

FORAITS SOFTWARE
MULTILOAD 48k / 128k SPECTRUM
INSTRUCTION MANUAL
**"ADD SOPHISTICATED LOADING ROUTINES
TO YOUR OWN PROGRAMS"**

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INTRODUCTION

During the history of the Sinclair Spectrum we have seen vast improvements in the quality of commercial software. This programming talent has not just concentrated on program content, but has also included numerous loading methods. Software houses have developed these loading routines to make their products both original and interesting.

Until now, the Spectrum owner has been unable to add such sophisticated loading routines to their own programs unless they have possessed an in-depth Machine Code knowledge. Foraits Software have now solved this problem by supplying an automated library of ready built Machine Code routines which can be incorporated in your own programs.

This system known as MULTILOAD, is a simple menu driven package which will convert your own programs to load with any combination of the following features:-

- Pulsating / jerky leaders
- Choice of loading speeds
- Multi-Colour loading boarder
- No loading border
- Reverse loading SCREEN\$ (bottom to top)
- Side loading SCREEN\$ (left to right)
- Diagonal loading SCREEN\$
- Anti-“break” option

MULTILOAD will take your original programs from cassette and re-write them to a blank tape with any combination of the above features. Your programs can therefore become more personalized and professional in appearance.

Foraits Software have recognized that programs converted with MULTILOAD may now become more marketable products. Provided the copyright restrictions stated in this manual are strictly adhered to, such programs may be widely sold without royalty or licence payment to ourselves.

The following chapters explain how to add the various routines to your programs. It is suggested that you read the instructions in the order they are presented. They are written in an order which provides a natural progression to MULTILOAD's facilities, not the order in which a conversion will be undertaken. After the manual has been read once it is unlikely it will be required in the future. MULTILOAD is menu driven and will automatically inform you if your chosen options are unsatisfactory.

CONVERTING MACHINE CODE PROGRAMS

MULTILOAD needs to read your original program from cassette to convert it – it will not convert a program which is in the Spectrum's RAM. It is therefore necessary to have a saved copy of your program on tape.

Load side 1 of the MULTILOAD cassette by typing LOAD " " – the following screen will be displayed :-

```
Foraits Software MULTILOAD
Program Options

Header (Y/N) . . . . .
SCREEN$ (Y/N) . . . . .
CODE (Y/N) . . . . .
Start Address . . . . .
Length of CODE . . . . .
```

The above options all relate to your original Machine Code file. The Spectrum is automatically switched to upper case mode and the use of the ENTER key is unnecessary.

Header (Y/N) – Answer "Y" if you file was saved with a standard Spectrum header, or "N" if it was a headerless file. A reply of "Q" to this option will terminate the program. It may be restarted at a later time by typing GOTO 10

SCREEN\$ - Answer "N" to tell MULTILOAD this is not a SCREEN\$ file but a CODE file. If the answer to the previous option was "Y" the remaining options will be skipped. If you answered "N" to the previous option the cursor will be moved to the next input field.

CODE (Y/N) – This option will only be presented to you if the file is headerless and not a SCREEN\$. A "Y" will then be automatically input and the cursor placed at the next field.

Start Address – You must enter the 5 digit address that you wish your file to be re-loaded to. You will only be given this choice if you answered "N" to the first option. As you will already know from the Spectrum manual, a Machine Code file does not have to be loaded into the same store address it was saved from. If your file was saved from a store address different from that which it should be loaded, you must answer "N" to the first option in order to provide a correct start address.

Length of CODE – You must enter the size of the file at this option. It is necessary to enter leading zeros if applicable – ie 5 digits must be input. Like the previous option, this one will only be presented if you are dealing with headerless files. MULTILOAD will use the header information if it exists.

If the Start Address / Length of CODE would potentially overwrite either the MULTILOAD save or load routine you will be re-prompted to enter the correct figures. This will be shown by the cursor returning to the start position of the appropriate line instead of accepting your data. The MULTILOAD system can deal with files as large as 38000 bytes in size provided they will not overwrite the load routine which starts at store address 64500.

Once the above options have been answered a secondary menu screen will be displayed :-

```
Foraits Software MULTILOAD
      Loading Options

Loading Speed (1-7.....
Pulsed Loader (Y/N).....
Normal Coloured Border (Y/N) .
Multi Coloured Border (Y/N) ..
Black & White Border (Y/N) ...
Black & Green Border (Y/N) ...
Red & Blue Border (Y/N) .....
No Border (Y/N) .....
Allow Break (Y/N) .....
```

The above options all deal with the way in which the converted file will load. It is here that you choose the options to suit the final appearance of your program.

