



***MSTC Evolution standards converter-TBC***  
***Operating and installation instructions***

## **INTRODUCTION**

The MSTC Evolution range of multi-standard TBC has been designed for general-purpose video processing and can stabilize, correct and standards convert composite (CVBS), Y/C and YPbPr (Evolution 2) component signals. A number of options are available to customize both versions of Evolution to suit particular needs. A second channel on-screen graphics display menu (OSD) is provided for on-line control of the system. The MSTC is entirely software driven ensuring that upgrades and improvements can be easily undertaken.

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## **General Information**

Unpack the product carefully and retain all packaging in case the MSTC is returned for servicing or upgrading.

**Claims will not be accepted as result of damage to the MSTC when being returned due to poor or unsuitable transit packing.**

## **Packing List**

MSTC main rack

Mains lead

Instruction manual

RGB output cable (when component output fitted)

## **Mains supply**

The MSTC can operate on a supply voltage between 90 and 260V 50/60 Hz AC without adjustment. The MSTC mains lead is supplied within the UK with a molded fused 13-amp mains connector whilst export versions are supplied without plug. **Great care should be taken to replace the fuse on both the MSTC mains inlet and plug with the same type and rating if this should be necessary.**

**MSTC rear panel fuse: 20mm 3.15A anti surge type.**

## **Operation**

### **On-screen graphics display (See MSTC Evolution OSD menu card)**

The 'on-screen display' is accessed from the CVBS+OSD connector on the rear of the MSTC and can be viewed using a suitable composite video monitor. The graphics is overlaid onto the output video when the red MENU button is pressed. The right hand up/down cursors are used to select the option and the left/right cursors confirm selection. The software version is also displayed at the bottom of this menu.

### **Inputs**

MSTC Evolution has three inputs using BNC connectors for CVBS/component signals and 4-pin Mini-Din for Y/C component sources. Input 1 is configured for composite (CVBS) signals that can be comb filtered in both PAL and NTSC formats. Inputs 2 and 3 can be configured to accept composite, Y/C and YPbPr (Evolution2) component signals as required. Connect only one type of signal format at a time to Inputs 2 and 3. Changes to the input configuration can be made via the OSD from within the INPUT SETUP option. Input selection status is confirmed by the I/P FMT (Input format) LEDs on the front panel. If an optional CCIR601 board is fitted then a fourth input will appear and the Digital LED will light when this input is selected. If the AUTO light flashes in the I/P STD section then no signal is present on the selected input. If the input signal is lost, the MSTC output will either freeze or go to black, depending on the option selected. (See OSD menu card for settings).

### **Input standard**

The MSTC defaults to automatic input standard selection in which case the AUTO indicator will be lit. The input standard setting (PAL, NTSC etc) can also be set manually to match the incoming signal format using the I/P STD button, the input standard being indicated by the appropriate LED. Manual override is useful when processing poor quality input signals when auto select does not function. The NTSC version for Japan (NTSC M without pedestal) is also supported - see OSD menus. If the comb filter is operating, the auto detect function will only select between PAL and NTSC.

### **Signal Processing**

When the AUTO LED is lit the controls, brightness contrast etc. are in bypass mode and the luma/chroma AGC will control the output video level and colour saturation. If the AUTO button is pressed and the AUTO LED is extinguished, the variable controls become active. Parameters are adjusted by holding down the appropriate function button and pressing the up/down cursor. A LED will light over the parameter indicating movement away from the detent value.

The value can be returned to detent by pressing the SHIFT control and the appropriate parameter button. Pressing the AUTO button again restores automatic operation, however the previous manual settings are retained for further use. Alternatively, values can be adjusted by using the PICTURE ADJUSTMENTS option within the OSD. The output signal should be monitored when using these controls to avoid incorrect signal levels. The HUE control is only active when NTSC input standard is selected. Separate adjustment of horizontal and vertical chroma/luma timing is available using the OSD or C/L TMG button plus LEFT/RIGHT cursor for horizontal and UP/DOWN cursor for vertical timing adjustment.

**Noise reduction** \* levels are adjusted using the OSD VIDEO PROCESSING controls and separate adjustments of chroma and luma noise reduction are provided. Since this is a recursive process, avoid use of excessive levels to avoid motion smear. Reduction levels are set from within the menu and are saved in the three PROC MODE memories, L1, L2 and L3, which are also accessible from the front panel. When no PROC LED is lit, the processing is by-passed.

