CA-MetaCOBOL™ +

Panel Definition Facility User Guide

Release 1.1

R203M+11DRP

-- PROPRIETARY AND CONFIDENTIAL INFORMATION --

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1. About this Manual

This manual provides information about using the CA-MetaCOBOL+ Panel Definition Facility to create and maintain panel definitions and members.

1.1 Purpose

This manual provides an overview of the PDF/CICS system and information on using the various menus, sub-menus, and commands to create and maintain panel definitions and members. Also covered in this manual is information required for problem determination. For detailed information on PDF/CICS commands, refer to the *Panel Definition Facility Command Reference Manual.*

1.2 Organization

Chapter	Description
1	Introduces the contents and organization of this manual. Additional reference materials used with this manual are also listed.
2	Provides an overview of the PDF/CICS system and discusses the concepts necessary for understanding the system.
3	Describes how to create, display, edit, delete, rename, duplicate, print, and index panel definitions. Also describes BMS map source generation.
4	Describes how to create, display, edit, delete, rename, duplicate, print, submit, and index members.
5	Gives procedures and tools for solving problems.

1.3 Publications

In addition to this manual, the following publications are supplied with CA-MetaCOBOL+:

Title	Contents
Introduction to CA-MetaCOBOL+	Introduces the CA-MetaCOBOL+ Work Bench, Structured Programming Facility, Quality Assurance Facility, CA DATACOM/DB Facility, Macro Facility, Panel Definition Facility, and the Online Programming Language.
Installation Guide - MVS	Explains how to install CA-MetaCOBOL+ in the MVS environment.
CA ACTIVATOR Installation Supplement - MVS	Explains how to install CA-MetaCOBOL+ in the MVS environment using CA ACTIVATOR.
Installation Guide - VSE	Explains how to install CA-MetaCOBOL+ in the VSE environment.
Installation Guide - CMS	Explains how to install CA-MetaCOBOL+ in the VM environment.
User Guide	Explains how to customize, get started, and use CA-MetaCOBOL+. Includes information on keyword expansion, the CA-MetaCOBOL+ translator, and CA macro sets and programs.
Structured Programming Guide	Introduces the Structured Programming Facility. Includes information on creating, testing, and maintaining structured programs.
Macro Facility Tutorial	Introduces the Macro Facility. Includes information on writing basic macros, model programming, macro writing techniques, and debugging.
Macro Facility Reference	Includes detailed information on the program flow of the CA-MetaCOBOL+ macro translator, macro format, definition of comments, macro nesting, macro prototypes, symbolic words, and model programming.
Quality Assurance Guide	Introduces the Quality Assurance Facility. Includes all the necessary information to perform quality assurance testing on COBOL source programs.
Program Development Guide CA DATACOM/DB	Includes all the information necessary to develop programs that make full use of the functions and features of the CA DATACOB/DB environment.
Program Development Reference CA DATACOM/DB	Contains all CA DATACOM/DB Facility constructs and statements.
Panel Definition Facility Command Reference	Contains all Panel Definition Facility commands.

Title	Contents
Panel Definition Facility User Guide	Includes all the information necessary to create, edit, duplicate, rename, delete, index, and print panel definitions and members. Also describes how to generate BMS source.
Online Programming Language Reference	Contains all Online Programming Language statements.
Online Programming Language Guide	Contains further instructions for using Online Programming Language statements.

All manuals are updated as required. Instructions accompany each update package.

1.4 Related Publications

The following publication relates to CA-MetaCOBOL+ PDF/CICS and is supplied by Computer Associates:

Title
CAIIPC Messages and Codes

The following guides relate to CA-MetaCOBOL+ PDF/CICS and are supplied by IBM.

Title
CICS Application Programmer's Guide
VS COBOL II Application Programming Guide
VS COBOL II Application Programming Reference
OS/VS COBOL Compiler and Library Programmer's Guide

1.5 Notation Conventions

This manual uses the following rules and special characters in syntax illustrations.

Enter the following exactly as they appear in command descriptions:

UPPERCASE	Identifies commands, keywords, and keyword values which must be entered exactly as shown or replaced by an authorized abbreviation.
symbols	All special characters such as parentheses and quotation marks (but not ellipses, brackets, and braces) must be entered as shown.

The following notations clarify command syntax; do not enter them as shown.

lower case *italics*	Represent a value you must supply.
Brackets, [ ]	Identify optional keywords or clauses, or a group of options from which, if included at all, a choice of one must be made.
Braces, {}	Indicate that one of the keywords or clauses must be entered.
Underlining	Indicates a CA-MetaCOBOL+ default that cannot be changed with a SET command, and therefore need not be specified.
Ellipses, ...	Indicate that the preceding word or clause can be repeated.

1.6 Summary of Revisions

Minor technical and editorial revisions have been made throughout this manual.

2. Preliminary Concepts

2.1 What is PDF?

CA-MetaCOBOL+'s Panel Definition Facility is a CICS "panel painter" and BMS map generator. "Panel painting" is a term that describes the function of a user at a terminal, interactively laying out, or "painting", a visual description of a panel. This panel can be used by a programming system to send and receive images to and from a terminal. The result of painting the panel and providing information about the panel is called a panel definition. With a panel definition as input, PDF/CICS can generate CICS BMS map source to be used as input to the assembler. The resulting BMS map source is stored in a PDF/CICS member. Panel definitions and members can be displayed, edited, printed, duplicated, renamed, and deleted with PDF/CICS.

PDF/CICS provides a comprehensive command language, as well as menus and command prompters for the less experienced user. A full-screen editor is also provided.

The terms panel and map, and panelset and mapset, are used interchangeably throughout this manual. A mapset consists of one map.

2.2 System Overview

Like any system, PDF/CICS is composed of several components. During a typical PDF/CICS session, a user uses command prompters and fill-ins to create and maintain entities. PDF/CICS supports two entity types: panel definitions and members. Panel definitions are stored in a panel library and qualified with a system identifier. Members are stored in a member library and qualified with a user prefix. Each component is discussed in the following sections.

Users

Any CICS user ID can sign on to PDF/CICS and create and maintain panels and members. PDF/CICS users have read/write access to all panels and members.

Panel Definitions

Panel definitions are created using the CREATE PANEL command. Panel names can be 1 to 7 characters in length. A panel consists of five components: the panel layout, identification, parameters table, field summary table, and picture table. These components are discussed in greater detail in Section 3.1, "Components of a Panel Definition."

Members

A member is a collection of 80-byte records, such as text, JCL, source, PDF/CICS commands, or test data. Members are created using the CREATE MEMBER command or the GENERATE command. Member names can be 1 to 8 characters in length and are prefixed with the user's prefix. The GENERATE command uses a panel as input to produce BMS map source. The command automatically creates a member containing the generated source.

Libraries

A library is a repository for panels and members. While panels and members can share a library, the default installation creates one panel library and one member library. Libraries are created by executing a batch job to allocate and initialize an area on disk. Library names can be 1 to 8 characters in length. One notable distinction between a panel library and a member library is that a user can determine which panel library is used with the SET PANEL LIBRARY command. The member library used by PDF/CICS is determined at installation time.

Systems

A system is a group designation for panels within a library. Within a library, panels are qualified with a 3-character system indentifier. The system concept provides a convenient way to logically group panels. For example, all panels used in an inventory system might be qualified with a system identifier of INV. Systems are created dynamically by the SET PANEL SYSTEM command. See the *Panel Definition Facility Command Reference Manual* for more information on this command.

Naming Conventions

The following naming conventions apply to PDF/CICS:

- Library names must be unique within the PDF/CICS system.
- System names must be unique within a library, however, different libraries can contain duplicate system names.
- Panel names must be unique within a system.
- Member names must be unique per user.

Prompters

A prompter is a panel that prompts the user for a response in order to execute a command. A prompter is displayed when a PDF/CICS command is entered without the required operands. The options listed in the prompter panels are indentical to the command syntax. To demonstrate, let's look at the GENERATE command. The syntax of the GENERATE command is:

```
                  [ *          ]
GENERATE          [ PNL name   ]   [ MEM memname [ USER id ] ]
```

If the GENERATE PNL command is entered without a panel name, the following GENERATE prompter is displayed.

```
 =>

 ------------------------------------------------------------------------------
 PDF/CICS: GENERATE BMS        PNL              LIB: BMSPANEL  SYS: BMS
PROMPTER

 GENERATE  PNL ________   MEM _________   USER ___
                (1)             (2)          (3)

 ------------------------------------------------------------------------------
 (1) Panel name                 (2) Member name for output macros (optional)
                                (3) User id for member            (optional)
```

Figure 1. GENERATE Command Prompter

The prompter panels are designed to familiarize the new user with the command formats, so the user can eventually enter the commands directly from the command line without the aid of a prompter.

Fill-ins

A fill-in is a panel used to supply information required to complete a PDF/CICS function, such as creating a panel definition. The following figure shows the panel identification fill-in presented when creating a panel definition.

```
=>

 ------------------------------------------------------------------------
 PDF/CICS: PNL IDENTIFICATION  PNL              LIB: BMSPANEL  SYS: BMS
FILL-IN

 Panel name ________



 Short description ____________________________

 Description:
      ____________________________________________________________________
      ____________________________________________________________________
      ____________________________________________________________________
      ____________________________________________________________________
      ____________________________________________________________________
```

Figure 2. Panel Identification Fill-in

After a fill-in has been completed, press any key except CLEAR, PA1 (Reshow), or PA2 (display PF/PA key assignments) to apply the data. The ENTER key always applies the data and leaves the current fill-in displayed.

2.3 Signing on to PDF/CICS

To signon to PDF/CICS, enter CICS transaction ID BMS. To signon under CA ROSCOE, enter the command BMS. The following signon screen is displayed.

```
 Welcome to CA-MetaCOBOL+ release 1.1

        PPPPPPP   DDDDDDD    FFFFFFF   //    CCCCCC   IIII   CCCCCC    SSSSSS
       PPPPPPPP  DDDDDDDD   FFFFFFF   //   CCCCCCCC  IIII  CCCCCCCC  SSSSSSSS
      PP    PP   DD    DD  FF        //   CC         II   CC        SS
     PPPPPPPP   DD    DD  FFFFFF    //   CC         II   CC        SSSSSSS
    PPPPPPP    DD    DD  FFFFFF    //   CC         II   CC         SSSSSSS
   PP         DD    DD  FF        //   CC         II   CC             SS
  PP        DDDDDDDD   FF        //   CCCCCCCC  IIII  CCCCCCCC  SSSSSSSS
 PP        DDDDDDD    FF        //    CCCCCC   IIII   CCCCCC    SSSSSS

                         CA-MetaCOBOL+ Release: 1.1

       Please enter your user-id  FRC                          Date:
01/24/92
                       Password>             <                 Time:
13:08:54


 ENTER: SIGN ON   CLEAR OR PA2: OFF

   CA-MetaCOBOL+ (TM) is a product of Computer Associates International, Inc.
        Use of this system by unauthorized persons is strictly prohibited.
```

Figure 3. PDF/CICS Signon Screen

Under CICS, PDF/CICS automatically uses your CICS OPID as your user ID. Under CA ROSCOE, PDF/CICS automatically uses your CA ROSCOE prefix as your user ID. Optionally, you may enter your password. PDF/CICS does not verify your password at this time; you may leave the field blank. However, during your PDF/CICS session, you may wish to transfer control to another CA product by using a product transfer command. These commands retrieve the CICS password supplied during PDF/CICS signon. If the correct password has not been supplied, the product transfer command fails. See Section 2.5 for a list of product transfer commands.

Alternatively, the BMSX transaction ID or BMX command for CA ROSCOE users bypasses the PDF/CICS signon screen, providing an express signon. The PDF/CICS Main Menu is displayed.

Similarly, if you signed on under a security program, you need not enter your user ID or password at the PDF/CICS Signon Screen. You need only press the Return key twice to bypass the PDF/CICS Signon Screen.

Note: PDF/CICS is also accessible from the CA-MetaCOBOL+ Work Bench.

2.3.1 The Signon Member

There are many commands available to change the PDF/CICS defaults for your session. These commands can be placed in a member called BMS#ON, which is executed automatically when you signon to PDF/CICS. For example, perhaps you prefer to have only one command line appear at the top of the screen, separated by a line of asterisks. To accomplish this, simply create a member called BMS#ON and add the following commands:

```
SET COMMAND LINE 1
SET COMMAND SEPARATOR *
```

These commands will be executed every time you signon to PDF/CICS and will be in effect for your entire session.

2.3.2 Considerations for CA ROSCOE Users

CA ROSCOE users have the option of storing members created by the GENERATE PANEL command in their CA ROSCOE library. Therefore, PDF/CICS automatically assigns the CA ROSCOE user prefix as the PDF/CICS user ID. Changing this user ID via the PDF/CICS signon screen will result in an error message when attempting to store the output member of the GENERATE PANEL command into the CA ROSCOE library.

Notes: Only members created with the GENERATE PANEL command can be stored as CA ROSCOE library members.

The SET GENERATE DESTINATION command is used to determine whether members are stored in the CA ROSCOE library or the VLS library.

Sharing Between CA ROSCOE and CICS

If you wish to share object files between CA ROSCOE and CICS, you must define the same libraries to both systems.

While PDF/CICS under CA ROSCOE automatically uses the CA ROSCOE user prefix as a user ID, PDF/CICS under CICS automatically uses the CICS OPID as a user ID. Thus, it is recommended that users of both systems supply the same user ID via the PDF/CICS signon screen under both systems. This will eliminate the need to specify the USER clause when addressing members.

To demonstrate, consider the following:

User ID JONES accesses PDF/CICS from both CICS and CA ROSCOE. Her CICS OPID is JON and her CA ROSCOE prefix is JN. Using the GENERATE PANEL command under CA ROSCOE, she creates a member named JN.BMSMEM. She then signs on to PDF/CICS under CICS, using her CICS OPID as her user ID, to edit the member. She must issue the command

EDIT MEMBER BMSMEM USER JN

in order for PDF/CICS to locate the correct member. Alternatively, she could signon to CICS and supply the user ID of JN. This would eliminate the need to supply the USER JN clause in the EDIT MEMBER command, as well as any other commands that would address members created via PDF/CICS under CA ROSCOE.

2.4 The Arrangement of the PDF/CICS Screen

The arrangement of a typical PDF/CICS screen is shown below.

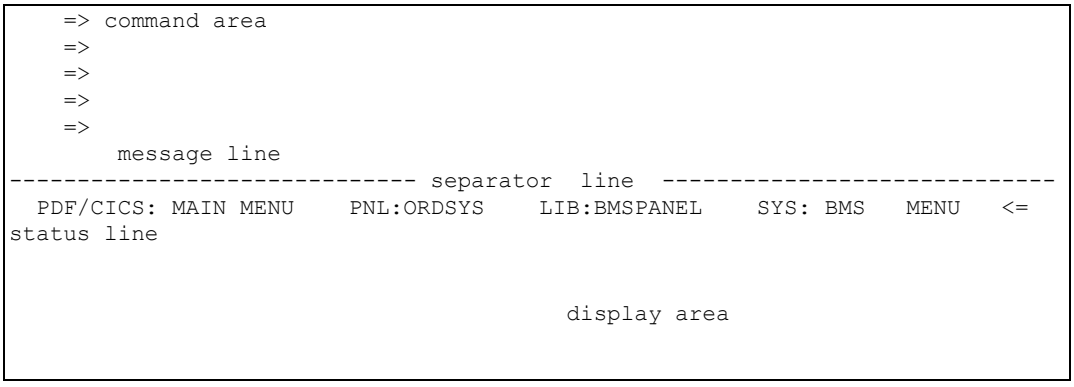

Figure 4. Typical PDF/CICS Screen

The fields on the screen are:

command area
The top five lines of the screen comprise the command area. The SET COMMAND LINE command determines how many command lines are displayed (from zero to five). Any valid PDF/CICS command can be entered in the command area. Multiple commands can be 'stacked' or delimited with a command delimiter symbol.

message line
PDF/CICS uses this area to display messages and warnings.

separator line
The optional separator line separates the command area from the display area. The SET COMMAND SEPARATOR command determines what character, if any, is used for the separator line.

status line
The status line includes the following fields:

Product identification
The PDF/CICS identifier.

Current activity
A brief description of the panel activity, such as main menu, display member, or Panel layout.

Current entity type and name
An abbreviation of the last requested entity type (either PNL or MEM) and the entity name.

LIB (library)
The current panel library.

SYS (system)
The current system.

Panel type
The type of PDF/CICS panel currently displayed. Panel types are MENU, PROMPTER, FILL-IN, and DISPLAY.

data area
The data area is used to display all panels, members, indexes, and options. During display, this data can not be modified. During edit, this data can be modified.

2.5 Transferring Control to Another CA Product

PDF/CICS uses CA's Session Control Facility (SCF). SCF provides session management facilities and dispatching services for commands and data in terminal regions, and PF/PA key analysis and execution. Many other CA products use SCF. SCF enables you to transfer from one product to another through the use of "product transfer commands." The following is a list of these products and their corresponding product transfer command:

Product	Transfer Command
CA IDEAL	IDEAL
CA DDOL	DDOL
CA DATAENTRY	DEII
CA DB/SC	DBSECURITY
CA-MetaCOBOL+ PDF/CICS	BMS

The transfer command, entered from the PDF/CICS command line, retrieves the password entered during PDF/CICS signon. If no password or an invalid password was supplied during signon, the transfer command will fail. In this case, it is necessary to signoff of PDF/CICS, signon with the correct password, and enter the transfer command again. The successful execution of the transfer command activates a session for the desired product. To return to PDF/CICS, simply enter the BMS transfer command.

See your site administrator to determine which of these products is available within your signon environment.

2.6 PF and PA Key Settings

This section contains a brief description of the commands which have Program Function or Program Access key assignments. A complete description of all PDF/CICS commands is contained in the *Panel Definition Facility Command Reference Manual*.

Program Function (PF) keys are equivalent to PDF/CICS commands. Program Access (PA) keys are keys that perform display functions.

The following figure shows the PF/PA key settings for PDF/CICS. Commands in **bold** are assignments consistent throughout all facilities of PDF/CICS. The other assignments shown are in effect while processing panels, with the exception of PF9/21 (FIND), which is applicable only when processing members.

HELP (PF1/13)	**RETURN** (PF2/14)	**PRINT SCREEN** (PF3/15)
PANEL: **PREVIOUS** (PF4/16) MEMBER: No Action	PANEL: **NEXT** (PF5/17) MEMBER: No Action	PANEL: **LAYOUT** (PF6) NULL/BLANKFILL (PF18) MEMBER: No Action
SCROLL BACKWARD (PF7/19)	**SCROLL FORWARD** (PF8/20)	PANEL: **SUMMARY FIND** (PF9/21) MEMBER: No Action
SCROLL TOP (PF10/22)	**SCROLL BOTTOM** (PF11/23)	**INPUT** (PF12/24)
RESHOW (PA1)	**DISPLAY PF/PA KEYS** (PA2)	**RESHOW** (PA3)

Figure 5. PF Key Assignments

HELP (PF1/13)
Displays a panel or series of panels that contain information to explain how to complete the current function.

RETURN (PF2/14)
Returns from a help panel to the program component display or from the program to the menu used to select the program.

PRINT SCREEN (PF3/15)
Generates a hardcopy printout of the current screen contents.

PREVIOUS (PF4/16)
In the panel editor, displays the extended field definition for the field that precedes the current extended field definition position. In the member editor, entering DISPLAY SESSION OPTIONS, DISPLAY INDEX, or HELP finds the previous FIND string occurrence.

NEXT (PF5/17)

In the panel editor, displays the extended field definition for the field following the current extended field definition. In the member editor, DISPLAY SESSION OPTIONS, DISPLAY INDEX, or HELP finds the next FIND string occurrence.

LAYOUT (PF6)

Displays the panel layout.

BLANKFILL/NULLFILL (PF18)

During panel layout editing, switches the fill-mode between blank-fill and null-fill.

SCROLL BACKWARD (PF7/19)

Displays the previous frame within the current component.

SCROLL FORWARD (PF8/20)

Displays the next frame within the current component.

SUMMARY (PF9/21)

Displays the field summary table.

FIND (PF9/21)

Locates the next occurrence of a previously located string.

SCROLL TOP (PF10/22)

Positions to the first line of the component.

SCROLL BOTTOM (PF11/23)

Positions to the bottom of the component.

INPUT (PF13/24)

Valid during EDIT PANEL LAYOUT and EDIT MEMBER. Opens a window of null lines preceding the first line of the component or at the current cursor position. Unused null lines in the window are deleted when the ENTER key is pressed after INPUT.

PA1

Refreshes the screen with the data that originally appeared before new data was entered for the current transaction. CICS may override the refresh.

PA2

Displays the current PF/PA settings.

PA3

Refreshes the screen with the data that originally appeared before new data was entered for the current transaction. CICS may override the refresh.

2.7 Making an Entity Current

A current entity (i.e., panel definition or member) is the entity that has most recently been named in any command or fill-in. For example, when a new panel definition is created with either a CREATE or DUPLICATE command, or when an existing panel definition is named in an EDIT or DISPLAY command, it becomes the current panel definition.

The concept of a current entity allows the user to omit the entity name from all subsequent commands that deal with the current entity type. It also allows the use of PF keys to position through the different components of a panel definition. An entity remains current until a different entity is accessed or created, or until the session ends.

The current panel definition is identified in the PNL field on the status line of the screen, as shown in the following figure.

```
=>
=>
=>

------------------------------------------------------------------------
PDF/CICS: MAIN MENU  PNL PAN1P      LIB: BMSPANEL   SYS: BMS   DISPLAY

 Enter desired option number===>       There are 9 options in this menu:
```

Figure 6. Identifying Current Panel on Display

Similarly, the current member is identified in the MEM field on the status line of the screen, as shown in the following figure.

```
=>
=>
=>

------------------------------------------------------------------------
PDF/CICS: MAIN MENU  MEM PFX.MEM1X   LIB: BMSPANEL   SYS: BMS   DISPLAY

 Enter desired option number===>       There are 9 options in this menu:
```

Figure 7. Identifying Current Member on Display

2.8 Messages

PDF/CICS messages are displayed on the message line of the PDF/CICS screen. PDF/CICS issues four types of messages: error, fatal, information, and warning. Messages are issued from the various components of PDF/CICS and are prefixed accordingly.

For more information on message format, see Section 5.1.4, "PDF/CICS Messages."

All messages are documented in the *Panel Definition Facility Command Reference Manual*.

2.9 The Main Menu

The functions offered by PDF/CICS for the creation and maintenance of panel definitions and members are presented in the PDF/CICS Main Menu shown in the following figure.

```
=>
=>
=>

------------------------------------------------------------------------
PDF/CICS: MAIN MENU  PNL            LIB: BMSPANEL   SYS: BMS   MENU

 Enter desired option number===>    There are 9  options in this menu:

 1. DISPLAY/EDIT          - Display/edit panel/member/options/index
 2. CREATE                - Create a panel/member
 3. DELETE                - Delete a panel/member
 4. DUPLICATE             - Duplicate a panel/member
 5. RENAME                - Rename a panel/member
 6. GENERATE              - Generate CICS BMS source
 7. PRINT                 - Print a panel/member/options/dest/index
 8. HELP                  - Overview of HELP facility
 9. OFF                   - End PDF/CICS session
```

Figure 8. PDF Main Menu

Each option on the Main Menu is described in the following chapters.

2.10 Command Retrieval

PDF/CICS enables you to retrieve the last command entered in the command area. By entering a plus sign (+) in the command area, the last command entered is re-displayed in the command area. By entering a minus sign (-), the last command entered is re-executed without being displayed.

