

**ACE POWER REQUIREMENT:** 9V RMS AC or DC at 600mA  
**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 600mA 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](mailto:sales@gthelectronics.com)

14

GTH  
ELECTRONICS

# “ACE”

## Advanced Converter Enhancer

Microprocessor Control. Full Digital 4:2:2 Processing



## Instruction Manual

Copyright © GTH Electronics 1997-2005

## CONTENTS

<b>INTRODUCTION</b> .....	<b>1</b>
<b>ACCESSORIES</b> .....	<b>1</b>
<b>CONNECTIONS</b> .....	<b>2</b>
<b>CONTROLS</b> .....	<b>4</b>
Simple Conversion Setup.....	4
General Advice.....	4
Colour Controls .....	5
White Balance.....	5
Video Controls.....	6
Special Effects .....	6
Left Hand Push Buttons .....	7
Right Hand Push Buttons.....	7
Fade/Standard Controls.....	8
<b>SETTING UP YOUR TV</b> .....	<b>9</b>
<b>POWER-UP OPTIONS</b> .....	<b>10</b>
Automatic Input Switching.....	10
Colour Standard Lock .....	10
Timebase Correction Disable.....	10
Zoom & Aspect Ratio Conversion .....	10
<b>USEFUL TIPS</b> .....	<b>11</b>
Optimum Correction Setting.....	11
Viewing Negatives.....	11
Creating Sepia Effects .....	11
Coloured Blank Screen .....	11
<b>FAULT FINDING GUIDE</b> .....	<b>12</b>
<b>SPECIFICATIONS</b> .....	<b>13</b>
<b>POWER SUPPLY &amp; GUARANTEE</b> .....	<b>14</b>

## SPECIFICATIONS

This unit is designed for Standards Conversion from Any World Video Standard to Any Other World Standard including non-standard formats. It also provides Full Colour Correction and offers TimeBase Correction. The ACE can work in one of three modes set by the 4 Standard Buttons: With Both Left Hand Buttons OUT the output standard always matches the input standard, ideal for simple colour correction on stable sources. On unstable sources such as VCR, if the 4 "Standard" Buttons are set for the same standard as the input then the ACE gives TimeBase Correction. For Standards Conversion simply set the required standard as described.

### 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 (4 Outputs Available)   1V peak to peak into 75 Ohms  
RGB/YUV Outputs on SCART   0.7V peak to peak into 75 Ohms

### VIDEO BANDWIDTH:

"S" Video   Luminance   5.5MHz (True "S" Processing)  
              Chrominance   1MHz (True "S" Processing)  
Composite   Luminance   5.5MHz (Using Comb Filtering)  
              Chrominance   1MHz

VIDEO SIGNAL/NOISE RATIO: >50dB (Sync and Burst Replaced)

CONTRAST & SATURATION: 0 (Zero) to +6dB (Double)

VIDEO SHARPNESS: +/- 3dB at 3MHz

HORIZONTAL COLOUR SHIFT: 0 +/- 740ns in 10 Steps each way

VERTICAL COLOUR SHIFT: 0 to 3 Lines Lift in 1 Line Steps

### 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 TEST SELECT in and then release 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 the MANUAL Fade is 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 button is pressed and the ACE is at full Fade. Release AUDIO or re-set the Fade.

### Controls Do Not Work

Check BYPASS Released (Bypass Warning LED should be Off)

### Patterns Do Not Work

Check BYPASS Released (Bypass Warning LED should be Off)

## INTRODUCTION

We congratulate you on your choice and thank you for purchasing our "ACE" Advanced Convertor 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 any tape, disc or off-air video source and up to four VCRs or TVs etc. for recording or viewing. Video and Audio signal type connections must be used, the unit does NOT handle Aerial signals.

## ACCESSORIES

Four Leads are supplied with your ACE. Two are Stereo Audio leads with pairs of Phono Plugs at each end and can be used for audio or video.

The third, "S" Video Lead, is for equipment with "S" video connections.

The fourth Special Lead has "S" connector one end and two phono plugs the other end. For a total of Four Composite Video Outputs connect this between the ACE "S" Video Output socket and Composite Video Inputs of your extra two units. Press "OUTPUT TYPE" button **once** to select Dual Composite mode (press again to revert to "S" Output; see page 7). (If you get lost then turning power Off will reset to normal "S" output.) Extra Audio Outputs can be taken using standard "Y" Phono Splitters.

