Application System/400™

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Application Development Tools: Data File Utility User's Guide and Reference

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Application Development Tools: Data File Utility User's Guide and Reference

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This major revision obsoletes SC09-1169-00.

Changes are periodically made to the information herein; any such changes will be reported in subsequent revisions. Changes or additions to the text and illustrations are indicated by a vertical line to the left of the change or addition.

This edition applies to Release 2 of IBM Application System/400™ Data File Utility, which is part of the Application Development Tools (licensed program 5728-PW1), and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Manual

Use the Data File Utility (DFU), which is part of the Application Development Tools (ADT) package, to create programs to maintain data files. This manual describes the purpose of DFU and presents the following DFU procedures:

- How to use DFU to create, change, run, or delete DFU programs
- How to design a DFU program
- How to run a DFU program to maintain data files

This manual contains exercises and reference material to help you learn to use DFU on the Application System/400 (AS/400)™ system. Only the most commonly used options and function keys are explained in the examples. You can find explanations about the options, function keys, commands, and messages in Chapter 1, "Introducing DFU."

Note: This manual contains examples to help you do common tasks. The information shown on the displays in the examples may differ from the ones you see because the names you give libraries, objects, files, and members may be different. Although the text you are asked to type in the examples is shown in uppercase, you can type it in uppercase, lowercase, or mixed case.

This manual may refer to products that are announced, but are not yet available.

Who Should Use This Manual

This manual is intended for application programmers, system programmers, and work station users who use DFU in an AS/400 environment.

What You Should Know

To use this manual effectively, you must know how to use your work station, how to understand and use messages, and have a general knowledge of the AS/400 system. If you are not familiar with your work station, you should refer to the specific guide for your work station. If you are not sure how to handle messages, refer to "How to Use Online Information" on page 1-7. If you are new to the AS/400 system and have no knowledge of how it works, refer to the *Operator's Guide*.

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How This Manual Is Organized

Chapter 1 describes when to use DFU, how to use the function keys, and how to use the Start DFU (STRDFU) command.

Chapters 2 through 5 describe creating, changing, running, and deleting a DFU program.

Chapter 6 describes updating data using a temporary program.

The appendixes for this manual describe:

- Additional considerations
- Double-byte character set considerations
- How to use DFU in the System/36 environment
- Service information
- Calculating modulus 10 and modulus 11 self-check digits
- Differences between System/38 DFU, System/36 DFU, and AS/400 DFU

The last part of this manual contains a glossary and an index. Use the glossary to find the meaning of an unfamiliar term. Use the index to look up a topic and find the pages on which the topic is covered.

How This Manual Has Changed

The following changes have been made since the previous edition of this manual:

- New Information
  - On using online education and the online question-and-answer function on the AS/400 system
  - Additional information on DFU use of data base files
  - On the data types that are not supported in AS/400 DFU
  - Additional information on the differences between using DFU on the System/36, on the System/38, and on the AS/400 system
- Changed Information
  - Changes have been made to displays throughout this manual to reflect the upgrade of this release.
- Miscellaneous
  - Minor technical and editorial changes have been made throughout this manual.

Changes since the previous edition of the manual are indicated by a vertical line to the left of the change.

Related Online Information

Various types of online information are available with the AS/400 system, as listed below. For a complete description of how the online information works, refer to "How to Use Online Information" on page 1-7.

- Display help
  - Extended
  - Field
  - Message
- Index Search
- Control Language Commands
- Online Education
- Question-and-Answer Function

Related Printed Information

For more information on using DFU, refer to the IBM AS/400 publications below.

The manuals below are listed with their full title and base order number. When these manuals are referred to in text, a shortened version of the title is used.

- *Application Development Tools: Source Entry Utility User's Guide and Reference*, SC09-1172
- *Communications: Distributed Data Management User's Guide*, SC21-9600
- *Languages: System/36-Compatible RPG II User's Guide and Reference*, SC09-1162
- *Programming: Concepts and Programmer's Guide for the System/36 Environment*, SC21-9663
- *Programming: Control Language Reference*, SBOF-0481
- *Programming: Data Description Specifications Reference*, SC21-9620
- *Programming: Security Concepts and Planning*, SC21-8083
- *Programming: System Reference for the System/36 Environment*, SC21-9662
- *Programming: System Reference Summary*, SC21-8104
- *Query: User's Guide*, SC21-9614
- *System Operations: Operator's Guide*, SC21-8082
- *Utilities: Data File Utility List for the System/36 Environment User's Guide and Reference*, SC09-1222
- *Utilities: Interactive Data Definition Utility User's Guide*, SC21-9657

Contents

Chapter 1. Introducing DFU

The Data File Utility (DFU) is a program generator that helps you create programs to enter data, update files, and make file inquiries. You do not need a programming language to use DFU. You create the program by responding to a series of displays. DFU creates the program based on your answers.

DFU provides you with a quick way of updating a file using a temporary program. You do not have to define a DFU program first. DFU also allows you to create data base maintenance programs faster than you could by using programming languages (for example, RPG).

DFU programs can perform several jobs. For example, a single DFU program can allow you to enter new records into a file, update fields within existing records, or perform file inquiry tasks.

DFU creates data entry programs from definitions based on the descriptions of existing data base files. DFU uses the descriptions to build your program. Once you have defined a program, you can recall and run that program as often as required.

To create or run a program, type the Start DFU (STRDFU) command on a command line and press Enter. DFU shows menus and prompts for all DFU operations.

Note: This manual shows you how to define, change, and run DFU programs by accessing DFU through the STRDFU command. If authorized, however, you can also run existing programs directly by using the CHGDTA or DSPDTA commands, or run a temporary program by using the UPDDTA command.

Creating the Program

To create a DFU program for data entry, you must select the record formats and fields you want to use. You make these selections as you define your program. DFU creates one or more data entry displays based on your selections. For example, if you select to use two record formats, DFU creates two different data entry displays. You can switch between the two formats while you are running your program. A single record format can have more than one display if you select more fields than can fit on a single display.

To help you while you are creating your program, DFU provides the following capabilities:

- Review available data base record formats.
- Review field specifications for a record.
- Review definition status.
- Show help text to explain the fields in a definition display.

DFU also allows you to print a summary of the defined program that shows all your selected fields and record formats.

Running the Program

While running a DFU program, you can:

- Change, delete, or display a record in a file by identifying the key field of a record in an **indexed** file and pressing Enter, or by identifying the relative record number of a record in a **nonindexed** file and pressing Enter.
- Add new records to a file by typing data into the displayed fields.
- Change or view records in a file by typing an approximate key value and then using the page keys to locate the desired record.
- Select new record formats, or types if the file was RPG-defined.
- Retrieve the next or previous record for any record format or type.
- Automatically duplicate one or more fields. This is useful when a data file contains a field that is the same in each record, and you do not want to retype the field each time.
- Print the program-specified fields of the current data base record when in Display mode.
- Show the status of the DFU program that is running.
- Present the total number of additions, deletions, and changes processed during the current DFU session.
- Print an audit report listing the changes made to a data file.
- Automatically generate key values or Relative Record Numbers (RRN).
- Accumulate the sum of additions and subtractions in a specific field in a record.

When to Use a Programming Language

If a programming language, such as RPG or COBOL, is available at your location, decide whether you can create and update your data entry program more efficiently with DFU or with the programming language.

Use a programming language if your data entry application requires any of the following capabilities:

- Computations on selected fields
- Data checking based on information contained elsewhere in a data base file, such as checking for the existence of a part number elsewhere in the file
- Validation of the relationship between multiple field entries
- Complex formatting requirements

Describing the File

DFU programs can operate on RPG II, Data Description Specifications (DDS), and Interactive Data Definition Utility (IDDU)-described data files. Use DFU to define data entry displays based on the data descriptions of these files.

Usually, data attributes of a file (such as the names and lengths of records and fields) are specified in application programs themselves. In RPG, this is done in input or output specifications. This method of describing data is called **program-described data**. Data attributes can also be defined externally through DDS or IDDU. These definitions are not in the application programs themselves but in file descriptions independent of the program. This is called **externally described data**.

RPG II-Described Files

DFU determines what a file looks like based on file descriptions. In a program-described file, you provide the file description on two RPG II specifications: the F specification and the I specification. DFU uses F and I specifications in a complete RPG II program but ignores the other specifications. The use of RPG II-described data files by DFU programs is allowed only within the System/36 environment. See Appendix C, "Using DFU in the System/36 Environment," for more information on using RPG II file descriptions.

DDS-Described Files

Data description specifications (DDS) provide a method of describing data files externally rather than within a program. External file descriptions are associated with the data files themselves. You do not have to specify the location of the description for DFU. A sample DDS file description is shown in Figure 2-4 on page 2-5. For more information on DDS described files, see the *DDS Reference*.

IDDU-Described Files

IDDU is an interactive data definition utility that is part of the Operating System/400 (OS/400)™. IDDU provides you with another method for describing the files and data stored on your system. IDDU file descriptions are linked to your file in a similar manner to DDS file descriptions. A sample IDDU file definition is shown in Figure 2-36 on page 2-43. For more information on IDDU described files, see the *IDDU User's Guide*.

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DFU Function Keys

Use function keys to request various DFU functions. DFU functions have different assignments depending on whether you are defining or running a DFU program.

Note: If you define your program as a System/36-style program, you must use the System/36 function keys shown in "System/36 Style Run-Time Function Keys" on page C-3 when you run that program.

Definition Function Keys

Definition function keys allow you to perform functions required while you define a DFU program. These keys are described in Figure 1-1.

Note: Some of the keys shown in Figure 1-1 are functional only on certain displays.

Figure 1-1 (Page 1 of 2). Definition Function Keys

Work Station Key	Name of Function Key	Description
Enter	Enter	Submits information on the display for processing.
F1	Help	Shows a description of the prompt or field from which you pressed Help. If your cursor is not positioned in a specific area when you press Help, a general description about the display appears.
Page Down (Roll Up)	Page Down (Roll Up)	Moves forward to show additional information for this display.
Page Up (Roll Down)	Page Up (Roll Down)	Moves backward to show additional information for this display.
Print	Print	Prints information currently shown on this display.
Sys Req	System Request	Interrupts the job you are currently working on and shows a menu from which you can do various tasks.
F3	Exit	Takes you to the End Program Definition display if you are either at the General Information display or further into the DFU definition prompting sequence. You may have to press F3 more than once to get to the End Program Definition display. If you press F3, the field values on the current display are not saved.
F4	List/Prompt	Calls the command prompt display for a command typed on the command line, or provides a selection list if the cursor is in a field that supports lists.
F5	Refresh	Discards input and displays the original values again.
F9	Retrieve	Retrieves your last commands entered on the display.

Figure 1-1 (Page 2 of 2). Definition Function Keys

Work Station Key	Name of Function Key	Description
F11	Alternate view	Shows an alternate format for information on the display.
F12	Cancel	Cancels the current task and returns you to the display where the task started. If you press this key after changing any prompts, they are reset to their previous values.
F14	Display definition	Shows the DFU definition defined so far. Any parts of the program not defined are displayed with default values.
F15	Print	Prints a copy of the complete DFU definition.
F17	Fast path	Completes the DFU definition for the current record format with default values.
F20	Renumber	Renumbers the sequence numbers that are already correctly entered. F20 changes the numbering to use an increment of 10, but the order of fields is not changed. (This is done to make room for insertions.)
F21	Select all	Selects all record formats, types, or fields (depending on the display you are using).

Run-Time Function Keys

Run-time function keys allow you to perform functions while running your DFU program. These keys are described in Figure 1-2.

Note: While you are running a program, there are more function keys available than can be shown on one display. Therefore, only the function keys you use most often are shown. To see definitions for all available function keys, move your cursor to either one of the function key lines at the bottom of your display and press Help. Detailed definitions of the function keys appear in numerical order.

Figure 1-2 (Page 1 of 3). Run-Time Function Keys

Work Station Key	Name of Function Key	Description
Enter	Enter	Submits information on the display for processing.
F1	Help	Shows a description of the prompt or field from which you pressed Help. If your cursor is not positioned in a specific area when you press Help, a general description about the display appears.
Page Down (Roll Up)	Page Down (Roll Up)	Moves forward to show additional information for this display.
Page Up (Roll Down)	Page Up (Roll Down)	Moves backward to show additional information for this display.

Figure 1-2 (Page 2 of 3). Run-Time Function Keys

Work Station Key	Name of Function Key	Description
Print	Print	Prints information currently shown on this display.
Sys Req	System Request	Interrupts the job you are currently working on and shows a menu from which you can do various tasks.
F3	Exit	Returns to the End Data Entry display without saving field values for the currently displayed record.
F5	Refresh	Discards input and displays the original values again.
F6	Select record type/format	Allows you to select a type or format for processing from a list of available record types or formats. DFU returns to the data entry display from which this key was pressed. (The list includes only available record formats for DDS-described files or IDDU-described files, or available record types for RPG II-described data files.)
F9	Insert	Changes the mode to Insert, which allows you to insert records anywhere in the file. If the file is processed sequentially, insert mode is identical to entry mode, that is, records are added at the end of the file.
F10	Entry	Changes to Entry mode, which allows you to add new records for the first time.
F11	Change	Changes to Change mode, which allows you to change existing records.
F12	Cancel	Cancels the current task and returns you to the display where the task started. If you press this key after changing any prompts, they are reset to their previous value.
F14	Record advance	Places default values into any unfilled fields in the record and processes the record.
F15	Print record	Prints the record on your defined printer. This function is active only for a display job.
F17	Display and print accumulators	Displays the Display Batch Accumulators display, prints the current accumulator totals, adds the batch accumulators to the total accumulators, and resets them to zero. **Note:** Accumulators are printed (on the audit report) **only** if the audit report is specified and the accumulators are defined during the program definition.

Figure 1-2 (Page 3 of 3). Run-Time Function Keys

Work Station Key	Name of Function Key	Description
F20	Automatic record advance	Switches the automatic record advance on and off. When on, the contents of a display are processed as soon as data is entered into the last field on the display. It is unnecessary to press Enter.
F21	Status	Displays the status of data entry including the current data file, library, format or type, and active functions (mode, automatic duplication, auto record advance).
F22	Automatic duplication	Switches the automatic duplicating function on and off. When on, fields you designated for automatic duplication are filled with values from the previous record. When off, the fields remain blank.
F23	Delete	Deletes the displayed record from the file.

How to Use Online Information

The following online information is available on the AS/400 system. After pressing Help on any menu, you can press Help a second time to see an explanation of how the online information works, including the index search function. You can press either Help or F1 for help.

Help for Displays

You can press Help on any display to see information about the display. There are two types of help available:

Field
Extended

Field help explains the field on which the cursor is positioned when you press Help. For example, it describes the choices available for a prompt. If a system message appears at the bottom of the display, position the cursor on the message and press Help to see information about the cause of the message and the appropriate action to take.

Extended help explains the purpose of the display. Extended help appears if you press Help when the cursor is outside the areas for which field help is available.

To exit the online information, press F3 (Exit). You return to the display on which you pressed Help.

Index Search

Index search allows you to specify words or phrases that identify the information that you want to see. To use index search, press Help, then press F11 (Search index). You can also use index search by entering the Start Index Search (STRIDXSCH) command on any command line or by selecting option 2 on the User Support menu.

Help for Control Language Commands

To see prompts for parameters for a control language command, type the command, then press F4 (Prompt) instead of the Enter key. To see extended help for the command, type the command and press Help.

Online Education

AS/400 online education provides training on a wide variety of topics. To use the online education, press F13 (User support) on any system menu to show the User Support menu. Then select the option to use online education.

Question-and-Answer Function

The question-and-answer (Q & A) function provides answers to questions you may have about using the AS/400 system. To use the Q & A function, press F13 (User support) on any system menu to show the User Support menu. Then select the option to use the question-and-answer function. You can also use the question-and-answer function by entering the Start Question and Answer (STRQST) command on any command line.

Starting the Data File Utility

To start DFU, sign on at a work station by responding to the sign-on prompt. The display you see after entering your password depends on your authorization for the work station and on the data processing procedures available for your computer system. You can request DFU from the Command Entry display by typing the command for the AS/400 Data File Utility (DFU) menu (STRDFU) or by typing a command with parameters on the command line to access a specific DFU function.

DFU Commands

DFU supports the following five commands:

Command	Description
STRDFU	Start the Data File Utility.
CHGDTA	Change records in an existing data file.
DSPDTA	Display records from an existing data file.
UPDDTA	Create and run a temporary AS/400 DFU program to update an existing data file.
DLTDFUPGM	Delete an AS/400 DFU program.

STRDFU (Start DFU) Command

Use the Start DFU (STRDFU) command to request the AS/400 Data File Utility (DFU) menu. To use the STRDFU command, you must have user authority to the command. You can specify a single option, or an option plus a suboption, to show a specific DFU prompt. For example, the Display a Data File display appears when you type the following command, selecting option 1 (Run a DFU program) plus suboption 2 (Display a data file):

```
STRDFU (1 2)
```

If you do not specify any options, the AS/400 Data File Utility (DFU) menu appears.

Additional commands you can use to access specific DFU functions are described in "DFU Commands" on page 1-8.

AS/400 Data File Utility (DFU) Menu

The AS/400 Data File Utility (DFU) menu appears when you type the STRDFU command without parameters and press Enter. From this menu, you can select options to run, create, change, or delete a DFU program, or to run a temporary program, as shown in Figure 1-3. DFU presents a sequence of displays for the option you select.

```
                        AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program









Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 1-3. AS/400 Data File Utility (DFU) Menu

DFU Options

The following options are available on the AS/400 Data File Utility (DFU) menu:

1. *Run a DFU program.* This option begins a prompting sequence through which you can select and run an existing DFU program. See Chapter 4, "Running a DFU Program," for a description and example of this option.
2. *Create a DFU program.* This option begins a prompting sequence through which you can define a new DFU program. See Chapter 2, "Creating a DFU Program," for a description and example of this option.
3. *Change a DFU program.* This option begins a prompting sequence through which you can change an existing DFU program. See Chapter 3, "Changing a DFU Program," for a description and example of this option.
4. *Delete a DFU program.* This option begins a prompting sequence through which you can delete an existing DFU program. See Chapter 5, "Deleting a DFU Program," for a description and example of this option.
5. *Update data using temporary program.* This option begins a prompting sequence through which you can quickly change or add data to a file without having to predefine a DFU program. See Chapter 6, "Updating Data Using a Temporary Program," for a description and example of this option.

Distributed Data Management Support

Distributed Data Management (DDM) accesses data files that reside on remote IBM systems, allowing you to retrieve, add, update, or delete records in a file on another system. In addition, a remote system can access your system's data base for record retrieval. See the *DDM User's Guide* for a more detailed description of DDM.

DFU supports the AS/400 DDM files on DFU program definition and operation.

Chapter 2. Creating a DFU Program

This chapter shows you how to create a Data File Utility (DFU) program to add and change records in a data file called QINVFILE. The characteristics of the DFU program, and the data entry displays used to access data files, are also described.

This chapter shows examples of how to create a new DFU program for both of the following:

- Indexed data files
- Nonindexed data files

Subsequent chapters show examples of how to change, run, and delete an existing DFU program.

You create DFU programs by specifying formats and fields through the create option of the AS/400 Data File Utility (DFU) menu. Through the change option, you can change an existing program and save the changed version under a different name to create a new program that is similar to an existing one.

Note: The data file used in this example is in a library called MYLIB. MYLIB is a user-defined library. Make sure the library and data file exist before trying the example. You can create the library by using the Create Library (CRTLIB) command. Copy the data files called QINVREC, QSALEREC, and QINVFILE, supplied with the AS/400 DFU, from the QGPL library to MYLIB using the Create Duplicate Object (CRTDUPOBJ) command.

Data Entry Display Example

When you create your DFU program, you can choose either an AS/400 System or a System/36 data entry style from the General Information/Indexed File display. The following example creates a program that uses the AS/400 data entry style. Figure 2-1 on page 2-2 shows the data entry display defined for the sample program in this chapter. The display appears when you run your program.

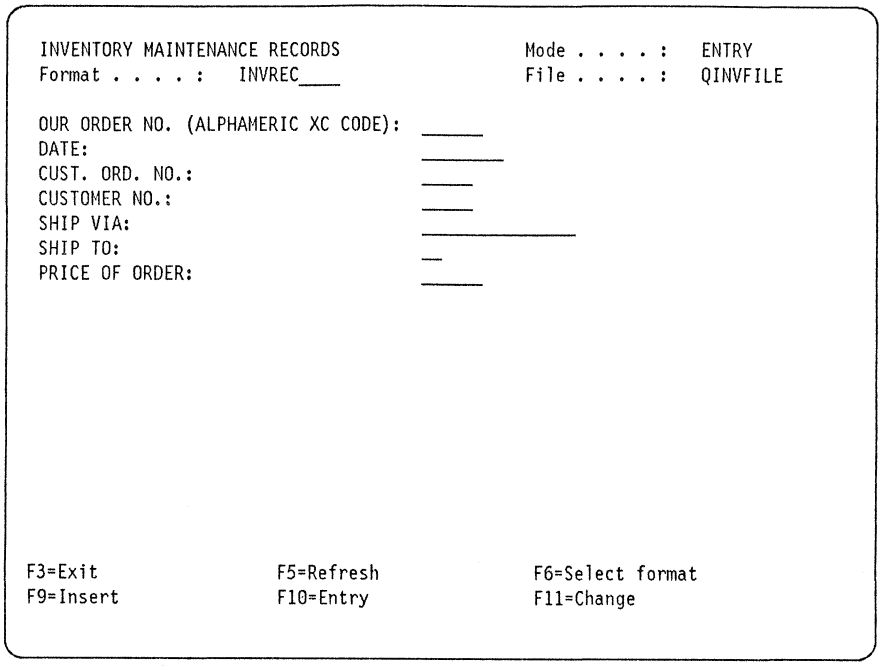


Figure 2-1. AS/400 Data Entry Display

This data entry display is in Entry mode, which is the default mode when you run your program against an empty file member. See Chapter 4, "Running a DFU Program," for additional information about running a DFU program and using the data entry display.

Note: A display style similar to Figure C-3 on page C-5 appears if you have requested a System/36 data entry style on the General Information/Indexed File display.

Procedure for Creating a DFU Program

After you enter the Start DFU (STRDFU) command, DFU shows a menu from which you can select an option to create a DFU program. After your selection, DFU begins a prompting sequence through which you define the program.

You can review program or data file details at any time while you are creating your DFU program. Function keys are provided for this purpose. DFU returns to the definition display when you press F3 (Exit) to finish reviewing the program or data file details.

The rest of this chapter discusses the displays that appear when you create a DFU program. The examples show the entries to type into each display to produce the sample DFU program.

Perform the following steps to start DFU program definition:

1. Sign on to the system.
2. Type STRDFU.

3. Press Enter. The AS/400 Data File Utility (DFU) menu appears as shown in Figure 2-2.

```
                        AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program









Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 2-2. AS/400 Data File Utility (DFU) Menu

4. Type 2 (Create a DFU program) on the command line of the AS/400 Data File Utility (DFU) menu as shown in Figure 2-3.

```
Selection or command
===> 2_____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 2-3. AS/400 Data File Utility (DFU) Menu with Option 2 Specified

5. Press Enter. The Create a DFU Program display appears.
6. Type data into the displays shown for this function as described in this chapter.

Creating a DFU Program for an Indexed Data File

The following example shows how to create a DFU program for an indexed data file that is described by an external DDS file specification. DFU determines whether you have an indexed or a nonindexed data file and presents the appropriate displays for you. You use the same procedure for creating a program for either type of data file. DFU may, however, present an additional display (Select a Field for Record Number) when you create a program for a nonindexed file.

Figure 2-4 on page 2-5 shows the DDS file description of the formats and fields that appear in this example for an indexed data file.

```
                                MEMBER:  QINVFILE

... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8 ... ... 9 ... ... 0

     R INVREC                   PFILE(INVREC)
                                TEXT('INVENTORY MAINTENANCE +
                                RECORDS')
     K ORDER
     R SALESREC                 PFILE(SALESREC)
                                TEXT('SALES RECORDS')
     K ORDER

          *****END OF SOURCE*****

PART 1


                                MEMBER:  QSALEREC

... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8 ... ... 9 ... ... 0

     R SALESREC                 TEXT('SALES RECORDS')
       ORDER          6         COLHDG('OUR ORDER NO.')
       SALEDATE       8         COLHDG('SALES DATE')
       SALESMAN      20         COLHDG('SALES PERSON')
     K ORDER

          *****END OF SOURCE*****

PART 2


                                MEMBER:  QINVREC

... ... 2 ... ... 3 ... ... 4 ... ... 5 ... ... 6 ... ... 7 ... ... 8 ... ... 9 ... ... 0

     R INVREC                   TEXT('INVENTORY MAINTENANCE +
                                RECORDS')
       ORDER          6         COLHDG('OUR ORDER NO.')
       ORDDATE        8         COLHDG('DATE')
       CUSORD         5         COLHDG('CUST. ORD. NO.')
       CUST           5         COLHDG('CUSTOMER NO.')
       SHPVIA        15         COLHDG('SHIP VIA')
       SHPTO          2         COLHDG('SHIP TO')
       PRICE          6         COLHDG('PRICE OF ORDER')
       GOODS         19         COLHDG('MERCHANDISE SHIPPED')

          *****END OF SOURCE*****

PART 3
```

Figure 2-4. DDS File Description Example

Note: This example assumes you are the first user of DFU and shows the default values you would see if values had never been entered. If you, or another user, have used DFU before, the defaults for the prompts might be different.

Create a DFU Program Display

The Create a DFU Program display appears when you select option 2 (Create a DFU program) from the AS/400 Data File Utility (DFU) menu. This display requests the name of the DFU program you want to define and the data file on which the program is to run. Your display appears as in Figure 2-5.

```
                              Create a DFU Program

Type choices, press Enter.

  Program . . . . . .  _________   Name, F4 for List
    Library . . . . .  *CURLIB___  Name, *CURLIB

  Data file . . . . .  _________   Name, F4 for List

    Library . . . . .  *LIBL_____  Name, *LIBL, *CURLIB

F3=Exit      F4=Prompt      F12=Cancel
```

Figure 2-5. Create a DFU Program Display

Example Action: Type INVMTN into the *Program* prompt, and MYLIB over the defaults in both *Library* prompts. Leave the *Data file* prompt blank. Your display appears as in Figure 2-6 on page 2-7.

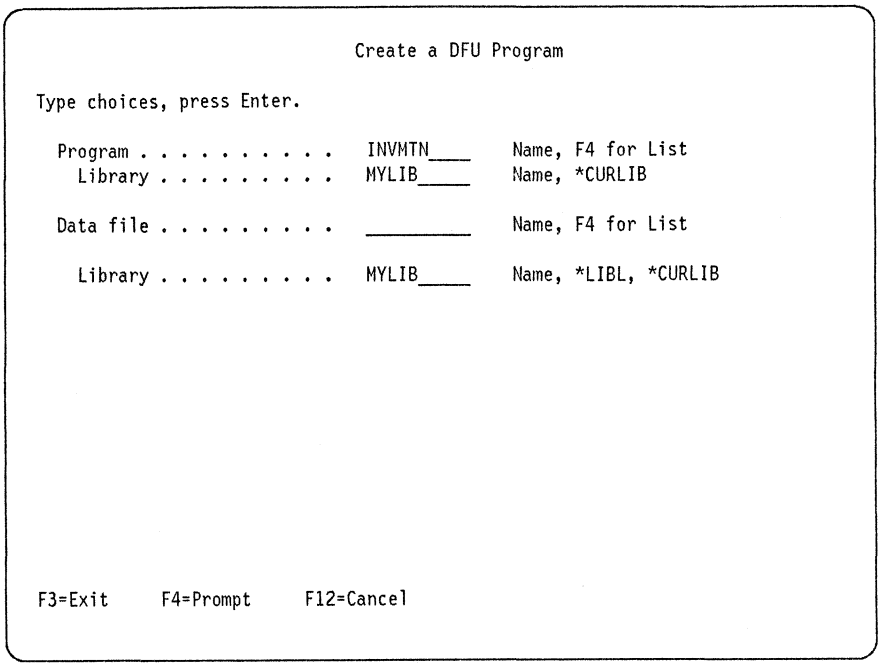


Figure 2-6. Create a DFU Program Display with Example Entries

Description of the information on the Create a DFU Program display is as follows:

Program. The name of the DFU program to be created. The defaults are the following:

- The name you specified in the previous DFU session
- The name specified for the DFUPGM parameter if you used the STRDFU command

To see a list of existing programs, move your cursor to the *Program* prompt and press F4. The program selected in the sample display is the INVMTN program. This program is an inventory maintenance program from which you can add or update inventory records.

Library. The name of the library in which you want to place the DFU program. The defaults are the following:

- The current library (*CURLIB)
- The last name you specified in the previous DFU session
- The library name specified for the DFUPGM parameter if you used the STRDFU command

The library shown for the INVMTN program in the sample display is MYLIB. This is a user-defined library. You can use another library or create a library called MYLIB by using the Create Library (CRTLIB) command from any AS/400 command line.

Data file. The name of the data file your DFU program uses when you run the program. DFU uses the name specified here if you run the DFU program without specifying a data file for the FILE parameter. To see a list of existing data files in the library specified in the *Library* prompt, press F4 while the cursor is in the *Data file* prompt. Select the desired file from the list, if applicable. See "Select File Display" for additional information. The defaults are the following:

- The name you specified in the previous DFU session
- The name you specified for the FILE parameter if you used the STRDFU command

Library. The name of the library containing the desired data file. If you specify *LIBL, your library list is searched for the data file. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library you specified in the previous DFU session
- The library specified for the FILE parameter if you used STRDFU

In the sample display, the library containing the data files of interest is called MYLIB. The DFU program searches for the data file in this library when you run the INVMTN program.

Example Action: Assume you have forgotten the name of the data file you want to use (this is why the *Data file* prompt was left blank). Move your cursor to the *Data file* prompt and press F4 to continue to the Select File display. A list of data files available to you in the MYLIB library appears. You can select the data file you want to use for your DFU program from this list.

Select File Display

The Select File display appears when you press F4 on any *Data file* prompt on a DFU display. For this example, the display appears when you press F4 from the Create a DFU Program display. Your display appears as in Figure 2-7 on page 2-9. DFU displays a list of data files from the specified library. You can then select the file you want to use for your program from the displayed list. DFU returns to the definition display with the selected file when you press Enter.

```
                              Select File

Library . . . . :   MYLIB

Type choice, press Enter.
  Position to . . . . . .  _________

Type option, press Enter.
  1=Select

Opt     File         Type         Description
 _      QINVFILE     LF           Inventory file (DFU example DDS source)
 _      QINVREC      PF-DTA       Inventory records file (DFU example DDS source)
 _      QSALEREC     PF-DTA       Sales Records file (DFU example DDS source)

                                                                        Bottom
F3=Exit       F5=Refresh       F12=Cancel
```

Figure 2-7. Select File Display

Example Action: Type 1 (Select) in the *Opt* column next to the QINVFILE field to select the file for the sample INVMTN program. Your display appears as in Figure 2-8.

```
                              Select File

Library . . . . :   MYLIB

Type choice, press Enter.
  Position to . . . . . .  _________

Type option, press Enter.
  1=Select

Opt     File         Type         Description
 1      QINVFILE     LF           Inventory file (DFU example DDS source)
 _      QINVREC      PF-DTA       Inventory records file (DFU example DDS source)
 _      QSALEREC     PF-DTA       Sales records file (DFU example DDS source)
```

Figure 2-8. Select File Display with QINVFILE Selected

Description of the information on the Select File display is as follows:

Library. The name of the library containing the listed data files.

In the sample display, MYLIB is the library containing the displayed data files.

Position to. The files are shown in alphameric order on this display. To start at a specific position in the list, type the desired character string (for example, the name of a known data file) and press Enter. The list repositions to the file name you specify, or to the nearest alphameric file name preceding your entry. You

can also use the special keywords *TOP and *BOT to reposition the list to the top or bottom respectively. This prompt defaults to blanks.

Opt. Indicates the file you want to select for processing. The *Opt* column defaults to blank. If you want to select a file, type 1 (Select) in the *Opt* column next to the file you want to process. You can select only one file at a time for processing. When you press Enter, DFU places the selected file name into the *Data file* prompt of the Create a DFU Program display.

The *Opt* column on the sample display contains 1 (Select) next to the QINVFILE to select that file for processing.

File. The file names for all files found in the specified library. The list shows only the physical, logical, and Distributed Data Management (DDMF) data files you are authorized to use.

Type. Describes the file type as physical (PF-DTA), logical (LF), or Distributed Data Management (DDMF).

Description. The object description of each file.

Example Action: Press Enter to return to the Create a DFU Program display with the selected file. The selected file, QINVFILE, appears as the designated data file on the Create a DFU Program display in Figure 2-9.

```
                              Create a DFU Program

Type choices, press Enter.

  Program . . . . . .  INVMTN____   Name, F4 for List
    Library . . . . .  MYLIB_____   Name, *CURLIB

  Data file . . . . .  QINVFILE___  Name, F4 for List

    Library . . . . .  MYLIB_____   Name, *LIBL, *CURLIB









F3=Exit     F4=Prompt     F12=Cancel
```

Figure 2-9. Create a DFU Program Display with Data File Specified

Example Action: Press Enter to continue to the General Information/Indexed File display.

Note: If your data file is **nonindexed**, the General Information/Nonindexed File display appears.

General Information/Indexed File Display

The General Information/Indexed File display, as shown in Figure 2-10, appears when you press Enter from the Create a DFU Program display when your data file is indexed. This display allows you to define the format for your data entry display and to choose whether or not to print an audit report.

```
                    General Information/Indexed File

Type choices, press Enter.

  Job title . . . . . .  INVMTN_____________________________
  Display format  . . . . . .  2          1=Single
                                          2=Multiple
                                          3=Maximum
  Audit report  . . . . . .  Y            Y=Yes, N=No
  S/36 style  . . . . . .  N              Y=Yes, N=No
  Suppress errors . . . . . .  N          Y=Yes, N=No
  Edit numerics . . . . . .  N            Y=Yes, N=No

  Generate keys . . . . . .  N            Y=Yes, N=No

F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-10. General Information/Indexed File Display

Example Action: Change the default job title to INVENTORY MAINTENANCE RECORDS by typing over the default entry. Your display appears as in Figure 2-11.

```
                    General Information/Indexed File

Type choices, press Enter.

  Job title . . . . . .  INVENTORY MAINTENANCE RECORDS_____
  Display format  . . . . . .  2          1=Single
                                          2=Multiple
                                          3=Maximum
```

Figure 2-11. General Information/Indexed File Display with Example Entries

Description of the information on the General Information/Indexed File display is as follows:

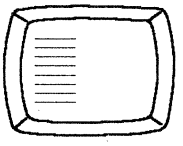
Job title. The name you want to appear on the audit report and data entry display heading for this DFU session. The title can be up to 36 characters long. The default title is the DFU program name.

Note: If you select the System/36 style of data entry, the job title can only be 24 characters long.

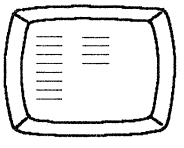
The job title shown in the sample display is INVENTORY MAINTENANCE RECORDS. This title appears on all data entry displays and audit reports for the inventory program.

Display format. Indicates whether you want the data entry display format to be single-column (1), multiple-column (2), or maximum data (3). The default is 2 (multiple-column). If there are more fields than can fit on a single display for a given display format, the remaining fields appear on additional displays. When you run your DFU program, press F12 to move backwards through multiple data entry displays or press Enter to advance. The three possible formats are as follows:

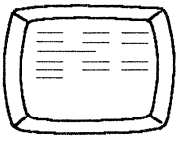
- *1=Single-column format*: All fields are listed in a single column on as many data entry displays as required. The format appears as follows:



- *2=Multiple-column format*: More fields are packed into one data entry display. DFU tries to fit all the fields in a single column. If they do not fit in a single column on one data entry display, DFU arranges the fields in multiple columns as shown below. Additional data entry displays are used if required. DFU uses as few columns as possible, which results in the least number of displays. The format appears as follows:



- *3=Maximum data format*: DFU packs as many fields into each data entry display as can neatly be accommodated. Additional data entry displays are used if required. DFU uses as few columns as possible, which results in the least number of displays. The format appears as follows:



The sample display shows the default value (2) which produces a multiple column data entry display.

Audit report. Indicates whether or not the DFU program should produce an audit report. An audit report is a listing showing all changes made to a file. You specify the type of changes to be listed on the Select Audit Control display. See "Select Audit Control Display" on page 2-14 for additional information. The default is Y (Yes). If you specify Y (Yes), DFU goes to the Select Audit Control display where you can specify the contents of the audit report. If you specify N (No), the Select Record Formats display appears.

The sample display shows the default Y (Yes). This produces an audit report. See "Audit Report" on page 4-20 for a sample listing for this example.

S/36 style. Indicates that the DFU program should use a System/36 display style Y (Yes), or an AS/400 display style N (No) for the data entry displays. The default is N (No). If you type Y (Yes), you see a display that allows you to select other System/36 style DFU functions. For more information, see Appendix C, "Using DFU in the System/36 Environment" on page C-1.

The System/36 display style **does not** show function key descriptions on the bottom of the display. The AS/400 display style **does** show function key descriptions on the bottom of the display. See "DFU Function Keys" on page 1-4 for a list of available AS/400 function keys. If you specify the System/36 style, you must use the System/36 function keys instead of the AS/400 function keys when you run your program. See "System/36 Style Run-Time Function Keys" on page C-3 for a list of System/36 function keys. Also see "Data Entry Display Example" on page 2-1 and "Example System/36 Data Entry Display" on page C-5 for examples of the two display styles.

The sample display shows the default, N (No), to specify the AS/400 display style.

Suppress errors. Indicates whether or not you want DFU to attempt to suppress decimal data errors in a record requested during data entry. If Y (Yes), DFU uses the method described in "Error Suppression" on page A-8 to handle decimal data errors.

The sample display shows the default of N (No). Decimal errors are not suppressed.

Edit numerics. Indicates whether or not numeric fields should appear in numeric format on the Entry, Change, and Display data entry displays. If N (No), numeric entries are **not** edited. Nonedited numeric fields are right-justified and do not have decimal points. If Y (Yes), numeric entries are edited. Edited numeric fields are right-justified, have a decimal point, and do not show leading zeros.

Enter all negative numbers using the Field Minus key on your keyboard for both edited and nonedited numeric fields. Accumulator results, and numeric fields on the audit report, are automatically edited with the J edit code. The J edit code inserts a comma to separate every three digits, inserts a decimal point, and does not show leading zeros.

Note: If you choose to edit numeric fields Y (Yes), you must enter the decimal point as appropriate, otherwise DFU places the decimal point after the last digit in the field. For example, if you type 100 and have defined the field to have 2 decimal places, then DFU assumes you mean 100.00. If you type 100 for a field with 2 decimal places but choose not to edit numerics N (No), DFU assumes you mean 1.00.

The sample display shows the default of N (No). Numeric fields are not edited.

Generate keys. Indicates whether or not DFU should generate keys for the data file. If Y (Yes), DFU generates a key for a new record at the next multiple of 10 after the highest key found in the file. Subsequent keys are increased by units of 10. The default is N (No). The sample display shows the default, N (No). Keys are not automatically generated.

Example Action: Press Enter to continue to the Select Audit Control display. This display appears next for the INVMTN example when you use the default setting of Y (Yes) for the *Audit report* prompt. If you enter N (No) in the *Audit report* prompt, the Select Record Formats display appears next.

Select Audit Control Display

The Select Audit Control display appears if you type Y (Yes) in the *Audit report* prompt of the General Information/Indexed File display. The audit report is a printed list of changes made to a data file when you run your DFU program. This display allows you to define the scope of information you want reported on the listing.

If you type Y (Yes) next to a reportable change on the Select Audit Control display, DFU prints a copy of each changed record for the selected print category (additions, changes, or deletions). If you have accumulator fields, you also receive a printout of accumulator totals on your audit report. If you do not select to print any of the audit control options but have indicated you want an audit report on the General Information/Indexed File display, you receive only a printout of accumulator totals (provided you have defined accumulators).

Example Action: Leave the default values for the sample INVMTN program. Your display appears as in Figure 2-12 on page 2-15.

