

IRMA

3279
Graphics™

User's Guide

*Digital
Communications
Associates, Inc.*

dca®

WARNING:

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

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Table of Contents

Preface

What is IRMA 3279 Graphics?	i
Product Features	ii
What to Do First	iii
Checking Package Contents	iii
Validating the Warranty	iv
Guide Contents	iv
Organization	v
Conventions Used in This Guide	viii
Frequently-Used Terms	viii
Typographical Conventions	ix

Chapter 1 Installation and Setup

Introduction	1-1
System Requirements	1-1
Getting Started	1-4
Hardware Installation	1-5
Setting the J1 Jumper	1-5
Setting the Base Address Jumpers	1-8
Installing the Hardware in an IBM Computer	1-10
Installing the Upgrade Board	1-18

Chapter 2 Software Configuration

Introduction	2-1
Installing the Software on Floppy Diskettes	2-1
Using Keyboard Switches	2-4
Installing the Software on a Hard Disk.....	2-6
Do I Need to Use GraphPac?.....	2-9
Starting GraphPac.....	2-11
GraphPac Menu Guidelines.....	2-13
Configuring Printers	2-14
Printer Menu Guidelines	2-16
Serial Non-Graphics Printers	2-17
Parallel Non-Graphics Printers	2-18
Advanced Color Technology (ACT) Printer	2-19
Quadjet Printer	2-20
IBM 5182 Printer	2-21
Tandy CGP-220 Printer	2-22
IBM 3852 Printer	2-23
Canon PJ1080A Printer	2-24
Toshiba P351C Printer	2-25
Toshiba P1351 Printer	2-26
Epson FX80 Printer	2-27
GTC Blaser Printer.....	2-27
HP LaserJet Printer	2-27
Do I Need to Configure the Keyboard?	2-28
Starting Keyboard Configuration.....	2-29
Changing the 3279 Keyboard Type	2-30
Changing the Keyboard Mapping.....	2-31

Selecting an Alternate PC Keyboard	2-31
Selecting an Enhanced Keyboard	2-32
Selecting an IRMAkey Keyboard	2-33
Selecting an RPQ Keyboard	2-33
Using a Custom Keyboard Profile	2-34
Customizing the Video Display	2-34
Specifying Monitor Type	2-35
Changing the Video Color	2-37
Configuring the Base Address	2-38
Exiting GraphPac	2-40
Returning to the Default Configuration	2-41
Creating Alternate GRAPH.DAT Files	2-41
Selecting Attributes and Program Symbol Sets	2-42

Chapter 3 S3G Terminal Emulation and Operation

Introduction	3-1
Starting Emulation	3-2
Emulator Startup Command Options	3-4
Verbose Reporting (-v)	3-5
Resident Mode (-r)	3-6
Force Download (-f)	3-6
Initialize and Exit (-e)	3-7
Session Operation.....	3-7

Chapter 3 S3G Terminal Emulation and Operation *(continued)*

Checking the Network Connection.....	3-7
Unlocking the Keyboard.....	3-8
Reading the Status Line.....	3-8
Saving and Printing Host Data.....	3-10
Exiting and Restarting the GRAPH Emulator	3-10

Chapter 4 Extended Functions

Introduction	4-1
Accessing the Extended Functions Prompt.....	4-1
Appending Text to a PC Disk File (Append).....	4-3
Capturing Text and Graphics in a PC Disk File (Capture).....	4-4
Printing Text on a PC Printer (Print)	4-6
Recalling a Screen of Graphics (Recall).....	4-7
Making the Emulator Resident	4-8
Functions Unavailable with the Resident Emulator	4-9
Power On Reset (Test).....	4-10
Printing and Recalling Screens	
Offline from the Host	4-11
Printing Graphics on the PC Printer	4-12
Recalling Text and Graphics	4-14
Video Reset (VR)	4-15

Chapter 5 E78 Emulation

Introduction	5-1
Configuring the E78 Emulation Program	5-2
Starting the E78 Emulator	5-7
Special Considerations for Using E78 with the Upgrade Hardware.....	5-9
Making E78 Resident	5-10

Chapter 6 Using the Keyboard Macro Driver, KMACDRV.SYS

Creating Macros.....	6-1
Saving Macros in a File.....	6-3
Example 1: Creating and Saving Key Macros	6-4
Clearing Current Macros.....	6-6
Loading Key Macro Files	6-6
Using the SK Program	6-7

Chapter 7 Remapping the Keyboard

Introduction.....	7-1
Using KYBDEDIT.....	7-2
Starting KYBDEDIT.....	7-2
Creating a Keyboard Profile.....	7-5
Using the Codes Option.....	7-7
Using the Xchg Option.....	7-13
Using the Copy Option.....	7-15
Using the Modes Option.....	7-18
Loading Keyboard Profiles.....	7-21
Activating Profiles.....	7-22
Key Position Numbers.....	7-23
BIOS Key Code Information.....	7-28
Key Value Tables Interpretation Guide	7-30

Appendix A Keyboards and Keys

Keyboards.....	A-1
Keys.....	A-1
GraphPac Menu Keys.....	A-5
Cursor Movement Keys.....	A-7
3279 Field Editing Keys.....	A-10
3279 Function Keys.....	A-13
PA Function Keys.....	A-17
PF Function Keys.....	A-17
Attribute-Select Keys.....	A-19
Color Select Keys.....	A-20
Highlight Select Keys.....	A-21
Program Symbol Set Keys.....	A-23

Appendix B Status Line Symbols and Messages

Introduction	B-1
Readiness and System Connection Messages	B-2
Do Not Enter Messages	B-3
Reminder Messages	B-9
Program Symbol Set Messages	B-10
Shift and Mode Messages	B-10
Highlighting Messages	B-12
Color Indicator	B-13
Printer Status Messages	B-13
Resident Mode Indicator	B-15

Appendix C Error Messages

Introduction	C-1
Correcting Errors	C-1

Appendix D Glossary

.....	D-1
-------	-----

Appendix E Diagnostics

Introduction	E-1
CHKBD Command Options	E-1
Starting CHKBD	E-5
Emulator (Coax) Board Tests	E-6
Graphics Board Tests	E-7
Color Video Test	E-9
Cursor Test	E-10
Installation Error Messages	E-10

Appendix F Advanced Utilities

Introduction	F-1
Remapping 3279 Key Assignments	F-2

Appendix G Controller and Mainframe Configuration

Introduction	G-1
SCP I/O Generation Parameters.....	G-1
VTAM Generation Parameters	G-2
Mode Tables Using IBM Default Parameters	G-4

Appendix H AT&T Installation Guide

Introduction.....	H-1
Installing the Hardware	H-1
Installing the Upgrade.....	H-7

Customer Support Information

Introduction	CS-1
Limited Product Warranty	CS-3
Diskette Replacement Policy	CS-5
Return For Repair Procedure	CS-6
Statement of Copyright Restrictions	CS-7

Index

.....	I-1
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List of Figures

1-1: J1 Jumper Location	1-6
1-2: J1 Jumper Setting for an IBM EGA	1-7
1-3: J1 Jumper Setting for Non-EGAs	1-7
1-4: Base Address Jumper Settings	1-9

List of Figures *(continued)*

3-1: The Status Line	3-9
A-1: Attribute Select Typewriter/APL Keyboard	A-2
A-2: Attribute Select Typewriter Keyboard	A-3
A-3: APL Typewriter Keyboard	A-4
F-1: 3279 Keyboard with Position Numbers	F-4
F-2: PC Keyboard with Position Numbers	F-7

List of Tables

7-1: Key Sequences for Activating Alternate Keyboard Profiles	7-23
7-2: Key Position Numbers	7-24
7-3: Key Values	7-31

Preface

What is IRMA 3279 Graphics?

IRMA 3279 Graphics is a hardware/software product that brings IBM 3279 S3G color graphics to your IBM Personal Computer (PC), PC XT, or PC AT. IRMA 3279 Graphics provides all the functions of the 3279 S3G terminal plus extended functions that let you save, redisplay, and print host graphics from the PC without reconnecting to the host. You can even perform high-speed file transfers with complimentary IRMAlink file transfer software. And the IRMA 3279 Graphics hardware is completely compatible with IRMA's E78 emulator, so you can run a variety of software such as TempusLink,TM Interactive PC Link,TM LOTUS 1-2-3,TM and Microsoft Word.TM

IRMA 3279 Graphics is available in two forms: a complete emulation and graphics hardware assembly, and an upgrade hardware assembly that attaches to an IRMA card installed in your PC. While both the upgrade and the complete IRMA 3279 Graphics product provide the same functions and features, the hardware and software cannot be mixed.

Product Features

IRMA 3279 Graphics and the upgrade provide the following features:

- o Complete emulation of the IBM 3279 S3G graphics terminal with program symbols
- o Extended capabilities for storing, printing, and redisplaying graphics while online with the host
- o Special utilities for printing and redisplaying graphics offline from the host
- o Support for extended color and highlighting and for EBCDIC, APL, scientific notation, and foreign language fonts
- o High-speed file transfer capability with complimentary IRMAlink FT/TSO and FT/CMS file transfer software
- o Compatibility with DCA's IRMAlink FT/3270 file transfer software, versions 1.27 and greater and ForteNet I and II file transfer software
- o Complete compatibility with DCA's E78 emulation program, versions 1.42 and greater
- o Hot key switching from DOS to emulation
- o Support for the IRMAkey/3270 keyboard and the IBM Enhanced keyboards
- o Emulation of three 3279 keyboards
- o Configurable keyboard with macro capability
- o Compatibility with the AT&T 6300/Olivetti M24 computer

-
- o IBM Selector Light pen support when the E78 emulator is used with the IBM Color Graphics Adapter (CGA) or Enhanced Graphics Adapter (EGA). The GRAPH emulator does not provide light pen support.

What to Do First

Checking Package Contents

The IRMA 3279 Graphics hardware is available in two forms, as a combined graphics-emulation product or as a graphics hardware upgrade for an IRMA board. The upgrade has a top connector that distinguishes it from the IRMA 3279 Graphics hardware. Check your package to be sure you have the right hardware. Also check your package to be sure it contains the following items:

- o IRMA 3279 Graphics diskette
- o IRMA 3279 Graphics User's Guide
- o Keyboard Utilities diskette
- o 3 standard PC keyboard templates and 3 enhanced keyboard templates
- o plastic card guide
- o video cable

-
- o IRMAlink FT/TSO and FT/CMS file transfer diskette*
 - o IRMAlink FT/CMS and FT/TSO User's Manual*

* The IRMAlink file transfer software and documentation are included as part of the IRMA package, so they are not included in the IRMA 3279 Graphics upgrade package. If you need a copy of the IRMAlink software or documentation, contact DCA Customer Support. In Georgia, call 1-404-442-4470. Outside Georgia, call 1-800-631-4171.

If any item is missing, contact your IRMA distributor.

Validating the Warranty

Now turn to the Customer Support section located at the end of this guide and carefully read the warranty information. Complete the product registration card included with your package and return it to DCA. This card validates your IRMA 3279 Graphics product warranty and provides a way to keep you informed of any updates that occur.

Guide Contents

This guide provides complete instructions for installing, configuring, and using IRMA 3279 Graphics and the graphics upgrade. This guide does not discuss details about data communications concepts, host graphics programs, host operations and application programs, or IBM 3270 terminal

operations. If you need information about these topics, refer to your system supervisor or the following IBM publications:

For information about 3270 terminals:
IBM 3270 Information Display System Configuration, GA27-2849.

For information concerning 3279 keyboards:
IBM 3270 Information Display System Character Set Reference, GA27-2837-6.

For information about a particular host graphics program, see the appropriate program documentation.

Organization

This user's guide is divided into the following chapters:

Chapter 1, "Installation and Setup," gives instructions for installing the IRMA 3279 Graphics hardware and the upgrade hardware. This chapter also includes instructions for setting the various jumpers on the hardware. See Appendix H for instructions on installing the hardware in an AT&T 6300/Olivetti M24 computer.

Chapter 2, "Software Configuration," describes the "GraphPac" configuration utility that lets you specify the type of display, printer, and keyboard you are using.

Chapter 3, "S3G Terminal Emulation and Operation," shows how to operate the 3279 S3G terminal emulation program, GRAPH.EXE.

Chapter 4, "Extended Functions," explains how to use the special capabilities of IRMA 3279 Graphics

to save, print, and redisplay host text and graphics locally at the PC, while online with the host as well as offline.

Chapter 5, "E78 Emulation," shows how to customize the E78 emulation program to run on the IRMA 3279 Graphics hardware.

Chapter 6, "Using the Keyboard Macro Driver, KMACDRV.SYS," explains how to use the <Alt><+> capability of the macro driver to create key macro files.

Chapter 7, "Remapping the Keyboard," shows how to use the KYBDEDIT program to remap the keyboard by altering, exchanging, and copying key codes. A good working knowledge of the IBM BIOS routine is required to use KYBDEDIT.

Appendix A, "Keyboards and Keys," presents reference tables and diagrams that describe 3279 keyboards, keys, and functions, and shows where 3279 functions are assigned on the PC keyboard.

Appendix B, "Status Line Symbols and Messages," contains tables that list the symbols and messages that may display on the status line while you use IRMA 3279 Graphics.

Appendix C, "Error Messages," lists and explains the error messages that may appear during any phase of IRMA 3279 Graphics operation. Instructions for correcting each error are included.

Appendix D, "Glossary," defines technical terms and words used frequently in this user's guide.

Appendix E, "Diagnostics," discusses the "CHKBD" program that allows you to test the installation of the emulator and graphics boards.

Appendix F, "Advanced Utilities," provides experienced users with instructions for using GraphPac to remap 3279 keys on the PC keyboard.

Appendix G, "Controller and Mainframe Configuration," gives the system programmer some notes to use when configuring the mainframe computer and the controller for use with IRMA 3279 Graphics.

Appendix H, "AT&T Installation Guide," provides special installation instructions for AT&T 6300 and Olivetti M24 users.

Customer Support Information provides warranty information, copyright restrictions, and explains what you should do if you need to return your hardware for repair.

Conventions Used in This Guide

Frequently-Used Terms

Throughout this guide, the following terms are used:

- o *Upgrade* refers to the IRMA 3279 Graphics upgrade hardware that connects to an existing IRMA board.
- o The term *IRMA 3279 Graphics* refers to the IRMA 3279 Graphics product as a whole, including the upgrade.
- o *Emulator* refers to the GRAPH emulation program unless "E78 emulator" is specified.
- o *Emulation* refers to IRMA 3279 Graphics' functioning as a terminal.
- o The mainframe computer is called the *host*.
- o Communication with the host is called a *session*.
- o When the term *enter* is used as part of an instruction (such as "Enter the filename") you must type the required filename, command, or other data, then press the <Enter> key. (The <Enter> key is also known as the carriage return key or the ↵ key. When using the IRMAkey keyboard in a 3270 session, be sure to use the key marked "Enter.")

Typographical Conventions

upper/
lower-
case

You can type commands in either uppercase or lowercase letters, according to your preference.

italics

Italicized words signify the type of information requested by a command. Do not type the italicized word or letter. Instead, read the command description to see what information is requested.

< >

Angle brackets appear around keys on the PC keyboard, e.g. <Esc>, <Enter>, <F3>, <a>. Press the key indicated by the angle brackets. Do not type the brackets.

[]

Square brackets appear around options in a command line, e.g.

GRAPH [-r]

To use the option, type the information inside the brackets. Do not type the brackets.

Chapter 1

Installation and Setup

Introduction

This chapter provides information to help you set up your system to run IRMA 3279 Graphics. The first part of the chapter provides system requirements and a checklist of installation steps. The last part of the chapter shows how to set the hardware jumpers and install the board in your PC. (If you are installing the hardware in an AT&T 6300 or Olivetti M24 computer, read the first half of this chapter. Then go to Appendix H for specific installation instructions.)

System Requirements

The following items are required to run IRMA 3279 Graphics.

Item	Description
personal computer	<ul style="list-style-type: none">o IBM PC, PC XT, PC AT oro AT&T 6300/Olivetti M24
memory	<ul style="list-style-type: none">o 128 Kilobytes Random Access Memory (RAM)

Chapter 1 - Installation and Setup

- disk drive** o at least 1 floppy disk drive with 320 Kbytes capacity

- DOS** o IBM PC DOS
 o Versions 2.1, 3.1, or 3.2

- graphics hardware** o Color Graphics Adapter (CGA) or Enhanced Graphics Adapter (EGA)

- color monitor** o High-resolution, long persistence, phosphor monitor capable of 2:1 interlace

The following monitors are supported:

- o Amdek Color 710
- o IBM 5153
- o PGS HX-12LP
- o Zenith ZVM-136
- o AT&T 6300/Olivetti M24
- o Microvitec 14L86 DD2U
- o IBM 5154 Enhanced Color
- o JVC GD-H1014LP
- o Electrohome ECM-1301
- o Aydin Controls 8810LP
- o NEC MULTISYNC with CGA
- o NEC MULTISYNC with EGA

- printer (optional)** o serial or parallel non-graphics printer

- o color or black and white graphics printer

The following color graphics printers are supported:

Chapter 1 - Installation and Setup

- o IBM 5182
- o IBM 3852
- o Toshiba P351C
- o Advanced Color Technology (ACT II)
- o Quadram Quadjet
- o Tandy CGP-220
- o Canon PJ1080A

The following black and white graphics printers are supported:

- o Toshiba P351
- o Epson FX80
- o GTC Blaser
- o HP LaserJet

host software

Host and application software configured to expect an IBM 3279 Model S3G terminal on the communication line and port where the PC is attached (see Appendix G)

- o IRMAlink host code is required for IRMAlink file transfer; see IRMAlink User's Manual.

network connection

- o connection to an IBM 3174 or 3274 terminal controller

- o C, D, or T support

(IBM 3276 terminal controllers do not support IRMA 3279 Graphics or IBM Model S3G terminals using Programmed Symbols and extended data streams.)

Getting Started

Use the following checklist to get IRMA 3279 Graphics installed and running. Check off each item to confirm that it has been completed.

Function to Perform	Completed
1) Read the warranty information (Customer Support section). Complete and mail the product registration card (inside back cover).	_____
2) Set the J1 jumper on the board (Chapter 1).	_____
3) Set the JP1 and JP2 jumpers if necessary (Chapter 1).	_____
4) Install the hardware (Chapter 1 - IBM computers, Appendix H - AT&T 6300 computers).	_____
5) Install the software (Chapter 2).	_____
6) Use GraphPac to specify the type of printer and monitor you are using, and to specify any other options (Chapter 2).	_____
7) Create or edit a CONFIG.SYS file to hold the keyboard drivers (Chapter 2).	_____
8) Reboot the PC to load the keyboard drivers (Chapters 2, 6, and 7).	_____
9) Verify that your controller	_____

is set up to run with a 3279
S3G graphics terminal by using
the TEST function (Chapter 2). _____

10) Review the 3279 keyboard layouts
in Appendix A, if necessary. _____

11) Customize E78 if you plan to run
that emulator on the IRMA 3279
Graphics hardware (Chapter 5). _____

12) Start emulation (Chapter 3). _____

Hardware Installation

The hardware installation instructions in this chapter are intended for IBM PC, XT, and AT users. If you are installing IRMA 3279 Graphics hardware in an AT&T 6300 or Olivetti M24 computer, refer to Appendix H for special installation instructions. The following sections describe how to set the jumpers that define the monitor and the hardware base address. The last two sections show how to install the hardware in your PC.

Setting the J1 Jumper

A jumper is a pin-like structure located on the printed circuit board. Both the upgrade and the original IRMA 3279 Graphics boards have a jumper labelled J1, which sets the board for the type of monitor you are using. Locate the J1 jumper using the following diagram:

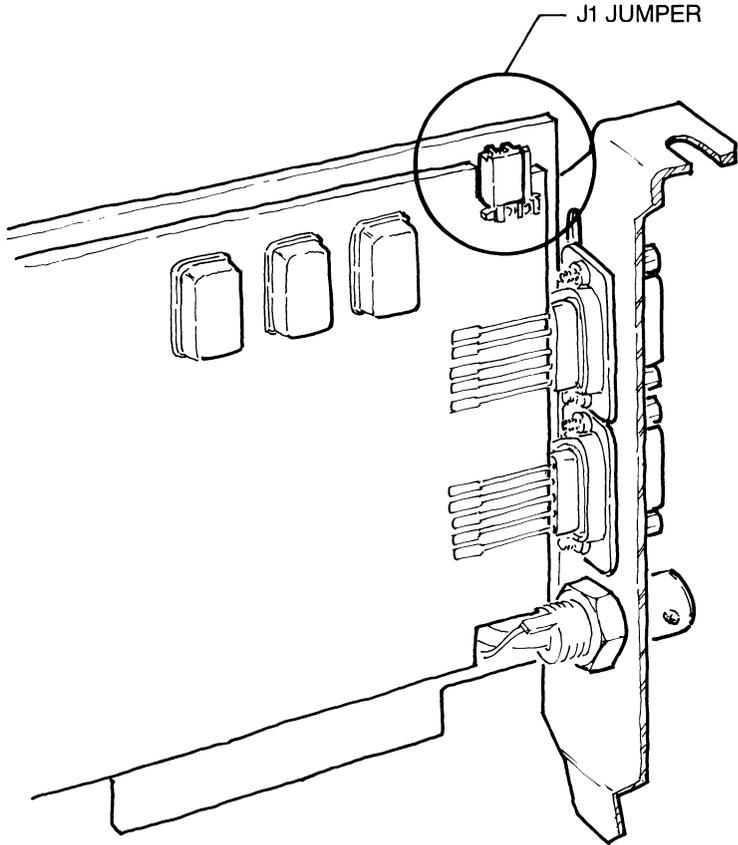


Figure 1-1: J1 Jumper Location

If you are using an IBM EGA (Enhanced Graphic Adapter) monitor or an equivalent monitor, set the jumper like this:

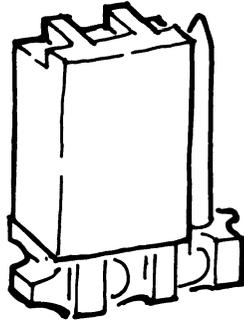


Figure 1-2: J1 Jumper Setting for an IBM EGA

If you are using any other monitor, set the jumper as shown below:

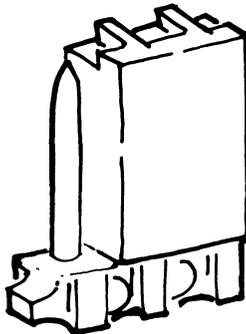


Figure 1-3: J1 Jumper Setting for Non-EGAs

If you have the upgrade hardware, skip the next section and read the section entitled, "Installing the Hardware in an IBM Computer."

Setting the Base Address Jumpers

(This section does not apply to the upgrade hardware, as its base address is defined by the IRMA board. IRMA's address of 220 cannot be changed. Change the address of any other board in your PC that conflicts with IRMA.)

The default hardware base address for IRMA 3279 Graphics is 280. If the default address of 280 conflicts with the address of another board in your PC, you need to change the JP1 and JP2 jumper settings. The following diagram shows the location of the jumpers, as well as the possible jumper settings and their base addresses. Use this diagram and the following information to set a base address not used by another board in your PC:

Figure 1-4 Diagram	Base Address	Jumper Setting
A	300	JP1 at 2 JP2 at 2
B	2A0	JP1 at 2 JP2 at 1
C	2C0	JP1 at 1 JP2 at 2
D	280	JP1 at 1 JP2 at 1

NOTE: JP3 must always be set at 1.

If you change the base address jumpers, you must set the same address in the software using the GraphPac configuration program, see Chapter 2. Note that the E78 emulator ignores these jumper settings.

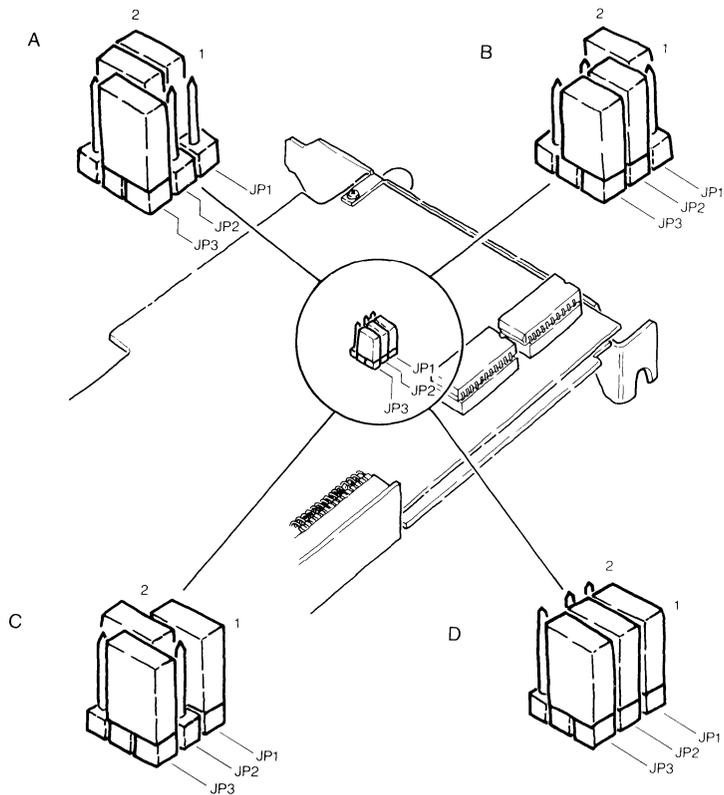


Figure 1-4: Base Address Jumper Settings

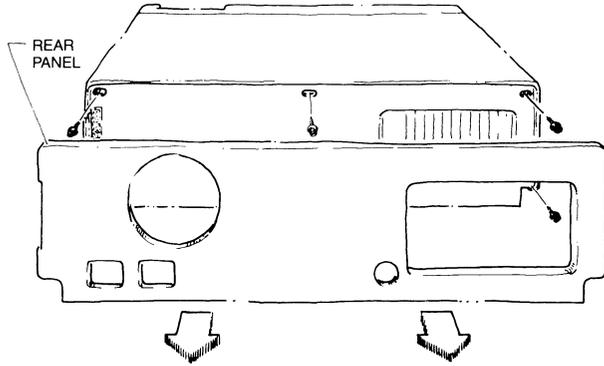
Installing the Hardware in an IBM Computer

Perform these steps to install the IRMA 3279 Graphics hardware in your IBM computer. If you need to install the upgrade hardware, follow steps 1 through 8, then complete the instructions in the next section. If you are using an AT&T 6300 or Olivetti M24 computer, refer to Appendix H for special installation instructions.

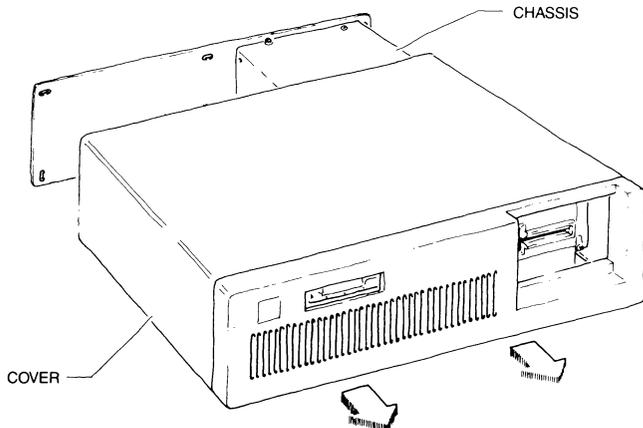
- STEP 1: Turn the PC power OFF and disconnect the power cord from the electrical outlet. Then disconnect the power cord from the rear panel of the PC.
- STEP 2: Turn OFF all externally attached devices such as printers, modems, etc. Unplug the power cables from the electrical outlets.
- STEP 3: Remove all cables from the back of the system unit, noting the location of each cable.
- STEP 4: If you are using an IBM PC AT, turn the key on the front panel counterclockwise to the unlocked position. Use your fingers or a flat-blade screwdriver to carefully remove the plastic back panel cover attached with hook-and-loop fasteners.

Chapter 1 - Installation and Setup

- STEP 5:** Using a PC or PC XT, remove the five cover mounting screws from the outside of the rear panel.



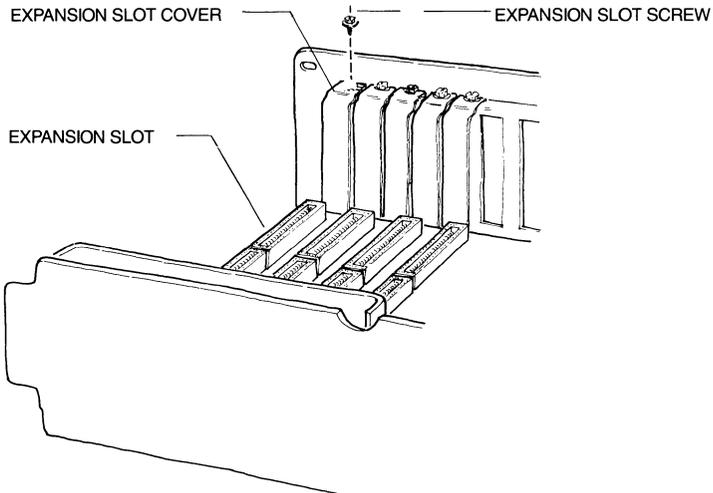
- STEP 6:** Carefully slide the cover forward and remove it.



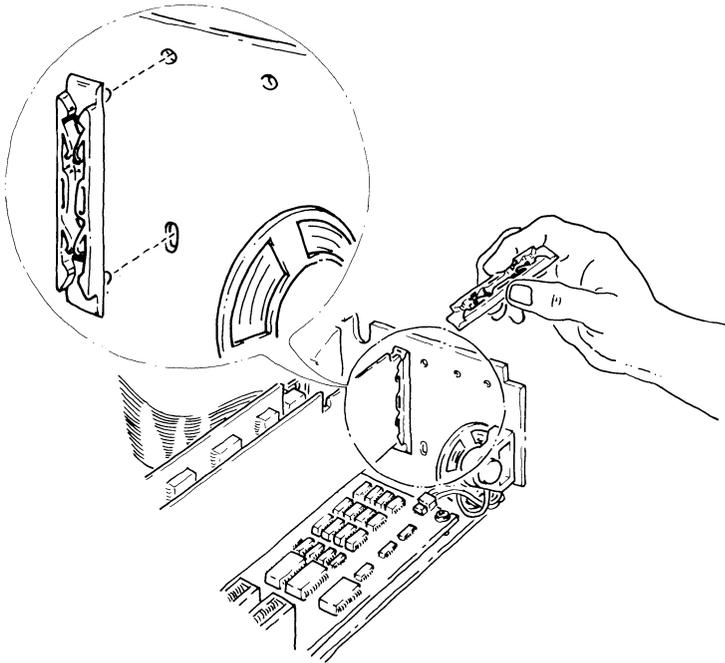
Chapter 1 - Installation and Setup

NOTE: We recommend that you install the IRMA 3279 Graphics hardware in the outer expansion slot, placing your Color Graphics Adapter (CGA) or Enhanced Graphics Adapter (EGA) in a slot no more than five inches away. Leave at least one slot between IRMA 3279 Graphics and the display adapter. **Do not install IRMA 3279 Graphics next to the disk controller on the IBM PC AT .**

STEP 7: Remove the necessary expansion slot covers and screws. Save the screws for later use.



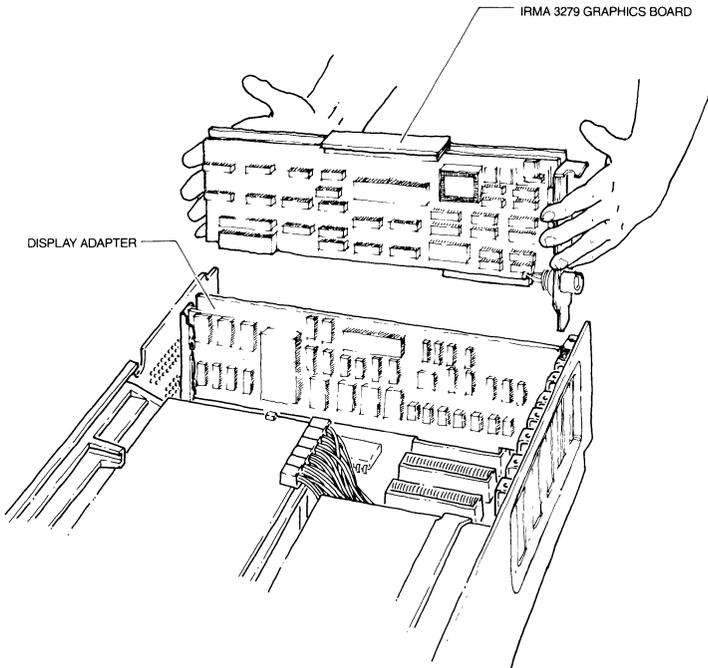
STEP 8: If you are using the IBM PC or PC XT, insert the plastic card guide into the holes that correspond to the expansion slot where you will install IRMA 3279 Graphics (or the display adapter if a card guide is already in the IRMA 3279 Graphics slot).



