



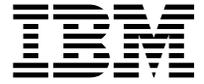
GDDM

# User's Guide

*Version 3 Release 2*



GDDM



# User's Guide

*Version 3 Release 2*

**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page vii.

**I Second Edition (September 1996)**

This edition applies to the following IBM GDDM series of licensed programs:

Program number	Program name	Version	Release	Modification
I 5695-167	GDDM/MVS	3	2	0
I 5684-168	GDDM/VM	3	2	0
I 5686-057	GDDM/VSE	3	2	0
I 5668-812	GDDM-PGF	2	1	3
I 5668-723	GDDM-IVU	1	1	3
I 5668-802	GDDM-GKS	1	1	3
I 5668-801	GDDM Interactive	2	1	3
I	Map Definition			

I GDDM/MVS as an element of OS/390 (program number 5645-001)

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# Contents

<b>Notices</b> . . . . .	vii
Trademarks . . . . .	viii
<b>Preface</b> . . . . .	ix
What this book is about . . . . .	ix
Who this book is for . . . . .	ix
What you need to know . . . . .	ix
Latest GDDM information . . . . .	x
GDDM publications . . . . .	xi
<b>Summary of changes</b> . . . . .	xiii
<b>Chapter 1. Introduction to GDDM</b> . . . . .	1
What GDDM is . . . . .	1
The GDDM family . . . . .	1
A few things you should know about GDDM . . . . .	8
<b>Chapter 2. Manipulating GDDM data</b> . . . . .	11
Displaying data with GDDM . . . . .	11
Running User Control . . . . .	13
Unexpected results in User Control . . . . .	28
<b>Chapter 3. Printing and plotting GDDM data</b> . . . . .	31
Print device families . . . . .	31
How operating systems affect printing . . . . .	33
Printing and plotting with GDDM-OS/2 Link . . . . .	36
Printing and plotting with GDDM-PCLK . . . . .	36
Formatting data for printing . . . . .	37
What to do about errors . . . . .	43
<b>Chapter 4. Giving yourself more control over GDDM</b> . . . . .	45
Coding your own external defaults and nicknames . . . . .	45
<b>Appendix A. Transferring files between PC and host</b> . . . . .	49
Copying files under CMS . . . . .	50
Copying files under TSO . . . . .	52
<b>Appendix B. Hardware notes</b> . . . . .	55
Display screens and adapters . . . . .	55
Keyboards . . . . .	57
Plotters . . . . .	61
PC printers . . . . .	62
Terminals . . . . .	64
Workstations . . . . .	65

## figures

	<b>Appendix C. Special considerations for Japanese users</b> . . . . .	69
	Enabling translation between the two extended Japanese code pages . . . . .	69
	<b>Glossary</b> . . . . .	71
	<b>Index</b> . . . . .	87

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## Figures

	1. A route map for GDDM-supported conversions . . . . .	6
	2. The alphanumerics and graphics cursors . . . . .	12
	3. The five User Control menus . . . . .	14
	4. The User Control main menu . . . . .	15
	5. Two operator windows . . . . .	17
	6. Scrolling up the active window . . . . .	18
	7. Maximizing the active window size . . . . .	19
	8. Moving the active window . . . . .	20
	9. The Picture menu . . . . .	22
	10. Centering a picture . . . . .	23
	11. Zooming in on part of a picture . . . . .	23
	12. Zooming out from a picture . . . . .	24
	13. Retaining the proportions in zoomed graphics . . . . .	24
	14. The Save GDF menu . . . . .	26
	15. The Save PIF menu . . . . .	27
	16. VSE Print Job Utility panel . . . . .	35
	17. The Output menu . . . . .	39
	18. The Output destination panel . . . . .	39
	19. Inactive screen menu . . . . .	66

**Tables**

	1.	Summary of GDDM-supported format conversions . . . . .	5
	2.	GDDM-supplied conversion utilities . . . . .	6
	3.	Display adapter screen sizes . . . . .	56
	4.	PC printer paper – standard print resolution . . . . .	62
	5.	PC printer paper – high print resolution . . . . .	63



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## Preface

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### What this book is about

This book provides the information you need to carry out the following tasks with GDDM:

- Display data
- Manipulate displayed data
- Print and plot displayed data
- Save displayed data

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### Who this book is for

This book is intended for end users of GDDM applications.

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### What you need to know

To work as an end user of GDDM applications, you need some knowledge of basic computing skills, such as using a terminal or workstation. You are not assumed to have any prior knowledge of GDDM.

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**Latest GDDM information**

| For up-to-date information on GDDM products, check our Home Page on the Internet at  
| the following URL:

| <http://www.hursley.ibm.com/gddm/>

| You might also like to look at the IBM Software Home Page at:

| <http://www.software.ibm.com>

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**GDDM publications**

GDDM	<i>GDDM Base Application Programming Guide</i> , SC33-0867
Base	<i>GDDM Base Application Programming Reference</i> , SC33-0868
	<i>GDDM Diagnosis</i> , SC33-0870
	<i>GDDM General Information</i> , GC33-0866
	<i>GDDM/MVS Program Directory</i> , GC33-1801
	<i>GDDM/VM Program Directory</i> , GC33-1802
	<i>GDDM/VSE Program Directory</i> , GC33-1803
	<i>GDDM Messages</i> , SC33-0869
	<i>GDDM Series Licensed Program Specifications</i> , GC33-0876
	<i>GDDM System Customization and Administration</i> , SC33-0871
	<i>GDDM User's Guide</i> , SC33-0875
	<i>GDDM Using the Image Symbol Editor</i> , SC33-0920
GDDM-GKS	<i>GDDM-GKS Programming Guide and Reference</i> , SC33-0334
GDDM-IMD	<i>GDDM Interactive Map Definition</i> , SC33-0338
GDDM-IVU	<i>GDDM Image View Utility</i> , SC33-0479
GDDM-PGF	<i>GDDM-PGF Application Programming Guide</i> , SC33-0913
	<i>GDDM-PGF Programming Reference</i> , SC33-0333
	<i>GDDM-PGF Interactive Chart Utility</i> , SC33-0328
	<i>GDDM-PGF Vector Symbol Editor</i> , SC33-0330
	<i>GDDM-PGF OPS User's Guide</i> , SC33-1776

| GDDM/MVS is an element of OS/390. GDDM-REXX/MVS and GDDM-PGF are  
 | optional features of OS/390. For a complete list of the publications associated with  
 | OS/390, see the *OS/390 Information Roadmap*, GC28-1727.

**preface**

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## Summary of changes

This section contains a summary of the changes to GDDM for Version 3 Release 2.

The chapters on working with GDDM-OS/2 Link and GDDM-PCLK have been moved into the *GDDM System Customization and Administration* book because they are intended for use by system administrators.

Appendix B, "Hardware notes" on page 55 covers the new devices supported in GDDM 3.2.

**changes**

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## Chapter 1. Introduction to GDDM

This chapter introduces you to GDDM. It describes the different parts of GDDM, and some basic GDDM concepts.

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### What GDDM is

Graphical Data Display Manager (GDDM) is a set of IBM programs that carry out various tasks on pictures (created from graphics, image, alphanumeric, and presentation text, data). The pictures can be created and displayed with a GDDM-compatible utility or application. You can then use GDDM to:

- Increase the size of part of the picture (zoom in)
- Reduce the size of the picture (zoom out)
- Print or plot the picture
- Save the picture
- Convert the picture files for use with OS/2 or DOS software.

Some GDDM-compatible applications automate the process, so that you create data in the application and then automatically use GDDM to carry out tasks such as printing. This type of use of GDDM in an application program may well be hidden from you.

GDDM also includes many *conversion utilities*, which convert data from one format to a different format so that you can use the data on different types of devices, such as screen displays or printers.

---

### The GDDM family

GDDM is not just one program. It has several component parts, some or all of which you may have access to. Ask your GDDM system support personnel which parts of GDDM you can access.

### GDDM Base

At the center of GDDM is a set of programs known as GDDM Base. GDDM Base contains an application programming interface which enables graphics, images, and text to be input to and output from application programs and utilities.

In addition to the application programming interface, GDDM Base includes the following:

- User Control facility
- Image Symbol Editor
- Composite Document Print Utility (CDPU)
- GDDM-PCLK
- GDDM-OS/2 Link
- File conversion utilities.

Each of these is described in the following sections.

### User Control

You can use the User Control facility to manipulate pictures displayed by an application or utility. User Control menus are superimposed over the picture. You can use the menu commands to carry out the following tasks:

- Printing
- Plotting
- Saving
- Increasing the size of the picture (zooming in)
- Reducing the size of the picture (zooming out).

User Control has options which control how the displayed output is printed or plotted. For example, you can use one of these options to rotate the output.

### Image Symbol Editor

You can use the Image Symbol Editor to create image symbols (patterns of colored or monochrome dots). These can then be loaded as programmed symbols for use in charts or as a company logo. See the *GDDM Using the Image Symbol Editor* book for detailed information.

### The Composite Document Print Utility (CDPU)

The main function of CDPU is to print composite documents, page segments, and overlay files, but you can also use CDPU to display them on your screen. CDPU creates the type of output required for the device that you specify. The composite documents are created by application programs and utilities.

See “Printing and previewing with CDPU” on page 40 and “What CDPU does” on page 41 for a more detailed description of the CDPU.

### GDDM-PCLK

GDDM-PCLK enables you to access host-based GDDM applications and utilities from a workstation (a personal computer system) running under DOS.

GDDM-PCLK uses a 3270 terminal emulator to communicate with GDDM running on the host. The terminal emulator is a separate non-GDDM product which runs on the workstation at the same time as GDDM-PCLK. Together with GDDM-PCLK, it makes the workstation behave in a similar way to the IBM 3270 family of graphics terminals, enabling you to use host facilities in the normal way.

If you are using the IBM Personal Communications/3270 emulator Version 3 or later, this includes host graphics support and you do not need GDDM-PCLK. This emulator also supports host graphics under Windows and, from Version 4.1.1 onwards, under Windows 95.

You can use GDDM-PCLK to do the following:

- Display alphanumeric and graphics together in a DOS session (in *merged mode*).
- Note:** Using GDDM-PCLK in *non-merged mode* is no longer necessary or recommended.
- Send host-generated graphics to a printer or plotter attached to a workstation.
  - Save displayed data as a file on your workstation in the *Picture Interchange Format* (PIF).

### GDDM-OS/2 Link

You can use GDDM-OS/2 Link to access host-based GDDM applications and utilities from a workstation (a personal computer system) running under the OS/2 operating system. GDDM-OS/2 Link conforms to Common User Access (CUA) standards.

Like GDDM-PCLK, GDDM-OS/2 Link communicates with GDDM running on the host using a 3270 *terminal emulator*. The IBM Personal Communications/3270 Version 3.2 (or later) program includes GDDM-OS/2 Link code.

You can also run host graphics under OS/2 without GDDM-OS/2 Link if you are using the IBM Personal Communications/3270 emulator Version 3 or later. This emulator also supports host graphics under Windows and, from Version 4.1.1 onwards, under Windows 95.

With GDDM-OS/2 Link you can:

- Use any screen or hardcopy device supported by GDDM-OS/2 Link
- Use any of three drawing modes, two of which store your graphics locally
- Save host graphics pictures as either PIFs or metafiles on your workstation
- Transfer data to other OS/2 Presentation Manager applications using the Presentation Manager clipboard
- Print to locally attached printers and plotters.

For further information about GDDM-OS/2 Link, refer to the *GDDM-OS/2 Link User's Guide*, which you can view online at your workstation. The guide is installed on your workstation as part of GDDM-OS/2 Link. It can be accessed in either of the following ways:

- Via the VIEW.EXE program from the GDDM-OS/2 Link group
- Via hypertext links from the online help system.

### Other GDDM programs

In addition to the Base programs, GDDM provides many other utilities and facilities. You may find the following two particularly useful:

- GDDM Image View Utility (GDDM-IVU)
- GDDM Presentation Graphics Facility (GDDM-PGF).

## the GDDM family

### GDDM Image View Utility (GDDM-IVU)

You can use GDDM-IVU to:

- Create images by scanning documents
- Save images in disk files
- View images on the screen
- Edit images
- Create image output files for printers.

For further information about GDDM-IVU, see the *GDDM Image View Utility* book.

### GDDM Presentation Graphics Facility (GDDM-PGF)

GDDM-PGF includes the following:

- Interactive Chart Utility (ICU)
- Vector Symbol Editor.
- Online Presentation System (OPS)

#### Interactive Chart Utility

You can use the ICU to create charts and graphs. For further information, see the *GDDM-PGF Interactive Chart Utility* book.

#### Vector Symbol Editor

You can use the Vector Symbol Editor to create *vector symbols*. A vector symbol is a character or shape made up of a series of lines and curves. Vector symbols can be used in application programs or utilities (such as the ICU) for a company logo, special text characters, and so on.

For further information, see the *GDDM-PGF Vector Symbol Editor* book.

#### Online Presentation System

The GDDM-PGF OPS (Online Presentation System) utility, on MVS/TSO and VM/CMS, provides a DCF-like command interface that is simple and easy to use, yet which is also powerful enough to allow you to create high-quality presentations. These can then be used from displays (perhaps using the built-in automatic scrolling feature), or can be saved for printing or plotting on overhead projection transparencies or paper in one of the many output formats supported by GDDM, such as ADMGDF, PSEG, IPDS, AFPDS, PostScript, and others.

See the *GDDM-PGF OPS User's Guide* for a full description of this utility.

### GDDM conversion utilities

There are many conversion utilities supplied with GDDM. These programs convert your data into formats that can be displayed on a screen, printed, plotted, and so on. The utility you need to use for a particular purpose depends on the task you want to perform and on the type of operating system or subsystem you are using.

## Converting GDDM objects and other files

GDDM supplies several conversion utilities. These support:

- Conversions between some object formats.
- Conversions between some object formats and Picture Interchange Format (PIF) or Computer Graphics Metafile (CGM) format. Such conversions allow interchange with other, non-GDDM applications.
- Conversions from some object formats to formats suitable for page-printer output. Such page-printer formats include PSEG38PP, PSEG3820, PSEG4250, LIST38PP, LIST3820, and LIST4250.

This section identifies GDDM-supported conversions and introduces the GDDM utilities that you use to perform them. For a more comprehensive description of conversions supported by IBM products, see the International Technical Support Centers (ITSC) Printing Library *Document Transforms Cookbook*, GG24-3530.

Table 1 summarizes which conversions are possible. Not every conversion identified here is accomplished in one step. Figure 1 on page 6 is a “route map” that shows the steps involved in the conversions identified as possible in Table 1.

<i>Table 1. Summary of GDDM-supported format conversions</i>											
<i>From ↓ to →</i>	<i>ADMGDF</i>	<i>ADMIMG</i>	<i>CGM</i>	<i>LIST38PP</i>	<i>LIST3820</i>	<i>LIST4250</i>	<i>PIF</i>	<i>PSEG38PP</i>	<i>PSEG3820</i>	<i>PSEG4250</i>	<i>GIF</i>
ADMCDATA	•	•	•	•	•	•	•	•	•	•	
ADMCFORM	•	•	•	•	•	•	•	•	•	•	
ADMGDF		•	•	•	•	•	•	•	•	•	•
ADMIMG				•	•	•		•	•	•	
CGM	•	•		•	•	•	•	•	•	•	
PIF	•	•	•	•	•	•		•	•	•	
PSEG3820		•		•	•	•		•		•	

## converting

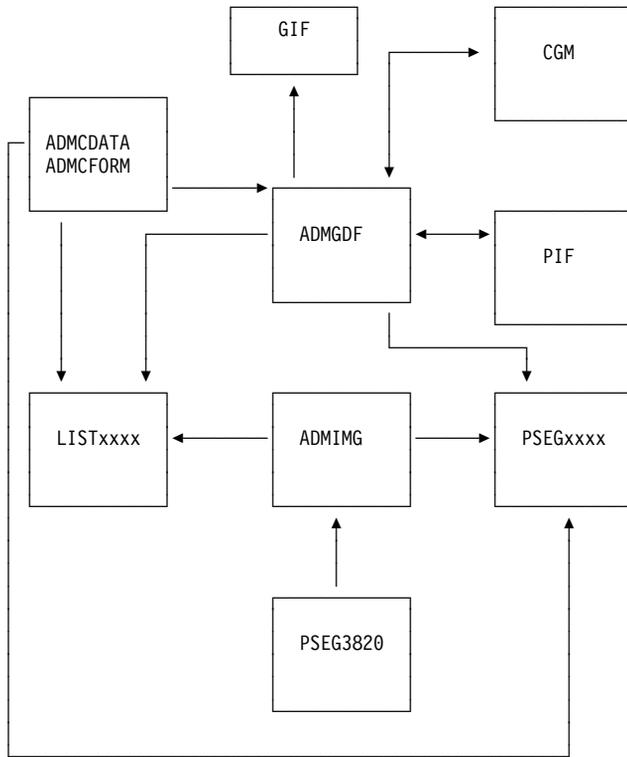


Figure 1. A route map for GDDM-supported conversions. *LISTxxxx* includes *LIST3820*, *LIST38PP*, and *LIST4250*. *PSEGxxxx* includes *PSEG3820*, *PSEG38PP*, and *PSEG4250*. *PSEG3820* is also shown separately: it is the only one of the *PSEGxxxx* formats that can be converted to *ADMIMG* format.

Table 2 identifies the GDDM-supplied utilities that support direct (“one-step”) format conversions. In most cases, more than one method is listed. Each of the methods is described briefly following Table 2.

Table 2 (Page 1 of 2). GDDM-supplied conversion utilities

Input	Output	Using
ADMCDATA ADMCFORM	ADMGDF	GDDM-PGF ICU
ADMCDATA ADMCFORM	PSEGxxxx LISTxxxx	ADMUCDSO GDDM-PGF ICU
ADMGDF	PSEGxxxx LISTxxxx	ADMUCDSO GDDM-PGF ICU
ADMGDF	CGM	ADMUGC
ADMGDF	PIF	ADMUPCx

Table 2 (Page 2 of 2). GDDM-supplied conversion utilities

Input	Output	Using
ADMIMG	PSEGxxxx LISTxxxx	ADMUIP GDDM-IVU
CGM	ADMGDF	ADMUCG
PIF	ADMGDF	ADMUPCx
PSEG3820	ADMIMG	GDDM-IVU
ADMGDF	GIF	ADMUGIF

**ADMUCDSO** ADMUCDSO, which is supported in the CMS and TSO environments, invokes the GDDM-PGF ICU noninteractively to format ADMCDATA and ADMCFORM or ADMGDF input for output to a page printer. Output can be in LIST3820, LIST38PP, LIST4250, PSEG3820, PSEG38PP, or PSEG4250 format. The output format is determined by parameters passed to ADMUCDSO.

A sample EXEC (ADMUCIMV EXEC) and a sample CLIST (ADMUCIMT CLIST) that invoke ADMUCDSO are supplied with GDDM. ADMUCDSO, ADMUCIMV, and ADMUCIMT are described in the *GDDM-PGF Programming Reference* book.

**ADMUCG** Utility ADMUCG, which is supported in the CMS and TSO environments, converts CGM files to ADMGDF format. For more information about ADMUCG, see the *GDDM Base Application Programming Reference* book.

ADMUCG can also be invoked from ADMUPCFx, which is described on page 8.

**ADMUGC** Utility ADMUGC, which is supported in the CMS and TSO environments, converts ADMGDF files to CGM format. ADMUGC is described in the *GDDM Base Application Programming Reference* book.

ADMUGC can also be invoked from ADMUPCFx, which is described on page 8.

**ADMUGIF** Utility ADMUGIF, which is supported in the CMS and TSO environments, converts ADMGDF files to GIF format. For more information about ADMUGIF, see the *GDDM Base Application Programming Reference* book.

**ADMUIP**<sub>x</sub> The image print utility ADMUIP<sub>x</sub> (where “x” is V under CMS, T under TSO, and D under VSE) formats ADMIMG data for output to a page printer. Sample code is provided to invoke ADMUIP<sub>x</sub> as follows:

- ADMUIP, a REXX-language CMS procedure that invokes ADMUIPV.
- ADMUJT10, sample MVS JCL that invokes ADMUIMPT.
- ADMUJD10, sample VSE JCL that invokes ADMUIMPD.

## about GDDM

These samples can be amended to suit your requirements. ADMUIMPx is described in the *GDDM System Customization and Administration* book.

**ADMUPCx** ADMUPCx (which is ADMUPCT under TSO and ADMUPCV under CMS) converts PIF files to ADMGDF format, and ADMGDF files to PIF format. ADMUPCx is described in the *GDDM Base Application Programming Reference* book. In the TSO environment only, a CLIST (ADMUFILE) that invokes ADMUPCT is provided in data set SADMSAM.

ADMUPCx can also be invoked from the ADMUPCFx utility.

**ADMUPCFx** ADMUPCFx (which is ADMUPCFT in data set SADMSAM under TSO, and ADMUPCFV under CMS) is a multipurpose utility that performs both file transfer (between workstation and host) and file conversion. (Refer to the information on transferring files in the *GDDM User's Guide*. It can:

- Convert ADMGDF data to PIF or CGM format, and transfer the results to the workstation
- Transfer PIF or CGM data to the host and convert it to ADMGDF format

On installation, ADMUPCFV is renamed to IND\$FILE EXEC, and ADMUPCFT is renamed to IND\$FILE CLIST.

### **GDDM-PGF ICU**

The GDDM-PGF ICU (Interactive Chart Utility) can be used to convert:

- ADMCDATA and ADMCFORM objects to ADMGDF format
- ADMCDATA, ADMCFORM, or ADMGDF objects to PSEGxxxx or LISTxxxx format.

The ICU is described in the *GDDM-PGF Interactive Chart Utility* book.

**GDDM-IVU** The GDDM Image View Utility (IVU) can be used to convert:

- ADMIMG objects to PSEGxxxx or LISTxxxx format
- PSEG3820 objects to ADMIMG format

The GDDM-IVU is described in the *GDDM Image View Utility* book.

---

## **A few things you should know about GDDM**

This section introduces you to the GDDM concepts of data types, defaults files, and nicknames.

### **GDDM data types**

There are three types of data that GDDM can use:

- Alphanumeric text
- Graphics (text and pictures)
- Images.

Normally, data is formatted using one of these specific data types. To convert the data into a different data type, you may need to use a GDDM conversion utility. See “GDDM conversion utilities” on page 4 for a list of these utilities.

