DB2 Query Management Facility

IBM

DB2 QMF High Performance Option User's Guide for TSO/CICS

Version 8 Release 1

DB2 Query Management Facility

DB2 QMF High Performance Option User's Guide for TSO/CICS

Version 8 Release 1

SC18-7450-00

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information in
> Appendix J, "Notices," on page 351.

Contents

Preface

About this manual

This book describes how to install, configure, and use DB2® QMF™ High Performance Option Version 8.1 for TSO/CICS®.

DB2 QMF High Performance Option (HPO) is a system utility used for generating, preparing, and running report programs for IBM®'s DB2 Query Management Facility (QMF).

HPO combines HPO/Compiler and HPO/Manager into one suite of performance facilities for the QMF for TSO/CICS environments.

- By tracking and identifying heavily used reports, and then automatically converting them into efficient COBOL programs, most reporting jobs for the enterprise can be greatly streamlined to reduce CPU resource consumption.
- By governing (preemptively and in real time) ad hoc and dynamic query and report activities, CPU resource usage can be precisely metered out at varying levels according to any number of schedules applied to QMF user groups.

This manual describes key HPO concepts, provides step-by-step procedures, and presents a sample of each panel.

Who should read this manual

The *DB2 QMF High Performance Option User's Guide for TSO/CICS* is intended for:

- **end users**, who run compiled report programs and provide runtime variables
- **programmers**, who convert QMF reports (queries, forms, and procedures) into compiled programs or who generate general purpose programs for accessing DB2
- **administrators**, who maintain control over QMF objects

Additional reference material

- Press **PF1** from a panel to view ISPF online help
- The program directory on the SMP/E tape contains detailed installation instructions

Documentation conventions

This section describes the typographical conventions used in this manual. These conventions make it easier to gather information. The typographical conventions are used to introduce new terms, illustrate panels, describe command syntax, among other reasons.

Table 1. Conventions and Terminology

Terminology	Meaning
Bold font	Identifies fields, such as: Errors logged on the **To Date** will be archived.
Italic font	Identifies related publications, chapters, and optional steps in a task. For example: Refer to the *User's Guide* for more information.
`Monospaced font`	Used for system messages and command syntax. For example: `CALL 'QMFHPO.SRAALLOAD(RAAMAIN)' 'CO 1'`

Getting support and service

To find service updates and support information, including software FixPaks, PTFs, Frequently Asked Questions (FAQs), technical notes, troubleshooting information, and downloads, refer to the following address:

www.ibm.com/software/data/qmf/support.html

Where to find information

The DB2 QMF Web site provides current product documentation that you can view, print, and download. To locate publications with the most up-to-date information, refer to the following Web sites:

www.ibm.com/software/data/qmf/library.html

www.ibm.com/software/data/qmf/support.html

Summary of changes

This manual reflects the following revisions and enhancements made to QMF High Performance Option since Version 7.2:

Table 2. Revision and enhancements for Version 8

Revision/Enhancement	Description
Long name support	The maximum length of owner and table names has been expanded to 128 characters for DB2 UDB Version 8 and DB2 QMF Version 8. The name fields will not be expanded on existing panels, which may result in truncated names. A greater than sign (>) will be appended to the name if the number of characters exceeds the field size. You can view or edit the entire name in a pop-up window by pressing **PF5**.
Stored procedure report generator	HPO/Compiler supports the ability to generate DB2 stored procedure programs. Using a query as input, you can generate a program that packages that query into a stored procedure, and optionally returns the query results as a result set.

Chapter 1. QMF HPO/Compiler

Welcome to QMF HPO⁄Compiler, the family of system utilities for generating, preparing, and running report programs for IBM's DB2 Query Management Facility (QMF).

Compiler comprises these integrated components:

- Program Generator
- End User Facility

Program Generator

This facility is used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs, to automatically generate DB2 stored procedure programs from QMF queries, or to generate general purpose application programs for accessing DB2. In addition, this facility can automatically register report programs with the End User Facility.

End User Facility

As report programs are generated and prepared for execution, they are automatically registered with the End User Facility. Once programs are registered, this facility is used by end users to run the compiled report programs. The non-technical user interface makes it easy to list, locate, and process reports.

After selecting a report, the end user is prompted to supply any runtime variable values. If the report is to run in batch mode, JCL is automatically generated and optionally submitted. Otherwise, the interactive report is run online in the appropriate environment, TSO or CICS.

Starting HPO⁄Compiler

Issue the following TSO command to display the Compiler Selection Menu:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'M1'
```

Selection menu

The Compiler Selection Menu is presented below:

Table 3. QMF HPO Compiler Selection Menu

```
QMF HPO∕Compiler -- Selection Menu -------------------------------- 8.1.0
ENTER SELECTION ===>
                                    DB2 SSID ===> DB2P
                                    Location ===> DB2PLOCATION
                                    User ID:
                                    Date:
                                    Time:
-------------------------------------------------------------------------
1  Program Generator
2  End User Facility
Q  QMF
X  Exit
-------------------------------------------------------------------------
5675-DB2 Copyright (C) 2003 IBM Corp. All Rights Reserved.
Copyright (C) 2003 Rocket Software, Inc. All Rights Reserved.
IBM is a registered trademark of International Business Machines Corporation.
Rocket is a registered trademark of Rocket Software, Inc.
-------------------------------------------------------------------------
```

You can invoke each of the menu options using the one-character selection codes.

Chapter 2. Program Generator

Overview

This chapter describes the use of Program Generator. With Program Generator, you can:

- Generate programs
- Prepare programs
- Run programs
- Maintain the End User Facility tables

Generate programs

Program Generator generates three basic types of programs: *QMF report programs*, *stored procedure programs*, and *data layer* programs.

The Generate Programs option guides you through the process of specifying and locating the inputs (queries, forms, and procedures), specifying options for the programs to be generated, and generating the programs. This option provides hooks into other Program Generator options (Prepare Programs and Run Programs) to automatically perform additional functions on a program once it is generated. It also provides a mechanism to register generated programs for use with the End User Facility.

QMF report program

At the simplest level, a QMF report is the result of issuing the QMF commands **RUN QUERY** and **PRINT REPORT**. A report program generated by this facility produces the same result, although there might be significant variations on a program's function (for example, it might also perform a **SAVE DATA** command). In this manual, a query (or a query and form) is often referred to as a report. QMF procedures, which consist of a series of QMF commands, contain one or more reports. Program Generator can generate one program for each report in a procedure, and can also generate a single proc (procedure) program that runs each of the report programs in the procedure.

Stored procedure program

A stored procedure program is a program stored at a DB2 server that can execute SQL statements and perform other functions. A client application, on either the same machine or a remote machine, can invoke the program using the SQL statement CALL. There are many advantages to using stored procedures. You should consult the documentation provided with your

licensed DB2 product for more information. This documentation is essential for fully understanding and taking advantage of the support for stored procedures in Program Generator.

Note: Program Generator supports DB2 stored procedure that run in a WLM-managed address space only. Stored procedures that run in the DB2-managed stored procedure address space are not supported.

Program Generator generates stored procedure programs from QMF queries. Substitution variables used in an input query are converted to input parameters for the generated stored procedure. If the query is a SELECT statement, the result set returned by that SELECT statement can be returned as a result set from the stored procedure.

Data layer program

A data layer program is a general utility program providing access to DB2 in order to retrieve data (via an SQL cursor or **SELECT INTO** statement) or to manipulate data (via an SQL **INSERT**, **UPDATE**, or **DELETE** statement). Data layer programs are generated from QMF queries, but do not provide any QMF-specific functionality, such as reports or procedure commands. Unlike stored procedure programs, they are intended to be called directly from other programs (rather than being invoked directly or via the SQL statement CALL), and they accept input variables and return output variables via the LINKAGE SECTION of the program.

Prepare programs

Program Generator provides a convenient panel-driven interface to easily prepare DB2 programs, online or in batch. *Preparing* a program involves running a precompile, bind, CICS command translation (for CICS programs), compile, and link. The Compile Programs option is tailored to preparing the type of programs generated by the Generate Programs option, but it can be used to prepare DB2 programs from any other sources that fit the same model.

Run programs

The Run Programs option gives you the ability to run DB2 programs online and to tailor and submit JCL to run batch DB2 programs. The user specifies a program to run and its characteristics, and Program Generator automatically performs all of the work to run it.

Maintaining the End User Facility tables

Program Generator provides an easy-to-use, panel-driven interface that allows you to maintain the information about the reports registered to the End User Facility. This option provides list, browse, create, drop, and edit functions for End User Facility reports (which are registered in DB2 tables).

Starting Program Generator

You can start this facility from a normal TSO/ISPF session or from a QMF session under TSO/ISPF. Starting from within a QMF session allows you to work with any current QUERY, FORM, or PROC object.

Starting from TSO/ISPF

Select option 1 from the Compiler Selection menu to start Program Generator. You can also invoke this facility by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

Starting from QMF

You can start Program Generator from QMF by running the following QMF procedure:

```
TSO CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

Additionally, you can build a command synonym that runs this procedure so that users can access the procedure fully qualifying its name (see ″Running programs″). A QMF command synonym named RCO is created during the standard installation process so that you can invoke this facility from QMF.

Selection menu

The Program Generator Menu is presented below:

Table 4. QMF HPO/Compiler Program Generator Selection Menu

```
QMF HPO/Compiler -- Program Generator Selection Menu ------------------ 8.1.0
Option ===>

                                        DB2 SSID ===> DB2P
                                        Location ===> DB2PLOCATION
                                        User ID:
                                        Date:
                                        Time:
-----------------------------------------------------------------------------

1  Generate Programs (Full Dialog)
2  Generate Programs (Short Dialog)
3  Compile Programs
4  Run Programs
5  Maintain End User Facility Reports
D  Set Default Parameters
X  Exit
```

Generating programs

The generation process proceeds in two phases. The first phase consists of specifying the inputs (queries, forms, and procedures), and locating them. Locating the inputs consists of exporting them from QMF to specified data sets and members (or temporary data sets), or verifying that they exist outside of QMF. The goal of this phase is to produce a list of all reports specified in the input, along with the pertinent information about each (for example, query name, form name, or query data set and member). This list is referred to as the Report List.

The second phase consists of using the Report List to selectively operate on, and generate programs for, each report. Operations include reviewing the query (browsing or editing it), providing values for substitution variables in the query and form, and setting generation options for the program.

Generating programs with the full dialog panel

Program generation is initiated from the Generate Programs (Full Dialog) panel or the Generate Programs (Short Dialog) panel. Most of the discussion in this chapter on generating programs refers to the Full Dialog option. Using the Short Dialog option to generate programs is discussed later in this chapter, as is generating programs using batch JCL.

Select option 1 from the Program Generator Menu to display the Generate Programs (Full Dialog) panel. This panel can also be reached by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 1'
```

Table 5. Generate Programs (Full Dialog) Panel

```
DB2P  DB2PLOCATION -- Generate Programs (Full Dialog) --------------- 8.1.0
Command ===>
Use % and _ as wildcard characters to produce a list of objects
Press ENTER to proceed to next panel.
Type CAN or CANCEL or press PF3 to end.

Generate programs from one of the following:
1. Query Name.... ===>

2. Query Name.... ===>
   Form Name..... ===>

3. Procedure Name ===>



```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the program generation process will begin.

If you press **PF3**, all input fields will be ignored and you will return to the Program Generator Menu.

Before you can generate a program, you must identify the input source: a query, a query and form combination, or a linear procedure. If you choose a query or a query and form, a Report List with one report will be produced. If you choose a query with no form, the same default form settings as QMF are assumed, and a form name of *DEFAULT will be used. If you choose a procedure, the procedure will be parsed, and a Report List will be produced consisting of all reports specified in the procedure.

You do not need to specify a form to generate a stored procedure program or a data layer program. You enter the name of a query or the name of a procedure that refers to queries from which to generate stored procedure programs or data layer programs.

The fields on the panel are:

Query Name
> Enter the name of a query from which to generate a program. If the name is unqualified, then the current SQLID will be used as the query owner. You can enter the name QUERY to specify the current QMF query object. You can use % and _ as wildcard characters in the name to produce a list of queries from which to select.

Form Name
> Enter the name of a form from which to generate a program (along with a query). If the name is unqualified, then the current SQLID will be used as the form owner. You can enter the name FORM to specify the current QMF form object. You can use % and _ as wildcard characters in the name to produce a list of forms. Leave this field blank to generate a stored procedure program or a data layer program.

Procedure Name
> Enter the name of a linear procedure from which to generate programs. If the name is unqualified, then the current SQLID will be used as the procedure owner. You can enter the name PROC to specify the current QMF PROC object. You can use % and _ as wildcard characters in the name to produce a list of procedures from which to select.

Confirming query and form locations

After the inputs are specified, a list of the reports they specify is built that contains the name of the query and optional form for each. The next goal is to

ensure that each object referenced exists (in exported format) in a data set and member. Objects that have not been exported (that is, they exist only in QMF) are automatically exported. Also, the existence in the specified data sets of all objects that have already been exported is verified at this time.

This step in the input specification phase is controlled from the Confirm Query/Form Locations panel. This panel lists the name and location of the query and form for each report for which you are generating a program. This panel displays only if the **Confirm Query/Form Locations?** flag on the Set Default Parameters panel is set to Y. If it is set to N, this panel is suppressed, and default values are used for all fields.

Confirm Query/Form Locations panel
When this panel is first displayed, the **Exp**, **DSN**, and **Mem** fields are filled in with values from the Set Default Parameters panel. However, if the input to the generation process was a procedure that contained IMPORT commands for any of the listed objects, the data sets and members referenced in those commands are used for the corresponding objects on this panel. You can change any of the fields for any of the objects listed by typing over the value.

Table 6. Confirm Query/Form Locations

```
DB2P / DB2PLOCATION -- Confirm Query/Form Locations ----------------- 8.1.0
Command ===>                                                Scroll ===> PAGE

Set Expor / Data set / Member fields for each report's query and form.
Press ENTER to proceed to the Report List panel.
Type CAN or CANCEL or press PF3 to cancel generation process at this time,


-------------------------------------------------------------------------------
Report
  Query: Export.. ===>    (Y=Yes, N=No)
         Data set ===>
         Member.. ===>
   Form: Export.. ===>    (Y=Yes, N=No)
         Data set ===>
         Member.. ===>
 -------------------------------------------------------------------------------
***************************** Bottom of data *****************************
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the program generation process will proceed with these location settings.

If you press **PF3**, the program generation process will stop and you will return to the Generate Programs panel.

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

The following fields are listed for each input query and form. If there is no form specified for a particular report, then the input fields for that form are initially blank and are ignored.

Export Enter Y if this object currently resides in QMF and should be exported to the specified data set. Enter N if this object has been exported to the specified data set.

Data set

Enter the name of the data set into which this object should be exported (if the **Export** flag is set to Y) or which contains this object (if the **Export** flag is set to N). If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. If the **Export** flag is set to Y, you can enter the name *TEMP, to specify that a temporary data set should be created for the export.

Member

If the specified **Data set** is a PDS, you must enter the member into which this object should be exported or which already contains this object. If the specified **Data set** is not a PDS or is *TEMP, leave this field blank.

Confirming exports

If the **Confirm Exports?** flag on the Set Default Parameters panel is set to Y, the Export Confirmation panel will be displayed before any objects are exported.

Two commands are issued by Program Generator when exporting a query. First, a CONVERT command is issued to ensure that the query is an SQL query (as opposed to a prompted or QBE query), and then an EXPORT command is issued. The CONVERT command converts the specified query and replaces the current query object with its SQL version. This current query is then exported.

Note: The CONVERT command resets the contents of the current query object.

On the Export Confirmation panel, the command displayed is the **effective** export command, not the commands which are actually issued. For example, if a query named QUERY1 is exported, the command as displayed on this panel is:

```
EXPORT QUERY QUERY1 TO ...
```

while the actual commands issued are:

```
CONVERT QUERY QUERY1 ...
EXPORT QUERY TO ...
```

Export Confirmation panel
The Export Confirmation panel is presented below:

Table 7. Export Confirmation

```
DB2P ⁄ DB2PLOCATION -- Export Confirmation -------------------------- 8.1.0
Command ===>
Press ENTER to confirm this export command.
Type CAN or CANCEL or press PF3 to bypass this export command.



About to issue this EXPORT command to QMF:
-----------------------------------------------------------------------




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




```

If you press **Enter**, the export command will be processed by QMF.

If you press **PF3**, the export command will be bypassed and the object that was being exported will be assumed to exist in the specified data set and member.

If you type `NOCONF` and press **Enter**, the export command will proceed, and the value of the **Confirm Exports?** flag on the Set Default Parameters panel will be set to `N`. All subsequent exports will proceed without confirmation.

The Report List

If you specified a linear procedure as input to the generation process, then a list of queries and forms referenced in that procedure is built. This list is called the Report List. Subsequent processing on this list is performed from the Report List panel.

If you specified a query or a query and form combination as input, then the Single Report List is produced. Subsequent processing on this single entry is performed from the Single Report List panel.

Operating from the Report List panel

If you specify a linear procedure as input to the generation process, when the input specification phase completes, Program Generator produces a list of the reports that confirms that the objects referenced in the reports exist in exported format in the data set specified for that object.

Report List panel

The Report List panel displays one row for each report in the Report List. Each row lists the query name, the form name, and a set of input fields that control the generation process for that report. The rest of the generation process is controlled from this panel, based on the settings of these input fields.

Table 8. Report List

```
DB2P ⁄ DB2PLOCATION -- Report List ------------------------------------ 8.1.0
Command ===>                                              Scroll ===> PAGE
Set the action flags in each row.
Press ENTER to process the action flags.
Type CAN or CANCEL or press PF3 to end.

Browse Procedure? (Y⁄N)..... ===>
Generate Proc Program? (Y⁄N) ===>
Review Edit Generate
Num Query                       Form                     Query Vars Program
--- ----------------------   ------------------------ ------ ---- --------

***************************** Bottom of data *****************************


```

If you press **Enter** (without entering a command), the action flags will be processed. These flags determine which panels will be displayed next. The Report List panel will not be displayed again until all of the flags have been processed, or until an error is encountered in processing the flags.

If you press **PF3**, the action flags will be ignored and you will return to the Generate Programs panel.

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

If you type NOCONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel will be set to N.

If you type CONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel will be set to Y.

If you type STOPQMF and press **Enter**, the QMF session that was started to issue export commands, will be terminated. This command has no effect when Program Generator was started from within a QMF session.

If you type EDIT <num> and press **Enter**, where <num> is a valid report row number, you will edit the previously generated program for that report row. If you type EDIT PROC and press **Enter**, you will edit the previously generated proc program.

If you type REGISTER <num> and press **Enter**, where <num> is a valid report row number, you will proceed to the Register Programs panel with initial values set for registering the program in that report row. If you type REGISTER PROC and press **Enter**, you proceed to the Register Programs panel with initial values set for registering the proc program.

If you type COMPILE <num> and press **Enter**, where <num> is a valid report row number, you proceed to the Compile Programs panel with initial values set for preparing the program in that report row. If you type COMPILE PROC and press **Enter**, you will proceed to the Compile Programs panel with initial values set for preparing the proc program. See "Preparing programs" for information on the Compile Programs option.

If you type RUN <num> and press **Enter**, where <num> is a valid report row number, you proceed to the Run Programs panel with initial values set for running the program in that report row.

If you type RUN PROC and press **Enter**, you proceed to the Run Programs panel with initial values set for running the proc program. See "Running programs" for information on the Run Programs option.

The fields on the panel are:

Browse Procedure?
> Enter Y to browse the input procedure. If you enter N, you will not browse the input procedure.

Generate Proc Program?
> Enter Y to proceed to the Proc Program Generation Options panel to generate a program for the procedure. If you enter N, no action will be

taken. You must generate programs for each report in the procedure before you can generate the proc program.

Review Query
Enter B to browse the input query, E to edit the input query, or N to do neither.

Edit Vars
Enter Y to proceed to the Edit Variables panel. If you enter N, no action will be taken.

Generate Program
Enter Y to proceed to the Generation Options panel, and to generate a program for this report. If you enter N, no action will be taken.

Operating from the Single Report List panel

If you specify a query or a query and form combination as input to the generation process, when the input specification phase is complete, Program Generator will have verified that the query and (optional) form referenced exist in exported format in the data set specified for each.

Single Report List panel
The Single Report List panel displays the same information for one report as the Report List panel displays in each row for each report in the Report List. The query name, form name, and three input flags that control the generation process for the report are listed. The rest of the generation process is controlled from this panel, based on the settings of these input flags.

Table 9. Single Report List

```
DB2P ⁄ DB2PLOCATION -- Single Report List ---------------------------- 8.1.0
Command ===>
Set the action flags.
Press ENTER to process the action flags.
Type CAN or CANCEL or press PF3 to end.
Query :
Form. :
1. Review Query?.... ===>    (B=Browse, E=Edit, N=None)
2. Edit Variables?.. ===>    (Y=Yes, N=No)
3. Generate Program? ===>    (Y=Yes, N=No)
```

If you press **Enter** (without entering a command), the action flags will be processed. These flags determine which panels will be displayed next. The

Single Report List panel will not be displayed again until all of the flags have been processed, or until an error is encountered in processing the flags.

If you press **PF3**, the action flags will be ignored and you will return to the Generate Programs panel.

If you type NOCONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel will be set to N.

If you type CONF and press **Enter**, the value of the **Confirm Exports?** flag on the Set Default Parameters panel will be set to Y.

If you type STOPQMF and press **Enter**, and if a QMF session has been started to issue export commands, the session will be terminated. This command has no effect when Program Generator was started from within a QMF session.

If you type EDIT 1 and press **Enter**, you will edit the previously generated program.

If you type REGISTER 1 and press **Enter**, you will proceed to the Register Programs panel with initial values set for registering the program.

If you type COMPILE 1 and press **Enter**, you will proceed to the Compile Programs panel with initial values set for preparing the program.

If you type RUN 1 and press **Enter**, you will proceed to the Run Programs panel with initial values set for running the program.

The fields on the panel are:

Review Query?
> Enter B to browse the input query, E to edit the input query, or N to do neither.

Edit Variables?
> Enter Y to proceed to the Edit Variables panel. If this flag is set to N, no action will be taken.

Generate Program?
> Enter Y to proceed to the Generation Options panel, and to generate a program for this report. If this flag is set to N, no action will be taken.

Reviewing the query before generation

You can browse or edit a query before generating a program by setting the **Review Query?** action flag to B or E, respectively, on the Report List panel.

Table 10. Report List

```
BROWSE -- USER.APPL.QUERY(QUERY1) ------------------ LINE 00000000 COL 001 079
Command ===>                                                 Scroll ===> PAGE
***************************** Top of data *****************************
*************************** Bottom of data ****************************




```

If you press **PF3**, you exit from the browse or edit session and the next panel
will be displayed.

Editing variables

QMF queries can contain substitution variables. Before a query is run, QMF
replaces each variable in the query with its value. If a variable does not have
a value (that is, it is unbound) then the query cannot be run.

Variable bindings can be established through the SET GLOBAL and RUN QUERY
commands. When using QMF in an online mode, a prompt panel is displayed
whenever a query with unbound variables is run. The panel lists the unbound
variables with a field in which you can enter its value. You cannot be
prompted when running QMF in batch. Therefore, the values must be set
through commands in the procedure that invokes the query.

Values for variables
A variable can be replaced with a literal text string. Before the query with the
variable is embedded in the generated program, the variable is replaced by
the literal. For example, this query contains a variable named &VAR1:

```
SELECT &VAR1
  FROM HR.DEPT_TABLE
```

If &VAR1 is given the value NAME, then the query that will be embedded in
the generated program is:

```
SELECT NAME
  FROM HR.DEPT_TABLE
```

In addition, QMF substitution variables can be replaced with host variables. Host variables can be used to receive values from DB2 or send values to DB2. For example, this query contains a host variable named: MAXDAYS in the WHERE clause:

```
SELECT NAME, DEPT
  FROM HR.DEPT_TABLE
 WHERE VACATION_DAYS > :MAXDAYS
```

If :MAXDAYS holds the value of 20 when this query is run, then the predicate will be evaluated as:

```
WHERE VACATION_DAYS > 20
```

A QMF substitution variable cannot always be replaced by a host variable. You can convert **some** QMF queries with variables into syntactically correct embedded SQL with host variables by substituting the variables with host variable names. However, it is possible to create a QMF query with variables that cannot be converted into embedded SQL by this substitution. For example, a QMF query can contain a variable in the FROM clause:

```
SELECT NAME, DEPT
  FROM &TAB
```

It is syntactically incorrect to code embedded SQL with a host variable in a FROM clause:

```
SELECT NAME, DEPT
  FROM :TAB
```

In a case like this, the &TAB variable must be replaced by a literal string (for example HR.DEPT_TABLE) as described above.

When specifying a replacement value for a QMF substitution variable, a host variable is specified by entering a value that begins with a colon (:). Although host variables are not required to start with a colon in embedded SQL, that requirement is made for host variables generated here. A value that does not begin with a colon is processed as a literal string.

The following example shows a query that contains variables, binding values for those variables, and the resulting embedded SQL

Query with substitution variables:

```
SELECT NAME, &ASOFDATE, DEPT
     FROM &CREATOR.DEPT_TABLE
   WHERE VACATION_DAYS > &MAXDAYS
      AND JOB = &JOB
      AND STATUS = &STATUS
```

Variable binding values:

Variable name	Value
&ASOFDATE	:TODAYS-DATE
&CREATOR	HR
&MAXDAYS	20
&JOB	'MGR'
&STATUS	:STATUS-IND

SQL embedded in a COBOL program:

```
EXEC SQL DECLARE C1 CURSOR FOR
   SELECT NAME, :TODAYS-DATE, DEPT
      FROM HR.DEPT_TABLE
   WHERE VACATION_DAYS > 20
      AND JOB = 'MGR'
      AND STATUS = :STATUS-IND
END-EXEC.
```

When you specify a host variable to replace a substitution variable, you can request that Program Generator automatically generate a host variable that is suitable for comparison with a specific database column. To do so, after the colon, enter an equal sign (=) followed by the name of the column. The name and data type of the host variable will be generated automatically to match the column. For example:

Variable name	Value
&INPUTID	:=Q.STAFF.ID
&INPUTNAME	:=Q.STAFF.NAME

You can also explicitly define the host variable name and data type. After the host variable's name, enter a space followed by its data type. For example:

Variable name	Value
&ASOFDATE	:TODAYS-DATE DATE
&STATUS	:STATUS-IND SMALLINT

Valid data types are:
- INTEGER
- SMALLINT
- FLOAT
- DECIMAL
- DECIMAL(p)

- DECIMAL(p,s)
- CHAR(n)
- VARCHAR(n)
- DATE
- TIME
- TIMESTAMP

When the program is generated, a definition of the appropriate type is included for each host variable. For example:

```
01  HOST-VARIABLES.
    03  TODAYS-DATE     PIC X(10).
    03  STATUS-IND      PIC S9(4) COMP.
```

Code to read a value for each host variable will also be included in the generated program. For stored procedure programs, values are obtained from input parameters to the stored procedure, accessed via the program's LINKAGE SECTION. For data layer programs, values are also passed in from the calling application and accessed via the LINKAGE SECTION. For other types of programs that run in batch, values are obtained by reading the HOSTVARS or PROCVARS DD. Online programs display prompt panels to obtain values from the user.

Edit Variables panel

When you set the **Edit Variables?** action flag to Y, the Edit Variables panel is displayed. This tabular panel contains three columns:

- substitution variable names
- values
- whether or not host variables from the second column should include an indicator variable to specify whether the host variable's value is NULL

Program Generator determines the default value for each variable by parsing the input query to determine if the variable is compared with a specific database column. If it is, the default value for that variable is an automatically-generated host variable for that column. Otherwise, the default value is a host variable with the same name as the original substitution variable. However, if the input to the generation process was a procedure, then the default setting for a variable is taken from a binding on the **RUN QUERY** command for that report. If there is no binding, the default setting is taken from any preceding **SET GLOBAL** command. If you do not provide appropriate values for each variable, you may encounter an SQL error when you try to generate a program from the query.

Table 11. Edit Variables

```
DB2P ⁄ DB2PLOCATION -- Edit Variables ----------------------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Overtype variable values to change.
Press ENTER to save variables values.
Type CAN or CANCEL or press PF3 to leave values unchanged.
Variable Name     Literal Value or Host Variable and Data Type       Null
----------------  ----------------------------------------------- ----

****************************** Bottom of data ******************************



```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, these variable settings will be saved (and later used if you generate a program for this report).

If you press **PF3**, all input fields will be ignored and you will proceed to the next panel. The previous variable settings will be restored.

If you type ABORT and press **Enter**, all input fields will be ignored and you will return to the Report List panel. The previous variable settings will be restored.

To replace variables with literals, enter the following field

Literal Value
> Enter the literal value with which to replace this variable. The value can be up to 55 characters in length. It must not start with a colon (:). Leaving this field blank implies a value of a single space.

To replace variables with host variables, enter the following fields:

Host Variable and Data Type
> Enter the host variable name, beginning with a colon (:).
>
> To automatically define a host variable that is suitable for comparison with a specific database column, enter an equal sign (=) after the colon, followed by the table creator, table name, and column name.
>
> For example, to create a host variable suitable for use with the ID column of the Q.STAFF table, enter :=Q.STAFF.ID. The name and data

type of the host variable will be generated automatically. To explicitly specify the host variable name and data type, enter the name after the colon, followed by at least one space and then the data type. Valid data types are: SMALLINT, INTEGER, DECIMAL(p,s), DECIMAL(p), DECIMAL, FLOAT, CHAR(n), VARCHAR(n), DATE, TIME, and TIMESTAMP.

Note: If you are specifying a data type for a host variable that will be the target in an SQL LIKE clause, you should specify VARCHAR(n) as the type rather than CHAR(n).

This is not a requirement of Program Generator; however, DB2's processing of a LIKE clause with a CHAR host variable is non-intuitive. Using the VARCHAR data type usually produces the desired results.

Null   Enter Y to specify that an indicator variable should be included with the specified host variable. An indicator variable is an additional host variable with data type SMALLINT that indicates whether or not the value of the primary host variable is NULL. If the indicator value is less than zero, the primary host variable value is NULL. Enter N to specify that an indicator variable is not required. For host variables used in the WHERE clause of an SQL statement, indicator variables are typically not required.

Note: For stored procedure programs, the nullability of input parameters is determined by the parameter style chosen when the program is generated. In this case, the nullability values you enter on the Edit Variables panel are ignored.

Description of generation options

Before you generate a program, you should be familiar with the generation options. These options allow you to control the characteristics of the program that will be generated. These options are set on the Generation Options panel and the pop-up options windows are accessed from there. These options can affect the speed and performance of the generated program.

Environment

You can generate programs for any of the batch, TSO, CICS, or stored procedure environments.

Batch programs

Batch report programs are straightforward. Data is read from an SQL cursor, formatted, and written to the REPORTnn DDs. Once all of the data is read, the report files are closed and the program ends. Data layer programs are

always generated as if for the batch environment, but they can be called by programs running in the batch or TSO environments.

TSO programs

TSO report programs must be run under TSO and ISPF because they make calls to ISPF dialog manager services. You can generate two types of TSO programs: display programs and print programs.

- Display programs allow you to browse the report, in most cases before all of the data is read (just like QMF). When you scroll forward, enough rows are fetched from the cursor to fill up the next panel of formatted report data. However, there are some reports (such as those that have print capability or those that use the **ACROSS** usage code) that require all of the data to be read before any of the formatted report can be displayed. In these cases, a prompt panel warns you that all of the data must be read, and you can cancel or continue the report.
- A print program is a specialized program that produces a printed version of a report being displayed by a display program. From a display program that has been generated with print capability, issuing the **PRINT** command invokes a corresponding print program that generates a printed report by writing to the RAAPRINT DD or by invoking GDDM® services if a GDDM printer nickname is specified on the **PRINT** command.

CICS programs

CICS programs are pseudo-conversational. You can generate two types of CICS programs: display programs and print programs.

- Display programs allow you to browse the report after the data is read from DB2 and the cursor is closed. The report data is browsed using the supplied BMS maps. The generated CICS program (not the BMS map) controls the scrolling through the report. Standard PF keys are used to scroll forward (**PF8**), backward (**PF7**), left (**PF10**), and right (**PF11**). In addition, full ISPF-like scrolling is supported with a command line and a scroll amount field.
- CICS print programs perform a similar function as TSO print programs, but they write their output to a CICS data queue. The name of the print queue defaults to RAAPnnnn, where nnnn is the terminal ID, but you can override this name on the PRINT command.

Stored procedure programs

Stored procedure programs run under the control of DB2 in response to a CALL statement executed by a client application. Stored procedure programs accept input parameter values, execute an SQL statement, and optionally

return a result set (if the executed SQL statement was SELECT). Stored procedure programs do not format or return QMF reports.

Program Type
The setting of the Program Type option determines the basic function of the generated program.

Specifying **PRINT** will result in a program that formats a report for printed output. This type of report has regular page breaks, and includes a carriage control character as the first character of each line of the report. The QMF `PRINT REPORT` command generates this type of report.

Specifying **DISPLAY** will result in a program that formats a report and displays it online to the user. The QMF `DISPLAY REPORT` command generates this type of report.

Specifying **NO REPORT** results in a program that does not print or display a report, but it retains additional QMF processing, such as SAVE DATA processing. This type of program must be specified when generating a stored procedure program. For programs that are not stored this type of program can be used as a skeleton or model for other processing.

Specifying **DATA LAYER** will result in a program that executes an SQL statement, using input host variables values and returning output data (if any) via the LINKAGE SECTION. Data layer programs differ from the other program types because they cannot contain additional QMF processing.

Program Type for batch programs must be **PRINT**, **NO REPORT**, or **DATA LAYER**. For TSO and CICS programs it can be **DISPLAY**, **PRINT**, or **REPORT**. For stored procedure programs it must be **NO REPORT**.

Note: TSO and CICS **PRINT** programs can be invoked only from a corresponding **DISPLAY** program, which is, a program for the same report, using the same host variables.

The above options apply to programs generated from SELECT queries. If the input query is not a SELECT statement, there is no concept of a report, so the program type must be **NO REPORT** or **DATA LAYER**.

Save Data
You can generate programs with source code to emulate the operation of the **SAVE DATA** command of QMF. The data fetched by the program will be saved to the specified DB2 table. If the table does not exist, it will be created. If the table exists, the generated program will check that the column layout of the query's SELECT clause matches the table. If it does not, program execution

will terminate with an error. Otherwise, the existing data will optionally be deleted (depending on the ACTION parameter to the **SAVE DATA** command), and the new data will be inserted.

The options for the **SAVE DATA** processing include the table name in which to save the data, the table space in which to create the table, the comment to put on the table, the action to take on data in the table, and the mode in which to run the SQL for the **SAVE DATA** command (static or dynamic). These options are specified on the Data Processing Options pop-up window. If the input to the generation process was a procedure that contained a **SAVE DATA** command, then the options specified on the command will be displayed as the default in the pop-up window.

If the **SAVE DATA** table name is unqualified, then it will be qualified with the package or plan OWNER or QUALIFIER parameters specified at bind time (if using static SQL) or with the CURRENT SQLID of the user at runtime (if using dynamic SQL). It is possible to generate a program that uses static SQL for most of its processing, but to use dynamic SQL specifically for **SAVE DATA** processing. This allows the qualification of the **SAVE DATA** table name to be based on the runtime user, without forcing the rest of the program to use dynamic SQL.

Programs that perform the **SAVE DATA** operation incur additional overhead, because they contain DDL statements (to create the table) and DML statements (to delete existing data and insert new data). When binding the plan for such a program, VALIDATE(RUN) should be specified if the processing uses static SQL, rather than VALIDATE(BIND). In addition, the user running such a program must have permission to create, delete from, insert into, and comment on the target table.

TSO and CICS display programs that perform the **SAVE DATA** operation must read all of the data for the report from DB2 before displaying a report. This ensures that the data is saved before exiting the program. This also avoids DB2 holding locks while a user is browsing a report, potentially for a long time.

Note: Stored procedure and data layer programs cannot include **SAVE DATA** functionality.

Erase Table(s)?
You can generate programs with source code to emulate the operation of the ERASE TABLE command of QMF.

At the end of a successful run of the program, the specified table will be dropped from DB2 by executing a DROP TABLE SQL statement.

Note: This operation deletes data from the table and drops the table.

If the input to the generation process was a procedure that contained an ERASE TABLE command, then the table name specified will be displayed as the default on the Data Processing Options pop-up window. If the procedure contained more than one **ERASE TABLE** command, then the string *MULTIPLE will be displayed as the default on the window, and the field will be protected. The names of the tables being dropped cannot be changed.

If the input was not a procedure or if it was a procedure that did not contain **ERASE TABLE** commands, you can build a program that performs an **ERASE TABLE** by manually specifying a table name on the Data Processing Options pop-up window. Only one table can be specified.

Note: Data layer programs cannot include **ERASE DATA** functionality.

Write Data To File

You can generate programs with source code to save data to a sequential file, instead of a DB2 table. This allows you to eliminate a significant amount of DB2 processing. All of the DDL and DML associated with saving data to DB2 tables will be omitted from the program, which will eliminate database locking contention. As with the **SAVE DATA** option, you can select this feature even if you are generating from a query or from a procedure with no **SAVE DATA** command.

Programs generated with this option write the fetched data to a DD named DATAOUT. Program Generator automatically calculates the minimum LRECL for this DD based on each selected column's length and indicator variable. If you want to specify a different LRECL, you can enter it in the **LRECL** field on the Data Processing Options pop-up window. If the **LRECL** field is left blank or contains an asterisk (*), the computed value will be used. You can determine the LRECL that is actually used by looking at the generated program.

You can SAVE DATA to a table **and** to a sequential file in the same program. These options are not mutually exclusive.

TSO display programs that have the print capability are required to enable this option. In this case, the data is written to the RAADATA DD. The print program invoked by the display program then reads from the RAADATA DD to format and print its report. This eliminates the need for the print program to re-read the data from DB2.

Note: Stored procedure and data layer programs cannot include **Write Data To File** functionality.

Read Data From File

You can generate a program that reads data from a file instead of retrieving data from DB2. A query must be specified to generate the program. The query is used to determine the expected column layout of the input file. The program will not include SQL statements to retrieve data using the input query. Instead, it will read the input data from a DD named DATAIN. This option typically reads data from a sequential file that was written by another program generated with the **Write Data To File** option set to **yes**.

Predicates specified in the input query (in its WHERE clause) will **not** be used when reading the data from a sequential file. To obtain the same effect as the SQL statement, the predicates must be manually added to the generated program.

TSO print programs are required to enable this option. These programs read data from the RAADATA DD that was written by their corresponding display programs.

Note: Stored procedure and data layer programs cannot include **Read Data From File** functionality.

Print Program Name

Online print programs provide print functionality from TSO and CICS display programs. While viewing a report online, you can request a printed version of the report by entering the PRINT command. The display program (if it has been so enabled) invokes the online print program to print the report to the RAAPRINT DD or a GDDM printer (for TSO programs) or to a CICS temporary storage or transient data queue (for CICS programs).

For TSO programs, you can specify a GDDM printer nickname on the **PRINT** command; otherwise, the report will be written to the RAAPRINT DD. For CICS programs, you can specify the name and type of the desired queue on the **PRINT** command; otherwise, the report will be written to a temporary storage queue named RAAPnnnn, where nnnn is the terminal ID.

For TSO programs, the syntax of the **PRINT** command is:

```
PRINT (PRINTER=nickname
```

where nickname is the name of a GDDM printer. The (PRINTER=nickname parameter is optional. If the nickname is omitted, the report will be written to the RAAPRINT DD (which must be allocated **before** issuing the PRINT command).

For CICS programs, the syntax of the **PRINT** command is:

```
PRINT queuename queuetype
```

where queuename is the name of the CICS data queue (up to eight characters) used to contain the printed report and queuetype is the type of that queue (TS or TD). If queuetype is omitted, it defaults to TS. If queuename is omitted, it defaults to RAAPnnnn.

Follow these steps to achieve print functionality:

1. Generate an online print program (a program with TSO or CICS for environment and print for report presentation type) with a particular name, such as Q1PRINT.
2. Generate a TSO or CICS display program, such as Q1DISP.
3. Fill in the **Print Program Name** field on the Report Options pop-up window with Q1PRINT, specifying Q1PRINT as the print program.

For CICS programs, PPT entries for the display and print programs must be defined to CICS.

Attachment Facility
Programs that contain embedded SQL statements need to connect to DB2 before executing the statements.

- For batch programs, you can choose between the TSO attachment facility, the call attachment facility (CAF), and the RRS attachment facility (RRSAF).
- For TSO programs, you can choose between TSO and CAF (RRSAF is not supported by DB2 under TSO).

  Using the TSO attachment facility entails running TSO and executing the program via the DSN command processor. Under TSO, you supply the DSN commands needed to run the program and plan.

  CAF can be used as an alternate method for connecting to DB2. A program using CAF includes routines to call the various DB2 attachment routines. This method of connecting to DB2 allows you to directly execute the program, instead of via TSO. Using this method allows you to reduce start-up and overhead costs.

  The interface to using RRSAF is similar to that for CAF, with the additional restriction that RRSAF is not supported with programs run online from a TSO session. Apart from this DB2 restriction, using RRSAF is very similar to using CAF.
- For CICS programs, there is no option, as CICS programs always use the CICS attachment facility to connect to DB2.
- For stored procedure programs, there is no option, as DB2 requires WLM-managed stored procedures to use RRSAF.

CAF Module Usage
There are two types of call attachment options available:

- DSNALI

• AACAF

DSNALI is a DB2-supplied module which must be link-edited with the generated program. Calls are made to it to establish a connection with DB2 and open the application plan.

AACAF (supplied as an alias of RAACAF in QMFHPO.SRAALOAD) is link-edited with the generated program. At runtime, AACAF dynamically loads the standard DB2 CAF module DSNALI. The primary advantage to using AACAF instead of using DSNALI is that, because DSNALI is dynamically loaded at runtime, you will not have to re-link the generated program if your DB2 version changes. If DSNALI is link-edited with the generated program, then you have to re-link the program when DSNALI changes.

SQL Type

You can generate programs that use static or dynamic SQL. Usually, static SQL is the preferred method because it uses less CPU time by the generated program. In some cases, you can use dynamic SQL. For example, programs that use dynamic SQL are able to work with Information Builders, Inc's. EDA/Dynamic Extender for DB2[1]. Dynamic SQL also allows more flexibility in the SQL that is run. For example, unqualified SQL object names will be qualified by the CURRENT SQLID at runtime rather than by the OWNER or QUALIFIER bind parameters at bind time.

You can generate a program that uses static SQL by default, but uses dynamic SQL for SAVE DATA processing. To do this, enter S for SQL Type on the DB2 Options pop-up window and enter D for SQL Type on the Data Processing Options pop-up window. See "Save Data" above.

In general, you should choose static SQL unless there is a specific need for the functionality of dynamic SQL.

HPO/Sort

If the HPO/Sort option is specified, Program Generator will automatically remove (by commenting out) any ORDER BY clause in the input query, and generate a program that invokes a COBOL internal sort. This feature can greatly reduce CPU time consumption, as an internal sort is typically more efficient than DB2 sorting. However, because DB2 can use indexes and clustering to effect a sort without actually sorting, you should use this option with caution. If you know that DB2 will invoke a sort to satisfy an ORDER BY clause, replacing it with an internal sort will usually reduce CPU usage.

1.

  Note: Trademark of Information Builders, Inc.

This option causes the generated program to read and release to the sort program the entire set of qualifying rows. These rows are sorted and returned to the generated program, then the report processing continues. You should be familiar with the sort program (for example, DFSORT) that is enabled at your site. You may need to include additional file input to set in-core sort sizes and other sort parameters to make the program as efficient as possible.

For documentation purposes, the query embedded in the generated program will still contain the ORDER BY clause in the form of a comment.

Note: Stored procedure and data layer programs cannot include **HPO/Sort** functionality.

HPO/Runtime
If the HPO/Runtime option is specified, Program Generator will generate a program that makes calls to HPO-supplied runtime routines in order to format the report. The program will contain fewer lines of code, as most of the data processing will be performed in the common routines. Because the program will have fewer lines of code, it will be easier to maintain.

If you do not specify this option, Program Generator will generate a program that does not rely on **any** support routines at runtime. In fact, this type of program does not have any special linkage requirements. You can generate a completely self-contained, standalone program. This type of program has more lines of code because all data processing is performed in the program.

Note: Stored procedure and data layer programs cannot include **HPO/Runtime** functionality.

DSNTIAR Calls
If the DSNTIAR Calls option is set to YES, the generated program will include static calls to the standard DB2 DSNTIAR routine to retrieve formatted SQL error message text when SQL errors occur.

Note: If portability to other platforms is important, then these calls can be omitted. In this case, only SQL error codes are returned when SQL errors occur.

RAACPY Calls
If the RAACPY Calls option is set to YES, the generated program will include static calls to the RAACPY routine.

Note: The use of this option sacrifices portability in favor of improved performance. COBOL source code for the RAACPY routine is provided in QMFHPO.SRAASAMP.

Report Width, Report Length, DateTime, and PageNo

The following four options to the QMF **PRINT REPORT** command are used by the generated program to determine the appearance of the printed report: WIDTH, LENGTH, DATETIME, and PAGENO. These options are taken from any PRINT REPORT commands in an input procedure or (in the case of WIDTH and LENGTH) from the QMF profile. You can, however, override the values used for these options during the generation process.

- Width can be from 22 to 999 characters.
- Length can be CONT, meaning the report should contain no page breaks, or from 1 to 999 lines.
- DateTime can be **yes** or **no**, and determines whether the date and time are added to the bottom of each page of the printed report.
- PageNo can be **yes** or **no**, and determines whether the page number is added to the bottom of each page of the printed report.

These options are only relevant for a printed report.

Host Variable File LRECL

Batch programs that use host variables read values for those variables from the HOSTVARS DD. You can specify the LRECL of the HOSTVARS DD, or allow it to default to 80.

Host Variable Format and Delimiter

Host variable values in the HOSTVARS DD can be specified in columnar format, with one value per record, or in tabular format, with all the values on one record, separated by a delimiter character, which can be specified as part of the generation process.

More than one set of host variable values can be specified in the HOSTVARS DD. Batch programs that use host variables will continue reading the HOSTVARS DD as long as variable values are available, producing multiple versions of the report for each set of variable values. If the values are specified in columnar format, the report will be generated for each block of records in the HOSTVARS DD that form a complete host variable set. If the values are specified in tabular format, the report will be generated for each record in the HOSTVARS DD.

Programs that will be run from the End User Facility cannot use tabular host variables.

Note: The Spill File and Buffering parameters affect the execution and performance of HPO/Runtime programs, but cannot be set from the Generation Options panel. They can only be changed by manually modifying the generated source code. They are **not** applicable to standalone programs.

Spill File

Most HPO/Runtime programs require a fixed amount of memory to run. However, HPO/Runtime programs generated from forms that contain certain QMF form usage codes require all of the data to be fetched before the report can be written. These programs will perform this function automatically, however, the data must be buffered as it is read. This buffering is done in memory by default, due to efficiency concerns. For very large tables, though, memory may be exhausted before all of the data is read. Because of this, a program can be directed to use of a spill file for buffering the data. This is done by setting the value of the USE-SPILL-FILE variable in the generated program. A value of 0 for this variable (the default) indicates that buffering should be done in memory. A value of 1 indicates that a spill file should be used.

When a program that uses a spill file runs, it uses a DD named RAASPILL for the spill file. This DD should be defined as a temporary file, for example:

```
//RAASPILL  DD    UNIT=SYSDA,SPACE=(CYL,(50,50))
```

Buffering

When an HPO/Runtime program runs, it repeatedly calls the HPO runtime modules to process the fetched data. On each call to the runtime modules, the program passes a buffer containing some number of rows of data, along with a count of how many rows are in the buffer. The number of rows in each buffer passed to the library has a direct impact on the performance of the program because each call to the library incurs an overhead cost. Thus, if the library is called every time a row is fetched, a substantial cost in overhead is incurred. If some number of rows are buffered together, the number of calls is reduced, and so is the overhead associated with the calls. As a result, a large buffer size should be used to improve performance.

Alternatively, the buffer size is limited by the amount of memory available to the executing program. (Additionally, some compilers put a restriction on the maximum size of objects defined in programs, which limits the size of the buffer.) The buffer size should be set as large as possible, within any such limits.

To change the number of rows per buffer in a OS/VS COBOL or VS COBOL II program, three items in the working storage section must be set to that number: the value of the variable FB-INDEX-MAX, and the OCCURS clause on the FETCH-BLOCK and INDICATORS-BLOCK variables. This specifies the number of rows per buffer, **not** the total buffer size (the total buffer size is the number of rows per buffer multiplied by the size of each row).

Setting generation options

If you set the **Generate Program?** action flag to Y, the Generation Options panel will be displayed.

Table 12. Generation Options

```
DB2P ╱ DB2PLOCATION -- Generation Options -------------------------- 8.1.0
Command ===>
Query :                              Form :
------------------------------------------------------------------------------
General Options...
Program╱Plan Name ===>
Environment...... ===>    (B=Batch, T=TSO, C=CICS)
Program Type..... ===>    (P=Print, D=Display, N=No Report, L=Data Layer)

Enter "/" to set options below...
_ DB2 Options                        _ Data Processing Options
_ Report Options                     _ Host Variable Options
_ Data Layer Options                 _ Miscellaneous Options
_ Stored Procedure Options

Write Source Code To...
Data Set ===>
Member.. ===>             (blank=Program/Plan Name)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. If no errors are detected, and options were selected, the pop-up windows will display for the selected options, then the panel will be redisplayed. If no options are selected, then the program will be generated with the specified options. After generation, the Actions After Generation pop-up window will display, allowing you to specify subsequent actions to take. If there is a processing error, you return to the Report List panel.

If you press **PF3**, all input fields will be ignored and you will proceed to the next panel. No generation will take place.

If you type ABORT and press **Enter**, all input fields will be ignored and you return to the Report List panel. No generation will take place.

The fields on the panel are:

Program╱Plan Name
> Enter the name of the program to generate. The name must conform to plan and program ID naming rules.

Environment
> Enter B to generate an MVS™ batch program, T to generate an online

TSO program, `C` to generate an online CICS program, or `S` to generate a stored procedure program. This option must be set to `B`, `T`, or `S` for a non-SELECT query.

Program Type

Enter `P` if the generated program should print a report, `D` if it should display a report online, `N` if it should do neither, or `L` to generate a data layer program. This option must be set to:

- `P`, `N`, or `L` for a batch program
- `P`, `D`, or `N` for a TSO or CICS program
- `N` for a stored procedure program

Note: You must set this option to `N` or `L` for a non-SELECT query.

DB2 Options

Enter `/` to display the DB2 Options pop-up window on which you can specify additional options related to how the program should work with DB2.

Attachment Facility

Enter `T` to generate a program that uses the TSO attachment facility, `C` to generate a program that uses the call attachment facility (CAF), or `R` to generate a program that uses the RRS attachment facility (RRSAF). This option must be `T` or `C` for a TSO program. This option must be `R` for a stored procedure program. This option is ignored for a CICS program.

CAF Module Usage

Enter `D` to generate a program that uses the DB2 call attachment module (DSNALI) or `H` to generate a program that uses the HPO call attachment module (AACAF). This option is ignored if **Attachment Facility** is not `C`.

SQL Type

Enter `S` to generate a program that uses static SQL, or `D` to generate a program that uses dynamic SQL. This option must be `S` for a data layer program.

DSNTIAR Calls

Enter `Y` to include static calls to the DSNTIAR routine in the generated program to retrieve SQL error message texts. Enter `N` to omit those calls, so that the generated program will produce only SQL return codes (without message text).

Data Processing Options

Enter `/` to display the Data Processing Options pop-up window, on which you can specify additional options related to how the program should read or manipulate data.

Save Data

Enter Y to generate a program that saves retrieved data to a DB2 table, mimicking the QMF **SAVE DATA** command, and specify the table name in the **Table** field. You must set this option to N for a TSO or CICS print program. This option is disabled for a stored procedure or data layer program and for a non-SELECT query.

Table Enter the name of the table in which to save retrieved data. The specified table should not be referenced in the input query. If the name is unqualified, it will be qualified by the package or plan OWNER or QUALIFIER parameter (if using static SQL) or by the CURRENT SQLID of the user at runtime (if using dynamic SQL). This option is ignored if the **Save Data** flag is N.

Table Space

Enter the name of the table space in which the SAVE DATA table should be created. Any text entered in this field will be included in the IN clause of the CREATE TABLE statement used to create the table. The default value is the value of your QMF profile SPACE parameter. Alternatively, enter *USERPROF to indicate that the value of the SPACE parameter for the user at runtime should be dynamically retrieved and used. This option is ignored if the **Save Data** flag is N.

Action

Enter R to replace any existing data in the SAVE DATA table. Enter A to append to the table. Enter P to make this determination at runtime. For batch programs, a positional parameter can be passed in the PARM field to specify the disposition of existing data. For TSO programs, a panel is displayed on which the user can choose the disposition. This parameter must be R or A for CICS programs. This option is ignored if the **Save Data** flag is N.

SQL Type

Enter S to generate a program that performs SAVE DATA processing using static SQL. Enter D to generate a program that performs SAVE DATA processing using dynamic SQL. This option must be D if the program uses dynamic SQL for all other SQL or if *USERPROF is specified in the **Table space** field. This option is ignored if the **Save Data** flag is N.

Erase Table(s)

Enter Y to generate a program that drops the specified DB2 table or tables at the end of its run, mimicking the QMF ERASE TABLE command. A table name must be specified in

the **Table(s)** field. This option must be set to N for a TSO or CICS print program. This option is disabled for a data layer program and for a non-SELECT query.

Table(s)

If the input to the generation process was a procedure that contained more than one **ERASE TABLE** command for this report, then this field will contain the value *MULTIPLE, and will be disabled. In this case, the names of the tables to be dropped cannot be changed. Otherwise, use this field to enter the name of a table to drop. This option is ignored if the **Erase Table(s)** flag is N.

Read Data from File

Enter Y to read data from the DD named DATAIN rather than from DB2. This option must be set to N for a CICS program. This option must be set to Y for a TSO print program. This option is disabled for a stored procedure or data layer program and for a non-SELECT query.

LRECL

Enter the LRECL to use for the DATAIN DD when the **Read Data from File** flag is Y. If this field is blank or contains an asterisk (*), the minimum LRECL dictated by the data will be used. This option is ignored if the **Read Data from File** flag is N.

Write Data to File

Enter Y to write retrieved data to the DD named DATAOUT. This is analogous to the SAVE DATA option to write data to a DB2 table. This option must be set to N for a CICS program. This option must be set to Y for a TSO display program if an online print program is specified. This option must be set to N for a TSO print program. This option is disabled for a stored procedure or data layer program and for a non-SELECT query.

LRECL

Enter the LRECL to use for the DATAOUT DD when the **Write Data to File** flag is Y. If this field is blank or contains an asterisk (*), the minimum LRECL dictated by the data will be used. This option is ignored if the **Write Data to File** flag is N.

Report Options

Enter / to display the Report Options pop-up window, on which you can specify additional options about how the program should produce a report.

Report Width

Enter the page width (from 22 to 999) to use when generating the report. This field is disabled for a non-print program and for a non-SELECT query.

Report Length

Enter the page length (from 1 to 999, or CONT) to use when generating the report. This field is disabled for a non-print program and for a non-SELECT query.

DATETIME

Enter Y to include the date and time in a printed report's page footing. Enter N to omit the date and time. This field is disabled for a non-print program and for a non-SELECT query.

PAGENO

Enter Y to include the page number in a printed report's page footing. Enter N to omit the page number. This field is disabled for a non-print program and for a non-SELECT query.

Print Program Name

If this program is a TSO or CICS display program, then specify the name of the program that will be invoked when a user enters the **PRINT** command from the display program. The program invoked should be an online print program for the same query and form, using the same host variables (if any). Leave this field blank for a batch program or a non-display program. This field is disabled for a non-SELECT query.

Host Variable Options

Enter / to display the Host Variable Options pop-up window to specify additional options about how the program should use host variables.

Host Variable File LRECL

Enter the LRECL that should be used for the HOSTVARS DD at runtime. The default value is 80. You must set this field to 80 in order to subsequently register the program with the End User Facility.

Format

This option determines how host variable values will be specified to the generated program. Enter T to specify the values on a single record separated by a specified delimiter

character. Enter C to specify one value per record. You must set this field to C to subsequently register the program with the End User Facility.

Delimiter

Enter the character that will be used to separate multiple host variable values on a single record. This field is only used when the **Format** flag is set to T.

Data Layer Options

Enter / to display the Data Layer Options pop-up window, on which you can specify additional options specific to data layer programs.

SELECT INTO

Enter Y to generate a program that uses the SQL statement **SELECT INTO** to retrieve a single row of data. Enter N to generate a program that uses the SQL statements DECLARE CURSOR, OPEN, FETCH, and CLOSE to retrieve multiple rows of data. This field is disabled for a non-SELECT query.

Host Variables Copybook Data Set

Enter the data set (which must be a PDS) to which a copybook containing working storage definitions of the host variables used by the program should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. You can leave this field blank to include the host variable definitions in the generated source code, rather than in a copybook.

Host Variables Copybook Member

Enter the member in the specified Host Variables Copybook Data Set to which a copybook containing working storage definitions of the host variables used by the program should be written. You can leave this field blank to include the host variable definitions in the generated source code, rather than in a copybook. Leave this field blank if the **Host Variables Copybook Data Set** field is blank.

Table Declarations Copybook Data Set

Enter the data set (which must be a PDS) to which a copybook containing the declarations of the tables referenced by the program (DCLGENs) should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to

qualify the name. Leave this field blank to include the table declarations in the generated source code, rather than in a copybook.

Table Declarations Copybook Member

Enter the member in the specified Table Declarations Copybook Data Set to which a copybook containing the declarations of the tables referenced by the program (DCLGENs) should be written. Leave this field blank to include the table declarations in the generated source code, rather than in a copybook. Leave this field blank if the **Table Declarations Copybook Data Set** field is blank.

Linkage Section Copybook Data Set

Enter the data set (which must be a PDS) to which a copybook containing the linkage section of the program should be written. If the data set does not exist, the Allocate Data Set pop-up window will display, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. Leave this field blank to include the linkage section in the generated source code, rather than in a copybook.

Linkage Section Copybook Member

Enter the member in the specified Linkage Section Copybook Data Set to which a copybook containing the linkage section of the program should be written. Leave this field blank to include the linkage section in the generated source code, rather than in a copybook. Leave this field blank if the **Linkage Section Copybook Data Set** field is blank.

Stored Procedure Options

Enter / to display the Stored Procedure Options pop-up window, on which you can specify additional miscellaneous options for the program.

Note: Many of the stored procedure options correspond directly to options on the DB2 SQL statement CREATE PROCEDURE. You should consult the SQL Reference manual for the DB2 product you are using for more information on these options.

Procedure Name

Enter the name of the stored procedure to generate. This is the name that will be specified in the CREATE PROCEDURE statement, and is the name by which client applications must CALL the generated program.

Result Set

Use this field to specify whether or not the data that the stored procedure retrieves from DB2 (if any) should be returned as a result set to the calling application. Enter Y to return the retrieved data or N to not return the data. This option is disabled for a non-SELECT query.

Diagnostic Parms

The generated stored procedure program will automatically include input parameter definitions for each of the host variables used by the query. You can optionally add output parameters to return general error message text or SQL error message text. Enter 1 to add no additional diagnostic parameters, 2 to add a single output parameter for general error message text, or 3 to add output parameters for both general error message text and SQL error message text.

Parameter Style

Enter D to use the DB2SQL parameter style in the generated program, G to use the GENERAL parameter style, or N to use the GENERAL WITH NULLS parameter style.

DBINFO

Enter Y to include parameters in the generated program to receive environmental information when the procedure is invoked. You must specify N if the **Parameter Style** field is G or N.

WLM Environment

Enter the WLM environment in which the stored procedure should execute. This parameter affects the generated CREATE PROCEDURE statement only.

Deterministic

Enter Y to specify that the stored procedure is deterministic or N to specify that it is not. This parameter affects the generated CREATE PROCEDURE statement only.

Collection ID

Enter the collection ID that is to be used when the stored procedure is executed. This parameter affects the CREATE PROCEDURE statement only.

ASU Time Limit

Enter the total amount of processor time, in CPU service units, that a single invocation of the stored procedure can run. A value of 0 implies no limit. This parameter affects the CREATE PROCEDURE statement only.

Stay Resident

Enter Y to specify that the stored procedure load module is to remain resident in memory when the stored procedure ends. This parameter affects the CREATE PROCEDURE statement only.

Run-time Options

Enter the Language Environment run-time options to be used for the stored procedure. This parameter affects the CREATE PROCEDURE statement only.

Program Type

Enter M to specify that the stored procedure should run as a main routine or S to specify that it should run as a subroutine. This parameter affects the CREATE PROCEDURE statement only.

Security

Select how the stored procedure should interact with security resources outside of DB2, D to use the authorization ID of the stored procedure's address space, U to use the run-time authorization ID, or F to use the definer's (i.e., your) authorization ID. This parameter affects the CREATE PROCEDURE statement only.

Commit on Return

Enter Y to specify that DB2 should commit the transaction immediately on return from the stored procedure. This parameter affects the CREATE PROCEDURE statement only.

Special Registers

Enter D to have special registers initialized to default values or I to inherit values from the calling environment. This parameter affects the CREATE PROCEDURE statement only.

Call on Null Input

Enter Y to specify that the stored procedure should be called even if any of its input parameters is null. This parameter affects the CREATE PROCEDURE statement only.

Miscellaneous Options

Enter / to display the Miscellaneous Options pop-up window, on which you can specify additional miscellaneous options for the program.

COBOL Dialect

Enter 1 to generate an OS/VS COBOL program, 2 to generate a VS COBOL II program, 3 to generate a COBOL for MVS program, or 4 to generate a COBOL for OS/390® program.

This option must be 3 or 4 for a stored procedure program.
This option must be 2, 3, or 4 for a data layer program.

HPO⁄Sort

Enter Y to replace an ORDER BY clause in the query with a
COBOL internal sort. If you enter N, any ORDER BY clause will
not be replaced. This option must be set to N for a CICS
program or a TSO print program. This option is not available
for a stored procedure program, a data layer program, or a
non-SELECT query.

HPO⁄Runtime

Enter Y to generate a program that requires the HPO runtime
modules. Enter N to generate a program that is fully
standalone (that is, does not require the HPO runtime
modules). Set this option to N for a CICS program. Also, set
this option to N for a TSO display program if an online print
program is specified, or for a TSO print program. This option
is not available with a stored procedure program, a data layer
program, or a non-SELECT query.

RAACPY Calls

Enter Y to include static calls to the RAACPY routine in the
generated program to further improve the program's
performance. Enter N to omit those calls, so that the generated
program will be fully standalone. This option is disabled for a
data layer program and for a non-SELECT query.

Skeleton Member

Enter the name of a member to use as the skeleton for the
generated program. If you leave this field blank, the default
member will be used. Program Generator searches for this
member in the following locations:

- RAASLIB DD (if allocated)
- ISPSUSR DD (if allocated and LIBDEF for ISPSLIB
  activated)
- LIBDEF for ISPSLIB (if active)
- ISPSLIB DD (if allocated)
- QMFHPO.SRAASKEL data set (if not found in any of the
  above locations)

Author

Enter the value to use as the program author in the generated
program.

Description

Enter comment text to include as a description in the

generated program. Any text entered is included verbatim in the source code, starting in column 8.

Source Code Data Set

Enter the data set to which the generated program should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Member

If the specified **Source Code Data Set** is a PDS, this is the member to which the generated program should be written. If you leave this field blank, then the value in the **Program/Plan Name** field will be used. Leave this field blank if the **Source Code Data Set** is not a PDS.

Actions After Generation

After you generate a program, the Actions After Generation pop-up window will be displayed.

Table 13. Actions After Generation

```
Command ===>
Review program?........................ ===>   (B=Browse, E=Edit, N=None)
Review CREATE PROCEDURE statement?...... ===>   (B=Browse, E=Edit, N=None)
Issue CREATE PROCEDURE statement?....... ===>   (Y=Yes, N=No)
Register program with End User Facility? ===>   (Y=Yes, N=No)
Compile program?........................ ===>   (Y=Yes, N=No)
Run program?............................ ===>   (Y=Yes, N=No)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the window will be redisplayed with an error message. If no errors are detected, and the actions that you specified will be performed in sequence. After the actions are performed, you will return to the Report List panel.

