Broomsoft present

WIMP

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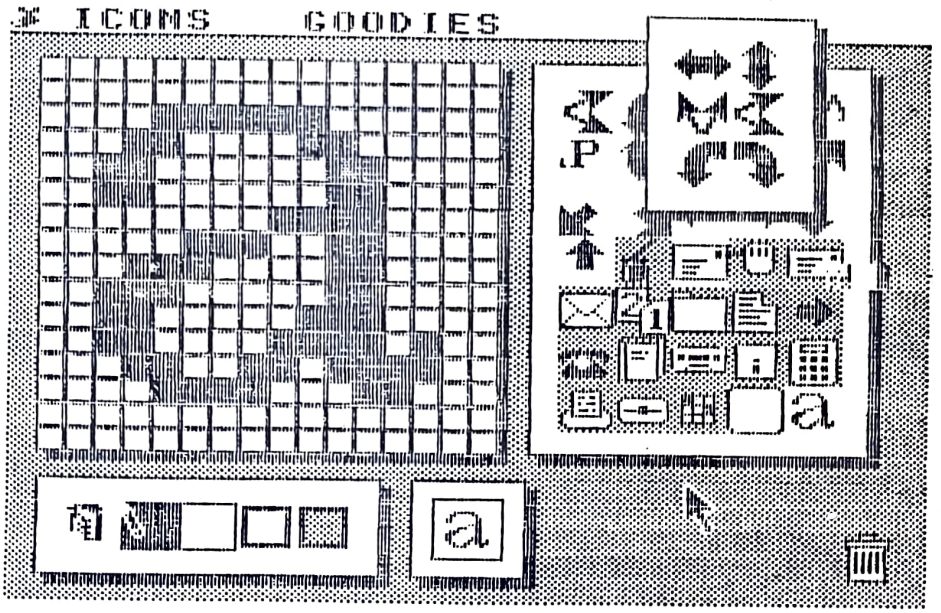
Programmer's Manual



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Introducing WIMP

The best introduction to WIMP is to use it. Turn the Dragon on (off and then on if you have been using it) and insert the WIMP disk. To run WIMP type boot. After a few seconds a blue screen will appear (grey on a black and white TV). This will have a white strip at the top with the titles of various functions : "TITLES" and "GOODIES". On the left hand side are various *icons* - a little mouse, a grid, a paintpot, a sheet of paper and a file. There will be dustbin icon in the bottom right-hand corner of the screen. You must plug a floating joystick into the **right hand** joystick port. You will see an arrow on the screen - this is controlled using the joystick. The arrow will sometimes all-but disappear, leaving only the tip. This is so you can point to the very edges of the screen.

Each icon represents a particular function. Whenever you select a function in WIMP, there are no keys to press (except on occasion) - you simply have to point the arrow tip at the appropriate icon and press the joystick button. On the starting screen (the program is called "MOUSMAIN" on the disk) you can have demonstrated all the major functions of WIMP. Firstly, select one of the icons and press the button. Try the little 3x3 grid first. This will load in the *icon designer* program ("ICONDES") and run it. Notice that if you remove the WIMP disk, so that the program is not on the disk in the drive, a message will come up saying "Option not available". Whenever you get an error, point at the box and press the button to get rid of it. For instance, if you select the mouse icon (to change the device from joystick to mouse) and select one, the program will try to load a *device driver* from disk. These are not yet available (hopefully a mouse interface will become available, in which case Broomsoft will develop a device driver for it) so the program will tell you "Option not available".

Upon selecting the grid icon, the disk will turn on and the icon designer program will run. This program has its own manual but notice that you can work out how it works without the manual, simply by messing about with it. The manual serves simply to explain all the functions, and to tell you any keys used (in the icon designer only one key is used - the spacebar is an 'undo' key). Once you have read it, you will not have to constantly refer to it - one quick read is sufficient. That is the beauty of WIMP programs.

To return to the main program, select the dustbin icon. This acts as a dustbin in WIMP programs - either "trash a file" in a housekeeping program or, more usually, "trash this program". This disk will turn on again, and the program will load in. This time, if you have changed disks, a message saying something like, "File not found" will appear. Again, point and press the button to get rid of the error and continue. Once you have returned to the main program, you can experiment with the icons. Only three will work just now - the grid, paintpot and file icons.

