INLINE ®

A WORLD OF A/V SOLUTIONS

INTERFACES

IN2022HR HIGH RESOLUTION
VGA & MAC INTERFACE

IN2022HR

OPERATION MANUAL

High Resolution Video Products • A/V System Integration Tools • Interactive Training Systems

⚠ 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 ausgewechselt 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.

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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.

Product Overview

DESCRIPTION

The **IN2022HR** is a high performance, dual function, computer video interface for VGA and MAC-type video signals. The unit features a permanently attached, dual-headed input cable, optimized for high-resolution signals. Like other INLINE interfaces, the **IN2022HR** performs the following functions:

- **Signal Splitting** - allows the simultaneous connection and viewing of both the computer's local monitor and a second output device such as an LCD data projector or a presentation monitor.

- **Physical Interfacing -**The **IN2022HR** connects directly to VGA and MAC G3 & G4 computers with 15-pin HD video connectors, or older Macintosh family computers with 15-pin D video connectors.

- **Electronic Interfacing -** Dipswitches located on the bottom of the interface allow users to manually select output sync signal characteristics, or allow the unit to make the conversions automatically.

KEY CONCEPT
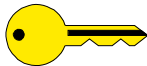
> *The **IN2022HR** is not a scan converter. The data projector, monitor or other output device must be compatible with the horizontal scan rate, vertical scan rate and resolution output by the computer video card.*

PRODUCT FEATURES

Universal Compatibility for VGA and MAC Computers - When connected to the appropriate input connector on the dual-headed input cable, the interface will automatically configure itself for VGA or MAC operation.

Ultra High-Resolution Amplification - The **IN2022HR** provides superb performance with analog video signals, even at 1600 x 1200 resolution.

Buffered Local Monitor Output - Ensures the highest quality display on a VGA or MAC local monitor.

Dual Outputs - With dual sets of BNC output connectors, the **IN2022HR** can drive two data displays in addition to a local monitor.

Flexible Monitor Emulation - The interface is set at the factory to pass all sense pins through to the local monitor, ensuring that the graphics card sees the sense signals from the attached monitor and sets itself to the appropriate resolution, refresh rate or frequency.

Dipswitches are Provided - to emulate virtually any local data display device, eliminating the need for costly termination or monitor emulation plugs.

Universal Power Supply - An internal switch mode power transformer operates with line conditions worldwide. Compatible with 90 - 260 VAC; 47 - 63 Hz.

Convenient Controls - offer intuitive one-touch command capability over the most important signal adjustments.

- **Gain Control -** adjusts the voltage level of the RGB components simultaneously (ensuring that gray scale is maintained), and may be used to compensate for signal loss due to long cable runs.

- **Sharpness Control -** provides effective image enhancement for high-resolution video signals by increasing clarity and edge detail.

- **Horizontal Position Control -** allows the picture to be centered precisely on the data display screen.

Compatibility

INPUT
The **IN2022HR** will accept high-resolution video signals from VGA or MAC-type video cards. Input signal compatibility parameters are:

|	
Video Signal:	Analog RGB Video
Connector:	15-Pin HD female or 15-pin D female video output port*
Signal format:	RGsB, RGBS or RGBHV
Horizontal Frequency Range:	15 KHz to 135 KHz
Vertical Refresh Rates:	30 Hz to 120 Hz

KEY CONCEPT
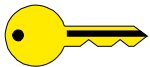
* Newer MAC G3 and G4 models (with translucent cases) have 15-pin HD connectors (pins arranged in three rows). Older G3 models (with solid white enclosures) incorporate 15-pin D connectors (pins arranged in two rows).

OUTPUT
The **IN2022HR** outputs an analog RGsB, RGBS, RGBHV or Composite Monochrome signal on female BNC connectors. This output signal is compatible with high-resolution data grade monitors and data / graphics projectors.

KEY CONCEPT
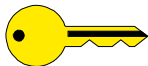
VGA and MAC computers operate in several video modes encompassing a wide range of resolutions and scan rates. Many of the video signals from the newest models can run as high as 70 KHz or more, with the newest VGA cards offering an output resolution of 1600 x 1200 (some can even go as high as 1920 x 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 **IN2022HR**. An **Application Diagram** is provided on the following page.

