



A WORLD OF A/V SOLUTIONS



SIGNAL CONVERTERS

IN1408 VIDEO / DVI SCALER
WITH 8 INPUT SWITCHER



IN1408
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

IN1408 is the first video and RGB scaler offering DVI digital video inputs and can accept virtually any popular video signal format. The **IN1408** Video/DVI Scaler combines superb video scaling for video, RGB computer video and DVI digital video signals with 8 Input A/V switching capability. The **IN1408** is a powerful system integration tool that makes it easy to connect a variety of analog and TMDS digital (DVI / DFP) signal sources to data, presentation and HDTV displays with analog or DVI inputs.

PRODUCT FEATURES

Sophisticated Motion Compensation Circuitry — Detects the original source material and selects the optimal formula to eliminate motion artifacts. The scaler automatically switches to adaptive frame mode (inverse 3:2 pulldown) with film-originated video sources.

Advanced Quad Standard Video Decoding - A high quality video decoder in the **IN1408** provides accurate video decoding of composite video and S-Video signals in the NTSC, PAL, SECAM and NTSC 4.43 video standards.

Advanced RGB Scaling - The **IN1408** also provides superb up-scaling and refresh rate changing for 640 x 480, 800 x 600 and 1024 x 768 resolution RGB video signals, making it an excellent companion for LCD and DLP display devices that have marginal, on-board video scaling capability.

DVI Input/Output – provides a direct digital connection for projectors, plasma panels and flat panel displays with DVI/DFP inputs.

Large LCD Status Display – that is conveniently embedded in the **IN1408** front panel offers an easily viewable display of the system menu and settings.

Flexible Control Options – allow the user to control all the settings using the large LCD Display or On-Screen Menu. All functions can also be controlled using the front panel controls, RS-232 serial commands or the optional **CTL120** IR remote control.

Selectable Output Resolution - The **IN1408** provides a progressive scan output signal at standard resolutions and refresh rates, ensuring optimal compatibility and exceptional image quality with a wide range of CRT, LCD, DMD, LCOS, and Plasma display devices.

Selectable Refresh Rate – allows the **IN1408** to display a remarkably solid, flicker-free image when using CRT monitors and projectors, the **IN1408** output vertical refresh rate is adjustable from 60 Hz to 120 Hz.

8-Input Video / Audio Switcher - The **IN1408** provides multiple inputs and flexible switching capability to accommodate a variety of applications. Stereo audio-follow-video switching is provided for all eight inputs.

Digital Freeze Frame - provides a high quality still image for applications that require close examination of a specific video frame.

Video Blank Button - allows the video image to be suppressed, outputting a solid black signal.

On Screen Menus - provide easy control of video adjustments including hue, color, contrast, brightness, gamma, sharpness, image size, image position and edge blanking. Individual image settings can be optimized and stored for each input.

Image Size, Position and Edge Blanking Controls – allows for easy precise fitting of the active video image to the display area and provide for multiple aspect ratios by using individual horizontal and vertical image adjustments.

Comprehensive Aspect Ratio Controls are provided for 4:3, letterbox, and anamorphically enhanced signal sources. The **Anamorphic** mode provides vertical image squeezing and lets users take full advantage of the superior image quality offered on anamorphically enhanced DVDs.

Advanced Input Adjustment Controls - are provided to optimize the unit when used with non-standard input signals. Input signal adjustments include: Total Pixels, Active Pixels, Active Lines, Horizontal and Vertical Blanking, Phase and Scan Type.

Blue Screen Feature - provides a full screen blue image that acts as a test signal and is ideal for setting up the output resolution, refresh rate, position settings, and to verify connection to the output display device.

128 User Memories – stores all video, audio and input parameters to allow the unit to be optimized for a large number of sources and gives the capability to recall those settings quickly.

RS-232 Serial Control - is provided for all scaler functions including input selections, image adjustments and output settings.

Two Analog Video Outputs — Output 1 (15-Pin HD) can be set for RGBHV, RGBS, RGsB signal format and is ideal for connecting to displays with RGB analog inputs. Output 2 (5 BNCs) can be set for RGBHV / RGBS / RGsB or component video format, letting you connect to HDTV displays and other devices that accept progressive component video input signals.

Rack Mountable - The **IN1408** can be mounted in a 2U rack space using the **MTR102** rack ears (provided).

Stereo Audio Switching – capability for balanced and unbalanced audio signals with volume control and mute.

Digital Audio Switching – The **IN1408** is equipped with four digital audio inputs that accept signals from computer sound cards with SPDIF digital outputs and DVD players with coaxial digital audio outputs.

Compatibility

VIDEO INPUTS

The **IN1408** Video Scaler accepts composite and S-Video signals in the NTSC, PAL, SECAM and NTSC 4.43 video standards on all eight inputs. Inputs 5 - 8 are universal inputs that also accept component video, progressive component video, RGBHV, RGBS, RGsB or computer pass through. Inputs 5&6 have the added feature of accepting TMDS (single link) digital video signals from computers with DVI or DFP digital video ports. When inputs 5 - 8 are set for passive mode, they are compatible with virtually any signal format at any resolution and refresh rate.

AUDIO INPUTS

Analog Audio Signals

Inputs 1 - 8 include a 5-pin captive screw terminal for analog audio input. All eight analog stereo audio inputs are compatible with balanced and unbalanced line level signals from a VCR, DVD player, computer audio card, or any other audio device that delivers a stereo line level signal.

Digital Audio Signals

Inputs 5-8 are equipped to accept digital audio signals from DVD players with coaxial digital outputs, computer sound cards with SPDIF digital audio outputs and other devices that feature similar digital audio output signals. The selected digital audio input signal is routed passively to the digital audio output with no signal processing.

VIDEO OUTPUTS

Resolutions and Refresh Rates

The **IN1408** features selectable output resolutions from 640 x 480 up to 1365 x 1024 to match the optimum or native resolution of virtually any display device. The unit provides a progressive scan output signal at standard resolutions and refresh rates, ensuring optimal compatibility and exceptional image quality with a wide range of CRT, LCD, DMD, D-ILA, and Plasma display devices.

The output refresh rate is also selectable as desired. When used with LCD or DMD displays, the 60 Hz output setting is recommended. Higher output refresh rates may be selected for use on CRT type displays in order to reduce flicker and provide enhanced ergonomics.

The **IN1408** provides three video outputs: a DVI Digital Video connector, 5 BNC connectors (RGB or component format), a 15-Pin HD (VGA) connector. Since the three sources are active simultaneously, the **IN1408** can directly drive three separate display devices. The output signal format can be set to Component, RGBHV, RGBS or RGsB as required.

AUDIO OUTPUTS

Analog Stereo Audio

The analog stereo audio output provides a balanced or unbalanced line level output signal (see page 5 for output wiring diagram). This output can drive any line level compatible audio unit, or a local device such as powered speakers. The output level is adjustable using the volume control.

Digital Audio

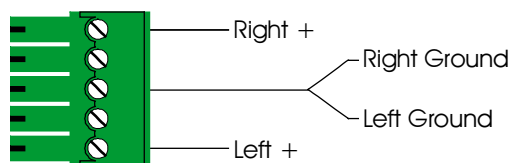
The digital audio output provides a digital signal that is compatible with receivers and decoders that feature coaxial digital audio inputs.

Installation

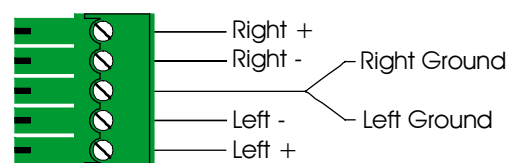
This section offers step-by-step instructions for installing the **IN1408** Video Scaler. An application diagram showing typical connections is provided on the page 8.

- **Note:** Prior to initiating the installation procedure, ensure that the power switch is in the off mode on the **IN1408** and there is no power supply cord connection to the unit.
- 1.) Place / install the **IN1408** 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 MTR102 rack ears (provided). The **IN1408** is exactly 2U high without the feet. If other equipment will be located in the space directly below the scaler, the rubber feet on the bottom of the unit must be removed before mounting it in the equipment rack.
 - 2.) The **IN1408** features a DVI video output, a 5-BNC video output and a 15-Pin HD video output for easy connections to a variety of display devices:
 - Digital display devices can be connected directly to the **IN1408** DVI output. If the video source features a DFP connector, use the appropriate **IN9700 Series** cable, DFP / DVI Patch Cable or DFP / DVI adapter (a complete list of available **INLINE** digital video cables and adapters can be found on page 9).
 - Display devices that feature BNC input connectors can be connected directly to the **IN1408** BNC video output using three, four or five BNC cables (for RGsB, RGbS or RGBHV, respectively) or a multi-conductor RGBHV, RGbS or RGB cable. The **INLINE IN7000 / IN7200 / IN7300 Series** cables are well suited for this purpose (see the RGB Input / Output Installation Cables table on page 42). While making connections, take care to insure that the red output is connected to the red input, green output is connected to the green input, etc.
 - Display devices with a 15-pin HD input can be connected directly to the **IN1408** 15-Pin HD output port using a standard VGA cable. **INLINE's IN8000 Series** flexible VGA cables offer exceptional performance and are available in a variety of lengths.
- **Note:** Since all three outputs are active simultaneously, the **IN1408** can directly drive three separate display devices.
- 3.) Connect the **IN1408** analog stereo audio output (5-pin captive screw terminal) to the audio system's line level input (mixer, amplifier, powered speakers, etc.). The output can be set for balanced or unbalanced output signal as required by wiring the output appropriately (see wiring diagram below). The analog audio output connector will accept stranded or solid cables from 20 - 26 AWG.

For Unbalanced Stereo Audio Output



For Balanced Stereo Audio Output



- 4.) Connect the **IN1408** digital audio output (RCA female) to a compatible digital audio decoder such as a receiver or digital audio processor. Use a 75 ohm cable to make the connection between the **IN1408** digital audio output and the sound system's coaxial digital audio input.
- 5.) Connect the video / computer video source(s) to the appropriate **IN1408** input connectors. All eight inputs can accept either a composite video signal or an S-Video signal. Inputs 5 - 8 are universal inputs that also accept interlaced component video, progressive component video, RGBHV, RGBS, or RGB video signals. For more details, see **Video Signal Input Connection Guide for Inputs 5 - 8** on page 7.
 - **Composite video sources** with BNC output connectors can be connected using an **IN7200-1 Series** high-resolution single coax cable. Devices with an RCA output connector can be connected using an **IN9101** BNC to RCA adapter cable.
 - **S-Video Sources** may be connected using an **IN9098** 4-Pin Mini DIN Male to 2-BNC Male adapter cable (6' long).

Key Concept



*On Inputs 1 through 4, Video input signals must only be connected to either the composite video or the S-video connector on any one input. **DO NOT connect composite video and S-Video signals simultaneously on the same input!***

- **Component video sources** and **Progressive component video** sources may be connected to Input 5, 6, 7 or 8 using an **IN9101** RCA to BNC adapter cable or an **IN7300-3 Series** 3-BNC cable. Ensure that the component video signals are connected to the correct connectors.
- **RGB / RGBS / RGBHV Video Signals** from video and computer video sources can be connected to Input 5, 6, 7 or 8 by using three, four or five BNC cables or a multi-conductor RGBHV, RGBS or RGB "snake". The **IN7000 / IN7200 / IN7300 Series** cables are well suited for this purpose (see RGB Input / Output Installation Cables on page 42). While making connections, ensure that the red output is connected to the red input, green output to the green input, etc.
- **Digital Video** sources can be connected to the DVI ports on Inputs 5 and 6.

Video Signal Connection Guide for Inputs 5 - 8

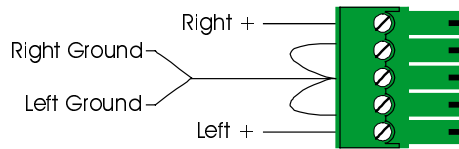
When making connections to inputs 5, 6, 7 or 8, take care to connect each signal component to the correct BNC connectors as indicated in the table below:

Signal Type	Red BNC	Green BNC	Blue BNC	H / C Sync BNC	V Sync BNC
Composite Video		C			
S-Video	C	Y			
Component - Interlaced	R-Y	Y	B-Y		
	Cr	Y	Cb		
Component - Progressive	Pr	Y	Pb		
RGsB	R	Gs	B		
RGBS	R	G	B	S	
RGBHV	R	G	B	H	V

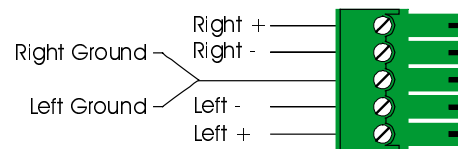
- 6.) Connect the audio signals to the appropriate inputs:

Analog Audio Signals: All eight Inputs will accept balanced or unbalanced stereo audio signals. Connect the audio signals to the 5-pin captive screw connectors according to the wiring diagram below:

For Unbalanced Stereo Audio Input



For Balanced Stereo Audio Input



Digital Audio Signals: Inputs 5 - 8 will also accept digital audio signals from a DVD player, computer with a SPDIF digital audio output or other devices with a coaxial digital audio output. Connect these digital audio signals to the Digital Audio RCA connectors.

- 7.) If desired, connect a control system, computer or other serial command source to the RS-232 remote connector. For more information about serial control of the **IN1408**, see the Remote Operations Section on page 36.
- 8.) Connect power to the **IN1408** using the **IN9230** IEC power cable (included).
- 9.) Turn on the video sources, the **IN1408**, the data display device(s) and the audio output equipment (if applicable).
- 10.) Using the front panel controls or RS-232 commands, adjust and store the parameters for each input source.

