XTENDEX® Series

ST-C6HD(-A)-300
ST-C6HD-(A)IR-300

300 FOOT HDMI, STEREO AUDIO AND IR EXTENDER

Installation and Operation Manual

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

TRADEMARK

XTENDEX is a registered trademark of Network Technologies Inc in the U.S. and other countries.

CHANGES

The material in this guide is for information only and is subject to change without notice. Network Technologies Inc reserves the right to make changes in the product design without reservation and without notification to its users.

Note: CATx connection cable used between NTI XTENDEX Series Local and Remote or any XTENDEX Series products should not be run underground, outdoors or between buildings.

WARNING: Outdoor or underground runs of CATx cable could be dangerous and will void the warranty.

TABLE OF CONTENTS

TABLE OF FIGURES

INTRODUCTION

The XTENDEX Series ST-C6HD-300 CAT6 HDMI and IR Extender (XTENDEX) is designed to enable the video and audio output from one digital video/audio source to be viewed and heard by a remote user. Each video extender consists of a local unit that connects to an HDMI source and optional IR emitter, and a remote unit that connects to an HDMI display and optional IR receiver as much as 300 feet away via Category 5e,6, 6a or 7 twisted-pair cable.

The XTENDEX Series Extender is extremely simple to install and has been thoroughly tested to insure reliable performance. Through the use of CAT5e/6/6a/7 (CATx) cable it is possible to economically increase the flexibility of a computer system. Here are some of the features and ways this can benefit any workplace:

- Allows the placement of an HDMI-enabled monitor in a location where only these parts are needed without having the video/audio source there too, taking up valuable space
- Allows digital video/audio to be viewed and heard by a remote user (up to 300 feet away)
- Provides crisp and clear computer resolution to 1920 x 1200 and HDTV resolutions to 1080p (see page 8 for more details)
- Transmits HDMI signal over one CATx cable.
- Only one power supply is necessary (Power supply can be connected to either the local or remote unit.)
- Supports an HDMI or DVI monitor. (DVI requires optional adapter cable- see page 2)
- Supports 480p, 720i/p and 1080i/p video formats
- HDMI 1.3, HDCP 1.2 compliant

   Supports:
   - x.v.Color
   - Dolby Digital and DTS
   - Dolby TrueHD and DTS-HD Master Audio
   - bandwidth to 225 MHz (6.75 Gbps)
   - 12-bit Deep Color
   - Lip Sync

- Supports the DDC2B protocol.
- Supports digital audio format, such as LPCM/Dolby Digital (AC-3)/(Plus)/DSD
- Support for CEC (consumer electronic control) compatible devices.

 OPTIONS:

 Available with optional full Infrared Remote (IR) extension-full IR control of HDMI source from remote HDTV extension (add "IR" to the model number ST-C6HD-**IR**-300)

 Available with optional stereo audio extension (add "A" to the model number- ST-C6HD-**A**-300)

Rackmount Modules

 The XTENDEX Series CAT6 Local Extenders can be ordered as rackmount modules- add "M" to the model number (i.e. ST-C6HD-LA-L-300**M**).   When ordering rackmount modules, also order the ST-C6RCK-24 Rackmount Extender Module Tray (see page 8).   The XTENDEX® Rackmount Extender Module Tray allows you to mount up to 12 extender modules in a space-saving 2RU shelf. The local extender modules and remote extenders are interconnected via one **CAT7** cable. Rackmount Modules include support for locally mounted video devices ("local access") and IR extension as standard features.

Only one power supply is necessary per local rackmount module to power both the local module and remote unit(s).

Optional CEC (Consumer Electronic Control) support for local display-add a "C" to the model number (i.e. ST-C6HD-**C**LA-L-300M) CEC support for remote display is standard.

Optional dual HDMI support- includes two local units in one case- add a "2" to the model number (i.e. ST-C6HD-LA-**2**L-300M)

Model	Single HDMI Support	Dual HDMI Support	CEC Support	Local Access
ST-C6HD-LA-L-300M	Y	N	N	Y
ST-C6HD-CLA-L-300M	Y	N	Y	Y
ST-C6HD-LA-2L-300M	N	Y	N	Y
ST-C6HD-CLA-2L-300M	N	Y	Y	Y

MATERIALS

Materials Included with ST-C6HD-300 kit:

- ✓ NTI ST-C6HD-300 Local Unit
- ✓ NTI ST-C6HD-300 Remote Unit
- ✓ 1-100VAC to 240VAC at 50 or 60Hz-24VDC/1.0A AC Adapter
- ✓ 1- Power Cord- country specific
- ✓ This manual

Additional Materials Included with ST-C6HD-IR-300 kit:

- ✓ 3 Foot IR-EMITTER (IR-EMTR-3)
- ✓ 3 Foot IR-RECEIVER (IR-RCVR-3)

Additional Materials Included with Modular Local Unit:

- ✓ 3 Foot IR-EMITTER (IR-EMTR-3)   (Models with dual HDMI include 2pcs of IR-EMITTER)

Additional materials may be required but are <u>not supplied</u>:

- ➢ CAT5e solid/stranded UTP ; 6/6a solid UTP; CAT7 solid STP (CATx) twisted-pair cables terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see page 14 for proper EIA/TIA 568 B wiring method)
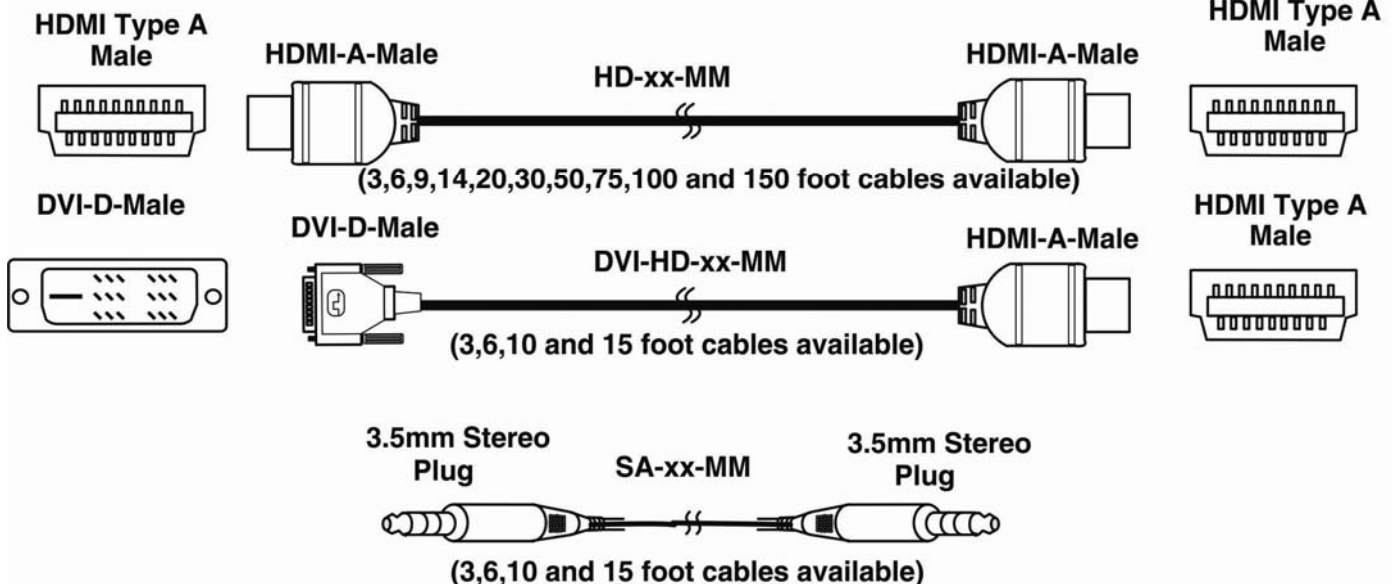
Note: Use only CAT7 solid STP cable if the extender is a rackmount module (i.e. ST-C6HD-LA-L-300**M**).

- ➢ HDMI male-male cable to connect a HDMI source or display (Order NTI # HD-xx-MM where xx=3, 6, 9,14,20,30, 50,75,100 and 150 foot cable).

- ➢ DVI-D male to HDMI-A male single link cable to connect a DVI source or display (Order NTI # DVI-HD-xx-MM where xx=3, 6, 10, or 15 foot cable)

- ➢ 3.5mm Stereo plug male-to-male cable to connect stereo audio source or self-powered stereo speakers.
  (Order NTI# SA-xx-MM where xx= 3, 6, 10 or 15 foot cable)
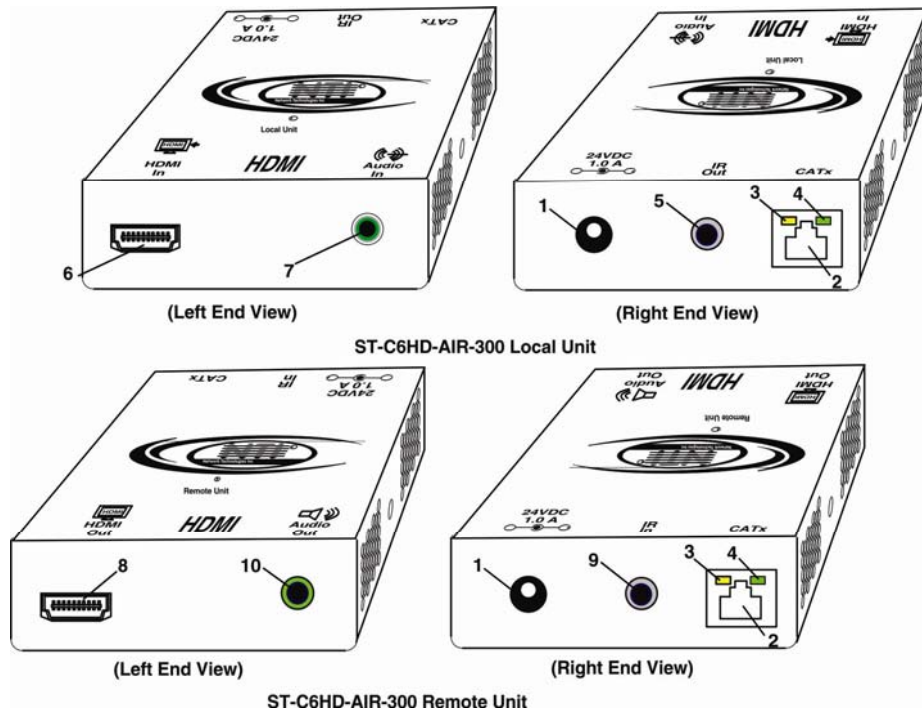
Always use the shortest possible cable for best performance.

