



A WORLD OF A/V SOLUTIONS



INTERFACES

IN2200RS
COMPUTER INTERFACE WITH
TWO INPUTS, TWO OUTPUTS AND RS-232 SERIAL CONTROL



IN2200RS
OPERATION MANUAL



Installation and Safety Instructions

For Models without a Power Switch:

The socket outlet shall be installed near the equipment and shall be accessible.

For all Models:

No serviceable parts inside the unit. Refer service to a qualified technician.

For Models with Internal or External Fuses:

For continued protection against fire hazard, replace only with same type and rating of fuse.



Instructions d'installation et de sécurité

Pour les modèles sans interrupteur de courant:

La prise de courant d'alimentation sera installé près de l'équipement et sera accessible.

Pour tout les modèles:

Pas de composants à entretenir à l'intérieur. Confiez toute réparation à un technicien qualifié.

Pour les modèles équipés de fusibles internes ou externes:

Afin d'éviter tout danger d'incendie, ne remplacer qu'avec le même type et la même valeur de fusible.



Installations- und Sicherheitshinweise

Für Geräte ohne Netzschalter:

Die Netzsteckdose soll in der Nähe des Gerätes installiert und frei zugänglich sein.

Für alle Geräte:

Keine Wartung innerhalb des Gerätes notwendig. Reparaturen nur durch einen Fachmann!

Für Geräte mit interner oder externer Sicherung:

Für dauernden Schutz gegen Feuergefahr darf die Sicherung nur gegen eine andere gleichen Typs und gleicher Nennleistung ausgetauscht werden.



Instalacion E Instrucciones de Seguridad

Modelos Sin Interruptor:

La conexión debe ser instalada cerca del equipo y debe ser accesible.

Para Todos Los Modelos:

Dentro de la unidad , no hay partes para reparar. Llame un tecnico calificado.

Modelos con Fusibles Internos o Externos:

Para prevenir un incendio, reemplace solo con el mismo tipo de fusible.

CE COMPLIANCE

All products exported to Europe by Inline, Inc. after January 1, 1997 have been tested and found to comply with EU Council Directive 89/336/EEC. These devices conform to the following standards:

EN50081-1 (1991), EN55022 (1987)
EN50082-1 (1992 and 1994), EN60950-92

Shielded interconnect cables must be employed with this equipment to ensure compliance with the pertinent Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) standards governing this device.



FCC COMPLIANCE

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide against harmful interference when equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Table of Contents

Product Overview	2
Description.....	2
Compatibility	3
Input.....	3
Output.....	3
Installation.....	4
Adapter / Extension Cables for Input and Local Monitor Output	5
IN2200RS Application Diagram.....	6
Front Panel Controls	7
Rear Panel Connectors.....	7
Operation.....	8
Input.....	8
LCD Display.....	8
Gain	8
Sharpness	8
Position	9
Screen Shift.....	9
Front Panel Disable	9
Automatic Input Selection	9
Status / Mode Information	9
Dipswitch Settings	9
Optimal Settings for LCD / DMD / D-ILA / Plasma Displays.....	11
Power-up Settings	11
IN2200RS Power-up Options.....	11
Reset to Factory Default	12
Remote Control Operation	11
RS-232 Control.....	12
IN2200RS Serial Commands	13
Serial Command Examples.....	15
Stereo Audio Switching	16
Input and Local Monitor Output.....	16
Main Audio Output.....	16
IN2200RS Internal Controls.....	17
IN2200RS Internal Controls Diagram.....	18
Specifications.....	19
Troubleshooting	20
IN2200RS Deluxe Computer Interface Kit	22
Warranty	23

Product Overview

DESCRIPTION

The **IN2200RS** is a high-performance video interface for analog video signals including VGA, SVGA, XGA, SXGA, UXGA, MAC, SUN, SGI and other high-resolution workstations. The **IN2200RS** includes an impressive range of features and signal adjustments, yet retains a clean, uncluttered appearance and amazingly simple operation.

KEY CONCEPT



*The **IN2200RS** is not a scan converter. The data projector, monitor or other output device must be compatible with the horizontal scan rate, vertical scan rate and resolution output by the computer video card.*

- **Two Video Inputs with Local Monitor Outputs** - offer flexibility in a variety of applications.
- **32 Memories** - When an input is selected, previously stored position, gain and sharpness settings for that input are automatically recalled.
- **Three Switching Modes** - In **Manual Mode**, users select the desired input by pressing a large front panel input button. In **Auto Switch Mode**, the unit automatically selects the active input. If more than one input is active, the highest numbered input has priority. **Remote Switching** is done via RS-232 control.
- **RS-232 Serial Control** - is provided for all interface functions and facilitates complete system integration and effortless control when combined with a third party control system.
- **Stereo Audio-Follow-Video Switching** - When Input 1 or 2 is selected, the video signal and the associated stereo audio signal are simultaneously switched to the output.
- **Large Backlit LCD Display** - simultaneously shows the horizontal and vertical frequencies of the current input signal.
- **15-Pin HD VGA Standard Connectors** - The **IN2200RS** connects directly to VGA graphics cards and VGA local monitors.
- **High-Resolution Amplification** - The **IN2200RS** provides superb performance with analog video signals at virtually any resolution and refresh rate.
- **Output Sync Optimization** - Dipswitches set the interface output sync signals for optimal operation with LCD, DMD, D-ILA and Plasma Data Grade Display devices.
- **Flexible Output Sync with Automatic Output Sync Selection** - The unit can be set for an RGBHV, RGBS or RGsB output signal to match the requirements of the data display device and signal distribution system.

- **Screen Shift** - slowly moves the image on the CRT or Plasma Display device to reduce video “burn-in” (when displaying static images).
- **Gain Control** - can be adjusted to boost the signal voltage and provides a smooth fade to black.
- **Sharpness Control** - provides image enhancement for high-resolution video signals by increasing clarity and image detail, and compensates for signal loss during long cable runs.
- **Horizontal and Vertical Position Controls** - provide precise positioning of the image within the data display area.
- **Easy Operation** - The **IN2200RS** offers an exceptional variety of controls and signal adjustments, yet remains very easy for non-technical personnel to operate.
- **300 MHz Video Bandwidth**
- **Rack Mountable**

Compatibility

INPUT

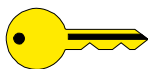
The **IN2200RS** will accept high-resolution video signals from virtually any computer that outputs an analog video signal. The unit will work with signals at virtually any resolution and refresh rate. Compatible computer video signals include VGA, SVGA, XGA, SXGA, UXGA, MAC, SUN, SGI and other high-resolution computers outputting an analog video signal. Input signal compatibility parameters are:

Video Signal:	Analog RGB Video
Signal Format:	RGBHV, RGBS, RGsB
Horizontal Frequency Range:	30 KHz to 130 KHz
Vertical Refresh Rates:	30 Hz to 120 Hz

OUTPUT

The output signal of the **IN2200RS** is analog RGB video with TTL sync on 3, 4 or 5 female BNC connectors. The output format can be set to RGBHV, RGBS or RGsB using dipswitches. This output signal is compatible with high-resolution data grade monitors and data / graphics projectors.

