Kramer Electronics, Ltd.

USER MANUAL

Models:

Cobra R1300A, ***Video / Audio Receiver***

Cobra R1300S2, ***Universal Receiver***

Cobra R1300S2M, ***Universal Receiver***

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1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups[1], which are clearly defined by function.

Congratulations on purchasing your Kramer **Cobra R1300A** *Video / Audio Receiver*, **Cobra R1300S2** *Universal Receiver*, and/or *Cobra R1300S2M Universal Receiver*. The Kramer **Cobra** Series System extends video, audio and serial signals over ordinary Category 5 cable. This manual covers the **Cobra R1300A** *Video / Audio Receiver*, the **Cobra R1300S2** *Universal Receiver*, and the *Cobra R1300S2M Universal Receiver*. These units are field configurable for various video, audio and serial options. See Appendix B for configuration settings. A versions support video and audio. S2 series feature video, stereo audio and RS-232 signals on a single CAT 5. In a daisy chain configuration, the last unit in the daisy chain must be an **R1300S2**. All receivers between the transmitter and the last unit must be Cobra **R1300S2M** receivers. The **R1300A** receiver can be used as either a middle unit, or an end unit.

The Kramer **Cobra R1300A** *Video / Audio Receiver*, **Cobra R1300S2** *Universal Receiver* and *Cobra R1300S2M Universal Receiver* feature optional integrated skew compensation that can be varied in 2 ns increments to 65 ns total per color channel to cancel the effects of skew in Category cables. This feature allows you to use CAT 5e and reduced-skew CAT6 cables to lengths up to 1300ft. For information on the respective transmitter unit, refer to the appropriate manual included with the transmitter. All models support refresh rates/resolutions up to 1920 x 1200 @ 60 Hz to 1300 feet (396m).

The package includes the **Cobra R1300A** *Video / Audio Receiver*, the **Cobra R1300S2** *Universal Receiver*, or the **Cobra R1300S2M** Universal Receiver, an external power supply, and this user manual[2].

The Kramer **Cobra** series products are not compatible with Kramer non-**Cobra** series products.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

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[1]. You may also need CAT 5 cable[2]

3 Overview

Our Kramer **Cobra** series products are compatible with CAT 5/5e/6 data cabling as well as skew free CAT 5/5e cabling manufactured for video applications. Note that some skew free CAT 5 is specific to a particular vendor and is not compatible with our products. Ensure any skew free CAT 5 cable is non-proprietary prior to purchase / installation.

We recommend using our Kramer **Cobra** ultra low skew cable—**BC-HDTP** (solid bulk) or **BCP-HDTP** (solid plenum bulk)—available in lengths of 700' (210m) and 1300' (390m).

CAT6 cable, due to the manufacture method, can exhibit much greater skew than standard CAT 5/5e and may require skew compensation beyond what the standard product offers. Contact Kramer Electronics for assistance.

CAT 5/5e/6 cabling for this product must be pinned to the TIA-EIA T568B wiring specification (see appendix A). We also highly recommend that all CAT 5 cables be pre-terminated and tested. Cables terminated on-site or in an existing infrastructure should be tested before use to ensure compliance with the TIA-EIA T568B specification. Using incorrectly terminated CAT 5 cables can damage this product.

Achieving the best performance means:

- Connecting 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)
- Avoiding interference from neighboring electrical appliances that may adversely influence signal quality and positioning your **Cobra R1300A / R1300S2 / R1300S2M** in a location free from moisture and away from excessive sunlight and dust

1 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

2 In addition, you may also need audio cable with RCA jacks, serial cable with DB9 connectors, and video cable with HD15 connectors

Caution – No operator-serviceable parts inside unit.

Warning – Use only the Kramer Electronics input power wall adapter that is provided with this unit[1].

Warning – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

Warning –This equipment is not intended for, nor does it support, distribution through an Ethernet network. Do not connect these devices to any sort of networking or telecommunications equipment!

1 For example: model number AD2512C, part number 2535-000251

4 Setup and Installation

4.1 Data Mode Configuration

The serial signal is 3 wire TX, RX, GND and does not support full modem signals. Baud rates for the S2 series are fixed at 9600. Simplex modes are supported without jumper or other changes by simply using the TX signal only. S2 units require no configuration.