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**

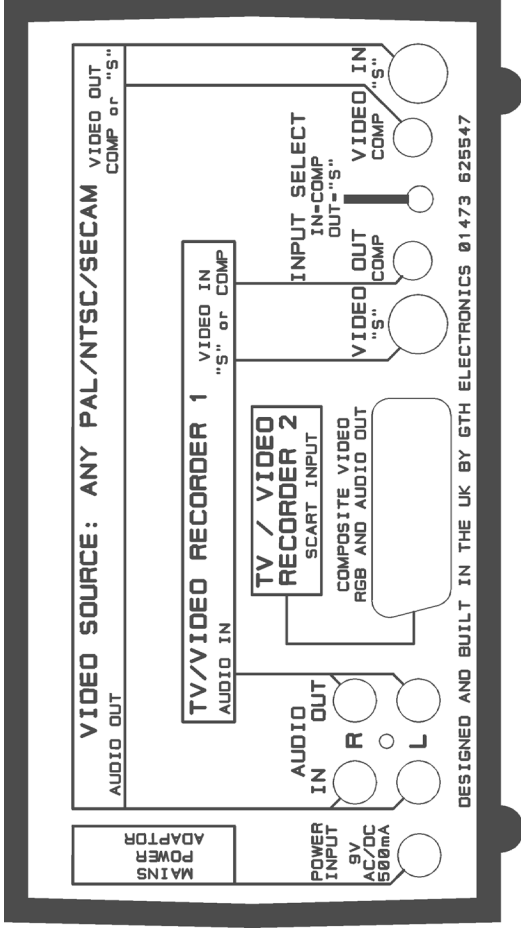
ALL POWER ADAPTORS MUST MEET THE SPECIFICATIONS ON PAGE 14.

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.

**VIDEO SOURCE:** Connect SOURCE Video Out ("S" or Composite) to ACE VIDEO IN ('S' or COMP) using the leads provided ('S' preferred) Connect SOURCE 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 VCR or TV Video Input Socket and connect the ACE AUDIO OUT to VCR/TV 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'.

## USEFUL TIPS

### Optimum Correction Setting

If you find defects on your video copies and want to know how to set up the ACE to correct these faults then try the following: First do a sample copy without the ACE. Next use the ACE during playback of this sample and adjust the controls to get the correct results. Then use the ACE for the final copy with the controls left in these positions for perfect results.

### Viewing Negatives

Press INVERT OPTION button Once to select Video & Colour Invert. 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.

### Creating Sepia Effects

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.

## POWER-UP OPTIONS

These features are accessed by pressing and holding in one of the four non-latching push buttons when the Power button is pressed each time the unit is used. They are cancelled when the power is turned off again. After power-up the buttons can be released and used in the normal way.

### **Automatic Input Switching: Selected with Invert Option**

This turns on Automatic Input switching between the rear panel "S" and Composite Video Inputs. The ACE then ignores the rear panel switch and switches automatically providing the unwanted input becomes inactive.

### **Colour Standard Lock: Selected with Colour Shift<sup>a</sup>**

This option locks out the automatic input colour standard detection on the ACE to prevent any colour problems with faulty or worn PAL tapes. In this mode the unit will only accept PAL/50/4.43 or NTSC/60/3.58.

### **Timebase Correction Disable: Selected with Test Select**

The automatic Timebase Correction is not always needed with stable video sources when converting between colour standards if both are 50Hz or 60Hz. This feature will disable it whenever possible, giving a fixed time delay and highest possible quality but is no use with VCRs.

### **Zoom & Aspect Ratio Conversion: Selected with Output Type**

The enabled Zoom has 7 steps of 5.5% using the "Digitise" knob in place of its normal function. When both the PAL and NTSC buttons are OUT this knob will Zoom up the Centre Portion of the screen horizontally and vertically, allowing 14:9 and 16:9 pictures to expand to fill a 4:3 screen. PAL/NTSC buttons IN gives horizontal expansion to stretch anamorphic widescreen video to fit a 4:3 screen. The TBC can be disabled as above.

If you continue to hold the Output Type button in a further 2.5 seconds the picture height will drop to 3/4 to allow an anamorphic widescreen picture to be converted to 4:3 letterbox format. The digitise control then offers 7 steps of 5.5% expansion for the usual semi-widescreen effect.

Holding the Output Type button in for a total of 5 seconds causes the picture height to return to normal and the width to drop to 3/4 to allow 4:3 images to be placed centrally in an anamorphic widescreen picture. The digitise control allows expansion with cropping of top and bottom.

## 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 four or more VCRs without any loss in level.

**SCART AUDIO/VIDEO SOCKET (Output Only):** Composite Video and Stereo Audio plus RGB or YUV are available. This socket is ideal for an RGB monitor or standard VHS VCR but not for "S" VCRs which should be connected to the "S" Video and Phono Stereo Audio Outputs.

**"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. Alternatively it can be set by OUTPUT TYPE for 2 Composite Outputs. Two VCRs may then be connected with the special "S" to 2 Phono lead.