KEY CONCEPT

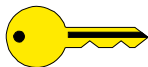


VGA, MAC, SUN, SGI and other high-resolution workstations operate in several video modes encompassing a wide range of resolutions and scan rates. Many of the video signals from the newest models can run as high as 70 KHz or more, with the newest VGA cards offering an output resolution of 1600 x 1200 (some can even go as high as 1920 x 1080). The data projector or monitor connected to the interface output must be compatible with the horizontal scan rate and vertical refresh rate of the computer's video signal. Please check the documentation for both the computer graphics card and the data display device to ensure compatibility

Installation

This section offers step-by-step instructions for installing the **IN2200RS**. An **Application Diagram** is provided on page 6. Illustrations showing **Front Panel Controls** and **Rear Panel Connectors** can be found on page 7.

1. Place / install the **IN2200RS** at the desired location. Make sure that the unit is seated on a flat surface or is securely installed in a standard 19" equipment rack in a 1-U rack space (using the optional **IN9129** Rack Ears).
2. Set the dipswitches for the requirements of your installation (see the **Dipswitch Settings Chart** on page 10).
3. Connect the **IN2200RS** video output (5 BNC connectors) to the data display device's RGB input using high-resolution BNC cables or a multi-conductor RGBHV, RGBS or RGsB "snake." The **IN7000 Series**, **IN7200 Series**, **IN7300 Series** and **IN7400 Series** high-resolution cables are well suited for this purpose. While making connections, take care to ensure that the red output is connected to the red input, green output is connected to the green input, etc.
4. Connect the **IN2200RS** main audio outputs (3.5mm female jacks for left and right channel signals) to the audio system's input (mixer or amplifier). The main audio output signal is line level and can be set for unbalanced (factory default) or balanced. The output is compatible with any audio system that accepts a line level signal, and can be easily connected with an **IN9106** audio cable. For audio systems with RCA connectors, use the **IN9017** audio adapter cable.
Note: Cable wiring configurations for balanced / unbalanced output signals and internal control adjustments can be found on pages 16 & 17.
5. Connect the computer graphics card to the **IN2200RS** 15-pin video input port.
 - **PC / MAC / SGI Computers with 15-pin HD Video Ports** - can be connected via **IN8000M-1 / IN8200M-1 Series** high-resolution coaxial VGA cables.
 - **Older Macintosh (15-pin D) / SUN (13W3) / Workstations (4 or 5 BNC)** - can be connected using the appropriate input / output cables listed in the chart on the following page.
6. Connect the computer sound card output (if applicable) to the **IN2200RS** 3.5mm female stereo audio input connector using an **IN8200-1 Series** cable [15-pin HD with 3.5mm (M-M) mini DIN], or an **IN9106** audio patch cable (3.5mm stereo mini male to 3.5mm stereo mini male). For computers with RCA connectors, use the **IN9107** audio adapter cable [(1) 3.5mm stereo mini male to (2) RCA male].
7. Connect the local computer monitor (if present) to the local monitor output port of the **IN2200RS**. Monitors with 15-pin VGA connectors will attach directly to the interface. For other types of monitors, use the appropriate monitor output adapter cable (see the list on the following page). If no local monitor is used, set the monitor emulation dipswitch to emulate a color VGA or 13/14" MAC RGB monitor (see the **Dipswitch Settings** chart on page 10).

KEY CONCEPT

Check the monitor emulation chart and dipswitch settings carefully. An inappropriate setting of the emulation dipswitches may lead to improper operation and could even result in severe damage to the computer video port or the monitor. If users are in doubt as to which monitor emulation to choose, set all the Monitor Emulation dipswitches to “0” and connect the local monitor.

8. Connect powered local speakers and / or recording devices to the local audio outputs (if applicable).
9. Connect power to the **IN2200RS** using the **IN9230** IEC power cable (included).
10. Complete the installation by turning on all computers, local monitors, powered speakers, data display devices, the **IN2200RS** and the audio system.

ADAPTER / EXTENSION CABLES FOR INPUT AND LOCAL MONITOR OUTPUT

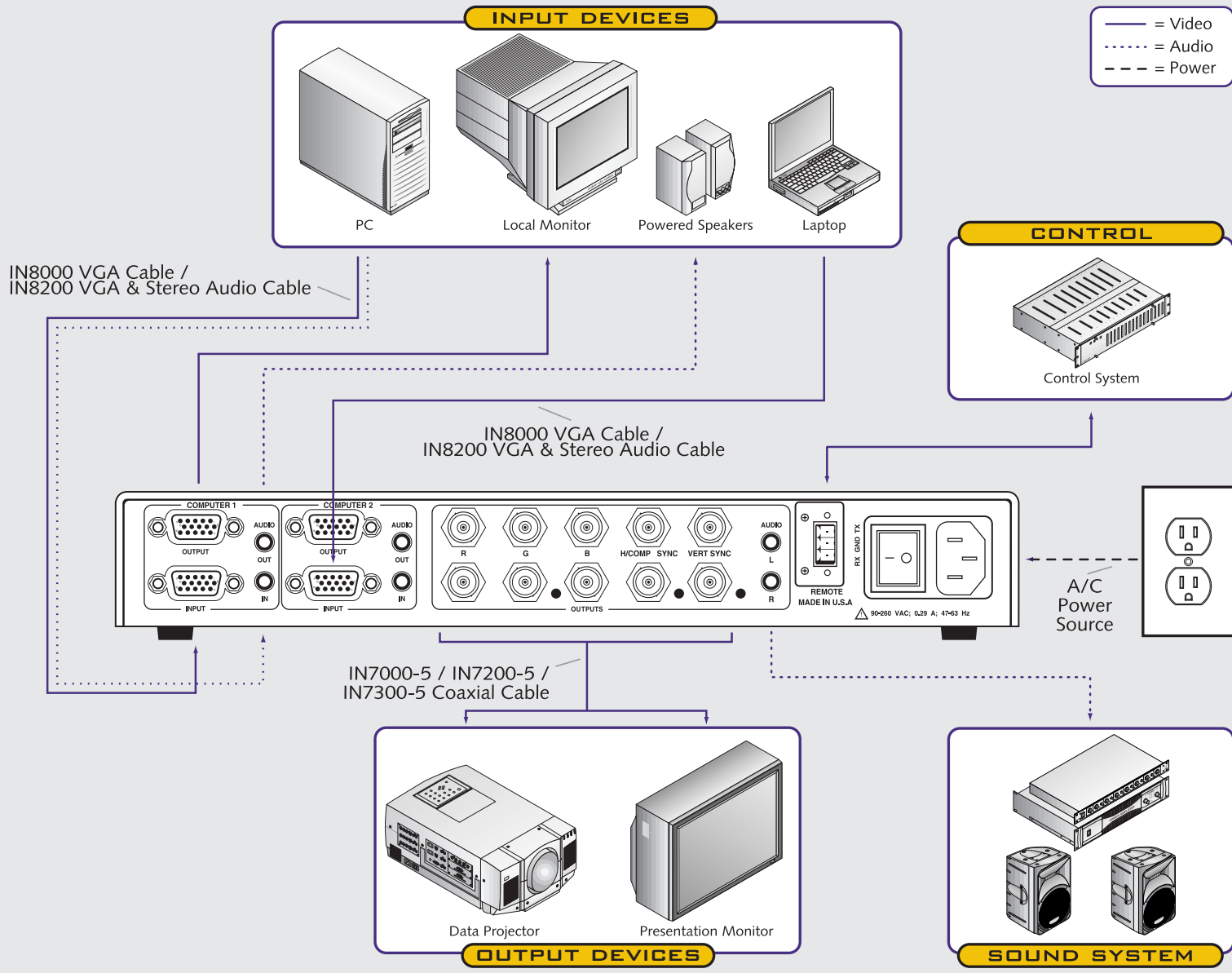
The **IN2200RS** has 15-pin HD VGA-type input and local monitor output connector ports. The following cables / adapters are available:

Computer	3'	6'	12'	25'	35' +
VGA: 15-Pin HD					
Input Cable (M-M)	IN8003M-1	IN8006M-1	IN8012M-1	IN8025M-1	IN80xxM-1
Output Cable (M-F)		IN8006-1	IN8012-1	IN8025-1	IN80xx-1
VGA with Stereo Audio: 15-Pin HD with 3.5mm (M-M) mini DIN					
Input Cable (M-M)	IN8203M-1	IN8206M-1	IN8212M-1	IN8225M-1	IN82xxM-1
Output Cable (M-F)	IN8203-1	IN8206-1	IN8212-1	IN8225-1	IN82xx-1
MAC with 15-Pin D:					
Input Cable (M-M)		IN9140M		IN9144M	
Output Cable (M-F)	IN9141			IN9145	
MAC G3, G4 and PowerBook with 15-Pin HD*:					
Input Cable (M-M)		IN8006M-1	IN8012M-1	IN8025M-1	IN80xxM-1
Output Cable (M-F)		IN8006-1	IN8012-1	IN8025-1	IN80xx-1
SUN: 13W3 (may also be used with SGI with RGsB output)					
Input Cable (M-M)		IN9142M		IN9146M	
Output Cable (M-F)	IN9143			IN9147	
Workstation: 5 BNC / RGBHV					
Input Cable (M-M)		IN9045-L6	IN9045-L12	IN9045-L25	IN9045-Lxx
Output Cable (M-M)		IN9045-L6	IN9045-L12	IN9045-L25	IN9045-Lxx
Workstation: 4 BNC / RGBS					
Input Cable (M-F)		IN9100			

*Newer Mac G3 models (with translucent cases) have 15-Pin HD connectors (pins arranged in 3 rows). Older G3 models (with solid white enclosures) incorporate 15-Pin D connectors (pins arranged in 2 rows).

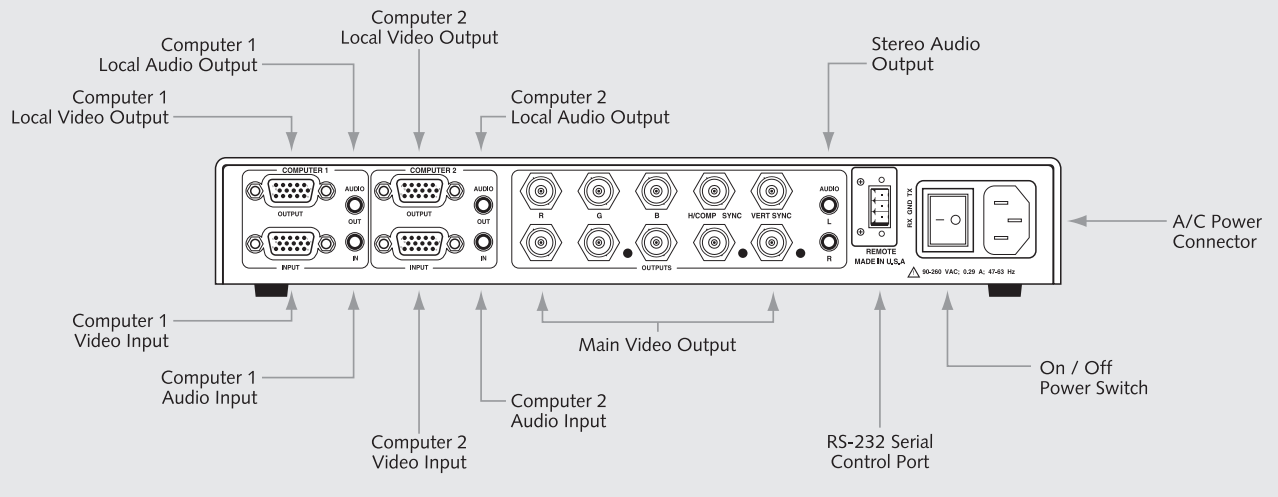
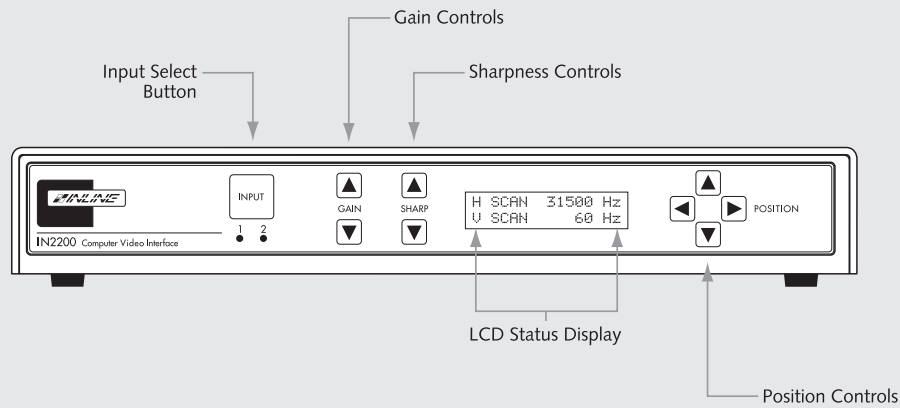
IN2200RS COMPUTER VIDEO INTERFACE

APPLICATION DIAGRAM



IN2200RS COMPUTER VIDEO INTERFACE

CONNECTORS & CONTROLS



Operation

INPUT

The Input Button can be used to select Input 1 or Input 2. Each time the button is pressed, the unit toggles back and forth between the two inputs, and the appropriate front panel LED indicator illuminates to show the current channel selection. Unique gain, sharpness, horizontal position and vertical position settings are automatically stored for each input and recalled each time the input is selected.

The non-selected channel is terminated into 75 Ohms. The interface automatically returns to the last selected channel if power is removed and reapplied to the unit. Input channels may also be selected remotely by using a third-party controller.

LCD DISPLAY

The LCD displays the horizontal and vertical scan rates and provides adjustment status feedback. When an adjustment is being made, the LCD shows a description of the function and a bar graph to indicate the current location within the adjustment range. The LCD remains in this state for several seconds after the last change and then reverts to the horizontal and vertical scan rate display.

