

# SYSTEM SAVERS

by Tom Stibolt



Saves SYSTEM Format Programs To Tape or Disk  
Level II, 16K

**For Radio Shack**

TRS-80\* Microcomputer

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\*\*\* SYSTEM SAVERS \*\*\*

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SYSTEM SAVERS is a package consisting of two machine language utility programs designed to make your use of SYSTEM format tapes easier and more enjoyable. The two programs, FLEXL and TDISK, allow you to make backup copies of SYSTEM tapes on either tape or disk. FLEXL will permit merging of two or more SYSTEM tapes and provides the capability to produce your own SYSTEM tapes.

TDISK will permit you to use any SYSTEM tape from disk. This feature is not available under Radio Shack's TRSDOS 2.1 for programs that overlap DOS. TDISK will even load programs with non-contiguous blocks, a feature lacking on some similar programs.

\*\*\*\*\* TAPE TO DISK UTILITY \*\*\*\*\*  
TDISK (Version 2.2)

TDISK is a machine language program for the Radio Shack TRS-80 designed to allow you to save programs from SYSTEM format tapes on disk. This program is specifically intended as an adjunct to TAPEDISK to allow saving those programs that reside in the same locations as DOS and that therefore cannot normally be loaded with DOS. TDISK accomplishes this by loading these programs into locations above DOS and adding a short program to move them down on top of DOS after they are loaded.

PROGRAM SPECIFICATIONS

TDISK will operate with any Radio Shack TRS-80 microcomputer equipped with Radio Shack's Disk Operating System (TRSDOS).

Tape Format - The cassette tape is in standard SYSTEM format.

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### USING TDISK

Two things need to be done in order to use TDISK to its fullest advantage. The first is to use TAPEDISK to load TDISK onto your disk. The second is to then use TDISK to load other programs onto disk (for instance T-BUG, Editor-Assembler, RSM-1S, or SARGON).

### LOADING TDISK ONTO DISK

First, place the tape containing TDISK into your cassette recorder. Make sure that the tape is positioned just before TDISK if there are other SYSTEM programs on the tape. This may require that you unplug the cables from the recorder and listen for the beginning of TDISK. Now run TAPEDISK (see TRSDOS reference manual). You will be prompted with a '?'. First type 'C <ENTER>' to load the tape. The tape will start to load accompanied by a flashing asterisk (\*) in the upper right corner of the screen. A 'C' appearing to the left of this asterisk indicates a tape error and requires starting over. If this occurs, check the volume setting of the recorder and make certain that you have started before the beginning of the recording. After proper loading has occurred you should type:

```
F TDISK/CMD:d 5500 57F1 5500 <ENTER>
```

TDISK will load onto your diskette in the drive specified by 'd'. Note that the disk drive number specification is mandatory.

### USING THE PROGRAM

From DOS, type 'TDISK <ENTER>'. TDISK will load and prompt you with 'SYSTEM PROGRAM NAME?'. You then enter the name of the program you wish to load onto disk (e.g. EDTASM). The tape must be in the cassette recorder with the PLAY button pressed. Your tape will load with the usual stars in the upper righthand corner of the screen. In addition, TDISK displays the

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name of the current file being loaded or skipped beneath the stars. TDISK will skip any intervening files and load only the specified file. A 'C' appearing in place of the leftmost '\*' indicates an error on loading and requires that you start over! This can be accomplished merely by pressing the <BREAK> key at any time that the tape is loading.

When your program is properly loaded from tape, TDISK will type:

```
RUN TAPEDISK AND ENTER:  
?F NAME/EXT:D 6100 eeee tttt
```

This is a reminder that you must now run the TRSDOS utility TAPEDISK (see TRSDOS reference manual) in order to save the program and its loader. 'NAME/EXT' represent the name and optional extension you wish to use for your program. ':D' is the required drive number you wish your program to be stored on. 6100, 'eeee', and 'tttt' are the starting, ending, and transfer addresses respectively to be used in saving your program. These latter two must be typed exactly as TDISK indicates for proper results.

