ACE POWER REQUIREMENT: 9V RMS AC or DC at 400mA

UK MAINS POWER ADAPTOR: 220/240V AC Nominal, 50/60Hz

For other supplies please use a Mains Adaptor with 9V output as above to suit your local mains supply and meeting all local safety regulations with a standard 2.1mm * 5.5mm * 12mm plug. Polarity is unimportant.

SAFETY NOTE: Power source maximum voltage 10VAC or 12VDC. Current rating from 400mA to 1Amp if 9V. 600mA Maximum if 12V. The adaptor must be fully isolated and self-protected against overload.

PLEASE NOTE: The ACE has been designed to meet all relevant standards but the performance of the ACE may be impaired if it is subjected to strong RF fields or irregular mains voltage supplies. Screened cables should always be used for all inter-connections.

CE

GUARANTEE

Any defects which appear under proper use in the ACE or accessories within a period of twelve months after delivery and which are due to faulty materials, workmanship or design will be made good by us either by repair or, at our option, by replacement, with free postage back to you, provided that the ACE or accessories are returned to us, carriage paid and suitably packaged, within the twelve month period, together with a claim in writing with proof of the purchase date. You are also advised to use a means of transport providing proof of delivery in case of loss in transit. Please check carefully as return postage is charged if no fault is found!

Except for any liability which we may incur for death or personal injury resulting from negligence or under Part 1 of the Consumer Protection Act 1987 (UK) we shall not be liable in any way whatsoever whether in contract, or in tort, in misrepresentation or under statute or common law or otherwise for any consequential or other loss, damage or injury however caused and whether caused by our negligence which may arise out of or in connection with supply of the ACE and accessories to you.

DESIGNED AND BUILT IN THE UK BY GTH ELECTRONICS
UK Tel: 01473 625547 International Tel: +44 1473 625547
http://www.gthelectronics.com sales@gthelectronics.com

GTH

ELECTRONICS

"ACE"

Advanced Colour Enhancer

Microprocessor Control. Full Digital 4:2:2 Processing

Instruction Manual

CONTENTS

UK Help Line: 01473 625547. International +44 1473 625547

SPECIFICATIONS

This unit is designed for the 625 line PAL standard only, as used in the UK and elsewhere. It will function perfectly with VCR sources in normal play mode but may show some vertical jitter if the source Camcorder or VCR is in Still Frame or Play Fast Forward or Play Fast Reverse modes. This is normal and not a fault and will have NO effect on normal use as these types of picture cannot in any case be recorded. These conditions may however occur during an automatic editing sequence but the ACE will recover immediately the player reverts to normal Play mode.

VIDEO INPUT and OUTPUT LEVELS and IMPEDANCES:

"S" Video	Luminance	1V peak to peak into 75 Ohms
	Chrominance	0.3V peak to peak into 75 Ohms
Composite		1V peak to peak into 75 Ohms

VIDEO BANDWIDTH:

"S" Video	Luminance	5.5MHz (True "S" Processing)
	Chrominance	1MHz (True "S" Processing)
Composite	Luminance	3MHz
	Chrominance	1MHz

VIDEO SIGNAL/NOISE RATIO:	>50dB (Sync and Burst Replaced)
CONTRAST & SATURATION:	0 (Zero) to +6dB (Double)
VIDEO SHARPNESS:	+/- 3dB at 3MHz
COLOUR SHIFT:	0 +/- 590ns in 4 Steps each way

AUDIO INPUT LEVEL and IMPEDANCE:
1.7V RMS Maximum into 40k Ohms Typical

AUDIO OUTPUT LEVEL and IMPEDANCE:
1.7V RMS Maximum from 10 Ohms Typical

AUDIO BANDWIDTH:	20Hz to 20kHz +/-1dB
STEREO SEPARATION at 1kHz:	>60dB
AUDIO SIGNAL/NOISE RATIO:	>70dB

FAULT FINDING GUIDE

If you have any problems with the use of your ACE then please try the following in order as required:

No Power (POWER LED Out)

Check Mains Power Adaptor properly connected and POWER switch depressed. If OK Check Mains Socket with another unit. If fault persists call GTH Electronics or return unit for service.

No Video Out

Press Either or Both Pattern buttons IN with BYPASS released. If No Video, Check your monitor wiring. If wiring OK turn off ACE and back on again after 20 seconds minimum and re-check. Check all leads, using them to connect other equipment together. If fault persists call GTH Electronics or return unit for service.

