



A WORLD OF A/V SOLUTIONS



SIGNAL CONVERTERS

**IN1700 COMPUTER TO VIDEO SCAN CONVERTER**  
WITH GENLOCK, COMPONENT VIDEO OUTPUT AND RS-232



**IN1700**  
**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.

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## Product Overview

### DESCRIPTION

The **IN1700** is a computer video scan converter that accepts computer video signals at resolutions of up to 1280 x 1024 and converts them to NTSC or PAL. Featuring a variety of output signal formats, flexible control options and exceptional output image quality, the **IN1700** is an excellent choice for presentation facilities, multi-media and video production suites, teleconferencing centers and other sites / applications requiring a high performance scan converter.

### FEATURES

**Flexible Input Signal Compatibility** - Offering scan conversion capability for computer video signals at resolutions as high as 1280 x 1024, the **IN1700** is compatible with RGBHV and RGBS computer video signals at horizontal scan rates up to 82 KHz and refreshes rates up to 120 Hz. The **IN1700** offers fully automatic operation, recognizing a wide variety of input signals and automatically sizing and centering the output image. The **IN9140M** reversible input adaptor cable (included) allows users to connect the **IN1700** directly to VGA, MAC, and SGI computers and local monitors featuring 15-pin HD or 15-pin D video connectors. The **IN1700** may also be connected to SUN, SGI and other high-resolution workstations featuring 13W3 or BNC video connectors by using optional input / output adapter and extension cables (see list on page 4).

**Variety of Video Outputs** - The **IN1700** local monitor output provides a loop-through signal (not scan converted) for a local computer monitor. The composite video output is always active, allowing users to select a second scan converted output in S-Video, Component Video or RGBS / RGBHV formats. The unit can be set for NTSC or PAL output as required.

**Advanced Flicker / Sharpness Control** - One of the keys to the **IN1700** scan converter's superb output image quality is an advanced flicker / sharpness filter that offers a remarkable flicker free video image with exceptional detail. By providing separate adjustments for horizontal and vertical filtering, the flicker / sharpness control lets users optimize the output image quality for various signal resolutions and different types of on-screen image content.

**Comprehensive Image Controls, Horizontal and Vertical Position Controls** and an **Underscan / Overscan Control** make it easy to center and size the output video image to accommodate different display devices. The **Zoom** function offers 2X image magnification and lets presenters emphasize one part of the screen, or enhance the visibility of extremely fine details. **Horizontal and Vertical Pan** controls allow the image to be smoothly shifted while in the Zoom mode. The **Freeze** feature works like the digital freeze frame button on a VCR or DVD player, allowing users to continuously display a single video frame / image.

**Easy Operation** - The **IN1700** offers a clean, organized control panel with very intuitive operation. An informative LCD display shows the horizontal and vertical scan rates of the current input signals, and indicates the adjustment range and current position of the image shift, zoom, pan, underscan / overscan and filter / sharpness controls. Menus are provided to set advanced parameters such as NTSC / PAL output, S-Video / Component Video / RGBS / RGBHV output selection, genlock adjustment and RS-232 serial control options.

**RS-232 Serial Control** - All scan converter functions and adjustments can be controlled via the RS-232 serial port. Serial control capability makes the **IN1700** an excellent choice for integration into sophisticated A/V installations where system operations will be automated and controlled using a third party control system.

**Component Video Output and Genlock Capabilities** - make the **IN1700** ideal for high end staging applications, video production, broadcast installations and other applications requiring several synchronous component video sources to be genlocked and switched clearly along with scan converted signals. The **IN1700** allows users to achieve the appropriate subcarrier to horizontal sync ratio necessary for applications involving the recording of pictures / images directly to full-bandwidth video recorders.

**NTSC and PAL Compatible** - Unlike older **INLINE** models that required separate scan converters for NTSC and PAL outputs, the **IN1700** combines NTSC and PAL compatibility in one unit.

**Rack Mountable** - The **IN1700** can be rack mounted in a 1U rack space using the optional **IN9129B** rack ears.

## Compatibility

### INPUT

The **IN1700** will accept video signals from VGA, MAC, SUN, SGI and other high-resolution workstations featuring 15-Pin HD, 15-Pin D, 13W3 or BNC video connectors. The unit automatically senses the characteristics of the input signal and adjusts accordingly. This allows it to work with non-standard signals that fall within the following operating parameters:

Resolution:	512 x 384 to 1280 x 1024
Horizontal Scan Rate:	24 KHz to 82 KHz
Vertical Refresh Rate:	50 Hz to 120 Hz
Signal Format:	RGBHV / RGBS / RGsB

*Note: The main limiting factor for compatibility is not the vertical scan rates or sync format, but the video resolution that may not exceed 1280 x 1024 and the horizontal scan rate that may not exceed 82 KHz.*

### OUTPUT

The **IN1700** output signal may be connected to many types of video equipment including TV & presentation monitors, video projectors, VCRs and teleconferencing equipment. Video output is offered in three formats:

**Composite Video** - Offers the widest compatibility with consumer video equipment such as TV monitors, VCRs and other equipment with composite video input. The composite video output is always active.