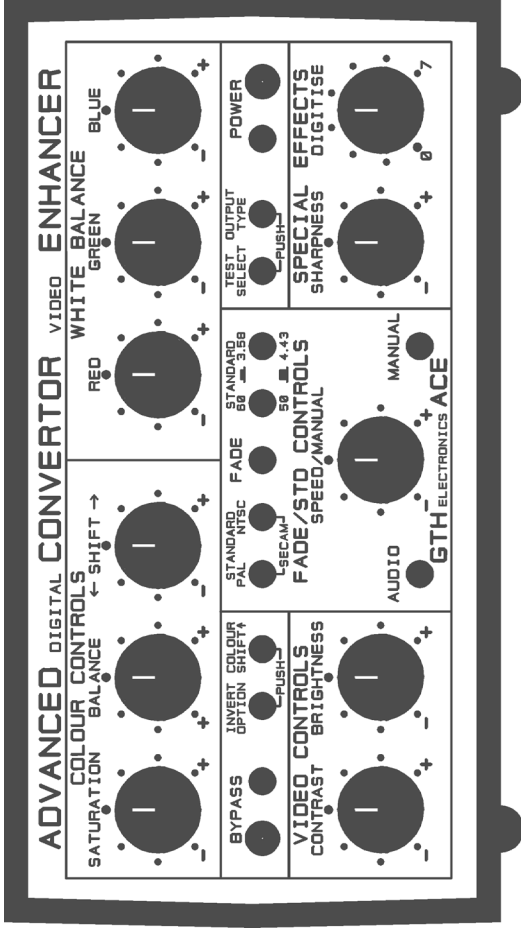
**COMPOSITE VIDEO OUT SOCKET:** This socket has Composite Video for connection to any VCR or TV without "S" Video connections or to a second VCR (if not connected to SCART socket) or Monitor TV etc.

**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 from the Video Output of any Video Source without an "S" Video connector.

**"S" VIDEO IN SOCKET:** This socket is for connection from the Video Output of any Video Source with an "S" Video connector. 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



### Simple Conversion Setup

The ACE has **Automatic Input Standard detection** so accepts anything. If you don't want to adjust the video then press the **BYPASS** button IN. For **UK PAL Output** press in the **PAL** button, leaving out the other three "standards" buttons. This gives normal UK PAL from ANY video input. For **SECAM** press in the **PAL** and **NTSC** buttons. 60 / 3.58 don't work. For **USA NTSC** press in the **NTSC** button and the two marked "60" and "3.58". Leave "PAL" button Out. For other standards please see page 8.

### 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 this happens, pressing in the **BYPASS** button will cancel the settings of all controls except the **INPUT SELECT** and **STANDARDS** buttons and allow you to check whether the problem is due to your control setting or not. If in doubt Press **BYPASS!** **BYPASS** should of course be **OUT** if you want to adjust the video in any way. However for simple standards conversion **BYPASS** can be left IN.

**AUDIO:** With this button pressed IN the Audio is faded with the Video. If it is left OUT then the audio will stay at its full level. If editing scenes together using just the original sound then this button should be pressed IN. If however you intend to re-mix the audio after video editing then for a sound track without audio fades the button should be left OUT.

**MANUAL:** This button selects between Automatic Fade (button OUT) and Manual Fade (button IN). With the **MANUAL** button OUT, Fades are Automatic and controlled as described above by the **FADE** button with the speed set by **SPEED/MANUAL**. With the **MANUAL** button IN Fades are controlled Manually by using the **SPEED/MANUAL** control:

**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. In its fully anti-clockwise setting the time for an automatic fade is around 5 seconds. In its fully clockwise setting the time is around 1 second. Typically this speed control will be set with pointer at the top for fade times of approximately 3 seconds.

With the **MANUAL** button Depressed this control allows Manual fading. When fully clockwise the picture is normal and as the control is turned anti-clockwise the picture fades to black. In its fully anti-clockwise position the screen is fully black.

### 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 control until all 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/Standard Controls:**

**STANDARD:** The ACE has **Automatic Input Standard detection** so accepts anything. These four buttons control the Output Video Standard and Timebase Correction action of the ACE for a wide variety of modes:

**For Simple Colour Correction:** Set Both PAL and NTSC buttons OUT. In this Direct Mode, Output Standard will always match Input Standard. Standards Conversion & Timebase Correction, 60 & 3.58 are Disabled. **For Timebase Correction or Conversion:** Select the Output Standard:

PAL: When depressed with NTSC button OUT selects the PAL Colour Standard. The Right Hand buttons then select various formats available.

