Kramer Electronics, Ltd.

USER MANUAL

Model:

SG-6006

Genlock Multistandard SPG / SDI / AUDIO Generator

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Congratulations on purchasing your Kramer **SG-6006** *Genlock Multistandard SPG[2]/SDI/Audio Generator* which is ideal for:

- Studio master genlock for one stable source
- Black or color bar reference for professional video cameras that need a stable reference
- Use as a test and alignment tool for professional video/audio equipment
- Use as a color bar generator as filler for recording in a duplication studio

Each package includes the following items:

- **SG-6006** *Genlock Multistandard SPG/SDI/Audio Generator*
- Power cord, rack "ears" and Null-modem adapter
- Windows®-based Kramer control software[3]
- This user manual[4]

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
- Use Kramer high performance high resolution cables[5]

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

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1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Sync Pulse Generator

3 Downloadable from http://www.kramerelectronics.com

4 Download up-to-date Kramer user manuals from http://www.kramerelectronics.com

5 The complete list of Kramer cables is available from http://www.kramerelectronics.com

Step 1: Mount the machine

Mount the machine in a rack or stick the 4 rubber feet to the underside

Step 2: Connect the inputs and outputs - see section 6

1 Connect the Genlock input
2 Connect the Video/Audio output(s)
3 Connect a controller (optional)

SDI

Non Linear Editor

RS-232

CV

CV

CV

Audio

Non Linear Editor

Studio Camera

To an input on the Kramer VS-808xl 8x8 Video / Audio Matrix Switcher

Step 3: Turn the power ON

Step 4: Operate the machine - see section 7

Enter the menu

MENU

Accept the changes

ENTER

Navigate through the menu

Lock/unlock the front panel

GENLOCK

PANEL LOCK

Toggle between a genlocked generator and a free-running

3   Overview

The **SG-6006** is a broadcast quality, multi-standard SPG (Sync Pulse Generator) with black burst, color bar, and audio tone outputs. It has eight composite video and four SDI outputs on BNC connectors. The analog video outputs—and the four SDI outputs—can be configured as either a black burst or a color bar signal.

In particular, the **SG-6006**:

- Has audio outputs available in AES 75Ω (AES-3id) and AES-EBU digital formats, as well as in unbalanced and balanced analog audio formats
- Has balanced audio and AES/EBU outputs on XLR connectors, AES 75Ω (AES-3id), SDI and composite video outputs on BNC connectors, and unbalanced audio outputs on RCA connectors. All outputs are available simultaneously
- Offers a choice of nine color bars (for video outputs), and you can set the timing parameters, SCH and phase
- Features adjustments for the frequency and amplitude
- Features various options for SDI audio embedding
- Can be genlocked to an external composite video source via its looping input with selectable termination

The **SG-6006** is housed in a 19" 1U rack mountable enclosure, and is fed from a 100-240 VAC universal switching power supply.

The **SG-6006** can be operated via the front panel buttons with an LCD and a user-friendly menu, and remotely operated via the RS-232 interface[1].

3.1   Recommendations for Best Performance

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 and position your **SG-6006** away from moisture, excessive sunlight and dust

4   Defining the SG-6006 Genlock Multistandard SPG/SDI/Audio Generator

Figure 1 and Table 1 define the front and rear panels of the **SG-6006**.