**S-Video** - Also known as Y/C, this output provides a clearer signal than the composite video output and should be used whenever possible. S-Video may be connected to any video equipment having a 4-pin mini DIN S-Video input such as video monitors, large screen monitors, video projectors, and S-VHS and Hi-8 VCRs.

**Component Video** - The **IN1700** can be directly connected to high-end video recorders and other industrial / broadcast video equipment featuring analog component video inputs.

**RGBHV / RGBS** - This output provides the best clarity and color accuracy, and *should* be used if your display equipment has the appropriate inputs. This format is most frequently used with industrial and professional grade video projectors, RGB monitors and retro-projectors.

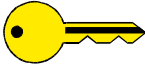
The **IN1700** local monitor output provides a loop-through signal (not scan converted) for a local computer monitor. The unit can be set for NTSC or PAL output as required.

## INPUT / OUTPUT ADAPTER AND EXTENSION CABLES

The **IN1700** has a 15-Pin HD VGA / MAC G3 & G4 and a 15-pin D MAC-type connector for input and local monitor output. The **IN9140M** reversible adapter cable provided with the unit will handle most applications involving VGA, MAC, and SGI computers featuring 15-pin HD or 15-pin D video ports. The following input / output adapter and extension cables are available to support a variety of other computer and local monitor applications.

		VGA / MAC G3 & G4/ SGI (15-Pin HD)*	MAC (15-Pin D)	SUN (13W3)	SGI (13W3)	RGBHV (5-BNC)
Input Cables	6' Long	<b>IN9140M**</b>	<b>IN9140M**</b>	<b>IN9190</b>	<b>IN9192</b>	<b>IN9045-L6</b>
Local Monitor Out	3' Long	N/A	N/A	<b>IN9191</b>	<b>IN9193</b>	<b>IN9194</b>

### KEY CONCEPT



*\* 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).*

\*\***IN9140M** is included with the **IN1700**.

## Installation

This section offers step-by-step instructions for installing the **IN1700** Scan Converter. An APPLICATION DIAGRAM is located on page 6.

*Note: Read the instructions carefully before initiating the installation procedure. Make sure that there is no power connected to the **IN1700** and that the power button is off.*

1. Place / install the **IN1700** 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 using the **IN9129B** rack ears (optional). The **IN1700** is exactly 1U high without the feet. If other equipment will be located in the space directly below the scan converter, the rubber feet on the bottom of the unit must be removed before mounting it in the equipment rack.
2. Using the **IN9140M** cable supplied with the unit, connect the computer's VGA / MAC video port to the **IN1700** VGA / MAC INPUT PORT. To connect SUN, SGI and other high-resolution workstations featuring 13W3 or BNC video ports, refer to the ADAPTER & EXTENSION CABLES chart above.

3. If your application requires a local monitor, connect the local monitor video input port to the **IN1700 VGA / MAC LOCAL MONITOR OUTPUT PORT**. A monitor can be connected via a 15-Pin HD female connector or a 15-Pin D female MAC type connector. If a local monitor will be connected, make sure the input termination is set to OFF / High Z using the LCD menus (see pages 8 & 9 for details).

*Note: If you are using a laptop computer or if a local monitor is not necessary, you may leave the **IN1700 LOCAL MONITOR OUTPUT PORT** open. No termination plug is required, however, you should set the input termination to ON/75 ohm using the LCD menu system (see pages 8 & 9 for details).*

4. Connect the **IN1700 COMPOSITE, S-VIDEO, COMPONENT** or **RGBHV / RGBS** output to your display device or VCR.

**Composite Video** - Connect the **IN1700 COMPOSITE VIDEO OUTPUT** to the video input on the display device or VCR using a BNC male to BNC male 75-ohm coaxial cable. The **IN7200 -1 Series** ultra-high resolution single coax cables (available in a variety of lengths) are recommended for optimum performance.

