



KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

SP-1G
3G HD-SDI Synchronizer

P/N: 2900-000766 Rev 3

SP-1G 3G HD-SDI Synchronizer Quick Start Guide

This page guides you through a basic installation and first-time use of your **SP-1G**. For more detailed information, see the **SP-1G** User Manual. You can download the latest manual from <http://www.kramerelectronics.com>.

Step 1: Check the contents of the box

- SP-1G** 3G HD-SDI Synchronizer
- 1 Power supply (5V DC)
- 1 Quick Start sheet
- 4 Rubber feet



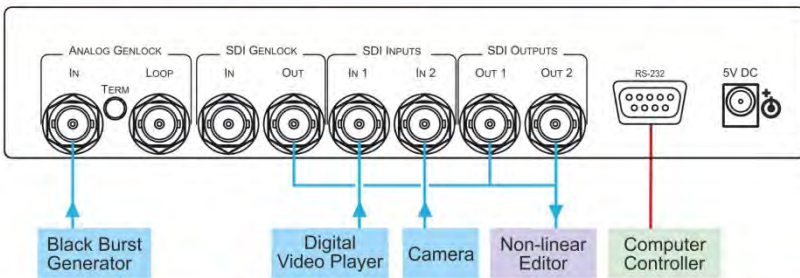
Save the original box and packaging in case your **SP-1G** needs to be returned to the factory for service.

Step 2: Install the SP-1G

Attach the rubber feet and place on a table or mount the device in a rack (using an optional **RK-1** rack mount).

Step 3: Connect the inputs and outputs

Always switch off the power to each device before connecting it to your **SP-1G**.



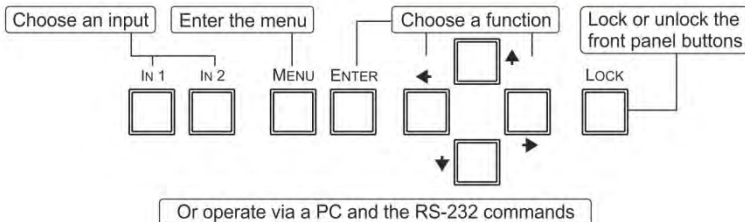
Always use Kramer high-performance cables for connecting AV equipment to the **SP-1G**.

Step 4: Connect the power

Connect the 5V DC power adapter to the **SP-1G** and plug the adapter into the mains electricity.



Step 5: Operate the SP-1G



Contents

1	Introduction	1
2	Getting Started	2
2.1	Achieving the Best Performance	2
3	Overview	3
3.1	Defining the SP-1G 3G HD-SDI Synchronizer	5
4	Connecting the SP-1G 3G HD-SDI Synchronizer	7
4.1	Connecting the SP-1G via RS-232	8
5	Operating the SP-1G	9
5.1	Using the LCD Display	9
5.2	Using the Front Panel Buttons	10
6	Using the SP-1G Menus	11
6.1	Loading Setups	14
6.2	Saving Setups	14
6.3	Using the Factory Reset	14
6.4	Setting the Video Signal	15
6.5	Setting the Image Size and Position	16
6.6	Setting the Genlock	18
6.7	Setting the No-Signal Screen	20
6.8	Setting the Machine Address	20
6.9	Displaying Status	21
6.10	Setting LCD Brightness	21
6.11	Setting the Sleep Mode	21
6.12	Enabling and Activating the Genlock Input Video Function	22
7	Technical Specifications	23
8	Kramer Protocol 2000	24

Figures

Figure 1:	SP-1G 3G HD-SDI Synchronizer	5
Figure 2:	Connecting the SP-1G 3G HD-SDI Synchronizer	7
Figure 3:	Connecting the SP-1G as a Clean Switch	8
Figure 4:	SP-1G Menu Map	13

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 that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; 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; and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer **SP-1G** *3G HD-SDI Synchronizer* which is ideal for the following typical applications:

- Broadcasting studios
- Post-production

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



Go to <http://www.kramerelectronics.com> to check for up-to-date user manuals, application programs and to check if firmware upgrades are available (where appropriate).



Caution: No operator serviceable parts inside the unit

Warning: Use only the Kramer Electronics input power wall adapter that is provided with the unit

Warning: Disconnect the power and unplug the unit from the wall before installing

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables to avoid interference, deterioration in signal quality due to poor matching and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **SP-1G** away from moisture, excessive sunlight and dust

3 Overview

The **SP-1G 3G HD-SDI Synchronizer** is a synchronizer for digital video signals up to 3G HD-SDI. When Genlock is active, the device converts any SDI input standard to any SDI output standard within compatible groups, scales the image, and synchronizes with a video channel from the dedicated genlock input - either an SDI input or an analog reference source. When the Genlock is inactive, the device converts any SDI input standard to any SDI output standard, scales the image, and synchronizes a video channel from the dedicated genlock input.

Input and output Video Standards (SMPTE 292M, SMPTE 259M and SMPTE 424M compliant): 480i/60, 576i/50, 720p/50, 720p/59.95, 720p/60, 1080i/50, 1080i/59.97, 1080i/60, 1080p/23.97, 1080p/24, 1080p/25, 1080p/29.97, 1080p/30, 1080p/50, 1080p/59.97, 1080p/60, 1080psf/23.97, 1080psf/24, 1080psf/25, 1080psf/29.97 and 1080psf/30.

