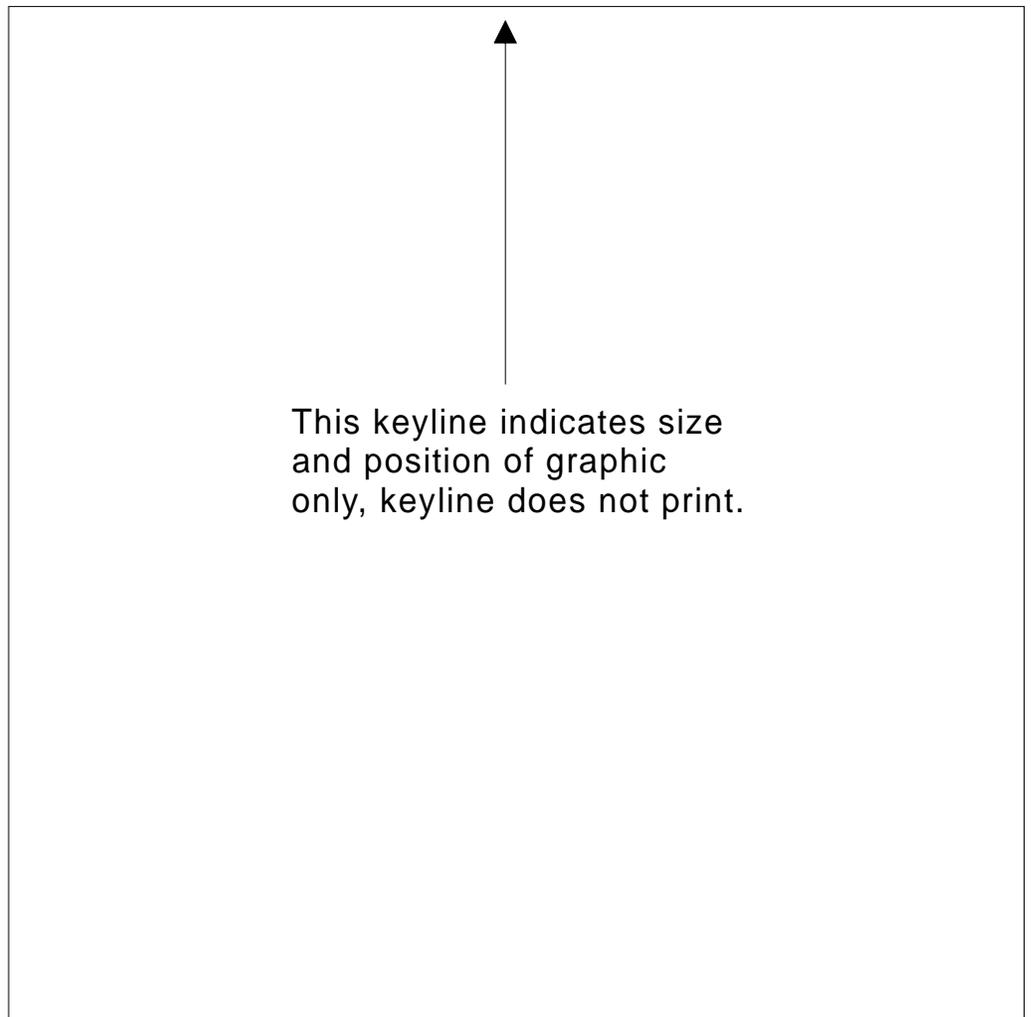


DFSORT Panels Guide





DFSORT

GC26-7037-00

DFSORT Panels Guide

Note!

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

First Edition (May 1995)

This edition applies to Release 13 of DFSORT, Program Number 5740-SM1, and to any subsequent releases until otherwise indicated in new editions or technical newsletters. Make sure you are using the correct edition for the level of the product.

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Preface

The *DFSORT Panels Guide* is a complete introduction to DFSORT (Data Facility Sort) Panels including customization, tutorial and reference information. You should read this guide if you are new to DFSORT Panels or use it for reference if you are an experienced user.

The chapters in the book assume that you have used job control language (JCL) and understand how to work with data sets. You should also know what data sets are available at your job site.

About This Book

This book provides you with a detailed tutorial on how to use DFSORT panels to create sort, merge, and copy jobs.

- Chapter 1, “Introduction to DFSORT Panels” on page 1 provides an overview of DFSORT and the panels interface.
- Chapter 2, “Using DFSORT Panels” on page 9 gives you basic instructions on getting around in DFSORT Panels.
- Chapter 3, “Sorting, Merging, and Copying Data Sets” on page 29 shows you how to run sort, merge and copy jobs with DFSORT Panels.
- Chapter 4, “Tailoring Input Data Sets with INCLUDE and OMIT” on page 61 gives you details on refining your jobs with the INCLUDE and OMIT options.
- Chapter 5, “Summing Values in Records” on page 77 shows you how to sum records with the panels.
- Chapter 6, “Reformatting Records” on page 87 provides instructions on using the INREC and OUTREC options in your jobs.
- Chapter 7, “Other DFSORT Panels Features” on page 105 details other features of DFSORT Panels that let you fine tune your jobs.
- Appendix A, “Using the DFSORT Sample Data Sets” on page 113 provides information on the sample data sets that come with DFSORT.
- Appendix B, “The Sample Bookstore Data Set” on page 115 shows you the Bookstore data set that is used in most of the examples in this book.
- Appendix C, “Processing Order of Control Statements” on page 119 gives you the order in which control statements are processed.
- Appendix D, “Map of DFSORT Panels” on page 121 gives you maps that show the processing flow through the panels.
- Appendix E, “Control Statements Selection Panel” on page 129 provides reference information on using control statements in DFSORT Panels.
- Appendix F, “Setting Up or Changing Your Profile” on page 141 details how to set up or change your user profile.
- Appendix G, “Customizing DFSORT Panels with the User-Defined Panels Interface” on page 147 shows you how to customize the panels for your own use.

An index also follows the appendices.

Related Publications

DFSORT Publications

DFSORT Panels Guide is a part of a more extensive DFSORT library. The additional books in the library are listed below. The entire DFSORT library may be ordered using number SBOF-1243.

Task	Publication Title	Order Number
Application Programming	<i>DFSORT Application Programming Guide</i>	SC33-4035
Diagnosing Failures and Interpreting Messages	<i>DFSORT Messages, Codes and Diagnosis Guide</i>	SC26-7050
Evaluating	<i>DFSORT Brochure</i>	GC33-4033
Learning to use DFSORT	<i>Getting Started with DFSORT</i>	SC26-4109
Planning for and Customizing DFSORT	<i>DFSORT Installation and Customization</i>	SC33-4034
Quick Reference	<i>DFSORT Reference Summary</i>	SX33-8001
Tuning DFSORT	<i>DFSORT Tuning Guide</i>	SC26-3111

Related Publications

In the course of learning how to use DFSORT, you may also want to refer to the publications listed in the table below.

Short Title	Publication	Order Number
ISPF Dialog Management Services and Examples	<i>Interactive System Productivity Facility Dialog Management Examples (for ISPF Version 3 Release 3)</i>	SC34-4313
	<i>Interactive System Productivity Facility Dialog Management Examples (for ISPF Version 3 Release 2)</i>	SC34-4265
	<i>Interactive System Productivity Facility Dialog Management Services and Examples (for ISPF Version 3)</i>	SC34-4215
	<i>Interactive System Productivity Facility Dialog Management Services and Examples (for ISPF Version 2 Release 3)</i>	SC34-4113
	<i>Interactive System Productivity Facility Dialog Management Services and Examples (for ISPF Version 2 Release 2)</i>	SC34-4010
ISMF User's Guide	<i>DFSMS/MVS Version 1 Release 1: Using the Interactive Storage Management Facility</i>	SC26-4911
	<i>MVS/DFP Version 3 Release 3: Interactive Storage Management Facility User's Guide</i>	SC26-4563
	<i>MVS/DFP Version 3 Release 2: Interactive Storage Management Facility User's Guide</i>	ST00-4616
	<i>MVS/ESA Interactive Storage Management Facility User's Guide</i>	SC26-4508
	<i>MVS/Extended Architecture Interactive Storage Management Facility User's Guide</i>	SC26-4266

Short Title	Publication	Order Number
JCL Reference	<i>MVS/ESA JCL Reference</i> (for MVS/ESA SP Version 4)	GC28-1654
	<i>MVS/ESA JCL Reference</i> (for MVS/ESA SP Version 3)	GC28-1829
	<i>MVS/Extended Architecture JCL Reference</i>	GC28-1352
JCL User's Guide	<i>MVS/ESA JCL User's Guide</i> (for MVS/ESA SP Version 4)	GC28-1653
	<i>MVS/ESA JCL User's Guide</i> (for MVS/ESA SP Version 3)	GC28-1830
	<i>MVS/Extended Architecture JCL User's Guide</i>	GC28-1351

Referenced Publications

Within the text of this document, references are made to the following publications:

Short Title	Publication	Order Number
Application Programming Guide	<i>DFSORT Application Programming Guide</i>	SC33-4035
Getting Started	<i>Getting Started with DFSORT</i>	SC26-4109
Messages and Codes	<i>DFSORT Messages, Codes and Diagnosis Guide</i>	SC26-7050
ISPF Dialog Management Guide	<i>Interactive System Productivity Facility Dialog Management Guide</i> (for ISPF Version 3 Release 2 or later)	SC34-4266
	<i>Interactive System Productivity Facility Dialog Management Guide</i> (for ISPF Version 3)	SC34-4213
	<i>Interactive System Productivity Facility Dialog Management Guide</i> (for ISPF Version 2 Release 3)	SC34-4112
	<i>Interactive System Productivity Facility Dialog Management Guide</i> (for ISPF Version 2 Release 2)	SC34-4009

A more comprehensive list of related publications appears in the *DFSORT Application Programming Guide*.

For more information on using DFSORT with COBOL or PL/I, see the Programmer's Guide describing the compiler version available at your site.

Referenced Publications

Chapter 1. Introduction to DFSORT Panels

This chapter provides an overview of DFSORT and the panels interface.

What is DFSORT?

DFSORT is a member of IBM's Data Facility family of products. The DFSORT licensed program is a high-performance data arranger developed by IBM for MVS/ESA* and MVS/XA* users.

With DFSORT, you can sort, merge, and copy data sets. You can use DFSORT to do simple tasks such as alphabetizing a list of names, or you can use it to aid complex tasks such as taking inventory or running a billing system. You can also use DFSORT's record-level editing capability to perform data management tasks.

The information you manipulate with DFSORT is contained in *data sets*. The term *data set* refers to a file that contains one or more records. Any named group of records is called a *data set*. The terms *data set* and *file* are synonymous; however, for the sake of consistency, this book refers only to data sets.

A data set contains the information that you want to sort, copy, or merge. For most of the processing done by DFSORT, the whole data set is affected. However, some forms of DFSORT processing involve only certain individual records in that data set.

Data sets can be *cataloged*, which permits the data set to be referred to by name without specifying where the data set is stored. A cataloged data set should not be confused with a cataloged *procedure*. A cataloged procedure is a named collection of JCL stored in a data set, and a cataloged data set is a data set whose name is recorded by the system.

Throughout this book, the term *record* refers to a collection of related information used as a unit, such as one item in a data base or personnel data about one member of a department. The term *field* refers to a specific portion of a record used for a particular category of data. A field is the smallest addressable unit of data in a data set.

Sorting Data Sets

You can use DFSORT to rearrange the records in your data sets. *Sorting* is arranging records in either ascending or descending order within a file. The following figure shows a sample data set of names, first sorted in ascending order, then in descending order.

What is DFSORT

(Andy, Edward, Carol, Dan, Betty)

Ascending	Descending
Andy	Edward
Betty	Dan
Carol	Carol
Dan	Betty
Edward	Andy

Figure 1. DFSORT Arranges Information in Ascending and Descending Order

You can sort data in several different formats. This list shows the most common data formats and the codes you use to specify them.

Code	Data Format
CH	Character (EBCDIC)
BI	Binary (Numeric)
ZD	Zoned Decimal (Numeric)
PD	Packed Decimal (Numeric)

Refer to *Application Programming Guide* for complete details of the available formats.

Merging Data Sets

You can also use DFSORT to merge data sets. DFSORT *merges* data sets by combining two or more files of sorted records to form a single data set of sorted records.

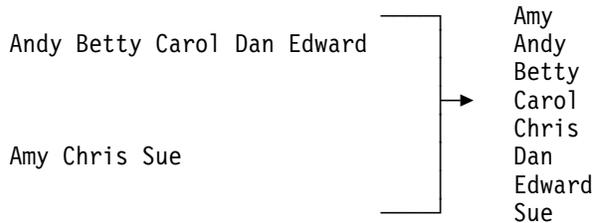


Figure 2. DFSORT Merges Two Lists to One List

The data sets you merge must be previously sorted into the same order (ascending or descending).

Copying Data Sets

DFSORT can also copy data sets without any sorting or merging taking place. You copy data sets in much the same way that you sort or merge them.

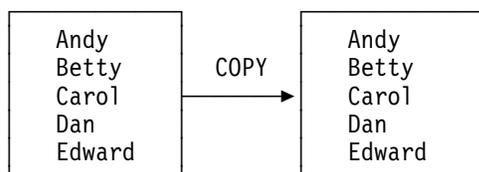


Figure 3. DFSORT Can Copy Your Data Sets

What Else Can You Do with DFSORT?

While sorting, merging, or copying data sets, you can also:

- Select a subset of records from an input data set. You can include or omit records that meet specified criteria. For example, when sorting an input data set containing records of course books from many different school departments, you can sort the books for only one department.
- Reformat records, add or delete fields, and insert blanks, constants, or binary zeros. For example, you can make a report more legible by inserting blank characters to separate fields.
- Sum the values in selected records while sorting or merging (but not while copying). In the example of a data set containing records of course books, you can use DFSORT to add up the dollar amounts of books for one school department.
- Alter the collating sequence when sorting or merging records (but not while copying). For example, you can have the lowercase letters collate after the uppercase letters.
- Sort, merge, or copy Japanese data if the IBM Double Byte Character Set Ordering Support (DBCS Ordering) (5665-360 Licensed Program, Release 2.0 or an equivalent product) is used with DFSORT to process the records.

What is the panels interface?

A *panel* is a preformatted screen of information presented on a display terminal. The panels shown in this book are representations of those you see on your terminal. The panels shown here might look different from what you see because of a difference in terminals. In addition, your system programmer might have customized some of the panels, or some of the options might have been changed at installation time from the supplied defaults.

If your site has installed DFSORT Panels under the Interactive System Productivity Facility (ISPF) or the Interactive Storage Management Facility (ISMF), you can perform many DFSORT tasks using interactive panels. You can use DFSORT Panels to sort, copy, and merge files in an online environment that lets you concentrate on performing the task without spending time in coding job control or program control statements.

You can access the DFSORT program in either foreground or background mode, depending on which environment best fits your task at the moment. With foreground processing, you submit your DFSORT job for immediate processing under TSO. With background processing, you can submit your job for batch processing while you perform other tasks, or you can save the completed application in a data set to edit or run later. The advantages of using DFSORT in panel mode are:

- You can create a job without coding JCL and DFSORT command syntax. You provide information about your application on the appropriate panels, and the panels build your DFSORT job automatically.
- You can allocate a new output data set without coding JCL or TSO commands. You only have to provide SPACE information for your new output data set (or use a Storage Management Subsystem (SMS) construct), and DFSORT Panels builds the necessary JCL or TSO commands to allocate your new output data set when your application runs.

Before You Begin

- You can use the online HELP facility to get information about DFSORT functions and options during your terminal session. HELP is keyed to individual DFSORT panels, so you can also use it as a tutorial. You can get explanations and examples of the panels while you work through them.
- The panels prime your entry fields with last-used values or with defaults, and you can create new jobs with similar control statements by simply paging through the panels. To change an existing value, type over it. To reset to a default, type over it with blanks.

With DFSORT Panels, occasional users can process data sets effectively with minimal preparation. Experienced users can access DFSORT functions and options more quickly and efficiently. Chapter 2, “Using DFSORT Panels” on page 9 introduces both DFSORT and the interactive panels in a step-by-step format with illustrations and complete examples.

Types of Panels

There are several different types of panels:

Selection panels (or menus)

display a list of options to choose.

Data entry panels

display labeled fields where you can enter information or accept default values.

Review panels

display information you have entered so you can verify that the information is correct.

Online HELP panels

give you immediate online reference information to help you complete DFSORT Panels. (For more information on using HELP, see “Getting Help” on page 11.)

Before You Begin

This section discusses some things that you need to know before starting the tutorials in this book.

Using the Sample Data Set

Before you begin, turn to Appendix B, “The Sample Bookstore Data Set” on page 115. Many of the examples in this book refer to the sample bookstore data set as the input data set, so you should become familiar with it. The input data set contains the data that you want arranged or sorted. You must specify an input data set for every DFSORT job you run. The sample bookstore data set is in an input data set named **SORT.SAMPIN**.

Each record in the bookstore data set has 12 fields (book title, author’s last name, and so on). A record can be represented by one horizontal row on the page. A field can be represented by one vertical column on the page.

To sort a data set, you choose one or more fields that you want to use to order the records (arrange in ascending or descending order). These fields are called *control fields* (or, in COBOL, *keys*).

As you work through the exercises on the following pages, remember that each *entire* record is sorted, not just the control field. However, for the sake of simplicity, the figures in the text show only the control fields being discussed. The sorted records actually contain all the fields, but one page is not wide enough to show them. Appendix B, “The Sample Bookstore Data Set,” is printed to show all the fields in each record. It is also arranged with headings and numbers that show the byte positions of each field. The numeric fields are in binary format and, therefore, will not appear on terminals as they do in this book. These methods of arranging and viewing the data are explained in the chapters on DFSORT functions that follow.

Figure 4 shows an example of sorted fields. Notice the line of numbers above the sorted fields. These numbers represent the byte positions of those fields. You use byte positions to identify fields to DFSORT. The examples show the byte positions to help you while you are learning to use DFSORT and DFSORT Panels. The byte positions do not actually appear in any of your processed data sets.

In Figure 4, the first two records, which show nothing in the course department fields, are general purpose books not required for a particular course. For this example, the control field is the Course Department field.

Figure 4. Sample Bookstore Data Set Sorted by Course Department in Ascending Order

Book Title	Course Department	Price
1	75 110 114	170 173
LIVING WELL ON A SMALL BUDGET		9900
PICK'S POCKET DICTIONARY		295
INTRODUCTION TO BIOLOGY	BIOL	2350
SUPPLYING THE DEMAND	BUSIN	1925
STRATEGIC MARKETING	BUSIN	2350
COMPUTER LANGUAGES	COMP	2600
VIDEO GAME DESIGN	COMP	2199
COMPUTERS: AN INTRODUCTION	COMP	1899
NUMBERING SYSTEMS	COMP	360
SYSTEM PROGRAMMING	COMP	3195
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	ENGL	595
EDITING SOFTWARE MANUALS	ENGL	1450
MODERN ANTHOLOGY OF WOMEN POETS	ENGL	450
THE COMPLETE PROOFREADER	ENGL	625
SHORT STORIES AND TALL TALES	ENGL	1520
THE INDUSTRIAL REVOLUTION	HIST	795
EIGHTEENTH CENTURY EUROPE	HIST	1790
CRISIS OF THE MIDDLE AGES	HIST	1200
INTRODUCTION TO PSYCHOLOGY	PSYCH	2200
ADVANCED TOPICS IN PSYCHOANALYSIS	PSYCH	2600

Also notice that records in Figure 4 with *equal control fields* (in this case, the same department) appear in their original order. For example, within the Computer Science department (COMP), the title *Video Game Design* still appears before *Computers: An Introduction*.

You can control whether records with equal control fields appear in their original order or whether DFSORT orders them randomly. The system programmer sets defaults at installation time that you can change with some DFSORT options at run

Before You Begin

time. The examples in this book assume that the default is for records with equal control fields to appear in their original order.

Note: The examples used in this book are for fixed-length records only. For information on processing variable-length records, see the *Application Programming Guide*.

Your Sample Input and Output Data Sets

The sample bookstore data set is the input data set you will use for most of the examples in this book. The system programmer created this data set when verifying the DFSORT Panels installation. If this data set is no longer available, ask your system programmer to run the SAMPJCL job, SAMPDATA, to create the sample data set, SORT.SAMPIN. The SAMPDATA job also creates a data set, SORT.SAMPOUT, which is used in many of the following examples as the DFSORT output data set. You must copy SORT.SAMPIN and SORT.SAMPOUT to your user ID before trying the examples that use them in this book.

For information on how to copy the sample data sets to your user ID, see Appendix A, "Using the DFSORT Sample Data Sets" on page 113.

Panels Considerations

You can use DFSORT Panels to specify most DFSORT functions and options directly by entering information in specific fields or by selecting codes on various panels. In some situations, you might want to create a DFSORT job with features that the panels do not directly support. For example, you might want to use:

- Tape input or output data sets
- Additional work data sets
- Specific DFSORT subparameters that do not appear in the panels (such as DEBUG ABEND)
- Nonstandard DFSORT control statements or keywords
- Data types unique to your system
- Data sets not cataloged or allocated on the system from which you access DFSORT Panels
- Other programs that invoke DFSORT

DFSORT Panels provides several solutions to these problems by letting you customize your jobs and enabling you to change the way you create them.

- You can use free form panels to insert control statements into your jobs exactly as you have coded them. If your application requires a DFSORT feature not listed in a panel, you can simply code the statement yourself, and direct DFSORT Panels to use it in your job.
- You can save your completed job in a data set and edit or add statements later without going through the interactive panels. Using both the text editor and DFSORT Panels to build jobs, you can choose the most efficient way to accomplish your tasks.
- You can create DFSORT DD and control statements for use by another program (such as COBOL) that invokes DFSORT. Just save the completed DFSORT job in a data set and copy the required statements to the other job.
- You can suppress some automatic procedures by changing the settings on the panels (for instance, building a job that uses uncataloged or unallocated data set names).

Your system programmers can also tailor DFSORT Panels to your needs by adding or substituting their own panels for user-defined control statements with the User-Defined Panels Interface (UDPI). With UDPI, they can insert additional panels that let you create DFSORT jobs with specialized control statements unique to your needs. Appendix G, “Customizing DFSORT Panels with the User-Defined Panels Interface” on page 147 contains specific information on customizing DFSORT Panels with the User-Defined Panels Interface.

Before You Begin

Chapter 2. Using DFSORT Panels

This chapter introduces you to DFSORT Panels, an interactive tool that helps you create and submit DFSORT jobs. How you invoke DFSORT Panels depends on how it was installed at your site. DFSORT Panels might be installed as an option on one or more of the following menus:

- The ISPF Master Application Menu or submenu
- The ISPF/PDF Primary Option Menu or submenu
- The ISMF Primary Option Menu

Or, your site might use the command ICEPANEL to invoke DFSORT Panels directly from TSO. If you do not know how to invoke DFSORT Panels at your site, ask someone in your information systems center.

You can use DFSORT Panels' interactive HELP facility at any time while you are using DFSORT Panels. As you work through the tutorials in the following chapters, you might find it useful to refer to the HELP panels in addition to using this book. See "Getting Help" on page 11 for information on using the HELP facility.

If the Interactive Storage Management Facility (ISMF) is available at your site, then the SORTREC line operator might also be available through the ISMF Data Set Application to do a quick and simple sort on a data set. For information on how to use SORTREC, see "Sorting in ISMF Using SORTREC" on page 108.

Getting Around

A panel is a formatted screen of information presented on a display terminal. Some panels provide information to you on request, while others require you to enter information. What you enter determines which panel you see next or which function is performed. Arrows mark the fields where you can enter information or specify choices, as shown in Figure 5.

```

                                DFSORT PRIMARY OPTION MENU
ENTER SELECTION OR COMMAND ==> _
SELECT ONE OF THE FOLLOWING...
```

Figure 5. Command Lines on the Panels Are Shown by Arrows

Instructions on the panels tell you what keys and commands to use to get the results you want, as shown in Figure 6.

```

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.
```

Figure 6. The Panels Explain the Keys and Commands You Use

The following commands control panel flow. Some commands are inactive in panels for which they are not appropriate. Most of these commands do not apply

to the HELP panels. See “Getting Help” on page 11 for information on the commands to use when using HELP.

ENTER key	On some panels, the ENTER key saves your new values and takes you to the next panel. On others, the ENTER key verifies that your panel input is correct. If you are using HELP, use ENTER to display the next sequential pages.
END	On some panels, END saves your new values and exits to the previous panel. On others, END cancels your new values and exits to the previous panel. If you are using HELP, the END command takes you back to the panel from which you invoked HELP.
HELP	Takes you to a HELP panel. HELP panels give you more information about a particular panel or function. HELP can also give you an explanation of DFSORT Panels messages.
RETURN	Terminates the application you are currently performing and returns you to the DFSORT Primary Option Menu.
UP	Scrolls the fields on the panel backward by the specified number of lines or takes you to the previous panel in a series.
DOWN	Scrolls the fields forward by the specified number of lines or takes you to the next panel in a series.
CANCEL	Exits the displayed panel without saving any changes.
REINIT	Reinitializes all pages of a panel with default entries or blanks in all the fields. Use this command to start over again with all new entries.
BROWSE	Displays the control statement you generated or entered exactly as it would be passed to DFSORT. Enter the command from the SORT or MERGE Control Fields Entry panels or from the SORT or MERGE Free Form Statement Entry panels. Use BROWSE to verify that the control statement does what you intended so that you can correct any errors in your panel entries. You can also enter the B BROWSE STATEMENT select code on the Control Statements Selection panel to display control statements in the form in which they would be passed to the DFSORT program.
PROFILE	Displays a menu that lets you view or update your DFSORT user profile. The profile controls the way DFSORT Panels constructs your applications. For information on what options are available and when you might want to change them, see the section Appendix F, “Setting Up or Changing Your Profile” on page 141. You can enter the PROFILE command from any SORT, COPY, or MERGE panel. You see the same panels by entering 0 on the DFSORT Primary Option Menu.

You can display the current PF key settings at the bottom of the screen by entering the command **PFSHOW**. **PFSHOW** remains in effect even if you exit DFSORT and later return to the panels. To remove the PF key display, enter **PFSHOW OFF**. For information on customizing PF keys, see *ISPF Dialog Management Guide*.

Primed Values on Panels

DFSORT saves the values that you enter on the data entry panels between each use of the panels, and from one session to the next. When you begin a DFSORT session and move through the panels, the panels appear with values filled in from the last time you used the function. This is called *priming*.

You can usually accept the primed values by pressing **ENTER**. However, on panels that direct you to USE END TO SAVE AND EXIT, you must use the **END** command to accept the primed values. To change the primed values, simply enter new values in any of the fields you want to change. The next time you display the panel, the new values appear. Note that DFSORT retains separate primed values for the sort, copy, and merge functions.

Also, on panels that direct you to USE END TO SAVE AND EXIT, you can reset some fields to their default values by using the **REINIT** command or by typing a space (blank) over the fields. If the default for the field is a blank, **REINIT** blanks the field.

What Your User Profile Provides to DFSORT Panels

DFSORT Panels maintains its own User Profile in which it stores information that determines the way your DFSORT Panels jobs are processed and run. A User Profile is created for each user ID on the system when DFSORT is installed. After your profile has been set up, you usually need not change any of the values that have been entered to run your normal sort, merge, and copy jobs.

The DFSORT Panels User Profile controls items such as:

- Logging of trace information
- The way DFSORT Panels recovers from abnormal terminations (abends)
- Diagnostic messages

The User Profile also contains information to control the processing of DFSORT jobs:

- JCL JOB statements used to run DFSORT jobs
- JCL EXEC statements used to run DFSORT jobs

For more information on the DFSORT Panels User Profile, see Appendix F, “Setting Up or Changing Your Profile” on page 141.

Getting Help

At any time while using DFSORT Panels, you can take advantage of the online help facility. Help panels provide immediate online reference information to help you complete panels. There are also help panels for informational or error messages, as well as an online help index.

Getting Help Online

You can display the help panel for a DFSORT panel by entering **HELP** on the command line, or by pressing the corresponding PF key.

Figure 7 on page 12 is the help panel DFSORT displays for the SORT Statement Data Entry panel.

```
HELP-----SORT CONTROL FIELDS-----HELP
COMMAND ==>

Use this series of help panels to assist you in entering values
for the fields on the SORT STATEMENT DATA ENTRY panel.

You can see the following topics and subtopics (indented) in
sequence, or choose them by number. After returning to this panel,
you can use ENTER to continue viewing topics and subtopics in
sequence from where you left off.

  1 Overview
  2 Control Fields
    3 POSITION
    4 LENGTH
    5 FORMAT
    6 ORDER
  7 SORT Statement Data Entry Example
  8 Line Commands

Use ENTER to continue, END to return to Sort Entry Panel.
```

Figure 7. Example of a Help Panel Menu

The first help panel that DFSORT displays is a list of topics available for help with the SORT Statement Data Entry panel. From this panel you can choose topics and subtopics such as an overview of how the panel works, descriptions of how the control fields work, examples of using the SORT Statement Data Entry panel, and descriptions of how to use line commands.

For example, if you enter a **2** on the command line, DFSORT displays a help panel that describes what control fields are and how to use them.

```

HELP-----SORT STATEMENT: CONTROL FIELDS (PAGE 1 OF 2)-----HELP
COMMAND ==>

DFSORT sorts your input records according to one or more control
fields that you select. Each control field must be described in
terms of its POSITION and LENGTH in the input records, its FORMAT
(for example, EBCDIC character, ISCI/ASCII character, decimal, or
binary), and its ORDER (ascending or descending).

Conceptually, DFSORT orders the records by doing a comparison on
each control field in turn. So, if the first control field in two
records is the same, DFSORT compares the second control field,
and so on until a difference is found. (If no difference is found,
the records are considered to be equal and are ordered together.)
Therefore, you must specify your control fields in order of
importance, with the most important control field first.

                (continued on next page)

Use ENTER to continue, END to return to Sort Entry Panel.

```

Figure 8. Example of a Detailed Help Panel

Help Panels for Messages

DFSORT Panels uses a three-level message scheme, providing detailed information about a message at each level:

- Short error or informational messages
- Long error or informational messages
- Message help panels

Short Error or Informational Messages

DFSORT displays short error or informational messages in the upper right corner of the panel, as appropriate.

Informational messages are displayed for a variety of reasons. For example, they tell you whether your foreground job was successful or unsuccessful.

Whenever DFSORT determines that there is an error, it displays a short error message. For example, if you typed in the name of a noncataloged data set in the OUTPUT DSN field, you might receive the error message shown in the upper right corner of Figure 9 on page 14.

```
COMMAND ==>                                SORT ENTRY PANEL          DATA SET NOT CATALOGED

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ==> DFS.SORTOUT
  ALLOCATE NEW OUTPUT DATA SET ==> N   (Y or N)
  VERIFY OUTPUT DSN          ==> Y   (Y or N)

SPECIFY EXECUTION ENVIRONMENT ==> 2
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY   QUANTITY ==> 5   (in Cylinders)
  SECONDARY QUANTITY ==> 5   (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL ==> Y   (Y or N)

REVIEW CONTROL STATEMENTS BEFORE EXECUTION ==> Y   (Y or N)

ENTER SORT CONTROL STATEMENT IN FREE FORM ==> N   (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 9. Sample Short Message

Long Error or Informational Messages

If you need more information than the short message provides, you can use the **HELP** command to display a longer message just below the command line (actual location might vary depending on how your User Profile is set). For example, if you want to see more information regarding the “DATA SET NOT CATALOGED” message, enter **HELP** on the command line to display the long message shown under the command line in Figure 10 on page 15.

```

                                SORT ENTRY PANEL          DATA SET NOT CATALOGED
COMMAND ==>
A123456.DFS.SORTOUT NOT FOUND IN CATALOG
SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ==> DFS.SORTOUT
  ALLOCATE OUTPUT DATA SET ==> N (Y or N)
  VERIFY OUTPUT DSN          ==> Y (Y or N)

SPECIFY EXECUTION ENVIRONMENT ==> 2
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY   QUANTITY ==> 5      (in Cylinders)
  SECONDARY QUANTITY ==> 5      (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL ==> Y (Y or N)

REVIEW CONTROL STATEMENTS BEFORE EXECUTION ==> Y (Y or N)

ENTER SORT CONTROL STATEMENT IN FREE FORM ==> N (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 10. Sample Long Message

Message Help Panel

If you need more help than the short message or long message provides, use the **HELP** command once again to display a message help panel. The message help panel displays both the short and long messages with an explanation, and offers suggestions on how to correct any problems, or suggests what action you should take (in the case of informational messages, sometimes there is no suggested action). Figure 11 on page 16 shows the Help Message Panel for the “DATA SET NOT CATALOGED” example.

```
HELP-----DFSORT PANELS MESSAGE-----HELP
COMMAND ===>

MESSAGE NUMBER:  ICEDV020

SHORT MESSAGE:   DATA SET NOT CATALOGED

LONG MESSAGE:    A123456.DFS.SORTOUT
                  NOT FOUND IN CATALOG

EXPLANATION:
  The data set name you specified was not found in the catalogs
  which are a part of the default order of search.

  (If you do not want to be warned about currently existing errors
  for this data set, enter N in the VERIFY OUTPUT DSN field.)

SUGGESTED ACTION:
  Ensure the spelling of the data set name is correct, and that the
  data set is cataloged in a catalog that is part of the default
  order of search at your site.

Use END to return to DFSORT, ENTER for additional information.
```

Figure 11. Message Help Panel

After viewing the message help panel, you can return to the functional panel by using the **END** command, or continue to the regular online help for that functional panel by pressing **ENTER**.

Note that the regular online help cannot be accessed directly while a short error or informational message is being displayed. You must first display the long message and the message help panel (by using the **HELP** command twice) before pressing **ENTER** to access the online help.

DFSORT Help Panels Index

To display the DFSORT help index, enter **INDEX** or **I** on the command line of any DFSORT help panel.

```
HELP-----DFSORT HELP INDEX: APPLICATION SELECTION-----HELP
COMMAND ===>

Enter H for an overview of the DFSORT Help Index facility.

Enter S to select the SORT Help Index, which contains index pages
for general topics and topics specific to the Sort Application.

Enter C to select the COPY Help Index, which contains index pages
for general topics and topics specific to the Copy Application.

Enter M to select the MERGE Help Index, which contains index pages
for general topics and topics specific to the Merge Application.

On each index page, you can view the help panel for any listed
subject, or you can move to any other index page by entering the
first letter of the topic you are interested in.

Use END to return to Sort Entry Panel.
```

Figure 12. DFSORT Help Index Application Selection Panel

The first index panel (see Figure 12) is a special Application Selection panel. Enter **S**, **C**, or **M** to use the index for SORT, COPY, or MERGE, respectively. Each index includes common information on general topics, as well as specific information for the application selected. You can also enter **H** to see an overview of the DFSORT Panels help index.