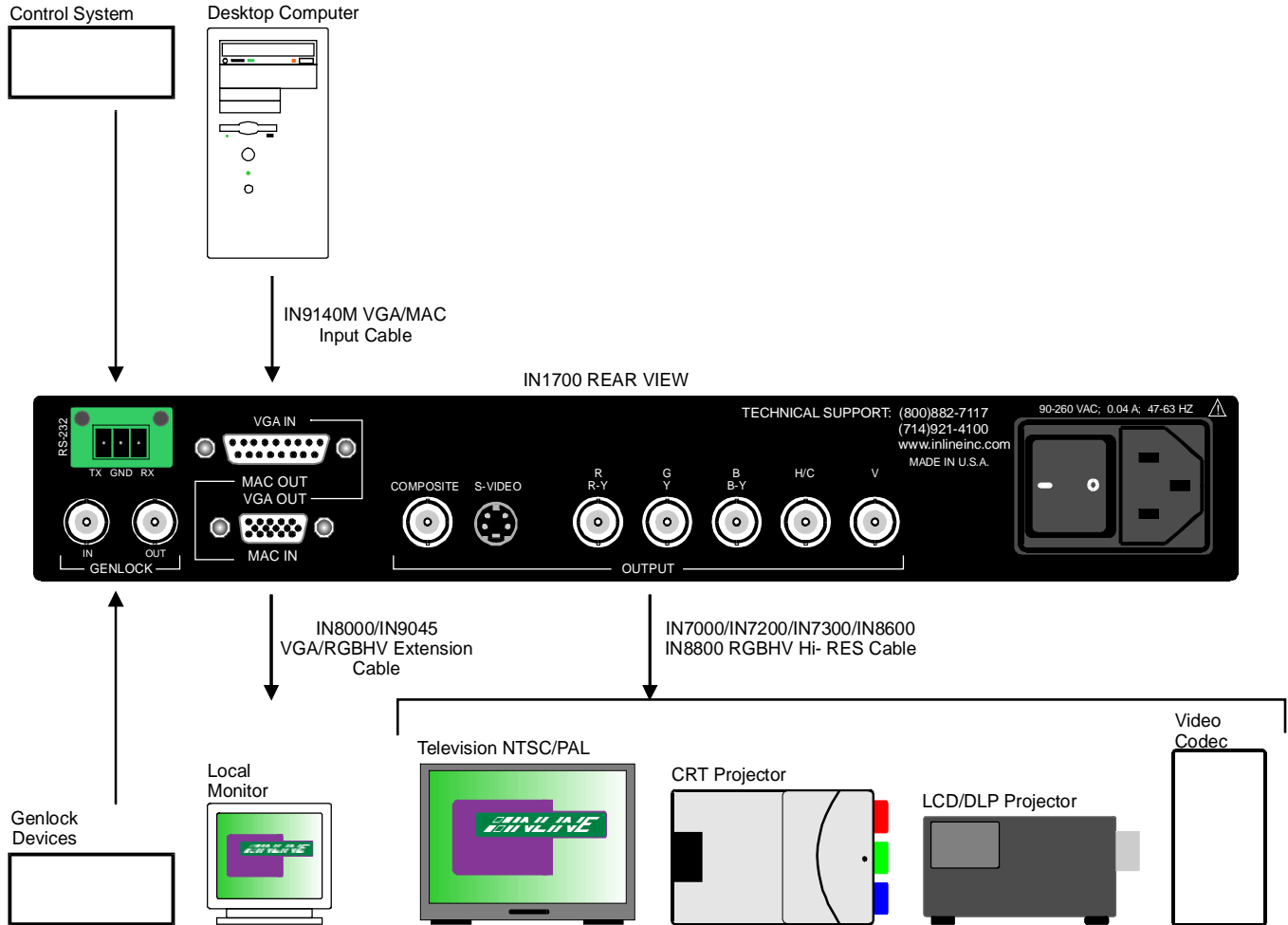
**S-Video** - Connect the **IN7100 S-VIDEO OUTPUT** to the video input on the display device or VCR using the 6' long **IN8606 S-Video** output cable (provided). **INLINE IN8600 Series S-Video** cables are available in lengths ranging from 6' to 100.'

**Component Video** - Connect the **IN1700 R-Y / B-Y / Y OUTPUT** to the video input on the video recorder or other industrial / broadcast video device (featuring R-Y / B-Y / Y inputs) using **IN7200 series** BNC male to BNC male 75-ohm coaxial cables.

**RGBHV / RGBS** - Connect the **IN1700 OUTPUT** (BNC connectors) to the data display device (featuring RGB video inputs). Installers can use multiple high-resolution BNC cables or a multi-conductor RGBHV "snake" (5 BNC cables bundled in a single jacket). The **IN7000 / IN7200 / IN7300 Series** high-resolution cables are well suited for this purpose (see RGB OUTPUT CABLES chart on page 15). While making connections, take care to insure that the red output is connected to the red input, green output to the green input, etc.

5. Connect a control system, computer or other source for serial commands to the RS-232 remote connector if desired. For more information about remote control of the **IN1700**, see the REMOTE OPERATION section on page 9.
6. Connect the genlock input (BNC connector) to the external device (house sync / black burst signal generator). Connect the genlock output to the next device in the system.  
*Note: When using the loop through feature, the last device in the loop requires a 75-Ohm termination plug (IN9130).*
7. Connect power to the **IN1700** using the **IN9230 IEC** power cable (included).
8. Turn on the video input source, the **IN1700**, the local monitor (optional), and the display device. To manually adjust / fine-tune the video image, refer to the OPERATION section on pages 7 - 9 to achieve optimum picture quality.