No Video but Patterns OK

Check INPUT SELECT is correctly set and depress BYPASS. If No Video check Video Input by direct connection to monitor. Use the same leads in turn to ensure all leads are OK. If Source and leads are OK call GTH Electronics or return unit for service.

No Video Except With BYPASS

Check Video CONTRAST and Colour SATURATION are not at Minimum anti-clockwise. Check ACTION Button is Released. Check If MANUAL Fade/Wipe Selected and SPEED/MANUAL control is at Minimum Setting. If so re-adjust these two controls.

No Audio Out

If Video OK then Check Audio Connections by direct connection of your Source to your Recorder, using the same leads in turn. If Source/leads OK call GTH Electronics or return unit for service. NOTE: There will be NO Audio Out if AUDIO pressed and ACE is at full Fade or Wipe. Release AUDIO or re-set the Fade/Wipe.

Controls Do Not Work

Check BYPASS Released (Warning LED should be Off)

Patterns Do Not Work

Check BYPASS Released (Warning LED should be Off)

INTRODUCTION

We congratulate you on your choice and thank you for your purchase of the “ACE” Advanced Colour Enhancer. Please read this manual before you use your ACE for the first time and keep it with your ACE for future reference. After unpacking and before use we also suggest you release all push buttons and set all rotary controls to 12 o’clock except the Digitise Control which should be set fully anti-clockwise. Then press in ‘Power’.

The ACE is mains powered via a 13A plug top adaptor and is designed to be connected between a camcorder or VCR used for playback of your video and one or two VCRs used for recording. Video and Audio signal type connections must be used, the unit does NOT handle Aerial signals.

If your playback machine is VHS(-C) or 8mm then use the connections described for “Composite” Video. If the machine is S-VHS(-C), Hi-8 or DV then use the connections described for “S” Video. If Stereo Audio is available then use both Left (L) and Right (R) connections as marked, otherwise for a Mono connection either Left or Right may be used.

The ACE is a very flexible post production unit allowing a wide variety of video faults to be corrected and also allowing you to use your creative abilities during copying or editing. For further tips on the wide range of effects possible please see Pages 10-11. Use in combination with other Video Processors may require some experimentation to obtain the best overall effect, particularly in respect of their order of connection.

NOTE: The UK Mains Power Adaptor which we supply is protected by a “Thermal Fuse”. In the event of a fault or if the plug at the end of the adaptor cable is “Shorted Out” then this fuse will cut out and will NOT reset. Normal operation when the Power switch is depressed is indicated by the associated Red LED on the ACE. See Fault Finding Guide.

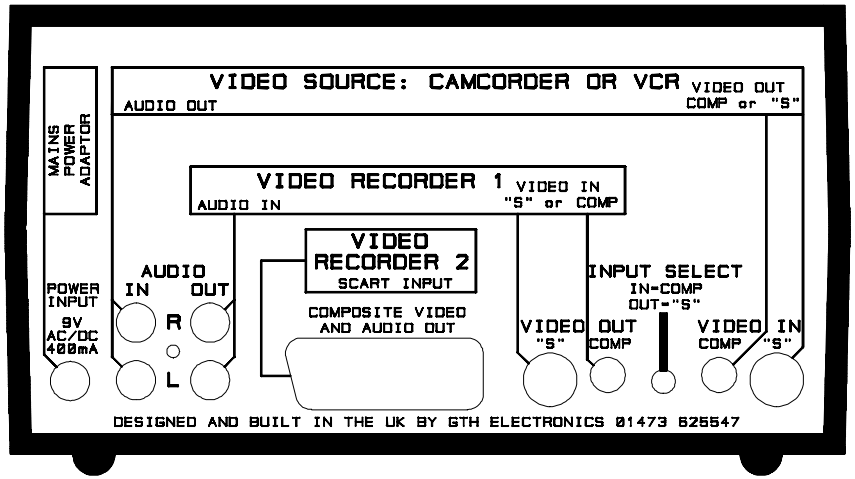
WARNING NOTES FOR YOUR SAFETY **WARNING**

ALL POWER ADAPTORS MUST MEET THE SPECIFICATIONS ON PAGE 14.
DO NOT LEAVE THE POWER ADAPTOR PLUGGED IN WHEN NOT IN USE.

ALL MAINS POWER ADAPTORS HAVE DANGEROUS VOLTAGES INSIDE, SO DO NOT REMOVE ANY COVERS; DO NOT EXPOSE TO RAIN OR MOISTURE.