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1 The Communication Protocol is available on request from Kramer support
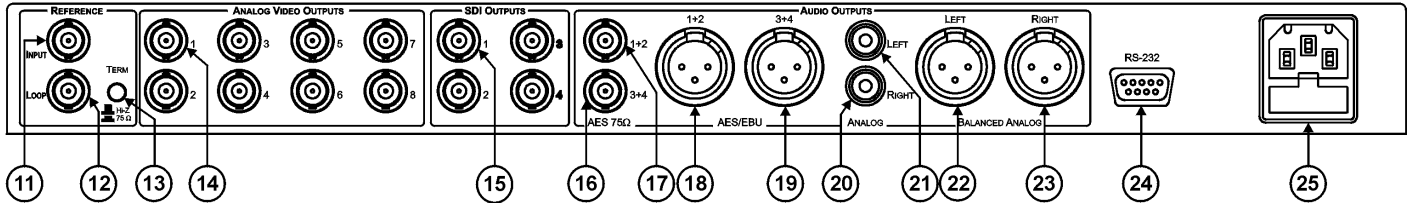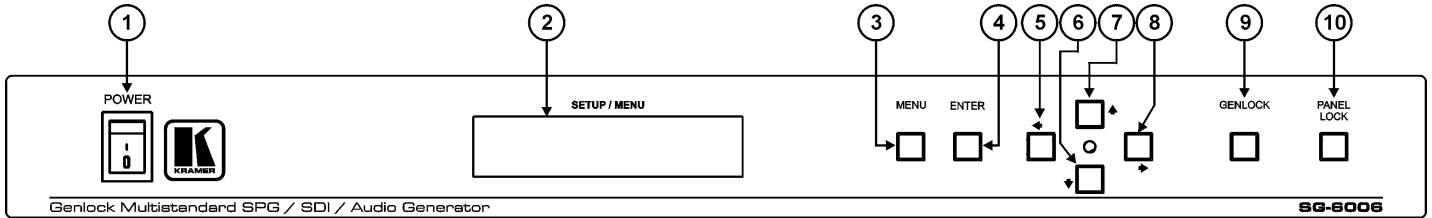
Figure 1: SG-6006 Front and Rear Panels

Table 1: SG-6006 Front and Rear Panel Features

#	Feature			Function
1	*POWER* Switch			Illuminated switch for turning the unit ON or OFF
2	*SETUP / MENU* LCD Display			Displays user interface messages and configuration menu items
3	*MENU* Button			Press to open the menu (see Section 7.1)
4	*ENTER* Button			Press to load and save a set up, and enter the submenus
5	◄ Button			Press to decrease numerical values or select from several definitions
6	▼ Button			Press to move down the menu list
7	▲ Button			Press to move up the menu list
8	► Button			Press to increase numerical values or select from several definitions
9	*GENLOCK* Button			Press to toggle between a genlocked generator and a free-running generator[1] When lit, the machine will "genlock" to a valid reference input. When not lit, the timing of the generator is internally generated (free-running)
10	*PANEL LOCK* Button			Press and hold[2] to lock/unlock the front panel buttons
11	*REFERENCE*	*INPUT* BNC Connector		Connect a reference input for genlocking the machine
12		*LOOP* BNC Connector		Connect to an additional machine to loop the genlocking source
13		*TERM* Button		When looping, release the TERM button When not looping, terminate the line by pressing the button
14	*ANALOG VIDEO OUTPUT* BNC Connectors			Connect to the composite video acceptors (from 1 to 8)
15	*SDI OUTPUT* BNC Connectors			Connect to the SDI acceptors (from 1 to 4)
16	*AUDIO OUTPUTS*	*AES 75Ω*[3] BNC Connectors	1+2	Connect to an AES-3id digital audio acceptor (for channels 1 and 2)[4]
17			3+4	Connect to an AES-3id digital audio acceptor (for channels 3 and 4)[4]
18		*AES/EBU*[5] XLR Connectors	1+2	Connect to an digital audio acceptor (for channels 1 and 2)[4]
19			3+4	Connect to an digital audio acceptor (for channels 3 and 4)[4]
20		*ANALOG* RCA Connectors	*RIGHT*	Connect to an analog audio acceptor
21			*LEFT*	
22		*BALANCED ANALOG* XLR Connectors	*LEFT*	Connect to a balanced analog audio acceptor
23			*RIGHT*	
24	*RS-232* 9-pin D-sub Port			Connects to the PC or the Remote Controller[6]
25	Power Connector with Fuse			AC connector enabling power supply to the unit