**Note:** GDDM also accepts and generates presentation text, but cannot modify it.

### **Alphanumeric text**

*Alphanumeric text* is character-based data (letters and numbers). You can use it to enter data through the keyboard, and it is displayed as output text in fields on the screen. Some of the attributes of alphanumeric text cannot be changed (for example, the typeface and size). However, you can change some other attributes, such as the color, if your program allows it.

### **Graphics (text and pictures)**

GDDM *graphics* are the lines, shading, areas, colors and so on that make up a picture used by GDDM. Text can also be in graphical form (where each character is a picture), enabling attributes such as color, size, symbol-set, and so on to be specified. You can create and change graphics text with the GDDM Image Symbol Editor and the GDDM Vector Symbol Editor.

GDDM graphics data can be saved or loaded in either:

- Graphics Data Format (ADMGDF)
- Computer Graphics Metafile (CGM) format.

GDDM can convert ADMGDF data to or from Picture Interchange Format (PIF).

### **Images**

GDDM *images* are monochrome and are normally captured using a scanner. The data is saved as an arrangement of dots, and can be edited.

## **GDDM external defaults file (ADMDEFS)**

When you are initially given access to GDDM, your system support personnel may set up a GDDM *external defaults* file for you. This resides on your host computer system and can contain some of the default values that GDDM uses. Default values may be needed in cases where a value is not provided by you or your GDDM application.

Default values can include such things as:

- The destination (printer or plotter) for your GDDM hardcopy output
- Whether you can use User Control
- Whether you can use Fast Path
- Whether you can use Operator Windows.

## about GDDM

### Notes:

1. The defaults file name for CMS is PROFILE and the type is ADMDEFS.
2. For TSO, the default ddname is ADMDEFS.
3. Defaults files are not available under IMS.  
Under CICS, they are suitable for diagnosis or testing only.
4. For further information about external defaults files, see the *GDDM System Customization and Administration* book.

### GDDM nicknames

GDDM *nicknames* are one of the elements that make up the external defaults file or external defaults module. Each nickname contains a default value. Nicknames should initially be set up by your system support personnel. They can be deleted or altered at any time, and new nicknames added to the file.

For information about nicknames, see the *GDDM System Customization and Administration* book.

## Chapter 2. Manipulating GDDM data

This chapter outlines how you can use GDDM to display data. It also describes how you can view, control, and save displayed data using GDDM's *User Control* facility.

---

### Displaying data with GDDM

You can display some types of GDDM data using the utilities provided as part of GDDM Base. However, to display other types of GDDM data, you need an application or other utility (such as the GDDM-PGF Interactive Chart Utility). The GDDM Base utilities can display:

- Computer graphics metafile (CGM) data
- Graphics data format (ADMGDF) data
- Composite documents which combine text and graphics.

### Displaying CGM and ADMGDF data

If you want to display CGM or ADMGDF data, ask your system support personnel for help. Although the utilities to display data in these formats are supplied with GDDM Base, the names of the utilities and the procedure for invoking them may have been changed at your enterprise.

### Displaying composite documents

Use the Composite Document Print Utility (CDPU) to both print and preview a *composite document*. A composite document combines text and pictures on one page or set of pages. See "Printing and previewing with CDPU" on page 40 for information. If you have problems with CDPU, see your system support personnel.

### Displaying data using GDDM-PCLK

A workstation running GDDM-PCLK can display data in the same way as a terminal, but you have a choice of running in *merged* mode or *non-merged* mode.

**Note:** The use of non-merged mode is no longer necessary or recommended.

See the *GDDM System Customization and Administration* book for more information about merged mode, and for other information specific to GDDM-PCLK.

## Cursors

There are three types of cursor provided within GDDM, as follows:

- Alphanumerics
- Graphics
- Image.

The alphanumerics and graphics cursors are shown in Figure 2 on page 12. All three cursors are described in the subsequent sections.

## cursors

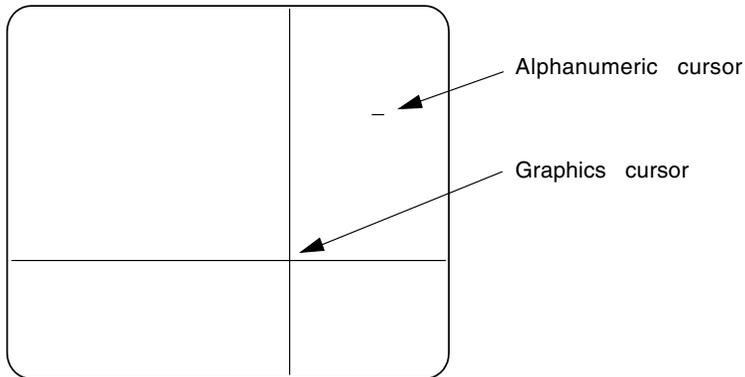


Figure 2. The alphanumerics and graphics cursors

### Alphanumerics cursor

Use the alphanumerics cursor for input to menus and panels. Move the cursor around the screen using the four cursor control keys. Use the cursor tab keys to jump between fields.

### Graphics cursor

Use the graphics cursor for graphics input. For example, use it to tell GDDM where to start and stop lines, or how far to move a curve. Use a pointing device (for example, a mouse) or the keyboard cursor control keys to move the graphics cursor around the screen.

**Note:** If you use GDDM-PCLK without a mouse driver loaded, use the cursor control keys to move both the graphics and alphanumerics cursors. Ctrl+F2 controls which of the two cursors is moved. When the graphics cursor is moved by the cursor control keys, "+CR" is shown in the *Operator Information Area* (OIA) at the bottom of the screen.

### Image cursors

If you are using an IBM 3193 Display Station, you can use the two image cursors (a box and a cross).

Use the cursor movement keys to move the image cursors. (When an image cursor is active, "+CR" is shown in the *Operator Information Area* at the bottom of the screen.)

Pressing the **Shift** key plus cursor movement keys allows you to increase or decrease the size of the box.

---

## Running User Control

When data is displayed on your screen, you can start GDDM's User Control, which superimposes a menu over part of the displayed data. The menu gives you access to commands and other menus which carry out common tasks on your displayed data, such as printing, plotting, and saving.

You can start the GDDM User Control facility at any time to perform various tasks with displayed data. Create and display the data using an application or utility, such as the GDDM-PGF Interactive Chart Utility. You can then use User Control to view the data in a particular way (such as "Zoom in") or to print, plot, or save the data. The important points to remember are that:

- You need an application or utility to create the data
- You need an application or utility to display the data
- You can start User Control at any time
- User Control runs while your application or utility is running
- All the tasks you can perform in User Control involve only the picture that is displayed on your screen
- Whatever you do in User Control, the data used by the application or utility in the displayed picture remains unchanged.

## What you can do with User Control

When data is displayed as a picture on your screen and GDDM is in User Control mode, you can:

- Scroll up and down the picture.
- Zoom in on the picture.
- Zoom out of the picture and control the quality of the picture by changing the display resolution.
- Move graphics around the screen.
- Save the displayed picture.
- Print or plot the picture (described in "Printing and plotting with User Control" on page 37).
- Run more than one application at a time, each one in a User Control Window (if you are running a *task manager*. See "Using operator windows" on page 16 for a description of this).

If you are using GDDM-PCLK or GDDM-OS/2 Link to access GDDM applications or utilities, there are some alternative functions available to you. The differences are documented in this chapter (for GDDM-PCLK) and in the online *GDDM-OS/2 Link User's Guide* (for GDDM-OS/2 Link).

# User Control

## Starting User Control

When your pictures are displayed on the screen, you can start User Control, as follows:

1. Press the *access key*. The access key is by default PA3, but it may be another key. If you are using GDDM-PCLK, see “Keyboards” on page 57 for information about the PA3 key and keyboard mapping. If you are using GDDM-OS/2 Link, see the online *OS/2 User's Guide* for information about key settings. If you are unsure which system you are using, ask your system support personnel.

If you are using a workstation, press the access key from within a host session.

2. User Control starts and a menu is displayed at the bottom of the screen. There are five User Control menus (see Figure 3). Which one is displayed depends on how your system is set up, and on the type of terminal or workstation you are using.

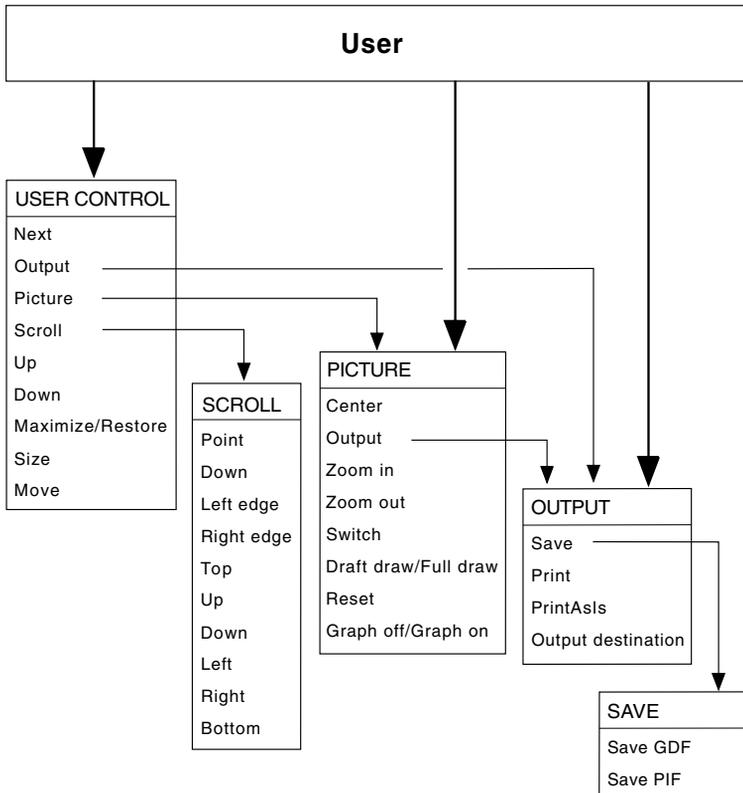


Figure 3. The five User Control menus

If your system has been set up to use the Operator Window commands, the User Control main menu is displayed (see Figure 4 on page 15). You can find more information about operator windows in “Using operator windows” on page 16.

```

==User Control1=====
PF1=No menu    2=Next      3=End        4=Output    + 5=Picture  + 6=Scroll  +
PF7=Up        8=Down      9=Escape    10=Maximize 11=Size    12=Move

```

Figure 4. The User Control main menu

If your system has not been set up to use Operator Window commands, and you are using a display device that supports GDDM graphics, the User Control Picture menu is displayed (see “Using Picture commands” on page 22).

If neither the Operator Window nor the Picture command is available to you, the Output menu is displayed (see “Saving displayed data” on page 26 or “Printing and plotting with User Control” on page 37).

3. The following message may be displayed on the menu:

If Pxx is intended for the current application, press PF9

(where Pxx = your access key, default is PA3).

This message tells you that, if the key designated as your access key has been set up for use by your application or utility, there is a conflict of key designations. If this is the case, select “Escape” (PF9) to end User Control and return to your application, which then responds to the key that you pressed. If this happens, ask your system support personnel to change your access key to one that is not used in your application.

Select “Scroll” if you want to use the Scroll menu (see “Using Scroll commands” on page 21 for more information).

## Moving between the User Control menus

To move to a different menu, select it from the currently displayed menu. For example, to move from the User Control main menu to the Picture menu, select “Picture” (PF5). Commands that display another menu are indicated by a plus sign (+).

## Hiding and restoring User Control menus

The menu displayed by User Control may cover part of the displayed data. To use the entire screen for your application, you can hide the menu by selecting “No menu” (PF1). You can still use the User Control PF keys.

To display a hidden menu, press the PF1 key again.

## Selecting and canceling User Control commands

Select a command from a User Control menu in any of the following ways:

**Note:** The alpha cursor must be in a partition that is under User Control.

- Press the indicated PF key.
- Move the cursor to the command word and press **ENTER**.

## User Control

- Use a mouse to move the graphics cursor to the command word, and press mouse button 1.
- Use a four-button cursor (puck) to move the graphics cursor to the command word, and press button 1 on the four-button cursor.
- Use a stylus to move the graphics cursor to the command word, and press the stylus tip down onto the tablet.

**Note:** Using a mouse, puck, or stylus as described above has the same effect as moving the cursor to a command word, and pressing **ENTER**.

If the command you select has more than one step (that is, if you have to do something more than just select the command before it can be completed), the command word is highlighted and an instruction message is displayed on the menu.

To cancel a command before its completion, reselect it. If you select a new command before completing the previous one, the previous command is canceled.

## Using operator windows

If you have access to a task manager, you can run one or more application programs or utilities at the same time. If you are unsure whether you have access to a task manager, ask your system support personnel.

Using the task manager, you can define User Control *operator windows* on the screen, with each window displaying a different application (see Figure 5 on page 17).

There can be only one window *active* at any time. The active window is identified by its border. On devices that support GDDM graphics, the active window border is a broken line surrounded by an unbroken line. On devices that do not support GDDM graphics, the border is made up of asterisks (\*).

Borders of inactive windows consist of a single unbroken line only. All windows have a title area in the left part of the top border. Whether windows have titles in the title area depends on the task manager you are using. If the window has no defined title, it is shown as 'XXXXXX'.

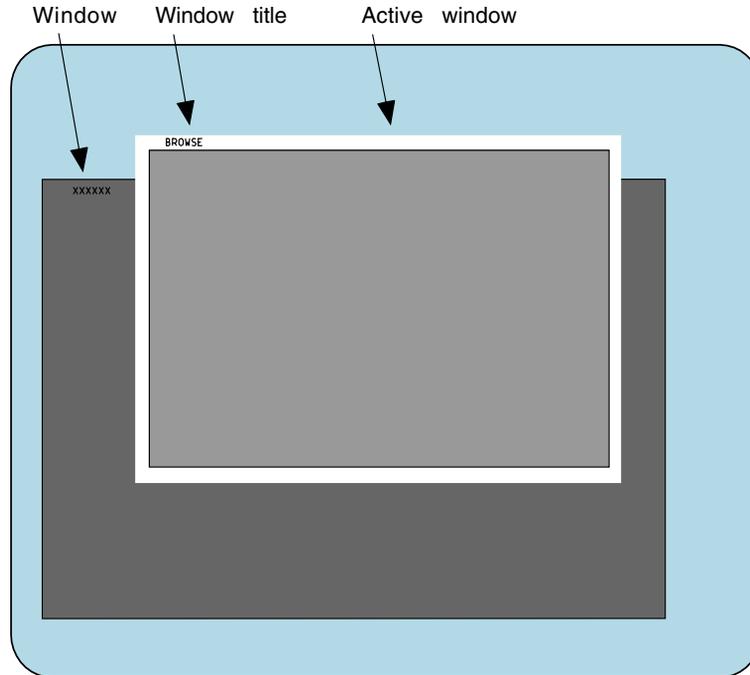


Figure 5. Two operator windows

When the operator windows have been set up in the task manager (see the task manager's documentation for information about this), you can start User Control and use the commands on the User Control menu. Remember that what is displayed in the window may be only part of your application.

You can type into the active window, but your typed data cannot be accepted by your application. This is because User Control provides “viewing-only” commands. To work on your application, you must first leave User Control.

You cannot type into inactive windows, or manipulate them or their contents on the screen. However, you can make a different window active by using the “Next” command on the User Control menu. If you work your way through all the windows, the task manager itself may be in one of them. You can then use it to start another application, or to define yet another window.

### Making the next window active

Select “Next” (PF2) from the User Control menu to make the next window active.

**Note:** You can also make any window into the active window by placing the cursor anywhere within the window and pressing **ENTER**. You do not have to be in User Control to do this.

### Scrolling up the active window

To scroll toward the top of the data (by half the height of the window), select the “Up” command (PF7) from the User Control or Scroll menus (see Figure 6).

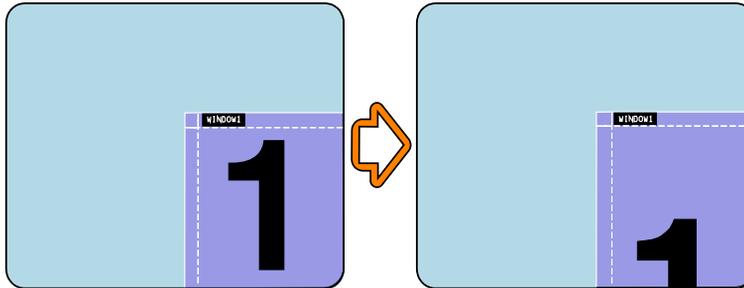


Figure 6. Scrolling up the active window

### Scrolling down the active window

To scroll towards the bottom of the data (by half the height of the window), select “Down” (PF8) from the User Control or Scroll menus.

### Maximizing the active window size

To increase the active window to its maximum size (as defined by the program that created the window), select “Maximize” (PF10) from the User Control menu (see Figure 7 on page 19). This size is not necessarily the full size of your screen. The data is returned to the original position in the window (that is, before any scrolling took place) and any zooming already in force is retained.

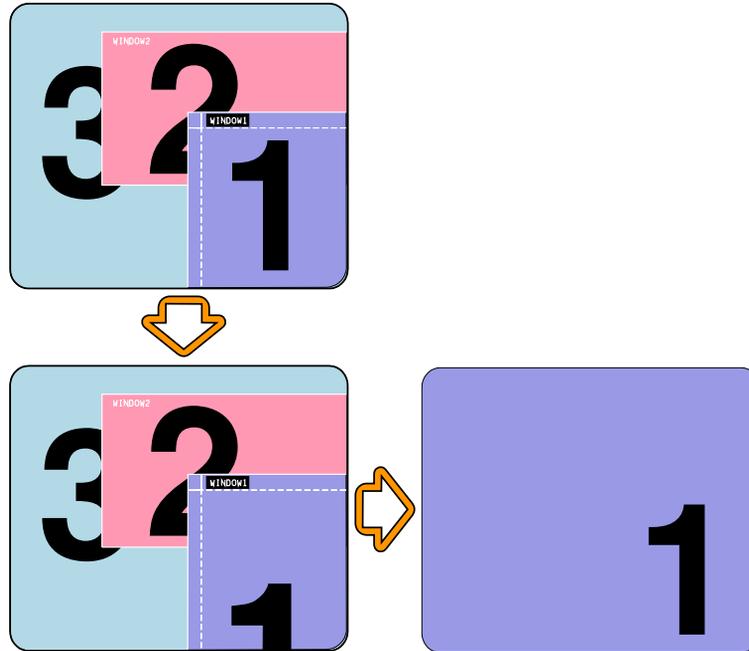


Figure 7. Maximizing the active window size

### Restoring the active window size

When you maximize a window, PF10 changes from “Maximize” to “Restore”. Invoking “Restore” alters the size of an active window, so that it reverts to its previous size (before the “Maximize” command was used). Any scrolling in force before the “Maximize” command is also restored.

When your window is maximized, “Restore” (PF10) is displayed in the menu. However, when you first start User Control, “Maximize” (PF10) is displayed, even if the active window is at its maximum size.

### Sizing the active window

To make the active window bigger or smaller:

1. Select “Size” (PF11). (If you can already see the window border, go directly to step 2.)
2. Place the cursor on or near the edge you want to move.
3. If you place the cursor in a corner box, you can move two sides at once. You can do this only if you can see the box in the corner of the window border. If the box is not visible, you can move only one side at a time.
4. To make your selection, press **ENTER**.

## User Control

5. The sides to be moved are highlighted. Move the cursor to the new position required.
6. To make the move, press **ENTER**.

**Note:** If you want to move the bottom border and it is not in view, do not place the cursor in the menu area to select the border, because you cannot use the bottom of the screen while the menu is displayed. Instead, suppress the menu by selecting “No menu” (PF1), or position the cursor just above the menu to select the bottom border. To make sure that you don’t select a side border, position the cursor halfway across the width of the window.

### Moving the active window

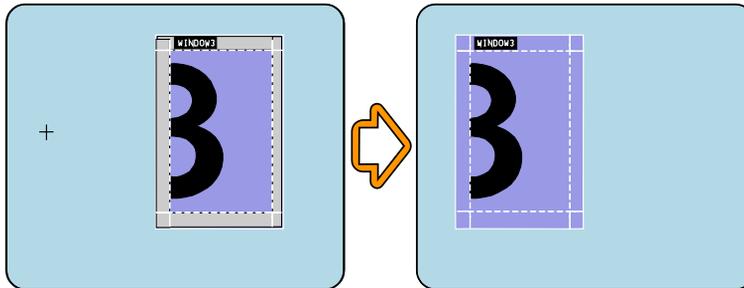


Figure 8. Moving the active window

To move the active window (as in Figure 8):

1. Select “Move” (PF12) from the User Control menu. The complete window border is highlighted, and the following message is displayed:  
Select anywhere within the current window or its border
2. Place the cursor in the window or its border and press **ENTER**.
3. When prompted, move the cursor to the new position required.
4. To make the move, press **ENTER**.
5. The point where you first placed the cursor is moved to the new cursor position.

**Note:** Window borders can be moved off the screen, but the window contents cannot. If you try to position the window so that some of the contents would be off the screen, the border disappears, the data is moved as close as possible to the edge of the screen, and the following message is displayed:

The window has reached the edge of the screen

The Fast Path facility is available with the “Move” command (see page 26). You can also use a shortcut to move the active window. You do not have to select the shortcut command explicitly if part of the window border is showing. You do not even have to be in User Control at all to use the shortcut, but the window title area must be visible.

To use the shortcut to move a window:

1. Place the cursor in the title area of the window border.
2. Press **ENTER**.
3. The complete window border is highlighted. Move the cursor to the new position for the border. (The point of the title area where you placed the cursor moves to the new position that you select.)
4. Press **ENTER**.

## Using Scroll commands

You can do basic up-and-down scrolling from the main User Control menu. The Scroll menu is specifically for scroll commands, which give you greater control of scrolling and enable you to position your data more precisely in the window. To display the Scroll menu, select "Scroll" (PF6) from the User Control menu. The commands available from the Scroll menu are as follows:

### Point (PF2)

Use this to move data around inside an active window. To do this, move a specific point in the data to a new position. You can use the Fast Path facility with this command (see "Using the Fast Path facility" on page 26). To move data around the active window:

1. Select "Point" (PF2).
2. Move the cursor to the point of data you want to move.
3. Press **ENTER**.
4. Move the cursor to the new position for the data.
5. To make the move, press **ENTER**.

