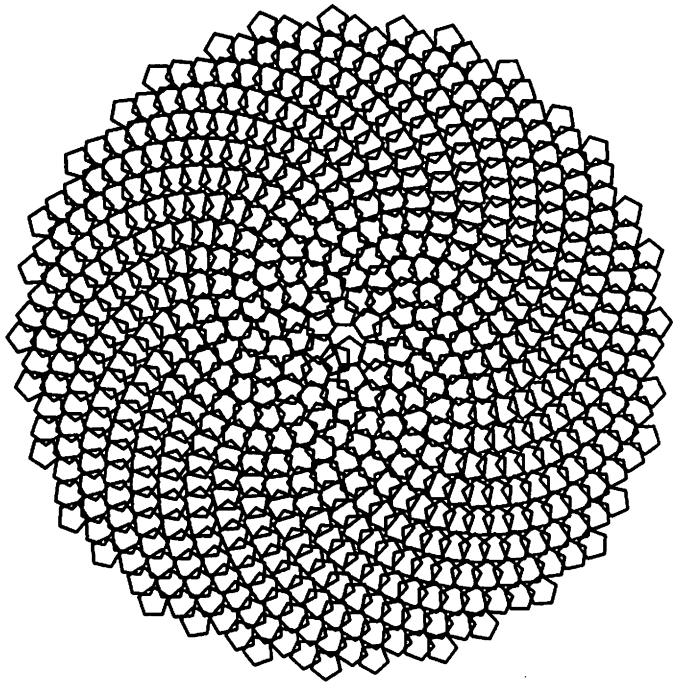
GDDM™

Installation and System Management for VM

IBM



Front Cover Pattern: Electronic Sunflower

The pattern on the front cover was produced by a GDDM program. The program to produce this pattern, and many variations of the pattern, is published in:

- *GDDM Application Programming Guide*
- *GDDM Base Programming Reference*

SC33-0323-2
File No. S370/4300/VM-34

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Installation and System Management for VM

GDDM/VM, 5664-200	Version 2 Release 2
GDDM Interactive Map Definition, 5668-801	Version 2 Release 1
GDDM-PGF, 5668-812	Version 2 Release 1
GDDM/VMXA, 5684-007	Version 2 Release 2
GDDM-IVU, 5668-723	Release 1
GDDM-GKS, 5668-802	Release 1
GDDM-REXX, 5664-336	Release 1

Licensed Programs

IBM

| **Third Edition (January 1988)**

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

Program name	program number	program level
GDDM/VM (Graphical Data Display Manager)	5664-200	Version 2 Release 2 Modification 0
GDDM/VMXA	5684-007	Version 2 Release 2 Modification 0
GDDM-PGF (Presentation Graphics Facility)	5668-812	Version 2 Release 1 Modification 0
GDDM Interactive Map Definition (GDDM-IMD)	5668-801	Version 2 Release 1 Modification 0
GDDM-IVU (Image View Utility)	5668-723	Release 1
GDDM-GKS (Graphical Kernel System)	5668-802	Release 1
GDDM-REXX	5664-336	Release 1

Changes and additions to the text and illustrations are indicated by revision bars (vertical lines) to the left of the change.

A **summary of changes** is given on page xvii.

Information about IBM publications and how to submit comments is given on page vii.

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Preface

What this book is about

This book provides the information needed to install and manage the following licensed programs:

- GDDM*/VM, program number 5664-200
- GDDM/VMXA, program number 5684-007
- GDDM-PGF, program number 5668-812
- GDDM Interactive Map Definition (GDDM-IMD), program number 5668-801
- GDDM Image View Utility (GDDM-IVU), program number 5668-723
- GDDM-GKS, program number 5668-802
- GDDM-REXX, program number 5664-336.

GDDM-GKS is an implementation of the Graphical Kernel System. GDDM-REXX is a productivity tool that lets GDDM be used from EXECs written for the VM/SP or VM/XA SP System Product Interpreter.

Who this book is for

This book is for system programmers experienced in installing IBM licensed programs.

What you need to know

This book assumes that you have experience in using CMS EXECs.

How to use this book

This book is divided into three parts, corresponding to before installation, installation, and after installation, followed by a number of appendixes. It should be used sequentially to install GDDM. After installation it can be used for reference.

Terminology

Throughout this book, unless otherwise specifically detailed, all references to VM can be taken to include VM/XA; details are given in Chapter 1.

Throughout this book the term GDDM is used to apply to the licensed programs listed on page 3, together with the National Language (NL) no-charge special features of GDDM/VM, GDDM/VMXA, GDDM-PGF, GDDM-IVU, and GDDM-GKS, and the PCLKF feature of GDDM/VM or GDDM/VMXA.

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* GDDM is a trademark of International Business Machines Corporation

The GDDM library

Introduction	*GDDM General Information* and brochures	GBOF-0058	
	GDDM General Information	GC33-0319	
	GDDM If you make business presentations... (brochure)	GC33-0455	
	GDDM If you're an engineer... (brochure)	GC33-0456	
	GDDM Release Guide	GC33-0320	
General	*GDDM Image View Utility*	SC33-0479	
	GDDM-REXX Guide	SC33-0478	
	GDDM Interactive Map Definition	SC33-0338	
	GDDM-PCLK Guide	—	
User's Guides	*GDDM Guide for Users*	SC33-0327	
	GDDM-PGF Interactive Chart Utility	SC33-0328	
	GDDM Image Symbol Editor	SC33-0329	
	GDDM-PGF Vector Symbol Editor	SC33-0330	
	GDDM-PCLK Reference Summary (booklet)	SX33-6067	
	GDDM-CSPF User's Guide	SC33-0552	
	GDDM Typefaces and Shading Patterns	SC33-0554	
Programming	*GDDM Application Programming Guide* (two volumes)	SC33-0337	
	GDDM Base Programming Reference (two volumes)	SC33-0332	
	GDDM Base Programming Reference Summary (booklet)	SX33-6053	
	GDDM-PGF Programming Reference	SC33-0333	
	GDDM-PGF Programming Reference Summary (booklet)	SX33-6054	
	GDDM-GKS Programming Guide and Reference	SC33-0334	
Systems	*GDDM Installation and System Management for MVS*	SC33-0321	
	GDDM Installation and System Management for VM	SC33-0323	← **this book**
	GDDM Installation and System Management for VSE	SC33-0322	
	GDDM Performance Guide	SC33-0324	
	GDDM-CSPF Installation Guide	SC33-0553	
Diagnosis	*GDDM Messages*	SC33-0325	
	GDDM Diagnosis and Problem Determination Guide	SC33-0326	

Books from related libraries

In addition to the GDDM library, you may need to refer to some of the following manuals:

VM/SP	*VM/SP Installation Guide*, SC24-5237 *VM/SP Planning Guide and Reference*, SC19-6201 *VM/SP Operator's Guide*, SC19-6202 *VM/SP CP Command Reference for General Users*, GC19-6212 *VM/SP System Programmer's Guide*, SC19-6203 *VM/SP CMS Command and Macro Reference*, SC19-6209 *VM/SP System Messages and Codes*, SC19-6204 *VM/SP System Product Interpreter Reference*, SC24-5239
VM/XA SP	*VM/XA SP Planning*, GC23-0378 *VM/XA SP Installation and Service*, SC23-0364 *VM/XA SP Administration*, SC23-0353 *VM/XA SP CP Command Reference*, SC23-0358 *VM/XA SP CMS Command Reference*, SC23-0354 *VM/XA SP System Product Interpreter Reference*, SC23-0374
APL	*VS APL for CMS: Terminal User's Guide*, SH20-9067 *APL2 Installation and Customization under CMS*, SH20-9221
VM/VCNA	*VM/VCNA General Information*, GC27-0501 *VM/VCNA Installation, Operation and Terminal Use*, SC27-0502
Networking	*Network Program Products Samples: VM SNA*, SC30-3309
GDDM/ graPHIGS	*Installing GDDM/graPHIGS*, SC33-8101 *Licensed Program Specifications*, GH23-0001 *Introducing graPHIGS*, SC33-8100 *Understanding graPHIGS*, SC33-8102 *Writing Applications with graPHIGS*, SC33-8103 *Programmer's Reference for graPHIGS*, SC33-8104 *Messages and Error Codes for graPHIGS*, SC33-8105 *Programmer's Pocket Reference for graPHIGS*, SC33-8107 *Problem Diagnosis for graPHIGS*, SC33-8108
Print Services Facility	*System Programmer's Guide for VM*, S544-3511
Composed Document Printing Facility	*Installation and Operations*, SC33-6135
IPDS	*Intelligent Printer Data Stream Reference*, S544-3417
3117 Scanner	*IBM 3117 Scanner and IBM 3117 PC Adapter Guide to Operations*, GA18-2477 *IBM 3117 Scanner and Extension Unit Guide to Operations*, GA18-2478 *IBM 3117 Scanner Hardware Maintenance and Service*, SY18-2159 *IBM 3117 Scanner Technical Reference*, SC18-2105

3118 Scanner	*Scanner Guide to Operations*, GA18-2475 *High Speed Adapter Guide to Operations*, GA18-2476 *IBM 3118 Scanner Hardware Maintenance and Service*, SY18-2158 *High Speed Adapter Hardware Maintenance and Service*, SY18-2167 *Scanner Technical Reference*, SC18-2104 *High Speed Adapter Technical Reference*, SC18-2117
3179-G, 3192-G	*3179-G and 3192-G Color Graphics Display Station Description*, GA18-2589
3193 Display station	*Description*, GA18-2364 *Setup Instruction*, GA18-2366 *Operator's Guide*, GA18-2365 *Problem Solving Quick Check Guide*, GA18-2443 *Problem Solving Guide*, GA18-2444
3270-family devices	*3270 Information Display System Configurator*, GA27-2849 *3270 Information Display System Data Stream Programmer's Reference*, GA23-0059 *8775 Display Terminal: Component Description*, GA33-3044
3270-PC/G and 3270-PC/GX work stations	*Introducing the IBM 3270 Personal Computer/G and /GX Ranges of Work Stations*, GA33-3157 *3270-PC/G Personal Computer/G and /GX Ranges of Work Stations; Planning Guide*, GA33-3158 *3270-PC/G Guide to Operations*, GA33-3140 *3270-PC/GX Guide to Operations*, GA33-3139 *Graphics Control Program User's Guide and Reference*, SC33-0207 (for IBM 3270-PC/G and PC/GX) *Graphics Control Program Version 3.2 User's Guide*, SC33-0368 (for IBM 3270-PC AT/G and PC AT/GX) *Graphics Control Program Version 3.2 User's Reference*, SC33-0372 (for IBM 3270-PC AT/G and PC AT/GX)
3274	*3274 Control Unit Description and Programmer's Guide*, GA23-0061 *3274 Control Unit Planning, Setup and Customization Guide*, GA23-2827
3812 Printer	*IPDS Handbook*, S544-3102 *IPDS NDS Attachment Feature Installation and Programming Instructions*, S544-3101 *Guide to Operations*, S544-3267
4224 Printer	*Printer Product and Programming Description Manual*, GC31-2551 *Operating Instructions*, GC31-2546 *Guide to Operations*, GC31-3621
4234 Printer	*Operation Instructions for Model 1*, GC31-2556
4250 Printer	*Operator's Guide*, GA33-1551

5550 Multistation (available in Japanese only)	*5550 Japanese 3270-PC User's Guide*, N:SC18-2059 *How To Use 5550 Japanese 3270-PC*, N:SC18-2060 *5550 Japanese 3270-PC/G User's Guide*, N:SC18-2071 *How To Use 5550 Japanese 3270-PC/G*, N:SC18-2072 *5550 Small Cluster User's Guide*, N:SC18-2092 *How To Use 5550 Small Cluster*, N:SC18-2091 *5550 Small Cluster/Graphics User's Guide*, N:SC18-2107 *How To Use 5550 Small Cluster/Graphics*, N:SC18-2108 *5550 3270 Kanji Emulation Description*, N:SC18-2020 *5550 3270 Kanji Emulation Operator's Guide*, N:SC18-2021

IBM manuals

Changes are periodically made to the information herein; before using this publication in connection with the operation of IBM systems or equipment, refer to the latest *IBM System/370, 30xx, and 4300 Processors Bibliography*, GC20-0001, for the editions that are applicable and current.

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Book structure

Preinstallation

Chapter 1. Introduction to GDDM ... pages 1 through 22
contains a brief introduction to the GDDM family of licensed programs, and to the hardware and software supported by GDDM.

Chapter 2. Overview of GDDM installation ... pages 23 through 31
gives an overview of installation, including the storage requirements.

Chapter 3. Preinstallation planning ... pages 33 through 39
discusses what you should consider before installing GDDM.

Installation

Chapter 4. Installing GDDM from tape ... pages 43 through 55
describes what is on the tapes that IBM supplies, and how to run the installation EXECs.

Chapter 5. Steps after using the installation EXECs ... pages 57 through 99
describes tailoring GDDM to meet the needs of your users, and testing the system.

Postinstallation

Chapter 6. Postinstallation tasks ... pages 103 through 111
describes how to apply service to GDDM, managing GDDM objects, and repackaging.

Appendixes ... pages 113 through 258
contain reference material that you may need during installation, or later. A summary of the contents of each appendix is given on page 113.

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Summary of Changes

Changes for Version 2 Release 2

Changes to the installation process for Version 2 Release 2

The installation process for Version 2 Release 2 is broadly the same as that for Version 2 Release 1 Modification 1. A new EXEC is available, to aid migration from Version 2 Release 1.

Changes in documentation for Version 2 Release 2

The book now incorporates instructions for installing GDDM/VMXA, GDDM-IVU, GDDM-GKS, and GDDM-REXX.

Changes for previous releases

Changes to the installation process for Version 2 Release 1 Modification 1

A new EXEC is available, to aid migration from Version 2 Release 1 Modification 0.

Changes in documentation for Version 2 Release 1 Modification 1

- Example EXECs for printing are added. The user EXECs are now in a new Appendix.
- Some insubstantial changes and editorial corrections have been made; these are not normally shown with revision bars.
- Information about the GDDM/VM PCLKF feature is added in TNL SN33-6323.

Changes to the installation process for Version 2 Release 1

The following major changes have been made to the installation process between GDDM Version 1 Release 4 and GDDM Version 2 Release 1.

- The National Language features allow individual languages to be selected for installation.
- GDDM can be installed using the INSTFPP process under VM/SP.
- Separate saved segments are used for GDDM/VM, GDDM-PGF, and GDDM-IMD.

Changes in documentation for Version 2

The manual, which used to deal with all subsystems, has been split into three separate manuals, one each for MVS, VM, and VSE.

In previous GDDM installation manuals there was a chapter on performance, and a chapter on tuning and customization. These have been removed and can now be found in the *GDDM Performance Guide*. The information on storage requirements is in both the *GDDM Performance Guide* and in this manual, as the information is required during installation and also when improved performance is being considered.

Part 1. Preinstallation

Chapter 1. Introduction to GDDM

GDDM (the Graphical Data Display Manager) consists of the following licensed programs:

Program name	Number	Applicable systems
GDDM/MVS	5665-356	MVS
GDDM/VM	5664-200	VM/SP
GDDM/VMXA	5684-007	VM/XA SP
GDDM/VSE	5666-328	VSE
GDDM-PGF (Presentation Graphics Facility)	5668-812	MVS, VM, VSE
GDDM Interactive Map Definition (GDDM-IMD)	5668-801	MVS, VM, VSE
GDDM-IVU (Image View Utility)	5668-723	MVS, VM, VSE
GDDM-GKS (Graphical Kernel System)	5668-802	MVS, VM
GDDM-REXX	5664-336	VM
GDDM/graPHIGS (*)	5668-792	MVS, VM
GDDM-PCLK Version 1.1 (*)		MVS, VM, VSE
GDDM-CSPF (*)	5668-013	MVS, VM

Notes:

1. The first four programs are informally called "GDDM Base." Of them, only GDDM/VM and GDDM/VMXA are considered in this book. For GDDM/MVS, see the *GDDM Installation and System Management for MVS* manual. For GDDM/VSE, see the *GDDM Installation and System Management for VSE* manual.
2. In the table above, and **throughout the rest of this book**, the generic term "VM" means VM/SP and VM/XA, and the generic term "GDDM Base" means GDDM/VM and GDDM/VMXA. In general, the GDDM/VMXA installation process is identical to that for GDDM/VM. Where there are differences, the specific terms are used to identify them.
3. This book also deals with the other programs that can be installed on GDDM/VM or GDDM/VMXA systems, except for those indicated by an asterisk (*); they have separate documentation and are not considered here — see the Preface for details.

These licensed programs enable your applications to communicate with many of IBM's advanced terminals, printers, and plotters. They handle graphics and alphanumerics in color and monochrome and can work under IBM's major software subsystems.

If you have the GDDM/VM or GDDM/VMXA licensed program, you can:

- Create graphics, including drawing primitives such as lines and shaded areas, and setting graphics attributes such as color
- Handle images, including reading from a scanner

- Process alphanumerics, both mapped and unmapped
- Send graphics, images, and alphanumerics to a terminal or printer, and read input from a terminal
- Use the Image Symbol Editor; an image symbol is a pattern of dots such as a company logo, reproduced to a predetermined size.

If you have the associated GDDM-PGF licensed program you can:

- Use the ICU (Interactive Chart Utility); the ICU is a widely-used, menu-based utility that enables non-DP personnel to draw business charts on display terminals, and print and plot them. Also, you can create multiple charts on one page.
- Use the Vector Symbol Editor; a vector symbol is formed by lines and curves, not dots, and GDDM-PGF can show vector symbols at any size. They can also be sheared (sloped, as in italic type faces), rotated, or shaded. Compared with image symbols, they are more versatile in use, but they display less accurately when very small.

If you have the GDDM-IMD licensed program, you can create interactively screen and printer alphanumeric maps during program development.

If you have the GDDM-PCLK licensed program, you can use an IBM PC with an appropriate emulator as a graphics terminal; this includes GDDM-emulated images, and printing and plotting to PC-attached devices.

If you have the GDDM-IVU licensed program, you can scan and display documents as images, scale, trim, and merge such images, and create image output for printers.

If you have the GDDM-GKS licensed program, you can code applications to the Graphical Kernel System (GKS) standard application programming interface. GDDM-GKS supports all family-1 and -2 devices supported for graphics by GDDM under TSO and CMS.

If you have the GDDM-REXX licensed program, you can code GDDM calls in EXECs that use the VM System Product Interpreter (REXX) language.

You must install the GDDM/VM or GDDM/VMXA licensed program in order to use GDDM-PGF, GDDM-IMD, GDDM-PCLK, GDDM-IVU, GDDM-GKS, or GDDM-REXX.

GDDM is a prerequisite for a number of licensed programs that use it for graphics and alphanumeric support.

What is in this book

This book tells you how to install GDDM. Because it also explains how GDDM fits in with other pieces of software, it helps you to smooth the path for your GDDM users.

Hardware and software supported

This section is not system-specific. If you have multiple systems, this helps you to have a complete picture of the hardware and software supported by GDDM.

Processors

In general, GDDM Version 2 Release 2 Modification 0 will run on all processors that support the System/370 architecture (or extended architecture) and have the Floating Point feature installed. This includes all models in the following processor families:

System/370
303x
308x
309x
43xx
937x.

The PC code of the GDDM-PCLK licensed program runs on a variety of IBM Personal Computers, as detailed in Figure 1 on page 6.

Control units

The supported control units are:

3174
3271
3272
3274
3276
3708 Network Conversion Unit
5088
7171 ASCII control unit (for ASCII terminals)
8100 (through the 3270 Data Stream Compatibility Licensed Program) direct TP line.

Some operating systems and subsystems may not support all models of these controllers. You should consult the relevant system and subsystem manuals for further details.

Not all devices attach to all controllers. You should consult the relevant device specification to determine the controller, model, and microcode level for any particular device.

Other than requiring that a device is attached to the correct controller type and model, GDDM is generally insensitive to the precise attachment of any device.

Notes:

1. For some 3274 Configuration Support levels, 3274 microcode fixes are required as follows:
   - Configuration Support C level 46 — PTR3174, PTR312B
   - Configuration Support D level 60 — PTR3144, PTR3174, PTR312B.

   Further microcode level and fix requirements for specific devices are listed in the notes in the next section.
2. The 7171 provides ASCII-to-3270 protocol conversion. The 7171 appears to the host processor as a 3274 Model 1D control unit. The attached ASCII display terminals and printers appear as (nonqueriable) 3278 or 3277 terminals and 3286 printers.

Devices

The supported presentation devices are listed in this section.

All GDDM functions are supported on all devices unless the description of the function in the *GDDM Base Programming Reference* manual states otherwise.

All applicable models of a listed device are supported unless a specific model is given in the table below.

Support of some devices is subject to system or subsystem restrictions described in "System and subsystem software" on page 16.

The "GDDM Function" column contains the following codes:

A: Supported as an alphanumeric device. The GDDM alphanumeric functions (the Axxxxx and Mxxxxx functions) will work on the device.

C: Supported for display or printing of composite documents.

G: Supported as a graphics device. The GDDM graphics functions (the Gxxxxx and similar functions) will work on the device. Graphics is done via Programmed Symbols (PS), vector graphics, or some other method. In some cases, a particular model or feature may be required beyond the base in order to do graphics.

I: Supported as an image device: GDDM image functions (the Ixxxxx functions) will work on the device.

Device	GDDM function	Title	Notes
3270 displays and printers (see notes 1 and 2)			
3104 Model B1, B2	A . . .	Display	
3178	A . . .	Display	
3179 Model 1	A . . .	Color display	
3179-G	ACGI	Color graphics display	3
3180 Model 1	A . . .	Display	4
3191	A . . .	Display	
3192-C	A . . .	Color display	
3192-D	A . . .	Display	4
3192-G	ACGI	Color graphics display	3
3193	A . . I	Display	5
3194	A . . .	Display	
3230 Model 1, 2	A . . .	Printer	6
3232 Model 1, 11	A . . .	Keyboard printer	7
3262 Model 3, 13	A . . .	Line printer	
3268	A . . .	Printer	
3268 Model 2C	ACGI	Color printer	8
3270-PC	ACGI	Work station	9, 10
3270-PC/G	ACGI	Work station	9, 11
3270-PC/GX	ACGI	Work station	9, 11
3275 Model 2, 12	A . . .	Display	
3276	A . . .	Control unit display	
3277 Model 1, 2	A . . .	Display	
3278	ACGI	Display	12
3278 Model 52	A . . .	Display	
3279	ACGI	Color display	13
3283 Model 52	A . . .	Printer	
3284 Model 2, 3	A . . .	Printer	
3286 Model 2	A . . .	Printer	
3287	ACGI	Printer	14
3288	A . . .	Line printer	
3290	ACGI	Information panel	15
3812 Model 2	ACGI	IPDS Printer	16
4224 Model 2XX	ACGI	IPDS Printer	16
4234 Model 1	A . . .	Dot band printer	
8775	ACGI	Display	17

Figure 1 (Part 1 of 3). GDDM device support

Device	GDDM function	Title	Notes
Plotters (see note 18; see also PC plotters below)			
6180	. . GI	Color Plotter (8-Pen A4-size)	
6182	. . GI	Color Plotter (8-Pen A3-size)	
6184	. . GI	Color Plotter (8-Pen A4-size)	
6186	. . GI	Color Plotter (8-Pen A0-size)	
7371	. . GI	Color Plotter (2-Pen A4-size)	
7372	. . GI	Color Plotter (6-Pen A3-size)	
7374	. . GI	Color Plotter (8-Pen A1-size)	
7375	. . GI	Color Plotter (8-Pen A0-size)	
Scanners (see note 19)			
3117	. . . I	Scanner and extension unit	
3118	. . . I	Scanner	
IBM PS/55 and 5550-family displays and printers (see note 20)			
Displays	A . GI	DBCS displays	21
Printers	A . . .	DBCS printers	
Other display terminals			
5081	ACGI	High-function graphics display	22
System printers (see note 23)			
1403	A . . .	Printer	
3203 Model 5	A . . .	Printer	
3211	A . . .	Printer	
3262 Model 1, 11, 5	A . . .	Line printer	
3800 Model 1, 2, 3, 6	A . . .	Printing subsystem	
4245	A . . .	Line printer	
4248	A . . .	Printer	
Composed-page printers (see note 24)			
3800 Model 3, 6, 8	. CGI	Printing subsystem	
3812	. CGI	Page printer	25
3820	. CGI	Page printer	
4250	. . GI	Printer	

Figure 1 (Part 2 of 3). GDDM device support

Device	GDDM function	Title	Notes
IBM Personal Computers (see note 26)			
PC	ACGI	IBM Personal Computer	
PC XT	ACGI	IBM Personal Computer XT	
PC XT-286	ACGI	IBM Personal Computer XT-286	
PC AT	ACGI	IBM Personal Computer AT®	
3270-PC	ACGI	IBM Personal Computer	
3270-PC AT	ACGI	IBM Personal Computer	
Personal System/2™ Model 25, 30, 50, 60, 80	ACGI	IBM Personal System	
IBM PC printers and plotters (see note 27)			
3852 Model 1, 2	A . GI	Color Jetprinter	
4201 Model 1	A . GI	Proprinter	
4201 Model 2	A . GI	Proprinter II	
4202	A . GI	Proprinter XL	
4207	A . GI	Proprinter X24	
4208	A . GI	Proprinter X124	
5152	A . GI	Mono graphics printer	
5182	A . GI	Color impact printer	
5201	A . GI	Quietwriter	
5202	A . GI	Quietwriter III	
6180	. . GI	Color Plotter	
6182	. . GI	Color Plotter	
6184	. . GI	Color Plotter	
6186	. . GI	Color Plotter	
7371	. . GI	Color Plotter	
7372	. . GI	Color Plotter	
7374	. . GI	Color Plotter	
7375	. . GI	Color Plotter	

Figure 1 (Part 3 of 3). GDDM device support

Notes for Figure 1:

1. Any terminal emulating the 3270 architecture can be used if it is fully compatible with one of the listed devices.
2. Some devices, such as the 3179 and 319x, support a keyboard definition utility that allows the user to define code points associated with keys when the keyboard is in native mode. Because the default GDDM character set may cause translation of some inbound non-EBCDIC code points, native mode is only supported by GDDM for applications that specify ASTYPE(1) to suppress translations.

Such devices are supported normally by GDDM when they are in keyboard emulation mode (emulating the 3278/3279).

3. When using remote non-SNA (BSC) attachment:
   - 3274 WACK (wait before transmit positive acknowledgement) support must be configured. To configure WACK support, specify 1 in reply to 3274 Customization question 176 (BSC Enhanced Communication Option for Distributed Function Terminals).
   - Fixes to NCP and SSP APARs described in note 28 are required.

   On IMS/VS, supported through SNA attachment only. This device is not supported on IMS/VS in BTAM or non-SNA configurations.

   Support for graphics and image requires 3274 Configuration Support D not less than level 64.

   The 3192-G color graphics display is functionally equivalent to the 3179 Model G.

4. Can be dynamically configured in any one of 8 modes (Model IDs 2 through 9). GDDM support of Model IDs 6 through 9 provides no extra function above that provided for Model IDs 2 through 5.

   The 3192 Model D is functionally equivalent to the 3180 Model 1.

5. Requires 3274 Models 31A, 31C, 31D, 41A, 41C, 41D, 51C, or 61C with Configuration Support D, and microcode of release level 65.0 or higher, or 3174 Models 1L, 1R, 2R, 3R, 51R, 52R, or 53R, and microcode of release level 1.0 or higher.

   When using remote non-SNA (BSC) attachment:

   - 3274 WACK support must be configured. To configure WACK support, specify 1 in reply to 3274 Customization question 176 (BSC Enhanced Communication Option for Distributed Function Terminals).
   - Fixes to NCP and SSP APARs described in note 28 are required.

   On IMS/VS, supported through SNA attachment only. This device is not supported on IMS/VS in BTAM or non-SNA configurations.

6. Supported as a 3287 printer.

7. Supported for output only (no keyboard input).

8. Support for graphics and image requires RPQ S30277. On IMS/VS, EC A21615 should be installed for correct operation of GDDM.

9. The AT version of this device is also supported.

10. Support for graphics and image requires an additional feature, namely, 5790 Programmed Symbols.

    GDDM-PCLK supports the 3270-PC (with or without Programmed Symbols) but support is limited to CGA emulation display mode (see note 26).

11. Corresponding software, the IBM 3270-PC Graphics Control Program (GCP), is also required. The following fixes to GCP APARs (according to the GCP Release) should be installed for correct operation of GDDM:

    - GCP Release 1.12 — IR67978 and IR67982.

- GCP Release 2.10 — IR67980 and IR67985.
- GCP Release 3.10 and 3.20 — IR67981 and IR67986.

3270-PC AT/G and AT/GX require at least GCP Release 2.0.

When using link-attached (remote) non-SNA (BSC) attachment:

- 3274 WACK support must be configured. To configure WACK support, specify 1 in reply to 3274 Customization question 176 (BSC Enhanced Communication Option for Distributed Function Terminals).
- Fixes to NCP and SSP APARs described in note 28 are required.

On IMS/VS, supported through SNA attachment only. These devices are not supported on IMS/VS in BTAM or non-SNA configurations.

Support for graphics and image:

- Requires that the 5371/5373 be attached to the 3274 in Distributed Function Terminal (DFT) mode.
- Requires 3274 Configuration Support D not less than level 61. The 3274 requires patch number 3537 for level 61.1, or patch numbers 3537 and 3538 for level 63. For level 64, the 3274 requires that you turn on bit 3 ('xxx1xxxx'B) in reply to 3274 Customization question 125 (Miscellaneous Feature Option).

12. Support for graphics and image requires additional features, namely:

    - 5790 Programmed Symbols
    - 3620 Character Set Extension.

    These functions are not available on 3278 Models 1 and 5.

13. Support for graphics and image on 3279 Models 3B, S3B, S3G, and 03X only. Except for 3279 Model S3G, this support requires additional features, namely:

    - 5790 Programmed Symbols
    - 3850 Extended Function.

    The 3279 Model 03X also supports the 8750 Video Output feature, which enables graphics to be copied from the terminal to another device such as a camera or TV screen.

14. Support for graphics and image requires additional features, namely:

    - Models 1, 2: 5781 Programmed Symbols (2) and, optionally, 5782 Programmed Symbols (4)
    - Models 1C, 2C: 5783 Programmed Symbols (4A).

    All these features have features 3610, 3880, and 9661 as prerequisites.

15. Requires 3274 Configuration Support D.

16. The 3812 Model 2 is supported as an IPDS printer when it has the 3270 Attachment Feature (number 3190). The 3812 Model 2 without the 3270 Attachment Feature and the 3812 Model 1 are supported as composed-page printers (see note 25).

    GDDM communicates with IPDS printers using the Intelligent Printer Data Stream (IPDS).

- IPDS-mode operation using a 3274 Control Unit requires a 3274 with configuration support level D and release 65.1.
- IPDS-mode operation using a 3174 Control Unit requires a 3174 with Release 2 or higher.
- IPDS-mode operation using a 4300 workstation adapter requires a 4361 WSA specify code 9261, Engineering Change (EC) 364436 and Request for Engineering Action (REA) 6421544.

When using remote non-SNA (BSC) attachment, fixes to NCP and SSP APARs described in note 28 are required.

GDDM can print on IPDS printers attached as follows:

- VM
  - LU-0 (non-SNA) locally attached printer attached to a single user virtual machine.
  - LU-0 (non-SNA) attached printer attached through RSCS 2.2.
  - LU-1 (SNA) attached printer attached through RSCS 2.2.

    GDDM/VM can spool IPDS print files to RSCS for subsequent printing on IPDS printers. IPDS printing through RSCS requires RSCS Version 2 Release 2 with APAR VM27763 and VM28573. For SNA printing APAR VM28392 is required.

    For LU-1 attached printers attached to RSCS 2.2, GDDM generates a LU-0 IPDS data stream which is converted to a LU-1 IPDS data stream by RSCS. In this case use a LU-0 (non-SNA) IPDS device token for subsequent LU-1 (SNA) printing.
- MVS
  - LU-0 (non-SNA) attached printer accessed through VTAM.
  - LU-1 (SNA) attached printer accessed through VTAM.
- CICS
  - LU-1 (SNA) attached printer accessed through CICS (and VTAM).

Some graphics applications may not run satisfactorily on 4224 printers without expanded storage. For printing of complex graphics and composite documents the expanded storage models (4224-2E2 and 4224-2C2) are recommended. 3812 IPDS printers have no such memory limitation.

The 4224 is also supported when attached through RSCS.

17. Support for graphics and image requires an additional feature, namely, 5790 Programmed Symbols.

    The 8775 requires down-stream loading to support Enhanced Function, Enhanced Function with Magnetics, or Multiple Partitions and Scrolling. This loading can be performed by DPPX or DPCX (if attached via 8100), or by the Downstream Load Utility (DSLU) Licensed Program (5668-006) which is supported on VSE and MVS. Consult the specifications of this program for further details.

18. When attached to 3270-PC/G or 3270-PC/GX work stations, support is through the IBM 3270-PC Graphics Control Program. The plotter must be

attached to an IEEE adapter in the 5371 system unit, or you require a GPIB card in the 5170 or 5373 system units.

For 3179-G or 3192-G, support is by an IEEE attachment through a 3979 Expansion Unit.

For Personal System/55 and 5550-family graphics members, support is by an IEEE attachment.

Formfeed options are triggered from the device type; they can be overridden by specifying a processing option. Refer to Appendix A, "GDDM defaults and nicknames" on page 115 for details.

19. Supported when attached to a 3193 Display.

20. A 5550-Family multistation typically consists of:

    - Monitor (for example, 5555)
    - System unit (for example, 5541, 5551, 5561)
    - Keyboard (for example, 5556)
    - Microcode, being any DBCS country version 3270-PC that is equivalent to Japanese 3270-PC or 3270-PC/G in the DBCS support
    - Printer (for example, 5557, 5563, 5575, 5577).

    GDDM supports any valid 5550-Family configuration.

    GDDM also supports IBM Personal System/55 as 3270, fully compatible with IBM 5550 as 3270.

    GDDM supports alphanumeric fields containing mixed DBCS data (that is, containing both EBCDIC and double-byte character set (DBCS) data). Support for mixed DBCS data without SO/SI separators taking positions requires Japanese 3270-PC microcode not less than Version 6 or Japanese 3270-PC/G microcode not less than Version 5, or DBCS country equivalent.

21. Support for graphics and image requires Japanese 3270-PC/G microcode, or DBCS country equivalent.

    Support for Outboard DBCS Vector Symbol Sets (VSSs) requires Japanese 3270-PC/G microcode not less than Version 6, or DBCS country equivalent.

    For non-SNA attachment:

    - Support for local non-SNA (SLHA) attachment requires Japanese 3270-PC/G microcode not less than Version 3.0, or DBCS country equivalent.
    - Support for remote non-SNA (BSC) attachment requires Japanese 3270-PC/G microcode not less than Version 5.0, or DBCS country equivalent.

    For remote non-SNA (BSC) attachment when using Japanese 3270-PC/G microcode, or DBCS country equivalent:

    - 3274 WACK support must be configured. To configure WACK support, specify 1 in reply to 3274 Customization question 176 (BSC Enhanced Communication Option for Distributed Function Terminals).
    - Fixes to NCP and SSP APARs described in note 28 are required.

    On IMS/VS, Japanese 3270-PC/G microcode, or DBCS country equivalent, is supported through SNA attachment only. Japanese 3270-PC/G microcode, or

DBCS country equivalent, is not supported on IMS/VS in BTAM or non-SNA configurations.

22. Supported as a component of the IBM 5080 Graphics System. GDDM supports two modes of a 5081:

    - A standard mode, supported only for graphics and image. The standard mode is supported only through GDDM/graPHIGS (5668-792), and is subject to any configuration requirements imposed by that product.
    - A 3270 mode, supported only for alphanumeric functions. The 3270 mode is supported through standard subsystem and system mechanisms.

    Applications that use both alphanumeric and graphic data are supported by GDDM combining the 5080 standard mode with either a separate 3270 device or the 5080 3270 mode, such that the two appear as one logical device to the program.

    When the 5080 standard mode is combined with a separate 3270 device, the terminal user should be aware that prompting messages (for example, PF = ...) appearing on the alphanumeric (3270) screen may be referring to the graphic (5080) screen/keyboard.

    When the 5080 standard mode is combined with the 5080 3270 mode, the alpha screen (in 3270 mode) and the graphic screen (in standard mode) cannot be viewed simultaneously.

23. Supported for alphanumerics, through system or subsystem spooling support.

24. Supported for graphics and image, through system or subsystem spooling support, such as, for example, the Print Services Facility (PSF/MVS 5665-275 or PSF/VSE 5666-319).

25. The 3812 Model 2 (without the 3270 Attachment feature) and the 3812 Model 1 are supported for composite document printing through a device access method such as VM3812 Version 1 Release 1 or later (5798-DTE).

    The 3812 Model 2 with the 3270 Attachment feature is supported as a directly-attached 3270 IPDS printer (see also note 16).

26. Supported by a display adapter, such as one of those listed below, using the GDDM-PCLK V1.1 licensed program. The PC terminal requires PC-DOS 2.1 or later, 512K bytes of storage, and a suitable terminal emulator.

Adapter name	Acronym	Resolution	Colors
Color/Graphics Adapter	CGA	640 x 200	2
Enhanced Graphics Adapter (64Kb) (Note a)	EGA	640 x 200	16
Enhanced Graphics Adapter (128Kb) (Note b)	EGA	640 x 350	16
Multi Color Graphics Adapter (Note c)	MCGA	640 x 480	2
Video Graphics Array (Notes d and e)	VGA	640 x 480	16
IBM Personal System/2 Display Adapter (Note e)		640 x 480	16
IBM Personal System/2 Display Adapter	8514/A	640 x 480	16
IBM Personal System/2 Display Adapter	8514/A	1024 x 768	16

Notes:
a. Attached to Color Display or Enhanced Color Display.
b. Attached to Enhanced Color Display.
c. In IBM Personal System/2 Models 25 and 30.
d. In IBM Personal System/2 Models 50, 60, and 80.
e. Attached to IBM Personal System/2 Color Display.

27. Supported when attached to one of the IBM PCs, as described above.

    Plotters are supported through an RS232 attachment.

28. The following fixes to NCP and SSP APARs (according to the NCP or SSP release) are required:

```
ACF/NCP V3/3705 - APAR IR64663
ACF/NCP V3/3725 - APAR IR64663
ACF/NCP V4      - APAR IR64663

SSP V2 R2.2     - APAR IR64682
SSP V3 OS/MVS   - APAR IR64938
SSP V3 VM       - APAR IR65021
```

System and subsystem software

Figure 2 shows the minimum software levels (see note 1) for the operating systems, subsystems, and access methods for GDDM Version 2 Release 2 Modification 0 function.

System Subsystem Access method	System level	Subsystem level (note 2)	Access method level (note 3)	Notes
VSE/Advanced Functions or VSE/SP	V2 R1 3.1.1			 4
CICS/DOS/VS		V1 R7		5
BTAM/ES			As VSE	
ACF/VTAM			V2 R1	
VSE/BATCH		As VSE		6
OS/VS2 (MVS)	SP1.3.6			
CICS/OS/VS		V1 R7		
BTAM			As OS	
ACF/VTAM			V2 R1	
IMS/VS		V1 R3		
BTAM			As OS	
ACF/VTAM			V2 R1	
TSO		As OS		7, 8
ACF/VTAM			V2 R1	
MVS/BATCH		As OS		7, 8
MVS/XA	SP2.1.7			
CICS/OS/VS		V1 R7		
BTAM/SP			As MVS	
ACF/VTAM			V2 R1	9
IMS/VS		V1 R3		
BTAM/SP			As MVS	
ACF/VTAM			V2 R1	9
TSO		As MVS		7, 8
ACF/VTAM			V2 R1	9
MVS/BATCH		As MVS		7, 8
VM/SP with or without HPO	R4			
CMS		As VM		7

Figure 2 (Part 1 of 2). Minimum level support for software for GDDM Version 2 Release 2 Modification 0

System Subsystem Access method	System level	Subsystem level (note 2)	Access method level (note 3)	Notes
VM/XA SF CMS	R2	 As VM		10 7
VM/XA SP CMS	R1	 As VM		11 7

Figure 2 (Part 2 of 2). Minimum level support for software for GDDM Version 2 Release 2 Modification 0

Notes for Figure 2:

1. In general, later levels of software should not be required for support of new hardware. However, some specific hardware facilities may require later levels than those quoted. Consult the specifications of the appropriate hardware products for further details.
2. GDDM support is subject to subsystem-specific notes and restrictions listed below.
3. Where a level of access method is given, later levels may be necessitated by operating system, subsystem, or access method requirements. Consult the specifications of these programs for further details.
4. GDDM will run with VSE/SP 2.1, provided that CICS 1.7 is installed. (VSE/SP 2.1 is supplied with CICS 1.6 integrated with it.) VSE/SP 3.1.1 is the lowest generally-available level that has the minimum required CICS level integrated with it.
5. VSE/Power Version 2 Release 2 is a prerequisite for composite document printing.
6. Report Controller Feature of CICS is a prerequisite for the VSE batch utility.
7. GDDM/graPHIGS and GAM/SP R2 are required for support of 5080 devices.

   Under MVS, fix to GDDM/graPHIGS APAR PL00837 is required for correct operation of GDDM.

   GDDM/graPHIGS APAR PL02021 is required for correct support of 5080 devices installed with less than the maximum number of bit planes.
8. With JES/328X Print Facility Version 2 Release 2 (Program Offering 5785-BAC) print files generated by GDDM may be routed through JES to a GDDM print utility for printing on VTAM-connected 3270-family printers.
9. ACF/VTAM V2 R1 provides support for 24-bit mode only. For 31-bit mode, ACF/VTAM Version 3 is required.
10. GDDM/VM can only run in 370-mode CMS virtual machines.
11. GDDM/VMXA supports both 370-mode and XA-mode CMS virtual machines, and can be installed and run only under VM/XA SP Release 1 or later.

GDDM support on CICS/OS/VS and CICS/DOS/VS

GDDM support under CICS/VS is subject to the following restrictions and considerations:

1. No support for 5080 devices.
2. Both the GDDM Composite Document Print Utility (for text, graphics, and image printing on the 3800-3 and 3820) and the creation of ADMIMAGE files (page segments and documents) suitable for composed-page printers (such as 4250, 3800-3, and 3820) are supported in VSE/Batch only.
3. For correct printing of page segments on 4250 printers, the following CDPF APAR fix is required: PL09163.
4. Operator windowing API functions are supported, but cannot be used to coordinate multiple instances of GDDM.
5. The Interactive Chart Utility (ICU) Data Import function is not supported.
6. The GDDM PC File Transfer and PIF/GGXC File Conversion facilities are not available.
7. Under CICS/OS/VS, a fix to the following CICS APAR is required for correct operation of GDDM:
   - PP56636 for correct operation when running on MVS/XA.
8. There is no support for GDDM-GKS or GDDM-REXX.
9. Support for GDDM-PCLK V1.1, except when the following GDDM processing options are specified:
   - BMS coordination mode (BMSCOORD,YES)
   - Pseudoconversational mode (PSCNVCTL,START/CONTINUE).

GDDM support on IMS/VS

Unlike the other subsystems under which GDDM operates, IMS/VS does not provide a direct interface to a terminal. Instead, it uses message queues. This imposes a number of additional restrictions on GDDM's operations on IMS/VS when compared with operations on other subsystems. These restrictions are included below.

1. No support for IPDS printers.
2. No support for 5080 devices.
3. No support for plotters or scanners.
4. No support for VTAM-attached remote non-SNA devices.
5. Support for 3179-G, 3192-G, 3193, 3270-PC/G, /GX, AT/G, AT/GX, and 5550-Family devices with SNA attachment only. They are not supported in BTAM or non-SNA configurations.
6. No support for the direct production of files containing graphics or images, in formats suitable for use, for example, by composed-page printers (such as 4250, 3820, 3800-3). (Specifically, the GDDM DSOPEN function does not support device-family 4 under IMS/VS.)

However, image-oriented applications can use GDDM image functions to *retrieve* image (but not graphic) data in such formats.

7. No support for operator windowing API functions.
8. No support for interactive graphics and control mode functions.
9. Input is not allowed in alphanumeric fields except to specify the name of the next transaction to be executed.
10. Terminal characteristics cannot be determined at execution but must be obtained from a preallocated table.
11. The Interactive Chart Utility (ICU) can be used interactively only in stand-alone mode. A user transaction can call the ICU to display a chart to the terminal user, but no interaction is possible in this circumstance.

    The ICU Data Import function is not supported.
12. The Image Symbol Editor and the Vector Symbol Editor can be used interactively only in stand-alone mode.
13. GDDM-IMD is not directly supported. Run-time mapping is supported. That is, maps generated by GDDM-IMD operating under other subsystems (such as TSO) can be imported using a GDDM-supplied utility, and can be used for output-only operations in transactions.
14. The GDDM PC File Transfer and PIF/GGXC File Conversion facilities are not available.
15. Fix to IMS APAR PP39371 is required for GDDM applications written using PL/I.
16. There is no support for GDDM-GKS, GDDM-IVU, GDDM-REXX, or GDDM-PCLK.
17. There is no support for composite document printing.

GDDM support on MVS/Batch and TSO/Batch

TSO Extensions (TSO/E) (5665-285) provides a batch support capability, referred to here as TSO/Batch.

GDDM support under MVS/Batch and TSO/Batch is subject to the following restrictions and considerations:

1. No support for directly-connected 3270 and 5550 devices. (Specifically, the GDDM DSOPEN function does not support device-family-1 under MVS/Batch and TSO/Batch, other than for dummy devices.)

   GDDM *does* support the production of queued printer files for printing through the GDDM TSO Print Utility.

   GDDM also supports the direct production of files containing graphics or images, in formats suitable for use, for example, by composed-page printers (such as 4250, 3820, 3800-3).
2. There is no support for GDDM-IVU, GDDM-REXX, or GDDM-PCLK.

3. There is no support for composite document printing on 3812, except through queued printer files for 3812 Model 2 with the 3270 Attachment feature, as described in note 1.

GDDM support on TSO

GDDM support under TSO is subject to the following restrictions and considerations:

1. ACF/VTAM V2 R1 and fixes to TSO/VTAM APAR OZ65553 and VTAM APAR OZ65555 are required for extended 3290 function on TSO/VTAM.
2. There is no support for composite document printing on 3812 Model 1. 3812 Model 2 (IPDS) with the 3270 Attachment feature is supported as a directly-attached device for composite document printing and standard GDDM page printing.
3. There is no support for GDDM-REXX.

GDDM support on CMS

GDDM support under CMS is subject to the following restrictions and considerations:

1. No support in the CMS DOS environment.
2. Where applicable, the VM/SP High Performance Option (5664-173) reduces the system overhead of the GDDM saved segment.
3. Under VM/SP Release 4 or later, with or without the associated HPO, VM SNA Console Support (VSCS), part of VTAM Version 3 for VM (5664-280), allows supported SNA, BSC, or local devices in SNA networks to be used as virtual machine consoles.

   Consult the specifications of these programs for lists of the supported devices.

   Fix to VM/VCNA APAR OX28032 is required for support of 3270 Extended data streams.
4. RSCS Networking Version 2 on VM/SP Release 4 or later, with or without HPO, supports the printing on RSCS-connected 3270-family printers of print data streams generated by GDDM, except for non-IPDS LU1 (SCS) printers.

   Support of LU-1 (SCS) 4224 IPDS printers connected by RSCS requires RSCS 2.2 with the fixes to APARs VM27763 and VM28573. For SNA printing, the fix to APAR VM28392 is also required. The 3812 Model 2 with the 3270 Attachment Feature is not supported by RSCS as an IPDS printer.
5. On VM/SP Release 4, the fix to APAR VM24666 is required to increase the maximum number of members of a TXTLIB.

Programming languages and compilers

GDDM function is accessible from application programs that use standard OS/370 call interfaces. This includes application programs written using the programming languages and compilers shown in Figure 3.

Language	Compiler	Notes
Assembler	System/370 Assembler	
COBOL	DOS/VSE	
	OS/VS	
	ANS V2, V3, V4	
FORTRAN	G Compiler	1
	H Compiler	
	VS FORTRAN	
PL/I	DOS Optimizing Compiler	
	OS Optimizing Compiler	
	Checkout Compiler	
BASIC	IBM BASIC	2
VS APL	Release 4	3, 4
APL2		3, 5
REXX	VM/SP or VM/XA SP	
	System Product Interpreter	6

Figure 3. Programming languages and compilers for GDDM

Notes for Figure 3:

1. CICS/VS and IMS/VS do not in general support application programs written in FORTRAN.

   GDDM-IMD does not generate application data structures in FORTRAN; this does not preclude use of mapping by FORTRAN applications where programmers create their own data structures.

2. IBM BASIC/VM and IBM BASIC/MVS each provide a CALL statement that can be used to call GDDM.

   GDDM-IMD does not generate application data structures in IBM BASIC; this does not preclude use of mapping by IBM BASIC programs where programmers create their own data structures.

3. The GDDM auxiliary processor (AP126) gives full screen control and allows access by APL programs to the functional capabilities of GDDM Base and GDDM-PGF.

   GDDM-IMD does not generate application data structures for VS APL or APL2.

4. Fixes to the following VS APL APARs are required for correct operation of GDDM:
   - CICS/OS/VS and TSO operation
     - PP23423 and PP27242 for general GDDM support
     - PP21528 and PP29200 for correct JCLIN (TSO only)
     - PP28645 to correct control parameters passed to GDDM (TSO only).
   - CICS/DOS/VS and VM/CMS operation
     - PP23423 for general GDDM support.
5. Fix to APL2 APAR PP57267 is required for support of GDDM under MVS/XA.
6. The GDDM-REXX licensed program is required for REXX support.

GDDM storage requirements

The storage required by GDDM depends on configuration, workload, device type, screen size, PS storage, or graphics storage available at the device, message rates, and the general processing environment. More information is given in "Storage requirements and capacity planning" on page 26.

Servicing

GDDM is serviced as an IBM licensed program through central service including the IBM support center. The GDDM-PCLK licensed program is serviced through the GDDM Base PCLKF feature.

Security and auditability

GDDM relies on the security features available in the subsystem being used. See "Security considerations" on page 111 for more about these security features.

Chapter 2. Overview of GDDM installation

Migrating from earlier releases

If you are migrating from GDDM Version 1, you will need to notice the following major changes in installation:

- The number of national languages supported has been increased for Version 2 and it is now possible to select a particular language or languages.
- New EXECs are provided for installation and setting up the saved segments.
- Separate saved segments have been introduced for GDDM-PGF and GDDM-IMD.

If you are migrating from GDDM Version 2 Release 1, a new EXEC is provided to assist migration.

Here is a brief overview of how to install GDDM including considerations of performance that might influence the installation process. Here, also, is a summary of the things that the installer may want to do, such as establishing nicknames, although these are not really part of the installation process.

Conventions used in this book

Throughout the book you will find the things you have to DO are numbered, except where the instruction consists of a single action. This enables you to go straight to the instructions, without reading the background material, if that is the way you like to work.

If you have GDDM already installed, use the sections headed "Migrating from earlier releases," like that above. These sections provide a quick path through the installation procedure for you to follow. The sections normally apply only if you are upgrading an existing system; if you are adding another GDDM product, say GDDM-IVU, to a system that you are also upgrading to this level, you should follow *all* relevant steps for that product. If you are installing GDDM/VMXA, you should follow the sections for a first-time installation, even if you have previously installed GDDM/VM.

EXECs, macros, and so on, that are supplied on the distribution tapes, are enclosed in open-sided frames, like this:

```
┌──────────SUPPLIED EXEC FROM GDDM──────────┐

└───────────────────────────────────────────┘
```

Suggested EXECs are either in a closed box or in open text.

GDDM allows you to specify some information through its defaults mechanism. This is described in detail in Appendix A. Whenever we refer to one of these defaults, we use phrases like "the ADMMDFT NATLANG default."

Other information can be supplied when you open a device, using the processing options associated with a DSOPEN call statement. These are referred to as "the LCLMODE processing option," and so on.

Overview of the installation process

When you install GDDM, you use an EXEC supplied on the GDDM tape to load the information from the installation tape onto the system. You then have to make some changes to the VM environment.

The operation consists of the following steps:

Step 1 Preinstallation planning:

Decide which GDDM products to install.
Look in the program directory for possible updates to this manual.
Decide on whether to change GDDM's naming conventions.
Determine space requirements and plan use of storage.
Check for prerequisites, known errors, and so on.

Step 2 Note the naming defaults to be changed.

Step 3 Check the installation tapes.

Step 4 Read in and run the installation EXEC.

a. Do this first for GDDM Base, and then for the National Language feature if you require NL support.

b. Repeat this for the GDDM Base PCLKF feature if you require GDDM-PCLK support.

c. Repeat this for GDDM-PGF if you are installing Presentation Graphics Facility, and then for the GDDM-PGF National Language feature if you require NL support.

d. Repeat this for GDDM-IMD if you are installing Interactive Map Definition.

e. Repeat this for GDDM-IVU if you are installing that program, and then for the GDDM-IVU National Language feature if you require NL support.

f. Repeat this for GDDM-GKS if you are installing that program, and then for the GDDM-GKS National Language feature if you require NL support.

g. Repeat this for GDDM-REXX if you are installing that program.

h. If you are upgrading your system from Version 2 Release 1 to Version 2 Release 2, use the new migration EXEC.

i. Repeat this for any other GDDM programs you are installing – check in the documentation for these programs for details.

Step 5 Tailor the print utility.

Step 6 Customize GDDM.

Step 7 Create GDDM Discontiguous Saved Segments.

Step 8 Review the telecommunications network.

Modify the telecommunications network to ensure that it is adequate for GDDM. (GDDM uses the advanced features of all terminals, printers, and controllers and therefore an existing network frequently has to be respecified before GDDM will work.)

If you are installing GDDM/VM to run on terminals connected to VM/SP through VCNA, you should check the telecommunications access method (VTAM) carefully.

Step 9 Test the installation.

Step 10 Provide suitable EXECs for users.

Step 11 If necessary, regenerate program modules, including IBM program products that were generated with Version 1 Release 1 or Release 2, such as APL.

Step 12 Inform users of the availability of this release of GDDM and how it can be accessed.

Step 13 Perform postinstallation tasks.

There is a checklist for VM/CMS installation on page 254. You are advised to use it during the installation process for indicating the stage you have reached.

Storage requirements and capacity planning

For the best performance, and also to reduce virtual storage requirements, GDDM should be installed in saved segments. In Version 2 each GDDM licensed program except GDDM-PCLK has its own segment.

To assist you, this section shows the sizes of GDDM and its associated licensed programs and tells you how to estimate how much of the various system resources your GDDM users require.

Read it to find out how to calculate:

- The amount of DASD space required for GDDM objects
- The amount of virtual storage required by the various GDDM functions in the different subsystem environments
- How much segment storage to allocate to the GDDM host session running in the 3270-PC/G or /GX
- The processor/link/3274 utilizations caused by GDDM for:
  - Mapped and procedural alphanumerics applications
  - Graphics applications executed on 3179G, 3192G, 3279, 3287, 3270-PC/G or /GX, or the 5550
  - Image applications.

GDDM objects and use of DASD space

GDDM users can produce a number of objects (such as saved charts) from application programs that use GDDM or from the GDDM interactive utilities. These objects require direct-access storage, and you may find it necessary to produce a system to manage them and to prevent unauthorized access to them.

The objects that may be produced are:

- Graphics data format files (ADMGDF)
- Alphanumeric maps in various forms
- Chart data files (ADMCDATA)
- Chart definition files (ADMCDEF)
- Chart format files (ADMCFORM)
- GKS metafiles (ADMGKSM)
- Composed-page printer image files (ADMIMAGE)
- Image data files (ADMIMG)
- Projection definition files (ADMPROJ)
- Saved picture files (ADMSAVE)
- Symbol sets (ADMSYMBL).

