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WANG MINI-COMPUTER AUTOMATIC DATABASE MANAGEMENT SYSTEM AUTO-SY--ETC(U)
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# WANG MINI-COMPUTER AUTOMATIC DATABASE MANAGEMENT SYSTEM

# AUTO-SYSTEM USER'S MANUAL

MARCH 1977

PUBLISHED BY THE DIRECTION OF
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# SECTION 1. INTRODUCTION TO AUTO-SYSTEM

1.1 BACKGROUND INFORMATION. AUTO-SYSTEM is an automated Data Base Management System created by NEEO-NORFOLK CODE 501. The AUTO-SYSTEM had a true and natural evolusion period of over 2 1/2 years. During this period of time, the techniques used in this system were developed and improved until they were finally ready for incorporation into the system. The actual construction of an automated system began in January 1977. The system was finally released in March 1977.

1.2 PURPOSE. The AUTO-SYSTEM is a management tool to more efficiently create and control informational data bases, and the available ADP resources. The AUTO-SYSTEM eliminates, for many, the need of hiring their own programmers to write repetious soft-ware for "standard" informational data bases. Programmers will still be needed to create customized or analytical software.

1.2.1 MAJOR EMPHASIS. The major emphasis of the AUTO-SYSTEM is on data base independence. Data base independence means that the software will work on any data base which meets the required specifications of the system. In other words, this system of programs will work on all your data base files such as Inventory, Reference and any other "standard" informational files you have or will create, regardles of the type, size, format or number of records.

1.3 EQUIPMENT CONFIGURATION NEEDED. The AUTO-SYSTEM was designed to be run on a "WANG" 2200 T / C / VP or the 2200 WCS series CENTRAL PROCESSING UNIT (CPU) with a 32 K ('K' means thousand) core. This system is disk operated and must have either a 2230 series disk (5 mega-bytes) or a 2260 series disk (10 mega-bytes). A 2270 series disk (a 1/2/3 drive floppy-diskette) may be integrated into the system for use as the system disk. It is also desirable that a 132 character, per line, high speed printer be availble for outputting data.

1.4 USER'S MANUAL - PURPOSE AND CORRECTIONS. The major purpose of this manual is to introduce the AUTO-SYSTEM to managers, programmers and operators. Another purpose is to give additional aid and information on the use and purpose of the AUTO-SYSTEM. This aid and information is in the form of definitions for terminology used and the operating instructions for the system.

1.4.1 CORRECTIONS. This manual will be upgraded along with any associated software changes. For more information on upgrades to the AUTO-SYSTEM, contact NEEO-NORFOLK CODE 501. Corrections and suggestions for this manual should be sent to NEEO-NORFOLK CODE 501.

1.5 LIMITATION OF LIABILITY. The programming staff of NEEO-NORFOLK CODE 05 has taken due care in preparing this

manual and the associated software system; however, in no event shall NEED-NORFOLK CODE 05 be liable for any incidental or consequential damages in connection with or arising from the use of the software system, the accompanying manual, or any related materials.

SECTION 2. THE DATA BASE TREE

2.1 INTRODUCTION. The DATA BASE TREE describes and explains the seven main levels of data organization. They are, in order, Data Bases, Files, Records, Fields, Elements, Bytes, and Bits. FIGURE 2-1 is a graphical presentation of the DATA BASE TREE.

2.1.1 DATA BASES. The Data Base is the entire system you are working on. As an example, a Finance System is a Data Base. It is an overall term for all data related to a system.

2.1.2 FILES. A Data Base is comprised of one or more files. Files are logical groupings of similarly formatted data pertaining to one generic area covered by the entire Data Base. Using the example of a Finance System as a Data Base, there is a Personnel File, a Job File, and a Ledger File.

2.1.3 RECORDS. As a Data Base is comprised of Files, Files are comprised of Records. Records are normally thought of as all data pertaining to one logical item of a File. In a Personnel File, Records are seen as all necessary data relating to one person. These are considered to be on a one to one ratio (i.e. - one person to one Record). It should be noted that each Record is formatted exactly the same (i.e. - the data types tracked on one person or Record is tracked on all persons or Records).

2.1.4 FIELDS. Breaking down a Record, the next level is Fields. Records are comprised of Fields. Fields are the main building blocks of the Record. Using our example of a Finance System and choosing a Personnel Record, examples of Fields are Name, Address, and Age. Therefore, a Field is a logical grouping (or subset) of data that defines a generic topic. In general, there is normally more than one Field per Record. In the case of only one Field per Record, the Record and the Field are synonymous. Fields must be exactly the same in all Records, which means the same length and starting in the same exact position in all Records of a File.

2.1.5 ELEMENTS. The next level of our DATA BASE TREE is Elements. Elements are the main building blocks of Fields. Not all Fields will be divided into Elements. Generally a Field will be divided into Elements to facilate special Search or Sorting routines. For example, using the Field of "Address", Street, City, State, and Zip Code would be designated as Elements. This would permit the searching for, and selection of, all records with the State equal to "VIRGINIA". It would also permit sorting the selected Records into City order. Infinite possibilities exist when a Field is divided down into logical subsets (or groupings) of distinguishable data. Of course, if there is no requirement to search or sort on City, State, or Zip Codes, the entire Address could have been entered as floating format. Implementing

# DATA BASE TREE

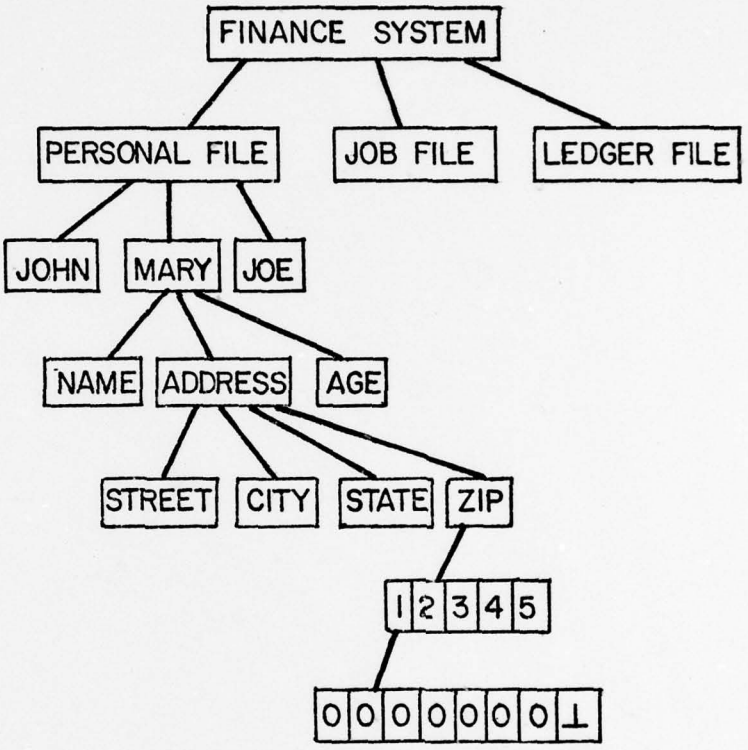
| LEVELS | EXAMPLES |
|---|---|
| 1. DATA BASE |  |
| 2. FILES | |
| 3. RECORDS | |
| 4. FIELDS | |
| 5. ELEMENTS | |
| 6. BYTES | |
| 7. BITS | |



FIGURE 2-1

Elements, however, insured that all data pertaining to City, for example, started in exactly the same position in each Record, thus enabling the computer (and the AUTO-SYSTEM) to easily recognize data as being that which is related to the City.

2.1.5.1 ELEMENT STRUCTURE. The Element Structure is perhaps the single most misunderstood concept in ADP, yet, it is probably the most powerful tool availble to the Manager using ADP. Experience in dividing and formatting all data requirements into logical groups (i.e. - the DATA BASE TREE) will enhance the use of the availble ADP resources. However, the AUTO-SYSTEM was designed to permit rapid changes to existing fields without costly software rewrites. In otherwords, if a manager determines that a Field should have been divided into Elements, but was not orginally done, the AUTO-SYSTEM will permit the change in a matter of minutes.

2.1.6 BYTES. An Element, such as a man's first name, is broken down to the next level of our DATA BASE TREE as characters. Each character is a Byte. Using the name 'John' as an example, there are 4 (four) characters or Bytes in this name. Each letter is a Byte. Elements are simply "groupings" of Bytes.

2.1.7 BITS. Bits are the binary break down of Bytes. These are normally in the reserved domain of Programmers and Analysts. The WANG 2200 Series uses an 8 (eight) Bits per Byte machine architecture, which means it takes 8 (eight) binary digits to represent 1 (one) Byte (character) in the machine.

2.1.8 SUMMARY. The understanding of the basic break down of the DATA BASE TREE is essential to the efficient use of the AUTO-SYSTEM or any other Data Processing System. Efficient use and understanding of the seven levels of the DATA BASE TREE will save you machine time, storage space, operating time, and give you more options of efficiently controlling and manipulating your data. This "TREE" may not grow money but it will certainly save you money if used correctly.

## SECTION 3. CONCEPT & PROGRAMS

3.1 CONCEPT. The basic concept behind the AUTO-SYSTEM is programs controlled by DATA. This is a unique concept which differs from the normal method of writting a seperate set of programs for each data file. The AUTO-SYSTEM uses 1 (one) set of programs (i.e. - a system) to control all data. The data used to control these programs are stored in 2 (two) Index files. The 2 (two) Index files are called "INDEX" and "PINDEX". The "PINDEX" index file is used to control data format for printing on the high speed printer. The "INDEX" file holds the data that controls all the other programs. Each file in a Data Base has an index record in both index files. These index records control the programs that control that file. Or, in other words, DATA, in the form of an Index record, is used to control a set of programs, which control data in the form of records in a file. This eliminates the need for creating repetious software.

3.1.1 LEVELS. The AUTO-SYSTEM is functionally divided into 2 (two) major levels or divisions. They are the MANAGER/PROGRAMMER level and the OPERATOR level.

3.1.1.1 MANAGER/PROGRAMMER LEVEL. The MANAGER/PROGRAMMER level consists of the following programs: INDEXER, PINDEXER, LAYOUT, FILESORT, and FILECOPY. These programs are used to create or update the Index records used to control files, to provide system maintenance, and to provide system documentation.

3.1.1.2 OPERATOR LEVEL. The OPERATOR level consists of the following programs: START, SEARCH, SORT, and PRINT. These programs are used to create, update, manipulate and output records within a file.

3.2 PROGRAMS. This is a listing and brief description of all the programs that make up the AUTO-SYSTEM. A more detailed explanation will follow later.

3.2.1 INDEXER. This program, as its name suggests, deals with the "INDEX" file. It is used to create a file and its associated "INDEX" record. It is here that you create and define the elements and fields within each record of the specified file. The INDEXER program is also used to establish the file itself and define its limits, such as, the file name and the maximum number of records for that file. On a new disk, the INDEXER program will even open up the "INDEX" and the "PINDEX" files.

3.2.2 PINDEXER. This program is the Print Indexer. It performs some of the same functions as the INDEXER program, except that it works with the Print Index ("PINDEX") file. In this program, you can modify the elements and fields within each record of the specified file, as specified by the INDEXER

program, and the format to be used on the high speed printer. Format includes column headers, spacing, and print order.

3.2.3 LAYOUT. This program is a print routine to the high speed printer. It produces 2 (two) types of forms. They are an Index Listing and a File Layout.

3.2.3.1 INDEX LISTING. This is a listing of all the files indexed on a disk along with pertinent information for each file. This information includes used and available characters, fields, and records.

3.2.3.2 FILE LAYOUT. This is a visual data base layout chart and a listing of information from the specified Index record. This information includes programming aids such as string values, matrix positions, lengths, and edit codes.

3.2.4 FILESORT. This program sorts (to place in a specified order) the Index records, contained in the "INDEX" file, into alphabetical order by File Name and deletes any scratched file's Index record and Print Index record. FILESORT also transfers the data on one disk to another. This deletes any scratched files on the disk, thus giving you more area to work with. This program can also be used to make a "BACK-UP" disk, or, in other words, an identical mate to the original.

3.2.5 FILECOPY. This program copies old data bases, that are not in the proper format for the AUTO-SYSTEM, and converts them to the proper format. It can also be used on existing AUTO-SYSTEM files, to allow expansion of a field or element by rearranging the fields and elements in both the Index Record and all records in the file.

3.2.6 START. This program allows you to choose the file with which you want to work, and to work with individual records within that file. You can add, change (correct), or delete records in a file with this program. The START program features the lastest "State of the Art" techniques pioneered by NEEO-NORFOLK CODE 501. Full TEXT EDITING capabilities (similiar to the actions of the EDIT ROM on program lines) are employed, which allows for character/cursor positioning, character insertion and deletion or erasure. Full record display while editing, with absolute control over any field or element (meaning the ability to go back and forth between any field at all times) is an important Operator feature. Complete error and format checking is accomplished while editing, with appropriate diagnostic messages displayed to the Operator. Record control is also enchanced by the sequencial display of records' highlights so that the Operator merely moves the cursor next to the desired record to work with, rather than the typing in of essential data to retrieve a record. The older method of typing in "access data" to retrieve a record is still permitted, but is used to rapidly retrieve (half-integral search) a record, or to position the

sequencial display mode. Complete file status is maintained, with the ability to visually see if a file needs to be sorted, if the file has been changed since the last baseline Revision date, and the constant count of records on file with the amount of available records left. This program also connects or chains you to the following programs: SEARCH, SORT, and PRINT.

3.2.7 SEARCH. This program allows you to search all the records in a file for a certain character or string of characters, within any field or element. Any or all fields or elements may be searched, with individual characters or character strings for each selected field or element. Once having found the records you searched for, the program stores them into a temporary file for sorting then printing on the high speed printer.

3.2.8 SORT. This program allows you to sort the records of any file on any field. This is a "Floating Sort" routine, whereby up to any 5 (five) fields or elements may be selected in any order, at any time. This allows you to place the records, in a file, into any order you wish for printing to the high speed printer. This program option leads directly to the PRINT program or back to the START program. Also, this same program is used for file maintenaince by the START program, by sorting the file into its designated permenant order that was defined in the Indexer Program.

3.2.9 PRINT. This program is a "Floating Print" routine, wherby you may create an infinite varity of customized printouts. Since the format and column headings are held in the "PINDEX" record for the file you are working on, you may choose which items in which order you wish displayed. Once obtaining a particular printout, you may either reprint then or rearrange the printout or the sort order prior to reprinting. This program will work on either the selected records obtained from the SEARCH and SORT program options (from the Temporary file) or upon the data file itself (permenant file, all records in sequence). The Print program will also allow you to connect to any customized print routines developed by your local programming staff.

3.3 SUMMARY. As you can see, the programs on the MANAGER/PROGRAMMER level are used to create an Index File and maintain the data contained therein. Each Index record contains the necessary information on 1 (one) particular file to tell the OPERATOR level programs where to find the fields within each record in that file. The OPERATOR level programs uses the data held in the Index record to operate on the individual records of a file. In other words, the MANAGER/PROGRAMMER level of programs are used to set-up the files, while the OPERATOR level of programs actually inputs and manipulates data.

## SECTION 4. SYSTEM CONSTRAINTS

4.1.1 FILES.

a. MAXIMUN number of FILES per DISK or DATA BASE is LIMITED ONLY BY THE SIZE OF THE DISK itself, or by the TOTAL number of RECORDS to be saved on the DISK.

4.1.2 RECORDS.

a. MAXIMUM number of RECORDS per FILE cannot exceed 3,500 on a 5 (five) mega-byte disk, and the TOTAL number of RECORDS per DISK cannot exceed 9,791 RECORDS.

b. MAXIMUM number of RECORDS per FILE cannot exceed 7,000 on a 10 (ten) mega-byte disk, and the TOTAL number of RECORDS per DISK cannot exceed 19,583 RECORDS.

c. MAXIMUM number of RECORDS per FILE cannot exceed 1,000 on a Floppy diskette, and the TOTAL number of RECORDS per DISK cannot exceed 1,023 RECORDS.

d. MAXIMUM number of CHARACTERS per RECORD cannot exceed 248 BYTES.

4.1.3 FIELDS / ELEMENTS.

a. MAXIMUM number of FIELDS per RECORD cannot exceed 30.

b. MAXIMUM number of CHARACTERS per FIELD cannot exceed 62.

4.2 CONTROL FORMAT or OPTION CONSTRAINTS

a. The FIRST BYTE of EVERY RECORD must be left BLANK for use by the SYSTEM.

b. There must be a selected 'SORT' and 'DSPLY' (DISPLAY) order.

4.3 PROMPT / DISPLAY CONSTRAINTS

a. The MAXIMUM number of BYTES per PROMPT, LABEL, or COLUMN HEADER cannot exceed 20.

4.4 ENVIRONMENTAL FACTORS.

a. The AUTO-SYSTEM Programs must be located on a disk platter, since they are disk oriented. They may be located on any disk drive, Fixed or Removable.

b. Any data base under control of the AUTO-SYSTEM must be located on a Removable disk platter.

c. The fixed disk, with the device address of 310, must be left in the scratched state (i.e. - SCRATCH DISK F LS=1, END=2), and available for sorting and FILE maintenance.

# SECTION 5. INDEXER

5.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will, first, describe the INDEXER program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for PROGRAM LOADING.

5.0.1 GENERAL PROGRAM DESCRIPTION. This program, as its name suggests, deals with the "INDEX" FILE. It is used to create a FILE and its associated "INDEX" RECORD. It is here that you create and define the ELEMENTS and FIELDS within each RECORD of the specified FILE. The INDEXER program is also used to establish the FILE itself and define its limits, such as the FILE name and the maximum number of records for that FILE. On a new disk, the INDEXER program will even open up the "INDEX" and the "PINDEX" FILES.

5.0.2 PROGRAM LOADING. To work with the INDEXER program:

a. Insure that the AUTO-SYSTEM PROGRAMS are on a disk drive and that a data disk (REMOVABLE platter) is on a disk drive, and that the disk drives are in the "READY" mode. Refer to your WANG System manuals for disk drive operating procedures.

b. Clear the CPU MEMORY by keying the verb "CLEAR", followed by an "(EXEC)" key.

c. Load the program by keying in -> LOAD DC R (or F) "INDEXER" . Follow this with an "(EXEC)".

d. Run the program by keying in the verb "RUN", followed by an "(EXEC)".

e. Follow all instructions displayed on the CRT SCREEN, or refer to this manual.

5.1 DISK SELECTION. The AUTO-SYSTEM allows for variable selection of disk device addresses. DISK SELECTION is the first step taken after loading the program - 'INDEXER' (or 'START') and running it. (See FIGURES 5-1 and 5-2 for examples of the 'DISK CONTROL SELECTION AREA' displays.)

5.1.1 AUTO-SYSTEM DISK SELECTION. The first DISK SELECTION display (Figure 5-1) asks you, the Operator, where are the AUTO-SYSTEM programs located (i.e. - on which disk drive and which platter). You have the option of putting the AUTO-SYSTEM programs on any disk drive with the following device addresses: 1) #310, 2) #320, 3) #330, or 4) #360. Not only do you have the above choice but you also choose which platter (i.e. - Fixed or Removable) the AUTO-SYSTEM programs are on. In answer to the question, "A. AUTO-SYSTEM PROGRAM DISK IS ON WHICH DISK DRIVE?", enter the option number (1-8) that corresponds with the proper disk device address and then press the key marked -> '(EXEC)'.

```
<=======  DISK SELECTION AREA  =======>

A.  AUTO-SYSTEM PROGRAM'S DRIVE? -/  (7 IS DEFAULT)

 1 = 'B10' REMOVABLE     2 = '310' FIXED
 3 = 'B20' REMOVABLE     4 = '320' FIXED
 5 = 'B30' REMOVABLE     6 = '330' FIXED
 7 = 'B60' REMOVABLE     8 = '360' FIXED
```

FIGURE 5-1

```
<= DISK SELECTION AREA =>

B.  DATA DISK'S DRIVE? -/  (2 IS DEFAULT)

 1 = 'B10' REMOVABLE
 2 = 'B20' REMOVABLE
 3 = 'B30' REMOVABLE
 4 = 'B60' REMOVABLE
```

FIGURE 5-2

5.1.2 DATA BASE DISK SELECTION. The second DISK SELECTION display (FIGURE 5-2) asks, you the operator, where the DATA DISK is located (i.e. - on which disk drive)? You have the option of putting the DATA DISK on any disk drive with the following device addresses: 1) #310, 2) #320, 3) #330, 4) #360. Notice that the DATA DISK must be located on the Removable platter. Following the same procedures as above (SECTION 5.1.1), the question, "B. DATA BASE DISK IS ON WHICH DISK DRIVE?", is answered by entering the option number (1-4) that corresponds with the proper disk device address and then press the key marked -> '(EXEC)'.

5.2 SYSTEM OPTIONS. The SYSTEM OPTIONS display (FIGURE 5-3) shows you the 7 (seven) available major options. They are, in SPECIAL FUNCTION key sequence:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '1 | OBTAIN A 'DATA BASE' LAYOUT CHART OR INDEX LISTING. |
| '2 | CORRECT (REVISE) AN EXISTING FILE'S INDEX. |
| '3 | CREATE (ADD) A NEW FILE TO THE INDEX ON THIS DISK. |
| '4 | WORK WITH THE 'PRINT INDEXER' PROGRAM AND INDEX. |
| '5 | GO DIRECTLY TO THE START PROGRAM. |
| '6 | SORT THE INDEX FILE IN NAME ORDER. |
| '7 | PERMANENTLY SCRATCH A DATA FILE FROM THE DISK. |

This is the main display of the INDEXER program and will be refered to as the SYSTEM OPTIONS display. To choose one of these options, press the corresponding SPECIAL FUNCTION key (the thin keys at the top of the keyboard).

5.2.1 OPTION #1 (SPECIAL FUNCTION '1) -> OBTAIN A 'DATA BASE' LAYOUT CHART OR INDEX LISTING. To obtain either an Index Listing or a File Layout, press the SPECIAL FUNCTION key marked -> '1. This will automatically load the program 'LAYOUT'. For further instructions see SECTION 7.

5.2.2 OPTION #2 (SPECIAL FUNCTION '2) -> CORRECT (REVISE) AN EXISTING FILE'S INDEX. This option, as it suggests, allows you to correct or change an existing FILE'S "INDEX" record. To choose this option, press SPECIAL FUNCTION key marked -> '2. This will take you to the 'FILE SELECTION' display.

5.2.2.1 FILE SELECTION. (SEE FIGURE 5-4) This sub-section explains the 'FILE SELECTION' display itself, the availble 'SPECIAL FUNCTIONS', and how to select a FILE to work with.