The multi-standard synchronizer **SP-1G** can convert the frame rate of HDTV signals without changing the number of lines per frame or the progressive–interlaced raster structure. It implements cross-conversion between any two standards belonging to the same group when the Genlock is active. Three groups contain mutually compatible standards:

- 720p: 720p/50, 720p/59.95 and 720p/60
- 1080i: 1080i/50, 1080i/59.95, 1080i/60, 1080psf/23.97, 1080psf/24, 1080psf/25, 1080psf/29.97 and 1080psf/30
- 1080p: 1080p/23.97, 1080p/24, 1080p/25, 1080p/29.97, 1080p/30, 1080p/50, 1080p/59.97 and 1080p/60

The unit contains a special audio synchronizer that de-embeds all input audio channels, resamples them simultaneously, and embeds the resulting audio signals in the SDI output. This corrects signal deterioration such as a frame drop or repetition that may occur during video signal synchronization.

The SDI video signal that is applied to the genlock SDI input can also be used (without external connections) as a third video input. Thus the **SP-1G**, besides its synchronizing function, can implement Clean Switching (glitch-free) video and Soft

Switching audio between three separate non-synchronous SDI inputs even if the standards of these signals differ, as long as they belong to the same group.

More specifically, the **SP-1G** features:

- Cross standard conversion
- Image scaling
- Two SDI inputs and outputs
- One dedicated SDI genlock input and one analog genlock input with LOOP output
- Clean Switching video (glitch-free switching) and Soft Switching audio functions
- Automatic standard detection
- TBC operation with continuous, uninterrupted syncs on the output, even when there is an input glitch
- An audio embedder/de-embedder that handles 16 audio channels simultaneously
- A built-in test signal generator that provides special video test signals as well as a 1kHz (−18dBFS) audio sine wave for all 16 SDI audio channels (all 4 groups simultaneously)
- A two-line, 16-character per line LCD display that shows the status of the device while in the main mode of operation
- Nine front panel buttons to control operation of the device
- One RS-232 port for controlling the **SP-1G** from a serial remote control device or a PC

3.1 Defining the SP-1G 3G HD-SDI Synchronizer

Figure 1 defines the **SP-1G**.

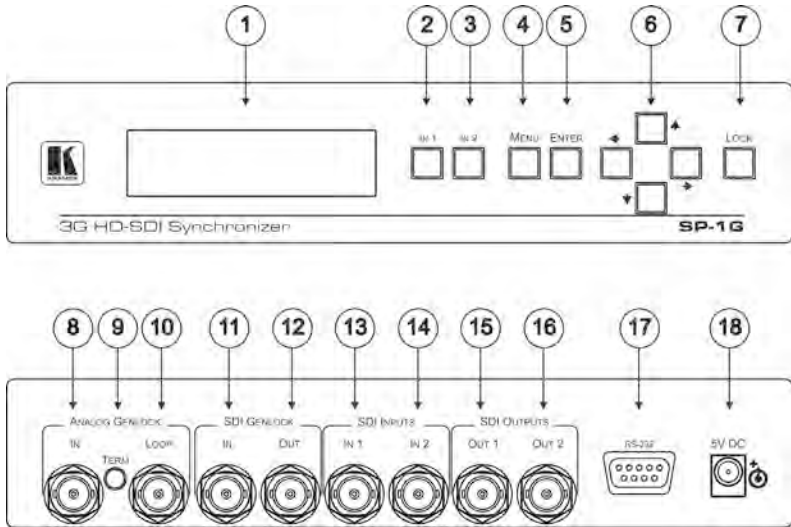


Figure 1: SP-1G 3G HD-SDI Synchronizer

#	Feature	Function
1	Display Panel	2-line, 32-character LCD display
2	IN 1 Button	Press to select the signal on Input 1, lights when IN1 has an appropriate video signal; flashes rapidly (about 5 times per sec) if the standard of input signal does not belong to the same group as the output standard; flashes about 1 time per sec if an input signal is absent
3	IN 2 Button	Press to select the signal on Input 2, lights when IN2 has an appropriate video signal; flashes rapidly (about 5 times per sec) if the standard of input signal does not belong to the same group as the output standard; flashes about 1 time per sec if an input signal is absent
4	MENU Button	1. Opens the top level MENU from the MAIN mode of operation. 2. Closes top the level MENU and returns to the MAIN mode of operation. 3. Closes a SUBMENU and returns to the top level MENU.
5	ENTER Button	1. Fixes a new value of the adjusted parameter (but doesn't save it). 2. Opens a SUBMENU from the top level MENU item. 3. Accelerates the repeat function 16 times, when this button is pressed together with LEFT or RIGHT buttons.

#	Feature	Function	
6	◀ Left Arrow Button	Selects the previous value of a selected parameter (with repeat function)	
	▼ Down Arrow Button	Selects the next item of any menu	
	▲ Up Arrow Button	Selects the previous item of any menu. Optionally this button can select an SDI genlock input as video input besides IN1 and IN2. This function can be turned ON in the last item of the "SDI GenlockIN as Video: Enable or Disable" menu, (See Section 6.12)	
	▶ Right Arrow Button	Selects the next value of selected parameter (with repeat function)	
7	LOCK Button	Press for 2 seconds to enable or disable the panel LOCK function	
8	Analog Genlock	IN BNC Connector	Connects to analog genlock reference source, auto standard identification is available
9		TERM Pushbutton	Press if no additional device is attached, release if another device is attached
10		LOOP BNC Connector	Connects the analog genlock signal to another device
11	SDI Genlock	IN BNC Connector	Connects to an SDI genlock reference source. It can also be used as third video input, (see Section 6.12). Auto standard identification is available
12		OUT BNC Connector	Connects to an SDI genlock acceptor
13	SDI Inputs	IN 1 BNC Connector	Connects to SDI source 1
14		IN 2 BNC Connector	Connects to SDI source 2
15	SDI Outputs	OUT 1 BNC Connector	Connects to SDI acceptor 1
16		OUT 2 BNC Connector	Connects to SDI acceptor 2
17	RS-232 9-pin D-sub Port	Connects to a PC or the remote controller	
18	5V DC Power Connector	Connect to the supplied 5V DC power adapter	