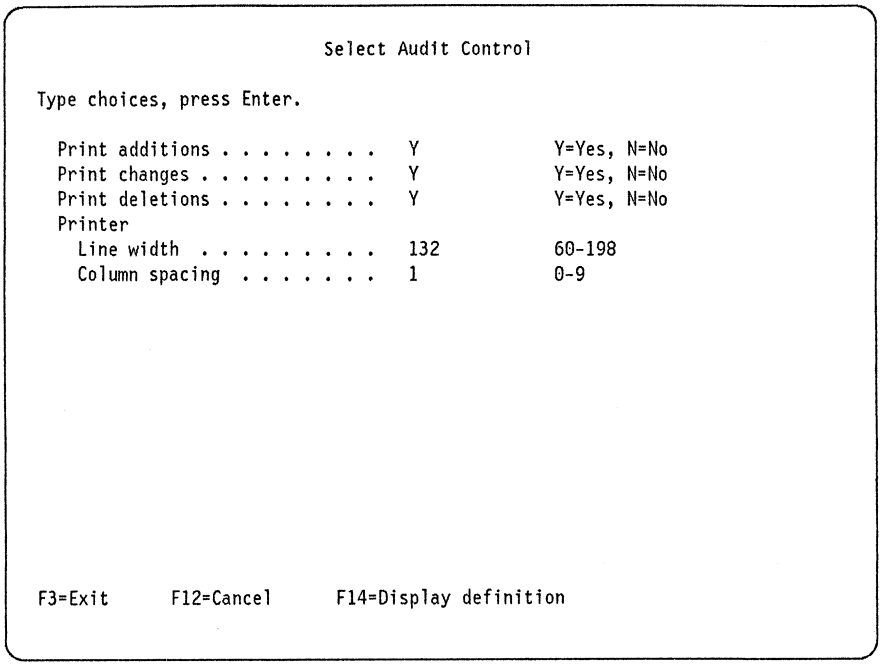


Figure 2-12. Select Audit Control Display

Description of the information on the Select Audit Control display is as follows:

Print additions. Indicates whether or not to print a copy of each new record. The default is Y (Yes).

Print changes. Indicates whether or not to print a copy of each changed record. The default is Y (Yes).

Print deletions. Indicates whether or not to print a copy of each deleted record. The default is Y (Yes).

Printer line width. Specifies the line width to send to the printer. The range is from 60 to 198 characters. The default length is 132. To print a width greater than 132, you must use a printer that can accept more than 132 characters in a print line.

Printer column spacing. Specifies the number of spaces to place between fields on the printed output. The range is 0 to 9. The default spacing is 1 character.

Example Action: Press Enter to continue to the Select Record Formats display.

Select Record Formats Display

The Select Record Formats display appears if your data file is a DDS- or IDDU-described file. This display lists the various record formats in your file specification. You can select one or more formats for processing. If you select multiple record formats, DFU presents a new Select and Sequence Fields display and repeats the field definition sequence for each record format you select from this display.

Note: Make sure you have defined record ID codes for each selected record when using multiple record formats for IDDU or RPG II. ID codes allow DFU to differentiate between the record formats on a record-by-record basis.

Your display appears as in Figure 2-13.

```
                          Select Record Formats

File . . . :   QINVFILE                      Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete


Opt  Format      Defined  Description
 _   INVREC         N     INVENTORY MAINTENANCE RECORDS
 _   SALESREC       N     SALES RECORDS

                                                                  Bottom
 F3=Exit definition          F5=Refresh          F12=Cancel
 F14=Display definition      F21=Select all
```

Figure 2-13. Select Record Formats Display

Example Action: Type 1 (Select) next to the INVREC format to select the inventory maintenance records for processing by the sample INVMTN program. Your display appears as in Figure 2-14.

```
                          Select Record Formats

File . . . :   QINVFILE                      Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete


Opt  Format      Defined  Description
 1   INVREC         N     INVENTORY MAINTENANCE RECORDS
 _   SALESREC       N     SALES RECORDS
```

Figure 2-14. Select Record Formats Display with INVREC Selected

Description of the information on the Select Record Formats display is as follows:

File. The name of the data file your DFU program uses when you run the program. The file shown in the sample display is QINVFILE.

Library. The name of the library containing the data file.

Opt. The option you want to perform on each record format. Type 1 (Select) to select a record format for processing. You can select multiple record formats by typing 1 (Select) next to each record format you want to use. To select all record formats in the list, press F21 (Select all). To remove a previously selected format, type 4 (Delete) next to the record format you no longer want and press Enter. Leave the *Opt* column blank if you do not want to select or remove a record format.

Note: You can select only option 4 (Delete) if the record has been previously defined for your program (where *Defined* is Y).

The sample display shows 1 (Select) next to the INVREC record format. This option selects the inventory maintenance record format for the sample program. The remaining display sequence for this example is for the INVREC record format.

Format. The list of record formats found in the externally described DDS- or IDDU-described file.

The sample display shows two record formats: INVREC and SALESREC.

Defined. Specifies whether or not a record format has been previously defined for this program. The indicator is Y (Yes) if previously defined and N (No) if not.

Description. The description of the record format as stored in the external file description.

Example Action: Press Enter to continue to the Select and Sequence Fields display.

Select and Sequence Fields Display

The Select and Sequence Fields display appears when you press Enter from the Select Record Formats display. This display allows you to select the fields and the field order that your DFU program uses for each selected record format. Your field selections appear on the data entry display when you run the program. The displayed information is from the applicable DDS- or IDDU-file descriptions. This display reappears for each selected record format when you finish the definition sequence for the current record format.

Press F21 (Select all) to select all of the displayed fields from the displayed record format. If you change the sequence of the displayed fields, the screen reappears in ascending sequential order when you press Enter. Press Enter again to confirm your changes and continue to the next definition display. If you do not change any information, the Define Fields display appears when you press Enter.

If you do not want to define new field headings or extended definitions for the fields you select from this display, press F17 (Fast path) to bypass the Define Fields and Specify Extended Field Definition displays for the current record

format. If there are still record formats to process, the Select and Sequence Fields display reappears for the next selected record format. Otherwise, the End DFU Program Definition display appears.

To use F17 (Fast path), first select the fields you want to appear on your data entry display and press Enter. Then press F17 (Fast path) to confirm your selections and bypass the remaining field definition displays for this record format.

The Fast path uses the following defaults:

- *Field headings*: The externally described DDS or IDDU headings, if they exist; otherwise DFU uses the name of the field from the file description.
- *Auto-duplicate*: No
- *Allow lowercase*: No
- *Accumulate*: No
- *Mod 10 check*: No
- *Mod 11 check*: No

The display shown in Figure 2-15 appears for the DDS-described file (QINVFILE) of this example.

```
                    Select and Sequence Fields

File . . . . . :   QINVFILE      Library . . . . :   MYLIB
Record Format . . . . . :   INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field      Attr    Length  Type     Description
_____     ORDER      KEY          6  CHAR     OUR ORDER NO.
_____     ORDDATE                 8  CHAR     DATE
_____     CUSORD                  5  CHAR     CUST. ORD. NO.
_____     CUST                    5  CHAR     CUSTOMER NO.
_____     SHPVIA                 15  CHAR     SHIP VIA
_____     SHPTO                   2  CHAR     SHIP TO
_____     PRICE                 6,0  PACK     PRICE OF ORDER
_____     GOODS                  10  CHAR     MERCHANDISE SHIPPED



                                                              Bottom
F3=Exit          F5=Refresh       F12=Cancel       F14=Display definition
F20=Renumber     F21=Select all
```

Figure 2-15. Select and Sequence Fields Display

Example Action: Type the sequence numbers shown in Figure 2-16 on page 2-19 for the sample INVMTN program.

```
                    Select and Sequence Fields

File . . . . . :   QINVFILE      Library . . . . :   MYLIB
Record Format . . . . . :   INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field      Attr    Length  Type     Description
 1_____   ORDER      KEY          6  CHAR     OUR ORDER NO.
 2_____   ORDDATE                 8  CHAR     DATE
 3_____   CUSORD                  5  CHAR     CUST. ORD. NO.
 4_____   CUST                    5  CHAR     CUSTOMER NO.
 5_____   SHPVIA                 15  CHAR     SHIP VIA
 6_____   SHPTO                   2  CHAR     SHIP TO
 7_____   PRICE                 6,0  PACK     PRICE OF ORDER
 _____    GOODS                  10  CHAR     MERCHANDISE SHIPPED


                                                                  Bottom
F3=Exit           F5=Refresh        F12=Cancel        F14=Display definition
F20=Renumber      F21=Select all
```

Figure 2-16. Select and Sequence Fields Display with Fields Selected

Example Action: Press Enter. The display reappears with your selected fields right-justified in order of your selection, and a message appears on the last line of the display asking you for confirmation. Your display appears as in Figure 2-17.

```
                    Select and Sequence Fields

File . . . . . :   QINVFILE      Library . . . . :   MYLIB
Record format . . . . . :   INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field      Attr    Length  Type     Description
    _____1   ORDER      KEY          6  CHAR     OUR ORDER NO.
    _____2   ORDDATE                 8  CHAR     DATE
    _____3   CUSORD                  5  CHAR     CUST. ORD. NO.
    _____4   CUST                    5  CHAR     CUSTOMER NO.
    _____5   SHPVIA                 15  CHAR     SHIP VIA
    _____6   SHPTO                   2  CHAR     SHIP TO
    _____7   PRICE                 6,0  PACK     PRICE OF ORDER
    _____    GOODS                  10  CHAR     MERCHANDISE SHIPPED


                                                                  Bottom
F3=Exit           F5=Refresh        F12=Cancel        F14=Display definition
F17=Fast path     F20=Renumber      F21=Select all
Press Enter to confirm or F17 to confirm with defaults.
```

Figure 2-17. Select and Sequence Fields Display for Confirmation

Description of the information on the Select and Sequence Fields display is as follows:

File. The name of the data file for which the program is defined. The file shown in the sample display is QINVFILE.

Library. The name of the library containing the data file. The program shown in the sample display is MYLIB.

Record format. The name of the format containing the fields contained in the file.

The sample display shows INVREC as the selected record format.

Sequence. Allows you to select and sequence the fields you want to use for your data entry program. Type a sequence number from 1 through 999999 to select and sequence fields for processing. The sequence number must be an integer. Leave the sequence number blank for any field you do not want to include for processing.

The sample display shows all fields selected except for the GOODS field.

Field. The name of the field as it appears in the DDS or IDDU specification.

Attr. The attribute of the field. A field attribute can be KEY, OUT (output fields only), or RRN (Relative Record Number for direct or sequential files). You must select all fields that have an attribute of KEY for indexed files (or RRN for direct or sequential files). Each KEY field composes part of the key of the record.

Length. Indicates the length of each field in the record format. (For packed fields, the length is the number of bytes the number occupies, not the actual number of digits).

Type. The type of the field: character (CHAR), packed decimal (PACK), zoned decimal (ZONE), binary (BIN), or double-byte character set (DBCS). See Appendix B, "Double-Byte Character Set Considerations for DFU Programs," for considerations about using double-byte characters.

All of the fields in the sample display are defined as CHAR except for the PRICE field, which is packed (PACK).

Description. The description of the field as contained in the DDS specification. For example, the description for the ORDER field on the sample display is OUR ORDER NO.

Example Action: Press Enter to confirm your choices for the sample INVMTN program. The Define Fields display appears.

Define Fields Display

The Define Fields display appears when you press Enter from the Select and Sequence Fields display. From here you can select the fields that need extended definition and specify alternate headings to appear on the data entry display. If you do not require extended definitions, press Enter. If there are record formats still to be processed (based on selections made on the Select Record Formats display), the Select and Sequence Fields display for the next record format appears. Otherwise, the End DFU Program Definition display appears.

Your display appears as in Figure 2-18.

```
                              Define Fields

File . . . . . :     QINVFILE       Library . . . . :    MYLIB
Record format . . . . . :     INVREC

Type options, or press F21 to select all; press Enter.
  1=Select for extended definition
  4=Delete extended definition


                   Extended
Opt  Field         Definition   Heading
 _   ORDER             N        OUR ORDER NO._______
 _   ORDDATE           N        DATE_________________
 _   CUSORD            N        CUST. ORD. NO._____
 _   CUST              N        CUSTOMER NO._______
 _   SHPVIA            N        SHIP VIA___________
 _   SHPTO             N        SHIP TO____________
 _   PRICE             N        PRICE OF ORDER_____

                                                              Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 2-18. Define Fields Display

Example Action: Type 1 (Select) next to the ORDER, ORDDATE, and PRICE fields to select them for extended definitions. Your display appears as in Figure 2-19 on page 2-22.

```
                              Define Fields

File . . . . . :     QINVFILE       Library . . . . :    MYLIB
Record format . . . . . :     INVREC

Type options, or press F21 to select all; press Enter.
  1=Select for extended definition
  4=Delete extended definition


                    Extended
Opt  Field          Definition   Heading
 1   ORDER              N        OUR ORDER NO._______
 1   ORDDATE            N        DATE_________________
 _   CUSORD             N        CUST. ORD. NO._______
 _   CUST               N        CUSTOMER NO._________
 _   SHPVIA             N        SHIP VIA_____________
 _   SHPTO              N        SHIP TO______________
 1   PRICE              N        PRICE OF ORDER_______

                                                              Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 2-19. Define Fields Display with Selected Fields

Description of the information on the Define Fields display is as follows:

File. The name of the data file for which the program is defined. The file shown in the sample display is QINVFILE.

Library. The library containing the data file. The library in the sample display is MYLIB.

Record format. The name of the format containing the fields shown on this display. The format shown in the sample display is INVREC.

Opt. Specifies whether you want to select a field for extended definition (option 1), or to remove a field's extended definition (option 4). You can remove an extended definition only if the *Extended Definition* prompt is Y. Leave the *Opt* column blank if you do not want to select or remove an extended definition.

The sample display shows 1 (Select for extended definition) next to the ORDER, ORDDATE, and PRICE fields. These fields are selected for extended definition for this example. When you leave this display, an extended definition display appears for each selected field in order of their selection. See "Specify Extended Field Definition Display for Alphameric Fields" on page 2-23 and "Specify Extended Field Definition Display for Numeric Fields" on page 2-26 for more information about extended definitions.

Field. The name of the field as specified in the DDS- or IDDU-described file specification.

Extended definition. Specifies whether or not the field already has an extended definition. None of the fields in the sample display have existing extended defi-

nitions because this example creates a new DFU program. If a field already contains a Y here, you do not need to select the field again unless you want to change its extended definition.

Heading. The field's heading in the externally described DDS or IDDU file specifications. DFU uses the headings shown here for the field headings on your data entry display. You can change the headings if you want them to appear differently on the data entry display. If you need to define a field heading that is longer than the length available on this display, type 1 (Select for extended definition) in the *Opt* column next to the desired field. The Specify Extended Field Definition display appears when you leave this display and you can specify a longer heading.

Note: If no heading is defined in the file definition, the field name appears here.

Example Action: Press Enter to continue to the Specify Extended Field Definition display. There are two extended definition displays: one for alphameric fields and one for numeric fields. For this example, the Specify Extended Field Definition display for alphameric fields appears first because the first field selected for extended definition is the alphameric ORDER field.

Note: If you have not selected fields for extended definition and there are no other record formats to process, the End DFU Program Definition display appears instead of an extended definition display.

Specify Extended Field Definition Display for Alphameric Fields

On the Specify Extended Field Definitions display, you can define additional features for selected alphameric fields. You can select the automatic duplication feature of DFU, choose whether or not to allow lowercase characters to be entered in this field on the data entry display, and specify alternate text headings. The Specify Extended Field Definition display appears for each alphameric field you select for extended definition on the Define Fields display. A field's alphameric type (CHAR) is displayed on the Select and Sequence Fields display. The type (alphameric or numeric) determines whether you see this display or the Specify Extended Field Definition display for numeric fields described in "Specify Extended Field Definition Display for Numeric Fields" on page 2-26.

The first extended field definition display for the sample INVMTN program is for the alphameric ORDER field. Your display appears as in Figure 2-20 on page 2-24.

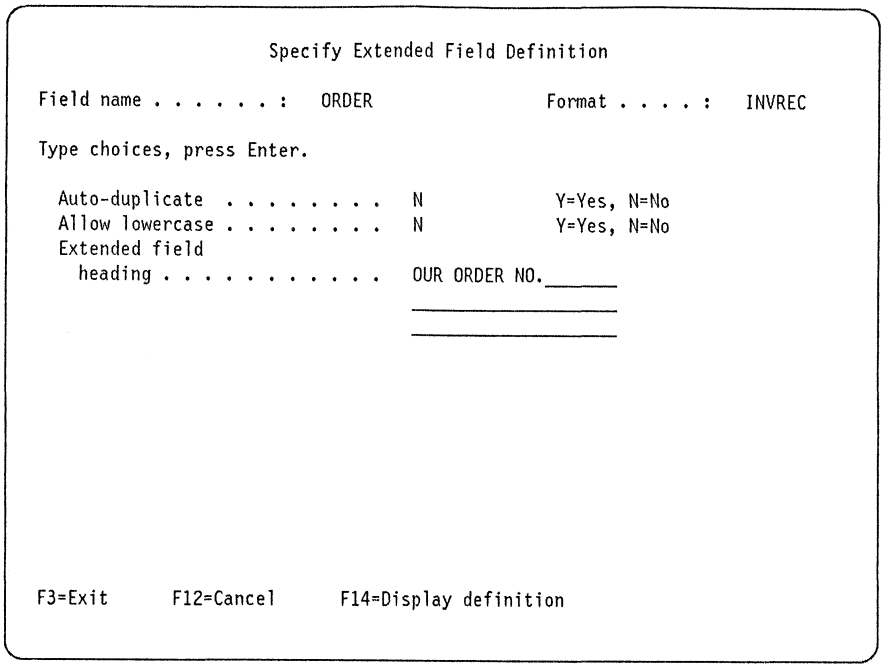


Figure 2-20. Specify Extended Field Definition Display for an Alphameric Field

Example Action: Type (ALPHAMERIC XC CODE) in the *Extended field heading* prompt on the line below OUR ORDER NO. Your display appears as in Figure 2-21.

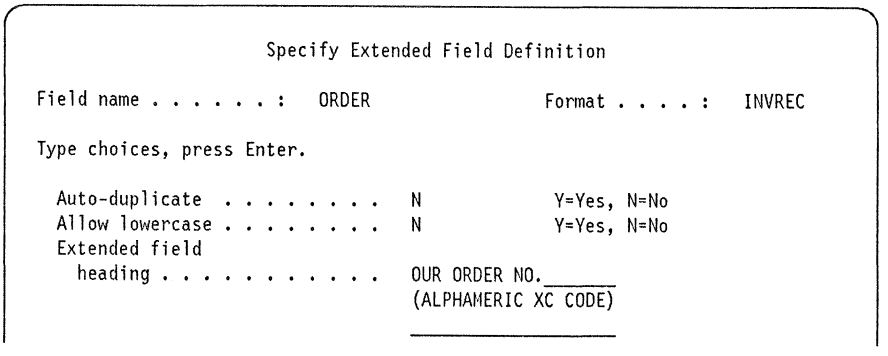


Figure 2-21. Specify Extended Field Definition Display with Example Heading

Description of the information on the Specify Extended Field Definition display is as follows:

Field name. The name of the field selected for extended definition. The selected field shown in the sample display is the ORDER field.

Format. The name of the format containing this field. The record format shown in the sample display is INVREC.

Auto-duplicate. Specifies whether or not you want DFU to fill the field with the value from the field in the previously processed record when you run your

program. This function helps speed data entry when you have fields that are the same in many records. Type Y (Yes) or N (No).

Note: You cannot use automatic duplication for a field that is defined as part of a unique key.

The sample display shows the default of N (No) for the *Auto-duplicate* prompt. Because this field is the key of the sample record format, it cannot be duplicated.

Allow lowercase. Specifies whether you want to be able to use mixed case during data entry. The default specification is N (No), which restricts entries to uppercase only.

Extended field heading. An extended text heading you can use for the data entry display instead of the default heading from the DDS specification. The extended heading can appear on three lines and can be as many as 20 characters per line. Your extended heading appears as a prompt on the data entry display when you run your program.

The extended field heading for the ORDER field in the sample display shows the original heading plus an additional reminder to data entry operators about the type of code expected.

Example Action: Press Enter to continue to the Specify Extended Field Definition Display for alphameric fields. This display appears next because you selected the alphameric ORDDATE field for an extended definition on the Define Fields display. Your display appears as in Figure 2-22.

```
                    Specify Extended Field Definition

Field name . . . . . :   ORDDATE              Format . . . . :   INVREC

Type choices, press Enter.

  Auto-duplicate . . . . . .  N              Y=Yes, N=No
  Allow lowercase . . . . . .  N             Y=Yes, N=No
  Extended field
    heading . . . . . .  . . .  DATE_____________
                                _____________
                                _____________




F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-22. Specify Extended Field Definition Display for an Alphameric Field

Example Action: Type Y (Yes) over the default value N (No) in the *Auto-duplicate* prompt to specify the automatic duplication feature for this field. When you run your program, DFU duplicates the date from the previously processed record into the DATE field on the data entry display. Your display appears as in Figure 2-23.

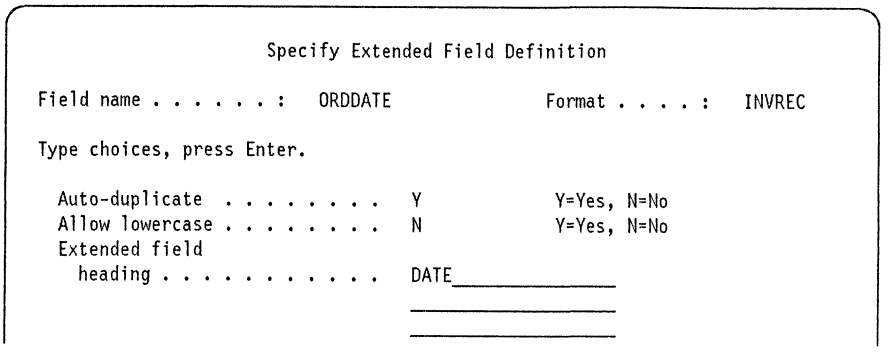


Figure 2-23. Specify Extended Field Definition Display for Automatic Duplication

Example Action: Press Enter to continue to the Specify Extended Field Definition Display for numeric fields. This display appears next because you selected the numeric PRICE field for an extended definition on the Define Fields display.

Note: If there are no additional fields remaining for extended definition, or no record formats still to be processed, the End DFU Program Definition display appears. If you have more formats to be defined, DFU returns to the Select and Sequence Fields display for the next format.

Specify Extended Field Definition Display for Numeric Fields

The Specify Extended Field Definition display allows you to define additional heading text for selected numeric fields. You can also select automatic duplication or accumulation for a field, and choose a method for numeric verification. The Extended Field Definition display appears for each numeric field you selected for extended definition from the Define Fields display. A field's numeric type (for example, PACK, BIN, or ZONE) appears in the *Type* prompt on the Select and Sequence Fields display. The field's type (alphameric or numeric) determines whether you see this display or the Specify Extended Field Definition display for alphameric fields described in the previous section.

This display is for the numeric PRICE field. The field was selected for extended definition to select the accumulate feature. Your display appears as in Figure 2-24 on page 2-27.

```
                    Specify Extended Field Definition

Field name . . . . . :   PRICE                Format . . . . :   INVREC

Type choices, press Enter.

  Auto-duplicate . . . . . .  N            Y=Yes, N=No
  Accumulate . . . . . . . .  N            Y=Yes, N=No
  Mod 10 check . . . . . . .  N            Y=Yes, N=No
  Mod 11 check . . . . . . .  N            Y=Yes, N=No
  Extended field
    heading . . . . . . . . .  PRICE OF ORDER_____
                               ____________________
                               ____________________

F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-24. Specify Extended Field Definition Display for a Numeric Field

Example Action: Type Y (Yes) over the default value in the *Accumulate* prompt to select the accumulate function for the PRICE field. The accumulate function maintains a running total of the values you type for a specified field when you run your program. The accumulator total appears at the end of your data entry session and prints on the audit report if you request that report. Your display appears as in Figure 2-25.

```
                    Specify Extended Field Definition

Field name . . . . . :   PRICE                Format . . . . :   INVREC

Type choices, press Enter.

  Auto-duplicate . . . . . .  N            Y=Yes, N=No
  Accumulate . . . . . . . .  Y            Y=Yes, N=No
  Mod 10 check . . . . . . .  N            Y=Yes, N=No
  Mod 11 check . . . . . . .  N            Y=Yes, N=No
  Extended field
    heading . . . . . . . . .  PRICE OF ORDER_____
                               ____________________
                               ____________________

F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-25. Specify Extended Field Definition Display for an Accumulate Field

Description of the information on Specify Extended Field Definition display is as follows:

Field name. The name of the field for which you are selecting an extended definition.

The selected field shown in the sample display is the PRICE field.

Format. The name of the record format containing this field.

The record format shown in the sample display is INVREC.

Auto-duplicate. Specifies whether or not to prefill the field with the value from the previously processed record when you run your DFU program. This function helps speed up data entry for records in which some fields are always the same. Type Y (Yes) or N (No). The default is N (No).

Note: You cannot use automatic duplication for a field that is defined as part of a unique key.

The sample display shows an entry of N (No).

Accumulate. Specifies whether or not to maintain a running total of changes made to this field in various records when you run your DFU program. Deletions are subtracted from the running total. To view these subtotals while you run your program, press F17 (Display and print accumulators). The subtotal is added to a total accumulator for the field and then reset to zero. The remaining subtotal and the final total appear when you finish running the program and exit from the End Data Entry display. DFU also prints the total accumulator tally with the audit report if you requested an audit report.

Type Y (Yes) to maintain a running total of changes, or N (No) if you do not want to maintain a total. The default for this prompt is N (No).

The entry in the sample display is Y (Yes). DFU accumulates totals for the PRICE field.

Mod 10 check. Specifies whether or not to validate a field entry containing a self-check digit based on a modulus 10 calculation. Type Y (Yes) to use the modulus 10 check, or N (No) if you do not want to use modulus 10. See Appendix E, "Calculating Modulus 10 and Modulus 11 Self-Check Digits," for a detailed explanation of the calculation used to produce this self-check digit.

The entry in the sample display is N (No). Modulus 10 validation is not used in the sample program.

Mod 11 check. Specifies whether or not to validate a field entry containing a self-check digit based on a modulus 11 calculation. Type Y (Yes) to use the modulus 11 check, or N (No) if you do not want to use modulus 11. See Appendix E, "Calculating Modulus 10 and Modulus 11 Self-Check Digits," for a detailed explanation of the calculation used to produce this self-check digit.

The entry in the sample display is N (No). Modulus 11 validation is not used in the sample program.

Extended field heading. The extended text heading you want to use in place of the heading on the "Define Fields Display" on page 2-21. The heading appears as a prompt on the data entry display when you run the DFU program. The extended heading can appear on three lines and be up to 20 characters per line.

No extended field heading is specified for the PRICE field in the sample display.

Example Action: You are finished defining your DFU program. Press Enter to return to the Define Fields Display, then press F14 (Display definition) to go to the Display DFU Program Summary display to review the DFU program definition for this example.

Note: You can also press Enter to return to the Define Fields display, and then press Enter again to continue directly to the End DFU Program Definition display where you can save the program.

Display DFU Program Summary Display

The Display DFU Program Summary display appears when you press F14 (Display definition) during the program definition process. This display allows you to review the information you have specified for the DFU program. Undefined prompts appear with their default values. Summary information appears on two displays. To obtain additional program summary information, press F11 (Alternate view). Press F15 (Print) to obtain a printed copy of this information. The first display of summary information appears as shown in Figure 2-26.

```
                        Display DFU Program Summary

Program . . . . . :   INVMTN
  Library . . . . . :   MYLIB
Data file . . . . . :   QINVFILE
  Library . . . . . :   MYLIB
Job title . . . . . :   INVENTORY MAINTENANCE RECORDS
Display format . . . . . :   Multiple
Generate keys or
  record numbers . . . . . :   N









Press Enter to continue.



F3=Exit      F11=Alternate view      F12=Cancel      F15=Print
```

Figure 2-26. Display DFU Program Summary Display

Description of the information on the Display DFU Program Summary display is as follows:

Program. The name of the DFU program you specified on the Create a DFU Program display.

Library. The name of the library containing the specified DFU program. You selected this parameter from the Create a DFU Program display.

Data file. The name of the specified data file to be used by the DFU program. You selected this parameter from the Create a DFU Program display.

Library. The name of the library containing the specified data file. You selected this parameter from the Create a DFU Program display.

Job title. The name that appears on the data entry display heading and the audit report, if requested. The default name is the name of the DFU program. For this example, you specified INVENTORY MAINTENANCE RECORDS on the General Information/Indexed File display.

Display format. The column format for your data entry display. The column format can be single, multiple, or maximum column display. For this example, you selected the multiple column display format from the General Information/Indexed File display.

Generate keys or record numbers. Specifies whether or not you want DFU to generate record keys. For this example, you specified N (No) on the General Information/Indexed File display and must enter your own record keys when you run the program.

Note: If you have a nonindexed data file, the Display DFU Program Summary display contains the following prompts pertaining to record numbers for nonindexed files:

- *Processing.* The designated method of file processing. It can be sequential (1), or direct (2). In this example, the QINVFILE file is indexed and the prompt does not appear.
- *Record number heading.* The prompt designated to appear on the data entry display and audit report for the record number as defined on the General Information/Nonindexed File display. In this example, the QINVFILE file is indexed and the prompt does not appear.
- *Record number field.* The name of the field selected to hold the record number, if any. This option is only available for nonindexed data files and the prompt does not appear.

Example Action: Press F11 (Alternate view) to show the remaining prompt information for the Display DFU Program Summary display. Your display appears as in Figure 2-27 on page 2-31.

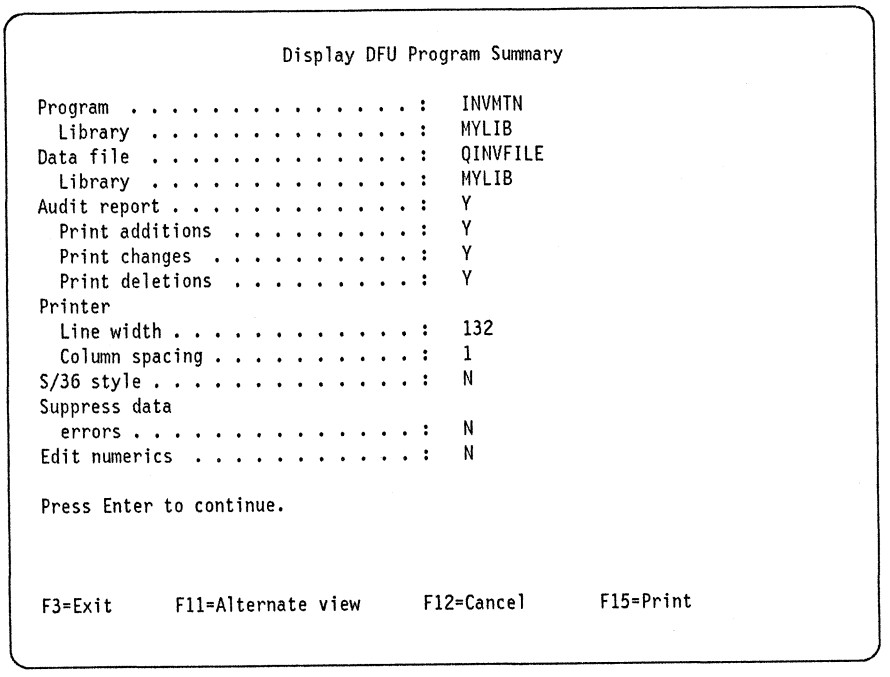


Figure 2-27. Display DFU Program Summary Display Alternate View

Description of the information on the alternate view of the Display DFU Program Summary display is as follows:

Program. The name of the DFU program you specified on the Create a DFU Program display.

Library. The name of the library containing the specified DFU program. You selected this parameter on the Create a DFU Program display.

Data file. The name of the specified data file to be used by the DFU program. You selected this parameter on the Create a DFU Program display.

Library. The name of the library containing the specified data file. You selected this parameter on the Create a DFU Program display.

Audit report. Specifies whether or not DFU prints an audit report when you finish data entry. The entry is Y (Yes) if DFU prints an audit report, or N (No) if it does not print the report. In this example, you selected the default Y (Yes) from the General Information/Indexed File display and DFU produces an audit report when you finish running your program.

Print additions. Specifies whether or not the audit report should show newly added records. For this example, you selected the default of Y (Yes) from the Select Audit Control display.

Print changes. Specifies whether or not the audit report should include changed records. For this example, you selected the default of Y (Yes) from the Select Audit Control display for the sample program.

Print deletions. Specifies whether or not the audit report should include deleted records. For this example, you selected the default of Y (Yes) from the Select Audit Control display for the sample program.

Printer Line width. Specifies the designated line width for the audit report. For this example, you selected the default of 132 columns from the Select Audit Control display.

Printer Column spacing. Specifies the designated number of spaces to appear between fields on the audit report. You selected the default of 1 from the Select Audit Control display.

S/36 style. Specifies the designated display format. You selected the default N (No) from the General Information/Indexed File display.

Suppress data errors. Specifies whether or not data errors should be suppressed. For this example, you selected the default N (No) from the General Information/Indexed File display.

Edit numerics. Specifies whether you want DFU to edit your numeric entries when you run the program. For this example, you selected N (No) from the General Information/Indexed File display.

Example Action: Press Enter to review the Display DFU Program Detail display.

Display DFU Program Detail Display

The Display DFU Program Detail display appears when you press Enter from either of the program summary displays. This display allows you to review the details of the record formats and fields defined so far for your DFU program. Press F15 (Print) to receive a printed copy of this information.

For the sample INVMTN program, your display appears as in Figure 2-28 on page 2-33.

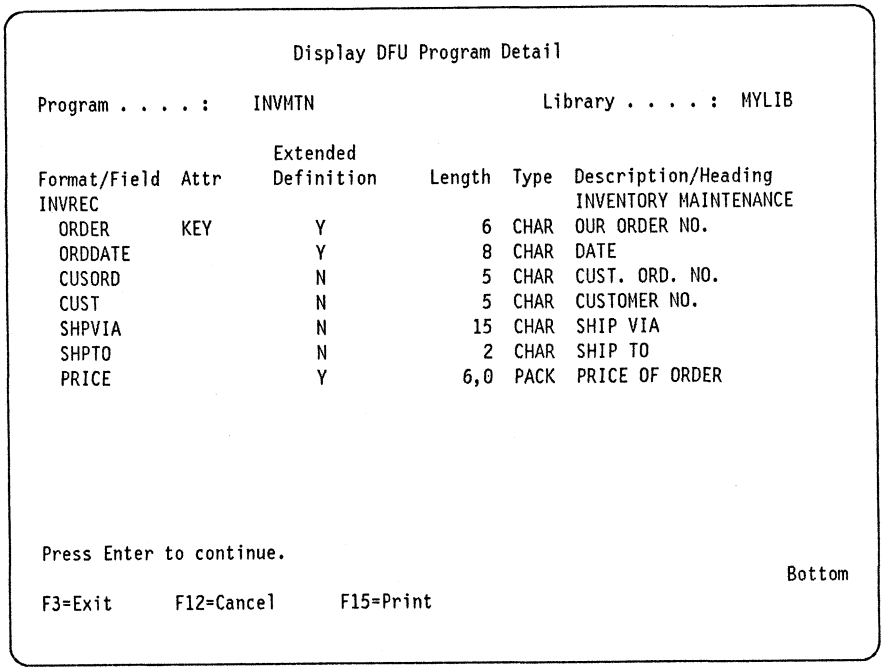


Figure 2-28. Display DFU Program Detail Display

Description of the information on the Display DFU Program Detail display is as follows:

Program. The name of the DFU program being defined.

Library. The name of the library containing the DFU program.

Format/Field. The record format or field name. The field names are grouped within a record format and are indented two spaces on the display. In the sample display, INVREC is the selected record format for this DFU program and the subsequent entries are the fields selected from the INVREC record format to appear on the data entry display.

Attr. The field attribute (KEY, OUT, or RRN for direct or sequential files) for each field within the record format.

Extended definition. Shows whether or not a field has an extended definition.

Length. Indicates the length of each field in the record format. (For packed fields, the length is the number of bytes the field occupies, not the actual number of digits).

Type. Indicates the data type (CHAR, PACK, ZONE, BIN, or DBCS) of each field in the record format.

Description/Heading. The description of the record format (if the item is a record format), or the heading for a field (if the item is a field).

Example Action: Press Enter to review the DFU Display Data File Detail display.

Display Data File Detail Display

The Display Data File Detail display appears when you press Enter from the Display DFU Program Detail display. This display allows you to review the details of all the record formats and fields defined by the DDS or IDDU specifications for this data file. Press F15 (Print) to receive a printed copy of this information.

This display shows all of the fields in the file specification, including your selected fields. Your display appears as in Figure 2-29.

```
                        Display Data File Detail

File . . . :   QINVFILE                      Library  . . . . :   MYLIB


Format/Field  Start  Length  Type  Attr  Description
INVREC                                    INVENTORY MAINTENANCE RECORD
  ORDER         1       6   CHAR  KEY    OUR ORDER NO.
  ORDDATE       7       8   CHAR         DATE
  CUSORD       15       5   CHAR         CUST. ORD. NO.
  CUST         20       5   CHAR         CUSTOMER NO.
  SHPVIA       25      15   CHAR         SHIP VIA
  SHPTO        40       2   CHAR         SHIP TO
  PRICE        42     6,0   PACK         PRICE OF ORDER
  GOODS        46      10   CHAR         MERCHANDISE SHIPPED
SALESREC                                  SALES RECORDS
  ORDER         1       6   CHAR  KEY    OUR ORDER NO.



Press Enter to continue.
                                                                      More...
F3=Exit      F12=Cancel      F15=Print
```

Figure 2-29. Display Data File Detail Display

Description of the information on the Display Data File Detail display is as follows:

File. The name of the data file used by the DFU program.

Library. The name of the library containing the data file.

Format/Field. Represents the record format or field name. The field names are subgrouped within a record format and are indented two spaces on this display. In the sample display, INVREC is the specified record format for this DFU program and the subsequent entries are the fields in the INVREC record format.

Start. The starting position of the field in the record format.

Length. The length of each field in a record format. (For packed fields, this represents the number of bytes occupied by the field, not the actual number of digits.)

Type. The data type (CHAR, PACK, ZONE, BIN, or DBCS) of each field in the record format.

Attr. The field attribute (KEY, OUT, or RRN for direct or sequential files) for each field within the record format.

Description. The description of the record format or field.

Example Action: You are finished reviewing the program definition and file details. Press F3 (Exit) to return to the Define Fields Display. Your display appears as in Figure 2-30.

```
                              Define Fields

File . . . . . :     QINVFILE       Library . . . . :    MYLIB
Record format . . . . . :     INVREC

Type options, or press F21 to select all; press Enter.
  1=Select for extended definition
  4=Delete extended definition


                   Extended
Opt  Field         Definition   Heading
 _   ORDER             Y       OUR ORDER NO._____
 _   ORDDATE           Y       DATE_____________
 _   CUSORD            N       CUST. ORD. NO._____
 _   CUST              N       CUSTOMER NO._____
 _   SHPVIA            N       SHIP VIA_________
 _   SHPTO             N       SHIP TO__________
 _   PRICE             Y       PRICE OF ORDER_____

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 2-30. Define Fields Display

Example Action: You are finished defining the DFU program, so press Enter to continue to the End DFU Program Definition display.

End DFU Program Definition Display

The End DFU Program Definition display is the final display in the definition sequence. The display appears for this example when you press Enter from the Define Fields display (because you did not select any fields for extended definition and there are no more record formats to process). The display also appears if you press F3 (Exit) from any definition display after the General Information/Indexed File display (except for the summary displays).

The End DFU Program Definition display allows you to save, to run, or to save and then run your newly defined DFU program. You can also return to the definition to make additional modifications to your program.

The following example saves the INVMTN program and allows you to work on records in the QINVFILE file while running the program.