Note that the extension '/CMD' allows you to load and begin execution of your program by merely typing the name (without extension) of your program.

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### \*\*\*\*\* FLEXIBLE LOADER \*\*\*\*\* FLEXL (Version 2.2)

FLEXL is a machine language program for the Radio Shack TRS-80 which will allow you to copy or make your own SYSTEM format tapes. Several commands enable FLEXL to be used in a number of different ways.

#### LOADING FLEXL FROM CASSETTE

In order to use FLEXL loaded from tape you must be in BASIC. If in DOS, type at the DOS command level 'BASIC (or BASIC2) <ENTER>'. Respond to 'HOW MANY FILES?' with whatever you prefer or <ENTER>. If using a Level II only machine, no special action is required. Type 'SYSTEM' (if in DISK BASIC, type CMD"T" first). You will be prompted with a '\*?' to which you reply 'FLEXL <ENTER>'. The tape will load and you will again be prompted with '\*?'. Respond this time with '/ <ENTER>' and you will be running FLEXL.

#### LOADING FLEXL ONTO DISK

To place FLEXL onto your disk, use the TDISK utility included in this same package (see TDISK manual). At the DOS command level type 'TDISK <ENTER>'. You will be prompted with 'SYSTEM PROGRAM NAME'. Type 'FLEXL <ENTER>' after preparing your tape to load. The recorder will start, your tape will load accompanied by a flashing asterisk in the upper right hand corner of the screen. A 'C' to the left of the asterisk indicates a load error and necessitates starting over. After the tape loads properly, you will be given the instruction to run TAPEDISK (see DOS manual for full details) and the starting, ending, and transfer addresses. Run TAPEDISK and, after receiving the prompt '?', type :

```
F FLEXL/CMD:d 6100 eeee tttt
```

The eeee and tttt above should be replaced by the numbers just indicated by TDISK (still on the screen)

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and the ':d' is the drive number you wish to store FLEXL on and is mandatory. This will save your program on disk. Respond with an 'E <ENTER>' to return to DOS. Now, to run FLEXL, type from DOS READY: 'FLEXL <ENTER>' and the program will run. Optionally, you may load FLEXL to be used with another program by first typing 'LOAD FLEXL/CMD <ENTER>' then entering your other program.

#### USING THE PROGRAM

The prompt used by FLEXL is 'FLEXL>'. This indicates that the program is waiting for an input from the keyboard. Input is in the form of one of the commands shown below.

#### LOADING TAPES TO BE COPIED

The command to load a system format program into memory is 'L'. The program can be loaded anywhere the user wishes provided that FLEXL is not overwritten and that there is room in memory. The locations that the program is loaded into using L need bear no relation to the location the program normally would load into and generally will not. The form of this command is:

L ssss filename

'ssss' is the optional hexadecimal address where the tape will begin loading and 'filename' is the name of the program as it currently resides on tape. If the latter two items are not specified, the next program encountered will be loaded into a standard buffer used by FLEXL. CAUTION -- FLEXL resides in memory beginning at 5200 hexadecimal and ending at 55F5 hexadecimal. Your program should not be loaded below 5600 hexadecimal!

As the program loads, the asterisks (\*\*) that usually are associated with program loading will appear and the right hand asterisk should flash. If the asterisks do not appear or fail to flash, check the

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recorder volume and connections to the computer. If using the Radio Shack Expansion Interface, you should be connected to port 1 not port 2. If a 'C' appears in place of the left hand asterisk, a load error has occurred. It is possible to abort the loading process by pressing the <BREAK> key. Additionally, during program loading, the name of the program currently being read will be displayed beneath the asterisks. FLEXL is able to properly skip over intervening files to read the file that you request. In the event of an error, the <BREAK> can be used as mentioned above.

