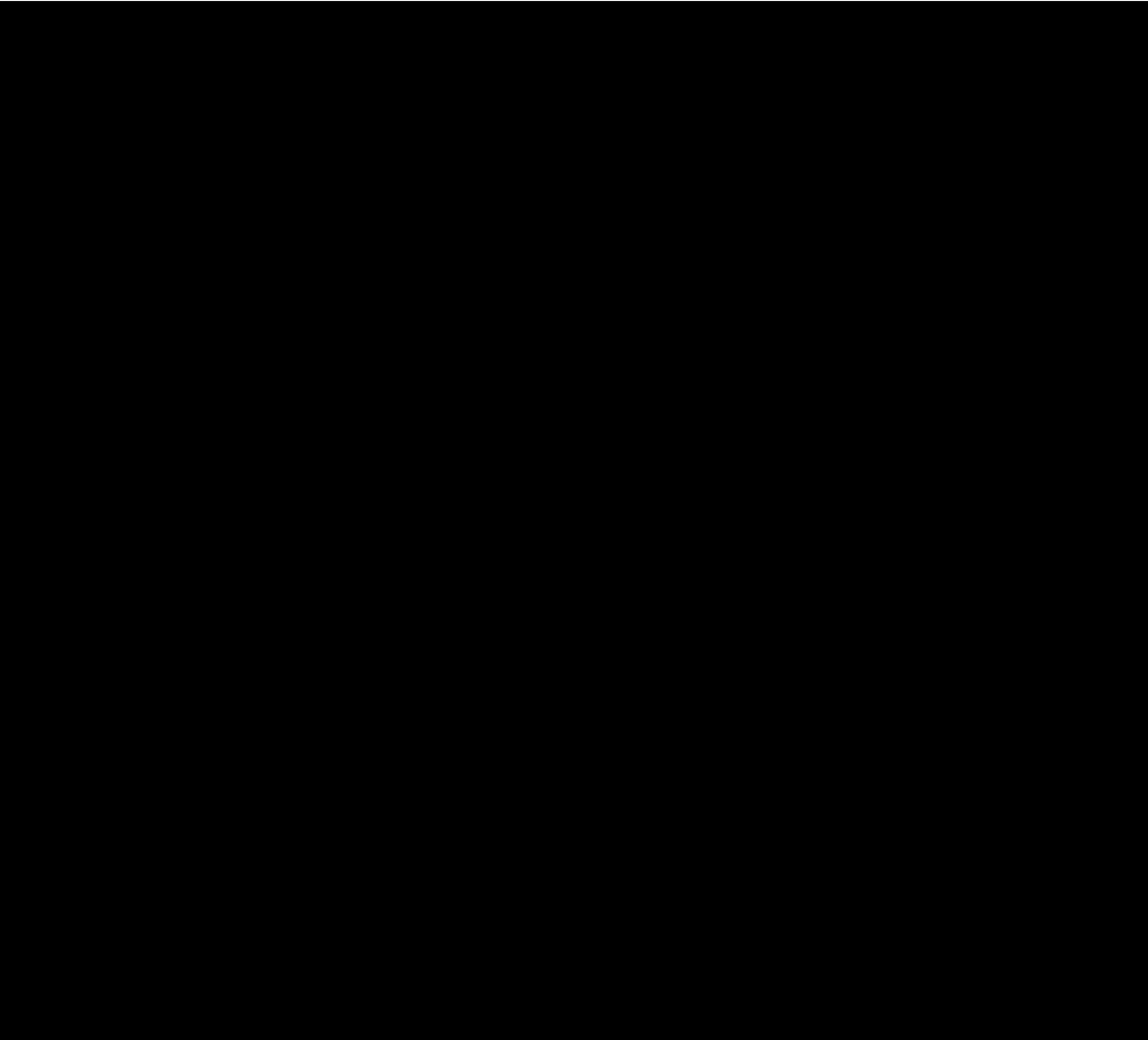


**PRELIMINARY**

**BFISD 5084**

# **Basic Four<sup>®</sup> Level 4 Utilities User's Guide**



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BASIC FOUR  
LEVEL 4 UTILITIES  
USER'S GUIDE

BFISD 5084



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OVERVIEW

The purpose of this manual is to describe the Business BASIC Level 4 utility programs and procedures for operating them. Utilities are general purpose functions useful to operators at all levels, whether they be first-time users or experienced programmers. This manual provides general information on standard utility procedures as well as detailed information on each utility program.

SCOPE

This manual describes all utilities that are standard features of the Level 4 and later Business BASIC systems, except for the Magnetic Tape Utilities. For information on the \*MTC utility, see the Magnetic Tape Utilities Reference Manual, BFISD 5052, and the Magnetic Tape Utilities Quick Reference Guide, BFISD 5086.

CONTENTS

The information in this manual is organized into the following sections:

- o Section 2, "STANDARD UTILITY PROCEDURES," includes general information on Level 4 utilities, including the main menu, utility groups, selecting parameters and control key functions.
- o Section 3, "DISC UTILITIES," describes all utilities associated with disc operations.
- o Section 4, "FILE UTILITIES," contains information on utilities which process an individual file.
- o Section 5, "FILES UTILITIES," contains information on utilities which process a group of files, designated by individual file names, mask or filelist.
- o Section 6, "PROGRAM UTILITIES," describes utilities allowing an operator to create and maintain program files.
- o Section 7, "SYSTEM UTILITIES," contains information on utilities involving system variables and parameters.
- o Section 8, "INFO UTILITY," gives a brief description of the utility which displays or prints information on all the Level 4 utilities.

- o Section 9, "UTILITY TOOLS," contains information on three general-purpose programs used by utilities and application programs.
- o Section 10, "ERROR HANDLING," briefly discusses the standard procedures for handling error conditions on Level 4 utilities.

#### RELATED PUBLICATIONS

The following Basic Four<sup>R</sup> publications contain additional information on the Level 4 Operating System:

- o Reference Manual for Business BASIC Levels 3 and 4, BFISD 5085
- o Magnetic Tape Utilities Reference Manual, BFISD 5052
- o Magnetic Tape Utilities Quick Reference Guide, BFISD 5087
- o 610/730 Operator's Guide, BFISD 5042
- o Operator's Training Guide 200/410, BFISD 5045
- o Synchronous Communications Reference Manual, BFISD 5007
- o Multi-level Directory Facility (MDF) Reference Manual, BFISD 5110

#### CONVENTIONS

This subsection describes the conventions used in this manual for representing data to be entered at the terminal. In references to information to be entered at the terminal in this guide, "Press" indicates that a function or control key is to be pressed, and "Enter" indicates that something is to be typed and frequently a Control Key (Carriage Return, Control Bar, etc.) is to be pressed.

Keys to be pressed are indicated in caps and underlined, without any quotation marks, such as:

CTL-IV (for Control Bar IV) and

RETURN or CR (for Carriage Return)

Information to be typed in is surrounded in single quotes, which are not themselves to be typed, as in:

'm' (for the letter m) 'YES' (for the word YES).

## DEFINITIONS OF TERMS

The following terms appear frequently in this manual and are defined as follows:

Block Print - The format used when listing program files. Each part of a compound statement is listed on a separate line. FOR/NEXT loops and IF/THEN/ELSE groups are indented five spaces, resulting in a more readable format than an ordinary listing.

Filelist - A file containing the names of a group of files to be processed by a program. Any list of file names may be saved as a filelist and assigned a name.

Gap File - An indexed file containing information about available sectors for that disc. The name of the file is "\*:XXXX" where the X's are the first four characters of the disc name. When a new file is created, the program reads the gap file to determine the available sectors and then allocates the appropriate space to that file. The gap file should be maintained regularly, either at load time or through the utility program MAINTAIN GAP FILE. See Section 3 on the MAINTAIN GAP FILE utility.

Hash - A 2-byte hexadecimal code used as a pointer to the Scatter Index Table. This code is not unique to each string of characters.

Mask - Used to create a filelist by using a special character as a place-holder for any ASCII character. On Level 4 systems, the special mask character is a CONTROL 'Z' (CTRL Z), or holding the CONTROL key down while pressing 'Z'. Utility programs consider the CONTROL 'Z' a match for any ASCII character, including blanks. Thus the mask '\*' + CTRL Z + 'BC' matches all file names beginning with an asterisk and with the letters BC in the third and fourth positions and containing any character, including a blank, between the asterisk and the B. The mask 'ABCD' + CTRL Z + CTRL Z matches all file names beginning with the letters 'ABCD' and ending with any two characters, including blanks. The mask composed of five CTRL Z's matches all file names containing five characters or less.

Parameter File - The file named "\*PARM" resides on the disc along with the utility programs and is essential to the operation of the Level 4 utilities. It contains all menus and the names of utility programs to be run upon selection. It also contains all utility parameters, their defaults, system

parameters and printer information. All utilities must refer to this file at some point during program execution.

Utility Tools - Programs used by both utility drivers and application programs. A utility tool (or PUBLIC TOOL) is used to allocate file space on disc, and is designed for general purpose use. There are twelve such programs on Level 4 systems. See SECTION 9 for detailed information on UTILITY TOOLS.

OVERVIEW

This section describes standard procedures used on Level 4 utility programs, including how to access the utilities, the procedures for using both the main menu and group menus, selecting parameters for specific utility programs, control key functions and the use of output devices.

ACCESSING THE  
LEVEL 4 UTILITIES

The paragraphs in this subsection describe general procedures for running the Level 4 utilities, including assigning memory, selecting options from the main menu and accessing utility group menus.

## ASSIGNING MEMORY

The Level 4 utilities require, in most cases, 32 pages of memory to run from a terminal. To assign memory, enter the command 'START 32'. All utility menus can function under these conditions. Some utilities, however, require more memory. The \*MTC utility, for example, requires 62 pages to run on Level 4 systems. If you attempt to run a utility which requires more than 32 pages of memory, the program displays a message such as the following:

THE TAPE UTILITIES MUST RUN IN AT LEAST A START  
62 IN BANKS 1-7.

ENTER 'CR' TO ABORT -

To run the \*MTC utility you would first press RETURN and then enter the command 'START 62'.

Under certain conditions, the allocation of more space improves the performance. Those utilities which are affected by performance or which require a larger START are noted in the applicable subsections of this manual.

## THE MAIN MENU

The Level 4 utilities are divided into groups according to their functions. The groups are: DISC, FILE (individual), FILES (multiple), PROGRAMS, SYSTEM, TAPE and INFO. The utilities main menu consists of a listing of these groups. To access the main menu, enter the command:

RUN "\*\*\*\*"

The program then displays the UTILITIES main menu as shown in Figure 2-1.

|   |                                   |       |
|---|-----------------------------------|-------|
| MM/DD/YY  | BASIC FOUR<br>UTILITIES MAIN MENU | HH:MM |
| <p>GROUP OPTIONS:    1. DISC<br/>                               2. FILE (INDIVIDUAL)<br/>                               3. FILES (MULTIPLE)<br/>                               4. PROGRAMS<br/>                               5. SYSTEM<br/>                               6. TAPE<br/>                               7. INFO</p> <p>SELECT GROUP OPTION:</p> |                                   |       |

Figure 2-1. Level 4 UTILITIES Main Menu

ACCESSING A  
UTILITY GROUP

Each utility group can be accessed in one of two ways, either through the main menu or in console mode. From the menu, to select the group including the desired utility, type the number corresponding to that option. There is no need to press RETURN. To copy a disc, for instance, choose the DISC group, option 1, and type '1'. To renumber a program, type '4' for the PROGRAMS utilities. For a complete list of Level 4 utilities, refer to the TABLE OF CONTENTS at the beginning of this manual.

To access a particular group without going through the main menu, enter the command 'RUN' followed by the file name for the group menu, surrounded in double quotes. The applicable file names are:

- \*DISC
- \*FILE
- \*FILES
- \*PGM
- \*SYS
- \*MTC
- \*INFO

To access the disc utilities, for example, enter the command 'RUN "\*DISC"'. The program then displays the menu for the disc utilities group. These menus and the procedures for running individual utilities are discussed in sections 3 through 8.

NOTE

The available options appearing on group menus and menus for individual utilities depend on the configuration of the system. Your menus may not be exactly as described in this manual.

SELECTING PARAMETERS

When a specific utility is accessed, in most cases, parameter options associated with it are displayed in groups near the top of the screen. Each option group consists of a list of options in background mode, with the default for each item listed first in foreground mode with an asterisk to the left, as shown in Figure 2-2 for the DISPLAY DIRECTORY utility.

|   |                |               |                   |
|---|----------------|---------------|-------------------|
| 1. FILE TYPE                            | 2. FILE RANGE  | 3. SORT ORDER | 4. OUTPUT DEVICE  |
| =====                                   | =====          | =====         | =====             |
| * ALL TYPES                             | * ALL FILES    | * BY LOCATION | * TERMINAL        |
| DATA FILES                              | SELECTED FILES | BY NAME       | LINE PRINTER (LP) |
| PROGRAM FILES                           |                |               | SELECTED PRINTER  |
| FREE SECTORS                            |                |               |                   |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                |               |                   |

Figure 2-2. DISPLAY DIRECTORY Option Groups

Thus for the FILE TYPE parameter, the default value is ALL TYPES, which is highlighted and marked with an asterisk. To change an option, press the number of the option to be changed until the desired selection is highlighted and the asterisk appears to the left. Each time the number of an option is pressed, the highlighting and asterisk move down one line. When the highlighting reaches the last line it next goes to the first parameter option. For example, from the screen display shown in Figure 2-2, to display only program files in the directory, press '1' twice. The selection PROGRAM FILES would then be highlighted with the asterisk to its left. To have the output sent to the line printer, press '4' once. If you change your mind and decide to display all types of files, press '1' twice so that ALL TYPES is highlighted and the asterisk appears by it again.

CONTROL KEY  
FUNCTIONS

Control keys are used to enter data, move the cursor and carry out or cancel program procedures. On Level 4 the control keys are the CARRIAGE RETURN, CONTROL BARS I through IV (the four keys at the right-hand side of the numeric keypad), the ESCAPE key and the question mark. The functions of these keys have been standardized on Level 4 utilities. Unless different functions are displayed on the screen, usually in the lower right-hand corner, the functions of these keys are as explained below.

CARRIAGE RETURN  
AND CONTROL BAR I

The Carriage Return and Control Bar I perform the same functions on Level 4 utilities. If pressed at any position other than the beginning of the field, they enter what has been typed in the field and move the cursor to the next field. If pressed at the beginning of a field, they enter the default value if any exists, and advance the cursor to the next field.

CONTROL BAR II

Control Bar II is used to move the cursor backward to the immediately preceding beginning position of a field. ~~If the cursor is at any position other than the beginning position of a field,~~ Control Bar II moves the cursor back to the beginning position of the current field and clears the field. If the cursor is at the beginning position of the field, Control Bar II moves it to the beginning position of the previous field and clears it.

CONTROL BAR III

Control Bar III is used to move forward, entering default values where they exist. It moves the cursor to the next field requiring operator input.

CONTROL BAR IV

Control Bar IV is used to exit from the current process. If the cursor is at the middle of a data entry screen, for example, pressing Control Bar IV moves the cursor to the beginning field of the screen and clears the screen of all entries. If pressed at the beginning of a process, Control Bar IV causes the program to exit from the process and return to the previous level of processing. Thus from a utilities group menu, Control Bar IV returns the operator either to the main menu screen or to console mode, depending on how the group menu was accessed.

ESCAPE KEY

In most cases the Escape key interrupts program execution and transfers control to console mode. If a SELECT command has been entered, pressing the Escape key will not override the command, and the task remains SELECTED to the given disc or fileset.

QUESTION MARK

From menus, the question mark (?) is used to call a HELP screen for a particular utility. If HELP text is available, the utility will display up to one page at a time. In some utilities the question mark is ignored. See SECTION 8 - INFO UTILITIES for information on HELP screens.

## OUTPUT DEVICES

The use of output devices has also been standardized on Level 4 utilities. Most utilities allow the user to send output either to the VDT or to a line printer or to a selected printer (if more than one printer is configured). If the user elects to send output to a selected printer, the program presents this prompt to enter the name of the printer:

ENTER PRINTER ID:

When the name of the printer is entered, e.g., 'P1', normal processing continues.

## PARAMETER FILE

The Level 4 utilities require a parameter file (\*PARM) on disc to operate. This file contains the printer parameters, system defaults and utility default parameters. The printer parameters include the paper width, paper length and the number of lines per inch to be printed.

The information maintained in the parameter file can be changed by means of the SYSTEM UTILITIES, specifically SET PRINTER VFU and SELECT PARAMETER DEFAULTS. Basic Four<sup>R</sup> encourages users to take advantage of the ability to change parameters to suit their particular needs. See SECTION 7 - SYSTEM UTILITIES, for procedures for changing parameter defaults.



OVERVIEW

This section of the manual describes procedures for using the DISC UTILITIES. The DISC UTILITIES allow an operator to display a listing of files on a disc, display and edit sectors, copy sectors, maintain the directory, maintain the gap file, change the disc ID or label, compact the disc, do an error analysis or repair and back up a disc. The next subsection explains how to access the DISC UTILITIES group menu. The following subsections describe the DISC UTILITIES in detail.

ACCESSING THE DISC UTILITIES

To access the DISC utility group, either type '1' from the Utilities main menu or from console mode enter the command 'RUN "\*DISC"'. If more than one disc is configured, the screen displays this prompt in the upper left-hand corner:

ENTER DISC:

Enter the number of a drive on which a configured disc resides, OR enter a valid disc name. If the disc number is invalid, the screen displays the message:

DISC n NOT CONFIGURED

If the name entered is not valid, the message appears:

DISC xxxxxx NOT MOUNTED

In both cases you are prompted to enter another disc number or name.

When a valid disc number or name has been entered, or if only one disc is configured, the program displays the disc roster and the DISC UTILITIES group menu, as shown in Figure 3-1:

| MM/DD/YY               | BASIC FOUR<br>DISC UTILITIES MENU |                       | HH:MM |
|------------------------|-----------------------------------|-----------------------|-------|
| DISC NAME:             |                                   | ALLOCATED FILES:      |       |
| DISC TYPE:             |                                   | AVAILABLE ENTRIES:    |       |
| DIRECTORY SIZE:        |                                   | TOTAL SECTORS:        |       |
| DISC UTILITY OPTIONS:  | 1.                                | DISPLAY DIRECTORY     |       |
|                        | 2.                                | DISPLAY/EDIT SECTORS  |       |
|                        | 3.                                | COPY SECTORS          |       |
|                        | 4.                                | MAINTAIN DIRECTORY    |       |
|                        | 5.                                | MAINTAIN GAP FILE     |       |
|                        | 6.                                | CHANGE DISC ID/LABEL  |       |
|                        | 7.                                | COMPACT DISC          |       |
|                        | 8.                                | ERROR ANALYSIS/REPAIR |       |
|                        | 9.                                | DISC BACKUP           |       |
| SELECT UTILITY OPTION: |                                   |                       |       |

Figure 3-1. Disc Roster and DISC UTILITIES Group Menu

If the correct disc is displayed on the roster, enter the number corresponding to the option desired. If you wish to use another disc, press CTL-II to enter a different disc name or number. (Recall that pressing CTL-IV at any time returns you to the beginning stage of the process.)

The following subsections describe each of the DISC UTILITIES in detail.

DISPLAY DIRECTORY  
UTILITY

This subsection describes the DISPLAY DIRECTORY utility, including the procedures for running the utility and its effects.

PURPOSE OF  
THE UTILITY

The DISPLAY DIRECTORY utility allows the user to list the contents of a disc directory, including files and free sectors, either to the VDT or to a printer. For files, the information listed includes the file name; file type; beginning, ending and total sectors of the file; number of records defined; number of records used; key size; record size; program size and program ID. For available sectors, the program lists available space by the beginning sector, ending sector and total number of sectors. This utility requires space on disc to build a work file for the listing. The amount of space required depends upon the number of files to be listed.

HOW TO USE  
THE UTILITY

When option 1 is selected from the DISC UTILITIES group menu, the DISPLAY DIRECTORY utility option screen appears as shown in Figure 3-2:

| MM/DD/YY                                | BASIC FOUR<br>DISPLAY DIRECTORY UTILITY |                    | HH:MM             |
|---|---|--------------------|-------------------|
| DISC NAME:                              |   | ALLOCATED FILES:   |                   |
| DISC TYPE:                              |   | AVAILABLE ENTRIES: |                   |
| DIRECTORY SIZE:                         |   | TOTAL SECTORS:     |                   |
| 1. FILE TYPE                            | 2. FILE RANGE                           | 3. SORT ORDER      | 4. OUTPUT DEVICE  |
| =====                                   | =====                                   | =====              | =====             |
| * ALL TYPES                             | * ALL FILES                             | * BY LOCATION      | * TERMINAL        |
| DATA FILES                              | SELECTED FILES                          | BY NAME            | LINE PRINTER (LP) |
| PROGRAM FILES                           |   |                    | SELECTED PRINTER  |
| FREE SECTORS                            |   |                    |                   |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |   |                    |                   |

Figure 3-2. DISPLAY DIRECTORY Utility Option Screen

## DISPLAY DIRECTORY

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

### Parameters and Options

The parameters of the DISPLAY DIRECTORY utility and their options are:

1. FILE TYPE - This parameter allows you to display or list files of ALL TYPES, DATA FILES only, PROGRAM FILES only, or FREE SECTORS.
2. FILE RANGE - The available options are ALL FILES or SELECTED FILES. If the ALL FILES option is selected, all files of the type specified under FILE TYPE are listed. If the user specifies SELECTED FILES, the program presents a series of prompts for the names of the files to be listed, as described below. File names can be specified using masks, filelists or individual file names.
3. SORT ORDER - Files can be listed in order BY LOCATION on the disc or BY NAME.
4. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

After all the options are correctly specified, press RETURN to proceed. If the listing is sorted by name or is for selected files, a work file is established on the disc to sort the directory.

### Specifying Selected Files

If the user chooses to list SELECTED FILES, the program presents this prompt for the names of the files:

ADD SELECTED NAME, CR TO END (CTRL+Z=MASK):

1.-----

Files can be specified either by individual file name, by mask (using CTRL+Z) or by filelist. If you enter the name of a filelist, the prompt appears to verify the selection:

IS THIS A FILELIST? (CR/N):

Pressing RETURN causes the list of files in the filelist to be displayed. Entering 'N' causes the previous prompt to be displayed.

If you enter a mask name, the program displays the message SEARCHING DISC XXXXXX (N) and then displays the names of files selected by the mask, as shown in Figure 3-3 below, using the mask '\*' + CTRL+Z.

```

                                BASIC FOUR
MM/DD/YY                      DISPLAY DIRECTORY UTILITY                      HH:MM
-----
DISC NAME:                      ALLOCATED FILES:
DISC TYPE:                      AVAILABLE ENTRIES:
DIRECTORY SIZE:                 TOTAL SECTORS:

ADD SELECTED NAME, CR TO END (CTRL+Z=MASK): 1.*(CTRL+Z)

**          *1          *2          *6          *9          *A          *B          *C
*D          *E          *F          *G          *H          *I          *L          *M
*N          *O          *P          *R          *S          *T          *U          *V
*W          *X          *Y          *Z
    
```

Figure 3-3. Listing of Selected Program Files by Mask

When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

If you press RETURN to begin the listing process, and if a filelist was used in specifying the files to be listed, the program allows you to save the current selection under a filelist. The prompt appears:

SAVE THIS VERSION? (Y/CR):

If you enter 'Y' to save the list as a filelist you are then prompted for the filelist name:

DISPLAY DIRECTORY

ENTER FILELIST NAME:

If the filelist name you have entered already exists, the message appears:

ALREADY EXISTS -- REPLACE? (CR/N):

If you press RETURN the utility saves the current list under the existing name. If you enter 'N', the filelist is not saved under the existing name.

When the complete list of files has been specified and you have pressed RETURN to proceed with the listing, the program displays the message SORTING LIST OF FILES. PLEASE WAIT... and the listing process begins.

EFFECTS OF THE UTILITY

Two different listings result from the DISPLAY DIRECTORY utility, one for FILES, the other for FREE SECTORS on disc.

Listing of Files on Disc

Whenever the user elects to list files on the disc, a display or printing similar to the one shown in Figure 3-4 below results.

| BASIC FOUR                                 |                   |           |            |           |            |               |              |          |            | PAGE:    |        |  |
|--|-------------------|-----------|------------|-----------|------------|---------------|--------------|----------|------------|----------|--------|--|
| SELECTED FILES BY LOC. -- DISC: XXXXXX (n) |                   |           |            |           |            |               |              |          |            | HH:MM    |        |  |
| MM/DD/YY                                   | FILE NAME         | FILE TYPE | FIRST SECT | LAST SECT | TOTAL SECT | NO. OF RECRDS | AVAIL RECRDS | KEY SIZE | RECRD SIZE | PGM SIZE | PGM ID |  |
|  | SW                | PGM       | 2066       | 2069      | 4          | 1             |              |          | 1024       | 281      | "PR    |  |
|  | AG                | PGM       | 2110       | 2110      | 1          | 1             |              |          | 1024       | 806      | "AR    |  |
|  | BB                | PGM       | 2124       | 2127      | 4          | 1             |              |          | 4096       | 3845     | "BU    |  |
|  | MS                | PGM       | 9406       | 9405      | 2          | 1             |              |          | 2048       | 1734     | "MA    |  |
|  | AC                | DIR       | 9546       | 10612     | 156        | 500           | 495          | 50       | 256        |          |        |  |
|  | SM                | PGM       | 11923      | 11924     | 2          | 1             |              |          | 2048       | 1313     | "SY    |  |
|  | TOTAL PROGRAMS:   |           |            |           | 6          |               |              |          |            |          |        |  |
|  | TOTAL DATA FILES: |           |            |           | 1          |               |              |          |            |          |        |  |
|  | TOTAL FILES:      |           |            |           | 7          |               |              |          |            |          |        |  |
| CR TO PROCEED:                             |                   |           |            |           |            |               |              |          |            |          |        |  |

Figure 3-4. DIRECTORY DISPLAY of Files By Location

For program files, the column PGM ID displays part of the first statement of the program. The amount of the statement listed depends on the size of the output device medium. The maximum width for each line of display is 80 characters on the VDT. It varies for the printer depending on the size of paper used.

For a listing of PROGRAM FILES only, the columns FILE TYPE, NO. OF RECRDS, AVAIL RECRDS, and KEY SIZE do not appear. For a listing of DATA FILES only, the columns PGM SIZE and PGM ID do not appear.

Listing of Free Sectors on Disc

When the user has chosen to list FREE SECTORS on the disc, a display similar to that shown in Figure 3-5 appears. This listing is useful for updating the gap file.

| BASIC FOUR  |             |                |                       |             |                |              |             |                |
|---|-------------|----------------|-----------------------|-------------|----------------|--------------|-------------|----------------|
| AVAILABLE SECTORS BY LOCATION -- DISC: XXXXXX (n) |             |                |                       |             |                |              |             |                |
|   |             |                |                       |             |                |              |             | PAGE:          |
|   |             |                |                       |             |                |              |             | HH:MM          |
| -----   |             |                |                       |             |                |              |             |                |
| FIRST SECTOR                                      | LAST SECTOR | NO. OF SECTORS | FIRST SECTOR          | LAST SECTOR | NO. OF SECTORS | FIRST SECTOR | LAST SECTOR | NO. OF SECTORS |
| 98  | 101         | 4              | 1270                  | 1273        | 4              | 2145         | 2146        | 2              |
| 119   | 119         | 1              | 1286                  | 1288        | 3              | 2185         | 2186        | 2              |
| 122   | 123         | 2              | 1293                  | 1293        | 1              | 2204         | 2207        | 4              |
| 138   | 138         | 1              | 1368                  | 1373        | 6              | 2237         | 2241        | 5              |
| 157   | 158         | 2              | 1718                  | 1728        | 11             | 2244         | 2249        | 6              |
| 175   | 177         | 3              | 2026                  | 2030        | 5              |              |             |                |
| 371   | 371         | 1              | 2037                  | 2037        | 1              |              |             |                |
| 392   | 393         | 2              | 2056                  | 2064        | 9              |              |             |                |
| 438   | 441         | 4              | 2100                  | 2101        | 2              |              |             |                |
| 545   | 546         | 2              | 2137                  | 2138        | 2              |              |             |                |
| TOTAL NUMBER OF GAPS=25                           |             |                | TOTAL FREE SECTORS=85 |             |                |              |             |                |
| CR TO PROCEED:                                    |             |                |                       |             |                |              |             |                |

Figure 3-5. DIRECTORY DISPLAY of Free Sectors

DISPLAY/EDIT SECTORS

DISPLAY/EDIT SECTORS UTILITY

This subsection describes procedures for using the DISPLAY/EDIT SECTORS utility and the displays or printouts that result from the utility.

PURPOSE OF THE UTILITY

This utility provides a display in both hexadecimal and ASCII characters of specified sectors on a disc. It also allows the user to edit the contents of a sector in either hexadecimal or ASCII characters and to write the edited sectors back to disc.

CAUTION

Extreme caution must be used when editing sectors. Mistakes may destroy a file or data base. Basic Four<sup>R</sup> is not responsible for the results of the editing process. It is recommended that you perform a backup before editing sectors.