Contact your nearest NTI distributor or NTI directly for all of your KVM needs at 800-RGB-TECH (800-742-8324) in US & Canada or 330-562-7070 (Worldwide) or at our website at http://www.networktechinc.com and we will be happy to be of assistance.

CONNECTORS AND LEDS

(Left End View)   (Right End View)

ST-C6HD-AIR-300 Local Unit

(Left End View)   (Right End View)

ST-C6HD-AIR-300 Remote Unit

#	LABEL	CONNECTOR	DESCRIPTION
1	**24VDC- 1.0A**	1.0mm Power Jack	connection jack for the AC adapter (only the Local or the Remote Unit needs to be powered, <u>not both</u>)
2	**CATx**	RJ45 connector	for connecting the CAT5e/6/6a/7 cable between the Local and Remote units
3	**Yellow LED**	--	**traffic indicator**- illuminates when there is communication between the local and remote units.
4	**Green LED**	--	**power indicator**- illuminates when power has been supplied to the unit
5	**IR Out**	3.5mm Stereo Jack	for connecting the IR Emitter (models with IR support only)
6	**HDMI In**	HDMI Type A Female	for connecting an HDMI cable between the Local Unit and the video source
7	**Audio In**	3.5mm Stereo jack	For connecting to stereo audio source (models with stereo audio support only)
8	**HDMI Out**	HDMI Type A Female	for connecting the remote display device
9	**IR In**	3.5mm Stereo Jack	for connecting the IR Receiver (models with IR support only)
10	**Audio Out**	3.5mm Stereo jack	For connecting self-powered stereo speakers (models with stereo audio support only)

ST-C6HD-LA-2L-300M
Local Module
Front and Rear Views

3
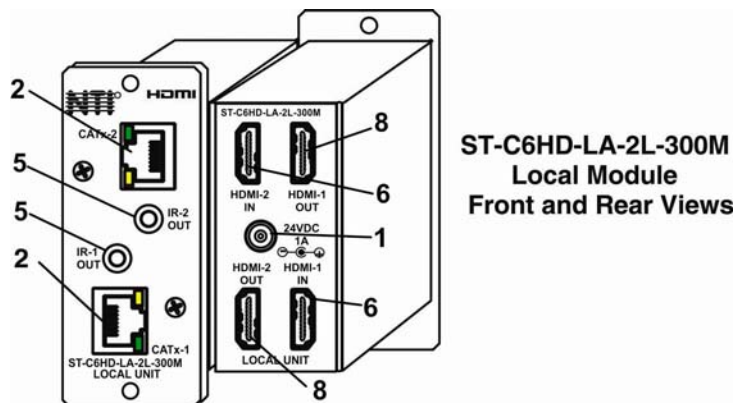
LIMITATIONS

- The use of CAT5e unshielded or all shielded CATx cabling will reduce the maximum distance and resolution.

PREPARATION FOR INSTALLATION

- Locations should be chosen for the monitor that also has space to connect the Remote unit within the distance provided by the cables.   If extension cables are needed, contact NTI for the cables required.

- The CATx cables must be run to the locations where the Remote and Local units will be connected.   Be careful to route the cables away from any sources of magnetic fields or electrical interference that might reduce the quality of the video signal (i.e. AC motors, welding equipment, fluorescent lighting, etc.).

- All cables should be installed in such a way that they do not cause stress on their connections to the equipment.   Extended lengths of cable hanging from a connection may interfere with the quality of that connection.   Secure cables as needed to minimize this.

- Properly shut down and disconnect the power from the video source and monitor to be separated.   If other equipment is involved whose connections are being interrupted, be sure to refer to the instruction manuals for that equipment for proper disconnection and reconnection procedures before proceeding.

- When CATx cables between more than one local and remote unit will run parallel and adjacent to one another for more than 6 feet in length, CAT7 cable should be used to ensure the best performance.   A lesser quality cable may cause poor video quality or prevent operation altogether.
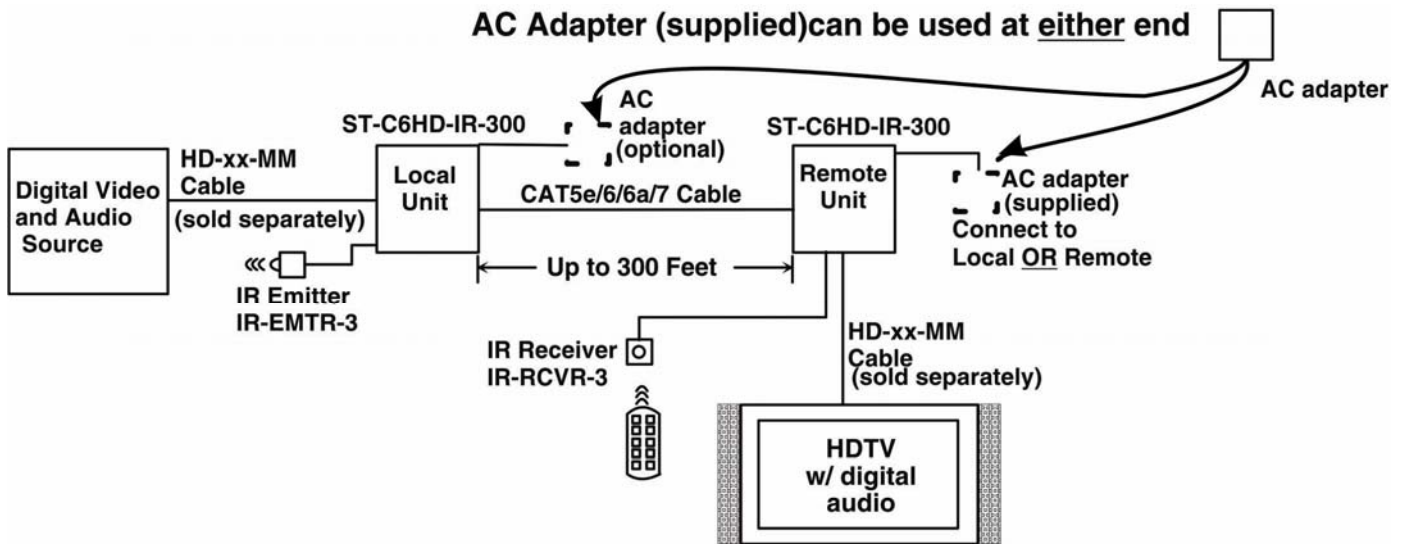
TYPICAL APPLICATION

