

**Kramer Electronics, Ltd.**



# **USER MANUAL**

**Model:**

**FC-4000**

*Standards Converter / TBC*



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## 1 Introduction

Dedication by Kramer Electronics since 1981, to the development and manufacture of high quality video/audio equipment, makes the Kramer line an integral part of the finest production and presentation facilities in the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better!

The Kramer line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to our high quality standards' converters, we also offer excellent switchers and matrices, encoders, decoders and transcoders, distribution amplifiers, remote controllers, processors, interfaces and computer-related products. Congratulations on purchasing your Kramer **FC-4000 Standards Converter / TBC**.

This product is ideal for the following typical applications:

- Studio standards conversion
- Timebase correction, frame-store synchronization for production and duplication
- Studio color correction

The package includes the following items:

- **FC-4000** Standards Converter / TBC
- Power cord
- This user manual
- Kramer concise product catalog/CD

## 2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

## 3 Overview

The Kramer **FC-4000 Standards Converter / TBC** is a high quality standards converter and Timebase corrector with full proc-amp facilities and a

GENLOCK<sup>1</sup> input (for frame synchronization).

In addition, the **FC-4000**:

- Converts between all common standards: PAL (B, D, G, H, I, M, N); NTSC (4.43, 3.58); and SECAM
- Includes 2 sets<sup>2</sup> of video inputs: 2 composite and 2 Y/C (s-Video), as well as the corresponding audio inputs
- Includes 3 different video output formats - composite, Y/C (s-Video) and component video (Y, R-Y, B-Y), as well as an audio output
- Is designed so that Y/C (s-Video) takes priority over the composite video when both composite and Y/C (s-Video) are connected as inputs<sup>3</sup>
- Has AGC<sup>4</sup> functionality for processing low quality sub-standard signals
- Is digitally synthesized, generating a standard color bar when no video signal is available on the inputs
- Includes a digital comb filter for input system decoding
- May be used for frame synchronization<sup>5</sup> (for example, enabling the mixing or processing of video signals)
- Includes full digital decoding and encoding with highly integrated digital processing

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **FC-4000** in a location free from moisture and away from excessive sunlight and dust

## 4 Your Standards Converter / TBC

Figure 1 illustrates the front and rear panels of the **FC-4000**. Tables 1 and 2 define the front and rear panels of the **FC-4000**, respectively.

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1 The video input acts as a TBC and can GENLOCK to the sync of another video, therefore synchronizing the 2 asynchronous video sources

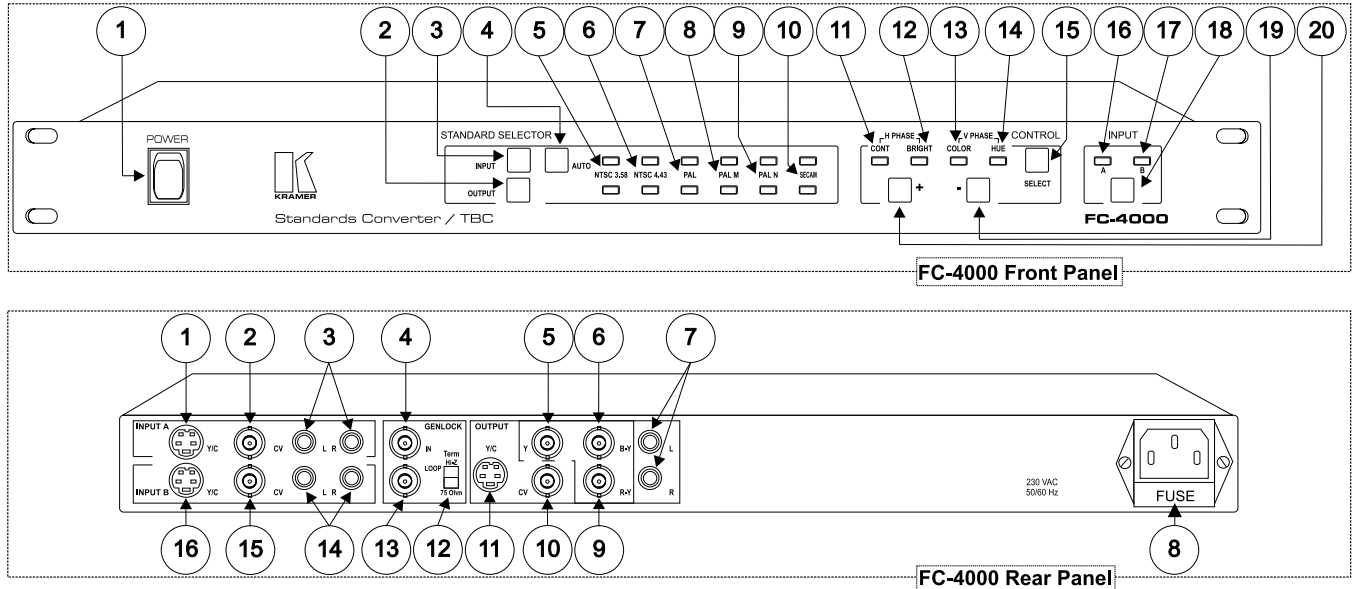
2 Labeled INPUT A and INPUT B, respectively