Figure 4 shows their contents, the features of GDDM with which they are associated, how many you may expect your users to produce, and their likely size. Estimates are necessarily approximate. Image projections, image data, and I/O operations can vary enormously according to the usage made of GDDM, but the figure should give you a usable estimation.

Object type	Contents	Produced by	How many	Average size of each object
ICU Chart data	Data values for ICU charts	GDDM-PGF – ICU	Many: 20 per user	4*400-byte records
Chart format	Formats for ICU charts	GDDM-PGF – ICU	Many: 15 per user	4*400-byte records
Chart data definitions	Data definitions for ICU charts	GDDM-PGF – ICU	Many: 5 per user	4*400-byte records
Image Projections (ADMPROJ)	Projection Information	GDDM Base & GDDM-IVU programs	Not many: 0.5 per user	(2-5)*400-byte records
Image Data (ADMIMG)	Image Information	GDDM Base & GDDM-IVU programs	Many per image user	(150-350)* 400-byte records
Symbol sets Image	Dot-pattern symbols for logos and special characters	GDDM Base Image Symbol Editor	Not many: 0.5 per user	10*400-byte records
Vector (This applies to user-created symbol sets only)	Line symbols for logos and special characters	GDDM-PGF Vector Symbol Editor	Not many: 0.5 per user	20*400-byte records
Saved picture (ADMSAVE files)	GDDM pictures held in device-dependent data-stream format	GDDM Base programs	Not many: 0.5 per user	40*400-byte records
Saved GDF (ADMGDF files)	GDDM pictures held in device-independent Graphic Data Format	GDDM Base & GDDM-GKS programs and ICU	Many: 10 per user	20*400-byte records
Composed-page print images	GDDM pictures held in device-dependent data stream format	GDDM Base programs	Not many: 0.5 per user	70 000 bytes (3800-3) 200 000 bytes (4250)

Figure 4 (Part 1 of 2). GDDM object contents and size table

Object type	Contents	Produced by	How many	Average size of each object
Maps MSL	Library of maps in a form for editing	GDDM-IMD	Not many: 1 per GDDM-IMD user + 2 or 3 common. Many maps per MSL	8*256-byte records per map
Generated mapgroups	Maps in usable form for execution	GDDM-IMD	Not many: 1+ per mapping program	4*400-byte records
Generated ADS	Data structures that correspond to maps	GDDM-IMD	Not many: 5 per mapping program	50*80-byte records
GKS metafiles	Metafile input/output	GDDM-GKS	8 per user	500 400-byte records

Figure 4 (Part 2 of 2). GDDM object contents and size table

Virtual storage requirement of GDDM

The GDDM virtual storage requirement comprises two elements:

1. The GDDM code size
2. The dynamic storage requirement for each GDDM user.

The code requirement is dependent upon the functions that your applications use and the devices on which they execute. Device type also influences the user dynamic storage requirement, although picture content is a more critical factor.

You should be aware that there are ways of reducing the code storage requirements by selectively loading parts of GDDM. These ways are discussed under "Performance background" in Chapter 1 and under "Tuning and customization by subsystem" in Chapter 2 of the *GDDM Performance Guide*.
Appendix H, "Repackaging for performance or for differing defaults" on page 197 of this book gives a detailed explanation of how to go about tuning with a more precise sizing of each of the GDDM functional areas.

Figure 5 gives you approximate minimum sizes for doing various functions under GDDM. It should be treated with some caution as usage varies enormously in different installations. This is particularly true of the User Dynamic Storage requirement. These figures are *not* guaranteed.

The symbol K, when used in this book, represents the quantity 1024.

GDDM Base Programming	1900K + 60K per additional user
GDDM-PGF Programming	2100K + 80K per additional user
Interactive Chart Utility	2480K + 90K per additional user
GDDM-IMD	1400K + 60K per additional user
Image Symbol Editor	2000K + 60K per additional user
Vector Symbol Editor	2100K + 60K per additional user
GDDM-IVU	1400K + 550K per additional user
GDDM-GKS	2200K + 120K per additional user
GDDM-REXX	50K + other GDDM requirements

Calculating the size you will need
To calculate the size of the address space, region, or virtual machine you will need, subtract any items held in shared storage, and add storage for other system requirements.

Method used to arrive at these figures
These figures were calculated using the table in the next figure and adding 10%. You should understand that the User Storage requirement is dependent on picture content and can vary considerably. Numbers quoted here are our best guess for typical GDDM usage.

There are various ways of reducing the code requirement. Read the *GDDM Performance Guide* for more information.

Figure 5. GDDM minimum virtual storage requirement (in bytes)

Figure 6 is a more detailed version of the same information, which you can use to get an estimate of how much storage you are likely to use.

You can reduce your use of virtual storage by putting GDDM in a shared area like a discontiguous saved segment in VM. In this case, the virtual storage requirement of the GDDM code determines the size of the shareable area that GDDM will occupy.

GDDM function	Code size	Dynamic storage per user 3279/3287	Dynamic storage per user 3179-G, 4224, 3270-PC/G,/GX, 5550	Dynamic storage per user 3193
a. Base GDDM alphanumerics	880K	20-30K	20-30K	20-30K
b. Base GDDM graphics	770K + a (See note 1)	Typically 40-90K Likely maximum 250-350K	20-60K Likely maximum 200-300K	Not applicable
c. Base GDDM image	85K + a	Typically 150-200K Likely maximum 300K	Typically 150-200K Likely maximum 300K	50-60K direct transfer, 150-200K indirect transfer
d. Presentation Graphics Routines	220K + a + b	60-100K (See note 2)	40-60K (See note 2)	Not applicable
e. Interactive Chart Utility	390K + a + b + d (See note 3)	100-150K (See note 2)	60-80K (See note 2)	Not applicable
f. Vector Symbol Editor	210K + a + b	40-60K	30-50K	Not applicable
g. Image Symbol Editor	130K + a + b	40-60K	40-60K	40-60K
h. Print Utility	10K + a + b	40-80K (See note 2)	40-80K (See note 2)	40-80K (See note 2)
i. Run-time Mapping	55K + a	20-40K	20-40K	20-40K
j. Interactive Map Definition	375K + a + h	40-50K	40-50K	40-50K

Figure 6 (Part 1 of 2). GDDM virtual storage requirement (in bytes)

GDDM function	Code size	Dynamic storage per user 3279/3287	Dynamic storage per user 3179-G, 4224, 3270-PC/G,/GX, 5550	Dynamic storage per user 3193
k. GDDM-IVU	230K + a + c + i	Typically 450-550K Likely maximum 650K	Typically 450-550K Likely maximum 650K	Typically 350-450K Likely maximum 600K
l. GDDM-GKS graphics	350K + a + b	Typically 100-150K Likely maximum 300-400K	Typically 80-120K Likely maximum 300-400K	Not applicable
m. GDDM-REXX	50K + other requirements (see above)	5-15K + other GDDM requirements (as above)		

Figure 6 (Part 2 of 2). GDDM virtual storage requirement (in bytes)

Example: To calculate the size of Presentation Graphics Routines add:

Presentation Graphics Routines	220K (d)	+
Base GDDM with alphanumerics	880K (a)	+
Base GDDM graphics	770K (b)	= 1870K total.

(Each item is included once only.)

Notes:

1. 770K is obtained using first-level packaging stubs. Using second-level packaging stubs to omit unwanted items such as high-resolution printing, can reduce this value. Letting GDDM load dynamically reduces the figure further. For example, for an output-only graphics application on a display terminal the size can can be reduced to around 600K.

   The packaging stubs are described in Appendix H, "Repackaging for performance or for differing defaults" on page 197.

2. User storage size depends on picture type; in particular on how many graphics primitives (lines, arcs, and so on) are used, or on the size of the image. Typical values are quoted. Maxima can be much higher: see item (b). In particular, enabling quality defaults in the ICU, enabling user control, and use of step by step charts in the ICU will increase storage requirements.

3. Add 350K if ICU English-language Help panels are packaged with GDDM.

Chapter 3. Preinstallation planning

This chapter contains:

- Information on planning the installation of the GDDM base product plus all the associated products in a single installation process.
- Information to help you to determine what space requirements you need, and also to plan the use of the storage available.
- Information to help you to check on prerequisites and known errors and so on.
- A table in which you should list any GDDM names that you need to change.

You should also look in the Program Directory supplied with the tape to see if there are any updates to this manual.

Step 1: Preinstallation planning

Migrating from earlier releases

You will need to perform this step.

When you install Version 2 Release 2 of GDDM you should use different DASD storage from the old version. This enables you to use both versions of GDDM during the changeover period. Note also that Version 2 Release 2 requires more storage than previous versions.

You can use the different versions by accessing the disks on which they are stored. If you use a saved segment you can use both versions, because the saved segment names are different for both versions.

If you are upgrading from Version 1 Release 1 or 2, you need to regenerate any existing CMS modules that use GDDM before they can use the later version. This applies both to application programs and to IBM licensed programs, such as APL.

If you have a GDDM DCSS named ADMASS00 already on the system, refer to "Migration and previously existing DCSSs" on page 72 for guidance on how to allow for this.

Deciding which licensed programs you are going to install

Before you start to install GDDM, you must decide which associated licensed programs and features you are going to install.

GDDM is structured as a base licensed program, GDDM/VM or GDDM/VMXA, and a number of associated licensed programs. The base licensed program and the associated licensed programs, GDDM-PGF, GDDM-IVU, GDDM-GKS, and GDDM-REXX, each have a no-charge special feature that provides national language support. The structure is:

- GDDM/VM or GDDM/VMXA with

  GDDM/VM or GDDM/VMXA National Language feature.
  GDDM/VM or GDDM/VMXA PCLKF feature.

  The GDDM/VM or GDDM/VMXA PCLKF feature gives access to the GDDM-PCLK licensed program (see below).

- GDDM-PGF with

  GDDM-PGF National Language feature.

  This provides various methods of producing business and other charts (including the ICU and the Vector Symbol Editor).

- GDDM-IMD

  This lets alphanumeric maps be produced interactively at the terminal. The maps are later used by user-written GDDM programs to determine the format of display screens and printer pages.

- GDDM-IVU with

  GDDM-IVU National Language feature

  This provides facilities for creating and handling image files, and for viewing or printing the resultant images.

- GDDM-GKS with

  GDDM-GKS National Language feature

  This is an implementation of the Graphical Kernel System, which is an International Standards Organisation (ISO) graphics standard.

- GDDM-REXX

  This lets you write CMS EXECs that use GDDM calls. (The distribution tape contains the files for all supported national languages – there is no separate NL tape.) GDDM/graPHIGS calls are not supported through GDDM-REXX.

- GDDM-PCLK

  This lets you use an IBM PC/XT, PC/AT, or Personal System/2 as an output device for GDDM graphics. You can view, print, and plot your pictures using your PC.

Other GDDM-series licensed programs are listed on page 3.

National Language features

The national language no-charge special features let you use one or more other national languages in addition to American-English. The GDDM Base NL feature changes the language of messages. The GDDM-PGF NL feature changes the language of the ICU panels and messages. The GDDM-IVU NL feature changes the language of IVU messages and panels. The GDDM-GKS NL feature changes the language of GKS messages.

Each national language feature provides national language files for some or all of the languages listed in Figure 7. Some of these files do not contain translations; they have the American-English text in them instead. Figure 7 indicates, for each language, the features for which files are available, and which files contain translated text.

Language	Base	PGF	IVU	GKS
Brazilian	Y	Y	Y	Y
PRC Chinese (Simplified, DBCS)	Y	N	N	N
Danish	Y	Y	Y	Y
French	Y	Y	Y	Y
German	Y	Y	Y	Y
Korean (Hangeul DBCS)	Y	Y	Y	Y
Italian	Y	Y	Y	Y
Japanese (Kanji DBCS)	Y	Y	Y	Y
Norwegian	Y	Y	Y	Y
French (Canadian)	Y	N	N	N
Spanish	Y	Y	Y	Y
Taiwan Chinese (Traditional, DBCS)	Y	N	N	N
Swedish	Y	Y	Y	Y

Notes:

1. The Y or N (Yes or No) indicates whether a language is available.
2. DBCS is an abbreviation for double-byte character set.
3. PRC is an abbreviation for People's Republic of China.

Figure 7. GDDM national language feature files

If you are installing the national language features, you must decide which languages you require. You must make your choice before running the installation EXECs.

If you are installing GDDM Base NL, and the national language file for another GDDM-series licensed program that you are installing is available, you must also install the national language feature for that program. If you do not do so, results are unpredictable.

If you are installing GDDM Base NL, and the national language file for another GDDM-series program that you are installing is NOT available, panels and messages for that program will appear in American-English.

These considerations do not apply to GDDM-REXX; all supported national languages are supplied on the GDDM-REXX installation tape, and you select one of them as the default language during installation.

Preinstallation planning — DASD requirements

The space requirements for GDDM and its features are given in Figure 8. These figures show the space required in terms of DASD cylinders and fixed block architecture (FBA) storage blocks.

Licensed program (or feature)	3330 cylinders	3340 cylinders	3350 cylinders	3375 cylinders	3380 cylinders	FBA storage blocks
GDDM Base	52	129	24	36	24	22000
GDDM-PGF	+ 15	+ 36	+ 7	+ 10	+ 7	+ 6000
GDDM-IMD	+ 13	+ 31	+ 6	+ 9	+ 6	+ 5200
GDDM-IVU	+ 3	+ 7	+ 1.2	+ 1.8	+ 1.2	+ 1100
GDDM-GKS	+ 5	+ 11	+ 2	+ 3	+ 2	+ 2000
GDDM-REXX	+ 3	+ 7	+ 1.3	+ 2	+ 1.2	+ 1100
Kanji Symbol Sets	+ 7	+ 12	+ 3	+ 4	+ 3	+ 2800
GDDM Base NL (for each language)	+ 0.5	+ 1.2	+ 0.3	+ 0.4	+ 0.2	+ 200
GDDM-PGF NL (for each language)	+ 4	+ 9	+ 2	+ 3	+ 2	+ 1600
GDDM-IVU NL (for each language)	+ 0.6	+ 1.5	+ 0.3	+ 0.5	+ 0.3	+ 250
GDDM-GKS NL (for each language)	+ 0.1	+ 0.2	+ 0.1	+ 0.1	+ 0.1	+ 40
GDDM Base PCLKF	+ 7	+ 12	+ 3	+ 4	+ 3	+ 2800

Figure 8. Space required for GDDM

Method of space estimation: The figures shown in Figure 8 were measured for the 3380 device and 25% added for service. Figures for other devices were estimated as follows:

Number of 1024-byte blocks per cylinder	
3330	209
3340	84
3350	450
3375	300
3380	465
FBA: 400 512-byte blocks =	1 3330 cylinder

Preinstallation planning — virtual machine size

The size of virtual machine needed to run GDDM depends very much on which features are installed, which parts of GDDM are being used, and what else is being done on the machine.

Estimated usable sizes and the method used for estimation are shown in "Virtual storage requirement of GDDM" on page 29. You should refer to this section to determine what virtual machine sizes are needed by your users.

Estimated time

Installing GDDM on VM/CMS is a fairly short process, as it consists basically of running a supplied EXEC for each of the GDDM licensed programs.

If you are installing GDDM for the first time, some extra work may be needed in setting up the network because GDDM uses the advanced features of terminals and controllers, and it may well be the first program in your installation that does this.

Instructions for preinstallation planning

1. Decide which GDDM licensed programs and features you are going to install.
2. Ensure that you have the GDDM installation tapes you require.
3. Check if the Program Directories supplied with the tapes contain any corrections to this manual. They are listed under the heading "Updates to GDDM Installation and System Management for VM manual." Make the corrections if necessary.
4. Check with the PSP "bucket" for late information about installation. The name of the PSP bucket is given in the Program Directory. (Ask your IBM representative if you do not understand this.)
5. Check in "Hardware and software supported" on page 5 to ensure that your system is one that GDDM can support. Check that the various components of your system have been brought up to the required levels.
6. Check in "Hardware and software supported" on page 5, and also in the Program Directory, for prerequisite PTFs to the subsystem and apply them if necessary. They are listed under the heading "Prerequisite System/Subsystem APARs."
7. If you are installing any of the national language features, you should decide which languages you will install.
8. Use Figure 8 on page 37 to determine the space you need for GDDM.
9. Ensure that you have enough space on the disk you intend to use.

Step 2: Changing GDDM naming defaults

Migrating from earlier releases

You should review this step.

You will need to reestablish naming defaults.

By default, GDDM names begin with the letters ADM. Many of these names can be changed if they conflict with your installation standards, but there are good reasons for not changing them. The most important are:

- Some of the names are used in GDDM documentation and changing them will probably lead to confusion.
- Some names need changing in more than one place and changes may lead to inadvertent discrepancies.

Do not change the names unless you have to. If you are going to change the names, you should note down the new names in the table below, so that you can refer back to them at various points in the installation process.

Default name	Item named	New name (if any)
ADMCDATA	Filetype of ICU data	.....
ADMCDEF	Filetype of ICU data definition	.....
ADMCFORM	Filetype of ICU formats	.....
ADMCOLn	Filetypes of family 4 output (color)	.....
ADMDECK	Filetype of symbol set decks	.....
ADMGDF	Filetype of GDF files	.....
ADMGGMAP	Filetype of generated maps	.....
ADMGKSM	Filetype of GDDM-GKS metafiles	.....
ADMIFMT	Filetype of GDDM-IMD Import/Export file	.....
ADMIMAGE	Filetype of family 4 output (monochrome)	.....
ADMIMG	Filetype of image files	.....
ADMLIST	Filetype of system printer data	.....
ADMMSL	Filetype of GDDM-IMD MSL	.....
ADMPC	Filetype of GDDM-PCLK files	.....
ADMPRINT	Filetype of print files	.....
ADMPROJ	Filetype of image projections	.....
ADMSAVE	Filetype of saved pictures	.....
ADMSYMBL	Filetype of symbol sets	.....
ADMTRACE	Filetype of trace output	.....
ADMUT1	Filetype of work files	.....
ADM00001	Filename of trace output	.....
COPY	Filetype of generated ADS (Application Data Structures of maps)	.....

Figure 9. GDDM names that can be changed if unsuitable

Part 2. Installation

Chapter 4. Installing GDDM from tape

Step 1 was "Preinstallation Planning" in Chapter 3.

Step 2 was "Changing GDDM naming defaults" in Chapter 3.

This chapter contains:

Step 3 — a description of the GDDM installation tapes.

Step 4 — instructions for executing the installation EXECs for

- GDDM/VM or GDDM/VMXA
- GDDM/VM or GDDM/VMXA National Language (NL)
- GDDM/VM or GDDM/VMXA PCLKF
- GDDM-PGF
- GDDM-PGF NL
- GDDM-IMD
- GDDM-IVU
- GDDM-GKS
- GDDM-REXX.

Step 3: Checking the tapes

Migrating from earlier releases

You will need to perform this step.

If you are upgrading from GDDM Version 2 Release 1, and you have previously installed GDDM-PGF or GDDM-IMD, you will need to reinstall those programs. If you choose to do this from tape (see page 50), ensure that you have the tapes available.

What IBM supplies

IBM supplies GDDM/VM or GDDM/VMXA and its associated programs on tape. A separate tape is supplied for each feature and program. The tapes can be supplied in 6250 or 1600 bpi format or formatted for 3480 tape cartridge. All files on the tape are in VMFPLC2 DUMP format.

A tape plus a Program Directory is supplied for GDDM/VM or GDDM/VMXA and each of its associated programs.

Licensed program (or feature)	1600 bpi tape	6250 bpi tape	3480 tape cartridge
GDDM/VM	5870	5871	5872
GDDM/VM NL	6870	6871	6872
GDDM/VM PCLKF	6880	6881	6882
GDDM/VMXA	5870	5871	5872
GDDM/VMXA NL	6870	6871	6872
GDDM/VMXA PCLKF	6880	6881	6882
GDDM-PGF	5870	5871	5872
GDDM-PGF NL	6870	6871	6872
GDDM-IMD	5870	5871	5872
GDDM-IVU	5870	5871	5872
GDDM-IVU NL	6870	6871	6872
GDDM-GKS	5870	5871	5872
GDDM-GKS NL	6870	6871	6872
GDDM-REXX	5870	5871	5872

Figure 10. Feature numbers of tapes and Program Directories supplied with GDDM

Use of the Program Directory

The Program Directory contains information about the tape contents, any prerequisite PTFs that should be applied to other parts of the system, and other information. This manual is printed earlier than the Program Directory. You should therefore look in the directory for any last-minute alterations to this manual. Any alterations are listed in the section headed "Updates to Installation and System Management for VM Manual" in the Program Directory.

Tape contents

The program numbers of the tapes for GDDM/VM or GDDM/VMXA and the associated programs on VM are given in Figure 10 on page 44. You should ensure that you have the correct tapes. The next set of figures shows the contents of the various tapes.

File No.	Contents
1	I5664200 022006 program identifier I5664200 Installation EXEC
2	I5664200 MEMO for GDDM/VM, relevant for installation using INSTFPP
3	Sample files
4	Symbol Sets
5	GDDM/VM object code
6	Kanji DBCS
7	Null file

Figure 11. Contents of GDDM/VM installation tape

File No.	Contents
1	I5664200 022005NL program identifier I5664200 Installation EXEC
2	I5664200 MEMONL for GDDM/VM NL, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM/VM NL object code
6	Null file

Figure 12. Contents of GDDM/VM national language installation tape

File No.	Contents
1	I5664200 022005PC program identifier I5664200 Installation EXEC
2	I5664200 MEMOPC for GDDM/VM PCLKF, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM-PCLK objects including national language files
6	Null file

Figure 13. Contents of GDDM/VM PCLKF installation tape

File No.	Contents
1	I5684007 022006 program identifier I5684007 Installation EXEC
2	I5684007 MEMO for GDDM/VMXA, relevant for installation using INSTFPP
3	Sample files
4	Symbol Sets
5	GDDM/VMXA object code
6	Kanji DBCS
7	Null file

Figure 14. Contents of GDDM/VMXA installation tape

File No.	Contents
1	I5684007 022005NL program identifier I5684007 Installation EXEC
2	I5684007 MEMONL for GDDM/VMXA NL, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM/VMXA NL object code
6	Null file

Figure 15. Contents of GDDM/VMXA national language installation tape

File No.	Contents
1	I5684007 022005PC program identifier I5684007 Installation EXEC
2	I5684007 MEMOPC for GDDM/VMXA PCLKF, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM-PCLK objects including national language files
6	Null file

Figure 16. Contents of GDDM/VMXA PCLKF installation tape

File No.	Contents
1	I5668812 021005 program identifier I5668812 Installation EXEC
2	I5668812 MEMO for GDDM-PGF, relevant for installation using INSTFPP
3	Sample files
4	Null file
5	GDDM-PGF object code
6	Null file

Figure 17. Contents of GDDM-PGF installation tape

File No.	Contents
1	I5668812 021005NL program identifier I5668812 Installation EXEC
2	I5668812 MEMONL for GDDM-PGF NL, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM-PGF national language object code
6	Null file

Figure 18. Contents of GDDM-PGF national language installation tape

File No.	Contents
1	I5668801 021005 program identifier I5668801 Installation EXEC
2	I5668801 MEMO for GDDM-IMD, relevant for installation using INSTFPP
3	Sample files
4	Maps and tutorial topic panels
5	GDDM-IMD object code
6	Null file

Figure 19. Contents of GDDM-IMD installation tape

File no.	Contents
1	I5668723 011005 program identifier I5668723 Installation EXEC
2	I5668723 MEMO for GDDM-IVU, relevant for installation using INSTFPP
3	Sample files
4	Menu and help panel maps
5	GDDM-IVU object code
6	Null file

Figure 20. Contents of GDDM-IVU installation tape for VM

File No.	Contents
1	I5668723 011005NL program identifier I5668723 Installation EXEC
2	I5668723 MEMONL for GDDM-IVU NL, relevant for installation using INSTFPP
3	Sample files
4	Menu and help panel maps
5	GDDM-IVU national language object code for all supported languages
6	Null file

Figure 21. Contents of GDDM-IVU NL installation tape for VM

File no.	Contents
1	I5668802 011005 program identifier I5668802 Installation EXEC
2	I5668802 MEMO for GDDM-GKS, relevant for installation using INSTFPP
3	Sample files
4	Null file
5	GDDM-GKS object code
6	Null file

Figure 22. Contents of GDDM-GKS installation tape for VM

File No.	Contents
1	I5668802 011005NL program identifier I5668802 Installation EXEC
2	I5668802 MEMONL for GDDM-GKS NL, relevant for installation using INSTFPP
3	Null file
4	Null file
5	GDDM-GKS national language object code for all supported languages
6	Null file

Figure 23. Contents of GDDM-GKS NL installation tape for VM

File No.	Contents
1	I5664336 011005 program identifier I5664336 Installation EXEC
2	I5664336 MEMO for GDDM-REXX, relevant for installation using INSTFPP
3	Sample and utility files
4	Null file
5	GDDM-REXX object code
6	Null file

Figure 24. Contents of GDDM-REXX installation tape

Step 4: Read in and execute the installation EXEC

Migrating from earlier releases

You need to perform this step.

If you are upgrading from GDDM Version 2 Release 1, and you use GDDM-PGF or other GDDM series programs, you will need to reinstall them. You can either install these programs from tape, or use the supplied ADMUP220 EXEC to copy the versions previously used onto your new system.

On earlier releases than Version 1 Release 4, it was possible to merge the TXTLIBs installed for GDDM and PGF. This is no longer possible because of the size of the TXTLIBs.

Note that for Version 2 the names of the installation EXECs have been changed, and that the ADMINST EXECs supplied with Version 1 no longer exist.

Note that GDDM Version 2 Release 2 is not supported on VM earlier than VM/SP Release 4, or VM/XA SP Release 1.

If you are installing GDDM/VM using the INSTFPP procedure, omit this step and refer to the *VM/SP Installation Guide* for instructions on how to install an optional licensed program, indexed under "Optional feature program products."

GDDM and its associated licensed programs and features are supplied on separate tapes. Each tape contains the installation EXEC and this is first read in and then used to complete the installation.

It is suggested that if you are installing any of the licensed programs or features associated with GDDM, they should be installed immediately after GDDM Base. Any other tasks should be done after all the features and licensed programs have been installed. If you prefer to install the licensed programs one by one, the only reason why you should not do so, is that it may mean some duplication of subsequent tasks.

Step 4A: Setting up VM to load the installation EXEC

To install on VM you load an installation EXEC from the distribution tape into a virtual machine, and then use the EXEC to complete the installation.

The disk on which GDDM is being installed must be linked in read/write mode. None of the disks you access may contain any files of the same name as those on the tape. (If they do, they will be overwritten.)

1. Decide on the size of disk you require for GDDM, using Figure 8 on page 37.
2. Log on to a virtual machine with a large enough disk to hold GDDM, as decided above. You are recommended to use an empty disk. Access this disk using an available filemode. Note the letter you use in Figure 25 on page 52.

   Suggested commands are:

   LINK gddmdisk xxx yyy W pword

   where `LINK ... W` means link to installation disk in read/write mode
   `gddmdisk xxx` identifies the disk to be used for the installation
   `yyy` is the virtual address to be used in your virtual machine
   `pword` is the write password; if your installation uses the password suppression facility, the password cannot be entered on the LINK command. (See the manuals *VM/SP CP Command Reference for General Users* and *VM/XA SP CP Command Reference* for details.)

   ACCESS yyy filemode (access installation disk)
3. Fill in the details of your installation in Figure 25 on page 52 so that you have a checklist to answer the prompts in the installation EXECs. See "National Language features" on page 35 for guidance about your choice of national languages.

   Note: Some releases of CMS restrict the number of members of a TXTLIB. This may limit the number of languages you can install. (See the manuals *VM/SP CMS Command and Macro Reference* and *VM/XA SP CMS Command Reference* for details.)
4. Ensure that you do not have any other disks accessed containing previously installed releases of GDDM. If you have, release them.

```
                    INSTALLATION EXEC CHECKLIST

Which filemode do you intend to use                          .....

Do you wish to install GDDM/VM or GDDM/VMXA (Y/N)            .....

Do you wish to install the Kanji double-byte character
sets ?  (These are for Japanese installations) (Y/N)         .....

Do you wish to install GDDM/VM NL or GDDM/VMXA NL ?
(No need if your language is American-English) (Y/N)         .....

Which National Languages do you want:
  B = Brazilian                      K = Japanese (Kanji)
  C = PRC Chinese (Simplified)       N = Norwegian
  D = Danish                         Q = French (Canadian)
  F = French                         S = Spanish
  G = German                         T = Taiwan Chinese (Traditional)
  H = Korean (Hangeul)               V = Swedish
  I = Italian

Enter the code letter(s) for the language(s) you want        .....

Do you wish to install GDDM-PGF (Y/N)                        .....

Do you wish to install GDDM-PGF NL (see Note) (Y/N)          .....

Do you wish to install GDDM-IMD (Y/N)                        .....

Do you wish to install GDDM-IVU (Y/N)                        .....

Do you wish to install GDDM-IVU NL (see Note) (Y/N)          .....

Do you wish to install GDDM-GKS (Y/N)                        .....

Do you wish to install GDDM-GKS NL (see Note) (Y/N)          .....

Do you wish to install GDDM-REXX (Y/N)                       .....

What default language do you want for GDDM-REXX ?            .....
(A = U.S. English, B = Brazilian, H = Hangeul,
 I = Italian, K = Kanji, S = Spanish)
```

Note: If national language features are being installed, see "National Language features" on page 35 for considerations of appropriate choices.

Figure 25. Checklist for the GDDM installation EXECs. Write your answers to these questions; you will be asked for them by the installation EXEC.

Step 4B: Installing GDDM licensed programs

Migrating from earlier releases

You will need to perform this step.

If you are upgrading from GDDM Version 2 Release 1 and you already have GDDM-PGF or GDDM-IMD on your system, you will need to reinstall them. There are two ways of doing this (*do not do it both ways*):

1. Reinstall them from tape, as if for the first time; you should follow this step for *all* the relevant programs.
2. Use the ADMUP220 EXEC, to reinstall the versions previously used; in this case, follow this step for GDDM/VM and GDDM/VM NL only, and use Step 4C for the other programs.

The procedure for each GDDM licensed program is essentially the same; the only changes are the names of objects loaded and EXECs used. The following instructions show how GDDM/VM or GDDM/VMXA is installed; Figure 26 shows the names for each of the programs.

1. Mount the distribution tape on virtual tape unit 181 (as described in the *VM/SP Operator's Guide*).
2. Enter the following commands at the terminal:

   When installing from tape:

   ```
   VMFPLC2 REW
   VMFPLC2 MODESET (9TRACK DEN nnnn
           (where nnnn is 1600 for a 1600 bpi tape or 6250 for a 6250 bpi tape)
   VMFPLC2 LOAD * * filemode
           (where filemode is the mode of the disk you are installing on)
   ```

   When installing from a 3480 tape cartridge:

   ```
   VMFPLC2 REW
   VMFPLC2 MODESET (18TRACK DEN 38K
   VMFPLC2 LOAD * * filemode
           (where filemode is the mode of the disk you are installing on)
   ```

3. Execute the installation EXEC with the appropriate command from Figure 26, for example, `I5664200` for GDDM/VM.
4. Use the information in Figure 25 on page 52 to answer the prompts given by the EXEC. The EXEC also issues informational messages. You may receive a nonzero return code (for example 111 or 777); refer to the comments at the start of the EXEC for an explanation.

Note that the installation EXEC loads a MACLIB called ADMLIB that contains sample call declarations. Your installation may find it necessary to rename this library or to merge it with other macro libraries. GDDM-PGF and other GDDM product installations, however, add further entries and, if you are also installing other GDDM products, you should not change the name until after installing these licensed programs.

Licensed program (or feature)	Files loaded by VMFPLC2 (instruction 2)	Command to invoke the EXEC (instruction 3)
GDDM/VM	I5664200 022006 I5664200 EXEC	I5664200
GDDM/VM NL	I5664200 022005NL I5664200 EXEC	I5664200 NL
GDDM/VM PCLKF	I5664200 022005PC I5664200 EXEC	I5664200 PC
GDDM/VMXA	I5684007 022006 I5684007 EXEC	I5684007
GDDM/VMXA NL	I5684007 022005NL I5684007 EXEC	I5684007 NL
GDDM/VMXA PCLKF	I5684007 022005PC I5684007 EXEC	I5684007 PC
GDDM-PGF	I5668812 021005 I5668812 EXEC	I5668812
GDDM-PGF NL	I5668812 021005NL I5668812 EXEC	I5668812 NL
GDDM-IMD	I5668801 021005 I5668801 EXEC	I5668801
GDDM-IVU	I5668723 011005 I5668723 EXEC	I5668723
GDDM-IVU NL	I5668723 011005NL I5668723 EXEC	I5668723 NL
GDDM-GKS	I5668802 011005 I5668802 EXEC	I5668802
GDDM-GKS NL	I5668802 011005NL I5668802 EXEC	I5668802 NL
GDDM-REXX	I5664336 011005 I5664336 EXEC	I5664336

Figure 26. What is installed and how to do it for each product

Step 4C: Upgrading associated GDDM programs to 2.2 level

Migrating from earlier releases

If you are upgrading from GDDM Version 1, do not perform this step.

You should perform this step if you have previously installed GDDM Version 2 Release 1, and you have GDDM-PGF (including its NL feature) or other GDDM programs at that level.

If you reinstalled the associated programs from tape in Step 4B, do not perform this step.

1. Access, in read/write mode, the disk on which you have installed GDDM/VM Version 2 Release 2.
2. Access, in read-only mode, the disk on which you previously installed GDDM Version 2 Release 1 Modification 0 or 1.
3. Note the filemodes of these disks.
4. Enter the command `ADMUP220`. You will be prompted for the two filemodes, and you will be asked whether you want to reinstall all programs previously installed, or to reinstall them selectively.

Step 4D: Installing other GDDM programs

If you are installing any other GDDM programs, this is probably the best point to read in and execute their installation EXECs. Check in the documentation for these programs for the detailed procedures to follow, including any special considerations.

Chapter 5. Steps after using the installation EXECs

Step 1 was "Preinstallation planning" in Chapter 3.

Step 2 was "Changing GDDM naming defaults" in Chapter 3.

Step 3 was "Checking the tapes" in Chapter 4.

Step 4 was "Read in and execute the installation EXEC" in Chapter 4.

Step 5: Tailor the print utility

Migrating from earlier releases

Follow this step to tailor the print utility. If you are upgrading from GDDM Version 2 Release 1, there are no special considerations and you may omit this step, unless you plan to use different defaults.

On VM/CMS, in the absence of any of the options described below, a request from a GDDM application program or from the ICU for printing on a 3270-family printer, causes a print file to be created on the user's A-disk. The user then has to invoke the GDDM print utility (ADMOPUV) separately, to cause the file to be printed on a specified directly attached printer.

Various options provided in GDDM Version 2 enable you to modify this processing. These options are described below.

Automatic invocation of the print utility

A DSOPEN processing option, INVKOPUV, can be specified to cause GDDM print utility processing to be invoked automatically whenever a print file is created.

If this option is specified, a temporary print file is created; the name specified by the application program or the ICU user is taken to identify a printer on which the file should be printed. GDDM processing equivalent to that performed by ADMOPUV is then done automatically and immediately (in the user's virtual machine), to cause the print file to be printed on the named printer. After that, the temporary file is deleted.

A full description of the INVKOPUV processing option appears in the *GDDM Base Programming Reference* manual.

The option can be applied to your installation by adding suitable nickname statements to the GDDM external defaults module, as described in "Step 6: Customize GDDM" on page 61, and in Appendix A, "GDDM defaults and nicknames" on page 115. The following nickname statement would apply the option for a printer attached as 062:

```
[label] ADMMNICK FAM=2,NAME=062,PROCOPT=((INVKOPUV,YES))
```

and this statement would apply the option for all 3270-family printers:

```
[label] ADMMNICK FAM=2,PROCOPT=((INVKOPUV,YES))
```

Sending output to another virtual machine

A special printer address of PUNCH is recognized by the GDDM print utility (ADMOPUV) as indicating that the printer data stream should be sent to the virtual punch instead of to a real 3270 printer.

If you use RSCS to transmit the data, and you issue suitable CP SPOOL and CP TAG commands first, the command

```
ADMOPUV filename ON PUNCH (DEV devtok
```

can be used to direct a printer data stream to a suitable virtual machine capable of printing such data streams. In the above command, `devtok` is a device token that provides GDDM with a description of the intended printer device. (See Appendix C, "Device characteristics tokens" on page 153.)

The device token, CP SPOOL, and CP TAG commands, and the printer address of PUNCH can be built into your installation by adding suitable nickname statements to the GDDM external defaults module (see "Step 6: Customize GDDM" on page 61 and Appendix A, "GDDM defaults and nicknames" on page 115).

For example, if an installation is using RSCS, the following nickname statement:

```
[label] ADMMNICK FAM=1,NAME=3287N03,TONAME=PUNCH,DEVTOK=L87,     X
              PROCOPT=((CPSPOOL,TO,RSCS),                        X
              (CPTAG,CHICAGO,3287N03,50,PRT=GRAF))
```

would cause the command:

```
ADMOPUV filename ON 3287N03
```

to punch a 3287 data stream to RSCS node id `CHICAGO` with a tag of '`3287N03 PRT=GRAF`' applied, and with a transmission priority of 50.

This nickname could successfully be used together with an INVKOPUV nickname described earlier.

Transmitting print files to a disconnected virtual machine

If your installation does not have a suitable virtual machine capable of printing data streams generated by the PUNCH facility described above, you can take advantage of a separate facility for transmitting the print files, when created, to a disconnected virtual machine for printing.

In this mode, you would need to attach your printers to the disconnected machine, and then cause the virtual machine to invoke the GDDM print utility as required. This would enable you to centralize printing of GDDM print files, and also to avoid your users having to wait while the print files were being processed.

To transmit the print files to a disconnected virtual machine, you should make an EXEC, ADMQPOST, available to your users, to be invoked automatically by GDDM whenever a print file is created. Figure 27 on page 59 lists a sample

ADMQPOST EXEC. Note that GDDM enters CMS subset mode to invoke the EXEC; this will limit the range of functions that you can perform.

```
/*******************************************/
/*     ILLUSTRATIVE   ADMQPOST EXEC        */
/*                                         */
/* THIS EXEC IS EXECUTED WHEN A PRINT FILE */
/* IS CLOSED.                              */
/*                                         */
/* PARAMETERS - FILENAME FILETYPE FILEMODE */
/* OF PRINT FILE CREATED.                  */
/*                                         */
/* THIS EXEC ASSUMES A CONVENTION THAT THE */
/* FILENAME IS THE NAME OF A DISCONNECTED  */
/* VIRTUAL MACHINE THAT WILL PRINT THE     */
/* FILE.                                   */
/*******************************************/
parse arg filename filetype filemode
CP SPOOL PUN CLOSE NOHOLD NOCONT
CP SPOOL PUN TO filename
PUNCH filename filetype filemode (NOHEADER
ERASE filename filetype filemode
CP SPOOL PUN CLOSE
```

Figure 27. Suggested ADMQPOST EXEC

You will also need to provide an EXEC to control the operation of the disconnected virtual machine. A sample EXEC is shown in Figure 28 on page 60. (Note that the EXEC listed fulfills only the basic requirements and you may well want to produce something more sophisticated.)

If your EXECs require your users to name their print files in any special way (as do the sample EXECs shown) remember to inform your users of these requirements.

Instructions for tailoring the print utility

1. Read the background information above and see if you want to create any nicknames or an ADMQPOST EXEC.
2. Write down any nicknames you may want in Figure 29 on page 62.
3. If you want to create EXECs to let you print on a disconnected virtual machine, use the ones shown in this section as models.
4. If your EXECs require the user to name the print file in a special way, remember to inform users of this fact.

```
*********************************************
**     ILLUSTRATIVE DISCONNECTED VIRTUAL    **
**     MACHINE CONTROL EXEC FOR PRINTING    **
**     GDDM PRINT FILES.                    **
**                                          **
** THIS EXEC IS EXECUTED CONTINUOUSLY       **
** IN A DISCONNECTED MACHINE.               **
*********************************************
&CONTROL OFF
CP SPOOL RDR NOHOLD NOCONT
*
&PRTER = &1
&SLEEP = &2
&IF &INDEX = 2 &GOTO -READ
&BEGTYPE
  TWO PARAMETERS REQUIRED
    1. THE NAME OF THE PRINTER
    2. THE NUMBER OF SECONDS TO WAIT BETWEEN
       POLLS OF THE READER
&END
&EXIT 4
*
*********************************************
** CHECK THE READER                        **
*********************************************
*
-READ
READCARD PRTFILE ADMPRINT A
&IF &RETCODE ¬= 0 &GOTO -SLEEP
*
*********************************************
** PRINT THE FILE                          **
*********************************************
*
ADMOPUV PRTFILE ON &PRTER
&IF &RETCODE ¬= 0 &TYPE PRINT FAILED. RC= &RETCODE
&IF &RETCODE = 0 ERASE   PRTFILE ADMPRINT A
*
*********************************************
** WAIT FOR SOMETHING TO DO                **
*********************************************
*
-SLEEP
CP SLEEP &SLEEP SEC
&GOTO -READ
```

Figure 28. Suggested EXEC to print from a disconnected virtual machine. This EXEC is designed to run on a basic VM system. If you have the WAKEUP module, it is more efficient than using the SLEEP command. There may also be other changes that you may want to make.

Step 6: Customize GDDM

Migrating from earlier releases

If you are migrating from a version of GDDM earlier than Version 1 Release 4, there are additional methods of changing the defaults. In addition, you may like to use the functions for defining nicknames.

If you are upgrading from GDDM Version 1 Release 4 or Version 2 Release 1, you will need to follow this step to reestablish any defaults you need.

Version 2 Release 2 of GDDM introduces support for "country-extended code pages," which associate GDDM objects (symbol sets, charts, and so on) with the environment in which they are used. An object that is tagged with a code page does not need any special action to make it usable in a different linguistic environment, provided that GDDM is suitably set up. (See "Country-extended code pages" on page 66.) You should consider the advantages of using this new function in your installation.

You can tailor the following elements of GDDM during installation:

- Naming conventions.
- Buffer sizes, paging, and other performance factors.
- Time, date, and number punctuation conventions.
- Language of messages and language of ICU panels. (This is only relevant if you have the GDDM Base and GDDM-PGF National Language features.)
- Debugging factors (error thresholds and trace values).
- Nicknames.
- Character code translation (for example, for Katakana terminals).
- APL and printing.
- 4250 code page names.
- Country-extended code pages.
- GKS workstation types.

All items except the Katakana character code translation are GDDM defaults, and can be specified in the external defaults module. Translation of Katakana characters is controlled by the alphanumeric defaults module, ADMDATRN, or by defaults.

A full discussion of the GDDM defaults is given in Appendix A, "GDDM defaults and nicknames" on page 115 and Appendix B, "Character code interpretation" on page 133. A short discussion is given below to give you a quick idea of what you can change. Figure 29 on page 62 is provided to note down any changes that you want to make.

Note that you can change defaults later if you prefer. (See "Replacing GDDM modules after installation" on page 105 for details.)

Checklist of items to change in defaults module
As you go through other steps you may decide to make changes that involve changing the defaults module. This space is provided so that you can note the changes and implement them all at once.

Figure 29. Checklist of items to change in defaults module

Naming conventions

You should have already decided whether to change any names, because some names, if they are to be changed, need changing in several places.

Look back at Figure 9 on page 39 to see what you decided.

If you need to make changes, you can find the ADMMDFT keywords to use in Figure 47 on page 117.

Buffer sizes, paging, and other performance factors

These items are discussed in broader terms in the *GDDM Performance Guide* under "Performance background" in Chapter 1 and under "Tuning and customization by subsystem" in Chapter 2.

The user default specifications are ADMMDFT IOBFSZ (transmission buffer size) and ADMMDFT SAVBFSZ (FSSAVE buffer size).

The value specified for IOBFSZ must not be greater than the RSCS buffer size if you use RSCS with 3287 or 4224 printers.

Time, date, and number punctuation conventions

GDDM gives you the choice of a number of conventions that can be used for these items. (For example, whether the date is presented in the form 25/12/86 or 12/25/86 for 25 December 1986.) The user default specifications are:

```
Time                ADMMDFT TIMEFRM=1 (HH:MM AM or PM)
Date                ADMMDFT DATEFRM=4 (DD MMM YYYY)
Number punctuation  ADMMDFT NUMBFRM=1 (NN,NNN,NNN.NNN)
```

Language of messages and ICU panels

If you have installed the National Language features, you must specify the language you require by using the `ADMMDFT NATLANG` default.

Debugging factors

The main use of changing error threshold or trace defaults is to help find any errors in the interactive utilities as described in the *GDDM Diagnosis and Problem Determination Guide.*

The standard defaults should not normally be changed.

Nicknames

Nicknames are a type of user default specification that lets you define all aspects of a device in advance of using a DSOPEN statement, and then reference that device on DSOPEN by using the nickname. A full discussion of nicknames is given in Appendix A, "GDDM defaults and nicknames" on page 115.

The next few paragraphs describe some typical uses for nicknames.

User control enables users to pan and zoom on their pictures, and also lets them print or plot their screen contents. User control can be turned off by use of nicknames. (It is on by default.) Note that, if you turn it off, you will not be able to test the print utility in the way suggested in the next step. Instead, if you are not

able to use the ICU, you will have to compile and link-edit one of the sample programs.

When printing output from the ICU, if you intend to use any printer other than a 3287 with standard paper you must set up a nicknames file containing the correct device token for the printer. Device tokens are supplied by GDDM to enable you to use most devices. There are instructions on how to create your own device tokens if you need them. (See Appendix C, "Device characteristics tokens" on page 153.)

Nicknames for plotters: Nicknames are particularly useful with local plotters. Plotters attached to the IEEE-488 port of various work stations can be driven by GDDM, and are referenced using a composite name of the form:

```
(session-device-address,auxiliary-plotter-name)
```

For example, (*,ADMPLOT) would reference the first customized plotter (ADMPLOT) on the user's terminal (*). A set of nickname examples is described in Appendix A, "GDDM defaults and nicknames" on page 115.

By using nicknames (as described in Appendix A) it is possible to transform references to a queued printer name from an application or from the ICU, and references to an attached printer name from the GDDM print utility, into references to a directly attached plotter. Such nicknames can be built into your installation by adding suitable nickname statements to the GDDM external defaults module.

For example, the nickname statement

```
[label] ADMMNICK FAM=2,NAME=*PLOT,TOFAM=1,TONAME=(*,ADMPLOT)
```

would cause a request from an ICU user for printing on device *PLOT to be performed immediately on an attached plotter without going through GDDM print utility processing. (Note, however, that this will inhibit multiple-copy requests.)

The statement

```
[label] ADMMNICK FAM=1,NAME=*PLOT,TOFAM=1,TONAME=(*,ADMPLOT)
```

would cause the command ADMOPUV filename ON *PLOT to plot the identified file on an attached plotter.

The following set of nicknames combines a number of the available options to permit a directly-attached plotter to be driven indirectly by means of GDDM print utility processing from the ICU. All the user need do is enter the name *PLOT on the ICU Print Panel.

```
[label] ADMMNICK FAM=2,NAME=*PLOT,DEVTOK=L7371,                    X
              PROCOPT=((INVKOPUV,YES))
[label] ADMMNICK FAM=1,NAME=*PLOT,TONAME=(*,ADMPLOT)
```

Nicknames for printing and controlling work stations: If you use RSCS to send files for printing on an MVS system, you may find these nicknames useful as models:

```
[label] ADMMNICK NAME=RSCS3287,FAM=2,DEVTOK=L87,
                PROCOPT=((INVKOPUV,YES))
[label] ADMMNICK NAME=RSCS3287,FAM=1,TONAME=PUNCH,DEVTOK=L87,
                PROCOPT=((CPSPOOL,TO,RSCSV2,FORM,STD),
                (CPTAG,V3287A,SYSTEM,50,PRT=GRAF))

[label] ADMMNICK NAME=RSCS4224,FAM=2,DEVTOK=X4224SE,
                PROCOPT=((INVKOPUV,YES))
[label] ADMMNICK NAME=RSCS4224,FAM=1,TONAME=PUNCH,DEVTOK=X4224SE,
                PROCOPT=((CPSPOOL,TO,RSCSV2,FORM,STD),
                (CPTAG,LAF2A20,SYSTEM,50,PRT=GRAF))
```

Some devices, such as the 3179-G, 3270-PC/G and 3270-PC/GX, and 5550, have predetermined symbol sets stored within their hardware. With these devices, GDDM uses the hardware symbol sets in preference to its own. If, however, you want to change the symbol sets that GDDM uses, you must first change the GDDM default as shown in "Changing the default symbol sets or making another set the default" on page 182, and then load them using the LOADDSYM DSOPEN processing option, thus:

```
[label] ADMMNICK PROCOPT=((LOADDSYM,YES))
```

PA3 is the default key used by GDDM for switching to user control mode (which allows the user to pan and zoom pictures, copy screen contents to a printer, do windowing, and so on). Some terminals do not have a PA3 key, so you can set a different one as the default using the CTLKEY processing option. For example, to set the control key to PF3, use:

```
[label] ADMMNICK PROCOPT=((CTLKEY,1,3))
```

There is a processing option, PCLK, described in the *GDDM-PCLK Guide*. If you are installing GDDM Base PCLKF, you should consider setting the PCLK processing option to YES; if you do not, your users will have to set it themselves. If you set this processing option, it will cause a prompt to appear when GDDM cannot determine whether a display device can show graphics. So it affects use with nongraphics displays, such as 3278s. Use:

```
[label] ADMMNICK PROCOPT=((PCLK,YES))
```

Nicknames for GDDM-GKS: GDDM-GKS applications use connection identifier numbers when referring to particular workstations. For the workstation types 6 through 13, GDDM-GKS uses a nickname, corresponding to the connection identifier, to access the device. Normally, the nicknames to be used are specified in an external defaults file provided by the user; however, you can use the external defaults module to provide nicknames for local printers, plotters, and other devices.

Each nickname to be provided for GDDM-GKS applications must be defined with the options FAM=1 and NAME=GKWSnnnn, where nnnn is a number in the range 0000 through 9999. The number given by nnnn is the connection identifier that GDDM-GKS applications will use to refer to the device. For example, if applications will use connection identifier 7 to open attached plotters, you could provide the following nickname:

```
[label] ADMMNICK FAM=1,NAME=GKWS0007,TONAME=(*,ADMPLOT)
```

Country-extended code pages

GDDM Version 2 Release 2 now adds to most GDDM objects an indication of their linguistic origin. This indication allows characters that are specific to a national language to be converted into the most appropriate form for any other national environment in which they are used.

You should consider setting up an installation-wide specification of the linguistic environment so that your application programs can use and produce objects that can be processed in other environments. If you do this, GDDM will automatically handle much of the language-dependent processing of data, and you can avoid much of the lengthy customization that was previously needed to achieve this support. Set up the defaults:

```
ADMMDFT INSCPG=nnnnn,APPCPG=nnnnn
```

where nnnnn is one of the "country-extended code-page" tags defined on page 120.

If you want to inhibit the keyboard input of extended CECP characters (for devices that support this), specify the ADMMDFT CECPINP default.

In addition, you should consider tagging existing GDDM objects on your system, as described in "Managing GDDM objects" on page 106.

APL and printing

If you are using APL with your printers, you may have to specify the ADMMDFT CMSAPLF default to indicate the APL character set they use. (See Appendix G, "APL and GDDM" on page 195 if you think you need to know more.)

Character code translation

If you are using Katakana, you may need to change the values in ADMDATRN, the alphanumeric defaults module. See Appendix B, "Character code interpretation" on page 133 for details. Alternatively, you can specify that Katakana is the default using the new country-extended code page support, new in Version 2 Release 2. Specify:

```
ADMMDFT APPCPG=00290,INSCPG=00290
```

Otherwise, the standard defaults should not normally be changed.

4250 code-page names

If your installation uses 4250 composed-page printers and the IBM Typographic Fonts for the IBM 4250 Printer (initial program numbers 5771-AAA to 5771-AAW plus later additions), you can use the ADMMDFT CPN4250 default to change the system default code page name. This identifies a default national language (or APL or mathematical symbols) for your 4250 symbol sets.

GDDM-GKS workstation types

GDDM-GKS applications use workstation type numbers when referring to the characteristics of workstations. GDDM-GKS allows users to define the type of physical devices they intend to use when GKS workstation type numbers 6 through 13 are given. Normally, the workstation types are specified in an external defaults file provided by the user; however, you can use the external default GKSWS to provide default values.

The default values are specified by the following external default:

```
ADMMDFT GKSWS=(dt1,dt2,...,dt8)
```

where `dt1` through `dt8` are device characteristic tokens for family-1 and family-2 graphics devices. The device tokens given by `dt1` through `dt8` indicate the device characteristics associated with workstation type numbers 6 through 13 respectively. Each device token is optional and can be omitted. You must ensure that the device tokens you specify are held in the GDDM table ADMLSYS1.

GDDM-IVU and image devices

In the *GDDM Image View Utility* manual, users are instructed to list their image files by entering CMS subset mode; you should therefore check that your GDDM Base installation defaults allow this. The processing option that controls access to subset mode is CMSINTRP, and you should ensure that this is set to PA1PA2 (the default) or PA2 by a default specification such as:

```
ADMMDFT PROCOPT=((CMSINTRP,PA1PA2))
```

You should consider increasing the default value that controls the buffer size for input/output transmissions, if you are using a 3117 or 3118 scanner. A value of 3000 is recommended; the required default specification is:

```
ADMMDFT IOBFSZ=3000
```

You should consider increasing the default value that controls the mapgroup storage threshold, to improve the performance of your system. It has the form:

```
ADMMDFT MAPGSTG=n
```

where `n` should be 20000 if you are not planning to use the help panels, or 70000 if you are.

IBM 3193 Display: For this type of terminal, it is recommended that the WINDOW and CTLMODE processing options are left at their default values of NO and * respectively. Other values will prevent GDDM-IVU using real partitions, which is detrimental to performance.

IBM 3270-PC/G and /GX work stations: It is recommended that these terminals are used with the GDDM SEGSTORE processing option set to NO to minimize response times. This can be done by the following nickname statement:

```
[label] ADMMNICK FAM=1,PROCOPT=((SEGSTORE,NO))
```

Double-byte character set (DBCS) defaults

If the Kanji symbol set has been installed, or if someone has sent you a DBCS file, you must set the ADMMDFT MIXSOSI default to YES to enable mixed strings of one byte and DBCS (2-byte) characters to be used. You will need to do this if you are using GDDM utility programs like the ICU on a device with Kanji.

The ADMMDFT DBCSLNG=K default defines the default DBCS language for both image and vector sets as Kanji. If another Asian language is to be supported, this must be defined to GDDM by means of DBCSLNG, and the character used (for example, H for Hangeul) must be included in the symbol-set name, as the K is for Kanji symbol sets.

If you want to emulate SO/SI characters on a device that does not support them, specify the ADMMDFT SOSIEMC default.

Note that if a chart is created on the ICU with MIXSOSI enabled, it will not display for a user without MIXSOSI enabled, even if it contains no double-byte characters.

The DBCSDFT default controls GDDM support for error message destinations in a DBCS environment. The ADMUDBCS EXEC is supplied to control the setting of this default.

```
EXEC ADMUDBCS {GDDM|NO|YES}
```

This EXEC updates or creates a PROFILE ADMDEFS A file. If the file does not exist, one is created with a single record:

```
DEFAULT DBSCDFT=option
```

If the file exists, this record is added at the end. If the file already contains a final record of this form, that record is replaced; this means that the EXEC may be used more than once with different options, without causing the file to increase in size.