INSTALLATION

Installing The Local Unit

Connect an HD-xx-MM or DVI-HD-xx-MM cable (page 2) between the video source and the "HDMI In" connector on the Local Unit (Figure 1).   If stereo audio support is present, a stereo audio source can be connected (Figure 2).
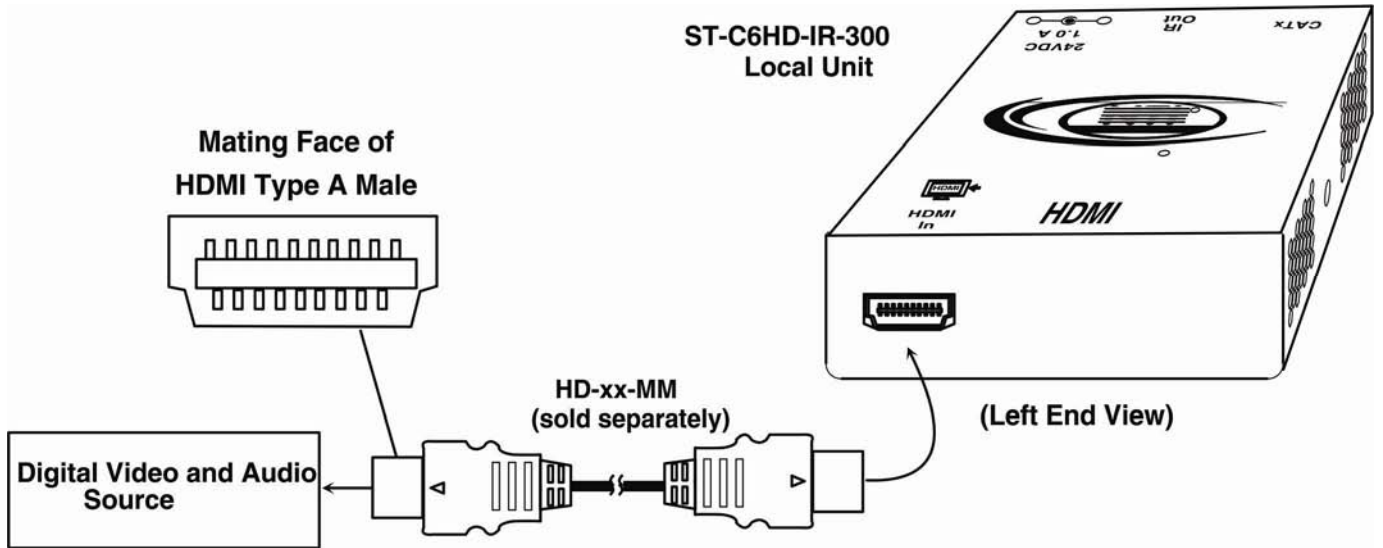