Your display appears as in Figure 2-31.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y             Y=Yes, N=No
  Run program . . . . . .   Y             Y=Yes, N=No
    Type of run . . . . .   1             1=Change
                                          2=Display

  Modify program . . . . .  N             Y=Yes, N=No


Location for saved DFU program:
  Program . . . . . .    INVMTN____
    Library . . . . .    MYLIB_____
  Authority . . . . .    *CHANGE___
  Text  . . . . . .      INVENTORY MAINTENANCE RECORDS_____________________




F3=Exit      F14=Display definition      F17=Fast path
```

Figure 2-31. End DFU Program Definition Display

Note: Press F17 (Fast path) to automatically run the program. When you press F17 (Fast path), you do not see any other displays before running the program. To choose a specific member, other than the first in the file, press Enter. A display appears prompting you for program, file and member information.

Description of the information on the End DFU Program Definition display is as follows:

Save program. Specifies whether or not to save the DFU program you just defined. Type Y (Yes) to save the program, or N (No) if you do not want to save the program. The default is Y (Yes).

The sample display shows the default of Y (Yes) to save the sample INVMTN program.

Run program. Indicates whether or not you want to run the program. Type Y (Yes) to run the program when you leave this display, or N (No) if you do not want to run the program now. The default is Y (Yes).

The sample display shows the default of Y (Yes) to run the program after it has been saved.

Type of run. Specifies the conditions for running the program. Type 1 (Change) if you are changing an existing data file. Type 2 (Display) if you want to view the data file only. This prompt only applies if you selected Y (Yes) to run the program. The default for this prompt is 1 (Change a data file).

The sample display shows 1 (Change) for the type of run.

Modify program. Allows you to return to the General Information display to continue defining your program. To modify the program, type Y (Yes) in this prompt and press Enter. The default is N (No).

The sample display shows the default N (No). It is not necessary to modify the definition in this example.

Program. The name under which you want to save your DFU program. The default name is the name you entered on the Create a DFU Program display. If you change the name in this prompt, DFU saves the program under the new name.

The sample display shows the default name for the INVMTN program.

Library. The name of the library to contain the saved DFU program. The library must already exist. For this example, the library is the name you entered on the Create a DFU Program display.

Authority. The authority level you want associated with your program. The default is *CHANGE. (*CHANGE provides object-operational and all data rights). The *ALL authority permits any user to change the program through DFU.

Other available authority levels are: *ALL, *USE, *EXCLUDE. The *ALL authority permits any user to change, run, or delete the program. The *USE authority permits any user to run the program but not to change it. The *EXCLUDE authority restricts rights to the program to the owner (creator) of the program. You can also specify the name of an authorization list in this prompt. The authorization list contains a list of users and their authorities, which gives you a way of granting a specific group of users a specific level of authority to a DFU program.

Text. The text description of the DFU program. The default is the job title you specified on the General Information display.

Example Action: Press Enter to save your program and continue to the Change a Data File display.

Change a Data File Display

The Change a Data File display appears when you select option 1 (Change) from the End DFU Program Definition display and press Enter. This display gives you the opportunity to specify the name of the program you want to use for working on a data file. You can use the default data file specified by the program, or specify a different data file by entering the new file name in the *Data file* prompt of this display.

Note: If you specify a different data file, you must make sure it meets the conditions discussed in "Change a DFU Program Display" on page 3-2.

Prompts show the names you specified when you created the program for this example, if this was the last time you were in DFU. Your display appears as in Figure 2-32.

```
                          Change a Data File

Type choices, press Enter.

  Program . . . . . .  INVMTN____   Name, F4 for List
    Library . . . . .  MYLIB_____   Name, *LIBL, *CURLIB

  Data file . . . . .  QINVFILE___  Name, *SAME, F4 for List

    Library . . . . .  MYLIB_____   Name, *LIBL, *CURLIB
  Member  . . . . . .  *FIRST____   Name, *FIRST, F4 for List

F3=Exit     F4=Prompt     F12=Cancel
The DFU program was saved successfully.
```

Figure 2-32. Change a Data File Display

Description of the information on the Change a Data File display is as follows:

Program. The name of the program you want to run. To see a list of available programs, move your cursor to this prompt and press F4. The Select Program display appears and you can select the program you want to run. See "Select Program Display" on page 3-5 for additional information. The defaults for the *Program* field are the following:

- The program name used on the End DFU Program Definition display
- The value specified for the DFUPGM parameter if you used the CHGDTA or STRDFU commands

The program selected in the sample display is the INVMTN program.

Library. The name of the library containing the DFU program. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name used on the End DFU Program Definition display

- The value specified for the DFUPGM parameter if you used the CHGDTA or STRDFU commands

The library shown in the sample program is MYLIB.

Data file. The name of the data file to be changed by your DFU program. To see a list of available data files, move your cursor to this prompt and press F4. The defaults are the following:

- The file specified on the End DFU Program Definition display
- The file specified for the FILE parameter if you used the CHGDTA or STRDFU commands to reach this display
- The file specified in the DFU program (*SAME) if you leave this prompt blank

The data file shown in the sample display is QINVFILE.

Library. The name of the library containing the data file. The defaults are the following:

- The library specified on the End DFU Program Definition display
- The library specified for the CHGDTA or STRDFU commands if either were used
- The current library (*CURLIB)
- The library specified in the DFU program (*SAME) if you leave the prompt blank

The library shown on the sample display is MYLIB.

Member. The name of the member in the data file that you want to change. For DDS- or IDDU-described files, the member name is the same as the data file.

Example Action: Accept the defaults on this display, and press Enter. The first data entry display appears. Your display appears as in Figure 2-33 on page 2-40.

```
INVENTORY MAINTENANCE RECORDS                Mode . . . . :   ENTRY
Format . . . . :   INVREC___                 File . . . . :   QINVFILE

OUR ORDER NO. (ALPHAMERIC XC CODE): _____
DATE:                               _______
CUST. ORD. NO.:                     ____
CUSTOMER NO.:                       ____
SHIP VIA:                           ___________
SHIP TO:                            __
PRICE OF ORDER:                     ______




F3=Exit              F5=Refresh          F6=Select format
F9=Insert            F10=Entry           F11=Change
```

Figure 2-33. Data Entry Display in Entry Mode

This data entry display is in Entry mode and has the AS/400 display style. Entry mode is the default mode when you add records to a file for the first time (when the file has no records).

Example Action: Type the information shown in Figure 2-34 into the data entry display to create a new record for this example.

```
INVENTORY MAINTENANCE RECORDS                Mode . . . . :   ENTRY
Format . . . . :   INVREC___                 File . . . . :   QINVFILE

OUR ORDER NO. (ALPHAMERIC XC CODE): XC4313
DATE:                               01/06/88
CUST. ORD. NO.:                     13019
CUSTOMER NO.:                       21884
SHIP VIA:                           AIR FREIGHT___
SHIP TO:                            19
PRICE OF ORDER:                     100___




F3=Exit              F5=Refresh          F6=Select format
F9=Insert            F10=Entry           F11=Change
```

Figure 2-34. Data Entry Display with Example Record Information

For more information about the data entry display, see the information following Figure 4-8 on page 4-9.

Example Action: Press Enter to process the new record. DFU adds the record to the QINVFILE data file and clears the display so you may continue adding records. Because you want to add only one record at this time, press F3 (Exit) to leave the data entry session. The End Data Entry display appears as in Figure 2-35.

```
                              End Data Entry

  Number of records processed

    Added  . . . . . :           1
    Changed  . . . . :           0
    Deleted  . . . . :           0



Type choice, press Enter.

   End data entry . . . . . .    Y          Y=Yes,  N=No

 F3=Exit     F12=Cancel
 All records added, changed, or deleted will be printed.
```

Figure 2-35. End Data Entry Display

Description of the information on the End Data Entry display is as follows:

Added. Shows the total number of new records added to the file. The sample exercise for the INVMTN program created only one record for the file QINVFILE.

Changed. Shows the total number of records changed in the file.

Deleted. Shows the total number of records deleted from the file.

Note: These three prompts do not appear if you have just completed a data entry session using Display mode because records cannot be changed in Display mode.

End data entry. Specifies whether or not to end the data entry session. The prompt requires a Y (Yes) or N (No) answer. The prompt defaults to Y (Yes). If you select N (No), you return to the data entry display. If you select Y (Yes) and your DFU program maintains accumulator totals for any fields, the Display Batch Accumulators display appears when you press Enter. Otherwise, the data entry job ends and you return to the AS/400 Data File Utility (DFU) menu.

Example Action: Leave the default of Y (Yes) in the *End data entry* prompt and press Enter to end the session. The Display Batch Accumulators display appears, followed by the Display Total Accumulators display. DFU presents the accumulator totals when you exit DFU (if you defined accumulator fields). For this example, you defined the program to keep an accumulator total for the PRICE field. If no fields were defined as accumulator fields, the AS/400 Data File Utility (DFU) menu appears directly.

For more information on these displays see Chapter 4, "Running a DFU Program" on page 4-1.

Example Action: Press Enter to continue to the Display Total Accumulators display. Press Enter again to end the session. The AS/400 Data File Utility (DFU) menu appears. The audit report is printed. See "Audit Report" on page 4-20 for a sample audit report. From the DFU Menu, you can perform another DFU operation or exit the utility.

Creating a DFU Program for a Nonindexed File

You use the same method to create a DFU program for a nonindexed (direct or sequential) file as you use for an indexed file. When using a nonindexed file, you can request an additional display that allows you to define a field in which to store a record number. In addition to the new display related only to nonindexed data files, this example shows you how to use the fast path for defining a DFU program quickly. See "Procedure for Creating a DFU Program" on page 2-2 for an overview of how to access DFU.

This example uses an IDDU described file called INVIDDU for a program called INVPGM. The program is similar to the one you created for an indexed file.

Figure 2-36 on page 2-43 shows the IDDU file description of the formats and fields that appear for the nonindexed data file in this example.

```
5728SS1 R01 M00 88XXXX      Display File/Field Information
Dictionary . . . . . : MYLIB
Definition or generic* . . . . : INVIDDU
Definition type . . . . . : *FILE
File information  . . . . . : *BASIC
Record format information . . . : *BASIC
Field information  . . . . . : *BASIC
File Information
  File name . . . . . : INVIDDU
  Number of record formats. . . :     2
  Type of file  . . . . . : Physical
  Last changed  . . . . . : 02/04/88
  Changed by  . . . . . : BROWN
  Created . . . . . : 02/04/88
  Created by  . . . . . : BROWN
Record Format Information
  Record format name  . . . . . : INVREC
  Number of fields  . . . . . :     8
  Record length . . . . . :    55
  Last changed  . . . . . : 02/04/88
  Changed by  . . . . . : BROWN
  Created . . . . . : 02/04/88
  Created by  . . . . . : BROWN
Field Level Information
             Data      Field  Buffer    Buffer        Field
  Field      Type     Length  Length  Position        Usage    Column Heading
  ORDER      CHAR          6       6         1        Both     OUR ORDER NO.
    Field text . . . . . : OUR ORDER NO.
  ORDDAT     CHAR          8       8         7        Both     DATE
    Field text . . . . . : DATE
  CUSORD     CHAR          5       5        15        Both     CUST. ORD. NO.
    Field text . . . . . : CUST. ORD. NO.
  CUST       CHAR          5       5        20        Both     CUSTOMER NO.
    Field text . . . . . : CUSTOMER NO.
  SHPVIA     CHAR         15      15        25        Both     SHIP VIA
    Field text . . . . . : SHIP VIA
  SHPTO      CHAR          2       2        40        Both     SHIP TO
    Field text . . . . . : SHIP TO
  PRICE      PACKED     6  0       4        42        Both     PRICE OF ORDER
    Field text . . . . . : PRICE OF ORDER
  GOODS      CHAR         10      10        46        Both     MERCHANDISE SHIP
    Field text . . . . . : MERCHANDISE SHIPPED
5728SS1 R01 M00 88XXXX      Display File/Field Information
File name . : INVIDDU       Dictionary . :  MYLIB
Record Format Information
  Record format name  . . . . . : SALESREC
  Number of fields  . . . . . :     4
  Record length . . . . . :    55
  Last changed  . . . . . : 02/04/88
  Changed by  . . . . . : BROWN
  Created . . . . . : 02/04/88
  Created by  . . . . . : BROWN
Field Level Information
             Data      Field  Buffer    Buffer        Field
  Field      Type     Length  Length  Position        Usage    Column Heading
  ORDER      CHAR          6       6         1        Both     OUR ORDER NO.
    Field text . . . . . : OUR ORDER NO.
  SALEDATE   CHAR          8       8         7        Both     SALES DATE
    Field text . . . . . : SALES DATE
  SALESMAN   CHAR         20      20        15        Both     SALES PERSON
    Field text . . . . . : SALES PERSON
  FILLER     CHAR         21      21        35        Both     FOR FUTURE USE
    Field text . . . . . : FOR FUTURE USE
```

Figure 2-36. IDDU File Description Example

Create a DFU Program Display

When you select option 2 (Create a DFU program) from the AS/400 Data File Utility (DFU) menu, the Create a DFU Program display appears. This display requests the name of the DFU program you want to define and its data file. Your display appears as in Figure 2-37.

```
                          Create a DFU Program

Type choices, press Enter.

  Program . . . . . .  _________   Name, F4 for List
    Library . . . . .  *CURLIB___  Name, *CURLIB

  Data file . . . . .  _________   Name, F4 for List

    Library . . . . .  *LIBL_____  Name, *LIBL, *CURLIB

F3=Exit     F4=Prompt     F12=Cancel
```

Figure 2-37. Create a DFU Program Display

Example Action: Type the name of the sample program (INVPGM), and the library name MYLIB for both *Library* prompts. Also type the name of the IDDU-described (INVIDDU) file in the *Data file* prompt. Your display appears as in Figure 2-38.

Note: This file must be linked to an IDDU file definition for DFU to run using this type of definition. Before you can link, you must create an IDDU file definition.

```
                          Create a DFU Program

Type choices, press Enter.

  Program . . . . . .  INVPGM____  Name, F4 for List
    Library . . . . .  MYLIB_____  Name, *CURLIB

  Data file . . . . .  INVIDDU___  Name, F4 for List

    Library . . . . .  MYLIB_____  Name, *LIBL, *CURLIB
```

Figure 2-38. Create a DFU Program Display with Example Entries

See "Create a DFU Program Display" on page 2-6 for a description of the information on this display.

Example Action: Press Enter to continue to the General Information/Nonindexed File display.

General Information/Nonindexed File Display

The General Information/Nonindexed File display appears when you press Enter from the Create a DFU Program display when your data file is nonindexed (direct or sequential). This display allows you to define the format of your data entry display. Your display appears as in Figure 2-39.

```
                General Information/Nonindexed File

Type choices, press Enter.

  Job title . . . . . .  INVPGM_____________________________
  Display format  . . . .  2          1=Single
                                      2=Multiple
                                      3=Maximum
  Audit report  . . . . .  Y          Y=Yes, N=No
  S/36 style  . . . . . .  N          Y=Yes, N=No
  Suppress errors . . . .  N          Y=Yes, N=No
  Edit numerics . . . . .  N
  Record numbers
    Generate  . . . . . .  N          Y=Yes, N=No
    Store in
      a field . . . . . .  N          Y=Yes, N=No
    Heading . . . . . .  *RECNBR_____
                         ____________________
                         ____________________
  Processing  . . . . . .  2          1=Direct
                                      2=Sequential

F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-39. General Information/Nonindexed File Display

Example Action: Type over the default entries for the *Job title*, *Store in a field*, and *Heading* prompts. Your display appears as in Figure 2-40 on page 2-46.

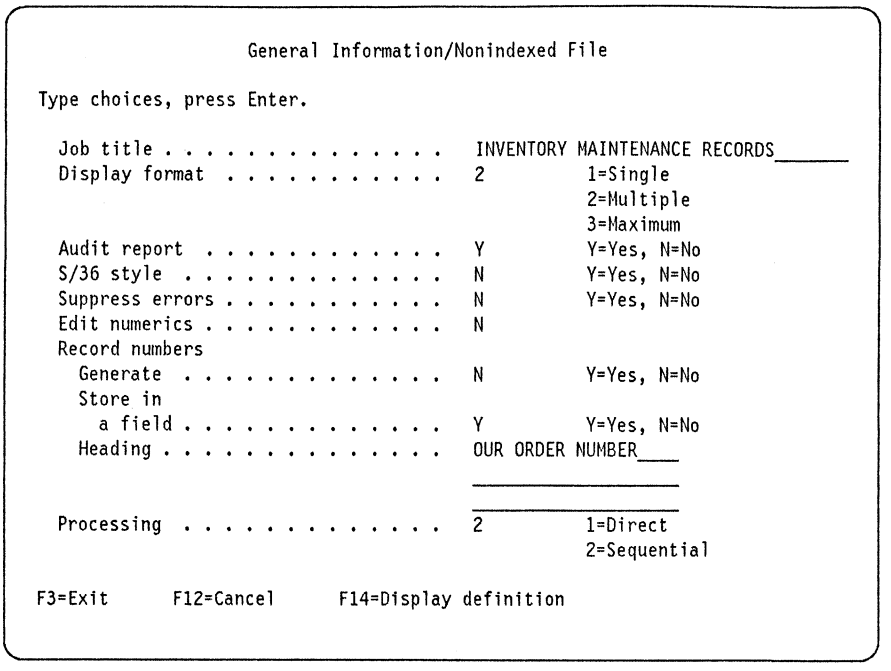


Figure 2-40. General Information/Nonindexed File Display with Example Entries

Description of the information on the General Information/Nonindexed File display is as follows:

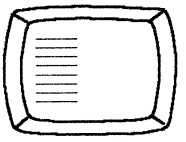
Job title. The name you want to appear on the audit report and data entry display heading for this DFU session. Enter up to 36 characters. The default title is the DFU program name (INVPGM for this example).

Note: If you select the System/36 style of data entry, the job title can only be 24 characters long.

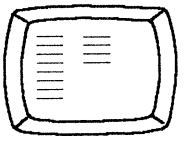
The sample display shows INVENTORY MAINTENANCE RECORDS as the job title. This title appears on all data entry displays and audit reports for the sample inventory program.

Display format. Indicates whether you want the data entry display format to be single-column (1), multiple-column (2), or maximum data (3). The default is 2 (multiple-column). If there are more fields than can fit on a single display for a given display format, the remaining fields appear on additional displays. When you run your DFU program, press F12 to move backward through multiple data entry displays or press Enter to advance. The three possible formats are as follows:

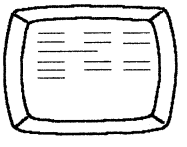
- *1=Single-column format*: All fields are listed in a single column on as many data entry displays as required. The format appears as follows:



- *2=Multiple-column format*: More fields are packed into one data entry display. DFU tries to fit all the fields in a single column. If they do not fit in a single column on one data entry display, DFU arranges the fields in multiple columns as shown below. Additional data entry displays are used if required. DFU uses as few columns as possible, which results in the least number of displays. The format appears as follows:



- *3=Maximum data format*: DFU packs as many fields into each data entry display as can neatly be accommodated. Additional data entry displays are used if required. DFU uses as few columns as possible, which results in the least number of displays. The format appears as follows:



The sample display shows the default (2). This produces a multiple column data entry display.

Audit report. Indicates whether or not the DFU program should produce an audit report. Type Y (Yes) if you want to receive an audit report, or N (No) if you do not want this report. The default is Y (Yes). An audit report is a listing showing all changes made to a file. You specify the type of changes to be listed on the Select Audit Control display. See "Select Audit Control Display" on page 2-14 for additional information. If you specify Y (Yes), DFU moves to the Select Audit Control display where you can specify the contents of the audit report. If you specify N (No), control passes either to the Select Record Formats display or, if you specified that you want to store the relative record numbers in a field in the file, control passes to the Select Field for Record Number display.

The sample display shows the default Y (Yes). This produces an audit report. See "Audit Report" on page 4-20 for a sample listing for this example.

S/36 style. Indicates whether the DFU program should use a System/36 display style (Y), or an AS/400 display style (N) for the data entry displays. The default setting is N (No). If you type Y (Yes), you see a display that allows you to select

other System/36 style DFU functions. For more information, see Appendix C, "Using DFU in the System/36 Environment" on page C-1.

The System/36 display style **does not** show function key descriptions on the bottom of the display. The AS/400 display style **does** show function key descriptions on the bottom of the display. See "DFU Function Keys" on page 1-4 for a list of AS/400 function keys. If you specify the System/36 style, you must use the System/36 function keys instead of the AS/400 function keys when you run your program. See "System/36 Style Run-Time Function Keys" on page C-3 for a list of available System/36 function keys. Also see "Data Entry Display Example" on page 2-1 and "Example System/36 Data Entry Display" on page C-5 for examples of the two display styles.

The sample display shows the default N (No) to specify the AS/400 display style.

Suppress errors. Indicates whether or not you want DFU to attempt to suppress decimal data errors in a record requested during data entry. If Y (Yes), DFU uses the method described in "Error Suppression" on page A-8 to handle decimal data errors.

The sample display shows the default, N (No). Decimal errors are not suppressed.

Edit numerics. Indicates whether or not numeric fields should appear in numeric format on the Entry, Change, and Display data entry displays. If N (No), numeric entries are **not** edited. Nonedited numeric fields are right-justified and do not have decimal points. If Y (Yes), numeric entries are edited. Edited numeric fields are right-justified, have a decimal point and do not show leading zeros.

Enter all negative numbers using the Field Minus key on your keyboard for both edited or nonedited numeric fields. Accumulator results and numeric fields on the audit report are automatically edited with the J edit code. The J edit code inserts a comma to separate every three digits, inserts a decimal point, and does not show leading zeros.

Note: If you choose to edit numeric fields Y (Yes), you must enter the decimal point as appropriate, otherwise DFU places the decimal point after the last digit in the field. For example, if you type 100 and have defined the field to have 2 decimal places, then DFU assumes you mean 100.00. If you type 100 for a field with 2 decimal places but choose not to edit numerics (N), DFU assumes you mean 1.00.

The sample display shows the default, N (No). Numeric fields are not edited.

Record numbers/Generate. Specifies whether or not DFU should generate record numbers for new records. If N (No), you must provide your own record numbers when you create new records. If Y (Yes), DFU provides the record numbers. DFU generates record numbers by locating the first unused record in a file and starts numbering from that record.

The sample display shows the default N (No). DFU does not generate record numbers so they must be provided by the operator.

Record numbers/Store in a field. Specifies whether or not DFU should store the record numbers in a field of the file. If you specify Y (Yes), the Select Field for Record Number display appears showing a list of fields available for storing a record number. The default for this prompt is N (No).

The sample display shows Y (Yes) and allows you to store a record number in a user-defined field for this example. Because of this designation, the Select Field for Record Number display appears when you press Enter from this display.

Record numbers/Heading. The record number prompt that you want to appear on the data entry display and printouts. The default is *RECNBR.

The sample display shows OUR ORDER NUMBER as the record number heading for the sample program.

Processing. Indicates the method (direct or sequential) for adding records to a data file. The following methods are available for file processing:

- *1=Direct*: If you type 1, new records can be added anywhere in the file as long as the total number of records does not exceed the file limits.
- *2=Sequential*: If you type 2, new records can only be added to the end of sequential files.

The sample display shows the default value of 2 (sequential processing).

Example Action: Press Enter to continue to the Select Audit Control display for the sample INVPGM program. This display appears when you leave the default value Y (Yes) in the *Audit report* prompt.

Note: If you type an N (No) in the *Audit report* prompt of the General Information/Nonindexed File display, either the Select Record Formats Display appears, or, if you specified that you want to store the relative record numbers in a field in the file, the Select Field for Record Number display appears.

Select Audit Control Display

The Select Audit Control display appears if you type Y (Yes) in the *Audit report* prompt on the General Information/Nonindexed display. The audit report is a printed list of changes made to a data file when you run the DFU program. You can define the scope of information you want reported on the listing from this display.

If you type Y (Yes) next to a reportable change below, DFU prints a copy of each changed record for the selected category (additions, changes, or deletions). If you have accumulator fields, you also receive a printout of accumulator totals on your audit report. If you do not select to print any of the audit control options but have indicated you want an audit report on the General Information/Nonindexed File display, you receive only a printout of accumulator totals (if you have defined accumulators).

Example Action: Leave the default values for the sample INVPGM program. Your display appears as in Figure 2-41.

```
                          Select Audit Control

Type choices, press Enter.

  Print additions . . . . . .  Y          Y=Yes, N=No
  Print changes . . . . . .  .  Y          Y=Yes, N=No
  Print deletions . . . . . .  Y          Y=Yes, N=No
  Printer
    Line width  . . . . . .  .  132        60-198
    Column spacing  . . . . .  1          0-9









F3=Exit      F12=Cancel      F14=Display definition
```

Figure 2-41. Select Audit Control Display

See "Select Audit Control Display" on page 2-14 for descriptions of the prompts on this display.

Example Action: Press Enter to continue to the Select Field for Record Number display.

Select Field for Record Number Display

The Select Field for Record Number display appears after you press Enter from the Select Audit Control display or the General Information/Nonindexed File display (if you did not select an audit report). DFU presents a list of all fields that qualify for storing a record number. Qualifying fields occur in the same position in all record formats in the file and have the same length and data type. The length of the field cannot exceed eight characters. Select the field you want to use for the record number from the displayed list. In the INVPGM program example, only the ORDER field qualifies for use as a record number. Your display appears as in Figure 2-42 on page 2-51.

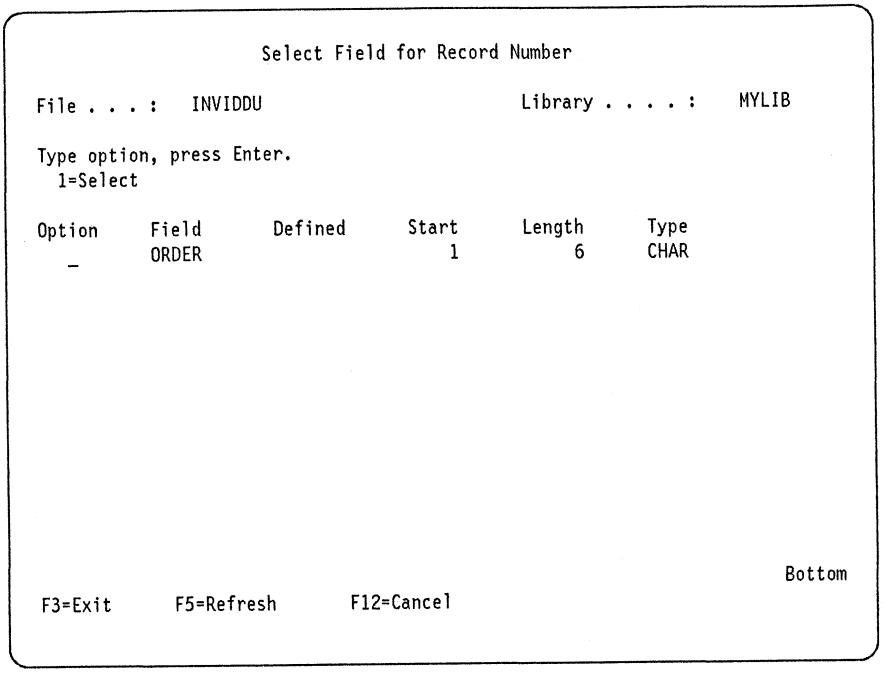


Figure 2-42. Select Field for Record Number Display

Example Action: Type 1 (Select) next to the ORDER field to select it for storing the record number in this example. Your display appears as in Figure 2-43.

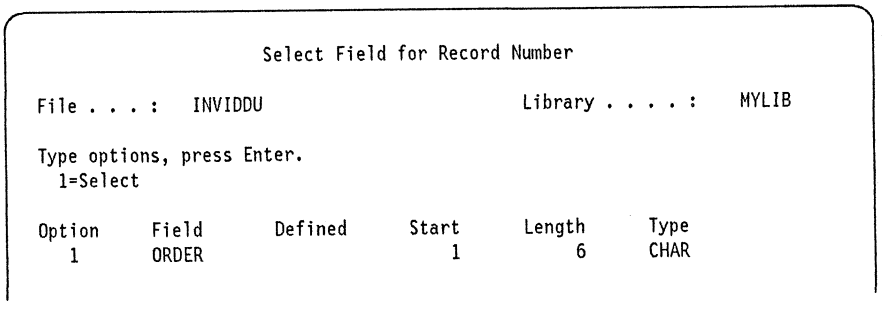


Figure 2-43. Select Field for Record Number Display with Specified Field

Description of the information on the Select Field for Record Number display is as follows:

File. The name of the data file containing the listed fields.

The file shown in the sample display is INVIDDU.

Library. The name of the library containing the data file.

The library shown in the sample display is MYLIB.

Option. Indicates which field to use for storing the record number. Type 1 (Select) into the *Option* column next to the field in which you want to store the record number. You can only select one field.

The field selected for storing the record number in the sample display is ORDER.

Field. The name of all fields qualifying to store a record number. Qualified fields must occur in the same position in every record format in the file.

Defined. Specifies whether or not a field has been previously defined for this program. The indicator is Y (Yes) if previously defined and N (No) if not.

Start. The field starting position in the record.

Length. The length of the field.

Type. The type of field: character (CHAR), binary (BIN), packed decimal (PACK), zone decimal (ZONE), or double-byte character set (DBCS).

Example Action: Press Enter to continue to the Select Record Formats display.

Select Record Formats Display

The Select Record Formats display appears if your data file is a DDS- or IDDU-described file. This display lists the various record formats defined in the DDS- or IDDU-described file specification. You can select one or more formats for processing. If you select multiple record formats, DFU presents a separate field definition display for each record format selected as you proceed through program definition.

Note: Make sure that you have defined record ID codes for each selected record when using multiple-record formats for IDDU. ID codes allow DFU to differentiate between the record formats on a record-by-record basis.

Your display appears as in Figure 2-44 on page 2-53.

```
                        Select Record Formats

File . . . :   INVIDDU                        Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete

Opt  Format      Defined   Description
 _   INVREC         N
 _   SALESREC       N

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 2-44. Select Record Formats Display

Example Action: Type 1 (Select) next to the INVREC format to select the inventory maintenance records for processing by the sample INVPGM program. Your display appears as in Figure 2-45.

```
                        Select Record Formats

File . . . :   INVIDDU                        Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete

Opt  Format      Defined  Description
 1   INVREC         N
 _   SALESREC       N
```

Figure 2-45. Select Record Formats Display with a Selected Format

See "Select Record Formats Display" on page 2-15 for descriptions of the prompts on this display.

Example Action: Press Enter to continue to the Select and Sequence Fields display.

Select and Sequence Fields Display

The Select and Sequence Fields display appears when you press Enter from the Select Record Formats display. This display allows you to select the fields and the field order that your DFU program uses for the data entry display. The displayed information is from the applicable DDS or IDDU file descriptions. The display reappears for each selected record format when you finish the definition sequence for the current record format.

Press F21 (Select all) to select all of the displayed fields from the displayed record format. If you change the sequence of the displayed fields, the display reappears in ascending sequential order when you press Enter. Press Enter again to confirm your changes and continue to the next definition display. If you do not change any information, control passes directly to the Define Fields display which appears when you press Enter.

If you do not want to define new field headings or extended definitions for the fields you select from this display, press F17 (Fast path) to bypass the Define Fields and Specify Extended Field Definition displays for the current record format. If there are still record formats to process, the Select and Sequence Fields display reappears for the next selected record format. Otherwise, the End DFU Program Definition display appears.

To use F17 (Fast path), select the fields you want to appear on your data entry display and press Enter. Then press F17 (Fast path) to confirm your selections.

The Fast path uses the following defaults:

- *Field headings*: The externally described DDS or IDDU headings, if they exist; otherwise, DFU uses the name of the field from the file description
- *Auto-duplicate*: No
- *Allow lowercase*: No
- *Accumulate*: No
- *Mod 10 check*: No
- *Mod 11 check*: No

The display shown in Figure 2-46 on page 2-55 appears for the IDDU-described file (INVIDDU) of this example.

```
                    Select and Sequence Fields

File . . . . . :  INVIDDU       Library . . . . :  MYLIB
Record format . . . . . :  INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field     Attr    Length  Type    Description
_____     ORDER     RRN          6  CHAR    OUR ORDER NO.
_____     ORDDAT                 8  CHAR    DATE
_____     CUSORD                 5  CHAR    CUST. ORD. NO.
_____     CUST                   5  CHAR    CUSTOMER NO.
_____     SHPVIA                15  CHAR    SHIP VIA
_____     SHPTO                  2  CHAR    SHIP TO
_____     PRICE                6,0  PACK    PRICE OF ORDER
_____     GOODS                 10  CHAR    MERCHANDISE SHIPPED



                                                              Bottom
F3=Exit           F5=Refresh        F12=Cancel       F14=Display definition
F20=Renumber      F21=Select all
```

Figure 2-46. Select and Sequence Fields Display

Example Action: Type the sequence numbers as shown in Figure 2-47 for the sample INVPGM program.

```
                    Select and Sequence Fields

File . . . . . :  INVIDDU       Library . . . . :  MYLIB
Record format . . . . . :  INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field     Attr    Length  Type    Description
 1____    ORDER     RRN          6  CHAR    OUR ORDER NO.
 2____    ORDDAT                 8  CHAR    DATE
 3____    CUSORD                 5  CHAR    CUST. ORD. NO.
 4____    CUST                   5  CHAR    CUSTOMER NO.
 5____    SHPVIA                15  CHAR    SHIP VIA
 6____    SHPTO                  2  CHAR    SHIP TO
 7____    PRICE                6,0  PACK    PRICE OF ORDER
 _____    GOODS                 10  CHAR    MERCHANDISE SHIPPED



                                                              Bottom
F3=Exit           F5=Refresh        F12=Cancel       F14=Display definition
F20=Renumber      F21=Select all
```

Figure 2-47. Select and Sequence Fields Display with Fields Selected

Example Action: Press Enter. The display reappears with your selected fields in the order of your selection, and a message appears on the last line of the display asking you for confirmation. Your display appears as in Figure 2-48.

```
                        Select and Sequence Fields

File . . . . . :   INVIDDU       Library . . . . :   MYLIB
Record format . . . . . :   INVREC

Select fields and their sequence or press F21 to select all; press Enter.


Sequence  Field      Attr    Length  Type      Description
     _____1  ORDER      RRN          6  CHAR      OUR ORDER NO.
     _____2  ORDDAT                  8  CHAR      DATE
     _____3  CUSORD                  5  CHAR      CUST. ORD. NO.
     _____4  CUST                    5  CHAR      CUSTOMER NO.
     _____5  SHPVIA                 15  CHAR      SHIP VIA
     _____6  SHPTO                   2  CHAR      SHIP TO
     _____7  PRICE                 6,0  PACK      PRICE OF ORDER
     ______  GOODS                  10  CHAR      MERCHANDISE SHIPPED



                                                                  Bottom
F3=Exit          F5=Refresh       F12=Cancel       F14=Display definition
F17=Fast path    F20=Renumber     F21=Select all
Press Enter to confirm or F17 to confirm with defaults.
```

Figure 2-48. Select and Sequence Fields Display for Confirmation

See "Select and Sequence Fields Display" on page 2-17 for descriptions of the prompts on this display.

Example Action: For the sample INVPGM program, press F17 (Fast path) to use defaults for the remaining definition displays. None of these fields have extended definitions or special features such as automatic duplication. The End DFU Program Definition display appears.

Note: If you select more than one record format for processing, the Select and Sequence Fields display appears again for the next format.

End DFU Program Definition Display

The End DFU Program Definition display is the final display in the definition sequence. This display appears if you press Enter from the Define Fields display (provided there are no fields selected for extended definition and no additional record formats to process). The display also appears if you either press F3 (Exit) one or more times from any definition display after the General Information/Nonindexed File display (except for the summary displays), or press F17 (Fast path) as you did in the previous example.

The End DFU Program Definition display allows you to save, to run, or to save and then run your newly defined DFU program. You can also return to the definition to make additional modifications to your program.

Your display appears as in Figure 2-49.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y            Y=Yes, N=No
  Run program . . . . . .   Y            Y=Yes, N=No
    Type of run . . . . . .  1           1=Change
                                         2=Display

  Modify program . . . . . .  N          Y=Yes, N=No


Location for saved DFU program:
  Program . . . . . .   INVPGM____
    Library . . . . . .  MYLIB_____
  Authority . . . . . .  *CHANGE___
  Text . . . . . .  INVENTORY MAINTENANCE RECORDS_____________________


F3=Exit      F14=Display definition      F17=Fast path
```

Figure 2-49. End DFU Program Definition Display

See "End DFU Program Definition Display" on page 2-35 for descriptions of the information on this display.

Note: Press F17 (Fast path) to automatically run the program. When you press F17 (Fast path), you do not see any other displays before running the program. To choose a specific member, other than the first in the file, press Enter. A display appears prompting you for program, file, and member information.

Example Action: Press Enter to save your program and continue to the Change a Data File display. Your display appears as in Figure 2-50 on page 2-58. For more information on the Change a Data File display, see "Change a Data File Display" on page 2-37.

```
                          Change a Data File

Type choices, press Enter.

  Program . . . . . .  INVPGM____   Name, F4 for List
    Library . . . . .  MYLIB_____   Name, *LIBL, *CURLIB

  Data file . . . . .  INVIDDU___   Name, *SAME, F4 for List

    Library . . . . .  MYLIB_____   Name, *LIBL, *CURLIB
  Member  . . . . . .  *FIRST____   Name, *FIRST, F4 for List




F3=Exit     F4=Prompt     F12=Cancel
The DFU program was saved successfully.
```

Figure 2-50. Change a Data File Display

Example Action: Press Enter. The first data entry display appears. Because this example assumes there are no records in the file, the display appears in Entry mode. Your display appears as in Figure 2-51.

```
INVENTORY MAINTENANCE RECORDS                Mode . . . . :   ENTRY
Format . . . . :   INVREC____                File . . . . :   INVIDDU


DATE:          ________
CUST. ORD. NO.: _____
CUSTOMER NO.:  _____
SHIP VIA:      ______________
SHIP TO:       __
PRICE OF ORDER: ______




F3=Exit                F5=Refresh              F6=Select format
F9=Insert              F10=Entry               F11=Change
```

Figure 2-51. Data Entry Display

From this display you can add new records to the INVIDDU data file. For information on how to add records to a file, see "Change a Data File Display" on page 2-37.

Example Action: After you are finished adding records, press F3 (Exit) to continue to the End Data Entry display. Press Enter to return to the AS/400 Data File Utility menu. From the AS/400 Data File Utility (DFU) menu, you can create or run another program, or change an existing DFU program as described in Chapter 3, "Changing a DFU Program."

Chapter 3. Changing a DFU Program

The Data File Utility (DFU) provides an easy way to change existing DFU programs. You can save the changed program (thus deleting the original version), or rename the changed program and preserve the original program.

Do not delete a DFU program before trying to change it using the OCL procedures ENTER, UPDATE, or INQUIRY from the System/36 environment. DFU bases the change on the program object itself. In order to change the program, leave the *Name of DFU program* prompt blank, and specify the name of the program you want to change in the *Name of DFU specification source member* prompt. Refer to the *System Reference for the System/36 Environment* for further information.

This chapter shows how to make a simple change to the INVMTN program created in Chapter 2, "Creating a DFU Program." The example shows how to delete the extended field definition of the ORDER field. This particular change must be made on the Define Fields display. The QINVFILE used by the sample program is an indexed DDS-described file.

Procedure for Changing a DFU Program

You use the same procedure to change a DFU program that you used to create a program. You can see a list of available programs by moving your cursor to the *Program* prompt and pressing F4 when using the Change a DFU Program display. Program and file lists provide an easy way for you to find and select programs and files to be used by DFU.

The rest of this chapter discusses the displays you use to make a simple change to the INVMTN program. The example shows the entries to type into each display to produce the changed sample program.

Perform the following steps to change a DFU program:

1. Sign on to the system.
2. Type STRDFU.
3. Press Enter. The AS/400 Data File Utility (DFU) menu appears. Your display appears as in Figure 3-1 on page 3-2.

```
                    AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program









Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 3-1. AS/400 Data File Utility (DFU) Menu

4. Select option 3 (Change a DFU program) from the AS/400 Data File Utility (DFU) menu. Your display appears as in Figure 3-2.

```
Selection or command
===> 3_____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 3-2. AS/400 Data File Utility (DFU) Menu with Option 3 Specified

5. Press Enter. The Change a DFU Program display appears.
6. Type data into the displays shown for this function as described in this chapter.

Change a DFU Program Display

The Change a DFU Program display allows you to specify the name of the existing DFU program you want to change. You can also specify use of a different data file for the changed program by typing the new data file name on this display. If you specify a different data file for your program, you must consider the following conditions:

- If the original data file was indexed, the new data file must also be indexed.
- If the original data file was nonindexed, the new data file must be nonindexed.

- Record formats and fields in the file must have the same names and attributes as in the original file.
- If you are in the System/36 environment, if you are changing a program that you originally defined using an RPG II file description and you have since converted the RPG II file description to an IDDU file description that is linked to the new file, DFU attempts to match your record types to the IDDU record formats.

Note: If you change a migrated System/36 DFU program on the AS/400 system, you lose all of your System/36 tailored information.

The entries in the *Program*, *Library*, and *Data file* prompts default to the values you previously specified from DFU. For this example, your first display for changing a program is similar to Figure 3-3.

```
                          Change a DFU Program

Type choices, press Enter.

  Program . . . . . .   INVPGM____    Name, F4 for List
    Library . . . . .   MYLIB_____    Name, *LIBL, *CURLIB

  Data file . . . . .   INVIDDU___    Name, *SAME, F4 for List

    Library . . . . .   MYLIB_____    Name, *LIBL, *CURLIB

F3=Exit     F4=Prompt     F12=Cancel
```

Figure 3-3. Change a DFU Program Display

Description of the information on the Change a DFU Program display is as follows:

Program. The name of the DFU program to change. To see a list of the DFU programs in the library specified in the *Library* prompt, move your cursor to the *Program* prompt and press F4. The Select Program display appears and you can select the program you want to change. See "Select Program Display" on page 3-5 for additional information. The defaults for the *Program* field are the following:

- The name you specified in the previous DFU session
- The name specified for the DFUPGM parameter if you used the STRDFU command

The prompt in the sample display shows the program you last specified in DFU. For this example, the INVPGM program created in Chapter 2, "Creating a DFU Program" is the last specified program.