HOW TO USE THE UTILITY

When option 2 is selected from the DISC UTILITIES group menu, the program displays the option screen shown in Figure 3-6 below.

| MM/DD/YY                                | BASIC FOUR<br>DISPLAY/EDIT SECTORS UTILITY |   | HH:MM |
|---|--|---|-------|
| DISC NAME:                              | ALLOCATED FILES:                           |   |       |
| DISC TYPE:                              | AVAILABLE ENTRIES:                         |   |       |
| DIRECTORY SIZE:                         | TOTAL SECTORS:                             |   |       |
| 1. FUNCTION<br>=====                    | 2. SEARCH OPTION<br>=====                  | 3. OUTPUT DEVICE<br>=====                           |       |
| * DISPLAY ONLY<br>DISPLAY & EDIT        | * DISPLAY ALL<br>STRING SEARCH             | * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |  |   |       |

Figure 3-6. DISPLAY/EDIT SECTORS Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

Parameters and Options

The parameters of the DISPLAY/EDIT SECTORS utility and their options are as follows:

1. FUNCTION - This parameter allows you to choose between only DISPLAYING (or printing) the contents of a sector, and DISPLAYING AND EDITING the contents. The EDITING function is described in more detail below.
2. SEARCH OPTION - The user can choose between DISPLAYING ALL characters of a sector, or executing a STRING SEARCH. The STRING SEARCH option is available only with the DISPLAY ONLY function. If the user has chosen the STRING SEARCH option, the screen presents a prompt for the string to be searched for:

ENTER SEARCH STRING (MAX=35 CHAR):

Enter a string of 1 to 35 characters. This causes the utility to display only those sectors which contain the string entered or those sectors which share the specified string across the sector boundary.

3. OUTPUT DEVICE - The standard choices of displaying the sector only at the TERMINAL or printing the contents at the LINE PRINTER or at a SELECTED PRINTER (when more than one printer is configured) are available. When the user chooses the SELECTED PRINTER option, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Specifying the Display

After the parameters are set, the utility requests a starting location for the display. The prompt appears:

ENTER STARTING LOCATION (CR=first sector after directory)

## DISPLAY/EDIT SECTORS

Enter a sector number or file name. For printing or searching, the screen then displays the prompt for the number of sectors to be printed or searched:

ENTER NUMBER OF SECTORS TO PRINT (CR=1,  
CTL-III=END OF DISC):

After this number is entered and displayed on the screen, the program prompts for the number of bytes to be displayed per line:

ENTER BYTES/LINE (CR=24, MAX=XX)

If you elect to specify a number other than 24 bytes per line, the maximum allowed depends on the size of paper used. Enter the number of bytes per line desired, or press RETURN for the default of 24 bytes per line. The program then displays or prints the requested sectors as shown in Figure 3-7 below.

### Editing the Display

When the EDIT option is chosen, the selected sector is displayed as shown below in Figure 3-7, with the available editing commands listed at the lower right-hand corner of the screen:

| MM/DD/YY   | BASIC FOUR<br>DISPLAY/EDIT SECTORS UTILITY |      |      |      |      |       |       |       | HH:MM                                       |
|--|--|------|------|------|------|-------|-------|-------|---|
|  | :::1                                       | :::3 | :::5 | :::7 | :::9 | :::11 | :::13 | :::15 | #SECTOR                                     |
|  |  |      |      |      |      |       |       |       | # sssss                                     |
| 1  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#DISC                                  |
| 17   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....# XXXXXX(n)                            |
| 33   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#FILE                                  |
| 49   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....# XXXXXX                               |
| 65   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#KSZ: n + n                            |
| 81   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#SIT: sssss                            |
| 97   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#KEY: sssss                            |
| 113  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#DATA: ssssss                          |
| 129  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#END: sssss                            |
| 145  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#                                      |
| 161  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#                                      |
| 177  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#COMMANDS                              |
| 193  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#E=EDIT                                |
| 209  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#D=NEW DISC                            |
| 225  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#S=NEW SECTOR                          |
| 241  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....#W=WRITE TO<br># DISC<br>#B=BYTES/LINE |
| ENTER SECTOR NUMBER:   |  |      |      |      |      |       |       |       |   |
| CR=NEXT 1/4,CTL-II=PREV SECTOR,CTL-III=NEXT SECTOR,CTL-IV=EXIT#P=PRINT |  |      |      |      |      |       |       |       |   |

Figure 3-7. EDIT SECTORS Screen Display

To display a new sector, enter the number of the sector and press RETURN. The editing commands, which can be invoked by a single keystroke, are as follows:

E = Edit. Enter 'E' to invoke the editing process. The CTL bars are now restricted to within the sector being edited. The cursor is positioned at the first character of the sector on the hexadecimal side of the screen. Enter new text to replace existing text, or move the cursor position by typing one of the following characters, displayed in the lower right-hand corner of the screen:

< = Left. Moves the cursor to the left.

> = Right. Moves the cursor to the right.

[ = Up. Moves the cursor up.

] = Down. Moves the cursor down.

## DISPLAY/EDIT SECTORS

@ = Switch. Switches the cursor from the hexadecimal side of the display to the ASCII side, or from the ASCII side to the hexadecimal side.

A message explaining Control Bar functions for the EDITING mode is displayed as follows at the bottom of the screen:

CTL-II=PREV 1/4, CTL-III=NEXT 1/4,  
CTL-IV=RETURN TO COMMAND

To see the previous quarter of the sector being displayed, press CTL-II. Pressing CTL-III causes the next quarter of the sector to be displayed. Pressing CTL-IV returns control to command mode.

S = Specify a new location to edit. Enter 'S' to position the cursor at the first character of the next sector.

D = New disc. Enter 'D' to change discs, at which time a new sector is read from the new disc.

W = Write to disc. Enter 'W' to write the current sector to the disc. Before the sector is written to the disc, the screen asks for a verification:

OK TO WRITE SECTOR sssss TO DISC XXXXXX (n)?  
(Y/CR):

where: "sssss" = sector number,  
"XXXXXX" = disc name,  
"n" = disc drive number.

Enter 'Y' and the utility attempts to DISABLE the disc and to WRITE the edited sector to the disc. If the attempt to disable the disc is unsuccessful, the message appears:

UNABLE TO RESERVE DISC n TO WRITE SECTOR  
CR TO RETRY, CTL-II TO SKIP, CTL-IV TO EXIT:

P = Print. If a printer has been specified as the OUTPUT DEVICE, enter 'P' to print the current sector to the printer.

B = Bytes/Line. If a printer has been specified as the OUTPUT DEVICE, enter 'B' to change the number of bytes per line printed on the printer. When you enter 'B', the program displays the prompt:

ENTER BYTES/LINE (CR=16, MIN=2, MAX=XX):

(where XX depends on the size of paper used). Enter the number of bytes per line to be printed or press RETURN for 16 bytes per line.

EFFECTS OF THE UTILITY

The following paragraphs describe the printed and displayed results of the DISPLAY/EDIT SECTORS utility. Displays to the terminal are 1/4 sector or 256 bytes at a time. Printed displays may be up to a sector to a page, depending on the number of bytes printed per line. The display resulting at the screen is as shown in Figure 3-8.

| MM/DD/YY  | BASIC FOUR<br>DISPLAY/EDIT SECTORS UTILITY |      |      |      |      |       |       |       | HH:MM                    |
|---|--|------|------|------|------|-------|-------|-------|--------------------------|
|   | :::1                                       | :::3 | :::5 | :::7 | :::9 | :::11 | :::13 | :::15 |                          |
|   |  |      |      |      |      |       |       |       | SECTOR                   |
| 1   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... sssss              |
| 17  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... DISC               |
| 33  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... XXXXXX(n)          |
| 49  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... FILE               |
| 65  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... XXXXXX             |
| 81  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... KSZ: n + n         |
| 97  | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... SIT: sssss         |
| 113   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... KEY: sssss         |
| 129   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... DATA: sssss        |
| 145   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... END: sssss         |
| 161   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | .....                    |
| 177   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... COMMANDS           |
| 193   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... E=EDIT             |
| 209   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... D=NEW DISC         |
| 225   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... S=NEW SECTOR       |
| 241   | 0000                                       | 0000 | 0000 | 0000 | 0000 | 0000  | 0000  | 0000  | ..... W=WRITE TO<br>DISC |
| ENTER SECTOR NUMBER:  |  |      |      |      |      |       |       |       |                          |
| CR=NEXT 1/4, CTL-II=PREV SECTOR, CTL-III=NEXT SECTOR, CTL-IV=EXIT |  |      |      |      |      |       |       |       |                          |

Figure 3-8. DISPLAY/EDIT SECTORS Screen Display

## DISPLAY/EDIT SECTORS

The column to the left gives the number of the first byte in the row, beginning with 1. The columns at the top of the screen are the numbers of the bytes across from 0 to 15. The display underneath these columns is the content of the sector in hexademical characters. To the right appears the same content in ASCII characters. To the right of the ASCII display may appear the following information: the number of the sector being displayed, the name and number of the disc, the name of the file, keysize, beginning sector of the Scatter Index Table, starting sector of the key area, starting sector of the data area and last sector of the file. For program files, only the DATA and END sectors are displayed. Commands for editing the display are shown in the lower right-hand corner of the screen.

Control Bar functions are displayed at the bottom of the screen. Press RETURN or CTL-I to proceed to the next 1/4 sector; press CTL-II to back up to the previous sector; press CTL-III to advance to the next sector display; pressing CTL-IV ends the display and returns to the beginning of this utility.

COPY SECTORS  
UTILITY

This subsection describes the COPY SECTORS utility, including procedures for running the utility and the results of the utility.

PURPOSE OF  
THE UTILITY

This utility is used to copy sectors on a disc to another location on the same disc, or to a different disc. The utility also provides an option to verify that sectors are correctly copied. In order to execute, the utility must DISABLE the destination disc. Otherwise the COPY procedure is aborted.

CAUTION

Extreme caution must be used when copying sectors. Mistakes may destroy a file or data base. Basic Four<sup>R</sup> is not responsible for the results of the copying process.

HOW TO USE  
THE UTILITY

When option 3 is selected from the DISC UTILITIES menu, the following screen display results:

| MM/DD/YY                                | BASIC FOUR<br>COPY SECTORS UTILITY | HH:MM |
|---|------------------------------------|-------|
| -----                                   |                                    |       |
| DISC NAME:                              | ALLOCATED FILES:                   |       |
| DISC TYPE:                              | AVAILABLE ENTRIES:                 |       |
| DIRECTORY SIZE:                         | TOTAL SECTORS:                     |       |
| 1. SECTOR RANGE                         | 2. VERIFY OPTION                   |       |
| =====                                   | =====                              |       |
| * WHOLE DISC                            | * NON-VERIFIED                     |       |
| SELECTED RANGE                          | VERIFIED                           |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                    |       |

Figure 3-9. COPY SECTORS Utility Option Screen

## COPY SECTORS

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

### Parameters and Options

The parameters of the COPY SECTORS utility and their options are as follows:

1. SECTOR RANGE - The available options here are to copy the WHOLE DISC (sectors 1 through the highest sector available) or only a SELECTED RANGE of sectors on the disc.
2. VERIFY OPTION - This option allows the user to execute the copy and to verify that the sectors were copied correctly. The amount of time needed for the copy depends on available memory. To verify the copy, approximately twice the amount of data area memory is required and twice as much time is required since only half as many sectors transfer at a time, and an extra read is required for the verification.

### Copying Sectors

If the user has chosen the SELECTED RANGE option, the screen displays the prompts:

ENTER START COPY SECTOR (CR=1):

ENTER ENDING SECTOR (CR=HSA):

where "HSA" is the highest sector available on the disc. Enter the number of the sector where the copy is to begin, then enter the number of the last sector to be copied. Defaults are the first and last sectors on the disc.

If more than one disc is configured, the screen displays:

COPY TO DISC (CR=name and number of source disc):

Enter the drive number or main directory name of any configured disc, or press RETURN to have the sectors copied to the source disc.

If SELECTED RANGE has been chosen, the screen next displays the prompt:

ENTER COPY TO SECTOR (CR=nnnnnn):

where "nnnnnn" is the same sector number as the START COPY sector on the source disc. Enter the number of the sector on the destination disc where copying is to begin.

If the utility cannot DISABLE the destination and source discs, the following message is displayed:

UNABLE TO RESERVE DISC n FOR SECTOR COPY

CR TO RETRY, CTL-IV TO EXIT:

If you press CTL-IV to abort the copy, the utility returns the MAINTAIN DIRECTORY menu. Or you may make sure that all files are closed and the disc is not RESERVED or DISABLED, and press RETURN to attempt the copy again.

When the disc is successfully DISABLED, the screen displays the message:

MAXIMUM TRANSFER SIZE: X SECTORS  
ORIGINAL DESTINATION SECTORS WILL BE LOST. OK TO  
PROCEED? (CR/N):

The maximum transfer size varies depending on the size of the system and the amount of memory assigned to the task. The maximum ever used is 18 sectors on a removable-disc system with the task assigned 128 pages of memory.

Enter 'N' to return to the first prompt after parameter selection or press RETURN to proceed with the copying process.

#### EFFECTS OF THE UTILITY

Once the parameters are selected and all the required information has been entered in response to the prompts, the copying process begins. The screen displays a progress indicator showing the first sector of the current group being transferred, and any errors encountered. The message COPY COMPLETE. CR TO PROCEED: is displayed when the sectors have been copied. When the copying process is finished, the destination disc is ENABLED and the DISC UTILITIES menu returns to the screen.

## MAINTAIN DIRECTORY

### MAINTAIN DIRECTORY UTILITY

This subsection describes the MAINTAIN DIRECTORY utility, including procedures for running the utility and its results.

#### PURPOSE OF THE UTILITY

This utility provides a means of initializing the directory or disc and changing the directory capacity. (For systems with the Multi-level Directory Facility, options are also provided to create and erase FILESETs). The disc is DISABLED before any of these processes begins.

#### HOW TO USE THE UTILITY

When option 4 is selected from the DISC UTILITIES menu, a secondary menu shown in Figure 3-10 is displayed:

|                        |                                     |       |
|------------------------|-------------------------------------|-------|
| MM/DD/YY               | BASIC FOUR<br>DIRECTORY MAINTENANCE | HH:MM |
| DISC NAME:             | ALLOCATED FILES:                    |       |
| DISC TYPE:             | AVAILABLE ENTRIES:                  |       |
| DIRECTORY SIZE:        | TOTAL SECTORS:                      |       |
| UTILITY OPTIONS:       | 1. INITIALIZE DIRECTORY/DISC        |       |
|                        | 2. CHANGE DIRECTORY CAPACITY        |       |
| SELECT UTILITY OPTION: |                                     |       |

Figure 3-10. MAINTAIN DIRECTORY Menu

For systems without the Multi-level Directory Facility, two options are provided: INITIALIZE DIRECTORY/DISC and CHANGE DIRECTORY CAPACITY. For systems with the Multi-level Directory Facility (available to vendors only), the fileset roster is shown below the disc roster and options to CREATE and ERASE FILESETs are included in the menu. See the Multi-level Directory Facility (MDF) Reference Manual, BFISD 5110, for information on these options.

Initialize  
Directory/Disc

This option allows the user to erase a disc directory or to erase an entire disc of all files. The sectors are cleared and all characters are replaced by hexadecimal zeroes (\$00\$).

CAUTION

Extreme caution must be used when initializing a directory or a disc. Mistakes may destroy a set of files or a data base. Basic Four<sup>R</sup> is not responsible for mistakes made during the initializing process.

Procedures for Initializing a Disc      When option 1 is selected from the MAINTAIN DIRECTORY menu, the following parameter group is displayed:

| MM/DD/YY  | BASIC FOUR<br>INITIALIZE DIRECTORY/DISC | HH:MM |
|---|---|-------|
| -----   |   |       |
| DISC NAME:  | ALLOCATED FILES:                        |       |
| DISC TYPE:  | AVAILABLE ENTRIES:                      |       |
| DIRECTORY SIZE:   | TOTAL SECTORS:                          |       |
| <p>1. ERASE ITEM<br/>           =====<br/>           * DIRECTORY ONLY<br/>           WHOLE DISC</p> |   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:   |   |       |

Figure 3-11. INITIALIZE DIRECTORY/DISC Option Screen

Two options are available: erase DIRECTORY ONLY, or erase WHOLE DISC. When the DIRECTORY ONLY option is specified, only the directory and sector 1 are cleared. Entries are replaced by x'00'. When the WHOLE DISC option is chosen, the entire disc is cleared and all entries are replaced by x'00'.

After this parameter is established and you have pressed RETURN, the screen displays the warning:

## MAINTAIN DIRECTORY

\*\*\*WARNING: ALL FILES ON DISC name (n) WILL BE LOST!

OK TO PROCEED? (YES/NO):

If you enter 'NO', the utility returns to the option screen shown above in Figure 3-11. If you enter 'YES', the utility attempts to disable the disc to begin the erasing process.

The utility cannot function if any other task has a file open on the disc, or has the disc RESERVED or DISABLED. In any of these cases, the screen displays the message:

UNABLE TO RESERVE DISC (n) TO ERASE

CR TO RETRY, CTL-IV TO EXIT:

If you press CTL-IV to abort the erase procedure, the utility returns the MAINTAIN DIRECTORY menu. Or you may make sure that all files are closed and the disc is not RESERVED or DISABLED, and press RETURN to attempt the erase procedure again.

Effects of the  
Initialize Disc  
Utility

Once the disc has been DISABLED, the directory or disc initialization begins. A progress indicator appears on the screen indicating the current location being erased: CLEARING SECTOR sssss.

When the process has been completed, the screen displays the MAINTAIN DIRECTORY menu.

Change Directory  
Capacity

Use this option to change the directory capacity, which can be expanded to a maximum of 32767 entries, or reduced to a minimum of the current number of entries used plus 1.

Procedures for  
Changing the  
Directory Capacity

When option 2 is selected from the MAINTAIN DIRECTORY menu shown in Figure 3-10 above, the screen displays the status of the directory:

CURRENT DIRECTORY SIZE IS: xxxxx  
CURRENT ENTRIES USED: yyyy  
CURRENT ENTRIES AVAILABLE: zzzzz

ENTER NEW MAXIMUM NUMBER OF ENTRIES (MIN=nnn):

where: "xxxxx" is the current number of maximum entries;  
"yyyyy" is the number of entries currently in use;  
"zzzzz" is the number of entries presently available (the difference between xxxxx and yyyyy).

Enter the desired directory size.

The utility must RESERVE the specified disc in order to function. If any other task has a file open on the disc, or has the disc RESERVED or DISABLED, the screen displays the following message:

```
UNABLE TO RESERVE DISC (n) TO CHANGE DIRECTORY  
  
CR TO RETURN, CTL-IV TO EXIT
```

If you press CTL-IV to abort the procedure, the utility returns the MAINTAIN DIRECTORY menu shown in Figure 3-10. Or you may make sure that all files are closed and the disc is not RESERVED or DISABLED, and press RETURN to attempt the procedure again.

After this disc has been successfully RESERVED, the utility displays a verification message:

```
UTILITY WILL (INCREASE/DECREASE) AVAILABLE  
ENTRIES TO: yyyyy  
NEW DIRECTORY WILL OCCUPY SECTORS sssss THRU  
eeeee.
```

```
OK TO INCREASE/DECREASE? (CR/N):
```

Enter 'N' to return to the "ENTER NEW MAXIMUM NUMBER OF ENTRIES" prompt. Or press RETURN to proceed with the change.

If the directory is being expanded and files currently reside in the area required for the directory, the screen displays:

## MAINTAIN DIRECTORY

THE FOLLOWING n FILES MUST BE MOVED BEFORE  
EXPANSION BEGINS

filename 1            filename 2            filename 3

OK TO (EXPAND/REDUCE)? (CR/N)

Enter 'N' to return the "ENTER NEW MAXIMUM NUMBER OF  
ENTRIES" prompt to the screen. Or press RETURN to  
execute the change in directory capacity.

### Effects of the Change Directory Capacity Utility

Once information has been entered in response to the  
prompts listed above, the utility goes through the  
following steps to change the size of the directory:

1. The utility backs up the directory, displaying  
the message:

BACKING UP DIRECTORY AT SECTORS xxxxx THRU  
yyyyy

2. Files residing in the area required for expansion  
are moved to the first available location.
3. The expansion or reduction process begins and the  
message is displayed:

REDUCING/EXPANDING DIRECTORY \*\*\*ESCAPE  
DISABLED\*\*\*

4. Key area sectors are transferred to their proper  
location, and sectors at the end of the key area  
are filled with x'00'.
5. The Scatter Index Table is cleared and  
reconstructed through hashing of the file names  
in the key area:

RE-HASHING FILE NAMES

After the expansion or reduction is complete, the  
program returns the MAINTAIN DIRECTORY menu.

MAINTAIN GAP FILE  
UTILITY

This subsection describes the MAINTAIN GAP FILE utility, including procedures for running the utility and the outcome of the utility.

PURPOSE OF  
THE UTILITY

This utility provides a means for creating, updating and displaying the GAP FILE for a specified disc. The GAP FILE is an indexed file containing one record listing the available sectors on the disc. The name of the gap file is "\*:XXXX" where the X's represent the first four letters of the disc name. If the name of the disc is changed, the name of the gap file is also changed accordingly. But if a BOSS UPDATE is performed on the disc, a new gap file is created with the name of the new disc and the old gap file is transferred to the new disc. The old gap file may then be erased from the new disc.

RECOMMENDATION

The GAP FILE is used to allocate space to new files, so it should be maintained regularly for the most efficient use of disc space. If the GAP FILE is not kept up to date, errors may occur when files are created or moved on disc.

HOW TO USE  
THE UTILITY

When option 5 is selected from the DISC UTILITIES menu, one of two displays results depending upon whether a gap file already exists for the disc.

1. If no gap file exists for the disc, the screen displays the message:

GAP FILE DOES NOT EXIST FOR XXXXXX (n)  
CREATE? (Y/CR):

If you press RETURN, the program returns to the DISC UTILITIES menu. If you enter 'Y', the message appears:

NOW COLLECTING FREE SECTORS ON DISC XXXXXX  
(n)...

The program then displays a distribution graph of gaps on the disc as shown in Figure 3-15 below under Updating a Gap File.

MAINTAIN GAP FILE

2. If a gap file already exists for the disc, the option screen shown in Figure 3-12 below appears.

|   |   |       |
|---|---|-------|
| MM/DD/YY                                | BASIC FOUR<br>MAINTAIN GAP FILE UTILITY | HH:MM |
| -----                                   |   |       |
| DISC NAME:                              | ALLOCATED FILES:                        |       |
| DISC TYPE:                              | AVAILABLE ENTRIES:                      |       |
| DIRECTORY SIZE:                         | TOTAL SECTORS:                          |       |
| 1. FUNCTION                             | 2. OUTPUT DEVICE                        |       |
| =====                                   | =====                                   |       |
| * DISPLAY GAP FILE                      | * TERMINAL                              |       |
| UPDATE GAP FILE                         | LINE PRINTER (LP)                       |       |
|   | SELECTED PRINTER                        |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |   |       |

Figure 3-12. MAINTAIN GAP FILE Utility Option Screen

The parameters of the MAINTAIN GAP FILE utility and their options are as follows:

1. FUNCTION - Available options are to DISPLAY GAP FILE or to UPDATE GAP FILE.
2. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

EFFECTS OF  
THE UTILITY

Two different displays result from the MAINTAIN GAP FILE utility, depending on whether the user has elected to DISPLAY or UPDATE the gap file.

Displaying the Gap File

If the user has chosen the DISPLAY GAP FILE option, the program produces a display or printing similar to the one shown in Figure 3-13.

| BASIC FOUR  |  |                |              |             |                |              |             |                | PAGE: |
|---|--|----------------|--------------|-------------|----------------|--------------|-------------|----------------|-------|
| MM/DD/YY  | AVAILABLE SECTORS BY GAP FILE -- DISC: XXXXXX(n) |                |              |             |                |              |             |                | HH:MM |
| FIRST SECTOR  | LAST SECTOR                                      | NO. OF SECTORS | FIRST SECTOR | LAST SECTOR | NO. OF SECTORS | FIRST SECTOR | LAST SECTOR | NO. OF SECTORS |       |
| 1193  | 3400   | 2208           |              |             |                |              |             |                |       |
| 5377  | 72719  | 67343          |              |             |                |              |             |                |       |
| TOTAL NUMBER OF GAPS = 2 TOTAL FREE SECTORS = 69551 |  |                |              |             |                |              |             |                |       |
| CR TO PROCEED:                                      |  |                |              |             |                |              |             |                |       |

Figure 3-13. MAINTAIN GAP FILE Display of Free Sectors.

To return to the DISC UTILITIES menu, press RETURN.

Updating a Gap File

If the user has chosen the UPDATE GAP FILE option, the program displays the message:

NOW COLLECTING FREE SECTORS ON DISC XXXXXX (n)...

When the gap file has been created the distribution graph shown below in Figure 3-14 appears:

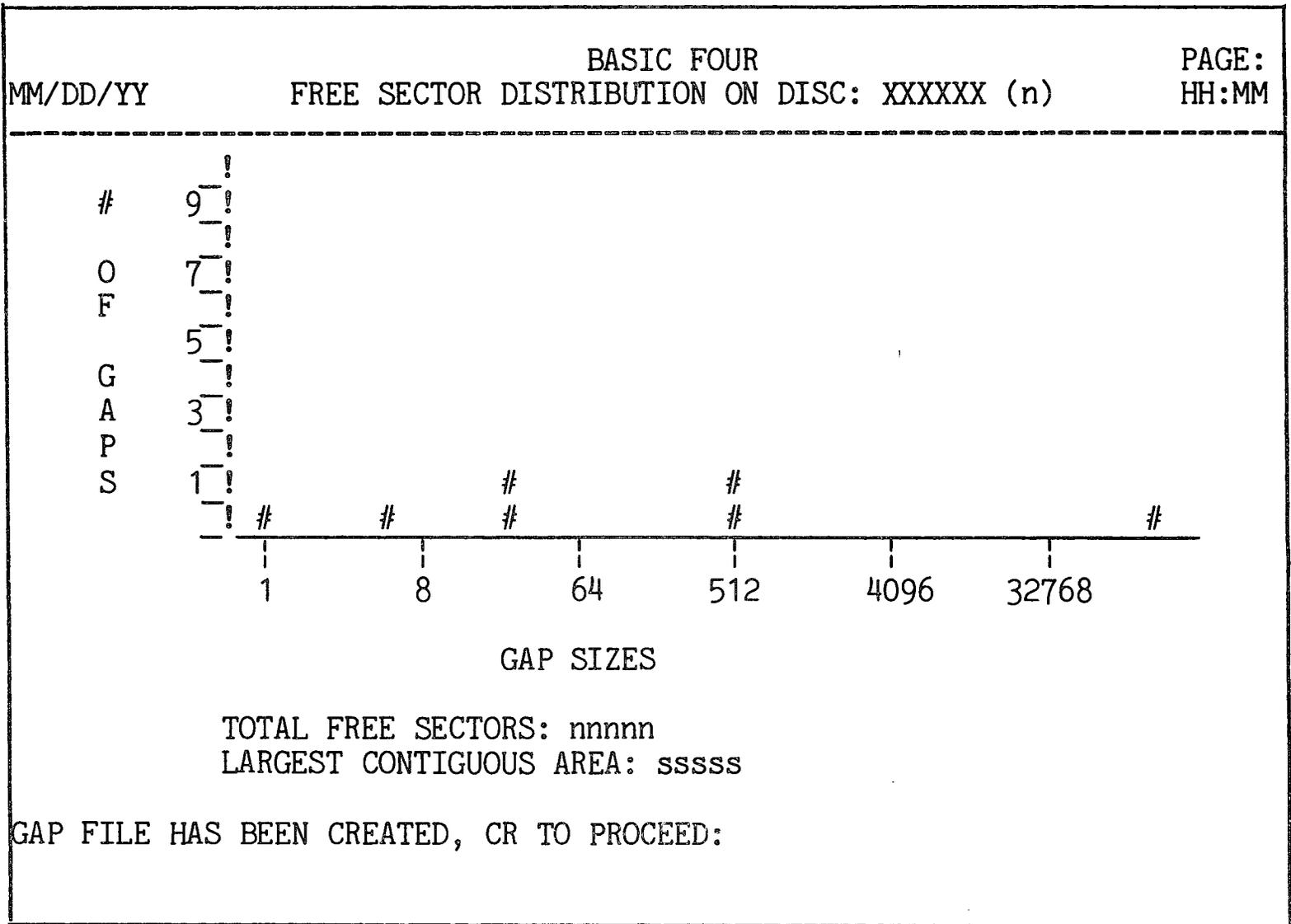


Figure 3-14. Distribution Graph of Free Sectors on Disc

The vertical coordinate (y-axis) represents the number of gaps and the horizontal coordinate (x-axis) represents the approximate size of the gap in sectors. The pound signs (#) show the number of gaps at about that sector size. In this example, there is one gap of about one sector, another of about 6 sectors, two gaps of between 8 and 64 sectors in size, two more gaps at about 512 sectors, and one larger than 32768 sectors.

To return to the MAINTAIN GAP FILE option screen, press RETURN.

CHANGE DISC  
ID/LABEL UTILITY

This subsection describes the CHANGE DISC ID/LABEL utility, including the procedures for running the utility and its effects.

PURPOSE OF  
THE UTILITY

This utility allows the user to change the name and other identifying information of a disc, stored on sector 1. The utility must be able to DISABLE the disc in order to write the new label.

HOW TO USE  
THE UTILITY

When option 6 is selected from the DISC UTILITIES menu, the program displays the current disc label and identification from sector 1 as shown below:

| MM/DD/YY   | BASIC FOUR<br>CHANGE DISC ID/LABEL UTILITY | HH:MM |
|--|--|-------|
| -----  |  |       |
| DISC NAME:   | ALLOCATED FILES:                           |       |
| DISC TYPE:   | AVAILABLE ENTRIES:                         |       |
| DIRECTORY SIZE:  | TOTAL SECTORS:                             |       |
| 1. DISC NAME:  |  |       |
| 2. DISC-SET:   |  |       |
| 3. DISC TYPE:  |  |       |
| 4. DESCRIPTION:  |  |       |
| 5. SERIAL NUMBER:                                      |  |       |
| 6. CREATOR ID:   |  |       |
| 7. LABEL DATE:   |  |       |
| 8. COPY DATE:  |  |       |
| SELECT ITEM TO CHANGE:                                 |  |       |
| CR TO SAVE, CTL-II TO RESTORE ORIGINAL, CTL-IV TO EXIT |  |       |

Figure 3-15. Disc ID and Label Information

To change an item in the list, enter the item number, then type in the change and press RETURN. To restore the original label items, press CTL-II. To abort the utility, press CTL-IV. The disc remains as it is, and the screen displays the DISC UTILITIES menu.