Key Concept



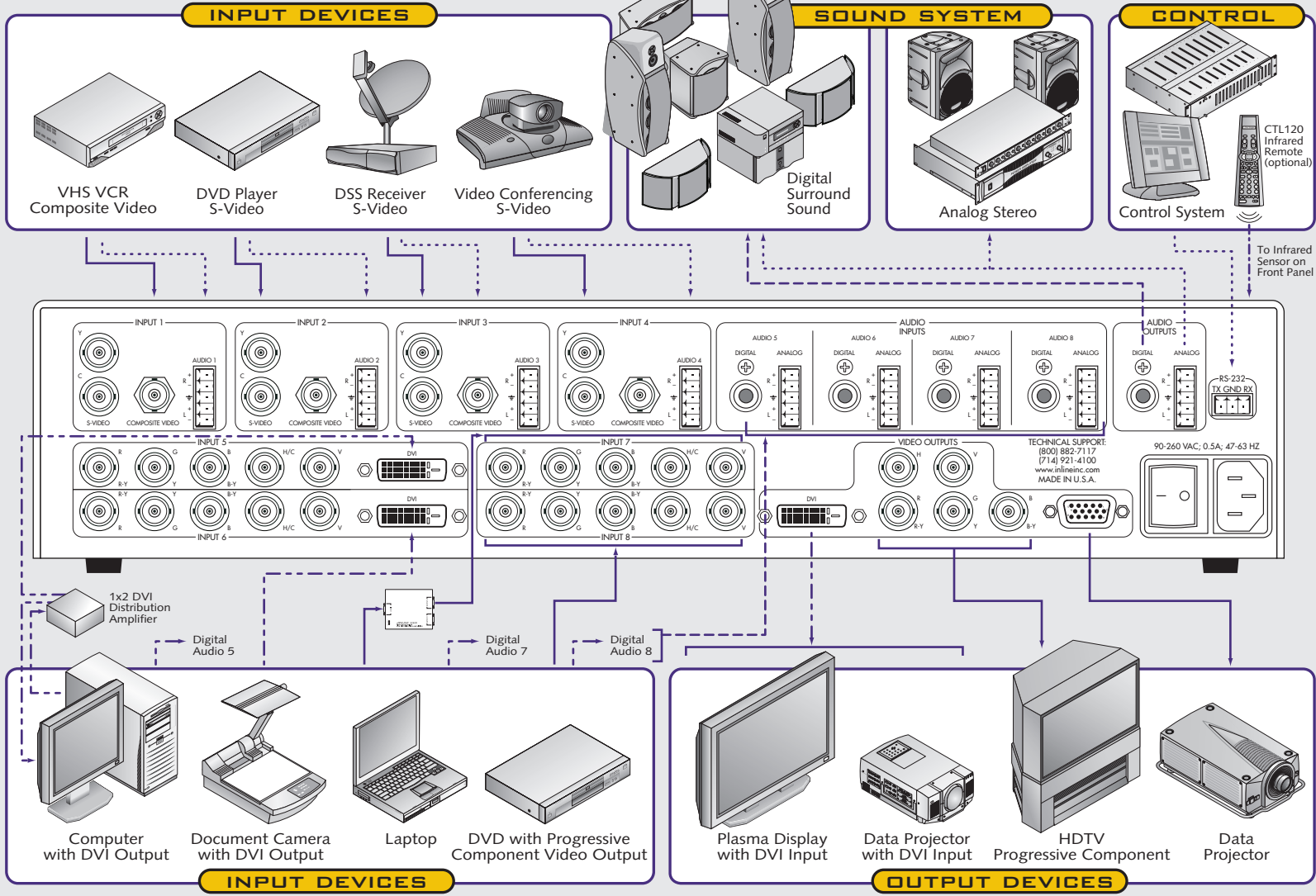
To ensure proper operation, it is critical that you set each input to match the format of the signal connected to that input (i.e. composite, S-video, component, RGBHV, etc.) See Signal Format under the INPUT MENU section on page 17 for details.

- 11.) Set the output resolution and refresh rate to match your display device / installation requirement. Refer to the Output Menu Section on page 21. For more information on selecting an appropriate resolution / refresh rate, see **Choosing the Optimal Resolution and Refresh Rate** on page 25.
- 12.) The default output format for the BNC connectors is RGBHV. If you need a Progressive Component video output signal, use the **BNC Output** menu selection to set the format as required (see page 22).

IN1408 VIDEO / DVI SCALER

APPLICATION DIAGRAM

- = Analog Video
- - - = DVI Video
- · · = Analog Audio
- - - = Digital Audio



INLINE Digital Video Cables and Adapters

IN9700 High Performance Digital Video Cables

IN9725-1: DFP Male to DFP Male, 25'

IN9735-1: DFP Male to DFP Male, 35'

IN9750-1: DFP Male to DFP Male, 50'

IN9775-1: DFP Male to DFP Male, 75'

IN9725-2: DFP Male to DVI Male, 25'

IN9735-2: DFP Male to DVI Male, 35'

IN9750-2: DFP Male to DVI Male, 50'

IN9775-2: DFP Male to DVI Male, 75'

IN9725-3: DVI Male to DVI Male, 25'

IN9735-3: DVI Male to DVI Male, 35'

IN9750-3: DVI Male to DVI Male, 50'

IN9775-3: DVI Male to DVI Male, 75'

DFP / DVI Digital Video Patch Cables

DFPM-DFPM-3: DFP Digital Video Cable, MDR20 Male to Male, 3'

DFPM-DFPM-6: DFP Digital Video Cable, MDR20 Male to Male, 6'

DFPM-DFPM-15: DFP Digital Video Cable, MDR20 Male to Male, 15'

DFPM-DVIM-3: DFP / DVI Digital Video Adapter Cable, MDR20 Male to DVI Male, 3'

DFPM-DVIM-6: DFP / DVI Digital Video Adapter Cable, MDR20 Male to DVI Male, 6'

DFPM-DVIM-15: DFP / DVI Digital Video Adapter Cable, MDR20 Male to DVI Male, 15'

DVIM-DVIM-3: DVI Digital Video Cable, DVI Male to Male, 3'

DVIM-DVIM-6: DVI Digital Video Cable, DVI Male to Male, 6'

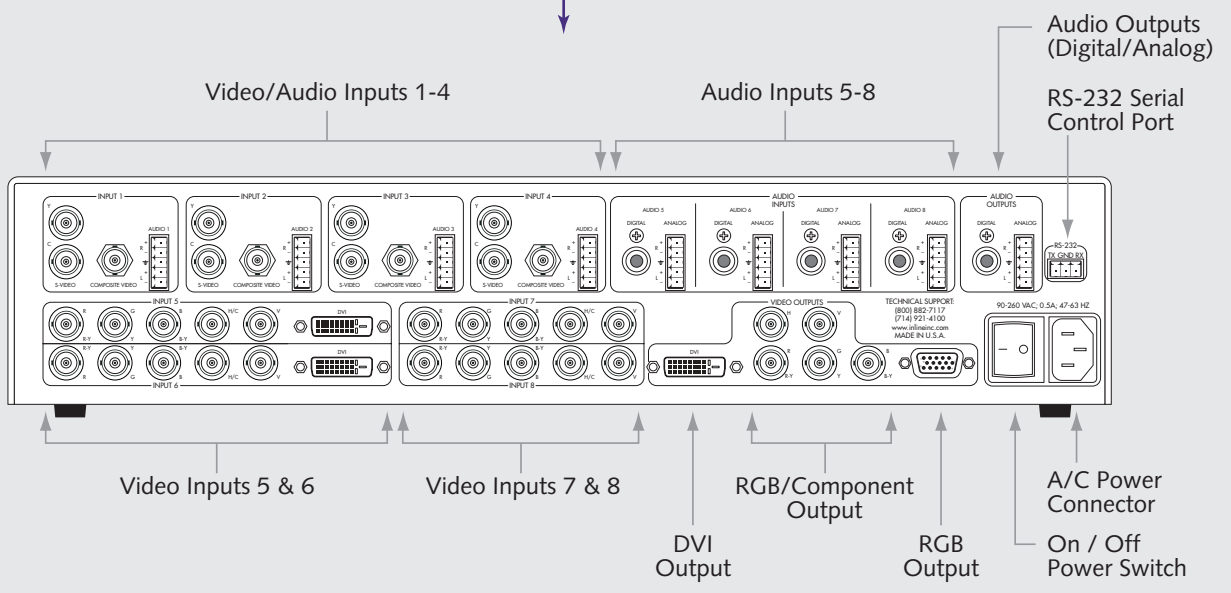
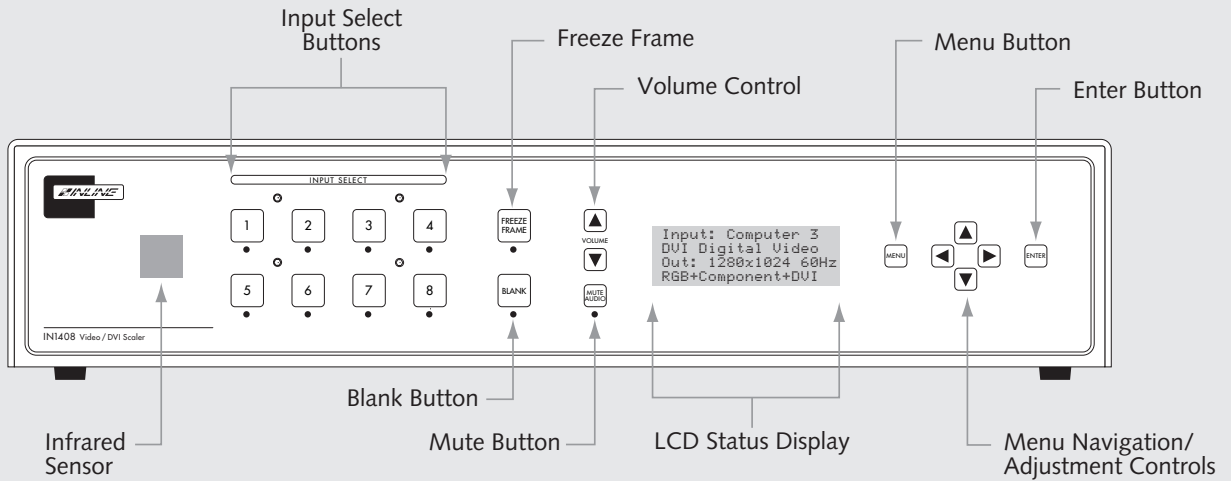
DVIM-DVIM-15: DVI Digital Video Cable, DVI Male to Male, 15'

DFP / DVI Adapters

IN9280: Digital Video Adapter, MDR20 Female to DVI Male

IN1408 VIDEO/DVI SCALER

CONNECTORS & CONTROLS



Operation

This section focuses on operating the **IN1408** using the front panel controls and commands. All adjustments, set-up functions and switching operations can be performed through the front panel or remotely via RS-232 serial commands or the optional IR remote control. Information on using the optional **CTL120** IR remote can be found on page 41.

FRONT PANEL CONTROLS

Input Select: Selects the audio and video source. The large buttons labeled **INPUT 1**, **INPUT 2**, **INPUT 3**, **INPUT 4**, **INPUT 5**, **INPUT 6**, **INPUT 7**, and **INPUT 8** are used to select the desired input. After turning on the **IN1408**, press and release the desired **INPUT SELECT** Button. A green LED will light underneath the button to indicate the selected input. The stereo audio signal associated with the input will automatically be selected at the same time. All audio, video and input settings for each input are stored internally (in memory) so the adjustment(s) will not have to be repeated after they are optimized. To switch to another input, simply press and release another numbered **INPUT SELECT** Button.

- **Note:** When powered up, the scaler automatically returns to the last configuration, including the last input selected.

The **BLANK** Button can be used at any time to show a blank screen on the display device. When blank is engaged, the output setting goes to black but the sync signals continue, ensuring that the data display device retains sync lock. Simply press and release the button to engage blanking (the green LED underneath the button will illuminate), and press and release it again to disengage.

- **Note:** The blank button has no effect on inputs 5 - 8 when they are configured as passive inputs.

Freeze Frame: Allows users to freeze the video signal and display a still image. Simply press and release the button to engage the function (the green LED below the button will illuminate), then press and release again to disengage.

- **Note:** The freeze button has no effect on inputs 5 - 8 when they are configured as passive inputs

Volume: The volume buttons are used to regulate the level of the audio signals routed through the scaler. Use the **▲ / ▼** volume buttons to increase / decrease the audio level for the current input. Press and release a button to raise / lower the volume level by one step, or press and hold a button to change the level continuously. Digital sound is a passive signal and can only be muted.

- **Note:** The IN1408 saves the volume levels for each input automatically.

Audio Mute: Mutes the audio for the selected input. Press the button to engage (the green LED below the button will illuminate), and press again to disengage.

Menu Buttons: The remaining buttons on the front panel (**MENU**, **▲**, **▼**, **➤**, **➤** and **ENTER**) are used to access and adjust the on-screen display menu. An illustration of the On Screen Display Menu System is provided on the next page.

IN1408 ON SCREEN DISPLAY MENU SYSTEM

Video⁵
Brightness
Contrast
Color Saturation ^{1,2}
RGB Gain ^{3,4}
Hue ^{1,2}
Sharpness ^{1,2,3}
Gamma ^{1,2}
Noise Filter ^{1,2}
Comb/Trap ¹
Reset Video

RGB Gain^{3,4}
Red
Green
Blue

Comb/Trap¹
Comb Filter
Trap Filter
Both Off

Reset Video
Yes
No

Audio
Bass
Treble
Balance
Reset Audio

Reset Audio
Yes
No

Input #
Composite
S-Video
Component Inter ⁷
Component Prog ⁷
RGBS Interlaced ⁷
RGB Progressive ⁷
DVI Digital ⁶
RGB Passive ⁷

Active Area
Active Pixels
Active Lines

Blanking
H-Blanking
V-Blanking

Scan Type
Interlaced
Swap Fields
Invert Sync

Input Mode
Auto Detect
Lockout Changes
User Defined
Redetect Now

Main Menu
Video ⁵
Audio
Input
Output
Advanced

Input
Signal Format
Aspect Ratio
Horiz Tracking ^{1,2}
Fine Phase ^{3,4}
Advanced
Reset Input

Signal Format
Input 1
Input 2
Input 3
Input 4
Input 5
Input 6
Input 7
Input 8

Aspect Ratio
Standard
Anamorphic
Wide Screen
Wider Screen
Expand

HorizTracking^{1,2}
Very Fast
Fast
Normal
Slow

Advanced
Active Area
Blanking
Total Pixels ^{3,4}
Scan Type ^{3,4}
Input Mode ⁴

Reset Input
Yes
No

Output
Resolution
Refresh Rate ⁸
Size
Position
Sync Format
Blue Screen
BNC Output
RGB Gain ^{1,2}
Reset Output

Resolution
640 x 480
800 x 600
852 x 480
1024 x 768
1152 x 864
1280 x 720
1280 x 768
1280 x 1024
1365 x 765
1365 x 1024

Refresh Rate⁸
56 Hz
60 Hz
65 Hz
72 Hz
75 Hz
85 Hz
96 Hz
100 Hz
120 Hz

Size
H-Size
V-Size

Position
H-position
V-position

Sync Format
RGBHV--
RGBHV++
RGBS
RGBS w/Serr
RGsB
RGsB w/Serr

Blue Screen
On
Off

BNC Output
Component
RGB

Reset Output
Yes
No

Advanced
Executive Mode
On Screen Menu
Input Labels
User Memory
Baud Rate
Delimiters
Reset RS-232
IR Code Format
Factory Reset
System Info

Executive Mode
On / Off

On Screen Menu
On / Off

Input Labels
Off
On
Momentary
Reset Label

User Memory
Save
Recall
Reset

Baud Rate
1200
2400
4800
9600
19200
38400
57600

Delimiters
Parenthesis
Brackets
Braces
Slashes
Less & Greater
Signs ! #

Reset RS-242
Yes / No

IR Code Format
Code Bank A (001)
Code Bank B (028)

Factory Reset
Yes
No

System Info
Input #
Signal Format
Input Horiz
Input Vert.
Output Size
Output Horiz.
Output Vert.
Sync Format
Version

Notes:

In Executive Mode the available menu items are restricted and only the menu items shown in **bold** are available.

