

*Suitable for use with Acorn Archimedes 300 series, 400 series,  
540 and A5000 computers.*

**(A3 000 requires an adaptor board)**

*Requires RISC OS 3.1*

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Colour Card is a joint development between:

Wild Vision Ltd.,  
15 Witney Way,  
Boldon Business Park,  
Boldon Colliery,  
Tyne & Wear NE35 9PE  
Tel. 091 5191455 Fax 091 5191929

and

Computer Concepts Ltd.,  
Gaddesden Place,  
Hemel Hempstead,  
Herts HP2 6EX  
Tel. 0442 63933 Fax. 0442 231632

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# 1 INTRODUCTION

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Colour Card is an advanced combination of hardware and software ideally suited for graphics applications on the Archimedes range of computers. It provides a range of new screen modes which permits more information on the screen, a wider range of colours and faster screen updating. And, with suitable applications software, you can display over 32,000 different colours.

## **What is a screen mode?**

The Archimedes lets you change the logical size of the screen (the desktop size). (You obviously cannot change the physical size of the screen. What you change are the number of horizontal and vertical pixels or elements on the screen.) The larger the desktop size, the more information the screen can display. The limits to the size of the desktop are:

- Processor power -- the larger the desktop, the more processing is necessary of the video information. (This is largely solved by using Colour Card.)
- Increasing the desktop size or number of colours increases the memory needed to store that information. The Archimedes limits screen memory to 480KBytes.
- Screen quality and your eyesight. As the desktop gets bigger, each individual item on the screen gets smaller. This can make it difficult to read.

Most desktop sizes can display 2, 4, 16 or 256 colours. The Acorn desktop environment has a limit of 256 colours.

Each combination of size and colours is called a *Screen Mode*. The Archimedes has a bewildering range of screen modes using a bizarre numbering scheme. *Using the new screen modes* (later in this manual) describes how to change screen modes.

## How does Colour Card work?

The Archimedes uses a special circuit called VIDC to control the monitor. Without Colour Card, as the desktop size and number of colours increases, VIDC needs to access the memory more frequently. This leaves less time available for processor memory accesses and so applications run slower. Also screen updates slow down and the display flickers slightly, which is very tiring on the eyes.

Colour Card intercepts the video memory and copies the data to extra memory on the card. Circuitry on the Colour Card then sends the data from this memory to the monitor. The result is that VIDC can run slower, the processor overhead is much less and the monitor can run at a higher speed. The increased monitor refresh rate means no flicker and less eye-strain for you. As a result, the monitor can display either more colours for the same desktop size or larger desktops.

Colour Card also offers a wider range of colours. The normal screen palette is limited to a fixed range of 256 colours and grey shades. This is inadequate for many programs such as grey-scale scanner programs which require a wider range of grey shades and graphics programs which require a wider choice of colours. Instead of having only 256 fixed colours, Colour Card can select from a range of over 16 million. Careful selection of colours from the full range has enormous benefits to scanner and graphics programs. An example is ArtWorks (Computer Concepts' graphics program), which expands its colour range by dithering and can simulate four times as many colours as previously.

## Using Colour Card

When using Colour Card, VIDC runs at approximately either 12 frames per second (12MHz or "low") or 25 frames per second (24MHz or "high"). This is controlled by software on the Colour Card. Selecting the speed is described later in section 5 *Technical information* (see *CCRefresh*).

Selecting low reduces the processor overhead to almost zero and is suitable for programs that meet Acorn's RISC OS programming guidelines. The only drawback is that menus and windows move across the screen in a series of small steps instead of smoothly. This is barely noticeable.

However some software assumes certain operating conditions such as frame rate. These programs and others which do not meet the RISC OS guidelines require the *high* update speed. This slows the processor down slightly - the increased overhead is only noticeable if your computer has an ARM2 processor. (ARM2 was fitted as standard to A300 series, A400 series and BBC A3000 computers.)

Some applications and games programs may show problems with the new screen modes provided by Colour Card. In such cases, switch back to the standard Acorn screen modes. (Changing screen modes is described later.)

## Using Acorn Replay

This works best with *high* update speed.