Library. The name of the library containing the DFU program. The defaults are the following:

- The library specified in the previous DFU session
- The library name specified for the DFUPGM parameter if you used the STRDFU command
- The current library (*CURLIB)

The library shown in the sample display is MYLIB. This is a user-defined library. You can use another library or create a library called MYLIB using the Create Library (CRTLIB) command from any AS/400 command line.

Data file. The name of the data file on which the DFU program is to operate. DFU uses the name specified here if you run the DFU program without specifying a data file for the FILE parameter. To see a list of available data files, move your cursor to this prompt and press F4. A list of data files in the library specified on the *Library* prompt appears and you can then select the file you want from the list, if applicable. See "Select File Display" on page 2-8 for additional information. The defaults for the *Data File* field are the following:

- The data file you specified in the last DFU session
- *SAME if the field is blanked out
- The name you specified for the FILE parameter if you used the STRDFU command

The data file shown in the sample display is INVIDDU.

Library. The name of the library containing the desired data file. If you specify *LIBL, your library list is searched for the data file. The defaults are the following:

- The name of the library you specified in the previous DFU session
- The name you specify for the FILE parameter if you used the STRDFU command
- *LIBL, if DFU has not been previously used or if the field is blanked out
- The current library (*CURLIB)

In the sample display, the library containing the data file of interest is called MYLIB. The DFU program searches for INVIDDU in this library when you run the INVPGM program.

Example Action: The data file you want to use for this example is QINVFILE. Type QINVFILE in the *Data file* prompt. Assume you have forgotten the name of the program you want to change. Move your cursor to the *Program* prompt and blank out the default name. Your display appears as in Figure 3-4 on page 3-5.

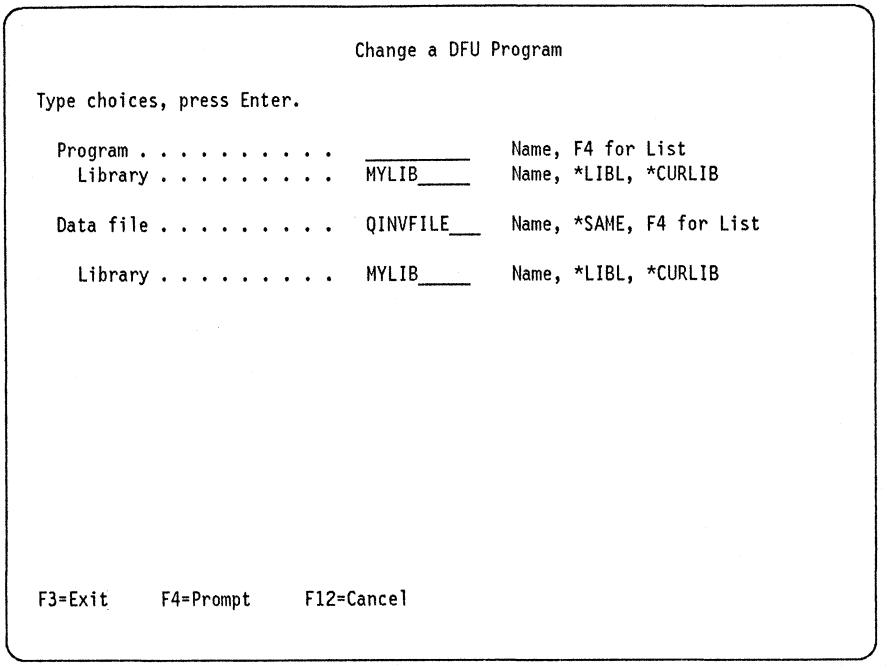


Figure 3-4. Change a DFU Program Display with Blank Program Name

Example Action: With your cursor still in the *Program* prompt, press F4. The Select Program display appears, showing the list of programs available in the MYLIB library. Select the program you want to change from this list.

Select Program Display

The Select Program display appears when you press F4 from a *Program* prompt on any DFU display. For this example, the display appears when you press F4 from the Change a DFU Program display. DFU presents a list of programs you are authorized to access in the specified library. Select the program you want to change from this list. DFU places the selected program into the *Program* prompt of the Change a DFU Program display when you press Enter. Your display appears similar to Figure 3-5 on page 3-6. Your MYLIB library may contain different programs.

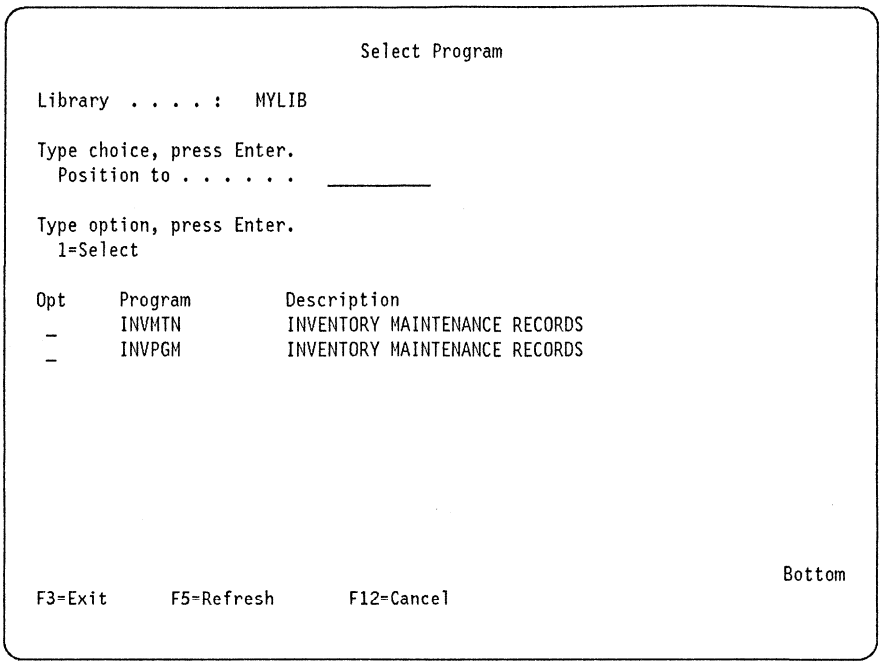


Figure 3-5. Select Program Display

Example Action: Type 1 (Select) in the *Opt* column next to the INVMTN program to select the INVENTORY MAINTENANCE RECORDS program for this example. Your display appears as in Figure 3-6.

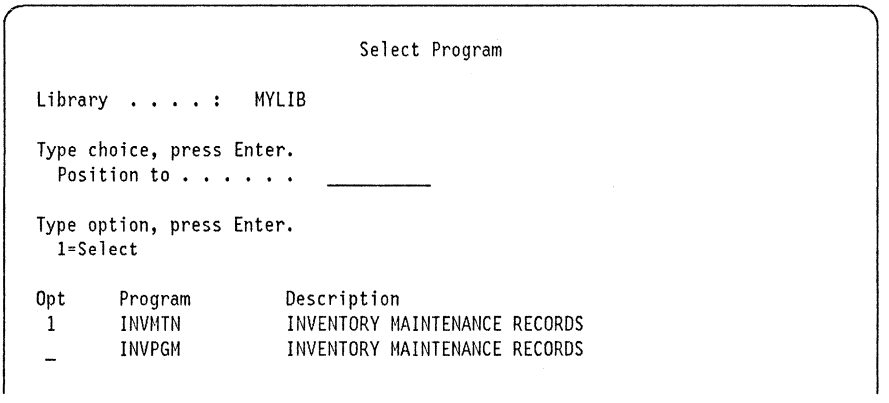


Figure 3-6. Select Program Display with INVMTN Selected

Description of the information on the Select Program display is as follows:

Library. The name of the library containing the listed programs.

The library in the sample display is *MYLIB*.

Position to. Indicates the alphameric position at which you want the list to start. The list starts at the top by default. Enter a character string (for example, the name of a known program) and press Enter. The list repositions to the program name you specify or to the nearest alphameric program name preceding your

entry in this prompt. You can use the special keywords *TOP and *BOT to reposition the list to the top or bottom respectively. The prompt defaults to blanks.

This prompt is blank in the sample display.

Opt. Indicates whether or not you want to select a program for processing. The *Opt* column defaults to blanks. If you want to select a program, type 1 (Select) in the *Opt* column next to the program of interest. You can select only one program for processing. When you press Enter, DFU places the selected program name into the *Program* field on the Change a DFU Program display.

Figure 3-7 shows selection of the INVMTN program for processing.

Description. Shows the object description of the program as defined in the program description.

Example Action: Press Enter to return to the Change a DFU Program display with the selected program. The INVMTN program name appears on the display. Your display appears as in Figure 3-7.

```
                          Change a DFU Program

Type choices, press Enter.

Program . . . . . .  INVMTN____   Name, F4 for List
  Library . . . . . .  MYLIB_____   Name, *LIBL, *CURLIB

Data file . . . . . .  QINVFILE___  Name, *SAME, F4 for List

  Library . . . . . .  MYLIB_____   Name, *LIBL, *CURLIB









F3=Exit     F4=Prompt     F12=Cancel
```

Figure 3-7. Change a DFU Program Display with Specified Program

Example Action: Press Enter. The General Information/Indexed File display appears. The information shown is based on the values you specified when you created your program. For this example, leave the default values that appear. Your display appears as in Figure 3-8 on page 3-8.

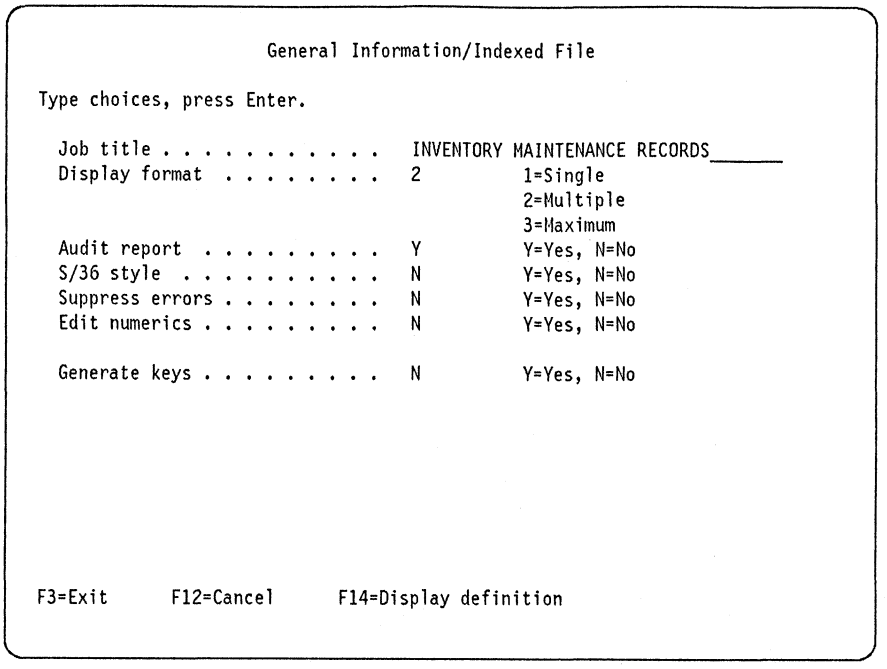


Figure 3-8. General Information/Indexed File Display with Example Entries

See "General Information/Indexed File Display" on page 2-11 for a description of the information on this display.

Example Action: Press Enter. The Select Audit Control display appears. The information shown is based on the values you specified when you created your program. For this example, leave the default values that appear. Your display appears as in Figure 3-9 on page 3-9.

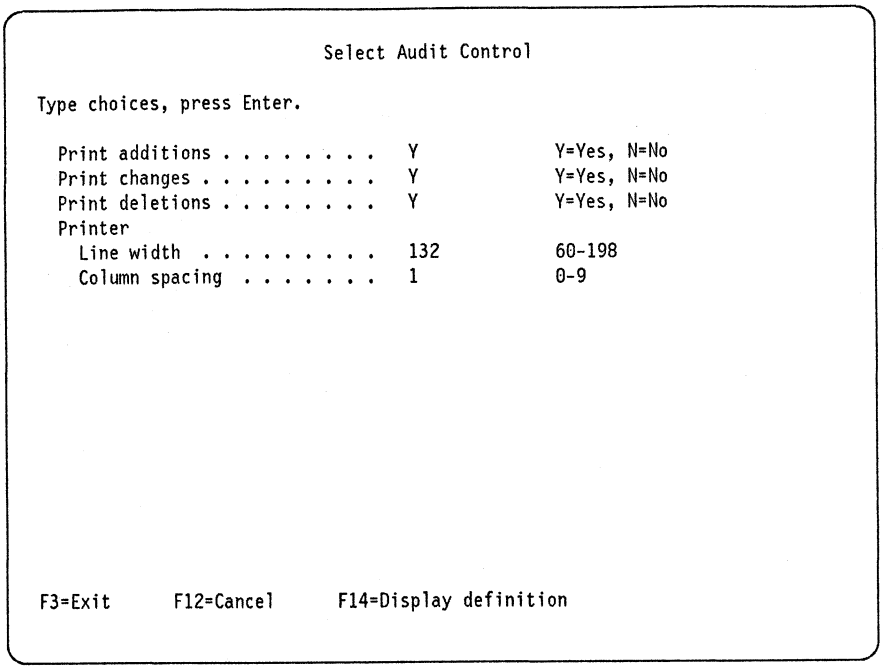


Figure 3-9. Select Audit Control Display

See "Select Audit Control Display" on page 2-14 for a description of the information on this display.

Example Action: Press Enter. The Select Record Formats display appears.

Select Record Formats Display

The Select Record Formats display appears if your data file is a DDS- or IDDU-described file. For this example, the display lists the various record formats available in the DDS-described file, QINVFILE. This example uses the same record format as the original program. Even if you want to use the same record format as the original program, you must select the format again to change the program.

You can select one or more formats for processing. If you select multiple record formats, DFU presents a new Select and Sequence Fields display and repeats the field definition sequence for each record format you select from this display.

The *Defined* prompt shows that the INVREC format has previously been defined for this program. Your display appears as in Figure 3-10 on page 3-10.

```
                          Select Record Formats

File . . . :   QINVFILE                      Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete

Opt  Format      Defined  Description
 _   INVREC         Y     INVENTORY MAINTENANCE RECORDS
 _   SALESREC       N     SALES RECORDS

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 3-10. Select Record Formats Display

Example Action: Type 1 (Select) next to the INVREC format to select the inventory maintenance records for processing by the sample INVMTN program. Your display appears as in Figure 3-11.

```
                          Select Record Formats

File . . . :   QINVFILE                      Library . . . . :   MYLIB

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete

Opt  Format      Defined  Description
 1   INVREC         Y     INVENTORY MAINTENANCE RECORDS
 _   SALESREC       N     SALES RECORDS
```

Figure 3-11. Select Record Formats Display with INVREC Selected

See "Select Record Formats Display" on page 2-15 for additional information about this display.

Example Action: Press Enter. The Select and Sequence Fields display appears. For this example, it is not necessary to change anything on the Select and Sequence Fields display. DFU has renumbered the field sequence numbers starting at 10 and increasing in units of 10. It has not changed the sequence of the fields. Renumbering in this fashion just makes it easier for you to insert new fields without manually renumbering subsequent fields. Your display appears as in Figure 3-12 on page 3-11.

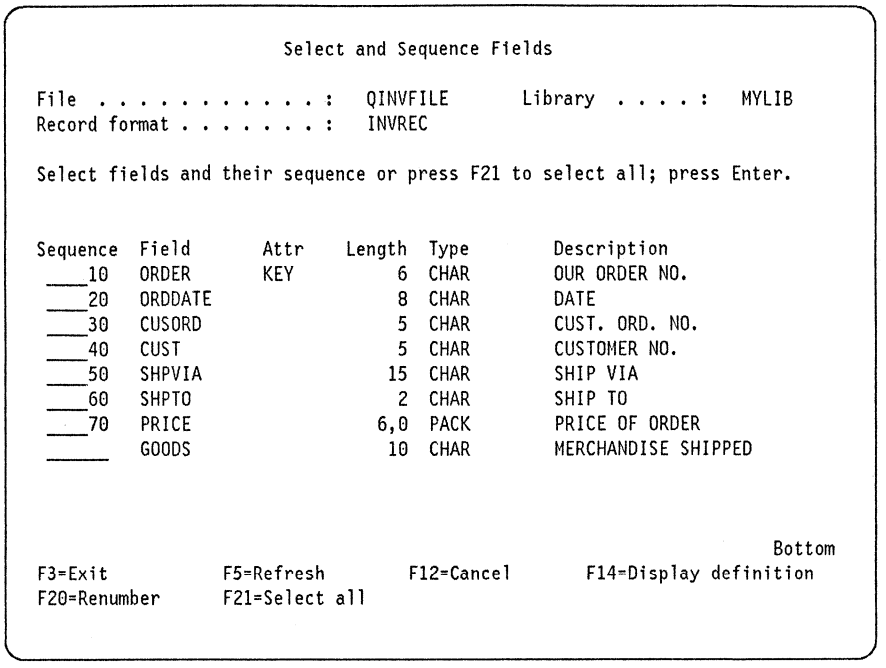


Figure 3-12. Select and Sequence Fields Display with Fields Renumbered

See "Select and Sequence Fields Display" on page 2-17 for a description of the information on this display.

Example Action: Leave the default entries and press Enter. Press Enter again to confirm and to continue to the Define Fields Display.

Define Fields Display

The Define Fields display is the destination display for this example. The example shows how to remove the extended heading definition for the ORDER field. The Define Fields display appears when you press Enter from the Select and Sequence Fields display. Currently, the ORDER, ORDDATE, and PRICE fields have extended definitions. The presence of an extended definition is designated by a Y in the *Extended Definition* prompt. Your display appears as in Figure 3-13 on page 3-12.

```
                              Define Fields

File . . . . . :     QINVFILE      Library . . . . :    MYLIB
Record format . . . . . :     INVREC

Type options, or press F21 to select all; press Enter.
  1=Select for extended definition
  4=Delete extended definition


                   Extended
Opt  Field         Definition   Heading
 _   ORDER             Y       OUR ORDER NO._______
 _   ORDDATE           Y       DATE_________________
 _   CUSORD            N       CUST. ORD. NO._______
 _   CUST              N       CUSTOMER NO._________
 _   SHPVIA            N       SHIP VIA_____________
 _   SHPTO             N       SHIP TO______________
 _   PRICE             Y       PRICE OF ORDER_______

                                                          Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 3-13. Define Fields Display

Example Action: Type 4 (Delete extended definition) in the *Opt* column next to the ORDER field to remove the extended definition you defined when you created this DFU program. Your display appears as in Figure 3-14.

```
                              Define Fields

File . . . . . :     QINVFILE      Library . . . . :    MYLIB
Record format . . . . . :     INVREC

Type options, or press F21 to select all; press Enter
  1=Select for extended definition
  4=Delete extended definition


                   Extended
Opt  Field         Definition   Heading
 4   ORDER             Y       OUR ORDER NO._______
 _   ORDDATE           Y       DATE_________________
 _   CUSORD            N       CUST. ORD. NO._______
 _   CUST              N       CUSTOMER NO._________
 _   SHPVIA            N       SHIP VIA_____________
 _   SHPTO             N       SHIP TO______________
 _   PRICE             Y       PRICE OF ORDER_______

                                                          Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure 3-14. Define Fields Display with Selection to Remove a Definition

Example Action: Press Enter to remove the extended definition for this field and continue to the End DFU Program Definition display.

Note: If you type 1 (Select for extended definition) next to a field to select that field for an extended definition, the Specify Extended Field Definition display appears next. Even if a field already has an existing extended definition, this display does not appear automatically. Reselect the field if you want to change the definition. See Chapter 2, "Creating a DFU Program" for information on these displays.

End DFU Program Definition Display

The End DFU Program Definition display is the final display in the definition process. This display allows you to save, save and run, or run the defined DFU program. Your display appears as in Figure 3-15.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y          Y=Yes, N=No
  Run program . . . . . .   Y          Y=Yes, N=No
    Type of run . . . . .   1          1=Change
                                       2=Display

  Modify program . . . . .  N          Y=Yes, N=No


Location for saved DFU program:
  Program . . . . . .   INVMTN____
    Library . . . . .   MYLIB_____
  Authority . . . . .   *CHANGE___
  Text  . . . . . .     INVENTORY MAINTENANCE RECORDS_____________________




F3=Exit      F14=Display definition      F17=Fast path
```

Figure 3-15. End DFU Program Definition Display

Example Action: Type 2 (Display) over the default setting in the *Type of run* prompt. This example saves the INVMTN program and then runs the program in Display mode. This gives you a chance to check the data entry display you have just changed. Display mode allows you to look at records in the QINVFILE file, but not change them.

Press Enter. The End DFU Program Definition display reappears and prompts you to confirm that you want to replace the original program with the changed version. Your display appears as in Figure 3-16 on page 3-14.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y           Y=Yes, N=No
  Run program . . . . . .   Y           Y=Yes, N=No
    Type of run . . . . . .  2          1=Change
                                        2=Display

  Modify program . . . . . .  N         Y=Yes, N=No


Location for saved DFU program:
  Program . . . . . .   INVMTN____
    Library . . . . . .  MYLIB_____
  Authority . . . . . .  *CHANGE___
  Text . . . . . .      INVENTORY MAINTENANCE RECORDS_____________________




F3=Exit      F14=Display definition      F17=Fast path
INVMTN already exists. Press Enter or F17 to replace it.
```

Figure 3-16. End DFU Program Definition Display with Display Option Chosen

Example Action: Press Enter to confirm that you want to replace the program with the changed version. The Display a Data File display appears.

Display a Data File Display

The Display a Data File display allows you to specify the data file you want to look at. See Chapter 4, "Running a DFU Program" for additional information about running DFU programs. When displayed from the End DFU Program Definition display, as for this example, this display contains default entries based on the information you specified on that display. Your display appears as in Figure 3-17 on page 3-15.

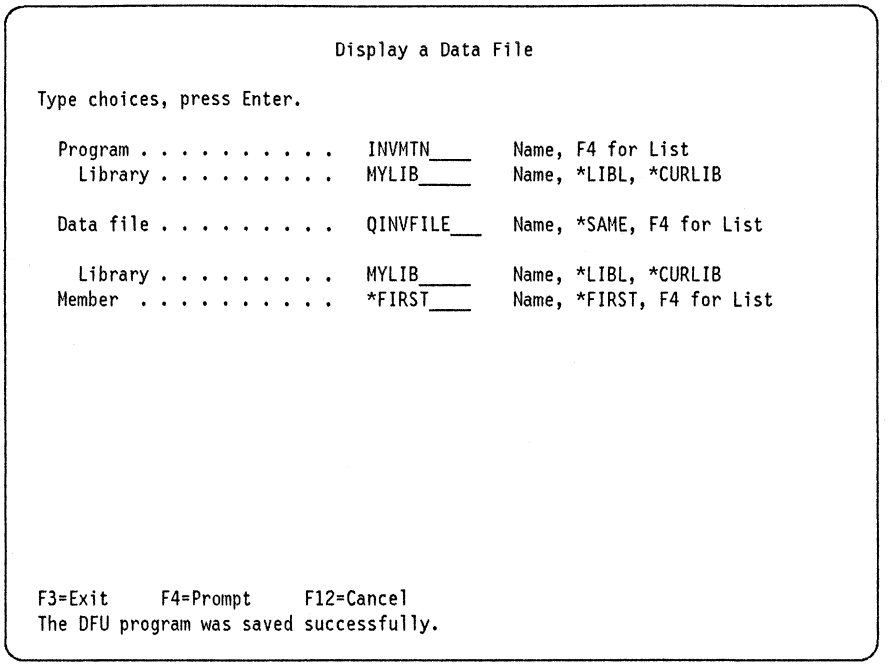


Figure 3-17. Display a Data File Display

Description of the information on the Display a Data File display is as follows:

Program. The name of the program you want to run. To see a list of available programs, move your cursor to this prompt and press F4. The Select Program display appears and you can select the program you want to run. The defaults for the *Program* field are the following:

- The program name used on the End DFU Program Definition display
- The value specified for the DFUPGM parameter if you used the DSPDTA or STRDFU commands

The sample display shows the INVMTN program that was specified on the End DFU Program Definition display.

Library. The name of the library containing the DFU program. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name used on the End DFU Program Definition display
- The value specified for the DFUPGM parameter if you used the DSPDTA or STRDFU commands

The sample display shows the MYLIB library that was specified on the End DFU Program Definition display for the sample INVMTN program.

Data file. The name of the data file to be displayed by your DFU program. To see a list of available data files, move your cursor to this prompt and press F4. The defaults are the following:

- The file specified on the End DFU Program Definition display
- The file specified for the FILE parameter if you used the DSPDTA or STRDFU commands
- The file specified in the DFU program (*SAME) if you leave this prompt blank

The sample display shows QINVFILE as the data file that was specified on the End DFU Program Definition display.

Library. The name of the library containing the data file. The defaults are the following:

- The library specified on the End DFU Program Definition display
- The library specified for the DSPDTA or STRDFU commands
- The library specified in the DFU program (*SAME) if you leave this prompt blank
- The current library (*CURLIB)

The sample display shows MYLIB as the library containing the data file.

Member. The name of the source member in the data file you want to display. For DDS- or IDDU-described data files, the member is the same as the file.

Example Action: Press Enter. Your data entry display appears as in Figure 3-18 on page 3-17.

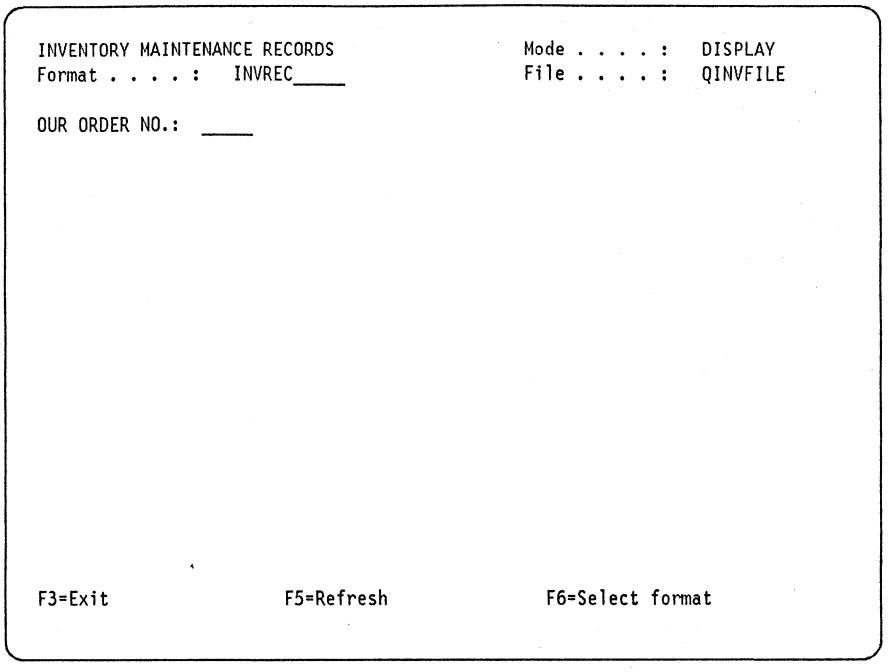


Figure 3-18. Data Entry Display in Display Mode

Example Action: Press Page Up to view the records that you have added. Note that the OUR ORDER NO field no longer appears with an extended field heading as it did on the original data entry display (see "Data Entry Display Example" on page 2-1 for comparison).

Note: You may also view records in a file by typing in the key value and pressing Enter. The record will appear.

Example Action: When you are finished viewing the records, press F3 (Exit) to go to the End Data Display. Your display appears as in Figure 3-19 on page 3-18.

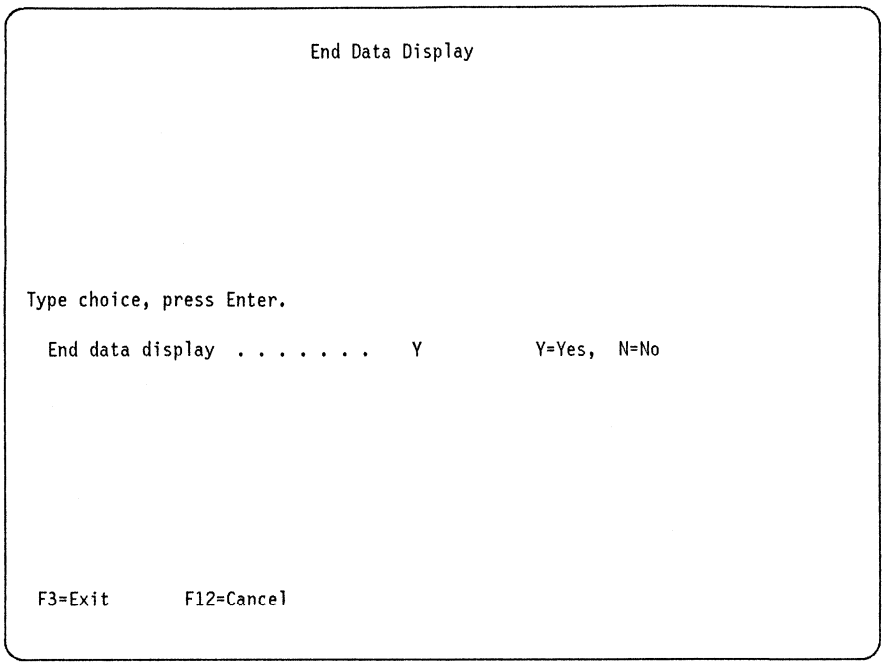


Figure 3-19. End Data Display

Note: The audit control information does not appear on the End Data Display because you cannot make changes to the data file.

Example Action: Press Enter to end this DFU session and to return to the AS/400 Data File Utility (DFU) menu.

Chapter 4. Running a DFU Program

This chapter shows how to run an existing Data File Utility (DFU) program. The example shows how to add new records to the QINVFILE file using the INVMTN program you created in Chapter 2, "Creating a DFU Program," and changed in Chapter 3, "Changing a DFU Program."

You can perform the following functions from a data entry display (see "Run-Time Function Keys" on page 1-5 for a complete list of run-time function keys):

- Add new records
- Change existing records
- Delete records
- Refresh the display with the original values
- Automatically duplicate fields from previously displayed records
- Change modes to Insert, Change, or Entry
- Print records from the Display mode
- Display accumulator totals for added, changed, and deleted records
- Check the run status
- Page through records

Procedure for Running a DFU Program

Perform the following steps to run a DFU program:

1. Sign on to the system.
2. Type STRDFU.
3. Press Enter. The AS/400 Data File Utility (DFU) menu appears. Your display appears as in Figure 4-1 on page 4-2.

```
                    AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program









Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989
```

Figure 4-1. AS/400 Data File Utility (DFU) Menu

4. Select option 1 (Run a DFU program) from the AS/400 Data File Utility (DFU) menu. Your display appears as in Figure 4-2.

```
Selection or command
===> 1_____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989
```

Figure 4-2. AS/400 Data File Utility (DFU) Menu with Option 1 Specified

5. Press Enter. The Run a DFU Program menu appears.

Run a DFU Program Menu

The Run a DFU Program menu allows you to select the type of activity you want to perform on a data file using an existing DFU program. You can either change a data file, or display records of a data file.

The DFU program runs in one of four modes: Entry, Change, Insert, or Display. The initial mode of data entry depends on your selection from the Run a DFU Program menu. You can change the mode using an associated function key. The initial mode for option 1 (Change a data file) is Change, provided there are records in the file that can be changed. Otherwise, Entry is the initial mode. Entry mode allows you to add records to an empty data file. The initial mode for

option 2 (Display a data file) is Display. From Display mode, you can only look at data file records, you cannot change them.

Refer to "DFU Function Keys" on page 1-4 for a list of applicable function keys for running a DFU program.

After selecting option 1 (Run a DFU program) from the AS/400 Data File Utility (DFU) menu, your display appears as in Figure 4-3.

```
                              Run a DFU Program

Select one of the following:

     1. Change a data file
     2. Display a data file

Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel
```

Figure 4-3. Run a DFU Program Menu

Example Action: Type 1 (Change a data file) on the command line and press Enter to continue to the Change a Data File display.

Change a Data File Display

The Change a Data File display appears when you select option 1 from the Run a DFU Program menu and press Enter. This display gives you the opportunity to specify the name of the program you want to use for working on a data file. You can use the default data file specified by the program, or specify a different data file by typing the new file name in the *Data file* prompt of this display.

Note: If you specify a different data file, you must make sure that data file meets the conditions discussed in "Change a DFU Program Display" on page 3-2.

After you select option 1 from the Run a DFU Program menu, the Change a Data File display appears. The prompts show the names you specified when you created the program for this example, if this was the last time you were in DFU. Your display appears as in Figure 4-4 on page 4-4.

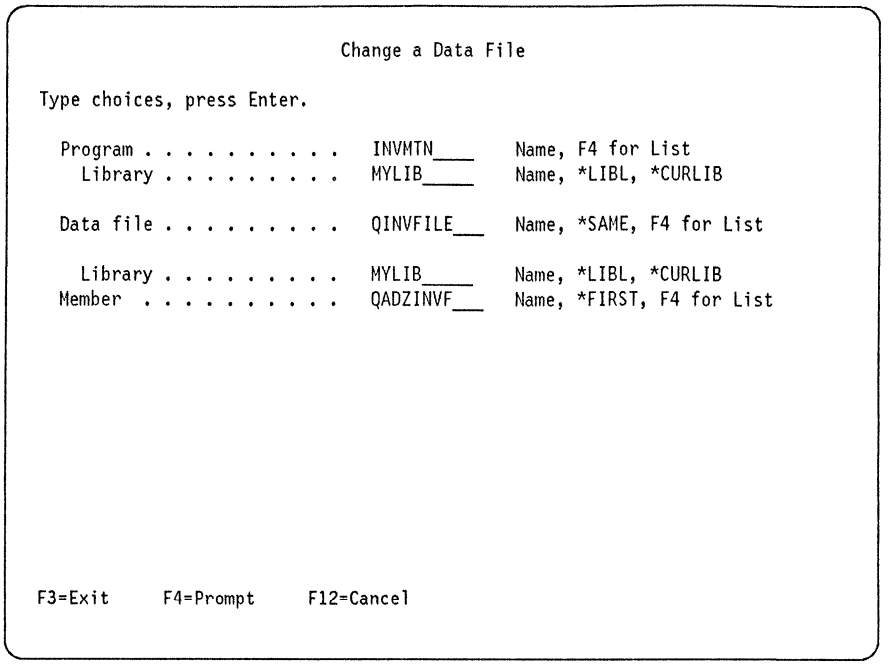


Figure 4-4. Change a Data File Display

Description of the information on the Change a Data File display is as follows:

Program. The name of the program you want to run. To see a list of available programs, move your cursor to this prompt and press F4. The Select Program display appears and you can select the program you want to run. See "Select Program Display" on page 3-5 for additional information. The defaults for the *Program* prompt are the following:

- The program name used on the End DFU Program Definition display
- The value specified for the DFUPGM parameter if you used the CHGDTA or STRDFU commands

The program selected in the sample display is the INVMTN program.

Library. The name of the library containing the DFU program. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name used on the End DFU Program Definition display
- The value specified for the DFUPGM parameter if you used the CHGDTA or STRDFU commands

The library shown in the sample program is MYLIB.

Data file. The name of the data file to be changed by your DFU program. To see a list of available data files, move your cursor to this prompt and press F4. The defaults are the following:

- The file specified on the End DFU Program Definition display
- The file specified for the FILE parameter if you used the CHGDTA or STRDFU commands
- The file specified in the DFU program (*SAME) if you leave this prompt blank

The data file shown in the sample display is QINVFILE.

Library. The library containing the data file. The defaults are the following:

- The current library (*CURLIB)
- The library specified on the End DFU Program Definition display
- The library specified for the CHGDTA or STRDFU commands
- The library specified in the DFU program (*SAME) if you leave the prompt blank

The library shown on the sample display is MYLIB.

Member. The name of the member in the data file that you want to change.

Example Action: Move your cursor to the *Member* prompt and press F4 to display a list of available members for the QINVFILE data file. The Select Data File Member display appears.

Select Data File Member Display

The Select Data File Member display appears when you press F4 from a display containing a *Member* prompt. DFU presents a list of data file members that are in the specified data file. If your program is for a DDS- or IDDU-described data file that does not have members, the list contains only one member which is the same as your data file (as in this example). Your display appears as in Figure 4-5 on page 4-6.

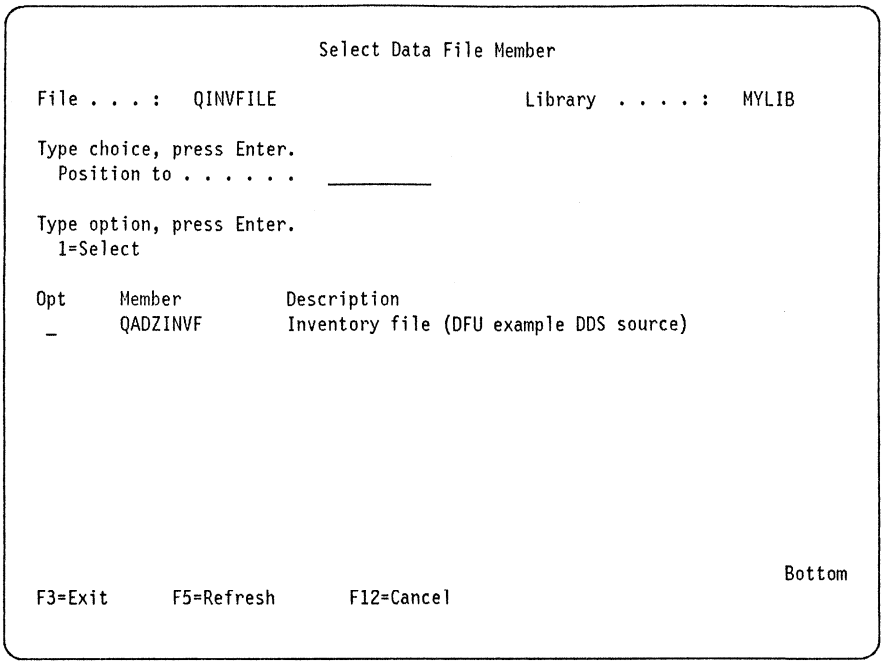


Figure 4-5. Select Data File Member Display

Description of the information on the Select Data File Member display is as follows:

File. The name of the data file containing the listed members shown on this display.

The data file shown in the sample display is QINVFILE.

Library. The name of the library containing the specified data file.

The library shown in the sample display is MYLIB.

Position to. The members are shown in alphameric order on this display. To start at a specific position in the list, type a character string (for example, the name of a known member) and press Enter. The list repositions to the member name you specify or to the nearest alphameric member name preceding your entry in this prompt. You can use the special keywords *TOP and *BOT to reposition the list to the top or bottom respectively. The prompt defaults to blanks.

This prompt is blank in the sample display.

Opt. Indicates that you want to select a member for processing. All prompts default to blank. If you want to select a member, type 1 (Select) in the *Opt* column next to the member of interest. You can select only one member for processing. When you press Enter, DFU places the selected member name into the *Member* prompt on the display from which you requested the list. For this example, DFU returns to the Change a Data File display with the selected member.

None of the members are selected for this example. The first member has already been specified by default, and you do not have to select it again.

Member. The name of each member in the data file. If your data file is externally described by DDS or IDDU, then the list contains only one member which is the same as the data file.

The sample display shows only one member for the DDS-described QINVFILE file.

Description. Shows the description of the member as defined in the file description.

Example Action: Press F12 (Cancel) to return to the Change a Data File display without processing any selections. You do not need to select a member for this example. DFU already uses the QINVFILE member by default, as shown on Figure 4-4 on page 4-4, and you do not have to select it again. Your display appears as in Figure 4-6.

```
                          Change a Data File

Type choices, press Enter.

