

**ART**



*Master*





# ART MASTER CONTENTS

(1)	INTRODUCTION	2
(2)	GETTING STARTED AND QUICK START REFERENCE	3
(3)	ACCESSING COMMANDS	4
(4)	TEXT EDITOR	5
(5)	COMPILE	14
(6)	DECOMPILE	16
(7)	RETURN	18
(8)	JUMP	18
(9)	TEST	19
(10)	MEMORY CHECK/CHANGE	19
(11)	INSERT	20
(12)	DELETE	20
(13)	AREA RELOCATE	20
(14)	DRAWING A PICTURE	21
(15)	THE DEMONSTRATION	22
(16)	SUMMARY OF COMMANDS	23
(17)	CUSTOMISING ART MASTER	24
(18)	SAVING THE RESIDENT CODE	25
(19)	WHAT IS G-CODE?	25

## 1. INTRODUCTION

ART MASTER is an advanced, self-contained Graphics manipulator for the 48K Spectrum. The program itself occupies a little over 14K of your machine, though only a small part of this need remain in the computer at all times. The program sits at the top of the computer's memory, this means that the maximum number of add-ons and other programs can be used alongside ART MASTER without need for modification.

ART MASTER's main function is to allow many screens to be stored in the computer at the same time, though unlike the average screen compressor its compression ratio is nearly 99%. This means that at any one time hundreds of screens can be loaded into the Spectrum instead of the tens of screens others will allow. This makes the provision for large scale animation by redrawing small parts of screens so that they appear to move. But it doesn't stop there...

With ART MASTER you can draw circles 600% faster than a normal Spectrum, fill in shapes with 10 different patterns, draw boxes, triangles, flip areas of the screen, the list goes on!

All these commands add up to one thing, a vastly superior graphics package, whose output can be used in adventure games, educational software, business software, and just about every other application you can think of where pictures or large scale animation is required.

If you're still not convinced load up the Demonstration on side 2 of the cassette and prepare to be amazed.

## 2. GETTING STARTED

By far the best way to learn to use ART MASTER is to load it up and experiment, using the manual as a guide. To load up the program type LOAD "" (See the Spectrum user guide). Set the level on your cassette recorder to around 7 (thats 3/4) and press play.

The program should then load and run automatically, this will take about 4 minutes and will follow this process: First border will flash cyan/red then flash blue/yellow, after this the screen will print Program: ART MASTER, then after a few seconds it will go black. If this does not happen try a different volume level, if the program refuses to load after several attempts then consult your dealer.

When the program has loaded you will be faced with a blank blue screen all except for a white asterisk (star) in the bottom left hand corner. This white asterisk is called the command cursor. The Basic variable 'a' has also been changed, it now holds the start address of the program. If at any stage you wish to re-enter the program from Basic simply type RANDOMISEUSR a or RANDOMISEUSR 51490.

### GETTING STARTED QUICK REFERENCE

If you want to start drawing pictures before you treat the manual as a bedtime story, then heres an A-Z of the manual.

First read Sections 2-5 then read Section 14, next find a simple picture to start with. After this you'll get the feel of the program and will be able to tackle the more detailed pictures like the ones on side two of the cassette.

### **3. ACCESSING COMMANDS**

The program, when loaded (See 'Getting Started') displays the white cursor mentioned earlier, this indicates you are in Command Mode. Once in Command Mode you can access all of ART MASTER's commands by simply pressing the key that corresponds to that command.

When the key has been pressed, the program will prompt you for any information it requires. This other information will be in the form of addresses etc. Just like your home address, an address indicates where pieces of code 'live' in the computer.

The addresses take the form of 5 digit numbers and are entered in decimal format (ordinary numbers). Pressing SHIFT & ZERO will delete the last digit entered, repeatedly pressing SHIFT ZERO will cause the whole number to be erased.

Upon receiving the fifth digit of an address the enter key will be pressed automatically for you, if your number is less than 5 digits then pressing enter will allow you to proceed to the next stage.

If at any stage you wish to exit the command you have selected then press the 'X' key and you will be returned to the Command Mode.