REFER SERVICING OF ACE OR UK ADAPTOR TO GTH ELECTRONICS.

CONNECTIONS



NOTE: All ACE Inputs Must be connected to the relevant Outputs of your playback machine. ACE Outputs Must be connected to the relevant Inputs of your recording machine(s), Video to Video, Audio to Audio. It is our experience that most problems are due to incorrect connections. So please check them thoroughly before trying more desperate measures.

STANDARD CONNECTIONS (For More Detail See Opposite)

POWER: Plug the lead from the Mains Power Adaptor in to the ACE POWER INPUT connector and then plug the Mains Power Adaptor into a standard Mains Outlet Socket of the correct voltage. Depress POWER.

CAMCORDER: Connect Camcorder Video Out ("S" or Composite) to ACE VIDEO IN ('S' or COMP) using the leads provided ('S' preferred) Connect Camcorder Audio Out (Left, Right) to ACE AUDIO IN (L, R) NOTE: Set INPUT SELECT button IN for Composite, OUT for "S".

RECORDING VCR(s): Connect the ACE VIDEO OUT ("S" or COMP) to the VCR Video Input Socket and connect the ACE AUDIO OUT to the VCR Audio Input Socket using the leads provided. Alternatively, or in addition for a second VCR, connect the ACE SCART socket to the VCR SCART Input Socket. Set VCR to Record from 'AV' or 'EXT'.

Use of Digitise for Captions

If you want to produce clear contrasty captions from hand drawings then the DIGITISE control can help by removing variations in brightness or colour across the caption and minor blemishes. Some experimentation is required with the settings of Video CONTRAST and BRIGHTNESS and Colour SATURATION, and the SHARPNESS control should be set fully anti-clockwise. With experience it is possible to generate very clear captions from documents such as wedding service sheets etc., where the lettering on the other side of the paper is often visible without this special processing. During preparation, the DIGITISE control should be turned up slowly as the other controls are adjusted. If very high contrast black on white captions are required then the DIGITISE control should be turned fully clockwise, but otherwise an intermediate setting will allow captions with lower contrast to be produced.

Use of VIDEO INVERT will allow the captions to be presented as white on black. Similarly it is worth experimenting with COLOUR INVERT.

NOTE: When the DIGITISE control is advanced it may be necessary to increase the Colour SATURATION control to maintain good colour if you intend to keep the original caption colouring.

The wide range of special effects available on the ACE can also add background or foreground tints to your black and white captions:

To take a black on white caption and add a background tint simply turn down Colour SATURATION and adjust the RED, GREEN and BLUE controls and if necessary the Colour BALANCE control to achieve the tint required. With VIDEO INVERT selected the RED, GREEN and BLUE controls will cause the dark areas to be tinted, resulting in a very pleasing effect with a white caption on a rich coloured background.

Use of White Balance

As already described, the RED/GREEN/BLUE controls have no effect if they are all increased or decreased together since their effect then cancels out. Conversely the greatest effect is achieved with one or two controls at maximum clockwise and the rest at minimum anti-clockwise settings.

USEFUL TIPS

Viewing Negatives

Press in Both the VIDEO INVERT and COLOUR INVERT buttons. Adjust Video CONTRAST and BRIGHTNESS and set the Colour SATURATION near Maximum (Fully Clockwise) for the best picture. Adjust RED, GREEN and BLUE to remove the unwanted bluish colour in the dark parts of the picture due to the orange colour of the negative. Typically this will require the BLUE to be reduced and RED advanced slightly. The Colour BALANCE control will also help to achieve correct colour rendering of skin tone etc.

Widescreen Effect

This and other forms of masking are easy to generate. First depress the TOP and BOTTOM WIPE buttons, with the LEFT and RIGHT WIPE buttons and the AUDIO button released. Now depress the MANUAL button and use the SPEED/MANUAL control to produce the required effect. All other controls can be used as normal.

Sepia Effect

To generate a Sepia Effect to simulate old black and white photographs simply turn Colour Saturation to Minimum (Fully Anti-Clockwise), then: Turn up the RED control to the 3 o'clock position, turn down the BLUE control to the 9 o'clock position and leave the GREEN control central. Adjust RED, GREEN and BLUE until you get the desired effect.

