A WORLD OF A/V SOLUTIONS

SPECIALIZED PRODUCTS

IN1124 / IN1130

TWISTED PAIR TRANSMITTER / 1X4 DISTRIBUTION AMPLIFIER FOR HIGH RESOLUTION VIDEO & AUDIO

TWISTED PAIR RECEIVER / 1X2 DISTRIBUTION AMPLIFIER FOR HIGH RESOLUTION VIDEO & AUDIO

IN1124/IN1130

OPERATION MANUAL

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

Installation and Safety Instructions

For Models without a Power Switch:

The socket outlet shall be installed near the equipment and shall be accessible.

For all Models:

No serviceable parts inside the unit. Refer service to a qualified technician.

For Models with Internal or External Fuses:

For continued protection against fire hazard, replace only with same type and rating of fuse.

Instructions d'installation et de sécurité

Pour les modèles sans interrupteur de courant:

La prise de courant d'alimentation sera installé près de l'équipement et sera accessible.

Pour tout les modèles:

Pas de composants à entretenir à l'intérieur. Confiez toute réparation à un technicien qualifié.

Pour les modèles équipés de fusibles internes ou externes:

Afin d'éviter tout danger d'incendie, ne remplacer qu'avec le même type et la même valeur de fusible.

Installations- und Sicherheitshinweise

Für Geräte ohne Netzschalter:

Die Netzsteckdose soll in der Nähe des Gerätes installiert und frei zugänglich sein.

Für alle Geräte:

Keine Wartung innerhalb des Gerätes notwendig. Reparaturen nur durch einen Fachmann!

Für Geräte mit interner oder externer Sicherung:

Für dauernden Schutz gegen Feuergefahr darf die Sicherung nur gegen eine andere gleichen Typs und gleicher Nennleistung ausgewechselt werden.

Instalacion E Instrucciones de Seguridad

Modelos Sin Interruptor:

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

Para Todos Los Modelos:

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

Modelos con Fusibles Internos o Externos:

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

CE COMPLIANCE

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

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

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

CE

FCC COMPLIANCE

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

Product Overview

DESCRIPTION

The **IN1124** Twisted Pair Transmitter / Distribution Amplifier and **IN1130** Twisted Pair Receiver / Distribution Amplifier combine to make a system for sending high-resolution RGBHV signals and audio signals up to 500 feet using Category 5 unshielded twisted pair (UTP) cable. By using one **IN1124** transmitter and four **IN1130** receivers, the VGA and audio signal from one source computer can be split and amplified to drive a local monitor plus up to eight additional displays. The **IN1124** / **IN1130** twisted pair video / audio transmission system lets A/V system designers and installers take advantage of the compact size, flexibility, and extremely low cost of CAT5 UTP cable.

PRODUCT FEATURES

IN1124-1 Twisted Pair Transmitter / Distribution Amplifier for High-Resolution Video - features four RJ45 female output ports (for connection to four CAT5 cables) as well as a local monitor output.

IN1124-2 Twisted Pair Transmitter / Distribution Amplifier for High-Resolution Video & Audio - provides the same features as the **IN1124-1** as well as dual stereo mini connectors: one for stereo audio input, and the other to drive a local audio device.

IN1130-1 Twisted Pair Receiver / Distribution Amplifier for High-Resolution Video - can drive two data display devices simultaneously.

IN1130-2 Twisted Pair Receiver / Distribution Amplifier for High-Resolution Video & Audio - provides the same features as the **IN1130-1**, as well as dual mini connectors for mono audio output.

High Quality Video - The **IN1124 / IN1130** system employs sophisticated video circuitry to maintain excellent video quality with VGA video signals at resolutions as high as 1600 x 1200. A **Video Peaking** control on the **IN1130** receiver lets users fine tune the video compensation to optimize the video image for various cable lengths.

