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It is my hope that you find the file of use to you personally – I know that I would have liked to have found some of these files years ago – they would have saved me a lot of time !

Colin Hinson

In the village of Blunham, Bedfordshire.



Diskette Software

Model PHD 5005

Programming Aids II

Four programs which enable you to manipulate data stored on your diskettes.

■ **DISK SORT** — Sorts a fixed-length data file into ascending or descending order using the disk as a sorting medium.

■ **RAM SORT** — Sorts a fixed-length data file into ascending or descending order using the computer's memory as the sorting medium.

■ **MERGE** — Combines two sorted fixed-length data files into one sorted data file.

■ **DUMP** — Displays the contents of a data file in ASCII codes and hexadecimal notation.

Designed for use with the TI-99/4 Home Computer and the TI Disk Memory System (TI Disk Drive Controller and TI Disk Memory Drive — sold separately).

As this manual was designed for the U.S. market, the warranty conditions described herein are not applicable in the U.K. The only valid Guarantee Conditions are those set forth in the "Users Reference Guide" accompanying the Home Computer.

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Author: Texas Instruments

Language: TI-99/4 BASIC

Hardware: TI-99/4 Home Computer
Disk Controller and Drive
Thermal Printer (Optional)
RS232 and Compatible Printer (Optional)

Media: Diskette

Programming Aids II allows you to manipulate your data files with ease. The Disk Sort sorts data from a file using the disk and rewrites the data in sorted order into the same file, while the RAM Sort uses the computer's memory for arranging the data in sorted order and creates a new file for the sorted data. The Merge program combines two files that have identical fields and have already been sorted. The Dump program displays or prints the contents of a file.

The Disk Sort program sorts data in a fixed-length disk file. This program places the data on the disk in order and stores the sorted data in the same file. To use this program, you determine whether you wish the data in ascending or descending order; you specify both the types of variables (fields) used in the record and the variable on which the data is sorted. You also decide whether to use the bubble sort or the shell sort on your data. The bubble sort is most efficient when used with data that is nearly in order because, as its name implies, it takes the last record in the file and "bubbles" it up through the file until its correct position is found. This method is most effective if the file is nearly in sorted order or if new records have been added to the end of the file. The shell sort, on the other hand, sorts through the file several times moving records in large jumps. The shell sort is usually much faster than the bubble sort on files which are not close to sorted order.

STEP 1: If the computer is not already in the BASIC mode, select `II BASIC`. To load the program from a diskette, insert the diskette into the drive, type

```
OLD DSK1.DSKSORT
```

and press `ENTER`.

NOTE: `DSK1` is used throughout this manual to indicate the disk drive used. However, if you have multiple disk drives, enter the number of the disk drive in which you have placed your diskette instead of "`DSK1`."

- STEP 2: When the cursor reappears, type `RUN`, and press `ENTER`. When the `DISK SORT PROGRAM` title screen appears, press `ENTER` again.
- STEP 3: Remove the program diskette from your drive, and insert the diskette containing the file you wish to sort. Then enter `DSK1` and the name of the file which contains the records you wish to sort. Next indicate the first record you wish to sort by entering the record number, and then enter the number of the last record you wish to sort. NOTE: If you do not know how many records are in your file, the program in Appendix A can help you determine the number of records.
- STEP 4: Indicate the number of fields (variables) in each record. Each field must then be designated either numeric or alphanumeric. Enter `SN` for the numeric field or `SA` for the alphanumeric field on which you wish to sort your data. Only one variable may be specified as the sort field.
- STEP 5: Indicate whether you wish the data sorted in ascending or descending order. Finally, specify the sort method you wish to use. The shell sort is more efficient if your data is not almost in order.

STEP 6: As the data is sorting, the computer beeps as each pair of records are compared. A different tone sounds if the records change position. Once all the data is sorted, the message "*** DONE ***" is displayed on your screen, and the program stops.

If you wish to sort the same file on a different sort field, you should make a copy of the file. Then repeat the sorting procedure, beginning with STEP 1, and specify the field you now wish to use as a sort field.

The RAM Sort program is faster than the Disk Sort program and is most useful with smaller files. (You can exceed the amount of memory space available and cause an error if your file is large and you are using a large sort field.) This program sorts a fixed-length disk file by reading each record and saving the sort field in the computer's Random Access Memory (RAM). The stored fields are then sorted using a shell sort. Once the data is sorted, an output file is written which may be either a sorted copy of the input file or a sorted pointer file to the input file. You determine whether the data is sorted in ascending or descending order and the field on which the data is sorted. You also specify the name of the output file and the type of fields.