Loading Speed (1-7) – This option gives you the choice of adding a variable speed “turbo” loader. The speed range starts at 1 for normal speed and increases up to 7 for treble speed. Any number outside this range will cause a default value of 1 to be substituted. It is suggested that you experiment with different speeds until you reach a satisfactory compromise between speed and reliability. Provided you intend to load the final program on the same cassette recorder as it was saved, you should be able to use the higher speeds successfully. If you lend your programs to other people or use more than one cassette recorder it is wise to limit the speed due to the slight incompatibility which will exist between machines. Use a SCREEN\$ to test your results and vary the volume and tone controls during saving and loading until the picture is displayed perfectly without attribute corruption (incorrectly coloured / flashing squares).

Pulsed Leader (Y/N) – An answer of "Y" to this option will automatically produce a double pulsating leader on your converted cassette. This form of loading has been gaining popularity amongst the leading software houses and adds a little extra security to your final cassette. Either answer to the option will move the cursor to the next field.

Normal Coloured Border (Y/N) – An answer of "Y" to this option will produce the normal Spectrum loading colours. This consists of an initial red/cyan colour followed by the main blue/yellow stripes. If you are bored with these loading colours answer "N" to this option and the cursor will move to the next choice.

Multi Coloured Border (Y/N) – If you answer "Y" to this option your converted file will load with constantly changing coloured stripes. A reply of "N" will move the cursor to the next input field.

The next 2 options all deal with the loading border colours and provide you with various choices to reduce the monotony of the standard Spectrum colours.

No Border (Y/N) – If all the previous border options have been answered with a "N" the cursor will move to this option and automatically enter a "Y". This will suppress any loading stripes and just display the current border colour during loading. This option is most effective when loading a SCREEN\$ where the PAPER & BORDER colours are the same.

Allow Break (Y/N) – A reply of "Y" to this option will create a loading routine which will stop if the BREAK key is pressed, This is the way in which the standard Spectrum load routine operates. If you answer "N" to this option MULTILOAD will generate a routine which will ignore the BREAK key whilst that individual file is loading. It will also ignore the case of the cassette recorder being stopped during a loading sequence. The routine will only terminate when it has read the correct number of bytes from the tape. This is an ideal way of introducing additional security measures to your programs, It does not, however, prevent a program from being "broken" once it has loaded. You must write your own routines to trap this.

After this last option has been answered the menu will be cleared and you will be prompted to "Load Source Cassette". The "Source Cassette" is your original tape which contains the file to be converted. If you realize at this point that you have made an error, you can press BREAK to stop the program. You may then restart it by typing – GOTO 10.

Assuming you wish to proceed, your cassette file will then be read into the Spectrum's RAM for MULTILOAD to convert. You will then be prompted to "Load Target Cassette". The "Target Cassette" is the output tape you are using to save the converted program to. The only differences you will notice during saving will be the "Speed" and "Pulsating" options if they were chosen.

The border stripes will be closer together depending on the chosen loading speed. This will obviously be noticed during the loading stage as well. The "Pulsing" will also be seen as the special routine saves it to your target tape between the header and the main block of code.

After the file has been saved to the target cassette the primary menu will be re-displayed for further conversions to take place. You may answer "Q" (quit) to the first option if you wish to terminate the program.

ERROR messages

There are 3 possible error messages which could be issued as the result of the above actions :-

File is Headerless – This is an obvious message and would only be displayed if you told MULTILOAD to expect a header which did not exist. You will be prompted to "Press any key to Continue". When this is done you should load the correct cassette for MULTILOAD to process.

Address/Length Incompatible – This message is issued if the combination of your file size and start address would potentially overwrite either the MULTILOAD save or load routines. As already stated MULTILOAD can convert files up to 3800 bytes long provided they do not infringe any store address above 64499. MULTILOAD will return you to the primary menu screen if it finds an incompatible file.

File Type not Supported – This message is output if MULTILOAD reads a file which is not CODE. It will not convert numeric or string arrays and will only convert Basic programs which have been specially saved by a Machine Code routine on side 2 of the MULTILOAD cassette. SCREEN\$ files and Machine Code programs are considered to be the same type for the purposes of conversion. If this message is output you will be returned to the primary menu screen for further selections.

CONVERTING A SCREEN\$

The conversion of a SCREEN\$ is similar to that of a CODE file. Follow the procedures in the previous chapter but answer "Y" to the SCREEN\$ (Y/N) on the first menu screen. This answer is necessary for MULTILOAD to trigger special routines during the loading process. The loading options on the second menu screen will be identical to those in the previous chapter. When you have replied to the last option a third menu screen will be displayed. This deals entirely with the appearance of the final SCREEN\$ and offers some very powerful facilities.

```
Foraits Software MULTILOAD
SCREEN$ Options

Paper Colour.....
Ink Colour.....
Border Colour.....
Normal Load.....
Reverse Load.....
Side Load.....
Diagonal Load.....
```

Paper Colour – This requires an answer in the range 0-7. This number matches the Spectrum's colour codes and will automatically set the "paper" to your chosen colour during loading.