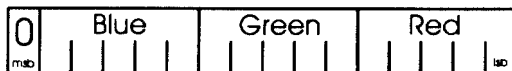
### Using CableNews from Lingenuity

You require CableNews version 1.20 or later.

## Enhanced graphics modes

As already described the Acorn desktop environment is limited to 256 colours (8 bits per pixel - bpp). Colour Card can work with a variety of other modes. The Colour Card hardware supports both 15 and 16bpp modes - 15bpp offers 32,000 colours whereas 16bpp offers 65,000 colours. However, Acorn has recommended a new 15bpp sprite format, which has a wide range of grey shades. For this reason the current software only supports 15bpp. When enhanced graphics display programs become available Colour Card will be ready to use the enlarged range of display colours.

Note that 15bpp has limited operating system support and many aspects of WIMP operation are unavailable.



*Bit allocation of 15bpp sprites*

On the Colour Card disc is !Clearly, a general purpose 15bpp and 24bpp picture loader. Also on the disc is a sample 15bpp sprite. To display this or any other 15bpp sprite or 24bpp clear file, load !Clearly and then drop the file icon onto the !Clearly icon on the icon bar. !Clearly dithers 24bpp images so that the 15bpp screen modes can produce screen image quality equal to 24bpp hardware.

## *Technical support*

Firstly, look in this manual. If you cannot find the answer here, contact the supplier of this Colour Card. Only contact Wild Vision if the supplier cannot help.



# 2 **INSTALLATION**

---

## **Caution!**

Static electricity can damage the Colour Card. Store the card in its protective bag until you install it. Touch one of the metal screws on the computer case before handling the card.

## *You should have received:*

Check that you have:

- Colour Card (in a protective bag),
- this manual,
- floppy disc,
- half-width blanking plate,
- interface cable,
- (optionally) one or more cable adaptors.

## **Installing the Colour Card into your computer**

### **Caution!**

No special skills are required to fit the Colour Card. However, the suppliers can accept no responsibility for any damage that may result from incorrect installation. If in any doubt consult your local supplier.

### **BBC A3000 computer**

This requires a special adaptor - contact Wild Vision for details.

### **Tools**

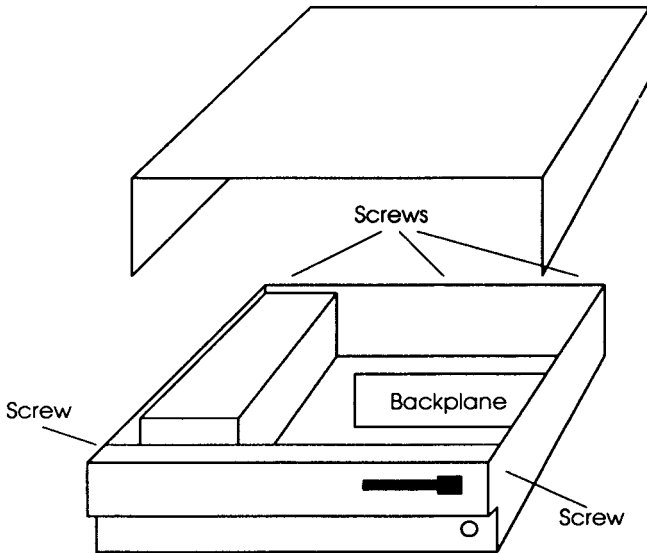
The only tool required is a No. 2 (medium) cross-head screwdriver.

### **Disconnect power**

Before installing the Colour Card switch off the power to the computer. However, leave the power lead connected. Disconnect all other leads to the computer. Remove anything (such as a monitor) that may be on top of the case.

## Remove the computer's cover - Archimedes only

The cover is secured to the main unit by five screws. The drawing shows their positions:



Remove all five screws. The cover should now slide back off the computer.

## Remove the computer's cover - A5000 only

The cover is secured by six screws (three each side) located underneath the case. Take care tilting or lifting the A5000 as the screw-heads can scratch a wooden or polished surface.

Remove all six screws. The cover should now slide back off the computer.

## Ensure Backplane is fitted

The Colour Card plugs into the expansion card Backplane. This is standard on all models except the 300 series where it is an optional extra.

