multinational Compose Characters, continued

Valid Multinational Compose Sequences			
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*
¸	cedilla	,,	
¨	dieresis	"" or "¥	
Þ	capital Icelandic thorn	TH	Both
þ	small Icelandic thorn	th	Both
Ð	capital Icelandic Eth	-D	Case
ð	small Icelandic Eth	-d	Case

Appendix G: 102+1-Key Keyboard

Contents

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Appendix G: 102+1-Key Keyboard

Keyboard Layout

The layouts on the following pages use position numbers on the keytops instead of keytop labels.

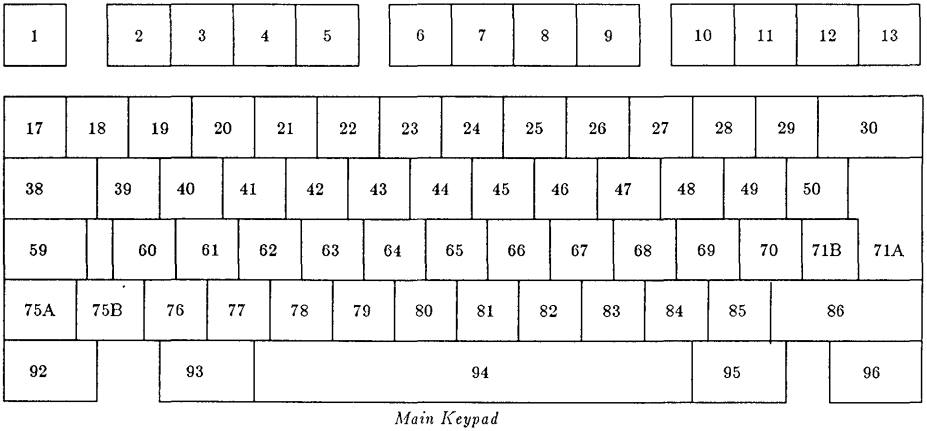

Figure G–1 102+1-key Keyboard -- Main Keypad

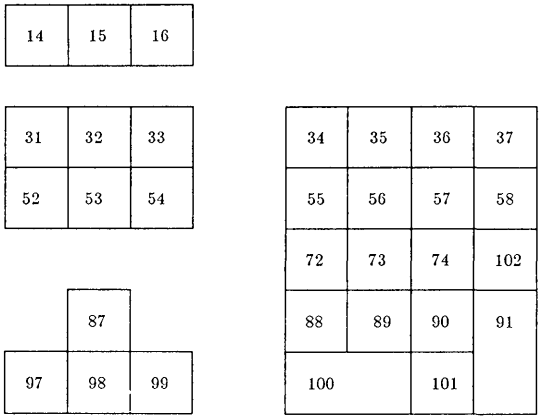

Figure G–2 102+1-key Keyboard -- Keypads

Transmitted Codes

Transmitted Codes are listed on the following pages. These codes are applicable when the Language option is set to **French/Canadian** and the connected port is optioned for **8 bits/character**.

Transmitted Codes

Table G–1 Transmitted Codes

Position	Description	Hexadecimal Codes Sent			
		Unshift	Shift	Control	AltCar
1	Esc	1b	1b	1b	
2	F1	Programmable (2)	Programmable (2)		
3	F2	Programmable (2)	Programmable (2)		
4	F3	Programmable (2)	Programmable (2)		
5	F4	Programmable (2)	Programmable (2)		
6	F5	Programmable (2)	Programmable (2)		
7	F6	Programmable (2)	Programmable (2)		
8	F7	Programmable (2)	Programmable (2)	User Fkey	
9	F8	Programmable (2)	Programmable (2)	Sys Fkey	
10	F9	Programmable (2)	Programmable (2)		
11	F10	Programmable (2)	Programmable (2)		
12	F11	Programmable (2)	Programmable (2)		
13	F12	Programmable (2)	Programmable (2)		
14	F13 Pr Scr	Programmable (2)	Programmable (2)		
15	F14	Programmable (2)	Programmable (2)		
16	Scroll Lock/Break	DC1/DC3	DC1/DC3	break	
17	# | FS	23	7c	FS	5c
18	1 !	31	21		b1
19	2 " NUL	32	22		40
20	3 /	33	2f	00	a3
21	4 $	34	24		a2
22	5 %	35	25		a4
23	6 ? RS	36	3f		ac
24	7 &	37	26		7c
25	8 *	38	2a	1e	b2
26	9 (	39	28		b3
27	0)	30	29		bc
28	- _ US	2d	5f	1f	bd
29	= +	3d	2b		be