To save changes on the disc, press RETURN. A final verification message is displayed:

OK TO SAVE NEW LABEL? (CR/N):

## CHANGE DISC ID/LABEL

If you enter 'N', the program restores the original disc label and information and displays the SELECT ITEM TO CHANGE prompt. If you press RETURN, the utility puts the information on the disc, and displays the DISC UTILITIES menu.

COMPACT DISC  
UTILITY

This subsection describes the COMPACT DISC utility, including procedures for running the utility and its results.

PURPOSE OF  
THE UTILITY

This utility compacts an entire disc or a specified range of files on a disc to the high or low end of the range, removing free sectors from in between files. It inserts the free sectors in a block at the opposite end of the range.

HOW TO USE  
THE UTILITY

When option 7 is selected from the DISC UTILITIES menu, the program displays the option screen shown below:

| MM/DD/YY                                | BASIC FOUR<br>COMPACT DISC UTILITY |                    | HH:MM |
|---|------------------------------------|--------------------|-------|
| DISC NAME:                              |                                    | ALLOCATED FILES:   |       |
| DISC TYPE:                              |                                    | AVAILABLE ENTRIES: |       |
| DIRECTORY SIZE:                         |                                    | TOTAL SECTORS:     |       |
| 1. DIRECTION                            | 2. RANGE                           | 3. OUTPUT DEVICE   |       |
| =====                                   | =====                              | =====              |       |
| * TO LOW END                            | * WHOLE DISC                       | * TERMINAL         |       |
| TO HIGH END                             | SELECTED RANGE                     | LINE PRINTER (LP)  |       |
|   |                                    | SELECTED PRINTER   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                    |                    |       |

Figure 3-16. COMPACT DISC Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

## COMPACT DISC

### Parameters and Options

The parameters of the COMPACT DISC utility and their options are as follows:

1. DIRECTION - This option allows the user to choose between compacting the selected files TO LOW END (towards the beginning of the disc) or TO HIGH END (towards the end of the disc).
2. RANGE - Available options are to compact the WHOLE DISC or a SELECTED RANGE of files on the disc.
3. OUTPUT DEVICE - The listing or display of the results can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

### Procedures for Running the Utility

If you choose to compact the WHOLE DISC, the program assumes the first and last files as the range to be compacted. If you choose the SELECTED RANGE option, the screen displays the prompts:

ENTER STARTING FILE (CR=FIRST):

ENTER ENDING FILE (CR=LAST):

Enter the starting and ending file names for the range to be compacted. The utility then checks the disc for files by that name. If no files are found with the names entered, the screen displays:

FILE XXXXXX NOT FOUND, CR TO PROCEED:

Press RETURN to enter other starting and ending file names.

When the starting and ending file names have been correctly entered, or if the WHOLE DISC option was selected, the program presents this display:

TO LOW/HIGH END:

WHOLE DISC:

UTILITY WILL: COMPACT DOWN/UP TO SECTOR: nnnnn  
START FILE:XXXXX SECTOR: sssss  
THRU FILE: XXXXX END SECTOR: sssss

ESCAPE WILL BE DISABLED. OK TO PROCEED? (CR/N):

Entering 'N' causes the COMPACT DISC option screen to be displayed. Pressing RETURN causes the utility program to begin compacting files on the disc.

EFFECTS OF  
THE UTILITY

After the parameters are set, the utility begins the following procedures:

1. The program displays the starting and ending files of the range and their location in sectors:

STARTING FILE: XXXXXX SECTOR: nnnnn  
ENDING FILE: XXXXXX SECTOR: nnnnn

Then the message is briefly displayed:

NOW SORTING DIRECTORY. PLEASE WAIT.

2. Sectors are transferred and the directory is updated for each file within the range. As each file is compacted, a progress indicator displays on the VDT indicating the current file being moved:

COMPACTING FILE: XXXXXX

3. The GAP FILE is updated.

When the results of the utility are sent to a printer, the program produces a printout like the one shown in Figure 3-17 below:

| MM/DD/YY           | BASIC FOUR<br>DISC COMPACT LOG |                             |                    | PAGE:<br>HH:MM    |
|--------------------|--------------------------------|-----------------------------|--------------------|-------------------|
| -----              |                                |                             |                    |                   |
| DISC: SFTWRE (4)   |                                | COMPACT DOWN TO SECTOR: 100 |                    |                   |
| START FILE: *:SFTW |                                | SECTOR: 69647               | THRU FILE: ERRLLST | END SECTOR: 72719 |
| FILE               | MOVE<br>FROM                   | TO<br>SECTOR                | THRU<br>SECTOR     |                   |
| *:SFTW             | 69647                          | 100                         | 101                | MOVE COMPLETE     |
| *6-4.2             | 69834                          | 102                         | 290                | MOVE COMPLETE     |
| *6-3.7             | 69903                          | 291                         | 358                | MOVE COMPLETE     |
| *6FL               | 70091                          | 359                         | 547                | MOVE COMPLETE     |
| PASWRD             | 70095                          | 548                         | 551                | MOVE COMPLETE     |
| PSWRDL             | 70099                          | 552                         | 553                | MOVE COMPLETE     |
| SYSINF             | 70101                          | 554                         | 1188               | MOVE COMPLETE     |
| DATSET             | 70736                          | 1189                        | 1189               | MOVE COMPLETE     |
| DATECK             | 70737                          | 1190                        | 1190               | MOVE COMPLETE     |
| *6                 | 70738                          | 1191                        | 1194               | MOVE COMPLETE     |

Figure 3-17. COMPACT DISC Utility Printout

Upon completing the compacting process, the program returns to the DISC UTILITIES menu.

ERROR ANALYSIS/  
REPAIR UTILITY

This subsection describes the ERROR ANALYSIS/REPAIR utility, including information on procedures for running the utility and its results.

PURPOSE OF  
THE UTILITY

This utility provides the means to examine the directory and specified sectors on a disc, and to repair the directory. The utility must RESERVE the disc in order to repair the disc.

NOTE

This utility requires a minimum START of 42 pages to run. Should the utility be attempted in less than a START 42, an error condition occurs during the REMOVED KEY ANALYSIS and you are required to enter the command 'START 42' in console mode to run the utility.

HOW TO USE  
THE UTILITY

When option 8 is selected from the DISC UTILITIES menu, the display shown in Figure 3-18 appears:

| MM/DD/YY                                | BASIC FOUR<br>DISC ERROR ANALYSIS |                    | HH:MM |
|---|-----------------------------------|--------------------|-------|
| DISC NAME:                              |                                   | ALLOCATED FILES:   |       |
| DISC TYPE:                              |                                   | AVAILABLE ENTRIES: |       |
| DIRECTORY SIZE:                         |                                   | TOTAL SECTORS:     |       |
| 1. FUNCTION                             | 2. DEPTH                          | 3. OUTPUT DEVICE   |       |
| =====                                   | =====                             | =====              |       |
| * EXAMINE DIRECTORY                     | * BRIEF                           | * TERMINAL         |       |
| REPAIR DIRECTORY                        | DETAILED                          | LINE PRINTER (LP)  |       |
| EXAMINE SECTORS                         |                                   | SELECTED PRINTER   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                   |                    |       |

Figure 3-18. ERROR ANALYSIS/REPAIR Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

Parameters and Options

The parameters of the ERROR ANALYSIS/REPAIR utility and their options are described below. For more information on the details of these functions, see the Reference Manual for Business BASIC Levels 3 and 4, BFISD 5085.

1. FUNCTION - The available options include EXAMINE DIRECTORY, REPAIR DIRECTORY and EXAMINE SECTORS. The utility goes through the following steps for these options:
  - a. EXAMINE DIRECTORY:
    - 1) verifies that all file names hash to the Scatter Index Table (SIT) area correctly and can be located in the key area by means of the SIT.
    - 2) verifies that the erased key chain contains only erased entries and that it accounts for all unused area up to the last key used, with no duplicates.
    - 3) verifies that the allocated files chain is not circular, that it accounts for the number of files listed in the header record of the disc, and that it contains no duplicate entries.
    - 4) makes sure that the sum of allocated files plus erased files plus entries above the highwater mark (highest used sector) equals the maximum size of the directory.
  - b. REPAIR DIRECTORY:
    - 1) clears the SIT area, using hexadecimal zeroes.
    - 2) replaces each sector of the key area with hexadecimal zeroes (\$00\$).

3) re-FILES each valid key entry.

c. EXAMINE SECTORS:

- 1) looks for DISC READ errors (ERROR 3's) and DISC WRITE VERIFICATION errors (ERROR 8's).
- 2) reports ERROR 3's and ERROR 8's to the log by SECTOR, CYLINDER and TRACK. Also displays 20 bytes from each verification string for ERROR 8's, showing differences found in both hexadecimal and ASCII characters.

2. DEPTH - The available options are to conduct an analysis in BRIEF or at a DETAILED level. The difference is the amount of detail on reports.

3. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Running the Utility

When the user has chosen to EXAMINE DIRECTORY, the program immediately begins to function without initial prompts. The utility needs to RESERVE the disc to EXAMINE or REPAIR the directory. If another task has a file OPEN on the disc, or has the disc RESERVED or DISABLED, the screen displays:

UNABLE TO RESERVE DISC (n) FOR ANALYSIS

CR TO RETRY, CTL-IV TO EXIT:

If you press CTL-IV to abort the process, the utility returns the DISC UTILITIES menu to the screen. If you make sure all files are CLOSED and the disc is not RESERVED or DISABLED, press RETURN to retry.

If the user has elected to REPAIR DIRECTORY, the program presents the warning prompt:

\*\* WARNING ESCAPE KEY WILL BE DISABLED DURING  
REFILING PHASE

OK TO BEGIN REFILING FILES ON DISC XXXXXX (n),  
(YES/NO):

If you enter 'NO', the program returns the DISC UTILITIES menu. If you enter 'YES', the program begins to repair the directory.

When the option is EXAMINE SECTORS, the screen displays the following prompts:

STARTING SECTOR (CR=FIRST):

Enter the number of the sector at which the examination should begin. If a file name is entered, the utility uses the first sector of that file as the starting sector. The next prompt is:

ENDING SECTOR (CR=LAST):

Enter the ending sector number. If a file name is entered, the utility uses the last sector of that file as the ending sector. The program then prompts:

NUMBER OF RETRYS (0-56, CR=19):

Enter the number of times (0-56) the system is to retry examining a sector if attempts to do so are unsuccessful.

## EFFECTS OF THE UTILITY

In addition to performing the functions listed above under Parameters and Options of the utility, the program produces displays and printouts of the results of the utility. These displays are described in the following paragraphs.

### Examine Directory

When the user has selected the option to EXAMINE DIRECTORY in BRIEF, the following information is displayed at the VDT or printed at a printer:

|   |                                   |      |                |
|---|-----------------------------------|------|----------------|
| MM/DD/YY  | BASIC FOUR<br>BRIEF DISC ANALYSIS |      | PAGE:<br>HH:MM |
| -----   |                                   |      |                |
| FILE NAME:                                      | FILE TYPE:                        |      |                |
| DISC:   | NO. OF RECORDS:                   |      |                |
| FILESET:  | KEY SIZE:                         |      |                |
| FIRST SECTOR:                                   | POINTER SIZE:                     |      |                |
| LAST SECTOR:                                    | NEXT AVAIL:                       |      |                |
| DIRECTORY SIZE:                                 | RECORDS AVAIL:                    |      |                |
| TOTAL SECTORS:                                  |                                   |      |                |
| HEADER ANALYSIS:                                |                                   |      |                |
| LOWEST KEY (VIA HEADER):                        | INDEX=                            | KEY= |                |
| LOWEST KEY (ACTUAL):                            | INDEX=                            | KEY= |                |
| ACTUAL NUMBER OF KEYS:                          |                                   |      |                |
| NEXT AVAILABLE (HIGHWATER):                     |                                   |      |                |
| FIRST REMOVED:                                  |                                   |      |                |
| NUMBER OF REMOVED KEYS:                         |                                   |      |                |
| SIT ANALYSIS:                                   |                                   |      |                |
| TOTAL SIT ENTRIES:                              |                                   |      |                |
| DUPLICATE SIT ENTRIES:                          |                                   |      |                |
| ** ALL KEYS FOUND VIA THE SIT **                |                                   |      |                |
| KEY AREA ANALYSIS:                              |                                   |      |                |
| ** ALL KEYS FOUND VIA THE NEXT HIGHEST CHAIN ** |                                   |      |                |

Figure 3-19. Display of EXAMINE DIRECTORY in BRIEF

When the user has chosen to EXAMINE DIRECTORY at a DETAILED level, the first display is the same as Figure 3-19 above. In addition, three other displays result. First is the SCATTER INDEX TABLE ANALYSIS.

| MM/DD/YY                         |            | BASIC FOUR<br>SCATTER INDEX TABLE (SIT) ANALYSIS |       |           |               |        |   |    |        |          |          | PAGE:<br>HH:MM |  |
|----------------------------------|------------|--|-------|-----------|---------------|--------|---|----|--------|----------|----------|----------------|--|
| DISC NAME: XXXXXX                |            |  |       |           |               |        |   |    |        |          |          |                |  |
| SIT ENTRIES PER SECTOR: nnn      |            |  |       |           |               |        |   |    |        |          |          |                |  |
| SCCTOR                           | BYTE OFFST | SIT POSTION                                      | INDEX | DUP CHAIN | SIT FIRST SEC | NAME   | T | K  | RECRDS | REC SIZE | LAST SEC | D              |  |
| 14                               | 451        | 6353   | 233   |           | 2275          | XXXXXX | 4 | 0  | 1721   | 3072     | 2278     | 01             |  |
|                                  | 453        | 6354   | 513   | 233       | 61282         | XXXXXX | 4 | 0  | 2179   | 7168     | 61289    | 01             |  |
|                                  |            |  | 223   |           | 134           | XXXXXX | 4 | 0  | 254    | 4096     | 138      | 01             |  |
|                                  | 467        | 6361   | 188   |           | 2159          | XXXXXX | 4 | 0  | 1287   | 2048     | 2161     | 01             |  |
|                                  | 655        | 6455   | 167   |           | 1124          | XXXXXX | 2 | 36 | 100    |          | 1129     | 01             |  |
| TOTAL SIT ENTRIES:               |            |  |       |           |               |        |   |    |        |          |          |                |  |
| DUPLICATE SIT ENTRIES:           |            |  |       |           |               |        |   |    |        |          |          |                |  |
| ** ALL KEYS FOUND VIA THE SIT ** |            |  |       |           |               |        |   |    |        |          |          |                |  |

Figure 3-20. Scatter Index Table Analysis

The next part of the display consists of the KEY AREA ANALYSIS as shown below.

| MM/DD/YY  |            | BASIC FOUR<br>KEY AREA ANALYSIS |       |           |           |        |   |   |        |          |          | PAGE:<br>HH:MM |  |
|---|------------|---------------------------------|-------|-----------|-----------|--------|---|---|--------|----------|----------|----------------|--|
| DISC NAME: XXXXXX                               |            |                                 |       |           |           |        |   |   |        |          |          |                |  |
| KEYS PER SECTOR: nnn                            |            |                                 |       |           |           |        |   |   |        |          |          |                |  |
| SCCTOR  | BYTE OFFST | SIT POSTION                     | INDEX | NEXT HIGH | FIRST SEC | NAME   | T | K | RECRDS | REC SIZE | LAST SEC | D              |  |
| 29  | 145        | 3081                            | 594   | 595       | 65059     | XXXXXX | 0 | 0 | 1000   | 64       | 65122    | 01             |  |
|   | 169        | 3985                            | 595   | 596       | 65122     | XXXXXX | 0 | 0 | 1000   | 64       | 65185    | 01             |  |
|   | 193        | 2047                            | 596   | 597       | 65185     | XXXXXX | 4 | 0 | 2086   | 3042     | 65188    | 01             |  |
|   | 217        | 230                             | 597   | 598       | 65188     | XXXXXX | 4 | 0 | 1620   | 2441     | 65191    | 01             |  |
|   | 241        | 4862                            | 598   | 599       | 65191     | XXXXXX | 4 | 0 | 2492   | 3516     | 65195    | 01             |  |
| ** ALL KEYS FOUND VIA THE NEXT HIGHEST CHAIN ** |            |                                 |       |           |           |        |   |   |        |          |          |                |  |

Figure 3-21. Key Area Analysis Table

The last part of the display consists of the REMOVED KEYS ANALYSIS as shown in Figure 3-22.

| MM/DD/YY   | BASIC FOUR<br>REMOVED KEYS ANALYSIS |       |                 |         | PAGE:<br>HH:MM |
|--|-------------------------------------|-------|-----------------|---------|----------------|
| -----  |                                     |       |                 |         |                |
| DISC NAME: XXXXXX                                      |                                     |       |                 |         |                |
| KEYS PER SECTOR: nnn                                   |                                     |       |                 |         |                |
| SECTOR   | BYTE<br>OFFSET                      | INDEX | NEXT<br>REMOVED | MESSAGE |                |
| -----  |                                     |       |                 |         |                |
| 30   | 73                                  | 633   | 28              |         |                |
| 15   | 673                                 | 28    | 25              |         |                |
|  | 601                                 | 25    | 23              |         |                |
|  | 553                                 | 23    | 22              |         |                |
|  | 529                                 | 22    | 21              |         |                |
|  | 505                                 | 21    | 20              |         |                |
| ** ALL REMOVED KEYS FOUND VIA THE REMOVED KEY CHAIN ** |                                     |       |                 |         |                |

Figure 3-22. Removed Keys Analysis

Repair Directory

When the user has chosen to REPAIR DIRECTORY, the program displays only a message giving the status of the repair procedure:

REFILING FILE NAME: XXXXXX

When the directory has been repaired, the message is displayed:

REPAIR COMPLETE. CR TO PROCEED:

The program then returns the DISC UTILITIES menu.

Examine Sectors

When the option is to EXAMINE SECTORS, a display such as the following is produced:

| MM/DD/YY   | BASIC FOUR<br>SECTOR ERROR ANALYSIS |     |         |  | PAGE:<br>HH:MM |
|--|-------------------------------------|-----|---------|--|----------------|
| -----  |                                     |     |         |  |                |
| DISC: XXXXX (n) FROM SECTOR: nn TO SECTOR: nnn RETRYS: n |                                     |     |         |  |                |
| SECTOR   | TRACK                               | CYL | ERR     | STATUS DESCRIPTION   |                |
| 1007   | 30                                  | 7   | 3       |  |                |
| 1019   | 31                                  | 7   | 3       |  |                |
| 21376  | 39                                  | 10  | 8       | BAD DATA STARTS AT BYTE 643                                    |                |
| 1ST GET  | - THIS                              | IS  | SHIFTED | DATA - xxx |                |
| 2ND GET  | - THIS                              | IS  | SHIFTED | DATA - xxx |                |

Figure 3-23. Sector Error Analysis

DISC BACKUP  
UTILITY

This subsection describes the DISC BACKUP utility, including procedures for using it and the results of the utility.

PURPOSE OF  
THE UTILITY

The DISC BACKUP utility allows the users whose systems have multiple disc drives to copy the contents of a disc onto another disc. The second disc can then be used as a backup, in case anything happens to the information on the first disc. This utility also provides an option to verify the correct transfer of files when an entire disc (sectors one through the highest sector available) is copied.

The utility maintains a listing for each disc of the specified backup discs. This listing can be changed via the utility. In this way the utility eliminates guessing about which discs are designated backups.

HOW TO USE  
THE UTILITY

When option 9 is selected from the DISC UTILITIES menu, the following display appears on the screen:

| MM/DD/YY   | BASIC FOUR<br>DISC BACKUP UTILITY | HH:MM |
|--|-----------------------------------|-------|
| -----  |                                   |       |
| DISC NAME:   | ALLOCATED FILES:                  |       |
| DISC TYPE:   | AVAILABLE ENTRIES:                |       |
| DIRECTORY SIZE:  | TOTAL SECTORS:                    |       |
| <p style="text-align: center;">1. VERIFY OPTION<br/>           =====<br/>           * NON-VERIFIED<br/>           VERIFIED</p> |                                   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:  |                                   |       |

Figure 3-24. DISC BACKUP Utility Option Screen

The only parameter that can be specified is the option to VERIFY the correct transfer of files. When this parameter is specified and you have pressed RETURN, the utility attempts to RESERVE the disc before copying it. If it cannot RESERVE the disc, the message is displayed:

## DISC BACKUP

UNABLE TO RESERVE DISC n FOR BACKUP  
CR TO RETRY, CTL-IV TO EXIT:

If you press CTL-IV to exit from the utility, the program returns you to the DISC UTILITIES menu. Or you may make sure that all files are closed and the disc is not RESERVED or DISABLED, and press RETURN to attempt to back up the disc again.

If the utility successfully RESERVES the disc, it then displays a list of acceptable backup pack names contained in the disc header:

BACKUP PACKS:    name 1            name 2            name 3

A maximum of 4 backup packs is allowed per source pack. If no backup packs are specified, the utility displays:

\*\* NO BACKUPS SPECIFIED \*\*

If the system has more than 2 discs on-line, the screen displays the prompt:

ENTER BACKUP DISC:

Enter the name or number of a configured disc. The utility checks the name against the list of backup discs specified in the disc header. If the name matches one of those in the list of backup discs, the utility verifies the acceptability of the disc.

If the name does not match one in the list of backup discs, the screen displays:

DISC XXXXXX (n) NOT A CATALOGED BACKUP FOR source  
name (y)

The utility then counts the number of names in the list of backup discs. If there are fewer than 4 backup discs in the list, the screen displays:

CATALOG backup name (x) AS A BACKUP FOR source  
name (y)? (Y/N):

If you enter 'N', the utility asks for another backup disc. If you enter 'Y', the utility adds the disc name to the backup disc catalog.

If there are already 4 backup names cataloged, the system asks for another backup disc. It then accepts only discs whose names are on that list.

After the names of acceptable source and backup discs have been entered, the system verifies that both discs are ready and that it can DISABLE the backup disc. The utility then verifies that the DAY variable contains a date that is equal to or later than the date on the backup disc. The system then displays:

OK TO PROCEED? (CR/N):

If you enter 'N', the screen returns to the DISC UTILITIES menu. If you press RETURN, the system begins a straight full disc copy, sector by sector.

EFFECTS OF  
THE UTILITY

The DISC BACKUP utility goes through the following steps once it begins the backup procedure:

1. Updates the backup date field to the system date but does not alter the disc label on the backup pack.
2. Copies all sectors, from sector 2 through the highest sector available, transferring as many sectors as memory can accommodate.

When the copying process has been completed, the program returns the DISC UTILITIES menu.



OVERVIEW

This section of the manual describes the FILE UTILITIES. The FILE UTILITIES allow an operator to define a file on disc, and to rename, erase, move, copy, compare, analyse and repair, examine and sort an existing file. The next subsection explains how to access the FILE UTILITIES group menu. The following subsections describe each of the FILE UTILITIES in detail.

ACCESSING THE FILE UTILITIES

To access the FILE UTILITIES group, either type '1' from the UTILITIES main menu, or from console mode enter the command 'RUN "\*FILE"'. If more than one disc is configured, the screen displays this prompt in the upper left-hand corner:

ENTER DISC (CR=ANY):

Enter the number of a drive on which a configured disc resides or enter a valid disc name or press RETURN to search any disc. If the source disc name or number is invalid, the screen displays:

INVALID DISC ID

ENTER DISC (CR=ANY):

Upon entry of a valid disc name or number, the screen displays:

ENTER FILE NAME:

If the name entered is not on disc, the screen displays:

FILE NOT FOUND, WOULD YOU LIKE TO DEFINE? (Y/CR):

If you press RETURN, you are prompted for another file name. Entering 'Y' allows the file to be defined as detailed in SECTION 5 - FILES UTILITIES, under DEFINE UTILITY.

If the file is located on the specified disc, the file description is displayed above the FILE UTILITIES group menu. The type of file information displayed depends on the type of file. For program files, the display is as shown in Figure 4-1 below:

| MM/DD/YY               | BASIC FOUR<br>FILE UTILITIES MENU   |                | HH:MM |
|------------------------|---|----------------|-------|
| -----                  |   |                |       |
| FILE NAME:             | file1 - PROGRAM FILE  |                |       |
| DISC ID:               | XXXXXX (n)  |                |       |
| FIRST SECTOR:          | sssss   | BYTES/RECORD:  | nnnn  |
| LAST SECTOR:           | sssss   | PROGRAM SIZE:  | nnnn  |
| TOTAL SECTORS:         | n   | PROGRAM PAGES: | nn    |
| PROGRAM ID:            | (First line of program)   |                |       |
|                        |   |                |       |
| FILE UTILITY OPTIONS:  | <ol style="list-style-type: none"> <li>1. RENAME</li> <li>2. ERASE</li> <li>3. MOVE</li> <li>4. COPY</li> <li>5. COMPARE</li> <li>6. FILE ANALYSIS/REPAIR</li> <li>7. EXAMINE DATA/KEYS</li> <li>8. SORT</li> </ol> |                |       |
|                        |   |                |       |
| SELECT UTILITY OPTION: |   |                |       |
| (CTL-III TO PRINT)     |   |                |       |

Figure 4-1. File ID and FILE UTILITIES Group Menu

For data files, such information as NO. OF RECORDS, DIRECTORY SIZE, KEY SIZE, RECORDS USED, BYTES USED and RECORDS AVAILABLE is also displayed.

If the correct file is displayed, enter the number corresponding to the option desired. If you wish to use another file, press CTL-II to enter a different file name. To print the file description, press CTL-III. The program then presents the prompt:

ENTER PRINTER ID:

Enter the name of a printer, e.g., 'P1'.

To return to the UTILITIES main menu, press CTL-IV.

The following subsections describe each of the FILE UTILITIES in detail.

RENAME UTILITY

This subsection describes the RENAME utility, including how to use it and its effects.

PURPOSE OF  
THE UTILITY

The RENAME utility allows a user to change the name of any existing file.

HOW TO USE  
THE UTILITY

When option 1 is selected from the FILE UTILITIES menu, the following prompt is displayed:

FILE TO BE RENAMED:

Enter the name of the file to be renamed. The prompt then appears:

NEW FILE NAME:

Enter the name to which the file is to be renamed. If a file with the same name is found on another disc, the system displays the message:

```
** WARNING: A FILE BY THE SAME NAME EXISTS ON  
ANOTHER DISC.  
DO YOU WANT TO CREATE THIS DUPLICATE FILE? (Y/CR)
```

If you enter 'Y', the designated file is renamed and the file on the other disc with the same name is not altered or erased. You then have two different files with the same name on different discs.

If a file with the same name exists on the same disc, the program displays the message:

```
"filename" ALREADY EXISTS ON DISC XXXXXX (n)  
OK TO REPLACE? (CR/N)
```

If 'Y' is entered, the existing file is erased and the designated file is renamed. If you press RETURN, the NEW FILE NAME prompt is displayed again.

EFFECTS OF  
THE UTILITY

When a new file name is entered which does not already exist on disc, the file is renamed and the system returns the FILE UTILITIES menu, with the file header displaying the new file name.

## ERASE FILE

### ERASE UTILITY

This subsection describes the ERASE utility, including how to run the utility and its effects.

### PURPOSE OF THE UTILITY

This option can be used to ERASE a specific disc file from the directory.

### HOW TO USE THE UTILITY

When option 2 is selected from the FILE UTILITIES menu, the prompt is displayed:

OK TO ERASE FILE file name? (Y/CR):

If you press RETURN, the system displays the FILE UTILITIES menu. Entering 'Y' erases the file name from the disc directory and the following message is displayed:

FILE filename HAS BEEN ERASED, CR TO PROCEED:

Pressing RETURN causes the ENTER FILE NAME prompt to be displayed again.

### EFFECTS OF THE UTILITY

Besides erasing the file, the utility updates the gap file to reflect the freed sectors.

MOVE UTILITY

This subsection describes the MOVE utility, including procedures for using it and its effects.

PURPOSE OF  
THE UTILITY

This option can be used to move a file from one location on disc to another location on the same disc, or to another disc, or to a fileset on any mounted disc. This utility can also be used to expand or reduce a file.

NOTE

When expanding a file, the system must create a work file. Free space is required and the amount of space is contingent upon the size of the file being expanded.

HOW TO USE  
THE UTILITY

When option 3 is selected from the FILE UTILITIES menu, the program presents the following screen display:

```
MM/DD/YY                BASIC FOUR                HH:MM
                        MOVE UTILITY
-----
FILE NAME:             file1 - PROGRAM FILE
DISC ID:               XXXXXX (n)
FIRST SECTOR:         sssss           BYTES/RECORD:   nnnn
LAST SECTOR:          sssss           PROGRAM SIZE:   nnnn
TOTAL SECTORS:        n               PROGRAM PAGES:  nn
PROGRAM ID:           (First line of program)

  **WARNING: SOURCE FILE WILL BE ERASED AFTER MOVE**
  1. FILE SIZE                2. MOVE METHOD
     =====
  * NO CHANGE                 * BY SECTORS
  NEW SIZE                    RECORD BY RECORD
  MINIMUM SIZE

CHANGE OPTION BY NUMBER, CR TO PROCEED:
```

Figure 4-2. MOVE Utility Option Screen

## MOVE FILE

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

### Parameters and Options

The parameters of the MOVE utility and their options are as follows:

1. FILE SIZE - Available options are to move the file with NO CHANGE in size, to move it and give it a NEW SIZE, or to move it and give it a MINIMUM SIZE. The NEW SIZE option allows a change of keysize, number of records, and bytes/record (see Figure 4-3 below). The MINIMUM SIZE option retains the same key size and record size, and causes only the number of records currently in use to be moved. For program files, only the number of bytes in the program are transferred when the MINIMUM SIZE option is chosen.
2. MOVE METHOD - The available options are to move the file BY SECTOR or RECORD BY RECORD. For DIRECT and SORT files, a RECORD BY RECORD move may be desirable. In those cases the file is MOVED using a sequential read by key. This uses the output file more efficiently in some applications.