Changing the default vector symbol set to a language other than American-English

Do *not* follow this section if you plan to use the support for country-extended code pages, that is new in Version 2 Release 2.

GDDM provides the following versions of the default vector symbol set:

Brazilian
Danish
U.S.-English
French
German
Italian
Japanese (Katakana)
Norwegian
Spanish
Swedish.

If your installation uses one of these languages, you can change the default set to the language you require. Instructions are given in Appendix D, "GDDM default symbol sets" on page 179.

Differing default requirements

It may be that your installation requires different default modules for different applications. (An installation where both French and English are used is an example.) This may have to be done by having two different default modules and linking them with the applications. Methods of doing this are discussed in Appendix H, "Repackaging for performance or for differing defaults" on page 197.

Note, however, that many GDDM defaults can be specified in an application program using GDDM call statements, and it may not be necessary to create different defaults modules for this purpose. See the section on defaults in the *GDDM Base Programming Reference* manual for details.

Instructions for changing the defaults

Do not alter the sample library versions. Take a copy to alter and leave the sample library entries intact because you may need to apply service to them.

1. After reading the discussions above, and any other relevant material, decide if you are going to change any default values.
2. Make a list of the user default specifications that you want to specify in the external defaults module, ADMADFV. Use Figure 29 on page 62 for this. This list should include the specifications for the defaults and the nicknames that you want.
3. Log on to a virtual machine and access the source file (or one of the files) you intend to change.

   ```
   ADMADFV   ASSEMBLE   - external defaults module
   ADMDATRN  ASSEMBLE   - alphanumerics defaults module.
   ```

4. Make the changes using a suitable editor.
5. Assemble the new modules with the commands:

   ```
   GLOBAL MACLIB ADMLIB   to access the GDDM macros
   ASSEMBLE ADMADFV       external defaults
   ASSEMBLE ADMDATRN      alphanumeric defaults
   ```

6. Place the reassembled modules in the ADMGLIB TXTLIB. The commands are:

   ```
   TXTLIB DEL ADMGLIB ADMADFV    external defaults
   TXTLIB ADD ADMGLIB ADMADFV
   TXTLIB DEL ADMGLIB ADMDATRN   alphanumeric defaults
   TXTLIB ADD ADMGLIB ADMDATRN
   ```

7. If you want a non-American-English default vector symbol set, change it as discussed in Appendix D, "GDDM default symbol sets" on page 179.
8. If you created a DCSS before changing the defaults modules, you must recreate the DCSS. (This will not be necessary if you have followed the suggested order in this book.)

   You can use an external defaults file (described in the *GDDM Base Programming Reference* manual) instead of an external defaults module to do your testing. You will not need to recreate the DCSS until you change the defaults module.

Note that you can change the external defaults module after you have installed and tested GDDM Base, if you find that any of the defaults need altering. See "Replacing GDDM modules after installation" on page 105 for more information.

Step 7: Create GDDM discontiguous saved segments (DCSS)

Migrating from earlier releases

You need to perform this step, paying particular attention to "Migration and previously existing DCSSs" on page 72.

If you are upgrading from GDDM Version 2 Release 1, you will probably also need to recreate your saved segments for GDDM-PGF and other GDDM programs because the GDDM Base segment has increased in size. If you don't, you may find that your new Base segment overlays those previously created for other GDDM programs.

To reduce the amount of storage required by GDDM, most of the executable code is dynamically loaded during execution. Under VM this loading can be extremely time-consuming and has to be done for each virtual machine.

To get satisfactory performance it is necessary either to create saved segments (DCSSs) that contain GDDM loadable code or to link individual programs or GDDM utilities with their loadable code.

Unless only the ICU and symbol editors are to be used, saved segments are normally the best solution. If only the ICU and symbol editors are used, you may prefer to package them with their associated code as described in Appendix H, "Repackaging for performance or for differing defaults" on page 197.

A DCSS is a segment of storage to which a number of virtual machines have access. See the manuals *VM/SP Installation Guide*, *VM/SP System Programmer's Guide*, *VM/XA SP Installation and Service*, and *VM/XA SP Administration* for details.

Each GDDM-series licensed program has its own DCSS.

You can choose which parts of GDDM loadable code are to be included in a DCSS. You may include all the code or the parts that are most frequently used in your installation.

An EXEC called ADMBLSEG that enables you to create DCSSs is provided on the installation tape. An equivalent EXEC, ERXBLSEG, enables you to create a DCSS for GDDM-REXX.

Potential servicing problems with DCSSs

If one of the modules in the GDDM TXTLIBs is serviced, the corresponding DCSS must be recreated before the fix is available to users.

Notes:

1. A module on your A-disk is not used if there is a module of the same name already in a DCSS. This prevents you from trying a fix before recreating the DCSS.
2. The original copies of modules in the DCSS must be retained for service, because service cannot be applied directly to a DCSS.

Migration and previously existing DCSSs

GDDM has adopted a naming convention for DCSSs that:

- Allows modules generated for a previous release to run with the new release
- Enables the new release DCSS to be tested while the old version is still available
- Allows modules that need a previous release to run with that release.

Note the one exception to the rules above. Modules generated for releases before GDDM Version 1 Release 3 need regenerating to run on later releases. This needs doing once only. When a module has been regenerated it will automatically run on later releases.

The naming system works by having a default name for the current DCSS, and a release-specific name for the DCSS for each release. If a DCSS with a specific name exists, it is used by modules generated for that release. If it does not exist, the default name is used.

Saved segments for other GDDM-series licensed programs

With Version 2 of GDDM, separate saved segments have been introduced for GDDM-PGF, GDDM-IMD, GDDM-IVU, GDDM-GKS, and GDDM-REXX. All of these have a similar naming scheme.

Names of saved segments

Figure 30 shows the names of the GDDM/VM saved segments:

Changes in GDDM	V.R.M	Default name	Release-specific name
Original naming	1.1.0	ADMASSSV	ADMASSSV
Defaults introduced	1.3.0	ADMASS00	ADMASS30
	1.4.0	ADMASS00	ADMASS40
Separate segments			
GDDM/VM	2.1.0	ADMASS00	ADMBA210
GDDM/VM	2.1.1	ADMASS00	ADMBA211
GDDM/VM	2.2.0	ADMASS00	ADMBA220
GDDM-PGF	2.1.0	ADMPG000	ADMPG210
GDDM-IMD	2.1.0	ADMIM000	ADMIM210
GDDM/IVU	1.1.0	ADMIV110	ADMIV110
GDDM/GKS	1.1.0	ADMGK000	ADMGK110
GDDM-REXX	1.1.0	ERXRX110	ERXRX110

Note: V.R.M is the Version Release Modification level

Figure 30. GDDM/VM saved segment names

Figure 31 shows the names of the saved segments when you use GDDM/VMXA, and the number of 1-megabyte segments they occupy.

Product	V.R.M	Default name	Release-specific name	Number of segments
GDDM/VMXA	2.2.0	ADMXSS00	ADMXA220	3
GDDM-PGF	2.1.0	ADMPG000	ADMPG210	2
GDDM-IMD	2.1.0	ADMIM000	ADMIM210	1
GDDM-IVU	1.1.0	ADMIV110	ADMIV110	1
GDDM-GKS	1.1.0	ADMGK000	ADMGK110	1
GDDM-REXX	1.1.0	ERXRX110	ERXRX110	1

Note: V.R.M is the Version Release Modification level

Figure 31. Names of the saved segments with GDDM/VMXA

Overview of how to deal with saved segments

You should plan to continue as follows (the details come later):

1. **Set up testing versions of saved segments for current release**
   a. Create the GDDM/VM or GDDM/VMXA Version 2 Release 2 DCSS with the name ADMBA220 or ADMXA220, respectively.

b. For GDDM-PGF, if installed, create the GDDM-PGF Version 2 Release 1 DCSS with the name ADMPG210.

c. For GDDM-IMD, if installed, create the GDDM-IMD Version 2 Release 1 DCSS with the name ADMIM210.

d. For GDDM-IVU, if installed, create the GDDM-IVU Version 1 Release 1 DCSS with the name ADMIV110.

e. For GDDM-GKS, if installed, create the GDDM-GKS Version 1 Release 1 DCSS with the name ADMGK110.

f. For GDDM-REXX, if installed, create the GDDM-REXX Version 1 Release 1 DCSS with the name ERXRX110.

2. **Test the new saved segments**

a. Ensure that you do not have any disks accessed that contain back levels of GDDM.

b. Use the ICU for GDDM Version 2, or, if you have not installed GDDM-PGF, use the Image Symbol Editor for basic testing.

c. Test any other saved segments you have created by using the programs.

d. If there are any applications from previous releases that you want to test on the new system before making it generally available, you will have to generate them on the new release and test them.

3. **Make the new release generally available**

a. Recreate the saved segments with the default names as follows:

Program	Test name	Default name
GDDM/VM	ADMBA220	ADMASS00
GDDM/VMXA	ADMXA220	ADMXSS00
GDDM-PGF	ADMPG210	ADMPG000
GDDM-IMD	ADMIM210	ADMIM000
GDDM-IVU	ADMIV110	ADMIV110
GDDM-GKS	ADMGK110	ADMGK110
GDDM-REXX	ERXRX110	ERXRX110

This means that all modules will use the new saved segment. If your previous saved segment was called ADMASS00, you must ensure that it is no longer accessible.

4. **Make previous DCSSs available, if necessary**

Note: Version 2 of GDDM has withdrawn support for 3277GA terminals. If you have any of these terminals, you will need to keep the saved segments from an earlier release to let you use them with GDDM.

a. If you want to retain saved segments containing previous releases, you must give them the specific name of the release to which they apply. For example the DCSS for Version 1 Release 4 should be ADMASS40.

b. If you want any modules for that release to use the current release, you must regenerate them using the new release.

Overlapping of old and new GDDM DCSS

If you intend to have both old and new saved segments for GDDM, to enable you to use two different releases, you can use overlapping main storage address ranges. This is possible because only one of the segments will be in use at any one time by a virtual machine. The new segments for GDDM Base, GDDM-PGF, GDDM-IMD, GDDM-IVU, GDDM-GKS, and GDDM-REXX must not overlap if they are ever needed to be used concurrently. If any of these segments will *never* be used concurrently, you may choose to allow them to overlap. This may cause storage problems if you use GDDM/VMXA in 370-mode, because the segments are in 1-megabyte blocks, and they will all have to reside in storage below 16-megabytes.

The next section of this chapter discusses the contents of the saved segment, so you can decide what you want to include.

Saved segment contents and sizing

GDDM DCSSs are made up of sections of GDDM code. The DCSSs must always contain licensed program code and associated messages. You can choose whether to include other code sections. The contents of typical DCSSs are shown in the figures that follow.

In principle, the more of the sections you include the better the performance you get. Of course, you should not include messages or languages that are not to be used, but, apart from that, there are no obvious candidates for exclusion.

GDDM/graPHIGS code is not included in the GDDM Base DCSS. Only the stub modules are required by GDDM Base to access GDDM/graPHIGS code.

The DCSSs for GDDM-IMD, GDDM-IVU, GDDM-GKS, and GDDM-REXX contain only the associated program routines; there are no optional contents for these DCSSs.

The use of the various optional sections and the consequences of excluding or including them is described after the figures.

Sizes are approximate and include an allowance for service changes.

Contents of GDDM Base saved segment	Size in bytes
Items that are always included:	
Graphics, alphanumerics (both mapped and unmapped), terminal I/O, first-language messages for all GDDM programs	X'24E000' (2360K)
Optional items:	
Image Symbol Editor	X '25800' (150K)
Image processing routines	X '4B000' (300K)
GDDM/graPHIGS stubs	X '800' (2K)
Total, including all optional items	X'2BF000' (2812K)
National language support (messages) for each additional language:	
GDDM Base	X 'D000' (52K)
GDDM-PGF	X '96000' (600K)
GDDM-IVU	X '19000' (100K)
GDDM-GKS	X '1C00' (7K)

Figure 32. Sizes of items in the GDDM Base saved segment

Contents of GDDM-PGF saved segment	Bytes
Presentation Graphics routines	X '3E800' (250K)
Optional items	
ICU first language (panels)	X 'AF000' (700K)
Vector Symbol Editor	X '4B000' (300K)
Total, including both optional items	X'138800' (1250K)
National language support (menus and panels) for each additional language:	X '96000' (600K)

Figure 33. Sizes of items in the GDDM-PGF saved segment

Contents of GDDM-IMD saved segment	Bytes
Interactive Map Definition routines	X '64000' (400K)

Figure 34. Sizes of items in the GDDM-IMD saved segment

Contents of GDDM-IVU saved segment	Bytes
GDDM-IVU routines	X '81000' (516K)

Figure 35. Sizes of items in the GDDM-IVU saved segment

Contents of GDDM-GKS saved segment	Bytes
GDDM-GKS routines	X '57800' (350K)

Figure 36. Sizes of items in the GDDM-GKS saved segment

Contents of GDDM-REXX saved segment	Bytes
GDDM-REXX routines	X 'A000' (40K)

Figure 37. Sizes of items in the GDDM-REXX saved segment

GDDM Base DCSS

The GDDM Base DCSS contains the messages and product descriptor tables for most other GDDM licensed programs, including GDDM-PGF, GDDM-IMD, GDDM-IVU, and GDDM-GKS. So if you install one of these associated programs into a system that already has GDDM Base, you will need to regenerate the Base DCSS.

National language routines: If you intend to use the ICU and are a multilanguage organization, you should include all languages that you use — language modules when loaded into the saved segment for the ICU significantly improve performance. You should exclude all other languages.

Similarly, include all languages that you will use for GDDM-IVU and GDDM-GKS.

Image Symbol Editor: If the Image Symbol Editor will not be used extensively in your installation, you should exclude it from the Base DCSS. The most common use for the Image Symbol Editor is the production of company logos or scientific symbols for use on charts. See the *GDDM Image Symbol Editor* manual for information on the Image Symbol Editor.

Image Processing Routines: If image processing is not used in your installation, exclude the image-processing routines from the Base DCSS. The most common use for image processing is associated with scanners and facsimile devices, and printing composite documents containing images.

GDDM/graPHIGS stub modules: The GDDM/graPHIGS stub modules could be excluded in installations that do not make extensive use of GDDM/graPHIGS. However they are very small, and are automatically excluded from installations that do not have GDDM/graPHIGS.

```
                    SAVED SEGMENTS CHECKLIST

Decide which saved segments (DCSSs) you want to create.
Enter the segment names.  Use the release-specific names for testing,
and the default names to make the segment generally available.

Product        Default name      Release-specific name
GDDM/VM        ADMASS00          ADMBA220                  ..........
GDDM/VMXA      ADMXSS00          ADMXA220                  ..........
GDDM-PGF       ADMPG000          ADMPG210                  ..........
GDDM-IMD       ADMIM000          ADMIM210                  ..........
GDDM-IVU       ADMIV110          ADMIV110                  ..........
GDDM-GKS       ADMGK000          ADMGK110                  ..........
GDDM-REXX      ERXRX110          ERXRX110                  ..........

Which national languages do you want in the saved segments?

  A = American English
  B = Brazilian
  C = PRC Chinese (Simplified)
  D = Danish
  F = French
  G = German
  H = Korean (Hangeul)
  I = Italian
  K = Japanese (Kanji)
  N = Norwegian
  Q = French (Canadian)
  S = Spanish
  T = Taiwan Chinese (Traditional)
  V = Swedish

Enter the code letter(s) for the language(s) you want.
Note that you can only include languages that you
specified in the installation EXEC.                         ..........

Do you want:
  The Image Symbol Editor in the Base DCSS?  (Yes or No)    ..........

  The Image Processing routine in the Base DCSS? (Yes or No) ..........

  The GDDM/graPHIGS stubs in the Base DCSS? (Yes or No)     ..........

  The Interactive Chart Utility in the PGF DCSS? (Yes or No) ..........

  The Vector Symbol Editor in the PGF DCSS? (Yes or No)     ..........
```

Figure 38. Checklist for the GDDM saved segments. Write your answers to these questions; you will be asked for them by the ADMBLSEG EXEC. Some of the prompts only appear if you have particular features installed.

GDDM-PGF DCSS

Interactive Chart Utility: The Interactive Chart Utility (ICU) is the interactive program used for drawing charts. Most installations use it frequently but it is possible that your installation may not use this method of producing charts. If your installation does not use the ICU, it should be excluded. See the *GDDM-PGF Interactive Chart Utility* manual for information on the ICU.

Vector Symbol Editor: If the Vector Symbol Editor is not widely used in your installation,you should exclude it from the GDDM-PGF DCSS. The most common use for the Vector Symbol Editor is the production of company logos or scientific symbols for use on charts. See the *GDDM-PGF Vector Symbol Editor* manual for information.

GDDM-IMD DCSS

The GDDM-IMD saved segment does not contain any optional items. If your installation does not make extensive use of GDDM-IMD, you should not create the GDDM-IMD saved segment.

See the *GDDM Interactive Map Definition* manual for information on GDDM-IMD.

GDDM-IVU DCSS

The GDDM-IVU saved segment does not contain any optional items. If your installation does not make extensive use of GDDM-IVU, you should not create the GDDM-IVU saved segment.

See the *GDDM Image View Utility* manual for information on GDDM-IVU.

GDDM-GKS DCSS

The GDDM-GKS saved segment does not contain any optional items. If your installation does not make extensive use of GDDM-GKS, you should not create the GDDM-GKS saved segment.

See the *GDDM-GKS Programming Guide and Reference* manual for information on GDDM-GKS.

GDDM-REXX DCSS

The GDDM-REXX saved segment does not contain any optional items. If your installation does not make extensive use of GDDM-REXX, you should not create the GDDM-REXX saved segment.

If you decide not to create a DCSS for GDDM-REXX, most of the GDDM-REXX code will be loaded as a nucleus extension when a user initializes GDDM-REXX (by issuing the command `GDDMREXX INIT`). This will use approximately 40K bytes of virtual storage in the user's machine.

The GDDMREXX module can also be loaded manually into the nucleus, especially if it is likely to interfere with other modules loaded at address X'20000'. If that is likely to be a problem for your users, you should consider advising them to `NUCXLOAD GDDMREXX`. They will need to do this if EXECs are to be run from CMS subset.

See the *GDDM-REXX Guide* for information on GDDM-REXX.

Instructions for creating DCSSs

If you have decided to create saved segments, continue as follows:

1. Decide which segments you are going to create and which items you are going to include in the segments. (The previous section is a discussion on this topic.) Mark the items you are going to include in the DCSS in Figure 38 on page 78.
2. Decide on whether you are going to name your segments with a release-specific name for testing, or a default name to make them the generally used segments. (There is a discussion of this in "Migration and previously existing DCSSs" on page 72.)
3. Calculate how much storage you will require using Figures 32 through 37 as a reference. (For example, you will require X'2BF000' or 2812K bytes if all of the optional items are included in the GDDM saved segment, without any additional national languages.)
4. Determine at what address DCSSs will start. This is *not* the same as the SYSSTRT operand of the NAMESYS macro. For VM/SP systems, the address of a DCSS must be higher than the size of any virtual machine that uses it. However, for both VM/SP and VM/XA SP systems, do not make the address unnecessarily high, because this will use extra space in VM tables. (See the *VM/SP System Programmer's Guide* and the *VM/XA SP Administration* manual for more guidance.)

   Ensure that any DCSS that you create will not overwrite any other saved segment or saved system for any program related to GDDM. The exception to this is the GDDM saved segment from a previous release which you may overwrite.
5. **For VM/SP systems:** Generate entries in the DMKSNT system name table.

   Figure 39 on page 82 gives a sample DMKSNT table entry for GDDM/VM. The defined DCSS is large enough to contain all GDDM facilities for a single national language. The method used to calculate the values in the example is shown in Figure 40 on page 82. Use this method to create a table entry for each DCSS, using the starting address and size calculated in the preceding steps. Note that if you are going to create a segment for testing and another to make the new release generally available, you should create two sets of names.

   Do not use the information without checking with the system programmer doing the saved segment generation. (See *VM/SP Planning and System Generation Guide* and the *VM/SP System Programmer's Guide* for details.)

   For VM/XA SP systems: In VM/XA SP, saved segments are defined dynamically using the CP DEFSEG command. The CP DEFSEG command replaces the DMKSNT installation step used in VM/SP. Information about handling saved segments in VM/XA SP may be found in the *VM/XA SP Administration* manual.

   This is the DEFSEG command required to define the GDDM/VMXA saved segments:

   ```
   DEFSEG segname aa00-bbFF SR
   ```

You should choose the storage page numbers to suit your installation's environment. Here are some examples:

To define the default base segment to occupy segments 8, 9, and A, use:

```
DEFSEG ADMXSS00 800-AFF SR
```

To define the release-specific PGF saved segment to occupy segments 20 and 21, use:

```
DEFSEG ADMPG210 2000-21FF SR
```

To define the default IMD saved segment to occupy segment C, use:

```
DEFSEG ADMIM000 C00-CFF SR
```

6. Log on to a virtual machine with "E" class privilege (or which has a class that allows you to use the SAVESYS command) and a virtual machine size at least X'20000' bytes larger than the end of the highest placed DCSS.
7. IPL CMS, immediately issue the command

   ```
   SET LDRTBLS 8
   ```

   and access the disk(s) on which GDDM Base and its associated programs have been installed. Associated programs include GDDM NL, GDDM-PGF, GDDM-IMD, GDDM/graPHIGS, and so on.
8. Enter the command ADMBLSEG (or ERXBLSEG for GDDM-REXX).

   The ADMBLSEG EXEC determines what you have installed and only asks you to select appropriate segments. It goes through the segments in the order GDDM Base, GDDM-PGF, GDDM-IMD, GDDM-IVU, and GDDM-GKS, and it prompts you for the answers you have prepared in Figure 38 on page 78.

   Note: The EXEC issues a `GLOBAL TXTLIB` command for all required GDDM libraries. If you are installing on VM/SP Release 4, there is a limit of eight text libraries that can be specified in this command. If necessary, you should merge some of these libraries, so that the number is within the limits of the command.
9. Do *not* delete the original copies of the text libraries after they have been copied into saved segments. They may be needed for service as described in "Potential servicing problems with DCSSs" on page 72.

Sample system name table entries for GDDM/VM

Do NOT use these figures without checking for overlays

Choose name ADMBA220 for test and ADMASS00 for general use

```
segname  NAMESYS SYSNAME=segname,  name of GDDM Base saved segment
     SYSPGCT=588,                  count of pages in segment
     SYSPGNM=(1360-1947),          page numbers used
     SYSHRSG=(85-121),             numbers of segments made up by
                                   these pages
     SYSVOL=GDDMVM,
     SYSSTRT=(009,50),
     SYSSIZE=1024K, (operand ignored; you can always use this value)
     VSYSRES=IGNORE,
     VSYSADR=IGNORE
```

This will define a saved segment of 2352K (X'24C000') bytes starting at X'550000'.

Figure 39. Sample system name table entries for GDDM/VM saved segment

Calculating values for DMKSNT entries

In this figure, names and sizes are for the GDDM Base saved segment, but the process is the same for all DCSSs.

The SYSNAME parameter defines the DCSS name. If you want to test the segment, use ADMBA220 for GDDM/VM, or ADMXA220 for GDDM/VMXA; if you want to make it available for general use, use ADMASS00 for GDDM/VM, or ADMXSS00 for GDDM/VMXA.

SYSVOL and SYSSTRT give the location of the cylinders on which the DCSS is to be saved. (SYSSTRT is not the starting address of the saved segment.)

The SYSPGCT, SYSPGNM, and SYSHRSG parameters must be specified to match the saved segment length and starting address. Here is how to calculate the values:

```
SYSPGCT  is the number of 4K-byte pages contained in the saved segment.

         Example: Assume DCSS size        = X'24C000'

                  Number of 4K-byte pages = X'24C000'/X'1000'
                                          = X'24C'
                                          = 588
                   SYSPGCT=588
```

Figure 40 (Part 1 of 2). Calculating values for DMKSNT entries

Calculating values for DMKSNT entries

SYSPGNM gives the numbers of the pages to be saved in **4K-byte pages**

Example: Assume starting address = X'550000'

First page number = X'550000'/X'1000'
= X'550'
= 1360

Number of 4K pages = 588 (from SYSPGNM, above)

Last page number = First page number +
number of 4K pages - 1
= 1360 + 588 - 1
= 1947

SYSPGNM = (1360-1947)

SYSHRSG is the address range of the saved segment in **64K-byte segments**

Example:
First segment = first page/16 = 1360/16 = 85.0
Last segment = last page/16 = 1947/16 = 121.6875

Note: **Both** numbers are rounded down: 85, 121

SYSHRSG=(85-121)

The next segment is 122, so the next usable page number is 122 x 16 = 1952

Figure 40 (Part 2 of 2). Calculating values for DMKSNT entries

Step 8: Review telecommunications network

Migrating from earlier releases

If you intend to use GDDM with any new devices, you should review the telecommunications network.

The telecommunications network must be made suitable for GDDM. Because GDDM uses advanced features of terminals and controllers, the installation of GDDM frequently shows up shortcomings in existing networks that otherwise seem to be adequate.

If you are installing GDDM to run on terminals connected to VM/SP through VCNA, you should check the telecommunications access method (VTAM) carefully. See Appendix E, "Checking a VTAM network" on page 185 for details. VTAM access is not supported on VM/XA.

If you are installing 3270-PC/G or /GX work stations, you should note that highly complex graphic output can sometimes incur processing that leads to VM's default "missing interrupt time interval" being exceeded. See the *GDDM Performance Guide*, indexed under "time-outs VM/CMS," for information on increasing this time interval.

When you have checked the access method, return and continue with the next step.

Step 9: Test the installation

Migrating from earlier releases

Perform this step to test the new release.

To test the installation of GDDM Base and its associated programs you will need to test the basic function, the print utility, the network (as far as is possible), and GDDM-PCLK.

Most of the basic function can be tested by using the interactive utilities. If you have installed GDDM-PGF, the best method is to use the ICU and try to create a small chart. If you have only installed GDDM Base you can use the Image Symbol Editor. If you have installed GDDM-IMD, test it by using it.

The sample programs can be used, but they are not as convenient as the interactive utilities, because they need compiling.

Instructions for testing

Before GDDM can be run, the necessary GLOBAL commands must be issued for the TXTLIBs unless the relevant code has been included in a saved segment. The names and contents of the TXTLIBs are shown in Figure 41. If you have installed any GDDM products besides GDDM Base, you must issue ADMGLIB as the last parameter in the GLOBAL command parameters list. Failure to do so results in GDDM abend code 1064.

If you decide you need to use the TXTLIBs and you still have an earlier release of GDDM in a DCSS, you will need to repackage GDDM – see Appendix H, "Repackaging for performance or for differing defaults" on page 197 for details.

GDDM TXTLIBs

You may have any of the following TXTLIBs in your system, depending on the features installed.

General purpose libraries

Required for utilities and application programs. If you have put everything into a saved segment, these libraries are not needed.

ADMGLIB – GDDM Base general purpose library
ADMPLIB – GDDM-PGF general purpose library
ADMILIB – GDDM-IMD general purpose library

Figure 41 (Part 1 of 3). GDDM TXTLIBs, their contents and uses

GDDM TXTLIBs

GDDM Base

You need the GDDM Base library only:
ADMGLIB

GDDM Base NL

You need GDDM Base NL and GDDM Base libraries:
ADMHLIB and ADMGLIB

GDDM-PGF

You need GDDM-PGF and GDDM Base libraries:
ADMPLIB and ADMGLIB

GDDM-PGF NL

You need GDDM Base NL, GDDM-PGF, GDDM-PGF NL, and GDDM Base libraries:
ADMHLIB, ADMPLIB, ADMQLIB, and ADMGLIB

GDDM-IMD

You need GDDM-IMD and GDDM Base libraries:
ADMILIB and ADMGLIB

GDDM-IVU

You need GDDM-IVU and GDDM Base libraries:
ADMVLIB and ADMGLIB

GDDM-IVU NL

You need GDDM Base NL, GDDM-IVU, GDDM-IVU NL, and GDDM Base libraries:
ADMHLIB, ADMVLIB, ADMWLIB, and ADMGLIB

GDDM-GKS

You need GDDM-GKS and GDDM Base libraries:
ADMKLIB and ADMGLIB

GDDM-GKS NL

You need GDDM Base NL, GDDM-GKS, GDDM-GKS NL, and GDDM Base libraries:
ADMHLIB, ADMKLIB, ADMLLIB, and ADMGLIB

GDDM-REXX

You need GDDM-REXX and GDDM Base libraries:
ERXLIB and ADMGLIB

Figure 41 (Part 2 of 3). GDDM TXTLIBs, their contents and uses

GDDM TXTLIBs
Programming libraries
One only required for application programs including sample programs (but not utilities).
If you have put everything into a saved segment, you need only consider these: ADMNLIB – Non-reentrant interface programming library ADMRLIB – Reentrant interface programming library

Figure 41 (Part 3 of 3). GDDM TXTLIBs, their contents and uses

Instructions if you have GDDM-PGF installed

1. Issue a GLOBAL command for the GDDM Base and GDDM-PGF general-purpose libraries if necessary: GLOBAL TXTLIB ADMPLIB ADMGLIB.
2. Issue the command to run the ICU – ADMCHART.

   You will probably be able to use the ICU without any help. However, there is a Help facility, which you can view by pressing the PF1 key, and you can refer to the introductory manual, *GDDM-PGF Interactive Chart Utility*.

   When you start, the following should happen:

   a. The Home panel of the ICU should appear.

   b. Type **2** to move to the Data Entry panel.

   c. Type **1** for Data Entry and Initialization.

   d. On the Command line, type `sample` to get the sample data supplied with the ICU.

   e. Display the chart by pressing PF5, the Display key.

   f. If you have a printer, you should create a print file at this point so that you can test the GDDM print utility.

      1) Press the Print key, PF4.

      2) In the PRINTER NAME field you can type in any valid file name, for example GDDMPRT1, subject to any tailoring you did in "Step 5: Tailor the print utility" on page 57.

      3) Press ENTER and the message "CHART SUCCESSFULLY OUTPUT" should appear. This means that a file with the filetype of ADMPRINT has been created. You will have to print the file with a separate command, unless you have performed additional tailoring of the print utility, as described in "Step 5: Tailor the print utility" on page 57.

   g. Return to the Home panel – PF12.

   h. End the ICU – PF9 twice.

This will test both the graphic and alphanumeric functions of GDDM Base and GDDM-PGF. It will also test GDDM-PGF NL if you have installed it. (If you have installed GDDM-PGF NL, the language of the ICU panels should be the one that you specified in the defaults module.)

Instructions if you do not have GDDM-PGF installed

1. Issue a GLOBAL command for the GDDM Base general purpose library if necessary – GLOBAL TXTLIB ADMGLIB.
2. Issue the command to run the Image Symbol Editor – ADMISSE.

   You will probably be able to use the Image Symbol Editor without any help. However, there is a Help facility, which you can view by pressing the PF1 key, and you can refer to the introductory manual, *GDDM Image Symbol Editor.*

   When you start the editor, the following should happen:

   a. The first panel of the editor should appear. It is called Step Selection.

   b. Type in the symbol set name `ADMDHII.` (note the final dot), and choose option 2, Edit Symbol Set. Press the ENTER key and the next panel will appear.

   c. Press PF6; a smaller set of characters appears (they are all "?" characters if message ADM0824 appears; this message does not invalidate the test).

   d. Move the cursor to a non-blank character in the main selection area (not one in reverse-video), and press ENTER again.

   e. Leave the cursor where it is, and type in the command TEST ON.

   f. If you have programmed symbols on your device, a small pattern, produced by GDDM graphics support, should appear at the bottom of the screen.

      Otherwise, message ADM0861 will appear.

   g. End the Image Symbol Editor by pressing PF3 three times.

This will test both the graphic and alphanumeric functions of GDDM Base.

If you are using a work station that is capable of showing graphics, but does not have programmed symbols, you can test the graphic functions of GDDM by running one of the sample programs, described in the *GDDM Base Programming Reference* manual.

Testing GDDM-IMD

1. Issue a GLOBAL command for the GDDM Base and GDDM-IMD general purpose libraries if necessary – GLOBAL TXTLIB ADMILIB ADMGLIB.
2. Issue the command to run GDDM-IMD – ADMIMD.
3. The GDDM-IMD frame numbered 0.2 will appear with the message

   `AEM00033A NO MSL ACCESSED. PRESS PF1 IF YOU NEED HELP.`

   (An MSL is a map specification library, used by GDDM-IMD to hold maps.)

4. Press the Help PF key, PF1, and a tutorial frame should appear. This frame will tell you about MSLs. In the tutorial page, press the End PF key, PF3, and return to GDDM-IMD frame 0.2.
5. In frame 0.2, in the field where the cursor is positioned, enter any valid file name for an MSL, for example MSLTEST1, and press ENTER.
6. Press PF3 and GDDM-IMD frame 0.0 will be displayed. If the MSL name you specified was a new one, a message will tell you that the MSL is empty.
7. Try all the options in panel 0.0, returning to frame 0.0 by pressing PF3.
8. End GDDM-IMD by pressing PF3.

Testing GDDM-IVU

A sample image file, called ADMU5IMG, is provided on the GDDM-IVU tape for checking the success of the installation procedure.

1. Invoke GDDM-IVU, as follows (see the *GDDM Image View Utility* manual for details):

   Enter `ADMIVU`.

2. Select option 2 (View) on the Home Panel and press `Enter`.
3. Type `ADMU5IMG` in the `View Image` field and press `Enter`.
4. Press `Enter` after the Input Selection panel is displayed.
5. Observe the image displayed on the screen – it should show details of a job application form. This image is shown in the *GDDM Image View Utility* manual.
6. As an additional optional check, you can enter the name of the sample projection, ADMU5PRJ, in the **Projection** field and press **Enter** again. You should then see selected parts of the sample image arranged in the form of a badge.

Testing GDDM-GKS

Testing consists of compiling, linking, and running the ADMJROOM sample program. The program has been written so that it can be compiled and run using one of the FORTRAN compilers:

VS FORTRAN
FORTRAN IV G
FORTRAN IV H.

If FORTRAN is not available on your system, you will not be able to test your installation now.

If you are using the VS FORTRAN 4.1 compiler:

1. Compile the sample program:

   ```
   FORTVS ADMJROOM
   ```

2. Make the GDDM-GKS and FORTRAN libraries available:

```
SET LDRTBLS 6
GLOBAL LOADLIB VFLODLIB
GLOBAL TXTLIB VFORTLIB CMSLIB ADMNLIB ADMKLIB ADMGLIB
```

3. Load and run the sample program:

```
LOAD ADMJROOM ADMJB77
START *
```

If you are using a FORTRAN IV compiler, you must use the FORTRAN IV compilation command and programming libraries. Also, when loading the program, you must use the GDDM-GKS FORTRAN IV binding routine, ADMJBIV, and not the VS FORTRAN binding routine, ADMJB77, in Step 3 above.

Testing GDDM-REXX

If you have installed GDDM-REXX, and built your saved segment (if required), you should test that the system works satisfactorily. The simplest way of doing this is by running one of the sample EXECs. If GDDM Base has not been installed into a saved segment, you will need to issue a `GLOBAL TXTLIB ADMRLIB ADMGLIB` command for the GDDM libraries. (Other GDDM programs may need other text libraries.)

1. Enter the command `ERXMODEL` from a terminal that can display graphics. The result is a random colored pattern, with the large characters "GDDM-REXX" near the top of the screen. Your terminal is not suitable for graphics if you see a message saying `ADM0275 W GRAPHICS CANNOT BE SHOWN.`

Testing the print utility

1. Before you can test the print utility, you must have produced a GDDM file for it to print. If you have installed GDDM-PGF you should have done this while testing the ICU.

   If you have not installed GDDM-PGF, you must create a print file using the sample program ADMUSC1 (COBOL), ADMUSF1 (FORTRAN), or ADMUSP1 (PL/I).

2. Find the program you want to use on the disk onto which GDDM has been installed. Compile and load the chosen program as shown in the sample program appendix of the *GDDM Base Programming Reference* manual. Suggested commands are:

   a. COBOL:

      To compile – `COBOL ADMUSC1 (APOST`
      To access libraries – `GLOBAL TXTLIB ADMNLIB ADMGLIB COBLIBVS` (where `COBLIBVS` is name of your COBOL Library)
      To execute – `LOAD ADMUSC1 (START`

   b. PL/I:

      To access macro libraries – `GLOBAL MACLIB ADMLIB`
      To compile – `PLIOPT ADMUSP1 (INCLUDE`
      To access libraries – `GLOBAL TXTLIB ADMNLIB ADMGLIB PLILIB` (where `PLILIB` is the name of your PL/I Library)
      To execute – `LOAD ADMUSP1 (START`

c. FORTRAN:
   To compile – FORTGI ADMUSF1
   To access libraries – GLOBAL TXTLIB ADMNLIB ADMGLIB FORTLIB (where FORTLIB is the name of your FORTRAN Library)
   To execute – LOAD ADMUSF1 (START

3. Subject to any tailoring that you did in "Step 5: Tailor the print utility" on page 57, test the print utility by using the ADMOPUV command. To do this you need to have created a print file as described above. You may have to attach the printer and, unless you have created a saved segment, you must use a GLOBAL command for the GDDM general purpose TXTLIB.

   The commands you will need are:

   GLOBAL TXTLIB ADMGLIB (not necessary if you have saved segment)

   Take the necessary action to attach printer.

   ADMOPUV file ON printer (where printer is as above)

Note: You will not be able to use your virtual machine during printing, because the command is executed on the virtual machine.

Testing the network

To test the network you should try GDDM on all the types of terminals and different types of connections that you have. Ensure that terminals you do not test are set up in the same way as terminals that have been tested successfully.

Testing GDDM Base PCLKF

If you have installed GDDM Base PCLKF, test it as follows. You may want to alter the details depending on the configuration of your PC. For this test you require a host-attached PC with a suitable terminal emulator.

1. Ensure that your host VM session has access to the disks on which you installed GDDM Base and the GDDM Base PCLKF feature. If you receive message ADM0307 E FILE 'a' NOT FOUND during this test, check to see that your session has not dropped a disk.
2. Ensure that you have customized GDDM to include the nickname

   ADMMNICK FAM=1,PROCOPT=((PCLK,YES))

   in the external defaults module, as described above. If you have not done this, put an entry in your PROFILE ADMDEFS file.
3. Insert the diskette supplied with GDDM-PCLK (not with GDDM Base PCLKF) in drive A of your PC. Issue the command a: from your PC DOS session, so that the default drive is that containing your GDDM-PCLK diskette.
4. Issue the command pclkinst c: /us – this will put the U.S.-English version of GDDM-PCLK onto drive C. If you want it on a different drive, or you need a different language, specify that instead.
5. Issue the command c: to change the default drive to C.
6. Issue the command \pclk\pclk – the GDDM-PCLK logo panel appears.
7. Press any key. The GDDM-PCLK main panel appears.

8. Select option 1 for GDDM application support.
9. When the message `GQD0010 PCLK ready. Press "Esc" to quit` appears, "hot-key" to the host session. (*Hot-keying* means using a key or combination of keys to switch between the host session and the PC DOS session – it is dependent on the characteristics of your terminal emulator.)
10. Then, depending on whether you have installed GDDM-PGF or not, follow the instructions given in the earlier section on testing (see pages 87 and 88) for testing with the ICU or the Image Symbol Editor. (The Image Symbol Editor does not display graphics on a GDDM-PCLK device, so you may prefer instead to use one of the supplied sample programs, such as ADMUSP1 – see the *GDDM Base Programming Reference* manual for details.)

    Before the home panel of the ICU or editor appears, you will see a prompt asking you to select PCLK. At this point you must:

    a. Hot-key to the DOS session. You will see several messages about files being transferred; the screen will clear, except for a horizontal line at the bottom.
    b. Press F9. The message `GQD0020 Either "hot-key" to Host Session or press F9 to resume PCLK` will appear.
    c. Hot-key to the host session; the main panel of the ICU or Image Symbol Editor will appear.

What to do if the tests fail

If an error message appears, look in the appropriate messages manual. The following messages are described in the *GDDM Messages* manual:

ADMxxxx GDDM Base, GDDM-PGF, GDDM-IVU, and GDDM-GKS messages
AEMxxxx GDDM-IMD messages
ERXxxxx GDDM-REXX messages

GDDM-PCLK messages start with **GQDxxxx**, and are described in the *GDDM-PCLK Guide.*

If graphics cannot be shown on one or more of the terminals when you test the network, see Appendix K, "What to do if things go wrong" on page 225.

Step 10: Provide suitable EXECs for users

Migrating from earlier releases

Check this step if you have any EXECs for users. You may want to consider providing these in any case.

If you have EXECs that refer to ADMGPLIB TXTLIB you have to change them to use ADMPLIB and ADMGLIB instead.

You may want to provide your users with suitable EXECs so that they can easily perform some GDDM-related tasks. The users of GDDM will want simple access to the various interactive programs such as the ICU, and the symbol editors. This will mean that they must link and access the disks on which GDDM and its features have been installed. In addition, programmers will want to load their programs, and PL/I users will want access to the sample PL/I declarations for inclusion when the programs are compiled. All this will be greatly simplified if you provide suitable EXECs.

Some EXECs are shown below for each of these activities. You may like to copy them. If you are an ISPF installation, you may prefer to set up suitable ISPF panels that give your users access to the various functions they will need.

Other EXECs are shown in Appendix L, "Listings of user EXECs" on page 237. GDDM provides an EXEC to enable users to generate image files for composed-page printers. It provides an EXEC that enables users who have created image files to print them on composed-page printers. It also provides an EXEC to help you transfer specific types of files to and from the auxiliary storage of a 3270-PC/G or /GX work station. You may want to change these to suit your installation.

EXECs for accessing GDDM and compiling and loading applications

The figures that follow show suggested EXECs for accessing GDDM, and for compiling and loading GDDM application programs.

Note: The EXEC shown in Figure 44 uses the non-reentrant interface. Issuing a GLOBAL command for ADMRLIB instead of ADMNLIB would make the reentrant interface available instead.

Suggested name: GDACC

```
LINK SYSTEM xxx yyy RR pword — Link to disk containing GDDM, read only.
                               SYSTEM xxx is system disk name, yyy is user disk address,
                               pword is the read password (if you are not using the CP
                               password suppression facility).
ACCESS yyy K                   Access with suitable mode.
```

Figure 42. Suggested EXEC to access GDDM disk

```
Suggested name: PLCOMP

GLOBAL MACLIB ADMLIB
PLIOPT &1 (INCLUDE &2 &3 &4 &5 &6 &7

Note the use of the INCLUDE option to call in the sample declarations.
```

Figure 43. Suggested EXEC to access the PL/I declarations and compile

```
Suggested name: GDLOAD

GLOBAL TXTLIB ADMNLIB ADMPLIB ADMGLIB otherlibs — where ADMNLIB, ADMPLIB,
                      and ADMGLIB are the GDDM libraries, and otherlibs are
                      other libraries, PLILIB for example. Include ADMKLIB if
                      you use GDDM-GKS.

LOAD &1
```

Figure 44. Suggested EXEC to load a program containing GDDM calls

EXEC for ICU using composed-page printers

You may want to prepare ICU charts or graphics data format (GDF) files for a composed-page printer, where a special DSOPEN call is necessary. GDDM provides a program module that makes the DSOPEN call and then calls the ICU or processes the GDF file. To support the program, a sample EXEC is provided.

The program is called **ADMUCDSO**, and the EXEC is called **ADMUCIMV**.

You may want to change this EXEC to suit your installation. The EXEC is shown in Figure 85 on page 238. If you want to change it you will find more details in the *GDDM-PGF Programming Reference* and *GDDM Base Programming Reference* manuals to find the meanings of the CHART and DSOPEN calls respectively.

The items you are most likely to want to change are the device token for the printer (if you are using a printer other than a 4250), the size of the final image, and the data stream type. (You may want output that can be imbedded in DCF or other documents.)

EXEC for printing image files

ADMUIMP EXEC (see Figure 86 on page 242) is supplied with GDDM, and can be used to take an image file (with filetype ADMIMG) and create a page segment or document file for a family 4 printer.

EXECs for browsing and printing composite documents

You might want to use the supplied ADMUBCDV EXEC as a basis for your own EXECs to help your users to print down or browse composite documents (for example, LIST38xx and PSEG38xx files). See Figure 87 on page 245.

EXEC for file transfer with the 3270-PC/G and 3270-PC/GX

A sample EXEC (ADMUPCFV — see Figure 88 on page 247) is provided that will automatically invoke the GDF/PIF conversion program when transferring graphics files to or from the 3270-PC/G and 3270-PC/GX. For more information about this program, see the *GDDM Base Programming Reference* manual.

You should create your own EXEC from this sample, calling it by the name used by the PC file transfer (normally IND$FILE).

Note that if you are using GDDM/VMXA, file transfer must be done in 370-mode.

Program for tagging GDDM object files

A utility program (ADMUOT) is supplied with GDDM, and is described in "Tagging GDDM objects for country-extended code page support" on page 109. It can be used to add code-page tags to existing GDDM object files. If your users are likely to need this frequently, you should consider providing an EXEC to invoke it with suitable parameters.

EXECs for using GDDM-REXX

The EXECs supplied on the installation tape should be sufficient for your users to see how to develop their own programs.

In addition, you might consider providing them with a simple EXEC that links and accesses the disks on which you have installed GDDM-REXX and GDDM Base, and issues a `GLOBAL TXTLIB` command if you have not installed a saved segment for GDDM-REXX.

Instructions for providing suitable EXECs

1. Consider writing and providing general purpose GDDM EXECs as shown in Figures 42 to 43.
2. If you have a composed-page printer that you want to use with GDDM, examine the supplied EXEC ADMUCIMV as shown in Figure 85 on page 238, make any necessary changes, and make the EXEC available to users.
3. If you want to print (on a composed-page printer) image files that you have created, examine the supplied EXEC file, ADMUIMP, listed on page 242, make any necessary changes, and make the EXEC available to users. Following the listing of ADMUIMP are examples of EXEC files you could use for printing composite documents on various printers.
4. If you have 3270-PC/G or /GX work stations and your users may need to transfer graphics files between your host computer and their work stations, use the supplied ADMUPCFV EXEC, as shown in Figure 88 on page 247, with any necessary changes.
5. Make the ADMUOT EXEC available to users, for tagging existing GDDM object files.
6. If you have installed GDDM-REXX, but not in a saved segment, consider supplying an EXEC to access the GDDM TXTLIBs.

Step 11: Regenerate existing program modules

Migrating from earlier releases

You must check if you need to perform this step.

This step only applies when you are migrating from a previous release.

If you have installed GDDM Version 1 Release 1 or 2, you will need to regenerate any existing program modules that use GDDM. This includes IBM licensed programs, such as APL, that have GDDM as a prerequisite. Note, however that regenerating these program modules will not automatically mean that GDDM Version 2 Release 1 function will be available with them. It will only mean that they will function with the Version 2 libraries.

Migrating from GDDM Version 1 Releases 1 and 2

GDDM Version 1 Release 1 or 2 applications that have been generated into MODULE files are release-dependent. They must only be executed with TXTLIBs, or saved segments, or with both, at the same release level.

If you have such applications, the modules must either be regenerated for Version 2, or the TXTLIBs, or saved segment, or both, of the old release must be retained.

Because GDDM Version 2 uses saved segments with a different name from that used for Version 1 Releases 1 and 2, it is possible for applications that use Version 2 to coexist with applications that use those previous releases.

Migrating from GDDM Version 1 Releases 3 and 4

GDDM Version 1 Release 3 or 4 applications that have been generated into MODULE files should continue to run with Version 2 Release 2 without regenerating.

To make them run with the new release, you must do the following:

- Install the saved segments for the new release with the release-independent (default) names
- Stop the saved segments for previous releases being accessible.

There is more about saved segment naming and migration in "Step 7: Create GDDM discontiguous saved segments (DCSS)" on page 71.

Migrating from GDDM Version 2 Release 1

While you are testing the new version, you should use the saved segment for Version 2 Release 1 as your production level. The name of the release-specific segment is ADMBA210 (for Modification level 0) or ADMBA211 (for Modification 1), and for production use it is ADMASS00. When testing of the new level is complete, regenerate its saved segment as ADMASS00, and your users will automatically pick it up.

Step 12: Inform users about GDDM

Migrating from earlier releases

Perform this step and inform your users of GDDM Version 2 Release 2.

Figure 46 on page 99 is a suggested memo that you may like to use.

When you have installed GDDM, and created EXECs for your users, you will want to inform them of the availability of GDDM Version 2 Release 2 on the system. Figures 45 and 46 show two skeleton memos that you may like to use as a basis for this information. Figure 45 is a suggested memo for installations that are installing GDDM for the first time. Figure 46 is a suggested memo for installations that are changing to Version 2 Release 2 of GDDM from a previous release.

If you are upgrading from GDDM Version 2 Release 1 Modification 1, use the change bars on the left as a guide to what is new in Version 2 Release 2.

To use the suggested memos you should:

1. Delete from the first paragraph the programs you have not installed.
2. Change the names of the EXECs as necessary.
3. Fill in the mode of the disk that the GDDM access EXEC will use.
4. Fill in the estimated virtual machine size for GDDM based on the values described in "Preinstallation planning – virtual machine size" on page 38.
5. Add a list of the manuals you believe are most appropriate to your users, based on the list on page iv.
6. Add a name to whom comments should be addressed.

Memo to all system users (first-time GDDM installation)

Graphics, Image, and Alphanumeric Functions Available with GDDM Version 2 Release 2.

GDDM/VM (or GDDM/VMXA) Version 2 Release 2 is now available on the system. It has been installed with the associated programs GDDM-PGF, GDDM-IMD, GDDM-REXX, GDDM-GKS, and GDDM-IVU. It offers the following facilities:

- Printing of composite documents.
- The ICU — a stand-alone menu-driven utility that draws business charts on display terminals and prints and plots them.
- A programming interface for the ICU for interactive and non-interactive drawing of charts.
- The presentation graphics routines, an application programming interface (API) for drawing graphic charts.
- A general-purpose graphics, image, and alphanumerics API.
- Two symbol editors for producing symbols such as company logos.
- Portable picture files.
- Windowing of display devices.
- Interactive production of screen menus and layouts (maps).
- Access to GDDM from an IBM PC through the GDDM-PCLK program.
- Messages in a choice of national languages.

EXECs and commands are provided to give you access to the following facilities:

GDACC – links and accesses the GDDM disk as your ... disk.

When you have executed this EXEC:

ADMCHART – gives access to the ICU.
ADMISSE – gives access to the Image Symbol Editor.
ADMVSSE – gives access to the Vector Symbol Editor.
ADMIMD – gives access to GDDM-IMD.
GDLOAD – loads a program containing GDDM calls.
PLCOMP – compiles a PL/I program that includes the GDDM sample declarations.
ADMUCIMV – produces composed-page printer files from ICU charts and GDF files.
ADMUPCFV – allows file transfer with the 3270-PC/G or /GX.
ADMUIMP – converts image files into a form suitable for composed-page printers.
CD38SAMP and CD42SAMP – print composite documents.

You will need a virtual machine of approximately ..... bytes storage to run GDDM.

The following external defaults have been changed: .....

The following extra device tokens have been set up: .....

The following system-wide nicknames have been generated: .....

The following IBM manuals are available that describe GDDM and its associated programs:
.....
(The *GDDM General Information* manual should be used as an introduction to the product.)

Any questions or suggestions about the use of GDDM should be addressed to:
.....

Figure 45. Suggested skeleton memo about first-time GDDM installation

Memo to all system users (upgrading from earlier release)

New Graphics, Image, and Alphanumeric Functions Available with GDDM Version 2 Release 2.

GDDM/VM Version 2 Release 2 is now available on the system. It replaces Version 2 Release 1, and has been installed with the associated programs GDDM-PGF, GDDM-IMD, GDDM-REXX, GDDM-GKS, and GDDM-IVU.

It offers the following NEW facilities:

- More characters in GDDM symbol sets.
- Character code conversion for data from other countries.
- Performance improvements in handling family-4 output.
- Support for new devices – 6182 auto-feed plotters.
- New national language support for messages in Canadian French and simplified (for the People's Republic of China) and traditional (for Taiwan – Republic of China) Chinese.
- Composite document printing.
- Improved performance when printing newly-created page segments on 3800-3.
- Access to GDDM from an IBM PC or PS/2 through the GDDM-PCLK program.

EXECs and commands are provided to give you access to the following facilities:

GDACC – links and accesses the GDDM disk as your ... disk.
When you have executed this EXEC:
ADMCHART – gives access to the ICU.
ADMISSE – gives access to the Image Symbol Editor.
ADMVSSE – gives access to the Vector Symbol Editor.
ADMIMD – gives access to GDDM-IMD.
GDLOAD – loads a program containing GDDM calls.
PLCOMP – compiles a PL/I program that includes the GDDM sample declarations.
ADMUCIMV – produces composed-page printer files from ICU charts and GDF files.
ADMUPCFV – allows file transfer with the 3270-PC/G or /GX.
ADMUIMP – converts image files into a form suitable for composed-page printers.
CD38SAMP and CD42SAMP – print composite documents.

You will need a virtual machine of approximately ..... bytes storage to run GDDM.

The following external defaults have been changed: .....

The following extra device tokens have been set up: .....

The following system-wide nicknames have been generated: .....

The following IBM manuals are available that describe GDDM and its associated programs:
.....
(The *GDDM General Information* manual should be used as an introduction to the product.)

Any questions or suggestions about the use of GDDM should be addressed to:
.....

Figure 46. Suggested skeleton memo about update of GDDM release level

Part 3. Postinstallation

Chapter 6. Postinstallation tasks

Step 13: Perform postinstallation tasks

Migrating from earlier releases

You need to check this section.

Use this chapter to find out about the postinstallation tasks that you may need to do. This chapter covers:

- Servicing and the requirements to link again after service
- Replacing GDDM modules after installation
- Advice on managing libraries of GDDM objects
- How to tag GDDM objects for country-extended code page support
- Editing IVU panels
- A note on repackaging GDDM
- Reorganizing your GDDM discontiguous saved segments under VM.

Servicing

All GDDM-series licensed programs whose installation is described in this manual have central service including IBM Support Center, and are serviced in the normal manner for IBM licensed programs. GDDM-PCLK is serviced through the GDDM/VM or GDDM/VMXA PCLKF feature. For further information about servicing GDDM-PCLK, see "Reporting problems to IBM" in the *GDDM-PCLK Guide*.

Care should be taken after service because some of the installation jobs may need to be repeated. For example, if service is applied to any of the modules in a saved segment, the saved segment will need regenerating.

General rule: Just as GDDM installation requires further action after reading GDDM in from the installation tape, it may require further action after service.

As a general rule, you should look at the installation procedure and see if any of the actions taken for installation apply to the code that has been serviced. If it does, the action should be repeated.

Service considerations

When applying service, care must be taken over disk access as described in the service documentation.

In addition, if any items that have been included in a saved segment are serviced, the saved segment *must* be recreated. This is because any changed modules are not picked up until they are put into the saved segment. Service modules on your A-disk are not picked up if the saved segment contains modules with the same name. Note that copies of modules in their installed form must be retained for service.

Using ADMSERV EXEC to apply corrective service

The ADMSERV EXEC, which is supplied on the GDDM Base installation tape, is used to apply corrective service to all GDDM Version 2 products.

If you need to apply corrective service do the following:

1. Put the replacement files on an empty disk. Note that there must be *no* other files on this disk. Link the disk in read/write mode and note the filemode for use while running the ADMSERV EXEC.
2. Link the disk containing the program to be serviced in read/write mode and note the filemode for use while running the ADMSERV EXEC.
3. Ensure that none of the disks you have accessed contains other levels of GDDM.
4. Start the service EXEC by typing ADMSERV, and use the filemode letters you noted in response to the prompts.
5. If the service includes any user-modified files, the new version will be left on the service disk and the EXEC will warn you that you need to merge the changes into the modified copy.
6. The existing level of all files that are replaced will be left on the GDDM disk and @ added to the start of the filetype. This will allow you to remove the service changes if you want to.
7. If you have created a DCSS for the program that is being serviced, you must recreate them to make the service update available.