If you press **PF3**, all input fields will be ignored and you will proceed to the next panel. No actions will be performed.

The fields on the window are:

Review program?

Enter B to browse the generated program, E to edit the program, or N to do neither.

Review CREATE PROCEDURE statement?

Enter B to browse the generated CREATE PROCEDURE statement, E to edit the statement, or N to do neither. This option is only available for a stored procedure program.

Issue CREATE PROCEDURE statement?

Enter Y to execute the generated CREATE PROCEDURE statement (after review) or N to bypass execution. This option is only available for a stored procedure program.

Register program with End User Facility?

Enter Y to proceed to the Register Program panel after generation. Enter N if you do not want to register the program with the End User Facility. You must set this option to N for a stored procedure program.

Compile program?

Enter Y to proceed to the Compile Programs panel after generation. Enter N if you do not want to compile the program.

Run program?

Enter Y to proceed to the Run Programs panel after generation. Enter N if you do not want to run the program. You must set this option to N for a stored procedure program, a CICS program, or a data layer program.

Generating proc programs

If the input to the generation process was a procedure, you can generate a proc program. This type of program acts as a driver to run each of the procedure's report programs in sequence.

Note: To generate a proc program, you need to generate each of the report programs it will run. In addition, the report programs must have the same characteristics. For example, they must all be batch programs, all TSO programs, or all CICS programs.

Setting proc program generation options

If you set the **Generate Proc Program?** flag on the Report List panel to Y, the Proc Program Generation Options panel will be displayed.

Table 14. Proc Program Generation Options

```
DB2P / DB2PLOCATION -- Proc Program Generation Options --------------- 8.1.0
Command ===>
Procedure :
-----------------------------------------------------------------Options...
Program/Plan Name......... ===>
Environment............... ===>     (B=Batch, T=TSO, C=CICS)
COBOL Dialect............. ===>     (1=OS/VS, 2=VS-II, 3=MVS, 4=OS/390)
Attachment Facility....... ===>     (C=CAF, T=TSO)
CAF Module Usage.......... ===>     (H=HPO CAF, D=DB2 CAF)
Author.................... ===>
Select All Report Programs ===>     (Y=Yes, N=No)

Write Source Code To:
Data Set ===>
Member.. ===>              (blank=Program/Plan Name)



```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message.

If the **Select All Report Programs** flag is set to N, you proceed to the Select Report Programs panel. Otherwise, the program will be generated with the specified options. After generation, the Actions After Generation pop-up window will display, allowing you to specify subsequent actions to take. If there is a processing error, you return to the Report List panel.

If you press **PF3**, all input fields will be ignored and you will return to the Report List panel. No generation will take place.

If you type ABORT and press **Enter**, all input fields will be ignored and you will return to the Report List panel. No generation will take place.

The fields on the panel are:

Program/Plan Name
> Enter the name of the program to generate. The name entered must conform to plan and program ID naming rules.

Environment
> Enter B to generate an MVS batch program, T to generate an online TSO program, or C to generate an online CICS program.

COBOL Dialect

Enter 1 to generate an OS/VS COBOL program, 2 to generate a VS COBOL II program, 3 to generate a COBOL for MVS program, or 4 to generate a COBOL for OS/390 program.

Attachment Facility

Enter T to generate a program that uses the TSO attachment facility, C to generate a program that uses the call attachment facility, or R to generate a program that uses the RRS attachment facility (RRSAF). This option must be T or C for a TSO program. This option is ignored for a CICS program.

CAF Module Usage

Enter D to generate a program that uses the DB2 call attachment module (DSNALI) or H to generate a program that uses the HPO call attachment module (AACAF). This option is ignored if **Attachment Facility** is not C.

Author

Enter the value to use as the program author in the generated program.

Select All Report Programs

Enter Y if the generated program should run all of the reports in the current Report List. If you enter N, a selection list will be displayed allowing you to select the reports the proc program should run.

Source Code Data Set

Enter the data set to which the generated program should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Member

If the specified **Source Code Data Set** is a PDS, this is the member to which the generated program should be written. If you leave this field blank, then the value in the **Program/Plan Name** field will be used. If the **Source Code Data Set** is not a PDS, this field must be left blank.

Selecting report programs

If you set the **Select All Report Programs** flag on the Proc Program Generation Options panel to N, the Select Report Programs panel will be displayed. From this panel, you can select the reports the proc program should run.

Table 15. Select Report Programs

```
DB2P ⁄ DB2PLOCATION -- Select Report Programs ------------------------- 8.1.0
Command ===>                                              Scroll ===> PAGE
Use Y or N to select report programs.
Press ENTER to process.
Type CAN or CANCEL or press PF3 to end.
Browse Procedure? (Y⁄N) ===>
                                                         Program
Num Query                        Form                    Name     Select?
--- -------------------------- -------------------------- -------- -------
**************************** Bottom of data ****************************



```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the proc program will be generated for the selected reports. After generation, any actions for after generation that you selected on the Proc Program Generation Options panel will be processed, and you will return to the Report List panel.

If you press **PF3**, all input fields will be ignored and you will return to the Report List panel. No generation will take place.

If you type ABORTand press **Enter**, all input fields will be ignored and you will return to the Report List panel. No generation will take place.

The fields on the panel are:

Browse Procedure?
If this flag is set to Y, then a browse session will be started displaying the input procedure. If it is set to N, the input procedure will not be browsed.

Select?
Enter Y to include this report in those that the proc program will run. All report programs run by the proc program must have the same characteristics, for example, they must all be batch programs, all TSO programs, or all CICS programs.

Actions after generation

After you generate a program, the Actions After Generation pop-up window will be displayed.

Table 16. Actions After Generation

```
Command ===>
Review program?........................ ===>    (B=Browse, E=Edit, N=None)
Register program with End User Facility? ===>   (Y=Yes, N=No)
Compile program?....................... ===>    (Y=Yes, N=No)
Run program?........................... ===>    (Y=Yes, N=No)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the window will be redisplayed with an error message. If no errors are detected, and the actions that you specified will be performed in sequence. After the actions are performed, you will return to the Report List panel.

If you press **PF3**, all input fields will be ignored and you will proceed to the next panel. No actions will be performed.

The fields on the panel are:

Review program?
> Enter B to browse the generated program, E to edit the program, or N to do neither.

Register program with End User Facility?
> Enter Y to proceed to the Register Program panel. Enter N if you do not want to register the program with the End User Facility.

Compile program?
> Enter Y to proceed to the Compile Programs panel. Enter N if you do not want to compile the program.

Run program?
> Enter Y to proceed to the Run Programs panel. Enter N if you do not want to run the program. This option must be set to N for a CICS program.

Generating programs with the short dialog

When you select option 2 from the Program Generator Menu the Generate Programs (Short Dialog) panel displays. This panel can also be reached by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 2'
```

The Short Dialog option follows the same procedure as the Full Dialog option. However, it suppresses all panel displays for locating queries and forms,

exporting queries, processing Report List entries, generating programs, preparing programs, and running programs. When you press **Enter** on the Generate Programs (Short Dialog) panel, all specified report programs are generated, prepared, and run according to the default parameter settings and current generation options.

The only panel that **will** be displayed is the Edit Variables panel. If any query specified as input uses substitution variables, or if the input to the generation process is a procedure that contains **SET GLOBAL** commands, the Edit Variables panel will be displayed allowing values to be specified for all substitution variables.

Note: This form of generation is recommended only for the more advanced user because a potentially large amount of processing can take place without any opportunity for interruption.

Table 17. Generate Programs (Short Dialog)

```
DB2P ⁄ DB2PLOCATION -- Generate Programs (Short Dialog) -------------- 8.1.0
Command ===>
Use % and _ as wildcard characters to produce a list of objects.
Press ENTER to generate program(s).
Type CAN or CANCEL or press PF3 to end.
Generate programs from one of the following:
1. Query Name.... ===>

2. Query Name.... ===>
   Form Name..... ===>

3. Procedure Name ===>




```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the entire program generation process will be performed.

If you press **PF3**, all input fields will be ignored and you will return to the Program Generator Menu.

Generating programs with batch JCL

Programs can also be generated using batch JCL. The batch JCL executes TSO (IKJEFT01) and issues the ISPSTART command to run the main program

named RAAMAIN under ISPF. The input query, query and form, or procedure are passed as parameters into RAAMAIN as shown in the example below.

The option settings usually displayed and set on the Program Generator panels will be obtained from the ISPF profile data set allocated to the ISPPROF DD. Generating programs in batch is like generating programs using the short dialog. Once the input query and form are specified, the program is generated, compiled, and run according to the default settings.

Values for variables that are usually specified on the Edit Variables panel are supplied in the DD named RAAVARS. Each line of this file should be of the form:

`&VARNAME=VARVALUE`

where `&VARNAME` is the name of the variable and `VARVALUE` is the value to supply for that variable. Do not insert spaces on either side of the equal sign (=). The RAAVARS file should be sorted alphabetically. Any variables for which values are not supplied will use the default value.

The following JCL sample will generate a program from a query named QUERY1 and a form named FORM1. The first parameter passed to RAAMAIN is CO. This tells RAAMAIN to run Program Generator. This JCL contains values for two variables in the RAAVARS DD, &VAR1 and &VAR2. This JCL also allocates the necessary DDs for QMF and DB2. Because the facility may have to start QMF and export objects, the QMF and DB2 libraries must be allocated appropriately.

```
//QMFHPOC   EXEC  PGM=IKJEFT01,DYNAMNBR=30,REGION=2M
//SYSTSIN   DD    *
  ISPSTART PGM(RAAMAIN) NEWAPPL(RAAX) +
          PARM(CO =BATCH =QUERY=QUERY1 =FORM=FORM1)
/*
//RAAVARS   DD    *
&VAR1=20
&VAR2=:HOSTVAR1 SMALLINT
/*
//SYSTSPRT  DD    SYSOUT=*
//STEPLIB   DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
//          DD    DSN=QMF.SDSQEXIT,DISP=SHR
//          DD    DSN=QMF.SDSQLOAD,DISP=SHR
//          DD    DSN=DSN.SDSNLOAD,DISP=SHR
//SYSPROC   DD    DSN=QMFHPO.SRAACLST,DISP=SHR
//          DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//          DD    DSN=QMF.SDSQCLTE,DISP=SHR
//          DD    DSN=DSN.SDSNCLST,DISP=SHR
//SYSEXEC   DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//          DD    DSN=QMF.SDSQEXCE,DISP=SHR
//ISPLOG    DD    SYSOUT=*,
//                DCB=(LRECL=133,RECFM=VBA,BLKSIZE=137)
```

```
⟋⟋ISPPROF    DD    DSN=USER.ISPF.ISPPROF,DISP=SHR
⟋⟋ISPMLIB    DD    DSN=QMFHPO.SRAAISPM,DISP=SHR
⟋⟋          DD    DSN=QMF.SDSQMLBE,DISP=SH
⟋⟋          DD    DSN=DSN.SDSNSPFM,DISP=SHR
⟋⟋ISPPLIB    DD    DSN=QMFHPO.SRAAISPP,DISP=SHR
⟋⟋          DD    DSN=QMF.SDSQPLBE,DISP=SHR
⟋⟋          DD    DSN=DSN.SDSNSPFP,DISP=SHR
⟋⟋ISPTLIB    DD    DSN=QMF.SDSQTLBE,DISP=SHR
⟋⟋DSQDEBUG   DD    SYSOUT=*,
⟋⟋               DCB=(RECFM=FBA,LRECL=121,BLKSIZE=12100)
⟋⟋RAADEBUG   DD    SYSOUT=*,
⟋⟋               DCB=(RECFM=FBA,LRECL=121,BLKSIZE=12100)
⟋⟋ADMGGMAP   DD    DSN=QMF.DSQMAPE,DISP=SHR
```

Preparing programs

After you generate program source code, you must prepare it before you can run the program. There are three methods to prepare programs:

- online preparation without prompting
- online preparation with prompting
- batch preparation

Online preparation without prompts

After the program is generated, you can prepare it online while you wait. A CLIST named RAADSNH is distributed that passes parameters to the DB2 DSNH command. Without customization, RAADSNH passes a small subset of parameters to DSNH (such as PLAN and HOST). RAADSNH can be customized during the installation process to pass any set of parameters to DSNH.

Online preparation with prompts

You can prepare the program online with prompting for parameter values. With this option, the RAADSNH CLIST invokes DB2I Program Preparation, which prompts you for library names, library concatenations, bind parameters, and so on, before DSNH is executed.

Online preparation implementation

When you request an online preparation, the RAADSNH CLIST is invoked and it is passed with the information that was specified on the Compile Programs panel. If a non-prompted prepare was specified, the DB2 DSNH command is invoked, passing on the information. If a prompted prepare was specified, the information is placed into ISPF shared pool variables. The DB2I Program Preparation option is then invoked, which uses those variable values.

There is one important difference between prompted and non-prompted compiles. When DSNH is invoked, it is passed the names of system libraries, such as your site's COBOL load library (which is optionally specified to the HPO Configuration Dialog). When DB2I Program Preparation is invoked, this

information cannot be specified. In this case, the default values for these parameters (as specified in the DSNH CLIST) are used.

Automatic batch preparation

Batch JCL to prepare programs can be automatically generated, edited, and submitted.

Compile programs option

Select option 3 from the Program Generator Menu to display the Compile Programs panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 3'
```

Specify basic information about the program to prepare. This information is used to invoke the preparation process.

Table 18. Compile Programs

```
DB2P ⁄ DB2PLOCATION -- Compile Programs ----------------------------- 8.1.0
Command ===>
Press ENTER to compile program.
Type CAN or CANCEL or press PF3 to bypass this compilation.
  1. Compile Type........ ===>          (P=Prompted, N=Non-prompted, B=Batch)
  2. Source Data Set..... ===>
  3. Source Member....... ===>
  4. Environment......... ===>          (B=Batch, T=TSO, C=CICS)
  5. COBOL Dialect....... ===>          (1=OS⁄VS, 2=VS-II, 370, or MVS)
  6. Attachment Facility. ===>          (C=CAF, T=TSO, R=RRSAF)
  7. CAF Module Usage.... ===>          (H=HPO, D=DB2)
  8. Compile Options..... ===>
  9. DBRM Library........ ===>
 10. Bind Type........... ===>          (1=Package, 2=Plan, 3=Both, 4=No bind)
 11. Collection ID....... ===>
 12. Plan Name........... ===>
 13. Bind OWNER.......... ===>
 14. Bind Validate....... ===>          (BIND or RUN)
 14. Target Load Library. ===>
 15. Link Edit Options... ===>
 16. DSNH PRINT Parameter ===>          (Prompted and Non-prompted only)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the specified compilation will be invoked online, or the Batch Job Information panel will be displayed, after which the JCL to compile the program will be edited or submitted.

Depending on how you reached this panel, two things can happen after the compilation:

- If this panel was displayed by selecting the Compile Programs option from the Program Generator Menu, it will be redisplayed after the compilation.
- If it was displayed due to a request to compile a program after generation (on the Generation Options panel), the next panel in the generation process will be displayed.

If you press **PF3**, all input fields will be ignored and you will return to the Program Generator Menu or proceed with the generation process. No compilation will take place.

If you type `ABORT` and press **Enter**, all input fields will be ignored and you will return to the Program Generator Menu or the Report List panel. No compilation will take place.

The fields on the panel are:

Compile Type
> Enter `P` to invoke a prompted compilation, via the Program Preparation option of DB2 Interactive (DB2I). Enter `N` to invoke a non-prompted compilation by invoking the DSNH command. Enter `B` to tailor JCL to compile the program in batch.

Source Data Set
> Enter the data set containing the source program to compile. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Member
> If the specified **Source Data Set** is a PDS, this is the member containing the source program to compile. Leave this field blank if the **Source Data Set** is not a PDS.

Environment
> Enter `B` if the program to be compiled is an MVS batch program, `T` if it is an online TSO program, or `C` if it is an online CICS program.

COBOL Dialect
> Enter `1` if the program to be compiled is an OS/VS COBOL program, `2` if it is a VS COBOL II program, `3` if it is a COBOL for MVS program, or `4` if it is a COBOL for OS/390 program.

Attachment Facility
> Enter `T` if the program to be compiled uses the TSO attachment facility, `C` if it uses the call attachment facility (CAF), or `R` if it uses the RRS attachment facility (RRSAF). This option is ignored for a CICS program.

CAF Module Usage

Enter D if the program to be compiled uses the DB2 call attachment module (DSNALI), or H if it uses the HPO call attachment module (AACAF).

Compile Options

Enter compile options. Additional options required by Program Generator will be appended to whatever is specified in this field.

DBRM Library

Enter the library for the DBRM output of the DB2 precompiler. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. The data set must be a PDS. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Bind Type

If compiling a report program enter 1 to bind a package, 2 to bind a plan, 3 to bind both, or 4 to bind neither. If compiling a stored procedure program, you must set this option to 1 or 4. If compiling a proc program, enter 1 to bind a plan with a PKLIST specifying all report program packages, 2 to bind a plan including all report program DBRMs, 3 to bind a plan using a mix of report program packages and DBRMs, or 4 to not bind a plan.

Collection ID

Enter the name of the collection ID to be used if **Bind Type** is 1 or 3. The name must conform to Collection ID naming rules.

Plan Name

Enter the name of the plan to be created by the bind process for this program. The name entered must conform to plan and program ID naming rules.

Bind OWNER

Enter the OWNER parameter to be used by the bind process. If you leave this field blank, no OWNER will be specified for the bind, and your primary authorization ID will be used.

Bind VALIDATE

Enter the VALIDATE parameter to be used by the bind process. Enter BIND to validate SQL authorization and determine access path selection during the BIND process. Specify RUN to defer this processing until the plan is executed. You must specify RUN if this program uses static SQL that refers to nonexistent tables (for example, SAVE DATA tables).

Target Load Library

Enter the data set in which to create the load module for this

program. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. The data set must be a PDS. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix will be used to qualify the name.

Link Edit Options

Enter link edit options. Additional options required by Program Generator will be appended to that which is specified in this field.

DSNH PRINT Parameter

Enter the value to use for the DSNH PRINT parameter. This field is used for prompted and non-prompted compiles (which invoke DSNH).

Setting batch job parameters

Before a batch compile is invoked (or a batch run, as discussed in "Running Programs"), the Batch Job Information panel is displayed to obtain more information about the job to submit. After specifying these additional batch parameters, JCL is generated, and submitted or edited.

Table 19. Batch Job Information

```
DB2P ⁄ DB2PLOCATION -- Batch Job Information ------------------------ 8.1.0
Command ===>

Press ENTER to generate JCL.
Type CAN or CANCEL or press PF3 to cancel this run.

1. Job Cards...
            ===>
            ===>
            ===>
            ===>
2. Report DCB Parameters...
    SYSOUT class.............. ===>
    LRECL.................... ===>
    DEST..................... ===>
    COPIES................... ===>
3. Enter Host Variable Values? ===>     (Y=Yes, N=No)
4. Write JCL To...
    Data Set ===>
    Member.. ===>
5. Edit or Submit JCL?........ ===>     (E=Edit, S=Submit)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, JCL will be generated and it will be edited or submitted, depending on the value of the **Edit or Submit JCL?** flag on this panel.

If you press **PF3**, all input fields will be ignored and you will return to the previous panel or proceed with the generation process. No JCL generation will take place.

The fields on the panel are:

Job Cards
Enter valid job cards for the job. At least one line must be entered. Any lines specified will be used exactly as entered in the generated JCL.

Report DCB Parameters
If this job will run a generated program, the following four fields, **SYSOUT class**, **LRECL**, **DEST**, and **COPIES**, are enabled and are used to specify the characteristics of the REPORTnn DDs. If this job will compile a generated program, these fields are disabled and ignored.

SYSOUT class
Specify the SYSOUT class for the REPORTnn DDs. If you leave this field blank, a system default value will be used.

LRECL
Specify the LRECL for the REPORTnn DDs. If you leave this field blank, 133 will be used.

DEST Specify the DEST for the REPORTnn DDs. If you leave this field blank, a system default value will be used. If no system default value exists, the DEST parameter will be omitted.

COPIES
Specify the COPIES for the REPORTnn DDs. This number must be between 1 and 254. If you leave this field blank, the COPIES parameter will be omitted.

Enter Host Variable Values?
If this job will run a generated program, enter Y to display the Enter Host Variable Values pop-up window on which you can specify values to be generated for the HOSTVARS or PROCVARS DD. Enter N if the program does not require any input host variable values. This field is disabled and ignored if this job will compile a generated program.

Data Set
Enter the data set to which the generated JCL should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use

the **Member** field. You can also enter *TEMP to specify that a
temporary data set should be created for the JCL.

Member

If the specified **Data Set** is a PDS, enter the name of the member to
which the generated JCL should be written. Leave this field blank if
the **Data Set** is not a PDS or is *TEMP.

Edit or Submit JCL?

Enter E to edit the generated JCL or S to automatically submit it after
it is generated.

OS∕VS COBOL program requirements

If you use a method other than the Compile Programs option to prepare
OS∕VS COBOL programs (for example, by creating your own batch JCL), the
following requirements must be observed:

Precompiler options

- APOST
- DATE(ISO)
- HOST(COBOL)
- TIME(ISO)

Bind parameters

- VALIDATE(RUN) for SAVE DATA programs
- VALIDATE(BIND) for all other types of programs

CICS translator options

- APOST

Compiler options

- APOST
- NODYNAM (only required for HPO∕Runtime programs)
- NOTRUNC
- OPTIMIZE
- RESIDENT (only required for HPO∕Runtime programs)

Link

For standalone programs using user-defined edit routines or any programs
using the HPO call attachment module or the RAACPY option,
QMFHPO.SRAALOAD must be included in the concatenation for SYSLIB.

VS COBOL II, COBOL for MVS, and COBOL for OS/390 program requirements

If you use a method other than the Compile Programs option to prepare VS COBOL II programs (for example, by creating your own batch JCL), the following requirements must be observed.

Precompiler options
- APOST
- DATE(ISO)
- HOST(COB2)
- TIME(ISO)

Bind parameters
- VALIDATE(RUN) for SAVE DATA programs
- VALIDATE(BIND) for all other types of programs

CICS translator options
- APOST
- COBOL2

Compiler options
- APOST
- NODYNAM (only required for HPO⁄Runtime programs)
- NOTRUNC (for VS COBOL II release 1 or 2)
- OPTIMIZE
- RESIDENT (only required for HPO⁄Runtime programs)
- TRUNC(BIN) (for VS COBOL II release 3 and above)

Link
For standalone programs using user-defined edit routines or any programs using the HPO call attachment module or the RAACPY option, QMFHPO.SRAALOAD must be included in the concatenation for SYSLIB.

Running programs

After you have generated and compiled the program, you can use the Run Programs option to run it (if it is an online TSO program), or to generate JCL to run it (if it is a batch program), or you can use an alternate facility.

You can also use the End User Facility to run generated programs. The method to use depends primarily on the type of user. The Run Programs option is intended for use by experienced technical users who are familiar

with the concepts of programs, plans, JCL, etc. The End User Facility is intended to be used by non-technical end users.

Run programs options

Select option 4 from the Program Generator to display the Run Programs panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 4'
```

On this panel, specify basic information about the program to run. This information is used to run an online program or generate JCL to run a batch program.

Table 20. Run Programs

```
DB2P / DB2PLOCATION -- Run Programs ---------------------------------- 8.1.0
Command ===>
Press ENTER to run program.
Type CAN or CANCEL or press PF3 to bypass this run.
1. Load Library....... ===>
2. Program Name....... ===>
3. Plan Name.......... ===>
4. Environment........ ===>     (B=Batch, T=TSO)
5. COBOL Dialect...... ===>     (1=OS/VS, 2=VS-II, 370, or MVS)
6. Attachment Facility ===>     (T=TSO, C=CAF, R=RRSAF)
7. Additional User Load Libraries...
     Load Library 1.... ===>
     Load Library 2.... ===>
8. Additional User EXEC Libraries...
     EXEC Library 1.... ===>
     EXEC Library 2.... ===>
```

If you press **Enter**, all input fields will be validated. If errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, if a TSO program was specified, it will be run. If a batch program was specified, the Batch Job Information panel will be displayed, after which the JCL to run the program will be edited or submitted.

Depending on how this panel was reached, two things can happen after the run. If this panel was displayed by selecting the Run Programs option from the Program Generator Menu, it will be redisplayed after the run. If this panel was displayed due to a request to run a program after generation (on the Generation Options panel), the next panel in the generation process will be displayed.

If you press **PF3**, all input fields will be ignored and you will return to the Program Generator Menu or you will proceed with the generation process. No run will take place.

If you type ABORT and press **Enter**, all input fields will be ignored and you will return to the Program Generator Menu or the Report List panel. No run will take place.

The fields on the panel are:

Load Library

Enter the name of the data set containing the load module to run. The data set must exist and must be a PDS. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. This parameter is optional. If you specify a load library and not a program name, a member list for the library will be displayed from which you can select a program.

Program Name

Enter the program to run. If you specified a load library, you can leave this field blank, and a member list for the library will be displayed from which you can select a program. If you specify both a load library and a program name, the program must exist in the library.

Plan Name

Enter the name of the plan to run with this program. This field is optional. If you leave this field blank, the plan name will not be specified on the run (which usually results in it defaulting to the program name).

Environment

Enter B if the program to be run is a batch program or T if it is an online TSO program.

COBOL Dialect

Enter 1 if the program to be run is an OS/VS COBOL program, 2 if it is a VS COBOL II program, 3 if it a COBOL for MVS program, or 4 if it is a COBOL for OS/390 program. This parameter is used to correctly allocate the language runtime library. If you leave it blank, no allocation will be performed.

Attachment Facility

Enter T if the program uses the TSO attachment facility, C if it uses the call attachment facility (CAF), or R if it uses the RRS attachment facility (RRSAF).

Additional User Load Libraries

Enter the names of any additional load libraries required for the run.

Additional User EXEC Libraries

Enter the names of any additional EXEC libraries required for the run.

Entering host variable values

When you run a batch program, you can specify, on the Batch Job Information panel, that you want to enter input host variable values for the generated JCL If you set the **Enter Host Variable Values?** flag to Y, the Enter Host Variable Values pop-up window is displayed.

Note: Using the Enter Host Variable Values pop-up window results in host values being included as an in-stream data set in the generated JCL. This is appropriate only if the program you are running is defined to read host variables from a file whose LRECL is 80. The program will abend if you use this method to specify host variables for a program that uses a different LRECL.

The End User Facility provides more comprehensive support for running programs that use host variables, including support for validating the format of variable values and using a host variable file whose LRECL is not 80.

Table 21. Enter Host Variable Pop Up

```
Command ===>

Press ENTER to accept these host variable values.
Type CAN or CANCEL or press PF3 to return to the previous panel.

Host Variable DD ===>     (H=HOSTVARS, P=PROCVARS)
Host Variable Values:
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
```

If you press **Enter**, the host variable values that you entered will be saved, and you return to the Batch Job Information panel.

If you press **PF3**, all input fields will be ignored and you return to the Batch Job Information panel.

The fields on the panel are:

Host Variable DD
If you are running a report program, enter H to specify that the host variable values you enter should be included in the HOSTVARS DD

in the generated JCL. If you are running a proc program, enter `P` to specify that the host variable values you enter should be included in the PROCVARS DD in the generated JCL.

Host Variable Values

Enter values for the host variables used by the program you are running. The text you enter will be included verbatim in the generated JCL. No validation is performed on the values you enter; you must enter values that are of the type and format expected by the program you are running.

Run implementation

When you specify a batch program to run, this facility can submit the JCL or allow you to edit the JCL it generates. If you specify an online TSO program, the RAARUN CLIST is invoked to run the program. This CLIST invokes the program (if it uses the call attachment facility), or it invokes the DSN command and issues the DSN subcommands to invoke the program.

Batch program requirements

If you generate a program that uses the TSO attachment facility, it must be run under the DSN command processor of TSO. If you generate a program that uses the call attachment facility or the RRS attachment, you can run the program.

If you use a method other than the Run Programs option to run programs (for example, by creating your own batch JCL), the following requirements must be observed:

Report DDs
REPORT01: The primary report is written to the DD named REPORT01. RECFM should be set to FBA, because the first character of each record that is written to this DD is reserved for carriage control. For standalone programs, the LRECL must equal the LRECL specified in the program. For HPO/Runtime programs, any LRECL may be specified. A typical DD declaration is:

```
//REPORT01   DD    SYSOUT=*,
//                 DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
```

REPORTnn: If the report horizontally spans multiple pages, then these additional pages are written to a series of DDs named REPORT02, REPORT03, and so on. Up to 99 of these subpages are supported. A typical DD declaration is:

```
//REPORT02   DD    SYSOUT=*,
//                 DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
//REPORT03   DD    SYSOUT=*,
//                 DCB=(RECFM=FBA,LRECL=133,BLKSIZE=1330)
```

In an HPO/Runtime program, you can control the width of a report page two different ways:

- Assign a value to the PAGE-WIDTH variable governing the page width in the generated program.

  For example, if you set the PAGE-WIDTH variable to 132, then no more than 132 characters **of report data** will appear on each line of the report. One additional character will be included in each report row to handle carriage control. In the previous example, even though the page width is set to 132, there will actually be 133 characters written to the report file.

- Use the LRECL DCB parameter on the REPORT01 DD in your run JCL. The LRECL value sets an additional limit on the width of the report.

  For example, if you set LRECL=133, then at most 133 characters will appear on each record of the report file (132 characters of report data and one character of carriage control).

These settings are taken into account when calculating the width of a report page and determining whether to split a report row across multiple pages:

```
report page width = minimum(page width variable value, LRECL - 1).
```

The LRECL is obtained from the REPORT01 DD. If you have more than one REPORTnn DD defined in your JCL, make sure that they all have the same LRECL value.

Other DDs

HOSTVARS: This DD is used to pass runtime host variable values to batch report programs. The LRECL must match the LRECL specified when the program was generated. If the program was generated to use a tabular host variable format, each record in this file must contain a complete set of host variable values for the program. Each value must be separated by the delimiter character specified when the program was generated. If the program was generated to use a columnar host variable format, each record in this file will contain only one host variable value.

The order of values must match (in order and type) the host variables as defined in the program. Host variables are defined in alphabetical order in the program. If there is any mismatch in data types, a runtime error will cause the program to exit.

This file will be read repeatedly and a report will be generated for each complete set of host variable values read. If an incomplete set of values is read, the program will terminate with an error.

A typical DD declaration (for non-tabular host variables) is:

```
⟋⟋HOSTVARS    DD    *
host variable value 1
.
.
.
host variable value n
⟋*
```

PROCVARS: Proc programs that run batch report programs that use host variables use the PROCVARS DD as described for the HOSTVARS DD above. The host variable values for each of the report programs run should be listed in the PROCVARS DD in sequence. These programs also need the HOSTVARS DD defined as a temporary file. A typical DD declaration (for non-tabular host variables) is:

```
⟋⟋PROCVARS    DD    *
program 1 host variable value 1
.
.
.
program 1 host variable value n
program 2 host variable value 1
.
.
.
program 2 host variable value n
⟋*
⟋⟋HOSTVARS    DD    UNIT=SYSDA,SPACE=(TRK,(1,1))
```

DATAOUT: If you generate a program that writes data to a sequential file, the DD that is opened for output is named DATAOUT. The only DCB parameter that *must* be in sync with the program is the LRECL. The length of the output record must exactly match the LRECL of the data set assigned to this DD. A typical DD declaration is:

```
⟋⟋DATAOUT    DD    DSN=data.set.name,DISP=disp
```

DATAIN: If you generate a program that reads data from a sequential file, the DD that is opened for input is named DATAIN. The only DCB parameter that *must* be in sync with the program is the LRECL. The length of the output record must exactly match the LRECL of the data set assigned to this DD. A typical DD declaration is:

```
⟋⟋DATAIN    DD    DSN=data.set.name,DISP=disp
```

RAASPILL: When an HPO/Runtime program that uses a spill file runs, it uses a DD named RAASPILL for the spill file. This DD should be defined as a temporary file. This DD is not used by standalone programs. A typical DD declaration is:

```
⟋⟋RAASPILL    DD    UNIT=SYSDA,SPACE=(CYL,(50,50))
```

SYSEXEC: When an HPO/Runtime program that makes use of QMF's FORM.CALC or FORM.COND features runs, it repeatedly evaluates a REXX EXEC named RAARCXPR, which is in QMFHPO.SRAAEXEC. The DD named SYSEXEC is searched for this EXEC at runtime, so SYSEXEC must be allocated to QMFHPO.SRAAEXEC. A typical DD declaration is:

```
//SYSEXEC   DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
```

STEPLIB: If the program to be run is an HPO/Runtime program, your JCL must allocate QMFHPO.SRAALOAD in JOBLIB or STEPLIB. This is not required for standalone programs.

In addition, you may have to include the DB2 load library and sort load library if they are not included in your site's link list. This is true of both HPO/Runtime programs and standalone programs.

EXEC parameters

For programs using the call attachment facility or RRS attachment facility, default values for the DB2 subsystem ID and the plan name are generated in the program source code. You can override these settings at runtime by passing parameters on the EXEC card. Here is an example:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN,QUERY2'
```

The following is an example of how to specify only the DB2 subsystem ID and not the plan name:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN'
```

Programs that include SAVE DATA processing where the **Action** parameter specified was P (prompt), a positional parameter can be specified to indicate the desired disposition of data existing in the SAVE DATA table, with a value of R to indicate that this data should be replaced, or A to indicate that this data should be retained (and appended).

For programs using the call attachment facility or the RRS attachment facility, this parameter follows the parameters described above:

```
//GO        EXEC  PGM=QUERY1,PARM='DSN,QUERY2,R'
```

Otherwise, it appears first in the PARM field:

```
//GO        EXEC  PGM=QUERY1,PARM='R'
```

TSO program requirements

If you generate a program that uses the TSO attachment facility, it must be run under the DSN command processor of TSO. If you generate a program that uses the call attachment facility, you can run the program from the TSO command prompt. You can also build an ISPF menu that lists each of the report programs that you generate and allows the user to select a report to run.

Allocating data sets to your ISPF session

Regardless of how the program is run, the following DDs must be allocated so that support routines, panels, and messages can be found by the program and ISPF.

STEPLIB: For HPO/Runtime programs, QMFHPO.SRAALOAD must be allocated to the STEPLIB DD.

ISPPLIB: QMFHPO.SRAAISPP must be allocated to the ISPPLIB DD. There are 6 panels in the panel library that are referenced in the generated program: RAATSO1, RAATSO2, RAATSO3, RAATSO4, RAATSO5, and RAATSOH.

ISPMLIB: QMFHPO.SRAAISPM must be allocated to the ISPMLIB DD. There are 3 members in the message library that are referenced in the generated program: RAAB00, RAAB01, and RAAB02.

RAAPRINT: For programs that have print capability (such as, this with an associated TSO print program), RAAPRINT should be allocated before attempting to print a report. A typical DD declaration is:

```
⌐RAAPRINT   DD    SYSOUT=*
```

RAADATA, SYSUTn: For programs that have print capability (such as, those with an associated TSO print program), these DDs will be dynamically allocated and freed as needed. They should **not** be pre-allocated.

Passing runtime values to host variables

When you run a TSO program, you are prompted for host variable values. Each host variable in the program is displayed on an ISPF table panel along with its data type. You must specify a value for each variable on this panel.

CICS program requirements

Read through these requirements before running a generated CICS program. CICS documentation and your site's CICS administration staff are the authoritative source for information on how to set up CICS tables and startup JCL.

CICS startup job stream

You must allocate QMFHPO.SRAALOAD (which contains the BMS maps used by the generated programs) to the CICS Module Load Library list (DFHRPL). The load library that contains the programs that you generate and prepare must also be allocated.

PPT entries

All generated CICS programs interact with the user via the following three BMS maps:

- RAAMAP1 (to browse the formatted report)

- RAAMAP2 (to display formatted SQL error messages)
- RAAMAP3 (to prompt user for host variable input values)

Generated programs refer to each of these maps in a single mapset named RAAM330. This module can be found in QMFHPO.SRAALOAD.

PPTs for all of these maps must be assembled and added to the appropriate CICS regions. These PPT entries can be found in QMFHPO.SRAASAMP.

PPTs for programs that you generate and prepare must also be assembled and added to your CICS session.

PCT entries
You must add transaction IDs for the programs you generate.

RCT entries
You must add resource control entries for the programs you generate.

Passing runtime values to host variables
When running a CICS program, you are prompted for host variable values, one at a time, in sequence. Each host variable in the program is displayed on a CICS map along with its data type. You must specify a value for each variable.

Understanding data queue storage requirements
Generated CICS programs are completely pseudo-conversational. They terminate the task (EXEC CICS RETURN...) each time that a map is sent. Because DB2 automatically closes cursors at task termination, these programs must read all of the DB2 data before the first screen of data is displayed. In fact, the data is read from DB2, formatted according to the form specifications, and placed in auxiliary temporary storage for browsing.

This implementation has many advantages. For example, when browsing the report, you are actually browsing the data stored in temporary storage. All of the DB2 I/O has finished by the time the first screen of report data is displayed. Because the cursor is closed, all shared page locks are released by this time.

Because of this implementation, however, there is a restriction on the number of rows of report data. CICS limits the number of rows that can be written to temporary storage queues to 32767. This limits the report to 32767 lines. To enhance the performance of generated CICS programs, CICS system programmers should verify that auxiliary temporary storage is properly allocated and tuned to handle these programs.

Registering and maintaining End User Facility reports

The End User Facility provides a convenient interface through which you can run reports. Before you can run a report in this way, it must be registered with the End User Facility via the Maintain End User Facility Reports option (or via the **Register Program?** post-generation action on the Generation Options panel).

A report is defined as one of the following:

- A compiled program, most likely converted from a QMF query, query and form, or procedure
- A non-compiled QMF query, query and form, or procedure

A report is uniquely identified by the combination of owner and name, similar to how QMF objects are identified. However, if the report owner is of the form T=**tranid** where **tranid** is a valid CICS transaction identifier, the report is associated with that transaction rather than with a particular owner.

Report storage locations

Reports are registered in two DB2 tables. The first table, named Q.REPORTS, stores information about the characteristics of a report, as described above. There is one row in Q.REPORTS for each registered report. The second table, named Q.REPORT_VARIABLES, stores information about the runtime variables used by each registered report. There is one row in Q.REPORT_VARIABLES for each host variable or variable used by each report in Q.REPORTS.

End User Facility Report Maintenance panel

Select option 5 from the Program Generator menu to display the End User Facility Report Maintenance panel. All report maintenance is performed from the End User Facility Report Maintenance panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO 5'
```

Table 22. End User Facility Report Maintenance

```
DB2P / DB2PLOCATION -- End User Facility Report Maintenance ---------- 8.1.0
Command ===>
Action................. ===>
Report Owner........... ===>
Report Name............ ===>
Drop Confirmation? (Y/N) ===>




----------------------------------------------------------------------------
Valid Actions Are...
B  Browse
C  Create
D  Drop
E  Edit
L  Display Selection List
----------------------------------------------------------------------------
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message.

If you press **PF3**, all input fields will be ignored and you return to the Program Generator Menu.

Building a selection list of reports

To build a selection list of report entries from the End User Facility Report Maintenance panel, you must enter the following fields:

Action
>Enter L (for list).

Report Owner
>Enter the report owner (up to 8 characters). The value entered must be a valid primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. If using a tranid, reports associated with that transaction will be selected, rather than reports with a particular owner. If you leave this field blank, your current SQLID will be used as a default.

Report Name
>Enter the report name (up to 18 characters). If **Action** is not C, you can use % and _ as wildcard characters in the name to process multiple reports. If you leave this field blank, % will be used as the default.

Drop Confirmation?
>Enter Y to request drop confirmations or N to suppress them. If left blank, this flag defaults to Y.

Report Selection List panel

When you enter L (for list) on the End User Facility Report Maintenance panel, the Report Selection List panel is displayed. This panel contains a list of all report entries that match the input specifications entered on the End User Facility Report Maintenance panel.

Table 23. Report Selection List

```
DB2P -- Report Selection List For QMFUSER ---------------------------- 8.1.0
Command ===>                                                  Scroll ===> PAGE
1. Use S to select report.
2. Press ENTER to run selected report.
3. Press PF10 to view Report Selection List with extended information.
4. Type CAN or CANCEL or press PF3 to exit this facility.
   Report          Description
   ------------------ --------------------------------------------------------
**************************** Bottom of data *******************************
```

If you press **Enter**, all rows that are selected with an action code will be processed. After all selected rows are processed, the panel will be redisplayed.

If you press **PF3**, all input fields will be ignored and you will return to the End User Facility Report Maintenance panel.

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

Browsing a report

You can a browse report entry from a selection list or from the End User Facility Report Maintenance panel.

Browsing directly

Enter the following fields to browse a report entry from the End User Facility Report Maintenance panel:

Action

Enter B (for browse).

Report Owner

Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. If using a tranid,

reports associated with that transaction will be selected, rather than those with a particular owner. If you leave this field blank, your current SQLID will be used as a default.

Report Name

Enter the report name (up to 18 characters). You can use % and _ as wildcard characters in the name to process multiple reports. If you leave this field blank, % will be used as the default.

Browsing from a selection list

To browse a report entry from the Report Selection List panel, you must enter the following field:

Action

Enter B (for browse).

Browse Report Registration panel

The Browse Report Registration panel is a browse-only panel; you cannot change displayed attribute values from this panel.

Table 24. Browse Report Registration

```
DB2P / DB2PLOCATION -- Browse Report Registration -------------------- 8.1.0
Command ===>
Owner..................... :
Name...................... :
Description:
Shared?................... :
Program Name.............. :
Load Library.............. :
Plan Name................. :
Environment............... :
Program Type.............. :
COBOL Dialect............. :
Attachment Facility....... :
Uses Variables?........... :
Host Variable File LRECL... :
Input Data LRECL.......... :
Output Data LRECL......... :
Report LRECL.............. :
Number of Report Files..... :
Query Name................ :
Form Name................. :
Procedure Name............ :
```

If you press **Enter**, you proceed to the Browse Variables panel if this report uses any variables. Otherwise, you proceed to the next panel or you return to the previous panel if no more actions have been requested.

If you press **PF3**, you proceed to the next panel or return to the previous panel if no more actions have been requested.

If you type `ABORT` and press **Enter**, you will return to the previous panel.

Browse Variables panel

The Browse Variables panel is a browse-only panel; you cannot change displayed variable definitions from this panel.

Table 25. Browse Variables

```
DB2P / DB2PLOCATION -- Browse Variables For QMFUSER.REPORT ------------ 8.1.0
Command ===>                                              Scroll ===> PAGE


Variable Name                      Type
-----------------------------      ---------------


***************************** Bottom of data *****************************
```

If you press **Enter** or **PF3**, you proceed to the next panel or you return to the previous panel if no more actions have been requested.

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

If you type `ABORT` and press **Enter**, you return to the previous panel.

Creating a report

You can create a report from a selection list or from the End User Facility Report Maintenance panel.

Creating directly

To create a report entry from the End User Facility Report Maintenance panel, you must enter the following fields:

Action
> Enter `C` (for create).

Report Owner
> Enter the owner for this report. The owner entered must be a valid

primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. In the latter case, the report will be associated with that transaction, rather than with a particular owner.

Report Name

Enter the name for this report. No spaces are allowed in the report name. The combination of report owner and name must be unique.

Creating from a selection list

To create a report entry from the Report Selection List panel, you must enter the following field:

Action

Enter C (for create). This action will be treated as a `Create Like...` The attributes of the profile entry selected with the action of `C` will be used as default attribute values on the Create Report Registration panel.

Create Report Registration panel

If you are creating a report from the End User Facility Report Maintenance panel, this panel lists default attribute values when it is first displayed. If you are creating a report from the Report Selection List panel, this panel lists the attribute values from the report that was selected.

Table 26. Create Report Registration

```
DB2P ⁄ DB2PLOCATION -- Create Report Registration -------------------- 8.1.0
Command ===>

Owner................... ===>
Name.................... ===>
Description ===>
Shared?................. ===>
Program Name............ ===>
Load Library............ ===>
Plan Name............... ===>
Environment............. ===>
Program Type............ ===>
COBOL Dialect........... ===>
Attachment Facility..... ===>
Uses Variables?......... ===>
Host Variable File LRECL ===>
Input Data LRECL........ ===>
Output Data LRECL....... ===>
Report LRECL............ ===>
Number of Report Files.. ===>
Query Name.............. ===>
Form Name............... ===>
Procedure Name.......... ===>
```

If you press **Enter**, the attribute values will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, if the **Uses Variables?** field is set to YES, you will proceed to the Edit Variables panel. If the **Uses Variables?** field is set to NO, the report will be created (an entry will be inserted into Q.REPORTS), and you will proceed to the next panel or return to the previous panel if no more actions have been requested.

If you press **PF3**, the attribute values will be ignored and the report will not be created. You will proceed to the next panel or return to the previous panel if no more actions have been requested.

If you type ABORT and press **Enter**, the attribute values will be ignored, the report will not be created, and you will return to the previous panel.

The fields on the panel are:

Owner
 Enter the owner for this report. The value entered must be a valid primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. For a tranid, this report will be associated with that transaction rather than with a particular owner. This field is disabled if the report is being updated.

Name Enter the name for this report. No spaces are allowed in the name. The combination of owner and name must be unique. This field is disabled if the report is being updated.

Description
 Enter a report description (55 characters maximum).

Shared?
 Enter YES if this report should be visible to all users or NO if it should be visible only to users with authority to SET CURRENT SQLID to the report owner.

Program Name
 If this report runs a program, enter the program name. Leave this field blank if this report runs a QMF query or procedure.

Load Library
 If this report runs a program, you can enter the name of the load library where the program is located. Leave this field blank if this report runs a QMF query or procedure.

Plan Name
 If this report runs a program, you can enter the name of the plan to run with the program. Leave this field blank if this report runs a QMF query or procedure.

Environment

Enter BATCH, TSO, or CICS, depending on the environment in which this report should run. Set this field to TSO if this report runs a QMF query or procedure.

Program Type

Enter P (print), D (display), N (no report), L (data layer), or R (proc), depending on the type of program. Set this field to P or Dif this report runs a QMF query or procedure.

COBOL Dialect

If this report runs a program, enter OS/VS COBOL, VS COBOL II, COBOL FOR MVS, or COBOL FOR OS/390, depending on the language in which the program is written. Enter QMF if this report runs a QMF query or procedure.

Attachment Facility

If this report runs a program, enter TSO, CAF, RRSAF, or CICS, depending on the attachment facility used by the program. Leave this field blank if this report runs a QMF query or procedure.

Uses Variables?

If this report runs a program that uses host variables, enter YES. If this report runs a QMF query or procedure that uses variables, and you want the End User Facility to prompt for variable values, enter YES. Otherwise, enter NO. If you enter YES, a subsequent panel will be displayed on which you can specify the variable names and data types.

Host Variable File LRECL

If this report runs a batch program that uses host variables, enter the LRECL to use for the HOSTVARS or PROCVARS DD at runtime. Otherwise, this field is set to 0 and is ignored.

Input Data LRECL

If this report reads data from an input file, enter the LRECL of that file; otherwise, set this field to -1.

Output Data LRECL

If this report writes data to an input file, enter the LRECL of that file; otherwise, set this field to -1.

Report LRECL

Enter the LRECL of the report written by this program; otherwise, set this field to -1 if it is not known or not applicable.

Number of Report Files

Enter the number of REPORTnn DDs written by this report, or enter -1 if it is not known or not applicable.

Query Name

> If this report runs a program that was generated from a query or runs a QMF query, enter the name of the query. Otherwise, leave this field blank.

Form Name

> If this report runs a program that was generated from a query and form or runs a QMF query and form, enter the name of the form. Otherwise, leave this field blank.

Procedure Name

> If this report runs a program that was generated from a procedure or runs a QMF procedure, enter the name of the procedure. Otherwise, leave this field blank.

Edit Variables panel

When you create a new report, this panel does not list variable definitions. When you edit an existing report, this panel will initially list the current variable definitions for that report. Enter variable definitions for the report on this panel.

Table 27. Edit Variables

```
DB2P ⁄ DB2PLOCATION -- Edit Variables For QMFUSER.REPORT -------------- 8.1.0
Command ===>                                               Scroll ===> PAGE

Valid Actions Are...
D  Delete
I  Insert
R  Repeat
-------------------------------------------------------------------------------
       Variable Name                        Type
       -----------------------------  ---------------

***************************** Bottom of data *****************************




```

If you press **Enter**, line commands and variable definitions will be validated and processed. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, if any line commands are processed, the panel will be redisplayed. If there are no line commands, the variable definitions will be created (entries will be inserted into Q.REPORT_VARIABLES), and you proceed to the next panel or you return to the previous panel if no more actions have been requested.

If you press **PF3**, the variable definitions will be ignored and the report will not be created. You will proceed to the next panel or return to the previous panel if no more actions have been requested.

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

If you type ABORT and press **Enter**, the variable definitions will be ignored, the report will not be created, and you will return to the previous panel.

The fields on the panel are:

Line commands
> Enter any of the following the characters as line commands:
> - D to delete a line
> - I to insert a line
> - R to repeat a line

Variable Name
> Enter the name of the variable. Omit the colon (:) at the beginning of host variable names and omit the ampersand (&) at the beginning of QMF variable names.

Type Enter the data type of the variable. Valid data types are SMALLINT, INTEGER, DECIMAL(p,s), DECIMAL(p), DECIMAL, FLOAT, CHAR(n), VARCHAR(n), DATE, TIME, and TIMESTAMP.

Editing a report

You can edit a report from a selection list or from the End User Facility Report Maintenance panel.

Editing directly

Enter information in the following fields to edit a report entry from the End User Facility Report Maintenance panel:

Action
> Enter E (for edit).

Report Owner
> Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. For a tranid, reports associated with that transaction will be selected, rather than those with a particular owner. If you leave this field blank, your current SQLID will be used as a default.

Report Name
> Enter the report name (up to 18 characters). You can use % and _ as wildcard characters in the name to process multiple reports. If you leave this field blank, % will be used as the default.

Editing from a selection list

To edit a report entry from the Report Selection List panel, you must enter the following field:

Action

Enter E (for edit).

Edit Report Registration panel

You can change attribute values from the Edit Report Registration panel. However, you cannot change the key values (report owner and report name) from this panel.

Table 28. Edit Report Registration

```
DB2P ╱ DB2PLOCATION -- Edit Report Registration --------------------- 8.1.0
Command ===>

Owner.................... :
Name..................... :
Description ===>
Shared?................ ===>
Program Name........... ===>
Load Library........... ===>
Plan Name.............. ===>
Environment............ ===>
Program Type........... ===>
COBOL Dialect.......... ===>
Attachment Facility..... ===>
Uses Variables?........ ===>
Host Variable File LRECL ===>
Input Data LRECL........ ===>
Output Data LRECL....... ===>
Report LRECL............ ===>
Number of Report Files.. ===>
Query Name............. ===>
Form Name.............. ===>
Procedure Name......... ===>
```

If you press **Enter**, the attribute values will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, if the **Uses Variables?** field is set to YES, you will proceed to the Edit Variables panel. If the **Uses Variables?** field is set to NO, the report will be updated, and you will proceed to the next panel or you will return to the previous panel if no more actions have been requested.

If you press **PF3**, the attribute values will be ignored and the report will not be updated. You will proceed to the next panel or you will return to the previous panel if no more actions have been requested.

If you type ABORT and press **Enter**, the attribute values will be ignored, the report will not be updated, and you will return to the previous panel.

Dropping a report

You can drop a report from a selection list or from the End User Facility Report Maintenance panel.

Dropping directly

Enter information in the following fields to drop a report entry from the End User Facility Report Maintenance panel:

Action
> Enter D (for drop).

Report Owner
> Enter the report owner (up to 8 characters). The report owner must be a valid primary or secondary SQLID or must be of the form T=**tranid**, where **tranid** is a valid CICS transaction identifier. In the latter case, reports associated with that transaction will be selected, rather than those with a particular owner. If you leave this field blank, your current SQLID will be used as a default.

Report Name
> Enter the report name (up to 18 characters). You can use % and _ as wildcard characters in the name to process multiple reports. If you leave this field blank, % will be used as the default.

Dropping from a selection list

To drop a report entry from the Report Selection List panel, you must enter the following field:

Action
> Enter D (for drop).

Report Registration Drop Confirmation panel

The name of the report to be dropped is displayed on the Report Registration Drop Confirmation panel, along with the number of database rows that will be deleted as a result of this drop command.

Table 29. Report Registration Drop Confirmation

```
DB2P ⁄ DB2PLOCATION -- Report Registration Drop Confirmation ---------- 8.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

Report Owner............... :
Report Name................ :

Number of rows to be deleted from Q.REPORTS......... :
Number of rows to be deleted from Q.REPORT_VARIABLES :
```

If you press **Enter**, the report identified on the panel will be dropped from the database. Then you will proceed to the next panel or return to the previous panel if no more actions have been requested.

If you press **PF3**, the drop command will be ignored (the report will remain in the database). Then you will proceed to the next panel or return to the previous panel if no more actions have been requested.

If you type ABORT and press **Enter**, the drop command will be ignored (the report will remain in the database), and you will return to the previous panel.

Setting default parameters

All Program Generator options use a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Program Generator Menu.

Table 30. Program Generator Menu

```
DB2P / DB2PLOCATION -- Set Default Parameters ----------------------- 8.1.0
Command ===>

 1. Export Queries?..... ===>    (Y=Yes, N=No)
    Query Data Set...... ===>
    Query Member........ ===>
 2. Export Forms? ...... ===>    (Y=Yes, N=No)
    Form Data Set....... ===>
    Form Member......... ===>
 3. Export Procs? ...... ===>    (Y=Yes, N=No)
    Procedure Data Set.. ===>
    Procedure Member.... ===>
    Review Proc? ....... ===>    (B=Browse, E=Edit, N=No)
 4. Source Code Data Set ===>
 5. Source Code Data Set Disposition ===>    (OLD, SHR, or MOD)
 6. Confirm Query/Form Locations?... ===>    (Y=Yes, N=No)
 7. Confirm Exports?............... ===>    (Y=Yes, N=No)
 8. QMF/REXX Initialization Program. ===>
 9. Current SQLID.................. ===>
10. QMF Profile Key ............... ===>    (T=TSOID, P=PRIMEID)
11. Translation.................... ===>
12. Table name customization exit... ===>
13. Column name customization exit.. ===>
14. Host variable customization exit ===>
```

If you press **Enter**, all input fields will be validated. If any errors are detected
during input validation, the panel will be redisplayed with an error message.
If there are no errors, then these default values will be saved and you will
return to the Program Generator Menu.

If you press **PF3**, all input fields will be ignored and you will return to the
Program Generator Menu. The previous default values will be restored.

The fields on the panel are:

Export Queries?
>   Enter Y to direct Program Generator to automatically export your
>   queries. Enter N if your queries have been exported.

Query Data Set
>   If the **Export Queries?** flag is set to N, this is the data set that contains
>   your queries.
>
>   If the **Export Queries?** flag is set to Y, this is the data set into which
>   your queries should be exported (in which case it must have
>   RECFM=FB and LRECL=79).
>
>   If the data set does not exist, the Allocate Data Set pop-up window
>   will be displayed, allowing you to allocate it.

If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Query Member** field. You can also enter the name *TEMP to specify that temporary data sets should be created for exporting your queries.

Query Member

If the specified **Query Data Set** is a PDS, this is the member into which your queries should be exported, or the member that contains your queries. If you leave this field blank, the member name will be derived from the query name if the **Query Data Set** is a PDS. Leave this field blank if the **Query Data Set** is not a PDS or is *TEMP.

Export Forms?

Enter Y to direct Program Generator to automatically export your forms. Enter N if your forms have already been exported.

Form Data Set

If the **Export Forms?** flag is set to N, this is the data set that already contains your forms. If the **Export Forms?** flag is set to Y, this is the data set into which your forms should be exported (in which case it must have RECFM=V and LRECL between 81 and 7290 for QMF V2 or between 161 and 7290 for QMF V3). If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Form Member** field. You can also enter the name *TEMP to specify that temporary data sets should be created for exporting your forms.

Form Member

If the specified **Form Data Set** is a PDS, this is the member into which your forms should be exported, or this is the member that contains your forms. If you leave this field blank, the member name will be derived from the form name if the **Form Data Set** is a PDS. Leave this field blank if the **Form Data Set** is not a PDS or is *TEMP.

Export Procs?

Enter Y to direct Program Generator to automatically export your procedures. Enter N if your procedures have been exported.

Procedure Data Set

If the **Export Procs?** flag is set to N, this is the data set that contains your procedures. If the **Export Procs?** flag is set to Y, this is the data set into which your procedures should be exported (in which case it must have RECFM=FB and LRECL=79). If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you

to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Procedure Member** field. You can also enter the name *TEMP to specify that temporary data sets should be created for exporting your procedures.

Procedure Member

If the specified **Procedure Data Set** is a PDS, this is the member into which your procedures should be exported, or the member that contains your procedures. If you leave this field blank, the member name will be derived from the procedure name if the **Procedure Data Set** is a PDS. Leave this field blank if the **Procedure Data Set** is not a PDS or is *TEMP.

Review Proc?

Enter B to browse input procedures before generation, E to edit them, or N to do neither.

Source Code Data Set

Enter the data set to which generated programs should be written. If the data set does not exist, the Allocate Data Set pop-up window will be displayed, allowing you to allocate it. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name.

Source Code Data Set Disposition

Enter the disposition for the source code data set on output. Valid values are OLD, SHR, or MOD.

Confirm Query/Form Locations?

If you enter Y, the Confirm Query/Form Locations panel will be displayed during the generation process. Use this panel to confirm the location of every query and form used as input. If you enter N, default values will be used to determine the location of each query and form.

Confirm Exports?

If you enter Y, the Export Confirmation panel will be displayed during the generation process. Use this panel to confirm each QMF export command before it is issued. Entering N will cause exports to proceed without confirmation.

QMF/REXX Initialization Program

Enter the name of the REXX program used to set default QMF startup parameters, if your site does not use the default REXX program, DSQSCMDE.'

Current SQLID

Enter a 1-to-8 character SQLID to be used to qualify query, form,

procedure, and table names. The value entered must be a valid primary or secondary SQLID. If this value is left blank, your current SQLID will be used to qualify object names.

QMF Profile Key

QMF provides the ability to select your profile based on your TSO logon ID or your primary SQLID. Set this flag is set to `T` use your TSO ID; otherwise, set this flag to `P` to use your primary SQLID.

Translation

Enter the QMF translation value to use to select your profile. Valid values are:

Table 31. Language environments supported by QMF

CESTINA	DANSK	DEUTSCH	DEUTSCH (SCHWEIZ)
ENGLISH	ESPANOL	FRANCAIS	FRANCAISE (BELGIQUE)
FRANCAIS (CANADIEN)	FRANCAIS (SUISSE)	GREEK	HANGEUL
ITALIANO	ITALIANO (VIZZERA)	MAGYAR	POLSKI
PORTUGAL (PORTUGESE)	PORTUGUES	RUSSIAN	SVENSKA
T-CHINESE	UPPERCASE		

> **Note:** Leave this field blank or enter an asterisk (*) to use the system default.

Table Name Customization Exit

Enter the name of an exit to be used to customize the appearance of database table names and declarations in generated source code. To invoke a CLIST as the exit, precede the name with a percent sign (%). Otherwise, Program Generator assumes that the you entered name refers to an executable load module. The RAATXL member in the QMFHPO.SRAACLST library contains a sample CLIST exit. No customization is performed if value is entered in this field.

Column Name Customization Exit

Enter the name of an exit to be used to customize the appearance of database column names in generated source code. To invoke a CLIST as the exit, precede the name with a percent sign (%). Otherwise, Program Generator assumes that the entered name refers to an executable load module. The RAACXL member in the QMFHPO.SRAACLST library contains a sample CLIST exit. If no value is entered in this field, no customization is performed.

Host Variable Customization Exit

> Enter the name of an exit to be used to customize the declaration and use of host variables in generated source code. To invoke a CLIST as the exit, precede the name with a percent sign (%). Otherwise, Program Generator assumes that the entered name refers to an executable load module. The RAAHXL member in the QMFHPO.SRAACLST library contains a sample CLIST exit. If no value is entered in this field, no customization is performed.

Allocating Data Sets

If you enter the name of a data set that does not exist, the Allocate Data Set pop-up window is displayed, providing an interface by which you can allocate it.

Table 32. Allocate Data Set Pop-Up

```
Command ===>

This data set does not exist:


Specify allocation parameters below and press ENTER to allocate it.
Type CAN or CANCEL or press PF3 to cancel the allocation.

Unit.............. ===>
Space Units....... ===>       (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>       (in above units)
Secondary Quantity ===>       (in above units)
Directory Blocks.. ===>       (0 for a sequential data set)
Record Format..... ===>
Record Length..... ===>
Block Size........ ===>
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the window will be redisplayed with an error message. If there are no errors, then the data set will be allocated with the specified parameters and you return to the previous panel.

If you press **PF3**, all input fields will be ignored and you return to the previous panel. The data set will not be allocated.

The fields on the window are:

Unit Enter the device type to which the data set should be allocated, for example, SYSDA.

Space Units

> Enter C to express the size of the data set in cylinders, T to express the size in tracks, or B to express the size in blocks.

Primary Quantity

Enter the primary space allocation for the data set, in the specified **Space Units**.

Secondary Quantity

Enter the secondary space allocation for the data set, in the specified **Space Units**.

Directory Blocks

Enter the number of directory blocks for the data set, which will be a PDS as a result. Enter 0 to allocate a sequential data set.

Record Format

This field displays the record format required for the type of data set being allocated. You cannot change this value.

Record Length

This field displays the record length required for the type of data set being allocated. You cannot change this value.

Block Size

Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length. For data sets with an undefined record format, this must be a value greater than zero.

Chapter 3. End User Facility

The End User Facility provides a convenient interface through which you can run reports. Reports are:

- Compiled programs, typically converted from a QMF query, query and form, or procedure
- Non-compiled QMF queries, queries and forms, or procedures

Before you can run a report, it must be registered with the End User Facility through Program Generator. You can run reports by selecting them from a list. If the report uses input variables, a subsequent panel will be displayed on which you can specify runtime values for the variables.

The End User Facility has a version for TSO and another version for CICS. These two versions are similar in appearance and behavior. In either environment, online reports are automatically run online, and the report is displayed to the user. In either environment, the user can print the report. Under TSO, if the selected report is a batch program, JCL to run it is automatically generated and submitted (or edited if desired). Under TSO, non-compiled QMF queries, queries and forms, and procedures can be run online.

This chapter describes how to access the End User Facility, and how to use it to select report programs, provide variable values to those programs, and run those programs.

Starting the End User Facility from TSO

You can access the End User Facility by selecting option 2 from the Compiler Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU'
```

When you invoke the End User Facility from TSO, you can pass a parameter that is used to set the current report owner. This eliminates the need to use the Set Default Parameters panel to set this value. Here is an example of how to invoke the End User Facility and set the current report owner to USER1:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU (OWNER=USER1'
```

This is the End User Facility Selection Menu. It is displayed only from the TSO version of the End User Facility.

85

Table 33. QMF HPO/Compiler End User Facility Menu

```
QMF HPO/Compiler -- End User Facility Selection Menu ---------------- 8.1.0
Option ===>
                                        DB2 SSID ===> DB2P
                                        User ID:
                                        Date
                                        Time:
-----------------------------------------------------------------------
1  Run Reports From List
D  Set Default Parameters
Q  QMF
X  Exit
```

Starting the End User Facility from CICS

You can start the End User Facility from CICS by using the transaction
identifier assigned during installation. The default value for this identifier is
RAAE; however, there is no requirement to use the default name.

Running reports from a list

The Report Selection List panel can be displayed with or without extended
information. The first time that you use the End User Facility, the Report
Selection List panel is displayed without extended information. To switch
between the two versions of the panel, press **PF10** or enter the SWAPVIEW
command. The version of the panel that was displayed when you last exited
the End User Facility is displayed the next time you enter the facility.

Invoking the Report Selection List panel from TSO

Under ISPF, you can display the Report Selection List panel by selecting
option 1 from the End User Facility Selection Menu, or by issuing one of the
following TSO commands:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU 1'
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'EU L'
```

If you enter the second command, the End User Facility Selection Menu will
not be displayed when you leave the Report Selection List. Instead, you will
exit the End User Facility.