### Running the Utility

The following paragraphs describe how the MOVE utility is run for each option.

#### No Change or Minimum Size

If the user has chosen to MOVE a file with NO CHANGE or a MINIMUM SIZE change to the file, the screen first displays the prompt:

```
MOVE FROM DISC: name(n)  MOVE TO DISC:  
(CR=name(n)):
```

Enter the name or number of the disc to which the file is to be MOVED. Pressing RETURN causes the original disc name and number to be entered.

The program next prompts for the beginning sector:

```
STARTING SECTOR TO BEGIN SEARCH (CR=ANYWHERE):
```

Enter a starting sector to begin the search for free space or press RETURN for the program to select the first available block of space.

The program then displays the messages:

```
FILE 'filename' WILL BE MOVED  
TO DISC: XXXXXX (n)  
STARTING AT SECTOR: sssss  
THE FILE WILL BE ERASED FROM CURRENT LOCATION
```

```
OK TO PROCEED? (CR/N)
```

If RETURN is pressed, the file is moved and the system displays:

```
MOVE COMPLETE, CR TO PROCEED
```

If 'N' is entered, the screen returns to the MOVE utility option screen.

#### New Size

When the user has chosen the NEW SIZE option, the utility proceeds as above through the prompt for the STARTING SECTOR to which the file should be moved. After that information is entered, the program then allows the user to specify the new size of the file, as shown below in Figure 4-3.

| STARTING SECTOR (CR=ANYWHERE): |                            |            |                                 |                                |                                 |
|--------------------------------|----------------------------|------------|---------------------------------|--------------------------------|---------------------------------|
| <u>FILE</u><br><u>NAME</u>     | <u>FILE</u><br><u>TYPE</u> | <u>KEY</u> | <u>NO. OF</u><br><u>RECORDS</u> | <u>BYTES/</u><br><u>RECORD</u> | <u>NO. OF</u><br><u>SECTORS</u> |
| file1                          |                            |            |                                 |                                |                                 |

Figure 4-3. File Roster for NEW SIZE Option (MOVE)

For DIRECT and SORT files the user may change the size of the KEY, NO. OF RECORDS, and BYTES/RECORD. For INDEXED files the NO. OF RECORDS and BYTES/RECORD can be changed. The program automatically changes the NO. OF SECTORS field once the other fields are entered. Current entries are retained if you press RETURN. For PROGRAM files, only the BYTES/RECORD can be changed. When the cursor is at this field, the program displays the prompt:

## MOVE FILE

ENTER PROGRAM SIZE IN PAGES (1-64) OR IN BYTES  
(156-32767:CURRENT=nnnnn BYTES):

When the appropriate fields have been filled in, the program presents the prompt:

ARE SIZE CHANGES CORRECT? (CR/N):

If you enter 'N', the program returns to the first size field that applies to the file. To have the size changes saved, press RETURN. The program then presents the following prompts:

FILE 'filename' WILL BE MOVED  
TO DISC XXXXX (n)  
STARTING AT SECTOR: nnnnn  
THE FILE WILL BE ERASED FROM CURRENT LOCATION  
OK TO PROCEED? (CR/N):

If you enter 'N', the program returns to the MOVE option screen. If you press RETURN, the utility moves the file and then displays the message:

MOVE COMPLETE, CR TO PROCEED:

When you press RETURN the program returns the FILE UTILITIES menu.

COPY UTILITY

This subsection describes the COPY utility, including how to use it and its effects.

PURPOSE OF THE UTILITY

This option can be used to copy a file from one location on disc to another location on the same disc or to another disc. This option differs from the MOVE option in that the original file is not modified or erased.

HOW TO USE THE UTILITY

When option 4 is selected from the FILE UTILITIES menu, the program presents the following screen display:

```

                                BASIC FOUR
                                COPY UTILITY
MM/DD/YY                                HH:MM
-----
FILE NAME:          file1 - PROGRAM FILE
DISC ID:            XXXXXX (n)
FIRST SECTOR:      sssss          BYTES/RECORD:  nnnn
LAST SECTOR:       sssss          PROGRAM SIZE:  nnnn
TOTAL SECTORS:     n              PROGRAM PAGES:  nn
PROGRAM ID:        (First line of program)

1. FILE SIZE          2. COPY METHOD
  =====
  * NO CHANGE         * BY SECTORS
  NEW SIZE            RECORD BY RECORD
  MINIMUM SIZE

CHANGE OPTION BY NUMBER, CR TO PROCEED:

```

Figure 4-4. COPY Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

Parameters and Options

The parameters of the COPY utility and their options are as follows:

## COPY FILE

1. FILE SIZE - Available options are the same as for the MOVE utility: to copy the file with NO CHANGE in size, to copy it and give it a NEW SIZE, or to copy it and give it a MINIMUM SIZE. The NEW SIZE option allows a change of keysize, number of records, and bytes per record (see Figure 4-5 below). The MINIMUM SIZE option retains the same key size and record size, and causes only the number of records currently in use to be copied. For program files, only the number of bytes in the program are transferred when the MINIMUM SIZE option is chosen.
2. COPY METHOD - The available options are to copy the file BY SECTOR or RECORD BY RECORD. In file types such as DIRECT and SORT files, a RECORD BY RECORD copy may be desirable. In those cases the file is COPIED using a sequential read by key. This uses the output file more efficiently in some applications.

### Running the Utility

The following paragraphs describe how the COPY utility is run for each option.

#### No Change or Minimum Size

If the user has chosen to COPY a file with NO CHANGE or a MINIMUM SIZE change to the file, the screen first displays the prompt:

```
COPY FROM DISC: name(n) COPY TO DISC: (CR=SAME):
```

Enter the name or number of the disc to which the file is to be COPIED. Pressing RETURN causes the original disc name and number to be entered.

The program next prompts for the beginning sector:

```
STARTING SECTOR TO BEGIN SEARCH (CR=ANYWHERE):
```

Enter a starting sector to begin the search for free space or press RETURN for the program to select the first available block of space.

The program then displays the messages:

```
FILE 'filename' WILL BE COPIED TO FILE 'filename'  
ON DISC: XXXXXX (n)  
AT SECTOR: sssss
```

```
OK TO PROCEED? (CR/N)
```

If RETURN is pressed, the file is copied and the system displays:

COPY COMPLETE, CR TO PROCEED

If 'N' is entered, the screen returns to the COPY utility option screen.

New Size

When the user has chosen the NEW SIZE option, the utility proceeds as above through the prompt for the STARTING SECTOR to which the file should be copied. After that information is entered, the program then allows the user to specify the new size of the file, as shown below in Figure 4-5.

| STARTING SECTOR (CR=ANYWHERE): |                  |            |                       |                     |                       |
|--------------------------------|------------------|------------|-----------------------|---------------------|-----------------------|
| <u>FILE NAME</u>               | <u>FILE TYPE</u> | <u>KEY</u> | <u>NO. OF RECORDS</u> | <u>BYTES/RECORD</u> | <u>NO. OF SECTORS</u> |
| file1                          |                  |            |                       |                     |                       |

Figure 4-5. File Roster for NEW SIZE Option (COPY)

For DIRECT and SORT files the user may change the size of the KEY, NO. OF RECORDS, and BYTES/RECORD. For INDEXED files the NO. OF RECORDS and BYTES/RECORD can be changed. The program automatically changes the NO. OF SECTORS field once the other fields are entered. Current entries are retained if you press RETURN. For PROGRAM files, only the BYTES/RECORD can be changed. When the cursor is at this field, the program displays the prompt:

ENTER PROGRAM SIZE IN PAGES OR IN BYTES  
(156-32767:CURRENT=nnnnn BYTES)

When the appropriate fields have been filled in, the program presents the prompt:

ARE SIZE CHANGES CORRECT? (CR/N):

If you enter 'N', the program returns to the first size field that applies to the file. To have the size changes saved, press RETURN. The program then presents the following prompts:

COPY FILE

FILE 'filename' WILL BE COPIED TO FILE 'filename'  
ON DISC XXXXX (n)  
AT SECTOR: nnnnn  
OK TO CONTINUE (CR/N):

If you enter 'N', the program returns to the COPY option screen. If you press RETURN, the utility moves the file and then displays the message:

COPY COMPLETE, CR TO PROCEED:

When you press RETURN the program returns the FILE UTILITIES menu.

COMPARE UTILITY

This subsection describes the COMPARE utility, including procedures for running the utility and its effects.

PURPOSE OF THE UTILITY

This utility provides a means for comparing two individual files of the same type, e.g., program files, direct files, etc. The utility also produces reports showing differences between the files.

NOTE

This utility may require a START of more than 32 pages, depending upon the size and structure of the files being compared.

HOW TO USE THE UTILITY

When option 5 is selected from the FILE UTILITIES menu, the program presents the following screen display:

| MM/DD/YY  | BASIC FOUR<br>COMPARE UTILITY |                | HH:MM |
|---|-------------------------------|----------------|-------|
| -----   |                               |                |       |
| FILE NAME:  | file1 - PROGRAM FILE          |                |       |
| DISC ID:  | XXXXXX (n)                    |                |       |
| FIRST SECTOR:   | sssss                         | BYTES/RECORD:  | nnnn  |
| LAST SECTOR:  | sssss                         | PROGRAM SIZE:  | nnnn  |
| TOTAL SECTORS:  | n                             | PROGRAM PAGES: | nn    |
| PROGRAM ID:   | (First line of program)       |                |       |
| <p style="text-align: center;">1. OUTPUT DEVICE<br/>           =====<br/>           * TERMINAL<br/>           LINE PRINTER (LP)<br/>           SELECTED PRINTER</p> |                               |                |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:   |                               |                |       |

Figure 4-6. COMPARE Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for the results of the utility, which has the standard choices. When this parameter is specified and you have pressed RETURN, the program then displays the prompt:

COMPARE FILE

COMPARE TO DISC (CR=ANY):

Enter the name or number of a configured disc or press RETURN to have the value ANYWHERE entered. The next prompt is for the file to be compared:

ENTER COMPARE TO FILE NAME:

Enter the name of the file. If the files are not of the same type, the program displays the message:

FILES ARE NOT THE SAME TYPE

You are then prompted for a new name of a file to be compared.

EFFECTS OF THE UTILITY

When the required information has been entered in response to the prompts above, and when the program has verified that the two files are of the same type, the comparison begins. The program goes through the steps described below for each file type.

Program Files

The comparison is on a statement by statement basis. All statements that do not compare identically are displayed or printed as shown in Figure 4-7 below.

```
MM/DD/YY                BASIC FOUR                PAGE:
                        COMPARE FILES UTILITY        HH:MM
-----
SOURCE FILE: file1 - PROGRAM FILE          COMPARE TO FILE: file2 - PROGRAM FILE
DISC ID:          XXXXXX (n)              DISC ID:          XXXXXX (n)
* PROGRAM SIZE:  nnnn                    * PROGRAM SIZE:  nnnnn

0010 REM "file1-WRITE OVERLAY TO          0010 REM "file2-PROGRAM TO PRINT
      PROGRAM YYYYYY"                    BANNERS"
0020 REM "A-O"                            0020 BEGIN
0040 LET S8=NUM(S$(D3*10-4,5))            0040 OPEN (1)"ZZZZ"
** MISSING **                            0050 OPEN (2)"YYYYY"
0060 IF M$(1,1)="1" THEN LET N9$        0060 OPEN (7,ERR=0080)"LP"
      =N9$+" (READ ONLY)"
0100 DISABLE D                            ** MISSING **
.
.
9840 END                                  ** MISSING **
** END OF COMPARE **
```

Figure 4-7. COMPARE FILES Display--Program Files

Serial/Indexed Files The files are compared record by record in a sequential manner.

```

                                BASIC FOUR                                PAGE:
MM/DD/YY                        COMPARE FILES UTILITY                    HH:MM
-----
SOURCE FILE: file1 - INDEXED FILE    COMPARE TO FILE: file2 - INDEXED FILE
DISC ID:          XXXXXX (n)         DISC ID:          XXXXXX (n)
* RECORD SIZE:   nnn                 * RECORD SIZE:   nnn
* NO. OF RECORDS: nnn                * NO. OF RECORDS: nnn

INDEX= 0                               INDEX= 0
* 1. 0                                     * 1.          COMPUTE CUSTOMER CHARGES
* 2. P   DVO                               * 2.          ** MISSING **
* 3. Q                                       * 3.          ** MISSING **
* 4. 0                                       * 4.          ** MISSING **
* 5. SYSTEM                               * 5.          ** MISSING **

INDEX= 1                               INDEX= 1
* 1. 14                                    * 1. 1. DATE
* 2. 153                                  * 2.          ** MISSING **

** END OF COMPARE **

```

Figure 4-8. COMPARE FILES Display--Indexed Files

Sorted Direct/  
Sort Files  
(Forward Links)

These files are stepped through on a key by key basis. When two keys match, the data area is compared as well. If a difference exists, the full record is displayed with the like keys and differences in data. If the keys do not match, the lesser key is reported as present in only one file and that file is read again to see if the next key matches. The display or printout is shown in Figure 4-9 below.

```

                                BASIC FOUR
                                COMPARE FILES UTILITY
                                PAGE:
MM/DD/YY                                HH:MM
-----
SOURCE FILE: file1 - DIRECT FILE      COMPARE TO FILE: file2 - DIRECT FILE
DISC ID:          XXXXXX (n)          DISC ID:          XXXXXX (n)
* KEY SIZE:      nn                   * KEY SIZE:      nn
* RECORD SIZE:   nnnn                 * RECORD SIZE:   nnnn
* NO. OF RECORDS: nn                 * NO. OF RECORDS: nn
* RECORDS USED:  nn                   * RECORDS USED:  nn

KEY= %C0101                            ** MISSING **
KEY= %C0201                            ** MISSING **
KEY= %D0101                            ** MISSING **
KEY= %D2101                            ** MISSING **
KEY= %D2301                            ** MISSING **
** MISSING **                          KEY= 0
** MISSING **                          KEY= 1
** MISSING **                          KEY= 10
** MISSING **                          KEY= 11
** END OF COMPARE **

```

Figure 4-9. COMPARE FILES Display--Direct Files

Unsorted Direct/  
Sort Files  
(No Forward Links)

For these files, the utility reads one file key by key and verifies that each key is present in the other file and that the data areas agree. The second file is then examined to see if all keys are present in the first file. On the pass through the second file, no data comparison is made. The display or printout is identical to that shown in Figure 4-9 above.

When the comparison is finished, the utility returns to the FILE UTILITIES menu.

FILE ANALYSIS/  
REPAIR UTILITY

This subsection describes the FILE ANALYSIS/REPAIR utility, including how to run the utility and its effects.

PURPOSE OF  
THE UTILITY

This utility provides a means to analyze and repair the scatter index table (SIT) and key area of a specified DIRECT or SORT file, or the header and records of a specified SERIAL file. For other file types, the screen displays the message:

INVALID FILE TYPE, CR:

Upon pressing RETURN, the screen returns the FILE UTILITIES menu.

HOW TO USE  
THE UTILITY

When option 6 is selected from the FILE UTILITIES menu, the following option screen is displayed as shown in Figure 4-10 below.

| MM/DD/YY                                | BASIC FOUR<br>FILE ANALYSIS/REPAIR UTILITY |                   | HH:MM |
|---|--|-------------------|-------|
| -----                                   |  |                   |       |
| FILE NAME:                              | file1 - DIRECT FILE                        |                   |       |
| DISC ID:                                |  | NO. OF RECORDS:   |       |
| FIRST SECTOR:                           |  | BYTES/RECORD:     |       |
| LAST SECTOR:                            |  | KEY SIZE:         |       |
| TOTAL SECTORS:                          |  | RECORDS USED:     |       |
| DIRECTORY SIZE:                         |  | RECORDS AVAIL.:   |       |
|   |  |                   |       |
| 1. FUNCTION                             | 2. DEPTH                                   | 3. OUTPUT DEVICE  |       |
| =====                                   | =====                                      | =====             |       |
| * ANALYSIS                              | * BRIEF                                    | * TERMINAL        |       |
| REPAIR STRUCTURE                        | DETAILED                                   | LINE PRINTER (LP) |       |
|   |  | SELECTED PRINTER  |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |  |                   |       |

Figure 4-10. FILE ANALYSIS/REPAIR Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

## FILE ANALYSIS/REPAIR

The parameters of the FILE ANALYSIS/REPAIR utility and their options are as follows:

1. FUNCTION - The available options are to do an ANALYSIS of the file or to REPAIR STRUCTURE. If the user chooses to REPAIR the file, the program attempts to correct inconsistencies that it finds in the file.
2. DEPTH - The available options are to conduct an analysis in BRIEF or at a DETAILED level. The default value of BRIEF displays only the inconsistencies found during the analysis of the file. If the highlighting is moved to DETAILED, the entire file structure is displayed with inconsistencies indicated by asterisks (\*) and a descriptive message.
3. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option was chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

### EFFECTS OF THE UTILITY

When the user has chosen the parameters and has pressed RETURN, the program immediately begins to function without prompts.

### Procedures

The program goes through the steps listed below for the file types.

### Direct/Sort Files

The program performs the following checks:

- 1) verifies all linked lists (removed chain, next highest key chain, duplicate SIT chain) to ensure continuity and that chains do not loop.
- 2) verifies header information versus actual file content.
- 3) verifies that each key is less than the next key.

- 4) verifies that the key area is empty beyond the last used/removed key.
- 5) verifies the SIT entries.
- 6) verifies that all keys can be found via the SIT.

NOTE

If the file is an unsorted type, the next highest key chain is not analyzed.

Serial Files

For SERIAL files, the program performs the following checks:

- 1) verifies the header record entries.
- 2) verifies that data records and length bytes are correct.
- 3) verifies the existence of an 'END' record.

Displays

When the option is an ANALYSIS or REPAIR in BRIEF, the program displays or prints the information as shown in Figure 4-11 below:

FILE ANALYSIS/REPAIR

|  |                                   |                |
|--|-----------------------------------|----------------|
| MM/DD/YY   | BASIC FOUR<br>BRIEF FILE ANALYSIS | PAGE:<br>HH:MM |
| -----  |                                   |                |
| FILE NAME:                                       | FILE TYPE:                        |                |
| DISC:  | NO. OF RECORDS:                   |                |
| FIRST SECTOR:                                    | BYTES/RECORD:                     |                |
| LAST SECTOR:                                     | KEY SIZE:                         |                |
| DIRECTORY SIZE:                                  | POINTER SIZE:                     |                |
| TOTAL SECTORS:                                   | NEXT AVAIL:                       |                |
|  | RECORDS AVAIL:                    |                |
| HEADER ANALYSIS:                                 |                                   |                |
| LOWEST KEY (VIA HEADER):                         | INDEX=                            | KEY=           |
| LOWEST KEY (ACTUAL):                             | INDEX=                            | KEY=           |
| ACTUAL NUMBER OF KEYS:                           |                                   |                |
| NEXT AVAILABLE (HIGHWATER):                      |                                   |                |
| FIRST REMOVED:                                   |                                   |                |
| NUMBER OF REMOVED KEYS:                          |                                   |                |
| SIT ANALYSIS:                                    |                                   |                |
| TOTAL SIT ENTRIES:                               |                                   |                |
| DUPLICATE SIT ENTRIES:                           |                                   |                |
| *** ALL KEYS FOUND VIA THE SIT **                |                                   |                |
| KEY AREA ANALYSIS:                               |                                   |                |
| *** ALL KEYS FOUND VIA THE NEXT HIGHEST CHAIN ** |                                   |                |

Figure 4-11. Display of FILE ANALYSIS/REPAIR in BRIEF

When the user has chosen an ANALYSIS or REPAIR at a DETAILED level, the first display is the same as Figure 4-11 above. For DIRECT, SORT and SERIAL files, a SCATTER INDEX TABLE ANALYSIS is displayed or printed as shown in Figure 4-12 below.

| MM/DD/YY                         | BASIC FOUR<br>SCATTER INDEX TABLE (SIT) ANALYSIS |                 |       |                  |        | PAGE:<br>HH:MM |
|----------------------------------|--|-----------------|-------|------------------|--------|----------------|
| -----                            |  |                 |       |                  |        |                |
| FILE NAME: file1                 |  |                 |       |                  |        |                |
| SIT ENTRIES PER SECTOR: nnn      |  |                 |       |                  |        |                |
| SECTOR                           | BYTE<br>OFFSET                                   | SIT<br>POSITION | INDEX | DUP SIT<br>CHAIN | KEY    |                |
| -----                            |  |                 |       |                  |        |                |
| 14                               | 451  | 6353            | 233   |                  | XXXXXX |                |
|                                  | 453  | 6354            | 513   | 233              | XXXXXX |                |
|                                  |  |                 | 223   |                  | XXXXXX |                |
|                                  | 467  | 6361            | 188   |                  | XXXXXX |                |
|                                  | 655  | 6455            | 167   |                  | XXXXXX |                |
| TOTAL SIT ENTRIES:               |  |                 |       |                  |        |                |
| DUPLICATE SIT ENTRIES:           |  |                 |       |                  |        |                |
| ** ALL KEYS FOUND VIA THE SIT ** |  |                 |       |                  |        |                |

Figure 4-12. Scatter Index Table Analysis

The next part of the display for DIRECT, SORT and SERIAL files is the KEY AREA ANALYSIS as shown below.

| MM/DD/YY  | BASIC FOUR<br>KEY AREA ANALYSIS |                 |       |              |        | PAGE:<br>HH:MM |
|---|---------------------------------|-----------------|-------|--------------|--------|----------------|
| -----   |                                 |                 |       |              |        |                |
| FILE NAME: file1                                |                                 |                 |       |              |        |                |
| KEYS PER SECTOR: nnn                            |                                 |                 |       |              |        |                |
| SECTOR  | BYTE<br>OFFSET                  | SIT<br>POSITION | INDEX | NEXT<br>HIGH | KEY    |                |
| -----   |                                 |                 |       |              |        |                |
| 29  | 145                             | 3081            | 594   | 595          | XXXXXX |                |
|   | 169                             | 3985            | 595   | 596          | XXXXXX |                |
|   | 193                             | 2047            | 596   | 597          | XXXXXX |                |
|   | 217                             | 230             | 597   | 598          | XXXXXX |                |
|   | 241                             | 4862            | 598   | 599          | XXXXXX |                |
| ** ALL KEYS FOUND VIA THE NEXT HIGHEST CHAIN ** |                                 |                 |       |              |        |                |

Figure 4-13. Key Area Analysis Table

FILE ANALYSIS/REPAIR

For the last part of the analysis the program prints or displays a REMOVED KEYS ANALYSIS.

| MM/DD/YY   | BASIC FOUR<br>REMOVED KEYS ANALYSIS |       |                 |         | PAGE:<br>HH:MM |
|--|-------------------------------------|-------|-----------------|---------|----------------|
| -----  |                                     |       |                 |         |                |
| FILE NAME: file1                                       |                                     |       |                 |         |                |
| KEYS PER SECTOR: nnn                                   |                                     |       |                 |         |                |
| SECTOR   | BYTE<br>OFFSET                      | INDEX | NEXT<br>REMOVED | MESSAGE |                |
| -----  | -----                               | ----- | -----           | -----   |                |
| 3683   | 321                                 | 32    | LAST            |         |                |
| ** ALL REMOVED KEYS FOUND VIA THE REMOVED KEY CHAIN ** |                                     |       |                 |         |                |

Figure 4-14. Removed Keys Analysis

EXAMINE DATA/KEYS  
UTILITY

This subsection describes the EXAMINE DATA/KEYS utility, including how to use it and its effects.

PURPOSE OF  
THE UTILITY

This utility prints or displays the data in a file in any of three ways: (1) the data, record by record, in ASCII characters; (2) the data, record by record, in hexadecimal characters; or (3) keys to each record.

NOTE

This utility may require a START larger than 32 pages depending on the size and structure of a file.

HOW TO USE  
THE UTILITY

When option 7 is selected from the FILE UTILITIES menu, the following option screen is displayed:

| MM/DD/YY                                | BASIC FOUR<br>EXAMINE DATA/KEYS UTILITY |                   | HH:MM |
|---|---|-------------------|-------|
| -----                                   |   |                   |       |
| FILE NAME:                              | file1 - DIRECT FILE                     |                   |       |
| DISC ID:                                |   | NO. OF RECORDS:   |       |
| FIRST SECTOR:                           |   | BYTES/RECORD:     |       |
| LAST SECTOR:                            |   | KEY SIZE:         |       |
| TOTAL SECTORS:                          |   | RECORDS USED:     |       |
| DIRECTORY SIZE:                         |   | RECORDS AVAIL.:   |       |
| 1. FUNCTION                             |   | 2. OUTPUT DEVICE  |       |
| =====                                   |   | =====             |       |
| * DISPLAY DATA (ASCII)                  |   | * TERMINAL        |       |
| DISPLAY DATA (HEX)                      |   | LINE PRINTER (LP) |       |
| DISPLAY KEYS ONLY                       |   | SELECTED PRINTER  |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |   |                   |       |

Figure 4-15. EXAMINE DATA/KEYS Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

## EXAMINE DATA/KEYS

### Parameters and Options

The parameters of the EXAMINE DATA/KEYS utility and their options are as follows:

1. FUNCTION - Available options are to DISPLAY DATA in ASCII characters, to DISPLAY DATA in HEXADECIMAL characters, or to DISPLAY KEYS ONLY. If the user selects DISPLAY KEYS ONLY and the file is not a keyed file, the following message is displayed:

FILE IS NOT A KEYED FILE

The highlighting then returns to DISPLAY DATA (ASCII), the default value.

2. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

### Running the Utility

When the parameters are set and you have pressed RETURN, the utility begins to function without any additional prompts.

### EFFECTS OF THE UTILITY

The data or keys in the file are displayed or printed at the output device. If the TERMINAL is specified as the output device, the screen fills with data and the system prompts you to press RETURN to view the next screen of data, or, for DIRECT and SORT files, the system provides the option of entering a key. When a key is entered rather than pressing RETURN for reading the next key, the next highest key greater than or equal to the key entered is used.

When data files are selected for printing, the system displays the status message:

NOW PRINTING KEY XXXX INDEX: XXXX

and then the printout begins.

The option to DISPLAY DATA in HEXADECIMAL appears as shown in Figure 4-16 below. If the user selects the DISPLAY DATA (ASCII) option, the display is identical to that below except that the hexadecimal content is not displayed.

| MM/DD/YY         | BASIC FOUR<br>EXAMINE DATA/KEYS UTILITY |                   | HH:MM |
|------------------|---|-------------------|-------|
| -----            |   |                   |       |
| FILE NAME: ..OBJ |   |                   |       |
| KEY: =CPLR       | IND: 35                                 |                   |       |
| 1. =CPLR.        |   | BDC3 DOCC D28A    |       |
| 2. 4764.         |   | B4B7 B6B4 8A      |       |
| KEY: =DCMIN      | IND: 12                                 |                   |       |
| 1. =DCMIN.       |   | BDC4 C3CD C9CE 8A |       |
| 2. 407.          |   | B4B0 B78A         |       |
| KEY: =FM         | IND: 8                                  |                   |       |
| 1. =FM.          |   | BDC6 CD8A         |       |
| 2. 1506.         |   | B1B5 BOB6 8A      |       |

Figure 4-16. EXAMINE DATA/KEYS Display of Data

If the user chooses to DISPLAY KEYS ONLY, the display is as shown in Figure 4-17 below.

| MM/DD/YY         | BASIC FOUR<br>EXAMINE DATA/KEYS UTILITY |             | HH:MM   |
|------------------|---|-------------|---------|
| -----            |   |             |         |
| FILE NAME: ..OBJ |   |             |         |
| KEY: =CPLR       | IND: 35                                 | KEY: =DCMIN | IND: 12 |
| KEY: =FM         | IND: 8                                  | KEY: =FM4   | IND: 18 |
| KEY: =FMD        | IND: 9                                  | KEY: =FMD4  | IND: 20 |
| KEY: =IMO        | IND: 32                                 | KEY: =L460  | IND: 19 |
| KEY: =L470       | IND: 24                                 | KEY: =L480  | IND: 25 |
| KEY: =L4AO       | IND: 16                                 | KEY: =L4DO  | IND: 17 |

Figure 4-17. EXAMINE DATA/KEYS Display of Keys

## SORT FILE

### SORT UTILITY

This subsection describes the SORT utility, including procedures for using it and its effects.

### PURPOSE OF THE UTILITY

This utility provides the capability of SORTing any type of data file or performing a SORTED/UNSORTED conversion of a KEYed file.

### NOTE

The SORT utility requires a minimum START of 58 pages.