### Left Edge (PF4)

Use this to move the data sideways until the left edge of the data is in the window.

### Right Edge (PF5)

Use this to move the data sideways until the right edge of the data is in the window.

### Top (PF6)

Use this to move directly to the top of the data.

### Up (PF7)

Use this to move the data in the window toward the start of the data. The data is moved by half the depth of the window.

### Down (PF8)

Use this to move the data in the window toward the bottom of the data. The data is moved by half the depth of the window.

### Left (PF10)

Use this to move the data in the window toward the left edge of the data. The data is moved by half the width of the window.

## User Control

### Right (PF11)

Use this to move the data in the window toward the right edge of the data. The data is moved by half the width of the window.

### Bottom (PF12)

Use this to move directly to the bottom of the data.

## Using Picture commands

The Picture menu has commands that enable you to manipulate displayed graphics.

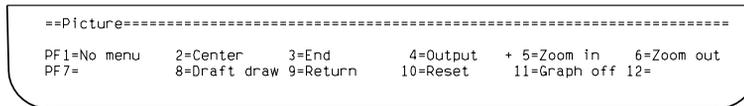


Figure 9. The Picture menu

Different display devices may have different commands on the Picture menu. The displayed menu shows the commands available to you on the display device you are using. See Appendix B, “Hardware notes” on page 55 for information about display devices.

The commands available from the Picture Menu and how to use each command are described on subsequent pages.

### Centering a picture

To move a picture so that a given point lies in the center of the window:

1. Select the “Center” command (PF2).
2. A cross is displayed to indicate the center of the visible graphics area. Move the cursor to the point you want to center.
3. Make the move by pressing **ENTER**.

**Note:** Centering becomes less precise if you use the zoom feature.

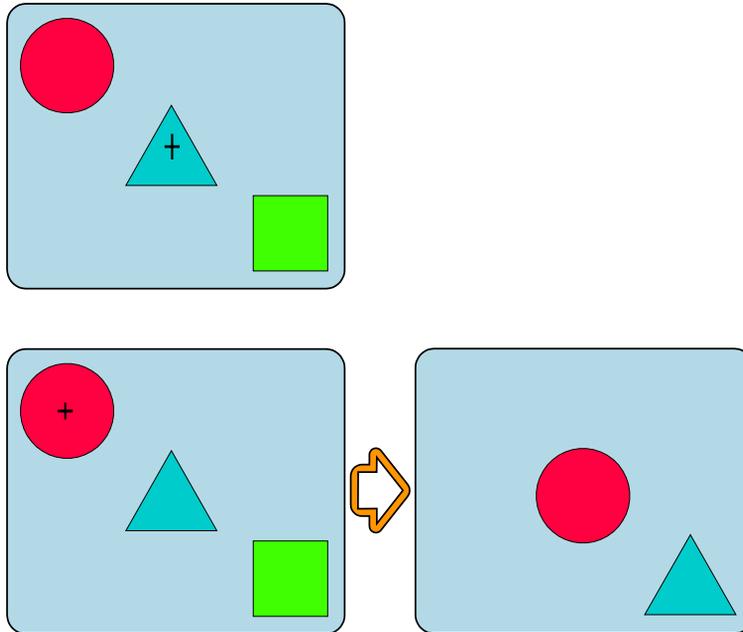


Figure 10. Centering a picture

### Zooming in on a picture

To zoom in on part of a picture:

1. Select “Zoom in” (PF5).
2. Use the cursor as instructed, or rubber box (see note) to define the area you want to enlarge.
3. Zoom in by pressing **ENTER**.

**Note:** A rubber box, also referred to as rubber banding, is where the sides surrounding the area to be viewed are “flexible” and can be changed to alter the viewing area.

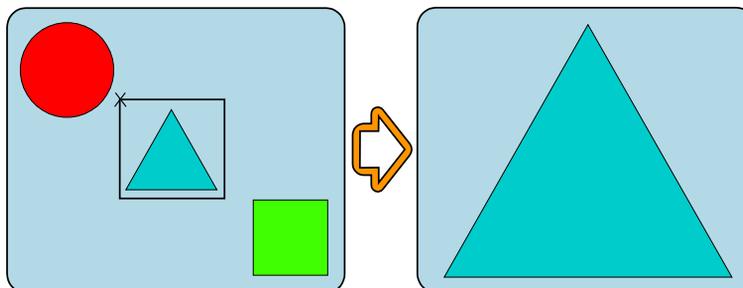


Figure 11. Zooming in on part of a picture

## User Control

With “Zoom in” the proportions of your picture are retained.

**Note:** As you zoom in more closely, centering may become less precise.

### Zooming out of a picture

You can reduce the scale of a displayed picture, and also have some control over the screen resolution of the graphic (see “Controlling the appearance of images” for information about controlling the screen resolution). To reduce the scale of a picture, so that more of it is visible:

1. Select “Zoom out”(PF6).
2. Use the cursor as directed or rubber box to define the area that is to contain your graphic.
3. Press **ENTER**.

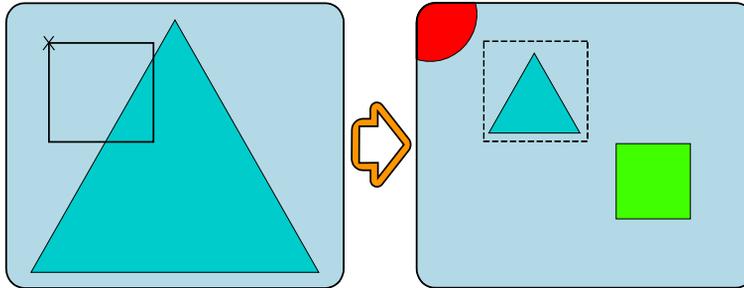


Figure 12. Zooming out from a picture

With “Zoom out” the proportions of your picture are retained. If you define a long narrow area to contain a wide picture, the result is a very small version of the picture, as shown in Figure 13.

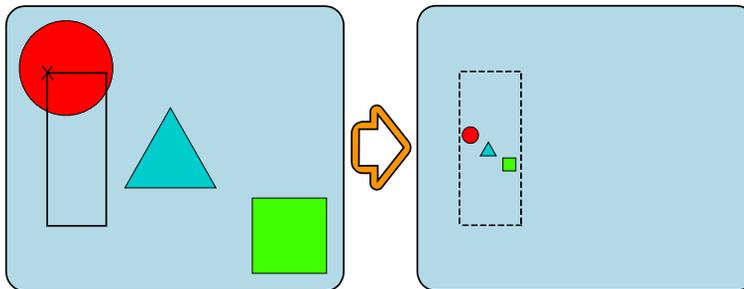


Figure 13. Retaining the proportions in zoomed graphics

### Controlling the appearance of images

When you use the “Zoom out” command on an image, you can define which color of pixel (black or white) is to be retained in preference to the other color. You can also specify that no preference is to be given to either color. These settings affect the

appearance of the displayed image. For example, it is likely that if you are zooming out of an image that has a white background and black writing (as in most scanned documents), the appearance of the image is improved if the default setting of black pixels is selected.

**Note:** Some images have a striped effect when you are zooming out.

Each time you select the “PixRet” (PF12) choice on the Picture menu, the currently offered option is selected and the next option is displayed on the Picture menu. The image is redrawn on the screen whenever you select one of the options. Each time you press **PF12**, the options are selected in the order shown here:

<b>PixRet BI</b>	Black pixels are retained in preference to white pixels.
<b>PixRet Wh</b>	White pixels are retained in preference to black pixels.
<b>PixRet Rp</b>	The default (Rp stands for <i>replicate</i> ). Neither black nor white pixels are given preference when zooming out.

### Undoing changes to a picture

To cancel Picture menu commands and display your picture as it was when User Control started, select “Reset” (PF10).

### Using the draft draw facility

Use the “Draft draw” command on the Picture menu to specify that you want to redraw the graphics that you have changed.

This may be useful in applications such as graphics editors (for example, the GDDM sample program, ADMUSP4), when a lot of redrawing takes place. You set “Draft draw” on and off from within User Control, but your application specifies when it is used.

“Draft draw” is only available on your particular display device if it is shown in the Picture menu.

You may get some unexpected results when “Draft draw” is set on. For example, there may be ragged edges on a picture, colors may change where they overlap, and alphanumeric characters may no longer be displayed. These results occur because the graphics have been simplified. This does not affect the data that is used to display the picture, just the displayed picture itself.

To set “Draft draw” on:

1. Select “Draft draw” (PF8) from the Picture menu.
2. The PF8 command on the menu changes to “Full draw”.
3. Return to your application (PF9). Continue working as usual—you are now in “Draft draw” operation. To return to normal operation, select “Full Draw” (PF8) from the Picture menu.

The “Draft draw” facility can be permanently switched on. If you want to do this, ask your system support personnel for help.

# User Control

## Using the Fast Path facility

When you are familiar with the User Control commands, you may want to try the *Fast Path* facility. Your system may have been already set up so that User Control operates with Fast Path set on.

Fast Path removes the need to define data to be moved around the screen, because GDDM assumes you have already positioned the cursor ready to select a point of data. You are not prompted to select a point. Instead, when you select a command, you see a message asking you to select a new position, or the diagonally opposite corner of the area you are defining, depending on which command you selected.

Fast Path takes effect only if you select commands with PF keys. This means that if Fast Path is on, you can easily switch between working in Fast Path mode (using the PF keys), and normal mode (using a four-button cursor, mouse, or stylus).

You cannot switch Fast Path on and off while you are in User Control; it is on all the time or not at all. If you want to use Fast Path, add this statement to your defaults file:

```
NICKNAME PROCOPT=((CTLFAST,YES))
```

The commands you can use with Fast Path are as follows:

- Size (User Control menu)
- Move (User Control menu)
- Center (Picture menu)
- Zoom in (Picture menu)
- Zoom out (Picture menu)
- Point (Scroll menu).

## Saving displayed data

Displayed graphics (but not images) can be saved in Graphics Data Format (ADMGDF), or in Picture Interchange Format (PIF) if you are using GDDM-PCLK or GDDM-OS/2 Link. Remember that User Control commands apply only to what is displayed on your screen (or active window), and this may be only part of the picture.

To save displayed data:

1. Select the Output menu from the User Control menu or Picture menu.
2. Select "Save GDF" (PF2) from the Output menu. The Save menu is displayed, as in Figure 14.

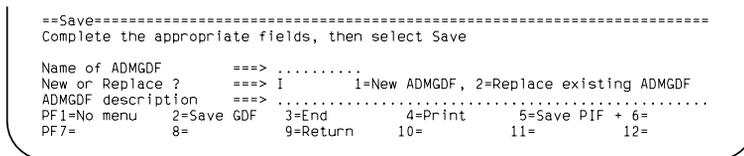


Figure 14. The Save GDF menu

3. In the “Name of ADMGDF” field, type the name you want to give to the saved data. If you are using GDDM-PCLK or GDDM-OS/2 Link and you want to save the data in PIF format, don’t type the name, but go to step 7.
4. In the “New or replace ?” field, type 1 if the name is a new name, or 2 if there is existing data that you want to replace.
5. In the “ADMGDF Description” field, type a description of the data, if you want one.
6. Select “Save ADMGDF” (PF2) to save the displayed data in an ADMGDF format.
7. If you are using GDDM-PCLK or GDDM-OS/2 Link, you can save the file in either ADMGDF format or PIF format (on screens with a width of 80 characters or less and depth of 32 characters or less). To save the data in PIF format, select “Save PIF” (PF5). In the panel displayed, type the directory path and file name.

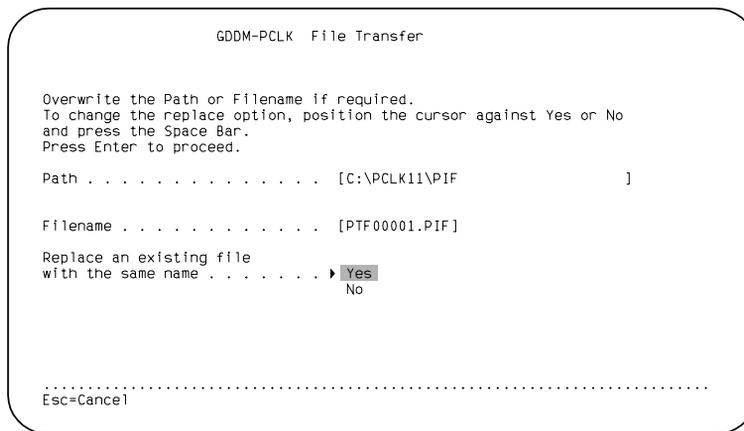


Figure 15. The Save PIF menu

## Ending User Control

You need to exit all the User Control menus if you want to work on your current application.

Use the following commands or keys to end User Control, or to exit the current menu:

- Return**      Select “Return” (PF9) to exit User Control and return to the application you are running.
- End**            Select “End” (PF3) to return to the previous User Control menu. Selecting “End” from each menu in turn exits User Control and returns you to your application.
- PA3**            If your terminal or workstation has a PA3 key, press PA3 to exit User Control. This has the same effect as selecting “Return”.

## problems

There are two things you should be aware of when ending User Control:

- The setup and contents of your windows remain as they are. They do not revert to their original state.
- If you select “Return” or “End” before completing a command, User Control tries to complete the command.

---

### Unexpected results in User Control

If you get unexpected results in User Control, check the symptoms listed below. This section describes the likeliest cause of the symptoms, and some actions you can take.

#### **Your application does not respond, yet you have taken the correct action.**

User Control is probably active.

- If the User Control menu is visible on the screen, select “Return” (PF9) to leave User Control.
- If the menu is not visible, you may have suppressed it. Press PF1 to restore the menu to the screen, then select “Return” (PF9) to return to your application.

#### **User Control seems to be active, but there is no User Control menu on the screen.**

The User Control menu has probably been suppressed. Press PF1 to restore it to the screen.

#### **During Center, Zoom in, or Zoom out commands, the command is canceled.**

- Make sure that you have not tried to move data or an operator window to or from a position within the User Control menu area.
- If you tried to mark a position inside the menu area, you may have selected a User Control command by mistake. To mark a position on this part of the screen, you must first suppress the menu, by selecting “No menu” (PF1).

#### **You selected a command and received the command’s second prompt, without being asked to make your initial point selection.**

User Control is operating with *Fast Path* set on. This means that, when you select a Fast Path command using a PF key, User Control assumes that you have already positioned the cursor to select the point you want to move.

*Fast Path* operates only if you select User Control commands by pressing PF keys. If you do not want to use *Fast Path*, select commands by another means. See “Using the Fast Path facility” on page 26 for further information.

Alternatively, if you are a VM or TSO user and do not want to use *Fast Path* at all, add this statement to your defaults file:

```
NICKNAME PROCOPT=((CTLFAST,NO))
```

#### **The “input inhibited” indicator appears in the operator information area at the bottom of the screen.**

You have probably tried to type in the area of an inactive operator window.

You can type in the active window only. However, your application cannot accept data while you are in User Control. If the window into which you typed is the one you want, you must make it the active window. To do this, move the cursor inside that window and press **ENTER**.

**Data is lost on starting User Control**

You have probably typed in data, then pressed a PA key to get into User Control, without first pressing **ENTER**.

If the User Control access key is a PA key, you must press **ENTER** to have your data accepted. However, if you define a PF key as the User Control access key, this problem does not arise, because your data is accepted by the application when you start User Control. Your system support personnel can define keys for you.

**Part or all of the graphics disappear, for example, when selecting the Output menu, or leaving User Control, or selecting the Reset command.**

This can happen when GDDM has to rewrite the entire screen, and the application program you are using has not described the graphics to GDDM in a suitable manner. This problem can be corrected only by changing the application program.

**Zooming in or out appears to have no effect.**

The application program you are using has not described the graphics to GDDM in the correct way. This problem can be corrected only by changing the application program.

**problems**

---

## Chapter 3. Printing and plotting GDDM data

This chapter describes what you need to do to output your GDDM data on graphics printers, page printers, and plotters. Any differences between printing and plotting are noted where they occur in the chapter.

**Note:** You cannot plot alphanumerics in any part of GDDM except using GDDM-OS/2 Link. (For a description of alphanumerics, see “A few things you should know about GDDM” on page 8.)

To produce printed or plotted output, you must carry out the following steps:

1. Create the data using an application or utility, such as the GDDM-PGF Interactive Chart Utility.
2. Convert the data into a format that can be used by GDDM or a system utility, such as the GDDM Composite Document Print Utility or the Print Services Facility (PSF). Use an application or utility to convert the data, such as the “Print” command in User Control or the GDDM Image Print Utility.
3. Send the data to a printer using a GDDM or system utility, such as the GDDM Print Utility, or the Print Services Facility (PSF). This step and step 2 may be treated as one step, depending on:
  - The print device you have specified
  - The operating system running GDDM
  - The conversion utility you use to format the data
  - The customization of GDDM at your enterprise.

You may be able to convert the data and automatically send it to a printer in one operation. If not, you need to manually invoke the process that sends the formatted output to a print device. If you request printing with User Control, the output is automatically routed to the printer you specify, without any need to invoke another utility manually.

The items that define whether you can print automatically or manually are discussed in this chapter.

---

### Print device families

Each printer or plotter used by GDDM belongs to a *device family*. A device family is a group of print devices that share certain common criteria in such a way that GDDM can send data in a format appropriate for the device. The particular family that your device belongs to should be specified in a *nickname*. (For an explanation of nicknames, see “GDDM nicknames” on page 10.)

Your system support personnel should set up the nickname that specifies the appropriate family for your print device. You do not have to know about the family your device belongs to, but it may help you to understand why you may need a GDDM or non-GDDM utility to print your data.

## print device families

There are four device families, the general characteristics of which are shown here. There are some exceptions to these descriptions. If you need further guidance, see your system support personnel.

### Family-1

This family is for printers and plotters that are attached **directly** to your terminal (or user ID on VM systems). The output you create is automatically printed, without requiring a separate print utility.

### Family-2

This family creates output that is **formatted for GDDM** and **written to disk**. This means that the GDDM Print Utility is needed to direct the output from the disk and print it. This utility can be invoked automatically, or you may have to run it yourself. This depends on the operating system under which GDDM is running, and on how GDDM is customized at your enterprise. Family-2 print devices are commonly used for graphics output.

### Family-3

This family creates **text-only** output, such as that used on system line printers. Depending on the operating system under which GDDM is running, the output either is automatically printed or needs a utility to print it.

### Family-4

This family creates print files in the following formats:

- PostScript
- Advanced Function Printer Data Stream (AFPDS)
- Composite Document Presentation Data Stream (CDPDS)

Each type of datastream must be processed differently.

The PostScript file must be sent to a PostScript printer. If the PostScript printer is attached to a workstation, the file should be downloaded to the workstation in binary format.

AFPDS print files can be sent to advanced-function printers (such as, the IBM 3816 or IBM 3825) using a utility such as the Print Services Facility (PSF). This utility may be invoked manually or automatically, depending on the operating system under which GDDM is running, and on how GDDM is customized at your enterprise. Family-4 printing is only available on VM and TSO.

CDPDS print files are processed by the Composed Document Print Facility, which supports 4250 printers.

## Primary and Secondary datastream

Family-4 print files can be either primary or secondary datastream.

### Primary datastream

Complete documents that can be printed (PostScript (PS), AFPDS, or CDPDS files).

### Secondary datastream

A datastream made to be imbedded in or overlaid on a primary datastream. This could be an encapsulated PostScript (EPS) file or a page

segment (PSEG) (to be used as an illustration in a book) or it could be an overlay file (to be used as a security heading or the outline of a form).

Family-4 AFPDS and CDPDS files can be browsed using CDPU (see “Printing and previewing with CDPU” on page 40).

---

### How operating systems affect printing

The operating system or subsystem under which GDDM is running affects certain aspects of printing. Any deviation from the information in “Print device families” on page 31 for a particular system is shown here.

### Printing and plotting under TSO

#### Family-2 output

When the GDDM data is formatted by an application or utility, the output is stored as a sequential data set. A pointer to it is inserted in a request queue data set, which is interrogated by the output print utility. This is used as input when the GDDM Print Utility is invoked to create a *data stream* for the print device. The utility can be run automatically or it may have to be invoked, depending on how your system is set up.

The output may also be automatically sent to a printer or plotter using the JES/328X Print Facility Version 2 Release 2 (Program Number 5785-BAC), or it can be transferred to a VM system, for processing there. the JES/328X Print Facility, Ask your system support personnel to set up the appropriate nicknames in your defaults file so you can use the JES/328X Print Facility to:

- Manually send print files to the printer
- Have your print files queued until there is a specific type of paper in the printer
- Spool your print files to other programs to be printed

#### Family-4 output

When the GDDM data is formatted by an application or utility, it can be stored as a data set, or sent directly to a print utility such as PSF, by allocating the output DDNAME to a suitable SYSOUT class.

### Printing and plotting under CMS

#### Family-1 output

If you have the exclusive use of a print device attached to your VM user ID, the output automatically prints on the device.

#### Family-2 output

The conversion utility or application creates an ADMPRINT file, and there are three ways that it can be sent to a print device:

##### Automatically with processing options

This is the preferred method and requires the appropriate *processing options* (procopts) to be used in nicknames. A processing option describes how output for a particular device is

## printing with different systems

to be processed, and should be set up by your system support personnel. For more information about processing options, see the *GDDM System Customization and Administration* book.

### **Automatically with ADMQPOST EXEC**

When an ADMPRINT file is created, GDDM automatically runs ADMQPOST EXEC, if it is available. This should be set up by your system support personnel.

### **Manually**

This means that the ADMPRINT file has been created on your A-disk and you can print it by running the ADMOPUV print utility. Ask your system support personnel if you need help with this.

### **Family-4 output**

The conversion utility or application creates an ADMIMAGE file, and there are two ways it can be sent to a print device:

#### **Automatically with processing options**

This is the preferred method and requires the appropriate processing options (procopts) to be used in nicknames. A processing option describes how output for a particular device is to be processed and should be set up by your systems support personnel. In this case, the relevant processing options are CPSPOOL and CPTAG. For more information about these, and other, processing options, see the *GDDM System Customization and Administration* book.

#### **Manually**

This means the ADMIMAGE file has been created on your A-disk and you can print it by using commands such as PRINT, PSF, and so on. Some utilities expect these files to have a filetype such as LIST38PP or PSEG3820, so renaming the file may be required.