## IN1700 APPLICATION DIAGRAM



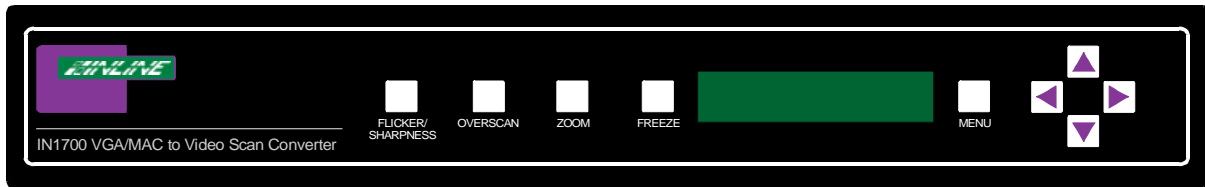
## Operation

### FRONT PANEL CONTROL BUTTONS

**Flicker / Sharpness Button** - The flicker filter offers six different settings to let users select the best sharpness adjustment for each type of display material while maintaining a flicker free image. Press the **FLICKER / SHARPNESS** Button and use the **▲** & **▼** Buttons to select the desired level (A, B & C). Use the **➤** & **➤** Buttons to toggle between each of the level's two variations. Perceived flicker varies according to the type of image displayed, the signal's vertical refresh rate, the display device brightness, the ambient room light, distance from the screen, and even the individual viewer's eye. Browse through the various settings (preferably *before* your meeting / presentation) to determine the best flicker / sharpness level and variation for each type of material.



IN1700 FRONT VIEW



You will notice that there is an inverse relation between flicker control and sharpness. The “flickeriest” settings (settings with the most amount of motion) have the sharpest image while the most flicker-free position offers the softest picture. The three levels are described below:

**Level A - (Virtually No Flicker / Least Sharpness)** If you are displaying an image with a lot of fine lines, you may wish to select the strongest flicker filter setting. This position is used for maximum picture stability and is recommended for viewing the Windows Desktop or other screens with single pixel lines.

**Level B - (Very Little Flicker / Average Sharpness)** Most users will select the middle position as a good compromise between flicker control and sharpness.

**Level C - (Most Flicker / Greatest Sharpness)** On multimedia shows and other screens made up primarily of large text, you may wish to defeat the flicker filter for maximum sharpness.

**Overscan Button** - This button toggles the **IN1700** between overscan and underscan each time it is pressed.

**Overscan** - The image fills the entire screen and some of the image may be lost off the edge (depends on the type of display device used). The overscan mode may offer slightly better image detail and should be used if possible.

*Note: The **OVERSCAN** Button will not work when the **IN1700** is in **ZOOM** mode.*

**Underscan** - Shrinks the image so that the entire image fills the screen.

**Vertical and Horizontal Position** - Users can adjust the vertical position of the on-screen display by pressing the ▲ & ▼ Buttons, and adjust the horizontal position by pressing the ➤ & ➤ Buttons. Press and release the buttons to adjust the settings slowly, or press and hold them for faster adjustments.

#### KEY CONCEPT



*If these settings seem confusing, we recommend that you experiment with the front panel buttons until you familiarize yourself with the **IN1700** operations. It's a good idea to get comfortable using these buttons to navigate through the on-screen menu system before moving on to other sections of this manual.*

**Zoom Button** - Toggles between zoom mode and normal mode. When zoom is engaged, the **IN1700** displays an enlarged view of part of the screen. This setting is ideal for viewing spreadsheets, small text or detailed drawings since everything on the screen is magnified to 2X its

normal size. Users can adjust the vertical position of the on-screen display by pressing the ▲ & ▼ Buttons, and adjust the horizontal position by pressing the ► & ◀ Buttons. Press and release the buttons to adjust the settings slowly, or press and hold them for faster adjustments. Pressing the **ZOOM** Button again returns to a normal view of the entire image.

**Freeze Button** - This works like the digital freeze frame button on a VCR or DVD player. The **IN1700** stores the image into memory and continues to display the same image until the button is pressed again.

**Menu Button** - Used to access the menu commands.\*

**Arrow Buttons** (▲, ▼, ► & ◀) - Used to select command options, make the necessary adjustments for all of the menu commands and maneuver around the screen while in zoom mode.