1.) **Turn the Computer and Computer Monitor Off -** Disconnect the monitor from the computer's video port.

2.) **Connect the IN2022HR Input Cable -** to the computer's video output port. The input cable is the 4' long "Y" cable permanently attached to the interface. Connect one of the connectors on this cable to the computer's video port as per the instructions below:

   ▪ **PC Compatible Computers (VGA) and Newer MAC G3 & G4 -** Connect the 15-pin HD connector on the **IN2022HR** input cable to the computer video output port (see diagram to the right). *Do not connect anything to the 15-pin D input connector.*
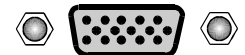
   ▪ **MAC Computers (older models) -** Connect the 15-pin D connector on the **IN2022HR** input cable to the computer video output port (see diagram to the right). *Do not connect anything to the 15-pin HD input connector.*
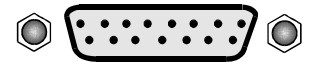
3.) **Connect the IN2022HR Video Output** - (5 BNC connectors) to the data display device's RGB input, using three, four, or five high-resolution BNC cables or a multi-conductor RGBHV, RGBS, or RGB "snake". The **IN7000 Series, IN7200 Series, IN7300 Series** and **IN7400P Series** high-resolution cables are well suited for this purpose. Take care while making connections to ensure that the red output is connected to the red input, green output to the green input, etc.

4.) **Select the Output Sync Format -** The interface will automatically set the output sync format according to the number of cables connected to the output. Users can to override the automatic output format feature and manually select a specific format by setting the dipswitches according to the chart on page 6.

5.) **Connect the Local Computer Monitor** - (if present) to the appropriate Local Monitor Output Port on the **IN2022HR**.

   ▪ **For Applications that Require a Local Monitor -** make sure that all dip switches on the bottom, right–hand side of the box labeled MONITOR EMULATION are set to "0".

