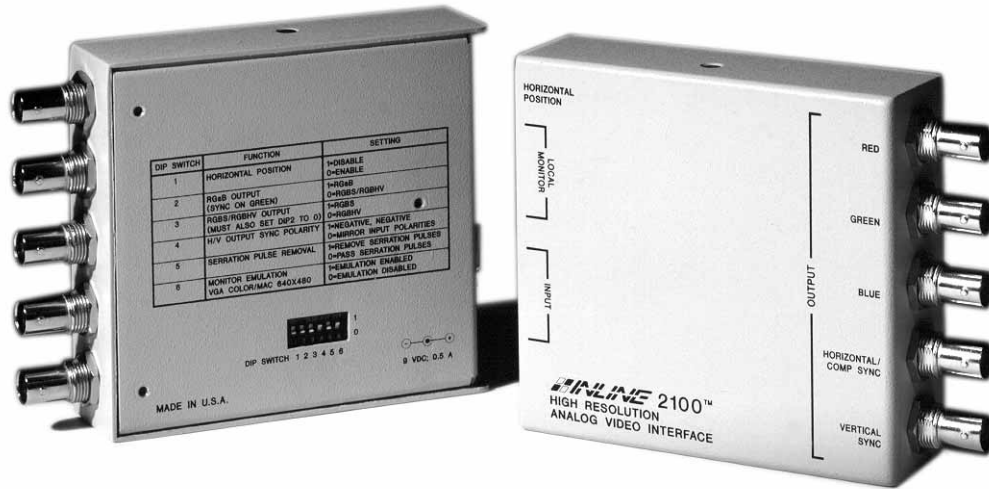


Operation Manual



IN2100 High Resolution Analog Video Interface



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DESCRIPTION

The **IN2100** is a high performance computer video interfaces for analog video signals including VGA, SVGA, XGA, MAC, SUN and other high resolution workstations. Like other Inline interfaces, the **IN2100** 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 a large screen data projector, monitor, or color printer.

Physical Interfacing - Computers employ many different types of video output connectors, making it difficult to hook up computers directly to data projection devices. The **IN2100** simplify interfacing, routing, and switching tasks by acting as universal adapters. Through the use of removable input cables, the **IN2100** can be attached to different computers and will provide a video output signal on five BNC connectors which can easily be connected to an RGB display device. The output signal format may be set to any of the following formats: RGBHV (default), RGBS, and RGsB.

KEY CONCEPT



*The **IN2100** is not a scan converter. The data projector, monitor, or other output device must be compatible with the horizontal scan rate output by the computer video card.*

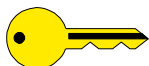
The **IN2100** Universal interface offers easy operation and the following features:

- ◆ **400 MHz Bandwidth** - High performance interface design ensures that video signals will be interfaced with no loss of image detail.
- ◆ **Analog Interface** - the unit will operate with Analog Video with TTL level sync signals. The sync can be separate H & V or composite sync.
- ◆ **VGA Input and Output** - the input and output are directly compatible with VGA, SVGA and XGA graphic cards. Other computer types can be connected via input and output adapters
- ◆ **Buffered Local Monitor Output** - provides a buffered output to be connected to the local computer monitor.
- ◆ **Monitor Emulation Switch** - eliminates the need for a termination plug if a local monitor is not used. Emulates a color VGA monitor or a 13/14" 640x480 Apple monitor.
- ◆ **Flexible Output Signal Formats** - RGBHV (default), RGBS, and RGsB
- ◆ **Horizontal Position Control** - allows picture to be centered precisely on the data display screen.
- ◆ **Sync Polarity Preservation Switch**- for RGBHV signals in and out, enables the sync polarity to be preserved, or to set them for negative polarity.
- ◆ **Serration Pulse Removal Switch** - for RGBS output, enables the user to remove serration pulses from the sync output.

INPUT COMPATIBILITY

The **IN2100** will accept analog video signals with composite or separate TTL level sync signals (RGBS or RGBHV.) The unit will not strip the sync off of the green video. Therefore, if a sync on green signal (RGsB) is sent to the unit, it will simply pass through to the output as RGsB.