  Program . . . . . .   INVMTN____   Name, F4 for List
    Library . . . . .   MYLIB_____   Name, *LIBL, *CURLIB

  Data file . . . . .   QINVFILE___  Name, *SAME, F4 for List

    Library . . . . .   MYLIB_____   Name, *LIBL, *CURLIB
  Member  . . . . . .   QADZINVF___  Name, *FIRST, F4 for List









F3=Exit     F4=Prompt     F12=Cancel
No items were selected from the list.
```

Figure 4-6. Change a Data File Display

Example Action: Press Enter to continue to the first data entry display. The key field OUR ORDER NO appears, allowing you to type a key value to retrieve the specified data base record you want to work with. Your display appears as in Figure 4-7 on page 4-8.

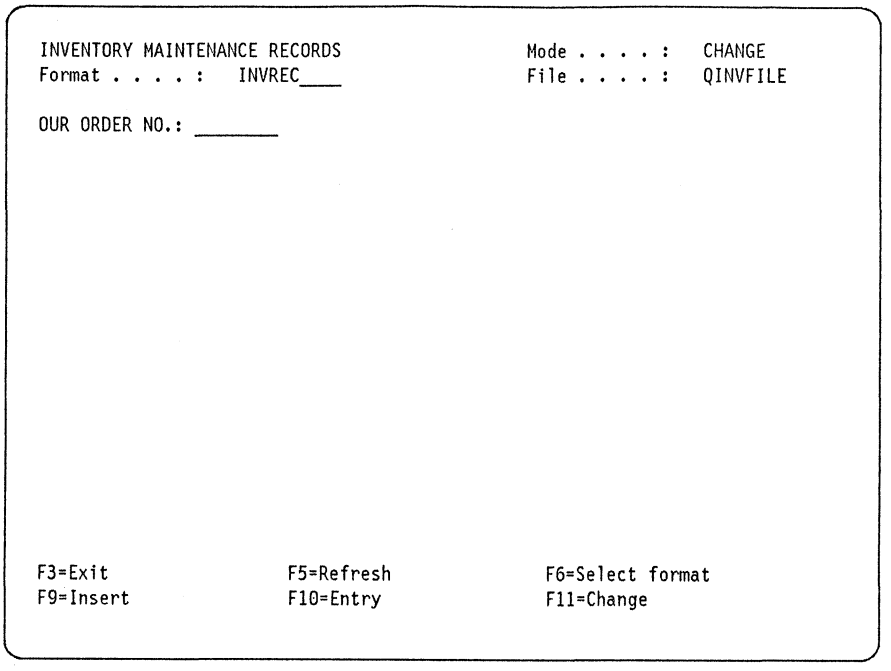


Figure 4-7. Data Entry Display in Change Mode

This data entry display is in Change mode because you added a record to QINVFILE in Chapter 2, "Creating a DFU Program" on page 2-1 (see Figure 2-34 on page 2-40). The data file is no longer empty. If the data file is empty, this display appears in Entry mode.

If all of the fields you selected for this program cannot fit on one display, there may be more than one display for a record. If so, press Enter to advance to the additional fields. Press F12 to move backward through the fields.

To change to a different record format, press F6 (Select format), or move the cursor to the *Format* prompt and enter the name of the record format you want and press Enter.

Example Action: Press F10 (Entry) to move into Entry mode to add new records. Type the information shown in Figure 4-8 on page 4-9 into the data entry display to create a new record for this example.

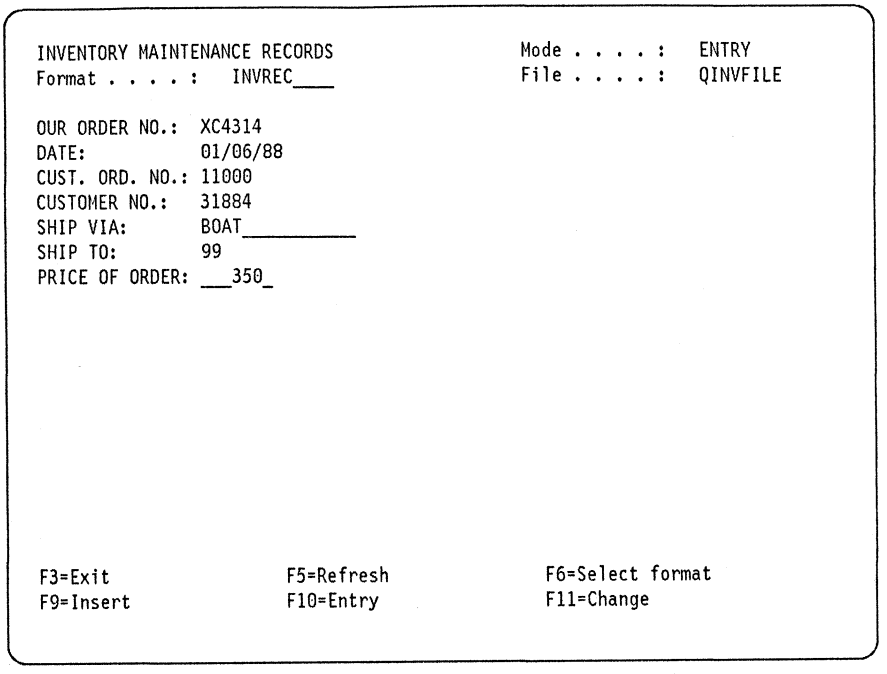


Figure 4-8. Data Entry Display with Example Record Information

Description of the information on this data entry display is as follows:

INVENTORY MAINTENANCE RECORDS. Your defined job title. It is the same for all data entry displays for this DFU program.

Mode. The current mode. There are four possible modes: Entry, Change, Insert, or Display (if you selected option 2 from the Run a DFU Program menu). The activities you perform in each mode are as follows:

- Entry mode is used to add new records at the end of a file (sequential entry). This is the default mode.
- Change mode is used to change existing records in the file.
- Insert mode is used to insert records anywhere in the file. If the file is processed sequentially, insert mode is identical to entry mode, that is, records are added to the end of the file.
- Display mode is used to view records but not to change them.

Format. Shows the current record format. DFU always presents the first record format selected when you defined your program. You can change the displayed format by pressing F6 (Select format) or by typing the new format into the *Format* prompt and pressing Enter.

The current record format shown in the sample display is INVREC.

File. The name of the data file being edited.

QINVFILE is the processed file shown in the sample display.

OUR ORDER NO. Your defined record key field for this display. Note that the record key field is highlighted. This format may differ depending on whether or not you have an indexed or a nonindexed file, single or multiple keys, or an AS/400 System versus a System/36 display style.

DATE, CUST. ORD. NO., CUSTOMER NO., SHIP VIA, SHIP TO and PRICE OF ORDER. The headings for each of the data input fields you selected. The fields are grouped in a single-data column (one field per line), even though the specified format was for multiple columns. For this number of fields, all of the display formats result in the same grouping. The display format is specified on the General Information display.

Example Action: Press Enter to process the new record. DFU adds the record to the QINVFILE data file and clears off the display so you can add information for another new record.

Press F22 (Auto-dup) if you want to turn on the automatic duplication function for this example. In the INVMTN program, the DATE field is the only field defined for automatic duplication. You specified this feature in the example shown in Figure 2-23 on page 2-26. Each time you create a new record, DFU copies the DATE from the last record into the new record. Automatic duplication switches on and off when you press F22 (Auto-dup). Press F21 (Status) if you want to check the status of the automatic duplication function. DFU duplicates the date from the record you just saved into the DATE field.

Your display appears as in Figure 4-9.

```
INVENTORY MAINTENANCE RECORDS                Mode . . . . :   ENTRY
Format . . . . :   INVREC___                 File . . . . :   QINVFILE

OUR ORDER NO.:
DATE:          01/06/88
CUST. ORD. NO.:
CUSTOMER NO.:
SHIP VIA:
SHIP TO:
PRICE OF ORDER:

F3=Exit              F5=Refresh          F6=Select format
F9=Insert            F10=Entry           F11=Change
```

Figure 4-9. Data Entry Display with Duplicated Field

Example Action: Press F17 (Display and print accumulators). The Display Batch Accumulators display appears.

Display Batch Accumulators Display

The Display Batch Accumulators display appears if you press F17 (Display and print accumulators) from a data entry display, or when you have finished a job and have accumulator fields. The Display Batch Accumulators display shows a running total of the value for designated accumulator fields since you last requested to look at this display. (The previous subtotal is added to a total accumulator each time you access this display.) During data entry, press Enter to return to the data entry display. At the end of data entry (after you leave the End Data Entry display), press Enter to look at the accumulator totals described in "Display Total Accumulators Display" on page 4-19.

For example, in the INVMTN program, you specified the PRICE field as an accumulator field when you defined the program. The Display Batch Accumulators display shows the subtotal of the value of the PRICE field. Because you created only one record in this example, the subtotal for the PRICE field is 350. If you had added two records with prices of 100, and 20, the subtotal would be 120. If you deleted the first record, the new subtotal would be 20. See "Specify Extended Field Definition Display for Numeric Fields" on page 2-26 for a detailed discussion about the DFU accumulate function.

Your display appears as in Figure 4-10.

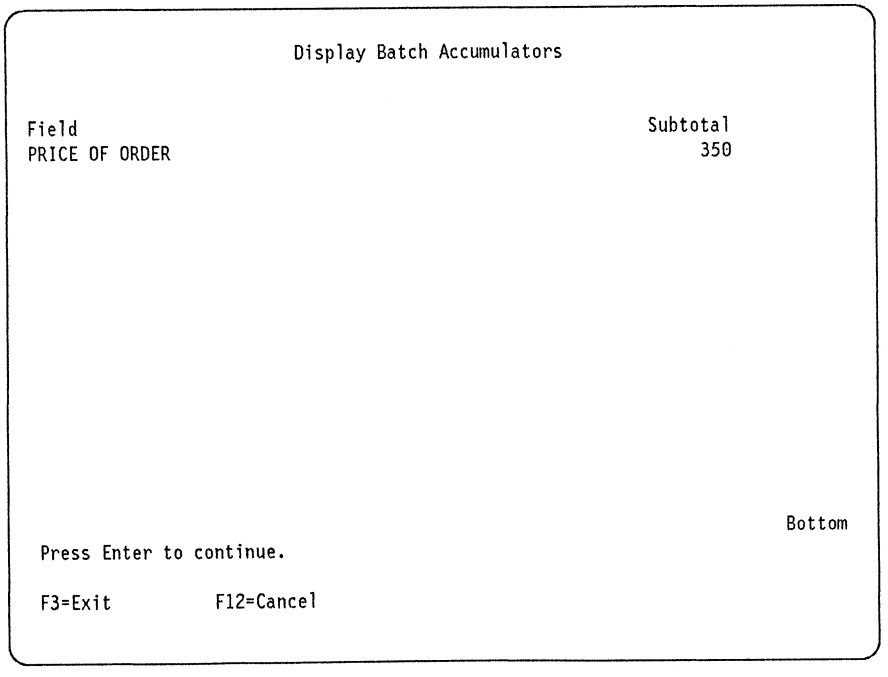


Figure 4-10. Display Batch Accumulators Display

Description of the prompts on the Display Batch Accumulators display is as follows:

Field. The name of the field for the accumulator subtotal.

Subtotal. The batch total for the field.

Example Action: Press F12 (Cancel) to return to the data entry display. Press F6 (Select format) to see the list of available record formats for this program. The Select a Record Format display appears.

Select a Record Format Display

The Select a Record Format display appears when you press F6 (Select format) from a data entry display for an externally described DDS or IDDU file. This display allows you to select a new record format for your data entry display. DFU shows one available record format for the sample QINVFILE data file. The INVREC format is the only format you selected when you created the example INVMTN program. If you had selected additional formats for your DFU program, all of those selected would appear on this list.

Your display appears as in Figure 4-11.

```
                          Select a Record Format

Type option, press Enter.
  1=Select

Opt  Format         Description
 _   INVREC         INVENTORY MAINTENANCE RECORDS

                                                                    Bottom
F3=Exit          F5=Refresh          F12=Cancel
```

Figure 4-11. Select a Record Format Display

Example Action: Type 1 (Select) in the *Opt* prompt to continue using the INVREC record format. Your display appears as in Figure 4-12.

```
                          Select a Record Format

Type option, press Enter.
  1=Select

Opt  Format         Description
 1   INVREC         INVENTORY MAINTENANCE RECORDS
```

Figure 4-12. Select a Record Format Display

Description of the information on the Select a Record Format display is as follows:

Opt. Indicates whether or not you want to select a record format. Type 1 (Select) to select a format. You can only select one record format at a time. All prompts default to blank.

The sample display shows option 1 (Select) to select the INVREC format again.

Format. The list of available record formats for this data file. An entry in the list consists of a 10-character format name as defined in the external file definition or the IDDU file definition used to create the DFU program.

Description. The format description for each record format as described in the external DDS or IDDU file definition.

Example Action: Press Enter to return to the data entry display for the selected record format. In this example, you return to the same data entry format you had before. Your display appears as in Figure 4-13.

```
INVENTORY MAINTENANCE RECORDS                Mode . . . . :  ENTRY
Format . . . . :   INVREC____                File . . . . :  QINVFILE

OUR ORDER NO.:  _________
DATE:           01/06/88
CUST. ORD. NO.: ____
CUSTOMER NO.:   ____
SHIP VIA:       _______________
SHIP TO:        _
PRICE OF ORDER: ______




F3=Exit                F5=Refresh              F6=Select format
F9=Insert              F10=Entry               F11=Change
```

Figure 4-13. Data Entry Display after Looking at Available Record Formats

Example Action: From the data entry display, press F21 (Status) to display the status of this run job.

Run Status Display

The Run Status display shows the current status of the DFU program being run. This display appears when you press F21 (Status) from a data entry display. Your display appears as in Figure 4-14.

```
                          Display Run Status


 Program . . . . . :   INVMTN
   Library . . . . . :   MYLIB
 Data file . . . . . :   QINVFILE
   Library . . . . . :   MYLIB
 Member . . . . . :    QADZINVF
 Record format . . . . . :   INVREC
 Last format . . . . . :   INVREC

 Current active functions:
   Mode . . . . . :   ENTRY
   Auto-dup . . . . . :   ON
   Auto advance . . . . . :   OFF

 Press Enter to continue.




 F3=Exit          F12=Cancel
```

Figure 4-14. Display Run Status Display

Description of the information on the Display Run Status display is as follows:

Program. The name of the DFU program being run.

Library. The name of the library containing the program.

Data file. The name of the data file being edited.

Library. The name of the library containing the data file.

Member. The member in the data file being edited.

Record format. The current record format.

Last format. The last used record format.

Mode. The current mode (Entry, Change, Insert, Display).

Auto-dup. Indicates whether the automatic duplication function is currently on or off.

Auto advance. Indicates whether the automatic record advance is ON or OFF. You can switch the auto advance ON and OFF while you are running the

program by pressing F20 (Automatic record advance). When ON, DFU processes the contents of a data entry display as soon as you finish entering data into the last prompt on the data entry display.

Example Action: Press Enter to return to the data entry display. Your display appears as in Figure 4-15.

```
INVENTORY MAINTENANCE RECORDS                  Mode . . . . :   ENTRY
Format . . . . :  INVREC____                   File . . . . :   QINVFILE

OUR ORDER NO.:  ______
DATE:           01/06/88
CUST. ORD. NO.: ______
CUSTOMER NO.:   ______
SHIP VIA:       _______________
SHIP TO:        __
PRICE OF ORDER: _______






F3=Exit                 F5=Refresh                F6=Select format
F9=Insert               F10=Entry                 F11=Change
```

Figure 4-15. Data Entry Display

Example Action: Assume that the SHIP TO value in the record you added is incorrect. To change an existing record in the QINVFILE file, press F11 (Change) to enter Change mode. Type the key value (XC4314) in the OUR ORDER NO key field and press Enter.

Note: DFU retrieves the record from the file and shows the contents of the record so that you can change it.

Your display appears as in Figure 4-16 on page 4-16.

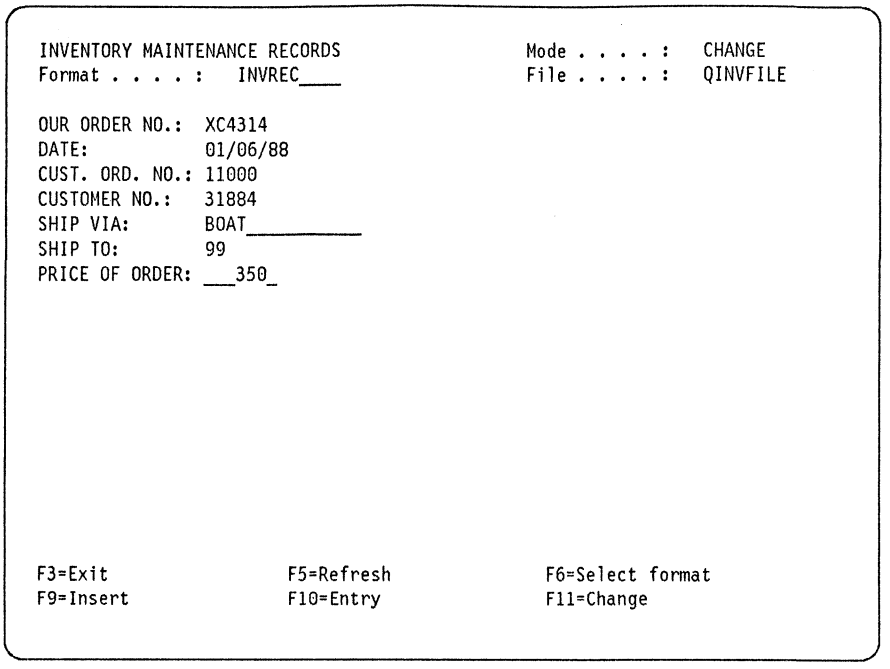


Figure 4-16. Data Entry Display in Change Mode

Note: You can change all the field values in the record except for the key field, OUR ORDER NO.

Example Action: Type in the correct value in the SHIP TO field. Your display appears as in Figure 4-17.

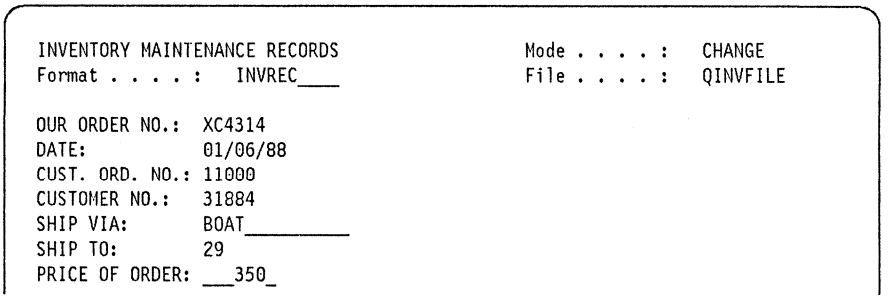


Figure 4-17. Data Entry Display with Changed Record

Example Action: Press Enter to change the record. DFU changes the record in the QINVFILE data file and clears the display. You can continue to change records by entering other key values. When you have no records left to process, press F3 (Exit) to go to the End Data Entry display and end this session.

End Data Entry Display

The End Data Entry display appears when you press F3 (Exit) from your data entry display. This display summarizes the changes made to the data file during the current session. You can exit the DFU data entry program from this display. When you end the data entry session, DFU prints the audit report if you requested it in your DFU program.

The display shown in Figure 4-18 shows that you have added one record and changed one record during the current session. The informational message indicates that all records you added, changed, or deleted are printed. This message appears because you selected to print an audit report on the General Information/Indexed File display.

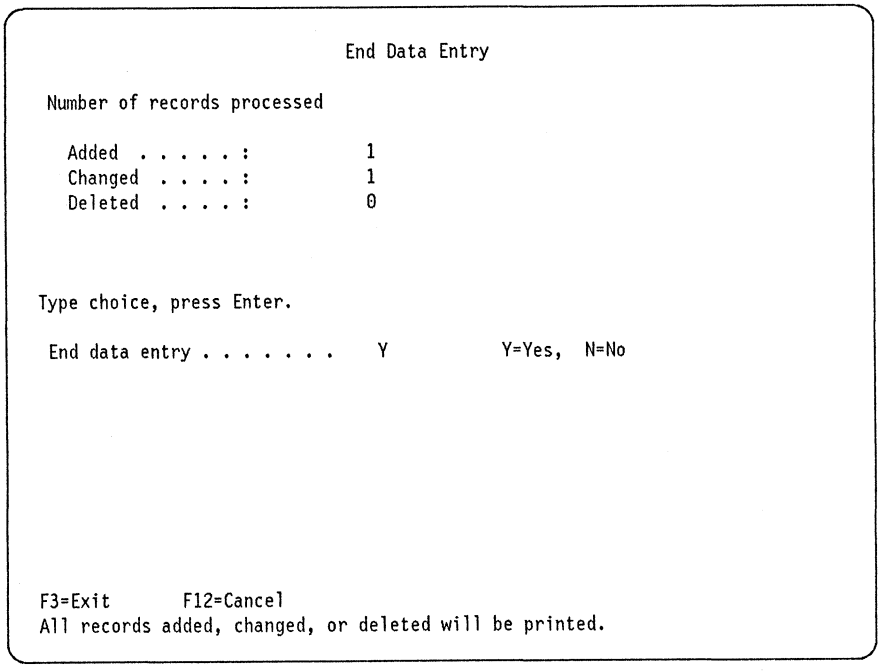


Figure 4-18. End Data Entry Display

Description of the information on the End Data Entry display is as follows:

Added. Shows the total number of new records added to the file. The sample exercise for the INVMTN program created only one record for the file QINVFILE.

Changed. Shows the total number of records changed in the file.

Deleted. Shows the total number of records deleted from the file.

Note: The above three prompts do not appear when you have just completed a data entry session using Display mode because records cannot be changed in Display mode.

End data entry. Specifies whether or not to end the data entry session. The prompt requires a Y (Yes) or N (No) answer. The prompt defaults to Y (Yes). If you select N (No), you return to the data entry display. If you select Y (Yes) and

your DFU program maintains accumulator totals for any fields, the Display Batch Accumulators display appears when you press Enter. Otherwise, the data entry job ends and you return to the AS/400 Data File Utility (DFU) menu.

Example Action: Leave the default of Y (Yes) in the *End data entry* prompt and press Enter to end the session. The Display Batch Accumulators display appears. DFU presents the accumulator totals when you exit DFU (if you defined accumulator fields). For this example, you defined the program to keep an accumulator total for the PRICE field. If no fields have been defined as accumulator fields, the AS/400 Data File Utility (DFU) menu appears directly.

Note: You also can press F17 (Display and Print Accumulators) to request the accumulator subtotals anytime during data entry.

In this example, DFU has reset the batch accumulator to zero because you requested to see the subtotals earlier (as shown in Figure 4-10 on page 4-11) and have not added additional records. Your display appears as shown in Figure 4-19. If you add additional records to the file and then press F17 (Display and Print Accumulators), the new total only includes accumulator field values added in the batch of records since the last time you pressed F17 (Display and Print Accumulators).

```
                     Display Batch Accumulators


 Field                                                   Subtotal
 PRICE OF ORDER                                                 0















                                                                      Bottom
 Press Enter to continue.

 F3=Exit          F12=Cancel
```

Figure 4-19. Display Batch Accumulators Display

Example Action: Press Enter to continue to the Display Total Accumulators display.

Display Total Accumulators Display

The Display Total Accumulators display appears when you press Enter from the Display Batch Accumulators display at the end of data entry. You cannot look at these totals during data entry if you press F17 (Display and Print Accumulators); you can only look at the batch accumulators at that time. This display shows the accumulator totals (the sum of each batch subtotal) for each defined accumulator field. The total accumulators for this example is 350 because you created only one record. Your display appears as in Figure 4-20.

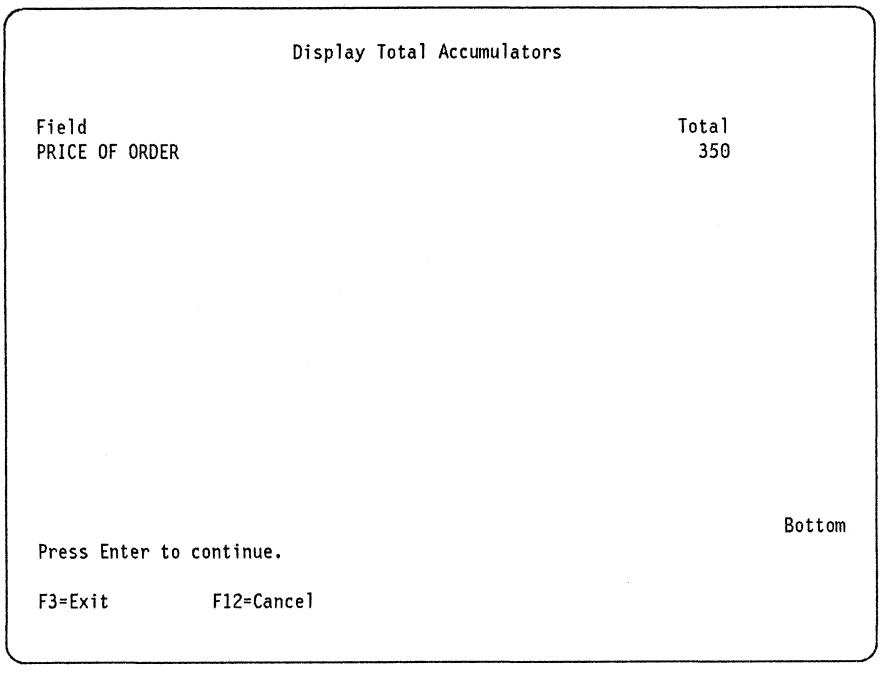


Figure 4-20. Display Total Accumulators Display

Description of the information on the Display Total Accumulators display is as follows:

Field. The name of the accumulator field. Only the PRICE field has been defined as an accumulator field for this example.

Total. The total accumulator value for the field. The sample display shows a total of 350 because you only added one record in this example.

Example Action: Press Enter to end the session. The AS/400 Data File Utility (DFU) menu appears. The audit report is printed. See "Audit Report" on page 4-20 for a sample audit report. From the AS/400 Data File Utility (DFU) menu, you can perform another DFU mode or exit the utility.

Audit Report

The audit report prints when you end the data entry program. Figure 4-21 is produced for the sample INVMTN program.

```
5728SS1     R01M00  880715                          AUDIT LOG                          02/16/88  14:20:09     PAGE

 Job Title . . . . .   INVENTORY MAINTENANCE RECORDS

                  OUR ORDER NO. DATE     CUST. ORD. NO. CUSTOMER NO. SHIP VIA       SHIP TO PRICE OF ORDER

Added               XC4314     01/08/88     11000         31884     BOAT            99          350

Batch accumulators are displayed

      PRICE OF ORDER                  350

                  OUR ORDER NO. DATE     CUST. ORD. NO. CUSTOMER NO. SHIP VIA       SHIP TO PRICE OF ORDER

Changed             XC4314     01/08/88     11000         31884     BOAT            99          350
                                                                                    29

Batch accumulators are displayed

      PRICE OF ORDER                    0


Total accumulators are displayed

      PRICE OF ORDER                  350

                1  Records Added
                1  Records Changed
                0  Records Deleted

                     * * * * *  E N D  O F  D F U  A U D I T  R E P O R T  * * * * *
```

Figure 4-21. Sample Audit Report

Chapter 5. Deleting a DFU Program

This chapter shows how to delete one or more Data File Utility (DFU) programs. To delete a program, specify the name of the program you want to delete and then confirm your selection for deletion.

Procedure for Deleting a DFU Program

Perform the following steps to delete an existing DFU program:

1. Sign on to the system.
2. Type STRDFU.
3. Press Enter. The AS/400 Data File Utility (DFU) menu appears as in Figure 5-1:

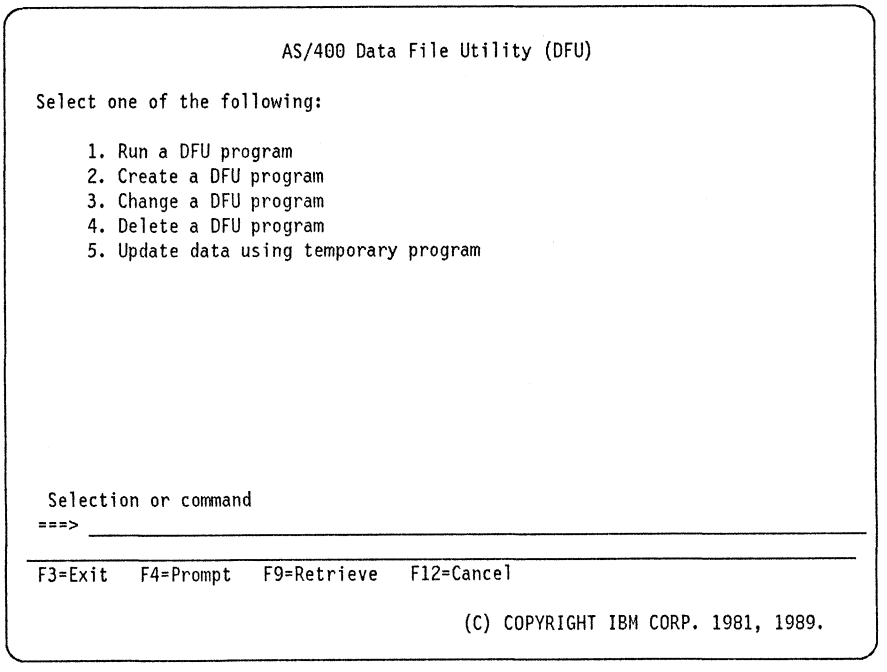


Figure 5-1. AS/400 Data File Utility (DFU) Menu

4. Select option 4 (Delete a DFU program) from the AS/400 Data File Utility (DFU) menu. Your display appears as in Figure 5-2 on page 5-2.

```
Selection or command
===> 4

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                   (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 5-2. AS/400 Data File Utility (DFU) Menu with Option 4 Specified

5. Press Enter. The Delete a DFU Program display appears.
6. Type data into the displays shown for this function as described in this chapter.

Delete a DFU Program Display

The Delete a DFU Program display appears when you select option 4 (Delete a DFU program) from the AS/400 Data File Utility (DFU) menu. Specify the name of the program you want to delete on this display. Alternatively, you can display a list of programs and delete more than one program. DFU automatically uses the *Program* and *Library* names you last specified in DFU. Your display appears as in Figure 5-3.

```
                        Delete a DFU Program

Type choices, press Enter.

  Program . . . . . .   INVMTN____    Name, F4 for List
    Library . . . . . .   MYLIB_____    Name, *LIBL, *CURLIB

F3=Exit      F4=Prompt      F12=Cancel
```

Figure 5-3. Delete a DFU Program Display

Description of the information on the Delete a DFU Program display is as follows:

Program. The name of the program you want to delete. To see a list of available programs, move your cursor to this prompt and press F4. The Select Program display appears and you can select the programs you want to delete. The defaults for the *Program* field are the following:

- The program name you specified in the previous DFU session
- The value specified for the DFUPGM parameter if you used the STRDFU command

The program selected in the sample display is INVMTN.

Library. The name of the library containing the DFU program. The defaults are the following:

- The library name specified in the previous DFU session
- Your library list (*LIBL)
- The current library (*CURLIB)
- The value specified for the DFUPGM parameter if you used the STRDFU command

The program selected in the sample display is MYLIB.

Example Action: Move your cursor to the *Program* prompt and press F4 to look at the available programs in the MYLIB library. The Select Program display appears.

Select Program Display

The Select Program display appears when you press F4 from the *Program* prompt of the Delete a DFU Program display. The programs listed on this display depend on what is in your MYLIB library. You can select more than one program for deletion from the Select Program display. This is different to the *Change a DFU program* or *Run a DFU program* options where you can only select one program at a time. Your display appears as in Figure 5-4 on page 5-4.

```
                              Select Program

Library . . . . :   MYLIB

Type choice, press Enter.
  Position to . . . . . .   _________

Type option, press Enter.
  1=Select

Opt     Program         Description
 _      INVMTN          INVENTORY MAINTENANCE RECORDS
 _      INVPGM          INVENTORY MAINTENANCE RECORDS

                                                                    Bottom
F3=Exit      F5=Refresh      F12=Cancel
```

Figure 5-4. Select Program Display

See "Select Program Display" on page 3-5 for a description of the information on this display.

Example Action: Type 1 (Select) beside the programs you want to delete. Your display appears as in Figure 5-5.

```
Type option, press Enter.
  1=Select

Opt     Program         Description
 1      INVMTN          INVENTORY MAINTENANCE RECORDS
 _      INVPGM          INVENTORY MAINTENANCE RECORDS
```

Figure 5-5. Select Program Display with Program Choices

Example Action: Press Enter to continue to the Confirm Delete of DFU Programs display.

Confirm Delete of DFU Programs Display

The Confirm Delete of DFU Programs display shows all programs you selected for deletion. Your display appears as in Figure 5-6 on page 5-5.

If you want to change your choice of programs to be deleted, press F12 (Cancel) to return to the Select Program display. Otherwise, press Enter to delete all selected programs. DFU returns to the Delete a DFU Program display.

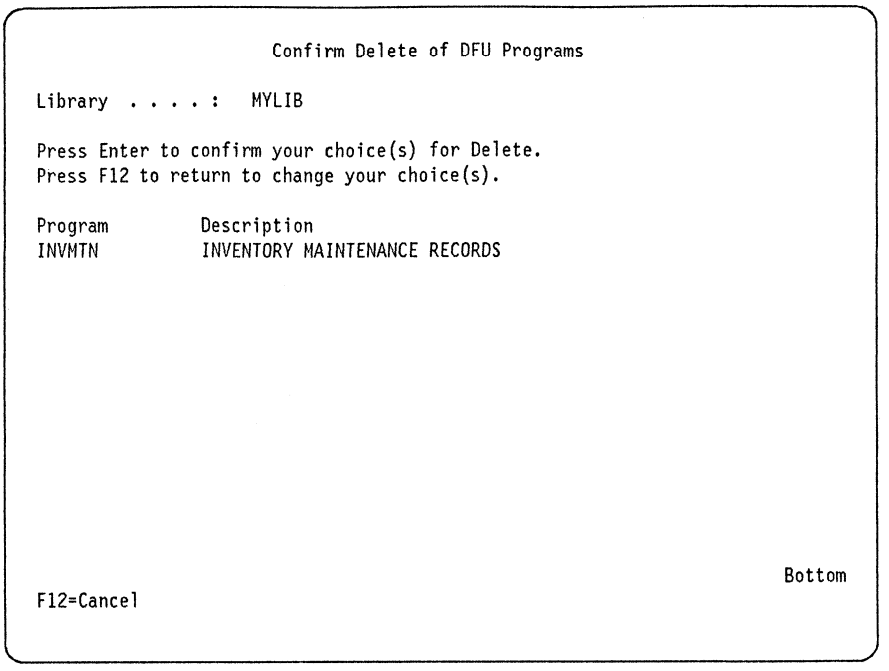


Figure 5-6. Confirm Delete of DFU Programs Display

Example Action: Do **not** delete these example programs for this exercise. Instead, press F12 (Cancel) to return to the Select Program display without processing the selection to delete the INVMTN program. Your display appears as in Figure 5-7.

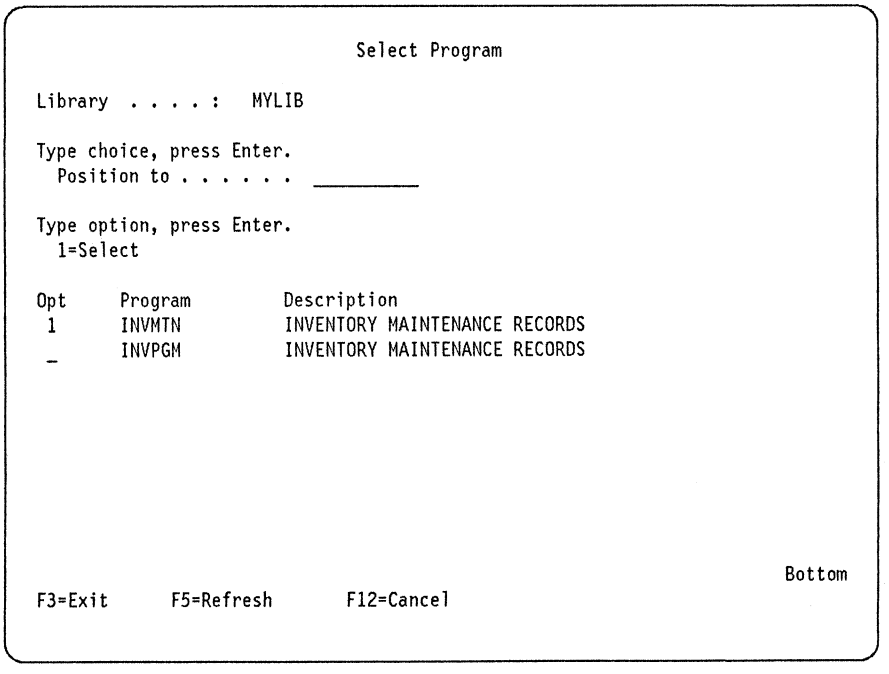


Figure 5-7. Select Program Display on Return from Confirm to Delete

Example Action: Press F3 (Exit). The Delete a DFU Program display appears.

Example Action: Press F3 (Exit). The AS/400 Data File Utility (DFU) menu appears. From the AS/400 Data File Utility (DFU) menu, you can perform another DFU operation or press F3 (Exit) to exit the utility.

Chapter 6. Updating Data Using a Temporary Program

This chapter shows a quick method for entering data into a data file. You do not have to define a DFU program first. Specify the data file you want to change and DFU defines a temporary program for you based on the externally described file specifications for that data file. When you finish data entry, DFU deletes the temporary program.

The temporary data entry program uses the following defaults for each display:

- General Information display
  - *Job title*: WORK WITH DATA IN A FILE
  - *Display format:* Multiple column
  - *Audit report:* Yes
  - *S/36 style:* No
  - *Suppress errors:* No
  - *Record numbers heading:* *RECNBR (nonindexed files only)
  - *Processing:* Sequential (nonindexed files only)
  - *Generate keys*: No (indexed files only)
  - *Generate record numbers:* No (nonindexed files only)
  - *Store record number in a field:* No
- Select Audit Control display
  - *Print additions*: Yes
  - *Print changes*: Yes
  - *Print deletions*: Yes
  - *Printer line width:* 132
  - *Printer column spacing:* 1
- Select Record Formats display: all available record formats
- Select and Sequence Fields display
  - *Select and Sequence fields:* Select all.
  - *Field headings:* The externally described headings if they exist, otherwise the field names specified in the file specification.
- Specify Extended Field Definition display (alphameric fields)
  - *Auto-duplicate:* No
  - *Allow lowercase:* Yes
- Specify Extended Field Definition display (numeric fields)
  - *Auto-duplicate:* No
  - *Accumulate:* No
  - *Mod 10 check:* No
  - *Mod 11 check:* No

See Chapter 2, "Creating a DFU Program," for additional information about these values.

Procedure for Updating Data Using a Temporary Program

Use the following procedure to update data using a temporary program (to add or change records in a data file):

1. Sign on to the system.
2. Type STRDFU.
3. Press Enter.

   The AS/400 Data File Utility (DFU) menu appears. Your display appears as in Figure 6-1.

```
                        AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program




Selection or command
===> _____________________________________________________________________
_____________________________________________________________________________
F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                       (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 6-1. AS/400 Data File Utility (DFU) Menu

4. Type 5 (Update data using temporary program) on the command line of the AS/400 Data File Utility (DFU) menu. Your display appears as in Figure 6-2.

```
Selection or command
===> 5_____________________________________________________________________
_____________________________________________________________________________
F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                       (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure 6-2. AS/400 Data File Utility (DFU) Menu with Option 5 Specified

5. Press Enter. The Update Data Using Temporary Program display appears.
6. Type data into the displays shown for this function as described in this chapter.

Update Data Using Temporary Program Display

The Update Data Using Temporary Program display allows you to specify the name of the data file for which you want to add or change records. The default names are those you last specified when you were in DFU. Your display appears as in Figure 6-3.

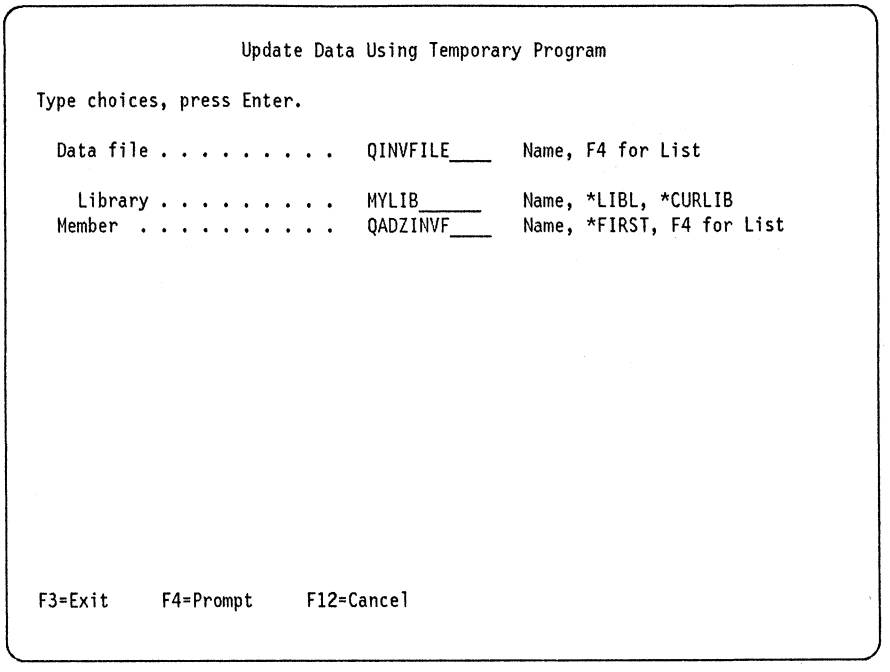


Figure 6-3. Update Data Using Temporary Program Display

Description of the information on the Update Data Using Temporary Program display is as follows:

Data file. The name of the data file to which you want to add or change records. To see a list of available data files, move your cursor to this prompt and press F4. The Select File display appears and you can select the data file you want to update. The defaults are as follows:

- The file name you specified in the previous DFU session
- The value specified for the FILE parameter if you used the STRDFU or UPDDTA commands

The data file shown in the sample display is QINVFILE.