Table G–2 Transmitted Codes

Position	Description	Hexadecimal Codes Sent			
		Unshift	Shift	Control	AltCar (1)
30	BACK SPACE	08	08	08	
31	Insert/Ins Ln	CSI @	CSI L		
32	Home/Clear/Lc Clr	CSI H	ESC [2 J	local clear	
33	Page Up/Disc	CSI V		disconnect	
34	Num (pad)	See Table G-5 (3)			
35	/ (pad)	See Table G-5 (3)			
36	* (pad)	See Table G-5 (3)			
37	- (pad)	See Table G-5 (3)			
38	TAB	09	CSI Z	CSI Z	
39	Q DC1	71	51	11	
40	W ETB	77	57	17	
41	E ENQ	65	45	05	
42	R DC2	72	52	12	
43	T DC4	74	54	14	
44	Y EM	79	59	19	
45	U NAK	75	55	15	
46	I HT	69	49	09	
47	O SI	6f	4f	0f	a7
48	P DLE	70	50	10	b6
49	caret caret ESC	compose	compose	1b	5b (4)
		compose	compose	1b	5b (5)
50	, " GS	compose	compose	1d	5d (4)
		compose		1d	
52	Delete/Del Ln/Del	CSI P	CSI M	DEL (6)	
		DEL	CSI M	CSI P (6)	
53	End	CSI 24 ; 1 H			
54	Page Down/Reset	CSI U		ESC c	

Table G–3 Transmitted Codes

Position	Description	Hexadecimal Codes Sent			
		Unshift	Shift	Control	AltCar (1)
55	7 Home (pad)	See Table G-5 (3)			
56	8 ↑ (pad)	See Table G-5 (3)			
57	9 Pg Up (pad)	See Table G-5 (3)			
58	- (pad)	See Table G-5 (3)			
59	CAPS LOCK				
60	A SOH	61	41	01	
61	S DC3	73	53	13	
62	D EOT	64	44	04	
63	F ACK	66	46	06	
64	G BEL	67	47	07	
65	H BS	68	48	08	
66	J LF	6a	4a	0a	
67	K VT	6b	4b	0b	
68	L FF	6c	4c		
69	; :	3b	3a	0c	7e
70	' '	compose compose	compose compose		7b (4) (5)
71a	RETURN	CR or LF or CR-LF			
71b	< >	3c	3e		7d
72	4 ← (pad)	See Table G-5 (3)			
73	5 (pad)	See Table G-5 (3)			
74	6 → (pad)	See Table G-5 (3)			
75	, (pad)	See Table G-5 (3)			
75a	SHIFT				
75b	<< >>	ab	bb		b0 (5)

Table G–4 Transmitted Codes

Position	Description	Hexadecimal Codes Sent			
		Unshift	Shift	Control	AltCar (1)
76	Z SUB	7a	5a	1a	
77	X CAN	78	58	18	
78	C ETX	63	43	03	
79	V SYN	76	56	16	
80	B STX	62	42	02	
81	N SO	6e	4e	0e	
82	M CR	6d	4d	0d	b5 (4)
		6d	4d	0d	(5)
83	, ,	2c	2c		2d
84	. .	2e	2e		
85	acute E	e9	c9		27 (multinational mode)
		7b			27 (national mode)
86	SHIFT				
87	↑	CSI A	CSI T	CSI T	
88	1 End (pad)	See Table G-5 (3)			
89	2 ↓ (pad)	See Table G-5 (3)			
90	3 PgDn (pad)	See Table G-5 (3)			
91	Enter (pad)	Up to 4 programmed characters (3)			
92	Ctrl				
93	Alt/Compose	(7)	(7)	(7)	
94	Space	20	20		
95	AltCar				
96	Ctrl				
97	←	CSI D	CSI ƀA	CSI ƀA	
98	↓	CSI B	CSI S	CSI S	
99	→	CSI C	CSI ƀ@	CSI ƀ@	
100	0 Inser (pad)	See Table G-5 (3)			
101	. Suppr (pad)	See Table G-5 (3)			

Notes

(1) AltCar codes are the same as Unshifted codes unless otherwise noted. The 102+1 key keyboard will act identical to the 102 key keyboard with the setup option "Language" set to "U.S.". The above table represents those codes which will be sent with the setup option "Language" set to "French/Canadian".

(2) The code generated depends on the 600 Family Keyboard option.

(3) The code generated depends on the alternate keypad mode setting.

(4) Multinational Mode.

(5) National Mode.

(6) Swap Delete = No.

(7) This code is received by wproc+ only if the keyboard is requested.

Numeric Keypad Transmitted Codes

Table G–5 Numeric Keypad Codes

Key	Num Lock Off	Num Lock On	Alt. Keypad	
			7-bit Mode	8-bit Mode
0 Ins	ESC [@	0	ESC O p	SS3 p
1 End	ESC [24; 1 H	1	ESC O q	SS3 q
2 ↓	ESC [B	2	ESC O r	SS3 r
3 PgDn	ESC [U	3	ESC O s	SS3 s
4 ←	ESC [D	4	ESC O t	SS3 t
5	5	5	ESC O u	SS3 u
6 →	ESC [C	6	ESC O v	SS3 v
7 Home	ESC [H	7	ESC O w	SS3 w
8 ↑	ESC [A	8	ESC O x	SS3 x
9 PgUp	ESC [V	9	ESC O y	SS3 y
+	+	+	ESC O S	SS3 S
,	,	,	ESC O l	SS3 l
Del	ESC [P	period	ESC O n	SS3 n
ENTER	CR	CR	ESC O M	SS3 M
Num Lock	Num Lock On	Num Lock Off	ESC O P	SS3 P
/	/	/	ESC O R	SS3 R
*	*	*	ESC O Q	SS3 Q
-	-	-	ESC O m	SS3 m

Note: The ENTER key can be programmed with up to four characters.