The Backplane is a vertically mounted circuit board, positioned approximately half-way across the main circuit board. It provides two or four sockets into which expansion cards can be fitted. If a Backplane

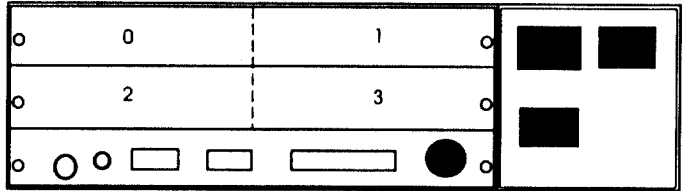
is not fitted, install it now before continuing. Carefully follow the instructions included with the Backplane.

## Colour Card positioning

With no expansion cards fitted the rear panel of the computer has three metal blanking plates, each secured to the case by screws at either end.

The lower plate (containing various sockets) is secured to the main circuit board and should not be removed. The upper two plates are temporary blanking plates, which are removed when expansion cards are installed.

*The Archimedes rear panel, indicating possible expansion card positions. The A5000 is slightly different.*



One 'standard width' expansion card occupies half the width of one blanking plate. The numbers 0...3 on the diagram above show the positions into which expansion cards may be fitted. With a two-socket Backplane only positions 0 and 2 are available.

If the Colour Card is fitted adjacent to another expansion card, bolt their rear panels together after installation. However, if no adjacent expansion card is present, the half-width blanking plate supplied should be screwed to the Colour Card rear panel.

## Remove rear blanking plate

Unscrew and remove the chosen blanking plate from the rear of the case.

If you have an Archimedes 300,400 or 540

The most logical position for Colour Card is the bottom left socket. (Shown as 2 on the diagram.) The ribbon cable on Colour Card plugs into a connector close to this position.

If you have an A5000

The most logical position for Colour Card is the bottom right socket. (Shown as 3 on the diagram.) The ribbon cable on Colour Card plugs into a connector close to this position.

## Connecting the Genlock cable...

This short ribbon cable connects the Genlock and video data signals from the computer to Colour Card.

### CAUTION!

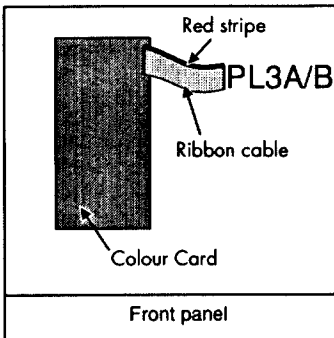
**Incorrectly connecting the ribbon cable can damage your computer. Carefully follow the instructions in this manual and pay particular attention to the orientation. The suppliers of Colour Card cannot be held liable for any damage that results from incorrect installation. If in any doubt contact your local supplier.**

Because of hardware differences you need to know exactly which type of computer you have. The front panel of the computer shows the model number. The options are:

- Archimedes 300 series
- Archimedes 400 series
- Archimedes 540
- A5000

Remove any circuit board (VIDC enhancer) or cable already connected to the Genlock connector. (The individual diagrams show you the connector number and its approximate position.)

Assuming there is no existing circuit or cable connector, remove the two links between pins 1 to 4 of the Genlock connector. Remember their orientation and store them in a safe place. If you ever remove the Colour Card in the future replace these links - the computer will not work correctly without them.

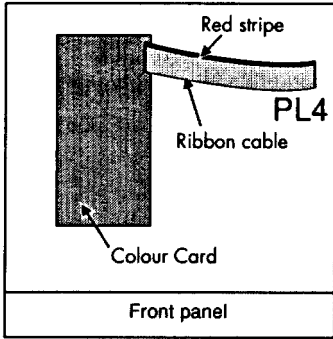


### ... on an Archimedes 300 series

The Genlock connector is PL3A & PL3B.

*Note: Some early 300 series computers do not have pins 7 to 14 fitted to PL3B. If these are missing, contact your local Acorn service agent.*

Plug the cable into PL3A/B with the red stripe away from the front panel.