1. Composite Video
2. S-Video
3. Interlaced Component and Interlaced RGB
4. Progressive Component and Progressive RGB
5. Not available for DVI inputs
6. Inputs 5 and 6
7. Inputs 5 through 8
8. Refresh rates available depend on the current resolution

ON SCREEN MENU

To access the main menu, press the **MENU** or **ENTER** Button. Use the arrow buttons to maneuver around within the menu display. Press **ENTER** to select and save a command, or press **MENU** to exit (out of the menu). All audio, video, input and output settings for each input and each output mode are stored internally (in memory) so the adjustments will not have to be repeated after they are optimized.

The MAIN MENU commands and their functions are:

VIDEO	-	Changes input signal video parameters
AUDIO	-	Changes input signal audio parameters
INPUT	-	Changes input signal parameters
OUTPUT	-	Changes output signal parameters
ADVANCED	-	Displays advanced options

Menu Commands



Save It or Lose It!

After you have optimized a setting, save it by pressing the ENTER BUTTON. It is critical that you save the setting before proceeding to another input or another menu function, otherwise your new adjustment will be lost.

VIDEO MENU

The **IN1408** allows users to manually adjust the brightness, contrast, RGB gain, color, hue, sharpness, gamma, noise filter, and comb / trap filter settings.

To access the video adjustment menu via the front panel control buttons, press the desired **INPUT SELECT** Button, press **MENU**, press the **▼** or **▲** button (if necessary) to reach the video menu, then press **ENTER**. Use the **▲** and **▼** buttons and the **ENTER** key to select the setting you wish to adjust. After selecting a setting, use the **➤** and **➤** buttons to make the adjustments. 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, press **ENTER** to save.

Key Concept



*If these settings seem confusing, we recommend that you experiment with the **MENU**, **▲**, **▼**, **➤**, **➤** and **ENTER** Buttons until you familiarize yourself with the **IN1408** front panel control 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. If you get lost, enter unfamiliar territory or are afraid of making an improper selection, pressing the **MENU** button allows you to leave the menu system safely without making any changes. We also recommend that, unless you're a qualified audiovisual technician, you should avoid entering the **Advanced Menu***

The following video adjustment parameters can be controlled via the on-screen menu system which can be accessed using the front panel buttons or the optional **CTL120** IR remote control. See page 41 for information on using the **CTL120** IR remote.

➡ **Note:** Video adjustments do not affect inputs configured for RGB passive.

Brightness Setting: Adjusts the input signal brightness.

Range: 0 to 255 Factory Default Setting: 128

Operation: Press ➤ button to increase the brightness.
Press ➤ button to decrease the brightness.

Contrast: Adjusts the difference between the input signal's brightest and darkest settings. At the minimum setting the entire picture is displayed at about the same brightness (very grayish). At the maximum setting there is a great difference between the darkest and lightest parts of the screen.

Range: 0 to 255 Factory Default Setting: 128

Operation: Press ➤ button to increase the contrast.
Press ➤ button to decrease the contrast.

Color Saturation: Adjusts the color saturation of the picture over a wide range. Setting this control to 0 will remove most of the color. *This control is only available for composite and S-Video signals.*

Range: 0 to 255 Factory Default Setting: 128

Operation: Press ➤ button to increase the color.
Press ➤ button to decrease the color.

RGB Gain: Changes the input signal gain (contrast) for each individual color. *This control is only available for component video, RGBHV, RGBS and RGSB signal formats.* Red, green and blue controls are available.

Range: 0 to 255 Factory Default Setting: 128

Operation: Press ➤ button to increase the Red, Green or Blue Gain.
Press ➤ button to decrease the Red, Green or Blue Gain.

Hue (NTSC Signals Only): Adjusts the picture's color towards red or green. *This control is only available for composite and S-Video signals.*

Range: 0 to 255 Factory Default Setting: 128

Operation: Press ➤ button to increase the green.
Press ➤ button to increase the red.

Sharpness: Uses variable filtering to affect input picture detail and definition. *This control is only available for composite, S-Video, component interlaced and RGBS interlaced signals.*

Range: 0 to 8

Factory Default Setting: 3

Operation: Press \blacktriangleright button to increase the sharpness.
Press \blacktriangleleft button to decrease the sharpness.

- ➡ **Note:** Increasing the sharpness setting gives the visual effect that the noise filter setting is decreasing. Although the sharpness and noise filter settings seem to offset each other, they are actually two different adjustments that affect two different sets of circuitry. Operators should adjust both settings until optimal picture quality is achieved.

Gamma: The 30 active gamma correction curves programmed into the **IN1408** are used to compensate for the non-linear response of many display devices. Before adjusting Gamma, the brightness and contrast controls should be set at factory default positions. Once the proper gamma setting has been achieved, the brightness and contrast settings should then be optimized to fine tune the image. *This control is only available for composite and S-Video signals only.*

Range: 1 to 30

Factory Default Setting: 10*

Operation: Press \blacktriangleright button to step to higher numbered gamma curves.
Press \blacktriangleleft button to step to lower numbered gamma curves.

9600 *The factory default setting of 10 corresponds to a gamma correction curve of 1.0*

Noise Filter: Changes the input signal noise filter. *This control is only available for composite and S-Video signals.*

Range: 0 to 47

Factory Default Setting: 9

Operation: Press \blacktriangleright button to increase noise filter.
Press \blacktriangleleft button to decrease noise filter.

- ➡ **Note:** Increasing the noise filter setting gives the effect that the picture sharpness setting is decreasing. Decreasing the noise filter will effectively add more image detail. Review the Sharpness setting section on the previous page.

Comb/Trap Filter: Selects the comb filter, trap filter or turns both off. *This control is only available for composite signals.*

The **comb filter** electronically provides excellent Luma / Chroma separation (separates the color from the picture signal). This greatly reduces cross-color interference and hanging dots while maintaining image bandwidth and detail (applies to composite, S-Video and Component A signal formats only).

The **trap filter** extracts luminance from the picture. Generally speaking, the trap filter is *usually* the preferred setting when running signals from a VCR (as composite video). You may wish to compare both settings to determine which is best for your application.

Reset Video Settings: Resets *all* video settings to factory default (for current input only).

AUDIO MENU

The **IN1408** allows users to manually adjust the bass, treble and balance settings.

➡ **Note:** The only control available for digital audio signals is MUTE.

To access the audio adjustment menu via the front panel control buttons, press the desired **INPUT SELECT** Button, press **MENU**, press the ▼ or ▲ button (if necessary) to reach the audio menu, then press **ENTER**. Use the ▲ and ▼ buttons and the **ENTER** key to select the setting you wish to adjust. After selecting a setting, use the ➤ and ◀ buttons to make the adjustments. 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, press **ENTER** to save.

The following audio adjustment parameters can be controlled via the on-screen menu system which can be accessed using the IN1408 front panel buttons or the optional CTL120 IR remote control. See page 41 for information on using the **CTL120** IR remote.

➡ **Note:** While on-screen menus are not displayed for Inputs 5 - 8 when set for RGB passive mode, all audio functions are still available for these inputs.

Bass: Increases / decreases the lower frequencies of the audio signal.

Range: 6 to 27

Factory Default Setting: 16 (0.0dB)

Operation: Press ➤ button to increase the bass frequencies.

Press ◀ button to decrease the bass frequencies.

Treble: Increases / decreases the higher frequencies of the audio signal.

Range: 8 to 25

Factory Default Setting: 16 (0.0dB)

Operation: Press ➤ button to increase the treble frequencies.

Press ◀ button to decrease the treble frequencies.

Balance: Shifts the audio balance toward the right or left audio channels.

Range: 0 to 31

Factory Default Setting: 16

Operation: Press ➤ button to move the balance toward the right channel.

Press ◀ button to move the balance toward the left channel.

Reset Audio Settings: Resets *all* audio settings to factory default (for current input only)

INPUT MENU

Key Concept



*Hint: Adjust the **IN1408** output settings first. Adjust the resolution, refresh rate, size, position and sync format, along with the display device settings, to fit the video image on the screen (use the blue screen if necessary). Once the **IN1408** output settings and the display device settings have been properly adjusted, the **IN408** input settings and video adjustments may be configured for each input signal.*

To access the input menu via the front panel control buttons, press the desired **INPUT SELECT** Button, press **MENU**, press the ∇ or \blacktriangle button (if necessary) to reach the input menu, then press **ENTER**. Use the \blacktriangle and ∇ buttons and the **ENTER** key to select the setting you wish to adjust. Once you've optimized the setting for the current input, press **ENTER** to save.

Signal Format: Use this control to select the signal format for each input. Inputs 1 - 8 can accept either composite or S-Video signals. Inputs 5 - 8 also accept component, progressive component, RGBHV, RGBS, RGsB or RGB Passive. Inputs 5&6 are the only inputs to accept DVI / TMDS digital video signals. On Inputs 1 - 4, the composite and S-Video connections are internally wired together; therefore, either composite or S-Video can be connected to each input, but not both at the same time. Refer to the Installation Section on page 7 for the specific connections for each signal format.

Signal Formats available are:

- **Composite**
- **S-Video**
- **Component Interlaced**
(Sub-menu selects NTSC / PAL / SECAM format)
- **Component Progressive**
- **RGBS Interlaced**
- **RGB Progressive**
(Sub-menu selects RGBHV / RGBS / RGsB format)
- **DVI Digital**
- **RGB Passive** (Passive Switching with No Scaling or Controls Available)
Compatible with RGBHV, RGBS, RGsB, Component Video Progressive or Interlaced Signals

To configure the inputs for a specific Signal Format:

- Press the **ENTER** or **MENU** Button to access the main menu.
- Highlight **INPUT** and press **ENTER** to access the input menu (use the \blacktriangle and ∇ arrow buttons to highlight the appropriate menu command).
- Highlight **SIGNAL FORMAT** and press **ENTER** to access the input selection menu.
- Highlight the input you want to configure and press **ENTER** to access the signal format menu.
- Select the signal format for each individual input (use the \blacktriangle and ∇ buttons to select the desired signal format).
- Press **ENTER** to save the signal format into memory.

Key Concept



It is critical that the signal format be selected properly for each input. If the input is not properly configured to match the input signal, the scaler will not function properly and will either display a distorted image or no image at all. Using the on-screen menu, operators can set / change the input signal format at any time, even when another input is active. For example: an operator can configure the signal format for Input 1 while the display device is presenting a signal that is passing through Input 3. This method is required to deselect the RGB passive signal format, since the on-screen menu cannot be seen while in this mode. These details are discussed in the Pass-Through RGB Video Section on page 27.

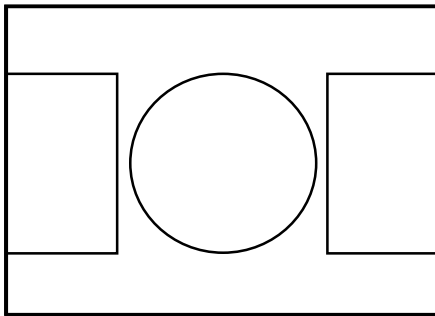
Aspect Ratio – The aspect ratio controls can be used to vary the relative image width and height. They can be used to accommodate various input signal aspect ratios as well as output device aspect ratios. The output aspect ratio is selected by choosing the appropriate resolution in the output menu (see Output Modes Section on page 27).

- Standard:** For Standard 1.33 input signals (sometimes referred to as full screen).
- Anamorphic:** This setting provides vertical image squeezing to accommodate anamorphically enhanced DVDs.
- Wide Screen:** For wide screen 1.78 input signals (letterbox).
- Wider Screen:** For wider screen 2.35 input signals (narrow letterbox).
- Expand:** Designed for wide screen (letterbox) signals viewed on 4:3 aspect ratio displays. Expand mode zooms in on the center of the image and crops the image vertically and horizontally so that the black bars above and below the image are removed. In this mode, some image is also lost on the right and left hand edges.

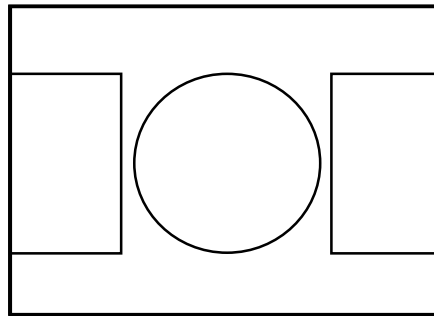
Most DVDs and VCRs put out a 4:3 signal. How this signal is filled with video determines its aspect ratio. In the following examples, four different input aspect ratios are shown on the left as they would be displayed in their native 4:3 format. The same signals are shown on the right as they would appear on the output after scaling.