Replacing GDDM modules after installation

After installation, you may need to replace a GDDM module (for example, if you are creating an installation-specific external defaults module). You may need to replace the following modules:

- External defaults module — ADMADFV (see page 116)
- Alphanumeric Defaults Module — ADMDATRN (see Appendix B, "Character code interpretation" on page 133)
- GDDM default symbol sets (see Appendix D, "GDDM default symbol sets" on page 179)
- Color table module — ADMDJCOL (see the manual *GDDM Base Programming Reference, Volume 2* indexed under "color master tables" for information concerning color tables)
- Font table module — ADM4FONT (see "GDDM font emulation table" on page 211 for more about font tables)
- AFPDS to IPDS conversion table module — ADMDKFNT (see "GDDM AFPDS to IPDS conversion table" on page 213 for more about conversion tables)
- Device Characteristics Tables (see Appendix C, "Device characteristics tokens" on page 153).

How to replace a GDDM module that you've changed

This paragraph refers only to replacing a GDDM module based on source that IBM has supplied. *When you modify the module for your own purposes, keep a copy somewhere other than within the GDDM libraries, so that if it is updated by PTF activity you will not lose any modifications you have inserted.*

1. Take a copy of the source file, as a back-up in case something goes wrong.
2. Edit the file, making the appropriate changes.

   If you are not using an assembler that supports the AMODE and RMODE instructions, remove any such instructions that may be included in the source file.

   Be careful that you do not erase entries you may need from the supplied file. (This is why you are advised to take a backup copy — you may find that you need other supplied entries later.)
3. (Omit this step for symbol sets.)

   Assemble the file, using the system assembler. You will need to specify the following macro library:

   ```
   GLOBAL MACLIB ADMLIB
   ```

   This will generate an object deck.
4. Place this object (text) deck into the ADMGLIB TXTLIB library.
5. If you have created a DCSS for GDDM Base, rebuild it to make the updates available.

If you modify the font table module, ADM4FONT, you will need to link-edit the Composite Document Print Utility module, ADM4CDU, again, so that it picks up the new font tables.

If you modify the AFPDS to IPDS conversion table module, ADMDKFNT, you will need to link-edit the Print Data Stream Processor module, ADMDK0, again, so that it picks up the new conversion table.

Managing GDDM objects

GDDM users can create or read a number of objects (such as saved charts) using their GDDM application programs or the GDDM interactive utilities. These objects will require direct-access storage, and you may find it necessary to create a system to manage them and to prevent unauthorized access to them.

The objects that may be produced are:

- Chart format files
- Chart data files
- Chart definition files
- Composed-page printer image files
- Symbol sets
- Graphics data format (GDF) files
- Saved pictures (FSSAVE) files
- Generated mapgroups from GDDM-IMD
- Image projection definition files
- Image data files
- GKS metafiles.

The table in Figure 4 on page 27 shows their contents, the products of GDDM with which they are associated, how many you may expect your users to produce, and their likely size. Some of these can vary enormously according to the usage made of GDDM, but the table should give you a figure that you can use for estimating.

The ICU contains a facility for listing chart format and data files, symbol sets, GDF files, saved pictures, and generated mapgroups. It also enables a description to be retained and listed with the names.

If you use GDDM-CSPF, you will also need to manage ADMPRINT files. (GDDM-CSPF lets you add backgrounds to print files, so that you can record them on film for transparencies; see *GDDM-CSPF User's Guide* for more information.)

Contents and use of GDDM objects

Chart format, data, and data definition files

Chart format and data files are usually the most important type of GDDM object in an installation. They are the files in which users save their charts. Charts are saved into two files, one containing the format and the other containing the data. This simplifies the production and storage of a number of charts with the same format.

Chart data definition files are used for importing data into the ICU from ordinary data files (flat files). Chart data definition files define how the data will be interpreted by the ICU. They are used when files of a common format are regularly imported into the ICU to produce charts.

Symbol sets

Although GDDM-supplied symbol sets are vital to the operation of GDDM, user-produced symbol sets are normally only used for special purpose characters, company logos, and typographical ornaments to smarten up charts. You are unlikely to use a large number of symbol sets.

There are two types of symbol set. Image symbol sets are dot patterns that can be reproduced at only one size. Vector symbols are like small pictures, reproducible at any size. Vector symbols have a performance overhead, and cannot give such accurate definition as do image symbols on 3270 devices.

Graphics data format (GDF) files

GDF files consist of a series of orders that are effectively an encoded form of the GDDM call statements that may be used to create a picture. As such, they are independent of any particular device.

GDF files are produced by a GSSAVE call to GDDM, and retrieved by GSLOAD. They can also be produced by the ICU.

GDF orders are described in the *GDDM Base Programming Reference* manual.

GDF files can also be produced by GDDM-GKS users. Such files consist of a series of orders that are an encoded form of the GDDM call statements used by GDDM-GKS to create a picture. As such, they are independent of any particular device. GDF files are produced by use of the GDF workstation in GDDM-GKS.

Image data files

Image data files are the files in which images are held. They have a format similar to other GDDM objects. The data is held in a compressed form that is interpreted by GDDM.

Projection definition files

Image projection definitions define how image data is to be moved from a source image to a target image during an image transfer operation. The data in the projection definition file is held in a compressed form and is in a format similar to other GDDM objects.

Saved pictures (FSSAVE files)

By using the FSSAVE call, it is possible to save GDDM pictures in a data-stream format. Such pictures can only be reproduced on a type of device having at least the required characteristics of the saved file (for example, the same usable area, or the same PS requirements, if these are used).

Maps

Maps, which are produced by the GDDM-IMD product, are held in three forms:

- Editable, source form
- Execution time or generated form in mapgroups
- Exportable form for use on other systems.

Editable maps are held in libraries known as MSLs (Map Specification Libraries). GDDM-IMD contains a mechanism for deleting, copying, and general housekeeping within MSLs.

Generated mapgroups are held in the same way as symbol sets, saved pictures, and saved charts.

Only small numbers of any of these object types are likely to be produced unless your installation is producing a large number of menu-driven programs.

Composed-page print image files

These files contain picture data encoded in a device-dependent manner, such as the 4250 and 3800-3 printers. They form the input to either Composed Document Printing Facility (CDPF) for the 4250, or Print Services Facility (PSF) for the 3800-3 and similar printers. These programs control the printing of the data contained within the files. The files are produced by an ASREAD or FSFRCE call to GDDM, after a DSOPEN call has been issued for a family-4 device.

GKS metafiles

GKS metafiles (GKSM) are sequential files that can be used for long-term storage, transmittal, and transferal, of graphical information. Metafile contents can be interpreted to provide graphical output identical to that produced by direct invocation of the relevant GDDM-GKS functions.

What you may need to do about GDDM objects

As an installer, what you do about GDDM objects depends very much on the interactive subsystem you are using. The actions you will need to take during the installation itself are described in the installation chapter.

After the installation you may have to do any of the following:

- Provide a housekeeping scheme
- Provide a security scheme for sensitive data
- Give general access to some of the objects.

The ICU and GDDM-IMD both provide listing facilities that can be used as part of a housekeeping scheme. (The ICU lists chart format and data files, symbol sets, saved pictures, GDF files, images and projections, and generated mapgroups.

GDDM-IMD lists maps, mapgroups, and attention identifier (AID) translate tables.)

For security (restricted access) and general access you must use the facilities provided by the operating system and interactive subsystem. The methods used to hold GDDM objects are described below.

Repackaging GDDM objects after servicing

After applying service to any GDDM objects supplied as part of the product, you will be told to repackage the objects using the service utility ADMUJOBJ. Base your job to do this on the following, where ADMOBJNM is the name of the object to be repackaged:

```
//S1       EXEC PGM=ADMUJOBJ,REGION=256K,COND=EVEN
//STEPLIB  DD   DSN=GDDM.OSPID.GDDMLOAD,DISP=SHR
//IN       DD   DSN=GDDM.OSPID.GDDMSAM(ADMOBJNM),
//         DCB=(RECFM=FB,LRECL=80),DISP=OLD
//OUT      DD   DSN=GDDM.OSPID.GDDMSAM(ADMOBJNM),
//         DCB=(RECFM=FB,LRECL=80),DISP=OLD
```

Tagging GDDM objects for country-extended code page support

If you are upgrading your system from an earlier release of GDDM, when you first install GDDM Version 2 Release 2, most of the GDDM objects on your system will not have any code-page tags; that is, they are not identified to GDDM as being associated with any specific national language environment. GDDM Version 2 Release 2 introduces a powerful new technique that allows objects to be tagged with an identification of their linguistic origin; GDDM then converts such objects to whatever form is most appropriate to the environment in which they are to be used.

For example, a symbol set that is generated in a French installation can be used in a German one, or used with displays that are customized for German use.

If yours is a new GDDM installation, your objects will automatically receive the appropriate tags, provided that you set up defaults for your installation and for application programs. Use

```
[label] ADMMDFT INSCPG=nnnnn,APPCPG=nnnnn
```

in your external defaults module, where `nnnnn` is the code-page tag that is appropriate to your installation (see page 120 for details).

If you are migrating from an earlier release of GDDM, you will have many untagged objects on your system already. So, as well as setting up the defaults, you should consider adding tags to these objects. (GDDM does not attempt to perform any conversions on objects that have no tag.)

A module is supplied, that allows users to add a tag to a GDDM object; you should consider running this program for all the objects for which you are responsible. The command is:

```
ADMUOT object-name object-type cpgid
```

where `object-name` and `object-type` (a number from the list of GDDM objects on page 110) identify the object, and `cpgid` is the number of the code-page.

Methods of holding GDDM objects

GDDM objects

Objects are normally written onto the A-disk of the user who creates them. They are distinguished by filetypes defined by external defaults. Unless changed, the filetypes will be as follows (the numbers are used in the ADMUOT utility program):

Chart data	ADMCDATA	5
Chart format	ADMCFORM	4
Chart data definition	ADMCDEF	9
Color-separation masters	ADMCOLn	–
Composed-page printer image files	ADMIMAGE	–
GDF files	ADMGDF	7
Generated mapgroups	ADMGGMAP	2
Image data	ADMIMG	11
Image projection	ADMPROJ	10
GDDM-IMD ADSs	COPY	–
GDDM-IMD export files	ADMIFMT	–
GDDM-IMD MSLs	ADMMSL	–
Saved pictures	ADMSAVE	3
Symbol sets	ADMSYMBL	1
GKS metafiles	ADMGKSM	8

Disk access and password protection can be used to give general or restricted access.

Moving GDDM objects between subsystems

The following types of GDDM objects are held in a format that enables them to be moved easily between subsystems:

- Chart format files
- Chart data files
- Chart data definition files (not VSE)
- Symbol sets
- Graphics data format (GDF) files
- Saved pictures (FSSAVE files)
- Generated mapgroups
- Image data files
- Projection definition files
- GKS metafiles.

All these types of objects are held as collections of fixed-length 400-byte records on all subsystems. Each record contains a 20-byte "source key," which includes the name that GDDM last used to store the object.

On VM/CMS, a GDDM object is retrieved using a name external to the content of the object (that is, a filename), and the internal source key is checked only for consistency; the name in the source key does not have to match the external name.

Moving one of these objects between systems involves simply transporting the 400-byte records using whatever method is available to the installation.

When such an object is read into a VM/CMS subsystem, it should be stored as a separate file with a filename of the user's choosing, and a filetype according to the type of object as described in "Methods of holding GDDM objects."

GDDM objects that you import from another country and that have code page tags are managed automatically by GDDM, with the exception of ADMCDATA and ADMCFORM chart files. A PL/I sample program, ADMUSP7, is supplied with GDDM, to allow you to import these. If you use ADMUSP7, you need to link-edit the supplied text deck, in much the same way as other PL/I programs are link-edited. (See the *GDDM Base Programming Reference, Volume 2* for details.)

Security considerations

For security, you can use password-protected minidisks and other VM security facilities.

Editing GDDM-IVU panels

If you have installed GDDM Interactive Map Definition (GDDM-IMD), you may want to edit the panels supplied with GDDM-IVU, to change any of the fields in them, or to add further information for your users. You will need to understand how IMD is used, and you should consult the *GDDM Interactive Map Definition* manual.

You should also read the section dealing with tailoring of GDDM-IVU panels in the *GDDM Image View Utility* manual.

You will need to use GDDM-IMD to import the panels from the ADM5IUx ADMIFMT files (x is the national language character.) Then edit the maps, and generate your required mapgroups.

Repackaging GDDM

You should consider deleting any unwanted symbol sets, particularly those based on DBCS.

Examine the repackaging considerations for GDDM (see "Repackaging GDDM," and Appendix H, "Repackaging for performance or for differing defaults," which includes "Special requirements" on page 208).

Saved segments

The procedure described in "Migration and previously existing DCSSs" on page 72 will have enabled you to create and test saved segments for GDDM Version 2 Release 2 users, without affecting your users of earlier versions and releases. After you have tested this release successfully, you should consider changing your system name table (DMKSNT), removing the discontiguous saved segments for earlier releases, thereby migrating your users automatically to Version 2 Release 2.

Appendixes

The Appendixes give information that may be of interest to your installation. They generally deal with topics that are not specific to a particular subsystem, though where there are subsystem dependencies these are covered.

Appendix A
covers the GDDM defaults mechanism, which changed in Version 1 Release 4. You should read this to decide which system defaults to apply. It also describes the nicknames facility, which allows you to define devices, like plotters and local printers, to give your application programs a degree of device-independence. Nicknames are also used to define the routing of output to such devices.

Appendix B
describes the country-extended code pages and the alphanumeric defaults module. Refer to it to set code pages so that national language symbols are always interpreted correctly, or if your installation uses APL or has Katakana devices.

Appendix C
describes the device characteristics tokens, which are GDDM's way of identifying the properties of particular types of device. GDDM tables define a wide range of IBM devices, or you can use some macros to define your own.

Appendix D
contains the descriptions of the default symbol sets that are provided as part of the product. It explains how you can change the defaults from one set to another.

Appendix E
discusses the things you may need to check if your access method is VTAM.

Appendix F
gives guidance on how to customize your 3270-PC/G or 3270-PC/GX work stations, and other devices being used with GDDM.

Appendix G
gives guidance on some of the things you may need to do if you are using GDDM with APL.

Appendix H
discusses the options available to you to package GDDM modules for optimum performance on your system.

Appendix I
describes how to add new fonts or change the fonts used by GDDM by coding entries in the font emulation table.

Appendix J
contains a list of all the modules, macros, sample programs, and other items that are on the installation tape.

Appendix K
gives guidance on some of the things that might go wrong when you test your system. If you come up against problems like graphics not being shown on your displays, then you should look here.

Appendix L
is a set of listings of suggested and supplied EXECs that you may find useful. They are described in "Step 10: Provide suitable EXECs for users" on page 93.

Appendix M
is a fold-out table, intended to be used as a checklist when you install GDDM.

Appendix A. GDDM defaults and nicknames

GDDM defaults can contain values that control elements such as:

- Data set and transaction names
- Buffer sizes
- Time, date, and number punctuation conventions
- Language used in ICU menu panels (if GDDM-PGF NL feature is installed)
- Trace and error record defaults.

Nicknames simplify access to devices. For example, you can use them to change the destination of a request for hardcopy output from a printer to a plotter.

Before GDDM Version 1 Release 4, you changed GDDM defaults by modifying and assembling a GDDM-supplied environmental defaults module, the contents of which changed with each release. From Version 1 Release 4, GDDM has provided new ways of specifying defaults and nicknames:

- Using an external defaults module
- Using an external defaults source file
- Using the SPINIT application program call
- Using the ESEUDS or ESSUDS application program calls.

As the installer of GDDM, you will be concerned only with the first of these mechanisms. Details of routes other than the external defaults module are described in the *GDDM Base Programming Reference* manual and in the *GDDM Application Programming Guide.*

These methods allow you to establish defaults tailored to suit your own installation, and enables your users to add their own defaults. A significant benefit is that the defaults module you create does not depend on the release levels.

When you are upgrading from an earlier release of GDDM than Version 1 Release 4, you will need to respecify any defaults in a defaults module. You cannot use your old environmental defaults module. However, when you are upgrading from Version 1 Release 4, you can continue using the new format module.

User default specifications (UDSs)

When you install GDDM, you can change many general defaults by defining **user default specifications (UDSs)** and assembling them into an external defaults module. (This is a text deck on CMS.) Sample source for this module is provided on the installation tape. It is called ADMADFV. This source file contains assembler language macro statements, and follows the normal rules for assembler language source. Here is an example of such a file:

```
ADMADFV  CSECT ,                    VM/CMS version
         ADMMDFT START              Indicates start of defaults
         ADMMDFT TRACE=X'00000000' No tracing
         ADMMDFT NATLANG=F          French language support
         ADMMDFT END                Indicates end of defaults
         END
```

If you define any nicknames, using ADMMNICK macro statements, they must precede the ADMMDFT END macro.

This appendix lists the various defaults that you can specify in an external defaults module. Information on how to assemble the source file is given in "How to replace a GDDM module that you've changed" on page 105.

There is another type of user default specification that you can include in your external defaults module, the nickname. For full details you should look in the *GDDM Base Programming Reference* manual and in the *GDDM Application Programming Guide*, or for a brief description, see "Nicknames" on page 128 in this book.

You might consider preparing a set of nicknames for local printers, plotters, and other devices, that your programmers may want to use.

It is possible to specify a particular UDS more than once, either in the external defaults module or using one of the other routes. In this case, the defaults are cumulative and the defaults specified in the external defaults module can be overridden by those specified through the other routes.

The following conventions apply to the default specifications:

Square brackets [ ] specify optional parameters
Braces { } specify a choice of options from which one must be chosen
GDDM default values are shown where applicable.

External defaults

Figure 47 shows the defaults that you can change by the external defaults module for the VM environment, together with their specifications. Full descriptions of the defaults are given under "Alphabetical list of default descriptions" on page 120, where they are listed in alphabetical order of keyword. For example, for the "always-unlock-keyboard" default you would look up AUNLOCK in the list.

In addition to the ADMADFV external defaults text file, which is normally placed in a TXTLIB, the defaults can be obtained from a source file (see the CMSDFTS default later in this Appendix).

Defaults you can change	How you specify the user defaults	GDDM defaults
Always-unlock-keyboard	ADMMDFT AUNLOCK={NO|YES}	NO
APL default specification	ADMMDFT CMSAPLF={DATAANAL|APLTEXT}	APLTEXT
Application code page	ADMMDFT APPCPG=n	00351
Comment	ADMMDFT COMMENT=(xxxxxxxx [,xxxxxxxx]...)	(none)
Composed-page printer files for image generation; monochrome filetype	ADMMDFT CMSMONO=aaaaaaaa	ADMIMAGE
Composed-page printer files for image generation; color filetype	ADMMDFT CMSCOLM=aaaaaaaa	ADMCOL+
Composed-page printer files for image generation; 4250 code page name	ADMMDFT CPN4250=aaaaaaaa	AFTC0395
Compressed PS loads	ADMMDFT IOCOMPR={NO|YES}	YES
Date convention	ADMMDFT DATEFRM={1|2|3|4}	4
DBCS component in-storage threshold	ADMMDFT DBCSLIM=n	4
DBCS default selection	ADMMDFT DBCSDFT={NO|YES|GDDM}	GDDM
DBCS strings with shift-out/shift-in	ADMMDFT MIXSOSI={NO|YES}	NO
DBCS SO/SI emulation character	ADMMDFT SOSIEMC=x	"
DBCS symbol set language	ADMMDFT DBCSLNG=x	K
Deck filetype	ADMMDFT CMSDECK=aaaaaaaa	ADMDECK
Defaults file filename and filetype	ADMMDFT CMSDFTS=(aaaaaaaa, bbbbbbbb)	PROFILE ADMDEFS
Device attachment	ADMMDFT AM3270=({LOCAL|REMOTE|LOCREM}, {SNA|NONSNA|SNANOSNA})	LOCREM, SNANOSNA

Figure 47 (Part 1 of 3). Source-format of user-default specifications

Defaults you can change	How you specify the user defaults	GDDM defaults
Error threshold value	ADMMDFT ERRTHRS=n	4
Form feed	ADMMDFT FF3270P={NO|AFTER|BEFORE|BOTH}	AFTER
FSSAVE buffer size	ADMMDFT SAVBFSZ=n	1024
GDDM-IMD ADS filetype	ADMMDFT CMSIADS=aaaaaaaa	COPY
GDDM-IMD export utility filetype	ADMMDFT CMSIFMT=aaaaaaaa	ADMIFMT
GDDM-IMD MSL filetype	ADMMDFT CMSMSLT=aaaaaaaa	ADMMSL
ICU format defaults	ADMMDFT ICUFMDF={0|1|2}	0
ICU isolate value	ADMMDFT ICUISOL={0|1|2}	0
ICU panel color	ADMMDFT ICUPANC={BLUE|TURQ}	TURQ
ICU symbol set use	ADMMDFT ICUFMSS={0|1|2}	0
Installation code page	ADMMDFT INSCPG=n	00037
Keyboard input of extended CECP characters	ADMMDFT CECPINP={YES|NO}	YES
Mapgroup storage threshold	ADMMDFT MAPGSTG=n	8192
Naming conventions for:	ADMMDFT OBJFILE=([aaaaaaaa] [,bbbbbbbb]...)	
Symbol set object	aaaaaaaa	ADMSYMBL
Generated mapgroups	bbbbbbbb	ADMGGMAP
Saved pictures	cccccccc	ADMSAVE
Chart formats	dddddddd	ADMCFORM
Chart data	eeeeeeee	ADMCDATA
GDDM-IMD tutorial pages	ffffffff	ADMTUTPG
GDF files	gggggggg	ADMGDF
(reserved)	hhhhhhhh	-
Chart data definitions	iiiiiiii	ADMCDEF
Projection definitions	jjjjjjjj	ADMPROJ
Image data	kkkkkkkk	ADMIMG
GDDM-PCLK objects	llllllll	ADMPC
National language	ADMMDFT NATLANG={A|B|C|D|F|G|H|I|K|N|Q|S|T|V}	A
Number convention	ADMMDFT NUMBFRM={1|2|3}	1
Print filetype	ADMMDFT CMSPRNT=aaaaaaaa	ADMPRINT
System printer filetype	ADMMDFT CMSSYSP=aaaaaaaa	ADMLIST

Figure 47 (Part 2 of 3). Source-format of user-default specifications

Defaults you can change	How you specify the user defaults	GDDM defaults
Time convention	ADMMDFT TIMEFRM={1|2|3|4}	1
Trace filename and filetype	ADMMDFT CMSTRCE=(aaaaaaaa, bbbbbbbb)	ADM00001 ADMTRACE
Trace file sharing	ADMMDFT TRCESHR={NO|YES}	NO
Trace string	ADMMDFT TRCESTR='aaaaaaaa'	(none)
Trace table size, in-storage	ADMMDFT TRTABLE=n	100
Trace output width	ADMMDFT TRCEWID={SINGLE|DOUBLE}	SINGLE
Trace control value	ADMMDFT TRACE={0|n}	0
Transmission buffer size	ADMMDFT IOBFSZ=n	1536
User-controlled save	ADMMDFT CTLSAVE={YES|NO}	YES
Work-file filetype	ADMMDFT CMSTEMP=aaaaaaaa	ADMUT1

Figure 47 (Part 3 of 3). Source-format of user-default specifications

Alphabetical list of default descriptions

Note: Where an operand is defined as a 4- or 8-character string, it may be specified as a shorter value, in which case the string is left-justified and padded with blanks to 4 or 8 characters.

AM3270 = ({LOCAL|REMOTE|LOCREM},{SNA|NONSNA|SNANOSNA})
This indicates the attachment mode of 3270-family devices. All devices can be local (channel-attached), all remote (link-attached), or a mixture. All can be SNA devices, all non-SNA, or a mixture.

This default identifies known device characteristics that GDDM may not otherwise be able to deduce, and enables GDDM to optimize its device processing.

If GDDM can deduce that all devices are locally attached, it will not normally generate "compressed PS load" data streams, even if the device indicates that it supports compression and even if the IOCOMPR = YES default has been specified.

If GDDM can deduce that all devices are either locally attached or SNA, it will not constrain "PS load" data streams to conform to the 3K-byte transmission limit required for remote non-SNA devices.

APPCPG = n
This indicates the code page for alphanumeric and graphic data that is passed across the application program interface. It includes names (for example, window names, symbol set names, map names) and character strings in FSLOG and FSLOGC calls. It also applies to data held by GDDM that is stored in a GDDM object; for example, when a page is saved using GSSAVE, graphics character strings in the resulting GDF file are coded according to the application code page.

The table below shows the country extended code pages (CECPs) supported by GDDM.

00037	Canada, Netherlands, Portugal, USA
00273	Austria, Germany
00275	Brazil
00277	Denmark, Norway
00278	Finland, Sweden
00280	Italy
00281	Japan (Latin characters)
00284	Latin America, Spain
00285	UK English
00290	GDDM Katakana
00297	France
00351	GDDM default EBCDIC
00500	Multi-lingual page (MLP), Belgium, Switzerland
00871	Iceland

AUNLOCK = {NO|YES}
This indicates whether GDDM is, by default, to operate in always-unlock-keyboard mode. This is defined in the *GDDM Base Programming Reference* manual indexed under AUNLOCK.

CECPINP = {YES|NO}
Some GDDM family 1 devices, such as the 3179-G, allow the host application program to specify whether keyboard input of extended CECP characters is to be allowed or inhibited. This default controls this function for GDDM programs.

CMSAPLF = {DATAANAL|APLTEXT}
Indicates the APL feature that is installed on *nonqueriable* IBM 3270 printer devices.

DATAANAL: GDDM is to assume that any APL feature installed on any printer of the above type is the Data Analysis − APL feature, unless specific application program device-definition information indicates otherwise. The Data Analysis − APL feature is applicable to such terminals as the IBM 3284, 3286, and 3288.

APLTEXT: GDDM is to assume that any APL feature installed on any printer of the above type is the APL/Text feature, unless specific application program device-definition information indicates otherwise. The APL/Text feature is applicable to such terminals as the IBM 3287 and 3289.

CMSCOLM = aaaaaaaa
An 8-character string defining the default filetype used by GDDM for multicolored output resulting from files containing graphics or images suitable for use by composed-page printers. Such printers are defined by means of the DSOPEN GDDM function described in the *GDDM Base Programming Reference* manual.

The character string must contain a "+" substitution character.

CMSDECK = aaaaaaaa
An 8-character string, which is the filetype used by GDDM for object module output resulting from requests through the Image Symbol Editor or the Vector Symbol Editor.

CMSDFTS = (aaaaaaaa,bbbbbbbb)
Two 8-character strings, which are the filename and filetype of the external defaults file.

CMSIADS = aaaaaaaa
An 8-character string, which is the default filetype used by GDDM for the output of ADSs (application data structures) resulting from the use of GDDM-IMD.

CMSIFMT = aaaaaaaa
An 8-character string, which is the default filetype used by GDDM for exporting data as a result of using GDDM-IMD's Export Utility.

CMSMONO = aaaaaaaa
An 8-character string defining the default filetype used by GDDM for monochrome output resulting from files containing graphics or images suitable for use by composed-page printers.

CMSMSLT = aaaaaaaa
An 8-character string, which is the filetype used by GDDM-IMD map specification libraries (MSLs).

CMSPRNT = aaaaaaaa
An 8-character string, which is the filetype used by GDDM for generating files to be printed by the GDDM/VM or GDDM/VMXA Print Utility.

CMSSYSP = aaaaaaaa
An 8-character string, which is the default filetype used by GDDM for disk file output resulting from system printer devices.

CMSTEMP = aaaaaaaa
An 8-character string, which is the filetype used by GDDM Base for intermediate file operations.

CMSTRCE = (aaaaaaaa,bbbbbbbb)
Two 8-character strings, which are the filename and filetype used by GDDM for trace output.

COMMENT = (xxxxxxxx,xxxxxxxx,...)
Specifies a comment in the form of a list of strings of 8 or less nonblank characters, which will be ignored by GDDM default processing. The list must not contain more than 8000 such strings. This can be used to imbed a comment into a defaults module for documentation purposes.

CPN4250 = aaaaaaaa
An 8-character string defining the default code page name used for a 4250 printer. Refer to the description of the GSCPG call in the *GDDM Base Programming Reference* manual for details.

CTLSAVE = {YES|NO}
This allows applications to control picture saving.

DATEFRM = {1|2|3|4}
The date convention to be used by GDDM and GDDM-PGF, as follows:

1 — `MM/DD/YYYY` (U.S. convention)
2 — `DD.MM.YYYY` (European convention)
3 — `YYYY-MM-DD` (ISO and Japanese convention)
4 — `DD MMM YYYY` (MMM are the first 3 characters of the month name).

Note that GDDM-IMD always displays the date in an abbreviated form, that is, the first two digits of the year (YYYY) are omitted.

DBCSDFT = {NO|YES|GDDM}
This default, which only has meaning when NATLANG specifies a double-byte character set (DBCS) language, introduces the concept of the default error message destination, and gives the user control over DBCS support for it. DBCSDFT allows the user to specify, or to ask GDDM to specify, whether the default error message destination is capable of supporting DBCS languages. The default is that GDDM should determine this.

NO means that the device is not capable of supporting DBCS
YES means that the device is capable of supporting DBCS
GDDM means that GDDM should determine whether the device is capable of supporting DBCS.

Some examples of default error message destinations are:

User console
FSQERR destination

FSEXIT destination.

This default can be set using the supplied ADMUDBCS EXEC.

DBCSLIM = n
An integer, in the range 1 through 16, that is the DBCS symbol set component in-storage threshold. GDDM will normally optimize DBCS symbol-set functions by retaining loaded DBCS symbol-set components in main storage up to the specified number of components.

DBCSLNG = c
The language used for DBCS symbol sets. The GDDM-supplied default is K for Kanji. If another language is used, the character chosen must be used in the symbol-set names as a replacement for K. The meaning of "c" is the same as that for the NATLANG option.

ERRTHRS = n
A non-negative integer that is the default error threshold value. This value has the same meaning as the error severity value specified in the FSEXIT call. However, the specified threshold can have effect from the start of initialization.

The error threshold value can also be changed in the FSEXIT call. See the *GDDM Base Programming Reference* manual.

FF3270P = {NO|AFTER|BEFORE|BOTH}
Indicates whether GDDM, including the GDDM Print Utility, will, by default, perform a form feed (page eject) at the start, end, or start and end of processing on a 3270-family printer. It does not apply to cut-sheet devices.

On IPDS printers a form feed will cause a blank page to be ejected.

ICUFMDF = {0|1|2}
This enables you to control the use of chart format defaults in the ICU. All applications on your system (new, old, or stand-alone ICU) have their chart format defaults controlled by this one parameter. The values that can be specified are:

0 — Release-dependent ICU choice.

This allows the ICU to choose the chart format defaults. The actual defaults may change from one release to the next. It is normally the same as choosing 2 except when the ICU is invoked by CHART with FORMNAME = * and DISPLAY equal to any value other than 1 or 2. In this case ICUFMDF is set as if 1 had been chosen.

1 — Use the chart format defaults as in Version 1 Release 4.

2 — Use the chart format defaults as specified in Version 2 Release 1.

ICUFMSS = {0|1|2}
This specifies the symbol sets used in the chart format defaults for the ICU.

The values that can be specified in this option are:

0 — Release-dependent ICU choice.

This allows the ICU to choose the symbol sets. The ICU choice is currently the same as setting an option value of 2 but it may change from one release to another.

1 — Use "*" for all symbol sets in the format defaults. Thus, by default, charts do not use named symbol sets and so they draw faster.

2 — Use the vector symbol sets as named in the format defaults.

ICUISOL = {0|1|2}
This specifies the default isolate value for the ICU. This value is inspected only if the chart-control parameter of GDDM-PGF's CHART call has the isolate value set to zero.

The values that can be specified in the defaults option are:

0 — The Save, Restore, and Directory panels of the ICU are made available to the operator.

1 — The Save, Restore, and Directory panels are not made available to the operator.

2 — The Save and Restore panels are made available to the operator, but the Directory panel is not.

ICUPANC = {BLUE|TURQ}
This specifies whether blue or turquoise is to be used for the ICU panels.

INSCPG = n
This indicates the code page of the installation. It applies to all character data that is not explicitly tagged, for example, object names in auxiliary storage.

The table below shows the country extended code pages (CECPs) supported by GDDM.

00037	Canada, Netherlands, Portugal, USA
00273	Austria, Germany
00275	Brazil
00277	Denmark, Norway
00278	Finland, Sweden
00280	Italy
00281	Japan (Latin characters)
00284	Latin America, Spain
00285	UK English
00290	GDDM Katakana
00297	France
00351	GDDM default EBCDIC
00500	Multi-lingual page (MLP), Belgium, Switzerland
00871	Iceland

IOBFSZ = n
An integer, in the range 1024 to 32000, which is the Transmission Buffer size used by GDDM for 3270-family devices. GDDM splits outgoing terminal transmissions to fit within this buffer size.

For a 3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX work station or a 5550 multistation, on a non-SNA connection, the outgoing transmission size is restricted to approximately 3500 bytes to avoid possible controller timeouts.

For a 3193, it is restricted to about 7000 bytes.

Incoming transmission sizes are regulated as follows:

IOBFSZ determines the default incoming transmission buffer size used by GDDM. GDDM acquires temporary buffers of 32000 bytes for larger incoming terminal data streams (resulting from 3270 READ MODIFIED commands).

IOCOMPR = {NO|YES}
Indicates whether GDDM is to create compressed PS load data streams. See also the description of the AM3270 default option.

Some IBM 3270 series terminals may (optionally) support compression of programmed symbol (PS) data streams. If such compression is to be inhibited, it is generally recommended that this be done on a specific basis by way of device configuration parameters. However, the IOCOMPR option can be used to inhibit compression, on a global basis, of all PS load data streams generated by GDDM.

MAPGSTG = n
An integer defining the mapgroup storage threshold. GDDM will normally optimize mapping functions by retaining loaded mapgroups in main storage up to the specified threshold value.

MIXSOSI = {NO|YES}
Indicates whether character strings may contain shift-out/shift-in characters to mix one-byte characters with two-byte (DBCS) characters.

NATLANG = c
The language used by GDDM and by the GDDM-PGF Interactive Chart Utility and Presentation Graphics Routines in generating messages, menu panels, help panels, and generated charts. The meanings of "c" are defined as:

A — American-English
B — Brazilian
C — PRC Chinese (Simplified) (GDDM Base NL only)
D — Danish
F — French
G — German
H — Korean (Hangeul)
I — Italian
K — Japanese (Kanji)
N — Norwegian
Q — French (Canadian) (GDDM Base NL only)
S — Spanish
T — Taiwan Chinese (Traditional) (GDDM Base NL only)
V — Swedish.

Languages other than American-English are supported only if the corresponding National Language Feature is available and installed.

NUMBFRM = {1|2|3}
The number representation convention to be used by GDDM, as follows:

1 - N,NNN,NNN.MMM (Period decimal convention)
2 - N.NNN.NNN,MMM (Comma decimal convention)
3 - N NNN NNN,MMM (French decimal convention).

OBJFILE = ([aaaaaaaa],[bbbbbbbb],...)
Up to twelve 8-character strings, which indicate the default filetypes for various GDDM objects, as follows:

aaaaaaaa — symbol sets
bbbbbbbb — generated mapgroups
cccccccc — saved pictures
dddddddd — chart formats
eeeeeeee — chart data
ffffffff — GDDM-IMD tutorial pages
gggggggg — GDF files
hhhhhhhh — GDDM-GKS metafiles
iiiiiiii — Chart data definition
jjjjjjjj — Projection definition
kkkkkkkk — Image data
llllllll — GDDM-PCLK objects.

Use names or commas even if they do not apply to the subsystem you are using. Names maintain the values, commas set them to blank while keeping the correct table offset.

SAVBFSZ = n
An integer, in the range 1024 to 32000, which is the FSSAVE transmission buffer size used by GDDM. The FSSAVE function stores preformatted data streams ready for subsequent recall and display by FSSHOW. SAVBFSZ determines the transmission buffer size used by such a saved data stream. The value of SAVBFSZ at the time of the FSSAVE call must not exceed the value of IOBFSZ at the time of the FSSHOW call.

For maximum efficiency, the FSSAVE buffer size should be chosen so that the value `4088/(n + 5)` is greater than 2 and close to an integer.

Be cautious of changing the value to an unnecessarily high value, because this may cause problems with BSC line protocol.

SOSIEMC = c
Indicates the character that will be used as the shift-out/shift-in emulation character in mixed character strings. The character can be any character that can be keyed and is consistent with the syntax of GDDM defaults; however, the character specified cannot then be used for any other purpose (for example, as its own keyed value) in a mixed-string field.

TIMEFRM = {1|2|3|4}
The time convention to be used by GDDM, as follows:

1 - HH:MM xM (U.S. convention; xM = AM or PM)
2 - HH.MM (International convention)
3 - -HH.MM.SS (ISO convention)
4 - ,HH,MM,SS (Japanese convention).

Note that GDDM-IMD always displays the time using the International convention (format 2).

TRACE = {0|n}
An integer that is the default value of the trace control word at initialization. The value may be specified either as a decimal integer or as an assembler language hexadecimal constant. The use of trace is described in the *GDDM Diagnosis and Problem Determination Guide.*

TRCESHR = {NO|YES}
Indicates whether multiple instances of GDDM are allowed to share a trace file. This causes a three-digit identifier to be placed in front of each trace record. The coordinating instance (the first instance to start tracing with this default) has the prefix 001, and for each subsequent instance the identifier increments by one.

TRCESTR = 'aaaaaaaa'
This parameter, which may be up to 256 characters long, indicates the type of trace; the use of trace is described in the *GDDM Diagnosis and Problem Determination Guide*. The string must be enclosed in quotes.

TRCEWID = {SINGLE|DOUBLE}
This parameter controls the width of printed output. It has only two options, SINGLE|DOUBLE. SINGLE is the default and produces a 4-word hexadecimal output. DOUBLE produces an 8-word hexadecimal output, and using this reduces the amount of paper used.

TRTABLE = n
An integer, in the range 5 to 1000, defining the number of trace entries to be held in the cyclic in-storage trace table.

Possible error messages from ADMMDFT macro

```
ADM5101E INVALID POSITIONAL OPERAND(S) 'a1,a2'
ADM5102E INVALID VALUE SYNTAX IN 'a'
ADM5103E WRONG NUMBER OF ARGUMENTS IN 'a'
```

Nicknames

Another type of user default specification (UDS) is a nickname. Nicknames provide a way of defining all the characteristics of a device in a table, and then referencing that device on DSOPEN just by using the nickname.

Nicknames can be used in this way to extend the range of devices supported by current applications, often without requiring any modification to the applications.

Nicknames also extend the range of devices supported by the GDDM Print Utilities, by providing a mechanism for passing complex device definitions to the asynchronously invoked utilities.

Nicknames also enable complex devices to be predefined by the installation programmer, thus simplifying the tasks of the application programmer and end user. The application programmer and end user retain the ability to override such predefinitions.

Refer to the *GDDM Application Programming Guide* for details and examples of how to use nicknames. The *GDDM Base Programming Reference* manual gives details of the full syntax of nicknames, and describes the way in which nicknames are processed and applied.

Source format of a nickname UDS

The source-format syntax of a nickname UDS is as follows:

```
[label] ADMMNICK [REPLACE|APPEND]
                 [,FAM=family]
                 [,NAME=name-list]
                 [,TOFAM=to-family]
                 [,TONAME=to-name-list]
                 [,DEVTOK=device-token]
                 [,PROCOPT=procopt-list]
```

label
This is optional (ignored — it is not part of the UDS).

REPLACE|APPEND
On any one scan or rescan of a nickname list, a number of nickname UDSs may be found to match the current source DSOPEN parameter list.

If REPLACE is specified in a matching nickname, it causes any preceding matching nickname in the current scan or rescan to be ignored.

If APPEND is specified in a matching nickname, the effect of the nickname is merged with that of any preceding nickname in the current scan or rescan.

FAM = family
This is a positive integer, which must be 0 or the same as the current source-family for the nickname to match the current source DSOPEN parameter list.

The default is FAM = 0, which will match any source-family.

NAME = name-list
This is a name-list in the form of name-parts, each being a string of from 0 through 8 nonblank characters. The following are valid name-lists:

```
NAME=name1,                 — one nonblank name-part
NAME=(name1),               — one nonblank name-part
NAME=(),                    — one blank name-part
NAME=(name1,name2,name3),   — three nonblank name-parts
NAME=(name1,,name3),        — two nonblank name-parts and one
                              blank name-part
NAME=,                      — null name
```

For the nickname to match the current source DSOPEN parameter list, the name-list must either be null or must match the current source name-list.

The two name-lists are considered to match if the corresponding name-parts are the same (after left-justification, translation to uppercase, and padding with blanks). In this respect, if the name-lists do not contain the same number of name-parts, the shorter name-list is extended with "*" name-parts for the purpose of comparison. For example:

```
'FRED' and '(FRED)'     )
'FRED' and '(FRED,*)'   ) match
'FRED' and '(FRED,*,*)' )
```

but 'FRED' and '(FRED,ADMPRINT)' do not match

A name-part in the NAME parameter can also contain a leading or trailing (or both) "?" generic character. Such a character is considered to match any combination of characters in the same position as the "?." Thus:

```
'abc?'  — matches any name-part starting with 'abc'
'?'     — matches any name-part
```

The default is null (that is, NAME=,); this matches any source-name-list.

TOFAM = to-family
This is a positive integer. If the nickname is found to match the current source DSOPEN parameter list, GDDM updates the target-family in the target DSOPEN parameter list according to the value of the TOFAM parameter, as follows:

to-family = 0
The target-family is not changed. This is the default.

to-family = nonzero
The target-family is changed to the value to-family.

TONAME = to-name-list
This is a name-list in the same form as the NAME parameter (except that "?" generic characters are not allowed).

If the nickname is found to match the current source DSOPEN parameter list, GDDM updates the target-name-list in the target DSOPEN parameter list according to the value of the TONAME parameter, as follows:

to-name-list = null
The target-name-list is not changed. This is the default.

to-name-list = not-null
The target-name-list is changed to be the value to-name-list.

DEVTOK = device-token
This is a string of 0 through 8 nonblank characters.

If the nickname matches the current source DSOPEN parameter list, GDDM updates the target-device-token in the target DSOPEN parameter list according to the value of the DEVTOK parameter, as follows:

device-token = null (that is, DEVTOK = ,)
The target-device-token is not changed. This is the default.

device-token = not-null
If the current source-device-token is "*" or null, the target-device-token is changed to be the value device-token. Otherwise, the target-device-token is not changed.

The DEVTOK parameter enables an explicit non-"*" or nonblank device token to be used, but only if the application program specified a DSOPEN device token of "*" (or blank). An explicit (that is, non-"*" or nonblank) device token specified in the DSOPEN call cannot be overridden.

PROCOPT = procopt-list
This is a list of procopt-specifications (procopt-specs), thus:

```
PROCOPT=((procopt-spec),(procopt-spec),...)
```

Each procopt-spec is a keyword identifying a specific DSOPEN processing option (see below) followed by a number of arguments valid for that processing option, thus:

```
PROCOPT=((keyword,argument,argument),
         (keyword,argument), ...)
```

If the nickname is found to match the current source DSOPEN parameter list, GDDM updates the target-procopt-list in the target DSOPEN parameter list according to the value of the PROCOPT parameter, as follows:

procopt-list = null (that is, PROCOPT = ,)
The target-procopt-list is not changed. This is the default.

procopt-list = ((procopt-spec),....)
The procopt-list is inserted into the target-procopt-list such that it follows any procopt-lists added so far during the current scan or rescan, but precedes any procopt-lists that were present at the start of the current scan or rescan.

Note that, in a DSOPEN procopt-list, the latest procopt-specifications take priority; that is to say, where a procopt-list contains two or more procopt-specs for the same processing option, the latest will apply. (Exceptions to this rule are the mergeable PRINTCTL and ORIGINID processing options; see below.) This means that the PROCOPT parameter enables an explicit procopt-spec to be applied, if the application program did not specify the corresponding processing option group in the DSOPEN call. A processing option group specified in the DSOPEN call cannot be overridden.

Note: In a DSOPEN procopt-list, any procopt-specifications that are not applicable to the DSOPEN device family and device name-list are ignored.

The processing options that can be specified are described in Figure 48 on page 131. Refer to the discussion of DSOPEN in the *GDDM Base Programming Reference* manual for full details. INRESRCE and PCLK are described in the *GDDM Release Guide* and the *GDDM-PCLK Guide* respectively.

DSOPEN Group Code	Keyword	Argument(s) (default, if any, is given first)	Examples
1	BMSCOORD	NO|YES	(BMSCOORD,NO)
2	OUTONLY	NO|YES	(OUTONLY,NO)
3	AUNLOCK	NO|YES	(AUNLOCK,NO)
4	PRINTCTL	n,n,n,n,.....	(PRINTCTL,0,1,66,0,0,0,80,0)
5	CDPFTYPE	PRIM|SEC	(CDPFTYPE,PRIM)
6	HRISPILL	YES|NO	(HRISPILL,YES)
7	HRISWATH	n	(HRISWATH,10)
8	HRIPSIZE	n,n,TENTHS|MILLS	(HRIPSIZE,5,3,TENTHS)
9	HRIFORMT	CDPF|BITMAP	(HRIFORMT,BITMAP)
10	PLTFORMF	YES|NO	(PLTFORMF,NO)
11	PLTPENV	n	(PLTPENV,30)
12	PLTPENW	n	(PLTPENW,10)
13	PLTPENP	n	(PLTPENP,10)
14	PLTAREA	xmin,xmax,ymin,ymax	(PLTAREA,0,70,0,70)
15	PLTPAPSZ	*|A4|A3|...|A|B|...	(PLTPAPSZ,A4)
16	PLTROTAT	NO|YES	(PLTROTAT,NO)
17	SEGSTORE	YES|NO	(SEGSTORE,NO)
18	STAGE2ID	xxxxxxxx,xxxxxxxx,...	(STAGE2ID,*,AUX2)
19	LOADDSYM	NO|YES	(LOADDSYM,YES)
20	ORIGINID	NO|YES	(ORIGINID,YES)
21	LCLMODE	NO|YES	(LCLMODE,NO)
22	HRIDOCNM	xxxxxxxx	(HRIDOCNM,FINALPRT)
23	SPECDEV	IBM5080|*,ddname|blank	(SPECDEV,IBM5080,FT10F001)
24	WINDOW	NO|YES	(WINDOW,NO)
26	FASTUPD	n	(FASTUPD,1)
27	CTLFAST	NO|YES	(CTLFAST,NO)
28	CTLMODE	*|YES|NO	(CTLMODE,*)
29	CTLKEY	type,value	(CTLKEY,4,1)
30	CTLPRINT	YES|NO	(CTLPRINT,YES)
31	CTLSAVE	YES|NO	(CTLSAVE,YES)
32	INRESRCE	NO|YES	(INRESRCE,NO)
33	PCLK	NO|YES	(PCLK,YES)
34	DEVCPG	n	(DEVCPG,00273)
35	IPDSQUAL	*|DP|DPQ|DPT|DPTQ|NLQ	(IPDSQUAL,*)
36	PCLKEVIS	NO|YES	(PCLKEVIS,YES)
1000	CMSINTRP	PA1PA2|PA2|PA1|NONE	(CMSINTRP,PA1PA2)
1001	CMSATTN	BASIC|EXTENDED,n,addr	(CMSATTN,BASIC,0,0)
1002	CPSPOOL	xxxxxxxx,xxxxxxxx,...	(CPSPOOL,TO,RSCS)
1003	CPTAG	xxxxxxxx,xxxxxxxx,...	(CPTAG,CHICAGO,3287NO3,PRT=GRAF)
1004	INVKOPUV	NO|YES	(INVKOPUV,YES)
3000	COLORMAS	n	(COLORMAS,2)

Figure 48. Processing options

Possible error messages from ADMMNICK macro

```
ADM5101E INVALID POSITIONAL OPERAND(S) 'a1,a2'
ADM5102E INVALID VALUE SYNTAX IN 'a'
```

Appendix B. Character code interpretation

The alphanumeric defaults module (ADMDATRN) is a set of translation tables used by GDDM to ensure that character codes managed by the program appear the same on any device in any country. For example, a word containing é entered as data in France will be displayed correctly as é on a terminal in Germany. ADMDATRN is also needed in installations that use APL, and those that use Personal Services/370 (PS/370) under CICS.

Applications can use:

- Country extended code pages (CECPs)
- GDDM's default EBCDIC character codes
- Katakana character codes.

An example CECP is shown on page Figure 52 on page 137. The *GDDM Typefaces and Shading Patterns* manual shows the other CECPs. The code page numbers for CECPs are shown on page 120. The EBCDIC character codes are shown in Figure 50 on page 135. The Katakana character codes are shown in Figure 51 on page 136.

To ensure that character codes are always interpreted in the same way, GDDM uses a set of 256 character tables. Pointers enable the characters in one table to be mapped onto those in any other table.

Programs written prior to GDDM Version 2 Release 2 that used an extended EBCDIC character code interpretation, will still work as designed. This means that (for example) X'31' appears as a superscript 1 if the device to which it is being sent can process it. (If the device cannot process it, what happens is explained later.)

Katakana can now be specified by the APPCPG external default (see page 120). For compatibility with earlier releases, Katakana codes can be specified by default if a small change is made to the alphanumeric defaults module.

Code page conversion

To enable character codes to be interpreted correctly, more than one conversion between code pages may take place. Figure 49 shows the conversions that are possible.

