



A WORLD OF A/V SOLUTIONS



SIGNAL CONVERTERS

IN1403 VIDEO SCALER
WITH 4X1 SWITCHER



IN1403
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 ausgewechselt werden.



Instalacion E Instrucciones de Seguridad

Modelos Sin Interruptor:

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

Para Todos Los Modelos:

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

Modelos con Fusibles Internos o Externos:

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

CE COMPLIANCE

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

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

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



FCC COMPLIANCE

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

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Product Overview

DESCRIPTION

The **IN1403** is a full featured video scaler that combines digital video decoding, advanced video scaling / line multiplication and a 4-input A/V switcher into a single product.

Superb Video Scaling Technology - Employing sophisticated video de-interlacing, scaling and filtering techniques, the **IN1403** offers an output signal with outstanding image detail and enhanced brightness that is entirely free of visible scan lines. The scaler automatically senses the origin of the video source material and selects the optimum motion compensation formula to eliminate unwanted artifacts in the output image. The **IN1403** employs high bandwidth digital signal processing and high speed digital to analog conversion, combined with effective filtering and sharpness circuitry to maintain and enhance image detail, even at the highest output resolutions.

Advanced Quad Standard Video Decoding - A high quality video decoder in the **IN1403** provides accurate video decoding of composite video and S-Video signals in the NTSC, PAL, SECAM and NTSC 4.43 video standards. The video decoder employs an advanced 3-line adaptive comb filter for composite video signals and greatly reduces cross-color interference and hanging dots, while maintaining maximum image bandwidth and detail.

Pick the Perfect Resolution - The **IN1403** offers a wide range of output resolutions to match the optimum or native resolution of virtually any display device. The **IN1403** 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, ILA, D-ILA and Plasma Display devices.

Selectable Refresh Rate - The **IN1403** output vertical refresh rate is adjustable from 60 Hz to 120 Hz. By converting PAL (25 Hz) and NTSC (30 Hz) input signals to higher, more ergonomic refresh rates, the **IN1403** makes it possible to display a remarkably solid, flicker-free image when using CRT monitors and projectors. The chart on page 20 indicates the output resolutions and refresh rates available on the **IN1403**.

4-Input Video / Audio Switcher - The **IN1403** provides multiple inputs and flexible switching capability to accommodate a variety of applications. Inputs 1, 2 and 3 can each accept a composite video or S-Video signal. Input 4 is a 15-Pin HD VGA pass-through connector for a computer video signal (passive - no scaling). Stereo audio-follow-video switching is provided for all four inputs.

Memory - The **IN1403** can recall previously stored settings with the push of a single button. All audio, video, input and output settings, for each input and each output mode, are stored internally (in memory). Once optimized, all adjustments are automatically recalled every time an input is selected.

Digital Freeze Frame - provides a high quality still image, useful for applications that require close examination of a specific video frame. Freeze Frame can be enabled / disabled using the front panel **Freeze** Button or an RS-232 serial command. Freeze is functional for Inputs 1, 2 and 3. It has no effect on Input 4, which is a passive input.

Video Blank Button - Located adjacent to the input selector buttons, the **Blank** Button allows the video image to be suppressed. When blank is engaged, the output signals go to black but the sync signals continue, ensuring that the data display device retains sync lock. When the Blank Button is pressed a second time, the previously selected input is once again displayed. The blank feature can also be engaged or disengaged using the RS-232 serial command. Video blank is functional for Inputs 1, 2 and 3. It has no effect on Input 4, which is a passive input.

On Screen Menus - provide easy control over video adjustments including hue, color, contrast, brightness, gamma, sharpness, image size, image position and edge blanking. Unique image settings can be optimized and stored for each input. Each time an input is selected, all image settings stored for that input are automatically recalled. The on-screen menus also make it easy to verify and adjust advanced settings such as output signal resolution / refresh rate / sync format, RS-232 control options and reset to factory default. **System Info** is a handy menu option that uses the on-screen display to show comprehensive information about the input and output signals and scaler settings.

Image Size, Position and Edge Blanking Controls - with individual horizontal and vertical image adjustments make it easy to precisely fit the active video image to the display area and provide for multiple aspect ratios.

Comprehensive Input Adjustment Controls - These input signal adjustments include signal format, aspect ratio and horizontal tracking. Once adjustments are made to optimize input signals, these settings are stored and automatically recalled when the same input source is selected again.

Blue Screen Feature - provides a full screen blue image for set up and testing purposes. The blue screen output signal (activated via the on-screen menu) is always available, even when the input signal is missing or the input settings are incorrectly adjusted. Blue screen acts as a test signal and is ideal for setting up the output resolution, refresh rate and position settings, and to verify connection to the output display device.

RS-232 Serial Control - is provided for all scaler functions including input selections, image adjustments and output settings. The **IN1403**'s comprehensive RS-232 control capacity facilitates complete system integration and effortless control when combined with a third party control system.

Dual Outputs - The **IN1403** features a 5-BNC output and a 15-Pin HD output. Since both are active simultaneously, the **IN1403** can directly drive two separate display devices.