Upon completion of the command, providing no error has been processed and that you have not selected TEXT EDITOR or RETURN, the white cursor will appear once more indicating you are again in Command Mode.

## 4. TEXT EDITOR

This will be one of the most used commands you will encounter. To access the TEXT EDITOR press the 'E' key, the message TEXT EDITOR will appear and you will seem to be in Basic. Press ENTER once, you now have three extra commands at your fingertips. These are AUTO LINE NUMBERING, LINE EDITING & RENUMBERING. To access these commands simply hold down the SYMBOL SHIFT key and then press the first letter of the command (A=Auto, E=Edit & R=Renumber). You will be asked for some extra information which is entered as a decimal number in the usual way (see Accessing Commands). Each of these commands will now be discussed in turn.

### **AUTO (SYMBOL SHIFT A)**

This command requires you to enter the step between each successive line number and then the line number to start from. Just pressing enter gives the default value of 10 in each case.

Once initialised AUTO will produce a new line number after each line is entered. A REM statement is also included after the line number, this is to tell the Spectrum that the information typed after the REM statement is of no concern to it. REM stands for REMark, for more information on REM see the Spectrum manual.

To stop the computer generating new line numbers delete the current line number & REM statement, then press ENTER. Pressing ENTER is essential to turn off the auto line number generator.

### **LINE EDITOR (SYMBOL SHIFT E)**

When the cursor (a > sign) is pointing to a line number it may be edited using SHIFT ONE (as in the Spectrum manual). Normally if the cursor is not pointing to the line number you require, you have to use SHIFT 6 for up and SHIFT 7 for down until the cursor is on the correct line. ART MASTER has a much better solution!

Push ENTER to clear any Spectrum intervention, then SYMBOL SHIFT E. You will now be asked to enter the line number you wish to edit, doing so will put you into the edit mode with the line you requested. Just pressing ENTER in reply to the line number question will cause you to exit the command.

If you forget to press ENTER to clear the Spectrum intervention and the last thing you did caused an error E.g. 'Break Cont repeats' etc, then you will be greeted with another error when you enter the edited line. This will be a 'Nonsense in Basic' error, and the line will remain unedited, the cursor will however now point to the line requested so you can either push ENTER and try again or use SHIFT ONE in the normal way.

### **RENUMBER (SYMBOL SHIFT R)**

This command requires three pieces of information, STEP, START & NEW START. STEP is the gap between successive line numbers & defaults to 10 if no number is entered. START is the line number you wish to renumber from, this defaults to the first line if no value is entered. NEW START is the line number you wish the new line numbers to start from, the default is 10 once more.

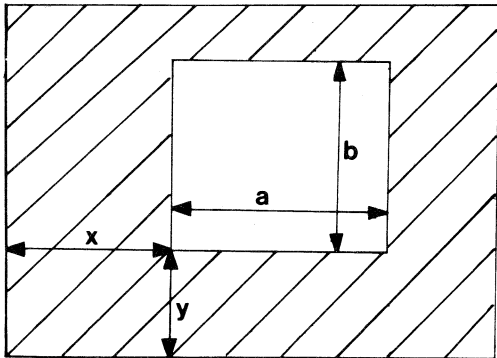
Now you know what extra commands you have at your fingertips, its time to find out what the function of the TEXT EDITOR is.

ART MASTER's drawing instructions are entered in Basic and then they are compiled down to an ultra fast & exceedingly small block of code called G-CODE. This G-CODE may then be incorporated into your own programs to give graphics without using up all the memory.

The drawing instructions are typed in after a REM statement to indicate to the Spectrum that they are extra to its normal command set. This is why AUTO produces the REM statement.