## Printing and plotting under VSE

You can use the GDDM-supplied VSE Print Job Utility to print graphics, image, and chart data on page printers (such as the IBM 3800 Model 3 and the IBM 3820 or IBM 4224, IBM 4230 and IBM4234). The procedure is as follows:

1. Create the data using an application or utility, such as the GDDM-PGF Interactive Chart Utility.
2. Save the data.
3. Invoke the CICS transaction to display the VSE Print Job Utility, as shown in Figure 16 on page 35. The GDDM-supplied transaction for this is "ADMB", but this name may have been changed by your system support personnel.

```

                                GDDM VSE PRINT JOB UTILITY

Type required information and then press Enter to submit job.

ITEM                                CHOICE    POSSIBLE CHOICES
----                                -
Name of Chart data or GDF . ==>
Name of Chart format . . . . . ==> =      '=' if the same as Chart Data
What is to be printed . . . . . ==>      1 - Chart, 2 - GDF, 3 - Image
Number of copies . . . . . ==> 1        1 - 99
Number of swathes . . . . . ==> 1        1 - 99

Job name . . . . . ==>
Accounting information . . . ==>
Printer name . . . . . ==> P38PPN3
Job type . . . . . ==> 3800

PF3=Quit

                                GDDM/VSE 5666-328 (C) Copyright IBM Corp 1987,1988

```

Figure 16. VSE Print Job Utility panel

4. Type the name of the chart data, GDF, or image file.
5. Leave “Name of Chart format” as ‘=’, unless it is different from the chart data file name.
6. Type 1, 2, or 3 for “What is to be printed”.
7. Type the number of copies you want (the default is 1).
8. Type the number of *swathes* you want (1 through 99). A swathe is a horizontal “slice” of the output. The result is the same whatever you specify, but the larger the number of swathes you specify, the easier the loading on the storage requirements of your system. Unless your system is very short of storage resources, leave the default setting of 1.
9. Type the “Job name” and “Accounting information” if you require them.
10. Leave the default “Printer name” and “Job type” unless you need to change them.
11. Press **ENTER**. If the fields are accepted, a VSE batch job is submitted to create a print file, and any errors in this are sent to the console log.

---

### Printing and plotting with GDDM-OS/2 Link

GDDM-OS/2 Link enables you to print or plot directly to a print device attached to your personal computer system. For information about printing and plotting with GDDM-OS/2 Link, see the online GDDM-OS/2 Link User's Guide. This document is installed as part of GDDM-OS/2 Link. You can view it online at your workstation. It can be accessed in one of the following ways:

- Using the VIEW.EXE program from the GDDM-OS/2 Link group
- Using hypertext links (see note) from the online help system.

**Note:** Hypertext is a way of presenting information on line with connections (called hypertext links) between one piece of information and another.

---

### Printing and plotting with GDDM-PCLK

GDDM-PCLK enables you to print or plot output generated by a GDDM program running on the host directly to a print device attached to your personal computer system. You also have the choice of deferring printing, in which case the output is stored for later printing or plotting. You cannot plot alphanumerics using GDDM-PCLK.

#### Immediate and deferred plotting

To plot immediately, select "Yes" on part 1 of the GDDM-PCLK setup menu in reply to:  
Plot immediately (no prompt to defer)?

To defer plotting, select "No" in response to this prompt.

For immediate plotting, a plot can be very complex. For deferred plotting, the complexity is limited by the amount of disk space available at the time of plotting.

#### Immediate and deferred printing

To print immediately, select "Yes" on part 2 of the GDDM-PCLK setup menu in reply to:  
Print immediately (no prompt to defer)?

This avoids your being reminded about deferred printing. If you are in *merged mode*, you are recommended to select "No" in reply to this prompt.

#### Printing or plotting deferred files

To print or plot a file that has been deferred (and therefore is stored on a disk), select option 3 from the GDDM-PCLK main panel. This panel shows only those deferred files that were created for the plotter or printer specified on the Setup panel. You can also delete print or plot files from this panel.

While each file is being processed, you receive one of the following messages:

GQD0506 Plotting spooled file. Press "Esc" to cancel.  
Number of bytes of remaining data = *n*

GQD0507 Printing in progress. Press "Esc" to cancel.

---

### Formatting data for printing

There are several GDDM-supplied utilities you can use to format output for printing or plotting. These utilities and their uses are as follows:

#### **GDDM User Control**

Print or plot data displayed on your screen. The output can be automatically sent to the print device you specify.

#### **GDDM Composite Document Print Utility**

Display and print (not plot) a document composed of text, graphics, and images. To print the output from this, you need the GDDM Print Utility.

#### **GDDM Image Print Utility**

Create output from image data.

Before you can use these utilities, they may need customizing by the system support personnel at your enterprise. Information about this is in the *GDDM System Customization and Administration* book. If you want to print or plot your data without User Control, ask your system support personnel which conversion utility you need, how you run it, and whether it automatically sends the formatted data to be printed or plotted. If the utility does not send the data automatically, you also need to know how to send the output to a printer or plotter.

### Printing and plotting with User Control

User Control prints or plots the data currently displayed on your screen. User Control prompts you to specify a print device for your output (from a list of available printers), and the output is automatically sent to this printer. With User Control you can:

- Print or plot just a part of the displayed data
- Print or plot all of the displayed data
- Specify the size of the output area on the printed page
- Specify the position of the output on the printed page
- Rotate the output.

If you are using a four-color printer (such as an IBM 3268, IBM 3287, or IBM 4224), any colors that you see on your screen that the printer does not have are printed black.

Before you can print or plot with User Control, your system support personnel need to make the printing and plotting functions available to you. If these functions are not available, and you try to print from User Control, the following message is displayed:

```
Print is not permitted from the current window
```

In this case, you need the appropriate User Control nickname in a defaults file. Ask your system support personnel to set this up for you.

If you have scrolled or zoomed the data displayed on your screen, the printed output is also scrolled or zoomed (or both).

## printing and plotting displayed data

To print from User Control:

1. Display data on the screen. To do this, you need an application or utility, such as the GDDM-PGF Interactive Chart Utility.
2. Start User Control. For information about this, see “Starting User Control” on page 14.
3. Select “Output” to display the Output menu.
4. In the “Name of printer or plotter” field, type the destination name of your output (see “Output menu fields” if you are unsure of the name).
5. You now have a choice of two different ways of printing:
  - You can complete the fields (or leave the defaults) on the “Output” menu and then select “Print” (PF4). See “Output menu fields” for information about the fields. This method gives you good control over the printed output.
  - The alternative way of printing is to select “PrintAsIs” (PF10) to print or plot an output area the same size in character cells as the display screen. Use this to specify that alphanumerics should be output. Apart from the printer name, the input fields on the Output menu are ignored. The output includes any menus (except for the User Control menu itself) or other alphanumerics contained in the current GDDM page.

**Note:** If your device has a graphics cursor capability it can be activated by User Control. If you are not using a mouse, puck, or stylus, you need to activate the alphanumerics cursor before entering values into the input fields. For example:

- On an IBM 3193 activate the cursor by pressing the **+CR** key
- On an IBM 3472 activate the cursor by pressing the **Alt** and **+CR** keys.

Having activated the cursor, use keyboard cursor control keys to move the cursor.

### 5080 users

The printer name must be typed on the alphanumerics device. If necessary, use the *Switch* function (detailed in “The 5080 or 6090 modes of operation” on page 66) to activate the alphanumerics keyboard. If you get unexpected results, (for example, only part of the displayed picture is printed), the application that you are using has been set up incorrectly. You may also find that when the graphics are printed, they change in size to match the cell size of the printer. Contact your system support personnel for guidance.

### Output menu fields

The fields in the Output menu enable you to control certain aspects of the output.

If you have already requested a print in the current session of User Control, the Output menu fields show any details previously specified in the session. The fields are cleared only if you overwrite them or end User Control.

The Output menu is displayed, as in Figure 17 on page 39.

```

==Output=====
Enter size and position of picture on the output page, then select Print

Name of printer or plotter ==> ?      (? for Printer/Plotter list)
Width                      ==> 80      %
Depth                     ==> 80      %
Offset from left of page  ==> *      % (*=Centered)
Offset from top of page   ==> *      % (*=Centered)
Rotation of picture       ==> 0      (0,90,180,270 degrees clockwise)
Maintain aspect ratio?    ==> Y      (1 or 0. Distort to fit specified area)
PF1=No menu      2=Save      + 3=End      4=Print      5=        6=
PF7=             8=         9=Return    10=PrintAsIs 11=       12=
    
```

Figure 17. The Output menu

The fields in the Output menu are as follows:

**Name of printer or plotter**

Use this field to specify the name of your printer or plotter. If you do not know the name:

1. Type “?” in the “Name of printer or plotter” field, and press **ENTER** to display the Output destination panel, which shows a list of the printers you can use. An example panel is shown in Figure 18.

```

==Output destination=====
Select an output destination using the graphics cursor
4 ITEM(S) LISTED
PCPRINT  Locally attached Printer
PCPLOT   Locally attached Plotter
PSF4028  IBM 4028 Printer in room G2035 (Prints using PSF)
R5C3812  IBM 3812 connected via R5C5

PF1=No menu      2=          3=End      4=          5=          6=Top
PF7=Up           8=Down     9=Return   10=         11=         12=Bot
    
```

Figure 18. The Output destination panel

2. Select a printer by placing the cursor on the same line as the printer you want, and press the **Enter** key.

**Note:** If your device has a graphics cursor, you must use that cursor to select the plotter you need.

If the GDDM application is using an alternate device when the output function is selected, the “Name of printer or plotter” field is prefilled with the name of this device.

**Width and Depth**

Use these two fields to specify the width and depth of the output area as a percentage of the output page.

**Note:** GDDM recognizes an artwork subject as a complete item, that is, the basic picture *plus* the picture frame or surround. The subject occupies a total rectangular space. It is this space that is copied to the output device to create the output page. However, even when you specify the *picture* content should occupy 100% (width or depth) of the output page, it is most unlikely for the picture to

occupy the whole page, a frame of white space surrounding the picture may be present. Always allow for this when creating diagrams.

The default for both fields is 80%, but you can specify a width of up to 1000%, this enables printing or plotting on a device that can output pictures that are wider or longer than a single sheet of paper, (for example, roll-feed plotters). If you want to specify more than 100% for a roll-feed plotter, then you must either attach the plotter directly, or specify an appropriate device token. If you specify more than 100% for the width, the maximum you can specify in the other field is 100%. When the output area is printed, the width and depth you specify here are used to the nearest accuracy allowed by the printer or plotter.

**Note:** If a value of greater than 100% is specified for a single sheet, unpredictable results may occur (even though the values are acceptable and valid).

#### **Offset from left of page and Offset from top of page**

These two fields specify the position of the top left-hand corner of the output area on the output page. The default (indicated by an asterisk) for both fields is for the output area to be centered on the page. (When the output area is printed, the offsets you specify here are used to the nearest accuracy allowed by the printer or plotter.) Therefore, for a non-centered picture a percentage setting must be specified for both the "Width" and the "Offset from left of page" fields, and a percentage setting must be specified for both the "Depth" and the "Offset from top of page" fields.

#### **Rotation**

Use this field to specify how many degrees you want to rotate the output page in a clockwise direction on the paper.

The default is 0, but you can specify 90, 180, or 270.

**Note:** If you have a rotation setting in both a processing option and the Output menu, the sum of these settings is used to rotate the output page. If your output is not rotated in the way you expect, ask your system support personnel to check whether there is a rotation setting in a processing option.

#### **Maintain aspect ratio**

The default for this field is "0", which means that the displayed data on your screen is to be printed as large as possible within the output area with its original *aspect ratio*. The aspect ratio is the ratio of the height of the displayed data to its width. If your displayed data has different proportions from the area you specified for output, the size of the output is smaller than you requested, but its proportions are maintained.

If you select "1", the output is stretched to fit the specified output area and the original aspect ratio may not be used.

## **Printing and previewing with CDPU**

The Composite Document Print Utility (CDPU) prints (but does not plot) a composite document that combines text and pictures on a page or set of pages. Composite documents can include any combination of text, graphics from a computer graphics

package, or images created by scanning illustrations, sketches, or photographs. You can use CDPU to preview and print both Single-Byte Character Set (SBCS) and Double-Byte Character Set (DBCS) data. Composite Document Printing Data Stream (CDPDS) files can include bar codes.

The main function of CDPU is to print composite documents, page segments (pictures, charts, or text, produced in a format that can be inlaid into the printed page) and overlay files (for example, company headings, logo's or page outlines). You can also use CDPU to display them on your screen. The composite documents are created by application programs and utilities.

### **What CDPU does**

CDPU creates the type of output required for the device that you specify. Your system support personnel can advise you on how to specify this device. The device can be:

- A screen
- An IPDS printer, either dedicated or queued (such as an IBM 3812 Model 2, IBM 3816, IBM 4028, IBM 4224, or IBM 4234)
- A 38xx page printer.

If the device is a screen or a dedicated IPDS printer, CDPU sends the document directly to the device to be displayed or printed immediately. If it is a queued printer, CDPU creates a GDDM print file (type ADMPRINT) that must be subsequently processed and sent to the printer by the GDDM Print Utility, ADMOPUx. If it is a page printer, CDPU creates a file that must be subsequently processed by the Print Services Facility (PSF) or an equivalent program.

### **Using CDPU**

How you start CDPU depends on the way your system support personnel have set up the system. Ask your system support personnel for instructions. In particular, find out what you have to do to print documents and to preview them on your screen.

### **Previewing with CDPU**

What you see on the screen when you preview a document is similar to what will be printed, but it is not an exact copy. You may notice these differences:

- Text is not positioned exactly; in particular, it is not right-justified.
- Underscores are not in exactly the right place.
- Vector symbols do not exactly match what is printed.
- Some symbols are not printed at all.

If you need to correct these, ask your system support personnel to change the *font emulation tables* for you. However, changing the font emulation tables cannot fix the following:

- Size variations on *mode-1* (device-dependent) and *mode-2* (ISS) characters and symbols.
- Size variations on images because of the way the pixels are handled.
- Bar codes shown as generalized and stylized pictures of bar codes rather than as accurate representations.

In CDPU, complete pages that you want to print sideways or upside down are shown with the lines of text unrotated. However, rotated lines within unrotated pages are shown rotated.

CDPU cannot emulate rotated fonts on the screen. All characters in such fonts are displayed upright.

The text is displayed on the screen in different colors, as follows:

<b>Cyan</b>	Normal text
<b>White</b>	Text to be highlighted
<b>Red</b>	No font name has been supplied
<b>Yellow</b>	No GDDM symbol set matches font name supplied.

The meanings of the PF keys when you view composite documents are as follows:

<b>PF1</b>	Remove prompts (the words on the screen that tell you what the PF keys do) if they are visible, or reinstate them if they are not.
<b>PF3</b>	End previewing.
<b>PF7</b>	Look at the previous page in the document.
<b>PF8</b>	Look at the next page in the document.
<b>PF9</b>	Switch between full image display and outline only (as described below).

**Note:** When a page segment or overlay is displayed, the PF7, PF8, and page number functions are not available. If no image data is present, the PF9 function is not available.

You can go directly to a particular page by typing its number over the page number shown on the screen, and pressing **ENTER**.

There are two ways that images can be shown when you view a document. When you first see the document, images are shown as they are when printed, with the exception that anything white on the screen is black when printed. Press **PF9** and a box is displayed that shows where the image is. Pages can be displayed more quickly if you use this method. If the image cannot be shown, perhaps because of an error, you see the box when the page is first shown. For example, on high-resolution devices such as the IBM 5080 workstation, large images may not be displayed correctly because of a lack of storage.

If you send documents to a printer that does not support composite documents, such as the IBM 3287 or IBM 3268, the same limitations apply as when viewing. Also, the information is scaled to fit the page it is printed on, and pages that you want to print in landscape format are printed unrotated.

You can use the Picture commands of User Control to enlarge a part of the page and move the page about on your screen. Note that when you use the pan and zoom function, the proportions of the page you are viewing stay the same.

### Using CDPU on an IPDS printer

When you print Advanced Function Printing Data Stream (AFPDS) files on an IPDS printer, GDDM uses a font conversion table (ADMDKFNT). Your system support personnel may need to update this table. Details can be found in the *GDDM System Customization and Administration* book.

## Printing with the GDDM Image Print Utility

To print GDDM images (ADMIMG files), you need to run the GDDM-supplied Image Print Utility. This utility program creates print files for page printers from the ADMIMG files. To run the Image Print Utility, type ADMUIMP in your host command area and press the **ENTER** key. If the Image Print Utility is available to you, information about it is displayed on your screen.

It is possible that ADMUIMP has been renamed or changed at your enterprise. If you encounter any problems, contact your system support personnel.

---

## What to do about errors

You can get an error report by using CDPU to print the document (you don't get an error report when you view a document).

If you get an error message, look it up in the *GDDM Messages* book. If there are error messages at the end of your printed document, you may need to contact your system support personnel.

If you don't get any print output at all, you may like to check the following points:

- If you are printing under a TSO system, check the system console log for errors; you may have to get a system operator to do this for you.
- Was the page segment or document created for the right type of printer?

Different printers require the files to be formatted differently. Ask your system support personnel for help.

- Is the page segment or document larger than the page you are trying to print?

The page segment or document is the size you specified when you created the file, even if it consists mostly of empty space. If it is too big for the page, nothing appears.

- Check carefully that your output has not been lost, or is not still in a print queue.

## errors

Printing is queued on most systems, and your output could have gone to one of several printers. The system operator can look at the queues and see if your file is still there, waiting to be printed.

Graphics output typically consists of two pages, one containing the picture, the other an identifier and time-and-date stamp. Make sure that the picture has not already been printed and that you have not simply overlooked it.

- Make sure that the file has been sent for printing.  
You may need to use a special command to print the file after the print file has been created. If you are a CMS user, and do not know the name of the EXEC to use, find it out from your system support personnel.
- Check whether your file has been rejected by the printer. If this has happened, the printer may have issued a rejection message.

---

## Chapter 4. Giving yourself more control over GDDM

As an end user of GDDM, you can have a special file in your personal storage called a user defaults file. By entering nickname statements and external default statements in this file, you can control how GDDM behaves in your operating environment and control the devices to which you send output. The statements that you code in your user defaults file can override or supplement the system-wide defaults set at your enterprise.

A group of users can share the same GDDM operating environment by placing a user defaults file in shared storage.

This chapter describes some of the functions provided in GDDM that you can exploit using your user defaults file.

---

### Coding your own external defaults and nicknames

There are two types of statement that you can place in your user defaults file.

#### External defaults

These statements affect the way GDDM operates when you are using it.

GDDM always uses the defaults specified in your defaults file, unless an application program overrides your setting.

#### Nicknames

These statements affect the way devices operate when they are opened by GDDM applications that you are running.

A GDDM application uses your nickname statements only when they match parameters specified by the application when it opens a device. The conditions under which nicknames are activated are described in the *GDDM System Customization and Administration* book.

### Example of external-default statements

Here is an example of some external-default statements that you can specify in your user defaults file:

```
*
*DEFAULT TRCESTR='FULLIO'
*DEFAULT TRCESTR='POSTSCR'
*
ADMMDFT NATLANG=F
ADMMDFT APPCPG=297
```

## external defaults

### Notes:

1. The keyword "ADMMDFT" is used to set defaults but you can also use the synonym "DEFAULT".
2. The keyword "ADMMDFT" cannot start in column 1. (Any statement starting in column 1 is treated as a label.)
3. "DEFAULT" is not valid for an assembled defaults file such as ADMADFT.
4. An asterisk "\*" in the first column instructs GDDM to ignore the statement on that line (that is, to treat the statement as a comment).

In this example, the defaults that specifies that a GDDM trace be produced are commented out. Typically, you don't need to generate such a trace file, unless GDDM or an application is not behaving as you expect. Change the asterisk to a space only when you need to produce a trace. Otherwise the default statement instructs GDDM to produce a trace every time it is initialized.

5. The NATLANG external default is used to set the national language to be used by the panels and messages of GDDM applications such as the Interactive Chart Utility. The value F specifies French as the national language. As with many external defaults, you only need to specify this default if you want to use these applications with a language other than the one defined in the system-wide setting of NATLANG.

### Example of nickname statements

Here is an example of some nickname statements that you can specify in your user defaults file:

```
*
ADMNICK FAM=1,PROCOPT=((CTLKEY,1,4),(CTLMODE,YES))
*
NICKNAME FAM=4,NAME=QUALPRT1,DEVTOK=P4079A3,
          PROCOPT=((PRNTR0T,270),(POSTPROC,DOWNLOAD)),
          DESC="PostScript output for IBM 4079 downloaded to W.Stn."

NICKNAME FAM=2,TOFAM=4,TONAME=QUALPRT1,
          PROCOPT=((IMGINIT,BACKGND)
```

### Notes:

1. The keyword "ADMMNICK" is used to set nicknames but you can also use the synonym "NICKNAME".
2. "NICKNAME" is not valid for an assembled defaults file such as ADMADFT.
3. You can use nickname statements to supplement or contradict the instructions a GDDM application gives to your output devices (displays plotters, and printers). The nickname statement that matches the device opened by an application determines how the output is processed and where it is sent.
4. A nickname statement takes effect only when it matches the name and family parameters used in the application program that opens a device.

It matches if the values specified in the “NAME” and “FAM” parameters of the nickname statement are exactly the same as those specified in the “NAME\_LIST” and “FAMILY” parameters specified in the application program that opens the device.

However, this is not a necessary condition.

5. The less specific a nickname statement, the more devices it applies to.

If, as in the first nickname statement in the example, you omit the “NAME” parameter completely, only the “FAM” parameter is used to match the nickname with devices opened by applications. The nickname matches every device opened for family-1 output.

The concept of *output family* is described in the *GDDM System Customization and Administration* book and in the *GDDM Base Application Programming Guide*.

6. The “DEVTOK” parameter specifies a *device token* for the device. By means of this device token, the nickname assigns characteristics to the device called “QUALPRT1”. The P4079A3 device token ensures that the output is created for a 4079 color PostScript printer with A3 size paper.

A complete list of device tokens is provided in the *GDDM Base Application Programming Reference* book.

7. You can use the “PROCOPT” parameter to specify *processing options* which affect how the GDDM application creates and processes output.

In the example, one option rotates the application’s output through 270° and another invokes a user-written program to download the print file from the host computer to the workstation.