NTSC: When depressed with PAL button OUT selects the NTSC Colour Standard. The Right Hand buttons then select various formats available.

SECAM: When Both PAL & NTSC buttons are depressed the SECAM Colour Standard is selected. The Right Hand buttons do NOT Operate.

60Hz: When depressed this button selects 60Hz Fields instead of 50Hz.

3.58MHz: When depressed selects 3.58MHz Colour instead of 4.43MHz.

<u>Output Format</u>	<u>Version</u>	<u>Fields</u>	<u>Colour</u>	<u>STANDARD BUTTONS</u>	
				<u>PAL</u>	<u>NTSC</u>
<b>PAL</b>	<b>BDGHIN</b>	<b>50</b>	<b>4.43</b>	<b>IN</b>	<b>OUT</b>
	Pseudo PAL	60	4.43	IN	OUT
	PAL-M	60	3.58	IN	OUT
	Combi.-N	50	3.58	IN	OUT
<b>NTSC</b>	<b>M(USA etc)</b>	<b>60</b>	<b>3.58</b>	<b>OUT</b>	<b>IN</b>
	NTSC-N	50	3.58	OUT	IN
	-	50	4.43	OUT	OUT
<b>SECAM</b>	-	60	4.43	OUT	IN
	<b>BDGKL</b>	<b>50</b>	<b>4 - FM</b>	<b>IN</b>	<b>Any Position</b>

**FADE:** With MANUAL OUT this button initiates a fully Automatic Fade. Pressing it IN will cause the picture to fade to black. Releasing the button to OUT will cause the picture to be restored by a reverse fade. 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.

**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.

**NOTE:** With NTSC inputs this control changes to NTSC HUE control.

**<-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. The colour moves in the same direction as the top of the control. In most cases the control will need to be near central. See COLOUR SHIFT^ for Vertical Correction.

**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. These controls can also be used creatively to add tints and create sepia effects etc. (See Useful Tips). Combined with the digitise control and video invert they can be used to improve/colour hand drawn captions. 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. Conversely the greatest effect is achieved with one or two controls at maximum clockwise and the rest at minimum anti-clockwise settings.

## **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.

NOTE: The "ACE" automatically limits the video to permitted levels.

## **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.

**DIGITISE/ZOOM:** 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. In its normal mode as a digitise control, when the knob is turned clockwise it decreases the number of colour and brightness levels in the picture, resulting in an increasing paint effect, and, fully clockwise, brightness levels are only black and white with no greys. At intermediate settings this control can convert a normal picture into something similar to a cartoon with bold poster colours in blocks. For best effect turn the SHARPNESS control fully anti-clockwise to minimise video noise dots. Try using with video invert and colour balance for hand drawn captions. See Page 10 to read how to set up and use this control for video zooming

NOTE: All pushbuttons latch IN except those with "PUSH" underneath. These cycle through four "Options", resetting to "Normal" at Power Up.

## **Left Hand Push Buttons:**

**BYPASS:** Depressing this button will cancel ALL colour correction, video and test settings. The Red BYPASS LED will light as a warning. Pressing this button IN allows you to compare the effects you create to the original i.e. 'Before' and 'After' processing. It can also be used to check when all controls are zero, as only then will it cause no change.

**INVERT OPTION:** Pressing this button allows you to cycle through the options in order: Normal / Negative / Colour Invert / Video Invert. In Negative Mode it is possible to view colour negatives, assuming you have a slide converter and film strip holder or can improvise. (See 'Tips') With Colour Inverted, green turns into purple, blue into yellow and skin tone a ghastly blue colour. Ideal to turn people into monsters! With Video Inverted, black parts of the picture go white and vice-versa. With Normal Colour this can have a quite pleasing but spooky effect.

**COLOUR SHIFT ^:** Pressing this button allows you to cycle through the Vertical Colour Shift range of 0 to +3 lines and back to 0, to get rid of "droopy" colour often resulting after several generations of copying.

## **Right Hand Push Buttons:**

**TEST SELECT:** Pressing this button allows you to cycle through the test patterns in order: Normal/Colour Bars/Blue Screen/Red Screen. The Broadcast standard Colour Bar Test Pattern and the Red and Blue Blank Screens can be used to check your own 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 it is to be duplicated. Video Standard set by usual buttons. NOTE: Test Select button over-rides all other controls except BYPASS.

**OUTPUT TYPE:** Pressing this button allows you to cycle through 4 output combinations on the "S" Video Output & SCART Connectors: The "S" Output Connector alternates between "S" and Dual Composite. The SCART Connector RGB Pins cycle through RGB/RGB/YUV/YUV. Overall order is: "S"+RGB / 2Comp+RGB / "S"+YUV / 2Comp+YUV.

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