LIST REPORTS from QMF

You can also invoke the Report Selection List panel from a QMF session by
issuing the QMF command synonym LIST REPORTS. You can pass the owner
parameter with this command.

```
LIST REPORTS
LIST REPORTS (OWNER=USER1
```

See "Step 2a. Create Compiler command synonyms" for information about how to enable the LIST REPORTS command synonym.

Invoking the Report Selection List panel from CICS

Under CICS, running the End User Facility transaction brings you to the Report Selection List panel.

Using the Report Selection List panel

This is the Report Selection List panel without extended information. It is available under both TSO and CICS.

Table 34. Report Selection List for [ ]

```
DB2P -- Report Selection List For QMFUSER ------------------- Row 1 to 1 of 1
Command ===>                                               Scroll ===> PAGE

Use S to select report.
Press ENTER to run selected report.
Press PF10 to show extended information.
Type CAN or CANCEL or press PF3 to exit.

  Report            Description
  ----------------- ---------------------------------------------------------

***************************** Bottom of data *****************************
```

This is the Report Selection List panel with extended information. It is available only under TSO.

Table 35. Extended Report Selection List for [ ]

```
DB2P -- Report Selection List For QMFUSER ------------------- Row 1 to 1 of 1
Command ===>                                               Scroll ===> PAGE

Use S to select report.
Press ENTER to run selected report.
Press PF10 to hide extended information.
Type CAN or CANCEL or press PF3 to exit.

  Report            Mode   Compiled? Description
  ----------------- ------ --------- -----------------------------

***************************** Bottom of data *****************************
```

The following keys and commands are available from both forms of the Report Selection List panels:

• If you press **Enter**, the first row selected with S will be processed.

If a row is selected with a code other than S, the panel will be redisplayed with an error message. After the first selected row is processed, the panel will be redisplayed. Under TSO, you can also select a row with E (to edit generated batch JCL).

- Under TSO, if you press **PF3**, all input fields will be ignored and you will return to the End User Facility Selection Menu. Under CICS, if you press **PF3** or **CLEAR**, all input fields will be ignored and you will exit the transaction.
- If you enter SELECT <name> on the command line, where <name> is the name of a report in the list, that report will be selected. You can use any abbreviation of the word SELECT, for example, S <name>.
- If you enter LOCATE <name> on the command line, the displayed list will be repositioned to the report named <name>. You can use any abbreviation of the word LOCATE, for example, L <name>.
- Under TSO, if you enter EDIT <name> on the command line, where <name> is the name of a batch report in the list, the JCL for that report will be generated and edited. You can use any abbreviation of the word EDIT, for example, E <name>. This command cannot be used on a non-batch report.
- Under TSO, if you press **PF10** or enter SV or SWAPVIEW on the command line, you will toggle between displaying and not displaying extended information.

Selecting a report

To select a report, position the cursor to the left of the report name. When the cursor is positioned, enter S to select the report. If the report requires variable input, a panel on which to enter input variable values will be displayed. If the report is an online program, then it will be run automatically and the report will be displayed. If the report is a batch program, then the JCL will be generated and submitted automatically. Under TSO, you can enter E to select a batch report. This allows you to edit the JCL after it is generated.

What reports show up in the selection list under TSO

Three attributes are assigned when a TSO report is created that determine whether it will show up in a user's selection lists:

- Environment
- Shared Status
- Report Owner

Environment defines the environment in which the report can run. Only TSO programs and batch programs show up in selection lists when using the End User Facility under TSO.

Shared Status defines the authorization level of the report. Shared reports are available to all users. If a report is defined as restricted, then use of the report is limited to authorized users.

The third attribute is **Report Owner**. Users are authorized to use a report (regardless of its Shared Status) if they can set their CURRENT SQLID to the owner of the report.

Therefore, if the current report owner (CURRENT-REPORT-OWNER) is a valid CURRENT SQLID, then this SQL statement is used to select reports from Q.REPORTS:

```
SELECT ...
FROM Q.REPORT
WHERE ENVIRONMENT IN ('T', 'B'
   AND REPORT_OWNER = :CURRENT-REPORT-OWNED
```

If the current report owner is not a valid CURRENT SQLID, then this SQL statement is used to select reports from Q.REPORTS:

```
SELECT ...
FROM Q.REPORTS
WHERE ENVIRONMENT IN ('T', 'B')
   AND REPORT_OWNER = :CURRENT-REPORT-OWNER
   AND SHARED = 'Y'
```

What reports show up in the selection list under CICS

When a CICS report is created, two attributes are assigned that determine in which selection lists it will be included.

- Environment
- Report Owner

Environment, defines the environment in which the report can run. Only CICS programs show up in selection lists when using the End User Facility under CICS.

The second attribute is the **Report Owner**. Users are authorized to use a report (regardless of its Shared Status) if they can set their CURRENT SQLID to the owner of the report. In addition, under CICS a user is authorized to use a report if the Report Owner matches the transaction ID used to invoke the End User Facility. For example, if the End User Facility transaction ID is RAAE, any user authorized to run that transaction can use reports whose Report Owner is T=RAAE.

Based on this description, the following sample SQL statement is used to obtain the reports to display in the selection list:

```
SELECT ...
FROM Q.REPORTS
WHERE ENVIRONMENT = 'C'
   AND (REPORT_OWNER = CURRENT SQLID
      OR REPORT_OWNER = 'T='||EIBTRANID)
```

Because Shared Status is ignored for CICS reports, it is recommended that
CICS sites register all reports with a Shared Status of **no** and a Report Owner
of the form **T=tranid**. This forces report list selection to be tied to transaction
ID authorization.

Supplying runtime variable values for batch reports

When you select a batch report that uses runtime variables, a panel on which
you can enter values for those variables is displayed before the report is run.

Specifying multiple variable sets

If the program does not read data from an input file or write data to an
output file, you can supply multiple sets of runtime variables on the Assign
Values to Variable Set * panel:

Table 36. Assign Values to Variable Set

```
DB2P -- Assign Values To Variable Set #1 -------------------- Row 1 to 1 of 1
Command ===>                                               Scroll ===> PAGE

Press ENTER to accept input for this variable set.
Type CANCEL or press PF3 to end variable prompting and run this report.
Type ABORT to cancel this report request.

Variable :                                     Type :
Value ===>
***************************** Bottom of data *******************************
```

If you press **Enter**, this indicates that all runtime variable values for the
current variable set have been supplied. All input data for the current variable
set will be validated. If you enter any values that do not conform to the listed
data types, the panel will be redisplayed with an error message. If there are
no errors, prompting resumes for the next variable set.

If you press **PF3**, all input data for the current variable set will be ignored.
The Specify Report Destination panel will be displayed.

If you type ABORT and press **Enter**, no JCL will be generated and you will
return to the Report Selection List panel.

Specifying a single variable set

If the program reads data from an input file or writes data to an output file,
then only one set of runtime variables can be specified per run. The Assign

Values to Variables panel is similar to the Assign Values to Variable Set *
panel:

Table 37. Assign Values to Variables

```
DB2P -- Assign Values To Variables -------------------------- Row 1 to 1 of 1
Command ===>                                                Scroll ===> PAGE

Press ENTER to accept these values and continue.
Type CAN or CANCEL or press PF3 to cancel.

Variable :                                   Type :
Value ===>
***************************** Bottom of data ******************************
```

If you press **Enter**, this indicates that all runtime variable values have been
supplied. All input data for these variable sets will be validated. If you enter
any values that do not conform to the listed data types, the panel will be
redisplayed with an error message. Otherwise, if the selected program reads
data from an input file, the Specify Input Data Set panel will be displayed. If
it writes data to an output file, the Specify Output Data Set panel will be
displayed. Otherwise, the Specify Report Destination panel will be displayed.

If you press **PF3**, no JCL will be generated and you will return to the Report
Selection List panel.

Specifying a report destination

The destination for the report output from the program (i.e., SYSOUT or a
data set) is specified on the Specify Report Destination panel:

Table 38. Specify Report Destination

```
DB2P -- Specify Report Destination ---------------------------------- 8.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program it calls) should write its report.

Write To SYSOUT... ===>      (Y=Yes, N=No)
If not writing to SYSOUT, enter data set parameters.
Data Set.......... ===>
Member............ ===>
Disposition....... ===>      (N=NEW, S=SHR, O=OLD, M=MOD)
If disposition is NEW, also enter allocation parameters.
Unit.............. ===>
Space Units....... ===>      (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>      (in above units)
Secondary Quantity ===>      (in above units)
Directory Blocks.. ===>      (0 for a sequential data set)
Record Format..... ===>      (FA, FBA, VA, or VBA)
Record Length..... ===>
Block Size........ ===>
```

If you press **Enter**, all input data will be validated. If any errors occur during validation, the panel will be redisplayed with an error message. If there are no errors, the JCL will be generated and edited or submitted.

If you press **PF3**, no JCL will be generated and you will return to the Report Selection List panel.

The fields on the panel are:

Write To SYSOUT
> Enter Y if the program should write its report output to a SYSOUT data set. Enter N if the program should write report output to a specified data set.

Data Set
> Enter the name of the data set to which the report output for the program should be written. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field.

Member
> If the specified data set is a PDS, enter the member to which the program should write its report output. Leave this field blank if the specified data set is not a PDS.

Disposition

Enter N if the specified data set does not exist. If the data set does exist, enter S to allocate it with disposition SHR, O to allocate it with disposition OLD, or M to allocate it with disposition MOD.

Unit   Enter the device type to which the data set should be allocated, for example, SYSDA.

Space Units

Enter C to express the size of the data set in cylinders, T to express the size in tracks, or B to express the size in blocks.

Primary Quantity

Enter the primary space allocation for the data set, in the Space Units defined above.

Secondary Quantity

Enter the secondary space allocation for the data set, in the Space Units defined above.

Directory Blocks

Enter the number of directory blocks for the data set, which will be a PDS as a result. Enter 0 to allocate a sequential data set.

Record Format

Enter the record format for the data set.

Record Length

This field displays the record length required by the program. You cannot change this value.

Block Size

Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length.

Supplying runtime variable values for online reports

When you select an online report that uses runtime variables, a panel on which you can enter values for those variables is displayed before the report is run. The Assign Value to Variables panel, shown below, is used to supply runtime variable values.

Table 39. Assign Values to Variables

```
DB2P -- Assign Values to Variables -------------------------- Row 1 to 1 of 1
Command ===>                                                  Scroll ===> PAGE

Press ENTER to accept these values and continue.
Type CAN or CANCEL or press PF3 to cancel.

Variable :                                  Type :
Value ===>

***************************** Bottom of data *********************************
```

If you press **Enter**, this indicates that all runtime variable values have been supplied. All input data for these variable sets will be validated. If you enter any values that do not conform to the listed data types, the panel will be redisplayed with an error message. Otherwise, if the selected program reads data from an input file, the Specify Input Data Set panel will be displayed. If it writes data to an output file, the Specify Output Data Set panel will be displayed. Otherwise, the program will be run.

After the report ends, you will return to this panel and all previous variable values will be redisplayed. If you want to run the report again with different input variables, specify the new variable values and press **Enter** again.

If you press **PF3**, all input data will be ignored and you will return to the Report Selection List panel. Under CICS, pressing **CLEAR** will perform the same function.

Specifying an input data set

If the selected program reads input data from a file, the Specify Input Data Set panel is displayed:

Table 40. Specify Input Data Set

```
DB2P -- Specify Input Data Set -------------------------------------- 8.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program that it calls) should read its input
data.

Data set... ===>
Member..... ===>
Disposition ===>      (S=SHR, O=OLD)

The data set must exist.
```

If you press **Enter**, all input data will be validated. If any errors occur during validation, the panel will be redisplayed with an error message. Otherwise, if the selected program writes data to an output file, the Specify Output Data Set panel will be displayed. Otherwise, for batch programs, the Specify Report Destination panel will be displayed. For online programs, the program will be run.

If you press **PF3**, no JCL will be generated and no program will be run and you will return to the Report Selection List panel.

The fields on the panel are:

Data Set

Enter the name of the data set containing the input data for the program. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field.

Member

If the specified data set is a PDS, enter the member from which the program should read its input data. Leave this field blank if the specified data set is not a PDS.

Disposition

Enter S to allocate the specified data set with disposition SHR or 0 to allocate it with disposition OLD.

Specifying an output data set

If the selected program writes output data to a file, the Specify Output Data Set panel is displayed:

Table 41. Specify Output Data Set

```
DB2P -- Specify Output Data Set ------------------------------------- 8.1.0
Command ===>

Press ENTER to continue.
Type CAN or CANCEL or press PF3 to cancel processing.

Specify where the program (or a program it calls) should write its output data.

Data Set.......... ===>
Member............ ===>
Disposition....... ===>      (N=NEW, S=SHR, O=OLD, M=MOD)
If disposition is NEW, also enter allocation parameters.
Unit.............. ===>
Space Units....... ===>      (C=Cylinders, T=Tracks, B=Blocks)
Primary Quantity.. ===>      (in above units)
Secondary Quantity ===>      (in above units)
Directory Blocks.. ===>      (0 for a sequential data set)
Record Format..... ===>      (F, FB, V, or VB)
Record Length..... ===>
Block Size........ ===>
```

If you press **Enter**, all input data will be validated. If any errors occur during validation, the panel will be redisplayed with an error message. If there are no errors, for batch programs, the Specify Report Destination panel will be displayed. For online programs, the program will be run.

If you press **PF3**, no JCL will be generated and you will return to the Report Selection List panel.

The fields on the panel are:

Data Set

Enter the name of the data set to write output data for the program. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here. Instead, use the **Member** field.

Member

If the specified data set is a PDS, enter the member to which the program should write its output data. Leave this field blank if the specified data set is not a PDS.

Disposition

Enter N if the specified data set does not exist. If the data set does exist, enter S to allocate it with disposition SHR, O to allocate it with disposition OLD, or M to allocate it with disposition MOD.

Unit Enter the device type to which the data set should be allocated, for example, SYSDA.

Space Units

Enter C to express the size of the data set in cylinders, T to express the size in tracks, or B to express the size in blocks.

Primary Quantity

Enter the primary space allocation for the data set, in the Space Units defined above.

Secondary Quantity

Enter the secondary space allocation for the data set, in the Space Units defined above.

Directory Blocks

Enter the number of directory blocks for the data set, which will be a PDS as a result. Enter 0 to allocate a sequential data set.

Record Format

Enter the record format for the data set.

Record Length

This field displays the record length required by the program. You cannot change this value.

Block Size

Enter the block size for the data set. For data sets with a fixed record format, this must be a multiple of the record length. For data sets with a variable record format, this must be at least four greater than the record length.

Setting default parameters (TSO only)

Under TSO, the End User Facility uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the End User Facility Selection Menu.

Table 42. Set Default Parameters

```
DB2P -- Set Default Parameters -------------------------------------- 8.1.0
Command ===>

1. Report Owner........................ ===>
2. Report DCB Parameters...
      SYSOUT CLASS...................... ===>
      LRECL............................ ===>
      DEST............................. ===>
      COPIES........................... ===>
3. Job Parameters (used only if Job Cards are left blank)...
      CLASS............................ ===>
      MSGCLASS......................... ===>
4. Job Cards...
   ===>
   ===>
   ===>
   ===>
5. Write JCL To...
      Data Set ===>
      Member.. ===
6. QMF∕REXX Initialization Program..... ===>
7. QMF Profile Key (T=TSOID, P=PRIMEID) ===>
```

If you press **Enter**, all input fields will be validated. If any errors are detected
during input validation, the panel will be redisplayed with an error message.
If there are no errors, then these default values will be saved.

If you press **PF3**, all input fields will be ignored and you will return to the
End User Facility Selection Menu. The previous default values will be
restored.

The fields on the panel are:

Report Owner
> Use this field to control which reports will be included in the selection
> list. If you leave this field blank, your current SQLID will be used as
> the default owner.

SYSOUT class
> Specify the SYSOUT class for the REPORTnn DDs. If you leave this
> field blank, a system default value will be used.

LRECL
> Specify the LRECL for the REPORTnn DDs. If you leave this field
> blank,133 will be used.

DEST Specify the DEST for the REPORTnn DDs. If you leave this field

blank, a system default value will be used. If no system default value exists, the DEST parameter will be omitted.

COPIES

Specify the COPIES for the REPORTnn DDs. This number must be between 1 and 254. If you leave this field blank, the COPIES parameter will be omitted.

CLASS

Specify the value to use for the job CLASS parameter. If you leave this field blank, a system default value will be used.

MSGCLASS

Specify the value to use for the job MSGCLASS parameter. If you leave this field blank, a system default value will be used.

Job Cards

These job cards will be used when generating JCL for batch programs. If left blank, system default job cards will be used.

Data Set

Enter the data set to which the generated JCL should be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can enter the name *TEMP to specify that a temporary data set should be created for the JCL.

Member

If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL should be written. Leave this field blank if the **Data Set** is not a PDS or is *TEMP.

QMF/REXX Initialization Program

If your site uses a REXX program other than the default (DSQSCMDE) to set default QMF start-up parameters, enter its name here.

QMF Profile Key

QMF provides the ability to select your profile based on your TSO logon ID or your primary SQLID. If this field is set to T, your TSO ID is used. If it is set to P, your primary SQLID is used.

100 DB2 Query Management Facility: DB2 QMF High Performance Option User's Guide for TSO/CICS

Chapter 4. QMF HPO/Manager

Welcome to QMF HPO/Manager, the family of system utilities for managing and administering IBM's Query Management Facility (QMF).

Manager comprises these integrated components:
- The HPO/Governor module
- The HPO Activity Log
- Online facilities

The HPO/Governor module

The HPO/Governor module replaces the QMF sample governor and it is the direct interface into QMF processing for Manager. This enhanced governor module is more than a QMF governor, as it services the following facilities:

Object Manager

The Object Manager tracks QMF session activity. It records information about the commands and objects being processed and writes this information to the HPO Activity Log.

Governor

The Governor controls QMF session activity. It obtains thresholds and controls from resource groups in the same way as the QMF sample governor, but it provides a much wider and more flexible set of controls. These controls enforce proper use of resources in QMF sessions.

Monitor

The Monitor supplies a real time user interface to QMF session activity information. It accepts administrator commands and passes them on to the HPO/Governor module. This facility can only be activated for QMF/TSO sessions.

Query Analyzer

The Query Analyzer provides preemptive governing capabilities. It traps queries before they are processed by DB2 and estimates their resource consumption. Queries that are judged too intensive can be canceled before they run. This facility can only be activated for QMF/TSO sessions.

Note: When running QMF under TSO, QMF looks for a governor module named DSQUEGV1. When running QMF under CICS, QMF looks for a governor module named DSQUEGV3. The HPO/Governor modules and the QMF sample governor modules have the same name. ″Step 4.b

Special allocations for the HPO/Governor module," explains what is necessary to ensure that QMF finds the HPO/Governor modules instead of the sample governor modules.

The HPO Activity Log

The HPO Activity Log is a repository for QMF session activity and object usage information. The HPO/Governor module writes to the HPO Activity Log data sets. You must run a batch job periodically to copy the HPO Activity Log data sets to the HPO Activity Log tables. You can use the HPO Activity Log JCL facility to create the JCL to run the batch job.

Online facilities

These online facilities help organize and simplify the administration and management of QMF:
- Object Manager
- Governor
- Monitor
- Query Analyzer
- User Profile
- Error Log
- Spill File
- HPO Activity Log JCL
- QMF Start-Up Parameters

Starting HPO/Manager

Issue the following TSO command to display the Manager Selection Menu:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'M2'
```

Table 43. QMF HPO Manager Selection Menu

```
QMF HPO Manager -- Selection Menu --------------------------------- 8.1.0
Option ===>
                          DB2 SSID ===> DB2P
                          Location ===> DB2PLOCATION
                          User ID:
                          Date:
                          Time:
----------------------------------------------------------------------
   1  Object Manager                   7  Spill File
   2  Governor                         8  HPO Activity Log JCL
   3  Monitor                          9  QMF Start-Up Parameters
   4  Query Analyzer                  10  Object Manager Reports
   5  User Profile                     X  Exit
   6  Error Log
----------------------------------------------------------------------
5675-DB2 Copyright (C) 2003 IBM Corp. All Rights Reserved.
Copyright (C) 2003 Rocket Software, Inc. All Rights Reserved.
IBM is a registered trademark of International Business Machines Corporation.
Rocket is a registered trademark of Rocket Software, Inc.
----------------------------------------------------------------------
```

You can invoke each of the menu options using the one-character selection codes.

Chapter 5. Object Manager

As users build QMF objects (queries, forms, and procedures), the QMF object tables become more populated. There is a negative impact on performance as the object tables increase in size. As an administrator, you need to maintain control over the QMF objects; you need to know who owns what objects, what objects are obsolete, what objects need to be transferred to new owners and DB2 subsystems, and so on.

As users leave your environment, they typically leave behind a set of queries, forms, and procedures. With Object Manager you can quickly and efficiently transfer those objects to a new owner or drop the unowned objects

Object Manager's integrated components provide the necessary functions for QMF and DB2 database administrators to effectively track and manage QMF objects.

Object Manager comprises three main components:
- The HPO Activity Log
- Online facilities
- Reports

In addition, the HPO/Governor module provides Object Manager's direct interface into QMF processing.

The HPO Activity Log

The HPO Activity Log is a repository for QMF session activity and object usage information. For example, when an object is erased from the system, the object name, the user ID of the person who issued the erase command, and the date and time will be recorded. All QMF object activity, including ad hoc activity, is tracked.

The HPO/Governor module writes to the HPO Activity Log data sets. A batch job, automatically generated by the HPO Activity Log JCL facility, is run periodically to copy the HPO Activity Log data sets to the HPO Activity Log tables.

An exit is provided from the HPO/Governor module to allow custom processing against the activity log records before they are written to the HPO Activity Log data sets. Each log record can be examined and marked for inclusion into or exclusion from the log. This exit can be used to selectively

track QMF object activity. Sample assembler source code for this exit is provided in QMFHPO.SRAASAMP in the member named RAAOBJX.

Online facilities

You can review and manipulate QMF objects using the Object Manager online facilities. Use the Object Manager to operate on a single object, or to operate on a set of objects.

Operating on a single object

The following actions operate on one object at a time:
- Browsing an object
- Viewing the first-used and last-used statistics for an object
- Reviewing historical CPU time consumption and rows fetched for a query
- Reviewing historical CPU time consumption and rows fetched for a proc
- Reviewing the SQL text associated with the running of a query
- Renaming an object
- Adding or modifying remarks for an object
- Changing the restricted status of an object
- Invoking Program Generator
- Cross referencing objects with their generated programs

Operating on multiple objects

The following actions can operate on one or more objects at a time:
- Copying one or more objects
- Transferring one or more objects
- Dropping one or more objects
- Reviewing QMF usage statistics for one or more objects

You can use Object Manager to build selection lists of QMF objects. Lists can be qualified by owner, name, type, and usage statistics. These lists can be used to help you identify dormant objects, frequently used objects, or resource intensive objects. From a list, it is easy for you to drop dormant objects or compile frequently used or resource intensive objects. It is possible to invoke Program Generator from an Object Manager selection list.

Object Manager obtains first-used, last-used, and last-modified statistics and historical query and procedure statistics from the HPO Activity Log tables. In addition, the Object Manager online facilities write to the HPO Activity Log data sets when objects are dropped or added.

Reports

Object Manager provides a series of reports to turn the HPO tracking data into information that can be used to properly manage a QMF environment. These include:

- Cancellation summary
- Cancellation detail for a user
- Performance summary based on maximum CPU
- Performance summary based on average CPU
- Performance summary for a query
- Performance detail for a query
- Resource consumption detail for a user
- Resource usage summary
- Resource usage summary for a time period
- Chargeback summary for a time period

These reports can be run using the Object Manager online facilities. Sample JCL is also provided in QMFHPO.SRAASAMP for batch reporting.

Starting Object Manager

You perform all object management from the Object Manager panel, which you can access by selecting option 1 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM O'
```

Table 44. Object Manager

```
 DB2P ∕ DB2PLOCATION -- Object Manager ------------------------ 8.1.0
 Command ===>
 Action................... ===>
 Object Owner............. ===>
 Object Name.............. ===>
 Object Type (Q∕P∕F∕%)..... ===>
 Additional List Filtering? ===>
 Drop Confirmation? (Y∕N).. ===>
 ------------------------------------------------------------------
 Valid Actions Are...
 B  Browse                        Q  QMF Activity Summary
 H  Detail History                R  Change Restricted Status
 N  Rename                        V  View Statistics and Remarks
 P  Invoke Program Generator      X  Objects∕Reports Cross Reference

 These actions support % and _ wildcard characters in Object Name...
 C  Copy                          L  Display Selection List
 D  Drop                          T  Transfer
 ------------------------------------------------------------------
```

If you press **Enter**, all input fields will be processed. If any errors are detected
during input validation, the panel will be redisplayed with an error message.

If you press **PF3**, all input fields will be ignored and you will return to the
previous menu.

Building a selection list of objects

To build a selection list of QMF objects from the Object Manager panel, you
must enter the following fields:

Action
> Enter L (for list).

Object Owner
> Enter the owner of the object you want to list. You can use % and _ as
> wildcard characters in the owner to select objects from multiple
> owners.

Object Name
> Enter the name of the object you want to list. You can use % and _ as
> wildcard characters in the name to select multiple objects. If you leave
> this field blank, % will be used as a default.

Object Type
> Enter Q, P or F to list queries, procedures, or forms only. For all object
> types, enter %. If you leave this field blank, % will be used as a
> default.

Additional List Filtering?

Enter Y to further qualify the objects to include in the selection list. If further qualification is requested, the List Filter Specification panel will be displayed. Enter N to bypass additional list filtering.

Drop Confirmation?

Enter Y to request drop confirmations or N to suppress them. This value will be carried forward to all actions performed from the selection list. If this flag is left blank, Y will be used as a default.

Additional list filtering

When you enter L (for list) on the Object Manager panel and the **Additional List Filtering?** flag is set to Y, the List Filter Specification panel is displayed. This panel displays the set of filters that you can use to further qualify the object selection list. An object must pass all of the enabled filters to be included in the selection list.

Table 45. List Filter Specification

```
DB2P ⁄ DB2PLOCATION -- List Filter Specification--------------- 8.1.0
Command ===>

Enable? Description
------- ----------------------------------------------------------
        Show only queries⁄procs that ran more than (CPU seconds)...
        Show only queries⁄procs run more than (number of times)....
        Show only queries⁄procs that have ever been canceled.
        Show only queries⁄procs run by user (TSO ID)..............
        Show only queries⁄procs run by user (SQLID)...............
        Show only objects      that have not been used since......
        Show only objects      that have been used on or since....
        Show only queries⁄procs that have not been run since.......
        Show only queries⁄procs that have been run on or since.....
        Show only objects      that include the text listed below.
        (Warning: resource intensive filter).......................

        Carry filtering through to History panel? (Y⁄N)....... ===>
```

If you press **Enter**, all enabled filters will be processed. An object must pass all enabled filters to be included in the selection list. That is, if more than one filter is enabled, these conditions are combined with the 'AND' operator.

If you press **PF3**, all input fields will be ignored and you will return to the Object Manager panel.

The fields on the panel are:

Show only queries that ran more than * CPU seconds.

Enter Y in the **Enable**? column to enable this filter. A query must have

run for more than the specified number of CPU seconds in order for it to be included in the selection list. This is useful for identifying resource intensive queries. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs run more than * times.
> Enter Y in the **Enable?** column to enable this filter. A query or proc must have been run more than the specified number of times in order for it to be included in the selection list. This is useful for identifying frequently used queries and procs. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs that have ever been canceled.
> Enter Y in the **Enable?** column to enable this filter. A query or proc must have been canceled at least once in order for it to be included in the selection list. This is useful for identifying frequently canceled queries and procs. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs run by user (TSO ID) *.
> Enter Y in the **Enable?** column to enable this filter. This is useful for identifying specific user's actions under QMF. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs run by user (SQLID) *.
> Enter Y in the **Enable?** column to enable this filter. This is useful for identifying specific user's actions under QMF. Enter N in the **Enable?** column to disable this filter.

Show only objects that have not been used since YYYY-MM-DD.
> Enter Y in the **Enable?** column to enable this filter. An object must not have been used since the specified date in order for it to be included in the selection list. This is useful for identifying dormant objects. Enter N in the **Enable?** column to disable this filter.

Show only objects that have been used on or since YYYY-MM-DD.
> Enter Y in the **Enable?** column to enable this filter. An object must have been used on or since the specified date in order for it to be included in the selection list. This is useful for identifying frequently used objects. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs that have not been run since YYYY-MM-DD.
> Enter Y in the **Enable?** column to enable this filter. A query or proc must not have been run since the specified date in order for it to be included in the selection list. This is useful for identifying dormant queries and procs. Enter N in the **Enable?** column to disable this filter.

Show only queries/procs that have been run on or since YYYY-MM-DD.
> Enter Y in the **Enable?** column to enable this filter. A query or proc must have been used on or since the specified date in order for it to

be included in the selection list. This is useful for identifying frequently used queries and procs. Enter N in the **Enable**? column to disable this filter.

Show only objects that include the text listed below.
Enter Y in the **Enable**? column to enable this filter. An object must contain the text that you specify for it to be included in the selection list. This is useful for locating queries that reference a specific table or column. Enter N in the **Enable**? column to disable this filter.

Note: It is resource intensive to search queries, forms, and procs for specific text. When you enable this option, expect to wait longer for results to be displayed.

Carry filtering through to History panel?
Enter Y to carry the filter specifications through to the History panel. When you specify an H (history) from the object selection list, the filter specifications will be applied to the historical tracking data before it is displayed. For example, if a date filter is specified, then the tracking data will be compared against the date filter and only that data that passed the filter will be displayed. Enter N to disable this option. If you leave this field blank, Y is assumed.

Object Selection List panel

When you enter L (for list) on the Object Manager panel, the Object Manager Selection List panel is displayed. This panel contains a list of all QMF objects that match the input specifications entered on the Object Manager panel and, if specified, the List Filter Specification panel.

Table 46. Object Manager Selection List

```
DB2P / DB2PLOCATION -- Object Manager Selection List----------- 8.1.0
Command ===>                                          Scroll ===> PAGE


Valid Actions Are...
B  Browse                        P  Invoke Program Generator
C  Copy                          R  Change Restricted Status
D  Drop                          T  Transfer
H  Detail History                V  View Statistics and Remarks
N  Rename                        X  Object/Reports Cross Reference
----------- -------------------<--First Used-->   <--Last Used--->
Act     Object Owner  / Object Name  T  R  Date  Time  Date    Time
---     --------------------------   -  -  ----  ----  ----    ----


************************* BOTTOM OF DATA**************************
```

If you press **Enter**, all rows that are selected with an action code will be processed. After all selected rows are processed, the panel will be redisplayed

with an informative message on each row (such as *UPDATE or *NODROP). This message will appear in the space between the **Act** and **Object Owner** columns.

You may `LOCATE` an object by object name only from the command line. Enter any abbreviation of the word "locate" (e.g., "L" or "LOC") followed by the object name to automatically scroll down to the desired object.

Note: If multiple object owners are included in this list, only the first owner's list will be searched.

If you press **PF3**, all input fields will be ignored and you will return to the Object Manager panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all selected rows have been processed.

Browsing an object

You can browse a QMF object (and optionally analyze a QMF query) from a selection list or from the Object Manager panel. You can browse SQL or PROMPTED queries, and procedures. You cannot browse ad hoc queries (*ADHOC).

Browsing directly

Enter the following fields to browse a QMF object from the Object Manager panel:

Action
> Enter B (for browse).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q or P to specify query or procedure. If the type is unknown, enter %.

Browsing from a selection list

Enter the following field to browse a QMF object from the Object Manager Selection List panel:

Action
> Enter B (for browse).

Object Browse panel

The object is displayed on the Object Browse panel.

Table 47. Object Browse

```
DB2P ⁄ DB2PLOCATION -- Query QMFUSER.QUERY1----------------- 8.1.0
Command===>                                  Scroll ===> PAGE

Valid Commands Are...
ANALYZE to invoke Query Analyzer (valid only for queries).




                  ----------------------------------------------------------------
***************************BOTTOM OF DATA *************************
```

If you enter the command ANALYZE on the command line and press **Enter**, Query Analyzer will be invoked with the QMF query identified on this panel. This command is only valid for QMF queries. When you exit Query Analyzer, you will return to this panel.

If you press **PF3**, you will return to the previous panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward.

Dropping an object

You can drop a QMF object or multiple objects (with the same owner) from a selection list or from the Object Manager panel. Ad hoc queries (*ADHOC) cannot be dropped.

Dropping directly

To drop a QMF object from the Object Manager panel, enter the following fields:

Action

Enter D (for drop).

Object Owner

Enter the owner of the object. No wildcard characters are allowed.

Object Name

> Enter the name of the object. You can use % and _ as wildcard characters in the name to copy multiple objects. If you leave this field blank, % will be used as a default.

Object Type

> Enter Q, P, or F to drop queries, procedures, or forms only. For all object types, enter %. If you leave this field blank, % will be used as a default.

Drop Confirmation?

> Enter Y to request a drop confirmation panel or N to suppress one. If this flag is left blank, Y will be used as a default.

Dropping from a selection list

To drop a QMF object from the Object Manager Selection List panel, the following field:

Action

> Enter D (for drop).

Object Drop Confirmation panel

The number of objects to be dropped is shown on the Object Drop Confirmation panel.

Table 48. Object Drop Confirmation

```
DB2P / DB2PLOCATION -- Object Drop Confirmation-------------- 8.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

Object Owner.. :
Object Name... :
Object Type... :
Number of objects to be deleted :
```

If you press **Enter**, the QMF objects identified on the panel will be dropped from the database, the HPO Activity Log will be updated, and you will return to the previous panel.

If you press **PF3**, the drop command will be ignored, the QMF objects will remain in the database, and you will return to the previous panel.

Copying an object

You can copy QMF objects from a selection list or from the Object Manager panel. The Copy action does not drop or delete the originally specified object (or set of objects). Ad hoc queries (*ADHOC) cannot be copied.

Copying directly

To copy a QMF object or multiple objects using the Object Manager panel, enter the following fields:

Action
> Enter `C` (for copy).

Object Owner
> Enter the owner of the object. You can use % and _ as wildcard characters in the owner to copy objects from multiple owners.

Object Name
> Enter the name of the object. You can use % and _ as wildcard characters in the name to copy multiple objects. If you leave this field blank, % will be used as a default.

Object Type
> Enter `Q`, `P`, or `F` to copy queries, procedures, or forms only. For all object types, enter %. If you leave this field blank, % will be used as a default.

Copying from a selection list

To copy a QMF object from the Object Manager Selection List panel, enter the following field:

Action
> Enter `C` (for copy).

Copy Object panel

The **From** information is displayed along with the number of QMF objects that will be processed.

Table 49. Copy Object

```
 DB2P ⁄ DB2PLOCATION -- Copy Object-------------------------- 8.1.0
 Command ===>

 Press ENTER to process this COPY request.
 Type CAN or CANCEL or press PF3 to cancel this COPY request.

 From DB2 Subsystem......... :
      Location.............. :
      Object Owner.......... :
      Object Name........... :
      Object Type (Q⁄P⁄F⁄%).. :
      Object Count.......... :

 To   Local DB2 Subsystem. ===>
      Location............ ===>
      New Owner........... ===>
      New Name............ ===>
      Replace Duplicates?. ===>
```

If you press **Enter**, the QMF objects identified on the panel will be processed,
the database will be updated, the HPO Activity Log will be updated, and you
will return to the previous panel.

If you press **PF3**, the command will be ignored, the objects will remain
unchanged, and you will return to the previous panel.

The fields on the panel are:

From DB2 Subsystem and Location
> These fields identify the source QMF system of the original objects.
> **Location** will only be specified if DDF is active.

To DB2 Subsystem and Location
> These fields identify the QMF system in which a copy of the source
> objects will be created. You can value in the **Location** field if DDF is
> active. You can leave the **To DB2 Location** blank to specify the default
> location for the **To DB2 Subsystem.**

New Owner
> Enter a value to create a new set of objects with a different owner
> from the **From Object Owner**.

New Name
> Enter a value to create a new object with a different name than the
> **From Object Name**. You can enter a value in this field only when you
> are processing one object (that is, when **Object Count** is equal to 1).

You cannot use any of the following QMF reserved words as the new name: CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?
This flag determines what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object will replace the object with the same name. If you enter N, the new object will not be created.

Transferring an object

You can transfer QMF objects from a selection list or from the Object Manager panel. The Transfer action drops or deletes the originally specified object (or set of objects). Ad hoc queries (*ADHOC) cannot be transferred.

Transferring directly

To transfer a QMF object or multiple objects using the Object Manager panel, you must enter the following fields:

Action
Enter T (for transfer).

Object Owner
Enter the owner of the object. No wildcard characters are allowed.

Object Name
Enter the name of the object. You can use % and _ as wildcard characters in the name to transfer multiple objects. If you leave this field blank, % will be used as a default.

Object Type
Enter Q, P, or F to transfer queries, procedures, or forms. For all object types, enter %. If you leave this field blank, % will be used as a default.

Transferring from a selection list

To transfer a QMF object from the Object Manager Selection List panel, you must enter the following field:

Action
Enter T (for transfer).

Transfer Object panel

The **From** information is displayed along with the number of QMF objects that will be processed.

Table 50. Transfer Object

```
DB2P / DB2PLOCATION -- Transfer Object ----------------------- 8.1.0
Command ===>

From DB2 Subsystem........ :
     Location.............. :
     Object Owner.......... :
     Object Name........... :
     Object Type (Q/P/F/%). :
     Object Count.......... :

To   DB2 Subsystem...... ===>
     Location........... ===>
     New Owner.......... ===>
     New Name........... ===>
     Replace Duplicates? ===>
```

Press **ENTER** to process this TRANSFER request. If you press **Enter**, the QMF objects identified on the panel will be processed, the database will be updated, the HPO Activity Log will be updated, and you will return to the previous panel.

Type CAN or CANCEL or press **PF3** to cancel this TRANSFER request.

If you press **PF3**, the command will be ignored, the objects will remain unchanged, and you will return to the previous panel.

The fields on the panel are:

New Owner

If you are transferring a set of objects, enter the new owner for the objects. You must specify a different owner from the **From Object Owner.** If you are transferring only one object, enter the new owner for the object, or specify the same owner as the **From Object Owner**, in which case you must specify a different object name in the **New Name field**.

New Name

If you are transferring a set of objects, you cannot enter a value in this field. If you are transferring only one object, enter the new name for the object. If the object is being transferred to a different owner, you can specify the same name as the **From Object Name**. Otherwise, you must specify a different name. You cannot use any of the following QMF reserved words as the new name: CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?
This flag controls what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object will replace the object having the same name. If you enter N, the new object will not be created.

Renaming an object

You can rename QMF objects from a selection list or from the Object Manager panel; however, you can only rename one object at a time. Ad hoc queries (*ADHOC) cannot be renamed.

Renaming directly

To rename a QMF object using the Object Manager panel, you must enter the following fields:

Action
Enter N (for name).

Object Owner
Enter the owner of the object. No wildcard characters are allowed.

Object Name
Enter the name of the object. No wildcard characters are allowed.

Object Type
Enter Q, P, or F to rename queries, procedures, or forms. For all object types, enter %. If you leave this field blank, % will be used as a default.

Renaming from a selection list

To rename a QMF object from the Object Manager Selection List panel, you must enter the following field:

Action
Enter N (for name).

Rename Object panel

The **From** information is displayed along with the number of QMF objects that will be processed.

Table 51. Rename Object

```
DB2P / DB2PLOCATION -- Rename Object ------------------------ 8.1.0
Command ===>

Press ENTER to process this RENAME request.
Type CAN or CANCEL or press PF3 to cancel this RENAME request.

From DB2 Subsystem........ :
     Location.............. :
     Object Owner.......... :
     Object Name........... :
     Object Type (Q/P/F/%). :
     Object Count.......... :

To   DB2 Subsystem...... ===>
     Location.......... ===>
     New Owner......... ===>
     New Name.......... ===>
     Replace Duplicates? ===>
```

If you press **Enter**, the QMF object identified on the panel will be processed, the database will be updated, the HPO Activity Log will be updated, and you will return to the previous panel.

If you press **PF3**, the command will be ignored, the object will remain unchanged, and you will return to the previous panel.

The fields on the panel are:

New Name
> Enter the new name of the object. You must specify a different value from the **From Object Name**. You cannot use any of the following QMF reserved words as the new name: CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

Replace Duplicates?
> This flag controls what happens if an object exists with the same name as one you are trying to create. If you enter Y, the new object will replace the object with the same name. If you enter N, the new object will not be created.

Toggling the restricted status of an object

You can toggle the restricted status of a QMF object between restricted and shared from a selection list or from the Object Manager panel. Ad hoc queries (*ADHOC) cannot have their status modified.

Toggling the restricted status directly

To toggle the restricted status of a QMF object from the Object Manager panel, you must enter the following fields:

Action
> Enter R (for restricted status).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q, P, or F to specify a query, procedure, or form. If the type is unknown, enter %.

Toggling the restricted status from a selection list

To toggle the restricted status of a QMF object from the Object Manager Selection List panel, you must enter the following field:

Action
> Enter R (for restricted status).

Viewing object statistics and remarks

You can view QMF object statistics, view object remarks, and add or modify object remarks from a selection list or from the Object Manager panel. You can view statistics collected for ad hoc queries (*ADHOC) from this panel.

Viewing object statistics and remarks directly

To view QMF object statistics from the Object Manager panel, you must enter the following fields:

Action
> Enter V (for view statistics).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q, P, or F to specify a query, procedure, or form. If the type is unknown, enter %.

Viewing object statistics and remarks from a selection list

To view QMF object statistics from the Object Manager Selection List panel, you must enter the following field:

Action

> Enter V (for view statistics).

View Statistics and Remarks panel

Object statistics and remarks are displayed on this panel.

Table 52. View Statistics and Remarks

```
DB2P ╱ DB2PLOCATION -- QMFUSER.QUERY1 ----------------------- 8.1.0
Command ===>

Overtype remarks to change.
Press ENTER to save new remarks.
Type CAN or CANCEL or press PF3 to leave remarks unchanged.


Remarks ===>

Type.................. :            Subtype................. :
Restricted Status...... :            Model................... :
Object Level.......... :            Number of Times Run..... :
Number of Times Used... :            Number of Times Canceled :

Object Activity          First Used    Last Used  Last Modified
Date.................. :        .....         .....
Time.................. :        .....         .....
TSOID................. :        .....         .....
Current SQLID......... :        .....         .....
Environment........... :        .....         .....
Mode.................. :        .....         .....
QMF Command........... :        .....         .....
```

If you enter the command COMPILE on the command line and press **Enter**, Program Generator will be invoked with the QMF object identified on this panel. This command is only valid for QMF queries and procedures. When you exit Program Generator, you will return to this panel.

Note: You can invoke Program Generator only if Compiler is installed on your system. A message is displayed if Compiler is not installed.

If you press **Enter** and you modify the **Remarks** field, the remarks for this object will be modified and you will return to the previous panel.

If you press **Enter** and you do not modify the **Remarks** field, the remarks for this object will remain unchanged and you will return to the previous panel.

If you press **PF3**, you will return to the previous panel and the remarks for this object will remain unchanged.

The field on the panel is:

Remarks
>   Enter the remarks for this object.

Viewing detail history

You can view QMF detail history for queries and procs from a selection list or from the Object Manager panel. You can view statistics collected for ad hoc queries (*ADHOC) and ad hoc procs (*ADHOCP) from this panel as well.

Viewing detail history directly

To view QMF detail history from the Object Manager panel, you must enter the following fields:

Action
>   Enter H (for history).

Object Owner
>   Enter the owner of the query or proc. No wildcard characters are allowed.

Object Name
>   Enter the name of the query or proc. No wildcard characters are allowed.

Object Type
>   Enter Q to specify a query or P to specify a proc.

Viewing detail history from a selection list

To view QMF detail history from the Object Manager Selection List panel, you must enter the following field:

Action
>   Enter H (for history).

View Query History panel

Query history is displayed on this panel.

Table 53. Query History

```
  DB2P ⁄ DB2PLOCATION -- Query QMFUSER.QUERY1 ------------------- 8.1.0
  Command ===>                                        Scroll ===> PAGE
  Valid Actions Are...
  B  Browse SQL Text


  Total number of times run............:
  Rows: Minimum :            Average :            Maximum :
  CPU : Minimum :            Average :            Maximum :


                                                            M
  A                                                         E O C S
  C  Start     Elapsed                                      N D A Q
  T  Date      Time    Time    TSOID    SQLID    Rows   CPU  V E N L
     -----     -----   -----   -----    -----    ----   ---  - - - -

****************************BOTTOM OF DATA****************************
```

If you press **Enter**, all rows that are selected with an action code of B (to browse query text) will be processed. If there is no query text to browse for the selected row, the row will be bypassed. After all selected rows are processed, the panel will be redisplayed.

If you press **PF3**, all input fields will be ignored and you will return to the previous panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all selected rows have been processed.

The fields on the panel are:

Total number of times run
> This field indicates the number of times this query has been run. If additional list filtering has been carried forward, the number of detail records displayed on this panel may be less than this value. If additional list filtering has been carried forward, an information message will be displayed on the panel's message line.

ACT   (Action): Set this field to B to browse SQL text.

ENV   (Environment): This column indicates the environment under which the object was run. T indicates TSO, C indicates CICS, and O or H indicates the action was performed in HPO Object Manager.

MODE

This column indicates the mode under which the object was run. `0` indicates online and `B` indicates batch.

CAN (Cancel code): This column indicates whether or not the query was canceled. If it was not canceled, a zero will be displayed. If it was canceled, a one character code will be displayed. See "HPO/Governor module cancel codes" for a discussion of the values that can appear in this column.

SQL (SQL text indicator): This column indicates whether or not there is any SQL text available for browsing. If SQL text is available, this flag is set to `Y`. If no text is available, this flag is set to `N`. SQL text is only available for queries in which CPU consumption exceeds an installation-defined threshold. For more information about this threshold and SQL text tracking, see "Step 12f. Set HPO/Governor module configuration parameters."

SQL Text Browse panel

The query text for the selected row is displayed on the SQL Text Browse panel. This is the actual SQL statement that was run in QMF. For queries stored in QMF, this may be different from the current SQL statement stored in QMF. This is the only panel from which you can browse ad hoc query text.

Table 54. SQL Text Browse

```
  DB2P ⁄ DB2PLOCATION -- QMFUSER.QUERY1 ------------------------------- 8.1.0
  Command ===>                                                  Scroll ===> PAGE

  Valid Commands Are...
  ANALYZE to invoke Query Analyzer (valid only for queries).
                                                                        Cancel
  Date      Time    TSOID   SQLID   Env  Mode   Rows      CPU          Code
  -----     -----   ------  ------  ---- -----  ----      --------     ----




  ----------------------------------------------------------------------------
**************************** BOTTOM OF DATA *******************************
```

If you enter the command `ANALYZE` on the command line and press **Enter**, Query Analyzer will be invoked with the QMF query identified on this panel. This command is only valid for QMF queries. When you exit Query Analyzer, you will return to this panel.

If you press **PF3**, you will return to the previous panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward.

View Proc History panel

Proc history is displayed on this panel.

Table 55. Proc History Panel

```
  DB2P / DB2PLOCATION -- Proc QMFUSER.PROC1 -------------------- 8.1.0
  Command ===>                                        Scroll ===> PAGE

  Total number of times run............:
  Rows: Minimum :              Average :             Maximum :
  CPU : Minimum :              Average :             Maximum :
                                                             M
                                                           E O C
          Start   Elapsed                                 N D A
  Date    Time    Time    TSOID   SQLID    Rows   CPU     V E N
  -----   ------  -----   ------  ------   -----  -----   - - -



************************** BOTTOM OF DATA***************************
```

If you press **PF3**, you will return to the previous panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all selected rows have been processed.

The fields on the panel are:

TOTAL number of times run
> This field indicates the number of times this proc has been run.

ENV (Environment): This column indicates the environment under which the object was run: TSO; CICS; or HPO.

Mode This column indicates the mode under which the object was run: ONLINE or BATCH.

CAN (Cancel code): This column indicates whether or not the proc was canceled. If it was not canceled, a zero will be displayed. If it was canceled, a one character code will be displayed. See "HPO/Governor module cancel codes" for a discussion of the values that can appear in this column.

Invoking Program Generator

You can select a query or a procedure and invoke Program Generator to compile that object into a program. When you exit Program Generator, you will return to the panel from which you selected the action.

Important

You can only invoke Program Generator if Compiler is installed on your system. A message will be issued if it is not installed.

Invoking Program Generator directly

To invoke Program Generator from the Object Manager panel, you must enter the following fields:

Action
> Enter P (for Program Generator).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q or P to specify a query or a procedure. If the type is unknown, enter %.

Invoking Program Generator from a selection list

To invoke Program Generator from the Object Manager Selection List panel, you must enter the following field:

Action
> Enter P (for Program Generator).

Object/reports cross reference

You can view which objects have been compiled into programs. If the selected object has been compiled and registered into any report programs, then a list of those programs will be displayed on the Object/Report Cross Reference panel. If no reports have been generated and registered from this object, then a message is displayed.

Viewing cross references directly

To view the cross reference report from the Object Manager panel, you must enter the following fields:

Action
> Enter X (for cross reference).

Object Owner
> Enter the owner of the object. No wildcard characters are allowed.

Object Name
> Enter the name of the object. No wildcard characters are allowed.

Object Type
> Enter Q, P, or F to specify a query, procedure, or form. If the type is
> unknown, enter %.

Viewing cross references from a selection list

To view the cross reference report from the Object Manager Selection List
panel, you must enter the following field:

Action
> Enter X (for cross reference).

Object/Reports Cross Reference panel

A list of all reports that were generated from the object is displayed on this
panel. In addition, the date and time that the program was generated is
displayed.

Table 56. Object/Reports Cross Reference

```
 DB2P / DB2PLOCATION -- Object/Reports Cross Reference--------------- 8.1.0
 Command ===>                                           Scroll ===> PAGE

 Object Owner......:
 Object Name.......:
 Report Owner     Report Name            Date          Time
 -----------      -----------------      ----------    --------




***************************** BOTTOM OF DATA *****************************
```

If you press **PF3**, you will return to the previous panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward.

QMF activity summary

You can use this action to review QMF usage statistics-CPU consumption,
rows fetched, and query execution counts. Statistics can be summarized by
resource group, date, time, mode, and environment.

To review QMF usage statistics from the Object Manager panel, only the
Action field must be entered. All other input fields on this panel are ignored.
This action can only be invoked from the Object Manager panel.

Action

Enter Q (for QMF activity summary).

QMF Activity Summary Filtering panel

The selection criteria for reviewing QMF usage statistics by resource group,
date, time, mode, and environment are specified on the following panel.

Table 57. QMF Activity Summary Filtering

```
DB2P ⁄ DB2PLOCATION -- QMF Activity Summary Filtering --------- 8.1.0
Command ===>


Required Filtering:
Resource Group............ ===>                    (*=ALL)
From Date................. ===>                    (MM⁄DD⁄YYYY)
To Date................... ===>                    (MM⁄DD⁄YYYY)

Optional Filtering:
From Time................. ===>                    (HH.MM.SS)
To Time................... ===>                    (HH.MM.SS)
Mode...................... ===>                    (1=ONLINE,2=BATCH)
Environment............... ===>                    (3=TSO,5=CICS)

```

If you press **PF3**, you will return to the previous panel.

If you press **Enter**, the selection criteria will be processed and the QMF
Activity Summary panel will be displayed.

The required fields on the panel are:

Resource Group

Enter the resource group for which you want to summarize QMF
activity. Enter an asterisk (*) for all resource groups.

From Date

Enter the start date for QMF activity in MM⁄DD⁄YYYY format.

To Date

Enter the end date for QMF activity in MM⁄DD⁄YYYY format.

The optional fields on the panel are:

From Time

Enter the start time for QMF activity in HH.MM.SS format.

To Time

Enter the end time for QMF activity in HH.MM.SS format. Leave this field blank if you left the **From Time** field blank. Specify a **To Time** if you specified a **From Time**.

Mode Enter 1 to display only online activity. Enter 2 to display only batch activity.

Environment

Enter 3 to display only TSO activity. Enter 5 to display only CICS activity.

QMF Activity Summary panel

The QMF Activity Summary panel is displayed with the results of processing the selection criteria from the previous panel. If **From Time** and **To Time** are specified, usage statistics are summarized and displayed only for the specified time range. If **From Time** and **To Time** filtering is omitted, usage statistics are summarized for 12 predefined time ranges. All filtering criteria are displayed in the panel header.

Table 58. QMF Activity Summary

```
 DB2P / DB2PLOCATION -- QMF Activity Summary ------------------- 8.1.0
 Command ===>                                        Scroll ===> PAGE

 Resource Group....:
 From Date.........:             To Date.....:
 From Time.........:             To Time.....:
 Mode..............:             Environment.:

 Hour              Avg CPU       Max CPU      Avg Rows  Max Rows  Run
 Range             Time          Time         Fetched   Fetched   Count
 --------------    ----------    ----------   --------  --------- -----




 ***************************** BOTTOM OF DATA ******************************
```

If you press **PF3**, you will return to the previous panel.

Using the Object Manager reports

The following reports, based on the HPO tracking data, are available to assist in managing a QMF environment.

• Cancellation summary
• Cancellation detail for a user

- Performance summary based on maximum CPU
- Performance summary based on average CPU
- Performance summary for a query
- Performance detail for a query
- Resource consumption detail for a user
- Resource usage summary
- Resource usage summary for a time period
- Chargeback summary for a time period

You can invoke the Object Manager reports by selecting option 10 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM R'
```

Table 59. Object Manager Reports

```
  DB2P ∕ DB2PLOCATION -- Object Manager Reports ---------------- 8.1.0
  Option ===>

  Select one of the options listed below and press ENTER.
    1  Cancellation summary
    2  Cancellation detail for a user
    3  Performance summary based on maximum CPU
    4  Performance summary based on average CPU
    5  Performance summary for a query
    6  Performance detail for a query
    7  Resource consumption detail for a user
    8  Resource usage summary
    9  Resource usage summary for a time period
   10  Chargeback summary for a time period
    X  Exit
```

Cancellation summary

This report identifies which users most frequently have their QMF queries canceled. High rates of cancellation may indicate that the user needs more training or that the user may need to be given greater resource privileges. High cancellation rates can often lead to end user dissatisfaction and should be investigated and discussed with the end user.

The following is an online example of the *Cancellation Summary* report:

Table 60. Sample Cancellation Summary Report

```
  RAAMR01T ------------------------ LINE 0000000 -- COLUMNS 001   080
  Command ===>                                      Scroll ===> PAGE
************************** TOP OF REPORT ****************************
                        QMF USERS
                  NUMBER OF TIMES CANCELED
                  SORTED IN DESCENDING ORDER

  CURRENT              NUMBER OF TIMES    FIRST DATE  LAST DATE
  SQLID      TSO ID       CANCELED          CANCELED   CANCELED
  --------   --------  ---------------    ----------  ----------
  DBPUSR     DBPUSR                 12    2099-10-05  2099-10-24
  TSOP100    TSOP100                10    2099-10-05  2099-10-10

************************* BOTTOM OF REPORT *************************
```

Note: The "Cancellation Detail For a User" report, described below, provides more specific cancellation information for a single user.

Input variables

This report requires no input variables.

How to run this report online

You can invoke this report by selecting option 1 from the Object Manager Reports Selection Menu.

How to run this report in batch

Edit the sample JCL member RAAMR01J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Cancellation detail for a user

This report provides details on the queries that were canceled for a specific user, including the query name, SQL text, and reason for cancellation.

The following is an online example of the *Cancellation Detail for a User* report:

Table 61. Sample Cancellation Detail for a User Report

```
  RAAMR02T ------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                      Scroll ===> PAGE
************************* TOP OF REPORT  **************************
  QMF CANCELLATION DETAILS        |
  FOR TSOID: DBPUSR               |
                                  |
  QUERY      QUERY                |
  OWNER      NAME                 | DATE       TIME    REASON FOR CANCEL
  --------- --------------        | ---------- ------  -----------------
  DBPUSR     RUNAWAY              | 2099-10-24 06.17.48 QUERY ANALYZER CANCELED
  TSOP02     GOVDEMO              | 2099-10-24 06.15.59 ROW LIMIT EXCEEDED
  APP1XPL    TEST_APPQ            | 2099-10-24 06.18.31 ROW LIMIT EXCEEDED
  XPRT12D5   QUERY_LOC            | 2099-10-05 11.53.41 MONITOR CANCELED

******************** BOTTOM OF REPORT ****************************
```

Input variables
This report requires the following input variable:

TSOID

Enter the TSO ID for which you want to obtain cancellation detail information.

How to run this report online
You can invoke this report by selecting option 2 from the Object Manager Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR02J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Performance summary based on maximum CPU

This report shows performance data for queries including their maximum CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

The following is an online example of the *Performance Summary Based on Maximum CPU* report:

Table 62. Sample Performance Summary Based on Maximum CPU Report

```
RAAMR03T ---------------------------- LINE 0000000 -- COLUMNS 031 079
Command ===>                                       Scroll ===> PAGE
************************** TOP OF REPORT ****************************
QMF QUERIES                   |
MAXIMUM CPU AND RUN COUNT     |
SORTED BY CPU SECONDS (DESC)  |

QUERY     QUERY               |    MAXIMUM     NUMBER OF    DATE
OWNER     NAME                | CPU (SECONDS)  TIMES RUN  FIRST RUN
--------  ----------------    | -------------  ---------  ---------
DBPUSR    Q2Q11               |    37.28          14      2099-10-05
USER01    RUNAWAY             |    33.31           2      2099-10-05
USER01    GGVDEEO             |     4.24           5      2099-10-05
USER01    QTEST506Q           |     0.34           4      2099-10-12
USER01    QTEST504Q           |     0.32           8      2099-10-11
USER01    QTEST507Q           |     0.32           2      2099-10-05
TSOTEST1  XAAAR02Q            |     0.30           1      2099-10-19
USER01    XAABR06Q            |     0.27           3      2099-10-20
USER01    QTEST501Q           |     0.24           1      2099-10-21
USER01    QTEST505Q           |     0.21           2      2099-10-21
USER01    QTEST511Q           |     0.21           1      2099-10-21
USER01    QTEST502Q           |     0.19           2      2099-10-21
```

Note: More information on a specific query's performance can be gathered from the Performance Detail For a Query report and the Resource Consumption Detail For a User reports, which are described below.

Input variables
This report requires no input variables.

How to run this report online
You can invoke this report by selecting option 3 from the Object Manager Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR03J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Performance summary based on average CPU

This report shows performance data for queries including their average CPU time consumed and number of times run. It is sorted in descending order to highlight those queries with the largest CPU consumption. Queries that are frequently run and have high average CPU time consumption are the best candidates for converting to static SQL programs with Program Generator because they present the greatest opportunities for cost savings.

The following is an online example of the *Performance Summary Based on Average CPU* report:

Table 63. Sample Performance Summary Based on Average CPU Report

```
  RAAMR04T ------------------------------- LINE 0000000 -- COLUMNS 031 079
  Command ===>                                            Scroll ===> PAGE
**************************** TOP OF REPORT  *******************************
  QMF QUERIES                   |
  AVERAGE CPU AND RUN COUNT     |
  SORTED BY CPU SECONDS (DESC)  |

  QUERY      QUERY              |    AVERAGE      NUMBER OF         DATE
  OWNER      NAME               | CPU (SECONDS)   TIMES RUN      FIRST RUN
  -------    ----------------   | --------------  --------------- ----------
  USER01     RUNAWAY            |     27.63              2        2099-10-05
  DBPUSR     XKQ1               |     12.46             14        2099-10-05
  USER01     XENDH              |      5.83              2        2099-10-05
  USER01     GGVEEMO            |      1.11              5        2099-10-05
  TSO01P     XAAAR02Q           |      0.30              1        2099-10-19
  USER01     QTEST507Q          |      0.28              2        2099-10-05
  USER01     QTEST501Q          |      0.24              1        2099-10-21
  XND1XY     XAAAR06Q           |      0.22              3        2099-10-20
  USER01     XAAAR011Q          |      0.21              1        2099-10-21
  USER01     QTEST505Q          |      0.21              2        2099-10-21
  USER01     QTEST502Q          |      0.19              2        2099-10-21
  XND1XY     QTEST505Q          |      0.19              1        2099-10-19
  USER01     QTEST506Q          |      0.14              4        2099-10-12
```

Note: More information on a specific query's performance can be gathered from the Performance Detail for a Query report and the Resource Consumption Detail for a User reports, which are described below.

Input variables
This report requires no input variables.

How to run this report online
You can invoke this report by selecting option 4 from the Object Manager Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR04J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Performance summary for a query

This report shows which users most often execute a specific query and the CPU time that it consumes. It can be used once a problem query is identified to determine which users are most frequently executing that query.

The following is an online example of the *Performance Summary for a Query* report.

Table 64. Sample Performance Summary for a Query Report

```
RAAMR05T ------------------------------------ LINE 0000000 -- COLUMNS 001 080
Command ===>                                               Scroll ===> PAGE
******************************* TOP OF REPORT *******************************
                         QMF RESOURCE USAGE BY USER
                          FOR QUERY USER01.XDEVTST


TSOID     SQLID    RUN COUNT    TOTAL CPU TIME
--------  --------  -----------  ------------------
USER01    USER01             2             55.26

***************************** BOTTOM OF REPORT *****************************
```

Input variables
This report requires the following input variables:

Query Owner
> Enter the owner of the query for which you want to obtain performance information.

Query Name
> Enter the name of the query for which you want to obtain performance information.

How to run this report online
You can invoke this report by selecting option 5 from the Object Manager Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR05J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Performance detail for a query
This report shows detail statistics for each execution of a query. It provides performance information such as CPU time consumed and rows fetched for each execution and an average CPU time consumed in seconds for all executions.

The following is an online example of the *Performance Detail for a Query* report:

Table 65. Sample Performance Detail for a Query Report

```
  RAAMR06T --------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                              Scroll ===> PAGE

**************************** TOP OF REPORT *****************************
  QMF RESOURCE STATISTICS
  FOR QUERY USER01.XDEVTST


  TSOID    SQLID   CPU SECONDS   ROWS FETCHED  DATE         TIME     QUERY T
  -------  ------  -----------   -------------- ------      -----    -------
  USER01   USER01        33.31           16245 2099-10-05  11.53.41  SELECT
  USER01   USER01        21.95           10334 2099-10-05  10.41.04  SELECT

  AVERAGE CPU TIME FOR USER01.XDEVTST IS 27.63

**************************** BOTTOM OF REPORT *****************************
```

Input variables

This report requires the following input variables:

Query Owner
> Enter the owner of the query for which you want to obtain performance information.

Query Name
> Enter the name of the query for which you want to obtain performance information.

How to run this report online

You can invoke this report by selecting option 6 from the Object Manager Reports Selection Menu.

How to run this report in batch

Edit the sample JCL member RAAMR06J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Resource consumption detail for a user

This report can be run for a specific user to determine which queries are executed and the resources being consumed by those queries. The query executions are sorted in descending order by CPU time consumed. This highlights queries that are most important from a resource consumption standpoint. It can indicate that resource problems are limited to specific queries, or that resource problems occur only when running ad hoc queries. The report contains the actual query text at the time of execution.

The following is an online example of the *Resource Consumption Detail for a User* report:

Table 66. Sample Resource Consumption Detail for a User Report