GAIN

Gain (▲ and ▼) Buttons adjust the output voltage of the red, green, and blue outputs simultaneously (ensuring that gray scale is maintained), and may be used to compensate for signal loss due to long cable runs. The gain adjustment range is 0 in the minimum position (no video information) and 1.3 in the maximum position (30% increase). The factory default setting is 1.0 (unity gain). Operators can press and release the button for small changes or press and hold for major changes. The Gain Control can also be used to fade the image to black.

SHARPNESS

Sharp (▲ and ▼) Buttons provide variable high-frequency equalization that can compensate for signal loss due to long output cable runs. Careful optimization of the sharpness control will result in a greatly enhanced image with increased clarity and edge detail. The amount of high frequency boost required for each display system will vary depending on the length and bandwidth performance of the video output cables, and, to a lesser extent, the resolution and frequency of the input signal. When using short output cables, the sharpness control should usually be placed at the minimum setting to avoid over-peaking.

Operators can press and release the sharpness control button for subtle changes or press and hold for major adjustments. The factory default setting is minimum (no sharpness / peaking enhancement). The following guidelines are useful in selecting the optimal sharpness / peaking setting:

If the image is soft and / or fine details in the picture lack clarity:

The sharpness is probably set too low. Increase the sharpness control setting.

If a white, ghosted image appears to the right side of the lines / characters:

The sharpness is probably set too high (over-peaked). Decrease the sharpness control setting.

POSITION

The Position (▲, ▼, ► & ◄) Arrows shift the video image in the designated direction. Operators can press and release a button for small shifts or press and hold for large shifts. If the horizontal or vertical positioning controls are disabled, the LCD display indicates the current status when the user tries to adjust them.

SCREEN SHIFT

This function is enabled / disabled by pressing the GAIN (▲ / ▼) Button during power-up. When enabled, the image is slowly shifted in a clockwise motion to help prevent CRT or Plasma display “burn-in.” A complete list of power-up options is provided on page 11.

Shift Range: The amount that the image is shifted can be set to “High” or “Low” during the power-up sequence. The High Range is set by pressing and holding the POSITION (►) Button while turning on the power. The Low Range is set similarly but holding the POSITION (◄) Button while turning on the power.

Shift Speed: When adjusting the size of the display it is important to allow for the shift range. Therefore, there is a Fast Screen Shift Speed, which rapidly moves through the entire shifting range (so users don't have to wait a long time for the image to make a complete cycle), and a Slow Screen Shift Speed. The Fast Screen Shift is set by holding the SHARP (▲) Button during power-up, and the Slow Shift Speed is set by holding the SHARP (▼) Button.

FRONT PANEL DISABLE

The front panel is disabled / enabled with a dipswitch setting (#5 of Dipswitch Bank 2). When the front panel is disabled, none of the front panel buttons operate. The LCD display will read “Front Panel Disabled” whenever a front panel button is pressed. However, input selection can still be made via the remote port or by setting the unit for Automatic Input Selection.

AUTOMATIC INPUT SELECTION

The **IN2200RS** can be set to automatically select the active input. An input is considered active if it has a sync signal, or if pin 10 is grounded (usually done through the presence of an input cable, regardless of whether or not a sync signal is present). If both inputs are active, Input 2 has priority. If there is no active input signal (or pin 10 is not grounded) on Input 2, Input 1 is the default.

Note: When set to the Automatic Input Selection mode, the front panel and remote input selection features are disabled. Dipswitch #6 on Bank 2 enables / disables the Automatic Input Select mode.

STATUS / MODE INFORMATION

Each time the unit is powered up, the LCD displays a sequence of screens to inform the user of how the **IN2200RS** interface is configured. These screens show the following items: Automatic Input Selection Enabled / Disabled, Front Panel Enabled / Disabled, Screen Shift Settings and the Output Sync Format.

DIPSWITCH SETTINGS

Two dipswitch panels are easily accessed through windows on the bottom of the **IN2200RS**. SWITCH 1 regulates the output sync format. SWITCH 2 determines the monitor emulation settings.

KEY CONCEPT



*For most installations, the **IN2200RS** will be operated in the factory default mode and will not require any changes to the dipswitch settings.*

Switch Panel #1

Switch	Function	Setting	Description
1	Reserved	None	
2	Output Sync Format	1* Auto	Sync format is set automatically based on the number of cables connected to the unit
		0 Manual	Sync format is set via switches #5 & #6
3	Horizontal Position Control	1 Off	Disable horizontal position control
		0* On	Enable horizontal position control
4	Vertical Position Control	1 Off	Disable vertical position control
		0* On	Enable vertical position control
5	Output Sync Format (#2 must be set to 0)	1* RGBS/ RGBHV	Sync format is RGBS or RGBHV depending on the setting of dipswitch #6
		0 RGsB	Sync format is sync on green (RGsB)
6	Output Sync Format (#5 must be set to 1)	1 RGBS	Sync format is RGBS
		0* RGBHV	Sync format is RGBHV
7	Output Sync Polarity (RGBHV In / Out only)	1* Forced (see #8)	With RGBHV input signal and RGBHV output signal, the H & V sync polarities are set with dipswitch #8
		0 Mirror Input	With RGBHV input signal and RGBHV output signal, the V & H sync polarities are the same as the input
8	Output Sync Polarity (RGBHV In / Out only)	1* Negative	With RGBHV input signal and RGBHV output signal, the H & V sync polarities are negative, negative
		0 Positive	With RGBHV input signal and RGBHV output signal, the H & V sync polarities are positive, positive
9	RGBS / RGsB Output serration pulses	1 Remove	The output sync will not have serration pulses when set for RGBS or RGsB output
		0* Present	The output sync will have serration pulses present when set for RGBS or RGsB output
10	Reserved	None	

Switch Panel #2:

Switch	Function	Setting	Description
1	Input 1 Monitor Emulation	1 Emulation On	Monitor emulation is always ON for Input 1
		0* Automatic	Monitor emulation is automatic. Emulation is ON when there is no local monitor present and off when there is a local monitor (switch #2 must be ON)
2	Input 1 Auto Emulation	1 Off	Disable Auto Emulation
		0* On	Enable Auto Emulation (switch #1 must be set to 0)
3	Input 2 Monitor Emulation	1 Emulation On	Monitor emulation is always ON for Input 1
		0* Automatic	Monitor emulation is automatic. Emulation is ON when there is no local monitor present and off when there is a local monitor (switch #2 must be ON)
4	Input 2 Auto Emulation	1 Off	Disable Auto Emulation
		0* On	Enable Auto Emulation (switch #1 must be to 0)
5	Front Panel Operation	1* Enable	Enable the front panel operation
		0 Disable	Disable the front panel
6	Automatic Input Selection	1 On	An input is selected automatically based on the presence of sync. Input 2 has the higher priority
		0* Off	Manual input selection
7	Reserved	None	
8	Reserved	None	
9	Reserved	None	
10	Reserved	None	

* Factory Default

OPTIMAL SETTINGS FOR LCD / DMD / D-ILA / PLASMA DISPLAYS

Output Sync Format – The **IN2200RS** interface features advanced sync processing circuitry that offers superb compatibility with a wide range of display devices. The **IN2200RS** has been designed (and extensively tested) to provide excellent operation when set for RGBHV, RGBS and RGsB output signal formats. However, some display devices most readily identify and display VGA-type signals when they are in the RGBHV signal format. For this reason, users may achieve optimal compatibility and more consistent results when the interface is set to the factory default output sync format of RGBHV (see **Dipswitch Settings** on the previous page).