Rack Mountable - The **IN1403** can be mounted in a 1U rack space using the **IN9123B** rack ears (provided).

Compatibility

INPUT

The **IN1403** Video Scaler accepts composite and S-Video signals in the NTSC, PAL, SECAM and NTSC 4.43 video standards on inputs 1, 2 and 3. The unit automatically senses NTSC, PAL and SECAM video standards and decodes the signal appropriately. The user must select composite video or S-Video mode as appropriate for each of these inputs. The Input 4 is a passive input (no decoding or scaling) designed to accept a VGA computer video signal.

The **IN1403** has stereo audio-follow-video capability. All four stereo audio inputs are compatible with unbalanced line level signals from a computer audio card, CD player, laser disc player or any other audio device that delivers a stereo line level signal.

OUTPUT

The **IN1403** features **selectable output resolutions** (ranging 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 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 / LCOS, and Plasma Display devices.

The **output refresh rate** is also selectable as desired. When used with LCD, DMD or LCOS 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 chart on page 20 indicates the available output resolutions and refresh rates.

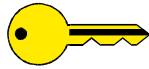
The stereo audio output provides an unbalanced line level signal, identical to the input signal. This output can drive any line level compatible audio unit, or a local device such as powered speakers.

Installation

This section offers step-by-step instructions for installing the **IN1403** Video Scaler. An APPLICATION DIAGRAM is provided on the page 6.

*Note: Read the instructions carefully before initiating the installation procedure. Make sure that there is no power connected to the **IN1403**, and that the power button is off.*

1. Place / install the **IN1403** 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 **IN9123B** rack ears (provided). The **IN1403** is exactly 1U 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. Connect the video sources to the **IN1403** input(s). Inputs 1, 2 and 3 can accept either a composite video signal (BNC female) or an S-Video signal (4-pin mini DIN female). Input 4 is a 15-pin HD VGA pass-through connector for a computer video signal.

KEY CONCEPT

*The 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!***

3. Connect the audio sources to the **IN1403** stereo audio inputs (dual RCA female jacks). A computer sound card can be connected using an optional **IN9107** (3.5mm stereo mini male to 2 RCA male) cable.
4. The **IN1403** features a 5-BNC output and a 15-Pin HD output, providing easy connection for a variety of data monitors, data projectors and other data grade displays.
 - VGA display devices can be connected directly to the **IN1403** output port using a standard male-to-male VGA cable. INLINE's **IN8000M Series** VGA cables offer exceptional performance and are available in a variety of lengths.
 - Data output devices that feature an RGB video input can be connected directly to the **IN1403** using three, four or five BNC cables (for RGsB, RGSB or RGBHV, respectively) or a multi-conductor RGBHV, RGSB or RGB "snake." The INLINE **IN7000 / IN7200 / IN7300 Series** cables are well suited for this purpose (see RGB INPUT / OUTPUT INSTALLATION CABLES table on page 26). 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.

Since both outputs are active simultaneously, the **IN1403** can directly drive two separate display devices.

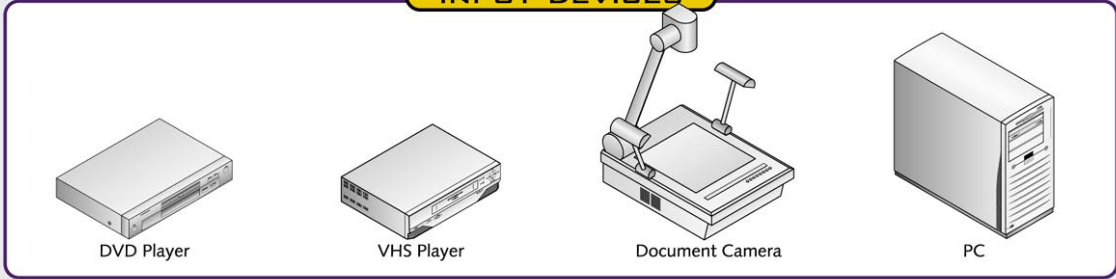
5. Connect the **IN1403** stereo audio output to the audio system's input (mixer, amplifier, powered speakers, etc.).
6. Connect a control system, computer or other source for serial commands to the RS-232 remote connector if desired. For more information about remote control of the **IN1403**, see the RS-232 REMOTE OPERATION section on page 21.
7. Connect power to the **IN1403** using the **IN9230** IEC power cable (included).
8. Turn on the video sources, the **IN1403**, the display device and the audio output equipment (if applicable).
9. Using the front panel controls or RS-232 commands, adjust and store the parameters for each input source. ***It is very important that you set each input for composite video or S-Video operation as appropriate to match the format of the input signal (see page 13 for details).***
10. Set the Output Resolution & Refresh Rate to match the optimum or native resolution of your display device as described in the OUTPUT MENU section on page 16. If you need assistance selecting the appropriate resolution and refresh rate for your display, see **Selecting the Optimal Resolution & Refresh Rate** on pages 17 - 19.