   ▪ **If no Local Monitor is Required -** refer to the **Monitor Emulation** Cart on page 9.
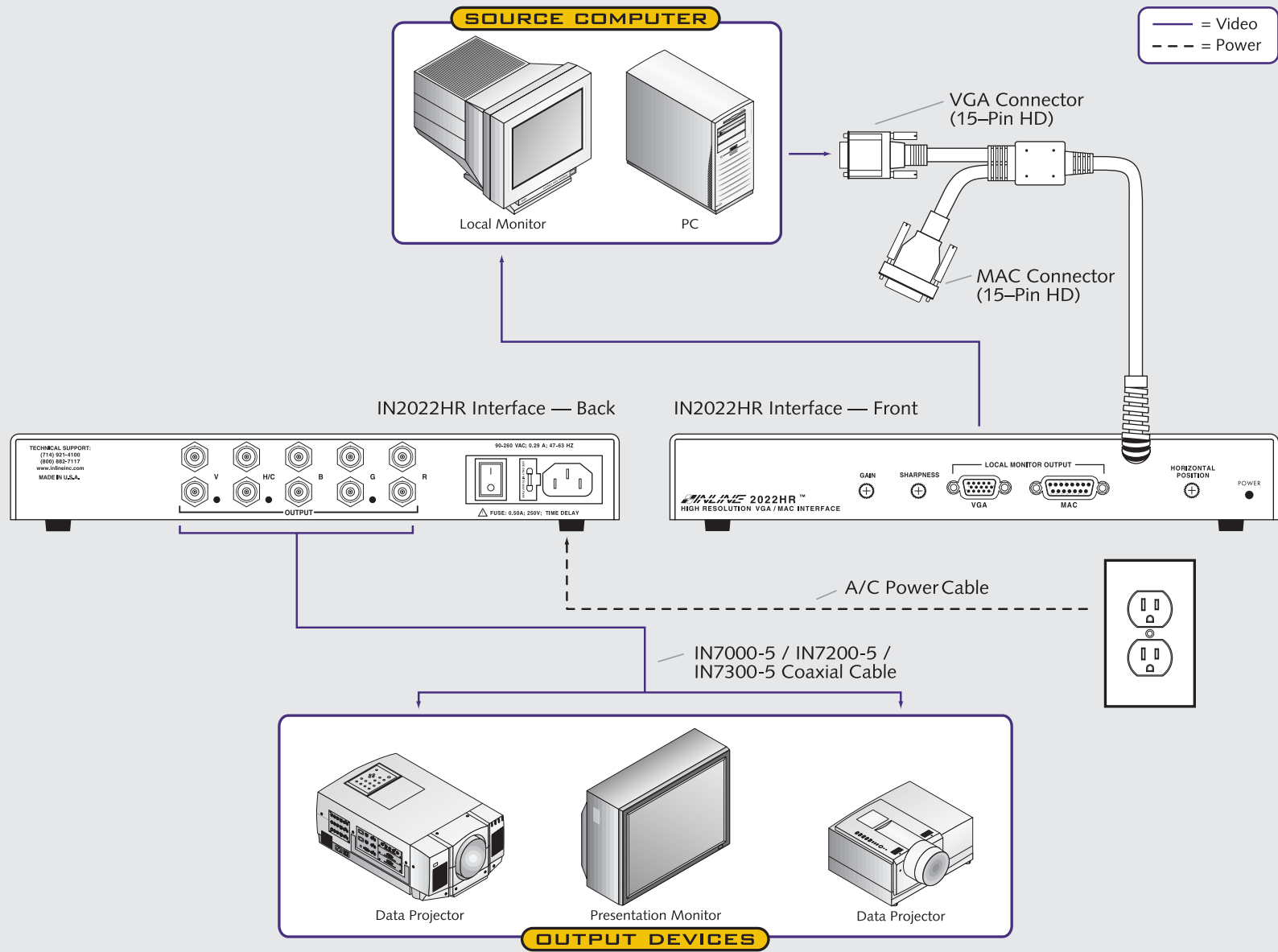
KEY CONCEPT
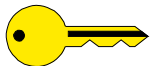
> *Check the Monitor Emulation chart and dipswitch settings carefully. An improper setting of the emulation dipswitches may lead to improper operation and could even result in severe damage to the computer video port or the monitor. If there is any doubt as to which monitor emulation setting is correct, connect a local monitor and set all the Monitor Emulation dipswitches to "0." The interface will adjust the video output automatically.*

6.) **Apply A/C Power -** to the **IN2022HR** using the **IN9230** IEC power cable (included).

7.) **Turn the IN2022HR, the Computer and the Computer Monitor on** - If necessary, adjust the gain, sharpness and horizontal position controls (see pages 5 & 6 for more details).

IN2022HR **HIGH RESOLUTION VGA & MAC INTERFACE**   APPLICATION DIAGRAM

SOURCE COMPUTER

Local Monitor   PC

—— = Video
- - - = Power

VGA Connector
(15–Pin HD)

MAC Connector
(15–Pin HD)

IN2022HR Interface — Back   IN2022HR Interface — Front

TECHNICAL SUPPORT:
(714) 921-4100
(800) 882-7117
www.inlineinc.com
MADE IN U.S.A.

90–260 VAC; 0.29 A; 47–63 HZ

V   H/C   B   G   R

OUTPUT

⚠ FUSE: 0.50A; 250V; TIME DELAY

INLINE 2022HR ™
HIGH RESOLUTION VGA / MAC INTERFACE

GAIN   SHARPNESS   LOCAL MONITOR OUTPUT   HORIZONTAL POSITION   POWER

VGA   MAC

A/C Power Cable

IN7000-5 / IN7200-5 /
IN7300-5 Coaxial Cable

Data Projector   Presentation Monitor   Data Projector

OUTPUT DEVICES

Front Panel Controls

The **IN2022HR** features fully automatic operation, however, the interface offers several external controls that allow users to optimize the unit's performance to meet the needs of specialized applications. Gain, sharpness and horizontal position control adjustments are located on the front of the **IN2022HR**. Turning the adjustments clockwise will increase the value, and counterclockwise will decrease it.