4 Connecting the SP-1G 3G HD-SDI Synchronizer

To connect the **SP-1G** as shown in the example in [Figure 2](#):

1. Connect up to two SDI input sources (for example, a video camera and SDI VTR) to the IN 1 or IN 2 BNC connectors.
2. Connect the OUT 1 and OUT 2 BNC connectors to up to 2 SDI output acceptors (for example, a non-linear editor).
3. To get the genlock function, connect an analog genlock reference source to the ANALOG GENLOCK IN BNC connector or an SDI genlock reference source to the SDI GENLOCK IN BNC connector.
4. If required, connect a controlling computer to the RS-232 9-pin D-sub connector (see [Section 4.1](#)).

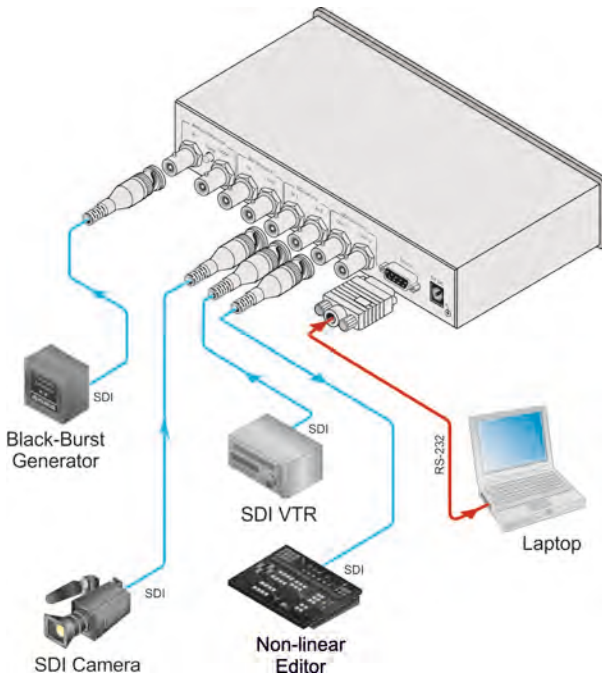


Figure 2: Connecting the SP-1G 3G HD-SDI Synchronizer

The **SP-1G** can be used as a clean switch as shown in the application in [Figure 3](#).

To connect an 8x1 clean switch:

1. Connect the SDI OUTPUT of a switcher (for example, a **VS-81HDxI**) to the SDI INPUT of the **SP-1G**.
2. Connect the SDI OUTPUT of the **SP-1G** to an SDI acceptor (for example, a non-linear editor).
3. Configure the internal genlock of the **SP-1G** to INPUT 1 (see [Section 6.6.3](#)).

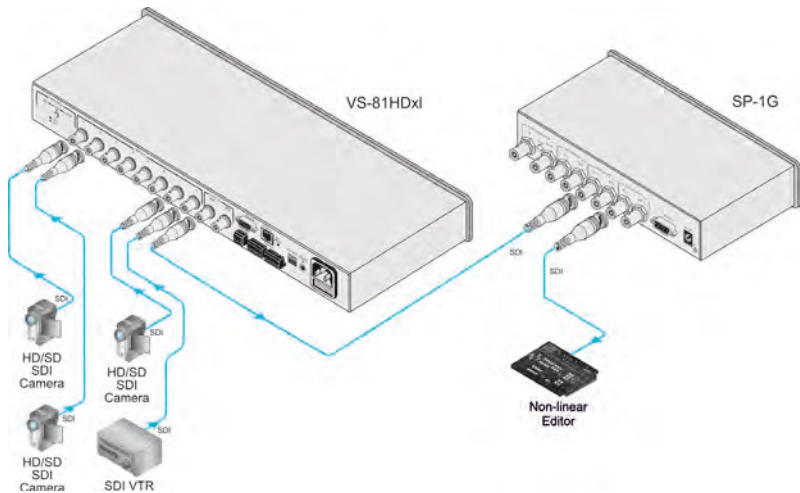


Figure 3: Connecting the SP-1G as a Clean Switch

4.1 Connecting the SP-1G via RS-232

You can connect to the **SP-1G** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **SP-1G** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **SP-1G** via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

5 Operating the SP-1G

This section explains how to use the:

- LCD display (see [Section 5.1](#))
- Front panel buttons (see [Section 5.2](#))

5.1 Using the LCD Display

The **SP-1G** includes a two-line, 16-character per line LCD display that displays (while in the main mode of operation) the device status, the genlock reference source and standard of video signals on SDI outputs. The following examples explain what is shown on the display.

1. When the genlock mode is turned OFF, the display shows:

SET3 INT.XTAL REF.
FrcSTD: 1080p/60

This means the setup (preset) number is 3; the internal crystal generator XTAL is used as the genlock reference source, the standard of output signals on outputs is forced to 1080p/60.