If you specify **S**, for instance, you see the beginning of an alphabetic listing of all help topics in the SORT index (see Figure 13 on page 18).

```

HELP-----SORT HELP INDEX: A TO B-----HELP
COMMAND ==>

To select a topic, enter the two- or three-character option in the
command line:

A1  Abend Recovery           B1  Background Environment
A2  After: A Line Command    B2  Before: B Line Command
A3  Allocation--Partitioned B3  BOUNDARY (INREC)
      Output Data Set        B4  BOUNDARY (OUTREC)
A4  Allocation--Sequential   B5  BROWSE Command
      Output Data Set        B6  BSAM (DEBUG)
A5  Allocation--Work Data Set B7  BUFFERS (DEBUG)
A6  Alternate Collating
      Sequence (ALTSEQ)
A7  ALTSEQ Statement--Code Table
A8  ALTSEQ Statement--Data Entry
A9  ALTSEQ Statement Overview
A10 AND/OR (INCLUDE)
A11 AND/OR (OMIT)
A12 ARESALL (OPTION)

Use ENTER to view the next index letter, END to return to DFSORT.

```

Figure 13. Help Index for SORT

To see the help panel for any topic on an index panel, enter its two- or three-letter select code on the command line. If you choose **A2**, for example, on the SORT HELP INDEX: A TO B panel, you see the following panel.

```

HELP-----LINE COMMANDS: 'A'-----HELP
COMMAND ==>

Use an A command to specify the field after which you want to
copy or move other fields.

COMMAND  FIELD NO.  ....
..a.....    1 <==    Causes field 3
.....      2          to be moved
..m.....    3 <==    after field 1
.....      4
..cc....    5 <==    Causes fields 5-7
.....      6          to be
.....cc     7 <==    copied
..a.....    8 <==    after field 8
.....      9

Use ENTER to continue, END to return to Sort Entry Panel.

```

Figure 14. Help Panel for Line Commands

Use **END** to return to the functional panel from which you first requested help. Press **ENTER** to return to the previous index panel (in this example, SORT HELP INDEX: A TO B).

To see the help panel for a topic not on the currently displayed index panel, enter the first letter of that topic in the command line and press **ENTER**. DFSORT displays the index panel for that topic, and you can select the appropriate two- or three-letter select code. For example, to see the help panel for the REINIT command, enter **R**, to get to the appropriate index panel, and **R9** to get the help screen for REINIT. You can also page through the index panels alphabetically by pressing **ENTER**.

Overview of Sort, Merge, and Copy Jobs

This section presents an overview of how you use the panels to sort, merge, and copy data sets. The remaining chapters in this book describe, step by step, how to:

- Sort, merge, and copy data sets
- Select records from the input data set
- Sum values in records
- Reformat records in data sets

Invoking DFSORT Panels

To start a DFSORT Panels session, you must display the DFSORT Primary Option Menu. As mentioned earlier in this section, how you invoke DFSORT Panels depends on how it was installed at your site. Your information center can tell you the correct method. When you enter DFSORT Panels, the Primary Option Menu panel appears.

Selecting Your Task

Select the task you want from the DFSORT Primary Option Menu (see Figure 15 on page 20). You can choose to sort, merge, or copy data sets, or you can view or change the DFSORT User Profile.


```

                                SORT ENTRY PANEL                                Page 1 of 2
COMMAND ===>

SPECIFY ONE OR MORE INPUT DATA SET(S):
  INPUT DSN 1 ===> SORT.SAMPIN

  (USE DSN 2 TO 12 FOR CONCATENATED DATA SETS)
  INPUT DSN 2 ===>
  INPUT DSN 3 ===>
  INPUT DSN 4 ===>
  INPUT DSN 5 ===>
  INPUT DSN 6 ===>
  INPUT DSN 7 ===>
  INPUT DSN 8 ===>
  INPUT DSN 9 ===>
  INPUT DSN 10 ===>
  INPUT DSN 11 ===>
  INPUT DSN 12 ===>

  VERIFY INPUT DSN ===> Y   (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 16. Selecting Data Sets on the SORT Entry Panel, Page 1

On page 1 of the SORT, COPY, or MERGE Entry Panel, you specify one or more input data sets. You can sort or copy records from up to 12 data sets, or you can merge records from up to 16 data sets. Remember that your own system will prime the data entry panel with previously used values. Therefore, the sample data set name (DSN) in Figure 16 might be replaced with some other name on your system.

You also use this panel to specify whether or not to verify the input DSN:

```
VERIFY INPUT DSN ===>      (Y or N)
```

The VERIFY INPUT DSN field is discussed on page 32.

Options for Processing Your Job

On the second page of the SORT, COPY, or MERGE Entry Panel (see Figure 17), you have various options to choose from:

- Which output data set to use
- Whether to process your job in foreground or background mode
- How much space to reserve for your work data sets
- What panels to use as you process your job

```

                                                                    SORT ENTRY PANEL
                                                                    Page 2 of 2
COMMAND ===>

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.SAMPOUT
  ALLOCATE NEW OUTPUT DATA SET ===> N (Y or N)
  VERIFY OUTPUT DSN          ===> Y (Y or N)

SPECIFY EXECUTION ENVIRONMENT ===> 1
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY   QUANTITY ===> 5 (in Cylinders)
  SECONDARY QUANTITY ===> 5 (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL ===> Y (Y or N)
REVIEW CONTROL STATEMENTS BEFORE EXECUTION ===> Y (Y or N)
ENTER SORT CONTROL STATEMENT IN FREE FORM ===> N (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO RETURN TO PAGE 1.
```

Figure 17. Specifying the Output Data Set on the SORT Entry Panel, Page 2

First, you must specify a new or existing output data set. Each step to do this is detailed in “Options for Processing Jobs” on page 32.

You decide between foreground or background execution of your job on this panel. Foreground and background execution are discussed in detail in “Selecting Your Execution Mode” on page 25, so for now just be aware that you can choose:

- **Foreground** execution, which submits your job immediately to TSO (this occupies your terminal until the job is completed)
- **Background** execution, which either submits your job in batch mode or saves it in a data set. The saved jobs can later be edited or submitted for processing.

You can also choose the amount of space for the work data set DFSORT uses to sort your records. For detailed information on work data sets, see the *Application Programming Guide*.

The remaining three items on page 2 of the SORT Entry Panel are discussed in detail on page 46. For now, just be aware that you can use them to adjust the path that you take through the panels as you specify your sort, merge, or copy job.

Arranging Records in SORT and MERGE Jobs

Your next step in sorting or merging records (but not copying) is to specify how you want to arrange the records. Do this on the SORT or MERGE Statement Data Entry panel (see Figure 18). The SORT or MERGE Statement Data Entry panel generates the SORT or MERGE control statements. (For the Copy application, DFSORT Panels automatically generates the OPTION COPY control statement.)

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION  LENGTH  FORMAT  SORT
.....   1  ===>  1    ===>  75    ===>  CH    ===>  A
.....   2  ===>          ===>          ===>  CH    ===>  A
.....   3  ===>          ===>          ===>  CH    ===>  A
.....   4  ===>          ===>          ===>  CH    ===>  A
          ***** END OF SORT FIELDS *****

```

Figure 18. Arranging the Records on the SORT Statement Data Entry Panel

The information you enter on this panel determines how the records will be arranged in the output data set. You can specify up to 100 control fields that DFSORT uses to arrange records within the output data set. For each control field, you specify the starting position of the field, the length of the field, the data format, and the order in which you want the records arranged, descending or ascending.

Choosing Additional Control Statements

Next, DFSORT displays the Control Statements Selection panel for your job. Depending on your job, you might want to build additional DFSORT control statements besides the SORT, MERGE, or OPTION COPY control statement. For example, you might want to select only certain records from the input data set, for which you must create an INCLUDE statement. These additional DFSORT control statements are selected on the Control Statements Selection panel (see Figure 19).

```
CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ===>   NO   (Various options)
INCLUDE ===>   NO   (Include only selected records)
OMIT    ===>   NO   (Exclude selected records)
SUM     ===>   NO   (Summarize/eliminate records with duplicate keys)
INREC   ===>   NO   (Reformat records before sort)
OUTREC  ===>   NO   (Reformat records for output)
ALTSEQ  ===>   NO   (Changes to standard collating sequence)
MODS    ===>   NO   (User exits)
RECORD  ===>   NO   (Unavailable input format/length information)
DEBUG   ===>   NO   (Various debugging options)
FREEFORM ===>   NO   (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 19. Choosing Additional Control Statements

You choose to build additional control statements by selecting from the list on the Control Statements Selection panel shown in Figure 19. Enter a **Y** next to the name of each control statement you want to create or update.

For each control statement you select, DFSORT displays one or more panels where you create that statement. Examples of some commonly used control statements are explained in Chapters 10 through 14. Appendix E, “Control Statements Selection Panel” on page 129 contains detailed reference information on all of the DFSORT control statements you can specify using the Control Statements Selection Panel. Keep in mind that the online help facility has easily accessed information on each of these statements that you can refer to as you work through the panel.

Reviewing Control Statements

The Review Control Statements panel displays your SORT, MERGE, or OPTION COPY control statement, as well as any additional control statements you selected (see Figure 20 on page 25). You see the Review Control Statements panel just before you submit your job for DFSORT processing.

```

                                REVIEW CONTROL STATEMENTS                                LINE 1 OF 1
COMMAND ===>                                                                SCROLL ===> 0111

(USE ENTER TO PERFORM DFSORT; USE UP/DOWN COMMANDS TO SCROLL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.)

-----
SORT      FIELDS=(1,75,CH,A)
----- END OF CONTROL STATEMENTS -----

```

Figure 20. Reviewing the Control Statements

This panel gives you a chance to check the accuracy of the DFSORT control statements before DFSORT Panels submits or saves your job. If you notice that your control statement is incorrect, you can go back to the appropriate panel and correct the statement before you submit the job.

When you press **ENTER**, your job will be processed. If you chose foreground execution on the second page of the SORT, MERGE, or COPY Entry Panel, your job is processed immediately. If you chose background execution, the next panel is the DFSORT Job Submission Entry Panel (see Figure 21 on page 26).

Backing Up and Starting Over

You can return to the original SORT, MERGE, or COPY Entry panels at any point during input by pressing **END** repeatedly, until you reach the panel you want to work with.

Selecting Your Execution Mode

When using DFSORT Panels to process DFSORT jobs, you can choose to:

- Immediately submit any job for processing under TSO
- Submit your job for batch processing or save your DFSORT job stream in a data set where you can edit or submit it as needed

You choose the method of processing on the SORT, MERGE, or COPY Entry panels. The following sections explain the differences between these methods of processing DFSORT jobs.

Selecting Your Execution Mode

Running Your Job in Foreground

If you specified foreground execution, DFSORT runs your job under TSO immediately after you have reviewed the control statements. You will not be able to use your terminal until the job is processed, so keep this in mind for long-running jobs. As your job is running, you see TSO execution messages and DFSORT program messages.

Submitting or Saving Jobs

If you selected background execution, DFSORT Panels displays the DFSORT Job Submission Entry Panel after you review the control statements (see Figure 21).

```
                                DFSORT JOB SUBMISSION ENTRY PANEL
COMMAND ===>

SELECT ONE OF THE FOLLOWING ===>
  1 SUBMIT JOB      2 SAVE GENERATED JOB IN A DATA SET

IF OPTION "2" IS SELECTED, SPECIFY:
DATA SET NAME     ===> SORT.CNTL(JCLSAV)
REPLACE CONTENTS  ===> Y                (Y or N)

JOB STATEMENT INFORMATION:                (verify before proceeding)
===> //A123456G JOB (TSOUSER), 'NAME'
===> //*
===> //*
===> //*
===> //*
===> //*
===> //*

VIEW OR CHANGE EXECUTE STATEMENTS FROM PROFILE ===> Y    (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 21. DFSORT Job Submission Entry Panel

On the DFSORT Job Submission Entry Panel, you must select either **1** to SUBMIT JOB for background processing or **2** to SAVE GENERATED JOB IN A DATA SET for later processing or editing.

If you select to save your job in a data set, you must specify the name of the data set to save the job in.

```
IF OPTION "2" IS SELECTED, SPECIFY:
DATA SET NAME     ===> SORT.CNTL(JCLSAV)
REPLACE CONTENTS  ===> Y                (Y or N)
```

Do not confuse the saved data set with the sort, merge, or copy output data set. The output data set contains your sorted, merged, or copied records, whereas the saved data set contains your job statement. The saved data set must be pre-allocated and cataloged with either fixed format or fixed-block format and a logical record length of 80.

The DFSORT Job Submission Entry Panel also displays the current job control language (JCL) JOB statements specified in your User Profile. The JOB statements

are used to process your job. You can verify and accept them as is, or you can change them if needed. See *Getting Started* or the *Application Programming Guide* for more information on the JOB statement. (Remember that DFSORT primes input fields with previously used values. The input you see on your own panel might differ from the printed example.)

Note: Any changes you make to the JCL statements on the DFSORT Job Submission Entry Panel are used to update the DFSORT User Profile when the job is submitted or saved. These changes are not saved if you decide not to submit or save your job.

If you enter an **N** in the VIEW OR CHANGE EXECUTE STATEMENTS FROM PROFILE field, when you press **ENTER** your job is saved or submitted immediately.

To see or change the JCL EXEC statements, enter a **Y** in the VIEW OR CHANGE EXECUTE STATEMENTS FROM PROFILE field on the DFSORT Job Submission Entry Panel. DFSORT Panels displays the Execute Statement Entry Panel (see Figure 22).

```

                                DFSORT EXECUTE STATEMENT ENTRY PANEL
COMMAND ===>

SPECIFY DFSORT EXECUTE STATEMENT INFORMATION:

====> /*
====> /*
====> /*
====> //STEP1 EXEC PGM=ICEMAN
====> /*
====> //SORTLIB DD DSN=SYS1.SORTLIB,DISP=SHR
====> /*
====> //SYSOUT DD SYSOUT=*
====> /*
====> /*

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 22. DFSORT Execute Statement Entry Panel

The DFSORT Execute Statement Entry Panel shows the current JCL EXEC statements as specified in your User Profile. The EXEC statements are used to process your job. You can verify and accept them as is, or you can change them if needed. See *Getting Started* or the *Application Programming Guide* for more information on the JCL required to process DFSORT jobs.

Press **ENTER** to submit or save your job.

Note: Any changes you make to the EXEC statements on the DFSORT Execute Statement Entry Panel are used to update the DFSORT User Profile when the job is submitted or saved. These changes are not saved if you decide not to submit or save your job.

Selecting Your Execution Mode

For more information on how to prepare the EXEC and other JCL statements, see the *Application Programming Guide*.

Task Summary

This chapter focused on the basics of using DFSORT Panels:

- What the panels are
- How you move from panel to panel
- How to get help for messages and the panels themselves
- Basic commands
- What the User Profile is and what information it gets from DFSORT Panels
- Processing in foreground and background mode

In addition, you have been taken on a basic tour of a sort, merge, or copy job, and have seen how to progress from one panel to the next.

In the next section, you will be guided through sorting, merging, and copying jobs using the sample data sets provided with DFSORT.

Chapter 3. Sorting, Merging, and Copying Data Sets

This chapter shows you how to sort, merge, and copy data sets using DFSORT Panels. The first section explains how to sort data sets by walking you step by step through the panels necessary to perform a simple sort. You will also learn how to sort using multiple control fields, and how to set up your sort job faster by bypassing some panels.

Finally, you merge and copy data sets, following a path similar to the one you used to sort.

You might want to refer to Appendix D, "Map of DFSORT Panels" on page 121 to see how the three main DFSORT Panels functions relate to each other.

Sorting Data Sets

This section describes how to use DFSORT Panels to sort a data set. You will step through sorting the sample bookstore data set records by course department in ascending order (as shown in Figure 23).

Figure 23. Sample Bookstore Data Set Sorted by Course Department in Ascending Order

Book Title		Course Department
1	75	110 114
LIVING WELL ON A SMALL BUDGET		
PICK'S POCKET DICTIONARY		
INTRODUCTION TO BIOLOGY		BIOL
SUPPLYING THE DEMAND		BUSIN
STRATEGIC MARKETING		BUSIN
COMPUTER LANGUAGES		COMP
VIDEO GAME DESIGN		COMP
COMPUTERS: AN INTRODUCTION		COMP
NUMBERING SYSTEMS		COMP
SYSTEM PROGRAMMING		COMP
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		ENGL
EDITING SOFTWARE MANUALS		ENGL
MODERN ANTHOLOGY OF WOMEN POETS		ENGL
THE COMPLETE PROOFREADER		ENGL
SHORT STORIES AND TALL TALES		ENGL
THE INDUSTRIAL REVOLUTION		HIST
EIGHTEENTH CENTURY EUROPE		HIST
CRISES OF THE MIDDLE AGES		HIST
INTRODUCTION TO PSYCHOLOGY		PSYCH
ADVANCED TOPICS IN PSYCHOANALYSIS		PSYCH

In the following sections, the tutorials guide you through the series of panels shown in Figure 24 on page 30.

Sorting Data Sets

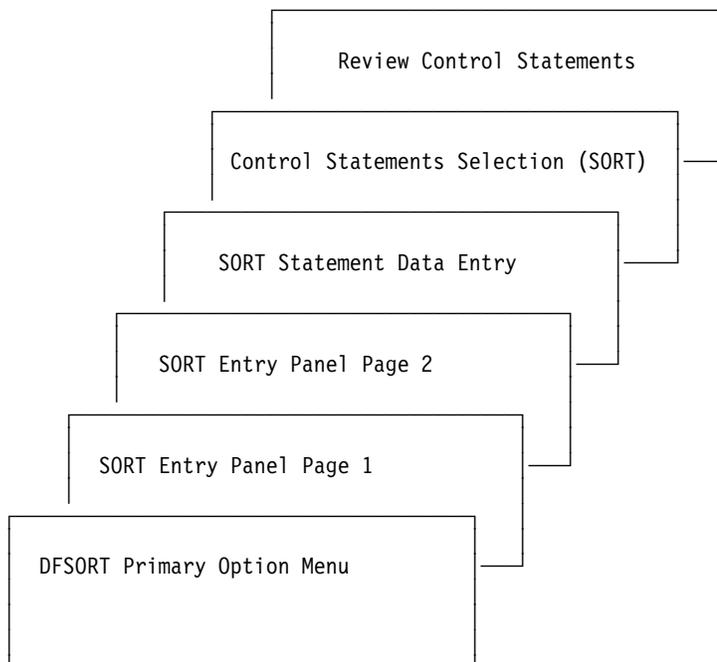


Figure 24. Overview of Panels Used for a Simple Sort

Selecting Tasks

The first panel that appears when you invoke DFSORT Panels is the DFSORT Primary Option Menu, as shown in Figure 25.

```
DFSORT PRIMARY OPTION MENU
ENTER SELECTION OR COMMAND ==>
SELECT ONE OF THE FOLLOWING:

0 DFSORT PROFILE          - Change DFSORT user profile
1 SORT                   - Perform Sort Application
2 COPY                   - Perform Copy Application
3 MERGE                  - Perform Merge Application
X EXIT                   - Terminate DFSORT

-----
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-----

USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 25. DFSORT Primary Option Menu

From the DFSORT Primary Option Menu you can choose to sort, copy, or merge a data set(s), go to the profile panels (to change the way your DFSORT sessions normally run), or exit DFSORT.

To sort a data set:

1. Select SORT by entering a **1** after ENTER SELECTION OR COMMAND on the panel.
2. Press **ENTER**.

DFSORT displays the SORT Entry Panel, shown in Figure 26.

```

                                SORT ENTRY PANEL                                Page 1 of 2
COMMAND ===>

SPECIFY ONE OR MORE INPUT DATA SET(S):
  INPUT DSN 1 ===> SORT.SAMPIN

  (USE DSN 2 TO 12 FOR CONCATENATED DATA SETS)
  INPUT DSN 2 ===>
  INPUT DSN 3 ===>
  INPUT DSN 4 ===>
  INPUT DSN 5 ===>
  INPUT DSN 6 ===>
  INPUT DSN 7 ===>
  INPUT DSN 8 ===>
  INPUT DSN 9 ===>
  INPUT DSN 10 ===>
  INPUT DSN 11 ===>
  INPUT DSN 12 ===>

  VERIFY INPUT DSN ===> Y  (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 26. SORT Entry Panel, Page 1

Designing Jobs

The SORT Entry Panel consists of two separate “pages” or panels.

On the first page, you can either enter the input data set name or accept the data set name displayed in the INPUT DSN 1 field.

On the second page, you can specify the output data set name, choose your execution environment, and choose whether or not to view some optional panels.

Selecting Data Sets for Processing

On the first page of the SORT Entry Panel:

1. After INPUT DSN 1, enter the first input data set name.

The input data set might already be primed with the last input data set you used. The other input data set name fields, INPUT DSN 2-12, are optional (use them to sort additional data sets). For this example, enter an input data set name of **SORT.SAMPIN**, as shown in Figure 26.

2. Leave the VERIFY INPUT DSN field set to the default value of **Y**.

When this field is set to **Y**, DFSORT checks the input data set name you entered on the panel to verify that the data set is cataloged and allocated.

If the data set name you entered is not cataloged and allocated, DFSORT displays an error message on the panel, asking you to enter a valid data set name. By setting the VERIFY INPUT DSN field to **Y**, you can keep from using data sets that might cause your job to fail.

3. To continue to page 2 of the panel, press **ENTER**. DFSORT displays the SORT Entry Panel, Page 2 (see Figure 27).

```
COMMAND ==>>                                SORT ENTRY PANEL                                Page 2 of 2

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ==>> SORT.SAMPOUT
  ALLOCATE NEW OUTPUT DATA SET ==>> N (Y or N)
  VERIFY OUTPUT DSN          ==>> Y (Y or N)

SPECIFY EXECUTION ENVIRONMENT ==>> 1
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY QUANTITY ==>> 5 (in Cylinders)
  SECONDARY QUANTITY ==>> 5 (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL ==>> Y (Y or N)
REVIEW CONTROL STATEMENTS BEFORE EXECUTION ==>> Y (Y or N)
ENTER SORT CONTROL STATEMENT IN FREE FORM ==>> N (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO RETURN TO PAGE 1.
```

Figure 27. SORT Entry Panel, Page 2

Options for Processing Jobs

On the second page of the SORT Entry Panel:

1. After OUTPUT DSN, enter the name of the *output* data set in which you want the sorted records to be placed. The output data set name might already be primed with the last output data set you used.

For this example, enter an output data set name of **SORT.SAMPOUT**, as shown in Figure 27.

2. Leave the ALLOCATE NEW OUTPUT DATA SET field set to the default value of **N**.

When this field is set to **N**, DFSORT uses the existing output data set specified in the OUTPUT DSN field.

3. Leave the VERIFY OUTPUT DSN field set to the default value of **Y**.

When this field is set to **Y**, DFSORT checks the output data set name you entered on the panel to verify that the data set is cataloged and allocated.

4. Leave the SPECIFY EXECUTION ENVIRONMENT field set to the default value of **1** for foreground execution.

You can choose either foreground or background execution. Using foreground execution, you run your job under TSO to sort your records immediately. Using background execution, you choose to submit the job for batch execution or save the job in a data set for later editing or batch submission.

5. After SPECIFY WORK DATA SET SPACE, specify the amount of space to allocate for the work data set that DFSORT needs to process your job. For now, leave these fields set to their default values of 5 and 5.

Note: You can allow dynamic allocation of work data sets by specifying the DYNALLOC option on the Option Statement Data Entry (SORT) panel. See the discussion of the DYNALLOC parameter in *Application Programming Guide* for details on using the DYNALLOC parameter.

6. For this example, make sure the last three fields are set to following default values (if they are not, change them as shown):

```
VIEW CONTROL STATEMENTS SELECTION PANEL  — Y
REVIEW CONTROL STATEMENTS BEFORE EXECUTION — Y
ENTER SORT CONTROL STATEMENT IN FREE FORM — N
```

The last three fields on the SORT Entry Panel define which series of panels you will work with as you specify your job. These options are explained later in this chapter.

7. Press **ENTER** to continue.

DFSORT displays the SORT Statement Data Entry panel (see Figure 28).

SORT STATEMENT DATA ENTRY ROW 1 OF 4

COMMAND ===> SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER. TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE COMMAND	SORT FIELD NO.	POSITION	LENGTH	FORMAT	SORT ORDER
.....	1	===>	===>	===> CH	===> A
.....	2	===>	===>	===> CH	===> A
.....	3	===>	===>	===> CH	===> A
.....	4	===>	===>	===> CH	===> A
***** END OF SORT FIELDS *****					

Figure 28. SORT Statement Data Entry Panel, Before You Fill It In

Arranging the Records

DFSORT uses the information you enter on the SORT Statement Data Entry panel to build a SORT control statement. If the panel is not primed with values from a previous session, it shows four unused *sort control fields* (you can enter up to 100 sort fields).

You must enter the following information for at least one sort field to continue.

POSITION The starting byte position of the field by which you are going to sort (in relation to the beginning of the record).

LENGTH The length, in bytes, of the field by which you are sorting.

FORMAT A code for the data format. The most common formats are:

- CH** EBCDIC character
- BI** Binary (numeric)
- ZD** Zoned decimal (numeric)
- PD** Packed decimal (numeric)

The default for FORMAT is **CH**, the format code for character type.

SORT ORDER The sorting order (ascending or descending) in which you want your records arranged. The SORT ORDER default is **A**, the code for ascending order.

In addition, you might need to modify the control fields by using *line commands*. Line commands are letters or numbers that represent commands that modify lists of control fields. You enter these commands in the LINE COMMAND field at the left of the screen and press **ENTER** to process the command. For a list of valid line commands, see Figure 29. Use line commands to save time by adding, deleting, or rearranging control fields without having to retype the entire list.

Figure 29. Line Commands Used in DFSORT Panels

Use:	To:
I	Insert a single unused field after a line.
Ix	Insert x unused fields after a line.
I-	Insert a single unused field before a line.
I-x	Insert x unused fields before a line.
D	Delete a single field.
Dx	Delete x fields including this one.
DD	Mark the first and last fields of a block of fields to be deleted.
R	Repeat a single field.
Rx	Repeat a single field x times.
RR	Mark the first and last fields of a block of fields to be repeated.
RRx	Mark the first and last fields of a block of fields to be repeated x times.
C	Mark a single field to be copied.
Cx	Mark the first of x fields to be copied.
CC	Mark the first and last fields of a block of fields to be copied.
M	Mark a single field to be moved.
Mx	Mark the first of x fields to be moved.
MM	Mark the first and last fields of a block of fields to be moved.
A	Mark the destination when fields are to be moved or copied <i>after</i> a field.
B	Mark the destination when fields are to be moved or copied <i>before</i> a field.

To sort the sample data set by course department in ascending order, fill in the SORT Statement Data Entry panel as follows:

1. The COURSE DEPARTMENT field begins at byte 110, so enter **110** after POSITION
2. The COURSE DEPARTMENT field is 5 bytes long, so enter **5** after LENGTH
3. The COURSE DEPARTMENT field contains character data. The FORMAT field defaults to **CH**, so you do not have to enter any changes in this field.
4. Arrange the records in ascending order. The SORT ORDER field has the default value of **A**, for ascending order, already displayed, so you do not have to enter any changes in this field.

After completing the fields on the SORT Statement Data Entry panel, the screen looks like Figure 30 on page 36.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT      SORT
.....   ..         ..         ..         ..         ORDER
.....    1    ===> 110    ===> 5    ===> CH    ===> A
.....    2    ===>         ===>         ===> CH    ===> A
.....    3    ===>         ===>         ===> CH    ===> A
.....    4    ===>         ===>         ===> CH    ===> A
          ***** END OF SORT FIELDS *****

```

Figure 30. SORT Statement Data Entry Panel, After You Fill It In

DFSORT Panels uses only the control fields for which you have specified POSITION and LENGTH. So in this example, DFSORT will arrange the input data set using SORT FIELD NO. 1 as the only sort field. SORT FIELD NO.s 2, 3, and 4, are not used.

- To verify the input you entered on the panel, press **ENTER** once.

DFSORT checks your input for any errors, and re-displays the screen. If DFSORT finds any errors, it displays a message at the top of the panel. If you do receive an error message, read the message, check your input closely, and correct any input errors.

If there are no errors, DFSORT displays an informational message at the top of the panel.

- To continue without any further input (entering anything else), press **ENTER**.

If you make any input changes (such as changing the sort order to **D** for descending), you must press **ENTER** to process the changes and re-display the SORT Statement Data Entry panel. Press **ENTER** again to continue to the next screen.

DFSORT displays the screen shown in Figure 31 on page 37.

```

                                CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ===>   NO    (Various options)
INCLUDE ===>   NO    (Include only selected records)
OMIT    ===>   NO    (Exclude selected records)
SUM     ===>   NO    (Summarize/eliminate records with duplicate keys)
INREC  ===>   NO    (Reformat records before sort)
OUTREC ===>   NO    (Reformat records for output)
ALTSEQ ===>   NO    (Changes to standard collating sequence)
MODS   ===>   NO    (User exits)
RECORD ===>   NO    (Unavailable input format/length information)
DEBUG  ===>   NO    (Various debugging options)
FREEFORM ===> NO    (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 31. Control Statements Selection (SORT) Panel

You use this panel to select any additional control statements such as INCLUDE or OMIT.

Choosing Additional Control Statements

You might want to build DFSORT control statements in addition to the SORT, MERGE, or OPTION COPY control statement. For example, if you want to select only certain records from the input data set, you need an INCLUDE statement.

```
CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ===>   NO    (Various options)
INCLUDE ===>   NO    (Include only selected records)
OMIT     ===>   NO    (Exclude selected records)
SUM      ===>   NO    (Summarize/eliminate records with duplicate keys)
INREC   ===>   NO    (Reformat records before sort)
OUTREC  ===>   NO    (Reformat records for output)
ALTSEQ  ===>   NO    (Changes to standard collating sequence)
MODS    ===>   NO    (User exits)
RECORD  ===>   NO    (Unavailable input format/length information)
DEBUG   ===>   NO    (Various debugging options)
FREEFORM ===>   NO    (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 32. Choosing Additional Control Statements

1. Select additional control statements on this panel. In this case, you do not want to add any other control statements.
2. Press **ENTER** to continue.

Running Sort Jobs

On the Review Control Statements panel (Figure 33), DFSORT Panels displays the control statement it built from the information you entered.

Sorting by Multiple Control Fields

In the first example, you sorted the sample data set by a single control field, the course department. You can also sort records by specifying more than one control field. When you specify more than one control field, you enter them from highest to lowest priority.

Note: Control fields can overlap or be contained within other control fields.

In this case, sort the sample data set in this order:

1. Course department
2. Course number
3. Instructor's last name
4. Instructor's initials
5. Book title

If two records have the same course department, they are sorted by course number. If they also have the same course number, they are sorted by the instructor's last name. If they also have the same last name, they are sorted by the instructor's initials. Finally, if they also have the same initials, they are sorted by title.

To accomplish this sort, follow the same path you used to sort the records by course department.

1. On the SORT Statement Data Entry panel, specify the POSITION, LENGTH, FORMAT, and SORT ORDER for the five control fields.

Figure 34 shows how to specify the first four control fields on the SORT Statement Data Entry panel.

```

                                SORT STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SORT
COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT      SORT
.....    1  ===> 110  ===> 5      ===> CH      ===> A
.....    2  ===> 115  ===> 5      ===> CH      ===> A
.....    3  ===> 145  ===> 15     ===> CH      ===> A
.....    4  ===> 160  ===> 2      ===> CH      ===> A
          ***** END OF SORT FIELDS *****
    
```

Figure 34. Sorting by Multiple Control Fields, the First Four Sort Fields

You must specify one more sort control field to sort the records by book title. Because there are no more open sort control fields on the panel, use a line

command to insert additional lines to enter more sort control fields (see Figure 29 on page 34 for a list of all line commands).

- Under LINE COMMAND, enter an I, for insert, on the bottom line of the panel, as shown in Figure 35.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....   1    ===> 110    ===> 5     ===> CH   ===> A
.....   2    ===> 115    ===> 5     ===> CH   ===> A
.....   3    ===> 145    ===> 15    ===> CH   ===> A
I.....  4    ===> 160    ===> 2     ===> CH   ===> A
                ***** END OF SORT FIELDS *****

```

Figure 35. Using the Insert (I) Line Command to Add More Sort Control Fields

- Press **ENTER**.

DFSORT re-displays the panel with one more sort control field.

```

                                SORT STATEMENT DATA ENTRY
                                SCROLL ===> PAGE

COMMAND ===>

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....   1    ===> 110    ===> 5     ===> CH   ===> A
.....   2    ===> 115    ===> 5     ===> CH   ===> A
.....   3    ===> 145    ===> 15    ===> CH   ===> A
.....   4    ===> 160    ===> 2     ===> CH   ===> A
.....   5    ===>          ===>          ===> CH  ===> A
                ***** END OF SORT FIELDS *****

```

Figure 36. SORT Statement Data Entry Panel with an Additional Line

Sorting Data Sets

Note: If you want to add more than one sort control field, enter **I***x*, where *x* is the number of lines you want to insert. Instead of using **I**, you can use **R**, to repeat a line, and change the control field in the repeated line to a new control field.

4. On the new line, enter the POSITION, LENGTH, and FORMAT for the fifth field, as shown in Figure 37.

```

                                SORT STATEMENT DATA ENTRY
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....    1    ===> 110    ===> 5      ===> CH    ===> A
.....    2    ===> 115    ===> 5      ===> CH    ===> A
.....    3    ===> 145    ===> 15     ===> CH    ===> A
.....    4    ===> 160    ===> 2      ===> CH    ===> A
.....    5    ===> 1      ===> 75     ===> CH    ===> A
          ***** END OF SORT FIELDS *****
```

Figure 37. Adding an Extra Sort Control Field to Sort by Book Title

5. To check your input for errors, press **ENTER**.
6. If there are no errors, press **ENTER** again without entering anything else to continue.
DFSORT displays the Control Statements Selection (SORT) panel.
7. Because you are sorting without adding any other control statements, press **ENTER** to continue to the Review Control Statements panel.
8. To perform the sort, press **ENTER** on the Review Control Statements (SORT) panel.

Figure 38 shows the sorted records.

Figure 38. Sort by Multiple Fields

Book Title	Course Department	Course Number	Instructor's Last Name	Instructor's Initials
1	75	110 114	115 119	145 159 160 161
LIVING WELL ON A SMALL BUDGET				
PICK'S POCKET DICTIONARY				
INTRODUCTION TO BIOLOGY	BIOL	80521	GREENBERG	HC
STRATEGIC MARKETING	BUSIN	70124	LORCH	HH
SUPPLYING THE DEMAND	BUSIN	70251	MAXWELL	RF
NUMBERING SYSTEMS	COMP	00032	CHATTERJEE	AN
COMPUTER LANGUAGES	COMP	00032	CHATTERJEE	CL
COMPUTERS: AN INTRODUCTION	COMP	00032	CHATTERJEE	CL
SYSTEM PROGRAMMING	COMP	00103	SMITH	DC
VIDEO GAME DESIGN	COMP	00205	NEUMANN	LB
SHORT STORIES AND TALL TALES	ENGL	10054	BUCK	GR
EDITING SOFTWARE MANUALS	ENGL	10347	MADRID	MM
THE COMPLETE PROOFREADER	ENGL	10347	MADRID	MM
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	ENGL	10856	FRIEDMAN	KR
MODERN ANTHOLOGY OF WOMEN POETS	ENGL	10856	FRIEDMAN	KR
THE INDUSTRIAL REVOLUTION	HIST	50420	GOODGOLD	ST
CRISES OF THE MIDDLE AGES	HIST	50521	WILLERTON	DW
EIGHTEENTH CENTURY EUROPE	HIST	50632	BISCARDI	HR
INTRODUCTION TO PSYCHOLOGY	PSYCH	30016	ZABOSKI	RL
ADVANCED TOPICS IN PSYCHOANALYSIS	PSYCH	30975	NAKATSU	FL

Specifying Fields Together

When fields are next to each other in the input data set, and they have the same data format, you can specify them together as one field on the SORT Statement Data Entry panel.

Look at the sample bookstore data set in Appendix B, “The Sample Bookstore Data Set” on page 115. Notice that the COURSE DEPARTMENT and the COURSE NUMBER fields are located next to each other and have the same data format, character (CH). Also, the INSTRUCTOR'S LAST NAME and the INSTRUCTOR'S INITIALS fields are next to each other and have the same data format.

You can specify the department and course number together as one field, and the instructor's last name and instructor's initials together as one field, on the SORT Statement Data Entry panel.

1. Delete the line for COURSE NUMBER (#2) and the line for INSTRUCTOR'S INITIALS (#4) by typing the line command **D** on their respective lines under the LINE COMMAND heading. You can enter the line command anywhere in the correct area.
2. When the two lines have been deleted, and only three lines are left, change the length of area sorted for lines #1 and #2 from **5** and **15** to **10** and **17**, respectively (see Figure 39 on page 44).