IN1403 VIDEO SCALER

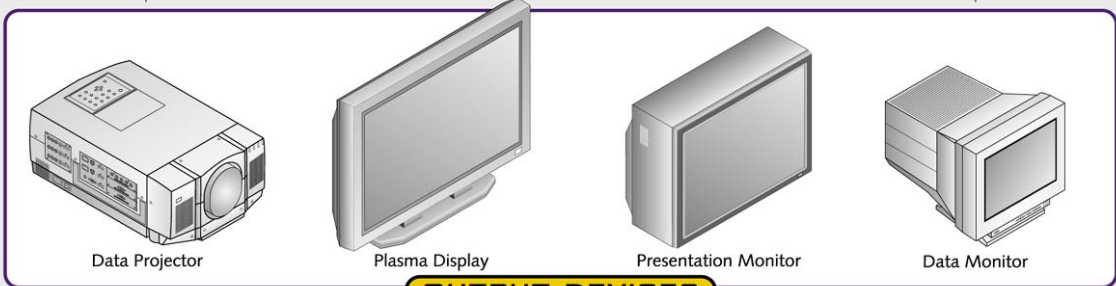
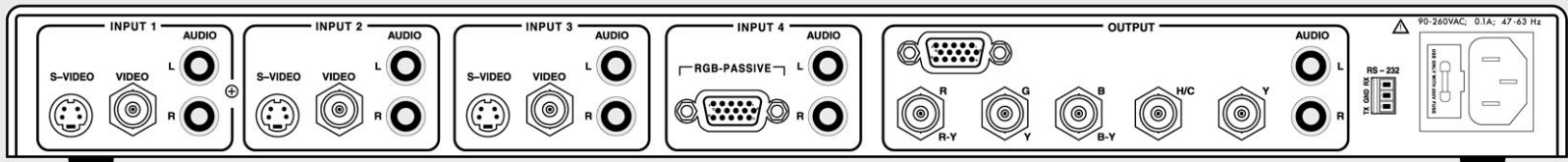
APPLICATION DIAGRAM

— = Video
 - - - = Audio

INPUT DEVICES



CONTROL



Operation

This section focuses on operating the **IN1403** using the front panel controls and commands. All video / audio adjustments, set-up functions and switching operations can be performed through the front panel or via RS-232 serial controls. Serial control information can be found on page 21.



FRONT PANEL CONTROLS

Input Select: The large buttons labeled **INPUT 1**, **INPUT 2**, **INPUT 3** and **INPUT 4** are used to select the desired input. After turning on the **IN1403**, 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.

KEY CONCEPT



When powered up, the scaler automatically returns to the last configuration, including the last input selected.

Blank: 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 to disengage.

Note: The blank button has no effect on input 4, which is a passive input.

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 frame button has no effect on input 4, which is a passive input.

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.

*Note: The **IN1403** 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.

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 escape to the previous menu or to clear the menu display. 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 timing format parameters
OUTPUT	-	Changes output signal resolution and format parameters
ADVANCED	-	Displays advanced options

An illustration of the ON SCREEN DISPLAY MENU SYSTEM is provided on the next page.

IN1403 ON SCREEN MENU DISPLAY SYSTEM

Main Menu
Video
Audio
Input
Output
Advanced

Video
Brightness
Contrast
Color
Hue
Sharpness
Gamma
Noise Filter
Comb / Trap*
Reset Video

Audio
Bass
Treble
Balance
Reset Audio

Input
Signal Format
Aspect Ratio
Horiz. Tracking
Reset Input

Output
Resolution
Refresh Rate
Size
Position
Sync Format
Blue Screen
Reset Output

Advanced
Factory Reset
Baud Rate
Delimiters
System Info
Reset RS-232

Comb / Trap
Comb Filter On
Trap Filter On

Signal Format
Input 1
Input 2
Input 3
Input 4

Aspect Ratio
Standard
Anamorphic
Wide screen
Widerscreen
Expand

Horiz. Tracking
Very Fast
Fast
Normal
Slow

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

Refresh Rate**
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 A
RGBS B
RGsB A
RGsB B

Blue Screen
On / Off

Factory Reset
Yes
No

Baud Rate
1200
2400
4800
9600
19,200
38,400
57,600

Delimiters
Parentheses ()
Brackets []
Braces { }
Slashes \ /
Less & Greater < >
Signs ! #

System Info
Input
Standard
Horizontal
Vertical
Output
Horizontal
Vertical
Sync
Version

* Only available on composite video

** Depends on the current resolution

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 **IN1403** allows users to manually adjust the brightness, contrast, 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 \blacktriangle button (if necessary) to reach the video menu, then press **ENTER**. Use the \blacktriangle and ∇ buttons and the **ENTER** key to select the setting you wish to adjust. After selecting a setting, use the \blacktriangleright and \blacktriangleleft 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 video adjustment parameters can be controlled via the on-screen menu system (front panel buttons). Remote operation instructions can be found on page 21.

Note: Video adjustments do not affect Input 4 (passive input).

Brightness Setting: Adjusts the input signal brightness.

Range: 0 to 255

Factory Default Setting: 128

Operation: Press \blacktriangleright button to increase the brightness.