3. Creating and Maintaining Panel Definitions

This section describes how to create, display, edit, delete, duplicate, rename, print, and display an index of panel definitions using PDF/CICS. Panels can be used to obtain and transmit information from online terminals.

3.1 Components of a Panel Definition

PDF/CICS is used to create and maintain panel definitions. Each panel definition includes:

- A panel identification fill-in used to initiate the creation of a panel definition and provide it with identification information. (Required.)
- A panel parameters fill-in for assigning BMS map parameters, and other general options which, once set, act as defaults for all fields in the panel definition. (Optional.)
- A panel layout fill-in for establishing the displayable form of the panel definition. (Required.)
  In addition, a facsimile of the panel layout (a functional representation of the panel at execution time) can be displayed, and the input fields can be tested.
- A field summary table fill-in for specifying detailed information about each field. (Optional.)
- An extended field definition fill-in for specifying additional detailed information about each field, optional editing rules, and selections to override any defaults established on the panel parameters fill-in. (Optional.)

- A picture table fill-in for COBOL for specifying input and output pictures for each field. (Optional.)

Throughout this section, the same sample panel is used to familiarize the user with the steps involved in building a panel layout and definition. A facsimile of the finished layout is shown in the following figure.

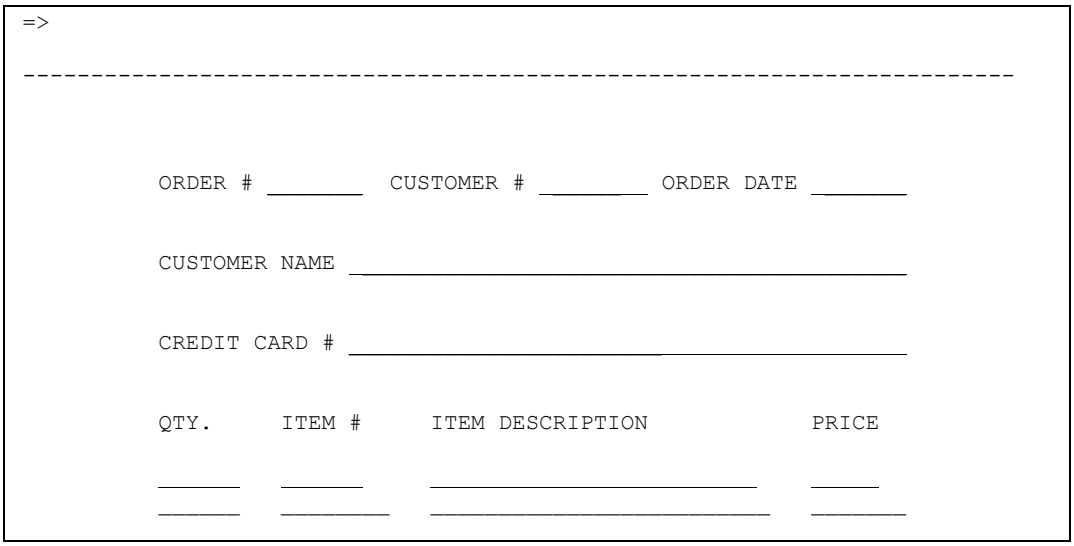

Figure 9. Sample Panel

3.2 Creating a Panel Definition

A panel definition is created in two steps by issuing the CREATE PANEL command or equivalent CREATE PANEL prompter, and the completion of the panel identification fill-in. To access the CREATE prompter, select option 2 on the PDF/CICS Main Menu.

The CREATE PANEL command without a panel name only initiates the creation process. The new panel definition does not exist until the panel has been named, either in the command or on the panel identification fill-in. The CREATE PANEL command presents the following blank panel identification fill-in.

```
=>

-------------------------------------------------------------------------
PDF/CICS: PNL  IDENTIFICATION  PNL     LIB: BMSPANEL  SYS: BMS  FILL-IN

Panel name _______



Short description ____________________________

Description:
     ____________________________________________________________________
     ____________________________________________________________________
     ____________________________________________________________________
     ____________________________________________________________________
     ____________________________________________________________________
```

Figure 10. Blank Panel Identification Fill-in

The fields on the panel identification fill-in are:

Panel name
Specify the desired 1- to 7-character name to be assigned to the panel definition. (If the panel name was provided on the CREATE PANEL command, the name will appear in this field.)

Short description
An area in which the user can supply an optional, brief description of the panel definition. This description will appear in all printed/displayed library indexes.

Description
An area in which the user can supply an optional, longer description of the panel definition. This description can be up to five lines in length.

After the panel identification panel has been completed, and the ENTER key has been pressed, the panel definition is created and becomes the current panel definition.

The actual painting, or layout, of the panel can be done immediately, or at a later time. The panel layout fill-in is discussed in Section 3.3.3. The modification of a panel definition is discussed in greater detail in Section 3.4.

3.3 Editing/Displaying a Panel Definition

The DISPLAY/EDIT command or equivalent DISPLAY/EDIT prompter is used to display or edit an existing panel definition and to make it current. The DISPLAY/EDIT prompter is accessed either by selecting option 1 on the PDF Main Menu, or by issuing the EDIT PANEL command to edit the panel definition or the DISPLAY PANEL command to display the panel definition.

Alternatively, panels can be displayed and edited from the DISPLAY INDEX PANEL display with the display or edit subcommand. Refer to the *PDF/CICS Command Reference Manual* for a description and the syntax of this command.

The following sections discuss each panel component fill-in.

3.3.1 The Panel Identification Fill-in

The IDENTIFICATION (or IDE) command displays the panel identification component of the current panel definition.

The panel identification fill-in is used to enter descriptive information about the panel either when the panel is initially created or subsequently modified.

The following figure shows a completed panel identification fill-in.

```
=>

------------------------------------------------------------------------

PDF/CICS: PNL IDENTIFICATION  PNL ORDSYS  LIB: BMSPANEL  SYS: BMS  FILL-IN

Panel name ORDSYS

Date created 01/16/92  Date last modified 01/16/92
                       Time last modified 15:58

Short description Initial order panel

Description:
     Initial order system panel.
     ____________________________________________________________________
     ____________________________________________________________________
     ____________________________________________________________________
     ____________________________________________________________________
```

Figure 11. Completed Panel Identification Fill-in

The fields on the panel identification fill-in are:

Panel name
The user-specified 1- to 7-character name assigned to the panel definition.

Date created
The creation date of the panel definition. This information is supplied by the system and cannot be modified by the user.

Date last modified
Time last modified
The date and time of the last edit access. If the panel definition has not been modified, these fields will reflect the date and time the panel was created. The information in the field is supplied by the system and cannot be modified by the user.

Short description
An optional description of the panel definition. This description will appear in all printed/displayed library indexes.

Description
An optional, longer description of the panel definition. This description can be up to five lines in length.

3.3.2 The Panel Parameters Fill-in

The PARAMETERS (or PAR) command displays the panel parameters of a panel definition. The panel parameters fill-in enables you to supply default values for BMS DFHMDI macro keywords created by the GENERATE PANEL command.

Each field on the panel parameters fill-in pertains to a corresponding SET PANEL keyword. When a panel is created, the current SET PANEL values are copied to the panel parameter fill-in. If a SET PANEL value has not been set, the corresponding value in the panel parameter fill-in is left blank. As noted at the bottom of the Panel Parameter fill-in, use of the ERASE EOF key at the beginning of a field resets the field's value to the current SET PANEL command value. Typing spaces over the field removes the current value, but does not replace it with any other value. When the panel is generated, this "empty" value is replaced with the CICS DFHMDI macro default.

The values in the panel parameter fill-in are used to generate keywords on the BMS DFHMDI macro created by the GENERATE PANEL command. In most cases, if a value is not set on the Panel Parameter Fill-in, the corresponding keyword is omitted from the generated macro (exceptions are noted in the following field definitions). For more information on the SET PANEL command, refer to the *Panel Definition Facility Command Reference Manual*. For more information on the BMS DFHMDI macro, refer to the IBM CICS documentation.

The following figure shows the panel parameter fill-in screen.

```
 =>

 ------------------------------------------------------------------------------
 PDF/CICS: PANEL PARAMETERS     PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN


 Size:
   Columns             ___   (1 to 240)
   Rows                ___   (1 to 240)
 Position:
   Column              ___   (1 to 240, N=next, S=same)
   Row                 ___   (1 to 240, N=next, S=same)
 Justification:
   Left or Right       _     (L=left, R=right)
   Top or Bottom       _     (T=top, B=bottom)
 Data format:          _     (F=field, B=block)
 Header or trailer:    _     (H=header, T=trailer)
 I/O area prefix?      Y     (Y=yes, N=no)
 Start printer?        _     (Y=yes, N=no)
 Print width:          ___   (40, 64, 80, EOM)
 Free keyboard?        _     (Y=yes, N=no)
 Alarm?                _     (Y=yes, N=no)
 Reset MDTs?           _     (Y=yes, N=no)
 Extended highlight?   _     (N=none, B=blinking, R=reverse video,
U=underscore)
 Outboard format?      _     (Y=yes, N=no)
 Color:                B     (D=default, B=blue, R=red, P=pink)
                             (G=green, T=turquoise, Y=yellow, W=black/white)
 Programmed symbols?   __    (BS=base, 1-char=char itself, 2-char=hex-value)
 Must fill?            _     (Y=yes, N=no)
 Must enter?           _     (Y=yes, N=no)

 ERASE EOF resets any value to the current SET PANEL command value.
 Typing spaces will remove the current value.
```

Figure 12. Panel Parameters Fill-in

The fields on the panel parameters fill-in are:

Size:

Columns

Specifies a number of columns in a panel. The number can be from 1 to 240. If no value is supplied, the SIZE=*column* operand is omitted.
Corresponding SET PANEL keyword: SIZECOL
Corresponding DFHMDI macro operand: SIZE=

Row

Specifies a number of rows in a panel. The number can be from 1 to 240. If no value is supplied, the SIZE=*line* operand is omitted.
Corresponding SET PANEL keyword: SIZEROW
Corresponding DFHMDI macro operand: SIZE=

Size values combine with the Justification or Position option (if used) to determine the placement of the panel within the terminal's partition set.

Position:

Column
Specifies the left-to-right position of the panel on the screen. If no value is supplied, the COLUMN= operand is omitted.
Corresponding SET PANEL keyword: POSCOL=
Corresponding DFHMDI macro operand: COLUMN=

N=next
the left or right margin is established in the next available column from the left or right on the current line. COLUMN=NEXT is generated.
S=same
the left or right margin is established in the same column as the last nonheader or nontrailer panel used. COLUMN=RIGHT is generated.
1 - 240
any number from 1 to 240, inclusive. COLUMN=nnn is generated.

Row
Specifies the starting line on a page in which data for the map is to be formatted. If no value is supplied, the LINE= operand is omitted.
Corresponding SET PANEL keyword: POSROW
Corresponding DFHMDI macro operand: LINE=

N=next
formatting of data begins on the next available completely empty line. LINE=NEXT is generated.
S=same
formatting of data begins on the same line as that used for the preceding BMS command. LINE=SAME is generated.

1 - 240
any number from 1 to 240, inclusive. LINE=nnn is generated.

Justification:

Left or Right
Specifies whether the panel is justified to the right or left margin. JUSTIFY=LEFT or JUSTIFY=RIGHT is generated.

Top or Bottom
Specifies the top-to-bottom positioning of the panel. JUSTIFY=FIRST or JUSTIFY=BOTTOM is generated.
Corresponding SET PANEL keywords: HORZJUST and VERTJUST
Corresponding DFHMDI macro operand: JUSTIFY=

PDF/CICS does not support JUSTIFY=LAST or JUSTIFY=NEXT.

Data format:

Specifies the format of the data from a screen as seen by the application program. If no value is supplied, the DATA= operand is omitted.
Corresponding SET PANEL keyword: DATAFORMAT
Corresponding DFHMDI macro operand: DATA=

F=field
: data is to be passed as a sequence of fields between the device and the application program by BMS run-time services. DATA=FIELD is generated.

B=block
: data is to be passed as a contiguous stream between the device and the application program by BMS run-time services. DATA=BLOCK is generated.

Header or trailer?

Specifies whether the panel is positioned by BMS as a header or trailer panel. If no value is supplied, neither operand is generated. This specification applies to full-function BMS only.
Corresponding SET PANEL keyword: HEADTRAIL
Corresponding DFHMDI macro operands: HEADER= and TRAILER=

I/O area prefix?

Specifies whether BMS should include a filler in the symbolic description maps to allow for the unused TIOA prefix. If no value is supplied, the TIOPREFIX= operand is omitted.
Corresponding SET PANEL keyword: IOPREFIX
Corresponding DFHMDI macro operand: TIOAPREFIX=

Start printer?

Specifies whether to start the printer. If no value is supplied, or N (no) is specified, the CTRL=PRINT operand is omitted.
Corresponding SET PANEL keyword: STARTPRT
Corresponding DFHMDI macro operand: CTRL=

Print width:

Specifies the line length of the printer. 40, 64, and 80 force a new line after 40, 64, or 80 characters, respectively. EOM causes the default printer length to be used. If no value is supplied, the CTRL=*length* operand is omitted.
Corresponding SET PANEL keyword: PRTWIDTH
Corresponding DFHMDI macro operand: CTRL=

Free keyboard?

Specifies whether the keyboard is to be locked after a screen is sent. If no value is supplied, the CTRL=FREEKB operand is omitted.
Corresponding SET PANEL keyword: FREEKEY
Corresponding DFHMDI macro operand: CTRL=

Alarm?

Specifies whether the 3270 audible alarm is activated. ALARM YES specifies that the DFHMDI macro operand CTRL=ALARM is generated. If no value is supplied, or ALARM NO is specified, the CTRL=ALARM operand is omitted.
Corresponding SET PANEL keyword: ALARM
Corresponding DFHMDI macro operand: CTRL=.

Reset MDTs?

Specifies whether the modify data tags are to be reset to an unmodified condition before any panel data is written to the buffer. If no value is supplied, or N (no) is specified, the CTRL=FRSET operand is omitted.
Corresponding SET PANEL keyword: RESETMDT
Corresponding DFHMDI macro operand: CTRL=

Extended highlight?

Specifies the type of extended attribute support to be included in the panel. If no value is supplied, the HILIGHT= operand is omitted.
Corresponding SET PANEL keyword: EXTENDED-HIGH
Corresponding DFHMDI macro operand: HILIGHT=

N=none
: indicates that no extended attributes are supported. HILIGHT=OFF is generated.

B=blinking
: indicates that the "blinking" extended attribute condition is set. HILIGHT=BLINK is generated.

R=reverse video
: indicates that the "reverse video" extended attribute condition is set. HILIGHT=REVERSE is generated.

U=underscore
: indicates that the "underscore" extended attribute condition is set. HILIGHT=UNDERLINE is generated.

Outboard format?

Specifies whether 3650-device outboard formatting is to be used. If no value is supplied, the OBFMT= operand is omitted.
Corresponding SET PANEL keyword: OUTBOARDFMT
Corresponding DFHMDI macro operand: OBFMT=

Color:

Specifies the default color for the panel. If no value is supplied, the COLOR=DEFAULT operand is generated.
Corresponding SET PANEL keyword: COLOR
Corresponding DFHMDI macro operand: COLOR=

Programmed symbols?

Specifies the program symbols to be used.
Corresponding SET PANEL keyword: PROGSYM
Corresponding DFHMDI macro operand: PS=

1 character
: specifies a single EBCDIC character that identifies a set of programmed symbols.

2-character hex value
: specifies a 2-character hex-value that identifies a set of programmed symbols.

BS=base
: specifies that the base symbol set is to be used.

Must fill?

Specifies whether the CICS validation rule "must fill" is in effect. If no value is supplied, or MUSTFILL NO is specified, the VALIDN=MUSTFILL operand is omitted.
Corresponding SET PANEL keyword: MUSTFILL
Corresponding DFHMDI macro operand: VALIDN=

N=no
: indicates that the "must fill" rule is not in effect. VALIDN=MUSTFILL is omitted.

Y=yes
: indicates that a field must be filled completely with data. An attempt to move the cursor from the field before it has been filled, or to transmit data from the incomplete field, will cause the inhibit input condition. VALIDN=MUSTFILL is generated.

Note: The "must-fill" option applies only to IBM 8775 terminals. This option does not correspond to the "must-fill" option of CA IDEAL.

Must enter?

Specifies whether the CICS validation rule "must enter" is in effect. If no value is supplied, or MUSTENTER=NO is specified, the VALIDN=MUSTENTER operand is omitted.
Corresponding SET PANEL keyword: MUSTENTER
Corresponding DFHMDI macro operand: VALIDN=

N=no
: indicates that the "must enter" rule is not in effect. VALIDN=MUSTENTER is omitted.

Y=yes
: indicates that data must be entered into a field. An attempt to move the cursor from an empty field causes the inhibit input condition. VALIDN=MUSTENTER is generated.

Note: The "must-enter" option applies only to IBM 8775 terminals. This option does not correspond to the "must-enter" option of CA IDEAL.

3.3.3 The Panel Layout Fill-in

This section briefly describes the panel layout fill-in. For a detailed discussion of defining and modifying a panel layout, see Section 3.4.

The LAYOUT (or LAY) command or PF6 key displays the panel layout of a panel definition. The panel layout fill-in is used to paint, or layout, the panel fields in the exact positions in which they are to appear on the panel display.

The layout fill-in is displayed with blank-filled or null-filled lines based on the current SET PANEL LAYOUT command setting. Blank-filled means all lines are padded with trailing blanks to achieve the defined panel width. Null-filled means the lines are not padded. For an explanation of the impact of the fill-mode on editing, see Section 3.4.1.)

The default layout mode in effect can be overridden when accessing the layout fill-in using the following LAYOUT command:

LAYOUT BLANKFILL or LAYOUT NULLFILL

While editing a panel layout, use the command BLANKFILL or NULLFILL to change the mode. PF18 can be used as a toggle to switch the fill-mode.

The current fill-mode is displayed along with the panel name on the status line.

When editing a panel, defaults such as panel layout symbols, letter case, fill mode, and screen attributes are obtained from the current corresponding SET PANEL values. To view the current value for all of the SET PANEL keywords, issue the DISPLAY SESSION OPTIONS or DISPLAY SESSION PANEL command. For more information on the SET PANEL command, refer to the *Panel Definition Facility Command Reference Manual*.

The following figure shows the panel layout fill-in.

```
=>

------------------------------------------------------------------------>>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS  LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢    Copy >   Dest !    Width  80
....+....1....+....2...+...3....+...4....+....5...+....6...+....7....+....
================================  T O P  ================================


          ^ORDER #^_______ ^CUSTOMER # ^_____ ^ ORDER DATE ^______;


          ^CUSTOMER NAME ^_____________________________________________;


          ^CREDIT CARD #^_____________________________;


          ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

          ^______; ^________; ^_____________________________; ^_______;
============================  B O T T O M  ============================
```

Figure 13. Sample Panel Layout Fill-in

At the top of a panel layout fill-in is the symbol definition line. This line includes the following fields:

Start field symbol
The symbol that indicates the start of an existing field on the panel layout.

End field symbol
The symbol that indicates the explicit end of a field on the panel layout. A field implicitly terminates at start-of-field or end-of-line.

New field symbol
The symbol used to indicate the beginning of a new field. PDF/CICS converts the "new field" symbol to the "start field" symbol when the ENTER key is pressed.

If the field contains blanks between start and end, it is considered an input field. It receives the Input Field Attributes (IFATTR) set for the current session.

If the field contains non-blanks, it is considered a text field and receives the Text Field Attributes (TFATTR) set.

Delete field symbol
The symbol that, when entered in place of the start field symbol, causes the field to be deleted from the panel definition.

Move field symbol
The symbol used to mark a field that is to be removed from the current location and placed at a new location. The "move field" symbol is placed in the same position as the current "start field" symbol. The target location is designated by the destination field symbol.

Copy field symbol
The symbol used to mark a field that is to be copied at another location. The receiving location is designated by the destination symbol. The "copy field" symbol is placed to overtype the "start field" symbol.

Destination field symbol
The symbol used to mark the receiving location of a copy or move operation. If more than one field is to be moved or copied, edit-ID numbers must be used to designate each field. See Section 3.4.6, "Relocating Fields," for details.

Field symbols can be changed on the layout fill-in by overtyping directly on the symbol definition line. The new symbol must be different from the other symbols and cannot be used in the layout text. The symbols on the symbol definition line are evaluated prior to the field definition area on the layout.

The SET PANEL command can also be used to change the field symbols. The new SET PANEL setting will be in effect for all panel definitions created subsequently. Changing a SET PANEL setting will not affect existing panel definitions.

3.3.4 The Panel Field Summary Table

The SUMMARY (or SUM) command or PF9/21 key displays the field summary table of a panel definition. The field summary table is a list of the fields that were entered in the layout, with columns for entering information associated with each field. The field summary table is displayed in the bottom portion of the screen. Part of the layout is displayed in the upper portion of the screen with each field numbered sequentially. In summary mode, no changes can be made to the layout of the panel.

The user can modify the field summary table fill-in to assign basic information about each field, such as field name, screen attributes, and field characteristics. A field's value may be removed by using either ERASE EOF key or by overtyping it with spaces, except for the attributes (Attr) field. The attributes field is restored with the value from SET PANEL TFATTRIBUTE if the field contains text, otherwise, the field is restored from the SET PANEL IFATTRIBUTE.

All information listed for a field in the field summary table is also displayed in the extended field definition fill-in (see Section 3.3.5). A modification to one automatically modifies the other.

The SUMMARY panel consists of a LAYOUT "presentation area" (a subset of lines from the LAYOUT display) followed by an area for modifying field characteristics.

The following figure shows the completed field summary table for the layout example.

```
=>

------------------------------------------------------------------------
PDF/CICS: SUMMARY TABLE     PNL ORDSYS  LIB: BMSPANEL  SYS: BMS  FILL-IN



 ==============================  T O P  ==============================


          ^ORDER #^_______ ^CUSTOMER # ^_____ ^ ORDER DATE ^______;
          1       2        3          4      5             6

          ^CUSTOMER NAME ^_____________________________________________;
          7              8

....+...1....+....2...+...3....+...4....+....5...+....6...+....7....+....
                                    E J P M M
 Seq Lv Row Col Len  Name    Attr   C H u C F E PS
 --- -- --- --- ---- ------- ------ - - - - - - --
   1 2    4  11    7 ORDER#  PSL    - - - - - - -- _ _ _ _ _ _ _ __
   2 2    4  19    8 ORDINP  UNL    - - - - - Y --_ _ _ _ _ _  __
   3 2    4  28   11 CUST#   PSL    - - - - - - --_ _ _ _ _ _ _ __
   4 2    4  40    6 CUSINP  UNL    - - - - - Y --
   5 2    4  47   12 ORDDATE PSL    - - - - - - --_ _ _ _ _ _ _ __
   6 2    4  60    6 DATINP  UNL    - - - - - Y --
   7 2    7  11   14 CUSNAME PSL    - - - - - - --_ _ _ _ _ _ _ __
   8 2    7  26   40 NAMEINP UAL    - - - - - Y --
```

Figure 14. Completed Field Summary Table

The fields on the field summary table fill-in are:

Seq (Sequence)
: A sequence number assigned by PDF/CICS. These numbers appear on a separate line, directly below the start field symbol for each field in the panel layout (in the top region). These sequence numbers simplify the correlation between the field in the panel layout and the field's table entry. Sequence cannot be modified by the user.

The summary table only shows the fields which exist within the presentation area of the layout. Fields off the screen are accounted for in the numbering routine, but are not displayed.