During your experimentation you may have been surprised by boxes appearing on the screen. If you were not, try pointing at the tiny icon in the extreme top left-hand corner of the screen (a little mouse!) and press the button. A little box will appear, naming the program and the author. It will stay for as long as you keep the button pressed. This is a *pull-down credit*. Most WIMP programs only have one, selected by pointing at the mouse icon. The starting program, "MAINPROG", has two. One credits the author of the program, one is the main titles for WIMP. Select this by pointing at the word, "TITLES" at the top of the screen. Other WIMP systems (on other computers) also have this on their main program (the technical term for which is *"WIMP Front Panel"*).

Anyone who has used a WIMP program before will know that pull-down credits are not the most important application of the top line of the screen. You will notice in all WIMP programs, the top line is reserved in this manner. The mouse is always to the left but there are other words - "GOODIES" is a favourite. If you select one, you will see a *pull-down menu*. These are like menus in other programs, with a list of options. However, there are two main differences. These options are selected by mouse, and the titles have been shortened (i.e. "Print icons 0-63" would be shortened to "ICONS") to fit into a small-ish box. The box is removed leaving whatever was behind it - it is as though it was never there. If you select "GOODIES" on the main program, then you can try to select options. To do this, keep the button pressed, point at the option (try ICONS first of all) and release the button. The option is executed. If you try icons, you will see a large white box appear on the screen, and fill with icons (these are icons 0-63, the standard icons. Look at them and try to imagine what they might be used for). This white box will not disappear, however. It is a *slap-down function* and will stay. You might select DIR, another slap-down function which will go over the box of icons. Like there are pull-down menus, there are also slap-down menus sometimes.

The last main feature will be seen if you try the "RESET" option in the "GOODIES" menu. A box will appear saying "OK", which you must point at to reset the system. These appear whenever a risky function is about to take place (e.g. kill a file, leave some programs without saving data, etc.)

To summarize, WIMP has many features, common to all WIMP programs:

1. Icon selection for functions
2. Error handling (friendly messages instead of ?NE ERROR etc.)
3. Easy to learn or go in at the deep end *without* drowning
4. Pull-down credits and menus
5. Slap-down functions etc.
6. Protection against yourself by "Are you sure" messages

WIMP programs are designed for ease of use. The last two pages should get you up and running any WIMP program, on this system at least - the more modern systems on 16- and 32-bit machines have extra features such as moving windows around with the mouse and re-sizing boxes etc. under user control. These are extra features afforded by the extra speed of these computers, such as the Atari ST, Apple Mac and the Acorn Archimedes. All the important features of WIMP systems are embodied in this system - it may be a good idea to start with Dragon WIMP if you want to go on to a bigger and better computer. If you already use a WIMP system you may find Dragon WIMP slow and less powerful; this is because the 6809E used in the Dragon, although being a 16-bit chip really (it just has a cut-down databus which makes it technically only an 8-bit chip) is still fairly slow (at 0.89MHz it is under half the speed of the 6502 used in the BBC micro and about 100 times slower than the latest thing in super-micros, the ARM chip used in the Archimedes).

It may be a good idea, if you want to program your own WIMP programs (and since you are reading this, I assume you will) to have a play on an Atari ST or Apple, just to get a feel of what has been done. Most things you could do on these computers can be done on the Dragon, so just have a look to get ideas. Obviously, a brilliant disk file manager under WIMP with 200 features would take a genius to program (or, at least, to fit into 32K) but a fairly competent basic programmer could rack off, in a matter of hours, a decent program to do something using WIMP. Just to get a few ideas, though, play with the STs in your local computer dealer. I recommend that you also play with an AMX mouse on a BBC, as Dragon WIMP owes a lot to that, and the things possible on a BBC would certainly be possible on a Dragon.