3 If Y/C (s-Video) is not connected, the composite video will take effect

4 Automatic Gain Control

5 As they use the same sync, color subcarrier frequencies and the same phase

## Your Standards Converter / TBC



*Figure 1: FC-4000 Standards Converter / TBC*

Table 1: Front Panel FC-4000 Standards Converter / TBC Features

#	Feature	Function
1	POWER Switch	Illuminated switch supplying power to the unit
2	OUTPUT Button	Press to select the output standard, illuminating the appropriate LED <sup>1</sup>
3	INPUT Button	Press to select the input standard, illuminating the appropriate LED <sup>2</sup>
4	AUTO Button	Toggles between automatically recognizing the input standard (illuminating the appropriate LED <sup>2</sup> ) and the manual selection mode
5	NTSC 3.58 LED Label	Defines the INPUT or OUTPUT NTSC 3.58 standard
6	NTSC 4.43 LED Label	Defines the INPUT or OUTPUT NTSC 4.43 standard
7	PAL LED Label	Defines the INPUT or OUTPUT PAL (BDGH) standard
8	PAL M LED Label	Defines the INPUT or OUTPUT PAL M standard
9	PAL N LED Label	Defines the INPUT or OUTPUT PAL N standard
10	SECAM LED Label	Defines the INPUT or OUTPUT SECAM standard
11	CONT (CONTRAST) LED	Select the CONT <sup>3</sup> LED via the SELECT button. Adjust using the + and – buttons
12	BRIGHT (BRIGHTNESS) LED	Select the BRIGHT LED via the SELECT button. Adjust using the + and – buttons
13	COLOR LED	Select the COLOR LED <sup>4</sup> via the SELECT button. Adjust using the + and – buttons
14	HUE LED	Select the HUE <sup>5</sup> LED via the SELECT button. Adjust using the + and – buttons
15	SELECT Button	Press to select an H PHASE and V PHASE control
16	INPUT A LED	Illuminates when selecting INPUT A
17	INPUT B LED	Illuminates when selecting INPUT B
18	Input Selector Button	Press to select the input source, INPUT A or B
19	- Button	Press to decrease the control level
20	+ Button	Press to increase the control level
		Press the + and – buttons simultaneously to reset the selected CONTROL <sup>6</sup> to its default value

Table 2: Rear Panel FC-4000 Standards Converter / TBC Features

#	Feature	Function
1	INPUT A Y/C 4p Connector	s-Video (Y/C) input
2	INPUT A CV BNC Connector	Composite video input
3	INPUT A L and R RCA Connectors	Audio input
4	GENLOCK IN BNC Connector	GENLOCK source <sup>7</sup>
5	OUTPUT Y BNC Connector	Component video output
6	OUTPUT B-Y BNC Connector	Component video output
7	OUTPUT L and R RCA Connectors	Audio output
8	Power Connector with Fuse	230 VAC, 50/60 Hz (115 VAC U.S.A) 5 VA power inlet

1 A green OUTPUT LED is positioned below the appropriate LED label

2 A red INPUT LED is positioned above the appropriate LED label

3 Select both the CONT (CONTRAST) and the BRIGHT (BRIGHTNESS) LEDs (simultaneously) to adjust the horizontal phase of the TBC input (against GENLOCK input) using the + and – buttons