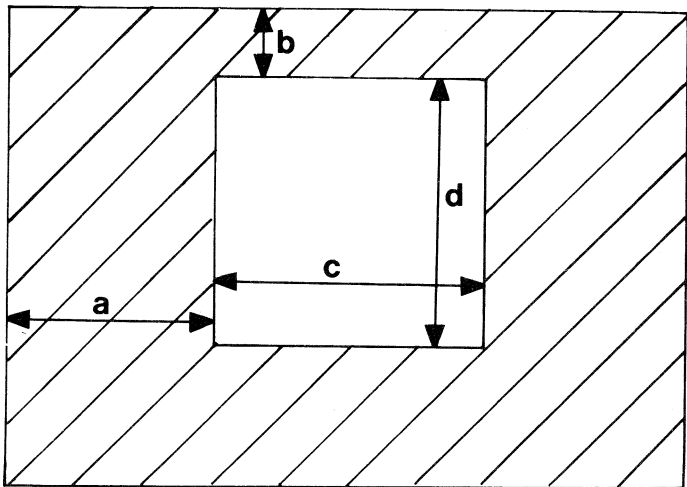
Below is a list of the drawing instructions used by ART MASTER, each is also accompanied by a brief description.

- \$ PLOT x,y                      This in the same as the Spectrum's own PLOT command and puts a dot on the screen at location x,y
- \$ DRAW x,y                     This is a new command, it links the last point to the new point location x,y
- \$ FILL x,y,z                    Again a new command, this allows you to fill any shape with one of ten patterns. x,y is the point to start from and z is the pattern number (1 to 10).
- \$ CIRCLE x,y,z                 This is like a normal circle only 600% faster. Its centre is given by x,y and radius is given by z.
- \$ ARC x,y,z                     This command draws an arc from the last position to x,y with a curve factor z.  $-128 \leq z \leq 127$  (see end of section)
- BOX x,y,a,b                    This draws a box from x,y with width a & height b. x,y,a,b are pixel positions  
e.g.  $0 \leq x \leq 255, 0 \leq a \leq 255$   
 $0 \leq y \leq 175, 0 \leq a \leq 175$





- \$ TRIANGLE a,b,c,d      This draws from the last point to a,b then to c,d and finally back to the original point leaving a triangle.
  
- \$ ATTR ink, paper, bright, flash      This handles all the colour commands in one go removing the need for ink & paper etc.  
(ink & paper 0-7)  
(bright & flash 1 = on, 0 = off)
  
- \$ MASK over, inverse      Very similar to ATTR only it handles over & inverse commands. (1 = on, 0 = off)
  
- \$ BORDER a      Same as the Spectrum, sets the border to the colour a  
 $0 = a = <7$
  
- \$ WINDOW a,b,c,d      This defines a window (an area to draw in) initially this is the whole screen. Print positions must be used (see Spectrum manual) a,b is the start position c is the width & d is the depth. a,b,c,d refer to print positions not pixel positions.  
e.g.  $0 = a = <31, 0 = c = <31$   
 $0 = b = <21, 0 = d = <21$



\$ CLW	This clears the contents of the current window and sets its colours to those defined by ATTR.
\$ COPY a,b,c,d,e,f	This copies the area a,b,c,d (defined in the same way as window) to new top left position e,f.
FLIP1 a,b,c,d,e,f	This is the same as copy only the block being copied is turned upside down.
FLIP2 a,b,c,d,e,f	Same as copy only contents are turned left to right.
\$ JUMP address (or label)	This command causes the pointer counting through the G-CODE to be moved to the address/label given. (see labels & addresses at the end of the section).
\$ CALL address (or label)	This is the same as jump only the place the pointer was moved from is recorded.
\$ RETURN	This is used with call and jumps back to the place the pointer was before call moved it.
\$ END	This tells the program you have finished your picture.

## ABBREVIATIONS §

All the instructions preceded by a dollar sign \$, can be abbreviated to either just the first letter or in the case of circle call etc to the first few letters. Providing the minimum abbreviation has been passed any number of letters (up to the full word) are acceptable e.g.

PLOT = P or PL or PLO or PLOT

## LABELS AND ADDRESSES

Labels may be used instead of addresses inside a program listing, but if the call/jump is to be made outside the listing then an address will have to be used. Up to 25 labels are allowed per listing (this will always be more than enough as call/jump are rarely used at all).