The Computer Under WIMP

To program in WIMP, you must first boot up the main WIMP disk, to get the front panel (it is possible to customize this so that you get WIMP programming straight away after loading by changing the last line in the boot file (at the moment it says RUN "MOUSMAIN"). Select the dustbin and you will have a programming window. Now, in memory is BASIC, the DOS (Disk Operating System) and WIMP. The memory map is as follows:

```
$0000 - $03FF = RAM used by BASIC and DOS
$0400 - $05FF = Spare RAM (can be used for short machine code routines)
$0600 - $0BFF = RAM used by DOS
$0C00 - $23FF = The WIMP screen (Pmode 4,1)
$2400 - $77FF = BASIC program and variable storage space
$7800 - $7FFF = Space reserved for user-defined icons
$8000 - $BFFF = BASIC
$C000 - $DFFF = DOS
$E000 - $E8FF = WIMP program
$E900 - $F0FF = Standard icons
$F100 - $F3FF = Characters for printing to screen
$F400 - $FEFF = Reserved memory for saving bits of screen
$FF00 - $FFF0 = Interfaces (i.e. printer, disk, keyboard, screen etc.)
```

In essence, all that has changed when booting WIMP is that WIMP is installed. It is as if you only have 32K of memory to program in (although the systems programmers of you will note that memory is used over and above this, for pull-down menus). WIMP will only run on a Dragon 64 (or a Dragon 32 with extra memory) so where has the extra memory gone? The answer to this is that the top 32K ($8000 - $FEFF), which is normally held on ROM (so is unchangable) has been copied to RAM. So that WIMP can directly interface with BASIC, it changed the program in RAM. Also, WIMP can live in this RAM and all the data and variables IT uses are locked away, without you loosing memory. If you imagine that WIMP is a plant which has to interface with the ground, the plant cannot root in concrete (ROM) but soft peat (RAM) is easy to grow into. In a way, WIMP does "grow into" BASIC.

Syntax

Until the advent of microcomputers, the word syntax (along with words like parse and interface) were little used, except by English professors. When looking through your Dragon manual for the first time, the chances are that when it explained that ?SN ERROR means "Syntax error" you were none the wiser. Syntax is the definite form of a sentence and cannot be quantified - it is a digital concept (fitting for computers!) and a sentence (or command) can either have bad syntax or good syntax. While your friends might understand you if you talking in any slang dialect, the computer is very fussy, so whenever a new command is introduced to the computer (like in WIMP) it comes bundled with syntax instructions. These can be totally ridiculous as long as the programmer obeys them. I have tried to keep syntax within the standards for Microsoft BASIC, so the following rules apply:

1 .... Pairs of coordinates are held in brackets : (x,y)
2 .... Other arguments (numbers) passed to a command are seperate, and divided up by commas (,).

Whereas in BASIC you can GET or PUT any size and anywhere on the screen, this is slow as it involves shifting registers and other long-winded processes. The idea of WIMP was to speed up these processes, so as a result only whole bytes are played with (as opposed to individual pixels). If fact, to speed the processes up even more, without seriously affecting the user, only 8x8 blocks of pixels are used. As a result, coordinates must obey these rules:

Coordinates of the top-left hand corner of a box or icon (expressed as x,y or x1,y1) MUST be exact multiples of 8.

Coordinates of the bottom-right hand corner (x2,y2) must be multiples of 8 minus 1 (so 7, 15, 31, 47 and 255 are valid)

WIMP Commands

Experimentation is a good way to learn how to use WIMP programs, and it is also a good way to learn what the WIMP commands all do. Here is a list of commands, with syntax and a brief description of their use. This will also serve as a reference page. The commands will be detailed later.