4.2 Making the Connections

This section contains figures showing connections with the specific **Cobra R1300A / R1300S2 / R1300S2M** series models. In general, however, the connection and setup procedure at both transmitter and receiver ends is as follows:

NOTE: all units must be the same type for all supported features to function correctly. For example, a **Cobra** transmitter set for R/L summed audio must be connected to an **R1300A / R1300S2 / R1300S2M** set for R/L summed audio. Similarly, a **Cobra T2** cannot be used with an **R1300A / R1300S2 / R1300S2M**. Video modes may function normally, but 4th pair options will not.

At the transmitter end (refer to the transmitter user guide):

1. Connect the source video to the **Cobra** Series transmitter video input port, which is an HD15 connector labeled SOURCE IN or VIDEO IN.
2. If desired, attach a local monitor via the local monitor port to LOCAL OUT.
3. Make your audio/serial connections via the audio connector or DB9 connector as appropriate.
4. Connect the CAT 5 cable to the transmitter.
5. Apply power on the transmitter. The LED should light and, if there is a local monitor attached, a video image should appear on the monitor's screen.

At the receiver end:

1. Connect the VIDEO OUT HD15 connector to the display unit and attach any audio (AUDIO/AUX I/O) or serial connections (RS-232) depending on the model of the **Cobra** CAT 5 Video System.
2. Connect the CAT 5 cable to the LINK INPUT connection. If daisy chaining units, connect the output CAT 5 cable to the LINK OUTPUT connection.
3. Apply power. The LED should light and video should appear on the display (make sure that the display is powered ON).
4. Adjust video levels and skew compensation.
5. Mount the **R1300A / R1300S2 / R1300S2M** in a location that ensures the ventilation holes and fan are not blocked.

With regard to connecting the cables:

- We recommend mounting and connecting all cabling to the **Cobra R1300A / R1300S2 / R1300S2M** components before applying power.
- Be sure that the CAT 5 cable you intend to use has been tested to comply with the T568B wiring specification (see Appendix A).

4.3 Connections on the Single-Port VGA/Audio

The single-port units with audio support video and audio signals over CAT 5 cable. The audio signal is line-level summed Right/Left audio, and powered speakers are required. You can also use the transmitters and receivers to make video-only connections without audio. Figure 1 shows the Single-Port **Cobra** CAT 5 Video System with Audio Transmitter connections, and Figure 2 shows the receiver connections.

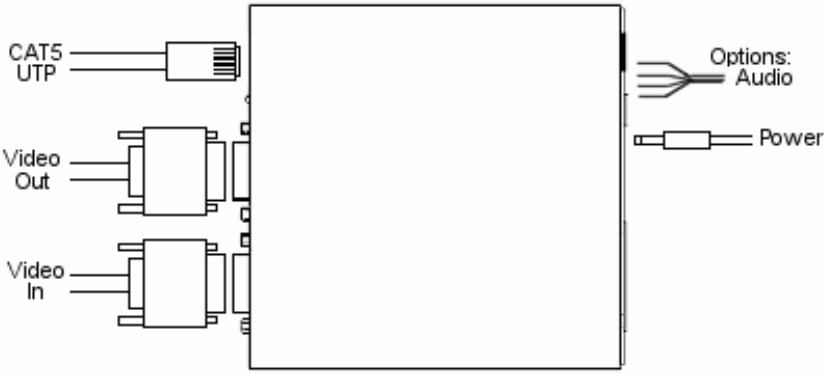


Figure 1: Transmitter Connections

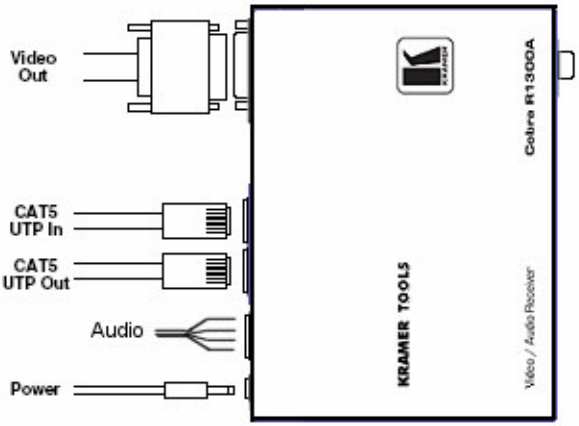


Figure 2: Cobra R1300A Video / Audio Receiver Connections

4.4 Connections on the single-port VGA S2

The Single-Port **Cobra** CAT 5 Video System series supports RS-232, video and stereo audio signals over CAT 5 cable. Serial signals are 3 wire RS232 (Tx, Rx, ground) and fixed at 9600 baud. Full 9 pin modem signals are not supported. Note when using the **Cobra** 2/S2 series with a **Cobra** CAT 5 DA or CAT 5 matrix switch, the serial is transmit only. There are no configuration changes required to the units. The serial application in use should be changed to transmit only. Audio is full stereo, line level. One or two separate channels of mono audio may also be used. See the Figures below for cabling connections.