### HOW TO USE THE UTILITY

When option 8 is selected from the FILE UTILITIES menu, the display shown in Figure 4-18 below appears on the screen:

| MM/DD/YY                                | BASIC FOUR<br>SORT UTILITY | HH:MM |
|---|----------------------------|-------|
| FILE NAME:                              | file1 - DIRECT FILE        |       |
| DISC ID:                                | NO. OF RECORDS:            |       |
| FIRST SECTOR:                           | BYTES/RECORD:              |       |
| LAST SECTOR:                            | KEY SIZE:                  |       |
| TOTAL SECTORS:                          | RECORDS USED:              |       |
| DIRECTORY SIZE:                         | RECORDS AVAIL:             |       |
| 1. ACTION                               |                            |       |
| =====                                   |                            |       |
| * SORT DATA                             |                            |       |
| SORTED/UNSORTED CONV.                   |                            |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                            |       |

Figure 4-18. SORT Utility Option Screen

The only parameter that can be specified is the ACTION the utility should take, whether to SORT DATA or to perform a SORTED/UNSORTED CONVERSION. When this parameter is specified and you have pressed RETURN, the program goes through the steps described below for each option.

Sorted/Unsorted  
Conversion

This option allows an operator to convert a DIRECT or SORT file from a sorted (type 02) to an unsorted (type 08) and vice-versa. The conversion from an unsorted to sorted file requires a work file and the performance of the utility depends on the amount of memory available.

When the SORTED/UNSORTED CONVERSION option is specified on a SORTED file, the screen prompts:

FILE 'filename' IS CURRENTLY SORTED

OK TO CONVERT TO UNSORTED? (Y/CR):

Pressing RETURN causes the system to display the FILE UTILITIES menu. A 'Y' entry starts the conversion. The utility operates on the forward key pointer chain in the key area of the file. For SORTED to UNSORTED conversion, the file type is changed and the nodes of the forward key chain are filled with hexadecimal zeroes (\$00\$).

If the file specified is UNSORTED, the screen displays:

FILE 'AAAAAA' IS CURRENTLY UNSORTED

OK TO CONVERT TO SORTED? (Y/CR):

For conversions from UNSORTED to SORTED files, the process is performed in memory and can be time consuming. A sort is performed on the keys of the file, and the forward key chain is then constructed. The final step is to change the file type from \$08\$ to \$02\$. The time required depends on the size of the key area, the keysize, the order of the keys, and the amount of memory available.

Sort Data

If SORT DATA is the selected option, the system checks the file type. If the input file is serial, the screen displays the message:

CONVERTING SERIAL FILE

The utility converts serial files into indexed files.

## SORT FILE

Specifying the  
End of File Record

If the file to be sorted is an INDEXED file, the screen prompts:

ENTER END OF FILE RECORD (CR=NONE):

You should press RETURN if the file is full or if the unused records at the end of the file are nulls (\$00\$), since the sort program skips any null records either imbedded in the file or at the end of the file. If you press RETURN and the actual end of file is not marked, any "garbage" records at the end of the file are included in the sort. If you enter a value for the END OF FILE RECORD, only enough characters to identify the end of file record uniquely are necessary.

Specifying the  
Output File

After a value is entered for the END OF FILE RECORD, the screen displays:

ENTER OUTPUT FILE NAME:

A file name must be entered where the sorted output records are to be written. This file must be INDEXED with at least the same record size and number of records as the input file. If the file is not found, the system displays:

FILE NOT FOUND. DO YOU WANT TO CREATE IT? (Y/N, CR=N):

An 'N' entry returns the system to the ENTER OUTPUT FILE NAME prompt. If 'Y' is entered, the utility prompts for the number of the disc:

ENTER DISC NUMBER (CR=disc number of input file):

After you have entered the disc number, the utility creates an output file of the same size as the input file.

If the output file specified exists but is not as large in record size or length as the input file, the message is displayed:

FILE SIZE ERROR

If the output file already exists, once it is verified to be valid, the screen prompts:

OK TO CLEAR FILE? (Y/N, CR=N):

An 'N' response returns the system to the ENTER OUTPUT FILE NAME prompt. A 'Y' entry causes the output file to be filled with null records.

Specifying the Sort Sequence

The program next presents the option to select ASCENDING sort sequence or DESCENDING sort sequence:

DO YOU WANT TO USE AN ASCENDING OR DESCENDING SORT SEQUENCE (A/D, CR=A):

If an ASCENDING sort is chosen, the file is sorted with the lowest value keys at the beginning of the file. A file sorted in DESCENDING order has high value keys at the beginning of the file and the low value keys at the end of the file.

Selecting a Sort Key

The system now prompts you for the sort key. The first step is to specify whether you want to use a pre-defined sort key or whether you want to create a new one:

DO YOU WANT TO USE A PRE-DEFINED SORT KEY? (Y/N, CR=N):

If you answer 'Y' to the above question, the system allows you to view the list of previously-defined sort keys:

DO YOU WANT TO SEE THE LIST OF PRE-DEFINED SORT KEYS? (Y/N,CR=N)

If the response is 'Y', the list of all the pre-defined sort key names is displayed. If the response is RETURN, the system then displays:

ENTER NAME OF PRE-DEFINED SORT KEY:

If a name is entered, the system looks for it in the file of pre-defined keys. If it is not found, the message:

NOT A PRE-DEFINED SORT KEY

is displayed and another name may be entered. If it is valid, the sort key parameters are displayed and the program presents the series of prompts described on page 4-30.

## SORT FILE

If you enter 'N' in response to USE A PRE-DEFINED SORT KEY?, the program prompts:

```
DEFINE SORT KEY BY RECORD FIELDS OR BYTE OFFSETS?  
(F/B):
```

If the records to be sorted were originally written with field terminators between the fields, the first option ('F') should be chosen. If the records were written without field terminators, the second option ('B') should be chosen. The utility then displays the sort key headers.

If the sort key is defined by RECORD FIELDS, the program presents the following display:

|  |            |        |         |           |            |        |         |
|--|------------|--------|---------|-----------|------------|--------|---------|
| SORT KEY " " FOR FILE "file1" DEFINED BY RECORD FIELDS |            |        |         |           |            |        |         |
| SORT KEY   | INPUT REC. |        | MAXIMUM | SORT KEY  | INPUT REC. |        | MAXIMUM |
| FIELD NO.  | FIELD NO.  | OFFSET | LENGTH  | FIELD NO. | FIELD NO.  | OFFSET | LENGTH  |
| 1  |            |        |         |           |            |        |         |

Figure 4-19. Defining a SORT Key by Record Fields

When the cursor is at the INPUT REC. FIELD NO., the prompt appears near the bottom of the screen:

```
*** ENTER FIELD NO. (1-999)
```

After you have entered the number of the first field to use in the SORT, the cursor goes to the OFFSET field and prompts you for the number of the first byte in that field to use in the sorting process:

```
*** ENTER OFFSET (1-6144 OR CR)
```

Enter the number or press RETURN to have the value '1' entered. When the cursor reaches the MAXIMUM LENGTH field, the prompt is displayed for you to enter the length of the field in the total number of bytes to be used for the first sort field:

```
*** ENTER LENGTH (1-252)
```

The system does not attempt to verify that the numbers entered are valid, except to ensure that no overlapping sort key fields are defined. Later, when the sort keys are being formed, if the field number

specified is found to be beyond the end of the record, or if the offset specified is beyond the end of the field, a null field is inserted in the sort key. No error message is issued. Also, if a field is found to be larger than the maximum length specified, the extra characters are truncated.

If the sort key is defined by BYTE OFFSET, the program presents the following display:

|  |           |        |           |           |        |
|--|-----------|--------|-----------|-----------|--------|
| SORT KEY " " FOR FILE "file2" DEFINED BY BYTE OFFSET |           |        |           |           |        |
| SORT KEY   | STARTING  |        | SORT KEY  | STARTING  |        |
| FIELD NO.  | FIELD NO. | LENGTH | FIELD NO. | FIELD NO. | LENGTH |
| 1  |           |        |           |           |        |

Figure 4-20. Defining a SORT Key by Byte Offset

When the cursor is at the STARTING POSITION field, the prompt appears:

\*\*\* ENTER STARTING POSITION (1-6144)

When this value is entered, the cursor goes to the LENGTH field and the prompt appears:

\*\*\* ENTER LENGTH (1-252) OR CR:

In both cases, when the list of sort key parameters is complete, or when the pre-defined sort key parameters have been displayed, the system asks:

IS EVERYTHING SATISFACTORY? (Y/N, CR=Y,  
CTL=SELECT NEW KEY):

If any Control Bar is pressed, the program returns to the prompt DO YOU WANT TO USE A PRE-DEFINED SORT KEY? If the response is 'Y' or RETURN, the program checks the sort key definition for duplicate or overlapping sort key fields. If any are found, the program displays:

DUPLICATE OR OVERLAPPING KEY FIELDS

It then requires you to edit the sort key until all erroneous sort key fields are corrected.

## SORT FILE

If the sort key was defined by record fields, the utility checks the input file for field terminators. If none are found, it displays:

NO FIELD TERMINATOR FOUND. DO YOU WANT TO  
CONTINUE? (Y/N, CR=N):

It gives you the options to proceed with the sort or to return to the FILE UTILITIES menu.

If the operator enters 'N' to the question, "IS EVERYTHING SATISFACTORY?" or if an error was found in the sort key definition, the system displays:

ENTER NUMBER OF LINE YOU WISH TO CHANGE:

The operator should enter the line number of the sort key field to be modified or deleted, or the number of the line preceding the place where he or she wishes to add an entry to the displayed list. After each change to the sort key parameters list, the question "IS EVERY SATISFACTORY?" is redisplayed until you enter 'Y'.

After all changes have been made to the sort key parameter list, the system asks:

DO YOU WANT TO SAVE THESE PARAMETERS AS A  
PRE-DEFINED SORT KEY? (Y/N, CR=N):

If the operator enters 'N' or presses RETURN, the system starts the sort. If 'Y' is entered, the system asks:

ENTER NAME OF PRE-DEFINED SORT KEY:

If an existing name is entered, the sort key parameters in that definition are replaced by the new values. If the name is new, the system adds the sort key definition to the file "-SLIST".

If the file "-SLIST" is not found on the disc, the utility creates it. First it displays:

CREATING PRE-DEFINED SORT KEYS FILE "-SLIST" ON  
DISC NUMBER N.  
HOW MANY KEYS DO YOU WANT TO ALLOW IN THE FILE?  
(1-9999):

When you have entered a number for the keys to be allowed in the file, the system then defines the file on disc, clears it, and writes the new pre-defined sort key in the file.

EFFECTS OF  
THE UTILITY

The system now proceeds to sort the file and to write the sorted file on disc. Status information is displayed on the bottom line of the screen, in addition to any error conditions that may occur.

NOTE

Once the last question before the actual sorting process is answered, the utility prevents escape from the sort program. When the status lines "SORTING" or "MERGING" are displayed, pressing the ESCAPE key causes the current record number to be displayed. Otherwise, the ESCAPE key is ignored. When the sort is finished, the system displays the amount of time used by the sort after the last user question was answered.

When the process is complete, the screen returns to the FILE UTILITIES menu.



OVERVIEW

This section of the manual describes the FILES UTILITIES. The FILES UTILITIES differ from the FILE UTILITIES in allowing an operator to maintain a group of files, defined either by individual file name, mask or filelist. Specifically, an operator can define files on disc, and erase, move, copy, and compare files and maintain filelists. The next subsection describes how to access the FILES UTILITIES. The following subsections describe each of the FILES UTILITIES in detail.

ACCESSING THE FILES UTILITIES

To access the FILES UTILITY group, either type 3 from the UTILITIES main menu, or from console mode, enter the command 'RUN "#FILES"'. The list of FILES UTILITIES options is displayed as in Figure 5-1 below:

| MM/DD/YY               | BASIC FOUR<br>FILES UTILITY MENU DRIVER   | HH:MM |
|------------------------|---|-------|
| -----                  |   |       |
| FILES UTILITY OPTIONS: | 1. DEFINE<br>2. ERASE<br>3. MOVE<br>4. COPY<br>5. COMPARE<br>6. MAINTAIN FILELIST |       |
| SELECT UTILITY OPTION: |   |       |

Figure 5-1. FILES UTILITIES Group Menu

To run a utility, enter the number corresponding to the option desired. To return to the UTILITIES main menu, press CTL-IV.

The following subsections describe the FILES UTILITIES options listed above.

## DEFINE FILES

### DEFINE UTILITY

This subsection describes the DEFINE utility, including its purpose and how to use the utility.

### PURPOSE OF THE UTILITY

This utility provides a way to define a group of files on disc. The utility also allows the user to redefine files which were accidentally erased.

### HOW TO USE THE UTILITY

When option 1 is selected from the FILES UTILITIES menu, the program first prompts for the disc name or number on which files are to be defined:

ENTER DISC:

Enter the drive number or main directory name of any configured disc. If an invalid disc name or number is entered, the system displays:

INVALID DISC ID

The program then returns to the ENTER DISC prompt above.

When a valid disc name or number has been entered, the program then displays a roster allowing the operator to enter parameters for the files being defined and also allows the operator to recover accidentally erased files by presenting the prompt shown below in Figure 5-2:

|   |             |            |                |               |                |                 |
|---|-------------|------------|----------------|---------------|----------------|-----------------|
| DISC:   |             |            |                |               |                |                 |
| <u>FILE</u>   | <u>FILE</u> |            | <u>NO. OF</u>  | <u>BYTES/</u> | <u>NO. OF.</u> | <u>STARTING</u> |
| <u>NAME</u>   | <u>TYPE</u> | <u>KEY</u> | <u>RECORDS</u> | <u>RECORD</u> | <u>SECTORS</u> | <u>SECTOR</u>   |
| ARE YOU REDEFINING ACCIDENTALLY ERASED FILES? (Y/CR): |             |            |                |               |                |                 |

Figure 5-2. DEFINE FILES Utility File Roster

If you enter 'Y', the files are entered into the directory but are not initialized, thus allowing the recovery of data that may have previously been in the area over which the file is defined. Pressing RETURN causes the files to be initialized when they are defined and the program displays the message (FILES WILL BE INITIALIZED) over the headers on the roster.

For each file that is defined, the file name, type, and other relevant information for the specified file type must be entered.

When the cursor reaches the FILE NAME field, the prompt appears near the bottom of the screen:

ENTER FILE NAME

When you have entered the name of a file, the system verifies that the file is not currently defined on the specified disc. If it is, the screen displays:

DUPLICATE FILE NAME

and awaits another file name. Upon entry of a valid unused name, the cursor moves to the FILE TYPE field. The system presents the prompt for the type of file to be defined (PROGRAM, INDEX, DIRECT, SORT, SERIAL) with the message:

P=PGM, I=IND, D=DIR, S=SRT, SE=SER

Any of the identified entries are acceptable.

If the file type selected is SORT or DIRECT, the additional prompt is displayed for you to specify whether the file is to be SORTED or UNSORTED as follows:

UNSORTED OR SORTED (U/CR)?

If the file type selected is PROGRAM and if the system is configured with 'V' in the Application Access Code, the prompt is displayed:

PROTECTED OR UNPROTECTED (P/CR)?

When the cursor reaches the KEY field, the prompt is displayed:

ENTER KEY SIZE (2-56)

When the cursor reaches the NO. OF RECORDS field, the program displays the prompt:

ENTER NO. OF RECORDS (1-8388607)

## DEFINE FILES

### NOTE

If the key size is greater than 54, the limit for NO. OF RECORDS is (1-32767).

For data files, the prompt when the cursor reaches the BYTES/RECORD field is:

ENTER RECORD SIZE IN BYTES (1-32767)

For program files the prompt is:

ENTER PROGRAM SIZE IN PAGES (1-64) OR IN BYTES (65-32767)

The program enters the correct value for NO. OF SECTORS. After all data pertinent to the specified file type is entered, a STARTING SECTOR is requested:

ENTER STARTING SECTOR TO BEGIN SEARCH  
(CR=ANYWHERE)

If accidentally erased files are being defined, a specific sector number must be entered. Pressing RETURN causes the utility to search for the first available block of sufficient free space. If sufficient space is not available the screen displays:

DISC IS FULL, CR TO RETRY, CTL-IV TO EXIT:

Pressing CTL-IV causes the program to return to the FILES UTILITIES menu.

When files have been successfully DEFINED, the cursor continues to return to the FILE NAME field until you press RETURN.

ERASE UTILITY

This subsection describes the ERASE utility, including its purpose and how to use it.

PURPOSE OF THE UTILITY

This utility can be used to ERASE file names from the disc directory. The program also updates the GAP FILE to include the newly-freed sectors. This utility requires available space on disc to build a work file. The amount of space required depends upon the number of files being ERASEd.

HOW TO USE THE UTILITY

When option 2 is selected from the FILES UTILITIES menu, the following screen display appears:

```

                                BASIC FOUR
                                ERASE FILES UTILITY
MM/DD/YY                                HH:MM
-----
1. VERIFY OPTION                      2. OUTPUT DEVICE
=====
* PAUSE FOR EACH                       * TERMINAL
NO PAUSE                                LINE PRINTER (LP)
                                         SELECTED PRINTER

CHANGE OPTION BY NUMBER, CR TO PROCEED:

```

Figure 5-3. ERASE FILES Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

The parameters of the ERASE utility and their options are as follows:

1. VERIFY OPTION - This option allows the operator to have each file name verified before it is erased. When the PAUSE FOR EACH option is selected, the message appears before each file is erased:

## ERASE FILES

OK (Y/N)?

If the NO PAUSE option is highlighted, the entire list of files is ERASED without any prompts.

2. OUTPUT DEVICE - Output always takes place to the terminal. If a printer is selected as the OUTPUT DEVICE, a log of the results of the utility is printed at the specified printer as well as displayed at the terminal.

Once the parameters are set and RETURN is pressed, the system first prompts for the disc from which files are to be erased:

ERASE FROM DISC (CR=ANY):

You may either enter a disc name or number or press RETURN to have files on more than one disc erased.

The program then allows the operator to construct a list of names of files to be erased. File names can be specified individually or by mask (using CTRL + Z). The prompt appears:

ADD FILE NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask, the file names are displayed on the screen. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution. The program then presents the prompt:

OK TO BEGIN ERASE? (Y/N)

If you enter 'N' in response to this prompt, the program goes back to the ADD/DELETE/CR TO CONTINUE prompt. If you enter 'Y' the erasing process begins.

EFFECTS OF  
THE UTILITY

As the program proceeds through the list of files, a message is displayed at the terminal listing the results of the program:

FILE 'filename' BEING ERASED. \*\* ERASED \*\*

Besides erasing file names from the directory, the ERASE utility updates the GAP FILE to include the newly-freed sectors in the list of available sectors.

## MOVE FILES

### MOVE UTILITY

This subsection describes the MOVE utility, including its purpose, how to use it and its effects.

### PURPOSE OF THE UTILITY

This utility can be used to move a set of one or more disc files to a different location on the same disc or from one disc to another. The files are erased from their original locations. The utility requires free space on disc for the system to create two work files, one for the list of files and one for the transfer function. Both the amount of free space and the time required depend on the size of the list, the type and size of files and the amount of available memory.

### HOW TO USE THE UTILITY

When option 3 is selected from the FILES UTILITIES menu, the following option screen is displayed:

| MM/DD/YY  | BASIC FOUR<br>MOVE FILES UTILITY |                  | HH:MM             |
|---|----------------------------------|------------------|-------------------|
| -----   |                                  |                  |                   |
| ** WARNING: SOURCE FILES WILL BE ERASED AFTER MOVE ** |                                  |                  |                   |
| 1. FILE TYPE  | 2. FILE SELECTION                | 3. MOVE METHOD   | 4. OUTPUT DEVICE  |
| =====   | =====                            | =====            | =====             |
| * ALL TYPES   | * ALL FILES                      | * BY SECTOR      | * TERMINAL        |
| PROGRAM ONLY  | SELECTED FILES                   | RECORD BY RECORD | LINE PRINTER (LP) |
| DATA ONLY   |                                  |                  | SELECTED PRINTER  |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:               |                                  |                  |                   |

Figure 5-4. MOVE FILES Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

### Parameters and Options

The parameters of the MOVE utility and their options are as follows:

1. FILE TYPE - The program allows the operator to select between moving ALL TYPES of files, or only PROGRAM files or only DATA files.
2. FILE SELECTION - Available options are to move ALL FILES or only SELECTED FILES. If the SELECTED FILES option is chosen, the operator must specify the files to be moved. The list of files may be constructed by entering individual file names or by a mask.
3. MOVE METHOD - The options are to move files BY SECTOR or RECORD BY RECORD. If the RECORD BY RECORD option is chosen, a progress indicator is displayed on the screen during the move. This method may be desirable on KEYED files since it makes better use of system resources.
4. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Running the Utility

After the parameters have been selected, the program presents prompts for the source and destination discs:

MOVE FROM DISC: name(n) MOVE TO DISC:  
(CR=same(n)):

Enter the names or numbers of the source and destination discs. Pressing RETURN for the MOVE TO DISC causes the source disc name and number to be entered.

The program next prompts for the beginning sector to which to move files:

## MOVE FILES

STARTING SECTOR TO BEGIN SEARCH FOR FREE SPACE  
(CR=SAME):

Enter a starting sector to begin the search for free space or press RETURN for the program to select the same sector on the destination disc as the beginning sector of the files on the source disc.

The program then allows the operator to construct a list of names of files to be moved. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD FILE NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified disc. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

## EFFECTS OF THE UTILITY

Once the list of files has been specified, the moving process begins. Each file name is displayed as it is moved and the original version is erased:

MOVING: 'filename'

Once the last file is moved, the screen displays the messages:

MOVE COMPLETE, CR TO PROCEED:

NUMBER OF FILES MOVED:

NUMBER OF FILES NOT MOVED:

Pressing RETURN brings back the FILES UTILITIES menu.

## COPY FILES

### COPY UTILITY

This subsection describes the COPY utility, including its purpose, how to use it and its effects.

### PURPOSE OF THE UTILITY

This utility provides a means for copying a set of one or more disc files from a specified disc to another disc. The original file is not altered or erased. The utility requires free space on disc for the system to create two work files, one for the list of files and one for the copying process. Both the amount of free space and the time required depend on the size of the list, the type and size of the files, and the amount of available memory.

### HOW TO USE THE UTILITY

When option 4 is selected from the FILES UTILITIES menu, the following option screen is displayed:

| MM/DD/YY                                | BASIC FOUR<br>COPY FILES UTILITY |                  |                   | HH:MM |
|---|----------------------------------|------------------|-------------------|-------|
| -----                                   |                                  |                  |                   |       |
| 1. FILE TYPE                            | 2. FILE SELECTION                | 3. COPY METHOD   | 4. OUTPUT DEVICE  |       |
| =====                                   | =====                            | =====            | =====             |       |
| * ALL TYPES                             | * ALL FILES                      | * BY SECTOR      | * TERMINAL        |       |
| PROGRAM ONLY                            | SELECTED FILES                   | RECORD BY RECORD | LINE PRINTER (LP) |       |
| DATA ONLY                               |                                  |                  | SELECTED PRINTER  |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                  |                  |                   |       |

Figure 5-5. COPY FILES Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

### Parameters and Options

The parameters of the COPY utility and their options are as follows:

1. FILE TYPE - The program allows the operator to choose between copying ALL TYPES of files, or only PROGRAM files or only DATA files.

2. FILE SELECTION - Available options are to copy ALL FILES or only SELECTED FILES. If the SELECTED FILES option is chosen, the operator must specify the files to be copied. The list of files may be constructed by entering individual file names, a filelist or a mask.
3. COPY METHOD - The options are to copy files BY SECTOR or RECORD BY RECORD. If the RECORD BY RECORD option is chosen, a progress indicator is displayed on the screen during the copy. This method may be desirable on KEYED files since it makes better use of system resources.
4. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option was chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Running the Utility

After the parameters have been selected, the program presents prompts for the source and destination discs:

COPY FROM DISC: name(n) COPY TO DISC:

Enter the names or numbers of the source and destination discs. If you attempt to enter the same number for both discs, the program presents the prompt:

UNABLE TO COPY MULTIPLE FILES ON THE SAME DISC.  
PLEASE USE COPY IN THE FILE (INDIVIDUAL) UTILITY  
GROUP FOR THIS PURPOSE.

When valid disc names or numbers have been entered, the program next prompts for the beginning sector to which to move files:

STARTING SECTOR TO BEGIN SEARCH FOR FREE SPACE  
(CR=ANYWHERE):

## COPY FILES

Enter a starting sector to begin the search for free space on the destination disc or press RETURN for the program to select the same sector on the destination disc as the beginning sector of the files on the source disc.

The program then allows the operator to construct a list of names of files to be copied. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

```
ADD FILE NAME, CR TO END (CTRL+Z=MASK):  
1. _____
```

If you enter a mask, the message is displayed:

```
SEARCHING DISC XXXXXX (N)
```

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

```
ADD/DELETE/CR TO CONTINUE (A/D/CR):
```

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

### EFFECTS OF THE UTILITY

Once the list of files has been specified, the copying process begins. Each file name is displayed as it is copied. The original version is not erased:

```
COPYING: 'filename'
```

Once the last file is copied, the screen displays the messages:

```
COPY COMPLETE, CR TO PROCEED:
```

```
NUMBER OF FILES COPIED:  
NUMBER OF FILES NOT COPIED:
```

Pressing RETURN brings back the FILES UTILITIES menu.

COMPARE UTILITY

This subsection describes the COMPARE utility, including its purpose, how to use it and its effects.

PURPOSE OF THE UTILITY

This utility may be used to compare files of the same type, with the same name, from different discs. The utility produces a display or printout of the differences in the files. Free space on disc is required to execute this utility since the utility must create a work file. The amount of space required varies based upon the size and structure of the files to be compared.

NOTE

Depending upon the structure and content of the files to be compared, a START of greater than 32 pages may be required.

HOW TO USE THE UTILITY

When option 5 is selected from the FILES UTILITIES menu, the following option screen is displayed:

|   |                             |       |
|---|-----------------------------|-------|
| MM/DD/YY  | BASIC FOUR<br>COMPARE FILES | HH:MM |
| -----   |                             |       |
| 1. OUTPUT DEVICE<br>=====                           |                             |       |
| * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |                             |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:             |                             |       |

Figure 5-6. COMPARE FILES Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for the results of the utility, which has the standard choices. When this parameter is specified and you have pressed RETURN, the program then displays the prompt:

SOURCE DISC:

## COMPARE FILES

Enter the name or number of the source disc. The program then prompts for the name of the second disc:

COMPARE TO DISC:

If you attempt to enter the same disc name or number in both places, the message is displayed:

UNABLE TO COMPARE MULTIPLE FILES ON THE SAME  
DISC.  
PLEASE USE COMPARE IN THE FILE (INDIVIDUAL)  
UTILITY GROUP FOR THIS PURPOSE.

The program then allows the operator to construct a list of names of files to be compared. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD FILE NAME, CR TO END (CTRL+Z=MASK):  
1. \_\_\_\_\_

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

Each file name is verified against the source disc on entry. At completion of the list, the utility verifies the existence of the files on the COMPARE TO disc. The screen displays the message:

VERIFYING FILES EXIST ON THE COMPARE TO DISC

If the utility is unable to locate a file in the COMPARE TO disc, the message appears:

FILE NAME 'filename' CANNOT BE OPENED (FILE NOT FOUND)

CR TO RETRY, CTL-II TO SKIP, CTL-III TO SKIP ALL PROBLEM FILES, CTL-IV TO EXIT

EFFECTS OF  
THE UTILITY

The comparison proceeds, generating a report to the specified output device. The printed or displayed reports have the same formats as those shown in SECTION 4 under COMPARE. See Figures 4-7 through 4-9 for examples.

When the comparisons have been completed, the system returns to the FILES UTILITIES menu.

MAINTAIN FILELIST

MAINTAIN FILELIST  
UTILITY

This subsection describes the MAINTAIN FILELIST utility, including its purpose, how to use it and its effects.

PURPOSE OF  
THE UTILITY

This utility may be used to create a filelist, to display and edit the contents of an existing filelist, or to display a listing of all filelists on a disc. (For a definition of FILELIST, refer to the definitions of terms at the end of SECTION 1.) During execution of the MAINTAIN FILELIST option, the system creates a work file.

HOW TO USE  
THE UTILITY

When option 6 is selected from the FILES UTILITIES menu, the screen display as shown below in Figure 5-7 appears:

| MM/DD/YY                                | BASIC FOUR<br>FILELIST MAINTENANCE UTILITY |              |                   | HH:MM |
|---|--|--------------|-------------------|-------|
| 1. ACTION                               | 2. SORT ORDER                              | 3. FILE TYPE | 4. OUTPUT DEVICE  |       |
| =====                                   | =====                                      | =====        | =====             |       |
| * CREATE/MAINTAIN                       | * AS ENTERED                               | * ALL TYPES  | * TERMINAL        |       |
| DISPLAY FILELIST                        | BY NAME                                    | PROGRAM ONLY | LINE PRINTER (LP) |       |
| INVENTORY                               | BY LOCATION                                | DATA ONLY    | SELECTED PRINTER  |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |  |              |                   |       |

Figure 5-7. MAINTAIN FILELIST Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

Parameters and Options

The parameters of the MAINTAIN FILELIST utility and their options are as follows:

1. ACTION - The default value provides the ability to CREATE or MAINTAIN a filelist. The DISPLAY option provides the ability to display the contents of a filelist. The INVENTORY option, when selected, displays the names of all filelists.
2. SORT ORDER - This parameter is used when CREATE/MAINTAIN is selected in the ACTION option. The option AS ENTERED produces unsorted output; the BY NAME option produces a list of files in alphabetical sequence.
3. FILE TYPE - This option allows an operator to specify whether the filelist will contain files of ALL TYPES, or PROGRAM ONLY or DATA ONLY files.
4. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option is chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Running the Utility

The utility goes through the following procedures described below for each ACTION option.