Press \blacktriangleleft 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 \blacktriangleright button to increase the contrast.

Press \blacktriangleleft button to decrease the contrast.

Color: Adjusts the color saturation of the picture over a wide range. Setting this control to 0 will remove most of the color.

Range: 0 to 255

Factory Default Setting: 140

Operation: Press \blacktriangleright button to increase the color.

Press \blacktriangleleft button to decrease the color.

Hue (NTSC Signals Only): Adjusts the picture's color towards red or green.

Range: 0 to 40

Factory Default Setting: 20

Operation: Press \blacktriangleright button to shift the color phase towards green.

Press \blacktriangleleft button to shift the color phase towards red.

Sharpness: Uses variable filtering to affect input picture detail and definition.

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.

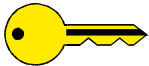
Range: 0 to 8

Factory Default Setting: 3

Operation: Press \blacktriangleright button to increase the sharpness.

Press \blacktriangleleft button to decrease the sharpness.

KEY CONCEPT



*If these settings seem confusing, we recommend that you experiment with the **MENU**, \blacktriangleup , \blacktriangledown , \blacktriangleright , \blacktriangleleft and **ENTER** Buttons until you familiarize yourself with the **IN1403** 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**.*

Gamma: The 30 active gamma correction curves programmed into the **IN1403** 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.

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.

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

Noise Filter: Changes the input signal noise filter.

Note: Increasing the noise filter setting gives the effect that the picture sharpness setting is decreasing. Refer to the sharpness setting section at the top of the page.

Range: 0 to 15

Factory Default Setting: 5

Operation: Press \blacktriangleright button to increase noise filter.

Press \blacktriangleleft button to decrease noise filter.

INPUT MENU

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.

Input Signal Format: Select the signal format for each input. The S-VIDEO and COMPOSITE VIDEO connections are internally wired together; therefore, only S-Video or composite video can be connected to each input, but not both at the same time. Input 4 is fixed as RGB passive.

To configure the Inputs 1 - 3 for either a composite video or S-Video 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 signal format menu.
- Highlight the input you want to configure.
- Select the format for each individual input (use the \blacktriangleright and \blacktriangleleft buttons to toggle between composite and S-Video). The **IN1403** will save the format setting automatically.
- Press **MENU** to exit.

KEY CONCEPT



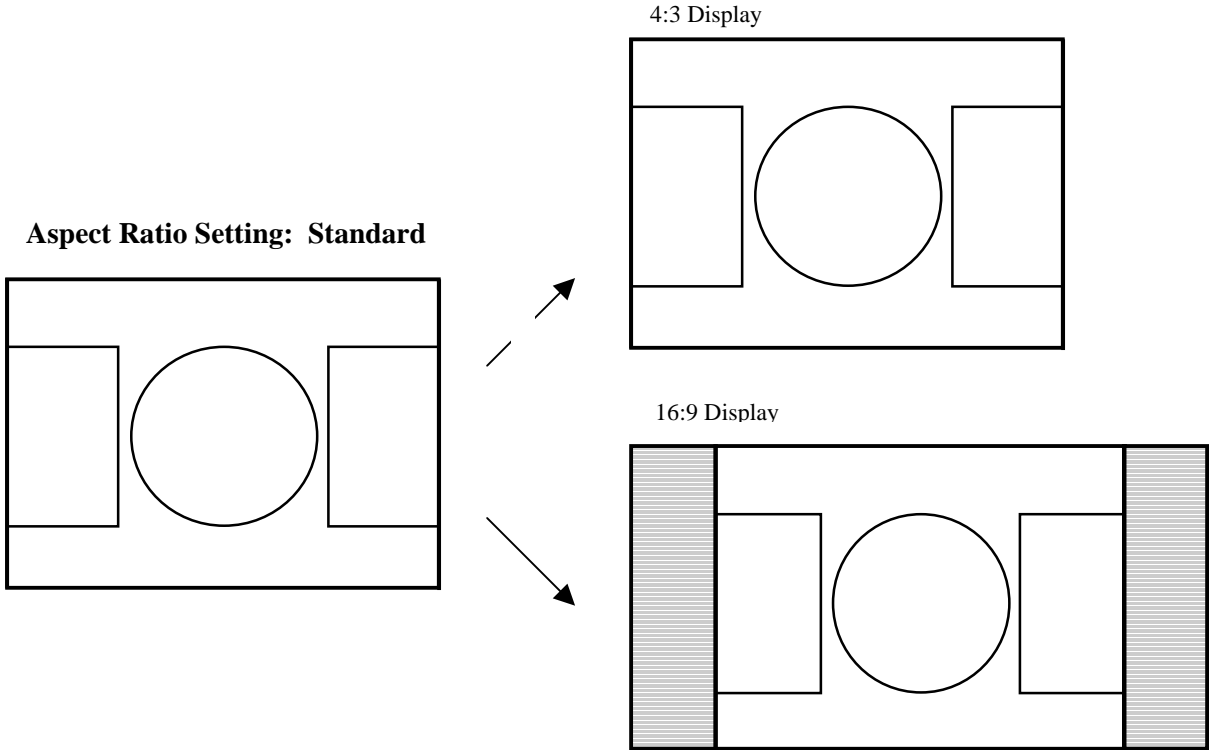
*It is critical that the composite / S-Video status is selected properly for each input. Using the on-screen menu, operators can set / change the input format at any time, even when another input signal is active. If the composite / S-Video selection is set wrong, the decoder circuitry will not function properly and the **IN1403** will display a distorted picture.*

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 Resolution Section on page 16).