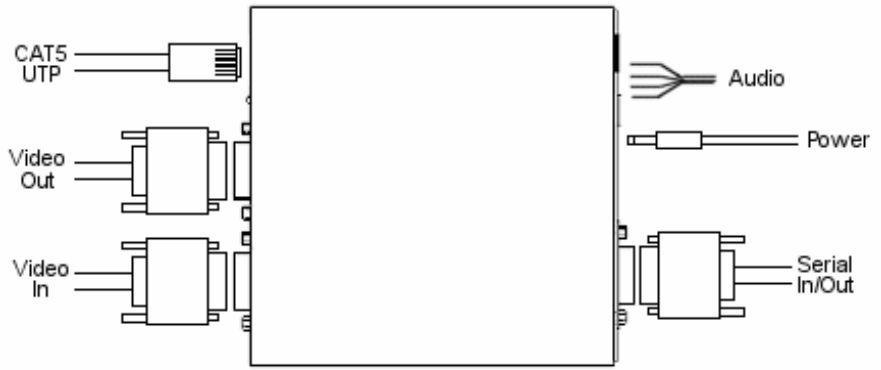


Figure 3: Transmitter Connections

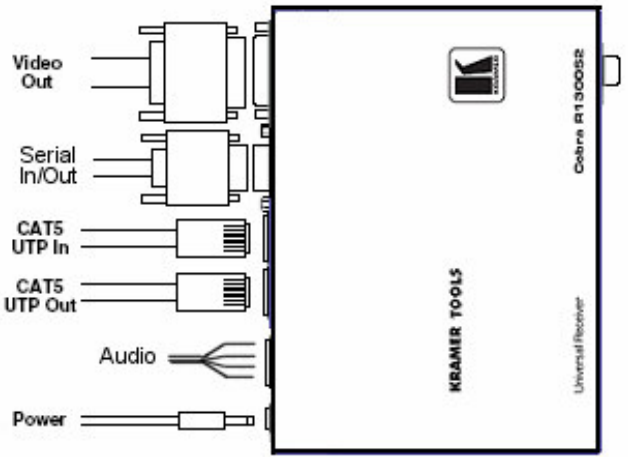


Figure 4: Cobra R1300S2 Universal Receiver Connections

4.5 Video Adjustment

4.5.1 Cable Distance Compensation Settings

To get the highest quality video signals from your **Cobra** CAT 5 Video System, follow the instructions and diagrams below:

NOTE: TURN KNOB SLOWLY DURING ADJUSMENT PROCEDURE. Turning too fast may result in missing the proper EQ setting resulting in picture loss.

To Reset EQ and Skew values to 0, remove power from R1300A / R1300S2 / R1300S2M, Push and hold EQ/Skew Knob in and re-apply power.

1. Display a test pattern consisting of a black box on a white background. Press and hold briefly, and then release the EQ/Skew knob so that the R/G/B LED is flashing white.
2. Turn the EQ/Skew knob clockwise until the shadow next to the black box just disappears. The brightness in the white area should be the same as the white area above and below the black box. Continue turning the knob for best picture quality. Note, that if the EQ setting is too high or too low, you may not get an image. Adjust the EQ settings until an image appears, and then adjust for best picture quality.
3. Press and hold briefly, and then release the EQ/Skew knob until the R/G/B LED is solid green.

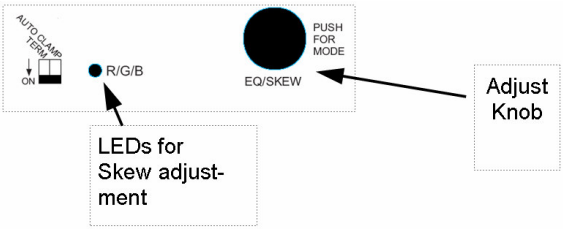


Figure 5: Adjustment locations

4.5.2 Skew Compensation Settings

The **R1300A / R1300S2 / R1300S2M** receiver is available with an optional skew compensation module to adjust for signal timing differences due to differing pair lengths within the CAT 5 cable. Using the delay signals, skew may be compensated from 2 to 65 nanoseconds in 2 nanosecond increments on each individual color pair. If skew compensation is required, but the skew comp module is not installed, call for technical assistance.