*\*Note: Pressing the **MENU** Button during power up will reset the **IN1700** to factory default. The factory default settings are:*

<i>Flicker H:</i>	<i>1</i>	<i>Flicker V:</i>	<i>A</i>	<i>Overscan:</i>	<i>off</i>	<i>Output Standard:</i>	<i>NTSC</i>
<i>Freeze:</i>	<i>off</i>	<i>Gen SC &amp; H:</i>	<i>128</i>	<i>Zoom:</i>	<i>off</i>	<i>Input Term.:</i>	<i>75 Ohms</i>
<i>Baud Rate:</i>	<i>9600</i>	<i>Serial Delimiter:</i>	<i>[ ]</i>	<i>Front Panel Enabled</i>		<i>Output Format:</i>	<i>RGBHV</i>

## MENU COMMANDS

This section offers a description of the menus and their operations. To access any of the menu commands, press the **MENU** Button until the desired command appears on the front panel LCD screen. When applicable, use the **ARROW** Buttons to make the necessary adjustments / select the desired operation. Press and release a button to move by one step in either direction. Press and hold a button to move continuously through the adjustment range. Once you've optimized the setting for the current input, the **IN1700** will retain the setting until it is changed.

An illustration of the LED Display Menu System is provided below, followed by a detailed description of each menu command.

Command Menu					
Input Termination					
Output Format					
Output standard					
GEN SC / GEN H					
Serial Baud Rate					
Serial Delimiter					

<b>Input Termination</b>	<b>Output Format</b>	<b>Output Standard</b>	<b>GEN SC / GEN H</b>	<b>Serial Baud Rate</b>	<b>Serial Delimiter</b>
OFF - Hi-Z	Component	NTSC*		2,400	Less & greater < >
ON - 75 Ohms*	S-Video	PAL		4,800	Brackets [ ]*
	RGBHV*			9,600*	Braces { }
	RGBS			19,200	Parentheses ( )

\* Factory Default Setting

**Input Termination** - This menu command allows users to toggle between the Hi-Z and 75 Ohm input termination. Use any of the four arrow buttons to toggle between the two settings.

--**No Local Monitor Connected:** Set the input termination to ON / 75 Ohm (factory default).

--**Local Monitor Connected:** Set the Input termination to OFF / High Z.

**Output Format** - The composite video output is always active. The output format menu lets users select the desired format for the secondary output signal. This setting allows users to select the. Use the ▲ & ▼ Buttons to select S-Video, component, RGBHV or RGSB output format.

**NTSC / PAL Output Standard** - The **IN1700** can be set to output signals at NTSC or PAL frequencies as required. Use the four arrows to toggle between the two settings.

**Gen SC / GEN H** - Gen SC allows users to achieve zero phase difference between the genlock signal and the NTSC / PAL output. SC adjustments can be made by using the ▲ & ▼ Buttons. Use the ► & ◀ Buttons to adjust Gen H control until the horizontal sync of the output is in line with genlock signal. Adjustments range from 0 to 225, and the factory default setting is 128.

**Serial Baud Rate** - All four arrows can be used to toggle between the four baud rate settings.

**Serial Delimiter** - All four arrows can be used to toggle between the four delimiter character settings.

## Genlock Operation

The **IN1700** can provide genlock operation for integration into professional video editing and switching systems. The unit has two BNC connectors on the rear panel to allow loop through of a house sync or a black burst signal. *Note: When using the loop through feature, the unused BNC connector on the last device in the loop requires a 75 Ohm termination plug (IN9130).*

## RS-232 Serial Control Operation

The **IN1700** 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 codes is included on page 11.

### Communication Protocol

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

### Baud Rate Selection

The **IN1700** has a factory default baud rate of 9600 bps and can communicate at baud rates from 2400 up to 19200. Baud rates can be selected using the Serial Baud Rate Menu (see pages 8 & 9).

### 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 **IN1700** can be set to recognize one of four sets of leading codes and ending codes (delimiters). These are: [ ] { } ( ) < > . The factory default serial delimiters are [ ] .

Commands sent with a different delimiter set will be ignored. The IN1700 delimiters may be selected using the Serial Delimiter menu (see pages 8 & 9).

A complete command consists of:

```
[      The leading code
  FLK1 The command code.
]      The ending code
```

*Example:* [FLK1] sets the IN1700 to flicker filter to setting 1

### Serial Control Cable Wiring

When controlling only one **IN1700** unit, connect the RS-232 serial control cable as follows:

```
Controller Transmit to IN1700 Receive
Controller Ground   to IN1700 Ground
Controller Receive  to IN1700 Transmit
```

When controlling multiple **IN1700** units, connect the RS-232 serial control cable as follows:

```
Controller Transmit to Each IN1700 Receive
Controller Ground   to Each IN1700 Ground
```