A complete list of processing options is provided in the *GDDM Base Application Programming Reference* book.

8. You can use the “TONAME” and “TOFAM” parameters to have the application you are running open a different device from the one specified by the programmer.

**external defaults**

---

## Appendix A. Transferring files between PC and host

Files created on your workstation can be copied to the host, converted on the host, and then used in a host application or utility. In a similar way, host data can be converted on the host and then copied to your workstation for use in a workstation application or utility. The conversion has to be done by the appropriate GDDM conversion utility, and it has to be done on the host.

Use the appropriate method for transferring data at your enterprise. This may be the SEND and RECEIVE terminal emulator commands that GDDM supports on CMS and TSO systems. These commands copy files between a host and your workstation. In some circumstances (especially on CMS), the SEND and RECEIVE commands also perform the necessary conversion. See the *GDDM Base Application Programming Reference* book for information about this.

GDDM does not support these functions on CICS or IMS systems. You may be able to transfer files on these systems, using some procedure you have on your workstation, but you cannot convert them.

The SEND command copies a file from your workstation to the host, and the RECEIVE command copies data from the host to your workstation. These commands make a copy of the file or data. They do not erase the original.

**Note:** If you need help to copy or convert files, see your system support personnel. There is information about the SEND and RECEIVE commands in the *GDDM Base Application Programming Reference* book. See “GDDM conversion utilities” on page 4 for information about the GDDM conversion utilities.

You can transfer and convert the following:

### Charts

Every chart consists of two files—one for the data and one for the format. Charts are created on the host as ADMCDATA and ADMCFORM objects respectively, using the GDDM ICU. Alternatively, they are created on the workstation as CHD and CHF files, using DisplayGraphics. If the data and format files are imported from the host to the workstation, they are known as ICD and ICF files.

**Note:** DisplayGraphics is an interactive, high-quality graphics editor that runs under DOS.

### Pictures

Pictures are created and stored on the host as ADMGDF objects, and on the workstation as Picture Interchange Format (PIF) files or Computer Graphics Metafiles (CGM).

- PIF files can be used by DisplayGraphics or the Graphics Work Station Program (GWSP). They can be converted further to OS/2 Metafiles for use by some OS/2 applications.

## transferring files

- CGM is an internationally recognized standard (ISO 8632) for the interchange of picture files. It is used by a number of graphics programs, including Lotus Freelance Plus and Harvard Graphics, running on both IBM workstations and other manufacturers' equipment.

### Non-graphics files

Examples include:

- Text files.
- Data Interchange Format (DIF) files. These are typically files from spreadsheet applications. You may want to transfer them to the host and display the information contained in them as charts, using the ICU. To find out how to get the file contents into the ICU, refer to the *GDDM-PGF Interactive Chart Utility* book.

### PostScript print files

If your PostScript printer is attached to your workstation you can use the RECEIVE command to download PostScript files created using GDDM on the host computer. The PostScript file should be downloaded in binary format.

You may need to download these types of file:

- PostScript documents. These are complete, formatted documents.
- Encapsulated PostScript documents. These contain PostScript datastream (typically illustrations) that can be imbedded in PostScript documents or printed on their own.

---

## Copying files under CMS

This section describes how you can copy personal computer system files to and from a CMS host system.

### What the host needs

To transfer files on a CMS system, the host uses:

- The GDDM-supplied conversion utilities:
  - ADMUPCV and ADMUPGV for PIF files
  - ADMUCG and ADMUGC for CGM files, and the conversion profiles relevant to the CGM applications in use on the workstation.
- The transfer procedure IND\$FILE EXEC
- The personal computer system file transfer program IND\$FILE MODULE.

The conversion utilities are installed as part of GDDM. The file transfer utilities are part of the terminal emulator.

**Note:** The "\$" in IND\$FILE may have been replaced by the symbol for your national currency. If you cannot successfully transfer files, check with your system support personnel whether the EXEC and MODULE have been renamed.

## What the workstation needs

The workstation must have a terminal emulator that supports file transfer. The file transfer utilities are part of the terminal emulator.

**Note:** You must have both an active personal computer system session and an active host session.

## The SEND and RECEIVE commands

Under CMS, you can convert and copy your files in one step. The commands you use are SEND (for workstation-to-host transfer) and RECEIVE (for host-to-workstation transfer). These commands make use of the various GDDM conversion utilities, depending on which type of conversion you are applying. You must issue the commands from a PC session.

The form of the commands is the same for both SEND and RECEIVE.

```
SEND|RECEIVE wsfilename.extension h:hostfilename filetype filemode (keywords
```

**wsfilename.extension** is the name and extension of the file already stored or to be stored in the workstation. When you are issuing a RECEIVE command, it may help you to think of it as being short for RECEIVE AS, to make sure you get the file names the right way round. Always put the workstation file name first.

**h:** is the host session to or from which the file is to be transferred. Omit this from the command if you have only one host session defined.

**hostfilename** is the name of the file already stored or to be stored in the host. It can be the same as the workstation file name.

**filetype** is the type of the file already stored or to be stored in the host.

**filemode** is the name of the disk on which the file is to be stored. This is an optional field. If no filemode is specified, this field defaults to A.

## transferring files

The **keywords** indicate the type of file conversion, and depend on the type of file you are transferring. The keywords for the various transfer and conversion operations are as follows:

Source	Target	Keyword
CHD (PC) <sup>1</sup>	ADMCDATA (H) <sup>2</sup>	chart
CHF (PC)	ADMCFORM (H)	chart
ADMCDATA (H)	ICD (PC)	<i>none</i>
ADMCFORM (H)	ICF (PC)	<i>none</i>
PIF (PC)	ADMGDF (H)	admgif
ADMGDF (H)	PIF (PC)	admgif
CGM (PC)	ADMGDF (H)	admcmg
ADMGDF (H)	CGM (PC)	admcmg
Text (PC)	Text (H)	ascii crlf
Text (H)	Text (PC)	ascii crlf
DIF (PC)	DIF (H)	ascii crlf
DIF (H)	DIF (PC)	ascii crlf

<sup>1</sup> If you're using a personal computer system

<sup>2</sup> If you're using a host.

If you need assistance to use the SEND or RECEIVE commands, see your system support personnel.

---

## Copying files under TSO

This section describes how you can copy personal computer files to and from a TSO host system.

For converting and transferring files, your system uses certain programs and utilities.

The conversion utilities are installed as part of GDDM. The file transfer utilities are part of the terminal emulator.

## What the host needs

The host system uses:

- The GDDM-supplied conversion utilities:
  - ADMUPCT and ADMUPGT for PIF files
  - ADMUCG and ADMUGC for CGM files, and the conversion profiles allocated using the ADMCGM DD name, relevant to the CGM applications in use on the workstation.
- The transfer procedure (CLIST) IND\$FILE
- The personal computer system file transfer program IND\$FILE.

**Note:** The "\$" in IND\$FILE may have been replaced by the symbol for your national currency. If you cannot successfully transfer files, check with your system support personnel whether the CLIST and program have been renamed.

## What the workstation needs

The workstation must have a terminal emulator that supports file transfer.

You must have both an active personal computer system session and an active host session.

## The SEND and RECEIVE commands

**Note:** Do not copy and convert large files in one operation. See your system support personnel if you need help to send or receive files.

The commands you use to transfer your files are SEND (for workstation-to-host transfer) and RECEIVE (for host-to-workstation transfer). You must issue the commands from a personal computer system session.

The form of the commands is the same for both SEND and RECEIVE:

```
SEND|RECEIVE wsfilename.extension h:datasetname(member) (keywords
```

**wsfilename.extension** is the name and extension of the file already stored or to be stored on the workstation. When you are issuing a RECEIVE command, it may help you to think of it as being short for RECEIVE AS, to make sure you get the file names the right way round. Always put the workstation file name first.

**h:** is the host session to or from which the file is to be transferred. Omit this from the command if you have only one host session defined.

**datasetname(member)** is the full name of the file to be stored or already stored in the host. If the host data set is partitioned, you must include the member name in your command. If the host data set is sequential, you do not need a member name.

In the SEND command, you can omit the data set "datasetname," because it is allocated automatically. If it does not already exist, it is created as a sequential data set with fixed-length 80-byte records (unblocked). If the data set already exists, it may be sequential or partitioned.

The **keywords** vary. Where the files are being transferred (but not converted) by the SEND and RECEIVE command, a keyword is not needed, unless the file is a text file. In this case, the keywords to be used are **ascii crlf**.

## transferring files

The keywords for the various transfer and conversion operations are as follows:

Source	Target	Keyword
CHD (PC) <sup>1</sup>	ADMCDATA (H) <sup>2</sup>	chart
CHF (PC)	ADMCFORM (H)	chart
ADMCDATA (H)	ICD (PC)	<i>none</i>
ADMCFORM (H)	ICF (PC)	<i>none</i>
PIF (PC)	ADMGDF (H)	admrgdf
ADMGDF (H)	PIF (PC)	admrgdf
CGM (PC)	ADMGDF (H)	admrgm
ADMGDF (H)	CGM (PC)	admrgm
Text (PC)	Text (H)	ascii crlf
Text (H)	Text (PC)	ascii crlf
DIF (PC)	DIF (H)	ascii crlf
DIF (H)	DIF (PC)	ascii crlf

<sup>1</sup> If you're using a personal computer system.

<sup>2</sup> If you're using a host.

If you need help to copy or convert files, see your system support personnel. For information about the SEND and RECEIVE commands, see the *GDDM Base Application Programming Reference* book. For information about the GDDM conversion utilities, see "GDDM conversion utilities" on page 4.

---

## Appendix B. Hardware notes

This appendix gives information about using GDDM on particular types of hardware. It describes:

- How the hardware affects GDDM
- How GDDM affects the hardware
- Other effects which may be produced.

The appendix is organized by type of hardware, as follows:

- GDDM-PCLK display screens and adapters
- GDDM-PCLK keyboards
- Plotters
- Printers
- Terminals
- Workstations.

Before reading this appendix, you may like to check the type of hardware you are using, to see whether there are any restrictions on the way you can use GDDM.

---

### Display screens and adapters

#### CGA and EGA display screens

To avoid possible problems when formatting graphics text and using a CGA or EGA display screen with GDDM-PCLK, the maximum alphanumeric screen size for the host session should be 80 columns by 24 rows.

#### Display adapter screen sizes

The screen sizes supported by GDDM-PCLK on the various display adapters are as shown in Table 3 on page 56.

## display screens

*Table 3. Display adapter screen sizes*

Display adapter	Screen size (row x column)
CGA, EGA 64KB	24x80
EGA 128KB+	24x80, 32x80
VGA, MCGA	24x80, 32x80, 43x80
8514/A + 8503, 8512, 8513, 8515, 8518	24x80, 32x80, 43x80
8514/A + 8507, 8514, 8515	24x80, 32x80, 43x80, 27x132
XGA + 8503, 8504, 8512, 8513, 8516, 8518	24x80, 32x80, 43x80
XGA + 8507, 8514, 8515	24x80, 32x80, 43x80
Image Adaptor/A + 8503, 8504, 8512, 8513, 8516, 8518	24x80, 32x80, 43x80
Image Adaptor/A + 8507, 8514, 8515	24x80, 32x80, 43x80, 27x132

## Loading drivers

Some display adapters require particular display drivers to be loaded. These are as follows:

### Loading the 8514/A driver

If you are using the 8514/A with GDDM-PCLK, add this command to your DOS AUTOEXEC.BAT file:

```
\HDIPCDOS\HDILOAD
```

This loads the display driver for the 8514/A. To run in merged mode, HDILOAD must be at level 1.01 or later.

### Loading the XGA driver

If you are using an XGA display adapter with GDDM-PCLK, add this command to your DOS CONFIG.SYS file:

```
\XGAPCDOS\XGAAIDOS.SYS
```

This loads the appropriate display driver.

### Loading the Image Adaptor/A driver

If you are using an Image Adaptor/A with GDDM-PCLK, add this command to your DOS CONFIG.SYS file:

```
IMGAIIDOS\IMGAIIDOS.SYS
```

This loads the appropriate display driver.

## Display adapter character attributes

For display adapters other than the 8514/A, XGA, or Image Adaptor/A 8-plane, the color blue is not supported for alphanumerics. Cyan is used instead.

The transparency attribute is not supported; non-null characters are displayed as opaque, and nulls are displayed as transparent. Field attributes are displayed with the same transparency as the character that follows them. Under some conditions, this can result in the graphics showing through.

The blink attribute is not supported. Characters with this attribute are displayed with normal highlighting, that is, double-intensity.

Programmable symbol sets are not supported. Characters are displayed using the base character set.

On two-color devices, highlighting is usually done by showing a particular field at double-intensity. However, when using a CGA or MCGA in 2-color mode, highlighted fields are shown in reverse video.

---

## Keyboards

This section describes the implications of using particular keyboards with GDDM.

### Supported keyboards

GDDM-PCLK supports the following keyboards:

- Personal Computer AT (not AT/370)
- Personal Computer XT (not XT/370)
- Enhanced PC
- 3270 PC
- Host-connected
- Space Saving.

### Keyboard layouts

When you use IBM Personal Communications/3270 with PCSPCLK or the IBM 3270 Workstation Program Version 1.1, correctly configured for the GDDM-PCLK system extension, the GDDM-PCLK key assignments match those of the host session.

When you use the IBM 3270 Emulation Program, Entry Level, and the IBM 3270 Emulation Program Version 3, it is not possible for GDDM-PCLK to match the key assignments to those of the host session.

To reassign keys, use the utility described in the *GDDM System Customization and Administration* book.

## keyboards

### Keyboard mapping

Because it is not possible to set all the required keys to match the emulators' key settings, the GDDM-PCLK keys are assigned as follows:

#### Personal Computer AT and XT keyboards

3270 function	PCLK key
ATTENTION	Alt+F1
BACKSPACE	
BACKTAB	Shift+Tab
CLEAR	Alt+F2
CURSOR DOWN	CurDown
CURSOR LEFT	CurLeft
CURSOR RIGHT	CurRight
CURSOR SEL	Alt+F3
CURSOR UP	CurUp
DELETE <sup>2</sup>	Del
DEV CANCEL	Alt+F4
DUP	Alt+F8
ENTER	Pad+ and Pad*
ERASE EOF	Alt+F6
ERASE INPUT	Alt+F5
FAST CURS L <sup>1</sup>	Ctrl+CurLeft
FAST CURS R <sup>1</sup>	Ctrl+CurRight
FLD MARK	Alt+F9
HOME	Home
IDENTIFY <sup>2</sup>	Ctrl+Backspace
INSERT <sup>2</sup>	Ins
NEW LINE	
PA1	PgUp
PA2	Pad-
PA3 <sup>1 2</sup>	PgDn
PF1	F1
PF2	F2
PF3	F3
PF4	F4
PF5	F5
PF6	F6
PF7	F7
PF8	F8
PF9	F9
PF10	F10
PF11	Shift+F1
PF12	Shift+F2
PF13	Shift+F3
PF14	Shift+F4
PF15	Shift+F5
PF16	Shift+F6
PF17	Shift+F7
PF18	Shift+F8
PF19	Shift+F9
PF20	Shift+F10
PF21	N/A
PF22	N/A
PF23	N/A
PF24	N/A
PRINT <sup>2</sup>	Alt+F7
RESET	Alt+F10
SYS REQ	Ctrl+Pad*
TAB	Tab
TEST <sup>2</sup>	Ctrl+End

**Notes:**

N/A Not applicable  
 Alt Alternate key  
 Ctrl Control key  
 Shift Shift key  
 Pad Numeric key-pad

Example 1. Pad\* = asterisk on the numeric keypad.

Example 2. Pad+ = + on the numeric keypad.

<sup>1</sup> Function not available from the IBM PC 3270 Emulation Program, Entry Level, Version 1.1 or 1.2.

<sup>2</sup> Function not available from the IBM 3270 Emulation Program Version 3.

**Enhanced personal computer system keyboards**

3270 function	PCLK key
ATTENTION	Esc
BACKSPACE	
BACKTAB	Shift+Tab
CLEAR	Alt+PgDn
CURSOR DOWN	CurDown or PadCurDown
CURSOR LEFT	CurLeft or PadCurLeft
CURSOR RIGHT	CurRight or PadCurRight
CURSOR SEL	Alt+F9
CURSOR UP	CurUp or PadCurUp
DELETE <sup>2</sup>	Del
DEV CANCEL <sup>2</sup>	Alt+F11
DUP	Ctrl+Ins
ENTER	Enter or Right Ctrl
ERASE EOF	End
ERASE INPUT	Alt+End
FAST CURS L <sup>1</sup>	Alt+CurLeft or Alt+PadCurLeft
FAST CURS R <sup>1</sup>	Alt+CurRight or Alt+PadCurRight
FLD MARK	Ctrl+Home
HOME	Home
IDENTIFY <sup>2</sup>	Ctrl+PrtScn
INSERT <sup>2</sup>	Ins
NEW LINE	
PA1	PgUp
PA2	PgDn
PA3 <sup>1 2</sup>	Ctrl+PgUp <sup>1</sup>
PF1	F1
PF2	F2
PF3	F3
PF4	F4
PF5	F5
PF6	F6
PF7	F7
PF8	F8
PF9	F9
PF10	F10
PF11	F11
PF12	F12
PF13	Shift+F1
PF14	Shift+F2
PF15	Shift+F3
PF16	Shift+F4
PF17	Shift+F5

# keyboards

3270 function	PCLK key
PF18	Shift+F6
PF19	Shift+F7
PF20	Shift+F8
PF21	Shift+F9
PF22	Shift+F10
PF23	Shift+F11
PF24	Shift+F12
PRINT <sup>2</sup>	Alt+F7
RESET	Alt+F12 or Left Ctrl
SYS REQ	Alt+PgUp
TAB	Tab
TEST <sup>2</sup>	Ctrl+End

## **Notes:**

Alt Alternate key

Ctrl Control key

Pad Numeric key-pad

Shift Shift key

<sup>1</sup> Function not available from the IBM PC 3270 Emulation Program, Entry Level, Version 1.1 or 1.2.

<sup>2</sup> Function not available from the IBM 3270 Emulation Program Version 3.

---

## Plotters

This section contains information about using plotters with GDDM.

### Controlling plotter pen colors

Depending on the model, your plotter has two pens, six pens, or eight pens. GDDM cannot determine which color is in which penholder, and so cannot control the colors that are used in your output. It is up to you to do this. A picture that looks good on your screen may be less successful when plotted. You should experiment with different pens in the holders to find the combination you like best. Here are some suggested color schemes according to the number of pens you have in your plotter:

<b>2-pen plotters</b>	<b>Holder number</b>	<b>Pen color</b>	<b>GDDM color</b>
	1	Black	1, (or 3, 5, 7)
	2	Red	2 or 0, (or 4, 6)
<b>6-pen plotters</b>	<b>Holder number</b>	<b>Pen color</b>	<b>GDDM color</b>
	1	Blue	1
	2	Red	2
	3	Violet	3
	4	Lime green	4
	5	Turquoise	5
	6	Black	6 or 0, (or 7)
<b>8-pen plotters</b>	<b>Holder number</b>	<b>Pen color</b>	<b>GDDM color</b>
	1	Blue	1
	2	Red	2
	3	Violet	3
	4	Lime green	4
	5	Turquoise	5
	6	Orange	6
	7	Black	7
8	Green	0	

#### Notes:

1. The "GDDM color" in the above tables refers to the color number used in GDDM-PGF ICU.
2. If no pen is selected, white is plotted (on white paper). Selecting GDDM color 7 results in white being displayed on a screen.

You can also use colors 9 through 16. These numbers produce the following colors on the screen:

## printers

<b>GDDM color</b>	<b>Multicolor screens</b>	<b>8-color screens</b>
9	Dark blue	Blue
10	Orange	Red
11	Purple	Magenta
12	Dark green	Green
13	Turquoise	Cyan
14	Mustard	Yellow
15	Gray	Neutral (appears as white)
16	Brown	Green

If you request a number higher than 8, the plotter colors are reused as follows:

- On 2-pen plotters, the colors continue to alternate.
- On 8-pen plotters, the colors 1 through 8 are repeated for numbers 9 through 16.
- The color-to-number relationship on 6-pen plotters is as follows:

<b>GDDM color</b>	<b>Pen used</b>	<b>GDDM color</b>	<b>Pen used</b>
0	6	9	1
1	1	10	2
2	2	11	3
3	3	12	4
4	4	13	5
5	5	14	6
6	6	15	6
7	6	16	6
8	Never plotted		

Suppose that you specify the color number 11, and you have your plotter pens set up as suggested in “Controlling plotter pen colors” on page 61. On a 2-pen plotter, 11 is black. On 6-pen and 8-pen plotters, it is violet.

---

## PC printers

This section contains information about using PC printers with GDDM.

### PC printer paper widths and print resolutions

The information is listed here in order of printer model.

	<b>Paper size (pels)</b>		<b>Resolution (pixels per inch)</b>
	<b>Standard</b>	<b>Wide</b>	
<b>Printer</b>	<b>depth × width</b>	<b>depth × width</b>	<b>depth / width</b>
IBM 3852-1	840 × 640	840 × 640	84 / 84
IBM 3852-2	960 × 800	960 × 800	96 / 100
IBM 4019	1200 × 960	1200 × 960	120 / 120
IBM 4201	720 × 960	720 × 960	72 / 120

Table 4 (Page 2 of 2). PC printer paper – standard print resolution

	Paper size (pels)		Resolution (pixels per inch)
	Standard	Wide	
Printer	depth × width	depth × width	depth / width
IBM 4201-2	720 × 960	720 × 960	72 / 120
IBM 4202	720 × 960	720 × 1632	72 / 120
IBM 4207	720 × 960	720 × 960	72 / 120
IBM 4208	720 × 960	720 × 1632	72 / 120
IBM 5152	720 × 960	720 × 960	72 / 120
IBM 5182	840 × 640	840 × 1056	84 / 84
IBM 5201	1200 × 960	1200 × 1584	120 / 120
IBM 5202	1200 × 960	1200 × 1584	120 / 120

Table 5. PC printer paper – high print resolution

	Paper size (pels)		Resolution (pixels per inch)
	Standard	Wide	
Printer	depth × width	depth × width	depth / width
IBM 3852-1	840 × 640	840 × 640	84 / 84
IBM 3852-2	960 × 800	960 × 800	100 / 96
IBM 4019	2400 × 1920	2400 × 1920	240 / 240
IBM 4201	720 × 1920	720 × 1920	72 / 240
IBM 4201-2	720 × 960	720 × 960	72 / 240
IBM 4202	720 × 1920	720 × 3264	72 / 240
IBM 4207	1800 × 2880	1800 × 2880	180 / 360
IBM 4208	1800 × 2880	1800 × 4896	180 / 360
IBM 5152	720 × 960	720 × 960	72 / 120
IBM 5182	840 × 640	840 × 1056	84 / 84
IBM 5201	2400 × 1920	2400 × 3168	240 / 240
IBM 5202	2400 × 1920	2400 × 3168	240 / 240

From these tables you can calculate the size of the paper you require for your printer, using the following method:

1. Select the standard or high resolution print table.
2. Select the standard or wide paper option.
3. Divide the figure in pels for depth by the resolution in pixels for depth and the figure in pels for width by the resolution in pixels for width.