The field summary table can be scrolled by specifying the SCROLL FORWARD or SCROLL BACKWARD command or by pressing the PF key assigned to the scroll function. (See Section 3.11 for PF key assignments.) In cases where there is no room for a field to be displayed in the layout portion of the screen, but the field entry in the summary table is displayed, the POSITION editing command can be specified with the field sequence number to position that field to be displayed at the top of both the layout and the summary table.

Use the POSITION command to move a field with a sequence number to the top of the screen.

Lv (Level)
The level number in the hierarchy of names within a panel. The number 2 indicates that the entry is a field within the panel.

Row
The physical row in which the field begins on the map partition.

Col (Column)
The column in which the field begins on the map partition.

Note: The Row and Column specifications should not exceed the SIZE characteristics set for DFHMDI in PARM or the capacity of your terminal. CICS abends may result if this guideline is not followed.

The field summary table can be scrolled by specifying the SCROLL FORWARD or SCROLL BACKWARD command or by pressing the PF key assigned to the scroll function. (See Section 3.11 for PF key assignments.) In cases where there is no room for a field to be displayed in the layout portion of the screen, but the field entry in the summary table is displayed, the POSITION editing command can be specified with the field sequence number to position that field to be displayed at the top of both the layout and the summary table.

Len (Length)
The length of the field as calculated by PDF/CICS based on how the field was defined in the layout. The maximum field length is the length of the line.

Name
The 1- to 7-character name of the field. Names are used in applications to reference data contained in panels.

Attr (Attributes)
A combination of screen attribute settings. Combinations of the following attributes can be specified by the user:

```
[UA]    [ ]
[UN]    [H]
[PA]    [L]
[PS]    [I]      [C]    [M]
```

CICS restrictions and conventions make certain attribute combinations synonymous. These combinations are grouped into two sets: primary attribute sets and alias attribute sets. When both sets exist, PDF substitutes the primary attribute set if the user enters an alias attribute set.

PA (P)
A protected field. A protected field cannot be modified or deleted. A P or PA field is not skipped over by the cursor. The cursor does not skip to the next unprotected field.

PS (S, PN)
: A protected field that is skipped over (cannot be accessed) by the cursor. The cursor skips to the next unprotected field. PN, PS, and S are synonyms.

UA (A, U)
: A field that can accept any characters. It is unprotected. U, A, and UA are synonyms.

UN (N)
: A field that can accept only 327x numeric characters (0-9,...,) on a data entry terminal. It is unprotected. N and UN are synonyms.

H
: A field displayed with high intensity characters.

I
: An invisible field (input or text) in which the characters are not displayed.

L
: A field that is displayed with regular (low) intensity. This setting is the default.

M
: A field that is to be treated as if data were entered on the current transaction. If a field has an attribute of M, the value for that field is assumed to have been entered by the user, even if the value was entered on a prior transaction or was not entered at all (a default value). The letter M shows that the Modified Data Tag (MDT) is defined as 'on' for this field.

C
: The field to contain the cursor when the panel is displayed. Only one field in the panel may contain the CURSOR attribute.

Notes:

A protected field is skipped if the previous field is defined as PS or if the previous field is defined as PA and has an end field (**;**) symbol. The end field symbol is recognized by the hardware as an indicator to skip to the next unprotected field. The start field symbol must be specified to mark the beginning of a field. A field can be terminated by the end field symbol or the start field symbol.

If a protection attribute is not specified (PROTECTED, SKIPPED, ALPHA, or NUMERIC), the default value (UNPROTECTED ALPHA) is used. If a HIGHLIGHT attribute is not specified (LOWLIGHT, HIGHLIGHT, or INVISIBLE), the default value (LOWLIGHT) is used.

C (color)

The color in which the field will be displayed when in use. Color can be used with other attributes and highlighting, but only one color can be specified.

D	Default
B	Blue
R	Red
P	Pink
G	Green
T	Turquoise
Y	Yellow
W	White/Black

E
H (extended highlighting)

The type of extended highlighting that will be used. Extended highlighting can be used with other attributes and color, but only one form of extended highlighting can be specified.

N	No extended highlighting.
B	Blinking.
R	Reverse video.
U	Underscore.

J
u (justify input)

Establishes the justification for characters in the field before they are presented to the application procedure. Left justification shifts leading spaces and null characters to the left and shifts trailing spaces and null characters to the right.

L

Left justification (default for alphanumeric field).

R

Right justification (default for numeric field).

P
C (pad character)

As part of justification, pad characters are inserted into the field on the opposite side from where justification occurred. This option controls the pad character substituted for the characters shifted off by justification.

Z

Field is padded with zeros (default for a field with the UN attribute).

B

Field is padded with blanks (default for a field with the UA attribute).

M
F (must-fill)

Specifies that if data is to be entered into this field, every character of the field must be filled.

This attribute has meaning only for IBM 8775 terminals.

This attribute is NOT identical to the CA IDEAL "must-fill" attribute.

Y

Indicates that data must be entered into every character of the field if any data is entered into the field.

N

Indicates that there is no requirement that data be entered into every character in the field.

M
E (must-enter)

Specifies that data must be entered into this field, though need not fill it.

This attribute has meaning only for specific hardware.

This attribute is NOT identical to the CA IDEAL "must-enter" attribute.

Y

Indicates that data must be entered in the field.

N

Indicates that there is no requirement that data be entered in the field.

PS (programmed symbols)
Specifies the program symbols to be used.

x
Specifies a single EBCDIC character that identifies a set of programmed symbols.

hh
Specifies a 2-character hex value that identifies a set of programmed symbols.

BS
(default) Specifies that the base symbol set is to be used.

3.3.5 Extended Field Definition

The extended field definition fill-in is used to define optional detailed information for each specific field. The FIELD, NEXT, and PREVIOUS commands or equivalent PF key invokes the extended field definition of a specific field.

FIELD *name*
FIELD *nnn*
Displays, for editing, the extended field definition of a specific field that is identified in the command with the field name or the sequence number assigned to that field on the layout.

NEXT
Displays, for editing, the extended field definition of the next field in sequence. If specified while in another component of a panel definition, the extended field definition of the first field on the panel is displayed.

PREVIOUS
Displays, for editing, the extended field definition of the preceding field in sequence. If PREVIOUS is specified while in another component of a panel definition, the extended field definition of the last field in the panel is displayed.

The following figure shows an extended field definition.

```
 =>

 ------------------------------------------------------------------------------
 PDF/CICS: EXTENDED FIELD DEF  PNL ORDSYS       LIB: BMSPANEL  SYS: BMS
FILL-IN


            ORDER # ________  CUSTOMER # ________ ORDER DATE ________
            ******* 2         3           4       5            6

....+...1....+....2...+...3....+...4....+....5...+....6...+....7....+....
 Field name       ORDER#   Field number    1    Field length   7
 Attribute        PSL      U=unprot    H=highlight      A=327x alpha     )
                          (P=prot      I=invisible      N=327x numeric   )
                          (S=skip      L=lowlight       M=modify-data-tag)
                          (C=cursor                                      )
 Color              -     (D=default, B=blue, R=red, P=pink, G=green,)
                          (T=turquoise, Y=yellow, W=white/black      )
 Ext highlighting   -     (N=none, B=blink, R=reverse video, U=underscore)
 Justify input      -     (L=left, R=right)
 Pad character      -     (Z=zeros, B=blanks)
 Must fill          -     (Y=yes, N=no)
 Must enter         -     (Y=yes, N=no)
 Programmed symbols --    (BS=basic symbols, other=2 hex digits)
                          (or 1 EBCDIC character               )
```

Figure 15. Completed Extended Field Definition

When an extended field definition is displayed, the line of the panel layout that contains the requested field is displayed in the top portion of the screen with a series of asterisks positioned directly under the field. The field information is displayed in the bottom portion of the screen.

A summary portion of the extended field definition information is listed in the field summary table entry for the field. Any modification to a field's attributes in the extended field definition is reflected in the summary table defined for this specific field. Similarly, modifications to the summary are reflected in the extended field definition.

The fields on the extended field summary fill-in are:

Field name
The 1- to 7-character name of the field. These names become BMS field names.

Field number and Field length
These fields are supplied by PDF/CICS for reference and cannot be modified by the user.

Attribute

A combination of screen attribute settings. Combinations of the following attributes can be specified by the user:

```
[UA]   [ ]
[UN]   [H]
[PA]   [L]
[PS]   [I]      [C]    [M]
```

Color

The color in which the field will be displayed when in use. Color can be used with other attributes and highlighting, but only one color can be specified at a time.

D	Default
B	Blue
R	Red
P	Pink
G	Green
T	Turquoise
Y	Yellow
W	White/Black

Ext highlighting

The type of extended highlighting that will be used. Extended highlighting can be used with other attributes and color, but only one form of extended highlighting can be specified at a time.

N	No extended highlighting.
B	Blinking.
R	Reverse video.
U	Underscore.

Justify input

Establishes the justification for entries in the field before they are presented to the application procedure.

L

Left justification (default for a field with the UA attribute).

R

Right justification (default for a field with the UN attribute).

Pad character

Z

Field is padded with zeros.

B

Field is padded with blanks.

Must-fill

Specifies that if data is to be entered into this field, every character of the field must be filled.

Y

Indicates that data must be entered into every character of the field if any data is entered into the field.

N

Indicates that there is no requirement that data be entered into every character in the field.

Must-enter

Specifies that data must be entered into this field, though need not fill it.

Y

Indicates that data must be entered in the field.

N

Indicates that there is no requirement that data be entered in the field.

Programmed symbols

Specifies the program symbols to be used.

1

Specifies a single EBCDIC character that identifies a set of programmed symbols.

2

Specifies a 2-character hex value that identifies a set of programmed symbols.

BS

Specifies that the base symbol set is to be used.

3.3.6 Picture Table

The PICTURE (or PIC) command displays the picture characteristics of fields within the panel definition. The picture table is a list of the fields that were entered in the layout, with columns for entering input and output pictures for each field. The picture table is displayed in the bottom portion of the screen. The presentation area of the layout is displayed in the upper portion of the screen, with each field numbered sequentially. In picture mode, no changes can be made to the layout of the panel.

The picture table can be scrolled by specifying the SCROLL FORWARD or SCROLL BACKWARD command or by pressing the PF key assigned to the scroll function. (See Section 3.11 for PF key assignments.) In cases where there is no room for a field to be displayed in the layout portion of the screen, but the field entry in the picture table is displayed, the POSITION editing command can be specified with the field sequence number to position that field to be displayed at the top of both the layout and the picture table.

The picture characteristics of a field may be removed by using either ERASE EOF key or by overtyping it with spaces.

The figure below shows the picture table fill-in for the layout example.

```
 =>


--------------------------------------------------------------------------
 PDF/CICS: PICTURE TABLE     PNL ORDSYS  LIB: BMSPANEL  SYS: BMS  FILL-IN


  ================================  T O P  ================================
           ^ORDER #^________ ^CUSTOMER # ^_____ ^ ORDER DATE ^______;
           1       2        3          4      5             6


           ^CUSTOMER NAME ^_____________________________________________;
           7              8

....+...1....+....2...+...3....+...4....+....5...+....6...+....7....+....
Seq Lv Len  Name    Input Picture             Output Picture
 --- -- ---- ------- ------------------------ ------------------------
   1 2     7 ORDER#  ________________________ ________________________
   2 2     8 ORDINP  ________________________ ________________________
   3 2    11 CUST#   ________________________ ________________________
   4 2     6 CUSINP  ________________________ ________________________
   5 2    12 ORDDATE ________________________ ________________________
   6 2     6 DATINP  ________________________ ________________________
   7 2    14 CUSNAME ________________________ ________________________
   8 2    40 NAMEINP ________________________ ________________________
   9 2    13 CRED#   ________________________ ________________________
  10 2    24 CREDINP ________________________ ________________________
  11 2     4 QUANT   ________________________ ________________________
  12 2     6 ITEMNO  ________________________ ________________________
  13 2    16 ITEMDES ________________________ ________________________
  14 2     5 PRICE   ________________________ ________________________
  15 2     6 QTYINP  ________________________ ________________________
  16 2     8 ITE#INP ________________________ ________________________
  17 2    25 OFFDINP ________________________ ________________________
  18 2     7 PRICINP ________________________ ________________________
```

Figure 16. Completed Picture Table

The fields in the picture table fill-in are:

Seq (Sequence)

A sequence number assigned by PDF/CICS. These numbers appear on a separate line, directly below the start-field symbol for each field in the panel layout (in the top region). These sequence numbers simplify the correlation between the field in the panel layout and the field's table entry. Sequence cannot be modified by the user.

The picture table only shows the fields which exist within the presentation area of the layout. Fields off the screen are accounted for in the numbering routine, but are not displayed.

Lv (Level)
The level number in the hierarchy of names within a panel. The number 2 indicates that the entry is a field within the panel. This field can not be modified.

Len (Length)
The length of the field as calculated by CA-MetaCOBOL+ based on how the field was defined in the layout. The maximum field length is the length of the line. This field can not be modified.

Name
The 1- to 7-character field name. Names are used in applications to reference data contained in panels.

Input Picture
The user-defined input picture for the field. The input picture must conform to COBOL rules for alphabetic, numeric, or alphanumeric picture clauses.

Output Picture
The user-defined output picture for the field. The output picture must conform to COBOL rules for alphabetic, numeric, alphanumeric, edited numeric, or edited alphanumeric picture clauses.

Avoid using incompatible input and output pictures. A numeric input picture is incompatible with a numeric output picture if the output picture includes zero suppression, insertion characters, or separate leading or trailing sign characters.

The number of significant characters in the input and output picture must be identical to the length of the field defined for PDF/CICS. Implicit decimal ("V"), sign ("S"), and scale-factor ("P") characters are not counted in the length of the picture clause.

3.3.7 Displaying a Panel Facsimile

The FACSIMILE (or FAC) command displays a facsimile, or likeness, of a panel.

When a facsimile is displayed, field delimiters and symbols, and any invisible fields are suppressed. Highlighted fields appear highlighted, protected and skip fields are protected and skipped, respectively. The cursor is placed in the field selected to receive the cursor.

The following figure is a facsimile for the sample panel used in previous sections.

```
=>

------------------------------------------------------------------------


          ORDER # ________  CUSTOMER # _________ ORDER DATE ________

          CUSTOMER NAME ____________________________________________

          CREDIT CARD # ____________________________________________

          QTY.     ITEM #     ITEM DESCRIPTION            PRICE

          _______  _______    ____________________________  _____
          _______  _________  ____________________________  ________
```

Figure 17. Sample Panel Facsimile

You can use the FACSIMILE command to prototype panels. The panel will be shown as it would appear when the associated program is executed. Users can enter data and observe limited error checking.

3.4 Defining and Modifying a Panel Layout

Panels are laid out on the terminal screen with symbols to start, end, add, delete, copy and move fields. These symbols can be defined on the layout fill-in. During panel layout, the symbols that are currently in effect are displayed above the separator line. These symbols can be changed by directly overtyping the current symbols on the symbol definition line above the separator line on the panel layout screen. The SET PANEL command can also be used to change the field symbols for an entire PDF/CICS session.

The primary editing commands that can be used while editing a panel layout are INPUT, BLANKFILL, NULLFILL, SCROLL, CHECKPOINT, DISPLAY ROLLBACK, ROLLBACK, and POSITION. Use of these commands is described briefly in this section and fully in the *Panel Definition Facility Command Reference Manual*.

The following rules are in effect during panel layout:

- The size of the region in which a panel is defined has no effect on the size of the region of the screen in which the panel will eventually be displayed during execution. A panel that exceeds the region size can be scrolled forward and backward, left and right.

  This rule does not affect the execution of programs. CICS panel scrolling through full-function BMS is the responsibility of the programmer. The GENERATE command will only generate a single DFHMDI macro for basic BMS functionality.

- Values for input fields (default values) can be entered (set) in the layout.

- The symbols used to define the fields and the functions must be unique and can not appear within the individual panel fields.

- A field must fit on a single panel line.

3.4.1 Defining a Panel Using the Panel Layout Fill-in

The initial panel layout fill-in is an input screen that contains either null-filled or blank-filled lines. Fields can be entered anywhere on these lines. All fields entered during the layout of a panel must be entered with a new-field symbol at the start of the field and ended either by an end-field symbol or by the beginning of another field with another new-field symbol.

When creating new fields on an empty line or creating fields after the last field of a line, the fill mode in effect has an impact.

Creating a new field on an empty line or after the last entry on the line:

- A null-filled screen: enter leading characters to position the fields, otherwise the fields will shift left after the ENTER key is pressed.

  To maintain space between fields, enter spaces in place of the null characters. To leave a blank line, enter at least one space on the line.

- A blank-filled screen: enter the fields exactly where they are to be positioned. No shifting occurs after the ENTER key is pressed.

Inserting fields before an existing field:

- A null-filled screen: insert the fields by pressing the INSERT key and then typing the data.

- A blank-filled screen: enter the fields exactly where they are to be positioned. Existing fields are not shifted. If the INSERT key is pressed, characters must be deleted prior to inserting the new fields.

In either mode, trailing blank or null lines are not retained with the stored layout. The fill-mode only pertains to panel layout editing.

The following example illustrates entering new fields using the plus sign (+) as the new-field symbol and the semicolon (;) as the end-field symbol. In this example, the screen is null-filled. A blank must be typed to retain a line that does not have a defined field. Blanks are also typed between fields to provide spacing.

```
=>

---------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


          +ORDER #+________ +CUSTOMER # +_______+ ORDER DATE +_______;


          +CUSTOMER NAME +_____________________________________________;


          +CREDIT CARD #+_____________________________;


          +QTY.;   +ITEM #;   +ITEM DESCRIPTION;          +PRICE;

          +_______; +_________; +_____________________________; +________;


============================  B O T T O M  ============================
```

Figure 18. Adding Fields to a New Panel Layout

The panel layout data is transmitted when the ENTER key is pressed, when any PF key is pressed (except PF keys assigned to HELP), or when a scroll, if specified, is performed.

After the data is transmitted:

- The panel layout is redisplayed with the new-field symbols changed to start-field symbols (shown as the "not sign" (^) in the following examples).
- Unused lines at the bottom of the panel layout are deleted.
- Each new field is added to the field summary table in the appropriate sequence.

```
=>


------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ================================


          +ORDER #+________ +CUSTOMER # +______+ ORDER DATE +______;


          +CUSTOMER NAME +_____________________________________________;


          +CREDIT CARD #+_____________________________;


          +QTY.;   +ITEM #;   +ITEM DESCRIPTION;          +PRICE;

          +______; +________; +_____________________________; +_______;


============================  B O T T O M  ============================
```

Figure 19. Resulting Panel Layout

3.4.2 Modifying Existing Fields on the Panel Layout

Panels are modified by changing either the physical arrangement of a layout or the characteristics of the data contained in the layout. These changes can include modification of the specification of a field, the addition or deletion of fields, and the relocation of fields. Modifications to a panel layout can also include changes to the summary table that contains information about the fields in the layout. The summary table is described in an earlier section. An explanation of how changes to the layout may require corresponding changes in the summary table is included in this section.

The specification of a field can be modified through LAYOUT edit.

- Field Length

  The length of a field can be increased by overtyping the end-of-field symbol with a space and typing additional spaces until the begin-field symbol of the next field is reached, until the end of the presentation area is reached, or until a new end-of-field symbol is typed.

  If NULLFILL is used, you can use the INSERT key to add spaces between the start-field and end-field symbols. Spaces elsewhere on the field may have to be deleted to properly align trailing fields.

  The length can be decreased by pressing the delete character key. Spaces may have to be inserted to properly re-align the fields following the shortened field.

- Input Field and Text Field

  A field can be changed from an input field to a text field by overtyping the blanks with text. The attribute for the field remains UAL. This can be changed on the summary fill-in.

  A text field can be changed to an input field by overtyping the text with blanks. The attribute for the field remains PSL. This can be changed on the summary fill-in.

- The contents of a text field can be changed by overtyping the text.

- A field can be copied or moved by using the layout editing symbols.

  Since a field can be copied to multiple locations, a field name must be specified on the summary fill-in for the new field. All other attributes, except location, are copied.

  A field can be moved to only one location; therefore, the name of the field is retained. All other attributes, except location, are copied.

The example shown below illustrates the use of the INSERT key to modify a field in the original layout. In this illustration, the decision has been made to replace the number symbol (#) with the word NUMBER. On a null-filled screen as shown for this example, place the cursor over the number symbol (#) on line one, and then press the INSERT key. On a blank-filled screen, delete the number of blanks equal to the number of characters in the word NUMBER.

Terminal editing facilities can be used to modify the number symbol to the word NUMBER as shown below.

```
=>


---------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ================================


        +ORDER NUMBER+________ +CUSTOMER NUMBER +____+ ORDER DATE +______;


        +CUSTOMER NAME +_____________________________________________;


        +CREDIT CARD #+_____________________________;


        +QTY.;   +ITEM #;   +ITEM DESCRIPTION;          +PRICE;

        +______; +_________; +_____________________________; +________;


============================  B O T T O M  ============================
```

Figure 20. Result of Editing Text on Layout

3.4.3 Adding Lines to a Layout

If additional lines are needed in a panel either during layout or editing, lines can be inserted at the bottom or top of the layout, or between existing lines with the INPUT command. When INPUT is specified, lines to fill the region are inserted below the line that contains the cursor when the ENTER key is pressed. If the cursor is in the command area, lines are inserted at the top line of the layout presentation area.

The inserted lines are null-filled or blank-filled based on the current layout fill specification. Lines inserted during null-fill are not retained; lines inserted during blank-fill are retained.

A detailed explanation of the INPUT command is included in the *Panel Definition Facility Command Reference Manual*.

Adding Lines to the Bottom of a Layout

Lines can be added to the bottom of the panel by pressing PF11 (BOTTOM), back tab, and PF12 consecutively. The INPUT command can also be used. The following example illustrates the use of the INPUT editing command to add lines at the bottom of the panel.

First, type the INPUT command on the command line. Next, place the cursor on the bottom line of the layout, and press the ENTER key.

```
=>input

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


          +ORDER #+________ +CUSTOMER # +______+ ORDER DATE +______;

          +CUSTOMER NAME +_____________________________________________;

          +CREDIT CARD #+_____________________________;

          +QTY.;   +ITEM #;   +ITEM DESCRIPTION;          +PRICE;

          +______; +________; +_____________________________; +_______;


============================  B O T T O M  ============================
```

Figure 21. Adding Lines to Layout

Entering the INPUT command with the cursor on the bottom line of the layout causes PDF/CICS to insert null-filled lines at the bottom of the layout to fill the region. (In blank-fill mode, blank lines are inserted and retained for the entire editing session.) The bottom line of the panel is retained with the display as a context line:

```
=>

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


          +______; +________; +_____________________________; +_______;









============================  B O T T O M  ============================
```

Figure 22. Inserting Lines at Bottom of Layout

In this example, six null-filled lines were entered at the bottom of the layout and retained by placing a space on each of them. On a seventh line a new field, PHONE NUMBER, was added to the layout. Any unused null-filled lines inserted by the INPUT command are deleted when the ENTER key is pressed. (Any blank lines at the bottom of the panel are deleted when the editing session is terminated.) The SCROLL TOP command can be used to display the layout from the first line.

```
=>

------------------------------------------------------------------------ >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


          +______; +________; +_____________________________; +_______;




          ^PHONE NUMBER^____^________;
============================  B O T T O M  ============================
```

Figure 23. Lines Inserted at Bottom of Layout

Adding Lines to the Top of a Layout

To add lines to the top of a layout, press PF10 (TOP) followed by PF12 or the INPUT command leaving the cursor in the command area when ENTER is pressed.