### IN1700 SERIAL COMMANDS\*

Command	Description
AC14	set baud rate to 2400
AC15	set baud rate to 4800
AC16	set baud rate to 9600**
AC17	set baud rate to 19,200
CMD0	set command code “[“and”]**
CDM1	set command code “{“and”}”
CDM2	set command code (“and”)
CDM3	set command code “<“and”>”
FLK1	flicker filter 1**
FLK2	flicker filter 2
FLKA	flicker filter A**
FLKB	flicker filter B
FLKC	flicker filter C
FP0	disable front panel
FP1	enable front panel**
FRZ0	freeze frame off**
FRZ1	freeze frame on
OUT0	RGBHV output format**

Command	Description
OUT1	RGBS output format
OUT2	component output format
OUT3	S-Video output format
PAL0	NTSC standard**
PAL1	PAL standard
RST	reset to factory default
SCN0	zoom on
SCN1	overscan on
SCN2	underscan on**
STAT	return 11 byte status (info defined below)
TRM0	input term Hi-Z
TRM1	input term 75 Ohms**
VIDD	video shift / pan down
VIDL	video shift / pan left
VIDR	video shift / pan right
VIDU	video shift / pan up

\* Serial commands are case sensitive.

\*\* Factory Default

### IN1700 SERIAL RESPONSE DESCRIPTION

After the **IN1700** receives a command it will respond with [OK] to indicate that it understood and executed the command. Responses are ASCII characters and begin and end with the currently selected delimiters. The **IN1700** sends responses at baud rate currently selected.

Example: [OK] or {OK} or (OK) or <OK> are the four possibilities for the OK response.

The exception to this rule is the response to the RST command. The RST command resets the unit to the factory default serial control settings which are a baud rate of 9,600 and [ ] command delimiter codes. The two possible responses to the RST command are:

[OK] Valid command received  
 [E1] Invalid command or parameter

### Status Command

The [STAT] command lets you query the **IN1700** to determine all current settings. The [STAT] command may be useful to help synchronize a control system to the current **IN1700** settings. When the [STAT] command is sent to the **IN1700**, the unit will respond with an 11 byte response that indicates the current device settings as indicated below:

Start Character	byte 0
Baud Rate	byte 1 '0' = 2,400, '1' = 4,800, '2' = 9,600, '3' = 19,200
Front Panel Disable	byte 2 '1' = enable, '0' = disable
Freeze	byte 3 '1' = on, '0' = off
Zoom	byte 4 '1' = on, '0' = off
Overscan	byte 5 '1' = overscan on, '0' = off (underscan on)
Flicker	byte 6 indicates '1', '2', '3' settings
Flicker	byte 7 indicates 'A', 'B' settings
Input Termination	byte 8 '1' = 75 Ohms, '0' = Hi-Z
PAL / NTSC Output	byte 9 '1' = PAL Output, '0' = NTSC Output
Output format	byte 10 '0' = RGBHV, '1' = RGBS, '2' = Component, '3' = S-Video
Stop Character	byte 11

## Getting the Best Image From Your Scan Converter

Beginning with a quick overview on the differences between computer video signals and conventional video signals, this section concludes with several tips to help you get the best looking images from your scan converter.

### REGULAR VIDEO & HIGH-RESOLUTION VIDEO - WHAT'S THE DIFFERENCE?

Users are sometimes surprised when the scan-converted image displayed on a conventional video monitor has lower quality than the original VGA or MAC signal displayed on their computer monitor. There are several reasons for the image quality loss, the main one being the vast differences between the two types of signals. VGA / MAC to video converters such as the **IN1700** have the difficult job of converting a non-interlaced, high-resolution image with precise colors into an interlaced, lower resolution image with a more limited choice of colors.

**Resolution** - When compared to regular video signals that you see on your home TV, computer video signals usually have a higher resolution (a higher number of pixels, or picture elements, make up the image). This means that the scan converter must actually throw away some of the VGA or MAC picture information and detail in order to transfer the image to a conventional monitor. This problem is more noticeable in the United States and other countries using the NTSC video standard because the picture has 100 fewer lines of picture information than the PAL video standard.

**Color** - Computer video systems maintain separate video signals for red, green and blue, allowing for more accurate color reproduction than conventional video monitors which combine all the color information into one signal. In addition to less accurate color, there is generally a narrower choice of colors available with conventional video monitors. Therefore, some colors shown on a computer monitor simply cannot be reproduced on a conventional video screen, especially when sent as a composite video or S-Video signal.

**Scan Methods** - The other big difference between the two video systems is the way the picture is scanned on the screen. A high-resolution video signal is usually non-interlaced. This method (also called progressive scan) “paints” all of the lines in a single pass from the top to the bottom of the screen. A conventional TV video monitor displays an interlaced video signal. This means that all the odd numbered lines are displayed first, followed by all the even numbered lines. The two pictures, made up of odd lines and even lines, are displayed so quickly in succession that the human eye combines the two into a single picture.