(If you are installing the upgrade, go to the next section.)

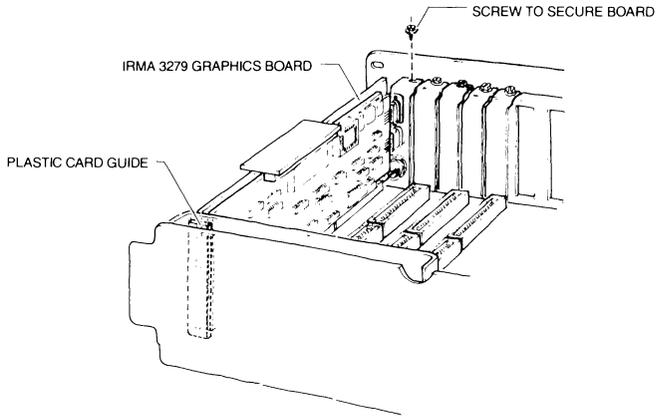
Chapter 1 - Installation and Setup

STEP 9: Grasp the IRMA 3279 Graphics board assembly by the top or sides and guide it into the proper slot, being sure that the pins at its base fit into the connector in the expansion slot. Press firmly. Check to see that the front edge is in the card guide and the coaxial connector bracket is properly positioned in the rear panel. The top should be even with all other cards.



Chapter 1 - Installation and Setup

STEP 10: Secure the board with the screw you removed in step 10.



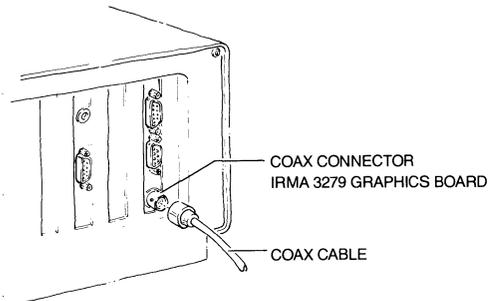
STEP 11: Replace the system unit cover by sliding it back over the chassis. Check to see that the lip (located on the bottom of the cover sides) fits under the rail on the sides of the chassis.

STEP 12: If you have an IBM PC AT, replace the back panel cover.

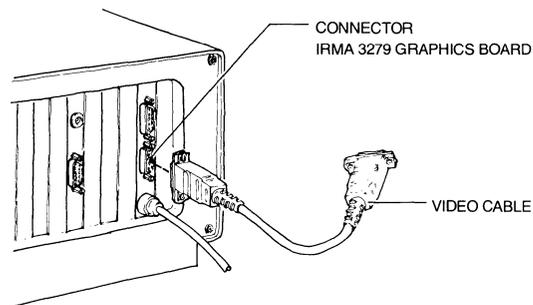
STEP 13: Replace the screws that secure the cover.

Chapter 1 - Installation and Setup

- STEP 14:** Connect the coax cable (not provided) from your communications controller to the round, bottom socket of the emulator board. Rotate the connector until it locks into place.

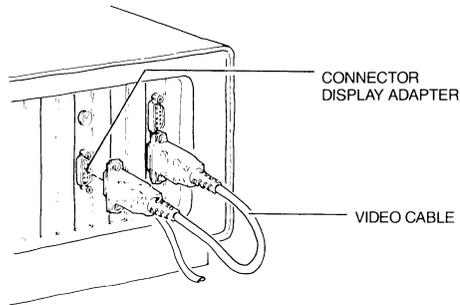


- STEP 15:** A short video cable is supplied with your IRMA 3279 Graphics package. Connect the female end of this cable to the male socket in the center of the emulator board.

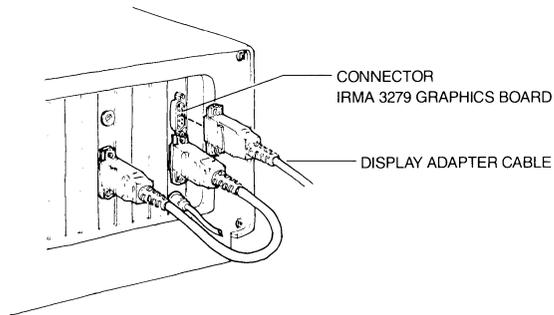


Chapter 1 - Installation and Setup

STEP 16: Connect the male end of the video cable to the female socket on the CGA or EGA card.



STEP 17: Connect the male end of the cable from your display unit to the female socket at the top of the emulator board.

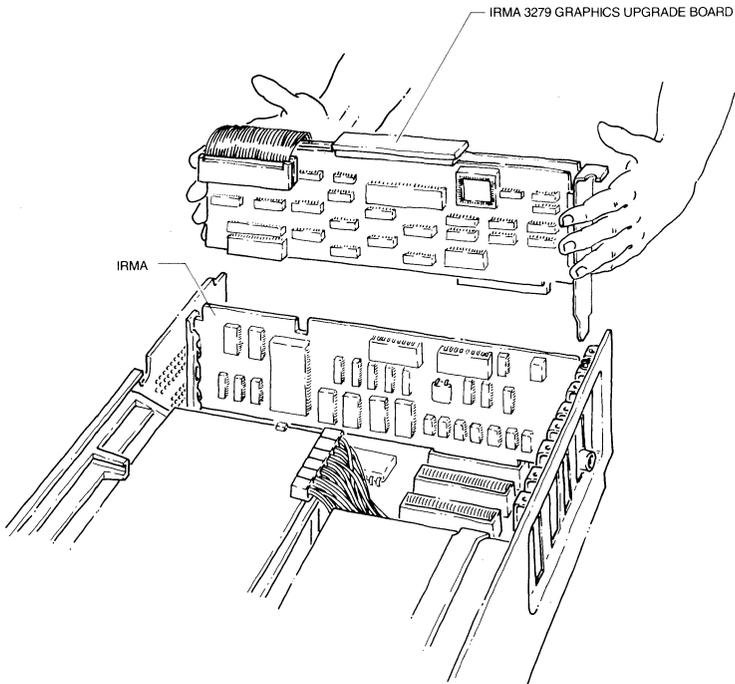


STEP 18: Test the installation using the diagnostic program in Appendix E.

Installing the Upgrade Board

After finishing steps 1 through 8 in the previous section, perform the following steps to complete the IRMA 3279 Graphics upgrade installation.

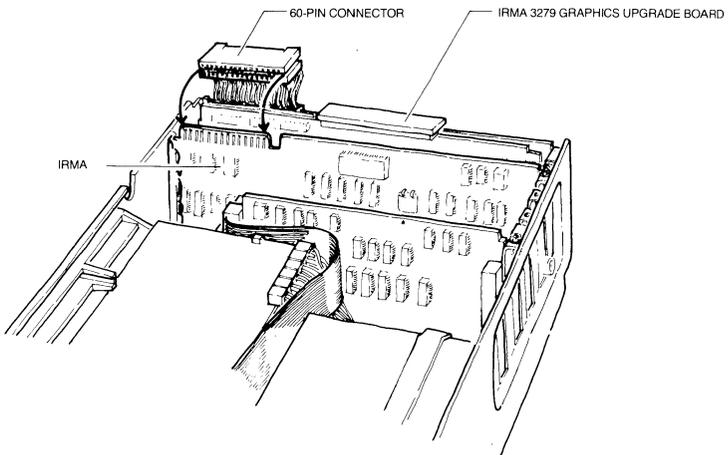
- STEP 9:** To promote cooling, install the graphics upgrade board in the outer expansion slot of your PC and position IRMA in the adjacent slot, removing the display adapter if necessary. Fit the pins of the boards into the base connectors of the expansion slots and press firmly.



NOTE: We recommend that you do not install the upgrade hardware next to the disk controller on an IBM PC AT.

STEP 10: Replace the retaining screws to secure the boards to the PC frame.

STEP 11: Connect the graphics upgrade board to IRMA as shown in the following diagram. Position the 60-pin connector of the upgrade board over the top connector of the IRMA board. Push down on the connector so that it is mounted securely on the IRMA board.

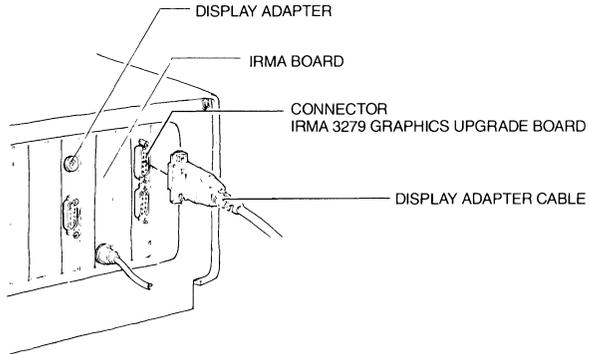


- STEP 12: If you removed the display adapter, re-install it in a slot no more than five inches away from the upgrade hardware. Leave at least one slot between a double-board display adapter (such as the IBM EGA) and IRMA 3279 Graphics. (You can install a single board or a half slot board in the slot between the upgrade and the display adapter.)
- STEP 13: Replace the system unit cover by sliding it back over the chassis. Check to see that the lip (located on the bottom of the cover sides) fits under the rail on the sides of the chassis.

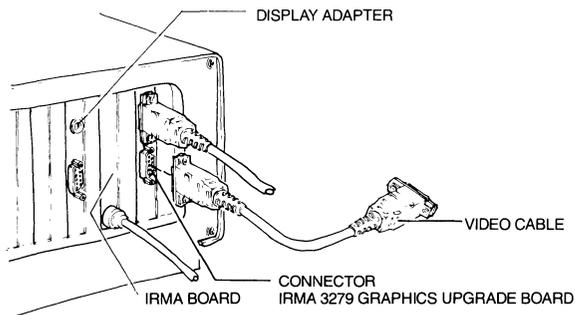
If you have an IBM PC AT, replace the back panel cover.

Chapter 1 - Installation and Setup

- STEP 14:** Replace the screws that secure the cover.
- STEP 15:** Connect the coax cable to your IRMA board.
- STEP 16:** If you have not done so already, remove the cable from the color graphics adapter or EGA. Insert the cable into the female top socket of the upgrade board.

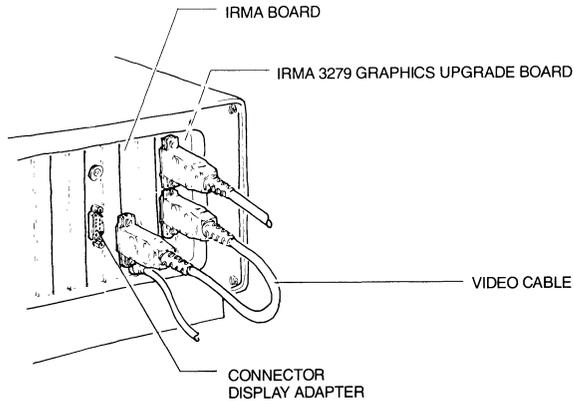


- STEP 17:** A short video cable is supplied with your IRMA 3279 Graphics package. Connect the female end of the cable to the male middle socket on the upgrade board.



Chapter 1 - Installation and Setup

STEP 18: Connect the male end of the video cable to the female socket on the CGA or EGA.



STEP 19: Check the installation using the diagnostic program in Appendix E. Note that the first part of this program tests the IRMA board, and the second part tests the 3279 S3G emulator board.

Chapter 2

Software Configuration

Introduction

Before you can use your PC as a 3279 S3G graphics terminal, you must install the software and run the GraphPac configuration program. The first half of this chapter provides instructions for installing the software on floppy disks and on a hard disk. The second half describes the GraphPac configuration program.

Installing the Software on Floppy Diskettes

You will need two formatted diskettes on which to install the software. Put DOS on one of the diskettes. Follow these steps to complete the installation:

- STEP 1: Put the IRMA 3279 Graphics Program diskette in drive A. Put the diskette formatted without DOS in drive B.
- STEP 2: At the DOS prompt, type the following command to copy the program files to drive b:

copy *.* b:

You now have a copy of the Program diskette in drive B. Put the original diskette in a place where it won't get damaged.

STEP 3: Replace the diskette in drive B with the diskette formatted with DOS. Replace the program diskette in drive A with the Keyboard Utilities diskette.

STEP 4: Copy the keyboard utilities to drive B by typing:

copy *.* b:

Now you have a bootable copy of the Keyboard Utilities diskette in drive B. Put the original diskette in a place where it won't get damaged.

From this point on, use the diskette *copies* for all operations.

STEP 5: Put the bootable Keyboard Utilities diskette in drive A and the copy of the Program diskette in drive B.

STEP 6: Create a CONFIG.SYS file on the Keyboard Utilities diskette to contain the keyboard drivers. Type the following command at the DOS A> prompt:

```
COPY CON CONFIG.SYS <Enter>  
DEVICE=KYBDDRV.SYS -2[X] <Enter>  
DEVICE=KMACDRV.SYS <Enter>  
<F6> <Enter>
```

The -2 in the second line allows space in memory for two keyboard profiles. You can allow memory for up to 9 keyboard profiles.

The *X* option represents one or all of the following values:

Value for X	Action
A	Turns OFF PrtSc
B	Turns OFF key click
C	Turns OFF shift toggle
D	Turns ON one-finger shift mode
F	Turns OFF automatic key repeat
G	Forces to a 15-key buffer
i	Implements IRMAkey keyboard
j	Implements AT&T 6300/Olivetti M24 keyboard

Include the switches you want to use after the -2, e.g. **DEVICE=KYBDDRV.SYS -2ACFi**. All users must include the -2 switch. IRMAkey users must specify i. AT&T 6300/Olivetti M24 users must specify j. These switches are described in greater detail in the following section.

STEP 7: Reboot the PC to load the keyboard drivers.

Note that the bootable copy of the Keyboard Utilities diskette must always be in drive B when you boot the PC in order for the keyboard drivers to load.

STEP 8: Read the section, "Do I Need to Use GraphPac," and run that configuration program if necessary.

STEP 9: If you plan to use attribute-select keys and program symbol sets, read the section at the end of this chapter, entitled "Selecting Attributes and Program Symbol Sets," for some special instructions.

After completing these steps, you are ready for emulation.

Using Keyboard Switches

The KYBDDRV.SYS driver provides several keyboard features, most of which can be activated in one of two ways:

- o By including a "switch" with the KYBDDRV.SYS driver in the CONFIG.SYS file (activates the feature for all keyboard profiles),
- o By pressing a key sequence -- where available (activates the feature only for the currently active profile)

To deactivate a feature, you either remove the switch or press the key sequence again.

The following paragraphs list and describe the switches and key sequences that activate the keyboard driver features. Keys represented by <NP> are located on the Numeric Key Pad. The format for including a switch as part of the KYBDDRV.SYS line is shown in the installation sections of this chapter.

Switch	Function	Key Sequence
1-9	Allocates memory for profiles	not available

REQUIRED: Allows memory for up to 9 keyboard profiles; you must specify at least 2. Each profile requires 3K of RAM. See Chapter 7 to create alternate keyboard profiles.

A	Turns OFF PrtSc	<Ctrl><Alt><PrtSc>
---	-----------------	--------------------

OPTIONAL: Reverts from the 128-key buffer provided by the keyboard driver to the standard 15-key buffer. You may need to include this switch when using certain PC application programs or when using a PC mouse.

i Implements not available
 IRMAkey
 keyboard

REQUIRED when an IRMAkey keyboard is attached to the PC.

j Implements not available
 AT&T 6300/
 Olivetti M24
 keyboards

REQUIRED when an AT&T 6300/Olivetti M24 keyboard is attached to the PC.

Installing the Software on a Hard Disk

Installing the IRMA 3279 Graphics software on a hard disk is a procedure made simple by the use of the DCA.BAT file. This file creates a directory labelled \DCA, installs all files into this directory, prompts you for RPQ keyboard configuration, and executes the GraphPac configuration program. The following steps show how to use DCA.BAT and give directions for installing keyboard drivers. Read these steps carefully before beginning your installation.

NOTE: If you are configuring an RPQ keyboard, the RPQ file must be located in the same directory as DCA.BAT. Otherwise, the program will not find the keyboard data file and configuration will not take place,

even though a "configuration complete" message may display. The international keyboard option that comes up with the RPQ keyboard option is valid only for international users.

- STEP 1:** Put the program diskette in drive A and type:

DCA C: <Enter>

This command starts DCA.BAT, which operates as described in the previous paragraph. DCA.BAT installs the program files in the \DCA directory on the specified drive.

- STEP 2:** Follow the directions on the screen to move through the DCA.BAT program. Most prompts request that you type ([n]/y) for a response. If there are brackets around the response, e.g. [n], you can simply press <Enter>. If there are no brackets, type the letter and press <Enter>.

Most users need to run the GraphPac configuration program, which is fully described in this chapter. Refer to the section entitled, "Do I Need to Use GraphPac?" for details.

- STEP 3:** Next, put the keyboard drivers in a CONFIG.SYS file on your hard disk to be read at boot time. If your hard disk already contains a CONFIG.SYS file, use your editing program to insert the last two lines below. Otherwise, type the complete command as follows:

```
COPY CON CONFIG.SYS <Enter>
DEVICE=KYBDDRV.SYS -2[X] <Enter>
DEVICE=KMACDRV.SYS <Enter>
<F6> <Enter>
```

The -2 in the second line allows space in memory for two keyboard profiles. You can allow memory for up to 9 keyboard profiles.

The *X* option represents one or all of the following values:

Value for X	Action
A	Turns OFF PrtSc
B	Turns OFF key click
C	Turns OFF shift toggle
D	Turns ON one-finger shift mode
F	Turns OFF automatic key repeat
G	Forces to a 15-key buffer
i	Implements IRMAkey keyboard
j	Implements AT&T 6300/Olivetti M24 keyboard

Include the switches you want to use after the -2, e.g. **DEVICE=KYBDDRV.SYS -2ACFi**. All users must include the -2 switch. IRMAkey users must specify **i**. AT&T 6300/Olivetti M24 users must specify **j**. These switches are described in greater detail in the previous section.

STEP 4: Reboot the PC to load the keyboard drivers. Now you are ready to start the emulator.

Do I Need to Use GraphPac?

The GraphPac configuration program lets you specify the type of printer, display monitor, and keyboard that you plan to use with IRMA 3279 Graphics. GraphPac also lets you change the video background color, specify an alternate hardware base address, and change 3279 key assignments. The items you can configure are listed below with their default values. The third column shows when you need to use GraphPac.

GraphPac Configuration Chart

Item to Configure	Default Value	Is Configuration Necessary?
printer model	No printer assigned	Yes, if you plan to use a printer.
keyboard type	83/84 key PC keyboard Attribute Select Typewriter/APL Keyboard	Yes, if you are using an RPQ, an IRMAkey, or an IBM Enhanced keyboard; or if you want to use an alternate 3279 keyboard.
display model	no display assigned	Yes
video blue	dark blue	No, this is a convenience feature for IBM Enhanced color monitors and AT&T 6300 color monitors.
hardware base address	280	Yes, if you set the jumpers on the board to a new address (upgrade cannot be altered).
3279 key assignment (See Appendix F for instructions)	Attribute Select Typewriter/APL Keyboard	No. This option should be used only by experienced operators when the default key assignments are completely unsatisfactory for a particular application.

Starting GraphPac

To start GraphPac from a floppy diskette, put the program diskette in a drive and move to that drive. At the DOS prompt type:

GP <Enter>

A logo and copyright notice display, followed by the HOME menu (see the diagram below).

If you used DCA.BAT to install the software on a hard disk, you are automatically prompted to run GraphPac. After you respond positively to run the program, the GraphPac logo and copyright notice display, followed by the HOME menu:

```
HOME          -GraphPac-
              IRMA 3279 Graphics
              (c) 1987 Digital Communications Associates, Inc
```

- 1 - Print Saved Graph
- 2 - Recall Saved Graph
- 3 - Configuration
- 0 - Exit
- __ Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Chapter 2 - Software Configuration

The first two items on this menu are extended functions that are described in Chapter 4. The third item selects the configuration utility. Note the menu's identification banner, "HOME," in the top left corner of the screen.

To start configuration, type "3" and press <Enter>. The following configuration menu displays:

```
CONFIG          -GraphPac-
                IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc
```

- 1 - Configure Printer
- 2 - Configure Keyboard
- 3 - Configure Video
- 5 - Configure Base Address
- __ - Select One

ESC -- Previous ENTER -- Process Selection TAB -- Next Field

Note that the banner "CONFIG" in the left corner of the screen identifies this menu as the configuration menu. Choose an item to configure by typing the number of your selection in the

space preceding "Select One." A menu displays for the selected item. Instructions for using the new menu and all other menus are provided in the following section.

GraphPac Menu Guidelines

The following notes apply to all GraphPac menus and options.

- o Menus are arranged in a hierarchy with the GraphPac HOME menu at the top.
- o The banner in the top left portion of the screen identifies the current menu and shows the menus from which the current menu was derived. For example, if the banner reads "CONFIG-PRINT-SERIAL" the current menu is the "SERIAL" printer configuration menu.
- o When using the GraphPac program, you move from the main menu to a submenu, and often to other submenus. Use the <Esc> key to return to a previous menu. For example, if CONFIG-PRINT-SERIAL is the current menu, pressing <Esc> returns you to the CONFIG-PRINT menu. Pressing <Esc> again returns you to the CONFIG menu. Pressing <Esc> another time returns you to the HOME menu. If you press the <Esc> key from the HOME menu, you return to DOS.
- o Valid keys to use on GraphPac menus are backspace, backtab, Enter, escape, all cursor keys, Home, and Tab. (Key descriptions are provided in Appendix A.)
- o When you exit the GraphPac program, the changes you make are written in the

GRAPH.DAT file and are effective the next time you enter the GRAPH emulator command (see Chapter 3).

- o It is necessary to use GraphPac only once, unless you need to specify a different type of monitor, printer, or keyboard or change or add other options.
- o If you run GraphPac more than once, the current values write over the existing values. (To use more than one configuration, see 'Creating Alternate GRAPH.DAT Files' in this chapter.)

The following sections show how to configure each item on the GraphPac HOME menu.

Configuring Printers

IRMA 3279 Graphics does not define a default printer. If you need to define a printer to use with IRMA 3279 Graphics, follow these steps:

- STEP 1: Press 1 <Enter> from the CONFIG menu. The following printer menu displays listing the printer models supported by IRMA 3279 Graphics:

Chapter 2 - Software Configuration

CONFIG-PRINT

-GraphPac-
IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc

00 - No Printer	08 - Canon PJ1080A
01 - Serial Non-graphic	09 - Toshiba P351C
02 - Parallel Non-graphic	10 - Toshiba P1351
03 - Advanced Color Technology ACT II	11 - Epson FX80
04 - Quadram Quadjet	12 - GTC Blaser
05 - IBM 5182	13 - HP LaserJet
06 - Tandy CGP-220	
07 - IBM 3852	

00 - Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

STEP 2: Find the two-digit number that identifies your printer, and type this number in the space preceding "Select One." Press <Enter>.

A new menu appears that allows you to specify control parameters for the chosen printer. (Each printer and its menu are discussed in the following sections.)

Printer Menu Guidelines

Each printer menu selected from the CONFIG-PRINT menu displays parameters whose values you can define. Observe the following guidelines when using the printer menus and changing parameters:

- o To display the menu for a specific printer, enter the number of the desired printer on the CONFIG-PRINT menu.
- o Each printer menu lists the valid parameters for that printer. The current parameter value displays to the left of each parameter with the possible values on the right.
- o To keep the current settings press the <Esc> key.
- o To change a setting, tab to the parameter you want to change and type the number of the new value over the current value. Then press <Enter>.
- o Refer to your printer documentation for information on parameters and their appropriate values.
- o The new settings for the parallel and serial non-graphic printer selections take effect the next time you enter the GRAPH command. The settings for all other printer selections take effect immediately.

NOTE: New settings for the serial and parallel non-graphic selections become the DOS settings for the connected printers. These settings override any parameters that may have been previously set with the MODE command (see the IBM DOS

Guide). Your settings remain in effect for all printer activity until you change them again with the MODE command or with the printer menu.

The following sections discuss each entry on the CONFIG-PRINT menu.

Serial Non-Graphics Printers

From the CONFIG-PRINT menu, type 01 and press <Enter> to display the menu for a serial non-graphics printer:

CONFIG-PRINT-SERIAL

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Port (1=COM1: 2=COM2:)
4 - Baud Rate (0=110 1=150 2=300 3=600 4=1200 5=2400 6=4800 7=9600)
2 - Parity (0=None 1=Odd 2=Even)
1 - Stop Bits (1 or 2)
7 - Data Bits (7 or 8)
0 - Line Feed (0=Yes 1=No)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Follow the "Printer Menu Guidelines" section of this chapter, and refer to your printer manual to change any of these settings.

Parallel Non-Graphics Printers

To configure a Parallel Non-Graphics Printer, type 02 from the CONFIG-PRINT menu and press <Enter>. The following menu displays:

```
CONFIG-PRINT-PARALLEL
      -GraphPac-
      IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc
```

```
1 - Port          (1=LPT1: 2=LPT2: 3=LPT3:)
0 - Line Feed     (0=Yes 1=No)
```

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Refer to your printer manual and the "Printer Menu Guidelines" section of this chapter to change any parameters.

Advanced Color Technology (ACT) Printer

Type 03 on the CONFIG-PRINT menu and press <Enter> to display the menu for an ACT graphics printer:

CONFIG-PRINT-ACT

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Zoom	(1 to 8)
002 - Zoom Y	(1 to 255)
6 - Aspect Ratio	(2=0.85 3=1.0 4=1.133 5=1.275 6=1.417)
1 - Black/White	(1=Reverse 2=As Is)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Refer to your printer manual and the "Printer Menu Guidelines" section of this chapter to change any parameters. The changes you make override the DIP switch settings on your printer while IRMA 3279 Graphics is in use. When you stop using IRMA 3279 Graphics, the printer reverts to its usual hardware DIP switch settings. Parameters set with DOS utilities are not affected by selections made with this menu.

Quadjet Printer

To configure a Quadjet Printer, type 04 from the CONFIG-PRINT menu and press <Enter>. The following menu displays:

CONFIG-PRINT-QUADJET

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Rotation	(1=0° 2=90°)
1 - Aspect Ratio	(1=1:1 2=3:4)
1 - Black/White	(1=Reverse 2=As Is 3=Only)
1 - Strike	(1=Single 2=Double)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The first option on this menu, "Rotation," allows you to print full-width screen displays on the Quadjet printer. To use this option, type a "2" over the "1" in the space preceding "Rotation." This turns the image 90° so that data displayed left-to-right on the screen prints top-to-bottom on the page. To return to normal printing, type a "1" over the "2."

For information about the other items on this menu, refer to your printer manual. Be sure to follow the "Printer Menu Guidelines" section of this chapter when changing parameters.

IBM 5182 Printer

Type 05 on the CONFIG-PRINT menu and press <Enter> to display the configuration menu for an IBM 5182 printer:

CONFIG-PRINT-IBM-5182

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

3 - Aspect Ratio	(1=1:1 2=6:5 3=3:4 4=6:5x3:4)
1 - Black/White	(1=Reverse 2=As Is)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Refer to your printer manual and the "Printer Menu Guidelines" section of this chapter to change any parameters. Note that the values you select override the DIP switch settings on your printer while IRMA 3279 Graphics is in use. When IRMA 3279 Graphics is not in use, the printer uses its original hardware DIP switch settings. Parameters set with DOS utilities are not affected by selections made with this menu.

Tandy CGP-220 Printer

To configure a Tandy CGP-220 graphics printer, type 06 from the CONFIG-PRINT menu and press <Enter>. The following menu displays:

```
CONFIG-PRINT-TANDY
      -GraphPac-
      IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc
```

```
1 - Rotation          (1=0° 2=90°)
1 - Aspect Ratio      (1=1:1 2=3:4)
1 - Black/White       (1=Reverse 2=As Is 3=Only)
```

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The first option on this menu, "Rotation," allows you to print full-width screen displays on the Tandy printer. To use this option, type a "2" over the "1" in the space preceding "Rotation." This turns the image 90° so that data displayed left-to-right on the screen prints top-to-bottom on the page. To return to normal printing, type a "1" over the "2."

For information about the other items on this menu, refer to your printer manual. Be sure to follow the "Printer Menu Guidelines" section of this chapter when changing parameters.

IBM 3852 Printer

Select 07 from the CONFIG-PRINT menu to display the IBM 3852 menu:

CONFIG-PRINT-IBM-3852

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Rotation	(1=0° 2=90°)
1 - Aspect Ratio	(1=1:1 2=3:4)
1 - Black/White	(1=Reverse 2=As Is 3=Only)
1 - Strike	(1=Single 2=Double)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The first option on this menu, "Rotation," allows you to print full-width screen displays on the IBM 3852 printer. To use this option, type a "2" over the "1" in the space preceding "Rotation." This turns the image 90° so that data displayed left-to-right on the screen prints top-to-bottom on the page. To return to normal printing, type a "1" over the "2."

For information about the other items on this menu, refer to your printer manual. Be sure to follow the "Printer Menu Guidelines" section of this chapter when changing parameters.

NOTE: Full screen pictures can be printed on an IBM 3852 without rotation.

Canon PJ1080A Printer

To display the menu for the Canon PJ1080A graphics printer, type 08 on the CONFIG-PRINT menu and press <Enter>. The following menu displays:

CONFIG-PRINT-CANON-PJ1080A

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Rotation	(1=0° 2=90°)
1 - Aspect Ratio	(1=1:1 2=3:4)
1 - Black/White	(1=Reverse 2=As Is 3=Only)
1 - Strike	(1=Single 2=Double)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The first option on this menu, "Rotation," allows you to print full-width screen displays on the Canon printer. To use this option, type a "2" over the "1" in the space preceding "Rotation." This turns the image 90° so that data displayed left-to-right on the screen prints top-to-bottom on the page. To return to normal printing, type a "1" over the "2."

For information about the other items on this menu, refer to your printer manual. Be sure to follow the "Printer Menu Guidelines" section of this chapter when changing parameters.

Toshiba P351C Printer

To display the configuration menu for a Toshiba P351C printer, type 09 on the CONFIG-PRINT menu and press <Enter>. The following menu displays:

CONFIG-PRINT-TOSHIBA-P351C

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Aspect Ratio	(0=5:6 1=1:1)
1 - Black/White	(1=Reverse 2=As Is)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Follow the "Printer Menu Guidelines" section of this chapter, as well as the instructions in your printer manual to change the values on this menu.

NOTE: In order to print graphs at the correct size, you must set the Vertical Movement Index (VMI) switch to $\frac{1}{144}$ " rather than $\frac{1}{256}$ ". Otherwise, your graphs will print at approximately 45% of their actual size.

Toshiba P1351 Printer

Type 10 on the CONFIG-PRINT menu and press <Enter> to display the configuration menu for a Toshiba P1351 black and white graphics printer. The following menu displays:

CONFIG-PRINT-TOSHIBA-P1351

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Rotation (1=0° 2=90°)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The option on this menu, "Rotation," allows you to print full-width screen displays on the Toshiba printer. To use this option, type a "2" over the "1" in the space preceding "Rotation." This turns the image 90° so that Data displayed left-to-right on the screen prints top-to-bottom on the page. To return to normal printing, type a "1" over the "2."

For information about the other items on this menu, refer to your printer manual. Be sure to follow the "Printer Menu Guidelines" section of this chapter when changing parameters.

Epson FX80 Printer

To use an Epson FX80 black and white graphics printer with IRMA 3279 Graphics, select 11 from the CONFIG-PRINT menu. No additional menu displays. Continue with other configuration menus or press <Esc> several times to return to DOS and save your configuration to the GRAPH.DAT file.

GTC Blaser Printer

To use a GTC Blaser black and white graphics printer with IRMA 3279 Graphics, select 12 from the CONFIG-PRINT menu. No additional menu displays. Continue with other configuration menus or press <Esc> several times to return to DOS and save your configuration to the GRAPH.DAT file.