Mouse commands:

```
*POINTER (i,m)  - sets pointer to icon number i and mask number m
                  e.g. *POINTER(2,3) sets the pointer to a pencil
*POINT          - puts the pointer on the screen
*UNPOINT        - takes the pointer off the screen
*PUTPOINT (x,y) - puts the pointer on the screen, at position (x,y)
*MOVEPOINT n    - moves the pointer according to joystick:
       if n = 0 - until button is pressed
          n = 1 - until button is released
          n = 2 - once
```

Screen commands:

```
*BLUE                       - clears screen to "blue"
*CLEAR (x1,y1) - (x2,y2)    - clears a rectangle to white
*ICON i,(x,y)               - puts icon number i at position (x,y) on
                              screen
*DESK                       - sets up a default screen layout
*STORE (x1,y1) - (x2,y2)    - GETs the area of screen and saves it
*UNSTORE                    - replaces the last area of screen that was
                              STOREd
*PICKUP                     - replaces all STOREd areas
*BOX (x1,y1) - (x2,y2)      - draws a white box with a black outline
                              and shadow
*PULLDOWN (x1,y1) -           draws a BOX but first STOREs what was behind
                  (x2,y2)   - it
*WINDOW (x1,y1) - (x2,y2)   - sets the text window
```

Here are some sample programs to demonstrate some commands:

```
 1 REM Print all icons on screen
 5 PMODE 4,1:COLOR 0,1:PCLS
10 I=0
20 FOR Y=0 TO 48 STEP 16
30 FOR X=0 TO 240 STEP 16
40 *ICON I,(X,Y)
50 I=I+1
60 NEXT X,Y
70 *WINDOW(0,64)-(255,191):CLS
```

```
 1 REM Trail of hands
 5 PMODE 4,1:COLOR 0,1:PCLS
10 *UNPOINT:*BLUE
20 *POINTER(4,5)
30 *POINT
40 IF INKEY$="" THEN 30

 1 REM Move pointer
 5 PMODE 4,1:COLOR 0,1:PCLS
10 *UNPOINT:*DESK
20 *POINTER(0,1):*POINT
30 *MOVEPOINT 0:*UNPOINT
40 *WINDOW(0,0)-(255,191):CLS
50 PRINT"X coord =";PEEK(&HE0E5)
60 PRINT"Y coord =";PEEK(&HE0E6)

 1 REM Superama
 5 PMODE 4,1:COLOR 0,1:PCLS
10 *UNPOINT:*BLUE
20 *WINDOW(0,64)-(255,127):CLS
30 LINE(0,63)-(255,63),PSET
40 LINE(0,128)-(255,128),PSET
```

The Commands in Detail

Mouse Commands:

*POINT - This is a very simple command, used for displaying the pointer. If the pointer is not on the screen, it appears. If it IS on the screen then it is NOT erased, but put down again. This will leave a trail, if desired. Be careful, though, if a trail is not desired.

*UNPOINT - This is used to "hide" or remove the pointer. If the pointer was on the screen it is removed (whatever was behind it is replaced) and if it was NOT on the screen, nothing happens. *UNPOINT, along with *PICKUP, should be used as the first line of a program, because when the pointer is moved in one program, it may leave behind what WAS behind it in a different program. Simply typing, as line 5 or 10, *UNPOINT, will remove this danger.

*PUTPOINT (x,y) - This is used mainly to animate the pointer of its own accord. It is similar to *POINT, but you can select the coordinates of the top left hand point of the mouse (any values from 0-255 and 0-191, not just multiples of eight) and, more importantly, if the pointer already was displayed, the old one is removed first (this is done so quickly that it looks as if there is a pointer moving around independant of the background - really it is just an illusion).

*MOVEPOINT n - This is like *PUTPOINT, but the coordinates of the pointer are read from the joystick. If the pointer is not on the screen when *MOVEPOINT is used, a *POINT command is automatically executed. This command can be programmed to loop depending on the value of n. If n is 0 then the pointer will be moved around the screen until the user presses the joystick button; if n is 1, the pointer is moved until the button is released, and if n is 2, the pointer is moved once only (so the BASIC program will have to check if the button is pressed - see the Dragon manual for details).

*POINTER (i,m) - This selects which pointer you want. Because a pointer is not often square, the computer needs not only graphic data but masking data. If you imagine a piece of card with a circle cut in it - you spray the whole card but on the background only a circle is drawn. The mask on this is similar. Have a look at icon 1 to see a mask. A white pixel is set for where you want the background to be seen and a black dot is set for where the pointer will be seen. In the table of icons, i is the icon number (0 for an arrow) and m is the mask number (1 for an arrow). Standard pointers are from 0 to 10, with odd numbers being the masks for the previous even number.