KEY CONCEPT



*The input pin configuration of the **IN2100** is VGA compatible. Therefore, it **DOES NOT** use IN5100 series input cables like other Inline Universal Interfaces. You can use a standard VGA cable for VGA applications, and other adapters are available for MAC, Sun Sparc, and other computers.*

The following cables are available to enable the **IN2100** to operate with the computers shown:

Computer Type	Part #	Description
VGA/SVGA/XGA	IN8006	6 ft. VGA cable (can be used for input and output.)
MACII/Quadra/Power MAC	IN9140	6 ft. Mac input cable
MACII/Quadra/Power MAC	IN9141	3 ft. Mac local monitor output cable
MACII/Quadra/Power MAC	IN9144	25 ft. Mac input cable
Sun Sparc	IN9142	6 ft. Sun Sparc input cable
Sun Sparc	IN9143	3 ft. Sun Sparc local monitor output cable
Sun Sparc	IN9147	25 ft. Sun Sparc input cable
5 BNC for RGBHV	IN9048	6 ft. 5 BNC to female VGA connector for Input to IN2100
5 BNC for RGBHV	IN9046	12 ft. 5 BNC to female VGA connector for Input to IN2100
5 BNC for RGBHV	IN9047	6 ft. 5 BNC to male VGA connector for local monitor output