Hewlett Packard LaserJet

To set up an HP LaserJet printer to run with IRMA 3279 Graphics, select 13 from the CONFIG-PRINT menu. No additional menu displays. Continue with other configuration menus or press <Esc> several times to return to DOS and save your configuration to the GRAPH.DAT file.

Do I Need to Configure the Keyboard?

You do not have to use GraphPac's keyboard configuration option if both of the following conditions exist:

- o you have a standard 83/84 key IBM PC, PC AT or PC XT keyboard
- o you want to use the default 3279 keyboard layout: the Attribute Select Typewriter/APL keyboard. (The default 3279 keyboard provides 12 PF keys, color and highlighting attribute-select keys, and APL symbols.)

If you have an IRMAkey or IBM Enhanced Keyboard or if you want to change the 3279 keyboard assignment, you must use the keyboard configuration option. The following sections show how to change the default assignments.

Starting Keyboard Configuration

To start keyboard configuration, go to GraphPac's CONFIG menu and select item 2, "Configure Keyboard." The following menu displays:

CONFIG-KEYBOARD

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Configure 3279 Keyboard Type

2 - Configure 3279 Keyboard Mapping

3 - Configure PC Keyboard Type

__ - Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

This menu lists the available keyboard options. Remember, if you don't select an option, the host assumes you want the 3279 Attribute Select Typewriter/APL keyboard assigned to a standard 83/84 key PC keyboard. To choose an option, type the item number in the space to the left of "Select One" and press <Enter>. A new menu displays for the selected option. The three options are discussed in the following sections.

Changing the 3279 Keyboard Type

If you do not select a 3279 keyboard, the default keyboard (Attribute Select Typewriter/APL keyboard) is used. The default keyboard is **00** on the following menu. To change the 3279 keyboard type, enter 1 on the CONFIG-KEYBOARD menu. The following menu displays listing the three 3279 keyboard types you may use. (These keyboards are illustrated on your templates and in Appendix A.)

CONFIG-KB-3279

-GraphPac-

IRMA 3279 Graphics

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- | | |
|---|--------------|
| 00 - Typewriter/APL/Attribute Select/U.S. | (12 pf keys) |
| 01 - Typewriter/Attribute Select/U.S. | (24 pf keys) |
| 02 - Typewriter/APL/U.S. | (12 pf keys) |
| | |
| 00 - Select One | |

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Select a 3279 keyboard by typing the item number in the "Select One" field and pressing <Enter>. With this change, the new 3279 keyboard will be assigned to the standard PC keyboard when you start the GRAPH emulator. If you have a standard keyboard, you are finished with the configuration. Press <Esc> several times to exit GraphPac, or use other GraphPac configuration options. If you need to select a different PC keyboard, go to the section entitled, "Selecting an IRMAkey or IBM Enhanced Keyboard."

NOTE: You must select keyboard 01 in order to have all 24 PF keys.

Changing the Keyboard Mapping

The second option on the keyboard configuration menu is an advanced keyboard remapping option. Since this procedure can radically alter your keyboard, possibly making some functions unavailable, we recommend that you create macros with the <Alt><+> procedure provided by the KMACDRV.SYS driver. This procedure is described in Chapter 6. The keyboard remapping option on this menu is explained in Appendix F.

Selecting an Alternate PC Keyboard

To use an IRMAkey keyboard, an RPQ keyboard, or an IBM Enhanced keyboard with IRMA 3279 Graphics, type 3 on the CONFIG-KEYBOARD menu and press <Enter>. The following menu displays:

NOTE: You do not have to specify an option from this menu to use a standard 83/84 key PC keyboard.

Chapter 2 - Software Configuration

CONFIG-KB-PC

-GraphPac-

IRMA 3279 Graphics

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00 - PC/XT/AT (83/84 key)

01 - XT/AT Enhanced (101/102 key)

02 - IRMAkey/3270

00 - Select One

2 - slot

ibmgraph __ - profile

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Selecting an Enhanced Keyboard

To select an IBM Enhanced Keyboard, type 01 in the "Select One" field and press <Enter>. The values for the "slot" and "profile" field are automatically assigned as follows:

2 - slot

ibmgraph __ - profile

The "slot" field directs the emulator to load the keyboard profile into memory slot 2. Do not change this value. The "profile" field tells the emulator to load the keyboard profile, "ibmgraph.kyb." Make sure that this file resides in the same directory as the GRAPH.EXE emulator file. You can insert a custom keyboard profile in place of "ibmgraph." See the following section for details.

Selecting an IRMAkey Keyboard

To select an IRMAkey keyboard, type 02 in the "Select One" field and press <Enter>. The values for the "slot" and "profile" field are automatically assigned as follows:

2 - slot
irmakey _ - profile

The "slot" field directs the emulator to load the keyboard profile into memory slot 2. Do not change this value. The "profile" field tells the emulator to load the keyboard profile, "irmakey.kyb." Make sure that this file resides in the same directory as the GRAPH.EXE emulator file. You can insert a custom keyboard profile in place of "irmakey." See the following section for details.

NOTE: If you want to use all 24 PF keys, be sure you select the 3279 Attribute Select Typewriter keyboard, item 02 on the CONFIG-KB-3279 menu. See "Changing the 3279 Keyboard Type" for instructions if necessary.

Selecting an RPQ Keyboard

To use an RPQ keyboard, go to the CONFIG-KB-PC menu (shown on the previous page) and select the PC keyboard you are using: 00 - PC/XT/AT, 01 - XT/AT Enhanced, or 02 - IRMAkey. Press <Tab> to move to the "profile" field and type in the name of the RPQ keyboard profile you want to use: 8K0808 or 8K1163. After typing one of these profiles press the <Esc> key to return to the previous menu. If you want to perform other functions continue with the GraphPac configuration. If you have completed configuration, press <Esc> as many times as

necessary to return to DOS and save your changes in the GRAPH.DAT file.

Using a Custom Keyboard Profile

When you start the GRAPH emulator, the keyboard profile specified on the CONFIG-KB-PC menu (ibmgraph or irmakey) is automatically loaded. If you have created an alternate keyboard profile with the KYBDEDIT program in Chapter 7, you can load this profile in place of the standard profile.

To automatically load an alternate profile, type the name of the alternate file in place of the standard filename on the CONFIG-KB-PC menu. For example, if IRMAkey keyboard is specified, the last entry on the CONFIG-KB-PC menu looks like this:

irmakey _-profile

Type your alternate filename over "irmakey":

altfile _-profile

The new profile will load automatically when you start the GRAPH emulator.

For instructions on loading multiple keyboard profiles, see Chapter 7.

Customizing the Video Display

The video customization menu allows you to specify the type of monitor you are using and to change the blue color from dark blue to bright blue. To display the Video Customization Menu,

enter 3 from the GraphPac HOME menu. The following menu displays:

CONFIG-VIDEO

-GraphPac-
IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc

1 - Configure Monitor

2 - Configure Alternate Color

__ - Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Select an item from this menu to configure by typing the desired number (1 or 2) in the "Select One" field. Then press <Enter>. Each of these items is described on the following pages.

Specifying Monitor Type

To display the menu for monitor configuration, type 1 in the "Select One" field on the CONFIG-VIDEO menu and press <Enter>. The following menu displays listing the monitors that you can use with IRMA 3279 Graphics:

Chapter 2 - Software Configuration

CONFIG-VIDEO-MONITOR

-GraphPac-

IRMA 3279 Graphics

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- | | |
|----------------------------|------------------------------|
| 01 - Default | 08 - Electrohome ECM-1301 |
| 02 - Amdek Color 710 | 09 - Aydin Controls 8810LP |
| 03 - IBM 5153 | 10 - IBM 5154 Enhanced Color |
| 04 - JVC GD-H1014LP | 11 - AT&T 6300/Olivetti M24 |
| 05 - Microvitec 14L86 DD2U | 12 - NEC MULTISYNC with CGA |
| 06 - PGS HX-12LP | 13 - NEC MULTISYNC with EGA |
| 07 - Zenith ZVM-136 | |

01 - Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Type the number that identifies the monitor you are using and press <Enter>. Your selection is automatically written in the GRAPH.DAT file upon exiting GraphPac and will be effective when you start the GRAPH emulator. If you will be using different monitors with IRMA 3279 Graphics, you can create several GRAPH.DAT configuration files. See "Creating Alternate GRAPH.DAT Files" in this chapter.

NOTE: Option 01, Default, provides general settings that can be used by a variety of monitors. Because one setting cannot provide the best operating configuration for all monitors, you

menu above. If your monitor is not listed, select the default setting, then contact DCA Customer Support for guidance.

Changing the Video Color

(This option applies only to AT&T color monitors and IBM Enhanced Color Monitors.)

The second option on the CONFIG-VIDEO menu lets you select to display characters on the screen in bright blue, which shows up better against the regular blue screen background. From the CONFIG-VIDEO menu, type 2 in the "Select One" field and press <Enter>. The following menu displays with the choices of the default blue (dark blue) or the alternate blue (bright blue):

CONFIG-VIDEO-COLOR

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

1 - Default Blue

2 - Alternate Blue

__ - Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Type the number of your choice in the "Select One" field and press <Enter>.

Configuring the Base Address

(This section does not apply to the upgrade.)

The base address specifies where the IRMA 3279 Graphics hardware is located in the PC. The software is configured for "autosearch" by default, which means that it automatically searches the four possible addresses where the hardware might be located. These addresses are 280 (the default), 2A0, 2C0, and 300.

For many users, the autosearch feature is satisfactory. However, if another board in your PC uses one of the autosearch addresses, or if you changed the base address jumpers on the IRMA 3279 Graphics board, you must specify a base address with this option. *The base address you set with this option, must match the base address set with the jumpers on the board (see Chapter 1).*

To set the base address, follow these steps:

STEP 1: From the CONFIG menu, select the base address option, by typing:

<5><Enter>

The following menu displays:

Chapter 2 - Software Configuration

CONFIG-BASE-ADDRESS

-GraphPac-

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc

() indicates current board address(es)

280 (1,2)

2A0 (2)

2C0 (2)

300 (2)

000 - Select Address (000 for auto search)

Notes: (1) Factory shipped configuration
(2) Address searched for in emulator

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

This menu lists the four base addresses to which you can set the IRMA 3279 Graphics hardware.

STEP 2: Type the desired address in the space preceding "Select Address," and press <Enter>.

NOTE: If you previously have used IRMA 3279 Graphics with a specific base address

and want to return to autosearch, type 000 in the space preceding "Select Address." The emulator will automatically search for the board at all four given addresses.

The new base address will be written in the GRAPH.DAT file when you exit the GraphPac program.

NOTE: If you are using other boards in your PC, be sure that each board is set to a different base address. Then be sure that you set the same base address for the board and its program.

Exiting GraphPac

After you have finished configuring the software, exit GraphPac by pressing <Esc> as many times as necessary to return to the HOME menu. Press <Esc> one additional time. The following message displays:

```
graph.dat changed, writing to current directory
```

The changes you have made are written in the GRAPH.DAT file on your diskette or in your \DCA directory. The GRAPH emulator will look for the GRAPH.DAT file when you start emulation. If the emulator doesn't find GRAPH.DAT, it uses the default configuration values coded on the hardware.

Returning to the Default Configuration

If you want to return to the default configuration (see page 2-1), you must remove the GRAPH.DAT file from the emulator's search path. To do this, perform one of the following functions:

- o Rename GRAPH.DAT to a file name of your choice.
- o Copy GRAPH.DAT to a directory that is different from the directory in which you start the GRAPH emulator (cannot be \DCA).
- o Erase GRAPH.DAT.

Creating Alternate GRAPH.DAT Files

If you plan to use different printers, monitors, or keyboard types with IRMA 3279 Graphics, you need to create more than one GRAPH.DAT file to hold the different configurations. Perform the following steps to create and use an alternate GRAPH.DAT file.

STEP 1: Rename the current GRAPH.DAT file or put it in a directory different from the one where the program files are stored.

STEP 2: Run GraphPac from your program diskette or the \DCA directory of your hard disk and select the options for the new GRAPH.DAT file.

To use the new GRAPH.DAT file, simply start the emulator from your program diskette or the \DCA directory where the new GRAPH.DAT file is

located. To use the original GRAPH.DAT file, do one of the following, according to whether you have a hard disk or floppy disk system.

For floppy disks:

- o Rename the current GRAPH.DAT file. Then, rename the original to GRAPH.DAT or move the original back into the directory where the emulator resides.

For hard disks:

- o Start the emulator from the directory where you copied the original GRAPH.DAT file. The emulator will search the \DCA directory for all the needed files.

Selecting Attributes and Program Symbol Sets

In order to use program symbols and attribute-select features, the control unit communications port where your coaxial cable is attached must be configured to operate with an IBM 3279 Model S3G terminal. To check the controller configuration, run the following test after installing the IRMA 3279 Graphics hardware and software. This test is equivalent to the "Extended Function and Programmed Symbols Test Procedure" for an IBM 3279 terminal.

STEP 1: With the hardware and software installed, start the emulator by typing the following command at the DOS prompt.

GRAPH <Enter>

The IRMA 3279 Graphics copyright notice displays, followed by the emulation screen.

STEP 2: Press the test function key:

<Alt><F8>

The word TEST appears on the status line.

STEP 3: Type:

/8 <Enter>

Test patterns appear on the screen.

If the controller is properly configured for a 3279 S3G terminal, the triangular symbols in the test pattern appear in red and white, and the numbers 1 through 7 each appear in a different color. If you do not get similar test results, your controller is not configured to support the full range of IRMA 3279 Graphics features.

STEP 4: To reset any attribute display to the application program's original value, use the field inherit function. The field inherit function is assigned to the following key sequences:

<Alt><Ins> resets highlighting

<Alt> resets program symbol sets

<Alt><+> resets colors (the + is on the numeric keypad)

STEP 5: To end the test session and return to emulation mode, press:

<Alt><F8>

NOTE: If you have a problem using programmed symbols but normal text operations are working properly, see your system administrator and verify that the controller is configured to support an IBM 3279 Model S3G Display Station. Appendix G provides information the system administrator can use to configure the control unit and mainframe computer.

Now, your PC and IRMA 3279 Graphics are ready for terminal emulation. Proceed to Chapter 3 for operating instructions.

S3G Terminal Emulation and Operation

Introduction

With the IRMA 3279 Graphics hardware installed, you can run the GRAPH.EXE emulation program to use your PC as a 3279 S3G graphics terminal. This chapter shows how to start 3279 graphics emulation, provides special command options, and shows how to make the emulator resident, as well as how to switch between DOS and emulation mode. You should read all of this chapter before starting emulation.

NOTE: Refer to the following appendices for detailed information about specific topics:

Appendix A: descriptions of the keyboards and keys you can use in emulation

Appendix B: status line symbols and messages with corrective action, where necessary

Appendix C: corrective action for error messages that occur during all phases of program operation

Starting Emulation

Follow these steps to start 3279 S3G emulation. Note that GRAPH.8X3 and GRAPH.FNT must reside in either the current directory or the DCA directory in order for the emulator to start.

- STEP 1: If you have a hard disk, boot the PC from the hard disk. If you have a floppy-disk system, boot from the Keyboard Utilities diskette. Notice that two banners display one after the other, giving the keyboard driver title and revision number. If these banners do not display, review the installation steps in Chapter 2.
- STEP 2: If you have a hard disk, go to the \DCA directory. If you have a floppy-drive system, put the program diskette in drive A.
- STEP 3: At the DOS prompt, type:

GRAPH [-f] [-v] [-e]* [-r] <Enter>**

The GRAPH command loads the GRAPH.DAT file and starts the emulator. The four command options are -f (force download), -v (verbose mode), -e (initialize and exit), and -r (resident mode). For a complete description of the options, see the following sections.

* Place -e last in a command line.

** Do not use -r with -e.

Chapter 3 - S3G Terminal Emulation and Operation

After you enter the GRAPH command, a screen displays giving the DCA copyright notice and the GRAPH emulator version number. If the emulator doesn't find the GRAPH.DAT file in the current directory or in the \DCA directory, a message displays. If you created the file with GraphPac, check the current directory and the \DCA directory. If the file does not exist, run GraphPac to specify your system options. The GRAPH.DAT file will ensure proper operation of the emulator with your PC and attached devices. GRAPH will use the default configuration values if GRAPH.DAT is not found (see the GraphPac Configuration Chart in Chapter 2 for default values).

STEP 4: Now the screen display changes. At the bottom of your screen the status line displays the number 4, indicating that the PC is attached to an IBM 3174 or 3274 controller:

4 A ?

If the number 4 is not shown on your screen, check the coaxial cable that connects the controller to your PC. This cable should be securely attached. If you do not see the number 4 after securing the cable, contact your host system administrator or DCA Customer Support.

STEP 5: When the question mark (?) is replaced by a stick figure,

4 A 

you can enter your logon sequence.

If the question mark is not replaced by the stick figure, press the SYS REQ function key, <Alt><F1>. When the question mark is replaced by the stick figure, you can enter your logon sequence. (These symbols and all the status line symbols are described in Appendix B.)

NOTE: (If the status line scrolls off the bottom of your screen, adjust the vertical control knob on the back of the monitor to bring the line up to the bottom of the screen.)

Once you have gained access to the mainframe, you can work with graphics application programs like GDDM, SAS/GRAPH, and TELLAGRAF. Your host system administrator and the program documentation can assist you in accessing and using these programs.

Emulator Startup Command Options

The four GRAPH command options are described in the following sections. To use an option, type a space after the GRAPH command, then type a dash and the option letter. For example:

GRAPH -e

To use more than one option, type the desired options on one line, putting a space between each:

GRAPH -r -f -v

The four options are described below.

Verbose Reporting (-v)

Using the `-v` option with `GRAPH` causes IRMA 3279 Graphics to display the current status of each of the emulator startup steps. The verbose report appears when the emulator is started and disappears when the emulator becomes active and the host session begins. On the following screen, the verbose report follows the version number:

IRMA 3279 Graphics

(c) 1987 Digital Communications Associates, Inc.
1000 Alderman Dr., Alpharetta, GA 30201
All Rights Reserved

Version 1.17

Verbose Option On...

graph.dat found in current directory, Version 1.17
Board found by auto search at address 280

The first line of the report lists the option(s) included with the `GRAPH` command. The second line displays the status of the `GRAPH.DAT` file. (If `GRAPH.DAT` is not found, the emulator uses the default values; see Chapter 2.) The third line reports the address where the IRMA 3279 Graphics hardware was found and the method that was used to find it. The fourth and fifth lines may or may not appear, depending on whether the startup procedure required `GRAPH` to search for the `GRAPH.8X3` and `GRAPH.FNT` files. When these lines appear, they display similar to those shown for `GRAPH.DAT`.

When you exit the emulator, the verbose report remains on the PC screen until you clear the screen or enter a DOS command (such as `DIR`) that will scroll the report off the screen.

Resident Mode (-r)

Typing a `-r` in the GRAPH command line makes the GRAPH emulator resident in the PC's memory. The resident emulator occupies 58 kilobytes of Random Access Memory (RAM). After you enter `GRAPH -r` you return to the DOS prompt. Now you can press both shift keys together (the "hot key") to quickly switch between DOS and emulation.

When using the resident emulator, screen append and screen capture (see Chapter 4), as well as file transfer are not available. If you want to use one of these functions and you have made the emulator resident, you can load a non-resident copy of the emulator then use the desired function. See the section in Chapter 4 entitled, "Making the Emulator Resident" for specific instructions.

NOTE: During a session you can make the emulator resident by pressing `<Ctrl><Home>` then `<Esc>`. You can also make the emulator resident by pressing `<Esc>` to display the extended functions prompt, then selecting "r." See Chapter 4 for more information.

Force Download (-f)

The forced download option causes GRAPH to reload the IRMA 3279 Graphics hardware with the `GRAPH.8X3` and `GRAPH.FNT` files when GRAPH is restarted. This option is useful when the emulator gets "hung up."

Note that the `-f` option terminates any active host session, so if possible, you should log off all active sessions before using this option.

Initialize and Exit (-e)

Putting a `-e` after the `GRAPH` command causes `GRAPH` to initialize the emulator hardware and then exit without remaining resident. This establishes a connection from the PC to the mainframe computer without establishing an actual session. You can use this option with the `-f` and `-y` options, being sure to place `-e` last in the command line, e.g. `GRAPH -f -v -e`. *Do not use the `-e` option with `-r`.*

Session Operation

After you establish a connection with the host computer, a status line at the bottom of your screen displays symbols that report the status of various aspects of the current session. While most of the symbols report user-selected information, such as the highlighting mode and program symbol set in use, the first two areas of the status line relay information that directly concerns program operation. These areas are described in the following sections.

Checking the Network Connection

The area farthest to the left on the status line provides information about your connection to the network. A number 4 displaying in this area shows that you are connected to a 3174 or 3274 controller. When a question mark displays in this area, the emulator is running, but your computer is not communicating with either the host application program or the network control program. To resume operation, make sure that you are logged on to the host and have executed the application

program startup command. If the question mark occurs during a session, press the reset key, <F10>, to resume operation. For a description of other symbols that display in this category, see Appendix B.

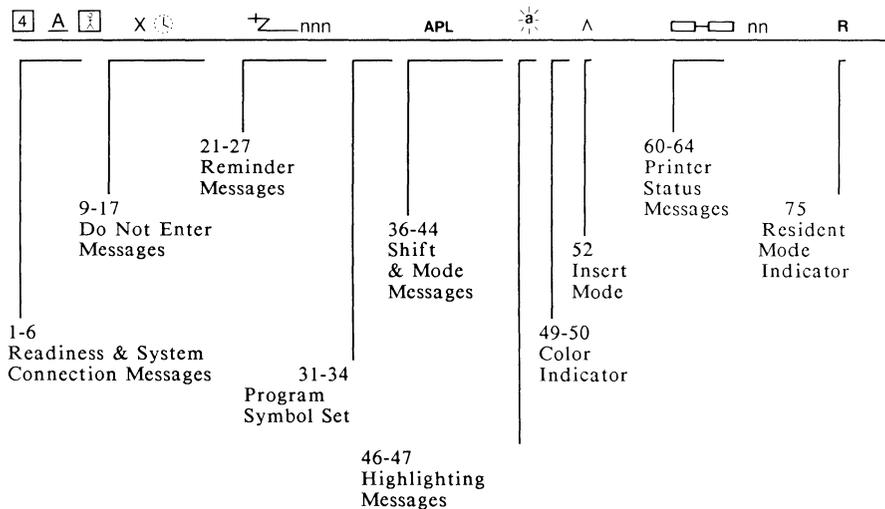
Unlocking the Keyboard

The area of the status line adjacent to the system connection area gives the status of the data entered at the keyboard. When symbols display in this area, your keyboard usually is locked, waiting for the host to finish processing your last request or for you to correct a data entry error. If the **X clock** symbol appears, the host needs more time to process your entry. The keyboard will unlock when the X clock symbol disappears. Most of the other symbols can be cleared by pressing the reset key, <F10>. See Appendix B for a complete listing of symbols and their messages.

Reading the Status Line

The remaining areas of the status line remind you of the operating mode selections you have made. One area also indicates the status of the printer. The following diagram shows the categories of symbols that display on the status line. Specific symbols and their meanings are listed in Appendix B.

Chapter 3 - S3G Terminal Emulation and Operation



NOTE: Not all symbols will display on the status line at one time.

Figure 3-1: The Status Line

Saving and Printing Host Data

To save and print text and graphics generated with your mainframe programs, you can use a special feature of IRMA 3279 Graphics: the extended functions prompt. Press <Esc> anytime during the session to display the extended functions prompt on your screen. From this prompt you can append text to a PC disk file, capture text and graphics in a PC disk file, print your data at the PC printer, and perform a variety of other functions. Chapter 4 describes each of the extended functions. You should review Chapter 4 before using the extended functions prompt.

Exiting and Restarting the GRAPH Emulator

There are two ways to exit a host session and return to DOS:

- o press <Esc> to display the extended functions prompt, then press e
- o press both shift keys together at the same time (hot key)

To return to the host session, re-enter the GRAPH command at the DOS prompt. If the emulator is resident, you can simply press both shift keys (the "hot key") to restart emulation.

NOTE: There are three ways to make the emulator resident:

- 1) Use the -r option with the GRAPH command when starting the emulator (see "Emulator Startup Command Options" in this chapter)

- 2) Press <Ctrl><Home> anytime during a session, then press <Esc>
- 3) Select resident mode from the extended functions prompt (see Chapter 4).

Chapter 4

Extended Functions

Introduction

IRMA 3279 Graphics enables the PC to perform online and offline functions that are not available with a 3279 S3G terminal. Online with the host, the extended functions prompt gives you the ability to save and print host graphics screens at the PC and recall saved graphics files without exiting the session. Offline in PC mode, the GraphPac utilities let you redisplay and print graphics files locally, without having to connect to the network. This chapter explains how to use these special functions.

Accessing the Extended Functions Prompt

To display the extended function prompt on your screen, press <Esc>. The following prompt displays:

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

These functions are described in the following chart:

GraphPac Extended Functions

Extended Function	Action
append	appends a screen of host text to a PC disk file
capture	saves a screen of text and/or graphics in a PC disk file
print	prints a screen of host text*
resident	makes emulator resident
recall	redispays a graphics file during a session*
test	resets error conditions (similar to a "power on reset")

* To print graphics and to redisplay text, use the GraphPac utility described at the end of this chapter.

To select a function from the prompt, type the first letter of the function, then press <Enter>. For example, to "append" a file, type "a" and press <Enter>. (Exception: if you want to use the "recall" function, enter "x.") The following sections show how to use each function.

Appending Text to a PC Disk File (Append)

NOTE: This function is not available with the **resident** emulator. Re-enter the Graph command to use this function. See "Resident Mode" in this chapter for complete instructions.

The append function adds the current display of host **text** to any specified DOS file on your disk. The primary purpose of append is to convert host EBCDIC text into ASCII for use with a PC application program. In the conversion process, highlighting, color, and redisplay features are lost. If you want to store a text screen in color and be able to recall the screen, use the "capture" function described in the following section.

To append a screen of text to a disk file, follow these steps. You can stop an append at any time by pressing the <Esc> key.

STEP 1: When the screen displays the text that you want to append to a file, press the <Esc> key. The extended functions prompt displays at the bottom of your screen.

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

STEP 2: Type:

a <Enter>

The following prompt displays:

Enter Filename:

STEP 3: Enter the name of the PC disk file to which you want to save the screen. If you want to save the screen in a new file (one that you have not yet created) enter any legal DOS filename, including

a drive designation, directory path, and extension. The following message displays:

File Append in Progress

The text screen is appended to the specified file, then you are returned to emulation mode.

- STEP 4: To append another file, display the next screen you want to save and press the <Esc> key. Then enter a for append. The following prompt displays:

Enter new filename or <CR> for XXX:

"XXX" is the name of the file specified in the previous append. If you want to save this screen in the same PC file as the previous append, press the <Enter> key. If you want to add the screen to a different PC file, enter the new filename.

Capturing Text and Graphics in a PC Disk File (Capture)

- NOTE: This function is not available with the resident emulator. Re-enter GRAPH to use this function. See "Resident Mode" in this chapter for specific instructions.

The screen "capture" function saves the current display of **host text and/or graphics** in a PC disk file. Highlighting and color are maintained, and the file can be redisplayed online or offline, exactly as it was captured.

Chapter 4 - Extended Functions

Follow these steps to capture a screen of graphics or text in a PC disk file. Press <Esc> at any time to cancel the capture.

STEP 1: When the screen displays the data you want to save, press <Esc>. The extended functions prompt displays:

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

STEP 2: Press:

c <Enter>

The following prompt displays:

G)raphics or T)ext

STEP 3: If you want to save, recall, and print the captured screen of graphics or text as it appears on your display, select **g**. If the display contains only text and you do not want to save its color features or use the Recall option with it, select **t**, which is similar to an append.

STEP 4: After you enter **g** or **t**, the program asks you to enter the name of the file to which you are saving the screen. Type a valid DOS file name, including a drive designation and path, if you want to capture the screen on a different drive or in a different directory from the current. The screen is saved in the specified PC disk file, and you return to emulation.

CAUTION: You should specify a different filename for each file saved with the capture option. If you try to capture a screen to an existing file, the new

data writes over the existing data.
Note that you can append text files
to any captured file.

NOTE: We recommend that you do not add an extension to files saved as graphics files (see STEP 3). If you do not specify an extension, the Capture function adds the extension **.GRF** to your file. This **.GRF** extension will differentiate files that can be recalled from ones that cannot. (Files saved with the Append function or saved as text files with the Capture function cannot be recalled).

Printing Text on a PC Printer (Print)

The print function allows you to print a screen of host text on a printer attached to your PC. To print graphics, use the GraphPac "Print Menu" described later in this chapter. IRMA 3279 Graphics must be configured for your printer before you can use this function (see Chapter 2).

NOTE: Do not use the <PrtSc> key to send graphics (non-alphanumeric symbols) to a printer, as results are unpredictable. Use the GraphPac "Print Menu" to print a screen that contains graphics. You can use the <PrtSc> key to print the current text screen.

Follow the steps below to print a screen of text. You can cancel the printer action at any time by pressing the <Esc> key.

STEP 1: When the screen displays the text that you want to print, press the <Esc> key. The extended functions prompt appears at the bottom of the screen:

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

STEP 2: Press:

p <Enter>

The current screen is sent to the printer attached to your PC. The following message displays:

Printing ... (Esc to cancel)

Recalling a Screen of Graphics (Recall)

The recall function lets you redisplay during a session, any graphics or text file that you've saved on diskette with the Capture option. To recall a screen to your display, follow the steps below.

STEP 1: During the session, press the <Esc> key to display the extended functions prompt:

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

STEP 2: Press **x** <Enter> to select recall. All files saved with the capture option display on your screen, and you are prompted for a filename. If the list of files is too long to display on the screen at once, use the cursor up and cursor down keys to scroll the file listing if necessary.

NOTE: If you did not specify an extension when you captured files with the G specification (see the Capture option), IRMA 3279 Graphics assigned the extension, .GRF, to the captured files. Files with the .GRF extension can be recalled.

STEP 3: Enter the name of the file you want to recall. Note that you can display only files saved with the Capture's G specification (see the Capture option). These files will have a .GRF extension, if you did not assign another extension.

Once the contents of the file display, you can proceed with any operation. To restore the previous host screen, press the Clear function key. This key might be <Clear>, <PA1>, or <PA2>, depending upon your application program's assignment.

Making the Emulator Resident

If you did not start the emulator with the resident option, -r, you can do so during a session in two ways. You can press <Ctrl><Home> during the session, then press the <Esc> key, or you can use the extended functions prompt by following these steps:

STEP 1: During emulation, press the <Esc> key to display the extended functions prompt at the bottom of your screen.

a)ppend c)apture e)xit p)rint r)resident t)est x)recall ESC to cancel

STEP 2: Press,

r <Enter>

to activate resident mode.

The emulator program becomes resident in the PC's memory and returns you to the DOS prompt. You can return to emulation by pressing <Shift><Shift>. The PC screen will display the most recent screen sent from the controller.

Note that an **R** displays in column 75 of the status line to indicate that IRMA 3279 Graphics is running in resident mode.

NOTE: The resident emulator uses 58 kilobytes of memory.

Functions Unavailable with the Resident Emulator

Due to DOS limitations, screen append, screen capture, and file transfer are not available from the resident emulator. In order to use these functions when the emulator is in resident mode, you can load and use a nonresident copy of the emulator. Follow these steps:

STEP 1: During an emulation session, press the hot key to return to DOS.

STEP 2: At the DOS prompt, type,

GRAPH <Enter>

to start the emulator with a nonresident copy of GRAPH.

STEP 3: Use the extended function you desire, or perform a file transfer.

STEP 4: When you complete your operation, press the hot key to exit the emulator and clear the nonresident copy of GRAPH.

STEP 5: At the DOS prompt, press the hot key again to return to emulation using the resident emulator.

Power On Reset (Test)

The local test function is similar to the Test/Normal switch on the 3279 terminal and is used to reset error conditions that result after the coaxial cable has been moved between personal computers or after the keyboard type has been changed. This function fills the screen with all displayable characters, initializes the controller connection, and sends a message to the controller about the type of keyboard in use. The local test function causes a power-on-reset condition and ends the session. If possible, log off the host session before entering test mode. To use this function, follow these steps:

STEP 1: Press <Esc> to display the extended functions prompt.

a)ppend c)apture e)xit p)rint r)esident t)est x)recall ESC to cancel

STEP 2: Select the test function by pressing:

t <Enter>

STEP 3: To exit the local test function, press <Esc>.