Horizontal Position Control - The **IN2200RS** horizontal position control utilizes a new circuit design that provides excellent image quality and greatly enhanced compatibility with a variety of data display technologies. However, in rare cases, instability in parts of the displayed image may still occur (depending on the design of the display device's sync circuitry). Adjusting the data display's fine phase or auto phase adjustment will usually alleviate the problem. If problems persist, users may wish to disable the **IN2200RS** horizontal position control (see **Dipswitch Settings**).

The following output sync settings provide maximum sync signal preservation and are recommended for the best image quality with LCD, DMD, D-ILA and Plasma Display devices:

DIPSWITCH PANEL #1:

Dip Switches ON:	3 & 5
Signal Format:	Red / Green / Blue / Horizontal and Vertical Sync
Horizontal Position Control:	Disabled
H & V Sync Polarity:	Mirror Input Polarities

Power-up Settings

Depressing certain front panel switches during power-up will change certain parameters. To access power-up adjustments, depress a specific button while turning the unit's power switch to ON. If power is already on, hold down the indicated button and switch the power off, and then back on. These settings are retained until they are changed by serial commands, during subsequent power-ups, or by resetting the unit to factory default.

IN2200RS POWER-UP OPTIONS

POSITION DOWN	Factory Default Reset	
POSITION UP		
POSITION LEFT	Set Screen Shift to Low Range	
POSITION RIGHT	Set Screen Shift to High Range	(factory default)
GAIN DOWN	Disable Screen Shift	(factory default)
GAIN UP	Enable Screen Shift	
SHARP DOWN	Set Screen Shift to Slow Speed	
SHARP UP	Set Screen Shift to Fast Speed	(factory default)

RESET TO FACTORY DEFAULT

The **IN2200RS** can be reset to factory default by holding the Position (▼) Button while applying power to the unit. The factory default values are:

- gain is set to **185** of 255
- sharpness is set to **126** of 255
- horizontal video position is set to **155** of 255
- vertical video position is set to **148** of 255
- screen shift is **enabled**
- screen shift speed is **fast**
- screen shift range is **high**
- baud rate is set to **9600**
- command code is set to []

Remote Control Operation

RS-232 CONTROL

The **IN2200RS** RS-232 serial control port accepts serial commands from a control system, computer serial port, or any other device capable of sending out serial ASCII commands at compatible baud rates. A complete listing of RS-232 command codes is included on the pages 13 & 14.

Communication Protocol:

- ◆ 8 data bits
- ◆ 1 stop bit
- ◆ No parity check
- ◆ 9600 baud (factory default setting)

Baud Rate Selection:

The **IN2200RS** has a factory default baud rate of 9600 bps and can communicate at rates from 2400 up to 38,400. Baud rates can be selected using the ACxx Serial Commands listed on the following page.

*Note: The baud rate transmitted must match the baud rate selected on the **IN2200RS**.*

Command Code Structure and Delimiters:

All commands sent to the unit must contain a leading code, the command code, and an ending code. Each command must be completely executed before the unit will accept a new command.

The **IN2200RS** can be set to recognize five sets of leading and end codes (delimiters) when using an RS-232 remote: parentheses (), brackets [], braces { }, slashes \ /, and less and greater than < >.

The factory default serial delimiters are [].

*Note: Only the **IN2200RS** that has the same delimiters as the remote controller will respond.*

A complete command consists of:

- [The leading code
- CH2** The command code.
-] The ending code

Example: [CH2] sets the **IN2200RS** to select channel 2.

Serial Control Cable Wiring:

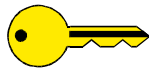
When controlling only one **IN2200RS** unit, connect the RS-232 cable as follows:

Controller Transmit to **IN2200RS** Receive
 Controller Ground to **IN2200RS** Ground
 Controller Receive to **IN2200RS** Transmit

When controlling multiple **IN2200RS** units, connect the RS-232 cable as follows:

Controller Transmit to Each **IN2200RS** Receive
 Controller Ground to Each **IN2200RS** Ground
 Controller Receive to Only one **IN2200RS** Transmit

KEY CONCEPT



*When controlling multiple units, the Controller Receiver Terminal must connect to only one **IN2200RS** Transmit Terminal. Multiple **IN2200RS** Transit Lines may not be connected together, otherwise signal contention from multiple units will result. Therefore, "receive" information is only available from one **IN2200RS** in this configuration. Each unit must be set to different delimiters.*

IN2200RS SERIAL COMMANDS ♦

COMMAND	DESCRIPTION
AC14	set serial baud rate to 2400
AC15	set serial baud rate to 4800
AC16	set serial baud rate to 9600 ♦ ♦
AC17	set serial baud rate to 19,200
AC18	set serial baud rate to 38,400
CALLxx	recall current setting from configuration memory (01 <= xx <=32) settings include:
	Channel
	Channel 1 Gain
	Channel 2 Gain
	Channel 1 Sharpness
	Channel 2 Sharpness
	Channel 1 Vertical Position
	Channel 2 Vertical Position
	Channel 1 Horizontal Position
	Channel 2 Horizontal Position
	<i>baud rate and command code are general and are not saved for each memory</i>
CH1	set channel 1*

COMMAND	DESCRIPTION
CH2	set channel 2*
CH?	request current channel
CMDCD0	set command code [] ♦ ♦
CMDCD1	set command code { }
CMDCD2	set command code ()
CMDCD3	set command code < >
CMDCD4	set command code \ /
GAIN+	set gain (increment)
GAIN-	set gain (decrement)
GAIN@	set gain (factory default is defined in in2200.h)
GAINxxx	set gain (absolute within limits defined in in2200.h)
GAIN?	request current gain value
HSC?	request horizontal scan rate (example response is [123456 Hz])
INFO	send unit version
PH-	image shift left***
PH+	image shift right***
PH@	set horizontal image position to normal***

COMMAND	DESCRIPTION
PHxxx	set horizontal image position to absolute***
PH?	request current horizontal image position
PV+	image shift up**
PV-	image shift down**
PV@	set vertical image position to normal**
PVxxx	set vertical image position to absolute**
PV?	request current vertical image position
RES0	reset (power on) (the channel, gain, sharpness, video position, baud rate and command codes are reset to their <u>most recent EEPROM values</u>)
RES1	reset ♦ ♦ 1) the gain, sharpness and video position for both channels 1 & 2 are reset to their <u>factory default values</u> 2) screen shift parameters, baud rate and command codes are reset to their <u>factory default values</u> 3) all configuration memories are initialized with <u>factory default values</u> 4) channel 1 is selected
SAVExxx	save current settings to configuration memory (01 <= xx <= 32) settings include: Channel Channel 1 Gain Channel 2 Gain Channel 1 Sharpness Channel 2 Sharpness Channel 1 Vertical Position Channel 2 Vertical Position Channel 1 Horizontal Position