Screen Layout Commands:

*BLUE - This command clears the screen to "blue" by setting half the dots black and half white.

*DESK - This is a command used to simplify screen layout. It sets up the commonest type of screen layout - blue screen with a dustbin in the bottom left-hand corner and a white bar at the top. It is identical to the corresponding BASIC commands, but slightly quicker and much less trouble.

*CLEAR (x1,y1) - (x2,y2) - This is precisely the same as the corresponding LINE ... ,PSET,BF command (providing the coordinates obey the rules in the syntax section). It is used simply to clear a plain white box quickly.

*BOX (x1,y1) - (x2,y2) - This command draws a box with a shadow below and to the right. First it *CLEARs the area, then draws a black box to surround the white box, and then does a shadow effect. Note that the black outline is inside the boxes boundaries, so you cannot define a text window which totally fills the box unless you delete the border (using LINE(x1,y1)-(x2,y2),PRESET,B) then draw a new one OUTSIDE the box (use LINE(x1-1,y1-1)-(x2+1,y2+1),PSET,B). The default (border inside the box) is the one I prefer, but it does waste space a bit.

*ICON i,(x,y) - This prints icon number i (0-127) at position x,y on the screen. Note, though, that if an icon has a blue border it will look strange in a white box, and vice versa. When designing icons you must decide whether it will go onto blue or white (or black) backgrounds.

Pulldown Menu Commands:

*STORE (x1,y1)-(x2,y2) - This is a low-level command used simply as a GET command. In WIMP, there is 3K of memory above the program into which *STOREd bits of screen are saved. They are stacked up in a pile (so the first one out is the last one on). *STORE just stacks a part of screen onto this. If there is not enough memory left on the stack, an ?OM ERROR will be produced. This may happen if you try to get a too-large piece of screen or (unforgivable) you forget to *UNSTORE what you have *STOREd!

*UNSTORE - This requires no coordinates, as they are stored with the *STOREd bit of screen. This command simply pulls the first bit of screen it finds and slaps it back onto the screen.

The above 2 commands only hint at the real power of pull-down menus. If you *STORE a part of screen, then draw a menu onto it, you can remove the menu by *UNSTOREing it (i.e. replacing what was behind the menu). As there is 3K to play with and you can store an unlimited number of bits in that 3K (as long as they do not run out the memory) you can have menus within menus. If a new menu is put partially obsuring an old one then, since the bits of screen are replaced in reverse order, the old one will be restored perfectly.

*PULLDOWN (x1,y1) - (x2,y2) - This command saves an area of screen and then draws a *BOX with the coordinates. When calculating how much memory is used, note that the area saved is 8 pixels wider and deeper than the coordinates given, as the shadow of the *BOX has to be taken into account. Anything saved using *PULLDOWN is replaced using *UNSTORE, as usual.

*PICKUP - This should also be used at the start of a program. It replaces all the stored windows, in the correct (i.e. reverse) order. It is useful if a program is interrupted by an error. The disk command ERROR GOTO will allow your program to take control, so first you must make sure no pull-down menus remain - use *PICKUP to do this.

Text Driver Commands:

The text driver is the program that allows text on the high-resolution graphic screen. There are many available, but one has been specially written to go with WIMP. This allows user-definable windows. The old command, PRINT@ has been replaced, in addition, to provide for the extra 256 character positions (old Dragon screen = 32 x 16 = 512 characters ; new WIMP screen = 32 x 24 = 768 characters).

*WINDOW (x1,y1) - (x2,y2) - This sets up a text window on the graphics screen. No text will be printed outside this window (but see *TEXTPOS) and the CLS command and the CLEAR key will only clear this window.

*TEXTPOS (x,y) - Sets the text position to be (x,y) which do not have to be within the current text window.

Note on text driver: Because of the way the screen has to be cleared when using the [CLEAR] key, the text buffer is not cleared - when you press the [CLEAR] key, the Dragon remembers what you typed last. Therefore, if you type, say, LIST then press [CLEAR] then type, for instance, DIR, you will get a ?SN ERROR as the computer will think you typed LISTDIR. This is nothing to worry about - just type the command again - but it is a minor inconvenience.