**Colour correction** \* is controlled using the COLOUR CORRECTION option of the OSD. Three memories are provided for storage of settings. Take care not to leave this option enabled when not required.

Depending on the nature of the input signal, there are three lock modes selectable using the LOCK control. Modes M1, M2 and M3 can be used to store various input locking modes to suit stable and unstable sources such as video tape machines and laser disc players etc.

An **inverted video** option is available from within the MISCELLANEOUS SETUP menu of the OSD and the VIDEO POL option within. This option is usually used when transferring film material to video.

In the same menu, the **vertical interval blanking** can be shorted to pass Teletext, VITC timecode etc using the VERTICAL BLANK option.

**VIDEPLEX**, a processing effect where only the ODD or EVEN field is passed by the MSTC and is also available in the same menu.

**\*These features are optional on Evolution 1**

The standards conversion output interpolator O/P INTERPOLATION can also be switched from this menu. This feature reduces interline 'twitter' at the expense of vertical resolution.

### **Output standard**

The output signal standard is selected using the O/P STD option. Two composite and Y/C component signals are simultaneously available, the second CVBS output showing the OSD status. If a component output option is fitted, RGB, RGB-sync-on-green and YPbPr formats are available on the 9-pin D-connector and BNC's. RGB and YPbPr formats are not available simultaneously. Signal format is selected from the OUTPUT SETUP menu. CCIR601 digital output is available at all times when this option board is fitted. All YPbPr levels, including Beta cam and M2, are available. Component RGB/YPbPr output is an option on Evolution1.

### **Genlocking**

If it is required to synchronize the output of the MSTC to another signal then a locking reference (black and burst or composite video) should be connected to either of the

REF1 or REF2 connectors. Termination is automatic. If looping is required, the top connector should be used for reference input and the loop taken from the lower BNC.

Two reference inputs, R1 and R2 are provided to allow multi-standard working, since the genlock must match the output standard and can be selected using the G/LOCK button. **NB. The genlock reference must be of the same standard as the output.** If the INT LED is lit, the reference is disconnected and the output is generated by the internal SPG. Horizontal phase and sub-carrier adjustment of the output signal in relation to the reference can be selected by using the SHIFT+H-ADJ or SC-ADJ combination to select the parameter and the SHIFT+UP/DOWN keys to adjust the value. Alternatively, adjustment can be made via the OSD and the PICTURE ADJUSTMENTS menu option.

### **Freeze field/frame**

The output signal can be frozen by pressing the FREEZE button. The choice of odd/even/field/frame type is set in the CONTROL ADJUSTMENTS menu of the OSD and toggling through the FREEZE FIELD options. If field freeze (ODD or EVEN) is selected then the interpolator in the MSTC provides pseudo interlace to improve the resolution of the freeze. The signal will be frozen until the FREEZE button is pressed again. This function can be remote controlled using the GPI port.

### **Test patterns**

These are accessed by the PATT button. When pressed EBU colour bars will appear. Other patterns are accessed by successively pressing PATT button and will be displayed in the output standard selected. When SHIFT and PATT combination is pressed again the output reverts to the input signal selected.

### **Fader**

The FADE button triggers the output fader. The speed of fade is controlled by the FADER SPEED option in the MISCELLANEOUS SETUP menu of the OSD. Once a fade has been initiated it must be completed before further fades can be selected. If a pattern is selected and the fader operated, the output will cut to black and fade up to the input signal. This function is useful for adding colour bars to the beginning of tape copies. The lower the value selected, the faster the fade will be executed.

***When any changes are made, the LED situated between the SHIFT and MENU buttons will flash after about 20 seconds indicating that settings have been saved. These will then be retained when the unit is de-powered.***

### **GPI remote control**

It is possible to remotely control the functions of MSTC such as fading etc using GPI triggers. The optional GPI (General Purpose Interface) system was chosen as it is universally accepted within the video industry and offers the widest choice options. This facility, when fitted can be accessed via the 9-pin connector on the rear of the unit.

The GPI connections are: -

Pin 1 - Fade down	Pin 2 - Fade up
Pin 3 - Test patterns on	Pin 4 - Output standard select
Pin 5 - Freeze	Pin 6 - Input select
Pin 7 - Not used	Pin 8 - Not used
Pin 9 - Control ground	

Connecting the appropriate control pin to the control ground momentarily triggers these functions. **On no account must voltages be applied to the control pins otherwise damage may result.**

## **General options**

### **CCIR 601 Output**

This option provides additional CCIR 601 serial digital inputs and outputs. The MSTC can be ordered with this option fitted or added later by G2 Systems or your local dealer. Bi-directional analogue/digital conversion is also possible. Contact G2 for details.