1 If a reference input is not connected, the GENLOCK button blinks when pressed

2 For about 3 seconds

3 Known in the industry as AES-3id

4 In accordance with the standard, the audio digital stream contains 2 audio channels

5 Known in the industry as AES3 Type I

6 Via a null-modem connection

5   Installing the SG-6006 in a Rack

This section describes what to do before installing in a rack and how to rack mount.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

|	
Operating temperature range	+5º to +45º C (41º to 113º F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20º to +70º C (-4º to 158º F)
Storage humidity range	5 to 95% RHL, non-condensing

⚠ CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:
1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.
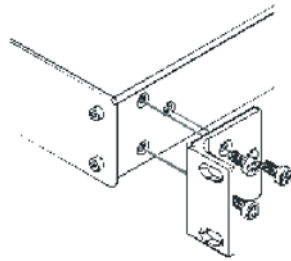
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.
Note:
• In some models, the front panel may feature built-in rack ears
• Detachable rack ears can be removed for desktop use
• Always mount the machine in the rack before you attach any cables or connect the machine to the power
• If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions (you can download it from http://www.kramerelectronics.com)
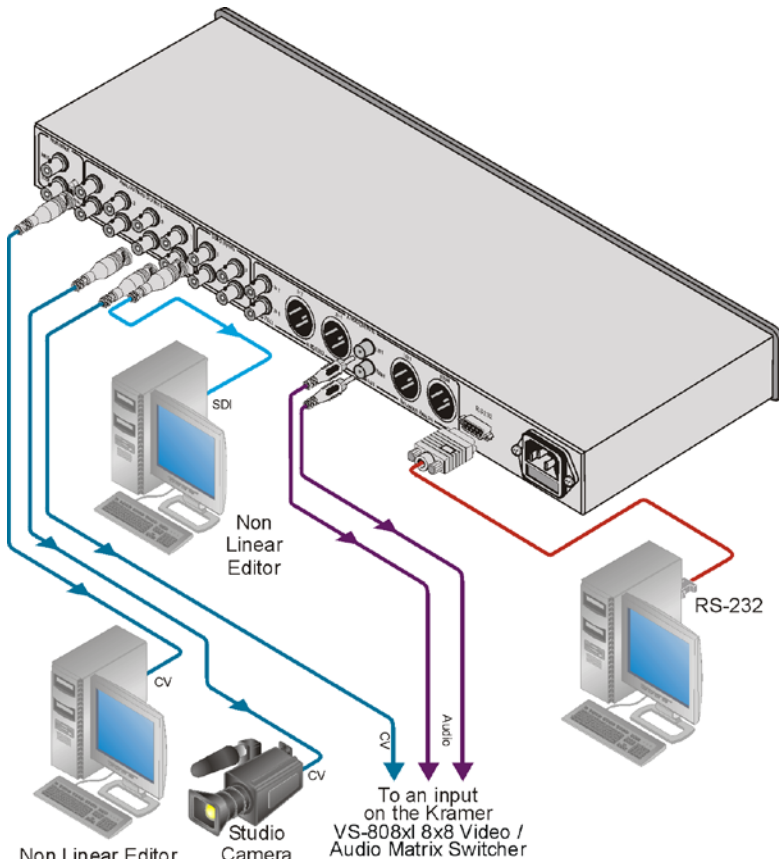
6   Connecting the SG-6006

Figure 2: Connecting the SG-6006 Genlock Multistandard SPG/SDI/Audio Generator

To connect[1] the SG-6006 *Genlock Multistandard SPG/SDI/Audio Generator,* **as illustrated in the example in** [Figure 2](#):

1. Connect the VIDEO OUTPUT BNC connectors to up to eight composite video acceptors[2], for example:
   - OUTPUT 1 to a non linear editor
   - OUTPUT 6 to a studio camera
   - OUTPUT 8 to an input on the Kramer **VS-808xl** *8x8 Video / Audio Matrix Switcher*