A label is defined in a listing by preceding it with an 'L' then the label (up to six characters starting with a letter).

e.g.

```
10 REM JUMPhello
20 REM PLOT 100,100
30 REM lhello
40 REM END
```

This will not plot the point 100,100 since it is jumped over.

Care should be taken if abbreviating JUMP or CALL when using them with labels, that the label does not start with the next letter of the command

e.g.

```
10 REM JUMum
```

would be read:—

```
10 REM JUMum
```

Addresses take the form of 5 digit numbers and point to the start location of the routine.

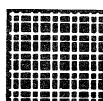
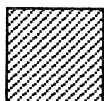
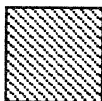
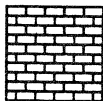
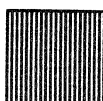
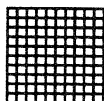
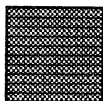
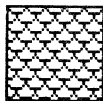
e.g.

If a routine to draw a dustbin is stored at 45000 and it ends with a RETURN then CALL 45000 will draw the dustbin.

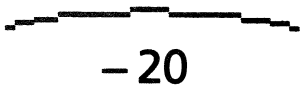
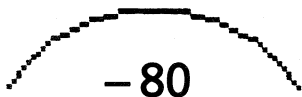
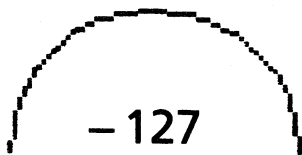
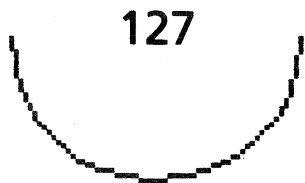
**REMEMBER** only use RETURN with CALL, it is always advisable to single step the picture first when using JUMP & CALL etc since mistakes are very easily made and will probably cause a system crash.

If you still have difficulty with JUMP and CALL then imagine JUMP as GOTO and CALL as GOSUB and then read up those in the Spectrum user manual.

**FILL:—** Here are the 10 patterns included in ART MASTER. To change or increase them see customising ART MASTER (end of the manual).



Arc:— Below are a few arcs at various curve factors so that you can get the idea how it works.



## 5. COMPILER

Having prepared your text file, the next thing to do is to compile it. To do this you must re-enter ART MASTER by typing RANDOMISE USR a or RANDOMISE USR 51490. Now press 'W' for compile mode, you will then be asked for the start address, type in a number between 28000 & 50000, (40000 is a good starting place).

You will then be asked 'Auto Leader (Y/N)?'. A leader is a four byte link that tells the computer to expect G-CODE. If you want to run the picture from Basic or Machine Code then you will need a leader. If on the other hand you wish to run the picture as part of another picture e.g. by a CALL or a JUMP then you must not have a leader. In about 99% of cases you will need a leader.

Upon answering the leader question there will be a short delay, the length of which depends on the length of the text file. After this delay you will be informed of the end address of the code, take note of this, it will be vital if you intend to put lots of pictures end on.

You are now back in Command Mode and are able to draw your picture using any of the 3 ways available (See Later).

### ERRORS

If you have made a mistake in the text file then one of four error reports will appear.

#### Mistake in line a

This occurs when a spelling mistake has been made, a number has too many digits or a comma has been put in the wrong place.

#### No End Instruction

This occurs if you have forgotten to put an END instruction on the end of the text file.

#### You forgot to define NAME

The label 'NAME' has been encountered and no pointer has been given in the text file.

#### Too many labels.

This, the last of the errors, is also the most rare, it only occurs in the event of you defining more than 25 labels. This being the case the chances are you are well enough acquainted with G-CODE to use Addresses instead.

In each of these cases you are returned to TEXT EDITOR mode and the offending line is pointed to ready to be edited.

## 6. DECOMPILE

As the name implies DECOMPILE is the reverse of COMPILE. Simply type 'Q' and then the Start Address of the block of G-CODE you wish to decompile. There will be a delay, this could be as long as 10 seconds for a very long block of code, then the white asterisk will re-appear. Providing the Start Address was pointing to a block of G-CODE, the old text file will have been replaced by a new text file relating to the G-CODE block.