GAIN CONTROL
The gain control is a small black knob located on the left side of the unit's front panel. The gain control adjusts 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 .7 in the minimum position (30% decrease) and 1.3 in the maximum position (30% increase). The factory default setting is 1.0 (unity gain).

SHARPNESS CONTROL
The **IN2022HR** sharpness / peaking circuitry provides variable high frequency equalization that can compensate for high frequency losses due to long output cable runs. The amount of high frequency boost required 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.

The sharpness control is located between the gain control knob and the local monitor output port. 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.

HORIZONTAL POSITION CONTROL
The horizontal position control is a small black knob located adjacent to the front panel power LED display. This adjustment allows users to shift the position of the image on the data display device from left to right. The horizontal position control does not effect the local monitor.

If the horizontal position adjustment is set to an extreme position on either the display device or the **IN2022HR**, the output image may appear dark and / or the colors may be displayed improperly. To position the video image and achieve optimum picture quality:

1. Set the display device's horizontal position control to the center of its adjustment range.

2. Adjust the horizontal position control on the **IN2022HR** until the picture is centered properly on the display device.

Horizontal Position Control Enable / Disable - The factory default setting is horizontal position control enabled. In rare cases (depending on the design of the display device sync circuitry), operators may have to disable the horizontal position control to achieve a solid image on the display device. The horizontal position control may be enabled or disabled by setting the appropriate switch in Dipswitch Bank #1 as indicated in the chart below.

Dipswitch Settings

Two dipswitch banks are easily accessed through windows on the bottom of the **IN2022HR**. Bank #1 regulates the output sync format, and Bank #2 determines the monitor emulation settings.

DIPSWITCH BANK #1
For most installations, the **IN2022HR** will be operated in the factory default mode and will not require any changes to the dipswitch settings. The factory default settings are:

BANK 1 Dipswitches ON:	1, 3, 5, 6, & 7
Output Signal Format:	Auto Sense Enabled - Interface Selects Format
Horizontal Position Control:	Enabled
H & V Sync Polarity:	Mirror Input Polarities

The following table lists the functions of the dipswitches:

| Switch 1	Function	Setting
#1	Horizontal Position Control	1 - Enabled* 0 - Disabled
#2	Output Sync Format: Sync on Green	1 - Sync on Green 0 - RGBHV / RGBS
#3	Output Sync Format: RGBHV / RGBS	1 - RGBHV* 0 - RGBS
#4	Output Sync Polarity	1 - Forced Negative 0 - Mirror Input
#5	Output Sync Formation: Auto Sense / Manual	1 - Auto Sensitive* 0 - Manual
#6	Serration Pulses	1 - Serrations Present* 0 - No Serrations
#7	Output Video Format RGB / Monochrome Video	1 - RGB* 0 - Monochrome on Green BNC
#8	Reserved	
#9	Reserved	
#10	Reserved	

* Factory Default Setting

OUTPUT SIGNAL FORMAT SELECTION

Automatic Sense Mode - In the factory default configuration, the **IN2022HR** automatically senses the number of cables connected to the output BNC connectors and selects the appropriate output signal format. LED indicators located next to the V/Sync, H/Comp Sync and Green output BNCs (on the back of the interface) provide clear visual confirmation of the current output sync format. In order for output format auto sense circuit to operate, dipswitch 5 must be set to 1.

Manual Mode - Some applications will require the interface to operate in a specific output format, thus requiring users to override the automatic sense mode. To set the output sync format manually, users must first disable the auto sense circuit by setting dipswitch #5 to 0, and then setting select dipswitches according to the table below (to set the desired output format).