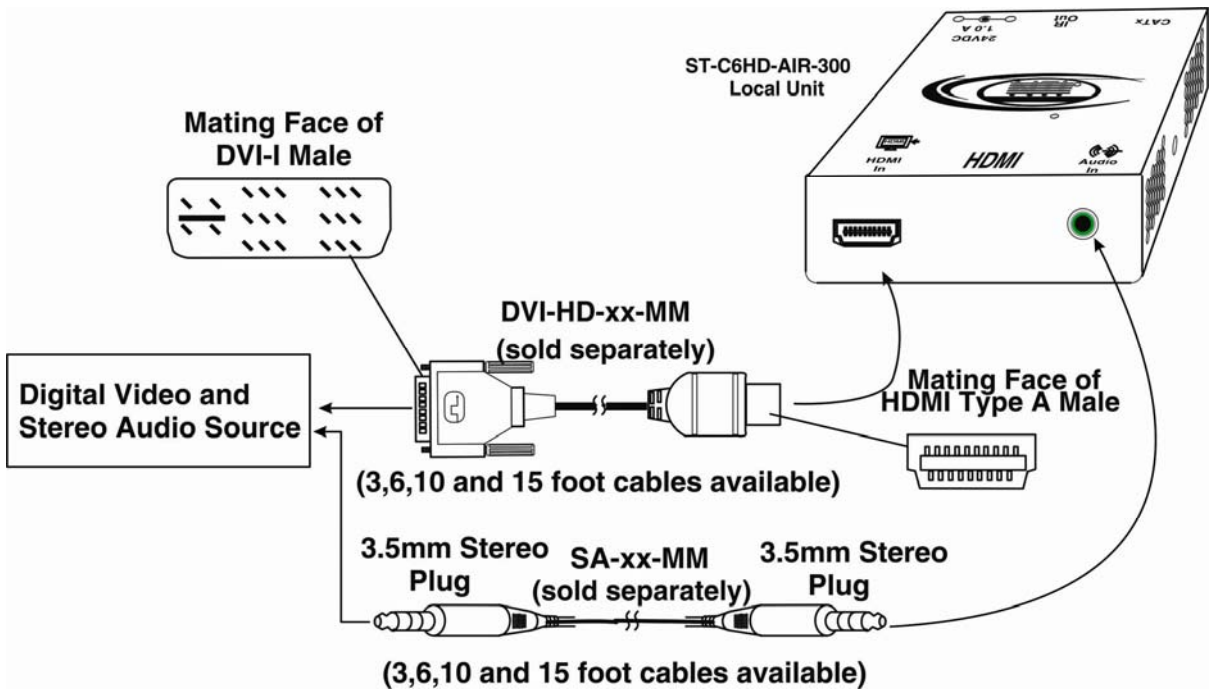**Figure 1- Connect the XTENDEX Local Unit to the source**

Figure 2- Connect the XTENDEX Local Unit to stereo audio source

Installing The Remote Unit

1.   Position the Remote Unit such that the CATx cable and the monitor cables can each reach the Remote Unit without putting strain on the cables.

2. Connect a HD-xx-MM (or DVI-HD-xx-MM cable depending upon what connector your display will accept) to the female HDMI video connector labeled "HDMI Out" on the Remote Unit.
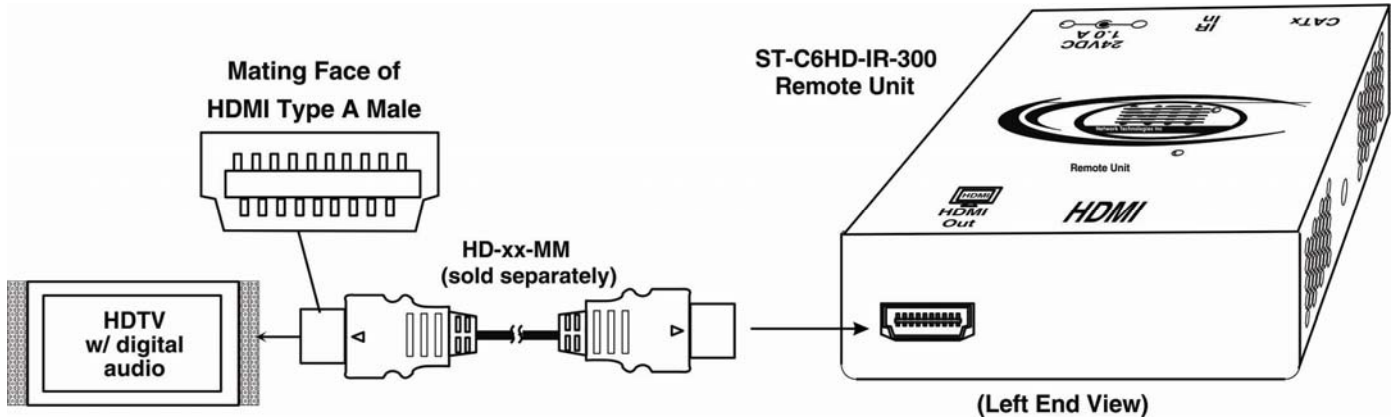