Example 1:

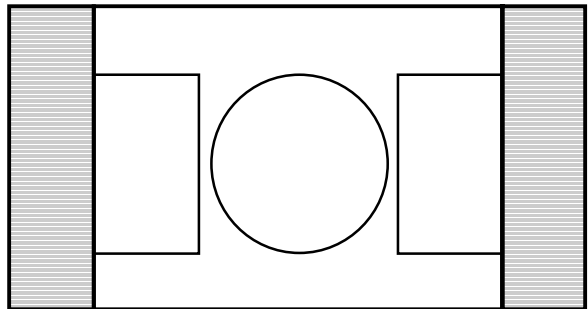
Aspect Ratio Setting: Standard



4:3 Display

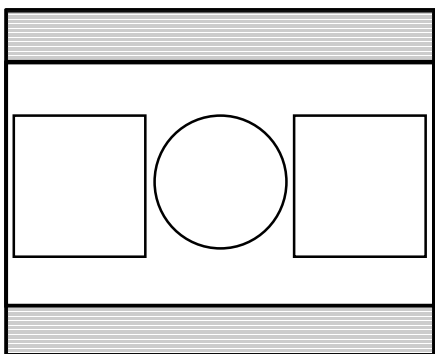


16:9 Display

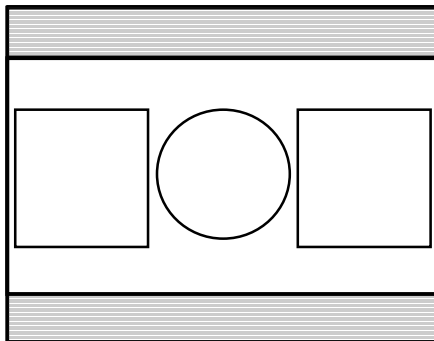


Example 2:

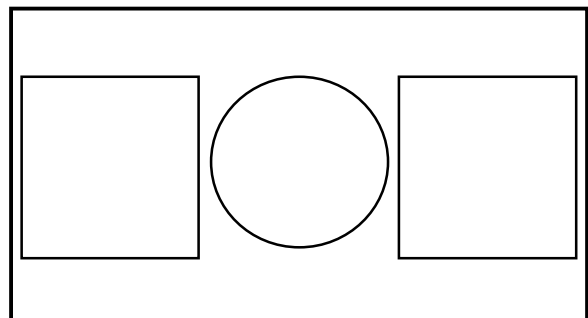
Aspect Ratio Setting: Wide Screen



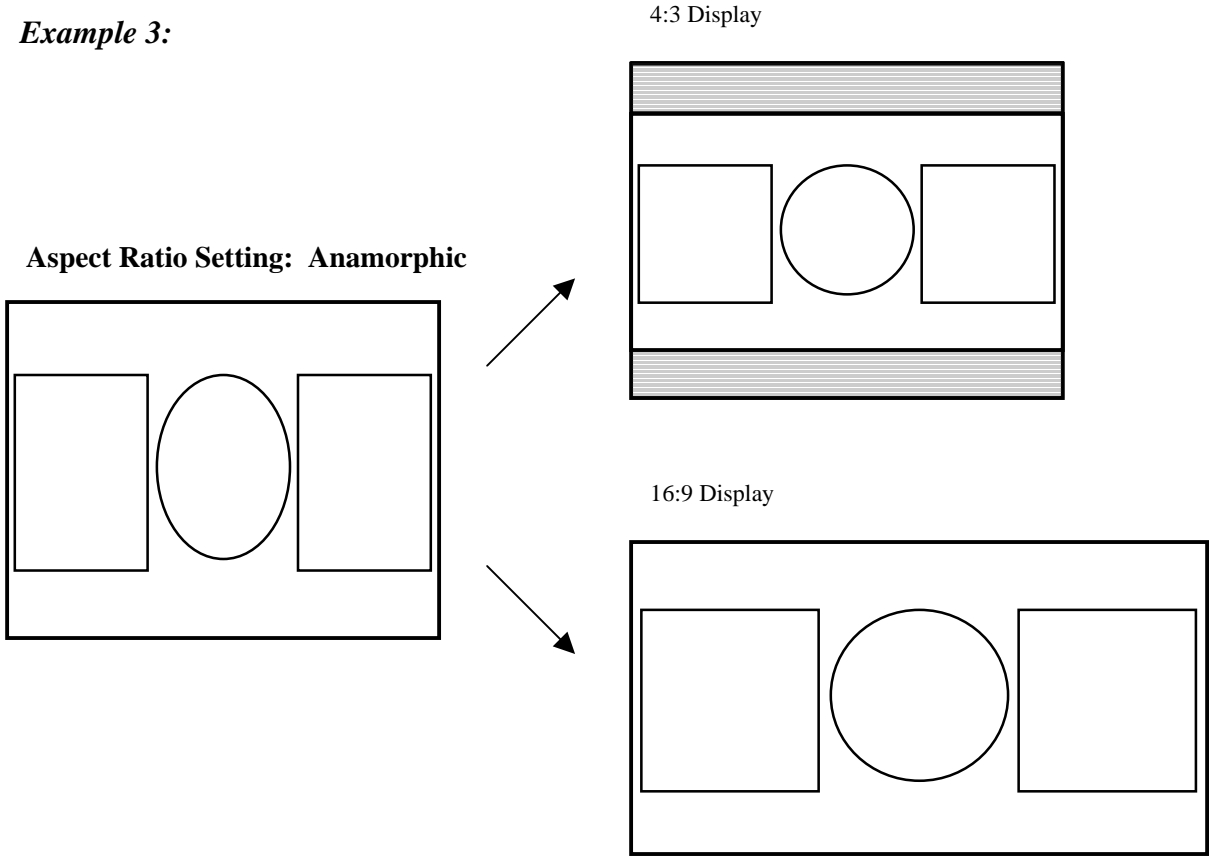
4:3 Display



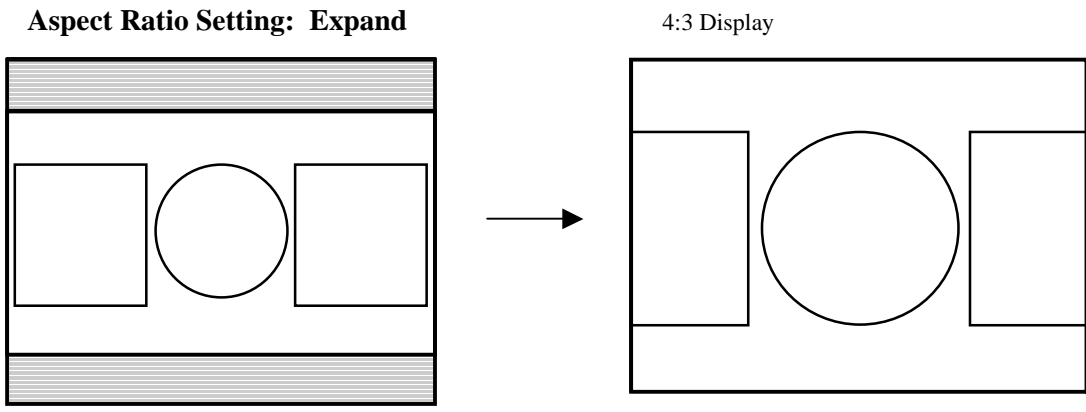
16:9 Display



Example 3:



Example 4.



Horizontal Tracking: (Composite / S-Video Signals Only) This control adjusts horizontal sync tracking to prevent image bending (hooking) along the top of the video image. Various settings are available to compensate for different quality input signals:

Very Fast	For poor quality video signals, such as from a VCR.
Fast	For normal quality video signals, such as from a TV.
Normal	For good quality video signals, such as from a DVD player.
Slow	For high quality video signals, such as broadcast video.

Fine Phase: Adjusts the amount of phase shift applied to the input signal. If video noise is present in the image, the fine phase control may be effective in optimizing the image to remove video noise due to input timing errors. Fine Phase is only available for Interlace Component, Progressive Component, RGBHV, RGBS and RGsB signal formats.

Advanced: The Input menu also includes several adjustments under the Advanced settings option. These adjustments are rarely needed for standard video signals and computer video signals and are mainly designed to optimize the quality when inputting non-standard or proprietary video signals. **Most users should not adjust the Advanced Input settings.** For additional details on Advanced Input Settings, please see Advanced Input Settings Section on page 29.

Reset Input: Resets *all* input settings to factory default (for the current input only).

OUTPUT MENU

To access the output menu via the front panel control buttons, press **MENU**, press the ∇ or \blacktriangle button (if necessary) to reach the output menu, then press **ENTER**. Use the \blacktriangle and ∇ buttons and the **ENTER** key to select the setting you wish to adjust. Once you've optimized the setting for the current output, press **ENTER** to save.

Output Resolution: This control lets you select the appropriate resolution for your display device. The available resolutions are listed on page 27. Because the **IN1408** only scales up, users must choose an output resolution that is greater than or equal to the input size. For instance, you may not select 640 x 480 output with PAL input signals since PAL has more than 480 lines of video.

Refresh Rate: Allows users to choose the optimal refresh rate for their display device.

➡ **Note:** Not all resolution and refresh rate combinations are available. Refer to the chart on page 27 for a chart of available resolutions / refresh rates.

Key Concept



*Of all the settings on the **IN1408**, perhaps the most critical adjustments are the output resolution and output refresh rates. Setting the scaler to match the capabilities of your data display device will have an enormous impact on the image quality. To achieve the optimum image on your display device, refer to the instructions on pages 25 & 26.*

Size: This adjusts the output horizontal and vertical size. It shrinks the size to a percentage of the output resolution selected. The output size is automatically reset anytime a new input aspect ratio is selected. This setting is useful to manually reduce the height of the output signal when an anamorphic input signal is connected. The **IN1408** only scales up; therefore, the output size controls will stop at a certain point where the input and output resolution are equal.

Position: Shifts the output image Up / Down / Left / Right on the display device. Unlike input blanking, the **Position** control does not crop the image or add blank borders. The output position is automatically reset anytime a new input aspect ratio is selected. To quickly access the position adjustment, simply press one of the front panel ▲ ▼ ◀ ▶ buttons at any time when the on-screen menu is not displayed. This immediately shifts the image in the appropriate direction. Press ENTER to accept the new setting. If desired, the position control can also be accessed using the Position on-screen menu item under Output menu.

Sync Format: Select an output signal format that is compatible with your display.

RGBHV--	RGB with negative horizontal and vertical sync (default)
RGBHV++	RGB with positive horizontal and vertical sync
RGBS	RGB with composite sync (without serrations)
RGBS w/Serr	RGB with composite sync (with serrations)
RGsB	RGB with sync on green (without serrations)
RGsB w/Serr	RGB with sync on green (with serrations)

Blue Screen: Available anytime (even when the input settings are incorrectly adjusted or the input signal is missing entirely), the blue screen may be used as a test signal to adjust the output settings (resolution, refresh rate, size, position and sync format) and verify the image on the monitor. The video and input settings have no effect on the blue screen. Once the output settings have been properly adjusted and verified on the monitor, the blue screen may be turned off to adjust the video and input settings.

BNC Output: Use this menu item to select the color space format for the 5-BNC output. The factory default is RGB color space (RGBHV, RGBS or RGsB). If you are connecting to an HDTV display or other device that requires a component video signal, set this menu item to Component. This adjustment does not affect the 15-Pin HD and DVI output, which always output signals in the RGB color space.

RGB Gain: This is a global setting that can be adjusted to compensate for the color temperature of the display device. This RGB gain setting only applies to composite video and S-video signals.

Range: 0 to 255

Factory Default Setting: 128

Operation: Press ▶ button to increase the Red, Green or Blue Gain.
Press ◀ button to decrease the Red, Green or Blue Gain.

Reset Output Settings: Resets *all* output settings to factory default.

ADVANCED MENU

To access the advanced menu via the front panel control buttons, press **MENU**, press the **▼** or **▲** button (if necessary) to reach the advanced menu, then press **ENTER**. Use the **▲** and **▼** buttons and the **ENTER** key to select the setting you wish to adjust. Once you've optimized the setting, press **ENTER** to save.

Executive Mode: This is a restricted operation mode that permits adjustments of common controls but removes all menu items for advanced controls. Executive Mode is ideal for rental applications, home theater installations and any other application where a non-technical users can select inputs, adjust volume, and make video image quality adjustments, while advanced settings like output resolution / refresh rate, RS-232 communication settings and other advanced adjustments are disabled. When Executive Mode is enabled, all advanced function menu items will now be missing from the on-screen and LCD menus, however, these functions are still available through RS-232 serial commands.

To Enable or Disable Executive mode, use the menu item found under the advanced menu. As shown in the menu tree on page 12, when Executive Mode is enabled only the items shown in bold will be available.

On-Screen Menu: This menu item allows you to enable or disable the on-screen menus. It does not affect the LCD status display, which is always functional.

Input Labels: Each input can display a label on the screen to indicate the name of the current input. The factory default input labels read "Input x", with x being the number of the current input. The **IN1408** can also be programmed with custom input labels such as "VCR" , "Camera 5", or "DVD #2" or any other desired text to correspond with the name of the actual source connected to each input. Use the input Select from the following label options:

- **On:** The labels remain on-screen and change each time a new input is selected.
- **Off:** The labels remain off and are not displayed.
- **Momentary:** The label is displayed for 3 seconds anytime a new input is selected.
- **Reset:** This resets the label to the factory default of "Input #." This is beneficial if the label was changed via user memory, or to reset the label if RS-232 control is no longer available.

☞ **Note:** The input label text is user definable via RS-232 commands. Refer to RS-232 Control Section on page 36 for more information.

Factory Reset: Returns all video, audio, input, output and RS-232 settings for all inputs to factory default.

User Memory: The User Memories (from 5 to 128) store all video, audio and input parameters. If a different input signal is applied to the **IN1408**, the User Memory can be recalled to return the video, audio and input settings for that particular signal. Select from the following options:

- **Save:** This saves all of the video, audio and input parameters for the current input into the selected memory.
 - **Recall:** This recalls all of the video, audio and input parameters from the selected memory into the current input.
 - **Reset:** This resets all video, audio and input parameters for the selected memory based on the current input mode.
- ☞ **Note:** Some parameters such as Active Area and Blanking are input mode dependent. Before recalling a user memory that has not been previously saved, it is best to reset that particular memory so it will be programmed for the current input mode

Baud Rate: Allows RS-232 remote users to select the baud rate that matches their remote control device system.

Delimiters: Use the on screen menu to select the desired command code delimiters. INLINE scalers can be set to recognize six sets of leading and end codes when using an RS-232 remote: parentheses (), brackets [], braces { }, slashes \/, less and greater than < >, and signs !#. If desired, several INLINE products may be connected together on the same RS-232 serial control line with each device set for a different delimiter pair. Each unit will only respond to codes sent with the appropriate delimiters and will ignore all other codes.

Reset RS-232 Settings: Resets *all* RS-232 settings to factory default.

IR Code Format: This menu item selects the IR code format for the **IN1408**. This may be used to select an alternative IR code format for installations where the **IN1408** IR codes are conflicting with other devices in the room. The factory default is code bank A and will work when the optional CTL120 remote is set to code 001. The alternative code format is code bank B. If the unit is set to Code Bank B, the CTL120 remote must be programmed to code 028 (see the CTL120 operation manual for more information).

System Info: This is an informative display that shows a variety of information about the currently selected input signal and scaler output settings on a single screen. The System Info display may be useful for troubleshooting or to quickly verify various settings. The following information is included in the System Info display:

- | | |
|-------------------------------|------------------------------------|
| • Input Source | • Input Signal Standard and Format |
| • Input Horizontal Scan Rate | • Input Vertical Refresh Rate |
| • If Input is Interlaced | • Output Resolution |
| • Output Horizontal Scan Rate | • Output Vertical Refresh Rate |
| • Output Sync Format | • Program Version Number |

Choosing the Optimal Output Resolution and Refresh Rate

Of all the settings on the **IN1408**, perhaps the most critical adjustment is the output resolution and output refresh rate. Every display device has an optimal or native resolution and an optimal refresh rate. This will vary depending on the type of display technology, if the display has a fixed number of display elements (native resolution), the size of the pixels, the size of the display or display screen, and even the distance of the viewer from the display screen. Setting the **IN1408** to the output resolution and refresh rate to match this optimal resolution for your data display will have an enormous impact on the image quality.

Please note that the ideal resolution must also lie within the compatible scan range of the display device. For example, some 27" – 36" presentation monitors are limited to input signals in the 30 – 50 KHz range. If the video scaler's output resolution and refresh rate settings are too high the signal will not be viewable on the display. Before selecting the output resolution and refresh rate, you should check the specifications page in the operation manual for your display device to verify the compatible horizontal scan range and vertical refresh rates. You may also be able to find this information in the **INLINE PRODUCT CATALOG** reference section. The Large Screen Data projector list and Large Data Display list include signal compatibility information for both current and obsolete models of data projectors, retro displays, presentation monitors and plasma displays.