## terminals

For example, the IBM 4201 printer used in high resolution mode with standard paper requires paper that is 720/72 × 1920/240 inches, that is 10 × 8 inches.

---

### Terminals

This section contains information about using particular terminals with GDDM.

#### Using cursors on the IBM 3179-G, 3192-G, and 3472-G

GDDM has an alphanumerics cursor and a separate graphics cursor. Use the graphics cursor when you use User Control functions with the following terminals:

3179-G  
3192-G  
3472-G

However, when you complete the Output panel, use the alphanumerics cursor to move from one part of the panel to another using the cursor control keys.

**Note:** If your device has a graphics cursor capability it can be activated by User Control. Normally a mouse, puck, or stylus, is used to move the graphics cursor. If you are not using a mouse, puck, or stylus, you need to activate the alphanumerics cursor before entering values into the input fields. For example; on an IBM 3472 activate the cursor by pressing the **Alt** and **+CR** keys.

Having activated the cursor, use keyboard cursor control keys to move the cursor.

#### Using cursors on 3270-PC/G and 3270-PC/GX

The implications of using these terminals are the same as those for using the workstations. See “Using cursors on 3270-PC/G and 3270-PC/GX” on page 65.

#### Using a 3270-PC/G or 3270-PC/GX in local mode

The implications of using these terminals are the same as those for using the workstations. See “Using a 3270-PC/G or 3270-PC/GX in local mode” on page 65.

### DEC terminals

If your local terminal is a DEC terminal, be aware that the colors you anticipate being displayed may differ from the ones normally displayed for your GDDM application. You can, if necessary, locally change the colors displayed by the DEC terminal to match your application.

---

## Workstations

This section contains information about using particular workstations with GDDM.

### Using cursors on the IBM 5550, PC, and PS/2

GDDM has an alphanumeric cursor and a separate graphics cursor. Use the graphics cursor when you use User Control functions with:

IBM 5550  
Personal Computer  
PS/2

However, when you complete the Output panel, use the alphanumeric cursor to move from one part of the menu to another.

### Using cursors on 3270-PC/G and 3270-PC/GX

These devices have separate graphics and alphanumeric cursors. Use the alphanumeric cursor to move from one part of the Output panel to another. For other User Control functions, use the graphics cursor.

In User Control Graphics, when you are defining an area on the screen (when zooming in or out), a *rubber box* accurately outlines the area you are defining.

### Using Draft Draw

The *Draft draw* function (described in “Using the draft draw facility” on page 25) is not available on the following terminals:

- 3278
- 3279
- 3290
- 3270-PC
- DEC
- Tektronix.

The “Draft Draw” command is not displayed on the User Control menus of these terminals.

### Using a 3270-PC/G or 3270-PC/GX in local mode

If you are using a 3270-PC/G or 3270-PC/GX workstation, User Control can operate in *local mode*. This means that the workstation (rather than the host computer) processes some of the moving and zooming functions, which may increase performance.

If you want to work in local mode all the time, ask your system support personnel to set up the appropriate nickname in your defaults file. (The *GDDM System Customization and Administration* book contains information about nicknames.)

### 5080 and 6090 display screens

You cannot use GDDM operator windows on a 5080 or 6090 screen. The User Control functions described in Chapter 2, “Manipulating GDDM data” on page 11 do not apply to 5080 or 6090 display screens.

#### The 5080 or 6090 modes of operation

The 5080 (or 6090) is used in two modes of operation (5080 or 6090 and 3270), with graphics being displayed on the 5080 or 6090 screen, and alphanumeric data typed on the 3270 (or equivalent) screen.

Only one device (5080 or 6090 or 3270) can receive commands at any one time. However, some applications may require you to type data into both the 5080 or 6090 and the 3270 screen during one operation. In this case, you need to use the User Control *Switch* operation to swap the active and inactive devices. You need to do this even if you are using only one screen, serving as both a 5080 or 6090 and a 3270 device.

#### The Switch function on the 5080 or 6090

When you need to make a different device active:

1. Start User Control.

When you start User Control, a menu is displayed on each screen. The menu on the inactive screen looks like this:

```
=====
=Graphics=====
This is a dummy menu, please use the real menu on the other screen
PF1=No menu  2=Center  3=End  4=Output  + 5=Zoom in  6=Zoom out
PF7=Switch  8=Draft draw 9=Return  10=Reset  11=  12=
```

Figure 19. Inactive screen menu

2. From the active keyboard, select “Switch” (PF7).

The “dummy menu” message now appears on the screen that was previously able to receive input.

3. Leave User Control (press PF9) so that you can type your input.

You cannot work on your application while you are in User Control.

While you are in User Control with the menu displayed, the “dummy message” is always displayed on the inactive screen, so you always know which screen and keyboard you must use to issue commands.

#### The 5080 or 6090 and User Control Graphics functions

When manipulating graphics with the User Control Graphics functions, make your 5080 or 6090 the active device (the 5080 or 6090 screen must display the “real” User Control menu and not show the “dummy menu” message). You can issue User Control commands from the 3270, but the graphics are displayed on the 5080 or 6090 screen (even if you are using a 3270 graphics device). The device on which you issue

commands is also the device on which you move the graphics cursor to make selections and define areas. It is good practice to control the graphics cursor on the screen displaying your graphics.

**Note:** You may get unexpected results when leaving User Control. If, while in User Control, you have moved the graphics so that the fixed point of the rubber box or rubber band is outside the visible graphics area, the position of the fixed point may change when you leave User Control.

### Unattended plotting and printing

This can be done (with hardware that supports form-feed) by selecting Yes in response to the question

Plot/Print immediately (no prompt to defer)?

on the setup panel part 1 (plotting) or 2 (printing). The programs and the type of printers they are used on are:

**Composed Document Printer Facility (CDPF)** 4250

**Print Services Facility (PSF)** IBM 3800 Model 3, IBM 3812,  
IBM 3812 Model 2, IBM 3816,  
IBM 3820, IBM 4224, IBM 3112,  
IBM 3116, IBM 3912, IBM 3916,  
IBM 4224, IBM 4234

The way in which these programs are used can vary, so find out from your GDDM administrator what you have to do. You should not run PSF with data checks blocked in the JCL because no error messages are logged on output in this case.

### Xstations

On VM and TSO, GDDM supports family-1 output directed to an Xstation by using the TCP/IP product called GDDMXD. GDDMXD converts 3270 datastream to XWS datastream.

**plotting and printing**

---

## Appendix C. Special considerations for Japanese users

The information in this appendix is of interest only to end users of GDDM with Japanese-configured devices.

---

### Enabling translation between the two extended Japanese code pages

In the past, GDDM support for Japanese devices was provided by the following code pages:

- |                        |  |
|------------------------|--|
| <b>290</b>             | Based on character set 332, which contains all the Katakana characters, uppercase Latin characters, special characters, and numerals.                |
| <b>1027 (extended)</b> | Based on character set 1172, which contains all the Katakana characters, uppercase and lowercase Latin characters, special characters, and numerals. |

(These code pages are shown in the *GDDM System Customization and Administration* book.)

If a device using one of these code pages is used to send input to an application that uses the other, the characters are not interpreted correctly.

If two code pages contain all the same characters, a mapping can be defined to translate the code points of one for the other. However, character set 332 contains all of the characters in character set 1172.

To help overcome this problem, GDDM now provides an extended version of Japanese (Katakana) code page 290. Japanese (Katakana) Extended code page 290 shares some characteristics of the old code page 290 and Japanese (Latin) Extended code page 1027. Like code page 1027, it is based on character set 1172 but it contains all the elements of character set 332 at the same code points they have in the old code page 290.

Because both extended Japanese code pages are based on character set 1172, they contain the same characters but located at different code points. It is possible, however, to map each code point of one code page onto the point on the other page with the same character.

The GDDM application can query your device to determine its code page. If your device code page is Japanese (Latin) Extended code page 1027 or Japanese (Katakana) Extended code page 290, you can enable automatic translation by including the following statement your user defaults file:

```
ADMMDFI APPCPG=1027
```

If your device is configured so that the device code page is the Japanese (Katakana) code page 290 based on character set 332, your input to the application cannot be translated to the correct code points.

## Japanese devices

The best way around this problem is to reconfigure your device so that it uses Japanese (Katakana) Extended code page 290 based on character set 1172. Reconfiguring is only possible with PS/55 workstations. If you are using an older device, you need to consider the actions described in “Overwriting the device code page with Japanese (Katakana) Extended code page 290.”

### Overwriting the device code page with Japanese (Katakana) Extended code page 290

If you have a device that uses Japanese (Katakana) code page 290 based on character set 332, your input to applications using Japanese (Latin) Extended code page 1027 cannot be interpreted correctly. Using the DEVCSSET processing option, you can force GDDM to treat the input from your device as if it came from a device using Japanese (Katakana) Extended code page 290 instead. In your user defaults file, place a nickname statement such as the following:

```
ADMMNICK FAM=0,PROCOPT=((DEVCPG=290),(DEVCSSET,1172))
```

The DEVCPG procopt tells GDDM that the device uses code page 290 and the DEVCSSET procopt tells GDDM that the device character set is 1172. GDDM interprets this combination as Japanese (Katakana) Extended code page 290. GDDM then translates the code points of input characters to the code points with the corresponding characters on Japanese (Latin) Extended code page 1027. Since the characters in the Japanese (Katakana) code page 290 occupy the same code points as the Japanese (Katakana) Extended code page 290, the translation of input is successful.

However, the application’s output to the device may not be displayed correctly. If the application sends characters to the display that are not in character set 332 (such as lowercase Latin characters), they cannot be displayed correctly on the device using Japanese (Katakana) code page 290.

### Using an extended Japanese code page as the application code page

When using GDDM applications, such as ICU, VSSE, and IVU on Japanese devices in SBCS mode, text on the panels is displayed in lowercase, if the display supports lower-case Latin characters. Devices with the Japanese (Katakana) Extended code page 290 support lower-case Latin characters but the code points used are different from the usual CECP code points. To run these applications successfully, it is recommended that you specify the Japanese (Latin) Extended code page 1027 as the application code page. This enables GDDM to translate the characters in the panels to the correct code points on the extended device code page.

### Displaying tagged GDDM objects on Japanese devices

On devices configured with Japanese (Katakana) Extended code page 290, or Japanese (Latin) Extended code page 1027, no translation is provided to correctly display GDDM objects tagged with CECP identifiers. However, acceptable results may be obtained by setting the application code page to 281 for devices using Japanese (Katakana) Extended code page 290 or to 037 for devices using Japanese (Latin) Extended code page 1027.

## Glossary

This glossary defines technical terms used in GDDM documentation. If you do not find the term you are looking for, refer to the index of the appropriate GDDM manual or view the *IBM Dictionary of Computing*, located on the Internet at:

<http://www.networking.ibm.com/nsg/nsgmain.htm>

### A

**AAB.** Application anchor block.

**ACB.** Application control block.

**active operator window.** In GDDM, the operator window with the highest priority in the viewing order.

**active partition.** The partition containing the cursor. Contrast with *current partition*.

**advanced function printing.** The ability of licensed programs to use the all-points-addressable concept to print text and illustrations.

**adjunct.** In mapped alphanumerics, one of a set of optional subfields in an application data structure that specifies some attribute of a data field; for example, that it is highlighted. An adjunct enables the attribute to be varied at run time.

**ADMGDF.** See *graphics data format (GDF)*.

**ADS.** Application data structure.

**AFPDS.** Advanced-function presentation data stream.

**AIC.** Application interface component.

**alphanumeric character attributes.** In GDDM, the highlighting, color, and symbol set to be used for individual characters.

**alphanumeric cursor.** A physical indicator on a display. It can be moved from one hardware cell to another.

**alphanumeric field.** A field (area of a screen or printer page) that can contain alphabetic, numeric, or special characters. In GDDM, contrast with *graphics field*.

**alphanumeric field attributes.** In GDDM, the intensity, highlighting, color, and symbol set to be used for field type, field end, output conversion, input conversion, translate table assignment, transparency, field outlining, and mixed-string fields.

**alphanumerics.** Pertaining to alphanumeric fields. In GDDM there are three types of alphanumerics:

- Procedural alphanumerics
- Mapped alphanumerics
- High performance alphanumerics (HPA)

**alternate device.** In GDDM, a device to which copies of the primary device's output are sent. Usually the alternate device is a printer or plotter. See also *primary device*.

**annotation.** An added descriptive comment or explanatory note.

**APA.** All points addressable.

**aperture.** See *pick aperture*.

**API.** Application programming interface.

**APL.** One of the programming languages supported by GDDM.

**application data structure (ADS).** A structure created by GDDM-IMD that contains an entry for each variable field within a *map*. The data to be displayed in a mapped field is placed into the application data structure by the user's program.

**application image.** In GDDM, an image contained in GDDM main storage, and independent of any device or GDDM page. Contrast with *device image*.

**application programming interface (API).** The formally defined interface used by an application programmer to pass commands to, and get responses from, an IBM system control program or licensed program.

**area.** In GDDM, a shaded shape, such as a solid rectangle. It is created by opening the area, defining its outline, and closing the area.

**aspect ratio.** The width-to-height ratio of an area, symbol, or shape.

## glossary

**attention identifier.** A number indicating which button the operator pressed to satisfy a read operation. For example, 0 (returned from GDDM to the application program) means that the operator pressed the Enter key.

**attribute byte.** The screen position that precedes an alphanumeric field on a 3270-family device and holds the attribute information. See also *trailing attribute byte*.

**attributes.** Characteristics or properties that can be controlled, usually to obtain a required appearance; for example, the color of a line. See also *alphanumeric character attributes*, *alphanumeric field attributes*, and *graphics attributes*.

**axis.** In a chart, a line that is drawn to indicate units of measurement against which items in the chart can be viewed.

**A3.** A paper size, more common in Europe than in the U.S. It measures 297mm by 420mm, and is twice the size of A4. See also A4.

**A4.** A paper size, more common in Europe than in the U.S. It measures 210mm by 297mm, and is half the size of A3. Compare with *quarto*. See also A3.

## B

**background color.** Black on a display, white on a printer. The initial color of the display medium. Contrast with *neutral color*.

**bar code.** A code representing characters by sets of vertical parallel bars of varying thickness and separation that are read optically by transverse scanning.

**BASIC.** One of the programming languages supported by GDDM.

**BDAM.** Basic Direct Access Method.

**bi-level image.** An image in which each pixel is either black or white (value 0 or 1). Contrast with *gray-scale image* and *halftone image*.

**BMS.** Basic Mapping Support (CICS).

**BPAM.** Basic Partitioned Access Method.

**business graphics.** The methods and techniques for presenting commercial and administrative information in chart form; for example, the creation and display of a sales bar chart. Contrast with *general graphics*.

## C

**CALS.** Continuous Acquisition and Life-Cycle Support.

**CDPDS.** Composite Document Presentation Data Stream.

**CDPF.** Composed Document Print Facility.

**CDPU.** Composite Document Print Utility.

**CECP.** Country-extended code page.

**cell.** See *character cell*.

**CGM.** Computer Graphics Metafile. A file that contains information about the content of a picture, and conforms to the International Standard, ISO 8632, or is of a similar format.

**channel-attached.** Pertaining to devices that are attached directly to a computer by means of data (I/O) channels. Synonymous with *local*. Contrast with *link-attached*.

**character.** A letter, digit, or other symbol.

**character attributes.** See *alphanumeric character attributes*. See also *graphics text attributes*.

**character box.** In GDDM, the rectangle or (for sheared characters) the parallelogram boundaries that govern the size, orientation, spacing, and italicizing of individual symbols or characters to be shown on a display screen or printer page.

The box width, height, and, if required, shear are specified in world coordinates and can be program-controlled. See also *character mode*. Contrast with *character cell*.

**character cell.** The physical, rectangular space in which any single character or symbol is displayed on a screen or printer device. The size and position of a character cell are fixed. Size is usually specified in pixels on a given device; for example, 9 by 12 on an IBM 3279 Model 3 display. Position is addressed by row and column coordinates. Synonymous with *hardware cell* and *symbol cell*. Contrast with *character box*.

**character code.** The means of addressing a symbol in a symbol set, sometimes called *code point*.

The particular form and range of codes depends on the GDDM context. For example:

- For the Image Symbol Editor, a hexadecimal constant in the range X'41' through X'FE', or its EBCDIC character equivalent
- For the Vector Symbol Editor, a hexadecimal constant in the range X'00' through X'FF', or its EBCDIC character equivalent
- For the GDDM API, a decimal constant in the range 0 through 239, or subsets of this range (for example, a marker symbol code range of 1 through 8)

**character grid.** A notional grid that covers the *graphics field*. The size of the grid determines the basic size of the characters in all text constructed by presentation graphics routines. It is the fundamental measurement in chart layout, governing the spacing of mode-2 characters and the size of mode-3 characters. It also governs the size of the chart margins and thus the plotting area.

**character matrix.** Synonym for *dot matrix*.

**character mode.** In GDDM, the type of characters to be used. There are three modes:

- Mode-1 characters are loadable into PS and are of device-dependent fixed size, spacing, and orientation, as are hardware characters.
- Mode-2 characters are image (ISS) characters. Size and orientation are fixed. Spacing is variable by program.
- Mode-3 characters are vector (VSS) characters. Box size, position, spacing, orientation, and shear of individual characters are variable by program.

**chart.** In GDDM, usually means business chart; for example, a *bar chart*.

**choice device.** A logical input device that enables the application program to identify keys pressed by the terminal operator.

**CICS.** Customer Information Control System. A subsystem of MVS or VSE under which GDDM can be used.

**clipping.** In computer graphics, removing parts of a display image that lie outside a viewport. Synonymous with *scissoring*.

**CMS.** Conversational Monitor System. A time-sharing subsystem that runs under VM/SP.

**COBOL.** One of the programming languages supported by GDDM.

**code page.** Defines the relationship between a set of code points and graphic characters. This relationship covers both the standard alphanumeric characters and the national language variations. GDDM supports a set of code pages used with typographic fonts for the IBM 4250 page printer.

**code point.** Synonym for *character code*.

**Composite Document Presentation Data Stream (CDPDS).** A data stream containing graphics, image, and text that is the input to the GDDM Composite Document Print Utility (CDPU).

**Composed Document Print Facility (CDPF).** An IBM licensed program for processing documents destined for the IBM 4250 page printer.

**composed-page image file.** An intermediate form, residing on disk, of a picture destined for a page printer.

**composed-page printer.** See *page printer*.

**composed-page printer format.** A general term describing the format of print data destined for output by using either *CDPF* or *PSF*.

**composite document.** A document that contains both formatted text, such as that produced by the DCF program, and graphic or image data, such as that produced by GDDM. It is a combination of text and pictures on a page or set of pages. The pictures can be computer graphics or images created by scanning paper originals.

**Composite Document Print Utility (CDPU).** A utility that can print or display composite documents

**compressed data stream.** A data stream that has been made more compact by use of a data-compression algorithm.

**constant data.** In GDDM, data that is defined in a map and need not be known to the application program.

**correlation.** The translation (by GDDM) of a screen position into a part of the user's picture. This follows a *pick* operation.

**country-extended code page (CECP).** An extension of a normal EBCDIC code page that includes definitions of all code points in the range X'41' through X'FE'. Each code page contains the same 190 characters, but the mapping between code points and graphics characters depends on the country for which the code page is defined. This is a method of marking a GDDM object so

## glossary

that the environment in which it was created can be identified. It enables automatic translation to a different environment.

**CSD.** (1) Under MVS or VSE, CICS system definition. (2) In personal computer systems, Corrective Service Diskette; the means by which service is applied to the personal computer system.

**current partition.** The partition selected for processing by the application program. Contrast with *active partition*.

**current position.** In GDDM, the end of the previously drawn primitive. Unless a “move” is performed, this position is also the start of the next primitive.

**cursor.** A physical indicator that can be moved around a display screen. See *alphanumeric cursor* and *graphics cursor*.

**CUT.** Control unit terminal.

## D

**DASD.** Direct access storage device.

**data stream compatibility (DSC).** In IBM 8100 systems, the facility that provides access to System/370 applications that communicate with IBM 3270 Information Display System terminals.

**data stream compression.** The shortening of an I/O data stream for the purpose of more efficient transmission between link-attached units.

**data set.** The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access.

**DBCS.** Double-byte character set.

**DCF.** Document Composition Facility.

**DCSS.** Discontiguous saved segment (VM/SP).

**DCT.** Destination control table (CICS).

**default value.** The value of an attribute chosen by GDDM when no value is explicitly specified by the user. For example, the default line type is a solid line. The default value is sometimes device-dependent. See also *drawing default* and *standard default*.

**denibblized data.** The decoded data stream used between the GDDM DOS Support feature in the host and GDDM-PCLK on the workstation.

**designator character.** The first byte of a light-pen-detectable field that indicates whether or not the field has been selected.

**device echo.** A visual identification of the position of the graphics cursor. The form of the device echo is defined by the application program.

**device family.** In GDDM, a device classification that governs the general way in which I/O will be processed. See also *processing option*. For example:

- Family 1: 3270 display or printer
- Family 2: queued printer
- Family 3: system printer (alphanumerics only)
- Family 4: page printer

**device image.** In GDDM, an image contained in a device or GDDM page. Contrast with *application image*.

**device suffix.** In GDDM-IMD, a suffix to a mapgroup name that indicates the device class.

**device token.** In GDDM, an 8-byte code giving entry to a table of pre-established device hardware characteristics that are required when the device is opened (initialized).