One final point - to get the x and y coordinates of the top left-hand corner of the pointer, use PEEK(&HE0E5) for the x coordinate and PEEK(&HE0E6) for the y coordinate

Standard Icons

These are stored from $ED00 to $F0FF - each icon takes up 32 bytes therefore there are 64 standard icons, numbered 0 - 63.

Mouseart Instructions

To load Mouseart, use the same procedure as for loading the icon designer program but select the paintpot icon instead of the grid. Again, Mouseart will load in a few seconds and a slightly more complex screen will appear.

The screen will contain a top bar containing "TRASH" for leaving the program (as the dustbin's space is taken up) and "UNDO" to undo commands. "FILE" and "GOODIES" are two pull-down menus. Along the bottom of the screen will be sixteen patterns, used for painting and drawing with. A box full of functions (16 icons) will be shown to the left of the screen, and the rest of the screen is taken up by a "window" on the larger screen.

The window shows part of the Pmode 4,5 screen (WIMP uses Pmode 4,1) and it should now be white, unless you have been using WIMP for a while already - it may show part of a picture or it may show utter garbage. If you have just BOOTed WIMP, the window will be white.

You may notice that when you move the arrow about in this program, it changes to a black square when it is over the window. This is so you can draw. At the moment, the paint colour will be black, and you will have a medium-sized (size 3 out of 5) square pencil/paint brush. If you press the button, a trail will be left where you were, in the paint colour of black. To change paint colour, just click on a new selection on the bottom line.

You have a choice of 3 types of brushes - square, round and airbrush - in 5 sizes (2 for the airbrush). The bottom three icons in the function box show brushes. Clicking on one of the brushes will have the joint effect of changing the brushes' size and also selecting that type of brush. Selecting airbrush (the spray can) will select an airbrush, and selecting pencil will alternate between square and round pencils (these two do not change the size of brushes).

Once you have drawn, say, a square it is easy to fill it. Select the paint roller (notice the roller does NOT change over the window) and a suitable colour to paint in. Position the roller's point over the area to be filled and press the button. If an area is very complicated, the computer may run out of memory so the paint may suddenly vanish - if this happens just split the area into two halves and paint each of them seperately. Note also that the paint is only stopped by a solid black line - some patterns (paint colours) do not provide adequate boundaries but you will soon get to know which.

As the window only shows part of the screen, you can move it around. Select the hand icon to get a menu of movements. The arrows show the window's direction of movement; the screen will move the other way. Select an arrow to move the window and click elsewhere to leave the arrows menu.

Selecting "UNDO" will allow you to correct mistakes. Whenever you click OUTSIDE the window, the current window is stored so if you mess up a paint job or line, just click on "UNDO".

Mouseart Instructions

The letter "a" will allow you to write on your picture. Selecting it will give you an "i" as a pointer; select the correct space for writing and press the button. Note that if you type too much, the screen may scroll and you will have to UNDO.

The eraser option gives simply a white square brush, without having to explicitly select square brush or white paint.

The line option will allow you to draw "rubber-band" lines. Position the cross-hairs on the screen (after selecting line) and press the button. Without releasing the button, you then move the line to where you want it to go, and release the button there. A line (always black) will be drawn. Note that you can only UNDO the last line drawn.

The rectangle, filled rectangle, ellipse and filled ellipse options are all similar. Again, set the cross-hairs to the corner, and do not release the button until the rectangle shown is correct. The rectangle or filled box or ellipse to fill the box drawn will then be put in. If you want a filled ellipse it will take a while to draw, as there is no command to always fill an ellipse so a short routine is used. The outline box and ellipse are drawn in black; the filled ones are drawn in the current paint colour.

The disk option is a safeguard against power cuts, etc. When you select the disk, a copy of your picture will be saved as "BACKUP.PIC" on the disk.