```

                                SORT STATEMENT DATA ENTRY                                ROW 1 OF 3
COMMAND ===>                                                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....   ..         ..         ..         ..         ORDER
.....   1         ===> 110    ===> 10    ===> CH    ===> A
.....   2         ===> 145    ===> 17    ===> CH    ===> A
.....   3         ===> 1      ===> 75    ===> CH    ===> A
          ***** END OF SORT FIELDS *****

```

Figure 39. Combining Fields on the SORT Statement Data Entry Panel

The sorted records look the same as shown in Figure 38 on page 42.

Changing the Default Sort Order

So far, you have sorted records in ascending order. Sorting records in descending order instead of ascending order is easy. Rather than an **A**, enter a **D** after SORT ORDER on the SORT Statement Data Entry panel.

You can sort some control fields in ascending order and others in descending order. For example, to sort the course departments in ascending order and the prices in descending order (within each course department), complete the SORT Statement Data Entry panel as shown in Figure 40.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE          SORT
COMMAND      FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....      1      ==> 110    ==> 5      ==> CH    ==> A
.....      2      ==> 170    ==> 4      ==> BI    ==> D
.....      3      ==>      ==>      ==> CH    ==> A
.....      4      ==>      ==>      ==> CH    ==> A
          ***** END OF SORT FIELDS *****

```

Figure 40. Sorting in Ascending and Descending Order

Note that the format code for PRICE is BI, for binary data (a numeric field).

Figure 41 shows the sorted records.

Figure 41. Sample Bookstore Data Set Sorted by Course Department in Ascending Order and Price in Descending Order

Book Title	Course Department	Price
1	75 110 114	170 173
LIVING WELL ON A SMALL BUDGET		9900
PICK'S POCKET DICTIONARY		295
INTRODUCTION TO BIOLOGY	BIOL	2350
SUPPLYING THE DEMAND	BUSIN	2350
STRATEGIC MARKETING	BUSIN	1925
COMPUTER LANGUAGES	COMP	3195
VIDEO GAME DESIGN	COMP	2600
COMPUTERS: AN INTRODUCTION	COMP	2199
NUMBERING SYSTEMS	COMP	1899
SYSTEM PROGRAMMING	COMP	360
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	ENGL	1520
EDITING SOFTWARE MANUALS	ENGL	1450
MODERN ANTHOLOGY OF WOMEN POETS	ENGL	625
THE COMPLETE PROOFREADER	ENGL	595
SHORT STORIES AND TALL TALES	ENGL	450
THE INDUSTRIAL REVOLUTION	HIST	1790
EIGHTEENTH CENTURY EUROPE	HIST	1200
CRISES OF THE MIDDLE AGES	HIST	795
INTRODUCTION TO PSYCHOLOGY	PSYCH	2600
ADVANCED TOPICS IN PSYCHOANALYSIS	PSYCH	2200

Shortcuts for Setting Up Your Sort Job

There are two optional steps you can take if you want to reduce the number of panels you usually see when setting up a sort job.

Remember those last three items on the SORT Entry Panel, Page 2?

```

                                SORT ENTRY PANEL                                Page 2 of 2
COMMAND ===>

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.SAMPOUT
  ALLOCATE NEW OUTPUT DATA SET ===> N (Y or N)
  VERIFY OUTPUT DSN      ===> Y (Y or N)

SPECIFY EXECUTION ENVIRONMENT ===> 1
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY  QUANTITY ===> 5 (in Cylinders)
  SECONDARY QUANTITY ===> 5 (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL  ===> Y (Y or N)

REVIEW CONTROL STATEMENTS BEFORE EXECUTION ===> Y (Y or N)

ENTER SORT CONTROL STATEMENT IN FREE FORM ===> N (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO RETURN TO PAGE 1.

```

Figure 42. SORT Entry Panel, Page 2

The next few sections discuss how you can use those fields to reduce the number of panels you go through to create a job.

Bypassing the Control Statements Selection Panel

The VIEW CONTROL STATEMENTS SELECTION PANEL field shown in Figure 42 is usually set to its default value of **Y**. When set to this value, DFSORT displays the Control Statements Selection panel, where you can choose to create additional control statements.

If you do not want to change any of the additional control statements, after VIEW CONTROL STATEMENTS SELECTION PANEL field, type **N**, for NO.

If you set this field to **N**, DFSORT bypasses the Control Statement Selection panel as you set up your job.

Bypassing the Review Control Statements Panel

You can also choose not to display the Review Control Statements panel, the last panel you see before you perform a foreground sort. On the Review panel you can check the control statement(s) that DFSORT built for you before you actually sort the records. This gives you a chance to see and correct any mistakes you might have made on the entry panels. Using this panel is recommended.

However, you can choose not to see this panel if, on page 2 of the SORT, MERGE, or COPY Entry Panels, you type **N** after REVIEW CONTROL STATEMENTS BEFORE EXECUTION.

So Far

So far, you have covered the basics of sorting data sets using DFSORT Panels:

- Completing a simple sort
- Sorting with multiple control fields
- Changing the default sort order
- Setting up your sort job faster.

Now you will cover the basics of merging data sets with DFSORT Panels.

Merging Data Sets

With DFSORT you can also merge previously sorted data sets into one data set.

For example, consider the sample bookstore data set. Assume that the bookstore data set is already sorted by course department and book title, as shown in Figure 43.

Figure 43. Sample Bookstore Data Set Sorted by Course Department and Book Title

Book Title		Course Department
1	75	110 114
LIVING WELL ON A SMALL BUDGET		
PICK'S POCKET DICTIONARY		
INTRODUCTION TO BIOLOGY		BIOL
STRATEGIC MARKETING		BUSIN
SUPPLYING THE DEMAND		BUSIN
COMPUTER LANGUAGES		COMP
COMPUTERS: AN INTRODUCTION		COMP
NUMBERING SYSTEMS		COMP
SYSTEM PROGRAMMING		COMP
VIDEO GAME DESIGN		COMP
EDITING SOFTWARE MANUALS		ENGL
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		ENGL
MODERN ANTHOLOGY OF WOMEN POETS		ENGL
SHORT STORIES AND TALL TALES		ENGL
THE COMPLETE PROOFREADER		ENGL
CRISES OF THE MIDDLE AGES		HIST
EIGHTEENTH CENTURY EUROPE		HIST
THE INDUSTRIAL REVOLUTION		HIST
ADVANCED TOPICS IN PSYCHOANALYSIS		PSYCH
INTRODUCTION TO PSYCHOLOGY		PSYCH

Now, suppose the bookstore receives five new books. A new data set is created containing the five new records, also sorted by department and title (see Figure 44 on page 48).

Merging Data Sets

Figure 44. Five New Records Sorted by Course Department and Book Title

Book Title		Course Department
1	75	110 114
INTERNATIONAL COOKBOOK		
WORLD JOURNEYS BY TRAIN		
ARTS AND CRAFTS OF ASIA		ART
BIOCHEMISTRY		BIOL
BEHAVIORAL ANALYSIS		PSYCH

You can update the original bookstore data set by merging it with the new data set that contains the five new records.

Whenever you merge data sets, you must make sure that the records have the same format and that they have *previously* been sorted by the same control fields in the same order (ascending or descending). You can merge up to 16 data sets at a time.

Using the panels to merge data sets is similar to using the panels to sort data sets. Figure 45 shows the path you will take through the panels for the merge tutorial.

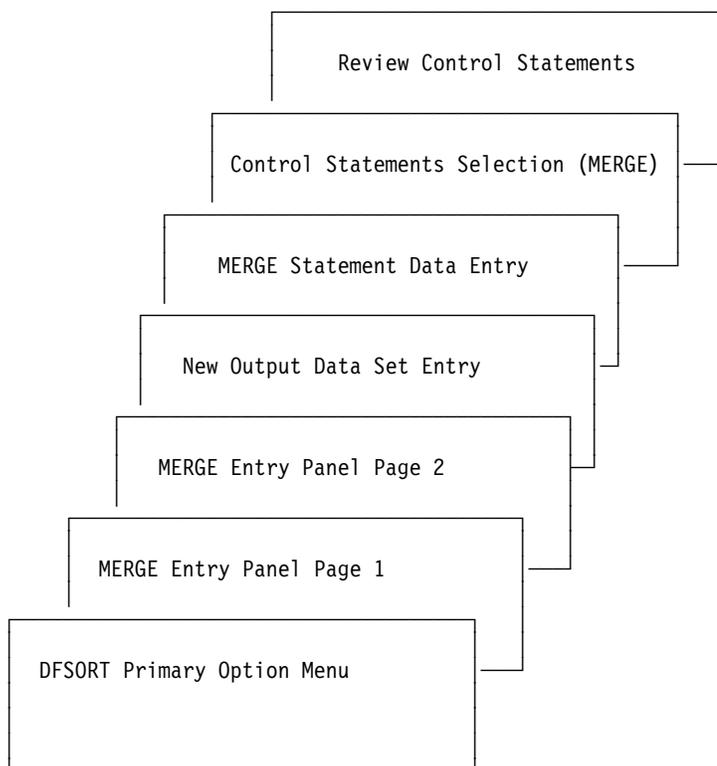


Figure 45. Overview of Panels Used for a Merge

Merging Data Sets

Figure 47 shows the first of two pages in the MERGE Entry Panel. Just as on the SORT Entry Panel, you use the first page of the MERGE Entry Panel to enter the names of the input data sets you want to merge. The input data set names might be primed with the last input data sets you used.

3. Enter the names of the data sets you are going to merge. Enter the names consecutively. Do not leave an open line between two data set names. In this example, you merge two data sets, **MERGE.MASTER** and **NEWREC.FIVE**.
4. Press **ENTER**.

DFSORT displays page 2 of the MERGE Entry Panel.

```

                                     MERGE ENTRY PANEL                               Page 2 of 2
COMMAND ===>

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.PDS(JOB1)
  ALLOCATE NEW OUTPUT DATA SET ===> Y (Y or N)
  VERIFY OUTPUT DSN      ===> Y (Y or N)

SPECIFY EXECUTION ENVIRONMENT ===> 1
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

VIEW CONTROL STATEMENTS SELECTION PANEL  ===> Y (Y or N)

REVIEW CONTROL STATEMENTS BEFORE EXECUTION ===> Y (Y or N)

ENTER MERGE CONTROL STATEMENT IN FREE FORM ===> N (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO RETURN TO PAGE 1.
```

Figure 48. MERGE Entry Panel, Page 2

On the second page of the MERGE Entry Panel:

1. After OUTPUT DSN, enter the name of the data set in which you want the merged records to be placed. The output data set name might be primed with the last output data set you used.

In this sample, you enter a new output data set with the name **SORT.PDS** with the member name **JOB1**.

2. Set the ALLOCATE NEW OUTPUT DATA SET field to **Y**. **Y** tells DFSORT you want to allocate SORT.PDS as a new partitioned output data set.
3. Leave the VERIFY OUTPUT DSN field set to the default of **Y**.

If the DFSORT panels detect an error in the syntax of your output data set name, a message will be displayed until you correct the error. Syntax verification is provided whether VERIFY OUTPUT DSN is set to **Y** or **N**.

If the VERIFY OUTPUT DSN field is set to **Y** and the ALLOCATE NEW OUTPUT DATA SET field is set to **Y**, additional data set verification, such as ensuring that

your data set is cataloged and allocated, is done after the New Output Data Set Entry Panel is displayed.

4. Leave the SPECIFY EXECUTION ENVIRONMENT field set to the default value of **1**. You can choose either foreground or background execution. Using foreground execution, you run your job under TSO to merge your records immediately. Using background execution, you choose to submit the job for batch execution or save the job in a data set for later editing or batch submission.
5. The last three items on the MERGE Entry Panel determine the panels you will work with as you specify your job. For this example, make sure these items are set to the following default values (if they are not, change them as shown):

```
VIEW CONTROL STATEMENTS SELECTION PANEL  - Y
REVIEW CONTROL STATEMENTS BEFORE EXECUTION - Y
ENTER MERGE CONTROL STATEMENT IN FREE FORM - N
```

These options are explained in detail on page 46.

6. To continue, press **ENTER**.

DFSORT displays the New Output Data Set Entry Panel.

```

                                NEW OUTPUT DATA SET ENTRY PANEL
COMMAND ==>
                                *** PARTITIONED ***

VERIFY OUTPUT DSN:  Y

OUTPUT DSN:  'A123456.SORT.PDS(JOB1) '

MANAGEMENT CLASS  ==>  -          (Blank for default management class)
STORAGE CLASS     ==>  -          (Blank for default storage class)
VOLUME SERIAL     ==>  -          (Blank for authorized default volume)*
GENERIC UNIT      ==>  -          (Generic group name or unit address)*
DATA CLASS        ==>  -          (Blank for default data class)
SPACE UNITS       ==>  CYLS      (TRKS, CYLS, KB, or MB)
PRIMARY QUANTITY  ==>  5         (In above units)
SECONDARY QUANTITY ==>  5         (In above units)
DIRECTORY BLOCKS  ==>  5         (In above units)
DATA SET NAME TYPE ==>  -          (LIBRARY, PDS or blank)

(* Only one of these fields can be specified.)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.
```

Figure 49. New Output Data Set Entry Panel, Partitioned.

On the New Output Data Set Entry Panel:

1. For this example, leave the MANAGEMENT CLASS, STORAGE CLASS, and DATA CLASS fields blank, so that the defaults will be used.
2. Leave the SPACE UNITS field set to the default value of **CYLS**, and leave the PRIMARY QUANTITY, SECONDARY QUANTITY, and DIRECTORY BLOCKS fields set to their default values of **5**. These values tell DFSORT how to allocate space for your new output data set.
3. Leave the DATA SET NAME TYPE field blank, so a PDS will be allocated.

Merging Data Sets

4. If you made any input changes, you must press **ENTER** to process the changes and re-display the New Output Data Set Entry panel. Press **ENTER** again to continue to the MERGE Statement Data Entry panel.

```

                                MERGE STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

MAKE ADDITIONAL CHANGES, OR USE ENTER TO CONTINUE
SPECIFY VALUES FOR ONE OR MORE MERGE FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT MERGE FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      MERGE
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    MERGE
.....    1    ===>      ===>      ===> CH    ===> A
.....    2    ===>      ===>      ===> CH    ===> A
.....    3    ===>      ===>      ===> CH    ===> A
.....    4    ===>      ===>      ===> CH    ===> A
          ***** END OF MERGE FIELDS *****
```

Figure 50. MERGE Statement Data Entry Panel, Before You Fill It In

To merge two or more data sets, use a MERGE statement the same way you used a SORT statement to sort data sets. To merge two data sets that are sorted by the COURSE DEPARTMENT and BOOK TITLE fields, create a MERGE statement that will merge the records by these fields.

1. Enter the POSITION, LENGTH, DATA FORMAT, and MERGE ORDER of the COURSE DEPARTMENT and BOOK TITLE fields as shown in Figure 51 on page 53.

```

                                MERGE STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ==>                                SCROLL ==> PAGE

MAKE ADDITIONAL CHANGES, OR USE ENTER TO CONTINUE
SPECIFY VALUES FOR ONE OR MORE MERGE FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT MERGE FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      MERGE
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    MERGE
.....    1    ==> 110    ==> 5    ==> CH    ==> A
.....    2    ==> 1     ==> 75   ==> CH    ==> A
.....    3    ==>      ==>      ==> CH    ==> A
.....    4    ==>      ==>      ==> CH    ==> A
          ***** END OF MERGE FIELDS *****

```

Figure 51. MERGE Statement Data Entry Panel, After You Fill It In

2. To have DFSORT verify the information you entered, press **ENTER**.
3. Press **ENTER** again without any further input changes. DFSORT displays the Control Statements Selection (MERGE) panel.
4. In this case, you do not want to create any other control statements, so press **ENTER** to continue.

DFSORT displays the Review Control Statements panel.

The Review Control Statements panel displays the MERGE control statement that DFSORT built for you from the information you entered on the panels.

Merging Data Sets

```
                                REVIEW CONTROL STATEMENTS                                LINE 1 OF 1
COMMAND ===>                                                                SCROLL ===> PAGE

(USE ENTER TO PERFORM DFSORT; USE UP/DOWN COMMANDS TO SCROLL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.)

-----
MERGE   FIELDS=(110,5,CH,A,1,75,CH,A)
-----
----- END OF CONTROL STATEMENTS -----
```

Figure 52. Review Control Statements Panel

5. To process the merge, press **ENTER**. Because you selected foreground execution, when you press **ENTER** you see TSO messages and DFSORT program messages as your merge job runs.

The output records consist of the original data set (Figure 43 on page 47) merged with the data set of the five new books (Figure 44 on page 48) sorted by department and book title. See Figure 53 on page 54 for the result.

Figure 53. Sample Bookstore Data Set Merged with Five New Records

Book Title		Course Department
1	75	110 114
INTERNATIONAL COOKBOOK		
LIVING WELL ON A SMALL BUDGET		
PICK'S POCKET DICTIONARY		
WORLD JOURNEYS BY TRAIN		
ARTS AND CRAFTS OF ASIA		ART
BIOCHEMISTRY		BIOL
INTRODUCTION TO BIOLOGY		BIOL
STRATEGIC MARKETING		BUSIN
SUPPLYING THE DEMAND		BUSIN
COMPUTER LANGUAGES		COMP
COMPUTERS: AN INTRODUCTION		COMP
NUMBERING SYSTEMS		COMP
SYSTEM PROGRAMMING		COMP
VIDEO GAME DESIGN		COMP
EDITING SOFTWARE MANUALS		ENGL
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		ENGL
MODERN ANTHOLOGY OF WOMEN POETS		ENGL
SHORT STORIES AND TALL TALES		ENGL
THE COMPLETE PROOFREADER		ENGL
CRISES OF THE MIDDLE AGES		HIST
EIGHTEENTH CENTURY EUROPE		HIST
THE INDUSTRIAL REVOLUTION		HIST
ADVANCED TOPICS IN PSYCHOANALYSIS		PSYCH
BEHAVIORAL ANALYSIS		PSYCH
INTRODUCTION TO PSYCHOLOGY		PSYCH

So Far

This section explained how to merge data sets using the panels. Next, you proceed with copying data sets.

Copying Data Sets

With DFSORT Panels, you can copy the records of your data sets directly without performing a sorting or merging operation.

You can copy records as they are, or you can edit the data sets by selecting and reformatting the specific records you want to copy. Later chapters show you how to edit data sets. For now, the copied data sets look the same as the original data sets.

Figure 54 on page 56 shows the path you take through the panels for the copy tutorial.

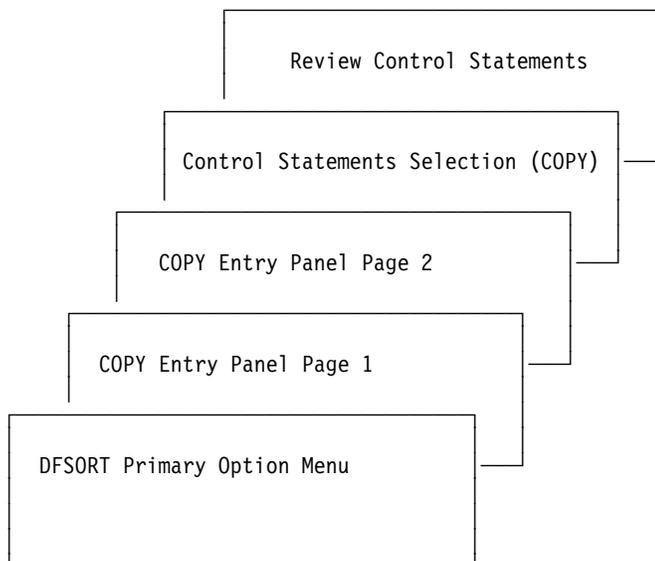


Figure 54. Overview of Panels Used for a Copy Application

For this example, you copy the records shown in Figure 55 without any editing.

Figure 55. Sample Bookstore Data Set as a Source for a Copy Application

Book Title		Course Department
1	75	110 114
LIVING WELL ON A SMALL BUDGET		
PICK'S POCKET DICTIONARY		
INTRODUCTION TO BIOLOGY		BIOL
STRATEGIC MARKETING		BUSIN
SUPPLYING THE DEMAND		BUSIN
COMPUTER LANGUAGES		COMP
COMPUTERS: AN INTRODUCTION		COMP
NUMBERING SYSTEMS		COMP
SYSTEM PROGRAMMING		COMP
VIDEO GAME DESIGN		COMP
EDITING SOFTWARE MANUALS		ENGL
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		ENGL
MODERN ANTHOLOGY OF WOMEN POETS		ENGL
SHORT STORIES AND TALL TALES		ENGL
THE COMPLETE PROOFREADER		ENGL
CRISES OF THE MIDDLE AGES		HIST
EIGHTEENTH CENTURY EUROPE		HIST
THE INDUSTRIAL REVOLUTION		HIST
ADVANCED TOPICS IN PSYCHOANALYSIS		PSYCH
INTRODUCTION TO PSYCHOLOGY		PSYCH

1. First, display the DFSORT Primary Option Menu, and enter a **2** to select a copy application. Press **ENTER** to continue. DFSORT displays the COPY Entry Panel, Page 1. This page is the first of two pages in the COPY Entry Panel.

- On page 1, enter the name(s) of the input data set(s) you want to copy. The INPUT DSN fields might already be primed with the last input data set names you used.

```

                                COPY ENTRY PANEL                                Page 1 of 2
COMMAND ===>

SPECIFY ONE OR MORE INPUT DATA SET(S):
  INPUT DSN 1 ===> COPY.DATA

  (USE DSN 2 TO 12 FOR CONCATENATED DATA SETS)
  INPUT DSN 2 ===>
  INPUT DSN 3 ===>
  INPUT DSN 4 ===>
  INPUT DSN 5 ===>
  INPUT DSN 6 ===>
  INPUT DSN 7 ===>
  INPUT DSN 8 ===>
  INPUT DSN 9 ===>
  INPUT DSN 10 ===>
  INPUT DSN 11 ===>
  INPUT DSN 12 ===>

  VERIFY INPUT DSN ===> Y   (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 56. COPY Entry Panel, Page 1

- Press **ENTER**.

DFSORT displays page 2 of the COPY Entry Panel.

```

                                COPY ENTRY PANEL                                Page 2 of 2
COMMAND ===>

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.SAMPOUT
  ALLOCATE NEW OUTPUT DATA SET ===> N   (Y or N)
  VERIFY OUTPUT DSN      ===> Y   (Y or N)

SPECIFY EXECUTION ENVIRONMENT ===> 1
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

VIEW CONTROL STATEMENTS SELECTION PANEL ===> Y   (Y or N)

REVIEW CONTROL STATEMENTS BEFORE EXECUTION ===> Y   (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO RETURN TO PAGE 1.

```

Figure 57. COPY Entry Panel, Page 2

Copying Data Sets

On the second page of the COPY Entry Panel:

1. In the OUTPUT DSN FIELD, enter the name of the data set in which you want the copied records placed. The OUTPUT DSN field might be primed with the name of the last output data set you used.

In this example, the output data set name is **SORT.SAMPOUT**.

2. Leave the ALLOCATE NEW OUTPUT DATA SET field set to the default value of **N**.

N tells DFSORT to use the existing output data set specified in the OUTPUT DSN field.

3. Leave the VERIFY OUTPUT DSN field set to the default value of **Y**.

When this field is set to **Y**, DFSORT checks the output data set name you entered on the panel to verify that the data set is cataloged and allocated.

4. Leave the SPECIFY EXECUTION ENVIRONMENT field set to the default value of **1** for foreground execution. Using foreground execution, you run your job under TSO to copy your records immediately.

5. The last two items on the COPY Entry Panel define which panels you will work with as you specify your job. For this example, make sure these items are set to the following default values (if they are not, change them as shown):

```
VIEW CONTROL STATEMENTS SELECTION PANEL    - Y  
REVIEW CONTROL STATEMENTS BEFORE EXECUTION - Y
```

These options are explained in detail on page 46.

6. To continue, press **ENTER**.

DFSORT displays the Control Statements Selection (COPY) panel. In this case, you do not want to display any other control statements, so press **ENTER** again to continue.

DFSORT displays the Review Control Statements panel shown in Figure 58 on page 59.

```

                                REVIEW CONTROL STATEMENTS                                LINE 1 OF 1
COMMAND ===>                                                                SCROLL ===> PAGE

(USE ENTER TO PERFORM DFSORT; USE UP/DOWN COMMANDS TO SCROLL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.)

-----
OPTION COPY
----- END OF CONTROL STATEMENTS -----

```

Figure 58. Review Control Statements Panel

- To process the copy, press **ENTER**. Because you selected foreground execution, DFSORT displays TSO messages and DFSORT program messages as your job runs.

The result is identical to the original data set in Figure 55 on page 56.

Task Summary

This chapter guided you through a simple tutorial for each of the three main DFSORT Panels' functions: sort, merge, and copy. All of the other control statements, covered later, use one of these three main applications. In the next chapter, you learn how to tailor your input data sets.

Copying Data Sets

Chapter 4. Tailoring Input Data Sets with INCLUDE and OMIT

For many DFSORT applications, you might need only a portion of the records in the input data set. This chapter shows you how to use DFSORT Panels to create INCLUDE or OMIT control statements. The tutorials in this chapter build on the previous chapters. You must understand the information in the previous chapters before attempting the tutorials in this chapter.

Including and Excluding Records from the Input Data Set

Selecting a subset of the records in the input data set increases the speed of the sort. The fewer the records, the less time it takes to sort them.

You select records from an input data set by either:

- Specifying the records you want included on the INCLUDE Statement Data Entry panel.
- Specifying the records you want omitted on the OMIT Statement Data Entry panel.

Choose INCLUDE or OMIT based on which is easier and more efficient for a given application. *You cannot use both statements together.*

You select the records you want included or omitted by comparing the contents of a field with either:

- **Another field.** For example, you can select records for which the author's last name is the same as the instructor's last name.
- **A constant.** The constant can be a character string, a decimal number, or a hexadecimal string. For example, you can select records that have the character string HIST in the department field.

You can also combine two conditions with logical ANDs or ORs. For example, you can select records that have either HIST or PSYCH in the department field.

Including Records: Creating INCLUDE Statements

In this section, you learn how to select records from the input data set by creating an INCLUDE statement using the panels. You can use the INCLUDE statement in sort, merge, and copy jobs. For this example, you will use the data set shown in Appendix B, "The Sample Bookstore Data Set" on page 115.

Suppose that it is the end of the year and you want to sort, by title, *only the books you need to reorder for the coming year*. If the number of copies sold this year for a particular book is greater than the number in stock, you can assume that you need to order more copies.

Use the panels to:

- Create an INCLUDE statement that will select from the input data set the books that meet this criterion.
- Sort these selected records in the order you want.

Including Records

Figure 59 shows the path that you will take through the panels as you complete your tutorial for INCLUDE.

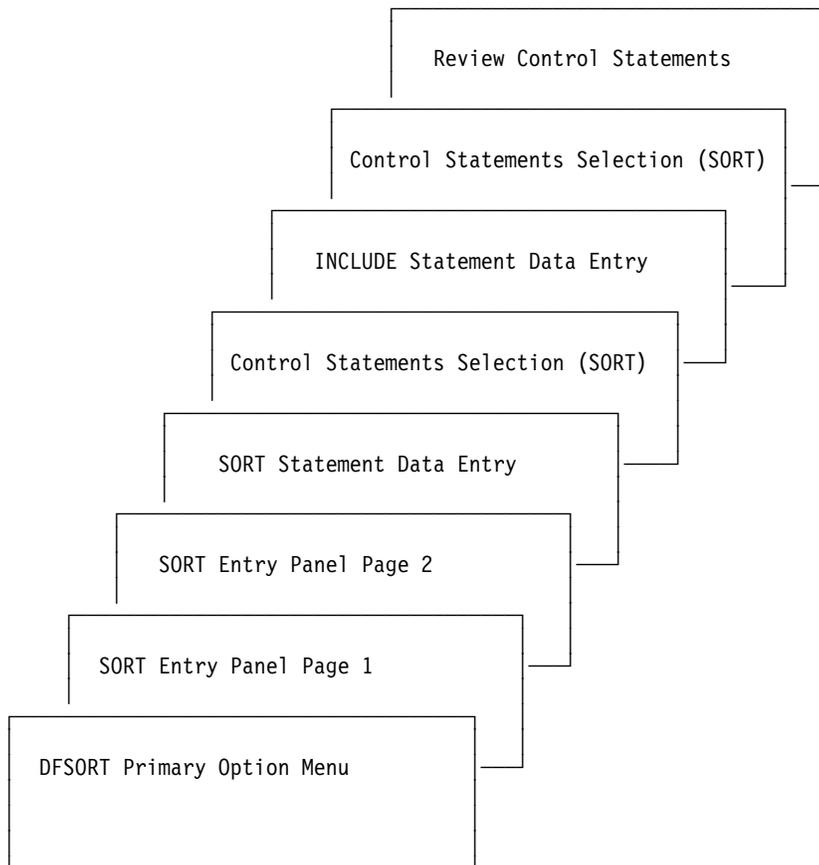


Figure 59. Overview of Panels Used for INCLUDE

Designing Your Job

Start by displaying the DFSORT Primary Option Menu:

1. To perform a sort application, enter **1** and press **ENTER**.

(Examples of the Primary Option Menu and the next two panels discussed are shown in Chapter 3, “Sorting, Merging, and Copying Data Sets” on page 29. To save space, they are not shown here.) DFSORT displays the two-page SORT Entry Panel.

2. On the SORT Entry Panel, Page 1, enter the name of the input data set that contains the records. For this example, you should use **SORT.SAMPIN**. Press **ENTER**.
3. On the SORT Entry Panel, Page 2, enter the name of the output data set in which you will place the sorted records. For this example, use **SORT.SAMPOUT** as the output data set. Press **ENTER**.
4. DFSORT displays the SORT Statement Data Entry panel. On this panel, specify how you want the selected records to be sorted and in what order. To sort the books by title in ascending order, complete the panel as shown in Figure 60 on page 63.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE          SORT
COMMAND      FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....      1      ===> 1      ===> 75      ===> CH      ===> A
.....      2      ===>      ===>      ===> CH      ===> A
.....      3      ===>      ===>      ===> CH      ===> A
.....      4      ===>      ===>      ===> CH      ===> A
          ***** END OF SORT FIELDS *****

```

Figure 60. Sorting by Title in Ascending Order

5. Press **ENTER** twice (first to verify your input, and again to continue).

DFSORT displays the screen shown in Figure 61.

```

                                CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT          ACTIVE
OPTION ===>        NO (Various options)
INCLUDE ===>      NO (Include only selected records)
OMIT ===>         NO (Exclude selected records)
SUM ===>          NO (Summarize/eliminate records with duplicate keys)
INREC ===>        NO (Reformat records before sort)
OUTREC ===>       NO (Reformat records for output)
ALTSEQ ===>       NO (Changes to standard collating sequence)
MODS ===>         NO (User exits)
RECORD ===>       NO (Unavailable input format/length information)
DEBUG ===>        NO (Various debugging options)
FREEFORM ===>     NO (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 61. Control Statements Selection Panel, Before You Fill It In

You use the Control Statements Selection (SORT) panel to display other control statement data entry panels, such as the INCLUDE or OMIT Statement Data Entry panels.

Including Records

- To display a control statement panel, enter **Y** after the control statement name. So, to display the **INCLUDE** Statement Data Entry panel, complete the Control Statements Selection panel as shown in Figure 62 on page 64, and press **ENTER**.

```
CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ===>   NO    (Various options)
INCLUDE  ===> Y   NO    (Include only selected records)
OMIT     ===>   NO    (Exclude selected records)
SUM      ===>   NO    (Summarize/eliminate records with duplicate keys)
INREC    ===>   NO    (Reformat records before sort)
OUTREC   ===>   NO    (Reformat records for output)
ALTSEQ   ===>   NO    (Changes to standard collating sequence)
MODS     ===>   NO    (User exits)
RECORD   ===>   NO    (Unavailable input format/length information)
DEBUG    ===>   NO    (Various debugging options)
FREEFORM ===>   NO    (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 62. Selecting **INCLUDE** on the Control Statements Selection Panel

DFSORT displays the **INCLUDE** Statement Data Entry panel.

```
INCLUDE STATEMENT DATA ENTRY                                     Page 1 of 2
COMMAND ===>

SPECIFY RELATIONAL CONDITION NO. 1:

POSITION 1 ===>
LENGTH 1  ===>
FORMAT 1  ===>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

COMPARISON ===>      (EQ NE GT GE LT LE)

CONSTANT  ===>
OR
POSITION 2 ===>
LENGTH 2  ===>
FORMAT 2  ===>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.
```

Figure 63. **INCLUDE** Statement Data Entry Panel, Before You Fill It In

Including Records Using the INCLUDE Statement Data Entry Panel

Now, select only those books whose number sold is greater than the number in stock.

To create an INCLUDE statement to select these records, complete the INCLUDE Statement Data Entry panel:

1. Specify the location, length, and data format of the NUMBER SOLD YEAR TO DATE field.
 - After POSITION 1, enter the location (byte position number) of the NUMBER SOLD YEAR TO DATE field, which is **166**.
 - After LENGTH 1, enter the length of the NUMBER SOLD YEAR TO DATE field, which is **4**.
 - After FORMAT 1, enter **BI**, the data format code for binary data.
2. To tell DFSORT to include only those records where the number-sold field is greater than the number-in-stock field, enter **GT**, the comparison operator for greater than, after COMPARISON. (A complete list of comparison operators is shown in "INCLUDE Statement" on page 132.)
3. Now, enter the location, length, and data format of the NUMBER IN STOCK field, which is the second or comparison field:
 - After POSITION 2, enter the location of the NUMBER IN STOCK Field, which is **162**.
 - After LENGTH 2, enter the length of the NUMBER IN STOCK Field, which is **4**.
 - After FORMAT 2, enter **BI** for binary data.