Create/Maintain

If CREATE/MAINTAIN is the ACTION parameter, the program first requests a disc ID:

ENTER DISC:

After you have entered the name or number of a configured disc, the screen then displays the prompt:

ENTER FILELIST NAME:

## MAINTAIN FILELIST

Upon entry of the filelist name, the system determines if the filelist currently exists on the specified disc. If the filelist does not exist, the utility allows you to create it:

ADD FILE NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

When all the names have been entered, or for existing filelists, when the screen has displayed all files in the list which meet the FILETYPE parameter, the utility then allows you to edit the filelist:

ADD/DELETE/CR TO PROCEED (A/D/CR):

If you enter an 'A' or a 'D', the program prompts for the name of files or a mask name. The file names are added to or deleted from the FILELIST. (The FILETYPE parameter has no meaning when deleting files.)

When you press RETURN to finish editing the filelist, the utility sorts the list according to the SORT ORDER parameter:

NOW SORTING FILELIST

The screen next displays the prompt:

SAVE THIS VERSION? (CR/N):

Pressing RETURN brings back the FILES UTILITIES menu. An 'N' response brings back the prompt:

DELETE FILELIST 'xxxxxx'? (Y/CR)

If you enter 'Y', the filelist is deleted. Pressing RETURN brings back the FILELIST MAINTENANCE option screen.

### Display Filelist

If the ACTION parameter is set to DISPLAY FILELIST, the name of the filelist is requested. If the name is not a filelist, a message is displayed and the prompt is then returned:

ENTER FILELIST NAME:

Inventory

If the operator has chosen the INVENTORY option, the program proceeds immediately to display or list all defined filelists at the specified output device.

EFFECTS OF THE UTILITY

The displayed and printed results of the utility are shown below. Figure 5-8 shows the printout that results when the option is to DISPLAY FILELISTS.

```
MM/DD/YY                BASIC FOUR
                        DISPLAY FILELIST                HH:MM
-----
FILELIST NAME: 'filelist' --- TOTAL # OF FILES: n
file 1  file 2  file 3  file 4  file 5  file 6
```

Figure 5-8. DISPLAY FILELIST

If the operator has chosen an INVENTORY of filelists, the following display or printout is produced showing the name of the filelist and the number of files it contains, as in Figure 5-9 below:

```
MM/DD/YY                BASIC FOUR
                        FILELIST INVENTORY                HH:MM
-----
NO. OF FILELISTS DEFINED: nn
NAME          NO.
-----
filelist1    nn
filelist2    nn
filelist3    nn
filelist4    nn
```

Figure 5-9. FILELIST INVENTORY Display

When the procedure has been completed, the system returns to the FILES UTILITIES menu.



OVERVIEW

This section of the manual describes the PROGRAM UTILITIES. The PROGRAM UTILITIES allow an operator to create, cross-reference, display the first statement, search and replace strings, compare, renumber and merge program files.

ACCESSING THE PROGRAM UTILITIES

To access the PROGRAM UTILITIES, either type '4' from the UTILITIES main menu or, from console mode, enter the command 'RUN "\*PGM"'. The program returns the screen display shown in Figure 6-1 below:

| MM/DD/YY                 | BASIC FOUR<br>PROGRAM UTILITY MENU DRIVER | HH:MM |
|--------------------------|---|-------|
| PROGRAM UTILITY OPTIONS: |   |       |
|                          | 1. DEFINE PROGRAM FILES                   |       |
|                          | 2. CROSS REFERENCE PROGRAMS               |       |
|                          | 3. DISPLAY FIRST STATEMENT                |       |
|                          | 4. STRING SEARCH & REPLACE                |       |
|                          | 5. COMPARE PROGRAM FILES                  |       |
|                          | 6. RENUMBER STATEMENTS                    |       |
|                          | 7. MERGE PROGRAM FILES                    |       |
| SELECT UTILITY OPTION:   |   |       |

Figure 6-1. PROGRAM UTILITIES Group Menu

To run a utility, enter the number corresponding to the option desired. To return to the UTILITIES main menu, press CTL-IV.

The following subsections describe the PROGRAM UTILITIES options listed above.

## DEFINE PROGRAM FILES

### DEFINE PROGRAM FILES UTILITY

This subsection describes the DEFINE PROGRAM FILES utility, including the purpose of the utility and how to use it.

#### PURPOSE OF THE UTILITY

This utility provides a means of creating program files. This utility operates in the same way as the DEFINE FILES utility.

#### HOW TO USE THE UTILITY

When option 1 is selected from the PROGRAM UTILITIES menu, the utility first prompts for the name or number of the disc on which the program is to be defined:

ENTER DISC:

Enter the drive number or main directory name of any configured disc. If an invalid disc name or number is entered, the system displays:

INVALID DISC ID

The program then returns to the ENTER DISC prompt above.

When a valid disc name or number has been entered, the program then displays a roster allowing the operator to enter parameters for the files being defined and also allows the operator to recover accidentally erased files by presenting the prompt shown below in Figure 6-2:

|  |             |            |                |               |                |                 |
|--|-------------|------------|----------------|---------------|----------------|-----------------|
| DISC:  |             |            |                |               |                |                 |
| <u>FILE</u>  | <u>FILE</u> |            | <u>NO. OF</u>  | <u>BYTES/</u> | <u>NO. OF.</u> | <u>STARTING</u> |
| <u>NAME</u>  | <u>TYPE</u> | <u>KEY</u> | <u>RECORDS</u> | <u>RECORD</u> | <u>SECTORS</u> | <u>SECTOR</u>   |
| ARE YOU REDEFINING ACCIDENTALLY ERASED FILES? (Y/CR) |             |            |                |               |                |                 |

Figure 6-2. DEFINE PROGRAM FILE Roster

If you enter 'Y', the files are entered into the directory but are not initialized, thus allowing the recovery of data that may have previously been in the area over which the file is defined. Pressing RETURN causes the files to be initialized when they are

defined and the program displays the message (FILES WILL BE INITIALIZED) over the headers on the roster.

For each file that is defined, information must be entered in the FILE NAME, BYTES/RECORD and STARTING SECTOR fields.

When the cursor reaches the FILE NAME field, the prompt appears near the bottom of the screen:

ENTER FILE NAME

When you have entered the name of a file, the system verifies that the file is not currently defined on the specified disc. If it is, the screen displays:

DUPLICATE FILE NAME

and awaits another file name. Upon entry of a valid unused name, the cursor moves to the FILE TYPE field. The utility automatically enters 'PGM' in that field for PROGRAM file.

If the system is configured with 'V' in the Application Access Code, the utility next allows the operator to specify whether the program is to be protected or unprotected:

PROTECTED OR UNPROTECTED (P/CR)?

When the operator has entered 'P' or has pressed RETURN in response to that prompt, the cursor moves to the PROGRAM SIZE field and the utility prompts:

ENTER PROGRAM SIZE IN PAGES (1-64) OR IN BYTES  
(65-32767)

Once the program size has been entered, the utility enters the correct value for NO. OF SECTORS. The utility then requests a STARTING SECTOR:

ENTER STARTING SECTOR TO BEGIN SEARCH  
(CR=ANYWHERE)

If accidentally erased files are being defined, a specific sector number must be entered. Pressing RETURN causes the utility to look for the first available sufficient free space on disc. If sufficient space is not available the screen displays:

## DEFINE PROGRAM FILES

UNABLE TO LOCATE nnnnn FREE SECTORS ON DISC 'disc  
name' (n), CR TO PROCEED:

Pressing RETURN causes the program to return to the  
PROGRAM UTILITIES menu. When files have been  
successfully DEFINED, the cursor continues to return  
to the FILE NAME field until you press RETURN.

CROSS REFERENCE  
PROGRAMS UTILITY

This subsection describes the CROSS REFERENCE PROGRAMS utility, including its purpose, how to run the utility, and its effects.

PURPOSE OF  
THE UTILITY

This utility provides a partial or complete analysis of a specified BUSINESS BASIC program. The analysis includes a cross-reference of key components of the program and the program provides an option to produce a block print listing of the program.

Free space on disc is required to run this utility since the system must create two work files, one for cross referencing and one for the list of files. An additional work file is defined if the option to cross-reference GLOBAL VARIABLES is selected. The amount of space required depends on the size and content of the files.

NOTE

This utility may require a START of greater than 32 pages depending upon the structure and content of the files.

HOW TO USE  
THE UTILITY

When option 2 is selected from the PROGRAM UTILITIES menu, the CROSS REFERENCE PROGRAMS option screen appears as shown in Figure 6-3 below:

| MM/DD/YY                                | BASIC FOUR<br>BASIC CROSS REFERENCE UTILITY | HH:MM                     |
|---|---|---------------------------|
| -----                                   |   |                           |
|   | CROSS REFERENCE OPTIONS<br>=====            | 7. OUTPUT DEVICE<br>===== |
| * 1.                                    | PROGRAM LISTING                             | * LINE PRINTER (LP)       |
| * 2.                                    | VARIABLES                                   | SELECTED PRINTER          |
| * 3.                                    | ARRAYS,FUNCTIONS,SPECIAL VARIABLES          |                           |
| * 4.                                    | STATEMENT NUMBERS                           |                           |
| * 5.                                    | DIRECTIVES                                  |                           |
| 6.                                      | GLOBAL VARIABLES                            |                           |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |   |                           |

Figure 6-3. CROSS REFERENCE PROGRAMS Option Screen

## CROSS REFERENCE PROGRAMS

### Parameters and Options

Parameter selection for this utility is different from the standard method because of the nature of the parameters. For the CROSS REFERENCE OPTIONS, more than one option can be selected. Rather than selecting one item in the group, the numbered options are either "on" or "off." When the screen is first displayed, the first six options under CROSS REFERENCE OPTIONS are highlighted, indicating that they are default values. The GLOBAL VARIABLES option applies only when more than one program is being cross-referenced. To change an option, press the number. When the option number is pressed, the highlighting goes "on" or "off" depending on its original state.

For the OUTPUT DEVICE, only the LINE PRINTER or a SELECTED PRINTER are available options, since the utility automatically produces a printed cross-reference of the specified program components.

### Running the Utility

Once the parameters are selected and you have pressed RETURN, the screen prompts for the name or number of the disc on which the program resides:

ENTER DISC (CR=ANY):

After you have entered the name or number of a configured disc or have pressed RETURN to have the value ANYWHERE entered, the utility then allows you to construct a list of names of files to be cross-referenced. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD PROGRAM NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified discs. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

EFFECTS OF  
THE UTILITY

When the utility has finished cross-referencing a file, the cross-reference parameters selected are printed. If the VARIABLES option is selected, two sections are printed, one for numeric and the other for string variables. The listing is printed in alphabetical order. If the GLOBAL VARIABLES option is selected, all variables for each program are printed again, listing all programs which include the variable.

Before reading any programs, the utility displays the message:

DEFINING SCRATCH FILE...

As the utility reads each program a message is displayed on the terminal showing the program name and current line number:

NOW WORKING ON PROGRAM: 'program' 0050

The listing in block format causes each part of a compound statement to be printed on a separate line, indenting 5 spaces for each nested FOR-NEXT loop and 5 spaces for each IF-THEN-ELSE level. It also provides blank lines around each REM statement or group of REM statements.

If the statement number printed is followed by a decimal point and value, the value stands for the part of a compound statement following the first part of the statement.

Figures 6-4 through 6-8 below show sample listings for the various options available.

CROSS REFERENCE PROGRAMS

| MM/DD/YY             | BASIC FOUR<br>CROSS REFERENCE LISTING: "program" |              |              |                |              | HH:MM  |
|----------------------|--|--------------|--------------|----------------|--------------|--------|
| NUMERIC<br>VARIABLES | STATEMENT NUMBERS                                |              |              |                |              |        |
| F                    | 0030<br>0130                                     | 0040<br>0200 | 0090<br>0202 | 0100<br>0202.1 | 0124<br>1000 | 0124.1 |
| L                    | 0080   | 0124.2       | 0130         | 0140           | 0200.1       | 0210   |
| X                    | 1010   | 1020         | 1030         | 1035           |              |        |

Figure 6-4. Listing of Numeric Variables

| MM/DD/YY            | BASIC FOUR<br>CROSS REFERENCE LISTING: "program" |        |        | HH:MM |
|---------------------|--|--------|--------|-------|
| STRING<br>VARIABLES | STATEMENT NUMBERS                                |        |        |       |
| D\$                 | 0120   | 0200.1 | 0202.1 |       |
| F8\$                | 0030   | 0040   |        |       |
| Z8\$                | 0060   | 0090   | 0100.1 |       |

Figure 6-5. Listing of String Variables

| MM/DD/YY                                     | BASIC FOUR<br>CROSS REFERENCE LISTING: "program" | HH:MM |
|--|--|-------|
| ARRAYS<br>FUNCTIONS, AND<br>SYSTEM VARIABLES | STATEMENT NUMBERS                                |       |
| 'CL'   | 1010   |       |
| 'CS'   | 0100.1   |       |
| 'FF'   | 0090.1   |       |
| KEY  | 0110   |       |
| ERR=   | 1010   |       |

Figure 6-6. Listing of Arrays, Functions and System Variables

| MM/DD/YY             | BASIC FOUR<br>CROSS REFERENCE LISTING: "program" | HH:MM |
|----------------------|--|-------|
| STATEMENT<br>NUMBERS |  |       |
| 0110                 | 0230   |       |
| 0130                 | 0122.1   |       |
| 0200                 | 0130.1    1010                                   |       |

Figure 6-7. Listing of Statement Numbers

CROSS REFERENCE PROGRAMS

| MM/DD/YY   | BASIC FOUR<br>CROSS REFERENCE LISTING: "program" |              |              |              |        | HH:MM |
|------------|--|--------------|--------------|--------------|--------|-------|
| DIRECTIVES | STATEMENT NUMBERS                                |              |              |              |        |       |
| BEGIN      | 0020   |              |              |              |        |       |
| DIM        | 0060   |              |              |              |        |       |
| END        | 2000   |              |              |              |        |       |
| GOTO       | 0122.1   | 0130         | 0230         | 1020.1       | 1030.1 |       |
| IF         | 0090<br>0202                                     | 0100<br>1000 | 0122<br>1030 | 0124<br>1040 | 0130   | 0200  |
| REM        | 0010   | 0050         |              |              |        |       |
| STOP       | 1000.1   |              |              |              |        |       |

Figure 6-8. Listing of Directives

When the listings for all selected programs are printed, the utility returns to the PROGRAM UTILITIES menu.

DISPLAY FIRST STATEMENT UTILITY

This subsection describes the DISPLAY FIRST STATEMENT utility, including its purpose, how to run it and the results of the utility.

PURPOSE OF THE UTILITY

This utility provides a means of displaying the first statement in specified BASIC programs. The system must create a work file for the list of files.

HOW TO USE THE UTILITY

When option 3 is selected from the PROGRAM UTILITIES menu, the utility displays the option screen shown in Figure 6-9:

```
MM/DD/YY                BASIC FOUR                HH:MM
                        DISPLAY FIRST STATEMENT UTILITY
-----
1. PROGRAM SELECTION
   *****
   * SELECTED PROGRAMS
   ALL PROGRAMS

2. OUTPUT DEVICE
   *****
   * TERMINAL
   LINE PRINTER (LP)
   SELECTED PRINTER

CHANGE OPTION BY NUMBER, CR TO PROCEED:
```

Figure 6-9. DISPLAY FIRST STATEMENT Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

The parameters of the DISPLAY FIRST STATEMENT utility and their options are as follows:

1. PROGRAM SELECTION - Available options are to display the first statement of SELECTED PROGRAMS or of ALL PROGRAMS on the specified disc. If the ALL PROGRAMS option is selected, the listing is produced in order by program name.

## DISPLAY FIRST STATEMENT

2. OUTPUT DEVICE - The listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option was chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Once the parameters have been selected, the screen displays:

ENTER DISC

After you have entered the name or number of a configured disc or have pressed RETURN to have the value ANYWHERE entered, the utility then allows you to construct a list of programs whose first lines are to be displayed. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD PROGRAM NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified discs. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

EFFECTS OF  
THE UTILITY

When the utility begins, it first displays the message NOW SORTING THE FILELIST. It then OPENS each of the specified programs on the selected disc and displays or prints the program name and first statement at the specified output device. The display or printing is as shown in Figure 6-10 below.

| MM/DD/YY | BASIC FOUR<br>DISPLAY FIRST STATEMENT UTILITY | HH:MM |
|----------|---|-------|
| PROGRAM  | FIRST STATEMENT IN PROGRAM                    |       |
| program  | 0010 REM "program"                            |       |
| program  | 0010 REM "program"                            |       |

Figure 6-10. DISPLAY FIRST STATEMENT Display

When the listing is complete, the utility returns control to the PROGRAM UTILITIES menu.

## STRING SEARCH AND REPLACE

### STRING SEARCH AND REPLACE UTILITY

This subsection describes the STRING SEARCH AND REPLACE utility, including its purpose, how to run the utility, and its effects.

### PURPOSE OF THE UTILITY

This utility provides a way to locate and replace all occurrences of a specified string by another string in a given set of BUSINESS BASIC programs.

### CAUTION

Caution must be exercised when using this utility. Mistakes may change the results obtained from running a program file. We recommend that you perform a backup before using the SEARCH & REPLACE option.

Free space on disc is required to run this utility since the utility creates two work files, one for the list of files and one for the replacements. The amount of space required depends on the size and content of the files.

### NOTE

This utility may require a START of greater than 32 pages depending upon the structure and content of the files.

### HOW TO USE THE UTILITY

When option 4 is selected from the PROGRAM UTILITIES menu, the option screen shown in Figure 6-11 is displayed:

| MM/DD/YY  | BASIC FOUR<br>STRING SEARCH & REPLACE UTILITY         | HH:MM   |
|---|---|---|
| <hr/>   |   |   |
| 1. FUNCTION<br>=====                                | 2. SCOPE<br>=====                                     | 3. OUTPUT DEVICE<br>=====                           |
| * SEARCH ONLY<br>SEARCH & REPLACE<br>PAUSE ON MATCH | * LITERALS ONLY<br>BASIC CODE ONLY<br>ALL OCCURRENCES | * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:             |   |   |

Figure 6-11. STRING SEARCH & REPLACE Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

The parameters of the STRING SEARCH & REPLACE utility and their options are as follows:

1. ACTION - SEARCH ONLY locates and reports each occurrence of the search string with no modifications. SEARCH AND REPLACE locates each occurrence and replaces it with the specified replacement string. PAUSE ON MATCH causes the utility to pause at each occurrence of the searched string and to prompt the operator for a replacement string.
2. SCOPE - This parameter allows the operator to choose between searching for LITERALS ONLY, BASIC CODE ONLY and not the literals, or reporting ALL OCCURRENCES of the string.
3. OUTPUT DEVICE - If PAUSE ON MATCH is selected for the ACTION option, the display is sent only to the TERMINAL. Otherwise the listing or display can be sent to the TERMINAL, the LINE PRINTER, or to a SELECTED PRINTER (if more than one printer is configured). If the SELECTED PRINTER option was chosen, the program prompts for the name of the printer:

ENTER PRINTER ID:

Enter the name of the printer, e.g., 'P1'.

Once the parameters have been entered, the screen displays a prompt for the string to be searched:

SEARCH STRING (MAX=35 CHARS):

If other than SEARCH ONLY is specified in the ACTION parameter, the screen next displays:

REPLACE STRING (MAX=35 CHARS):

## STRING SEARCH AND REPLACE

If the search string specified resembles a BUSINESS BASIC variable, and the SCOPE parameter is not set for LITERALS ONLY, the screen displays:

VARIABLE ONLY? (CR/N):

If you press RETURN, the utility locates only occurrences of the string where it is used as a variable. If you enter 'N', all occurrences of the string are located and acted upon. The user may specify one or more search/replace strings to be processed.

The system now displays:

ENTER DISC (CR=ANY):

After you have entered the name or number of a configured disc or have pressed RETURN to have the value ANYWHERE entered, the utility then allows you to construct a list of programs whose first lines are to be displayed. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD PROGRAM NAME, CR TO END (CTRL+Z=MASK):  
1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified discs. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

EFFECTS OF  
THE UTILITY

The utility OPENS each program file and searches the LISTED format of each statement for the exact search string. If a replacement is to be performed, the COMPILED (CPL) format of the statement is replaced in the program. Any attempt to replace BASIC code resulting in an error in the CPL instruction is reported as a failure to replace and the statement is left in its original form.

If PAUSE ON MATCH is the selected ACTION, the system stops each time the search string is found and requests a replacement string. The utility displays the message:

CR TO SKIP, CTL-II TO DELETE

Pressing RETURN causes the program to skip the occurrence. If you press CTL-II the utility deletes the occurrence. Pressing CTL-III causes the program to replace the string with the previous replacement string if one was last entered.

The output lists each statement which contains a search string with the search string underlined if the output device is a printer. If a replacement is done the statement is listed again after the replacement, as shown in Figure 6-12 below.

| MM/DD/YY   | BASIC FOUR<br>STRING SEARCH & REPLACE UTILITY | HH:MM  |
|--|---|--|
| -----  |   |  |
| DISC:  |   |  |
| PROGRAM:   | SCOPE:  | SEARCH STRING: 'A\$'<br>REPLACE STRING: 'A6\$' |
| 0040 LET I=0,X=0, A\$="", B\$=""                         |   |  |
| 0040 LET I=0, X=0, A6\$="", B\$=""                       |   |  |
| 0110 IF X>L1 THEN A\$="Y" ELSE A\$="N"                   |   |  |
| 0110 IF X>L1 THEN <u>A6\$</u> ="Y" ELSE <u>A6\$</u> ="N" |   |  |
| 230 LET B\$ = \$0-A\$                                    |   |  |
| *** ERROR=20 REPLACE IGNORED                             |   |  |

Figure 6-12. STRING SEARCH & REPLACE Report

## STRING SEARCH AND REPLACE

Upon completing the printout or display, the system returns to the PROGRAM UTILITIES menu.

COMPARE PROGRAMS  
UTILITY

This subsection describes the COMPARE PROGRAMS utility, including its purpose, how to run the utility and its effects.

PURPOSE OF  
THE UTILITY

This utility provides a means for comparing program files of the same name on different discs. The utility produces a report of any differences in program statements.

NOTE

This utility may require a START of greater than 32 pages depending upon the structure and content of the files.

HOW TO USE  
THE UTILITY

This utility functions very much like the COMPARE utility under the FILE utilities. When an operator selects option 7 from the PROGRAM UTILITIES menu, the following option screen is displayed:

| MM/DD/YY  | BASIC FOUR<br>COMPARE PROGRAM FILES UTILITY | HH:MM |
|---|---|-------|
| -----   |   |       |
| 1. OUTPUT DEVICE<br>=====                           |   |       |
| * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:             |   |       |

Figure 6-13. COMPARE PROGRAMS Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for the results of the utility, which has the standard choices. When this parameter is specified and you have pressed RETURN, the program then displays the prompt for the disc on which the first file or set of files resides:

SOURCE DISC:

Next the program prompts for the disc on which the comparison files reside:

## COMPARE PROGRAMS

### COMPARE TO DISC:

After you have entered the names or numbers of configured discs or have pressed RETURN to have the value ANYWHERE entered, the utility then allows you to construct a list of names of files to be compared. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD PROGRAM NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified discs. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

Before the utility runs, the message is displayed:

VERIFYING FILES EXIST ON THE COMPARE TO DISC

If the utility is unable to locate a file in the COMPARE TO disc, the message appears:

FILE NAME 'filename' CANNOT BE OPENED (FILE NOT FOUND)

CR TO RETRY, CTL-II TO SKIP, CTL-III TO SKIP ALL PROBLEM FILES, CTL-IV TO EXIT

Pressing CTL-III causes the program to skip all files in the list which cause an error when the program attempts to OPEN them, or which are device names.

EFFECTS OF  
THE UTILITY

When the required information has been entered in response to the prompts above, and when the program has verified that the files are of the same type, the comparison begins. The comparison is on a statement by statement basis. All statements that do not compare identically are displayed or printed as shown in Figure 6-14:

| MM/DD/YY   | BASIC FOUR<br>COMPARE PROGRAMS UTILITY       | PAGE:<br>HH:MM |
|--|--|----------------|
| -----  |  |                |
| SOURCE FILE: file1 - PROGRAM FILE                          | COMPARE TO FILE: file2 - PROGRAM FILE        |                |
| DISC ID: XXXXXX (n)  | DISC ID: XXXXXX (n)                          |                |
| * PROGRAM SIZE: nnnn                                       | * PROGRAM SIZE: nnnnn                        |                |
| 0010 REM "file1-WRITE OVERLAY TO<br>PROGRAM YYYYYY"        | 0010 REM "file2-PROGRAM TO PRINT<br>BANNERS" |                |
| 0020 REM "A-O"   | 0020 BEGIN                                   |                |
| 0040 LET S8=NUM(S\$(D3*10-4,5))                            | 0040 OPEN (1)"ZZZZZ"                         |                |
| ** MISSING **  | 0050 OPEN (2)"YYYYY"                         |                |
| 0060 IF M\$(1,1)="1" THEN LET N9\$<br>=N9\$+" (READ ONLY)" | 0060 OPEN (7,ERR=0080)"LP"                   |                |
| 0100 DISABLE D   | ** MISSING **                                |                |
| 0200 PRINT @(70,0),"DISC: ",D                              | ** MISSING **                                |                |
| .  |  |                |
| .  |  |                |
| 9840 END   | ** MISSING **                                |                |
| ** END OF COMPARE **                                       |  |                |

Figure 6-14. COMPARE PROGRAMS Display

When the comparisons have been completed the system returns to the PROGRAM UTILITY menu.

## RENUMBER PROGRAM

### RENUMBER PROGRAM UTILITY

This subsection describes the RENUMBER PROGRAM utility, including the purpose of the utility, how to run it, and its effects.

### PURPOSE OF THE UTILITY

This utility provides a means of renumbering BUSINESS BASIC programs in specified increments. Free space on disc is required to run this utility since the system must create two work files. The amount of space required is contingent upon the structure and content of the files being renumbered.

### NOTE

This utility may require a START of greater than 32 pages depending upon the structure and content of the files.

### HOW TO USE THE UTILITY

When option 5 is selected from the PROGRAM UTILITIES menu, the option screen shown in Figure 6-15 is displayed:

| MM/DD/YY                                | BASIC FOUR<br>PROGRAM RENUMBER | HH:MM   |
|---|--------------------------------|---|
|   | 1. INCREMENT<br>=====          | 2. OUTPUT DEVICE<br>=====                           |
|   | * 10<br>SPECIFIED              | * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                |   |

Figure 6-15. PROGRAM RENUMBER Utility Option Screen

As described in SECTION 2, the first item of each option group is highlighted and has an asterisk to its left, indicating that it is the default value for that parameter. (See SECTION 2 - STANDARD UTILITY PROCEDURES for information on selecting options.)

The parameters of the PROGRAM RENUMBER utility and their options are as follows:

1. INCREMENT - Available options are to renumber program statements in increments of 10 or some other number. If the operator selects the SPECIFIED option, the utility prompts for the increment:

ENTER STATEMENT INCREMENT (CR=10)

Any integer value from 1 to 100 may be entered as the increment value, with 10 the default value. The statement increment is also the number assigned to the first statement.

2. OUTPUT DEVICE - This option allows the operator to obtain a printout of the renumbered program, from either the line printer or a selected printer. If SELECTED PRINTER is requested, a printer name is required.

Once the parameters have been entered, the screen displays:

ENTER DISC (CR=ANY):

After you have entered the name or number of a configured disc or have pressed RETURN to have the value ANYWHERE entered, the utility then allows you to construct a list of names of files to be renumbered. File names can be specified individually, by mask (using CTRL + Z) or by filelist. The prompt appears:

ADD PROGRAM NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified disc. If they do, the program displays them.

If you enter a mask, the message is displayed:

## RENUMBER PROGRAM

### SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

### ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

### EFFECTS OF THE UTILITY

The utility begins by defining two scratch files; one in which to renumber code, and one to maintain a cross reference of old and new statement numbers. During the first pass through a program, the utility keeps track of each original statement number and its corresponding new statement number in the work file. On a second pass, it then changes all statement numbers in code references such as GOSUB's, GOTO's and ERR='s.

The utility makes no attempt to resolve an EXECUTE statement, but prints a warning of a possible problem for each occurrence to the specified output device.

Any time the utility encounters a statement of the format:

```
xxxx REM stno {remark}
```

the system sets the statement number to the stno following 'REM', provided that the number is greater than the previously renumbered statement. If it is less than the previous statement, the utility increments the statement number and continues.

The program data is then transferred from the work file to the program file. The status message is displayed on the screen:

```
NOW RENUMBERING "program" nnnn<<nnnn
```

where the two sets of numbers represent the original statement number and the new statement number. When

a printer is specified as the output device, the utility produces a printout of the newly-renumbered program.

## MERGE PROGRAM FILES

### MERGE PROGRAM FILES UTILITY

This subsection describes the MERGE PROGRAM FILES utility, including its purpose, how to run the utility, and its effects.

#### PURPOSE OF THE UTILITY

This utility allows an operator to merge a program file into one or more other program files. This is especially useful if the operator has a standard routine (such as an error routine) which can be used for many programs. Some free space on disc is required for the system to create a work file.

#### NOTE

This utility may require a START of greater than 32 pages depending upon the structure and content of the files.

#### HOW TO USE THE UTILITY

When option 6 is selected from the PROGRAM UTILITIES menu, the option screen is first displayed as shown in Figure 6-16:

| MM/DD/YY                                | BASIC FOUR<br>MERGE PROGRAM UTILITY | HH:MM |
|---|-------------------------------------|-------|
| -----                                   |                                     |       |
| 1. OUTPUT DEVICE<br>=====               |                                     |       |
| * TERMINAL                              |                                     |       |
| LINE PRINTER (LP)                       |                                     |       |
| SELECTED PRINTER                        |                                     |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                     |       |

Figure 6-16. MERGE PROGRAM FILES Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for the results of the utility, which has the standard choices. When this parameter is specified and you have pressed RETURN, the program then displays the prompt for the disc on which the file to be merged resides:

ENTER DISC (CR=ANY)

Enter a valid disc name or number or press RETURN to have the program search all discs for the files. The utility then prompts for the name of the file to be merged:

ENTER MERGE FROM FILE NAME:

Next the utility requests the list of files into which this file is to be merged:

ADD MERGE TO NAME, CR TO END (CTRL+Z=MASK):

1. \_\_\_\_\_

If you enter the name of a filelist, the program asks for verification that it is a filelist:

IS THIS A FILELIST (CR/N):

It then checks to see whether the files reside on the specified discs. If they do, the program displays them.