COMMAND	DESCRIPTION
	Channel 2 Horizontal Position <i>baud rate and command code are general and are not saved for each memory</i>
SHP+	set sharpness (increment)
SHP-	set sharpness (decrement)
SHP@	set sharpness (factory default is defined in in2200.h)
SHPxxx	set sharpness (absolute within limits defined in in2200.h)
SHP?	request current sharpness value
SS	toggle screen shift enable
SS0	disable screen shift ♦ ♦
SS1	enable screen shift
SS?	request current screen shift enable state
SSR	toggle screen shift range
SSR0	set screen shift range low
SSR1	set screen shift range high ♦ ♦
SSR?	request current screen shift range
SSS	toggle screen shift speed
SSS0	set screen shift speed slow
SSS1	set screen shift speed fast ♦ ♦
SSS?	request current screen shift speed
STAT0	request for general info (gain, sharpness, vertical & horizontal position, and state of front panel enable / disable)
STAT1	request for screen shift info (enable / disable, range and speed)
STAT2	request for output sync format
STAT3	request for horizontal and vertical frequencies
SYNC?	request for sync info responses include: [RGBHV], [RGSB], [RGSB] & [MONO]
VSC?	request vertical scan rate (example response is [12345Hz])

♦ This Command List is preliminary. All commands listed in this manual are functional, however, INLINE reserves the right to modify, remove and / or add commands on future product revisions. The commands are *not* case sensitive.

♦ ♦ Factory Default enabled by dipswitch

* Only if AUTOSWITCH is disabled by dipswitch

** Only if VERTICAL POSITION is enabled by dipswitch

*** Only if HORIZONTAL POSITION is enabled by dipswitch

SERIAL COMMAND EXAMPLES

The table below provides a sampling of complete serial command strings (including delimiters) and the responses the **IN2200RS** might provide after receiving those commands. The bracket [] serial delimiters are used for example purposes. The **IN2200RS** can be set to recognize four other sets of leading and end codes: parentheses (), braces { }, slashes \ /, and less and greater than < >.

DESIRED FUNCTION	COMMAND STRING	RESPONSE
Request for current system status	[STAT0]♦	[CH=2, GAIN=1, SHARP=1, VPOS=1, HPOS=1, FPANEL=ENABLED]
Request for screen shift status (enable / disable, range and speed)	[STAT1]	[SSHIFT=OFF, RANGE=HI, SPEED=HI]
Request current input and output sync format	[STAT2]	[CH=2, SYNC OUT=RGBHV]
Request for horizontal and vertical frequencies (for currently selected input)	[STAT3]	[HFREQ=31,480 Hz, VFREQ=70.1 Hz]
Select input 1	[CH1]	[OK]
Request current channel	[CH?]	[1]
Request current gain value	[GAIN?]	[1]
Set gain to factory default	[GAIN@]	[OK]
Set gain to exact value (0)	[GAIN000]	[OK]
Request horizontal scan rate	[HSC?]	[31,460 Hz]
Request vertical scan rate	[VSC?]	[70.1 Hz]
Request unit firmware version	[INFO]	[Version 1.0]
Request current vertical image position	[PV?]	[1]
Set vertical image position to factory default	[PV@]	[OK]
Set horizontal image position to a predetermined value of 123	[PH123]	[OK]
Request current horizontal image position	[PH?]	[123]
Set sharpness to factory default	[SHP@]	[OK]
Request current sharpness value	[SHP?]	[126]
Request current screen shift enabled state	[SS?]	[OFF]
Toggle screen shift enable	[SS]	[OK]
Disable screen shift	[SS0]	[OK]
Shift image up 1 unit	[PV+]	[OK]
Shift image down 1 unit	[PV-]	[OK]
Enable screen shift	[SS1]	[OK]
Request current screen shift range	[SSR?]	[HI]
Toggle screen shift range	[SSR]	[OK]
Request current screen shift speed	[SSS?]	[FAST]
Toggle screen shift speed	[SSS]	[OK]
Request for current sync status	[SYNC?]	[RGBHV] (Info responses include [RGBHV], [RGBS], [RGsB] & [MONO])
Save current setting to configuration memory	[SAVE01]	[OK]
Recall current setting from configuration memory	[CALL01]	[OK]
Error examples		
]	[INVALID COMMAND]
	[CH3]	[INVALID PARAMETER]
	[CCH]	[INVALID COMMAND]
Dipswitch setting conflicts - dipswitches must be changed to enable the function		
Select input 1	[CH1]	[INVALID MODE-AUTO SWITCH IS ENABLED]
Set horizontal image position to factory default	[PH@]	[INVALID MODE-HPHASE DISABLED]
Set vertical image position to factory default	[PV@]	[INVALID MODE-VPHASE DISABLED]

Stereo Audio Switching

IN2200RS has stereo audio-follow-video switching capability. When Input 1 or Input 2 is selected manually or automatically, the **IN2200RS** switches the stereo audio signals in conjunction with their corresponding video signals.

INPUT AND LOCAL MONITOR OUTPUT

Located next to the 15-pin HD female video input connectors are 3.5mm stereo female audio input ports (one for each video input). The audio inputs are compatible with unbalanced line level audio signals from a computer sound card, CD player, VCR, laser disc player or other device that outputs a stereo line level audio signal.

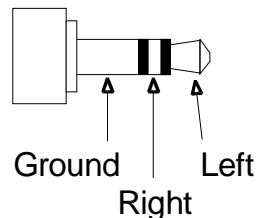
Located next to the 15-pin HD female local video output connectors are 3.5mm stereo female audio output ports. Inputs 1 & 2 each have a local audio output that provides an unbalanced line level signal, identical to the input signal. This is a passive output (not buffered) designed to drive a local device such as powered speakers or other line level compatible audio equipment. Both local outputs are always active, even when an input is not currently selected.

The following cables are available to connect audio equipment to the stereo audio inputs and local outputs. For more information, see the **Cable Pin Outs** Diagram below.

IN9106 (1) 3.5mm Stereo Mini Male to (1) 3.5mm Stereo Mini Male, 6' long

IN9107 (1) 3.5mm Stereo Mini Male to (1) RCA Stereo Male, 6' long

Cable Pin Outs for Stereo Input / Local Output



Note: The diagram above is for input cables and local output cables only. The main audio output has a different pin configuration (see diagram on the following page).

MAIN AUDIO OUTPUT

Located just to the right of the main BNC outputs, the main audio output provides a buffered audio signal from Input 1 or Input 2, depending on which input is currently selected. The main audio output signal is line level and can be set for unbalanced (factory default) or balanced. See the **IN2200RS Internal Controls** Section on the following page for information on setting the unit for unbalanced or balanced output.

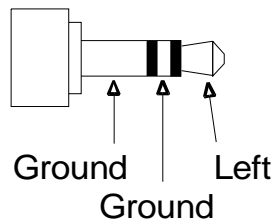
The **IN2200RS** main audio outputs require one 3.5mm Mini DIN connector for left audio, and a separate connector for right audio. This is done to accommodate unbalanced or balanced audio signals.