If the block of code was not G-CODE the delay could be as long as 2 minutes and will probably end in the error 'Out of Memory'.

All being well the text file will now be a little different to the one you typed in in the first place. Four main differences can be seen, the first three are unimportant. These are: the shortest abbreviations are used, capital letters are used and the line increments are always in steps of five.

The last of the four differences is very important LABELS ARE NOT DECOMPILED ONLY THE ADDRESS THEY POINT TO!!!

e.g.

The example given in the TEXT EDITOR section:

```
10 REM jumhello
20 REM plot 100,100
30 REM lhello
40 REM end
```

If Compiled at 40000 with no leader it would Decompile to:

```
5 REM J40006
10 REM P100,100
15 REM E
```

The reason for the number 40006 is that a JUMP takes up 3 bytes, and so does a PLOT (if declared for the first time [see What is G-CODE ? at the end of the manual]).

If a leader had been used then the whole block would have been shifted down four bytes meaning the address would now be 40010.

### HINT

If you use the Basic command CLEAR (address-1) [see Spectrum manual] before you compile your text file at 'address' then not only will you protect your code you will also safeguard yourself against one of the possible types of crash. This crash is the one that performs a NEW function erasing the Basic but not the Code. Decompile will then allow you to recreate your text file after it has been lost.

The other handy thing about using CLEAR is that it protects your code against being overwritten by the text file should you make a mistake using Decompile.

**DON'T FORGET** if you use CLEAR you must also type LET a=51490 to setup the variables again.

## 7. RETURN

Type 'Y' to enter this mode, you will be returned to the Normal Spectrum. You must use this mode whenever loading or saving, printing or running a picture using RANDOMISE USR address. If you do any of the above in TEXT EDITOR MODE YOU MAY CRASH THE SYSTEM.

If you wish to test which mode you are in once in Basic then hold down the SYMBOL SHIFT key and press A. If the word STOP appears then you are in RETURN mode, if AUTO starts up then you are in TEXT EDITOR mode. If the latter is the case then press 'X' to quit the AUTO command then type RANDOMISE USR a or RANDOMISE USR 51490 to enter ART MASTER then press 'Y' to enter RETURN mode.

## 8. JUMP

This is the first of the two 'in program' drawing commands. Pressing 'J' will cause you to be asked for the Start Address of the code. Answer this question in the usual way (see getting started). The picture is then drawn without the need to return to Basic and RANDOMISE USR address. The major advantage of this command is that you can draw picture elements, e.g. pictures with no leader (see compile) as well as pictures with leaders.

Once the picture has been drawn you will be returned to Command Mode ready to continue with the next command.

## 9. TEST

Pressing 'T' gets you into TEST mode, this is essentially the same as JUMP only after each command has been processed the system displays the address of the current command in the top right hand corner of the screen and waits for a key to be pressed. 'X' will exit at any stage.

If either JUMP or TEST come across an error e.g. PLOT 250,200 (the y coordinate is too big for the Spectrum screen), the RETURN mode is selected and the error 'Integer out of range' is printed at the bottom of the screen.

## **10. MEMORY CHECK/CHANGE**

This command serves two functions. Firstly it lets you view the contents of any memory location & secondly you are able to change the contents of that location if you wish.

Press 'M' followed by the Address of the location you wish to view, then either type ENTER to view and proceed to the next location or type a number (0-255) to change the contents of that location.

Pressing 'X' will let you exit at any stage. Upon the third digit of the number being typed ENTER will automatically be pressed, if your number has less than 3 digits then press ENTER to proceed. In the event of the number being greater than 255 you will be asked for the number once more.

## **11. INSERT**

This command, and the two others that accompany it allow you to manipulate the G-CODE down at object level. Press the 'I' key then enter the start of the insertion, the end of the block of code and finally the number of spaces to make. The command will then move everything from the start of the insertion to the end of the block down the memory by the number of spaces required. The resulting gap will then be filled with zeros.

## **12. DELETE**

This is the opposite to INSERT and takes the same form. Press the 'D' key to remove the required number of bytes from the starting point and move the end of the block back up the memory. The space created at the end of the memory is then filled with zeros so that it is ready for use.