Library. The name of the library containing the data file. The defaults are as follows:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name you specified in the previous DFU session

- The value specified for the FILE parameter, if you used the STRDFU or UPDDTA commands

The library shown in the sample display is MYLIB.

Member. The name of the member in the data file.

Example Action: Press Enter to display the first data entry display. The temporary program uses all of the fields in the data file specification instead of only those you would select if creating your own program. DFU also creates data entry displays for all record formats specified in the external DDS or IDDU file descriptions. Your display appears as in Figure 6-4.

```
WORK WITH DATA IN A FILE                    Mode . . . . :   CHANGE
Format . . . . :   INVREC___                File . . . . :   QINVFILE

OUR ORDER NO.:   _________




F3=Exit                F5=Refresh              F6=Select format
F9=Insert              F10=Entry               F11=Change
```

Figure 6-4. Data Entry Display for a Temporary DFU Program

Example Action: Press F10 (Entry). This changes the mode to Entry and displays the rest of the fields. Your display appears as in Figure 6-5 on page 6-5. It contains one more field than the sample display created in Chapter 2, "Creating a DFU Program." In that example, you did not select the GOODS field. See Figure 2-1 on page 2-2 for comparison.

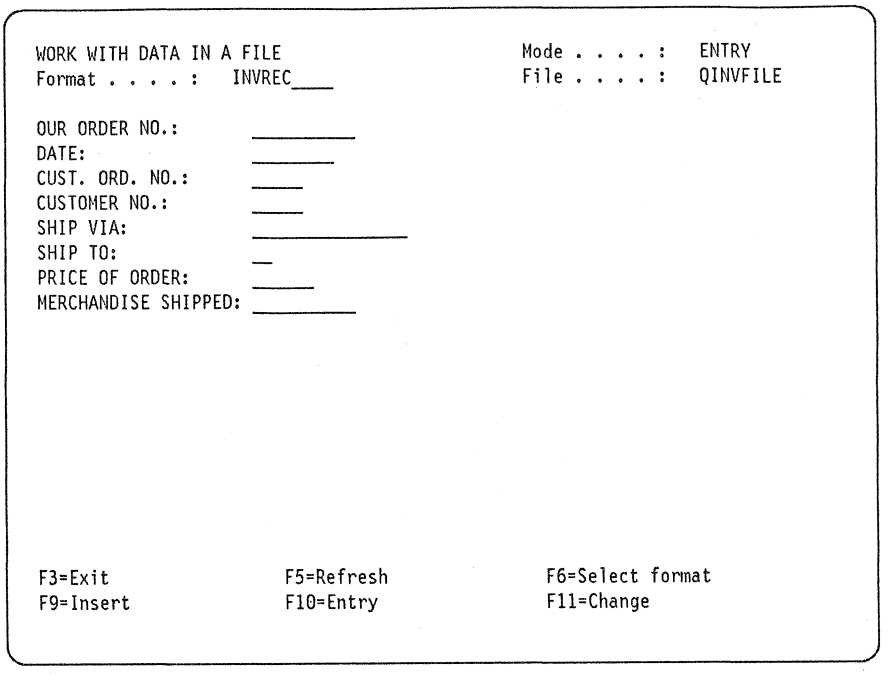


Figure 6-5. Data Entry Display for a Temporary DFU Program

You can add, change, or delete records as desired.

See Chapter 4, "Running a DFU Program," for additional information about running a DFU program.

Example Action: From the data entry display, press F3 (Exit) to access the End Data Entry display to finish this session.

End Data Entry Display

The End Data Entry display appears when you press F3 (Exit) from the data entry display. This display summarizes the changes made to your data file during the current session. You can exit the DFU data entry program from this display. When you end the data entry session, DFU prints the audit report if you requested it in your DFU program.

The informational message indicates that all records you added, changed, or deleted are printed. See "End Data Entry Display" on page 4-17 for more information on this display.

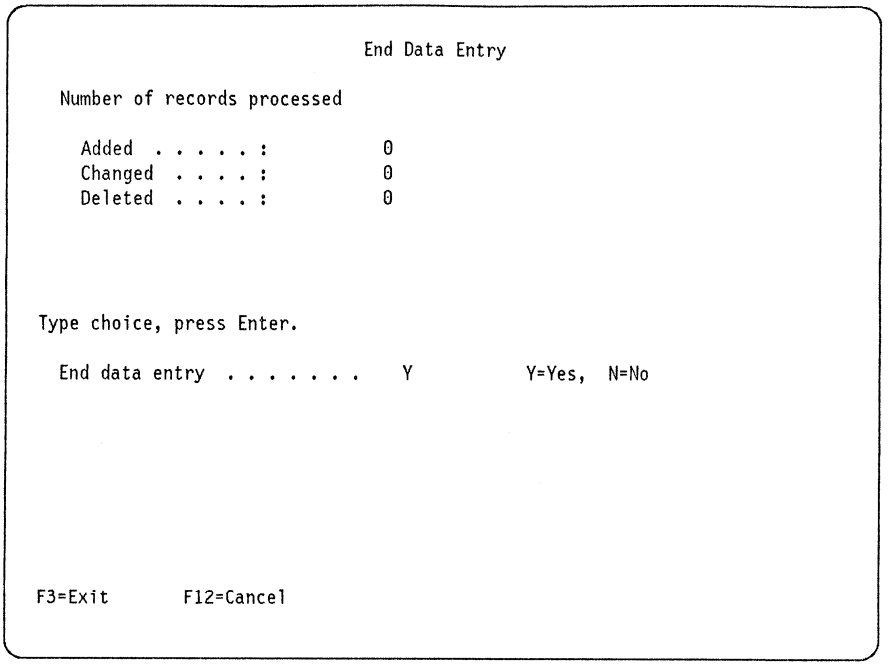


Figure 6-6. End Data Entry Display

Example Action: Leave the default of Y (Yes) in the *End data entry* prompt. Press Enter to end the session. The Update Data Using Temporary Program display appears and the audit report is printed. See "Audit Report" on page 4-20 for a sample audit report. Press F3 (Exit) to return to the AS/400 Data File Utility (DFU) menu. From the AS/400 Data File Utility (DFU) menu, you can perform another DFU operation or press F3 (Exit) to exit the utility.

Appendix A. Additional Considerations

This appendix describes the following additional considerations for using the Data File Utility (DFU):

- DFU command and file security control
- Using data base files
- Using the library list
- Responding to file changes
- Error suppression
- Unsupported data types

Security

DFU allows you full access to any file and any DFU command unless you define alternate security controls. To ensure adequate data security, you must introduce file controls over DFU functions. Figure A-1 on page A-2 summarizes the minimum required authority needed to perform DFU functions.

Figure A-1. Minimum Authority for DFU Functions

Operation	OBJ	Object Authority			Data Authority			
		OBJOPR	OBJMGT	OBJEXIST	READ	ADD	UPD	DLT
Create/Save program								
Create program	Library[1]				X	X		
	File	X						
Change program	Library				X	X		X
	File	X						
	Program	X		X				
Run program								
DSPDTA	Program	X			X			
	File	X			X			
CHGDTA[2]	Program	X			X			
Add	File	X			X	X		
Change	File	X			X		X	
Delete	File	X			X			X
UPDDTA[2]	Program	X			X			
Add	File	X			X	X		
Change	File	X			X		X	
Delete	File	X			X			X
Delete DFU Program	Library	X			X			X
	Program			X				

[1] The minimum authority required for the data base file library is **operational** for all DFU functions.

[2] The same authority to the data base file is required for the STRDFU command to do these functions.

Authority

The authority (AUT) of an object specifies the different levels of access users have to the objects being created. Object rights can be public or private. Public object rights are authorized for all users. Private object rights are authorized only to specific users.

The owner of the object and the person at your location who is responsible for security have all rights to the object. They can both grant or revoke authority for an object to other users of the system. They are the only individuals who can grant object management rights for an object.

There are two major groups of rights: object rights and data rights. Object rights control how the user can use the entire object. Data rights control how the user can use the data contained in the object.

Object Authority

The following types of authority can be granted to the public for rights to the object:

Operational authority (OBJOPR)
The right to use an object and look at its description. For objects such as physical files, operational authority can also include one or more of the data rights (read, add, delete, and update).

Object existence authority (OBJEXIST)
The right to delete, save, restore, free storage of, and transfer ownership of the object. For example, to delete a program, you must have object existence authority for that program.

Object management authority (OBJMGT)
The right to move, rename, grant authority to, take authority away from, and change the attributes of an object. For example, to move an object from one library to another, you must have object management authority for the object.

All commands require that you have operational authority over the command. To change or delete a DFU program, you must have operational authority over the command, and operational and read authority over the objects to be changed. Note that each DFU program is made up of two objects: FILE and PGM. The objects have the same name and are in the same library.

Data Authority

The following types of authority can be granted to the public for rights to the data:

Read authority (READ)
The right to read the entries in an object. For example, to read records from a file you must have read authority for the file.

Add authority (ADD)
The right to add an entry to an object. For example, to add a record to a file, you must have add authority for the file.

Update authority (UPD)
The right to change the entries in an object. For example, to update a record in a file, you must have update authority for the file.

Delete authority (DLT)
The right to delete an entry from an object. For example, to delete a record from a file, you must have delete authority for the file.

Refer to the *Security Concepts and Planning* manual for more information on authority.

Command Authorization

DFU commands have a *USE authority when they are shipped by IBM. This authority allows all users to use any DFU command. The person responsible for security at your location can, however, limit the use of the commands to individual users. For information on how the use of commands can be limited to individual users, see the *System Reference Summary*. The *USE authority allows all users to use the following DFU commands:

- STRDFU
- CHGDTA
- DSPDTA
- UPDDTA
- DLTDFUPGM

You can also be authorized for access to the external (DDS or IDDU) and program-defined (RPG) specification files used for program definition. The default authorization allows public access when the specification file is created. If you want the file to be privately authorized, you should specify AUT (*EXCLUDE) when you create the data specification file.

You can be authorized for specific commands, programs, and files when you run a DFU program. For example, you can be authorized to use the following:

- The CHGDTA or DSPDTA command that uses a program. The default is for public operational authorization. The command authorization can be changed by the person responsible for security at your location.
- A specific DFU program. The AUT parameter determines if the program is authorized for public use or not. The default is for public operational authorization.
- The data base file used by DFU. These can be individually controlled. Definition and creation of a DFU program requires that the operator is authorized to use the data base file. A productive run of the created program requires additional file authorizations.

Data Base File Authorization

DFU supports the use of group profiles for data base authorization. You can be a member of a group profile as well as an individual with your own user profiles. As a member of a group profile, you have access to any objects which the group owns or is explicitly authorized to use, as well as those objects that you, as an individual user, are explicitly authorized to use, or that you own.

Default Security Implications

The following DFU security status applies if you use all command defaults without changing the authorization supplied by IBM:

- All data base and IDDU files can be used by DFU.
- Any user profile can use the CHGDTA and DSPDTA commands to run any DFU program created by the programmer (QPGMR).

DFU Use of Data Base Files

By default, DFU opens the first member of the data base file when you run the DFU program. If you want to open a different member, specify the desired member name on the MBR parameter of the CHGDTA, DSPDTA, or STRDFU commands, or in the *Member* prompt if you use menu access to DFU.

Level Checking

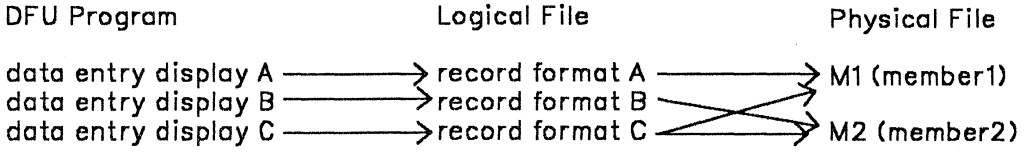
The data base formats (or types) used by the DFU program are taken from existing DDS, IDDU, or RPG II file descriptions when the program is created. The file and library name of these descriptions are saved as part of the created program. Then, when you run the DFU program, DFU extracts the data file description and checks the identifier assigned to the file to make sure that the file description has not been changed since you defined the DFU program.

The record format level numbers are checked against the level numbers that existed when the program was created. If the formats present in the program and data base members have equal level numbers, no message is created and the file is used. Otherwise, DFU checks the file definition for the file against the definition stored in the program to try to match them and allow you to run the program against a new file.

Note: DFU does not support predefined joined files.

Multiple Record Formats

A single DFU data entry display can add records to only one physical file member. If a DFU data entry display is defined on a logical file record format, the DFU data entry display can add records if the logical file record format is linked to **only one** physical file member. An example is shown below:



All data entry displays can add records except data entry display C because it is linked to two physical file members.

The relationship between logical file record formats and physical file members is defined by the DTAMBRS parameter of the CRTLF (Create Logical File) command and the ADDLFM (Add Logical File Member) command. See the *Control Language Reference* for a description of these commands.

The following examples show how the DTAMBRS parameter affects a DFU program.

Example 1

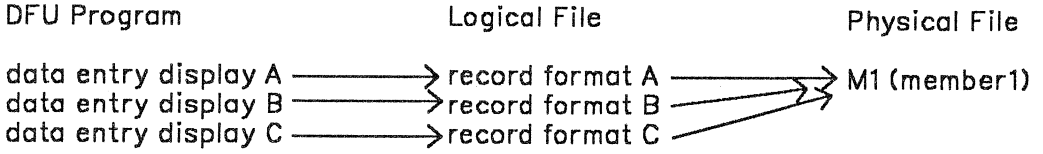
A logical file has three formats that reference the physical file MYLIB/FILE1. The member M1 is the only member FILE1. You want to define a DFU program to add records to FILE1. The DTAMBRS parameter must be coded in one of two ways:

```
DTAMBRS ((MYLIB/FILE1 M1) (MYLIB/FILE1 M1) (MYLIB/FILE1 M1))
```

or

```
DTAMBRS (*ALL)
```

The relationship defined is the same in either case:



Each record format in the logical file is linked to only one physical file member; all data entry displays of the DFU program can add records to the physical file.

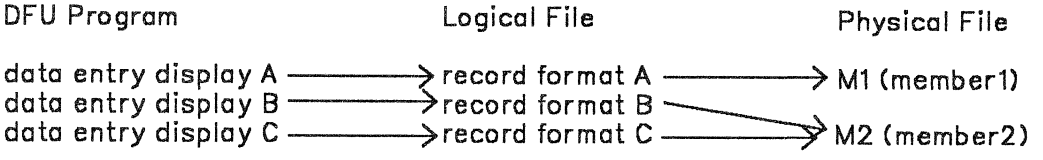
Example 2

The physical file MYLIB/FILE1 has two members. Consider the following ways in which you can code the DTAMBRS parameter:

1.

```
DTAMBRS ((MYLIB/FILE1 M1) (MYLIB/FILE1 M2) (MYLIB/FILE1 M2))
```

The relationship between data entry displays, logical record formats, and physical file members is shown below:

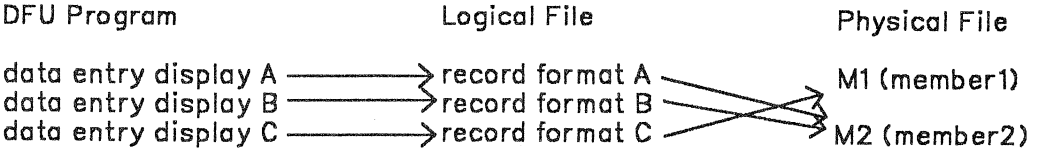


All three data entry displays can add records.

2.

```
DTAMBRS ((MYLIB/FILE1 M2) (MYLIB/FILE1 M2) (MYLIB/FILE1 M1))
```

The relationship between data entry displays, logical record formats, and physical file members is shown below:



All data entry displays of the DFU program can add records.

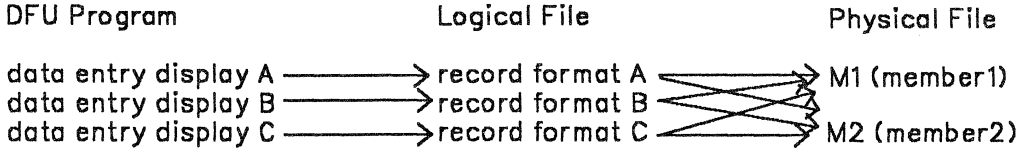
3.

```
DTAMBRS (*ALL)
```

This is equivalent to:

```
DTAMBRS ((MYLIB/FILE1 M1 M2) (MYLIB/FILE1 M1 M2)
(MYLIB/FILE1 M1 M2))
```

The relationship between data entry displays, logical record formats, and physical file members is shown below:



None of the data entry displays can add records since all of the logical record formats are linked to more than one physical file member.

Using the Library List

As indicated in the command descriptions, DFU uses the default library list (*LIBL) to find objects for which no library qualifier is specified in a command. Before you enter DFU commands, you may want to make sure that the objects you refer to in the commands are either qualified in the command or named, if appropriate, in the library list. You can use the following commands to operate on library lists:

- DSPLIBL (Display Library List) allows you to look at the library list.
- RPLLIBL (Replace Library List) allows you to change the entire library list.
- ADDLIBLE (Add Library List Entry) allows you to add a single entry to the library list.
- RMVLIBLE (Remove Library List Entry) allows you to remove a single entry from the library list.

  The *CL Reference* describes the commands explained above.

Responding to File Changes

The file description used by a DFU program can be changed a number of times after the DFU program has been defined. The changes, such as the addition, deletion, or reordering of fields within record formats, may or may not affect your DFU program directly.

- If the changes to a file affect your definition directly, you must change your DFU program definition by creating a new program based on the new file description. For example, if fields referred to by your program are deleted, you must redefine the program.

- If the changes to a file do not affect your program directly, you only need to re-create the program from the existing definition. Re-creating the program ensures that it reflects the context of changed record formats.

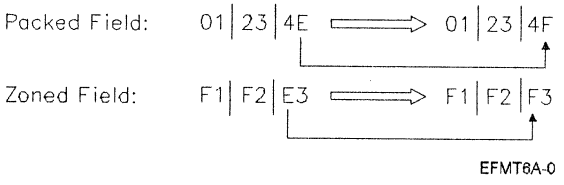
If the changes do not affect the program, you do not have to re-create the program.

Error Suppression

It is unlikely your data file will contain data errors as a result of working with DFU. Your file could, however, have errors if you made an invalid change to a field from outside of DFU. If you request error suppression when you define your program, DFU attempts to suppress any decimal data errors so that the record can still be displayed.

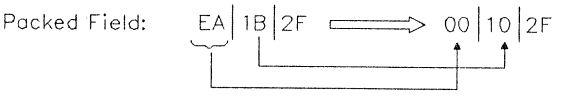
DFU uses the following method for suppressing errors in all fields containing invalid data:

- In a packed or zoned field, an invalid sign is forced to a positive sign value as follows:



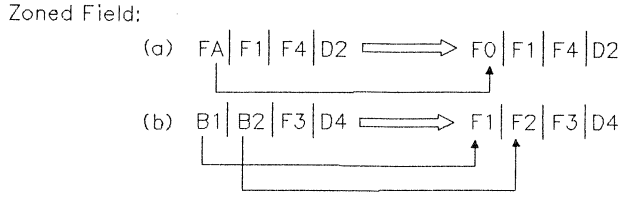
EFMT6A-0

- In a packed field, any hex digit (other than the sign digit) field that is greater than hex 9 is forced to hex 0 as follows:



EFMT7A-0

- In a zoned field, any hex digit in the numeric half-byte of each byte that is greater than hex 9 is forced to hex 0. Any hex digit in the zone half-byte of each byte less than hex F (except the sign half-byte) is forced to hex F. Examples of these circumstances follow:



EFMT8A-0

If error suppression is successful, DFU shows the corrected data on your data entry display. The corrected fields are written back to the data file only if you subsequently change the corrected field on the data entry display. For example, imagine that fields A and B are zoned fields that contain an invalid hex 40. DFU suppresses the error by changing the hex 40 to zero. The zero is what shows on your data entry display. If you change the zero (error suppressed hex 40) in field A to valid data but do not change the zero (error suppressed hex 40) in field B, then only field A is written back to the data file. The original contents of field B (hex 40) are undisturbed.

If error suppression was not selected, or your record contains invalid data in a non-numeric field, then DFU does not display the record and issues you an error message.

Unsupported Data Types

AS/400 DFU does not support the following data types:

- Floating point field
- Any hex fields in *HEX format

Appendix B. Double-Byte Character Set Considerations for DFU Programs

This appendix discusses double-byte character set (DBCS) considerations, including the following:

- DBCS characters supported on AS/400
- Software requirements
- Programming considerations

Supported DBCS Characters

DBCS on the AS/400 system consists of the following types of characters:

- Kanji (Japanese)
- Katakana (Japanese)
- Hiragana (Japanese)
- Hanguel (Korean)
- Jamo (Korean)
- Hanja (Korean)
- Traditional Chinese
- Simplified Chinese
- Alphabetic and numeric (A through Z, a through z, and 0 through 9)*
- Roman numerals (I through X)*
- Greek
- Cyrillic*
- Special symbols*
- Additional characters defined through the Character Generator Utility (CGU)

Characters marked with an asterisk (*) are supplied by IBM in the Japanese basic DBCS. Many frequently used Japanese Kanji characters are also included in this basic DBCS. Additional Japanese Kanji characters and user-defined characters not included in the Japanese basic DBCS comprise the Japanese extended double-byte character set, and are called extension characters. Extension characters require additional processing to be displayed and printed, basic characters do not.

Double-byte character sets differ from alphameric character sets in the following ways:

- The Japanese alphameric character set consists of only Roman (A-Z) and Katakana alphabets, and numerals (0-9).
- The Korean alphameric character set consists of the uppercase and lowercase Roman (A-Z, a-z) and Korean Jamo alphabets, and numerals (0-9).
- The traditional and simplified Chinese alphameric character sets consist of the uppercase and lowercase Roman (A-Z, a-z) alphabet and numerals (0-9).

  Note: Alphameric characters are also included in the DBCS. When using DBCS versions of alphameric characters, however, the characters are considered DBCS.

- DBCS data, when displayed and printed, usually is twice as wide as alphameric data.
- DBCS characters each use two bytes of storage plus shift-out and shift-in characters required at the ends of a DBCS string. Alphameric characters use one byte.

Software Requirements

When programming in DFU with DBCS characters:

- The DBCS OS/400 feature must be on your system.
- You must use a DBCS-capable display station.
- You must start each DBCS character string with a shift-out (SO) character and end it with a shift-in character (SI).

  Open fields allow you to mix alphameric and DBCS characters. DBCS characters must be within shift-in and shift-out characters.
- Printed output must be sent to a DBCS-capable printer.

Programming Considerations

Part of the ideographic (IGC) Japanese character feature is the ability to use Katakana (single byte) characters. Alphameric characters and Katakana characters are one position each. DBCS characters are two positions each.

A string of DBCS characters begins with a shift-out character of one position, followed by DBCS characters of two positions each, followed by a shift-in character of one position. This configuration means each DBCS character string is an even number of positions at least four positions long for a single DBCS character. The following shows a string of three DBCS characters, where the first and fifth characters represent the shift-out and shift-in characters respectively. This example requires eight character positions: one for the shift-out character, two for each DBCS character, and one for the shift-in character.

Figure B-1. DBCS Character Example

In DFU, you can select DBCS fields on the Select and Sequence Fields display as shown in Figure B-2 on page B-3.

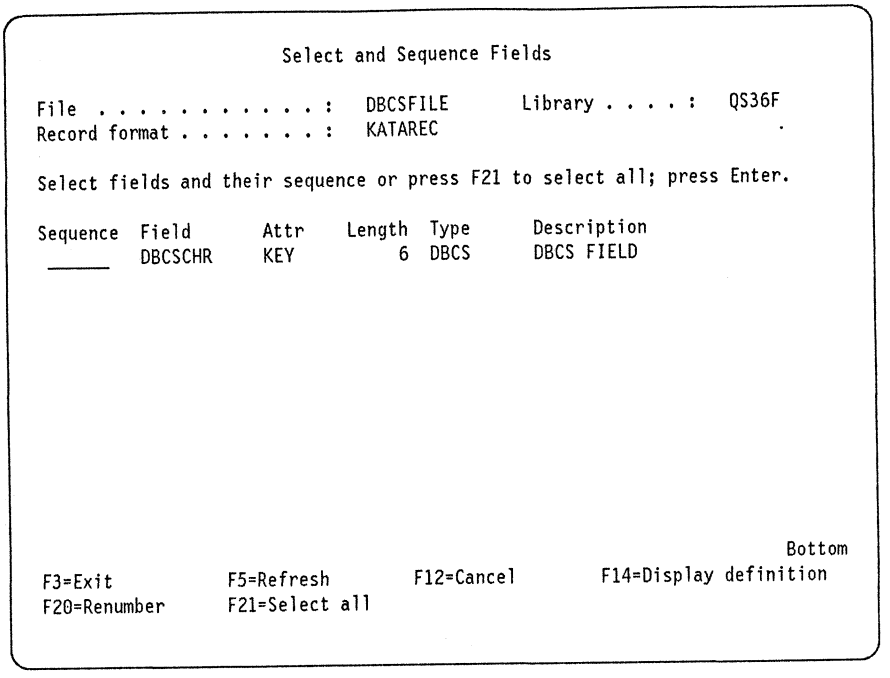


Figure B-2. Select and Sequence Fields Display for DBCS Characters

In Figure B-2, the DBCSCHR field is designated as a DBCS field. This means you can enter only DBCS characters into this field on the data entry display. You can also specify extended definitions for DBCS fields selected from the Define Fields display. If you have DBCS-capable DFU, your display appears as shown in Figure B-3.

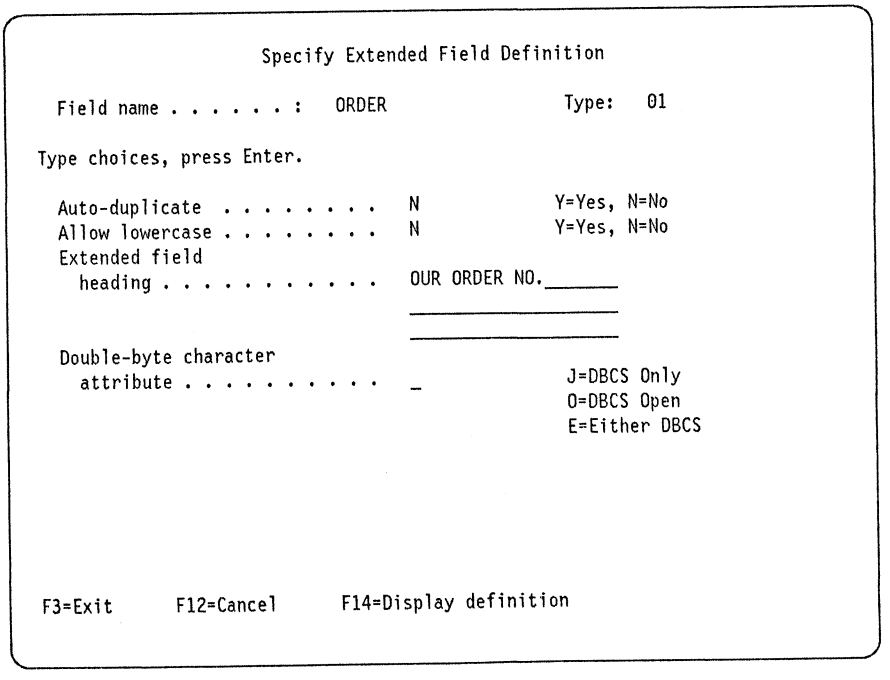


Figure B-3. Specify Extended Field Definition Display for DBCS-Capable DFU

Description of the DBCS specific information on the Specify Extended Field Definition display is as follows:

Double-byte character attribute. Allows you to specify whether or not a DBCS character can be entered into this field prompt on the data entry display. The following values are available:

J DBCS ONLY: This field accepts DBCS characters only.

Note: The field must be at least 4 bytes long and of even length. DBCS characters are 2 bytes long and are delimited with shift-out and shift-in characters. If you omit the leading shift-out character, the entire string is deleted up to the next shift-in character. You cannot delete the shift-in character unless you delete the shift-out character.

O DBCS OPEN: The field accepts both DBCS and alphameric characters at the same time.

E Either DBCS (default): The field accepts either all DBCS or all alphameric characters but not both types together in the same field.

Note: The field must be at least 4 bytes long and of even length. DBCS characters are 2 bytes long and are delimited with shift-out and shift-in characters. If you omit the leading shift-out character, the entire string is deleted up to the next shift-in character. The shift-in character cannot be deleted unless you delete the shift-out character.

In DBCS mode, the following are DBCS:

- DFU prompts
- DFU informational messages
- Output page headings

Note: DFU supports data description specifications (DDS) extensions for DBCS support in data base files only.

Appendix C. Using DFU in the System/36 Environment

Using DFU in the System/36 environment on an AS/400 system is similar to using DFU on a System/36. This appendix shows how to create a DFU program in the System/36 environment.

Following are the main differences between the two systems:

- AS/400 command function keys have different functions from those on the System/36. If you specify the System/36 style option when you define your DFU program, the function keys and displays are the same as if the program were defined on a System/36 (when you run your program).
- AS/400 displays and function keys are used when you define a DFU program. System/36 function keys are used when you run the program, if you specify the System/36 style when you define the program.
- If you want to change a DFU program using the OCL procedures ENTER, UPDATE, or INQUIRY from the System/36 environment, **do not** delete the program before trying to change it. DFU bases the change on the program object itself. To change the program, leave the *Name of DFU program* prompt blank, and specify the name of the program you want to change in the *Name of DFU specification source member* prompt.

The following System/36 DFU functions are available only within the System/36 environment:

- DFU LIST function. The List function is used to print the contents of a file. See the *DFU List for the System/36 Environment User's Guide/Reference* for details.
- DFU UPDATE function. The Update function is used to change a data file.
- DFU INQUIRY function. The Inquiry function is used to display a data file.
- DFU ENTER function. The Enter function is used to create a new data file.

These functions can only be accessed by using the ENTER, UPDATE, INQUIRY, or LIST procedures. Using the DFU procedure does not give access to these functions. (Use ENTER#, UPDATE#, INQUIRY#, or LIST# to run the program.)

RPG II-Described Files

DFU determines what a file looks like based on file descriptions. In the System/36 environment, DFU can use RPG II-, DDS-, or IDDU-described data files. In an RPG II program-described file, you provide the file description on two RPG II specifications: the F specification and the I specification. Figure C-1 on page C-2 shows the layout of RPG II F and I specifications. Use the information on these forms for the example in "Creating a DFU Program for an Indexed Data File" on page C-7.

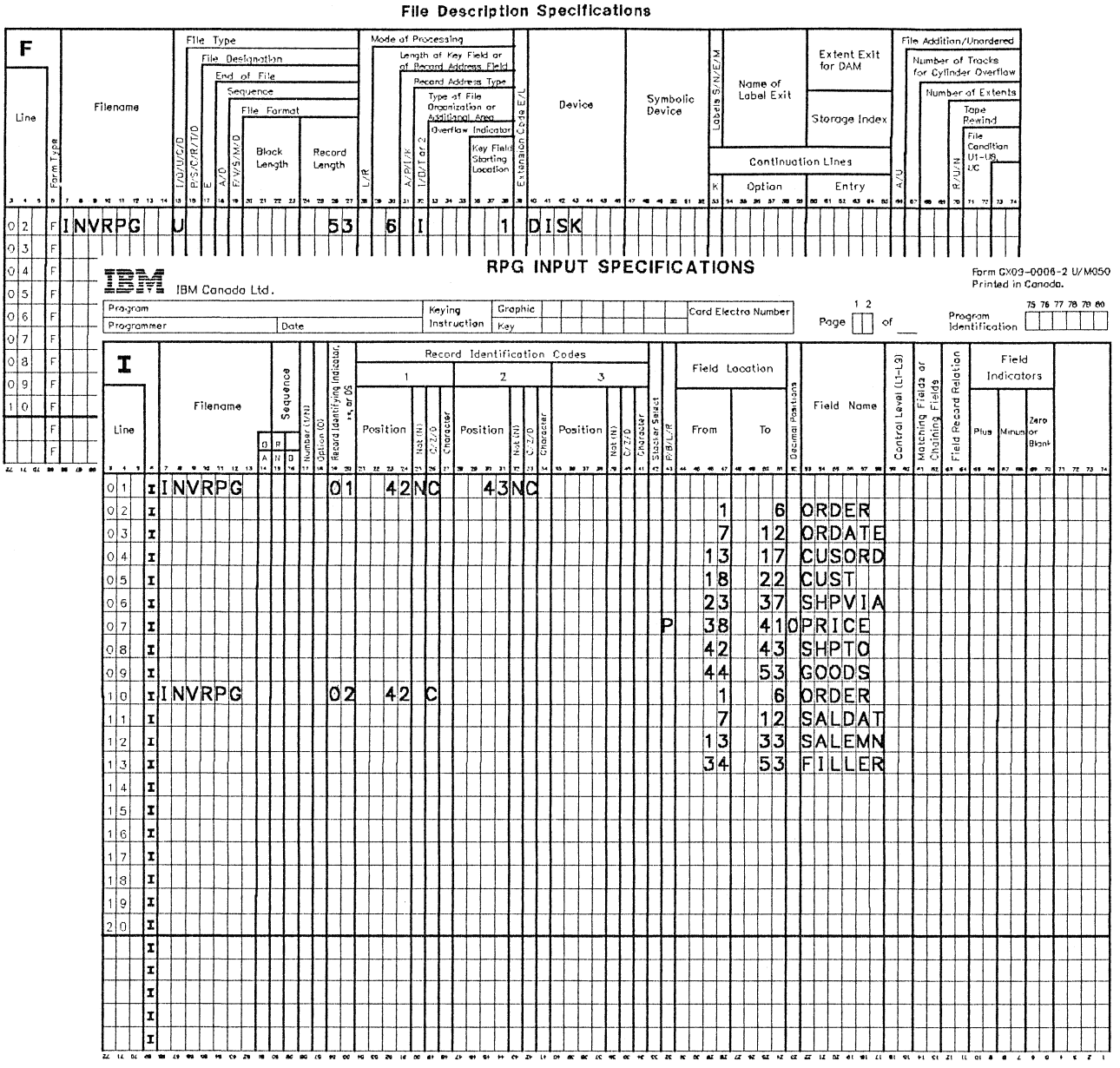


Figure C-1. RPG II F and I Specification Coding Sheets

To use a program-described data file, you must enter the F and I specifications into a source member (this is the only coding you have to do for DFU). Source member information appears in the same format as you enter it through the text editor. You can use any AS/400 text editor to enter the information into a source member. For example, you can enter the information through the Source Entry Utility (SEU), a part of the ADT licensed program.

For information on how to use SEU, see the *SEU User's Guide/Reference*.

If the DFU program you create processes an existing file, there may already be F and I specifications in the system for that file. In this case, you do not need to

create file specifications for the data file. DFU uses the existing F and I specifications from any existing RPG II source program.

Note: When using the ENTER, UPDATE, INQUIRY, LIST, ENTER#, UPDATE#, INQUIRY#, or LIST# System/36 procedures in the System/36 environment, all data files must reside in library QS36F, and all RPG II source members must reside in file QS36SRC in the library you specify.

System/36 Style Run-Time Function Keys

If your DFU program uses System/36 style data entry displays, you can use the System/36 function keys when you run your program. You define the data entry display style on the General Information display.

Note: Some of these keys are functional on certain displays only.

The System/36 run-time function keys are described in Figure C-2.

Figure C-2 (Page 1 of 2). System/36 Run-Time Function Keys

Work Station Key	Name of Function Key	Description
F1	Auto-dup	Switches the automatic duplicate function on and off. When on, fields defined for automatic duplication are filled with the last specified value for the field. When off, blank fields are displayed.
F2	Display accumulators	Moves to the Display Batch Accumulators display, shows the current accumulator totals, adds the accumulators to the total accumulators, and resets them to zero.
F3	Select record type	Allows you to select a record type for processing from a list of available record types and returns to the data entry display from which this key was pressed.
F4	Delete	Removes the record physically from the file if no record delete code is specified. Otherwise, the delete code is written into the record to indicate that it is deleted.
F5	Record backspace	Shows the previous display of a multiple display record. This function is not supported.
F6	Print record	Prints the record on the user's defined printer. This function is active in Display mode only.
F7	End of job	Returns to the previous display by way of the End Data Entry display without saving the field values for the currently displayed record.

Figure C-2 (Page 2 of 2). System/36 Run-Time Function Keys

Work Station Key	Name of Function Key	Description
F9	Insert	Changes the mode to Insert, which allows you to insert records anywhere in the file. If the file is processed sequentially, insert mode is identical to entry mode, that is, records are added at the end of the file.
F10	Entry	Changes the mode to Entry, which allows you to add new records.
F11	Change	Changes the mode to Change, which allows you to change existing records.
F12	Record advance	Places default entries into any unfilled fields in the record and saves the entire record to the data file.
F20	Auto record advance	Switches the automatic record advance on and off. The automatic record advance is set to ON mode when the user runs the program. When on, the contents of a display are processed as soon as data is entered into the last field on the display. It is not necessary to press Enter.
F21	Status	Displays the status of data entry including the current data file, library, format or type, and active functions (mode, automatic duplication, auto record advance).

Creating a DFU Program through the System/36 Environment

This section shows how to create a Data File Utility (DFU) program to add and change records in a data file called INVRPG. It defines the characteristics of the DFU program and the data entry displays used to access data files. It also includes two examples of how to create a new DFU program: one for indexed data files and one for nonindexed data files.

The displays for running and deleting programs are similar on both the AS/400 system and System/36. Review Chapter 4, "Running a DFU Program," and Chapter 5, "Deleting a DFU Program," for details on these procedures.

The DFU program is created from a definition made through the create or change option of the AS/400 Data File Utility (DFU) menu. You can modify existing program definitions to create a new program by saving the modified version under a different name.

Example System/36 Data Entry Display

When you create your DFU program, you can select an AS/400 or System/36 data entry style from the General Information display. You can run the program in either style in the System/36 environment. If you select the System/36 style for this example, the display shown in Figure C-3 appears when you run the DFU program.

```
INVENTORY RECORDS                  Filename:  INVRPG       Mode:  Display
Record Type:  01          Last record type: 01        Auto-dup:  OFF
OUR ORDER NUMBER (ALPHAMERIC XC CODE): _________

DATE:                                  ______
CUST. ORD. NO.:                        ____
CUSTOMER NO.:                          ____
SHIP VIA.:                             ______________
SHIP TO:                               _
PRICE OF ORDER:                        ______
```

Figure C-3. System/36 Style Data Entry Display

Procedure for Creating a DFU Program from the System/36 Environment

After you enter the DFU command, DFU displays a menu from which you can select options to create, change, delete, or run a DFU program. After your selection to create a program for this example, DFU begins a prompting sequence through which you define the program. The displays that appear for creating and for changing DFU programs are the same.

Notes:

1. You can also use the System/36 commands Enter, Update, and Inquiry to define DFU programs from the System/36 environment. You can use the System/36 commands ENTER#, UPDATE#, and INQUIRY# to run DFU programs from the System/36 environment. See the *System Reference for the System/36 Environment* for descriptions of these commands. See *Concepts and Programmer's Guide for the System/36 Environment* for details on using the System/36 environment.

2. You must use the System/36 LIST command to access the DFU LIST function. You can also use the System/36 command LIST# to run DFU LIST programs from the System/36 environment. See the *DFU List for the System/36 Environment User's Guide/Reference* for more information.
3. All data files referenced through the operation control language (OCL) from the System/36 environment must exist in library QS36F. DFU uses OCL to access files in the System/36 environment.
4. If you want to change a DFU program using the OCL procedures ENTER, UPDATE, or INQUIRY from the System/36 environment, **do not** delete the program before trying to change it. DFU bases the change on the program object itself. To change the program, leave the *Name of DFU program* prompt blank, and specify the name of the program you want to change in the *Name of DFU specification source member* prompt.

You can review the program or the data file definitions and default entries any time while you are creating or changing a DFU program. Command function keys are provided for this purpose. DFU returns to the definition display after you finish reviewing program or data file details.