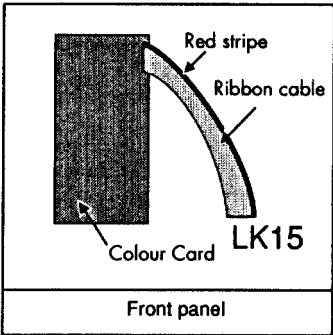


... on an **Archimedes 400 series**

The Genlock connector is PL4.

*Note: Some early 400 series computers do not have piers 7 to 14 fitted to PL4. If these are missing, contact your local Acorn service agent.*

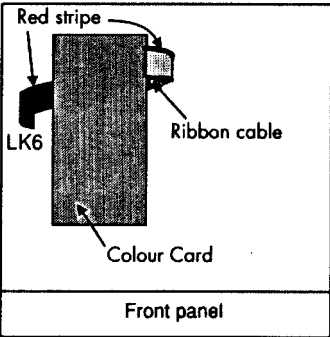
Plug the cable into PL4 with the red stripe away from the front panel.



... on an **Archimedes 540**

The Genlock connector is LK15. (It is about 5cm from the connector side of the backplane.)

Plug the cable into LK15 with the red stripe towards the nearest side of the computer.



... on an **A5000**

The Genlock connector is LK6.

Plug the cable into LK6 with the red stripe away from the front panel.

## Fit the Colour Card

Insert the Colour Card (usually from the rear) and, whilst held horizontally, push it into a corresponding Backplane socket. The Backplane is supported by a strong metal bar; however, we advise you to support the Backplane with one hand whilst pushing the Colour Card into place.

Replace any screws that you removed from the blanking plate, ensuring that the Colour Card is screwed to an adjacent expansion card or to the half-width blanking plate supplied.

## Replace the cover

Colour Card is now ready for initial testing. Replace the cover by sliding it back onto the computer from the rear. Replace the securing screws.

## Copy the software

We recommend copying files from the floppy disc supplied onto a hard disc or another floppy disc. You can then store the original floppy disc in a safe place.

## Initial testing

Reconnect any peripherals. For these initial tests connect the monitor to the *Analogue RGB* connector (the usual connector) on the back of the computer.

Turn on the power in the usual way. The computer should start up normally - if not, refer to the *If problems occur...* section.

Assuming the computer starts correctly, list the details of the expansion cards fitted. Press function key F12 and type

\*PODULES and press *Return*.

This displays a list of the expansion cards and their positions from 0 to 3. In the list should be

Wild *Vision/CC* ColourCard *Vx.xx* (*x.xx* is the issue number)

Press *Return* to return to the normal desktop display.

## Configuring Colour Card

Colour Card has to drive different monitors in slightly different ways for best results.

### Set the refresh rate and set up the colour video controller

There is more details on the CCRrefresh and CCSyncs commands in section 5 Technical information.

- 1 Press function key F12.
- 2 Type in  
Configure CCRrefresh low  
and press Return
- 3 Type in  
Configure CCSyncs <n>

The separate sheet Monitors known to work with Colour Card shows the correct value of < n > for your monitor. For example, for an Acorn Multisync you would type:

```
Configure CCSyncs 4
```

- 4 Press Return twice to return to the desktop.

### Load the appropriate module

If you have a standard multisync such as the Acorn Multisync, Eizo 9060, Taxan 770 or 775 or NEC 3D:

load the AcornMulti module. (Double-click on it to load it.)

If you have a "high-end" multisync such as CTX, Taxan 795 or 1095, Eizo 550, 560 or 5500:

load the Taxan795 module. (Double-click on it to load it.)

You can include the appropriate module in the boot sequence for the computer. It is then automatically loaded every time you restart the computer. The User Guide supplied with the computer explains how to do this.

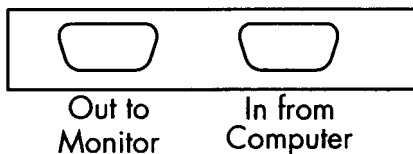
## **Connecting your monitor**

Assuming that the initial tests were successful, you can now connect the monitor to the Colour Card.

The Archimedes has two possible types of monitor connector:

- 9-way with two rows of pins, or
- 15-way with three rows of pins.