5.2.2.1.1 FILE SELECTION DISPLAY. (SEE FIGURE 5-4) The FILE SELECTION DISPLAY encompasses 6 (six) major descriptive HEADINGS.

a. 'NAME' -> This HEADING shows you the

```
****************** PROGRAM -> 'INDEXER' ******************

YOU, THE OPERATOR HAVE THE FOLLOWING OPTIONS :

  ' 1 -> OBTAIN A 'DATABASE' LAYOUT CHART OR INDEX LISTING.
  ' 2 -> CORRECT (REVISE) AN EXISTING FILE'S INDEX.
  ' 3 -> CREATE (ADD) A NEW FILE TO THE INDEX ON THIS DISK.
  ' 4 -> WORK WITH THE 'PRINT INDEXER' PROGRAM AND INDEX.
  ' 5 -> GO DIRECTLY TO THE START PROGRAM.
  ' 6 -> SORT THE INDEX FILE IN NAME ORDER.
  ' 7 -> PERMANENTLY SCRATCH A DATA FILE FROM THE DISK.


********************************************************************
>>>> PRESS S.F. KEYS AS LABELED ABOVE TO CHOSE YOUR OPTION <<<<
```

FIGURE 5-3

actual NAME under which the FILE was SAVED.

b. 'FILE DESCRIPTION' -> This HEADING, as it implies, describes the FILE as a whole.

c. 'LAST REVISION DATE' -> This HEADING shows you the last time this FILE was UPDATED. This lets you know how UP-TO-DATE the FILE is.

d. 'SETUP' -> This HEADING shows you the TOTAL number of RECORDS RESERVED for the FILE.

e. 'USED' -> This HEADING shows you the TOTAL number of RECORDS USED up to now.

f. 'AVAILABLE' -> This HEADING shows you the TOTAL number of RECORDS LEFT AVAILABLE to be used.

Listed below these headings will be the first 10 (ten) Indexed FILES on your DATA DISK. On the third line from the bottom of the page (on line 13), the program will indicate the number of FILES 'LEFT' to see. Just below the number of FILES left to see, are the available SPECIAL FUNCTIONS.

5.2.2.1.2 AVAILABLE SPECIAL FUNCTIONS. A SPECIAL FUNCTION is defined as a separate sub-routine or module constructed specially to take you (the Operator) from one specific point in a program to another point. These sub-routines or modules are accessed through the use of either the thin grey keys at the top of the keyboard (the SPECIAL FUNCTION KEYS , naturally), or any "KEY" as specified. To select a SPECIAL FUNCTION key simply press the key indicating that function. There are 5 (five) available SPECIAL FUNCTION keys in the FILE SELECTION display. They are, in SPECIAL FUNCTION number sequence:

S.F. FUNCTION PERFORMED

'0 -> This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' one FILE, or in other words, this key allows you to back space.

'1 -> This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one FILE, or in other words, this key allows you to space forward.

'2 -> This key is used to select the FILE'S INDEX RECORD

```
PROGRAM -> 'INDEXER' ********** FILES ON THIS DISK **********
NAME       FILE DESCRIPTION    LAST REV. DATE     SETUP USED  AVAIL
FILE #1    TEST FINANCE FILE   13 AUGUST 1977     00100 00010 00090
FILE #2    PERSONNEL FILE      15 AUGUST 1977     00050 00049 00001
FILE #3    MILESTONE DATES     09 JULY 1977       01000 00499 00501
FILE #4    CONFIGURATION       11 OCTOBER 1976    00500 00300 00200
FILE #5    SCHEDULE FILE       18 AUGUST 1977     00600 00250 00350
FILE #6    SUPPLY INVENTORY    16 SEPT 1977       00850 00848 00002
FILE #7    TELEPHONE NO#'S     15 JANUARY 1977    00100 00076 00024
FILE #8    DOCUMENT LIBRARY    11 NOVEMBER 1977   02000 01190 00810


********* THERE ARE 0 FILES LEFT TO SEE ON THIS DISK **********
S.F. KEYS :      '00 = UP        '02 = REVISE      '05 = NEXT PAGE
                 '01 = DOWN      '06 = RE-SELECT OPTION
```

FIGURE 5-4

you wish to correct. When this key is pressed, the line describing the file, which the cursor is next to, is the file that will be selected. This SPECIAL FUNCTION leads to the 'PROGRAM OPTIONS' display (See SECTION 5.3).

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive INDEXED FILE'S RECORDS. This key works in the 'FOWARD' direction only.

'6 -> This key is used to take you back to the SYSTEM OPTIONS display (see SECTION 5.2). Using this key does not change any data. It only allows you to 'RESELECT' (select another) SYSTEM OPTION.

5.2.2.1.3 HOW TO SELECT A FILE. To select a FILE, you (the Operator) would use SPECIAL FUNCTION key marked -> '5 to find the page upon which the FILE you wish to correct is shown. Next, use SPECIAL FUNCTION keys marked -> '0 and '1 to locate the cursor next to the FILE you wish to correct. Now, press SPECIAL FUNCTION key marked -> '2 thus indicating the specific FILE'S INDEX RECORD you wish to correct. Once having pressed SPECIAL FUNCTION key marked -> '2, the program will take you to the PROGRAM OPTIONS display (see SECTION 5.3).

NOTE: IF THERE ARE NO FILES CURRENTLY INDEXED ON THE DISK, THE PROGRAM WILL TELL YOU SO, AND INDICATE THAT YOUR OPTION SHOULD HAVE BEEN TO 'CREATE' A NEW INDEX RECORD FOR A FILE. TO RETURN TO THE 'SYSTEM OPTIONS' DISPLAY, SIMPLY PRESS THE KEY MARKED -> '(EXEC)'.

5.2.3 OPTION #3 (SPECIAL FUNCTION '3) -> CREATE (ADD) A NEW FILE TO THE INDEX ON THIS DISK. This option allows you to create an INDEX RECORD for an existing file that is not 'INDEXED' already, or, to create an INDEX RECORD and the FILE itself. This option will take you to the 'PROGRAM OPTIONS' display. (See SECTION 5.3)

5.2.4 OPTION #4 (SPECIAL FUNCTION '4) -> WORK WITH THE 'PRINT INDEXER' PROGRAM AND INDEX. This option allows you to select a FILE and work with it's 'PRINT INDEX' RECORD. To select the FILE you wish to work with, follow the instructions found in SECTION 5.2.2.1. There are 2 (two) exceptions. They are:

EXCEPTION #1 -> SPECIAL FUNCTION '2 under SECTION 5.2.2.1.2 (AVAILABLE SPECIAL FUNCTIONS), will be labeled 'REVISE PRINT INDEX'. You will still use this SPECIAL FUNCTION to indicate the FILE you wish to work with.

EXCEPTION #2 -> After pressing SPECIAL FUNCTION marked -> '2, the program will automatically take you to the 'PRINT INDEXER' program. For further instructions see SECTION 6.

5.2.5 OPTION #5 (SPECIAL FUNCTION '5) -> GO DIRECTLY TO THE START PROGRAM. To select this option, press SPECIAL FUNCTION key marked -> '5. This will automatically load the 'START' program. For further instructions see SECTION 10.

5.2.6 OPTION #6 (SPECIAL FUNCTION '6) -> SORT THE INDEX FILE IN NAME ORDER. This option will SORT the 'INDEX' FILE in 'NAME' order and delete scratched FILES. Selecting this option will automatically load the 'FILESORT' program. For further instructions and explanations, please see SECTION 8.

5.2.7 OPTION #7 (SPECIAL FUNCTION '7) -> PERMANENTLY SCRATCH A DATA FILE FROM THE DISK. This option allows you to 'SCRATCH' (DELETE) a FILE'S 'INDEX' and 'PRINT INDEX' RECORDS and the FILE itself. To select this option, press SPECIAL FUNCTION key marked -> '7. This will take you to the FILE SELECTION display.

5.2.7.1 FILE SELECTION DISPLAY FOR SCRATCHING FILES. To select the FILE you wish to SCRATCH, follow the instructions found in SECTION 5.2.2.1. There are 2 (two) exceptions.

EXCEPTION #1 -> SPECIAL FUNCTION '2 under SECTION 5.2.2.1.2 (AVAILABLE SPECIAL FUNCTIONS), will be labeled 'SCRATCH THE FILE'. You will use this SPECIAL FUNCTION to indicate the FILE you wish to SCRATCH.

EXCEPTION #2 -> After pressing SPECIAL FUNCTION key marked -> '2, the program will take you to the 'SCRATCHED FILE' display.

5.2.7.2 SCRATCHED FILE DISPLAY. (See FIGURE 5-5) The 'SCRATCHED FILE' display encompasses 4 (four) major descriptive HEADINGS.

a. YOU ARE IN THE 'FILE SCRATCHING' MODE OF OPERATION -> This HEADING is a warning sign. It is informing you (the Operator) of the operating mode you are now in.

b. FILE NAME TO BE SCRATCHED -> This HEADING tells you the NAME of the FILE to be SCRATCHED.

c. DESCRIPTION OF FILE -> This HEADING describes, as a whole, the FILE to be SCRATCHED.

d. TOTAL RECORDS SAVED TO DATE -> This HEADING informs you of the total number of RECORDS USED in the FILE up to now.

```
**************************************************************************
      YOU ARE IN THE 'FILE SCRATCHING  ' MODE OF OPERATION

YOUR OPTIONS ARE NOW AS FOLLOWS :

     '15 ->  ('RECALL' KEY) TO CANCEL SCRATCHING THIS FILE
              AND ITS INDEX - RETURN TO BEGINNING
     ' 8 ->  ('ERASE ' KEY) TO PERMANENTLY SCRATCH FOREVER :

              FILE NAME TO BE SCRATCHED    = FILE #1
              DESCRIPTION OF FILE          = TEST FINANCE FILE
              TOTAL RECORDS SAVED TO DATE = 00010

**************************************************************************
```

FIGURE 5-5

5.2.7.3 AVAILABLE SPECIAL FUNCTIONS. There are 2 (two) available SPECIAL FUNCTION keys in the 'SCRATCHED FILE' display. They are, in SPECIAL FUNCTION number sequence:

' 8 -> This key is used to PERMANENTLY SCRATCH a FILE and it's associated INDEX and PRINT INDEX RECORDS.

'15 -> This key is used to take you out of the FILE SCRATCHING MODE OF OPERATION without scratching the FILE.

5.2.7.4 HOW TO SCRATCH THE FILE. Select the FILE you wish to SCRATCH in the FILE SELECTION display by using SPECIAL FUNCTION key marked -> '2. This will take you to the SCRATCHED FILE display. If you have selected the wrong FILE, use SPECIAL FUNCTION key marked -> '15 to return to the SYSTEM OPTIONS display (you can then re-select your SYSTEM OPTION). If you are sure this is the FILE you wish to scratch, press SPECIAL FUNCTION key marked -> '8. This will clear the screen and display the following line: "MARKING FILE FOR PERMANENT DESTRUCTION". This option will mark both the INDEX and the PRINT INDEX RECORDS as SCRATCHED (TO DELETE UPON SORT), and will SCRATCH the FILE ITSELF. It will then return you to the FILE SELECTION display so you can see that the FILE IS ACTUALLY SCRATCHED. Listed SPECIAL FUNCTIONS are then available.

NOTE: TO COMPLETELY REMOVE THE SCRATCHED "INDEX" AND "PINDEX" RECORDS, ALONG WITH THE ACTUAL SCRATCHED FILE AND ITS ASSOCIATED RECORDS, THE FILESORT OPTION MUST BE RUN. THE FILESORT OPTION WILL REMOVE ALL REFERENCES TO THE SCRATCHED FILE. FOR FURTHER EXPLANATION, REFER TO SECTION 8.

5.3 PROGRAM OPTIONS. The PROGRAM OPTIONS display (FIGURE 5-6) shows you (the Operator) the 6 (six) available PROGRAM OPTIONS. They are, in SPECIAL FUNCTION key sequence:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '0 | CORRECT OR ADD HEADER INFORMATION. |
| '1 | CORRECT OR ADD A FIELD. |
| '2 | CHANGE DISPLAY SEQUENCE. |
| '3 | ADJUST CRT SCREEN DISPLAY. |
| '4 | SET EDIT OPTIONS. |
| '5 | SAVE HEADER TO INDEX FILE (RE-SELECT SYSTEM OPTIONS). |

Once having selected a FILE to work with (see SECTION 5.2.2.1), or adding a FILE to the DISK INDEX (see SECTION 5.2.3), the program will then lead to the PROGRAM OPTIONS display. The PROGRAM OPTIONS display will tell you what "MODE OF OPERATION" you (the Operator) are in (i.e. - 'ADD' or 'CORRECT'), and what FILE you are working on (i.e. - FILE DESCRIPTION). If you are in the 'ADD' mode of operation, the display showing the FILE

```
********************* PROGRAM -> 'INDEXER' ************************
      YOU ARE IN THE 'CORRECT  (REVISE)' MODE OF OPERATION
      AND YOU ARE WORKING ON THE 'PERSONNEL FILE     ' FILE

YOUR OPTIONS ARE NOW AS FOLLOWS :

      ' 0 ->  CORRECT OR ADD HEADER INFORMATION
      ' 1 ->  CORRECT OR ADD A FIELD
      ' 2 ->  CHANGE DISPLAY SEQUENCE
      ' 3 ->  ADJUST CRT SCREEN DISPLAY
      ' 4 ->  SET EDIT OPTIONS
      ' 5 ->  RE-SAVE HEADER TO INDEX FILE (RE-SELECT OPTIONS)

*********************************************************************
 >>>>>>>>> USE S.F. KEYS ABOVE TO CHOOSE YOUR OPTION <<<<<<<<<
```

FIGURE 5-6

DESCRIPTION will be blank. It is recommended, when in the 'ADD' mode, that you work the PROGRAM OPTIONS in order by SPECIAL FUNCTION number sequence. To choose one of the above options, press the corresponding SPECIAL FUNCTION key (the thin keys at the top of the keyboard).

5.3.1 PROGRAM OPTION #1 (SPECIAL FUNCTION 'O) -> CORRECT OR ADD HEADER INFORMATION. To choose this option, press SPECIAL FUNCTION key marked -> 'O. This will take you to the "HEADER INFORMATION" display (see FIGURE 5-7). Choosing this option will allow you to 'ADD' the FILE DESCRIPTION, FILE TO BOUNCE UPON, and FILE NAME, or 'CORRECT' the FILE DESCRIPTION and FILE TO BOUNCE UPON.

NOTE: A FILE NAME MUST BE ENTERED. ONCE A FILE NAME HAS BEEN ENTERED, IT CAN NOT BE CHANGED EXCEPT BY A QUALIFIED PROGRAMMER.

5.3.1.1 HEADER INFORMATION DISPLAY (see FIGURE 5-7). The true name of this display is shown across the top of the CRT screen, "INDEX RECORD HEADER INFORMATION". This sub-section is divided into 3 (three) divisions. They are: 1) FIELD DESCRIPTION, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

5.3.1.1.1 FIELD DESCRIPTIONS. There are 3 (three) main fields in this display. They are, as numbered:

1. FILE DESCRIPTION -> This is an 18 (eighteen) character alpha-numeric field used to distinquish the FILE generically as to TYPE and SYSTEM. This field may be added, corrected, or changed at any time.

2. FILE TO BOUNCE UPON -> This is an 8 (eight) character alpha-numeric field used to NAME a related FILE from which you wish data to be automatically entered into your RECORDS. PLEASE NOTE THAT ALL FILE BOUNCING SUB-ROUTINES REQUIRE 'CUSTOMIZED' SOFTWARE. This field may be added, corrected, or changed at any time.

3. FILE NAME -> This is an 8 (eight) character alpha-numeric field containing the ACTUAL NAME that the FILE was saved under on the Disk Catalogue. This field must be entered in the 'ADD' mode of operation. IT CAN NOT BE

```
********** INDEX RECORD HEADER INFORMATION **********
 1. FILE DESCRIPTION     : PERSONNEL FILE
 2. FILE TO BOUNCE UPON :
 3. FILE NAME            : FILE #2




********** PERSONNEL FILE **********
S.F. KEYS:  '0 = NO CORRECTIONS  '2 = CORRECT

********** PERSONNEL FILE **********
'EXEC' = NEXT FIELD     '↑' = BACK ONE     'PRINT' = SAVE REC'D
```

FIGURE 5-7

CORRECTED OR CHANGED!

Notice that only the first 2 (two) fields can be corrected or changed. If you are in the 'CORRECT' mode of operation, the above 3 (three) fields would be the only ones displayed on the CRT screen. However, if you are in the 'ADD' mode of operation then the following fields would be displayed on the CRT screen as necessary:

a. IS THIS AN EXISTING FILE NOW ON THE DISK (Y/N)?
This is a 'YES or NO' question (enter "Y" if yes or "N" if no). If you have a FILE, which is in the correct format, that you wish to "INDEX", thus enabling the use of the AUTO-SYSTEM, enter the letter "Y". This will take you back to the PROGRAM OPTIONS display. If this is truely a new FILE (and you wish the program to open the FILE for you), enter the letter "N". This will take you to the next field. REMEMBER, THIS QUESTION IS ONLY DISPLAYED WHEN ADDING A FILE TO THE 'INDEX' ON THE DISK. IT CAN NOT BE CORRECTED OR CHANGED.

b. MAXIMUM NUMBER OF RECORDS YOU WISH TO RESERVE SPACE FOR? This is a NUMERIC field. You must enter the MAXIMUM NUMBER of RECORDS you plan to put into this FILE. The NUMBER OF RECORDS a file can hold IS ONLY LIMITED BY THE SIZE OF THE DISK DRIVE. This routine will automatically utilize the standard disk cataloging features of the WANG 2200 SERIES, by creating (or opening) a file under catalog control. The number that you enter for the maximum number of records, will open a file for that many sectors, plus 2 (two) extra sectors (for the beginning and end of file). For further discussions of the disk catalog features, refer to your WANG Programming Manual for the "DATA SAVE DC OPEN" VERB. This field, when executed, will lead you back to the PROGRAM OPTIONS display.

5.3.1.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 5 (five) possible available SPECIAL FUNCTIONS in the HEADER INFORMATION display. They are, in SPECIAL FUNCTION sequence:

'0 = NO CORRECTIONS -> If you have no corrections, pressing SPECIAL FUNCTION key marked -> '0 will take you back to the PROGRAM OPTIONS display.

'2 = CORRECT -> If there is a field you wish to correct, pressing SPECIAL FUNCTION key marked -> '2 will take you into the DATA ENTRY mode of operation.

```
 ()  PROMPT MESSAGE          P/L   LENGTH   MATRIX   SORT   DSPLY
************** INDEXED FIELDS FOR THIS FILE **********************
  1  LAST NAME :              P      25       02       1      1
  2  FIRST NAME :             P      10       27       0      0
  3  BIRTH DATE :             P       6       37       0      0
  4  STREET ADDRESS :         P      25       43       0      0
  5  CITY :                   P      10       68       0      2
  6  STATE :                  P       2       78       0      3
  7  ZIP CODE :               p       5       80       0      4
  8  ** PERSONAL DATA **      L
  9  *** ADDRESS DATA ***     L
 10  BLANK                    P
********************** PERSONNEL FILE ******************************
'05    = NEXT PAGE      '06 = SKIP 5 LINES  '07      = 'MENU'
'EXEC' = NEXT FIELD     '↑' = BACK ONE      'PRINT' = SAVE LINE
```

FIGURE 5-8

The above SPECIAL FUNCTIONS will only be displayed and operational in the 'CORRECT' mode of operation. If you are in the 'ADD' mode of operation, you will be taken directly into the DATA ENTRY mode of operation. The following SPECIAL FUNCTIONS will then be available:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '(EXEC)' | -> This key (known as the "RETURN/(EXEC) key), when pressed, will take you (the Operator) to the next field. |
| '↑' | -> This key (known as the "UP-ARROW"), when pressed, will take you (the Operator) back to the previous field. If you are working on the first field and press this key, you will still be working on the first field. |
| 'PRINT' | -> This key (known as the "PRINT" key), when pressed, will terminate the HEADER INFORMATION sub-routine and take you to the PROGRAM OPTIONS display. |

5.3.1.1.2.1 SPECIAL FUNCTIONS FOR EDITING DATA. All programs in the AUTO-SYSTEM, where fields are able to be EDITED, feature the latest STATE-OF-THE-ART "EDIT ROM" emulation of SPECIAL FUNCTION key controlled text editing. At any time, while in the DATA ENTRY mode of operation (not entering a program control option), the following SPECIAL FUNCTION keys are always available for use:

| S.F. | FUNCTION PERFORMED |
|---|---|
| ' 8 | 'ERASE' -> Pressing this key will ERASE (or set to blanks) all characters or digits, starting with the character or digit displayed immediately above the cursor, continuing with all remaining characters to the right of the cursor, for the entire remaining length of the DATA field. |
| ' 9 | 'DELETE' -> Pressing this key will delete the character immediately above the cursor and then move all remaining characters on the right side of the cursor to the left 1 (one) place. |
| '10 | 'INSERT' -> Pressing this key will move all characters to the right 1 (one) place, starting with the character immediately above the cursor. Having moved the characters to the right, a blank character is then inserted above the cursor. (NOTE: You can continuously insert blank characters until the orginal characters to the right of the cursor are no longer visible -> meaning you have pushed them past the end of the allowed field length. However, normally, touching the "DELETE" key the same amount of |

```
     ***** OLD       *****                ***** NEW       *****
 ()  ***** SEQUENCE *****            ()  ***** SEQUENCE *****
 ..  ......................              ......................
  1  LAST NAME :                      1  BLANK
  2  FIRST NAME :
  3  BIRTH DATE :
  4  STREET ADDRESS :
  5  CITY :
  6  STATE :
  7  ZIP CODE :
  8  ** PERSONAL DATA **
  9  *** ADDRESS DATA ***
 10  BLANK
********************** PERSONNEL FILE ****************************
'02 -> SAVE TO 'NEW'   '05 -> NEXT PAGE        '07   -> 'MENU'
                       '06 -> SKIP 5 LINES
```

FIGURE 5-9

times will move the characters back in to the orignal position. This means that when moving the characters off the display, the characters are not lost until you depress the SPECIAL FUNCTION marked -> '(EXEC)'.

'11 '----->' -> Pressing this key will position the cursor 5 (five) places to the right of where the cursor originally was. However, upon reaching the end of the allowed field length, the key is no longer functional, since the cursor will not move pass the boundaries of the field.

'12 '->' -> Pressing this key will position the cursor 1 (one) place to the right of where the cursor originally was. However, upon reaching the end of the allowed FIELD length, the key is no longer functional, since the cursor will not move pass the boundaries of the field.

'13 '<-' -> Pressing this key will cause the same actions as SPECIAL FUNCTION '12, except that it will move the cursor left 1 (one) place.

'14 '<-----' -> Pressing this key will cause the same actions as SPECIAL FUNCTION '11, except that it will move the cursor left 5 (five) places.

'15 'RECALL' -> Pressing this key will return the field display to its original format and DATA content, provided that SPECIAL FUNCTION marked -> '(EXEC)' was not depressed. In other words, once SPECIAL FUNCTION marked -> '(EXEC)' has been depressed, the field is set to whatever has been typed in. However, if while using the 'DELETE', 'INSERT', or 'ERASE' keys, you decide that you would like to start over (prior to touching the SPECIAL FUNCTION marked -> '(EXEC)'), depress SPECIAL FUNCTION marked -> 'RECALL' and the field will return to its original state.