After loading your tape, FLEXL will print the message 'TO MERGE WITH THIS PROGRAM LOAD AT xxxx'. Using the address xxxx in a subsequent load will result in the merging of that program with the first. Using an address at least three beyond this allows several separate programs to reside in memory simultaneously. If the value xxxx is beyond the end of user RAM (7FFF for 16k, BFFF for 32k, or FFFF for 48k), then your program has not fit into the available memory. In this event, try loading again with a lower starting address if possible (see below!).

The 'L' command strips the object file of the leader, filename and checksum before writing into memory. This command also inserts some special relocation information so the program is not executable when loaded.

#### WRITING SYSTEM TAPES ENTERED WITH THE 'L' COMMAND

To write the information loaded by the 'L' command out to tape, type:

W ssss filename

'sss' is the optional hexadecimal address specified under the 'L' command and 'filename' is the filename you wish assigned to the new object file on tape. If the latter two are not specified, the standard buffer is used and the name of the last program loaded is used.

This command will write to tape an object file loaded with the 'L' command assigning it the filename

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specified. The 'W' command will generate a tape which may be loaded using the TRS-80 'SYSTEM' command. To abort this operation, press <BREAK> as mentioned above.

**VERIFYING TAPES**

In order to verify a tape either after loading or after writing it out to a new tape, type:

V ssss filename

'ssss' is the optional address that the program was originally loaded at (using the 'L' command) and 'filename' is the name of the file on tape you wish to compare with the program in memory. This tape file can be either a file loaded for subsequent copying (in which case you are checking to see that it loaded properly) or a file just written (in which case you are checking to see that it was written properly). If the two optional arguments are not given, the standard buffer is used and the name searched for is that of the last accessed file.

Be sure to place the tape at a point before the program you are verifying. Following verification, the message 'PROGRAM VERIFIED' is displayed if the two programs match. If a mismatch is found, the tape will stop and the message 'TAPE VERIFY ERROR!' is displayed. WARNING--Some of the CTR-80 recorders supplied with the TRS-80 will place a pop on the tape when stopped. This can occur when the tape stops due to a verify error or when using the <BREAK> key. If your recorder has this problem, it can be fixed by your local Radio Shack.

**EXAMPLE**

To make a backup copy of FLEXL you would do the following:

- 1) Load FLEXL into memory by typing 'L <ENTER>'.
- 2) Rewind the tape and verify that the program is correct by typing 'V <ENTER>'.

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- 3) Insert a new tape, set your recorder for record, and type 'W <ENTER>'. This will produce a copy of FLEXL.
- 4) Rewind the copy, set the recorder for play, and type 'V <ENTER>' to verify that the copy is correct.

#### MAKING NEW SYSTEM TAPES

To produce a tape of the contents of some block of memory (e.g. a program written by RSM-1 or a program after modification) type:

```
S ssss eeee tttt filename
```

Where 'sss' is the hexadecimal starting address, 'eeee' is the hexadecimal ending address, and 'tttt' is the hexadecimal transfer address. 'filename' is the filename assigned to the tape

This command will write to tape a block of memory in a form that can be loaded using the TRS-80 'SYSTEM' command. This command is very useful when FLEXL is used with one of the available machine language monitors (i.e., RSM).

#### EXITING FROM FLEXL

To exit from FLEXL, simply type <BREAK> after receiving the prompt (FLEXL>). This will return you to BASIC if using a level II machine or BASIC2 in a disk machine. If running under DOS or Disk BASIC, you will be returned to DOS.

#### USING FLEXL WITH OTHER MACHINE LANGUAGE PROGRAMS

In order to use FLEXL with another machine language program (such as RSM-1), you must arrange for FLEXL to return to your program. To do this, place the starting address of your other program into locations 402E and 402F (the least significant byte of the address goes into 402E). To run FLEXL you need only cause a jump to 5200 (20992 decimal). To return,

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press <BREAK> in response to 'FLEXL>'. Remember that FLEXL occupies locations 5200 to 559F so that it is incompatible with any program that uses or resides in any portion of that range. Also, care must be taken when using FLEXL with another program not to overwrite that program.

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