Flexible Input Signal Compatibility - In addition to VGA signal compatibility at all resolutions up to 1600 x 1200, the **IN1124 / IN1130** system is also compatible with high-resolution analog video RGBHV, RGBS, RGsB signals at a variety of resolutions and refresh rates. By using the appropriate adapter cables (see the table on page 6), the **IN1124 / IN1130** system can transmit video and stereo audio signals from MAC, SUN, SGI and other high-resolution workstations.

Twisted Pair Cable Compatibility - The **IN1124 / IN1130** has been optimized for Category 5 unshielded twisted pair (UTP) cable. However, the system will work with other twisted pair cables that conform to the appropriate pin outs and performance characteristics. The system may be used with CAT3 cable, but video performance will be compromised and maximum cable lengths and input signal resolution must be decreased. As new, higher performance types of twisted pair cables are developed in the future (that exceed the capabilities of CAT5), the **IN1124 / IN1130** will be able to offer enhanced video bandwidth over longer cable runs.

Rack Mountable - Two **IN1124** transmitters can be rack mounted side-by-side in a 1U rack space.

ADVANTAGES OF CAT5 CABLE

Category 5 cable is a 4-pair, twisted pair cable that's extremely affordable, costing only a fraction of high-resolution multi-conductor coaxial cables. In addition, CAT5 cable features:

Quick and Easy Termination - Utilizing RJ45 connectors, CAT5 cables offer fast, easy and extremely economical cable terminations.

Easy Handling and Compact Size - CAT5 cable is much thinner than high-resolution and super high-resolution coaxial cables, providing easy cable pulls and preserving conduit space. Using multiple **IN1124** transmitters and **IN1130** receivers allows users to send a dozen or more RGBHV signals in the same conduit space required for a single super high-resolution 5-conductor coaxial cable.

INLINE CAT5 Cables - INLINE offers the **IN9500** series of CAT5 cables, available in lengths from 50 feet to 300 feet (longer lengths are available via special order). These high quality CAT5 cables are pre-terminated with molded RJ45 connectors for enhanced durability.

Using special technology that allows high resolution video and stereo audio transmission over CAT 5 cables, the **IN1124 / IN1130** system leverages the many advantages of CAT5 cable and provides A/V systems designers with an economical, space efficient solution for high-resolution video and audio signal transmission in a variety of applications.

Compatibility

INPUT

The **IN1124** Twisted Pair Transmitter / Distribution Amplifier will accept analog video signals, at a variety of resolutions and refresh rates, from virtually any computer. The unit is compatible with high-resolution analog video RGBHV / RGBS / RGsB signals, and can accept video and stereo audio signals from MAC, SUN, SGI and 4 or 5 BNC.

The **IN1124-2** shares the same features as the **IN1124-1**, but also provides a 3.5mm stereo mini connector for stereo audio input. The IN1124-2 converts stereo audio signals to mono audio.

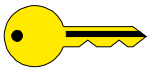
OUTPUT

The **IN1124** provides a local monitor loop output on a 15-pin HD female connector, allowing direct connection without the need for additional equipment. All sense pins are passed from each input directly to the corresponding local monitor output. Since the unit also acts as a four-output distribution amplifier, four RJ45 female output ports are provided for connection to four CAT5 cables.

Featuring dual 15-pin HD female outputs, the **IN1130** can drive up to two data display devices simultaneously. The output signal is compatible with high-resolution data grade monitors and data / graphics projectors, making it ideal for use with LCD projectors and other data display devices which require that all VGA sync formats and polarities remain unchanged from the original source signal.

The **IN1124-2** features (1) 3.5mm mini connector for stereo audio output (to drive a pair of powered speakers / local audio device), and the **IN1130-2** provides (2) 3.5mm mini connectors for mono audio output.

KEY CONCEPT



VGA, MAC, SUN, SGI and other high-resolution workstations operate in several video modes encompassing a wide range of resolutions and scan rates. Many of the video signals from the newest models can run as high as 70 KHz or more, with the newest VGA cards offering an output resolution of 1600 x 1200 (some can even go as high as 2048 x 1536). The data projector or monitor connected to the system output must be compatible with the horizontal scan rate and vertical refresh rate of the computer's video signal. Please check the documentation for both the computer graphics card and the data display device to ensure compatibility.