**DIF.** In GDDM terms, data interchange format.

**digital image.** A two-dimensional array of picture elements (pixels) representing a picture. A digital image can be stored and processed by a computer, using bits to represent pixels. In GDDM, pixels have the value black or white. Often called simply *image*.

**direct transmission.** In GDDM image processing, the transfer of image data direct from a source outside GDDM to an image device, including manipulation by a projection in the device, and without GDDM maintaining a copy or buffer of the data.

**display device.** Any output unit that gives a visual representation of data; for example, a screen or printer. More commonly, the term is used to mean a screen and not a printer.

**display point.** Synonym for *pixel*.

**display-point matrix.** Synonym for *dot matrix*.

**display terminal.** An input/output unit by which a user communicates with a data processing system or subsystem. It usually includes a keyboard and always provides a visual presentation of data. For example, an IBM 3179 display.

**DL/1.** Data language 1. A language for database processing operations.

**dot matrix.** In computer graphics, a two-dimensional pattern of dots used for constructing a display image. This type of matrix can be used to represent characters by dots. Synonymous with *character matrix* and *display-point matrix*.

**double-byte characters.** See *double-byte character set (DBCS)*.

**double-byte character set (DBCS).** A set of characters in which each character occupies two byte positions in internal storage and in display buffers. Used for oriental languages; for example, *Kanji* or *Hangeul*. Contrast with *single-byte character set*.

**DPCX.** Distributed Processing Control Executive. An IBM 8100 system control program.

**DPPX.** Distributed Processing Programming Executive. An IBM 8100 system control program.

**drawing default.** The value of a graphics attribute chosen by GDDM when no value is explicitly specified by the user. The drawing default may be altered by the user.

**DSC.** Data stream compatibility.

**dual characters.** See *double-byte characters*.

**dummy device.** An output destination for which GDDM does all the normal processing but for which no actual output is generated. Used, for example, to test programming for an unavailable output device.

## E

**EBCDIC.** Extended binary coded decimal interchange code. A coded character set consisting of 8-bit coded characters.

**echo.** In interactive graphics, the visible form of the locator or other logical input device.

**ECSA.** Extended character set adapter.

**edit.** To enter, modify, or delete data.

**editing grid.** In the GDDM Image and Vector Symbol Editors, a grid used as a guide for editing a symbol. In the Image Symbol Editor, it is a dot matrix. In the Vector Symbol Editor, it is a grid of lines.

**enterprise.** An organization or company that undertakes local, national, or international business ventures.

**extended data stream.** For IBM 3179, 3192, 3278, 3279, and 3287 devices, input/output data formatted and encoded in support of color, programmed symbols, and extended highlighting. These features extend the IBM 3270 data stream architecture.

**extended highlighting.** The emphasizing of a displayed character's appearance by blinking, underscore, or reverse video.

**external defaults.** GDDM-supplied values that users can change to suit their own needs.

**extracted image.** In GDDM, an image on which transform element calls operate. It may imply the whole source image or just a part of it, depending on whether a define sub-image transform element has been applied in its derivation.

## F

**FCT.** File control table (CICS).

**field.** An area on the screen or the printed or plotted page. See *alphanumeric field*, *graphics field*, and *mapped field*.

**field attributes.** See *alphanumeric field attributes*.

**field list.** The high performance alphanumeric data structure used to define alphanumeric fields.

**fillet.** A curve that is tangential to the end points of two adjoining lines.

**flat file.** A file that contains only data; that is, a file that is not part of a hierarchical data structure. A flat file can contain fixed-length or variable-length records.

**floating area.** The part of a page reserved for *floating maps*.

**floating map.** A map whose absolute position on the GDDM page is not fixed. During execution, a floating

## glossary

map takes the next available space that satisfies its specification.

**floating-point feature.** A processing unit feature that provides four 64-bit floating-point registers to perform floating-point arithmetic calculations.

**foil.** A transparency for overhead projection.

**font.** A particular style of typeface (for example, Gothic English). In GDDM, a font can exist as a programmed symbol set.

**formatted document.** A type of file containing text, images, and graphics.

**FORTRAN.** One of the programming languages supported by GDDM.

**four-button cursor.** A hand-held device, with cross-hair sight, used on the surface of a *tablet* to indicate position on a screen. Synonymous with *puck*.

**frame.** In GDDM-IMD, a synonym for *panel*.

**full-screen alphanumeric operation.** Full-screen processing operations on alphanumeric fields.

**full-screen mode.** A form of screen presentation in which the contents of an entire terminal screen can be displayed at once. Full-screen mode is often used for fill-the-blanks prompting, and is an alternative to line-by-line I/O.

**full-screen processor.** A host software component that, together with display terminal functions, supports display terminal input/output in full-screen mode.

## G

**GDDM.** Graphical Data Display Manager. A series of IBM licensed programs, running in a host computer, that manage communications between application programs and display devices, printers, plotters, and scanners for graphics applications.

**GDDM-GKS.** GDDM Graphical Kernel System. A member of the GDDM family that runs under TSO and CMS and provides an alternative graphics programming interface to that of the GDDM base product. It is an implementation of the Graphical Kernel Standard, ISO 7942, of the International Organization for Standardization.

**GDDM/graPHIGS.** A member of the GDDM family used for creating hierarchical three-dimensional structures on the IBM 5080 Graphics System. It is based on the proposed ANSI standard for the Programmer's Hierarchical Interactive Graphics System (PHIGS).

**GDDM Interactive Map Definition.** GDDM-IMD. A member of the GDDM family of licensed programs. It enables users to create alphanumeric layouts at the terminal. The user defines the position of each field within the layout and may assign attributes, default data, and associated variable names to each field. The resultant map can be tested from within the utility.

**GDDM-IVU.** GDDM Interactive View Utility. A member of the GDDM family of licensed programs. It enables users to view, create, modify, store, and print images.

**GDDM-OS/2.** A licensed program that enables IBM PS/2 and other personal-computer systems with OS/2 installed to run GDDM application programs in the host computer.

**GDDM-PCLK.** A licensed program that enables IBM PS/2 and other personal computers with graphics-display adapters, and IBM 3270 terminal emulators to run GDDM application programs in the host computer.

**GDDM-PGF.** GDDM-Presentation Graphics Facility. A member of the GDDM family of licensed programs. It is concerned with business graphics, rather than general graphics.

**GDDM storage.** The portion of host computer main storage used by GDDM.

**GDF.** Graphics data format.

**general graphics.** The methods and techniques for converting data to or from graphics display in mathematical, scientific, or engineering applications; that is, in any application other than business graphics. See also *business graphics*.

**generated mapgroup.** The output produced when a source GDDM-IMD mapgroup is generated. It contains the information needed by GDDM at execution to position the mapped fields on the GDDM page.

**GIF.** Graphics Interchange Format.

**GKS.** Graphical Kernel System. See *GDDM-GKS*.

**GL.** Graphical Language.

**Graphical Data Display Manager.** See *GDDM*.

**graphics.** A picture defined in terms of *graphics primitives* and *graphics attributes*.

**graphics area.** Part of a mapped field that is reserved for later insertion of graphics.

**graphics attributes.** In GDDM, color selection, color mix, line type, line width, graphics text attributes, marker symbol, and shading pattern definition.

**graphics cursor.** A physical indicator that can be moved (often with a joystick, mouse, or stylus) to any position on the screen.

**graphics data format (GDF).** A picture definition in an encoded order format used internally by GDDM and, optionally, providing the user with a lower-level programming interface than the GDDM API.

**graphics data stream.** The data stream that produces graphics on the screen, printer, or plotter.

**graphics field.** A rectangular area of a screen or printer page, used for graphics. Contrast with *alphanumeric field*.

**graphics input queue.** A queue associated with the graphics field onto which elements arrive from logical input devices. The program can remove elements from the queue by issuing a graphics read.

**graphics primitive.** A single item of drawn graphics, such as a line, arc, or graphics text string. See also *graphics segment*.

**graphics read.** A form of read that solicits graphics input or removes existing elements from the graphics input queue.

**graphics segment.** A group of graphics primitives (lines, arcs, and text) that have a common window and a common viewport and associated attributes. Graphics segments allow a group of primitives to be subject to various operations. See also *graphics primitive*.

**graphics text attributes.** In GDDM, the symbol (character) set to be used, character box size, character angle, character mode, character shear angle, and character direction.

**graPHIGS.** See *GDDM/graPHIGS*.

**gray-level.** A digitally encoded shade of gray, normally (and always in GDDM) in the range 0 through 255. See also *gray-scale image*.

**gray-scale image.** An image in which the gradations between black and white are represented by discrete gray-levels. Contrast with *bi-level image* and *halftone image*.

**green lightning.** The name given to the flashing streaks on an IBM 3270 screen while a programmable symbol set is being loaded.

## H

**halftone image.** A bi-level image in which intermediate shades of gray are simulated by patterns of adjacent black and white pixels. Contrast with *gray-scale image*.

**Hangul.** A character set of symbols used in Korean ideographic alphabets.

**hardware cell.** Synonym for *character cell*.

**hardware characters.** Synonym for *hardware symbols*.

**hardware symbols.** The characters that are supplied with the device. The term is loosely used also for GDDM mode-1 symbols that are loaded into a PS store for subsequent display. Synonymous with *hardware characters*.

**hexadecimal.** Pertaining to a numbering system with base sixteen.

**host.** See *host computer*.

**high performance alphanumerics.** The creation of alphanumeric displays using field list data structures. Contrast with *procedural* and *mapped* alphanumerics.

**host computer.** The primary or controlling computer in a multiple-computer installation.

## I

**ICU.** Interactive Chart Utility.

**identity projection.** In GDDM image processing, a projection that is transferred from source image to target image without any processing being performed on it.

**image.** Synonym for *digital image*.

**image data stream.** The internal form of the GDDM data in an image environment.

## glossary

**image field.** A rectangular area of a screen or printer page, used for image. Contrast with *alphanumeric field* and *graphics field*.

**Image Object Content Architecture (IOCA).** An architected collection of constructs used to interchange and present images.

**image symbol.** A character or symbol defined as a dot pattern.

**Image Symbol Editor (ISE).** A GDDM-supplied interactive editor that enables users to create or modify their own image symbol sets (ISS).

**image symbol set (ISS).** A set of symbols each of which was created as a pattern of dots. Contrast with *vector symbol set (VSS)*.

**IMD.** See *GDDM Interactive Map definition*.

**IMS/VS.** Information Management System/Virtual Storage. A subsystem of MVS under which GDDM can be used.

**include member.** A collection of source statements stored as a library member for later inclusion in a compilation.

**input queue.** See *graphics input queue*.

**integer.** A whole number (for example, -2, 3, 457).

**Intelligent Printer Data Stream (IPDS).** A structured-field data stream for managing and controlling printer processes, allowing both data and controls to be sent to the printer. GDDM uses IPDS to communicate with the IBM 4224 printer.

**Interactive Chart Utility (ICU).** A GDDM-PGF menu-driven program that allows business charts to be created interactively by nonprogrammers.

**interactive graphics.** In GDDM, those graphics that can be moved or manipulated by a user at a terminal.

**Interactive Map definition.** A member of the GDDM family of licensed programs. It enables users to create alphanumeric layouts at the terminal. The operator defines the position of each field within the layout and may assign attributes, default data, and associated variable names to each field. The resultant map can be tested from within the utility.

**interactive mode.** A mode of application operation in which each entry receives a response from a system or

program, as in an inquiry system or an airline reservation system. An interactive system can also be conversational, implying a continuous dialog between the user and the system.

**interactive subsystem.** (1) One or more terminals, printers, and any associated local controllers capable of operation in interactive mode. (2) One or more system programs or program products that enable user applications to operate in interactive mode; for example, CICS.

**intercept.** In a chart, a method of describing the position of one axis relative to another. For example, the x axis can be specified so that it intercepts (crosses) the y axis at the bottom, middle, or top of the plotting area of a chart.

**inter-device copy.** The ability to copy a page or the graphics field from the current primary device to another device. The target device is known as the alternate device.

**IOCA.** See *Image Object content Architecture*.

**IPDS.** See *Intelligent Printer Data Stream*.

**ISE.** Image Symbol Editor.

**ISO.** International Organization for Standardization.

**ISPF.** Interactive System Productivity Facility.

**ISS.** Image symbol set.

**IVU.** Image View Utility. See *GDDM-IVU*.

## J

**joystick.** A lever that can pivot in all directions in a horizontal plane, used as a *locator* device.

## K

**Kanji.** A character set of symbols used in Japanese ideographic alphabets.

**Katakana.** A character set of symbols used in one of the two common Japanese phonetic alphabets; Katakana is used primarily to write foreign words phonetically. See also *Kanji*.

**key.** In a legend, a symbol and an associated data group name. A key might, for example, indicate that the

blue line on a graph represents “Predicted Profit.” See also *legend*.

**key symbol.** A small part of a line (from a line graph) or an area (from a shaded chart) used in a legend to identify one of the various data groups.

## L

**Latin.** Of or pertaining to the Western alphabet. In GDDM, a synonym for *single-byte character set*.

**legend.** A set of symbolic keys used to identify the data groups in a business chart.

**line attributes.** In GDDM, color, line type, and line width.

**link pack area.** An MVS term that describes an area of shared storage.

**link-attached.** Pertaining to devices that are connected to a controlling unit by a data link. Synonymous with *remote*. Contrast with *channel-attached*.

**local.** Synonym for *channel-attached*.

**local character set identifier.** A hexadecimal value stored with a GDDM symbol set, which can be used by symbol-set-loading means other than GDDM in the context of local copy on a printer.

**locator.** A logical input device used to indicate a position on the screen. Its physical form may be the alphanumeric cursor or a graphics cursor moved by a joystick.

**logical input device.** A concept that allows application programs to be written in a device-independent manner. The logical input devices to which the program refers may be subsequently associated with different physical parts of a terminal, depending on which device is used at run time.

**LPA.** Link pack area.

**LTERM.** In IMS/VS, logical terminal.

## M

**map.** A predefined format of alphanumeric fields on a screen. Usually constructed outside of the application program.

**map specification library (MSL).** The data set in which maps are held in their source form.

**mapgroup.** A data item that contains a number of maps and information about the device on which those maps are to be used. All maps on a GDDM page must come from the same mapgroup.

**mapped alphanumerics.** The creation of alphanumeric displays using predefined maps. Contrast with *procedural alphanumerics* and *high performance alphanumerics*.

**mapped field.** An area of a page whose layout is defined by a map.

**mapped graphics.** Graphics placed in a graphics area within a mapped field.

**mapped page.** A GDDM page whose content is defined by maps in a mapgroup.

**mapping.** The use of a map to produce a panel from an output record, or an input record from a panel.

**marker.** In GDDM, a symbol centered on a point. Line graphs and polar charts can use markers to indicate the plotted points.

**MDT.** Modified data tag.

**menu.** A displayed list of logically grouped functions from which the user can make a selection. Sometimes called a menu panel.

**menu-driven.** Describes a program that is driven by user response to one or more displayed menus.

**MFS.** Message format service.

**MICR.** Magnetic ink character recognition.

**mixed character string.** A string containing a mixture of *Latin* (one-byte) and *Kanji* or *Hangeul* (two-byte) characters.

**Mixed Object Document Content Architecture (MO:DCA).** An architected, device-independent data stream for interchanging documents.

## glossary

**mode-1/2/3 characters.** See *character mode*.

**mountain shading.** A method of shading surface charts where each component is shaded separately from the base line, instead of being shaded from the data line of the previous component.

**mouse.** A device that a user moves on a flat surface to position a pointer on a screen.

**MSHP.** Maintain System History Program. A software process for installing licensed programs on VSE systems.

**MSL.** Map specification library.

**MVS.** IBM Multiple Virtual Storage. A system under which GDDM can be used.

**MVS/XA.** Multiple Virtual Storage/Extended Architecture. A subsystem under which GDDM can be used.

## N

**name-list.** A means of identifying which physical device is to be opened by a GDDM program. It can be used as a parameter of the DSOPEN call, or in a *nickname*.

**National Language Support (NLS).** A special feature that provides translations of the ICU panels and some of the GDDM messages into a variety of languages, including US English.

**negate.** In bi-level image data, setting zero bits to one and one bits to zero.

**neutral color.** White on a display, black on a printer. Contrast with *background color*.

**nibblized data.** The encoded data stream used between the GDDM DOS Support feature in the host and GDDM-PCLK on the workstation.

**nickname.** In GDDM, a means of referring to a device, the characteristics and identity of which have been already defined.

**NLS.** National Language Support.

**nonqueriable printer.** A printer about which GDDM cannot obtain any information.

**NSS.** Named saved system (VM/XA and VM/ESA).

**null character.** An empty character represented by X'00' in the EBCDIC code. Such a character does not occupy a screen position.

## O

**operator reply mode.** In GDDM, the mode of interaction available to the operator (display terminal user) with respect to the modification (or not) of alphanumeric character attributes for an input field.

**operator window.** Part of the display screen's surface on which the GDDM output of an application program can be shown. An operator window is controlled by the end user; contrast with *partition*. A *task manager* may create a window for each application program it is running.

**outbound structured field.** An element in IBM 3270 data streams from host to terminal with formatting that allows variable-length and multiple-field data to be sequentially translated by the receiver into its component fields without the receiver having to examine every byte.

## P

**page.** In GDDM, the main unit of output and input. All specified alphanumerics and graphics are added to the current page. An output statement always sends the current page to the device, and an input statement always receives the current page from the device.

**page printer.** A printer, such as the IBM 3820 or IBM 4250, to which the host computer sends data in the form of a succession of formatted pages. Such devices can print pictorial data and text, and can position all output to pixel accuracy. The pixel density and the general print quality both often suffice as camera-ready copy for publications. Also known as *composed-page printer*.

**page segment.** A picture file in a form that can be printed. It can only be printed if it is embedded in a primary document. Also known as a *PSEGo* file.

**panel.** A predefined display that defines the locations and characteristics of alphanumeric fields on a display terminal. When the panel offers the operator a selection of alternatives it may be called a menu panel. Synonymous with *frame*.

**partition.** Part of the display screen's surface on which a page, or part of a page, of GDDM output can be

shown. Two or more partitions can be created, each displaying a page, or part of a page, of output. A partition is controlled by the GDDM application; contrast with *operator window*.

**partition set.** A grouping of partitions that are intended for simultaneous display on a screen.

**partitioned data set (PDS).** A data set in direct access storage that is divided into partitions, called members, each of which can contain a program, part of a program, or data.

**PCB.** In GDDM, program communication block (IMS/VS).

**PCLK.** See *GDDM-PCLK*.

**PDS.** Partitioned data set (MVS).

**pel.** Picture element. See *pixel*.

**PGF.** Presentation Graphics Facility. A member of the GDDM family of licensed programs. It is concerned with business graphics, rather than general graphics.

**PHIGS.** Programmer's Hierarchical Interactive Graphics System.

**pick.** The action of the operator in selecting part of a graphics display by placing the graphics cursor over it.

**pick aperture.** A rectangular or square box that is moved across the screen by the graphics cursor. An item must lie at least partially within the pick aperture before it can be picked.

**pick device.** A logical input device that allows the application to determine which part of the picture was selected (or picked) by the operator.

**picture interchange format (PIF) file.** In graphics systems, the type of file, containing picture data, that can be transferred between GDDM and an IBM 3270-PC/G, /GX, or /AT workstation.

**picture space.** In GDDM, an area of specified aspect ratio that lies within the graphics field. It is centered on the graphics field and defines the part of the graphics field in which graphics will be drawn.

**PIF.** Picture interchange format.

**pixel.** The smallest area of a display screen capable of being addressed and switched between visible and

invisible states. Synonymous with *display point*, *pel*, and *picture element*.

**PL/I.** One of the programming languages supported by GDDM.

**plotter.** An output device that uses pens to draw its output on paper or transparency foils.

**pointings.** Pairs of x-y coordinates produced by an operator defining positions on a screen with a locator device, such as a *mouse*.

**polar chart.** A form of business chart where the x axis is circular and the y axis is radial.

**polyfillet.** In GDDM, a curve based on a sequence of lines. It is tangential to the end points of the first and last lines, and tangential also to the midpoints of all other lines.

**polyline.** A sequence of adjoining lines.

**popping.** A method of ordering data whereby each item in a list or sequence takes the value of the previous item in the list or sequence, and is then removed from the list; when this happens, the list or sequence of data is said to be "popped."

**ppi.** Pixels per inch.

**PQE.** Printer queue element.

**presentation graphics.** Computer graphics products or systems, the functions of which are primarily concerned with graphics output presentation. For example, the display of business planning bar charts.

**preview chart.** A small version of the current chart that can be displayed on ICU menu panels.

**primary device.** In GDDM, the main destination device for the application program's output, usually a display terminal. The default primary device is the user console. See also *alternate device*.

**primitive.** See *graphics primitive*.

**primitive attribute.** A specifiable characteristic of a graphics primitive. See *graphics attributes* and *graphics text attributes*.

**Print Services Facility (PSF).** An IBM licensed program for processing documents destined for the IBM 3800 Model 3 page printer.

## glossary

**print utility.** A subsystem-dependent utility that sends print files from various origins to a queued printer.

**procedural alphanumerics.** The creation of alphanumeric displays using the GDDM alphanumeric API. Contrast with *mapped alphanumerics* and *high performance alphanumerics*.

**processing option.** Describes how a device's I/O is to be processed. It is a device-family-dependent and subsystem-dependent option that is specified when the device is opened (initialized). An example is the choice between CMS attention-handling protocols.

**procopt.** Processing option.

**profile.** In GDDM, a file that contains information about how GDDM is to process requests for services to devices or other functions.

**program library.** (1) A collection of available computer programs and routines. (2) An organized collection of computer programs.

**programmed symbols (PS).** Dot patterns loaded by GDDM into the PS stores of an output device.

**projection.** In GDDM image processing, an application-defined function that specifies operations to be performed on data extracted from a source image. Consists of one or more *transforms*. See also *transform element*.

**PS.** Programmed symbols.

**PS overflow.** A condition where the graphics cannot be displayed in its entirety because the picture is too complex to be contained in the device's PS stores.

**PSB.** Program specification block (IMS).

**PSEG.** See *page segment*.

**PSF.** Print Services Facility.

**PSP bucket.** A database containing descriptions of faults found in programs. Used by Service personnel.

**PS/2.** Personal System/2.

**puck.** Synonym for *four-button cursor*.

**PUT.** Program update tape.

## Q

**quarto.** A paper size, more common in the U.S. than in Europe. It measures 8.5 inches by 11.0 inches. Also known as A size. Compare with A4.