1. To adjust individual colors, press and hold briefly, and then release the EQ/Skew knob until the desired color LED is flashing for the R/G/B LED. The LED color corresponds to the color channel being adjusted.
2. Using the image utility, turn knob to add/subtract delay timing until a single vertically aligned line of red, green, blue is obtained.
3. When complete, press and hold briefly, and then release the EQ/Skew knob until the R/G/B LED is solid green.

Not all colors will have the same delay settings.

5 Solutions to Common Problems

In most cases, nearly every issue with the **Cobra** series can be resolved by checking the CAT 5 termination and making sure that it's pinned to the TIA/EIA 568B wiring specification. However, there may be other problems that cause the system to not perform as it is designed. Below are solutions to the most common installation errors.

Problem:	No video signal at the transmitter local port or at the receiver
Solution:	Check that both units are powered. Ensure EQ adjustment is set correctly — turn knob slowly. • Make sure the CAT 5 cable is terminated correctly per the TIA/EIA 568B wiring specification. Is the display device powered on and functioning? Check to ensure display settings (resolution, refresh rate, etc) are compatible with input signal.
Problem:	Poor video quality.
Solution:	Have all receiver adjustments been finished? Ensure EQ adjustment switches are set correctly Check all cable connections The video signal's refresh rate may be set too high. Reset to a lower refresh rate in your monitor-configuration menu There may be a delay skew issue. See Section on Skew
Problem:	Poor audio quality.
Solution:	Powered speakers are required. Make sure speaker power is ON Check input source levels from the source device. Make sure the audio source is not overdriven or underdriven. Audio is summed left and right for "A" versions. If using a single channel, both audio inputs must be connected at the transmitter end for full audio gain. Audio is line level Serial//audio units support full stereo line level. A high frequency noise may be heard if the CAT 5 cable from the transmitter is disconnected, or the transmitter is not on. This is normal and will disappear once a complete link connection is made. Units do not exhibit this behavior

Problem:	Serial communication doesn't work correctly.
Solution:	Are the serial devices connected properly? Are the serial parameters correct for source/destination devices? Are the serial cables terminated correctly? If a null-modem cable is used, it must be placed at the receiver end. When using RS-232 transmitters or receivers in daisy chains, CAT 5 switches or CAT 5 distribution amps, the serial signal is a unidirectionally broadcast mode only. In this mode, all other **Cobra** CAT 5 Video System devices must be the simplex serial type. The last device in a transmitter-to receiver or daisy chain configuration must be terminated. The **R1300A** can be used as either a "middle unit" or an "end unit"; the termination switch is located on the front of the unit. The **R1300S2** can only be used as an "end unit" in a transmitter-to-receiver or daisy chain configuration. The **R1300S2M** Receiver must be used as a "middle unit" in a daisy chain configuration. Using the **R1300S2** as a "middle unit" will prevent audio and serial signals from operating correctly. Using the **R1300S2M** as an "end unit" will prevent audio and serial signals from operating correctly. **R1300S2/R1300S2M** Receivers cannot be modified in the field.
Problem:	"Green shift" or "green washout" on multimedia signals.
Solution:	The standard video/serial model is designed to function with DC coupled signals in which the black level is referenced to 0 volts. Nearly all VGA cards function this way. Some media servers, however, provide AC coupled signals and can cause a green color shift in the video. This is a result of the sync clamping on the red and blue channels of the video/serial model. For five-component (RGB/H&V) AC coupled video, the **Cobra** CAT 5 transmitter has been designed with full DC restoration capability. This problem is easily solved via a simple switch setting in the **Cobra** Transmitter. Refer to the **Cobra** Transmitter user manual.
Problem:	Notes on Daisy Chaining:
Solution:	When daisy chaining, the maximum cable distance is not increased beyond the rated distance of the receiver used. For example, the maximum distance from a transmitter to the last R1300S2 Receiver in a daisy-chain is 1300 feet. A maximum of 12 units may be daisy chained together. If a unit in the middle of the chain loses power or is disconnected from the chain, all units after this will lose signals. All serial communication in a daisy chain is one way simplex.