RAM Sort creates an output file when it sorts a file. Before using this program, you should catalog your disk and determine whether the diskette has adequate space available for the output file. One factor which affects the amount of space required for the output file is the type of file used. You may choose either a relative file or a pointer file as the output file. The relative file contains all of the records you have sorted from the input file in sorted order and provides quick access to the sorted data. The pointer file contains only the number of each record from the input file in sorted order and requires only nine bytes per record. If you desire to sort a file using several different fields (variables), you should consider leaving the original file as it is and create pointer files, each sorted on the desired field. As a result, you may conserve considerable disk space. In either case, the output file begins with record number 0.

STEP 1: If the computer is not already in the BASIC mode, select TI BASIC. To load the program from a diskette, insert the diskette into the drive, type

OLD DSK1.RAMSORT

and press ENTER.

NOTE: DSK1 is used throughout this manual to indicate the disk drive used. However, if you have multiple disk drives, enter the number of the disk drive in which you have placed your diskette instead of "DSK1."

- STEP 2: When the cursor reappears, type RUN, and press ENTER. When the RAM SORT PROGRAM title screen appears, press ENTER again.
- STEP 3: Remove the program diskette, and insert the diskette containing the file you wish to sort. Then enter DSK1. and the name of the file to be sorted. Next indicate the first record you wish to sort by entering the record number, and then enter the number of the last record you wish to sort. NOTE: If you do not know how many records are in your file, the program in Appendix A can help you determine the number of records.
- STEP 4: Indicate the number of fields (variables) in each record. Each field must then be designated either numeric or alphanumeric. Enter SN for the numeric field or SA for the alphanumeric field on which you wish to sort your data. Only one variable may be specified as the sort field.
- STEP 5: Now indicate whether you wish the data sorted in ascending or descending order. Finally, enter DSK1. and the name for the output file, and indicate whether you wish to use a relative or pointer file. If you select a relative file and the input file uses more than one-half of the disk space, the output file must be written to a different diskette. NOTE: The first record of the output file is stored in record number 0.

STEP 6: As the data is sorting, the computer beeps whenever a record is placed in sorted order. Once all the data is ordered, the message "*** DONE ***" is displayed on your screen, and the program stops.

If you wish to sort the file on a different sort field, repeat the sort procedure, beginning with STEP 1. Then specify the field you now wish to use as the sort field, and to conserve disk space, use a pointer file as the output file.

The Merge program allows you to combine two fixed-length data files with identical fields that have been sorted on the same field into one sorted data file. The only limitation on the size of the merged file is the amount of space remaining on your diskette. To use this program, you specify the output file, the number of records to be merged, the type of fields in each record, and the field on which the sort has occurred. You determine whether the data is merged in ascending or descending order.

STEP 1: If the computer is not already in the BASIC mode, select TI BASIC. To load the program from a diskette, insert the diskette into the drive, type

OLD DSK1.MERGE

and press ENTER.

NOTE: DSK1 is used throughout this manual to indicate the disk drive used. However, if you have multiple disk drives, enter the number of the disk drive in which you have placed your diskette instead of "DSK1."

STEP 2: When the cursor reappears, type RUN, and press ENTER. When the MERGE PROGRAM title screen appears, press ENTER again.

STEP 3: Remove the program diskette, and insert the diskette containing the first file you wish to merge. Then enter DSK1. and the name of the file to be merged. Next indicate the first record you wish to merge by entering the record number, and then enter the number of the last record you wish to merge.

NOTE: If you do not know how many records are in your file, the program in Appendix A can help you determine the number of records.

STEP 4: If necessary, remove the first data diskette and insert the one that contains the second file you wish to merge. Then enter DSK1. and the name of the file to be merged. Next indicate the record with which you wish to begin the merge, and then specify the last record you wish to merge.

STEP 5: Enter DSK1. and the name you wish to use for the merged output file. NOTE: The first record in the output file is record number 0.