5.3.1.1.3 OPERATIONAL DESCRIPTION -> 'ADD' MODE OF OPERATION.

This should be the first PROGRAM OPTION chosen when adding a FILE to the INDEX on the disk. Once having chosen this option, you will be taken directly into the DATA ENTRY mode of operation for the first field -> 1. FILE DESCRIPTION. The cursor will be located under the first hyphen in the data field. Now, simply enter in the desired data. The System will not allow you (the Operator) to enter in more than 18 (eighteen) characters for the FILE DESCRIPTION. Once having entered in the desired data, press the SPECIAL FUNCTION marked -> '(EXEC)'. This will take you to the next field -> 2. FILE TO BOUNCE UPON. Follow the same procedure for entering data

```
********** PERSONNEL FILE **********
** PERSONAL DATA **.
     LAST NAME :--------------------
    FIRST NAME :----------
    BIRTH DATE :YYMMDD

*** ADDRESS DATA ***.
STREET ADDRESS :--------------------
          CITY :----------
         STATE :..
      ZIP CODE :.....

********************************************************************************
S.F. KEYS :  ' 0 = NO CORRECTIONS    ' 2 = ADJUST SCREEN DISPLAY


********************************************************************************
                ( 1 )      LAST NAME :
'EXEC' = NEXT FIELD      '↑' = BACK ONE      'PRINT' = 'MENU'
```

FIGURE 5-10

into this field and the FILE NAME field as described above. For both fields, the System will only let you enter a maximum of 8 (eight) characters. The above 3 (three) fields (FILE DESCRIPTION, FILE TO BOUNCE UPON, and FILE NAME) are completely EDITABLE and, therefore, all SPECIAL FUNCTIONS FOR EDITING DATA are available and operational (see SECTION 5.3.1.1.2.1). The following fields are straight INPUT statements and ARE NOT EDITABLE. After executing the FILE NAME field, the System will ask you (the Operator), "IS THIS AN EXISTING FILE NOW ON THE DISK?" If you have an existing FILE that is not INDEXED, BUT IS IN THE PROPER FORMAT FOR THE AUTO-SYSTEM, then enter in the letter "Y", followed by the SPECIAL FUNCTION marked -> '(EXEC)'. This will take you back to the PROGRAM OPTIONS display. If there is no existing FILE, then enter the letter "N" followed by the SPECIAL FUNCTION marked -> '(EXEC)'. This will lead you to the next question, which asks what is, "THE MAXIMUM NUMBER OF RECORDS YOU WISH TO RESERVE SPACE FOR"? This number should be computed by the MANAGER or ANALYST of your group. Remember, once the limits of the FILE in question has been set, a qualified programmer is necessary to implement any change to this field. Also, the size of a FILE is limited only by the size of the disk drive. After entering this number, press the SPECIAL FUNCTION marked -> '(EXEC)'. This will take you back to the PROGRAM OPTIONS display.

5.3.1.1.4 OPERATIONAL DESCRIPTION -> 'CORRECT' MODE OF OPERATION. Once having selected this option, the System will then display the data in field number 1 (one) through 3 (three) and allow you the option of either correcting these fields (SPECIAL FUNCTION '2) or not correcting these fields (SPECIAL FUNCTION '0), therefore going back to the PROGRAM OPTIONS display. If you do not want to correct or change either of the first 2 (two) fields then press the SPECIAL FUNCTION key marked -> '0. This will take you back to the PROGRAM OPTIONS display. If you do wish to correct either of the first 2 (two) fields (REMEMBER -> the third field, 'FILE NAME', can not be corrected or changed), press the SPECIAL FUNCTION key marked -> '2. This will take you into the DATA ENTRY mode of operation. All SPECIAL FUNCTIONS FOR EDITING DATA are operational (see SECTION 5.3.1.1.2.1). Pressing the SPECIAL FUNCTION marked -> 'PRINT', or executing after the second field, will take you back to the PROGRAM OPTIONS display.

5.3.2 PROGRAM OPTION #2 (SPECIAL FUNCTION '1) -> CORRECT OR ADD A FIELD. There is a maximum of 30 (thirty) individual data fields allowable per FILE reference in the AUTO-SYSTEM. A FIELD, in reference to its use in PROGRAM OPTION #2, encompasses the PROMPT or LABEL MESSAGE, the DATA LENGTH, the beginning MATRIX position, a SORT key designator, and a DISPLAY key designator. If you are in the 'ADD' mode of operation, this should be the SECOND PROGRAM OPTION you choose after entering in the HEADER INFORMATION. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '1. This will

```
********************* SET EDIT OPTIONS ***************************
00 = LABEL VARIABLE . 12 =                . 24 =
01 = NO EDIT CHECKS . 13 =                . 25 =
02 = DIGITS ONLY    . 14 =                . 26 =
03 = NO# RT-JUSTIFY . 15 =                . 27 =
04 = YYMM FORMAT    . 16 =                . 28 =
05 = YYMMDD FORMAT  . 17 =                . 29 =
06 = JULIAN (YYDDD) . 18 =                . 30 =
07 = ALPHA'S ONLY   . 19 =                . 31 =
08 = HYPHEN OUT     . 20 =                . 32 =
09 =                . 21 =                . 33 =
10 =                . 22 =                . 34 =
11 =                . 23 =                . 35 =
********************* PERSONNEL FILE *****************************
S.F. KEYS :  ' 0 = NO CORRECTIONS ' 2 = ADJUST EDIT OPTIONS

********************* PERSONNEL FILE *****************************
*(  1  )     STREET ADDRESS :          ERROR CODE : 01
'EXEC' = NEXT FIELD     '↑' = BACK ONE     'PRINT' = 'MENU'
```

FIGURE 5-11

take you to the "INDEXED FIELDS" display (see FIGURE 5-8).

5.3.2.1 INDEXED FIELDS DISPLAY (see FIGURE 5-8). The INDEXED FIELDS display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: the INDEXED FIELDS display itself, the available SPECIAL FUNCTIONS and a brief description of what they do, and an OPERATIONAL DESCRIPTION on this sub-section (PROGRAM OPTION #2).

5.3.2.1.1 INDEXED FIELDS DISPLAY. The INDEXED FIELDS DISPLAY encompasses 7 (seven) major descriptive HEADINGS. They are:

a. '()' -> This represents the FIELD SEQUENCE ORDER. These numbers represent the sequence in which you will move through the fields in the START program. This is normally known as the 'DISPLAY SEQUENCE'. This is the only Data Field in this display that CAN NOT BE CORRECTED. In order to CORRECT (or CHANGE) the FIELD SEQUENCE ORDER, you must select PROGRAM OPTION #3 (SPECIAL FUNCTION '2). For further information, see SECTION 5.3.3.

b. 'PROMPT MESSAGE' -> This HEADING represents the data used to identify a particular FIELD. A few examples of data entered here would be:

LAST NAME :
FIRST NAME :
CITY :
STATE :
ZIP CODE :
BIRTH DATE :

Please note that each of the above fields are ended by a colon (":"). This is the character that is replaced by an asterisk ("*"), in the START program, to denote which field you are presently working on. When you execute to the next field, the asterisk is replaced by a colon. The MAXIMUM number of characters per PROMPT MESSAGE can not exceed 20 (twenty). The MINIMUM number of characters per PROMPT MESSAGE can not be less than 1 (one). All SPECIAL FUNCTIONS FOR EDITING DATA are operational for each PROMPT MESSAGE.

c. 'P/L' -> This HEADING represents whether the PROMPT MESSAGE is a TRUE PROMPT MESSAGE or a LABEL. A LABEL differs from a PROMPT MESSAGE in that it DOES NOT REFERENCE DATA. A LABEL is for CRT (or PRINTER)

display enhancement only. It serves no other function. A LABEL DOES NOT HAVE TO BE ENDED WITH A COLON.

d. 'LENGTH' -> This HEADING represents the LENGTH OF THE DATA FIELD. This is a NUMERICS ONLY field or, in other words, only numbers may be entered under this HEADING. This number must be greater than zero (N>0) and less than or equal to sixty-two (N<=62). The System will automatically set this field to 1 (one), as a default value should you fail to assign a data field length.

e. 'MATRIX' -> This HEADING represents the starting position in the DATA ARRAY (RECORD). This is a NUMERICS ONLY field (NUMBERS ONLY). If the FIELD IS A PROMPT MESSAGE with DATA ENTRY, then this number must be greater than one (N>1) and less than or equal to two hundred and forty-eight (N<=248). If the FIELD is a LABEL then the MATRIX must be set to "001". The AUTO-SYSTEM will automatically calculate this field for you. If you wish to change it, you may. Remember, the AUTO-SYSTEM uses the first byte (or matrix position) for record status. Therefore, you can never have a data entry field start with a matrix position of "001".

f. 'SORT' -> This HEADING represents the designated permanent SAVE-BACK ORDER of the FILE. THERE MUST BE A DESIGNATED SORT ORDER in order for the System to function properly. Each FILE may be sorted on up to 5 (five) FIELDS. SORT FIELDS are numerically set by the use of the digits 0 (zero) through 5 (five): 0 (zero) designates no SORT on this FIELD; 1 (one) designates the primary overall SORT order and 5 (five) designates the inner most SORT. The System will preset this value to 0 (zero).

g. 'DSPLY' -> This HEADING represents the control for which fields and in what order they will appear in the SEQUENTIAL RECORD LOOK-UP display in the start program. The System will display the MAXIMUM number of CHOSEN FIELDS that will completely fit on the screen. If more FIELDS are chosen than can fit on the screen, the EXCESS FIELDS are truncated. An entry in this area must be a number from 0 (zero) to 30 (thirty), inclusive. THERE MUST BE AT LEAST 1 (ONE) FIELD SET TO DISPLAY.

5.3.2.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 10 (ten) available SPECIAL FUNCTIONS in the INDEXED FIELDS display. They are, in SPECIAL FUNCTION sequence:

S.F. FUNCTION PERFORMED

'0 -> This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' 1 (one) FIELD, or, in other words, this key allows you to back space through the FIELDS.

'1 -> This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one FIELD, or, in other words, this key allows you to space forward.

'2 -> This key is used to select the FIELD you wish to add or correct. By pressing this key, you enter the DATA ENTRY sub-section.

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive FIELDS. This key works in the 'FORWARD' direction only.

'6 -> This key is used to jump ahead 5 (five) FIELDS at a time. This key works in the 'FORWARD' direction only.

'7 -> This key, when pressed, will return you to the PROGRAM OPTIONS display (see SECTION 5.3).

The following SPECIAL FUNCTIONS are found on the right side of the keyboard. They are only available after pressing SPECIAL FUNCTION key marked -> '2.

'(EXEC)' -> This key (known as the "RETURN/(EXEC)" key),

when pressed, will take you (the Operator) to the next point of DATA ENTRY.

'↑' -> This key (known as the "UP-ARROW" key),when pressed, will take you (the Operator) back to the previous point of DATA ENTRY.

'PRINT' -> This key (known as the "PRINT" key), when pressed, will terminate the DATA ENTRY mode of operation for a particular line. This, in effect, returns you to the first set of SPECIAL FUNCTIONS shown above.

5.3.2.1.3 OPERATIONAL DESCRIPTION. After choosing PROGRAM OPTION #2 (SPECIAL FUNCTION '1), the System will take you to the INDEXED FIELDS display. Use SPECIAL FUNCTION keys marked -> '5 and '6 to locate which page the FIELD you wish to correct is on. Use SPECIAL FUNCTION keys marked -> '0 and '1 to align the cursor with the FIELD you wish to correct (or add). Press SPECIAL FUNCTION key marked -> '2 to enter the DATA ENTRY mode of operation for that FIELD (line). The data sequence is left to right. After you have entered data in the 'DSPLY' entry, pressing SPECIAL FUNCTION marked -> '(EXEC)' will take you out of the DATA ENTRY mode of operation for that FIELD. Or, if you do not need to execute through all entry points, press SPECIAL FUNCTION marked -> 'PRINT'. Either of the above will take you out of the DATA ENTRY mode of operation and allow you to select another FIELD. When you are finished entering data into the INDEXED FIELDS display, press SPECIAL FUNCTION key marked -> '7 to return to the PROGRAM OPTIONS display. Remember, once SPECIAL FUNCTION key marked -> '2 is selected, you are in the DATA ENTRY MODE, which then activates all the EDIT SPECIAL FUNCTIONS KEYS -> '8 through '15 (see SECTION 5.3.1.1.2.1).

5.3.3 PROGRAM OPTION #3 (SPECIAL FUNCTION '2) -> CHANGE DISPLAY SEQUENCE. There is a maximum of 30 (thirty) individual data FIELDS and PROMPT messages, or LABEL messages, allowable per FILE reference in the AUTO-SYSTEM. This sub-section deals with the FIELD SEQUENCE ORDER (see SECTION 5.3.2.1.1.a). The FIELD SEQUENCE ORDER, normally known as the 'DISPLAY SEQUENCE', specifies the order in which the PROMPT and LABEL messages are displayed on the CRT, and specifically the order in which DATA FIELDS are corrected or added. If you are in the 'ADD' mode of operation, this should be the THIRD PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '2. This will take you to the "DISPLAY SEQUENCE" display (see FIGURE 5-9).

5.3.3.1 DISPLAY SEQUENCE DISPLAY (see FIGURE 5-9). This display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: 1) FIELD DESCRIPTIONS, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

5.3.3.1.1 FIELD DESCRIPTIONS. There are 2 (two) main HEADINGS in this display. They are:

1. OLD SEQUENCE -> This HEADING encompasses the "OLD" DISPLAY SEQUENCE number and the associated PROMPT message or LABEL.

2. NEW SEQUENCE -> This HEADING encompasses the "NEW" DISPLAY SEQUENCE number and the associated PROMPT message or LABEL.

5.3.3.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 6 (six) available SPECIAL FUNCTIONS in the DISPLAY SEQUENCE display. They are, in SPECIAL FUNCTION number sequence:

S.F. FUNCTION PERFORMED

'0 -> This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' 1 (one) FIELD, or, in other words, this key allows you to back space through the FIELDS.

'1 -> This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' 1 (one) FIELD, or, in other words, this key allows you to space forward.

'2 -> This key is used to move a FIELD from the "OLD" to the "NEW" sequence HEADINGS.

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive FIELDS. This key works in the 'FORWARD' direction only.

'6 -> This key is used to jump ahead 5 (five) FIELDS at a time. This key works in the 'FORWARD' direction only.

'7 -> This key, when pressed, will return you to the PROGRAM OPTIONS display (see SECTION 5.3).

5.3.3.1.3 OPERATIONAL DESCRIPTION. After choosing PROGRAM OPTION #3 (SPECIAL FUNCTION '2), the System will take you to the DISPLAY SEQUENCE display. Use SPECIAL FUNCTION keys marked -> '5 and '6 to locate which page the FIELD, you wish to transfer, is on. Use SPECIAL FUNCTION keys marked -> '0 and '1 to align the cursor with the FIELD you wish to transfer. Press SPECIAL FUNCTION key marked -> '2 to move the FIELD from the OLD SEQUENCE HEADING to the NEW SEQUENCE HEADING. By pressing SPECIAL FUNCTION '2, you will see the FIELD, with its old sequence number, erased and placed under the NEW SEQUENCE

HEADING, with a new sequence number. Any FIELDS that are not transferred are deleted from the FILE'S INDEX RECORD. Blanks may be used to separate active data from inactive data. When a BLANK FIELD is inserted between two FIELDS, only those FIELDS coming before the BLANK FIELD are correctable or displayable. All FIELDS, after the BLANK FIELD, will be retained by the System for future use, BUT are ignored by the AUTO-SYSTEM as far as CRT display or data entry is concerned.

NOTE: If a FIELD is not transferred during this operation, it is lost from the System until re-entered. If you wish to inhibit a FIELD temporarily (lock it out from corrections), then simply tranfer it after a BLANK FIELD.

When you are finished arranging the FIELDS' SEQUENCE NUMBER, press SPECIAL FUNCTION key marked -> '7 to return to the PROGRAM OPTIONS display.

5.3.4 PROGRAM OPTION #4 (SPECIAL FUNCTION '3) -> ADJUST CRT SCREEN DISPLAY. This sub-section allows you, the Operator, to arrange the data fields and PROMPT messages, and LABELS, on the CRT as you deem efficient. If you are in the 'ADD' mode of operation, this should be the FOURTH PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press th SPECIAL FUNCTION key marked -> '3. This will take you to the "CRT SCREEN" display (see FIGURE 5-10).

5.3.4.1 CRT SCREEN DISPLAY (see FIGURE 5-10). This display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: 1) FIELD DESCRIPTIONS, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

5.3.4.1.1 FIELD DESCRIPTIONS. At the top of the CRT, in the CRT SCREEN display, you, the Operator, will see the FILE DESCRIPTION (see SECTION 5.3.1.1.1) centered and framed, to either side, by asterisks ("*"). At the bottom of the CRT will be a single line of asterisks. These 2 (two) lines form the top and bottom perimeters for data display on the CRT. The side boundaries are the CRT screen itself. Within these perimeters are where the actual PROMPT MESSAGES, with the data fields and LABELS you have created, are displayed. The dots and dashes following each PROMPT message signify the data fields and whether or not the FIELDS have been assigned an EDIT check (see SECTION 5.3.5). When you correct the SCREEN DISPLAY, each FIELD will be displayed at the bottom of the CRT to show you which FIELD is presently being worked on and its sequence number.

5.3.4.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 2 (two) modes of operation for the use of SPECIAL FUNCTIONS. The first is the DISPLAY MODE and the second is the

ADJUST MODE.

5.3.4.1.2.1 SPECIAL FUNCTIONS -> DISPLAY MODE. The available SPECIAL FUNCTIONS for the DISPLAY MODE are:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '0 | -> NO CORRECTIONS. If you have no corrections that you wish to make, pressing SPECIAL FUNCTION key marked -> '0 will take you back to the PROGRAM OPTIONS display. |
| '2 | -> CORRECT. If There is a change you wish to make, pressing SPECIAL FUNCTION key marked -> '2 will take you into the ADJUST MODE of operation. |

5.3.4.1.2.2 SPECIAL FUNCTIONS -> ADJUST MODE. There are 9 (nine) available SPECIAL FUNCTIONS in the ADJUST MODE. They are, in SPECIAL FUNCTION sequence:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '0 | -> Pressing this key will cause the FIELD, now displayed at the bottom of the CRT screen, to position itself 1 (one) line above where it was located. If you are at the top of the CRT screen, this key has no effect. |
| '1 | -> Pressing this key will cause the FIELD, now displayed at the bottom of the CRT screen, to position itself 1 (one) line below where it was located. If you are at the bottom of the CRT screen, this key has no effect. |
| '11 | -> Pressing this key will position the FIELD, you are now working on, 5 (five) places to the right of where the FIELD originally was. However, upon reaching the end of the display screen, this key is no longer functional, since the FIELD will not move pass the boundaries of the CRT SCREEN. |
| '12 | -> Pressing this key will position the FIELD, you are now working on, 1 (one) place to the right of where the FIELD originally was. However, upon reaching the end of the diplay screen, this key is no longer functional, since the FIELD will not move pass the boundaries of the CRT SCREEN. |
| '13 | -> Pressing this key will cause the same actions as SPECIAL FUNCTION '12, except that it will move the FIELD left 1 (one) place. |
| '14 | -> Pressing this key will cause the same actions as SPECIAL FUNCTION '11, except that it will move |

the FIELD left 5 (five) places.

'(EXEC)' -> This key (known as the "RETURN/(EXEC) key), when pressed, will take you, the Operator, to the next FIELD.

'↑' -> This key (known as the "UP-ARROW"), when pressed, will take you back to the previous FIELD. If you are working on the first FIELD and press this key, you will still be working on the FIRST FIELD.

'PRINT' -> This key (known as the "PRINT" key), when pressed, will terminate the ADJUST mode and return you to the DISPLAY mode.

5.3.4.1.3 OPERATIONAL DESCRIPTION. Once having selected this PROGRAM OPTION, the System will take you to the CRT SCREEN display. You will be in the DISPLAY mode and you will have the option to not correct or adjust the CRT SCREEN, or to correct or adjust the CRT SCREEN. If you have no corrections, press the SPECIAL FUNCTION key marked -> '0 to return you to the PROGRAM OPTIONS display. If you do want to correct or adjust the CRT SCREEN, press the SPECIAL FUNCTION key marked -> '2 to enter the ADJUST mode. Now, use the SPECIAL FUNCTIONS marked -> '(EXEC)' and '↑' to locate the FIELD you wish to adjust on the CRT SCREEN. Once you have found the FIELD you want to adjust, use the SPECIAL FUNCTION keys marked -> '0, '1, '11, '12, '13 and '14 to move the FIELD to where you want it. When you are finished adjusting the CRT SCREEN, press the SPECIAL FUNCTION marked -> 'PRINT' to return to the DISPLAY mode (see SECTION 5.3.4.1.2.1). If there are no more corrections, press SPECIAL FUNCTION key marked -> '0 to return to the PROGRAM OPTIONS display.

5.3.5 PROGRAM OPTION #5 (SPECIAL FUNCTION '4) -> SET EDIT OPTIONS. This sub-section allows you, the Operator, to set EDIT OPTIONS for each FIELD. This causes the START program to only allow entry of data as you describe it. As an example, if you set a FIELD to EDIT OPTION -> 02, the START program will allow entry of numbers only. If any data other than numbers are entered, the START program will display an "ERROR" message and keep you on that FIELD until the correct type of data is entered. If you are in the 'ADD' mode of operation, this should be the FIFTH PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '4. This will take you to the EDIT OPTIONS display (see FIGURE 5-11).

5.3.5.1 EDIT OPTIONS DISPLAY (see FIGURE 5-11). This display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: 1) FIELD DESCRIPTIONS, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

5.3.5.1.1 FIELD DESCRIPTIONS. The major portion of the EDIT OPTIONS display is a listing of available EDIT OPTIONS. Listed below are the MAIN EDIT OPTIONS and the FUNCTION PERFORMED by each.

| EDIT OPTION | FUNCTION PERFORMED |
|---|---|
| 00 | -> LABEL VARIABLE. This EDIT OPTION will cause the entry in the PROMPT MESSAGE to be displayed as a LABEL with no DATA ENTRY allowed. Entering this EDIT OPTION will also change the 'P/L' entry (see SECTION 5.3.2.1.1.a) to an "L". All other EDIT OPTIONS will cause the 'P/L' entry to be set to "P". |
| 01 | -> NO EDIT CHECKS. This EDIT OPTION, as it implies, will allow the Operator in the START program to enter data of any kind into this FIELD. |
| 02 | -> DIGITS ONLY. This EDIT OPTION defines a FIELD as numeric. The only data accepted into this FIELD will be the digits 0 (zero) through 9 (nine). No spaces will be accepted. |
| 03 | -> NO# RT-JUSTIFY. This EDIT OPTION defines a FIELD as numeric with spaces allowed. This EDIT OPTION will cause a number entered to be justified (aligned) to the right side of the FIELD. |
| 04 | -> YYMM FORMAT. This EDIT OPTION defines the FIELD as a date entry with the specific format of a 2 (two) digit YEAR, followed by a 2 (two) digit MONTH. (Example -> "7706" indicates the 6 (six) month (JUNE) of 1977.) THE FIELD LENGTH MUST BE SET TO 4 (four) (see SECTION 5.3.2.1.1). |
| 05 | -> YYMMDD FORMAT. This EDIT OPTION defines the FIELD as a date entry with the specific format of a 2 (two) digit YEAR, followed by a 2 (two) digit MONTH, followed by a 2 (two) digit DAY. (Example -> "770623" indicates the 23 (twenty third) day of the 6 (six) month (JUNE) of 1977.) THE FIELD LENGTH MUST BE SET TO 6 (six) (see SECTION 5.3.2.1.1). |
| 06 | -> JULIAN (YYDDD). This EDIT OPTION defines the FIELD as a date entry with the specific format of a 2 (two) digit YEAR, followed by a 3 (three) digit DAY. (Example -> "77213" indicates the 213 (two hundred and thirteenth) day of 1977, which is the same as 01 AUGUST 1977.) THE FIELD |

LENGTH MUST BE SET TO 5 (five) (see SECTION 5.3.2.1.1).

07 -> ALPHA's ONLY. This EDIT OPTION defines the FIELD as an alphabetic only field. No numbers or special characters will be accepted.