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1 Switch OFF the power on each device before connecting it to your SG-6006. After connecting your SG-6006, switch on its power and then switch on the power on each device

2 You do not have to connect all the outputs

2. Connect the SDI OUTPUT BNC connectors to up to four SDI acceptors[2] (for example, OUTPUT 1 to a non-linear editor).

3. Connect the AUDIO OUTPUTS as follows:
   - The LEFT and RIGHT ANALOG RCA connectors to an analog stereo audio acceptor (for example, the audio input on the Kramer **VS-808xl** *8x8 Video / Audio Matrix Switcher*)
   - The AES 75Ω BNC connectors (for channels 1+2 and 3+4) to AES 75Ω (AES-3id) digital stereo audio acceptors[1]
   - The AES/EBU XLR connectors (for channels 1+2 and 3+4) to AES/EBU digital audio acceptors[1]
   - The LEFT and RIGHT BALANCED ANALOG XLR connectors to an analog balanced stereo audio acceptor[1]

4. If required[1], connect:
   - A Genlock source to the REFERENCE INPUT BNC connector[2]
   - The LOOP BNC connector to the INPUT BNC connector of the next unit in the line, and release the TERM button for looping[3]

5. If required, connect a PC and/or controller to the RS-232 port (see Section 7).

6. Connect the power connector to the mains electricity[1].

7 Using the SG-6006

This section describes how to:
- Operate the **SG-6006** (see Section 7.1)
- Use front PANEL LOCK button (see Section 7.2)

7.1 Operating the SG-6006

The **SG-6006** can save and load up to 16 setups via the menu.

To use the menu, press the:
- MENU button to start or exit the menu
- ENTER to enter a submenu, load a setup, accept changes and reset to the default settings
- ⬆ and ⬇ buttons to scroll through the menu and sub-menus
- ➡ and ⬅ to increase or decrease numerical values or select from several definitions of a setup

Upon exiting the menu, the SAVE SETTING AS item appears.

Table 2 defines the menu items.

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1 Not illustrated in Figure 2