```
 RAAMR07T --------------------------------- LINE 0000000 -- COLUMNS 031 079
 Command ===>                                            Scroll ===> PAGE
*************************** TOP OF REPORT  ********************************
 QMF RESOURCE STATISTICS|
 FOR TSOID: USER01      |


 QUERY     QUERY        |
 OWNER     NAME         | CPU SECONDS   ROWS FETCHED  DATE       TIME
 ------    -------      | -----------   ------------  --------   -----
 USER01    XDEVTST      | 33.31         16245         2099-10-05 11.53
 USER01    XDEVTST      | 21.95         10334         2099-10-05 10.41
 USER01    XENDH        | 9.16          988           2099-10-05 13.35
 USER01    GGVEEMO      | 4.24          2211          2099-10-24 06.13
 USER01    XENDH        | 2.50          102           2099-10-24 07.10
 USER01    GGVEEMO      | 0.39          401           2099-10-24 06.15
 USER01    GGVEEMO      | 0.39          401           2099-10-05 10.57
 USER01    GGVEEMO      | 0.37          401           2099-10-24 06.16
 USER01    QTEST507Q    | 0.32          4             2099-10-05 13.04
 USER01    QTEST507Q    | 0.24          4             2099-10-05 13.06
 USER01    QTEST501Q    | 0.24          2             2099-10-21 07.48
 USER01    QTEST511Q    | 0.21          14            2099-10-21 08.09
 USER01    QTEST505Q    | 0.21          4             2099-10-24 07.08
 USER01    QTEST505Q    | 0.20          3             2099-10-21 08.00
```

Input variables

This report requires the following input variable:

TSOID

> Enter the TSO ID for which you want to obtain resource consumption information.

How to run this report online

You can invoke this report by selecting option 7 from the Object Manager Reports Selection Menu.

How to run this report in batch

Edit the sample JCL member RAAMR07J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Resource usage summary

This report shows which users are most actively using QMF and consuming the most resources.

The following is an online example of the *Resource Usage Summary* report:

Table 67. Sample Resource Usage Summary Report

```
  RAAMR08T -------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                            Scroll ===> PAGE
***************************** TOP OF REPORT *****************************
                        QMF RESOURCE USAGE BY USER

   TSOID     SQLID    RUN COUNT    TOTAL CPU    TIME
   --------  --------  -----------  ----------   -------
   DBPUSR    DBPUSR            36                175.75
   USER01    USER01            32                 75.30
   XND1XY    XND1XY             9                  1.44
   TSO01P    TSO01P            12                  1.29

**************************** BOTTOM OF REPORT ***************************
```

Input variables
This report requires no input variables.

How to run this report online
You can invoke this report by selecting option 8 from the Object Manager
Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR08J in QMFHPO.SRAASAMP. See the
comments in this JCL member for instructions on what modifications are
necessary before submitting the batch job.

Resource usage summary for a time period

This report shows which users are most actively using QMF and consuming
the most resources during a specific period of time. Information on the report
can be used for chargeback purpose, trend analysis, or problem identification.
The following is an online example of the *Resource Usage Summary for a Time
Period* report:

Table 68. Sample Resource Usage Summary for a Time Period Report

```
  RAAMR09T ---------------------------------- LINE 0000000 -- COLUMNS 001 080
  Command ===>                                                Scroll ===>PAGE
****************************** TOP OF REPORT  ******************************
                        QMF RESOURCE USAGE BY USER
                     FOR PERIOD 2099-10-01 TO 2099-10-31


   TSOID     SQLID    RUN COUNT    TOTAL CPU TIME     TOTAL ROW COUNT
   --------  --------  -----------  ------------------  ------------------
   DBPUSR    DBPUSR           36             175.75               92148
   USER01    USER01           32              75.30               31329
   XND1XY    XND1XY            9               1.44                  51
   TSO01P    TSO01P           12               1.29                  27

**************************** BOTTOM OF REPORT ******************************
```

Input variables
This report requires the following input variables:

Begin Date
> Enter the beginning date (in YYYY-MM-DD format) for which you
> want to obtain resource usage information.

End Date
> Enter the ending date (in YYYY-MM-DD format) for which you want
> to obtain resource usage information.

How to run this report online
You can invoke this report by selecting option 9 from the Object Manager
Reports Selection Menu.

How to run this report in batch
Edit the sample JCL member RAAMR09J in QMFHPO.SRAASAMP. See this
JCL for details on how to modify and run this report. See the comments in
this JCL member for instructions on what modifications are necessary before
submitting the batch job.

Chargeback summary for a time period
This report allows you to associate a cost with QMF usage for real or
informational chargeback purposes. It allows you to set a cost per unit for
CPU seconds consumed and rows fetched and then it calculates a usage cost
per user for the specified time period.

The following is an online example of the *Chargeback Summary* report:

Table 69. Sample Chargeback Summary [for a time period] Report

```
RAAMR10T ----------------------------- LINE 0000000 -- COLUMNS 001 080
Command ===>                                        Scroll ===> PAGE
************************** TOP OF REPORT  **************************
                        QMF RESOURCE USAGE BY USER
                     FOR PERIOD 2099-01-01 TO 2099-12-31
                       CPU COST $1.00  ROW COST $0.07

TSOID   SQLID  RUN COUNT   TOTAL CPU TIME  TOTAL ROW COUNT   TOTAL COST
-----   -----  ---------   --------------  ---------------   --------
DBPUSR  DBPUSR        36           175.75            92148     $6,626
USER01  USER01        32            75.30            31329     $2,268

************************** BOTTOM OF REPORT **************************
```

Input variables

This report requires the following input variables:

Begin Date
> Enter the beginning date (in YYYY-MM-DD format) for which you want to obtain resource usage information.

End Date
> Enter the ending date (in YYYY-MM-DD format) for which you want to obtain resource usage information.

Dollars per CPU
> Enter the amount (in DECIMAL(5,2) format) which represents the dollar per CPU second consumed cost.

Dollars per Row
> Enter the amount (in DECIMAL(5,2) format) which represents the dollar per row fetched cost.

How to run this report online

You can invoke this report by selecting option 10 from the Object Manager Reports Selection Menu.

How to run this report in batch

Edit the sample JCL member RAAMR10J in QMFHPO.SRAASAMP. See the comments in this JCL member for instructions on what modifications are necessary before submitting the batch job.

Chapter 6. Governor

Governor defines a number of resources that can be governed during a QMF session. Examples of these resources are:

- access to a QMF session
- types of sessions that can be started
- types of QMF commands and SQL verbs that can be processed
- the number of rows fetched by a query
- the amount of system resources consumed

Governor provides the necessary functions for QMF and DB2 database administrators to effectively manage, control, and restrict QMF resource usage.

The HPO⁄Governor module provides Governor's direct interface into QMF processing.

You can review and manipulate QMF resource groups using the Governor online facility. The following actions are supported:

- Browsing a resource group
- Creating a resource group (optionally using another group as a model)
- Dropping a resource group
- Editing a resource group
- Assigning a resource group to a user profile
- Showing all control schedules for a resource group

Enabling QMF governing

This chapter describes how to enable QMF governing by creating a resource group and assigning the resource group to your user profile. In addition, you need to allocate QMFHPO.SRAALOAD to your TSO session and your CICS session. See ″Step 4b. Special allocations for the HPO/Governor module″ for more information about this allocation.

Creating a resource group

You create resource groups using the Governor online facilities. This is where you define all thresholds and controls. One of the common controls is the **Activate Resource Group?** flag. The HPO⁄Governor module will bypass resource limit checking for any resource group that is not active. One of the scheduled controls is the **Active?** flag. The HPO⁄Governor module will bypass

any schedules within a resource group that are not active. Make sure that the desired resource group and schedules within that resource group are active.

Assigning a resource group to a user profile

A resource group has no effect unless it is assigned to at least one user profile. QMF users are mapped to a user profile, through their TSO logon ID, their DB2 primary authorization ID, or through QMF open enrollment. By assigning a resource group to a user profile, you are setting limits and options for all users who map into that profile entry.

Resource groups

A resource group is a set of related controls that restrict when a QMF session can begin, what type of session can be started, what types of QMF commands and SQL verbs can be processed, and the amount of system resources that can be consumed. For example, a resource group may restrict the number of fetched rows to 500 and prohibit the use of the SAVE DATA command.

Governor supports two types of controls in a resource group:
- Common
- Scheduled

Common controls are common to the entire resource group. **Scheduled controls** pertain to a specific date, day of the week, and time of day. For example, a QMF session that starts at 10 p.m. on a weekday will be controlled by the scheduled controls that are in effect at 10 p.m. on a weekday. Some controls are both common and scheduled. If so, the scheduled control will override the common control if the common control is enabled. Governor supports up to 255 schedules per resource group. Within each schedule, online controls can be set separately from batch controls.

With Governor, you have the flexibility to control QMF resource consumption by user, date, day of the-week, time of day, and mode of access (online or batch).

Resource groups are stored in the native QMF table named Q.RESOURCE_TABLE. A view named Q.RESOURCE_VIEW must be defined on this table because QMF accesses that view, not the table. For a detailed discussion of this table and view, and their columns and data types, see *Managing QMF for MVS*.

Resource group common controls

The following common controls pertain to an entire resource group:

Description
> Although this field is not a control (no actions are taken due to the

value supplied), it allows you to record a description about this resource group. The maximum length is 40 characters.

Activate Resource Group?
This flag controls whether or not this entire resource group is active. Its value must be Y (to activate or enable) or N (to deactivate or disable). When a resource group is disabled, all control schedules are disabled. When a resource group is enabled, only the control schedules that are active are enabled.

Log Resource Violations?
This flag controls the logging that Governor will perform when a resource violation occurs. If it is set to Q, a message will be logged to the user's DSQDEBUG data set. If it is set to R, a message will be logged to the user's RAADEBUG data set. If it is set to B, messages will be logged to both data sets. If it is set to N, no messages will be logged.

Asynchronous Timer Interval
There are some scheduled controls that are governed asynchronously. Specifically, CPU and row limits are governed at distinct intervals while QMF is processing commands. The interval at which these controls are checked is specified by this option (in wall-clock seconds). If this value is 0, asynchronous governing is disabled. (CPU time limits are only checked asynchronously, so a value of 0 in this field effectively disables CPU time limit checking.)

REXX Program Name
If you are not using Query Analyzer, this field is ignored. If you are using Query Analyzer, then you can specify the name of an exit routine that Query Analyzer should invoke. If you leave this field blank, then it will default to the sample exit routine named RAARXQA. If you have written your own exit routine, specify the name here. See "Sample exit routine" for a more detailed discussion.

Plan Table Owner/Current SQLID
If you are not using Query Analyzer, this field is ignored. If you are using Query Analyzer, then you can specify the CURRENT SQLID that Query Analyzer should use during query analysis.

The value that you enter here will have two effects:
- the ID will become the owner of the PLAN_TABLE used for the EXPLAIN command issued by Query Analyzer
- it will become the owner of all unqualified tables in queries that are analyzed

Before setting this value, review the restrictions for setting CURRENT SQLID in *DB2 Administration Guide*.

Create Plan Table In Database

If you are not using Query Analyzer, this field is ignored. Otherwise, you can specify the database in which Query Analyzer should create a PLAN_TABLE for a user if one does not already exist. If you leave this field blank and a PLAN_TABLE does not exist, query analysis will be bypassed.

Create Plan Table In Table Space

If you are not using Query Analyzer, this field is ignored. Otherwise, you can specify the table space in which Query Analyzer should create a PLAN_TABLE for a user if one does not exist. You cannot enter a value in this field unless you also enter a value in the **Create Plan In Database** field.

DB2 Subsystem ID for *

This field is used by the HPO⁄Governor module under CICS and can be ignored if you are not planning to govern or track activity under QMF⁄CICS. Otherwise, if the location field is non-blank, then you need to fill in the name of the DB2 subsystem ID that correlates to this location. If the location field is blank, the subsystem ID of the current DB2 will be used internally, but may be explicitly specified here as well.

Resource group scheduled controls

Scheduled controls are active for the duration of a defined schedule. For example, if a schedule starts at 8 p.m. and stops after 5 p.m., then the associated controls will be in effect during those times and only those times. Governor supports up to 255 schedules per resource group, providing enough flexibility to properly control resource consumption.

All date, day, and time criteria are inclusive. For example, if the *stop after* time is 5 p.m., then the schedule will be active at 17:00:01, 17:00:02, through 17:00:59. The schedule will not be ignored until after 17:00:59.

As an administrator, you must define a value for each control. For each control, you can set online values separately from batch values. Again, this should provide enough flexibility to properly control both online resource consumption and batch resource consumption.

Prompt limits and cancel limits

If a cancel limit is exceeded, then the HPO⁄Governor module cancels the current QMF command. If a prompt limit is exceeded (and the corresponding cancel limit is not exceeded), then a dialog begins with the user. This dialog explains which resource limit has been exceeded and asks the user for a response to one of these questions:

- should the current command continue running
- should the command be canceled

- should the command continue through to completion and disable any further prompting

Notice that there is no batch prompt limit because it is not possible to invoke a dialog with the user in batch mode.

CPU time limits

Governor can control the amount of CPU time consumed for each distinct command. When a user issues a command, Governor begins to monitor CPU consumption. If a QMF command completes before the defined limits are exceeded, Governor resets its internal counters back to zero and waits for the next command to be issued.

Fetched row limits

Governor can control the number of rows fetched from the database for each distinct command. When a user issues a command, Governor begins to quantify fetched rows. If a QMF command completes before the defined limits are exceeded, Governor resets its internal counters back to zero and waits for the next command to be issued.

However, a command such as RUN can be followed by a series of related commands (such as, DOWN). When related commands are detected, these internal counters will not be reset to zero. Instead these related commands are treated as extensions of the primary command.

To understand how Governor behaves, consider a scenario in which a user issues a RUN QUERY command. Assume that you want to limit the number of fetched rows to 1000. When the RUN command is issued, QMF fetches rows from the database until it is ready to display the first screen of data. Once the screen is displayed to the user the RUN command ends. When the user presses PF8 to view the next panel of data, a new command is issued, namely the DOWN command. As the user repeatedly presses PF8 and proceeds down the table, QMF will access more and more rows from the database.

Governor limits the number of fetched rows from the beginning of the primary command (RUN) until the end of the last related command (DOWN). That is, when related commands are detected, internal counters tracking the number of fetched rows will not be reset to zero. Using the scenario above, the limit of 1000 will not be reached until the sum of rows fetched from the RUN command and subsequent DOWN commands exceeds 1000.

Schedule definitions (date, day of the week, time of day)

You can define up to 255 schedules per resource group. The first schedule in which the date, day, and time definition match the current date, day, and time will become the active schedule. Schedules are checked in numerical order.

That is, schedule 1 is checked first, schedule 2 is checked second, and so on (schedule 255 is checked last). The priority of checking to determine which set of controls is active is defined below:

1. *Start and Stop Date*
   If the current date is within this specified range, then the day field is checked next.

2. *Start and Stop Day*
   If the current day is within this specified range, then the time field is checked next.

3. *Start and Stop Time*
   If the current time is within this specified range, then this schedule's controls are in effect.

All ranges are inclusive, so that if the Start Date is 20990101, then the schedule would become active after midnight on 20981231. The order of checking is Date followed by Day Of The Week followed by Time Of Day. Therefore, if the Day does not coincide with the Date, the schedule will never be in effect.

If Start and Stop Times wrap around midnight (for example, 5 p.m. through 8 a.m.), this creates, in effect, two separate blocks of time each day that the schedule becomes active. Consider the following schedule as an example:

Start Date:	20990111 (January 11, 2099)
Stop Date:	20990131 (January 31, 2099)
Start Day:	2 (Monday)
Stop Day:	6 (Friday)
Start Time:	1700 (5 p.m.)
Stop Time:	0800 (8 a.m.)

This schedule is active January 11, 2099 through January 31, 2099 only on weekdays (Mondays through Fridays). For each day that this schedule is active, it is in effect for the hours 5 p.m. to midnight, and midnight to 8 a.m. For example, this schedule is active each Monday morning from midnight to 8 a.m., as well as each Monday evening from 5 p.m. to midnight.

Scheduled controls
These are the scheduled controls in a resource group:

Start and Stop Date
These values specify the start and stop dates that this schedule should be active. The dates should be of the form YYYYMMDD and are inclusive.

Start and Stop Day

These values specify the start and stop days of the week that this schedule should be active. The days should be from 1 (Sunday) to 7 (Saturday) and are inclusive.

Start and Stop Time

These values specify the start and stop times that this schedule should be active. The times should be of the form HHMM and are inclusive.

Active?

This flag controls whether or not this resource group control schedule is active. Its value must be `Y` (to activate or enable) or `N` (to deactivate or disable). If the entire resource group is disabled, all scheduled controls are disabled. If the resource group is enabled, this flag is used to determine whether or not this particular schedule is enabled.

Use Service Unit Defaults Flag

If set to `N` only Cost Category A Service Unit estimates are used in preemptive governing. All Category B estimates are ignored and the SQL statement is processed. If set to `Y` Cost Category A or B Service Unit estimates can be used.

> **Note:** Enable Query Analyzer, described below, must be set to 'Y' or 'S' and Service Units must be set greater than 0 for this value to have effect.

Max CPU Seconds (Prompt Limit)

In an online QMF session, if the CPU time for a QMF command exceeds this limit, a prompt dialog will occur between the user and QMF. (The cancel limit will be checked before the prompt limit is checked.) CPU time checking is only performed asynchronously; it will effectively be disabled if the common control **Asynchronous Timer Interval** is set to `0`.

Max CPU Seconds (Cancel Limit)

For batch or online QMF, this value, expressed in CPU seconds, represents the maximum CPU time allowable for any command. If this value is exceeded, the command will be canceled. CPU time checking is only performed asynchronously; it will effectively be disabled if the common control **Asynchronous Timer Interval** is set to `0`.

Max Rows Fetched (Prompt Limit)

In an online QMF session, if the rows fetched for a QMF command exceeds this limit, a prompt dialog will occur between the user and QMF. (The cancel limit will be checked before the prompt limit is checked.)

Max Rows Fetched (Cancel Limit)

> For batch or online QMF, this value represents the maximum number of rows that may be fetched per command. If this value is exceeded, the command will be canceled.

Allow GRANT, REVOKE SQL? Allow CREATE, ALTER, DROP SQL? Allow INSERT, DELETE, UPDATE SQL?

> A value of Y for any of these fields enables the type of SQL statement to be processed. A value of N disables or disallows the type of SQL statement. If N is specified and the user attempts to process the type of SQL statement, the command will be canceled.

Allow TSO/CICS Command? Allow EXPORT Command? Allow IMPORT Command? Allow SAVE DATA Command? Allow CONNECT Command?

> A value of Y for any of these fields enables that type of QMF command to be processed. A value of N disables that type of QMF command. If N is specified and the user attempts to process that type of command, the command will be canceled.

Enable QMF Access?

> A value of Y for this field allows access to QMF while the schedule is active. A value of N disallows access. You can enable access to online sessions independently of batch sessions.

Enable Query Analyzer?

> A value of Y for this field causes Query Analyzer to automatically analyze all queries. A value of S allows selective analysis of queries. A value of N disables all query analysis.

Starting Governor

You perform all resource group maintenance from the Governor panel, which you can access by selecting option 2 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM G'
```

Table 70. Governor

```
DB2P / DB2PLOCATION -- Governor ----------------------------------- 8.1.0
Command ===>

Action................... ===>

Resource Group........... ===>

Drop Confirmation? (Y/N).. ===>

----------------------------------------------------------------------
Valid Actions Are...
A  Assign
B  Browse
C  Create
D  Drop
E  Edit
L  Display Selection List
R  Create Using Defaults
S  Show Schedules
----------------------------------------------------------------------
```

If you press **Enter**, all input fields will be processed. If any errors are detected during input validation, the panel will be redisplayed with an error message.

If you press **PF3**, all input fields will be ignored and you will return to the previous selection menu.

Building a selection list of resource groups

To build a selection list of resource groups from the Governor panel, you must enter the following fields:

Action
> Enter L (for list).

Resource Group
> Enter the resource group to list. You can use % and _ as wildcard characters to list multiple groups.

Drop Confirmation?
> Enter Y to request drop confirmations or N to suppress them. This value will be carried forward to all actions performed from the selection list that will be produced.

Resource Group Selection List panel

When you enter L (for list) on the Governor panel, the Resource Group Selection List panel will be displayed. This panel will contain a list of all error

log entries that matched the input criteria entered on the Governor panel.

Table 71. Resource Group Selection List

```
DB2P / DB2PLOCATION -- Resource Group Selection List ------------ 8.1.0
Command ===>                                            Scroll ===> PAGE

Valid Actions Are...
A  Assign                    B  Browse
C  Create Like               D  Drop
E  Edit                      S  Show Schedules
-------------   --------------------------------------------------------
Action          Resource Group    Description
------          ---------------   ----------------------------------

************************** BOTTOM OF DATA ***************************
```

If you press **Enter**, all rows that you selected with an action code will be
processed. After all selected rows are processed, the panel will be redisplayed
with an informative message on each row (such as *CREATED or *NODROP).
This message will appear in the space between the **Action** and **Resource
Group** fields.

If you press **PF3**, all input fields will be ignored and you will return to the
Governor panel

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all
selected rows are processed.

Browsing a resource group

You can browse a resource group from a selection list or from the Governor
panel.

Browsing directly

To browse a resource group entry from the Governor panel, you must enter
the following fields:

Action
> Enter B (for browse).

Resource Group
> Enter the resource group to browse. No wildcard characters are
> allowed.

Browsing from a selection list

To browse a resource group entry from the Resource Group Selection List panel, you must enter the following field:

Action

> Enter B (for browse).

Browsing common controls

The Browse Resource Group panel displays the resource group common controls. You can also browse one or more resource group schedules from this panel.

Table 72. Browse Resource Group

```
DB2P / DB2PLOCATION -- Browse Resource Group ------------------------- 8.1.0
Command ===>
Resource Group :
Description... :
Common Control Options:
   Activate Resource Group? (Y/N)....... :
   Log Resource Violations? (Q/R/B/N)... :
   Asynchronous Timer Interval.......... :         (in seconds)
Query Analyzer Options
   REXX Program Name.................... :
   Plan Table Owner/Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :
DB2 Subsystem ID for DB2PLOCATION....... :
Schedule Number To Process.......... ===>         (0=none,1-255=sched num)
```

If you press **Enter** and the **Schedule Number To Process** field is *not* equal to zero, you will proceed to the next specified scheduled control panel.

If you press **Enter** and the **Schedule Number To Process** field is equal to zero, or if you press **PF3**, you will return to the previous panel.

The field on the panel is:

Schedule Number to Process

> Enter a number between 0 and 255. If you enter 0, then no schedules will be browsed. Otherwise, the value that you enter indicates the number of the first schedule to browse.

Browsing scheduled controls

The Browse Resource Group panel displays scheduled controls.

Table 73. Browse Resource Group

```
DB2P ⁄ DB2PLOCATION -- Browse Resource Group: GROUP1 ----------------- 8.1.0
Command ===>
Schedule Number. : 1        Next Schedule Number to Process.. ===>
Start Date...... :          Stop Date... :        (YYYYMMDD)
Start Day....... :          Stop Day ... :        (1=SUN,2=MON,...)
Start Time...... :          Stop Time... :        (HHMM)
Active? (Y⁄N)... :          Use Service Unit Defaults (Y/N) :
Max CPU Seconds (Prompt Limit)...........Online :
Max CPU Seconds (Cancel Limit)...........Online :           Batch :
Max Rows Fetched (Prompt Limit)..........Online :
Max Rows Fetched (Cancel Limit)..........Online :           Batch :
Allow GRANT,REVOKE SQL? (Y⁄N)............Online :           Batch :
Allow CREATE,ALTER,DROP SQL? (Y⁄N).......Online :           Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y⁄N)....Online :           Batch :
Allow TSO⁄CICS Commands? (Y⁄N)...........Online :           Batch :
Allow EXPORT Command? (Y⁄N)..............Online :           Batch :
Allow IMPORT Command? (Y⁄N)..............Online :           Batch :
Allow SAVE DATA Command? (Y⁄N)...........Online :           Batch :
Allow CONNECT Command? (Y⁄N).............Online :           Batch :
Enable QMF Access? (Y⁄N).................Online :           Batch :
Enable Query Analyzer? (Y⁄S⁄N)...........Online :           Batch :
Service Units in 100s (Cancel limit).....Online :           Batch :
```

If you press **Enter** and **Next Schedule Number To Process** is not equal to the current schedule number, you will browse the next specified schedule.

If you press **Enter** and **Next Schedule Number To Process** is equal to the current schedule number, or if you press **PF3**, you will return to the previous panel.

The field on the panel is:

Next Schedule Number to Process
> Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the browse session. Otherwise, the value that you enter indicates the number of the next schedule to browse.

Creating a resource group

You can create a resource group from a selection list or you can create a resource group from the Governor panel.

Creating directly

To create a resource group from the Governor panel, you must enter the following fields:

Action

Enter C (for create).

Resource Group

Enter the resource group to create. The resource group must not already exist.

Creating from a selection list

To create a resource group from the Resource Group Selection List panel, you must enter the following field:

Action

Enter C (for create). This action will be treated as a Create Like... The controls of the resource group selected with the action of C will be used as a model on the Create Resource Group panel.

Creating common controls

The Create Resource Group panel is used to create the resource group common controls. You can also create one or more resource group schedules from this panel.

Table 74. Create Resource Group

```
DB2P ⁄ DB2PLOCATION -- Create Resource Group ------------------------ 8.1.0
Command ===>
Resource Group :
Description... :
Common Control Options:
   Activate Resource Group? (Y⁄N)....... :
   Log Resource Violations? (Q⁄R⁄B⁄N)... :
   Asynchronous Timer Interval......... :          (in seconds)

Query Analyzer Options
   REXX Program Name................... :
   Plan Table Owner⁄Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :
DB2 Subsystem ID for DB2PLOCATION...... :
Schedule Number To Process.......... ===>        (0=none,1-255=sched num)
```

If you press **Enter**, the common controls will be created. If the **Schedule Number To Process** field is greater than zero, you will proceed to the Schedule Creation panel. If the **Schedule Number To Process** field is equal to zero, you will return to the previous panel.

If you press **PF3**, you will return to the previous panel and these controls will be ignored. "Resource group common controls" describes the values you can enter for the fields on this panel, with the exception of this field:

Schedule Number to Process
> Enter a number between 0 and 255. If you enter 0, then no schedules will be created. Otherwise, the value that you enter indicates the number of the first schedule to create.

Creating scheduled controls

You can create resource group schedules from the Create Resource Group panel. Up to 255 schedules can be created for each resource group.

Table 75. Create Resource Group

```
DB2P / DB2PLOCATION -- Create Resource Group: GROUP1 ----------------- 8.1.0
Command ===>
Schedule Number. : 1         Next Schedule Number to Process.. ===>
Start Date...... :           Stop Date... :      (YYYYMMDD)
Start Day....... :           Stop Day ... :      (1=SUN,2=MON,...)
Start Time...... :           Stop Time... :      (HHMM)
Active? (Y/N)... :           Use Service Unit Defaults (Y/N) :
Max CPU Seconds (Prompt Limit)..........Online :
Max CPU Seconds (Cancel Limit)..........Online :          Batch :
Max Rows Fetched (Prompt Limit).........Online :
Max Rows Fetched (Cancel Limit).........Online :          Batch :
Allow GRANT,REVOKE SQL? (Y/N)...........Online :          Batch :
Allow CREATE,ALTER,DROP SQL? (Y/N).......Online :          Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y/N)....Online :          Batch :
Allow TSO/CICS Commands? (Y/N)..........Online :          Batch :
Allow EXPORT Command? (Y/N).............Online :          Batch :
Allow IMPORT Command? (Y/N).............Online :          Batch :
Allow SAVE DATA Command? (Y/N)..........Online :          Batch :
Allow CONNECT Command? (Y/N)............Online :          Batch :
Enable QMF Access? (Y/N)................Online :          Batch :
Enable Query Analyzer? (Y/S/N)..........Online :          Batch :
Service Units in 100s (Cancel limit).....Online :          Batch :
```

If you press **Enter**, the input data will be validated. If any errors are detected, the panel will be redisplayed with an error message. If all values are valid, then this schedule will be created. If the **Next Schedule Number To Process** field is equal to the current schedule number, the previous panel will be displayed. If the **Next Schedule Number To Process** field is set to a new schedule number, this panel will be displayed again, ready for you to create a new schedule.

If you press **PF3**, you will return to the next panel without creating this schedule. "Resource group scheduled controls" describes the values you can enter for the fields on this panel, with the exception of these fields:

Schedule Number
> This field indicates the number of the schedule that is being processed.

Next Schedule Number to Process
> Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the create session. Otherwise, the value that you enter indicates the number of the next schedule to create.

Creating a resource group using defaults

You can create a resource group using predefined system default values. Follow the procedures described in "Resource group scheduled controls," but use an action of R instead of C. All of the panels will be initialized with default values instead of blanks and zeros.

Note: These defaults may not make sense for your installation to use in a production environment. You may find them useful if you want to quickly establish resource groups with predefined controls.

Default values for common controls

The predefined system default values include common (non-scheduled) control values that are used when creating a resource group.

Control	Value
Description	HPO DEFAULTS
Activate Resource Group?	Y
Log Resource Violations?	Q
Asynchronous Timer Interval	1 second

Default values for scheduled controls

The predefined system default values include scheduled control values that are used when creating one or more schedules in a resource group.

Table 76. Default values for scheduled controls

Control	Value
Schedule Number	1
Schedule Start Date	20440101
Schedule Stop Date	20991231
Schedule Start Day	1
Schedule Stop Day	7
Schedule Start Time	00:00

Table 76. Default values for scheduled controls (continued)

Control	Value
Schedule Stop Time	24:00
Active?	Y
Max CPU: Online Prompt Value	1
Max CPU: Online Cancel Value	3
Max CPU: Batch Cancel Value	5
Max Rows: Online Prompt Value	250
Max Rows: Online Cancel Value	500
Max Rows: Batch Cancel Value	1500
Enable GRANT/REVOKE SQL?	N (online and batch)
Enable CREATE/ALTER/DROP SQL?	N (online and batch)
Enable INSERT/UPDATE/DELETE SQL?	Y (online and batch)
Enable TSO/CICS Command?	N (online and batch)
Enable EXPORT Command?	N (online and batch)
Enable IMPORT Command?	N (online and batch)
Enable SAVE DATA Command?	N (online and batch)
Enable CONNECT Command?	N (online and batch)
Enable QMF Access?	Y (online and batch)
Enable Query Analyzer?	N

Editing a resource group

You can edit a resource group from a selection list or from the Governor
panel.

Editing directly

To edit a resource group entry from the Governor panel, you must enter the
following fields:

Action
>   Enter E (for edit).

Resource Group
>   Enter the resource group to edit. The resource group must already
>   exist.

Editing from a selection list

To edit a resource group entry from the Resource Group Selection List panel,
you must enter the following field:

Action

> Enter E (for edit).

Editing common controls

The Edit Resource Group panel is used to edit the resource group common controls. You can also edit one or more resource group schedules from this panel.

Table 77. Edit Resource Group

```
DB2P / DB2PLOCATION -- Edit Resource Group -------------------------- 8.1.0
Command ===>
Resource Group :
Description... :
Common Control Options:
   Activate Resource Group? (Y/N)....... :
   Log Resource Violations? (Q/R/B/N)... :
   Asynchronous Timer Interval.......... :          (in seconds)
Query Analyzer Options
   REXX Program Name.................... :
   Plan Table Owner/Current SQLID....... :
   Create Plan Table In Database........ :
   Create Plan Table In Table Space..... :
DB2 Subsystem ID for DB2PLOCATION...... :
Schedule Number To Process.......... ===>        (0=none,1-255=sched num)

```

If you press **Enter**, the common control fields will be modified. If the **Schedule Number To Process** field is *not* equal to zero, you will proceed to the next panel. If the **Schedule Number To Process** field is equal to zero, you will return to the previous panel.

If you press **PF3**, you will return to the previous panel and these controls will be ignored.

"Resource Group Selection List panel" describes the values you can enter for the fields on this panel, with the exception of this field:

Schedule Number to Process

> Enter a number between 0 and 255. If you enter 0, then no schedules will be edited. Otherwise, the value that you enter indicates the number of the first schedule to edit.

Editing scheduled controls

You can edit resource group schedules from the Edit Resource Group panel.

Table 78. Edit Resource Group

```
DB2P / DB2PLOCATION -- Edit Resource Group: GROUP1 -------------------- 8.1.0
Command ===>
Schedule Number. : 1         Next Schedule Number to Process.. ===>
Start Date...... :           Stop Date... :          (YYYYMMDD)
Start Day....... :           Stop Day ... :          (1=SUN,2=MON,...)
Start Time...... :           Stop Time... :          (HHMM)
Active? (Y/N)... :           Use Service Unit Defaults (Y/N) :
Max CPU Seconds (Prompt Limit)...........Online :
Max CPU Seconds (Cancel Limit)...........Online :          Batch :
Max Rows Fetched (Prompt Limit).........Online :
Max Rows Fetched (Cancel Limit).........Online :          Batch :
Allow GRANT,REVOKE SQL? (Y/N)...........Online :          Batch :
Allow CREATE,ALTER,DROP SQL? (Y/N).......Online :          Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y/N)....Online :          Batch :
Allow TSO/CICS Commands? (Y/N)..........Online :          Batch :
Allow EXPORT Command? (Y/N).............Online :          Batch :
Allow IMPORT Command? (Y/N).............Online :          Batch :
Allow SAVE DATA Command? (Y/N)..........Online :          Batch :
Allow CONNECT Command? (Y/N)............Online :          Batch :
Enable QMF Access? (Y/N)................Online :          Batch :
Enable Query Analyzer? (Y/S/N)..........Online :          Batch :
Service Units in 100s (Cancel limit).....Online :          Batch :
```

If you press **Enter**, the input data will be validated. If any errors are detected, the panel will be redisplayed with an error message. If all values are valid, then this schedule will be modified. If the **Next Schedule Number To Process** field is equals the current schedule number, the previous panel will be displayed. If the **Next Schedule Number To Process** field is set to another schedule number, this panel will be displayed again, ready for you to edit the next schedule.

If you type DELETE on the command line and press **Enter**, this schedule is deleted. The **Next Schedule Number To Process** field determines which panel is displayed next.

If you press **PF3**, you will return to the next panel without modifying this schedule.

"Resource group scheduled controls" describes the values you can enter for the fields on this panel, with the exception of these fields:

Schedule Number
> This field indicates the number of the schedule that is being processed.

Next Schedule Number to Process

Enter a number between 1 and 255. Enter the same number as the currently displayed schedule to terminate the edit session. Otherwise, the value that you enter indicates the number of the next schedule to edit.

Dropping a resource group

You can drop a resource group from a selection list or from the Governor panel.

Dropping directly

To drop a resource group from the Governor panel, you must enter the following fields:

Action

Enter D (for drop).

Resource Group

Enter the resource group to drop.

Drop Confirmation?

Enter Y to request a drop confirmation panel or N to suppress one.

Dropping from a selection list

To drop a resource group entry from the Resource Group Selection List panel, you must enter the following field:

Action

Enter D (for drop).

Resource Group Drop Confirmation panel

The resource group to be dropped and the number of database rows that will be deleted are displayed on the Resource Group Drop Confirmation panel.

Table 79. Resource Group Drop Confirmation

```
DB2P / DB2PLOCATION -- Resource Group Drop Confirmation -------------- 8.1.0
Command ===>
Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.
Resource Group :
Description... :
This resource group is currently assigned to          user profile(s).
Number of rows to be deleted from Q.RESOURCE_TABLE :
```

If you press **Enter**, the resource group identified on the panel will be dropped from the database.

If you press **PF3**, this drop command will be ignored and the resource group will remain in the database.

Assigning a resource group to a user profile

Assignments of resource groups to user profiles are performed from a selection list. Once you choose the assignment action from the Governor panel or from the Resource Group Selection List panel, you must then set up a user profile selection list.

Assigning directly

To choose a resource group which will be assigned to one or more user profiles from the Governor panel, you must enter the following fields:

Action
  Enter A (for assign).

Resource Group
  Enter the resource group name.

Assigning from a selection list

To choose a resource group that will be assigned to one or more user profiles from the Resource Group Selection List panel, you must enter the following field:

Action

Enter A (for assign).

Resource Group Assignment panel 1 of 2

This Resource Group Assignment panel is the first of two assignment panels that will be displayed.

Table 80. Resource Group Assignment panel (1 of 2)

```
DB2P ⁄ DB2PLOCATION -- Resource Group Assignment -------------------- 8.1.0
Command ===>
Resource Group..... :
    Description..... :
Creator......... ===>
Translation..... ===>
Environment..... ===>
Selection Filter ===>
--------------------------------------------------------------------------
Use this panel to build a selection-list of User Profiles.
Selection Filter = 1 will build a list of all User Profiles like...
Selection Filter = 2 will build a list of all User Profiles
                    already assigned to this Resource Group like...

```

If you press **Enter**, a selection list will be built using the qualifying user profiles that you entered.

If you press **PF3**, this assignment will be bypassed and you will return to the previous panel.

The fields on the panel are:

Creator

Enter the creator field for the user profile. You can use % and _ as wildcard characters in this field to select multiple user profiles.

Translation

Enter the translation field for the user profile. You can use % and _ as wildcard characters in the translation to select multiple user profiles.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. You can use % and _ as wildcard characters in the environment to select multiple user profiles.

Selection Filter

Enter 1 if you want the user profile selection list to include all matching user profiles or 2 if you want the list to include only those matching user profiles that are assigned to this resource group.

Resource Group Assignment panel 2 of 2

This Resource Group Assignment panel is the panel from which the assignments are processed.

Table 81. Resource Group Assignment panel (2 of 2)

```
DB2P ∕ DB2PLOCATION -- Resource Group Assignment --------------------- 8.1.0
Command ===>                                              Scroll ===> PAGE
Valid Actions are...
A --Assign Resource Group to User Profile
U --Unassign Resource Group from User Profile
Resource Group:
   Description:
Action          Creator   Translation       Environment  Assigned To...
------          --------  ----------------   -----------  ----------------



**************************** BOTTOM OF DATA ******************************
```

If you press **Enter**, the selected assignments will be processed and the database will be updated. Because a resource group can be assigned to multiple user profiles, you will remain on this panel until you press **PF3**.

If you press **PF3**, any pending assignments will be bypassed and you will return to the previous panel.

Show schedules for a resource group

You can display all currently defined schedules for a resource group from a selection list or from the Governor panel.

Showing schedules directly

To show schedules for a resource group from the Governor panel, you must enter the following fields:

Action
> Enter S (for show schedules).

Resource Group
> Enter the resource group that you want to show.

Showing schedules from a selection list

To show schedules for a resource group entry from the Resource Group Selection List panel, you must enter the following field:

Action

Enter S (for show schedules).

Resource Group Schedule List panel

The resource group schedule definitions will be displayed in schedule number order on the Resource Group Schedule List panel.

Table 82. Resource Group Schedule List

```
DB2P ╱ DB2PLOCATION -- Schedule List For GROUP1 ---------------------- 8.1.0
Command ===>                                                  Scroll ===> PAGE
  Schedule  Schedule  Start     Stop      Start      Stop       Start  Stop
  Number    Active?   Date      Date      Day        Day        Time   Time
  --------  --------  --------  --------  ---------  ---------  -----  -----
**************************** BOTTOM OF DATA *******************************
```

If you press **PF7** or **PF8**, the panel will scroll backward or forward.

To return to the previous panel, press **PF3**.

Online display of current limits from QMF (RLIMITS)

While in QMF, a user can review the resource group scheduled limits and controls that are currently in effect by issuing the RLIMITS command from the QMF command line. To operate properly, the RLIMITS command synonym must be installed as described in ″Step 2b. Crate Manager command synonyms.″

When the RLIMITS command is issued, this panel is displayed.

Table 83. Current Active Governor Schedule

```
DB2P -- Current Active Governor Schedule ---------------------------- 8.1.0
Command ===>
Resource Group :
Start Date.... :          Stop Date.... :          (YYYYMMDD)
Start Day..... :          Stop Day..... :          (1=SUN,2=MON,...)
Start Time.... :          Stop Time.... :          (HHMM)
Active?....... :          Use Service Unit Defaults (Y/N) :
Max CPU Seconds (Prompt Limit)........Online :
Max CPU Seconds (Cancel Limit)........Online :          Batch :
Max Rows Fetched (Prompt Limit).......Online :
Max Rows Fetched (Cancel Limit).......Online :          Batch :
Allow GRANT,REVOKE SQL? (Y/N).........Online :          Batch :
Allow CREATE,ALTER,DROP SQL? (Y/N)....Online :          Batch :
Allow INSERT,UPDATE,DELETE SQL? (Y/N).Online :          Batch :
Allow TSO/CICS Commands? (Y/N)........Online :          Batch :
Allow EXPORT Command? (Y/N)...........Online :          Batch :
Allow IMPORT Command? (Y/N)...........Online :          Batch :
Allow SAVE DATA Command? (Y/N)........Online :          Batch :
Allow CONNECT Command? (Y/N)..........Online :          Batch :
Enable QMF Access? (Y/N)..............Online :          Batch :
Enable Query Analyzer? (Y/S/N)........Online :          Batch :
Service Units in 100s (Cancel limit)..Online :          Batch :
```

To return to the previous QMF panel, press **Enter**.

The HPO/Governor module help panel

Whenever a QMF command is canceled, a message is displayed on the QMF panel message line. This message explains why the command was canceled, for example:

RAAG006E--Not authorized to process this QMF command: SAVE DATA

If you want to provide your QMF users with additional information regarding what to do when one of their QMF commands is canceled, you can enable the HPO/Governor module help panel. If enabled, this panel will be displayed when a user enters the HELP command after their QMF command is canceled. This panel, named RAAQMFH, can be customized to contain any information. For example, it can provide end users with the telephone number to your Help desk if they have questions about the cancellation of a QMF command.

Note: For detailed instructions on enabling this feature, see "Step 12f. Set the HPO/Governor module configuration parameters."

Chapter 7. Monitor

You can view QMF session activity in real time with Monitor. You can monitor who is currently using QMF, determine what types of actions are being performed, assess CPU time utilization and number of rows fetched for any action requiring database activity, and even view the SQL text associated with a long running query.

The following actions are supported from the Monitor online facility:

- Listing QMF sessions
- Browsing detail session activity
- Browsing SQL text
- Canceling current activity
- Generating VSAM file cleanup JCL

The HPO/Governor module provides Monitor's direct interface into QMF processing.

Note: This facility can only be activated for QMF/TSO sessions.

Enabling QMF monitoring

To enable QMF monitoring, you must allocate QMFHPO.SRAALOAD to your TSO session. "Step 4b. Special allocations for the HPO/Governor module" provides for more information about this allocation. In addition, you must create the Monitor VSAM file (see "Step 3. Create Monitor VSAM file"), and specify its name to the HPO Configuration Dialog (see "Step 12f. Set the HPO/Governor module configuration parameters").

Starting Monitor

Start the Monitor online facility by selecting option 3 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN'
```

Note: You will receive an error indicating a dynamic allocation failure if you attempt to invoke the Monitor online facility while you have a QMF session active.

Table 84. Monitor Selection Menu

```
QMF HPO⁄-Manager -- Monitor Selection Menu --------------------------- 8.1.0
Option ===>


                                          DB2 SSID   ===> DB2P

                                          User ID:
                                          Date:
                                          Time:
-----------------------------------------------------------------------------

   1  List QMF Sessions
   2  VSAM File Cleanup JCL
   D  Set Default Parameters
   X  Exit
```

Viewing the QMF session list

The Monitor online facility allows you to generate a list of QMF sessions. Both current and previous sessions can be included in the list. The list displays the session user, and the start date and time. If the session has terminated, the stop date and time display.

When you select option 1 from the Monitor Selection Menu, the QMF Session List panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN 1'
```

The sessions that match the default parameter values will be displayed.

Table 85. QMF Session List

```
DB2P -- QMF Session List -------------------------------------------- 8.1.0
Command ===>                                              Scroll ===> PAGE

Valid Actions Are...
B  Browse Detail Activity for a Session


                             --Session Start--   ---Session End---
Act  TSOID     Mode          Date     Time       Date     Time
---  --------  --------      -------- --------   -------- --------

**************************** BOTTOM OF DATA ********************************
```

If you press **Enter**, the screen will be refreshed and the QMF sessions displayed will be current to the present time.

If you press **PF3**, you will return to the Monitor Selection Menu.

The fields on the panel are:

Act   (Action): Enter a B to view the detail activity for this session. This is the only input field on the panel.

TSOID
For online sessions, this field displays the TSOID of the user who logged on to QMF. For batch sessions, this field displays the user ID associated with the batch job.

Mode   This field displays the mode of the session, either ONLINE or BATCH.

Session Start Date and Time
This field displays the start date and time for the QMF session.

Session End Date and Time
> This field displays the end date and time for the QMF session. If this field is blank, the session is still active or it abnormally terminated.

Viewing the session activity list

Within a session, you can see every QMF command that is being issued by the user. For actions that cause database activity, the number of rows fetched and the CPU time consumption are also displayed.

When you enter a B next to an entry on the QMF Session List panel and press **Enter**, the Session Activity List panel is displayed. This panel displays the detail activity being performed in the user's QMF session.

Table 86. Session Activity List

```
DB2P -- Session Activity List ---------------------------------------- 8.1.0
Command ===>                                                Scroll ===> PAGE

Valid Actions Are...
B  Browse SQL Text
C  Cancel Current Action

TSOID :
Mode  :                                                                 C S
                   QMF Object   Object                                  A Q
A Date     Time    Act Owner    Name                 Rows      CPU      N L
- -------- -------- --- -------- ----------------- ---------- ----------- - -

***************************** BOTTOM OF DATA *****************************
```

If you are displaying an active QMF session and you press **Enter**, the displayed data will be refreshed.

If you are displaying a QMF session that has ended and you press **Enter**, the displayed data will remain the same.

If you press **PF3**, you will return to the QMF Session List panel.

The fields on the panel are:

A (Action): Enter B in this column to browse SQL text associated with a query, or C to cancel an active QMF command with database activity.

Date and Time
The date and time that the command started displays in these columns. If this entry indicates incremental database activity (that is, QMF Act is ***), the date and time will be the same as the corresponding entry for the command that initiated the database activity.

QMF Act
(QMF action): The QMF action that was performed displays in this column. Values that can appear here are:

Table 87. QMF Action Codes

Code	Description
BEG	Start QMF session
END	End QMF session
ERA	ERASE command
CNV	CONVERT command
PRI	PRINT command
DIS	DISPLAY command
EXP	EXPORT command
IMP	IMPORT command
SAV	SAVE command
RUN	RUN command
***	Incremental database activity

Object Owner
The owner of the object against which the action is being performed displays in this column.

Object Name
The name of the object against which the action is being performed displays in this column.

Rows The accumulated number of rows retrieved displays in this column. It is valid only for entries indicating incremental database activity.

CPU The accumulated CPU time consumed displays in this column. It is valid only for entries indicating incremental database activity.

CAN The cancel flag displays in this column. See "HPO/Governor module cancel codes" for more information on the values that can appear here.

SQL If a Y appears in this column, then SQL text is available for viewing. Otherwise, no SQL text is available.

Viewing SQL text

When you enter a B next to an entry on the Session Activity List panel and press **Enter**, the SQL Text Browse panel is displayed (if SQL text is available). This panel displays the actual SQL statement being executed.

Table 88. SQL Text Browser

```
DB2P -- SQL Text ------------------------------------------------------- 8.1.0
Command ===>                                                  Scroll ===> PAGE

Object :


Date        Time     TSOID    SQLID      Mode   Rows      CPU
----------  -------- -------- ---------  ------ --------  -----------


-------------------------------------------------------------------------------
**************************** BOTTOM OF DATA *********************************
```

If you press **Enter**, no action is performed.

If you press **PF3**, you will return to the Session Activity List panel.

The fields on the panel are:

Date This field displays the date on which the command that activated database activity began.

Time This field displays the time on which the command that activated database activity began.

TSOID

For online sessions, this field displays the TSOID of the user who logged on to QMF. For batch sessions, it displays the user ID associated with the batch job.

SQLID
This field displays the CURRENT SQLID at the time the command was initiated.

Mode This field displays the mode in which the command was run, either ONLINE or BATCH.

Rows This field displays the accumulated number of rows fetched at the time that the SQL text was captured for the query.

CPU This field displays the accumulated CPU time consumed at the time that the SQL text was captured for the query.

Canceling a QMF command

In addition to browsing QMF session activity, you can use the Monitor online facility to cancel a command in progress. Incremental records are displayed that show the cumulative CPU time consumption and database rows fetched for the command. You can use this information to decide whether or not to cancel a command.

You can enter a line action of C (Cancel) on the Session Activity List panel. The cancel action will only take effect if entered on the most recent incremental database activity row for an active QMF session. (Incremental database activity rows are indicated by a value of *** for QMF Act.) When you enter the cancel action, Monitor sends a message to the HPO/Governor module, requesting that the command be canceled.

Setting default parameters

Monitor uses a collection of default parameter settings. These default settings are saved from session to session in your ISPF profile data set (under an application ID of RAAX). You can set these default parameters by selecting option D from the Monitor Selection Menu.

Table 89. Set Default Parameters

```
DB2P -- Set Default Parameters -------------------------------------- 8.1.0
Command ===>

Include QMF sessions that were started...
1. By this TSOID (use * for LIKE)....... ===>
2. On or since this date (YYYYMMDD)..... ===>          (TODAY for current date)
3a. On or since this time (HHMMSS)....... ===>          (TODAY for current time)
 b. If 3a. = TODAY, include sessions that
    were started this many hours ago (HH) ===>
```

If you press **Enter**, the default values specified will be saved.

If you press **PF3**, all input fields will be ignored and you will return to the
Monitor Selection Menu.

The fields on the panel are:

Include QMF sessions that were started by this TSOID
> Enter the TSOID to monitor. You can use * as a wildcard character in
> the TSOID to select a group of TSOIDs to monitor. For example, enter
> ABC* to monitor all TSOIDs that start with ABC.

Include QMF sessions that were started on or since this date
> Enter a date (in the form YYYYMMDD) to select QMF sessions started on
> or after this date, or enter TODAY to select today's QMF sessions.

Include QMF sessions that were started on or since this time
> Enter a time of (in the form HHMMSS) to select QMF sessions started on
> or after this time (on the date specified), or enter TODAY to select
> today's QMF sessions. If you enter TODAY, you must specify a value in
> the **If 3a. = TODAY, include sessions that were started this many
> hours ago** field.

If 3a. = TODAY, include sessions that were started this many hours ago
> Enter a number from 00 to 24 to represent the number of hours back
> in time from the current time to include in the monitor display for
> session activity. If this number would result in a time earlier than

midnight, then midnight is used. This field is ignored if the value for the **Include QMF sessions that were started on or since this time** field is not TODAY.

Monitor VSAM file maintenance

Monitor obtains QMF session information from the Monitor VSAM file (which is written by the HPO/Governor module). During normal usage, more and more data will be written to this file. The Monitor online facility can generate and submit JCL to clean up this file.

Note: If the Monitor VSAM file fills up, Monitor will automatically stop recording QMF session information.

The required frequency of cleanup is related to the amount of QMF activity at your site and the space allocation of the VSAM file. Once the data in the file is purged, it is no longer available for display from the Monitor online facility. Therefore, if a daily purge is scheduled, data will only be available for the last 24 hours.

Selecting option 2 from the Monitor Selection Menu brings you to the VSAM File Cleanup JCL panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'MN 2'
```

This panel allows you to specify the information needed to create the JCL and to run the cleanup batch job.

Table 90. VSAM File Cleanup JCL

```
DB2P -- VSAM File Cleanup JCL ---------------------------------------- 8.1.0
Command ===>

Press ENTER to build JCL.
Type CAN or CANCEL or press PF3 to cancel this request.

1. Monitor VSAM File.. ===>

2. Cleanup Parameter.. ===>    (1=Reinitialize entire file,
                                2=Keep records for today,
                                3=Keep records for last 7 days,
                                4=Keep records for last 30 days)

3. Job Cards...
       ===>
       ===>
       ===>
       ===>

4. Edit or Submit JCL? ===>    (E=Edit, S=Submit)
```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, JCL to run the cleanup job will be edited or submitted.

If you press **PF3**, all input fields will be ignored and you will return to the previous panel.

The fields on the panel are:

Cleanup Parameter
You can specify four different types of cleanup:
- 1 = reinitializes the file
- 2 = purges all records except for the records from today
- 3 = purges all records except for the records from the last seven days
- 4 = purges all records except for the records from the last 30 days

Job Cards
Enter valid job cards for the job. You need to enter at least one line. Any lines specified will be used exactly as entered in the generated JCL.

Edit or Submit JCL?

Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Chapter 8. Query Analyzer

Query Analyzer provides you with preemptive governing capabilities needed to automatically prohibit resource intensive or inefficient QMF queries from being processed by DB2. By providing you with a resource profile for your query that is more meaningful than the TIMERON value, you can make decisions about whether a query should run or be canceled before it runs.

Even though you can also use Query Analyzer outside of QMF to interpret a query's access path efficiency without running it, this facility is primarily designed to be a preemptive governor for QMF.

The primary components of Query Analyzer are access path reporting, historical QMF query statistics, and an exit routine to allow conditional processing of the query based on the above information. The HPO/Governor module provides Query Analyzer's direct interface into QMF processing.

Access Path Reporting

Query Analyzer automatically generates the PLAN_TABLE information needed to explain the access path information for a query. Relevant fields of the plan table output are calculated and summarized into a concise report for display purposes. Additionally, this data may be used by the exit routine to prevent queries from running based on restrictions devised by your site.

Historical QMF Query Statistics

With the object tracking component of Object Manager in place, Query Analyzer can also provide accurate detailed historical data for queries that have previously run. The historical information (maximum, minimum, and average CPU time, and number of rows fetched) can be used in conjunction with the access path data to further identify resource intensive queries.

Exit Routine

An exit point is taken after Query Analyzer has produced the raw analysis data. The analysis data is passed to the Query Analyzer exit routine (a REXX program named RAARXQA), where you can specify whether the query should run or be canceled.

This exit routine specifies which ISPF panel to display to the user. A pre-defined panel is (and associated help panels are) shipped with Query Analyzer, but you can create your own and display it instead.

Additionally, all tables found in the access path information are passed to this exit routine. This allows you to cancel queries based on the tables that are referenced and accessed.

The exit routine can also limit the number of rows that the query should return. This "Top-10" feature tells QMF to return only the first *n*-rows of an answer set before the query runs.

The exit routine provided uses the REXX language for easy programming and modification.

Enabling QMF query analysis

To enable query analysis, you must allocate QMFHPO.SRAALOAD to your TSO session. See ″Step 4b. Special allocations for the HPO/Governor module″ for more information about this allocation.

Creating a resource group

To activate query analysis for a QMF user, you must create a resource group using the Governor online facility that enables Query Analyzer. For that resource group to take effect, you must assign it to the QMF user's profile. For a detailed discussion of the Governor online facility, resource groups and their Query Analyzer options, and assigning resource groups to user profiles, see ″Governor.″

If you have used the Governor online facility to make query analysis **automatic** for a resource group, then as users issue RUN QUERY commands in QMF, the SQL to be executed is automatically analyzed.

If you have enabled Query Analyzer in **selective mode**, only those queries run with the RQA command synonym will be analyzed. RQA is a command synonym for the QMF RUN command, which directs Query Analyzer to analyze the associated query. See ″Step 2b. Create Manager command synonyms″ for information about how to create this command synonym.

Starting Query Analyzer

Start the Query Analyzer online facility by selecting option 4 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'QA'
```

This is the Query Analyzer Selection Menu. This panel is not displayed from QMF. It displays only when running the Query Analyzer online facility.

Table 91. Query Analyzer Selection Menu

```
QMF HPO/Manager — Query Analyzer Selection Menu --------------------- 8.1.0
Option ===>


                                            DB2 SSID ===> DB2P

                                            User ID:
                                            Date:
                                            Time:
 ---------------------------------------------------------------------------

   1  Analyze Query
   D  Set Default Parameters
   X  Exit
```

Analyzing queries from outside of QMF

Query Analyzer can be used to process queries outside of QMF, such as ad hoc queries, exported QMF queries, and SPUFI queries. Selecting option 1 from the Query Analyzer Selection Menu brings you to the Analyze Query panel. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'QA 1'
```

Table 92. Analyze Query

```
DB2P -- Analyze Query ------------------------------------------------ 8.1.0
Command ===>

Press ENTER to analyze a query from one of the following input sources.
Type CAN or CANCEL or press PF3 to end.

1. Query Data Set ===>

2. Or Enter Ad Hoc Query Text Below===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
```

If you press **Enter**, the specified query will be analyzed. If any errors are
detected, the panel will be redisplayed with an error message. Otherwise, the
analysis data will be passed to the exit routine identified on the Set Default
Parameters panel.

If you press **PF3**, all input fields will be ignored and you will return to the
Query Analyzer Selection Menu.

The fields on the panel are:

Query Data Set
> Enter the name of the data set or data set and member containing the
> query to be analyzed. The data set should contain only query text and
> QMF-style comments.

Enter Ad Hoc Query Text Below
> Enter an ad hoc query.

Setting default parameters

Query Analyzer uses a collection of default parameter settings. These default
settings are saved from session to session in your ISPF profile data set (under
an application ID of RAAX). You can set these default parameters by selecting
option D from the Query Analyzer Selection Menu.

Table 93. Set Default Parameters

```
DB2P -- Set Default Parameters -------------------------------------- 8.1.0
Command ===>

1. REXX Program Name............. ===>
2. Plan Table Owner/Current SQLID ===>

Create Plan Table In
3a. Database..................... ===>
3b. Table Space.................. ===>




```

If you press **Enter**, all input fields will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. If there are no errors, then these default values will be saved.

If you press **PF3**, all input fields will be ignored and you will return to the Query Analyzer Selection Menu. The previous default values will be restored.

The fields on the panel are:

REXX Program Name
(This field is optional.) Specify the name of your exit routine, if you have written one. If you leave this field blank, the sample exit routine, RAARXQA, will be used.

Plan Table Owner/Current SQLID
(This field is optional.) If a value is entered here, it will be used as the CURRENT SQLID during query analysis. This ID will become the owner of the PLAN_TABLE used for the EXPLAIN command. It also will become the owner of all unqualified tables in FROM clauses. Before setting this value, review the restrictions for setting CURRENT SQLID in the *DB2 Administration Guide*.

Create Plan Table In Database
(This field is optional.) Specify the database in which Query Analyzer

should create a PLAN_TABLE for a user if one does not exist. If you leave this field blank and a PLAN_TABLE does not exist, query analysis will be bypassed.

Create Plan Table In Table Space
(This field is optional.) Specify the table space in which Query Analyzer should create a PLAN_TABLE for a user if one does not exist. You cannot enter a value in this field unless you enter a value in the **Create Plan Table In Database** field.

Analyzing queries with the edit macro

Queries can be analyzed outside of QMF using the Query Analyzer edit macro named RAAQA. While you are in an ISPF EDIT session, you can select a query from the edited data set and invoke Query Analyzer.

You can enter the name of the DB2 subsystem in which to analyze the query after the macro name. For example, to analyze a query in DB2 subsystem DB2T, type RAAQA DB2T on the command line.

Here is an example of how to invoke query analysis from an ISPF EDIT session.

```
EDIT ---- USERAPPL.SOURCE(QUERY1) -- 01.00 ------------------- COLUMNS 007 072
 Command ===> RAAQA DB2T                                        Scroll ===> CSR
 013700             DEPT            SMALLINT              ,
 013800             JOB             CHARACTER(5)          ,
 013900             YEARS           SMALLINT              ,
 014000             SALARY          DECIMAL(7,2)          ,
 014100             COMM            DECIMAL(7,2)
 014200         )
 014300     END-EXEC.
 014400 *
 014500     EXEC SQL
 014600     DECLARE C1 CURSOR FOR
 014700
 QQ          SELECT ID, NAME
 014900       FROM Q.STAFF
 QQ          WHERE COMM IS NOT NULL
 015100
 015200     END-EXEC.
 015300 *
 015400     EXEC SQL INCLUDE SQLCA END-EXEC.
 015500 *
 015600  01  SAVED-SQLCODE             PIC S9(9) COMP.
 015700 *
```

If you type RAAQA or RAAQA ssid on the command line and press **Enter**, the selected query will be analyzed in the specified DB2 subsystem. If you do not

specify a subsystem, the last subsystem specified will be used. If any errors are detected, the panel will be redisplayed with an error message. Otherwise, the analysis data will be passed to the exit routine.

The fields on the panel are:

Command

Type RAAQA or RAAQA ssid on the command line (where ssid is a valid DB2 subsystem ID).

Line Command:

Isolate or select the query by entering a Q on the line of code (or QQ for blocks of code) that contain the query. Only select the query; do not select any lines that contain EXEC SQL, DECLARE CURSOR FOR, or END-EXEC.

Exit routine

This section describes how the exit routine fits into the general processing flow. In addition, the sample exit routine and the sample analysis output panel (and associated help panels) are discussed. Read this entire section before attempting to use or modify the sample exit routine or before you write your own exit routine.

General processing flow

Step 1. RUN QUERY
RUN QUERY represents the beginning of the process. This could mean the user issued a RUN QUERY or RQA QUERY command from QMF. It could also mean that Query Analyzer was invoked from the online ISPF facility or from the edit macro. In the latter two cases, the query is never executed.

Step 2. Trap SQL
This step represents the isolation of the query prior to execution of the analysis phase. If the query is coming from QMF, then all substitution variables will have been replaced. If the query is coming from the online ISPF facility or the edit macro, host variables and substitution variables will be replaced internally by parameter markers (question marks) in this step.

Step 3. Run EXPLAIN
During this step, the query is processed using the EXPLAIN command. The result of this command is that access path information is inserted into a PLAN_TABLE. These PLAN_TABLE entries are read and stored internally in the program, then these entries are deleted from the PLAN_TABLE.

The owner of the PLAN_TABLE into which these entries are inserted is determined by the user's CURRENT SQLID. You can override the CURRENT SQLID. That is, Query Analyzer can SET CURRENT SQLID before running

the EXPLAIN to control which PLAN_TABLE will be used. Once CURRENT SQLID is set, all unqualified tables within the query will be qualified by CURRENT SQLID.

From QMF, CURRENT SQLID is obtained from the user's resource group. Use the Governor online facilities to set this field. From the online ISPF facility or from the edit macro, CURRENT SQLID is obtained from the Set Default Parameters panel.

If a PLAN_TABLE does not exist for the user (the CURRENT SQLID), then Query Analyzer will attempt to create one. The database and table space in which the PLAN_TABLE will be created is supplied to Query Analyzer via the resource group definitions if the user is running under QMF, or via the value set on the Set Default Parameters if the user is running from the online ISPF facility. If these variables are left blank, no analysis can be performed.

Step 4. Gather Access Path and Historical Data

During this step, access path information is gathered and summarized. In addition, historical query statistics (CPU time and rows fetched) are summarized and made available to the exit routine. All table names found in the plan table output (a maximum of 10) are passed to the exit routine.

Step 5. Call Exit Routine

Once the access path information is gathered and summarized, the exit routine is called. The exit routine is responsible for setting three variables:

- PANELID
- CANFLG
- AAQARM

The **PANELID** variable notifies Query Analyzer which panel, if any, should be displayed to the user after the query is analyzed. Any non-blank value is used as the name of the output panel.

The **CANFLG** variable notifies Query Analyzer if it should cancel the QMF query. To cancel the query, set CANFLG to CANCEL. Any other value allows the query to continue.

If the exit routine specifies a panel name and has canceled the query, a message will be displayed on the output panel notifying the user that the query has been canceled. If the query was not canceled by the exit routine, then the panel contains a cancellation prompt. If the user responds with a Y, then the CANFLG variable will be set to CANCEL by the output panel in its processing section.

If the query will be canceled (if CANFLG is set to CANCEL after all exit processing finishes), then Query Analyzer cancels the QMF query and notifies the user with a message on the QMF message line.

The **AAQARM** variable is more of a resource controller than an analysis tool, but it provides more user control over query execution. This field lets the user tell QMF how many rows to fetch before canceling the query. The default value is zero, which means no row limit is set here. If any other value is specified, that value will cause QMF to halt execution after reaching this row limit.

Step 6. PANELID Set?

Query Analyzer can display a panel to the user. The exit routine is responsible for notifying Query Analyzer which panel it should display by setting the ISPF variable named PANELID. To hide the analysis from the user, set PANELID to spaces. The sample exit sets PANELID to RAAQMFQA, the sample output panel.

Step 7. Display Analysis Output Panel

If the PANELID variable is set, then Query Analyzer displays the appropriate panel.

Step 8. Cancel Query?

Query Analyzer can cancel a QMF query. This exit routine is responsible for notifying Query Analyzer if the query should be canceled by setting the ISPF named CANFLG to CANCEL. (The sample output panel can also set CANFLG.)

Sample exit routine

The sample exit routine is named RAARXQA and it performs several operations on the raw analysis data as received from the analysis engine. Refer to the comments within these exits for details on the processes and for a list of the incoming parameters, the names of the variables, and their meanings.

Set CANFLG variable

To cancel a query, set the CANFLG variable to the character string CANCEL. Any other value allows the query to continue running. For example, if a table is being accessed at a time of day when it is restricted, the exit routine can set this flag, as described in Step 5, "Call Exit Routine," to cancel the query.

To pass the variable value back to Query Analyzer, the exit routine must VPUT the variable into the shared variable pool.