Printing and Recalling Screens Offline from the Host

Two convenient functions of the GraphPac utility program let you print and redisplay host screens offline from the host. Thus you can work with host graphics or text without having to be connected to the network. To use these functions, start GraphPac from the default drive and directory by typing the following command at the DOS prompt. (Note that the GRAPH emulator does not have to be active to use GraphPac.)

Type:

GP <Enter>

The following menu displays:

HOME -GraphPac-
 IRMA 3279 Graphics
 (c) 1987 Digital Communications Associates, Inc

- 1 - Print Saved Graph
- 2 - Recall Saved Graph
- 3 - Configuration
- 0 - Exit
- __ Select One

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The first option on this menu lets you print graphics screens saved in PC disk files. The second option lets you recall files containing text and graphics screens. (The third option, "Configuration" is explained in Chapter 2.) To select an option, type the option number in the field preceding "Select One" and press <Enter>. Pressing 0 or <Esc> returns you to DOS. The following sections discuss how to use options 1 and 2.

NOTE: To move the cursor on this menu and all submenus, use these keys: backspace, backtab, cursor down, cursor left, cursor right, cursor up, Enter, escape, Home, and Tab. For a description of each key's function, refer to Appendix A.

Printing Graphics on the PC Printer

Press 1 <Enter> from the HOME menu to select the print option. This option lets you print a graphics file saved with the capture option on the printer attached to your PC. After you select 1, the following print menu displays:

Chapter 4 - Extended Functions

PRINT -GraphPac-
 IRMA 3279 Graphics
(c) 1987 Digital Communications Associates, Inc

_____ Enter Name of Graph File To Print

(A listing of the first 80 directory files with the extension, .GRF,
displays here in alphabetical order.)

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

Enter the filename and extension of the file you
want to print, including a path name if the file is
in a directory other than the current one. Your
entry will look similar to the following:

filename Enter Name of Graph File to Print

If you do not specify an extension, the emulator
assumes that the extension is .GRF. To print a file
that does not have an extension, type a period
after the filename, i.e. **filename.** Press <Enter> to
print the file.

Recalling Text and Graphics

This option recalls files saved with the capture option when "g" was specified (see the section on capturing files). Select 2 from the HOME menu, and press <Enter> to display the recall menu:

```
RECALL                -GraphPac-
                      IRMA 3279 Graphics
                      (c) 1987 Digital Communications Associates, Inc
```

_____ Name of File To recall

DCA STYLES IRMAPIE

ESC -- Previous Menu ENTER -- Process Selection TAB -- Next Field

The area following "Name of File To recall," displays the first 80 directory files with the .GRF extension. The distribution diskette contains three sample .GRF files, which are listed on this menu. To recall one of the sample files (or any .GRF file), type the filename in the space provided on the screen. For example, to recall the DCA.GRF file, type "DCA" in the provided space:

DCA _____ Name of File to Recall

If you do not type an extension, the .GRF extension is assumed. To recall a file that has no extension, type a period after the filename, i.e. **filename.** You may also include a drive

designation and a pathname if the file is on a drive or in a directory other than the current one.

Press <Enter> to display the file contents on your screen. Press any key to return to the recall menu.

Video Reset (VR)

The video reset program resets the IRMA 3279 Graphics video controller after the emulator has been abnormally exited. The VR command resets the GRAPH board so that the DOS screen can be displayed.

To reset the emulation screen to the DOS screen, type the following at the DOS prompt:

VR [xxx] <Enter>

The [xxx] option allows you to specify the base address of the IRMA 3279 Graphics hardware. If you do not specify the base address, the default address of 280 is assumed.

If you want to automatically reset the video controller to DOS each time the PC is booted, include the VR command in your AUTOEXEC.BAT file. Refer to your DOS manual for instructions on creating or editing an AUTOEXEC.BAT file

Chapter 5

E78 Emulation

Introduction

This chapter is provided for users who want to run E78 on the IRMA 3279 Graphics hardware. E78 is a program contained on the IRMA diskette that provides 3278/3279 Model 2 terminal emulation. The E78 program provides text emulation only. *E78 does not provide graphics terminal emulation.*

You do not have to use E78, as the GRAPH program provides text as well as graphics emulation. However, if you want to use a light pen or write your own programs using DCA BASICA and C subroutines, you must use E78. You might also want to take advantage of E78's compatibility with the following software.

Micro-to-Mainframe Link Software:

- o Interactive PC Link™
- o Linkit™
- o PC Focus Link™
- o TempusLink™
- o Golden Gate™
- o PanLink™
- o Expert Link™

PC Application Software:

- o Symphony™
- o Lotus 1-2-3™
- o Microsoft Word™
- o Displaywrite™ 2 and 3,
- o WordStar™

Only E78 versions 1.42 and above are compatible with the IRMA 3279 Graphics hardware. If you need the version 1.42 software or documentation,

you can order them by checking the last box on the product registration card located inside the back cover of this guide.

Only E78 versions 1.42 and above run on the IRMA 3279 Graphics hardware.

Configuring the E78 Emulation Program

The E78 emulator must be customized for certain options in order to run properly on the IRMA 3279 Graphics hardware. To customize E78, use the GENX program located on the E78 diskette. The following steps show how to start GENX and give the options you *must specify*.

STEP 1: If your PC is OFF, Booth with DOS as you normally do.

If your PC is ON, exit all application programs, log off all sessions, and return to DOS.

STEP 2: Put the E78 diskette in the default drive.

STEP 3: At the DOS prompt, start GENX by typing:

E78GEN <Enter>

The following menu displays, listing the items you can specify with GENX:

Chapter 5 - E78 Emulation

E78 Terminal Emulator Customization Menu Rev 1.47. 12 March 1987

- 1 - Disable 26th line status display
- 3 - Make emulator auto-resident
- 5 - make 2 color mode default
- 6 - Make 7 color mode default
- 8 - Make SHOW COLUMNS default
- 10 - Convert to pre-1.20 keyboard
- 12 = Select KEYBOARD & SCREEN type
- 13 = Set LIGHT PEN correction
- 14 = PC look-alike setups
- 15 = Setup COM1: input parameters
- 17 - Disable NON-DISPLAY display
- 18 - Force dark blue to cyan
- 20 - Select IRMAlette Operation
- 22 = Non-Standard Display Adapters
- 24 - Force E78 to NOT allow APL
- 25 - Disable EAB
- 99 = Exit GENX program

Your selection:

Your cursor will be in the space following "Your Selection."

STEP 4: The first items you need to configure are the keyboard and screen types, option 12. Type 12 in the "Your Selection" field, and press <Enter>. The following menu displays:

Chapter 5 - E78 Emulation

E78 Terminal Emulator Customization Menu Rev 1.47 12 March 1987

Select KEYBOARD & SCREEN type

- | | |
|------------------------------------|-------------------------------------|
| 1 - Typewriter (default) | 17 - No attached keyboard |
| 2 - Typewriter 2/ numeric lock | 18 - Reserved 0000 |
| 3 - Typewriter, PSHIC | 19 - Reserved 0011 |
| | 20 - Reserved 1011 |
| 5 - APL | |
| 6 - APL w/ numeric lock | 22 - Mod 2 Screen (24x80) |
| 7 - APL, PSHICO | 23 - Mod 3 Screen (32x80) |
| | 24 - Mod 4 Screen (43x80) |
| 9 - Text | |
| 10 - Text w/ numeric lock | 26 - Mod 2 Full Screen IRMAvision |
| | 27 - Mod 3 Full Screen IRMAvision |
| 12 - Data Entry | 28 - Mod 4 Full Screen IRMAvision |
| 13 - Data Entry I w/ numeric lock | 29 - Mod 5 Full Screen IRMAvision |
| 14 - Data Entry II | |
| 15 - Data Entry II w/ numeric lock | 31 - Enable IRMAvision Cursor Blink |
| 98 = Return to previous menu | 99 = Exit GENX program |

Your selection:

STEP 5: From this menu select option 7 - APL, PSHICO - by typing 7 in the "Your Selection" field and pressing <Enter>. This option installs a patch that lets you use an APL keyboard and Programmed Symbols set, extended HIGHLIGHTING, and extended Color Overlay. Note that a "+" displays after option 7 to show that this option has been specified.

STEP 6: Next select a Model 3 screen by typing 23 in the "Your Selection" field and pressing <Enter>. This option installs a patch for a Mod 3 screen, which is required to use both emulators from the same hardware without experiencing screen malfunctions. Note that a "+" displays after option 23 to show that it has been selected.

NOTE: To display the Full Mod 3 screen during E78 emulation, you must scroll.

STEP 7: Type 98 in the "Your Selection" field and press <Enter> to return to the GENX Main Menu.

STEP 8: At the main menu, type 22 and press <Enter> to specify the type of display monitor you are using. The following menu appears:

E78 Terminal Emulator Customization Menu Rev 1.47 12 March 1987

Non-Standard Display Adapters

- 1 - IBM EGA Monochrome Display
- 2 - IBM EGA Normal Color Display
- 3 - IBM EGA Enhanced Color Display
- 5 - Hercules Monochrome Board
- 6 - Paradise with Monochrome Display
- 7 - STB Chauffer display adapter

98 = Return to previous menu 99 = Exit GENX program

Your selection:

If you are not using any of the monitors listed on the menu, you do not have to make a selection. In this case, go to STEP 10.

STEP 9: Find the number that identifies your display adapter and type it in the "Your Selection" field. Press <Enter> to install the patch.

STEP 10: If there are other options you need to specify, type 98 in the "Your Selection" field to return to the main menu. Select the other options you need.

(Refer to the *IRMA User's Guide* for information about the other GENX options.)

STEP 11: When you have specified all needed options, type 99 in the "Your Selection" field on the main menu (or submenu) and press <Enter> to exit the GENX program.

A prompt tells you that the GENX operation is complete, and you return to DOS.

The GENX program creates two files on your diskette, **CE78.EXE** and **CE78.LOG**. **CE78.EXE** is the customized version of the E78 emulator, which you should use to start E78 emulation. **CE78.LOG** keeps a record of all the GENX options contained in the **CE78** file. To review the contents of your customized emulator program, type the following command at the DOS prompt:

TYPE CE78.LOG <Enter>

This command lists on your screen all the patches installed with GENX.

Starting the E78 Emulator

After completing the GENX configuration, follow these steps to start E78 emulation:

STEP 1: If you have a hard disk, boot the PC from your hard disk and go to the \DCA directory.

If you have floppy disks, put the Keyboard Utilities diskette in drive A and the Program diskette in drive B. Boot from drive A. Go to drive B.

STEP 2: At the DOS prompt, type the command,

GRAPH -e

and press <Enter>.

This command initializes the IRMA 3279 Graphics hardware and downloads the microcode into the Random Access Memory of the board. A copyright notice flashes on the screen, then you return to the DOS prompt.

NOTE: You can put the **GRAPH -e** command in an AUTOEXEC.BAT file. Then when you boot the PC with the IRMA 3279 Graphics program, the microcode is automatically downloaded to the hardware, and you can use the emulation program you desire. See your DOS manual for instructions on creating an AUTOEXEC.BAT file.

STEP 3: Put the E78 diskette in the disk drive. At the DOS prompt where the E78 diskette is located, type the command,

CE78 <Enter>

to start the E78 emulation program.

STEP 4: When you have a connection to the host, you can log on to the desired application.

CAUTION: Do not make both the E78 emulator and the GRAPH emulator resident at the same time as results are unpredictable.

STEP 5: If you did not choose to make the emulator resident with GENX, you can do so now by pressing, <Ctrl><Home>. A prompt reads that E78 is becoming resident. Press <Esc> to continue. You return to the DOS prompt. Press the hot key to return to the emulation session.

STEP 6: If you want to start a session with the GRAPH emulator, press the hot key to exit the E78 session and return to DOS. The E78 session continues, although it doesn't currently display on your screen. At the DOS prompt, type the GRAPH command to start a 3279 S3G session. Proceed according to the instructions in Chapters 3 and 4.

STEP 7: If you want to return to the E78 session, press the hot key to exit the GRAPH session and return to DOS. If you made E78 resident, press the hot key again to return to the session. If you did not make E78 resident, execute the CE78 command.

STEP 8: When you are ready to quit, be sure you log off both sessions before you turn off the PC.

Special Considerations for Using E78 with the Upgrade Hardware

When you use the upgrade hardware, you are using prom-based IRMA hardware and RAM-loaded IRMA 3279 Graphics hardware. Because of these hardware differences, you may experience difficulty running third-party software and other E78-compatible applications after using the GRAPH emulator and switching to E78 (via the hot key and/or the startup command). If you are having difficulty switching from GRAPH emulation to E78 without rebooting, you can use the "native mode" function, which returns the IRMA hardware to its prom-based mode.

To use native mode, press the <Esc> key anytime during a graphics emulation session. The following extended functions prompt (see Chapter 4) displays with the additional native mode option:

a)ppend c)apture e)xit p)rint r)esident N)ative t)est r)ecall ESC to cancel

To access native mode, type:

n <Enter>

This exits the GRAPH emulator, ends the session with the host computer, and returns the hardware to prom-based mode. Now you can start E78 and run the desired programs.

Making E78 Resident

CAUTION: Do not make the E78 emulator and the GRAPH emulator resident at the same time as results are unpredictable.

If you plan to frequently switch between a DOS application program and a host session, you might want to make E78 resident in memory. With the resident emulator, you can press the hot key (<Shift><Shift>) to switch back and forth between DOS and emulation. The resident E78 emulator occupies 96 kilobytes of Random Access Memory (RAM).

To make E78 resident, press the following key sequence during a host session:

<Ctrl><Home>

A prompt informs you that E78 is becoming resident. Press <Esc> to continue. After you press <Esc> you return to DOS. Press the hot key to return to the session. The E78 emulator software remains in the PC's memory until you reboot the PC.

NOTE: The control and print screen functions cannot be initiated from the resident E78 emulator. See the IRMA documentation for details.

Using the Keyboard Macro Driver, KMACDRV.SYS

Creating Macros

The KMACDRV.SYS keyboard driver that you put in your CONFIG.SYS file in Chapter 2, lets you assign multiple keystrokes to a single key or key combination (a macro key). Macros are convenient for often-used words and phrases, embedded commands, filenames, addresses, etc. To create a key macro, use the Alternate <Alt> key and the plus <+> key on the numeric keypad as described in the following steps. Be sure to read the guidelines that follow these steps before actually creating macros.

- NOTE:** The KMACDRV.SYS file must be included in the CONFIG.SYS file as described in Chapter 2 in order to use the <Alt><+> procedure.
- STEP 1:** At the DOS prompt, press the <Alt> key, and while holding it down, press the <+> (plus) key on the NUMERIC KEYPAD. (The PC will beep once.)
- STEP 2:** Press the key or key combination to be defined.
- STEP 3:** Press the <Alt><+> key combination again. Remember to use the "+" on the Numeric Keypad. (The PC beeps twice.)

STEP 4: Press the new key definition. This may be a single key or a series of keystrokes.

STEP 5: Press <Alt><+>. (The PC beeps three times.)

The key definition procedure is complete. Now, each time you press the key defined in STEP 2, the new value you entered displays or the command or series of commands executes. To change a macro, repeat STEPS 1-5, pressing the same key in STEP 2, but assigning a new definition in STEP 4. If you want to create other macros, repeat the <Alt><+> procedure.

Follow these guidelines when redefining keys:

- o Do not assign new definitions to the <Ctrl>, <Alt>, <Caps Lock>, and <Shift> keys or any other keys that have similar specific functions.
- o Do not assign a new definition to the shift of keys that emit a character in the shift position. For example, if you assign a definition to the shift of "a," you lose the uppercase "A."
- o Do not assign a definition to any position of the function keys, <F1> through <F10>.
- o When assigning macros to PF keys, we recommend that you do not redefine PF1-PF12, leaving them available for any host defined functions. Instead, assign functions to PF13-PF24.
- o You can assign a definition to any position -- <Alt><Shift>, <Ctrl><Alt>, <Ctrl><Shift>, etc. -- of a key that does not emit a character or perform a specific function.

Chapter 6 - Using the Keyboard Macro Driver, KMACDRV.SYS

The macros you define remain in memory until you reboot the PC. To clear macros without rebooting or to save macros into a file, see the following sections.

Saving Macros in a File

After you have defined one or more keys using the <Alt><+> procedure, you can save the key macros to a disk file using a program labelled "SKSAVE." The SKSAVE program assigns a .KMC extension to the file.

To save a macro file on your working disk or hard disk simply type,

SKSAVE *filename* <Enter>

where *filename* is any name you wish to assign to the macro file following DOS file naming conventions. You do not need to type an extension, as SKSAVE will automatically assign a .KMC extension.

Note that a key macro file uses 4 Kbytes of disk space. If you want to save file on an additional diskette, specify the destination drive *x* with the SKSAVE command:

SKSAVE *x:filename* <Enter>

Example 1: Creating and Saving Key Macros

Following is an example of how to create and save a key macro. For this example, assume that you are using a word processing program that requires you to type the following embedded commands at the beginning of every paragraph:

```
<bb=1>  
<fo=4>
```

You want to create a macro that will produce these commands when pressed. The following steps assign these commands to the <Ctrl> position of the <1> key on the top row of the keyboard.

- STEP 1: Press the <Alt><+> key combination. (The keyboard emits one beep.)
- STEP 2: Press <Ctrl><1>, the key sequence to be defined.
- STEP 3: Press <Alt><+> (two beeps).
- STEP 4: Now, enter the keystrokes that you want to assign to the <Ctrl><1> sequence. For this example, we are assigning <bb=1> with a carriage return and <fo=4> with a carriage return. Type the first part of the definition:

```
<bb=1> <Enter>
```

Note that pressing the <Enter> (or carriage return) key presents <bb=1> as a command to DOS. Just ignore the "Bad command or file name" message that displays. This message has no effect on the macro definition procedure.

Chapter 6 - Using the Keyboard Macro Driver, KMACDRV.SYS

STEP 5: When the DOS prompt returns, type the second part of the definition:

<fo=4> <Enter>

Again, you can ignore the DOS "Bad command..." message.

STEP 6: When the DOS prompt returns, press <Alt><+> to complete the key definition procedure (three beeps).

STEP 7: To make sure that your definition is correctly recorded, press the <Ctrl><1> key sequence. (The information you assigned will try to execute in the same way it did during the <Alt><+> procedure.) If the key emits something other than

**<bb=1>
<fo=4>**

repeat STEPS 1-6.

STEP 8: If you want to create any other key macros, do so now, repeating steps 1-7.

STEP 9: To save the macros in a file, we will use SKSAVE. We will call the file created in this example, "NEWKEYS." The correct SKSAVE command line looks like the following:

SKSAVE NEWKEYS <Enter>

The key macro file "NEWKEYS" is saved to disk and given a .KMC extension: NEWKEYS.KMC.

Clearing Current Macros

The macros you define remain in memory until you reboot the PC or clear the memory. If you reboot or clear without saving the files, the macros will be lost. A single macro can be cleared by pressing <Alt><+> (1 beep), the input macro sequence, <Alt><+> (2 beeps), <Alt><+> (3 beeps). For example, to remove the macro created in Example 1 above, press:

<Alt><+>	(1 beep)
<Ctrl><1>	
<Alt><+>	(2 beeps)
<Alt><+>	(3 beeps)

Press <Ctrl><1> and note that the previous

All currently active macros can be cleared by pressing the <Alt><+> key sequence 3 times. These macros are lost unless they have been previously saved to a file with the SKSAVE command.

Loading Key Macro Files

The SKLOAD program allows you to load any key macro file that has a .KMC extension. To load a key macro file, type the following command at the DOS prompt,

SKLOAD *filename* <Enter>

where *filename* is the name of the macro file you want to load. You don't need to type the extension.

Using the SK Program

Typically, to use a key macro file with an application program, you have to perform 3 steps. You must 1) boot the PC from your hard disk or Keyboard Utilities diskette to load the keyboard drivers 2) load your .KMC file with SKLOAD, and 3) execute the application. The SK program combines steps 2 and 3, loading the custom .KMC file and executing the application program with a single command.

The format for the SK command is,

SK[/V[/P] Programname

where "SK" saves the current macro file if one exists, loads a new macro file that must bear the same name as the program, and executes the program.

The operand "/V" turns on a Verbose mode that displays messages about program operation and asks "Are you sure?" questions where appropriate.

The operand "/P" tells SK to Preserve any changes you make to the key macro file while you are using the program. When you exit the program, the changes are saved in the .KMC file with which you started the program.

Programname is the command used to execute the PC application program. The name of your key macro file must match the command to start the program.

NOTE: If you make changes to a key macro file while running an application program, but you haven't specified /P, SK will ask you if you wish to save the changes. If you answer "No," the changes are

discarded and the original keyboard is restored.

The following steps give instructions for using the SK program. Thoroughly read these guidelines before you attempt to use the SK program.

- STEP 1: Boot the PC from your hard disk or Keyboard Utilities diskette.
- STEP 2: Create and save a key macro file with <Alt><+> and SKLOAD. The name you assign to the macro file must match the command to execute the application program. For example, "WS" is the command to start WordStar, so your macro file must be named "WS.KMC."
- STEP 3: Copy the SK program, SK.EXE and the custom macro file from the program disk to the PC application disk.
- STEP 4: To execute the application program with the custom macro file, type,

[X:]SK/V/P *Programname*

where *X* is the drive containing the application program (if other than the current drive) and *Programname* is the command to execute the application as well as the name of the custom .KMC file.

NOTE: When you exit the application program, SK restores the macro file in effect before the application was executed.

To automatically load the application program and its custom keyboard profile at boot time, place the SK command line in an AUTOEXEC.BAT file on your program disk. Use the editing program of your choice to insert the following line:

Chapter 6 - Using the Keyboard Macro Driver, KMACDRV.SYS

X:SK/V/P Programname

where *X*: is the drive containing the PC application program.

When you boot the PC from your working disk or hard disk, the PC loads the keyboard drivers first, and then reads the AUTOEXEC.BAT file and defaults to drive *X*, where the SK program and your custom .KMC file load automatically and the application program starts.

Chapter 7

Remapping the Keyboard

Introduction

The KYBDDRV.SYS keyboard driver, placed in the CONFIG.SYS file in Chapter 2, allows you to use a special remapping program labelled KYBDEDIT. KYBDEDIT lets you create alternate keyboard profiles by changing, swapping, or duplicating key codes. Because KYBDEDIT alters the key code, the slightest error may make your keyboard unrecognizable. Thus, we recommend using the <Alt><+> procedure described in Chapter 6 for making most all keyboard changes. Programmers requiring major keyboard modifications are the intended audience for KYBDEDIT.

NOTE: In order to use KYBDEDIT, the KYBDDRV.SYS driver must be placed in the CONFIG.SYS file on your working disk or hard disk with the appropriate parameters. See Chapter 2 for complete instructions.

Using KYBDEDIT

The KYBDEDIT program and the GraphPac remapping program primarily serve the same function: they both allow major keyboard remapping. If you have previously used one of these programs, you should continue to use the program that is familiar to you. (GraphPac remapping is described in Appendix F). If you have never used either program, you should first try to use the <Alt><+> procedure in Chapter 6 to create macros. Then if you need more extensive remapping, you can try KYBDEDIT. Using KYBDEDIT requires extensive knowledge of the IBM BIOS routine and IBM 3270 character codes. *Don't use KYBDEDIT unless you are thoroughly familiar with the BIOS routine.*

Starting KYBDEDIT

Execute the KYBDEDIT program from your hard disk or program diskette by typing:

KYBDEDIT <Enter>

The following screen displays when any keyboard other than the IBM 101/102 key keyboard is used:

Chapter 7 - Remapping the Keyboard

Initial KYBDEDIT Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1987, Digital Communications Associates, Inc.

Keyboard File Name
Description

1 Read	2 Help
3 Edit	4
5 Save	6Ers EOF
7	8Nxt Val
9 Exit	0Reset

The following screen displays if you are using a 101/102 key keyboard.

Initial KYBDEDIT Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1986, 1987, Digital Communications Associates, Inc.

Keyboard File Name
Description

1	2	3	4	5	6	7	8	9	10	11	12
Read	Help	Edit		Save	Erase EOF		Next Value	Exit	Reset		

To select an option, press the function key, <F1> through <F10>, that corresponds with the option.

For example, to select "Help," press the <F2> key. The even numbered options are found on all screens, while the odd numbered options vary from screen to screen. The five common options are described below.

KYBDEDIT: Common Options

Option	Access Key	Description
Help	<F2>	Displays help information for the current task.
Ers EOF	<F6>	Erases characters to the right of the cursor.
Nxt Val	<F8>	Displays the next valid value of a field, if there is one.
Exit	<F9>	Returns you to the previous screen. If you press this key at the first screen, you return to DOS.
Reset	<F10>	Clears any input error messages on the screen.

NOTE: To display help information for the first field of a menu, press <F2> (Help) while in the first field. To display help files for other fields, press <F10> (Reset) to leave the help file, press <F1>, (Change) to reach the next field and then press <F2> (Help). Use the tab key to reach remaining fields.

After you have pressed the <F1> (Change) key, exercise caution to avoid accidentally changing a key.

Creating a Keyboard Profile

To edit or create a keyboard profile, follow these steps.

- STEP 1: Start KYBDEDIT as described earlier.
- STEP 2: In the "Keyboard File Name" field, type the name of the file you want to edit or create. You don't need to type an extension, as KYBDEDIT assumes (or assigns) a .KYB extension.
- STEP 3: If you are creating a new file, skip this step. If you are editing an existing file, press <F1> (Read). The contents of this profile are read into memory.
- STEP 4: Press <F3> to display one of the following editing screens:

Chapter 7 - Remapping the Keyboard

Editing Options Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1987, Digital Communications Associates, Inc.

1 Codes	2 Help
3 Xchg	4
5 Copy	6Ers EOF
7 Modes	8Nxt Val
9 Exit	0Reset

Editing Options Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1986, 1987, Digital Communications Associates, Inc.

Keyboard filename Sample

Description

1	2	3	4	5	6	7	8	9	10	11	12
Codes	Help	Xchg		Copy	Erase EOF	Modes	Next Value	Exit	Reset		

The screen now contains four options. From the descriptions below, choose an option by pressing its access key. Then read the following sections for information on using each option.

KYBDEDIT: Editing Options

Editing Option	Access Key	Description
Codes	<F1>	Lets you modify the character codes sent from the keyboard to the BIOS when a given key is pressed. Use this screen only if you are an experienced programmer.
Xchg	<F3>	Allows you to exchange the position of two keys, including all special keys such as Shift, Caps Lock, and Insert.
Copy	<F5>	Lets you duplicate keys.
Modes	<F7>	Gives you control over four basic keyboard features: print screen, typewriter shift lock, key clicker, and one-finger shifts.

Using the Codes Option

The Codes option is intended only for technically proficient programmers who require major keyboard alterations. You can make most of your keyboard changes with the Copy and Xchg options which are easier to use and are explained in the following sections.

Chapter 7 - Remapping the Keyboard

CAUTION: Severe program malfunction will result from incorrectly entering data in the Codes menu. Do not attempt to use the Codes option unless you have a thorough understanding of the IBM 3270 character codes.

If you are going to use the Codes option, carefully study the information regarding keyboard encoding, keyboard values, character codes, etc. found in the IBM PC *Technical Reference*. You should have a clear understanding of how this information is used by the PC BIOS before using the Codes option.

To display the Codes screen, press the <F1> key. One of the following screens displays:

KYBDEDIT Codes Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1987, Digital Communications Associates, Inc.

Key Position Number 0

Key Name

Key Tag

Shift Lock Type None Auto Repeat No SysReq No

No Key Break (release)? No 101 Duplicate? No

1 Change	2 Help
3 Next	4
5	6Ers EOF
7Dead Ky	8Nxt Val
9 Exit	0Reset

High Low Display

Normal (Unshifted) .	Key Value 0	(0)
Shifted (Upper Case)	Key Value 0	(0)
Control (CTRL) . . .	Key Value 0	(0)
Alt	Key Value 0	(0)
Control-Alt	Key Value 0	(0)
Control-Shift	Key Value 0	(0)
Alt-Shift	Key Value 0	(0)

Chapter 7 - Remapping the Keyboard

KYBDEDIT Codes Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1986, 1987, Digital Communications Associates, Inc.

Key Position Number 0

Key Name

Key Tag

Shift Lock Type None Auto Repeat No

SysReq No

No Key Break (release)? No

101 Duplicate?

		High	Low	Display
Normal (Unshifted)	. Key Value	0	(0)	
Shifted (Upper Case)	Key Value	0	(0)	
Control (CTRL)	. . . Key Value	0	(0)	
Alt	. . . . . Key Value	0	(0)	
Control-Alt	. . . . . Key Value	0	(0)	
Control-Shift	. . . . . Key Value	0	(0)	
Alt-Shift	. . . . . Key Value	0	(0)	

1	2	3	4	5	6	7	8	9	10	11	12
Chnge Key	Help	Next			Erase EOF	Dead Key	Next Value	Exit	Reset		

The following fields are displayed on the Codes menu:

KYBDEDIT: Codes Menu Options

Field	Description
Key Position Number	Position number of key to be modified. (Position numbers are located at the end of this chapter.
Key Name	Description of the primary function or action of the key. Maximum 28 characters.

Chapter 7 - Remapping the Keyboard

KYBDEDIT: Codes Menu Options *(continued)*

Field	Description
Key Tag	Short form description of the key function--maximum 4 characters.
Shift Lock Type	Lock type, if any, on this key. Press <F8>, "Nxt Val" for lock types. Types are: CAPS--Caps lock shifts key to upper-case mode. NONE--No locks. NUM--Num lock moves key to numeric (shifted) mode.
Auto Repeat	When ON, allows key to repeat when held down.
Sys Req	Parameter used by the KYBDDRV.SYS keyboard driver to determine the location of the AT's SYSREQ key. Note that the AT's SYSREQ key does not perform the same function as the 3270 SYS RQ.
No Key Break Release	KYBDDRV.SYS processes information in the field to determine if a key's break code should be expected by the driver.

KYBDEDIT: Codes Menu Options (*continued*)

Field	Description
101 Duplicate?	Enhances processing of the 101/102 key keyboard. The valid options are
NO	Specifies that the key is not duplicated on the 101/102 keyboard. Duplicate keys include the extra keypad keys: Insert, Delete, Home, End, Page Up, Page Down; the new cursor keys; and the Numeric Pad Slash.
RmvShf	Removes the upper case shift state on keys duplicated by the extra (or "alpha") key pad. Thus, when Num Lock is ON, only the numeric keypad is affected.
AddShf	Intended for international users; ignore this option.
High	Controls high part of BIOS key code sent to a program when the key is pressed. Range is 0-255 (usually the same as the Key Position Number). Value of 250-255 indicates a special action key.

KYBDEDIT: Codes Menu Options (*continued*)

Field	Description
Low	Controls low part of BIOS key code sent to a program when the key is pressed (usually the PC extended ASCII character code or zero if the key is a function key or numeric pad cursor control key). Range is 0-255. To determine these values, see the tables at the end of this chapter.
Display	Shows how the BIOS key code is displayed in a document or in the PC display.

To modify a key with the Codes option, follow the steps below.

- STEP 1:** Fill in the key position number of the key you want to modify. Press <Enter> to display the corresponding values for that key under the High, Low, and Display headings.
- STEP 2:** Press <F1> (Change) to move to the next field and fill in the value. Tab to reach the remaining fields. Fill in the new values the key will have under the High, Low, and Display headings. You can find this information in the tables at the end of this chapter. You can also display key values by pressing <F3> (Next).
- STEP 3:** After filling in the appropriate values for the key modification, return the cursor to the "Key Position Number"

field. If you want to alter other keys, repeat the procedure.

STEP 4: When finished, press <F9> (Exit) twice to return to the main KYBDEDIT screen, and press <F5> (Save) to save the alterations in a profile. To load profiles, see the section entitled 'Loading Keyboard Profiles' in this chapter.

NOTE: The "Dead Key" option selected by pressing <F7>, is a feature for international users.

Using the Xchg Option

To display the Xchg (exchange) menu, press <F3>. One of the following screens is returned:

Exchange Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
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Source Key Number		Description
Exchange with Key	0	Description

1 Xchnge	2 Help
3	4
5	6Ers EOF
7	8Nxt Val
9 Exit	0Reset

Chapter 7 - Remapping the Keyboard

Exchange Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1986, 1987, Digital Communications Associates, Inc.