08 -> HYPHEN OUT. This EDIT OPTION will cause a field to be set to hyphens ("-") if it is blank.

Just below the listing of available EDIT OPTIONS will be the FILE DESCRIPTION centered in a line of asterisks. Just below this, in the ADJUST mode, will be the FIELD SEQUENCE NUMBER, the PROMPT MESSAGE or LABEL, and a DATA ENTRY POSITION FOR THE ERROR CODE, for the FIELD you are presently working on. The DATA ENTRY field is a 2 (two) digit numerics only field.

5.3.5.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 2 (two) modes of opeation for the use of SPECIAL FUNCTIONS. The first is the DISPLAY MODE and the second is the ADJUST MODE.

5.3.5.1.2.1 SPECIAL FUNCTIONS -> DISPLAY MODE. The DISPLAY mode SPECIAL FUNCTIONS are the same as for PROGRAM OPTION #4 (SPECIAL FUNCTION '3). For further details see SECTION 5.3.4.1.2.1.

5.3.5.1.2.2 SPECIAL FUNCTIONS -> ADJUST MODE. There are 3 (three) available SPECIAL FUNCTIONS in the ADJUST mode plus all SPECIAL FUNCTIONS FOR EDITING DATA (see SECTION 5.3.1.1.2.1). The 3 (three) available SPECIAL FUNCTIONS are:

S.F. FUNCTION PERFORMED

'(EXEC)' -> This key (known as the "RETURN/(EXEC) key), when pressed, will take you, the Operator, to the next FIELD.

'↑' -> This key (known as the "UP-ARROW"), when pressed, will take you back to the previous FIELD. If you are working on the first FIELD and press this key, you will still be working on the FIRST FIELD.

'PRINT' -> This key (known as the "PRINT" key), when pressed, will terminate the ADJUST mode and return you to the DISPLAY mode.

5.3.5.1.3 OPERATIONAL DESCRIPTION. Once having selected this PROGRAM OPTION, the System will take you to the EDIT OPTIONS display. You will be in the DISPLAY mode and you will have the option to not correct or adjust the EDIT OPTIONS, or to correct or adjust the EDIT OPTIONS. If you have no corrections, press the SPECIAL FUNCTION key marked -> '0 to

return you to the PROGRAM OPTIONS display. If you do want to correct or adjust the EDIT OPTIONS, press the SPECIAL FUNCTION key marked -> '2 to enter the ADJUST mode. Now, use the SPECIAL FUNCTIONS marked -> '(EXEC)' and '↑' to locate the FIELD you wish to correct. Now enter in the exact 2 (two) digits corresponding to the chosen EDIT OPTION. When you have corrected or adjusted all FIELDS needing such, press the SPECIAL FUNCTION marked -> 'PRINT' to return to the DISPLAY mode (see SECTION 5.3.5.1.2.1). If there are no more corrections, press SPECIAL FUNCTION key marked -> '0 to return to the PROGRAM OPTIONS display.

NOTE: When establishing a FIELD (see SECTION 5.3.2.1), all EDIT OPTIONS are set automatically to "00" for LABELS and "01" for all other FIELDS. To change an EDIT OPTION, this PROGRAM OPTION must be used.

5.3.6 PROGRAM OPTION #6 (SPECIAL FUNCTION '5) -> SAVE (or RESAVE) HEADER TO INDEX FILE (RE-SELECT OPTIONS). This PROGRAM OPTION, when executed, will SAVE a newly created INDEX RECORD, to the INDEX FILE. This is the last PROGRAM OPTION to be choosen in either the 'ADD' or 'CORRECT' mode of operation. To choose this PROGRAM OPTION, press SPECIAL FUNCTION key marked -> '5. This will return you to the SYSTEM OPTIONS DISPLAY (see SECTION 5.2).

SECTION 6. PINDEXER

6.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will, first, describe the PINDEXER program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for PROGRAM LOADING.

6.0.1 GENERAL PROGRAM DESCRIPTION. This program is the Print Indexer. It performs some of the same functions as the INDEXER program, except that it works with the Print Index ("PINDEX") file. In this program, you can modify the elements and fields within each record of the specified file, as specified by the INDEXER program, and the format to be used on the high speed printer. Format includes column headers, spacing, and print order.

6.0.2 PROGRAM LOADING. PINDEXER is not a stand alone program. Any attempt to directly load and run this program will result in errors. Program loading for the Print Indexer program is handled automatically by the following programs:

a. INDEXER -> see System Option S.F. '4, Section 5.2 for further details.

b. PRINT -> see Print Option No. 4, Section 13 for further details.

6.1 OPERATION MODES. There are 3 (three) main modes of operation in the PINDEXER program. They are "ADD", "PERMANENT CORRECT", and "TEMPORARY CORRECT" modes of operation.

6.1.1 ADD. The "ADD" mode is automatically invoked by the system the first time you (the Operator) enter the Print Indexer to create a new PINDEX record. In this mode, it is recommended you return to the INDEXER program after saving the PINDEX record to the disk.

6.1.2 CORRECT MODE OPTIONS (see FIGURE 6-1). If the "ADD" mode is not automatically invoked by the system, you (the operator) have the option of either PERMANENTLY correcting (S.F. '2) the PINDEX record or, TEMPORARILY correcting (S.F. '4) the PINDEX record for a one time PRINT procedure. If you are PERMANENTLY correcting the PINDEX record, it is recommended you return to the INDEXER program when the PINDEX record is re-saved back to the disk. If you are TEMPORARILY correcting the PINDEX record, you will only be able to go directly to the PRINT program.

6.2 PROGRAM OPTIONS. The PROGRAM OPTIONS display (FIGURE 6-2) shows you (the Operator) the 4 (four) available PROGRAM OPTIONS. They are, in SPECIAL FUNCTION key sequence:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '1 | REVISE COLUMN HEADER LABELS |

```
************************ PRINT INDEXER ****************************

     ***** YOU ARE IN THE 'CORRECT' MODE OF OPERATION *****

YOU, THE OPERATOR, HAVE THE FOLLOWING OPTIONS :

   ' 2  ->  PERMANENTLY CORRECT (REVISE) THIS PRINT INDEX RECORD


   ' 4  ->  TEMPORARILY CORRECT (REVISE) THIS PRINT INDEX RECORD
            FOR A ONE (1) TIME PRINT SEQUENCE

************************ PERSONNEL FILE ****************************
>>>>>>>>>> USE S.F. KEYS ABOVE TO CHOOSE YOUR OPTION <<<<<<<<<<
```

FIGURE 6-1

'2 CHANGE PRINT ORDER SEQUENCE
'3 SET PRINT FORMAT OPTIONS
(for the "ADD" mode of operation the following option applies)
'4 SAVE PRINT HEADER TO PRINT-INDEX FILE
(for the "PERMANENT CORRECT" mode of operation the following option applies)
'4 RE-SAVE PRINT HEADER TO PRINT-INDEX FILE
(for the "TEMPORY CORRECT" mode of operation the following option applies)
'4 GO DIRECTLY TO PRINT ROUTINE

The PROGRAM OPTIONS display will tell you what "MODE OF OPERATION" you (the Operator) are in and what FILE you are working on (i.e. - FILE DESCRIPTION). It is recommended, when in the 'ADD' mode, that you work the PROGRAM OPTIONS in order by SPECIAL FUNCTION number sequence. To choose one of the above options, press the corresponding SPECIAL FUNCTION key (the thin keys at the top of the keyboard).

6.2.1 PROGRAM OPTION #1 (SPECIAL FUNCTION '1) -> REVISE COLUMN HEADER LABELS. There is a maximum of 30 (thirty) individual data fields allowable per FILE reference in the AUTO-SYSTEM. A FIELD, in reference to its use in PROGRAM OPTION #1, encompasses the HEADER or LABEL MESSAGE, the HEADER LENGTH, the DATA LENGTH, the beginning MATRIX position, and the number of spaces USED on the actual printout. If you are in the 'ADD' mode of operation, this should be the first PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '1. This will take you to the "INDEXED HEADERS" display (see FIGURE 6-3).

6.2.1.1 INDEXED HEADERS DISPLAY (see FIGURE 6-3). The INDEXED HEADERS display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: the INDEXED HEADERS display itself, the available SPECIAL FUNCTIONS and a brief description of what they do, and an OPERATIONAL DESCRIPTION on this sub-section (PROGRAM OPTION #1).

6.2.1.1.1 INDEXED HEADERS DISPLAY. The INDEXED HEADERS DISPLAY encompasses 7 (seven) major descriptive HEADINGS. They are:

a. '()' -> This represents the PRINT ORDER SEQUENCE. These numbers represent the sequence in which the Header and data fields will be printed. This is normally known as the 'DISPLAY SEQUENCE'. This is the only Data Field in this display that can not be corrected. In order to CORRECT (or CHANGE) the PRINT ORDER SEQUENCE, you must select PROGRAM OPTION #2 (SPECIAL FUNCTION '2). For further

```
************************ PRINT INDEXER ******************************
  ***  YOU ARE IN THE 'PERMANENT CORRECT' MODE OF OPERATION ***

YOUR OPTIONS ARE NOW AS FOLLOWS:
      ' 1 ->  REVISE COLUMN HEADER LABELS
      ' 2 ->  CHANGE PRINT ORDER SEQUENCE
      ' 3 ->  SET PRINT FORMAT OPTIONS
      ' 4 ->  RE-SAVE PRINT HEADER TO PRINT-INDEX FILE


************************ PERSONNEL FILE *****************************
>>>>>>>>>> USE S.F. KEYS ABOVE TO CHOOSE YOUR OPTION <<<<<<<<<<
```

FIGURE 6-2

information, see SECTION 6.2.2.

b. 'COLUMN HEADER' -> This HEADING represents the data used to identify a particular FIELD. These are the actual HEADINGS printed on your report. A few examples of data entered here would be:

LAST NAME
FIRST NAME
CITY
STATE
ZIP
BIRTH DATE

The maximum number of characters per COLUMN HEADER can not exceed 20 (twenty). The minimum number of characters per COLUMN HEADER can not be less than 1 (one). All special functions for editing data are operational for each COLUMN HEADER.

c. 'HDR/LEN' -> This heading represents the COLUMN HEADER length. If this number is larger than the DATA length, you may wish to shorten the HEADER to conserve space on your report. This field is automatically calculated for you (the Operator) by the SYSTEM.

d. 'H/L' -> This HEADING represents whether the COLUMN HEADER is a TRUE COLUMN HEADER or a LABEL. A LABEL differs from a COLUMN HEADER in that it does not reference data. A LABEL is for HIGH SPEED PRINTER display enhancement only. It serves no other function. A label is used to save space in the data record. On the printout, a label appears like data (Example -> DATA to print = "GS-12". Data stored is "12" and label is "GS-").

e. 'LENGTH' -> This HEADING represents the LENGTH OF THE DATA FIELD. This is a numerics only field or, in other words, only numbers may be entered under this HEADING. This number must be greater than zero (N>0) and less than or equal to sixty-two (N<=62). The System will automatically set this field to 1 (one), as a default value should

```
 () COLUMN HEADER          HDR/LEN  H/L   LENGTH   MATRIX   USED
*************************************************************************
  1 LAST NAME                  9     H      25       02      26
  2 FIRST NAME                10     H      10       27      11
  3 BIRTH DATE                10     H       6       37      11
  4 STREET ADDRESS            14     H      25       43      26
  5 CITY                       4     H      10       68      11
  6 STATE                      5     H       2       78       6
  7 ZIP CODE                   8     H       5       80       9
  8 ** PERSONAL DATA **       19     L
  9 *** ADDRESS DATA ***      20     L
 10 BLANK
********************** PERSONNEL FILE ******************************
'05    = NEXT PAGE      '06 = SKIP 5 LINES  '07     = 'MENU'
'EXEC' = NEXT FIELD     '↑' = BACK ONE      'PRINT' = SAVE LINE
```

FIGURE 6-3

you fail to assign a data field length.

f. 'MATRIX' -> This HEADING represents the starting position in the DATA ARRAY (RECORD). This is a numeric field (numbers only). If the FIELD is a COLUMN HEADER with DATA ENTRY, then this number must be greater than one (N>1) and less than or equal to two hundred and forty-eight (N<=248). If the FIELD is a LABEL then the MATRIX must be set to "001". The AUTO-SYSTEM will automatically calculate this field for you. If you wish to change it, you may. Remember, the AUTO-SYSTEM uses the first byte (or matrix position) for record status.

g. 'USED' -> This HEADING represents the number of actual spaces used on the high speed printer to print that field as defined. This field is calculated for you automatically by the SYSTEM. Its only purpose is to help you (the Operator) in setting up your printed report. The calculation represents the larger of either the COLUMN HEADER or the DATA LENGTH plus 1 (one) for spacing.

When the Print Index record is set up for the first time, all fields from the Index record are automatically copied to the Print Index record. Any changes made to the Print Index record are normally to either add a new field or enhance the present printout by shortening fields or combining fields to make new print formats. Any changes made to the Index record should also be made to the Print Index record. When making any such changes, be sure to use the DATA BASE LAYOUT CHART to ensure that the matrix position and field length are the same as in the Index record. Also note that two fields can be combined on a printout to look like one field. Or one field could be shortened to show only the data you wish to display. Remember, the matrix position indicates the start of the data field and the length represents how many characters will print.

6.2.1.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 10 (ten) available SPECIAL FUNCTIONS in the INDEXED FIELDS display. They are, in SPECIAL FUNCTION sequence:

S.F. FUNCTION PERFORMED

```
 *  OLD PRINT SEQUENCE  *          *  NEW PRINT SEQUENCE  *
 ()  COLUMN HEADER/FIELD           ()  COLUMN HEADER/FIELD
 ..  ....................              ....................
  1  LAST NAME                      1  BLANK
  2  FIRST NAME
  3  BIRTH DATE
  4  STREET ADDRESS
  5  CITY
  6  STATE
  7  ZIP CODE
  8  ** PERSONAL DATA **
  9  *** ADDRESS DATA ***
 10  BLANK
*** PERSONNEL FILE    ***      USED = 0          AVAIL = 131
'02 -> SAVE TO 'NEW'  '05 -> NEXT PAGE       '07   -> 'MENU'
                      '06 -> SKIP 5 LINES
```

FIGURE 6-4

'0 -> This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' 1 (one) FIELD, or, in other words, this key allows you to back space through the FIELDS.

'1 -> This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one FIELD, or, in other words, this key allows you to space forward.

'2 -> This key is used to select the FIELD you wish to add or correct. By pressing this key, you enter the DATA ENTRY sub-section.

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive FIELDS. This key works in the 'FORWARD' direction only.

'6 -> This key is used to jump ahead 5 (five) FIELDS at a time. This key works in the 'FORWARD' direction only.

'7 -> This key, when pressed, will return you to the PROGRAM OPTIONS display (see SECTION 6.2).

The following SPECIAL FUNCTIONS are found on the right side of the keyboard. They are only available after pressing SPECIAL FUNCTION key marked -> '2.

'(EXEC)' -> This key (known as the "RETURN/(EXEC)" key), when pressed, will take you (the Operator) to the next point of DATA ENTRY.

'↑' -> This key (known as the "UP-ARROW" key),when pressed, will take you (the Operator) back to the previous point of DATA ENTRY.

'PRINT' -> This key (known as the "PRINT" key), when pressed, will terminate the DATA ENTRY mode of operation for a particular line. This, in effect, returns you to the first set of SPECIAL FUNCTIONS shown above.

6.2.1.1.3 OPERATIONAL DESCRIPTION. After choosing PROGRAM OPTION #1 (SPECIAL FUNCTION '1), the System will take you to the COLUMN HEADERS display. Use SPECIAL FUNCTION keys marked -> '5 and '6 to locate which page the FIELD you wish to correct is on. Use SPECIAL FUNCTION keys marked -> '0 and '1 to align the cursor with the FIELD you wish to correct (or add). Press SPECIAL FUNCTION key marked -> '2 to enter the DATA ENTRY mode of operation for that FIELD (line). The data sequence is left

```
****************** SET PRINT FORMAT OPTIONS ************************
00 = LABEL VARIABLE . 12 =                . 24 =
01 = FORMAT AS IS   . 13 =                . 25 =
02 = SPACE OUT (1+1). 14 =                . 26 =
03 =                . 15 =                . 27 =
04 =                . 16 =                . 28 =
05 =                . 17 =                . 29 =
06 =                . 18 =                . 30 =
07 =                . 19 =                . 31 =
08 =                . 20 =                . 32 =
09 =                . 21 =                . 33 =
10 =                . 22 =                . 34 =
11 =                . 23 =                . 35 =
************************ PERSONNEL FILE ******************************
S.F. KEYS :   ' 0 = NO CORRECTIONS ' 2 = ADJUST FORMAT OPTIONS

************************ PERSONNEL FILE ******************************
*(  1  )      STREET ADDRESS              ERROR CODE : 01
'EXEC' = NEXT FIELD      '↑' = BACK ONE      'PRINT' = 'MENU'
```

FIGURE 6-5

to right. After you have entered data in the last entry point, pressing SPECIAL FUNCTION marked -> '(EXEC)' will take you out of the DATA ENTRY mode of operation for that FIELD. Or, if you do not need to execute through all entry points, press SPECIAL FUNCTION marked -> 'PRINT'. Either of the above will take you out of the DATA ENTRY mode of operation and allow you to select another FIELD. When you are finished entering data into the COLUMN HEADERS display, press SPECIAL FUNCTION key marked -> '7 to return to the PROGRAM OPTIONS display. Remember, once SPECIAL FUNCTION key marked -> '2 is selected, you are in the DATA ENTRY MODE, which then activates all the EDIT SPECIAL FUNCTIONS KEYS -> '8 through '15 (see SECTION 5.3.1.1.2.1).

6.2.2 PROGRAM OPTION #2 (SPECIAL FUNCTION '2) -> CHANGE PRINT ORDER SEQUENCE. There is a maximum of 30 (thirty) individual data FIELDS and COLUMN HEADERs, or LABEL messages, allowable per FILE reference in the AUTO-SYSTEM. This sub-section deals with the FIELD SEQUENCE ORDER (see SECTION 6.2.1.1.1.a). The FIELD SEQUENCE ORDER, normally known as the 'PRINT SEQUENCE', specifies the order in which the HEADER and LABEL messages are displayed on the high speed printer. If you are in the 'ADD' mode of operation, this should be the second PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '2. This will take you to the "PRINT SEQUENCE" display (see FIGURE 6-4).

6.2.2.1 PRINT SEQUENCE DISPLAY (see FIGURE 6-4). This display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: 1) FIELD DESCRIPTIONS, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

6.2.2.1.1 FIELD DESCRIPTIONS. There are 4 (four) main HEADINGS in this display. They are:

1. OLD SEQUENCE -> This HEADING encompasses the "OLD" PRINT SEQUENCE number and the associated COLUMN HEADER or LABEL.

2. NEW SEQUENCE -> This HEADING encompasses the "NEW" PRINT SEQUENCE number and the associated COLUMN HEADER or LABEL.

3. USED -> This represents the number of characters used on the printed report. This field is calculated by adding all 'USED' from the INDEXED HEADER DISPLAY (see section 6.2.1.1.1.g).

4. 'AVAIL' -> This field represents the number of characters left available on the report. The field which causes this field to go negative will be truncated from the report along with any fields

following it.

6.2.2.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 6 (six) available SPECIAL FUNCTIONS in the PRINT SEQUENCE display. They are, in SPECIAL FUNCTION number sequence:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '0 -> | This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' 1 (one) FIELD, or, in other words, this key allows you to back space through the FIELDS. |
| '1 -> | This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' 1 (one) FIELD, or, in other words, this key allows you to space forward. |
| '2 -> | This key is used to move a FIELD from the "OLD" to the "NEW" sequence HEADINGS. |
| '5 -> | This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive FIELDS. This key works in the 'FORWARD' direction only. |
| '6 -> | This key is used to jump ahead 5 (five) FIELDS at a time. This key works in the 'FORWARD' direction only. |
| '7 -> | This key, when pressed, will return you to the PROGRAM OPTIONS display (see SECTION 6.2). |

6.2.2.1.3 OPERATIONAL DESCRIPTION. After choosing PROGRAM OPTION #2 (SPECIAL FUNCTION '2), the System will take you to the PRINT SEQUENCE display. Use SPECIAL FUNCTION keys marked -> '5 and '6 to locate which page the FIELD, you wish to transfer, is on. Use SPECIAL FUNCTION keys marked -> '0 and '1 to align the cursor with the FIELD you wish to transfer. Press SPECIAL FUNCTION key marked -> '2 to move the FIELD from the OLD SEQUENCE HEADING to the NEW SEQUENCE HEADING. By pressing SPECIAL FUNCTION '2, you will see the FIELD, with its old sequence number, erased and placed under the NEW SEQUENCE HEADING, with a new sequence number. Any FIELDS that are not transferred are deleted from the FILE'S INDEX RECORD. Blanks may be used to separate active data from inactive data. When a BLANK FIELD is inserted between two FIELDS, only those FIELDS coming before the BLANK FIELD are printable. All FIELDS, after the BLANK FIELD, will be retained by the System for future use, BUT are ignored by the AUTO-SYSTEM as far as printing is concerned.

NOTE: If a FIELD is not transferred during this operation, it is lost from the System until re-entered. If you wish to inhibit a FIELD temporarily (lock it out from printing), then simply tranfer it after a BLANK FIELD.

When you are finished arranging the FIELDS' PRINT SEQUENCE NUMBER, press SPECIAL FUNCTION key marked -> '7 to return to the PROGRAM OPTIONS display.

6.2.3 PROGRAM OPTION #3 (SPECIAL FUNCTION '3) -> SET PRINT FORMAT OPTIONS. This sub-section allows you, the Operator, to set FORMAT OPTIONS for each FIELD. This causes the PRINT program to print data as you describe it. If you are in the 'ADD' mode of operation, this should be the third PROGRAM OPTION you choose. To choose this PROGRAM OPTION, press the SPECIAL FUNCTION key marked -> '3. This will take you to the PRINT FORMAT OPTIONS display (see FIGURE 6-5).

6.2.3.1 PRINT FORMAT OPTIONS DISPLAY (see FIGURE 6-5).
This display will be discussed in 3 (three) major sub-sections. They are, in order of discussion: 1) FIELD DESCRIPTIONS, 2) the available SPECIAL FUNCTIONS, and 3) an OPERATIONAL DESCRIPTION for this PROGRAM OPTION.

6.2.3.1.1 FIELD DESCRIPTIONS. The major portion of the PRINT FORMAT OPTIONS display is a listing of available FORMAT OPTIONS. Listed below are the MAIN FORMAT OPTIONS and the FUNCTION PERFORMED by each.

| FORMAT OPTION | | FUNCTION PERFORMED |
|---|---|---|
| 00 | -> | LABEL VARIABLE. This FORMAT OPTION will cause the entry in the COLUMN HEADER to be displayed as a LABEL. Entering this FORMAT OPTION will also change the 'H/L' entry (see SECTION 6.2.1.1.1.d) to an "L". All other FORMAT OPTIONS will cause the 'H/L' entry to be set to "H". |
| 01 | -> | FORMAT AS IS. This FORMAT OPTION, as it implies, will print the data as it appears in the record with no alteration as to format. |
| 02 | -> | SPACE OUT (1+1). This FORMAT OPTION causes the PRINT program to print the field a character at a time, inserting spaces between each character. It also numbers, in the COLUMN HEADER, each character of data it prints, starting with '1'. |

Just below the listing of available FORMAT OPTIONS will be the FILE DESCRIPTION centered in a line of asterisks. Just below this, in the ADJUST mode, will be the PRINT SEQUENCE NUMBER, the COLUMN HEADER or LABEL, and a DATA ENTRY POSITION FOR THE

FORMAT CODE, for the FIELD you are presently working on. The DATA ENTRY field is a 2 (two) digit numerics only field.