The rest of this appendix discusses the displays that appear when you define a DFU program in the System/36 environment. The examples show the prompt entries you enter into each display to produce the sample DFU program.

Perform the following steps to define a DFU program:

1. Sign on to the System/36 environment by typing:

   STRS36

   This command puts you into the System/36 environment and allows you to enter System/36 style commands provided your work station is defined to the System/36 environment. Ignore this step if you are already signed on to the System/36 environment.
2. Press Enter.
3. Type DFU.
4. Press Enter. The AS/400 Data File Utility (DFU) menu appears. Your display appears as in Figure C-4 on page C-7.

```
                    AS/400 Data File Utility (DFU)

Select one of the following:

     1. Run a DFU program
     2. Create a DFU program
     3. Change a DFU program
     4. Delete a DFU program
     5. Update data using temporary program




Selection or command
===> _____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure C-4. AS/400 Data File Utility (DFU) Menu

5. Select option 2 (Create a DFU program) from the AS/400 Data File Utility (DFU) menu. Your display appears as in Figure C-5.

```
Selection or command
===> 2_____________________________________________________________________

F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel

                                        (C) COPYRIGHT IBM CORP. 1981, 1989.
```

Figure C-5. AS/400 Data File Utility (DFU) Menu with Option 2 Specified

6. Press Enter. The Create a DFU Program display appears.
7. Type data in the displays shown for this function as described in this chapter.

Creating a DFU Program for an Indexed Data File

This example shows you how to create a DFU program for an indexed RPG II-described data file. DFU determines whether or not you have an indexed or a nonindexed data file and the appropriate displays appear for you. You use the same procedure for creating a program for either type of data file. DFU may, however, present an additional display (Select Field for Record Number) when you create a program for a nonindexed file.

Use the BLDFILE procedure to create a file that matches the RPG II F and I specification shown in Figure C-1 on page C-2 to do this example.

Create a DFU Program Display

The Create a DFU Program display appears when you select option 2 (Create a DFU program) from the AS/400 Data File Utility (DFU) menu. This display requests the name of the DFU program being defined and the data file on which the program will run. Because you entered DFU using the System/36 procedure DFU, the display also prompts you for RPG II source member information.

Your display appears as in Figure C-6. Your display may contain different values. This example assumes that you put the F and I specifications in MYLIB.

```
                          Create a DFU Program

Type choices, press Enter.

  Program . . . . . .  _________   Name, F4 for List
    Library . . . . .  _________   Name, *CURLIB

  Data file . . . . .  _________   Name, F4 for List

    Library . . . . .  QS36F____   Name, *LIBL, *CURLIB


If the file is program described, enter the following RPG II information:

  Source member . . . . . .  _________   Name, F4 for List
  Source file . . . . . .  QS36SRC___   Name, F4 for List
    Library . . . . . .  MYLIB_____   Name, *LIBL, *CURLIB



F3=Exit      F4=Prompt      F12=Cancel
```

Figure C-6. Create a DFU Program Display for an RPG II-Described File

Example Action: Move your cursor to the *Source member* prompt and press F4. A list of the available source members for this data file appears.

Select RPG II Source Member

The Select RPG II Source Member display appears when you press F4 from the *Source member* prompt of any display with such a prompt. For this example, this display appears when you press F4 from the Create a DFU Program display.

The Select RPG II Source Member display shows you a list of available source members. You can select the member you want to process from this list.

Your display appears as in Figure C-7 on page C-9.

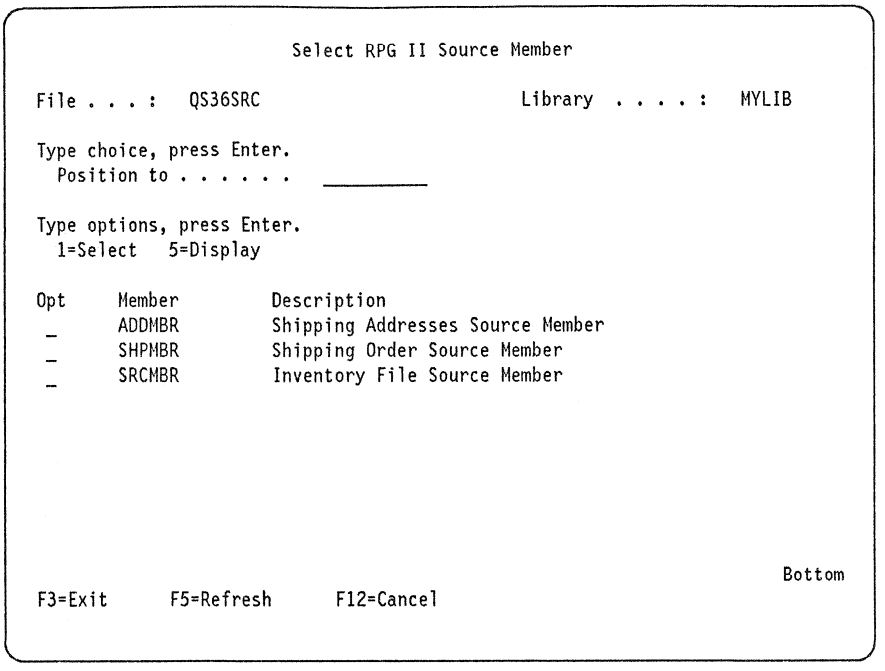


Figure C-7. Select RPG II Source Member Display

Description of the information on the Select RPG II Source Member display is as follows:

File. The name of the RPG II source file used by the DFU program.

Library. The name of the library containing the source file.

Position to. Indicates the alphameric position you want to start at in the member list. To reposition the list, type the desired character string (for example, the name of a known source member) into this prompt and press Enter. The list repositions to the member name you specify, or to the nearest alphameric member name preceding your entry. You can also use the special keywords *TOP or *BOT to position the list to either the top or bottom respectively. The default for the prompt is blanks, that is, the list starts at the top.

Opt. Indicates whether you want to select a member for processing or whether you want to display source member details. Type 1 (Select) in the *Opt* column and press Enter to select the member for processing. Type 5 (Display) in the *Opt* column and press Enter to display the member. SEU browse is called.

Member. The list of member names in this data file.

Description. The description of each member.

Example Action: Type 1 (Select) in the *Opt* column next to the SRCMBR member to select it for processing for this example. This member contains the F and I specifications shown on the coding sheets in Figure C-1 on page C-2. Your display appears as in Figure C-8 on page C-10.

```
                        Select RPG II Source Member

File . . . :   QS36SRC                      Library . . . . :   MYLIB

Type choice, press Enter.
  Position to . . . . . .   _________

Type options, press Enter.
  1=Select   5=Display

Opt      Member         Description
 _       ADDMBR         Shipping Addresses Source Member
 _       SHPMBR         Shipping Order Source Member
 1       SRCMBR         Inventory File Source Member

                                                                    Bottom
F3=Exit       F5=Refresh       F12=Cancel
```

Figure C-8. Select RPG II Source Member Display with Selected Member

Example Action: Press Enter to return to the Create a DFU Program display with the selected source member. Your display appears as in Figure C-9.

```
                            Create a DFU Program

Type choices, press Enter.

  Program . . . . . .   _________   Name, F4 for List
    Library . . . . . .   _________   Name, *CURLIB

  Data file . . . . . .   _________   Name, F4 for List

    Library . . . . . .   QS36F____   Name, *LIBL, *CURLIB


If the file is program described, enter the following RPG II information:

  Source member . . . . . .   SRCMBR____   Name, F4 for List
  Source file . . . . . .   QS36SRC___   Name, F4 for List
    Library . . . . . .   MYLIB____   Name, *LIBL, *CURLIB



F3=Exit    F4=Prompt    F12=Cancel
```

Figure C-9. Create a DFU Program Display for an RPG II-Described File

Example Action: Type the name of the sample program (INVNTRY), the name of the data file (INVRPG), and the library names MYLIB and QS36F over the default entries. Your display appears as in Figure C-10 on page C-11.

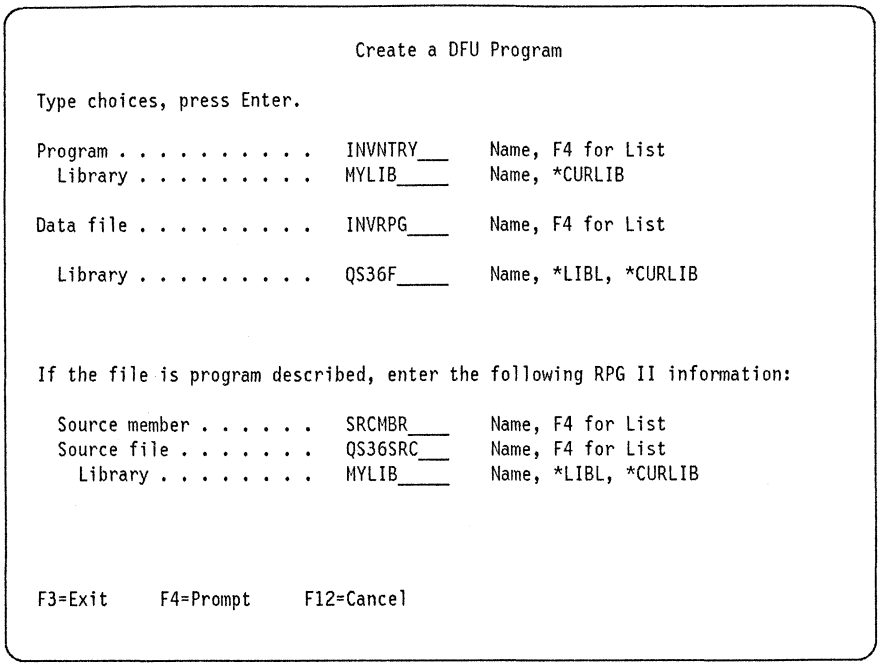


Figure C-10. Create a DFU Program Display with Example Entries

Description of the information that appears for RPG II-described files follows. See "Creating a DFU Program for an Indexed Data File" on page 2-4 for a description of the other information on this display.

Source member. The name of the RPG II source member containing the F and I specifications describing your selected data file.

If you press F4 while the cursor is on this prompt, a list of RPG II source members from the file specified in the following *file* prompt appears. You can then select the desired source member in the specified source file from the list.

The source member for the sample program is SRCMBR.

Source file. The name of the source file containing the RPG II source member.

If you press F4 while the cursor is on this prompt, a list of source files from the library specified in the following *Library* prompt appears. You can then select the desired file from the list, if applicable. To use your program with the System/36 environment OCL, all source members must be in a file called QS36SRC.

The source file for the sample program is QS36SRC.

Library. The name of the library containing the designated source member and file. The defaults are the following:

- Your user library list (*LIBL)
- The current library (*CURLIB)

The library for the sample program is MYLIB.

Example Action: Press Enter to continue to the General Information/Indexed File display.

Note: If your data file is nonindexed, the General Information/Nonindexed File display appears.

General Information/Indexed File Display

The General Information/Indexed File display appears if you press Enter from the Create a DFU Program display and if your data file is indexed. This display allows you to define the format of your data entry display and to choose whether or not to print an audit report.

Your display appears as in Figure C-11.

```
                    General Information/Indexed File

Type choices, press Enter.

  Job title . . . . . .  . .  INVNTRY_____________________________
  Display format  . . . . . .  2          1=Single
                                          2=Multiple
                                          3=Maximum
  Audit report  . . . . . . .  Y          Y=Yes, N=No
  S/36 style  . . . . . . . .  Y          Y=Yes, N=No
  Suppress errors . . . . . .  N          Y=Yes, N=No
  Edit numerics . . . . . . .  N          Y=Yes, N=No

  Generate keys . . . . . . .  N          Y=Yes, N=No









F3=Exit      F12=Cancel      F14=Display definition
```

Figure C-11. General Information/Indexed File Display

Example Action: Type INVENTORY RECORDS over the default job title to change the entry for the sample program. Your display appears as in Figure C-12.

```
                    General Information/Indexed File

Type choices, press Enter.

  Job title . . . . . .  . .  INVENTORY RECORDS___________________
  Display format  . . . . . .  2          1=Single
                                          2=Multiple
                                          3=Maximum
```

Figure C-12. General Information/Indexed File Display

See "General Information/Indexed File Display" on page 2-11 for a description of the prompts on this display.

Example Action: Press Enter to continue to the Select Audit Control Display. This display appears when you use the default setting of Y (Yes) for the *Audit report* prompt. Otherwise, if you type N (No) in the *Audit report* prompt, the Select Record Types display appears.

Select Audit Control Display

The Select Audit Control display appears if you type Y (Yes) in the *Audit report* prompt on the General Information/Indexed File display. The audit report is a printed list of changes made to a data file when you run your DFU program. This display allows you to define the scope of information you want reported on the listing.

If you type Y (Yes) next to a reportable change on the Select Audit Control display, DFU prints a copy of each changed record for the selected print category (additions, changes, or deletions). If you have accumulator fields, you also receive a printout of accumulator totals on your audit report. If you do not select to print any of the audit control options but indicate that you want an audit report on the General Information/Indexed Files display, you receive a printout of accumulator totals only (if you have defined accumulators).

Example Action: Leave the default values for the sample INVNTRY program. Your display appears as in Figure C-13.

```
                          Select Audit Control

Type choices, press Enter.

  Print additions . . . . . .  Y          Y=Yes, N=No
  Print changes . . . . . .  .  Y          Y=Yes, N=No
  Print deletions . . . . . .  Y          Y=Yes, N=No
  Printer
    Line width . . . . . .  .  132        60-198
    Column spacing . . . . . .  1          0-9

F3=Exit      F12=Cancel      F14=Display definition
```

Figure C-13. Select Audit Control Display

See "Select Audit Control Display" on page 2-14 for a description of the prompts on this display.

Example Action: Press Enter to continue to the Select S/36 Style Options display.

Select S/36 Style Options Display

The Select S/36 Style Options display appears when you leave Y (Yes) in the *S/36 style* field on the General Information/Indexed File display. You can select S/36 style options that you want to appear in your DFU data entry program.

Your display appears as in Figure C-14.

```
                        Select S/36 Style Options

Type choices, press Enter.

  Use delete codes . . . . . .  Y          Y=Yes, N=No
    Delete code . . . . . . . .
    Position . . . . . . . . .  00001      1-Record length
  Blank fill numeric
    fields . . . . . . . . . .  Y          Y=Yes, N=No

F3=Exit      F12=Cancel      F14=Display definition
```

Figure C-14. Select S/36 Style Options Display

Description of the information on the Select S/36 Style Options display is as follows:

Use delete codes. DFU uses the delete code and position specified on this display to mark each record you delete when you run your program.

Type Y (Yes) and the data entry program will mark records to delete rather than actually deleting them when you run your DFU program. Type N (No) and records will actually be deleted from the file when you run your DFU program. DFU physically deletes the record from the file.

Delete code. If you enter a valid delete code and position, when you run the program and use the delete key to delete a record, DFU marks the record as deleted by writing this character into the record in the position you specify.

Position. The position in the record where you want the delete code to be added to your record. If you enter a valid delete code and position, then this is the position in the record where DFU inserts the delete code when you run your DFU

data entry program and deletes a record. You must enter a valid number between one and the record length of the file. The delete code cannot be in the record key.

Blank fill numeric fields. DFU fills all selected unchanged zoned numeric fields in your file with blanks or zeros.

Type Y (Yes) if you want selected unchanged zoned numeric fields filled with blanks. Type N (No) if you want selected unchanged zoned numeric fields filled with zeroes.

Note: This option only applies to the System/36 environment.

Example Action: Press Enter to continue to the Select Record Types display. For RPG II files, this display appears instead of the Select Record Formats display (as would appear if your file is DDS or IDDU described).

Select Record Types Display

The Select Record Types display appears if your data file is an RPG II-described file. This display lists the various record types defined in the RPG II-described file. You can select one or more types for processing. If you select multiple record types, DFU presents a separate field definition display for each record type selected as you go through program definition.

Note: Make sure that you define record ID codes for each selected record when using multiple record types for RPG II. ID codes allow DFU to differentiate between the record types on a record-by-record basis.

Your display appears as in Figure C-15.

```
                          Select Record Types

File . . . :   INVRPG                        Library  . . . . :   QS36F

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete   8=Display attributes

Opt  Record Type   Defined
 _        01          N
 _        02          N

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure C-15. Select Record Types Display

Example Action: Type 8 (Display attributes) in the *Opt* column next to record type 01 to display the RPG II attributes of record type 01. Your display appears as in Figure C-16.

```
                          Select Record Types

File . . . :   INVRPG                        Library . . . . :   QS36F

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete   8=Display attributes

Opt  Record Type   Defined
 8        01          N
 _        02          N

                                                                   Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure C-16. Select Record Types Display with Option 8 Specified

Description of the information on the Select Record Types display is as follows:

File. The data file on which the DFU program operates.

Library. The name of the library containing the data file.

Opt. The option you want to perform on each record type. Option 1 (Select) selects a record type for processing. You can select multiple record types by typing 1 (Select) next to all record types of interest. You can select all record types in the list by pressing F21 (Select all). You can also remove a previously selected type by typing 4 (Delete) next to the record type you no longer want. Type 8 (Display attributes) to review the details of a record type on the Display a Record Type display.

The sample display shows selection of option 8 (Display attributes) next to record type 01.

Record type. The list of record types found in the RPG II-described file.

In the sample display, DFU found two record types: 01 and 02.

Defined. Specifies whether or not a record type has been previously defined for this program. The indicator is Y (Yes) if previously defined and N (No) if not.

The sample display shows that none of the record types have been previously defined for a DFU program.

Example Action: Press Enter to continue to the Display a Record Type display.

Display a Record Type Display

The Display a Record Type display appears when you type 8 (Display attributes) in the *Opt* field next to a record type on the Select Record Type display and press Enter. This display allows you to review the RPG II specifications for a record type. The display shows the values in the RPG II specification that determine whether or not a record in the data file belongs to this record type. See the *System/36-Compatible RPG II User's Guide/Reference* for additional information about record identification codes.

Your display appears as in Figure C-17.

```
                            Display a Record Type

File . . . . . . . . . :    INVRPG          Library . . . . :    QS36F
Record type . . . . . . :   01


Or/And  Position  Not  Type  Character
  ___        42    X   CHAR
  AND        43    X   CHAR










                                                                  Bottom
Press the Enter key to continue.

F3=Exit      F12=Cancel      F14=Display definition
```

Figure C-17. Display a Record Type Display

Description of the information on the Display a Record Type display is as follows:

File. The data file on which DFU operates.

The file indicated on the sample display is INVRPG.

Library. The name of the library containing the data file.

Record type. The record type for which attributes are displayed.

The selected record type shown in the sample display is 01.

Or/And. The logical connector between the character tests in each position. The result of the logical operation specifies the conditions in which a record type in the data file matches the selected record type.

For example, record type 01 in the sample display can be identified by these different codes: not blank in position 42 and **and not** blank in position 43.

Position. The position of the data in the record to be tested for determining the record type.

Not. Indicates whether or not the character specified in the *Character* field should be in the specified position. The field contains an X if the **NOT** condition is used. Otherwise, the field is blank.

For example, one test to be considered for record type 01 is that the characters in positions 42 and 43 cannot be blanks.

Type. Represents the portion of the character to use for the record identification test. The type can be one of the following:

Type	**Explanation**
CHAR	Use the entire character.
ZONE	Use the zone portion of the character only.
DIGIT	Use the digit portion of the character only.

Character. The alphameric character, special character, or numeric character used in the record as the identification code or part of the code (the actual value to test against).

Example Action: After you have reviewed the information, press Enter to return to the Select Record Types display. Your display appears as in Figure C-18 on page C-19.

```
                          Select Record Types

File . . . :   INVRPG                        Library . . . . :   QS36F

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete   8=Display attributes

Opt  Record Type   Defined
 _       01          N
 _       02          N

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure C-18. Select Record Types Display

Type 1 (Select) in the *Opt* column next to record type 01. Your display appears as in Figure C-19.

```
                          Select Record Types

File . . . :   INVRPG                        Library . . . . :   QS36F

Type options, or press F21 to select all; press Enter.
  1=Select   4=Delete   8=Display attributes

Opt  Record Type   Defined
 1       01          N
 _       02          N

                                                                  Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure C-19. Select Record Types Display with Option 1 Specified

Example Action: Press Enter to process your selection of record type 01 and continue to the Select and Sequence Fields display.

Select and Sequence Fields Display

The Select and Sequence Fields display appears when you press Enter from the Select Record Types display. This display allows you to select the fields and the field order that your DFU program uses for the data entry display. The displayed information is from the applicable RPG II file definition. This display reappears for each selected record type when you finish the definition sequence for the current record type.

Press F21 (Select all) to select all of the displayed fields from the record type. If you change the sequence of the displayed fields, the screen reappears in ascending sequential order when you press Enter. Press Enter again to confirm your changes and continue to the next definition display. If you do not change any information, the Define Fields display appears when you press Enter.

If you do not want to define new field headings or extended definitions for the fields you select from this display, press F17 (Fast path) to bypass the Define Fields and Specify Extended Field Definition displays for the current record type. If there are still record types to process, the Select and Sequence Fields display reappears for the next selected record type. Otherwise, the End DFU Program Definition display appears.

To use F17 (Fast path), first select the fields you want for your data entry display and press Enter to confirm your selections. Then press F17 (Fast path).

The Fast path uses the following defaults:

- *Field headings*: The RPG II field names.
- *Auto-duplicate*: No.
- *Allow lowercase*: No.
- *Accumulate*: No.
- *Mod 10 check*: No.
- *Mod 11 check*: No.

The display shown in Figure C-20 on page C-21 appears for the RPG II-described INVRPG data file of this example.

```
                    Select and Sequence Fields

File . . . . . :   INVRPG        Library . . . . :   QS36F
Record type . . . . . :   01

Select fields and their sequence or press F21 to select all; press Enter.

Sequence  Field      Attr    Length  Type     Description
_____     ORDER      KEY          6  CHAR
_____     ORDATE                  6  CHAR
_____     CUSORD                  5  CHAR
_____     CUST                    5  CHAR
_____     SHPVIA                 15  CHAR
_____     PRICE                 7,0  PACK
_____     SHPTO                   2  CHAR
_____     GOODS                  10  CHAR

                                                                    Bottom
F3=Exit           F5=Refresh        F12=Cancel        F14=Display definition
F20=Renumber      F21=Select all
```

Figure C-20. Select and Sequence Fields Display for RPG II-Described Files

Example Action: Type the sequence numbers shown in Figure C-21 for the sample INVNTRY program.

```
                    Select and Sequence Fields

File . . . . . :   INVRPG        Library . . . . :   QS36F
Record type . . . . . :   01

Select fields and their sequence or press F21 to select all; press Enter.

Sequence  Field      Attr    Length  Type     Description
 1____    ORDER      KEY          6  CHAR
 2____    ORDATE                  6  CHAR
 3____    CUSORD                  5  CHAR
 4____    CUST                    5  CHAR
 5____    SHPVIA                 15  CHAR
 6____    PRICE                 7,0  PACK
 7____    SHPTO                   2  CHAR
 _____    GOODS                  10  CHAR

                                                                    Bottom
F3=Exit           F5=Refresh        F12=Cancel        F14=Display definition
F20=Renumber      F21=Select all
```

Figure C-21. Select and Sequence Fields Display with Selected Fields

Description of the information on the Select and Sequence Fields display is as follows:

File. The name of the data file for which the program is defined.

In the sample display, the file is INVRPG.

Library. The name of the library containing the data file. The library for the sample program is QS36F.

Record type. The name of the record type describing the fields contained in the file.

The selected record type for the sample program is 01.

Sequence. Allows you to select and sequence fields you would like to use. Type a sequence number from 1 through 999999 to select fields for processing and specify the sequence of the field. The sequence number must be an integer. Leave the sequence number blank for any fields you do not want to include for processing.

In the sample display, the fields numbered 1 through 7 have been selected for processing. The GOODS field has not been selected and is blank.

Field. The name of the field in the RPG II file specification.

Attr. The field's attribute. A field attribute can be KEY, OUT (output fields only), or RRN (Relative Record Number for direct or sequential files). You must select all fields that have an attribute of KEY or RRN. They represent a single key that is the composite of more than one field.

Length. The length of the field measured in bytes.

Type. The type of the field: character (CHAR), packed decimal (PACK), zone decimal (ZONE), binary (BIN), or double-byte character set characters (DBCS). See Appendix B, "Double-Byte Character Set Considerations for DFU Programs," for considerations about using DBCS characters.

All of the fields in the sample display are defined as CHAR except for the PRICE field, which is packed (PACK).

Description. The description of the field contained in the field definition. For example, the description for the ORDER field on the sample display is OUR ORDER NO.

Example Action: Press Enter to indicate your choices for the sample INVNTRY program. Press Enter again to confirm. The Define Fields display appears.

Define Fields Display

The Define Fields display appears when you press Enter from the Select and Sequence Fields display. From here you can select the fields that need extended definition and specify alternate headings to appear on the Data Entry display. If you do not require extended definitions, press Enter. If there are record types still to be processed (based on selections made on the Select Record Types display), the Select and Sequence Fields display for the next record type appears. Otherwise, the End DFU Program Definition display appears.

Your display appears as shown in Figure C-22.

```
                              Define Fields

File . . . . . :     INVRPG        Library . . . . :    QS36F
Record type . . . . . :    01

Type options, or press F21 to select all; press Enter.
  1=Select for extended definition
  4=Delete extended definition


                    Extended
Opt  Field          Definition   Heading
 _   ORDER              N        ORDER_____________
 _   ORDATE             N        ORDATE____________
 _   CUSORD             N        CUSORD____________
 _   CUST               N        CUST______________
 _   SHPVIA             N        SHPVIA____________
 _   PRICE              N        PRICE_____________
 _   SHPTO              N        SHPTO_____________

                                                          Bottom
F3=Exit definition          F5=Refresh          F12=Cancel
F14=Display definition      F21=Select all
```

Figure C-22. Define Fields Display

Example Action: Type 1 (Select for extended definition) in the *Opt* column next to the ORDER field to select it for extended definition to type new headings for each selected field as shown in Figure C-23 on page C-24.

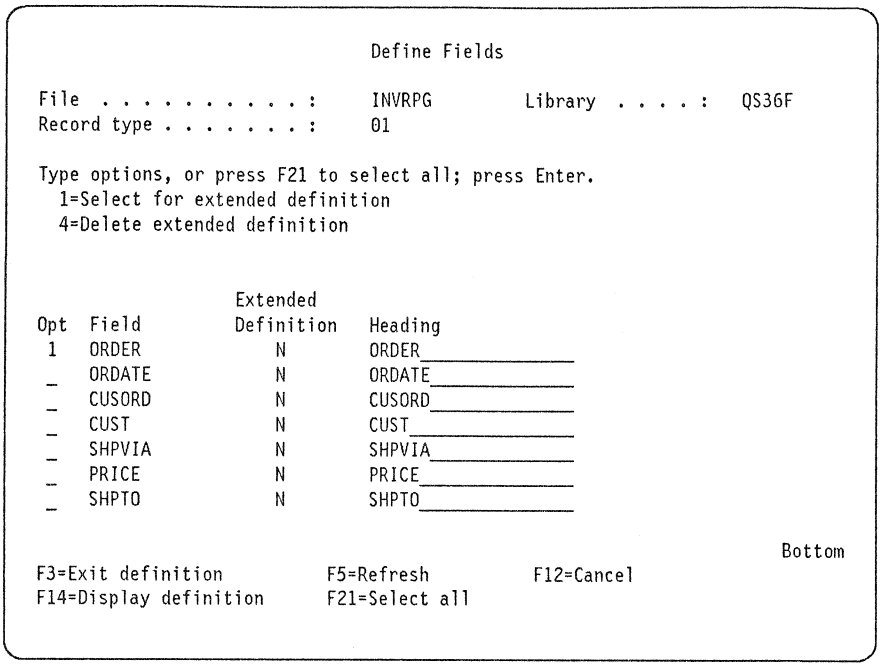


Figure C-23. Define Fields Display with a Selected Field

Description of the information on the Define Fields display is as follows:

File. The name of the data file for which the program is defined. The file in the sample display is INVRPG.

Library. The library containing the data file. The library in the sample display is QS36F.

Record type. The name of the record type describing the fields contained in the file.

The selected record type for the sample program is 01.

Opt. Specifies whether or not you want to select a field for extended definition (option 1), or to remove a field's extended definition (option 4). Leave the *opt* column blank if you do not want to select or remove an extended definition.

The ORDER field in the sample display has been selected for an extended definition. When leaving this display, the Specify Extended Field Definition display appears for this field and you can specify additional text for the field heading. See "Specify Extended Field Definition Display for Alphameric Fields" on page 2-23 and "Specify Extended Field Definition Display for Numeric Fields" on page 2-26 for more information.

Field. The name of the field in the RPG II-described file.

Extended definition. Specifies whether or not the field already has an extended definition.

None of the fields in the sample display have existing extended definitions because you are creating the DFU program for the first time.

Heading. The heading of the field from the RPG II-described file. DFU uses the displayed headings for the data entry displays when you run the DFU program. You can change the headings that appear here for the data entry display. If you want to define a field heading that is longer than is available on this display, you can request an extended field definition by typing 1 in the option column next to the field for which you want an extended definition. Extended field headings can be up to 60 characters in length. This heading also appears on the Audit report, if you have requested to print that report.

Note: If there is no heading defined in the file definition, the field name appears on the Audit Report.

Example Action: Press Enter to continue to the Specify Extended Field Definition display. There are two types of extended definition displays: one for alphameric fields, and one for numeric fields. For this example, only the Specify Extended Field Definition display for alphameric fields appears because you selected only the alphameric ORDER field for extended definition.

Note: If you have not selected fields for extended definition and there are no other record types to process, the End DFU Program Definition display appears instead of an extended definition display.

Specify Extended Field Definition Display for Alphameric Fields

Extended field definitions allow you to define additional features for selected alphameric fields. You can select the automatic duplication feature of DFU, choose whether or not to allow lowercase characters to be entered in this field on the data entry display, and specify extended field headings. For RPG II-described files, you can also specify double-byte character set attributes for a field if you have DBCS capable DFU.

The Specify Extended Field Definition display appears for each alphameric field you select for extended definition on the Define Fields display. A field's alphameric type (CHAR) is displayed on the Select and Sequence Fields display. The type (alphameric or numeric) determines whether or not this display appears or the Specify Extended Field Definition display for **numeric** fields described in Chapter 2, "Creating a DFU Program" on page 2-1 appears.

For this example, the only field selected for an extended definition is the alphameric ORDER field as shown in Figure C-24 on page C-26.

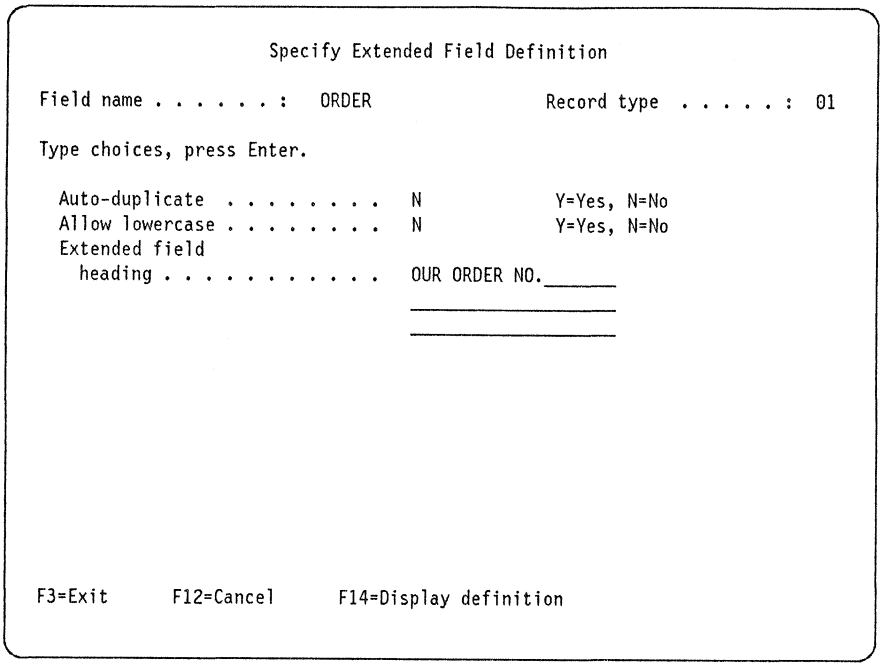


Figure C-24. Specify Extended Field Definition Display for an Alphameric Field

Example Action: Type the text shown in Figure C-25 into the *Extended field heading* prompt.

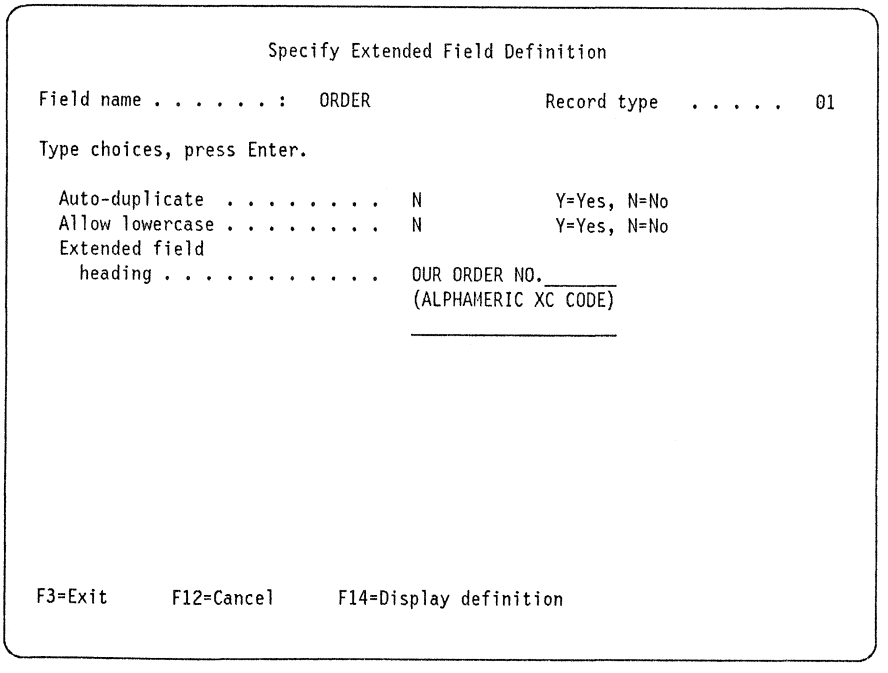


Figure C-25. Specify Extended Field Definition with Extended Heading

Description of the information on the Specify Extended Field Definition display is as follows:

Field name. The name of the field selected for extended definition.

The selected field shown in the sample display is the ORDER field.

Record type. The name of the record type describing the fields contained in the file.

The record type shown in the sample display is 01.

Auto-duplicate. Specifies whether or not you want DFU to prefill this field prompt on the data entry display with the value from the field in the previously processed record. Type Y (Yes) or N (No).

Note: You cannot specify automatic duplication for a field that is a unique key of the record format.

The sample display shows the default setting N (No) because this field is the only key of the record format and cannot be duplicated.

Allow lowercase. Specifies whether or not you want entries for this field to be in mixed case. The default specification is N (No), which restricts entries to uppercase only.

The sample display shows the default of N (No). Entries for the sample program must be made in uppercase only.

Extended field heading. An extended text heading you can specify for use instead of the default heading that appears when the Define Fields display appears the first time. The extended heading appears as a field prompt on the data entry display when you run the DFU program.

The extended field heading for the ORDER field in the sample display shows the original heading plus an additional reminder to data entry operators about the type of code expected.

If you have DBCS-capable DFU, your display contains additional fields as shown in Figure B-3 on page B-3.

Example Action: You are finished defining your DFU program. Press F14 (Display definition) to see the Display DFU Program Summary display to review your DFU program definition.

Display DFU Program Summary Display

The Display DFU Program Summary display appears when you press F14 (Display definition) during the program definition process. This display allows you to review the information you have specified so far for the DFU program. Undefined prompts appear with their default values. Summary information appears on two displays. To obtain additional program summary information, press F11 (Alternate view).

Your display appears as in Figure C-26 on page C-28.

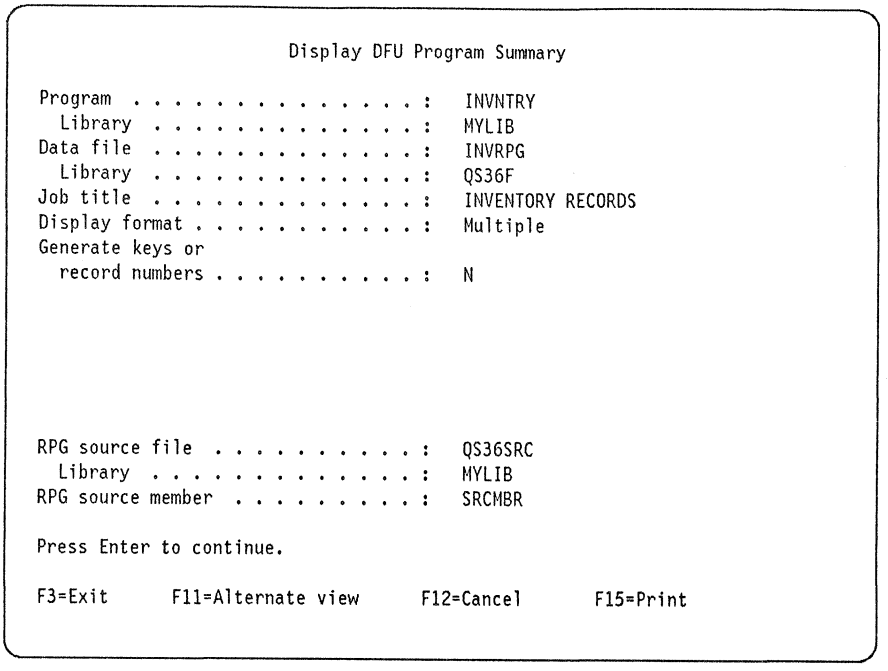


Figure C-26. Display DFU Program Summary Display

Description of the information on the Display DFU Program Summary display is as follows:

Program. The name of the DFU program you specified on the Create a DFU Program display.

Library. The name of the library containing the specified DFU program. You chose this parameter on the Create a DFU Program display.

Data file. The name of the specified data file to be used by the DFU program. You chose this parameter on the Create a DFU Program display.

Library. The name of the library containing the specified data file. You selected this parameter on the Create a DFU Program display.

Job title. The name that appears on the data entry display heading and the audit report, if requested. The name you defined on the General Information/Indexed File display is INVENTORY RECORDS.

Display format. The user-defined format for the data entry display which can be either Single, Multiple, or Maximum.

The sample display shows the value Multiple, which produces a multiple-column display format. You select this value from the General Information/Indexed File display.

Generate keys or record numbers. This prompt contains the value N (No) because you typed N (No) in the *Generate keys* prompt on the General Information/Indexed File display.

Note: If you have a **nonindexed** data file, the Display DFU Program Summary display contains the following prompts relating to record numbers for non-indexed files:

- *Processing*. The designated method of file processing. It can be sequential (1), or direct (2). The INVRPG file in this example is indexed and this prompt does not appear.
- *Record number heading*. The prompt designated to appear on the data entry display and audit report for the record number as defined on the General Information/Nonindexed File display. In this example, INVRPG is indexed and this prompt does not appear.
- *Record number field*. The name of the field selected to hold the record number, if any. This option is only available for nonindexed data files and does not appear on this display.

Example Action: Press F11 (Alternate view) to show the remaining information for the Display DFU Program Summary display. Your display appears as in Figure C-27.

```
                    Display DFU Program Summary

Program . . . . . :  INVNTRY
  Library . . . . . :  MYLIB
Data file . . . . . :  INVRPG
  Library . . . . . :  QS36F
Audit report . . . . . :  Y
  Print additions . . . . . :  Y
  Print changes . . . . . :  Y
  Print deletions . . . . . :  Y
Printer
  Line width . . . . . :  132
  Column spacing . . . . . :  1
S/36 style . . . . . :  Y
Suppress data
  errors . . . . . :  N
Edit numerics . . . . . :  N

Press Enter to continue.