Installation

This section offers step-by-step instructions for installing the **IN1124** Twisted Pair Transmitter / Distribution Amplifier and the **IN1130** Twisted Pair Receiver / Distribution Amplifier. An APPLICATION DIAGRAM is provided on page 7.

Note: Read the instructions carefully before initiating the installation procedure. Make sure that there is no power connected to any of the units.

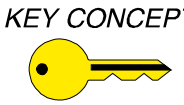
1.) Place / install the **IN1124** at the desired location. Make sure that the unit is seated on a flat surface or is securely installed in a standard 19" equipment rack using an optional **IN9080** rack shelf. *When attaching any INLINE unit to an INLINE rack mount shelf, the four (4) rubber feet must be removed from the bottom of the unit.* Secure the **IN1124** to the rack mount shelf using two (2) #6 - 32 x ¼" long screws (provided with the rack shelf). Two **IN1124** Twisted Pair Transmitter / Distribution Amplifiers may be mounted side-by-side on a single rack shelf, or a single unit may be mounted along with an optional **IN9088B** blank plate. Together, the **IN1124** and the **IN9088B** fit snugly in a 1U rack space.

2.) Place / install the **IN1130** at the desired location. Once again, make sure that the unit is seated on a flat surface. The **IN1130** can be mounted to virtually any flat surface using the optional **IN9089** "L" brackets that attach to the sides of the unit.

3.) Connect the video source to the **IN1124** 15-pin VGA input port (a list of available adapter / extension cables can be found on page 6).

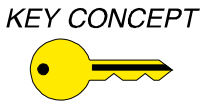
4.) Connect the computer sound card (if applicable) to the **IN1124-2** 3.5mm audio input port (the **IN9106** audio patch cable is ideal for this application). For computers with RCA connectors, use the **IN9107** audio adapter cable. Connect powered local speakers (if present) to the local audio output.

5.) Connect the local monitor to the **IN1124** local monitor output port.



*The **IN1124** local monitor output is <u>not</u> buffered. Therefore, the LOCAL MONITOR OUTPUT Connector Port **must be terminated**, either with a local monitor or the **IN9031** VGA Termination Plug (included).*

6.) Run the appropriate **IN9500 Series** CAT5 cable from the **IN1124** to the **IN1130**.
Note: Always test your cable(s) prior to any permanent installation.



*It is imperative that the wired pairs in the **IN1124 / IN1130** CAT5 system adhere to the wiring standards shown on the following page, otherwise the system will not function properly. The pertinent standard for INLINE's CAT5 cable is the TIA 568B. In order for the **IN1124 / IN1130** system to function properly, the CAT5 wire pairs (regardless of their color) must be maintained within both RJ45 connectors.*

7.) Connect one end of the CAT5 cable(s) to one of the RJ45 Output Receptacles on the back of the **IN1124**. Connect the other RJ45 connector(s) to the CAT5 Input Receptacle(s) on the back of the **IN1130** (s).

8.) Connect the **IN1130** 15-pin VGA output(s) to the display device(s).

9.) If applicable, connect the powered local speakers to the 3.5mm outlet(s) on the back of the **IN1130-2**. Featuring (2) 3.5mm mini connectors for mono audio output, the **IN1130-2** can drive two pairs of speakers simultaneously, or be connected to any audio device that accepts a buffered line level audio signal.

10.) Connect the round connector on the **IN9204-1 / IN9204-2** power supply (included) to the power input jack of the **IN1130** (s) (located on the right side of the rear panel). Connect the adapter box side of the power supply to the A/C power source. Both units power up automatically after A/C power has been applied (the power indicator lights / front panel LEDs will illuminate).

11.) Connect the round connector on the **IN9211-1 / IN9211-5** power supply (included) to the power input jack of the **IN1124** (also located on the right side of the rear panel). Connect the adapter box side of the power supply to the A/C power source.

12.) Turn on the computer, local monitor, all powered speakers and all remote data monitors.