The final set of commands is for getting areas of the screen. The dotted-line box commands is selected, then a rectangle is indicated (as in the draw box command). If the rectangle is too big, a beep will be made otherwise the computer will remember the contents of that rectangle. To put the rectangle down, select the "GOODIES" menu. Both "PUT" and "PUT-OR" will put the rectangle down - "PUT-OR" will plot only black lines (i.e. the background will still be there) but "PUT" will simply paste the whole rectangle down (imagine "PUT-OR" is sticking on tracing paper but "PUT" is sticking on normal paper). An arrow is used to point at the top left-hand corner of where you want the rectangle. If you press the button, the rectangle will be put down (unless you try to put the rectangle overlapping the edge of the window, when nothing will happen).

The "GOODIES" menu has a few other useful features. "CLEAR" clears the window (not the whole picture) to white. "PATTERN" gives you another 16 patterns along the bottom of the screen. "SHOW" just shows the whole picture at once (click once to leave "SHOW" mode).

The "FILE" menu just gives you save,load and directory disk facilities. It is self-explanatory. Press ENTER when a filename is requested to abort save or load. All picture have a default extension of .PIC (i.e. if you type "WIMP" a file "WIMP.PIC" will be saved).

"TRASH" will let you leave Mouseart. If you go straight back to Mouseart your picture will still be there.

Icon Designer Instructions

The icon designer program included in WIMP will allow you to design and manipulate icons - small graphic representations. You may also use it to design graphics for games and fonts for printing on the screen or printer. To load the program, insert the WIMP disk (it is recommended that you back this disk up and use the backup copy to BOOT from) and type "BOOT". You will get the front panel program (from which you can select all the other supplied WIMP programs). **To select an item, point at it using a floating joystick and press the joystick button.** This is known as "point and click" - point the arrow, click the button. From the front panel you can do a few useful things (select the GOODIES menu) but to load the icon designer, select (point and click) the small 3 x 3 grid on the left of the screen. The icon designer will load (from disk) and run in a few seconds. Icon number 0 will be displayed in a box at the bottom of the screen and also in a large format, filling about a third of the screen.

WIMP programs consist of the following - pull-down menus and on-screen selections. Any icons on the screen now (like the pencil or spray can) can be selected straight away, and are usually very simple and basic functions - the most often used. The other 50 or so functions are hidden away at the top of the screen. There is a white bar with a mouse and the words "ICONS" and "GOODIES" at the top of the screen. Selecting any of these will give you a menu. **To select an option from a pull-down menu you must first select the menu, then without letting go of the button, point at the menu item you want. Release the button when you are pointing at the desired function. To leave a pull-down menu without doing anything, just release the button while pointing away from the menu.** Most WIMP programs also have a title screen, similar to a pull-down menu, which is selected using the tiny mouse icon to the left of the white menus bar.

To design icons (and graphics for games, etc.) you have a pencil and a spraycan in each of 3 colours - black, white and "blue". At the bottom of the screen are shown boxes of black, white and "blue" and a pencil and a spraycan. Two of these (one colour and one tool) will be shown in "inverse" - white on black instead of black on white. This shows you which are currently selected. At the moment it will be pencil and black (i.e. a black pencil). Now look at the large representation of an arrow. Note that it is made up of large squares in a 16 x 16 grid. Each square in the grid can be black or white and the pattern of black and white dots, when reduced to a small scale, looks like an arrow. The small scale version can be seen to the right of the pencil/colour selection box. If you point and click one of the white squares (with your black pencil) it will turn to black. A corresponding black dot will appear on the reduced version at the bottom of the screen. **Any changes you make on the large copy of the icon, will appear on the normal-sized one at the bottom of the screen.**

Icon Designer Instructions

To change your tool from a black pencil, point and click at the colour wanted (the boxes of white and blue) to change colour; point and click at the tool wanted to change tool. A white pencil will rub out black dots. The blue pencil will seem strange. Sometimes a white dot will appear, sometimes a black dot. If you colour an area with this pencil, you will see a pattern emerge and the area on the small scale diagram will look blue (blue on a colour TV or grey on a black and white TV or printer). Blue pencils are not much use, but blue paint is. If you look at some of the icons to the left of the screen, they often have blue borders. This is so they will match the blue screen background of the front panel and other programs (the dustbin to the screen's bottom right is outlined in blue). Blue is also useful for graphics where shading is required. Black and white paint also exists - black paint fills a white area black and white paint fills a black area white (blue paint fills a white area).