2. If the genlock is turned ON and a reference input signal was selected as dedicated input SDI GenlockIN, the display shows:

SET3 Ref: GnlSDI
FrcSTD: 1080p/60

3. If the output standard selection mode is AUTO, the display shows:

SET3 Ref: GnlSDI
AutSTD: 1080p/60

4. If genlock is turned ON and Analog Genlock Input was selected as the reference input signal, the display shows:

SET3 Ref: GnlAnI
AutSTD: 1080p/60

5.2 Using the Front Panel Buttons

The front panel includes the following buttons:

IN1, IN2, MENU, ENTER, ►, ▲, ▼, ◀. Pressing any arrow button once advances or returns one parameter. Pressing and holding an arrow button scrolls automatically through the menus or parameters. The following table explains their functions.

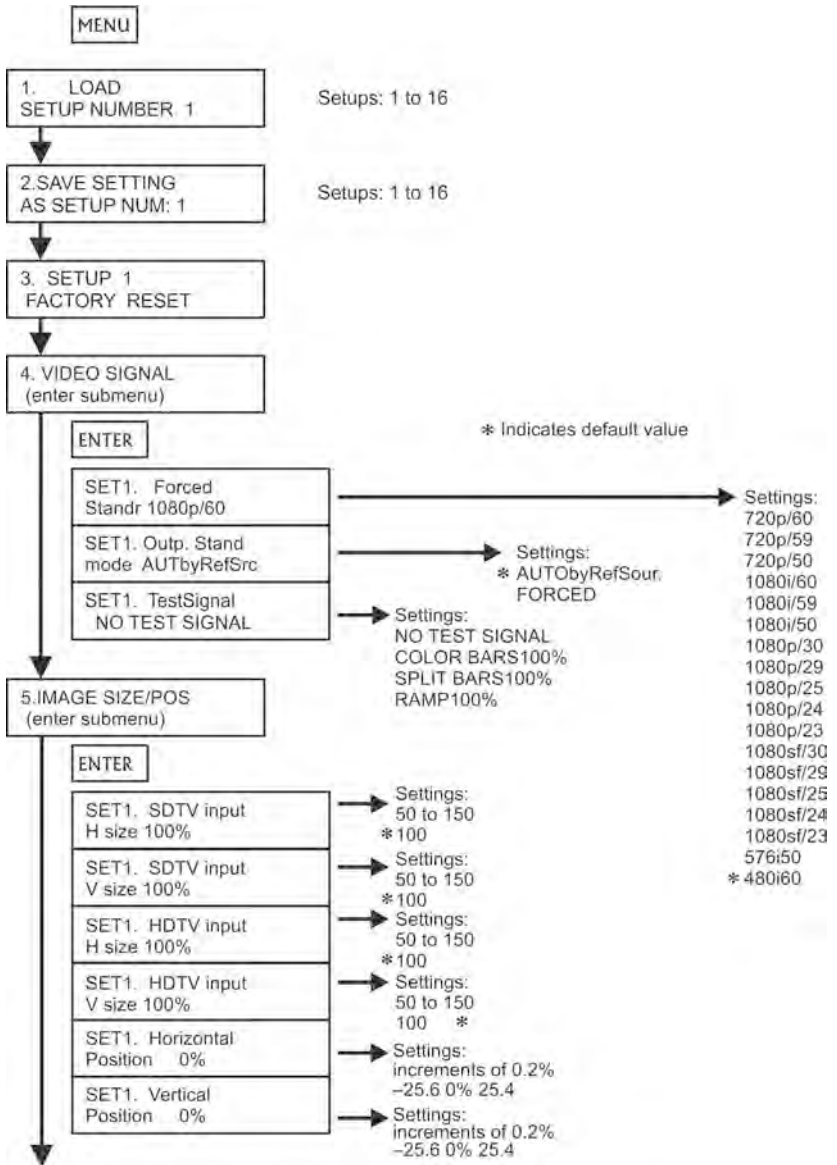
Button	Function
IN 1	Selects SDI INPUT 1
IN 2	Select SDI INPUT 2
MENU	<ol style="list-style-type: none"> 1. Opens the top level MENU from the MAIN mode of operation. 2. Closes the top level MENU and returns to the MAIN mode of operation. 3. Closes the SUBMENU and returns to the top level MENU.
ENTER	<ol style="list-style-type: none"> 1. Fixes a new value of the adjusted parameter (but does not save it). 2. Opens a SUBMENU from the top level MENU. 3. Accelerates the repeat function 16 times, if this button is pressed together with LEFT or RIGHT buttons.
UP ▲	Selects the previous item of any menu. Optionally this button can be used for additional selecting of SDI genlock input as video input besides IN1 and IN2. This optional function can be turned ON in special item (last item) of top menu: "SDI Genl Input as Video: Enable or Disable", (see Section 6.12)
DOWN ▼	Selects the next item of any menu
LEFT ◀	Selects the previous value of a selected parameter (with repeat function)
RIGHT ►	Selects the next value of a selected parameter (with repeat function)
PANEL LOCK	Enables or disables the PANEL LOCK function after pressing for 2 sec

6 Using the SP-1G Menus

This section explains how to operate the **SP-1G** using the various menus and their functions.

The menu map in [Figure 4](#) illustrates how to navigate through the various menus and their settings.