Source Key Number	0	Description
Exchange with Key	0	Description

1	2	3	4	5	6	7	8	9	10	11	12
Xchng Keys	Help				Erase EOF		Next Value	Exit	Reset		

To exchange or swap the positions of two keys, follow these steps:

- STEP 1:** In the "Source Key Number" field, enter the key position number of one of the keys you want to exchange. (For key position numbers, see the tables at the end of this chapter.) Press the tab key to move to the next field and note that the description of the source key is displayed.
- STEP 2:** In the "Exchange With Key" field, enter the key position number of the key to be exchanged with the previous key. Press the tab key and note that the "exchange" key description is displayed.
- STEP 3:** Press <F1> (Change). If you want to make other exchanges, repeat the procedure.
- STEP 4:** When you have finished making changes, press <F9> (Exit).

- STEP 5: Press <F9> again to return to the original KYBDEDIT screen.
- STEP 6: Press <F5> (Save). KYBDEDIT will give the profile a .KYB extension.
- STEP 7: To verify your change, press <F9> again to return to DOS and load the profile using the commands discussed in the section of this chapter entitled 'Loading Keyboard Profiles.'

Using the Copy Option

To display the Copy menu, press the <F5> key. The following screen displays:

KYBDEDIT Copy Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1987, Digital Communications Associates, Inc.

Source Key Number	0	Description
Destination Key Number	0	Description

1 Copy	2 Help
3	4
5	6Ers EOF
7	8Nxt Val
9 Exit	0Reset

Chapter 7 - Remapping the Keyboard

KYBDEDIT Copy Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
Revision x.xx Copyright 1986, 1987, Digital Communications Associates, Inc.

Source Key Number	0	Description
Destination Key Number	0	Description

1	2	3	4	5	6	7	8	9	10	11	12
Copy Key	Help				Erase EOF		Next Value	Exit	Reset		

To make one key the duplicate of another, follow these steps:

- STEP 1:** In the "Source Key Number" field, enter the key position number of the key you wish to copy. (Key position numbers are listed at the end of this chapter.) Press the tab key to move to the next field and note that the source key description is displayed.
- STEP 2:** In the "Destination Key Number" field, enter the position number of the key that is to be the duplicate of the source key. Press the tab key and note that the destination key description is displayed.
- STEP 3:** Press <F1> (Change). Note that the destination key description is now the same as the source key description, indicating that the copy has been recorded. If you want to make other

Chapter 7 - Remapping the Keyboard

duplicates, repeat the procedure, being careful to press <F1> (Change) each time after entering the destination key number.

- STEP 4: When you finish assigning the duplicate keys, press <F9> (Exit) twice to return to the first KYBDEDIT screen.
- STEP 5: Press <F5> (Save).
- STEP 6: To verify your copy, press <F9> to return to DOS, load the profile using the KYBDLOAD command discussed in 'Loading Keyboard Profiles,' and check the keys you copied.

Using the Modes Option

The modes option lets you specify keyboard features for a single profile. (Most of these features can also be activated by switches, described at the beginning of this chapter.)

To display the Modes menu, press <F7> from the KYBDEDIT editing screen. One of the following menus displays:

KYBDEDIT Modes Screen: Standard PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
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	Yes	Key Clicker	1st Key Yes	Repeat No
Print Screen Key	Yes			
Typewriter Shift Lock	No	One Finger Shifts	No	
International	No	Alt Gr key shift type	None	
101 Duplicate Shift	None			

1	2 Help
3	4
5	6Ers EOF
7	8Nxt Val
9 Exit	0Reset

Chapter 7 - Remapping the Keyboard

KYBDEDIT Modes Screen: Enhanced PC Keyboard

KYBDEDIT -- Extended Keyboard Layout Editor
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Print Screen Key	Yes	Key Clicker	1st Key Yes	Repeat No
Typewriter Shift Lock	No	One Finger Shifts	No	
International	No	Alt Gr key shift type	None	
101 Duplicate Shift	None			

1	2	3	4	5	6	7	8	9	10	11	12
	Help				Erase EOF		Next Value	Exit	Reset		

The following fields are found on the modes menu. Options for all fields are YES and NO to enable or disable, respectively. Use the tab key to move from one field to the next. Within each field, press <F8>, "Nxt Val" to display the opposite value.

KYBDEDIT: Modes Menu Fields

Field	Description
Print Screen Key	Enables or disables the print screen key. Users with no printer attached to the PC printer port may wish to disable, since the PC may "hang up" when the key is pushed with no printer available.

KYBDEDIT: Modes Menu Fields *(continued)*

Field	Description
Key Clicker	<p>Enables or disables the key click sound for a key the first time it is pressed (1st Key), and when held (Repeat).</p> <p>For example, if you answer yes to 1st Key and no to Repeat, all keys on your keyboard click the first time they are pressed. If you have specified automatic key repeat (see Chapter 2), a key clicks the first time it is pressed but does not click when held.</p>
Typewriter Shift Lock	<p>Enables or disables the typewriter-style shift lock. An enabled PC CAPS lock key works in a manner similar to that of a typewriter shift lock.</p>
One-Finger Shifts	<p>Enables or disables the one-finger shift feature which causes the shift keys to "stay pressed" until a character key is pressed.</p>
International	<p>(Intended for international users; ignore this field.)</p>
Alt Gr key shift type	<p>(Intended for international users; ignore this field.)</p>

KYBDEDIT: Modes Menu Fields (*continued*)

Field	Description
101 duplicate shift	(Intended for international users; ignore this field.)

For more information pertaining to any field on the Modes menu, tab to the field and press <F2> for help.

Loading Keyboard Profiles

Once you have allocated memory for alternate profiles (see the switches at the beginning of this chapter), you can load them into random access memory with the KYBDLOAD program. The command for loading a keyboard profile is as follows:

KYBDLOAD/S=*n*/A *filename* <Enter>

This command line loads the profile that you insert in place of *filename* into memory slot *n* where *n* is a number from 1 to 9. (Memory slot "0" is always occupied by the standard profile, USA.KYB, which is automatically loaded at startup.) The /A flag activates the profile.

For example, to load a profile labelled "PCDOS.KYB" type,

KYBDLOAD/S=1/A PCDOS

where

1 - is the memory slot location for PCDOS

/A - is a flag that activates the PCDOS profile.

Activating Profiles

Up to nine different profiles can be placed in memory at one time, as long as sufficient memory has been allocated with the driver in the CONFIG.SYS file (see "Using Keyboard Switches" in Chapter 2). Because only one profile can be active at boot time, you must omit the /A flag when loading additional profiles with KYBDLOAD. To activate an alternate profile or to switch back and forth among profiles, press the following key sequence:

<Ctrl><Alt><Fx>

where "Fx" is a function key (F1-F10) that selects the profile assigned to a specific memory slot. Activate or swap profiles by using the key sequences given in the following table.

**Table 7-1: Key Sequences for
Activating Alternate Keyboard Profiles**

Key Sequence	Profile Location
Ctrl-Alt-F1	Activates the DCA standard profile, USA.KYB, in memory slot 0
Ctrl-Alt-F2	Activates profile in memory slot 1
Ctrl-Alt-F3	Activates profile in memory slot 2
Ctrl-Alt-F4	Activates profile in memory slot 3
Ctrl-Alt-F5	Activates profile in memory slot 4
Ctrl-Alt-F6	Activates profile in memory slot 5
Ctrl-Alt-F7	Activates profile in memory slot 6
Ctrl-Alt-F8	Activates profile in memory slot 7
Ctrl-Alt-F9	Activates profile in memory slot 8
Ctrl-Alt-F10	Activates profile in memory slot 9

Key Position Numbers

The following table lists key position numbers required by the Codes, Xchg, and Copy editing options of the KYBDEDIT program. The other tables supply more detailed information about standard and special key values.

NOTE: Where there are two characters listed under the "unshifted" or "shifted" column, the first character is generated in PC mode and the second is generated in 3270 emulation.

Chapter 7 - Remapping the Keyboard

Table 7-2: Key Position Numbers

Key Position Numbers	KEYCAP LABEL (UNSHIFTED)		
	PC, PC AT	IRMAkey	101/102
1	Esc	Esc	Esc
2	1	1	1
3	2	2	2
4	3	3	3
5	4	4	4
6	5	5	5
7	6	6	6
8	7	7	7
9	8	8	8
10	9	9	9
11	0	0	0
12	-	-	-
13	=	=	=
14	Back Space	Back Space	Back Space
15	Tab	Tab	Tab
16	q	q	q
17	w	w	w
18	e	e	e
19	r	r	r
20	t	t	t
21	y	y	y
22	u	u	u
23	i	i	i
24	o	o	o
25	p	p	p
26	[[[
27]]]
28	CR	CR	CR
29	Ctrl	Ctrl	Ctrl
30	a	a	a
31	s	s	s
32	d	d	d

Chapter 7 - Remapping the Keyboard

Table 7-2: Key Position Numbers *(continued)*

Key Position Numbers	KEYCAP LABEL (UNSHIFTED)		
	PC, PC AT	IRMAkey	101/102
33	f	f	f
34	g	g	g
35	h	h	h
36	j	j	j
37	k	k	k
38	l	l	l
39	;	;	;
40	,	,	,
41	~	~	~
42	Left Shift	Left Shift	Left Shift
43	\	\	\
44	z	z	z
45	x	x	x
46	c	c	c
47	V	V	V
48	b	b	b
49	n	n	n
50	m	m	m
51	,	,	,
52	.	.	.
53	/	/	/
54	Right Shift	Right Shift	Right Shift
55	*	*	*
56	Alt	Alt	Alt
57	Space Bar	Space Bar	Space Bar
58	Caps Lock	Caps Lock	Caps Lock
59	F1	F1	F1
60	F2	F2	F2
61	F3	F3	F3
62	F4	F4	F4
63	F5	F5	F5

Table 7-2: Key Position Numbers (*continued*)

Key Position Numbers	KEYCAP LABEL (UNSHIFTED)		
	PC, PC AT	IRMAkey	101/102
64	F6	F6	F6
65	F7	F7	F7
66	F8	F8	F8
67	F9	F9	F9
68	F10	F10	F10
69	NumLk	NumLk	NumLk
70	ScrLk	ScrLk	ScrLk
71	Num Pad 7	Num Pad 7	Num Pad 7
72	Num Pad 8	Num Pad 8	Num Pad 8
73	Num Pad 9	Num Pad 9	Num Pad 9
74	Num Pad -	Num Pad -	Num Pad -
75	Num Pad 4	Num Pad 4	Num Pad 4
76	Num Pad 5	Num Pad 5	Num Pad 5
77	Num Pad 6	Num Pad 6	Num Pad 6
78	Num Pad +	Num Pad +	Num Pad +
79	Num Pad 1	Num Pad 1	Num Pad 1
80	Num Pad 2	Num Pad 2	Num Pad 2
81	Num Pad 3	Num Pad 3	Num Pad 3
82	Num Pad 0	Num Pad 0	Num Pad 0
83	Num Pad	Num Pad	Num Pad
84	SYSREQ	PF1	SYSREQ
85	N/A	PF2	N/A
86	N/A	PF3	N/A
87	N/A	PF4	F11
88	N/A	PF5	F12
89	N/A	PF6	N/A
90	N/A	PF7	N/A
91	N/A	PF8	N/A
92	N/A	PF9	N/A
93	N/A	PF10	N/A
94	N/A	PF11	N/A
95	N/A	PF12	N/A

Chapter 7 - Remapping the Keyboard

Table 7-2: Key Position Numbers (continued)

Key Position Numbers	KEYCAP LABEL (UNSHIFTED)		
	PC, PC AT	IRMAkey	101/102
96	N/A	PF13	N/A
97	N/A	PF14	N/A
98	N/A	PF15	N/A
99	N/A	PF16	N/A
100	N/A	PF17	N/A
101	N/A	PF18	N/A
102	N/A	PF19	N/A
103	N/A	PF20	N/A
104	N/A	PF21	N/A
105	N/A	PF22	N/A
106	N/A	PF23	N/A
107	N/A	PF24	N/A
108	N/A	<	N/A
109	N/A	RESET	N/A
110	N/A	ENTER	N/A
111	N/A	DUP	N/A
112	N/A	FM	N/A
113	N/A	Back Tab	N/A
114	N/A	INS	N/A
115	N/A	DEL	N/A
116	N/A	DCA1	N/A
117	N/A	UP CURSOR	N/A
118	N/A	DCA2	N/A
119	N/A	LEFT ARROW	N/A
120	N/A	HOME/RULE	N/A
121	N/A	RIGHT CURSOR	N/A
122	N/A	DCA3	N/A
123	N/A	DOWN CURSOR	N/A
124	N/A	DCA4	N/A
125	N/A	Num Pad =	N/A
126	N/A	Num Pad Tab	N/A

BIOS Key Code Information

The Basic Input/Output System (BIOS) key codes generated by the driver KYBDDRV.SYS may be classified by function. The BIOS returns the following three major types of key code:

1. **Standard PC pseudo-ASCII characters.** These are characterized by an ASCII character in the low byte of the returned BIOS key code and the key scan code in the high byte.
2. **PC Function keys.** Function keys are marked by a BIOS code which has a zero low byte. The function number is returned as a value from zero through 255 in the high byte.
3. **3270 Extended function codes.** These codes contain a function number in the low byte and an extended scan code value in the high byte. Extended scan codes are 128 through 191.

To classify the codes, use the following procedure:

- STEP 1: Check for a standard PC function key by comparing the low byte of the BIOS key code with zero. If the low byte is zero, the key is a function key and its function code is in the high byte.
- STEP 2: Check for standard PC pseudo-ASCII characters. Compare the high byte of the BIOS scan code with 128. If the scan code is less than 128, the keystroke is a standard PC ASCII character keystroke.
- STEP 3: Any keys not in the previously listed groups are one of the following 3270 extended character codes:

Chapter 7 - Remapping the Keyboard

- a. **3270 PF keys.** These keys have a scan code of 128 and a low byte arranged in ascending order first by scan code, then shift state.
- b. **3270 PC Extension keys.** These keys have a scan code of 129 and are grouped in a fashion similar to that of the PF keys described above.
- c. **Standard PC Expansions.** These key codes fill in the "holes" in the existing PC keyboard layout. Scan codes reserved for these keys are 130 through 133. The low byte of each of these codes is an ASCII character corresponding to the uppercase or shifted value of the key. The following values are used to fill in the PC "holes".
 - 130 - Holes in Ctrl-XX domain.
 - 131 - Holes in Ctrl-Alt XX domain.
 - 132 - Holes in Ctrl-Shift XX domain.
 - 133 - Holes in Alt-Shift XX domain.

The following tables list key codes for all states of the keys on the IRMAkey keyboard.

Key Value Tables Interpretation Guide

Use the following "key" to interpret the information in the Key Value tables which follow.

- o "Key" is the decimal key scan code.
 - o "Flag t" indicates that the key automatically repeats when held. This has no effect on shift keys and toggle keys. "C" indicates that CAPS LOCK acts on this key. "N" indicates that NUM LOCK acts on this key.
 - o Key descriptions consisting of a number followed by a symbol indicate that the ASCII value of the symbol is returned with the given number in the high byte.
 - o Key descriptions consisting of a number followed by "fky" indicate a function key which has the number in the high byte and a zero in the low byte.
 - o Key descriptions consisting of a number followed by capital letters (e.g. 046 ETX) return the ASCII control character given (ETX) with the number in the high byte (46).
 - o The insert key action, indicated by "082*fky," means that the insert state flag is toggled and the key code "082" is returned.
-

Table 7-3: Key Values

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
1	t	ESC	001 ESC	001 ESC	134 ESC	001 fky	KeyPass	132 ESC	133 ESC	Escape
2	t	!	002 !	002 !	134 !	120 kyf	131 !	132 !	133 !	One/Exclamation
3	t	@	003 @	003 @	003 fky	121 fky	131 @	132 @	133 @	Two/Commercial At Sign
4	t	#	004 #	004 #	134 #	122 fky	131 #	132 #	133 #	Three/Pound Sign
5	t	\$	005 \$	005 \$	134 \$	123 fky	131 \$	132 \$	133 \$	Four/Dollar Sign
6	t	%	006 %	006 %	134 %	124 fky	131 %	132 %	133 %	Five/Percent
7	t	^	007 ^	007 ^	007 RS	125 fky	131 ^	132 ^	133 ^	Six/Upcarat/Logical Not
8	t	&	008 &	008 &	134 &	126 fky	131 &	132 &	133 &	Seven/Ampersand
9	t	*	009 *	009 *	134 *	127 fky	131 *	132 *	133 *	Eight/Asterisk
10	t	(	010 (	010 (	134 (	128 fky	131 (	132 (	133 (	Nine/Left Paren
11	t	)	011)	011)	134)	29 fky	131)	132)	133)	Zero/Right Paren
12	t	_	012 _	012 _	134 _	130 fky	131 _	132 _	133 _	Minus/Underscore
13	t	=	013 =	013 =	134 =	131 fky	131 =	132 =	133 =	Equal/Plus
14	t	BS	014 BS	014 BS	014 RUB	140 fky	131 BS	132 BS	133 BS	Backspace
15	t	TAB	015 HT	015 fky	134 HT	015 fky	131 HT	132 HT	133 HT	Tab/Back Tab
16	tC	Q	016 q	016 Q	016 DC1	016 fky	131 Q	132 Q	133 Q	Q
17	tC	W	017 w	017 W	017 ETB	017 fky	131 W	132 W	133 W	W
18	tC	E	018 e	018 E	018 ENQ	018 fky	131 E	132 E	133 E	E
19	tC	R	019 r	019 R	019 DC2	019 fky	131 R	132 R	133 R	R
20	tC	T	020 t	020 T	020 DC4	020 fky	131 T	132 T	133 T	T

Table 7-3: Key Values (continued)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
21	tC	Y	021 y	021 Y	021 EM	021 fky	131 Y	132 Y	133 Y	Y
22	tC	U	022 U	022 U	022 NAK	022 fky	131 U	132 U	133 U	U
23	tC	I	023 i	023 I	023 HT	023 fky	131 I	132 I	133 I	I
24	tC	O	024 o	024 O	024 \$I	024 fky	131 O	132 O	133 O	O
25	tC	P	025 p	025 P	025 DLE	025 fky	131 P	132 P	133 P	P
26	t	[	026 [	026 [	026 ESC	026 fky	131 [	132 [	133 [	Open Bracket/Brace
27	t	]	027]	027]	027 GS	027 fky	131]	132]	133]	Close Bracket/Brace
28	t	RET	028 CR	028 CR	028 LF	028 fky	131 CR	132 CR	133 CR	Return/New Line
29		CTRL	Control	Control	Control	Control	Control	Control	Control	Control
30	tC	A	030 a	030 A	030 SOH	030 fky	131 A	132 A	133 A	A
31	tC	S	031 s	031 S	031 DC3	031 fky	131 S	132 S	133 S	S
32	tC	D	032 d	032 D	032 EOT	032 fky	131 D	132 D	133 D	D
33	tC	F	033 f	003 F	033 ACK	033 fky	131 F	132 F	133 F	F
34	tC	G	034 g	034 G	034 BEL	034 fky	131 G	132 G	133 G	G
35	tC	H	035 h	035 H	035 BS	035 fky	131 H	132 H	133 H	H
36	tC	J	036 j	036 J	036 LF	036 fky	131 J	132 J	133 J	J
37	tC	K	037 k	037 K	037 VT	037 fky	131 K	132 K	133 K	K
38	tC	L	038 l	038 L	038 FF	038 fky	131 L	132 L	133 L	L
39	t	;	039 ;	039 :	134 :	039 fky	131 :	132 :	133 :	Semicolon/Colon
40	t	'	040 '	040 " "	134 " "	040 fky	131 " "	132 " "	133 " "	Single/Double Quote

Table 7-3: Key Values (continued)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
41	t	'	041 '	014 ~	134 ~	041 fky	131 ~	132 ~	133 ~	Accent/Tilde
42		SHFT	Shift	Shift	Shift	Shift	Shift	Shift	Shift	Left Shift Key
43	t	\	043 \ \	043 |	043 FS	043 fky	131 |	132 |	133 |	Backslash/Vertical Bar
44	tC	Z	044 z	044 Z	044 SUB	044 fky	131 Z	132 Z	133 Z	Z
45	tC	X	045 x	045 X	045 CAN	045 fky	131 X	132 X	133 X	X
46	tC	C	046 c	046 C	046 ETX	046 fky	131 C	132 C	133 C	C
47	tC	V	047 v	047 V	047 SYN	047 fky	131 V	132 V	133 V	V
48	tC	B	048 b	048 B	048 STX	048 fky	131 B	132 B	133 B	B
49	tC	N	049 n	049 N	049 SO	049 fky	131 N	132 N	133 N	N
50	tC	M	050 m	050 M	050 CR	050 fky	131 M	132 M	133 M	M
51	t	,	051 ,	051 <	134 <	051 fky	131 <	132 <	133 <	Comma
52	t	.	052 .	052 .	134 >	052 fky	131 >	132 >	133 >	Period
53	t	/	053 /	053 ?	134 ?	053 fky	131 ?	132 ?	133 ?	Slash/Question
54		SHFT	Shift	Shift	Shift	Shift	Shift	Shift	Shift	Right Shift Key
55	t	PTSC	055 *	PrtSc	114 fky	055 fky	PrtEn	132 '	133 '	Print Screen/Asterisk
56		ALT	Alt	Alt	Alt	Alt	Alt	Alt	Alt	Alt
57	t	SP	057 SP	057 SP	134 SP	057 fky	131 SP	132 SP	133 SP	Space
58	t	CAPS	Caps Lk	Caps Lk	Caps Lk	Caps Lk	131 /	132 /	133 /	CAPS Lock
59	t	F1	059 fky	084 fky	094 fky	104 fky	Layout 0	132 a	133 a	F1
60	t	F2	060 fky	085 fky	095 fky	105 fky	Layout 1	132 b	133 b	F2

Table 7-3: Key Values (continued)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
61	t	F3	061 fky	086 fky	096 fky	106 fky	Layout 2	132 c	133 c	F3
62	t	F4	062 fky	087 fky	097 fky	107 fky	Layout 3	132 d	133 d	F4
63	t	F5	063 fky	088 fky	098 fky	108 fky	Layout 4	132 e	133 e	F5
64	t	F6	064 fky	089 fky	099 fky	109 fky	Layout 5	132 f	133 f	F6
65	t	F7	065 fky	090 fky	100 fky	110 fky	Layout 6	132 g	133 g	F7
66	t	F8	066 fky	091 fky	101 fky	111 fky	Layout 7	132 h	133 h	F8
67	t	F9	067 fky	092 fky	102 fky	112 fky	Layout 8	132 i	133 i	F9
68	t	F10	068 fky	093 fky	103 fky	113 fky	Layout 9	132 j	133 j	F10
69	t	NUM	Num Lk	Num Lk	Hold	Num Lk	131 ;	132 ;	133 ;	NUM Lock
70	t	SCRL	Scr Lk	Scr Lk	Break	Scr Lk	Reset	Scr Lk	Scr Lk	Scroll Lock
71	tN	NP7	071 fky	071 7	119 fky	AltNP 7	Clicker	132 7	AltNP 7	Numeric Pad 7
72	tN	NP8	072 fky	072 8	134 8	AltNP 8	Typwtr	132 8	AltNP 8	Numeric Pad 8
73	tN	NP9	073 fky	073 9	132 fky	AltNP 9	OneFnger	132 9	AltNP 9	Numeric Pad 9
74	t	NPM	074 -	074 -	134 -	074 fky	-	132 -	133 -	Numeric Pad Minus
75	tN	NP4	075 fky	075 4	115 fky	AltNP 4	AutoRept	132 4	AltNP 4	Numeric Pad 4
76	tN	NP5	076 fky	076 5	134 5	AltNP 5	jrGreen	132 5	AltNP 5	Numeric Pad 5
77	tN	NP6	077 fky	077 6	116 fky	AltNP 6	-	132 6	AltNP 6	Numeric Pad 6
78	t	NPP	078 +	078 +	134 +	078 fky	-	132 +	133 +	Numeric Pad Plus
79	tN	NP1	079 fky	079 1	117 fky	AltNP 1	-	132 1	AltNP 1	Numeric Pad 1
80	tN	NP2	080 fky	080 2	134 2	AltNP 2	-	132 2	AltNP 2	Numeric Pad 2

Table 7-3: Key Values (continued)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
81	tN	NP3	081 fky	081 3	118 fky	AltNP 3	-	132 3	AltNP 3	Numeric Pad 3
82	tN	NP0	082*fky	082 0	134 0	AltNP 0	-	132 0	AltNP 0	Numeric Pad 0
83	tN	NPD	083 fky	083 .	134 .	AltNP .	Reboot	132 .	AltNP .	Numeric Pad Dot
84	tS	PF1	128 SP	128 8	128 P	128 h	129 SP	129 8	129 P	PF1
85	t	PF2	128 !	128 9	128 Q	128 i	129 !	129 9	129 Q	PF2
86	t	PF3	128 " "	128 :	128 R	128 j	129 " "	129 :	129 R	PF3
87	t	PF4	128 #	128 ;	128 S	128 k	129 #	129 ;	129 S	PF4
88	t	PF5	128 \$	128 <	128 T	128 l	129 \$	129 <	129 T	PF5
89	t	PF6	128 %	128 =	128 U	128 m	129 %	129 =	129 U	PF6
90	t	PF7	128 &	128 >	128 V	128 n	129 &	129 >	129 V	PF7
91	t	PF8	128 '	128 ?	128 W	128 o	129 '	129 ?	129 W	PF8
92	t	PF9	128 (	128 @	128 X	128 p	129 (	129 @	129 X	PF9
93	t	PF10	128)	128 A	128 Y	128 q	129)	129 A	129 Y	PF10
94	t	PF11	128 *	128 B	128 Z	128 r	129 *	129 B	129 Z	PF11
95	t	PF12	128 +	128 C	128 [	128 s	129 +	129 C	129 [	PF12
96	t	PF13	128 ,	128 D	128 \	128 t	129 ,	129 D	129 \	PF13
97	t	PF14	128 -	128 E	128]	128 u	129 -	129 E	129]	PF14
98	t	PF15	128 .	128 F	128 ^	128 v	129 .	129 F	129 ^	PF15
99	t	PF16	128 /	128 F	128 -	128 w	129 /	129 G	129 -	PF16
100	t	PF17	128 0	128 H	128 '	128 x	129 0	129 H	129 '	PF17

Table 7-3: Key Values (continued)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shift	Alt-Shift	Description
101	t	PF18	128 1	128 I	128 a	128 y	129 1	129 I	129 a	PF18
102	t	PF19	128 2	128 J	128 b	128 z	129 2	129 J	129 b	PF19
103	t	PF20	128 3	128 K	128 c	128 Ć	129 3	129 K	129 c	PF20
104	t	PF21	128 4	128 L	128 d	128 |	129 4	129 L	129 d	PF21
105	t	PF22	128 5	128 M	128 e	128 }	129 5	129 M	129 e	PF22
106	t	PF23	128 6	128 N	128 f	128 ~	129 6	129 N	129 f	PF23
107	t	PF24	128 7	128 O	128 g	128 RUB	129 7	129 O	129 g	PF24
108	t	<	108 <	108 >	134 k	130 k	131 k	132 k	133 k	Less Than/Greater Than
109	t	REST	109 SP	134 L	134 l	130 l	131 l	132 l	133 l	Reset
110	t	ENTR	110 CR	134 M	134 m	130 m	131 m	132 m	133 m	Enter
111	t	DUP	111 *	134 N	134 n	130 n	131 n	132 n	133 n	Duplicate Field
112	t	FM	112 ;	134 O	134 o	130 o	131 o	132 o	133 o	Field Mark
113	t	BTAB	015 fky	113 HT	134 p	130 p	131 p	132 p	133 p	Back Tab
114	t	INS	083*fky	082*fky	134 q	130 q	131 q	132 q	133 q	Insert
115	t	DEL	083 fky	083 fky	134 r	130 r	131 r	132 r	133 r	Delete
116	t	DCA1	116 SP	134 S	134 s	130 s	131 s	132 s	133 s	DCA1
117	t	UP	072 fky	072 fky	134 t	130 t	131 t	132 t	133 t	Up Cursor
118	t	DCA2	118 SP	134 U	134 u	130 u	131 u	132 u	133 u	DCA2
119	t	LEFT	075 fky	075 fky	115 fky	130 v	131 v	132 v	133 v	Left Arrow

Table 7-3: Key Values (*continued*)

Key	Flags	Name	Normal	Shift	Control	Alt	Ctrl-Alt	Ctrl-Shft	Alt-Shft	Description
120	t	HOME	120 SP	34 W	134 w	130 w	131 w	132 w	133 w	Home/Rule
121	t	RGHT	077 fky	077 fky	116 fky	130 x	131 x	132 x	133 x	Right Cursor
122	t	DCA3	GS xxLR	GS xxLR	GS xxLR	DCA3				
123	t	DOWN	080 fky	080 fky	134 z	130 z	131 z	132 z	133 z	Down Cursor
124	t	DCA4	124 SP	134 {	134 [	130 [	131 [	132 [	133 [	DCA4
125	t	NPE	125 =	125 =	134 \\	130 \\	131 \\	132 \\	133 \\	Numeric Pad Equal
126	t	NPT	126 HT	126 HT	134]	130]	131]	132]	133]	Numeric Pad Tab

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Appendix A

Keyboards and Keys

This appendix provides diagrams that show where 3270 keys are located on each of the PC keyboards emulated by IRMA 3279 Graphics. Also included are tables that describe the 3270 keys and give their PC key assignments.

Keyboards

IRMA 3279 Graphics lets your PC function like a 3279 Attribute Select Typewriter/APL Keyboard, which provides 12 PF keys, color and highlighting attribute select keys, and APL keys. You can change this default assignment with GraphPac (Chapter 2) to have your PC keyboard function as either an APL Typewriter Keyboard, or an Attribute Select Typewriter Keyboard. The requirements of your application program along with your host configuration determine which keyboard you need. The three 3279 keyboards are illustrated on the following pages.

Keys

The sections following the keyboard charts locate and describe keys used to move the cursor, those used to alter data, and those used to perform special host and display functions.

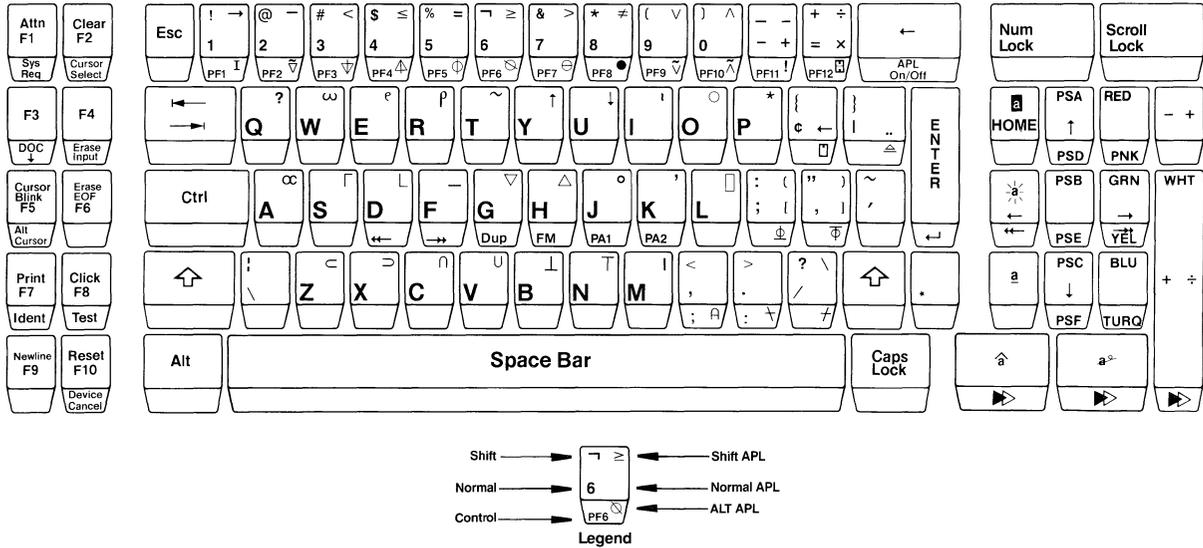


Figure A-1: Attribute Select Typewriter/APL Keyboard (default keyboard)

Attribute select features are available whether APL is on or off. Note that the semicolon (;) on the comma key and the colon (:) on the period key are not available unless the APL mode is on.