When the non-interlaced computer video signal is converted to an interlaced signal and displayed on a conventional TV monitor / projector, flicker may be observed, especially on parts of the image made of very thin lines (one pixel) or patterns composed of thin lines.

## 15 TIPS FOR HAPPY SCAN CONVERSION

**Preview the Scan Converted Image** - The best way to ensure a good scan converted image on a conventional video screen is to connect your computer to the **IN1700** and view the image displayed on the conventional video monitor *before* you begin your presentation. This will let you select the colors that look best on the video screen, determine the appropriate text size and help you stay within the “safe title area.”

**Choose Colors and Backgrounds Carefully** - You may notice that intense colors and many shades of red often look bad on the conventional video monitor, while pastel shades, greens and grays provide a more pleasing image. Solid backgrounds are usually better than gradations and patterns. If you are creating an on-screen presentation to be viewed through the scan converter, select a color scheme and background that provides the best contrast and readability. Most presentation packages offer several templates that define background hues, and the colors of headlines and bullet types.

Before demonstrating software programs, view the scan-converted image to select color settings that look best on the TV monitor. The Windows and Macintosh operating systems let you choose the overall color scheme that sets the color of window borders, title bars, menu text and small items. Remember that some viewers may be located far from your video display, so you must select the best colors in order to enhance their ability to see illustrations, icons and other detailed information.

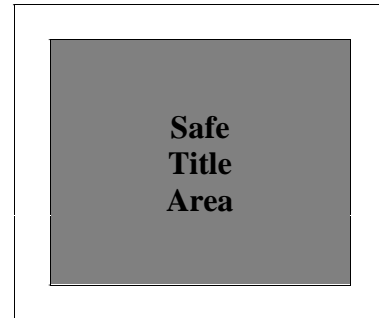
**Use BIG Fonts** - You may enhance the readability of your presentation by using the largest font size possible. Headlines should be at least 36 points, bullet points at least 24, and body text no smaller than 18. For best visibility on speaker-support slides, try to limit yourself to no more than five or six lines of text and no more than 25 words per screen.

When demonstrating software you may increase visibility by selecting a sans serif font such as **Arial** or **Helvetica** for menu bars and increase the font to a larger size. If there are parts of the

screen that cannot be changed (i.e. viewing a document or spreadsheet with small text) use the **ZOOM** Button to enhance visibility.

**Don't Go Near the Edge** - Remember that conventional video monitors, since they overscan by at least 5% to 10%, usually don't display the entire picture from edge to edge. This means that anything located at the extreme edge of the screen may be cut off. Since the amount of overscan varies from monitor to monitor, it is generally best to avoid the outer edges of the screen when placing important headlines, logos and other critical items. Be sure to view the display on your conventional monitor before the presentation to ensure that you are staying within the safe title area.

## Entire Video Image



**Avoid Thin Lines and Gray Fill Patterns Made of Thin Lines** - When making on-screen graphics, create lines that are at least two pixels thick. Lines and patterns containing single pixels tend to create flicker problems. You may also lessen or avoid the problem if you use lines that are an even number of pixels wide (2, 4, 6, 8 etc.).

**Experiment With the Six Flicker Settings** - The flicker filter has six settings, each step affecting both the flicker and the sharpness of the image. The "B" level setting is best for most applications but you may need to change to a different setting depending on the type of material displayed on the screen. We recommend that you experiment with the flicker / sharpness settings (before your presentation) to find the best one for each application and screen.

### More Tips for Flicker Reduction:

- Try setting your computer to a higher refresh rate (i.e. 72 Hz instead of 60 Hz).
- Set your computer to 16 bit or 24 bit mode (65,000 colors or 16.7 million colors). The High Color and True Color modes feature a wider color palette, which creates color directly. Sixteen color and 256 color modes use dithering patterns to create many colors, which may cause flicker. An added benefit of the high color modes is the elimination of palette snaps and flashes.
- Reduce the brightness and contrast control on your video display.
- Try different room lighting. You may wish to turn off fluorescent lights as they may interact with the video display, causing more flicker.
- Use the **IN1700** overscan mode. The flicker reduction filter is more effective in this setting.
- Use the **ARROW** Buttons to move the picture up / down or side-to-side. Some screen positions are more solid than others.

**Set the IN1700 to Overscan** - The **IN1700** provides the best quality image when in the overscan mode. If part of your picture is off the screen while showing your presentation in overscan mode, you may use the **ARROW** Buttons on the front panel to move the image around as needed.