6.2.3.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 2 (two) modes of operation for the use of SPECIAL FUNCTIONS. The first is the DISPLAY MODE and the second is the ADJUST MODE.

6.2.3.1.2.1 SPECIAL FUNCTIONS -> DISPLAY MODE. The DISPLAY mode SPECIAL FUNCTIONS are the same as for PROGRAM OPTION #4 (SPECIAL FUNCTION '3) in the INDEXER program. For further details see SECTION 5.3.4.1.2.1.

6.2.3.1.2.2 SPECIAL FUNCTIONS -> ADJUST MODE. There are 3 (three) available SPECIAL FUNCTIONS in the ADJUST mode plus all SPECIAL FUNCTIONS FOR EDITING DATA (see SECTION 5.3.1.1.2.1). The 3 (three) available SPECIAL FUNCTIONS are:

| S.F. | FUNCTION PERFORMED |
|---|---|
| '(EXEC)' -> | This key (known as the "RETURN/(EXEC) key), when pressed, will take you, the Operator, to the next FIELD. |
| '↑' -> | This key (known as the "UP-ARROW"), when pressed, will take you back to the previous FIELD. If you are working on the first FIELD and press this key, you will still be working on the FIRST FIELD. |
| 'PRINT' -> | This key (known as the "PRINT" key), when pressed, will terminate the ADJUST mode and return you to the DISPLAY mode. |

6.2.3.1.3 OPERATIONAL DESCRIPTION. Once having selected this PROGRAM OPTION, the System will take you to the FORMAT OPTIONS display. You will be in the DISPLAY mode and you will have the option to not correct or adjust the FORMAT OPTIONS, or to correct or adjust the FORMAT OPTIONS. If you have no corrections, press the SPECIAL FUNCTION key marked -> '0 to return you to the PROGRAM OPTIONS display. If you do want to correct or adjust the FORMAT OPTIONS, press the SPECIAL FUNCTION key marked -> '2 to enter the ADJUST mode. Now, use the SPECIAL FUNCTIONS marked -> '(EXEC)' and '↑' to locate the FIELD you wish to correct. Now enter in the exact 2 (two) digits corresponding to the chosen FORMAT OPTION. When you have corrected or adjusted all FIELDS needing such, press the SPECIAL FUNCTION marked -> 'PRINT' to return to the DISPLAY mode. If there are no more corrections, press SPECIAL FUNCTION key marked -> '0 to return to the PROGRAM OPTIONS display.

6.2.4 PROGRAM OPTION #4 (SPECIAL FUNCTION '4). This PROGRAM OPTION, when executed, will SAVE a newly created or CORRECTED PINDEX RECORD, to the PINDEX FILE. This is the last

PROGRAM OPTION to be choosen in either the 'ADD' or 'CORRECT' mode of operation. To choose this PROGRAM OPTION, press SPECIAL FUNCTION key marked -> '4. If you are in the 'TEMPORAY CORRECT' mode of operation, you will be sent directly back to the PRINT program. If you are in either of the other two modes of operation, then you will be given the choice of either going to the INDEXER program (S.F. '2), or going to the PRINT program (S.F. '4).

SECTION 7. LAYOUT

7.0 GENERAL PROGRAM DESCRIPTION. This program is a print routine to the high speed printer. It produces 2 (two) types of forms. They are an Index Listing and a File Layout. An Index Listing is a listing of all the files indexed on a disk along with pertinent information for each file. This information includes used and available characters, fields, and records. A File Layout is a visual date bare layout chart and a listing of information from the specified Index record. This information includes programming aids such as string values, matrix positions, lengths, and edit codes.

7.0.1 LOADING. Loading procedures for this program are handled automatically for you (the operator) by the Indexer program when you choose Option #1 (SF '1).

7.1 FILE SELECTION. This sub-section explains the "FILE SELECTION" display itself, the available "SFS", and their usage.

7.1.1 FILE SELECTION DISPLAY. See SECTION 5.2.2.1.1 for a complete description of the File Selection Display.

7.1.2 AVAILABLE SPECIAL FUNCTIONS. There are 5 (five) availble SF keyes in the Layout File Selection module. They are, in SF number sequence:

| S.F. | | FUNCTION PERFORMED |
|---|---|---|
| '0 | -> | This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' one FILE, or in other words, this key allows you to backspace one file at a time. |
| '1 | -> | This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one FILE, or in other words, this key allows you to space foward one file at a time. |
| '2 | -> | This key is used to select the file which you want a FILE LAYOUT of. |
| '3 | -> | This key is used to select the option of an INDEX LISTING. |
| '5 | -> | This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive INDEXED FILE'S RECORDS. This key works in the 'FORWARD' direction only. |

7.2 FIELD EXPLANATION FOR PRINTOUTS. The sub-section will explain the fields used in the 2 (two) printouts produced by this program. The 2 (two) printouts are the INDEX LISTING and the FILE LAYOUT.

7.2.1 INDEX LISTING (see FIGURE 7-1). The INDEX LISTING is devided into 2 (two) major sub-sections. They are 'FILE INFORMATION' and 'FILE STATUS'.

7.2.1.1 FILE INFORMATION. ' The following fields are listed under 'FILE INFORMATION':

a. FILE NAME -> This field lists the actual disk catalogued FILE NAME.

b. FILE DESCRIPTION -> This field lists the FILE DESCRIPTION entered by the Operator in the INDEXER program (see SECTION 5.3.1). The FILE DESCRIPTION, as its name implies, describes the file generically according to use by the USER.

c. BOUNCE FILE -> This field describes a file from which data is used when entering new records. For further information see SECTION 5.3.1.1.1.2.

d. MASTER FORMAT -> This field is used in conjunction with a MASTER FILE concept. For further information, contact NEEO-NORFOLK CODE 501.

e. MERGE START -> This field is used in conjunction with a MASTER FILE concept. For further information, contact NEEO-NORFOLK CODE 501.

f. merge end -> This field is used in conjunction with a MASTER FILE concept. For further information, contact NEEO-NORFOLK CODE 501.

7.2.1.2 FILE STATUS. The following fields are listed under 'FILE STATUS':

a. CHARACTERS USED -> This field shows the total number of bytes used in each of the file's, in question, records. The maximum number of characters can not exceed 248.

b. CHARACTERS AVAILABLE -> This field shows the total number of bytes AVAILABLE in each of the file's, in question, records for future use. This field can not be less than 0.

c. FIELDS USED -> This field shows the total number of fields used out of the available 30 (thirty) per file.

d. FIELDS AVAILABLE -> This field shows the total number of fields left to be used for future expansion.

e. RECORDS RESERVED -> This field shows the total number of records initially set aside for this file. For further information see SECTION 5.3.1.1.3.

f. RECORDS USED -> This field shows the total number of records USED up to the date of the INDEX LISTING.

g. RECORDS AVAILABLE -> This field shows the total number of records left available to be used for future expansion.

7.2.2 FILE LAYOUT (see FIGURE 7-2). The FILE LAYOUT is divided into 3 (three) major sections. They are 'DATA BASE LAYOUT CHART', 'HEADER INFORMATION', and 'FIELD INFORMATION'.

7.2.2.1 DATA BASE LAYOUT CHART. The DATA BASE LAYOUT CHART is a pictorial illustration of a 4 (four) by 62 (sixty-two) matrix. This matrix is a representation of a single data record. The first character of the matrix (row 1, column 1) is always blank (represented by a hyphen). Sort fields are represented by numbers, starting with "1". The field would be completely filled with "1"'s, thus indicating the position and number of characters of the major sort key. All other fields are represented by alphabetic characters, starting with "a". The two digit numbers appearing above the 'fields' are references to the 'FIELD INFORMATION' section.

7.2.2.2 HEADER INFORMATION. For further information, please see SECTION 7.2.1.

7.2.2.3 FIELD INFORMATION. The following fields are listed under 'FIELD INFORMATION':

a. PROMPT MESSAGE -> This field represents either the PROMPT or LABEL message displayed on the CRT in the correct or add mode of operation in the START program. For further information, see SECTION 5.3.2.1.1.

b. CRT P/L -> This field represents the Prompt or Label length. This field refers to the CRT display only.

c. CRT LINE -> This field represents the CRT line on which the Prompt or Label message will be displayed.

d. CRT POS -> This field represents the position on the CRT line that the data will be printed.

e. SORT ORDER -> This field represents the selected sort order of the file. For further information, see SECTION 5.3.2.1.1.

f. DISPLAY ORDER -> This field represents the display order of fields in the sequential look-up mode of operation in the START program. For further information, see SECTION 5.3.2.1.1.

g. MERGE SORT -> This field is used in conjunction with a MASTER file concept. For further information, contact NEEO-NORFOLK CODE 501.

h. MERGE ORDER -> This field is used in conjunction with a MASTER file concept. For further information, contact NEEO-NORFOLK CODE 501.

i. ERROR CODE -> This field represents the selected error option chosen when the file was created or corrected. For further information, please see SECTION 5.3.5.

j. FIELD LENGTH -> This field represents the length of the data field in question. For further information, please see SECTION 5.3.2.1.1.

k. MATRIX START -> This field represents the starting position in the data array of the field in question. For further information, see SECTION 5.3.2.1.1.

l. STRING VALUE'S -> This field represents the actual string value's of the field in question. If the field should have more than one string position, the program will print both. This information is useful if you are contemplating writing your own print routine. For further information, contact NEEO-NORFOLK CODE 501.

SECTION 8. FILESORT

8.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will first, describe the FILESORT program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for program loading.

8.0.1 GENERAL PROGRAM DESCRIPTION. This program, as its name suggests, sorts (places in a permanent and specific order) the individual index records located in the INDEX File. The specified sort order is "hardlocked" by the FILESORT program to use the 8 (eight) character FILE NAME field as the sort key. The FILE NAME is the actual name that you assigned the file in the INDEXER program (see SECTION 5.3.1.1.1) and is also the name that is assigned to the catalog area of the disk you are working with (refer to the WANG Laboratories Disk Reference Manual that came with your disk drive for an explainaton of the disk catalog operations). The FILE NAME is sorted into alphabetic order as an operator enhancement for those disks with many files established under the control of the AUTO-SYSTEM. Howvever, the primiary purpose for the FILESORT program is to permit the deletion of scratched files, along with their INDEX and PRINT INDEX records (refer to SECTION 5.2.7 for a discussion on file scratching). In addition, the FILESORT program also permits you to create a backup copy of your entire data disk.

8.0.2 PROGRAM LOADING. This program can not be loaded or used directly. It is considered a program option of the INDEXER program, and therfore requires that considerable data be transferred by the INDEXER program to the FILESORT program (i.e., the two programs are "chained" or interelated). If you attempt to directly load and run the FILESORT program, it will error off due to the lack of data normally transferred from the INDEXER program. Thus, you may only use this program by : first, loading the INDEXER program (refer to SECTION 5.0.2), and, second, by selecting program option #6 of the INDEXER program (refer to SECTION 5.2.6).

8.1 PROGRAM DISPLAYS. Once having selected Option #6 in the INDEXER program, that is to sort the index records, the FILESORT program is automatically loaded and run. There are no options for the operator to select until the sorting process is completed. However, there is a display sequence that may be meaningful to the operator during the sorting process.

8.1.1 SORT KEY CREATION DISPLAY. The first display that is encountered is a sequential listing of the "sort keys" as they are created. The sort process begins by loading the first index record located in the INDEX file. The 8 (eight) character file name is used as the prime part of the sort key. In addition to the file name, the disk location address is derived for each index record. The actual sort key consists of both the file name and the address. Thus the first display is

```
== ATTENTION : TO CLEAR THE DISK OF SCRATCHED FILES THE DISK
                SHOULD BE MOVED

===== SELECT OPTIONS =====

 1 = GO DIRECTLY TO INDEXER WITH OUT DISK MOVES
 2 = PERFORM NECESSARY MOVES ( RUN TIME = 15 MIN. +-)
 3 = MAKE BACK UP DISKS ALSO

YOUR OPTION IS?
================================================================
```

FIGURE 8-1

simply a sequential listing of each sort key as it is created. The sort key display for each INDEX record is a line that includes (1) the sequence number, (2) the file name, (3) the disk sector address, and (4) in parenthesis the file description assigned in the INDEXER program.

8.1.2 SORT STATUS SUMMARY DISPLAY. Once the sort routine has completed the creation of the individual sort keys for each individual index record, it begins the actual sorting process. The second display that is encountered is a summary of the amount of records that are involved in the sort. This summary display appears when the actual sort is taking place, refer to the below example:

```
******* SORTING   25  records *******
   **** AMOUNT    25  DONE    ****
```

The first line represents the amount of records involved in the current pass. If, for example, there are more index records on file than the sort routine can process at one time, it loads only as many records (195 records) as it can process (i.e., one pass). Once having sorted the first pass, the sort routine will return to the "SORT KEY CREATION AREA" display as it creates the sort keys for the second pass. The sort rountine will make as many passes as necessary, merging each pass together, until all index records are loaded and sorted together. Thus, the first line of the display indicates the amount of records involved in each individual pass, while the second line of the display indicates the total amount of records from all passes that have been sorted so far.

8.1.3 TEMPORARY FILE CONSTRUCTION DISPLAY. After all sort keys have been created and sorted, the sort routine then uses the sort keys to establish a temporary file of INDEX records. Since each sort key was sorted in file name order first, the remaining portion of the sort key is the disk address of the actual INDEX record that corresponds to the file name contained in the sort key. Therefore, the sort key (after sorting) contains the list of addresses, in file name order, for THE INDEX records. The temporary file construction area uses the sorted list of addresses to load the entire INDEX record (from the removable disk), and copy that entire record to the temporary file (on the fixed disk). The display for this area is exactly the same as that described for the "SORT KEY CREATION AREA" (paragraph 8.1.1), except that the sequence is shown in sorted order.

8.1.4 PERMANENT FILE CONSTRUCTION DISPLAY. Upon completion of creating the temporary file of INDEX records, now in sorted order on the fixed disk, the sort routine must now copy the temporary file back to the permanent file. Since the fixed disk is used by many routines in the AUTO-SYSTEM, all permanent files are kept only on removable disks. The process simply starts from the beginning of the temporary file, loading each

INDEX record in sequence, and saving that record back to the INDEX FILE on the removable disk. The display for this area consists of a listing of each INDEX record, as it is being transferred from the temporary file to the permanent file. The individual lines consist of (1) the sequence number and (2) the first 52 (fifty-two) characters of each INDEX record (which contains the file description, revision date, file name, bounce file, and a few control characters).

8.2 PROGRAM OPTIONS. The sort routine, itself, is actually completed once the temporary file has been transferred back to the permanent file. Although the ability to sort the INDEX records into file name order is an enhancement, the true purpose for this program was to permit the deletion of scratched files. During the actual transferring of records from the temporary file to the permanent file, any INDEX record that was flagged as "scratched" is omitted from the permanent file. Once the permanent file is re-established, the program then goes through the PRTINDEX (Print Index records), and also deletes any Print Index record that had an INDEX record omitted. Having omitted all INDEX records, the system then permits the removal of the actual scratched data file. In accordance with the procedures found in the WANG Laboratories Disk Reference Manual, to delete a scratched file from both the disk itself and the disk catalog, a "MOVE" statement must be executed. The program options in the FILESORT program are all related to this operation of moving.

8.2.1 MOVE OPERATIONS OPTIONS. FIGURE 8-1 is the only display that requires an operator's action. The display calls attention to the fact that the removable disk must be MOVED to the fixed disk to delete all scratched files, and then re-MOVED back from the fixed disk. Refering to FIGURE 8-1, the operator has only 3 (three) options, which are described below.

8.2.2 OPTION #1, NO MOVES. Option #1 allows the operator To jump around the MOVE operation, and return to the INDEXER program. This option is selected by typing the number "1", follwed by keying the "EXEC" key. This option is important for two reasons; first the MOVE operation often takes from 5 to 15 minutes, or longer. Quite often it is impossible to tie up the entire system for that period of time, being more desirable to perform the required MOVES later. The second reason, is that it is desirable to re-sort the INDEX records after a new one is added to the INDEX file. However, seldom is there a scratched file that needs to be deleted each time that a sort of the INDEX records is desired. Thus the ability to jump around the MOVE operation is available for those times when there are no scratched files to delete, in which case a MOVE operation would be a waste of time.

8.2.3 OPTION #2, PERFORM THE NECESSARY MOVES. This option, as it implies, will immediately MOVE the removable disk to the fixed disk, deleting all scratched files or programs during the

process. This option is selected by typing in the number "2", followed by keying the "EXEC" key. On the CRT screen, the following display will then appear:

```
DON'T TOUCH ME, I'M MOVING.
MOVING 'R' to 'F'
```

This display indicates that the removable ('R') is being MOVED to the fixed ('F') disk. This operation, depending on the disk size and amount of records on the disk, will take about 5 to 10 minutes. Upon completion, the program will then MOVE the fixed disk back to the removable disk, and display the following:

```
MOVING 'F' to 'R'
```

Again, depending on the size of the disk drive and the amount of records on the disk, the operation to MOVE the fixed ('F') disk back to the removable ('R') disk will take from 5 to 10 minutes. Upon completion of both MOVE operations, the program will SCRATCH the fixed disk ( SCRATCH DISK F LS=1, END=2), and automatically load and run the INDEXER program.

8.2.4 OPTION #3, MAKE BACKUP DISKS. Option #3 allows the operator to create a backup copy of the data disk. This option is selected by typing in the number "3", followed by keying the "EXEC" key. A backup disk is a common method of providing insurance in the event that the orginal data disk is damaged, lost, or rendered unuseable by bad data entry or operational procedures. Disk cartridges are now becoming relatively inexpensive, and therefore makes backup disks a cheap method of providing insurance. Considering that some data disks took many man-months to establish, the lost of some data disks could result in the replacement value of countless thousands of dollars - if it can be replaced at all. Option #3 performs the same exact operations as Option #2 (Paragraph 8.2.3), including the same displays. However, once the fixed disk has been MOVED back to the removable disk, instead of automatically loading the INDEXER program, the FILESORT program stops and displays the following to the operator:

```
**** TO MAKE A BACKUP DISK ****
CHANGE DISKS AND THEN KEY 'CONTINUE' THEN 'EXEC'
STOP
```

The operator would, at this time, remove the data disk from the disk drive and replace it with any formatted disk that has been designated and labelled as the backup disk for the prime data disk. Once the disk drive is ready (i.e., the "READY" light is on), the operator types in the word "CONTINUE", followed by keying the "EXEC" key. The program will then display the following:

```
DON'T TOUCH ME, I'M MOVING
MOVING 'F' TO 'R'
```

When the MOVE operation of the fixed ('F') disk being transferred to the new removable ('R') backup disk is finished, the program will display the following:

ANOTHER BACKUP DISK (Y/N) ?

If you wish to make several backup disks, respond to the above question by typing in the letter "Y", followed by keying the "EXEC" key. The program will repeat the same procedures already discussed for Option #3, by asking the operator to replace the disk. This process will continue until the above question is responded to with the letter "N", at which time the fixed disk will be scratched (SCRATCH DISK F LS = 1, END = 2), and the INDEXER program will automatically be loaded and run.

## SECTION 9. AUTO-SYSTEM UTILITIES

9.0 PROGRAM DESCRIPTION. There are various programs that are under development for the AUTO-SYSTEM. These programs are generally not released with the basic AUTO-SYSTEM programs, because they serve very specfic functions, and are therefore not considered to be safe for general purpose applications. Some of these programs will be described in this SECTION. If you determine that you have a need for these applications, contact NEEO-NORFOLK for further details. It is important to note that these programs will NOT be released without first recieving a brief training session on each program desired. The training sessions guaranty that the use of any of these programs will not harm your current data files.

9.1 FILECOPY. FILECOPY is a utility that is used to convert old data files, that are not in a D$(4)62 format (or AUTO-SYSTEM/TELECOM format), into the proper format for use with the AUTO-SYSTEM. It has been the policy of NEEO-NORFOLK, CODE 501 to aid new users of the AUTO-SYSTEM in converting their older data bases. This policy avoids the re-typing in of an entire data base, and insures that the conversion is accomplished in a safe and accurate manner. FILECOPY is also used to rearrange current AUTO-SYSTEM data files, to allow the expansion of fields. In other words, this feature permits the insertion of additional characters, by moving the array positions of fields that are next to the expanded field. Since this program can completely alter a data file, it requires that a qualified programmer supervise the running operations to insure that the changes to the data file are organized and re-INDEXED.

9.2 CORRECT. The CORRECT program permits rapid revision of the data within selected fields, using a comparision decision logic routine. The comparsion logic can be established to scan all records within one or more files on a disk. Any record meeting the required conditions, will be automatically altered to the selected revision data. Again, since this program results in a possible massive change to the data files, it requires that a qualified programmer supervise the operation.

9.3 INDEXER AND PRINT INDEXER CANS. These programs permit the rapid establishment of INDEX and PRINT INDEX records. The basic use for these programs are for those activities who have a large quantity of data files with very similar format requirements. Generally the CANS allow the establishment of up to 10 (ten) formats. Each format would include the CRT displays, error codes, printer formats, field prompts, field lengths and matrix data. This saves considerable time for those people who do have similar data formats. However, since formats are a unique thing, the establishment of formats does require that a qualified programmer modify these programs for the activity's customized format CANS.

9.4 WORD PROCESSOR INTERFACE SYSTEM. The programs to interface the WANG 2200 Series to the WANG Word Processor Series are still under development. When the system is completed, they will be made available with out the required training sessions. To date the system performs many functions such as, converting Word Processor floppy diskettes to WANG 2270 Series floppy diskettes, or any standard WANG storage device (i.e., 9 Channel Tape, 5 or 10 Meg Disks, and Cassette Tape). The purpose for this conversion is to allow a back up mode for the Word Processor, or to permit a massive storage of many Word Processor diskettes (i.e., to use the larger storage devices for documents needed for history, thus freeing up floppy diskettes for current documents). Also, since the Word Processor documents are now in standard WANG format, working documents or non-formal documents may be replayed using the higher speed printer (the WANG 2221W Printer has upper/lower case characters). The real developement efforts center around interfacing the AUTO-SYSTEM to the Word Processor to permit the creation of formal looking documents, using standard data. Also it is possible to use the Word Processor as a data entry device for the AUTO-SYSTEM. The system is expected to be available by January 15, 1978.

9.5 TELECOMMUNICATIONS. This system is also still under development. When finished, it will permit the operator to access any data file under the control of the AUTO-SYSTEM, and select records for transmission to another computer. The transmitted records can be either printed, saved to disk, or manipulated by the recieving site. The system also includes features that permit the transmission of the entire data disk, or of an entire permanent or temporary file. Another feature will be the capability to recieve records from a foreign computer, saving the records to a temporary file, from which an AUTO-SYSTEM file can then be quickly created (i.e., the system will aid the operator in designing the INDEX file, based upon the data recieved).

9.6 MISCELLANOUS PROGRAMS. Other features under development are the creation of HIERARCHICAL Data Files, WANG Card Reader interfaces, 9 Channel Tape interfaces, multiple sector records (i.e., variable size data files), user defined math functions for finanical and scientic applications, and of course, more program enhancements to the existing AUTO-SYSTEM.