Figure 64 shows the completed INCLUDE Statement Data Entry panel.

```

                                INCLUDE STATEMENT DATA ENTRY                                Page 1 of 2
COMMAND ===>

SPECIFY RELATIONAL CONDITION NO. 1:

POSITION 1 ===> 166
LENGTH 1  ===> 4
FORMAT 1  ===> BI   (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

COMPARISON ===> GT   (EQ NE GT GE LT LE)

CONSTANT  ===>
OR
POSITION 2 ===> 162
LENGTH 2  ===> 4
FORMAT 2  ===> BI   (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 64. INCLUDE Statement Data Entry Panel, After You Fill It In

Including Records

4. To verify your input, press **ENTER**.
5. To save your input and return to the Control Statements Selection (SORT) panel (see Figure 65), use the **END** command.

```
CONTROL STATEMENTS SELECTION (SORT)
COMMAND ==>
MAKE ADDITIONAL SELECTIONS, OR USE ENTER TO CONTINUE.
OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION ==>     NO   (Various options)
INCLUDE ==>    YES  (Include only selected records)
OMIT ==>       NO   (Exclude selected records)
SUM ==>        NO   (Summarize/eliminate records with duplicate keys)
INREC ==>      NO   (Reformat records before sort)
OUTREC ==>     NO   (Reformat records for output)
ALTSEQ ==>     NO   (Changes to standard collating sequence)
MODS ==>       NO   (User exits)
RECORD ==>     NO   (Unavailable input format/length information)
DEBUG ==>      NO   (Various debugging options)
FREEFORM ==>   NO   (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 65. Control Statements Selection Panel

Note: The INCLUDE statement now displays a YES in the ACTIVE column, indicating that INCLUDE is active and will be passed to DFSORT for processing. The statement remains active for the next use of the panels. If you do not want to use INCLUDE, enter the **N** select code in the column to the right of the arrow. This deactivates the statement. To reactivate the statement or to make changes to the statement, specify the **Y** select code again.

6. To continue to the Review Control Statements panel, press **ENTER**.

Reviewing and Submitting Your Job

DFSORT built both an INCLUDE and a SORT statement from the information you entered on the panels. (See Figure 66.)

```

                                REVIEW CONTROL STATEMENTS                                LINE 1 OF 2
COMMAND ===>                                                                SCROLL ===> 0111

(USE ENTER TO PERFORM DFSORT; USE UP/DOWN COMMANDS TO SCROLL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.)

-----
SORT      FIELDS=(1,75,CH,A)
INCLUDE   COND=(166,4,BI,GT,162,4,BI)
-----
                                END OF CONTROL STATEMENTS                                -----

```

Figure 66. Review Control Statements Panel

DFSORT processes the INCLUDE statement first, selecting only those records from the input data set that meet the criterion you specified (NUMBER SOLD field greater than NUMBER IN STOCK field). After DFSORT selects this subset of records from the input data set, it sorts only these records by book title in ascending order. The sorted records appear in Figure 67.

Figure 67. Books for Which Number Sold is Greater than Number in Stock

Book Title	Number In Stock	Number Sold Year-to-Date
1 75	162 165	166 169
ADVANCED TOPICS IN PSYCHOANALYSIS	1	12
COMPUTER LANGUAGES	5	29
COMPUTERS: AN INTRODUCTION	20	26
CRISES OF THE MIDDLE AGES	14	17
EDITING SOFTWARE MANUALS	13	32
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	2	32
INTRODUCTION TO BIOLOGY	6	11
MODERN ANTHOLOGY OF WOMEN POETS	1	26
NUMBERING SYSTEMS	6	27
STRATEGIC MARKETING	3	35
SUPPLYING THE DEMAND	0	32
SYSTEM PROGRAMMING	4	23
THE COMPLETE PROOFREADER	7	19

Note: For information about the order in which DFSORT processes control statements, see *Getting Started*.

So Far

This section explained how to select only the specific records that you need from an input data set by using an INCLUDE control statement. Next, you will learn an even more selective method of extracting records by using a logical AND with your INCLUDE statement.

Designing a Job Using Logical ANDs

In the last example, you selected only those records where the number of books sold was greater than the number currently in stock. To extract records for only the books you must order from COR Publishers, two conditions must be true:

- The NUMBER SOLD field is greater than the NUMBER IN STOCK field.
- The book is published by COR Publishers.

To add this second condition, expand the INCLUDE statement you created for the last example by:

- Adding a logical AND
- Comparing the contents of the PUBLISHER field to the character string COR.

To complete the INCLUDE Statement Data Entry panel to expand the INCLUDE statement:

1. Complete page 1 of the INCLUDE Statement Data Entry panel as you did in the last exercise (Figure 64 on page 65). Doing so, you specify the first of the two conditions (the number sold is greater than the number in stock).
2. To specify the second condition (only books published by COR), display the second page of the INCLUDE Statement Data Entry panel. Use the **DOWN** command to display the second page of the INCLUDE panel.

To select only books published by COR, use page 2 of the INCLUDE Statement Data Entry panel to build a logical AND condition:

- After the AND or OR field, enter **AND**.
- After POSITION 1, enter the byte position number of the PUBLISHER Field, which is **106**.
- After LENGTH 1, enter the length of the PUBLISHER Field, which is **4**.
- After FORMAT 1, enter **CH** for character data.
- After COMPARISON, enter **EQ**, the comparison code for equals.
- After CONSTANT, enter **C'COR'**, to specify the publisher COR.

Figure 68 on page 69 shows the completed second page of the INCLUDE Statement Data Entry panel.

```

                                INCLUDE STATEMENT DATA ENTRY
                                Page 2 of 2
COMMAND ===>

OPTIONALLY SPECIFY RELATIONAL CONDITION NO. 2:

  AND or OR  ===> AND

  POSITION 1  ===> 106
  LENGTH 1   ===> 4
  FORMAT 1   ===> CH (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

  COMPARISON ===> EQ (EQ NE GT GE LT LE)

  CONSTANT   ===> C'COR'
  OR
  POSITION 2   ===>
  LENGTH 2   ===>
  FORMAT 2   ===> (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE ENTER FOR VERIFICATION; USE UP COMMAND TO VIEW PREVIOUS PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 68. INCLUDE Statement Data Entry Panel, Page 2, After You Fill It In

3. Press **ENTER**.

Figure 69 shows the sorted records, which consists of only the books that you need to order from COR.

Figure 69. Books Published by COR for Which Number Sold is Greater than Number in Stock

Book Title	Publisher	Number In Stock	Number Sold Year-to-Date
1	75 106 109	162 165	166 169
CRISES OF THE MIDDLE AGES	COR	14	17
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	COR	2	32
MODERN ANTHOLOGY OF WOMEN POETS	COR	1	26
SUPPLYING THE DEMAND	COR	0	32

Note: For information on how DFSORT uses padding and truncation, see *Getting Started* or the *Application Programming Guide*.

Designing a Job Using Logical ORs

As another example, you can sort only the books required for courses 00032 and 10347.

1. Specify the SORT Statement Data Entry panel as shown in Figure 70 on page 70.

Including Records

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT      SORT
.....   ..         ..         ..         ..         ORDER
.....   1   ===> 115   ===> 5       ===> CH      ===> A
.....   2   ===>      ===>      ===> CH      ===> A
.....   3   ===>      ===>      ===> CH      ===> A
.....   4   ===>      ===>      ===> CH      ===> A
          ***** END OF SORT FIELDS *****

```

Figure 70. SORT Statement Data Entry Panel

2. Complete page 1 of the INCLUDE Statement Data Entry panel as shown in Figure 71.

```

                                INCLUDE STATEMENT DATA ENTRY
                                Page 1 of 2
COMMAND ===>

SPECIFY RELATIONAL CONDITION NO. 1:

POSITION 1 ===> 115
LENGTH 1  ===> 5
FORMAT 1  ===> CH (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

COMPARISON ===> EQ (EQ NE GT GE LT LE)

CONSTANT  ===> C'00032'
OR
POSITION 2 ===>
LENGTH 2  ===>
FORMAT 2  ===> (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 71. INCLUDE Statement Data Entry Panel, Page 1

3. Complete the second page of the INCLUDE Statement Data Entry panel as shown in Figure 72.

```

                                INCLUDE STATEMENT DATA ENTRY
                                Page 2 of 2
COMMAND ===>

OPTIONALLY SPECIFY RELATIONAL CONDITION NO. 2:

  AND or OR  ===> OR

  POSITION 1  ===> 115
  LENGTH 1   ===> 5
  FORMAT 1   ===> CH (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

  COMPARISON ===> EQ (EQ NE GT GE LT LE)

  CONSTANT   ===> C'10347'
  OR
  POSITION 2   ===>
  LENGTH 2   ===>
  FORMAT 2   ===> (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE ENTER FOR VERIFICATION; USE UP COMMAND TO VIEW PREVIOUS PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 72. INCLUDE Statement Data Entry Panel, Page 2

Note: Remember the rules for padding and truncation of constants and fields. In the last example, you cannot substitute C'32' for C'00032' because character constants are padded on the right with blanks.

4. Press **ENTER** to verify your changes, and press **END** to return to the Control Statements Selection (SORT) panel. Proceed from there to the Review Control Statements panel and process your sort.

So Far

This section showed you how logical ANDs and ORs can further narrow the scope of an INCLUDE statement. Next, you use the OMIT statement to omit certain records from the input data set.

Omitting Records: Creating OMIT Statements

Sometimes, it can be easier to select records from an input data set by telling DFSORT to *exclude* certain records. You exclude records from the input data set with an **OMIT** statement.

The following figure shows the path that you will take through the panels during the tutorial for OMIT.

Omitting Records

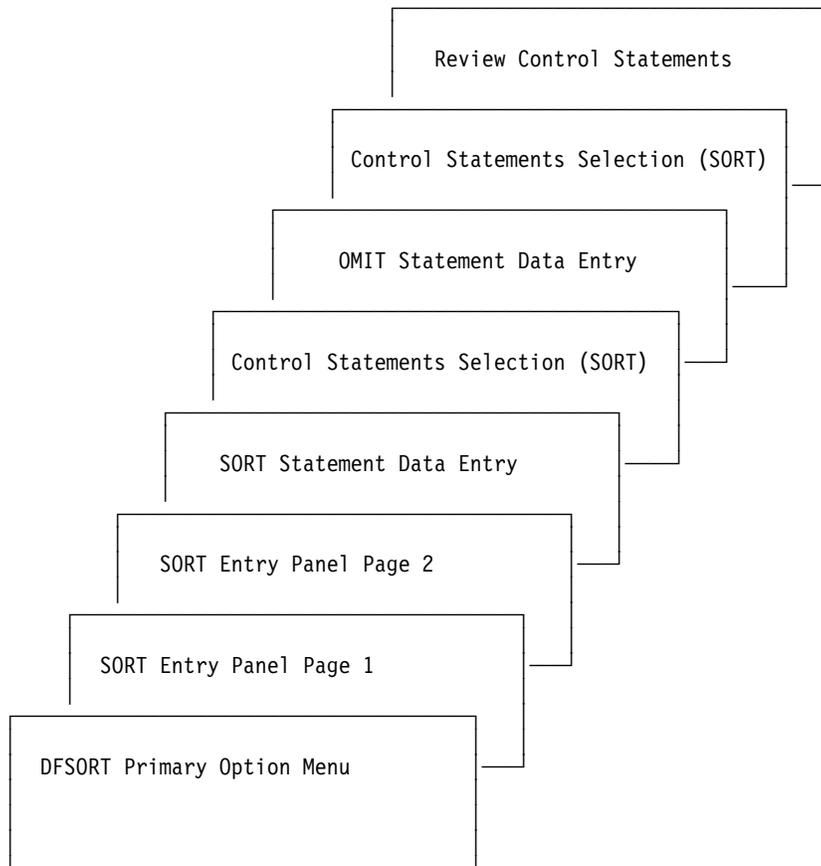


Figure 73. Overview of Panels Used for OMIT

Designing Your Job

DFSORT's OMIT Statement Data Entry panel is similar to the INCLUDE Statement Data Entry panel. Use it to specify records to be omitted from the input data set.

1. To display the OMIT Statement Data Entry panel, enter **Y** after the arrow next to OMIT on the Control Statements Selection (SORT) panel.
2. Press **ENTER**.

DFSORT displays the OMIT Statement Data Entry panel. (See Figure 74.)

```

OMIT STATEMENT DATA ENTRY                                     Page 1 of 2
COMMAND ===>

SPECIFY RELATIONAL CONDITION NO. 1:

  POSITION 1 ===>
  LENGTH 1  ===>
  FORMAT 1  ===>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

  COMPARISON ===>      (EQ NE GT GE LT LE)

  CONSTANT  ===>
  OR
  POSITION 2  ===>
  LENGTH 2  ===>
  FORMAT 2  ===>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 74. OMIT Statement Data Entry Panel, Before You Fill It In

Omitting Records Using the OMIT Statement Data Entry Panel

Suppose that you want to sort, by title, all the books used for courses, but not those for general reading (not required for a particular course). An easy way to do this is to create an OMIT statement that excludes records that have a blank in the COURSE DEPARTMENT field.

To exclude the general reading books:

1. After POSITION 1, enter the location of the COURSE DEPARTMENT field, **110**.
2. After LENGTH 1, enter the length of the COURSE DEPARTMENT field, **5**.
3. After FORMAT 1, enter the data format code for character data, **CH**.
4. After COMPARISON, enter the code for equals, **EQ**.
5. After CONSTANT, specify a constant of blank characters with **C' '**.

Figure 75 on page 74 shows the completed OMIT Statement Data Entry panel.

```

                                OMIT STATEMENT DATA ENTRY                                Page 1 of 2
COMMAND ===>

SPECIFY RELATIONAL CONDITION NO. 1:

  POSITION 1 ===> 110
  LENGTH 1  ===> 5
  FORMAT 1  ===> CH  (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

  COMPARISON ===> EQ  (EQ NE GT GE LT LE)

  CONSTANT  ===> C' '
    OR
  POSITION 2 ===>
  LENGTH 2  ===>
  FORMAT 2  ===>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 75. OMIT Statement Data Entry Panel, After You Fill It In

Figure 76 shows the sorted records.

Figure 76. Sorted Data Set Without Books Not Required for Classes

Book Title		Course Department
1	75	110 114
ADVANCED TOPICS IN PSYCHOANALYSIS		PSYCH
COMPUTER LANGUAGES		COMP
COMPUTERS: AN INTRODUCTION		COMP
CRISES OF THE MIDDLE AGES		HIST
EDITING SOFTWARE MANUALS		ENGL
EIGHTEENTH CENTURY EUROPE		HIST
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		ENGL
INTRODUCTION TO BIOLOGY		BIOL
INTRODUCTION TO PSYCHOLOGY		PSYCH
MODERN ANTHOLOGY OF WOMEN POETS		ENGL
NUMBERING SYSTEMS		COMP
SHORT STORIES AND TALL TALES		ENGL
STRATEGIC MARKETING		BUSIN
SUPPLYING THE DEMAND		BUSIN
SYSTEM PROGRAMMING		COMP
THE COMPLETE PROOFREADER		ENGL
THE INDUSTRIAL REVOLUTION		HIST
VIDEO GAME DESIGN		COMP

Allowable Comparisons and Constants

When using INCLUDE and OMIT, you must follow certain standards for allowable comparisons and certain formats for writing constants. Valid comparison operators are:

EQ Equal to
NE Not equal to
GT Greater than
GE Greater than or equal to
LT Less than
LE Less than or equal to

The correct formats for constant strings are:

Decimal number format: $[\pm]n$

Character string format: **C** 'xx...x'

Hexadecimal string format: **X** 'xx...x'

See Appendix E, "Control Statements Selection Panel" on page 129 for a discussion of the comparison operators and constants you can use with INCLUDE and OMIT.

Task Summary

This chapter covered:

- The use of INCLUDE to include only specific records
- The use of OMIT to exclude unwanted records
- The uses of logical ANDs and ORs to make your INCLUDE or OMIT even more selective

The next tutorials show you how to sum values in records.

Allowable Comparisons and Constants

Chapter 5. Summing Values in Records

You can also sum values in records when sorting or merging. This chapter shows you:

- How to sum numeric fields
- What formats are allowed for summing
- How to suppress records with duplicate control fields

You can sum one or more numeric fields whose records have the same (equal) control fields. You can sum numeric fields that are in binary, packed decimal, or zoned decimal format. The SUM statement can be used with SORT or MERGE, but not with COPY.

When you sum records, keep in mind that two types of fields are involved:

- *Control fields*, which you specify on the SORT Statement Data Entry panel
- *Summary fields*, which you specify on the SUM Statement Data Entry panel

The contents of the summary fields are summed *only* when the contents of the control fields are equal.

Summing Values: Creating the SUM Statement

Suppose the English department wants to know the total price of books for all its courses. To do this, you must create, in order:

- A SORT statement that will sort the job by the DEPARTMENT field
- An INCLUDE statement for the department field to select only English department books (ENGL)
- A SUM statement to total the price field

DFSORT processes the INCLUDE statement first, using it to narrow the job down to just the records with ENGL in the DEPARTMENT field. DFSORT then sorts those records as you specify (ascending or descending) and sums all records with equal control fields. DFSORT places the sum in the first record and deletes all other records with equal control fields. Because the INCLUDE statement selected only English department books for this job, DFSORT creates an output data set that includes a single record with the sum of all the English department books.

The following figure shows the path that you will take through the panels for this tutorial.

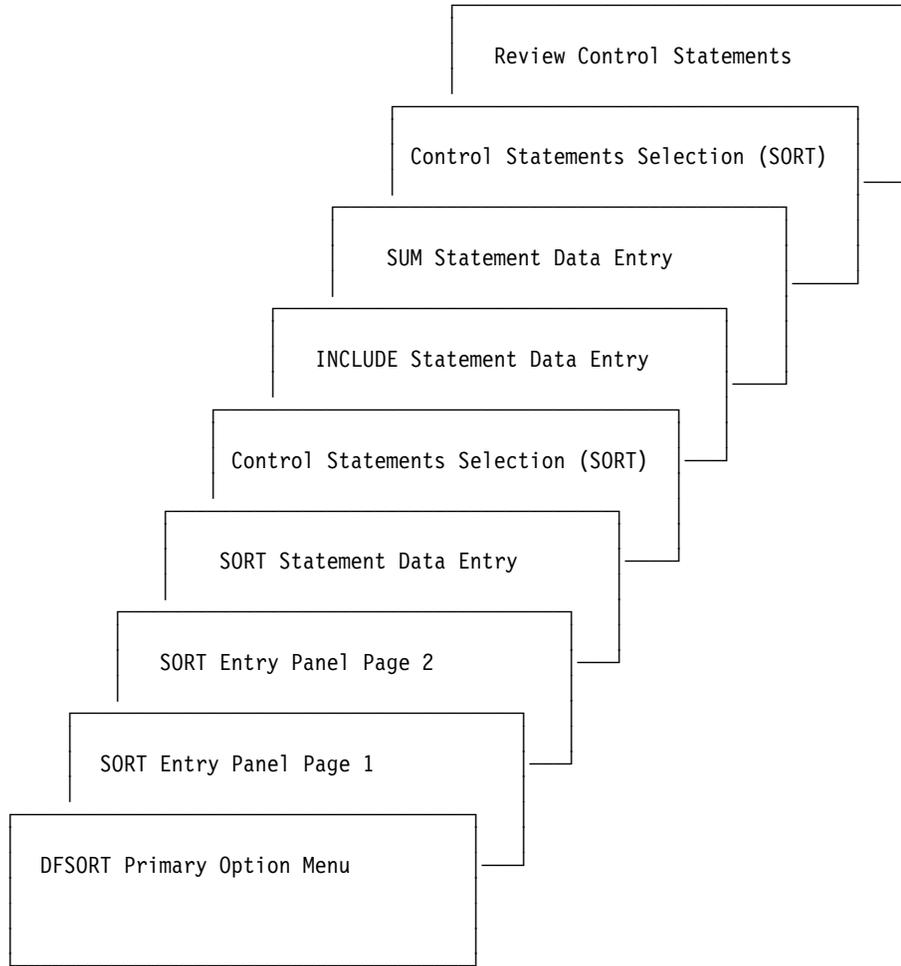


Figure 77. Overview of Panels Used for Summing

For a flowchart showing the order in which the INCLUDE, SUM, and SORT statements are processed, see *Getting Started*.

Designing Your Job

To sum the prices for the English department's books, start at the DFSORT Primary Option Menu panel, and select SORT by entering 1.

1. On the first page of the SORT Entry Panel, enter the name of the input data set.
2. On the second page of the SORT Entry panel, enter the name of the output data set.

DFSORT displays SORT Statement Data Entry Panel shown in Figure 78 on page 79.

3. To sort the COURSE DEPARTMENT field, complete the panel as follows:
 - Enter the location and length of the COURSE DEPARTMENT field in the POSITION and LENGTH items on the panel.
 - Accept the defaults for the FORMAT and SORT ORDER fields (**CH** for character data and **A** for ascending order).

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....    1      ==> 110    ==> 5      ==> CH    ==> A
.....    2      ==>      ==>      ==> CH    ==> A
.....    3      ==>      ==>      ==> CH    ==> A
.....    4      ==>      ==>      ==> CH    ==> A
          ***** END OF SORT FIELDS *****

```

Figure 78. Sorting by Course Department

4. Press **ENTER** without changing anything else. DFSORT displays the Control Statements Selection (SORT) panel.
5. To create both an **INCLUDE** and a **SUM** statement, type **Y** next to both of these control statement names on the Control Statements Selection (SORT) panel.

```

                                CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ==>    NO   (Various options)
INCLUDE ==> Y   NO   (Include only selected records)
OMIT    ==>    NO   (Exclude selected records)
SUM     ==> Y   NO   (Summarize/eliminate records with duplicate keys)
INREC  ==>    NO   (Reformat records before sort)
OUTREC ==>    NO   (Reformat records for output)
ALTSEQ ==>    NO   (Changes to standard collating sequence)
MODS   ==>    NO   (User exits)
RECORD ==>    NO   (Unavailable input format/length information)
DEBUG  ==>    NO   (Various debugging options)
FREEFORM ==>   NO   (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 79. Selecting **INCLUDE** and **SUM** Data Entry Panels

Summing Values

6. Press **ENTER** to continue. DFSORT displays the INCLUDE Statement Data Entry panel.
7. To sort only the English department books, complete the INCLUDE Statement Data Entry panel by specifying:
 - The position, length, and data format of the COURSE DEPARTMENT field
 - The operator and constant for the comparison.

```
                                INCLUDE STATEMENT DATA ENTRY                                Page 1 of 2
COMMAND ==>>

SPECIFY RELATIONAL CONDITION NO. 1:

POSITION 1 ==>> 110
LENGTH 1  ==>> 5
FORMAT 1  ==>> CH  (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

COMPARISON ==>> EQ  (EQ NE GT GE LT LE)

CONSTANT  ==>> C'ENGL'
OR
POSITION 2 ==>>
LENGTH 2  ==>>
FORMAT 2  ==>>      (CH ZD PD FI BI AC CSL CST CLO CTO ASL AST AQ)

USE DOWN COMMAND TO SPECIFY RELATIONAL CONDITION NO. 2.

USE ENTER FOR VERIFICATION; USE DOWN COMMAND TO VIEW NEXT PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.
```

Figure 80. Including Only English Department Books

8. Use the **END** command to save and exit the INCLUDE panel.
DFSORT displays the SUM Summary Fields Entry panel.

```

                                SUM STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 1
  1  SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2  ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT
.....    1  ===>          ===>          ===>
.....    2  ===>          ===>          ===>
.....    3  ===>          ===>          ===>
.....    4  ===>          ===>          ===>
          ***** END OF SUM FIELDS *****

```

Figure 81. SUM Statement Data Entry Panel

Summing Values Using the SUM Summary Data Entry Panel

To sum the price:

1. Accept the default value of **1** to SUMMARIZE RECORDS WITH DUPLICATE KEYS.
2. Under POSITION, type **170** for the byte position of the PRICE field.
3. Under LENGTH, type **4** for the length of the PRICE field.
4. Under FORMAT, type **BI** to specify binary data format.

Figure 82 shows the SUM Statement Data Entry panel.

```

                                SUM STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 1
  1 SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2 ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
  COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT
  .....   1      ===> 170      ===> 4      ===> BI
  .....   2      ===>          ===>          ===>
  .....   3      ===>          ===>          ===>
  .....   4      ===>          ===>          ===>
          ***** END OF SUM FIELDS *****

```

Figure 82. Summing the Price Field

When you run the job with these SORT, INCLUDE, and SUM statements, DFSORT sums the prices and places the sum in the PRICE field of one record (book), and deletes the other records (books). Figure 83 shows the results.

Figure 83. Sum of Prices for English Department's Books

Book Title	Course Department	Price
1	75 110 114	170 173
INKLINGS: AN ANTHOLOGY OF YOUNG POETS	ENGL Control Field	4640 Summary Field

The record that will be kept is determined by a default set at installation time. This example assumes that the site default specifies that records with equal control fields appear in the order they are shown in the bookstore data set.

Notice that some *fields* in your summation record might not be meaningful, such as the book title field in Figure 83. As you learned in the last chapter, you can omit the fields that are not meaningful.

So Far

So far, this chapter explained how to sum a single value. Next, you learn how to create jobs with a result of two summary fields.

Designing a Job with Two Summary Fields

Assume that, for inventory purposes, you want to sum separately the number of books in stock and the number sold for each publisher.

1. Specify the PUBLISHER as the control field on the SORT Statement Data Entry panel.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....   ..         ..         ..         ..         ORDER
.....   1  ===> 106  ===> 4    ===> CH    ===> A
.....   2  ===>         ===>         ===> CH    ===> A
.....   3  ===>         ===>         ===> CH    ===> A
.....   4  ===>         ===>         ===> CH    ===> A
***** END OF SORT FIELDS *****

```

Figure 84. The SORT Statement Data Entry Panel, Sorting by Publisher

2. Specify the NUMBER IN STOCK and NUMBER SOLD as summary fields on the SUM Statement Data Entry panel.

Suppressing Records with Duplicate Control Fields

```

                                SUM STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 1
  1 SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2 ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT
.....    1      ==> 162      ==> 4      ==> BI
.....    2      ==> 166      ==> 4      ==> BI
.....    3      ==>          ==>          ==>
.....    4      ==>          ==>          ==>
          ***** END OF SUM FIELDS *****

```

Figure 85. The SUM Statement Data Entry Panel

DFSORT shows you the Control Statements Selection (SORT) panel.

3. You do not want to use the INCLUDE statement, so if it is active type **N** over the **Y** to deactivate it.

When you run the job, DFSORT returns four records, each one showing the total number of books in stock and books sold for a single publisher.

Figure 86. Sum of Number in Stock and Number Sold for Each Publisher

Book Title	Publisher	Number In Stock	Number Sold Year-to-Date
1	75 106 109	162 165	166 169
LIVING WELL ON A SMALL BUDGET	COR	103	161
COMPUTER LANGUAGES	FERN	19	87
VIDEO GAME DESIGN	VALD	42	97
COMPUTERS: AN INTRODUCTION	WETH	62	79

Suppressing Records with Duplicate Control Fields

Apart from summing values, you can also use SUM to delete records with duplicate control fields.

For example, you might want to list the publishers in ascending order, but you want each publisher in the list to appear only once. If you used only the SORT statement, the publisher named COR would appear seven times in the list, FERN would appear four times, VALD five times, and WETH four times. This time:

1. Complete the SORT Statement Data Entry panel just as you did before to sort the records by publisher (see Figure 84 on page 83).

- Specify option 2 on the SUM Statement Data Entry panel. When you specify option 2, no sum fields will be used, and when you process the job, DFSORT eliminates records that have duplicate (equal) control fields, producing one record per publisher.

```

                                SUM STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 2
  1 SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2 ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
COMMAND  FIELD NO.  POSITION  LENGTH  FORMAT
.....    1  ===>      ===>      ===>
.....    2  ===>      ===>      ===>
.....    3  ===>      ===>      ===>
.....    4  ===>      ===>      ===>
          ***** END OF SUM FIELDS *****

```

Figure 87. The SUM Statement Data Entry Panel, Deleting Records with Duplicate Control Fields

Figure 88 shows the results of the job. Notice that each publisher's name appears only once.

Book Title	Publisher
1	106 109
LIVING WELL ON A SMALL BUDGET	COR
COMPUTER LANGUAGES	FERN
VIDEO GAME DESIGN	VALD
COMPUTERS: AN INTRODUCTION	WETH

Figure 88. List of Publishers, Deleting Duplicates

Handling Summation Overflow

When a sum becomes larger than the space available for it, overflow occurs; both *Getting Started* and the *Application Programming Guide* describe methods of preventing overflow. You may also wish to refer to "Preventing Overflow When Summing Values" on page 103 for additional information.

Task Summary

This chapter has covered the uses of the SUM Statement Data Entry panel. You can use SUM to:

- Sum numeric fields
- Suppress records with duplicate control fields

The next tutorial focuses on reformatting records using OUTREC or INREC.

Chapter 6. Reformatting Records

With DFSORT Panels, you can reformat records that you sort, merge, or copy.

You can use INREC or OUTREC with SORT, COPY, or MERGE to:

- Delete fields
- Reorder fields
- Insert separators (blanks, zeros, or constants)

The difference between the two DFSORT control statements is that OUTREC reformats records *after* they are sorted, copied, or merged, whereas INREC reformats records *before* they are sorted, copied, or merged. This has an effect on other control statements. See “Creating Other Statements with INREC” on page 100 for information about how INREC affects other control statements.

INREC and OUTREC perform the same functions. When deciding which to use, remember their processing order. In general:

- If you are deleting fields, try to use INREC because shorter records take less time to sort, merge, or copy (INREC reformats the records before they are processed).
- If you are going to insert separators, use OUTREC because OUTREC inserts the separators into the records after they are processed.
- If you are reordering fields, it does not matter which control statement you use because reordering fields does not affect the record length.

Note: If you use OUTREC or INREC to change the record length (by deleting fields or inserting blanks), be sure that you allocate your output data set with the appropriate record length. See *Getting Started* or the *Application Programming Guide* for more details.

Reformatting Records Using the OUTREC Statement

The following figure shows the pathway you will take through the panels during the OUTREC tutorial.

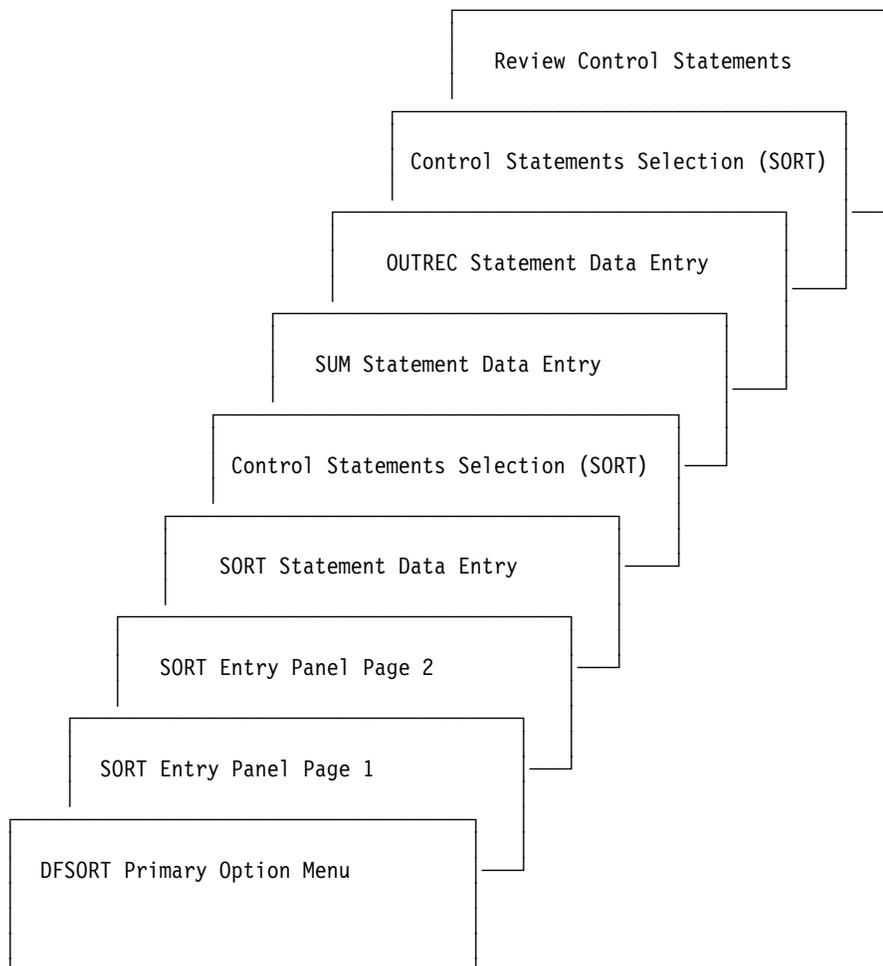


Figure 89. Overview of Panels Used for OUTREC

Suppressing Unnecessary Fields

In the last chapter, one example output data set shows the sums, for each publisher, of the number of books in stock and the number of books sold year-to-date. The record for each publisher also contains the book title field, which, for this application, was meaningless.

Using the OUTREC Statement Data Entry panel, you can delete fields you do not want to appear in the output data set, such as the book title field that appeared in the result of the last application. You can use OUTREC to shorten the record to include only the following fields:

- Publisher
- Number of books in stock
- Number of books sold

Doing this reduces the output record length to 12 bytes.

Start by displaying the DFSORT Primary Option Menu panel and selecting the SORT application.

1. On the SORT Entry panels, specify the input and output data set names.
2. To sort the records by publisher in ascending order, complete the SORT Statement Data Entry panel as shown in Figure 90.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SORT
  COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
  .....   1    ===> 106    ===> 4    ===> CH    ===> A
  .....   2    ===>      ===>      ===> CH    ===> A
  .....   3    ===>      ===>      ===> CH    ===> A
  .....   4    ===>      ===>      ===> CH    ===> A
          ***** END OF SORT FIELDS *****

```

Figure 90. Sorting the Records by Publisher

3. Press **ENTER** without changing anything else.
 - DFSORT displays the Control Statements Selection (SORT) panel.
4. Select SUM and OUTREC on the Control Statements Selection (SORT) panel.

```

                                CONTROL STATEMENTS SELECTION (SORT)
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION  ===>    NO    (Various options)
INCLUDE ===>    NO    (Include only selected records)
OMIT    ===>    NO    (Exclude selected records)
SUM     ===> Y    NO    (Summarize/eliminate records with duplicate keys)
INREC   ===>    NO    (Reformat records before sort)
OUTREC  ===> Y    NO    (Reformat records for output)
ALTSEQ  ===>    NO    (Changes to standard collating sequence)
MODS    ===>    NO    (User exits)
RECORD  ===>    NO    (Unavailable input format/length information)
DEBUG   ===>    NO    (Various debugging options)
FREEFORM ===>    NO    (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 91. Selecting the SUM and OUTREC Statement Data Entry Panels

5. To sum the NUMBER IN STOCK and NUMBER SOLD fields, complete the SUM Statement Data Entry panel as shown in Figure 92 on page 90.

Reformatting Records With OUTREC

```

                                SUM STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 1
  1 SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2 ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
  COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT
  .....   1      ===> 162      ===> 4      ===> BI
  .....   2      ===> 166      ===> 4      ===> BI
  .....   3      ===>          ===>          ===>
  .....   4      ===>          ===>          ===>
          ***** END OF SUM FIELDS *****

```

Figure 92. Summing Number In Stock and Number Sold Fields

6. To save changes and exit, press **END**.

DFSORT displays the OUTREC Statement Data Entry panel shown in Figure 93.