### **SECAM-V output**

This optional card provides SECAM-V (Russian/French) output, which is not present on the standard output. (SECAM-H output only as standard). Since this card is fitted into the component output expansion bay, it is not possible to use this with either EVO2 or EVO1 fitted with component output.

### **Logo inserter**

This option can be factory fitted to either EVO. The colour logo is downloaded via the RS232 port and held in non-volatile memory, and can be soft-edged or semi-transparent keyed. The graphic can be positioned on the screen using the cursors and switched on/off using the LOGO front panel switch. See separate instruction sheet for details of operation.

### **Serial remote controller**

An optional RS232 manual remote control is available for use with both EVO1 and EVO2 and can control up to three MSTCs from a single unit. All front panel functions are available and the colour correction adjustments are bought out to individual buttons. See separate instruction sheet for details of operation.

### **Translator standards conversion upgrade board**

This optional plug-in card upgrades both Evolutions to four-field/four line level of standards conversion that reduces motion judder and increases vertical resolution. Translator can be retrospectively fitted if required, contact G2 for details.

## **OSD menus** (See menu card)

As described previously, the Onscreen display menus are viewed from the CVBS + OSD BNC when the Menu button is pressed.

The main menus are:

### **PICTURE ADJUSTMENTS**

VIDEO PROCESSING (Noise reduction is an option on Evolution 1)

COLOUR CORRECTION (Option on Evolution 1)

MISCELLANEOUS SETUP

INPUT SETUP

OUTPUT SETUP

LOCK MODE SETUP

MEMORY CONTROL

VERSION NUMBER (Installed software version number)

### **PICTURE ADJUSTMENTS**

BRIGHTNESS (Black level), CONTRAST (Gain), SATURATION (Chroma gain), HORIZ/VERT C/L TIMING (Horizontal/Vertical chroma/luma timing relationship) HUE (Operates with NTSC type inputs only). These proc-amp parameters can be entered from this menu or from the front panel controls. Functions are accessed by pressing AUTO button - AUTO LED extinguished.

### **VIDEO PROCESSING**

PROC MODE (Memory location number corresponding to L1/L2/L3 on front panel. In the fourth position no PROC LED is lit and processing is non-functional). HF PEAKING (Provides a high frequency enhancement to horizontal resolution) LUMA/CHROMA N/R LEVEL (Recursive Luma and Chroma noise reduction values).

### **COLOUR CORRECTION** (Optional on Evolution 1)

ON/OFF (Functions when proc-amp is activated and AUTO mode is disabled - see above. CC MODES 1/2/3 for storage of colour correction values for later use). B-Y/R-Y GAIN/OFFSET with Hi/Lo operation. (Gain and offset values for colour components)

### **MISCELLANEOUS SETUP**

FADER SPEED (Sets fader speed. The lower the value the faster fade action)

FREEZE FIELD (Selects whether freeze function operates on odd or even field or whole frame - ODD+EVEN)

VIDEPLEX ON/OFF/FIELD (Selects only odd or event field for output)

VERTICAL BLANK (Selects LONG - full re blanking or SHORT to enable passage of VITC and Teletext on the output)

VIDEO POL (Enables chroma/luma video signal inversion)

O/P INTERPOLATION (Enables the output interpolator. Reduces vertical 'twitter' of detail during standards conversion at the expense of vertical resolution)

MENU BACKGROUND (Enables the black background behind OSD text for legibility.

## **INPUT SETUP**

INPUT 1/2/3 (Sets the signal format of each input. Input 1 is CVBS only with switchable comb filter. Inputs 2/3 CVBS/YC/YPbPr on Evolution 2 only)

INPUT SELECT (Both Evolutions have the feature to enable clean vertical interval switching of non-synchronous inputs. This is achieved by freezing the present signal until vertical interval of new signal is met. FREEZE holds previous frozen input signal when next input signal is not present. NORMAL gives black when no input present. NOTE: For best results when using this facility select the input standard manually and disable to comb filter on CVBS signals).

INPUT FAIL (This function selects the output of Evolution to freeze output or display black on input signal failure)

525 CVBS/YC (Selects NTSC input to either NTSC M or NTSC J - Japanese NTSC with no pedestal when NTSC M input standard is chosen).

525/625 COMP (Selects the YPbPr component input level).