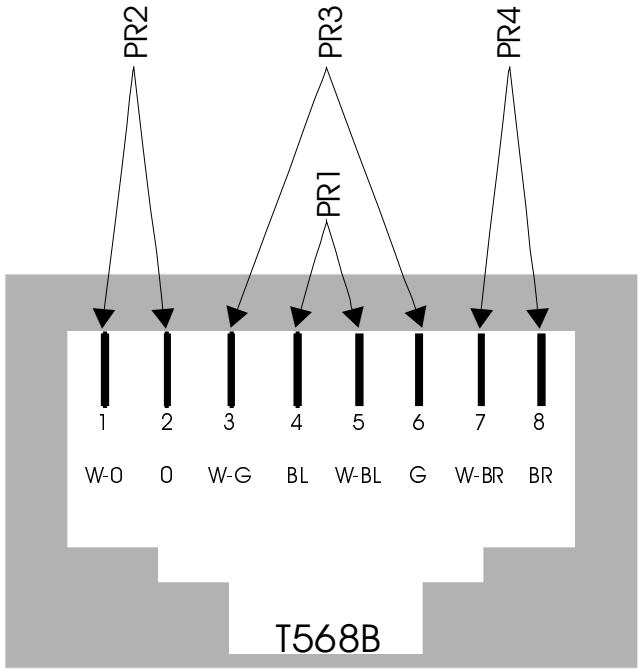
13.) The **IN1130** features a video peaking control (located on the right side of the back panel) that enhances image detail and sharpness by boosting high frequencies, allowing users to optimize the display device(s) video image for various cable lengths. Turning the regulator clockwise will increase the peaking, and counter-clockwise will decrease the peaking. Using the **IN9333** adjustment tool (provided), gently adjust the peaking control until optimum sharpness and picture quality is achieved.

SUGGESTED MAXIMUM CABLE LENGTHS

Several factors will affect the video signal quality you can expect using the **IN1124 / IN1130** system including the input signal resolution and refresh rate, quality of CAT5 cable and the length of cable. Generally speaking, the higher the signal bandwidth, the shorter the distance it can be transmitted along any cable (coaxial or UTP) before it begins to degrade. The table below provides the maximum recommended cable lengths at various resolutions for the **IN1124 / IN1130** system using CAT5 cable:

Resolution	Maximum Length
1600 x 1200	250’
1280 x 1024	300’
1024 x 768	350’
800 x 600	400’
640 x 480	500’

TIA 568B STANDARDS FOR CAT5 CABLE - EIGHT POSITION MODULAR JACK PAIR ASSIGNMENTS FOR RJ45 CONNECTORS



PR1 - Blue/White Blue

PR2 - White Orange/Orange

PR3 - White Green/Green

PR4 - White Brown/Brown

ADAPTER / EXTENSION CABLES FOR INPUT AND LOCAL MONITOR / DISPLAY DEVICE OUTPUT

The **IN1124 / IN1130** system has 15-pin HD VGA-type input / output connectors. The following adapter / extension cables are available:

Computer	3’	6’	12’	25’	35’ - 250’
VGA: 15-Pin HD					
Input Cable		**IN8006M**	**IN8012M**	**IN8025M**	**IN80xx**
Output Cable (optional)		**IN8006**	**IN8012**	**IN8025**	**IN80xx**
MAC with 15-Pin D:					
Input Cable		**IN9140M**		**IN9144M**	
Output Cable	**IN9141**			**IN9145**	
MAC G3, G4 and PowerBook with 15-Pin HD*:					
Input Cable		**IN8006M**	**IN8012M**	**IN8025M**	**IN80xx**
Output Cable		**IN8006**	**IN8012**	**IN8025**	**IN80xx**
SUN: 13W3 (may also be used with SGI with RGsB output)					
Input Cable		**IN9142M**		**IN9146M**	
Output Cable	**IN9143**			**IN9147**	
Workstation: 5 BNC / RGBHV					
Input Cable		**IN9047**	**IN9045**	**IN9045-L25**	
Output Cable		**IN9047**	**IN9045**	**IN9045-L25**	
Workstation: 4 BNC - RGBS					
Input Cable		**IN9100M**			

*Newer Mac G3 models (with translucent cases) have 15-Pin HD connectors (pins arranged in 3 rows).
Older G3 models (with solid white enclosures) incorporate 15-Pin D connectors (pins arranged in 2 rows).