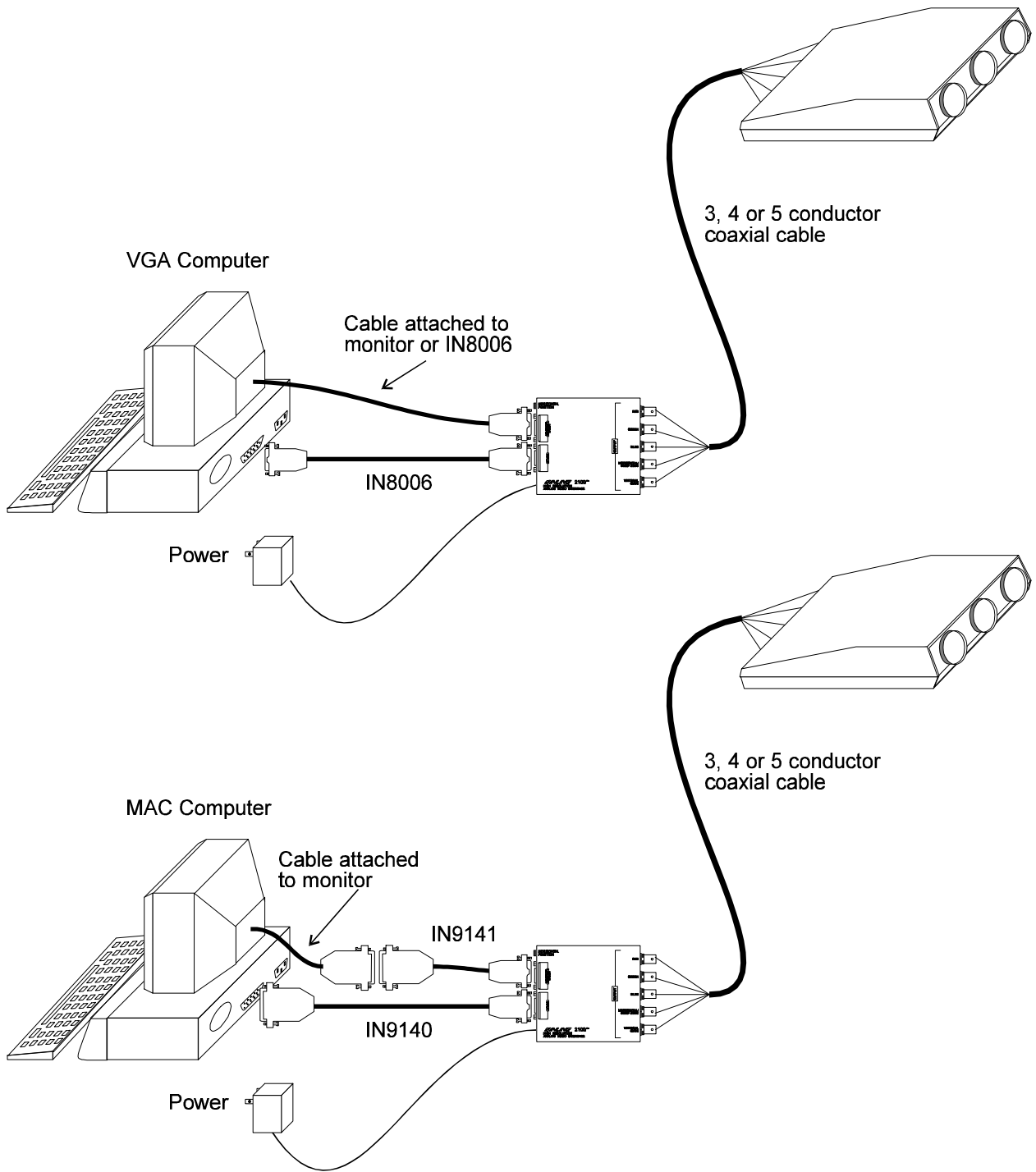
OUTPUT COMPATIBILITY

The **IN2100** outputs analog video signals with various sync formats. The output sync is determined by dip switch settings and can be set to output RGSB, RGSB or RGBHV.

INSTALLATION

This section offers step-by-step instructions for installing the **IN2100**. See the next page for a diagram.

1. Turn the computer and computer monitor off. Disconnect the computer monitor (if present) from the video output port on the computer.
2. Connect the output of the computer to the Input of the **IN2100** with the appropriate input cable.
3. Connect the local computer monitor (if present) to the local monitor output of the **IN2100**. If no local monitor is used, set the monitor emulation dip switch to emulate a color VGA monitor or a 13/14" MAC 640x480 monitor.
4. Connect the **IN2100** 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, RGSB, or RGB "snake". The **IN7000 Series**, **IN7100 Series** and **IN7200 Series** high resolution cables are well suited for this purpose. Take care while making connections to insure that the red output is connected to the red input, green output to the green input, etc.
5. Set the dip switches for the requirements of your installation. The **IN2100** factory default output format is RGBHV. If your display device, routing system, or cabling require a different format, use the dip switches to change the output signal to RGSB or RGSB as desire.
6. Connect the 9 VDC, 500 mA power adapter to the IN2100. The LED next to the power jack should light to indicate it is on.
7. Complete the installation by turning the computer and computer monitor on. If required, adjust the horizontal position control.