**queued printer.** A printer belonging to the subsystem under which GDDM runs, to which output is sent indirectly by means of the GDDM Print Utility program. In some subsystems, this may allow the printer to be shared between multiple users. Contrast with *system printer*.

## R

**raster device.** A device with a display area consisting of dots. Contrast with *vector device*.

**rastering.** The transforming of graphics primitives into a dot pattern for line-by-line sequential use. In GDDM PS devices, this is done by transforming the primitives into a series of programmed symbols (PS).

**real device.** A GDDM device that is not being windowed by means of operator window functions. Contrast with *virtual device*.

**reentrant.** The attribute of a program or routine that allows the same copy of the program or routine to be used concurrently by two or more tasks.

**remote.** Synonym for *link-attached*.

**reply mode.** See *operator reply mode*.

**resolution.** In graphics and image processing, the number of pixels per unit of measure (inch or meter).

**reverse clipping.** Where one graphics primitive overlaps another, removing any parts of the underlying primitive that are overpainted by the overlying primitive.

**reverse video.** A form of alphanumeric highlighting for a character, field, or cursor, in which its color is exchanged with that of its background. For example, changing a red character on a black background to a black character on a red background.

**REXX.** Restructured Extended Executor Language. One of the programming languages supported by GDDM.

**Roman.** Relating to the *Latin* type style, with upright characters.

## S

**SBCS.** Single-byte character set.

**scanner.** A device that produces a digital image from a document.

**scissoring.** Synonym for *clipping*.

**scrolling.** In computer graphics, moving a display image vertically or horizontally in a manner such that new data appears at one edge as existing data disappears at the opposite edge.

**SCS.** SNA character string.

**segment.** See *graphics segment*.

**segment attributes.** Attributes that apply to the segment as an entity, rather than to the individual primitives within the segment. For example, the visibility, transformability, or detectability of a segment.

**segment library.** The portion of auxiliary storage where segment definitions are held. These definitions are GDDM objects in graphics data format (GDF) and are managed by GDDM API calls. GDDM handles the file accesses to and from auxiliary storage.

**segment priority.** The order in which segments are drawn; also the order in which they are detected.

**segment transform.** The means to rotate, scale, and reposition segments without re-creating them.

**selector adjunct.** A subfield of an application data structure that qualifies a data field.

**shear.** The action of tilting graphics text so that each character leans to the left or right while retaining a horizontal baseline.

**single-byte character set (SBCS).** A set of characters in which each character occupies one byte position in internal storage and in display buffers. Used for example, in most non-Oriental symbols. Contrast with *double-byte character set*.

**SMP/E.** System Modification Program/Extended. A software process for installing licensed programs on MVS systems.

**SNA.** System Network Architecture.

**source image.** An image that is the data input to image processing or transfer.

**spill file.** A means of reducing storage requirements at the cost of processing time, when creating high-resolution output files for page printers, for example.

**stand-alone (mode).** Operation that is independent of another device, program, or system.

**standard default.** The value of a graphics attribute chosen by GDDM when no value is explicitly specified by the user. The standard default cannot be altered by the user, although it may be overridden by the user.

**string device.** A logical input device that enables an application program to process character data entered by the terminal operator.

**stroke device.** A logical input device that enables an application program to process a sequence of x,y coordinate data entered by the terminal operator.

**stylus.** A pen-like pointer used on the surface of a tablet to indicate position on a screen.

**surface chart.** A chart similar to a line graph, except that no markers appear and the areas between successive lines are shaded.

**swathe.** A horizontal slice of printer output, forming part of a complete picture. Page printer images are often constructed in swathes to reduce the amount of storage required.

**symbol.** Synonymous with *character*. For example, the following terms all have the same meaning: vector symbols, vector characters, vector text.

**symbol cell.** Synonym for *character cell*.

**symbol matrix.** Synonym for *dot matrix*.

**symbol set.** A collection of symbols, usually but not necessarily forming a font. GDDM applications may use the hardware device's own symbol set. Alternatively, they can use image or vector symbol sets that the user has created.

**symbol set identifier.** In GDDM, an integer (or the equivalent EBCDIC character) by which the programmer refers to a loaded symbol set.

**system printer.** A printer belonging to the subsystem under which GDDM runs, to which output is sent

## glossary

indirectly by use of system spooling facilities. Contrast with *queued printer*.

## T

**tablet.** (1) A locator device with a flat surface and a mechanism that converts indicated positions on the surface into coordinate data. (2) The IBM 5083 Tablet Model 2, which, with a four-button cursor or stylus, allows positions on the screen to be addressed and the graphics cursor to be moved without use of the keyboard.

**tag.** In interactive graphics, an identifier associated with one or more primitives that is returned to the program if such primitives are subsequently picked.

**target image.** An image that is the destination of processed or transferred data.

**target position.** In the GDDM Vector Symbol Editor, the grid coordinates of a point on the editing grid to which a vector is to be drawn.

**task manager.** A program that supervises the concurrent running of other programs.

**temporary graphics.** Graphics created outside a segment.

**terminal.** A device, usually equipped with a keyboard and a display unit, capable of sending and receiving information over a link. See also *display terminal*.

**terminal emulator.** A program that enables a device such as a personal computer system to enter and receive data from a host computer system as if it were a particular type of attached terminal.

**test symbol.** In the GDDM Image and Vector Symbol Editors, an area on the Symbol Edit panel in which the currently chosen symbol is displayed.

**text.** Characters or symbols sent to the device. GDDM provides alphanumeric text and graphics text.

**text attributes.** See *graphics text attributes*.

**tilted pie chart.** A pie chart drawn in three dimensions, which has been tilted away from full face to reveal its three-dimensional properties.

**trailing attribute byte.** The screen position following an alphanumeric field. This attribute byte can specify, for example, that the cursor should auto-skip to the next field when the current field is filled.

**transfer operation.** In GDDM image processing, an operation in which a projection is applied to a source image, and the result placed in a target image. The source and target images can be device or application images in any combination, or one or other of them (but not both) can be image data within the application program.

**transform.** (1) The action of modifying a picture for display; for example, by scaling, rotating, or displacing. (2) The object that performs or defines such a modification; also referred to as a *transformation*. (3) In GDDM image processing, a definition of three aspects of the data manipulation to be done by a projection:

1. A transform element or sequence of transform elements
2. A resolution conversion or scaling algorithm
3. A location within the target image for the result

Only the third item is mandatory.

See also *projection* and *transform element*.

**transform element.** In GDDM image processing, a specific function in a transform, which can be one of the following: define sub-image, scale, orient, reflect, negate, define place in target image.

A given transform element can be used only once in a *transform*.

**transformable.** A segment must be defined as transformable if it will subsequently be moved, scaled, or rotated.

**transparency.** (1) A document on transparent material suitable for overhead projection. (2) An alphanumeric attribute that allows underlying graphics or image to show.

**TSO.** Time Sharing Option. A subsystem of MVS under which GDDM can be used.

**TWA.** Transaction work area.

## U

**UDS.** User default specification.

**UDSL.** A list of user default specifications (UDSs).

**unformatted data.** In GDDM image processing, compressed or uncompressed binary image data that has no headers, trailers, or embedded control fields other than any defined by the compression algorithm, if applicable. The data is in row major order, beginning with the top left of the picture.

**User Control.** A GDDM function that enables the terminal or workstation to perform some functions without the need for application programming. The actions include: moving and zooming graphics; manipulating windows; printing, plotting, and saving pictures.

**user default specification (UDS).** The means of changing a GDDM external default value. The external default values that a UDS can change are those of the GDDM or subsystem environment, GDDM user exits, and device definitions.

**user exit.** A point in GDDM execution where a user routine will gain control if such has been requested.

## V

**variable cell size.** In most devices, the hardware cell size is fixed, but the IBM 3290 Information Panel has a cell size that can be varied. This, in turn, causes the number of rows or columns on the device to alter.

**vector.** (1) In computer graphics, a directed line segment. (2) In the GDDM-PGF Vector Symbol Editor, a straight line between two points.

**vector device.** A device capable of displaying lines and curves directly. Contrast with *raster device*.

**vector symbol.** A character or shape composed of a series of lines or curves.

**Vector Symbol Editor.** A program supplied with GDDM-PGF, the function of which is to create and edit vector symbol sets (VSS).

**vector symbol set (VSS).** A set of symbols, each of which was originally created as a series of lines and curves.

**Venetian blind effect.** The name given to the appearance of bars across shaded patterns on an IBM 3270-PC when GDDM tries to match the image symbol sets.

**Venn diagram.** A form of business chart in which, in GDDM, two or more populations and their intersection are represented by overlapping circles.

**viewport.** A subdivision of the picture space, most often used when two separate pictures are to be displayed together.

**virtual device.** A GDDM device that is being windowed by use of operator window functions. Contrast with *real device*.

**virtual screen.** The presentation space viewed through an *operator window*.

**VM/ESA.** IBM Virtual Machine Enterprise Systems Architecture.

**VM/SP CMS.** IBM Virtual Machine/System Product Conversational Monitor System; a system under which GDDM can be used.

**VMXA.** IBM Virtual Machine Extended Architecture; a system under which GDDM can be used.

**VSE.** Virtual storage extended; an operating system consisting of VSE/Advanced Functions and other IBM programs.

**Note:** In GDDM, the abbreviation VSE has sometimes been used to refer to the Vector Symbol Editor, but to avoid confusion, this usage is deprecated.

**VSS.** Vector symbol set.

## W

**Ward.** One of the 190 matrices used to contain the symbols of a double-byte character set. The value in the first byte of each double-byte character code refers to the ward in which the character is contained. The value in the second byte denotes the character's position in the matrix.

**window.** In GDDM, the term window has three distinct meanings:

1. The "graphics window" is the coordinate space used for defining the primitives that make up a graphics picture. By default, both x and y coordinates run

## **glossary**

from 0 through 100. The graphics window can be regarded as a set of coordinates that are overlaid on the viewport.

2. An “operator window” is an independent rectangular subdivision of the screen. Several can exist at the same time, and each can receive output from, and send input to, either a separate GDDM program or a separate function of a single GDDM program.
3. The “page window” defines which part should be displayed of a page that is deeper or wider than its partition.

**workstation.** A display screen together with attachments such as a local copy device or a tablet.

**world coordinates.** The user application-oriented coordinates used for drawing graphics. See also *window*.

**wrap-around field.** An alphanumeric field that extends to the right-hand edge of the page and continues at the start of the next row.

**WTP.** Write-to-programmer.

## Index

### Special Characters

+CR 12

### Numerics

3112 printer 67  
 3116 printer 67  
 3912 printer 67  
 3916 printer 67  
 4250 printer 67  
 5080 66  
     *See also* display screens  
 6090 66  
     *See also* display screens  
 8514/A – driver load 56

### A

ADMCGM data  
     displaying 11  
 ADMDEFS  
     *See* defaults files  
 ADMGDF 9  
 ADMGDF data  
     displaying 11  
 ADMGDF objects  
     converting to CGM using ADMUCG 7  
     converting to PIF using ADMUPCx 8  
     printing using ADMUCDSO 7  
 ADMGDF-to-GIF conversion utility, ADMUGIF 7  
 ADMIMG files  
     printing 43  
 ADMIMG objects  
     printing via GDDM-IVU 8  
 ADMUCDSO, chart-data print utility 7  
 ADMUCG, CGM-to-ADMGDF conversion utility 7  
 ADMUCIMT CLIST (MVS) 7  
 ADMUCIMV EXEC (VM) 7  
 ADMUFILE CLIST 8  
 ADMUGC, ADMGDF-to-CGM conversion utility 7  
 ADMUGIF, ADMGDF-to-GIF conversion utility 7  
 ADMUIPx, image print utility 7  
 ADMUJD10, job stream 7  
 ADMUJT10, job stream 7  
 ADMUPCFx, file transfer and conversion utility 8

ADMUPCx, PIF-ADMGDF conversion utility 8  
 advanced-function printers 32  
 alphanumeric text 9  
 alphanumerics  
     plotting 31, 36  
 application code page  
     APPCPG external default 45  
 applications  
     accessing  
         from a workstation 3  
         host-based 3  
     not responding 28  
     running multiple 2  
 aspect ratio 40

### B

blinking characters 57

### C

CDPDS files 41  
 CDPU 2, 40  
 centering 22  
 CGM format 9  
 CGM-to-ADMGDF conversion utility, ADMUCG 7  
 chart data, printing using ADMUCDSO 7  
 charts  
     transferring 49  
 code pages  
     Japanese  
         1027 extended 69  
         290 69  
         290 extended 69  
         extended 69  
         translation between 69  
 colors  
     for plotting 61  
     on DEC terminals 64  
 commands  
     incomplete 28  
     User Control  
         *See* User Control  
 Composed Document Printer Facility (CDPF) 67  
 Composite Document Print Utility  
     *See* CDPU

# index

Composite Document Printing Data Stream

See CDPDS files

composite documents

description 40

displaying 11

PF keys when viewing 42

previewing 11

printing 11, 43

Computer Graphics Metafile format

See CGM format

conversion utilities 7

ADMUCG 50, 52

ADMUGC 50, 52

ADMUPCT 52

ADMUPCV 50

ADMUPGT 52

ADMUPGV 50

conversions supported by GDDM 5

copying files

See files

cursors

alphanumerics 12

activating 38, 64

four-button

See puck

GDDM 11

graphics 12

image 12

moving without a mouse 12

on a 3270-PC/G 64

on a 3270-PC/GX 64

on the 3179-G 64

on the 3192-G 64

on the 3270-PC/G 65

on the 3270-PC/GX 65

on the 3472-G 64

on the IBM 5550 65

## D

data

displaying 11

ADMCGM 11

ADMGDF 11

using GDDM-PCLK 11

formatting for printing 37

lost 29

moving 21

plotting 31

printing

See printing

data (*continued*)

saving 26

data types 8

ddname 10

DEC terminals

colors displayed on 64

default values 9

defaults files 9

CICS 10

CMS 10

IMS 10

PROFILEfilename 10

TSO

See ddname

deferred files

plotting 36

printing 36

depth

of output area 39

device families 31

display adapter

screen sizes 55

display adapters

See display screens

display screens

5080 66

6090 66

CGA 55

drivers 56

EGA 55

sizes 56

documents

composite

See composite documents

draft draw facility 25

using on different terminals 65

## E

encapsulated PostScript (EPS) 33

ENTER 16

error reports 43

external defaults

examples

country-extended code page (CECP) 45

national language 45

trace 45

**F**

families 31  
 family-2 print files  
   manually sent to printer  
     JES/328X 33  
 Fast Path facility  
   commands 26  
   description 26  
   switching on and off 26  
     under TSO 28  
     under VM 28  
 files  
   copying  
     under CMS 50  
     under TSO 52  
   transferring 49  
 function-key assignments 58

**G**

GDDM  
   introduction to 1  
 GDDM Internet home page x  
 GDDM objects, converting formats 5  
 GDDM trace  
   TRCESTR external default  
     full I/O trace 45  
     PostScript trace 45  
 GDDM-IVU 4, 8  
 GDDM-OS/2 Link  
   description 3  
   User's Guide  
     viewing 3  
 GDDM-PCLK  
   communicating with the hose 2  
   description 2  
   keys 58  
 GDDM-PGF 4  
 GDDM-PGF ICU 8  
 GDDM-PGF OPS 4  
 GDDMXD 67  
 GDF  
   save menu 26  
 graphics  
   centering 22  
   description 9  
   disappearing 29  
   loading 9  
   redrawing 25

graphics (*continued*)  
   saving 9, 26  
   undoing changes 25  
 graphics formats 9  
 graphics text  
   changing 9  
   creating 9

**H**

hardware for GDDM 55  
 HDILOAD 56  
 highlighting  
   on two-color devices 57  
 home page for GDDM x  
 hypertext 36

**I**

IBM 3112 printer 67  
 IBM 3116 printer 67  
 IBM 3800 Model 3 printer 67  
 IBM 3812 Model 2 printer 67  
 IBM 3812 printer 67  
 IBM 3820 printer 67  
 IBM 3912 printer 67  
 IBM 3916 printer 67  
 IBM 4224 printer 67  
 IBM 4234 printer 67  
 IBM trademarks viii  
 ICU 4  
 ICU (Interactive Chart Utility) 8  
 image data  
   *See* images  
 image print utility, ADMUIMPx 7  
 image symbol editor 2  
 Image View Utility  
   *See* GDDM-IVU  
 Image View Utility (IVU) 8  
 images 9  
   printing 43  
 IND\$FILE  
   CLIST 52  
   EXEC 50  
   MODULE 50  
   program 52  
 IND\$FILE CLIST / EXEC 8  
 Input Inhibited indicator 28  
 Interactive Chart Utility  
   *See* ICU

# index

Interactive Chart Utility (ICU) 8  
Internet home page for GDDM x  
IVU (Image View Utility) 8

## J

Japanese (Katakana)  
code pages  
290 69  
290 extended 69  
Japanese (Latin)  
code page  
1027 extended 69  
job streams, supplied  
ADMUJD10 7  
ADMUJT10 7

## K

keyboard mapping 58  
for enhanced keyboards 59  
Personal Computer AT 58  
Personal Computer XT 58  
keyboards  
activating 38  
enhanced 59  
supported by GDDM 57  
keys  
for enhanced keyboards 59  
for GDDM-PCLK 58  
using with GDDM 61

## L

LISTxxxx files 32  
local mode 65

## M

menus  
not displayed 28  
User Control  
See User Control  
mouse  
selecting commands with 16

## N

national-language panels and messages  
NATLANG external default 45  
nicknames  
description 10  
examples  
PostScript printing 46  
User control 46  
PostScript printing 47  
non-graphics files  
transferring 50  
notices vii

## O

on the PC 65  
on the PS/2 65  
Online Presentation System 4  
OPS 4  
overlay files 33

## P

PA3 14, 15  
page printers 32  
page segments 33  
pages  
moving to specified 42  
paper width 62  
paper widths 62  
pens  
color of 61  
Personal Computer AT keyboard 58  
Personal Computer XT keyboard 58  
pictures  
centering 22  
transferring 49  
undoing changes 25  
zooming in 23  
zooming out 24  
PIF  
character limitation 27  
save menu 27  
saving 26  
PIF-to-ADMGDF conversion utility, ADMUPCx 8  
PixRet 25  
plotter pen colors 61  
plotters 61

- plotting
    - alphanumerics 31, 36
    - deferred 36
    - description 31
    - immediate 36
    - under CMS 33
    - under TSO 33
    - under VSE 34
    - with GDDM-OS/2 Link 36
    - with GDDM-PCLK 36
    - with User Control 37
  - PostScript
    - downloading to workstation 50
    - primary datastream
      - PS files 32
    - secondary datastream
      - encapsulated PostScript (EPS) 33
  - PostScript debug information
    - TRACESTR external default
      - example 45
  - Presentation Graphics Facility
    - See GDDM-PGF
  - presentation text 9
  - previewing 40
  - print device families 31
  - print resolutions 62
  - Print Services Facility (PSF) 67
  - print utility 2
  - printers
    - advanced-function
      - See page printers
    - page
      - See page printers
    - paper widths 62
    - PostScript 32
    - print resolutions 62
    - using with GDDM 62
  - printing
    - ADMIMG files 43
    - composite documents 43
    - deferred 36
    - description 31
    - formatting data for 37
    - GDDM images 43
    - immediate 36
    - manually with JES/328X 33
    - on IPDS printers 43
    - on page printers 34
    - problems 43
    - rotated lines 42
    - printing (*continued*)
      - rotated pages 42
      - spooled to JES/328X
        - changing print medium 33
        - changing writer program 33
      - under CMS 33
      - under TSO 33
      - under VSE 34
      - with a 4-color printer 37
      - with CDPU 40
      - with GDDM-OS/2 Link 36
      - with GDDM-PCLK 36
      - with IPU 43
      - with User Control 37
    - PROFILE filename 10
    - PS/55 Japanese workstation
      - reconfiguring
        - for code-page translation 70
    - PSEGxxxx files 33
    - PSF (Print Services Facility) 67
    - puck
      - selecting commands with 16
- ## R
- RECEIVE command
    - CMS 51
    - TSO 53
  - reverse video 57
  - rotated graphics
    - printing 42
  - rotation 40
  - rubber band 67
  - rubber box 67
- ## S
- save GDF menu 26
  - save PIF menu 27
  - screen drivers
    - loading 56
  - screen sizes 55
  - screens
    - See display screens
  - scrolling 18
    - commands 21
  - secondary datastream
    - encapsulated PostScript (EPS) 33
    - overlay files 33
    - page segments 33

# index

SEND command  
  CMS 51  
  TSO 53  
stylus  
  selecting commands with 16  
swathes 35

## T

terminal emulators  
  description 2  
terminals  
  3270-PC/G in local mode 64  
  3270PC/GX in local mode 64  
  DEC 64  
  using with GDDM 64  
text  
  alphanumeric 9  
  graphics  
    See graphics text  
  presentation 9  
trademarks viii  
transfer and conversion utility, ADMUPCFx 8  
transferring files  
  between PC and host 49  
  charts 49  
  non-graphics 50  
  on CICS systems 49  
  on IMS systems 49  
  pictures 49  
  PostScript 50  
  under CMS 50  
transforms 5  
transparent characters 57

## U

User Control  
  commands  
    canceling 15  
    selecting 15  
  description 2, 13  
  ending 27  
  functions 13  
  menus 14  
    displaying 15  
    hiding 15  
    moving between 15  
    not displayed 28  
    restoring 15

User Control (*continued*)  
  operator windows  
    defining 16  
    PA3 key 14  
    starting 14  
  utilities  
    accessing  
      from a workstation 3  
      host-based 3

## V

Vector Symbol Editor  
  See VSE  
vector symbols 4

## W

width  
  of output area 39  
window borders 16  
  description 16  
  moving 20  
windows  
  active 16  
  borders  
    See window borders  
  making active 17  
  moving 20  
  operator  
    See User Control  
  scrolling down 18  
  scrolling up 18  
  sizing 19  
    to the maximum 18  
    to the original 19  
workstations 65

## X

Xstations 67

## Z

zooming  
  failure 29  
  in 23  
  out 24

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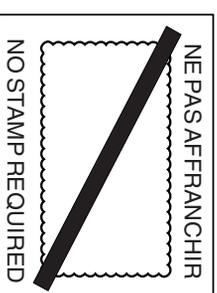
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