Note: All menus below show **SET1**. as an example. Your setup numbers may differ.



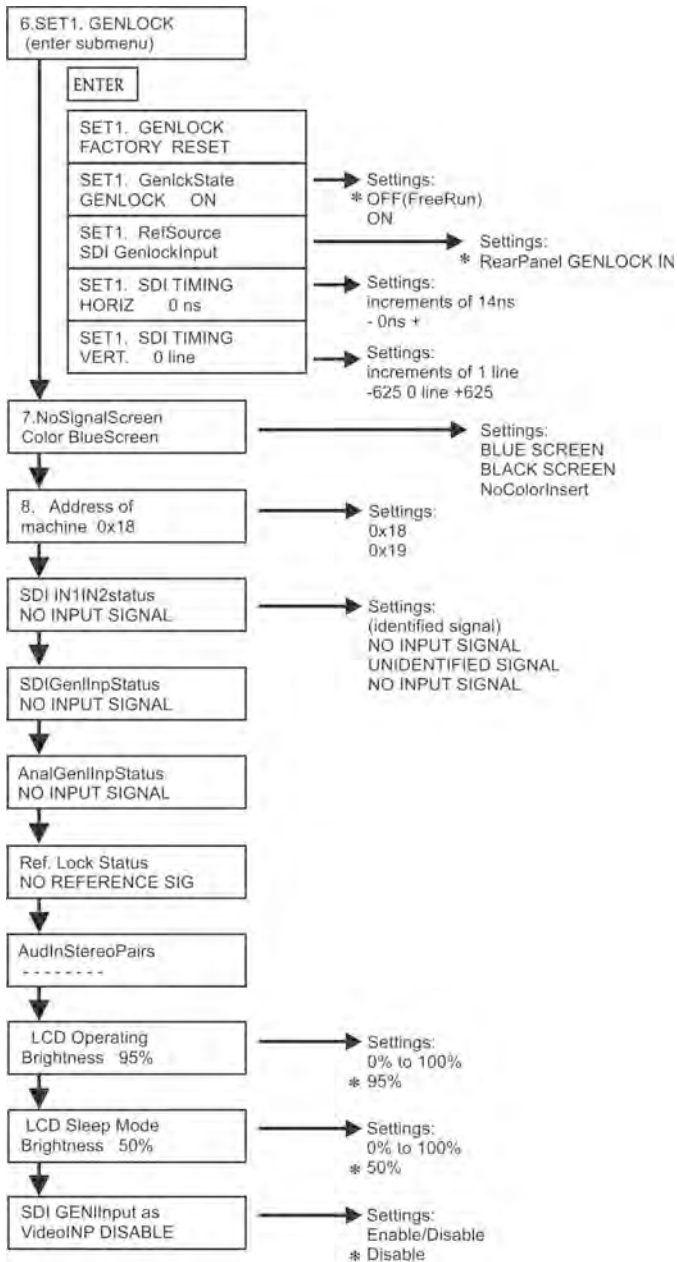


Figure 4: SP-1G Menu Map

6.1 Loading Setups

To load a saved setup:

- Press MENU to enter the menu mode
- Press ▼ or ▲ as needed until **LOAD SETUP NUMBER** is displayed
- Press ◀ or ▶ to reach the setup number desired (from 1 to 16)
- Press ENTER to load the setup
- Press MENU to return to the normal operating mode

6.2 Saving Setups

A setup is a snapshot of all device settings at a given instant. There are 16 setups are available for saving and reloading.

Note: Most parameter changes are temporarily saved in memory only until the **SP-1G** is powered OFF. To permanently save the change, perform **SAVE SETTING AS A SETUP NUMBER** as shown in this procedure.

To save a setup:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **SAVE SETTING AS SETUP NUMBER** is displayed
- Press ◀ or ▶ to reach the setup number desired (from 1 to 16)
If the present setup is different from the saved setup, **SETUP NUMBER:** appears (with a colon)
- Press ENTER to save the setup (the colon disappears)
- Press MENU to return to the normal operating mode

6.3 Using the Factory Reset

Use Factory Reset to return any individual setup to its original factory setting.

To perform a factory reset:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **SETUP 1 FACTORY RESET** is displayed

- Press ◀ or ▶ to reach the setup number desired (from 1 to 16)
- Press ENTER to reset the setup
- Save the new setup using the procedure Saving Setups in [Section 6.2](#)
- Press MENU to return to the normal operating mode

6.4 Setting the Video Signal

Use this menu to choose between forced or auto standard identification for input and output signals, also to select and turn ON embedded video test signals for each channel separately.

To set the video signal:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **VIDEO SIGNAL** (enter submenu) is displayed
- Press ENTER go into the submenu
- Press ▼ and ▲ to navigate through the submenus

6.4.1 Setting a Standard

To set a forced standard:

- Press ▼ or ▲ until **SET1. Forced Standr** is displayed
- Press ◀ or ▶ to reach the desired settings (available settings are shown in the following table)

Standard Resolutions				
Group 1	Group 2		Group 3	Out of group
720p/50	1080i/50	1080sf/23	1080p/23	576i/50
720p/59	1080i/59	1080sf/24	1080p/24	480i/60
720p/60	1080i/60	1080sf/25	1080p/25	
		1080sf/29	1080p/29	
		1080sf/30	1080p/30	
			1080p/50	
			1080p/59	
			1080p/60	

Note: Each group contains its own mutually compatible standards

- Press ENTER to activate the setting

6.4.2 Setting the Output Standard Mode

To set the output standard mode:

- Press ▼ or ▲ until **SET1. Outp. Stand mode**
- Press ◀ or ▶ to choose settings: **AUTObyRefSour.** or **FORCED**

Note: In order to make the AUTO Output Standard mode available, it is necessary to turn on the Genlock State (see [Section 6.6.3](#)). If the Genlock State is turned off, then FORCED STANDARD is used.