SELECTING THE RIGHT CAT5 CABLE

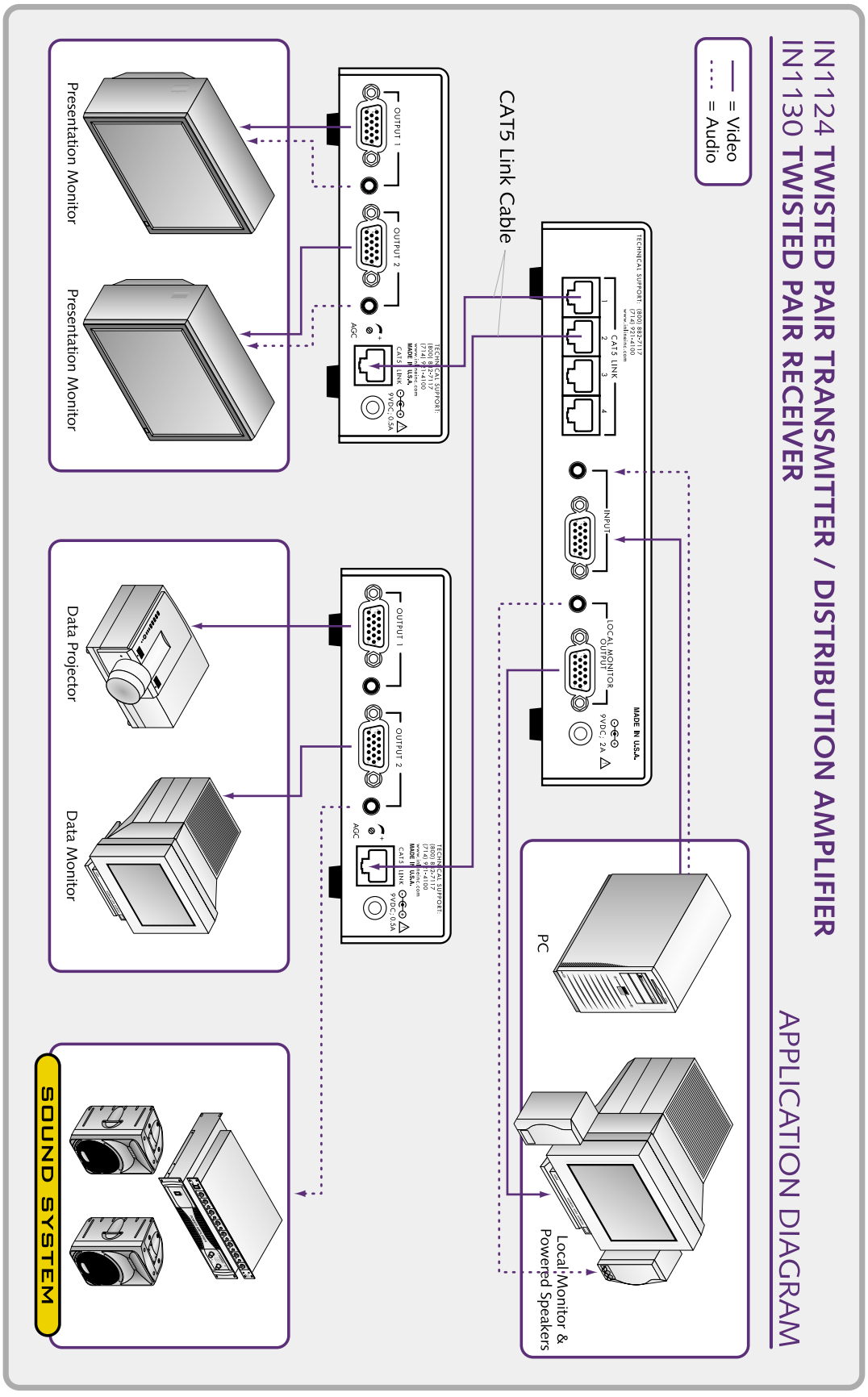
The CAT5 standard was created to address issues related to high bandwidth transmission of data signals. CAT5 cables were not originally intended for video and audio signal transmission and unfortunately, many performance characteristics that are important for good quality transmission of video signals are not included in the CAT5 spec and are not tested by most cable manufacturers. Many cable performance parameters such as attenuation, bandwidth, capacitance and near-end cross talk are important to video performance; however, impedance and pair-to-pair skew have the greatest effect when transmitting high resolution video signals over CAT5 cables.