SECTION 10. START

10.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will, first, describe the START program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for program loading.

10.0.1 GENERAL PROGRAM DESCRIPTION. This program allows you to choose the file with which you want to work, and to work with individual records within that file. You can add, change (correct), or delete records in a file with this program. The START program features the latest "State of the Art" techniques pioneered by NEEO-NORFOLK CODE 501. Full text editing capabilities (similiar to the actions of the EDIT ROM on program lines) are employed, which allows for character/cursor positioning, character insertion and deletion or erasure. Full record display while editing, with absolute control over any field or element (meaning the ability to go back and forth between any field at all times) is an important operator feature. Complete error and format checking is accomplished while editing, with appropriate diagnostic messages displayed to the operator. Record control is also enhanced by the sequential display of records' highlights so that the operator merely moves the cursor next to the desired record to work with, rather than the typing in of essential data to retrieve a record. The older method of typing in "access data" to retrieve a record is still permitted, but is used to rapidly retrieve (half-integral search) a record, or to position the sequential display mode. Complete file status is maintained, with the ability to visually see if a file needs to be sorted, if the file has been changed since the last Base Line Revision date, and the constant count of records on file with the amount of available records left. This program also connects or chains you to the following programs: SEARCH, SORT, and PRINT.

10.0.2 PROGRAM LOADING. To work with the START program:

a. Insure that the AUTO-SYSTEM programs are on a disk drive and that a data disk (removable platter) is on a disk drive, and that the disk drives are in the "READY" mode. Refer to your WANG System manuals for disk drive operating procedures. Also insure the the fixed platter on disk 310 (there must be a disk device addressed as 310) is scratched, with LS = 1, END = 2.

b. Clear the CPU memory by keying the verb "CLEAR", followed by an "(EXEC)" key.

c. Load the program by keying in LOAD DC R (or F) "START" . Follow this with an "(EXEC)".

d. Run the program by keying in the verb "RUN", followed by an "(EXEC)".

```
<=======  DISK SELECTION AREA  =======>

A.  AUTO-SYSTEM PROGRAM'S DRIVE? -/  (7 IS DEFAULT)

 1 = 'B10' REMOVABLE     2 = '310' FIXED
 3 = 'B20' REMOVABLE     4 = '320' FIXED
 5 = 'B30' REMOVABLE     6 = '330' FIXED
 7 = 'B60' REMOVABLE     8 = '360' FIXED
```

FIGURE 10-1

e. Follow all instructions displayed on the CRT screen, or refer to this manual.

10.1 DISK SELECTION. The AUTO-SYSTEM allows for variable selection of disk device addresses. Disk selection is the first step taken after loading the 'START' program and running it. (See FIGURES 10-1 and 10-2 for examples of the 'DISK CONTROL SELECTION AREA' displays.)

10.1.1 AUTO-SYSTEM DISK SELECTION. The first DISK SELECTION display (FIGURE 10-1) asks you, the Operator, where are the AUTO-SYSTEM programs located (i.e., - on which disk drive and which platter). You have the option of putting the AUTO-SYSTEM programs on any disk drive with the following device addresses: 1) #310, 2) #320, 3) #330, or 4) #360. Not only do you have the above choice but you can also choose which platter (i.e., Fixed or Removable) the AUTO-SYSTEM programs are on. In answer to the question, "A. AUTO-SYSTEM PROGRAM'S DRIVE?", enter the option number (1-8) that corresponds with the proper disk device address and then press the key marked '(EXEC)'.

10.1.2 DATA BASE DISK SELECTION. The second disk selection display (FIGURE 10-2) asks, you the operator, where the DATA DISK is located (i.e., on which disk drive)? You have the option of putting the DATA DISK on any disk drive with the following device addresses: 1) #310, 2) #320, 3) #330, 4) #360. Notice that the DATA DISK must be located on the removable platter. Following the same procedures as above (SECTION 10.1.1), the question, "B. DATA DISK'S DRIVE?", is answered by entering the option number (1-4) that corresponds with the proper disk device address and then press the key marked '(EXEC)'.

10.2 FILE SELECTION. (SEE FIGURE 10-3) This sub-section explains the 'File Selection' display itself, the availble 'SPECIAL FUNCTIONS', and how to select a FILE to work with.

10.2.1 FILE SELECTION DISPLAY. (see FIGURE 10-3) The File Selection display encompasses 5 (FIVE) major descriptive headings.

a. 'NAME' -> This heading shows you the actual NAME under which the FILE was saved.

b. 'FILE DESCRIPTION' -> This heading, as it implies, describes the FILE as a whole.

c. 'LAST REVISION DATE' -> This heading shows you the last time this FILE was updated. This lets you know

```
<= DISK SELECTION AREA =>

B.  DATA DISK'S DRIVE? -/  (2 IS DEFAULT)

 1 = 'B10' REMOVABLE
 2 = 'B20' REMOVABLE
 3 = 'B30' REMOVABLE
 4 = 'B60' REMOVABLE
```

FIGURE 10-2

how up to date the FILE is.

d. 'SRT' -> This heading indicates whether or not the File needs to be sorted. A "%" (per cent sign) in this column indicates the need to Sort.

e. 'CHG' -> This heading indicates whether or not the File has had any records changed or altered since the last Base Line Revision Date was established. An "*" (asterisk) in this column indicates that one or more records have been altered.

Listed below these headings will be the first 10 (ten) Indexed FILES on your DATA DISK. On the third line from the bottom of the page (on line 13), the program will indicate the number of FILES 'left' to see. Just below the number of FILES left to see, are the available special functions.

10.2.2 AVAILABLE SPECIAL FUNCTIONS. A special function is defined as a separate sub-routine or module constructed specially to take you (the Operator) from one specific point in a program to another point. These sub-routines or modules are accessed through the use of either the thin grey keys at the top of the keyboard (the Special Function keys , naturally), or any "KEY" as specified. To select a SPECIAL FUNCTION key simply press the key indicating that function. There are 5 (five) available SPECIAL FUNCTION keys in the FILE SELECTION display. They are, in SPECIAL FUNCTION number sequence:

S.F. FUNCTION PERFORMED

'0 -> This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' one FILE, or in other words, this key allows you to back space.

'1 -> This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one FILE, or in other words, this key allows you to space forward.

'2 -> This key is used to select the data file you wish to work with. When this key is pressed, the line describing the file, which the cursor is next to, is the file that will be selected. This SPECIAL FUNCTION leads to the 'PROGRAM OPTIONS' display (See SECTION 10.3).

```
======< PROGRAM: 'START' >============ FILES ON THIS DISK ===
 FILE NAME      DESCRIPTION        REVISED ON              SRT CHG
 =========   ==================   ================        =   =
 FILE #1     TEST FINANCE FILE    13 AUGUST 1977          %   *
 FILE #2     PERSONNEL FILE       15 AUGUST 1977
 FILE #3     MILESTONE DATES      09 JULY 1977                *
 FILE #4     CONFIGURATION        11 OCTOBER 1976             *
 FILE #5     SCHEDULE FILE        18 AUGUST 1977          %   *
 FILE #6     SUPPLY INVENTORY     16 SEPT 1977
 FILE #7     TELEPHONE NO#'S      15 JANUARY 1977
 FILE #8     DOCUMENT LIBRARY     11 NOVEMBER 1977

******** THERE ARE 0 FILES LEFT TO SEE ON THIS DISK **********
S.F. KEYS :      '00 = UP        '02 = REVISE      '05 = NEXT PAGE
                 '01 = DOWN      '06 = RE-SELECT DISK OPTIONS
```

FIGURE 10-3

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive FILES on the disk. This key works in the 'FOWARD' direction only.

'6 -> This key is used to take you back to the DISK SELECTION AREA DISPLAY (see SECTION 10.1). Using this key does not change any data. It only allows you to 'RESELECT' (select another) DISK OPTIONS.

10.2.3 HOW TO SELECT A FILE. To select a FILE, you (the Operator) would use SPECIAL FUNCTION key marked -> '5 to find the page upon which the FILE you wish to correct is shown. Next, use SPECIAL FUNCTION keys marked -> '0 and '1 to locate the cursor next to the FILE you wish to work with. Now, press SPECIAL FUNCTION key marked -> '2 thus indicating the specific FILE you wish to work with. Once having pressed SPECIAL FUNCTION key marked -> '2, the program will take you to the PROGRAM OPTIONS display (see SECTION 10.3).

10.3 PROGRAM OPTIONS. The PROGRAM OPTIONS display (FIGURE 10-4) shows you (the Operator) the 6 (six) available PROGRAM OPTIONS. The following list, in option number sequence, is a list of the program options along with the SECTION number where a description of the option will be located.

| PROGRAM OPTION | | | SECTION |
|---|---|---|---|
| 1 | = | RE-SELECT FILE | 10.4 |
| 2 | = | PRINT OUT REPORTS | 10.5 |
| 3 | = | CORRECT EXISTING RECORDS | 10.6 |
| 4 | = | ADD NEW RECORDS | 10.7 |
| 5 | = | SYSTEM MAINTENANCE SORT | 10.8 |
| 6 | = | SEARCH FOR PRINT | 10.9 |

Each of the above program options will be discussed in detail, within the SECTION number listed by each option. In addition to the program options, the PROGRAM OPTION DISPLAY also contains file information and file status. Refering to FIGURE 10-4, the upper portion of the PROGRAM OPTION DISPLAY is used to provide the operator with necessary data about the file that was selected to work with. The file status and information is described in the following list :

a. CRT BOARDER LINE : This line is simply an operator enhancement line that helps to divide up the CRT display. Within the boarder line, the 18 character FILE NAME (entered in the INDEXER program) is displayed to inform the operator which file is ready to be accessed.

b. RECORDS ON FILE : The complete file accounting

```
======================== PERSONNEL FILE ========================
RECORDS ON FILE     : RESERVED = 50   USED = 49   LEFT = 1
REVISION STATUS     : NO RECORDS WERE ADDED OR CHANGED SINCE
LAST REVISION DATE : 26 JULY 1977
SORT STATUS         : == FILE IS PROPERLY SORTED ==
==================== SELECT PROGRAM OPTIONS ====================

1 = RE-SELECT FILE                              2 = PRINTOUT REPORTS
3 = CORRECT EXISTING RECORDS                    4 = ADD NEW RECORDS
5 = SYSTEMS MAINTENANCE SORT                    6 = SEARCH FOR PRINT

                ===== ENTER OPTION NO# =====  ?
```

FIGURE 10-4

status is displayed on this line. Included in this status will be "RESERVED = ", which reminds the operator how much space was orginally set aside for this file (i.e., the total amount of records that may be eventually saved in this file). The "USED = " reference will always indicate the exact amount of records that are currently saved on the selected file. The "LEFT = " reference will always indicate the exact amount of space that remains within the file for additional records (i.e., the "LEFT" equals "RESERVED" minus "USED").

c. REVISION STATUS : This information area will indicate the change status of the file. The AUTO-SYSTEM detects the fact that either an existing record has been changed or altered, or that a new record has been added to the file since the last Base Line Revision date. There are two possible messages that can be encountered here:

(1) "NO RECORDS WERE ADDED OR CORRECTED SINCE"
(2) "RECORDS HAVE BEEN ADDED/CORRECTED SINCE"

The above messages are automatically selected by the AUTO-SYSTEM, and the "SINCE" refers to the Revision Date that is displayed immediately below the message.

d. LAST REVISION DATE : The Base Line Revision Date will be explained in greater detail in SECTION 10.6, but basically this date establishes a base line where all records are considered accurate. Once the date is set, the AUTO-SYSTEM will then flag any record that is changed or added. The records will remain "flagged" until the next Base Line Date is established.

e. SORT STATUS : The AUTO-SYSTEM will also monitor the file for any changes that would affect the overall sequential (sort) order of the file. The prime sort order of the file is established in the INDEXER program by assigning certain fields to be the SORT keys. Therefore, if any of these fields, designated as SORT keys, are changed, or any new records are added to the file, the sort order of the file is then changed. There are two possible messages that can be displayed on this line:

(1) "== FILE IS PROPERLY SORTED =="
(2) "** CAUTION ** (FILE NEEDS TO BE SORTED)"

The above messages are automatically selected by the AUTO-SYSTEM, and will always indicate whether or not the SYSTEM MAINTENANCE SORT Option needs to be selected (refer to SECTION 10.8).

```
***** YOU ARE NOW IN THE 'FAST LOOK-UP MODE' OF OPERATION *****

YOU MAY NOW ENTER IN THE ONE OF THE FOLLOWING :
1.  '?' =  TO EXIT TO THE SEQUENTIAL LOOK-UP TABLE
2.  '↑' =  TO EXIT TO THE SEQUENTIAL LOOK-UP TABLE
           STARTING WITH A PARTICULAR RECORD
3.  '+' =  TO RESELECT OPTIONS (GO BACK TO BEGINNING)
4.  ENTER THE FOLLOWING INFORMATION TO SEARCH FOR ONE
           PARTICULAR RECORD

 SSAN# ? ----------
```

FIGURE 10-5

Refering to FIGURE 10-4, below the file status and information area of the PROGRAM OPTIONS DISPLAY are the primary options that an operater may select. Any of the 6 (six) options are selected by typing in the number that appears next to the desired option, followed by keying the "(EXEC)" key. The program will then respond to the selected option by changing the display, based upon the selected option. Each option will be described in detail in the SECTION listed at the beginning of this SECTION (10.3).

10.4 OPTION #1 - RE-SELECT FILE. Selecting Option #1 will return the operator to the SELECT FILE DISPLAY (refer to SECTION 10.2). Option #1 simply allows the operator to work with one file until all desired work is completed, and then work with any other INDEXED file that may also be on the disk. This option permits multiple file work without having to clear the WANG, and then reload and rerun the START program. In other words, the AUTO-SYSTEM will always permit the operator to return to the prime selection area that the current option was selected from. The control logic of the AUTO-SYSTEM is structured so that program options are organized in a "TREE" fashion, whereby you may always move back up to the major area that you came from. This featue not only allows for multiple file access, but also permits error recovery when an option was selected by mistake. Thus when an option is selected by mistake, there is no need to clear the WANG and start from the beginning, just simply read the CRT screen and find the option that returns you to the SELECTION area that allowed you to get to the option you are now in.

10.5 OPTION #2 - PRINT OUT REPORTS. Option #2 permits the operator to immediately jump out of the file maintenance routines (i.e., the START program), and go to file outputting routines. When Option #2 is selected, the following display is presented to the operator :

```
*** SELECT SORT OPTION ***
1 = NO SORT PRIOR TO PRINT OUTS
2 = SORT RECORDS PRIOR TO PRINT OUTS
*** ENTER OPTION NO# **?
```

The operator now has 2 (two) options to select from. Each of these options are described below.

10.5.1 NO SORT PRIOR TO PRINT OUTS. Option #1 is used for those times when an operator desires to print out the entire file on the disk, with no sorting done prior to printing. Option #1 is selected by typing in the number "1", followed by keying the "(EXEC)" key. Once Option #1 is selected, the PRINT program will be automatically loaded and run (refer to SECTION 13). It is important to note that this option, when selected, will assume that the operator desired to print out "ALL" records on the file, in the exact order that file is currently in (i.e., there is no sorting available in this option).

```
* YOU'RE IN THE FAST SEQUENTIAL POSITIONING MODE OF OPERATION *

YOU MAY NOW ENTER IN ONE OF THE FOLLOWING :
1.  '?'  =  TO EXIT TO THE SEQUENTIAL LOOK-UP TABLE
2.  '+'  =  TO RESELECT OPTIONS (GO BACK TO BEGINNING)
3.  ENTER IN THE FOLLOWING INFORMATION TO BEGIN THE SEQUENTIAL
            LOOK-UP TABLE WITH A PARTICULAR RECORD


SSAN# ? ----------
```

FIGURE 10-6

10.5.2 SORT RECORDS PRIOR TO PRINT OUTS. Selecting Option #2 will allow the operator to sort "ALL" records within the selected data file into any desired order prior to printing out the selected file. Option #2 is selected by typing in the number "2", followed by keying the "(EXEC)" key. Once Option #2 is selected, the SEARCH program is loaded and run, but the SEARCH selection area is by passed and the SORT selection area is immediately made available to the operator. Refer to SECTION 11 for instructions on how to select a SORT order (the SORT options are part of the overall SEARCH program). It is important to note that by selecting Option #2, the program assumes that the operator desired to print out "ALL" the records within the selected data file, but wished to re-arrange (SORT) all the records into a specific order prior to printing.

10.6 OPTION #3 - CORRECT EXISTING RECORDS. Refering back to SECTION 10.3, the PROGRAM OPTION DISPLAY, Option #3 allows the operator to correct any record already on file. Correcting means to change or to alter the record in some fashion, either to update, to reflect current status, or correct a mistake made when orginally adding the record to the file. Since most of the START program is involved while in the "CORRECT" mode of operation, all available options will be described in detail in this SECTION, and used as a reference point for all other major program options. The correct operation involves serveral major features of the AUTO-SYSTEM, and are listed below, along with the SECTION number that will detail the function:

| MAJOR FEATURES | SECTION |
|---|---|
| a. Base Line Revision Date | 10.6.1 |
| b. Record retrieval - Fast | 10.6.2 |
| c. Record retrieval - Sequential | 10.6.3 |
| d. Record Display | 10.6.4 |
| e. Record Control | 10.6.5 |

10.6.1 BASE LINE REVISION DATE. The first major display that is encountered after selecting the "CORRECT" mode of operation is the Base Line Revision Date display. A Base Line Date is defined to mean that date when the file was last assumed to be fully up to date. In other words, at any specific point in time, a data file is printed out as a report to a user or to management. Once a major output of the file is made, the date of that output could be considered as the Base Line Date. Since the user now has a print out of the file, all changes to the file since the time the print out was made should be understood as being different from what is on the major user's print out. The AUTO-SYSTEM will flag any record that is changed or is newly added to the file. This feature permits the operator to identify which records in the data file are different from the major print out. There are many uses of this feature. For example, in the SEARCH program, it is possible to select and print out only those records that have been changed since the last Base Line Revision Date. Selecting

```
* YOU'RE IN THE SLOW SEQUENTIAL POSITIONING MODE OF OPERATION *
-- NOTE : FILE NEEDS TO BE SORTED TO USE 'FAST LOOK-UP' MODE --

YOU MAY NOW ENTER IN ONE OF THE FOLLOWING :
1.  '?'  =   START CORRECTING FROM THE 1ST RECORD ON FILE
2.  '↑'  =   JUMP TO THE LAST PAGE OF RECORDS
3.  '+'  =   TO RESELECT OPTIONS (GO BACK TO BEGINNING)
4.  ENTER IN THE FOLLOWING INFORMATION TO BEGIN THE SEQUENTIAL
             LOOK-UP TABLE WITH A PARTICULAR RECORD
             ON FILE ('SLOW LOOK-UP')

** ENTER AS MANY CHARACTERS AS DESIRED **
SSAN# ? ----------
```

*FIGURE 10-7*

only those changed records could be an easy way of validating corrections or updating of the file, or to inform the user on a daily basis of those changes, without having to re-print the entire file again. Once selecting either the "CORRECT" or the "ADD" mode of operation, the operator is presented with the following display:

```
==== BASE LINE REVISION DATE CHANGE AREA ====
<< 'EXEC' IF NO CHANGE, OR ENTER NEW DATE >>
    ENTER REVISION DATE ? 31 OCTOBER 1977
```

The operator has 2 (two) options to consider at this point. The first option is to not change the date, which is selected by simply keying the "(EXEC)" key. Choosing the first option will leave the Base Line Date as is, and thus will leave all flagged records still flagged as being changed since the date that is displayed. The second option is to change the date, which is done by typing in a new date over the old date. The operator may change only as many characters as necessary to reflect the new date. It is not necessary to retype the entire date, if changing only a few characters will revise the date (however, those characters that are not typed over will remain as is). Changing the displayed date, in any fashion, will inform the program that a new Base Line has been established, and therefore the following display will appear:

```
** INITIALIZING CHANGE STATUS INDICATORS **
```

Immediately below the above display, the program will display the first 60 (sixty) characters of every record that had been previously flagged as changed. The program is actually removing the change flag from those displayed records at this point. The flag that is used is the astrisk ("*"), which was placed in the first character of any newly added record, or any record that was changed. Upon completion of removing all the previously set astrisks, the data file is now initialized, and any changes from this point on will be flagged. The flagged records will remain flagged until the Base Line Revision Date is again changed. After completion of this initializing process, the program will proceed to the RECORD RETRIEVAL display area.

10.6.2 RECORD RETRIEVAL. There are 3 (three) different displays and modes of operation involved for RECORD RETRIEVAL. Which display is selected by the AUTO-SYSTEM is dependent upon the SORT STATUS of the data file. If the data file needs to be sorted (refer to SECTION 10.3), then the system will automatically select the SEQUENTIAL mode of record retrieval, which is described in SECTION 10.6.2.3. If the file is properly sorted, then the system automatically selects the FAST LOOK-UP MODE of operation. There are 2 (two) major displays associated with the FAST LOOK-UP MODE.

10.6.2.1 FAST LOOK-UP MODE OF RECORD RETRIEVAL. FIGURE

```
========================= PERSONNEL FILE ============================
NAME                    DEPARTMENT          FUNCTION
====================    ================    ======================
TIM VE ARD              NEEO-NORFOLK, 501   FATHER OF AUTO-SYSTEM
RICHARD SAMMS           CONTROL DATA CORP   PROGRAMMER OF AUTO-SYS
MARTIN GIMPELSON        CONTROL DATA CORP   PROGRAMMER OF AUTO-SYS
JACKIE BARFOOT          RCA SERVICES CO.    OPERATOR OF AUTO-SYS
GENE NEWMAN             NEEO-NORFOLK, 05    PAID FOR AUTO-SYSTEM


============== THERE ARE 0 RECORDS LEFT TO SEE ==================
SF    '0 = UP     '2 = CORRECT   '4 = MULTIPAGE     '6 = OPTIONS
      '1 = DOWN   '3 = ADD       '5 = ONE PAGE
```

FIGURE 10-8

10-5 is the display for the prime FAST LOOK-UP MODE. The operator has several options to consider at this point. In addition to the options shown on FIGURE 10-5, the LOOK-UP key must be understood. At the bottom of the CRT display will be a field prompt message followed by a '?'. This prompt message is actually the prime sort key that was selected in the INDEXER program. This sort key becomes the LOOK-UP key for retrieving records, since the file is sorted in the order of the sort key.

| "ENTRY CODE" | FUNCTIONS |
|---|---|
| '?' | Typing a '?' into the LOOK-UP key will cause the program to by-pass the FAST LOOK-UP MODE and jump immediately to the SEQUENTIAL method of retrieving records, starting with the first record on the data file. Refer to SECTION 10.6.3. |
| '↑' | Typing an '↑' into the LOOK-UP key will cause the program to by-pass the standard FAST LOOK-UP MODE and jump to the FAST SEQUENTIAL POSITIONING LOOK-UP MODE of operation. Refer to SECTION 10.6.2.2. |
| '+' | Typing a '+' into the LOOK-UP key will cause the program to by-pass the FAST LOOK-UP MODE of operation and return the operator back to the PROGRAM OPTIONS DISPLAY for the selected data file. Refer to SECTION 10.3. |
| 'DATA' | Typing actual data into the LOOK-UP key will cause the program to actually enter the FAST LOOK-UP MODE. |

The data that is typed into the LOOK-UP key should be data that is actually on file. Since the LOOK-UP key is actually the SORT key, it defines a record on file. If more than one SORT key was established in the INDEXER program, the operator will have to enter data into more than one LOOK-UP key. Once all LOOK-UP keys are filled with data, the program then starts to search the selected data file for the record described by the LOOK-UP keys. The actual search routine used is called a HALF-INTEGRAL (binary) search. The routine functions by continously dividing the data file in half until the record is located. If the record is not found, the system will display the following message :

ATTN: RECORD WITH SEARCH KEY OF 'xxxxxxx' IS NOT ON FILE!