```
ISPEXEC VPUT (CANFLG) SHARED
```

You can add threshold logic, such as, logic that will cancel a query if more than one table is accessed and no indexes are used.

Set AAQARM variable

The exit routine can pass back the number of rows to fetch before canceling the query. This allows each user the ability to minimize resource consumption by limiting the number of rows fetched for each query. To pass the variable value back to Query Analyzer, the exit routine must also VPUT the variable into the shared variable pool.

```
ISPEXEC VPUT (AAQARM) SHARED
```

Set analysis output variables

The exit routine must VPUT all variables that will be displayed on the output panel. In the sample exit, the variables QAP1 through QAP29 are VPUT to the shared pool.

```
ISPEXEC VPUT (QAP1 , QAP2 , QAP3 , QAP4 , QAP5 ,
              QAP6 , QAP7 , QAP8 , QAP9 , QAP10,
              QAP11, QAP12, QAP13, QAP14, QAP15,
              QAP16, QAP17, QAP18, QAP19) SHARED
ISPEXEC VPUT (QAP20, QAP21, QAP22, QAP23, QAP24,
              QAP25, QAP26, QAP27, QAP28, QAP29) SHARED
```

The analysis output variables and their descriptions are presented in the table below.

Variable	Description
QAP1	Number of Query blocks
QAP2	Number of Tables Referenced
QAP3	Join Methods
QAP4	Access Types
QAP5	Number of Index Only scans
QAP6	DB2 Sorting
QAP7	Parallelism Modes
QAP8	Highest Access Degree
QAP9	Number of Page Range Screens
QAP10	Join Types
QAP11	Prefetch Types
QAP12	Minimum row count
QAP13	Maximum row count
QAP14	Average row count
QAP15	Minimum CPU time
QAP16	Maximum CPU time
QAP17	Average CPU time
QAP18	Number of Matching Index scans

Variable	Description
QAP19	Column Functions Evaluation Types
QAP20	Is access through an index?
QAP21	Is access through more than one index?
Variable	**Description**
QAP22	How many indexes use matching columns?
QAP23	Is the query satisfied using only an index?
QAP24	Are scans limited to certain partitions?
QAP25	What kind of prefetching is done?
QAP26	Is data accessed/processed in parallel?
QAP27	Are sorts performed?
QAP28	Are joins present in query?
QAP29	When are column functions evaluated?

Description of analysis output

Before you run Query Analyzer using the sample exit routine or before you modify or create your own exit routine, you should be familiar with the analysis data that is provided to the exit routine. The sample output panel (and associated help panels) that are provided with Query Analyzer contain and describe all of these values, excluding the table names passed to the exit routine.

Table creator/name

The table creator and name for up to 10 tables found in the plan table are passed to RAARXQA. The exit routine can act upon this information by canceling the query, displaying the table name, or any other appropriate action. These table names are accessed using the ISPF VGET command in the sample exit routine for the variables named T1, T2, ..., T10.

Sample analysis output panel

The QMF Query Information panel (RAAQMFQA) is described in this section. All of the data available from Query Analyzer are shown on this panel.

Table 94. Query Information

```
DB2P — QMF Query Information ------------------------------------------ 8.1.0
Command ===>


Is access through an index?............................... :
Is access through more than one index?.................... :
How many indexes use matching columns?.................... :
Is the query satisfied using only the index?.............. :
Was a scan limited to certain partitions?................. :
Is prefetching performed?................................. :
Is data accessed⁄processed in parallel?................... :
Are sorts performed?...................................... :
Are joins present in the query?........................... :
When are column functions evaluated?...................... :
Cost category-Service Units (in 100s) to run query........ :

Historical Data For This Query
Minimum rows...... :            Minimum CPU time......... :
Maximum rows...... :            Maximum CPU time......... :
Average rows...... :            Average CPU time......... :

Enter Y or press PF3 to cancel this query ===>
Enter maximum number of rows to fetch.... ===>           (0=bypass)
```

If you press **PF1**, a description of these fields and the raw access path data are available for display.

The fields on the panel are:

Is access through an index?
>   If an access type of I, I1, N, or MX is found in the EXPLAIN output, then this field is set to YES. This indicates that there is at least one instance of index access, although other access types may also be present.

Is access through more than one index?
>   If an access type of M, MX, MI, or MU is found in the EXPLAIN output, then this field is set to YES. This indicates at least one instance of a multiple index access.

How many indexes use matching columns?
>   If index access is found in the plan and MATCHCOLS > 0, then this number is incremented by 1. This is not the number of matching columns per index nor is it the sum of the number of matching columns, but rather it is the number of index accesses in which columns in a WHERE condition matched columns of the index. This is equal to the Matching Index scans field on the Help panel.

Is the query satisfied using only the index?
> If **any** query in the plan has an INDEXONLY column = YES, then this field will be set to YES.

Was a scan limited to certain partitions?
> If PAGE_RANGE = Y for any row in the plan table, then this field will be set to YES.

Is prefetching performed?
> If PREFETCH is L or S for any row of the plan table, then this field will be set to YES.

Is data accessed/processed in parallel?
> If PARALLELISM_MODE is I or C for any row in the plan table, then this field is set to YES.

Are sorts performed?
> If any of the SORTN_ or SORTC_ columns of the plan table are Y, then this field is set to YES. Also, if Join Method = 3, this also indicates a sort was performed.

Are joins present in the query?
> If METHOD = 1,2, or 4 for any row in the plan table, then this field is set to YES.

When are column functions evaluated?
> This value can be S and/or R according to COLUMN_FN_EVAL in the plan table. SQL Parsing is not performed to determine specific function type.

Cost Category and Service Units to run query
> This is the estimated processor cost for this SQL statement. This value is comprised of the Cost Category and the Service Units. Both these values come from the DSN STATEMNT TABLE and are present only if the release level of DB2 is 6.1 or higher.

> **Cost Category**
> > Indicates which values DB2 used to make the estimate.
> > - **A** indicates DB2 had enough information to make the estimate without using defaults.
> > - **B** indicates DB2 had some condition that forced it to use defaults and, as a result, estimates may not be as accurate.

> **Service Units**
> > Estimated processor cost for this SQL statement in units of 100. For example, a displayed value of 21 means approximately 2100 service units (the value is truncated).

Historical data for query
> This area of the panel shows the actual historical values saved from

previous runs of the named object. The object name and associated statistics will be displayed only if they are available. Because object history is tracked by QMF object name, queries run with no associated object name will not be able to access historical statistics. Given the case where the object has been tracked, the information shown is the minimum, maximum, and average counts for both rows fetched and CPU utilization (the CPU time shown is in HH:MM:SS:HS format).

Query will be canceled by Query Analyzer
If the exit routine has determined that the query should be canceled, then this message will appear at the bottom of the panel.

Enter Y or press PF3 to cancel this query
If you specify Y and press **Enter** or press **PF3**, this query will not run and you will return to the previous QMF panel. If you leave this field blank and press **Enter**, this query will run.

Enter maximum number of rows to fetch (0=bypass)
This value determines the number of rows that QMF will fetch before the query is canceled. A value of 0 (zero) directs Query Analyzer to bypass this row limit checking. The value entered here will not override the row limit enforced by Governor.

Sample analysis help panel

The QMF Query Information Help panel (RAAQMFQB) is described in this section. All of the raw access path data available from Query Analyzer is shown on this panel. This panel is accessed from the QMF Query Information help facility.

Table 95. QMF Query Information Help

```
DB2P — QMF Query Information Help - Access Path Details ------------- 8.1.0
Command ===>
Press ENTER for a description of these values.


Number of Query Blocks.................................... :
Number of Tables Referenced............................... :
Access Types.............................................. :
Number of Index Only Scans⁄Matching Index Scans........... :
Join Methods.............................................. :
Join Types................................................ :
Prefetch Types............................................ :
Number of Page Range Screens.............................. :
DB2 Sorting............................................... :
Parallelism Modes⁄Highest Access Degree................... :
Column Functions Evaluation Types......................... :
```

The fields on the panel are:

Number of Query Blocks
> The highest number found in the QBLOCKNO column of the plan
> table. It represents the number of queries in the SQL statement.

Number of Tables Referenced
> The total number of table names occurrences found in the plan table.
> An occurrence of a table name is a non-blank value in the TNAME
> column of the plan table. This column can contain a name of a table,
> view, table expression or temporary table. Duplicates will be counted
> as separate references. For a list of table names found in the plan
> table, see Table Creator⁄Name on page 189.

Access Types
> The different methods of accessing the tables found in the plan table.
> The values listed here are from the ACCESSTYPE column of the plan
> table. Duplicates are not shown.

Number of Index Only Scans⁄Matching Index Scans
> A total number of occurrences of the value Y (Yes) in the INDEXONLY
> column of the plan table. This represents the number of steps within
> the plan that can be satisfied with an index read only (no data access
> necessary). If the Number of Query Blocks, described above, equals

this number, then all queries in the statement are satisfied using an index only. The **Number of Matching Index Scans** represent the number of occurrences of the MATCHCOLS column where the value is greater than zero. It is not the actual number of columns matching on the index, but rather the number of times the index keys are used in an index scan.

Join Methods
A list of the different types of join methods found in the plan table. The values listed come from the METHOD column of the plan table. Duplicates are not included.

Join Types
A list of the different types of joins found in the plan table. The values listed come from the JOIN_TYPE column of the plan table. Only outer joins are listed (inner joins are blank) and a Left Outer join (L) is equivalent to a Right Outer join. Duplicates are NOT included.

Prefetch Types
A list of the different types of prefetch, if any, found in the plan table. If prefetching is possible, it will be a sequential (S) prefetch or a list (L) prefetch as listed in the PREFETCH column of the plan table. Duplicates are NOT included.

Number of Page Range Screens
The total number of occurrences of tables that qualify for page range screening. For every value equal to Y (Yes) in the column PAGE_RANGE of the plan table, this number is incremented by one. The total Number of Page Range Screens found and the **Number of Tables Referenced**, described above, can be used to determine percentages of page range screening per table access within the query.

DB2 Sorting
This value indicates whether any DB2 sorting was found in the plan table. A value of Y (Yes) for any of the SORTN_ or SORTC_ columns would trigger a Y indicator for this field.

Parallelism Modes/Highest Access Degree
Parallelism modes list the types of parallelism available at bind time. If a value of I or C (I/O or CPU parallelism) is found for any step in the plan in column PARALLELISM_MODE, then the highest access degree field can be non-zero. The highest access degree represents the greatest number of parallel tasks available for any step in the plan table activated by the query. This is the highest value found in the ACCESS_DEGREE column of the plan table and does not include the JOIN_DEGREE value.

Column Functions Evaluation Types
A list of the different types of column function evaluations, if any,

found in the plan table. The values can be an S (function evaluated while performing a sort to satisfy a GROUP BY clause) or R (column function evaluated while data is being read). If NONE is listed, then function may be evaluated after data retrieval and any sorts, or if ACCESSTYPE = I1 and MIN or MAX function is present, at index access time. Duplicates are not included.

Restrictions

Query Analyzer restrictions are listed below.

- Only SELECT queries are currently handled. Other types of queries, such as INSERT, UPDATE, and DELETE are ignored.
- A maximum of 10 tables (creator and name) will be passed to the sample exit routine.
- Queries cannot be analyzed from QMF running under CICS.
- Queries cannot be analyzed from QMF running in batch.

Chapter 9. User Profile Facility

Every QMF user is required to have a user profile to start a QMF session. A user profile contains values that define attribute settings. Examples of user profile attributes are report dimensions, such as page length and page width.

A QMF user profile is uniquely identified by the combination of creator, translation, and environment.

Creator
> The Creator is usually a user's TSO logon ID, such as TSOU01.

Translation
> The Translation value corresponds to the different language environments supported by QMF:

Table 96. Language environments supported by QMF

CESTINA	DANSK	DEUTSCH	DEUTSCH (SCHWEIZ)
ENGLISH	ESPANOL	FRANCAIS	FRANCAISE (BELGIQUE)
FRANCAIS (CANADIEN)	FRANCAIS (SUISSE)	GREEK	HANGEUL
ITALIANO	ITALIANO (VIZZERA)	MAGYAR	POLSKI
PORTUGAL (PORTUGESE)	PORTUGUES	RUSSIAN	SVENSKA
T-CHINESE	UPPERCASE		

Environment
> The Environment can be TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or null. The User Profile Facility allows you to specify null for this field with a single dash (-).

Where a user profile is stored

User profiles are stored in your site's QMF user profile table, Q.PROFILES. For a detailed discussion of this table, see *Managing QMF for MVS*.

Open and restricted enrollment

Every QMF user needs a user profile. Under restricted QMF enrollment, if a user profile with a matching creator does not exist, then the user cannot start a QMF session. With open QMF enrollment, if a user profile with a matching creator does not exist, then QMF will look for a user profile with a creator equal to SYSTEM. A session can begin only if a profile is found. With open enrollment in effect, every user has access to the SYSTEM profile, giving every user potential access to QMF.

It is possible for a site to have open and restricted enrollment. The hierarchy of searches is:
- Search for a restricted user profile row (matching creator)
- Search for the open user profile row (creator = SYSTEM)

Environment and creator are used to identify a profile entry.

The User Profile Facility makes it easy for you to support full restricted enrollment. This will ultimately help you achieve better control over your QMF environment.

Displaying the User Profile panel

You perform all user profile maintenance from the User Profile panel, which you can access by selecting option 5 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM U'
```

Table 97. User Profile

```
DB2P / DB2PLOCATION -- User Profile -------------------------------- 8.1.0
Command ===>

Action................... ===>

Creator.................. ===>
Translation.............. ===>
Environment.............. ===>

Clean Up Objects? (Y/N)... ===>
Drop Confirmation? (Y/N).. ===>


--------------------------------------------------------------------------
Valid Actions Are...
A  Assign
B  Browse
C  Create
D  Drop
E  Edit
G  Invoke Governor
L  Display Selection List
--------------------------------------------------------------------------
```

If you press **Enter**, all input fields will be processed. If any errors are detected during input validation, the panel will be redisplayed with an error message.

If you press **PF3**, all input fields will be ignored and you will return to the previous menu.

Building a selection list of user profiles

To build a selection list of user profile entries from the User Profile panel, you must enter the following fields:

Action
> Enter L (for list).

Creator
> Enter the creator field for the user profile. You can use % and _ as wildcard characters in the creator to select multiple profile entries.

Translation
> Enter the translation field for the user profile. You can use % and _ as wildcard characters in the translation to select multiple profile entries. If you leave this field blank or enter *, the system default will be used.

Environment

Enter the environment field for the user profile, one of `TSO`, `CICS`, `CICSMVS`, `CICSVSE`, `CMS`, `WINDOWS`, or `-`. You can use % and _ as wildcard characters in the environment to select multiple profile entries.

Clean Up Objects?

Enter `Y` to automatically invoke Object Manager after a user profile is dropped. This allows you to clean up (drop, transfer, copy, or migrate) objects for the user that was just dropped. Enter `N` to disable this action.

Drop Confirmation?

Enter `Y` to request drop confirmations or `N` to suppress them. This value will be carried forward to all actions performed from the selection list.

User Profile Selection List panel

When you enter `L` (for list) on the User Profile panel, the User Profile Selection List panel is displayed. This panel contains a list of all user profile entries that match the input specifications entered on the User Profile panel.

Table 98. User Profile Selection List

```
DB2P / DB2PLOCATION -- User Profile Selection List -------------------- 8.1.0
Command ===>                                                  Scroll ===> PAGE

Valid Actions Are...
A  Assign                   B  Browse
C  Create Like              D  Drop
E  Edit                     G  Invoke Governor
----------------------------------------------------------------------------
Action          Creator   Translation      Environment  Resource Group
------          --------  ---------------   -----------  ----------------


***************************** BOTTOM OF DATA *****************************







```

If you press **Enter**, all rows that are selected with an action code will be processed. After all selected rows are processed, the panel will be redisplayed

with an informative message on each row (such as *CREATED or *NODROP). This message will appear in the space between the **Action** and `Creator` columns.

If you press **PF3**, all input fields will be ignored and you will return to the User Profile panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all selected rows have been processed.

Browsing a user profile

You can browse a user profile from a selection list or from the User Profile panel.

Browsing directly

To browse a user profile entry from the User Profile panel, you must enter the following fields:

Action
> Enter B (for browse).

Creator
> Enter the creator field for the user profile. No wildcard characters are allowed.

Translation
> Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default will be used.

Environment
> Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

Browsing from a selection list

To browse a user profile entry from the User Profile Selection List panel, you must enter the following field:

Action
> Enter B (for browse).

Browse User Profile panel

The Browse User Profile panel is a browse-only panel; you cannot change displayed attribute values from this panel.

Table 99. Browse User Profile

```
DB2P ⁄ DB2PLOCATION -- Browse User Profile -------------------------- 8.1.0
Command ===>

Creator... :            Translation... :            Environment... :
-----------------------------------------------------------------------------
Case...... : (   ) UPPER    Decimal.... : (   ) PERIOD
( ) STRING                  (   ) COMMA
( ) MIXED                   (   ) FRENCH

Confirm... : (   ) YES      Language... : (   ) SQL
( ) NO                      (   ) QBE
( ) PROMPTED

Model..... : (   ) REL      Trace...... : (   ) ALL
( ) ER                      (   ) NONE
                            (   ) Custom:
Number of Lines⁄Page.... :
Number of Chars⁄Line.... :
GDDM Printer Nickname... :
Table Space Name....... :
Resource Group......... :
PF Key Table........... :
Synonym Table.......... :
```

If you press **Enter** or **PF3**, you will return to the previous panel.

Creating a user profile

You can create a user profile from a selection list or from the User Profile panel.

Creating directly

To create a user profile entry from the User Profile panel, you must enter the following fields:

Action
> Enter C (for create).

Creator
> Enter the creator field for the user profile. No wildcard characters are allowed.

Translation
> Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default will be used.

Environment

Enter the environment field for the user profile, one of `TSO`, `CICS`, `CICSMVS`, `CICSVSE`, `CMS`, `WINDOWS`, or `-`. No wildcard characters are allowed.

Creating from a selection list

To create a user profile entry from the User Profile Selection List panel, you must enter the following field:

Action

Enter `C` (for create). This action will be treated as a Create Like... The attributes of the profile entry selected with the action of C will be used as default attribute values on the Create User Profile panel.

Create User Profile panel

If you are creating a user profile from the User Profile panel, this panel will contain default attribute values when it is first displayed. If you are creating a user profile from the User Profile Selection List panel, this panel will contain the attribute values from the user profile that was selected.

Table 100. Create User Profile

```
DB2P ⁄ DB2PLOCATION -- Create User Profile -------------------------- 8.1.0
Command ===>

Creator ===>          Translation ===>            Environment ===>
-----------------------------------------------------------------------------
Case... ===> (  ) UPPER     Decimal. ===> (  ) PERIOD
(   ) STRING                (   ) COMMA
(   ) MIXED                 (   ) FRENCH

Confirm ===> (  ) YES       Language ===> (  ) SQL
(   ) NO                    (   ) QBE
(   ) PROMPTED

Model.. ===> (  ) REL       Trace... ===> (  ) ALL
(   ) ER                    (   ) NONE
                            (   ) Custom:
Number of Lines⁄Page. ===>
Number of Chars⁄Line. ===>
GDDM Printer Nickname ===>
Table Space Name..... ===>
Resource Group....... ===>
PF Key Table......... ===>
Synonym Table........ ===>
```

If you press **Enter**, the attribute values will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the user profile will be created (an entry will be inserted into Q.PROFILES) and you will return to the previous panel.

If you press **PF3**, the attribute values will be ignored and the user profile will not be created. You will return to the previous panel.

The fields on the panel are:

Case This field can be: UPPER, STRING, or MIXED. Enter an X by the desired selection. Only one of these options can be selected.

Decimal
This field can be: PERIOD, COMMA, or FRENCH. Enter an X by the desired selection. Only one of these options can be selected.

Confirm
This field can be: YES or NO. Enter an X by the desired selection. Only one of these options can be selected.

Language
This field can be: SQL, QBE, or PROMPTED. Enter an X by the desired selection. Only one of these options can be selected.

Model This field can be: REL or ER. Enter an X by the desired selection. Only one of these options can be selected.

Trace This field can be: ALL, NONE, or a custom value. Enter an X by the desired selection. Only one of these options can be selected. If a custom trace value is desired, enter the trace value next to the prompt.

Length
Enter the maximum number of lines per report page. This field must be a positive number less than 1000.

Width Enter the maximum number of characters per report line. This field must be a number between 22 and 999 inclusive.

Space This field defines the table space used in SAVE DATA and IMPORT DATA commands. Enter the desired table space name here.

Printer
Enter the desired GDDM printer nickname.

Resource Group
Enter the name of the resource group to assign to this profile. If you leave this field blank, then QMF will use the user's TSO logon ID or primary authorization ID (depending on the value of the QMF startup parameter DSQSPRID).

PF-Key Table
Enter the name of the PF-key table to be used by this profile.

Synonym Table
Enter the name of the synonym table to be used by this profile.

Editing a user profile

You can edit a user profile from a selection list or from the User Profile panel.

Editing directly

To edit a user profile entry from the User Profile panel, you must enter the following fields:

Action
Enter E (for edit).

Creator
Enter the creator field for the user profile. No wildcard characters are allowed.

Translation
Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default will be used.

Environment
Enter on of the following environment fields for the user profile: TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

Editing from a selection list

To edit a user profile entry from the User Profile Selection List panel, you must enter the following field:

Action
Enter E (for edit).

Edit User Profile panel

You can change attribute values from the Edit User Profile panel. However, you cannot change the key values (creator, translation, and environment) from this panel.

Table 101. Edit User Profile

```
DB2P ∕ DB2PLOCATION -- Edit User Profile ---------------------------- 8.1.0
Command ===>

Creator... :           Translation... :              Environment... :
------------------------------------------------------------------------------
Case... ===> (  ) UPPER    Decimal. ===> (  ) PERIOD
(  ) STRING               (  ) COMMA
(  ) MIXED                (  ) FRENCH

Confirm ===> (  ) YES      Language ===> (  ) SQL
(  ) NO                   (  ) QBE
(  ) PROMPTED

Model.. ===> (  ) REL      Trace... ===> (  ) ALL
(  ) ER                   (  ) NONE
                          (  ) Custom:
Number of Lines∕Page. ===>
Number of Chars∕Line. ===>
GDDM Printer Nickname ===>
Table Space Name..... ===>
Resource Group....... ===>
PF Key Table......... ===>
Synonym Table........ ===>
```

If you press **Enter**, the attribute values will be validated. If any errors are detected during input validation, the panel will be redisplayed with an error message. Otherwise, the user profile will be updated and you will return to the previous panel.

If you press **PF3**, the attribute values will be ignored and the user profile will not be updated. You will return to the previous panel.

Dropping a user profile

You can drop a user profile from a selection list or from the User Profile panel. In addition, Object Manager can be automatically invoked after a User Profile is dropped. This facilitates the cleaning up of objects for users who are being removed from the system.

Dropping directly

To drop a user profile entry from the User Profile panel, you must enter the following fields:

Action

Enter D (for drop).

Creator

Enter the creator field for the user profile. No wildcard characters are allowed.

Translation

Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default will be used.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

Clean Up Objects?

Enter Y to automatically invoke Object Manager after a user profile is dropped. This allows you to clean up (drop, transfer, copy, or migrate) objects for the user that was just dropped. Enter N to disable this action.

Drop Confirmation?

Enter Y to request a drop confirmation panel or N to suppress one.

Dropping from a selection list

To drop a user profile entry from the User Profile Selection List panel, you must enter the following field:

Action

Enter D (for drop).

User Profile Drop Confirmation panel

The user profile being dropped displays on the User Profile Drop Confirmation panel, along with the number of database rows that will be deleted.

Table 102. User Profile Drop Confirmation

```
DB2P ╱ DB2PLOCATION -- User Profile Drop Confirmation ---------------- 8.1.0
Command ===>

Press ENTER to confirm this DROP request.
Type CAN or CANCEL or press PF3 to cancel this DROP request.

User....... :
Translation :
Environment :

Number of rows to be deleted from Q.PROFILES :




```

If you press **Enter**, the user profile identified on the panel will be dropped
from the database and you will return to the previous panel.

If you press **PF3**, the drop command will be ignored (the user profile will
remain in the database) and you will return to the previous panel.

Assigning a resource group to a user profile

You perform assignments of resource groups to user profiles from a selection
list. Once you choose the assignment action from the User Profile panel or
from the User Profile Selection List panel, you need to set up a resource group
selection list.

Assigning directly

To assign a resource group to a user profile entry from the User Profile panel,
you must enter the following fields:

Action
> Enter A (for assign).

Creator
> Enter the creator field for the user profile. No wildcard characters are
> allowed.

Translation

Enter the translation field for the user profile. No wildcard characters are allowed. If you leave this field blank or enter *, the system default will be used.

Environment

Enter the environment field for the user profile, one of TSO, CICS, CICSMVS, CICSVSE, CMS, WINDOWS, or -. No wildcard characters are allowed.

Assigning from a selection list

To assign a resource group to a user profile entry from the User Profile Selection List panel, you must enter the following field:

Action

Enter A (for assign).

User Profile Assignment panel 1 of 2

This is the first assignment panel:

Table 103. User Profile Assignment (1 of 2)

```
DB2P ⁄ DB2PLOCATION -- User Profile Assignment ---------------------- 8.1.0
Command ===>

Creator................ :
Translation............ :
Environment............ :

Is currently assigned to :


Resource Group....... ===>

----------------------------------------------------------------------------
Use this panel to build a selection-list of Resource Groups.
```

If you press **Enter**, a selection list of all qualifying resource groups will be built.

If you press **PF3**, the assignment will be bypassed and you will return to the previous panel.

Building the assignment selection list

Enter the following information on the User Profile Assignment panel 1:

Resource Group

> Enter the resource group to include in the list. You can use % and _ as wildcard characters in the resource group name to select multiple resource groups.

User Profile Assignment panel 2 of 2

Use this panel to process the assignments:

Table 104. User Profile Assignment (2 of 2)

```
DB2P ⁄ DB2PLOCATION -- User Profile Assignment ----------------------- 8.1.0
Command ===>                                                Scroll ===> PAGE

Valid Actions are...
A --Assign Resource Group to User Profile
U --Unassign Resource Group from User Profile

Creator.... :
Translation :
Environment :

Action            Resource Group   Description
------            ----------------  --------------------------------------

***************************** BOTTOM OF DATA *****************************




```

If you press **Enter**, the selected assignment will be processed, the database will be updated, and you will return to the previous panel (because a user profile can be assigned only to one resource group).

If you press **F3**, pending assignments will be bypassed and you will return to the previous panel.

Chapter 10. Error Log Facility

When QMF detects a system or resource error, it writes an entry to the Q.ERROR_LOG table. Errors are logged by user and message number and are date and time stamped. System programmers and troubleshooters refer to error log entries to resolve outstanding QMF problems. You can review and manipulate the error log using the Error Log Facility. The following actions are supported:

- Browsing a log entry
- Deleting a log entry
- Archiving a log entry

Error log entries are stored in Q.ERROR_LOG. For a detailed discussion of this table, see *Installing and Managing DB2 QMF for TSO/CICS.*

QMF continually inserts entries into the QMF error log table. Review this table for outstanding problems and remove resolved error log entries. If entries are not removed, this table will grow and it will tie up excessive DASD storage.

A well maintained error log table will ensure that you are not wasting critical system resources and that you are resolving outstanding errors.

Displaying the Error Log panel

You perform all error log maintenance from the Error Log panel, which you can access by selecting option 6 from the Manager Selection Menu. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM E'
```

Table 105. Error Log

```
DB2P / DB2PLOCATION -- Error Log ------------------------------------- 8.1.0
Command ===>

Action................... ===>

From Date................ ===>                    To Date...... ===>
From Time (HH:MM)........ ===>                    To Time...... ===>
User..................... ===>
Message Number........... ===>

Asc/Desc Option (A/D)..... ===>
Delete Confirmation? (Y/N) ===>

Error Log Archive DSN..... ===>


-------------------------------------------------------------------------------
Valid Actions Are...
A  Archive
B  Browse
D  Delete
L  Display Selection List
-------------------------------------------------------------------------------
```

If you press **Enter**, all input fields will be processed. If any errors are detected during input validation, the panel will be redisplayed with an error message.

If you press **PF3**, all input fields will be ignored and you will return to the previous panel.

Building a selection list of error log entries

To build a selection list of error log entries from the Error Log panel, you must enter the following fields:

Action
> Enter L (for list).

From Date
> Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or after this date will be selected.

To Date
> Enter a date (the date format depends on the version/release and

maintenance level of QMF). Errors logged on or before this date will be selected. If you leave this field blank, **From Date** will be used as the default.

From Time
>Enter a time in HH:MM format. Errors logged on **From Date** at or after this time will be selected. If you leave this field blank, `00:00` will be used as the default.

To Time
>Enter a time in HH:MM format. Errors logged on **To Date** at or before this time will be selected. If you leave this field blank, `24:00` will be used as the default.

User Enter the user for whom the error was logged. You can use % and _ as wildcard characters in the user to select entries from multiple users. If you leave this field blank, % will be used as the default.

Message Number
>Enter the message number for the logged error. You can use % and _ as wildcard characters in the message number to select entries with multiple error message numbers. If you leave this field blank, % will be used as the default.

Asc/Desc Option
>This flag determines the order of entries in the selection list. Enter `A` to list the entries in ascending (chronological) order. Enter `D` to list the entries in descending (reverse chronological) order.

Delete Confirmation?
>Enter `Y` to request delete confirmations or `N` to suppress them. This value will be carried forward to all actions performed from the selection list.

Archive Data Set
>Enter the name of a data set for archiving the error log entries. This data set must be catalogued and must have DSORG=PS and LRECL=131.

Error Log Selection List panel

When you enter `L` (for list) on the Error Log panel, the Error Log Selection List panel will be displayed. This panel contains a list of all error log entries that matched the input criteria entered on the Error Log panel.

Table 106. Error Log Selection List

```
DB2P ⁄ DB2PLOCATION -- Error Log ------------------------------------- 8.1.0
Command ===>

Action................... ===>

From Date................ ===>              To Date...... ===>
From Time (HH:MM)........ ===>              To Time...... ===>
User..................... ===>
Message Number........... ===>

Asc⁄Desc Option (A⁄D)..... ===>
Delete Confirmation? (Y⁄N) ===>

Error Log Archive DSN..... ===>


-----------------------------------------------------------------------
Valid Actions Are...
A   Archive
B   Browse
D   Delete
L   Display Selection List
-----------------------------------------------------------------------
```

If you press **Enter**, all rows that are selected with an action code will be processed. After all selected rows are processed, the panel will be redisplayed with an informative message on each row (such as *BROWSED or *NOARCH). This message will appear in the space between the **Action** and **Date** columns.

If you press **PF3**, all input fields will be ignored and you will return to the Error Log panel.

If you press **PF8** or **PF7**, the panel will scroll forward or backward after all selected rows have been processed.

Browsing an error log entry

You can browse an error log entry from a selection list or from the Error Log panel.

Browsing directly

To browse an error log entry from the Error Log panel, you must enter the following fields:

Action

       Enter B (for browse).

From Date
    Identify the date on which the entry was logged.

To Date
    This field is ignored when **Action** is B.

From Time
    Identify the time on which the entry was logged

To Time
    This field is ignored when **Action** is B.

User   Enter the user for whom the entry was logged.

Message Number
    Enter the QMF message number of the entry.

Browsing from a selection list

To browse an error log entry from the Error Log Selection List panel, you must enter the following field:

Action
    Enter B (for browse).

Browse Error Log Entry panel

The message text associated with the selected error log entry is displayed on the Browse Error Log Entry panel.

Table 107. Browse Error Log

```
DB2P ⁄ DB2PLOCATION -- Browse Error Log ------------------------------ 8.1.0
Command ===>                                                Scroll ===> PAGE

User:                    Date:
Msg :                    Time:

Message Text
-------------------------------------------------

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




***************************** BOTTOM OF DATA *******************************
```

If you press **PF3**, the browse session will end and you will return to the previous panel.

If you press **PF8** or **PF7**, the message text will scroll forward or backward.

Deleting an error log entry

You can delete an error log entry or multiple entries from a selection list or from the Error Log panel.

Deleting directly

To delete an error log entry from the Error Log panel, you must enter the following fields:

Action
Enter D (for delete).

From Date
Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or after this date will be deleted.

To Date
Enter a date (the date format depends on the version/release and maintenance level of QMF). Errors logged on or before this date will be deleted. If you leave this field blank, **From Date** will be used as the default.

From Time
Enter a time in HH:MM format. Errors logged on **From Date** at or after this time will be deleted. If you leave this field blank, 00:00 will be used as the default.

To Time
Enter a time in HH:MM format. Errors logged on **To Date** at or before this time will be deleted. If you leave this field blank, 24:00 will be used as the default.

User   Enter the user for whom the error was logged. You can use % and _ as wildcard characters in the user to delete entries from multiple users. If you leave this field blank, % will be used as the default.

Message Number
Enter the message number for the logged error. You can use % and _ as wildcard characters in the message number to delete entries with multiple error message numbers. If you leave this field blank, % will be used as the default.

Delete Confirmation?
Enter Y to request a delete confirmation panel or N to suppress one.

Deleting from a selection list

To delete an error log entry from the Error Log Selection List panel, you must enter the following field:

Action
> Enter D (for delete).

Error Log Delete Confirmation panel

The number of database rows that will be deleted as a result of this delete command is displayed on Error Log Delete Confirmation panel.

Table 108. Error Log Delete Confirmation

```
DB2P ╱ DB2PLOCATION -- Error Log Delete Confirmation ---------------- 8.1.0
Command ===>

Press ENTER to confirm this DELETE request.
Type CAN or CANCEL or press PF3 to cancel this DELETE request.


Number of error log entries to be deleted :
```

If you press **Enter**, the error log entry identified on the panel will be deleted from the database and you will return to the previous panel.

If you press **PF3**, the delete command will be ignored (the error log entry will remain in the database) and you will return to the previous panel.

Archiving an error log entry

You can archive an error log entry or multiple entries from a selection list or from the Error Log panel. The archive process will write the entire error log entry to the archive data set identified on the Error Log panel and then remove the error log entry from the QMF system table.

Archiving directly

To archive an error log entry from the Error Log panel, you must enter the following fields:

Action
> Enter A (for archive).

From Date

Enter a date (the format depends on the version/release and maintenance level of QMF). Errors logged on or after this date will be archived.

To Date

Enter a date (the format depends on the version/release and maintenance level of QMF). Errors logged on or before this date will be archived. If you leave this field blank, **From Date** will be used as the default.

From Time

Enter a time in H:MM format. Errors logged on **From Date** at or after this time will be archived. If you leave this field blank, `00:00` will be used as the default.

To Time

Enter a time in HH:MM format. Errors logged on **To Date** at or before this time will be archived. If you leave this field blank, `24:00` will be used as the default.

User Enter the user for whom the error was logged. You can use % and _ as wildcard characters in the user to archive entries from multiple users. If you leave this field blank, % will be used as the default.

Message Number

Enter the message number for the logged error. You can use % and _ as wildcard characters in the message number to archive entries with multiple error message numbers. If you leave this field blank, % will be used as the default.

Delete Confirmation?

Enter `Y` to request a delete confirmation panel or `N` to suppress one.

Archiving from a selection list

To archive an error log entry from the Error Log Selection List panel, you must enter the following field:

Action

Enter `A` (for archive).

Error Log Archive Confirmation panel

The number of database rows that will be printed (and deleted) as a result of this archive command is displayed on the Error Log Archive Confirmation panel.

Table 109. Error Log Archive Confirmation

```
DB2P ╱ DB2PLOCATION -- Error Log Archive Confirmation ---------------- 8.1.0
Command ===>

Press ENTER to confirm this ARCHIVE request.
Type CAN or CANCEL or press PF3 to cancel this ARCHIVE request.


Number of error log entries to be archived :
Rows will be written to this archive data set before they are deleted :
```

If you press **Enter**, the error log entry identified on the panel will be written to your archive data set and then deleted from the database. You will return to the previous panel.

If you press **PF3**, the archive command will be ignored and the error log entry will not be written to your archive data set and will remain in the database. You will return to the previous panel.

Chapter 11. Spill File Facility

QMF uses a spill file when there is no more room in virtual storage for the current data object. The spill file is a temporary storage area utilized by QMF when virtual storage is not large enough to hold the current data object.

The spill file allocation for each user should be large enough to hold all rows from the largest accessed table. If you do not allocate a spill file for a user or if you allocate a spill file that is too small, problems can occur. QMF can encounter an insufficient storage condition which can degrade response time.

The Spill File online facility helps to ensure the correct allocation for a user's spill file. By entering the name of a table and the type of device on which the spill file will reside, the allocation will be calculated automatically.

Displaying the Spill File panel

When you select option 7 from the Manager Selection Menu, the Spill File panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM S'
```

Table 110. Spill File

```
DB2P / DB2PLOCATION -- Spill File ----------------------------------- 8.1.0
Command ===>

To calculate the number of tracks to allocate for spill file, enter:

Name of Largest Table (Creator) ===>
                       (Name)... ===>

Device Type (3350, 3380, 3390) ===>


----------------------------------------------------------------------------
When you press ENTER, the spill file allocation will be computed.

Maximum number of tracks for spill file:
----------------------------------------------------------------------------




```

If you press **Enter**, the spill file track allocation will be calculated based on the specified input table name and the storage device type.

If you press **PF3**, you will return to the previous panel without performing any more calculations.

Calculating spill file allocation

Enter the following information on the Spill File panel:

Name of Largest Table (Creator)
Enter the creator of the largest table that will be accessed in a QMF session.

Name of Largest Table (Name)
Enter the name of the largest table that will be accessed in a QMF session.

Device Type
Enter the type of device on which the spill file will be stored. Valid values are 3350, 3380, or 3390.

Chapter 12. HPO Activity Log JCL

The HPO Activity Log is a repository for QMF session activity and object usage information. This chapter discusses the batch job used to process the log data sets.

The HPO Activity Log has the following three components:

- data sets
- tables
- batch job

As described in "Object Manager," the HPO⁄Governor module writes to the HPO Activity Log data sets. A batch job is run periodically to copy the HPO Activity Log data sets to the HPO Activity Log tables. This facility generates the JCL for this batch job. This JCL can be generated once and then added to your job scheduling system.

HPO Activity Log data sets

The HPO Activity Log data sets must be specified to (and optionally created by) the HPO Configuration Dialog. For more information about the requirements for these data sets, see "Step 12f. Set the HPO/Governor module configuration parameters."

The current HPO Activity Log data sets

The following data sets must be processed periodically (daily, nightly, etc.) by the HPO Activity Log batch job. After successful completion of the batch job, the current data sets are automatically reset.

TSO activity log
> Current QMF activity under TSO is recorded in this data set.

TSO SQL text log
> SQL text associated with current QMF activity under TSO is recorded in this data set.

CICS activity log
> Current QMF activity under CICS is recorded in this data set.

CICS SQL text log
> SQL text associated with current QMF activity under CICS is recorded in this data set.

The historical HPO Activity Log data sets

These data sets are updated by the HPO Activity Log batch job.

Sorted activity log
Current TSO and CICS session activity is sorted and written to this data set.

Archive activity log
The Sorted Activity log is appended to this data set for historical purposes.

Archive SQL text log
The current TSO and CICS SQL text data sets are appended to this data set for historical purposes.

HPO Activity Log tables

The HPO Activity Log tables must be created during the installation process. For a complete discussion of these tables, indexes, table spaces, and the HPO database, see "Step 1a. Create database, table spaces, tables, and indexes," and "HPO DB2 tables."

HPO Activity Log batch job

The log data sets must be processed periodically by the HPO Activity Log batch job. Because this facility needs exclusive access to the log data sets, you should schedule this job for a time when there is no QMF activity. You can use the HPO Activity Log JCL panel to generate JCL to run a batch job that performs the following functions:

- Sorts the current TSO and CICS activity log files into the sorted activity log file
- Updates Q.OBJ_ACTIVITY_SUMM and Q.OBJ_ACTIVITY_DTL from the sorted activity log file and the current TSO and CICS SQL text log files
- Appends the sorted activity log file to the historical archive activity log file
- Appends the SQL text log files to the historical archive SQL text log file
- Resets the TSO activity log file
- Resets the CICS activity log file
- Resets the sorted activity log file
- Resets the TSO SQL text log file
- Resets the CICS SQL text log file

HPO Activity Log JCL panel

You can access the HPO Activity Log JCL panel by selecting option 8 from the Manager Selection Menu, or by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RM L'
```

Table 111. HPO Activity Log JCL

```
DB2P / DB2PLOCATION -- HPO Activity Log JCL ------------------------- 8.1.0
Command ===>

Press ENTER to build JCL.
Type CAN or CANCEL or press PF3 to cancel this request.

1. Process TSO Activity Logs? (Y/N).............................. ===> Y
2. Process CICS Activity Logs? (Y/N)............................. ===> Y

3. Delete historical data when an object is erased? (Y/N)........ ===> Y
4. Delete historical data when an object is re-saved? (Y/N)...... ===> N
5. Process data at remote locations? (Y/N)...................... ===> Y

6. Job Cards...
     ===>
     ===>
     ===>
     ===>

7. Edit or Submit JCL?... ===>        (E=Edit, S=Submit)
```

If you press **Enter**, JCL will be generated. This JCL contains the steps to completely process the log data sets. If the **Edit or Submit JCL?** flag is set to E, an ISPF edit session will be invoked, allowing you to view and optionally modify the generated JCL. You must explicitly issue the TSO SUBMIT command to submit the JCL. If the **Edit or Submit JCL?** flag is set to S, the JCL will automatically be submitted without editing it.

If you press **PF3**, you return to the previous panel, bypassing JCL generation.

The fields on the panel are:

Process TSO Activity Logs? (Y/N)
> Enter a Y here to process the TSO activity logs as defined in your configuration file.

Process CICS Activity Logs? (Y/N)
> Enter a Y here to process the CICS activity logs as defined in your configuration file.

Delete historical data when an object is erased? (Y/N)?
> This flag is used as input to the batch job. If you enter Y, ERASE commands that have been logged will cause corresponding rows in the activity tables to be deleted. If you enter N, then no deletes are performed against the tables and you must remove rows for obsolete objects from the tables manually. The default value is Y.

Delete historical data when an object is re-saved? (Y/N)?
> This flag is used as input to the batch job. If you enter Y, SAVE and

IMPORT commands that have been logged will cause corresponding rows in the activity tables to be deleted, and the object will be re-saved as if it were new. If you enter N, then no deletes are performed against the tables and the new object activity is considered an extension of the old. The default value is N.

Process data at remote locations (Y/N)?
This flag is used as input to the batch job. If you enter Y, remote locations will be processed. If you enter N, then remote locations will not processed. The default value is Y. If specific locations need to be included or excluded from processing, set this flag to Y and use the optional INCLUDE or EXCLUDE DD statements .

Job Cards
Enter valid job cards for the job. At least one line must be entered. Any lines specified will be used exactly as entered in the generated JCL.

Edit or Submit JCL?
Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Understanding the generated JCL

The generated JCL is described in this section. This description assumes that all TSO and CICS log data sets are configured. If any data sets are omitted, the corresponding steps and DDs are automatically omitted from the generated JCL.

Step SORT1
This step sorts the TSO and CICS activity log files and merges them into the sorted activity log file.

Step Name	SORT1
Program	SORT
Input Data Sets (DD=SORTIN)	Current TSO and CICS activity log files
Input Data Set Disposition	OLD
Output Data Set (DD=SORTOUT)	Sorted activity log file
Output Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at job start.

Step LOAD2
This step updates the HPO Activity Log table, loading the information from the sorted activity log file and the SQL text log files into DB2.

Step Name	LOAD2

Program	RAAOMLD
Input Data Set (DD=RAALOG)	Sorted activity log file (SORTOUT from previous step)
Input Data Set (DD=RAALOG2)	Current TSO and CICS SQL text log files
Input Data Set (DD=INCLUDE) **Note:** This DD is not generated automatically.	Optional DD; read only if remote location parm = Y. Sysin listing for all desired included locations.
Input Data Set (DD=EXCLUDE) **Note:** This DD is not generated automatically.	Optional DD; read only if remote location parm = Y. Sysin listing for all desired excluded locations.
DB2 Tables Updated	Q.OBJ_ACTIVITY_SUMM and Q.OBJ_ACTIVITY_DTL
IF JOB TERMINATES NOW:	Restart at LOAD2 step.

Step ARCH3

This step appends the sorted activity log file to the activity archive log file.

Step Name	ARCH3
Program	IEBGENER
Input Data Set (DD=SYSUT1)	Sorted activity log file
Input Data Set Disposition	OLD
Output Data Set (DD=SYSUT2)	Archive activity log file
Output Data Set Disposition	MOD (data will be appended to the archive log file)
IF JOB TERMINATES NOW:	Restore the archive activity log file (SYSUT2 data set) to its state prior to executing this step then restart at the ARCH3 step.

Step ARCH4

This step appends the SQL text log files to the SQL text archive log file.

Step Name	ARCH4
Program	IEBGENER
Input Data Set (DD=SYSUT1)	Current TSO and CICS SQL text log files
Input Data Set Disposition	OLD
Output Data Set (DD=SYSUT2)	Archive SQL text log file
Output Data Set Disposition	MOD (data will be appended to the archive log file)
IF JOB TERMINATES NOW:	Restore the archive SQL text log file (SYSUT2 data set) to its state prior to executing this step then restart at ARCH4 step.

Step INIT5
This step reinitializes the TSO activity log file.

Step Name	INIT5
Program	RAAMT
Input Data Set (DD=SYSUT1)	Current TSO activity log file
Input Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at INIT5 step.

Step INIT6
This step reinitializes the CICS activity log file.

Step Name	INIT6
Program	RAAMT
Input Data Set (DD=SYSUT1)	Current CICS activity log file
Input Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at INIT6 step.

Step INIT7
This step reinitializes the sorted activity log file.

Step Name	INIT7
Program	RAAMT
Input Data Set (DD=SYSUT1)	Sorted activity log file
Input Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at INIT7 step.

Step INIT8
This step reinitializes the TSO SQL text log file.

Step Name	INIT8
Program	RAAMT
Input Data Set (DD=SYSUT1)	TSO SQL text log file
Input Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at INIT8 step.

Step INIT9
This step reinitializes the CICS SQL text log file.

Step Name	INIT8
Program	RAAMT
Input Data Set (DD=SYSUT1)	CICS SQL text log file
Input Data Set Disposition	OLD
IF JOB TERMINATES NOW:	Restart at INIT9 step.

Location Processing of HPO Activity Log Records

QMF activity at remote locations is recorded in the HPO Activity Log data sets. For example, suppose a QMF CONNECT command is followed by a RUN QUERY command. This RUN QUERY command will be tracked with an indicator that it was executed at the remote DB2 location (the target of the CONNECT statement). When processing the log records through the batch job, the **Process data at remote locations?** parameter determines whether or not the records should be processed at that remote location. An internal connection to the remote location is attempted and the DB2 activity log tables at that remote location will be updated as appropriate. The local DB2 activity log tables are not affected, regardless of the setting of the parameter, for this particular record.

Additional granularity is provided with two optional input DD cards. An INCLUDE DD * or EXCLUDE DD * card can be specified on the job step LOAD2 explicitly naming the locations to include or omit from processing. The **Process data at remote locations?** parameter must be set to Y; otherwise, the location DDs will be ignored. When it is set to Y, and neither DD is present, all remote locations will be processed.

Note: If the parameter is set to Y, and the INCLUDE DD * card is present, the local location must be defined in the list of locations in order to process the local DB2 records.

The following sample JCL will process all records for DB2A, as well as all remote activity at DB2B and DB2C (assume LOCATION_ DB2A is location name for subsystem DB2A, etc.) Any other location records found in the file will be bypassed.

```
//...
//LOAD2    EXEC PGM=RAAOMLD,PARM='DB2A,YYY'
//STEPLIB    DD DSN=QMFHPO.LOADLIB,DISP=SHR
//           DD DSN=DB2.LOADLIB,DISP=SHR
//LOADMSGS   DD SYSOUT=*
//RAALOG     DD DSN=SORTED.LOG,DISP=SHR
//RAALOG2    DD DSN=SQL.LOG,DISP=SHR
//INCLUDE    DD *
LOCATION_DB2A
```

```
LOCATION_DB2B
LOCATION_DB2C
⁄*
⁄⁄...
```

The following JCL will process all records for DB2A, as well as all remote
activity at any location except DB2B, which will be bypassed.

```
⁄⁄...
⁄⁄LOAD2    EXEC PGM=RAAOMLD,PARM='DB2A,YYY'
⁄⁄STEPLIB   DD DSN=QMFHPO.LOADLIB,DISP=SHR
⁄⁄          DD  DSN=DB2.LOADLIB,DISP=SHR
⁄⁄LOADMSGS  DD SYSOUT=*
⁄⁄RAALOG    DD DSN=SORTED.LOG,DISP=SHR
⁄⁄RAALOG2   DD DSN=SQL.LOG,DISP=SHR
⁄⁄EXCLUDE   DD *
LOCATION_DB2B
⁄*
⁄⁄...
```

Note: Had the **Process data at remote locations?** parameter for either
example above specified N for location processing (such as
PARM='DB2A,YYN') the INCLUDE and EXCLUDE DD cards would
have been ignored and only DB2A location records would have been
processed.

Cleanup of HPO Activity Log tables

As historical data is added to the HPO Activity Log tables, you must perform
maintenance on the tables, table spaces, and indexes. (The
Q.OBJ_ACTIVITY_DTL table grows substantially faster than the
Q.OBJ_ACTIVITY_SUMM table, so it requires careful maintenance.)

Make sure that RUNSTATS is run for the appropriate table spaces and
indexes; this helps to maintain efficient performance.

Chapter 13. QMF Startup Parameters

You can control the characteristics of a QMF session that you start by passing parameters to it. For example, there are parameters to identify the DB2 environment, the QMF plan, and other performance-related parameters. Tuning these parameters typically requires manual changes to CLISTs and EXECs. You can tune and customize these parameters by using the QMF Start-Up Parameters panel. You can specify values for the QMF start-up parameters, and you can start a QMF session using those parameters.

Displaying the QMF Start-Up Parameters panel

When you select option 9 from the Manager Selection Menu, the QMF Start-Up Parameters panel is displayed. You can also invoke this panel by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'RMQ'
```

Table 112. QMF Start-Up Parameters

```
DB2P / DB2PLOCATION -- QMF Start-Up Parameters ---------------------- 8.1.0
Command ===>

Long      Short
Form      Form
--------  -----
DSQSBSTG   B   ===>             Maximum storage for reports (Version 3 parm)
DSQSDBCS   K   ===>             DBCS support at a non-DBCS terminal
DSQSDBNM   D   ===>
                                Location for initial connection (Version 3 parm)
DSQSDBUG   T   ===>             Trace options
DSQSIROW   F   ===>             Maximum number of fetched rows
DSQSMODE   M   ===>             Mode of operation
DSQSPILL   L   ===>             Use the spill file (Version 3 parm)
DSQSPLAN   P   ===>             Name of QMF application plan
DSQSPRID   U   ===>             Profile key (Version 3 parm)
DSQSRSTG   R   ===>             Amount of reserved storage
DSQSRUN    I   ===>

                                 Name of called procedure


--------------------------------------------------------------------------
Start a QMF session using these parameters? (Y/N) ===>
```

If you press **Enter**, the current parameters will be saved in your ISPF profile. If you set the **Start a QMF session using these parameters?** flag to Y, then a QMF session will be started using these parameters.

If you press **PF3**, you will return to the previous panel without saving the current parameters.

To use the default value for a parameter, leave the field for that parameter blank.

The fields on the panel are:

DSQSBSTG (B-Parm)
Enter the amount of storage to reserve for the data object (in bytes).

DSQSDBCS (K-Parm)
Enter a Y if you are printing DBCS data from or on a non-DBCS device.

DSQSDBNM (D-Parm)
Enter the location that should be used for the initial connection.

DSQSDBUG (T-Parm)
Enter any desired trace options.

DSQSIROW (F-Parm)
Enter the maximum number of rows to be fetched before the first screen of report data is displayed.

DSQSPILL (L-Parm)
Specify whether the spill file can be used for this QMF session.

DSQSMODE (M-Parm)
Specify batch mode or interactive mode.

DSQSPLAN (P-Parm)
Enter the name of the QMF application plan.

DSQSPRID (U-Parm)
Enter the profile key setting to be used when validating the QMF profile. The two valid values are TSOID or PRIMEID.

DSQSRSTG (R-Parm)
Enter the amount of storage to reserve for this QMF session (in bytes).

DSQSRUN (I-Parm)
Enter the procedure that should be invoked when the QMF session is started.

Start a QMF session using these parameters?
If this flag is set to Y when you press **Enter**, then a QMF session will be started using these options. If this flag is set to N, then a a session will not be started; however, you will remain on the panel until you press **PF3**.

Chapter 14. Installation

These instructions describe the installation of QMF HPO components. If you are installing HPO⁄Compiler *and* HPO⁄Manager, follow all installation steps. If you are installing HPO⁄Compiler *or* HPO⁄Manager, you can skip the steps that do not pertain to the feature you are installing.

Planning for installation

Three sets of requirements should be verified before beginning installation:
- Program product requirements
- DASD requirements
- DB2 privileges

Program product requirements

Here are program product requirements of QMF HPO:

Program product	Minimum version and release level
QMF	Version 8 Release 1
DB2	Version 6 Release 1
OS/390	Version 2 Release 6
z/OS	Version 1 Release 1
CICS	Version 4 Release 1

Required DB2 privileges

You must be authorized with the following DB2 privileges to perform the installation:

Object Type	Object	Privileges
System	System	CREATEDBA or CREATEDBC, BINDADD
Collection	RAACOLL	CREATE IN
Database	RAADB	CREATETS, CREATETAB
Object Type	**Object**	**Privileges**
Tables	Q.ERROR_LOG	DELETE, INSERT, SELECT, UPDATE
	Q.OBJECT_DATA	DELETE, INSERT, SELECT, UPDATE
	Q.OBJECT_REMARKS	DELETE, INSERT, SELECT, UPDATE
	Q.OBJECT_DIRECTORY	DELETE, INSERT, SELECT, UPDATE

	Q.PROFILES	DELETE, INSERT, SELECT, UPDATE
	Q.RESOURCE_TABLE	DELETE, INSERT, SELECT, UPDATE
	Q.OBJ_ACTIVITY_SUMM	ALL
	Q.OBJ_ACTIVITY_DTL	ALL
	Q.REPORTS	ALL
	Q.REPORT_VARIABLES	ALL
	SYSIBM.SYSCOLUMNS	SELECT
	SYSIBM.SYSDATABASE	SELECT
	SYSIBM.SYSINDEXES	SELECT
	SYSIBM.SYSKEYS	SELECT
	SYSIBM.SYSTABLES	SELECT
	SYSIBM.SYSTABLESPACE	SELECT
	SYSIBM.SYSVIEWS	SELECT
	SYSIBM.SYSVIEWDEP	SELECT
	SYSIBM.SYSSYNONYMS	SELECT

Installing HPO

Before you install HPO, make sure that the product requirements specified in the appropriate DB2 program directory have been met. After you verify these requirements, you can begin the installation process.

Step 1a. Create database, table spaces, tables, and indexes

Skip this step if these DB2 objects already exist.

DB2 documentation and your site's DB2 administration staff are the authoritative sources for information on how to create databases, table spaces, tables, and indexes. All supplied DDL is generic and should be reviewed and modified to meet your site's standards for DB2 object placement and creation.

Do not change any table names, including the owner.

Run the RAADDLO (RAADDLOX for long names) member in QMFHPO.SRAASAMP to create the following objects:

- **Database**
  RAADB
- **Table spaces**
  RAADB.RAATS1, RAADB.RAATS2, RAADB.RAATS3, and RAADB.RAATS4
- **Tables**

Q.OBJ_ACTIVITY_SUMM, Q.OBJ_ACTIVIY_DTL, Q.REPORTS, and
Q.REPORT_VARIABLES

- **Indexes**

  Q.RAAIX1, Q.RAAIX2, Q.RAAIX3, and Q.RAAIX4

Step 1b. Alter HPO Activity Log table

Skip this step if you are **not** using Manager.

Skip this step if you executed "Step 1a. Create database, table spaces, tables,
and indexes."

Follow the instructions below to determine which DDL member in
QMFHPO.SRAASAMP needs to be run.

RAADDL2A

This member contains ALTER statements that add the following
columns to the Q.OBJ_ACTIVITY_SUMM table:

- LMDATE
- LMTIME
- LMTSOID
- LMSQLID
- LMACTN
- LMENVIRO
- LMMODE

Skip this SQL if these columns exist.

RAADDL3A

This member contains SQL that changes multiple objects:

- It contains an ALTER statement to add the IXTIME column to the
  Q.OBJ_ACTIVITY_DTL table.
- It drops the index on this table and creates the index to include the
  IXTIME column.
- The FACTN, LACTN, and LMACTN columns in
  Q.OBJ_ACTIVITY_SUMM are redefined with FOR BIT DATA by
  updating their column definitions in SYSIBM.SYSCOLUMNS.

Skip this SQL if the IXTIME column exists and if the FACTN, LACTN,
and LMACTN columns are defined with FOR BIT DATA.

RAADDL4A

This member contains ALTER statements that add the following
columns to the Q.REPORTS table:

- DATAOUT_LRECL

- DATAIN_LRECL
- REPORT_LRECL
- NUM_REPORT_FILES

Skip this SQL if these columns exist.

Step 1c. Alter End User Facility registration table

Skip this step if you are **not** using Compiler.

Skip this step if you executed "Step 1a. Create database, table spaces, tables, and indexes."

Follow the instructions below to determine if the listed DDL member in QMFHPO.SRAASAMP needs to be run.

RAADDL4A

This member contains ALTER statements that add the following columns to the Q.REPORTS table:

- DATAOUT_LRECL
- DATAIN_LRECL
- REPORT_LRECL
- NUM_REPORT_FILES

Skip this SQL if these columns already exist.

Step 2a. Create Compiler command synonyms

Skip this step if you are **not** using Compiler.

Skip this step if these QMF command synonyms exist.

Execute the following member in QMFHPO.SRAASAMP:

RAADML1

This member creates two QMF command synonyms:

- RCO, which invokes Program Generator
- LIST REPORTS, which invokes the End User Facility

Before executing this member, update the command synonym text to reflect the name of QMFHPO.SRAALOAD at your site.

Step 2b. Create Manager command synonyms

Skip this step if you are **not** using Manager.

Skip this step if these QMF command synonyms exist.

Execute the following member in QMFHPO.SRAASAMP:

RAADML2

This member creates two QMF command synonyms:

- RLIMITS, which displays the governing schedule and the associated processing options and restrictions currently active in a QMF session
- RQA, which invokes selective query analysis

Step 3. Create Monitor VSAM file

Skip this step if you are **not** using Manager.

Skip this step if this VSAM file exists.

A VSAM file must be created and initialized for each DB2 subsystem before using Monitor. The member named RAAIDCMM in QMFHPO.SRAASAMP contains sample JCL to create this file. You must modify this member according to its instructions before you can run it.

The space allocation for this file will need to be adjusted based on the amount of QMF activity and the frequency with which the cleanup job is run. Use the following formulas to produce an initial estimate for the space allocation:

- If you will be tracking SQL text along with activity, allocate (5 * the number of QMF users * the number days between running the cleanup job) tracks for the DATA component.
- If you will not be tracking SQL text along with activity, allocate (1 * the number of QMF users * the number days between running the cleanup job) tracks for the DATA component.

Tailoring for TSO

This section describes tailoring for TSO.

Step 4a. Allocating libraries

The HPO libraries must be allocated to use the products. There are several ways to perform these allocations, depending on how QMF and DB2 library allocations are currently performed at your site.

If QMF and DB2 libraries are allocated in a user's TSO logon procedure, review and select from allocation scenarios 1 and 2, below.

If QMF and DB2 libraries are allocated dynamically from within a CLIST or EXEC, review and select from the allocation scenarios 3 and 4, described below.

Only HPO library allocations with corresponding QMF and DB2 allocations are shown in these allocation scenarios. Any additional QMF and DB2 allocations should be left unchanged.

Note: You can add the QMFHPO.SRAALOAD library to the system linklist. However, you **cannot** add it to the LPA list.

Allocation scenario 1
If explicit library allocations for QMF and DB2 libraries currently exist in a user's TSO logon procedure, set the **Automatically LIBDEF and ALTLIB?** configuration parameter to N (see "Step 12c. Set data set names"). Also, add explicit HPO library allocations to the same logon procedure:

```
//ISPMLIB   DD    DSN=QMFHPO.SRAAISPM,DISP=SHR
//          DD    DSN=QMF.SDSQMLBE,DISP=SHR
//          DD    DSN=DSN.SDSNSPFM,DISP=SHR
//ISPLLIB   DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
//          DD    DSN=QMF.SDSQEXIT,DISP=SHR
//          DD    DSN=QMF.SDSQLOAD,DISP=SHR
//          DD    DSN=DSN.SDSNLOAD,DISP=SHR
//ISPPLIB   DD    DSN=QMFHPO.SRAAISPP,DISP=SHR
//          DD    DSN=QMF.SDSQPLBE,DISP=SHR
//          DD    DSN=DSN.SDSNSPFP,DISP=SHR
//SYSPROC   DD    DSN=QMFHPO.SRAACLST,DISP=SHR
//          DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//          DD    DSN=QMF.SDSQCLTE,DISP=SHR
//          DD    DSN=DSN.SDSNCLST,DISP=SHR
```

Note: If the QMF.SDSQLOAD library is allocated to ISPLLIB, then you cannot allocate the QMFHPO.SRAALOAD library to STEPLIB. QMFHPO.SRAALOAD must also be allocated to ISPLLIB, before QMF.SDSQLOAD (and QMF.SDSQEXIT).

Allocation scenario 2
If explicit library allocations for QMF and DB2 libraries currently exist in a user's TSO logon procedure, set the **Automatically LIBDEF and ALTLIB?** configuration parameter to Y (see "Step 12c. Set data set names"). In this case, there is no need to add explicit library allocations to the TSO logon procedure.