Output Format	Dipswitch Settings (Bank #1)
RGBHV	2 = 0 3 = 1 5 = 0
RGBS	2 = 0 3 = 0 5 = 0
RGsB	2 = 1 3 = 1 5 = 0 7 = 1
Composite Monochrome on Green BNC	2 = 1 3 = 1 5 = 0 7 = 0

KEY CONCEPT
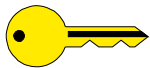
Keep in mind that PCs and MACs operate in several video modes encompassing a wide range of resolutions and scan rates. The data projector or monitor must be compatible with the horizontal scan and vertical refresh rate of the computer's video signal. Please check the documentation for both the computer graphics card and the data display device to ensure compatibility.
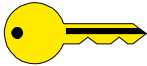
DIPSWITCH BANK 2: MONITOR EMULATION

The **IN2022HR** includes a bank of 10 dipswitches on the bottom of the interface for monitor emulation. Setting the dipswitches to the appropriate positions allows the unit to emulate the appropriate sense signals, thus setting the video card to the desired frequency, refresh rate and resolution, even without a local monitor. When configured properly, the interface can emulate virtually any type of monitor.

Using the IN2022HR with a Local Monitor - Many high-resolution graphic workstations use sense signals to set resolution, horizontal frequency and vertical refresh rate. The **IN2022HR** passes all sense pins between the computer video port and the Local Monitor, ensuring that the computer can sense the attached monitor and set itself to an appropriate resolution and scan rate for that device. **The Monitor Emulation dipswitches must all be set to "0" when using a local monitor. This allows all sense pins to pass through, ensuring proper operation of the graphics card and monitor.**

Using the IN2022HR without a Local Monitor - The **IN2022HR**'s design makes it easy to use the interface without a local monitor. Because the Local Monitor Output port is buffered, there is no need for a termination plug to terminate the video signals when used without a local display device. If you are not using a local monitor, but need to emulate a specific mode, locate your workstation type and desired mode in the chart on the following page. If you are not sure of the exact mode to select for your computer, select the setting shown in **bold** since it is the most common mode. Using the **IN9339** Adjustment Tool (provided), gently set the dipswitches to the appropriate settings.

KEY CONCEPT

Check the Monitor Emulation chart and the IN2022HR dipswitch settings carefully. An improper 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. Some modes listed on the following page may not be supported by certain workstations / graphics cards.

MONITOR EMULATION DIPSWITCH CHART

Make / Mode	Dipswitch Settings
PC Compatibles	
VGA Color (also SVGA, XGA, XGA2)	**0100000000**
MAC II Type Video Cards	
12" RGB Monitor - 512 x 384 / 24.5 KHz	1010000000
13"/14" RGB Monitor - 640 x 480 / 35 KHz	**1000000000**
15" RGB Monitor - 640 x 870 / 68.9 KHz	0100000000
16" RGB Monitor - 832 x 624 / 49.7 KHz	0000001100
19" RGB Monitor - 1024 x 768 / 60.24 KHz	0000000011
21" RGB Monitor - 1152 x 870 / 68.7 KHz	1110000000
14"/15" Multi Scan Monitor - 640 x 480 or 832 x 624	1000110101
16"/17" Multi Scan Monitor - 640 x 480, 832 x 624 or 1024 x 768	1000010101
20"/21" Multi Scan Monitor - 640 x 480, 832 x 624, 1024 x 768, 1152 x 870	1000100101
15" Full Page Monochrome Monitor - 640 x 870 / 68.9 KHz	0110000000
Dual Page 21" Monochrome Monitor - 1152 x 870 / 68.7 KHz	0010000000
VGA / SVGA Emulation - 640 x 480 or 800 x 600 / 31.5 KHz or 35.2 KHz	0000110000

PIN OUTS - INPUT CABLE / LOCAL MONITOR OUTPUTS

Pin #	15-Pin HD	15-Pin D
1	Red Signal	Red Ground
2	Green Signal	Red Signal
3	Blue Signal	Composite Sync
4	ID Bit 2	Sense Pin 1
5	N/C	Green Signal
6	Red Ground	Green Ground
7	Green Ground	Sense Pin 2
8	Blue Ground	N/C
9	N/C	Blue Signal
10	Ground	Sense Pin 3
11	ID Bit 0	C & V Sync Grounds
12	ID Bit 1	Vertical Sync
13	Horizontal Sync	Blue Ground
14	Vertical Sync	H. Sync Ground
15	ID Bit 3	Horizontal Sync