Note: If the SDI output standards are strictly defined and never change, FORCED mode is recommended.

- Press ENTER to save the setting temporarily (only until powered off)

6.4.3 Generating a Test Signal

To generate a test signal:

- Press ▼ or ▲ until **SET1.TestSignal** appears
- Press ◀ or ▶ to choose the settings: **NO TEST SIGNAL, COLOR BARS100%, SPLIT BARS100%** or **RAMP100%**
- Press ENTER to run the test
- To stop the test, return to **NO TEST SIGNAL** and press ENTER

6.5 Setting the Image Size and Position

This parameter is used to set the image size or position on the screen. The image size can be changed separately for SDTV and HDTV input signals.

To set the image size or position:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until SET1. IMAGE SIZE / POS (enter submenu) is displayed
- Press ENTER go into the submenu
- Press ▼ and ▲ to navigate through the submenu

6.5.1 Setting the Image Size from the Video Signal Menu

To set the horizontal image size:

- Press ▼ or ▲ until SET1 SDTV input H size, (or in the case of an HDTV input SET1 HDTV input H size appears), press ◀ to decrease the horizontal image size in 1% steps and ▶ to increase the size by the same amount
- Press ENTER to save the setting temporarily (until powered down)
- Save the new size settings using the Saving Setups procedure (see [Section 6.2](#))

To set the vertical image size:

- Press ▼ or ▲ until SET1 SDTV input V size, (or in the case of an HDTV input SET1 HDTV input V size appears), press ◀ to decrease the image size in 1% steps and ▶ to increase the size by the same amount
- Press ENTER to save the setting temporarily (until powered down)
- Save the new Size settings using the Saving Setups procedure (see [Section 6.2](#))

6.5.2 Setting an Image Position from the Video Signal Menu

To set the horizontal image position (for both SDTV and HDTV inputs):

- Press ▼ or ▲ until SET1 Horizontal Position appears, press ◀ to shift horizontally the image to the left in 0.2% steps and ▶ to shift to the right by the same amount
- Press ENTER to save the setting temporarily (until powered down)
- Save the new position settings using the Saving Setups procedure (see [Section 6.2](#))

To set the vertical image position (for both SDTV and HDTV inputs):

- Press ▼ or ▲ until SET1 Vertical Position appears, press ◀ to shift vertically the image to the top of the screen in 0.2% steps and ▶ to shift downwards by the same amount

- Press ENTER to save the setting temporarily (until powered down)
- Save the new position settings using the Saving Setups procedure (see [Section 6.2](#))

6.6 Setting the Genlock

Use this menu to set genlock parameters; activation, source and timing.

To set the genlock:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **SET1. GENLOCK (enter submenu)** is displayed
- Press ENTER go into the submenu
- Press ▼ and ▲ to navigate through the submenu

6.6.1 Resetting the Genlock

To reset the genlock:

- From **SET1 GENLOCK FACTORY RESET**, press ENTER to reset the genlock to its factory settings
- Save the new genlock using the procedure Saving Setups in [Section 6.2](#)

6.6.2 Activating/Deactivating the Genlock

When the genlock is turned OFF, an internal crystal generator is used as the reference source.

To activate or deactivate the genlock:

- Press ▼ or ▲ until **SET1 GenickState**
- Press ◀ or ▶ to choose the settings: **OFF(FreeRun)** or **ON**
- Press ENTER to save the setting temporarily (until powered down)

6.6.3 Setting the Genlock Reference Source

Use the genlock reference source to select either a dedicated genlock input or any one of the four SDI inputs.

To set the genlock reference source:

- Press ▼ or ▲ until **SET1. RefSource SDI**
- Press ◀ or ▶ to choose the settings: **SDI GenlockInput** or **AnalogGenlockInp**
- Press ENTER to save the setting temporarily (until powered down)

6.6.4 Setting the Horizontal and Vertical Timing

Use the horizontal timing to adjust the horizontal delay of an output signal relative to the reference source signal.

Possible timing values are:

- -9800nsec to +9800nsec, step 7nsec in 3G HD mode
- -19600nsec to +19600nsec, step 14nsec in HDTV mode
- -51800nsec to +51800nsec, step 37nsec in SDTV mode

Default timing is 0nsec.

Negative values advance the output signal, positive values retard the signal.

To speed the adjustment, press and hold the appropriate ◀ or ▶ button (repeat mode). For 16x ultra repeat mode, press and hold the appropriate ◀ or ▶ button while pressing the ENTER button. In this case, the adjusted parameter changes by steps of 16 units.

To quickly reset to the factory default value, press and hold both ◀ and ▶ buttons together for 1 sec.