The above message will either mean that the record is not on file, or that the operator typed bad data into the LOOK-UP keys. The operator may then either retype data into the

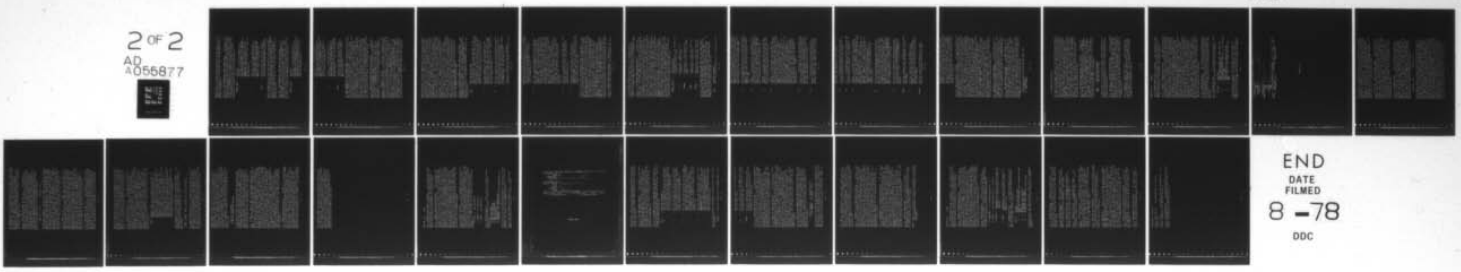
```
====================== PERSONNEL FILE ============================
<< PERSONAL DATA >>
          NAME *TIM VE ARD---------------
    DEPARTMENT :NEEO-NORFOLK, CODE 501
      FUNCTION :FATHER OF AUTO-SYSTEM----------

<<< COMMAND DATA >>>
STREET ADDRESS :835 PHILPOTTS ROAD------
          CITY :NORFOLK---
         STATE :VA
      ZIP CODE :23513
         PHONE :804-444-9396
=================================================================
'EXEC ' = NEXT FIELD   '↑' = BACK ONE FIELD   '16 = DELETE RECORD
'PRINT' = SAVE         <SF KEYS FOR EDITING>  '17 = CANCEL DELETE
```

FIGURE 10-9

AD-A055 877 NAVAL STATION NORFOLK VA F/G 9/2
WANG MINI-COMPUTER AUTOMATIC DATABASE MANAGEMENT SYSTEM AUTO-SY--ETC(U)
MAR 77

UNCLASSIFIED NL

2 OF 2
AD
A055877



END
DATE FILMED
8-78
DDC

LOOK-UP keys, or select another option as listed above. If the record is found on file the system will load the record and display the record for correcting. Refer to SECTION 10.6.4 for further information.

10.6.2.2 FAST SEQUENTIAL POSITIONING MODE. Selecting this option, while in the prime FAST LOOK-UP MODE of operation, will allow the operator to use the speed of the FAST LOOK-UP routine to start the SEQUENTIAL display mode from a particular record on the selected data file. FIGURE 10-6 shows the display that is presented to the operator when in this mode. Several options are available, which are described below:

| "ENTRY CODE" | FUNCTION |
|---|---|
| '?' | Typing a '?' into the LOOK-UP key will cause the program to by-pass the FAST POSITIONING MODE of the SEQUENTIAL display and jump immediately to the SEQUENTIAL display starting with the first record on the data file. Refer to SECTION 10.6.3. |
| '+' | Typing a '+' into the LOOK-UP key will cause the program to by-pass the FAST POSITIONING MODE and return the operator back to the PROGRAM OPTIONS DISPLAY. Refer to SECTION 10.3. |
| 'DATA' | Typing actual data into the LOOK-UP key will cause the program to commence with FAST POSITIONING MODE of operation. |

Once all LOOK-UP keys have been filled in, the program begins to search the data file for the record described by the LOOK-UP keys. As in the FAST LOOK-UP MODE, the half-integral search routine will either find the record and go to the RECORD DISPLAY area (SECTION 10.6.4), or will display that the record was not on file.

10.6.2.3 SLOW SEQUENTIAL POSITIONING LOOK-UP MODE. If the selected data file is not properly sorted, the SEQUENTIAL LOOK-UP MODE is automatically selected. FIGURE 10-7 is the display presented to the operator when in this mode. There are several options available in this mode that will allow the operator to position the SEQUENTIAL display. They are:

| "ENTRY CODE" | FUNCTION |
|---|---|
| '?' | Typing a '?' into the LOOK-UP key will cause the program to by-pass the SLOW SEQUENTIAL POSITIONING mode and jump immediately to the SEQUENTIAL DISPLAY starting with the first record on file. Refer to SECTION 10.6.3. |

| | |
|---|---|
| '↑' | Typing an '↑' into the LOOK-UP key will cause the program to by-pass the SLOW SEQUENTIAL POSITIONING MODE and jump immediately to the SEQUENTIAL DISPLAY AREA starting with the last page of records (i.e., the last 10 records) on file. Refer to SECTION 10.6.4. |
| '+' | Typing a '+' into the LOOK-UP key will cause the program to by-pass the SLOW SEQUENTIAL POSITIONING MODE and return the operator back to the PROGRAM OPTIONS DISPLAY. Refer to SECTION 10.3. |
| 'DATA' | Typing actual data into the LOOK-UP key will cause the program to commence with the SLOW SEQUENTIAL POSITIONING MODE of operation. |

The SLOW SEQUENTIAL POSITIONING MODE of operation differs from the FAST SEQUENTIAL POSITIONING MODE, in that only one sort key (the first sort key) will be used as a LOOK-UP key. When entering data into this LOOK-UP key, the operator need not type in all characters of the actual record that the SEQUENTIAL display should start from. The LOOK-UP key can be used to start the SEQUENTIAL DISPLAY with the very first record on the data file that matches the exact characters in the LOOK-UP key. There is no fast search routine involved in this mode. The routine simply starts loading every record on file (starting with the first record), and compares only the characters that were typed into the LOOK-UP key to each record. Once a match is found, the program jumps to the SEQUENTIAL DISPLAY starting with the record it just found. Refer to SECTION 10.6.3.

10.6.3 SEQUENTIAL MODE FOR RECORD RETRIEVAL. FIGURE 10-8 reprensents the display that is encountered by the operator when using the SEQUENTIAL MODE to retrieve records for correcting. The SEQUENTIAL MODE is divided into 3 (three) major areas, (1) the display itself, (2) available SPECIAL FUNCTONS, and (3) how to use the SEQUENTIAL MODE of operation.

10.6.3.1 SEQUENTIAL DISPLAY. Refering to FIGURE 10-8, the SEQUENTIAL DISPLAY is divided into 3 (three) functional areas. The first line of the display is used to help divide up the CRT screen for operator enhancement, and also to display to the operator the 18 character FILE DESCRIPTION as a reminder as to which file is being accessed. Immediately below the CRT boarder line, will be the COLUMN HEADERS display area. These COLUMN HEADERS are actually the FIELD PROMPT MESSAGES of the fields that were assigned as the DISPLAY KEYS in the INDEXER program (refer to SECTION 5). These DISPLAY KEYS, assigned in the INDEXER program, serve to present to the operator record high lights while in the SEQUENTIAL MODE of record retrieval. In other words, when you created the data file by using the

INDEXER program, you were premitted to select up to 5 (five) of your fields to be used as DISPLAY KEYS by the SEQUENTIAL MODE of record retrieval. The fields that were assigned as the DISPLAY KEYS should have been the combination of fields that would best identify the record. The DISPLAY KEYS should also include the SORT KEY fields, since the file is in the order of the SORT KEYS. The SEQUENTIAL MODE will display the assigned PROMPT MESSAGES for up to five (or no more than 60 total characters) DISPLAY KEYS. Below each displayed PROMPT MESSAGE, will be an equal sign ('=') for each character allowed in the field (i.e., if the field is 10 characters in length there will be 10 equal signs). Immediately below each displayed PROMPT MESSAGE (which forms a column) will be the data that is contained in that field for 10 (ten) records. The entire display is commonly referred to as a PAGE. A PAGE consists of the display of high lights for 10 records at a time. Below the display area of the 10 selected records is another CRT boarder line. This second boarder line displays to the operator the amount of records left on the file, starting from the last record displayed on the PAGE. Below the second boarder line are all the SPECIAL FUNCTIONS available to the operator to control the SEQUENTIAL DISPLAY MODE.

10.6.3.2 AVAILABLE SEQUENTIAL MODE SPECIAL FUNCTIONS. The SEQUENTIAL MODE of operation has 7 (seven) SPECIAL FUNCTIONS available to the operator. These SPECIAL FUNCTIONS permit the operator to control the action of the SEQUENTIAL MODE of operation, the use of each SPECIAL FUNCTION is defined in the following list:

| S.F. | | FUNCTION DEFINITIONS |
|---|---|---|
| '0 | -> | This key controls the cursor movement in the upward direction. Each time this key is pressed, the program will move the cursor 'UP' one record. If the cursor is at the first record, then the program will display the 10 records that came before the presently displayed 10 records. |
| '1 | -> | This key controls the cursor movement in the downward direction. Each time this key is pressed, the program will move the cursor 'DOWN' one record. If the cursor is next to the last record on the PAGE, the program will display the next 10 records on file. |
| '2 | -> | This key is used to select the record you wish to correct. When this key is pressed, the line describing the record, which the cursor is next to, is the record that will be selected. Pressing this key will lead to the RECORD DISPLAY and CORRECT MODE (see SECTION 10.6.4). |
| '3 | -> | This key is used to select the ADD MODE of operation, the same way OPTION #4 is used in the |

PROGRAM OPTION DISPLAY (SECTION 10.3). Pressing this key will take the program out of the record retrieval and correcting modes, and will immediately enter the ADD MODE of operation (refer to SECTION 10.7).

'4 -> This key is used to jump PAGES. Pressing this key will cause the program to display "NO# OF PAGES TO JUMP?" over the over the bottom CRT boarder line. The operator then may enter the number of pages desired to jump ahead or behind in the display. An entry of 10 (10 PAGES) will cause the program to jump ahead 100 records (10 records per page), and display the records that are 100 positions away from the last record that was on the screen at the time. If the number of pages is greater than the actual amount available, then the last 10 records will be displayed. If an entry of -10 is entered, the program will back up 100 records. If the number is less than the amount of records actually available, then the first 10 records are displayed.

'5 -> This key is used to jump to the NEXT PAGE. This function lists the next 10 (ten) consecutive records on the file. This key works in the forward direction only.

'6 -> This key is used to take you back to the selection area, from which you entered the SEQUENTIAL MODE. This key is simply part of the control logic "TREE" that allows you to always to return to where you came from.

10.6.3.3 HOW TO USE THE SEQUENTIAL MODE OF OPERATION. To locate the record you desire to correct, use SPECIAL FUNCTION keys '4 and '5 to find the PAGE that the record is on. Once the PAGE that contains the desired record is located, then use SPECIAL FUNCTION keys '0 and '1 to position the cursor next to the desired record. When the cursor is positioned next to the line that describes the desired record, use SPECIAL FUNCTION key '2 to select the record. SPECIAL FUNCTION key '2 will start the correct process by displaying the entire record (refer to SECTION 10.6.4). If, at any time, you wish to terminate the SEQUENTIAL MODE of operation, use SPECIAL FUNCTION '6 to re-select your program options, or use SPECIAL FUNCTION key '3 to enter the ADD MODE (refer to SECTION 10.7). When you have corrected a record, the correct routine will return you to this display area, with the record you have just finished correcting as the first record displayed on the PAGE.

10.6.4 CORRECT MODE RECORD DISPLAY. FIGURE 10-9 is an example of the screen presentation that the program uses while

in the CORRECT MODE of operation. This display will be discussed in 3 (three) major areas, (1) the record field display itself, (2) the available SPECIAL FUNCTIONS that control the CORRECT MODE, and (3) how to use the CORRECT MODE.

10.6.4.1 THE CORRECT MODE RECORD DISPLAY. Refering to FIGURE 10-9, the CORRECT MODE DISPLAY is divided into 2 (two) basic areas. First the actual record display is boardered off by two lines. In the first boarder line, the 18 character FILE DESCRIPTION is displayed to remind the operator of which file that this record belongs to. The top boarder line will also be used to display any error messages that result from bad data entry. The bottom boarder line will be used to display special comments, such as informing the operator that the record has been flagged for deletion. Below the bottom boarder line is the list of available SPECIAL FUNCTIONS. The major portion of the display, is of course, used to display the data contained within the record. The format used for record display was established when creating the file by using the INDEXER program. Each defined field (defined in the INDEXER program) will either contain actual data that has been previously entered, or will contain format information. When the file was established in the INDEXER program, you were also able to define specific format options. Based upon the assigned format option, any field that does not contain data, will have one of the following format displays:

| FORMAT DISPLAY | | FORMAT REQUIRED |
|---|---|---|
| ------ | -> | No format specified. Any character is acceptable in this field. |
| ..... | -> | Digits only. Numbers only are acceptable in this field. |
| YYMMDD | -> | Digits only, in the "year-year", "month-month", and "day-day" format only. |
| YYMM | -> | Digits only, in the "year-year" and "month-month" format only. |
| YYDDD | -> | Digits only, in the "year-year" and "day-day-day" format only (julian). |

10.6.4.2 AVAILABLE SPECIAL FUNCTIONS FOR THE CORRECT MODE. The programs in the AUTO-SYSTEM, where fields are able to be EDITED, feature the latest STATE-OF-THE-ART "EDIT ROM" emulation of SPECIAL FUNCTION key controlled text editing. At any time, while in the DATA ENTRY mode of operation (not entering a program control option), the following SPECIAL FUNCTION keys are always available for use:

| S.F. | FUNCTION PERFORMED |
|---|---|
| ' 0 | This key controls the cursor in reference to the |

first field that follows the next highest LABEL. When using the INDEXER program it is wise to use LABELS to generally divide up your data fields into logical groups, which will also allow you to jump to groups of data in this CORRECT MODE.

' 1 This key controls the cursor in reference to the use of LABELS that divide your data into logical groups. Press this key and the cursor will move DOWN to the first field that follows the next lowest LABEL.

' 8 'ERASE' -> Pressing this key will ERASE (or set to blanks) all characters or digits, starting with the character or digit displayed immediately above the cursor, continuing with all remaining characters to the right of the cursor, for the entire remaining length of the DATA field.

' 9 'DELETE' -> Pressing this key will delete the character immediately above the cursor and then move all remaining characters on the right side of the cursor to the left 1 (one) place.

'10 'INSERT' -> Pressing this key will move all characters to the right 1 (one) place, starting with the character immediately above the cursor. Having moved the characters to the right, a blank character is then inserted above the cursor. (NOTE: You can continuously insert blank characters until the orginal characters to the right of the cursor are no longer visible -> meaning you have pushed them past the end of the allowed field length. However, normally, touching the "DELETE" key the same amount of times will move the characters back in to the orignal position. This means that when moving the characters off the display, the characters are not lost until you depress the SPECIAL FUNCTION marked -> '(EXEC)'.

'11 '----->' -> Pressing this key will position the cursor 5 (five) places to the right of where the cursor originally was. However, upon reaching the end of the allowed field length, the key is no longer functional, since the cursor will not move pass the boundaries of the field.

'12 '->' -> Pressing this key will position the cursor 1 (one) place to the right of where the cursor originally was. However, upon reaching the end of the allowed FIELD length, the key is

move pass the boundaries of the field.

'13 '<-' -> Pressing this key will cause the same actions as SPECIAL FUNCTION '12, except that it will move the cursor left 1 (one) place.

'14 '<-----' -> Pressing this key will cause the same actions as SPECIAL FUNCTION '11, except that it will move the cursor left 5 (five) places.

'15 'RECALL' -> Pressing this key will return the field display to its original format and DATA content, provided that SPECIAL FUNCTION marked -> '(EXEC)' was not depressed. In other words, once SPECIAL FUNCTION marked -> '(EXEC)' has been depressed, the field is set to whatever has been typed in. However, if while using the 'DELETE', 'INSERT', or 'ERASE' keys, you decide that you would like to start over (prior to touching the SPECIAL FUNCTION marked -> '(EXEC)'), depress SPECIAL FUNCTION marked -> 'RECALL' and the field will return to its original state.

'16 This key will flag the record for deletion on the next SYSTEM MAINTENANCE SORT of the file. Once the record is flagged for deletion, it will be removed from the file during sorting. Once flagged, the bottom CRT boarder line will flash on and off with the message "ATTENTION: THIS RECORD IS FLAGGED FOR DELETION". Also any time this record is displayed during the SEQUENTIAL MODE a message stating "<--FLAGGED FOR DELETION" will be displayed with the high lights.

'17 This key will remove the flag that will cause the record to be deleted during the next sort. It will also remove the DELETION MESSAGES from both the CRT boarder line and the SEQUENTIAL DISPLAY.

'(EXEC)' This key (known as the "RETURN/(EXEC) key), when pressed, will take you, the Operator, to the next FIELD.

'↑' This key (known as the "UP-ARROW"), when pressed, will take you back to the previous FIELD. If you are working on the first FIELD and press this key, you will still be working on the FIRST FIELD.

'PRINT' This key (known as the "PRINT" key), when pressed, will terminate the correct mode of

change, informing the operator that (1) if you wish to recorrect a field, type the "(EXEC)" key; or (2) if you want to save the corrected record back to file key the "PRINT" again. If "(EXEC)" was keyed, you will re-enter the record display. If "PRINT" was keyed, you will be returned to the record retrieval selection area that caused you locate this record.

10.6.3.3 HOW TO CORRECT A RECORD. To correct a record once it has been located and presented in the RECORD DISPLAY, use SPECIAL FUNCTION key '0, '1, "(EXEC)", and "↑" to position the cursor next to the field that needs to be altered. An asterisk ("*") will be displayed just prior to the first character of the selected field, to indicate that it is the current field to be edited. Once at the desired field, use SPECIAL FUNCTION keys '8 through '15 to edit the field. Should you enter data that does not meet the specific format for the field, review the diagnostic message displayed on the top CRT boarder line, and re-edit the field as indicated. If you desire to delete the record from file, use SPECIAL FUNCTION key '16. If you wish to cancel the deletion use SPECIAL FUNCTION key '17. When you finished altering the record, use SPECIAL FUNCTION key "PRINT" to terminate the CORRECT MODE. Once you have terminated the CORRECT MODE, the program will give you another chance to review the record. If you decide you need to work with the record further, simply key the "(EXEC)" key and the program will re-enter the CORRECT MODE. If, after the review, you determine that no further work is necessary, use SPECIAL FUNCTION key "PRINT" again to resave the record back to file, and to return to record retrieval area.

10.7 OPTION #4 - ADD NEW RECORDS. Selecting Option #4 in the PROGRAM OPTION DISPLAY (SECTION 10.3) will cause the program to go to the Base Line Revision Date area first. Refer to SECTION 10.6.1 for further explanation of the Base Line Date. Once having completed the options of changing the Base Line Date, the program then transfers to the MASK OPTION area.

10.7.1 ADD MODE MASKING OPTION. The MASK OPTION is only available while in the ADD MODE of operation. Masking is a technique that allows the operator to create new records for the selected data file in 2 (two) different fashions. Adding records is basically the same as correcting records, except that you do not retrieve a record. The new record is initialized to all blank characters, and you fill in the data from scratch. When completed filling in all desired data, the program then saves the new record to the end of the data file. The MASKING options are displayed below:

```
***** SELECT MASKING OPTION FOR ADD MODE *****
1 = NO MASKING
2 = MASK RECORDS
```

** ENTER OPTION NO# **?

Refering to the above display, if the operator selects Option #1, then the ADD MODE will start out each record to be added to the file with all blank characters. Selecting Option #2, will cause the program to start only the first record to be added with all blank characters. All other records to be added will start with a MASK (exact copy) of the last record just added. The MASKING effect then makes the ADD MODE the same as the CORRECT MODE, in the respect that while still adding you are really just correcting those entries that were made in the last record that was added. This feature can save a great deal of time when many records must be added to a file, that all have alot of similar data in various fields. Within either MASKING OPTION, all new records are added to the end of file, and all new records are flagged as being a change since the last established Base Line Revision date.

10.7.2 ADD MODE RECORD DISPLAY AND CONTROL. FIGURE 10-9 that showed how the RECORD DISPLAY appeared in the CORRECT MODE, is the same exact display that appears in the ADD MODE. In fact, all the SPECIAL FUNCTIONS and operation procedures that were described in the CORRECT MODE are in effect during the ADD MODE. Refer to SECTION 10.6.4 for a review of all procedures on controlling the RECORD DISPLAY. The only major difference in the ADD MODE is that when the record is saved to file, the following display is presented:

'EXEC' = CREATE ANOTHER RECORD
'NO' = END CREATING RECORDS

If the "(EXEC)" key is pressed, another record display will be pesented, for the creation of the next record. If 'NO' is typed in, then the program will return to the PROGRAM OPTION display (SECTION 10.3)

10.8 OPTION #5 - SYSTEM MAINTENANCE SORT. Selecting option #5 in the PROGRAM OPTION display (SECTION 10.3) will cause the START program to immediately load the SORT program. The SORT program (refer to SECTION 12) will use the SORT KEYS that were selected for the file in the INDEXER program, to rearrange the file into the order defined by the SORT KEYS. Once the SORT program has completed, the START program will automatically be re-loaded and run.

10.9 OPTION #6 - SEARCH FOR PRINT. Selecting Option #6 in the PROGRAM OPTION display (SECTION 10.3), will cause the START program to immediately load and run the SEARCH program for the data file selected. Refer to SECTION 11 for further information on the SEARCH operations.

SECTION 11. SEARCH

11.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will first, describe the SEARCH program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for program loading.

11.0.1 GENERAL PROGRAM DESCRIPTION. The SEARCH program, as its name implies, permits the user to SEARCH any data file and select only specific records for further sorting and printing. Quite often a user or a manager is able to solve very specific problems, only because he is able to access only those records that pertain to a well defined situation. The SEARCH program was developed to be a highly responsive and flexible tool in the overall ADP process. The SEARCH program permits a wide range of options that, when employed, will allow countless methods for searching any data base for precisely those records that meet the exact requirement at the time. This program allows you to search all records in a file for a certain character or string of characters, within any field or element. Any or all fields may be searched for individual characters or character strings, all at the same time. Each selected field may also have any one of four Algebraic relations selected independently (i.e., 'less than or equal to', greater than', 'not equal to', 'equal to', etc.). In addition, a global search routine permits the scanning of the entire record for a particular character string, regardless of which field it may be in, or its position within the field. Once having found the desired records, the program stores them in a temporary file that can be sorted prior to printing.

11.0.1 PROGRAM LOADING. The loading of the SEARCH program is done by program control, that is, the program is loaded as a direct consequence of mode selection while in either the START or the PRINT programs. This is not a stand alone program and will error off if loaded directly from the program disk by the Operator.