Coloured Blank Screen

To generate coloured blank screens with a wide range of pastel shades: First ensure you have a working Video Input from any source e.g. TV. Without this ACE will not produce colour (except on Test Patterns). Turn Video CONTRAST down to Minimum (Fully Anti-Clockwise) Turn Colour SATURATION down to Minimum (Fully Anti-Clockwise) Turn BRIGHTNESS to get a mid grey shade and then adjust as required Adjust RED/GREEN/BLUE to get the desired colour. This will also be affected by Colour Balance. For deeper shades try using Video Invert.

SOCKET DETAILS, WORKING FROM LEFT TO RIGHT:

POWER INPUT: Connect the Mains Power Adaptor supplied or bought. NOTE: UK Mains Power Adaptor is protected internally. If it cuts out it cannot be reset but must be replaced. Page 14 has adaptor specifications.

AUDIO IN SOCKETS: Use Both for Stereo or Either for Mono Audio. Maximum Input level is 1.7V RMS. If this is exceeded the audio output may be distorted on the very loudest passages.

AUDIO OUT SOCKETS: Use Both for Stereo or Either one for Mono Audio (Left or Right as used for the AUDIO IN). Outputs are buffered and can be connected to two VCRs without any loss in level.

SCART AUDIO/VIDEO SOCKET: Composite Video and Stereo Audio are available from this connector. This socket is thus ideal for connection to a standard VHS VCR but not for an "S" VCR which should ideally be connected to the "S" Video Output and Phono Stereo Audio sockets.

"S" VIDEO OUT SOCKET: This socket has separate Video and Colour signals for use with a VCR or TV with "S" Video connections. It is also the preferred Video Output socket for connection to another processor.

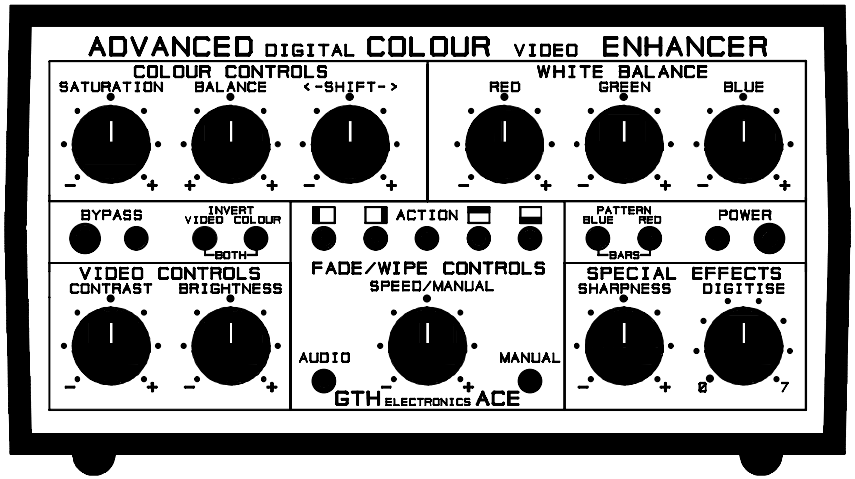
COMPOSITE VIDEO OUT SOCKET: This socket has Composite Video for connection to any VCR or TV without "S" Video connections or to a second VCR (if not connected to SCART socket) or Monitor TV.

INPUT SELECT SWITCH: This Switch allows selection between either the "S" Video Input (Switch left OUT) or the Composite Video Input (Switch Pressed IN). It is important that this switch is set correctly or you will not see the video you want to see! Audio Input is unaffected.

COMPOSITE VIDEO IN SOCKET: This socket is for connection to the Video Output of any Camcorder or VCR without "S" Video connection.

"S" VIDEO IN SOCKET: This socket is for connection to the Video Output of any Camcorder or VCR with "S" Video connection. It is also the preferred Video Input socket for connection from another processor. With an "S" input, Video and Colour are processed entirely separately.

CONTROLS



General Advice

The range of the controls has been deliberately kept as wide as possible to allow you full control over the video and audio. However this does allow for settings which can make the picture disappear completely and perhaps cause you to think there is a fault. If such a situation occurs, pressing in the BYPASS button will cancel the settings of all controls (except the INPUT SELECT button) and allow you to check whether the problem is due to control setting or not. If in doubt Press BYPASS! Conversely BYPASS should of course be OUT for normal operation.

After experimenting with the various controls you will soon find out what they do and be able to start using your creative talents to make the very best of your video. This instrument is designed both to correct and enhance your video production and with experience you will soon come to understand the best combination of control settings. To start you off the following descriptions explain the main purpose of each control and there is also a 'Useful Tips' section where some interesting and useful combinations are suggested.