*Hint: For best results, avoid using the areas along the outer edge of the screen when you create your presentation.*

**Use Good Quality Tape** - If you are recording the output of your scan converter use a good quality videotape and record in the SP mode. Standard VHS machines only provide about 220 lines of resolution. While this is adequate for recording on-screen slide presentations and multimedia shows with large type, it generally does not provide enough resolution to record

detailed software demonstrations featuring Windows and Macintosh application screens. If practical for your application, use a higher resolution VCR format such as S-VHS, Hi-8, DV or even Betacam, connecting the S-Video or component output on the **IN1700** to the recording deck.

## Specifications

<b>IN1700 Video Scan Converter</b>	
<b>Input</b>	
Computer Video Input	VGA / MAC: (1) 15-pin D female (use with <b>IN9140M</b> ) MAC: (1) 15-pin HD female (use with <b>IN9140M</b> )
Input Signal Format	RGBHV / RGBS
Compatible Resolutions	512 x 384 to 1280 x 1024
Horizontal Scan Rate	24 KHz to 82 KHz
Vertical Refresh Rate	50 Hz to 120 Hz
Genlock In / Out	(2) BNC female
<b>Output</b>	
Local Monitor	VGA / MAC G3 & G4: 15-pin HD female MAC: 15-pin D female
Video Output Standards	NTSC / PAL (selectable)
Composite Video	(1) BNC female
S-Video	(1) 4-pin female Mini-DIN for Y/C
Component / RGBS / RGBHV	(3, 4 or 5) BNC female
<b>General</b>	
Power Supply	Internal Switch Mode: 90 - 260 VAC; 47 - 63 Hz
Power Consumption	12 Watts
Shipping Weight	6 lbs. / 3 kg
Product Weight	3.5 lbs. / 1.6 kg
Dimensions	1.75" x 11.75" x 8.1" / 4.4 cm x 29.8 cm x 20.6 cm
Regulatory Approvals	UL 1950, CAN/CSA-22.2 No. 950, 3 <sup>rd</sup> Edition CE: EN55022 (1987), EN50081-1 (1991), EN50082-1 (1992 & 1994), EN60950-92

<b>Included Accessories</b>
<b>IN9140M</b> - VGA / MAC Reversible Input Cable, 6' long
<b>IN8606</b> - S-Video Output Cable, 6' long
<b>IN9230</b> - IEC Power Cable, 6' long (USA only)
Operation Manual

<b>Optional Accessories</b>
<b>Mounting Hardware</b>
<b>IN9129B</b> - Rack Ears (mounts <b>IN1700</b> in 1U rack space)
<b>Connectors</b>
<b>IN9130</b> - 75 Ohm termination plug, BNC male



<b>Optional Cables</b>
<b>Monitor Adapter and Extension Cables</b>
<b>IN8000 / IN9000 Series</b> - See list on page 3
<b>S-Video Cables</b>
<b>IN8600 Series</b> - S-Video cables, 4-pin mini DIN (M-M), lengths from 6' to 25'
<b>Installation Cables</b>
<b>IN7000P-5 Series RGBHV Cable</b> - Standard Resolution, Plenum Cable available in bulk lengths
<b>IN7000P-5K Series RGBHV Cable</b> - Standard Resolution, Plenum Cable available in 1000' bulk length

<b>RGB Output Cables</b>				
<b>Coaxial Cables</b>	<b>1-Conductor</b>	<b>3-Conductor</b>	<b>5-Conductor</b>	<b>6-Conductor</b>
Standard Resolution			<b>IN7000-5</b>	
Standard Resolution, Flexible Plenum			<b>IN7000FP-5</b>	
Ultra High Resolution	<b>IN7200-1</b>	<b>IN7200-3</b>	<b>IN7200-5</b>	<b>IN7200-6</b>
Super High Resolution			<b>IN7300-5</b>	<b>IN7300-6</b>

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 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 **IN1700** and the display device / monitor.

**Solution 4:** Verify the connection to the output display device.

**Solution 5:** Verify that there is an image on the local monitor.

**Problem:** There is no response from the front panel controls / RS-232 remote.

**Solution:** Freeze is probably activated. Press the **FREEZE** Button to disengage.

**Problem:** The picture on the display device / local monitor is scrambled.

**Solution:** Your computer may be set to a resolution higher than 1280 x 1024. Reset the computer to a lower resolution.

**Problem:** The **OVERSCAN** Button is not responding.

**Solution:** Disengage the zoom mode. The **OVERSCAN** Button will not work when the **IN1700** is in zoom mode.

**Problem:** The picture is very dark.

**Solution 1:** You may have shifted the image too far to one side. Try pressing the right or left arrows on the front panel to see if the picture improves.

**Solution 2:** The input may be double terminated. If you are using a local monitor, set the input termination to OFF / High Z using the appropriate LCD menu (see page 9).

**Problem: The picture is too bright / overdriven.**

**Solution:** The input may be unterminated. If you are not using a local monitor, the input termination must be set to ON / 75 ohm using the LCD menu (see page 9).

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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