Impedance - There is a wide variance in impedance between different brands of cables. The TIA / EIA* standard for CAT5 impedance is 100 ohms -/+ 15 ohms. Some CAT5 cables have an impedance of 100 ohms +/- 50 ohms, rendering them virtually useless above 100 MHz. The visible result may be multiple images or “ghosting” in the displayed image.

Skew - Another factor that affects the performance of CAT5 cable is skew (timing differences on multi-pair cable). Signals arriving at different times could result in misconvergence (improperly aligned colors) on the video display device. For best performance with high resolution video signals, we recommend that you select a CAT5 with less than 8 nanoseconds per 100 meters of cable. Because skew is cumulative, it becomes more visible with longer cable lenghts.

A few manufacturers have now responded with CAT5 cable formulations that were specially designed to match the stringent requirements of high resolution video signal transmission. The INLINE **IN9500 Series CAT5** cables provide excellent performance with the **IN1124 / IN1130**.

*Telecommunications Industry Association / Electronic Industries Association


IN1124 TWISTED PAIR TRANSMITTER / DISTRIBUTION AMPLIFIER
IN1130 TWISTED PAIR RECEIVER
APPLICATION DIAGRAM
= Video
= Audio
CAT5 Link Cable
Presentation Monitor
Presentation Monitor
Data Projector
Data Monitor
PC
Local Monitor &
Powered Speakers
SOUND SYSTEM

Specifications

IN1124-1 / IN1124-2 Twisted Pair Transmitter / Distribution Amplifier	
Video Input Connector	(1) 15-pin HD female
Local Monitor Output	(1) 15-pin HD female
Stereo Audio Input	(1) 3.5mm Stereo mini female (**IN1124-2** only)
Local Audio Output	(1) 3.5mm Stereo mini female (**IN1124-2** only)
Output Connectors	(4) RJ45 female
Video Input Signals	Analog Video, 1.5 Vp-p max. Sync Signals: TTL
Compatible Signal Formats	RGBHV, RGBS, RGsB
Audio Input Signals	Line Level Stereo Audio
Power Supply	9VDC, 2.0A External Adapter
Product Weight	1 lb. / 0.45 Kg
Shipping Weight	3 lbs. / 1.5 Kg
Dimensions	1.65" x 8.5" x 6" / 4.2cm x 21.6cm x 9.5cm
Regulatory Approvals	UL 1950, CAN / CSA-22.2 No. 950, 3rd Edition CE: EN55022 (1987), EN50081-1 (1991), EN50082-1 (1992 and 1994), EN60950-92

Parts Included

IN1124-1 - Twisted Pair Transmitter / Distribution Amplifier for High-Resolution Video, *or*
IN1124-2 - Twisted Pair Transmitter / Distribution Amplifier for High-Resolution Video & Audio
IN9211-1 - 9VDC, 2.0A External Adapter - U.S. Style / 120VAC, *or*
IN9211-5 - 9VDC, 2.0A External Adapter - Continental Style / 230VAC
IN9031 VGA Termination Plug
Operation Manual