To set the horizontal timing:

- Press ▼ or ▲ until **SET1 SDI TIMING Horiz**, press ◀ to advance the timing by the appropriate step and ▶ to retard the timing
- Press ENTER to save the setting temporarily (until powered down)
- Save the new horizontal timing using the procedure Saving Setups in [Section 6.2](#)

To set the vertical timing:

- Press ▼ or ▲ until **SET1. SDI TIMING Vert.**, press ◀ to advance the timing by **1 TV line** and ▶ to retard the timing
- Press ENTER to save the setting temporarily (until powered down)
- Save the new horizontal timing using the procedure Saving Setups in [Section 6.2](#)

6.7 Setting the No-Signal Screen

The no-signal screen appears when there is no input signal or when input and output signals are incompatible.

To set the no-signal screen:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **NoSignal Screen** is displayed
- Press ◀ or ▶ to choose the settings: **BLUE SCREEN**, **BLACK SCREEN** or **NoColorInsert (default)**
- Press ENTER to save the setting

Note: This assignment affects all 16 setups (presets) after ENTER is pressed. The setting is saved with auto power-down.

6.8 Setting the Machine Address

To set the machine address:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **Address of machine** is displayed
- Press ◀ or ▶ to choose the settings: **0x18** (default), **0x19**
- Press ENTER to save the setting

Note: This assignment affects all 16 setups (presets) after ENTER is pressed. The setting is saved with auto power-down.

6.9 Displaying Status

The next five top-level menu items give a read-only status display of all SDI inputs, the genlock input, the reference lock and audio in.

To display a status:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until the status of the desired SDI input, SDI genlock, analog genlock, audio in or reference lock is displayed

6.10 Setting LCD Brightness

This setting adjusts the brightness of the LCD display.

To set LCD brightness:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **LCD Operating Brightness** is displayed
- Press ◀ or ▶ to change the settings from **0%** to **100%** (95% default)

Note: This assignment affects all 16 setups (presets) after ENTER is pressed. The setting is saved with auto power-down.

6.11 Setting the Sleep Mode

This setting adjusts the sleep mode brightness of the LCD display.

To set the sleep mode brightness of the LCD:

- Press MENU to enter the menu mode
- Press ▼ or ▲ until **LCD Sleep Mode Brightness** is displayed
- Press ◀ or ▶ to change the settings from **0%** to **100%** (50% default)

Note: This assignment affects all 16 setups (presets) after ENTER is pressed. The setting is saved with auto power-down.

6.12 Enabling and Activating the Genlock Input Video Function

You can set the GenlockIN input to be used as an SDI video input in addition to the IN1 and IN2 inputs. When this function is enabled, the ▲ (Up) button is used to switch the Genlock input signal to both outputs, irrespective of whether or not there are signals present on IN1 and IN2.

To enable and activate the Genlock input as a video input function:

- Press MENU to enter the menu mode
- Use the arrow buttons to scroll down to “SDI GenInput as VideoINP”
- Select Enable
- Press ENTER
The setting is saved with auto power-down
- Press MENU to exit the menu
- Press the ▲ Up button to switch the Genlock input signal to both outputs.
Both Input buttons light
- Press either of the Input buttons to cancel and return the input selection to normal operation

7 Technical Specifications

The **SP-1G** technical specifications are shown in the following table.

INPUTS:	2 SDI/HD-SDI, 1 genlock 75Ω on BNC connectors
OUTPUTS:	2 SDI/HD-SDI, 1 genlock 75Ω on BNC connectors
CONTROLS:	9 front panel buttons, RS-232
POWER CONSUMPTION:	5V DC, 1.2A
OPERATING TEMPERATURE:	0° to +40°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	21.5cm x 16.2cm x 4.4cm (8.5" x 6.4" x 1.7") W, D, H
WEIGHT:	0.95kg (2.1lbs)
ACCESSORIES:	Power supply
OPTIONS:	RK-1 19" rack mount

8 Kramer Protocol 2000

Protocol 2000 for the **SP-1G** is described below. For RS-232, data is at 9600 baud, no parity, 8 data bits, and 1 stop bit. All values shown are hexadecimal.

Supported Commands (I value in decimal)

Command	I	D	E	Comments
Reset	PC → 0 PC ← 0	0 0	0 → Machine 0 ← Machine	Power up, pseudo
Genlock Reset	PC → 17 PC ← 17	0 0	0 → Machine 0 ← Machine	Timing and phase
Read Parameter	PC → 32 PC ← 32	Parameter Number Parameter Number	0 → Machine Parameter Number ← Machine	
Write Parameter	PC → 33 PC ← 33	Parameter Number Parameter Number	Parameter → Machine Parameter ← Machine	
Save	PC → 35 PC ← 35	Initial source setup number Initial source setup number	Destination (new) setup number → Machine Destination (new) setup number ← Machine	If only saving adjusted parameters in the initial setup number (no setup number change), then E must be equal to D, the initial setup number.
Identify Machine Name	PC → 61 PC ← 61	1 Machine name high	0 → Machine Machine name low ← Machine	
Identify Software Version	PC → 61 PC ← 61	3 SW version high	0 → Machine SW version low ← Machine	

Parameter Addresses

There are global parameters that are invariable in the case of a setup number change, and local parameters that have appropriate E values for each setup number (16 different values, stored in special memory). During write or read operations with local parameters, the PC gets access only to the active local parameter that corresponds to an actual setup number. Certain local parameters (not all) are represented in two-byte format because of their large adjustment. To distinguish between one-byte and two-byte parameters, as well as global and local parameters, the hex address of any parameter (value "D"), contains a two-byte format flag – D7 (MSB) and a local parameter flag – D6. All global parameters have the one-byte format, therefore their addresses (D7 = 0, D6 = 0) do not exceed 0x3f(hex) or 63(dec). One-byte local parameters (D7 = 0, D6 = 1) have addresses greater than 63(dec), but less than 128(dec). Two-byte local parameters (D7 = 1, D6 = 1) have addresses greater than 192(dec). Note that while writing or reading two-byte parameters (PC → machine), you must send two consecutive write or read commands (each command having a conventional 4-byte structure) for low (first) and high bytes with a minimal time interval between them.