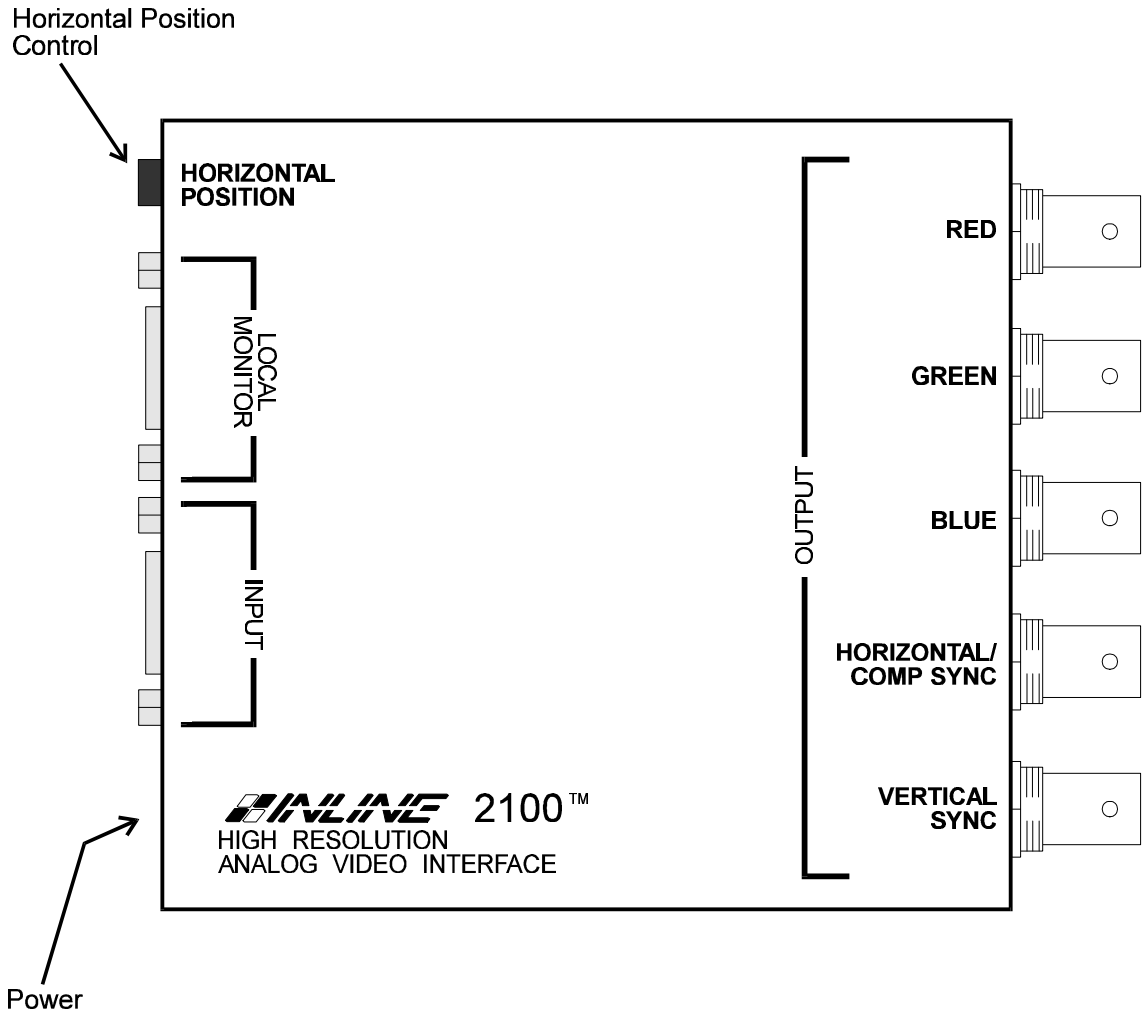


HORIZONTAL POSITION CONTROL

The location of the horizontal position control is diagrammed below. The horizontal position control adjusts the position of the image on the data display device from left to right (it has no effect on the local computer monitor).

Many data projectors and monitors have their own horizontal position control, and the interaction of the display device's horizontal control and the interface's horizontal control may result in a dark image on the data display. The following procedure is suggested to ensure best results:

1. Adjust the **IN2100** horizontal position control so a good quality image is displayed. This control should not be set to an extreme position.
2. Adjust the display device horizontal position control until the image is centered as desired.
3. If the image appears dark or the colors are not properly displayed, fine tune the controls on both the display device and the interface until the picture is centered and a good quality image is attained.



DIP SWITCH SETTINGS

Most installations will not require any changes to the dip switch settings, and the **IN2100** will generally be operated with the factory default settings. The Factory Default setting and specialized dip switch settings are indicated below.

Factory Default Settings



Dip Switches ON: 2 & 4

Signal Format: Red / Green / Blue / Horizontal and Vertical Sync

Horizontal Position Control: Enabled

H & V Sync Polarity: Negative, Negative

Monitor Emulation: Disabled

With the exception of Dip Switch 6, all Dip Switches only affect the BNC output signal. They do not affect the local monitor output.

Dip Switch 1 - Horizontal Position Control:

- 1 When enabled, the Horizontal Position control can be used to center the image of the BNC output.
- 0 The Horizontal Position control is disabled. The output sync timing (position, pulse width, etc.) is very similar to the input sync signal.

Dip Switch 2 - Sync on Green Output:

- 1 No sync on green. The output sync will be determined by dip switch 3.
- 0 The output will be RGB (Sync on Green video.)

Dip Switch 3 - RGBS/RGBHV Output:

Dip switch 2 must be set to 1 for this dip switch to affect the output sync format.

- 1 RGBS output.
- 0 RGBHV output.

Dip Switch 4 - Horizontal and Vertical Sync Polarity:

This function is only valid when the input signal has separate Horizontal and Vertical sync signals and the **IN2100** is set for RGBHV output (Dip switch 2 must be set to 1 and dip switch 3 to 0.)

- 1 The Horizontal and Vertical sync signals will have a negative polarity regardless of the polarity of the input signal.
- 0 The polarity of the Horizontal and Vertical sync signals will mirror the polarity of the input signal.

Dip Switch 5 - Serration Pulse Removal:

This function is only valid when the **IN2100** is set for an RGBS output.

- 1 The output composite sync signal will not have serration pulses.
- 0 The output composite sync signal will pass serration pulses.