Compose Mode

In Compose Mode, a special character is generated when the Compose key is pressed followed by a two key sequence representing the character. For instructions on using Compose Mode, see Appendix E. Compose sequences are listed below for the Canadian/French keyboard (102+1-key keyboard) and in Appendix E.

Table G–6 Canadian/French Compose Characters

NOTE: ␣ denotes a <SPACE> key depression.

Valid Canadian/French (National) Compose Sequences				
Compose Character	*Character Name*	*Necessary Characters To Depress Following* **Compose** *Key*	*Case or Order Sensitive*	*Two-Key Auto Compose Sequence*
"	quotation mark	"␣		
#	number sign	++		
'	apostrophe	'␣		
à	grave a	a`	Case	`a
â	circumflex a	a^	Case	^a
ç	cedilla c	c,	Case	,c
ê	circumflex e	e^	Case	^e
è	grave e	e`	Case	`e
é	acute e	e´	Case	´e
î	circumflex i	i^	Case	^i
ô	circumflex o	o^	Case	^o
ù	grave u	u`	Case	`u
û	circumflex u	u^	Case	^u

Appendix H: 122-Key Keyboard

Contents

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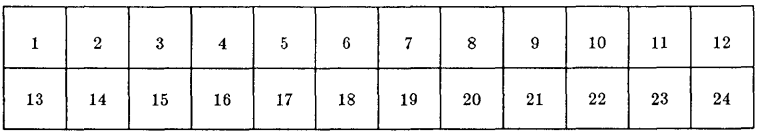
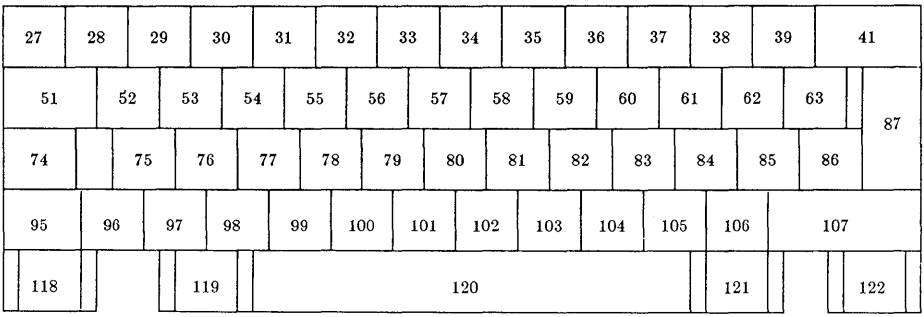
Appendix H: 122-Key Keyboard

Keyboard Layout

The layouts on the following pages use position numbers on the keytops instead of keytop labels.