```

                                OUTREC STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      OUTREC      OUTPUT      INPUT      INPUT      OUTPUT
  COMMAND  FIELD NO.  COLUMN      POSITION      LENGTH      BOUNDARY
  .....   1      ===>          ===>          ===>          ===>
  SEPARATION ===>
  .....   2      ===>          ===>          ===>          ===>
  SEPARATION ===>
  .....   3      ===>          ===>          ===>          ===>
  SEPARATION ===>
  .....   4      ===>          ===>          ===>          ===>
  SEPARATION ===>
          ***** END OF OUTREC FIELDS *****

```

Figure 93. OUTREC Panel, Before You Fill It In

Using the OUTREC Statement Data Entry panel, you specify which fields from the input data set you want placed in the output data set. Any fields you do not specify on the OUTREC Statement Data Entry panel are deleted.

7. Notice that each OUTREC field line actually takes up two physical lines on the screen starting with the in the line command field and ending with the SEPARATION field.

To make the output data set consist of only the PUBLISHER, NUMBER IN STOCK, and NUMBER SOLD fields, specify the position and length of each of these fields under INPUT POSITION and INPUT LENGTH on OUTREC field lines 1, 2, and 3, respectively on the OUTREC Statement Data Entry panel. Notice that you do **NOT** specify the data format on the OUTREC Statement Data Entry panel.

```

                                OUTREC STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE   OUTREC   OUTPUT   INPUT   INPUT   OUTPUT
COMMAND FIELD NO. COLUMN   POSITION LENGTH BOUNDARY
..... 1   =====>   =====> 106   =====> 4   =====>
SEPARATION =====>
..... 2   =====>   =====> 162   =====> 4   =====>
SEPARATION =====>
..... 3   =====>   =====> 166   =====> 4   =====>
SEPARATION =====>
..... 4   =====>   =====>     =====> 4   =====>
SEPARATION =====>
                ***** END OF OUTREC FIELDS *****

```

Figure 94. OUTREC Panel, After You Fill It In

Because the NUMBER IN STOCK and NUMBER SOLD fields are next to each other in the input data set, you can specify them together as one field (they do not have to be the same data format).

8. Fill out the OUTREC Statement Data Entry panel to specify these two fields as one field, as shown in Figure 95 on page 92.

Reformatting Records With OUTREC

```

                                OUTREC STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      OUTREC      OUTPUT      INPUT      INPUT      OUTPUT
COMMAND  FIELD NO.  COLUMN      POSITION  LENGTH  BOUNDARY
.....    1      ===>      ===> 106      ===> 4      ===>
SEPARATION ===>
.....    2      ===>      ===> 162     ===> 8      ===>
SEPARATION ===>
.....    3      ===>      ===>      ===>      ===>
SEPARATION ===>
.....    4      ===>      ===>      ===>      ===>
SEPARATION ===>
          ***** END OF OUTREC FIELDS *****

```

Figure 95. OUTREC Statement Data Entry Panel, Specifying Two Fields Together

When you run the job, the reformatted output data set, shown in Figure 96, contains only the three fields you specified on the OUTREC Statement Data Entry panel.

Figure 96. Writing Only Publisher, Number-in-Stock, and Number-Sold Fields

Publisher	Number In Stock	Number Sold Year-to-Date
1 4	5 8	9 12
COR	103	161
FERN	19	87
VALD	42	97
WETH	62	79

Reordering Fields to Reserve Space

The fields always appear in the order that you specify them. If you want the NUMBER SOLD field to come before the NUMBER IN STOCK field, complete the OUTREC Statement Data Entry panel as displayed in Figure 97 on page 93.

```

                                OUTREC STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      OUTREC      OUTPUT      INPUT      INPUT      OUTPUT
COMMAND  FIELD NO.  COLUMN      POSITION  LENGTH  BOUNDARY
.....    1      ===>      ===> 106    ===> 4    ===>
SEPARATION ===>
.....    2      ===>      ===> 166    ===> 4    ===>
SEPARATION ===>
.....    3      ===>      ===> 162    ===> 4    ===>
SEPARATION ===>
.....    4      ===>      ===>      ===>      ===>
SEPARATION ===>
                ***** END OF OUTREC FIELDS *****
    
```

Figure 97. OUTREC Panel, Reordering the Fields

Figure 98 shows the sorted data set.

Figure 98. Reordering the Fields

Publisher	Number Sold Year-to-Date	Number In Stock
1 4	5 8	9 12
COR	161	103
FERN	87	19
VALD	97	42
WETH	79	62

Inserting Binary Zeros

Assume that you want to reformat the records to include a new 4-byte binary field after the NUMBER IN STOCK field (beginning at byte 13). In this case, you can insert binary zeros as place holders for the new field (to be filled in with data at a later date).

To add a new 4-byte field of binary zeros field after the NUMBER IN STOCK field, enter **4Z** in the SEPARATION field of OUTREC field line 3 on the panel, where:

- **4** is the *length* of the separation field
- **Z** is the *type* of separation field. (Z is for binary zeros, and X is for blanks. You learn about this in the next section.)

Figure 99 on page 94 shows the completed OUTREC Statement Data Entry panel.

Reformatting Records With OUTREC

```

                                OUTREC STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      OUTREC      OUTPUT      INPUT      INPUT      OUTPUT
COMMAND  FIELD NO.  COLUMN      POSITION  LENGTH  BOUNDARY
.....    1      ===>      ===> 106    ===> 4    ===>
  SEPARATION ===>
.....    2      ===>      ===> 166    ===> 4    ===>
  SEPARATION ===>
.....    3      ===>      ===> 162    ===> 4    ===>
  SEPARATION ===> 4Z
.....    4      ===>      ===>      ===>      ===>
  SEPARATION ===>
                ***** END OF OUTREC FIELDS *****

```

Figure 99. Inserting Binary Zeros

Figure 100 shows the sorted data set with the new field of binary zeros.

Figure 100. Inserting Binary Zeros

Publisher	Number Sold Year-to-Date	Number In Stock	X'0...0'
1 4	5 8	9 12	13 16
COR	161	103	0...0
FERN	87	19	0...0
VALD	97	42	0...0
WETH	79	62	0...0

You can insert binary zeros before, between, or after input fields or other separation fields.

Inserting Blanks

You can use the OUTREC Statement Data Entry panel to separate fields with blanks or to create margins, improving the appearance of printed data sets.

For example, suppose you want to print just the PUBLISHER and BOOK TITLE fields, and you want the publishers' names to appear first. Most of the publishers' names fill up the entire 4-byte PUBLISHER field. If you do not separate the PUBLISHER and BOOK TITLE fields with blanks, the publishers' names will run into the titles. Also, without a margin, the publishers' names will begin at the edge of the paper.

The printout can be made more legible by separating the fields with 10 blanks and creating a left margin of 20 blanks.

To insert these blanks, complete the SORT Statement Data Entry panel to sort the records by book title in ascending order (see Figure 60 on page 63 for an example).

Note: If a separation field immediately follows an input field, the separation field can be specified on the same OUTREC field line as the input field. So for this example, you will use three OUTREC field lines for four fields.

On the OUTREC Statement Data Entry panel:

1. In the SEPARATION field on OUTREC field line 1, enter **20X** to make the first field a 20-byte blank field.
2. Specify the PUBLISHER and BOOK TITLE fields on OUTREC field lines 2 and 3, respectively.
3. Insert spaces between the PUBLISHER and BOOK TITLE fields by entering **10X** in the SEPARATION field on OUTREC field line 2, which already has POSITION=106 and LENGTH=4. This method of entering the separation field on the same OUTREC field line as the input field saves you space on the panel.

Figure 101 shows the completed OUTREC Statement Data Entry panel.

```

                                OUTREC STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE   OUTREC   OUTPUT   INPUT   INPUT   OUTPUT
COMMAND FIELD NO. COLUMN   POSITION LENGTH  BOUNDARY
..... 1   ===>   ===>   ===>   ===>
SEPARATION ===> 20X
..... 2   ===>   ===> 106   ===> 4   ===>
SEPARATION ===> 10X
..... 3   ===>   ===> 1     ===> 75  ===>
SEPARATION ===>
..... 4   ===>   ===>   ===>   ===>
SEPARATION ===>
                ***** END OF OUTREC FIELDS *****

```

Figure 101. Inserting Blanks with the OUTREC Panel

The sorted records, shown in Figure 102, have a left margin of 20 blanks and have 10 blanks in between the PUBLISHER and BOOK TITLE fields.

Inserting Constants

Figure 102. Output After Inserting Blanks

		Publisher				Book Title		
1	20	21	24	25	34	35		109
	(20 Blanks)			(10 Blanks)				
		FERN				ADVANCED TOPICS IN PSYCHOANALYSIS		
		FERN				COMPUTER LANGUAGES		
		WETH				COMPUTERS: AN INTRODUCTION		
		COR				CRISES OF THE MIDDLE AGES		
		VALD				EDITING SOFTWARE MANUALS		
		WETH				EIGHTEENTH CENTURY EUROPE		
		COR				INKLINGS: AN ANTHOLOGY OF YOUNG POETS		
		VALD				INTRODUCTION TO BIOLOGY		
		COR				INTRODUCTION TO PSYCHOLOGY		
		COR				LIVING WELL ON A SMALL BUDGET		
		COR				MODERN ANTHOLOGY OF WOMEN POETS		
		FERN				NUMBERING SYSTEMS		
		COR				PICK'S POCKET DICTIONARY		
		VALD				SHORT STORIES AND TALL TALES		
		VALD				STRATEGIC MARKETING		
		COR				SUPPLYING THE DEMAND		
		WETH				SYSTEM PROGRAMMING		
		FERN				THE COMPLETE PROOFREADER		
		WETH				THE INDUSTRIAL REVOLUTION		
		VALD				VIDEO GAME DESIGN		

Inserting Constants

In addition to making a printout more legible, you can also use the OUTREC Statement Data Entry panel to set up a report format by inserting character or hexadecimal constants. The formats for writing constants are shown below.

Character Strings

The format for writing a character string is:

`C'x...x'`

where *x* is an EBCDIC character. For example, `C'FERN'`.

The format for writing character string repetition is:

`nC'x...x'`

where *n* can be from 1 to 4095; *n* repetitions of the character string constant (`C'x...x'`) are inserted into the reformatted input records. If *n* is omitted, 1 is used instead.

If you want to include a single apostrophe in the string, you must specify it as two single apostrophes. For example, `O'NEILL` must be specified as `C'O''NEILL'`.

Hexadecimal Strings

The format for writing a hexadecimal string is:

```
X'yy...yy'
```

where *yy* is a pair of hexadecimal digits. For example, X'7FB0'.

The format for writing hexadecimal string separation is:

```
nX'yy...yy'
```

where *n* can be from 1 to 4095. *n* repetitions of the hexadecimal string constant (X'yy...yy') are inserted in the reformatted input records. If *n* is omitted, 1 is used.

Suppose you want to produce an unsorted report of the publisher's names and author's names from the bookstore data set. You can use OUTREC to put in "Publisher is" and "Author is" as character separators. Since you want an unsorted report, you can use a Copy Application to produce it. Display the DFSORT Primary Option menu and enter a **2** to select a copy application. Then fill in the Copy Entry panel Pages 1 and 2 specifying **SORT.SAMPIN** as the input data set and **SORT.SAMPOUT** as the output data set. Select OUTREC on the Control Statements Selection (COPY) panel.

On the OUTREC Statement Data Entry panel:

1. Under OUTPUT COLUMN on OUTREC field line 1, enter **11** as the column you want your report to start in. Blanks are automatically inserted before this column in the report.
2. In the SEPARATION field on OUTREC field line 1, enter **C'Publisher is '**. This constant is printed starting at column 11.
3. Specify the PUBLISHER field on OUTREC field line 2 so that the publisher's name appears after the first character constant.
4. Under OUTPUT COLUMN on OUTREC field line 3, enter **31** as the column you want your report to continue in. Blanks are automatically inserted between the end of the publisher's name and the start of this column.
5. In the SEPARATION field on OUTREC field line 3, enter **C'Author is '**. This constant is printed starting at column 31.
6. Specify the AUTHOR'S FIRST NAME field on OUTREC field line 4 so that the first name appears after the second character constant.
7. In the SEPARATION field on OUTREC field line 4, enter **X** to insert a space between the author's first name and last name.
8. Enter **i** in the line command field of OUTREC field line 4 to create OUTREC field line 5. Then specify the AUTHOR'S LAST NAME field on OUTREC field line 5 so that the last name appears separated from the first name by a blank.

Figure 103 on page 98 shows the completed OUTREC Statement Data Entry panel.

Inserting Constants

```

                                OUTREC STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE OUTREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT OUTREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      OUTREC      OUTPUT      INPUT      INPUT      OUTPUT
COMMAND  FIELD NO.  COLUMN      POSITION  LENGTH  BOUNDARY
.....    1      ===> 11      ===>      ===>      ===>
SEPARATION ===> C'Publisher is '
.....    2      ===>      ===> 106     ===> 4      ===>
SEPARATION ===>
.....    3      ===> 31      ===>      ===>      ===>
SEPARATION ===> C'Author is '
.....    4      ===>      ===> 91      ===> 15     ===>
SEPARATION ===> X
.....    5      ===>      ===> 76      ===> 15     ===>
SEPARATION ===>
                ***** END OF OUTREC FIELDS *****

```

Figure 103. Inserting Constants with the OUTREC Panel

Figure 104 shows the unsorted output data set.

Figure 104. Unsorted output data set

		Publisher						Author's First Name		Author's Last Name	
1	10	11	22	24	27	31	39	41	55	57	71
(10 blanks)	Publisher is	FERN	Author is	ROBERT	MURRAY						
	Publisher is	COR	Author is	FRANK	DEWAN						
	Publisher is	COR	Author is	TOM	MILLER						
	Publisher is	VALD	Author is	LORI	RASMUSSEN						
	Publisher is	COR	Author is	KAREN	WILDE						
	Publisher is	WETH	Author is	JOKHI	DINSHAW						
	Publisher is	COR	Author is	CAROL	GUSTLIN						
	Publisher is	VALD	Author is	VICTOR	OJALVO						
	Publisher is	FERN	Author is	WILLIAM	BAYLESS						
	Publisher is	VALD	Author is	MARK	YAEGER						
	Publisher is	WETH	Author is	DON	GROSS						
	Publisher is	COR	Author is	PETER	COWARD						
	Publisher is	COR	Author is	LINDA	DUZET						
	Publisher is	FERN	Author is	ANN	GREEN						
	Publisher is	WETH	Author is	RAUL	CAUDILLO						
	Publisher is	VALD	Author is	LILIANA	AVRIL						
	Publisher is	VALD	Author is	CHIEN	WU						
	Publisher is	FERN	Author is	DIANNE	OSTOICH						
	Publisher is	WETH	Author is	ALICE	MUNGER						
	Publisher is	COR	Author is	GREG	BENDER						

So Far

So far, you have covered how to use OUTREC to:

- Suppress unnecessary fields
- Reorder fields
- Insert binary zeros as place holders
- Use blanks and constants to make a printout of a data set more readable

Now, you will move on to INREC.

Reformatting Records Using the INREC Statement

To reformat data sets before they are sorted, copied, or merged, you complete information on the INREC Statement Data Entry panel. The INREC Statement Data Entry panel works the same as the OUTREC Statement Data Entry panel.

The following figure shows the pathway through the panels for INREC. Notice that it is the same as the pathway taken for OUTREC.

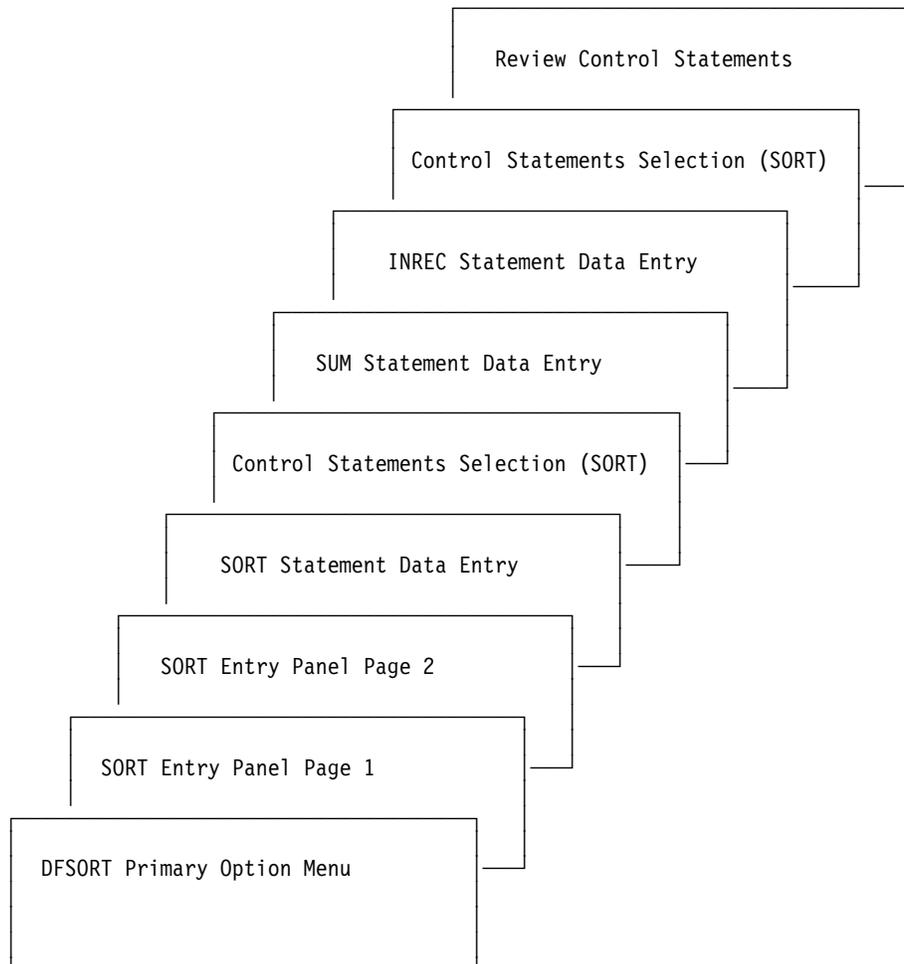


Figure 105. Overview of Panels Used for INREC

Creating Other Statements with INREC

Use the same example discussed in “Reformatting Records Using the OUTREC Statement” on page 87. You want to reformat the data sets to include only the following fields in the output data set:

- Publisher
- Number of books in stock
- Number of books sold

Just as you did with OUTREC, you can delete all fields you do not want to appear in the result from the input data set by specifying on the INREC Statement Data Entry panel only those fields that you want to include.

To include only those fields listed above for the output data set, complete the INREC Statement Data Entry panel as shown in Figure 106.

```

                                INREC STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE INREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT INREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE   INREC   OUTPUT   INPUT   INPUT   OUTPUT
COMMAND FIELD NO. COLUMN   POSITION LENGTH BOUNDARY
.....  1   ===>   ===> 106    ===> 4    ===>
  SEPARATION ===>
.....  2   ===>   ===> 162    ===> 4    ===>
  SEPARATION ===>
.....  3   ===>   ===> 166    ===> 4    ===>
  SEPARATION ===>
.....  4   ===>   ===>         ===>         ===>
  SEPARATION ===>
                    ***** END OF INREC FIELDS *****
```

Figure 106. Reformatting Records with the INREC Statement Data Entry panel

Creating Other Statements with INREC

When you use OUTREC, the affected records are reformatted *after* being sorted or merged. Therefore, the SORT, MERGE, and SUM statements refer to the original positions of the records in the input data set.

Because the INREC control statement reformats the records *before* they are sorted or merged, the SORT, MERGE, and SUM statements must refer to the *reformatted* records rather than the original records.

In this example, DFSORT first processes the INREC statement and reformats the input records to be just 12 bytes long, containing only the three fields specified (see Figure 107).

Figure 107. Input Records After INREC

Publisher	Number In Stock	Number Sold Year-to-Date
1 4	5 8	9 12

Because INREC reformats the records before sorting, you must complete the SORT Statement Data Entry panel and the SUM Statement Data Entry panel to build SORT and SUM statements that refer to the new, reformatted record positions shown in Figure 107 on page 100.

1. To sort the reformatted records by publisher in ascending order, fill in the SORT Statement Data Entry panel as shown in Figure 108.

```

                                SORT STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ===>                                SCROLL ===> PAGE

SPECIFY VALUES FOR ONE OR MORE SORT FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SORT FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE ENTER TO CONTINUE, UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE      SORT
COMMAND  FIELD NO.  POSITION    LENGTH    FORMAT    SORT
.....   ..
.....   1    ===> 1    ===> 4    ===> CH    ===> A
.....   2    ===>    ===>    ===> CH    ===> A
.....   3    ===>    ===>    ===> CH    ===> A
.....   4    ===>    ===>    ===> CH    ===> A
***** END OF SORT FIELDS *****

```

Figure 108. Sorting by Publisher, Using the Reformatted Record Positions

2. To sum the NUMBER IN STOCK and NUMBER SOLD fields, complete the SUM Statement Data Entry panel using the reformatted record positions.

```

                                SUM STATEMENT DATA ENTRY                                ROW 1 OF 4
COMMAND ===>                                                                SCROLL ===> PAGE

SELECT ONE OF THE FOLLOWING ===> 1
  1  SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2  ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT
.....    1  ===> 5      ===> 4      ===> BI
.....    2  ===> 9      ===> 4      ===> BI
.....    3  ===>      ===>      ===>
.....    4  ===>      ===>      ===>
          ***** END OF SUM FIELDS *****
    
```

Figure 109. Summing Two Fields, Using the Reformatted Record Positions

Figure 110 shows the sorted data set.

Figure 110. Using INREC to Write Only Publisher, Number in Stock, and Number Sold

Publisher	Number In Stock	Number Sold Year-to-Date
1 4	5 8	9 12
COR	103	161
FERN	19	87
VALD	42	97
WETH	62	79

The INREC statement is processed *before* SORT, MERGE, SUM, and OUTREC, but *after* INCLUDE and OMIT. Therefore, when you create an INREC statement, SORT, MERGE, SUM, and OUTREC must refer to the *reformatted* records, and INCLUDE and OMIT must refer to the *original* records. Figure 111 summarizes the control statements and the corresponding record positions to refer to when using INREC.

You can review the flowchart in *Getting Started* to see the order in which the DFSORT control statements are processed.

Figure 111. Control Statement and Corresponding Record Positions for INREC

Control Statement	Original Records	Reformatted Records
SORT		✓
MERGE		✓
SUM		✓
OUTREC		✓
INCLUDE	✓	
OMIT	✓	

Preventing Overflow When Summing Values

In some cases, you can prevent overflow by using INREC to pad summary fields with zeros. However, you cannot use this method for negative fixed-point binary data, because padding with zeros rather than with ones changes the sign.

If the summary fields in the last example were overflowing, you could pad each of them on the *left* with four bytes (binary fields must be 2, 4, or 8 bytes long), as shown in Figure 112.

Figure 112. Padding Summary Fields

Publisher	X'0...0'	Number In Stock	X'0...0'	Number Sold Year-to-Date
1 4	5 8	9 12	13 16	17 20
		New Number in Stock Field	New Number Sold Field	

- To pad summary fields with zeros to prevent possible overflow, complete the INREC Statement Data Entry panel as shown in Figure 113.

INREC STATEMENT DATA ENTRY ROW 1 OF 4
SCROLL ==> PAGE

COMMAND ==>

SPECIFY VALUES FOR ONE OR MORE INREC FIELDS.
OPTIONALLY SPECIFY LINE COMMANDS TO EDIT INREC FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

LINE COMMAND	INREC FIELD NO.	OUTPUT COLUMN	INPUT POSITION	INPUT LENGTH	OUTPUT BOUNDARY
.....	1	====>	====> 106	====> 4	====>
SEPARATION	====>	4Z			
.....	2	====>	====> 162	====> 4	====>
SEPARATION	====>	4Z			
.....	3	====>	====> 166	====> 4	====>
SEPARATION	====>				
.....	4	====>	====>	====>	====>
SEPARATION	====>				

***** END OF INREC FIELDS *****

Figure 113. Padding Summary Fields Using INREC

Preventing Overflow When Summing

2. Complete the SUM panel to sum the new NUMBER IN STOCK field and the new NUMBER SOLD field, as shown in Figure 114 on page 104.

```

                                SUM STATEMENT DATA ENTRY
                                ROW 1 OF 4
COMMAND ==>                                SCROLL ==> PAGE

SELECT ONE OF THE FOLLOWING ==> 1
  1 SUMMARIZE RECORDS WITH DUPLICATE KEYS
  2 ELIMINATE RECORDS WITH DUPLICATE KEYS

IF OPTION "1" IS SELECTED, SPECIFY VALUES FOR ONE OR MORE SUMMARY FIELDS.

OPTIONALLY SPECIFY LINE COMMANDS TO EDIT SUMMARY FIELDS
(I Insert, D Delete, R Repeat, M Move, C Copy, A After, B Before).

(USE UP/DOWN COMMANDS TO SCROLL,
HELP COMMAND FOR HELP, END COMMAND TO SAVE AND EXIT.)

  LINE      SUM
  COMMAND  FIELD NO.  POSITION      LENGTH      FORMAT
  .....   1  ==> 5    ==> 8      ==> BI
  .....   2  ==> 13   ==> 8      ==> BI
  .....   3  ==>      ==>      ==>
  .....   4  ==>      ==>      ==>
          ***** END OF SUM FIELDS *****

```

Figure 114. Summing the New Fields

Figure 115 shows the output records, each 20 bytes long.

Figure 115. Padding Summary Fields

Publisher	Number In Stock	Number Sold Year-to-Date
1 4	5 12	13 20
COR	103	161
FERN	19	87
VALD	42	97
WETH	62	79

Task Summary

This chapter explained how to use INREC and OUTREC to reformat records, create place holders, and change the appearance of output data sets. It concludes the DFSORT Panels tutorials.

Chapter 7. Other DFSORT Panels Features

This chapter covers two additional DFSORT Panels features you might want to use:

- DFSORT Free Form panels
- The ISMF line operator, SORTREC

Creating and Changing Statements Using DFSORT Free Form Panels

If you are experienced in writing DFSORT control statements, you can skip the panels that create SORT or MERGE control statements and write these control statements yourself.

On page 2 of the SORT or MERGE Entry Panel, specify **Y** after ENTER SORT or ENTER MERGE CONTROL STATEMENT IN FREE FORM.

```

                                SORT ENTRY PANEL                                Page 2 of 2
COMMAND ===>

SPECIFY EXISTING OR NEW OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.SAMPDOUT
  ALLOCATE NEW OUTPUT DATA SET ===> N   (Y or N)
  VERIFY OUTPUT DSN           ===> Y   (Y or N)

SPECIFY EXECUTION ENVIRONMENT ===> 2
  1 FOREGROUND (Execute as TSO job)
  2 BACKGROUND (Submit or save job)

SPECIFY WORK DATA SET SPACE:
  PRIMARY   QUANTITY ===> 5   (in Cylinders)
  SECONDARY QUANTITY ===> 5   (in Cylinders)

VIEW CONTROL STATEMENTS SELECTION PANEL   ===> Y   (Y or N)
REVIEW CONTROL STATEMENTS BEFORE EXECUTION ===> Y   (Y or N)
ENTER SORT CONTROL STATEMENT IN FREE FORM ===> Y   (Y or N)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 116. An Example of Choosing Free Form Panels

The next panel you see is the SORT or MERGE Statement Free Form Entry panel, where you enter DFSORT program control statements in free form (see Figure 117 on page 106). Use this option when you feel confident that you can save time by writing the control statements on your own.

```
                                SORT STATEMENT FREE FORM ENTRY
COMMAND ===>
ENTER SORT STATEMENT IN FREE FORM:
===>
===> *SORT THREE FIELDS
===>
===>   SORT FIELDS=(10,8,CH,A,
===>
===>           20,2,BI,D,
===>
===>           5,3,CH,A)
===>
===>
===>
===>
===>
===>
===>
===>
===>
===>
UPPERCASE CONVERSION ENABLED BY PROFILE.
USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.
```

Figure 117. SORT Statement Free Form Entry Panel

Use the SORT and MERGE Statement Free Form Entry panels to write your own control statements with the same coding conventions you use when writing a DFSORT application without the panels.

The panel contains 15 lines into which you can enter DFSORT control statements. DFSORT ignores any lines you leave blank. Lines which begin with an asterisk (*) in column 1 are treated as comment statements by DFSORT. Use these features to arrange your statements and insert comment lines. To continue a statement onto the next line, break the line at a blank space following a comma.

You can enter other DFSORT control statements in free form on the General Statement Free Form Entry panel (see Figure 119 on page 107). To display this panel, specify **Y** in the VIEW CONTROL STATEMENTS SELECTION PANEL field on page 2 of the SORT, COPY, or MERGE Entry Panel. On the Control Statements Selection Panel (See Figure 118 on page 107), specify **Y** for FREEFORM.

Sorting in ISMF Using SORTREC

If your site has Interactive Storage Management Facility (ISMF) installed as an option under ISPF, and DFSORT Panels is installed under ISMF, you can use the ISMF line operator SORTREC to do a quick and simple sort.

1. Select the ISMF Data Set Application option from the ISMF Primary Option Menu. The Data Set Selection Entry Panel will appear.
2. To get a complete listing of data sets cataloged under your TSO user ID:
 - Enter two asterisks (**) in the line requesting the name of your data set.
 - Select 2 GENERATE LIST FROM CATALOG.
 - Press **ENTER** (see Figure 120).

```

                                DATA SET SELECTION ENTRY PANEL                                Page 1 of 4
COMMAND ==>>

FOR A DATA SET LIST, SELECT SOURCE OF GENERATED LIST ==>> 2  (1 OR 2)

 1 GENERATE FROM A SAVED LIST
   LIST NAME ==>>

 2 GENERATE A NEW LIST FROM CRITERIA BELOW
   DATA SET NAME ==>> **

   SPECIFY SOURCE OF THE NEW LIST ==>> 2  (1 - VTOC, 2 - Catalog)

     1 GENERATE LIST FROM VTOC
       VOLUME SERIAL NUMBER ==>>          (fully or partially specified)
     2 GENERATE LIST FROM CATALOG
       CATALOG NAME ==>>
       CATALOG PASSWORD ==>>             (if password protected)
       VOLUME SERIAL NUMBER ==>>        (fully or partially specified)
       ACQUIRE DATA FROM VOLUME ==>> N (Y or N)
       ACQUIRE DATA IF DFHSM MIGRATED ==>> N (Y or N)

USE ENTER TO PERFORM SELECTION; USE DOWN COMMAND TO VIEW NEXT SELECTION PANEL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 120. ISMF Data Set Selection Entry Panel

ISMF displays the Data Set List panel (see Figure 121 on page 109).

3. Move the cursor down to the name of the data set you are using (SORT.SAMPIN in this example). Enter **SORTREC** in the line operator field next to SORT.SAMPIN and press **ENTER**.

```

COMMAND ==>
DATA SET LIST
SCROLL ==> HALF
Entries 1-14 of 14
Data Columns 3-7 of 21
ENTER LINE OPERATORS BELOW:

LINE          ALLOC   ALLOC   % NOT   NUM   ALLOC
OPERATOR      SPACE   USED   USED   EXT   UNIT
---(1)----- (2)----- --(3)-- --(4)-- -(5)- -(6)- -(7)-
A123456.BROADCAST.LIST
A123456.CLIST.CLIST
A123456.FLR.SORTIN
A123456.IDTF.LOG
A123456.INPF.P40
A123456.ISPF.PROFILE
A123456.LOG.MISC
A123456.OUTF.P40
A123456.R10.CNTL
A123456.SAMPLE.DATA3
A123456.SAMPLE.JOBS
SORTREC A123456.SORT.SAMPIN
A123456.SORT.SAMPOUT
A123456.SPFL0G2.LIST

USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 121. ISMF Data Set List panel

The format of the SORTREC Entry Panel differs somewhat depending on what type of input data set you are processing: a physical sequential data set, a member of a partitioned data set, or a VSAM data set. In this example, SORT.SAMPIN is a physical sequential data set.