If you enter a mask, the message is displayed:

SEARCHING DISC XXXXXX (N)

When the program locates files selected by the mask or contained in the filelist, the file names are displayed on the screen. The utility verifies that each file resides on the specified source disc. When you have finished entering file names, press RETURN in response to the prompt to add names. The program then allows you to edit the list:

ADD/DELETE/CR TO CONTINUE (A/D/CR):

You may enter 'A' or 'D' to alter the list of files or press RETURN to begin program execution.

#### EFFECTS OF THE UTILITY

The utility first compares DEF tables and skips any merge which would result in duplicate DEF names. A warning is displayed with an option to skip or continue whenever a DEF changes type (numeric versus string). See the Reference Manual for Business BASIC Levels 3 and 4, BFISD 5085.

## MERGE PROGRAM FILES

Then the utility proceeds by GETting consecutive portions of each program and building a third file with the statements merged together in order. If two statements share the same statement number, the statement from the MERGE FROM file is used.

All work is written back into a work file large enough to hold both MERGE FROM and MERGE TO files. When the merge is complete, the newly-created file is written to the MERGE TO file, which is filled with only the number of sectors required (leaving a minimum of 256 extra bytes). The MERGE FROM file is not altered in any way. When all sets of programs have been merged, the system returns to the PROGRAM UTILITIES menu.

OVERVIEW

This section of the manual describes the SYSTEM UTILITIES. The SYSTEM UTILITIES group contains utilities associated with system status, configuration, memory usage, printer and utility defaults, BOSS updates, ghost communications and spooling.

ACCESSING THE SYSTEM UTILITIES

To access the SYSTEM UTILITIES, either type '5' from the UTILITIES main menu or, from console mode, enter the command 'RUN "\*SYS"'. The program returns the screen display shown in Figure 7-1 below:

| MM/DD/YY                | BASIC FOUR<br>SYSTEM UTILITY SELECTOR MENU   | HH:MM |
|-------------------------|--|-------|
| -----                   |  |       |
| SYSTEM UTILITY OPTIONS: | 1. SET DATE & TIME<br>2. DISPLAY CONFIGURATION<br>3. DISPLAY MEMORY/DEVICE USAGE<br>4. SET PRINTER VFU<br>5. BOSS UPDATE<br>6. GHOST COMMUNICATIONS<br>7. SELECT PARAMETER DEFAULTS<br>8. SPOOLING CONTROL |       |
| SELECT UTILITY OPTION:  |  |       |

Figure 7-1. SYSTEM UTILITIES Option Screen

To run a utility, enter the number corresponding to the option desired. To return to the UTILITIES main menu, press CTL-IV.

The following subsections describe the SYSTEM UTILITIES options listed above.

## SET DATE AND TIME

### SET DATE AND TIME UTILITY

This subsection describes the SET DATE AND TIME utility, including its purpose and how to use the utility.

### PURPOSE OF THE UTILITY

This utility allows an operator to set the system time and date.

### HOW TO USE THE UTILITY

When option 1 is selected from the SYSTEM UTILITIES menu, the utility displays the current date and prompts the user to enter a new date:

```
CURRENT SYSTEM DATE: 01/18/80  
ENTER NEW DATE (CR=UNCHANGED): MMDDYY
```

The cursor goes to the MMDDYY field and waits for a valid date entry. If the date is correct, press RETURN. Pressing CTL-II causes the SYSTEM UTILITIES menu to be displayed. Pressing CTL-IV returns the UTILITIES main menu. When the user enters a date or presses RETURN, the program next displays the current system time and prompts for a new time:

```
CURRENT SYSTEM TIME IS: 12:00 AM  
ENTER NEW TIME (CR=UNCHANGED): HHMM  
AM OR PM: -M
```

The cursor goes to the HHMM field and waits for a valid time entry. If the operator presses RETURN, the time remains unchanged and the screen returns to the SYSTEM UTILITIES menu. Pressing CTL-II causes the program to return to the date field. Pressing CTL-IV causes the program to exit from the utility. If the operator enters a new time the cursor goes to the AM OR PM field. When the operator enters an 'A' or a 'P', the program returns to the SYSTEM UTILITIES menu. (The operator may also enter the time as HHMM\* where the \* = A or P.)

DISPLAY  
CONFIGURATION  
UTILITY

This subsection of the manual describes the DISPLAY CONFIGURATION utility, including its purpose and how to use the utility.

PURPOSE OF  
THE UTILITY

This utility provides a means of displaying the system configuration to a specified output device. The display shows detailed information concerning the system, including system identification, memory capacity, number and types of terminals and printers and communications capacity.

HOW TO USE  
THE UTILITY

When option 2 is selected from the SYSTEM UTILITIES menu, the program displays the option screen shown in Figure 7-2:

| MM/DD/YY  | BASIC FOUR<br>DISPLAY SYSTEM CONFIGURATION | HH:MM |
|---|--|-------|
| -----   |  |       |
| 1. OUTPUT DEVICE<br>=====                           |  |       |
| * TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |  |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:             |  |       |

Figure 7-2. DISPLAY CONFIGURATION Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for printing or displaying the system configuration. The parameter has the standard choices.

EFFECTS OF  
THE UTILITY

When the OUTPUT DEVICE parameter is specified and you have pressed RETURN, the program immediately begins the display or printout shown in Figure 7-3 below. When the display or printout is finished, the program returns to the SYSTEM UTILITIES menu.

DISPLAY CONFIGURATION

```

                                     BASIC FOUR
MM/DD/YY      DISPLAY CONFIGURATION UTILITY FROM DISC: XXXXX(N)      HH:MM
-----
      MANUFACTURING MASTER CONFIGURATOR LEVEL 4.2A :      MODEL:
1. DATE:      SERIAL #:      7. MTU [800 BPI] #:
  APPLICATION ACCESS CODE:      BLOCK SIZE:
  NAME:      TRACKS MO:      M1:
  CONFIGURE ON TAPE/TRACKS/TYPE:      8. MTR [800/1600 BPI] #:
  SCT=GO: GAMES: EZ 2:      9. MTC #: TRACKS:
  MDF: EUROPEAN FORMAT MASK:
2. TOTAL SYSTEM MEMORY:
3. IMLC COMM:
4. DISC NO./TYPE:
  CAPACITY:
  SECTOR CACHE:
5. TERMINALS NO./TYPE:
  GHOST TASKS: INPUT BUFFER SIZE:
  KATAKANA:
6. PRINTERS NO:
  TYPES LP: P01: P02: P03: PAGES FOR OPERATING SYSTEM
          P04: P05: P06: P07: PAGES FOR OPTIONAL FEATURES
          P08: P09: P10: P11: PAGES FOR DIRECTORY CACHE
          P12: P13: P14: P15: PAGES FOR SECTOR CACHE
                                     USER PAGES AVAILABLE
                                     TOTAL SYSTEM MEMORY PAGES

      MANUFACTURING MASTER CONFIGURATOR LEVEL 4.2A :      MODEL:
      CONFIGURATOR INFORMATION FOR IMLC
CHANNEL A DEVICE TYPE (CR=NONE,1=27XX/37XX,2=3270,3=IMLC 'WP'):
NUMBER IMLC WORD PROCESSING TERMINALS (1-8):

CHANNEL B DEVICE TYPE (CR=NONE,1=27XX/37XX,2=3270,3=IMLC 'WP'):
```

Figure 7-3. SYSTEM CONFIGURATION Display

DISPLAY MEMORY/  
DEVICE USAGE  
UTILITY

This subsection describes the DISPLAY MEMORY/DEVICE USAGE utility, including its purpose, how to run the utility and its effects.

PURPOSE OF  
THE UTILITY

This utility can be used to display the memory allocation of a system by bank. The display shows free pages by bank, all ADDED programs by bank and size, and all active tasks with size. The utility also displays the current status of all configured tasks and devices. The display is always sent to the terminal but provides an option to print the information at the LP using CTL-III.

HOW TO USE  
THE UTILITY

When option 3 is selected from the SYSTEM UTILITIES menu, the program immediately begins to display the information as shown in Figures 7-4 and 7-5 to the terminal.

EFFECTS OF  
THE UTILITY

The utility consults the system variables BSZ, TSK, and PUB for each configured memory bank. The result is a display of all space used and available for all configured tasks. It also consults the TSK(0) for device status and all PUBs to see if the spooler program is resident. For each bank, the utility shows the amount of free memory, the disc (and fileset) of the program listed, all ADDED program names and size, sorted in ascending location order, and all STARTED devices and the START size. The utility allows for a maximum of sixteen banks (0-15), but displays memory only when a bank shows configured memory.

DISPLAY MEMORY/DEVICE USAGE

| MM/DD/YY  | BASIC FOUR<br>MEMORY/DEVICE USAGE |                 |               | HH:MM |
|---|-----------------------------------|-----------------|---------------|-------|
|   | BANK-1                            | BANK-2          | BANK-3        |       |
|   | 45.0 FREE                         | 128.0 FREE      | 0.0 FREE      |       |
|   | DISC                              | DISC            | DISC          |       |
|   | 31.5 1/0 TLOG                     | 6.8 1/0 OSSPOL  | 128.0 8000 T9 |       |
| BANK-4  | BANK-5                            | BANK-6          | BANK-7:       |       |
| 128.0 FREE  | 128.0 FREE                        | 128.0 FREE      | 4.0 FREE      |       |
| DISC  | DISC                              | DISC            | DISC          |       |
| 5.1 1/0 MSMENU                                      |                                   | 18.3 1/0 WPS.FM | 31.0 E100 G1  |       |
|   |                                   |                 | 31.0 C200 G2  |       |
|   |                                   |                 | 31.0 A300 G3  |       |
|   |                                   |                 | 31.0 8400 G4  |       |
| CR TO PROCEED, CTL-II TO RESTART, CTL-III TO PRINT: |                                   |                 |               |       |

Figure 7-4. MEMORY/DEVICE USAGE Display of Bank Allocation

In the example above, Bank 1 has 45 pages of free space, and 31.5 pages of memory are allocated to the program "TLOG" which is resident on disc 1, fileset 0.

Pressing RETURN causes the program to display the next screen. Pressing CTL-II causes the same screen of information to be updated. If you press CTL-III the program prints the current screen of information at the line printer. Pressing CTL-IV causes the program to exit to the SYSTEM UTILITIES menu.

The status of terminals, ghost tasks, devices and discs is also displayed as shown in Figure 7-5 below.

```
MM/DD/YY                BASIC FOUR                HH:MM
                        MEMORY/DEVICE USAGE
-----
TERMINALS
T0  ACTIVE    32 PAGES
T1  ACTIVE    32 PAGES
T2  ACTIVE    32 PAGES
T4  ACTIVE    60 PAGES

IMLC/DATAWORD II
I0  IN USE
I1  IN USE
I2  IN USE
I3  IN USE

GHOSTS
G0  ACTIVE    35 PAGES
G1  ACTIVE    25 PAGES
G2  ACTIVE    31 PAGES
G3  ACTIVE    25 PAGES

PRINTERS
LP  SPOOLED
P1  SPOOLED

SPOOLER
ACTIVE

DISC 0
READY
ENABLED
READ/WRITE

DISC 1
READY
ENABLED
READ/WRITE

CR TO PROCEED, CTL-II TO RESTART, CTL-III TO PRINT:
```

Figure 7-5. MEMORY/DEVICE USAGE Display Status of Tasks, Devices and Discs

## SET PRINTER VFU

### SET PRINTER VFU UTILITY

This subsection describes the SET PRINTER VFU utility including its purpose, how to run the utility and its effects.

#### PURPOSE OF THE UTILITY

This utility provides a means of setting the electronic vertical forms unit (VFU) of a selected printer, which determines the size of paper to use in the printer. The utility updates the printer parameter file with the new values.

#### HOW TO USE THE UTILITY

When option 4 is selected from the SYSTEM UTILITIES menu, the program prompts for the name of the printer whose parameters are to be changed:

ENTER PRINTER ID (LP,P1):

Once the printer ID has been specified, the utility reads the parameter file for the last specified paper size and uses those values as defaults. If no entry is in the parameter file, the system defaults of 14.8" wide by 11" long are displayed. The screen then displays these values:

| MM/DD/YY                                    | BASIC FOUR<br>SET VFU UTILITY | HH:MM |
|---|-------------------------------|-------|
| PRINTER:                                    |                               |       |
| 1. PAPER WIDTH: 14.8 INCHES                 |                               |       |
| 2. PAPER LENGTH: 11 INCHES                  |                               |       |
| 3. LINES/INCH: 6 LPI                        |                               |       |
| ENTER LINE NUMBER TO CHANGE, CR TO PROCEED: |                               |       |

Figure 7-6. SET VFU Utility Printer Parameters

The operator can now specify new dimensions for paper by entering '1' for the WIDTH, '2' for the LENGTH, or '3' for the LINES/INCH. The acceptable sizes are:

PAPER WIDTH = 8.5, 11, or 14.8 inches

PAPER LENGTH (MIN=6) = a minimum of 6 inches in  
one inch increments

LINES/INCH = 6 or 8

EFFECTS OF  
THE UTILITY

When the dimensions are specified and the operator has pressed RETURN, the utility attempts to OPEN the selected printer and specify the VFU. If the printer is busy or not ready, or if an error occurs, the utility displays a message to the terminal and provides options to RETRY or ABORT.

Should the electronic VFU setting not be available on the specified printer, the screen displays a message, and the parameter file is updated.

Upon successful completion, the utility displays:

PARAMETER FILE HAS BEEN UPDATED, CR TO PROCEED:

Pressing RETURN causes the SYSTEMS Utility menu to be displayed.

If spooling is on, the form must be re-aligned. Even if the form does not need re-alignment, the printer must be taken off-line continuously for at least 15 seconds. When the printer is brought back on-line, printing continues.

## BOSS UPDATE

### BOSS UPDATE UTILITY

This subsection describes the BOSS UPDATE utility, including the purpose of the utility, how to run it and its effects.

### PURPOSE OF THE UTILITY

The utility is used to update an old BOSS pack with a new BOSS. The utility copies all user files except the old BOSS to the new BOSS pack. In this way the old BOSS pack can serve as a backup pack. This option is available only on multiple drive systems.

### HOW TO USE THE UTILITY

For multiple-drive systems, when option 5 is selected from the SYSTEM UTILITIES menu, the program displays the following option screen:

| MM/DD/YY                                | BASIC FOUR<br>BOSS UPDATE UTILITY | HH:MM |
|---|-----------------------------------|-------|
| -----                                   |                                   |       |
| 1. OUTPUT DEVICE                        |                                   |       |
| =====                                   |                                   |       |
| * TERMINAL                              |                                   |       |
| LINE PRINTER (LP)                       |                                   |       |
| SELECTED PRINTER                        |                                   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                   |       |

Figure 7-7. BOSS UPDATE Utility Option Screen

The only parameter that can be specified is the OUTPUT DEVICE for printing or displaying the BOSS UPDATE audit trail. The parameter has the standard choices.

The utility requires that the new BOSS be mounted on Drive 0 and the old BOSS be mounted on Drive 1. The utility must DISABLE both disc drives to perform the update. If it cannot DISABLE a disc drive, the message appears:

UNABLE TO RESERVE DISC 1 FOR UPDATE  
CR TO RETRY, CTL-IV TO EXIT:

When the drive is successfully DISABLED, the screen then displays:

```
MM/DD/YY                BASIC FOUR                HH:MM
                        BOSS UPDATE UTILITY
-----
SOURCE DISC (OLD BOSS) IS:  'XXXXXX'(1)
RECEIVING DISC (NEW BOSS) IS:  'ZZZZZ'(0)
THIS UTILITY WILL COPY ONLY THOSE FILES FROM XXXXXX (1) WHICH ARE NOT
ALREADY PRESENT
WARNING:  THE ESCAPE KEY WILL BE DISABLED DURING THE TRANSFER
CR TO PROCEED, CTL-IV TO EXIT:
```

Figure 7-8. BOSS UPDATE Display

To begin the transfer of files, press RETURN. To exit the program, press CTL-IV.

EFFECTS OF  
THE UTILITY

A first pass is made to transfer all files on the old BOSS which do not exist on the new BOSS pack (that is, all files other than operating system files). The utility attempts to transfer these files to the same sector. Any files that cannot be located at the same sectors on the first pass have an alternate location, which can be found on a second pass. Only files unique to the old BOSS are copied.

At the end of the procedure, the screen displays:

```
FILE TRANSFER COMPLETE.
PLEASE MOUNT NEW BOSS ON DRIVE 0 AND RELOAD.
```

Basic Four<sup>R</sup> recommends that you go through the LOAD procedure to be sure that all utilities are present and operating. The output produced consists of a log of transfer activity showing all files transferred, files transferred to a new location, and files not transferred.

## GHOST COMMUNICATION

### GHOST COMMUNICATION UTILITY

This subsection describes the GHOST COMMUNICATION utility, including its purpose, how to use the utility and its effects.

#### PURPOSE OF THE UTILITY

This utility allows an operator to attach a terminal to an active GHOST task, in order to run a program or enter data.

#### HOW TO USE THE UTILITY

When option 6 is selected from the SYSTEM UTILITIES menu, the program clears the screen below the header and displays the status of each ghost task with a prompt for the user to enter the ID of the task with which to communicate:

```
MM/DD/YY                BASIC FOUR                HH:MM
                        GHOST COMMUNICATIONS
-----
ENTER GHOST ID (G0-Gn, CR TO EXIT):
G0 STARTED
G1 STARTED
G2 NOT STARTED
.
.
Gn STARTED
```

Figure 7-9. GHOST COMMUNICATIONS Display

Enter the ID of the ghost task you wish to communicate with (G0-Gn where "n" is the highest ghost task configured). The utility verifies that the ID entered represents an active task.

When communication has been established, it takes place using READ RECORDs and WRITE RECORDs. The utility alternately attempts to accept input both from the ghost task and from the terminal. When it receives input from the terminal (user input) it attempts to write to the ghost task. When it receives input from the ghost, it displays the data on the screen.

Communication between the ghost and the terminal is broken by pressing ESCAPE. This closes the device opened to the ghost and returns the program to the ENTER GHOST TASK ID prompt.

## SET PARAMETER DEFAULTS

### SET PARAMETER DEFAULTS UTILITY

This subsection describes the SET PARAMETER DEFAULTS utility, including its purpose, how to use it and its effects.

### PURPOSE OF THE UTILITY

This utility can be used to set or change the default parameters for each of the utilities; the general system parameter defaults such as spooling, updating the gap file and descriptive errors; and the VFU parameters for printers.

### HOW TO USE THE UTILITY

When option 7 is selected from the SYSTEM UTILITIES menu, the program displays a menu showing the options available with the SET PARAMETER DEFAULTS utility:

| MM/DD/YY                 | BASIC FOUR<br>SET SYSTEM DEFAULTS UTILITY  | HH:MM |
|--------------------------|--|-------|
| -----                    |  |       |
| DEFAULT UTILITY OPTIONS: | 1. UTILITY DEFAULTS<br>2. SYSTEM PARAMETERS<br>3. PRINTER DEFAULTS<br>4. TASK START-UP |       |
| SELECT UTILITY OPTION:   |  |       |

Figure 7-10. SET SYSTEM DEFAULTS Utility Menu

To run a utility, enter the number corresponding to the option desired. To return to the SYSTEM UTILITIES menu, press CTL-IV. Each of the options is described below.

### Utility Defaults

This utility allows the user to change the default values for any of the Level 4 utilities. When the operator enters '1' in response to the menu above, the program displays the UTILITIES main menu and allows the operator to select the utility group which contains the utility whose parameters are to be changed.

The program presents the utility option screen just as it does for running the utility, with the current default values highlighted and with an asterisk to the left, as shown in Figure 7-11.

| MM/DD/YY                                | BASIC FOUR<br>DISPLAY DIRECTORY UTILITY |               |                   | HH:MM |
|---|---|---------------|-------------------|-------|
| -----                                   |   |               |                   |       |
| 1. FILE TYPE                            | 2. FILE RANGE                           | 3. SORT ORDER | 4. OUTPUT DEVICE  |       |
| =====                                   | =====                                   | =====         | =====             |       |
| * ALL TYPES                             | * ALL FILES                             | * BY LOCATION | * TERMINAL        |       |
| DATA FILES                              | SELECTED FILES                          | BY NAME       | LINE PRINTER (LP) |       |
| PROGRAM FILES                           |   |               | SELECTED PRINTER  |       |
| FREE SECTORS                            |   |               |                   |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |   |               |                   |       |

Figure 7-11. SET PARAMETER DEFAULTS Option Screen

To change the default values of a parameter, press the number of the parameter until the desired value is highlighted and has the asterisk to its left. When the values are established, press RETURN. The system then presents the prompt:

SAVE NEW DEFAULT PARAMETERS? (Y/N):

If you press RETURN, the new defaults are written to the parameter file, and these are the defaults which appear when the utility is run (until they are changed again). If 'N' is entered, the changes are ignored. With either response, the system returns to the SET SYSTEM DEFAULTS utility menu.

At any given sample menu, pressing RETURN causes the previous menu to be displayed.

System Parameters

This option allows the operator to set defaults connected with system start-up. The parameters included are AUTO SPOOLING, AUTO GAP FILE and DESCRIPTIVE ERRORS. When '2' is entered from the SET SYSTEM DEFAULTS Utility menu, the program displays the following option screen:

## SET PARAMETER DEFAULTS

| MM/DD/YY                                | BASIC FOUR<br>SET PARAMETER DEFAULTS |                                | HH:MM |
|---|--------------------------------------|--------------------------------|-------|
| -----                                   |                                      |                                |       |
| 1. AUTO SPOOLING<br>=====               | 2. AUTO GAP FILE<br>=====            | 3. DESCRIPTIVE ERRORS<br>===== |       |
| * QUERY                                 | * QUERY                              | * ON                           |       |
| ON                                      | ON                                   | OFF                            |       |
| OFF                                     | OFF                                  |                                |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED: |                                      |                                |       |

Figure 7-12. SYSTEM PARAMETERS Option Screen

To change the default values of a parameter, press the number of the parameter until the desired value is highlighted and has the asterisk to its left. When the values are established, press RETURN. The system then presents the prompt:

OK TO SAVE DEFAULTS? (CR/N):

If you press RETURN, the new defaults are written to the parameter file, and these are the defaults in effect until they are changed again. If you enter 'N', the changes are ignored. With either response, the system returns to the SET SYSTEM DEFAULTS utility menu.

The options for each system parameter are as follows:

### Auto-Spooling

QUERY = at system LOAD time the program allows the operator to specify spooling by requesting:

SPOOLING? (Y/CR)

ON = automatically starts spooling at system LOAD time.

OFF = will not start spooling at system load time.

Auto Gap File

QUERY = at system LOAD time the utility allows the operator to specify updating by requesting:

INITIALIZE GAP FILES? (Y/CR)

ON = automatically starts a ghost task to update the GAP FILE for each configured and ready disc at system LOAD time. If no ghosts are available, TO is used.

OFF = does not update the GAP FILE at system LOAD time.

Descriptive Error Messages

ON = causes the system to display detailed error messages when an error condition causes processing to return to console mode.

OFF = causes error conditions to be reported only with the standard message !ERROR=X when processing returns to console mode because of an error condition.

Once the selected SYSTEM PARAMETER DEFAULTS have been set, the screen displays:

OK TO SAVE DEFAULTS? (CR/N):

Pressing RETURN causes the new parameters to be written to the parameter file. An 'N' response causes the program to ignore changes. Either response returns the system to the SET SYSTEM DEFAULTS utility menu.

Printer Defaults

Those utilities which produce printed reports consult a parameter file to determine the length and width of paper and the number of lines per inch to be printed. When an operator selects option 3 from the SET SYSTEM DEFAULTS utility menu, the utility passes control to the SET PRINTER VFU utility discussed earlier in this

## SET PARAMETER DEFAULTS

section, except that the utility makes no attempt to access the printer. See the description of the SET PRINTER VFU utility above for information on this option.

### Task Start-Up

This option provides a means of specifying tasks to be started automatically at load time. A START size and optional program name may be specified for each configured task.

When option 4 is selected from the SET SYSTEM DEFAULTS menu, the program displays the following:

| BASIC FOUR |       |                             |         |      |       |       |         |
|------------|-------|-----------------------------|---------|------|-------|-------|---------|
| MM/DD/YY   |       | SET SYSTEM DEFAULTS UTILITY |         |      |       | HH:MM |         |
| TASK       | PAGES | BANK                        | PROGRAM | TASK | PAGES | BANK  | PROGRAM |
| T0         | 32    |                             | MSSO    |      |       |       |         |
| T1         | 32    | 4                           | +EASY   |      |       |       |         |
| T2         | 32    |                             | MSSO    |      |       |       |         |
| T3         | 60    | 3                           | MSSO    |      |       |       |         |
| G1         | 40    |                             | WPS.LP  |      |       |       |         |

ENTER TASK ID, CR TO SAVE, CTL-IV TO EXIT:

Figure 7-13. TASK START-UP Display

If more than one screen is required for the display, the additional options of pressing CTL-II to view the previous screen and pressing CTL-III to view the next screen are provided. Enter the ID of the task whose parameters you wish to change. Upon entry of a valid task ID, the cursor moves to the appropriate line and displays the following prompt:

ENTER SIZE IN PAGES (CR=40, CTL-II=DELETE,  
CTL-III=32)

If the task already had a start-up entry, pressing RETURN causes the previous entry to remain. The utility does not accept a START SIZE which does not fit in the remaining memory bank. When an entry is made in the PAGES field, the cursor moves to the BANK field and the utility prompts:

ENTER BANK # (1-x, CR=n, CTL-III=ANYWHERE)

where "n" is the highest bank with configured memory. If the task previously had an entry for BANK, pressing RETURN enters the previous value. Pressing CTL-III specifies any available bank.

The cursor then moves to the PROGRAM field and the program prompts:

ENTER START PROGRAM ID (CR=SAME, CTL-III=NONE):

If the task previously had an entry for a program ID, pressing RETURN enters the previous program ID. Pressing CTL-III causes no entry to be made under PROGRAM.

When all entries have been made for tasks, press RETURN to save the entries. To exit from the utility without changing any entries, press CTL-IV.

## SPOOLING CONTROL

### SPOOLING CONTROL UTILITY

This subsection describes the SPOOLING CONTROL utility, including its purpose, how to use it and its effects.

#### PURPOSE OF THE UTILITY

This utility provides a means of maintaining the SPOOLER, the SPOOL QUEUE file, and the spooling task parameters. It can be accessed through the main menu, or directly from console mode.

#### HOW TO USE THE UTILITY

When an operator selects option 8 from the SYSTEM UTILITIES menu or, from console mode, enters the command 'RUN "%SPOOL"', the program presents the SPOOLING main menu:

| MM/DD/YY               | BASIC FOUR<br>SPOOLING MAIN MENU   | HH:MM |
|------------------------|--|-------|
| -----                  |  |       |
| SPOOL UTILITY OPTIONS: | <ol style="list-style-type: none"><li>1. MAINTAIN QUEUE FILE</li><li>2. MAINTAIN DEFAULTS</li><li>3. ADD OR DROP SPOOLER</li><li>4. SPOOLING INITIALIZATION</li><li>5. SET AUTOMATIC VFU</li></ol> |       |
| SELECT UTILITY OPTION: |  |       |

Figure 7-14. SPOOLING Utility Menu

To run a utility, enter the number corresponding to the option desired. To return to the SYSTEM UTILITIES menu, press CTL-IV. Each of the options is described below.

#### Maintain Queue File

This option allows an operator to maintain the file "%QUEUE", which contains all entries to be printed. Spooled entries can be added, dropped, viewed, held, or modified. Despooling entries can only be held or dropped.

When the operator selects option 1 from the SPOOLING utility menu, the program first displays the list of jobs in the SPOOLING queue:

| BASIC FOUR  |                         |     |     |     |     |       |       |     |        |          |       |
|---|-------------------------|-----|-----|-----|-----|-------|-------|-----|--------|----------|-------|
| MM/DD/YY  | SPOOL QUEUE MAINTENANCE |     |     |     |     |       |       |     |        |          | HH:MM |
|   | JOB                     | PRI | CLS | CPY | PTR | ERASE | RECDS | TYP | STATUS | COMMENTS | INDEX |
| 1   | LPT000                  | 9   | A   | 1   | LP  | Y     | 729   | SER | PRINT  | TO       |       |
| 2   | P1T001                  | 0   | A   | 0   | P1  | Y     | 19327 | SER | HOLD   | TO       | 50    |
| ENTER: A=ADD, D=DROP, H=HOLD, M=MODIFY, P=HOLD PRI: HOLD PRI: 0 |                         |     |     |     |     |       |       |     |        |          |       |
| CR=EXIT, CTL-II=REFRESH, CTL-IV=EXIT                            |                         |     |     |     |     |       |       |     |        |          |       |

Figure 7-15. SPOOL QUEUE MAINTENANCE Menu

Up to 17 jobs may be displayed at one time. If more entries exist in the queue, the screen prompts:

CR=NEXT DISPLAY, CTL-II=REFRESH, CTL-IV=EXIT

Screen Headings

The headings on the screen and their meanings are as follows:

JOB. The name of the file submitted to the spooler. When the system assigns the name, it consists of 6 bytes: the first two for the printer ID, the next two for the terminal the job was submitted from and the last two as a counter. When the job is submitted manually, the name of any SERIAL or PROGRAM file is acceptable.