When the **IN2200RS** is set for an unbalanced audio output signal and the application requires RCA adapter cables), two (2) **IN9107** (3.5mm Stereo Mini male to RCA Stereo male) cables can be used as output adapters for the left and right output jacks. In this configuration, the output signal is found on the red RCA connector on each **IN9107**.

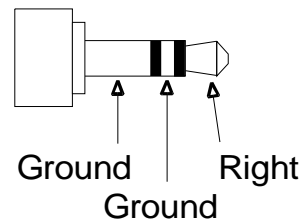
When the **IN2200RS** is set for balanced audio output, custom adapter cables should be constructed, conforming to the pin configuration shown in the diagrams below.

Cable Pin Outs for Unbalanced Output

Left Channel

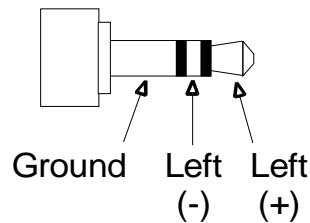


Right Channel

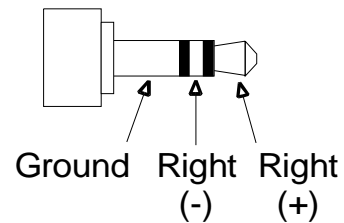


Cable Pin Outs for Balanced Output

Left Channel



Right Channel



Note: The diagram above is for the main audio left and right outputs only. Cables for the audio inputs and local audio outputs have a different pin configuration.

IN2200RS Internal Controls

The location of the **IN2200RS** internal controls is shown on the next page.

KEY CONCEPT



Warning: Adjustment of the **IN2200RS** internal controls must *only* be carried out by qualified technicians. Care must be taken to avoid static shock to the internal components.

Set Audio Output for Unbalanced or Balanced

All four jumpers (**J9/J10/J15/J16**) must be set to the appropriate positions as indicated:

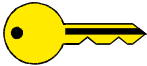
Set Output for Unbalanced (Factory Default)

J15 / J16 Closed
 J9 / J10 Connect 2 Pins Closest to BNC Connectors

Set Output for Balanced

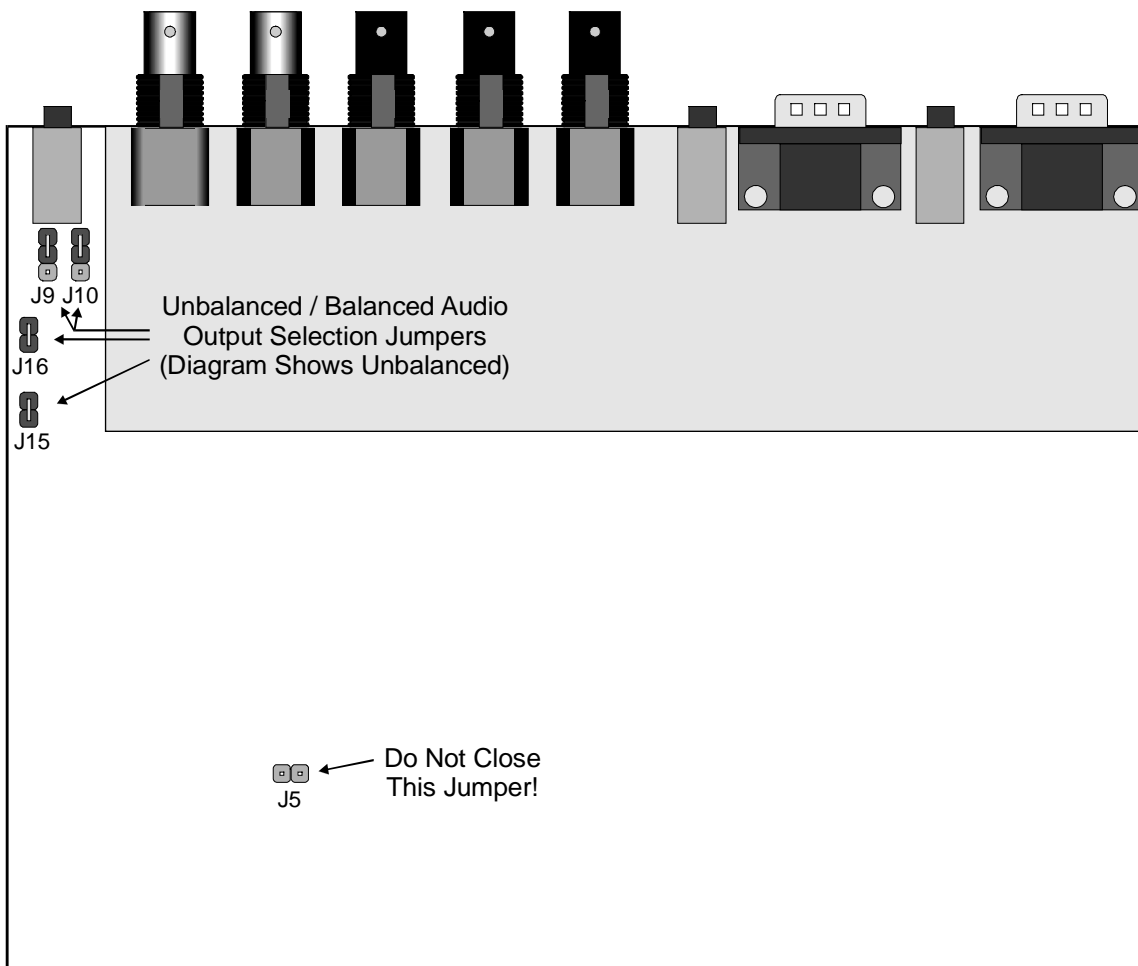
J15 / J16 Open
 J9 / J10 Connect 2 Pins Closest to Center of Unit

KEY CONCEPT



Warning: *The J5 jumper must remain open at all times for normal operation. Do not close this jumper! If J5 is closed, the microprocessor is continuously reset and the unit will not function properly.*

IN2200RS INTERNAL JUMPERS



Specifications

IN2200RS High-Resolution Computer Video Interface	
Input	
Video Connectors	(2) 15-Pin HD female
RGB Signals	Analog video, 1.5 Vp-p max
Sync Signals	TTL Format: RGBHV, RGSB or RGSB
Sync Range	Horizontal: 30 - 130 KHz Vertical: 30 - 120 Hz
Stereo Audio	(2) 3.5mm Stereo Mini Impedance: 10 Kohm
Output	
Buffered Local Monitor	(2) 15-Pin HD Female
Main Output Connectors	2 sets of (5) female BNC
Stereo Audio	(2) 3.5mm Stereo Mini female Impedance: 50 ohm
Signal Format	RGBHV, RGSB or RGSB
Gain Range	0.0 (black) to 1.2 (20% voltage increase)
Bandwidth	300 MHz @ -3 dB with 0.7 Vp-p input signal
General	
Power Supply	Internal Switch Mode: 90-260 VAC; 0.29 A; 47-63 Hz
RS-232 Serial Port	3-Pin Captive Screw Terminal
RS-232 Protocol	2400 to 38,400 bps, 8 Bits, 1 stop Bit, No parity
Shipping Weight	6 lbs. / 3 Kg
Product Weight	4 lbs. / 1.8 Kg
Dimensions	1.75" x 11.75" x 8.1" / 4.4cm x 29.8cm x 20.6cm
Regulatory Approvals	UL1950, CAN/CSA-22.2 No. 950, 3 rd Edition CE: EN55022 (1987), EN50081-1 (1991), EN50082-1 (1992 & 1994), EN60950-92