4. To use the SORTREC Entry Panel (as seen in Figure 122 on page 110), in the OUTPUT DSN field specify the name of the output data set in which you want the sorted records to be placed. The OUTPUT DSN field might already be primed with the name of the last output data set you used.

```

                                SORTREC ENTRY PANEL
COMMAND ===>

SPECIFY ONE OR MORE FOR DATA SET:  A123456.SORT.SAMPIN

SPECIFY OUTPUT DATA SET:
  OUTPUT DSN ===> SORT.SAMPOUT
  OUTPUT MEMBER NAME ===>          (IF THE DATA SET IS PARTITIONED)

SPECIFY ONE OR MORE SORT CONTROL FIELDS:
SORT
FIELD NO.   POSITION   LENGTH   FORMAT   SORT
           1   ===> 1     ===> 75   ===> CH   ===> A
           2   ===>     ===>     ===> CH   ===> A
           3   ===>     ===>     ===> CH   ===> A
           4   ===>     ===>     ===> CH   ===> A

USE ENTER TO PERFORM SORTREC;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 122. SORTREC Entry Panel for a Physical Sequential Data Set

The SORTREC line operator allows up to four sort control fields. You complete the sort control fields on the SORTREC Entry panel just as for the SORT Statement Data Entry panel; that is, by specifying the record position of the field you want to sort by, its length in bytes, a code for its data format, and whether you want it arranged in ascending or descending order.

Arranging the Records

DFSORT uses the information you enter on the SORT Statement Data Entry panel to build a SORT control statement. If the panel is not primed with values from a previous session, it shows four unused *sort control fields*.

You must enter the following information for at least one sort field to continue.

POSITION The starting byte position of the field by which you are going to sort (in relation to the beginning of the record).

LENGTH The length, in bytes, of the field by which you are sorting.

FORMAT A code for the data format. The most common formats are:

- CH** EBCDIC character
- BI** Binary (numeric)
- ZD** Zoned decimal (numeric)
- PD** Packed decimal (numeric)

The default for FORMAT is **CH**, the format code for character type.

SORT ORDER The sorting order (ascending or descending) in which you want your records arranged. The SORT ORDER default is **A**, the code for ascending order.

To verify your input and perform the sort, press **ENTER**. Only foreground execution under TSO is available with the SORTREC line operator, so the job occupies your terminal until it completes.

Task Summary

This chapter covered two additional DFSORT Panels features:

- DFSORT Free Form Panels
- The ISMF line operator, SORTREC

Sorting in ISMF Using SORTREC

Appendix A. Using the DFSORT Sample Data Sets

The DFSORT product tape includes a sample job, SAMPDATA, which creates the data sets SORT.SAMPIN and SORT.SAMPOUT. You can use these data sets in many of the panels examples in the tutorial chapters of this book, if you follow these steps using your own user ID wherever "userid" is indicated:

1. Make sure SORT.SAMPIN and SORT.SAMPOUT are available at your site.
2. Allocate userid.SORT.SAMPIN as a fixed-length data set with a record length of 173 bytes.
3. Copy SORT.SAMPIN to userid.SORT.SAMPIN.
4. Allocate userid.SORT.SAMPOUT as a fixed-length data set with a record length of 173 bytes.

Now, you can specify SORT.SAMPIN or SORT.SAMPOUT in DFSORT Panels and TSO will supply your userid.

Appendix B. The Sample Bookstore Data Set

Assume that the data set is used at a college bookstore to keep information about the books it sells. Each horizontal line represents a record, and each column represents a record field. For the sake of illustration, the data set has only 20 records, each 173 bytes long. The data set has also been arranged with headings and numbers to show the byte positions of each field. Neither of these appear in the actual data set. The fields that are in binary format will not appear on your terminal as they do in this book. The methods used to arrange and present that data set as you see it here are explained in the chapters detailing the DFSORT functions.

The first nine fields of each record contain character data and the last three fields contain binary data (binary data is shown in its character representation). Note that because binary data cannot contain decimal points, the prices are shown in cents rather than dollars.

Blanks in the course field indicate that the book is not required for any class.

The sample file contained in this appendix is also on the back cover, as a foldout page.

For your quick reference, the table below shows the length and data format of each field.

Field	Length	Data Format
Title	75	CH
Author's Last Name	15	CH
Author's First Name	15	CH
Publisher	4	CH
Course Department	5	CH
Course Number	5	CH
Course Name	25	CH
Instructor's Last Name	15	CH
Instructor's Initials	2	CH
Number In Stock	4	BI
Number Sold Y-to-D	4	BI
Price	4	BI

Sample File

Sample File

Book Title		Author's Last Name	Author's First Name	Publisher	Course Department
1	75	76 90	91 105	106 109	110 114
COMPUTER LANGUAGES		MURRAY	ROBERT	FERN	COMP
LIVING WELL ON A SMALL BUDGET		DEWAN	FRANK	COR	
SUPPLYING THE DEMAND		MILLER	TOM	COR	BUSIN
VIDEO GAME DESIGN		RASMUSSEN	LORI	VALD	COMP
INKLINGS: AN ANTHOLOGY OF YOUNG POETS		WILDE	KAREN	COR	ENGL
COMPUTERS: AN INTRODUCTION		DINSHAW	JOKHI	WETH	COMP
PICK'S POCKET DICTIONARY		GUSTLIN	CAROL	COR	
EDITING SOFTWARE MANUALS		OJALVO	VICTOR	VALD	ENGL
NUMBERING SYSTEMS		BAYLESS	WILLIAM	FERN	COMP
STRATEGIC MARKETING		YAEGER	MARK	VALD	BUSIN
THE INDUSTRIAL REVOLUTION		GROSS	DON	WETH	HIST
MODERN ANTHOLOGY OF WOMEN POETS		COWARD	PETER	COR	ENGL
INTRODUCTION TO PSYCHOLOGY		DUZET	LINDA	COR	PSYCH
THE COMPLETE PROOFREADER		GREEN	ANN	FERN	ENGL
SYSTEM PROGRAMMING		CAUDILLO	RAUL	WETH	COMP
SHORT STORIES AND TALL TALES		AVRIL	LILIANA	VALD	ENGL
INTRODUCTION TO BIOLOGY		WU	CHIEN	VALD	BIOL
ADVANCED TOPICS IN PSYCHOANALYSIS		OSTOICH	DIANNE	FERN	PSYCH
EIGHTEENTH CENTURY EUROPE		MUNGER	ALICE	WETH	HIST
CRISES OF THE MIDDLE AGES		BENDER	GREG	COR	HIST

Course Number	Course Name	Instructor's Last Name	Instructor's Initials	Number In Stock	Number Sold Year-to-Date	Price	
115 119	120	144	145 159	160 161	162 165	166 169	170 173
00032	INTRO TO COMPUTERS	CHATTERJEE	CL	5	29	2600	
				14	1	9900	
70251	MARKETING	MAXWELL	RF	0	32	1925	
00205	VIDEO GAMES	NEUMANN	LB	10	10	2199	
10856	MODERN POETRY	FRIEDMAN	KR	2	32	595	
00032	INTRO TO COMPUTERS	CHATTERJEE	CL	20	26	1899	
				46	38	295	
10347	TECHNICAL EDITING	MADRID	MM	13	32	1450	
00032	INTRO TO COMPUTERS	CHATTERJEE	AN	6	27	360	
70124	ADVANCED MARKETING	LORCH	MH	3	35	2350	
50420	WORLD HISTORY	GOODGOLD	ST	15	9	795	
10856	MODERN POETRY	FRIEDMAN	KR	1	26	450	
30016	PSYCHOLOGY I	ZABOSKI	RL	26	15	2200	
10347	TECHNICAL EDITING	MADRID	MM	7	19	625	
00103	DATA MANAGEMENT	SMITH	DC	4	23	3195	
10054	FICTION WRITING	BUCK	GR	10	9	1520	
80521	BIOLOGY I	GREENBERG	HC	6	11	2350	
30975	PSYCHOANALYSIS	NAKATSU	FL	1	12	2600	
50632	EUROPEAN HISTORY	BISCARDI	HR	23	21	1790	
50521	WORLD HISTORY	WILLERTON	DW	14	17	1200	

Sample File

Appendix C. Processing Order of Control Statements

The flowchart below shows the order in which control statements are processed. (SUM is processed at the same time as SORT or MERGE. It is not used with COPY.)

Although you can write the statements in any order, DFSORT always processes the statements in the order shown below.

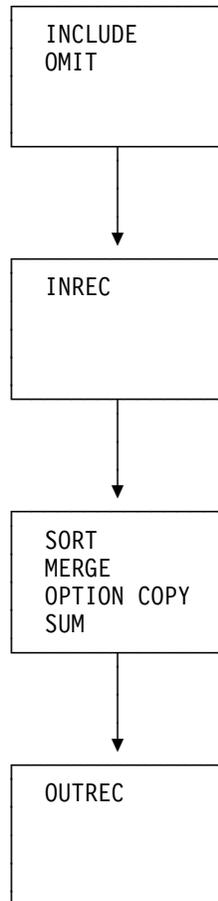
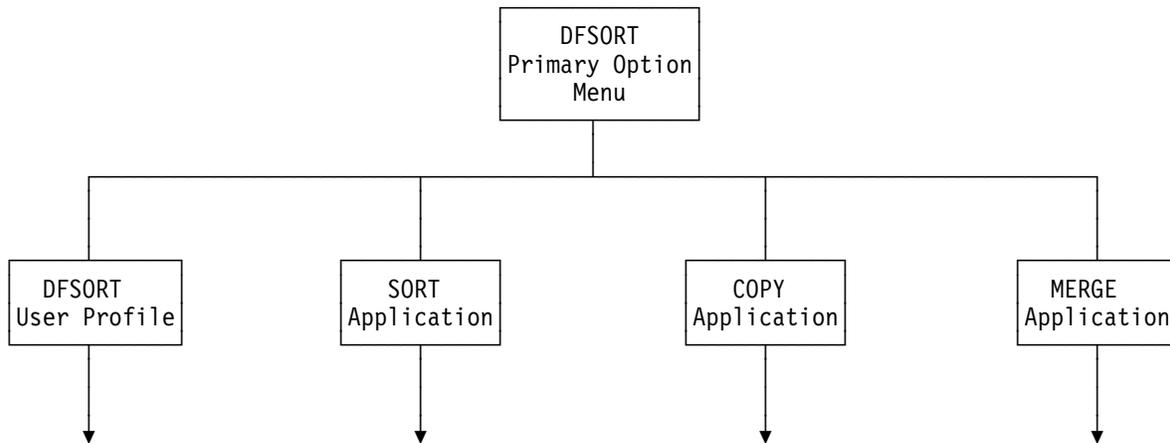


Figure 123. Processing Order of Control Statements

Processing Order of Control Statements

Appendix D. Map of DFSORT Panels

The following charts are handy reference maps of DFSORT Panels. Use them to trace your pathway through the panels, to compare the paths of the three main applications (SORT, COPY, and MERGE), and to see the path through the DFSORT User Profile.



See Figure 124.

See Figure 125 on page 122.

See Figure 126 on page 124.

See Figure 127 on page 126.

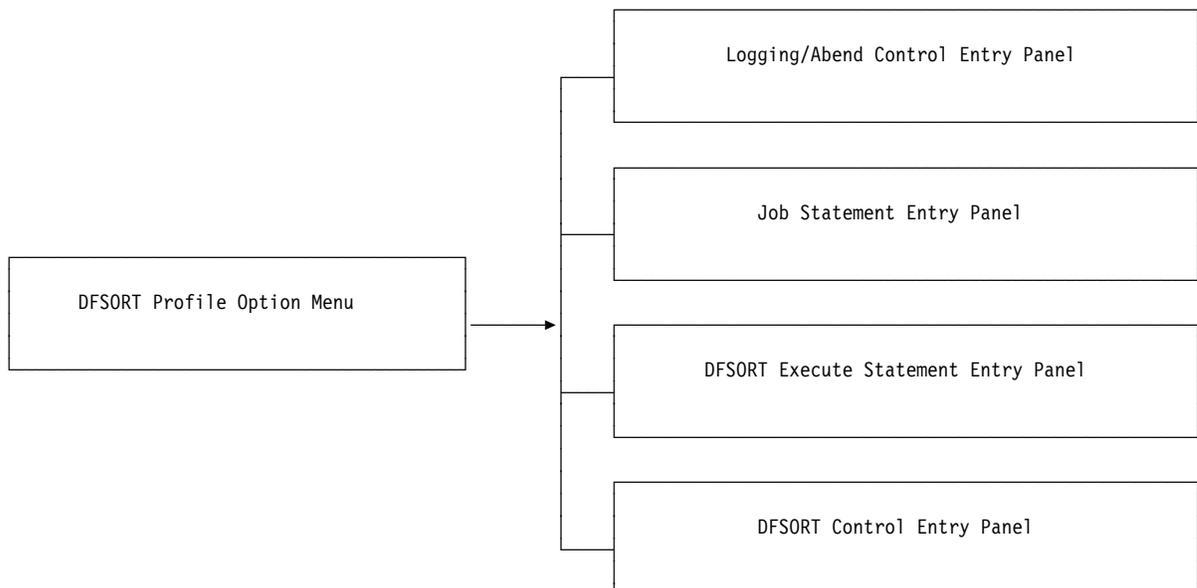


Figure 124. Map of the DFSORT Profile Panels

Map of DFSORT Panels

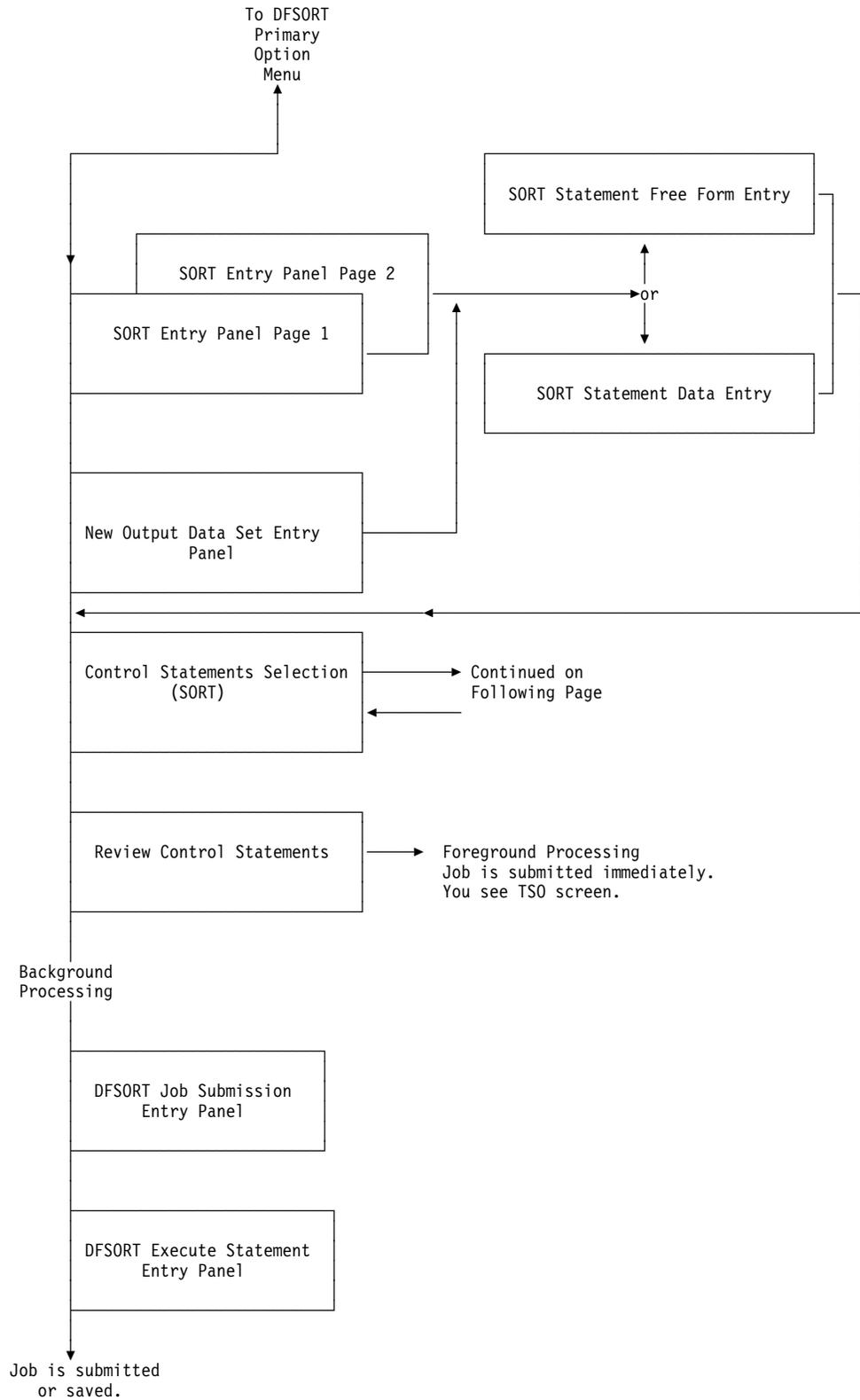


Figure 125 (Part 1 of 2). Map of the DFSORT SORT Panels

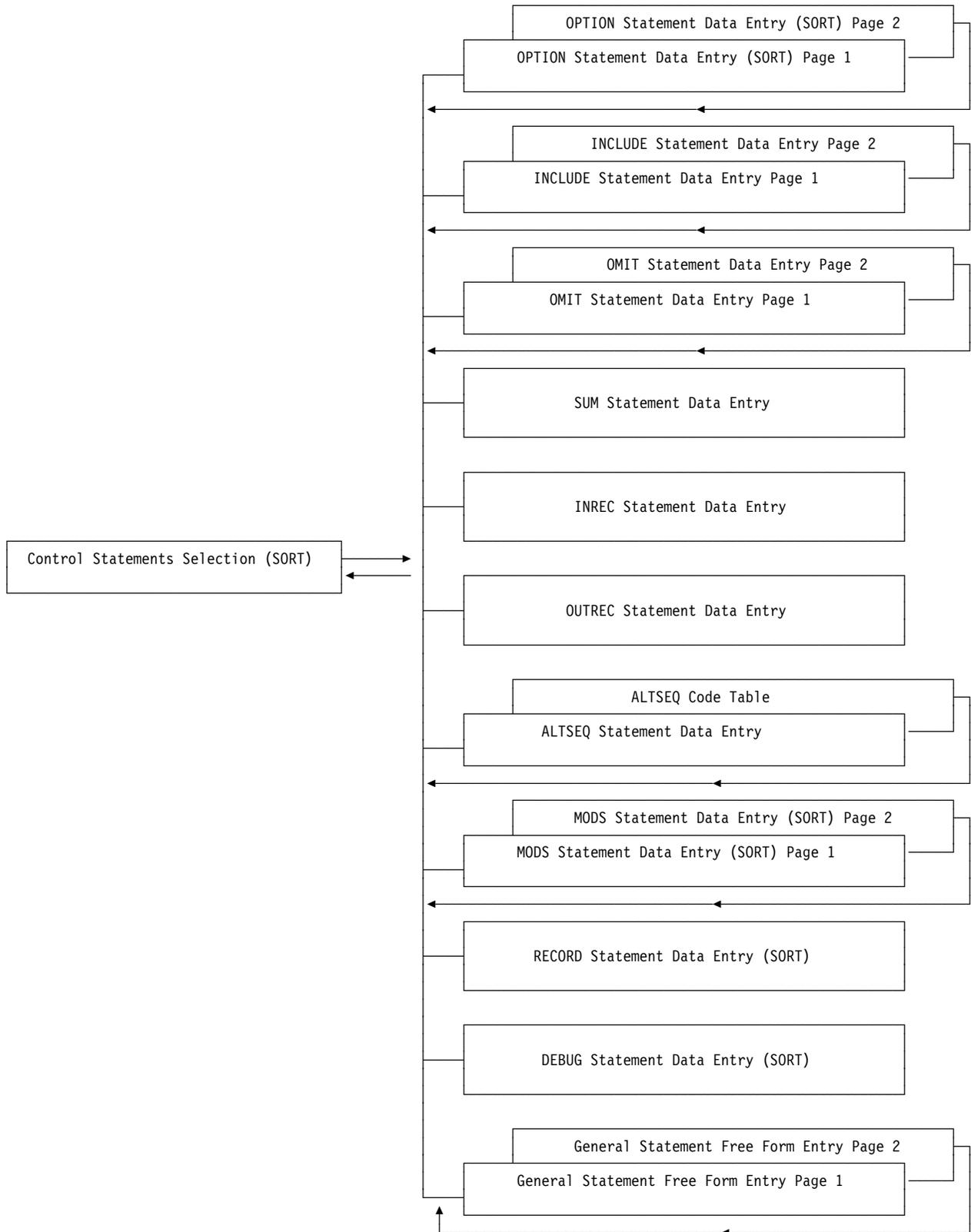


Figure 125 (Part 2 of 2). Map of the DFSORT SORT Panels

Map of DFSORT Panels

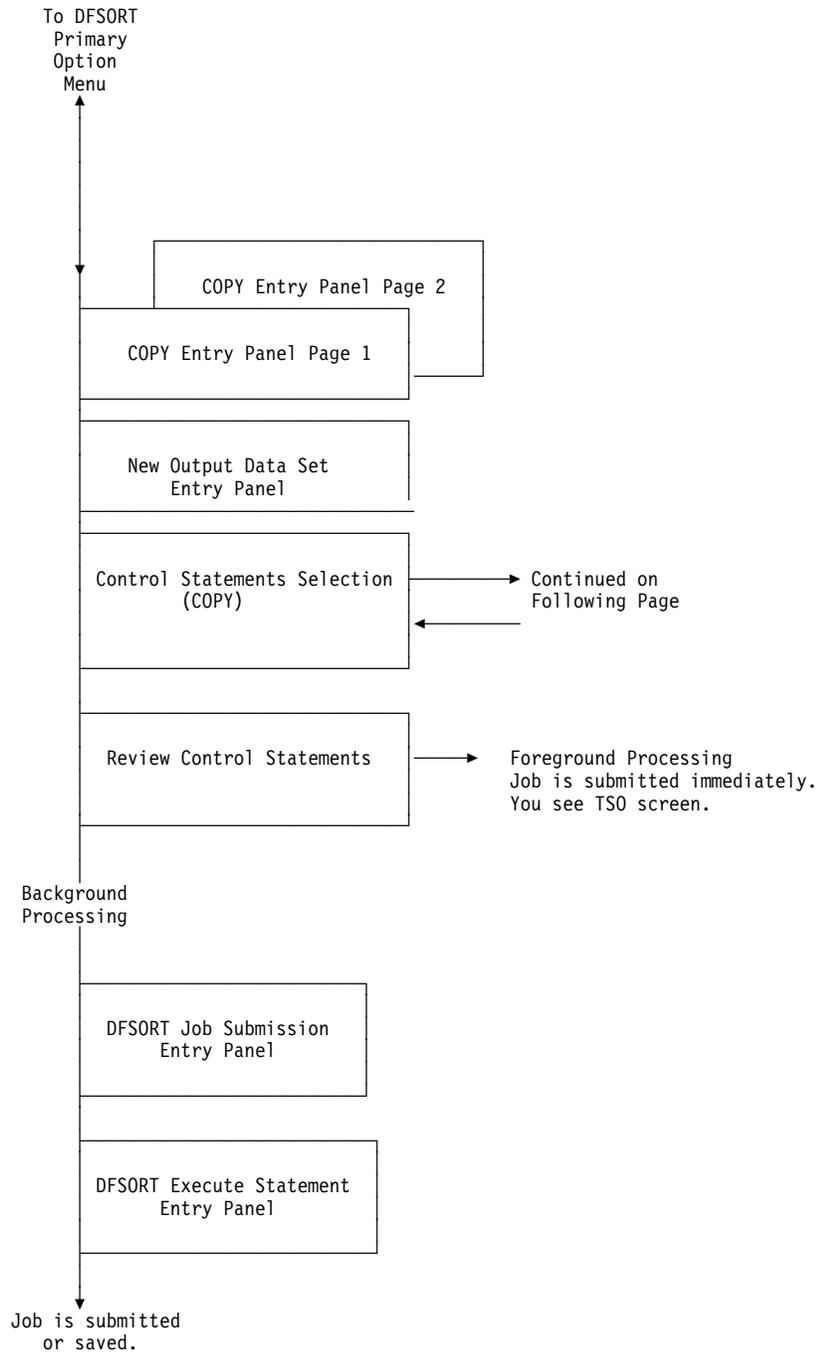


Figure 126 (Part 1 of 2). Map of the DFSORT COPY Panels

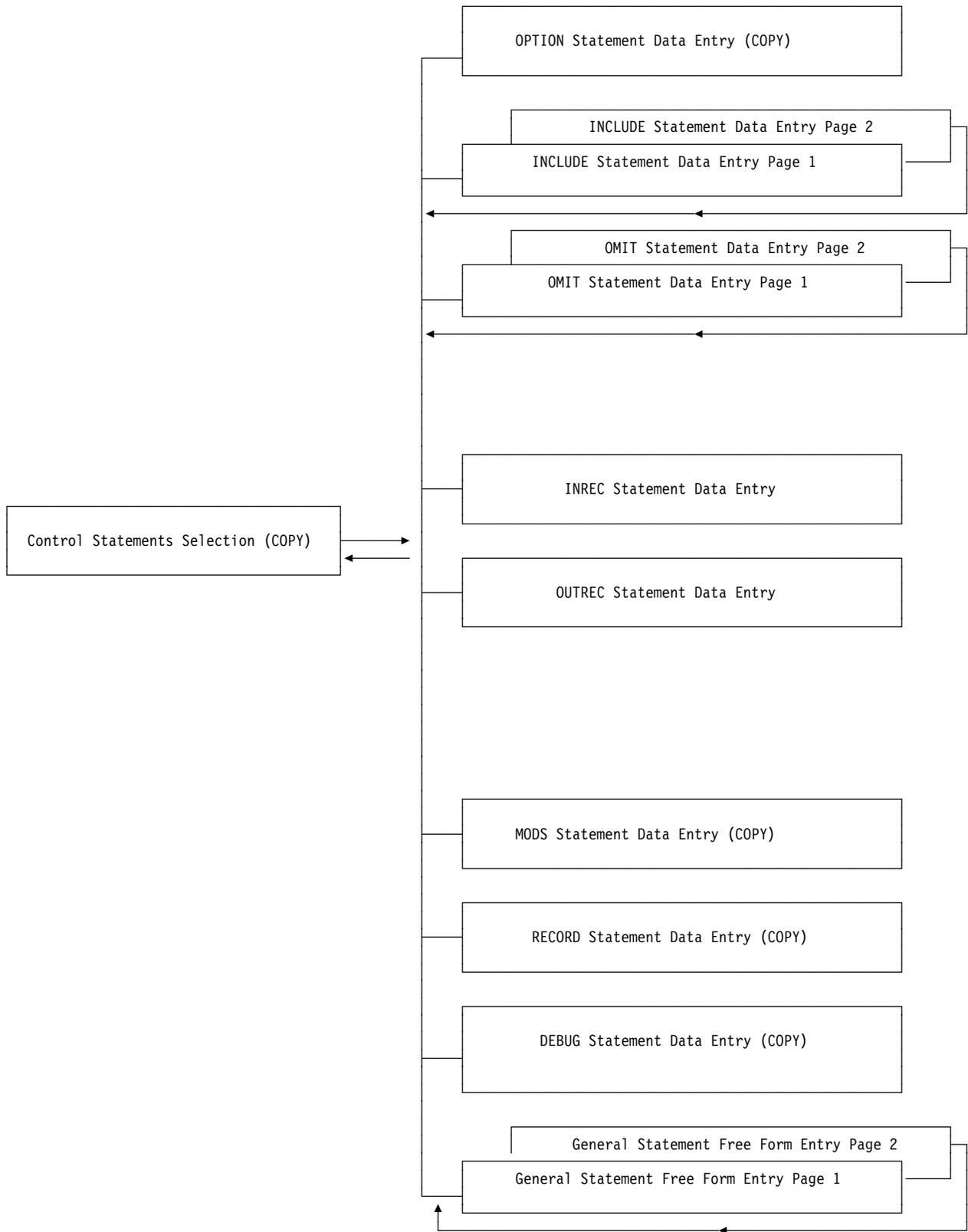


Figure 126 (Part 2 of 2). Map of the DFSORT COPY Panels

Map of DFSORT Panels

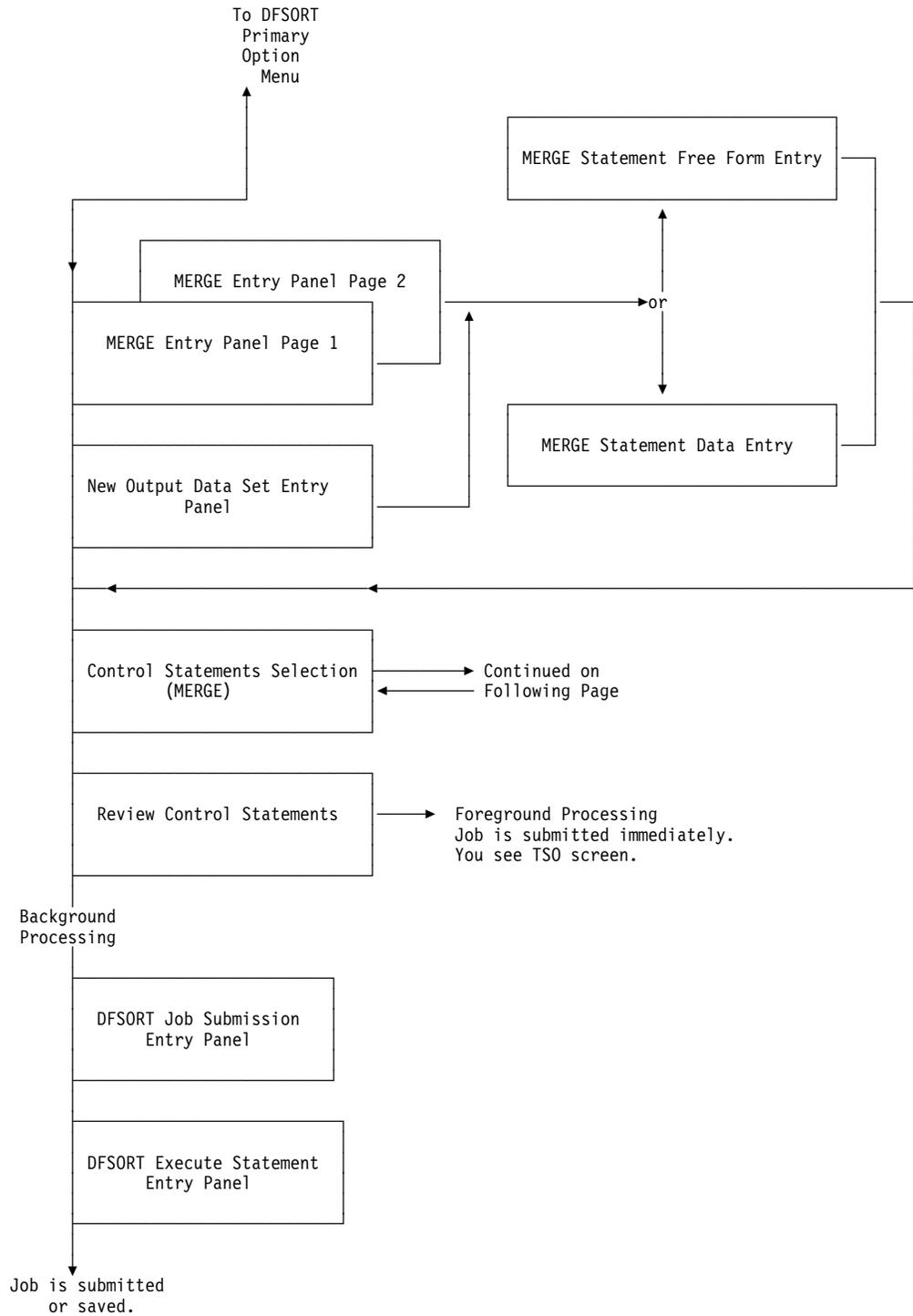


Figure 127 (Part 1 of 2). Map of the DFSORT MERGE Panels

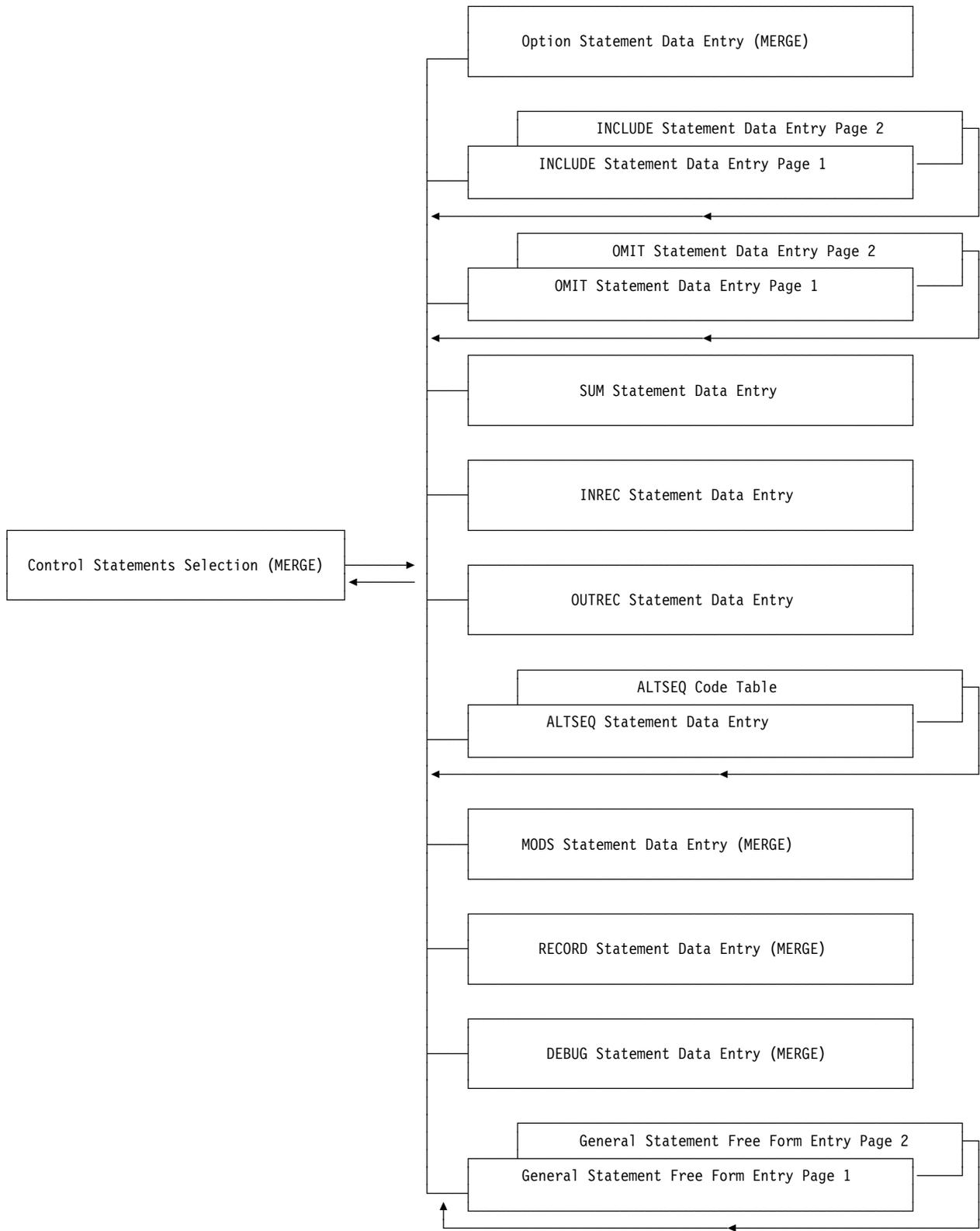


Figure 127 (Part 2 of 2). Map of the DFSORT MERGE Panels

Map of DFSORT Panels

Appendix E. Control Statements Selection Panel

Examples of some commonly used DFSORT control statements are explained in Chapters 3 through 6. This appendix contains detailed reference information for all of the control statements you can specify using the Control Statements Selection Panel. You see the Control Statements Selection panel only if you entered **Y** on the VIEW CONTROL STATEMENTS SELECTION PANEL field on the second page of the SORT, COPY, or MERGE Entry Panel. Use the Control Statements Selection panel to select additional DFSORT control statements such as OPTION, INCLUDE, INREC, and SUM.

Activating Control Statements

Available control statements are listed on the left side of the panel, with their descriptions to the right. Only those control statements with "YES" in the column headed "ACTIVE" are activated for your job. Statements with "NO" in the column are not inserted into your job but can be activated by typing **Y** into the blank space to the right of the arrow. You deactivate control statements the same way by typing **N**. By turning control statements on or off, you create different applications using different combinations of statements. Deactivated statements are not erased between sessions and can be inserted into any application by reactivating them.

Figure 128 illustrates the Control Statements Selection (SORT) panel filled out to use the INCLUDE control statement without modification, to activate the SUM and INREC control statements for modification and use, to deactivate the MODS control statement, and to browse the control statements created by the General Statement Free Form Entry panel if you had previously entered information in it.

