Kramer Electronics, Ltd.

USER MANUAL

Standards Converter - TBC

Model:

FC-5000

IMPORTANT: Before proceeding, please read paragraph entitled
"Unpacking and Contents"

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1   INTRODUCTION

The **FC-5000** multi-standard TBC has been designed for general-purpose video processing and can stabilize, correct and standards convert composite (CVBS) and Y/C signals.   A second channel on-screen graphics display menu (OSD) is provided for on-line control of the system. The **FC-5000** is entirely software driven ensuring that upgrades and improvements can be easily undertaken.

2   GENERAL INFORMATION

Unpack the product carefully and retain all packaging in case the **FC-5000** is returned for servicing or upgrading.
Claims will not be accepted as result of damage to the **FC-5000** when being returned due to poor or unsuitable transit packing.

2.1   Unpacking And Contents

The items contained in your Kramer Standards Converter - TBC package are listed below.
- ❖ FC-5000 main rack
- ❖ Mains lead
- ❖ Instruction manual
- ❖ RGB output cable (when component output fitted)

2.2   Mains supply

The **FC-5000** can operate on a supply voltage between 90 and 260V 50/60 Hz AC without adjustment. The **FC-5000** 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 **FC-5000** mains inlet and plug with the same type and rating if this should be necessary. **FC-5000** rear panel fuse: 20mm 3.15A anti surge type.

3   OPERATION

3.1   On-screen graphics display (FC-5000 OSD menus @ page 11)

The 'on-screen display' is accessed from the CVBS+OSD connector on the rear of the FC-5000 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.

3.2 Inputs

FC-5000 has three inputs using BNC connectors for CVBS 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 or Y/C 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 the AUTO light flashes in the I/PUT STD section then no signal is present on the selected input. If the input signal is lost, the FC-5000 output will either freeze or go to black, depending on the option selected. (See OSD menu card for settings).

3.3 Input standard

The FC-5000 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.

3.4 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 color 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.

Color 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 time-code etc using the VERTICAL BLANK option.

VIDEPLEX, a processing effect where only the ODD or EVEN field is passed by the FC-5000 and is also available in the same menu.

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.

3.5   Output standard

The output signal standard is selected using the O/P STD option. Two composite and Y/C signals are simultaneously available, the second CVBS output showing the OSD status. Signal format is selected from the OUTPUT SETUP menu.

3.6   Genlocking

If it is required to synchronize the output of the FC-5000 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.

3.7   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 FC-5000 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.

3.8   Test patterns

These are accessed by the PATT button. When pressed EBU color 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.

3.9 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 color 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.

3.10 GPI remote control

It is possible to remotely control the functions of FC-5000 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.

3.11 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 WITH NOISE REDUCTION
- ❖ COLOUR CORRECTION
- ❖ MISCELLANEOUS SETUP
- ❖ INPUT SETUP
- ❖ OUTPUT SETUP
- ❖ LOCK MODE SETUP
- ❖ MEMORY CONTROL
- ❖ VERSION NUMBER (Installed software version number)

3.12   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.

3.13   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).

3.14   COLOR CORRECTION

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

3.15   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.

3.16   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/ INPUT SELECT (The FC-5000 has 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 FC-5000 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).

3.17   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)

3.18   LOCK MODE SETUP

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

COLOR/HORIZ/VERT (Selects color, horizontal and vertical response of input decoder)

3.19   MEMORY CONTROL

SAVE SETTINGS (Each time a change is made to FC-5000 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 FC-5000 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)

4   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.
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
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, color saturation, hue (NTSC) and Chroma/Luma timing. Color 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 color 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 RGBS signals.