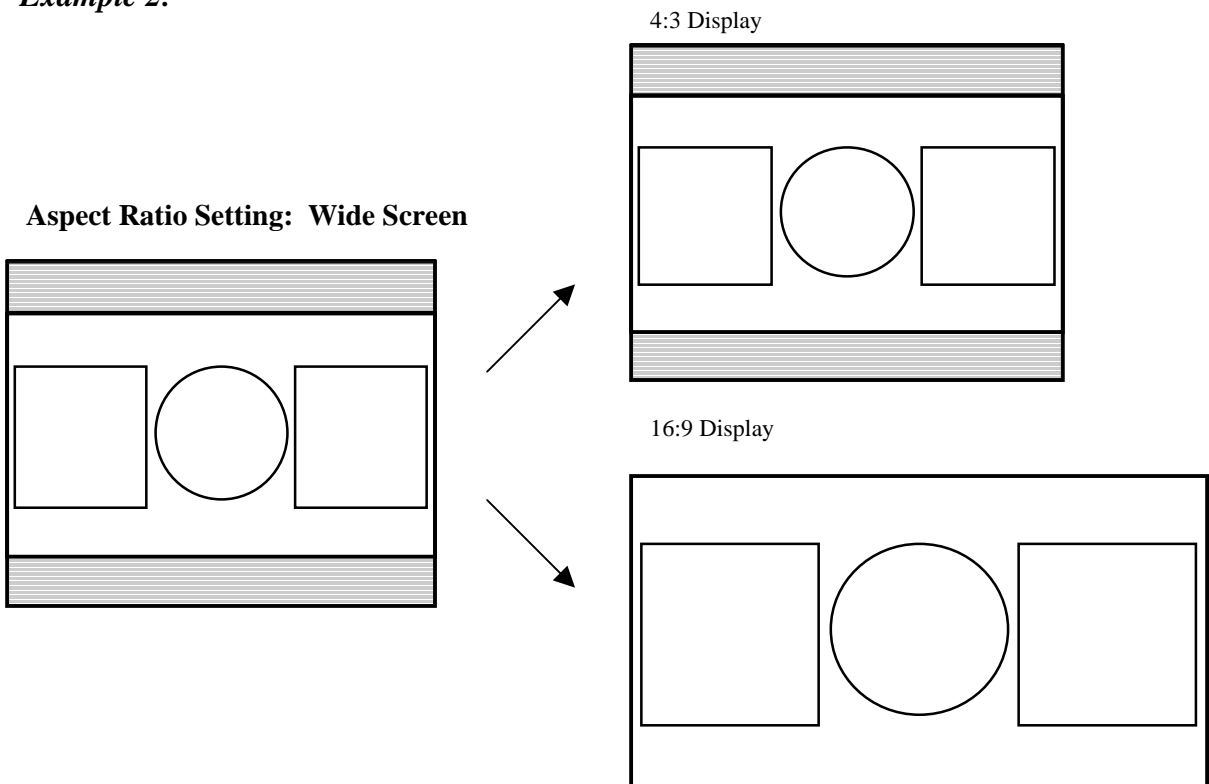
Standard:	For Standard 1.33 input signals (sometimes referred to as full screen).
Anamorphic:	This setting provides vertical image squeezing to accommodate anamorphically enhanced DVDs.
Wide Screen:	For wide screen 1.78 input signals (letterbox).
Wider Screen:	For wider screen 2.35 input signals (narrow 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.

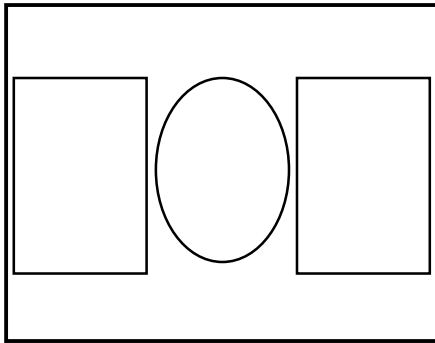
Most DVDs and VCRs and other video source output a signal with an aspect ratio of 4:3. How this signal is filled with active video information determines its aspect ratio. In the following examples, four different input aspect ratios are shown on the left as they would be displayed in their native 4:3 format. The same signals are shown on the right as they would appear on 4:3 and 16:9 display devices with the scaler set to various aspect ratio settings.