MANUAL: This button selects between the Automatic Fade or Wipe (button OUT) and the Manual Fade or Wipe (button IN):

With the MANUAL button Released, Fades or Wipes are Automatic and controlled as described above by the ACTION button with speed set by SPEED/MANUAL. With the MANUAL button Depressed all Fades and Wipes are controlled manually by the SPEED/MANUAL control as described below.

SPEED/MANUAL: Operation depends on the MANUAL button:

With the MANUAL button Released this control allows you to set the speed of the Automatic Fade or Wipe. In its fully anti-clockwise setting the time for a fade or wipe is around 5 seconds. In its fully clockwise setting the time is around 1 second. Typically this control will be set with pointer at the top for fade or wipe times of approximately 3 seconds.

With the MANUAL button Depressed this control allows Manual fading or wiping. When fully clockwise the picture is normal and as the control is turned anti-clockwise the picture fades or wipes to black, depending on the setting of the WIPE buttons, so that in its fully anti-clockwise position the screen is fully black. This allows either a manual control of the fade or wipe or, with wipes selected, can be used in a fixed position to mask the video to give, for example, a widescreen effect. (See 'Tips')

SETTING UP YOUR TV

The Colour Bar Pattern is ideal for checking and adjusting the setting of your TV. First turn down the Colour Saturation on the TV to minimum. Now adjust the TV Contrast and Brightness so that the far right hand bar is just black but all other bars are visible with the contrast adjusted to suit your preference, remembering that the far left hand bar is full white level. Now turn up the TV Colour Saturation until the colours are bright and pure but not higher than necessary or you will make the picture look over coloured. The Blue and Red Blank Screens should now look pure all over the screen. If there are any very obvious odd coloured patches (or 'Impurity') then you might want to contact your TV service engineer to adjust the TV internally. DO NOT ATTEMPT THIS YOURSELF.

Fade/Wipe Controls:

With NO Wipe buttons pressed the ACE automatically performs Fades otherwise Wipes are performed as described below. When more than one button is depressed the wipes will start from all selected sides together, giving 15 different effects. For a very pleasing effect try reversing the direction of the wipe between the wipe down and wipe back. e.g. Wipe the first scene to black using Wipe Left and Wipe Bottom and then for the next scene wipe back from black using Wipe Right and Wipe Top.

 WIPE LEFT: When ACTION is pressed this causes the picture to Wipe to Black starting at the Left. When ACTION is released the picture will be restored in place of the black screen, ending at the Left.

 WIPE RIGHT: When ACTION is pressed this causes the picture to Wipe to Black starting at the Right. When ACTION is released the picture will be restored in place of the black screen, ending at the Right.

ACTION: This button initiates an Automatic Wipe or Fade. Pressing it IN will cause the picture to fade or wipe to black. Releasing the button to OUT will cause the picture to be restored by a reverse fade or wipe. This control has been deliberately placed central with a clear gap above so that it can be operated easily and precisely by right or left handed people using the thumb, with the other fingers resting on top of the unit.

 WIPE TOP: When ACTION is pressed this causes the picture to Wipe to Black starting at the Top. When ACTION is released the picture will be restored in place of the black screen, ending at the Top.

 WIPE BOTTOM: When ACTION is pressed this causes the picture to Wipe to Black starting at the Bottom. When ACTION is released the picture will be restored in place of a black screen, ending at the Bottom.

AUDIO: With this button pressed IN the Audio is faded along with the Video fade or wipe. If this button is left OUT then the audio will stay at its full level. If you are editing scenes together using the original sound directly then this button should be pressed IN. If however you intend to re-mix the audio separately after you have first completed the video edit then you may wish to leave the audio sound track without fades during the video editing. The button should then be left OUT.

Colour Controls:

SATURATION: This control allows you to adjust the level of colour in the picture from zero, i.e. Black and White only, up to twice the normal colour level. The normal position is with the pointer at the top.

BALANCE: This control alters the colour balance of coloured areas without affecting white balance and is especially useful for correcting any residual faults in skin tone when white balance has been corrected. It is also needed for colour correction of some negatives (See 'Useful Tips'). Clockwise movement makes skin tone more yellow, anti-clockwise movement makes it more pink. Normal position is with pointer at top.