Programmable Function Keypad



Main Keypad

Figure H–1 122-key Keyboard -- Main and Function Key Keypads

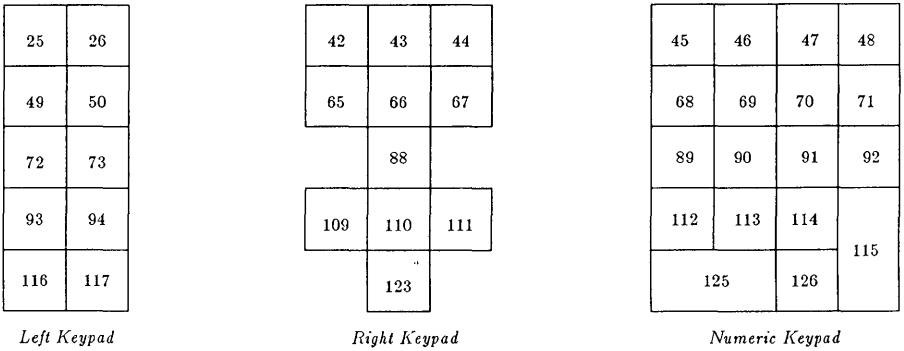


Figure H–2 122-key Keyboard -- Keypads

Transmitted Codes

Table H–1 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
1	F13	Programmable (1)	Programmable (1)	
2	F14	Programmable (1)	Programmable (1)	
3	F15	Programmable (1)	Programmable (1)	
4	F16	Programmable (1)	Programmable (1)	
5	F17	Programmable (1)	Programmable (1)	
6	F18	Programmable (1)	Programmable (1)	
7	F19	Programmable (1)	Programmable (1)	
8	F20	Programmable (1)	Programmable (1)	
9	F21	Programmable (1)	Programmable (1)	
10	F22	Programmable (1)	Programmable (1)	
11	F23	Programmable (1)	Programmable (1)	
12	F24	Programmable (1)	Programmable (1)	
13	F1	Programmable (1)	Programmable (1)	
14	F2	Programmable (1)	Programmable (1)	
15	F3	Programmable (1)	Programmable (1)	
16	F4	Programmable (1)	Programmable (1)	
17	F5	Programmable (1)	Programmable (1)	
18	F6	Programmable (1)	Programmable (1)	
19	F7	Programmable (1)	Programmable (1)	User
20	F8	Programmable (1)	Programmable (1)	System
21	F9	Programmable (1)	Programmable (1)	
22	F10	Programmable (1)	Programmable (1)	
23	F11	Programmable (1)	Programmable (1)	
24	F12	Programmable (1)	Programmable (1)	
25	ATTN Del SYSRQ	7f	7f	disconnect
26	Clear	ESC [2 J	ESC [2 J	
27	ESC	1b	1b	1b
28	! 1	21	31	
29	2 @ NUL	32	40	00

Table H–2 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
30	3 #	33	23	
31	4 $	34	24	
32	5 %	35	25	
33	— 6	36	5e	1e
34	7 &	37	26	
35	8 *	38	2a	
36	9 (	39	28	
37	0)	30	29	
38	- _ US	2d	5f	1f
39	= +	3d	2b	
41	← Erase & Tab	08	08	
42	DUP PA1			
43	FIELD MARK PA2			
44	BLANK KEY			
45	BLANK KEY (pad)		optionable (2)	
46	+ (pad)	2b (2)	2b (2)	2b (2)
47	, (pad)	2c (2)	2c (2)	2c (2)
48	SPACE (pad)	20 (2)	20 (2)	20 (2)
49	Cmd			
50	Cursr Sel Er Inp			
51	TAB →|	09	09	09
52	Q DC1	71	51	11
53	W ETB	77	57	17
54	E ENQ	65	45	05
55	R DC2	72	52	12
56	T DC4	74	54	14
57	Y EM	79	59	19
58	U NAK	75	55	15
59	I HT	69	49	09

Table H–3 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
60	O SI	6f	4f	0f
61	P DLE	70	50	10
62	¢ [{ ESC	5b	7b	1b
63	]] } GS	5d	7d	1d
65	TAB ⊢←	ESC [Z	ESC [Z	ESC [Z
66	insert char/line	ESC [@		ESC [L
67	del char/line	ESC [P		ESC [M
68	7 (pad)	37 (2)	37 (2)	37 (2)
69	8 (pad)	38 (2)	38 (2)	38 (2)
70	9 (pad)	39 (2)	39 (2)	39 (2)
71	TAB →| (pad)	09 (2)	09 (2)	09 (2)
72	Jump	next window	next window	
73	Erase EOF Record			
74	CAPS LOCK			
75	A SOH	61	41	01
76	S DC3	73	53	13
77	D EOT	64	44	04
78	F ACK	66	46	06
79	G BEL	67	47	07
80	H BS	68	48	08
81	J LF	6a	4a	0a
82	K VT	6b	4b	0b
83	L FF	6c	4c	0c
84	; :	3b	3a	
85	' "	27	22	
86	| FS	5c	7c	1c
87	RETURN KEY		CR or LF or CR-LF	
88	↑	ESC [A	ESC [A	ESC [A
89	4 (pad)	34 (2)	34 (2)	34 (2)

Table H–4 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
90	5 (pad)	35 (2)	35 (2)	35 (2)
91	6 (pad)	36 (2)	36 (2)	36 (2)
92	- (pad)	2d (2)	2d (2)	2d (2)
93	Print Ident	print window	print window	
94	Copy Play Pause			
95	SHIFT			
96	‘	60	7e	
97	Z SUB	7a	5a	1a
98	X CAN	78	58	18
99	C ETX	63	43	03
100	V SYN	76	56	16
101	B STX	62	42	02
102	N SO	6e	4e	0e
103	M CR	6d	4d	0d
104	, <	2c	3c	
105	. >	2e	3e	
106	/ ? US	2f	3f	1f
107	SHIFT			
109	←	ESC [D	ESC [D	ESC [2 D
110	HOME	ESC [H	ESC [H	ESC [H
111	→	ESC [C	ESC [C	ESC [2 C
112	1 (pad)	31 (2)	31 (2)	31 (2)
113	2 (pad)	32 (2)	32 (2)	32 (2)
114	3 (pad)	33 (2)	33 (2)	33 (2)
115	ENTER (pad)	Up to 4 programmed characters (2)		
116	SCROLL LOCK	scroll lock	scroll lock	
117	Break Discon	break	break	disconnect
118	Reset Quit	ESC c	ESC c	
119	CONTROL ALT (left)			

Table H–5 Transmitted Codes

Position	Description	Hexadecimal Codes Sent		
		Unshift	Shift	Control
120	SPACE	20	20	20
121	CONTROL ALT (right)			
122	ENTER	Up to 4 programmed characters (2)		
123	↓	ESC [B	ESC [B	ESC [B
125	0 (pad)	30	30	30
126	. (pad)	2e	2e	2e

Notes

(1) The code generated depends on the 600 Family Keyboard option.