## **OUTPUT SETUP**

HORIZONTAL/CHROMA PHASE (Values of genlock timing)

SYNC (Selects separate or mixed syncs on RGB output)

525 CVBS/YC (NTSC M or J output selection as above)

525/625 COMP (Output YPbPr levels)

## **LOCK MODE SETUP**

LOCK MODE 1/2/3/ (Corresponds to M1/2/3 memory locations on front panel)

COLOUR/HORIZ/VERT (Selects colour, horizontal and vertical response of input decoder)

## **MEMORY CONTROL**

SAVE SETTINGS (Each time a change is made to Evolution it is saved. When disabled this is not the case and provides a ready way of returning to a previous setting using the RESTORER USER option)

RESTORE FACTORY (Returns Evolution to original default settings)

LOCK FRONT PANEL (MENU+LOCK+FREEZE unlocks)

DISPLAY LOGO (0-Logo not loaded on power-up)

LOCK LOGO POSITION (On/Off)

## **SPECIFICATIONS**

### **Inputs:**

PAL B/I/G/M/N/60Hz-443, NTSC M/433/J. SECAM-H/V standards.

Input 1 - CVBS/Composite with switchable PAL/NTSC combing. Input 2 - CVBS/YPbPr/YC. Input 3 - CVBS/YC/YPbPr on Evolution 2 only. Optional CCIR601 digital input. Full cross conversion between all formats. Conversion between all input and output standards. Switchable modes for use with a wide range of signal grades including optimized settings for unstable sources such as VT replay.

### **Outputs:**

PAL B/I/G/M/N NTSC M/443J, SECAM - H/V standards. Two simultaneous CVBS and two YC outputs. One switchable RGB, RGB sync on green and YPbPr component signal. Optional SDI 601 output. PAL and NTSC signals will have a correct mathematical relationship between line and subcarrier frequencies.

### **Internal:**

Component digital CCIR 601.8 Bits each for YPbPr. Sample rates Y: 13.5MHZ CrCb: 6.75 MHZ

Full sync and burst re-insertion with fully legal burst and sync regardless of inputs. Variable recursive noise reduction with field memories (EVO2-Option on EVO1). Standards converter uses an 8-level/2-line interpolator. TBC window: 2 field (infinite).

### **Frequency response**

CVBS with comb filter or Y channel: to 5.0 MHZ + 0.5/-1dB

CVBS without comb filter: to 3.0 MHZ +0.5/-2dB

Kp (CVBS with comb filter or YC) better than 2%

Differential gain and phase; better than 4% and 3 degrees peak to peak including quantisation errors.

S/N ratio: better than 50 dB

AGC CVBS input: 0.5V to 2V with AGC action on sync tip.

YC input: as CVBS: C: nominal 0.3v burst with AGC from at least - 12dB to + 3dB.

### **Test Patterns:**

Digitally generated. EBU bars, saw-tooth, PLUGE, grille and multi-burst patterns selectable from the front panel.

### **Controls**

Continuous control of contrast, brightness, colour saturation, hue (NTSC) and chroma/luma timing. Colour correction, HF peaking and noise reduction.

### **Features**

Negative video, fade to black, freeze field and frame and fade up from bars. GPI remote controls. Videplex.

**Genlock**

Fully adjustable horizontal and sub-carrier phase. External reference colour black or composite video to suit output standard. Range: 0.5V to 2V p-p with AGC acting on sync tip.

**General**

Self contained 19" IU rack. Depth 390mm. Mains 90-260 VAC 40w 50/60-Hz. All connectors on rear of unit. All controls including adjustments of H and SC on the front panel. BNC connectors for all signals except Mini-Din 4-pin connectors for YC and 9-pin D for GPI/RS232 serial and RGSB signals.

# EC DECLARATION OF CONFORMITY

This is to certify that the:

**MSTC Evolution1 and 2 standards converter/TBC**

Manufactured by:

G2 Video Systems Limited  
5 Mead Lane  
Farnham Surrey GU9 7DY UK

Conforms with the protection requirements of Council Directive 89/336/EEC and the Amending Directive 92/31/EEC, relating to Electromagnetic Compatibility, by the application of:

EN50081 - 1:            1992 Generic Emissions Standard.  
Referencing:  
1995 EN55022 (Class B Equipment)

EN50082 - 2:            1995 Generic Immunity Standard.  
Referencing:  
EN61000/4/2 and EN61000/4/4  
EN61000/4/3 and EN61000/4/6

Signed:



Position: Director

Of:

G2 Video Systems Limited

Date: 3.9.99