2 Press the GENLOCK button to toggle between a genlocked generator and a free-running generator

3 Pushed in terminates the input. Release when the input extends to another unit

Table 2: The SG-6006 Menu

#	Menu Item	Submenu	Default Value
1	LOAD SETUP NUMBER …	1 to 16 (press ENTER to load)	
2	SAVE SETTING AS SETTING NUMBER …	1 to 16 (press ENTER to save)	
3	SET UP … FACTORY RESET	Press ENTER to reset	
4	SET VIDEO SIGNAL (enter submenu)		
	⬆ ⬇ TEST SIGNAL	⬅ ➡ COLOR BARS 75%	COLOR BARS 75%
		⬅ ➡ SPLIT BARS 75%	
		⬅ ➡ HORIZONTAL BARS 75%	
		⬅ ➡ INVERS HDR. BARS 75%	
		⬅ ➡ MULTIBURST 5.8	
		⬅ ➡ PULSE 2T AND BAR	
		⬅ ➡ VITS 330	
		⬅ ➡ TEST PATTERN 1	
		⬅ ➡ TEST PATTERN 2	
	⬆ ⬇ SET STANDARD	⬅ ➡ 525i NTSC 3.58	625i PAL 4.43
		⬅ ➡ 625i PAL 4.43	
5	SET (enter submenu)		
	⬆ ⬇ VIDEO OUTPUT CH 1 to CH 10	⬅ ➡ BLACK BURST	BLACK BURST
		⬅ ➡ TEST SIGNAL	
6	SET … AUDIO TUNING (enter submenu)		
	⬆ ⬇ CHANNEL L (1,3)[1] Frequency	⬅ ➡ 10Hz – 20000Hz (in 10Hz steps)[2]	1000Hz
	⬆ ⬇ CHANNEL R (2,4)[3] Frequency	⬅ ➡ 10Hz – 20000Hz (in 10Hz steps)[2]	1000Hz
	⬆ ⬇ ANALOG LEFT LEVEL[4]	⬅ ➡ -19dBu (-25dBu) to +12dBu (+6dBu)	-19dBu (-25dBu)
	⬆ ⬇ ANALOG LEFT CHANNEL	⬅ ➡ SILENT, ACTIVE	SILENT
	⬆ ⬇ ANALOG RIGHT LEVEL	⬅ ➡ -19dBU (-25dBu) to +12dBu (+6dBu)	-19dBu (-25dBu)
	⬆ ⬇ ANALOG RIGHT CHANNEL	⬅ ➡ SILENT, ACTIVE	SILENT
	⬆ ⬇ DIGITAL 1 (L) LEVEL[5]	⬅ ➡ -31dBFS to 0dBFS	-31dBFS
	⬆ ⬇ DIGITAL 1 (L) CHANNEL[5]	⬅ ➡ SILENT, ACTIVE	SILENT
	⬆ ⬇ DIGITAL 2 (R) LEVEL[6]	⬅ ➡ -31dBFS to 0dBFS	-31dBFS
	⬆ ⬇ DIGITAL 2 (R) CHANNEL[6]	⬅ ➡ SILENT, ACTIVE	SILENT
	⬆ ⬇ DIGITAL 3 (L) LEVEL[5]	⬅ ➡ -31dBFS to 0dBFS	-31dBFS
	⬆ ⬇ DIGITAL 3 (L) CHANNEL[5]	⬅ ➡ SILENT, ACTIVE	SILENT
	⬆ ⬇ DIGITAL 4 (R) LEVEL[6]	⬅ ➡ -31dBFS to 0dBFS	-31dBFS
	⬆ ⬇ DIGITAL 4 (R) CHANNEL[7]	⬅ ➡ SILENT, ACTIVE	SILENT

1 (1, 3) refer to the ANALOG LEFT, and to the BALANCED ANALOG LEFT signals, respectively

2 To speed up the increase or decrease rate of the values, press the ➡ or ⬅ buttons simultaneously with the ENTER button

3 (2, 4) refer to the ANALOG RIGHT, and to the BALANCED ANALOG RIGHT signals, respectively

4 The values without parentheses refer to the BALANCED ANALOG signals, the values in parentheses refer to the ANALOG signals

5 Refers to the left channel of the digital signal

6 Refers to the right channel of the digital signal

7 Refers to the right channel of the digital signal

#	Menu Item	Submenu	Default Value
	⬆ ⬇ CLICK IN LEFT CHANNELS[1]	⬅ ➡ DISABLE, 1 SEC to 4 SEC	DISABLE
7	SET …GENLOCK (enter submenu)		
	⬆ ⬇ FACTORY RESET	Press ENTER to reset the GENLOCK parameters	
	⬆ ⬇ GENLOCK MODE	⬅ ➡ HV only, HV and SC	HV only
	⬆ ⬇ GENLOCK TIMING HORIZONTAL	⬅ ➡ from -31968ns to +31968ns (in 37ns steps)[2]	0
	⬆ ⬇ GENLOCK TIMING VERTICAL	⬅ ➡ from -625 line to +625 line	0
	⬆ ⬇ GENLOCK EXTRA V SHIFT	⬅ ➡ -1 frame, 0 frame, +1 frame	0 frame
	⬆ ⬇ GENLOCK SC PHASE SHIFT	⬅ ➡ from -185° to +185°	0
	⬆ ⬇ NON-GENLOCK or HVmode SCHphase	⬅ ➡ from -64° to +63°	0
8	TEST 1 PROGRAMMING	⬅ ➡ TEST 2 PROGRAMMING	
9	ADDRESS OF machine	⬅ ➡ First, Second	First

7.2 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock your **SG-6006**. Unlocking releases the protection mechanism.