4 Select both the COLOR and the HUE LEDs (simultaneously) to adjust the vertical phase of the TBC input (against GENLOCK input) using the + and – buttons

5 For an NTSC input only

6 Reset all the CONTROLS to their default values by simultaneously pressing the + and – buttons for more than 3 seconds

7 The FC-4000 unit functions as a Standards Converter when no video source is connected to the GENLOCK IN connector

#	Feature	Function
9	OUTPUT R-Y BNC Connector	Component video output
10	OUTPUT CV BNC Connector	Composite video output
11	OUTPUT Y/C 4p Connector	s-Video (Y/C) output
12	Term Hi-Z Switch	Controls loop termination <sup>1</sup>
13	GENLOCK LOOP BNC Connector	GENLOCK loop <sup>2</sup>
14	INPUT B L and R RCA Connectors	Audio input
15	INPUT B CV BNC Connector	Composite video input
16	INPUT B Y/C 4p Connector	s-Video (Y/C) input

### 4.1 Connecting the Standards Converter / TBC

To connect the **FC-4000**, connect<sup>3</sup> the following to the rear panel ports:

- Audio and video inputs and outputs
- Power cord

Figure 2 illustrates how to connect the **FC-4000**:

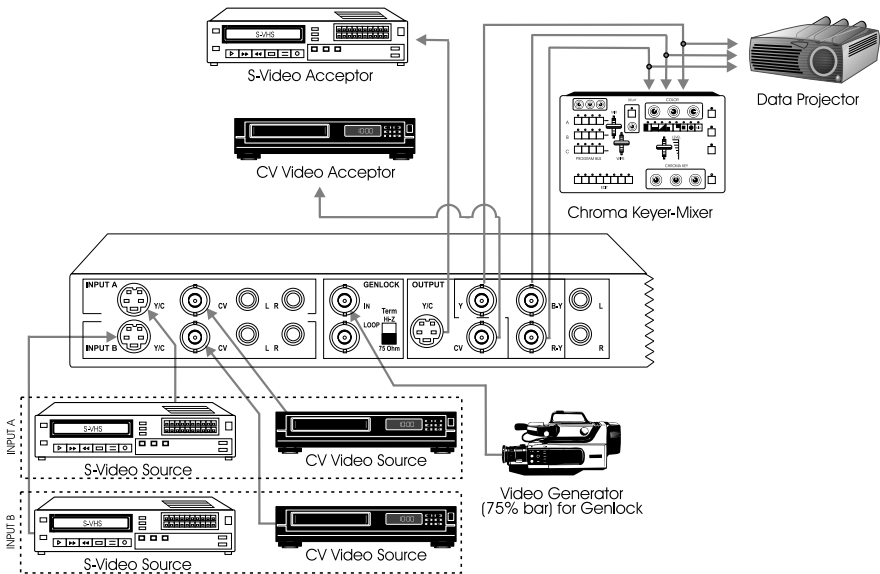


Figure 2: FC-4000 Standards Converter / TBC Connections

1 Push down to terminate the line with 75 Ohm. Push up when the line extends to another unit

2 Connect to the GENLOCK IN connector of the next unit in the line

3 Switch OFF the power on each device before connecting it to your FC-4000. After connecting your FC-4000, switch on its power and then switch on the power on each device



## 5 Operating Your Standards Converter / TBC

Section 5.1.1 describes how to convert a Standard and section 5.1.2 describes how to adjust specific Control levels.

### 5.1.1 Converting a Standard

To convert a Standard, do the following:

1. Press the Input Selector button<sup>1</sup> to select either INPUT A or INPUT B. The appropriate LED illuminates<sup>2</sup>.
2. Press the INPUT button<sup>3</sup> to select the desired input standard<sup>4</sup>. The red LED illuminates above the appropriate LED label.
3. Press the OUTPUT button<sup>5</sup> to select the desired output standard. The green LED illuminates below the appropriate LED label and the selected input standard converts to the selected output standard.