(2) The code generated depends on the alternate keypad mode setting. See Table H-6.

Numeric Keypad Transmitted Codes

Table H–6 Numeric Keypad Codes

Key	Numeric Keypad Mode	Alternate Keypad Mode
(Blank)	-	-
+	Plus	ESC O Q
,	Comma	ESC O R
Space	Space	ESC O S
9	9	ESC O y
8	8	ESC O x
7	7	ESC O w
6	6	ESC O v
5	5	ESC O u
4	4	ESC O t
3	3	ESC O s
2	2	ESC O r
1	1	ESC O q
0	0	ESC O p
Enter	CR	ESC O M
-	Minus	ESC O l
→|	tab	ESC O m

Appendix I: Software Support

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Appendix I: Software Support

Host Software

Note: Use this appendix if you plan to operate your 730 MTG terminal in the *layers* environment, or plan to download or develop 730 MTG application programs.

AT&T Windowing Utilities

You will need the AT&T Windowing Utilities package to run the *layers* program. This package is a standard utilities package delivered with the UNIX® Operating System beginning with UNIX System V Release 3 (System V Release 2.1.1 for the 3B20).

This package may already be installed on your host computer. To check if this is the case, type the command **layers** at the host prompt in a non-*layers* window. If no error message is displayed in response to this command, and host prompt appears, your host computer is already properly configured to support the *layers* environment.

If the message, "Firmware Mismatch," appears, it is possible that the windowing utilities are not installed. Follow the instructions below and consult your systems administrator for assistance in installing the utilities package.

If your computer is running a version of UNIX® for which the AT&T Windowing Utilities package is available, install the package as described in the accompanying documentation.

Note: For System V Release 3 and earlier releases, the AT&T Windowing Utilities package is designed for RS-232 connections. To run *layers* over networks may require

additional host software (e.g., *streams/xt*). See the appropriate AT&T 730 Network Access Unit documentation for more details.

5620 DMD Core Package

For earlier versions of UNIX® where the utilities package is not available, the same windowing feature can be obtained by installing the 5620 DMD Core package. See the 5620 Dot-Mapped Display Administrator Guide (Catalog 999-801-120IS) for installation instructions.

After you install the 5620 DMD Core package, a zero-length file is created in the directory *$DMD/lib/layersys* to inform the 5620 layers program of the 730 MTG Terminal version. The name of this file must be in the form

lsys.TERMINAL_VERSION

where the **TERMINAL_VERSION** is displayed in the 730 Setup window.

For example, if the first line of your Setup window says "8;8;8 ROMS", your **TERMINAL_VERSION** is 8;8;8 and the zero-length file must be called *lsys.8;8;8*. To create the **lsys** file, change to the directory called *$DMD/lib/layersys* and type the command

>"lsys.8;8;8"

If engineering modifications are made to the 730 MTG terminal, changed functionality will be reflected in the **TERMINAL_VERSION.** One **lsys.TERMINAL_VERSION** must be created for each unique **TERMINAL_VERSION** type.

If the zero-length file for a particular **TERMINAL_VERSION** is missing, the error message, "5620 Software - Firmware Mismatch", will be displayed when attempting to execute the *layers* command.

An alternative to creating **lsys.TERMINAL_VERSION** files is to execute *layers* with the following command line:

layers /dev/null

Changes to Your .profile

TERM Variable

Changing the **TERM** variable is not strictly required to use 730 host software, but may be required by some UNIX® applications such as *vi* which use the *terminfo* facility (see the next section).

Set the **$TERM** shell variable to **730** by including the following lines in your *.profile*:

```
TERM=730
export TERM
```

DMD and PATH Variables

630 Software Development Package

Refer to the 630 Software Development Guide for information on how to set your $DMD and $PATH variables.

AT&T Windowing Utilities Package

If your host computer is running a version of UNIX® for which this utilities package is available, the $DMD variable does not have to be set and the $PATH variable does not have to be modified. The AT&T Windowing Utilities package is available starting with UNIX System V Release 3 (System V Release 2.1.1 for the 3B20).

5620 DMD Core Package

If your host computer is running a version of UNIX® for which the AT&T Windowing Utilities package is not available, you will be using this package (see previous section). With this package, the host environment must be set to use the 730 in the *layers* environment by

- Setting the shell variable **$DMD** to the root of the 5620 Core package tree. The root is usually the directory **/usr/dmd**. If this directory does not exist on your host computer, ask your system administrator where the 5620 Core package is installed.

- By adding the directory **$DMD/bin** to the **$PATH** variable.