Figure 3- Connect the extended video display to the Remote Unit

3. If your model includes stereo audio support, an SA-xx-MM cable can be connected between the "Audio Out" connector on the Remote Unit and a set of self-powered stereo speakers.
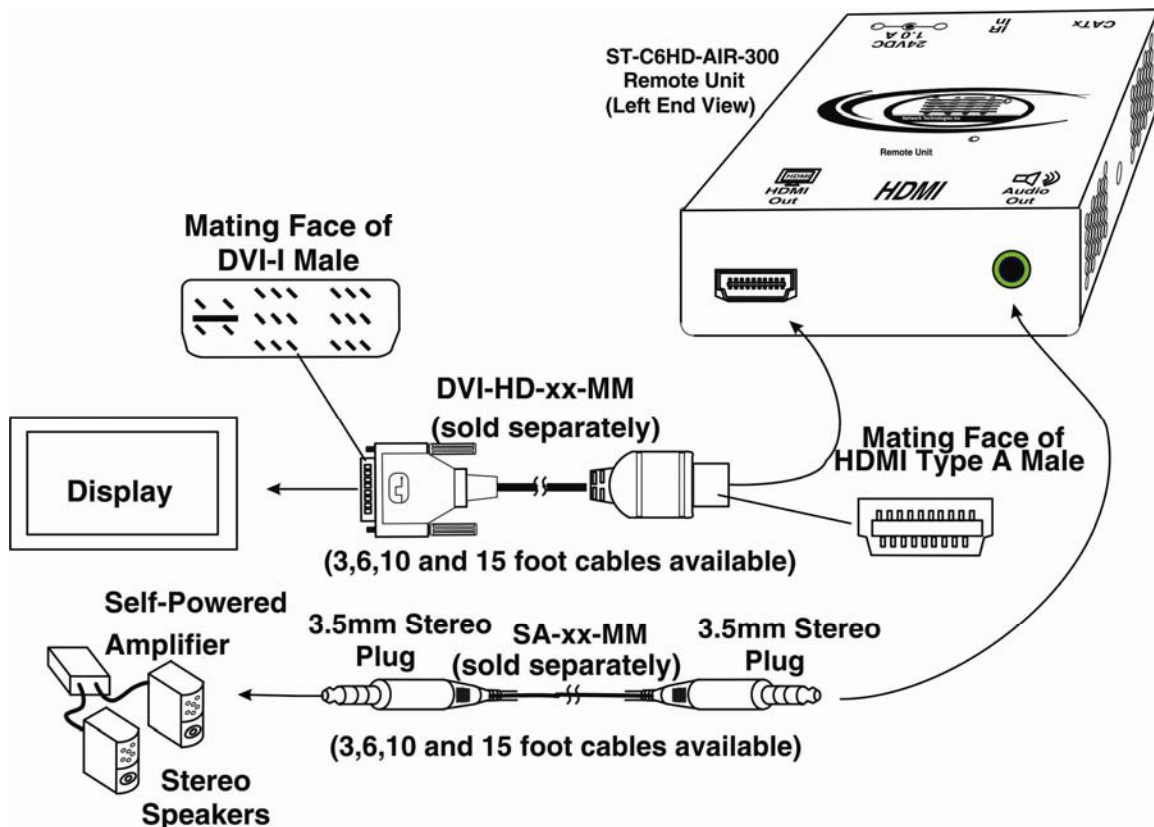

Figure 4- Connect self-powered stereo speakers to the Remote Unit

Connect the CATx Cables

Connect the CATx cable between the "CATx" ports on the Local and Remote Unit. (See Figure 5.) When properly inserted the cable ends should snap into place.

⚠️ *WARNING: Never connect the XTENDEX to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device.   Damage to devices connected to the Ethernet may result.*

Note: When CATx cables between more than one local and remote unit will run parallel and adjacent to one another for more than 6 feet in length, CAT7 cable should be used to ensure the best performance.   A lesser quality cable may cause poor video quality or prevent operation altogether.
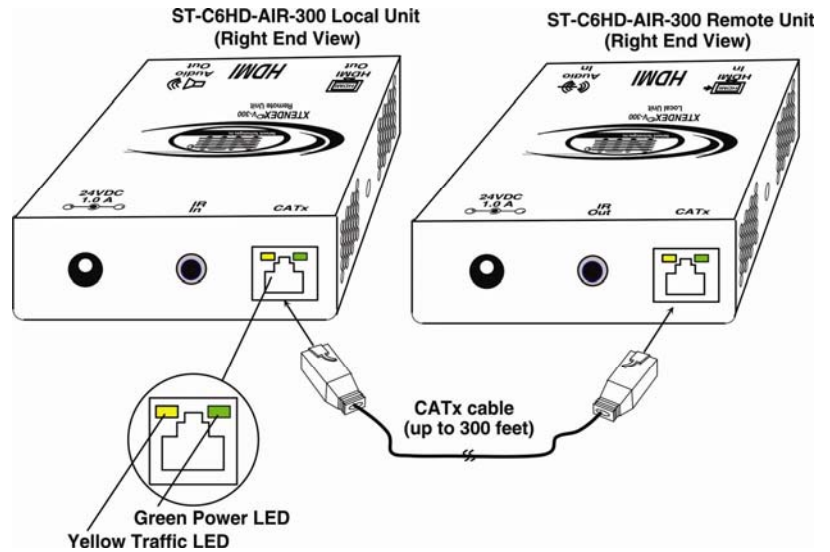
Figure 5- Connect CATx cable

Plug-in and Boot Up

1. Plug the power cord from the monitor into the power outlet.

2. Connect an AC adapter power connector to the 24VDC port on the Remote Unit or the Local Unit. Plug the AC adapter into a power outlet. The green LED on the RJ45 connector of both the Remote and Local Units should illuminate, indicating that a proper power connection has been made to them. (See Figure 6)

3. Turn ON the video/audio source and video display device. The yellow LED on both the Local and Remote Units should illuminate. The source and display device should each react as if directly connected to each other.