Dip Switch 6 - Monitor Emulation:

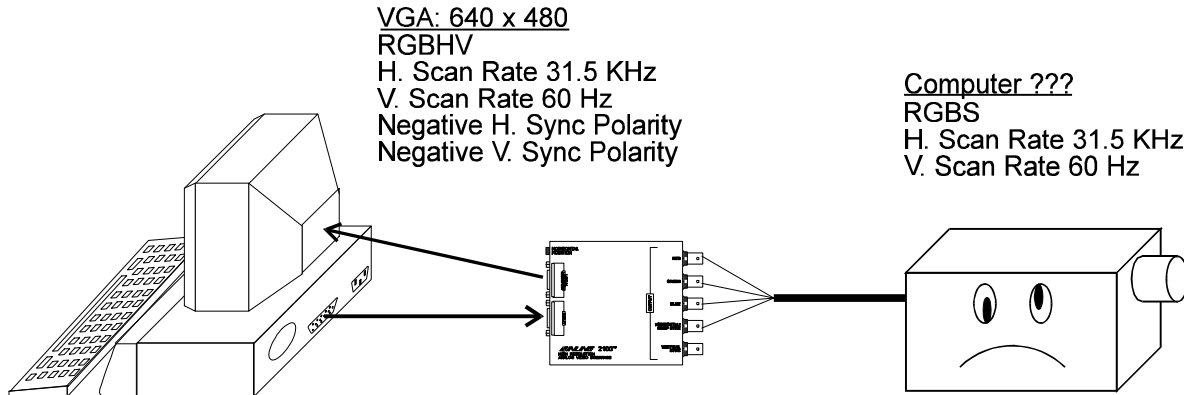
This switch can be used to emulate a local monitor is one is not present (such as in the case of a laptop.) The **IN2100** automatically provides 75 Ohm termination for the video, and this switch provides an ID bit identification to emulate a color VGA monitor or 13"/14" Apple color monitor (640x480.)

- 1 Emulate the presence of a monitor.
- 0 Do not emulate a monitor. There must be a monitor to ensure a proper output from the computer.

SPECIAL APPLICATION: LCD DISPLAY DEVICES

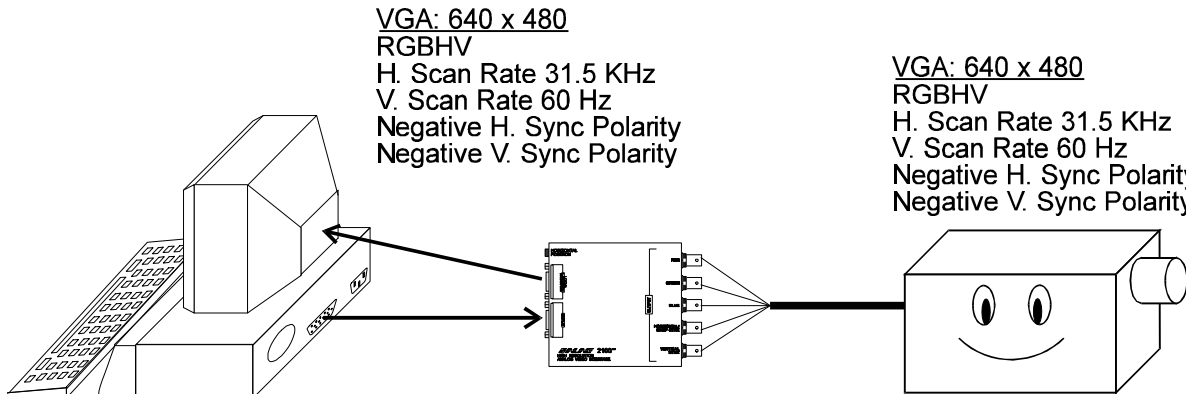
When using an Interface with an LCD panel or projector, some special considerations must be made. Many LCD display devices utilize a “look-up table” when identifying an input signal. The display device compares the parameters of the input signal to those in its table and looks for a match. If there is no match to the signal format it is receiving, it may not be able to display the image properly. Some parameters that the LCD devices use to recognize a signal are sync format, polarity, and horizontal and vertical scan rates.

An Interface is often used to change the sync format. However, in doing this, you might make the signal unrecognizable to the LCD device. For example, let’s look at a 640 x 480 VGA signal:



The user utilizing the **IN2100** interface to convert a VGA signal to an RGBS output. The LCD projector is expecting to see VGA as RGBHV at 31.5 KHz. Because the interface changes the signal format to RGBS, the LCD projector does not recognize the signal as VGA at 640 x 480 resolution. The resulting image may be the wrong size, scrambled, or nothing at all.

The solution is to set the **IN2100** for an RGBHV output so that the LCD projector can recognize it as VGA. In addition, you may need to set the dip switches to mirror the input sync polarities and/or disable the Horizontal position control.



TROUBLESHOOTING

The display device connected to the IN2100 output has a bad/scrambled image.

Solution 1: Verify that the correct input cable is being used.