If the connectors on the Colour Card cable or the Colour Card itself are the wrong type, use the adaptor supplied.



Connect the cable supplied with Colour Card between the computer (*RGB analogue*) and the right-hand (looking from the back of the computer) Colour Card connector. Plug the monitor lead into the left-hand Colour Card connector. The screen display should be the same as when the monitor was directly connected to the *Analogue RGB* connector.

## **Return the Registration Card**

Don't forget to return the Registration Card. This ensures you receive information about any updates or improvements made to Colour Card.

Installation is now complete. The next section describes how to use the improved screen modes provided by Colour Card.

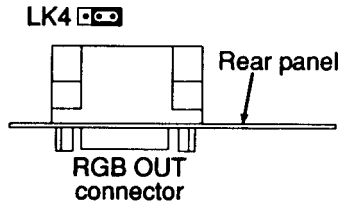


## ***If problems occur..***

All boards are tested before dispatch so problems should be rare.

### **... flashes across the screen**

If you see occasional horizontal flashes across the screen, move LK4 on the Colour Card to its other position. (The flashes appear green in 256-colour modes.) There is no "correct" position; use the position that suits your monitor.



### **... if the image on your screen bends**

This sometimes occurs with Eizo 550 or 560 monitors

Check you correctly configured Colour Card and that you loaded the correct module (*AcornMulti* or *Taxan795*).

### **...other problems**

Check that:

- the Backplane is correctly installed and working,
- Colour Card is fully inserted into the Backplane socket,
- the Genlock cable is properly fitted.

If things still do not work, try Colour Card in a different Backplane socket.

If the problem remains, contact Wild Vision with details of the tests and results.

# 3 USING THE NEW SCREEN MODES

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You can select the improved screen modes using:

- the *Palette* program,
- the *Configure* program, or
- **FlipTop**. (FlipTop is the easiest to use.)

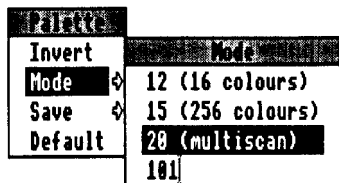
If you have already loaded modules that define screen modes 100 or above, you will be unable to select Colour Card's improved screen modes. If your computer loads any such modules during its boot sequence you should:

- 1 Quit any applications you have loaded onto the icon bar and save any current files.
- 2 Modify the boot sequence to remove such modules.
- 3 Reset the computer by pressing *Ctrl-Reset*.

Not all screen modes are suitable for all monitor types. The new modes available with Colour Card are designed for multisync monitors. It is very unlikely that other monitor types will give a suitable image. Even some multisync monitors may give an unsatisfactory display with the larger desktops.

## Using Palette

This is normally loaded whenever the desktop is running. Its icon is on the right-hand side of the icon bar.



- 1 Click the Menu (centre) mouse button on the Palette icon.
- 2 Move over the arrow to the right of Mode to display a submenu.
- 3 Type the new screen mode number into the bottom field. (The illustration shows 101 in this field.)
- 4 Press *Return* to change the screen mode.

This has made a temporary change - the change is lost when you switch off or reset the computer.

## Using Configure

The *User Guide* supplied with your computer shows you how to use Configure.

## Using FlipTop

This is on the floppy disc supplied with Colour Card. Load it as usual by double-clicking on its icon.

### Mouse actions on the FlipTop icon:

All these mouse actions are described later in more detail.

- Click Select to display the screen mode selector.
- Double-click Select to decrease the number of colours.
- Click Menu to display the FlipTop menu.
- Click Adjust for the Quick-change display.
- Double-click Adjust to increase the number of colours.

### The FlipTop menu

Info - gives information about FlipTop.



*Show modes* - displays the screen mode selector (described later).

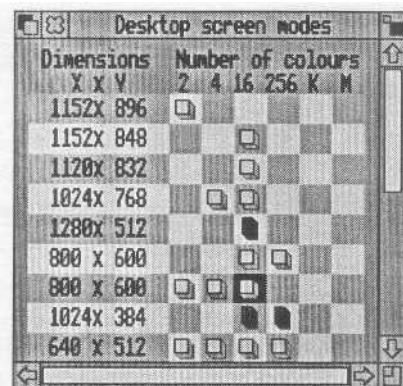
*Mode information* - gives information on the current screen mode.