CRT DISPLAYS – SELECTING THE GOLDEN RESOLUTION

While CRT displays do not have a native resolution, they will have a "golden resolution," or sweet spot, for input signal resolution. When the video scaler is set to the golden resolution of the CRT display, this will result in a sharp, detailed image without visible scan lines. If the video scaler is set below the golden resolution, the displayed image will have tiny black lines between the image lines. If the video scaler is set above the golden resolution, the lines will actually overlap and the image will appear soft and loose detail because there are more lines and pixels than the display can clearly resolve. When experimenting to find the golden resolution for your CRT display device it is best to set the output refresh rate at 72 Hz and begin at the output resolution indicated in the chart on page 26. You can then try higher and lower resolutions until you achieve the setting that offers both a solid image and excellent picture detail.

CRT DISPLAYS – SELECTING THE OPTIMAL REFRESH RATE

CRT displays may tend to flicker at refresh rates below 70 Hz. In order to achieve a solid, flicker-free image, an output refresh rate of 72 Hz or 75 Hz is recommended for most CRT displays. You should also experiment with even higher refresh rates to see if they create a better image. In some cases, you will find that the image suddenly appears better at a higher refresh rate such as 85 Hz.

Keep in mind that as the refresh rate is increased, the horizontal scan rate also increases. This places greater higher bandwidth demands on the video distribution system and the display device. If you select a refresh rate that is too high you will actually see a softer image because the signal is exceeding the bandwidth capabilities of the display device. Extremely high refresh rate settings may also create a compatibility problem because a very high refresh rate may result in a signal that is outside the compatible scan rate of the data display.

FIXED PIXEL DISPLAYS – SELECTING THE OPTIMAL RESOLUTION AND REFRESH RATE

Display devices based on LCD, DLP, LCOS, and plasma display technology have a specific number of display elements, or pixels. This is also referred to as the “native resolution” of the display device. These devices are usually capable of showing higher or lower resolution signals, but can only do this by scaling the image up or down to the native resolution. In order to avoid additional image scaling it is important to know the native resolution of your display device.

Check your operation manual to determine the native resolution of your display device. The video scaler output should be set to match this native resolution. The video scaler output refresh rate should be set to 60 Hz with most LCD, plasma, D-ILA / LCOS and DLP displays. Higher refresh rates are not recommended with these display technologies because they usually *do not* improve the image and may actually cause compatibility problems.

Display Type	Suggested Optimal / Native Resolution	Suggested Refresh Rate	Comments
CRT Displays			
15" Data Monitor	800 x 600 / 1024 x 768	72Hz / 75Hz	
17" Data Monitor	1024 x 768	72Hz / 75Hz	
19" / 21" Data Monitor	1024 x 768 / 1280 x 1024	72Hz – 85Hz	
27" – 42" Presentation Monitor	800 x 600 / 1024 x 768	72Hz / 75Hz	
32" – 38" HDTV Display (16:9)	1024 x 768 / 1280 x 720	72Hz / 75Hz	
Data Projector or Retro Display with 7" CRTs	800 x 600 / 1024 x 768	72Hz – 85Hz	
Data Projector or Retro Display with 9" CRTs	1024 x 768 / 1280 x 1024	72Hz – 85Hz	
Projectors, Flat Panel and Plasma Display Devices			
DMD / DLP Projectors	800 x 600 / 1024 x 768 / 1280 x 720 / 1280 x 1024	60 Hz	Check Native Resolution of Display. For 848 x 600, set scaler to 800 x 600.
LCOS / D-ILA Projectors	1365 x 1024	60Hz	
LCD Projectors	800 x 600 / 1024 x 768 / 1280 x 1024 / 1365 x 768	60Hz	Check Projector's Native Resolution. Very old units may be 640 x 480.
LCD 14" / 15" Flat Panel Display	1024 x 768	60Hz	
LCD 18" Flat Panel Display	1280 x 1024	60Hz	
LCD 28" Flat Panel Display	1280 x 768	60 Hz	
Plasma Display 40" (4:3)	640 x 480	60Hz	
Plasma Display 42" (16:9)	852 x 480 / 1024 x 768 / 1280 x 768	60Hz	Fujitsu / Sony 42" Plasmas with 1024x1024: Set Scaler to 1024 x 768
Plasma Display 50" / 60" (16:9) (Boxlight / Eizo / LG / Pioneer / Runco / Sharp / Viewsonic)	1280 x 768	56 / 60 / 65 Hz	Pioneer PDP-505HD: Use 56 Hz
Plasma Display 50" / 60" (16:9) (Fujitsu / JVC / Luce / Marantz / NEC / Panasonic / RCA / Runco / Samsung / Toshiba)	1365 x 768	60Hz	NEC 50": Set Sync Format to RGBHV++

Advanced Operation

PASS-THROUGH RGB VIDEO

Inputs 5 - 8 can be set for RGB passive video. No decoding, scaling or video adjustment functions are available when these inputs are set for passive format. In passive mode, the unit merely acts as an RGB switcher. Since there is a distribution amplifier built into the **IN1408**, the selected output will appear at both the 5 BNC and the 15-Pin HD (VGA) video outputs.

Key Concept



Blank, freeze, the on screen menu and other video functions are not available for Inputs 5 - 8 when set to RGB passive mode.

Once you have set Input 5, Input 6, Input 7 or Input 8 for RGB passive mode, the **IN1408** is functioning as a passive switcher and you will not be able to see any on-screen menus. If you wish to select a different input mode following this procedure:

1. Select Input 1, Input 2, Input 3 or Input 4 (use the front panel Input Select Buttons). The main menu will become available.
2. Using the front panel Menu Buttons, select **Input**, followed by **Signal Format**.
3. Select Input 5, Input 6, Input 7 or Input 8, and then select the desired signal format.

Once this change has been made, the proper signal format will be displayed whenever Input 5, Input 6, Input 7 or Input 8 is selected (via the Input Select Buttons).

➡ **Note:** Audio is an active function, and all audio functions are still available, even though the menu cannot be displayed.

OUTPUT RGB CONNECTORS

The dual RGB outputs of the **IN1408** are individually buffered (including RGB passive signals). They may both be connected simultaneously without degradation of the other output. Both are capable of transmitting the RGB signal over 100 feet or more through high quality coaxial cables (see RGB Input / Output Installation Cables Chart on page 43).

OUTPUT MODES

The **IN1408** supports the following Output Modes:

Resolution	Mode	Aspect Ratio*	Refresh Rate (Hz)								
			56	60	65	72	75	85	96	100	120
640 x 480	VGA	4:3									
800 x 600	SVGA	4:3									
852 x 480	HDTV - 480p	16:9									
1024 x 768	XGA	4:3									
1152 x 864		4:3									
1280 x 720	HDTV - 720p	16:9									
1280 x 768		16:9									
1280 x 1024	SXGA	5:4									
1365 x 768	Wide XGA	16:9									
1365 x 1024		4:3									

DEFAULT POWER-UP BUTTONS

An output mode, output sync format or a factory reset may be selected without the use of the **IN1408** menu. This is particularly useful if the monitor does not display an image or if the image is scrambled. Simply hold down the front panel button while turning on the **IN1408**. The front panel buttons perform the following functions:

INPUT 1:	Factory Reset
INPUT 2:	Set Output Format to RGBHV--
INPUT 3:	Set Output Format to RGBHV++
INPUT 4:	Set Output Format to RGBS
BLANK:	Set Output Format to RGsB
FREEZE:	Enable Front Panel
MENU:	640 x 480 @ 60 Hz
LEFT:	800 x 600 @ 60 Hz
UP:	1024 x 768 @ 60 Hz
DOWN:	1152 x 864 @ 60 Hz
RIGHT:	1280 x 1024 @ 60 Hz
ENTER:	Factory Reset

OUTPUT POSITIONING

The output position may be adjusted without entering the main menu sequence. Pressing the arrow keys selects the output position controls if the menu is not on. Afterwards, press enter to save the output position, or press menu to exit without saving the setting.

The output position simply moves the image on the monitor. It does not add blank borders or crop any part of the image. However, the apparent effect of blank borders and a cropped image may be due to the image being incorrectly positioned on the monitor. The blue screen is available to adjust the output image on the monitor. It is available at any time, even when the input settings are incorrectly adjusted or the input signal is missing entirely. Use the blue screen to adjust the output settings (resolution, refresh rate, size, position and sync format) and to verify the image on the monitor. The video and input settings have no effect on the blue screen. Once the output settings have been properly adjusted and verified on the monitor, the blue screen can be turned off, and the video and input settings may then be adjusted.

Advanced Input Settings

- **Note:** The Advanced Input Settings adjustments are a complex and powerful set of adjustments designed to optimize the unit for non-standard video and RGB signals. Since most users will never encounter such signals, only qualified A/V technicians should adjust the Advanced Input Settings

The **IN1408** adjusts automatically for different input and output modes. However, in cases where the input signal has slightly different timing or is a non-standard mode, some settings may be adjusted manually. All settings for each input and output mode (including non-standard input modes) are stored internally so the adjustments will not have to be repeated after they are optimized. The various input settings are outline below.

- **Note:** Figure 1 and the formulas and figures included on the following pages will assist in the adjustment of these settings.
 - **Active Pixels:** The number of pixels per line inside the input active area.
 - **Active Lines:** The number of lines per frame inside the input active area. For interlaced input signals, this number refers to the lines per frame after de-interlacing, not the number of lines per field.
 - **H-Blanking:** The number of pixels per line inside the blanking area that is on the left side of the active area (including the horizontal sync width and the horizontal back porch).
 - **V-Blanking:** The number of lines per frame inside the blanking area that is above the active area (including the vertical sync height and the vertical back porch).
 - **Total Pixels:*** The total number of pixels per line including the blanking on both sides of the input active area (active, horizontal sync width, back porch and front porch). Refer to the Advanced Input Settings Section on pages 31- 35 to determine how to set the total pixels. The total number of lines per frame including the blanking above and below the active area is determined by the input signal and cannot be adjusted by the user.
 - **Scan Type:*** Three options are available:
 - **Interlaced** - for interlaced signals
 - **Swap fields** - to swap the interlaced fields (if necessary)
 - **Invert Sync** - to invert the sync polarity (if necessary)
 - **Input Mode:*** Four options are available:
 - **Auto Detect:** The default mode at power up that allows the **IN1408** to automatically detect new input modes and adjust accordingly.
 - **Lockout Changes:** Prevents the **IN1408** from switching back and forth between input modes, or flickering when small input mode changes occur (such as from a VCR in fast forward or reverse).
 - **User Defined:** All input modes have the same user definable settings, however, they are restricted to values close to the input mode detected. If a full range of values is necessary, the user-defined mode may be manually selected.
- **Note:** If auto detect cannot determine the input mode, the user defined mode is selected automatically.

- **Redetected Now:** The **IN1408** automatically reconfigures when each new input mode is detected and each new output mode is selected. In the event that the scaler does not detect a change in the input mode, or should the input / output settings become invalid, the Redetect Now option allows users to initiate a new detection sequence and reload the input / output settings.

* These items are only available for interlaced component, progressive component, interlaced RGBS, and progressive RGBHV, RGBS and RGSB signal formats.

Adjusting Advanced Input Settings

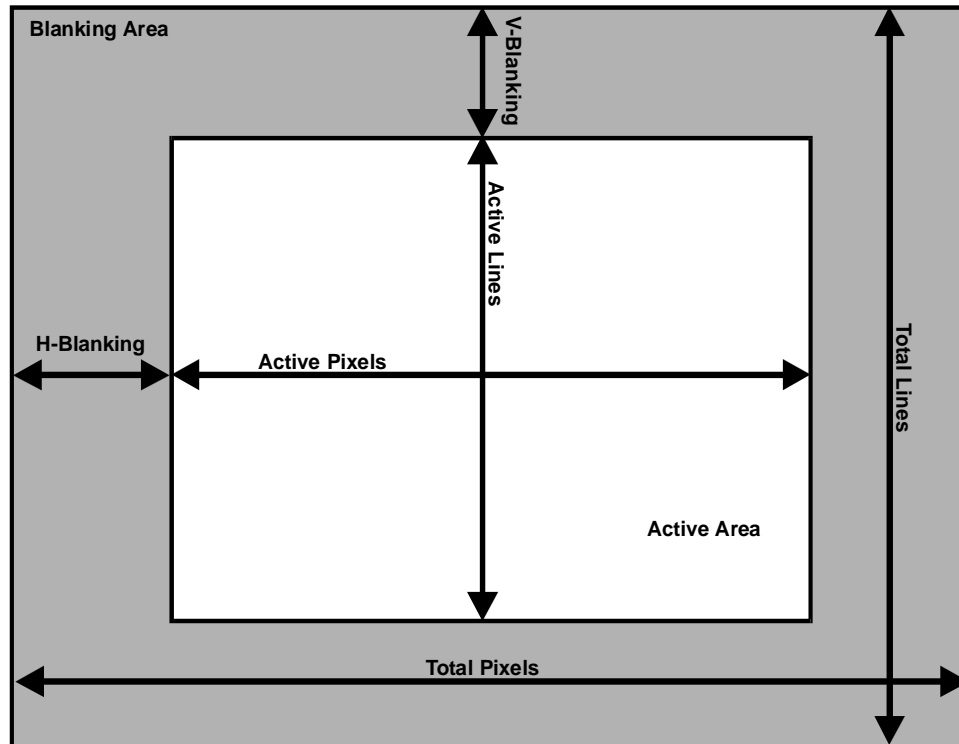


Figure 1. Input Settings

The input settings control the following:

- H-Blanking: Left edge of image
- Active Pixels: Right edge of image
- Total Pixels: Right edge of image
- V-Blanking: Top edge of image
- Active Lines: Bottom edge of image

Use these controls to match the input video signal, framing the actual active area.

- ☞ **Note:** Active pixels and total pixels are interactive. Setting one may require re-adjusting the other.

Input Blanking Adjustment

In Figure 2, the input blanking is set incorrectly (as indicated by the dashed lines). If the H-Blanking is set less than the *actual* H-Blanking, the **IN1408** will look for the active area before it really occurs. This results in a blank border on the left side of the active area, and cropping on the right side of the active area. This gives the apparent effect that the image is shifted to the right. Similarly, if the V-Blanking is set less than the *actual* V-Blanking, the **IN1408** will again look for the active area before it really occurs. This results in a blank border on top of the active area, and cropping on the bottom of the active area. This gives the apparent effect that the image is shifted down.