For example, the lines below from a sample *.profile* will set up your environment to operate a 730 MTG terminal with the 5620 DMD Core package:

```
stty tabs ixon
DMD=/usr/dmd # (or wherever 5620 software is located)
PATH=$PATH:$DMD/bin
TERM=730
export DMD PATH TERM
```

Terminfo

TERM Variable

See the previous section on editing your *.profile*.

730 Terminfo Entry

A *terminfo* entry for the 730 terminal must be installed in order to use certain visual programs such as *vi*. Contact your AT&T Service Representative for an electronic copy of the 730 MTG *terminfo*. Alternatively, a printed copy of the 730 *terminfo* is listed on the following pages in case you do not have access to the 730 *terminfo* and must install it on your system.

If you are not sure whether 730 MTG *terminfo* is installed on your computer, enter the following command:

tput -T730 clear

This command generates the message, "Unknown terminal", if 730 *terminfo* is not installed. You must then install the 730 *terminfo*. Install the 730 *terminfo* as described in the **tic(M)** manual page in the UNIX System V Administrator Reference Manual. An alternative is to install the *terminfo* individually as a *local terminfo* as discussed below.

Terminfo Listing

The standard 730 MTG 2terminfo entry is for a 60 by 80 window. There are also entries for 24 by 80 (730-24) and 41 by 80 (730-41) windows. These entries are for a dark background. There are also entries for light background: 730r, 730r-24, and 730r-41 respectively.

```
730|att730|730MTG|AT&T 730 windowing terminal Version @(#)730.ti 1.0,

# has status line of 80 chars

        hs,
        wsl#80,
        tsl=\E7\E[;%i%p1%dx,

# support \E on the status line (status_line_esc_ok)

        eslok,

#       screen dimension

        cols#80,
        lines#60,

# label information

        lw#8,
        lh#2,
        nlab#24,
        rmln=\E[?13h,
        smln=\E[?13l,

# mapping of alternate character set to ASCII

        acsc="aaffggjjkkllmmnnooppqqrrssttuuvvwwxxyyzz{{||}} ,

# change the scrolling region

        csr=\E[%i%p1%d;%p2%dr,
```

```
# cursor visibility control

        civis=\E[?25l,
        cnorm=\E[?25h\E[?12l,
        cvvis=\E[?12;25h,

# character set mode

        smacs=^N,
        rmacs=^O,

        am,
        da,
        db,
        xenl,
        mir,
        msgr,
        npc,
        xon,
        it#8,
        lm#0,

# short descriptions without \E

        bel=^G,
        cr=^M,
        ht=\t,

# cursor movement

        cud1=\E[B,
        cuf1=\E[C,
        cuu1=\E[A,
        cub1=^H,
        cud=\E[%p1%dB,
        cuu=\E[%p1%dA,
        cuf=\E[%p1%dC,
        cub=\E[%p1%dD,
        cup=\E[%i%p1%d;%p2%dH,
```

```
        home=\E[H,
        cbt=\E[Z,

# scrolling

        ind=\ED,
        ri=\EM,
#       indn=\E[%p1%dS,
#       rin=\E[%p1%dT,

# character attributes

        smul=\E[4m,
        rmul=\E[24m,
        smso=\E[7m,
        rmso=\E[27m,
        rev=\E[7m,
```

Note: The following should be entered as a single line:

```
        sgr=\E[0%?%p6%t;1%;%?%p5%t;2%;%?%p2%t;4%;
        %?%p4%t;5%;%?%p3%p1%|%t;7%;%?%p7%t;
        8%;m%?%p9%t^N%e^O%;,
        sgr0=\E[m^O,

# character attribute mode

        blink=\E[5m,
        bold=\E[1m,
        dim=\E[2m,
        invis=\E[8m,

# line attribute

        swidm=\E#6,

# clear

        el=\E[K,
```

```
        el1=\E[1K,
        ed=\E[J,
        clear=\E[H\E[J,

# insert/delete

        dch1=\E[P,
        dl1=\E[M,
        il1=\E[L,
        dch=\E[%p1%dP,
        dl=\E[%p1%dM,
        il=\E[%p1%dL,
        ich=\E[%p1%d@,
        smir=\E[4h,
        rmir=\E[4l,

# pf string
# the escape sequences are different to program
#       system function keys 1-24
#       shifted system function keys (numbers 25-48, but no label)
# <25:  ESC [ pf# ; string-length q 16-char-label up-to-8-char-str
# >24:  ESC [ pf#-24 ; string-length ; 0 ; 3 q      up-to-8-char-str
```