```

CONTROL STATEMENTS SELECTION (SORT)

COMMAND ==>>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS
( Y Use statement, N Do not use statement, B Browse statement):

STATEMENT      ACTIVE
OPTION ==>>    NO   (Various options)
INCLUDE ==>>   YES  (Include only selected records)
OMIT ==>>     NO   (Exclude selected records)
SUM ==>> Y     NO   (Summarize/eliminate records with duplicate keys)
INREC ==>> Y    YES  (Reformat records before sort)
OUTREC ==>>   NO   (Reformat records for output)
ALTSEQ ==>>   NO   (Changes to standard collating sequence)
MODS ==>> N    YES  (User exits)
RECORD ==>>   NO   (Unavailable input format/length information)
DEBUG ==>>    NO   (Various debugging options)
FREEFORM ==>> B   NO   (Free form entry of statements)

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO SAVE AND EXIT.

```

Figure 128. Control Statements Selection Panel (SORT)

Editing Control Statements

Each control statement has one or more panels to direct the function of the statement in your application. When you press **ENTER** after specifying **Y** select codes on the Control Statements Selection panel, you see the panels for each statement you specified, one after the other. You can modify them or retain. If you do not modify them, they will be unchanged when retained. After you inspect all specified panels you return to the Control Statements Selection panel and can continue constructing your job.

Note: Control statement panels must have entries in the fields to remain activated. For example, if you delete all the entries on a panel and then exit with the **END** command (which saves the blank panel), DFSORT Panels deactivates the statement automatically.

You can also type **B** (BROWSE STATEMENT) instead of **Y** or **N** to display any statement as DFSORT Panels would create it based on the current settings of its control statement panel. Use this option for a quick look at the statement in final format to decide if you want to use or modify it.

Editing Control Statements

With DFSORT Panels, you can use control statements to perform the same operations on your data sets that you perform when you create and submit DFSORT jobs in non-panel mode. Each control statement has one or more data entry panels where you specify necessary parameters, relational conditions, or other values. You decide how you want the control statement to function, and the panels create the statement for you in correct format.

Press **ENTER** to verify your entries. Use **END** to save changes and go to the next control statement panel that you specified (or return to the Control Statements Selection panel if no further statements were selected).

If you decide not to use a particular control statement in your job after you are within the data entry panel, you can exit the panel with either the **END** or the **CANCEL** command. Exiting with **END** saves the changes you have made to the panel. Exiting with **CANCEL** erases any changes you have made. The **END** or the **CANCEL** commands take you either to the next data entry panel (if you selected any other control statements on the Control Statement Selection panel) or back to the Control Statements Selection panel. When you return to the Control Statements Selection panel, enter the **N** select code in the field next to any control statements that you decided not to use, and press **ENTER** to deactivate them.

You can use **REINIT** from the command line of a data entry panel to reinitialize all the pages with default entries or blanks in all the fields. Use **REINIT** to start over with all new entries.

The control statements in DFSORT Panels work the same way that they do in directly invoked DFSORT applications. See the *Application Programming Guide* for information on how control statements operate and which parameters are available to you in each of them. The following discussions explain only those features unique to using control statements in DFSORT Panels.

ALTSEQ Statement

The ALTSEQ statement lets you change the EBCDIC collating sequence for any control fields you specify with format AQ. If CHALT is in effect, your alternate collating sequence is also used for any control fields you specify with format CH. Your ALTSEQ statement overrides the default alternate collating sequence set during DFSORT installation at your site.

The two pages of the panel give you two different ways to define your alternate collating sequences. You can use either technique (or both) to indicate which EBCDIC characters to collate differently. The EBCDIC sequence is still used for any characters you do not change.

Use the ALTSEQ Statement Data Entry panel to set up your alternate sequence by entering one or more pairs of hexadecimal values which represent:

- The *original* collating position for the EBCDIC character
- The *new* collating position for the EBCDIC character

For example, if you want @ (hexadecimal 7C) to collate after Z (hexadecimal E9), enter the following values and press **ENTER**:

```
SPECIFY VALUES FOR EACH CHARACTER TO BE MOVED:
```

```
CHARACTER TO BE MOVED    ==> 7C  (EBCDIC character's hexadecimal value)
```

```
NEW POSITION OF CHARACTER ==> EA  (EBCDIC character's hexadecimal value)
```

The values are accepted and blanked out so that you can enter more values. @ now collates after Z.

If you next want # (hexadecimal 7B) to collate after @ (now at hexadecimal EA), type the following values and press **ENTER**:

```
SPECIFY VALUES FOR EACH CHARACTER TO BE MOVED:
```

```
CHARACTER TO BE MOVED    ==> 7B  (EBCDIC character's hexadecimal value)
```

```
NEW POSITION OF CHARACTER ==> EB  (EBCDIC character's hexadecimal value)
```

The values are again accepted and blanked out so that you can enter more. @ now collates after Z, and # collates after @.

The ALTSEQ Code Table on the next page of the panel can show you all of the changes you made for your alternate sequence. You can also change the collating sequence directly from the table. The headings 0 through F for the rows and columns of the table correspond to the first and second hexadecimal digits, respectively, of the old EBCDIC characters. To change a collating position for any EBCDIC character, locate the blank corresponding to its first and second hexadecimal digits, and enter the new collating position in the blank.

The ALTSEQ Code Table displays the current alternate collating settings whenever you enter it.

For more information about the ALTSEQ statement, see the *Application Programming Guide*.

DEBUG Statement

Use the Debug Statement Data Entry panel to select various debugging options for your application. Normally, you do not need to use these options, but they might be useful when you try to isolate or bypass a problem in the DFSORT program. Use these options only if necessary as their use can degrade performance.

The Debug Statement Data Entry panels for SORT, COPY, and MERGE are similar, but only those options which are relevant to each application appear on the corresponding panels. To select a DEBUG option for inclusion in your job, enter an **S** in the corresponding field.

See the *Application Programming Guide* for detailed information about what these options do and when you might want to use them:

- BSAM
- BUFFERS
- EQUCOUNT
- NOASSIST

INCLUDE Statement

Use the INCLUDE Statement Data Entry panel to limit the records in your output data set to those for which a logical expression you specify is true. You can specify up to two relational conditions combined with a logical AND or OR operator to compare fields to fields or fields to constants. (You can also limit the records in your input data sets by omitting, instead of including, those records for which a logical expression is true. See the following section describing the OMIT statement.)

For a field-to-field comparison, describe the POSITION, LENGTH and FORMAT of the first and second control fields in the entry fields marked with a **1**, and a **2**, respectively. Remember that the Record Descriptor Word (RDW) occupies bytes 1-4 in variable-length records. Valid format codes are listed on the panel and are explained in the *Application Programming Guide*.

If you want to compare the first control field with a constant, instead of another control field, enter the constant in the CONSTANT field. The correct formats for constant strings are identical to those you use in non-panel mode.

See the *Application Programming Guide* for more information about constants and comparisons.

Note that if you specify a character constant string, you must ensure that you enter uppercase and lowercase characters appropriately between the quotation marks. DFSORT Panels passes text within the character constant string to the program exactly as you enter it on the panel; it cannot determine whether the case is correct.

On the second page of the panel, a second relational condition can be described in the same fashion as the first. Direct DFSORT to combine the two conditions into a single logical expression by specifying the **AND** or **OR** operator on the second page of the panel. If your expression requires more than two relational conditions,

use the General Statement Free Form Entry panel to specify your INCLUDE statement.

For more information about the INCLUDE statement, see the *Application Programming Guide*.

OMIT Statement

The OMIT statement, like the INCLUDE statement, is used to select the records for your output data set. With OMIT, you specify a logical expression that, if true, excludes a record from your output data set. The two pages of the OMIT Statement Data Entry panel work in the same way as the INCLUDE Statement Data Entry panel; see the discussion of that panel for details.

Use either the INCLUDE or the OMIT statement to filter your records, depending upon whichever is more convenient for you. You cannot specify both within the same job.

See the *Application Programming Guide* for more information about using OMIT.

INREC and OUTREC Statements

The panels you use to create INREC and OUTREC control statements are similar, and you specify information in the fields in similar ways.

Use the INREC Statement Data Entry panel to reformat records prior to further processing during DFSORT processing. You can delete or reorder fields and insert blanks, zeros, character strings, or hexadecimal strings. DFSORT processes the INREC statement before SORT, COPY, MERGE, SUM, OUTREC, and the E35 user exit, but after INCLUDE, OMIT, and the E15 user exit. When using INREC, remember that SORT, COPY, MERGE, SUM, OUTREC and the E35 user exit always refer to the positions and lengths of *reformatted* records. INCLUDE, OMIT, and the E15 user exit refer to the *original* records.

Use the OUTREC Statement Data Entry panel to reformat records after all other processing but before the records are written. You construct the OUTREC statement from the panel in the same way that you construct the INREC statement. As with INREC, you can delete or reorder fields and insert blanks, zeros or strings. You can use INREC and OUTREC statements in the same job to reformat records both before and after other processing.

Both the INREC and OUTREC Statement Data Entry panels initially contain four unused fields, but you can work with up to 100 by adding fields with line commands (see Figure 29 on page 34).

Each INREC or OUTREC field can be used to supply two related types of information. **Input fields** describe the position and length of the fields in the input record to be placed in the reformatted record. Input fields are placed contiguously in the reformatted record unless you use **output separators** to change that. You can specify a particular output column or output boundary for the input field or insert blanks, zeros or strings before, between, or after input fields.

Use the OUTPUT COLUMN field to indicate the column in which you would like your input field or separation field to start, relative to the start of the reformatted input record. Valid OUTPUT COLUMN values are 1 to 32000.

Editing Control Statements

Type the position of the first byte of your first input field (the first position in the record is byte 1) into the INPUT POSITION field and its length in bytes into the INPUT LENGTH field. For variable-length records, the first input field must consist of or include the Record Descriptor Word (RDW) in bytes 1-4.

If you want to alter the alignment of the input fields within your reformatted records, you can do so with the OUTPUT BOUNDARY field on the panel.

The OUTPUT BOUNDARY values you can use are **H** (Halfword aligned), **F** (Fullword aligned), and **D** (Doubleword aligned). If you specify an output boundary value for an input field, you must also specify the position and length.

SEPARATION fields specify where blanks, binary zeros, or strings are to be placed in the reformatted record. Separation fields can be placed before, between, or after input fields or other separation fields. Valid separators are nX, nZ, nX'string', or nC'string'. n can range from 1 to 4095.

For variable-length records:

- Separation fields cannot come before the first input field (the Record Descriptor Word) in bytes 1-4.
- Separation fields cannot come after the last input field if the length is omitted (that is, if the last field is for the variable part of the record).

A SEPARATION field can be specified without also specifying values in the INPUT POSITION, INPUT LENGTH, or OUTPUT BOUNDARY fields.

You can save time by using line commands to add, delete, or rearrange entries in the INREC or OUTREC panels. The line commands in the INREC and OUTREC panels work in the same way as those in the SORT and MERGE Statement Data Entry panels (see Figure 29 on page 34).

Because processing is quicker with shorter records, you can save time if you use INREC to delete fields and OUTREC to insert blanks or zeros. Rearranging the order of fields does not change total record length, so neither statement gives you slower processing after reordering fields. Both statements have these functions so that you can choose whichever is more convenient for you.

If processing time is not an issue, you can simplify working with your control fields by editing your records with OUTREC. Using OUTREC lets you specify positions and lengths in other control fields as they appear in your input data sets, while INREC requires that you specify positions and lengths in some of the other control statements as they appear in the reformatted records. However, INREC can improve performance when you use it to make your records significantly shorter.

For more detailed information about the INREC and OUTREC statements, see the *Application Programming Guide*.

MODS Statement

Use the MODS Statement Data Entry panel to direct DFSORT calls to user exit routines which you supply. The MODS panel lets you specify:

- Which exit routines to call
- Where the exit routines are located
- Approximately how much main storage each routine uses

- Whether certain exit routines are written in COBOL

The panel lists the exits you can use. Not all exits apply to all applications, so the list differs depending upon whether you want to sort, copy, or merge data sets. See the *Application Programming Guide* for complete details about each of these exits as well as restrictions that apply to the MODS statement.

When you want DFSORT to call an exit routine, type the 1- to 8-character member name of that routine in the appropriate MEMBER NAME field. For example, if you link-edit an E31 routine into 'SYSTEM1.EXIT(SOPEN)' and an E35 routine into 'SYSTEM2.EXIT(ADDZIP)', the E31 and E35 member names would be SOPEN and ADDZIP, respectively.

You can use any valid operating system name for a routine. You can also keep several alternative routines with different names in the same library (for example, E35A, and E35B) and select the one that you want to call for a given application by its name.

When you enter an exit routine in the MEMBER NAME field, you must also specify values in the corresponding MAIN STORAGE, SEARCH EXIT ROUTINE LIBRARY and COBOL ROUTINE fields.

Enter the approximate amount of bytes of main storage that the routine requires in the corresponding MAIN STORAGE field. The value that you specify must be the approximate sum of:

- The storage required for the load module of the routine
- The storage that the routine obtains using system services such as GETMAIN and OPEN
- The storage required to load the COBOL library routine (if the routine is written in COBOL)

Use the SEARCH EXIT ROUTINE LIBRARY field to tell DFSORT which libraries to search for the exit routine you entered in the corresponding MEMBER NAME field. If you would like the libraries specified in the EXIT DSN fields to be searched for the exit routine specified in the MEMBER NAME field, enter **Y** in the SEARCH EXIT ROUTINE LIBRARY field. DFSORT searches the EXIT DSN 1 library first, the EXIT DSN 2 library second, and so on.

If you would like DFSORT to search the libraries identified by the STEPLIB DD statement, JOBLIB DD statement (if there is no STEPLIB DD statement), or the link library, respectively, then enter **N** in the SEARCH EXIT ROUTINE LIBRARY field.

If you specify an E15 or E35 user exit routine, indicate whether or not your routine is written in COBOL by typing **Y** or **N**, respectively, in the COBOL ROUTINE field.

Enter the names of the libraries (that is, the partitioned data sets containing the exit routines) in the EXIT DSN fields. You can use from one to eight library names for sorting and from one to four data set names for merging and copying, but you must specify a library name in one of the EXIT DSN fields if any SEARCH EXIT ROUTINE LIBRARY field is set to **Y** with a corresponding member name specified. If the same library contains two or more members, you need to specify the library name only once. Note that the order in which you specify library names in the EXIT DSN fields

Editing Control Statements

determines the search order used to locate them. DFSORT ignores any blank EXIT DSN fields.

Use the VERIFY EXIT DSN field to check that your library names are valid. If you enter a **Y** in the field, you will receive an error message on the panel when you press **ENTER** if any of the library names you specified are invalid. Type **N** to suppress validation messages. Incorrect syntax in your library names always results in an error message no matter what the VERIFY EXIT DSN setting is.

If you know that your library names are invalid (as when you construct and save a job prior to allocating the libraries to which it refers), the VERIFY EXIT DSN field must be set to **N** to continue. You cannot submit the job from the panels this way, but you can save it in a data set for later use. This way you can construct and save jobs that you can edit for use on systems in which your libraries are cataloged.

For more information about the MODS control statement, see the *Application Programming Guide*.

OPTION Statement

Use the OPTION Statement Data Entry panel to select various DFSORT program options for your application. Only the options relevant to a particular sort, copy, or merge application appear on the corresponding OPTION panel, so some of the following options might not apply to a given task. In general, these options let you override DFSORT defaults set during installation by your system programmers, and to request optional information for your application. What you type into the entry fields depends upon the particular option. You might specify **Y** or **N**, a number, or simply **S** to activate a selection. The necessary values are listed opposite the option entry field.

For more information about the Option control statement, see the *Application Programming Guide*.

RECORD Statement

To process your records, DFSORT must work with their format and length. Under certain conditions, this information is unavailable to the program from the system control blocks and must be supplied from the Record Statement Data Entry panel. The panels for SORT, COPY, and MERGE applications are basically similar and are not discussed separately here. Because MERGE applications do not use the E15 user exit routine, references to that exit do not apply to the Record Statement Data Entry (MERGE) panel.

You must specify *record type* when:

- You work with VSAM input and VSAM output data sets.
- You use an E15 user exit to provide all of your input records.
- The system has no record type information about your input data sets.

Indicate your record type in the RECORD TYPE field:

- F** Fixed-length records
- V** Variable-length records
- D** ISCI/ASCII variable-length records

You must specify *maximum input record length* when:

- You use an E15 routine to provide all your input records.
- The system has no record length information about your input data sets.

Indicate the length in the RECORD LENGTH L1 field. For variable-length records, the L1 value you enter must be at least as large as the length of your longest input record.

If you use an E15 user exit routine that changes your input record length (for example, to eliminate fields within your input records), you must indicate the *maximum record length after invoking the E15*. Enter the number in the RECORD LENGTH L2 field. For variable-length records, the L2 value that you enter must be at least as large as the length of the longest record you pass to DFSORT from your exit routine.

You must specify *output record length* when it differs from your input record length, *and* the system has no record length information about your output data set. Enter your output record length in the RECORD LENGTH L3 field. For variable-length records, the L3 value that you enter must be at least as large as the length of your longest output record.

For more information about the RECORD statement, see the *Application Programming Guide*.

SUM Statement

Use the SUM Statement Data Entry panel to handle processing of input records with equal control fields; that is, those records with duplicate keys. With SUM, you choose to keep only one record from a group of input records with duplicate keys. You can also choose whether to sum one or more numeric fields from those records. (Select EQUALS on the OPTION Statement Data Entry panel to direct DFSORT to retain the *first* record with each unique control field. See the *Application Programming Guide* for details on EQUALS).

To retain only one input record from the set and sum numeric fields, select 1 (SUMMARIZE RECORDS WITH DUPLICATE KEYS) in the SELECT ONE OF THE FOLLOWING field. If you choose this option, you must also indicate which of the numeric fields (the *summary fields*) you want to sum.

To retain only one input record from the set without summing any numeric fields, specify 2 (ELIMINATE RECORDS WITH DUPLICATE KEYS) in the same entry field. If you choose this option, you do not need to enter further information on the panel. Any existing summary fields on the panel are saved but otherwise ignored.

The other entry fields on the panel let you describe which numeric summary fields to sum during DFSORT processing. The panel initially displays four unused summary fields but you can work with up to 100 by adding fields with line commands. See Figure 29 on page 34 for an explanation of the line commands you can use. Type the position of the first byte of each summary field (the first position in the record is byte 1) into the POSITION field, and the length in bytes into the LENGTH field. Indicate the data format in the FORMAT field. Remember that the RDW occupies bytes 1-4 in variable-length records. Valid format codes are explained in the *Application Programming Guide*. Summary fields can be located anywhere within the first 4092 bytes of your input records as long as they do not overlap control fields, other summary fields, or the RDW.

For more information about the SUM statement, see the *Application Programming Guide*.

General Free Form Statement

Use the General Statement Free Form Entry panel to insert complete DFSORT program control statements into your job. The General Free Form panel works like the SORT and MERGE Statement Free Form panels. You can enter up to 30 lines containing DFSORT control statements. Specify a comment statement by typing an asterisk (*) in column 1. Blank lines are ignored, but any entries you make on the Free Form panel are passed to DFSORT exactly as you type them. Free form entries are *not* verified automatically, so you must use correct syntax.

If you enter a control statement (for example, INCLUDE) in the General Statement Free Form Entry panel and also use the corresponding data entry panel for that statement, both statements are passed to DFSORT. However, because DFSORT Panels places the free form statement *before* the data entry statement, DFSORT ignores the data entry statement as a duplicate.

Note: You can use the General Statement Free Form Entry panel to insert non-DFSORT control statements to be processed through DFSORT's Extended Function Support interface. See the *Application Programming Guide* for details.

Your Work.Inspect Your Work: Review Control Statements Panel

After you enter all required information describing your DFSORT sort, copy, or merge application, you can inspect the completed program control statements before saving or submitting the job. You see only the Review Control Statements panel if you specified **Y** in the REVIEW CONTROL STATEMENTS BEFORE EXECUTION field on the second page of the SORT, COPY, or MERGE Entry Panel. The panel displays all active control statements as they would be passed to DFSORT.

Use the Review Control Statements panel (see Figure 129 on page 139) to check whether you activated the correct control statements and that they are appropriate for your application. If you used free form entry to write some or all of the control statements for your job, you can check them here for errors and proper syntax. Any program control statements created using DFSORT control statements entry panels are already in correct format and syntax. Free form entries are *not* verified automatically.

```

                                REVIEW CONTROL STATEMENTS                                LINE 1 OF 1
COMMAND ===>                                                                SCROLL ===> PAGE

(USE ENTER TO PERFORM DFSORT; USE UP/DOWN COMMANDS TO SCROLL;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.)

-----
SORT      FIELDS=(1,75,CH,A)
----- END OF CONTROL STATEMENTS -----

```

Figure 129. Review Control Statements Panel

If the statements are incorrect or are not appropriate to your task, use the **END** command one or more times to return to earlier panels that you can use to alter them. Activate or deactivate control statements by using the Control Statements Selection panel; modify control statements by using the control statement data entry panels.

If you are satisfied with the way your statements appear, press **ENTER** to continue. If you specified foreground processing for the job, DFSORT Panels processes your job under TSO. If you specified background processing, DFSORT Panels takes you on to the panels from which you can submit the job or save the application in a data set for future use.

The DFSORT Panels can generate DFSORT control statements and options in two different formats: compact or expanded. See the *Application Programming Guide* for more information.

Inspecting

Appendix F. Setting Up or Changing Your Profile

The information that DFSORT stores in your User Profile controls the processing of jobs you have built with DFSORT Panels. You can change:

- Logging and abend control
- Job statement information
- DFSORT execute statement information
- DFSORT control

To set up your profile or change it, select the DFSORT PROFILE option on the DFSORT Primary Option Menu. DFSORT displays the DFSORT Profile Option Menu, shown in Figure 130. You can also go to the Profile Option Menu by using the **PROFILE** command on any DFSORT functional panel.

```

                                DFSORT PROFILE OPTION MENU
ENTER SELECTION OR COMMAND ===>

SELECT ONE OF THE FOLLOWING:

  1 LOGGING AND ABEND CONTROL
  2 JOB STATEMENT INFORMATION
  3 DFSORT EXECUTE STATEMENT INFORMATION
  4 DFSORT CONTROL
  X EXIT, RETURN TO DFSORT PRIMARY OPTION MENU

USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 130. DFSORT Profile Option Menu

The four options on the Profile Option Menu each display a panel where you can specify or change information in your user profile.

Note: If you have DFSORT Panels installed under ISMF, an interface exists between the ISMF and DFSORT profiles so that if you make changes to the logging/abend control or job statement variables in the DFSORT profile you will also make the same changes in the ISMF profile, and vice versa.

Logging and ABEND Control

Choose this option to go to the Logging/ABEND Control Entry Panel, where you can set up or change values that control standard log information that DFSORT will keep track of (see Figure 131 on page 142). You can:

Job Statement Information

- Specify whether to log inter-module trace data, which gives you a record for every module that executes.

Enter **Y** after LOG INTER-MODULE TRACE to record the trace data in the ISPF log data set. If you specify **N**, the trace data is not logged. For better performance of DFSORT Panels, set this field to the default of **N**.

- Determine how DFSORT responds to abnormal termination (ABEND) conditions, and whether a DFSORT Panels dump from the time of failure should be placed in the ISPF log.

Enter **Y** after RECOVER FROM ABENDS to direct DFSORT Panels to attempt recovery from DFSORT Panels abends, and to record the results of a DFSORT Panels dump in the ISPF log data set. Specify **N** if you want DFSORT Panels to cancel an operation without a DFSORT Panels dump when an abend occurs.

To save your changes, press **ENTER**, and to exit the panel, use the **END** command. If you use **END** without first pressing **ENTER**, your User Profile is not changed.

```
                                LOGGING/ABEND CONTROL ENTRY PANEL
COMMAND ===>
OPTIONALLY SPECIFY ONE OR MORE:
LOG INTER-MODULE TRACE ===> N   (Y or N)
RECOVER FROM ABENDS    ===> Y   (Y or N)

User ENTER to update Profile;
User HELP command for HELP; use END command to exit.
```

Figure 131. Logging/ABEND Control Entry Panel

For a list and explanation of the abends for DFSORT Panels, see *Messages and Codes*.

Job Statement Information

DFSORT uses the JOB statements stored in your User Profile to prime the Job Submission Entry Panel each time you choose background execution of your job. When you see the Job Submission Entry Panel in the course of submitting your job in background, you can either accept the JOB statements as they are (taken from your profile), or change them.

To set up or change the JOB statements in your User Profile, select the JOB STATEMENT INFORMATION option (2) on the DFSORT Profile Option Menu. DFSORT then displays the Job Statement Entry Panel.

```
                                JOB STATEMENT ENTRY PANEL
COMMAND ===>

SPECIFY JOB STATEMENT INFORMATION:

===> //A123456G JOB (TSOUSER),'NAME'
===> /**
===> /**
===> /**
===> /**
===> /**
===> /**
===> /**

Use ENTER to update Profile;
Use HELP command for HELP; use END command to exit.
```

Figure 132. Specifying JCL on the Job Statement Entry Panel

Use this panel to specify up to seven lines of JCL to be added to the beginning of background jobs that you submit or save. If you are not familiar with JCL, you might want to have someone in the information center at your site alter your profile for you.

To save your changes, press **ENTER**, and to exit the panel, use the **END** command. If you use **END** without first pressing **ENTER**, your User Profile is not changed.

DFSORT Execute Statement Information

DFSORT uses the EXECUTE statement stored in your profile to prime the DFSORT Execute Statement Entry Panel. Again, as you submit a background execution job, you can choose to accept the EXECUTE statement as specified in your profile, or change it. You must enter a **Y** in the VIEW OR CHANGE EXECUTE STATEMENTS FROM PROFILE field on the Job Submission Entry Panel to change the EXECUTE statement.

To set up or change the EXECUTE statement in your User Profile, select the DFSORT EXECUTE STATEMENT INFORMATION option (3) on the DFSORT Profile Option Menu. DFSORT then displays the DFSORT Execute Statement Data Entry Panel.

DFSORT Control Entry Panel

```
                                DFSORT EXECUTE STATEMENT ENTRY PANEL
COMMAND ===>

SPECIFY DFSORT EXECUTE STATEMENT INFORMATION:

===> //*
===> //*
===> //*
===> //STEP1 EXEC PGM=ICEMAN
===> //*
===> //*
===> //SYSOUT DD SYSOUT=*
===> //*
===> //*
===> //*

Use ENTER to update Profile;
Use HELP command for HELP; use END command to exit.
```

Figure 133. Specifying an EXEC Statement on the EXECUTE Statement Entry Panel

Use this panel to specify up to 10 lines of JCL for background jobs. You can add parameters to the EXEC statement and additional related JCL statements. Again, if you are not familiar with JCL, you might want to have someone alter your profile for you. Then, for most standard sort, merge, or copy jobs, you can just accept the statements and run your job.

To save your changes, press **ENTER**, and to exit the panel, use the **END** command. If you use **END** without first pressing **ENTER**, your User Profile is not changed.

DFSORT Control

The DFSORT CONTROL option on the DFSORT Profile Menu displays the DFSORT Control Entry panel.

```

                                DFSORT CONTROL ENTRY PANEL
COMMAND ===>

OPTIONALLY SPECIFY ONE OR MORE:

    ISSUE DFSORT DIAGNOSTIC MESSAGES          ===> N   (Y or N)
    CONVERT FREE FORM ENTRY TO UPPERCASE      ===> Y   (Y or N)
    GENERATE CONTROL STATEMENTS IN EXPANDED  ===> N   (Y or N)
    FORMAT

USE ENTER TO UPDATE PROFILE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 134. DFSORT Control Entry Panel

Leave the ISSUE DFSORT DIAGNOSTIC MESSAGES field set to the default value of **N** if you do not want DFSORT to issue diagnostic messages. Enter **Y** in this field if you want DFSORT to issue diagnostic messages.

Leave the CONVERT FREE FORM ENTRY TO UPPERCASE field set to the default value of **Y** if you want lowercase input to be changed to uppercase input on free form entry panels. Enter **N** in this field if you do not want lowercase input to be changed to uppercase input on free form entry panels.

Leave the GENERATE CONTROL STATEMENTS IN EXPANDED FORMAT field set to the default value of **N** if you want the DFSORT panels to code control statements in as few lines as possible. Enter **Y** in this field if you want the DFSORT panels to code control statements in an easy to read and edit format using as many lines as necessary.

You must press **ENTER** to save your changes, and use **END** to exit the panel. If you use **END** without first pressing **ENTER**, your User Profile is not changed.

Exiting from the Profile

After specifying or changing the items through the DFSORT Profile Option Menu panel, select X EXIT, RETURN TO DFSORT PRIMARY OPTION MENU, to exit your profile. To permanently save your changes to the profile, you must successfully exit from the DFSORT Primary Option Menu. If your session terminates abnormally before you exit, your changes might be lost.

Note: If you have DFSORT Panels installed under ISMF, an interface exists between the ISMF and DFSORT profiles so that changes you make to the logging/abend control or job statement variables in the DFSORT profile are also made to the ISMF profile, and vice versa.

Exiting from the Profile

Appendix G. Customizing DFSORT Panels with the User-Defined Panels Interface

DFSORT Panels is delivered with a complete set of interactive panels that help you build a DFSORT job. With the User-Defined Panels Interface (UDPI), you can add to and replace the original panels with your own customized versions. You can customize the control statement selection panels to access different combinations of DFSORT and user-defined control statements and create data entry panels that collect information for your user-defined control statements. You can even create special control statements that need no data entry panels or routines.

For example, you might create specialized SORT and MERGE control statements with user-defined data types or user-defined collating sequences by replacing the existing SORT and MERGE Statement Data Entry panels with new user-defined panels.

As your needs change, you can continue to modify the interface to work most efficiently for you.

Getting Ready to Customize DFSORT Panels

Before you modify any panels, you should be thoroughly familiar with DFSORT and DFSORT Panels. Because two UDPI tools — data entry routines and statement coder routines — are ISPF functions that you must write yourself, you must be thoroughly acquainted with ISPF and its dialog management services. For information on ISPF dialogs and the ISPF SELECT service, see the *ISPF Dialog Management Guide*.

You might also want to review the previous chapters on using DFSORT Panels.

Before attempting to work with the User-Defined Panels Interface, you should read this chapter thoroughly and try out the examples described in “A Sample Customized DFSORT Application” on page 167.

Some Important Precautions

DFSORT Panels consists of several ISPF libraries (such as the ISPLIB panel definition library and the ISPLIB message definition library) and one CLIST procedure library (SYSPROC). The best way to make and test additions or changes to a DFSORT Panels library is to copy the member you want to add or modify into a personal library. Add your library to the beginning of the existing concatenation that you or your site uses. This ensures that you can safely make changes without affecting the other libraries in the concatenation.

After you have tested your changes, redo the concatenation to make the added or modified part available to a larger group of people, such as a single department. Note any changes in the comment section at the beginning of the modified member.

Do not delete or rename any of the parts of DFSORT. Deleting or renaming a part could severely affect the way DFSORT works, and can cause errors or cause DFSORT to fail.

Before you change anything you should make a backup copy of DFSORT. Keep this unmodified version of the product for diagnostic purposes. IBM support and maintenance is provided for *only* the unmodified version of DFSORT.

Restrictions to Customizing

DFSORT is copyrighted. Under the IBM licensing agreement, you may modify DFSORT for your own use. You may not modify it for commercial resale.

A User-Defined Panels Interface Overview

This section is a brief look at the structure of a DFSORT Panels application. All DFSORT Panels applications, whether standard or customized (user-defined), are based on a sort, merge, or copy. Each application takes you through a series of screens:

1. **DFSORT Primary Option Menu**, where you choose which application you wish to perform.
2. **A SORT/MERGE/COPY Entry Panel** where you specify the input data set name(s), the output data set name, and a number of processing options.
3. **A SORT/MERGE Statement Data Entry Panel**, where you specify selection criteria.
4. **A Control Statements Selection (SORT/MERGE/COPY) Panel**, where you choose additional DFSORT control statements. For each control statement you select, there is a corresponding panel where you specify processing criteria.
5. **Review and Processing screens.**

With UDPI, you can customize:

- The DFSORT Primary Option Menu by adding new applications or revising existing ones.
- The SORT/MERGE Statement Data Entry Panel to fit the needs of your new or revised applications.
- The Control Statements Selection (SORT/MERGE/COPY) Panel by adding new control statements or revising existing ones.
- Individual control statements by providing them with new functions of your own design,

using these four tools:

- The ICESPRIM definition of the DFSORT Primary Option Menu
- The internal profile panel definition (IPPD), which controls the SORT/MERGE/COPY Entry Panels and the Control Statements Selection (SORT/MERGE/COPY) panels
- Data entry routines, which collect user data for control statements (regular or user-defined)
- Statement coder routines, which generate the control statements that are passed to DFSORT at run time.

It is especially important to understand the relationship between the data entry and statement coder routines, both of which you must provide to make any new or revised panels work correctly with DFSORT. The data entry routine displays

Customizing the Primary Option Menu

```
)ATTR

/*****
/*  PANEL ID:  ICESPRIM                               */
/*  (C) COPYRIGHT IBM CORPORATION 1988, 1992.         */
/*  DATE OF LAST CHANGE:  01/21/92 APG               */
*****/

+ TYPE(TEXT) INTENS(LOW) SKIP(ON)
% TYPE(TEXT) INTENS(HIGH) SKIP(ON)
)BODY
%                                DFSORT PRIMARY OPTION MENU
%ENTER SELECTION OR COMMAND ==>_ZCMD
+
+SELECT ONE OF THE FOLLOWING:
+
% 0 +DFSORT PROFILE           - Change DFSORT user profile
% 1 +SORT                     - Perform User Sort Application
% 2 +COPY                      - Perform User Copy Application
% 3 +MERGE                     - Perform User Merge Application
% X +EXIT                     - Terminate DFSORT

          \
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          | Contract with IBM Corp.
          |
          |
          /

+USE%HELP+COMMAND FOR HELP; USE%END+COMMAND TO EXIT.
)INIT

&HHELP = ICEHP001
.HELP = &HHELP
&PNLDESCR = 'Primary Option Menu'
&ZHTOP = &Z
&ZHINDEX = ICEHIX00

&ZPRIM = YES

)PROC

&ZCMDC = TRUNC(&ZCMD, '.')
&NEXTOPT = .TRAIL
&GDRBOPT = '&GDRBPARAM&NEXTOPT'
```

Figure 136 (Part 1 of 2). Sample Panel Definition for the User-Defined Primary Option Menu

```

&ZSEL = TRANS( &ZCMD
              0,'PGM(ICEPPF01) PARM(&GDRBOPT) NEWAPPL(ICEP) NOCHECK PASSLIB'
              1,'PGM(ICEPSA01) PARM(&GDRBPARM.ICEPSORT.) NEWAPPL(ICE1) PASSLIB'
              2,'PGM(ICEPSA01) PARM(&GDRBPARM.ICEPCOPY.) NEWAPPL(ICE2) PASSLIB'
              3,'PGM(ICEPSA01) PARM(&GDRBPARM.ICEPMERG.) NEWAPPL(ICE3) PASSLIB'
              ' ' ' '
              ' ' ' '
              X,'EXIT'
              *,'? ' )
)END

```

Figure 136 (Part 2 of 2). Sample Panel Definition for the User-Defined Primary Option Menu

See the “Menus” section in the *ISPF Dialog Management Guide* for a detailed description of selection panels such as the DFSORT Primary Option Menu.

DFSORT can display screens with a maximum of 24 lines (due to limitations in ISPF/ISMF). So, even if you use terminals that can display larger panels, you should be careful not to increase the number of lines in the)BODY section beyond 24. If the)BODY section is larger than 24 lines, the panel display will fail.

The PARM keyword must have the following format:

```
PARM(&GDRBPARM.<internal profile panel id>.)
```

The <internal profile panel id> must be an eight-character string. It is the name of the internal profile panel definition (IPPD) of the new application. If the name is fewer than eight characters, pad the name with blanks on the right, followed by a period. You can define up to six DFSORT Panels applications. The NEWAPPL keyword in the selection strings must have a value of ICE1, ICE2, ICE3, ICE4, ICE5, or ICE6. Each selection string must have a unique NEWAPPL value—for example, ICE1 can be used in only one selection string.

Customizing the Entry and Control Statements Panels with IPPD

In DFSORT Panels, there are three main applications: sort, merge, and copy. All control statements — whether they are standard DFSORT applications or your own user-defined applications — are built with one of these three main applications, to which the individual control statements are added. These three applications are built from an internal profile panel definition (IPPD), a file of control information that tells DFSORT what is in the application. When a DFSORT Panels’ user selects an application from the DFSORT Primary Option Menu, DFSORT Panels processes the information in the IPPD to display the appropriate Entry Panel and Control Statements Selection panel. The IPPD also controls:

- The number of active pages of the Control Statements Selection panel
- The additional control statements (up to 36) available through the Control Statements Selection panel

Customizing the Entry and Control Statements Panels

It is important to note that, although the Control Statements Selection panel is defined by the IPPD and thus has no displayable panel definition, the panels for each individual control statement have separate, displayable panel definitions.

For your user-defined panels, you may be creating new applications that need new IPPDs, or you may only need to change the current IPPDs to call the new individual panel definitions for new control statements.

A Sample Sort Application IPPD

The regular sort, copy, and merge applications use the ICEPSORT, ICEPCOPY, and ICEPMERG IPPDs, respectively. Figure 137 shows the ICEPSORT IPPD.