*Choices* - displays a dialogue box to set up key short-cuts and set the count-down option (described later).

*Colour sets* - displays a menu of screen palettes (described later).

*Quit* - this is the usual option to remove FlipTop from memory.

## The screen mode selector



Display the screen mode selector either from the FlipTop menu or by clicking on the FlipTop icon.

The left-hand column shows the number of pixels displayed (the desktop size).

Each column represents the number of colours that can be displayed. K and M stand for thousands and millions of colours, respectively.

Icons are placed where there is a screen mode for that desktop size and number of colours.

The selector uses several different types of icon:

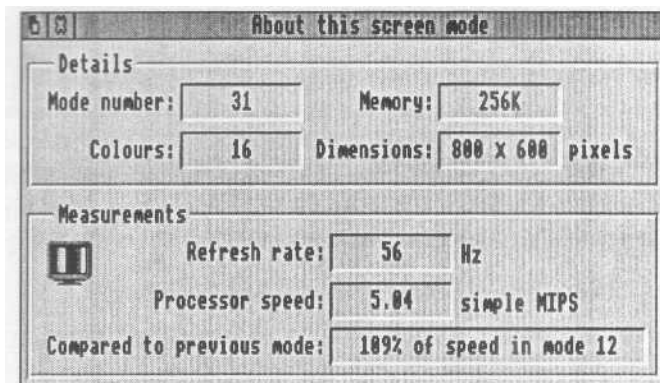
- The current screen mode has a red background.
- Square pixel modes (which give the most accurate dimensional displays) have square icons.
- Non-square pixel modes have rectangle icons.
- Some modes squash the system font (used for Title Bars, menus, error messages and so on) to get more information on the screen. These modes may not work well on some monitors. Squashed modes have a vertical or horizontal bar across the icon.
- Standard modes from Acorn have green icons.
- Modes from other sources (such as Colour Card) have yellow icons.

Click on an icon to change the screen mode.

Caution:

Some screen modes may not be suitable for your monitor and the picture on screen may break up. If this happens press Esc or *Break* to return to the previous settings.

## Mode info...



*Mode number* is the current screen mode.

*Memory* is the amount of memory used by the screen mode. More colours or larger dimensions require more memory.

*Colours* is the number of colours available.

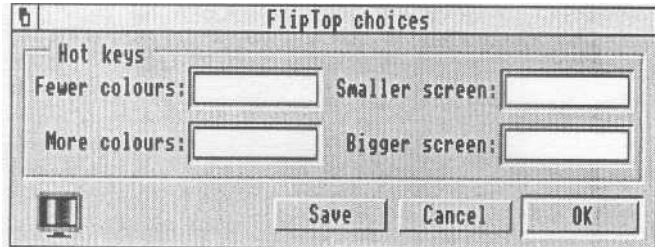
*Dimensions* is the desktop size. The larger the dimensions, the more information the screen can display.

*Refresh rate* indicates the amount of flicker on the screen. The lowest frequency at which flicker becomes noticeable varies between individuals. (Usually it is between 50-70Hz.) Frequencies above 70Hz should appear flicker-free to everyone.

*Processor speed* indicates how much the current screen mode slows down the processor. The simple MIPS value is not comparable with MIPS ratings from other types of processor - they are measuring different parameters.

If you change the screen mode, the *Compared to...* value tells you the increase or decrease in processor speed.

## The Choices dialogue box



You can also change screen modes using keyboard short-cuts. Use this dialogue box to set-up the short-cuts. Click on Save to make the current settings the defaults.

## The Quick-change display

This lets you change the screen mode directly.



This display shows the current mode number, its desktop size and the number of colours. Click on the up or down arrows to change the size. Click on the left or right arrows to change the number of colours.

You can also type a mode number into the editable display.

Click on OK or press *Return* to implement any changes made to the display.

Click anywhere outside the box to remove the display.