Ink Colour – This option relates to the Spectrum's colour code for the "ink" colour during loading. An answer in the range 0-7 is acceptable.

Border Colour – Like the 2 previous options this choice relates to the border colour during loading. An answer in the range 0-7 will be accepted.

Normal Load – An answer of "Y" to this option produces a SCREEN\$ which loads in the standard Spectrum way – ie top to bottom followed by the attributes (colours). An answer of "N" allows you to choose a different style loading method from the remaining choices.

Reverse Load – A reply of "Y" will load your final SCREEN\$ from bottom to top followed by the attribute bytes in the same direction.

Side Load – A reply of "Y" to this option will load your SCREEN\$ from left to right. It will wait for the whole SCREEN\$ to be read and display it together with the attribute bytes.

Diagonal Load – If the previous loading options have all been bypassed with a reply of "N" this choice will automatically be selected. It will produce a final SCREEN\$ which is displayed in a diagonal manner complete with the attribute bytes.

CONVERTING BASIC PROGRAMS

As you will have noticed from the error messages on page 5 Basic programs in their normal form are not supported by MULTILOAD. They must be changed to CODE files before they can be converted. This process is achieved by the use of the "BASIC TO CODE" program on side 2 of the MULTILOAD cassette. Follow the procedures below to change your Basic program to a CODE file :-

- 1) Type CLEAR 64999
- 2) Type LOAD "BASIC TO CODE" CODE – then load side 2 of the MULTILOAD cassette

NOTE – the file name above is made up as follows :-

BASIC – normal upper case characters
TO – Spectrum keyword on the "F" key
CODE – Spectrum keyword on the "I" key

- 3) When the program in step 2 has loaded your Basic program can be loaded in the normal way. If you saved it using the LINE command you will have to use the MERGE command to prevent it from "Autorunning"
- 4) After you Basic program has loaded type RANDOMIZE USE 65000. The Screen will be cleared and the following message will be displayed:-

CLEAR XXXXX Performed

Make a note of the number which will be output instead of the XXXXX this may be required later. The normal "Start tape, then press any key." message will also be displayed.

- 5) Load a blank cassette to save the Basic program as CODE – then press a key to commence the save.

Your basic program has now been changed to a CODE file. This does not mean it has been converted into Machine Code, it has just been saved as a series of bytes and includes the Spectrum's "System Variables" as well. You can now add the MULTILOAD features by following the instructions on page 2 of this manual.

Creating "Auto-Run" Programs

Because your Basic programs are changed to CODE files before they are converted, the normal Spectrum LINE command will not function. To produce a Basic MULTILOAD program which will "Auto-Run" when reloaded a simple procedure must be adopted.

The line number 9999 will always be executed by MULTILOAD if it exists. It is therefore a simple matter to include such a statement in you Basic program when designing it. Line 9999 will normally be a GOTO statement which will redirect the Basic interpreter to the correct start line.

The following example shows a normal Basic program and one which has been written with MULTILOAD in mind.

Normal

```
10 CLEAR 39999
20 PAPER 1: INK 7: CLS
30 LOAD "PIC" SCREEN$
40 LOAD "PROG1" CODE 40000
50 RANDOMIZE USR 40000
```

MULTILOAD Version

```
20 PAPER 1: INK 7: CLS
30 LOAD "PIC" SCREEN$
40 LOAD "PROG1" CODE 40000
50 RANDOMIZE USR 40000
60 STOP
9999 GOTO 20
```

LINE 10 – This line is not necessary for a MULTILOAD Basic program. The "BASIC TO CODE" conversion program will automatically perform its own CLEAR statement for you. The value it chooses is displayed on the screen prior to saving the converted file. If for some reason you find it necessary to include a CLEAR statement in your Basic program you must ensure it is not lower than the value which was automatically selected. It may be necessary to use a higher value to make space for the program variables you create.

LINES 20-40 – These are just examples of standard Spectrum Basic commands which require no modification for MULTILOAD use.

LINE 60 – A STOP statement must be placed at the end of a MULTILOAD Basic program. If it were omitted, the program would execute line 9999 and keep looping.

LINE 9999 – As stated on page 7 MULTILOAD will always start executing a Basic program from line 9999 if one exists. In the above example it would perform a GOTO 20 which would effectively start running the program from the start. Any line number could be jumped to just by substituting the number in line 9999.