Appendix A - Keyboards and Keys

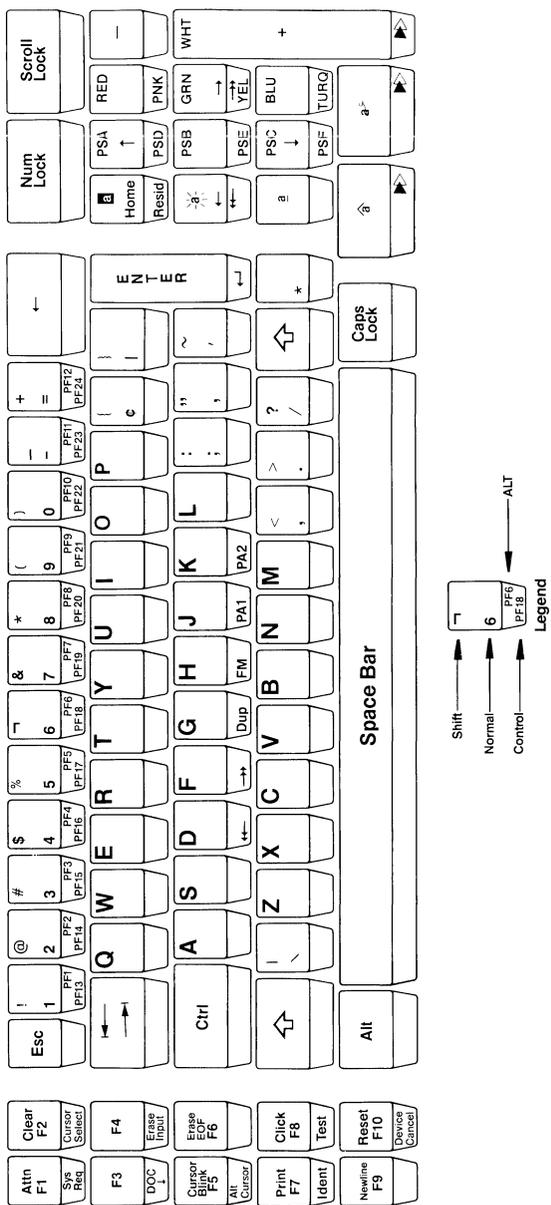


Figure A-2: Attribute Select Typewriter Keyboard

Appendix A - Keyboards and Keys

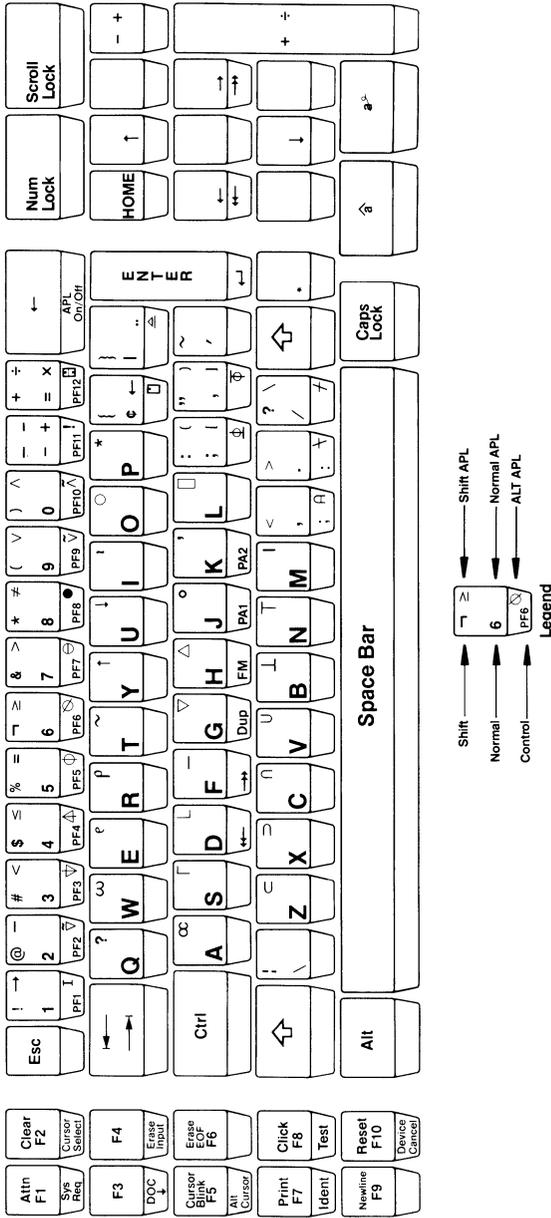


Figure A-3: APL Typewriter Keyboard

GraphPac Menu Keys

The keys listed below are used to enter data and move the cursor on GraphPac menus. While these keys have general PC functions, they function differently on GraphPac menus.

Key Name	PC Key Assignment	Function
Backspace	←	Moves the cursor to the previous query field and erases data.
Backtab	|←	Moves the cursor to the start of the previous query field.
Cursor Down		Moves the cursor to the start of the next query field.
Cursor Left	←	Moves the cursor to the previous query field position.
Cursor Right	→	Moves the cursor to the next query field.
Cursor Up		Moves to the cursor to the beginning of the previous query field.
Enter	↵	Causes GraphPac to process the current menu selections.
ESC	<Esc>	Moves up one level in the menu hierarchy.

(continued)

GraphPac Menu Keys (cont.)

Key Name	PC Key Assignment	Function
HOME	<Home>	Moves the cursor to the beginning of the first query field.
Tab	|← →|	Moves the cursor to the start of the next query field.

Cursor Movement Keys

These keys move the cursor around the screen. Press and hold a key to repeat its function. Note that some keys function differently on a screen without input fields (unformatted screen). This difference is indicated in parentheses.

Key Name	PC Key Assignment	Function
Backtab	|←	Moves the cursor to the beginning of the current input field. If the cursor is already in this position, it moves to the beginning of the preceding input field. On an unformatted screen the cursor moves to the beginning of line one.
Cursor Down	↓	Moves the cursor down one line. If the cursor is at the bottom of the screen it moves to the top of the screen.
Cursor Left	←	Moves the cursor one space to the left. If the cursor is at the beginning of a line, it moves to the end of the previous line. If the the cursor is at the beginning of the top line, it moves to the end of the last line.

(continued)

Cursor Movement Keys (cont.)

Key Name	PC Key Assignment	Function
Cursor Right	→	Moves the cursor one space to the right. If the cursor is at the end of a line, it moves to the start of the next line. If the cursor is at the end of the screen, it moves to the top.
Cursor Up	↑	Moves the cursor up a line. If the cursor is at the top of the screen, it moves to the bottom.
Home	<Home>	Moves the cursor to the beginning of the first input field. Moves the cursor to the beginning of line one on an unformatted screen.
New Line	<Ctrl> <Enter>	Moves the cursor to the first unprotected space on a following line or to the start of line one on an unformatted screen. If

(continued)

Cursor Movement Keys (cont.)

Key Name	PC Key Assignment	Function
Tab	|← →|	all fields are protected, the cursor moves to the beginning of line one. Moves the cursor to the beginning of the next input field on the screen. On an unformatted screen, moves the cursor to the first position of line one.

3279 Field Editing Keys

Use the field editing keys to enter new data, change existing data, or erase data from input fields on the screen. If you press a key while not in an input field, the keyboard beeps, then locks until you press the RESET key, <F10>. Note that some keys function differently on an unformatted screen, as indicated in the descriptions below.

Key Name	PC Key Assignment	Function
DEL		Deletes the character at the cursor position and moves the other characters one space to the left. If you press the key when the cursor is not in an input field, the PC's alarm sounds, and the keyboard locks until you press reset, <F10>.
DUP	<Alt><g>	Puts the DUP character into the current input field. Each application program determines the validity and function of the DUP key.

(continued)

3279 Field Editing Keys (cont.)

Key Name	PC Key Assignment	Function
ERASE EOF (End Of Field)	<F6>	Erases all characters from the cursor position to the end of the current input field even if the field continues onto another line. On an unformatted screen, all characters from the cursor to the end of the screen are erased.
ERASE INPUT	<F4>	Erases the contents of all input fields on the screen and places the cursor at the first field. If there are no input fields, characters are not erased, and the cursor moves to line one. Erases all contents of an unformatted screen.
FM (Field) (Mark)	<Alt><h>	Puts the field mark character into the current input field. Each application determines the function of the field mark.

(continued)

3279 Field Editing Keys (cont.)

Key Name	Key Name Assignment	Function
INS	<Ins>	Changes the mode of text entry so that new text is inserted at the cursor position, while existing text moves to the right. Press RESET, <F10>, to turn off this mode and return to replace mode. (Replace mode types over existing text.)

NOTE: At times you may not be able to type data in a field, even though the field appears empty. This can happen if the field actually contains a "blank" character. If this occurs when you need to insert characters, move the cursor past the last visible character and press the ERASE EOF function key, <F6>, to remove the blank character(s).

3279 Function Keys

The host application program you use typically determines the function of the 3270 keys listed below. Refer to your application program documentation for detailed information about each function.

3270 Function	PC Key Assignment	Description
ALT CURSR	<Alt> <F5>	Changes the appearance of the cursor. Alternate the ALT CURSR key with the blink key (<Shift><Cursor Left>) to get four different cursor display modes.
ATTN	<F1>	Requests attention from the host. The application program determines when this function can be used and the response that will be received. Refer to the mainframe program documentation for information on using this key.
CLEAR	<F2>	Sends the clear function to the host.
Click	<F8>	Enables and disables the audible click sound produced when you press keys at the keyboard.

(continued)

3279 Function Keys (cont.)

3270 Function	PC Key Assignment	Description
CURSR SEL	<Alt> <F2>	Functions as an IBM Selector Light Pen.
DEV CNCL	<Alt> <F10>	Cancels a print request that failed due to a problem with your printer. Does not cancel an active print request.
DOC On/Off	<Alt> <F3>	Provides a controller option for use with the IBM 3270 Information Display Entry Assist System. See the "IBM 3270 Information Display System Entry Assist User's Guide, IBM 3174 or 3274 Control Unit (GA23-0119).
Enter	↵	Notifies the host application program that you have finished entering data and are ready to continue with the program. Your keyboard is temporarily disabled while the information is being processed. The host normally responds by returning a new screen or a message.

(continued)

3270 Function Keys (cont.)

3270 Function	PC Key Assignment	Description
IDENT	<Alt> <F7>	Lets you select the printer you want to use with your terminal. See your host system administrator for the printer numbers you are authorized to use.
PRINT	<F7>	Prints the current display screen on the host printer assigned to your terminal.
RESET	<F10>	Unlocks the keyboard when it is locked by a program error, operator error, or system failure. Before using RESET, check the status line to determine why the keyboard locked. Some errors, such as printer failures, cannot be cleared by RESET. Also some error conditions, such as coax line failure, must be corrected before the RESET key is pressed.

(continued)

3279 Function Keys (cont.)

3270 Function	PC Key Assignment	Description
SYS REQ	<Alt> <F1>	This key's use depends upon your system configuration and the host application program you are using. For specific instructions, refer to the application program's documentation.
TEST	<Alt> <F8>	Clears your screen and places your terminal in test mode. When the test is complete, a power-on-reset is sent to the host. You must log on to the application program to continue operation. For more information on the test function, see the IBM 3279 Problem Determination Guide.

PA Function Keys

The PA function keys signal the application to perform a specific function without processing data on the screen. Each application program can define different uses for the PA keys and may not use all of them. Refer to the documentation for the desired application program for specific information on the use of the PA keys. IRMA 3279 Graphics assigns the PA keys to the following PC key combinations:

PA1	<Ctrl><j>
PA2	<Ctrl><k>

PF Function Keys

The PF keys are defined by each application program to perform specific program functions. All the PF keys may not be used by a particular application program. Refer to your application program documentation for more information. The IRMA 3279 Graphics software provides keys PF1 through PF12 for the default keyboard layout (Attribute Select Typewriter/ APL Keyboard), PF1 through PF12 for the APL/Typewriter Keyboard, and PF1 through PF24 for the Attribute Select Typewriter Keyboard. The PF keys are assigned to the following PC key sequences.

PF Function Keys (cont.)

PF Key	Attr. Select Typewriter/ APL Keyboard (default)	APL Typewriter Keyboard	Attr. Select Typewriter Keyboard
PF1	<Ctrl><1>	<Ctrl><1>	<Alt><1>
PF2	<Ctrl><2>	<Ctrl><2>	<Alt><2>
PF3	<Ctrl><3>	<Ctrl><3>	<Alt><3>
PF4	<Ctrl><4>	<Ctrl><4>	<Alt><4>
PF5	<Ctrl><5>	<Ctrl><5>	<Alt><5>
PF6	<Ctrl><6>	<Ctrl><6>	<Alt><6>
PF7	<Ctrl><7>	<Ctrl><7>	<Alt><7>
PF8	<Ctrl><8>	<Ctrl><8>	<Alt><8>
PF9	<Ctrl><9>	<Ctrl><9>	<Alt><9>
PF10	<Ctrl><0>	<Ctrl><0>	<Alt><0>
PF11	<Ctrl><->	<Ctrl><->	<Alt><->
PF12	<Ctrl><=>	<Ctrl><=>	<Alt><=>
PF13			<Ctrl><1>
PF14			<Ctrl><2>
PF15			<Ctrl><3>
PF16			<Ctrl><4>
PF17			<Ctrl><5>
PF18			<Ctrl><6>
PF19			<Ctrl><7>
PF20			<Ctrl><8>
PF21			<Ctrl><9>
PF22			<Ctrl><0>
PF23			<Ctrl><->
PF24			<Ctrl><=>

Attribute-Select Keys

The attribute-select keys control the highlighting, program symbol set, and color of characters displayed at your terminal. Your controller must be configured for these attributes in order for you to use them.

To test your controller configuration, perform these steps:

STEP 1: Start the GRAPH emulation program by typing, "GRAPH," and pressing, <Enter>.

STEP 2: Once in emulation, activate the TEST function by pressing, <Alt><F8>.

STEP 3: When the word "TEST" displays on the status line, type /8 and press <Enter>.

Test patterns appear on the screen. Now you can choose the attributes you want.

STEP 4: To reset any attribute display to the application program's original value, use the field inherit function. This function assigns a different key sequence for each of the attribute groups. To reset highlighting, press <Alt><Ins>. To reset programmed symbol sets, press <Alt>. To reset colors press <Alt><+>.

STEP 5: To exit test mode and return to emulation, press <Alt><F8>.

The following sections describe the groups of attribute-select keys and the field inherit function.

Color Select Keys

The color select function keys let you choose the color of the characters you type at the terminal. The availability of this function depends upon your application program and the controller configuration. After you press a color-select key, all characters you type will display in the selected color. The color assignment appears in columns 49 and 50 of the status line. The supported colors and their PC key assignments are as follows:

Color	PC Key Assignment
Blue	<Shft><PgDn>
Green	<Shft><Cursor Right>
Pink	<Alt><PgUp>
Red	<Shft><PgUp>
White	<Shft><+> (+ on numeric keypad)
Turquoise	<Alt><PgDn>
Yellow	<Alt><Cursor Right>
Field Inherit*	<Alt><+>

* The field inherit key sequence resets colors to the original values set by the mainframe application program.

Highlight Select Keys

Three highlight-select keys let you choose the way characters display on the PC screen during a network session. Press the key once to activate the function. Press the key a second time to turn off the function. The active highlight mode displays in lines 36-44 of the status line. Note that the availability of highlighting depends upon the application program in use and the controller configuration.

Highlight Mode	Status Line Symbol	PC Key Assignment	Description
Blink 		<Shift> ←	Causes the characters you type to blink.
Reverse Video 		<Shift> <Home>	Displays characters you type in reverse video. This means that characters and the background display in opposite colors from usual. For example, if the characters usually are green and the background is black, the characters display in black and the background displays in green.

(continued)

Highlight Select Keys (cont.)

Highlight Mode	Status Line Symbol	PC Key Assignment	Description
Under-score	<u>a</u>	<Shift> <End>	Underlines each character that you type at the keyboard.
Field Inherit	▶	<Alt> <Ins>	Resets highlighting to the values originally set by the mainframe application program.

Program Symbol Set Keys

The PSA-PSF function keys select the program symbol set that IRMA 3279 Graphics uses to display all the characters that you type at the keyboard. The selected symbol set displays in lines 31-34 of the status line. Note that your controller, as well as the host application must support programmed symbols, in order for these keys to be valid.

Symbol Set	PC Key Assignment
PSA	<Shft><Cursor Up>
PSB	<Shft><5> (5 on the numeric keypad)
PSC	<Shft><Cursor Down>
PSD	<Alt><Cursor Up>
PSE	<Alt><5> (5 on the numeric keypad)
PSF	<Alt><Cursor Down>
Field* Inherit	<Alt>

* The field inherit function resets to the program symbol sets originally specified by the mainframe application program.

Appendix B

Status Line Symbols and Messages

Introduction

This appendix describes the messages that may display on your screen during emulation. These messages display as symbols and text on the "status line," a line that appears at the bottom of your screen during emulation. Most of the messages are provided by the host computer or controller. A few messages are provided by IRMA 3279 Graphics. The status line provides the following information:

- o color selection
- o "do not enter" messages
- o highlighting messages
- o insert mode selection
- o printer status messages
- o program symbol set selection
- o readiness and system connection messages
- o reminder messages
- o resident mode selection
- o shift and mode messages

Some of these areas always display a message, while others display messages only part of the time. These areas are fully described in the following sections.

Readiness and System Connection Messages

These messages display in columns 1-6 of the status line and indicate whether your terminal and the host computer are ready to start a session.

Symbol	Meaning
4	A 4 appears in column 1 of the status line when communication is established with a 3274 control unit. This indicator must display before you can log on to the network.
Online <u>A</u> <u>B</u>	An A or B in column 2 of the status line indicates that the terminal is "online" (communicating with the host). If column 2 is blank, communication has not been established.
My Job ■	The display is logically attached to a mainframe computer
System Operator ⊙ ⋈	Your computer is communicating with the network control program rather than with an application program.
Unowned ?	The emulator is running, but your computer is not communicating with a host application program or the network control program.

Do Not Enter Messages

A "do not enter" message displays when the system temporarily cannot accept data. This may happen if you type non-numeric characters in a numeric field, if you type too many characters in a field, if the requested printer is not working, or if the host needs more time to complete the previous task. The first part of the message displays an **X**, which indicates that the keyboard is temporarily disabled. The symbols to the right of the **X** indicate the reason the keyboard is disabled.

Note that some messages display only while the host processes your last request and are cleared automatically by the system when the request is complete. However, certain messages, such as **X -f** and **X ?+** require you to press the **RESET** function key, <F10>, to unlock the keyboard and restore operation. If you cannot clear a message with **RESET** or the **CLEAR** function, check the other messages on the status line for more information.

Following is a table listing the "do not enter" messages with descriptions and corrective action.

Do Not Enter Messages

Symbol	Meaning	Corrective Action
X 	The host needs more time to complete your task.	Wait for this message to disappear.
XSYSTEM	The host locked your keyboard after processing your data.	<ul style="list-style-type: none">o Wait to see if the host unlocks the keyboard.o Look up the meaning of any system communication messages that may appear.o If the host doesn't restore keyboard operation, press the RESET key, <F10>.
X?+	The IRMA 3279 Graphics emulator did not accept all or part of the last operation.	Press the RESET key, <F10>.

(continued)

Do Not Enter Messages (cont.)

Symbol	Meaning	Corrective Action
X ← ☉ →	The last operation attempted was started from an incorrect location. For example, IRMA Graphics does not allow data to be modified in a protected field.	<ul style="list-style-type: none"> o Press the RESET key, <F10>. o Then move the cursor before entering data, or perform another function.
X ☉ >	You have exceeded the maximum number of characters allowed in a field.	Press the RESET key, <F10>, then correct the entry.
X ☉ NUM	IRMA Graphics does not allow non-numeric characters in a numeric field.	Press the RESET key, <F10>, then enter numeric data or move to another field.

(continued)

Do Not Enter Messages (cont.)

Symbol	Meaning	Corrective Action
X 𠄎 #?	The operation you attempted requires a number different from the number you entered. IRMA Graphics displays this message when you enter an invalid printer ID or printer class.	Press the RESET key, <F10>, to unlock the keyboard.
X-S	The last key you pressed is not recognized by the IRMA Graphics emulator.	Press the RESET key <F10>, to unlock your keyboard.
X □ ← 𠄎	The control operator sent a message that was received and rejected.	Press RESET, <F10>, to unlock the keyboard.
X-f	The last function attempted is not available or is not appropriate at this time.	Press RESET, <F10>, to unlock the keyboard.

(continued)

Do Not Enter Messages

Symbol	Meaning	Corrective Action
X  2%	Either the keyboard type you selected is not supported through your controller or the controller is not configured for this feature.	See Appendix G for controller configuration notes.
X  X	You attempted to perform an unauthorized printer-related function.	Press RESET, <F10>, unlock the keyboard.
X  nn	Hardware errors occurred that were internal to the 3274, and the 3274 could not recover.	Press RESET, <F10>, and retry your operation. If the same error recurs, note the three-digit error code and report the problem to DCA Customer Support.
X +z__nnn	Communications error number nn or nnn occurred.	Press RESET, <F10>, to unlock the keyboard. If the error persists, refer to the "IBM Problem Determination Guide" to select the appropriate action.

(continued)

Do Not Enter Messages (cont.)

Symbol	Meaning	Corrective Action
X PROG nnn	Program error nn	Press RESET, <F10>, to unlock the keyboard.
X 	The requested printer is not working. It may be out of order, unplugged, or out of paper.	<ul style="list-style-type: none"> o Check the printer; solve the problem. o To restore keyboard operation, press the DEV CNCL key, <Shft><F10>. o The printer message area of the status line displays the status of the job being printed when the printer failed.
X 	The selected printer is busy and cannot perform the print operation you requested.	You can wait until the printer is not busy or press the DEV CNCL function key, <Shift><F10> to unlock the keyboard.

(continued)

Do Not Enter Messages (cont.)

Symbol	Meaning	Corrective Action
X □ □ ● ●	The requested printer is busy and cannot perform your print job at this time. This message indicates a longer waiting period than the "printer busy" message.	You can wait until printer is not busy, or you can press the DEV CNCL function key, <Shft><F10>, to unlock the keyboard.

Reminder Messages

Reminder messages display in columns 21 - 27 of the status line and indicate the status of the communication line between the PC and the host. The list below describes the reminder messages that may occur.

Symbol	Meaning
Link Error	The link between the host and your control unit produced error <i>nn</i> or <i>nnn</i> . This message remains set until the control unit detects that the error condition has been cleared.
	Ignore this message. It is reserved for future use.

Program Symbol Set Messages

The program symbol set determines the symbol set used by the terminal. The program symbol set you select appears in columns 31 - 34 on the status line. Status messages include the following:

Symbol	Meaning
PSA-PSF	Program symbol sets PSA, PSB, PSC, PSD, PSE, and PSF are active.
SO	Base symbol set.

Status messages that display for the program symbol set may be followed by blank characters or other symbols. A blank character indicates that the program symbol set cannot be changed. If any other character or symbol follows the status message, you may select other symbol sets.

Shift and Mode Messages

Shift and mode messages appear in columns 36-44 and indicate the current mode of operation. The following table describes these messages.

Symbol	Meaning	Corrective Action
^	The keyboard is in insert mode, so new text is inserted at the cursor position, and exiting text moves to the right.	To cancel this mode, and use replace mode, press RESET, <F10>. (Replace mode specifies that new text types over existing text.)

(continued)

Shift and Mode Messages (cont.)

Symbol	Meaning	Corrective Action
	The caps lock key has been pressed, so all letters that you type appear in upper-case.	Press the caps lock key again to release this mode.
APL	The APL keyboard is active and IRMA Graphics is configured for the default keyboard.	To switch APL mode OFF press the APL On/Off function key, <Alt> <Backspace>.
NUM	The cursor is in a numeric field.	Type only numeric data in this field. If you type letters or symbols the keyboard locks. Press RESET, <F10>, then type numbers, or move to another field.

Highlighting Messages

Highlighting messages display in columns 46 and 47 of the status line and indicate the mode of highlighting that is currently active. Highlighting may display in reverse video, as blinking characters, or as underscored characters.

Symbol	Meaning
Blink a	The next character you enter will display in blinking mode.
Reverse Video a	The next character you enter will display in the reverse color. For example, if the character currently displays in red and the background is black, the next character will display in black and its background will be red.
Underscore a	The next character you type will be underlined.

Color Indicator

The color indicator displays as a colored block or a blue zero in columns 49 and 50 of the status line. The colored block indicates the display color of the next character you enter. The blue zero indicates that the default display color (green or white) will be used to display the next character you type.

To change the color indicator and the color of text to be entered, refer to 'Attribute Select Keys' in this appendix.

Printer Status Messages

Printer status messages display in columns 60 through 64 of the status line and indicate printer selection, assignment, operation, and failure. Following is a description of the messages with corrective action where appropriate.

Printer Status Messages (cont.)

Symbol	Meaning	Corrective Action
	You pressed the IDENT function key to assign a new printer, and the emulator is waiting for you to enter the printer number.	Type the two-digit printer ID and press <Enter>.
	Shows which printers you are authorized to use. Printer numbers 01-31 are individual printers and numbers 70-85 are classes of printers.	If no number displays in the printer status area, you are not authorized to use a printer.
	The printer is currently printing your job.	
	The printer failed while printing your job. It may be out of order, or it may be out of paper.	<ul style="list-style-type: none"> o Press the DEV CNCL function key, <Shft><F10>, to unlock the keyboard. o Fix the printer. o Restart the print operation.

(continued)

Printer Status Messages (cont.)

Symbol	Meaning	Corrective Action
□-□ ??	Your printer assignment has changed.	Press the IDENT function key, <Alt><F7>, to display your new printer assignment.

Resident Mode Indicator

An **R** in column 75 of the status line indicates that the IRMA Graphics emulator is running in resident mode. The **R** is an IRMA Graphics program message and not a 3279 terminal function.

Appendix C

Error Messages

Introduction

This appendix lists the error messages that may occur while you are using IRMA 3279 Graphics. Descriptions of the messages and instructions for correcting a message are included. All error messages display in the following format:

> > > ERROR [000] : TEXT

Indicates a problem has occurred. _____

Three digit error code number. _____

Explanation of the problem. _____

Correcting Errors

To clear an error message, first press the <Esc> key to let the emulator know that you are aware of the message. Then try to correct the error using the instructions in the following tables. If you cannot correct a problem, or if any problem persists, write the message on paper exactly as it appears on your screen, then contact DCA Customer Support. In Georgia, call 1-404-442-4470. Out of the state of Georgia, call 1-800-631-4171.

Error Code	Error Name	Meaning	Cause	Corrective Action
001	GRAPH Malfunction	IRMA 3279 Graphics hardware failure		Turn off the power to your PC for five seconds, then turn the power on and run the GRAPH program again.
002	Missing Graph file	An IRMA 3279 Graphics file is missing.		Make sure that your working IRMA 3279 Graphics diskette contains all the files shipped on the original distribution diskette. If a file is missing, copy the appropriate file(s) to the working disk from which you run the IRMA 3279 Graphics programs.
003, 004	Graph File Corrupted	The GRAPH file on your diskette cannot be accessed.	You possibly have a diskette failure or a PC system malfunction or perhaps a file was copied onto the GRAPH file by mistake.	Copy the GRAPH.EXE file from the IRMA 3279 Graphics distribution diskette onto the disk you use to run IRMA 3279 Graphics. Then try running the GRAPH program again.

(continued)

Error Code	Error Name	Meaning	Cause	Corrective Action
005	GRAPH	See error message 001.		
006	Graph Board Not Plugged In	The IRMA 3279 Graphics software could not find the IRMA Graphics hardware.	Usually this message indicates that the graph board was not plugged in correctly during installation, but it can also signal a failure on the graph board.	Remove the board and re-insert it. Check all connections. Then run the GRAPH program again.
007	Unknown Command		You entered a command key that the IRMA 3279 Graphics emulator did not recognize.	Enter another command.
008	File Cannot Be Opened	The file you entered during the file capture sequence cannot be accessed.	Possible reasons are diskette failure, unformatted floppy diskette, PC disk drive failure, diskette full, or diskette write-protected.	Try another diskette.

(continued)

Error Code	Error Name	Meaning	Cause	Corrective Action
009	Start-Of-Day Diagnostics Failure	This message indicates a download problem.		Contact DCA Customer Support. In Georgia, call 1-404-442-4470. Outside Georgia, call 1-800-631-4171.
010	No Programmed Symbols font.			See error code 002.
011	Programmed Symbols Option Not Installed.		You tried to run the IRMA 3279 Graphics software when the IRMA 3279 Graphics hardware was installed improperly or not installed at all.	If you have not installed the hardware, do so following the instructions in Chapter 2. If you have installed the hardware, make sure that it is properly installed (see Chapter 2). Run the CHKBD program in Appendix E to check the installation.
012	Corrupt Recall File	The file you tried to recall does not fit in the IRMA Graphics format.	The file could have been written over or corrupted in some other way.	Capture the screen display again.

(continued)

Error Code	Error Name	Meaning	Cause	Corrective Action
013	Printer File Cannot Be Opened	You tried to do a screen print, and IRMA Graphics could not find the specified printer.		<ul style="list-style-type: none">o Check to see that the printer is plugged in properly.o If you have not attached the printer, attach it.o Check the printer configuration to see that it agrees with the location of the printer.

Appendix D

Glossary

ASCII

American Standard Code for Information Interchange, the data coding used by most PC operating systems and programs.

Boot

Load the PC operating system, such as DOS. To boot the PC, put the DOS software (or any diskette formatted with DOS) into the default disk drive and turn on the PC. You must boot the PC with DOS before you can run any other programs.

bps (bits per second)

A method of measuring the transmission rate of a channel. BPS measures the number of bits that pass a given point in a one-second period.

Character set

Symbols that represent the characters that constitute a language.

Configuration

The values and arrangement of the characteristics of the personal computer, printer, keyboard, display, and host computer.

Cursor

A one-character block or underline that indicates your position on the screen.

Default

A condition, value, or setting that is used automatically unless you specify another condition, value, or setting.

DOS (Disk Operating System)

A group of programs that the computer uses with disks or diskettes that determines how the system reads, writes, and organizes information.

Display

The PC monitor when used to run a session in emulation.

Drive designator

A single alphabetic character that names a diskette drive, a hard disk drive, or a logical drive. It is followed by a colon; for example, A:.

EBCDIC

Expanded Binary Coded Decimal Interchange Code, the data code used to represent 256 unique letters, numbers, and other characters used by IBM host computers.

Emulator

A computer system or component that functions like another computer system or component. GRAPH.EXE is the IRMA 3279 Graphics emulator which lets your PC function as a 3279 graphics terminal.

Extension

A filename suffix made up of a period followed by one to three characters. Blank spaces are not allowed in filename extensions.

Field

A defined position in a program that contains information entered by the user or generated by the program. Fields can be protected (they only display information) or unprotected (you can enter information in them).

File

A collection of data that the personal computer treats as a single unit. Each file has a unique filename to identify it.

File specification

Indicates the name and location of file. It can include a drive designator, a directory path, a filename, and an extension.

Host Computer

The primary or controlling computer whose operating system and applications you can use when you enter emulation.

Hot Key

The <Shft><Shft> key combination on the PC keyboard. In emulation, the Hot Key switches between a host session and DOS.

Keyboard Profile

A file containing key definitions created with the KYBEDIT program described in Chapter 7. A keyboard profile has a .KYB extension.

Macro File

A file containing key definitions created with the <Alt><+> procedure described in Chapter 6. A key macro file has a .KMC extension.

Network

A communication system that sends and receives data over a cable. It can contain a host operating system, terminals, printers, and other devices in one or more locations.

Programmed Symbol Sets

User definable character sets which may represent characters or graphics and may be altered by host application software.

Session

A logical connection with the host computer. The session begins when you log on to the host, and ends when you log off.

Status Line

The line on your display screen that reports the status of the communications system, the system connection, keyboard, printer, numeric mode, cursor, communications link, and error conditions.

Terminal

A hardware device, such as a monitor-keyboard combination, that gives a user access to a host computer. IRMA 3279 Graphics lets your PC function as a 3279 S3G graphics terminal.

Appendix E

Diagnostics

Introduction

The CHKBD program described in this appendix lets you check the accuracy of your hardware installation. The first part of this program tests the emulator board, while the second part of the program checks the graphics board and display characteristics. If you are using the upgrade, the first part of the program tests the IRMA emulator board.