## A quick way to change the number of colours -

The figure underneath the FlipTop icon is the number of colours displayed on screen. Double-click on the icon to change the number of colours:



- use **Select** (the left-hand mouse button) to decrease the number of colours, or
- use **Adjust** (the right-hand mouse button) to increase the number of colours (up to the maximum available for the current desktop size).

The monitor display may be unable to display some selections, particularly 256 colours. (This is a quirk of individual monitors.) If this happens press Esc or *Break* to return to the previous selection.

## THE NEW SCREEN MODES

mode	desktop size	colours	aspect ratio	
88	512x512	16	1:1	Modes 88-91 are for PAL monitors only. They are unsuitable for multi-sync monitors.
89		256	1:1	
90	768x576	16	1:1	
91		256	1:1	
96	640x512	2	1:1	
97		4	1:1	
98		16	1:1	equivalent to mode 20
99		256	1:1	equivalent to mode 21
100	800x600	2	1:1	not suitable for Taxan 770 monitors
101		4	1:1	
102		16	1:1	equivalent to mode 31
103		256	1:1	
104	640x256	32768	2:1	32768 colours modes cannot be used within Acorn's current desktop environment.
105	800x304	32768	2:1	
106	512x256	32768	1:1	
107	576x424	32768	1:1	
108	1152x424	2	2:1	
109		4	2:1	
110		16	2:1	
111		256	2:1	
112	1024x768	2	1:1	
113		4	1:1	
114		16	1:1	
115	1280x512	16	2:1	
116	1440x544	16	2:1	
117	1600x600	16	2:1	
123	640x480	256	1:1	equivalent to mode 28



The following modes are suitable only for "high-end" monitors (see page 16). Your monitor might give an unsatisfactory display with some of these modes.

92	640x256	2	2:1	equivalent to mode 0
93		4	2:1	
94		16	2:1	equivalent to mode 12
95		256	2:1	
118	1280x1024	4	1:1	
119	1440x1080	4	1:1	
120	1152x848	2	1:1	
121		4	1:1	
122		16	1:1	

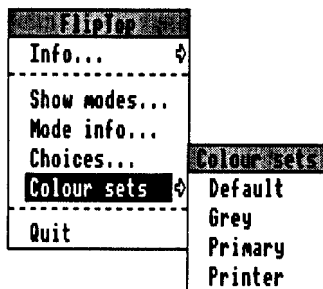
# 4 THE SCREEN PALETTES

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*FlipTop* lets you select from a range of palettes that are optimised for different requirements.

## Choosing a new palette

Use the Colour sets option on the *FlipTop* menu.



When using a Colour Card 256-colour mode the options are Default256, Grey256 and so on. In other modes the options are as shown.

Primary and Printer change the colours used on the desktop. This means that some icons appear in unusual colours. (Primary256 and Printer256 leave the desktop colours unchanged.)

## Default/Default256

These are equivalent to the standard Acorn palette. They are required for those programs which cannot use non-standard palettes.

In 256 colour modes use Default256 when running Paint. This program is known to give problems with the other palettes. (There is no problem with Draw, even with Draw files containing sprites.)

## Grey/Grey256

These grey-scale palettes are for applications which handle scanned images. They provide a full range of greys. The result is that suitable scanned images appear with photographic quality on screen.

## Primary/Primary256

The standard Acorn palette cannot show some colours correctly. For example, Red and Magenta are indistinguishable in 16 colour modes. *Primary* selects pure primary colours (Cyan, Magenta, Yellow, Red, Green, Blue) as the basic on-screen palette. Many packages, especially graphics packages such as ArtWorks, give much better results using these palettes. However, primary colours appear brighter on screen than they do when printed.

Primary256 gives a range of 216 colours plus 46 grey-levels. This also benefits applications which require a good range of colours and wide range of grey levels. (The normal Acorn 256 colour palette only has 16 grey levels.)

## Printer/Printer256

These are similar to *Primary* except that colours are more muted. This gives a better representation on the screen of how the colours appear when printed. The colour balance is optimised for the Canon BJC-800 colour printer but is also suitable for proofing full-colour (separated) work.

## ***Modifying ScanLight to use the new palettes***

ScanLight is Computer Concepts' scanner control program. It will give better results with a simple modification. Normally ScanLight dithers the 8 or 16 grey shades in the default palette to simulate a wider range of shades. With 256 grey shades from *Grey256* or 46 from *Primary256*, this dithering is unnecessary.