As you can see from the above example very few changes are necessary to "Auto-Run" MULTILOAD programs. You must, however, remember to make the changes before you convert the program with "BASIC TO CODE".

CREATING A FINISHED CONVERSION TAPE

So far in the previous chapters we have only seen how to convert individual CODE, SCREEN\$ & Basic files. For MULTILOAD to be of any practical use it must be able to string all your files together and "Auto-Run" them from a normal LOAD command. The following instructions explain how this can be achieved :-

Before any of your converted files can be loaded back into the Spectrum the "MULTILOAD" Machine Code program on side 2 of the MULTILOAD cassette must be in store. To enable this to be done automatically it should be placed on your final conversion tape. A small Basic program must therefore be written to load "MULTILOAD" and then load each of your converted files.

The "MULTILOAD" program is run by the command – RANDOMIZE USE 64500. This must be issued for each converted file you wish to load. A Basic program which will load "MULTILOAD" followed by 3 converted programs should look something like the following example :-

```
10 CLEAR 29999
20 LOAD "MULTILOAD" CODE 64500,1000
30 RANDOMIZE USR 64500
40 RANDOMIZE USR 64500
50 RANDOMIZE USR 64500
60 PRINT USR 30000
```

The above Basic program would obviously NOT be converted with "BASIC TO CODE" but just saved as the first program on your "target" cassette. It will be necessary to save this program with the Spectrum LINE command to allow it to "Auto-Run" when reloaded.

LINE 10 – This lowers RAMTOP to make enough store available to load the "MULTILOAD" program and all your converted files.

LINE 20 – This loads the "MULTILOAD" program into store

LINES 30-50 – These 3 lines each start the "MULTILOAD" program to read in one of your converted files.

LINE 60 – This line is just an example of how you might start running the programs which have been loaded.

After the above program, or similar, had been saved to your "target" cassette it would be necessary to save a copy of the "MULTILOAD" program to the same tape.

- 1) Type – Clear 64499 as a direct statement
- 2) Load side 2 of your MULTILOAD cassette and type LOAD "" CODE
- 3) When the "MULTILOAD" program has loaded remove the cassette and replace it with your "target" tape. This should be positioned directly after the above Basic program.
- 4) Type – SAVE "MULTILOAD" CODE 64500,1000 – this will save a copy of the load routine to your "target" tape directly after the Basic loader program.
- 5) It now remains for you to follow the instructions in the previous chapters to convert your various files and save them on the "target" cassette after the "MULTILOAD" routine.

The Spectrum can now be reset and your newly created cassette loaded by typing – LOAD ""

NOTE

If any of your converted files are Basic you must remember that when reloaded they will overwrite the Basic loader program already in store. This problem would obviously happen with normal Spectrum programs and is not a function of MULTILOAD conversions. If you require further converted files to be loaded after a Basic program is read into store you must write the necessary RANDOMIZE USR 64500 statements into the converted Basic program. When this program is loaded and "Auto-Run" from line 9999 it could be directed to execute the relevant RANDOMIZE USR 64500 program lines.

CONVERTING COMMERCIAL SOFTWARE

Although this utility was designed to convert your own software it could still be applied to commercial programs to add "that personal touch". Provided the "target" cassette is only used by yourself there should be no problems with copyright laws.

Most commercial software is written in 100% Machine Code. These files tend to be extremely large in size and would probably exceed the maximum allowed by MULTILOAD. Various protection methods may also be found which will make the job of conversion more difficult. Foraits Software produce a utility called **CODE SLICER 2** which can assist in the conversion of many such programs. This package consists of several routines to "investigate" protection methods, read "turbo" programs, headerless files etc. Further details are available by sending a large SAE to the address at the back of this manual.

COPYRIGHT DETAILS

As already stated Foraits Software will allow a converted program to be duplicated and sold commercially without royalty or licence payment. The following points, however, must be adhered to :-

- 1) The MULTILOAD routines must not be amended in any way.
- 2) All programs made commercially available with MULTILOAD should display a credit to "Fraits Software" and its product "MULTILOAD". This credit should be clearly visible on the external packaging of the software.
- 3) Our MULTILOAD software must not be used to provide a conversion service to a third party.
- 4) Fraits Software will still retain the copyright on MULTISAVE, MULTILOAD & BASIC TO CODE even if copyright is applied for on a converted product.

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With the exception of the above points MULTILOAD and the associated documentation may not be copied, hired, lent or re-sold without the written consent of Fraits Software.

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In return for allowing our loading routines to be incorporated in commercial software we would like to ask one favour. Please write to inform us if you produce software using these routines. This will help us evaluate how useful MULTILOAD is.

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