Note: The following should be entered as a single line:

```
        pfx=\E[%?%p1%{25}%<%t%p1%e%p1%{24}%-%;%d
        ;%p2%l%02d%?%p1%{25}%
        <%tq\s\s\sSYS\s\s\s\s\sF%p1%
        :-2d\s\s%e;0;3q%;%p2%s,

# set/reset

        sc=\E7,
        rc=\E8,
        is2=\E[0m^O,
        rs2=\Ec\E[?3l,

# printer
```

```
        mc0=\E[?19h\E[0i,
        mc4=\E[?4i,
        mc5=\E[?5i,

# keyboard definition

        kich1=\E[@,
        kil1=\E[L,
        kbs=^H,
        kclr=\E[2J,
        khome=\E[H,
        kcbt=\E[Z,
        kcuu1=\E[A,
        kcud1=\E[B,
        kcuf1=\E[C,
        kcub1=\E[D,
        kf1=\EOc,
        kf2=\EOd,
        kf3=\EOe,
        kf4=\EOf,
        kf5=\EOg,
        kf6=\EOh,
        kf7=\EOi,
        kf8=\EOj,
        kf9=\ENo,
        kf10=\ENp,
        kf11=\ENq,
        kf12=\ENr,
        kf13=\ENs,
        kf14=\ENt,
        kf15=\ENu,
        kf16=\ENv,
        kf17=\ENw,
        kf18=\ENx,
        kf19=\ENy,
        kf20=\ENz,
        kf21=\EN{,
        kf22=\EN|,
        kf23=\EN},
```

```
        kf24=\EN ,

# the following keys are used for shifted system Fkeys

        kf25=\EOC,
        kf26=\EOD,
        kf27=\EOE,
        kf28=\EOF,
        kf29=\EOG,
        kf30=\EOH,
        kf31=\EOI,
        kf32=\EOJ,
        kf33=\ENO,
        kf34=\ENP,
        kf35=\ENQ,
        kf36=\ENR,
        kf37=\ENS,
        kf38=\ENT,
        kf39=\EOU,
        kf40=\EOV,
        kf41=\EOW,
        kf42=\EOX,
        kf43=\EOY,
        kf44=\EOZ,
        kf45=\EO[,
        kf46=\EO\s,
        kf47=\EO],
        kf48=\EO\^,
        flash=\E[?5h$<200>\E[?5l,
        fsl=\E8,
        is1=\E[8;0|\E[?3;4;5;13;15l\E[13;20l\E[?7h\E[12h\E(B\E)B,
        is3=\E(B\E)0,
        kind=\E[S,
        kri=\E[T,
        nel=\EE,
        pln=\E[%p1%d;0;0;0q%p2%:-16.16s,
        kLFT=\E[\s@,
        kRIT=\E[\sA,
```

```
# add sequences for changing flow control setting

        smxon=\E[?21;29h,
        rmxon=\E[?21l,

# add shifted HOME key

        kHOM=\ENM,

# repeat char

#       rep=%p1%c\E[%p2%1%-$db,


730-41|att730-41|730MTG-41|AT&T 730-41
windowing terminal Version @(#)730.ti 1.0,

        lines#41,
        use=730,

730-24|att730-24|730MTG-24|AT&T 730-24
windowing terminal Version @(#)730.ti 1.0,

        lines#24,
        use=730,

730r|att730r|730MTGr|AT&T 730 rev video
windowing terminal Version @(#)730.ti 1.0,

        flash=\E[?5l$<200>\E[?5h,
        is1=\E[8;0|\E[?3;4;13;15l\E[?5h\E[13;20l\E[?7h\E[12h\E(B\E)B,
        use=730,

730r-41|att730r-41|730MTG-41r|AT&T 730r-41 rev video
windowing terminal Version @(#)730.ti 1.0,

        lines#41,
        use=730r,
```

730r-24|att730r-24|730MTGr-24|AT&T 730r-24 rev video windowing terminal Version @(#)730.ti 1.0,

lines#24,
use=730r,

Note: An application such as *vi* uses the *cvvis* and *cnorm* entries in the 730 MTG *terminfo*. As a result, you will get a blinking cursor when the application is run and get a steady cursor when the application exits. If this is not desirable, redefine *cvvis* and *cnorm* as shown so that *cvvis* = \E [? 25h and *cnorm* = \E [? 25h.

Local 730 Terminfo Entry

An alternative to installing 730 *terminfo* in the system *terminfo* is to create a *local terminfo* in your directory. A local *terminfo* is also required if you change the default size of the non-*layers* windows (see the next section).

Follow the steps below to create a local *terminfo*:

1. Edit your *.profile* to include the lines:
   TERM=730
   TERMINFO=$HOME/.dmdterminfo
   export TERM TERMINFO
2. Log off and then log back on to cause your *.profile* to be executed.
3. Execute the following commands:
   cd
   mkdir .dmdterminfo
   cd .terminfo
4. Copy the 730 *terminfo* description in the previous section into a file called 730terminfo in your *.dmdterminfo* directory.
5. Execute the command:
   tic 730terminfo

The **tic** command will create a local *terminfo* in the directory **$HOME/.dmdterminfo.** For more information on local *terminfo* descriptions, see the entry for **tic(1M)** in the UNIX System Administrator's Reference Manual.

Terminfo for Fixed Non-Layers Window

Changing the Default Non-Layers Window

The size of the non-*layers* window can be changed from the 60 by 80 character default size provided for in Setup (see Chapter 4 for more information on this feature). If the default size is changed, *terminfo* must be changed to reflect the new size of the non-*layers* window.