Included Accessories

IN9230 IEC Power Cable, 6' long (USA only)
Operations Manual

Optional Accessories

VGA Monitor Adapter and Extension Cables

Input and Local Monitor Adapter and Extension Cables:

IN8000 Series - 15-pin HD male to 15-pin HD female, various lengths from 3' to 100'
For Other Computers: Refer to the **Adapter / Extension Cables for Input and Local Monitor Output** Table on page 5

Stereo Audio Cables

IN9106 - (1) 3.5mm Stereo Mini Male to (1) 3.5mm Stereo Mini Male, 6' long
IN9107 - (1) 3.5mm Stereo Mini Male to (1) RCA Stereo Male, 6' long

Rack-Mount Hardware

IN9129 - One Pair Rack Ears - Mounts **IN2200RS** in 1U Rack Space

Miscellaneous Accessories

IN9120 - Heavy Duty Carrying Case for **IN2200RS**, Input Cables and Output Cables

RGB Installation Cables			
Coaxial Cables	3-Conductor	4-Conductor	5-Conductor
Standard Resolution		IN7000-4	IN7000-5
Standard Resolution, Plenum		IN7000P-4	IN7000P-5
Super High Resolution	IN7300-3	IN7300-4	IN7300-5
Super High Resolution, Plenum			IN7400P-5
Ultra High Resolution	IN7200-3	IN7200-5	IN7200-6

All cable grades are available in lengths from 3' to 250' pre-terminated with high quality BNC connectors or as bulk cable.

Troubleshooting

Problem: There is no image on the monitor / display device.

- **Solution 1:** Make sure that the IN9230 IEC power cable is securely plugged into the unit and the A/C source.
- **Solution 2:** Make sure the A/C source is live.
- **Solution 3:** Verify that the power switch is turned on for the video source, the IN2200RS and the monitor.
- **Solution 4:** Verify the connection to the output display device.

Problem: The display device connected to the IN2200RS output has a bad / scrambled image.

- **Solution 1:** The display device connected to the output of the interface may not be compatible with the computer output. PC, MAC, SUN and other high-resolution workstations have new and ultra high-resolution modes such as 1600 x 1200 and 1800 x 1440, and can output a video signal with a horizontal scan rate of over 100 KHz! Many data monitors and data projectors are not compatible with these resolutions and frequencies.
- **Solution 2:** Check the dipswitch settings to make sure the unit is outputting a sync format that the display device can use. For most applications the default dipswitch settings will work best (see page 10).
- **Solution 3:** The output cable may have a bad sync line. Try running the sync through another cable.

Problem: The local monitor looks fine but the image on the Data Projector / Data Display is wavy or has vertical bars in the picture.

- **Solution 1:** LCD / DMD displays work best when the sync signal has minimum sync processing. Set the interface dipswitches as indicated in the Optimal Settings for LCD / DMD / D-ILA / Plasma Displays Section on page 11. Setting the interface to RGBHV output and disabling the horizontal position control may alleviate this problem.
- **Solution 2:** LCD / DMD displays often have an adjustment called Phase Adjust or Fine Phase Control. This control should be adjusted to provide the best image.

Problem: The output image is too green.

- **Solution:** The dipswitches may be set for Sync on Green output. Try changing the dipswitches to factory default so the unit outputs an RGBHV signal (see page 10).

Problem: The output image is missing a color.

- **Solution:** The RGB output cable may be bad. Try switching connections on the output to verify that the bad color's cable is OK (*Example:* If there is no red, try running the green output through the red cable and see if green is displayed or not).

Problem: The image on the display device is not centered.

- **Solution:** Adjust the Position Control (see page 9).

Problem: The position control's horizontal adjustment is not working.

- **Solution 1:** Check the dipswitch settings to see if the horizontal position control has been disabled.
- **Solution 2:** The input setting may be RGSB (sync on green). The horizontal position control does *not* work with RGSB input signals.

Problem: The front panel controls are not responding.

- **Solution:** The front panel operation dipswitch may be disabled.

Problem: The image on the display device is fuzzy.

- **Solution:** Adjust the Sharpness / Gain Control until the image regains its detail.

Problem: The output image is very bright and appears "overdriven" with poor contrast.

- **Solution 1:** The gain may be set to high. Reduce the gain as required.
- **Solution 2:** Check the contrast and brightness settings on the display device. Many CRT display devices look best with the contrast set toward the upper end of the adjustment range (75 - 95%) and the brightness set towards the middle of the adjustment range (40 - 60%).

Problem: There unit is not responding to serial commands.

- **Solution 1:** Make sure that the baud rates of the controller and the unit match (factory default is [ACI6] or 9600).
- **Solution 2:** Make sure the controller is configured as eight data bits, one stop bit and no parity.
- **Solution 3:** Make sure that the correct command codes are being used (factory default is [CMDCD0] or '[]').
- **Solution 4:** Make sure that the connector cable is properly inserted into both / all units.

Problem: There is no audio output.

- **Solution 1:** Verify that power is present and that the power switch is turned on for the audio source, the **IN2200RS** and the amplifier / speakers.
- **Solution 2:** Verify that the audio source is connected to the correct input.
- **Solution 3:** The audio output of the **IN2200RS** is line level audio *only*. It should be connected to a mixer / amplifier or to amplified "computer type" speakers.
- **Solution 4:** Verify that the 3.5mm Mini DIN connectors are wired correctly (see the **Stereo Audio Switching** Section on pages 16 & 17).
- **Solution 5:** Verify that the internal jumpers are set properly (see the **IN2200RS Internal Controls** Section on pages 17 & 18).

If problems persist, call INLINE Technical Services at (714) 921-4100 for further assistance.

Warranty

- INLINE warrants the equipment it manufactures to be free from defects in materials and workmanship.
- If equipment fails because of such defects and INLINE is notified within two (2) years from the date of shipment, INLINE will, at its option, repair or replace the equipment at its plant, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications.
- Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of re-shipment to the Buyer.
- **This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.**

The information in this manual has been carefully checked and is believed to be accurate. However, INLINE, Inc. assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will INLINE, Inc. be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding **IN2200RS** features and specifications is subject to change without notice.

Apple, Mac and Macintosh are registered trademarks of Apple Computer, Inc. Sun, Sun Microsystems and the Sun Logo are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. SGI is a trademark of Silicon Graphics, Inc. All other trademarks and registered trademarks are the property of their respective companies.

© Copyright 2001 INLINE, Inc. All Rights Reserved.

INLINE, Inc. ♦ 810 West Taft ♦ Orange, CA 92865

800-882-7117 ♦ 714-450-1800 ♦ Fax 714-450-1850 ♦ www.inlineinc.com