Solution 2: The display device connected to the output of the interface may not be compatible with the computer output. VGA runs at 31.5 KHz, but SVGA can be as high as 48 - 58 KHz with newer modes such as 1600 x 1200 running at 79 KHz! MACII/Quadra computers sense which monitor is connected and configure themselves accordingly, with horizontal scan rates ranging from 24.48 to 68.9 KHz.

Solution 3: Check the dip switch settings to make sure the unit is putting out a sync format that the display device can use. For most applications the default dip switch settings (see Page 5) will work best.

Solution 4: The RGSB or RGBHV cable may have a bad sync line. Try running the sync through another cable.

The output image is very dark.

Solution: The horizontal position control may be set off to an extreme position or may be interacting poorly with the horizontal position control on the display device. Follow the horizontal position adjustment procedure listed on Page 4.

The output image is missing a color.

Solution: Possibly the output RGSB or RGBHV cable is 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.)

The output image is very bright and overdriven looking with poor contrast.

Solution 1: The signal may be unterminated. Check the internal termination jumpers to ensure they are set for 75 Ohm termination.

Solution 2: Check the contrast and brightness settings on the display device. Many CRT type 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%).

The output image is too green.

Solution 1: The dip switches may be set for Sync on Green output. Try changing the dip switches to output an RGSB or RGBHV signal.

Solution 2: Some older MACII computers output an RGSBS signal. Since the IN2100 does not strip the sync off of the green, the resulting output signal is actually RGSBS. The problem can be solved by disconnecting the composite sync signal from the display device, forcing the display to operate in Sync on Green mode. If the display absolutely must have an RGSB or RGBHV signal, then use an IN2005 or IN2025 with an IN5161A input cable.

The output image is doubled, with two images displayed side-by-side.

Solution: The display device may not be compatible with the horizontal scan rate of the computer. This problem often occurs when a 31.5 KHz VGA signal is sent into an RGB monitor which is only compatible with signals at 15.75 KHz.

If problems persist, call INLINE Technical Services at (800) 882-7117 for further assistance.

SPECIFICATIONS

Input	
Connector type	15 Pin HD Female - VGA Pin-Outs
RGB Video Signals	Analog, 0.7 Vp-p Nominal
Input Impedance	75 Ohms
Sync Signals	TTL compatible
Horizontal Scan Range	15.0 KHz - 135.0 KHz
Vertical Scan Range	30 Hz - 180 Hz
Output	
Connector Type	5 BNC Female connectors
Output Signal Formats	RGBHV (Default), RGSB or RGSB,
RGB Signals	Analog Video, 75 ohm impedance
Bandwidth	400 MHz @ -3 dB
Rise and Fall Times	0.875 nano seconds
Gain	1.0 ± 5%
Sync Signal	H, V and S: 5V unterminated and 2Vp-p 75 ohm terminated Gs: 0.3 Vp-p 75 Ohm terminated
Horizontal Pulse Width	Horizontal Position Enabled: approximately 1.5 µsec Horizontal Position Disabled: Approximately the same as the input signal
Vertical Pulse Width	Approximately the same as the input signal
Controls	
External	Horizontal Position Control Dip Switches
Internal	Untermination jumpers for red, green and blue
Dimensions	
Size	1.25" H x 5" W x 4" D
Shipping Weight	3 lb.
Power	
Power Supply	IN9204-X: External AC to DC Power Transformer, 9V 500 mA

Parts and Accessories Included
IN2100: IN9204-X
IN2100VGA: IN2100, IN8006, IN9204-X
IN2100MAC: IN2100, IN9140, IN9141, IN9204-X
IN2100WS: IN2100, IN9142, IN9143, IN9204-X

Optional Accessories	
IN8000 Series VGA Cable: Available in a variety of lengths from 3' to 100'	
IN9140: Mac input cable	IN9141: Mac local monitor output cable
IN9142: Sun Sparc input cable	IN9143: Sun Sparc local monitor output cable
IN7000-5 Series RGBHV Cable: Standard 5 - BNC Cable available in a variety of lengths from 6' to 250'	
IN7100-5 Series RGBHV Cable: High Resolution 5 - BNC Cable, available in lengths from 6' to 250'	
IN7200-5 Series RGBHV Cable: Ultra High Resolution 5 - BNC Cable, available in lengths from 6' to 250'	

CE COMPLIANCE

All products exported to Europe by Inline, Inc. after January 1, 1996 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)

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.



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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