CHKBD Command Options

Before you start the CHKBD program, look at the help menu to get an idea of the kinds of tests CHKBD runs and the options you can use with the CHKBD. To view the help menu, boot your PC with DOS, following your usual procedure. With the working copy of IRMA Graphics in the default drive and directory, type the command:

CHKBD -? <Enter>

The following screen displays, listing the options you can use in the CHKBD command line:

Appendix E - Diagnostics

DIGITAL COMMUNICATIONS ASSOCIATES
IRMA 3279 GRAPHICS UPGRADE INSTALLATION TEST
VERSION 2.06 02/28/86
INSTALLATION TEST OPTIONS

```
-axxx  --- address  -- define xxx as base address
-v      --- verbose  -- expanded error reporting
-c      --- continue -- continue test on error
-r      --- repeat   -- loop on selected tests
-txx    --- test     -- xx selects Coax Board tests
-gxx    --- graph    -- xx selects Graph Board tests

-t for all tests, or select tests by bits set in -txx:
01 - 10 - Display Ram
02 - Download Ram          20 - Coax Loopback
04 - Download 8x305 File   40 - Controller Detect
08 - Read/Write Registers

-g for all tests, or select tests by bits set in -gxx:
01 - Download Graph File  10 - Cursor Test
02 - CRTC Test
04 - PS Ram Test
08 - Color Video Test
```

B>

These options let you customize the installation diagnostic program to fit your particular needs. Any option can be entered in the format:

CHKBD -X <Enter>

"-X" is one of the options listed on the help menu. These options are described in detail in the following table.

CHKBD Command Options

Command Options	Description
-? test	The test and -? options display the available test options described in this table. Command format: CHKBD -? <Enter>
- <i>xxx</i>	Specifies the address of the board you want to test. Insert the address in place of <i>xxx</i> . Command format: CHKBD -<i>xxx</i>
-v	Prints all known data for the option in the event of a failure. Command format: CHKBD -v
-c	Continues to run the installation test even after the program detects an error. Command format: CHKBD -c
-r	Repeats the entire test continuously until you terminate it by pressing any key (which returns control to DOS). Use this option to help track down an intermittent hardware problem. Command format: CHKBD -r

CHKBD Command Options (*continued*)

Command Options	Description
-gxx	<p>Specifies the number of the graphics board test you want to run. The tests are as follows:</p> <ul style="list-style-type: none">01 - Download Graph file02 - CRTC Test04 - PS Ram Test08 - Color Video Test10 - Cursor test <p>Insert the test number in place of <i>xx</i>, e.g. -g04.</p> <p>Command format: CHKBD -g01</p>
-txx	<p>Specifies the number of a particular emulator board test that you want to run. The tests are as follows:</p> <ul style="list-style-type: none">02 - Download Ram04 - Download 8x305 file08 - Read/Write registers10 - Display Ram20 - Coax Loopback40 - Controller Detect <p>Insert the test number in place of <i>xx</i>, e.g. -t04.</p> <p>Command format: CHKBD -t04</p>

Starting CHKBD

To start the CHKBD program, execute the CHKBD command at the DOS prompt, including any options. A screen displays with the title of the test and the options to be tested. The program then begins to test the emulator board.

```
DIGITAL COMMUNICATIONS ASSOCIATES  
GRAPH INSTALLATION TEST  
VERSION 2.07a 05/22/86
```

```
**** Find Board Address    << Add = 280 >>  
Download RAM 160         << **Testing** >>  
Download 8x305 file  
Read/Write Registers  
Display Ram  
Coax Loopback  
Controller Detect
```

As each item is tested, the <<***Testing***>> prompt displays to the right. If no error is detected with that item, the prompt, <<---OK--->> replaces the testing prompt. If an error is detected, an error number appears beside the item that failed, testing terminates, and an error message displays at the bottom of the screen. You must refer to the error message section in this chapter to correct the error, then restart the program. (Note that you can include the [-c] option with the CHKBD command to continue testing after an error is found.)

Emulator (Coax) Board Tests

The first part of the CHKBD program runs the following tests on the emulator board.

Download RAM Test

Tests the data path from the 8088 to the download RAM bank, download RAMs, and increment address circuitry.

Download of 8X305 File

Tests the data path to the RAMS. RAM integrity as a 16-bit checksum value is checked by the 8088 for the downloaded data. It tests the data path between the RAMS and the 8X305.

Read/Write Register Test

Tests the communications path from the PC to the 8X305 and back. It also checks the IV Bus lines for independence and the IV Bus decoding.

Display RAM Test

Tests the data path from the IV Bus to the display RAMS. It also tests the display RAMs and parity error checking hardware (error reset hardware).

Coax Loopback Test

Tests the data path to the transmitter and receiver, and the transmitter status bits. It also checks the receiver status bits, the transmit-receive data path, all possible data transmitted and received in loopback mode for contiguous and noncontiguous transmission, parity detection circuitry, and error checking circuitry by forcing errors.

Controller Detect Test

Checks to determine whether an active coax line is connected from the controller to the emulator board and issues a message if one is not connected.

Graphics Board Tests

If the emulator board test completes without an error, CHKBD automatically starts testing the graphics board. The test title and a list of items to be tested display on the screen similar to the following:

```
DIGITAL COMMUNICATIONS ASSOCIATES      Model GRAPH Rev 1
  GRAPH INSTALLATION TEST              SN 00103, C1C 01
  VERSION 2.07A 05/22/86                MFG DATE: 04/18/86
```

```
Find Board Address    << Add = 280 >>
Download Ram 7f0      <<-----OK----->>
Download 8x305 File
Read/Write Registers
Display Ram 003
Coax Loopback
Controller Detect
```

Graph Board Test

```
Download Graph File
CRC Test
PS Ram Test
Color Video Test
Cursor Test
```

Installation Diagnostics Pass.

Please connect an active coax cable to the board and proceed with normal use.

The graphics board test displays several screens that let you evaluate graphic attributes and cursor types. The tests that check the graphics hardware are as follows:

Download of Graph File

The 8X305 file containing the executable PS tests is loaded into RAM and started. The load module used is not the same as the module used for the emulator board tests.

CRTC Test

Tests the CRTC by loading different CRT timing parameters and monitoring the video enable/disable bit.

PS RAM Test

Tests the programmed symbols' RAM. Checks the IV Bus pathways on the graphics board, as well as the right bank decoding, mask registers, and PS RAM.

Color Video Test

Loads the character fonts into PS RAM from the file "GRAPH.FNT" and displays several screens for user inspection. Screens contain display attributes and character fonts, as well as attribute wrap and field attribute propagation (see the next section of this guide, entitled, 'Color Video Test').

Cursor Test

Tests the cursor display, cursor modes, and cursor addressing with respect to the screen (see the next section, 'Color Video Test').

NOTE: If you are using the graphics upgrade board with IRMA, and the top connector for the boards is not properly installed, you may get the following message:

IRMA 3279 Graphics option not installed

If this occurs, refer to the installation instructions in Chapter 1 and check the installation of the boards.

Color Video Test

The color video test presents the four-color field attribute display and the seven-color extended field attribute display test screens. When IRMA 3279 Graphics is properly installed, test screens display the attributes listed below. Press any key to hold a screen for viewing. To resume testing, press <Enter>. Screens are described from top to bottom and from left to right.

The four-color field attribute screen displays the following:

- o The ROS and APL character sets in green
- o The status line symbols in green
- o All labels in red
- o The words "green," "blue," "red," and "white" in their respective colors
- o A line and status symbols in blue below the thirty-second line

The seven-color extended field attributes screen displays the following:

- o Rectangles in each of the extended colors: blue, red, pink, green, turquoise, yellow, and white
- o A list of the extended attributes in yellow

- o Beside the attribute list, a field containing each of the extended colors, demonstrating the attribute (i.e. beside "blinking," the name of each color flashing on and off)
- o Attribute wrap, demonstrating how each attribute extends from the end of one line to the line below it. All extended colors are used in the display, showing wrap characteristics twice. For example, "Reverse" is displayed once in white and once in pink.

Cursor Test

The cursor test checks the four types of cursors available when IRMA 3279 Graphics is properly installed. Each type of cursor is used to draw the following:

- o Non-blinking underline, red chevron pattern
- o Blinking underline, blue chevron pattern
- o Non-blinking block, turquoise chevron pattern
- o Blinking block, pink chevron pattern, which continues to blink until the test is complete

NOTE: If the test is interrupted, press <Enter> to resume testing.

Installation Error Messages

When an error occurs during the CHKBD test, testing terminates (unless you used the [-c] option with the CHKBD command), and an error message appears at the bottom of the screen. The error message contains an error number, which identifies a specific failure point, and an error type, which

address for another board in the PC, or when the IRMA Graphics boards are not properly seated in the expansion slot. Check the JP1 and JP2 jumpers that determine the base address, then remove the IRMA Graphics hardware and re-insert it, making sure that the boards are properly seated and the top connector is secure if you are attaching your IRMA board to the graphics upgrade board. If the same error occurs again, try a different expansion slot.

Error Type 204 PROBABLY A MORTAL FAILURE

This error message usually indicates a problem with the emulator board. Make sure that the cable that connects the emulator board and the graphics board is securely connected to both boards. If the same error occurs again, run the CHKBD program and use the -txx option to check the emulator board (see 'CHKBD Command Options').

Error Type 205 PROBABLY A MORTAL FAILURE

Indicates that either a software error or a PC hardware failure that IRMA Graphics cannot identify has occurred. Contact DCA Customer Support.

Error Type 206 PROBABLY A MORTAL FAILURE GRAPH BOARD

This error message usually indicates a faulty IRMA Graphics board, although it can also indicate a software problem. If the problem persists, report the failure to DCA Customer Support.

Appendix F

Advanced Utilities

Introduction

This appendix explains how to use the advanced features of the GraphPac program to remap 3270 key assignments on the PC keyboard. (If you have previously used KYBDEDIT to remap your keyboard, you should continue to do so.) Because KYBDEDIT and this GraphPac option can radically alter your keyboard, possibly making some keys unrecognizable, both functions should be implemented only by programmers or experienced users. Most keyboard changes can be made satisfactorily with the <Alt><+> procedure described in Chapter 6.

The key remapping utility is the second option on the keyboard configuration menu. Four general steps are required to change a key:

- 1) Start GraphPac.
- 2) Select the keyboard remapping option.
- 3) Choose the 3279 function key.
- 4) Specify whether to add (assign) or delete the 3279 function.
- 5) Select the PC key where you will add or delete the 3279 function.

These steps are described in detail in the following section.

Remapping 3279 Key Assignments

The following steps explain how to add or delete a 3279 function from the PC keyboard.

STEP 1: Start GraphPac by typing the following command at the DOS prompt:

GP <Enter>

STEP 2: Select the keyboard remapping option.

A) From the GraphPac main menu, select "Configure Keyboard" by typing 2 and pressing <Enter>. The following menu displays:

CONFIG-KEYBOARD

-GraphPac-
IRMA 3279 Graphics
(c) 1986 Digital Communications Associates, Inc.

- 1 - Configure Keyboard Type
- 2 - Configure Keyboard Mapping
- _ - Select One

ESC - Previous Menu ENTER - Process Selection TAB - Next Field

B) From this menu, select "Configure Keyboard Mapping" by typing 2 and pressing <Enter>. A 3279 keyboard outline displays.

The 3279 keyboard on your screen places a number over each 3279 key location. These numbers are used to reference the underlying 3279 key. The

Appendix F - Advanced Utilities

following page shows an actual Attribute Select Typewriter/APL keyboard with these numbers printed in purple above each key.

NOTE: If you are using one of the other keyboards emulated by IRMA Graphics, see the *IBM 3270 Information Display System Character Set Reference, GA27-2837-6* for the keyboard layout. Then reference those keys with the numbered layout on the screen or on the next page.

STEP 2: Choose the 3279 function key.

- A) From the previous page, select the 3279 key that you want to configure. The purple number is the reference number.
- B) If the 3279 key is in a normal (unshifted) position, type the reference number and press <Enter>.
- C) If the key is in another position, type "s" before the key number for a shifted key (i.e. s52). Type "a" before the key number for an alternate (Alt) position (i.e. a30).

After you enter the 3279 key reference number, the following prompt displays:

The 3279 key selected is ENTER (76) and it is configurable.

Is this the correct key ([y]/n)?

If you pressed a key by accident, type "n" and press <Enter> to avoid changing the key. The previous prompt returns, and you can select another 3279 key to configure.

If the key name displayed is the correct one, simply press <Enter>. A numbered PC keyboard outline displays with a prompt.

STEP 3: Specify whether to add or delete the 3279 function.

Appendix F - Advanced Utilities

The prompt that displays with the numbered PC keyboard reads similar to the following:

Space (57), Shift Space (Shift 57),

There are 2 existing configurations for the key selected.

Select the update desired.

Enter '[a]' for ADD, 'd' for DELETE, 'n' for NO CHANGE.

The first line gives the PC keys that function as the 3279 key you entered in STEP 2. The second line confirms that the configuration exists. The third line prompts you for action. The fourth line lists what you can do with the 3279 function. You can do the following:

- A) Press <Enter> if you want to add the 3279 function to an additional PC key.
- B) Press <d>, then press <Enter> to delete the 3279 function from a PC key.
- C) Press <n>, then press <Enter> to make no changes to the existing key assignments.

After you perform one of the options above, the screen prompt reads:

Select the PC key to be configured.

Prefix the key number with "A" for ALT, "C" for CTRL, and "S" for SHIFT.

STEP 4: Select the PC key where you will add or delete the 3279 function.

The following page shows the PC keyboard with the reference numbers in purple print.

Appendix F - Advanced Utilities

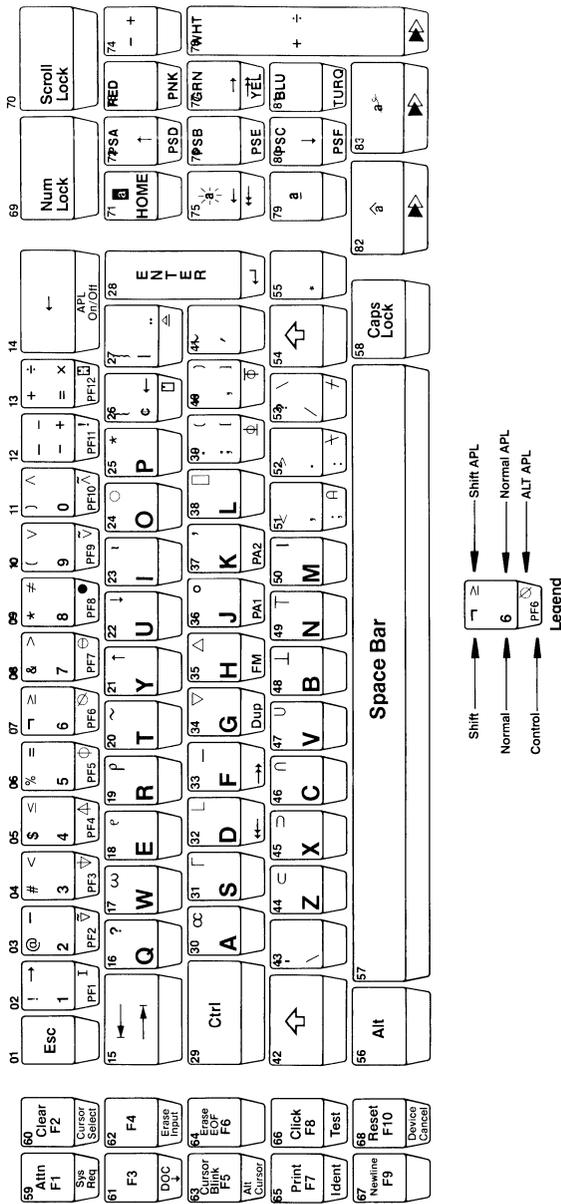


Figure F-2: PC Keyboard with Position Numbers

Appendix F - Advanced Utilities

- A) From the previous page, select the PC key that will function as the 3279 key. The purple number above the key is the reference number.
- B) If the PC key is in the unshifted position, type the reference number and press <Enter>.
- C) If the PC key is in another position, precede the number with a for Alt, c for Ctrl, or s for shift.
- D) If you are deleting a 3279 function from the PC key, GraphPac will prompt you to confirm that you want to delete the function.
- E) If the PC key you select is already being used for a 3279 function, GraphPac tells you so and gives you the option to reassign the key or to leave it as it is. If you do not reassign this key, GraphPac lets you select another PC key.

After you complete step 4, GraphPac displays the following prompt:

Do you wish to configure another key? ([y]/n)?

Press <Enter> to configure another key. Press <n> and <Enter> to exit the keyboard remapping option.

Appendix G

Controller and Mainframe Configuration

Introduction

This appendix is provided only as a reference for the System Programmer to use when configuring the mainframe computer and the controller for use with IRMA 3279 Graphics. This appendix should be ignored by the IRMA 3279 Graphics user.

SCP I/O Generation Parameters

The configuration that the system programmer uses at the mainframe depends upon the operating system used. The following table gives the configuration for controllers operating under VM/CMS and MVS/TSO.

Table G-1: SCP I/O Generation Parameters

Protocol Environment	Operating System	
	VM	MVS
LOCAL 3274 NON-SNA	DEVTYPE=3279 MODEL=3	UNIT=3279 MODEL=3
LOCAL 3274 SNA	DEVTYPE=3705 MODEL=E8 ADAPTER=TYPE4	UNIT=3791L
REMOTE 3274 NON-SNA	DEVTYPE=2703 CLUSTER=3274 TERM=3279 MODEL=3	UNIT=3279 MODEL=3
REMOTE 3274 SNA	DEVTYPE=3705 MODEL=E8 ADAPTER=TYPE4	UNIT=3791L

VTAM Generation Parameters

The VTAM generation parameters are shown in Tables G-2 and Table G-3.

Table G-2: VTAM Generation Parameters

NON-SNA Terminal	MODETAB=M32783 DLOGMOD=M32783B
SNA Terminal	MODETAB=M32783 DLOGMOD=M32783S

Table G-3: VTAM Generation Parameters

<p>LOCAL NON-SNA</p> <p>S1ABC123 LOCAL</p>	<p>CUADDR=123, TERM=3277, DLOGMOD=M32783B, FEATUR2=MODEL2, ISTATUS=ACTIVE, MODETAB=M32783, USSTAB=USSEAB</p>	<p>CU address 3270 type display terminal IBM non-SNA mode table Model 2 display - 24 x 80 Initial status active IBM mode table Graphics USS table</p>
<p>LOCAL SNA</p> <p>S1XYZ122</p>	<p>LOCADDR=02, DLOGMOD=M32783S, MODETAB=M32783, USSTAB=USSSNA</p>	<p>Controller port address IBM SNA mode table IBM mode table SNA Graphics USS table</p>
<p>REMOTE SNA</p> <p>S1XYZ348 LU</p>	<p>LOCADDR=08, ISTATUS=ACTIVE, DLOGMOD=M32783S, MODETAB=M32783, PACING=0, VPACING=0</p>	<p>Controller port address Initial status active IBM SNA mode table IBM mode table</p>

Mode Tables Using IBM Default Parameters

Following are mode tables that use the IBM default parameters.

Table G-4: Mode Tables (IBM Default Parameters)

<p>NON-SNA</p> <p>M32783B MODEENT</p>	<p>LOGMODE=M32783B, FMPROF=X'02', TSPROF=X'02', PRIPROT=X'71', SECPROT=X'40', COMPROT=X'2000', PSERVIC=X'008000000000185020507F00'</p>
<p>SNA</p> <p>M32783S MODEENT</p>	<p>LOGMODE=M32783S, FMPROF=X'03', TSPROF=X'03', PRIPROT=X'B1', SECPROT=X'90', (see Note 1) COMPROT=X'3080', RUSIZE=X'88C7', PSERVIC=X'028000000000185020507F00' (see Note 2)</p>
<p>Notes:</p> <ol style="list-style-type: none"> 1. SECPROT = X'90' for MVS and VM environments = X'A0' for VCNA environments 2. PSERVIC = X'..80...' for MVS and VM environments = X'..C0...' for VCNA environments (This value works properly even though it conflicts with VCNA documentation on valid queriable device values.) 	

Appendix G - Controller and Mainframe Configuration

The PSERVIC parameter controls a variety of terminal characteristics. For further information, consult the following manuals:

IBM GDDM Installation and System Management Guide, SC33-0152 (Appendix E)

VTAM Version 3 Releases 1 and 1.1 Programming, SC23-0115

Appendix H

AT&T Installation Guide

Introduction

This appendix shows how to install the IRMA 3279 Graphics hardware and the upgrade hardware in your AT&T 6300 computer. These instructions differ slightly from those provided in Chapter 2 for installing the hardware in an IBM personal computer.

NOTE: Be sure to select the AT&T 6300 monitor from the CONFIG-VIDEO-MONITOR when running GraphPac. See Chapter 2 for instructions on using GraphPac.

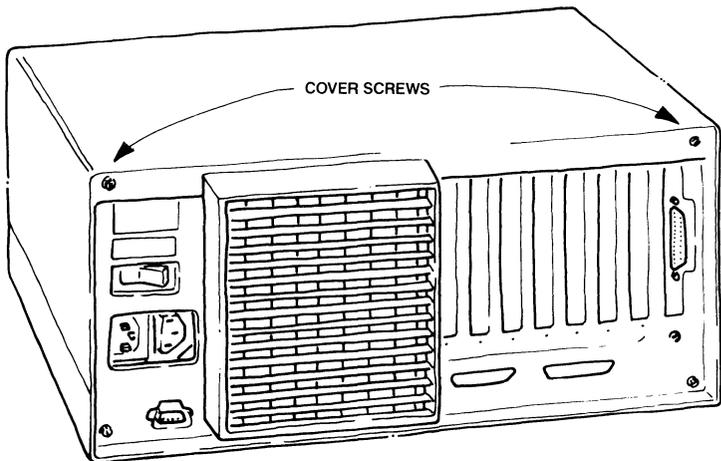
Installing the Hardware

Included with your package are two short video cables. Take these cables out of your package along with the IRMA 3279 Graphics hardware and follow the steps below. (If you are installing the graphics upgrade to IRMA, follow steps 1 through 7, then complete the instructions in the next section.)

- STEP 1:** Set the jumpers on the board following the instructions provided on pages 1-5 through 1-7 of the user's guide.
- STEP 2:** Turn the PC power off and disconnect the power cord from the wall's electrical outlet.

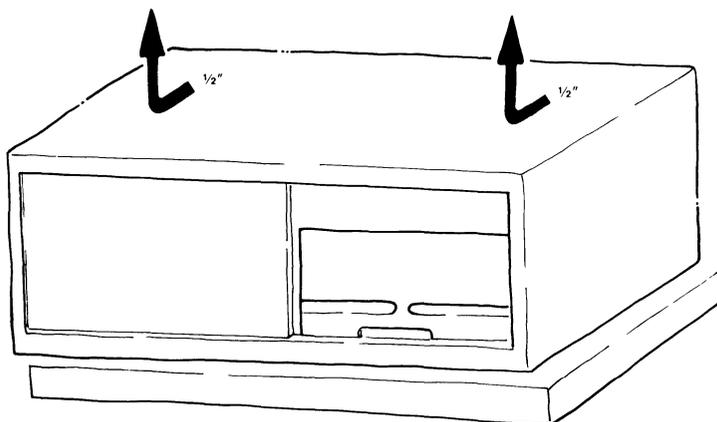
Appendix H - AT&T Installation Guide

- STEP 3: Turn off all externally attached devices such as printers, modems, etc. Remove any remaining power cords from the electrical outlet on the wall.
- STEP 4: Remove all cables from the back of the system unit, noting the location of each cable.
- STEP 5: Set the display monitor next to the system unit.
- STEP 6: Remove the top two cover screws from the outside rear panel, as shown in the following diagram.



Appendix H - AT&T Installation Guide

- STEP 7: Carefully slide the cover forward about half an inch, then lift it up and remove it as shown in the following diagram. Set the cover aside.

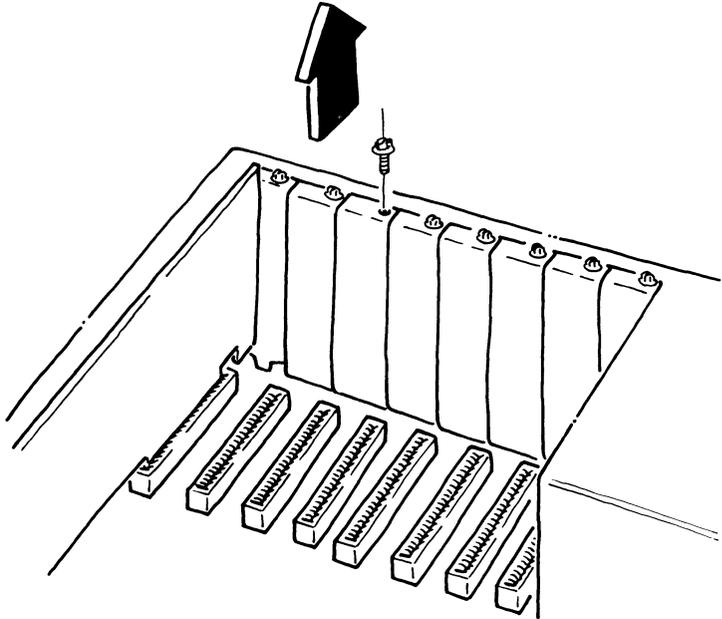


If you are using the upgrade, skip to the next section entitled, "Installing the Upgrade."

- STEP 8: Choose the expansion slot where you will install the IRMA 3279 Graphics board. To promote cooling, leave at least one slot between IRMA 3279 Graphics and the AT&T display adapter.

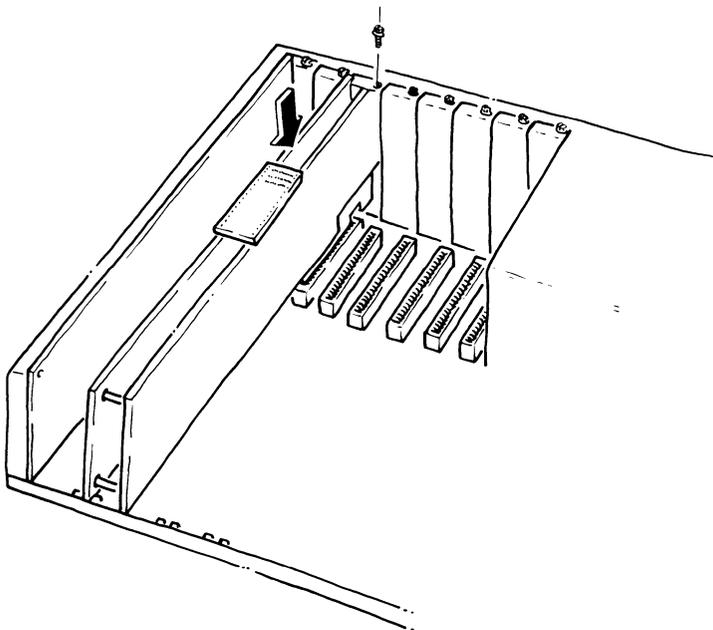
Appendix H - AT&T Installation Guide

- STEP 9: If you haven't already done so, remove the expansion slot covers and screws. Save the screws for later use.



- STEP 10: Insert the IRMA 3279 Graphics board into the expansion slot with the sockets of the board projecting out of the back of the system unit.

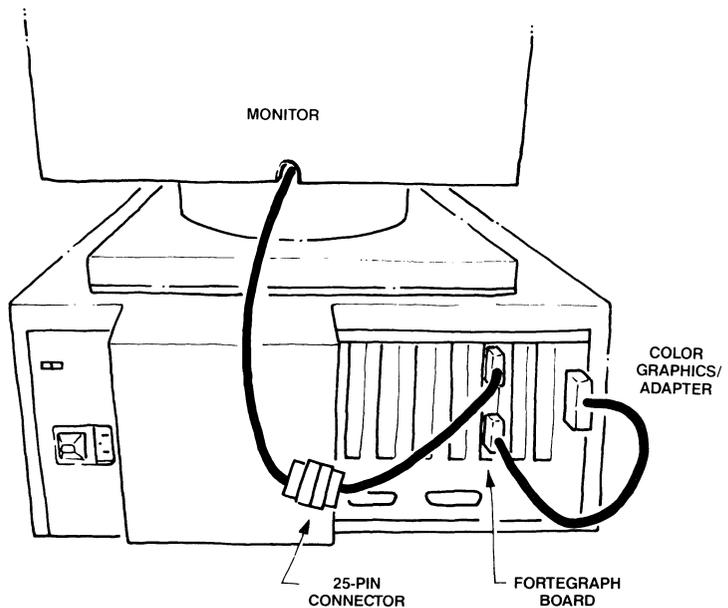
- STEP 11:** Push the opposite end of the board into the white plastic guides at the base of the expansion slot. Press down on the board until it is well-seated in the slot. Secure the board with the screw you removed in STEP 9.



- STEP 12:** Replace the computer cover by reversing the procedures outlined in STEPs 6 and 7.
- STEP 13:** Connect the coax cable (not provided) from your communications controller to the round socket (BNC connector) at the bottom of the IRMA 3279 Graphics board. Rotate the connector on the cable until it locks into place on the board.

STEP 14: To connect the IRMA 3279 Graphics board (or upgrade) and the AT&T display adapter, use one of the short cables supplied with your package. Insert the 25-pin end of the cable into the 25-pin socket on the AT&T display adapter. Insert the 9-pin end of this cable into the bottom 9-pin socket on the IRMA 3279 Graphics board. See the diagram below.

STEP 15: Use the other short cable to connect the IRMA 3279 Graphics board with the AT&T monitor. Insert the 9-pin end into the top 9-pin socket on the IRMA 3279 Graphics board. Connect the 25-pin end with the 25-pin connector on the cable from the AT&T monitor. See the following diagram.



- STEP 16: Reconnect all cables, including the power cord, plug the necessary cords into electrical outlets, and boot your computer with DOS.
- STEP 17: Run the installation diagnostic test described in Appendix E of the user's guide.

Installing the Upgrade

After finishing steps 1 through 7 in the previous section, perform the following steps to complete the IRMA Graphics upgrade installation. While you can install the graphics upgrade board and the IRMA board in any of the slots in the AT&T computer, we recommend that you install the graphics upgrade board next to the display adapter and position IRMA in the adjacent slot.

- STEP 8: Choose the expansion slot where you will install the upgrade hardware. Fit the pins of the board into the white plastic guides at the base of the expansion slot and press firmly.
- STEP 9: Replace the IRMA board beside the graphics upgrade board.
- STEP 10: Replace the retaining screws that secure the boards to the PC frame.
- STEP 11: Connect the graphics board to IRMA, positioning the 60-pin connector over the edge connector at the top of the IRMA board. Push down on the connector so that it is mounted securely on the IRMA board.

Appendix H - AT&T Installation Guide

- STEP 12: Replace the system unit cover by reversing the instructions in STEPS 6 and 7 of the previous section.
- STEP 13: Connect the coax cable to your IRMA board.
- STEP 14: Complete the installation by following steps 14 through 17 in the previous section.

Customer Support Information

Introduction

Digital Communications Associates, Inc. makes every effort to ensure that the product you have purchased is of excellent quality in all respects. All hardware and software products have been tested and subjected to strict quality control procedures. User's guides are designed and written to provide you with complete and accurate instructions on how to use your DCA product. You are encouraged to comment on the IRMA 3279 Graphics User's Guide by filling out and sending in the customer response form included in this section.

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This section provides instructions on returning hardware units to DCA for repair or replacement.

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IRMA 3279 Graphics	
Hardware Serial Number	_____
Software Version Number	_____
Date of Purchase	_____
Place of Purchase	_____

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Warranty repairs will be performed at the DCA manufacturing facility or DCA designated repair facility. Purchaser should first contact a Service Representative at DCA to arrange for warranty service. Equipment for warranty service should then be returned postpaid to DCA and be accompanied by proof of purchase and a written description of the defect. Upon repair or replacement the equipment will be redelivered by DCA freight prepaid to the Purchaser.

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Replacement diskettes will be shipped to Purchaser by a method of DCA's choosing to any United States destination. If Purchaser desires a specific form of conveyance, or is located outside the USA, Purchaser must bear the cost of shipment.

The Purchaser's sale and exclusive remedy in the event of a defect is expressly limited to replacement of the diskette. Purchaser shall be solely responsible for the failure of any diskette resulting from accident, abuse or misapplication of the diskette and DCA assumes no liability as a consequence of such events under the terms of this Limited Warranty.