Appendix A Cabling Pinouts

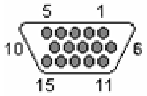


Table 1: HD15 Video Connector PINOUT

Pin	RGBHV (VGA)	RGBS	RGsB	Composite	SVHS (Y/C)	YUV
1	Red +	Red +	Red +		C+	V+
2	Green+	Green+	Green+	C+	Y+	Y+
3	Blue+	Blue+	Blue+			U+
4	—	—	—			
5	Gnd	Gnd	Gnd			
6	Red-	Red-	Red-		C-	V-
7	Green-	Green-	Green-	C-	Y-	Y-
8	Blue-	Blue-	Blue-			U-
9	—	—	—			
10	Gnd	Gnd	—			
11	Gnd	Gnd	—			
12	—	—	—			
13	H Sync	C Sync	—			
14	V Sync	—	—			
15	Gnd	Gnd	—			

Table 2: Terminal Block Connection

PIN	Audio	Audio*	Simplex Serial	S/PDIF Audio	Composite Video
Pin 1	Left Channel	Right Channel	Tx	Signal +	Signal +
Pin 2	Ground	Ground	ground	Signal -	Signal -
Pin 3	Right Channel	Left Channel	-	-	-
Pin 4	-		Shell	-	-

Note: Typically Channel 1 is left audio and Channel 2 is right audio.

* series RECEIVER units use Channel 1 for Right audio and channel 2 for left audio.

* series TRANSMITTER units use Channel 2 for Right audio and channel 1 for left audio.

Appendix A Cabling Pinouts

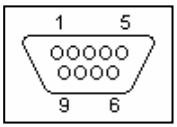
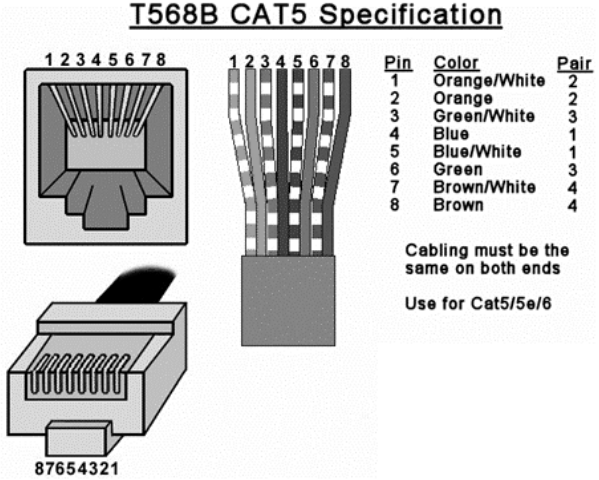


Table 3: DB9 Video Connector PINOUT

Pin	Full Duplex	3 wire (SA/SAP)	Simplex
1	DCD		
2	RX	RX	
3	TX	TX	TX
4	DTR		
5	Ground	Ground	Ground
6	DSR		
7	RTS		
8	CTS		
9	RI		

Table 4: T568B CAT 5 PINOUT



Appendix B Configuration Settings

Note: the **Cobra R1300A** *Video* and the *Audio Receiver* **Cobra R1300S2** *Universal Receiver* are typically pre-configured at time of order and will have factory configuration indicated on the bottom of the unit. The factory configuration may be changed or checked by using the following jumper location diagram as well as Table 5 for jumper settings.