To lock the SG-6006:

- Press the LOCK button for more than three seconds, until the LOCK button lights
- The front panel is locked. Pressing a button will have no effect other than causing the LOCK button to flash[2]

To unlock the SG-6006:

- Press the lit LOCK button for more than three seconds, until the LOCK button no longer lights
  The front panel unlocks

7.3 Remotely Operating the SG-6006 via RS-232

You can remotely operate the **SG-6006** via RS-232 using a device such as a PC.

To connect a PC to the SG-6006 unit using the Null-modem adapter provided with the machine (recommended):

- Connect the RS-232 9-pin D-sub rear panel port on the **SG-6006** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 9-pin D-sub port on your PC

To connect a PC to the SG-6006 unit, without using a Null-modem adapter:

- Connect the RS-232 9-pin D-sub port on your PC to the RS-232 9-pin D-sub

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1 Insert a pulse signal and select the pulse rate

2 Warning that you need to unlock to regain control via the front panel

KRAMER: SIMPLE CREATIVE TECHNOLOGY

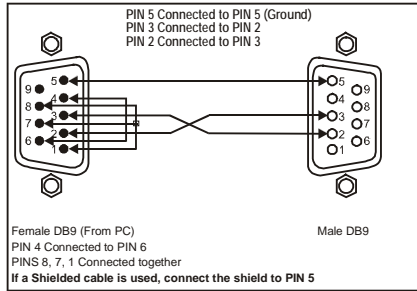rear panel port on the Master **SG-6006** unit, as illustrated in Figure 3

Figure 3: Connecting a PC without using a Null-modem Adapter

8   Technical Specifications

Table 3 includes the technical specifications.

Table 3: Technical Specifications[1] of the SG-6006

INPUTS:	1 REF (genlock), looping on BNC connectors, 1Vpp/75Ω on BNC connectors with a termination switch	
OUTPUTS:	8 composite video on BNC connectors, globally configurable: black burst 0.3Vpp/75Ω (sync) or 1Vpp/75Ω max (color bar); 4 SDI SMPTE-259M, ITU-BT.601 on BNC connectors, 0.8Vpp/75Ω; 1 stereo balanced analog audio on 2 XLR connectors, 12dBu max; 1 unbalanced stereo analog audio on 2 RCA connectors, 6dBu max; 2 AES/EBU digital audio on XLR connectors, 0dBFS max; 2 AES 75Ω (AES-3id) digital audio on BNC connectors, 0dBFS max	
VIDEO STANDARDS:	PAL, NTSC	
COLOR BAR:	8 selectable patterns	
STABILITY:	1ppm	
S/N RATIO:	VIDEO: >73dB (black burst)	AUDIO: 89dB
DIGITIZATION:	VIDEO: 10 bits, 27MHz	AUDIO: 20 bits, 48kHz
CONTROLS:	VIDEO: black burst or test signal configuration AUDIO: frequency out: 10Hz to 20kHz; audio analog range: 31dBu; audio digital range: 31dBFS; each channel may be set to silent; Control via front panel (OSD) and RS-232; Buttons for genlock, panel lock, input termination	
POWER SOURCE:	100-240VAC, 50/60Hz, 10VA	
DIMENSIONS:	48.3cm x 17.8cm x 4.4cm (19in x 7in x 1.8in) W, D, H rack mountable	
WEIGHT:	2.5kg (5.5lbs) approx.	
ACCESSORIES:	Power cord, rack "ears" and Null-modem adapter	

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1 Specifications are subject to change without notice

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 seven 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.

2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.

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.

**For the latest information on our products and a list of
Kramer distributors visit** www.kramerelectronics.com
**where updates to this user manual may be found.
We welcome your questions, comments and feedback.**

Safety Warning:
Disconnect the unit from the power supply before
opening/servicing.

Caution