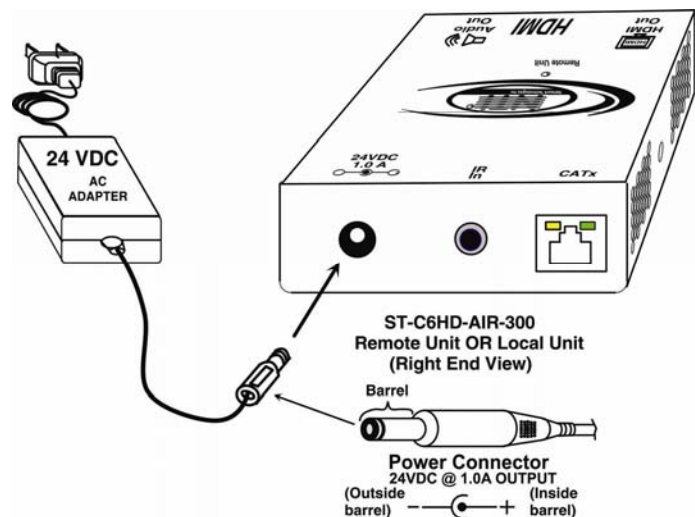**The AC adapter can be connected to either the Local Unit OR the Remote Unit to make the XTENDEX function**

Figure 6- Connect the AC adapter

Rackmount Modules (optional)

If ST-C6-300M Series XTENDEX rackmount Local Unit modules are being installed, then an ST-C6RCK-24 Rackmount Extender Module Tray must be used (sold separately) to mount the modules to a RACK.   The ST-C6RCK-24 provides a convenient mounting method for up to 12 Local XTENDEX modules.

Mount the ST-C6RCK-24 Rackmount Extender Module Tray

1. The ST-C6RCK-24 Rackmount Extender Module Tray was designed to be directly mounted in a rack. It includes a mounting flange to make attachment easy.

2. Install 4 cage nuts (supplied) to the rack in locations that line up with the holes in the mounting flange on the tray. Then secure the tray to the rack using four #10-32 x 3/4" screws (supplied). Be sure to tighten all mounting screws securely.
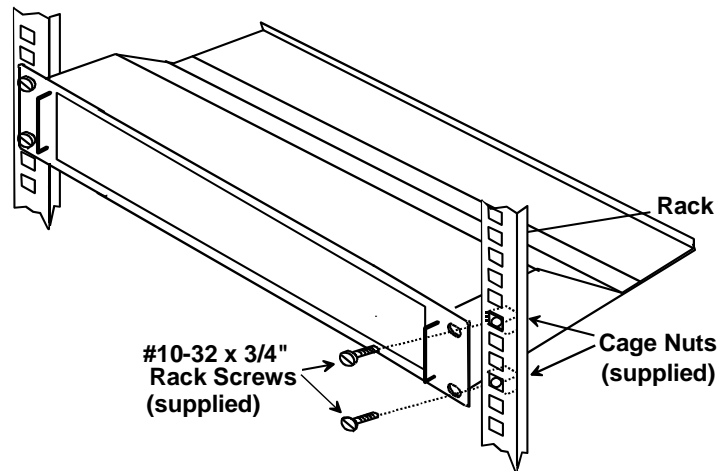
Figure 7- Mount ST-C6RCK-24 Extender Module Tray in a rack

3.   Slide each module into the tray and line up the holes in the mounting plate on the module with corresponding holes in the tray. Secure the module(s) using the two screws provided. Blank plates and screws are provided to cover empty module spaces.
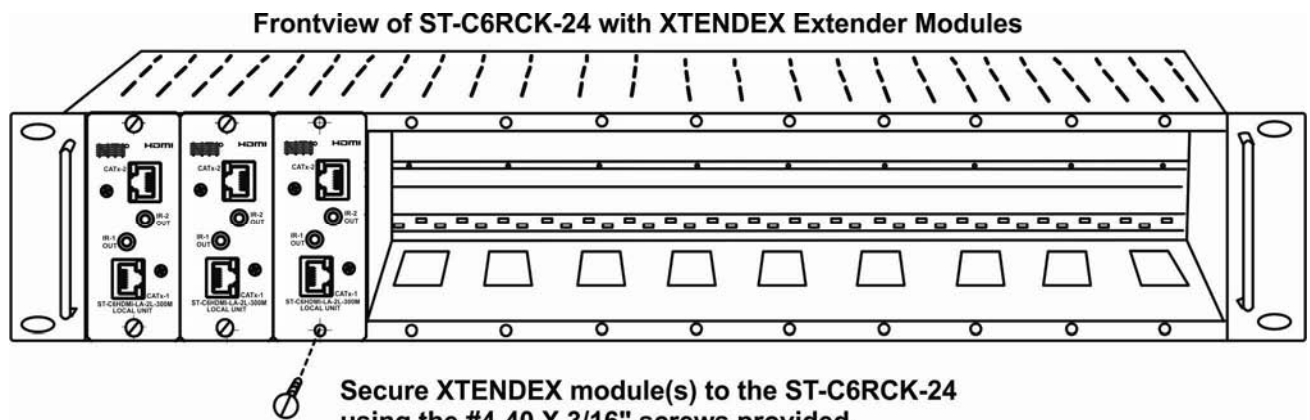
Figure 8- Secure each module to the tray