Example 1:

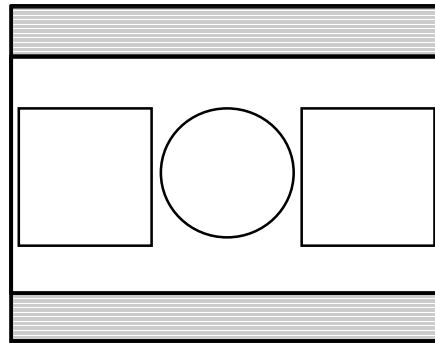


Example 2:

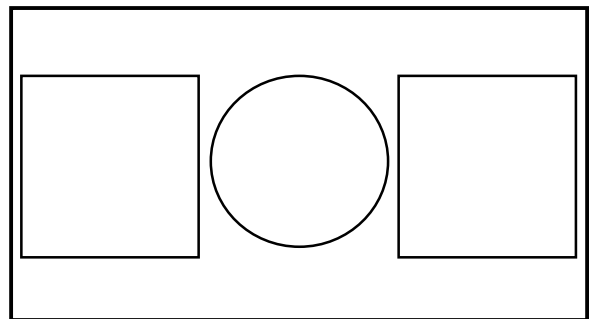
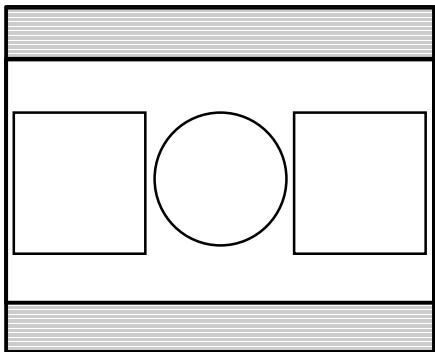


Example 3:**Aspect Ratio Setting: Anamorphic**

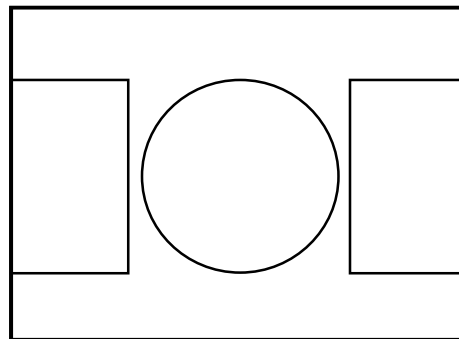
4:3 Display



16:9 Display

**Example 4.****Aspect Ratio Setting: Expand**

4:3 Display

**Horizontal Tracking**

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.

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 the desired **INPUT SELECT** Button, 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 input, 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 20. Because the **IN1403** 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 640x480 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 20 for a complete listing.

KEY CONCEPT



Of all the settings on the IN1403, 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 17-20.

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 **IN1403** only scales up; therefore, the output size controls will stop at a certain point where the input and output resolution are equal.

Position: Situates the output image on the monitor. The output position is automatically reset anytime a new input aspect ratio is selected.

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 A	RGB with composite sync (with serrations)
RGBS B	RGB with composite sync (without serrations)
RGsB A	RGB with sync on green (with serrations)
RGsB B	RGB with sync on green (without 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.

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

ADVANCED MENU

To access the advanced 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 advanced 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.

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

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.

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 Horizontal Scan Rate
- Output Resolution
- Output Vertical Refresh Rate
- Program Version Number
- Input Signal Standard and Format
- Input Vertical Refresh Rate
- Output Horizontal Scan Rate
- Output Sync Format

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

Choosing the Optimal Output Resolution and Refresh Rate

Of all the settings on the **IN1403**, 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 **IN1403** 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 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 20. 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, DMD, D-ILA / LCOS or plasma 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 or the chart on page 19 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, DMD, LCOS, and plasma 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

Input 4 is for passive RGB video. No scaling or video functions are available for this input. Only switching of the RGB signal is provided from the front panel or the RS-232 control. All color and sync signals are passed through an internal distribution amplifier and then to the output connectors. Blank, freeze, the on screen menu and other video functions are not available. Audio is an active function, and all audio functions are still available for Input 4, even though the menu cannot be displayed.

OUTPUT RGB CONNECTORS

The dual RGB outputs of the **IN1403** are individually buffered (including signals from Input 4). 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 26).

OUTPUT MODES

The **IN1403** can be set to output any of the following resolutions and refresh rates:

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									

POWER-ON SETTINGS

Power-On settings let you adjust key **IN1403** settings without using on-screen menus. This may be particularly helpful if the **IN1403** has been accidentally set for a mode that is incompatible with the display device, preventing the viewing of the on-screen menus. To execute a Power-On setting, simply press and hold the desired front panel button (indicated in the chart below) while turning on the **IN1403** power switch.

- **INPUT 1:** Factory Reset
- **INPUT 2:** Sets Output Sync Format to RGBHV--
- **INPUT 3:** Sets Output Sync Format to RGBHV++
- **INPUT 4:** Sets Output Sync Format to RGBS with serration pulses
- **BLANK:** Sets Output Sync Format to RGsB with serration pulses
- **MENU:** Sets Output Resolution / Refresh rate to 640 x 480 @ 60 Hz
- **←:** Sets Output Sync Format to 800 x 600 @ 60 Hz
- **▲:** Sets Output Sync Format to 1024 x 768 @ 60 Hz
- **▼:** Sets Output Sync Format to 1152 x 864 @ 60 Hz
- **➤:** Sets Output Sync Format to 1280 x 1024 @ 60 Hz
- **ENTER:** Factory Reset - Returns all Scaler Input, Output and Serial Control settings to factory defaults.