## **13. AREA RELOCATE**

This command moves a block of code from one position to another. Press the 'A' key followed by the START of the block, the END of the block and then the NEW START. The block will then be moved, or rather copied as the old block is not erased.



## 14. DRAWING A PICTURE

If you already have the picture you wish to draw to hand, e.g. from a magazine, then it is advisable to plan it on graph paper first. If you are composing a picture then again doing the design on graph paper is going to make it much easier later. You can get special Spectrum Screen mapped paper, but this is often very expensive and graph paper will do just as well.

Next translate the picture into lines, curves, plots etc. Load up ART MASTER and select the TEXT EDITOR mode, select AUTO line numbering. Then enter the lines, curves etc into the text file. It is often advisable to COMPILE the text file at various stages throughout the picture to make sure you haven't made a mistake as it is much easier to alter in the early stages of its development, than trying to find it later.

When you've finished your picture you can relocate it anywhere in the Spectrum memory, providing that you haven't used JUMPs or CALLs. If you have then these will need to be changed to their new values using the MEMORY CHECK/CHANGE function.

If you intend to draw many pictures, it is often a good idea to see if any part comes up more than once. In an adventure game a castle may appear twenty times, it would be wasting memory to draw it twenty times. Draw the castle on its own and put a RETURN statement before the final END command. Then all you have to do is call up the castle routine every time you want to add it to your picture.

## 15. THE DEMONSTRATION

Every picture in the demonstration (with the exception of the title screen) is stored in G-CODE format. It is interesting to note that the title screen takes up more room than the rest of the demonstration, this will give you an idea of what ART MASTER can do. All the pictures were drawn, in the way described in section 14 (Drawing a Picture), using ART MASTER.

The demonstration takes the form of a film show and lasts about one minute. This might spark off some of your ideas how to make money for yourself using ART MASTER, show the demonstration side of the cassette to your local shopkeeper. Then tell him that your pictures could be adverts for his goods, if its a video shop then they will already have many televisions just sitting idle waiting for your artwork!

This is just one of the ways you can make money from your computer with ART MASTER, all we ask in return is that if you use ART MASTER in your own programs or film shows etc, that you give the program a mention. This need not be massive just "Graphics drawn with the aid of ART MASTER by SUMMIT" will be fine.

Remember that with ART MASTER you can give your programs that professional edge, graphics really get a program moving. They will also help you to impress other people especially if those other people are about to buy your program.

If you want to know how the demonstration was done they why not DECOMPILE it, it will show just how easy great graphics can be.

## 16. SUMMARY OF COMMANDS

Here's a quick reference table for you to use if you forget a command and don't want to search through the whole manual for it.

COMMAND	KEY	REQUIREMENTS	
INSERT	I	START, END & NUMBER OF BYTES.	4
DELETE	D	START, END & NUMBER OF BYTES.	5
AREA RELOCATE	A	START, END & NEW START.	14
MEMORY CHECK/CHANGE	M	START, THEN ENTER TO VIEW OR NUMBER (0-255) TO CHANGE.	6
COMPILE	W	START ADDRESS.	
DECOMPILE	Q	START ADDRESS.	
JUMP	J	START ADDRESS.	
TEST	T	START THEN ENTER TO SINGLE STEP.	
RETURN	R	NO INPUT REQUIRED.	
TEXT EDITOR	E	NO INPUT REQUIRED.	

## 17. CUSTOMISING AND MANIPULATING ART MASTER

To copy ART MASTER to disk or microdrive simply load up the program then type:—

```
YOUR SAVE SYNTAX "ART"CODE 51490.8000
```

e.g. for microdrive:

```
SAVE "*"m";1;"ART"CODE 51490.8000
```

next type this:

```
10 CLEAR 51489: LET a=51490:
```

```
LOAD "*"m";1;"ART"CODE:RANDOMISE USR a
```

and then save that:

e.g. microdrive:

```
SAVE "*"m";1;"art" LINE 10
```

From there on load "art" and the rest of the program will load up and run.