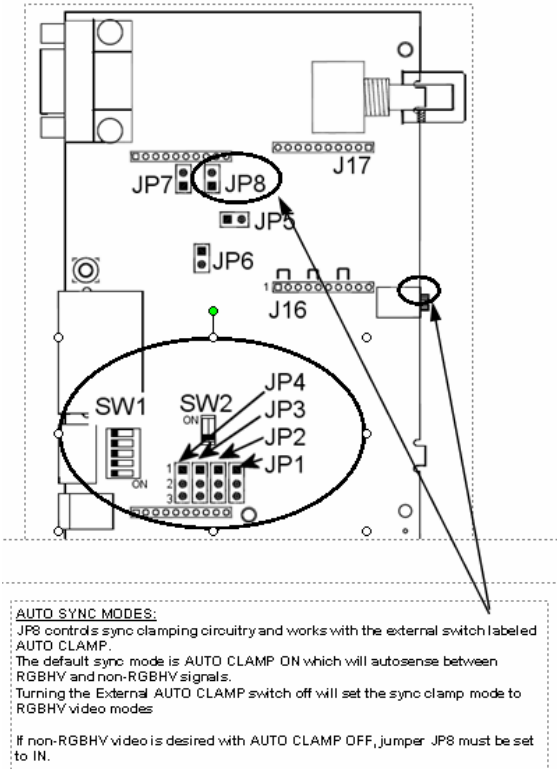


Table 5: Configuration Jumper Settings

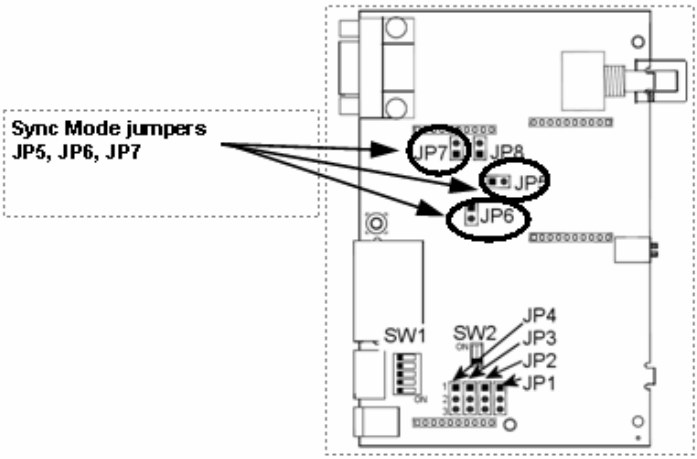
Configuration Option (all options utilize 4th pair):	JP1	JP2	JP3	JP4	SW1					SW2	
					1	2	3	4	5	1	2
RGBHV Computer Video (see note below on daisy chaining)											
With Left/Right Line Level Audio	1-2	1-2	1-2	1-2	OFF	ON	ON	OFF	OFF	OFF	OFF
With SDPIF Digital Audio	1-2	1-2	1-2	1-2	OFF	ON	OFF	OFF	OFF	OFF	ON
With Simplex Serial (receive only)	1-2	1-2	1-2	1-2	ON	OFF	OFF	OFF	OFF	ON	OFF
With Composite Video	1-2	1-2	1-2	1-2	OFF	ON	OFF	OFF	OFF	OFF	ON
With RS 232 serial series (requires separate daughterboard installed) Also set External TERM switch to OFF.**	2-3	2-3	2-3	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Composite, S-Video, Component Video (see note below on daisy chaining)											
With Left/Right Line Level Audio	1-2	1-2	1-2	1-2	OFF	ON	ON	OFF	OFF	OFF	OFF
With SDPIF Digital Audio	1-2	1-2	1-2	1-2	OFF	ON	OFF	OFF	OFF	OFF	ON
With Simplex Serial (receive only)	1-2	1-2	1-2	1-2	ON	OFF	OFF	OFF	OFF	ON	OFF
With Composite Video	1-2	1-2	1-2	1-2	OFF	ON	OFF	OFF	OFF	OFF	ON
With RS 232 serial series (requires separate daughterboard installed) Also set External TERM switch to OFF.**	2-3	2-3	2-3	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Dual Port Daisy Chain units											
*** For END OF LINE Units, use configuration above, but set the external TERM switch to ON.**	*	*	*	*	*	*	*	*	*	*	*
***Middle daisy chain units, use configuration above, but set the external TERM switch to OFF.**	*	*	*	*	*	*	*	*	*	*	*
**** FOR series units in the middle of a daisy chain, set external TERM switch to OFF and note JP1/JP2 changes**	1-2	1-2	*	*	*	*	*	*	*	*	*

Appendix D Setting Sync Mode

The **Cobra R1300A / R1300S2 / R1300S2M** has the capability for fixed and agile sync. The default sync mode setting is for agile sync which replicates the source sync polarity signals. However some displays require a fixed sync polarity that is not possible to change at the video source.

The following details jumper settings to change the sync polarity of the horizontal and vertical sync signals (*note that jumpers JP6 and JP7 have no affect in agile mode*):

Jumper Setting	JP5	JP6	JP7
Fixed Sync	IN	-	-
Agile Sync (default)	OUT	-	-
Horizontal Sync Positive	-	IN	-
Horizontal Sync Negative	-	OUT	-
Vertical Sync Positive	-	-	IN
Vertical Sync Negative	-	-	OUT



Appendix E Skew Module

The **Cobra R1300A / R1300S2** receivers have an optional skew compensation module that can be installed or removed.