OUTPUT POSITIONING

The output position may be adjusted without entering the main menu sequence. Any time there are no menus showing on the screen, simply press one of the ▲ ▼ ◀ ▶ arrow keys to shift the image in the desired direction. 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 signal 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 settings may then be adjusted.

Remote Operation

RS-232 CONTROL

The **IN1403 REMOTE 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. All switching, adjustment and set-up parameters can be controlled using RS-232 commands.

A complete listing of RS-232 codes is included on pages 23 & 24.

Communication Protocol:

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

Baud Rate Selection:

The **IN1403** 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 17).

*Note: The baud rate transmitted must match the baud rate selected on the **IN1403**.*

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. When a command is completed, the unit provides a response code:

[OK] indicates that the command was received and executed
 [ERR] indicates that there is a problem with the code and the command was not executed

The **IN1403** can be set to recognize six sets of leading and end codes (delimiters). These are: (), [], { }, \ /, < >, and !#. The factory default serial delimiters are []. The unit may be set to a different delimiter pair using the Advanced Menu (see page 17).

Note: The will ignore all commands that do not contain the appropriate delimiters.

A complete command consists of:

[The leading code
CH4 The command code. In this case, CH4 would select Input 4.
] The ending code

Sample command codes:

[CH1] Select Input 1
 [FRZ1] Activate Freeze Frame

Serial Cable Connection

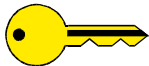
When controlling only one **IN1403** unit, connect the RS-232 cable as follows:

Controller Transmit	to	IN1403 Receive
Controller Ground	to	IN1403 Ground
Controller Receive	to	IN1403 Transmit

When controlling multiple **IN1403** units, connect the RS-232 cable as follows:

Controller Transmit	to	Each IN1403 Receive
Controller Ground	to	Each IN1403 Ground
Controller Receive	to	Only one IN1403 Transmit

KEY CONCEPT



*When controlling multiple units, the Controller Receiver Terminal and each **IN1403** Transmit Terminal is left unconnected. Multiple **IN1403** Transit Lines may not be connected together; otherwise signal contention from multiple units will result. Therefore, “receive” information is only available from one **IN1403** in this configuration. Each unit must be set to different delimiters.*

IN1403 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 current baud rate
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 current aspect ratio
BALR	increase balance right
BALL	increase balance left
BAL@	set audio balance to center** (016)
BALxxx	set balance to absolute value (000-031)
BAL?	return current balance
BAS+	increase bass
BAS-	decrease bass
BAS@	set bass to normal (016)
BASxxx	set bass to absolute value (006 – 027)
BAS?	return current bass
BLANK	toggle blanking
BLANK0	disable blanking**
BLANK1	enable blanking
BLANK?	return current blank state
BRG+	increase brightness
BRG-	decrease brightness
BRG@	set brightness to normal** (128)
BRGxxx	set brightness to absolute value (000-255)
BRG?	return current brightness
CH1	select channel 1
CH2	select channel 2
CH3	select channel 3
CH4	select channel 4
CH?	return current channel
CMDCD0	set delimiters to brackets []**
CMDCD1	set delimiters to braces { }

COMMAND	DESCRIPTION
CMDCD2	set delimiters to parentheses ()
CMDCD3	set delimiters to less and greater < >
CMDCD4	set delimiters to slashes \ /
CMDCD5	set delimiters to signs !#
CMDCD?	return current delimiters
CON+	increase contrast
CON-	decrease contrast
CON@	set contrast to normal** (128)
CONxxx	set contrast to absolute value (000-255)
CON?	return current contrast
CTF0	select comb filter**
CTF1	select trap filter
CTF?	return current comb / trap filter state
FMTx	toggle signal format of channel x (1,2,3)
FMTxy	set signal format of channel x (1,2,3) to composite / S-video y (0/1)
FMTx?	return current signal format from channel x
FP	toggle front panel controls
FP0	disable front panel controls
FP1	enable front panel controls**
FP?	return current front panel state
FRZ	toggle freeze frame
FRZ0	disable freeze frame**
FRZ1	enable freeze frame
FRZ?	return current freeze state
GAM+	increase gamma
GAM-	decrease gamma
GAM@	set gamma to normal** (010)
GAMxxx	set gamma to absolute value (001-030)
GAM?	return current gamma
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 current horizontal tracking
HUE+	increase hue
HUE-	decrease hue
HUE@	set hue to normal** (020)
HUExxx	set hue to absolute value (000-040)