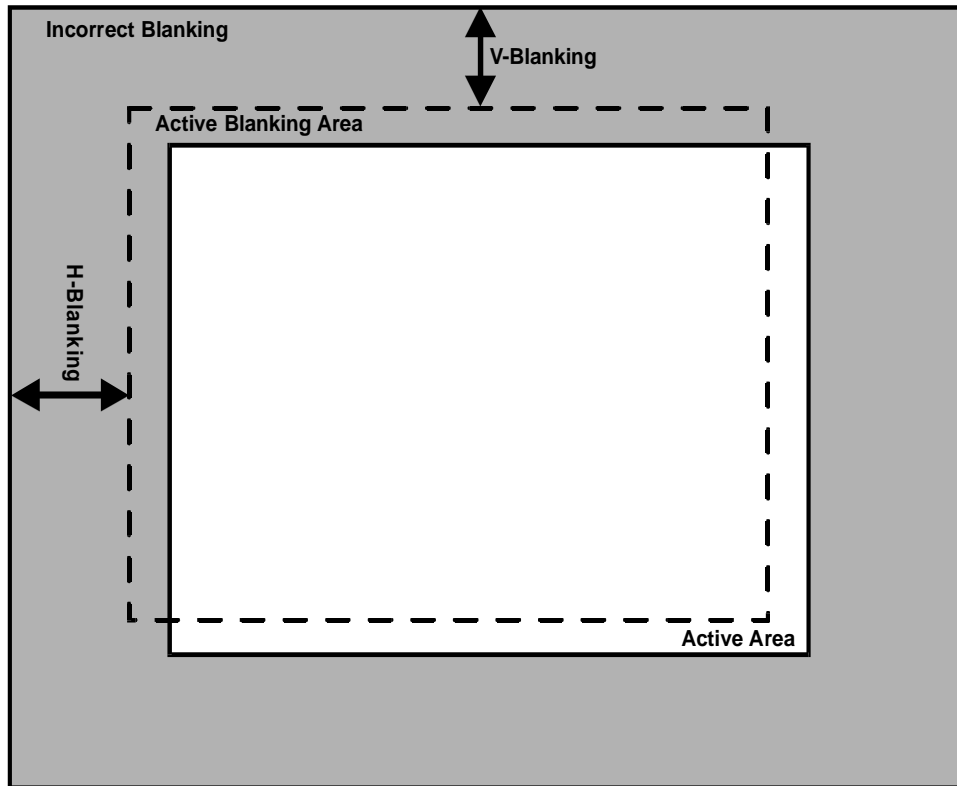


Figure 2. Incorrect Input Blanking

Do not confuse input blanking with the output position. The input blanking adjusts where the electronic scaling process takes effect, which may add blank borders or crop the active area if set incorrectly. The input blanking and active area should be manually adjusted to match the input video signal, framing the actual active area of the input signal.

The output position simply moves the image on the monitor. It does not add blank borders or crop any part of the image. However, the apparent effect of blank borders and a cropped image may be due to the image being incorrectly positioned on the monitor. The blue screen is available to adjust the output image on the monitor. It is available at any time, even when the input settings are incorrectly adjusted or the input signal is missing entirely. Use the blue screen to adjust the output settings (resolution, refresh rate, size, position and sync format) and to verify the image on the monitor. The video and input settings have no effect on the blue screen. Once the output settings have been properly adjusted and verified on the monitor, the blue screen can be turned off, and the video and input settings may then be adjusted.

Active Area Adjustment

In Figure 3, the active area is adjusted incorrectly, as shown by the dashed lines. If the active pixels are set less than the *actual* active pixels, the **IN1408** will only look for the active area inside this smaller region. This results in an active area containing fewer pixels than are really present. This gives the apparent effect that the picture is stretched horizontally. Similarly, if the active lines are set less than the *actual* active lines, the **IN1408** will again only look for the active area inside the smaller region. This results in an active area containing fewer lines than are really present. This gives the apparent effect that the image is stretched vertically.

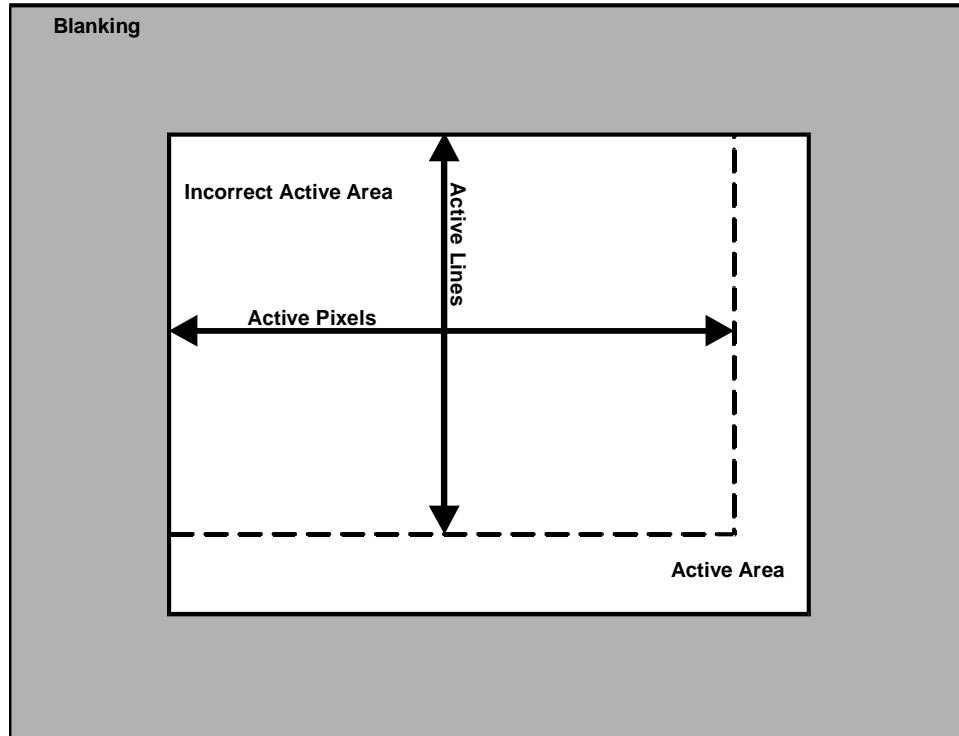


Figure 3. Incorrect Active Area

Depending on the RGB source, the following input modes may have the same horizontal scan rate and vertical refresh rate. The differences between these input modes will not be detected. The input aspect ratio will automatically be maintained at the output by inserting blank borders around the image. However, if you want to fill the entire monitor, the input aspect ratio may be set by adjusting the active pixels or active lines, according to the input mode. This will stretch the image to fill the entire monitor. The total pixels may also be adjusted to match the input mode as shown in the table below:

Predefined Input Mode Settings - Partial Table

Table 1. Input Modes for Horizontal Scan Rate = 31.5 kHz and Vertical Refresh Rate = 60 Hz

Active Pixels	Active Lines	Aspect Ratio	Total Pixels	
640	480	4:3	780	(progressive NTSC)
640	350	64:35	800	
640	400	8:5	800	
640	480	4:3	800	(factory default)
720	350	72:35	900	
720	400	9:5	900	

Table 2. Input Modes for Horizontal Scan Rate = 15.7 kHz and Vertical Refresh Rate = 60 Hz

Active Pixels	Active Lines	Aspect Ratio	Total Pixels	
768	480	8:5	910	NTSC 14.3
720	480	3:2	858	NTSC 13.5
640	480	4:3	780	NTSC 12.3 (default)

Total Pixels Adjustment

In Figure 4, the total pixels are adjusted incorrectly. There are several ways to set the total pixels. It is best to set the total pixels according to the input signal specifications. Otherwise, if the input pixel clock is known, the input total pixels may be calculated from the formula shown below. The input horizontal scan rate, as measured by the **IN1408**, can be found in the Advanced Menu Section under System Info (see page 23).

Multiplying the input active pixels by 1.3 may approximate the input total pixels. Also, the input total pixels may be adjusted to minimize any faint vertical lines that may be seen within the image, as shown below in Figure 4.

The total pixels may be adjusted to move the lines closer together or further apart. Adjust the total pixels until the lines are furthest apart or until they are completely out of view. If one line still remains, it may be moved out of view using the phase adjustment. The input active pixels and total pixels are interactive. Setting one may require readjustment of the other.

1. Set input total pixels according to input signal specifications.
2. $\text{Input total pixels} = \text{input pixel clock} / \text{input horizontal scan rate}$.
3. $\text{Input total pixels} \approx 1.3 \times \text{input active pixels}$.
4. Set input total pixels to minimize faint vertical lines (see Figure 4).
5. After the input active pixels have been set correctly, adjust total pixels for the correct active width.

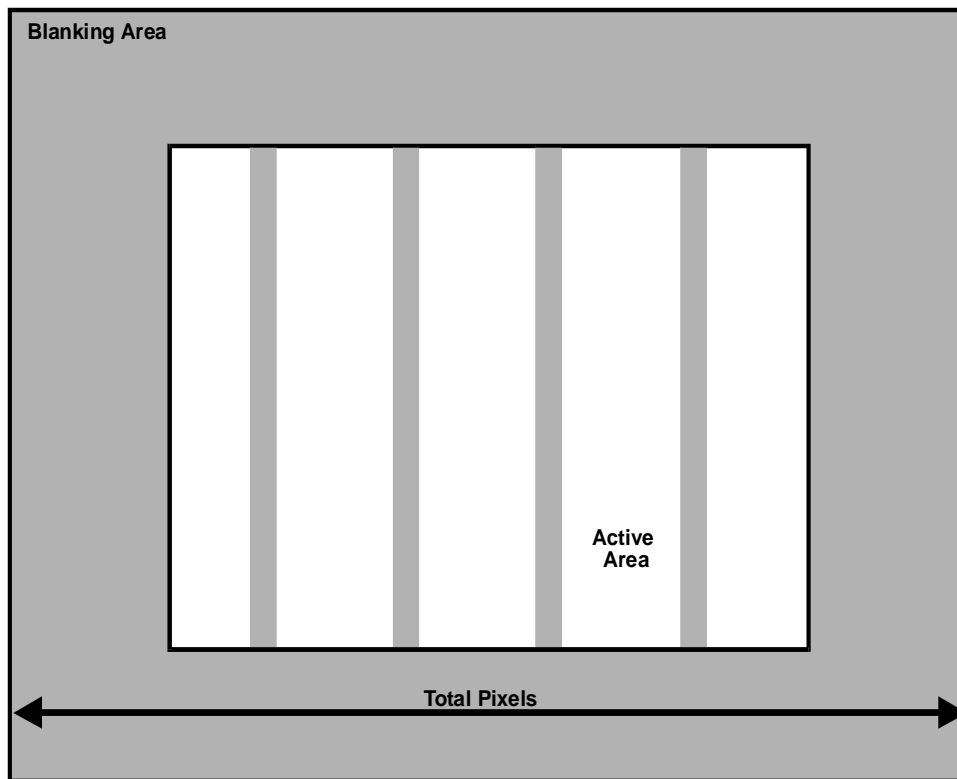


Figure 4. Incorrect Total Pixels

Remote Operation

RS-232 CONTROL

The **IN1408** 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 the following pages.

Communication Protocol:

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

Baud Rate Selection:

The **IN1408** has a factory default baud rate of 9600 bps and can communicate at baud rates from 1200 up to 57,600. Baud rates can be selected using the Advanced Menu (see page 23).

➡ **Note:** The baud rate transmitted must match the baud rate selected on the **IN1408**

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.

INLINE scalars can be set to recognize six sets of leading and end codes (delimiters) when using an RS-232 remote: parentheses (), brackets [], braces { }, slashes \ /, less and greater than < >, and signs !#. The factory default serial delimiters are [].

*Note: Only the **IN1408** that has the same delimiters as the remote controller will respond.*

A complete command consists of:

```
[      The leading code
CH3  The command code.
]      The ending code
```

Example: [CH3] commands the **IN1408** to select channel 3.

Serial Control Cable Wiring

When controlling only one **IN1408** unit, connect the RS-232 cable as follows:

```
Controller Transmit   to   IN1408 Receive
Controller Ground    to   IN1408 Ground
Controller Receive    to   IN1408 Transmit
```

When controlling multiple **IN1408** units, connect the RS-232 cable as follows:

```
Controller Transmit   to   Each IN1408 Receive
Controller Ground     to   Each IN1408 Ground
Controller Receive    to   Only one IN1408 Transmit
```

Key Concept



*When controlling multiple units, the Controller Receiver Terminal must connect to only one **IN1408** Transmit Terminal. Multiple **IN1408** Transit Lines may not be connected together; otherwise signal contention from multiple units will result. Therefore, “receive” information is only available from one **IN1408** in this configuration. Each unit must be set to different delimiters.*

IN1408 SERIAL COMMANDS

COMMAND	DESCRIPTION
ACI3	set baud rate to 1200
ACI4	set baud rate to 2400
ACI5	set baud rate to 4800
ACI6	set baud rate to 9600**
ACI7	set baud rate to 19,200
ACI8	set baud rate to 38,400
ACI9	set baud rate to 57,600
ACI?	return baud rate
AL+	increase active lines
AL-	decrease active lines
AL@	set active lines to normal** ◆
ALxxx	set active lines to absolute value ◆
AL?	return active lines
AP+	increase active pixels
AP-	decrease active pixels
AP@	set active pixels to normal** ◆
APxxx	set active pixels to absolute value ◆
AP?	return active pixels
ASP0	set aspect ratio to standard**
ASP1	set aspect ratio to anamorphic
ASP2	set aspect ratio to wide screen
ASP3	set aspect ratio to wider screen
ASP4	set aspect ratio to Expand
ASP?	return aspect ratio
BALR	increase balance right
BALL	increase balance left
BAL@	set audio balance to center** (015)
BALxxx	set balance to absolute value (000-030)
BAL?	return balance
BAS+	increase bass
BAS-	decrease bass
BAS@	set bass to normal (005)
BASxxx	set bass to absolute value (000-010)
BAS?	return bass
BH+	increase horizontal blanking
BH-	decrease horizontal blanking
BH@	set horizontal blanking to normal** ◆

BHxxx	set horizontal blanking to absolute value ◆
BH?	return horizontal blanking
BLANK	toggle blanking
BLANK0	disable blanking**
BLANK1	enable blanking
BLANK2	set blue screen off
BLANK3	set blue screen on
BLANK?	return blank state
BLU+	increase blue RGB gain
BLU-	decrease blue RGB gain
BLU@	set blue RGB gain to normal** (128)
BLUxxx	set blue gain to absolute value (0-255)
BLU?	return blue RGB gain
BRG+	increase brightness
BRG-	decrease brightness
BRG@	set brightness to normal** (128)
BRGxxx	set brightness to absolute value (000-255)
BRG?	return brightness
BV+	increase vertical blanking
BV-	decrease vertical blanking
BV@	set vertical blanking to normal** ◆
BVxxx	set vertical blanking to absolute value ◆
BV?	Return vertical blanking
CH1	select channel 1
CH2	select channel 2
CH3	select channel 3
CH4	select channel 4
CH5	select channel 5
CH6	select channel 6
CH7	select channel 7
CH8	select channel 8
CH?	Return channel
CMDCD0	set delimiters to brackets []**
CMDCD1	set delimiters to braces { }
CMDCD2	set delimiters to parentheses ()
CMDCD3	set delimiters to less and greater < >
CMDCD4	set delimiters to slashes \ /
CMDCD5	set delimiters to signs !#
CMDCD?	Return delimiters