To install the skew compensation module:

1. Remove top cover.
2. Remove the 3 jumpers from J16 pins 1-2, 4-5, 7-8.
3. Insert the Skew assembly onto the PCB using 11 pin headers J16 and J17.
4. The correct orientation of the skew board is to place the side with the logo into header J17.
5. Reassemble unit.

Removal is the opposite of the above. Ensure 3 jumpers are installed in locations shown in Figure 6:

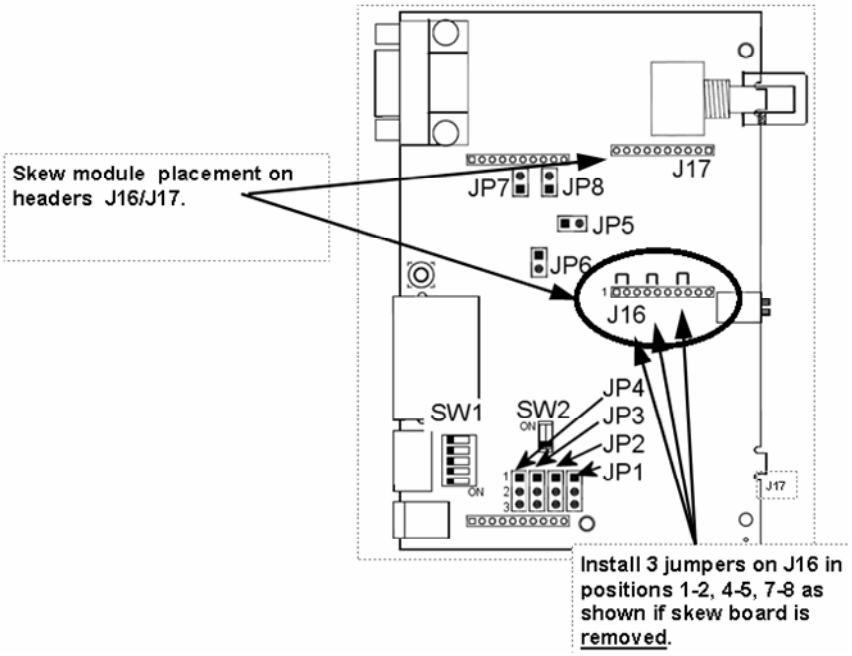


Figure 6: Skew Module

6 Technical Specifications

Table 6: Technical Specifications[1] of the Cobra R1300A, Cobra R1300S2

CABLE REQUIRED:	Category 5, 5e, 6 shielded or unshielded twisted pair
COMPLIANCE:	CE; FCC Class A, IC Class/class A
VIDEO SUPPORT:	all supported VESA modes to WUXGA (1920x1200), RGBHV, RGB, Composite (NTSC, PAL, SECAM), S-Video, Component Video, widescreen modes, HDTV modes including 1080p, 1080i, 720p
RESOLUTION AND REFRESH RATE:	At 1300 ft. or less: a maximum of 1920x1200 to 60 Hz
REQUIRED SOURCE IMPEDANCE:	Video OUT: 75 ohms; Audio OUT (if any): 600 ohms maximum
REQUIRED DESTINATION IMPEDANCE:	Video IN: 75 ohms; Audio models: Audio IN (if any): 600 ohms minimum
AUDIO CHARACTERISTICS:	**R1300A**: Right/Left summed **R1300S2**: Full Stereo Line Level 600 Ohm Unbalanced
SERIAL CHARACTERISTICS:	3 wire, fixed baud rate of 9600
CONNECTORS:	(1) 4 pin terminal block, (2) RJ-45, (1) HD15 F; (1) DB9M (model dependent)
TEMPERATURE TOLERANCE:	Operating: 32 to 104°F (0 to 40°C); Storage: -4 to +140°F (-20 to +60°C).
HUMIDITY TOLERANCE:	Up to 80% noncondensing
ENCLOSURE:	Steel
POWER:	+5 VDC @ 260 mA max Consumption: 6 watts maximum
SIZE:	1.2" H x 4.1" W x 5.5" D (3.0 x 10.4 x 14.0 cm)
WEIGHT:	1.0 lb. (0.45 kg)

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 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.
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.

For the latest information on our products and a list of Kramer distributors, visit our Web site: 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.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-650004 REV 3