When using the INPUT command, the top line of the existing layout is retained on the display as a context line at the bottom of the panel, and the remainder of the screen is filled with lines for data entry. The lines are null-filled or blank-filled based on which layout fill option is in effect.

Adding Lines Between Existing Lines in a Layout

To add lines between existing lines in the layout, specify the INPUT command, position the cursor to the line below the desired location, and press PF12. The line containing the cursor is redisplayed as a context line and the remainder of the screen is provided to insert new lines. A specific number of lines can be inserted by specifying INPUT WINDOW n where n is the number of lines to be inserted.

When the mode is blank-fill, the inserted lines are retained regardless of whether data is typed on them.

When the mode is null-filled, data must be typed on each line that is to be retained. At least one blank must be typed on lines inserted for spacing.

3.4.4 Adding Fields to an Existing Panel Layout

Any time a new field is added to a layout, it must be specified with the new-field symbol. This is true both when a panel is first laid out and when fields are added during modification of a panel. When a panel is modified, fields can be added at any point in the layout. When the modifications are transmitted, PDF/CICS renumbers the fields to accommodate the new field or fields, and changes the new-field symbol to a start-field symbol.

The following example shows two new fields (DEPT CODE _____) being added to the sample layout used throughout this section. The new-field symbol used in this example is the plus sign (+).

```
=>

 ------------------------------------------------------------------- >>>
 PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

  Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
 ....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
 ================================  T O P  ==================================


           ^CREDIT CARD NUMBER^_____________________________;

           +DEPT CODE+_______;
```

Figure 24. Adding Fields to Existing Layout

In this example the SCROLL TOP command acts as if ENTER was pressed prior to the scroll request. The added fields are incorporated into the layout and the new-field symbol is changed to the start-field symbol. Since null-fill is in effect, any unused inserted lines are deleted.

```
=>

---------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;

       ^DEPT CODE ^________;

       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^________;
============================  B O T T O M  ============================
```

Figure 25. New Fields Inserted into Layout

3.4.5 Deleting Fields from the Panel Layout

To delete a field from a layout, overtype the start-field symbol to the delete-field symbol. The EOF key can be used to delete an entire line including any fields. To use the EOF key in this manner, the cursor must be in the first position of the line.

Using the Delete-field Symbol

When the delete-field symbol is used, PDF/CICS removes the field from the panel definition. That means all references to the field in the layout, the summary table, the extended field definition, and the picture table are deleted. The remaining fields on the layout are then resequenced. During blank-fill mode, the deleted fields are replaced with blanks. During null-fill mode, the remaining fields on the line remain unmoved. If there are no fields remaining on the line, the line is deleted.

The following examples illustrate using the delete-field symbol, an asterisk (*) in this example, to delete DEPT CODE from the layout.

```
=>

---------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


       ^ORDER NUMBER^_______ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;

       +DEPT CODE+_______;

       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
==============================  B O T T O M  ============================
```

Figure 26. Using the Delete Field Symbol

As the following example shows, fields that were marked with the delete-field symbol have been removed from the panel.

```
=>

---------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT NULLS  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


       ^ORDER NUMBER^_______ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
==============================  B O T T O M  ============================
```

Figure 27. Layout After Fields are Deleted

Using the EOF Key

The EOF key can be used to delete fields in a layout if the entire line in the layout is to be deleted. The cursor must be placed at the beginning of the line, and all fields on that line are deleted by PDF/CICS along with the corresponding summary table, extended definition, and picture table entries. In null-fill mode, an EOF can only be issued from the first column of a line. In blank-fill mode, an EOF can be issued to erase blanks at the end of a line after the last field.

The EOF key can be used to delete all the fields of a line in the field edit area and to delete blanks at the end of a line in the field edit area.

To delete all the fields of a line in the field edit area, press the ERASE/EOF key with the cursor at the leftmost position of the field edit area of the line to be deleted.

To delete blanks at the end of a line in the field edit area, move the cursor to the right of any panel-field symbols on the desired line.

3.4.6 Relocating Fields

A field can be relocated using the hardware editing facilities or by using the layout editing symbols to move and copy fields.

Adding and Deleting Data to Relocate a Field

A field can be relocated within the current order in relation to the other fields in the layout by inserting or deleting spaces on the line before the field. The layout editing symbols can be used to add new fields or delete existing fields prior to any field causing it to be relocated. All changes are made automatically to the summary table.

Note: This method will not move field names or field characteristics.

Moving and Copying to Relocate a Field

The move and copy layout editing symbols can be used to relocate a field to a new order in relation to the other fields in the layout.

When the move-field symbol is used, the attributes for the field including the field name are maintained. The location is the only value that changes. When the copy-field symbol is used, the attributes for the field except for the field name are duplicated at the destination. The summary table or extended field definition must be used to define a name for the destination field.

Using Move To Relocate a Field

A field can be moved from one location to another using the move-field symbol to mark the field to be moved and the destination-field symbol to mark the new location. On the following blank-filled sample panel layout, the data entry field after the words CREDIT CARD NUMBER is to be moved to the next line.

```
=>

 ------------------------------------------------------------------------ >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ==================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;
                           !


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
============================  B O T T O M  ============================
```

Figure 28. Moving a Field on the Layout

The move-field symbol is typed over the start-field symbol. A destination symbol is typed at the new location. In this example, that location is directly beneath the current location. The moved field is replaced by blanks at the original location.

The fill-mode in effect has a direct impact at the new location. On a blank-filled panel, as used in the example above, the destination symbol is typed where the field is to be placed. On a null-filled panel, blanks must be inserted prior to the destination symbol or the moved field will be shifted to the left and not retained as expected. The following figure displays the resulting null-filled panel, without blanks inserted.

```
=>

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER
^_____________________________;


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
============================  B O T T O M  ============================
```

Figure 29. Move Fields Shift on Null-Filled Layout

Using Copy To Relocate a Field

The copy-field symbol is used to maintain a field at the original location and insert a copy of the field at one or more new locations. It is used much like the move-field symbol. For example, rather than move the data entry field after the words CREDIT CARD NUMBER, a second field is to be inserted to allow for a two-line credit card number.

```
=>

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;
                           !


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
============================  B O T T O M  ============================
```

Figure 30. Copying Fields on Panel Layout

The resulting layout is shown below. Note that the copied field is placed exactly where the destination symbol was placed because blank-fill is in effect.

```
 =>

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
==============================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;


       ^CREDIT CARD NUMBER ^_____________________________;
                           ^_____________________________;


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;
============================  B O T T O M  ============================
```

Figure 31. Result of Copying Fields on Layout

Relocating Multiple Fields

Up to nine fields can be marked to be copied or moved. PDF/CICS keeps track of the fields by assigning a number from 1 to 9 to each marked field in the order in which they are encountered on the layout panel. The order is determined from left to right, top to bottom.

This value is called the edit-id. It is distinct from the field sequence number. The edit-id is a temporarily assigned value that is lost once the copy and move operations are completed. The edit-id is defined so that multiple fields can be copied or moved, and one field can be copied multiple times in one transaction.

When only one field is being copied or moved, the edit-id is not needed with the destination-field symbol. When multiple fields are involved, the edit-id is required.

In the following example, the three fields that make up the phone number on the bottom line are to be moved after the customer name. PDF/CICS regards the edit-id's of the fields as:

```
Edit-id       Field Content
    1        PHONE NUMBER
    2          _____
    3          _______
```

The destination for each of these fields must contain the edit-id to identify the data to be received at each location.

Note: The edit-id's are renumbered on every transaction.

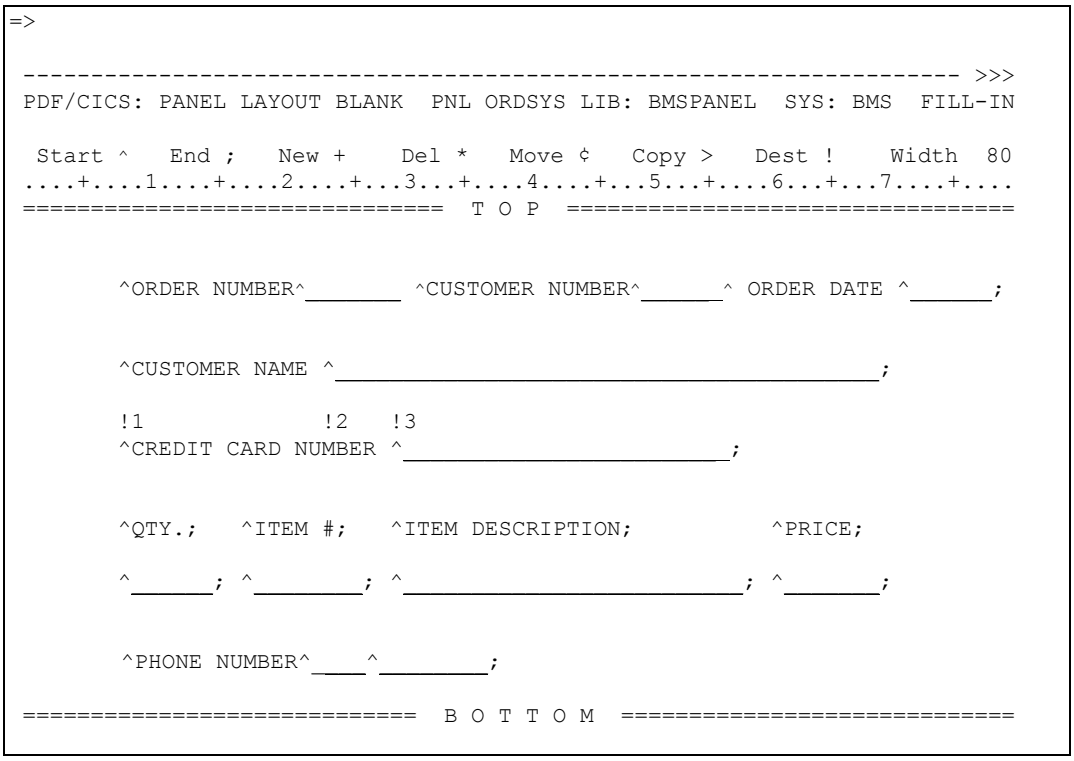

Figure 32. Using Edit-Id to Relocate Multiple Fields

The resulting panel layout is:

```
=>

---------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;
       ^PHONE NUMBER^____^_________;


       ^CREDIT CARD NUMBER ^_____________________________;


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^_________; ^_____________________________; ^________;



============================  B O T T O M  ============================>
```

Figure 33. Result of Relocating Multiple Fields

A range of fields can be specified with the destination symbol. For example, in the previous sample layout, one destination could have been specified as the receiving location for the moved fields. Fields having edit-ids 1, 2, and 3 could be defined as !1-3. The result is the same.

When a single field is copied, there must be room for the start-field symbol and the number of characters in the field. If room is available, the end-field symbol is added.

When a range of fields is specified, PDF/CICS checks for adjacent and non-adjacent fields.

- Adjacent fields have no intervening spaces (e.g., ^field1^field2^field3). Adjacent fields are considered to be related to one another; therefore, they are copied or moved together as designated at the original location including end-field symbols as specified.

- Non-adjacent fields have intervening positions (e.g., ^field1; ^field2; ^field3). Non-adjacent fields are treated as unrelated individual fields. The start-field symbol and the characters that comprise the field are copied. The end-field symbol is not included.

Whether adjacent or non-adjacent, an end-field symbol is always included in the total number of empty spaces needed for a field. In other words, space is required for the length of the field and the length of the end field symbol.

Although a field can be moved to only one location, a field can be copied to multiple locations by specifying the same edit-id for more than one destination-field symbol. For example, on the following layout the heading QTY is to be copied at three locations. The edit-ID 1 is added for clarity but is not required since the field being copied is the only marked field.

```
=>

 ---------------------------------------------------------------- >>>
 PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

  Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
 ....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
 ================================  T O P  ==================================


        ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


        ^CUSTOMER NAME ^_____________________________________________;
        ^PHONE NUMBER^____^_________;


        ^CREDIT CARD NUMBER ^_____________________________;


        ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

        ^______; ^________; ^_______________________________; ^_______;


        !1     !1     !1


 ============================  B O T T O M  ============================>
```

Figure 34. Specifying Multiple Destinations for one Edit-Id

The resulting panel layout is:

```
=>

------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ================================


       ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;
       ^PHONE NUMBER^____^_________;


       ^CREDIT CARD NUMBER ^_____________________________;


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^_________; ^_____________________________; ^_______;


       ^QTY.; ^QTY.; ^QTY.;


============================  B O T T O M  ============================>
```

Figure 35. Result of Copying to Multiple Destinations

Pending Operations

If PDF/CICS cannot successfully process all move and copy operations, none of the operations are performed. These operations are pending. Any terminal editing and any new, repeat, or delete operations provided by the field symbols are performed. An unsuccessful copy or move operation results when a destination is not provided for every field marked for relocation, when a marked field is not provided for every destination edit-id, or when a field to be copied or moved does not fit at the new location.

In the figure below, PDF/CICS displays a message noting the pending operations. Each operation is distinguished by the defined function symbol. On the following panel layout, a move operation has been specified for the field following CREDIT CARD NUMBER. It is assigned edit-id 1. A destination has not been specified for the field. A destination, under the field CREDIT CARD NUMBER, is pending for a field to be defined as edit-id 2. As a result, the operations cannot be performed. The pending message is displayed and the symbols are retained as specified on the layout. The cursor is placed on the first incomplete operation specification (e.g., copy-symbol or move-symbol lacking a destination or destination symbol lacking a copy or move designation).

```
=>

---------------------------------------------------------------------- >>>
PDF/CICS: PANEL LAYOUT BLANK  PNL ORDSYS LIB: BMSPANEL  SYS: BMS  FILL-IN
Pending: ¢(1) !(2)

 Start ^   End ;   New +    Del *   Move ¢   Copy >   Dest !    Width  80
....+....1....+....2....+...3...+....4....+...5...+....6...+...7....+....
================================  T O P  ==================================

        ^ORDER NUMBER^________ ^CUSTOMER NUMBER^______^ ORDER DATE ^______;


       ^CUSTOMER NAME ^_____________________________________________;
       ^PHONE NUMBER^____^_________;


       ^CREDIT CARD NUMBER ^_____________________________;
                           !2


       ^QTY.;   ^ITEM #;   ^ITEM DESCRIPTION;          ^PRICE;

       ^______; ^________; ^_____________________________; ^_______;



============================  B O T T O M  ============================>
```

Figure 36. Pending Message on Layout Fill-in

The pending message will list all pending copy, move and destination field specifications. The following sample pending message contains examples of the different ways the edit-id can be designated.

PENDING: >(1) ¢(2,3,9) !(4,5-8,9)

This message indicates that the following are pending:

- Move of field edit-id 1.
- Copy of fields edit-id 2, 3, and 9.
- Destination marked for edit-id 4 and the range 5-8. Edit-id 5-8 will be placed consecutively at the same location.
- Copy of field edit-id 9 is pending only because the other operations are pending.

The copy and move functions are always re-evaluated and the pending message revised each time the panel is transmitted. The primary commands, the new, repeat, and delete-field operation symbol, and the hardware editing functions are performed while pending operations exist. The pending message is removed once all of the move and copy operations can be successfully performed.

The pending state can be useful. For example, INPUT can insert lines in the layout to be designated as the destination of a move or copy function. It is also useful when editing panels that are larger than the current display screen.

Pending functions are maintained for the current PDF session. The other PDF prompt and fill-in panels can be accessed and the pending functions are maintained and redisplayed upon return to the layout.

Resetting

Any individual pending move or copy operation can be changed or cancelled by overtyping the field symbol in the layout area. Individual destination locations can be respecified also by overtyping. The RESET primary command is used to cancel all pending move and copy operations. That means all specified move and copy field symbols are replaced by the start-field symbol and all destination field symbols are removed from the layout. The pending message is removed. Any other editing is performed.

3.4.7 Error Handling

When an error occurs in the editing process of the panel layout, PDF displays an appropriate message on the message line. The line containing the error is highlighted. The cursor is positioned to the field in error. No changes will be applied to the panel. However, the pending line will be updated. Possible errors include:

- Deleting or overtyping a start-field symbol but not the entire field.
- Overtyping a valid field symbol with an invalid symbol.
- Attempting to add a field without starting it with a new-field symbol.
- Attempting to insert a field by a copy or move operation that cannot fit at the destination.
- Attempting to use a current panel-field symbol as text in a panel-field.

Once the error is resolved, processing continues.

3.5 Printing a Panel Definition

The PRINT command or equivalent PRINT prompter is used to print a specific panel definition. The PRINT prompter is accessed either by selecting option 7 on the PDF/CICS Main Menu or by issuing a PRINT command. Alternatively, panels can be printed from the DISPLAY INDEX PANEL display with the print subcommand. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of these commands.

3.6 Deleting a Panel Definition

The DELETE command or equivalent DELETE prompter is used to delete a panel definition. The DELETE prompter is accessed by selecting option 3 on the PDF/CICS Main Menu or by issuing the DELETE PANEL command. Alternatively, panels can be deleted from the DISPLAY INDEX PANEL display with the delete subcommand. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of these commands.

3.7 Renaming a Panel Definition

The RENAME command or equivalent RENAME prompter is used to rename a panel definition. The RENAME prompter is accessed by selecting option 5 on the PDF/CICS Main Menu or by issuing the RENAME PANEL command.

Panels from another system and/or library can be renamed by specifying the SYSTEM and/or LIBRARY operands. Without these operands, the panel is renamed in the current system and library. When renaming a panel from another system, the newly named panel is placed in the current system.

Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of this command.

3.8 Generating CICS BMS Source

The GENERATE command or equivalent GENERATE prompter is used to generate BMS macro source. The GENERATE prompter is accessed by selecting option 6 on the PDF/CICS Main Menu or by issuing the GENERATE command. Alternatively, panels can be generated from the DISPLAY INDEX PANEL display with the generate subcommand. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of these commands.

The GENERATE command uses an existing panel definition as input. The panel definition must contain at least one field. The output of the GENERATE command is a PDF/CICS member or a CA ROSCOE member, depending on the SET GENERATE DESTINATION command setting (see the *Panel Definition Facility Command Reference Manual* for details on this command). The panel name is used as the member name, unless a new member name is specified on the GENERATE command. Note that an existing, like-named member will be replaced by the GENERATE command.

The member will contain the BMS macros in the following format:

- The title card with the panel name, date, and time of generation. The date format is controlled by SET CMD DATEFOR.
- The DFHMSD macro for the panelset. The panel name is used as the macro label.
- The DFHMDI macro for the panel. The panel name is used as the macro label. PNL PARAMETER provides data for macro variable data and may be overridden by SET GEN.
- A DFHMDF macro for each field in the panel. The field name is used as the macro label. If the field has no name, no label is generated. Data is supplied through the command format shown below.

  Format:

```
PNL { SUMMARY }
    { PIC     }
```

- The DFHMSD TYPE=FINAL macro.

The following partial figure contains the BMS macro source generated for the sample panel used throughout this manual.

```
=>

------------------------------------------------------------------------------
PDF/CICS: DISPLAY MEMBER      MEM FRC.ORDSYS                  SYS: BMS  FILL-IN

Command....+....1....+....2....+....3....+....4....+....5....+....6....+....7..
====== ================================ T O P ================================
000100  TITLE 'BMS DSECT FOR PANEL ORDSYS  GENERATED ON 01/17/92 AT 16:20'
000200 ORDSYS   DFHMSD TYPE=DSECT,                                           X
000300               TERM=3270,                                              X
000400               LANG=COBOL,                                             X
000500               MODE=INOUT,                                             X
000600               STORAGE=AUTO
000700 ORDSYS   DFHMDI COLOR=BLUE,                                           X
000800               DSATTS=(COLOR,HILIGHT,PS,VALIDN,OUTLINE,SOSI,TRANSP),   X
000900               MAPATTS=(COLOR,HILIGHT,PS,VALIDN,OUTLINE,SOSI,TRANSP),  X
001000               SIZE=(15,80),                                           X
001100               TIOAPFX=YES
001200 ORDER#   DFHMDF POS=(4,11),                                           X
001300               LENGTH=7,                                               X
001400               INITIAL='ORDER #',                                      X
001500               ATTRB=(PROT,ASKIP,NORM)
   D
   D
   D
   D
   D
   D
   D
010800 PRICINP  DFHMDF POS=(15,59),                                          X
010900               LENGTH=7,                                               X
011000               INITIAL='_______',                                      X
011100               ATTRB=(UNPROT,NUM,NORM),                                X
011200               VALIDN=(MUSTENTER)
011300          DFHMDF POS=(15,67),                                          X
011400               ATTRB=(PROT,ASKIP,NORM)
011500          DFHMSD TYPE=FINAL
011600          END
====== ============================ B O T T O M ============================
```

Figure 37. Generated BMS Macro Source

Values on the panel parameter fill-in are either set explicitly by the user or obtained from the SET PANEL and/or SET GENERATE settings current when the panel was created. For more information on the SET PANEL and SET GENERATE commands, see the *Panel Definition Facility Command Reference Manual*.

Once the BMS macro source has been generated, the member is ready for assembly and link edit. There are a number of ways to accomplish this:

- The member can be submitted with leading and trailing JCL members using the PDF/CICS SUBMIT command. The following command submits three members in order to create a complete job stream:

```
SUBMIT LEADJCL ORDSYS TRAILJCL
```

- The member can be edited to include the appropriate JCL and then submitted.
- The member can be exported to another system for execution.
- A member containing PDF/CICS commands can be executed to perform the generate, edit, and submit of the BMS macro member. This can be demonstrated by using three members: LEADJCL, TRAILJCL, and GENJOB. Examples for MVS and VSE are given below.