Since the text files are stored in Basic all types of printer interface will work without customisation!

If your printer interface code clashes with ART MASTER then save the text file and reset the computer, then load it back up, load up your interface software then list it. This will only be necessary in about 1% of cases.

### FILL PATTERNS

If you want to change the fill patterns then load in your new patterns from 59280 to 59360. Design the patterns using a UDG designer and save the first 10 UDG's.

If you want more patterns then you will have to find a spare piece of memory and then POKE 59187 & 59188 with the start address, then load the patterns into your spare memory.

You can then use any number for the FILL command parameter 'z' between 1 & and the number of patterns you have (max 255).

## 18. SAVING THE RESIDENT CODE

The code that has to remain in the computer while you draw a picture resides between 57742 & 59742. The rest of the memory above 59742 is also used as a buffer for fill and circle commands. You can use this buffer as a scratch pad while pictures are not being drawn if you wish.

To save the resident code type:

```
SAVE "resid" CODE 57742,2000
```

## 19. WHAT IS G-CODE?

G-CODE is a graphic compression system (c) 1985 S.M.Reeder. It works by using a code between 236 and 255 to represent each function, the computer searches for the code and then stays in that mode until it gets another code. For this reason a PLOT statement will take 3 bytes first time it is declared, but until the next code comes along only the two coordinates are required to carry on plotting.

The coordinates for the pixel positions are stored in reverse order, this is because the y coordinate of the Spectrum never gets bigger than 175 and that can be distinguished from a control code.

Use the MEMORY CHECK/CHANGE command to study G-CODE from a COMPILED listing if you want to find out more. Comparing the text file with the G-CODE should reveal all you wish to know, but remember you are not permitted to write software like ART MASTER to create G-CODE since it is copyright. Only pictures using G-CODE and the resident code may be distributed without the authors permission.

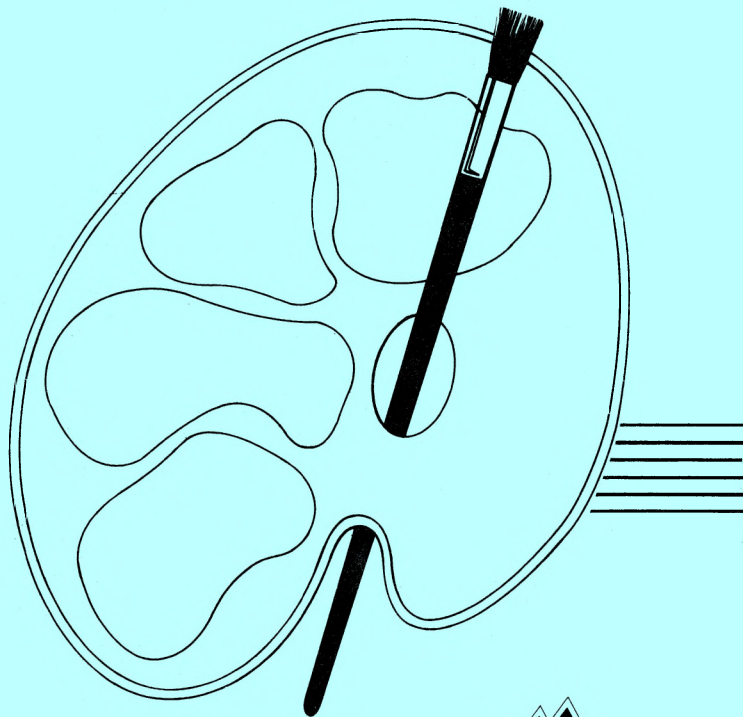




**ART MASTER**  
1986 Summit Software

All rights reserved.

No part of this book or the accompanying programs may be reproduced either in part or whole in any form whatsoever without the prior written permission of Summit Software. Both book and program are sold on an understanding that they may not be lent or hired or sold on a buy-back basis unless under written authorisation of Summit Software.



**SUMMIT SOFTWARE**

Units 3-6 Baileygate Estate,  
Pontefract, West Yorkshire Wf8 2LN.  
Telephone: 0977 797777