F3=Exit      F11=Alternate view      F12=Cancel      F15=Print
```

Figure C-27. Display DFU Program Summary Display (Alternate View)

Description of the additional information of the alternate view of the Display DFU Program Summary display is as follows:

Program. The name of the DFU program you specified on the Create a DFU Program display.

Library. The name of the library containing the specified DFU program. You selected this parameter on the Create a DFU Program display.

Data file. The name of the specified data file to be used by the DFU program. You selected this parameter on the Create a DFU Program display.

Library. The name of the library containing the specified data file. You selected this parameter on the Create a DFU Program display.

Audit report. Specifies whether or not an audit report is to be printed. You used the default of Y (Yes) on the General Information/Indexed File display for the sample program.

Print additions. Specifies whether or not the audit report should include new records. You used the default of Y (Yes) on the Select Audit Control display for the sample program.

Print changes. Specifies whether or not the audit report should include changed records. You used the default of Y (Yes) on the Select Audit Control display for the sample program.

Print deletions. Specifies whether or not the audit report should include deleted records. You used the default of Y (Yes) on the Select Audit Control display for the sample program.

Printer line width. Specifies the designated line width for the audit report. You used the default of 132 characters on the Select Audit Control display for the sample program.

Printer column spacing. Specifies the designated number of spaces to appear between fields on the Audit report. You used the default of 1 on the Select Audit Control display for the sample program.

S/36 style. Specifies the designated display format. You used the default of Y (Yes) on the General Information/Indexed File display for the sample program.

Suppress data errors. Specifies whether or not data errors should display. You used the default N (No) on the General Information/Indexed File display for the sample program.

Edit numerics: Specifies whether or not you want DFU to edit your numeric entries when you run the program. For this example, you selected N (No) from the General Information/Indexed File display.

Example Action: Press Enter to review the DFU Program Detail display.

Display DFU Program Detail Display

The Display DFU Program Detail display appears when you press Enter from either of the program summary displays. This display allows you to review the details of the record types and fields defined so far for the DFU program.

Your display appears as shown in Figure C-28 on page C-31.

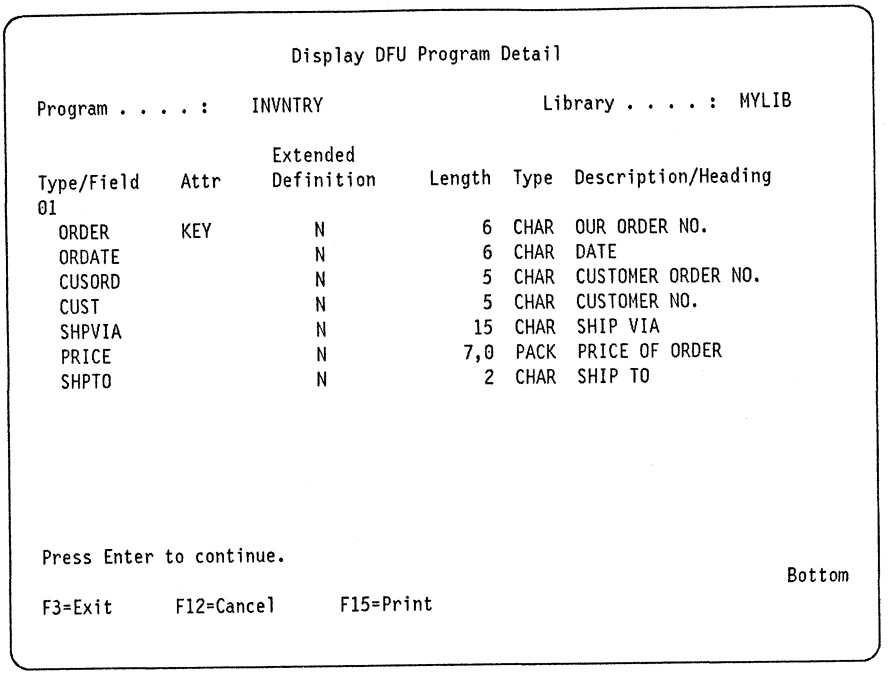


Figure C-28. Display DFU Program Detail Display

Description of the information on the Display DFU Program Detail display is as follows:

Program. The name of the DFU program being defined.

Library. The name of the library containing the DFU program.

Type/Field. Represents the record type or field name. The field names are grouped within a record type and are indented two spaces on the display.

In the sample display, 01 is the specified record type for this DFU program and the subsequent entries are the fields selected from record type 01 for the data entry display.

Attr. The field attribute (KEY, OUT, or RRN for direct or sequential files) for each field within the record type.

Extended definition. Shows whether or not a field has an extended definition.

Length. Specifies the length of each field in the record type.

Type. The data type (CHAR, PACK, ZONE, BIN, or DBCS) of each field within the record type.

Description/Heading. The description of the record type (if the item is a record type) or the heading for a field (if the item is a field).

Example Action: Press Enter to review the Display Data File Detail display.

Display Data File Detail Display

The Display Data File Detail display appears when you press Enter from the DFU Program Detail display. This display allows you to review the details of the record types and fields defined by the RPG II specifications for this data file.

This display shows all of the fields in the file specification, not just your selected fields. For this example, your display appears as shown in Figure C-29.

```
                        Display Data File Detail

File . . . :   INVRPG                        Library . . . . :   QS36F


Type/Field    Start  Length  Type  Attr  Description
01
  ORDER           1       6  CHAR  KEY
  ORDATE          7       6  CHAR
  CUSTORD        13       5  CHAR
  CUST           18       5  CHAR
  SHPVIA         23      15  CHAR
  PRICE          38     7,0  PACK
  SHPTO          42       2  CHAR
  GOODS          44      10  CHAR
02
  ORDER           1       6  CHAR  KEY



Press Enter to continue.
                                                                      More...
F3=Exit      F12=Cancel      F15=Print
```

Figure C-29. Display Data File Detail Display

Description of the information of the Display Data File Detail display is as follows:

File. The name of the data file used by the DFU program.

Library. The name of the library containing the data file.

Type/Field. Represents the record type or field name. The field names are sub-grouped within a record type and are indented two spaces on the display. In the sample display, 01 and 02 are the specified record types for this DFU program and the subsequent entries are the fields selected for the data entry display.

Start. The start position of the field in the record type.

Length. Specifies the length of each field in a record type.

Type. The data type (CHAR, PACK, ZONE, BIN, or DBCS) of each field within the record type.

Attr. The field attribute (KEY, OUT, or RRN for direct or sequential files) for each field within the record type.

Description. The description of the record or field.

Example Action: You are finished reviewing the program definition and file details. Press F3 (Exit) to return to the Specify Extended Field Definition display. Your display appears as shown in Figure C-30.

```
                    Specify Extended Field Definition

Field name . . . . . :  ORDER                Record type . . . . . :  01

Type choices, press Enter.

  Auto-duplicate . . . . . .  N              Y=Yes, N=No
  Allow lowercase . . . . . .  N             Y=Yes, N=No
  Extended field
    heading . . . . . .  OUR ORDER NO._____
                         (ALPHAMERIC XC CODE)
                         _____________________




F3=Exit      F12=Cancel      F14=Display definition
```

Figure C-30. Specify Extended Field Definition Display

Example Action: Press Enter twice. The End DFU Program Definition display appears.

End DFU Program Definition Display

The End DFU Program Definition display is the final display in the definition sequence. The End DFU Program Definition display allows you to save, or to save and then run your newly defined DFU program. You can also return to the definition sequence to make additional modifications to your program.

The following example saves the INVNTRY program and then runs the program in Display mode. This gives you a chance to check the data entry displays you have just defined. Display mode allows you to look at records in the INVRPG data file but not change them.

Your display appears as in Figure C-31 on page C-34.

Note: Option 9=Create appears in the *Type of run* prompt only if you used the OCL ENTER procedure.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y           Y=Yes, N=No
  Run program . . . . . .   Y           Y=Yes, N=No
    Type of run . . . . . .  1          1=Change
                                        2=Display

  Modify program . . . . . .  N         Y=Yes, N=No


Location for saved DFU program:
  Program . . . . . .   INVNTRY___
    Library . . . . .   MYLIB_____
  Authority . . . . .   *CHANGE___
  Text . . . . . .      INVENTORY RECORDS_____




F3=Exit      F14=Display definition      F17=Fast path
```

Figure C-31. End DFU Program Definition Display

Example Action: Type 2 (Display) over the default setting in the *Type of run* prompt. Your display appears as in Figure C-32.

```
                        End DFU Program Definition

Type choices, press Enter.

  Save program . . . . . .  Y           Y=Yes, N=No
  Run program . . . . . .   Y           Y=Yes, N=No
    Type of run . . . . . .  2          1=Change
                                        2=Display

  Modify program . . . . . .  N         Y=Yes, N=No
```

Figure C-32. End DFU Program Definition Display for a Display Type of Run

See "End DFU Program Definition Display" on page 2-35 for a description of the information on this display.

Example Action: Press Enter to save your program and continue to the Display a Data File display. This display appears because you selected to run the program in Display mode (option 2 (Display) in the *Type of run* prompt). This is also the first display that appears when you run a DFU program by using the DSPDTA command.

Display a Data File Display

The Display a Data File display allows you to specify the name of the data file you want to look at. See Chapter 4, "Running a DFU Program," for additional information about running DFU programs. When displayed from the End DFU Program Definition display, as for this example, this display contains default entries based on the information you specified on that display.

For this example, your display appears as shown in Figure C-33.

```
                          Display a Data File

Type choices, press Enter.

  Program . . . . . .  INVNTRY      Name, F4 for List
    Library . . . . .  MYLIB        Name, *LIBL, *CURLIB

  Data file . . . . .  INVRPG       Name, *SAME, F4 for List

    Library . . . . .  QS36F        Name, *LIBL, *CURLIB
  Member  . . . . . .  *FIRST       Name, *FIRST, F4 for List

F3=Exit     F4=Prompt     F12=Cancel
The DFU program was saved successfully.
```

Figure C-33. Display a Data File

Description of the information on the Display a Data File display is as follows:

Program. The name of the program to run. To see the Select Program display, press F4 while your cursor is in this prompt. The defaults are the following:

- The program name you specified in the previous DFU session
- The name specified for the DFUPGM parameter if you used the DSPDTA or STRDFU command

The sample display shows the program you specified earlier on the End DFU Program Definition display for the sample INVNTRY program.

Library. The name of the library containing your specified DFU program. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name you specified in the previous DFU session

- The value specified for the DFUPGM parameter if you used the DSPDTA or STRDFU command

The sample display shows the library you specified earlier on the End DFU Program Definition display for the sample INVNTRY program.

Data file. The name of the data file you want your DFU program to display. If you want to see the Select File display, press F4 while your cursor is in this prompt. The defaults are the following:

- The program default (*SAME)
- The file name you specified in the previous DFU session
- The value specified for the FILE parameter if you used the DSPDTA or STRDFU command

The sample display shows the data file specified on the End DFU Program Definition display for the sample INVNTRY program.

Library. The name of the library in which to find your specified data file. The defaults are the following:

- Your library list (*LIBL)
- The current library (*CURLIB)
- The library name you specified in the previous DFU session
- The value specified for the FILE parameter if you used the DSPDTA or STRDFU command

The sample display shows the library you specified earlier on the End DFU Program Definition display for the sample INVNTRY program.

Member. The name of the data file member to be displayed by your DFU program. To see the Select Data File Member display, press F4 while your cursor is in this prompt. The defaults are the following:

- The *FIRST member
- The name specified on the MBR parameter if you used the DSPDTA or STRDFU command

The sample display shows the first member in the member list (*FIRST).

Example Action: Press Enter. The first data entry display appears as shown in Figure C-34 on page C-37.

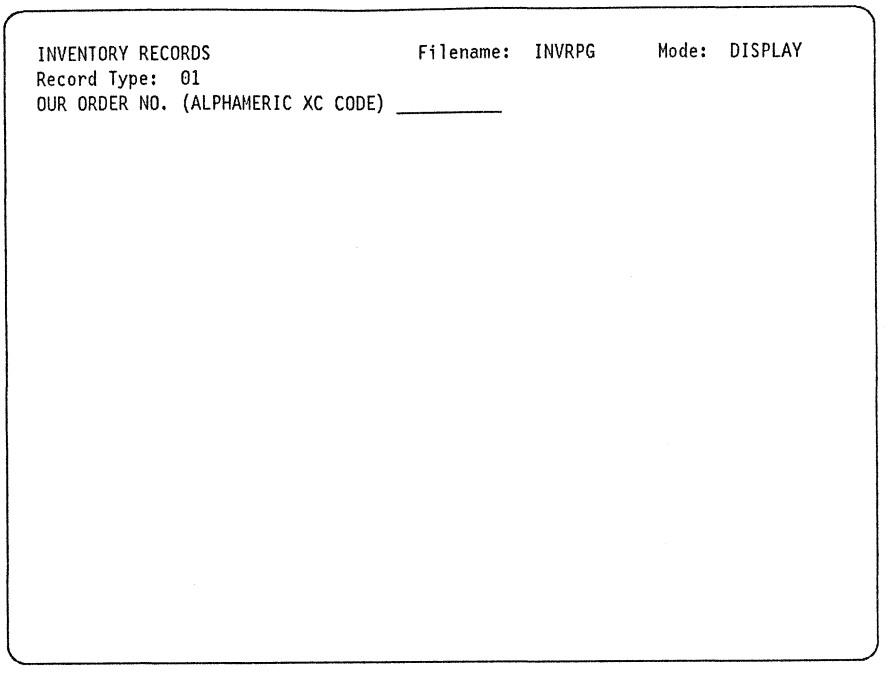


Figure C-34. System/36 Style Data Entry Display for the INVNTRY Program

You can run the DFU program in the same way as on the AS/400 system. You use System/36 function keys to perform DFU functions instead of AS/400 function keys. To display specific records, enter a key field value and press Enter. That record appears. You can also use Page Up and Page Down to page through records.

Appendix D. Service Information

This appendix contains information about DFU data areas and module names to help you investigate DFU problems that could occur while you are defining or running a DFU program.

Major DFU Data Areas

DFU contains two major data areas: definition data areas, and run-time data areas. These data areas are used by the various DFU modules listed in "DFU Module Names" on page D-2.

Definition Data Areas

DFU uses the following data areas when you create your data entry program.

The *Answer Table* (AT) holds an internal representation of the DFU program you have defined. The AT consists of a header, subsequent units, and related data. Each unit represents a group of information about one piece of a DFU program. For example, one unit may contain information about a record format and another contain information about a field. Each unit is built from one or more completed definition displays after entry of the STRDFU command.

The *Global Communications Area* (GCA) contains control information that is used and updated during the definition process. Preparation of the GCA occurs in the DFU command processing program (CPP) for the command being used.

The *Message Stack* (MS) contains error messages and substitution text for listing or displaying messages. The MS is used during the definition of a DFU program.

The *Record/Field List* (RFL) contains an internal representation of the data base file used by the DFU program. The RFL contains information about each record format and field in the file.

Run-Time Data Areas

DFU uses the following data areas when you run your data entry program:

The *Global Communications Area* (GCA) contains control information that is used and updated while the DFU program is running. Preparation of the GCA occurs in the DFU command processing program (CPP) for the command being used. The GCA is the interface between CPP and the run-time processes.

The *DFU Generate Code Interface Block* (GCIB) is the area passed to all DFU run-time modules, and, therefore, provides an interface between all of the run-time modules. It is maintained in a temporary space (QDZXGCIB) in the QTEMP library.

The *DFU Communication Block* (COMM) contains common data used by all DFU run-time modules. It is maintained in a temporary space (QDZXCOMM) in the QTEMP library.

The *Answer Table* (AT) contains much of the information needed to run a particular DFU program. The AT resides in the associated space of the copy of the program. A temporary copy is also made in QDZXDFAT in the QTEMP library for use while the program is running.

DFU Module Names

DFU uses principal and secondary modules to define a program, run a program, and migrate from a System/36 environment to the AS/400 system.

Definition Modules

DFU uses definition modules when you create the data entry program. Principal modules control the prompting sequence and secondary modules verify and process user input.

Principal Definition Modules

The following are the principal definition modules used by DFU:

QDZCHGF	Change a Data File prompt handler.
QDZCHGPG	Change a DFU Program prompt handler.
QDZCMDP	Command preprocessor for DFU.
QDZCPP	Command processor for DFU commands.
QDZCRTPG	Create a DFU Program prompt handler.
QDZDAUDT	Processes the Select Audit Control display.
QDZDDTYP	Presents the Display a Record Type display.
QDZDENDD	Processes the End DFU Program Definition display.
QDZDFDRV	DFU definition driver.
QDZDFDTL	Presents DFU File Detail display.
QDZDFLDD	Processes the Define Fields display.
QDZDGENI	Processes the General Information display.
QDZDLT	Deletes the program (DFU program and display file).
QDZDLTPG	Deletes a DFU Program prompt handler.
QDZDOLST	Presents object lists (file, member).
QDZDPDTL	Presents DFU Program Detail display.
QDZDPLST	Presents DFU Program List and Delete Confirmation displays.
QDZDPSUM	Presents DFU Program Summary display.
QDZDRLST	Processes the Select a Record Format/Type display.

QDZDRRNF	Processes the Select a Field for Relative Record Number display.
QDZDSPF	Display a Data File display handler.
QDZDSSEQ	Processes the Select and Sequence Fields display.
QDZDS360	DFU Select S/36 Style Options display manager.
QDZDXDEF	Processes the Extended Definition displays.
QDZMAIN	AS/400 Data File Utility (DFU) menu and Run a DFU program menu handler.
QDZTPDTA	Prompt handler for the Update Data Using Temporary Program display.

Secondary Definition Modules

The following are the secondary definition modules used by DFU:

QDZALC	Allocates a temporary space object.
QDZCHK	Carries out authority and existence checks.
QDZCLUP	DFU cleanup.
QDZDDL	Generates display layout.
QDZDGAT	Generates default answer table.
QDZDGCB	Generates control blocks needed by DFU.
QDZDGDF	Generates the Device File for a DFU Program.
QDZDGDR	Generates a DR Answer Table Unit (record format unit).
QDZDGD1	Generates a D1 Answer Table Unit (audit unit).
QDZDGD2	Generates a D2 Answer Table Unit (data format unit).
QDZDGD3	Generates a D3 Answer Table Unit (data field unit).
QDZDGD4	Generates a D4 Answer Table Unit (data validity unit).
QDZDGEM	Generates edit masks.
QDZDGPGM	Generates the DFU program.
QDZDGRFL	Generates the RFL.
QDZDLVL	Sets the IGC program level.
QDZDPC	Performs a procedure check to validate the Answer Table.
QDZDRAT	Retrieves the Answer Table for existing DFU programs.
QDZDRCB	Retrieves the Control Blocks for existing DFU programs.
QDZDRPG	RPG II parser.
QDZDTPD	Generates a temporary DFU program.
QDZIEXIT	Exits DFU.

QDZINIT	Starts DFU.
QDZMXDOP	Services displays.

Principal Run-Time Modules

DFU uses run-time modules when you run your data entry program. The principal modules control the prompting sequence as listed below:

QDZXADD	Data entry run-time Insert/Entry processor.
QDZXBSER	DFU buffer services processor.
QDZXCTL	DFU Data entry controller.
QDZXDBI	DFU data base servicer.
QDZXDRV	DFU run-time driver.
QDZXFET	DFU Update/Display processor.
QDZXFMT	Format/Type Selection processor.
QDZXINIT	DFU Start processor.
QDZXPRT	Print record processor.
QDZXSVC	DFU display service manager.

Migration Modules

DFU uses migration modules when you use DFU in the System/36 environment. The migration modules are as follows:

QDZCMRFL	DFU RFL conversion.
QDZCONV	DFU System/36 to the DFU AS/400 system conversion driver and print program.
QDZCSFGR	DFU System/36 Screen Format Generator (SFGR) conversion program.
QDZCSUBR	DFU System/36 subroutine conversion program.

System/36 Environment Modules

DFU uses the following modules in the System/36 environment:

#DFMP	DFU System/36 environment definition module.
#DFEX	DFU System/36 environment run-time module.

Appendix E. Calculating Modulus 10 and Modulus 11 Self-Check Digits

DFU can perform data entry validation for numerical entries that contain a self-check digit if you choose either the modulus 10 or modulus 11 check on the Specify Extended Field Definition display shown in Figure 2-24 on page 2-27. The two examples shown in this appendix use the same base number so that you can see the difference in the result of the calculation.

Modulus 10 Self-Check Digit

The modulus 10 check validates a field entry containing a self-check digit based on the following calculation:

1. Save the farthest right digit of the number as the number to be compared against the self-check digit.
2. Multiply the units in the next farthest right position and in every alternate position of that number by 2.
3. Add the digits in the products to the digits in the numbers not used in step 2 (except for the farthest right).
4. Subtract the sum from the next highest number ending in zero. The difference is the self-check digit.
5. Compare the self-check digit with the farthest right digit of the input field saved in step 1. If the digits are the same, the self-check is successful.

   For example:

```
Base number with
self-check digit:       1 2 3 4 6 1 2 8 7

Alternate positions
(excluding farthest       2   4   1   8
right)

Multiply by 2:            4   8   2   16

Digits not multiplied:  1   3   6   2

Add:                    4 + 8 + 2 + 1 + 6 + 1 + 3 + 6 + 2 = 33

Next highest number
ending in zero:         40

Subtract:               40 - 33 = 7

Self-check digit:       7

Farthest right digit:   7
```

Therefore, the modulus 10 check passes and the number 123461287 is a valid modulus 10 number. If an operator types this number into a field selected for the modulus 10 check, DFU would accept the number.

Modulus 11 Self-Check Digit

The modulus 11 check validates an entry containing a self-check digit using the following calculation:

1. Exclude the farthest right digit and save it.
2. Assign a weighting factor to each digit of the entered numbers except the self-check digit (the farthest right digit). The weighting factors are assigned to each digit in the following order: 2,3,4,5,6,7,2,3,4,5,6,7 and so on, starting with the farthest right position of the number (except the self-check digit) and progressing toward the high-order digit (farthest left). For example, the weighting factor for each digit of the base number 123461282 is as follows:

```
Base number with
self-check digit:     1 2 3 4 6 1 2 8 2 (exclude 2 farthest to the right)

Weighting factor:     3 2 7 6 5 4 3 2
                       <- - - - - - - -
```

3. Multiply each digit (except the farthest right self-check digit) by its weighting factor.
4. Add the products.
5. Divide the sum by 11.
6. Subtract the remainder from 11. The difference is the self-check digit.
7. Compare the self-check digit with the farthest right digit of the input field. If the digits are the same, the self-check is successful.

   For example:

```
Base number with
self-check digit:           1 2 3 4 6 1 2 8 2

Weighting factor:           3 2 7 6 5 4 3 2

Multiply each digit by its
weighting factor:           3 4 21 24 30 4 6 16

Add the products:           3 + 4 + 21 + 24 + 30 + 4 + 6 + 16 = 108

Divide by 11:               108/11 = 9 with a remainder of 9

Subtract remainder from 11: 11 - 9 = 2

Self-check digit:           2

Farthest right digit:       2
```

Since the self-check digit (2) is the same as the farthest right digit in the original number (2), the number 123461282 passes the modulus 11 self-check test. If an operator types this number into a field selected for the modulus 11 check, DFU would accept the number.

Appendix F. Differences Between System/38, System/36, and AS/400 DFU

Some operations and treatment of records and files differ between systems and environments. You should note the following differences if you are accustomed to using the System/36 or System/38, or are using the AS/400 system in a different environment.

DFU Migration

The AS/400 DFU migration aid only works with R-modules (sub-routine members). You must, therefore, compile your DFU source into System/36 R-modules before running the migration aid.

On System/36, you can define a DFU program for inquiry purposes only. This means that the DFU inquiry program cannot update records or insert records into a file. On the AS/400 system, however, DFU does not distinguish between inquiry or update programs. This causes DFU inquiry programs to become update-capable when migrated to the AS/400 system. You can use this System/36 inquiry program to update the file on the AS/400 system. To limit this System/36 inquiry program to only inquiry, selectively limit the use of the CHGDTA command. The *Security Concepts and Planning* manual contains information on how to selectively limit the use of specific commands.

Changing Programs Using OCL Procedures

If you want to change a DFU program using the OCL procedures ENTER, UPDATE, or INQUIRY from the System/36 environment, **do not** delete the program before trying to change it. DFU bases the change on the program object itself. In order to change the program, leave the *Name of DFU program* prompt blank, and specify the name of the program you want to change in the *Name of DFU specification source member* prompt.

Printing Reports

In the AS/400 environment, you must use Query to print reports instead of DFU LIST. For further details, see the *Query User's Guide*. If you are in the System/36 environment, you may use DFU LIST.

Deleting Records

System/36 marks records as deleted by placing a specified character in the record. Unless delete codes are specified, the AS/400 system physically deletes the record.

Blank Records

When you use the BLDFILE command to create a file in System/36, the records of the file are created with blanks. System/36 treats all blank records (X'40') as empty. If you create a file on the AS/400 system with externally described data, the numeric fields are filled with zeros and the records do not appear empty to DFU.

Key Fields on the Data Entry Display

In data entry in INQUIRY mode on the System/36, DFU shows two field prompts related to the key: Current key and Next key. The AS/400 system shows only one key field. This one key provides both functions depending on the current mode. For example, if you type a key and press Enter during Change mode, the requested record appears.

CHGDTA Command

In the System/38 environment, the CHGDTA command starts the System/38 DFU product. In the AS/400 environment, the CHGDTA command starts the AS/400 DFU product.

Record Backspace (Cmd 5)

On the System/36, if you press the Record Backspace function key when in entry or insert mode, the previously processed record is displayed. The mode changes to update mode and you can change the record. When you have changed the record, press Enter to return to the previous mode.

AS/400 DFU does not support this function. To achieve a similar result in the AS/400 environment, press F11 (Change) to go to the Change mode. Type the key for the record you want to update and press Enter. The record you want to update appears. You can now change this record.

Changing Record Keys

On the System/38, when you are creating a DFU program, you can change the record key. On the AS/400 DFU system, the record keys are protected and cannot be changed.

Inability to Edit Screens

On the System/36, you can save your $SFGR for a DFU program. You can make changes to the screen and recompile it to make your screens appear as you want them. You can also migrate your programs from the System/36 and keep any of the edited results. The edited screens will disappear if you make changes to the migrated program on the AS/400 system.

On the AS/400 system, DFU does not allow you to save your screen source: you cannot edit your data entry screens.

Glossary

access path. The order that records in a data base file are organized for processing by a program. See *arrival sequence access path* and *keyed sequence access path.*

add authority. A data authority that allows the user to add entries to an object; for example, add job entries to a job queue or add records to a file. Contrast with *delete authority.* See also *read authority* and *update authority.*

all authority. An object authority that allows the user to perform all operations on the object except those limited to the owner or controlled by authorization list management authority. The user can control the object's existence, specify the security for the object, and change the object. Contrast with *exclude authority.*

alphabetic character. (1) Any one of the letters A through Z (uppercase and lowercase) or one of the characters #, $, or @. (2) (COBOL) A character that is one of the 26 uppercase letters of the alphabet, or a space. (3) (BASIC) A character that is one of the 26 uppercase or 26 lowercase letters of the alphabet.

alphameric. Pertaining to the letters, A-Z; numbers, 0-9; and special symbols, $, #, @, ., or _. Synonymous with *alphanumeric.*

alphanumeric. Pertaining to the letters, A-Z; numbers, 0-9; and special symbols, $, #, @, ., or _. Synonymous with *alphameric.*

APAR. See *authorized program analysis report (APAR).*

application. A particular business task, such as inventory control or accounts receivable.

arrival sequence access path. An access path to a data base file that is arranged according to the order in which records are stored in the physical file. See also *keyed sequence access path* and *access path.*

attribute. A characteristic or property of one or more objects.

authority. Right to do something or have it done.

authority checking. A function of the system that looks for and verifies a user's authority to an object.

authorized program analysis report (APAR). A request for correction of a defect in a current release of an IBM-supplied program.

automatic duplication. An option of the data file utility (DFU) function of the AS/400 Application Development Tools licensed program, that allows information from a previous record to be automatically copied into the current record.

batch. Pertaining to a group of jobs to be run on a computer sequentially with the same program with little or no operator action. Contrast with *interactive.*

batch accumulator. (DFU) An accumulator in which subtotals for a field are stored. Contrast with *total accumulator.*

batch processing. A method of running a program or a series of programs in which one or more records (a batch) are processed with little or no action from the user or operator. Contrast with *interactive processing.*

bracket. (SNA) One or more chains of request units and their responses, representing a complete transaction, exchanged between two logical unit half sessions. See also *RU chain.*

chain. (1) A group of logically linked records. (2) A character set on an impact printer. (3) (DFU) A way to change from one display format to another after the user signals that the first display format was completed. (4) (BASIC) An operation in which a program passes control to another program then ends. (5) (RPG/400) An operation code that reads input records identified by specified relative record numbers or keys. (6) (SNA) A group of logically linked records that are transferred over a communication line. See RU chain.

character field. An area that is reserved for information that can contain any of the characters in the data character set. Contrast with *numeric field.*

character key. A keyboard key that allows the user to type into the system the character shown on the key. See also *function key.*

CL. See *control language (CL).*

command. (1) A statement used to request a function of the system. A command consists of the command name, which identifies the requested function, and parameters. (2) (SNA) Any field set in the

transmission header (TH), request header (RH), or a request unit that states an action or that starts a protocol.

command attention (CA) key. (DDS) A keyboard key that can be specified with the CA keyword to request the function specified by the keyword. Data is not returned to the system. Contrast with *command function (CF) key.*

command file. (RJE) A remote job input stream that can contain host system commands and job control language (JCL), data, and RJE control statements (READFILE or EOF). Contrast with *data file.*

command function (CF) key. (DDS) A keyboard key that can be specified with the CF keyword to request the function specified by the keyword. Data is returned to the system. Contrast with *command attention (CA) key.*

control language (CL). The set of all commands with which a user requests system functions.

create. (1) The function used to bring an object into existence in the system. (2) To bring an object into existence in the system.

creation date. The system date when an object is created. See also *job date*, and *system date.*

cursor. A movable symbol, often a blinking or solid block of light, that tells the user where to type, or identifies a choice to select.

data authority. A specific authority to read, add, update, or delete data. See also *add authority*, *delete authority*, *read authority*, and *update authority.*

data base. The collection of all data files stored in the system.

data base file. An object that contains descriptions of how input data is to be presented to a program from internal storage and how output data is to be presented to internal storage from a program. See also *physical file* and *logical file.*

data description specifications (DDS). A description of the user's data base or device files that is entered into the system in a fixed form. The description is then used to create files.

data file. (1) A collection of related data records organized in a specific order. (2) A file created by the specification of FILETYPE(*DATA) on the create commands. Contrast with *source file.* (3) (BASIC) The table containing the values from the DATA statements of a program. (4) (RJE) A remote job input stream that can contain host system commands and job control language as well as data. Contrast with *command file.*

data file utility (DFU). The part of the AS/400 Application Development Tools licensed program that is used to enter, maintain, and display records in a data base file.

data type. A characteristic used for defining data as numeric or character.

DDM. See *distributed data management (DDM).*

DDS. See *data description specifications (DDS).*

default. A value automatically supplied or assumed by the system or program.

delete. Remove all or part of a document, file, list, and so forth.

delete authority. A data authority that allows the user to remove entries from an object; for example, delete messages from a message queue or delete records from a file. Contrast with *add authority.* See also *read authority* and *update authority.*

DFU. See *data file utility (DFU).*

DFU application. See *application.*

distributed data management (DDM). A function of the operating system that allows an application program or user on one system to use data files stored on remote systems. The systems must be connected by a communications network, and the remote systems must also be using DDM.

duplicate key value. The occurrence of the same value in a key field or in a composite key in more than one record in a file.

edit. (1) To interactively add, change, delete, or rearrange the data; for example, to insert or remove characters, sentences, or paragraphs, or to insert or remove characters in dates or decimal numbers. (2) To make changes to a document by adding, changing, or removing text.

edit code. A letter or number indicating that editing should be done according to a defined pattern before a field is displayed or printed. Contrast with *edit word.*

edit word. A user-defined word with a specific format that indicates how editing should be done. Contrast with *edit code.*

entry format. The description of a personal directory entry. Each personal directory entry has an identical structure. The entry structure determines the type and size of each field in a personal directory entry.

exclude authority. An object authority that prevents the user from using the object or its contents. Contrast with *all authority*.

folder. A directory for documents. A folder is used to group related documents and to find documents by name. The system-recognized identifier for the object type is *FLR. Compare with *library*.

function key. A keyboard key that allows the user to select keyboard functions or programmer functions. Contrast with *character key*.

general-purpose library. The library shipped with the system that contains IBM-provided objects required for many system functions and user-created objects that are not explicitly placed in a different library when they are created. Named QGPL.

generic name. The characters common to object names that can be used to identify a group of objects. A generic name ends with an * (asterisk). For example, ORD* identifies all objects whose names begin with the characters ORD.

help. The additional information about menus, prompts, and messages supplied when the user presses the Help key.

IDDU. See *interactive data definition utility (IDDU)*.

input-capable field. Any field that can receive data from a user.

input field. A field specified in a display file or data base file that is used for data you supply. Contrast with *output field*.

interactive. Pertaining to the exchange of information between people and a computer. Contrast with *batch*.

interactive data definition utility (IDDU). A function of the operating system that can be used to externally define the characteristics of data and the contents of files.

interactive processing. A processing method in which each operator action causes a response from the program or the system. Contrast with *batch processing*.

job. A unit of work defined by a user to be accomplished by a computer. This may include a set of computer programs, files, and control statements to the operating system.

job date. The date associated with a job. The job date usually assumes the system date, but it can be changed by the user. See also *creation date* and *system date*.

job description. A system object that defines how a job is to be processed. The object name is *JOBD.

join logical file. A logical file that combines (in one record format) fields from two or more physical files.

key field. A field used to arrange the records of a particular type within a file member.

keyed sequence. The order in which indexed records are read by the program.

keyed sequence access path. An access path to a data base file that is arranged according to the contents of key fields contained in the individual records. See also *arrival sequence access path* and *access path*.

keyword. (1) A name that identifies a parameter in a command. (2) (DDS) A name that identifies a function. (3) (AS/400 Office) A user-defined word used as one of the search values to identify a document during a search operation. (4) (RPG/400) A word whose use is essential to the meaning and structure of a statement in a programming language. (5) (PL/I) An identifier used in a defined context that takes on a specific meaning, such as an action to be taken or the attributes of data.

library. (1) An object on disk that serves as a directory to other objects. A library groups related objects, and allows the user to find objects by name. Compare with *folder*. (2) The set of publications for a system.

library list. A list that indicates which libraries are to be searched and the order in which they are to be searched. The system-recognized identifier is *LIBL.

lock state. A condition defined for an object that determines how it is locked, how it is used (read or write), and whether the object can be shared (used by more than one job).

logical file. A description of how data is to be presented to a program. This type of data base file contains no data, but it defines formats for one or more physical files. See also *join logical file*. Contrast with *physical file*.

member. Different sets of data within one file.

menu. Options listed in a display image that can be selected by the user of the display device.

message. A displayed or written communication.

modulus 10 checking/modulus 11 checking. (1) A method for verifying data. (2) Formulas used to calculate the check digit for a self-check field.

numeric field. An area that is reserved for a particular unit of information and that can contain only the digits 0 through 9. Contrast with *character field*.

object. A named unit that consists of a set of characteristics that describe the object and, in some cases, data. An object is anything that exists in and occupies space in storage and on which operations can be performed, such as programs, files, libraries, and folders.

object authority. A specific authority that controls what a system user can do to an entire object. For example, object authority includes deleting, moving, or renaming an object. There are three types of object authorities: object operational, object management, object existence.

object description. The characteristics (such as name, type, and owner name) that describe an object.

object existence authority. An object authority that allows the user to delete the object, free storage of the object, save and restore the object, transfer ownership of the object, and create an object that was named by an authority holder.

object management authority. An object authority that allows the user to specify the authority for the object, move or rename the object, and add members to data base files.

object name. The name of an object. Contrast with *qualified name*.

object operational authority. An object authority that allows the user to look at the description of an object and use the object as determined by the user's data authorities to the object. See also *all authority* and *use authority*.

object owner. A user who creates an object or to whom the ownership of an object was reassigned. The object owner has complete control over the object.

object type. The attributes that define the purpose of an object within the system. Each object type has associated with it a set of commands with which to process that type of object.

object user. A user who has been authorized by the object owner, the security officer, or a user with object existence rights to perform certain functions on an object.

output field. A field specified in a display file or data base file that is reserved for the information processed by a program. Contrast with *input field*.

packed field. A field that contains data in the packed decimal format.

physical file. A description of how data is to be presented to or received from a program and how data is actually stored in the data base. A physical file contains one record format and one or more members. Contrast with *logical file*.

printer file. A device file created by the user to support a printer device.

private authority. The authority specifically given to a user for an object that overrides any other authorities, such as the authority of a user's group profile or an authorization list. Contrast with *public authority*.

problem analysis. The process of finding the cause of a problem. For example, a program error, device error, or user error.

prompt. (1) A reminder or a displayed request for information or user action. The user must respond to allow the program to proceed. (2) A list of values or a request for information provided by the system as a reminder of the type of information or action required.

protected field. A field on a display in which a user cannot add, change, or delete data.

public authority. The authority given to users who do not have any specific (private) authority to an object, who are not on the authorization list (if one is specified for the object), and whose group profile has no specific authority to the object. Contrast with *private authority*.

QGPL. See *general-purpose library*.

qualified name. The name of the library containing the object and the name of the object. Contrast with *object name*.

read authority. A data authority that allows the user to look at the contents of an entry in an object or to run a program. See also *add authority*, *delete authority*, and *update authority*.

record. A collection of related data or words, treated as a unit; such as one name, address, and telephone number.

record format. (IDDU and DDS) The arrangement of data in the records contained in, or processed by, a file. The record format includes the record name, field names, and field descriptions (such as length and data type). The record formats used in a file are contained in the file description (DDS) or in the record format definition (IDDU).

relational operator. (1) The reserved words or symbols used to express a relational condition or a relational expression. (2) (COBOL) A reserved word, a relational character, a group of consecutive reserved words, or a group of consecutive reserved words and relational characters used to express a relational condition. (3) (FORTRAN) Any of the set of operators that express an arithmetic condition that can be either true or false. The operators are: .GT., .GE., .LT., .LE., .EQ., and .NE.. They are defined as greater than, greater than or equal to, less than, less than or equal to, equal to, and not equal to, respectively.

RU chain. (SNA) A set of related request/response units that are transmitted consecutively on a particular normal or expedited data flow. See also *bracket.*

security. Safety; protection from damage or theft.

security officer. A person assigned to control all of the security authorizations provided with the system. A security officer can, for example, remove password or resource security; or add, change, or remove security information about any system user.

self-check digit. The far right digit of a self-check field.

self-check field. A field, such as an account number, consisting of a base number and a self-check digit. For data entry applications, the operator-entered self-check number is compared with the self-check number calculated by the system.

SEU. See *source entry utility (SEU).*

sign off. To end a session at a display station.

sign on. To start a session at a display station.

source entry utility (SEU). A function of the AS/400 Application Development Tools licensed program that is used to create and change source members.

source file. (1) A file of programming code that is not compiled into machine language. Contrast with *data file.* (2) A file created by the specification of FILETYPE(*SRC) on the Create command. A source file can contain source statements for such items as high-level language programs and data description specifications.

source member. A member of a data base source file that contains source statements such as RPG/400, COBOL, BASIC, PL/I, or DDS specifications. See also *member.*

source statement. A statement written in symbols of a programming language. For example, RPG/400, COBOL, BASIC, PL/I, or DDS specifications are source statements.

system date. The date assigned in the system values when the system is started. See also *creation date,* and *job date.*

total accumulator. (DFU) A storage area where final totals for a field are kept. Contrast with *batch accumulator.*

truncate. (1) To cut off data that cannot be printed or displayed in the line width specified or available. Contrast with *fold.* (2) To cut off data that does not fit in the specified field length in a field definition.

UDS. See *utility definition specifications (UDS).*

update authority. A data authority that allows the user to change the data in an object, such as a journal, a message queue, or a data area. See also *add authority, delete authority,* and *read authority.*

use authority. An object authority that allows the user to run a program or display the contents of a file. Use authority combines object operational authority and read authority.

user profile. An object with a unique name that contains the user's password, the list of special authorities assigned to a user, and the objects the user owns.

user-defined edit code. A number (5 through 9) indicating that editing should be done on a numeric output field according to a pattern predefined to the system program. User-defined edit codes can take the place of edit words, so that repetitive coding of the same edit word is not necessary.

validity checking. To verify the contents of a field.

work station. A device used to transmit information to or receive information from a computer; for example, a display station or printer.

zoned field. A field that contains data in the zoned decimal format.

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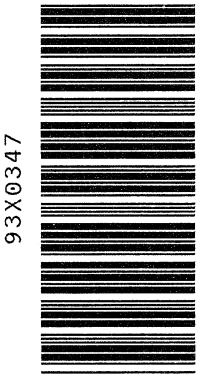

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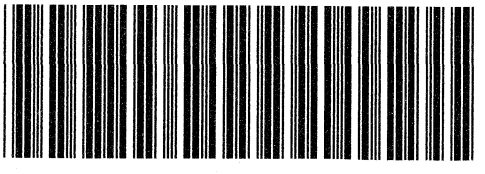

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