COMMAND	DESCRIPTION
CON+	increase contrast
CON-	decrease contrast
CON@	set contrast to normal** (128)
CONxxx	set contrast to absolute value (000-255)
CON?	Return contrast
CTF0	select comb filter**
CTF1	select trap filter
CTF2	set both comb and trap filters off
CTF?	Return comb/trap filter state
DOWN	front panel down button
ENTER	front panel enter button
EX0	Executive Mode Off
EX1	Executive Mode On
FMT0	set signal format to composite**
FMT1	set signal format to S-Video
FMT2	set signal format to Component Interlaced
FMT3	set signal format to Component Progressive
FMT4	set signal format to RGB Interlaced
FMT5	set signal format to RGBHV
FMT6	set signal format to RGBS
FMT7	set signal format to RGsB
FMT8	set signal format to DVI
FMT9	set signal format to RGB passive
FMT?	Return signal format
FP	toggle front panel controls
FP0	disable front panel controls
FP1	enable front panel controls**
FP?	Return front panel state
FRZ	toggle freeze frame
FRZ0	disable freeze frame**
FRZ1	enable freeze frame
FRZ?	Return freeze state
GAM+	increase gamma
GAM-	decrease gamma
GAM@	set gamma to normal**(010)
GAMxxx	set gamma to absolute value (001-030)
GAM?	Return gamma
GRN+	increase green RGB gain
GRN-	decrease green RGB gain
GRN@	set green RGB gain to normal** (128)

GRNxxx	set green RGB gain to absolute value (0-255)
GRN?	Return green RGB gain
HTK0	set horizontal tracking to very fast
HTK1	set horizontal tracking to fast**
HTK2	set horizontal tracking to normal
HTK3	set horizontal tracking to slow
HTK?	Return horizontal tracking
HUE+	increase hue
HUE-	decrease hue
HUE@	set hue to normal** (128)
HUExxx	set hue to absolute value (000-255)
HUE?	Return hue
IM0	set input mode to auto detect**
IM1	set input mode to lockout changes
IM2	Set input mode to user defined
IM3	redetect input mode now
IM?	Return input mode state
INFO?	Return unit version
LBL0	set input labels to off**
LBL1	set input labels to on
LBL2	Set labels to momentary
LBL3	reset label
LBL?	return label state
LBL=xxx	Load a custom label name, where xxx = the label text to be displayed (up to 15 characters)
LBL:	return label name
LEFT	front panel left button
MENU	front panel menu button
MSAVxxx	save memory xxx (5-128)
MRCLxxx	recall memory xxx (5-128)
MRSTxxx	reset memory xxx (5-128)
MUTE	toggle mute
MUTE0	disable mute**
MUTE1	enable mute
MUTE?	Return mute state
NOISE+	increase noise filter
NOISE-	decrease noise filter
NOISE@	set noise filter to normal (009)

COMMAND	DESCRIPTION
NOISExxx	set noise filter to absolute value (000-047)
NOISE?	Return noise filter
OFMT0	Output format on BNC set RGB
OFMT1	Output format on BNC set to Component
PH+	increase horizontal position
PH-	decrease horizontal position
PH@	set horizontal position to normal** ♦
PHxxx	set horizontal position to absolute value ♦
PH?	Return horizontal position
PHS+	increase phase
PHS-	decrease phase
PHS@	set phase to normal** ♦
PHSxxx	set phase to absolute value (0-31)
PHS?	Return phase
PV+	increase vertical position
PV-	decrease vertical position
PV@	set vertical position to normal** ♦
PVxxx	set vertical position to absolute value ♦
PV?	Return vertical position
RED+	increase red RGB gain
RED-	decrease red RGB gain
RED@	set red RGB gain to normal** (128)
REDxxx	set red gain to absolute value (0-255)
RED?	Return red RGB gain
REF0	set refresh rate to 60Hz**
REF1	set refresh rate to 72Hz
REF2	set refresh rate to 75Hz
REF3	set refresh rate to 85Hz
REF4	set refresh rate to 96Hz
REF5	set refresh rate to 100Hz
REF6	set refresh rate to 120Hz
REF?	Return refresh rate
RES000	factory reset
RES1	reset video
RES2	reset audio
RES3	reset input
RES4	reset output
RES5	reset RS-232

RIGHT	front panel right button
SAT+	increase color saturation
SAT-	decrease color saturation
SAT@	set color saturation to normal** (128)
SATxxx	set color saturation to absolute value (000-255)
SAT?	return color saturation
SCS0	set output resolution to 640 x 480**
SCS1	set output resolution to 800 x 600
SCS2	set output resolution to 852 x 480
SCS3	set output resolution to 1024 x 768
SCS4	set output resolution to 1152 x 864
SCS5	set output resolution to 1280 x 720 (720p)
SCS6	set output resolution to 1280 x 768
SCS7	set output resolution to 1280 x 1024
SCS8	set output resolution to 1365 x 768
SCS9	set output resolution to 1365 x 1024
SCS?	Return resolution
SH+	increase horizontal size
SH-	decrease horizontal size
SHxxx	set horizontal size to absolute value (♦-100)
SH@	Set horizontal size to normal
SH?	Return horizontal size
SHP+	increase sharpness
SHP-	decrease sharpness
SHP@	set sharpness to normal** (003)
SHPxxx	set sharpness to absolute value (000-008)
SHP?	Return sharpness
ST0	toggle interlaced (1=on)
ST1	toggle swapped fields (10=on)
ST2	toggle invert sync (100=on)

COMMAND	DESCRIPTION
ST?	return scan type (add above numbers)
SV+	increase vertical size
SV-	decrease vertical size
SV@	set vertical size to normal**(100)
SVxxx	set vertical position to absolute value (◆ - 100)
SV?	Return vertical size
SYNC0	set output sync format to RGBHV- -**
SYNC1	set output sync format to RGBHV+ +
SYNC2	set output sync format to RGBS (no serrations)
SYNC3	set output sync format to RGBS with serrations
SYNC4	set output sync format to RGsB
SYNC5	set output sync format to RGsB w/Serr
SYNC?	Return output sync format
TP+	increase total pixels
TP-	decrease total pixels
TP@	set total pixels to normal** ◆
TPxxx	set total pixels to absolute value ◆
TP?	return total pixels

TRE+	increase treble
TRE-	decrease treble
TRE@	set treble to normal**(005)
TRExxx	set treble to absolute value (000-010)
TRE?	return treble
UP	front panel up button
VOL+	increase volume
VOL-	decrease volume
VOL@	set volume to normal**(020)
VOLxxx	set volume to absolute value (000-030)
VOL?	return volume

*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.

** Default values when factory reset is performed.

◆ Normal and available values depend on the current input or output mode.

CTL120-2 REMOTE CONTROL

CONNECTORS & CONTROLS

IN1402 / IN1403 / IN1404 / IN1408 Video Scalers

1st BUTTON TO PRESS VIDEO SCALER



Video Scaler Button
Press this button first to set the CTL120 to control IN1400 Series video scalers

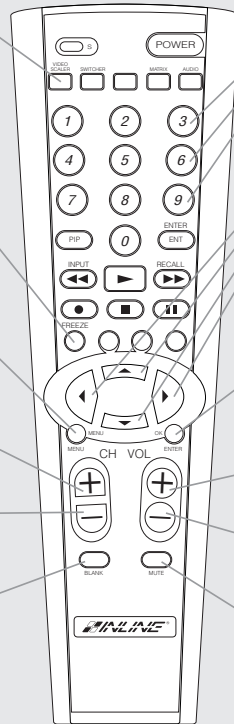
Freeze Button
Enable / Disable digital still frame

Menu Button
Activates or removes on-screen menus

CH + Button
Selects the next higher input

CH - Button
Selects the next lower input

Blank Button
Blanks the video image (black)



Numeric Buttons
Select desired input

Arrow Buttons
Press the UP ARROW / DOWN ARROW buttons to navigate through on-screen menus. Press LEFT ARROW / RIGHT ARROW buttons to decrease / increase a setting.


Enter Button
Press to make a menu selection or to execute a new setting when using on-screen menus

Vol + Button
Increases audio level

Vol - Button
Decreases audio level

Mute Button
Mutes audio signals

CTL120-2 COMMAND EXAMPLES FOR IN1400 SERIES VIDEO SCALERS

IMPORTANT: You must press the VIDEO SCALER button () once to set the CTL120 remote to control INLINE IN1400 Series video scalers.

COMMAND EXAMPLES

FUNCTION: Select Input #3.
STEPS: Press numeric button 3.

FUNCTION: The scaler is currently set to Input #3. Select Input #4.
STEPS: Press the CH + button once.

FUNCTION: Increase the audio level.
STEPS: Press the VOL + button once to increase the volume slightly. Press and hold VOL + to continuously increase the volume.

FUNCTION: Mute the audio signal.
STEPS: Press the MUTE button to engage mute. Press MUTE again to return to previous volume.

FUNCTION: Engage digital freeze frame
STEPS: Press the FREEZE button to engage freeze frame. Press FREEZE again to return to motion video.

FUNCTION: Adjust image brightness for the current input.
STEPS: Press the MENU to activate the on-screen menus. Press the UP ARROW or DOWN ARROW to move the selection highlight to Video. Press ENTER to select the Video menu. Press ENTER again to select Brightness adjust. Press the LEFT ARROW or RIGHT ARROW buttons to decrease / increase the brightness setting. Press ENTER to accept the new setting.

Specifications

IN1408 Video / RGB Scaler	
Input	
Connections	Composite Video, Inputs 1 - 8: (2) BNC female
	S-Video, Inputs 1 - 8: (2) BNC female for Y/C
	DVI Digital Video, Inputs 5 & 6: (1) DVI-D female
	Component Video, Inputs 5 - 8: (3) BNC female for Y, Cb, Cr
	RGB, Inputs 5 - 8: (5) BNC female for RGBHV, RGSB, RGsB
	Analog Audio: (8) 5 pin captive screw Digital Audio Inputs 5 - 8: (1) RCA
Signal	Video / Luma: 0.7 Vp-p typical, 75 Ohm impedance
	Chroma: 0.3 Vp-p typical, 75 Ohm impedance
Audio	Standard line level stereo
Signal Type	Analog Video, Progressive Scan or Interlaced Digital Video Progressive Scan
Horiz. Scan Rate	15 kHz - 60 kHz
Refresh Rates	50 Hz - 120 Hz
Standards Supported	NTSC / PAL / SECAM / NTSC 4.43 and virtually all RGB signals (within input limits)
Output	
Connectors	Analog Video: (5) BNC female & (1) 15-Pin HD female
	DVI Digital Video: (1) DVI-D female
	Analog Audio: (1) 5 pin captive screw Digital Audio: (1) RCA
RGB Video	0.7 Vp-p typical, 75 Ohm impedance
Audio	Standard line level stereo
Sync Format / Color Space	Selectable: RGBHV (default), RGSB, RGsB or Progressive Component (Progressive Component is Available on BNC Connectors Only)
Resolution	640 x 480 / 800 x 600 / 852 x 480 / 1024 x 768 / 1152 x 864 / 1280 x 720 / 1280 x 768 / 1280 x 1024 / 1365 x 768 / 1365 x 1024
Vertical Refresh Rate	56 Hz / 60 Hz / 65 Hz / 72 Hz / 75 Hz / 85 Hz / 96 Hz / 100 Hz / 120 Hz
General	
RS-232 Control	1200 to 57,600 baud, N, 8, 1; 3-Pin Phoenix
Power Supply	Internal Switch Mode: 90 to 260 VAC; 47 to 63 Hz
Power Consumption	28 Watts
Shipping Weight	14 lbs. / 7 kg
Product Weight	9 lbs. / 4.1 kg
Dimensions	3.5" x 17" x 12.2" / 8.8cm x 43.2cm x 31.0cm
Regulatory Approvals	UL1950, CAN/CSA-22.2 No. 950, Third Edition CE: EN55022 (1987), EN50081-1 (1991), EN50082-1 (1992 AND 1994). EN60950-92

Included Accessories
MTR102 Rack Ears IN9230 IEC Power Cable (included in the USA only) Operation Manual

Optional Accessories
VGA Monitor Adapter and Extension Cables
IN8000 Series - 15-pin HD male to 15-pin HD female, lengths from 3' to 250' IN8000M Series - 15-pin HD male to 15-pin HD male, lengths from 3' to 150'

S-Video Cables
IN8600 Series - S-Video cables, 4-pin mini DIN (M-M), lengths from 6' to 25' IN9101 Series – Video Adapter Cable, BNC Male – RCA Male, 6' IN9094 Series – S-Video Female to 2 Male BNC (Chroma and Luma), 3" Long
Installation Cables
IN7000P-5 Series RGBHV Cable - Standard Resolution, Plenum Cable available in bulk lengths IN7000P-5K Series RGBHV Cable - Standard Resolution, Plenum Cable available in 1000' bulk length IN9700-1 Series – High Performance Digital Video Cable, DFP Male to DFP Male IN9700-2 Series – High Performance Digital Video Cable, DFP Male to DVI Male IN9700-3 Series – High Performance Digital Video Cable, DVI Male to DVI Male

RGB Input / Output Installation Cables				
Coaxial Cables	1-Conductor	3-Conductor	5-Conductor	6-Conductor
Standard Resolution			IN7000-5	
Standard Resolution, Flexible Plenum			IN7000FP-5	
Standard Resolution, Zero Halogen (LSFOH)			IN7000ZH-5	
Ultra High Resolution	IN7200-1	IN7200-3	IN7200-5	IN7200-6
Super High Resolution			IN7300-5	IN7300-6
Super High Resolution, Zero Halogen (LSFOH)			IN7300ZH-5	
Super High Resolution, Plenum			IN7400P-5	

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 **IN1408** and the monitor.
- ✓ **Solution 4:** Verify the connection from the video source. Refer to the installation section on how to connect different signals to the rear panel.
- ✓ **Solution 5:** Verify the connection to the output display device. Even with no input signal, the **IN1408** menu can be displayed. Press MENU or ENTER to gain access to the menu screen.
- ✓ **Solution 6:** Select an output resolution and refresh rate compatible with the display device being used. Use the default power-up buttons to select an output mode without the menu present, and then turn on the blue screen to verify these settings.
- ✓ **Solution 7:** The output resolution may be less than the input (the **IN1408** can only scale up). Select an output resolution that is greater than or equal to the input active area.
- ✓ **Solution 8:** The display device may not accept certain sync formats. Verify the display device sync capability and select the **IN1408** output sync using the power-up default buttons.
- ✓ **Solution 9:** The input / output settings may be incorrect. Although the unit should not allow invalid settings, they may need to be reloaded. If the menu is available, select Input, Advanced, Input Mode and Redetect Now to reload these settings.
- ✓ **Solution 10:** The Input Mode may have changed with Lockout Changes enabled. Select Input, Advanced, Input Mode, and Redetect Now to set up the new Input Mode.
- ✓ **Solution 11:** The Input Signal Format may not be set correctly. Select Input, followed by Signal Format. Verify that each input has the correct Signal Format setting.