To create an updated *terminfo*:

1. Display the Setup window and menu. Under the Ports submenu, change the Non-layers Window Cols and/or the Non-layers Window Rows to your desired values. Remember the values you choose.
2. Edit the 730 *terminfo* listing, setting the variable *cols* to the value you set for Non-layers Window Cols and setting the variable *lines* to the value you set for Non-layers Window Rows.
3. Create a local *terminfo* from this edited description as explained previously.

The next time the non-*layers* window is created, it will be the new default size. The outline window used in the Reshape and Peel features will also reflect the new default size the next time these features are used.

Appendix J: Options and Accessories

Contents

Listing J–1

Appendix J: Options and Accessories

Listing

Currently available options and accessories for your 730 MTG Terminal are listed below. Additional ones will be offered in the future.

Description	Comcode	PE Code
Amber Monitor	501001697	33534 Col 19
White Monitor	501006241	33534 Col 10
Monitor Base	524186384	None
Base Pan	524186392	None
730 MTG Controller/Base	501013015	3344-730
Metal Base and Logic Card	524594652	None
98-key Keyboard	501009013	33401
102-key Keyboard	501007421	33404
102+1-key Keyboard	106075567	33405
122-key Keyboard	501004881	33537
Red Mouse	524594157	33536
White Round Mouse	524599875	33450
512K RAM Card	501002166	33422
512K - Memory Kit *for NAU*	523482883	33542
2MB - Memory Kit *for NAU*	523482891	33543
Blank Cartridge	523482206	33539

Description	Comcode	PE Code
SSI/EIA Interface Card and Documentation	524594306	33535
730 StarLAN 10 ISO Network Access Unit and Documentation	501012041	33540
730 StarLAN 10 TCP/IP Network Access Unit and Documentation	501012058	33541
730 MTG Upgrade Kit *to upgrade a 630 MTG to a 730 MTG*	523484293	33544
730 X Cartridge Package	523488088	33503
730 X Terminal *with 1 MB RAM*		3344-731
730 X Terminal *with 2.5 MB RAM*		3344-732
730 X Binary Host Package	523488096	1331-731
730 X Source Host Package	846481950	

Note: *730 X Server Host Source Software* available through AT&T UNIX® Licensing

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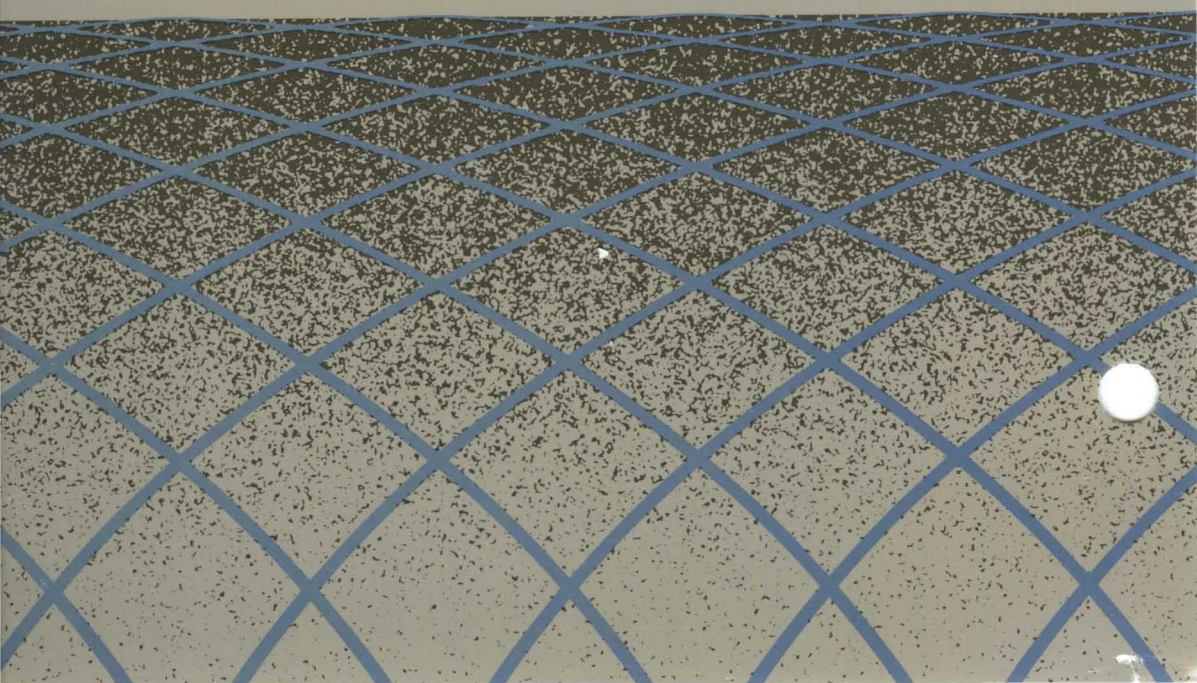
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