MVS Example

Member LEADJCL contains the following JCL:

```
//BMSMAP    JOB
//STEP1     EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSUT2    DD DSN=&&TEMPM,DISP=(NEW,PASS),UNIT=SYSDA,
//             SPACE=(TRK,(5,5)),
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//SYSIN     DD DUMMY
//SYSUT1    DD *
```

Member TRAILJCL contains the following JCL:

```
/*
//ASMMAP   EXEC PGM=IEV90,REGION=4000K,TIME=(1,0),COND=(0,NE),
//              PARM=('LIST,XREF(FULL),ALIGN',
//              'DECK,SYSPARM(MAP)')
//SYSLIB   DD DSN=CICS170B.MACLIB,DISP=SHR
//         DD DSN=SYS1.MACLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSUT2   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSUT3   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSPUNCH DD DSN=&&ASM,DISP=(,PASS),UNIT=SYSDA,
//            SPACE=(CYL,(1,1)),
//            DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
```

```
//SYSIN    DD DSN=&&TEMPM,DISP=(OLD,PASS)
//*
//LINKEDIT EXEC PGM=IEWL,COND=(7,LT),
//              PARM=(XREF,LIST,MAP,RENT)
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSPRINT DD SYSOUT=*
//SYSLIN   DD DSN=&&ASM,DISP=OLD
//SYSLMOD  DD DSN=your.load.library (+++++++),DISP=SHR
//*
//ASMDSECT EXEC PGM=IEV90,REGION=4000K,TIME=(1,0),COND=(7,LT),
//              PARM=('LIST,XREF(FULL),ALIGN',
//              'DECK,SYSPARM(DSECT)')
//SYSLIB   DD DSN=CICS170B.MACLIB,DISP=SHR
//         DD DSN=SYS1.MACLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSUT2   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSUT3   DD UNIT=SYSDA,SPACE=(CYL,(1,1))
//SYSPUNCH DD DSN=your.caicics.library(+++++++),DISP=SHR
//SYSIN    DD DSN=&&TEMPM,DISP=(OLD,DELETE)
//
```

Member GENJOB contains the following PDF/CICS commands:

```
GENERATE PANEL ORDSYS
EDIT MEMBER ORDSYS
COPY MEMBER LEADJCL TOP
COPY MEMBER TRAILJCL BOT
CHANGE /+++++++/ORDSYS/
SUBMIT ORDSYS
```

VSE Example

Member LEADJCL contains the following JCL:

```
// JOB BMSMAP
// EXEC LIBR
ACCESS SUBLIB=lib.sublib
CATALOG +++++++.A REPLACE=YES
```

Member TRAILJCL contains the following JCL:

```
/+
/*
// LIBDEF *,SEARCH=lib.sublib,CATALOG=lib.sublib
// OPTION CATAL,NODECK,SYSPARM='MAP',ALIGN
   PHASE +++++++,*
// EXEC ASSEMBLY
         PRINT NOGEN
         COPY +++++++
         END
/*
// EXEC LNKEDT
/*
// OPTION DECK,SYSPARM='DSECT'
// DLBL IJSYSPH,'BMS.TEMP.SOURCE',0,SD
// EXTENT SYSPCH,vvvvvv,1,0,nn,nn
   ASSGN SYSPCH,DISK,VOL=vvvvvv,SHR
// EXEC ASSEMBLY
         PUNCH ' ACCESS SUBLIB=lib.sublib'
         PUNCH ' CATALOG +++++++.C REPLACE=YES'
         COPY +++++++
         END
/*
 CLOSE SYSPCH,PUNCH
// DLBL IJSYSIN,'BMS.TEMP.SOURCE',0,SD
// EXTENT SYSIPT,vvvvvv
   ASSGN SYSIPT,DISK,VOL=vvvvvv,SHR
// EXEC LIBR
/*
 CLOSE SYSIPT,SYSRDR
/*
/&
* $$ EOJ
```

Member GENJOB contains the following PDF/CICS commands:

```
GENERATE PANEL ORDSYS
EDIT MEMBER ORDSYS
COPY MEMBER LEADJCL TOP
COPY MEMBER TRAILJCL BOT
CHANGE /+++++++/ORDSYS/
SUBMIT ORDSYS
```

The command EXECUTE GENJOB will execute member GENJOB, which will generate panel definition ORDSYS, edit the resulting BMS source member, copy LEADJCL to the top of the member and TRAILJCL to the bottom, change the occurrence of character string +++++++ to ORDSYS, and finally, submit the job.

3.9 Duplicating a Panel Definition

The DUPLICATE command or equivalent DUPLICATE prompter is used to copy an existing panel definition to a new panel definition. The DUPLICATE prompter is accessed either by selecting option 4 on the PDF/CICS Main Menu or by issuing the DUPLICATE command. Refer to the *Command Reference Manual* for a description and the syntax of the command. Panels from another system and/or library can be duplicated by specifying the SYSTEM or LIBRARY operands. Without these operands, the panel is duplicated from the current system and library.

After DUPLICATE has been performed successfully, the new panel definition becomes the current definition, and the user is presented with the panel identification fill-in. The content of the newly created panel is identical to the original panel, only with a new name, and is presented for modification.

3.10 Displaying a Panel Definition Index

The DISPLAY INDEX command or equivalent DISPLAY INDEX prompter is used to display the name, description, creation date, update date, and the number of blocks for each panel definition. The index can be generated for all panels in the current system in the current library. Additionally, panels can be processed from the DISPLAY INDEX panel list. The following subcommands are supported by the DISPLAY INDEX panel display:

DEL, DELETE
DIS, DISPLAy
EDI, EDIT
GEN
PRI, PRINT
* (to position the display)

For further information about the DISPLAY INDEX command, refer to the *Panel Definition Facility Command Reference Manual*.

3.11 PF and PA Key Assignments

This section contains a brief description of PDF/CICS commands which have PF key assignments and PDF/CICS functions that have PA assignments. A complete description of all PDF/CICS editing commands is contained in the *Panel Definition Facility Command Reference Manual*.

In the following chart, commands in **bold** are assignments consistent throughout all facilities of PDF/CICS. The other assignments shown are in effect while displaying/editing panels definitions.

DISPLAY PF/PA SETTINGS (PA1)	**REFRESH SCREEN** (PA2)	
HELP (PF1/13)	**RETURN** (PF2/14)	**PRINT SCREEN** (PF3/15)
PREVIOUS (PF4/16)	**NEXT** (PF5/17)	LAYOUT (PF6) NULL/BLANKFILL (PF18)
SCROLL BACKWARD (PF7/19)	**SCROLL FORWARD** (PF8/20)	SUMMARY (PF9/21)
SCROLL TOP (PF10/22)	**SCROLL BOTTOM** (PF11/23)	**INPUT** (PF12/24)

Figure 38. PF Key Assignments

HELP
Displays a panel or series of panels that contain information to explain how to complete the current function.

RETURN
Returns from a help panel to the program component display or from the program to the menu used to select the program.

PRINT SCREEN
Generates a hardcopy printout of the current screen contents.

PREVIOUS
Displays the extended field definition for the field that precedes the current extended field definition position.

NEXT
Displays the extended field definition for the field that follows the current extended field definition position.

LAYOUT
Displays the panel layout.

NULLFILL/BLANKFILL
During panel layout editing, switches the fill-mode between blank-fill and null-fill.

SCROLL BACKWARD
Displays the previous frame within the current component.

SCROLL FORWARD
Displays the next frame within the current component.

SUMMARY
Displays the field summary table.

SCROLL TOP
Positions to the first line of the component.

SCROLL BOTTOM
Positions to the bottom of the component.

INPUT
Opens a window of null lines preceding the first line of the component or at the current cursor position. Unused null lines in the window are deleted when the ENTER key is pressed after INPUT.

PA1
Refreshes the screen with the data as it originally appeared before data was entered for the current transaction.

PA2
Displays the current PF/PA settings.

4. Creating and Maintaining Members

This section describes how to create, display, edit, delete, duplicate, print, and rename PDF/CICS members and how to display a member index.

4.1 Creating a Member

Any data that can be stored in an 80-byte record can be stored in a PDF/CICS member. A member can be created in one of two ways:

- Manually, using the CREATE MEMBER command or equivalent prompter. This method requires that the user provide the data records, member name, and optional member description.

- Automatically by the GENERATE command. The generate command uses an existing panel definition as input to generate BMS map source. The resulting map source is stored in a newly created member. PDF/CICS uses the panel name as the member name (unless a new name is specified) and provides a generic member description.

To access the CREATE prompter, select option 2 on the PDF/CICS Main Menu.

A member name can be 1- to 8-characters in length. Once a member name has been specified, the member is created and editing can begin. The ALTER MEMBER command is used to provide a new description or change an existing description for a member. For more information on the CREATE MEMBER and ALTER MEMBER commands, see the *Panel Definition Facility Command Reference Manual*.

4.2 Editing and Displaying a Member

The DISPLAY/EDIT command or equivalent DISPLAY/EDIT prompter is used to display or edit an existing member and to make it current. DISPLAY/EDIT prompter is accessed by one of the following methods:

- Selecting option 1 on the PDF Main Menu
- Issuing the EDIT MEMBER command to edit the member
- Issuing the DISPLAY MEMBER command to display the member.

Alternatively, members can be displayed and edited from the DISPLAY INDEX MEMBER display with the display or edit subcommand. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of this command.

PDF/CICS offers a full-screen editor and the ability to customize your edit session via the SET EDIT command.

See the *Panel Definition Facility Command Reference Manual* chapter entitled Editing Commands for a detailed discussion of editing a member in PDF/CICS.

4.3 Deleting a Member

The DELETE command or equivalent DELETE prompter is used to delete a member. The DELETE prompter is accessed by selecting option 3 on the PDF/CICS Main Menu or by issuing the DELETE MEMBER command. Alternatively, members can be deleted from the DISPLAY INDEX MEMBER display with the delete subcommand. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of these commands.

4.4 Duplicating a Member

The DUPLICATE command or equivalent DUPLICATE prompter is used to copy an existing member to a new member. The DUPLICATE prompter is accessed either by selecting option 4 on the PDF/CICS Main Menu or by issuing the DUPLICATE command. Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of the command.

After the DUPLICATE has been performed successfully, the new member becomes the current member and is presented for modification. The content and description of the newly created member is identical to the original member.

4.5 Renaming a Member

The RENAME command or equivalent RENAME prompter is used to rename a member. The RENAME prompter is accessed by selecting option 5 on the PDF/CICS Main Menu or by issuing the RENAME MEMBER command.

A member description can be provided for the renamed member.

Refer to the *Panel Definition Facility Command Reference Manual* for a description and the syntax of this command.

4.6 Displaying a Member Index

The DISPLAY INDEX command or equivalent DISPLAY INDEX prompter is used to display the name, description, creation date, update date, and number of records for each member. The index can be generated for the current user (the default), another user, or all users. Additionally, members can be processed from the DISPLAY INDEX member list. The following subcommands are supported by the DISPLAY INDEX MEMBER display:

DEL, DELETE
DIS, DISPLAy
EDI, EDIT
PRI, PRINT
SUB, SUBMIT
* (to position the display)

For further information about the DISPLAY INDEX command, refer to the *Panel Definition Facility Command Reference Manual*.

4.7 Submitting a Member

The SUBMIT command or equivalent SUBMIT prompter is used to submit one or more members for execution. Up to eight members can be specified to create a single job stream.

In an MVS system, the first (or only) member being submitted must contain a valid MVS JCL JOB statement as its first record.

4.8 Printing a Member

The PRINT command or equivalent PRINT prompter is used to print a specific member. The PRINT prompter is accessed either by selecting option 7 on the PDF/CICS Main Menu or by issuing a PRINT command. Alternatively, members can be printed from the DISPLAY INDEX MEMBER display with the print subcommand. Refer to the *Panel Facility Command Reference Manual* for a description and the syntax of these commands.

4.9 PF and PA Key Assignments

This section contains a brief description of PDF/CICS commands which have PF key assignments and PDF/CICS functions that have PA key assignments. A complete description of all PDF/CICS editing commands is contained in the *Panel Definition Facility Command Reference Manual*.

In the following chart, commands in **bold** are assignments consistent throughout all facilities of PDF/CICS. The other assignments shown are in effect while editing/displaying members.

DISPLAY PF/PA SETTINGS (PA1)	**REFRESH SCREEN** (PA2)	
HELP (PF1/13)	**RETURN** (PF2/14)	**PRINT SCREEN** (PF3/15)
PREVIOUS (PF4/16)	**NEXT** (PF5/17)	(not set) (PF6/18)
SCROLL BACKWARD (PF7/19)	**SCROLL FORWARD** (PF8/20)	FIND (PF9/21)
SCROLL TOP (PF10/22)	**SCROLL BOTTOM** (PF11/23)	INPUT (PF12/24)

Figure 39. PF/PA Key Assignments

HELP
Displays a panel or series of panels that contain information to explain how to complete the current function.

RETURN
Returns from a help panel to the program component display or from the program to the menu used to select the program.

PRINT SCREEN
Generates a hardcopy printout of the current screen contents.

PREVIOUS
Displays the previous occurrence of the current FIND string.

NEXT
Displays the next occurrence of the current FIND string.

SCROLL BACKWARD
Displays the previous frame within the current component.

SCROLL FORWARD
Displays the next frame within the current component.

FIND
Locates the next occurrence of a previously located string.

SCROLL TOP

Positions to the first line of the component.

SCROLL BOTTOM

Positions to the bottom of the component.

INPUT

Opens a window of null lines preceding the first line of the member or at the current cursor position. Unused null lines in the window are deleted when the ENTER key is pressed after INPUT.

PA1

Refreshes the screen with the data as it originally appeared before data was entered for the current transaction.

PA2

Displays the current PF/PA settings.

5. Problem Determination

This chapter is both a description of problem determination procedures and a reference to tools available for problem determination.

Consult Sections 5.4 through 5.7 for the syntax and function of various facilities and commands. You can use some of these on your own; others you will use when requested by CA-MetaCOBOL+ Support.

When contacting CA-MetaCOBOL+ Support, have this manual handy so that the support staff can refer to the applicable information in it.

5.1 Problem Determination Overview

This section introduces concepts and descriptions that are essential to effective problem solving. It includes an overview of the PDF/CICS software environment, descriptions of the basic classes of problems, the format of PDF/CICS error messages, and references to non-PDF/CICS problem solving tools.

5.1.1 System Overview

This section describes the PDF/CICS software environment, PDF/CICS's internal software modules, and how PDF/CICS application components are stored in VLS libraries.

The Inter-Product Components (IPCs) provide common functions to PDF/CICS and an interface between PDF/CICS and the external environment. These programs allow PDF/CICS to process user requests and to provide the services requested while remaining independent of the operating system and teleprocessing monitor. The IPCs are described next.

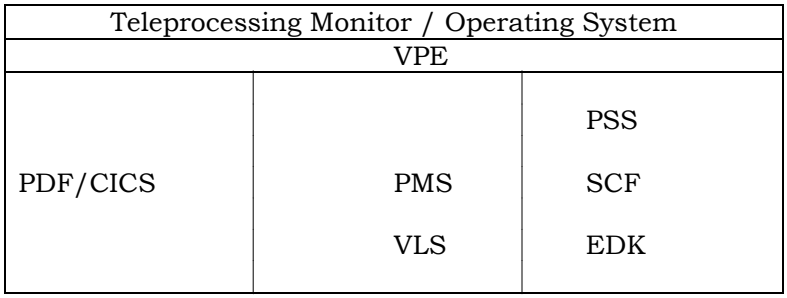

Figure 40. PDF/CICS and the IPCs

VPE

VPE (Virtual Processing Environment) acts as a software interface between PDF/CICS and the teleprocessing monitor, and operating system. All external services required by PDF/CICS are invoked through VPE. Other IPCs also use VPE for their external services.

VPE handles requests for services such as memory management, program management, resource management, I/O services, enqueue/dequeue, and dynamic batch job submission. It handles these requests for service by means of function calls and performs the desired functions according to the rules and syntax of the host environment.

PSS

PSS (Print Subsystem) processes, routes, and manages print requests. PSS handles PDF/CICS commands for maintaining the output library, browsing output, and performing other print services.

PMS

PMS (Panel Management Services) is a set of run-time services for acquiring, sending, receiving, and managing 327x-type terminal messages. PMS validates date/time stamps and checks input fields for violations of panel edit rules. PMS supports both PDF/CICS product panels and panels developed using PDF.

SCF

SCF (Session Control Facility) handles user requests, whether from an online terminal session or from a PDF/CICS batch session. SCF provides PDF/CICS sign-on processing, handles network printing and processes commands such as SPLIT, COMBINE, SCROLL, HELP, and RETURN.

SCF also acts as a command dispatcher, managing PDF/CICS menus, commands, and PF/PA keys; separating commands; and passing commands to the appropriate PDF/CICS module for further analysis.

VLS

VLS (Virtual Library System) uses the basic I/O services of VPE to store, retrieve, and modify data in both online and batch environments.

There are two types of VLS library members. Record members are used to store source data in source libraries and output in the output library. Block data members are used to store variable-length data in panel libraries.

Any number of VLS libraries may exist. However, VLS does not support concatenated libraries. PDF/CICS itself requires at least five VLS libraries:

- ADRLIB -- PDF/CICS control information, master JOBCARD, user JOBCARDS, and system messages.
- ADRPNL -- PDF/CICS and IPC product panels and session options.
- ADROUT -- The output library.
- PDDAT -- Data member library.
- User panel libraries (the default is MCT$PNL).

A site can define additional panel libraries.

In addition to being used directly by PDF/CICS and the IPCs, VLS has a batch utility for library maintenance (VLSUTIL). For information on its use, see the *CAIIPC Customization and Tuning Guide*.

EDK

The editor kernel maps fill-in panels to VLS members, providing editing commands and checkpoint/rollback functions.

5.1.2 PDF/CICS Internals

This section outlines the PDF/CICS internal modules and describes how components of PDF/CICS applications are stored.

PDF/CICS Modules

PDF/CICS is comprised of a number of Assembler modules, falling into the following categories:

- Online Services

  These panels and processors are used to create and maintain user and system definitions and to process commands such as DISPLAY INDEX, CREATE, DELETE, DUPLICATE, GENERATE, PRINT, DISPLAY, and SUBMIT.

- Editors

  There is a separate editor or processor in PDF/CICS for each PDF/CICS component. (Refer to the next section.)

Entities and VLS

PDF/CICS entities (data members and panels) are stored on a VLS library. See Section 5.6 for descriptions of VLS member name formats and details of how PDF/CICS commands affect VLS members.

VLS members for PDF/CICS entities are created at various times during the development process.

Data members are stored in the VLS library PDDAT.

Panels are stored as VLS members. A VLS member is added to the panel library for the panel layout, summary data, extended field definitions, picture, and facsimile. This member contains all of these panel components.

5.1.3 Categories of Problems

This section describes the basic categories of problems that may be encountered while in PDF/CICS. Understanding these categories is useful in identifying problems and in communicating them to CA-MetaCOBOL+ Support.

CICS or Operating System Crash

An abnormal end that brings down CICS or the operating system, including PDF/CICS and any other transactions currently active. CICS or system dumps in various formats can be produced.

Transaction Abend/Batch Abend

An abnormal end by CICS or the operating system that affects only a PDF/CICS transaction.

A CICS transaction abend encountered while PDF/CICS is executing is intercepted by VPE, and control is returned to CICS. VPE produces an edited dump. CICS produces a dump, and CICS statistics are produced at shut down.

A batch transaction abend returns control to the operating system and displays an MVS or VSE error message.

Common abends are:

CICS Abend Code	MVS Batch Abend Code	VSE Batch Msg. No.	Cause
ATNI ATCH	S222, S122	N/A	Program cancelled by operator console, master terminal, or DFHNEP.
AICA	S322, S522	N/A	Runaway task due to: a) exceeding time limit parameter ICVR in SIT table (DFHSIT); b) program loop; c) exceeding system default for CPU usage.
APCT	S806	0S05I	Program not found due to: a) program not in PPT; b) program not in the load library; c) program disabled. Causes include a user subprogram call with the subprogram not found in the STEPLIB/LIBDEF, DFHPPT, or DFHRPL.
ASRA	S0C1...S0CF	0S03I	Most other abends. Causes include misapplied zaps, a problem with a call to a non-PDF/CICS subprogram, or a PDF/CICS or CICS temp storage bug. A S0C3 results from executing a PDF/CICS load module.

CICS Abend Code	MVS Batch Abend Code	VSE Batch Msg. No.	Cause
ASPD	N/A ASPE	N/A	DTB=YES was not coded in PCT at site using VSAM, DB2, or DATACOM/DB SQL. All transactions at the site must be coded with DTB=YES in PCT, even if they do not use those access methods. ASPD occurs with PDF/CICS CHECKPOINT command; ASPE occurs with PDF/CICS ROLLBACK.
AFCA	N/A	N/A	Transaction has attempted to access a disabled CICS data set.
APCP or	N/A	N/A	MVS only. Can occur if zap libraries are updated while CICS is running and one more libraries add extents.

Internal Error

An unexpected result produced by a PDF/CICS or IPC process. Most internal error messages contain the identifier INTERR. PDF/CICS or the IPC keeps control and produces an ADRLOG entry. Online, ADRLOG is printed when the teleprocessing monitor comes down, and a panel containing information about the error can be displayed using the PDF/CICS command DISPLAY ERROR. See the DISPLAY ERROR Facility in Section 5.4.1. In batch, ADRLOG is printed when the batch job ends.

5.1.4 PDF/CICS Messages

PDF/CICS produces messages to assist the user. Some of these messages are issued when the user has made an error, some are produced when PDF/CICS requires some response from the user, and some messages simply provide information about the activity the user has performed.

PDF/CICS messages can be issued in a variety of places. Many messages appear on the message line of the terminal screen. However, messages can appear in other places as well. If an error occurs during signon, a message will appear in the top line of the signon screen. Messages also are recorded in ADRLOG, and can be viewed as the result of a DISPLAY ERROR command, or as the result @I$TRACE PRINT command.

Error Message Format

The numbers that identify PDF/CICS error messages are displayed in the following format:

#t-r-ppxxxxxxxxs - text

#t
For messages generated by an asynchronous task only (network print), the asynchronous task number. For all other types of messages, these positions are omitted.

r
The region number (on the display screen) to which the message applies.

pp
The product code. This is either "MC" for CA-MetaCOBOL+ PDF/CICS, "IC" for IPC components, or "SC" for SCF (Session Control Facility).

xxxxxxxxx
The error message identification. This information is extremely important because it uniquely identifies the error message. Note that Several messages can be issued with similar text and are distinguishable only by their identification.

s
The message severity code, as follows:

E (ERROR)
An error that does not terminate processing has occurred.

F (FATAL)
An error that terminates processing has occurred.

I (INFORMATION)
Informational message only -- no action is required.

W (WARNING)
A condition has been detected which may lead to incorrect or unexpected results.

text
the message description.

Example:

In the following error message,

```
      #1-2-ICPDXPOP03I - Command successfully processed output
number = 473
```

"**#1**"
Indicates that the message was generated from asynchronous task number 1;

"**2**"
Indicates display region number 2 on the terminal;

"**IC**"
Indicates that IPC is the product in control;

"**ICPDXPOP03**"
Is the message identification; and

"**I**" ("INFORMATION") is the severity level.

Note: If the text of an error message includes the keyword "INTERR" (internal error), this indicates an internal system error, and additional diagnostic actions are taken by PDF/CICS. See Section 5.1.3, "Categories of Problems," and Section 5.4.1, "DISPLAY ERROR Facility."

For complete descriptions of all PDF/CICS error messages, see the *Panel Definition Facility Command Reference Manual*.

5.1.5 CICS Debugging Aids

Problems encountered when PDF/CICS is running under CICS may be traceable to CICS itself. Among the diagnostic aids available to the CICS programmer are the following.

CICS can experience two types of abnormal ends--abends that affect one transaction and abends that affect CICS itself. Terminal messages produced by CICS following a transaction abend start with a standard message identifier in the following format:

DFHccnn

where **cc** is the component code and **nn** is a two-digit identifier.
For example:

DFH0506 - CICS IS UNDER STRESS - SHORT ON STORAGE

Messages are explained in CICS *Messages and Codes*. CICS transaction and system dumps should be produced for use in the debugging process. The CSMT Log, produced when CICS is brought down, may also be useful.

The CICS Statistics Report is produced when CICS is brought down. Statistics shown include task control, storage, transactions, programs, dumps, and temporary storage. This report can be valuable in identifying what happened to CICS when a problem was encountered.

For further information, see the CICS *Problem Determination Guide*.

5.2 Strategies for Problem Management

This section describes procedures for preventing, analyzing, and reporting problems.

5.2.1 Maintenance

Applying CA-MetaCOBOL+ maintenance tapes when they are issued can prevent many problems. Maintenance tapes are issued periodically by the CA-MetaCOBOL+ support staff to CA-MetaCOBOL+ customers who have service contracts.

5.2.2 Defining Problems

This is a description of the steps that you should take toward resolving problems encountered with PDF/CICS. Before contacting CA, perform the steps that are appropriate to the problem.

Describing the Problem

Quite often, simply producing an accurate description of the problem is sufficient for you to resolve the problem. This section provides suggestions on the type of questions you should ask in order to produce an accurate description of the problem.

Observe the problem.

- How often does the problem occur?
- Can the problem be recreated? If so, how?
- Can the problem be recreated in both the batch and online environments?
- Is an error message associated with the problem? If so what kind of message is it (PDF/CICS, CICS terminal message, CICS console message, MVS, VSE)?