<-SHIFT->: After recording and video processing you will often find that the colour seems to 'bleed' out of the coloured areas. This is caused by faults in the video processing which can move the colour sideways compared to the black and white parts of the picture and is particularly evident with multiple generation copies. This control allows the colour part of the picture to be moved horizontally left and right to line up the colour properly and eliminate the colour bleed. Turning the control anti-clockwise moves the colour left, moving it clockwise moves the colour right i.e. the colour moves in the same direction as the top of the control. In most cases the control will need to be set slightly anti-clockwise.

White Balance:

RED, GREEN and BLUE: These controls affect only the white and lighter parts of the picture and affect coloured and non-coloured areas alike. They allow correction of colour balance faults caused when the camcorder does not properly compensate for the colour of the lighting, e.g. when shooting with indoor lighting but with a sun-lit scene visible through a window, when the camcorder will wrongly assume that the sun is the main light source. Similarly they can correct colour casts caused by coloured reflecting surfaces close to the action. These controls can also be used creatively to add tints, create sepia effects etc. (See Useful Tips) Clockwise rotation increases the relevant colour level, anti-clockwise decreases it. So, starting with all three pointers at the top, turn up any colour(s) you want increased and turn down any you want decreased. Moving all three controls together in the same direction has no effect.

Video Controls:

CONTRAST: This operates exactly as the contrast on your TV except that it probably has a wider range. It is used to correct video which has either a too low or a too high contrast. At its minimum anti-clockwise setting the contrast is zero and all that will be seen is the colour in the picture, assuming the Colour SATURATION is not set to zero as well. At its maximum clockwise setting the contrast is twice the normal level. Standard setting is with the pointer at the top.

BRIGHTNESS: This again operates exactly as the brightness on your TV and is used to correct pictures which are too dark or too light. Standard setting is with the pointer at the top.

Special Effects:

SHARPNESS: In its normal position with pointer at top the sharpness, or detail, of the picture is unaffected. However by a clockwise rotation this control allows you to boost the sharpness to compensate for losses often found after copying. Conversely the control when turned anti-clockwise will reduce sharpness if already excessive and at the same time reduce any graininess of the video (video 'noise'). Be careful not to use more boost than necessary for best results. See 'Tips' for use with DIGITISE.

DIGITISE: This is the only rotary control which should normally be set fully anti-clockwise as this is the position in which it has no effect on the picture. As this control is turned clockwise it gradually decreases the number of colour and brightness levels in the picture, resulting in an increasing paint effect. At its most effective fully clockwise position the brightness levels are only black and white with no shades of grey. Colour levels are similarly restricted. Used at intermediate settings this control can convert a normal picture into something similar to a cartoon with bold colours in blocks. For best effect turn the SHARPNESS control to minimum i.e. fully anti-clockwise. This reduces the dottiness of the result but does not lose picture sharpness as the Digitise control automatically produces a perfectly sharp picture. See 'Tips' for use with Captions.

Left Hand Push Buttons:

BYPASS: Depressing this button will cancel ALL settings Except the Rear INPUT SELECT, and the Red BYPASS LED will light as a warning. Pressing this button IN allows you to compare the effect you have created to the original signal i.e. to compare the difference 'Before' and 'After' processing. It can also be used as a check when setting all controls to zero, as only then will it cause no visible change.

INVERT VIDEO: This button allows you to make the black parts of the picture white and vice-versa. With normal (i.e. not inverted) colour it can have a quite pleasing but spooky effect.

INVERT COLOUR: This button reverses the colours in the picture, making green into purple, blue into yellow and skin tone a ghastly blue colour. Ideal to turn people into monsters!

INVERT BOTH: With Both buttons IN, as well as combining the two effects above, it is possible to view colour negatives, assuming you have a slide converter and film strip holder or can improvise. (See 'Tips')

Right Hand Push Buttons:

PATTERN BLUE: This replaces the picture with a clear deep Blue screen, useful between scenes or as a lead in to a programme.

PATTERN RED: This replaces the picture with a clear deep Red screen, useful between scenes or as a lead in to a programme.

PATTERN BARS: With Both buttons depressed the normal picture is replaced by the European Broadcasting Union standard Colour Bar Test Pattern. This and the Red and Blue Blank Screens can be used to check your equipment performance, to check your TV's Contrast, Brightness and Colour Saturation settings as described below, and as a professional lead in to a video programme, especially if this is to be sent to be copied.

NOTE: These two buttons over-ride all other controls except BYPASS.

POWER: The operation of this button will come as no surprise. It must be depressed for normal operation! The Red LED will then light.