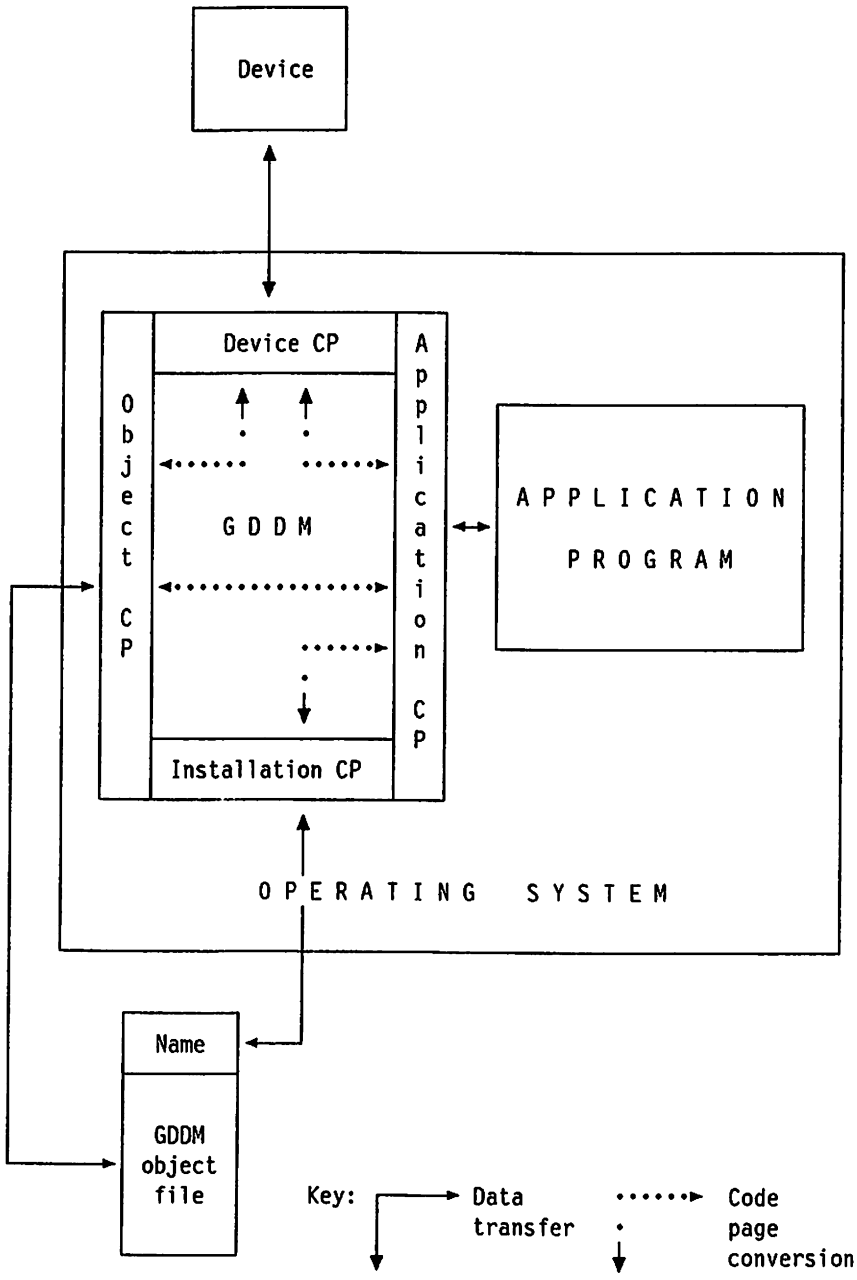


Figure 49. Code page conversion

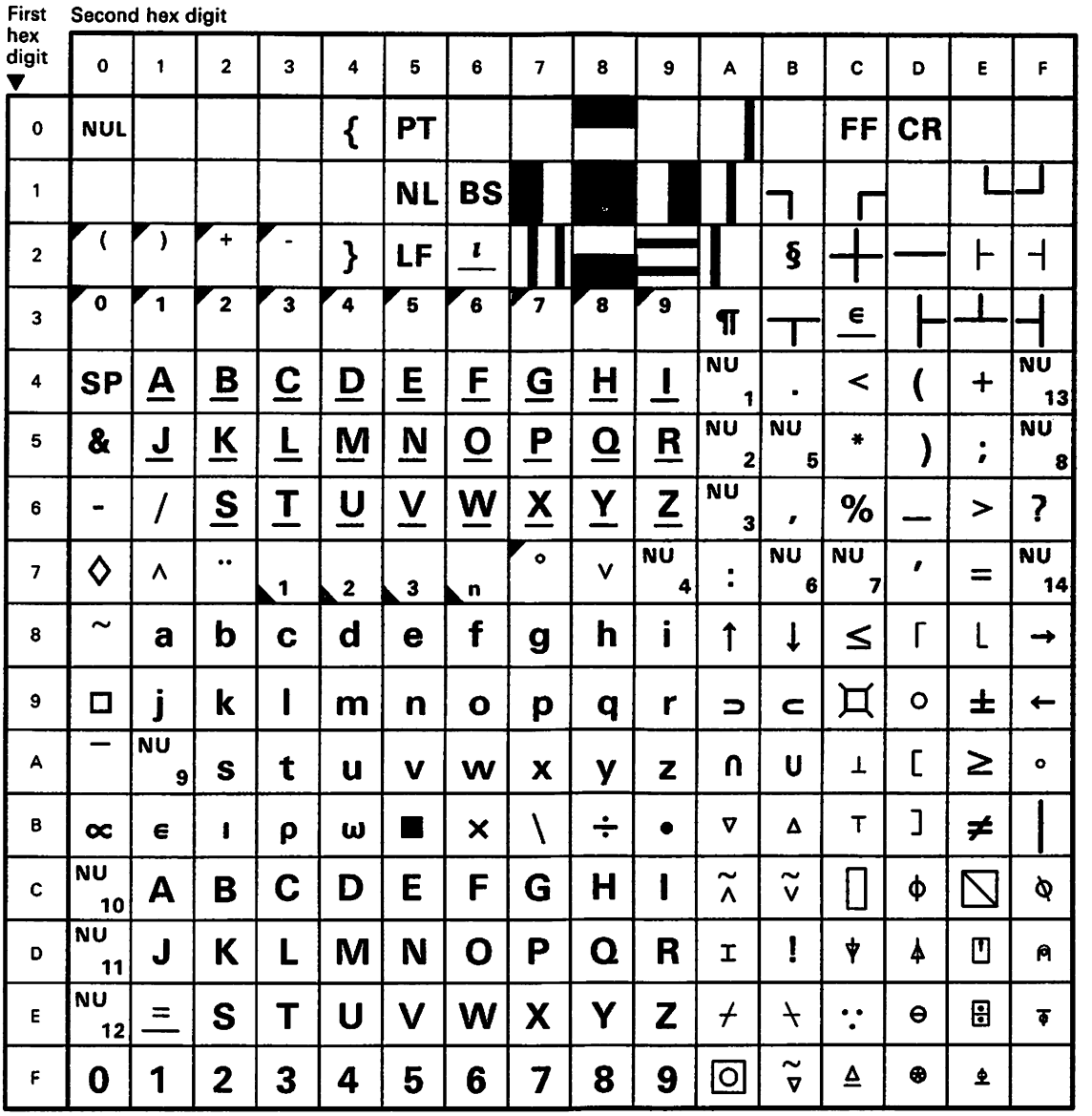
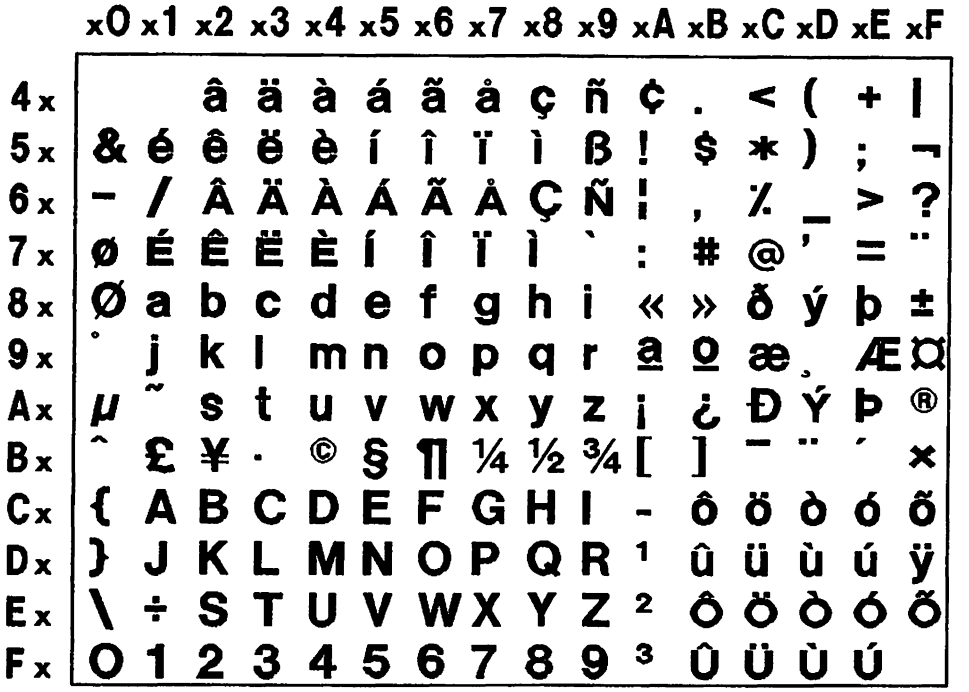


Figure 50. GDDM default EBCDIC character codes

First hex digit ▼	Second hex digit 0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL					PT							FF	CR	SO	SI
1						NL	BS									
2						LF										
3																
4	SP	。	「	」	、	・	ヲ	ァ	ィ	ゥ	£	.	<	(	+	|
5	&	ェ	ォ	ャ	ュ	ョ	ッ		-		!	¥	*	)	;	¬
6	-	/										,	%	_	>	?
7											:	#	@	'	=	"
8		ア	イ	ウ	エ	オ	カ	キ	ク	ケ	コ		サ	シ	ス	セ
9	ソ	タ	チ	ツ	テ	ト	ナ	ニ	ヌ	ネ	ノ			ハ	ヒ	フ
A		ー	ヘ	ホ	マ	ミ	ム	メ	モ	ヤ	ユ		ヨ	ラ	リ	ル
B											レ	ロ	ワ	ン	゛	°
C		A	B	C	D	E	F	G	H	I						
D		J	K	L	M	N	O	P	Q	R						
E	$		S	T	U	V	W	X	Y	Z						
F	0	1	2	3	4	5	6	7	8	9						

◢ = lowercase Katakana character

Figure 51. GDDM default Katakana character codes



	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
4x			â	ä	à	á	ã	å	ç	ñ	¢	.	<	(	+	|
5x	&	é	ê	ë	è	í	î	ï	ì	ß	!	$	*	)	;	¬
6x	-	/	Â	Ä	À	Á	Ã	Å	Ç	Ñ	¦	,	%	_	>	?
7x	ø	É	Ê	Ë	È	Í	Î	Ï	Ì	`	:	#	@	'	=	¨
8x	Ø	a	b	c	d	e	f	g	h	i	«	»	ð	ý	þ	±
9x	°	j	k	l	m	n	o	p	q	r	ª	º	æ	¸	Æ	¤
Ax	µ	~	s	t	u	v	w	x	y	z	¡	¿	Ð	Ý	Þ	®
Bx	^	£	¥	·	©	§	¶	¼	½	¾	[	]	¯	¨	´	×
Cx	{	A	B	C	D	E	F	G	H	I	-	ô	ö	ò	ó	õ
Dx	}	J	K	L	M	N	O	P	Q	R	¹	û	ü	ù	ú	ÿ
Ex	\	÷	S	T	U	V	W	X	Y	Z	²	Ô	Ö	Ò	Ó	Õ
Fx	0	1	2	3	4	5	6	7	8	9	³	Û	Ü	Ù	Ú	

Figure 52. Example country extended code page (CECP 00037)

Structure of the alphanumeric defaults module

The alphanumeric defaults module consists of sets of tables for various national languages and devices, and control information on how the tables are to be used and how they are to be associated with a particular language and type of device. In addition, the module contains tables used for uppercase translation. The format of the alphanumeric defaults module is shown in Figure 53. As the figure shows, it includes:

- The basic control information
- Translation-type descriptor blocks for each allowed translation-type value
- Translation tables
- CECPs that relate translation tables to code page identifiers.

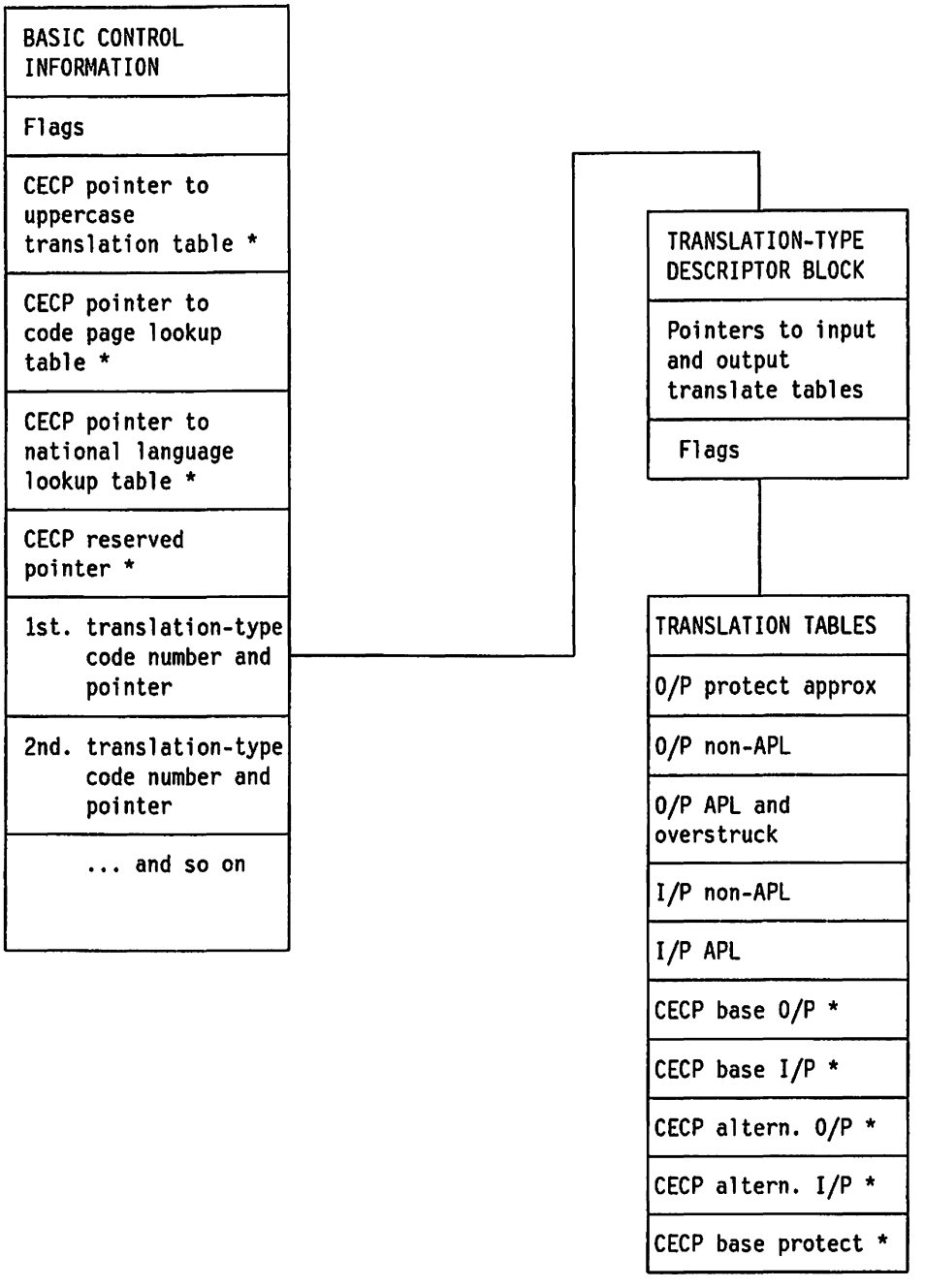
The translation tables are 256-byte tables and are held within the module.

The contents of the fields shown in Figure 53 are described below. The basic control information is in Figure 54 on page 139. The module as supplied with GDDM includes several translation-type descriptor blocks; the format of such a block is shown in Figure 56 on page 143.

In addition to the fields described in Figure 53, the module contains the default translation tables to which they refer.

If you intend to update the module, you will find further information in the comments within the module itself.

The structure described in the following pages uses TRNxxx labels. These labels do not appear in the supplied ADMDATRN but they could be used to define overlays representing the structure.



* These items are only present if this is a CECP format ADMDATRN

Figure 53. Format of the alphanumeric defaults module

Compatibility of ADMDATRN with previous releases

For GDDM Version 2 Release 2 changes have been made to ADMDATRN to incorporate CECP. In particular:

- TRNTYPE and TRNYPEP are now grouped under TRNTYPES which is the array of device types. This has enabled the new CECP pointers, grouped under TRNCECPP, to be defined on TRNTYPES.
- The translation type descriptor block has been extended to include pointers for CECP.

For GDDM Version 1 Release 4 the meanings of the TRNIGM and TRNIG flags (previously called TRNGAM and TRNGA) were extended to cover the 3179-G, the 3270-PC/G, 3270-PC/GX, the 5550, and any other terminals supporting the APL2 character set. Unless entries "5279" and "52791" are incorporated in any customized versions of ADMDATRN from GDDM Version 1 Releases 1, 2, or 3, then abend 1201 will occur when attempting to use a 3270-PC/G or a 3270-PC/GX.

Basic control information

This is the first part of the alphanumeric defaults module.

Field name	Field offset	Field length	IBM default value (where applicable)
TRNUCTP	0	4	address
TRNPTP	4	4	address
TRNFMASK	8	3	-
TRN3277M	x.......	Bits in TRNFMASK	1
TRNDISPM	.x......		1
TRNAPLM	..x.....		1
TRNNLCM	...x....		1
TRNSYSPM	....x...		1
TRNIGM	.....x.		1
TRN293M	x		1
TRNFCECP	11	1	-
TRNCECP	x.......	Bits in TRNFCECP	1
TRNNTYPE	12	4	36
TRNTYPES(*)	16+		-
TRNTYPE		4	0
TRNTYPEP		4	address
TRNCECPP			-
TRNMUCTP		4	address
TRNCPL		4	address
TRNNATP		4	address
reserved		4	-

Figure 54. Alphanumeric defaults module, basic control information

TRNUCTP

This is the address of the uppercase translation table. The GDDM-supplied table translates lowercase EBCDIC characters to uppercase, and leaves all other characters unchanged.

The address must **not** be zero.

TRNPTP
This is the address of the invalid character translation table. The GDDM-supplied table translates the character codes X'01' through X'3F' and X'FF' to the character code X'40' on output.

The address must **not** be zero.

TRNFMASK
A set of flags that correspond to device characteristic flags in the translation type-descriptor blocks. If these flags are set on, the corresponding flags in the type-descriptor blocks are tested when searching for a translation table set for a particular device.

TRN3277M
Older 3270 or those that support highlighting, color, and PS.

TRNDISPM
Display or printer.

TRNAPLM
APL or non-APL devices.

TRNNLCM
Device displays lowercase characters in recognizable form or does not.

TRNSYSPM
System printers or other devices. (System printers are characterized by the use of carriage control.)

TRNIGM
Interactive graphics devices or others.

TRN293M
Device supports APL code page 293.

TRNFCECP
A set of flags relating to CECP.

TRNCECP
Country extended code page available.

Reserved
Seven unused bits.

TRNNTYPE
This is a fullword integer (or string of four characters) specifying the number of entries in TRNTYPES. Each entry consists of one TRNTYPE and one TRNTYPEP. The list is scanned at GDDM device initialization to determine which translation type to use. There must be at least one entry.

The translation types supplied with GDDM are listed in Figure 55 on page 142.

TRNTYPES(n)
Array of device types.

TRNTYPE
This is a fullword integer (or string of four characters) naming the translation-type identifier for this entry. This must be different from all other values of TRNTYPE in the list.

TRNTYPEP
This is the address of a translation-type descriptor block. Each TRNTYPEP in the list should address a different descriptor block. This address must not be zero.

TRNCECPP
This is an array of four pointers defined over the TRNTYPES array for use by CECP.

TRNMUCTP
Pointer to CECP uppercase translation table.

TRNCPL
Pointer to CECP lookup table.

TRNNATP
Pointer to national-language-to-CECP lookup table.

Reserved
Unused.

Translation types supplied by GDDM

GDDM uses the translation types shown in Figure 55 on page 142. When GDDM is choosing a translation type, it starts at 0 and goes to the point specified by the 0 group. By default, this is 2 but may have been changed to 3. It then goes to the point specified by 2 or 3 and searches until it finds a translation-type number that matches the device in use.

If an ASTYPE call is used to override character code assignments, Figure 55 on page 142 is used as follows:

Type parameter	Translation used
Zero	Default (from application code-page to device code-page for output and from device code-page to application code-page for input).
Non-zero	Default is overridden and the associated table is used.

Note: DUP(*) means unprintable character

Translate type number	Device	"Invalid" character
GROUP SELECTIONS – these define the points in the table at which the search will start.		
0	Points to 2 by default (can be altered to be same as Katakana or other group)	
2	Points to EBCDIC group	
3	Points to Katakana group	
SPECIFIC SELECTIONS – these can be specified only in an ASTYPE call		
1	No translation except output protection using TRNPTP.	
3288	3288	ASTERISK (*)
32881	3288-TN	ASTERISK (*)
3289	3289	ASTERISK (*)
32891	3289-TN	ASTERISK (*)
KATAKANA group (falling through to EBCDIC group) – one of these values is selected by GDDM if group selection 0 is set to point to 3 and a suitable match is found.		
32772	Katakana 3277	DUP (*)
32792	Katakana 3279 or 5550	DUP (*)
32793	Katakana 3279 – APL	DUP (*)
3179	Katakana 3179-G	DUP (*)
31791	Katakana 3179-G – APL	DUP (*)
5553	Katakana 5553 or 5557	DUP (*)
55531	Katakana 5553 or 5557 – APL	DUP (*)
4224	Katakana 4224	DUP (*)
42241	Katakana 4224 – APL	DUP (*)
3812	Katakana 3812	DUP (*)
38121	Katakana 3812 – APL	DUP (*)
EBCDIC group (may be selected by GDDM by default) – one of these values is selected by GDDM if group selection 0 is set to point to 2, or if it is set to point to 3 but no suitable match is found in the Katakana group. **Note:** For 3290 and 8775 terminals GDDM selects translation types as it does for 3278 terminals.		
5279	3270-PC/G, 3270-PC/GX, 3179-G	DUP (*)
52791	3270-PC/G, 3270-PC/GX, 3179-G – APL2	DUP (*)
3277	3277	DUP (*)
3279	3278, 3279	DUP (*)
32771	3277-APL/DE	DUP (*)
32791	3278-APL/DE, 3279-APL/DE	DUP (*)
713287	3271/3287	DUP (*)
743287	3274/3287	DUP (*)
7132871	3271/3287-APL	DUP (*)
7432871	3274/3287-APL	DUP (*)
1403	1403, 3211	-
744224	3274/4224	DUP (*)
7442241	3274/4224-APL	DUP (*)
743812	3274/3812	DUP (*)
7438121	3274/3812-APL	DUP (*)

Figure 55. Translation tables in the alphanumeric defaults module

Translation-type descriptor block

This is the second part of the alphanumeric defaults module.

Field name	Field offset	Field length	IBM default value
TRNDEFRT	0	4	number
TRNBOP	0	4	address or 0
TRNBIP	4	4	address or 0
TRNAOP	8	4	address or 0
TRNAIP	12	4	address or 0
TRNBPOP	16	4	address or 0
TRNCOP	20	4	address or 0
TRNCIP	24	4	address or 0
TRNCAOP	28	4	address or 0
TRNCAIP	32	4	address or 0
TRNCPOP	36	4	address or 0
TRNFLAGS	40	3	-
TRN3277	x.......	Bits	-
TRNDISP	.x......	within	-
TRNAPL	..x.....	TRNFLAGS	-
TRNNLC	...x....		-
TRNSYSP	....x...		-
TRNDEFR	.....x..		-
TRNIG	......x.		-
TRN293	x		-
TRNNONU	x.......		-
TRNIIC	43	1	-

Figure 56. Alphanumeric defaults module, translation-type descriptor block

TRNDEFRT
This is only referred to if TRNDEFR = 1, contains the type number at which search shouid continue. It is used to bypass standard defaults by nonstandard defaults such as Katakana.

TRNBOP
This is the address of output symbol set 0 (non-APL) translation table. If zero, this translation does not occur.

TRNBIP
This is the address of input symbol set 0 (non-APL) translation table. If zero, this translation does not occur.

TRNAOP
This is the address of output symbol set 1 (APL) translation table. It is also used as overstruck-character translation table. If zero, this translation does not occur.

TRNAIP
This is the address of input symbol set 1 (APL) translation table. If zero, this translation does not occur and character codes revert automatically to symbol store 0.

TRNBPOP
This is the address of output-protected approximation translation table. If zero, this translation does not occur.

TRNCOP
This is the address of the CECP base output table. It maybe zero when TRNDEFR = 0.

TRNCIP
This is the address of the CECP base input table. It maybe zero. It is used when TRNDEFR = 0 and must be 0 when TRNDEFR = 1.

TRNCAOP
This is the address of the CECP alternate output table. It maybe zero. It is used when TRNDEFR = 0 and must be 0 when TRNDEFR = 1.

TRNCAIP
This is the address of the CECP alternate input table. It maybe zero. It is used when TRNDEFR = 0 and must be 0 when TRNDEFR = 1.

TRNCPOP
This is the address of CECP base protected output table. It maybe zero. It is used to approximate protected field output when TRNDEFR = 0 and must be 0 when TRNDEFR = 1.

TRNFLAGS
This is a set of flags that specifies the combination of device characteristics for which the translate table will be used. Flags not shown are not used. Some flags may be ignored, depending on the setting of TRNFMASK in the basic control information.

TRN3277
1 = the device must be an older type (that is, a 3277).

0 = opposite to 1.

TRNDISP
1 = the device must be a display.

0 = the device must be a printer.

TRNAPL
1 = the device must have an APL character set.

0 = opposite to 1.

TRNNLC
1 = the device must be one that does not display lowercase characters in a recognizable form (for example, a Katakana device). This setting affects the operation of the ASCGET call when ASFTRN has been used to specify uppercase translation of alphanumeric input.

0 = the device must display lowercase characters in a recognizable form. This includes those devices that display lowercase characters as uppercase.

This flag is not used in device characteristic matching.

TRNSYSP
1 = the device must be a system printer (for example, 1403 or 3211).

0 = opposite to 1.

TRNDEFR
1 = do not process this type number; go to the translation-type number found in TRNDEFRT, and continue searching from there.

0 = process in the normal manner.

This flag is not used in device characteristic matching.

TRNIG
1 = the device is an interactive graphics device that supports the APL2 character set (for example, a 3179-G or a 3270-PC/G).

0 = opposite to 1.

TRN293
1 = the device supports APL code page 293.

0 = opposite to 1.

TRNNONU
1 = the device has no national use characters.

0 = opposite to 1.

TRNIIC
Invalid character replacement.

Translation tables

This is the third part of the alphanumeric defaults module.

How GDDM translates alphanumeric fields

The object of GDDM translation of alphanumeric fields is to:

- Give consistency of interpretation of hexadecimal character codes between different languages
- Give consistency of interpretation of hexadecimal character codes between different devices
- Give an approximation of undisplayable codes where this is likely to help the user
- Allow for APL characters.

ADMDATRN contains two sets each of five tables, three for output and two for input, for each device type. These tables are used to translate alphanumeric fields. One set of tables handles non-CECP applications (as in earlier releases); the other set is for CECP applications running on non-CECP devices. Figure 57 on page 146 shows how the tables are used. Both sets of tables work in the same way. The tables and their uses are described below.

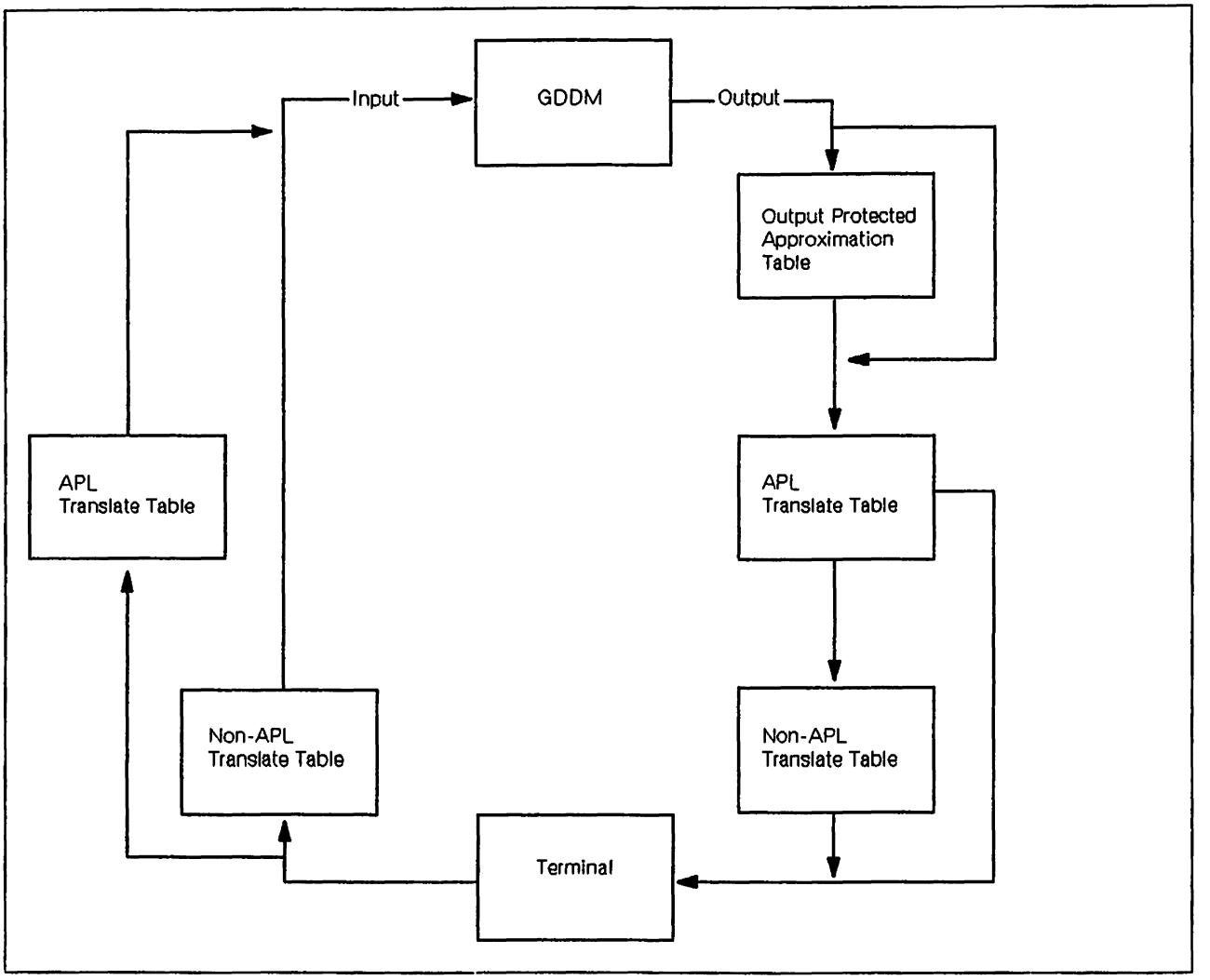


Figure 57. Translation tables used for GDDM alphanumeric fields

The non-CECP translation tables are only used for the read-only symbol sets supplied in the hardware. No translation is done if you use other symbol sets in alphanumeric fields.

Translation is only done on one-byte characters that use ASCPUT. Two-byte characters using ASGPUT (such as Kanji) are not translated.

Instructions on setting up a new translation table

Brief instructions on setting up a new translation table to be accessed by an ASTYPE call are given below. The task should not be attempted unless you have studied the module and the comments it contains.

1. Set up a new translation group by copying either group 3 if you are interested in Katakana terminals or group 2 if you are interested in other terminals. Make this group number 4.
2. Change the numbers, such as 5279, to unique numbers such as 45279. (Any number can be used if it is unique within the module.)

3. Set up the appropriate translate tables, using those in ADMDATRN as a model.
4. Set the entries in group 4 so that they point to the appropriate translate tables.
5. If you want the new table to become the default, change group 0 so that it points to group 4. If you do not want it is as the default, it can be specified explicitly by using ASTYPE(4).
6. Reassemble and link-edit the defaults module as described under "How to replace a GDDM module that you've changed" on page 105.
7. Replace ADMDATRN as described under "Replacing GDDM modules after installation" on page 105.

Device dependent translation tables

Device dependent translation tables are used to handle both CECP and non-CECP alphanumeric fields. The pointers to the tables are all in the Translation Type Descriptor Block.

Output-protected approximation table
For protected fields only. Translates characters that cannot be shown on the device to the nearest possible equivalent. (For example, superscript values may be shown as ordinary values.) The table is only used for protected fields because the data stream could be corrupted if the translated value was returned. Where the character cannot be approximated, a blank is used.

Addressed by TRNBPOP for non-CECP. Addressed by TRNCPOP for CECP.

Output symbol set 0 (non-APL) translate table
This translates the hexadecimal code sent by GDDM to the code that will result in the desired character appearing on the terminal.

Addressed by TRNBOP for non-CECP. Addressed by TRNCOP for CECP.

Output symbol set 1 (APL) translate table
This table is used to translate APL characters for interactive devices. APL characters are known in GDDM as hexadecimal values (for example A̲ (A underscore) is represented as X'41'). On some devices A̲ is represented as X'81' in symbol set 1. The output symbol set 1 translate table, translates X'41' to X'81' and sets a marker to indicate that symbol set 1 is to be used.

For system printers, the table is used in a similar manner to generate overstruck characters.

APL translation is done after output-protect translation and before non-APL translation. As shown in Figure 57 on page 146, characters translated by the APL-translate table are not passed through the non-APL translate table.

Addressed by TRNAOP for non-CECP. Addressed by TRNCAOP for CECP.

Input symbol set 0 (non-APL) translate table
This translates the hexadecimal code sent by the device to the code that will be expected by GDDM, which is the reverse of the equivalent output table.

Addressed by TRNBIP for non-CECP. Addressed by TRNCIP for CECP.

Input symbol set 1 (APL) translate table
This table is used to translate APL characters back into the format recognized by GDDM.

Addressed by TRNAIP for non-CECP. Addressed by TRNCAIP for CECP.

In addition to this translation, GDDM removes invalid characters that might corrupt the device and replaces them with the Invalid Device Character. A record is kept of the position of these characters and they are replaced in the field on input if they have not been changed.

CECP lookup table

Field name	Field offset	Field length	IBM default value (where applicable)
TRNCSID	0	4	-
TRNCPID	4	4	-
TRNCPFG	8	1	-
TRNCECPF	x.......	Bits	1
TRNACPF	.x.....	within	1
TRNAROSF	..x.....	TRNCPFG	1
Reserved	...xxxxx		-
TRNTMLP	12	4	address
TRNFMLP	16	4	address

Figure 58. Alphanumeric defaults module, CECP lookup table

TRNCSID
Character set identifier.

TRNCPID
Code page identifier.

TRNCPFG
Code page flags.

TRNCECPF
CECP flag. Set if there is a CECP coded character set.

TRNACPF
Application code page flag. Set if the code page is supported as an application or installation code page. If not set, the coded character set is used as a device code page for input/output operations.

TRNAROSF
ROS translation flag. Set for coded character sets on devices supporting 94 EBCDIC characters.

Reserved
Five unused bits.

TRNTMLP
Pointer to the translate-to-code-page-500 table.

TRNFMLP
Pointer to the translate-from-code-page-500 table.

There is no set order for the entries in this table except that:

- Entries for possible application code pages must be placed first. See TRNACPF.
- The last entry must have a zero TRNCSID and TRNCPID.

Other entries can be arranged to optimize performance.

This table is used to validate and interpret code page identifiers. It has an entry for each coded character set recognized by GDDM. These correspond to:

- Pages which can be supported as the application or installation code page
- Additional device code pages.

Each entry contains character set and code page identifiers, flags, and pointers to translation tables.

Addressed by TRNCPL in the Basic Control Information.

Code-page-to-code-page translation tables

Translation tables from code page 500 to every other supported code page, and vice versa.

Addressed by TRNFMLP in the CECP lookup table for translating from code page 500.

Addressed by TRNTMLP in the CECP lookup table for translating to code page 500.

National-language-to-CECP lookup table

Field name	Field offset	Field length	IBM default value (where applicable)
TRNNATL	0	1	-
TRNNLCP	1	4	-

Figure 59. Alphanumeric defaults module, national language lookup table

TRNNATL
National language identifier.

TRNNLCP
Code page identifier.

Valid combinations of national language identifier and code page identifier are:

National language	Code page	Language
A	00037	American English
B	00275	Brazilian Portuguese
C	00037	PRC Chinese
D	00277	Danish
F	00297	French
G	00273	German
H	00037	Korean (Hangeul)
I	00280	Italian
K	00037	Japanese (Kanji)
N	00277	Norwegian
Q	00037	Canadian French
S	00284	Spanish (Latin America)
T	00037	Taiwan Chinese
V	00278	Swedish
0	00000	End of table

Figure 60. National language and code page identifiers

This lookup table is used to access the message data set.

Addressed by TRNNATP in the Basic Control Information.

CECP upper case translation table

Translation table for code page 500 used by ASFTRN to translate to upper case on input.

Addressed by TRNMUCTP in the Basic Control Information.

How to use the alphanumeric defaults module

By changing the alphanumeric defaults module you can:

- Change the default translation so that 3270-family devices (including work stations that use 3270 data-stream architecture) are assumed to be Katakana rather than EBCDIC where there is such a choice. (This enables Katakana to be correctly processed.)
- Set up special translation tables of your own that will cater for a nonstandard device or a group of nonstandard devices. If you use a CECP you may not need any special translation tables.

Instructions for making the change to Katakana are given in "How to make the default translation table Katakana" on page 151. If you do need to set up special translation tables, you will have to read and understand the description of the alphanumeric defaults module that performs the Katakana instructions.

How to make the default translation table Katakana

Katakana can be specified by the APPCPG external default (see page 120), but for compatibility with earlier releases it can be made the default by using the method described here.

PTFs may have replaced this table, so check that it is still valid for your installation.

The GDDM Katakana character codes are shown in Figure 51 on page 136. These codes can be explicitly specified in a program by use of the ASTYPE(3) call or can be made the default for an installation.

To make the Katakana codes the default for the installation:

1. Find the source of the alphanumeric defaults module ADMDATRN. It is provided as part of the installation process.
2. Within the module find the assembler label T0.
3. On the next line change F'2' to F'3'.
4. Reassemble and link-edit the defaults module as described under "How to replace a GDDM module that you've changed" on page 105.
5. Replace ADMDATRN as described under "Replacing GDDM modules after installation" on page 105.

This action will make the default table the Katakana table (number 3) instead of the EBCDIC table (number 2) and will make Katakana display and printing the same across all Katakana devices supported by GDDM.

Appendix C. Device characteristics tokens

There are four families of devices supported by GDDM/VM or GDDM/VMXA. These are:

Family 1 3270-based devices
Family 2 Queued-printer devices
Family 3 System-printer devices
Family 4 Composed-page devices.

This appendix describes device characteristics tokens (normally called device tokens) and the macros that are used to generate them. Device tokens describe the characteristics of devices. They should only be used if you want to override the answer for a queriable device.

- They are used to specify some special types of device such as the 4250 composed-page printer in a DSOPEN call.
- They override the information obtained by GDDM about a particular device so that device information will be taken from the token rather than the usual source (normally the device itself but in some cases a table).

GDDM-supplied device tokens

The GDDM-supplied device tokens are shown in Figures 61 through 67. The meanings of the tokens are in terms of typical devices that they can be used with. You may need to study the meanings of the macro operands fully to understand the tokens. The operands are explained in "The ADMM3270 macro" on page 162, "The ADMMSYSP macro" on page 177, and "The ADMMIMAG macro" on page 178.

Some of the tokens do not apply in all operating environments; the same set of tokens is supplied in all GDDM operating environments (MVS, VM, and VSE).

Note that the tokens that start with the letters ADMK are automatically generated the first time the related macro is invoked.

Where device tokens are held

The device tokens are held in tables with the following names:

ADMLSYS1 for family 1 (3270) and family 2 (queued printer)
ADMLSYS3 for family 3 (system printer)
ADMLSYS4 for family 4 (composed-page printer files).

The source of these modules is individual files on the GDDM installation disk.

GDDM-supplied device tokens for queriable terminals and printers

This set of token definitions is part of ADMLSYS1.

- Locally attached 3179 Models G1 and G2 displays.
  - L3179G 3179-G, 32 rows by 80 columns
  - L3179GM 3179-G, 32 rows by 80 columns with mouse
- Locally attached 3270-PC displays.
  - L3270PC 3270-PC displays
- Locally attached 3270-PC/G work stations.
  - L5279A1 3270-PC/G, 32 rows by 80 columns
  - L5279A1M 3270-PC/G, 32 rows by 80 columns, with mouse
  - L5279A1T 3270-PC/G, 32 rows by 80 columns, with tablet
  - L5279A2 3270-PC/G, 49 rows by 80 columns
  - L5279A2M 3270-PC/G, 49 rows by 80 columns, with mouse
  - L5279A2T 3270-PC/G, 49 rows by 80 columns, with tablet
  - ADMKPCA1 copy of L5279A1, generated for use by ADMUPC utility for dummy device
- Locally attached 3270-PC/GX work stations (32 rows, 80 columns).
  - L5379CS 3270-PC/GX, color
  - L5379CSM 3270-PC/GX, color, with mouse
  - L5379CST 3270-PC/GX, color, with tablet
  - L5379MS 3270-PC/GX, monochrome
  - L5379MSM 3270-PC/GX, monochrome, with mouse
  - L5379MST 3270-PC/GX, monochrome, with tablet
  - L5379CD 3270-PC/GX, color, dual screen
  - L5379CDM 3270-PC/GX, color, dual screen, with mouse
  - L5379CDT 3270-PC/GX, color, dual screen, with tablet
  - L5379MD 3270-PC/GX, monochrome, dual screen
  - L5379MDM 3270-PC/GX, monochrome, dual screen, with mouse
  - L5379MDT 3270-PC/GX, monochrome, dual screen, with tablet
- Locally attached 3278 and 3279 displays – no PS compression is specified on the assumption that this is most efficient for a channel-attached controller. The "buffer code" corresponds to the code in the "dev" parameter of the ADMM3270 macro.
  - L78A2 3278, buffer code 2
  - L78A3 3278, buffer code 3
  - L78A4 3278, buffer code 4
  - L78A5 3278, buffer code 5
  - L79A2 3279, buffer code 2
  - L79A3 3279, buffer code 3
- Locally attached 3193 display with 3117 or 3118 scanner.
  - L3193 3193 display
  - L319317 3193 display with 3117 flat-bed scanner
  - L319318 3193 display with 3118 feed-through scanner

Figure 61 (Part 1 of 2). GDDM-supplied device tokens for queriable terminals and printers

GDDM-supplied device tokens for queriable terminals and printers

- Plotters attached to 3179 Models G1 and G2 displays.

L3179G80	6180 plotter
L3179G82	6182 plotter
L3179G84	6184 plotter
L3179G86	6186 plotter
L3179G71	7371 plotter
L3179G72	7372 plotter

- Plotters attached to 3270-PC/G and /GX work stations.

L6180	6180 plotter
L6182	6182 plotter
L6184	6184 plotter
L6186	6186 plotter
L7371	7371 plotter
L7372	7372 plotter
L7374	7374 plotter
L7375	7375 plotter

- Plotters attached to 5550 family multistations.

L5550G71	7371 plotter
L5550G72	7372 plotter

- Locally attached 3268, 3287, and 3262 printers, with no compression.

L68	3268, LU type 3 protocols
L87	3287, LU type 3 protocols
L87S	3287, LU type 1 (SCS) protocols
L3262	3262 belt printer

- Remotely attached 3278 and 3279 displays – PS compression is specified on the assumption that this is most efficient for a link-attached controller. The "buffer code" corresponds to the code in the "dev" parameter of the ADMM3270 macro.

R78A2	Remote 3278, buffer code 2
R78A3	Remote 3278, buffer code 3
R78A4	Remote 3278, buffer code 4
R79A2	Remote 3279, buffer code 2
R79A3	Remote 3279, buffer code 3

- Remote 3287 printers, again with compression.

R87	Remote 3287, LU type 3 protocols
R87S	Remote 3287, LU type 1 (SCS) protocols

Figure 61 (Part 2 of 2). GDDM-supplied device tokens for queriable terminals and printers

GDDM-supplied device tokens for IPDS devices

This set of token definitions is generated as part of ADMLSYS1.

These tokens require the 4224 printer to be set to 10 characters per inch and 8 lines per inch.

- 4224 Printers, LU type 0 protocols.

X4224SS	64K byte RAM, no loadable alphanumeric symbol sets, 68 rows by 132 columns
X4224SE	512K byte RAM, up to 6 loadable alphanumeric symbol sets, 68 rows by 132 columns
X4224QS	64K byte RAM, no loadable alphanumeric symbol sets, 88 rows by 85 columns
X4224QE	512K byte RAM, up to 6 loadable alphanumeric symbol sets, 88 rows by 85 columns

- 4224 Printers, LU type 1 (SCS) protocols.

S4224SS	64K byte RAM, no loadable alphanumeric symbol sets, 68 rows by 132 columns
S4224SE	512K byte RAM, up to 6 loadable alphanumeric symbol sets, 68 rows by 132 columns
S4224QS	64K byte RAM, no loadable alphanumeric symbol sets, 88 rows by 85 columns
S4224QE	512K byte RAM, up to 6 loadable alphanumeric symbol sets, 88 rows by 85 columns

These tokens are for the 3812 Model 2 (IPDS) printer.

- 3812 Printers, LU type 0 protocols.

X3812A4	A4 paper, 93 rows by 82 columns
X3812Q	Quarto paper, 88 rows by 85 columns

- 3812 Printers, LU type 1 (SCS) protocols.

S3812A4	A4 paper, 93 rows by 82 columns
S3812Q	Quarto paper, 88 rows by 85 columns

Figure 62. GDDM-supplied device tokens for IPDS devices

GDDM-supplied device tokens for Kanji devices, and 8775 and 3290 displays

This set of token definitions is generated as part of ADMLSYS1.

- KANJI displays and printers.

KANJI	Kanji 3278 Model 2 display
KANJIP	Kanji 3283 printer, LU type 1 (SCS) protocols
K78A2	Kanji 3278 Model 2 display
K83S	Kanji 3283 printer, LU type 1 (SCS) protocols
K83	Kanji 3283 Model 2 printer, LU type 3 protocols

- 5550 family multistations (non-graphics).

L5550A	Japanese 3270 emulation display, monochrome
L5553A	Japanese 3270 emulation printer, LU type 3 protocols
L5553A1	Japanese 3270 emulation display, LU type 1 (SCS) protocols
L5550G4	Japanese 3270-PC V4.0 display, monochrome
L5550H4	Japanese 3270-PC V4.0 display, color
L5553B14	Japanese 3270-PC V4.0 printer, LU type 1 protocols
L5553B34	Japanese 3270-PC V4.0 printer, LU type 3 protocols

- 5550 family multistations (graphics).

L5550GC2	Japanese 3270-PC/G V2.0 display, 16 dot font
L5550GH2	Japanese 3270-PC/G V2.0 display, 24 dot font
L5550GC3	Japanese 3270-PC/G V3.0 display, 16 dot font, with APL2
L5550GH3	Japanese 3270-PC/G V3.0 display, 24 dot font, with APL2
L5550GC5	Japanese 3270-PC/G V5.0 display, 16 dot font, with APL2
L5550GH5	Japanese 3270-PC/G V5.0 display, 24 dot font, with APL2
L5550GC6	Japanese 3270-PC/G V6.0 display, 16 dot font, with APL2
L5550GH6	Japanese 3270-PC/G V6.0 display, 24 dot font, with APL2

The following tokens are produced automatically by the ADMM3270 macro and cannot be altered.

- 8775 displays with PS and partitions.

ADMK7510	8775, 12 rows by 80 columns
ADMK7520	8775, 24 rows by 80 columns
ADMK7530	8775, 32 rows by 80 columns
ADMK7540	8775, 43 rows by 80 columns

- 8775 displays with partitions and scrolling.

ADMK751S	8775, 12 rows by 80 columns
ADMK752S	8775, 24 rows by 80 columns
ADMK753S	8775, 32 rows by 80 columns
ADMK754S	8775, 43 rows by 80 columns

Figure 63 (Part 1 of 2). GDDM-supplied device tokens for Kanji devices, and 8775 and 3290 displays

GDDM-supplied device tokens for Kanji devices, and 8775 and 3290 displays

- 3290 displays.

ADMK9020	3290, 24 rows by 80 columns
ADMK9030	3290, 32 rows by 80 columns
ADMK9040	3290, 43 rows by 80 columns
ADMK9050	3290, 27 rows by 132 columns
ADMK9060	3290, 62 rows by 160 columns

Figure 63 (Part 2 of 2). GDDM-supplied device tokens for Kanji devices, and 8775 and 3290 displays

GDDM-supplied device tokens for nonqueriable terminals and printers

This set of token definitions is generated as part of ADMLSYS1.

These tokens are produced automatically by the ADMM3270 macro and cannot be altered.

- Nonqueriable display terminals.

ADMK7710	3277 Model 1
ADMK771A	3277 Model 1 with APL
ADMK7720	3277 Model 2
ADMK772A	3277 Model 2 with APL
ADMK7810	3278 Model 1
ADMK781A	3278 Model 1 with APL
ADMK7820	3278 Model 2
ADMK782A	3278 Model 2 with APL
ADMK7830	3278 Model 3
ADMK783A	3278 Model 3 with APL
ADMK7840	3278 Model 4
ADMK784A	3278 Model 4 with APL
ADMK7850	3278 Model 5
ADMK785A	3278 Model 5 with APL

- Other nonqueriable printers.

ADMKQUEP	default token for Family 2 (queued) printers
ADMK8710	3287 Model 1
ADMK871A	3287 Model 1 with APL

Figure 64. GDDM-supplied device tokens for nonqueriable terminals and printers

GDDM-supplied device tokens for PC displays, printers, and plotters

This set of token definitions is in ADMLSYS1.

- Locally-attached PC displays.

LPCM	PC, CGA, monochrome, 80 columns by 24 rows, 640 by 200 pixels
LPCC1	PC, EGA, 16-color, 80 columns by 24 rows, 640 by 200 pixels
LPCC2	PC, EGA, 16-color, 80 columns by 24 rows, 640 by 350 pixels

- Plotters attached to PC displays.

LPC7371	7371 plotter
LPC7372	7372 plotter
LPC7374	7374 plotter
LPC7375	7375 plotter
LPC6180	6180 plotter
LPC6184	6184 plotter

- Printers attached to PC displays.

LPC5182	5182 Color impact printer
LPC3852	3852 Color Jetprinter
LPC5152	5152 Mono Graphics printer
LPC4201	4201 Proprinter
LPC4202	4202 Proprinter XL
LPC5201	5201 Quietwriter

Figure 65. GDDM-supplied device tokens for PC displays, printers, and plotters

GDDM-supplied device tokens for system printers

This set of token definitions is in ADMLSYS3.

- System printers.
  ADMKSYSP default token for Family 3 non-3800 printers
- Various non-3800 printers.

S1403N6	1403, 66 rows by 85 columns, 6 lines per inch
S1403N8	1403, 88 rows by 85 columns, 8 lines per inch
S1403W6	1403, 66 rows by 132 columns, 6 lines per inch
S1403W8	1403, 88 rows by 132 columns, 8 lines per inch

- Various 3800 printers.

S3800N6	3800, 60 rows by 85 columns, 6 lines per inch
S3800N8	3800, 80 rows by 85 columns, 8 lines per inch
S3800N12	3800, 120 rows by 85 columns, 12 lines per inch
S3800W6	3800, 60 rows by 136 columns, 6 lines per inch
S3800W8	3800, 80 rows by 136 columns, 8 lines per inch
S3800W12	3800, 117 rows by 136 columns, 12 lines per inch
S3800N6S	3800, 45 rows by 110 columns, 6 lines per inch
S3800N8S	3800, 60 rows by 110 columns, 8 lines per inch
S3800W6S	3800, 45 rows by 136 columns, 6 lines per inch
S3800W8S	3800, 60 rows by 136 columns, 8 lines per inch

Figure 66. GDDM-supplied device tokens for system printers

GDDM-supplied device tokens for composed-page printers

This set of token definitions is in ADMLSYS4.

- Composed-page printers – this token is used when the DSOPEN device token is given as "*," and no nicknames are in force to alter it. It describes a 4250 printer at 23.62 pixels per mm (600 pixels per inch), 6 pixels per unit line width, with an output image width of 216 mm (8.5 inches), and a depth of 280 mm (11.0 inches).
  ADMKHRIG default token for Family 4 (composed-page) printers
- 3800 or 3820 printer at 4.725 pixels per mm (120 pixels per inch), 3 pixels per unit line width.
  IMG120 3800, width 216 mm (8.5 in), depth 280 mm (11.0 in).
- 3800 or 3820 printer at 9.45 pixels per mm (240 pixels per inch), 3 pixels per unit line width.
  IMG240 3800, width 216 mm (8.5 in), depth 280 mm (11.0 in)
  IMG240X 3800, width 353 mm (13.9 in), depth 317 mm (12.5 in)
  LETTER 3800, width 216 mm (8.5 in), depth 280 mm (11.0 in)
  LEGAL 3800, width 216 mm (8.5 in), depth 356 mm (14.0 in)
  A4 3800, width 211 mm (8.3 in), depth 300 mm (11.8 in)
  EXECUTIV 3800, width 190 mm (7.5 in), depth 267 mm (10.5 in)
  P38PPN3 3800, width 216 mm (8.5 in), depth 254 mm (10.0 in)
- 3800 or 3820 printer at 9.45 pixels per mm (240 pixels per inch), 1 pixel per unit line width.
  FINE240 3800, width 353 mm (13.9 in), depth 317 mm (12.5 in)
  P38PPN1 3800, width 216 mm (8.5 in), depth 254 mm (10.0 in)
  IMG2401 3800, width 216 mm (8.5 in), depth 280 mm (11.0 in)
- 4250 printer at 23.62 pixels per mm (600 pixels per inch), 6 pixels per unit line width.
  IMG85 4250, width 216 mm (8.5 in), depth 280 mm (11.0 in)
  IMG117 4250, width 297 mm (11.7 in), depth 254 mm (10.0 in)
  IMG600X 4250, width 297 mm (11.7 in), depth 356 mm (14.0 in)
  IMG600Y 4250, width 432 mm (17.0 in), depth 280 mm (11.0 in)
  IMGA3X 4250, width 297, depth 420 millimeters
- 4250 printer at 23.62 pixels per mm (600 pixels per inch), 1 pixel per unit line width.
  FINE600 4250, width 297 mm (11.7 in), depth 356 mm (14.0 in)
- Canonical (unformatted) bit image output (note that the values given in DSOPEN processing option groups 5, 8, and 9 are overridden when you use the following tokens).
  CAN512 Unformatted bit image output, 512 × 512 pixels
  CAN1024 Unformatted bit image output, 1024 × 1024 pixels

Figure 67. GDDM-supplied device tokens for composed-page printers

Creating your own device tokens

The GDDM-supplied device tokens are designed to cater for most subsystems.

For family-1 devices, you will not normally need to specify a device token unless:

- The device is a dummy device
- The device is nonqueriable.

You may need to alter the supplied tokens under particular conditions:

- If you have unusual devices
- If the work-station setup is different from that defined in the supplied tokens (for example, the plotter name is different from that suggested).

The entries within the tables are generated by macros. The names of the macros are:

ADMM3270 to generate the entries in ADMLSYS1 (for 3270-family devices)
ADMMSYSP to generate the entries in ADMLSYS3 (for system printers)
ADMMIMAG to generate the entries in ADMLSYS4 (for high-resolution image files).

The general form of the assembler input to generate the tables is:

```
ADMLSYSx  CSECT
          ADMMxxxx  START
T1        ADMMxxxx  .....          DEFINITION FOR TOKEN T1
T2        ADMMxxxx  .....          DEFINITION FOR TOKEN T2
          ........
          ADMMxxxx  END
          END
```

The CSECT name must be either ADMLSYS1, ADMLSYS3, or ADMLSYS4 as appropriate, there must be at least one token defined, and the last macro invocation in the list must contain the single parameter END. Refer to "How to replace a GDDM module that you've changed" on page 105 for further information about how to replace these tables.

Each macro is described in more detail below.

The ADMM3270 macro

The ADMM3270 macro is used to define the characteristics of 3270-family devices. The properties of devices of this family are described in the manual *3270 Information Display System: 3274 Control Unit Description and Programmer's Guide*, which is referred to below as the Control Unit Description manual.

A device token is a chain of query reply structured fields, organized as follows:

- At least one non-IPDS structured field (all devices)
- A sense type and model (STM) header field, followed by at least one STM structured field (IPDS devices only)

- At least three request printer information (RPI) structured fields (IPDS devices only).

The syntax of the macro invocation is as follows:

```
name  ADMM3270  dev,          unit-code | DISPLAY | PRINTER |
                              PLOTTER | START | END
                type,         BASE | EXTENDED
                APL=,         YES | NO
                ANOMALY=,     reply-field
                AUXDEV=,      reply-field
                AUXONLY=,     YES | NO
                BGTRAN=,      reply-field
                BUFFER=,      (rows,columns)
                COLOR=,       MONO | NO | reply-field
                COMPRES=,     YES | NO
                DBCS=,        reply-field
                DDM=,         reply-field
                FLDOUT=,      reply-field
                FMH=,         YES | NO
                GCOLEX=,      reply-field
                GCOLOR=,      reply-field
                GSSETnn=,     sdp-field (for nn=00 to 19)
                GSSHDR=,      reply-field
                GSSPSK=,      sdp-field
                HILITE=,      NO | reply-field
                IMAGE=,       reply-field
                IMAUX=,       reply-field
                IMPART=,      reply-field
                KANJI=,       YES | NO
                LCID=,        (lcid-1,lcid-2,....)
                LINETYP=,     reply-field
                MAXPAGE=,     (rows,columns)
                OEMAUXn=,     reply-field (n=0 to 9)
                OUTBND=,      YES | NO
                PART=,        reply-field
                PDEST=,       plotter-destination/origin-id
                PORTn=,       reply-field (for n=0 to 9)
                PNAME=,       plotter-user-name (PLOTTERn)
                PROC=,        reply-field
                PTYPE=,       IBM737x|IBM618x
                PS=,          NO| 0 | 2 | 4 | 6 | reply-field
                REPLY=,       FIELD | EFIELD | CHAR
                REPLYn=,      general-reply (for n=0 to 9)
                SCS=,         YES | NO
                SCSSET=,      (<BASE|FULL>,<BEL|NOBEL>)
                SEGMENT=,     reply-field
                STGPOOL=,     reply-field
                TEXT=,        YES | NO
                UAREA=,       reply-field
                UNSPEC=,      unspecified-hex-string
                VALID=,       reply-field
```

The following parameters are only associated with tokens for IPDS devices:

```
DATCHN=,     reply-field
DSTXBL=,     reply-field
IPDS=,       stm-model
STMBC=,      stm-field
STMDC=,      stm-field
STMDR=,      stm-field
STMIM=,      stm-field
STMIO=,      stm-field
STMLF=,      stm-field
STMOL=,      stm-field
STMPS=,      stm-field
STMPT=,      stm-field
RPIFA=,      rpi-field
RPIFC=,      rpi-field
RPIFI=,      rpi-field
RPIFR=,      rpi-field
RPIPA=,      rpi-field
RPIPAn=,     rpi-field (for n=0 through 3)
RPIPQ=,      rpi-field
RPIRFnn=,    sdp-field (for nn=01 through 19)
RPISPD=,     sdp-field
RPISPn=,     sdp-field (for n=1 through 9)
RPISSF=,     sdp-field
RPISSV=,     sdp-field
```

The keyword parameters can be arranged in any order; the last keyword parameter must not be delimited with a comma.

The explanations of the operands of the ADMM3270 macro instruction are in the order: reply-field, general-reply, sdp-field, stm-model, stm-field, rpi-field, name, dev, type, followed by the keywords in the order given above.

reply-field

This is the value of a query reply structured field of the appropriate type from the fifth byte onwards. Its format is either a single data constant, or a list of data constants enclosed within parentheses. These are used as operands to one or more assembler DC instructions. The content of the structured field is described in the Control Unit Description manual. Some examples are shown in Figure 68 on page 175.

A Query Reply structured field consists of:

1. A 2-byte length field
2. A code byte, X'81', identifying it as a query reply
3. A type byte, referred to in the descriptions of the parameters that follow
4. The reply-field, as specified for the parameter.