  What is the exact message identifier? What is the exact text of the message?
- Does the error message text contain the word INTERR? If so, what is the internal error information? Use the DISPLAY ERROR command described in Section 5.4.1, "Internal Error."
- Does the PDF/CICS task terminate? What is the abend code (system or user)? In which module (load or core-image) did the abend occur, and what is the offset?
- Does the PDF/CICS task appear to be in a loop? In a wait state? Active or suspended?
- What sequence of events led up to the problem? What was the last PDF/CICS command?

Associate the problem with a cause.

- When was the last time the software worked properly?
- Have any new applications been put into production?
- Has there been a change to the operating system or hardware?
- Have all PDF/CICS solutions for the current release been applied? If not, which ones have not been applied?
- Has a new PDF/CICS release, component, or maintenance change been applied (including an InfoCAI tape or individual solution)?

Classifying the Problem

When you report a problem to CA, you can assign a severity code. The severity determines the order in which CA processes the incoming issues. The possible values are:

Severity	Meaning
1	Production system down, or major business impact.
2	Major component non-functional (for example: compiles, prints, etc.), or serious business impact.
3	Minor component non-functional (for example, you cannot compile a specific program), or moderate business impact.
4	Question or problem for which you have found a work-around.

Everyone benefits from a priority system. Therefore, it is important that you do not overestimate or underestimate the severity of a problem. If you are not sure what the severity should be, discuss the situation with the CA representative you contact. The general rule is that the severity should reflect the impact of the problem on your enterprise. Note that if you do not assign a severity, and if you do not discuss it with the CA contact person, a default severity of 4 is assigned.

You may change the severity of an issue at any time. If, for example, you originally reported a severity 3, but an approaching deadline makes the problem more urgent a few days later, request that the CA contact person raise the severity to an appropriate level.

Documenting the Problem

Before contacting CA, you should assemble the following information:

User Information:

Date:_____

Contact #_____ (will be supplied by CA Support)

Company Name_____

Company ID_____

Contact_____ (person reporting problem)

Phone ( )_____

Releases: Release and maintenance level of the following:

Operating System_____ Level_____

CICS_____ Level_____

TSO_____

CA ROSCOE_____

CA VOLLIE_____

DSGEN_____

IPC_____

PDF/CICS_____

InfoCAI Tape #_____ (most recent tape applied)

CA DATACOM/DB_____

DB2_____

CA DATADICTIONARY_____

VSAM_____

Documentation: (dump, trace, compile listing, etc.)

A._____ D._____

B._____ E._____

C._____ F._____

Comments: Any explanations or descriptions that can help in interpreting the documentation.

5.2.3 Reporting Problems to Computer Associates

If you have defined, classified, and documented the problem, and it is still unresolved, contact Computer Associates Support immediately. The product support staffs are often aware of permanent or temporary solutions to known problems which can be given over the telephone. It saves time to call Computer Associates before sending problem documentation to Computer Associates. In any case, do not send problem documentation (dumps, trace output, etc.) to Computer Associates Support until you have been requested to do so.

Calling Support

Customers in the United States and Canada can call the Princeton or Dallas support centers directly. The Princeton support center number for all products is 908-874-9100. The Dallas number is 214-680-8999. In general, if you are sure the problem is related to PDF/CICS or the Inter-Product Components, call CA-MetaCOBOL+ Support at 908-874-9650. If you are sure the problem is related to CA DATACOM/DB or the CA DATADICTIONARY, call the Dallas number. If you are not sure, you can call either number. In any case, Computer Associates will determine the appropriate group, and the problem will be transferred internally.

For U.S. and Canadian customers, when you call Computer Associates Support, the contact operator attempts to connect you immediately with a support technician. If no technician is available at that moment, Computer Associates will call you back as soon as possible, depending on the call load at the time and the severity of your issue.

When you do call Computer Associates Support, please have the PDF/CICS Contact Information Form and all supporting documentation at hand. When you call the Princeton support number, it usually helps to call from a telephone where you have easy access to a terminal, since the support technician may ask you to issue diagnostic commands.

Customers in locations other than the United States and Canada should contact their local Computer Associates representatives.

Here is a summary of what you need when calling Computer Associates Support:

For new issues:

- Contact information, as described in the previous section.
- All supporting documentation.
- Your CA company-id or CA-MetaCOBOL+ contract number (if available).
- A brief description of the problem.

For continuing contact on an existing issue:

- The contact number.
- A brief description of the nature of this call.

StarTrak

Computer Associates uses an online CA IDEAL application called StarTrak for support tracking and problem reporting. When you call Computer Associates for the first time concerning a new issue, you will be given a contact number. This number uniquely identifies the issue you have reported. Any subsequent communication with Computer Associates about that issue (telephone calls, correspondence, dumps, trace output, compile listings, etc.) should be identified with that contact number. Even if the issue was apparently resolved and closed, but reappears (due to incomplete resolution), you should continue to refer to the same contact number. If you call Computer Associates Support about a previously closed issue, StarTrak automatically re-opens the issue.

If at any time you call Computer Associates about a new, previously unreported issue, make sure you request a new contact number. You should never use an existing contact number for a new problem. Following these guidelines enables Computer Associates to give you the best support.

When you do call Computer Associates Support about a new issue, it will be necessary to identify your site to the StarTrak system. The quickest method is to give the contact operator your site ID, or your CA-MetaCOBOL+ contract number. If you do not know either of these, the contact operator will attempt to locate your company name in a CA customer file, but this usually takes longer.

For a new issue, once your site has been identified, the contact operator will ask you for a brief description of the problem. StarTrak can accommodate a 30-character problem title and two lines (66 characters each) of description. This information can be particularly helpful in routing the issue to the appropriate group, and in providing the technician with an initial direction for problem solving.

Keeping the Issue Current

If you obtain new information about an open issue, please call Computer Associates immediately. Reference the issue by contact number, not by the name of the technician with whom you previously spoke. The issue may have been transferred to a different group internally, and a new technician may be responsible. All prior history of the contact is contained in StarTrak under that contact number, so that the new technician has immediate access to it.

In addition, if at any time you need to know the status of the issue, or need to change the severity, call Computer Associates Support. Every customer call is automatically placed on the StarTrak queue as a call that must be answered. Therefore, calls for status or severity change are the best means you have of keeping the problem solving process responsive to your needs.

Sending Problem Documentation

When you are requested to send supporting documentation (dumps, trace listings, compile listings, etc.) for an issue to MetaCOBOL+ Support, please make sure the contact number is written prominently on each separate listing, as well as on the outside of the package. Do not address the package to the technician with whom you spoke.

For the U.S. and Canada, address it to:

Computer Associates
Route 206 and Orchard Rd.
Princeton, NJ 08543

Attn: PCS Desk
Contact #

For customers in other locations, obtain the local mailing address from your Computer Associates representative.

CA-MetaCOBOL+ Support can process dumps on paper, microfiche (not microfilm), and in most cases, magnetic tape. However, before sending a dump on magnetic tape, please discuss with the support technician whether CA-MetaCOBOL+ Support can process the specific format.

If the support technician requests that a dump be submitted, the dump must contain all of the information normally produced by the affected environment with no modifications:

MVS batch: Standard SYSUDUMP DD statement dump.

VSE batch: Standard partition dump.

CICS: A formatted transaction dump is preferred. In some cases, a formatted full partition dump will be requested. Unformatted CICS dumps are acceptable.

In general, however, if the problem (including the abend) can be reproduced in batch, this will speed up the problem resolution process. When requested to send a dump, try to produce the dump in the batch environment if applicable.

Some PDF/CICS customers use ABEND-AID® or similar products to control the size of memory dumps. While in many instances the dumps produced by these products are useful in locating the cause of a problem, they are not suitable for locating the cause of PDF/CICS abends.

Sending a dump that has been edited delays the problem solving process while the necessary information is being obtained.

5.3 PDF/CICS Trace Facility

The PDF/CICS Trace Facility is a debugging aid used to trace the PDF/CICS and IPC components executed when any command is executed in PDF/CICS. The PDF/CICS trace facility is not available under CA ROSCOE.

Under certain circumstances, you will be requested to run a PDF/CICS Trace by MetaCOBOL+ Support. The trace output is used by Support to identify the internal processes that precede or accompany an abend, internal errors, or unexpected results from a PDF/CICS program.

This section describes how to use the PDF/CICS Trace Facility. Topics include:

- Trace Facility Overview
- Executing a VPE Service Trace
- Printing Trace Files
- Trace Examples
- Reading Trace Output
- Printing an Object Module
- JCL Requirements

5.3.1 Trace Facility Overview

The PDF/CICS Trace Facility consists of the VPE service trace (@I$TRACE). This function records all PDF/CICS service routines called and IPC service macros invoked during a specified part of a PDF/CICS session. It generates entries for all PDF/CICS online and batch services requested (except those that invoke asynchronous tasks online). It includes a facility to extract and print selected entries.

The following figures illustrate the data flow of the VPE and Dial traces under MVS and VSE. There are significant differences between the way the traces work online and in batch; these differences are then described.

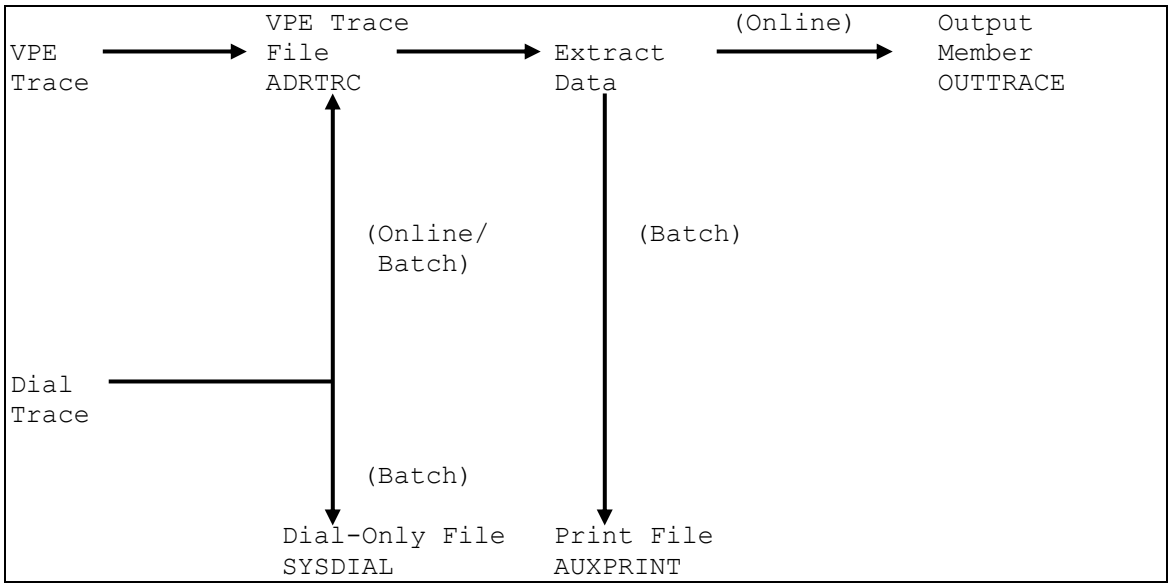

Figure 41. MVS Trace Facility Flow

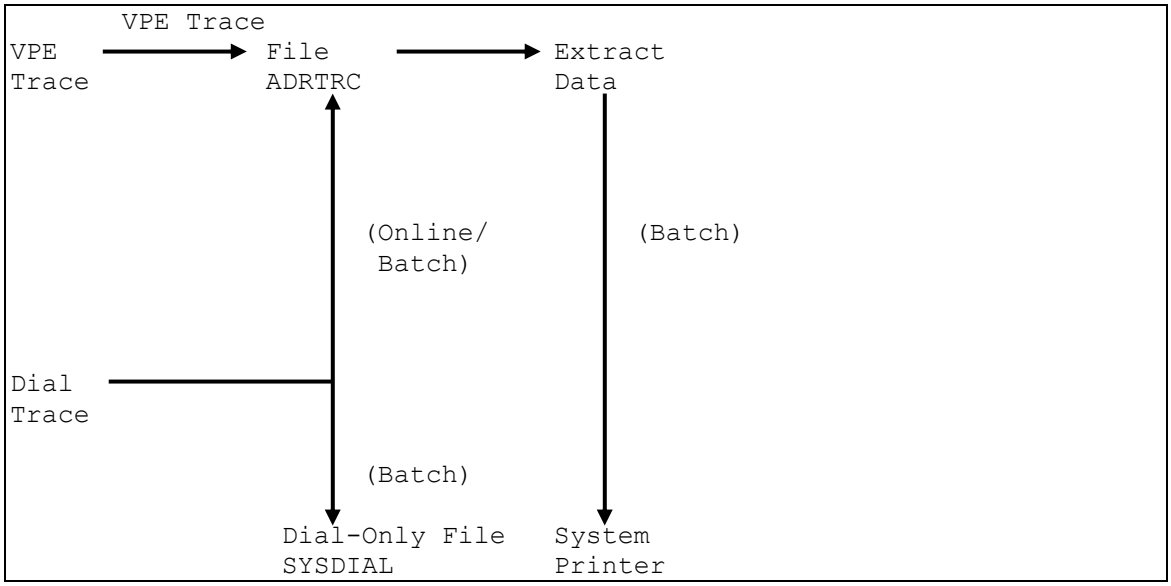

Figure 42. VSE Trace Facility Flow

There is only one VPE trace file for all PDF/CICS users. A trace can be local to a single user or globally include all users, but all traces using a given CICS region share the same file. As in batch, information can be extracted from the VPE trace file selectively (for example, by the function or by the time an error occurred).

Under MVS, extracted information can be printed or displayed online using the PDF/CICS output processor. Under VSE, the trace can be activated online, but trace information can be extracted only in batch.

To minimize the degradation of the online system by traces, they should be run in batch whenever possible.

5.3.2 @I$TRACE -- Executing a VPE Service Trace

The VPE service traces log requests for PDF/CICS online and batch services (both PDF/CICS services and IPC services). The @I$TRACE options to activate or deactivate a VPE service trace, to extract data from the VPE trace file, and to reset the VPE trace file are described in this section.

Format

```
           { {ON }  [LOCAL ] }
           { {OFF}  [GLOBAL] }
@I$TRACE   {                 }
           {  PRINT option   }
           {  RESET          }
```

Activating or Deactivating a VPE Service Trace

The VPE service trace must be activated before any logging will occur. The service trace can be activated for an entire session or any part of a session. Entries are logged until an @I$TRACE OFF or @I$TRACE PRINT command is issued.

The following command activates or deactivates a VPE service trace.

Format

```
           {ON }  [LOCAL ]
@I$TRACE   {OFF}  [GLOBAL]
```

ON

Activates the VPE trace and begins logging entries to a sequential file (installed as ADRTRC).

OFF

Terminates a VPE trace.

LOCAL

(Default) Logs only those entries for the PDF/CICS user requesting the trace. (The user is identified with a particular terminal online or with a particular batch job.) Note that under TSO, there is no distinction between LOCAL and GLOBAL.

GLOBAL

Online, logs entries for all users. Use caution with GLOBAL, because the trace file may quickly reach its capacity. In batch, this option has the same effect as Local. Note that under TSO, there is no distinction between LOCAL and GLOBAL.

Note that online asynchronous tasks (network prints) require a global trace.

Examples:

```
@I$TRACE ON
```

Activates a VPE trace for the current user only.

```
@I$TRACE ON GLOBAL
```

Online only, activates a VPE trace for all users.

```
@I$TRACE OFF
```

Deactivates a VPE trace for the current user.

```
@I$TRACE OFF GLOBAL
```

Deactivates a VPE trace for all users.

@I$TRACE PRINT -- Extracting Data from the VPE Trace File

The following command is used to extract entries from the VPE trace file, with options to limit the information extracted.

Trace output is described in Section 5.3.5, "Reading Trace Output."

Note that in a VSE environment, the @I$TRACE PRINT command can only be issued in batch (even if the trace has been run online).

Format:

```
                    ┌                    ┐
                    │ USER uuu           │
                    │ TIME hhmm[/hhmm]   │
                    │ DATE mmdd          │
@I$TRACE PRINT      │ FUNC aaa[/aaa]...  │
                    │ BLOCK nnnnn[/nnnnn]│
                    │ NAME output-name   │
                    │ FILE file-name     │
                    │ STATISTICS         │
                    └                    ┘
```

The @I$TRACE PRINT command alone extracts all entries on the VPE trace file.

USER uuu

Limits the selection of entries in the trace file to those generated by the specified user. uuu is the 3-character short user ID of the user. If other users have written to the trace file, this option lets you extract only your own entries. For example,

```
@I$TRACE PRINT USER GBS
```

selects entries for user GBS only.

TIME hhmm[/hhmm]

Limits the selection of entries made in the trace file to those generated during the specified time range. hhmm is the beginning of the time range. The range ends with another hhmm, if specified, or when the end of the trace file is reached. Time is in 24-hour format. For example,

```
@I$TRACE PRINT TIME 1201
```

selects all records entered in the trace file from 12:01 pm until the end of the trace file is reached. For example,

```
@I$TRACE PRINT TIME 0115/1324
```

selects all records entered in the trace file between 1:15 am and 1:24 pm.

DATE mmdd

Limits the selection to entries made in the trace file on a specific day. mmdd is a numeric value that specifies the date. If your CICS region or partition is not recycled daily (so that the trace file is not re-initialized daily), this option ensures that you select the entries for the specified day only. For example,

```
@I$TRACE PRINT DATE 0427
```

results in selecting all entries made in the trace file on April 27.

FUNC aaa[/aaa]...

Limits the selection to entries in the trace file resulting from service aaa. Up to 6 of the following services can be specified. If no function is specified, all are selected.

ALL	All functions (default)
PSS	Print Sub-System services
SCF	Session Control Facility services
PMS	Panel Management System services
VPE	Virtual Processing Environment services
VLS	Virtual Library System services
EDK	Editor Kernel services
SVC	PDF/CICS internal services
ENQ	Enqueue and Dequeue requests
CMD	All commands (internal and external)
LOG	All LOG requests (for the PDF/CICS error log)
PGM	All calls to system level subprograms

Examples:

```
@I$TRACE PRINT FUNC VPE
```

selects only VPE services.

```
@I$TRACE PRINT FUNC SCF/PSS/PMS
```

selects SCF, PSS, and PMS services.

```
@I$TRACE PRINT
```

selects all functions.

You can also limit selection to all entries except those resulting from specified services. Use a not sign (^) prefix. For example:

```
@I$TRACE PRINT FUNC ^VPE
```

selects all entries except those from VPE.

```
@I$TRACE PRINT FUNC ^SCF/^PSS
```

selects all entries made in the trace file except those from SCF or PSS.

BLOCK nnnnn[/nnnnn]

Limits the selection of entries in the trace file to those within the specified range of data blocks. nnnnn specifies the starting block from which entries are selected. The range ends with another nnnnn or when the end of the trace file is reached. Leading zeros are required. Data blocks on the trace file are numbered sequentially. You can find the block numbers on the Trace Listing (see Section 5.7, following). For example,

```
@I$TRACE PRINT BLOCK 00100
```

selects all entries on the Trace file from block 100 to the end of the trace file.

```
@I$TRACE PRINT BLOCK 00005/00096
```

selects all entries from block 5 to block 96.

NAME output-name

Changes the name of the output member in the online output library. The default name is OUTTRACE. The output-name can be any alphanumeric name up to 8 characters.

For example,

```
@I$TRACE PRINT NAME MYOUTPUT
```

defines MYOUTPUT as the name of the output member.

FILE file-name

Batch Only. Changes the name of the VPE trace file (used as input to @I$TRACE PRINT). The file-name is any valid DD/DLBL name up to 8 characters in MVS and up to 7 characters in VSE. @I$TRACE PRINT first closes the default input trace file and then opens the file with the name specified in this parameter. The default trace file name is ADRTRC.

Note that in VSE, the VPEBMSFT must be updated to include an entry for the new file name with the same format as the ADRT entry. (See Section 5.3.6, JCL Requirements.)

For example,

```
@I$TRACE PRINT FILE MYDTF
```

changes the input VPE trace file name to MYDTF.

STATISTICS

Used to print only the statistics accumulated for the sections of the trace file analyzed.

This option suppresses the printing of detailed trace entries. Instead, it summarizes the services requested and resources used during the activity that was traced. If you also use the FUNC option, only statistics that apply to the specified functions are generated. Otherwise, statistics are generated for all entries in the trace file. Other options besides FUNC are ignored. For example,

```
@I$TRACE PRINT STATISTICS
```

generates statistics for the entire VPE trace file.

```
@I$TRACE PRINT FUNC VLS STATISTICS
```

generates statistics for VLS entries only.

Note: Any combination of these options can be used together in any order. For example,

```
@I$TRACE PRINT USER XYZ DATE 0115 FUNC DIL
```

extracts all Dial trace entries for user XYZ written on the 15th of January. As stated above, however, if you specify STATISTICS, all other options except FUNC are ignored.

Resetting the Online CICS VPE Trace File

The following command allows you to erase the data in the online VPE trace file and to start writing at the beginning of the file. It must be used when the VPE trace file fills up. (An ASRB abend occurs.) In batch, if the trace file fills up, you can rerun the job with a larger trace file.

Format

```
@I$TRACE RESET
```

The following procedure must be used with this command.

1. If you are still in PDF/CICS, sign off from PDF/CICS, but not off from CICS.

2. From CICS, close and reopen the VPE trace file using the CEMT CICS Operator command against the DCT. That is:

   CEMT S QUEUE(ADRT) CLOSE
   CEMT S QUEUE(ADRT) OPEN

3. Sign back on to PDF/CICS.

4. From PDF/CICS, issue @I$TRACE RESET.

5.3.3 Printing Trace Files

This section summarizes the information presented on outputting the results of PDF/CICS traces. It describes the data flow when you:

- Print the VPE trace file in batch.
- Print the VPE trace file online.

Note that installed default names are used here. These can be changed. See Section 5.3.6 for JCL requirements.

Printing the VPE Trace File in Batch

In a batch environment, the @I$TRACE ON command writes VPE trace records and, if requested, Dial trace records to the VPE trace file with the following DD/DLBL name:

ADRTRC

Under MVS, the @I$TRACE PRINT command reads the ADRTRC file and routes the output to the file with the DD name:

AUXPRINT

This output can then be printed or displayed using a standard operating system spooling queue or printing facility.

Under VSE, the @I$TRACE PRINT command reads the ADRTRC file and routes the output to the system printer; that is, to the device address specified in the first available PSSPRTnn entry in the VPEBMSFT.

Printing the VPE Trace File Online -- MVS Only

Online, the VPE trace and the Dial trace both write entries to a data set with the DD name:

ADRTRC

In order to support online printing of the trace in an MVS CICS environment, the @I$TRACE PRINT command reads the trace records from the same data set pointed to by the DD name ADRTRC, but instead uses the DD name:

ADRINT

The @I$TRACE PRINT command writes the output to a member in the PDF/CICS online output library with the name:

OUTTRACE

This output can then be printed or displayed using the standard PDF/CICS OUTPUT commands.

Note that in a VSE environment, although the trace can be run online, it can only be extracted using batch PDF/CICS. To do so, there must be a DLBL in the batch JCL that points to the same data set that the DLBL for ADRTRC points to in your online CICS start-up JCL. See the JCL Requirements in Section 5.3.6.

The following charts show output destinations for trace commands under MVS and VSE.

Command	Batch Output	Online Output
@I$TRACE ON	ADRTRCADRTRC	
@I$TRACE PRINT	AUXPRINT	ADROUT

Figure 43. MVS Trace Output Files

Command	Batch Output	Online Output
@I$TRACE ON	ADRTRCADRTRC	
@I$TRACE PRINT	PRTSYSnn	N/A

Figure 44. VSE Trace Output Files

5.3.4 Trace Examples

The following examples illustrate how to run VPE service traces and Dial traces under MVS and VSE, in both batch and online environments. For a description of the JCL required, see Section 5.3.6, "JCL Requirements."