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Before returning any units, contact DCA's Customer Support. Customer Support will attempt to determine the cause of your difficulty. If the board requires repair or replacement, they will provide a Return Authorization Number (RA#). There will be no charge for the replacement or repair of boards still under warranty.

The following explains the procedure for returning a unit to DCA.

1. If possible, pack the unit in its original container. If the original container is not available, wrap the unit in NON-STATIC material such as newspaper and pack it in a sturdy, cardboard container. Send only the unit. Do NOT send any accessories or documentation.
2. Include the following information for all units returned:

NAME
ADDRESS
CITY, STATE ZIP
TELEPHONE NUMBER
RETURN AUTHORIZATION #
PROBLEM DESCRIPTION

3. All units should be returned by prepaid postage. DCA WILL NOT ACCEPT UNITS THAT HAVE BEEN SENT C.O.D.

4. Mail package to:

Digital Communications Associates, Inc.
Attention: Warranty/Repair
1000 Alderman Drive
Alpharetta, Georgia 30201-4199

Write the RA# on the label of your package.

Any package received without an RA # on the label may be returned to you unopened.

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INDEX

A

ACT printer 2-15, 2-19
activating keyboard
 profiles 7-22, 7-23
<Alt><+> procedure
 6-1, 6-2, 6-4, 6-5
alternate blue
 2-37, 2-38
alternate GRAPH.DAT
 configuration files
 2-42, 2-43
alternate keyboard
 profile (see "keyboard
 profiles")
APL keyboard
 2-30, A-1, A-4
append 4-2 through 4-4
AT&T 6300
 H-1 through H-8
attribute select keys
 A-19 through A-22
attribute select type-
 writer keyboard
 2-30, A-1, A-3
attribute select type-
 writer/APL keyboard
 2-10, 2-28 through
 2-30, A-1, A-2
automatic key repeat
 2-3, 2-5, 2-8

B

base address 1-8, 1-9,
 2-38 through 2-41
BIOS key codes 7-28, 7-29
blink mode, cursor A-21
blue, alternate color
 2-37, 2-38
board tests
 emulator (coax) board
 E-6, E-7
 graphics board
 E-7 through E-9
buffers for keyboard
 profiles 2-2 through 2-4
 2-8, 7-22, 7-23

C

cable, video iii, 1-16,
 1-17, 1-21, 1-22
Canon, PJ1080A printer
 2-15, 2-24
capture 4-2,
 4-4 through 4-8
CE78 5-6, 5-8
CGA 1-2, 1-12
CHKBD
 command options

- E-2 through E-4
- error messages
 - E-10 through E-12
- startup command E-5
- tests
 - color video E-9, E-10
 - cursor E-10
 - emulator coax board
 - E-6, E-7
 - graphics board
 - E-7, E-8, E-9
- coaxial cable 1-16, 1-21
- codes, BIOS key
 - 7-28 through 7-37
- codes editing option
 - 7-6 through 7-13
- color, alternate blue
 - 2-37, 2-38
- color attributes A-20
- Color Graphics Adapter (CGA) 1-2, 1-12, 1-17, 1-22
- color monitor
 - ... 1-2, 2-35 through 2-37
- color select keys A-18
- color video test
 - E-9, E-10
- command options
 - CHKBD . E-2 through E-4
 - GRAPH 3-2, 3-4
 - e 3-7, 5-7
 - f 3-6, 3-7
 - r 3-6
 - v 3-5
- CONFIG.SYS file 2-2, 2-4, 2-7, 2-8, 6-1, 7-1, 7-22
- configuration,
 - base address 1-8, 1-9, 2-38 through 2-41
 - controller
 - G-1 through G-5
 - E78 5-2 through 5-6
 - GENX 5-2 through 5-6
 - GraphPac
 - 2-9 through 2-41
 - keyboard
 - 2-28 through 2-33
 - keyboard drive
 - 2-2, 2-3, 2-7, 2-8
 - mainframe
 - G-1 through G-5
 - printer
 - 2-14 through 2-27
 - video
 - 2-34 through 2-38
- configuration file
 - (see "GRAPH.DAT" file)
- controller
 - configuration
 - G-1 through G-6
 - models 1-3
- copy option, KYBDEDIT
 - 7-6, 7-7, 7-15 through 7-17
- <Ctrl><Alt><Fx> key
 - sequence 7-22, 7-23
- cursor highlight
 - A-21, A-22
- cursor keys
 - A-5 through A-9
- cursor test E-10
- customized emulator (see
 - "CE78")

D

- decoding, key**
 - 7-28 through 7-37
- default configuration**
 - 2-10
- default keyboard** 2-10,
 - 2-28, 2-29, 2-30,
 - A-1, A-2
- diskette**
 - configuration 2-2, 2-3,
 - 2-7, 2-8,
 - 2-9 through 2-41
 - installation 2-1, 2-2,
 - 2-6, 2-7
- display adapter** (see
 - "CGA" or "EGA")
- DOS** 1-2
- download** (see "append,"
 - also see "capture")

E

- E78** (also see "CE78")
 - configuration
 - 5-2 through 5-6
 - compatible software
 - 5-1
 - exiting emulation
 - 5-8
 - native mode 5-9
 - residency 5-10
 - starting emulation
 - 5-7 through 5-9
 - upgrade considerations
 - 5-9
- editing keyboard profiles**
 - (see "KYBDEDIT")
- EGA** 1-2, 1-12
- emulation**
 - 3278/3279 non-graphics,
 - (see "E78")
 - 3279 S3G graphics,
 - (see "GRAPH emulator")
- emulator**
 - E78**
 - 5-1 through 5-10
 - (also see "E78")
 - GRAPH**
 - 3-2, 3-4 through 3-7
 - (also see "GRAPH emulator")
- emulator startup command**
 - E78/CE78** 5-6, 5-8
 - GRAPH** 3-2
- emulator startup command options, GRAPH**
 - 3-2, 3-4 through 3-7
- Enhanced Graphics Adapter (EGA)** 1-2, 1-12,
 - 1-17, 1-20, 1-22
- Enhanced Keyboard, IBM**
 - 2-10, 2-28
 - 2-30 through 2-32
- Epson FX80 printer**
 - 2-15, 2-27
- error codes, CHKBD**
 - E-10 through E-12
- error messages**
 - C-1 through C-5
- execute**
 - E78/CE78** 5-6, 5-8
 - extended functions..... 4-1
 - GRAPH emulator** 3-2

GraphPac 2-11
installation test, CHKBD
..... E-5
power-on-reset 4-10
video reset 4-15
exit emulation
E78 5-8
GRAPH 3-10, 3-11, 5-8
extended functions
append 4-2 through 4-4
capture 4-2
..... 4-4 through 4-8
print 4-6, 4-7
recall 4-7, 4-8
resident 4-8, 4-9
test 4-10
extensions, filename
.DAT 2-41 through 2-43
.GRF 4-6 through 4-8
.KMC 6-3, 6-5, 6-6
..... 6-7, 6-9
.KYB 7-15

F

features, product
..... ii, iii
field editing keys
..... A-10 through A-12
field inherit function
..... A-19 through A-23
file,
key macro 6-3,
..... 6-5 through 6-9
keyboard profile 2-2,
..... 2-4, 2-8, 2-34, 7-13,

..... 7-15 7-17, 7-21, 7-22
file transfer
..... i, ii, 4-9
function keys, 3279
..... A-13 through A-16

G

GENX options 5-3
GENX program
..... 5-2 through 5-6
GP.EXE (see "GraphPac")
GRAPH command
..... 3-2, 5-7
GRAPH.DAT file
..... 2-41, 2-42
alternate files
..... 2-42, 2-43
default values 2-10
GRAPH emulator
extended functions
..... 4-1 through 4-10
force download 3-6
initialize and exit 3-7
native mode 5-9
resident mode
..... 3-6, 4-8, 4-9
startup command 3-2
verbose report option
..... 3-5
GRAPH.FNT 3-2
GRAPH.8X3 3-2
graphics board test
..... E-7 through E-9
graphics emulation (see
"GRAPH emulator")

GraphPac

- configuration 2-12,
..... 2-14 through 2-40
- exiting 2-41
- menu guidelines
..... 2-13, 2-14
- printing graphics 4-12
- recalling files
..... 4-14, 4-15
- starting 2-11

GTC Blaser printer

- 2-15, 2-27

H**hardware**

- base address 1-8, 1-9,
..... 2-38 through 2-41
- initializing
..... 3-7, 5-7
- installing
 - in IBM PCs
..... 1-10 through 1-17
 - in AT&T 6300
computers
..... H-1 through H-8
- upgrade
..... 1-10 through 1-13
..... 1-18 through 1-22

highlight select keys

- A-21 through A-22

host software 1-3**hot key** 3-10,
..... 5-8 through 5-10**HP LaserJet** 2-15, 2-27**I****IBM 3852 printer**

- 2-15, 2-23

IBM 5182 printer

- 2-15, 2-21

IBM Enhanced Keyboard

- 2-10, 2-28, 2-30,
..... 2-31, 2-32

initialize hardware

- 3-7, 5-7

installation**error messages**

- E-10 through E-12

test (see "CHKBD")**installation,****hardware**

- (see "hardware")

keyboard driver

- 2-2, 2-3, 2-7, 2-8

upgrade

- 1-10 through 1-13,
..... 1-18 through 1-22

IRMAkey keyboard 2-28

- 2-30 through 2-34

J**jumpers**

- base address 1-7 (also
..... see "base address")

J1 1-5, 1-6, 1-7**JP1 through JP3**

- 1-8, 11-9

K

- key click 2-3, 2-5, 2-8
- key codes, BIOS
 - 7-28 through 7-37
- key decoding 7-28, 7-29
- key macros
 - clearing 6-6
 - creating 6-1,
..... 6-2, 6-4, 6-5
 - .KMC extension 6-3,
..... 6-5, 6-6, 6-7, 6-9
 - load macros 6-6
 - loading with an application
 - 6-7 through 6-9
 - saving to a file
 - 6-3, 6-5
 - SKLOAD 6-6
 - SKSAVE 6-3, 6-5
- key position numbers
 - 7-24 through 7-27
- keyboard,
 - APL Typewriter 2-30,
..... A-1, A-4
 - Attribute Select Type-writer 2-30, A-1, A-3
 - Attribute Select Type-writer/APL 2-10,
..... 2-28 through 2-30,
..... A-1, A-2
 - configure
 - 2-28 through 2-33
 - default 2-10,
..... 2-28 through 2-30
..... A-1, A-2
 - IBM Enhanced 2-10,
.. 2-28, 2-30 through 2-32
 - IRMAkey 2-28,
..... 2-30 through 2-34
 - RPQ 2-33, 2-34
- keyboard drivers
 - 2-2 through 2-8
 - (also see "key macros"
and "keyboard profiles")
- keyboard profiles
 - activating profiles
 - 7-22, 7-23
 - creating profiles
 - 7-2 through 7-21
 - editing options (see "KYBDEDIT")
 - loading (see "KYBDLOAD")
 - loading with emulator
 - 2-34
- keyboard remapping, GraphPac
 - F-1 through F-9
- keys
 - attribute select
 - A-19 through A-22
 - cursor A-5 through A-9
 - editing, field
 - A-10 through A-12
 - function
 - A-13 through A-16
 - PA A-17
 - PF A-17, A-18
- KMACDRV.SYS 2-2, 2-8, 6-1
 - (also see "key macros")
- KYBDDRV.SYS 2-2, 2-3
 - 2-4, 2-8, 7-1
 - (also see "keyboard profiles")
- KYBDEDIT

codes option
..... 7-7 through 7-13
common options 7-4
copy option
..... 7-15 through 7-17
editing options 7-7
editing options
 screen 7-6
general information
..... 7-1, 7-2
modes option
..... 7-18 through 7-21
startup 7-2, 7-5
xchg option
..... 7-13 through 7-15

KYBDLOAD
 keyboard features 2-3,
 2-4 through 2-6, 2-8
 loading procedure 7-21
 memory allocation 2-2,
 2-3, 2-8
 switches
 2-4 through 2-6

L

LaserJet, HP 2-15, 2-27
loading keyboard profiles
 (see "KYBDLOAD")
loading macro files
 (see "SKLOAD")

M

macro,
 <Alt><+> procedure 6-1,
 6-2, 6-4, 6-5
 clearing a 6-6
 creating a 6-1,
 6-2, 6-4, 6-5
 saving a 6-3, 6-5

macro file,
 clearing 6-6
 loading 6-6
 saving 6-3, 6-5

mainframe configuration
 G-1 through G-5

memory
 resident E78 emulator
 5-10
 resident GRAPH emulator
 3-6
 system requirement 1-1

monitor 1-2, 2-25, 2-26
MVS/TSO 6-1

N

native mode 5-9

O

one-finger shift mode
..... 2-3, 2-5, 2-8

operating system

DOS 1-2
MVS/TSO G-1
VM/CMS G-1

P

PA keys A-17
parallel printer 2-15,
..... 2-16, 2-18
PF keys A-17, A-18
power-on-reset 4-10
print graphics 4-12
print screen switch 2-3,
..... 2-4, 2-8
print text 4-6, 4-7
printer
ACT 2-15, 2-19
Canon PJ1080A
..... 2-15, 2-24
configuration
..... 2-14 through 2-27
Epson FX80 2-15, 2-27
GTC Blaser 2-15, 2-27
HP LaserJet 2-15, 2-27
IBM 3852 2-15, 2-23

IBM 5182 2-15, 2-21
parallel 2-15, 2-18
Quadjet 2-15, 2-20
serial 2-15, 2-17
Tandy CGP-220
..... 2-15, 2-22
Toshiba P351C
..... 2-15, 2-26
Toshiba P351 2-15, 2-25

Program Symbols

..... A-19, A-23

Q

Quadjet printer

..... 2-15, 2-20

R

RAM (see "memory")

recall

graphics 4-7,
..... 4-8, 4-14, 4-15
text 4-7, 4-18

remap keyboard

GraphPac option
..... F-1 through F-9

KYBDEDIT

..... 7-1 through 7-21
. (also see "KYBDEDIT")

reset

errors B-3
video 4-15

resident mode

E78 5-10
GRAPH 3-6, 4-9
reverse video mode A-21
RPQ keyboard 2-33, 2-34

S

save graphics (see
"capture")
save macros (see
"SKSAVE")
save text(see "append,"
..... also see "capture")
SCP/IO generation
 parameters 6-1, 6-2
serial printer 2-15, 2-17
shift mode switch, one
 finger 2-3, 2-5, 2-8
shift toggle switch 2-3,
 2-5, 2-8
SK program
 6-7 through 6-9
SKLOAD 6-6
SKSAVE 6-3, 6-5
status line
 3-7 through 3-9, B-1
 color indicator B-14
 do not enter messages
 B-3 through B-9
 printer indicator
 B-8, B-9,
 B-14 through B-16
 program symbol set B-10
 reminder messages B-9
 shift and mode messages
 B-10

 system connection
 messages 3-7, B-2
switches for keyboard
 options 2-4 through 2-6
sys req key 7-10

T

Tandy CGP-220 printer
 2-15, 2-22
test
 controller configuration
 2-43 through 2-45
 cursor E-10
 hardware installation
 (see "CHKBD")
 S3G setup
 2-43 through 2-45
Toshiba P351 printer
 2-15, 2-25
Toshiba P351C printer
 2-15, 2-26

U

underscore mode A-22
upgrade ii, iii,
 1-10 through 1-13,
 1-18 through 1-22

V

- verbose mode 3-5
- video cable iii, 1-16,
..... 1-17, 1-21, 1-22
- video color test
..... E-9, E-10
- video reset 4-15
- VM/CMS G-1
- VTAM generation
parameters G-2, G-3

X

- xchg option, KYBDEDIT
..... 7-13 through 7-15

**Addendum
For
IRMA 3279 Graphics
Micro Channel Hardware and Software Installation**

READ THIS SECTION FIRST

Part Number: 001199

Introduction

This addendum documents the installation of IRMA 3279 Graphics-mca into an IBM Personal System/2 Model 50, 60, or 80. In addition, the second section of this document explains how to install the software using version 1.23 or higher of IRMA 3279 Graphics software onto an IBM PC or PS/2 system.

Using the IRMA 3279 Graphics Micro Channel Card

The IRMA 3279 Graphics micro channel card is designed for the IBM's Personal System/2 Models 50, 60, and 80. The information on the following pages will guide you in installing the IRMA 3279 Graphics micro channel hardware.

Prior to the installation, you should have a thorough understanding of the functions of the Reference Diskette, which is provided with your PS/2. Before beginning, review your IBM documentation for information on the following areas:

- What is the Reference Diskette?
- How to start the reference diskette
- How to install the IBM options
- How to install an adapter

You can find these topics in the *IBM Personal Systems/2 Model 50/60 Quick Reference* and the *IBM Personal System/2 Model 80 Quick Reference* manuals.

Installing Your IRMA 3279 Graphics Micro Channel Card

Installing the IRMA 3279 Graphics micro channel hardware requires you to do the following:

1. Create a backup of the IBM PS/2 Reference Diskette.
2. Transfer the Adapter Definition File (@6E78.adf) from the IRMA 3279 Graphics program diskette to the backed up Reference Diskette.
3. Install the IRMA 3279 Graphics micro channel card.
4. Update the PS/2 hardware configuration.

Creating a Backup of the IBM PS/2 Reference Diskette

The following steps tell you how to create a backup copy of the IBM Personal System/2 Model 50/60 Reference Diskette or the IBM Personal System/2 Model 80 Reference Diskette. If you already have successfully create a backup diskette, proceed to the next section on transferring the adapter definition file, @6E78.adf.

Before you begin, make sure you have the following:

- The original PS/2 Reference Diskette
- A 3.5" blank HD (high density - 1.4 Meg) diskette

Making the Backup Copy

1. Insert the original Reference Diskette in drive A of the PS/2 Model 50, 60 or 80 and turn on the unit.
2. Wait for the memory count and single beep signal. When the IBM Reference Diskette logo screen appears, press <Enter> to continue.
3. Select item 2 (Backup the Reference Diskette) from the Main Menu. Follow the prompts in the Instruction window. Note that IBM refers to the backup copy as the "target" diskette.
4. This process will format your diskette and ask you several times to change the backup and the original diskette while reading data and copying information onto the backup diskette.
5. When the "Copy Complete" message appears in the Information window, press <Enter>. At the Main Menu, press <Esc> to quit.
6. Follow the Information window instructions to restart your system.

Transferring the Adapter Definition File to the Backup Reference Diskette

This section explains how to modify the backup Reference Diskette to install and support the required configuration information for the IRMA 3279 Graphics micro channel card. The @6E78.adf adapter definition file contains load addresses, interrupts, and other pertinent information about the IRMA 3279 Graphics micro channel card that the PS/2 requires to configure the Micro Channel Bus.

Before you begin, make sure you have the following:

- A backup PS/2 Model 50 and 60 Reference Diskette or a backup PS/2 Model 80 Reference Diskette
- The IRMA 3279 Graphics program diskette which contains the @6E78.adf file

Procedures

- STEP 1: Restart your system unit with the backup Reference Diskette in drive A. Following the memory count and a single beep, the IBM Reference Diskette logo screen appears. Press <Enter> to continue.
- STEP 2: Select item 5 (Copy an option diskette). Note that when the PS/2 prompts you for "New Option Diskette", it expects a disk containing a *.ADF file, such as the @6E78.adf file contained on your IRMA 3279 Graphics program diskette. Follow the instructions in the Information window.
- STEP 3: The PS/2 unit checks the @6E78.adf adapter definition file and reads the information into memory. It then asks you to insert your backup Reference Diskette in drive A. Note that IBM refers to it as the "copy of the Product 2 Diskette".
- STEP 4: When the update of the backup Reference Diskette is completed, press <Enter>.
- STEP 5: At the Main menu, press <Esc> to quit. Then, follow the instructions in the Information window to restart your system.

Installing the IRMA 3279 Graphics Micro Channel Card

Before you begin, make sure you have the following:

- an IRMA 3279 Graphics micro channel card
- a coin
- a copy of your system's IBM quick reference manual

Prior to installing the IRMA 3279 Graphics micro channel card, you should have a thorough understanding of the PS/2 Reference Diskette and the adapter installation procedures as described in your system's documentation.

The adapter installation procedures are explained in the *IBM Personal System/2 Quick Reference Manual*. See also the *IBM Personal System/2 Model 50 and 60 Quick Reference* manual and the *IBM Personal System/2 Model 80 Quick Reference* manual. In particular, refer to:

- "Removing the System Unit Cover"
- "Installing an Adapter"
- "Installing the System Unit Cover"

Slot Selection

The IRMA 3279 Graphics micro channel card must be installed into a slot that connects all connectors on the bottom of the card. The following lists the correct slots:

- Model 50 - slot 2
- Model 60 - slot 2
- Model 80 - slot 2

Please make sure that the coax connector plate is flush with the expansion slot cover that you removed from the system unit.

Updating the PS/2 Hardware Configuration

After you install the hardware and reconnect the devices and power supply to your system unit, you must update the PS/2 configuration. This final step is required to complete the hardware installation.

Before you begin, make sure you have the following:

- Updated Reference Diskette with the @6E78.ADF file

How to Update the PS/2 Configuration

- STEP 1: Insert the backup Reference Diskette in drive A and turn on your PS/2.
- STEP 2: After the memory count, the PS/2 displays the message, ERROR 165, and issues two short beeps which are followed by the appearance of the IBM Reference

Diskette logo screen. Press <Enter> to continue.

- STEP 3:** The system displays a brief description of the error resulting from the addition of the IRMA 3279 Graphics hardware. Press <PgDn> to proceed to the next screen, which gives you a choice of either automatically or manually configuring the system.

Automatic Configuration

- STEP 1:** If you want to configure the system automatically, press <Y> for "yes". The Information window will inform you that automatic configuration is under way. After you receive the completion message, press <Enter> to restart the computer.

- STEP 2:** Automatic configuration selects the IRMA 3279 Graphics hardware default I/O address range of 220-22Fh/280/29Fh. IRMA 3279 Graphics reads and writes to these addresses which support software written for IRMA 3279 Graphics, IRMA, IRMA 2, and PJ. However, only one base address is used at a time.

NOTE: If you need to change I/O addresses, refer to the section on changing the IRMA 3279, Graphics I/O address.

- STEP 3:** After restarting, the PS/2 should complete its memory count without returning any error messages, issue a single beep, and display the DOS prompt. This sequence of events follows if you have successfully

installed the IRMA 3279 Graphics hardware.

Manual Configuration

- STEP 1:** If you want to reconfigure the system manually, press <N> for "no". Next, from the Main Menu of the backup Reference Diskette, select item 3 (Set Configuration).
- STEP 2:** From the Set Configuration Menu, select item 1 (View Configuration). Press <PgDn> to see which adapters are installed and what their PS/2 slot locations are. IRMA 3279 Graphics should be displayed as having an I/O address range of 220-22Fh/280-29Fh and being in the numbered slot in which it was installed.
- STEP 3:** Press <Esc> to return to the Set Configuration menu.
- NOTE:** If you need to change these I/O addresses, refer to the section on changing the IRMA 3279 Graphics I/O address.
- STEP 4:** Select item 3 (Backup configuration). Press <Enter> when the "Backup Complete" message appears in the Information window.
- STEP 5:** Quit the Set Configuration Menu by pressing <Esc>. At the Main Menu, press <Esc> again. Follow the instructions in the Information window to restart your system.

- STEP 6:** After restarting, the PS/2 should complete its memory count without returning any error messages, issue a single beep, and display the DOS prompt. This sequence of events follows if you have successfully installed the IRMA 3279 Graphics card.

Changing the IRMA 3279 Graphics Base I/O Address

- STEP 1:** Perform step 1 in the previous section on manual configuration.
- STEP 2:** From the Set Configuration Menu, select item 2, (Change Configuration). Use the <PgDn> key to move down the configuration screen to the slot entry for the IRMA 3279 Graphics card. (The default settings for the I/O address range will be displayed as 220-22Fh/280-29Fh.)
- STEP 3:** Press <F6> (Next Value), as directed by the screen prompts, to display the next address range which is 280-29Fh. Other addresses available include the range of 2C0-2Dfh, A80-A9Fh, and Ac0-Adfh. Press <F6> to scroll through the settings or <F5> to return to a previous choice.
- STEP 4:** Press <F10> to save the setting you selected, and wait for the PS/2 to display the message, "Save configuration complete". Continue with steps 5 and 6 covered in the previous section, Manual Configuration, to complete the procedure.

Installing IRMA 3279 Graphics on an IBM PS/2

Once you complete the hardware and system configuration steps, you can install the IRMA 3279 Graphics software by following the software installation instructions in the next section of this addendum. Follow the steps given for a hard disk system.

Software Installation for the IBM PC and PS/2 Systems

Before you can use your PC as a 3279 S3G terminal, you must install the software and run the GraphPac configuration program. Chapter 2 of the *IRMA 3279 Graphics User's Guide* provides detailed information on the GraphPac configuration program. This section guides you through an automated process that installs the software, and it shows you how to set up the CONFIG.SYS file.

The software includes two keyboard drivers, KYBDDRV.SYS and KMACDRV.SYS, which support such options as keyboard macros, alternate keyboard profiles, international keyboard profiles and certain types of non-standard PC hardware. The keyboard driver, KYBDDRV.SYS, must be installed to use the IRMA 3279 Graphics software. The macro driver, KMACDRV.SYS, is optional. Installation procedures for both keyboard drivers are given in this addendum.

Chapter 2 of the *IRMA 3279 Graphics User's Guide* provides detailed information on keyboard drivers.

Steps to Install and Configure the IRMA 3279 Graphics Software

- STEP 1: Run the DCA install program.
- STEP 2: Configure the software using GraphPac
- STEP 3: Create or modify a CONFIG.SYS file.
NOTE: International users only must execute STEP 4.
- STEP 4: Create or modify an AUTOEXEC.BAT file.

Installing the Software

This section guides you through the process for installing the software to a floppy diskette and a hard disk.

Before you begin, make backup copies of the IRMA 3279 Graphics diskettes. Use the backup diskettes for installing and configuring the software.

If you are installing the software onto a floppy diskette you will need one formatted diskette with DOS on it, on which to install the software. Follow these steps to complete the installation.

- STEP 1: Place any of the IRMA 3279 Graphics diskettes into drive A.
- STEP 2: Make your current working directory drive A.
- STEP 3: At the A prompt type:
DCA <Enter>

The software displays instructions for installing the software for several types of environments. Read through the instructions and follow the prompts according to your environment. The following outlines the appropriate actions for each step.

The default settings to the prompts appear in brackets.

- 1) If you are a domestic (U.S.) user, insert the Keyboard and Printer Utilities Diskette into drive A.

If you are an international user, insert the Keyboard Profiles Diskette.

- 2) At select target drive:

For floppy diskette installation, type B

or

For hard diskette installation, type C

NOTE: Hard disk installation will automatically create a DCA directory to which it installs the software. Make sure you do not have an existing DCA directory.

If you are installing the software onto a floppy diskette make sure you have a bootable floppy in Drive B.

- 3) At Select Printer, you may select a printer or you may wait to configure the printer in the GraphPac configuration program. There are many more printer options in GraphPac than in the install program.
- 4) At Select National Language, pick the appropriate language for your environment.

For domestic (U.S.) users press <Enter>.

The program will then prompt you for the current diskette to insert into drive A. The program will automatically copy the appropriate files to your floppy diskette or hard disk.

Configuring the Software using GraphPac

After the program has finished the installation process, it will automatically invoke the GraphPac program. To complete the installation process, use the GraphPac program to configure the software for your environment.

YOU MUST CONFIGURE THE SOFTWARE FOR YOUR SPECIFIC ENVIRONMENT USING GraphPac IN ORDER TO USE THE IRMA 3279 GRAPHICS SOFTWARE.

Refer to the section on IRMA 3279 Graphics and the VGA in this addendum to configure the emulation software for an IBM PS/2 Model 50, 60, or 80. The GraphPac program is fully documented in Chapter 2 of the *IRMA 3279 Graphics User's Guide*.

Creating a CONFIG.SYS File

Floppy Diskette Users:

Create a CONFIG.SYS file on the working copy of the IRMA 3279 Graphics diskette to contain the keyboard drivers. Type the following command at the DOS A> prompt:

```
COPY CON CONFIG.SYS <Enter>  
DEVICE=KYBDDRV.SYS -2go|x| <Enter>  
DEVICE=KMACDRV.SYS <Enter>  
<F6> <Enter>
```

The -2 in the second line allows space in memory for two keyboard profiles. You can allow memory for up to 9 keyboard profiles.

The **g** and **o** switches exist for compatibility with certain DOS applications.

The **x** option represents one or all of the remaining keyboard driver options. The *<IRMA 3279 Graphics User's Guide>* outlines these options.

NOTE: International users must add an **N** switch.

Reboot the PC with a working copy of the IRMA 3279 Graphics diskette to load the keyboard drivers.

Refer to the section on IRMA 3279 Graphics and the VGA in this addendum to configure the emulation software for an IBM PS/2 Model 50, 60, or 80. The GraphPac program is fully documented in Chapter 2 of the *IRMA 3279 Graphics User's Guide*.

Hard Disk Users:

Create or modify a CONFIG.SYS on the hard disk root directory to contain the following:

```
DEVICE=KYBDDRV.SYS -2go[x] <Enter>  
DEVICE=KMACDRV.SYS <Enter>
```

The **g** and **o** switches exist for compatibility with certain DOS applications.

The **x** option represents one or all of the remaining keyboard driver options. Chapter 2 in the *IRMA 3279 Graphics User's Guide* outlines these options.

NOTE: International users must add an **N** switch.

Next copy the KYBDDRV.SYS and KMACDRV.SYS files from the DCA directory to the root directory.

Reboot the PC to load the keyboard drivers.

Refer to the section on IRMA 3279 Graphics and the VGA in this addendum to configure the emulation software for an IBM PS/2 Model 50, 60, or 80. The GraphPac program is fully documented in Chapter 2 of the *IRMA 3279 Graphics User's Guide*.

International Users

International users must also create or modify an AUTOEXEC.BAT file to load the DOS keyboard profile. Hard disk users must include the AUTOEXEC.BAT file on their root directories with a DOS path to the DCA directory where the IRMA 3279 Graphics software is installed. Floppy users must include the AUTOEXEC.BAT on their bootable working copy of the IRMA 3279 Graphics software.

Create or modify an AUTOEXEC.BAT file to include the following:

```
KYBDLOAD/s=2/a KEYB**.KYB
```

The **a** switch automatically activates the DOS profile.

The ****** in the KEYB file name represents the codes given to the various countries. These codes are:

BE = Belgian	NS = New Spanish
CA = Canadian French	SF = Swiss-French
FC = Canadian Bilingual	SG = Swiss-German
FI = Finnish	SP = Spanish
FR = French Azerty-105	SS = Spanish Speaking
GR = German	SW = Swedish
IT = Italian	UK = English
NO = Norwegian	

IRMA 3279 Graphics and the VGA

IRMA 3279 Graphics recognizes the PS/2's VGA (Video Graphics Array) as a compatible display adapter. The following instructions detail how to configure the emulator for VGA support.

STEP 1: To install the VGA, go to your GraphPac main menu by typing in <GP> at the DOS prompt.

STEP 2: Choose item 3 (Configuration).

STEP 3: Choose item 3 (Configure Video).

STEP 4: Choose item 1 (Configure monitor).

STEP 5: Choose item 14 (IBM 5512, 5513 PS/2 Color)

or

Choose item 15 (IBM 8503 PS/2 Monochrome).

STEP 6: Press <Esc> until you return to the main menu.

STEP 7: At this time, you may continue the configuration for any additional item you may need. (See the *IRMA 3279 Graphics User's Guide* for full instructions on GraphPac.)

STEP 8: Press <Esc> until you are back to the DOS prompt.

To execute the IRMA 3279 Graphics emulation program, follow the instructions in the *IRMA 3279 Graphics User's Guide*.

Diagnostics

Appendix E in the IRMA 3279 Graphics User's Guide documents the CHKBD program for hardware diagnostics. Software version 1.23 or higher contains two CHKBD programs located in subdirectories on the master IRMA 3279 Graphics program diskette.

One CHKBD program is for the standard IRMA 3279 Graphics hardware and is located in subdirectory 2BOARD. The other CHKBD program is for the IRMA 3279 Graphics upgrade and is located in the subdirectory 3BOARD.

To use these programs according to the documentation in Appendix E, copy all of the files in the correct directory for your environment (depending on whether you have the standard or upgrade product) onto your hard disk or floppy.

IRMA 3279 Graphics User's Guide



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