IN1130-1 / IN1130-2 Twisted Pair Receiver / Distribution Amplifier	
Input Connector	(1) RJ45 female
Data Display Outputs	(2) 15-pin HD female
Audio Outputs	(2) 3.5mm female (**IN1130-2** Only)
Power Supply	9VDC, 500mA External Adapter
Product Weight	0.7 lb. / 0.3 Kg
Shipping Weight	2 lbs. / 1 Kg
Dimensions	1.65" x 5.6" x 3.75" / 4.2cm x 14.2cm x 9.5cm
Regulatory Approvals	UL 1950, CAN / CSA-22.2 No. 950, 3rd Edition CE: EN55022 (1987), EN50081-1 (1991), EN50082-1 (1992 and 1994), EN60950-92

Parts Included

IN1130-1 - Twisted Pair Receiver / Distribution Amplifier for High-Resolution Video, *or*
IN1130-2 - Twisted Pair Receiver / Distribution Amplifier for High-Resolution Video & Audio
IN9204-1 - 9VDC, 500mA External Adapter - U.S. Style / 120VAC, *or*
IN9204-2 - 9VDC, 500mA External Adapter - Continental Style / 230VAC
IN9333 - Adjustment Tool
Operation Manual

Optional Accessories
CAT5 Link Cable
IN9550 - 50’ Long **IN95100 -** 100’ Long **IN95150 -** 150’ Long **IN95200 -** 200’ Long **IN95250 -** 250’ Long **IN95300 -** 300’ Long (Custom / longer lengths are available via special order. Call INLINE at (800) 882-7117)
VGA Cables
IN8000 Series High-Resolution VGA Cables with 15-Pin HD Connectors (available in a variety of lengths)
Audio Input Cables
IN9106: 3.5mm stereo mini male to 3.5mm stereo mini male, 6’ long **IN9107:** (1) 3.5mm stereo mini male to (2) RCA male, 6’ long
Installation Hardware
IN9080: Rack Shelf **IN9088B:** Blank Plate (Black) **IN9089:** “L” Brackets

Troubleshooting

Problem: The IN1124 / IN1130 is plugged in but the power indicator light / front panel LED is dark.
Solution 1: Make sure that the power adapter is securely plugged into the unit and the A/C source.
Solution 2: Make sure the A/C source is live.

Problem: LED’s on the front panel of the IN1130 are illuminated, but the data display connected to the receiver is dark.
Solution 1: Make sure the data display device is on.
Solution 2: Make sure the power light on the **IN1124** is illuminated.
Solution 3: Make sure that both RJ45 connectors of the CAT5 cable are securely seated in each unit.

Problem: The image on the IN1130 monitor(s) is too bright.
Solution: The **IN1124** LOCAL MONITOR OUTPUT Connector Port **must be terminated**, either with a local monitor or the **IN9031** VGA Termination Plug (included).

Problem: The image on the IN1130 monitor(s) is blurry.
Solution: The signal may be overdriven. Adjust the video peaking control on the **IN1130** so that the signal’s intensity matches the length of the CAT5 cable. Gently adjust the regulator until optimum sharpness and picture quality is achieved.

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

Warranty

- INLINE warrants the equipment it manufactures to be free from defects in materials and workmanship.
- If equipment fails because of such defects and INLINE is notified within two (2) years from the date of shipment, INLINE will, at its option, repair or replace the equipment at its plant, provided that the equipment has not been subjected to mechanical, electrical, or other abuse or modifications.
- Equipment that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for ninety (90) days from the day of re-shipment to the Buyer.
- **This warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty or merchantability or fitness for any particular purpose, all of which are expressly disclaimed.**

The information in this manual has been carefully checked and is believed to be accurate. However, INLINE, Inc. assumes no responsibility for any inaccuracies that may be contained in this manual. In no event will INLINE, Inc. be liable for direct, indirect, special, incidental, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding the **IN1124 / IN1130** features and specifications is subject to change without notice.

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(800) 882-7117 ♦ (714) 921-4100 ♦ Fax (714) 921-4160 ♦ www.inlineinc.com