### 5.1.2 Adjusting the CONTROL Levels

Figure 3 illustrates the SELECT button sequence:



Figure 3: SELECT Button Sequence

To adjust a specific CONTROL level:

- Press the SELECT button
- The appropriate *CONT*, *BRIGHT*, *COLOR* and/or *HUE* LED illuminates
- Press the + button or - button to increase or decrease the current level

To adjust the *HORIZONTAL PHASE* of the TBC input:

- Press the SELECT button one or more times, according to the SELECT button sequence<sup>6</sup>, until both the *CONT* (*CONTRAST*) and the *BRIGHT* (*BRIGHTNESS*) LEDs illuminate and press the + button or - button to increase or decrease the current phase

<sup>1</sup> Item 18 in Figure 1

<sup>2</sup> Item 16 or 17, respectively, in Figure 1

<sup>3</sup> Item 3 in Figure 1

<sup>4</sup> Or press the AUTO button to automatically recognize the input standard

<sup>5</sup> Item 2 in Figure 1

<sup>6</sup> For example, if the BRIGHT LED presently illuminates, press the SELECT button 3 times to simultaneously illuminate the CONT (CONTRAST) and the BRIGHT (BRIGHTNESS) LEDs for HORIZONTAL PHASE

To adjust the *VERTICAL PHASE* of the TBC input:

- Press the **SELECT** button one or more times, according to the **SELECT** button sequence<sup>1</sup> until both the *COLOR* and the *HUE* LEDs illuminate and press the + button or - button to increase or decrease the current phase

## 6 Technical Specifications

Table 3 includes the technical specifications:

*Table 3: Technical Specifications of the FC-4000 Standards Converter / TBC*

Inputs:	2 Composite Video, 1Vpp/75 ohms on BNCs 2 Y/C (s-Video), 1Vpp/75 ohms (Y), 0.3Vpp/75 ohms (C) on 4P connectors 2 Audio-stereo on RCAs, 1Vpp/10K (When both Composite and Y/C exist on an input, the Y/C input takes priority)
Outputs:	1 Composite Video, 1Vpp/75 ohms on a BNC 1 Y/C (s-Video), 1Vpp/75 ohms (Y), 0.3Vpp/75 ohms (C) on a 4P connector 1 Audio-stereo on RCAs, 1Vpp/1K
AGC:	Composite Video and (Y) input 0.5 Volts to 2 Volts with AGC acting on sync tip
Decoder:	Digital comb filter on input
Encoder:	Digitally synthesized; with color bar generator when video input is not detected
Input Formats:	PAL B/D/G/H/I/M/N, NTSC 3.58, NTSC 4.43 and SECAM
Output Formats:	PAL B/D/G/H/I/M/N, NTSC 3.58, NTSC 4.43 and SECAM
Controls:	Continuous control of contrast, brightness, color saturation, hue (NTSC only), H and V phase, input selector button, input/output (standards selector) buttons, auto (input) button
Dimensions:	19-inch (W), 7-inch (D) 1U (H) rack-mountable
Power Source:	230 VAC, 50/60 Hz, (115VAC, U.S.A.) 5 VA max
Weight:	2.7kg. (6 lbs.) approx.
Accessories:	Power cord

<sup>1</sup> For example, if the BRIGHT LED presently illuminates, press the SELECT button 4 times to simultaneously illuminate the COLOR and the HUE LEDs for VERTICAL PHASE

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## LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

### HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

### WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

### WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site [www.kramerelectronics.com](http://www.kramerelectronics.com).
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
  - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
  - ii) Product modification, or failure to follow instructions supplied with the product
  - iii) Repair or attempted repair by anyone not authorized by Kramer
  - iv) Any shipment of the product (claims must be presented to the carrier)
  - v) Removal or installation of the product
  - vi) Any other cause, which does not relate to a product defect
  - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

### WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

### HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

### LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

### EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

**NOTE:** All products returned to Kramer for service must have prior approval. This may be obtained from your dealer. This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: "Radio frequency devices Subpart B – Unintentional radiators"

### CAUTION!

- ☒ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ☒ Use the supplied DC power supply to feed power to the machine.
- ☒ Please use recommended interconnection cables to connect the machine to other components.



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**For the latest information on our products and a list of Kramer distributors, visit our Web site: [www.kramerelectronics.com](http://www.kramerelectronics.com).**

**Updates to this user manual may be found at  
<http://www.kramerelectronics.com/manuals.html>.**

**We welcome your questions, comments and feedback.**



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