Global Parameters (D and E values in decimal) for Supported Commands (I value in decimal)			
Parameter	D	E	Comments
Panel Lock	0	0 – Off (default) 1 – On	
No_Signal_Color	1	0 – No_Color_Insert (default) 1 – Black screen 2 – Blue screen	
PC Addr	2	0 1 (corresponds to 0x18 and 0x19)	Read only
Setup Number	3	0 – 15 (0 corresponds to setup#1, 15 – to setup#16)	
The next addresses allow periodic request and read of the machine status (read only):			
Actual Output Standard	8	0 – 22	Status of actual output standard, read only.
		0 – 480i/60 1 – 576i/50 2 – 720p/50 3 – 720p/59 4 – 720p/60 5 – 1080i/50 6 – 1080i59	

Global Parameters (D and E values in decimal) for Supported Commands (I value in decimal)			
Parameter	D	E	Comments
		7 – 1080i/60 8 – 1080p/23 9 – 1080p/24 10 – 1080p/25 11 – 1080p/29 12 – 1080p/30 13 – 1080p/50 14 – 1080p/59 15 – 1080p/60 16 – 1080sf/23 17 – 1080sf/24 18 – 1080sf/25 19 – 1080sf/29 20 – 1080sf/30 21 – Unidentified signal 22 – No input signal	
N1-IN2 Standard Status	9	0 – 22	E values and standards same as above (read only)
Genlock SDI Input Status	10	0 – 22	E values and standards same as above (read only)
Analog GenI Input Status	11	0 – 22	E values and standards same as above (read only)
Genlock Status	15	E = 0 – 2	Read only
		0 – No reference signal 1 – Loss of lock to reference 2 – Proper lock to reference	

One-Byte Local Parameters			
Parameter	D	E	Comments
Forced Standard	64	0 – 20	(May be used as input forced standard and as output forced standard. See two next items – "Input Standard Mode" and "Output Standard Mode")
		0 – 480i/60 1 – 576i/50 2 – 720p/50 3 – 720p/59 4 – 720p/60 5 – 1080i/50 6 – 1080i/59 7 – 1080i/60 8 – 1080p/23 9 – 1080p/24 10 – 1080p/25 11 – 1080p/29 12 – 1080p/30 13 – 1080p/50 14 – 1080p/59 15 – 1080p/60 16 – 1080sf/23 17 – 1080sf/24 18 – 1080sf/25 19 – 1080sf/29 20 – 1080sf/30	
Input Standard Mode	65	E = 0 – 1 0 – Auto identified standard using appropriate input signal (on each channel separately) (default) 1 – Forced input standard defined in previous item	
Output Standard Mode	66	E = 0 – 1 0 – (Default) auto identified standard, based on signal that has been preselected as reference genlock source. (This source can be selected between either dedicated genlock SDI input or Analog input, see parameter D = 71 – genlock reference source). If genlock is turned off, forced standard is used	

One-Byte Local Parameters			
Parameter	D	E	Comments
		instead of auto. 1 – Forced output standard defined in parameter D = 0.	
Test_Signal	67	E = 0 – 3 0 – Test off (default) 1 – Color bars 100% 2 – Split bars 100% 3 – Ramp 100%	
Video Input Switch	68	E = 0 – 2 0 – IN1 selected 1 – IN2 selected 2 – SDI Genlock input selected as video source	
Genlock Off/On	70	E = 0 – 1 0 – off (default) 1 – on	
Genlock_Ref_Source	71	E = 0 – 1 defines input that will be used as genlock reference 0 – dedicated genlock SDI input (default) 1 – dedicated Analog genlock input	

Two-Byte Local Parameters			
Parameter	D	E	Comments
Low Byte of Horizontal Timing H	200	$E0 = H \% 256$ i.e. Remainder on dividing H by 256 (signed)	
High Byte of Horizontal Timing H	201	$E1 = \text{Floor}(H/256)$ i.e. greatest signed integer less or equal to $(H/256)$ where $H = -1400$ to $+1400$ 7ns step (3G HD) 14ns step (HDTV) 37ns step (SDTV) $H = 0$ – default	
Low Byte of Vertical Timing V	202	$E0 = V \% 256$ i.e. Remainder on dividing V by 256 (signed)	
High Byte of Vertical Timing V	203	$E1 = \text{Floor}(V/256)$ i.e. Greatest signed integer less or equal to $(V/256)$ where $V = -625$ to $+625$ 1 line step $V = 0$ – default	

LIMITED WARRANTY

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics will not do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF KRAMER ELECTRONICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW.

IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A "CONSUMER PRODUCT" UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPLICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

Your rights under this limited warranty are not diminished if you do not complete and return the product registration form or complete and submit the online product registration form. Kramer Electronics thanks you for purchasing a Kramer Electronics product. We hope it will give you years of satisfaction.



For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

Web site: www.kramerelectronics.com

E-mail: info@kramerel.com



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing



P/N 2900-000766



Rev 3