COMMAND	DESCRIPTION
HUE?	return current hue
INFO?	return unit version
MUTE	toggle mute
MUTE0	disable mute**
MUTE1	enable mute
MUTE?	return current mute state
NOISE+	increase noise filter
NOISE-	decrease noise filter
NOISE@	set noise filter to normal (009)
NOISExxx	set noise filter to absolute value (000-047)
NOISE?	return current noise filter
PH+	increase horizontal position
PH-	decrease horizontal position
PH@	set horizontal position to normal** ♦
PHxxx	set horizontal position to absolute value ♦
PH?	return current horizontal position
PV+	increase vertical position
PV-	decrease vertical position
PV@	set vertical position to normal** ♦
PVxxx	set vertical position to absolute value ♦
PV?	return current horizontal position
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 current refresh rate
RES000	factory reset
RES1	reset video
RES2	reset audio
RES3	reset input
RES4	reset output
RES5	reset RS-232
SAT+	increase color
SAT-	decrease color
SAT@	set color to normal** (140)
SATxxx	set color to absolute value (000-255)
SAT?	return current color
SCS0	set resolution to 640 x 480**

COMMAND	DESCRIPTION
SCS1	set resolution to 800 x 600
SCS2	set resolution to 852 x 480
SCS3	set resolution to 1024 x 768
SCS4	set resolution to 1152 x 864
SCS5	set resolution to 1280 x 720
SCS6	Set resolution to 1280 x 768
SCS7	set resolution to 1280 x 1024
SCS8	set resolution to 1365 x 768
SCS9	set resolution to 1365 x 1024
SCS?	return current resolution
SH+	increase horizontal size
SH-	decrease horizontal size
SH@	set horizontal size to normal**(100)
SHxxx	set horizontal size to absolute value (♦-100)
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 current sharpness
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 to RGBHV- -**
SYNC1	set output sync to RGBHV+ +
SYNC2	set output sync to RGSB A
SYNC3	set output sync to RGSB B
SYNC4	set output sync to RGSB A
SYNC5	set output sync to RGSB B
SYNC?	return current output sync
TRE+	increase treble
TRE-	decrease treble
TRE@	set treble to normal**(016)
TRExxx	set treble to absolute value (008-025)
TRE?	return current treble
VOL+	increase volume
VOL-	decrease volume
VOL@	set volume to normal**(043)
VOLxxx	set volume to absolute value (012-063)
VOL?	return current 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 output mode.

Specifications

IN1403 Video Scaler	
Input	
Connections	Composite Video: (3) BNC female
	S-Video: (3) 4-Pin Mini DIN female for Y/C
	RGB: (1) 15-Pin HD female (passive)
	Audio: (4) Pairs female RCA for Stereo L/R
Signal	Video / Luma: 0.7 Vp-p typical, 75 Ohm impedance
	Chroma: 0.3 Vp-p typical, 75 Ohm impedance
Standards Supported	NTSC / PAL / SECAM / NTSC 4.43
Output	
Connectors	RGBHV: (5) BNC female & (1) 15-Pin HD female
	Audio: (1) Pair female RCA for Stereo L/R
RGB Video	0.7 Vp-p typical, 75 Ohm impedance
Sync Format	Selectable: RGBHV (default), RGBS, RGsB
Resolution	640 x 480 to 1365 x 1024
Vertical Refresh Rate	60 - 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	25 Watts
Shipping Weight	7 lbs. / 3.5 kg
Product Weight	3.5 lbs. / 1.6 kg
Dimensions	1.75" x 17" x 12.2" / 4.4cm 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	
IN9123B Rack Ears IN9230 IEC Power Cable Operations 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'	
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	
Audio Cables	
IN8700 Series - Stereo audio cable (2) RCA (M-M), lengths from 6' to 25'	
IN9107 - (1) 3.5mm stereo mini male to (2) RCA male, 6' long	

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 **IN1403** and the monitor.

Solution 4: Verify the connection to the output display device. Even with no input signal, the **IN1403** menu can be displayed. Press MENU or ENTER to gain access to the menu screen.

Solution 5: 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 6: The output resolution must be less than the input (the **IN1403** can only scale up). Select an output resolution that is greater than or equal to the input size.

Solution 7: The display device may not accept certain sync formats. Verify the display device sync capability and select the **IN1403** output sync using the power-up default buttons.

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 **IN1403** 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 **IN1403** 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 image on the display device is scrambled.

Solution: 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.

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

Solution 1: Increase the output H-Position to line up the image on the display device. Use the blue screen.

Solution 2: 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: Reduce the output H-Position to line up the image on the display device. Use the blue screen.

Solution 2: 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: Increase the output V-Position to line up the image on the display device. Use the blue screen.

Solution 2: 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: Reduce the output V-Position to line up the image on the display device. Use the blue screen.

Solution 2: 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: The IN1403 cannot separate multiple signal formats. Make sure that only one signal is connected to each input.

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: The input aspect ratio is set incorrectly. Adjust the input aspect ratio to match the input video signal.

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 (only applicable in composite video mode).

Problem: The Output Resolution will not decrease.

Solution 1: The IN1403 can *only* scale up. Resolutions that would result in scaling down are **not** available.

Problem: The desired Input Aspect Ratio cannot be selected.

Solution 1: The IN1403 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 IN1403 will *only* scale up. Increase the output resolution, and then reduce the size of the output image.

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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