Use a reply-field to specify the values to be assumed by GDDM for devices that GDDM itself cannot query (dummy devices or nonqueriable devices).

general-reply

This is the value of a query reply structured field from the fourth byte onwards. It is similar to a reply-field, but it also includes the type byte.

sdp-field
This is a more general form of reply-field, which is intended for the unusual types of query reply structured field that cannot be defined using one of the supplied keywords. The reply-field for some non-IPDS keywords and the rpi-field for some IPDS keywords contain one or more self-defining parameters (SDP). These consist of:

- A 1-byte length field
- A 1-byte type field, referred to in the descriptions of parameters given below
- The sdp-field as specified for the parameter.

stm-model
This is a 3-byte data constant, specifying the IPDS product and model numbers. It forms part of the STM header field, which comprises:

- A header byte X'FF'
- A 2-byte product number
- A 1-byte model number
- A reserved field, X'0000'.

stm-field
This is the value of an STM query reply structured field of the appropriate type from the sixth byte onwards. Its format is a single-digit level number optionally followed by a list of 16-bit data constants. The whole value must be enclosed within parentheses unless the parameter comprises only the level number. An STM structured field consists of:

- A 2-byte length field
- A 2-byte type field, referred to in the descriptions of the STM parameters below
- A 2-byte level field of the form X'FFn0' where "n" is the single-digit level number
- A sequence of 2-byte property fields.

rpi-field
This is the value of an RPI query reply structured field of the appropriate type from the fifth byte onwards. An RPI structured field consists of:

- A 2-byte length field
- A 2-byte type field, referred to in the descriptions of the RPI parameters below
- The rpi-field, as specified for the parameter.

name
This is the name of the device characteristics token. It is from 1 through 8 characters long and must follow the rules for assembler labels. It must be present on all invocations of the macro except those with START and END, where it must be omitted. The name must not start with the letters ADM.

dev
This indicates the type of device for which the token is defined. The type of device can be:

`unit-code`, `PRINTER`, `PLOTTER`, or `DISPLAY`.
`END` is coded when the list of device token definitions is terminated.
`START` can be specified the first time the macro is invoked.

The most common case is "unit-code." Unit-code contains two parts separated by a hyphen. For example, 3278-2.

"unit" is one of

3275	3277	3279	3284	8775
3276	3278	3283	3287	

and "code" is a single digit from 1 through 5, and is a code for the character buffer size of the device, although it can be overridden by the BUFFER parameter. For displays, it has the following meanings:

Code	Character buffer size	
	Rows	Columns
1	12	40
2	24	80
3	32	80
4	43	80
5	27	132

The hyphen and "code" can be omitted only when the device is a printer to which SCS data streams are to be sent. In this case, the SCS option described below must be used.

For displays, the buffer size defined by "code" determines the size of the default page created by GDDM.

For printers, the character buffer specification is used within GDDM to determine how much of a page can be transferred to the printer at any one time.

If applicable to a device, it is assumed that the default and alternate character buffer sizes are equal. For details of default and alternate character buffer sizes, see the Control Unit Description manual.

Most of the information associated with a device-characteristics token is held in the table in the form of a QUERY REPLY, whose content is defined for each of the "unit" numbers in the list above. If the device being defined requires a QUERY REPLY that does not match that for one of the unit types defined above and the remaining options cannot override it, the DEV parameter should be coded accordingly as a PLOTTER, DISPLAY, or PRINTER.

If the device is a plotter, GDDM treats it as a separate device and much of the query-reply data from the session device is not relevant. To simplify the construction of tokens for plotters, the DEV parameter can specify PLOTTER, and only those keywords relevant to plotters (PTYPE, PNAME, and PDEST) need be specified. Such tokens may only be used for auxiliary devices.

If the device is a display or a printer, the DEV parameter should specify PRINTER if it is a printer and DISPLAY if it is a display, and the rest of the information for the device should be built up by specifying values for the options described below.

type

This is a gross qualification of the function provided by the device. If this option is specified as BASE, the device supports no extended attributes. If specified as EXTENDED, the device supports at least one extended attribute.

By default, all attributes are assumed supported, but this may be overridden by the COLOR, HILITE, and PS options described below.

APL
This indicates (YES) that the device contains the APL character set and has the APL keyboard, or (NO) that the device does not support the APL characters.

This option may be coded for any device. The default is NO for all devices except the 3279 and 3287, for which the default is YES. APL=YES and TEXT=YES cannot both be specified.

When a PS= reply-field is also specified, you should ensure that it is consistent with respect to "graphic-escape supported."

ANOMALY
This specifies the reply-field for type X'9D' (anomaly implementation) query reply structured fields.

AUXDEV
This specifies the reply-field for type X'99' (auxiliary device) query reply structured fields.

AUXONLY
This specifies whether the device is an auxiliary-only device (a plotter), but is not necessary when PLOTTER is specified.

BGTRAN
This specifies the reply-field for type X'A8' (background transparency) query reply structured fields.

BUFFER
This is an explicit specification of the character buffer size, and consists of two subfields, **rows** and **columns**. This parameter may be specified only for EXTENDED type devices. It is required for the generic DISPLAY or the generic non-SCS PRINTER devices. It is optional for generic IPDS PRINTER devices, and invalid for generic SCS PRINTER devices.

COLOR
This indicates that the device supports the color attribute.

NO indicates that the device does not support Set-Attribute orders for color.

MONO indicates that Set-Attribute orders may be sent to the device but that each color is displayed or printed in the default color.

If neither of the above two options is coded, the value specified is assumed to be a reply-field for type X'86' (color) query reply structured fields.

COMPRES
This indicates the type of load PS data format that may be sent to the device. **YES** indicates that the device will accept formats in which the definitions of each character have been compressed to reduce line traffic. **NO** indicates that only the fully expanded form of symbol definitions may be sent to the device.

The option may be coded only for EXTENDED devices and defaults to NO.

DBCS
This specifies the reply-field for type X'91' (DBCS-Asian node) query reply structured fields.

DDM
This specifies the reply-field for type X'95' (distributed data management) query reply structured fields.

FLDOUT
This specifies the reply-field for type X'8C' (field outlining) query reply structured fields.

FMH
This indicates that Function Management Headers Type 1 (FMH-1) may be sent (YES) or may not be sent (NO) to an SCS device.

If this parameter is omitted for an SCS device, the default is YES if the device supports the SCS data structured field, and NO if it does not.

GCOLEX
This can be used as an extension of the GCOLOR parameter, when the specification exceeds the assembler limit of 455 characters for macro operands.

GCOLOR
This specifies the reply-field for type X'B4' (graphics color) query reply structured fields.

GSSET00 through GSSET19
This specifies the sdp-field for the type X'01' (symbol store definition) self-defining parameter for the graphics symbol sets query reply structured field. The value is from the third byte onwards.

GSSHDR
This specifies the first part of the reply-field for type X'B6' (graphics symbol sets) query reply structured fields. The remainder of the reply-field may be specified by one or more GSSET00 through GSSET19 operands and a GSSPSK operand.

GSSPSK
This specifies the sdp-field for the type X'02' (proportional spacing and kerning) self-defining parameter for the graphics symbol sets query reply structured field. Like the GSSETnn operand, the value is from the third byte onwards.

HILITE
This indicates support for the Set Attribute (extended highlighting) order by the device. If NO is coded, the device does not support the order. If the option is not NO, the value specified is assumed to be a reply-field for type X'87' (highlighting) query reply structured fields.

IMAGE
This specifies the reply-field for type X'82' (image device) query reply structured fields.

IMAUX
This specifies the reply-field for type X'AA' (image auxiliary device) query reply structured fields.

IMPART
This specifies the reply-field for type X'A6' (implicit partitions) query reply structured fields.

This option is necessary in those cases where UAREA does not define the buffer size explicitly (for example, for the IBM 3290).

KANJI
This indicates (YES) that the device supports the KANJI character set, or (NO) that it does not.

This parameter may be coded only if the DEV parameter is 3278-2, 3283-2 or (if SCS = YES) 3283.

LCID
This is a list of symbol-set identifiers, one for each loadable symbol set. Each identifier must be two hexadecimal digits. See the Control Unit Description manual for valid values of these identifiers.

LINETYP
This specifies the reply-field for type X'B2' (line types) query reply structured fields.

MAXPAGE
This is an explicit specification of the page size that will be used by GDDM if the default page is created. (The default page is created as page 0 by GDDM if no explicit FSPCRT call is used.) MAXPAGE consists of two subfields, **rows** and **columns**.

The rows and columns values must be positive. For display devices, they must be less than or equal to the rows and columns values of the character buffer size respectively.

For both displays and printers, rows * columns * 2 must be less than or equal to 32000.

If the MAXPAGE parameter is not explicitly specified in the device token, GDDM applies default values as follows:

For displays, the default values are determined by the character buffer size.
For printers with SCS = YES, GDDM selects appropriate defaults according to the contents of the UAREA field of the device token, and the limits defined above.
For IPDS printers, GDDM selects appropriate defaults according to the contents of the RPIPA field of the device token, and the limits defined above.
For non-IPDS non-SCS printers, GDDM applies a default value of (80,132).

OEMAUX0 through OEMAUX9
These specify the reply-fields for type X'8F' (OEM auxiliary device) query reply structured fields.

OUTBND
This indicates support for the outbound 3270 structured field for displays or, for SCS printers, the support of the SCS data structured field.

If coded as **YES**, the relevant structured field may be sent to the device. **NO** indicates that the device does not support the structured field.

This option may be coded only for EXTENDED types of device, and must not be coded for the generic devices PRINTER and DISPLAY. The default is YES for devices described as "unit-code" which are extended.

PART
This specifies the reply-field for type X'84' (partitions) query reply structured fields.

If this option is not coded, the device is assumed to have no partition capability.

PDEST
This is the IEEE address of an attached plotter.

PORT0 through PORT9
These specify the reply-fields for type X'B3' (port) query reply structured fields.

PNAME
This is the name of an attached plotter. It must match the name specified when you customize your work station. The suggested names are of the form PLOTTERn.

PROC
This specifies the reply-field for type X'B1' (procedure) query reply structured fields.

PTYPE
This is the type of an attached plotter. Supported values are:
`IBM6180, IBM6182, IBM6186, IBM7371, IBM7372, IBM7374, IBM7375`

PS
This indicates the number of programmed symbols set stores in the device. The value can be **0, 2, 4, 6**. NO means the same as 0. The value 6 may be coded only for displays.

If the option is none of the above, it is assumed to be a reply-field for type X'85' (character sets) query reply structured fields.

REPLY
This indicates the reply modes supported by the device. The values coded may be one of FIELD, EFIELD, and CHAR. These indicate support for Field Mode, Extended Field Mode, and Character Mode incoming data streams, respectively. These modes are further described in the Control Unit Description manual.

REPLY0 through REPLY9
These specify query reply structured field values from the fourth byte onward.

SCS
This indicates (YES) that SCS data streams are accepted or (NO) are not accepted by the device. If SCS = YES, a type X'A2' (data stream) query reply structured field is generated. The "reply-field" defaults to either X'00' for non-IPDS tokens or X'0002' for IPDS tokens.

This keyword may be coded only for PRINTER devices. The default is NO.

SCSSET
This indicates the subset of SCS data streams accepted by a device for which SCS = YES has been specified. It consists of two subfields, the second of which is optional.

The first may be FULL or BASE. The former indicates the FULL BASE subset, the latter the BASE subset. The content of these two subsets of SCS is defined in the Control Unit Description manual.

The second may be BEL or NOBEL. The former indicates that BEL may be sent to the device, the latter that it may not.

This option may be coded only for devices for which SCS = YES. The default is FULL,BEL for EXTENDED devices, and BASE,NOBEL for BASE devices.

SEGMENT
This specifies the reply-field for type X'B0' (segment) query reply structured fields.

STGPOOL
This specifies the reply-field for type X'96' (storage pools) query reply structured fields.

TEXT
This indicates (YES) that the device contains the TEXT character set and has a Data Entry keyboard, or (NO) that it does not.

This option may be coded for any device. The default is NO for all devices. APL = YES and TEXT = YES cannot both be specified.

If PS = reply-field is also specified, you should ensure that it is consistent with respect to "graphic-escape supported."

UAREA
This specifies the reply-field for type X'81' (usable area) query reply structured fields.

UNSPEC
This specifies a complete query reply structured field from the first byte onward.

VALID
This specifies the reply-field for type X'8A' (validation) query reply structured fields.

If this option is not coded, the device is assumed to have no validation feature.

DATCHN
This specifies the reply-field for type X'98' (Data chaining) query reply structured fields. This keyword is only valid for IPDS PRINTER devices, and it must be specified if SCS data streams are not accepted.

DSTXBL
This specifies the reply-field for type X'9A' (LU-0 data stream type, and transfer buffer limit) query reply structured fields. This keyword is only valid for IPDS PRINTER devices, and it must be specified if SCS data streams are not accepted.

IPDS
This identifies an IPDS token and therefore:

It validates the inclusion of STM and RPI keywords.
It defines the product and model numbers. These are stored in the STM reply-list header.

STMBC
This specifies the stm-field for type X'C2C3' (bar code) STM query reply structured field.

STMDC
This specifies the stm-field for type X'C4C3' (IPDS device control) STM query reply structured field.

STMDR
This specifies the stm-field for type X'E5C7' (vector graphics) STM query reply structured field.

STMIM
This specifies the stm-field for type X'C9D4' (Advanced Function Presentation Datastream – AFPDS – image) STM query reply structured field.

STMIO
This specifies the stm-field for type X'C9D6' (IDF image) STM query reply structured field.

STMLF
This specifies the stm-field for type X'C3C6' (loaded font) STM query reply structured field. Three levels are supported with the following dependencies:

LF/1 – coded fonts only
LF/2 – loaded symbol sets only
LF/3 – coded fonts and loaded symbol sets.

STMOL
This specifies the stm-field for type X'D6D3' (overlay) STM query reply structured field.

STMPS
This specifies the stm-field for type X'D7E2' (page segment) STM query reply structured field.

STMPT
This specifies the stm-field for type X'D7E3' (presentation text) STM query reply structured field.

RPIFA
This specifies the rpi-field for type X'0007' (features available) RPI query reply structured field.

RPIFC
This specifies the rpi-field for type X'0005' (foreground colors) RPI query reply structured field.

RPIFI
This specifies the rpi-field for type X'0006' (features installed) RPI query reply structured field.

RPIFR
This specifies the rpi-field for type X'0003' (font resolution) RPI query reply structured field.

RPIPA, RPIPAn
These specify the rpi-field for type X'0001' (printable area definition) RPI query reply structured field. **n** is the bin number, for multiple bin printers.

RPIPQ
This specifies the rpi-field for type X'0009' (print quality) RPI query reply structured field.

RPIRFnn
This specifies the sdp-field for type X'01' (resident font code page support) self-defining parameter. A number of these parameters are concatenated together to form the rpi-field for type X'0008' (resident font list) RPI query reply structured field.

RPISPD
This specifies the sdp-field for type X'01' (storage pool) self-defining parameter. This default parameter always forms the first or only part of a type X'0004' (storage pool list) RPI query reply structured field.

RPISPn
This specifies the sdp-field for type X'01' (storage pool). These supplementary parameters are concatenated together with the default parameter to form the rpi-field of a type X'0004' (storage pool list) RPI query reply structured field.

RPISSF
This specifies the sdp-field for type X'01' (symbol set, fixed block size) self-defining parameter. This parameter forms the first or only part of the RPI field for a type X'0002' (symbol set) RPI query reply structured field.

RPISSV
This specifies the sdp-field for type X'02' (symbol set, variable block size) self-defining parameter. This parameter forms the second or only part of the RPI field for a type X'0002' (symbol set) RPI query reply structured field.

Notes relating to IPDS tokens:

1. The IPDS keyword may be coded only for PRINTER devices.
2. The IPDS device supports LU-1 mode (SCS = YES), or LU-0 mode (SCS = NO), LU-0 being the default.
3. A data-stream query reply structured field is generated either (1) as described by the SCS keyword for LU-1 mode tokens, or (2) as described by the DSTXBL keyword for LU-0 mode tokens.
4. The BUFFER keyword can be omitted. This is equivalent to BUFFER = (0,0).

5. All objects that are not specified in supplementary storage pools are stored in the default storage pool.
6. If a null parameter is coded for features available, the default will be a copy of the features-installed parameter.
7. The keywords STMDC, RPIFR, RPIPA, and RPISDP must be specified. All the other STM or RPI keywords are optional.

Possible error messages from ADMM3270 macro

```
ADM5001 E DEVICE PARAMETER OMITTED
ADM5002 E DEVICE PARAMETER 'a' IS INVALID
ADM5003 E THE NAME PARAMETER IS REQUIRED
ADM5004 E USER NAMES MUST NOT START WITH 'ADM'
ADM5005 E CODE 'n' IS INVALID FOR DEVICE 'a'
ADM5006 E A VALUE FOR KEYWORD 'a' IS REQUIRED
ADM5007 E 'a1=a2' IS INVALID FOR GENERIC DEVICES
ADM5008 E 'a1' MAY NOT BE CODED FOR 'a2' DEVICES
ADM5009 E THE VALUE 'a2' FOR KEYWORD 'a1' IS INVALID
ADM5010 E MAIN CONTROL SECTION NAME MUST BE 'a'
ADM5011 E TOO MANY LCIDS ARE SPECIFIED
ADM5012 E GENERIC DEVICES MUST NOT BE SPECIFIED AS BASE
ADM5013 W NO DATA GENERATED FOR THIS DEVICE
ADM5014 E END PROCESSING HAS ALREADY OCCURRED
ADM5015 E TOO MANY POSITIONAL OPERANDS
ADM5024 E KEYWORD 'a1' IS REQUIRED WITH 'a2'
ADM5025 E KEYWORD 'a' MUST HAVE 2 VALUES
ADM5026 E THE 'a' AREA (n) EXCEEDS 16000
ADM5027 E 'a1' MAY NOT BE CODED WITH 'a2=REPLY-FIELD'
ADM5028 E KEYWORD 'a' IS ONLY VALID FOR PRINTER DEVICES
ADM5029 E KEYWORD 'a' IS ONLY VALID FOR IPDS DEVICES
ADM5030 E INVALID LU-MODE SPECIFICATION
ADM5031 E LEVEL n IS NOT VALID FOR KEYWORD 'a'
ADM5032 E KEYWORD 'a' DOES NOT EXIST
ADM5033 E INVALID VALUE SYNTAX FOR KEYWORD 'a'
```

Example of coding a device characteristics token

Some device tokens can be defined using only the "unit-code," BUFFER, and COMPRES options. If only these options are coded, the remainder of the options default to the maximum function or capability. For example, for 3279 devices it is assumed by default that all the extended attributes are supported, and that the maximum number of loadable PS stores is available. Thus, one of the GDDM-supplied tokens for a 3279 Model 3 is:

```
L79A3    ADMM3270 3279-3
```

An example of the coding for a device characteristics token using the UAREA and other values is given in Figure 68.

```
*********************************************************************
*                                                                   *
*      EXAMPLE OF FULL SPECIFICATION OF DEVICE TOKEN.               *
*                                                                   *
*      (The following hexadecimal Reply-fields specify Query        *
*       Reply structured fields from the fifth byte onwards.)       *
*                                                                   *
*********************************************************************
ADMK9060 ADMM3270 DISPLAY,EXTENDED,BUFFER=(62,160),REPLY=CHAR,APL=YES, X
               UAREA=(X'03A003C002EF010005000E0005000E060C0000060C101F'X
               ),                                                    X
               HILITE=(X'0400F0F1F1F2F2F4F4'),                       X
               PART=(X'10600080',X'07020200000000'),                 X
               IMPART=(X'0000',X'0B0100005000180OA0003E',X'0B0200000600X
               0C0006000C'),                                         X
               PS=(X'B80009106000000005',X'0000000910',X'0000000910',X'X
               0100F10910',X'0100F10910',X'0280FF0910',X'0380FF0910',X'X
               0480FF0910',X'0580FF0910',X'0680FF0910',X'0780FF0910'), X
               COLOR=(X'000800FAF100F200F300F400F500F600F700')

*********************************************************************
```

For detailed descriptions of each of the above reply-fields, see the Control Unit Description manual. The query reply structured fields generated by the macro are as follows:

```
ADM1011A EQU     *
         DC      AL2(ADM1011B-ADM1011A)
         DC      X'8181'          USABLE AREA
         DC      X'03A003C002EF010005000E0005000E060C0000060C101F'
ADM1011B EQU     *
ADM1014A EQU     *
         DC      AL2(ADM1014B-ADM1014A)
         DC      X'8184'          PARTITIONS
         DC      X'10600080',X'07020200000000'
ADM1014B EQU     *
ADM1015A EQU     *
         DC      AL2(ADM1015B-ADM1015A)
         DC      X'8185'          CHARACTER SETS
         DC      X'B80009106000000005',X'0000000910',X'0000000910',X'01X
               00F10910',X'0100F10910',X'0280FF0910',X'0380FF0910',X'04X
               80FF0910',X'0580FF0910',X'0680FF0910',X'0780FF0910'
ADM1015B EQU     *
ADM1016A EQU     *
         DC      AL2(ADM1016B-ADM1016A)
         DC      X'8186'          COLOR REPLY
         DC      X'000800FAF100F200F300F400F500F600F700'
ADM1016B EQU     *
```

Figure 68 (Part 1 of 2). Example of coding a device token

```
ADM1017A EQU     *
         DC      AL2(ADM1017B-ADM1017A)
         DC      X'8187'          HIGHLIGHTING
         DC      X'0400F0F1F1F2F2F4F4'
ADM1017B EQU     *
ADM1018A EQU     *
         DC      AL2(ADM1018B-ADM1018A)
         DC      X'8188'          REPLY MODES
         DC      X'000102'
ADM1018B EQU     *
ADM1016E EQU     *
         DC      AL2(ADM1016F-ADM1016E)
         DC      X'81A6'          IMPLICIT PARTITIONS
         DC      X'0000',X'0B0100005000180OA0003E',X'0B02000006000C0006X
               000C'
ADM1016F EQU     *
```

Figure 68 (Part 2 of 2). Example of coding a device token

The ADMMSYSP macro

The ADMMSYSP macro is used to define the device characteristics of a system printer (family 3) that is accessed using GDDM functions. The syntax of the macro is given below:

```
name  ADMMSYSP  type,          3800 | * | omitted
                MAXPAGE=,      (rows,columns)
                SPACING=       (lines/inch,columns/inch)
```

name

This is the name of the device characteristics token. It is from 1 to 8 characters long and must follow the rules for assembler labels. It must be present on all invocations of the macro except the last where it must be omitted. The name must not start with the letters ADM.

type

This determines whether one- or two-character carriage control sequences are to be used. If this parameter is omitted or coded as *, a single carriage-control character will be used. If **3800** is coded, the additional Table Reference Characters for 3800 printers will be used.

MAXPAGE

This is two integer values in the range 1 through 32767. The first is the maximum number of rows that may be created on a GDDM page, the second the number of columns. The number of columns does not include space required for carriage control. The output print file will be 1 or 2 characters wider than the size given.

The default value is (66,132).

SPACING

These are two integer values in the range 1 through 32767. The first is the number of lines per inch, and the second the number of columns per inch on the device.

The default value is (6,10).

Possible error messages from ADMMSYSP macro

```
ADM5003 E THE NAME PARAMETER IS REQUIRED
ADM5004 E USER NAMES MUST NOT START WITH 'ADM'
ADM5009 E THE VALUE 'a2' FOR KEYWORD 'a1' IS INVALID
ADM5010 E MAIN CONTROL SECTION NAME MUST BE 'a'
ADM5013 W NO DATA GENERATED FOR THIS DEVICE
ADM5014 E END PROCESSING HAS ALREADY OCCURRED
ADM5015 E TOO MANY POSITIONAL OPERANDS
ADM5016 E INVALID DEVICE TYPE 'a'
```

The ADMMIMAG macro

To generate device tokens for family 4 (composed-page) devices you need the ADMMIMAG macro instruction. The syntax of the macro invocation is as follows:

```
name   ADMMIMAG  type,              device number
                 PPI=value,         pixels per inch
                 LINE=value,        pixels per unit line width
                 PAPER=(width,      default paper width
                        depth,      default paper depth
                        units)      units (1/10 inch or mm)
```

name
This is the name of the device characteristics token. It is from 1 to 8 characters long and must follow the rules for assembler labels. It must be present on all invocations of the macro except the last, from which it must be omitted. The name must not start with the letters ADM.

type
This is the device number, and it is required if the image data is to be formatted according to specific device requirements. Specify **4250** for the IBM 4250 Printer or **3800** for the IBM 3800 Printing subsystem (composed-page printer). (The 3820 and 3812 printers are treated as being 3800 composed-page printers.)

PPI
This is the factor to be used in converting the image size from inches to pixels.

LINE
This is the factor to be used in calculating line widths. The value indicates the number of pixels per unit line width.

PAPER
This defines the default size of the medium on which the image is to be drawn. The width and depth are specified in units of tenths of inches or millimeters according to the units parameter.

```
units = 0       tenths of inches
        1       millimeters
```

Possible error messages from ADMMIMAG macro

```
ADM5003 E THE NAME PARAMETER IS REQUIRED
ADM5004 E USER NAMES MUST NOT START WITH 'ADM'
ADM5009 E THE VALUE 'a2' FOR KEYWORD 'a1' IS INVALID
ADM5010 E MAIN CONTROL SECTION NAME MUST BE 'a'
ADM5013 W NO DATA GENERATED FOR THIS DEVICE
ADM5014 E END PROCESSING HAS ALREADY OCCURRED
ADM5015 E TOO MANY POSITIONAL OPERANDS
ADM5016 E INVALID DEVICE TYPE 'a'
```

Example of the ADMMIMAG macro

```
IMG85    ADMMIMAG 4250,PPI=600,LINE=6,PAPER=(85,110,0)
```

Appendix D. GDDM default symbol sets

See "Symbol sets" on page 107 for a brief description of what symbol sets are and how they are used. Full descriptions of using symbol sets are in the *GDDM Image Symbol Editor* and *GDDM-PGF Vector Symbol Editor* manuals. The *GDDM Typefaces and Shading Patterns* booklet illustrates and summarizes the supplied symbol sets.

Default symbol sets are the symbol sets that GDDM uses to display character strings, to shade areas, and to draw markers when the user has not specified an alternative.

Some of the symbol sets used by GDDM are provided both within load modules and, separately, in editable source format. The symbol sets in the load modules are used by default when GDDM displays text or graphics. The editable formats allow installations to change the defaults if they want to, or they can be used as a basis for creating your own symbol sets, for example, to change currency symbols.

Figure 70 on page 181 shows the names and uses of the symbol sets. Note that, for some of the vector symbol sets, the name within the load module is not the same as that of the editable symbol set. Use Figure 69 on page 180 to give a last letter that corresponds to the smallest containing cell size. Figure 69 also lists the devices for which each set may be suitable.

Last letter	Matrix size	Monochrome or multicolor	Suitable devices
A	9 x 16	Monochrome	3278 Display Station Models 2 and 3 8775 Display Terminal Models 1 and 11 8775 Display Terminal Models 2 and 12 (can be either 9 x 16 or 9 x 12) 3270-PC Work station (symbol size is 9 x 14) 3270-PC/G Work station 3290 Panel display, all models
C	9 x 12	Monochrome	3278 Display Station Model 4 8775 Display Terminal Models 2 and 12 (can be either 9 x 16 or 9 x 12) IBM PC EGA high-resolution display adapter IBM Personal System/2 display adapter
D	9 x 12	Multicolor	3179 Model G Color Display 3279 Color Display Station, all models
E	9 x 10	Monochrome	3270-PC/G alphanumerics only IBM PC CGA display adapter IBM PC EGA low-resolution display adapter
G	10 x 8	Monochrome	3268, 3287 Printers, all models
H	10 x 8	Multicolor	3268, 3287 Printers, all models
J	—	Monochrome	4250 Printer (high-resolution symbol sets, 400 pels per inch or greater)
K	20 x 18	Monochrome	4224 Printer
L	—	Monochrome	3800 Printer (medium-resolution symbol sets, less than 400 pels per inch)
N	8 x 16	Multicolor	3270-PC/G, all models (graphics only)
Q	24 x 30	Monochrome	3812 Model 2 Printer
R	12 x 20	Multicolor	3270-PC/GX, all models
	12 x 24		5550 multistation IBM Personal System/2 8514/A display adapter
U	—	Multicolor	618x and 737x plotters

Figure 69. Last letters of sample symbol set names

If the device has a cell size that is not one listed above, GDDM selects the character that corresponds to the smallest containing cell size. For example, for a device cell size of 9 by 14, such as 3270-PC, GDDM selects an image symbol set with a cell size of 9 by 16 (last letter A). This means that the 3270-PC can suffer from bars across shaded patterns giving an effect known as the "venetian blind" effect.

Name within load module	Editable set name if different	Type	Usage and size
ADMDHHVN	ADMDVIH *	Vector	Mode 3 text (8 by 16)
ADMDHHVR	ADMDVIH *	Vector	Mode 3 text (12 by 20)
ADMDHIIA	ADMDHHIA	Image	Mode 2 text (9 by 16)
ADMDHIIC	ADMDHHIC	Image	Mode 2 text (9 by 12)
ADMDHIIG	ADMDHHIG	Image	Mode 2 text (10 by 8)
ADMDHIIK	ADMDHHIK	Image	Mode 2 text (20 by 18)
ADMDHIIN	ADMDHHIN	Image	Mode 2 text (8 by 16)
ADMDHIIQ	ADMDHHIQ	Image	Mode 2 text (24 by 30)
ADMDHIIR	ADMDHHIR	Image	Mode 2 text (12 by 20)
ADMDHIMA		Image	Markers (9 by 16)
ADMDHIMC		Image	Markers (9 by 12)
ADMDHIMG		Image	Markers (10 by 8)
ADMDHIMJ		Vector	Markers
ADMDHIMK		Image	Markers (20 by 18)
ADMDHIMN		Image	Markers (8 by 16)
ADMDHIMQ		Image	Markers (24 by 30)
ADMDHIMR		Image	Markers (12 by 20)
ADMDHIMV		Vector	Markers
ADMDHIPA		Image	Patterns (9 by 16)
ADMDHIPC		Image	Patterns (9 by 12)
ADMDHIPG		Image	Patterns (10 by 8)
ADMDHIPJ		Image	Patterns (32 by 32)
ADMDHIPK		Image	Patterns (32 by 32)
ADMDHIPM		Image	Patterns (32 by 32)
ADMDHIVA	ADMDVSS	Vector	Mode 3 text (9 by 16)
ADMDHIVC	ADMDVSS	Vector	Mode 3 text (9 by 12)
ADMDHIVG	ADMDVSS	Vector	Mode 3 text (10 by 8)
ADMDHIVJ		Vector	Modes 1, 2 and 3 text
ADMDHIVK	ADMDVSS	Vector	Mode 3 text (20 by 18)
ADMDHIVM		Vector	Modes 1, 2 and 3 text (See Note)
ADMDHIVN	ADMDVSS	Vector	Mode 3 text (8 by 16) (See Note)
ADMDHIVQ	ADMDVSS	Vector	Mode 3 text (24 by 30)
ADMDHIVR	ADMDVSS	Vector	Mode 3 text (12 by 20)
ADMDHIVW	ADMDVSS	Vector	Mode 3 text (plotters)

Figure 70 (Part 1 of 2). Sample symbol set names and usage in load module and editable formats

Name within load module	Editable set name if different	Type	Usage and size
ADMDHJIA	ADMDHIIA	Image	Mode 2 text (9 by 16)
ADMDHJIC	ADMDHIIC	Image	Mode 2 text (9 by 12)
ADMDHJIG	ADMDHIIG	Image	Mode 2 text (10 by 8)
ADMDHJIK	ADMDHIIK	Image	Mode 2 text (20 by 18)
ADMDHJIN	ADMDHIIN	Image	Mode 2 text (8 by 16)
ADMDHJIQ	ADMDHIIQ	Image	Mode 2 text (24 by 30)
ADMDHJIR	ADMDHIIR	Image	Mode 2 text (12 by 20)
ADMDHJVA	ADMDVECP	Vector	Mode 3 text (9 by 16)
ADMDHJVC	ADMDVECP	Vector	Mode 3 text (9 by 12)
ADMDHJVG	ADMDVECP	Vector	Mode 3 text (10 by 8)
ADMDHJVJ		Vector	Modes 1, 2 and 3 text
ADMDHJVK	ADMDVECP	Vector	Mode 3 text (20 by 18)
ADMDHJVM		Vector	Modes 1, 2 and 3 text (See Note)
ADMDHJVN	ADMDVECP	Vector	Mode 3 text (8 by 16) (See Note)
ADMDHJVQ	ADMDVECP	Vector	Mode 3 text (24 by 30)
ADMDHJVR	ADMDVECP	Vector	Mode 3 text (12 by 20)
ADMDHJVW	ADMDVECP	Vector	Mode 3 text (plotters)

Figure 70 (Part 2 of 2). Sample symbol set names and usage in load module and editable formats

Note: * means equivalent to a symbol set built into the device

Symbol set load modules ADMDHIxx are compatible with previous releases of GDDM and are used for non-CECP processing; the ADMDHJxx modules are CECP sets, tagged with country-extended code page 00037.

You should carefully note the relationship between symbol set names and load module names for image sets.

Changing the default symbol sets or making another set the default

If you want to change any of the default symbol sets or make another symbol set the default, you must replace the version in the ADMGLIB TXTLIB. To do this you create a deck version of the symbol set with the name shown in the "Name within Load Module" column in Figure 70 on page 181. You then replace it in ADMGLIB. If you use a DCSS for GDDM Base, you will need to rebuild it.

You must also ensure that GDDM uses the changed default by issuing the LOADDSYM processing option. The easiest way to do this is by the nickname

```
[label] ADMMNICK PROCOPT=((LOADDSYM,YES))
```

Examples of changing symbol sets are given at the end of this appendix.

Changing the default vector symbol set from American-English

The country-extended code-page support, which is new in GDDM Version 2 Release 2, makes the provision of default vector symbol sets for national language use very much simpler than before. If you specify a CECP as your installation and application code-page, then your application programs, including the GDDM utility programs, will produce the correct national-use characters, without any further action on your part.

The external defaults to use are:

```
[label] ADMMDFT INSCPG=nnnnn,APPCPG=nnnnn
```

where nnnnn is the code-page number (see page 120).

If you decide to change a supplied symbol set that is tagged with a country-extended code page, set the application code page to 00037 before you use the symbol editor.

National language vector symbol sets, including items such as accented letters, can also be made the default vector symbol set for non-CECP processing by using the Vector Symbol Editor to generate deck versions and linking them into a TXTLIB.

An example of how to do this is shown at the end of this appendix.

The following image symbol sets also support Katakana:

Name	Cell size	Description
ADMDISKA	9 x 16	Katakana
ADMDISKC	9 x 12	Katakana
ADMDISKG	10 x 08	Katakana
ADMDISKN	8 x 16	Katakana for 16 x 16 5550
ADMDISKR	12 x 24	Katakana for 24 x 24 5550

How and where sample symbol sets are held

The editable versions of the symbol sets exist with the filetype of ADMSYMBL. The deck formats generated by the symbol editors have a default filetype of ADMDECK. The load module formats used by GDDM exist as TEXT decks contained in the relevant TXTLIBs or saved segments.

Note that the CECP load modules ADMDIIJI* correspond to the sample sets ADMDHII*.

Setting up pattern sets available to ICU users on your installation

If you want to set up an extended pattern set to be generally available to ICU users in an installation, create a user-defined pattern set with the name ADMICUPx, where "x" can be either "D" or "C," depending upon the device type in use.

For example, the sample 64-color shading pattern set supplied on the distribution tape under the name ADMCOLSD need only be copied under the name

ADMICUPD to become available to ICU users with pattern values 65 through 128. The copying can be done with the Copy command of the ICU Directory panel. For further information on setting up your own pattern sets, see the *GDDM-PGF Programming Reference* manual.

Example of changing the default symbol sets

Example — Making the French vector symbol set the default

The same instructions can be followed for any of the national language symbol sets. Note that the ADMDVSS vector symbol set has six load module format names but only one editable format. All load module formats are identical.

1. Start the Vector Symbol Editor. The command is ADMVSSE.
2. Start editing the French symbol set by entering it in the symbol set field thus:

   ```
   Symbol Set ==> ADMDVSSF
   ```

3. Save the symbol set in deck form with the following names ADMDHIVA, ADMDHIVC, ADMDHIVG, ADMDHIVN, ADMDHIVR, and ADMDHIVW, in the manner shown below:
   a. Rename the set to ADMDHIVA with the command RENAME ADMDHIVA
   b. Save the deck with this name with the command SAVE DECK
   c. Repeat the process for the other names.
4. Replace the saved decks in ADMGLIB.
   a. Leave the Vector Symbol Editor, using PF3.
   b. Rename the files to a filetype of TEXT.
   c. Replace the members of the ADMGLIB TXTLIB with commands like TXTLIB ADD ADMGLIB ADMDHIVA.
5. If you have created a DCSS for GDDM Base, rebuild it to make the updates available.

Appendix E. Checking a VTAM network

This section does not apply if you are installing GDDM on a VM/XA system.

The following two licensed programs enable terminals running under CMS to have access to VTAM-attached devices.

- The Virtual Machine/VTAM Communications Network Application (VM/VCNA)
- VM SNA Console Support (VSCS), part of Advanced Communication Function for VTAM Version 3 for VM, licensed program 5664-280.

If GDDM is to be used with VTAM, the VTAM network definition should be reviewed. Particular attention should be paid to the bind images that are set in the PSERVIC operand of the MODEENT macro. The bind image is used by GDDM to determine the type of device to which it is sending the data stream. If the bind image is wrong, GDDM will not work.

GDDM requires that a logmode table should exist and that the LU, TERMINAL, or LOCAL macros in the system definition should nominate the logmode table and the MODEENT entry within the table.

For details on the use of these VTAM macros, see the appropriate ACF/VTAM installation manuals and the manual *Network Program Products Samples: VM SNA*. The instructions that follow, however, should be enough to let you do the work necessary to install GDDM.

In addition to checking these macros, you may also consider using VPACING, and enlarging the IOBUF area to improve performance.

Queriable terminals and printers

The term "queriable" is used to describe those devices which support the Write Structured Field (WSF) command and the Read Partition (Query) Structured Field, within the 3270 Data Stream.

The 3270 Data Stream is described in the *IBM 3270 Information Display System Data Stream Programmer's Reference* manual. Typical devices within this category, such as any 3270-PC work station, 5550 multistation, or 8775 display, support some of the following:

Programmed Symbols (PS)
7-color
Extended highlighting
Partitions
Graphics (using GDDM)
Image
IPDS-mode operation.

Instructions for checking a VTAM network

1. Check if you are already using a LOGMODE table. If you are not, you must create one with the MODETAB macro. It takes the form:

   ```
   tabname  MODETAB
   ```

   (If you have not created a logmode table, the IBM-supplied table, ISTINCLM, will have been used, and this is not adequate for many of the operations that can be done by GDDM.)

2. Check the MODEENT macros in the logmode table (or create them if you do not already have a logmode table). Examples of MODEENT macros are given in Figure 71 on page 187, and instructions on setting up the PSERVIC operand are given in "The PSERVIC operand of the MODEENT macro" on page 188. You are strongly recommended to use the given values; if you do not, your system may not work correctly.

   When checking or writing your MODEENT macros, note the following important points:

   a. The examples are samples only. If the given PSERVIC values are followed exactly, GDDM will work. You may, however, have problems if you change the values. Particularly note the RUSIZES (see next point).

   b. The outgoing request unit (RU) size for SNA 3270 terminals (the second byte in the RUSIZES operand) should be checked carefully.

      - X'87' (indicating 1024 decimal) is suggested as an outgoing RU size. This may be too large for some subsystems.
      - For display terminals attached through a 3274-1A controller, the outgoing RU size must not exceed X'C7' (indicating 1536 decimal).

   c. For the SNA 3179-G1 and G2, and 3192-G terminals, the 3270-PC/G and 3270-PC/GX work stations, the 5550 multistation, and the 3193 terminal, the SRCVPAC (secondary receive pacing) value *must* be specified, and must be as follows:

      - **For SNA 3179-G1, 3179-G2, or 3192-G terminals:**

        ```
        (2 * n - 1) * m <= 7680
        ```

        where n is the SRCVPAC value, and m is the outgoing maximum RU size.

      - **For SNA 3270-PC/G and 3270-PC/GX work stations and 5550 multistations:**

        ```
        (2 * n - 1) * m <= 3584
        ```

        where n is the SRCVPAC value, and m is the outgoing maximum RU size.

      - **For SNA 3193 terminals:**

        The fixed size of buffer (7680 bytes) is shared for the pacing buffer by the two LTs that the 3193 supports.

        The maximum RU length that the PLU is permitted to send is defined in byte 11 of the BIND, and the pacing count is specified in byte 9.

The 3193 accepts a maximum RU size and a pacing count within the following limits:

The BIND to one (LT-1 or LT-2) is accepted if the following formula is met:

```
(2 * n - 1) * m <= 6144
```

where n is the SRCVPAC value, and m is the outgoing maximum RU size.

The BIND to the other LT is accepted if:

```
(2 * n - 1) * m <= 7680 - buffer
```

where `buffer` is the buffer size already allocated to the first LT.

d. On non-SNA (LU0) display terminals for VM/VCNA, VM/VCNA (and therefore GDDM) relies on the setting of byte 2 of the PSERVIC operand to distinguish 3277 displays from other types of display terminal. Ensure that this byte is set correctly, as shown in "The PSERVIC operand of the MODEENT macro" on page 188.

3. Check that the MODETAB and DLOGMOD operands have been included in your system-definition table and that they point to the correct logmode tables and MODEENT entries for the terminals.

   You should specifically ensure that the DLOGMOD operands are always *explicitly* included, and not permitted to default.

   The MODETAB and DLOGMOD operands may be coded for individual terminals in the LU, LOCAL, or TERMINAL macros or for a number of terminals in the GROUP, LINE, or CLUSTER macros. Examples of the use of these macros are shown in Figure 72 on page 189.

4. For queriable non-SNA terminals, FEATUR2=EDATS must be included in the TERMINAL macro for individual terminals, or at a higher level for a number of terminals in the GROUP, LINE, or CLUSTER macros.

5. Consider the use of VPACING to improve performance because of the large data streams generated by GDDM. (See under "Performance background" in Chapter 1 and under "Tuning and customization by subsystem" in Chapter 2 of the *GDDM Performance Guide*.)

6. If non-SNA displays are in use, consider the size of the I/O buffer pool as specified by the IOBUF parameter in VTAMLST. The large size of data streams generated by GDDM and the mode in which they are transmitted by GDDM may require an increase in the value of this parameter.

The MODEENT macro for non-SNA 3270 terminals:

```
MODEENT LOGMODE=modname,              C
        TYPE=1,                       C
        FMPROF=X'02',                 C
        TSPROF=X'02',                 C
        PRIPROT=X'71',                C
        SECPROT=X'40',                C
        COMPROT=X'2000',              C
        PSERVIC=X'.....
```

The MODEENT macro for SNA 3179-G1 and 3179-G2 terminals, 3270-PC/G and 3270-PC/GX work stations, 3193 displays, and 5550 multistations:

```
MODEENT LOGMODE=modname,              C
        TYPE=1,                       C
        FMPROF=X'03',                 C
        TSPROF=X'03',                 C
        PRIPROT=X'B1',                C
        SECPROT=X'90',                C
        COMPROT=X'3080',              C
        RUSIZES=X'8587',              C
        PSNDPAC=X'01'                 C
        SRCVPAC=X'01'                 C
        PSERVIC=X'.....
```

The MODEENT macro for other SNA 3270 terminals excluded from the above:

```
MODEENT LOGMODE=modname,              C
        TYPE=1,                       C
        FMPROF=X'03',                 C
        TSPROF=X'03',                 C
        PRIPROT=X'B1',                C
        SECPROT=X'90',                C
        COMPROT=X'3080',              C
        RUSIZES=X'8587',              C
        PSERVIC=X'.....
```

Figure 71. Examples of MODEENT macro instructions

The PSERVIC operand of the MODEENT macro

Bytes 1 through 6, and 12

These bytes define the terminal and should be set as follows:

Nonqueriable devices

`X'000000000000.....00'` for a non-SNA display terminal (LU0)
`X'020000000000.....00'` for an SNA display terminal (LU2)

Queriable devices

```
X'008000000000.....00' for a non-SNA display terminal (LU0)
X'028000000000.....00' for an SNA display terminal (LU2)
```

Under *VM/VCNA* and under *VM SNA*, the following must be coded for non-SNA (LU0) display terminals that are *not* 3277s:

```
X'..40.................' nonqueriable terminal
X'..C0.................' queriable terminal
```

Bytes 7 through 11

These define the "screen sizes."

For display terminals

```
X'..........0000000001..' for size 480 (12x40)
X'..........0000000002..' for size 1920 (24x80)
X'..........0C280C507F..' for dual sizes 480,960 (12x40,12x80)
X'..........185018507F..' for dual sizes 1920,1920 (24x80,24x80)
X'..........185020507F..' for dual sizes 1920,2560 (24x80,32x80)
X'..........18502B507F..' for dual sizes 1920,3440 (24x80,43x80)
X'..........18501B847F..' for dual sizes 1920,3564 (24x80,27x132)
```

For 3290 Information Display Panel, 5279 and 5379 Displays (the 5279 and 5379 displays are part of the 3270-PC/G and /GX work stations).

The 3290, 5279, and 5379 displays may be set up to have any of a large number of screen sizes. Their PSERVIC operands should be:

```
X'..........rdcdraca7F..'
```

where: (rd,cd) is the default screen size in rows and columns
(ra,ca) is the alternate screen size in rows and columns
rd, cd, ra, and ca are single-byte hexadecimal numbers

A typical configuration for such a display (and the standard configuration for 5279s and 5379s) would specify a default screen size of 24 x 80 and an alternate screen size of 32 x 80.

Particular subsystem levels may restrict the values that can be supported. (This depends on how the device was customized.) For an SNA device, the value here will override a customized value. For non-SNA devices, the values must match.

The LU macro for SNA 3270 terminals:

```
LU      LOCADDR=addr,                C
        MODETAB=tabname,             C
        DLOGMOD=modname,             C
        .
        other parameters
```

The MODETAB and DLOGMOD operands can also be specified on the PU macro.

The LOCAL macro for non-SNA 3270 terminals:

```
LOCAL   CUADDR=addr,                 C
        MODETAB=tabname,             C
        DLOGMOD=modname,             C
        .
        other parameters
```

The TERMINAL macro for non-SNA 3270 terminals:

```
TERMINAL ADDR=addr,                  C
        MODETAB=tabname,             C
        DLOGMOD=modname,             C
        FEATUR2=EDATS,               C
        .
        other parameters
```

FEATUR2=EDATS must only be specified for queriable terminals.

Verify that FEATURE2=MODEL1 is not implicitly specified for devices that have a default buffer size larger than 480 bytes.

The FEATUR2, MODETAB, and DLOGMOD operands can also be specified on the GROUP, LINE, and CLUSTER macros.

The DLOGMOD operand should always be specified explicitly. It should not be allowed to default.

Figure 72. Examples of LU, TERMINAL, and LOCAL macros

Default logmodes

The specification of the logmode on the macros provides only the *default* logmode. VTAM provides a mechanism to override the default. For example, the terminal operator may be able to specify the logmode on the LOGON command, or a logmode may be added to the LOGON command as a result of command conversion driven by the USSTAB definition table. You should therefore ensure that a suitable logmode name is selected whatever the source of the name.

Appendix F. Customizing devices

3270-PC/G and 3270-PC/GX customization

If you are using GDDM with IBM 3270-PC/G or 3270-PC/GX work stations (the 5279 and 5379 displays), you will need to customize the work stations using the Graphics Control Program. When you customize a 3270-PC/G or 3270-PC/GX work station, you will need to specify several things:

- The name to be used for your plotter (see "Plotters" below).
- The identifications of, and number of, host sessions. This will depend on how you customized your 3274 controller. If you are going to use complex graphics in GDDM, you should try to restrict the number of host sessions so that performance is not impaired.
- The storage for each session (host or PC). You should try to allocate as much storage as possible if you are using GDDM. Storage sizes depend on the type of application you plan to run. Simple alphanumeric pictures will require significantly less storage in the work station than complex graphics. See below for guidance on this topic.

Full details of the customization procedures for these work stations can be found in these manuals:

- *Introduction to the IBM 3270-PC/G and /GX*
- *3270-PC/G Guide to Operations*
- *3270-PC/GX Guide to Operations*
- *Graphics Control Program User's Guide.*

Plotters

If you are using a plotter attached to the IEEE-488 port of a 3270-PC/G or /GX, you will have supplied a plotter name during the customization of the device (as described in the *Graphics Control Program User's Guide*). This plotter name corresponds to the "auxiliary-device-name" referenced by GDDM in a DSOPEN call or in a nickname (see "Nicknames" on page 63).

GDDM recognizes the reserved name ADMPLOT as a reference to the first plotter attached to a work station.

3274 configuration

When using a remote non-SNA (BSC) attachment, the 3270-PC/G and /GX also require that 3274 WACK support is configured. If this is not done, you may experience line timeouts.

To configure WACK support, specify 1 in reply to 3274 Customization question 176 BSC Enhanced Communication Option (Distributed Function Terminals).

3270-PC/G and /GX segment storage requirement for GDDM

To fully exploit the capabilities of the 3270-PC/G and /GX work stations, such as dragging or local pan and zoom, GDDM must be able to operate in retained mode to these devices. This is the default case, when sufficient segment storage has been allocated to the GDDM host session in the work station.

In addition to the increased function that retained mode operation offers, there are also potential performance advantages, particularly in the area of data-stream reduction.

Figure 73 and its following notes should be used as a starting point for 3270-PC/G and /GX segment storage allocation.

GDDM picture type	Segment storage size
1. ICU business charts	5 – 15K bytes
2. Simple GDDM Base graphics	10K bytes
3. Scientific and engineering graphics	5 – 30K bytes
4. Complex cartographic or seismological applications	30 – 60K bytes
5. Image applications	200 – 350K bytes

Figure 73. 3270-PC/G segment storage requirements

Notes:

1. The above figures do not include the requirements for characters from any nondefault GDDM symbol sets that might be used in the picture. Allow 8K bytes for each GDDM-supplied symbol set. User-defined symbol sets may need more than this.
2. The range quoted for complex pictures (type 4) is thought to be reasonable. You should be aware, however, that there is no limit to the size of picture that GDDM can create for display on these work stations, excepting those imposed by the computing power and storage available in the mainframe host processor.

5550 customization

For details of how to customize a 5550 multistation, refer to the *5550 Operations Guide*.

3812 IPDS printer customization

When an "Intervention Required" condition exists in the 3812 (such as running out of paper, or a paper jam), the condition is normally reported to GDDM after a delay of one minute. GDDM's response is to terminate printing of the current document.

If you prefer the 3812 to handle such conditions internally, change the setting of the 3812's Configuration Switch C17 to "suppress timeout = yes" (value 001). See the

IBM Pageprinter 3812, IPDS NDS Attachment Feature Installation and Programming Instructions for information about changing the Configuration Switch settings.

If you make this change,"Intervention Required" conditions that do not involve loss of data do not cause GDDM to terminate printing and issue an error message; instead, printing continues when the problem at the printer is corrected.

3193 customization for GDDM-IVU

If you are using 3193 displays, it is recommended that the 3193 is set up as follows, so that GDDM-IVU can make the most effective use of the device. However, other applications may have conflicting requirements. If the terminal set up differs from these recommendations, GDDM-IVU will still work, but perhaps less effectively.

1. Power-on the display. After the 3193 has completed its power-on tests, the data at the left side of the operator information area should contain the symbols
   LT-1
2. Hold down the Alt key and press the Setup key. This switches the 3193 into level 1 setup mode.
3. Look at the line of information at the bottom of the screen in the Operator Information Area. It should be similar to (though not necessarily exactly the same as) this:

   ```
   <1>                              Aa  LP  [ ][A][I]  CL0  AL1  <1>
   ```

4. Check that none of the fields [ ], [A], or [I] is in reverse video. If any are, move the cursor under each one in turn and press the Cursr Sel key. The fields will alternate between normal and reverse video.
5. Move the cursor under the <1> at the right hand end, overtype with a 2 and press the Cursr Sel key. This puts the terminal into level 2 setup mode. There should be a row of boxes numbered 1 through 6 across the lower part of the screen. In each of the boxes 3 through 5, two sets of letters and numbers are shown. You can ignore the lower set, because only the upper one affects the logical terminal used by GDDM-IVU.
6. Carry out the following steps. The cursor move keys will skip the cursor from one box to the next, and from one item to the next within a box.
   a. In box 1, check that two partially overlapping rectangles are shown, indicating that the 3193's two logical terminals both occupy the full screen. If they do not, move the cursor into box 1 and press the Cursr Sel key repeatedly until one rectangle is shown partially overlapping the other.
   b. In box 2, check that the model number in the upper rectangle is 48R. If it is something different, move the cursor under the rectangle and press the Cursr Sel key until 48R appears.
   c. In box 3, check that the upper entry has ¬EAB selected. If it shows EAB without the ¬, move the cursor under it and press the Cursr Sel key. The field will alternate between EAB and ¬EAB.
   d. In box 4, check that the upper entry shows the number of partitions as 2. If it does not, overtype it with a 2.

7. Press the Alt and Setup keys again to leave setup mode.
8. Hold down the Alt key and press the Jump key if necessary to ensure that logical terminal 1 LT-1 is selected.

Appendix G. APL and GDDM

APL uses GDDM for its character handling and its graphics. If APL is to work efficiently both GDDM and APL must be installed correctly.

APL character sets

For APL, GDDM needs to be able to distinguish between two different ways of supporting the APL character set. If it assumes the wrong way, garbage will appear instead of the APL characters. For VM printers and for VM/VCNA displays, it is necessary to understand the methods used by GDDM to ensure that you take the correct actions.

Two types of devices are involved:

1. Devices with the APL-Data-Analysis feature number 1066.

   This is available on a number of devices such as 3277-2, 3284-2, 3286-2, and 3287 attached to 3271 or 3272 controllers.

2. Devices with the APL/Text feature number 1120.

   This is available on a number of devices such as 3179-G, 3276, 3278, 3279, 3287, 5279, and 5379 attached to 3274 controllers.

APL/Text (feature number 1120) is available with the more recent devices that support programmed symbols, color, extended highlighting, and alternate sizes. Only devices that support "Read Partition Query" can use APL/Text.

In most situations GDDM can discover the type of APL on a terminal, either by querying the terminal or by looking at subsystem tables. However it cannot tell for nonqueriable printers on VM. For VM printers, GDDM relies on the ADMMDFT CMSAPLF default. Additionally, for VM/VCNA display terminals, GDDM relies on subsystem tables having been defined correctly.

If your users use APL characters, you should set code page 00351 as the default. If, instead, you set a CECP code page as the system default, warn your APL users that they should set their own default code page to 00351.

VM print

For VM print, GDDM uses the ADMMDFT CMSAPLF default to determine the type of APL feature for nonqueriable printers. If DATAANAL has been specified, APL-Data analysis is assumed, otherwise APL/Text is assumed.

For nonqueriable display terminals, GDDM assumes that the terminal supports APL in one or other of its forms. If the device does not support APL at all, this may cause errors unless care is taken in using APL characters.

VM/VCNA display terminals

For VM/VCNA display terminals, GDDM relies on subsystem tables having been defined correctly. Specifically, a bit in the associated VTAM BIND parameter must be set to identify a non-SNA (LU0) display terminal that is *not* a 3277. Refer to Appendix E, "Checking a VTAM network" on page 185 for full details.

Installation with a mixture of terminal types

In the cases where GDDM depends on the ADMMDFT CMSAPLF default, it is possible that there will be a mixture of terminals that have different types of APL feature. When this occurs, different defaults must be used, either using different versions of the default modules, as described in "Repackaging to get a special defaults module" on page 208, or by using appropriate external default files, as described in Appendix A, "GDDM defaults and nicknames" on page 115.