Specifications

IN2022HR High Resolution VGA & MAC Interface	
Input	
Connector type	15-Pin HD male & 15-Pin D male on 4' Cable
RGB Video Signals	Analog, 1.5 Vp-p max.
Input Impedance	75 Ohms
Sync Signals	TTL compatible
Signal Format	RGBHV / RGBS / RGsB / RGBHVS
Horizontal Scan Range	15.0 KHz - 135.0 KHz
Vertical Scan Range	30 Hz - 120 Hz
Local Monitor Output	
Connector Type	15-Pin HD female & 15-Pin D female, buffered output, sync format same as input
Data Display Outputs	
Connector Type	2 Sets of (5) BNC female
Output Signal Formats	RGBHV / RGBS / RGsB / Composite Monochrome
RGB Signals	Analog Video, 75 ohm impedance
Bandwidth	230 MHz @ -3 dB
Rise and Fall Times	1.5 nano seconds
Gain	Adjustable from .7 – 1.4
Sync Signal	H, V and S: 5V unterminated and 2Vp-p 75 ohm terminated Sync on Green: 0.3 Vp-p 75 Ohm terminated
Horizontal Pulse Width	30 KHz - 40 KHz: 1.5 μSec; >40 KHz: 0.7 μSec
Vertical Pulse Width	Same as the input signal + 11 μSec
Controls	
External	Horizontal Position Control, Video Gain, Sharpness, Input Computer Select, Monitor Emulation, Dipswitch Bank #1
Dimensions	
Size	1.75" H x 11.75" W x 6.5" D
Product Weight	2 lb. / 1 kg.
Shipping Weight	5 lb. / 2.5 kg.
Power	
Power Supply	Internal Switch Mode: 90 - 260 VAC; 47 - 63 Hz
Power Consumption	14.5 Watts
Regulatory Compliance	
Safety & EMI	UL 1950, 3rd Ed.; CE: EN60950-92; CAN/CSA-22.2 No. 950 3rd Ed. FCC class A; CE: EN50081-1, EN55022, EN50082-1

Parts Included
(1) **IN2022HR** Interface
(1) **IN9230** IEC to Edison Power Cord (US Only)
(1) **IN9339** INLINE Adjustment Tool
(1) Operation Manual

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: The display device connected to the RGB output has a bad/scrambled image.
- **Solution 1:** The display device connected to the output of the **IN2022HR** may not be compatible with the computer output. Many PCs and MACs 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:** The output cable may have a bad sync line. Try running the sync through another cable.
- **Solution 3:** The **IN2022HR** output sync format may not be compatible with the display device. Check the documentation for both the computer graphics card and the data display device to ensure compatibility.
- **Solution 4: You may not connect both a PC and a MAC to the IN2022HR simultaneously!** Connect one or the other.

Problem: The power switch is turned on, but the front panel POWER LED is dark.
- **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:** The **IN2022HR** contains a time delay fuse. To change the fuse, disconnect the **IN9230** IEC power cable and slide out the fuse holder (located on the rear panel to the left of the IEC cable receptacle) using the **IN9339** INLINE adjustment tool.

Problem: The output image is very dark.
- **Solution:**   The horizontal position control may be set to an extreme position or may be interacting poorly with the horizontal position control on the display device. Follow the horizontal position adjustment procedure on page 5.

Problem: The output image is missing a color.
- **Solution:**   The output RGB 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 MAC connected to the IN2022HR is not booting up in the right resolution mode.
- **Solution:**   The monitor emulation dipswitches on the bottom of the **IN2022HR** are probably forcing the computer into the wrong mode. When using a local monitor, set all monitor emulation dipswitches to 0.

Problem: A laptop is connected to the IN2022HR input. The display device connected to the IN2022HR main output (5 BNCs) is not showing an image.
- **Solution 1:** All monitor emulation dipswitches must be set and all connections must be made *before* powering up the laptop. This tells the laptop to make the video port active.
- **Solution 2:** The laptop's video port may require a keystroke to make the video port active. Many laptops have a key with a monitor shaped icon that activates the external video port. With many laptops, each time you press the monitor key, the video will cycle between the three possible video modes: Laptop display screen active / external video port active / Laptop display screen and external video port active.

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.**

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