Allocation scenario 3
If QMF and DB2 libraries are currently allocated dynamically from within a CLIST or EXEC, set the **Automatically LIBDEF and ALTLIB?** configuration parameter to N (see "Step 12c. Set data set names"). Also, add dynamic allocations for the HPO libraries to the same CLIST or EXEC that dynamically allocates QMF and DB2:

```
ALTLIB ACTIVATE APPLICATION(CLIST) DATASET    +
                      ('QMFHPO.SRAACLST'   +
                       'QMFHPO.SRAAEXEC'   +
                       'QMF.SDSQCLTE'    +
                       'DSN.SDSNCLST')
```

```
ISPEXEC LIBDEF ISPMLIB DATASET ID            +
                       ('QMFHPO.SRAAISPM'    +
                        'QMF.SDSQMLBE'     +
                        'DSN.SDSNSPFM')
ISPEXEC LIBDEF ISPPLIB DATASET ID            +
                       ('QMFHPO.SRAAISPP'    +
                        'QMF.SDSQPLBE'     +
                        'DSN.SDSNSPFP')
ISPEXEC LIBDEF ISPLLIB DATASET ID            +
                       ('QMFHPO.SRAALOAD')
```

If the QMF and DB2 load libraries are allocated using the DSQLLIB DD and
the ISPF LIBDEF service, the QMFHPO.SRAALOAD library must be added to
the beginning of the allocation for the DSQLLIB DD:

```
ALLOC DD(DSQLLIB) DA('QMFHPO.SRAALOAD' +
                     'QMF.SDSQEXIT' +
                     'QMF.SDSQLOAD' +
                     'DSN.SDSNEXIT' +
                     'DSN.SDSNLOAD') SHR REUSE
ISPEXEC LIBDEF ISPLLIB LIBRARY ID(DSQLLIB)
```

Allocation scenario 4

If QMF and DB2 libraries are currently allocated dynamically from within a
CLIST or EXEC, set the **Automatically LIBDEF and ALTLIB?** configuration
parameter to Y (see "Step 12c. Set data set names"). Also, you must modify the
member named RAAALLOC in QMFHPO.SRAACLST to specify the names of
the QMF and DB2 libraries:

```
SET &QMFCLIST = &STR('QMF.SDSQCLTE')
SET &QMFMLIB = &STR('QMF.SDSQMLBE')
SET &QMFPLIB = &STR('QMF.SDSQPLBE')
SET &DB2CLIST = &STR('DSN.SDSNCLST')
SET &DB2MLIB = &STR('DSN.SDSNSPFM')
SET &DB2PLIB = &STR('DSN.SDSNSPFP')
```

If the QMF and DB2 load libraries are allocated using the DSQLLIB DD and
the ISPF LIBDEF service, you must also specify the names of those data sets
in the RAAALLOC CLIST:

```
SET &QMFEXIT = &STR('QMF.SDSQEXIT')
SET &QMFLOAD = &STR('QMF.SDSQLOAD')
SET &DB2LOAD = &STR('DSN.SDSNLOAD')
SET &DB2EXIT = &STR('DSN.SDSNEXIT')
```

The RAAALLOC CLIST will use these variables to perform the appropriate
LIBDEFs and ALTLIBs for all of the HPO, QMF, and DB2 libraries (overriding
any allocations made prior to invoking HPO). If the CLIST or EXEC, which
you were using to allocate QMF and DB2 libraries used a dynamic STEPLIB
facility to allocate the load libraries, you should manually add commands to
perform the same function in the RAAALLOC CLIST.

Step 4b. Special allocations for the HPO/Governor module

Skip this step if you are **not** using Manager.

The HPO/Governor module runs **under** QMF. As a result, allocations for HPO libraries are not necessarily in effect. For the proper functioning of this module, you must ensure that the following allocations are in place for users who will be governed, logged, monitored, or analyzed by the HPO/Governor module. There is no support for performing these allocations automatically.

```
//ISPLLIB   DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
//          DD    DSN=QMF.SDSQEXIT,DISP=SHR
//          DD    DSN=QMF.SDSQLOAD,DISP=SHR
//ISPPLIB   DD    DSN=QMFHPO.SRAAISPP,DISP=SHR
//SYSPROC   DD    DSN=QMFHPO.SRAACLST,DISP=SHR
//          DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//RAADEBUG  DD    SYSOUT=A,
//              DCB=(RECFM=FBA,LRECL=121,BLKSIZE=1210)
```

Conditions:

- QMFHPO.SRAALOAD must be allocated before the QMF load library.
- If the QMF load library is allocated to ISPLLIB, then you cannot allocate QMFHPO.SRAALOAD to STEPLIB.
- QMFHPO.SRAALOAD must also be allocated to ISPLLIB, before the QMF load library.

Step 4c. Special allocations for Compiler-generated programs

Skip this step if you are **not** using Compiler.

Users who will be running programs generated by Compiler must have the following libraries allocated. There is no support for performing these allocations automatically:

```
//ISPMLIB   DD    DSN=QMFHPO.SRAAISPM,DISP=SHR
//ISPPLIB   DD    DSN=QMFHPO.SRAAISPP,DISP=SHR
//SYSEXEC   DD    DSN=QMFHPO.SRAAEXEC,DISP=SHR
//ISPLLIB   DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
```

Step 5. Customize the HPO/Governor module help panel

Skip this step if you are **not** using Manager.

You can enable a help panel to be displayed if the HPO/Governor module cancels a command. This panel will be displayed if the end user presses **PF1** (or enters the HELP command) after a cancellation message appears.

Follow these steps to activate this panel:

1. Edit the member named RAAQMFH found in QMFHPO.SRAAISPP.

RAAQMFH, as provided, is a sample and can be modified for your site. The text in the panel body is customizable. For example, you can add text to this panel so that the end user can contact the help desk phone number when a QMF command is canceled.

2. Set the **Enable the HPO/Governor Module Help Panel?** configuration parameter to Y (see "Step 12f. Set HPO/Governor module configuration parameters").

Step 6. Customize compile CLIST

Skip this step if you are **not** using Compiler.

If your site is using VS COBOL II Release 1 or Release 2, modify the member named RAADSNH in QMFHPO.SRAACLST, by changing all occurrences of TRUNC(BIN) with NOTRUNC.

If this modification is omitted, VS COBOL II programs will not compile.

Step 7. Verify DSNH CLIST

Skip this step if you are **not** using Compiler.

Compiler invokes the DB2 CLIST named DSNH. Verify that DSNH is installed and working properly. See *DB2 Command and Utility Reference* for a discussion of DSNH.

If DSNH is not installed and working properly, online program preparation will not work.

Step 8. Customize pre- and post-generation CLISTs

Skip this step if you are **not** using Compiler.

Standard processing can be performed prior to generating source code by modifying the member named RAAPREG in QMFHPO.SRAACLST. Standard post-generation modifications can be made to generated source code by modifying the member named RAAPOSTG in QMFHPO.SRAACLST. For example, this CLIST can easily be used to apply an ISPF edit macro to the generated source code. (A sample edit macro CLIST named RAAPOSTM is also provided.)

The RAAPOSTG CLIST is invoked by Compiler after the program has been generated and before any of the post-generation action flags are processed.

You can add your own code to the supplied RAAPOSTG (and RAAPOSTM) CLIST. However, when new releases of Compiler are introduced, you will need to repeat these modifications.

Step 9a. Customize Compiler JCL skeletons

Skip this step if you are **not** using Compiler.

These members, found in QMFHPO.SRAASKEL, contain skeleton JCL:

- **RAACC**

  The CICS library names are assumed to follow the SDFH naming convention as adopted beginning with CICS 3.2. If you will be compiling programs for earlier versions of CICS, modify the following three lines in this member:

  ```
  ⏤ DSN=#AACICSPR#.SDFHLOAD
  ⏤ DSN=#AACICSPR#.SDFHLOAD
  ⏤ DSN=#AACICSPR#.SDFHCOB
  ```

  This skeleton JCL supports the compiling of OS/VS COBOL and VS COBOL II programs only. If you are using AD/Cycle COBOL/370 or COBOL for MVS, you must perform any customization necessary for those products.

- **RAACR**

  Add a JOBLIB card to this JCL to identify the library that contains your site's sort program. This is not necessary if the sort program exists in a linklist or LPA library.

  This skeleton JCL supports the compiling of OS/VS COBOL and VS COBOL II programs only. If you are using COBOL for MVS or COBOL for OS/390, you must perform any customization necessary for those products.

- **RAAENDUJ**

  Modify the default job cards found at the beginning of this member. These default cards will be used if a user does not specify the default job cards when running a program.

Step 9b. Customize Manager JCL skeletons

Skip this step if you are **not** using Manager.

This member, found in QMFHPO.SRAASKEL, contains skeleton JCL:

- **RAAOMLD**

  Add an appropriate JOBLIB card to this JCL to identify the library that contains your site's sort program. This is not necessary if the sort program exists in a linklist or LPA library.

Configuring HPO

Specify configuration values for each DB2 subsystem with which you use HPO.

Step 10. Preparing for configuration

The configuration parameters are set by executing the HPO Configuration Dialog.

If you have not previously configured QMF HPO Version 8 Release 1, the HPO Configuration Dialog will question whether QMFHPO.SRAAISPM, QMFHPO.SRAAISPP, QMFHPO.SRAACLST, QMFHPO.SRAAEXEC, and QMFHPO.SRAALOAD have been allocated to your session. If these libraries have been allocated, then respond Y to the prompt.

If these libraries have not been allocated, then respond N to the initial prompt and specify the library names to the subsequent prompts. The HPO Configuration Dialog will dynamically allocate QMFHPO.SRAAISPM, QMFHPO.SRAAISPP, and QMFHPO.SRAALOAD using the ISPF LIBDEF service. It will also allocate QMFHPO.SRAACLST and QMFHPO.SRAAEXEC using the TSO ALTLIB command.

Step 11. Invoke the HPO Configuration Dialog

You invoke the HPO Configuration Dialog by issuing the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CONFIG'
```

Table 113. HPO Configuration Dialog Selection Menu

```
HPO Configuration Dialog Selection Menu ----------------------------- 8.1.0
Option ===>

                                             DB2 SSID ===> DB2P

                                             User ID:
                                             Date:
                                             Time:
--------------------------------------------------------------------------

   1  Configure One DB2 Subsystem
   2  Bind Application Plans For One DB2 Subsystem
   3  Bind Packages At One Location
   X  Exit


--------------------------------------------------------------------------
5675-DB2 Copyright (C) 2003 IBM Corp. All Rights Reserved.
Copyright (C) 2003 Rocket Software, Inc. All Rights Reserved.
IBM is a registered trademark of International Business Machines Corporation.
Rocket is a registered trademark of Rocket Software, Inc.
--------------------------------------------------------------------------
```

Step 12. Configure one DB2 subsystem

Once you select option 1, the configuration process begins for the specified DB2 subsystem:

- If this subsystem has been configured, the current configuration parameters will be displayed.
- If this subsystem has not been configured, but another subsystem has, then the most recent configuration parameters specified will be displayed.
- If no subsystems have been configured, configuration defaults will be displayed.

If at any point the dialog is terminated prematurely (by pressing **PF3** or typing CAN or CANCEL), none of the parameters for this DB2 subsystem will be saved and you will return to the HPO Configuration Dialog Selection Menu.

Table 114. General Configuration Parameters

```
DB2P -- General Configuration Parameters ---------------------------- 8.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. DB2 Version And Release.. ===>

2. QMF Version And Release.. ===>
3. Default Translation...... ===>

4. Default Job Parameters...
      CLASS................. ===>
      MSGCLASS.............. ===>
      SYSOUT CLASS.......... ===>
      DEST.................. ===>
      Temporary Data Set Unit ===>
```

Step 12a. Set general configuration parameters

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

DB2 Version And Release
> Enter the version and release of this DB2 subsystem. Valid values are 6.1, 7.1, 7.2, or 8.1.

QMF Version And Release
> Enter the version and release of the QMF installation running under this subsystem. Valid values are 3.3, 6.1, 7.1, 7.2, or 8.1.

Default Translation
> Enter the default value to use for Translation for this QMF installation. Valid values are:

Table 115. Language environments supported by QMF

CESTINA	DANSK	DEUTSCH	DEUTSCH (SCHWEIZ)
ENGLISH	ESPANOL	FRANCAIS	FRANCAISE (BELGIQUE)
FRANCAIS (CANADIEN)	FRANCAIS (SUISSE)	GREEK	HANGEUL
ITALIANO	ITALIANO (VIZZERA)	MAGYAR	POLSKI
PORTUGAL (PORTUGESE)	PORTUGUES	RUSSIAN	SVENSKA
T-CHINESE	UPPERCASE		

Default CLASS

Enter the default value to be used by Program Generator and the End User Facility for the CLASS parameter when tailoring JCL to run report programs.

Default MSGCLASS

Enter the default value to be used by Program Generator and the End User Facility for the MSGCLASS parameter when tailoring JCL to run report programs.

Default SYSOUT CLASS

Enter the default value to be used by Program Generator and the End User Facility for the SYSOUT parameter on the REPORTnn DDs when tailoring JCL to run report programs.

Default DEST

Enter the default value to be used by Program Generator and the End User Facility for the DEST parameter on the REPORTnn DDs when tailoring JCL to run report programs. If you leave this field blank, no DEST will be specified.

Temporary Data Set Unit

Enter a work unit (such as SYSDA) to be used when creating temporary data sets.

Note: Do not enter a VIO unit.

Step 12b. Set plan names

Table 116. Plan Names

```
DB2P -- Plan Names -------------------------------------------------- 8.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.


1. QMF (Optional).................. ===>

Compiler...
2. Program Generator............... ===>
3. End User Facility for TSO........ ===>
4. End User Facility for CICS....... ===>

Manager...
5. Object Manager for Administrators ===>
6. Object Manager for Users......... ===>
7. Governor........................ ===>
8. HPO∕Governor Module.............. ===>
```

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

QMF Enter the name of the QMF application plan. If you leave this field blank, the system default will be used.

Program Generator
Enter the name of the Program Generator application plan.

End User Facility For TSO
Enter the name of the End User Facility for TSO application plan.

End User Facility For CICS
Enter the name of the End User Facility for CICS application plan.

Object Manager For Administrators
Enter the name of the Object Manager for Administrators application plan.

Object Manager For Users
Enter the name of the Object Manager for Users application plan.

Governor
Enter the name of the Governor application plan.

HPO/Governor Module

Enter the name of the HPO/Governor module application plan.

Step 12c. Set data set names

Table 117. Data Set Names

```
DB2P -- Data Set Names ----------------------------------------- 8.1.0
Command ===>


Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. Automatically LIBDEF and ALTLIB? (Y/N) ===>

2. Data Set Names...
     DBRM Library.... ===>
     Skeleton Library ===>
     Load Library.... ===>
     Message Library. ===>
     Panel Library... ===>
     CLIST Library... ===>
     EXEC Library.... ===>
     Source Library.. ===>
```

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

Automatically LIBDEF and ALTLIB?

Enter Y to automatically LIBDEF to the specified message, panel, and load libraries and ALTLIB to the specified CLIST and EXEC libraries on entry. Enter N if this function should not be performed. See "Step 4a. Allocating libraries" for more information.

Data Set Names

Enter the name of each of the listed libraries.

Step 12d. Set optional Program Generator data set names

Table 118. Program Generator Data Set Names

```
DB2P -- Program Generator Data Set Names ---------------------------- 8.1.0
Command ===>
Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

Default User Libraries (Optional)...
1. Query Library.... ===>
2. Form Library..... ===>
3. Procedure Library ===>
4. Source Library... ===>
5. DBRM Library..... ===>
6. Load Library..... ===>
```

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

Default User Libraries (Optional)
> Enter the default value to use for the listed Program Generator data sets. These values are used only when a user enters Program Generator for the first time. Do not enter the names of restricted system data sets because users must be able to write to these data sets. If any of these data sets do not exist, a subsequent panel will be displayed, allowing you to allocate them. If you leave any of these fields blank, the corresponding fields in Program Generator will be blank when a user enters Program Generator for the first time.

Step 12e. Set Program Generator parameters

These parameters are used by Program Generator when preparing generated programs. Any of the fields except for **Use Custom Compile?** may be left blank. However, if they are left blank, Program Generator will use the default names found in DSNH (the DB2 program preparation CLIST) when performing online compiles, and will not specify them when performing batch compiles.

Table 119. Program Generator Parameters

```
DB2P -- Program Generator Parameters -------------------------------- 8.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. Use Custom Compile? (Y/N) ===>

2. DB2 Data Sets (Optional)...
      Precompiler. ===>
      Load Library ===>
3. OS/VS COBOL Data Sets (Optional)...
      Compiler.... ===>
      Load Library ===>
4. VS COBOL II, COBOL for MVS, or COBOL  Data Sets (Optional)...
      Compiler.... ===>
      Load Library ===>
      CICS Library ===>
5. CICS Data Sets (Optional)...
      DSN Prefix.. ===>
6. GDDM Data Sets (Optional)...
      Load Library ===>
```

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

Use Custom Compile?
>
> Enter `Y` to have Program Generator bypass all panel displays associated with preparing a program, and it will invoke the RAADSNH CLIST to prepare a program.
>
> **Note:** RAADSNH must be customized to invoke a local prepare/compile facility.)
>
> Otherwise, enter `N` to use Program Generator's native facilities.

DB2 Precompiler
>
> Identify the DB2 precompiler (both data set and member). For example, `'DSN.SDSNLOAD(DSNHPC)'`.

DB2 Load Library
>
> Identify the DB2 load library (data set only). For example, `'DSN.SDSNLOAD'`.

OS/VS COBOL Compiler
>
> Identify the OS/VS COBOL compiler (both data set and member). For example, `'IKF.VSCOLIB(IKFCBL00)'`.

OS/VS COBOL Load Library

Identify the OS/VS COBOL load library (data set only). For example, `'IKF.VSCLLIB'`.

VS COBOL II, COBOL for MVS, or COBOL for OS/390 Compiler

Identify the VS COBOL II, COBOL for MVS, or COBOL for OS/390 compiler (both data set and member). For example, `'IGY.COB2COMP(IGYCRCTL)'`.

VS COBOL II, COBOL for MVS, or COBOL for OS/390 Load Library

Identify the VS COBOL II, COBOL for MVS, or COBOL for OS/390 load library (data set only). For example, `'IGY.COB2LIB'`.

VS COBOL II, COBOL for MVS, or COBOL for OS/390 CICS Library

Identify the VS COBOL II, COBOL for MVS, or COBOL for OS/390 CICS load library (data set only). For example, `'IGY.COB2CICS'`.

CICS DSN Prefix

Identify the prefix for the names of the CICS libraries. For example, `CICS`. This field is validated by checking for the existence of a CICS .LOADLIB library or .SDFHLOAD library.

GDDM Load Library

Identify the GDDM load library (data set only). For example, `'GDDM.SADMMOD'`.

Step 12f. Set the HPO/Governor module configuration parameters

These parameters are used in QMF by the HPO/Governor module for object tracking, monitoring, and customized help processing.

Table 120. HPO/Governor Module Configuration

```
DB2P -- HPO/Governor Module Configuration -------------------------- 8.1.0
Command ===>

Press ENTER to proceed to the next configuration panel.
Type CAN or CANCEL or press PF3 to cancel configuration.

1. HPO Activity Log Data Set Names...
      TSO Activity......... ===>
      TSO SQL Text......... ===>
      CICS Activity........ ===>
      CICS SQL Text........ ===>
      Sort/Merge........... ===>
      Activity Archive..... ===>
      SQL Text Archive..... ===>
2. Number of Additional TSO Activity and SQL Text Log Data Sets ===>
3. CICS Transient Data Queue Names...
      CICS Activity Log.... ===>
      CICS SQL Text Log.... ===>
4. VSAM File Names...
      Monitor.............. ===>
5. CPU Time Threshold for SQL Text Monitoring (in seconds).... ===>
6. Enable the HPO/Governor Module Help Panel? (Y/N)........... ===>
```

If you press **Enter**, the next panel will be displayed. If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the configuration parameters will not be saved.

The fields on the panel are:

TSO Activity
> Enter the name of the data set to which Object Manager should log all activity against QMF objects under TSO. If you leave this field blank, no logging will be performed. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=80. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

TSO SQL Text
> Enter the name of the data set to which Object Manager should log SQL text associated with the run of a QMF query under TSO. This logging is conditional, depending on the value of **CPU Time Threshold for SQL Text Monitoring** specified on this panel. If you leave this field blank, no logging will be performed. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=3600, and BLKSIZE=3604. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

CICS Activity
> Enter the name of the data set to which Object Manager should log all

activity against QMF objects under CICS. If you leave this field blank, no logging will be performed. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=80. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

> **Note:** CICS object tracking is activated by the specification of the CICS data set names in conjunction with:
> - the QMF HPO resource group assigned to the CICS user
> - the specification of a DB2 subsystem ID for the DB2 location within the assigned resource group (see "Resource group common controls.")

CICS SQL Text
Enter the name of the data set to which Object Manager should log SQL text associated with the run of a QMF query under CICS. This logging is unconditional. If you leave this field blank, no logging will be performed. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=3600, and BLKSIZE=3604. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

Sort/Merge
Enter the name of the data set to be used during the processing of the TSO and CICS activity log data sets. If a data set was specified for the TSO or CICS activity log, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=80. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

Activity Archive
Enter the name of the data set in which to archive object activity information from the TSO and CICS activity log data sets after processing them. If a data set was specified for either of the TSO or CICS activity logs, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=FB, LRECL=80. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

SQL Text Archive
Enter the name of the data set in which to archive SQL text information from the TSO and CICS SQL text log data sets after processing them. If a data set was specified for either of the TSO or CICS SQL text logs, this field must be specified. Otherwise, it is not used. If the data set exists, it must have DSORG=PS, RECFM=VB, LRECL=3600, and BLKSIZE=3604. If it does not exist, a subsequent panel will be displayed, allowing you to allocate it.

Number of Additional TSO Activity and SQL Text Log Data Sets
Enter the number of additional log data sets to be allocated. In

environments that support large numbers of simultaneous QMF users, adding additional log data sets can eliminate file contention by spreading the activity logging I/O across multiple files. Entering 0 results in no additional log data sets. A value of 5, for example, would allocate an additional 5 TSO activity and SQL log data sets. These data sets are created from the base file names you explicitly provide for the TSO activity and SQL text log data sets, and are processed automatically by HPO. A value greater than 0 should be considered on heavily utilized QMF systems.

Activity Log
Enter the DCT name that defines this DB2 subsystem's HPO Activity Log for CICS activity.

SQL Text Log
Enter the DCT name that defines this DB2 subsystem's HPO Activity Log for CICS SQL text.

Monitor File
If Monitor will be used, enter the name of the CLUSTER component of the VSAM data set that it uses. This data set must have been created using the procedures described in "Step 3. Create Monitor VSAM file." If Monitor will not be used, this field should be left blank.

CPU Time Threshold For SQL Text Monitoring
This field is ignored if the HPO Activity Log Data Set Name for TSO SQL Text is left blank. Enter a CPU time threshold value which will determine whether or not SQL text associated with the run of a query will be logged to the TSO SQL text activity log. If the amount of CPU time consumed by a query exceeds this value, its SQL text will be logged. Otherwise, it will not be logged. If you enter 0, all SQL text will be logged. Under CICS, SQL text is always logged.

Enable the HPO/Governor Module Help Panel?
Enter Y to activate the HPO/Governor module help panel whenever the HPO/Governor module cancels a QMF command.

Step 12g. Build the HPO configuration modules

After the configuration parameters have been specified, the dialog is ready to build the HPO configuration modules. The Select Action Mode panel is used to select the mode (foreground or batch) in which this action should be performed. If foreground is selected, the HPO configuration modules will be assembled and link-edited online while you wait. If batch is selected, JCL to perform the assemble and link-edit is generated and submitted.

Table 121. Select Action Mode

```
DB2P -- Select Action Mode ------------------------------------------ 8.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode................. ===>    (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
    ===>
    ===>
    ===>
    ===>

2. Write JCL To...
    Data Set.......... ===>
    Member............ ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

If you press **Enter** and Mode is set to F, the HPO configuration modules will
be assembled and link-edited online while you wait. After this action has
completed, you will return to the HPO Configuration Dialog Selection Menu.

If you press **Enter** and Mode is set to B, JCL to perform this action will be
generated and edited or submitted. After this action has completed, you will
return to the HPO Configuration Dialog Selection Menu.

If you press **PF3**, you will return to the HPO Configuration Dialog Selection
Menu and the configuration parameters will not be saved.

The fields on the panel are:

Mode Enter F to build the configuration modules online. Enter B to generate
JCL to build the configuration modules in batch.

Job Cards
Enter valid job cards for the job. At least one line must be entered.
Any lines specified will be used exactly as entered in the generated
JCL.

Data Set
Enter the data set to which the generated JCL should be written. The
data set must exist. If the name is enclosed in single quotes, it is taken
to be a fully qualified TSO data set name. Otherwise, your current

TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can also enter the name *TEMP to specify that a temporary data set should be created for the JCL.

Member
If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL should be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?
Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Step 13. Select application plans to bind

After the DB2 subsystem is configured, you need to bind the application plans. When you select option 2 from the HPO Configuration Dialog Selection Menu, the following panel is displayed:

Table 122. Bind Application Plan

```
DB2P -- Bind Application Plans -------------------------------------- 8.1.0
Command ===>

Select the plans to bind by entering Y or N next to each plan name.
Press ENTER to bind the selected plans.
Type CAN or CANCEL or press PF3 to cancel.

Owner........ ===>
Collection ID ===>
Additional End User Facility Collection ID(s)
===>


   Component                                  Plan Name  Bind Plan? (Y/N)
   ---------------------------------------- --------- ----------------
1. Compiler: Program Generator..............
2. Compiler: End User Facility for TSO.......
3. Compiler: End User Facility for CICS......
4. Manager: Object Manager for Administrators
5. Manager: Object Manager for Users.........
6. Manager: Governor.........................
7. Manager: HPO/Governor Module..............
```

If you press **Enter**, the next panel will be displayed.

If you press **PF3**, you will return to the Configuration Dialog Selection Menu and the plans will not be bound.

The fields on the panel are:

Owner

Enter the desired OWNER parameter for the BIND PLAN command. If you leave this field blank, the OWNER parameter will not be specified on the BIND.

Collection ID

Enter the collection ID to use in the PKLIST parameter of the BIND PLAN command. The packages must be bound into this collection ID at all locations that will be accessed remotely. This field must be left blank if DDF is not running in this subsystem.

Additional End User Facility Collection ID(s)

Enter additional user defined collection IDs to be included in the PKLIST parameter of the BIND PLAN command. Collection IDs should be separated by a comma.

Step 13a. Bind the plans

After the bind parameters have been specified, the dialog is ready to bind the application plans. The Select Action Mode panel is used to select the mode (foreground or batch) in which this action should be performed. If foreground is selected, the plans will be bound while you wait. If batch is selected, JCL to perform the bind is generated and submitted.

Table 123. Select Action Mode

```
DB2P -- Select Action Mode ------------------------------------------ 8.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode.................. ===>   (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
     ===>
     ===>
     ===>
     ===>

2. Write JCL To...
     Data Set........... ===>
     Member............. ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

If you press **Enter** and Mode is set to F, the plans will be bound online. The HPO Configuration Dialog invokes the CLIST named RAABIND (found in QMFHPO.SRAACLST) to perform the online bind. You can review RAABIND

to ensure that the BIND parameters are consistent with your site's standards. After this action has completed, you will return to the HPO Configuration Dialog Selection Menu.

If you press **Enter** and Mode is set to B, JCL to perform the bind in batch will be generated and edited or submitted. This JCL also invokes the CLIST named RAABIND. After this action has completed, you will return to the HPO Configuration Dialog Selection Menu.

If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the plans will not be bound.

The fields on the panel are:

Mode   Enter F to perform the bind online. Enter B to generate JCL to perform the bind in batch.

Job Cards
        Enter valid job cards for the job. At least one line must be entered. Any lines specified will be used exactly as entered in the generated JCL.

Data Set
        Enter the data set to which the generated JCL should be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can enter the name *TEMP to specify that a temporary data set should be created for the JCL.

Member
        If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL should be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?
        Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Step 14. Select packages to bind

After the DB2 subsystem is configured, you can bind the packages. Only the packages for the components you will be using should be bound. The packages should be bound at each location that will be accessed remotely. When you select option 3 from the HPO Configuration Dialog Selection Menu, the following panel is displayed:

Table 124. Bind Packages

```
DB2P -- Bind Packages ------------------------------------------------ 8.1.0
Command ===>

Select the packages to bind by entering Y or N next to each component name.
Press ENTER to bind the packages for the selected components.
Type CAN or CANCEL or press PF3 to cancel.

Owner........ ===>
Location..... ===>
Collection ID ===>

    Component                                        Bind Packages? (Y∕N)
    ---------------------------------------- --------------------
1. Compiler: Program Generator................ ===>
2. Manager:  Object Manager for Administrators ===>
3. Manager:  Object Manager for Users......... ===>
4. Manager:  Governor......................... ===>
5. Manager:  HPO∕Governor Module.............. ===>


NOTE: Your current authorization ID (or the specified BIND owner) must have
      authority to bind the selected packages, and to execute the SQL
      contained in those packages.
```

If you press **Enter**, the next panel will be displayed.

If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the packages will not be bound.

The fields on the panel are:

Owner
Enter the desired OWNER parameter for the BIND PACKAGE command. If you leave this field blank, the OWNER parameter will not be specified on the BIND.

Location
Enter the location at which to bind the packages. If you leave this field blank, the packages will be bound at the local DB2 location.

Collection ID
Enter the desired collection ID for the packages. Your current authorization ID (or the specified BIND OWNER) must have the authority to create a package in the specified collection. You should specify the same collection ID at all locations.

Step 14a. Bind the packages

After the bind parameters have been specified, the dialog is ready to bind the packages. The Select Action Mode panel is used to select the mode

(foreground or batch) in which this action should be performed. If foreground is selected, the packages will be bound while you wait. If batch is selected, JCL to perform the bind is generated and submitted.

Table 125. Select Action Mode

```
DB2P -- Select Action Mode ------------------------------------------ 8.1.0
Command ===>

Press ENTER to perform this action.
Type CAN or CANCEL or press PF3 to cancel this action.

Mode................. ===>   (F=Foreground, B=Batch)


If selecting batch, specify the following parameters:

1. Job Cards...
     ===>
     ===>
     ===>
     ===>

2. Write JCL To...
     Data Set........... ===>
     Member............. ===>

3. Edit or Submit JCL? ===>   (E=Edit, S=Submit)
```

If you press **Enter** and **Mode** is set to F, the packages will be bound online. The HPO Configuration Dialog invokes the CLIST named RAABINDP (found in QMFHPO.SRAACLST) to perform the online bind. You can review RAABINDP to ensure that the BIND parameters are consistent with your site's standards. After this action has completed, you will return to the HPO Configuration Dialog Selection Menu.

If you press **Enter** and **Mode** is set to B, JCL to perform the bind in batch will be generated and edited or submitted. This JCL also invokes the CLIST named RAABINDP. After this action has completed, you will return to the HPO Configuration Dialog Selection Menu.

If you press **PF3**, you will return to the HPO Configuration Dialog Selection Menu and the packages will not be bound.

The fields on the panel are:

Mode   Enter F to perform the bind online. Enter B to generate JCL to perform the bind in batch.

Job Cards

Enter valid job cards for the job. At least one line must be entered. Any lines specified will be used exactly as entered in the generated JCL.

Data Set

Enter the data set to which the generated JCL should be written. The data set must exist. If the name is enclosed in single quotes, it is taken to be a fully qualified TSO data set name. Otherwise, your current TSO profile prefix is used to qualify the name. If it is a PDS, do not specify a member name here; instead, use the **Member** field. You can also enter the name *TEMP to specify that a temporary data set should be created for the JCL.

Member

If the specified **Data Set** is a PDS, enter the name of the member to which the generated JCL should be written. If the **Data Set** is not a PDS or is *TEMP, this field must be left blank.

Edit or Submit JCL?

Enter E to edit the generated JCL or S to automatically submit it after it is generated.

Tailoring for CICS

If QMF is being used under CICS or if you intend to use Compiler to generate CICS programs, then you must tailor for CICS. Otherwise, you can skip the installation steps relating to CICS.

Note: CICS documentation and your site's CICS administration staff are the authoritative sources for information on how to set up CICS tables and startup JCL.

Step 15a. Define the PPT entries

Skip this step if these PPT entries exist.

There is a member named RAAPPT in QMFHPO.SRAASAMP that should be used to define the following HPO configuration modules to CICS:

RAAX This is the HPO main configuration module.

RAAXssid

This is the HPO configuration module for <ssid>, where <ssid> is the DB2 subsystem ID being used with this CICS region. One entry should be created for each desired subsystem.

RAAXPR

This is the HPO product registration module.

RAAXTB
> This is the HPO trial module.

Assemble and link-edit or dynamically define these PPT entries to CICS.

Note: If you are planning on using the HPO/Governor module for CICS, make sure that the PPT entries for DSQUEGV3 and DXEUEGM are defined to CICS according to the instructions in *Installing QMF on OS/390*.

Step 15b. Define the Compiler PPT entries

Skip this step if you are **not** using Compiler.

Skip this step if these PPT entries exist.

There is a member named RAAPPT1 in QMFHPO.SRAASAMP that should be used to define the following programs and maps to CICS:

RAAEUC
> This is the End User Facility main program.

RAAEUCH
> This is the End User Facility variable prompt program.

RAAEUM
> This is the mapset used by End User Facility for CICS.

RAAM330
> This is the mapset used by CICS programs generated by Program Generator.

Assemble and link-edit or dynamically define these PPT entries to CICS.

Step 16. Define the PCT entry

Skip this step if you are **not** using Compiler.

There is a member named RAAPCT in QMFHPO.SRAASAMP that should be used to define the End User Facility transaction to CICS. The supplied transaction ID is RAAE; however, it can be changed to meet site specific requirements.

Assemble and link-edit or dynamically define this PCT entry to CICS.

Step 17. Define the RCT entry

Skip this step if you are **not** using Compiler.

There is a member named RAARCT in QMFHPO.SRAASAMP that should be used to define the End User Facility transaction and DB2 plan to CICS. The supplied transaction ID is RAAE; however, it can be changed to meet site

specific requirements. The plan name specified in RAARCT is RAADBIO3. If
you changed this default plan name during the HPO Configuration Dialog
(see ″Step 12b. Set plan names″), modify RAARCT with this name.

Assemble and link-edit or dynamically define this RCT entry to CICS.

Note: The supplied example in the RAARCT member is basic. Refer to *DB2
Administration Guide* for more information about defining RCT entries.

Step 18. Define the HPO Activity Log data sets to CICS

Skip this step if you are **not** using Manager.

Use the following procedure to define the HPO Activity Log data sets to
CICS. This procedure must be followed once for each DB2 subsystem that you
will be accessing from QMF:

- Add DD statements to the CICS startup JCL for the HPO CICS activity log
  data set and the CICS SQL text log data set that you specified to the HPO
  Configuration Dialog (see ″Step 12f. Set HPO/Governor module
  configuration parameters″). You can use any DD names. You must allocate
  these data sets with a disposition of MOD.
- Specify the relationship between the DD names that you specified above
  and the DCT names that you specified to the HPO Configuration Dialog
  (see ″Step 12f. Set HPO/Governor module configuration parameters″).
  Modify the RAADCT and RAADCTSD members in QMFHPO.SRAASAMP,
  by specifying the DCT and DD names.
- Assemble and link-edit or dynamically define these DCT entries to CICS.

Step 19. Modify DFHRPL in the CICS startup JCL

Add QMFHPO.SRAALOAD to the CICS module load library concatenation
(DFHRPL):

```
//DFHRPL    DD    ...
//          DD    DSN=QMFHPO.SRAALOAD,DISP=SHR
//          DD    DSN=QMF.SDSQEXIT,DISP=SHR
//          DD    DSN=QMF.SDSQLOAD,DISP=SHR
```

Note: QMFHPO.SRAALOAD must be allocated before the QMF exit and load
libraries.

Completing Installation

There are several final steps that complete the installation process.

Step 20a. Grant EXECUTE authority on the plans

Different types of users require EXECUTE authority on different plans. This table lists the plans to which each type of user must be given access. (The plan names for the listed components are set during the HPO Configuration Dialog.)

Component	QMF Administrator	QMF Programmer	QMF End User
Compiler: Program Generator	‡	‡	
Compiler: End User Facility for TSO	‡	‡	‡
Compiler: End User Facility for CICS	‡	‡	‡
Manager: Object Manager for Administrators	‡		
Manager: Object Manager for Users	‡	‡	
Manager: Governor	‡		
Manager: HPO/Governor	‡	‡	‡

Step 20b. Grant EXECUTE authority on the packages

Skip this step if DDF is not running in this subsystem.

Certain QMF HPO functions can use the remote unit of work capability of DB2 to perform remote processing. These components are:
- Program Generator
- Object Manager
- Governor
- HPO/Governor module

For these functions to work correctly, users must be granted EXECUTE authority on the packages associated with those components at each desired remote location.

Follow this procedure to grant EXECUTE authority on the appropriate packages to a particular type of user:
1. Determine on which plans the type of user should be granted EXECUTE authority, as described in "Step 20a. Grant EXECUTE authority on the plans."
2. Use the tables below to determine which packages correspond to each plan. The packages associated with a given plan vary by the release of QMF.
3. Grant EXECUTE authority on those packages to users of that type (at the remote location).

Component	Packages for QMF 2.3
Compiler: Program Generator	RAAFORM2, RAALOC, RAAMENDU, RAAPQSP, RAAPQX, RAAPROF2
Compiler: End User Facility for TSO	n/a
Compiler: End User Facility for CICS	n/a
Manager: Object Manager for Administrators	RAADBIO, RAADB23, RAARMOM3, RAAOM1, RAALOC, RAAMR01B, RAAMR01T, RAAMR02B, RAAMR02T, RAAMR03B, RAAMR03T, RAAMR04B, RAAMR04T, RAAMR05B, RAAMR05T, RAAMR06B, RAAMR06T, RAAMR07B, RAAMR07T, RAAMR08B, RAAMR08T, RAAMR09B, RAAMR09T, RAAMR10B, RAAMR10T
Manager: Object Manager for Users	RAADBIO, RAADB23, RAARMOM3, RAALOC
Manager: Governor	RAADBIO, RAADB23, RAALOC
Manager: HPO/Governor module	RAAOBJT, RAALOC

Component	Packages for QMF 2.4
Compiler: Program Generator	RAAFORM2, RAALOC, RAAMENDU, RAAPQSP, RAAPQX, RAAPROF2
Compiler: End User Facility for TSO	n/a
Compiler: End User Facility for CICS	n/a
Manager: Object Manager for Administrators	RAADBIO, RAADB24, RAARMOM3, RAAOM1, RAALOC, RAAMR01B, RAAMR01T, RAAMR02B, RAAMR02T, RAAMR03B, RAAMR03T, RAAMR04B, RAAMR04T, RAAMR05B, RAAMR05T, RAAMR06B, RAAMR06T, RAAMR07B, RAAMR07T, RAAMR08B, RAAMR08T, RAAMR09B, RAAMR09T, RAAMR10B, RAAMR10T
Manager: Object Manager for Users	RAADBIO, RAADB24, RAARMOM3, RAALOC
Manager: Governor	RAADBIO, RAADB24, RAALOC
Manager: HPO/Governor module	RAAOBJT, RAALOC

Component	Packages for QMF 3.1
Compiler: Program Generator	RAAFORM2, RAALOC, RAAMENDU, RAAPQSP, RAAPQX, RAAPROF3
Compiler: End User Facility for TSO	n/a
Compiler: End User Facility for CICS	n/a
Manager: Object Manager for Administrators	RAADBIO, RAADB31, RAARMOM3, RAAOM1, RAALOC, RAAMR01B, RAAMR01T, RAAMR02B, RAAMR02T, RAAMR03B, RAAMR03T, RAAMR04B, RAAMR04T, RAAMR05B, RAAMR05T, RAAMR06B, RAAMR06T, RAAMR07B, RAAMR07T, RAAMR08B, RAAMR08T, RAAMR09B, RAAMR09T, RAAMR10B, RAAMR10T
Manager: Object Manager for Users	RAADBIO, RAADB31, RAARMOM3, RAALOC
Manager: Governor	RAADBIO, RAADB31, RAALOC
Manager: HPO/Governor module	RAAOBJT, RAALOC

Component	Packages for QMF 3.2 or higher
Compiler: Program Generator	RAAFORM2, RAALOC, RAAMENDU, RAAPQSP, RAAPQX, RAAPROF3
Compiler: End User Facility for TSO	n/a
Compiler: End User Facility for CICS	n/a
Manager: Object Manager for Administrators	RAADBIO, RAADB32, RAARMOM3, RAAOM1, RAALOC, RAAMR01B, RAAMR01T, RAAMR02B, RAAMR02T, RAAMR03B, RAAMR03T, RAAMR04B, RAAMR04T, RAAMR05B, RAAMR05T, RAAMR06B, RAAMR06T, RAAMR07B, RAAMR07T, RAAMR08B, RAAMR08T, RAAMR09B, RAAMR09T, RAAMR10B, RAAMR10T
Manager: Object Manager for Users	RAADBIO, RAADB32, RAARMOM3, RAALOC
Manager: Governor	RAADBIO, RAADB32, RAALOC
Manager: HPO/Governor module	RAAOBJT, RAALOC

Note: Package names, unlike plan names, are not customizable.

Step 21. Initialize HPO Activity Log table

Skip this step if you are **not** using Manager.

Follow the instructions below to determine which one of the listed DML members in QMFHPO.SRAASAMP need to be run.

RAADML2A

Run this SQL if you ran RAADDL2A in "Step 1b. Alter HPO Activity Log table." This SQL will initialize the new **last-modified** columns in Q.OBJ_ACTIVITY_SUMM.

RAADML2I

Run this SQL if you executed "Step 1a. Create database, table spaces, tables, and indexes," and if you are using QMF 3.1.1 or earlier. You need to make the following changes to this member before you run it:

1. Change 'SSID' to the ID of the DB2 subsystem in which you are installing.
2. Include the single quotes and the value within the quotes must be four characters long, for example, 'DB 2 '.

This SQL initializes Q.OBJ_ACTIVITY_SUMM with default values for all QMF objects.

RAADML3I

Run this SQL if you executed "Step 1a. Create database, table spaces, tables, and indexes," and if you are using QMF 3.2 or higher. You need to make the following changes to this member before you run it:

1. Change 'SSID' to the ID of the DB2 subsystem in which you are installing.
2. Include the single quotes and the value within the quotes must be four characters long, for example, 'DB2 '.

This SQL initializes Q.OBJ_ACTIVITY_SUMM with CREATED, LAST_USED, and MODIFIED values from Q.OBJECT_DIRECTORY.

Note: No initialization takes place for objects where any of these columns contain a null value. Because of this, you may want to replace null values in these columns with an initial timestamp value before running RAADML3I.

Step 22. Modify previously generated Compiler programs

Skip this step if you are **not** using Compiler.

Skip this step if you **have not** generated programs with a previous version or release of Compiler.

Skip this step if you generated programs with a previous version or release of Compiler and you **have not** enabled the DATETIME option.

Prior to this version/release, programs generated with the DATETIME option were unable to handle the year 2000 (and beyond) for the DATETIME date. Programs generated with the DATETIME option contain an 01 level variable named CURRNT-DATE in the source code. If the setting of this option is currently unknown for previously generated programs, a source search on CURRNT-DATE will point out the affected programs.

Important

Any new programs generated with this version/release (and all future versions/releases) will correctly handle the year 2000 (and beyond) for the DATETIME date.

To achieve full support of the year 2000 for the DATETIME date you can regenerate your programs using this version/release of Compiler. Alternately, you can modify existing source code according to the instructions below.

- **For Compiler generated CICS programs:**
  1. In the WORKING STORAGE section, find this 01 level for CURRNT-DATE.

     ```
     01  CURRNT-DATE.
         03  FILLER                 PIC X(2) VALUE '19'.
         03  CURRNT-DATE-DATA       PIC X(8).
     ```
  2. Modify this CURRNT-DATE variable definition as follows:

     ```
     01  CURRNT-DATE.
         03  CURRNT-DATE-CC         PIC X(2) VALUE '19'.
         03  CURRNT-DATE-DATA.
             05  CURRNT-DATE-YEAR   PIC X(2).
             05  FILLER             PIC X(1).
             05  CURRNT-DATE-MONTH  PIC X(2).
             05  FILLER             PIC X(1).
             05  CURRNT-DATE-DAY        PIC X(2).
     ```
  3. Find the 1901-INIT-DATE-AND-TIME paragraph in the PROCEDURE DIVISION.
  4. Locate the following code:

     ```
     EXEC CICS FORMATTIME
         ABSTIME(CURRNT-ABSTIME)
         YYMMDD(CURRNT-DATE-DATA)
         DATESEP('-')
         TIME(CURRNT-TIME)
         TIMESEP('.')
     END-EXEC.
     ```
  5. Add these lines following the above code:

```
        IF CURRNT-DATE-YEAR < '90'
            MOVE '20' TO CURRNT-DATE-CC.
```

- **For Compiler generated TSO and BATCH programs:**
    1. In the WORKING STORAGE section, find this 01 level for CURRNT-DATE.

       ```
       01  CURRNT-DATE                    PIC X(10).
       ```

    2. Modify this CURRNT-DATE variable definition to look as follows:

       ```
       01  CURRNT-DATE.
           03  CURRNT-DATE-CC             PIC X(2).
           03  CURRNT-DATE-YYMMDD         PIC X(8).
       ```

    3. Find the 1901-INIT-DATE-AND-TIME paragraph in the PROCEDURE DIVISION.

    4. Locate the following code:

       ```
       ACCEPT CURRNT-DATE-DATA FROM DATE.
       STRING '19'               DELIMITED BY SIZE
             CURRNT-DATE-YEAR  DELIMITED BY SIZE
             '-'               DELIMITED BY SIZE
             CURRNT-DATE-MONTH DELIMITED BY SIZE
             '-'               DELIMITED BY SIZE
             CURRNT-DATE-DAY   DELIMITED BY SIZE
          INTO CURRNT-DATE.
       ```

    5. Modify the above code as follows:

       ```
       ACCEPT CURRNT-DATE-DATA FROM DATE.
       IF CURRNT-DATE-YEAR < '90'
           MOVE '20' TO CURRNT-DATE-CC
       ELSE
           MOVE '19' TO CURRNT-DATE-CC.
       STRING CURRNT-DATE-YEAR  DELIMITED BY SIZE
             '-'               DELIMITED BY SIZE
             CURRNT-DATE-MONTH DELIMITED BY SIZE
             '-'               DELIMITED BY SIZE
             CURRNT-DATE-DAY   DELIMITED BY SIZE
          INTO CURRNT-DATE-YYMMDD.
       ```

Step 23. Query Analyzer VSAM files cleanup

Skip this step if you are **not** migrating from a previous version or release of Manager.

Skip this step if you are installing Manager for the first time.

Previous releases of Query Analyzer have required the use of VSAM data sets which held DB2 catalog snapshot information. These VSAM data sets are no longer used and should be deleted. If you have scheduled Query Analyzer Snapshot JCL running to update these files, this JCL should also be removed from your scheduler.

Chapter 15. Messages

This chapter contains descriptions for messages prefixed with RAA.

RAAC messages

Messages that begin with RAAC are issued from Program Generator and appear on the message line on ISPF panels.

RAAC002E **Please select one of the options listed below**

Explanation: Choose one of the selection options listed on this panel.

RAAC003E **DB2 subsystem ID cannot be left blank**

Explanation: You must enter a valid DB2 subsystem ID. This is the subsystem used to execute SQL, to start QMF, to obtain QMF profile information, and to compile and run programs.

RAAC004E **DB2 subsystem * not configured**

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAC005E **Unrecognized command**

Explanation: The command that you entered on the command line is not valid.

RAAC006E **Specify one of query, query and form, or procedure**

RAAC007E **Specify only one of query, query and form, or procedure**

Explanation: The input to the generation process must be either a query, a query and form combination, or a linear procedure. Specify only one of these input sources.

RAAC008E **Cannot specify form without query**

Explanation: A program cannot be generated from a form only. You must also specify a query.

RAAC009E *** flag must be "Y" (yes) or "N" (no)**

Explanation: The only acceptable values for the specified flag are yes or no.

RAAC010E *** data set name cannot be left blank**

Explanation: You must enter a data set name for the specified type of object (query, form, procedure, source code, or load module). It may or may not already contain the specified data.

RAAC011E **QMF requires RECFM = F and LRECL = 79**

Explanation: QMF requires that data sets into which queries and procedures are exported have RECFM = F and LRECL = 79.

RAAC012E **Member name not allowed for sequential data sets**

Explanation: You cannot specify a member name for the data set because it is a sequential data set.

RAAC013E Member name has invalid syntax

Explanation: The member name that you entered does not conform to PDS member naming rules.

RAAC014E QMF requires RECFM = V and LRECL between * and 7290

Explanation: QMF requires that data sets into which forms are exported have RECFM = V and LRECL between 161 and 7290.

RAAC015E Data set must have DSORG = PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAC016E Profile key must be "T" (TSOID) or "P" (PRIMEID)

Explanation: Your QMF profile can be keyed by either your TSO logon ID or by your primary DB2 authorization ID. Enter the desired value.

RAAC017E Translation must be a valid QMF translation value or "*"

Explanation: Enter a valid QMF translation value. Valid values are ENGLISH, UPPERCASE, FRANCAIS CANADIEN, SIMPLIFIED CHINESE, T-CHINESE, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ). If you enter *, the configuration default translation will be used.

RAAC018I Default values not saved; Cancel request honored

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAC019I Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAC020I Previous QMF command not issued; Cancel request honored

Explanation: The previous export command was bypassed due to your cancel command. The object that was to be exported is assumed to **not** exist in the specified data set.

RAAC021E Post-generation CLIST RAAPOSTG RC = *

Explanation: The post-generation CLIST named RAAPOSTG did not run successfully.

RAAC022I Starting QMF; Please wait...

Explanation: Program Generator is starting a QMF session to export objects.

RAAC023I Exporting object from QMF; Please wait...

Explanation: QMF is exporting the query, form, or procedure. After the export finishes, the specified data set and member will contain the object.

RAAC024E Previous export command failed; QMF error *

Explanation: The previous export command failed due to an error condition. Common reasons for this are that the QMF object does not exist or that there is a problem with the specified data set and member. See *QMF Messages and Codes* for more information on the specified error number. In addition, the DSQDEBUG file may contain more information.

RAAC025I Previous QMF export command was successful

Explanation: The previous export command was successful. The specified data set and member now contain the QMF object.

RAAC026E * does not exist due to export failure

Explanation: A previous export of the specified object failed (or was canceled). Consequently, you cannot process the report for that object.

RAAC027E * data set does not exist, has been migrated, or is empty

Explanation: The data set specified for the object cannot be found or is empty. Consequently, you cannot process the report for that object.

RAAC028E * member * does not exist in PDS

Explanation: The PDS member specified for the object cannot be found. Consequently, you cannot process the report for that object.

RAAC029I Parsing procedure; Please wait...

Explanation: Program Generator is parsing the procedure to build a list of the reports that it runs.

RAAC030E Member name cannot be left blank for PDS

Explanation: If you specify a partitioned data set, you must also specify a member name.

RAAC031E Missing argument

Explanation: You must specify a report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC032E Invalid argument

Explanation: You specified an invalid argument with this command. You must specify a report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC033E Too many arguments

Explanation: Too many arguments were specified with this command. You must specify exactly one report list row number or the word "PROC" as an argument to this command. For example, specify COMPILE 1 or COMPILE PROC.

RAAC034E Argument out of range

Explanation: The row number that you specified as an argument to this command is either less than 1 or greater than the number of rows in the report list.

RAAC035E Plan name cannot be left blank

Explanation: You must enter an 8 character (or less) name to be used as the plan name for the program.

RAAC036E Plan name has invalid syntax

Explanation: The plan name that you entered does not conform to plan naming rules.

RAAC037E Review flag must be "B" (browse), "E" (edit), or "N" (none)

Explanation: To browse the specified object, set this flag to B. To edit the object, set this flag to E. To do neither, set this flag to N.

RAAC038E Browse failed; Data set or member is empty

Explanation: The data set or member to be browsed contains no data.

RAAC039E Browse failed; Member * not found

Explanation: The member to be browsed does not exist.

RAAC040E Browse failed; Severe error

Explanation: The browse session failed due to a severe ISPF error.

RAAC041E Edit failed; Member or data set in use

Explanation: The data set or member is in use and therefore cannot be edited.

RAAC042E Edit failed; Member * not found

Explanation: The member to be edited does not exist.

RAAC043E Edit failed; Severe error

Explanation: The edit session failed due to a severe ISPF error.

RAAC044I No variables found in query or form.I

Explanation: Program Generator did not find any substitution variables in the query or the form, so there are none to edit. Normal processing will continue.

RAAC045I Variable values not saved; Cancel request honored

Explanation: Any variable value changes that you made were discarded.

RAAC046E Dialect must be ″1″ (OS/VS COBOL), ″2″ (VS COBOL II), ″3″ (COBOL for MVS), or ″4″ (COBOL for OS/390)

Explanation: You can generate OS/VS COBOL, VS COBOL II, COBOL for MVS, or COBOL for OS/390 programs. Choose the one desired for this generation.

RAAC047E Environment must be "B" (batch), "T" (TSO), "C" (CICS), or ″S″ (stored procedure)

Explanation: You can generate programs to run either in MVS batch, TSO, CICS, or as a stored procedure under DB2. Choose the one desired for this generation.

RAAC048E Attachment Facility must be ″T″ (TSO attachment facility), ″C″ (call attachment facility), or ″R″ (Recoverable Resource Manager Services attachment facility)

Explanation: If you set this flag to T, the generated program will connect to DB2 via the TSO attachment facility. If you set it to C, the generated program will connect to DB2 via the call attachment facility (CAF). If you set it to C, the generated program will connect to DB2 via the Recoverable Resource Manager Services attachment facility (RRSAF). This flag is ignored for CICS programs, which always connect to DB2 via the CICS attachment facility.

RAAC049E Table name cannot be left blank

Explanation: You must specify a table name when generating a program that will SAVE DATA to a DB2 table or ERASE a DB2 table.

RAAC050E * must be ″N″ (no) with data layer program

Explanation: The specified option is not allowed with data layer programs.

RAAC051E Print program can only be specified with display program

Explanation: You can only specify a print program when you are generating a display program. The program that you enter will be invoked when a user enters the PRINT command from the display program.

RAAC052E Program must be generated before it can be edited

Explanation: You cannot edit a program until it is generated.

RAAC053E * flag must be "N" (no) with CICS program

Explanation: The specified option is not allowed with CICS programs.

RAAC054E   **Pre-generation CLIST RAAPREG RC = ***

Explanation: The pre-generation CLIST named RAAPREG did not run successfully.

RAAC055E   *** flag must be "N" (no) with TSO or CICS print program**

Explanation: The specified option is not allowed with TSO or CICS print programs.

RAAC056I   **Generation was bypassed; Cancel request honored**

Explanation: Program Generator bypassed the generation process due to your cancel command.

RAAC057I   **Generating program; Please wait...**

Explanation: Program Generator is generating the program. When it is finished, the specified output data set and member will contain the source code.

RAAC058I   **Program * has been generated**

Explanation: The program has been generated in the specified data set and member.

RAAC059E   **Compile type must be P (prompted), N (non-prompted), or B (batch)**

Explanation: If you enter P, the program will be compiled by invoking DB2I, which will lead you through a series of panels to invoke the compilation process. If you enter N, the program will be compiled immediately by invoking the DSNH command online. If you enter B, JCL will be tailored to perform the compile in batch.

RAAC060E   **Dialect must be ″1″ (OS/VS COBOL), ″2″ (VS COBOL II), ″3″ (COBOL for MVS), or ″4″ (COBOL for OS/390)**

Explanation: You can compile OS/VS COBOL, VS COBOL II, COBOL for MVS, and COBOL for OS/390 programs using this facility.

RAAC061E   *** flag must be "N" (no) with TSO print program**

Explanation: The specified option is not allowed with TSO print programs.

RAAC062E   **Validate parameter must be "BIND" or "RUN"**

Explanation: Enter the value to use for the VALIDATE parameter to the BIND PLAN command. See *DB2 Application Programming and SQL Guide* for more information on this parameter. If the SQL in the program you are compiling refers to any DB2 tables that do not exist at compile time, you must specify RUN for the BIND to succeed.

RAAC063E   **Target data set must be a PDS**

Explanation: Load modules can only be created as members of partitioned data sets. You cannot specify a sequential data set as the target for the program.

RAAC064E   **Error issuing LMINIT on data set**

Explanation: A severe ISPF error occurred when issuing the LMINIT service.

RAAC065E   **Error issuing LMOPEN on data set**

Explanation: A severe ISPF error occurred when issuing the LMOPEN service.

RAAC066I   **Program not compiled; Cancel request honored**

Explanation: The program was not compiled due to your cancel command.

RAAC067I   **Invoking online compile; Please wait...**

Explanation: Program Generator is preparing the program online. If the process completes successfully, the program will be ready to run.

RAAC068E   Online compile error; RC = *

Explanation: An error occurred during the online compile. The return code is included in this message. More information should be written to your terminal during the compile. In addition, see the discussion of the DSNH command in *DB2 Command and Utility Reference* for more information about the compile, including how to locate the output from each step.

RAAC069E   Load library must be a PDS

Explanation: You can only run programs from a partitioned data set.

RAAC070E   Load library and program ID cannot both be left blank

Explanation: If you leave the load library blank, Program Generator assumes that the program to be run exists within one of the load libraries allocated to your TSO session. If you leave the program ID blank, Program Generator displays a member list (from the specified load library). You can select the program to run from this list. If you specify both the load library and the program ID, the program is run from the specified load library (the program must exist in the specified library). You cannot leave both of these fields blank.

RAAC071E   Not all job cards may be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAC072E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END or CANCEL commands.

RAAC073I   Program not run; Cancel request honored

Explanation: The program was not run due to your cancel command.

RAAC074I   Running program; Please wait...

Explanation: The program is running. Please wait for the first page of the report to be displayed.

RAAC075E   Run error; RC = *

Explanation: An error occurred while running the program. The return code is included in this message.

RAAC076E   Member cannot be specified with temporary data set

Explanation: When using temporary data sets to export queries, forms, or procedures, you cannot specify a member name. The temporary data set that Program Generator creates will be a sequential data set.

RAAC077E   Program name has invalid syntax

Explanation: The program name that you entered does not conform to program naming rules.

RAAC078E   Environment must be "B" (batch) or "T" (TSO)

Explanation: You can only run batch or TSO programs using this facility.

RAAC079E   * flag must be "Y" (yes) with TSO print program

Explanation: The specified option is required with TSO print programs.

RAAC080E   Print program can only be specified if Write flag is ″Y″

Explanation: TSO print programs always read their input from a file written by the display

program, rather than reading from DB2. Because of this, a print program can only be specified for a display program if the display program writes data to a file.

RAAC081I   JCL submitted

Explanation: Program Generator has submitted JCL to either compile or run a program.

RAAC082E   Error submitting JCL

Explanation: An error occurred while submitting JCL to either compile or run a program. Additional information may be written to the terminal by TSO.

RAAC083E   Print program can only be specified if HPO/Runtime flag is ″N″

Explanation: TSO display programs that have a corresponding print program cannot use the HPO/Runtime feature.

RAAC084E   Dialect must be blank, "1" (OS/VS COBOL), "2" (VS COBOL II), ″3″ (COBOL for MVS), or ″4″ (COBOL for OS/390)

Explanation: When running a program, you can optionally specify the language the program was written in. This allows Program Generator to allocate the appropriate system libraries to the run (i.e., the appropriate COBOL runtime library).

RAAC085E   Environment must be "B" (batch) or "T" (TSO) with non-SELECT SQL

Explanation: Program Generator does not support non-SELECT SQL in CICS programs.

RAAC086E   SQL type must be ″S″ (static) with data layer program

Explanation: Data layer programs are required to use static SQL.

RAAC087E   Illegal character (') in options

Explanation: The single quote character (') is not allowed in compile or link edit options. Remove the character.

RAAC088E   Program * not generated yet

Explanation: You must generate the program in the specified row of the report list before you can generate a proc program that runs it.

RAAC089E   Program * has different dialect than proc program

Explanation: The program in the specified row of the report list was generated in a different language than the proc program. All programs run by a proc program must be written in the same language as the proc program.

RAAC090E   Program * has different environment than proc program

Explanation: The program in the specified row of the report list was generated for a different environment than the proc program. All programs run by a proc program must be written for the same environment as the proc program.

RAAC091E   Program * uses different attachment facility than proc program

Explanation: The program in the specified row of the report list was generated to use a different attachment facility than the proc program. All programs run by a proc program must be written to use the same attachment facility as the proc program.

RAAC092E   Temporary data set only allowed when exporting

Explanation: You cannot specify a temporary data set (*TEMP) for a query, form, or procedure data set unless the object is to be exported.

RAAC093E   Temporary data set not allowed in this field

Explanation: You cannot specify a temporary data set (*TEMP) for the data set entered in this field.

RAAC094E   Error creating temporary data set

Explanation: An error occurred while creating a temporary data set. Additional error messages may be written to the terminal.

RAAC095E   No matching objects found

Explanation: No objects matching the specified owner and name were found in the database.

RAAC096E   Select one and only one object

Explanation: You must select one and only one object from each displayed column.

RAAC097E   Use "S" to select an object

Explanation: The character entered in the selection field was not recognized.

RAAC098E   JCL not generated; Cancel request honored

Explanation: The JCL was not generated due to your cancel command.

RAAC099E   DBRM library must be a PDS

Explanation: You must specify a partitioned data set name for the DBRM library. Sequential data sets are not allowed.

RAAC100E   Unexpected internal error *

Explanation: An unexpected error was encountered.

RAAC101E   Memory exhausted

Explanation: Expand your region size.

RAAC102E   Data set does not exist or has been archived/migrated

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is catalogued.

RAAC103E   Cannot specify member name in this field

Explanation: You cannot specify the member name as part of the data set name. For example, PDS.LIBRARY(MEM) is invalid. On the Set Default Parameters panel, you can leave the member field blank, and Program Generator will automatically build a member name from the object name. On all other panels, you must specify a member.

RAAC104E   Error connecting to DB2 * (RC=* REASON=*)

Explanation: This message may appear while Program Generator is connecting to the specified DB2 subsystem. Check the return code (RC) and reason code (REASON) in *DB2 Messages and Codes*. Also check that the DB2 subsystem ID that you entered is correct.

RAAC105E   Could not open data set *

Explanation: Program Generator could not open the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAC106E   Error reading data set *

Explanation: An error occurred while reading the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAC107E   Error writing data set *

Explanation: An error occurred while writing the specified data set. Verify that the data set is not full, that you have permission to write it, etc.

RAAC108E   Procedures with logic are not supported

Explanation: You may only specify a linear procedure as input. Procedures with logic are not supported.

RAAC109E   Qualified object name too long

Explanation: Object names must follow QMF object name syntax. The owner can be 8 characters or less and name can be 18 characters or less. A period should be used to delimit the owner and name.

RAAC110I   Too many reports in procedure

Explanation: The specified procedure referred to too many reports. See "Program Generator specifications" for the maximum number of reports supported.

RAAC111E   Too many variables in query

Explanation: The specified query referred to too many substitution variables. See "Program Generator specifications" for the maximum number of substitution variables supported.

RAAC112E   No reports in procedure

Explanation: Program Generator did not find any reports when parsing the specified procedure. Each PRINT REPORT command in a procedure corresponds to a report. Also, each RUN QUERY command without a succeeding PRINT REPORT command corresponds to a report.

RAAC113E   SQL error reading Q.OBJECT_DIRECTORY

Explanation: An SQL error occurred while reading the Q.OBJECT_DIRECTORY table to build an object selection list. Enter the HELP command to obtain more information about the error.

RAAC114E   SQL error accessing registration tables

Explanation: An SQL error occurred while accessing the report registration tables (Q.REPORTS and Q.REPORT_VARIABLES). Enter the HELP command to obtain more information about the error.

RAAC115E   SQL error retrieving current SQLID

Explanation: An SQL error occurred while retrieving the current SQLID. This is generally indicative of an unrecoverable error (for example, the application plan has been bound incorrectly). Enter the HELP command to obtain more information about the error.

RAAC116E   Error opening plan * (RC=* REASON=*)

Explanation: This message may appear while Program Generator is connecting to DB2. Check the return code (RC) and reason code (REASON) in *DB2 Messages and Codes*. Enter the HELP command to obtain more information about the error.

RAAC117E   Error connecting to location; SQLCODE = *

Explanation: You cannot connect to the specified location from this DB2 subsystem. Enter the HELP command to obtain more information about the error and check with your system or database administrator.

RAAC118E   Error allocating RAAOUT DD to *

Explanation: An error occurred while trying to allocate the RAAOUT DD to the specified output data set. This allocation uses the disposition specified on the Set Default Parameters panel.

RAAC119E Disposition must be "OLD", "SHR", or "MOD"

Explanation: You must specify the disposition to use for the output data set when generating source code.

RAAC120E Error disconnecting from DB2 * (RC=* REASON=*)

Explanation: This message may appear while Program Generator is disconnecting from the specified DB2 subsystem. Check the return code (RC) and reason code (REASON) in *DB2 Messages and Codes*.

RAAC121E Bind type must be 1, 2, 3 or 4

Explanation: You must select one of the specified bind types.

For report programs, specifying 1 indicates that only a package should be bound from the program's DBRM. Specifying 2 indicates that only a plan should be bound from the program's DBRM. Specifying 3 indicates that a package should be bound from the program's DBRM, and then a plan should be bound, including the package. Specifying 4 indicates that no bind should be performed.

For proc programs, specifying 1 indicates that a plan should be bound with a PKLIST that references all of the referenced report programs' packages. Specifying 2 indicates that a plan should be bound that includes all of the report programs' DBRMs. Specifying 3 indicates that a plan should be bound with a PKLIST that references the referenced report programs' packages (for those that have packages bound) as well as including the referenced report programs' DBRMs (for those that do not have packages bound). Specifying 4 indicates that no bind should be performed.

RAAC122E Collection ID must be specified when binding a package

Explanation: In order to bind a package, a collection ID in which to bind it must be specified. Your user ID (or the bind OWNER)

must have the DB2 privilege to bind packages in the collection ID that you specify.

RAAC123E Collection ID contains invalid characters

Explanation: The specified collection ID has invalid syntax.

RAAC124E All reports must have packages bound to specify this bind type

Explanation: In order to bind a plan for a proc program that includes only a PKLIST that references the report programs' packages, all of the report programs must have packages bound.

RAAC125E Save data action must be ″R″ (replace), ″A″ (append), or ″P″ (prompt)

Explanation: When saving data, if it is determined that the target table already exists, a decision must be made regarding what to do with any data that might already exist in the table. If you specify to replace the existing data, it is deleted before saving the new data. If you specify to append to the existing data, it is not deleted. If you specify to prompt for the action, different behavior occurs depending on whether the program is a batch program or a TSO program. For batch programs, a positional parameter can be passed in the PARM field at runtime to indicate the desired disposition (R for replace or A for append). For TSO programs, a prompt panel is displayed, prompting the user for the desired disposition. Prompting is not supported for CICS programs; the save data action for CICS programs must be replace or append.

RAAC126E Save data SQL type must be ″S″ (static) or ″D″ (dynamic)

Explanation: Enter S to specify that all SQL used in saving data should be static SQL, or D to specify that it should be dynamic SQL. If the program uses dynamic SQL in all other contexts, the save data SQL must also be dynamic.

Using dynamic SQL for saving data allows the save data table name, when unqualified, to be qualified with the user ID of the user at runtime, rather than the plan or package OWNER or QUALIFIER parameter.

RAAC127E   Host variable format must be ″T″ (tabular) or ″C″ (columnar)

Explanation: Enter T to specify that all of the host variables used by the program will be specified on a single input record, separated by a specific delimiter character. Enter C to specify that each host variable will be specified on a separate input record (in which case no delimiter character is used).

RAAC128I   * options do not apply to non-SELECT queries

Explanation: The specified type of options do not apply when generating programs from queries that do not use the SQL verb SELECT. As a result, the display of the options pop-up window has been suppressed.

RAAC129I   * options do not apply to data layer programs

Explanation: The specified type of options do not apply when generating data layer programs. As a result, the display of the options pop-up window has been suppressed.

RAAC130E   Host variable DD must be ″H″ (HOSTVARS) or ″P″ (PROCVARS)

Explanation: If you are running a report program, which expects to read host variable input from the DD named HOSTVARS, enter H. If you are running a proc program, which expects to read host variable input from the DD named PROCVARS, enter P.

RAAC131I   * options apply only to batch programs which use host variables

Explanation: The specified type of options do not apply unless generating programs for the batch environment which also use host variables (excluding data layer programs). As a result, the display of the options pop-up window has been suppressed.

RAAC132E   Host variable values not accepted; Cancel request honored

Explanation: Your request to cancel entry of host variable values has been accepted.

RAAC133I   Options set; Press Enter to generate program

Explanation: All of the selected options pop-up windows have been displayed. Press Enter to generate the program.

RAAC134E   Save data SQL type must be ″D″ (dynamic) when table space is *USERPROF

Explanation: In order to use the special value *USERPROF to specify that the target table space for the save data table should be retrieved from the QMF profile of the user at runtime, the SQL used to save data must be dynamic. If dynamic SQL is not desired, the table space value must be changed from *USERPROF.

RAAC135E   Attachment facility must be ″T″ (TSO attachment facility) or ″C″ (call attachment facility) for TSO program

Explanation: TSO programs can use the TSO attachment facility or the call attachment facility (CAF) to connect to DB2. You must select one of these two values.

RAAC136E   Attachment facility must be ″T″, ″TSO″, ″C″, or ″CAF″ for TSO program

Explanation: TSO programs can use the TSO attachment facility or the call attachment facility (CAF) to connect to DB2. You must select one of these two values.

RAAC137I *** options apply only to data layer programs**

Explanation: The specified type of options do not apply unless generating data layer programs. As a result, the display of the options pop-up window has been suppressed.

RAAC138E **Data layer programs can only be generated from queries which can be parsed**

Explanation: Part of the generation process for data layer programs requires Program Generator to parse the input SQL statement. Program Generator was unable to parse the current statement, and therefore cannot generate a data layer program from it. This error indicates an unexpected internal parsing error in Program Generator.

RAAC139E **Dialect must be ″2″ (VS COBOL II), ″3″ (COBOL for MVS), or ″4″ (COBOL for OS/390) with a data layer program**

Explanation: Data layer programs can only be generated in VS COBOL II, COBOL for MVS, or COBOL for OS/390. OS/VS COBOL is not supported.

RAAC200E **Token too long at line * of ***

Explanation: A token was found while parsing the procedure data set that exceeded the maximum length. The maximum length for a token in a procedure is 256.

RAAC201E **Invalid quoted value at line * of ***

Explanation: An invalid token was found while parsing the procedure data set. Verify that the data set contains a valid linear procedure.

RAAC202E **Unbound variable at line * of ***

Explanation: An unbound variable was found while parsing the procedure data set. Verify the procedure in the data set, possibly replacing variables with constants.

RAAC203E **Invalid DSN in IMPORT at line * of ***

Explanation: The data set specified in the IMPORT command in the procedure data set is invalid.

RAAC204E **Syntax error at line * of ***

Explanation: A syntax error was found while parsing the procedure data set.

RAAC205E **Variable value too long at line * of ***

Explanation: Variable values must be 55 characters or less.

RAAC206E **Missing variable value at line * of ***

Explanation: Verify the specified procedure data set. Make sure that variable assignments are complete. Do not leave any assignments incomplete, such as RUN QUERY (FORM=.

RAAC207E **Integer value out of range at line * of ***

RAAC208E **Bad integer value at line * of ***

Explanation: A positive integer value was expected. A non-integer or an integer that is too large was found.

RAAC209E **No query name for RUN at line * of ***

Explanation: A RUN command was found that did not reference a query name or QUERY.

RAAC210E **Bad value for DATETIME at line * of ***

Explanation: An invalid value for the DATETIME parameter of the PRINT command was found. See *QMF Reference* for legal values.

RAAC211E   Bad value for PAGENO at line *
of *

Explanation: An invalid value for the PAGENO
parameter of the PRINT command was found.
See *QMF Reference* for legal values.

RAAC212E   Unexpected continuation at line *
of *

Explanation: An illegal continuation line was
found while parsing the procedure data set.

RAAC213E   Command too long at line * of *

Explanation: A command was found while
parsing the procedure data set that exceeds the
maximum procedure command length.

RAAC214E   Variable name is too long

Explanation: The host variable name that you
entered is too long. The length of COBOL
identifiers is limited to 30 characters. You must
specify a shorter variable name.

RAAC215E   Invalid length for variable * with
*** type**

Explanation: When specifying data type CHAR,
you must specify a length within parentheses
directly after the data type, for example: VAR1
CHAR(3). When specifying data type DECIMAL,
you may optionally specify a precision or
precision and scale after the data type, for
example: VAR1 DECIMAL(5) or VAR1
DECIMAL(7,2). The precision must be less than
or equal to 15 and the scale must be less than or
equal to the precision.

RAAC216E   Unrecognized type * for variable *

Explanation: Valid data types are INTEGER,
SMALLINT, DECIMAL(p,s), DECIMAL(p),
DECIMAL, FLOAT, CHAR(n), VARCHAR(n),
DATE, TIME, and TIMESTAMP.

RAAC217E   Empty variable name

Explanation: When specifying a host variable
name, enter a colon (:) followed by the variable
name. For example,:VAR1.

RAAC218E   Variable naming conflict

Explanation: One or more host variables have
the same name. Note that the following suffixes
may be added to the names entered on the Edit
Variables panel: -I, -L, -C. You must change one
or more of the names to eliminate the conflict.

RAAC219E   Missing variable type

Explanation: You must supply a data type for
each host variable specified.

RAAC220E   Error opening RAAVARS DD

Explanation: When you are generating a
program in batch from a query or form that uses
variables, Program Generator reads values for
those variables from the RAAVARS DD. Make
sure that the RAAVARS DD is defined and has
the correct format.

RAAC221E   Invalid record in RAAVARS DD

Explanation: A record read from the RAAVARS
DD had an invalid format. Each record must be
of the form &VARNAME=VARVALUE

RAAC222E   Column does not exist in table

Explanation: A host variable name was
specified in the format
`:=tbcreator.tbname.colname`, but there is no
column with the given name in the specified
table. You must specify a valid column name.

RAAC222E   Column does not exist in table

Explanation: A host variable name was
specified in the format
`:=tbcreator.tbname.colname`, but there is no
column with the given name in the specified
table. You must specify a valid column name.

RAAC223E   Unable to resolve host variable name conflicts

Explanation: An unexpected internal error occurred while trying to resolve conflicts in the names of host variables by appending numeric suffixes to the host variable names.

RAAC224E   Host variable name too long

Explanation: The indicated host variable name is too long. The maximum length that may be specified is 25 characters. This limit allows for the addition of standard name prefixes and suffixes generated by Program Generator.

RAAC225E   Query cannot be parsed; host variables matched to columns are not allowed

Explanation: The use of the host variable name syntax :=tbcreator.tbname.colname to automatically create a host variable suitable for use with the named database column is only supported when Program Generator is able to parse the input SQL statement. This error indicates an unexpected internal parsing error in Program Generator.

RAAC226E   Data set allocation error

Explanation: An error occurred while allocating the specified data set. Additional TSO messages written to the terminal should contain more information about the cause of the error.

RAAC227I   Data set allocated

Explanation: The specified data set has been allocated.

RAAC228E   Space units must be ″C″ (cylinders), ″T″ (tracks), or ″B″ (blocks)

Explanation: You must select the units in which the primary and secondary space allocation for the data set will be expressed.

RAAC229E   Primary space quantity must be a positive integer

Explanation: You must enter a valid number greater than zero for the primary space quantity.

RAAC230E   Directory blocks must be a positive integer or zero

Explanation: You must enter a valid number greater than or equal to zero for the number of directory blocks. Entering a zero will result in the allocation of a sequential data set. Entering a value greater than zero will result in the allocation of a partitioned data set (PDS).

RAAC232I   Data set not allocated; Cancel request honored

Explanation: The data set has not been allocated.

RAAC233E   Secondary space quantity must be a positive integer or zero

Explanation: You must enter a valid number greater than or equal to zero for the secondary space quantity.

RAAC234E   Directory blocks must be a positive integer

Explanation: You must enter a valid number greater than zero for the number of directory blocks.

RAAC235I   Host variable values accepted; Press Enter to continue

Explanation: The values that you entered on the Enter Host Variable Values pop-up window have been saved. Press Enter to continue generating the JCL.

RAAC236E   Data set must have DSORG = PO

Explanation: You must specify the name of a partitioned data set.

RAAC237E   Member name cannot be specified without data set name

Explanation: In order to specify a member name in this field, you must also specify a data set name in the preceding field.

RAAC238E   * flag must be ″N″ with stored procedure program

Explanation: The specified option is not allowed with stored procedure programs.

RAAC239I   CREATE PROCEDURE statement executed successfully

Explanation: The generated CREATE PROCEDURE statement was executed successfully, creating the stored procedure definition in the database. Note that the stored procedure cannot be called until the program is compiled and the resulting load module placed in the appropriate load library for the desired WLM address space.

RAAC301E   Exported form has warnings or errors

Explanation: The specified form data set contains a form that has QMF warnings or errors. To determine what the warnings or errors are, display the form in QMF, and enter the CHECK command.

RAAC302E   Exported form is incomplete

RAAC303E   Invalid record type * at record * of *

RAAC304E   Unexpected T record at record * of *

RAAC305E   Invalid T record at record * of *

RAAC306E   Unexpected V record at record * of *

RAAC307E   Invalid V record at record * of *

RAAC308E   Unexpected R record at record * of *

RAAC309E   Error reading column info at record * of *

RAAC310E   Invalid form value at record * of *

RAAC311E   Invalid BREAK usage code at record * of *

Explanation: The specified form data set does not contain a valid QMF form.

RAAC312E   Environment must be "B" (batch) or "T" (TSO) for user edit codes

Explanation: Program Generator does not support user edit routines (Uxxxx and Vxxxx) with CICS programs.

RAAC313E   HPO/Runtime must be "Y" (yes) for * usage code

Explanation: Program Generator does not support the ACROSS and CALC usage codes with standalone programs.

RAAC314E   Invalid form variable at record * of *

Explanation: The specified form data set does not contain a valid QMF form.

RAAC315E   Host variables not supported in form text

Explanation: You attempted to replace a substitution variable with a host variable. However, that variable is used in the form. All substitution variables in form text must be replaced with literals when generating a program that uses the HPO/Runtime feature.

RAAC316E Unsupported use of form detail variation

Explanation: The exported form contains form detail variation, which Program Generator does not support.

RAAC317E Environment must be "B" (batch) or "T" (TSO) for * usage code

Explanation: Program Generator does not support the xPCT usage codes with CICS programs.

RAAC318E Diag Parameters must be ″1″ (none), ″2″ (error message), or ″3″ (error and SQL messages)

Explanation: You must specify what additional output parameters (if any) should be generated in the stored procedure program. If you enter 1, no such parameters are generated. If you enter 2, one additional output parameter (named ERROR_MESSAGE) is added to the generated program to receive a single line of error message text if any error occurs. If you enter 3, an additional output parameter (named SQL_ERROR_MESSAGE) is added to the generated program to receive detailed SQL error message text if any SQL error occurs.

RAAC400E Unexpected SQL parsing error

Explanation: An error occurred while parsing the query. One possible cause (of many) for this is that substitution variables in the query have not been replaced with values. Make sure that all variables have been replaced by constants, literals, or host variables (with data types).

RAAC403E SQL parsing error: token too long

Explanation: A token which exceeds the maximum token length was found while parsing the query.

RAAC405E SQL parsing error: invalid SQL object name

RAAC406E SQL parsing error: SQL object name too long

RAAC407E SQL parsing error: "*" invalid as SQL object name

Explanation: An invalid name was found while parsing the query.

RAAC408E SQL parsing error: invalid hexadecimal string constant

Explanation: An invalid hexadecimal string constant (e.g., x'40F') was found while parsing the query.

RAAC410E Security must be ″D″ (DB2), ″U″ (User), or ″F″ (Definer)

Explanation: You must specify how the stored procedure will interact with any security resources outside of DB2. If you enter D, such interaction is performed in the context of the authorization ID associated with the address space in which the stored procedure is running. If you enter U, such interaction is performed in the context of the authorization ID invoking the stored procedure. If you enter D, such interaction is performed in the context of the authorization ID that executed the CREATE PROCEDURE statement for the stored procedure.

RAAC411E Special Registers must be ″I″ (Inherit) or ″D″ (Default)

Explanation: You must specify how special register values are initialized when the stored procedure executes. If you enter I, the values of special registers are inherited from the environment in which the stored procedure executes. If you enter D, the values of special registers are initialized to default values.

RAAC412E SQL parsing error: invalid lexical token

Explanation: Invalid characters were found while parsing the query.

RAAC413E Program in row * with * must be generated first

Explanation: The query refers to a table that does not exist. Either there is a preceding query in the procedure that performs a CREATE TABLE for the nonexistent table, or there is a preceding SAVE DATA command that creates the nonexistent table. In either case, you must generate the program that performs the CREATE TABLE or SAVE DATA before you can generate this program.

RAAC414E ASU Time Limit must be numeric

Explanation: The ASU time limit that you specify for the stored procedure must be numeric. If you enter 0, no limit is applied.

RAAC415E Bind Type must be ″1″ (package) or ″4″ (no bind) with stored procedure program

Explanation: Stored procedure programs use only packages, not plans. Consequently, you must enter 1 to bind a package for the program, or 4 to skip the bind at this time.

RAAC416E ″3″ (COBOL for MVS) or ″4″ (COBOL for OS/390) with stored procedure program

Explanation: Stored procedure programs can only be generated in COBOL for MVS or COBOL for OS/390. OS/VS COBOL and VS COBOL II are not supported.

RAAC417E SQL parsing error: expected *

Explanation: An error occurred while parsing a query that contains a UNION clause. An invalid token was found when expecting the type of token specified in the message.

RAAC420E SQL parsing error: the number of columns specified in the correlation clause does not match the number of columns in the table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC421E SQL parsing error: the column * was found in more than one table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC422E SQL parsing error: the FETCH FIRST n ROWS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC423E SQL parsing error: the FOR FETCH ONLY clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC424E   SQL parsing error: the FOR UPDATE clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC425E   SQL parsing error: the QUERYNO clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC426E   SQL parsing error: the WITH clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC427E   SQL parsing error: the WITH HOLD clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC428E   SQL parsing error: the WITH RETURN clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC429E   SQL parsing error: the OPTIMIZE FOR clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC430E   SQL parsing error: no function by the name * having compatible arguments was found in the function path

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC431E   SQL parsing error: the FOR UPDATE and ORDER BY clauses were both specified

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC432E   SQL parsing error: an internal error occurred at line *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC433E   SQL parsing error: invalid parameters to arithmetic operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC434E   SQL parsing error: * is an unrecognized data type

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC435E   SQL parsing error: invalid parameters to CONCAT operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC436E   SQL parsing error: incompatible types in expression list

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by

running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC437E   SQL parsing error: invalid identifier *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC438E   SQL parsing error: invalid scalar function parameter

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC439E   SQL parsing error: invalid use of parameter markers

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC440E   SQL parsing error: invalid use of "*"

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC441E   SQL parsing error: an invalid lexical token was found beginning at ″*″

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC442E   SQL parsing error: labeled duration missing value

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC443E   SQL parsing error: no SELECT clause was found

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC444E   SQL parsing error: no subselect was found in a full select

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC445E   SQL parsing error: parameter markers used on both sides of operator

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC446E   SQL parsing error: column * was not found in any table

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC447E   SQL parsing error: the token * is unexpected; expected tokens may include: *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC448E   SQL parsing error: the token is unexpected; expected tokens may include: *

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC449E   **SQL parsing error: a column in the ORDER BY clause was not found in any table**

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC450E   **SQL parsing error: table locators are not supported**

Explanation: An error has occurred while parsing the input query. The use of table locators was encountered, which is not supported by Program Generator.

RAAC451E   **SQL parsing error: three-part table names are not supported**

Explanation: An error has occurred while parsing the input query. The use of three-part table names was encountered, which is not supported by Program Generator.

RAAC452E   **SQL parsing error: row value expression invalid in the current context**

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC453E   **SQL parsing error: the FOR UPDATE and FOR FETCH ONLY clauses were both specified**

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an

unexpected internal parsing error in Program Generator.

RAAC454E   **SQL parsing error: transition tables are unsupported**

Explanation: An error has occurred while parsing the input query. The use of transition tables was encountered, which is not supported by Program Generator.

RAAC455E   **SQL parsing error: unrecognized statement type**

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC457E   **Host variable exit * return code = ***

Explanation: The user-specified host variable exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC458E   **Unable to map host variables due to previous query parsing error**

Explanation: A host variable exit was specified on the Set Default Parameters panel to customize the declaration and use of host variables in the generated program. However, Program Generator encountered an error while parsing the input query, and as a result, cannot apply the exit.

RAAC459E   **Column exit * return code ***

Explanation: The user-specified column exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC460E Unable to map column names due to previous query parsing error

Explanation: A column exit was specified on the Set Default Parameters panel to customize the appearance of column names in the generated program. However, Program Generator encountered an error while parsing the input query, and as a result, cannot apply the exit.

RAAC461E Table exit * return code *

Explanation: The user-specified table exit specified on the Set Default Parameters panel returned a non-zero return code. Investigate this exit CLIST to determine the cause of the error.

RAAC462E Exit module * could not be loaded

Explanation: The executable exit module with the specified name could not be loaded. Program Generator searches for this member in the following locations:

- RAALLIB DD (if allocated)
- ISPLUSR DD (if allocated and LIBDEF for ISPLLIB activated)
- LIBDEF for ISPLLIB (if active)
- ISPLLIB DD (if allocated)
- system libraries (LINKLIST and LPA)

Verify that the correct module name was entered on the Set Default Parameters panel and that a module with that name exists in one of the above locations.

RAAC463E SQL parsing error: SQL code *

Explanation: An SQL error identified by the specified SQL code has occurred while parsing the input query and retrieving information about one of the tables referenced by the query. Verify that the correct table is referenced by the query, that the table exists, and that you have authority to read from it, and try the operation again.

RAAC464E SQL parsing error: the ON ROLLBACK RETAIN CURSORS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC465E SQL parsing error: the ON ROLLBACK RETAIN LOCKS clause was specified more than once

Explanation: An error has occurred while parsing the input query. Verify that the query is actually a valid SQL statement (for example, by running it from QMF) or correct any errors in it. If the problem persists, this is indicative of an unexpected internal parsing error in Program Generator.

RAAC500E Error preparing SQL statement; SQLCODE = *

Explanation: The query contains an SQL error, indicated by SQLCODE. Enter the HELP command to obtain more information about the error.

RAAC501E Error describing SQL statement; SQLCODE = *

Explanation: The query contains an SQL error, indicated by SQLCODE. Enter the HELP command to obtain more information about the error.

RAAC502E SQL statement not SELECT; Form not allowed

Explanation: You may not specify a form for this query because it is not a SELECT query.

RAAC503E   SQL statement too long

Explanation: The query exceeds the maximum length for SQL statements. See "Program Generator specifications" for the maximum length of an SQL statement.

RAAC504E   Invalid column count after DESCRIBE

Explanation: An unexpected DB2 error occurred. This is usually indicative of an unrecoverable error.

RAAC505E   Number of columns in form inconsistent with query

Explanation: The number of columns in the SELECT clause of the query must exactly match the number of columns referred to in the form. This message is also produced if you specify a form that makes use of column definitions.

RAAC506E   Unrecognized column type * from DESCRIBE

Explanation: An unexpected column type was received from DB2.

RAAC507E   Error executing SQL statement; SQLCODE = *

Explanation: An error occurred while executed the specified SQL statement(s). Press F1 to see more detailed SQL error message text.

RAAC600E   Invalid control statement at line * of *

Explanation: The skeleton code data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAC601E   Too many)IF's at line * of *

Explanation: The nesting of)IF's in the skeleton code data set is too great. The maximum nesting level is 10.

RAAC602E   Unexpected)ELSEIF at line * of *

Explanation: An)ELSEIF was found in the skeleton code data set without a preceding)IF.

RAAC603E   Unexpected)ELSE at line * of *

Explanation: An)ELSE was found in the skeleton code data set without a preceding)IF.

RAAC604E   Unexpected)ENDIF at line * of *

Explanation: An)ENDIF was found in the skeleton code data set without a preceding)IF.

RAAC605E   Unexpected EOF in *

Explanation: The end of the skeleton code data set was reached while processing was still within an)IF or)LOOP.

RAAC606E   Specified LRECL is too small; Must be at least *

Explanation: When reading data from or writing data to a sequential file, the LRECL of the DATAIN or DATAOUT DD must be at least as large as the total length of the columns in the SELECT clause and their associated null indicators.

RAAC607E   Illegal nested)COPY at line * of *

Explanation: The skeleton code data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAC608E   Loop too long at line * of *

RAAC609E   Illegal nested loop at line * of *

Explanation: The skeleton code data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAC610E   Unexpected)ENDLOOP at line *
of *

Explanation: An)ENDLOOP was found in the
skeleton code data set without a preceding
)LOOP.

RAAC611E   Unterminated)IF in loop at line *
of *

Explanation: An)ENDLOOP was found in the
skeleton code data set without an)ENDIF to
terminate an)IF within the loop.

RAAC612E   Unrecognized)COPY target at line
* of *

Explanation: The skeleton code data set
contains an invalid construct. Verify that the
installation process was successful and complete.

RAAC613E   * flag must be ″N″ (no) with
parameter style ″G″ (GENERAL)
or ″N″ (GENERAL WITH NULLS)

Explanation: The specified option is not
supported with the GENERAL or GENERAL
WITH NULLS parameter style.

RAAC614E   ASU time limit must be a positive
integer, or 0 to specify no limit

Explanation: Enter the limit on processor time,
in CPU service units, that a single invocation of
the stored procedure can run. If you enter 0, no
limit is applied.

RAAC616E   * cannot be left blank

Explanation: You must enter a value for the
specified field.

RAAC617E   Result Sets must be ″D″ (data),
″R″ (report), ″B″ (both), or ″N″
(neither)

Explanation: You must specify what result sets,
if any, should be returned by the stored
procedure. If you enter D, the data retrieved by
the program is returned. If you enter R, the

report generated by the program is returned. If
you enter B, both the data and report are
returned. If you enter N, no result sets are
returned.

RAAC618E   Parameter Style must be ″D″
(DB2SQL), ″G″ (GENERAL), or
″N″ (GENERAL WITH NULLS)

Explanation: You must specify how the stored
procedure will receive input parameters. If you
enter D, the DB2SQL parameter style will be
used. If you enter G, the GENERAL parameter
style will be used. If you enter N, the GENERAL
WITH NULLS parameter style will be used. See
the documentation for the DB2 product you are
using for more information about stored
procedure parameter styles.

RAAC619E   Program Type must be ″M″ (main)
or ″S″ (subroutine)

Explanation: You must specify how the stored
procedure will execute. Enter M to have the
stored procedure execute as a main program or S
to have it execute as a subroutine. See the
documentation for the DB2 product you are
using for more information about stored
procedure program types.

RAAC700E   Program not registered; Cancel
request honored

Explanation: The program was not registered
due to your cancel command.

RAAC701E   Report owner cannot be left blank

Explanation: You must specify a report owner
when creating a report.

RAAC702E   Report owner must be valid
SQLID

Explanation: You must specify a valid primary
or secondary SQLID for the owner of the report.
You may also specify an owner of the form
T=**tranid** where **tranid** is a valid CICS
transaction identifier.

RAAC703E   Report name cannot be left blank

Explanation: You must specify a report name when creating a report.

RAAC704E   Program must be generated before it can be registered

Explanation: You cannot register a program until you generate it.

RAAC705I   Program has been registered

Explanation: T he program has been registered by creating a row in the Q.REPORTS table and (optionally) rows in the Q.REPORT_VARIABLES table. You can now run the program from the End User Facility.

RAAC706E   Invalid SQLID

Explanation: You must enter a valid primary or secondary SQLID.

RAAC707E   Please select one of the actions listed below

Explanation: Choose one of the selection options listed on this panel.

RAAC709E   No matching report(s)

Explanation: No reports matching the specified owner and name were found in the database.

RAAC710E   Report already exists

Explanation: A report with the specified owner and name already exists in the database. Specify a different owner or name.

RAAC711I   Report not created; Cancel request honored

Explanation: The report was not created due to your cancel command.

RAAC712I   Report not updated; Cancel request honored

Explanation: The report was not updated due to your cancel command.

RAAC713E   Field must be "YES" or "NO"

Explanation: The only acceptable values for this field are yes or no.

RAAC714E   Program name cannot be left blank

Explanation: You must specify a program name for the report.

RAAC715E   Dialect must be "1", "OS/VS COBOL", "2", "VS COBOL II", ″3″, ″COBOL for MVS″, ″4″, ″COBOL for OS/390″, ″Q″, or "QMF"

Explanation: You can specify either the appropriate COBOL dialect or QMF (for a QMF report) as the language for the report. Choose the one desired for this registration.

RAAC716E   Environment must be "B", "BATCH", "T", "TSO", "C", or "CICS"

Explanation: You can specify either batch, TSO or CICS as the environment for the report. Choose the one desired for this registration.

RAAC717E   Attachment facility must be ″T″, ″TSO″, ″C″, ″CAF″, ″R″, or ″RRSAF″

Explanation: You can specify TSO (the TSO attachment facility), CAF (the call attachment facility), or RRSAF (the Recoverable Resource Manager Services attachment facility) as the attachment facility for this report. Choose the one desired for this registration. This field is ignored for CICS programs, which always connect to DB2 via the CICS attachment facility.

RAAC718E   Invalid LRECL value

Explanation: You must enter an integer greater than or equal to -1 (greater than or equal to zero when specifying the LRECL of the report's host variable file).

RAAC719E   Invalid character in report name

Explanation: Report names may not contain spaces.

RAAC720I   Report not dropped; Cancel request honored

Explanation: The report was not dropped due to your cancel command.

RAAC721E   Unrecognized line command

Explanation: Legal line commands when editing host variables are D (delete), I (insert), and R (repeat). Each may be followed by a number specifying a repetition factor.

RAAC722E   Variable name cannot be left blank

Explanation: You must specify a name for each of the report's variables.

RAAC723E   Variable type cannot be left blank

Explanation: You must specify a data type for each of the report's variables.

RAAC724I   Report created

Explanation: The specified report was created in the database.

RAAC725I   Report dropped

Explanation: The specified report was dropped from the database.

RAAC726I   Report updated

Explanation: The specified report was updated in the database.

RAAC727E   Program type must be ″P″ (print), ″N″ (no report), or ″L″ (data layer) with batch program

Explanation: Batch programs must either print a report or present no report, or must be a data layer program.

RAAC728E   Program type must be ″P″ (print), ″D″ (display), or ″N″ (no report) with TSO program

Explanation: TSO programs must either print a report, display a report, or do neither.

RAAC729E   Program type must be ″P″ (print), ″D″ (display), or ″N″ (no report) with CICS program

Explanation: CICS programs must either print a report or display a report.

RAAC730E   Program * is online print program

Explanation: The program specified is an online print program and therefore cannot be invoked directly from a proc program.

RAAC731E   SQL type must be "S" (static) or "D" (dynamic)

Explanation: You can generate programs that use either static or dynamic SQL. Select the type desired for this generation.

RAAC732E   Invalid transaction identifier

Explanation: A CICS transaction identifier must be no more than four characters long.

RAAC733E   Field must be left blank when dialect is "QMF"

Explanation: You cannot enter a value in this field when registering a QMF report.

RAAC734E   Environment must be "TSO" when dialect is "QMF"

Explanation: You must set environment to TSO when registering a QMF report. The End User Facility does not support QMF reports in CICS or in batch.

RAAC735E   Invalid variable name

Explanation: The variable name that you entered for the report is invalid. Variable names cannot contain the colon (:) or ampersand (&) characters.

RAAC736E   EXEC library must be a PDS

Explanation: You must enter the name of a partitioned data set for the EXEC library.

RAAC737E   Program/plan name cannot be left blank

Explanation: You must specify a name for this program/plan.

RAAC738E   Program/plan name has invalid syntax

Explanation: The name you specified cannot be used as a program/plan name.

RAAC739I   Processing report list row *

Explanation: Program Generator is now processing the report list row identified in the message text.

RAAC740I   Specify batch job information for *

Explanation: You must specify job cards and other JCL information to generate JCL to either compile or run a program.

RAAC741I   Options not saved; Cancel request honored

Explanation: Any changes that you made to the options in the current pop-up window have been discarded.

RAAC743E   CAF module usage must be "H" (HPO CAF) or "D" (DB2 CAF)

Explanation: Enter H to generate a program which uses the HPO call attachment module (AACAF), or D to generate a program which uses the DB2 call attachment module (DSNALI).

RAAC744E   Report width must be between 22 and 999, inclusive

Explanation: Enter the page width (from 22 to 999) to use when generating the report.

RAAC745E   Report length must be "CONT" or between 1 and 999, inclusive

Explanation: Enter the page length (from 1 to 999, or CONT) to use when generating the report. Entering CONT specifies that the report should be generated without any page breaks.

RAAC746E   LRECL must be a positive integer

Explanation: You must enter a positive integer.

RAAC747E   Registration of QMF reports only supported with QMF 3.1 and higher

Explanation: You can only register a report that runs a QMF query or procedure if you are running QMF Version 3 Release 1 or higher.

RAAC748E   Program type must be ″N″ (no report) or ″L″ (data layer) for batch program with non-SELECT query

Explanation: When generating a batch program from a query that does not use the SQL verb SELECT, you must specify that the program produces no report or is a data layer program.

RAAC749E Program type must be ″N″ (no report) for TSO or CICS program with non-SELECT query

Explanation: When generating a TSO or CICS program from a query that does not use the SQL verb SELECT, you must specify that the program produces no report.

RAAC750E Program * is a data layer program

Explanation: The specified program is a data layer program, and as such, cannot be called by a proc program.

RAAC751E Number of report files must be an integer greater than or equal to -1

Explanation: Enter the number of REPORTnn DDs written by the report, or -1 if unknown or not applicable.

RAAC752E Program type must be ″P″ (print), ″D″ (display), ″N″ (no report), ″L″ (data layer), or ″R″ (proc)

Explanation: Enter the type of program.

RAAC753E Program type must be ″P″ (print) or ″D″ (display) when dialect is ″QMF″

Explanation: QMF reports must be either print or display programs.

RAAC754I * options apply only to stored procedure programs

Explanation: The specified type of options do not apply unless generating stored procedure programs. As a result, the display of the options pop-up window has been suppressed.

RAAC755E Program Type must be ″N″ (no report) with stored procedure programs

Explanation: When generating a stored procedure program, you must specify that the program produces no report.

RAAC756E * flag must be ″N″ (no) with stored procedure program

Explanation: The specified option is not allowed with stored procedure programs.

RAAC757I * options apply only to stored procedure programs

Explanation: The specified type of options do not apply unless generating stored procedure programs. As a result, the display of the options pop-up window has been suppressed.

RAAC758E Attachment Facility must be ″R″ (RRSAF) with stored procedure program

Explanation: Program Generator only supports stored procedures that run in a WLM-managed address space. DB2 requires that WLM stored procedures use the RRS attachment facility. You must enter R to select RRSAF.

RAAC759E Action must be ″R″ (replace) or ″A″ (append) with stored procedure program

Explanation: Stored procedure programs do not have the capability to prompt the user for the action to take when saving data. As a result, you must enter R to replace any existing data or A to append to any existing data.

RAAG messages

Messages that begin with RAAG are issued from the HPO⁄Governor module. These messages appear on the message line on QMF panels and may also appear in the user's DSQDEBUG data set or RAADEBUG data set.

RAAG000I   HPO prompt dialog begin (ID=*)

Explanation: This message marks the beginning of a dialog with the HPO⁄Governor module.

RAAG001E   Error issuing asynchronous timer

Explanation: A system error occurred while issuing the asynchronous timer. This is usually an unrecoverable error.

RAAG002E   * rows have been fetched; Authorized limit exceeded

Explanation: This message will appear if a resource violation is related to excess row fetches. Your current QMF command will be canceled and this message will appear on the message line. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO⁄Governor module help panel, you can get more information by entering the HELP command.

RAAG003E   CPU time exceeds authorized limit

Explanation: This message will appear if a resource violation is related to excess CPU time consumption. Your current QMF command will be canceled and this message will appear on the message line. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO⁄Governor module help panel, you can get more information by entering the HELP command.

RAAG004E   Not authorized to begin QMF session at this time

Explanation: Your ID is not authorized to invoke QMF at this time. This message will not appear on any QMF panel but will be logged to your DSQDEBUG data set and your RAADEBUG data set.

RAAG005E   Not authorized to process this SQL verb: *

Explanation: Your ID is not authorized to process SQL statements containing the specified verb. Your QMF administrator can selectively enable or disable certain SQL verbs for your session. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO⁄Governor module help panel, you can get more information by entering the HELP command.

RAAG006E   Not authorized to process this QMF command:

Explanation: Your ID is not authorized to process QMF commands containing the specified verb. Your QMF administrator can selectively enable or disable certain QMF commands for your session. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO⁄Governor module help panel, you can get more information by entering the HELP command.

RAAG007I   This QMF command has already run for * CPU seconds

Explanation: This message will appear during a prompt dialog if the resource violation is related to excess CPU time consumption. It tells you the amount of CPU time that has already been consumed by your current QMF command.

RAAG008I   This QMF command has already fetched * rows

Explanation: This message will appear during the prompt dialog if the resource violation is related to excess row fetches. It tells you the number of rows that have already been fetched by your current QMF command.

RAAG009I   Valid prompt dialog responses are:

Explanation:
1. Press ENTER to continue processing
2. Type CANCEL and press ENTER to cancel command
3. Type NOPROMPT and press ENTER to continue without prompts

RAAG010I   Enter your response now ===>

Explanation: You must select one of the listed responses during the prompt dialog. If you determine that the current command should not be allowed to run to completion and should now be canceled, enter CANCEL. If you determine that the command should be allowed to continue processing, simply press Enter. If you want the command to run to completion without any more prompts, enter NOPROMPT. Any other response will cause this message to be redisplayed.

RAAG011I   Response accepted; Processing will continue

Explanation: QMF will continue to process the command.

RAAG012I   Response accepted; Will try to cancel command

Explanation: QMF will attempt to cancel your command. QMF cannot always successfully cancel a command.

RAAG013E   Your response * is not valid

Explanation: This message indicates that the response you entered previously is invalid. Refer to the description of message RAAG009I for more information.

RAAG014I   Response accepted; Continuing without prompts

Explanation: QMF will continue processing your command without further interruptions from the prompt dialog.

RAAG015E   Query canceled by Query Analyzer

Explanation: Query Analyzer has canceled your query. This can happen at your request or as determined by your administrator. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG017E   QMF command canceled

Explanation: Your QMF command canceled due to an unknown resource violation. This message may optionally be logged to your DSQDEBUG data set and your RAADEBUG data set. If your site has enabled the HPO/Governor module help panel, you can get more information by entering the HELP command.

RAAG018E   Not authorized to use QMF at this time; Please end session

Explanation: Your ID is not authorized to continue using QMF at this time. You should end your session immediately. No further commands will be processed successfully.

RAAG019E   Query canceled by Monitor

Explanation: Your query has been canceled by a command from the Monitor online facility.

RAAG020E   Error issuing asynchronous timer

Explanation: A system error occurred while issuing the asynchronous timer.

RAAG021E Error issuing prompt dialog

Explanation: A system error occurred while issuing the prompt dialog.

RAAG025I * rows fetched; No more fetches allowed

RAAG025I * rows fetched; No more fetches allowed without confirmation

Explanation: The HPO/Governor module has detected that your command has fetched more rows than your authorized limit. You are able to view all of the rows that have already been fetched, but no more fetches will be allowed for this query. If the message text includes "without confirmation", then additional fetches will be allowed, but only after prompting you for confirmation.

RAAG026I No limits found for resource group *

Explanation: The RLIMITS command was issued, however there is no current resource group schedule defined for the current date, day, and time in the specified resource group.

RAAG027I The maximum allowable CPU limit is *

Explanation: As part of the governor prompt, this message indicates the current CPU limit in effect for the QMF session.

RAAG028I The maximum allowable row limit is *

Explanation: As part of the governor prompt, this message indicates the current row limit in effect for the QMF session.

RAAG029I Current resource limits shown

Explanation: The RLIMITS command has been successfully executed.

RAAG030I * rows fetched; Query Analyzer row limit exceeded

Explanation: The row limit that you specified on the query analysis panel for this query has been exceeded. No more rows will be fetched.

RAAG998I QMF HPO activity log disabled for user *, reason *, subsystem *

Explanation: This message will appear in the system log and indicates that a severe error was encountered while attempting to allocate, open, or write to one of the HPO Activity Log data sets. Check the reason code, DB2 subsystem ID, and see "HPO Activity Log failure reason codes."

RAAG999I HPO prompt dialog end

Explanation: This message signals the end of a dialog with the HPO/Governor module. Press Enter to return to your QMF session.

RAAM messages

Messages that begin with RAAM are issued from the Monitor online facility and appear on the message line on ISPF panels.

RAAM001E Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAM002E DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid DB2 subsystem ID. Monitor will display activity from QMF sessions running under this subsystem.

RAAM003E DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAM004I Default values not saved; Cancel request honored

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAM005I Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAM007E Value must be between 00 and 24, inclusive

Explanation: This value indicates the number of preceding hours for which to display QMF activity. It is only used if you have specified (via the values of the preceding fields) that activity is to be shown relative to the current date and time.

RAAM008E Specified command not defined

Explanation: The command that you entered on the command line is not valid.

RAAM009E Specified command requires an argument

Explanation: The command that you entered on the command line requires an argument. Retry the command with proper arguments.

RAAM010E Specified entry not found

Explanation: The entry specified in the command could not be found in the selection list. Verify that the argument is valid and try again.

RAAM011I No entries were selected

Explanation: No entries were selected when you pressed Enter without specifying a command on the command line. The QMF session activity data you are viewing cannot be updated.

RAAM012E Invalid selection code; Use "B"

Explanation: You entered an invalid selection code; use only B for browse.

RAAM013E Invalid date specified; Use YYYYMMDD format

Explanation: The format of the date that you entered is incorrect. Specify a date in the format required (for example, 19940101), or enter TODAY (for the current date).

RAAM014I Cancel request accepted for this QMF action

Explanation: Your cancel request was accepted and passed on to the HPO Governor module. The command may or may not be canceled, depending on the current activity within QMF. Only QMF activity involving DB2 fetches may be successfully canceled from here.

RAAM015I No SQL text available for this entry

Explanation: You requested to browse SQL text, but no SQL text is available for this entry. The SQL column must contain a value of Y for this entry to be eligible for SQL text browsing.

RAAM016E Cannot cancel action; Session already terminated

Explanation: You cannot cancel QMF activity if the QMF session has already terminated.

RAAM017E Invalid selection code; Use "B" or "C"

Explanation: You entered an invalid selection code. Use only B for browse or C for cancel.

RAAM018I   Monitor data refreshed

Explanation: You pressed Enter without specifying a command on the command line. The QMF session activity data that you are viewing has been updated.

RAAM019E   Invalid time specified; Use HHMMSS format

Explanation: The format of the time that you entered is incorrect. Specify a time in the format required (for example, 123000), or enter TODAY (for the current time).

RAAM020E   VSAM OPEN error; Return code=*, reason code=*

RAAM021E   VSAM GET error; Return code=*, reason code=*

RAAM022E   VSAM PUT error; Return code=*, reason code=*

Explanation: An error occurred while attempting to open, read from, or write to the Monitor VSAM file.

RAAM023E   Dynamic allocation error; Return code=*, reason code=*

Explanation: An error occurred while attempting to allocate the Monitor VSAM file. A common cause of this error is attempting to invoke the Monitor online facility while you have a QMF session active. In this case, the HPO⁄Governor module already has the Monitor VSAM file allocated. This may be the case if the return code is 4 and the reason code is 410.

RAAM024E   VSAM file name for Monitor not configured

Explanation: No name was specified for the Monitor VSAM file in the HPO configuration module for this DB2 subsystem. As a result, the Monitor online facility is inactive. To enable these facilities, you (or your administrator) must

reconfigure this subsystem and specify a name for this VSAM file.

RAAM025E   No QMF activity found for user ID(s) specified

Explanation: There are no records available for display based on your selection criteria from the Set Default Parameters panel.

RAAM026E   No SQL text available for this entry

Explanation: You requested to browse SQL text, but no SQL text is available for this entry.

RAAM027E   Unable to cancel session; May have previously terminated

Explanation: The current QMF activity could not be canceled. The session may have already ended. Refresh the activity panel (by pressing Enter) to determine the current state of the session.

RAAM028E   Severe error; No user detail found

Explanation: A severe error was detected when attempting to display QMF user session detail activity.

RAAM029E   Unable to lock the Monitor VSAM file; Try again

Explanation: The Monitor VSAM file could not be locked for exclusive access, most likely because another user was writing to it. Repeat your action.

RAAM031E   Parameter value must be "1" or "2" or "3" or "4"

Explanation: To reinitialize the entire Monitor VSAM File, set this parameter to 1. To delete all records except for today's, set this parameter to 2. To delete all records except for the last 7 days', set this parameter to 3. To delete all records except for the last 30 days', set this parameter to 4.

RAAM032E Not all job cards can be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAM033E Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END or CANCEL commands.

RAAM034E Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAM035E Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAM036E Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system

administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAM037E Not authorized to select this option

Explanation: Only system administrators are allowed to select this option

RAAM038E Error opening plan * (RC=*, REASON=*)

Explanation: Either of these messages may appear while connecting to the specified DB2 subsystem. Check the return code (RC) and reason code (REASON) in *DB2 Messages and Codes*. Also check that the DB2 subsystem ID that you entered is correct.

RAAM998I *

Explanation: This message will appear in the system log and indicates that a severe error was encountered while attempting to allocate, open, or write to the Monitor VSAM file. The message text will contain more specific information about the error.

RAAP messages

Messages that begin with RAAP are issued from the Manager online facility and appear on the message line on ISPF panels.

RAAP000I Some required QMF files are not allocated; Trying to continue...

Explanation: Certain QMF data sets are required to be allocated to your TSO session to run QMF. This message indicates that some of the required data sets are not allocated to your session. Although QMF may operate successfully, some functions require these data set allocations. See *Installing QMF on MVS* to determine the required data set allocations for QMF.

RAAP001E Select one of the valid actions listed below

Explanation: Review the list of supported actions at the bottom of this panel and select the desired action. If you leave this field blank, the LIST (L) action will be selected for you. If you want to exit this panel, enter the END command.

RAAP002E   Value must be "Q" (DSQDEBUG), "R" (RAADEBUG), "B" (Both), "N" (None)

Explanation: To log QMF debug messages, specify the letter above to direct the output to the appropriate files. Q will write to the standard QMF DSQDEBUG file, R will write to the RAADEBUG file, B will write to both of these files, and N disables QMF debug message logging.

RAAP003E   Resource group cannot be left blank

Explanation: You must enter the name of a resource group to perform the desired action. You can use % or _ as wildcard characters in the name if you wish to obtain a list of available resource groups. For example, to list all resource groups that start with the letter R, enter R% in this field.

RAAP004E   Resource group not found in database

Explanation: The resource group specified does not exist in the database. Check for incorrect entry. Also, this resource group may have been dropped or may not contain any HPO resource options.

RAAP005E   Wildcard characters are not allowed with specified action

Explanation: This action does not support multiple entries. You must specify a unique entry without any wildcard characters (% or _).

RAAP006I   Archive was not performed; Cancel request honored

Explanation: The error log entry was not archived due to your cancel command.

RAAP007I   Archive was performed successfully

Explanation: The error log entry was removed from the database and written to the error log archive data set.

RAAP008I   Delete was not performed; Cancel request honored

Explanation: The selected item was not deleted due to your cancel command.

RAAP009I   Delete was performed successfully

Explanation: The selected item was successfully removed from the database.

RAAP010E   Select one and only one row for processing

Explanation: You can only assign one resource group to this user profile.

RAAP011E   Select one of the valid actions listed on the panel

Explanation: Review the list of supported actions at the top of this panel and select the desired action. If you want to exit this panel, enter the END command.

RAAP012E   Duplicate user profile rows found

Explanation: The QMF user profile table should contain unique rows. Check with your administrator to have the extra rows deleted.

RAAP013E   Action must be either "A" (assign) or "U" (unassign)

Explanation: While processing assignments from this panel, you can either assign this resource group to a user profile or unassign this resource group from a user profile. Note that you cannot assign this resource group to a user profile that is already assigned to this resource group. You also cannot unassign a resource group from a user profile unless it is already

assigned to this resource group.

RAAP014E **Selection filter must be either "1"**
or "2"

Explanation: The selection filter is used to
determine what profiles will be displayed on the
next panel. A value of 1 will display all user
profiles, including those that are and those that
are not assigned to this resource group. A value
of 2 will display only those user profiles that are
already assigned to this resource group.

RAAP015I **Resource group common controls**
have been saved in the database

Explanation: The resource group, including the
description and common options that you just
entered, has been saved in the database.

RAAP016E **SQL error was detected**

Explanation: An SQL error occurred while
processing your action. More specific information
is displayed as the error occurs.

RAAP017I **Schedule * controls have been**
saved in the database

Explanation: The resource group scheduled
controls, including all limit values and options
that you just entered, have been saved in the
database.

RAAP018E **Environment must be a valid**
QMF environment value or "-"
(NULL)

Explanation: Enter a valid value for
environment. Enter a dash (-) to specify NULL. If
you are building a selection list, use % to specify
all environments.

RAAP019E **Object(s) not dropped**

Explanation: An error occurred while dropping
the objects that you selected. The objects were
not dropped.

RAAP020E **No qualifying error log entries**
found in database

Explanation: No entries were found in the
Q.ERROR_LOG table that matched your selection
criteria. Check that you specified the correct date,
time, and user.

RAAP021E **No qualifying user profile found**
in database

Explanation: No entries were found in the
Q.PROFILES table that matched your selection
criteria. Check that you entered the correct
creator, translation, and environment.

RAAP022E **Translation must be a valid QMF**
translation value or "*"

Explanation: Enter a valid QMF translation
value. Valid values are ENGLISH, UPPERCASE,
FRANCAIS CANADIEN, SIMPLIFIED CHINESE,
T-CHINESE, DANSK, FRANCAIS, DEUTSCH,
ITALIANO, NIHONGO, HANGEUL,
PORTUGUES, ESPANOL, SVENSKA, FRANCAIS
(SUISSE), and DEUTSCH (SCHWEIZ). If you
enter *, the configuration default translation will
be used.

RAAP023E **Set asc/desc option to either "A" or**
"D"

Explanation: You can list the error log entries in
ascending or descending order. If you want to
list the oldest error log entries first, enter a value
of A for ascending (94/01/01 will display before
94/12/31). If you want to list the newest error log
entries first, enter a value of D for descending
(94/12/31 will display before 94/01/01).

RAAP024E **Characters per line must be**
between 22 and 999 inclusive

Explanation: The page width (the number of
characters per line) that you specify must be
within the QMF supported limits, which are 22
to 999, inclusive

RAAP025E   **Lines per page must be between 1 and 999 inclusive**

Explanation: The page length (the number of lines per page) that you specify must be within the QMF supported limits, which are 1 to 999, inclusive.

RAAP026E   **Please select one and only one "CASE" option**

RAAP027E   **Please select one and only one "DECIMAL" option**

RAAP028E   **Please select one and only one "LANGUAGE" option**

RAAP029E   **Please select one and only one "TRACE" option**

RAAP030E   **Please select either YES or NO for "CONFIRM" option**

RAAP031E   **Please select either REL or ER for "MODEL" option**

Explanation: Select one and only one of the listed values.

RAAP032E   **User profile already exists; Cannot create a duplicate**

Explanation: You cannot create a user profile with the specified creator, translation, and environment. If you want to change the attributes of an existing user profile, use the edit option.

RAAP033I   **Action was terminated; Cancel request honored**

Explanation: No action was processed due to your cancel command.

RAAP034I   ***objects dropped; * objects not dropped**

Explanation: Some of the objects that you selected were dropped; others were not, due to errors. Build a new selection list to determine which objects have not been dropped.

RAAP035E   **DB2 subsystem * not configured**

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAP036E   **No entries archived due to error**

Explanation: The selected entries were not archived due to errors.

RAAP037E   **No entries deleted due to error**

Explanation: The selected entries were not deleted due to errors.

RAAP038E   **Resource group already exists; Cannot create a duplicate**

Explanation: You cannot create a resource with the specified name. If you want to make changes to an existing resource group, use the edit option.

RAAP039E   ***entries archived; * entries not archived**

Explanation: Some of the error log entries were archived; others were not, due to errors. Build a new selection list to determine which entries still exist.

RAAP040E   ***entries deleted; * entries not deleted**

Explanation: Some of the error log entries were deleted; others were not, due to errors. Build a new selection list to determine which entries still exist.

RAAP041E   Cannot unassign a profile that is not assigned to this resource grp

Explanation: You can only unassign a user profile if it is already assigned to this resource group.

RAAP042E   Cannot assign a profile that is already assigned

Explanation: This assignment already exists. To reassign a profile, first unassign it, then assign it.

RAAP043E   Creator cannot be left blank

Explanation: This field cannot be left blank. You can use % and _ as wildcard characters in the creator for some actions, which are listed on the panel. For all other actions, you must specify the exact creator.

RAAP044I   Resource group does not exist; This action will create it

Explanation: You have selected to edit this resource group, however it does not contain any HPO resource options. This edit action will allow you to create the resource group with HPO resource options.

RAAP045I   User profile was not created; Cancel request honored

Explanation: The user profile was not created due to your cancel command.

RAAP046E   Wildcard characters are not allowed in this field

Explanation: You can specify multiple entries in this field. You must specify a unique entry without any wildcard characters (% or _).

RAAP047I   User profile was not modified; Cancel request honored

Explanation: The user profile was not modified due to your cancel command.

RAAP048E   Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAP049E   Not authorized to access objects for this owner

Explanation: You are not able to set your CURRENT SQLID to this ID. Any owner that you specify must be one of your valid SQLIDs.

RAAP050E   User cannot be left blank

Explanation: You must enter a value in the User field for this error log action.

RAAP051E   Message number cannot be left blank

Explanation: You must enter a value in the Message field for this error log action.

RAAP052E   Object(s) not found

Explanation: No object with this owner, name, and type exists in the database.

RAAP053I   Position the cursor on the desired row and select a valid action

Explanation: Review the list of supported actions at the top of this panel and select the desired action. If you want to exit this panel, enter the END command.

RAAP054E   Value must be positive integer

Explanation: You cannot enter alphabetic or special characters in this field. You must enter a positive integer.

RAAP055E   Value must be either "Y" (yes) or "N" (no)

Explanation: The only acceptable values for this field are yes or no.

RAAP056E   From Time cannot be left blank

Explanation: You must specify the From Time. To specify 8 a.m., enter 08:00. To specify noon, enter 12:00. To specify 3 p.m., enter 15:00. To specify midnight, enter 24:00.

RAAP057E   Timer interval must be between 0 and 6000 seconds

Explanation: The asynchronous timer will activate every "n" wall-clock seconds, where "n" is equal to the value that you enter in this field. The largest acceptable value is 6000 seconds (100 minutes).

RAAP058I   Schedule * does not exist; This action will create it

Explanation: You requested to edit this schedule, but it does not exist. This edit session will allow you to create the schedule.

RAAP059I   Schedule * not stored in database; Cancel request honored

Explanation: The schedule definition was not saved due to your cancel command.

RAAP060E   Table not found in database

Explanation: The table name that you entered cannot be found in the DB2 catalog. The DB2 subsystem ID specified may not be correct or you may have entered the table name or creator name incorrectly.

RAAP061I   Calculation for spill file completed

Explanation: The spill file allocation calculation is complete. The result is displayed on the panel.

RAAP062I   RUNSTATS has not been run on table; Space estimated for 1000 rows

Explanation: The spill file allocation is directly related to the number of rows in the specified table. Because the number of rows could not be obtained from the DB2 catalog, an estimate of 1000 rows was used.

RAAP063E   Device type not recognized

Explanation: Enter one of the following device types: 3350, 3380, or 3390.

RAAP064E   Owner cannot be left blank

Explanation: You must enter the owner of the objects to process. You can use % and _ as wildcard characters in the owner to select multiple objects if you are selecting the LIST action. For all other actions, you must specify the exact name.

RAAP065E   Name cannot be left blank

Explanation: You must enter the name of the objects to process. You can use % and _ as wildcard characters in the name to select multiple objects for some actions, which are listed on the panel. For all other actions, you must specify the exact name.

RAAP066E   Type can be "Q" (queries), "P" (procs), "F" (forms), or "%" (any)

Explanation: You must enter one of the object types listed. If you leave this field blank, % will be assumed as a default.

RAAP067E   Invalid parameter

Explanation: An invalid parameter was passed to a Manager program.

RAAP068E   "TO" object name cannot be left blank

Explanation: You cannot leave the name of the "TO" object blank. You can either keep the same

name as the "FROM" object or change the name.

RAAP069E   Invalid object name; QMF reserved words cannot be used

Explanation: You cannot use any of the following QMF reserved words as the name of a QMF object: CHART, DATA, FORM, FORM., PROC, PROFILE, QUERY, REPORT, and TABLE.

RAAP070I   User profile has been successfully created

Explanation: The user profile that you just entered has been added to the database.

RAAP071I   User profile was successfully updated

Explanation: The changes that you made to the user profile have been copied to the database.

RAAP072I   Assignment request(s) have been processed

Explanation: Your assignment requests have been processed and the database has been updated.

RAAP073I   No assignments were requested

Explanation: No assignments were processed because you did not select any of the rows on this panel.

RAAP074E   Archive data set allocation error; Cannot continue

Explanation: Make sure that the data set specified on the Error Log panel exists and is catalogued.

RAAP075E   Archive data set must have DSORG = PS and LRECL = 131

Explanation: The error log data set specified on the Error Log panel must conform to these DCB requirements.

RAAP076E   Archive data set not specified; Action not allowed

Explanation: You cannot request the ARCHIVE action unless you specify the name of a data set in which to archive the error log entries.

RAAP077E   Archive data set does not exist or has been archived/migrated

Explanation: Make sure that the data set specified on the Error Log panel exists and is catalogued.

RAAP078E   Not able to browse unless object is SQL or prompted query or proc

Explanation: Object Manager allows you to browse SQL and prompted queries and procedures. You cannot browse forms or any other types of queries.

RAAP079E   "TO" object owner cannot be left blank

Explanation: You cannot leave the "TO" object owner blank. You can either keep the same owner as the "FROM" object or you can change the owner.

RAAP080E   DB2 subsystem cannot be left blank

Explanation: You must set a valid DB2 subsystem ID before invoking this option.

RAAP081E   Resource group does not contain any HPO resource options

Explanation: To process this resource group, it must contain HPO resource options. This message indicates that only sample governor resource options exist for this resource group. You can edit this resource group to add the desired HPO resource options.

RAAP082E   Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAP083E   **"TO" DB2 subsystem * not configured**

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAP085E   **Cannot migrate⁄copy objects to a previous release of QMF**

Explanation: You cannot migrate⁄copy a QMF object to a previous release of QMF, due to downward incompatibilities. Migrating to a new release is fully supported because QMF versions are upward compatible. Migrating to the same release is also supported.

RAAP086I   **Action was not performed; Cancel request honored**

Explanation: The action you selected was not performed due to your cancel command.

RAAP087E   **"TO" information cannot be the same as "FROM"**

Explanation: When performing an action against an object, the "TO" information must be different than the "FROM" information.

RAAP088E   **"TO" DB2 subsystem cannot be left blank**

Explanation: You cannot leave the "TO" DB2 subsystem ID blank. You can either specify the same DB2 subsystem as the "FROM" subsystem, or you can change it. In either case, both the "FROM" and the "TO" DB2 subsystems must exist on the local MVS subsystem.

RAAP089E   **From Date cannot be left blank**

Explanation: This field cannot be left blank to browse an error log entry. Specify the date in the format requested on the panel.

RAAP090I   **Object's status changed from * to ***

Explanation: This object's restricted flag has been changed successfully.

RAAP091E   **Error connecting to DB2 * (RC=*, REASON=*)**

Explanation:

RAAP091E   **Error opening plan * (RC=*, REASON=*)**

Explanation: Either of these messages may appear while connecting to the specified DB2 subsystem. Check the return code (RC) and reason code (REASON) in *DB2 Messages and Codes*. Also check that the DB2 subsystem ID that you entered is correct.

RAAP092I   **Detail does not exist for schedule *; Browse bypassed**

Explanation: You have requested to browse the specified schedule. The schedule does not exist, so the browse request was bypassed.

RAAP093E   **Start and stop dates must be valid dates of the form YYYYMMDD**

Explanation: All dates are verified for correctness down to the number of days in a given month. For example, 19910229 is not a valid date because 1991 was not a leap year.

RAAP094E   **Schedule number must be between 0 and 255**

Explanation: There can be up to 255 schedules per resource group. Zero is used to indicate that no further schedule processing is desired, but is not a valid schedule number.

RAAP095E   **Start and stop times must be valid times of the form HHMM**

Explanation: Time fields are verified for correctness. Times must be between 0000 and 2400.

RAAP096E   Not able to compile unless object is query or procedure

Explanation: You can invoke Compiler only with queries or procedures. Forms cannot be selected for this action

RAAP097E   .*ADHOCP is only valid for procs

Explanation: Ad hoc procs are tracked with a name of *ADHOCP. You must select an object type of P (for proc) when selecting an object name of *ADHOCP.

RAAP098E   History not found for this object

Explanation: No historical data was found for this object. Either the HPO Activity Log is disabled or the log data sets have not yet been summarized into the DB2 tables.

RAAP099E   Not able to rename more than one object at a time

Explanation: You can only rename objects one at a time.

RAAP100E   Data set name cannot be left blank

Explanation: You must specify the name of a data set that exists and is catalogued. JCL will be generated and written to this data set.

RAAP101E   Not all job card lines can be left blank

Explanation: You must fill in at least one of the fields for the job card. If only one line is required for the job card, use the first line.

RAAP102E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAP103E   Error occurred while invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAP104E   Both TSO and CICS processing cannot be set to "N"

Explanation: You must specify that either TSO and∕or CICS logs be processed. You cannot set both to N.

RAAP105I   No object activity information available

Explanation: No historical data was found for this object. Either the HPO Activity Log is disabled or the log data sets have not yet been summarized into the DB2 tables.

RAAP106E   HPO Activity Log records not written; File I∕O error

Explanation: The actions performed in this session were not recorded into the HPO Activity Log data sets due to file I∕O problems. All actions were accepted, however they will not appear in the log.

RAAP107E   Action not performed; Errors indicated in status log

Explanation: The action you selected was not performed due to errors. The errors are described on the displayed status log panel.

RAAP108I   Action performed successfully

Explanation: The action that you selected was completed without errors or warnings.

RAAP109E   Action performed with warnings as indicated in status log

Explanation: The specified action was completed, however warnings were detected.

The status log panel lists all of the actions attempted and the result of each.

RAAP110E   Not authorized to select this option

Explanation: Only system administrators are allowed to select this option.

RAAP111E   Day values must be in range of 1-7, inclusive

Explanation: Values for the day of the week are given as numbers, where 1=Sunday, 2=Monday, 3=Tuesday, 4=Wednesday, 5=Thursday, 6=Friday, and 7=Saturday.

RAAP112I   Schedule * has been deleted from database

RAAP113E   Schedule * not deleted; May not exist in database

Explanation: The schedule specified was not deleted.

RAAP114E   No schedules found for resource group *

Explanation: No schedules exist for the specified resource group.

RAAP115E   Schedule number must be in range from 1 to 255

Explanation: Valid schedule numbers are between 1 and 255, inclusive.

RAAP116E   Value must be valid date in format specified

Explanation: You must specify a valid date in the form specified on the panel.

RAAP117E   Resource Group name must be supplied here

Explanation: Enter a valid resource group name or * for all resource groups. This field cannot be left blank.

RAAP118E   Invalid filtering criteria information

Explanation: You either specified From Time and not To Time or To Time and not From Time, or you entered an invalid value for Environment or Mode. Verify the values you entered in the Optional Filtering section.

RAAP119E   Object has not been compiled or registered

Explanation: No cross reference list is available because the object has not been compiled or registered with the End User Facility.

RAAP120E   From Date may not be greater than To Date

Explanation: You must enter a From Date that is earlier than the To Date. Dates must be entered in the format specified on the panel.

RAAP121E   From Time may not be greater than To Time

Explanation: You must enter a From Time that is earlier than the To Time. Times must be entered in the format specified on the panel.

RAAP122I   No query text available to browse for this run

Explanation: You requested to browse SQL text, but none is available for this entry. The SQL column must contain a value of Y for this entry to be eligible for SQL text browsing.

RAAP123E   Not able to analyze unless object is query

Explanation: You cannot analyze procedures or forms, only queries.

RAAP124E   Unrecognized command

Explanation: The command that you entered on the command line is not valid.

RAAP125I   Starting Query Analyzer; Please wait...

Explanation: The results of the analysis will be displayed when Query Analyzer is finished.

RAAP126E   Error allocating temporary data set; Cannot analyze

Explanation: An error occurred while allocating a temporary data set to use as input to Query Analyzer.

RAAP127I   Object remarks updated

Explanation: The remarks have been successfully modified for the object.

RAAP128E   Object remarks not updated

Explanation: The remarks were not updated due to a system error.

RAAP129E   Error connecting to location

Explanation: You cannot connect to the specified location from this DB2 subsystem.

RAAP130E   "TO" DB2 location must be left blank

Explanation: Because the "TO" DB2 subsystem is running DB2 Version 2 Release 2, the "TO" DB2 location must be left blank.

RAAP131E   Detail history available only for queries or procs

Explanation: You can only obtain detail history for queries and procs.

RAAP132E   Use *ADHOC only to view adhoc query history

Explanation: Ad hoc queries are tracked with a name of *ADHOC. You must select an object type of Q (for query) when selecting an object name of *ADHOC.

RAAP133E   Use *ADHOCP only to view adhoc proc history

Explanation: Ad hoc procs are tracked with a name of *ADHOCP. You must select an object type of P (for proc) when selecting an object name of *ADHOCP.

RAAP134E   Specified command not defined

Explanation: The entered command is not defined for this panel.

RAAP135E   Command needs argument

Explanation: Command requires at least one space following it and preceding an argument.

RAAP136E   Invalid argument for command

Explanation: Command argument is not valid.

RAAP137E   Only one argument allowed for command

Explanation: This command requires one and only one argument.

RAAP138E   Specified object name not found

Explanation: The object name could not be located as specified.

RAAP139E   Selection invalid; TSO Activity Log has not been configured

Explanation: The product has not been configured to track QMF TSO activity. Therefore, you cannot select the TSO Activity Log for processing.

RAAP140E   Selection invalid; CICS Activity Log has not been configured

Explanation: The product has not been configured to track QMF CICS activity. Therefore, you cannot select the CICS Activity Log for processing.

RAAP141I   Additional list filters have been applied to detail records

Explanation: This message will appear when the list filters are carried through and applied to detail history records. This indicates that some detail records are not shown, due to the filter specifications on the Additional List Filter panel.

RAAP142E   Value must be a positive integer less than 32768

Explanation: The maximum allowable value for this field is 32768.

RAAQ messages

Messages that begin with RAAQ are issued from the Query Analyzer online facility and appear on the message line on ISPF panels and within a QMF session.

RAAQ000E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAQ001E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid DB2 subsystem ID.

RAAQ002E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAQ003E   Select one query source

Explanation: You may analyze a query that exists in a data set or you may enter ad hoc query text in the space provided. You cannot leave both of these areas blank.

RAAQ004E   Select only one query source

Explanation: You may analyze a query that exists in a data set or you may enter ad hoc query text in the space provided. Only one of these sources can be selected at a time.

RAAQ005E   Error allocating skeleton data set

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAQ007E   Not all job cards can be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAQ008E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAQ009E   Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAQ010E   Data set name cannot be left blank

Explanation: You must specify the name of a data set that exists and is catalogued. JCL will be generated and written to this data set.

RAAQ011E   Data set must have RECFM = PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAQ012E   Member name not allowed with sequential data sets

Explanation: You cannot specify a member name for the data set because it is a sequential data set.

RAAQ013E   Member name cannot be left blank for PDS

Explanation: If you specify a partitioned data set, you must also specify a member name.

RAAQ014E   Data set must have LRECL = 79 or 80

Explanation: The data set that you specify must have a record length of either 79 or 80. No other record length is supported.

RAAQ015E   Error processing input data set; Analysis not performed

Explanation: An unexpected error was encountered. Your query was not analyzed, but processing will continue.

RAAQ016I   Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAQ017E   Failure attempting to run REXX program *

Explanation: The named REXX program could not be found. Make sure that the library containing the EXEC is allocated to your session.

RAAQ020I   Default values not saved; Cancel request honored

Explanation: Any changes that were just made to the default parameter settings have been discarded due to your cancel command.

RAAQ021E   Member not found in PDS

Explanation: The member specified is not found in the data set. Check that you have entered the name correctly and that the member exists.

RAAQ022E   Database cannot be blank if table space is specified

Explanation: If you specify table space name, then you must also specify a database name. You can, however, specify a database without a table space.

RAAQ023E   Error allocating temporary JCL file

Explanation: The generated JCL will reside in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAQ026E   Data set does not exist or has been archived/migrated

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is catalogued.

RAAQ100E   Call attachment failure on connect

RAAQ101E   Call attachment failure on open

Explanation: An error occurred while Query Analyzer either was connecting to DB2 or opening its application plan. In either case, query analysis will be bypassed, and your session will continue normally.

RAAQ102E   Call attachment failure on disconnect

Explanation: An error occurred while Query Analyzer was disconnecting from DB2. Query analysis was performed, and your session will continue normally.

RAAQ105E   Configuration module not found; Cannot analyze query

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the current DB2 subsystem. Query analysis will not be performed, but your session will continue normally.

RAAQ108E   No database/table space name given for PLAN_TABLE creation

Explanation: A PLAN_TABLE does not exist and no database/table space for creating one is specified in the active resource group. As a result, a PLAN_TABLE cannot be created and query analysis will be bypassed.

RAAQ109E   Query is not a SELECT statement

Explanation: Non-SELECT SQL is ignored by Query Analyzer.

RAAQ110E   SQL error in EXPLAIN processing

Explanation: The query could not be processed by the EXPLAIN command. Either a PLAN_TABLE does not exist or there is an error in the query. Your session will continue normally.

RAAR messages

Messages that begin with RAAR are issued from the Compiler runtime routines. They appear in the SYSOUT DD for batch programs and on the message line for online TSO and CICS programs when running programs generated with the HPO/Runtime option.

RAAR000E   Error loading runtime modules; REASON = *

Explanation: An attempt to dynamically load the runtime modules failed. Make sure that your JCL (if running in batch) or your TSO logon proc (if running online) allocates QMFHPO.SRAALOAD to STEPLIB.

RAAR001E   Invalid function code *

Explanation: An invalid function code was passed to the runtime modules. Verify any changes that may have been made to the control variables and flow of the generated program.

RAAR002E   Illegal call after end of data

Explanation: Once the runtime modules have indicated the end of the report, they do not expect to be called again. Verify any changes made to the control flow of the generated program.

RAAR003E   Invalid language *

Explanation: Only OS/VS COBOL and VS COBOL II programs can call the runtime modules. Since VS COBOL II is source compatible with AD/Cycle COBOL/370 and COBOL for MVS, these products can also call the runtime modules.

RAAR004E   Form contains illegal variable reference

Explanation: The generated program's form contains a variable reference which is not allowed by QMF. See *QMF Reference* for allowed variable references.

RAAR005E   Report page longer than physical page

Explanation: The page length specified is not large enough to hold any report data after formatting the page header and footer. Either increase the page length or reduce the size of the page header or footer.

RAAR006E   Fixed area wider than physical page

Explanation: The fixed columns in this report exceed your page width. Either increase the page width or reduce the number of fixed columns.

RAAR007E   Error opening report DD *

Explanation: A REPORTnn DD could not be opened. Make sure that the appropriate report DDs are defined in your JCL. Up to 99 of these DDs may be required.

RAAR008E   Invalid data type * in form

Explanation: The generated program's form contains a column with an unrecognized data type. If you have modified the program, refer to the column in error and make sure that the value for its data type is one of the following: INTEGER (0), SMALLINT (1), DECIMAL (2), FLOAT (3), VARCHAR (4), DATE (5), TIME (6), TIMESTAMP (7).

RAAR009E   Report DD format error

Explanation: The runtime modules have encountered an error while writing a record to one of the report DDs. The report DDs must have RECFM = F.

RAAR010E   Error writing report DD

Explanation: The runtime modules have encountered an error while writing a record to one of the report DDs. Verify the definition of each report DD.

RAAR011E   Memory exhausted

Explanation: The program has exhausted available memory. If the report does not make use of any of the xPCT usage codes or the ACROSS usage code, increase the region size. If the report does make use of any of the above usage codes, modify the program to make use of a spill file (see "Spill File").

RAAR012E   Error opening spill file

RAAR013E   Error writing spill file

RAAR014E   Error reading spill file

Explanation: An error occurred while processing the spill file. If your JCL does not define a RAASPILL DD, then add one (see "Batch Program requirements").

RAAR015E   Could not get LRECL for report DD

Explanation: The runtime modules was unable to obtain the characteristics of the DD named REPORT01. This is most likely because the DD is not defined. Verify your JCL.

RAAR016E   Report DD record format must be fixed

Explanation: The REPORTnn DDs must have RECFM = F.

RAAR017E   Page width must be between 22 and 999

Explanation: The page width (which is the minimum of the value of the PAGE-WIDTH variable in the program and one less than the LRECL on the REPORTnn DDs) must be between

22 and 999. Verify the definition of the PAGE-WIDTH variable and your JCL.

RAAR018E   Queue buffer too small for report data

Explanation: A queue buffer (and its size) is passed to the runtime modules at initialization time. This is the buffer in which each row of an online report is returned to the program. This message indicates that the buffer is not wide enough to hold a row of the report.

RAAR019E   Error creating queue; RC = *

Explanation: An error occurred when creating the ISPF table which is used to store the online report.

RAAR020E   Error executing REXX EXEC RAARCXPR; RC=*, REASON=*

Explanation: An error was received from the REXX EXEC named RAARCXPR in QMFHPO.SRAAEXEC. This EXEC is executed to evaluate FORM.CALC expressions. Make sure that this library is allocated to the SYSEXEC DD and that the named EXEC exists in the library.

RAAR021E   Unexpected value returned by RAARCXPR

Explanation: This message should not be received unless modifications have been made to the RAARCXPR EXEC. Verify that no modifications have been made.

RAAR022E   *

Explanation: An expression passed to the RAARCXPR EXEC for evaluation contained a

REXX error. The message text contains the REXX error message. This is not an error in the invocation of the REXX EXEC, but rather a REXX error in a FORM.CALC expression.

RAAR023E   User edit error 99101: unrecognized edit code *

Explanation: The DSQUEDIT module containing user edit routines that was loaded does not implement the specified edit code. Check that the library containing the desired DSQUEDIT module is allocated to STEPLIB.

RAAR024E   User edit error 99102: improper input data type for edit code *

RAAR025E   User edit error 99103: invalid input value for item to be formatted

---

RAAR026E   User edit error 99104: item to be formatted too short

---

RAAR027E   User edit error 99105: not enough room for result in ECSRSLT

RAAR028E   User edit error * for edit code *

RAAR030E   Authorization failure; Cannot generate report

RAAR998E   Unknown error *

RAAR999E   Unexpected internal error *

Explanation: An unexpected error occurred.

RAAU messages

Messages that begin with RAAU are issued from the End User Facility and appear on the message line on ISPF panels or CICS maps.

RAAU001E   Severe error; Internal ISPF table could not be created

Explanation: An unexpected error was encountered.

RAAU002E   Error submitting job for report *

Explanation: An error occurred while submitting JCL to run the selected report. Additional information may be written to the terminal by TSO.

RAAU003E   Report list is empty

Explanation: There are no reports registered in the system for the specified report owner. If the specified owner is not one of your primary or secondary SQLIDs, a search is made only for shared reports with that owner.

RAAU004E   Report LRECL must be numeric

Explanation: The logical record length (LRECL) that you specify for the printed report must be numeric.

RAAU005E   Error during CAF (SSID=* PLAN=* RC=* REASON=*)

Explanation: An error occurred while attempting to connect to DB2. Check the return code (RC) and the reason code (REASON) in *DB2 Messages and Codes*.

RAAU006E   SQL error detected; SQLCODE = *

RAAU007E   SQL warning detected; SQLCODE = *

Explanation: An SQL error or warning occurred. Check the SQL code in *DB2 Messages and Codes*.

RAAU008E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAU009E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid DB2 subsystem ID.

RAAU010E   DB2 subsystem * not configured

Explanation: You (or your administrator) must run the HPO Configuration Dialog for the specified DB2 subsystem.

RAAU011I   Default values not saved; Cancel request honored

Explanation: Any changes that you made to the default parameter settings have been discarded.

RAAU012I   Default values will be saved

Explanation: Any changes that you made to the default parameter settings will be saved in your ISPF profile.

RAAU013E   Invalid selection code; Use "S" or "E"

Explanation: To select a report, use a selection code of S. Technical users can use a selection code of E to edit JCL to run the report.

RAAU014E   Selection code of "E" is not valid for online reports

Explanation: A selection code of E is only valid for batch reports. This action is only recommended for technical users who are familiar with JCL.

RAAU015E   No reports were selected

Explanation: To select a report, use a selection code of S. Technical users can use a selection code of E to edit JCL to run the report. You can select more than one report at a time.

RAAU016E   Error invoking ISPF edit session

Explanation: An error occurred while editing the generated JCL. Check with your system

administrator and make sure that you are authorized to create and allocate temporary data sets.

RAAU017I   Report not processed; Cancel request honored

Explanation: The report will not be processed due to your cancel command.

RAAU018E   Please enter a numeric value for this input variable

Explanation: You cannot specify alphabetic characters when entering numeric values. Check the variable data type and enter a valid number.

RAAU019E   )IF out of sequence in skeleton at line *

RAAU020E   )ELSE out of sequence in skeleton at line *

RAAU021E   Unrecognized token in skeleton at line *

Explanation: The skeleton JCL data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAU022E   Report copies must be a number between 1 and 254

Explanation: If you specify a number of report copies, the value must be a positive integer that does not exceed 254.

RAAU023E   Report owner must be valid SQLID

Explanation: You must specify one of your primary or secondary SQLIDs as the report owner. That is, you must be authorized in DB2 to change your CURRENT SQLID to this report owner.

RAAU024E   Specified command not defined

Explanation: Valid commands are LOCATE, SELECT, and EDIT, and any abbreviations of these commands.

RAAU025E   Specified command requires an argument

Explanation: You must specify a report name as an argument to the command.

RAAU026E   Specified report not found

Explanation: The report that you have specified does not exist. Check the spelling of the report name.

RAAU027E   Error allocating temporary JCL data set *

Explanation: The JCL will be generated in a temporary data set that is created automatically. An error occurred while creating the data set. Associated error messages may be written to the terminal.

RAAU028E   Error allocating skeleton data set *

Explanation: An error occurred while trying to allocate QMFHPO.SRAASKEL to your session.

RAAU029E   Value must be blank, "T" (TSOID), or "P" (PRIMEID)

Explanation: Your QMF profile can be keyed by either your TSO logon ID or by your primary DB2 authorization ID. Enter the desired value.

RAAU030I   Starting QMF; Please wait...

Explanation: A QMF session must be started to run this report. This message will be displayed until QMF is started.

RAAU031E   *

Explanation: Any error or warning messages returned by QMF are listed with this error.

**RAAU032E Error starting QMF; QMF message
*; Start parameter ***

Explanation: A QMF session must be started to
run this report. The report cannot be run because
this process failed. The QMF error message
number and the start parameter in error are both
indicated in the message. See *QMF Messages and
Codes* for more information.

RAAU033I Job submitted for report *

Explanation: The report you selected will be
run in batch. This message indicates that the
batch job has been submitted for processing.

**RAAU034I Variable set * accepted; Ready for
next set**

Explanation: Because you pressed Enter after
the previous set of input variables were
specified, you now have to make a decision
whether to specify another set of input variables,
run the report with all sets previously specified,
or abort all report requests. Follow the
instructions in the panel header for valid keys
and commands.

**RAAU035E Data set must exist, have DSORG
= PS or PO, and have LRECL = 80**

**RAAU036E Data set must exist before JCL can
be generated**

Explanation: You must specify the name of a
data set that has the listed DCB characteristics.

**RAAU037E Member name cannot be specified
without data set name**

Explanation: You cannot leave the data set
name blank if you specify a member name.

**RAAU038E Cannot specify member name in
this field**

Explanation: You cannot specify the member
name as part of the data set name. For example,
PDS.LIBRARY(MEM) is invalid. Specify the

member name in the Member field.

**RAAU039E Member name cannot be specified
for sequential data sets**

Explanation: You cannot specify a member
name for a sequential data set.

**RAAU040E Member name must be specified
for partitioned data sets**

Explanation: If you specified a partitioned data
set, you must specify a member name in the
Member field.

RAAU041E Error connecting to location

Explanation: You cannot connect to the
specified location from this DB2 subsystem.
Check with your system or database
administrator.

RAAU042E Data set name is required

Explanation:

**RAAU043E Data set must have DSORG = PS
or PO**

Explanation:

RAAU044E Data set LRECL must be *

Explanation:

**RAAU045E Space units must be ″C″
(cylinders), ″T″ (tracks), or ″B″
(blocks)**

Explanation:

**RAAU046E Value must be an integer greater
than zero**

Explanation:

RAAU047E   Value must be an integer greater than or equal to zero

Explanation:

RAAU048E   Directory blocks specification is inconsistent with member name specification

Explanation:

RAAU049E   Record format must be ″F″, ″FB″, ″V″, or ″VB″

Explanation:

RAAU050E   Unable to retrieve attributes of specified data set

Explanation:

RAAU051E   Unit is required

Explanation:

RAAU052E   Error allocating DATAOUT

Explanation:

RAAU053E   Disposition must be ″S″ (SHR) or ″O″ (OLD)

Explanation:

RAAU054E   Data set must exist

Explanation:

RAAU056E   Error allocating DATAIN

Explanation:

RAAU057E   Input and output data sets cannot be the same

Explanation:

RAAU058E   Loop too long in skeleton at line *

Explanation:

RAAU059E   Nested loop in skeleton at line *

Explanation:

RAAU060E   Unexpected)ENDLOOP in skeleton at line *

Explanation:

RAAU061E   Invalid)LOOP syntax in skeleton at line *

Explanation:

RAAU062E   Disposition must be ″S″ (SHR), ″O″ (OLD), or ″M″ (MOD) when data set exists

Explanation:

RAAU063E   Disposition must be ″N″ (NEW) when data set does not exist

Explanation:

RAAU064E   SYSOUT flag must be ″Y″ (yes) or ″N″ (no)

Explanation:

RAAU065E   Record format must be ″FA″, ″FBA″, ″VA″, or ″VBA″

Explanation:

RAAU100E   Invalid scroll amount

Explanation: The scroll amount that you entered is invalid. Valid values are MAX, HALF, PAGE, DATA, CSR, or an integer.

RAAU101E   Invalid selection code; Use "S"

Explanation: To select a report, use a selection code of S.

RAAU102E   No reports found

Explanation: No reports have been assigned to this transaction ID.

RAAU103E   Queue overflow; Report list truncated

Explanation: The maximum number of registered reports that can be displayed is 32767. More than 32767 registered reports were found, but only the first 32767 will be displayed.

RAAU104E   Invalid argument to command

Explanation: The command that you entered does not accept the type of argument that you entered. For example, the LOCATE command (when entering variable values) can only accept a numeric argument.

RAAU105E   Only one argument to command is allowed

Explanation: The command that you entered accepts only one argument.

RAAU106E   No host variables found in registration database

Explanation: The row for the selected report in the Q.REPORTS table (the DB2 table holding the report registration information) contains a value of Y for the VARIABLES column.

However, the Q.REPORT_VARIABLES table does not contain any rows for the report. You (or your administrator) must resolve this inconsistency before you can run the report.

RAAU107E   Queue overflow; Host variable list truncated'

Explanation: The maximum number of variables that can be used by a registered report is 32767. More than 32767 variables were found for this report, but only the first 32767 will be displayed.

RAAX messages

Messages that begin with RAAX are primarily issued from the HPO Configuration Dialog and common functions.

RAAX000E   Please select one of the options listed below

Explanation: Choose one of the selection options listed on this panel.

RAAX001E   DB2 subsystem ID cannot be left blank

Explanation: You must enter a valid DB2 subsystem ID. This selects the subsystem to be configured.

RAAX002I   Configuration parameters not saved; Cancel request honored

Explanation: The configuration parameters were not saved due to your cancel command. Previous values remain in effect.

RAAX003E   Field cannot be left blank

Explanation: You must enter a value in this field. There is no default value.

RAAX005E   Invalid QMF version; Must be "3.3", "6.1", "7.1", "7.2", or "8.1"

Explanation: Enter one of these supported QMF versions and releases. If your QMF version and release is higher than 8.1 enter 8.1.

RAAX006E Translation must be a valid QMF translation value

Explanation: Enter the default value to use for Translation for this QMF installation. Valid values are ENGLISH, UPPERCASE, FRANCAIS CANADIEN, SIMPLIFIED CHINESE, T-CHINESE, DANSK, FRANCAIS, DEUTSCH, ITALIANO, NIHONGO, HANGEUL, PORTUGUES, ESPANOL, SVENSKA, FRANCAIS (SUISSE), and DEUTSCH (SCHWEIZ).

RAAX007E Data set does not exist or has been archived/migrated

Explanation: The specified data set could not be found. You must specify the name of a data set that exists and is catalogued.

RAAX008E Flag must be "Y" (yes) or "N" (no)

Explanation: The only acceptable values for this flag are yes or no.

RAAX009E Invalid data set name prefix

Explanation: Enter the prefix of the names of the CICS libraries at your site. This field is validated by checking for the existence of either a CICS .LOADLIB library or a .SDFHLOAD library.

RAAX010I Saving configuration parameters; Please wait...

Explanation: The configuration parameters are being saved in QMFHPO.SRAALOAD. Please wait while the library is updated.

RAAX011E Error allocating temporary data set; RC = *

Explanation: A severe error occurred while issuing a TSO command to save the configuration parameters. Additional information may be written to your terminal.

RAAX012E Error writing data sets

Explanation: An error occurred writing a temporary data set used as input to the assembler.

RAAX013E Assembler error writing configuration module; Use batch option

Explanation: To build the configuration module, an assembler program is created and assembled automatically. All errors encountered during the assemble process are considered severe. If an error occurs, you will browse the output from the assemble (which will contain more information about the error).

RAAX014E Linkage editor error writing configuration module: Use batch option

Explanation: To build the configuration module, an assembler program is created, assembled, and link-edited automatically. If an error occurs, you will browse the output from the link-edit (which will contain more information about the error).

RAAX021I Configuration parameters saved

Explanation: The configuration parameters have been saved.

RAAX022E Cannot bind plans or packages until subsystem is configured

Explanation: The application plans and packages cannot be bound until the subsystem is configured (by selecting option 1 from the HPO Configuration Dialog Selection Menu).

RAAX023I Binding plans; Please wait...

Explanation: The selected plans are being bound online. Please wait for this process to finish. Status information will be written to your terminal as the bind proceeds.

RAAX024I   Plans bound successfully

Explanation: The plans were successfully bound.

RAAX025E   Error binding plans

Explanation: An error occurred while binding the selected plans. More information should have been written to your terminal. If not, try binding the plans in batch.

RAAX026E   Member not allowed

Explanation: You must not specify a member in this field. The name of a partitioned data set (PDS) is expected. Enter a name without specifying a member.

RAAX027E   Invalid DCB info; Must be DSORG=PS, RECFM=FB, LRECL=80

Explanation: You must enter the name of a data set that has the DCB characteristics listed. Either specify the name of an existing data set with the proper characteristics, or enter the name of a nonexistent data set which you will subsequently be allowed to create online.

RAAX028E   Space units must be "T" (tracks) or "C" (cylinders)

Explanation: Enter the units for the following space allocations for the data set to be created.

RAAX029E   Invalid space quantity

Explanation: Enter a quantity (in the units specified in the previous field) for the primary or secondary space allocation for the data set.

RAAX030I   Data set(s) created

Explanation: The specified data sets have been created with the proper DCB information and the specified space allocations.

RAAX031E   Invalid DB2 version; Must be "6.1", ″7.1″, or ″8.1″

Explanation: Enter one of these supported DB2 versions and releases. If your DB2 version and release is higher than 8.1, enter 8.1.

RAAX032E   Member must be specified

Explanation: You must enter a member name with a data set name in this field.

RAAX033E   Invalid data set; Must be VSAM

Explanation: The specified data set is invalid. You must enter the name of a VSAM file. The specified data set is invalid.

RAAX034E   Cannot specify SQL text log without activity log

Explanation: SQL text cannot be logged without logging activity. If you specify an SQL text log, you must also specify an activity log.

RAAX035E   Invalid DCB info; Must be DSORG=PS, RECFM=VB, LRECL=3600, BLKSIZE=3604

Explanation: You must enter the name of a data set that has the DCB characteristics listed. Either specify the name of an existing data set with the proper characteristics, or enter the name of a nonexistent data set which you will subsequently be allowed to create online.

RAAX036E   CPU time must be non-negative integer

Explanation: You must specify a number for the CPU time threshold value.

RAAX037I   Configuration does not exist; This action will create it

Explanation: No configuration information was found for the specified DB2 subsystem. Proceeding with the configuration process will create it. Configuration values from the last

subsystem configured will be carried forward as default values.

RAAX038E   Unrecognized command

Explanation: The command that you entered on the command line is not valid.

RAAX039I   No plans were selected for bind

Explanation: You did not select any plans on the Bind Application Plans panel.

RAAX040E   Foreground configuration not supported with IEV90 assembler

Explanation: The IEV90 assembler has been detected on the system. In this case, saving the configuration parameters in the foreground is not supported. You must use the batch option.

RAAX041I   No packages were selected for bind

Explanation: You did not select any packages on the Bind Packages panel.

RAAX042I   Binding packages; Please wait...

Explanation: The packages for the components that you selected are being bound online. Please wait for this process to finish. Status information will be written to your terminal as the bind proceeds

---

RAAX043I   Packages bound successfully

Explanation: The packages for the components you selected have been successfully bound.

RAAX044E   Error binding packages

Explanation: An error occurred while binding the packages for the selected components. More information should have been written to your terminal. If not, try binding the packages in batch.

RAAX045E   Not all job cards may be left blank

Explanation: You must fill in at least one of these fields for the job card. If only one line is required for the job card, use the first line.

RAAX046E   Member cannot be specified with temporary data set

Explanation: When you are using a temporary data set for generated JCL, you cannot specify a member name. The temporary data set created will be a sequential data set.

RAAX047E   Invalid DCB info; Must be DSORG=PS or PO

Explanation: You must specify the name of a sequential data set or a partitioned data set.

RAAX048E   Member name has invalid syntax

Explanation: The member name that you entered does not conform to PDS member naming rules.

RAAX049E   Flag must be "E" (edit) or "S" (submit)

Explanation: To edit the JCL after it is generated, set this flag to E. To submit the JCL automatically after it is generated, set this flag to S. To bypass JCL generation and job submission, enter the END command.

RAAX050E   Could not open data set *

Explanation: The specified data set could not be opened. Verify that the data set exists, that you have permission to read it, etc.

RAAX051E   Error editing data set *

Explanation: The specified data set could not be edited. Verify that the data set exists, that you have permission to read it, etc.

RAAX052I   JCL submitted

Explanation: JCL to save configuration information, bind plans, or bind packages has been submitted.

RAAX053E   Error submitting JCL; RC = *

Explanation: An error occurred while submitting JCL. Additional information may be written to your terminal by TSO.

RAAX054E   Error writing data set *

Explanation: An error occurred while writing the specified data set. Verify that the data set is not full, that you have permission to write it, etc.

RAAX055E   Error reading data set *

Explanation: An error occurred reading the specified data set. Verify that the data set exists, that you have permission to read it, etc.

RAAX056E   Invalid control statement at line *
of *

Explanation: The skeleton data set contains an invalid control code. Verify that the installation process was successful and complete.

RAAX057E   Too many)IF's at line * of *

Explanation: The nesting of)IF's in the skeleton data set is too great. The maximum nesting level is 10. Verify that the installation process was successful and complete.

RAAX058E   Unexpected)ELSEIF at line * of *

Explanation: An)ELSEIF was found in the skeleton data set without a preceding)IF. Verify that the installation process was successful and complete.

RAAX059E   Unexpected)ELSE at line * of *

Explanation: An)ELSE was found in the skeleton data set without a preceding)IF. Verify

that the installation process was successful and complete.

RAAX060E   Unexpected)ENDIF at line * of *

Explanation: An)ENDIF was found in the skeleton data set without a preceding)IF. Verify that the installation process was successful and complete.

RAAX061E   Unexpected EOF in *

Explanation: The end of the skeleton data set was reached while processing was still within an)IF or)LOOP. Verify that the installation process was successful and complete.

RAAX062E   Loop too long at line * of *

RAAX063E   Illegal nested loop at line * of *

Explanation: The skeleton data set contains an invalid construct. Verify that the installation process was successful and complete.

RAAX064E   Unexpected)ENDLOOP at line *
of *

Explanation: An)ENDLOOP was found in the skeleton data set without a preceding)LOOP. Verify that the installation process was successful and complete.

RAAX065E   Unterminated)IF in loop at line *
of *

Explanation: An)ENDLOOP was found in the skeleton data set without an)ENDIF to terminate an)IF within the loop. Verify that the installation process was successful and complete.

RAAX066I   Plans not bound; Cancel request
honored

Explanation: The selected plans were not bound due to your cancel request.

RAAX067I Packages not bound; Cancel request honored

Explanation: The packages for the selected components were not bound due to your cancel request.

RAAX068E Invalid DCB info; Must be DSORG=PO, RECFM=F, LRECL=79

RAAX069E Invalid DCB info; Must be DSORG=PO, RECFM=V, *<=LRECL<=7290

RAAX070E Invalid DCB info; Must be DSORG=PO

RAAX071E Invalid DCB info; Must be DSORG=PO, RECFM=F, LRECL=80

RAAX072E Invalid DCB info; Must be DSORG=PO, RECFM=U

Explanation: You must specify the name of a data set with the specified DCB characteristics.

RAAX073E Flag must be "F" (foreground) or "B" (batch)

Explanation: You must specify either F to perform the selected action online at your terminal while you wait, or B to generate JCL to perform the selected action in batch.

RAAX074E Temporary data set not allowed in this field

Explanation: You cannot specify a temporary data set (*TEMP) in this field.

RAAX075E Error allocating work data sets; Use batch mode for action

Explanation: An unknown error occurred while allocating work data sets to perform the selected

action online. Try selecting batch mode for the action.

RAAX076E Work data set DCB information overridden; Use batch mode for action

Explanation: The system has overridden the DCB characteristics of a work data set needed to perform the selected action online. This is most likely the result of automatic selection of block size for allocated data sets. Try selecting batch mode for the action.

RAAX077E Selected option is not installed

Explanation: The option that you selected has not been installed

---

RAAX078E .Error issuing LMINIT on data set

Explanation: A severe ISPF error occurred when issuing the LMINIT service.

RAAX079E Error issuing LMOPEN on data set

Explanation: A severe ISPF error occurred when issuing the LMOPEN service.

RAAX080E Could not locate required load modules

Explanation: Neither the RAACGUI or the RAARM module could be located in QMFHPO.SRAALOAD. This probably indicates an error unloading the distribution tape.

RAAX081I Some required QMF files are not allocated; Trying to continue...

Explanation: Certain QMF data sets are required to be allocated to your TSO session to run QMF. This message indicates that some of the required data sets are not allocated to your session. Although QMF may operate successfully, some functions require these data set allocations. See *Installing QMF on MVS* to determine the required data set allocations for QMF.

RAAX082E   RAAXPR/RAAXTB cannot be found; contact product administrator

Explanation: Either RAAXPR or RAAXTB is missing from the capital SRAALOAD library.

RAAX083E   Invalid registration or trial module; contact product administrator

Explanation: Either the registration (RAAXPR) or trial (RAAXTB) module contains an invalid key.

RAAX084E   Number of additional log files must be an integer between 0 and 20

Explanation: Enter the number of additional log data sets to be allocated. In environments that support large numbers of simultaneous QMF users, adding additional log data sets can eliminate file contention by spreading the activity logging I/O across multiple files. Entering 0 results in no additional log data sets. A value of 5, for example, would allocate an additional 5 TSO activity and SQL log data sets. These data sets are created from the base file names you explicitly provide for the TSO activity and SQL text log data sets, and are processed automatically by HPO. A value greater than 0 should be considered on heavily utilized QMF systems.

RAAX085E   * DSN must be less than 34 characters long to use this option

Explanation: Additional log data sets will be named by appending a numeric suffix to the explicit names entered previously on the panel. As a result, the explicit names entered must be no longer than 34 characters.

RAAX086E   Error allocating * file *; RC = *

Explanation: An error occurred while allocating the specified data set. Additional messages written to the terminal may include more information about the error.

RAAX998E   User *; Program *; Abend *

Explanation: This message, written to the system log, indicates that the specified user running the specified program has encountered an abend condition. Contact product support.

RAAX999E   User *; Program *; Terminating

Explanation: This message, written to the system log, indicates that the specified program is terminating prematurely. Other error messages written to the user terminal or system log contain more information about the cause of the premature termination. Contact product support.

Appendix A. Connection to QMF for Exports

One of the powerful features of Program Generator is that it can **automatically** export QMF queries, forms, and procedures when it is invoked from within a QMF session or from outside a QMF session. Program Generator uses the SAA callable interface to establish an instance of QMF and to communicate with it.

Export data set attributes

QMF requires the following DCB for export data sets:

Data Set Type	LRECL	RECFM
QUERY	79	F
PROC	79	F
FORM	minimum 161, maximum 7290	V

Exporting from within a QMF session

A unique feature of Program Generator is that you can invoke it from within a QMF session. This allows you to easily navigate between QMF and Program Generator without having to repeatedly exit and restart each. The primary functional benefit of using Program Generator under QMF is that the current QUERY, FORM, or PROC object can be used.

Build shared QMF procedure

To invoke Program Generator from a TSO/ISPF session, you can issue the following TSO command:

```
CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

To invoke Program Generator from under QMF, a shared procedure should be set up that executes this TSO command. The following is a QMF procedure (QMFADM.RCO), which contains a single command:

```
TSO CALL 'QMFHPO.SRAALOAD(RAAMAIN)' 'CO'
```

To run Program Generator from QMF, you run this QMFADM.RCO procedure from the QMF command line:

```
RUN PROC QMFADM.RCO
```

QMFHPO.SRAALOAD must be allocated to the TSO session when this procedure is run.

Build QMF command synonym

You can build a QMF command synonym to run this TSO command. RCO, which is a QMF command synonym, is created during installation. All you need to type on the QMF command line is **RCO**.

Exporting from outside of QMF

The SAA callable interface of QMF (explained in detail in *Developing DB2 QMF Applications* and *Installing and Managing DB2 QMF on TSO/CICS*) has the ability to start an instance of QMF and execute QMF commands. Program Generator makes use of this SAA callable interface each time that you direct it to automatically export QMF objects.

QMF invokes a REXX program that initializes start-up parameters. A default REXX initialization program is shipped with QMF. This sample initialization program, named DSQSCMDE, resides in the QMF.SDSQEXCE library. To run QMF, the SDSQEXCE library must be allocated to the SYSEXEC DD in your TSO logon procedure (as directed in *Installing and Managing DB2 QMF on TSO/CICS*).

On the Set Default Parameters panel for Program Generator, there is a field named **QMF/REXX Initialization Program**. If you leave this field blank, DSQSCMDE will be used as the initialization program. If you want Program Generator to use a different REXX program, specify the name on this default panel.

The DB2 subsystem ID that is specified on the Program Generator Menu will override the DSQSSUBS parameter that is set in the REXX program.

Appendix B. Migrating from the QMF Sample Governor

If you are currently using the QMF sample governor (TSO or CICS), you should keep your existing resource groups separate from any new groups that you create using the Governor online facility.

If the HPO/Governor module detects a resource group with only sample resource options (SCOPE, ROWLIMIT, ROWPROMPT, and so on), it will govern the QMF session appropriately using those thresholds and limits. Otherwise, if it detects a resource group with sample and HPO resource options (AACOM, AASCHD), the sample thresholds and limits will be ignored.

Because there is not a one-to-one relationship between sample and HPO resource options, there is no fail-safe, automated method of migration. However, you can quickly establish comprehensive and effective QMF resource controls using the Governor online facility.

Appendix C. Interface to the HPO Call Attachment Module

The HPO call attachment module (AACAF) performs three functions:
- Attach to DB2
- Open a plan
- Disconnect from DB2

Parameter area structure

```
01  CAF-AREA.
    03  CAF-ACTION      PIC S9(9) COMP.
    03  CAF-SSID        PIC X(4).
    03  CAF-PLAN        PIC X(8).
    03  CAF-RETURN      PIC S9(9) COMP.
    03  CAF-REASON      PIC X(8).
```

Input values

Parameter	Description
CAF-ACTION	Valid input values are +0 (connect to DB2), +1 (open plan), and +2 (disconnect from DB2).
CAF-SSID	The DB2 subsystem ID to which to connect. This is required when the action code is +0 or +1.
CAF-PLAN	The name of the plan to open. This is required when the action code is +1.

Output values

Parameter	Description
CAF-RETURN	This is set to +0 if the function is completed successfully. Otherwise, it contains the CAF return code.
CAF-REASON	This is set to spaces if the function is completed successfully. Otherwise, it contains the CAF reason code.

Pseudocode for static call

```
move appropriate values into CAF-AREA.
CALL 'AACAF' USING CAF-AREA.
IF CAF-RETURN NOT = ZERO
```

THEN process error.

Appendix D. Program Generator Specifications

This appendix describes specifications and restrictions for Program Generator.

QMF commands supported in procedures

The following QMF commands are supported when parsing a QMF linear procedure:

- DISPLAY REPORT
- ERASE TABLE
- IMPORT FORM
- IMPORT QUERY
- PRINT REPORT
- RUN QUERY
- SAVE DATA
- SET GLOBAL
- SET PROFILE

Edit codes supported in forms

All QMF edit codes are supported, with the following restrictions:

- The B, BW, X, and XW edit codes are supported only when generating HPO/Runtime programs.
- User-defined edit codes are not supported when generating CICS programs.
- Vxxxx edit codes with floating point values as input are not supported when generating standalone programs.
- The TDL and TTL date and time edit codes are not supported.

Usage codes supported in forms

All QMF usage codes are supported, with the following restrictions:

- The ACROSS and CALC usage codes are supported only when generating HPO/Runtime programs (which implies that they are not supported when generating CICS programs).
- The CSUM, PCT, CPCT, TPCT, and TCPCT usage codes are not supported when generating programs that also use the ACROSS usage code.
- The PCT, CPCT, TPCT, and TCPCT usage codes are not supported when generating CICS programs.

Aggregation variables in form text (such as &AVG1) are supported in the same way as the corresponding usage code.

Additional fields supported in forms

All QMF form panels and fields on those panels are supported, with the following restrictions:

- The **Select Panel Variation?** field on the FORM.DETAIL panel and the entire FORM.CONDITIONS panel are not supported. An error will occur at generation time if they are specified.
- Specification of column definitions on the FORM.COLUMNS panel is not supported. An error will occur at generation time if they are specified.
- Specifying BOTTOM for the **Blank Lines Before Text** field on the FORM.FINAL panel is silently treated as if 0 was specified.
- The **Line wrapping width?** field on the FORM.OPTIONS panel is not supported and is silently ignored if it is specified.
- The **Column wrapped lines kept on a page?** field on the FORM.OPTIONS panel is not supported in HPO∕Runtime programs and is silently ignored if it is specified. This field is supported in standalone programs.

Additional restrictions and limitations

- The maximum number of reports per procedure is 100.
- The maximum number of substitution variables per report is 50.
- &DATE and &TIME variables in form text are always formatted according to the ISO date and time formats, regardless of the installation default.
- Global substitution variables used in form text can only be replaced with host variables when generating standalone programs.

Restrictions on and dependencies between the different program generation options are described in "Setting generation options," "Setting extended generation options," and "Setting proc program generation options."

Appendix E. HPO Activity Log data set specifications

This appendix describes the format of the HPO Activity Log data sets and the values that can appear in each field of each record.

HPO Activity Log record types

There are several record types written to the HPO Activity Log data sets. The first byte in each record identifies the type of record.

Record Type	Description
X'00'	Start QMF session
X'01'	ERASE command
X'02'	PRINT command
X'03'	DISPLAY command
X'04'	RUN command
X'05'	EXPORT command
X'06'	IMPORT command
X'07'	SAVE command
X'08'	Incremental database activity
X'09'	CONVERT command
X'1F'	End QMF session

Layout for type X'00' and X'1F' records

Offset	Byte Numbers	Description
0	1	Record type
1	2-51	Reserved for future use
51	52-55	Date in packed signed Julian format (1/31/1996 is stored as X'0096031F')
Offset	Byte Numbers	Description
55	56-59	Time in packed unsigned format (12:10:46:50 is stored as X'12104650')
59	60	Reserved for future use
60	61-68	TSOID

68	69	'2' or '3' TSO session; '5' CICS session, 'O' Object Manager
69	70-73	DB2 Subsystem ID
73	74	'1' online session; '2' batch session
74	75-76	Reserved for use by the HPO Activity Log batch job
76	77-80	Reserved for future use

Layout for type X'01' through X'07' and X'09' records

Offset	Byte Numbers	Description
0	1	Record type
1	2-17	Object location
17	18-25	Object owner
25	26-43	Object name
43	44-51	Current SQLID
51	52-55	Date in packed signed Julian format (1/31/1996 is stored as X'0096031F')
55	56-59	Time in packed unsigned format (12:10:46:50 is stored as X'12104650')
59	60	Success indicator, one of the HPO/Governor module cancel codes
60	61-68	TSOID
68	69	'2' or '3' TSO session; '5' CICS session, 'O' Object Manager
69	70-73	DB2 Subsystem ID
73	74	'1' online session; '2' batch session
74	75-76	Reserved for use by the HPO Activity Log batch job
Offset	Byte Numbers	Description
76	77-80	Reserved for future use

Layout for type X'08' records

Offset	Byte Numbers	Description
0	1	Record type
1	2-3	Reserved for future use
3	4-7	Number of rows fetched in binary integer format (256 rows is stored as X'00000100')

Offset	Byte Numbers	Description
7	8-11	CPU time consumed (in hundredths of seconds) in binary integer format (1 second is stored as X'00000064')
11	12-15	Current time in packed unsigned format (12:10:46:50 is stored as X'12104650')
15	16-17	Reserved for future use
17	18-80	Same as record types X'01' through X'07' and X'09'

Layout for SQL Text Log file

Offset	Byte Numbers	Description
0	1	Record type (X'08' for SQL text record)
1	2-3	Reserved for future use
3	4-7	Number of rows fetched in binary integer format (256 rows is stored as X'00000100')
7	8-11	CPU time consumed (in hundredths of seconds) in binary integer format (1 second is stored as X'00000064')

Appendix F. HPO DB2 tables

This appendix describes the format of the HPO DB2 tables and the values that can appear in each column of each table.

Object activity summary table layout (Q.OBJ_ACTIVITY_SUMM)

Column Name	Data Type	Description
OBJOWNER	CHAR(8)	Object owner
OBJNAME	VARCHAR(18)	Object name
SSID	CHAR(4)	DB2 subsystem ID
FDATE	DATE	First-used date
FTIME	TIME	First-used time
FTSOID	CHAR(8)	First-used TSOID
FSQLID	CHAR(8)	First-used SQLID
FACTN	CHAR(1)	First-used action: X'01' ERASE; X'02' PRINT; X'03' DISPLAY; X'04' RUN; X'05' EXPORT; X'06' IMPORT; X'07' SAVE; X'09' CONVERT
FENVIRO	CHAR(1)	First-used environment: '2' or '3' TSO, '5' CICS, 'O' Object Manager, 'W' Windows
FMODE	CHAR(1)	First-used mode: '1' online session, '2' batch session
LDATE	DATE	Last-used date
LTIME	TIME	Last-used time
LTSOID	CHAR(8)	Last-used TSOID
LSQLID	CHAR(8)	Last-used SQLID
LACTN	CHAR(1)	Last-used action (see FACTN for values)
LENVIRO	CHAR(1)	Last-used environment (see FENVIRO for values)
LMODE	CHAR(1)	Last-used mode (see FMODE for values)
USE_CT	INTEGER	Number of times object has been used
CAN_CT	INTEGER	Number of times object has been canceled by the HPO/Governor module
RUN_CT	INTEGER	Number of times object has been run
Column Name	**Data Type**	**Description**
LMDATE	DATE	Last-modified date

LMTIME	TIME	Last-modified time
LMTSOID	CHAR(8)	Last-modified TSOID
LMSQLID	CHAR(8)	Last-modified SQLID
LMACTN	CHAR(1)	Last-modified action (see FACTN for values)
LMENVIRO	CHAR(1)	Last-modified environment (see FENVIRO for values)
LMMODE	CHAR(1)	Last-modified mode (see FMODE for values)

> **Note:** For data retrieval purposes, a unique index should be created on columns OBJOWNER and OBJNAME.

Object activity detail table layout (Q.OBJ_ACTIVITY_DTL)

Column Name	Data Type	Description
OBJOWNER	CHAR(8)	Object owner
OBJNAME	VARCHAR(18)	Object name
SSID	CHAR(4)	DB2 subsystem ID
DATE	DATE	Date query was run
TIME	TIME	Time query was run
TSOID	CHAR(8)	TSOID running query
SQLID	CHAR(8)	CURRENT SQLID running query
ENVIRO	CHAR(1)	Environment in which query was run: '2' or '3' TSO, '5' CICS
MODE	CHAR(1)	Mode in which query was run: '1' online session, '2' batch session
ROWCT	INTEGER	Number of rows fetched
CPUCT	INTEGER	CPU time consumed (in hundredths of seconds)
SUCCESS	CHAR(1)	One of the HPO/Governor module cancel codes
SQLTEXT	VARCHAR(3500)	SQL Text
ETIME	TIME	Time query ended
IXTIME	INTEGER	HPO internal use
Column Name	**Data Type**	**Description**
BYTECT	INTEGER	Number of bytes fetched (not used by QMF HPO)

> **Note:** For data retrieval purposes, a unique index should be created on columns OBJOWNER, OBJNAME, DATE, TIME, and IXTIME.

Report registration table layout (Q.REPORTS)

Column Name	Data Type	Description
REPORT_OWNER	CHAR(8)	Report owner
REPORT_NAME	VARCHAR(18)	Report name
RESTRICTED	CHAR(1)	'Y' restricts access to this report; 'N' allows shared access to this report
ENVIRONMENT	CHAR(1)	'B' for batch; 'T' for TSO; 'C' for CICS
LANGUAGE	CHAR(1)	'1' or 'B' for OS/VS COBOL; '2' for VS COBOL II; 'C' for C
DB2_CONNECTION	CHAR(1)	'C' for call attachment facility; 'T' for TSO attachment facility
PLAN_NAME	CHAR(8)	Plan name (optional)
PROGRAM_NAME	CHAR(8)	Program name
LOAD_LIBRARY	VARCHAR(44)	Load library name (optional)
VARIABLES	CHAR(1)	'Y' if this report uses variables; 'N' otherwise
QUERY_OWNER	CHAR(8)	Owner of query that was converted into program
QUERY_NAME	VARCHAR(18)	Name of query that was converted into program
FORM_OWNER	CHAR(8)	Owner of form that was converted into program
FORM_NAME	VARCHAR(18)	Name of form that was converted into program
PROC_OWNER	CHAR(8)	Owner of procedure that was converted into program
PROC_NAME	VARCHAR(18)	Name of procedure that was converted into program
VARIABLE_LRECL	SMALLINT	LRECL of HOSTVARS DD for batch programs
DESCRIPTION	VARCHAR(55)	Description of this report
RDATE	DATE	Date of program registration
RTIME	TIME	Time of program registration
DATAOUT_LRECL	SMALLINT	LRECL of DATAOUT DD, or -1 if n/a
DATAIN_LRECL	SMALLINT	LRECL of DATAIN DD, or -1 if n/a
REPORT_LRECL	SMALLINT	LRECL of REPORTnn DDs, or -1 if n/a
NUM_REPORT_FILES	SMALLINT	Number of REPORTnn DDs used by program, or -1 if unknown or n/a
PROGRAM_TYPE	CHAR(1)	Type of program: 'P' print, 'D' display, 'N' no report, 'L' data layer, 'P' proc

Note: For data retrieval purposes, a unique index should be created on columns REPORT_OWNER and REPORT_NAME.

Report variables table layout (Q.REPORT_VARIABLES)

Column Name	Data Type	Description
REPORT_OWNER	CHAR(8)	Report owner
REPORT_NAME	VARCHAR(18)	Report name
NAME	VARCHAR(31)	Variable name
TYPE	VARCHAR(15)	Variable data type
SEQUENCE	SMALLINT	Sequence number used to order variables

Note: For data retrieval purposes, a unique index should be created on columns REPORT_OWNER, REPORT_NAME, and SEQUENCE.

Appendix G. HPO Activity Log Failure reason codes

The following reason codes are recorded in the system log with message prefix **RAAG998I** whenever an error occurs while processing any of the HPO Activity Log data sets.

Reason Code	Description
2	Load of RAAX configuration module failed
3	Load of RAAXssid configuration module failed
5	Reserved
7	Severe internal error
8	Enqueue failure on HPO Activity Log data set
9	Dynamic allocation failure on HPO Activity Log data set
A	ESTAE routine captured abend while attempting to write to HPO Activity Log data set; data set may be full
B	HPO Activity Log data set DCB verification failed; data set not created or not created with proper attributes
C	Enqueue failure on HPO SQL text data set
D	HPO SQL text data set DCB verification failed; data set not created or not created with proper attributes
E	HPO SQL Text data set open failure
F	Dynamic allocation failure on HPO SQL text data set
G	ESTAE routine captured abend while attempting to write to HPO SQL text data set; data set may be full
O	HPO Activity Log data set open failure
S	SQL error attempting to read Q.OBJECT_DIRECTORY
T	DB2 call attachment failure; user does not have authority to execute the HPO/Governor module plan or plan has not been bound

Appendix H. HPO/Governor Module cancel codes

The following cancel codes are recorded in the HPO Activity Log and the Q.OBJ_ACTIVITY_DTL table.

Cancel code	Description
0	Not canceled
1	Canceled by QMF
2	Canceled by Governor
3	Canceled by the Governor site-defined exit routine
4	Canceled by Governor; QMF access not allowed
5	Canceled by Governor; Row limit exceeded
6	Canceled by Governor; CPU time limit exceeded
7	Canceled by Governor; QMF command not allowed
8	Canceled by Governor; SQL verb not allowed
9	Canceled by Governor; User canceled from prompt dialog
A	Canceled by Query Analyzer
B	Canceled by Monitor
C	Canceled by Governor; Idle query timeout exceeded
D	Canceled by Governor; Byte limit exceeded
E	Canceled by QMF; Error occurred
N	Fatal error running query

Appendix I. The RAADEBUG data set

The RAADEBUG data set should be allocated with:

- DSORG=PS
- RECFM=F
- LRECL=121

This is the record layout for this file:

Offset	Byte numbers	Description
0	1	Reserved
1	2-9	TSOID
9	10	Reserved
10	11-18	Current SQLID
18	19	Reserved
19	20-29	Date in YYYY/MM/DD format
29	30	Reserved
30	31-38	Time in HH:MM:SS format
38	39	Reserved
39	40-117	Message
117	118-121	Reserved

Appendix J. Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10594-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106-0032, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will

be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
J46A/G4
555 Bailey Avenue
San Jose, CA 95141-1003
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

AIX	iSeries
C/370	MVS
CICS	OS/390
COBOL/370	Parallel Sysplex
DataJoiner	PL/I
DB2	QMF
DB2 Information Integrator	RACF
DB2 Universal Database	S/390
Distributed Relational	SQL/DS
Database Architecture	VM/ESA
DRDA	VSE/ESA
GDDM	VTAM
IBM	WebSphere
IBMLink	z/OS
IMS	zSeries

Java or all Java-based trademarks and logos, and Solaris are trademarks of Sun Microsystems, Inc. in the United States, other counrtries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, and service names may be trademarks or service marks of others.

Glossary

A

ad hoc query. A query that has not been named or saved; it has been submitted and executed "on the fly."

activity log. A repository for QMF session activity and object usage information, and writes to the HPO Activity Log data sets.

application plan. The output produced by the BIND process. It contains information about resources (tables, indexes) required and the access path used by DB2 to satisfy an SQL request.

B

bind. A process that compiles one or more DBRMs into an application plan.

buffering. A portion of storage used to hold input or output data temporarily, which can affect system overhead and can be limited by the amount of memory available to the executing program.

C

collection. A set of packages which are bound together with a collection ID. If you use several versions of QMF for Windows, you can use different collection names for different versions to avoid naming conflicts.

column. Contains values that have the same data type in the database. A value is similar to a field in a record. A value is the smallest unit of data that you can manipulate with SQL. The two basic components of the column definition are the name and the data type.

common controls. Controls that are common to a resource group.

D

data layer program. A general utility program providing access to DB2 in order to retrieve or manipulate data, and are generated from QMF queries.

display programs. Programs that allow you to browse a report by panel, typically before all data is read (fetched).

edit codes. Codes that determine how a column is formatted in a report. You use different edit codes depending on the type of data you want to format. Some edit codes include: character, date, graphic, numeric, time, timestamp, and user-defined.

E

enrollment. A method of granting a user profile certain authorities to start a QMF session.

error log. A time- and date-stamped log that identifies the user and message number for system or resource errors.

end user facility. Registers reports that have been generated and prepared for execution, then is used by end users to run compiled report programs.

F

filtering. A means to qualify object selection lists. An object must pass all of the enabled filters to be included in the selection list.

G

generation option. Options that allow you to control the characteristics of the program that will be generated, which are set on the Generation Options panel and the pop-up

options, which can affect the speed and performance of the generated program.

governing.   Establishes certain limits and controls for database and communication resources.

governor.   Controls QMF session activity by obtaining thresholds and taking control of resource groups.

H

host variable.   Enable you to use the same static query to retrieve different data. To retrieve different data, you do not need to rebind a package for the static query; instead, you supply different values for the host variables in the query.

Database servers specify rules for where host variables can appear in a query. Refer to documentation for your database server for these rules.

Host variables must have a specific data type. A value that you provide for a host variable must conform to that variable's data type.

L

linear procedure.   Any procedure that does not begin with an IBM Object REXX comment. A linear procedure can run QMF commands, comments, blank lines, RUN commands, and substitution variables.

list.   To display data in an ordered format. For example, the LIST command in BASIC displays lines of a program. A list is any ordered set of data.

M

monitor.   Supplies a real-time interface to QMF session activity information, accepting administrator commands and passing them on to the HPO/Governor module.

O

object.   A query, form, procedure, or table.

object list.   Tree-structured representations of the database objects available on the server. Which objects can be viewed depends upon your resource limits. Objects can be added and removed from the object list; also, the objects can be saved and shared with other users.

online facilities.   Facilities that help organize and simplify the administration and management of QMF, including: Object Manager, Governor, Monitor, Query Analyzer, User Profile, Error Log, Spill File, HPO Activity Log JCL, and QMF start-up parameters.

open enrollment.   A type of enrollment that is assigned to a user profile which searches for a creator equal to SYSTEM so the user can start a QMF session.

P

package.   An object containing a set of SQL statements that have been statically bound (access paths to the data are selected and some authorization checking is performed) and are available for processing.

prepare program.   An interface that prepares DB2 programs, online or in batch, and involves running a precompile, bind, CICS command translation (for CICS programs), compile, and link.

procedure.   An object that contains QMF commands. A procedure can be run with a single RUN command.

A procedure is a set of commands that enable you to run queries, print reports, import and export data, and perform other functions with a single command.

proc program.   A program that acts as a driver to run each of the procedure's report programs in sequence, and it requires that each report program has been generated and the report

programs must have the same characteristics such as being all batch programs.

print program.   A specialized program that produces a printed version of a report being displayed by a display program, and is invoked by issuing the PRINT command.

program generator.   A facility used by programmers to convert QMF reports (queries, forms, and procedures) into compiled programs, or to generate general purpose programs for accessing DB2.

Q

QMF report.   The result of issuing the QMF commands RUN QUERY and PRINT REPORT, sometimes referred to as a query and often is the output of QMF procedures.

query.   A request for a specific result set of information from a database. You can work with an SQL query, a prompted query or a natural query.

query analyzer.   Provides preemptive governing capabilities by trapping queries before they are processed by DB2.

R

report.   A compiled program, typically converted from a QMF query, query and form, or procedure; or a non-compiled QMF query, query and form, or procedure.

resource group.   A set of related controls that restrict when a QMF session can begin, what type of session can be started, what types of QMF commands and SQL verbs can be processed, and the amount of system resources that can be consumed.

resource limits.   Limits and controls that govern the use of database and communication resources. These include setting schedules, time-outs, limits, authorization to SQL verbs, binding and object tracking privileges, LOB options, Report Center, and other options.

resource limits group.   Users belonging to a group for which certain restrictions and permissions have been defined for schedules, time-outs, limits, SQL verbs, options, save data, binding, object tracking, LOB options, and the Report Center.

resource limits group schedule.   The days and times during which the schedule for a resource limits group is active or inactive. The schedule includes parameters for time-outs, limits, SQL verbs, miscellaneous options, binding, save data, object tracking, LOB options, and Report Center.

restricted enrollment.   A type of enrollment assigned to a user profile which prohibits the user from starting a QMF session.

REXX.   (Restructured Extended Executor): IBM Object REXX is an interpreted, structured, procedural script programming language that allows programs and algorithms to be written in a clear structured way.

It was designed so that it would be truly easy to use for both professionals and casual users and was designed to work in several diverse application areas -- such as personal programming, command processing, application macro processing and application prototyping -- where different languages are typically used. It is, however, designed to be platform-independent.

S

scheduled controls.   Controls that pertain to a specific date, day of the week, and time of day during which a resource is allowed to or prohibited from performing an action or task.

spill file.   A file that can buffer excess data when there is no room in virtual storage for the current data object.

SQL query.   (Structured Query Language): A standardized language for defining and manipulating data in a relational database. SQL is used to write queries in descriptive phrases.

startup parameters. Parameters that control the characteristics of a QMF session, such as environment, plan, and performance-related parameters.

static query. An SQL query that has been previously passed to a database server and bound into a package.

When a static query is executed, the database server uses the SQL text bound into the package, rather than the SQL text currently appearing in the query window. Static queries are more resource efficient than dynamic queries, but static queries cannot be edited.

static SQL. SQL statements, embedded within a program, that are prepared during the program preparation process, before the program is executed. After being prepared, the SQL statement does not change (although variable values that are specified by the statement might change).

stored procedure. A group of SQL statements that form a logical unit and perform a particular task. Stored procedures are used to encapsulate a set of operations or queries to execute on a database server. For example, operations on an employee database (hire, fire, promote, lookup) could be coded as stored procedures executed by application code. Stored procedures can be compiled and executed with different parameters and results, and they may have any combination of input, output, and input/output parameters. Stored procedures are supported by most DBMSs, but there is a fair amount of variation in their syntax and capabilities.

string delimiter. A character or string used to separate or mark the start of and end of items of data in a database, text file, or in source code. A string delimiter uses an apostrophe or quote to delimit this data.

substitution variable. A variable in a procedure or query whose value is specified by a global variable or a run-time variable. Or, it is a variable in a form whose value is specified by a global variable.

Substitution variables must begin with an ampersand (&) and can contain up to 18 characters, which can be alphabetic, numeric or one of the following characters: [! $ ~ { } ? @ # % \ _.

T

table. A collection of stored data under the control of the relational database manager, consisting of a fixed number of rows and columns. You can interact with tables by running queries or by using the table editor.

U

usage code. Codes that control how data is summarized, such as at the end of a column or as a partial summary at the control breaks in a table. Which usage codes are available depend on the data in the column and the type of summary.

user profile facility. A profile created for each user that is identified by the creator, translation, and environment which is required to start a QMF session.

V

variable. A data element that specifies a value that can be changed. A variable is a symbol or name that stands for a value.

Index

A

activity log 102
    batch job 224
    cleanup tables 230
    components 223
    data sets 223
    failure reason codes 345
    JCL panel 224
    location processing 229
    record types 337
    tables 224
allocate
    CLIST RAAALLOC 239
    data sets 83
analyzer
    access path reporting 179
    default parameters 182
    edit macro 184
    enable 180
    exit routine 179, 185
    features 179
    non-QMF queries 181
    query statistics 179
    resource group 180
    sample exit routine 187
    sample help panel 192
    start 180
attachment options
    CAF module 26
    SQL type 27
audience ix

B

batch job parameters 53
batch programs
    report DDs 60
    requirements 60
batch reports
    runtime variables 90

C

call attachment module
    attach to DB2 333
    disconnect from DB2 333
    EXEC parameters 63
    functions 333
    input values 333
    output values 333
    parameter area structure 333

call attachment module *(continued)*
    pseudocode 334
CICS
    data queue storage 65
clean up objects 200
command synonyms
    RCO 5
common controls 144
    create 155
    default values 157
    edit 159
compile programs 50
compiler
    components 1
    end user facility 1
    program generator 1
components
    activity log 223
    compiler 1
    manager 101
    object manager 105
conventions
    manual x
customize
    HPO/Governor help 166

D

DB2 tables
    format 341
    values 341
default parameters
    TSO 97

E

end user facility
    compiler 1
    features 1
    maintaining reports 66
    registering reports 66
    report maintenance panel 66
    selection menu 85
    starting
        CICS 86
        TSO 85
error log
    browse 214
    display 211
    selection list 212
error log entry
    archive 217

error log entry *(continued)*
    browse 215
    delete 216
error log facility
    features 211
export
    data set attributes 329
    outside QMF 330
    within QMF session 329

F

failure reason codes
    activity log 345
form fields
    supported 336
form usage codes
    supported 335

G

generate programs
    batch JCL 47
    full dialog panel 6
    proc programs 42
    process 6
    short dialog 46
generated JCL
    description 226
generation options
    attachment facility 26
    buffering 30
    DSNTIAR calls 28
    environment 20
    erase table 23
    host variable file LRECL 29
    host variable format and
       delimiter 29
    HPO/Runtime 28
    HPO/Sort 27
    print program name 25
    program type 22
    RAACPY calls 28
    read data from file 25
    set 30, 41, 46
    spill file 30
    write data to file 24
governor 101
    assign resource group 144
    cancel codes 347
    common controls 144
    create resource group 143

IBM.®

Program Number: 5675-DB2

Printed in USA