Possible combinations that might cause this situation are 3286 and 3287 printers attached to a 3271 or 3272, combined with a nonqueriable 3287 attached to a 3274.

Appendix H. Repackaging for performance or for differing defaults

Migrating from earlier releases

If you repackaged for performance when you installed a previous release, you must use the new samples. The method has changed.

There are new packaging groups compared with Version 2 Release 1 Modification 0.

Use this appendix to:

- Repackage the GDDM executable code to reduce dynamic loading. The pros and cons of doing this are discussed under "Performance background" in Chapter 1 of the *GDDM Performance Guide.*
- Repackage a GDDM utility or GDDM application program so that dynamic loading is eliminated or reduced. Again, this is discussed in the *GDDM Performance Guide.*
- Run versions of GDDM with different defaults modules, or override saved defaults modules such as those in a VM base saved segment. See "Differing defaults" on page 208 for information on how to do this.

Background to repackaging

GDDM executable code modules are, by default, loaded dynamically as needed. They can be repackaged so that some or all of them are to be loaded during program initialization. They can also be repackaged with a GDDM utility or application program so that everything is loaded together, eliminating dynamic loading entirely.

To understand this, and the similar techniques used to run with different defaults modules, you must understand how dynamic loading takes place.

If no packaging is done, the following series of loads takes place when a GDDM application program or GDDM utility is executed.

1. The GDDM utility or application program is loaded.
2. The GDDM initially-loaded modules are loaded. These are:
   a. The application interface initialization module
   b. The external defaults module
   c. The subsystem initializer.
3. Subsequently, other GDDM modules are loaded as needed by the GDDM subsystem initializer, unless they are on a DCSS.

This process is shown in Figure 74 on page 198.

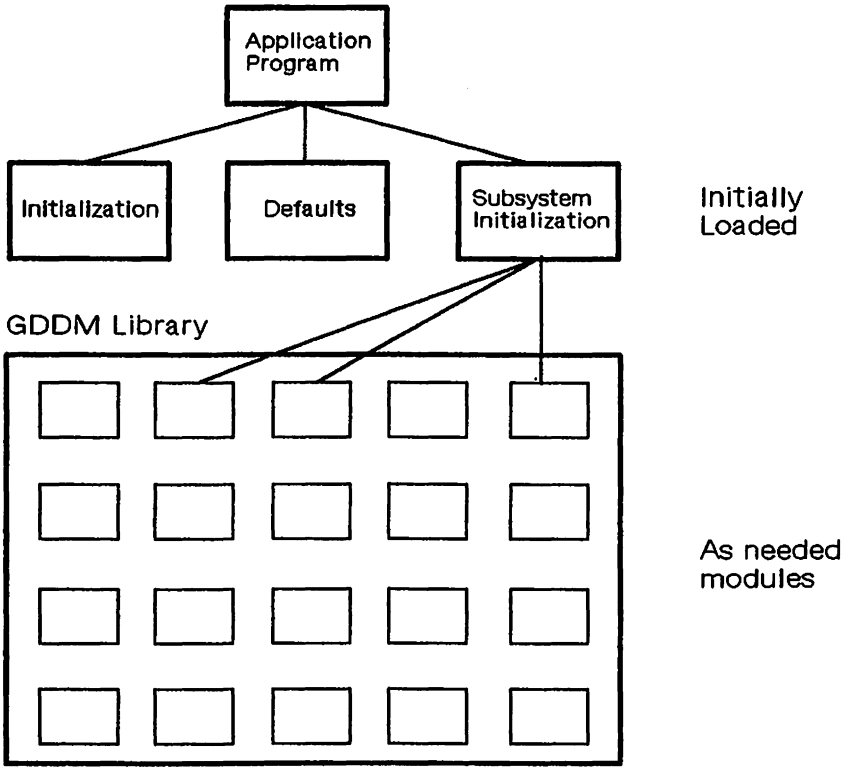


Figure 74. Default order of loading during GDDM utilities and programs

You can reduce the number of loads by packaging the items together. This can be done in a number of ways, the most important of which are:

- Repackaging the GDDM executable code so that "as needed" modules are loaded with the subsystem initializer.
- Repackaging a utility or application program with all or part of the GDDM executable code.
- Repackaging a utility or application program with a version of the GDDM external defaults module.

These options are shown in Figure 75 on page 199. Note that any module that is not repackaged will be loaded dynamically as needed. GDDM will still work regardless of what you put in or leave out of the repackaged modules.

How repackaging is done

In this appendix, the term link-editing refers to the process of using the LOAD and INCLUDE commands followed by the GENMOD command to create program modules, nonrelocatable files whose external references have been resolved. These files have a filetype of MODULE.

Repackaging is done using the linkage editor. However, the linking of the GDDM modules that are "loaded as needed" has to be done in a special manner.

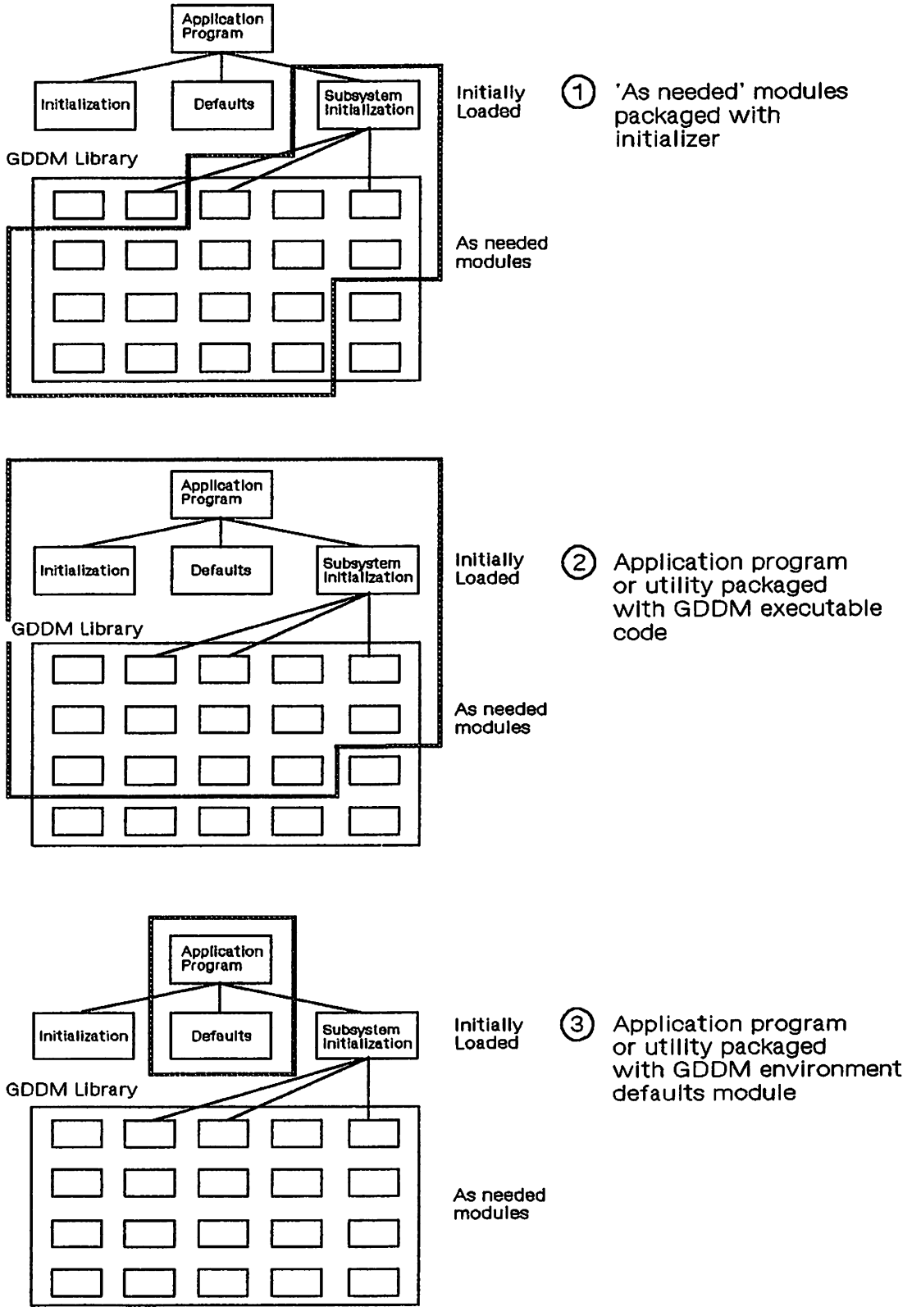


Figure 75. Possible loading combinations

GDDM supplies modules known as **packaging stubs** that contain references (V-cons) to groups of associated modules. These packaging stubs must be linked with the subsystem initialization module to "drag in" the associated modules. This is shown in Figure 76 on page 201.

Provisos about packaging

Before you consider packaging you should be aware of the following consequences.

Link-editing and possible future releases

GDDM Releases from Version 1 Release 3 have been designed with the intention that application programs will not have to be link-edited again as a matter of course for any subsequent releases of GDDM.

If packaging options that involve link-editing the application are used, the application will have to be link-edited again for any subsequent release of GDDM.

Retaining original libraries for service

IBM service procedures (PTF Tapes) assume that the GDDM libraries have not been repackaged. This may cause problems if one of the modules that has been repackaged needs to be changed by service.

Repackaged GDDM routines should therefore be placed in libraries other than the original installation libraries.

The original libraries should be retained and service applied to these libraries. Packaged application programs or repackaged GDDM routines should be regenerated to include the serviced modules.

Repackaging the GDDM executable code on its own

GDDM executable code is repackaged using the subsystem initialization module and packaging stubs. The subsystem initialization module is always loaded at the start of a program. As shown in Figure 77, it is called ADME000V.

To repackage the executable code, link-edit the module, ADME000V, with one or more packaging stubs. The packaging stubs "drag in" other routines to form a load module that contains all the modules referenced in the packaging stubs. The composite module is given the same name as the ADME000V module. Note that this can only be done with the ADME000V module, and that this module can discern if it has been linked with executable code only when this has been done through packaging stubs.

The effect of repackaging the GDDM executable code is shown in Figure 76.

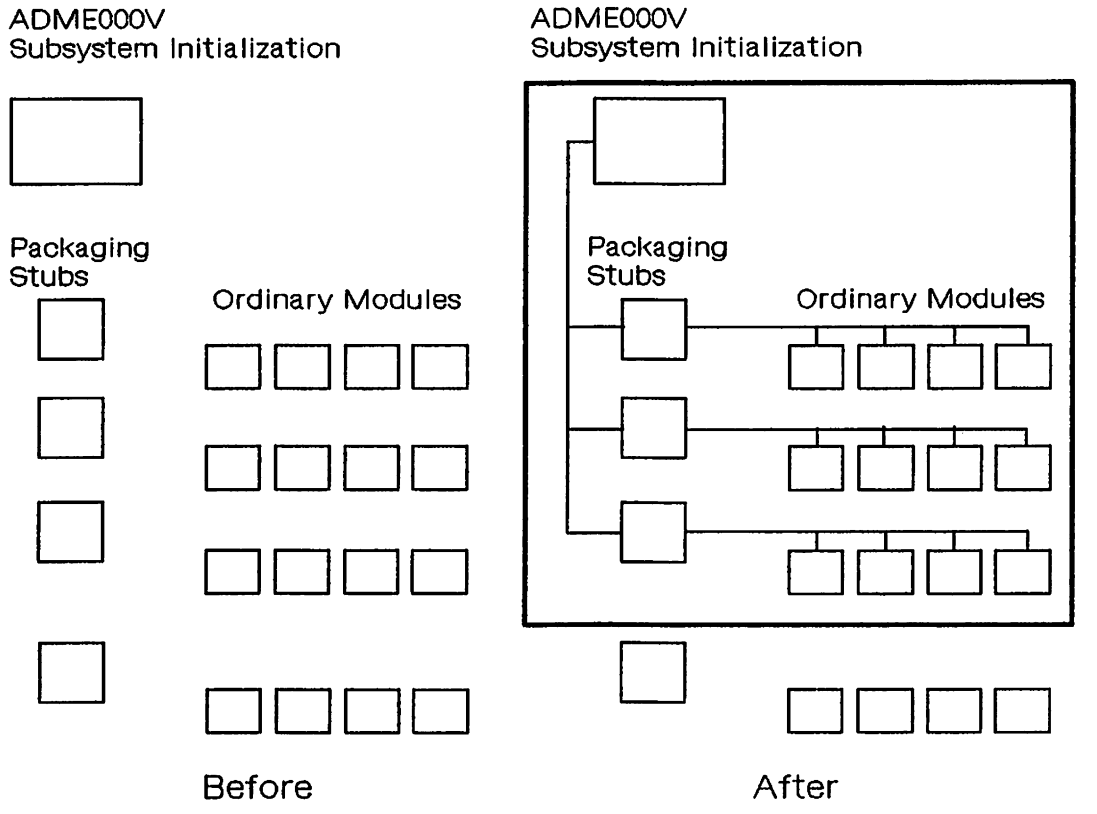


Figure 76. How packaging stubs are used to repackage the executable code

Figure 77 shows the name of the subsystem initialization module.

Application interface initialization module	External defaults module	Subsystem initialization module
ADMACIN	ADMADFV	ADME000V

Figure 77. Names of initially-loaded modules

Levels of packaging stubs

Two levels of packaging stub are provided to give you more control of the modules you repackage. The full screen manager and the ICU can both be subdivided by use of second-level packaging stubs. (The full screen manager does most of the graphic and alphanumeric processing within GDDM.)

The contents of packaging stubs

Figure 78 shows the contents of the first-level packaging stubs. Figure 79 and Figure 80 show the contents of the second-level packaging stubs for the full screen manager and the ICU respectively. Note that the use of a first-level stub automatically includes all the associated second-level stubs. Code sizes quoted are approximate and for guidance only.

Name	Contents	Size (in bytes)
	GDDM Base subsystem-adapter routines	
ADMUX000	– common (used on all subsystems)	66K
ADMUX00V	– subsystem-dependent – VM/CMS	80K
ADMUXA00	Application-adapter routines – common	202K
ADMUXA0x	Messages	
..... A	– American-English	43K
..... B	– Brazilian	47K
..... C	– PRC Chinese (Simplified)	43K
..... D	– Danish	43K
..... F	– French	43K
..... G	– German	43K
..... H	– Korean (Hangeul)	43K
..... I	– Italian	48K
..... K	– Japanese (Kanji)	47K
..... N	– Norwegian	42K
..... Q	– French (Canadian)	43K
..... S	– Spanish	47K
..... T	– Taiwan Chinese (Traditional)	43K
..... V	– Swedish	42K
ADMUXD00	Full-screen manager routines (see Figure 79 on page 205)	1408K
ADMUXI00	Image Symbol Editor subroutines	127K
ADMUXO00	Print utility subroutines	9K
ADMUX300	Image routines	279K
ADMUX400	Composite document routines	42K
ADMUXB00	GDDM-PGF Presentation Graphics routines	214K
ADMUXB0x	Day/date routines	
..... A	– American-English	1K
..... B	– Brazilian	1K
..... D	– Danish	1K
..... F	– French	1K
..... G	– German	1K
..... H	– Korean (Hangeul)	1K
..... I	– Italian	1K
..... K	– Japanese (Kanji)	1K
..... N	– Norwegian	1K
..... S	– Spanish	1K
..... V	– Swedish	1K

Figure 78 (Part 1 of 3). GDDM first-level packaging stubs

Name	Contents	Size (in bytes)
ADMUXPAx	GDDM-PGF and ICU messages	
..... A	– American-English	20K
..... B	– Brazilian	21K
..... D	– Danish	21K
..... F	– French	20K
..... G	– German	20K
..... H	– Korean (Hangeul)	19K
..... I	– Italian	22K
..... K	– Japanese (Kanji)	20K
..... N	– Norwegian	19K
..... S	– Spanish	21K
..... V	– Swedish	19K
ADMUXP00	ICU routines (see Figure 80 on page 205)	316K
ADMUXP0x	Menus and HELP	
..... A	– American-English	396K
..... B	– Brazilian	417K
..... D	– Danish	413K
..... F	– French	405K
..... G	– German	394K
..... H	– Korean (Hangeul)	318K
..... I	– Italian	427K
..... K	– Japanese (Kanji)	391K
..... N	– Norwegian	331K
..... S	– Spanish	407K
..... V	– Swedish	291K
ADMUXV00	Vector Symbol Editor subroutines	202K
ADMUX100	GDDM-IMD subroutines	335K
ADMUX10A	GDDM-IMD messages	20K
ADMUXJ00	GDDM-GKS routines	350K
ADMUXJAx	GDDM-GKS messages	
..... A	– American-English	7K
..... B	– Brazilian	7K
..... D	– Danish	7K
..... F	– French	7K
..... G	– German	7K
..... H	– Korean (Hangeul)	7K
..... I	– Italian	7K
..... K	– Japanese (Kanji)	7K
..... N	– Norwegian	7K
..... S	– Spanish	7K
..... V	– Swedish	7K

Figure 78 (Part 2 of 3). GDDM first-level packaging stubs

Name	Contents	Size (in bytes)
ADMUX500	GDDM-IVU routines	650K
ADMUX5Ax	GDDM-IVU messages	
..... A	– American-English	100K
..... B	– Brazilian	100K
..... D	– Danish	100K
..... F	– French	100K
..... G	– German	100K
..... H	– Korean (Hangeul)	100K
..... I	– Italian	100K
..... K	– Japanese (Kanji)	100K
..... N	– Norwegian	100K
..... S	– Spanish	100K
..... V	– Swedish	100K

Figure 78 (Part 3 of 3). GDDM first-level packaging stubs

Name	Contents	Size (in bytes)
Alphanumeric stubs	For alphanumeric-only support use all the following:	
ADMUXDA0	Alphanumerics	35K
ADMUXDB0	Partitions	6K
ADMUXDC0	Common device processor	34K
ADMUXDE0	Partition sets	7K
ADMUXDN0	Window control processor	11K
ADMUXDP0	Direct printer support	41K
ADMUXDS0	Supervisor	115K
ADMUXDW0	Data stream generator	240K
	Total	489K
Graphic stubs	For basic graphics support use all the alphanumeric stubs plus:	
ADMUXDG0	Graphics device processor	556K
ADMUXDH0	Graphics generator (for PS graphics)	42K
Image stub	For image support use all the alpha-numeric stubs plus:	
ADMUXD30	Image processor	85K
Mapping stub	For runtime mapping support use all the alphanumeric stubs plus:	
ADMUXDM0	Mapping processor	56K
Miscellaneous stubs	Miscellaneous individual stubs to be added as needed:	
ADMUXDI0	Queued printer support (input)	16K
ADMUXDJ0	Composed page printers	48K
ADMUXDK0	IPDS	44K
ADMUXDL0	System printers	5K
ADMUXDO0	Queued printer support (output)	15K
ADMUXDT0	Plotters	73K
ADMUXD40	Text processor	26K
	Total	227K

Figure 79. Full screen manager second-level packaging stubs

Name	Contents	Size (in bytes)
ADMUXPMx	Menus, messages: choose from list	
. . . . . A	– American-English	61K
. . . . . B	– Brazilian	65K
. . . . . D	– Danish	63K
. . . . . F	– French	64K
. . . . . G	– German	60K
. . . . . H	– Korean (Hangeul)	62K
. I	– Italian	64K
. . . . . K	– Japanese (Kanji)	68K
. . . . . N	– Norwegian	62K
. . . . . S	– Spanish	63K
. V	– Swedish	62K
ADMUXPHx	Help menus: choose from list	
. . . . . A	– American-English	336K
. . . . . B	– Brazilian	353K
. . . . . D	– Danish	352K
. . . . . F	– French	342K
. . . . . G	– German	335K
. . . . . H	– Korean (Hangeul)	318K
. I	– Italian	365K
. . . . . K	– Japanese (Kanji)	324K
. . . . . N	– Norwegian	331K
. . . . . S	– Spanish	345K
. V	– Swedish	291K

Figure 80. ICU second-level packaging stubs

Which stubs to use

You should include only those packaging stubs that are of interest to you. This means that you will exclude any message routines that are in languages that you do not use (for instance, exclude French, English, and so on if you use German).

When you have excluded these obvious stubs, you should consider the processing code.

The main processing for all graphics in both GDDM Base and GDDM-PGF is done by the full screen manager and major savings can be made by including this in any repackaging.

For the full screen manager and the ICU, second levels of packaging stubs are supplied, to enable their functions to be subdivided.

You may consider excluding the utility subroutines from the package and repackaging them separately. If you are doing this, the Image Symbol Editor and Vector Symbol Editor stubs are candidates for exclusion, as is the print utility stub.

Before you exclude the ICU stub, you should remember that the ICU can be called by an application program. Also with the ICU you should remember that the ICU

makes use of the GDDM-PGF processing routines, which in turn make use of the full screen manager.

For application image handling, the image routines, ADMUX300, can be used without the full screen manager

For device image handling, ADMUX300 is required as well as ADMUXD30.

Rather than using ADMUXD00, which gives the whole of the full screen manager, individual functions can be packaged. Figure 79 on page 205 shows the stubs required to do this. You could use these stubs if, for example, you used GDDM only for its alphanumeric support.

Rather than using ADMUXP0x, which gives all the ICU frames, you can separate the HELP panels from the menu panels. Figure 80 on page 205 shows the stubs required to do this. You could use these stubs, for example, to repackage only the working code, and have the HELP panels loaded as needed.

Repackaging executable code with a utility or application program

When you repackage GDDM executable code with an application program or the invoking routine for a GDDM utility, you use the linkage editor to link the program and the subsystem-initialization module. This, in turn, is linked with the executable code. In practice this means packaging:

- The application program or the invoking routine for a GDDM utility
- The subsystem-initialization module
- Any packaging stubs that are relevant.

Special requirements for utilities

When repackaging the invoking routine for a GDDM utility, the internal link-edit name of the utility-invoking routine must be used. These names are shown in Figure 81. If utilities are not listed in this figure, they may not be repackaged.

Image Symbol Editor	Vector Symbol Editor	Chart utility	Print utility	GDDM-IMD
ADMISSEV	ADMVSSEV	ADMPSTBV	ADMOPUV	ADM1IMDV

Figure 81. Names of invoking routines for GDDM utilities

Eliminating dynamic loading completely

There is no need to eliminate dynamic loading completely. Any modules that are needed, but are not included in the package, will be loaded dynamically when required.

If you want to eliminate dynamic loading completely, you must include in the repackaged module the initially-loaded modules and all the modules that would otherwise be loaded as needed.

All the initially-loaded modules can be included by using packaging stubs. The common adapter stub (ADMUX000) automatically includes the application interface controller. The subsystem adapter stub (ADMUX00V) automatically includes the corresponding external defaults module and subsystem-initialization module.

Repackaging to get a special defaults module

It is possible to override a shared defaults module by packaging an application with a special external defaults module. This is done by linking the application with the external defaults module and using normal linkage editor methods.

Differing defaults

The same method can be used if you want to use two sets of defaults in an installation; for example, if you wanted to use the ICU in both French and English. Assuming English was specified in the normal defaults module, you would link a copy of the ICU-invoking routine with a defaults module that specified French, and make the resulting load module available with a different name. French users would use this version. You will have to assemble a suitable version of the defaults module before doing the packaging.

If you are repackaging with a utility-invoking routine, you will have to use the internal linkage-editor name for that utility-invoking routine as shown in Figure 81 on page 207.

This use of a defaults module is in addition to other methods of specifying user defaults, which are described in the *GDDM Base Programming Reference* manual, and are listed in Appendix A of this manual.

Special requirements

Under VM/CMS the packaging facilities are used in the construction and operation of discontiguous saved segments (DCSS). This is more fully described in "Step 7: Create GDDM discontiguous saved segments (DCSS)" on page 71.

If the packaging stubs ADMUX00V and ADMUXA00 are loaded with an application program, they will suppress use of the saved segment.

Instructions for repackaging

The list below is a suggested order for repackaging:

1. Decide on the type of repackaging you are trying to do.

   This is discussed earlier in this appendix and in broader terms under "Performance background" in Chapter 1 and under "Tuning and customization by subsystem" in Chapter 2 of the *GDDM Performance Guide*.

2. If you are repackaging the defaults module, go to 5.
3. Look at "The contents of packaging stubs" on page 201 and decide what packaging stubs to include.
4. The name of your subsystem initialization module (see Figure 77 on page 201) is ADME000V.
5. If you are changing the defaults module:
   a. The name (see Figure 77 on page 201) is ADMADFV.
   b. Change the defaults module as required. See Appendix A, "GDDM defaults and nicknames" on page 115 for details.
   c. Reassemble the defaults module.
6. If you are linking with a GDDM utility-invoking routine, find its internal link-edit name from Figure 81 on page 207.
7. Use the linkage editor to create a module containing the required elements and having the correct name.

The examples that follow can be used as models. Further information on link-editing with GDDM can be found in the *GDDM Base Programming Reference* manual.

Examples of repackaging

Repackaging application program with executable code

The following example shows the commands entered to create a composite load module for an application program and to execute the composite module. All GDDM routines other than those required for the production of language-dependent error messages are included in the composite module. The language-dependent routines would be dynamically loaded should the application program require the generation of an error message.

The commands shown suppress the use of any copy of GDDM Base installed into a discontiguous saved segment (DCSS).

```
GLOBAL TXTLIB ADMPLIB ADMRLIB ADMGLIB PLILIB
LOAD appl-name ADMUX000 ADMUX00V ADMUXA00 ADMUXD00 (START
```

Loaded items are:

The application
The common subsystem adapter routine (ADMUX000)
The VM subsystem adapter routine (ADMUX00V)
The common application adapter routine (ADMUXA00)
The full screen manager (ADMUXD00).

Overriding saved segment defaults module

A saved segment is frequently used to reduce the dynamic loading that would otherwise be done for each separate virtual machine. Sometimes it is necessary to override the use of the defaults module for a particular program. A typical example is to use the trace facilities on the ICU, or to have the ICU panels appear in a language other than the default provided for your installation.

The following example shows the commands entered to invoke a GDDM application program, using a GDDM external defaults module other than that available in a discontiguous saved segment (DCSS).

The commands shown would permit the use of any other GDDM Base and GDDM-PGF routines that were present in a discontiguous saved segment (DCSS).

1. Create a suitably modified defaults module and generate it (as described in Appendix A, "GDDM defaults and nicknames" on page 115).
2. Ensure it is present either as a file of type TEXT, or in a TXTLIB of name, say, DFTLIB.
3. Issue the commands:

   ```
   GLOBAL TXTLIB DFTLIB ADMRLIB PLILIB
   LOAD appl-name ADMADFV (START
   ```

Loaded items are:

The application
The VM environment defaults module (ADMADFV).

Appendix I. GDDM font and conversion tables

This appendix contains information about two GDDM tables:

- GDDM font emulation table
- GDDM AFPDS (Advanced Function Presentation Data Stream) to IPDS (Intelligent Printer Data Stream) conversion table.

GDDM font emulation table

The GDDM font emulation table contains information about coded fonts that GDDM uses to emulate composite documents on screens. The font emulation table specifies:

- GDDM symbol set
- Character width
- Character height
- Character shear
- Font weight.

The GDDM font emulation table is a module (ADM4FONT) that is link-edited with GDDM. A copy of this module is supplied with GDDM for installations that want to add new fonts, or to change the fonts used by GDDM.

Changing the ADMMFONT macro

ADM4FONT contains an invocation of the ADMMFONT macro for each font, coded font, or code page. Entries in the GDDM font table are generated by coding invocations of the ADMMFONT macro. The syntax of the macro is:

```
FONTNAME ADMMFONT  SSETNAM=,      a GDDM vector symbol set name
                   CWIDTH=,       in units of 1/1440th inch
                   CHEIGHT=,      in units of 1/1440th inch
                   WEIGHT=,       MEDIUM | BOLD | 1 .. 8
                   SPACING=,      FIXED | PROPORTIONAL
                   SHEAR=,        float between 0.0 and 1.0
                   CODEID=,       see notes below
                   CECP=          CECP identifier
```

FONTNAME
The label specifies the CPDS font, coded font, or code page being defined.

1. The invocations of ADMMFONT should be coded in ascending order of **FONTNAME** or **CODEID**.
2. To allow both the unrotated and rotated versions of a font to be specified with a single macro invocation, the **FONTNAME** label may have a wild card as its second character. Coding:

   ```
   C#A05500  ADMMFONT
   ```

   will define font emulation table entries for:

   C1A05500

C2A05500
C3A05500
C4A05500.

It is possible to override some or all of the entries specified with a wild card by explicitly defining a given font. In the GDDM-supplied ADM4FONT, this is done for fonts C1Z05640, C2Z05640, C3Z05640, and C4Z05640.

3. Use **FONTNAME** or **CODEID**, not both.

SSETNAM = 'ADMDVSS'
Name (up to 8 characters) of a GDDM symbol set to be used for this font.

CWIDTH = 200
The width of the character box for the font. The default is equivalent to 10-point text.

CHEIGHT = 200
The height of the character box for the font. The default is equivalent to 10-point text.

WEIGHT = MEDIUM|BOLD|1|2|3|4|5|6|7|8
The weight of the font. This is interpreted as a GDDM color. **MEDIUM** is turquoise, and **BOLD** is neutral.

SPACING = PROPORTIONAL| FIXED
The spacing of the font. This attribute, whether specified explicitly or by default, will override the characteristics of the GDDM symbol set specified.

SHEAR = 0.0
The shear (specified as a quoted floating point value) to be applied to the character. For a description of how GDDM interprets shear, see the description of GSCH in the *GDDM Base Programming Reference*. The shear specified will form the **dx** component of the shear. The **dy** component will always be 1.0.

CODEID
This is provided as an alternative syntax to allow fonts with a numeric name to be specified. The GDDM-supplied ADM4FONT contains an example of its use for fonts 163, 84, 86, and 87.

Use **FONTNAME** or **CODEID**, not both.

CECP =
The code page identifier corresponding to the coded font or code page name specified for the FONTNAME label.

Installing a new font table

When you have assembled the font emulation table you will have a text deck which is also called ADM4FONT. You can link this text deck with an application or replace it in the system version of GDDM using the same facility that you used when installing it originally. (See also the section "Replacing GDDM modules after installation" on page 105.)

GDDM AFPDS to IPDS conversion table

GDDM uses the GDDM AFDPS to IPDS conversion table to convert information from the AFPDS font, code page, or coded font format into a suitable IPDS format, to allow AFPDS documents to be printed on IPDS printers. The conversion table supplied with GDDM is suitable for most applications; you need not change it unless you have special requirements.

The conversion table specifies:

- AFPDS resource name (font, code page, or coded font)
- IPDS printer product number
- IPDS font number
- IPDS code page number
- Font weight
- Font width
- Font descriptor.

The AFPDS to IPDS font conversion table is a module (ADMDKFNT) that is link-edited with GDDM. A copy of this module is supplied with GDDM for installations that want to add new fonts, or to change existing entries.

Changing the ADMDKFNT table

ADMDKFNT contains an invocation of the ADMMKFNT macro for each AFPDS resource name. Entries in the conversion table are generated by coding invocations of the ADMMKFNT macro. The syntax of the macro is:

```
AFPDS ADMMKFNT  MODEL=,        IPDS printer model number
                FONT=,         IPDS font number
                CDPG=,         IPDS code page number
                BOLD=,         YES|NO
                ITALIC=,       YES|NO
                WIDE=,         YES|NO
                DOUBLE=,       YES|NO
                CODEID=        see notes below
```

AFPDS

The label specifies the AFPDS resource name being defined.

1. The invocations of ADMMKFNT must be coded in ascending order of **AFPDS** or **CODEID**.
2. To allow both the unrotated and rotated versions of an AFPDS resource to be specified with a single macro invocation, the **AFPDS** label may have a wild card as its second character. Coding:

   ```
   C#A05500  ADMMKFNT
   ```

   will define conversion tables entries for:

   C1A05500
   C2A05500
   C3A05500
   C4A05500.

It is possible to override some or all of the entries specified with a wild card by explicitly defining a given AFPDS resource.

3. Use **AFPDS** or **CODEID**, not both.

FONT = 85
The IPDS font number (decimal) that is to be used instead of the AFPDS name. The default IPDS font is Courier 12.

MODEL = 3812
The IPDS printer model number for which this table entry is valid (for example, 3812, 4224).

CDPG = 500
The IPDS code page number (decimal) that is to be used instead of the AFPDS name.

WIDE = NO|YES
When **YES** is specified, the IPDS font will be printed using wide characters.

ITALIC = NO|YES
When **YES** is specified, the IPDS font will be printed using italic characters.

BOLD = NO|YES
When **YES** is specified, the IPDS font will be printed using bold characters.

DOUBLE = NO|YES
When **YES** is specified, the IPDS font will be printed twice; that is each character will be double-struck.

CODEID
This is provided as an alternative syntax to allow fonts with a numeric name to be specified. The GDDM-supplied ADMDKFNT contains an example of its use for fonts 163, 84, 86, and 87.

Use **AFPDS** or **CODEID**, not both.

Installing a new conversion table

When you have assembled the conversion table you will have a text deck which is also called ADMDKFNT. You can link this text deck with an application or replace it in the system version of GDDM using the same facility that you used when installing it originally. (See also the section "Replacing GDDM modules after installation" on page 105.)

Appendix J. Installation module directory

This appendix contains a list of modules that are included on the GDDM installation tape. References are made to it throughout the rest of the manual.

Revision bars are not used in this appendix. You should assume that all the information has changed.

National language modules

Where there is one module for each national language, the module name is shown with a lowercase x as part of the name; replace the lowercase x with the relevant letters from this table:

National language	Letter
Brazilian	B
PRC Chinese (Simplified)	C (GDDM Base NL only)
Danish	D
French	F
German	G
Korean (Hangeul)	H
Italian	I
Japanese (Kanji)	K
Norwegian	N
French (Canadian)	Q (GDDM Base NL only)
Spanish	S
Taiwan Chinese (Traditional)	T (GDDM Base NL only)
Swedish	V

Figure 82. Letters for national language files

TXTLIBs

GDDM/VM or GDDM/VMXA

ADMGLIB ADMNLIB ADMRLIB

GDDM/VM NL or GDDM/VMXA NL

ADMHxLIB where x is a letter from Figure 82.

GDDM-PGF

ADMPLIB

GDDM-PGF NL

ADMQxLIB where x is a letter from Figure 82.

directory

GDDM-IMD

ADMILIB

GDDM-IVU

ADMVLIB

GDDM-IVU NL

ADMWxLIB where x is a letter from Figure 82 on page 215.

GDDM-GKS

ADMKLIB

GDDM-GKS NL

ADMLxLIB where x is a letter from Figure 82 on page 215.

GDDM-REXX

ERXLIB

MACLIB

GDDM/VM or GDDM/VMXA

ADMLIB

Module files

The installation procedure will have generated the following module files onto the appropriate disk.

GDDM/VM or GDDM/VMXA

ADMISSE ADMUIMPV ADMUPCV ADMUPGV ADM4CDUV
ADMOPUV

GDDM-PGF

ADMCHART ADMUCDSO ADMVSSE

GDDM-IMD

ADMIMD ADMMSL

GDDM-IVU

ADMIVU

GDDM-REXX

ERXASCOM ERXTMSGA ERXTMSGH ERXTMSGK GDDMREXX
ERXASTUB ERXTMSGB ERXTMSGI ERXTMSGS
ERXTEMSG (for the default language)

Packaging stubs

GDDM/VM or GDDM/VMXA

ADMUXA0A ADMUXDH0 ADMUXD00 ADMUXD40 ADMUX000
ADMUXA00 ADMUXDI0 ADMUXDP0 ADMUXEBV ADMUX0AV
ADMUXDA0 ADMUXDJ0 ADMUXDS0 ADMUXEFV ADMUX00V
ADMUXDB0 ADMUXDK0 ADMUXDT0 ADMUXEF0 ADMUX000
ADMUXDC0 ADMUXDL0 ADMUXDW0 ADMUXI00 ADMUX300
ADMUXDE0 ADMUXDM0 ADMUXD00 ADMUXL0V ADMUX400
ADMUXDG0 ADMUXDN0 ADMUXD30 ADMUXL00

GDDM/VM NL or GDDM/VMXA NL

ADMUXA0x where x is a letter from Figure 82 on page 215.

GDDM-PGF

ADMUXB0A ADMUXPAA ADMUXPMA ADMUXP00 ADMUXV00
ADMUXB00 ADMUXPHA ADMUXP0A

GDDM-PGF NL

ADMUXB0x ADMUXPAx ADMUXPHx ADMUXPMx ADMUXP0x
where x is a letter from Figure 82 on page 215.

GDDM-IMD

ADMUX1G0 ADMUX1P0 ADMUX1T0 ADMUX10A ADMUX100
ADMUX1M0 ADMUX1S0 ADMUX1U0

GDDM-IVU

ADMUX5AA ADMUX500

GDDM-IVU NL

ADMUX5Ax where x is a letter from Figure 82 on page 215.

GDDM-GKS

ADMUXJAA ADMUXJ00

GDDM-GKS NL

ADMUXJAx where x is a letter from Figure 82 on page 215.

Directory of GDDM-IMD frames

The following GDDM-IMD frames are provided as part of the installation process.

GDDM-IMD

AEMCU2D9	AEMMU5D9	AEMM1ZD9	AEMM2YD9	AEMM31D9
AEMCU3D9	AEMMU6D9	AEMM10D9	AEMM2ZD9	AEMM32D9
AEMC30D9	AEMMU7D9	AEMM11D9	AEMM20D9	AEMM33D9
AEMMDBD9	AEMMXXD9	AEMM12D9	AEMM21D9	AEMM34D9
AEMMTTD9	AEMM00D9	AEMM13D9	AEMM22D9	AEMM40D9
AEMMU0D9	AEMM01D9	AEMM2SD9	AEMM23D9	AEMM41D9
AEMMU1D9	AEMM02D9	AEMM2TD9	AEMM24D9	AEMVU2D9
AEMMU2D9	AEMM1SD9	AEMM2UD9	AEMM25D9	AEMVU3D9
AEMMU3D9	AEMM1XD9	AEMM2VD9	AEMM30D9	AEMV30D9
AEMMU4D9	AEMM1YD9	AEMM2XD9		

AEMYUSAA	AEMYUSA1	AEMYUSCK	AEMYUSGM	AEMYUSLQ
AEMYUSAB	AEMYUSA2	AEMYUSCL	AEMYUSGO	AEMYUSLS
AEMYUSAC	AEMYUSA3	AEMYUSCM	AEMYUSHL	AEMYUSLU
AEMYUSAD	AEMYUSA4	AEMYUSCN	AEMYUSIU	AEMYUSLV
AEMYUSAE	AEMYUSA5	AEMYUSCO	AEMYUSI1	AEMYUSLW
AEMYUSAF	AEMYUSA6	AEMYUSCP	AEMYUSI3	AEMYUSLX
AEMYUSAG	AEMYUSBA	AEMYUSCQ	AEMYUSI4	AEMYUSLY
AEMYUSAH	AEMYUSBB	AEMYUSCR	AEMYUSK3	AEMYUSMA
AEMYUSAI	AEMYUSBC	AEMYUSCS	AEMYUSK4	AEMYUSMB
AEMYUSAJ	AEMYUSBD	AEMYUSCT	AEMYUSK5	AEMYUSMC
AEMYUSAK	AEMYUSBE	AEMYUSCU	AEMYUSK6	AEMYUSMD
AEMYUSAL	AEMYUSBF	AEMYUSCV	AEMYUSLA	AEMYUSMG
AEMYUSAM	AEMYUSB1	AEMYUSCZ	AEMYUSLB	AEMYUSMH
AEMYUSAN	AEMYUSB2	AEMYUSC1	AEMYUSLC	AEMYUSMJ
AEMYUSAO	AEMYUSB4	AEMYUSC9	AEMYUSLD	AEMYUSMK
AEMYUSAP	AEMYUSCA	AEMYUSDB	AEMYUSLE	AEMYUSML
AEMYUSAR	AEMYUSCB	AEMYUSDV	AEMYUSLF	AEMYUSMM
AEMYUSAS	AEMYUSCC	AEMYUSER	AEMYUSLH	AEMYUSMN
AEMYUSAT	AEMYUSCD	AEMYUSES	AEMYUSLI	AEMYUSMO
AEMYUSAU	AEMYUSCE	AEMYUSEX	AEMYUSLJ	AEMYUSMQ
AEMYUSAV	AEMYUSCF	AEMYUSEY	AEMYUSLM	AEMYUSMY
AEMYUSAW	AEMYUSCG	AEMYUSFP	AEMYUSLN	AEMYUSM1
AEMYUSAY	AEMYUSCH	AEMYUSGA	AEMYUSLO	AEMYUSM2
AEMYUSAZ	AEMYUSCI	AEMYUSGB	AEMYUSLP	AEMYUSM3

AEMYUSM7	AEMYUSQL	AEMYUSTS	AEMYUS1L	AEMYUS2X
AEMYUSM8	AEMYUSQM	AEMYUSTU	AEMYUS1M	AEMYUS2Y
AEMYUSM9	AEMYUSQN	AEMYUSU0	AEMYUS1N	AEMYUS2Z
AEMYUSNA	AEMYUSQO	AEMYUSU1	AEMYUS1O	AEMYUS20
AEMYUSNC	AEMYUSQP	AEMYUSU2	AEMYUS1Q	AEMYUS21
AEMYUSNF	AEMYUSQQ	AEMYUSU3	AEMYUS1S	AEMYUS22
AEMYUSNG	AEMYUSQR	AEMYUSU4	AEMYUS1U	AEMYUS23
AEMYUSNM	AEMYUSQS	AEMYUSU5	AEMYUS1V	AEMYUS24
AEMYUSNO	AEMYUSQT	AEMYUSU6	AEMYUS1W	AEMYUS25
AEMYUSNP	AEMYUSQU	AEMYUSU7	AEMYUS1X	AEMYUS3A
AEMYUSNQ	AEMYUSQV	AEMYUSX1	AEMYUS1Y	AEMYUS3B
AEMYUSNR	AEMYUSQY	AEMYUSX2	AEMYUS1Z	AEMYUS3C
AEMYUSNS	AEMYUSQZ	AEMYUSZZ	AEMYUS10	AEMYUS3D
AEMYUSNT	AEMYUSQ0	AEMYUSZ1	AEMYUS11	AEMYUS3E
AEMYUSNU	AEMYUSQ1	AEMYUSZ2	AEMYUS12	AEMYUS3F
AEMYUSNX	AEMYUSQ2	AEMYUS00	AEMYUS13	AEMYUS30
AEMYUSPF	AEMYUSQ3	AEMYUS01	AEMYUS2A	AEMYUS31
AEMYUSQA	AEMYUSQ4	AEMYUS02	AEMYUS2B	AEMYUS32
AEMYUSQB	AEMYUSQ5	AEMYUS08	AEMYUS2C	AEMYUS33
AEMYUSQC	AEMYUSQ7	AEMYUS1B	AEMYUS2D	AEMYUS34
AEMYUSQD	AEMYUSQ8	AEMYUS1C	AEMYUS2E	AEMYUS4B
AEMYUSQE	AEMYUSTA	AEMYUS1D	AEMYUS2F	AEMYUS40
AEMYUSQF	AEMYUSTC	AEMYUS1E	AEMYUS2N	AEMYUS41
AEMYUSQG	AEMYUSTD	AEMYUS1F	AEMYUS2R	AEMYUS5A
AEMYUSQH	AEMYUSTE	AEMYUS1G	AEMYUS2S	AEMYUS5F
AEMYUSQI	AEMYUSTF	AEMYUS1H	AEMYUS2T	AEMYUS50
AEMYUSQJ	AEMYUSTH	AEMYUS1J	AEMYUS2U	AEMYUS5P
AEMYUSQK	AEMYUSTJ	AEMYUS1K	AEMYUS2V	AEMYUS5Z

GDDM-IVU

ADM51AD6	ADM52AD6	ADM53AD6	ADM54AD6	ADM55AD6

GDDM-IVU NL

ADM51xD6	ADM52xD6	ADM53xD6	ADM54xD6	ADM55xD6

where x is a letter from Figure 82 on page 215, except for H and K.

ADM51HK5	ADM52HK5	ADM53HK5	ADM54HK5	ADM55HK5
ADM51KK5	ADM52KK5	ADM53KK5	ADM54KK5	ADM55KK5

Directory of GDDM/VM PCLKF or GDDM/VMXA PCLKF objects

The following objects are on the GDDM/VM PCLKF or GDDM/VMXA PCLKF tape:

ADMPC files

GQDKMAP	GQDNLFR	GQDRPD3A	GQDSYS	GQD12V23
GQDLEV	GQDNLGR	GQDRPD4	GQDSYSA	GQD12V30
GQDLEVA	GQDNLIT	GQDRPD4A	GQDSYX	GQD7V27
GQDNLACF	GQDNLSP	GQDRPD5	GQDXXBM	GQD8I10
GQDNLAFR	GQDNLUS	GQDRPD5A	GQDXXBMA	GQD8I14
GQDNLAGR	GQDRPD1	GQDRPD6	GQDXX06	GQD8I19
GQDNLAIT	GQDRPD1A	GQDRPD6A	GQDXX06A	GQD8I8
GQDNLASP	GQDRPD2	GQDRPD7A	GQDXX10	GQD8V14
GQDNLAUS	GQDRPD2A	GQDSIF	GQDXX10A	GQD8V19
GQDNLDA	GQDRPD3	GQDSTRCA	GQD12V17	

Maintenance file

GQDMAINT DATA

Directory of sample material

The following sample materials are provided as part of the installation process.

Sample symbol sets

GDDM/VM or GDDM/VMXA

ADMCOLSD	ADMDHIMV	ADMDHJIR	ADMDVSSN	ADMUUARP
ADMCOLSN	ADMDHIPA	ADMDHJVJ	ADMDVSSP	ADMUUCIP
ADMCOLSR	ADMDHIPC	ADMDHJVK	ADMDVSSS	ADMUUCRP
ADMDHIIA	ADMDHIPG	ADMDHJVM	ADMDVSSV	ADMUUCSP
ADMDHIIC	ADMDHIPJ	ADMDISKA	ADMDVSSW	ADMUUDRP
ADMDHIIE	ADMDHIPK	ADMDISKC	ADMIPATA	ADMUUFSS
ADMDHIIG	ADMDHIPL	ADMDISKG	ADMIPATC	ADMUUGEP
ADMDHIIK	ADMDHIPM	ADMDISKN	ADMIPATG	ADMUUGGP
ADMDHIIN	ADMDHIPN	ADMDISKR	ADMIPATN	ADMUUGIP
ADMDHIIQ	ADMDHIPR	ADMDVECP	ADMIPATR	ADMUUKRF
ADMDHIIR	ADMDHIVJ	ADMDVIH	ADMITALA	ADMUUKRO
ADMDHIMA	ADMDHIVM	ADMDVSS	ADMITALC	ADMUUKSF
ADMDHIMC	ADMDHIVQ	ADMDVSSB	ADMITALG	ADMUUKSO
ADMDHIMG	ADMDHJIA	ADMDVSSD	ADMITALK	ADMUUMOD
ADMDHIMJ	ADMDHJIC	ADMDVSSE	ADMPATTA	ADMUUNSF
ADMDHIMK	ADMDHJIG	ADMDVSSF	ADMPATTC	ADMUUNSO
ADMDHIMN	ADMDHJIK	ADMDVSSG	ADMPATTG	ADMUUORP
ADMDHIMQ	ADMDHJIN	ADMDVSSI	ADMPATTN	ADMUUSHD
ADMDHIMR	ADMDHJIQ	ADMDVSSK	ADMPATTR	ADMUUSRP

ADMUUTIP	ADMUVGGP	ADMUVORP	ADMUWCSP	ADMUWMOD
ADMUUTRP	ADMUVGIP	ADMUVSHD	ADMUWDRP	ADMUWNSF
ADMUUTSS	ADMUVKRF	ADMUVSRP	ADMUWGEP	ADMUWNSO
ADMUVCIP	ADMUVKRO	ADMUVTIP	ADMUWGGP	ADMUWORP
ADMUVCRP	ADMUVKSF	ADMUVTRP	ADMUWGIP	ADMUWSHD
ADMUVCSP	ADMUVKSO	ADMUVTSS	ADMUWKRF	ADMUWSRP
ADMUVDRP	ADMUVMOD	ADMUWARP	ADMUWKRO	ADMUWTIP
ADMUVFSS	ADMUVNSF	ADMUWCIP	ADMUWKSF	ADMUWTRP
ADMUVGEP	ADMUVNSO	ADMUWCRP	ADMUWKSO	

GDDM/VM or GDDM/VMXA KANJI

ADMIK4A	ADMIK5B	ADMIK61	ADMVK43	ADMVK53
ADMIK4B	ADMIK5C	ADMIK62	ADMVK44	ADMVK54
ADMIK4C	ADMIK5D	ADMIK63	ADMVK45	ADMVK55
ADMIK4D	ADMIK5E	ADMIK64	ADMVK46	ADMVK56
ADMIK4E	ADMIK5F	ADMIK65	ADMVK47	ADMVK57
ADMIK4F	ADMIK50	ADMIK66	ADMVK48	ADMVK58
ADMIK41	ADMIK51	ADMIK67	ADMVK49	ADMVK59
ADMIK42	ADMIK52	ADMIK68	ADMVK5A	ADMVK60
ADMIK43	ADMIK53	ADMVK4A	ADMVK5B	ADMVK61
ADMIK44	ADMIK54	ADMVK4B	ADMVK5C	ADMVK62
ADMIK45	ADMIK55	ADMVK4C	ADMVK5D	ADMVK63
ADMIK46	ADMIK56	ADMVK4D	ADMVK5E	ADMVK64
ADMIK47	ADMIK57	ADMVK4E	ADMVK5F	ADMVK65
ADMIK48	ADMIK58	ADMVK4F	ADMVK50	ADMVK66
ADMIK49	ADMIK59	ADMVK41	ADMVK51	ADMVK67
ADMIK5A	ADMIK60	ADMVK42	ADMVK52	ADMVK68

Sample programs and data

GDDM/VM or GDDM/VMXA

ADMUBCDV	EXEC	ADMUSP1	PLI	ADMUTMDV	ASSEMBLE
ADMUIMP	EXEC	ADMUSP2	PLI	ADMUTMIV	ASSEMBLE
ADMUPCFV	EXEC	ADMUSP3	PLI	ADMUTMPV	ASSEMBLE
ADMUSC1	COBOL	ADMUSP4	PLI	ADMUTMSV	ASSEMBLE
ADMUSC2	COBOL	ADMUSP7	PLI	ADMUTMTV	ASSEMBLE
ADMUSF1	FORTRAN	ADMUTMAV	ASSEMBLE	ADMUTMV	PLI
ADMUSF2	FORTRAN	ADMUTMCV	ASSEMBLE		

GDDM-PGF

ADMUCSIM	DATA	ADMUPLNO	COPY	ADMUSF5	FORTRAN
ADMUPINC	COPY	ADMUPLRO	COPY	ADMUSF6	FORTRAN
ADMUPINV	COPY	ADMURCPO	COPY	ADMUSP5	PLI
ADMUCIMV	EXEC	ADMUSC5	COBOL	ADMUSP6	PLI
ADMUPIRC	COPY	ADMUSC6	COBOL	ADMUSP60	ASSEMBLE
ADMUPIRV	COPY				

GDDM-IMD

```
ADMUAIMC COPY        ADMUCIMC COPY        ADMUPIMC COPY
```

GDDM-IVU

```
ADM5IUA (containing mapgroups ADM51A, ADM52A, ADM53A, ADM54A, and ADM55A)
ADMU5IMG ADMIMG      ADMUPIN5 COPY        ADMUPIR5 COPY
ADMU5PRJ ADMPROJ
```

GDDM-IVU NL

```
ADM5IUx (containing mapgroups ADM51x, ADM52x, ADM53x, ADM54x, and ADM55x)
```
where x is a letter from Figure 82 on page 215.

GDDM-GKS

```
ADMJROOM FORTRAN     ADMJBIV ASSEMBLE     ADMJB77 FORTRAN
```

GDDM-REXX

```
ERXCHART EXEC        ERXMSVAR EXEC        ERXORDER EXEC
ERXMENU  EXEC        ERXOPWIN EXEC        ERXPROTO EXEC
ERXMODEL ADMGDF      ERXORDD6 ADMGGMAP    ERXTRY   EXEC
ERXMODEL EXEC        ERXORDER ADMIFMT
```

Default materials

GDDM/VM or GDDM/VMXA

```
ADMADFV  ASSEMBLE    ADMLSYS1 ASSEMBLE    ADMUDBCS EXEC
ADMDATRN ASSEMBLE    ADMLSYS3 ASSEMBLE    ADM4CP   ASSEMBLE
ADMDJCOL ASSEMBLE    ADMLSYS4 ASSEMBLE    ADM4FONT ASSEMBLE
ADMDKFNT ASSEMBLE
```

Installation and service material

GDDM/VM

```
5664200  DATA        I5664200 MEMO        I5664200 022006
ADMBLSEG EXEC        ADMSERV  EXEC        ADMUP220 EXEC
I5664200 EXEC
```

GDDM/VM NL

```
I5664200 MEMONL      I5664200 022005NL    I5664200 EXEC
```

GDDM/VM PCLKF

```
I5664200 EXEC        I5664200 MEMOPC      I5664200 022005PC
```

GDDM/VMXA

```
5684007  DATA        I5684007 MEMO        I5684007 022006
ADMBLSEG EXEC        ADMSERV  EXEC        ADMUP220 EXEC
I5684007
```

GDDM/VMXA NL

```
I5684007 MEMONL      I5684007 022005NL    I5684007 EXEC
```

GDDM/VMXA PCLKF

```
I5684007 EXEC        I5684007 MEMOPC      I5684007 022005PC
```

GDDM-PGF

```
5668812  DATA        I5668812 MEMO        I5668812 021005
I5668812 EXEC
```

GDDM-PGF NL

```
I5668812 MEMONL      I5668812 021005NL    I5668812 EXEC
```

GDDM-IMD

```
5668801  DATA        I5668801 MEMO        I5668801 021005
I5668801 EXEC
```

GDDM-IVU

```
5668723  DATA        I5668723 MEMO        I5668723 011005
I5668723 EXEC
```

GDDM-IVU NL

```
I5668723 MEMONL      I5668723 011005NL    I5668723 EXEC
```

GDDM-GKS

```
I5668802 EXEC
```

GDDM-GKS NL

```
I5668802 EXEC
```

GDDM-REXX

```
5664336  DATA        I5664336 MEMO        I5664336 011005
ERXBLSEG EXEC        I5664336 EXEC
```

Appendix K. What to do if things go wrong

If you find that you cannot get GDDM to work satisfactorily when you try to test it, there are several things you should check out before calling for assistance.

- Refer to the *GDDM Diagnosis and Problem Determination Guide* for full details of any of these checks.
- Check in the section "Common errors and pitfalls" on page 231 for the symptoms of your problem. If you cannot find your problem described in that section, continue with the following checks.
- Refer to Chapter 1 of this manual and check that you have the correct levels of:
  - System
  - Subsystem
  - Access method
  - Controller microcode
  - Control program (where appropriate)
  - Hardware features (specifically for graphics).

  Check any relevant notes, restrictions, or prerequisites that are mentioned in Chapter 2.
- If an error message appears, either on a display screen or on your console log, you should look it up in the appropriate manual. Most GDDM messages start with the letters ADM; GDDM-IMD messages start with AEM, and GDDM-CSPF messages start with EAK. They are all documented in the *GDDM Messages* manual.

  GDDM-PCLK messages start with GQD and are described in the *GDDM-PCLK Guide*.
- If an abnormal termination (abend) occurs, you should check in the appropriate system or subsystem manual. The *GDDM Diagnosis and Problem Determination Guide* contains details of all GDDM abends.
- If these measures fail to solve the problem, check through the steps you have completed thus far, and examine the console log for any unusual messages.
- You should also review the whole installation process from the start, and check for errors. In particular:
  - Check the items in "Instructions for preinstallation planning" on page 38.
  - Check the VTAM bind parameters.
  - Check for consistency any defaults you have changed.