MVS Online

VPE Service Trace
(To VPE Trace File)

```
@I$TRACE ON LOCAL
...
one or more PDF/CICS commands
...
@I$TRACE OFF LOCAL
@I$TRACE PRINT USER uuu FUNC
PRINT OUT OUTTRACE DEST SYS
```

VSE Online

VPE Service Trace
(To VPE Trace File)

```
@I$TRACE ON LOCAL
...
one or more PDF/CICS commands
...
@I$TRACE OFF LOCAL
```

VSE Batch

Print VPE Trace File
From Online Trace

```
PERSON uuu PSW ppp
@I$TRACE PRINT
OFF
```

5.3.5 Reading Trace Output

This section describes the VPE trace output generated by the @I$TRACE PRINT command. The output has three parts:

- Environment Section
- Trace Listing
- Statistics

Note that the Trace Listing is not printed if the STATISTICS option is used with @I$TRACE PRINT.

Each page of the listing has a heading showing the following system information:

- PDPLOG Program (@I$TRACE PRINT Command) Version Number.
- PDF/CICS Version Number.
- Date and Time of the Printout.
- User Name.

The heading also shows the following selection criteria:

- Date Selected (mmdd if none).
- Time Selected (hhmm/hhmm if none).
- User Selected (xxx if none).
- Functions Selected/Rejected (ALL/ xxx/ xxx if none).
- Blocks Selected (nnnnn/nnnnn if none).

Environment Section

The environment page is always first. It shows the following information:

- The @I$TRACE PRINT command (generated by the PDPLOG program) as entered, including the requested options.
- A description of the trace print (PDPLOG) options.
- The monitor name and operating system.
- The version of each major software component.
- A dump of the PDF/CICS zap table (maintained in phase/load module @MPDV#R#.)

```
PDPLOG Ver:1.1 PDF/CICS 1.1 print trace facility. Date: 01/23/92 Time: 17:14:30
User:PRO
Selection criteria:  Date mmdd   Time hhmm/hhmm   User PRO   Func  ALL/ xxx/ xxx/
xxx
Command entered : @I$TRACE PRINT USR PRO
This program provides a group of commands designed to select
information from the trace file.
The commands are as follows:
 - DATE  mmdd         to select a specific day in the month
 - TIME  hhmm         to select from a given time
 - TIME  hhmm/hhmm    to select a range of time
 - BLOCK nnnnn        to select from a specific block
 - BLOCK nnnnn/nnnnn  to select a range of blocks
 - USER  uuu          to select a specific user-id
 - FUNC  fff/fff/...  to select up to six functions
 - FUNC   fff/ fff/.. to exclude up to six functions
 - FILE  iiiiiiii     to change the name of the input file
 - NAME  oooooooo     to change the name of the print file
 - STATISTICS         to print only the statistics
 The values for "fff" are the following:
 - VPE, VLS, PMS, PSS, SCF, DIL, LOG,
 - CMD, SVC, DSF, ENQ, PGM, EDK, BAS, SQI
 The following software was used:
 Monitor=CICS      Opsys=MVS/JES2
 VPE(4.0 ) SCF(0400) PSS(4.0 ) PMS(040 ) EDK(040 ) PDF(040 ) DSF(2.4A)IDL(021)
DB(75A)
 The following zap table was found:
 00010203  04050607  08090A0B  0C0D0E0F  10111213  14151617  18191A1B  1C1D1E1F
 20212223  24252627  28292A2B  2C2D2E2F  30313233  34353637  38393A3B  3C3D3E3F
 40414243  44454647  48494A4B  4C4D4E4F  50515253  54555657  58595A5B  5C5D5E5F
 60616263  64656667  68696A6B  6C6D6E6F  70717273  74757677  78797A7B  7C7D7E7F
 80818283  84858687  88898A8B  8C8D8E8F  90919293  94959697  98999A9B  9C9D9E9F
 A0A1A2A3  A4A5A6A7  A8A9AAAB  ACADAEAF  B0B1B2B3  B4B5B6B7  B8B9BABB  BCBDBEBF
 C0C1C2C3  C4C5C6C7  C8C9CACB  CCCDCECF  D0D1D2D3  D4D5D6D7  D8D9DADB  DCDDDEDF
 E0E1E2E3  E4E5E6E7  E8E9EAEB  ECEDEEEF  F0F1F2F3  F4F5F6F7  F8F9FAFB  FCFDFEFF
```

Figure 45. @I$TRACE PRINT Sample Output (Environment Page)

Trace Listing

Dial trace entries may be interspersed with VPE trace entries in the trace listing, or they may be separated. Dial entries are free format. VPE trace entries display the following columns of information:

Time...usr r trace-entry.....cmp function...rc..aux-data...

Where:

time	Time the entry was logged
usr	Three-character short user id
r	Region number (1, 2, or 3) or *0 for asynchronous task
trace-entry	VPE trace entry in hex format
cmp	Component name
function	Function name
rc	Component return code
aux-data	Auxiliary information

For each entry, the hex trace data, time, user, and region come from the VPE trace file. @I$TRACE PRINT extracts the component, function, return code, and auxiliary data in symbolic form from the hex trace entry.

The beginning of each data block in the trace file is marked on the trace listing with a row of asterisks, along with the block number, date, and time of the entry.

The following is a sample output of the trace listing:

```
 PDPLOG Ver:1.1 PDF/CICS 1.1 print trace facility. Date: 01/23/92 Time:16:16:50
User:PRO
 Selection criteria:  Date mmdd   Time hhmm/hhmm   User PRO   Func  ALL/ xxx/
xxx/ xxx
 ************************************************************block=0000001
Date:07/23/90
 16:16:46 PRO 1 0629814E000000007CC9C1C4E3D9C3C5 VPE $EXT-n   00 pgmn=@IADTRCE
 16:16:46 PRO 1 0629814E000000007CC9C1C4C3D4C4F2 VPE $EXT-n   00 pgmn=@IADCMD2
 16:16:46 PRO 1 0629814E000000007CC9C1C4C3D4C4D7 VPE $EXT-n   00 pgmn=@IADCMDP
 16:16:46 PRO 1 021B3478000754907CC9C1C4C3D4C4D7 VPE $CSP-n   00 pgmn=@IADCMDP
parm=00075490
 16:16:46 PRO 1 AA0000000005C3000000000C00075359 IDL CMD-C    00 RUN DEMOPGM2
 16:16:46 PRO 1 AA00000000200000000000E002C7C74 IDL entered  00 pgmn=ADSVCS
 16:16:46 PRO 1 50078938001EE201D30000340003165C SCF CVT-loc  00 CB name=SSOPTSCB
 16:16:46 PRO 1 AA2A5E7A00000000D3D6C3C300075D28 SVC LOCC     00 SSOPTSCB
 16:16:46 PRO 1 AA00000000200000000000D002C7FE8 IDL exited   00 pgmn=ADSVCS
 16:16:46 PRO 1 022A589C00075D28E2C3F0F0C5C1C3D7 VPE $CSP-n   00 pgmn=SC00EACP
parm=00075D28
 16:16:46 PRO 1 021DC2160007F740E2C3D7E2C5D5C4D7 VPE $CSP-n   00 pgmn=SCPSENDP
parm=0007F740
 16:16:46 PRO 1 021D24DA0007FD20000000000024ED60 VPE $CSP-a   00 pgma=0024ED60
parm=0007FD20
 16:16:46 PRO 1 500789380012E201D30000340003165C SCF CVT-loc  00 CB name=PSSMCB
 16:16:46 PRO 1 58078938000F0001000000B300000000 PSS LOC#CB   00 pssid=00000
 16:16:46 PRO 1 0629814E00000000000000000024ED60 VPE $EXT-a   00 pgma=0024ED60
 16:16:46 PRO 1 0329814E00080100E2C3C67B00000035 VPE $DEQ     00 name=SCF#....
                                                                 type=shared
 16:16:46 PRO 1 021D26B60007FB60C5C4C5C4C9E3D6D9 VPE $CSP-n   00 pgmn=EDEDITOR
parm=0007FB60
 16:16:46 PRO 1 ED29845CC5C40103E2010002000003BE EDK 1#CLOSE  00 type=start
(Editor)
 16:16:46 PRO 1 50078938001BE201D30000340003165C SCF CVT-loc  00 CB name=EDMAINCB
 16:16:46 PRO 1 ED227EFA00000000C901030300000A1A EDK 3#ENDSES 00 type=call
(Editor,Edmemb)
 16:16:46 PRO 1 02227702000801C4C5C4C5C4D4C5D4C2 VPE $CSP-n   00
pgmn=EDEDMEMB  parm=000801C4
 16:16:46 PRO 1 ED1D87FC00000000C9030704000007F4 EDK 7#CLSLIB 00 type=call
(Edmemb,Edfile)
 16:16:46 PRO 1 021D81B400080A40C5C4C5C45BE5D3E2 VPE $CSP-n   00
pgmn=EDED$VLS  parm=00080A40
 16:16:46 PRO 1 0B298812000026ADE5D7C5F9F8F9F040 VPE $LDM     00     pgmn=VPE9890
addr=000026AD
16:16:46 PRO 1 0929814E00072D680000018800000000 VPE $GS      00  addr00072D68
Length=000188
 16:16:46 PRO 1 1F29882000001003000000000000000000 VLS RELEASE  00     vcb#=03
 16:16:46 PRO 1 0929814E00031EC80000004000000000 VPE $GS      00
addr=00031EC8
 16:16:46 PRO 1 0A29814E00031EC80000000000000000 VPE $IQE     00     addr00031EC8
```

Figure 46. @I$TRACE PRINT Sample Output (TRACE Listing)

Statistics

The last two pages contain statistics summarizing the contents of the trace file. (If only statistics have been requested, these are the only pages printed. See @I$TRACE PRINT FUNC STATISTICS.) The statistics section is divided into two parts.

1) The Service Requests Summary shows the number of entries for major components accessed by the traced activity.

2) The Resource Utilization Summary shows the number of entries for major resources used by the traced activity, including:

- File tables used (Filetab).
- VLS file I/O (Fileid) and sequential file I/O (where the file-id is the CICS DCT name; e.g., ADRL for the PDF/CICS error log, DD/DLBL name of ADRLOG).
- VPE control blocks (VCB) used. Program loads and releases ($LDM and $RLM).
- Subroutine calls ($CSP-n and $CSP-a) and program branches (Branch).

The following is a sample output of the trace statistics:

```
 SERVICE REQUEST SUMMARY
 VPE-total..0000352  $AGS.......0000001  $CSP-a.....0000016  $CSP-n.....0000053
                     $DT........0000011  $ENQ.......0000014  $EXT-a.....0000015
                     $FS........0000028  $GS........0000026  $IQE.......0000005
                     $LGS.......0000005  $LPS.......0000004  $RBL.......0000028
                     $GSS.......0000004  $LSS.......0000010  $FSS.......0000005
 VLS-total..0000064  ADD........0000014  BDREAD.....0000004  CREATE.....0000002
                     READ.......0000008  RELEASE....0000010  REP........0000008
                     SPACE......0000002
 SCF-total..0000022  CVT-loc....0000012  CVT-rel....0000004  CVT-alc....0000002
 IDL-total..0000356  DSF........0000004  DB.........0000322  Entered....0000015
                     CMDP.......0000003
 ADSVCS.....0000014  ALCC.......0000001  ATZ........0000001  DEQ........0000001
                     LOCC.......0000008  RELC.......0000001
 PMS-total..0000001  FPS........0000001
 PSS-total..0000010  LOCATE.....0000001  OPEN.......0000001  PUT........0000007
 EDK-total..0000006  1#CLOSE ...0000002  3#ENDSES...0000002  7#CLSLIB...0000002
 PDPLOG Ver: 1.1 PDF/CICS 1.1 print trace facility. Date:01/23/92 Time:16:16:50
User:PRO
 Selection criteria: Date mmdd Time hhmm/hhmm User PRO Func ALL/xxx/ xxx/ xxx/
xxx/ xxx
 RESOURCE UTILIZATION SUMMARY
 Filetab             DDURTBL....0000012  DBFLT001...0000002
 Fileid              ADROUT.....0000058  ID$IDOBJ...0000004
 VCB                 03.........0000034  02.........0000022  00.........0000001
 $LDM                VPE9890....0000001  VTPM9891...0000002  DDSRTLM....0000001
 $RLM                @IAETINT...0000001  @IAELPGM...0000001
 $CSP-n              @IADCMDP...0000002  SC00EACP...0000001  SCPSENDP...0000002
                     EDED$VLS...0000001  PMSPNS1....0000001  SCPSCMDP...0000004
                     @IAEINIT...0000001  @IADDDGT...0000002  DDOLIUSP...0000001
                     DDBFMLM....0000014  DDRTVLM....0000002  DDCDBLM....0000001
                     @IADOMLD...0000001  @IAESYNC...0000001  @IAERLSE...00000004
                     @IADCMD2...0000001  @IPDPLOG...0000001
 $CSP-a              0024ED60...0000010  00374900...0000004  002D1850...00000002
 Branch              ADSVCS.....0000014  AETINT.....0000001
```

Figure 47. @I$TRACE PRINT Sample Output (Statistics)

5.3.6 JCL Requirements

This section shows the JCL, VPEBMSFT, and CICS table entries required by the PDF/CICS trace facility. All of the statements and entries required to run the traces are provided as part of the installation process. They may be modified, but if they are changed, they must still include all required entries.

MVS Batch Job Stream

An MVS job stream to trace a program includes:

```
//jobname JOB acctinfo,'username',MSGLEVEL=1
//          EXEC PDBATCH
//SYSIN DD *
 .  .  .
PDF/CICS trace commands and PDF/CICS commands
 .  .  .
```

//jobname JOB
A standard JOB card containing information about the job for the operating system.

// EXEC PDBATCH
Identifies a JCL PROC containing the PDF/CICS JCL PROC and the dataview records necessary for a batch session.

//SYSIN DD *
Indicates that the PDF/CICS commands to be executed follow. The PDF/CICS commands are entered in a sequence that simulates an online session. For example, a SIGNON command is the initial command that simulates the signon screen and OFF is the final command.

VSE Batch Job Stream

The following standard JCL records are used in a VSE environment to execute PDF/CICS traces in batch.

```
* $$ JOB JNM=PDBATCH,PRI=n,USER='username',DISP=D
* $$ LST DISP=D,CLASS=L
// JOB PDBATCH
// OPTION LOG,NODUMP
// EXEC PROC=PDFPROC
// EXEC PDBATCH,SIZE=15K
.  .  .
PDF/CICS trace commands and PDF/CICS commands here
.  .  .
/*
// EXEC LISTLOG
/*
/&
* $$ EOJ
```

*** $$ JOB JNM=PDBATCH, PRI=n,USER='username',CLASS=c,DISP=D**

JNM=PDBATCH
This jobstream is identified to POWER as 'PDBATCH'

PRI=n
The dispatching priority of this job is n.

USER='username'
This parameter is used for accounting purposes.

CLASS=c
This defines which VSE partition this jobstream may execute in.

DISP=D
This defines the disposition in the reader spool for the jobstream. 'D' indicates that the jobstream should be submitted for execution immediately and not be retained in the reader queue (spool) after execution.

*** $$ LST DISP=D,CLASS=L**

This card defines the output parameters for the VSE system log file.

DISP=D

This parameter defines the disposition of the output in the POWER list queue. As in the "DISP" option for the JOB command, 'D' indicates that the jobstream should be released immediately, and not retained in the queue.

CLASS=L

This is used to organize the LIST queue. This is used in conjunction with subsequent "* $$ LST" cards to logically separate the various PDF/CICS outputs.

// JOB PDBATCH

This is the first VSE job control command of the jobstream. The jobstream is identified as "PDBATCH". All references to the JOB on the operator's console will be to PDBATCH (not the POWER jobname).

// EXEC PROC=PDFPROC

This statement calls for a JCL procedure to be copied into the jobstream. PDFPROC is an installed procedure to define all PDF/CICS and user system files for batch.

// EXEC PDBATCH,SIZE=15K

PDBATCH is the PDF/CICS batch processing program. The size parameter sets the amount of storage to be allocated to the program for execution. The rest of the partition will be used for processing other PDF/CICS routines. The statements which follow are PDF/CICS commands, including trace commands. They are entered in a sequence that simulates an online session (e.g., a SIGNON command is the initial command which simulates the signon screen and OFF is the final command).

/*

This is a JOB step delimiter.

// EXEC LISTLOG

LISTLOG is a VSE utility which adds all operator console messages associated with the jobstream to the end of the output for the jobstream.

/&

VSE Job delimiter.

*** $$ EOJ**

POWER Job delimiter.

MVS Batch Procedure

The following DD statements, installed in the PDBATCH sample job, are required to run the traces in batch.

```
//ADRTRC DD DSN=&&ADRTRC,DISP=(MOD,PASS),
//          UNIT=SYSDA,SPACE=(TRK,(15,15)),
//          DCB=BLKSIZE=2000
//SYSDIAL DD SYSOUT=*   For Dial-Only and ADPOBJ output.
//AUXPRINT DD SYSOUT=*  For VPE Trace file output
```

Defining ADRTRC as a temporary data set is suggested. If however, the trace is to be run online but printed with PDF/CICS Batch, the ADRTRC DD name MUST point to the same DSN as in the CICS start-up JCL. Do not change the block size for the ADRTRC file.

The following ROSFD entries, installed in the VPEBMSFT (PDF/CICS System File Table), are required to run traces in batch.

```
SYSDIAL  ROSFD DDNAME=SYSDIAL,ACCMETH=SEQ,RECFM=FBA,  X
            LRECL=133,BLKSIZE=1330,PRODUCT=IGN
AUXPRINT ROSFD DDNAME=AUXPRINT,ACCMETH=SEQ,RECFM=FBM, X
            LRECL=133,BLKSIZE=1330,PRODUCT=IGN
ADRT     ROSFD DDNAME=ADRTRC,ACCMETH=SEQ,RECFM=FB,    X
            LRECL=2000,BLKSIZE=2000,PRODUCT=IGN
```

Note that the VPEBMSFT must be reassembled if any entries are added or changed.

VSE Batch Procedure

The following JCL, installed in the PDBATCH sample job procedure, is required to run the traces in batch.

```
// DLBL ADRTRC,'file-id'
// EXTENT SYSnnn,VOLID,,,beg-track,#-of-tracks
// ASSGN SYSnnn, DISK,VOL=xxxxxx,SHR
// ASSGN SYSLST,PRINTER   For Dial-Only and ADPOBJ output
// ASSGN SYSaaa,PRINTER PDF/CICS REPORT FORM #01
// ASSGN SYSbbb,PRINTER PDF/CICS REPORT FORM #02
// ASSGN SYSccc,PRINTER PDF/CICS REPORT FORM #03
// ASSGN SYSddd,PRINTER PDF/CICS REPORT FORM #04
// ASSGN SYSeee,PRINTER PDF/CICS REPORT FORM #05
```

SYSLST is used for Dial-Only and ADPOBJ output.

The SYS numbers assigned to the printers (SYSaaa-eee) depend on the values assigned by the site at installation. System printers are used for VPE trace file output. Output goes to the device specified by the first available PSSPRTnn entry encountered in the VPEBMSFT (see below).

The following ROSFD entries installed in the VPEBMSFT (PDF/CICS System File Table) are required to run traces in batch:

```
SYSDIAL   ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSLST,DEVICE=1403,          X
             CTLCHR=ASA,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
ADRT      ROSFD ACCMETH=SEQ,DTFTYPE=DTFSD,        X
             DEVADDR=SYSnnn,DEVICE=3340,          X
             DTFNAME=ADRTRC,RECFM=FB,             X
             IBLKSZ=2000,OBLKSZ=2008,             X
             LRECL=2000,OPSYS=DOS
PSSPRT01  ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSaaa,DEVICE=1403,          X
             CTLCHR=YES,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
PSSPRT02  ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSbbb,DEVICE=1403,          X
             CTLCHR=YES,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
PSSPRT03  ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSccc,DEVICE=1403,          X
             CTLCHR=YES,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
PSSPRT04  ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSddd,DEVICE=1403,          X
             CTLCHR=YES,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
PSSPRT05  ROSFD ACCMETH=SEQ,DTFTYPE=DTFPR,        X
             DEVADDR=SYSeee,DEVICE=1403,          X
             CTLCHR=YES,RECFM=F,                  X
             BLKSIZE=133,OPSYS=DOS
```

Do not change the block size for the ADRTRC file. Note that the VPEBMSFT must be updated and reassembled if any entries are added or changed. For more information, refer to either the MVS or VSE CA-MetaCOBOL+ *Installation Guide*, whichever is appropriate for your operating environment.

MVS CICS

The following DD statements are required as part of the CICS start-up JCL to run PDF/CICS traces online.

```
//ADRTRC DD DSN=index.pdfcics.TRACE,DISP=SHR            For Writing
//ADRINT DD DSN=index.pdfcics.TRACE,DISP=SHR            For Reading
```

The following CICS DFHFCT entry is required:

```
DFHFCT TYPE=DATASET,                                              X
     DATASET=ADRINT,                                              X
     ACCMETH=BDAM,                                                X
     SERVREQ=GET,                                                 X
     RELTYPE=BLK,                                                 X
     LRECL=2000,                                                  X
     BLKSIZE=2000,                                                X
     RECFORM=(FIXED,UNBLOCKED),                                   X
     OPEN=INITIAL
```

Note that an FCT entry is NOT needed for ADRTRC.

The following CICS DFHDCT entries are required:

```
DFHDCT TYPE=SDSCI,                                                X
     DSCNAME=ADRTRC,                                              X
     TYPEFLE=OUTPUT,                                              X
     RECSIZE=2000,                                                X
     RECFORM=FIXBLK,                                              X
     BLKSIZE=2000
DFHDCT TYPE=EXTRA,                                                X
     DSCNAME=ADRTRC,                                              X
     DESTID=ADRT,                                                 X
     OPEN=INITIAL
```

The above entries must be in the appropriate sections of the DCT table.

Note that a DCT entry is NOT needed for ADRINT. Do not change the block size for the ADRTRC file.

VSE CICS

In the VSE environment, the VPE trace file used by CICS online may remain closed even after CICS has been brought up. In this case, it must be explicitly opened and enabled with the CICS Master Terminal Operator command:

```
CEMT SET QUEUE(ADRT) OPEN ENABLE
```

Although a trace can be created online, it can be extracted using Batch PDF/CICS only. Online, the DLBL file name must be ADRTRC. The file-id, EXTENT, and ASSGN must match the corresponding entries for the batch DLBL definition of ADRTRC. That is:

```
// DLBL ADRTRC,'file-id'
// EXTENT SYSnnn,VOLID,,,beg-track,#-of-tracks
// ASSGN SYSnnn,DISK,VOL=xxxxxx,SHR
```

The following CICS DFHDCT entries are required:

```
DFHDCT TYPE=SDSCI,                                              X
    DSCNAME=ADRTRC,                                             X
    TYPEFLE=OUTPUT,                                             X
    RECSIZE=2000,                                               X
    RECFORM=FIXBLK,                                             X
    BLKSIZE=2000
DFHDCT TYPE=EXTRA,                                              X
    DSCNAME=ADRTRC,                                             X
    DESTID=ADRT,                                                X
    OPEN=INITIAL
```

The above entries must be in the appropriate sections of the DCT table. Do not change the block size for the ADRTC file.

Note that DCT entries are NOT made for ADRINT. No FCT entries are made in the VSE environment.