PRI = Priority. This field designates the priority of a task. The priority value must be between zero (0) and nine (9). The standard default value is 5.

CLS = Class. The class heading indicates the type of form to be used. Form class values range from A to Z, with A the default for all tasks. If a task or device requires a special form or multiple forms, the class must be changed. Note that no file contains a record of the different form classes. Such a record must be kept manually.

## SPOOLING CONTROL

CPY = Copy. This heading indicates the number of copies to be printed. The range for values is from 1 to 100, with the copy value for each task normally set at one (1). If multiple copies are required for a particular class, the copy value must be changed accordingly. This option can help eliminate the necessity of adding code to a program when more than one copy is required.

PTR = Printer. The ID of the printer to which the file is spooled.

ERASE. The ERASE option allows the user to choose between erasing or not erasing a spool file when the job is printed. If the ERASE value is 'N', when the job is completed it is left in the queue with a priority of zero (HOLD) and a copy count of one (1).

RECDS = Records. The number of records in the file being submitted.

TYP = Type. The type of file being spooled, either SER for Serial or PGM for Program. This field is entered by the system.

STATUS. The current status of the file in the queue. This field is entered by the system.

COMMENTS. Either user-entered comments from the SPOOLING DEFAULTS file, or SPOOL II comments, such as a task ID or "VFU PENDING".

INDEX. The number of records at which printing begins. Each index number is equivalent to one record, i.e., one print statement. There are approximately 50 records to a page. This field is useful when a job is to be restarted or if the user does not want to print the entire file. (See information on the HOLD option below.)

Running the Utility

If the selected option is D (Drop), H (Hold) or M (Modify), the program prompts for the number of the job to be changed:

ENTER JOB ##:

The system accepts only numbers displayed on the terminal.

NOTE

Basic Four<sup>R</sup> strongly recommends that you place jobs to be DROPPED or MODIFIED on HOLD first. This may prevent you from dropping or modifying the wrong job. Jobs that are DROPPED or put on HOLD are terminated 50 lines of print at a time. The program prints a message at the bottom of the page of a suspended job, indicating whether it was dropped or held, and then despools the next print job.

The possible entries and their meanings are as follows:

- A = ADD. This option allows for the manual submission of new files to the QUEUE for despooling. When a new file is to be added, type 'A' and press RETURN. The program then adds the number of the new job and the cursor proceeds to the JOB field and waits for the operator to enter the name of the JOB. For jobs submitted manually, the JOB name should be the name of a SERIAL or PROGRAM file.
- D = DROP. The DROP option allows you to delete an entry from the queue. We recommend that before you DROP a job, you first place it on HOLD. To drop a job, enter 'D' and press RETURN. The system prompts for the job number. Enter the number of the job to be dropped. The cursor goes to the beginning of the job name. If the job is to be dropped, type a space and then press RETURN.
- H = HOLD. This option prevents spool files from being despoiled or terminates the despooling process on jobs that are printing. If a job needs to be restarted or suspended for a period of time, this is the option to use. If a job is on HOLD, the index value of the next print line

## SPOOLING CONTROL

is stored and displayed in the INDEX field of the queue display. Only a job in HOLD may be restarted, and the priority of the job, which was automatically set to zero (0) after the HOLD, must be increased to a value greater than the HOLD PRIORITY value. To restart a job from the beginning of the file, set the index field value to 0. To restart from a portion that was previously printed, subtract 50 for each page from the INDEX value. To continue the job from where it was terminated, leave the INDEX value the same.

M = MODIFY. This option allows the user to modify any fields for a job in the spool queue. The job must be placed on HOLD before it can be modified. To modify a job which is on HOLD, enter 'M'. When prompted for the number of the job, enter the number. The cursor then proceeds through each field except for the fields TYP, RCDS and STATUS (or PTR if only one printer is configured). You can enter the existing value by pressing RETURN or change the value.

P = HOLD PRIORITY. This option allows an operator to change the priority at which jobs are put on HOLD. Possible values range from 0 to 9. If the HOLD PRIORITY has a value of 9, no jobs are despoiled. This option is useful when several jobs are in the queue and the operator wants to print one job before the others. Change the value in HOLD PRIORITY to a value lower than that of the job to be printed next. That job should have a higher priority. When the job has been printed, change the HOLD PRIORITY value back to 0 (or the previous value), and the remaining jobs are printed in the order of their priority.

### Maintain Defaults

This option allows the user to maintain the list of tasks or devices in the default file for the SPOOLER. When the operator enters '2' from the SPOOLING main menu, the program presents the display shown below in Figure 7-16:

| MM/DD/YY | BASIC FOUR<br>SPOOLING DEFAULTS |     |     |     |       |       | HH:MM           |
|----------|---------------------------------|-----|-----|-----|-------|-------|-----------------|
|          | TSK/DEV                         | PRI | CLS | CPY | ERASE | LINES | COMMENTS        |
|          | T0                              | 5   | A   | 1   | Y     | 5000  | EASY II REPORTS |
|          | T1                              | 5   | A   | 1   | Y     | 10000 | TEST            |
|          | G5                              | 6   | A   | 1   | Y     | 5000  | DWII/DESPOOLER  |

ENTER: A=ADD, D=DROP, M=MODIFY:  
CR=EXIT, CTL-II=REFRESH, CTL-IV=EXIT

Figure 7-16. MAINTAIN SPOOLING DEFAULTS Screen Display

Up to 17 default entries may be displayed at one time. If more entries are to be displayed, the screen prompts:

CR=NEXT PAGE, CTL-II=REFRESH, CTL-IV=EXIT

Adding a task or device to the default file is accomplished by using the ADD option. If default values for that task or device are already present, use the MODIFY option to change them. To drop an existing entry, enter 'D' for the DROP option.

#### Screen Headings

The headings and their meanings are as follows:

PRI = Priority. This field is used to designate the priority of jobs originating from the task or device. Possible values range from zero to 9. The standard default value for priority is 5. In the example above, "G5" has a priority of six (6) which means that all WORD PROCESSING jobs have priority over the other tasks displayed.

CLS = Class. The class default indicates the type of form to be used. The form class "A" is the default for all tasks. If a task or device requires a special form or multiple forms, the class should be changed accordingly. Since the system does not keep a record of the different form classes, this must be done manually. The form class values range from A-Z.

## SPOOLING CONTROL

CPY = Copy. This field determines the number of copies to be printed for a job. The value for each task is normally set at one (1). If more than one copy is required for a particular class, change the copy value accordingly. Possible values range from 1 to 100. This option can help eliminate the necessity of adding code to a program when more than one copy is required.

ERASE. The ERASE option allows the user to choose between erasing or not erasing a spooled file when it has been printed. If the default value is 'N', when a job is completed it is left in the queue with a priority of zero (hold) and a copy count of one (1).

LINES. The value in this field represents the number of lines in the file where a line is equivalent to a record, at 128/bytes record. Each spool file has a default value of 3200 lines. The value may range from 100 to 100,000.

COMMENTS. The COMMENT entry does not display on any job. This field is used only for informational purposes and can contain up to 15 characters.

### Running the Utility

If the selected option is D (Drop) or M (Modify), the screen prompts for the name of the task or device:

ENTER TSK/DEV:

The program accepts only task IDs displayed on the terminal. The available options are:

A = ADD. This option allows the user to add default values for a new task or device to the spooler system. Enter 'A' to ADD an entry. The cursor then goes to the TSK/DEV field and waits for an entry. When a task or device ID has been entered, the program displays defaults for all fields in background mode. You can enter a default value by pressing RETURN or enter a different value.

D = DROP. This option allows an operator to drop default values for a task or device from the spooler system. Enter 'D' to DROP a task or

device. The program prompts for the task or device ID. When you have entered the task ID, the cursor goes to the first character under the TSK/DEV field for that device. To DROP the entry, type a space and then press RETURN. The program drops the entry from the roster.

M = MODIFY. This option allows the user to change any parameter field of any existing entry to a valid value. Enter 'M' to MODIFY an entry. After you have entered the ID of the task or device to be modified, the cursor proceeds to the PRI field and allows you to change the entry of each field. To maintain a value, press RETURN.

Add or Drop Spooler

This option allows a user to ADD or DROP spooling without reloading the system. Each configured printer in the system may be used by a despooler, provided enough despoolers are available. Currently, only one despooler (ghost task) may be assigned to each printer. The printer is then classified as spooled, and any attempt to access that particular printer causes the spooler to be activated.

When option 3 is selected from the SPOOLING main menu, the program presents one of two screens, depending on whether spooling is active. If spooling has not been activated, the program first prompts:

ENTER CR TO ADD SPOOLING, CTL-IV TO EXIT:

Press RETURN to activate SPOOLING. The screen then displays:

|  |                            |       |
|--|----------------------------|-------|
| MM/DD/YY   | BASIC FOUR<br>ADD SPOOLING | HH:MM |
| -----  |                            |       |
| ENTER CR TO ADD SPOOLING, CTL-IV TO EXIT:                            |                            |       |
| ADD SPOOLING: STATUS = ACTIVE  |                            |       |
| CR TO START INITIALIZATION, CTL-II TO DROP SPOOLING, CTL-IV TO EXIT: |                            |       |

Figure 7-17. ADD SPOOLING Screen Display

## SPOOLING CONTROL

Press RETURN to begin the initialization process. See the next SPOOLING utility, SPOOLING INITIALIZATION, for information on this process. Or you can press CTL-II to drop spooling or CTL-IV to exit from the program.

If spooling has been activated, the program presents the prompt:

ENTER CR TO DROP SPOOLING, CTL-IV TO EXIT:

If you press RETURN to drop SPOOLING, the screen display appears as shown in Figure 7-18:

| MM/DD/YY  | BASIC FOUR<br>DROP SPOOLING | HH:MM |
|---|-----------------------------|-------|
| -----   |                             |       |
| ENTER CR TO DROP SPOOLING, CTL-IV TO EXIT:  |                             |       |
| DROP SPOOLING: STATUS = RELEASED  |                             |       |
| DESPOOLER WILL TERMINATE AT START OF NEXT LISTING<br>CR TO EXIT, CTL-II TO ADD SPOOLING |                             |       |

Figure 7-18. DROP SPOOLING Screen Display

Any errors encountered are displayed with the error number and message.

Upon completing the process, the program returns to the SPOOLING main menu.

### Spooling Initialization

This utility provides a means for testing the integrity of the spooling system as well as starting the requested despoolers. It also makes necessary repairs in the record structure of the \*QUEUE file.

When option 5 is selected from the SPOOLING main menu, or after spooling is added, the program begins the spooling initialization.

The QUEUE file integrity test is performed first. If the QUEUE file does not exist, the QUEUE is built. No operator intervention is required for the QUEUE file test.

Next a spool record test is performed to check all records for validity. Invalid records are classified 'BAD' and are rewritten to the QUEUE with a priority of zero in their correct format. Valid records are left untouched. At this point the screen requests an answer to the prompt:

ERASE UNUSED SPOOL FILES? (Y/CR):

A 'Y' response starts a directory scan to erase all spool files not found in the QUEUE but which reside on the same disc as the QUEUE. When this test is completed the message is displayed:

SPOOL FILE TEST COMPLETE.

The program then performs a component integrity test. A critical file test checks for the presence of OSSPOL (the spooler) and \*.P (the despooler). If either of these files is missing, the screen displays:

FILE 'OSSPOL' MISSING:

If the critical files are all present, the utility test is performed. If any of these are missing, then the screen displays:

UTILITY 'AAAAA' MISSING. LIMITED SPOOLING  
CAPABILITY.

Initialization still continues after this message is displayed, but some component of spooling is missing. When this test is finished, if all files are found, the program displays the message:

ALL CRITICAL FILES PRESENT  
ALL UTILITIES PRESENT  
COMPONENT TEST COMPLETE

The program then presents the prompt to start any of the despoolers:

## SPOOLING CONTROL

ARE ANY DESPOOLERS TO BE STARTED? (CR/N):

An 'N' response ends the initialization process. Pressing RETURN causes the system to display the available printers and available ghost tasks:

| MM/DD/YY   | BASIC FOUR<br>SPOOLING INITIALIZATION | HH:MM |
|--|---------------------------------------|-------|
| AVAILABLE PRINTERS: LP P1  |                                       |       |
| AVAILABLE GHOSTS: G6 G7  |                                       |       |
| (CR FOR NEXT GHOST, CTL-II TO START OVER, CTL-IV TO TERMINATE PROMPTS) |                                       |       |
| ENTER PRINTER TO BE DESPOOLED ON G6:                                   |                                       |       |
| ENTER PRINTER TO BE DESPOOLED ON G7:                                   |                                       |       |

Figure 7-19. Starting Despoolers

Enter the names of the printers to be started on the ghost tasks, or press RETURN when the prompt is given. The message is displayed:

```
DESPOOLERS STARTED ON:  G6 FOR LP
                        G7 FOR P1
CR TO PROCEED:
```

Each ghost task is STARTed with 25 pages. Pressing RETURN causes the program to return to the SPOOLING main menu.

### NOTE

Unless a printer is used as a despooler, only one task may use the printer. Any other attempt to access the printer will cause an ERROR=14 (DEVICE IN USE) to occur. If the printer is used as a despooler, however, any task can spool files to it.

### Set Automatic VFU

This utility allows for printer controls to be set and changed while spooling is in effect. For information on how to use the utility, see the subsection on SET PRINTER VFU in this section of the manual.

OVERVIEW

This section of the manual describes the INFO utility, including how to use it and its results. The INFO utility prints or displays descriptions of all Level 4 utilities. It can be accessed through the UTILITIES main menu, or from console mode.

ACCESSING THE INFO UTILITY

To access the INFO utility group, either type '7' from the UTILITIES main menu or, from console mode, enter the command 'RUN "\*INFO"'. The program then displays the screen shown below in Figure 8-1.

| MM/DD/YY   | BASIC FOUR<br>INFO UTILITY | HH:MM |
|--|----------------------------|-------|
| -----  |                            |       |
| 1. OUTPUT DEVICE<br>=====<br>* TERMINAL<br>LINE PRINTER (LP)<br>SELECTED PRINTER |                            |       |
| CHANGE OPTION BY NUMBER, CR TO PROCEED:  |                            |       |

Figure 8-1. INFO Utility Option Screen

HOW TO USE THE INFO UTILITY

The only parameter that can be specified is the OUTPUT DEVICE for printing or displaying the information on Level 4 utilities. The parameter has the standard choices. When you have made your choice and have pressed RETURN, the utility then proceeds through the various Level 4 utilities menus, allowing you to select the utility or utility group (or all utilities) on which to display information. The first display is a sample version of the UTILITIES main menu, as shown in Figure 8-2 below:

MM/DD/YY

BASIC FOUR  
UTILITY INFORMATION

HH:MM

SAMPLE MENU  
-----

- MAIN UTILITY OPTIONS:
1. DISC
  2. FILE (INDIVIDUAL)
  3. FILES (MULTIPLE)
  4. PROGRAMS
  5. SYSTEM
  6. TAPE
  7. INFO

SELECT GROUP (A=ALL, M=MENU):

Figure 8-2. INFO Utility Main Menu

The program allows you to enter a number to display a group menu, enter 'A' to have detailed information displayed or printed on ALL utilities, or enter 'M' to have less detailed information on the major utility groups. If 'A' is entered for ALL, the display or printout begins immediately. Selecting an individual utility group causes the menu for that group to be displayed, and the same choices are available.

The utility uses a DIRECT FILE which is KEYed by utility name. Each record is alphanumeric text providing general operational information about each utility.

OVERVIEW

This section describes the implementation and performance of the PUBLIC UTILITY TOOLS. These are programs which perform general functions frequently used by the Level 4 utilities. These utility tools are available to application programs as well as to the Level 4 utilities.

THE UTILITY TOOLS

The utility tools consist of twelve programs used to allocate space for files on disc. The package of programs is supported on systems of Level 4.2 and above.

REQUIREMENTS

This subsection describes requirements for supporting the utility tools.

Data Space

The utilities may require up to 3500 bytes of data space, and more if the GAP FILE must be rebuilt. This can be achieved with the overlaid CALL feature in most cases, since all the programs involved are less than 1300 bytes.

Initialization

No initialization is required. Whenever an allocation routine is called and the GAP FILE is not present or is not initialized, the utilities create it automatically if there is room on the disc. There is an initialization utility in the Level 4.2 DISC utility set, and the files may be initialized at system load time.

Termination

All programs EXIT normally unless an error occurs. If an ESCAPE is detected, the utilities EXIT 127 to generate the ESCAPE at the CALLING level. If a logical unit is required but not available, the tools EXIT 14.

The programs are described below in alphabetical order.

## \*ALOC

This program finds space on a specified disc for a file, and performs the actual FILE command to allocate space. \*ALOC may be CALLED by any Business BASIC program on a Level 4.2 system or above. The format for the command is:

```
CALL "*ALOC", F$
```

where 'F\$' is a 20-byte string as follows:

```
F$(1,3) = BIN (S,3) or nulls [S=starting sector  
to begin search]  
      (4,6) = N$ [N$=File name]  
      (10,1) = CHR(T) [T=File type]  
      (11,1) = CHR (K) [K=key size and pointers]  
      (12,3) = BIN (N,3) [N=Number of records]  
      (15,2) = BIN (R,2) [R=Record size]  
      (17,3) = Nulls  
      (20,1) = CHR (8*F+D) [F=Fileset number; D=Disc  
number]
```

First \*ALOC attempts to FILE the FID as is to use the exact location specified. If this is successful, \*ALOC then CALLS \*UFREE to update the list, then EXITS.

If \*ALOC is able to locate and OPEN the GAP FILE, disc space is allocated from the sector list. The list is then updated and the file is created. If an ERROR=15 occurs while attempting to allocate the file space using the GAP FILE, \*ALOC tries again. This second attempt is used in case the GAP FILE is not up to date.

If for some reason \*ALOC is unable to locate the GAP FILE, it builds a free sector list. From this list, it allocates space and creates the GAP FILE, then returns to process the original file allocation request. An ERROR=15 indicates that there is no room available on the disc. An ERROR=17 indicates an invalid file type. All other errors are reported just as they occur.

## \*CGAP

This program creates a GAP FILE for a specified disc. The program is CALLED in the following manner:

```
CALL "*CGAP", D (,E$)
```

where 'D' is the disc number

'E\$' is the list of gaps in 6-byte entries  
(optional)

If E\$ is not entered or is empty, the program CALLS \*GAPS to build the list of gaps. Otherwise it uses the string in E\$ without verification.

The program then OPENS and WRITERECORDS the list. Since the GAP FILE can hold only 339 gaps, if more are present in the list the program removes the smallest gaps until only 339 are listed. A 2-byte string plus 6 bytes of hexadecimal zeroes (\$00\$) are appended to the front of the list, and 6 bytes of \$FF\$ are appended to the end. If the file is not found on the specified disc, the program creates one using the list to find space on the disc.

The specified disc must be ENABLED and READY. The program \*GAPS must be available if the list must be built. There must be a device available to OPEN the GAP FILE. The utility requires sufficient data space to build the gap file, more than 1 sector.

\*DEFx

A set of utility programs, designed to be equivalent to the file creation verbs, perform the sector search via the file allocation method. These files are CALLED in the following manner:

| <u>PROGRAM</u> | <u>ARGUMENT LIST</u> | <u>CORRESPONDING VERB</u> |
|----------------|----------------------|---------------------------|
| *DEFD          | N\$,K,N,R,D,S        | DIRECT                    |
| *DEFI          | N\$,N,R,D,S          | INDEXED                   |
| *DEFP          | N\$,R,D,S            | PROGRAM                   |
| *DEFS          | N\$,K,N,D,S          | SORT                      |
| *DEFSE         | N\$,N,R,D,S          | SERIAL                    |

where 'N\$' is the file name (1-6 characters)  
'K' is the key size (less pointers) for keyed files  
'N' is the number of records  
'R' is the record/program size  
'D' is the disc (or disc + 8\*fileset) number  
'S' is the beginning sector for search

These programs work functionally like the associated verb. The difference is that the sector number may be calculated automatically by \*ALOC. See the Reference Manual for Business BASIC Levels 3 and 4, BFISD 5085, for more information.

Each program builds an appropriate 20-byte file ID and supplies the BIN(5,3) as the first three bytes. \*ALOC calculates the number of sectors required for the file and finds the first gap large enough after the sector specified. Thus if S = 0, the program puts the file at the first available location on the disc after the directory. If the utility is successful, the file is established on the disc and the GAP FILE is updated. In addition, S contains the actual starting sector used by the file.

There must be a device available to OPEN the GAP FILE on the specified disc. The disc must be READY and ENABLED and the programs \*ALOC and \*SPAC must be available.

## \*ERAS

This utility tool can be used to ERASE a disc file and update the GAP FILE accordingly. \*ERAS may be CALLED by any Business BASIC program on a Level 4.2 system or above. The format for the command is:

```
CALL "*ERAS", N$ (,D)
```

where 'N\$' is the name of the file to be erased  
'D' is the disc (or disc + 8\*fileset) number  
(optional)

If the optional argument D is specified and is a valid number, then the utility SELECTs D and verifies that the file is within the specified fileset before ERASEing the file. If the file is not within the specified fileset, the utility does not ERASE the file. Instead it returns an ERROR=12. If D is not specified, the utility performs the ERASE as SELECTed and ERASEs the first occurrence of the file.

\*ERAS obtains the FID of the file and performs the ERASE. If no errors are encountered, it then CALLS the tool \*FREE which updates the GAP FILE of the appropriate disc. Errors are reported in standard format.

## \*FREE

This utility tool updates the GAP FILE when a file has been ERASEd from the disc. \*FREE may be CALLED by any Business BASIC program on a Level 4.2 system or above. When a file is to be ERASEd, \*ERAS first obtains the FID and erases the file. When the file has been ERASEd, \*ERAS calls \*FREE:

```
CALL "*FREE", F$
```

where 'F\$' is the FID of the ERASEd file.

\*FREE obtains the current Free Sector List from the GAP FILE and attempts to insert the new GAP into the list. It resolves adjacent GAPS (cases in which the current GAP is next to the previous or next GAP), and writes the new list to the file.

There must be a file device available for use or an ERROR=12 occurs.

\*GAPS

This program searches the directory and builds a GAP LIST of available sectors on the disc. The program is called according to this format:

```
CALL "*GAPS", Z$, D
```

where 'Z\$' is the GAP LIST returned  
'D' is the number of the disc

The program GETs each directory sector and finds each key internally, rather than READING the directory. As each gap is found it is added to the list.

The utility requires a large amount of data space, sufficient to hold a sector of the directory plus a growing list of GAPS (3500 bytes or more).

\*SPAC

This program calculates the sector space required for a file on disc, given the specifications for the file in the file ID. The utility is CALLED as follows:

```
CALL "*SPAC", F$, S1, S2, S3, X
```

where 'F\$' is the 20-byte file ID  
'S1' is the SIT size in sectors  
'S2' is the key area size in sectors  
'S3' is the data area size in sectors  
'X' is the pointer size in bytes

When CALLED, the program takes the file attributes from the file ID and calculates the sector spaces required using the standard formulas listed in the Reference Manual for Business BASIC Levels 3 and 4. The total sector space required is the sum of S1, S2 and S3. For INDEXED and SERIAL files, S1, S2 and X are 0; for SORT files, S3 is 0.

## \*UFREE

This program updates the GAP FILE when disc space is allocated without using the other allocation tools. The program is CALLED according to the command:

```
CALL "*UFREE", F$
```

where 'F\$' is the file ID (starting sector, ending sector and disc ID only)

\*UFREE obtains the current list of free sectors from the GAP FILE and removes the gap specified in the string. It joins any GAPS which become contiguous and removes ALL gaps in the area to be removed without regard for the actual directory.

The program requires that the specified disc be ENABLED and READY and that there be a device available to OPEN the GAP FILE.



OVERVIEW

This section of the manual describes procedures for handling errors on Level 4 utilities. Error handling is the method by which the system reports unexpected error conditions and verifies operator inputs. When operator intervention might lead to successful resolution of an error condition, the system usually allows the options to REPLY or EXIT processing. For those errors determined to be unresolvable by the operator, the system goes into console mode. The majority of errors which can be retried are Input/Output errors. Errors which are resolvable by the system are not reported.

For more information on system errors, see the section on ERROR PROCESSING in the Reference Manual for Business BASIC Levels 3 and 4, BFISD 5085.

ERROR HANDLING PROCEDURES

Error conditions are classified into two types: those resolvable by the operator and those which are not. The Level 4 utilities use standardized procedures for each type of error. This subsection describes these standard procedures.

## NON-RESOLVABLE ERRORS

Non-resolvable errors are those which are not anticipated, and for which there is no automatic method of resolution. Examples are ERROR=41 (INVALID INTEGER RANGE) and ERROR=27 (RETURN WITHOUT GOSUB). On Level 4 utilities the system displays an error message giving the number of the error, a brief description of the error (if DESCRIPTIVE ERROR MESSAGES is activated), the program name and the statement at which the error condition occurred. The utility either allows the operator to exit the program by pressing RETURN or goes immediately into console mode. An example of such a message is the following:

ERROR=n HAS OCCURRED: PROGRAM=prgm1, STMT=stno

CR TO EXIT:

## RESOLVABLE ERRORS

Errors which might be resolvable are reported to the terminal. The system displays a description of the error and the operator is given the options to retry the procedure or to exit from the program. In some cases, for example, when multiple files are being processed, the operator may elect to retry, to exit the program, or to skip files causing error conditions. An example of such a resolvable error

can occur during the COMPARE FILES utility when a file to be compared cannot be found. The program displays the message:

FILE NAME 'filename' CANNOT BE OPENED (FILE NOT FOUND)

CR TO RETRY, CTL-II TO SKIP, CTL-III TO SKIP ALL PROBLEM FILES, CTL-IV TO EXIT

To resolve the error, the operator can press CTL-II to skip that particular file, or CTL-III to skip all such files, or CTL-IV to exit from the program.

The following are common resolvable errors which occur when an attempt is made to access a printer, a file, or a disc, or when an operator is in the process of inputting data.

### Print Errors

The following errors, considered resolvable, can occur when an attempt is made to process a PRINT statement:

| <u>Number</u> | <u>Display on the Terminal</u> |
|---------------|--------------------------------|
| ERROR=0       | PRINTER NOT READY              |
| ERROR=5       | PERIPHERAL DATA TRANSFER ERROR |
| ERROR=12      | PRINTER NOT CONFIGURED         |
| ERROR=14      | PRINTER IN USE                 |

Whenever possible, the system provides a prompt to select an alternate printer. Otherwise, the options to RETRY or EXIT are provided.

Transmission errors to printers can be retried in the same way as other error conditions listed. Transmission errors to the terminal can be retried by the utilities until the error condition no longer exists.

### File Access Errors

The following errors, considered resolvable, can occur when an attempt is made to access a file:

| <u>Number</u> | <u>Display on the Terminal</u> |
|---------------|--------------------------------|
| ERROR=0       | FILE IS LOCKED                 |
| ERROR=12      | FILE NOT FOUND                 |
| ERROR=14      | FILE IN USE                    |

Utility programs generally provide the options to RETRY or EXIT when file access errors are encountered.

### Disc Access Errors

The following errors, considered resolvable, can occur when an attempt is made to access a disc:

| <u>Number</u> | <u>Display on the Terminal</u> |
|---------------|--------------------------------|
| ERROR=0       | DISC IN USE                    |
| ERROR=3       | UNABLE TO READ SECTOR          |
| ERROR=4       | DISC NOT READY                 |
| ERROR=8       | VERIFICATION ERROR             |
| ERROR=12      | DISC DRIVE NOT CONFIGURED      |
| ERROR=14      | PRINTER IN USE                 |
| ERROR=16      | DIRECTORY IS FULL              |

When an ERROR=3 or an ERROR=8 is encountered, in addition to providing the RETRY or EXIT options, the program also allows the operator to skip to the next sector. When an ERROR=3 (UNABLE TO READ SECTOR) is issued, the utility reports both the error and the disc status. If the operator elects to SKIP, the utility skips the bad sector(s) and continues processing. An ERROR=8 (VERIFICATION ERROR) occurs only when a verified GET is requested. The utility reports the error and sector number and allows the operator to RETRY, SKIP, or EXIT. If the operator chooses to SKIP, the utility moves on to the next sector.

An ERROR=4 (DISC NOT READY) is reported only if the error occurs on a drive which is essential to the operation of the utility. An example of an ERROR=4 which is not reported is the following: Suppose that drive 1 is ENABLED but not READY and a utility is determining if file "x" exists on drive 0. The utility executes an OPEN(n)"x". If "x" is not on drive 0, the operating system attempts to find it on drives 1, 2, 3...., but drive 1 causes an ERROR=4. The utility does not report ERROR=4.

An ERROR=16 (DISC or DIRECTORY IS FULL) is reported when a utility is unable to define a permanent or scratch file.

#### NOTE

Under all circumstances, an ERROR=12 on a RUN or CALL causes the system to fall into console mode.

## Input Verification

Each operator input is verified for validity of type, range, syntax and availability. If an error occurs when data is input, a message is displayed, the utility waits for 1 or 2 seconds, then clears the message and redisplay the prompt. The following tests are performed to verify the correct input of data:

### Type

If an input is to be numeric, the utility requires numeric input.

### Range

The input should comply to a specified range, either alphanumeric or numeric. For example, if a (Y/N) response is requested, the input must be either a 'Y' or a 'N'.

### Syntax

Syntax errors are concerned with the order or size of data. For example, if a six-character name is requested, the input may not be larger than six characters. If a MM/DD/YY format is requested, the data must be eight characters.

### Availability

Utilities requiring the operator to input a disc ID, printer ID or file name must verify that the file or device is configured and available.