STEP 6: The input files must have identical record structures and have already been sorted on the same field. Now indicate the number of fields in each record. Each field must then be designated either numeric or alphanumeric. Enter SN for the numeric

field or SA for the alphanumeric field on which both files have been sorted. Now indicate whether the data has been sorted in ascending or descending order.

- STEP 7: As the data is merged, the computer beeps whenever a record is merged into the output file. Once all the data is merged, the message "** DONE **" is displayed on your screen, and the program stops.

The Dump program lists the contents of a data file. To use this program, you specify the record with which you wish to begin the listing. Also you may determine whether the listing is displayed on the screen or printed. The file contents are displayed using the normal display format. However, if you wish, you may see the internal hexadecimal representation in addition to the corresponding ASCII characters. If you choose to do so and the file is in internal fixed format, the offset from the beginning of the record is given in hexadecimal notation.

This program reads the contents of your file as strings and converts (in the ASCII format) all convertible strings to numbers. Because of this conversion, you need not know any details about the format of your files; any internal or display data file of any length can be dumped. However, the conversion can occasionally misinterpret data that is eight bytes long. Because the TI Home Computer stores a number in internal format in eight bytes, it is possible for data of this length to be read as both a valid string and a valid number. If this condition occurs, both the valid string and valid number are displayed.

NOTE: The Dump program may inaccurately list the contents of a data file if the record length is 255. If you use this length and your data does not fill the record entirely, the data displayed will include data remaining from a previous record. If you use a record length of 254 or less, the data displayed is exactly what is stored in the record.

- STEP 1: If the computer is not already in the BASIC mode, select TI BASIC. To load the program from a diskette, insert the diskette into the drive, type

OLD DSK1.DUMP

and press ENTER.

NOTE: DSK1 is used throughout this manual to indicate the disk drive used. However, if you have multiple disk drives, enter the number of the disk drive in which you have placed your diskette instead of "DSK1."

- STEP 2: When the cursor reappears, type RUN, and press ENTER. When the DUMP PROGRAM title screen appears, press ENTER again.
- STEP 3: Remove the program diskette, and insert the data diskette that has the file you wish to dump. Then enter the complete file name, which must begin with "DSK1."
- STEP 4: Determine whether you wish to display or print the file listing. Enter the appropriate number. Then decide if you wish to see a hexadecimal listing in addition to the ASCII codes. (To help you interpret the hexadecimal notation, a chart is provided in Appendix B which lists the decimal, hexadecimal, and binary representation for the numbers 1 through 15.) Finally, indicate the number of the record with which you wish to begin the listing.
- STEP 5: If you wish to interrupt the display or printing of your listing so that you may examine it more closely, press any key. To resume the display or printing, press another key.

To list all of the data in your files, this program uses special techniques, which prevent using the normal End-of-File function. As a result, when all the data is listed, the error message "I/O 25 in Line nnnn," where nnnn is a number, is displayed on your screen, and the program stops.

To use the Disk Sort, RAM Sort, and Merge programs, you must know the number of records you wish to sort in the data file. To sort the entire file, you must know the last record number in the file. If you have changed your file several times, you may not know the last record number. To determine that number, you may write a program similar to the following one.

```
100 C = 0
110 OPEN #1:"file-name",INPUT,SEQUENTIAL,FIXED
    [record-length],[INTERNAL or DISPLAY]
120 IF EOF(1) THEN 160
130 INPUT #1:A$
140 C = C + 1
150 GOTO 120
160 PRINT "THERE ARE";C;"RECORDS."
170 CLOSE #1
180 END
```

First, set a record counter (C in the example below) to zero; then open the file you wish to sort. Write a transfer statement to exit the loop when the end of file is reached. Next use an input statement which references each record. After the input statement has been executed, increment the record counter by one. Then use a GOTO statement to create the loop which references and counts each record. Use the print command to display the number of records which have been referenced when the end of file is reached. Finally, close the file and end the program. (Refer to your User's Reference Guide for details on the OPEN and INPUT statements.)

If your file was created using relative accessing, a zero record was created and is counted in this program. If you did not store data in record 0, decrease the number of records displayed by 1 when entering the record number in your programs.

To help you interpret the hexadecimal notation available from the Dump program, the following chart lists the decimal, hexadecimal, and binary representation for the numbers 1 through 15.

DECIMAL	HEXADECIMAL	BINARY
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
10	A	1010
11	B	1011
12	C	1100
13	D	1101
14	E	1110
15	F	1111