```
)ATTR

/*****
/*  PANEL ID:  ICEPSORT                               */
/*  (C) COPYRIGHT IBM CORPORATION 1988                */
*****/

)BODY

)INIT

    &APPLCODE = S

    &CSSPAGES = 1

    &STMCTYPE = R
    &STMVERB = SORT
    &STMCEPM = &Z
    &STMCSCPM = &Z

    &ST01TYPE = R
    &ST01VERB = OPTION
    &ST01DESC = '(Various options)'
    &ST01NMBR = &Z
    &ST01DEPM = &Z
    &ST01SCPM = &Z

    &ST02TYPE = R
    &ST02VERB = INCLUDE
    &ST02DESC = '(Include only selected records)'
    &ST02NMBR = &Z
    &ST02DEPM = &Z
    &ST02SCPM = &Z

    &ST03TYPE = R
    &ST03VERB = OMIT
    &ST03DESC = '(Exclude selected records)'
    &ST03NMBR = &Z
    &ST03DEPM = &Z
    &ST03SCPM = &Z

    &ST04TYPE = R
    &ST04VERB = SUM
    &ST04DESC = '(Summarize/eliminate records with duplicate keys)'
```

Figure 137 (Part 1 of 3). The ICEPSORT IPPD

```

&ST04NMBR = &Z
&ST04DEPM = &Z
&ST04SCPM = &Z
&ST05TYPE = R
&ST05VERB = INREC
&ST05DESC = '(Reformat records before sort)'
&ST05NMBR = &Z
&ST05DEPM = &Z
&ST05SCPM = &Z

&ST06TYPE = R
&ST06VERB = OUTREC
&ST06DESC = '(Reformat records for output)'
&ST06NMBR = &Z
&ST06DEPM = &Z
&ST06SCPM = &Z

&ST07TYPE = R
&ST07VERB = ALTSEQ
&ST07DESC = '(Changes to standard collating sequence)'
&ST07NMBR = &Z
&ST07DEPM = &Z
&ST07SCPM = &Z

&ST08TYPE = R
&ST08VERB = MODS
&ST08DESC = '(User exits)'
&ST08NMBR = &Z
&ST08DEPM = &Z
&ST08SCPM = &Z

&ST09TYPE = R
&ST09VERB = RECORD
&ST09DESC = '(Unavailable input format/length information)'
&ST09NMBR = &Z
&ST09DEPM = &Z
&ST09SCPM = &Z

&ST10TYPE = R
&ST10VERB = DEBUG
&ST10DESC = '(Various debugging options)'
&ST10NMBR = &Z
&ST10DEPM = &Z
&ST10SCPM = &Z

&ST11TYPE = R
&ST11VERB = FREEFORM
&ST11DESC = '(Free form entry of statements)'
&ST11NMBR = &Z
&ST11DEPM = &Z
&ST11SCPM = &Z

&ST12TYPE = N
&ST12VERB = &Z
&ST12DESC = &Z

```

Figure 137 (Part 2 of 3). The ICEPSORT IPPD

```
.  
. .  
. .  
&ST12NMBR = &Z  
&ST12DEPM = &Z  
&ST12SCPM = &Z  
&ST36TYPE = N  
&ST36VERB = &Z  
&ST36DESC = &Z  
&ST36NMBR = &Z  
&ST36DEPM = &Z  
&ST36SCPM = &Z  
  
)END
```

Figure 137 (Part 3 of 3). The ICEPSORT IPPD

The &APPLCODE and &CSSPAGES Variables

The **&APPLCODE** variable contains a one-character code defining the type of application (sort, copy, or merge). Use one of the following codes:

- S** Sort application (regular or user-defined)
- C** Copy application (regular or user-defined)
- M** Merge application (regular or user-defined)

These codes are required for both regular and user-defined applications. The default for **&APPLCODE** is S for sort applications.

The **&CSSPAGES** variable indicates the number of pages of the Control Statements Selection panel you will see for your application. **&CSSPAGES** can be set to 0, 1, 2, or 3. If **&CSSPAGES** is set to zero, the Control Statements Selection panel will not be displayed for the application.

If **&CSSPAGES** is not specified, it defaults to 1. The Control Statements Selection panel and **&CSSPAGES** are further described in “How IPPD Affects Control Statements Selection Panels” on page 157.

The &STxx Variables

In the following descriptions of the variables in the internal profile panel definition, **&STxx** refers to a set of:

- One **&STxxTYPE** variable
- One **&STxxVERB** variable
- One **&STxxDESC** variable
- One **&STxxNMBR** variable
- One **&STxxDEPM** variable
- One **&STxxSCPM** variable

The xx can be MC or any number from 1 to 36. The MC in **&STMCTYPE** indicates that the set of variables define the main control statement. These variables are explained in “How IPPD Information Affects Control Statements” on page 156.

The **&STxxTYPE** variable is a one-character code indicating the type of control statement assigned to the &STxx set. The code must be one of the following:

- R** Regular control statement. The statement is a standard DFSORT control statement (SORT, MERGE, OPTION, INCLUDE, OMIT, SUM, INREC, OUTREC, ALTSEQ, MODS, RECORD, or DEBUG) or represents the General Statement Free Form Entry panel (FREEFORM).
- U** User-defined control statement. The statement is defined by the user and is processed by the Extended Function Support program supplied by the user.
- N** Not defined/unused. When &STxxTYPE is set to N, the area reserved for that &STxx set in the Control Statements Selection Panel will be left blank.

If &STxxTYPE is not specified, &STxxTYPE defaults to N.

The **&STxxVERB** variable contains the verb of the control statement. The valid statement verbs are:

- For regular DFSORT control statements (&STxxTYPE is set to R), &STxxVERB must be one of the following verbs:

SORT	MERGE	OPTION	OPTIONCP	INCLUDE
OMIT	SUM	INREC	OUTREC	ALTSEQ
MODS	RECORD	DEBUG	FREEFORM	

FREEFORM represents the General Statement Free Form Entry panel. SORT, MERGE, and OPTIONCP can be assigned only to &STMCVERB as main control statement verbs, while the other verbs can be assigned only to &STyyTYPE, where yy is 01 to 36.

- For user-defined control statements (&STxxTYPE is set to U), &STxxVERB can be any 1-to-8 character verb that can be used with EFS. You must use EBCDIC characters.

&STxxVERB is ignored (and so, normally set to &Z for null) when &STxxTYPE is set to N.

The **&STxxDESC** variable can contain up to 49 characters of a string briefly describing the purpose/function of the control statement. You can use EBCDIC or double-byte character set (DBCS) characters. The &STxxDESC string is the line of text that will appear on the right-hand side of the Control Statements Selection Panel, across from the control statement verb.

&STxxDESC is ignored (and so, normally set to &Z for null) when &STxxTYPE is set to N.

The **&STxxNMBR** variable applies only to user-defined control statements. It contains a unique number between 1 and 100. This number is used to permanently assign an internal set of one data indicator and one activity indicator (there are 100 such sets) to the user-defined control statement.

The data indicator tells DFSORT Panels if the user-defined statement has sufficient data saved through its data entry panel to code a complete statement for processing by EFS (if applicable). The activity indicator tells DFSORT Panels if the statement is active and controls the YES/NO setting of the ACTIVE column on the Control Statements Selection panel.

Customizing the Entry and Control Statements Panels

The number assigned to **&STxxNMBR** for the specific user-defined statement verb should not be changed if the statement is later switched to another **&STxx** set. For example, suppose you set **&ST05VERB** to the user-defined statement verb 'REPORT' and set **&ST05NMBR** to 34. If you later decide to relocate the 'REPORT' verb to **&ST24VERB**, then **&ST24NMBR** should be set to 34, which is the old **&ST05NMBR** value. **&ST05NMBR** should no longer be set to 34.

&STxxNMBR is ignored (and so, normally set to **&Z** for zero) when **&STxxTYPE** is set to R or N. If **&STxxNMBR** is not specified, it defaults to zero. No two **&STxxNMBR** variables, when used for user-defined control statements, can have the same value. **&STxxNMBR** is not applicable to the main control statement of the application.

The **&STxxDEPM** variable, applicable only to user-defined control statements, contains the ISPF SELECT service parameters necessary to invoke the Data Entry function you wrote to go with your control statement. The string assigned to **&STxxDEPM** can be up to 50 characters long. The string, if non-blank, is passed as a buffer to the ISPF SELECT service when needed.

If **&STxxDEPM** is set to **&Z** or blanks for a user-defined control statement, DFSORT Panels assumes that the user-defined control statement does not require a data entry panel. No ISPF SELECT service call for a data entry routine is attempted in this case. DFSORT Panels simply sets the statement's activity indicator to YES (see **&STxxNMBR** variable description).

&STxxDEPM is ignored (and so, normally set to **&Z** for null) when **&STxxTYPE** is set to R or N. See "Invoking Your Data Entry Routine" on page 161 for further details on **&STxxDEPM**.

The **&STxxSCPM** variable, applicable only to user-defined control statements, contains the ISPF SELECT service parameters necessary to invoke the statement coder function you wrote to go with your control statement. The string assigned to **&STxxSCPM** can be up to 50 characters long. The string, if non-blank, is passed as a buffer to the ISPF SELECT service when needed.

If **&STxxSCPM** is set to **&Z** or blanks for a user-defined control statement, DFSORT Panels automatically codes the control statement using only the control statement verb defined by **&STxxVERB**, and no ISPF SELECT service call for a Statement Coder routine is attempted.

&STxxSCPM is ignored (and so, normally set to **&Z** for null) when **&STxxTYPE** is set to R or N. See "Invoking Your Statement Coder Routine" on page 164 for further details on **&STxxSCPM**.

How IPPD Information Affects Control Statements

The **&STMCTYPE**, **&STMCVERB**, **&STMCDEPM**, and **&STMCSCPM** variables define the main control statement of the application and, if applicable, the associated data entry panel. As mentioned previously, the MC stands for main control.

The data entry panel for the regular SORT control statement is the SORT Statement Data Entry panel, while the regular MERGE control statement uses the MERGE Statement Data Entry panel. For the regular Copy Application, 'OPTIONCP' is assigned to &STMCTYPE, to indicate that the 'OPTION COPY' control statement should be automatically coded if the regular OPTION control statement is not active.

If a user-supplied data entry panel is to replace the regular SORT/MERGE Statement Data Entry panel, &STMCTYPE can be set to 'U' and &STMCTYPE (which can still be SORT or MERGE), &STMCTYPE, and &STMCTYPE can be set to the appropriate values for your application.

For the Copy Application, if the 'OPTION COPY' statement is to be replaced by a user-defined statement, code &STMCTYPE, &STMCTYPE, &STMCTYPE, and &STMCTYPE appropriately for your application.

If *no* main control statement is to be provided, set &STMCTYPE to 'N'. For sort/merge applications, the SORT/MERGE Statement Free Form Entry panel will still be accessible, but the SORT/MERGE Statement Data Entry panel will not be displayed.

How IPPD Affects Control Statements Selection Panels

The main statement selection panel for both regular DFSORT control statements and user-defined control statements is the Control Statements Selection panel, whose three pages allow for up to 36 (regular or user-defined) control statements. You define and activate these three pages through the internal profile panel definition (IPPD).

For regular sort, copy, and merge applications, only the first page of the selection panel is active, and no user-defined control statements are present.

For user-defined applications, up to three pages of the Control Statements Selection panel can be activated, depending on what setting you choose for the &CSSPAGES variable in the IPPD. The Control Statements Selection panel is created and displayed based on the settings in the internal profile panel definition. The formats of these three pages are shown by the following three figures.

Page 1 of the Control Statements Selection panel (ICEDACS1), as shown in Figure 138 on page 158, is displayed for the user only when the &CSSPAGES variable in the IPPD is set to 1, 2, or 3.

Customizing the Entry and Control Statements Panels

```
CONTROL STATEMENTS SELECTION (<appl.>) <Page 1 of n>
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS:
( Y Use statement, N Do not use statement, B Browse statement)

STATEMENT      ACTIVE
<verb01> ===>  <NO/YES> <description01>
<verb02> ===>  <NO/YES> <description02>
<verb03> ===>  <NO/YES> <description03>
<verb04> ===>  <NO/YES> <description04>
<verb05> ===>  <NO/YES> <description05>
<verb06> ===>  <NO/YES> <description06>
<verb07> ===>  <NO/YES> <description07>
<verb08> ===>  <NO/YES> <description08>
<verb09> ===>  <NO/YES> <description09>
<verb10> ===>  <NO/YES> <description10>
<verb11> ===>  <NO/YES> <description11>
<verb12> ===>  <NO/YES> <description12>

<USE DOWN COMMAND FOR ADDITIONAL STATEMENTS.>

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.
```

Figure 138. (ICEDACS1) Control Statements Selection Panel, Page 1

The statement 1 verb <verb01> is defined by the &ST01VERB variable in the IPPD for the application, <description01> is defined by &ST01DESC, <verb02> by &ST02VERB, <description02> by &ST02DESC, and so on.

Statements 1 to 12 defined in the IPPD appear on Page 1 of the Control Statements Selection Panel. Statements 13 to 24 appear on page 2, and statements 25 to 36 are assigned to page 3.

Each statement line

```
<verbxx> ===> <NO/YES> <descriptionxx>
```

is displayed only when the corresponding &STxxTYPE variable in the IPPD is set to 'R' for regular DFSORT control statement, or 'U' for user-defined control statement. If &STxxTYPE is set to 'N' for not-defined, or is not specified, the statement line does not appear and has no input fields.

The <appl.> in the title line is SORT, COPY, or MERGE, depending on the application in effect.

If &CSSPAGES is set to 1, 'Page 1 of n' and 'USE DOWN COMMAND FOR ADDITIONAL STATEMENTS' do not appear.

If &CSSPAGES is set to 2 or 3, 'Page 1 of n' (where n is the &CSSPAGES value of 2 or 3) and 'USE DOWN COMMAND FOR ADDITIONAL STATEMENTS' do appear.

Page 2 of the Control Statements Selection panel (ICEDACS2), as shown in Figure 139 on page 159, is displayed for the user only if &CSSPAGES is set to 2 or 3. This page shows statements 13 to 24 as defined in the IPPD.

```

CONTROL STATEMENTS SELECTION (<app1.>)           Page 2 of <n>
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS:
( Y Use statement, N Do not use statement, B Browse statement)

STATEMENT          ACTIVE
<verb13> ===>     <NO/YES> <description13>
<verb14> ===>     <NO/YES> <description14>
<verb15> ===>     <NO/YES> <description15>
<verb16> ===>     <NO/YES> <description16>
<verb17> ===>     <NO/YES> <description17>
<verb18> ===>     <NO/YES> <description18>
<verb19> ===>     <NO/YES> <description19>
<verb20> ===>     <NO/YES> <description20>
<verb21> ===>     <NO/YES> <description21>
<verb22> ===>     <NO/YES> <description22>
<verb23> ===>     <NO/YES> <description23>
<verb24> ===>     <NO/YES> <description24>

USE <UP/DOWN> COMMAND FOR ADDITIONAL STATEMENTS.

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 139. (ICEDACS2) The Control Statements Selection Panel, Page 2

If &CSSPAGES is set to 2, the <n> in 'Page 2 of <n>' is set to 2, and 'USE UP COMMAND FOR ADDITIONAL STATEMENTS.' appears. If &CSSPAGES is set to 3, the <n> in 'Page 2 of <n>' is set to 3, and 'USE UP/DOWN COMMAND FOR ADDITIONAL STATEMENTS.' appears.

Page 3 of the Control Statements Selection panel (ICEDACS3), as shown in Figure 140 on page 160, is displayed for the user only if &CSSPAGES is set to 3. Statements 25 to 36 as defined in the IPPD appear here.

```

CONTROL STATEMENTS SELECTION (<app1.>)                                Page 3 of 3
COMMAND ===>

OPTIONALLY SPECIFY SELECT CODE ON ONE OR MORE STATEMENTS:
( Y Use statement, N Do not use statement, B Browse statement)

STATEMENT          ACTIVE
<verb25> ===>     <NO/YES> <description25>
<verb26> ===>     <NO/YES> <description26>
<verb27> ===>     <NO/YES> <description27>
<verb28> ===>     <NO/YES> <description28>
<verb29> ===>     <NO/YES> <description29>
<verb30> ===>     <NO/YES> <description30>
<verb31> ===>     <NO/YES> <description31>
<verb32> ===>     <NO/YES> <description32>
<verb33> ===>     <NO/YES> <description33>
<verb34> ===>     <NO/YES> <description34>
<verb35> ===>     <NO/YES> <description35>
<verb36> ===>     <NO/YES> <description36>

USE UP COMMAND FOR ADDITIONAL STATEMENTS.

USE ENTER TO CONTINUE;
USE HELP COMMAND FOR HELP; USE END COMMAND TO EXIT.

```

Figure 140. (ICEDACS3) The Control Statements Selection Panel, Page 3

Customizing Control Fields Entry Panels with Data Entry Routines

If a special data entry panel is needed for a user-defined control statement, then you must also supply a data entry routine. The routine must be a valid ISPF function, which you can code either as a CLIST command procedure or write in a programming language supported by ISPF, such as PL/I, COBOL, FORTRAN, or Pascal. The function must do the following:

1. Display (using ISPF services) the panels needed to collect sufficient data for the control statement, such that a complete statement can be coded for processing by DFSORT. The function (along with the associated panel definitions) is responsible for doing any necessary verification of values, panel command execution, and other necessary panel processing.
2. Retrieve from or save in the application profile pool the data collected through the panels. The retrieve is done before the display of these panels, and the save is done after the user exits from the display.

A data entry routine is *not* required in the special case of permanently fixed control statements with no varying parameters, because permanently fixed control statements do not require a special data entry panel. An example of a fixed control statement is a control statement that can be coded using only its verb (such as the DFSORT END statement, which is not regularly supplied by DFSORT Panels).

See *ISPF Dialog Management Guide* for a complete description of a valid ISPF function.

Invoking Your Data Entry Routine

The user-supplied data entry routine is invoked when appropriate by DFSORT Panels using the ISPF SELECT service, so the SELECT service parameters for the data entry routine must be defined to DFSORT Panels.

You define the SELECT service parameters through the **&STxxDEPM** variables of the IPPD for the user-defined DFSORT Panels application. Up to 50 characters of SELECT service parameters can be assigned to the &STxxDEPM variable associated with the control statement for which the data entry routine is being supplied. See the description of the SELECT service in the *ISPF Dialog Management Guide* for a complete description of valid SELECT service parameters.

The NEWAPPL parameter *must not* be used because the data entry routine cannot be invoked as a new ISPF application. The routine must run in the same application as the DFSORT Panels application. In addition, the PANEL and OPT parameters cannot be used. DFSORT Panels will not validate the &STxxDEPM assignments, and specifying such parameters will cause the User-Defined Panels Interface to work incorrectly.

The NEWPOOL parameter can be used to specify that a new shared variable pool is to be created without specifying a new application.

The value of the &APPLCODE variable in the application profile pool can be retrieved using the VGET service to determine the type of application: S for sort, C for copy, or M for merge.

Examples of &STxxDEPM variable assignments are:

```
&ST05DEPM = 'CMD(%USERDESR) '
&ST07DEPM = 'PGM(USERDEOP) PARM(OPTIONS) '
&ST24DEPM = 'PGM(USERDEAQ) NEWPOOL '
&ST32DEPM = 'CMD(%REPTSTMT) PARM(ENTRY) NEWPOOL '
```

For example, a CLIST procedure named DEREPOR is the user-supplied data entry routine for the user-defined REPORT control statement. This statement is assigned to the &ST13 set of variables in the IPPD. The &ST13 variable assignments could be as follows:

```
&ST13TYPE = U
&ST13VERB = REPORT
&ST13DESC = '(Report control statement) '
&ST13NMBR = 23
&ST13DEPM = 'CMD(%DEREPOR) '
&ST13SCPM = 'CMD(%CDREPOR) '
```

Conventions for Data Entry Panels

Certain conventions and commands are used by the regular data entry panels (such as SORT Statement Data Entry and OPTION Statement Data Entry panels). For simplicity of use, any user-supplied data entry panels should follow the same conventions and commands as the regular data entry panels.

Customizing Control Fields

The commands used by the regular data entry panels selected through the Control Statements Selection panel are as follows:

Command	Description
ENTER key	Used to perform verification of values.
END	Used to save changes in the application profile pool and exit the panel. If verification errors are present, END should be ignored.
CANCEL	Used to exit the panel without saving changes. Any verification errors are ignored.
REINIT	Used to delete all existing values on the panel. Any verification errors are ignored.
UP	Used to scroll to the previous page of a multi-page panel. The command action of the UP command is dynamically specified through the &SCRVERT dialog variable. All user-written data entry panel definitions should have the statement '&SCRVERT=PASSTHRU' in the)INIT section. All table display panels, processed by the TBDISPL service, should have '&SCRVERT=SETVERB'.
DOWN	Used to scroll to the next page of a multi-page panel. The command action of the DOWN command is also dynamically specified through the &SCRVERT dialog variable; see the UP command description above for further details.
PROFILE	Used to invoke the Profile Application. If verification errors are present, PROFILE is ignored.

Basically, for data entry panels entered from the Control Statements Selection panel, **ENTER** should be used to perform verification and redisplay the data entry panel. **END** should be used to perform verification and, if no errors are present, to save the data entry panel values in the application profile pool (using the VPUT service with the PROFILE parameter) and terminate the display of the data entry panel.

The data entry panels for the main control statement of the application, such as the SORT Statement Data Entry panel (ICETSRCF) and the SORT Statement Free Form Entry panel (ICEDSRFF), follow the same conventions as the data entry panels selected through the Control Statements Selection panel. But, **ENTER** has an additional function: when there are no verification errors, then **ENTER** also saves changes and exits the data entry panel, continuing to the next panel.

ENTER has the same effect as the **END** command on the SORT/MERGE Statement Data Entry panel (ICETSRCF) and SORT/MERGE Statement Free Form Entry panels (ICEDSRFF and ICEDMGFF) *only* when **ENTER** is pressed without any further input changes. The user might want to use this convention in the user-supplied data entry panel, particularly if it is scrollable, to help prevent **ENTER** from causing premature exit from the panel.

Executing the PROFILE Command

The user-supplied data entry routine must allow the execution of the **PROFILE** command by including appropriate code to invoke the Profile Application. For data entry routines that are CLIST command procedures, the following code can be used:

```
/* IF PROFILE COMMAND WAS ISSUED, INVOKE PROFILE APPLICATION */

IF &ZCMD = PROFILE THEN DO
  ISPEXEC VGET GDRBPARM PROFILE
  ISPEXEC SELECT PGM(ICEPPF01) PARM(&GDRBPARM) NEWAPPL(ICEP)
END
```

Restrictions for ISPF Variables Used in Data Entry Routines

Any ISPF variables defined by the user-supplied data entry routine and saved in the application profile pool using the VPUT service must start with the letter U, to avoid conflicts with variables used by DFSORT Panels. If the NEWPOOL parameter is *not* specified in the &STxxDEPM variable for the routine, then the U-letter restriction also applies to variables saved in the shared variable pool.

Required Return Codes for Data Entry Routines

The following return codes must be set by the user-supplied data entry routine:

Code	Description
0	END or RETURN was used to exit from the data entry panel, and sufficient data was saved through the data entry panel such that a valid control statement can be coded.
4	END or RETURN was used to exit from the data entry panel, but insufficient data was saved through the data entry panel (this normally means that all panel input fields were blank) such that a valid control statement <i>cannot</i> be coded.
8	CANCEL was used to exit from the data entry panel without saving any changes.

For those main control statement data entry panels that use **ENTER** (as well as **END** and **RETURN**) to save changes and exit from the panel, the following *additional* return codes apply. They are *invalid* for data entry routines selected through the Control Statements Selection panel, but are *required* for the main control statement data entry panels, so that DFSORT Panels goes forward to the next panel or back to the previous panel correctly.

Code	Description
1	ENTER was used to exit from the data entry panel, and sufficient data was saved through the data entry panel such that a valid control statement can be coded.
5	ENTER was used to exit from the data entry panel, but insufficient data was saved through the data entry panel (this normally means that all panel input fields were blank) such that a valid control statement <i>cannot</i> be coded.

Any invalid return code returned by a user-supplied data entry routine causes DFSORT Panels to terminate the user-defined application.

Customizing Individual Control Statements with Statement Coder Routines

Normally, you must supply a statement coder routine for each user-defined control statement. The routine must be a valid ISPF function, which you can either code as a CLIST command procedure or write in a programming language supported by ISPF, such as PL/I, COBOL, FORTRAN, or Pascal. The function must do the following:

1. Retrieve (using ISPF services) the control statement data from the application profile pool.
2. Code the control statement and save the control statement in the existing temporary ISPF table, 'STMTTABL', provided the data is sufficient to build a valid control statement.

In the special case of fixed control statements with no varying parameters, which do not require a data entry routine, the sole function of the statement coder routine is to save the complete fixed control statement in the 'STMTTABL' table. However, if the complete control statement consists only of the statement verb, then the statement coder routine is not required and DFSORT Panels automatically codes the statement using the verb.

See *ISPF Dialog Management Guide* for a complete description of a valid ISPF function.

Invoking Your Statement Coder Routine

The user-supplied statement coder routine is invoked, when appropriate, by DFSORT Panels using the ISPF SELECT service. To use the ISPF SELECT Service, the SELECT service parameters for the statement coder routine must be defined to DFSORT Panels.

You define the SELECT service parameters through the **&STxxSCPM** variables of the IPPD. Up to 50 characters of SELECT service parameters can be assigned to the &STxxSCPM variable associated with the control statement for which the statement coder routine is being supplied. See the description of the SELECT service in the *ISPF Dialog Management Guide* for a complete description of valid SELECT service parameters.

The NEWAPPL parameter *must not* be used because the statement coder routine cannot be invoked as a new ISPF application. The routine must run in the same application as the DFSORT Panels application. In addition, the PANEL and OPT parameters cannot be used. DFSORT Panels will not, however, validate the &STxxSCPM assignments. Specifying such parameters will cause the User-Defined Panels Interface not to work properly.

The NEWPOOL parameter can be used to specify that a new shared variable pool is to be created without specifying a new application.

The value of the &APPLCODE variable in the application profile pool can be retrieved using the VGET service to determine the type of application: S for sort, C for copy, or M for merge.

Examples of &STxxSCPM variable assignments are:

```
&ST05SCPM = 'CMD(%USERCDSR) '
&ST07SCPM = 'PGM(USERCDOP) PARM(OPTIONS) '
&ST24SCPM = 'PGM(USERCDAQ) NEWPOOL '
&ST32SCPM = 'CMD(%REPTSTMT) PARM(CODE) NEWPOOL '
```

For example, a CLIST procedure named CDREPORT is the user-supplied statement coder routine for the user-defined REPORT control statement. This statement is assigned to the &ST13 set of variables in the internal profile panel definition. The &ST13 variable assignments could be as follows:

```
&ST13TYPE = U
&ST13VERB = REPORT
&ST13DESC = '(Report control statement) '
&ST13NMBR = 23
&ST13DEPM = 'CMD(%DEREPORT) '
&ST13SCPM = 'CMD(%CDREPORT) '
```

Conventions for Statement Coder Routines

The user-supplied statement coder routines must code the control statements according to the DFSORT control statement general coding rules described in the *DFSORT Application Programming Guide*.

Using the ISPF TBADD service, each 80-character line of each coded statement is added to the 'STMTTABL' ISPF table (which is opened and initialized by DFSORT Panels) through the 'CODELINE' variable.

CODELINE is an 80-character variable (defined to ISPF by DFSORT Panels) which the statement coder routine can use to build each line of the control statement. The routine can then invoke the TBADD service to add each completed CODELINE line to STMTTABL.

Statement coder routines that are program modules must first use the ISPF VDEFINE service to establish addressability to the ISPF CODELINE parameter by using the following statement:

```
CALL ISPLINK ('VDEFINE', 'CODELINE', CODELINE, 'CHAR', 80);
```

The ISPF VDELETE service must be used to release CODELINE after the statement coder routine completes its coding of the control statement.

Restrictions for ISPF Variables Used in Statement Coder Routines

Any ISPF variables defined by the user-supplied statement coder routine and saved in the application profile pool using the VPUT service must start with the letter U, to avoid conflicts with variables used by DFSORT Panels. If the NEWPOOL parameter is *not* specified in the &STxxSCPM variable for the routine, then the U-letter restriction also applies to variables saved in the shared variable pool.

Required Return Code for Statement Coder Routines

All user-supplied statement coder routines must specifically set a return code of zero. Any non-zero return code can be an indication of routine failure and will cause DFSORT Panels to terminate the user-defined application.

How Are Control Statements Generated?

When the Review Control Statements panel step is entered, even if the Review Control Statements panel is not displayed, all active control statements are generated and saved in a temporary ISPF table in preparation for entry to the foreground execution facility or the submit facility. The following sections describe the order in which each individual control statement is generated for each application (the same order in which they appear in the completed job).

Sort Applications

For a sort application, the active control statements are ordered as follows:

1. Any statements entered on the General Statement Free Form Entry panel, if the regular FREEFORM statement is active on the Control Statements Selection panel.
2. The main control statement of the application or, if free form entry of the SORT statement was requested, the statements on the SORT Statement Free Form Entry panel.
3. All remaining active control statements selected through the Control Statements Selection panel, in the order in which they appear on the Control Statements Selection panel. This step does not include the regular FREEFORM statement, which, if active, is generated in step 1.

Copy Applications

For a copy application, the active control statements are ordered as follows:

1. The statements entered on the General Statement Free Form Entry panel, if the regular FREEFORM statement is active on the Control Statements Selection panel.
2. The main control statement of the application. If the main control statement is the regular OPTIONCP statement (which generates 'OPTION COPY') and the regular OPTION statement is active on the Control Statements Selection panel, then the selected OPTION keywords accompany the COPY keyword.
3. All remaining active control statements selected through the Control Statements Selection panel, in the order in which they appear on the Control Statements Selection panel. This step does not include the regular FREEFORM statement, which, if active, is generated in step 1.

Merge Applications

For a merge application, the active control statements are ordered as follows:

1. Any statements entered on the General Statement Free Form Entry panel, if the regular FREEFORM statement is active on the Control Statements Selection panel.
2. The main control statement of the application or, if free form entry of the MERGE statement was requested, the statements on the MERGE Statement Free Form Entry panel.
3. All remaining active control statements selected through the Control Statements Selection panel, in the order in which they appear on the Control Statements Selection panel. This step does not include the regular FREEFORM statement, which, if active, is generated in step 1.

A Sample Customized DFSORT Application

A set of sample files is shipped with DFSORT to help you set up a sample user-defined DFSORT Panels application and to assist you in defining your own DFSORT Panels application with the User-Defined Panels Interface. The sample files consist of four panel definitions and seven CLIST command procedures.

The sample panel definitions are:

ICEUSORT	Internal profile panel definition for sample user-defined sort application
ICEUSRTP	Data entry panel for sample user-defined SORT control statement
ICEUICLP	Data entry panel for sample user-defined INCLUDE control statement
ICEURPTP	Data entry panel for sample user-defined REPORT control statement.

The sample CLIST command procedures are:

ICEUSRTD	Sample data entry routine for user-defined SORT statement
ICEUSRTC	Sample statement coder routine for user-defined SORT statement
ICEUICLD	Sample data entry routine for user-defined INCLUDE statement
ICEUICLC	Sample statement coder routine for user-defined INCLUDE statement
ICEUDBGC	Sample statement coder routine for user-defined DEBUG statement
ICEURPTD	Sample data entry routine for user-defined REPORT statement
ICEURPTC	Sample statement coder routine for user-defined REPORT statement.

To activate the sample user-defined sort application, you must modify the DFSORT Primary Option Menu to add a selection string containing the 'ICEUSORT' internal profile panel definition name (see "Customizing the DFSORT Primary Option Menu" on page 149).

Sample Sort Application

The ICEUSORT internal profile panel definition defines a user-defined sort application, with the regular OPTION, OMIT, FREEFORM, SUM, INREC, OUTREC, and ALTSEQ control statements and the user-defined SORT, INCLUDE, REPORT, DEBUG, and END control statements. The regular RECORD and MODS control statements are not used by the user sort application.

Data entry and statement coder routines are supplied by the user for the SORT, INCLUDE, and REPORT control statements. The END control statement is a verb-only control statement, requiring no data entry or statement coder routines. DFSORT Panels automatically codes verb-only statements, when appropriate, using only their verbs.

Sample Customized Application

The only valid syntax for the user-defined DEBUG statement is 'DEBUG BSAM'. This means that DEBUG does not require a data entry routine, but it does require a statement coder routine to code the 'DEBUG BSAM' statement. (Note that while the regular DEBUG Statement Data Entry panel is available, the user-defined DEBUG BSAM statement is presented here strictly as an example of a fixed control statement with no varying parameters.)

The SORT control statement is the main control statement of the user sort application. The OPTION, INCLUDE, OMIT, and FREEFORM statements appear on Page 1 of the Control Statements Selection panel. The REPORT, SUM, INREC, and OUTREC statements appear on Page 2 of the selection panel, while ALTSEQ, DEBUG, and END appear on Page 3.

The syntax of the user-defined SORT control statement, with user-defined collating types <format>, is:

```
SORT FIELDS=(<position>,<length>,<format>,<order>)
```

The syntax of the user-defined INCLUDE control statement, with user-defined data types <format 1> and <format 2>, is:

```
INCLUDE COND=(<position 1>,<length 1>,<format 1>,<comparison>,  
             <position 2>,<length 2>,<format 2>)
```

The syntax of the user-defined REPORT control statement is:

```
REPORT <PAGES=n>  
      <,>FORMAT=<NEW|REP|GML>>  
      <,>HEADER|,NOHEADER>
```

You still need to supply an Extended Function Support (EFS) program to process the SORT statement with user-defined collating types, the INCLUDE statement with user-defined data types, and the REPORT statement.

The following steps allow the invocation of your EFS program with the DFSORT program through the DFSORT Panels.

- For foreground execution, the foreground execution CLIST command procedure that invokes the DFSORT Program (ICEQFG04) should be modified to add the PARM EFS=programname parameter to the DFSORT Program call statement.
- For background execution, users should update the DFSORT Execute Statement Entry panel, either in the Profile Application or in the Submit Facility, to include the PARM EFS=programname parameter on the EXEC statement.

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Readers' Comments

DFSORT

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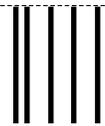
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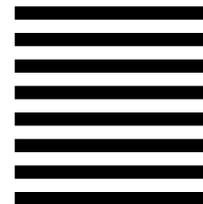
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