Now you can design icons - these six tools provide as much (probably more) control as most icon designer (or graphic designer) programs you may have come across. But I mentioned 50 or so other functions earlier. Just wait! The first thing you may have noticed the apparent lack of is a clear screen function. If you select the pull-down menu entitled "ICONS" you will see a list of options, including "CLEAR". If you select this now the icon will be cleared. Notice that if you are holding a white pencil, the icon is cleared to black, so that you can draw white graphics on a black background. The standard is black on white, so clearing the icon while holding a black or blue pencil will give a plain white icon.

If you have just spent ages doing an icon, and spill black paint all over it, you will be glad to hear of an "UNDO" key. When you press the button, the current icon is stored before the computer changes it, so to undo the change just press the spacebar. This is the only key used in the icon designer

You will have noticed that upon loading the icon designer, an arrow first appeared on the big screen. When you messed about with it you were really just re-designing the arrow. To store this re-designed arrow (at least the computer thinks it is an arrow, even if it is a face) select "TRANS" (short for transfer) from the "ICONS" menu. The new icon will appear in the box full of icons, where the arrow was. Obviously you do not want to spend all day designing one icon over and over again - this program lets you design up to 128 in memory at once. 35 icon are on the screen and you can select these simply by clicking them. To redesign the spraycan, just click the spraycan. However, this only gives you 35 out of 128 icons. Selecting "SET" from "ICONS" will give you another 35 (actually the two SETs of 35 overlap - they are the top 35 and bottom 35 of a "bank" of 64 icons). The other 64 icons can be selected by selecting "7800" from "ICONS" (Note that to return, the 7800 has changed to E900 - the addresses in memory where the banks are held).

It is best not to re-design too many of the default icons (the first bank) as they are used in programs (not least of which is this one). The bank at 7800 is totally unused (probably empty at the moment). These are USER icons and can hold anything.

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The "SAVE" item in "ICONS" allows you to save the current bank or icon. Select "TAPE" or "DISK" and "ONE" (one icon) or "ALL" (all icons in this bank). Select "GO" to do the save or just click elsewhere to abort the save. You will need to type in a filename and then the program will save the icon(s). "LOAD" works in exactly the same way.

We have not used "GOODIES" yet - these functions work on the banks of icons or do special things to the icon you are working on.

First, try "MOVE". A menu of arrows will appear. Click the arrows to move the icon in that direction. Click outside the menu to leave the move option. "FLIP" allows you to flip the icons or mirror them, or rotate them. There is a short delay after selecting a flip option - you can see the option being performed in the small-scale icon box before the finished function is put into the large-scale icon box. Rotate takes longest. These options may not seem useful now, but do become indispensable once used (like a video recorder).

The "COPY" function lets you make copies of icons within the set of 35. A hand will appear, instead of an arrow. Select an icon, which will then be picked up, and put it over another icon. Note that the icon it will be copied to is the one that the top left-hand corner of the icon is over. This is important. Any number of copies can be made. At any time, pointing outside the box full of icons will leave copy mode (you will get your arrow back).

The "COL" function allows you to "invert" the current icon. Black dots turn white and white dots turn black.

The "PIC" function is used when designing graphics. The large icon is turned into a mini screen - the same colour as the pencil is now, so a black pencil will give a black screen. You can select an icon by clicking it, and then put it on the mini-screen. To drop the icon, click outside the mini-screen. You will get the arrow back. Now you can get another icon to put on the mini-screen or click outside the two boxes to leave "PIC" mode. To get the other SET, you can also click on "ICONS". This allows you to make up pictures so you know if your graphics fit together properly.

It is possible to re-design the pointers used by WIMP. The first 10 icons (bank E900) are pointers. First come an arrow, then a pencil, hand, spray can and cross-hair. Each pointer is made up of two icons - one is the graphic and one is the MASK. The mask is black where the graphic goes, and white where you want the screen to show through (otherwise every pointer would be square). "TEST" lets you test these pointers, so you know they work.

To leave the icon designer, select the dustbin icon.