11.1 PROGRAM OPTIONS. The program option display will show the four (4) modes of operation allowed in this program:

| OPTION # | | FUNCTION |
|---|---|---|
| 1 | -> | SELECT THOSE RECORDS THAT WERE CORRECTED SINCE LAST REVISION DATE |
| 2 | -> | FIND RECORDS ON ANY CHARACTER IN ANY POSITION OF ANY FIELD |
| 3 | -> | GLOBAL SEARCH FOR A CHARACTER STRING |
| 4 | -> | SELECT SORT KEY FOR RECORDS SELECTED LAST TIME |

11.2 OPTION #1 - SELECT THOSE RECORDS THAT WERE CORRECTED SINCE LAST REVISION DATE. This option will create a temporary file of those records that were either corrected or added since the last time the File Revision Date was changed.

```
========== SET SORT ORDER FOR PERSONNEL FILE ==========
<< PERSONAL DATA >>
          NAME  D                              1
    DEPARTMENT  A                          2
      FUNCTION  ---------------------------------

<<< COMMAND DATA >>>
STREET ADDRESS  ------------------------
          CITY  ----------
         STATE  --
      ZIP CODE  -----
         PHONE  ----------
========== TOTAL RECORDS TO BE SORTED =  4 ====================
(EXEC) = NEXT FIELD    '↑' = BACK ONE FIELD    'PRINT' = SORT
    '4 = DESCENDING SORT           '6 = ASCENDING SORT
```

FIGURE 11-1

This option is selected by typing in the number "1", followed by keying the "(EXEC)" key. Once this option is selected, the program will immediately start searching for all records that have an "*" in the first byte. Refer to SECTION 10, the START program, for an explaination of the Base Line Revision Date. The display presented for this option, during the SEARCH operation, is the same as all other SEARCH mode options. Refer to SECTION 11.6 for a description of the SEARCH operation display and further operating instructions.

11.3 OPTION #2 - CREATE A SEARCH MASK. This option will display for the operator a screen display similar to an actual record in the file, with the exception that the field(s) contain small arrows pointing to the left. The Operator then merely uses the same keys to create the search mask as he would if he were correcting a record. It is important to note here what the arrows actually mean. They exist only as place holders and to the SEARCH Program indicate that any character in that position in the actual record is acceptable. The various operating instructions are discussed in detail in the following sub-sections.

11.3.1 THE SEARCH MASK. The search mask as previously stated is created in much the same way that an actual data record is corrected. The data edit keys SF '8 thru '15 work the same way as indicated in SECTION 10 of the AUTO-SYSTEM MANUAL. The Operator simply moves to the desired field, and enters the character or character string that is to be used as the search criteria for that field. The major difference, however, is that the left-going arrows are place markers that indicate that no character comparision will be performed on that position. The below example may explain the use of the left-going arrows under the relation of equality.

FIELD #1 :-CAT---- FIELD #2 :-23-----

In the above example, a record that had "CAT" starting in the second position of field #1 would be considered, all other records would be rejected regardless of what was in FIELD #2. In other words, if a record had the word "SCAT" in FIELD #1, then the program would look at FIELD #2. If that same record had "12345" in FIELD #2, then the record has met the search criteria, and therefore is transferred to the temporary file. Any record not having exactly the characters you selected, in exactly the position you placed them, is rejected. Up to this point, we have been assuming that the SEARCH criteria is based upon the record exactly matching the SEARCH keys that you have typed in. The SEARCH program has, however, introduced four new keys SF '2 thru '5 to accomodate the four algebraic relations by which the records can be selected. These of course being LESS THAN OR EQUAL TO, EQUAL TO, NOT EQUAL TO, and GREATER THAN. Upon completion of selecting all the FIELDS with their individually selected algebraic relations and character criteria, you are ready to commence the searching operation.

The selection process is terminated, at any time, by depressing the "PRINT" key. The bottom of the CRT screen will then change to reflect that you may either alter your selections by depressing the "(EXEC)" (which allows you to change any selection), or immediately commence searching by depressing the "PRINT" key again. The search operation display is discussed in detail in SECTION 11.6.

11.3.2 LESS THAN OR EQUAL TO (SF '2). The algebraic relation performed here is the selection of records based on whether or not a character or string of characters in a field in the actual record is less than or equal to a character or string of characters that are typed into the search mask's corresponding field. To invoke this relation the Operator first locates the selected data field, then depresses SF '2, at which time the SEARCH program acknowledges the selection by inserting the characters '<=' at the beginning of the field. Below is an example of how this function is used.

FIELD #1 <=-CAT---- FIELD #2 =-23------

In the above example, a record with "SCAT" in FIELD #1 would be considered because the characters in position #2-#4 are either equal to or less than the characters in position #2-#4 of the search key typed in by the operator. If the record had "SCAB" in FIELD #1, it would also be considered, since the character "B" in position #4 is less than the character "T" that is in position #4 of the search key (the characters "CA" in FIELD #1 being equal to the characters "CA" in the search key). Now, if the record had "WANG" in FIELD #1, it would be rejected since the character "N" that is in position #3 is greater than the character "A" that is in position #3 of the search key.

11.3.3 EQUAL TO (SF '3). 'EQUAL TO', as it implies, is an algebraic relation which allows only those records that have exact matches, field by field to be selected. The relation is also the default relation. The Operator need not depress any keys to invoke this relation, unless they invoked one of the other three relations first by mistake. At which time they need only depress SF '3 to again regain this relation. The SEARCH program will then acknowledge the change by placing the character '=' to the left of the field. Examples of the use of this option have already been discussed in SECTION 11.3.1. Each record that has any single character in any single position of FIELD #1 or #2, that does not exactly match the search key character by character, will be rejected.

11.3.4 NOT EQUAL TO (SF '4). This algebraic relation will select those records that do not match the character or string of characters that are entered into the corresponding field in the search mask. To invoke this relation, the Operator must depress SF '4, at which time the program will acknowledge the selection by placing the characters '<>' to the left of the field. Using the example in SECTION 11.3.2, a record with

"WANG" in FIELD #1 would be considered because starting with position #2 through position #4 of the SEARCH key, no character matches. However, if FIELD #1 contained "SCAB" it would also be considered since even though the characters "CA" match the SEARCH key, the letter "B" in position #4 does not match the letter "T" in position #4 of the SEARCH key, thus the entire field is not equal and therefore meets the search criteria.

11.3.5 GREATER THAN (SF '5). This algebraic relation will select those records which have a character or string of characters that is greater than the coresponding search character or string of characters. To invoke this relation, the Operator must depress SF '5, at which time the program will acknowledge the selection by placing the characters '>' to the left of the field. Using the example in SECTION 11.3.2, a record with "WANG" in FIELD #1 would be accepted, because the character "N" in position #3 is greater than the letter "A" that is in position #3 of the search key. However, if the record had "SCAB" in FIELD #1, it would be rejected, since the character "B" in position #4 is less than the letter "T" in position #4 of the search key, and therefore does not meet the search criteria.

NOTE: Remember that the left going arrow informs the SEARCH program that it need not check any characters in that position of the field. The program will ignore any left going arrow position. Should you accidently hit the space bar, the character "blank" will replace an arrow. The character "blank" is, in fact, a character, and the SEARCH routine will react to the "blank" as a significant character. Also, all of the relationships are based upon the hexidecimal value of any character, in accordance with the standard VASCII character set. Refer to any ASCII Hexidecimal coding chart for classification of the relational values for any characters.

11.4 OPTION #3 - GLOBAL SEARCH FOR A CHARACTER STRING. The GLOBAL SEARCH option is selected by typing in the number "3", followed by keying the "(EXEC)" key. Selecting this option will present the following display on the CRT screen.

```
ENTER 'GLOBAL' SEARCH STRING (up to 62 characters)
? ------------------------------------------------------
```

The GLOBAL SEARCH option will prompt the operator to type in a character or character string (up to 62 characters maximum). Once having entered the character string, followed by keying the "(EXEC)" key, the SEARCH program will commence searching all records for the exact character string that was typed in. The major difference between Option #2 and this option, is that in Option #2 each FIELD was individually scanned. In the

GLOBAL SEARCH routine, the entire record is treated like a single FIELD. In other words, if a record contains the character string specified, regardless of where the string appeared in the record, then the record meets the search criteria and is accepted for transfer to the fixed disk. It is important to note that this routine is field independent and also is position independent. For example, if you entered the character string of "CAT", the routine would look for that series of characters, regardless of where they appeared in the record. Consider a sample record with the following fields established:

```
FIELD #1 :SCATTERED
FIELD #2 :ASSETS CATALOGGED
```

In the above example, the record actually meets the SEARCH criteria twice, since the characters "CAT" appeared in both FIELDS in the words "sCATtered" and "CATalogged". Note that the GLOBAL SEARCH'S recognition of the specified characters "CAT", was not tied to which FIELD or where in the FIELD the characters appeared. The searching operation display for Option #3, is the same as the display for all other Options. Refer to SECTION 11.6 for a description of the display.

11.5 OPTION #4 - SELECT SORT KEY FOR RECORDS SELECTED LAST TIME. This option is only available when returning from the PRINT program. In the PRINT program, there is an option to re-sort the records that have been orginally selected during the first time you used the SEARCH program (Refer to the PRINT program for further details). Therefore, should you select the RE-SORT option in the PRINT program, you may either (1) change your option to re-sort the same selected records, and therefore re-search the data file for a different set of records, or (2) choose Option #4 to immediately enter into the SORT program to sort those records on the fixed disk into a different order. Remember, each time the SEARCH program is used, a temporary file of selected records is created. These selected records in the temporary file are used by both the SORT and PRINT programs. Thus Option #4 is a method that allows you to re-sort the temporary file, or if Option #4 is not used when returning from the PRINT program, to create another temporary file (without having to start all over again, by loading the START program).

11.6 SEARCH OPERATION DISPLAY. FIGURE 11-1 shows basically what is displayed during the SEARCHING operation. Using FIGURE 11-1, the first line of the display simiply informs the operator that a temporary file is being constructed for the data file shown. The second lined of the display will indicate exactly how many records within the selected data file have been searched already, along with displaying the first 56 characters of the record currently being scanned (refer to a Data Base Layout of the data file for what fields are contained within the first 56 characters of a record). If a record meets

the selected SEARCH criteria, and is therefore transfered to the temporary file, the entire 248 characters of that record will be displayed. Immediately above the entire record display area, a record counter will indicate the total number of records that have met the search criteria, and have therefore been transferred to the Temporary file. Upon completion of searching all records, the SEARCH program ends, and the SORT program automatically begins. Refer to SECTION #12 for a description of how the SORT program works.

SECTION 12. SORT

12.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will first, describe the SORT program as to its general operation and philosophy, and, second, describe in detail the necessary instructions for program loading.

12.0.1 GENERAL PROGRAM DESCRIPTION. This program allows you (the Operator) to sort (place in a specified order) the records of any file on any field. This is a "FLOATING SORT" routine, whereby up to any 5 (five) fields, or 45 (forty-five) characters, which ever comes first, may be selected in any order, at any time. These fields can also be specified as to ASCENDING (lowest to highest) or DESCENDING (highest to lowest) order. This allows you to place the records, in a file, into any order you wish for printing to the high speed printer. This program option (see SECTION 10) leads directly to the PRINT program or back to the START program. Also, this same program is used for file maintenance by the START program, by sorting the file into its designated permanent sort order that was defined in the INDEXER program.

12.0.2 PROGRAM LOADING. This program can not be loaded or used directly. It is considered a program option of the START program, and therfore requires that considerable data be transferred by the START program to the SORT program (i.e., the two programs are "chained" or interelated). If you attempt to directly load and run the SORT program, it will error off due to the lack of data normally transferred from the START program. The SORT program can be loaded from the following programs:

a. START -> See SECTION 10.

b. SEARCH -> See SECTION 11.

c. PRINT -> See SECTION 13.

12.1 PROGRAM DISPLAYS. There are 6 (six) major program displays in the SORT program. They are, in order of appearance:

a. SET SORT ORDER
b. SORT KEY CREATION
c. SORT STATUS SUMMARY
d. SORT KEY MERGE
e. TEMPORARY FILE CONSTRUCTION
f. PERMANENT FILE CONSTRUCTION (FILE MAINTENANCE only)

If you are in the File Maintenance mode of operation, the only displays you will see are "b" through "f", since you set the permanent sort order in the INDEXER program.

12.1.1 SET SORT ORDER (see FIGURE 12-1). The SET SORT ORDER display will be discussed in 3 (three) major

```
============ SET SORT ORDER FOR PERSONNEL FILE ================
<< PERSONAL DATA >>
          NAME  D                                1
    DEPARTMENT  A                           2
      FUNCTION  --------------------------------

<<< COMMAND DATA >>>
STREET ADDRESS  ------------------------
          CITY  ----------
         STATE  --
      ZIP CODE  -----
         PHONE  ----------
========== TOTAL RECORDS TO BE SORTED =  4 ====================
(EXEC) = NEXT FIELD     '↑' = BACK ONE FIELD     'PRINT' = SORT
    '4 = DESCENDING SORT            '6 = ASCENDING SORT
```

FIGURE 12-1

sub-sections. They are, in order of discussinon: the display itself, the available SPECIAL FUNCTIONS and a brief description of what they do, and an OPERATIONAL DESCRIPTION on setting the desired sort order.

12.1.1.1 SET SORT ORDER DISPLAY. This display is the same display as in the START program for record correction or addition (see SECTION 10). At the top of the screen will be the heading "SET SORT ORDER FOR" plus the file description. Any algebraic functions set in the SEARCH program will also be displayed in this display but will have no significance on the sort order you set. For further information on the screen display, see SECTION 10.

12.1.1.2 AVAILABLE SPECIAL FUNCTIONS (see SECTION 5.2.2.1.2 for an explanation of what a SPECIAL FUNCTION is). There are 7 (seven) available SPECIAL FUNCTIONS in this display. They are, in SPECIAL FUNCTION sequence:

| S.F. | | FUNCTION PERFORMED |
|---|---|---|
| '0 | -> | This key controls the cursor in reference to the use of LABELS to section off your data. Press this key and the cursor will jump up to the field after the next highest LABEL. For further information, see SECTION 10. |
| '1 | -> | This key controls the cursor in reference to the use of LABELS to section off your data. Press this key and the cursor will jump down to the field after the next LABEL. For further information, see SECTION 10. |
| '4 | -> | This key sets the sort order, for the field you are presently working on, in the ASCENDING order. This will cause the letter "A" to be placed into that field with the number corresponding to the sequence in the sort field matrix. ASCENDING order will place the records in the sequence of smallest first to largest last. |
| '6 | -> | This key sets the sort order, for the field you are presently working on, in the DESCENDING order. This will cause the letter "D" to be placed into that field with the number corresponding to the sequence in the sort field matrix. DESCENDING order will place the records in the sequence of largest first to smallest last. |

The following SPECIAL FUNCTIONS are found on the right side of the keyboard.

'(EXEC)' -> This key (known as the "RETURN/(EXEC)" key),

when pressed, will take you (the Operator) to the next data field.

'↑' -> This key (known as the "UP-ARROW" key), when pressed, will take you (the Operator) back to the previous data field.

'PRINT' -> This key (known as the "PRINT" key), when pressed, will terminate the set sort key mode of operation and begin the actual sort operation as you described.

12.1.1.3 OPERATIONAL DESCRIPTION. Use SPECIAL FUNCTION '0, '1, "(EXEC)", and "↑" to position the cursor to the field you wish to set as a sort key. If you wish the file to be sorted on the field in ascending order, then press SPECIAL FUNCTION '4. If you wish the file to be sorted on the field in descending order, then press SPECIAL FUNCTION '6. This operation can be repeated up to 5 (five) times before the system automatically enters the actual sort process. Be sure to enter the sort keys in the correctly designated order, since the system will mark the sort fields in sequential order.

12.1.2 SORT KEY CREATION DISPLAY. The first display that is encountered in the actual sort process itself is a sequential listing of the "sort keys" as they are created. The sort process begins by sequentially loading the records located in the file in question (i.e. - Temporary or Permanent). The first 45 (forty-five), or less, characters are used as the prime part of the sort key. In addition to the above 45 characters, the disk location address is derived for each record. The actual sort key consists of both the prime sort matrix and the address. Thus this display is simply a sequential listing of each sort key as it is created. The sort key display for each record is a line that includes (1) the sequence number, (2) the prime sort matrix, and (3) the disk sector address.

12.1.3 SORT STATUS SUMMARY AND SORT KEY MERGE DISPLAYS. Once the sort routine has completed the creation of the individual sort keys for each individual record, it begins the actual sorting process. This display is a summary of the amount of records that are involved in the sort. This summary display appears when the actual sort is taking place, refer to the below example:

```
******* SORTING   25  RECORDS *******
   **** AMOUNT    25  DONE     ****
```

The first line represents the amount of records involved in the current pass. If, for example, there are more records on file than the sort routine can process at one time, it loads only as many records as it can process (i.e., in one pass). Once having sorted the first pass, the sort routine will return to

the "SORT KEY CREATION AREA" display as it creates the sort keys for the second pass. The sort rountine will make as many passes as necessary, merging each pass together, until all records are loaded and sorted together. Thus, the first line of the display indicates the amount of records involved in each individual pass, while the second line of the display indicates the total amount of records from all passes that have been sorted so far.

12.1.4 TEMPORARY FILE CONSTRUCTION DISPLAY. After all sort keys have been created and sorted, the sort routine then uses the sort keys to establish a temporary file of sorted records. Since each sort key is in the designated sorted order, the remaining portion of the sort key is the disk address of the actual record, therefore, the sort key (after sorting) contains the list of addresses, in the designated sort order, for the records in question. The temporary file construction area uses the sorted list of addresses to load the entire record (from the removable disk), and copy that entire record to the temporary file (on the fixed disk). The display for this area is exactly the same as that described for the "SORT KEY CREATION AREA" (SECTION 12.1.2), except that the sequence is shown in sorted order.

12.1.5 PERMANENT FILE CONSTRUCTION DISPLAY. If this is not a file maintenance sort, then procede to SECTION 12.1.6. Upon completion of creating the temporary file of records, now in sorted order on the fixed disk, the sort routine must now copy the temporary file back to the permanent file. Since the fixed disk is used by many routines in the AUTO-SYSTEM, all permanent files are kept only on removable disks. The process simply starts from the beginning of the temporary file, loading each record in sequence, and saving that record back to the PERMANENT FILE on the removable disk. The display for this area consists of a listing of each record, as it is being transferred from the temporary file to the permanent file. The individual lines consist of (1) the sequence number and (2) the first 52 (fifty-two) characters of each record.

12.1.6 PROGRAM CONNECTIONS. If you are in a systems maintenance sort, the system will automatically return you to the START program. Any other situation will cause the system to automatically load the PRINT program.

NOTE: Under no circumstances should this program ever be RESET during normal operation, unless performed by a qualified programmer.

SECTION 13. PRINT

13.0 PROGRAM DESCRIPTION / LOADING. The following 2 (two) sub-sections will, first, describe the PRINT program as to its general operation and philosophy, and second, describe in detail the necessary instructions for program loading.

13.0.1 GENERAL PROGRAM DESCRIPTION. This program is a "Floating Print" routine, whereby you may create an infinite varity of customized printouts. Since the format and column headings are held in the "PINDEX" record for the file you are working on, you may choose which items in which order you wish displayed. Once obtaining a particular printout, you may either reprint then, or rearrange the printout or the sort order prior to reprinting. This program will work on either the selected records obtained from the SEARCH and SORT program options (from the Temporary file) or upon the data file itself (permenant file, all records in sequence). The PRINT program will also allow you to connect to any customized print routines developed by your local programming staff.

13.0.2 PROGRAM LOADING. PRINT is not a stand alone program. Any attempt to directly load and run this program will result in errors. Program loading for the PRINT program is handled automatically by the following programs:

a. PINDEXER -> see Program option S.F. '4.

b. START -> see Program Option S.F. '2 and '6.

c. SEARCH -> Automatically loads the PRINT program after completion of searching amd if no sort is desired.

d. SORT -> Automatically loads the PRINT program after completion of sorting records int the temporary file.

13.1 PROGRAM OPTIONS. The PROGRAM OPTIONS display shows you (the Operator) the 5 (five) available PROGRAM OPTIONS. They are, in option number sequence:

| OPT # | | OPTION |
|---|---|---|
| 1 | = | AUTOMATIC FLOATING PRINT |
| 2 | = | PRINT USING RE-ARRANGED PRINT HEADINGS OR SORT ORDER |
| 3 | = | RE-ARRANGE PRINT HEADINGS |
| 4 | = | RE-ARRANGE SORT ORDER |
| 5 | = | CUSTOMIZED PRINT ROUTINES (HARD LOCKED) |

To choose one of the above options, simply enter in the number corresponding to the option you want followed by a "RETURN (EXEC)".

13.1.1 PROGRAM OPTION #1 -> AUTOMATIC FLOATING PRINT. This option will use the PINDEX record you created (or if you have not created one, then the system will use the INDEX record as default value) to print out the data specified from where ever you came from.

13.1.2 PROGRAM OPTION #2 -> PRINT USING RE-ARRANGED PRINT HEADINGS OR SORT ORDER. This option is used for printing after re-arranging the PRINT HEADINGS or SORT ORDER.

13.1.3 PROGRAM OPTION #3 -> RE-ARRANGE PRINT HEADINGS. This option will take you into the PINDEXER program. For further information, please see SECTION 6.

13.1.4 PROGRAM OPTION #4 -> RE-ARRANGE SORT ORDER. This option will take you into the SEARCH program. For further information, please see SECTION 11.

13.1.5 PROGRAM OPTION #5 -> CUSTOMIZED PRINT ROUTINES (HARD LOCKED). This option allows you to chain to a print routine that your programing staff has created. The customized print routine must be named "PRINT" followed by 2 (two) digits (01 through 99). To chain to your program, a program change is necessary at line #170 (enter name given to that print program in one of the 'NOT ASSIGNED' slots).

13.2 "FOR LIST BY" STATEMENT. Before every printout, using the floating print routine, the Operator will be asked to enter a 16 (sixteen) character description of this paticular printout. This is usually the selected search and/or sort order of the file in question.

13.3 REPRINTING. After every printout, using the floating print routine, the system will ask you "DO YOU WISH TO PRINT THESE SAME RECORDS AGAIN (Y/N)?". If you do wish to print these same records (or records from the same file again) again, enter "Y". If you do not wish to print records from the present file, then enter "N" and the system will return you to the START program. If your answer was "Y" then the system will ask you "WOULD YOU LIKE TO MAKE ANY CHANGES (Y/N)?". If you do not wish to make any changes, then enter "N" and the system will give you an exact copy of the last printout. If you do wish to make any changes, then enter "Y". This will take you back to the PROGRAM OPTION display (see SECTION 13.1).

13.4 EXPLANATION OF FIELDS ON THE PRINTOUT. There are 4 (four) fields on a floating print routine printout that may need explanation. They are the department printing the report, the "FOR LIST BY" statement, the "AS OF" date, and the file description.

13.4.1 DEPARTMENT PRINTING REPORT. This field is hard locked in the print routine itself. If you wish to change it, call up line #400 in the PRINT program, and enter in your

department's heading.

13.4.2 FOR LIST BY. See SECTION 13.2 for further information.

13.4.3 AS OF. This field is the LAST REVISION DATE. For further information, see SECTION 5.2.2.1.1.

13.4.4 FILE DESCRIPTION. The FILE DESCRIPTION is the field printed in double size letters between the equal signs. For further information, see SECTION 5.2.2.1.1.