- 1 Hold down the *Shift* key and double-click on the ScanLight application icon in a directory window. This shows the contents of the ScanLight directory.
- 2 In this directory is a file called *Settings*. Load this into a text processing application such as *!Edit*.
- 3 After the other dash commands add the line  
-nohalf-tone and press *Return*
- 4 Save the file back to the ScanLight directory.

## ***ArtWorks and the new palettes***

ArtWorks is Computer Concepts' graphics illustration package. You require ArtWorks version 1.1 or later to exploit the new palettes. (Upgrades from 1.0 to 1.1 are free – return ArtWorks disc 1 to Computer Concepts.)

ArtWorks may start up displaying the wrong colours. If this happens press function key *F12*, then press *Return*. This will correct the colour display.

# 5 TECHNICAL INFORMATION

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## Software commands

All these are entered using the command line:

- 1 Press function key F12. This leaves the desktop and displays the command line \* prompt.
- 2 Type in the command and press *Return*.  
You can now type in another command.
- 3 When you have finished typing in commands press *Return* again to return to the desktop.

### CCSyncs

This configures the sync output from Colour Card. It sets control register A of the Inmos Colour Video Controller.

Format:

Configure CCSyncs n

where n is in the range 0 to 7. The separate sheet Monitors known to work with Colour Card shows the correct value for your monitor.

bit 0	0 = tessellated sync	1 = plain sync
bit 1	0 = composite sync	1 = separate sync
bit 2	0 = composite video+sync	1 = video only

### CCRefresh

This defines the update rate for the RAM on the Colour Card.

Format:

Configure CCSyncs High    or  
Configure CCSyncs Low

High sets a pixel transfer rate of 24MHz. This setting is useful for *animation* programs such as Acorn Replay.

Low sets a pixel transfer rate of 12MHz and is suitable for most applications. This setting minimises the processor overhead. (Your computer runs faster.)

## **CCModes**

This displays a list of screen modes provided by Colour Card. Some modes are unsuitable for your type of monitor. For more information, refer to *Using the new screen modes*.

Format:

CCModes

## ***Links on the Colour Card***

On each link header a white dot denotes pin 1.

LK1 1-2 selects 512KB ROM  
2-3 selects 256KB ROM

LK2 1-2 selects -5V from expansion card interface for A300, A400,  
A540 & A5000 computers.  
2-3 selects -5V from IC3 (not fitted on all cards) for A3000.

LK3 1-2 returns CLK to VIDC (duplicates pins 1-2 on Genlock  
connector)  
3-4 VIDC sink pin low (duplicates pins 3-4 on Genlock  
connector)

LK4 1-2 provides inverted clock to Colour Card  
2-3 provides non-inverted clock to Colour Card

PL4 Genlock header for Colour Card

## ***Notes for programmers***

This information is of interest to programmers; it has no relevance to ordinary users.

\*fx19 should continue to work at Colour Card's frame rate. However some aspects of the software continue to rely on the VIDC frame rate. (An example is the cursor blink speed at the star command - this will run slowly.)

Any software that makes direct access to the VIDC chip will almost certainly not work in the new Colour Card modes.

## Programming the palette

If you are writing your own software you can program the palette entries in either 16 or 256 colour screen modes. For full details on this refer to Acorn's *Programmers Reference Manual 1*.

Format:

VDU 19,n,16,r,g,b

n is the colour number (range 0-255),

r is the red component (range 0-255),

g is the green component (range 0-255),

b is the blue component (range 0-255).

## Further technical information

Other software developers wishing to exploit the enhanced resolution and colour range of Colour Card can obtain further information from the Technical Department at Computer Concepts. (There is a nominal charge for this documentation.)

## Frequency ranges

For "standard" monitors which use the *AcornMulti* module the horizontal frequency range is 30-45KHz and vertical frequency range is (50-70Hz).

For "high-end" monitors which use the *Taxan795* modules the . frequency ranges are 36-60KHz (horizontal) and 55-90Hz (vertical).

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