5.4 Diagnostic Tools

This section describes facilities available for accessing PDF/CICS system information about internal errors, installed modules and solutions, VLS library indexes, and the output library.

5.4.1 Internal Error Facility

PDF/CICS provides an internal error logging and reporting facility. This facility is intended to trap internal system errors, not necessarily user errors. Any time an illogical or unexpected return code is received from an internal service within PDF/CICS, the Internal Error Facility automatically gets control.

For example, if you attempt to delete a VLS member that does not exist, a return code indicating the problem is a reasonable condition, and a simple message is issued. However, if the return code indicates "library cannot be accessed," this is an unexpected condition, probably due to an error in generating or restoring the PDF/CICS system. In the second case, an internal error message is issued.

Such internal error messages begin with the keyword INTERR.

If the message contains the keyword INTERR, the Internal Error Facility has performed two actions:

1. It has written a hardcopy record of the internal error to the ADRLOG Log File (printed when the teleprocessing monitor is shut down or when a batch job ends).

2. For an online session, it has saved information about the error that can be displayed on the terminal by entering the following command.

Format:

```
DISPLAY ERROR
```

The minimum abbreviation is D ERR.

If you plan to call Computer Associates about the error, copy the information from your terminal, from a PRINT SCREEN printout or from ADRLOG. Save the PRINT SCREEN or ADRLOG printout in case you are requested to send it to Computer Associates.

Note that, online, you can enter the DISPLAY ERROR command at any time. Information about the most recent internal error (if any) is displayed.

The following is an example of DISPLAY ERROR information.

```
1-MCDADERRP99E - INTERR:  Internal system error
SRVC=LOG FUNC=RC=       PGM=ADXSSP  02.1 -3FE8 01/09
CALPGM=                   CURACT=AD ACTTYP=U USER=BYR ERRID=P
SYS=$ID ENTTYP=PGM ENTNAM=SAMPERR1        ENTVER=002 ENTSTAT=
LOGMSG: PGM OBJECT MODULE DOES NOT EXIST
```

Figure 48. DISPLAY ERROR Sample Output

Following is a description of the various fields that may be displayed on Internal Error panels. Note that the Internal Error "key" consists of the Service (SRVC) detecting the error, the internal function (FUNC) being performed by that service, and the return code (RC). Also note that only relevant fields are displayed on a given Internal Error panel.

SRVC
The internal service detecting the error. Currently, the internal services are:

LBN Linked Bundle (Storage Management)
LOG General Log Message
PMS Panel Management Service
PSS Print Subsystem
SCF Session Control Facility
VLS Virtual Library System
VPE Virtual Processing Environment

FUNC
The specific function being performed by the service. For example, VLS services include INIT (initialize), READ, WRITE, etc.

RC
The return code from the service.

PGM
The identifier of the internal program in control when the error was detected. This includes the 6-character program name, the PDF/CICS version when the program was last compiled, the offset of the instruction detecting the error, and the date and time when the program was last compiled.

CALPGM
The identifier of the calling program, in cases where the program actually detecting the error is a general subroutine called from several other places. This includes the calling program name, the PDF/CICS version, and the offset of the call instruction.

CURRACT
The current activity. Codes are as follows:

AD	General Service Commands
ED	General Editing
PD	Panel Definition Facility
PM	Panel Management Services
PS	Print Subsystem
SC	Session Control
IN	Index Display

ACTTYP
The type or mode of activity. Possible codes are D (display), E (edit), and U (utility).

USER
The 3-character USERID.

ERRID
The 1- to 10-character string returned by the program detecting the error. For example, this may be the sequence number of an iterated call to the service. This field may be blank.

SYS
The 3-character short system-ID currently selected.

ENTTYP
The current entity type.

ENTNAM
The current entity name.

ENTVER
The current entity version.

ENTSTAT
The current entity status.

PANEL-NAME
The current panel name.

VER
The current panel version.

SUB-SYS
The current panel subsystem (PDF only).

LIB
A 7- or 8-character VLS library identifier (corresponds to the DD/DLBL name for the indicated VLS file).

MEM
An 11- to 24-character VLS member name, possibly with embedded spaces.

LOGMSG
An optional message written to ADRLOG by the program detecting the error. It may be in any format.

5.4.2 @I$INTERNAL CHECK -- PDF/CICS Module Verification

The following command verifies that the correct versions of the major PDF/CICS software modules are installed. It compares all such modules to a table distributed at installation that identifies the correct release and the date/time stamps. If a verification fails, a report shows the name of each module that failed, with the data expected and the data actually found in hexadecimal and character format.

From PDF/CICS online or in PDF/CICS batch, issue the command using the following format.

Format

```
@I$INTERNAL CHECK product rrr
```

product
The identifier of the software being verified; this is usually PDFC. CA-MetaCOBOL+ Support may indicate other identifiers to use. For example:

PDFC	PDF/CICS
IDEAL	CA IDEAL
SCF	Session Control Facility
PMS	Panel Management Services
PDF	CA IDEAL Panel Definition Facility
PSS	Print Subsystem
EDK	Editor Kernel
IPC	Inter-Product Components
IDB2	PDF/CICS with DB2
IDCM	PDF/CICS with CA DATACOM/DB
IVSM	PDF/CICS VSAM option
IMXD	PDF/CICS mixed environment (CA DATACOM/DB and DB2)

rrr
The release of the software being verified; for example, 011 for CA-MetaCOBOL+ Release 1.1.

Example:

```
@I$INTERNAL CHECK PDFC 011
```

Verifies CA-MetaCOBOL+ Release 1.1

If the modules are correct, the following message is displayed:

```
1-MCUTRELP03I - VERIFICATION OF MODULES WAS SUCCESSFUL
```

If the verification fails, the following message is displayed:

```
1-MCUTRELP02E - VERIFICATION FAILED.  SEE OUTPUT LISTING FOR DETAILS.
```

The CA Module Verification Exception Report is produced only if a module does not verify or is missing. The Exception Report is written to the Output library as a member with the name UTRELP.

If the report indicates an error:

1. Check the concatenation of the load libraries or core image libraries. If you are upgrading, you may accidentally have loaded an old fix library in front of the new software library. In CICS MVS, check the DFHRPL DD concatenation. In batch MVS, check the STEPLIB DD. In VSE, both CICS and batch, check the core image LIBDEF order.

2. Verify that the software was unloaded from the tape correctly. (ADRCOPY can give a return code of zero although the software was not unloaded from the tape.)

Native CICS/Batch

A version of this command can be run in native CICS or batch to verify the environment if the PDF/CICS environment cannot be established or PDF/CICS is not yet installed. In batch, the syntax is that described above.

Under CICS, the transaction code ADRV precedes the command. For example:

```
ADRV @I$INTERNAL CHECK PDFC 011
```

The CICS version must be entered from a CICS terminal that is not logged on to any application. From native CICS, the status message is displayed on one screen, and pressing the Enter key displays only the first page of the Exception Report. If you need the complete Exception Report, run the batch version.

The following is a sample output of the @I$INTERANL CHECK command:

```
UTRELP                Module Verification Exception Report
Prod:PDFC Rel:011          Date: 03/06/92 Time: 09:39         Page      1
*-Module-**--Offset--**---------------Hex--------------* *----Graphic-----*
@MADCMDP Verification String #   3 failed at module offset X'000055'
 Expect   000051 0000 F0F361F0 F161F9F1                  *03/01/91        *
 Found    000051 0000 F0F361F0 F561F9F1                  *03/05/91        *
@MADCMDP Verification String #   4 failed at module offset X'00005A'
 Expect   000059 0000 F1F14BF1 F7                        *11.17           *
 Found    000059 0000 F1F04BF4 F3                        *10.43           *
@MADINTP Verification String #   3 failed at module offset X'000052'
 Expect   000051 0000 F0F261F0 F961F9F1                  *02/09/91        *
 Found    000051 0000 F0F361F0 F561F9F1                  *03/05/91        *
@MADINTP Verification String #   4 failed at module offset X'00005A'
 Expect   000059 0000 F1F44BF5 F1                        *14.51           *
 Found    000059 0000 F1F04BF1 F7                        *10.17           *
@MPDSETC Verification String #   3 failed at module offset X'000055'
 Expect   000051 0000 F0F361F0 F161F9F1                  *03/01/91        *
 Found    000051 0000 F0F361F0 F461F9F1                  *03/04/91        *
@MPDSETC Verification String #   4 failed at module offset X'00005A'
 Expect   000059 0000 F1F54BF4 F6                        *15.46           *
 Found    000059 0000 F1F74BF3 F5                        *17.35           *
```

Figure 49. @I$INTERNAL CHECK Sample Output

5.4.3 Displaying VLS Library Index

VLS libraries are maintained with the installed utility VLSUTIL. Its functions are described in the *CAIIPC Customization and Tuning Guide*. The VLSUTIL LIBRARY function allows you to display the indexes of the current PDF/CICS system's VLS libraries (member or panel) and the space usage statistics. The following command accesses the LIBRARY function online from PDF/CICS.

Format:

```
{ DISPLAY } INDEX MEMBER USER { @I$DAT }
{ PRINT   }                   { @I$PNL }
```

@I$PNL
Displays or prints the index of the panel library. All panel systems with panels in the current library are shown. The panel system ID is the first 3 characters of the internal VLS member name.

@I$DAT
Displays or prints the index of the member library (PDDAT). All user IDs with members in the current library are shown. The user-id prefix is the first 3 characters of the member name.

This command can be used to display the index when it is suspected that a library is full or when the index has been corrupted.

Note that this command does not produce exactly the same space information as VLSUTIL.

The following is a sample output of the DISPLAY INDEX MEMBER USER @I$DAT command:

```
=>

*****************************************************************************
PDF/CICS: DISPLAY INDEX MEM   MEM                          SYS: BMS  DISPLAY

Command Name ...1...+...2... Description             Created  Updated Bl/Rc
====== ================================ T O P ================================
000001 $IDCOMSCROL       Z   COMPILE CMNDS FOR SCROL 08/20/90 08/20/90 00024
000002 BIRHELPBBB        Z   BMS MACROS               12/12/90 12/12/90 00021
000003 BIRHELPFD1        Z   BMS MACROS               11/29/90 11/29/90 00034
000004 BIRHELPFD2        Z   BMS MACROS               11/29/90 11/29/90 00034
000005 BIRINT10001       Z X                          08/21/90 08/21/90 00000
000006 BIRMAPDDDD        Z   BMS MACROS FOR DDDD      02/26/91 02/26/91 00103
000007 BRRJCL1           Z   1st half of BMS JCL      10/25/90 02/07/91 00018
000008 BRRJCL2           Z   2nd half of BMS JCL      10/25/90 12/14/90 00042
000009 BRRMQ90007        Z   BMS MACROS               12/14/90 12/14/90 00049
000010 BRRMQ90010        Z   BMS MACROS               12/14/90 12/14/90 00051
000011 BRWBMS#ON         Z                            03/04/91 03/04/91 00007
000012 FRCBMS#ON         Z   signon member            12/10/90 01/17/91 00004
000013 FRCBMSMACS        Z   BMS MACROS               12/07/90 01/23/91 00022
000014 FRCEXECSAMP       Z   combines 2 maps, submit  01/18/91 01/24/91 00014
000015 FRCFIRSTGEN       Z   original gen parameters  01/04/91 01/08/91 00038
000016 FRCGENJCL         Z   cmds 2 gen,edit,sub pan  01/18/91 01/18/91 00006
000017 FRCJCL1           Z   1st half of BMS JCL      10/25/90 01/30/91 00094
000018 FRCJCL2           Z   2nd half of BMS JCL      10/25/90 01/18/91 00008
000019 FRCORDSYS         Z   BMS MACROS FOR ORDSYS    01/24/91 01/24/91 00116
000020 FRCPAN1           Z E BMS MACROS               12/07/90 12/19/90 00022
000021 FRCROUTPRT        Z   BMS MACROS FOR PDFKETS   01/15/91 01/15/91 00038
000022 FRCTESTSUB        Z                            01/23/91 01/23/91 00001
```

Figure 50. DISPLAY INDEX MEMBER USER @I$DAT Sample Output

5.4.4 @I$UTIL PSS Online Debugging

PSS provides several online commands for maintaining the output library (ADROUT). They allow you to obtain information on the current status of the output library and obtain an index of all members in the output library.

The following command displays or prints the current status of the output library. This information includes:

- The date and time of last initialization
- Date and time of last clean-up maintenance
- User-id of person submitting the request
- Use of library space, including total blocks on library, number of free blocks, percent occupied, and maximum number of members the library can accommodate.

Format:

```
@I$UTIL  OUT  STATUS  [ print-name { SYSTEM  } name ]
                      { NETWORK }
```

print-name
Name identifying this display or print.

name
Destination ID of the system printer or network printer.

Example:

The command @I$UTIL OUT STATUS alone displays status information online at your terminal.

The following submits the output to print on network printer HR86 with the identifier MYLIB:

```
@I$UTIL OUT STATUS MYLIB NETWORK HR86
```

The following is the output:

```
STATUS OF THE LIBRARY "ADROUT  "
LAST INITIALIZATION:   01/09/92  11:05
LAST RECOVERY:         06/28/90  10:15:56   PSS
SPACE:    1002 BLOCKS     FREE:    682    OCCUPANCY:  32%
NUMBER OF PRINT MEMBERS:     505
```

Figure 51. @I$UTIL OUT STATUS Sample Output

The output shows the information for the current PSS output directory in ADROUT. Please note that there may be more than one output directory. The output directory was built by using SCPSUTIL. (See the CAIIPC *Customization and Tuning Guide* for further information regarding the usage of SCPSUTIL).

The following command displays or prints:

- The names of all members in the specified VLS library
- The description of each member
- Total records per member
- Number of blocks occupied by the member
- Date created
- Date updated
- Length of each record.

Format:

```
@I$UTIL  OUT  INDEX    [ ADROUT    { SYSTEM  }   name ]
                       [ file-id   { NETWORK }        ]
```

ADROUT
The output library.

file-id
The DD/DLBL name of a VLS library.

name
Destination ID of the system or network printer.

Example:

The following command:

```
@I$UTIL OUT INDEX
```

produces the following output:

```
PDF   DISPLAY OUTPUT    OUT INDEX          DISPLAYP.S.S.   -   ONLINE  UTILITY
STATUS OF THE LIBRARY ADROUT         DATE 01/31/92     TIME 11.59.56
MEMBER NAME           MEMBER DESCRIPTION          NREC NBLK ADDED UPDATED RLEN
================================================================================

PSS$PSSDIR$           *** PSS SPOOL DIRECTORY ***   0250 0014 070690 073190 0179
PSS$PSSDST@           PSS - DESTINATION TABLE       0012 0002 071190 071990 0024
PSSSCF#0052           COMPILE LISTING               0021 0002 071990 071990 0133
PSSSCF#0053           COMPILE LISTING               0133 0004 071990 071990 0133
PSSSCF#0054           COMPILE LISTING               0109 0004 071990 071990 0133
PSSSCF#0056           COMPILE LISTING               0350 0006 071990 071990 0133
PSSSCF#0057           DISPLAY INTERR:               0009 0002 071990 071990 0133
PSSSCF#0071           COMPILE LISTING               0118 0004 071990 071990 0133
PSSSCF#0076           COMPILE LISTING               0101 0004 071990 071990 0133
PSSSCF#0082           COMPILE LISTING               0088 0004 071990 071990
0133PSSSCF#0083       COMPILE LISTING               0088 0004 071990 071990 0133
PSSSCF#0089           COMPILE LISTING               0109 0004 071990 071990 0133
PSSSCF#0090           COMPILE LISTING               0109 0004 071990 071990 0133
PSSSCF#0092           COMPILE LISTING               0115 0004 071990 071990 0133
PSSSCF#0093           COMPILE LISTING               0018 0002 071990 071990 0133
PSSSCF#0094           COMPILE LISTING               0021 0002 071990 071990 0133
PSSSCF#0103           COMPILE LISTING               0125 0004 071990 071990 0133
PSSSCF#0104           DISPLAY INTERR:               0012 0002 071990 071990 0133
PSSSCF#0112           COMPILE LISTING               0112 0004 071990 071990 0133
PSSSCF#0114           COMPILE LISTING               0116 0004 071990 071990 0133
PSSSCF#0115           COMPILE LISTING               0110 0004 071990 071990 0133
PSSSCF#0116           PRINT INDEX                   0026 0002 071990 071990 0133
PSSSCF#0118           COMPILE LISTING               0125 0004 071990 071990 0133
PSSSCF#0134           COMPILE LISTING               0163 0004 072090 072090 0133
PSSSCF#0143           COMPILE LISTING               0112 0004 072090 072090 0133
PSSSCF#0144           COMPILE LISTING               0215 0004 072090 072090 0133
```

Figure 52. @I$UTIL OUT INDEX Sample Output

The output directory in this example is the member PSS$PSSDIR$, which contains a system name of PSS and Directory name of $PSSDIR$. Both system name and directory name can be set by the command SET OUTPUT OPTIONS.

5.5 Error Recovery Tools

This section describes PDF/CICS features that can be used after an error occurs. It includes a description of MODU, and the DEQUEUE command (including the format of enqueue names).

5.5.1 MODU Transaction

The MODU transaction, which is distributed on the IPC installation tape, returns your terminal to uppercase translation mode. You can initiate the transaction from CICS Release 2.1.1 and below when control returns to CICS from PDF/CICS following an abend with the terminal in mixed (upper/lower) case mode.

Format:

```
MODU
```

This transaction is needed in the following circumstances. SCF must have complete control of the case mode during a PDF/CICS session so that the user's panels are transmitted as entered. In order to do this, SCF must set the terminal to mixed (upper/lower) case mode. If any module abends, the VPE abend handler gains control which will reset the terminal to its original setting. However, there are instances when the VPE abend handler does not gain control. An example is when an external security package, such as ACF2, times out a terminal. In this case, CICS gains control and expects the terminal to be in uppercase mode. It issues an error message when the next transaction is typed in:

```
DFH2001I INVALID TRANSACTION IDENTIFICATION transaction
PLEASE RESUBMIT hh:mm:ss
```

When you key in MODU and press Enter, you will receive a message that your terminal is in uppercase mode, and you can proceed.

5.5.2 DEQUEUE Command

PDF/CICS uses enqueues to protect entities (i.e., members and panel definitions). PDF/CICS entities are protected from simultaneous update, even by another CICS region or a batch job. This protection is at the individual entity level, rather than at the data set level.

Online, when a transaction abends, the program being edited remains enqueued. When you sign on again, an attempt to re-edit the program will result in the "resource busy" message. This may also happen when a system failure occurs while displaying an index, output, or jobcard. You cannot dequeue the program from another region, because the operating system keeps track of where the enqueue came from. Note that a batch job will not cause this problem, because when any job ends (including CICS), the operating system automatically cleans up all enqueues left outstanding by that job.

The PDF/CICS user has the responsibility to DEQUEUE entities. The user should always determine that the outstanding enqueue is a result of a transaction abnormal termination before issuing the DEQUEUE. For example, if one programmer is editing a panel and a second programmer attempts to edit the same panel, the second programmer will get the same "resource busy" message. If the Administrator issued a DEQUEUE in this situation and allowed the second programmer to begin editing the panel, serious library corruption could result.

The *Panel Definition Facility Command Reference Manual* includes the format of this command.

Do not try to relate PDF/CICS entities enqueued/dequeued to system data sets or other system objects. PDF/CICS generates a unique internal enqueue name for each object. This internal enqueue name does not correspond to any object known to the operating system.

The format for a PDF/CICS enqueue name is:

```
    10      20
+----+----+----+----

$Itsssxxxxxxxxebbbbbbvvv    For PNL names.

$Ituuuzzzzzzzzbbbbbbbbbb    For MEM names.
```

t
Type code:
- O Panel
- Z Data member

sss
System id.

x..x
Panel name.

vvv
Version number.

e
Optional enqueue code to uniquely identify names across systems; blank if not used.

b..b
Spaces.

uuu
User id.

z..z
Member name.

For MVS, note that the major or queue name, ADRPRDCT, is used with the minor or resource name. These names are compressed for VSE to a 12-byte format. The resulting name may not be printable.

Examples:

```
DEQUEUE PGM DEMO1 VER 1 SYS DOC
```

Dequeues program DEMO1 in system DOC.

```
DEQUEUE LIBRARY $IDLIB
```

Dequeues VLS dataview library $IDLIB.

5.5.3 @I$UTIL PSS Online Dequeue

The following command dequeues a print file, the display status member, or the PSS directory if the resource is caught in an enqueue due to a system failure, a PDF/CICS/IPC failure, or another failure level.

Format

```
@I$UTIL  OUT  DEQUEUE  [ print-number ]
                       [ STATUS       ]
                       [ DIRECT       ]
```

print-number
Number identifying a print file.

STATUS
The Display Status member.

DIRECT
The output directory.

Warning: Use this command with extreme caution. Be certain that the resource is locked due to an error condition, and not due to a legitimate enqueue.

5.6 PDF/CICS VLS Member Name Format

VLS supports member names of up to 40 characters. Member names may contain embedded blanks. PDF/CICS panel and member entities use 24-character member names.

Since a site can use a single VLS library for storing various types of information, the following conventions are used internally by PDF/CICS to identify VLS members.

A type code in the 22nd position of the name identifies the member as:

'H' Help text member
'O' Panel definition
'Z' Data member

Based on the member type, the following name formats are used:

```
Types          VLS Name 10        20        30        40
   ------      ----+----+----+----+----+----+----+----+
   O           sssxxxxxxxxx.......vvvt.e


   HZ          uuuxxxxxxxxx..........t.e
```

sss
The 3-character system-id of the PDF/CICS SYSTEM containing the program, panel, or report.

uuu
The 3-character user-id of the data member's owner.

xxxxxxxx
The 1- to 8-character panel, data member, or help member name, left-adjusted and padded to the right with blanks if necessary.

vvv
The 3-digit version number in unsigned zoned format, or the literal "PRD" for the PROD version of the program executable and symbol table objects.

t
The 1-character type code, as specified above.

e

A 1-byte edit-indicator to distinguish an EDIT session work copy of a source member from the original.

Normally, this position is blank (X'40'), indicating that this is the original member. For object members, this position is always blank.

When a source member is being edited, a copy of the member is made with an "E" in this position. This work copy is used when a ROLLBACK operation is done, either as a primary command or as an option when editing a member for which a previous EDIT session terminated abnormally. When an EDIT session ends normally, the work copy is deleted.

This position can also be "R" if the member is in the process of being deleted.

For data members (on library PDDAT) only, this position can be "I" if the member is under the control of an internal command.

These member are created during DISPLAY SESSION OPTIONS and DISPLAY INDEX.

5.7 PDF/CICS VLS Operations

This section describes how various PDF/CICS commands affect VLS members.

CREATE

PNL

Creates a single member on the PANEL library (type O). This member will contain all the components of the panel (parameters, layout, summary, field, picture, and facsimile).

MEM

Creates a single member on the PDDAT library (type Z).

EDIT

PNL

Makes a copy of the panel member on the panel library with an edit-indicator of E. At normal end of EDIT, the E member is deleted.

MEM

Makes a copy of the data member on the PDDAT library with an edit-indicator of E. At normal end of EDIT, the E member is deleted.

DUPLICATE

PNL

Makes a copy of the panel member with the new name: The panel name is changed to the new name, and the version is always 001. In addition, the DUP command internally invokes an EDIT command for the new panel.

MEM

Makes a copy of the data member with the new name: For a different user, the user-id is changed to the new user-id. In addition, the DUP command internally invokes an EDIT command for the new report.

DELETE

PNL

The panel source member is deleted.

MEM

The data member is deleted.

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