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 **IN1408** and the amplifier / speakers.
- ✓ **Solution 2:** Verify that the audio source is connected to the correct input and that the source volume has not been turned down or muted.
- ✓ **Solution 3:** The audio output of the **IN1408** is line level audio *only*. It should be connected to a mixer / amplifier or to amplified “computer type” speakers.
- ✓ **Solution 4:** Increase the volume using the volume UP button.
- ✓ **Solution 5:** The mute may be activated. Press MUTE to deactivate the function.

Problem: The input source cannot be changed.

- ✓ **Solution:** Auto Switching may be turned on. Turn Auto Switching off to return input control to the front panel and RS-232.

Problem: The on screen menu does not appear.

- ✓ **Solution:** The On Screen Menu is not available for RGB passive signals. To deselect the RGB Passive Mode refer to the Pass-Through RGB Video Section on page 27.

Problem: The Input Label is incorrect. The Input Label may have been recalled into the current input from a User Memory.

- ✓ **Solution 1:** Recall the User Memory that contains the correct label.
- ✓ **Solution 2:** Reset the label using the **Input: Input Labels: Reset** menu control.
- ✓ **Solution 3:** Reprogram the label using RS-232 controls.

Problem: The image on the display device is scrambled.

- ✓ **Solution 1:** The Input Signal Format may not be set correctly. Select Input, followed by Signal Format. Verify that each input has the correct Signal Format setting.
- ✓ **Solution 2:** Select an output resolution and refresh rate compatible with the display device being used. Use the default power-up buttons to select an output mode without the menu present, and then turn on the blue screen to verify these settings.
- ✓ **Solution 3:** The Input mode may have changed with Lockout Changes enabled. Select Input, Advanced, Input Mode then Redetect Now to set up the new Input Mode.

Problem: The image on the monitor is stretched horizontally.

- ✓ **Solution 1:** The Input Total Pixels may be set too high. Reduce the Input Total Pixels to match the input signal. Refer to the Advanced Input Settings Section on page 29 to make the necessary adjustment.
- ✓ **Solution 2:** Increase the Input Active Pixels to match the input settings.
- ✓ **Solution 3:** Increase the Output Resolution to a value greater than the input active area.

Problem: The image on the monitor is compressed horizontally.

- ✓ **Solution 1:** Increase the Input Total Pixels setting to match the input signal. Refer to the Advanced Input Settings Section on page 29 to make the necessary adjustment.
- ✓ **Solution 2:** Reduce the Input Active Pixels setting to match the input signal.

Problem: The image on the monitor is stretched vertically.

- ✓ **Solution 1:** Increase the number of Input Active Lines to match the input settings.
- ✓ **Solution 2:** Increase the Output Resolution to a greater value than the input active area.

Problem: The image on the monitor is compressed vertically.

- ✓ **Solution:** Reduce the number of Input Active Lines to match the input signal.

Problem: The image on the display device is cropped to the left side.

- ✓ **Solution 1:** Reduce the Input H-Blanking to match the input signal.
- ✓ **Solution 2:** Increase the output H-Position to line up the image on the display device. Use the blue screen.
- ✓ **Solution 3:** Adjust the monitor position or size controls to fit the image on the display device. Use the blue screen.

Problem: The image on the display device is cropped on the right side.

- ✓ **Solution 1:** Increase the Input H-Blanking to match the input signal.
- ✓ **Solution 2:** Reduce the Output H-Position to line up the image on the display device. Use the blue screen.
- ✓ **Solution 3:** Adjust the Monitor Position or Size Controls to fit the image on the display device. Use the blue screen.

Problem: The image on the display device is cropped on the top.

- ✓ **Solution 1:** Reduce the Input V-Blanking to match the input signal.
- ✓ **Solution 2:** Increase the Output V-Position to line up the image on the display device. Use the blue screen.
- ✓ **Solution 3:** Adjust the Monitor Position or Size Controls to fit the image on the display device. Use the blue screen.

Problem: The image on the display device is cropped on the bottom.

- ✓ **Solution 1:** Increase the Input V-Blanking to match the input signal.
- ✓ **Solution 2:** Reduce the Output V-Position to line up the image on the display device. Use the blue screen.
- ✓ **Solution 3:** Adjust the Monitor Position or Size Control to fit the image on the display device. Use the blue screen.

Problem: The display device has a double image.

- ✓ **Solution 1:** The **IN1408** cannot separate multiple signal formats. Make sure that only one signal is connected to each input.
- ✓ **Solution 2:** The odd and even fields are not properly detected. For Component B and RGB interlaced signals, the detection of odd and even fields can be corrected by selecting Input, Advanced, Scan Type, then Invert Sync.

Problem: The image on the display device is Black & White (no color).

- ✓ **Solution:** Set the input signal format to match the input signal connected to the rear of the unit.

Problem: The picture on the display device has hooking along the top.

- ✓ **Solution 1:** Increase the input horizontal tracking to compensate for poor quality video signals (such as from a VCR).
- ✓ **Solution 2:** The display device may need different sync serrations. Choose a different output sync from the sync format menu.

Problem: The image is frozen.

- ✓ **Solution:** Freeze is activated. Press FREEZE to deactivate the freeze frame feature.

Problem: The image on the display device is the wrong shape.

- ✓ **Solution 1:** The input aspect ratio is set incorrectly. Adjust the input aspect ratio to match the input video signal.
- ✓ **Solution 2:** The output aspect ratio is incorrect. Select an output resolution to match the display device.

Problem: The image on the display device appears fuzzy.

- ✓ **Solution 1:** Adjust the video sharpness until the image regains its detail.
- ✓ **Solution 2:** Adjust the video noise filter until the image is sharp.
- ✓ **Solution 3:** Change the comb or trap filter setting.

Problem: The output resolution can not be set to some of the lower settings.

- ✓ **Solution 1:** The IN1408 can *only* scale up. Resolutions that would result in scaling down are **not available**. If a lower output resolution is desired, connect a signal with a lower Input Active Area.
- ✓ **Solution 2:** The Active Pixels / Active Lines may be set too high. Reduce the Input Active Pixels / Input Active Lines setting to match the input signal.

Problem: The desired input aspect ratio cannot be selected.

- ✓ **Solution 1:** The IN1408 can *only* scale up. Increase the output resolution until the desired aspect ratio is available.
- ✓ **Solution 2:** Manually decrease the image size by using the output menu.
- ✓ **Solution 3:** Select a different available aspect ratio.

Problem: The output size will not decrease.

- ✓ **Solution:** The IN1408 will *only* scale up. Increase the Output Resolution, and then reduce the size of the output image.

Problem: The image on the monitor has multiple faint vertical lines.

- ✓ **Solution:** Adjust the Input Total Pixels until the faint vertical lines move out of view or until only one line remains. Refer to the Advanced Input Settings Section on pages 29-35 to make the necessary adjustment.

Problem: The image on the monitor has one faint vertical line.

- ✓ **Solution:** Adjust the Input Phase to move the faint vertical line out of view.

Problem: Some characters on the monitor appear fuzzy.

- ✓ **Solution 1:** Adjust the Input Total Pixels until all the characters are sharp.
- ✓ **Solution 2:** Adjust the Input Phase until all the characters are sharp.

Problem: The monitor only displays the upper half of the signal.

- ✓ **Solution:** The Input Scan Type is set incorrectly. For non-interlaced signals, select Input, Advanced, Scan Type and verify that the Interlaced Setting is turned off. Select the Interlaced Setting to toggle on / off.

Problem: The image on the monitor jitters up and down.

- ✓ **Solution:** The Input Scan Type is set incorrectly. For interlaced signals, select Input, Advanced, Scan Type and verify that the Interlaced Setting is turned on. Select the Interlaced Setting to toggle on / off.

Problem: The image on the monitor has jagged edges.

- ✓ **Solution:** The odd and even fields are swapped. For interlaced signals, the odd and even fields can be switched by selecting Input, Advanced, Scan Type, then Swap Fields.

Problem: The settings on the IN1408 will not move to the desired values.

- ✓ **Solution:** Your settings may be outside the range of predefined modes. Switch to the User Defined Mode to allow for a full range of settings. Select Input, Advanced, Input Mode, and User Defined.

Problem: The input total pixels setting will not decrease.

- ✓ **Solution 1:** The Input H-Blanking may be set too high. Reduce the Input H-Blanking to match the input signal.
- ✓ **Solution 2:** The Input Active Pixels may be set too high. Reduce the Input Active Pixels to match the input signal.

Problem: The input active pixels setting will not increase.

- ✓ **Solution 1:** The Input Total Pixels may be set too low. Increase the Total Pixels setting to match the input signal. Refer to the Advanced Input Settings Section on page 29 to make this adjustment.
- ✓ **Solution 2:** The Input H-Blanking may be set too high. Reduce the Input H-Blanking to match the input signal.
- ✓ **Solution 3:** The Output Resolution may be set too low. Select an Output Resolution that is greater than or equal to the Input Active Area.

Problem: The input active lines will not increase.

- ✓ **Solution 1:** The Input V-Blanking may be set too high. Reduce the Input V-Blanking to match the input signal.
- ✓ **Solution 2:** The Output Resolution may be set too low. Select an Output Resolution that is greater than or equal to the Input Active Area.

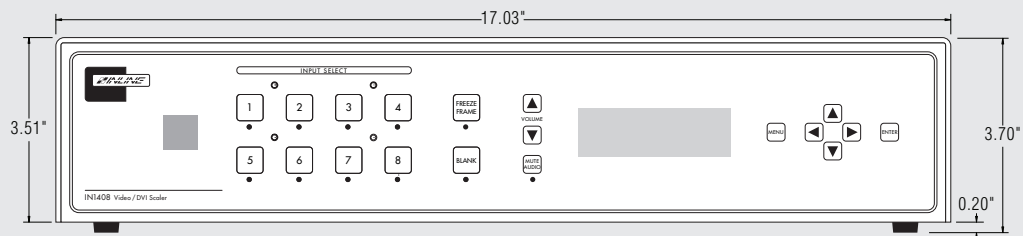
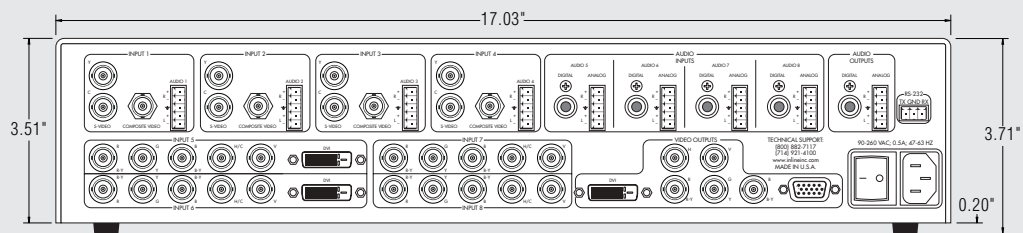
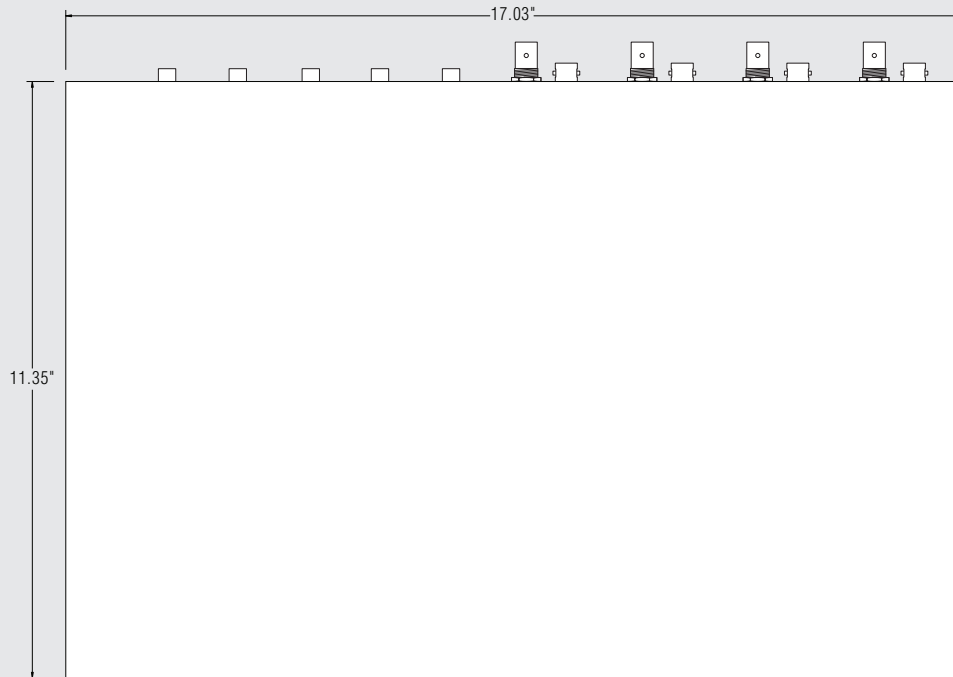
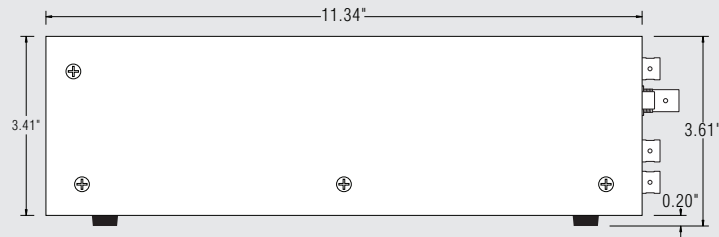
Problem: The input H-Blanking will not increase.

- ✓ **Solution 1:** The Input Total Pixels may be set too low. Increase the Input Total Pixels to match the input signal. Refer to the Advanced Input Settings Section on page 29 to make this adjustment.
- ✓ **Solution 2:** The Input Active Pixels may be set too high. Reduce the Input Active Pixels setting to match the input signal.

Problem: The input V-Blanking will not increase.

- ✓ **Solution:** The Input Active Lines may be set too high. Reduce the input Active Lines setting to match the input signal.

If problems persist, call INLINE Technical Services at (714) 450-1800 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 three (3) 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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