If you have some terminals working successfully on GDDM, compare the definitions for the successful terminals against the one you are presently diagnosing.

If these checks show up no unusual circumstances, check out your hardware devices; it could be that they are not set up correctly to show GDDM graphics. The section "Checking out hardware characteristics" on page 226 gives you advice on doing this.

If your problem is still unresolved, check with your IBM Support Center or NSD PSP "bucket" for late information about installation. Further guidance on debugging problems can be found in the *GDDM Diagnosis and Problem Determination Guide*, which also contains information about reporting problems to IBM.

Checking out hardware characteristics

In the course of determining your problem, you may need to check out your hardware characteristics. The following sections give you advice on doing this, and may enable you to isolate the problem to a specific terminal or controller. Checking a screen will require about one minute, a controller another ten to fifteen minutes.

3179-G and 3192-G graphics diagnosis

First check that you have a 3179 Model G. 3179 terminals, other than the 3179-G, do not show graphics. Next refer to the documentation that is provided with the terminal, *IBM 3179 Color Display Station Operator Reference and Problem Solving Guide*, GA18-2180.

Similar considerations apply to the 3192-G color display station.

3270 graphics diagnosis

This is not applicable to 3179-G color display stations or 3270-PC work stations.

Is the terminal built for graphics?

To test for installed graphics features (Program Symbol Sets 2 and 4), hold the Alternate key down and press the TEST key on the lower left-hand row of the keyboard. Enter the data "/8" and press the ENTER key.

If graphics is available you will see the PS fields A through F with a symbol. Absence of a PS (Program Symbol) set is signified by a period ".". Triple-plane PS stores are marked with a red and white triangle.

Absence of the PS feature means that you require graphics capabilities installed on your terminal. Ask your IBM representative to verify the terminal configuration. If you receive the stick man message "operation not permitted" in the Operator Information area, check the controller for graphics (see the next section), and then review the screen functions again.

3270 EDCB verification

This is not applicable to 3179-G color display stations or 3270-PC work stations.

3270-devices that have been configured for extended functions (more correctly known as SFAP — Structured Field and Attribute Processing) should normally operate with an extended DCB (Device Control Block) allocated by the controller and created during customization.

As part of problem determination, the following test can be performed to confirm that the device is indeed operating with an extended DCB. This test is more fully

documented in the Error Codes Appendix of the *3274 Control Unit Description and Programmer's Guide.*

On any 3278 or 3279 display attached to the same controller as the display or printer being diagnosed:

- Enter TEST Mode by holding down the ALT key and pressing the TEST key.
- Enter AA/6 to display the DCB for the device in question; AA is the coax port number in question (00-31). (If the device being used for the test is the port in question, /6 will suffice.)
- Press the ENTER key. The first X'40' bytes of the DCB in question will be displayed on lines 3 – 6. The first two bytes of the displacement from the start of the control block of the data being displayed, will be displayed on line 2 (initially 00).
- Continue to press the ENTER key. Line 2 should change to 04, 08, 0C, 10, 14, 18, 1C for each pressing. Lines 3 – 6 will change to display further bytes of the DCB.

If the test display stops at 0C (with the keyboard inhibited with the minus function indicator on the fifth pressing of the ENTER key), the device in question is not operating with an extended DCB.

The reason for this lies either with the controller or customization or with the features installed on the device. TEST /8 (displays), described above, or TEST 5 (printers), described below, can be used to verify the features installed on the device.

If the test display stops at 1C, the device is operating with an extended DCB.

3287 printer diagnosis

To test for installed graphics features on a 3287 printer, you must use the print control information area (PCIA), which can be printed out by the printer. To produce the PCIA, do the following:

1. Press and hold down the TEST button.
2. Press and release the 5 button.
3. Release the TEST button.

The meaning of the PCIA is shown in Figure 83. The complete information is in the 3287 Maintenance Information manual provided with the product.

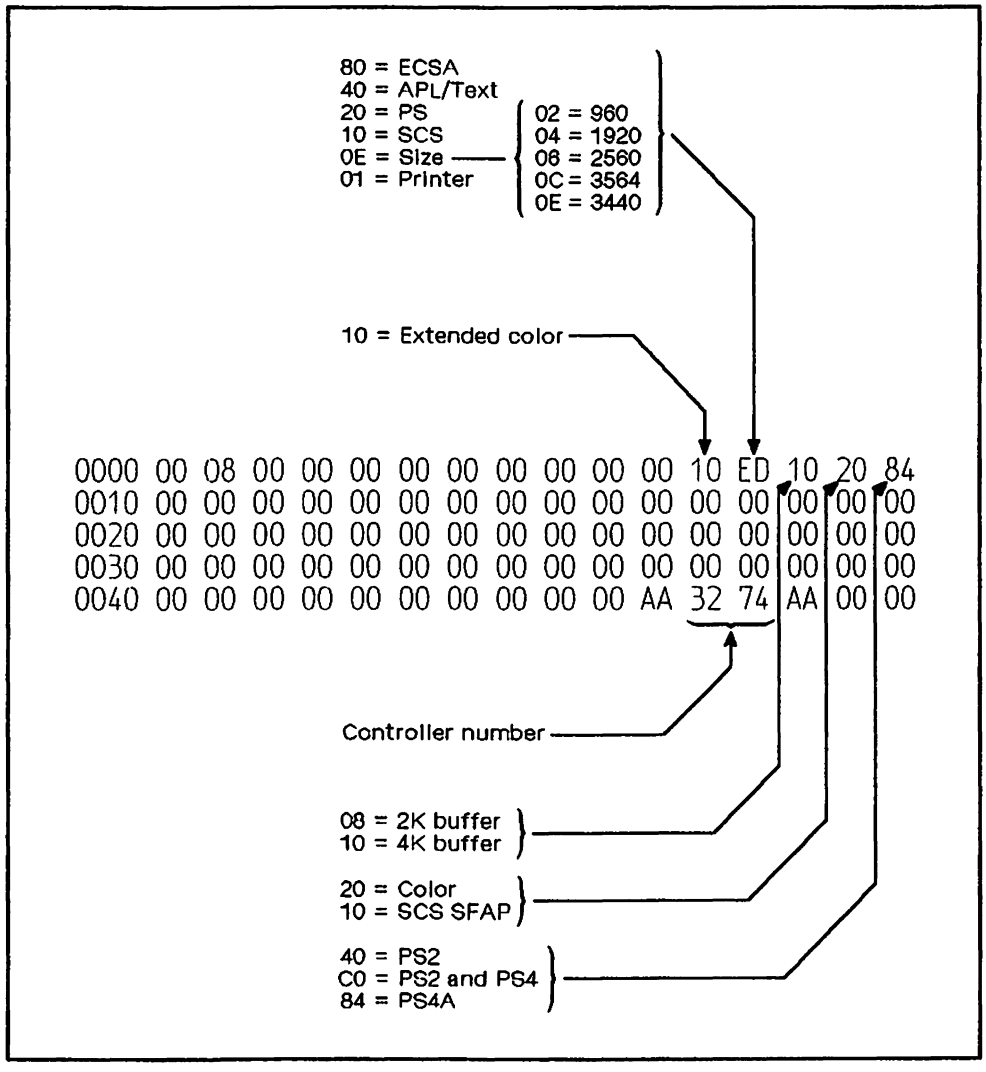


Figure 83. Meaning of the PCIA on the 3287 printer

3268 printer diagnosis

To test for installed graphics features on a 3268 printer, you must use the test procedure that can print out the print control information area (PCIA). To produce this PCIA, do the following:

1. Press and hold down the TEST button
2. Press and release the 4 button
3. Release the TEST button.

The meaning of the PCIA is shown in Figure 84. The complete information is in the 3268 Maintenance Information manual provided with the machine.

Note: To enable use of the triple plane PS, language switch 1 must be in the On position.

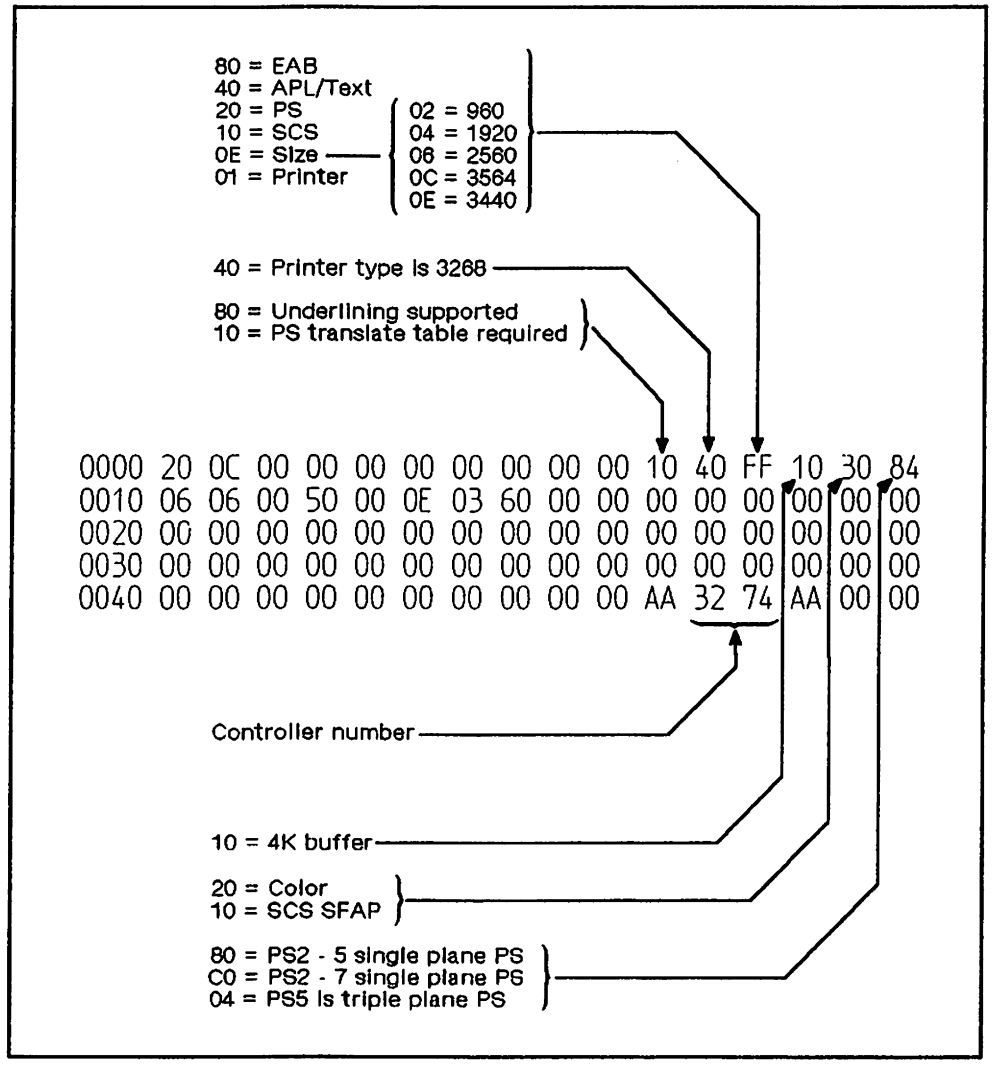


Figure 84. Meaning of the PCIA on the 3268 printer

4224 printer

If you have a problem when using the 4224 printer, check that your printer has been set up with the correct page size. The printer page size is checked and changed using the printer operator panel; for more information refer to the *4224 Printer Operating Instructions.*

It is not important what lines per inch (lpi) or characters per inch (cpi) settings are used, provided that the resulting page size is correct.

Page depth in inches = Maximum Page Length (MPL) / lpi
Page width in inches = Maximum Print Position (MPP) / cpi

Other printer settings can be set as most convenient.

If device tokens are being used, the page size defined to the printer must be at least as large as that defined to GDDM by the device token. (It does not matter if the printer has a larger page sized defined to it than that defined by the device token.)

3193 display station

Check the stand-alone TEST procedure and the device set-up procedure. The set-up procedure allows you to change many attributes of the display, for example:

- Whether extended attributes are supported, such as blink or reverse video.
- How many hardware partitions are available in each of the two logical terminals.
- The size of each logical terminal's viewport.
- The volume of the alarm.

All these may affect how the application runs. Another potential problem is that Image is only supported on Logical Terminal 1 (LT-1).

3274 controller diagnosis

To permit graphics, a 3274 must be configured for graphics. Any 3274 Model 31 is eligible for graphics, as are the 3274-1A, 3274-1C, 3274-1D, or 3274-51C with sufficient storage. Any 3274 Model 21 or a 3274 Model 1B is not eligible for graphics. All these models can be upgraded to be graphics-compatible.

Ensure that you have the correct model and enough storage (96K bytes are required for 3278, 3279, 3287, but later devices may need more; 3274 Model 31s all have sufficient storage). Then check if the diskettes that have been customized are Configuration C or D for 3278, 3279, and 3287, or D or T for 3270-PC/G and /GX, 3290, and 5550. If not, get the level of support and customize as described in the *IBM 3274 Control Unit Planning, Setup, and Customization Guide.* Specific questions, given in the Guide, must be answered to support graphics. These may be any of the following:

```
Q.121 Is this correctly selected for your language requirement?

Q.161 Color
A. 1..Yes
```

```
Q.162 SFAP
A. 1..Yes

Q.163 Extended Character Set Adapter (ECSA).
A. 1..for every device on the controller that
      has ECSA, but not greater than quantity in Q.112.

Q.164 PS
A. 1..Yes

Q.165 Decompression.
Normal recommendation is:
A. 0..for 3274 A and D models,
   1..for 3274 C models.

Q.166 Attribute Select Keyboard.
A. C..This encompasses all options.

Q.176 Decompression.
Normal recommendation is:
A. 1..for BSC Enhanced Communication Option (Distributed
         Function Terminals) applied to 3270-PC/G and
         3270-PC/GX.  This is known as WACK support.
```

If you already have the 3274 correctly customized, use the modification procedure described in the *IBM 3274 Control Unit Planning, Setup, and Customization Guide*, to verify that the above options are defined. Then complete the documentation card held with the controller for future reference.

Common errors and pitfalls

The following section contains a list of common (and some not so common) errors and pitfalls that you may encounter during the installation process.

If you have a problem, you should check if it is described in this section.

The problems are listed in the following categories:

Problems associated with abends: The host software program is terminated, with an abend code displayed or printed.

Problems associated with incorrect output: The output did not correspond to that expected, or did not appear.

Problems associated with messages: An unexpected message was encountered.

Problems involving system performance: A degradation in performance occurred, which could not be accounted for.

Problems involving device checks: A device "PROG" code or other code was displayed in the device's Operator Information Area.

Problems associated with SNA sense codes: An unexpected SNA sense code was encountered.

Within each category, the errors and pitfalls are listed in order of the code, message number, or other characteristic associated with the error.

You should check for your problem in any of the categories that may seem appropriate. (Scan the "Contents" list at the front of this book for likely items.)

Problems associated with abends

User abend code 1064

Problem Description

ADMGLIB is not the last parameter in the GLOBAL command parameter list. When any other GDDM licensed program is installed with GDDM Base, you must issue ADMGLIB as the last parameter in the GLOBAL command parameter list.

Problem Resolution

Repeat with ADMGLIB in its correct place in the GLOBAL command parameter list.

User abend code 1201

Applicable Devices:

3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX, or 5550.

Problem Resolution:

This abend occurs if an incomplete Alphanumerics Defaults Module (ADMDATRN) is used with a 3179-G1 or 3179-G2 color display station, or with a 3270-PC/G or /GX work station or a 5550 multistation. Refer to "Compatibility of ADMDATRN with previous releases" on page 139.

Problems associated with incorrect output

Thick black lines on 3812 output

Symptoms:

Thick black lines appear on 3812 output.

Applicable Devices:

3812.

Problem Resolution:

Either the required font has not been loaded, or the wrong level of the VM3812 program is in use.

User session logoff

Symptoms:

Missing Interrupt conditions and consequent user session logoff.

Applicable Devices:

3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX.

Problem Resolution:

For GDDM/VM systems, refer to the description of message DMKDID546I in "Message DMKDID546I" on page 234. This message is sent to the operator, not the user.

For GDDM/VMXA systems, the matching message is HCPMHT2150I; this message is described in "Message HCPMHT2150I" on page 234.

Problems associated with messages

Messages beginning ADM

Symptoms:

ADM..... Any message beginning with the letters ADM.

Problem Description:

The message may appear on the display screen, on printer output, or in a console log.

Problem Resolution:

Look up the message in the *GDDM Messages* manual. The manual contains an explanation of the message and an indication of what to do. Also, check this section for additional information relating to the specific message.

Message ADM0275

Symptoms:

```
ADM0275 GRAPHICS {(IMAGE)} CANNOT BE SHOWN, REASON CODE n
```

Problem Resolution:

Look up the message in the *GDDM Messages* manual. If the reason code indicates that system tables are at fault, check the system tables, including VTAM bind definitions where appropriate.

If the reason code indicates that the device is at fault, read the section "Checking out hardware characteristics" on page 226.

Message ADM0275, reason code 9

Symptoms:

```
ADM0275 GRAPHICS {(IMAGE)} CANNOT BE SHOWN, REASON CODE 9
```

Applicable Devices:

3270-PC/G and /GX work stations.

Problem Resolution:

Message ADM0275, reason code 9, will occur for a 3270-PC/G or /GX when the device has PS support but no graphics support.

Even when such a device has been customized with graphics support, it will dynamically suppress the graphics support when it is SNA-attached and its VTAM MODEENT SRCVPAC specification is incorrect. Refer to Appendix E, "Checking a VTAM network" on page 185 for more information.

Messages beginning AEM

Symptoms:

AEM..... Any message beginning with the letters AEM.

Problem Description:

The message may appear on the display screen, on printer output, or in a console log.

Problem Resolution:
Look up the message in the *GDDM Messages* manual. The manual contains an explanation of the message and an indication of what to do.

Message DMKDID546I

Symptoms:
```
DMKDID546I INTERRUPTION <PENDING|CLEARED> ........
```

Applicable Devices:
3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX.

Problem Resolution:
Highly complex graphic output can sometimes incur a significant length of processing time in 3179-G1 or 3179-G2 color display stations, or in 3270-PC/G or /GX work stations before they indicate the completion of an I/O operation. If the time interval involved exceeds the host system's "missing interrupt time interval" an error condition may be raised and the user session logged off. On VM/CMS, the default time interval is 30 seconds. See the *GDDM Performance Guide*, indexed under "time-outs VM/CMS," for information on increasing this time interval.

Message DMSLIO169S

Symptoms:
```
DMSLIO169S ESDID TABLE OVERFLOW
```

Other Limitations:
PL/I application programs.

Problem Resolution:
On some levels of VM/CMS, there is a limit of 255 to the number of external names allowed for a text deck. This limit may be exceeded by a PL/I application program that includes all the GDDM sample declarations. Refer to the *GDDM Base Programming Reference* manual for further information. The limit is removed by PUT tape 8505 for VM/SP3.

Messages beginning GQD

Symptoms:
`GQD.....` Any message beginning with the letters GQD.

Problem Description:
The message may appear on the display screen, on printer output, or in a console log.

Problem Resolution:
Look up the message in the *GDDM-PCLK Guide*. The manual contains an explanation of the message and an indication of what to do.

Message HCPMHT2150I

Symptoms:
```
HCPMHT2150I devtype addr AN INTERRUPT IS PENDING
```

Applicable Devices:
3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX.

Problem Resolution:
Highly complex graphic output can sometimes incur a significant length of processing time in 3179-G1 or 3179-G2 color display stations, or in 3270-PC/G or /GX work stations before they indicate the completion of an I/O operation. If the time interval involved exceeds the host system's "missing interrupt time interval" an error condition may be raised and the user session logged off. On VM/CMS, the default time interval is 30 seconds. See the *GDDM Performance Guide*, indexed under "time-outs VM/CMS," for information on increasing this time interval.

Problems involving system performance

Line time-outs

Symptoms:
Line time-outs.

Applicable Devices:
3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX, or 5550.

Applicable Access Methods:
Remote (link-attached) non-SNA environments.

Problem Resolution:
Communication line time-outs may occur for a 3179-G1 or 3179-G2 color display station, or for a 3270-PC/G or /GX work station, or a 5550 multistation if the device is BSC-attached but the associated 3274 controller has not been configured with WACK support. For more information refer to Appendix F, "Customizing devices" on page 191.

Missing interrupt conditions

Symptoms:
Missing interrupt conditions and consequent user session logoff.

Applicable Devices:
3179-G1, 3179-G2, 3270-PC/G, or 3270-PC/GX.

Problem Resolution:
For GDDM/VM systems, refer to the description in "Message DMKDID546I" on page 234.

For GDDM/VMXA systems, refer to the description in "Message HCPMHT2150I" on page 234.

Problems involving device checks

Machine check 207

"207"

Symptoms:
Machine check 207.

Applicable Devices:
3270-PC/G and /GX work stations.

Problem Resolution:

This machine check may be indicated on a 3270-PC/G or /GX if required patches or customization options have not been applied to the associated 3274 controller. See "Control units" on page 5.

Appendix L. Listings of user EXECs

This appendix contains listings of the supplied EXECs that you might want to provide for your users. Review "Step 10: Provide suitable EXECs for users" on page 93 for more information. The EXECs are:

Figure	Page	Function	Status
85	238	Generate family-4 printer file from a chart or GDF file	Supplied as ADMUCIMV
86	242	Generate family-4 printer file from an image file	Supplied as ADMUIMP
87	245	Browse or print composite documents	Supplied as ADMUBCDV
88	247	File transfer with 3270-PC/G or /GX	Supplied as ADMUPCFV

SUPPLIED EXEC FROM GDDM

```
*********************************************************************
*                                                                   *
* NAME:     ADMUCIMV                                                *
*                                                                   *
* FUNCTION: DRIVE MODULE ADMUCDSO TO OUTPUT CHARTS OR GDF           *
*           FOR A COMPOSED PAGE   (FAMILY-4) PRINTER                *
*                                                                   *
* INPUT:    CHART_DATA_NAME  CHART_FORMAT_NAME|'GDF'                *
*                                                                   *
*********************************************************************
*                                                                   *
*                5668-812                                           *
*                (C) COPYRIGHT IBM CORP. 1979,1986                  *
*                LICENSED MATERIALS - PROPERTY OF IBM               *
*                                                                   *
*********************************************************************
&CONTROL ERROR
*
*********************************************************************
* REQUEST INPUT PARAMETERS IF NOT PRESENT ON ENTRY
*********************************************************************
&IF &INDEX > 0 &GOTO -PARMOK
&SPACE
&BEGTYPE
==> ENTER FILENAME OF CHART DATA (AND FORMAT IF DIFFERENT):
&END
&READ ARGS
&IF &INDEX = 0 &EXIT 4
*
*********************************************************************
* PROCESS CHART DATA NAME
*         CHART FORMAT NAME (OPTIONAL)
*********************************************************************
-PARMOK
&CD = &1
&CF = =
&IF &INDEX = 1 &TYPE *** CHART FORMAT NAME ASSUMED = CHART DATA NAME.
&IF &INDEX > 1 &CF = &2
*
*********************************************************************
* ICU DISPLAY OPTION: DEFAULT DISPLAY = 6
*                     IF THE DATA FILE IS GDF THEN DISPLAY = 99
*                     THIS CAUSES ADMUCDSO TO LOAD THE GDF AND DISPLAY
*                     DIRECTLY ONTO THE REQUESTED DEVICE.
*                     THIS IS NOT A CHART DISPLAY OPTION.
*********************************************************************
&DP = 6
&IF &CF = GDF &DP = 99
```

continued ...

Figure 85 (Part 1 of 4). Supplied EXEC ADMUCIMV for producing a composed-page printer file on the ICU

SUPPLIED EXEC FROM GDDM (continued)

```
*
*********************************************************************
* DEFINE DEVICE TOKEN: (IMG600X) 4250 PRINTER
*                      (IMG240X) 3800-3/3820 PRINTER
*********************************************************************
&DT = IMG600X
*
*********************************************************************
* DSOPEN OPTION GROUP 5
* =====================
* DEFINE DATA STREAM TYPE: (0) DOCUMENT (PRIMARY D/STREAM)
*                          (1) PAGE SEGMENT (SECONDARY D/STREAM)
*********************************************************************
&DS = 0
*
*********************************************************************
* DSOPEN OPTION GROUP 6
* =====================
* DEFINE SPILL FILE USAGE: (0) KEEP INTERNAL DATA IN A SPILL FILE
*                          (1) KEEP INTERNAL DATA IN MAIN STORAGE
*********************************************************************
&SP = 0
*
*********************************************************************
* DSOPEN OPTION GROUP 7
* =====================
* DEFINE THE NUMBER OF SWATHES THAT MAKE UP THE COMPLETE IMAGE
*********************************************************************
&N = 8
*
*********************************************************************
* DSOPEN OPTION GROUP 8
* =====================
* DEFINE IMAGE WIDTH
*              DEPTH
*              UNITS: (0) TENTHS OF AN INCH
*                     (1) MILLIMETERS
*********************************************************************
&W = 60
&D = 40
&U = 0
*
```

continued ...

Figure 85 (Part 2 of 4). Supplied EXEC ADMUCIMV for producing a composed-page printer file on the ICU

SUPPLIED EXEC FROM GDDM (continued)

```
*************************************************************************
* DSOPEN OPTION GROUP 9
* =====================
* DEFINE IMAGE FORMAT: (0) UNFORMATTED (BIT ARRAY)
*                      (1) FORMATTED D/STREAM TO CDPF/PSF REQUIREMENTS:
*                          (CDPF IS THE 4250 DEVICE DRIVER)
*                          (PSF IS THE 3800-3/3820 DEVICE DRIVER)
*************************************************************************
&FO = 1
*
*************************************************************************
* DSOPEN NAMELIST PARAMETERS
* ==========================
* DEFINE OUTPUT IMAGE FILE_NAME
*                     FILE_TYPE
*                     FILE_MODE
*************************************************************************
&F = &CD
&T = *
&M = A1
*
*************************************************************************
* PRINTOUT OF ALL VARIABLES FOR A VISUAL CHECK
*************************************************************************
&SPACE
&TYPE . CHART DATA NAME = &CD
&TYPE CHART FORMAT NAME = &CF
&TYPE .... DEVICE TOKEN = &DT
&IF &DS = 0 &IF &FO = 1 &TYPE .DATA STREAM TYPE = DOCUMENT
&IF &DS = 1 &IF &FO = 1 &TYPE .DATA STREAM TYPE = PAGE SEGMENT
&IF &SP = 0 &TYPE .SPILL FILE USAGE = REQUIRED
&IF &SP = 1 &TYPE .SPILL FILE USAGE = NOT REQUIRED
&TYPE NUMBER OF SWATHES = &N
&TYPE ..... IMAGE WIDTH = &W
&TYPE ..... IMAGE DEPTH = &D
&IF &U = 0 &TYPE .IMAGE SIZE UNITS = TENTHS OF AN INCH
&IF &U = 1 &TYPE .IMAGE SIZE UNITS = MILLIMETERS
&IF &FO = 0 &TYPE .... IMAGE FORMAT = BIT ARRAY
&IF &FO = 1 &IF &DT = IMG600X &TYPE .... IMAGE FORMAT = CDPF D/STREAM
&IF &FO = 1 &IF &DT = IMG240X &TYPE .... IMAGE FORMAT = PSF D/STREAM
&TYPE . OUTPUT FILENAME = &F
&TYPE . OUTPUT FILETYPE = &T
&TYPE . OUTPUT FILEMODE = &M
*
```

continued ...

Figure 85 (Part 3 of 4). Supplied EXEC ADMUCIMV for producing a composed-page printer file on the ICU

SUPPLIED EXEC FROM GDDM (continued)

```
*********************************************************************
* GO/QUIT DECISION
*********************************************************************
&SPACE
&TYPE ==> ENTER GO OR QUIT:
&READ VARS &REPLY
&IF .&REPLY NE .GO &EXIT 100
*
*********************************************************************
*                                                                   *
* PARAMETERS AT ADMUCDSO ENTRY:                                     *
*                                                                   *
*   CHARTDATA  CHARTFORM  CHARTDISP  DSOPEN-PARAMETERS              *
*                                                                   *
*   CHARTDISP IS THE DISPLAY PARAMETER FOR CSSICU.                  *
*                                                                   *
*   THE DEVICE-ID IS OMITTED FROM DSOPEN-PARAMETERS. THE            *
*   PROCLIST AND NAMELIST ARE WRITTEN IN BRACKETS SO THAT THE       *
*   PROCOPT-COUNT AND NAMELIST COUNT ARE DEDUCED BY ADMUCDSO        *
*                                                                   *
* PARAMETERS AT ADMUCDSO DSOPEN CALL TO GDDM:                       *
*                                                                   *
*    FAMILY  DEVICE-TOKEN  ( PROCOPT-LIST )  ( NAMELIST )           *
*                                                                   *
*********************************************************************
ADMUCDSO &CD &CF &DP 4 &DT (5 &DS 6 &SP 7 &N 8 &W &D &U 9 &FO)(&F &T &M)
*
&EXIT &RC
```

Figure 85 (Part 4 of 4). Supplied EXEC ADMUCIMV for producing a composed-page printer file on the ICU

SUPPLIED EXEC FROM GDDM

```
/*********************************************************************/
/*                                                                   */
/*                           GDDM/VM                                 */
/*                                                                   */
/*       5664-200   (C) COPYRIGHT IBM CORP.  1987                    */
/*       ALL RIGHTS RESERVED                                         */
/*       LICENSED MATERIAL - PROGRAM PROPERTY OF IBM                 */
/*                                                                   */
/*********************************************************************/

/* Name : ADMUIMP EXEC                                               */

/* This is a sample user exec which reads in a GDDM image save file  */
/* (type ADMIMG) and restores it to create a page segment or         */
/* document file for a family 4 printer.                             */
/* NOTE. This exec assumes that the GDDM default image file type     */
/*       ADMIMG has been used.  If the GDDM default has been         */
/*       changed for your installation, all references to ADMIMG in  */
/*       this exec should also be changed (and this note updated).   */

 Arg fn ft fm . "(" token fieldh fieldv fields .

/* Check invocation parameters                                       */

 If fn = '?' | fn = ''            /* If parameters are incorrect    */
    then signal prompt            /* prompt user .....              */

/* Substitute default values for unspecified parameters              */

 Parse Value ft "ADMIMG"   With ft . /* I/P file type               */
 Parse Value fm "*"        With fm . /* I/P file mode               */
 Parse Value token "IMG240" With token . /* GDDM Device Token        */
 Parse Value fieldh "60"   With fieldh . /* Horizontal size          */
 Parse Value fieldv "40"   With fieldv . /* Vertical Size            */
 Parse Value fields "0"    With fields . /* in inches                */
                                 /*  0 = tenths of inches          */
                                 /*  1 = millimeters               */

/* Set default parameters                                            */

 scale = "2"                     /* scale 0 = image size           */
                                 /*  field size will be ignored    */
                                 /* scale 1 = no image scaling     */
                                 /*  image may be clipped          */
                                 /* scale 2 = exact fit            */
                                 /*  image may be distorted        */
                                 /* scale 3 = maintain aspect ratio*/
                                 /*  image may have space in 1 dim */
```

continued ...

Figure 86 (Part 1 of 3). Supplied EXEC ADMUIMP for printing ADMIMG files

SUPPLIED EXEC FROM GDDM (continued)

```
type  = "0"                          /* type 0 = document              */
                                     /* type 1 = page segment          */
outft = "LIST38PP"                   /* Document for 3800-3            */
                     /* "PSEG38PP" = page segment for 3800-3           */
                     /* "PSEG3820" = page segment for 3820             */
                     /* "LIST38PP" = document for 3800-3               */
                     /* "LIST4250" = document for 4250                 */
/* Check that the filetype is ADMIMG (see NOTE at top of file)         */

If ft ¬= 'ADMIMG' then               /* If not, issue error message    */
   do;                               /* and exit with return code=100  */
     say                             /*                                */
     say 'Specified file type must be ADMIMG'
     say                             /*                                */
     exit 100                        /*                                */
   end;                              /*                                */

/* Check that the specified Image file exists                          */

address command 'STATE' fn ft fm     /* Look for specified file        */
If rc ¬= 0 then                      /* If not, issue error message    */
   do;                               /* and exit with CMS return code  */
     say                             /*                                */
     say fn ft fm 'NOT FOUND'        /*                                */
     say                             /*                                */
     exit rc                         /*                                */
   end;                              /*                                */

/* Check that the specified page segment file does not exist           */

address command 'STATE' fn outft 'A1'
If rc = 0 then                       /* If file exists, erase it       */
  address command 'ERASE' fn outft 'A1'

/* Tell user what he is likely to get                                  */

name = fn ft fm
nlist = fn outft 'A1'
plist = '5' type
field = fieldh fieldv fields
string = '('name')('scale')('nlist')('plist')('token')('field')'
clear
say 'Image file    =' name
say 'Output file   =' nlist
say 'Procopts are  =' plist
say 'Printer token =' token
if fields = 0 then units = 'tenths of inches'
              else units = 'millimeters'
```

continued ...

Figure 86 (Part 2 of 3). Supplied EXEC ADMUIMP for printing ADMIMG files

SUPPLIED EXEC FROM GDDM (continued)

```
 say 'Field size    =' fieldh 'x' fieldv 'in' units
 if scale = 0 | fieldh = 0 | fieldv = 0 then
   say 'Image will be same size as original (field ignored)'
 if scale = 1 then
   say 'Image may be clipped and/or spaced to fit field'
 if scale = 2 then
   say 'Image may be distorted to fit the specified field'
 if scale = 3 then
   say 'Image proportion will be maintained to fit without clipping'
 say 'About to issue the command:'
 say 'ADMUIMPV' string
 say 'Enter Go to continue, or Quit'
 pull comm
 if comm ¬= 'GO' then exit 200
/* Start the GDDM Page Segment generation module                    */

 address command 'ADMUIMPV' string

 exit rc

/* Provide a description of the invocation parameters for this exec  */

prompt : parse source . . execname .

say 'This exec reads a GDDM Image file (ADMIMG) and restores it to    '
say 'create a page segment or document file.                          '
say '                                                                 '
say '   Format :-                                                     '
say '                                                                 '
say '         'execname' filename filetype filemode ( token h v s     '
say '                                                                 '
say '   where filename is the input filename                          '
say '         filetype is the input filetype        (default ADMIMG)  '
say '         filemode is the input filemode        (default *)       '
say '         token    is the GDDM device token     (default IMG240)  '
say '         h        is the horizontal size       (default 60)      '
say '         v        is the vertical size         (default 40)      '
say '         s        is the scale (0 = tenths of inches(default))   '
say '                               (1 = millimeters)                 '
say '                                                                 '

exit 0
```

Figure 86 (Part 3 of 3). Supplied EXEC ADMUIMP for printing ADMIMG files

```
┌──────────────SUPPLIED EXEC FROM GDDM──────────────┐

/*********************************************************************/
/*                                                                   */
/*                          GDDM/VM                                  */
/*                                                                   */
/*       5664-200   (C) COPYRIGHT IBM CORP.  1979, 1988              */
/*       ALL RIGHTS RESERVED                                         */
/*       LICENSED MATERIAL - PROGRAM PROPERTY OF IBM                 */
/*                                                                   */
/*********************************************************************/
/*                                                                   */
/* PROGRAM NAME - ADMUBCDV EXEC                                      */
/*                                                                   */
/* DESCRIPTIVE NAME - Browse Composite Document files on a terminal. */
/*                                                                   */
/* FUNCTION - To browse LIST38xx, PSEG38xx, OVLY38xx, LIST4250,      */
/*            PSEG4250, OVLY4250, LISTAPA, LISTCDP and ADMIMAGE      */
/*            files on a terminal.                                   */
/*                                                                   */
/* ENTRY CONDITIONS - None                                           */
/*                                                                   */
/* EXIT-NORMAL RETURN CODES -                                        */
/*                                                                   */
/*     0   When the file has been displayed correctly                */
/*                                                                   */
/* EXIT-ERROR RETURN CODES -                                         */
/*                                                                   */
/*     Any return code other than 0 would indicate an error          */
/*     which will be explained in an accompanying message.           */
/*                                                                   */
/* NOTES - None                                                      */
/*                                                                   */
/*********************************************************************/

 Arg fn ft fm .

/* Check invocation parameters                                      */

 If fn = '?' | fn = ''            /* If parameters are incorrect    */
    then signal prompt            /* prompt user .....              */

/* Substitute default value for filetype & filemode if not specified */

 Parse Value ft "ADMIMAGE"  With ft . /* I/P file type             */
 Parse Value fm "*"         With fm . /* I/P file mode             */
                                        continued ...
└──────────────────────────────────────────────────────────────────┘
```

Figure 87 (Part 1 of 2). Supplied EXEC ADMUBCDV to browse and print composite documents

SUPPLIED EXEC FROM GDDM (continued)

```
/* Set default parameters for ADM4CDUV                                  */

 copies   = "1"                  /* number of copies                  */
 duplex   = "1"                  /* 1 = simplex                       */
                                 /* 2 = normal duplex                 */
                                 /* 3 = tumble duplex                 */
 procopts = ""                   /* Procopts                          */
 devtok   = "**"                 /* Device token                      */
 family   = "1"                  /* GDDM Family                       */
 namelist = ""                   /* Namelist entry                    */

/* Check that the specified AFPDS/CDPDS file exists                    */

 address command 'STATE' fn ft fm  /* Look for specified file         */
 If rc ¬= 0 then                 /* If not, issue error message       */
    do;                          /* and exit with CMS return code     */
      say                        /*                                   */
      say fn ft fm 'NOT FOUND'   /*                                   */
      say                        /*                                   */
      exit rc                    /*                                   */
    end;                         /*                                   */

/* Start the GDDM Composite Document Print Utility                     */

 address command 'ADM4CDUV ' fn ft fm '(' copies duplex ')',
          '(' namelist ')(' procopts ')(' devtok ')(' family ')'
 exit rc

/* Provide a description of the invocation parameters for this exec    */

prompt : parse source . . execname .

say '                                                                  '
say 'This exec reads an Advanced Function Presentation Data Stream     '
say '(AFPDS) file (e.g LIST38PP, PSEG4250, OVLY3820, LISTAPA, ADMIMAGE),'
say 'or a Composite Document Presentation Data  Stream  (CDPDS) file   '
say '(eg. LISTCDP), and displays the composite document on the terminal.'
say '                                                                  '
say '   Format :-                                                      '
say '                                                                  '
say '          'execname' filename filetype filemode                   '
say '                                                                  '
say '         where filename is the input filename                     '
say '               filetype is the input filetype                     '
say '               filemode is the input filemode                     '
say '                                                                  '

exit 0
```

Figure 87 (Part 2 of 2). Supplied EXEC ADMUBCDV to browse and print composite documents

SUPPLIED EXEC FROM GDDM

```
/*********************************************************************/
/*                                                                   */
/*  5664-200,5665-356,5666-328                                       */
/*  (C) COPYRIGHT IBM CORP. 1979,1986                                */
/*  LICENSED MATERIALS - PROPERTY OF IBM                             */
/*                                                                   */
/* *** Note ***                                                      */
/*  The name of this EXEC should be the same as the name of          */
/*  the command sent to the host by the 3270-PC file transfer        */
/*  commands 'SEND' and 'RECEIVE'.  The default command name         */
/*  used by SEND and RECEIVE is IND$FILE, where '$' is the           */
/*  national currency symbol.                                        */
/*                                                                   */
/* This REXX EXEC intercepts the PC/DOS 'IND$FILE' command and       */
/* pre or post processes picture files when triggered by the         */
/* option 'ADMGDF' in the 'IND$FILE' command                         */
/*                                                                   */
/* 'GET' -> retrieve file from GDF object library                    */
/* 'PUT' -> Store file on GDF object library                         */
/*                                                                   */
/* The 'CHART' option can also be used on the EXEC.  This has        */
/* no effect when transfer is from host to workstation.  On          */
/* transfer from workstation to host it will convert the file        */
/* into a GDDM PGF ICU chart file.                                   */
/*                                                                   */
/*  The EXEC takes the GDF object name to be the same as the         */
/* filename specified in the send or receive command.                */
/*                                                                   */
/*  A temporary 'Picture Interchange File' is created at the         */
/* host. Its file identifier is supplied on the send and receive     */
/* commands.  If the file type and file mode are omitted they        */
/* default to 'PIF A1'. 'PIF' is also used as the file type if        */
/* graphic conversion has been requested and the file type           */
/* parameter has been specified as 'ADMGDF'.                         */
/*                                                                   */
/*  A typical send command will look like:                           */
/*                                                                   */
/*  SEND pc.picture picture ( admgdf                                 */
/*                                                                   */
/* This will create a GDF object 'PICTURE ADMGDF A1' and use         */
/* a temporary file 'PICTURE PIF A'.                                 */
/*                                                                   */
/*                                                                   */
/*********************************************************************/
```

continued ...

Figure 88 (Part 1 of 5). Supplied EXEC ADMUPCFV for file transfer with the 3270-PC/G and 3270-PC/GX

SUPPLIED EXEC FROM GDDM (continued)

```
/*********************************************************************/
/* get parameters                                                    */
/*********************************************************************/
parse upper arg operation fn ft fm '(' options ')' .
if operation ¬= 'PUT' & operation ¬= 'GET' then
  do
    call help
    exit 12
  end
if ft='' then
  do
    if pos('CHART',options)¬=0 then
      ft='CHF'
    else
      ft='PIF'
  end
if fm='' then fm='A1'
/*********************************************************************/
/* remove chart option from list                                     */
/*********************************************************************/
chart_transfer=(1=0)           /* set chart transfer flag off      */
i=pos('CHART',options)
if i ¬= 0 then
  do
    /*****************************************************************/
    /* pre or post process picture and transfer                      */
    /*****************************************************************/
    options = substr(options,1,i-1) || substr(options,i+5)
                                /* remove CHART from options        */
    chart_transfer=(1=1)        /* set chart transfer flag on       */
    address command 'STATE' fn ft fm
    if rc = 0 then             /* Stop Transfer with no filename    */
      do
      address command 'IND$FILE GET'
      say 'Temporary file' fn ft fm 'exists.'
      say ''
      exit 12
      end
  end
```

continued ...

Figure 88 (Part 2 of 5). Supplied EXEC ADMUPCFV for file transfer with the 3270-PC/G and 3270-PC/GX

SUPPLIED EXEC FROM GDDM (continued)

```
/*********************************************************************/
/* test if picture conversion required                               */
/*********************************************************************/
i = pos('ADMGDF',options)
if i¬=0 & chart_transfer then   /* both chart and admgdf             */
  do
    address command 'IND$FILE GET'  /* abort transfer               */
    say 'ADMGDF and CHART options both specified'
    say ''
    call help
    exit 12
  end
if i ¬= 0 then
  do                            /* ADMGDF specified in options       */
    /*****************************************************************/
    /* pre or post process picture and transfer                      */
    /*****************************************************************/
    options = substr(options,1,i-1) || substr(options,i+6)
                                  /* remove ADMGDF from options      */
    /*****************************************************************/
    /* Check that temporary file does not exist and ft is not ADMGDF */
    /*****************************************************************/
    if ft='ADMGDF' then
      ft='PIF'
    address command 'STATE' fn ft fm
    if rc = 0 then              /* Stop Transfer with no filename    */
      do
      address command 'IND$FILE GET'
      say 'Temporary file' fn ft fm 'exists.'
      say ''
      end
    else
      do                        /* ADMGDF transfer to be done        */
        select                  /* select for operation              */
          when operation = 'GET' then
            do
              parms = fn ft fm '( GET' fn 'RECFM F LRECL 80 FIXED REPLACE'
              address command 'ADMUPCV' parms
                                          continued ...
```

Figure 88 (Part 3 of 5). Supplied EXEC ADMUPCFV for file transfer with the 3270-PC/G and 3270-PC/GX

SUPPLIED EXEC FROM GDDM (continued)

```
            if rc = 0 | rc = 4 then/* conversion ran ok          */
              do
                say fn 'ADMGDF converted to' fn ft fm
                address command 'IND$FILE GET' fn ft fm '(' options ')'
                if rc = 0 | rc = 4 then
                  do                  /* transfer ran ok         */
                  say 'File' fn ft fm 'transferred to PC'
                  address command 'ERASE' fn ft fm
                  end
              end
            else              /* conversion failed               */
              do              /* send 'file not found' to pc     */
                address command 'STATE' fn ft fm
                if rc = 0 then/* if temporary file exists erase it*/
                  address command 'ERASE' fn ft fm
                                                /* to stop IND$FILE */
                address command 'IND$FILE GET' fn ft fm
              end
          end                 /* GET processing                  */

        when operation = 'PUT' then
          do
            address command 'IND$FILE PUT' fn ft fm '(' options ')'
            if rc = 0 | rc = 4 then/* transfer ran ok            */
              do
                say 'File' fn ft fm 'transferred to Host'
                parms = fn ft fm '( PUT' fn 'FLOAT REPLACE'
                address command 'ADMUPCV' parms
                if rc = 0 | rc = 4 then
                  do                  /* conversion ran ok       */
                  say fn ft fm 'converted to' fn ADMGDF
                  address command 'ERASE' fn ft fm
                  end
              end
          end                  /* PUT processing                 */
      end                     /* select for operation           */
    end                       /* ADMGDF transfer to be done     */
  end                         /* ADMGDF specified in options    */
```

continued ...

Figure 88 (Part 4 of 5). Supplied EXEC ADMUPCFV for file transfer with the 3270-PC/G and 3270-PC/GX

SUPPLIED EXEC FROM GDDM (continued)

```
else
  do
    /*****************************************************************/
    /* picture conversion not requested                              */
    /*****************************************************************/
    address command 'IND$FILE' operation fn ft fm '(' options ')'
    /*****************************************************************/
    /* post process any chart transfer if needed                     */
    /* (NOTE: There is no possible pre processing)                   */
    /*****************************************************************/
    if chart_transfer & rc=0 then
      do
        if operation='PUT' then/* operate only on transfer to host  */
          do
            say 'File' fn ft fm 'transferred to Host'
            address command 'ADMUPGV' fn ft fm '( CHART' fn 'REPLACE'
            if rc=0 then
              say fn ft fm 'converted to CHART file' fn
            if rc=0&,          /* good conversion                  */
               ft¬='ADMCFORM'&,/* not a chart format file type      */
               ft¬='ADMCDATA' then  /* or a chart data one         */
              address command 'ERASE' fn ft fm
          end
      end
  end

exit rc

help: procedure
 parse source . . function .
 say 'HELP for' function
 say function 'GET|PUT file-id ( options||<ADMGDF|CHART>||options '
 say 'GET - retrieve object from GDDM GDF object library'
 say 'PUT - store object in GDDM GDF object library'
 say 'file-id identifier of PIF file, file-name - name of GDF object'
 say 'options - for File Transfer Program'
 say 'ADMGDF - trigger for graphic conversion'
 say 'CHART  - trigger for GGXC/ICU conversion'
return
```

Figure 88 (Part 5 of 5). Supplied EXEC ADMUPCFV for file transfer with the 3270-PC/G and 3270-PC/GX

GDDM glossary

This glossary defines various terms used in this manual.

In the definitions, the qualification "in GDDM" means in the GDDM/VM or GDDM/VMXA program or in GDDM-PGF (or both). "In GDDM-PGF" means in GDDM-PGF, which includes the ICU.

This glossary includes terms and definitions from the *IBM Dictionary of Computing*, SC20-1699.

A

Advanced Function Presentation Data Stream (AFPDS). A data stream, sometimes known as Composed Page Data Stream (CPDS), sent to composed-page printers such as the 3800-3 and 4250.

B

blank character. An empty character represented by X'40' in the EBCDIC code. In GDDM-PGF, such a character occupies one position in a label or a key and may be used for positioning purposes.

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.

C

CDPF. Composed Document Printing Facility, a program that supports the advanced printing capabilities of the 4250 printer.

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.

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.

CICS/VS. Customer Information Control System/Virtual Storage. 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.

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

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 printer.

Composed Document Presentation Data Stream (CDPDS). A data stream containing graphics, images, and text, that is the input to the GDDM Composed Document Presentation Utility.

composed-page printer. A printer, such as the IBM 4250 or IBM 3800 Model 3, to which the host computer transmits 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 density of pixels and the general print quality are often high enough for the output to be used as camera-ready copy for publications.

composite document. A document that contains both formatted text, such as that produced by the Document Composition Facility program, and graphic or image data, such as that produced by GDDM.

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'–X'FE'. Each CECP contains the same 190 characters, but the mapping between code points and graphic characters depends upon the country for which the code page is defined.

D

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

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

DCSS. Discontiguous Saved Segment (VM).

DCT. Destination control table (CICS/VS).

default value. A value chosen by GDDM when no value is explicitly specified by the user. For example, the default line type is a solid line.

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

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

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).

display point. Synonym for **pixel**.

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 example, for Kanji symbols.

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

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

DSC. Data-stream compatibility.

dual characters. In GDDM, characters that each occupy two bytes in internal storage and in display buffers. They are used to display, for example, Kanji symbols.

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

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

F

FCT. File control table (CICS/VS).

field. An area on the screen or the printed or plotted page.

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 or variable length records, usually sequentially organized.

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

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

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.

GDDM-IMD. GDDM Interactive Map Definition.

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

GDF. Graphics data format.

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

H

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.

I

ICU. Interactive Chart Utility.

Image Symbol Editor (ISE). A GDDM-supplied interactive editor that lets users 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).

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.

Intelligent Printer Data Stream (IPDS). A structured-field data stream for managing and controlling printer processes. IPDS uses all-points addressability, a printing concept that allows users to position text, images, graphic pictures, bar codes, and overlays at any defined point on a printed page.

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 may 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 may 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 licensed programs that enable user applications to operate in interactive mode. For example, CICS/VS.

ISE. Image Symbol Editor.

ISS. Image symbol set.

J

JCL. Job Control Language.

K

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

L

link-edit. To create a loadable computer program by means of a linkage editor.

load module. A program unit that is suitable for loading into main storage for execution; it is usually the output of a linkage editor.

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

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.

LTERM. In IMS/VS, logical terminal.

M

map. A predefined alphanumeric layout, defining the position, attributes, and default data for each constituent alphanumeric field.

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 will be used. All maps on a GDDM page must come from the same mapgroup.

mapped alphanumerics. The creation of alphanumeric displays via predefined maps.

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 may use markers to indicate the plotted points.

MDT. Modified data tag.

menu. A displayed list of logically grouped functions from which the operator may make a selection. Sometimes called a menu panel.

menu-driven. Describes a program that is driven by an operator responding to one or more displayed menus.

MFS. Message format service.

missing values. In GDDM-PGF or the ICU, x or y values that are omitted from a chart. For example, one line on a graph might represent a sales forecast and extend to the end of the year on the x axis, while a second line might represent actual sales and extend only to the current month.

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

mixed chart. In GDDM-PGF or the ICU, the combination of more than one chart type in a business graph. For example, the overlaying of a line graph on top of a bar chart.

MSHP. Maintain system history program.

MSL. Map specification library.

multiple charts. Two or more charts appearing together on the display screen or page. Multiple charts can be of the same type or different types, and can be derived from one or more sets of data.

N

National Language (NL) feature. The translations of the ICU panels and GDDM messages into a variety of languages other than English.

nickname. In GDDM, a quick and easy means of referring to a device, the characteristics and identity of which have been predefined.

O

object code. Output from a compiler or assembler that is in itself executable machine code or is suitable for processing to produce executable machine code.

object deck. Synonym for **object module.**

object libraries. An area on a direct access storage device used to store object programs and routines.

object module. A module that is the output of an assembler or a compiler and is input to a linkage editor.

outbound structured field. An element in 3270 data streams from host to terminal with formatting that permits variable-length and multiple-field data to be sequentially translated by the receiver into its component fields without having to examine every byte.

P

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.**

PCB. Program communication block (IMS/VS).

PCT. Program control table (CICS/VS).

PDS. In OS/TSO, a partitioned data set.

pel (picture element). Synonym for pixel.

PGF. Presentation Graphics Facility.

picture element (pel). Synonym for pixel.

picture interchange format (PIF) file. In graphics systems, the type of file, containing picture data, that can be transferred between GDDM and a 3270-PC/G or 3270-PC/GX work station.

PIF. Picture interchange format (PIF) file.

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**.

plotter. An output device that uses pens to draw its output on paper or transparency foils.

PPT. Processing program control table (CICS/VS).

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.

Presentation Graphics Facility (PGF). A member of the GDDM family of licensed programs. It is concerned with business graphics, as opposed to general graphics.

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.

print utility. A subsystem-dependent utility that sends print files from various origins to a queued printer.

processing options. Describe how a device's I/O will be processed. These device-family-dependent and subsystem-dependent options are specified when the device is opened. An example is the choice between CMS attention-handling protocols.

program library. (1) A collection of available computer programs and routines. (2) An organized collection of computer programs. (3) Synonym for partitioned data set.

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.

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. In IMS/VS, a program specification block.

PSF. Print Services Facility, a program that supports the advanced printing capabilities of the 3800 model 3 printing subsystem.

Q

QSAM. Queued sequential access method.

QTAM. Queued telecommunications access method.

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

RCP. Request control parameter.

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.

resolution. In graphics and image processing, the number of pixels per unit of measure (inch or meter).

S

scanner. A device that produces a digital image from a document.

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.

SMF. System management facilities.

SMP. System management program.

SNA. Systems network architecture.

SPI. System programmer interface.

SPIB. System programmer interface block.

stand-alone (mode). Operation that is independent of another device, program, or system.

swathe. A horizontal slice of printer output, forming part of a complete picture. Composed-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, which the user may have 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 indirectly by means of system spooling facilities. Contrast with **queued printer.**

T

TCT. Terminal control table (CICS/VS).

terminal. A device, usually equipped with a keyboard and a display unit, capable of sending and receiving information over a link.

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, shearing, 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, and
2. A resolution conversion or scaling algorithm, and
3. A location within the target image for the result.

Only item 3 is mandatory.

transform element. In GDDM image processing, a specific function in a transform, which may be one of the following: define sub-image, scale, orient, reflect, negate, define place in target image.

TSO. Time sharing option. A subsystem of OS/VS under which GDDM can be used.

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 default specification (UDS). The means of changing a GDDM default value. The 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 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.

VCNA. VTAM communications network application.

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.

vector symbol. A character or shape made up 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. Contrast with **image symbol set (ISS).**

VM/SP CMS. IBM Virtual Machine/System Product Conversational Monitor System. A system under which GDDM can be used.

VM/XA. IBM Virtual Machine/Extended Architecture. A system under which GDDM/VM or GDDM/VMXA and associated programs can be used.

VSE. Virtual storage extended. An operating system consisting of VSE/Advanced Functions and other IBM programs. A system under which GDDM can be used. 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.

VTAM. Virtual Telecommunications Access Method.

W

window. (1) In GDDM, 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. (2) A defined section of world coordinates. In GDDM, the window can be regarded as a set of coordinates that are overlaid on the viewport. (3) The "graphics window" is the set of coordinates used for defining the primitives that make up a graphics display. By default, both x and y coordinates run from 0 through 100. (4) The "page window" defines which part of a deep or wide page should currently be displayed.

work station. A display screen together with attachments such as a local copy device or a tablet.

WTP. Write-to-programmer.

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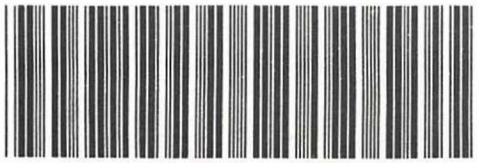

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