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5   OSD MENUS

Picture Adjustments	Brightness	(Black level-also on front panel)
	Contrast	(Luma gain-also on front panel)
	Saturation	(Chroma gain-also on front panel)
	Horizontal CIL	(Relative chroma/luma timing)
	Vertical CIL	(Relative chroma/luma timing)
	Hue	(NTSC only)

Video Processing	Proc Mode	(L1-L3 memories on front panel)
	HF peaking	(Boosts sharpness in picture detais)
	Luma NR level**	(Noise reduction level in picture)
	Chroma NR level**	(Noise reduction level in chroma)

Color Correction**	CC on/off	(Color correction on/off)
	CC display	(Adjustment mode RGB or R-Y/B-Y)
	CC mode	(Color correction memories)
	RGB or R-Y/B-Y highlight	(Color balance in picture highlights)
	RGB or R-Y/B-Y lowlight**	(Colour balance near black)

** Option on some versions

Miscellaneous Setup	Fader speed	(Values 0 - 255)
	Freeze field	(Odd or even field or frame=odd+even)
	Videplex on/off	(Single field is passed to output)
	Videplex odd/even	(Selects field to be passed)
	Vert blank	(Long - full blank, Short-passes VITC etc.)
	Video pol	(Positive or negative video)
	OIP interpolation	(Controls output interpolator- see manual)
	Menu bgnd	(Controls background behind OSG)

INPUT Setup	Input 1	(Configures input 1 toCVBS or CVBS with comb filter
	Input 2	(Configures input 2 to CVBS, YC or PbPr** format)
	Input 3	(Sets input 3 to CVBS, YC or YPbPr** format)
	Input select	(Normal/freeze - see manual)
	Input fail	(Normal/blank - see manual.)
	525 CVBS/YC	(Sets NTSC input standard to M or J)
	525 Comp**	(Sets component in to SMPTE YPbPr/Betacam/M2)
	625 Comp**	(Sets component in to EBU YPbPr or Betacam Old)

** Option on some versions

OUTPUT Setup	Horizontal phase	(Genlock H-phase, values +/-1281)
	Chroma phase	(Genlock SC-phase, values +/-180)
	Sync	(Sets RGB output sync to mixed or separate syncs)
	525 CVBS/YC	(Sets NTSC output to M or J standard)
	525 comp**	(Sets 525 component output to SMPTE YpbPr / GBR 700mV/GBR7OOmV+Sync On Green / GBR714mV plus SOG /Betacam/M2)
	625 comp**	(Sets 625 component output to EBU YPbPr/Betacam old)

Lock Mode Setup	Lock mode	(Lock memories, M1-M3 on front panel)
	Colour lock	(Chroma vector lock – Slow /medium / fast)
	Horiz lock	(Line lock - VTR/Stable)
	Vert lock	(Vertical lock - Stable/VTR/Fast)

FC-5000 Control	Save settings	(OFF - changes to menu settings are not saved)
	Restore user	(Resets FC-5000 to status before Save Settings was set OFF)
	Retore factory	(Resets FC-5000 to default status)
	Lock front panel	(Locks controls - MENU+LOCK+FREEZE unlocks)
	Display Logo**	(0- logo not loaded on powerup)
	Lock logo position**	(On/Off)

** Option on some versions

6 EC DECLARATION OF CONFORMITY

This is to certify that the:

FC-5000 standards converter/TBC
Manufactured for:
Kramer Electronic Ltd
3, Am VeOlamo Street, Jerusalem, Israel

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: Dr. Joseph Kramer   Position: Managing Director

Of: Kramer Electronics Limited   Date: 19/12/2000
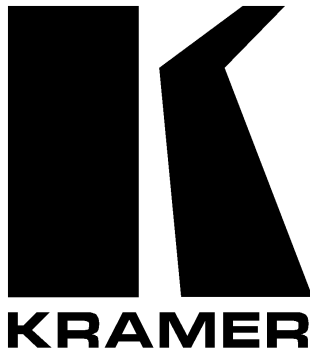
The list of Kramer distributors appears on our web site:
www.kramerelectronics.com
From the web site it is also possible to e-mail factory headquarters.
We welcome your questions, comments and feedback.