4. Secure the power supply for each module to the power supply/cable management shelf at the rear of the tray using the bracket and screw supplied.
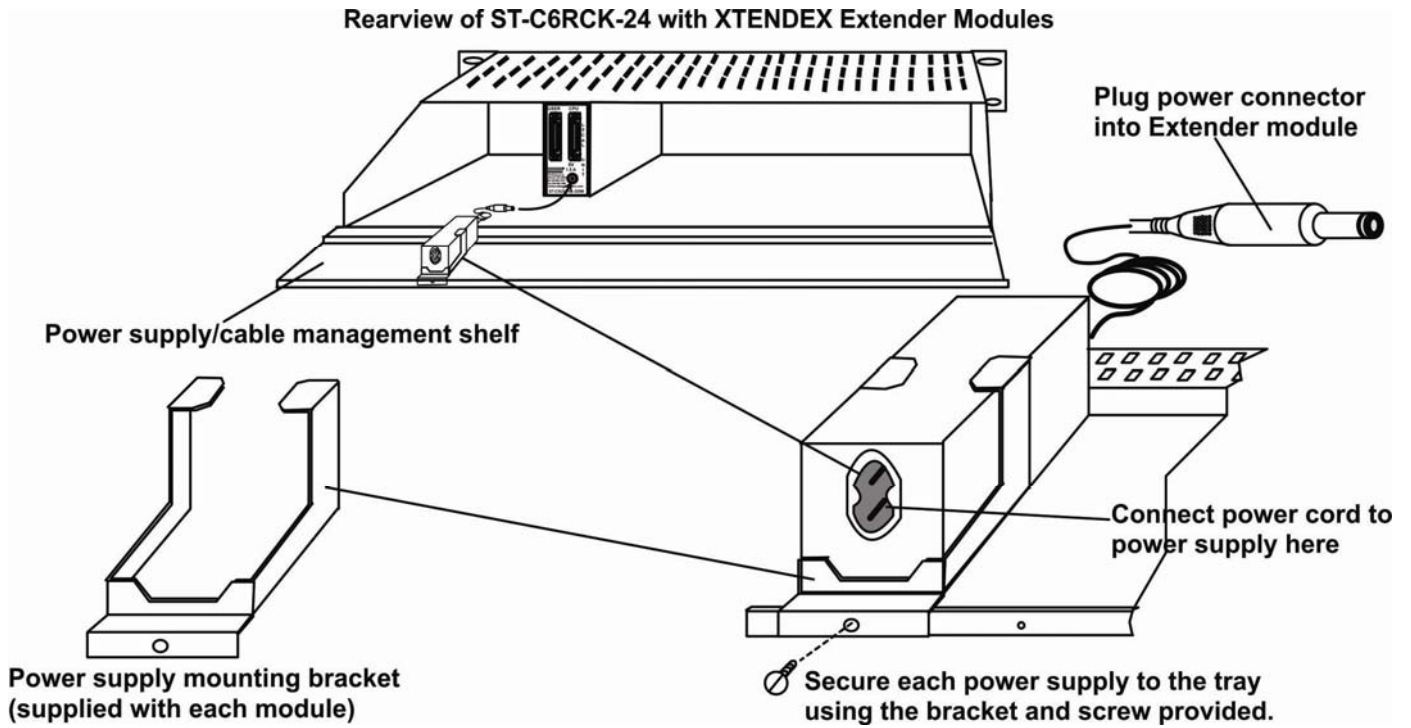
Figure 9- Secure each power supply to the tray

Connect the HDMI Video/Audio Source

➢ Connect a cable between the Local Unit and the HDMI video source.   Figure 10 shows the proper connections for the ST-C6HD-LA-2L-300M using a HD-xx-MM cable (xx= 3, 6, 9,14,20,30, 50,75,100 and 150 foot length).   Make sure connections are firmly seated.   If your local unit includes CEC support, a CEC-enabled source will be fully supported when using the IR remote control.
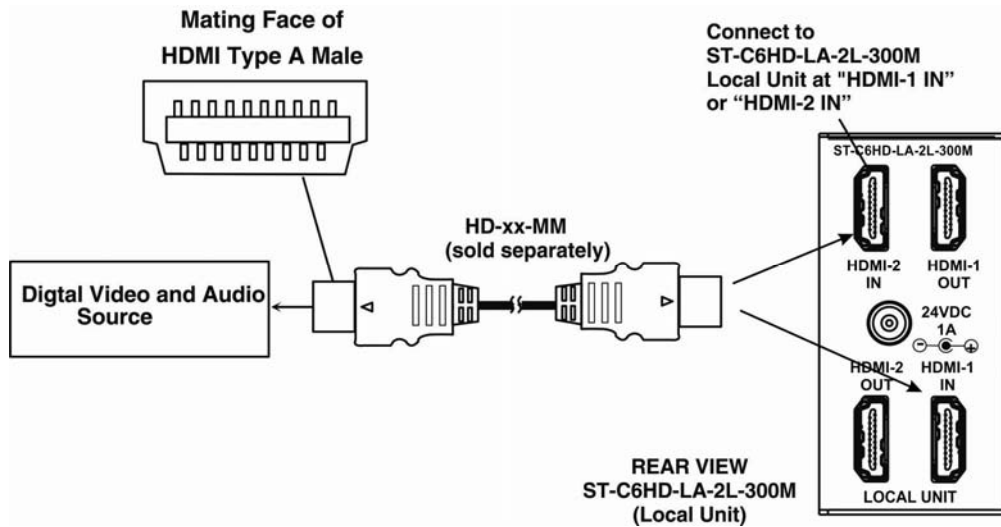
Figure 10- Connect cable between video/audio source and module

Connect Local Display(s)

If desired, connect a local display to the local unit at "HDMI-1 OUT".   If your extender module has dual HDMI support, up to two local displays can be connected.
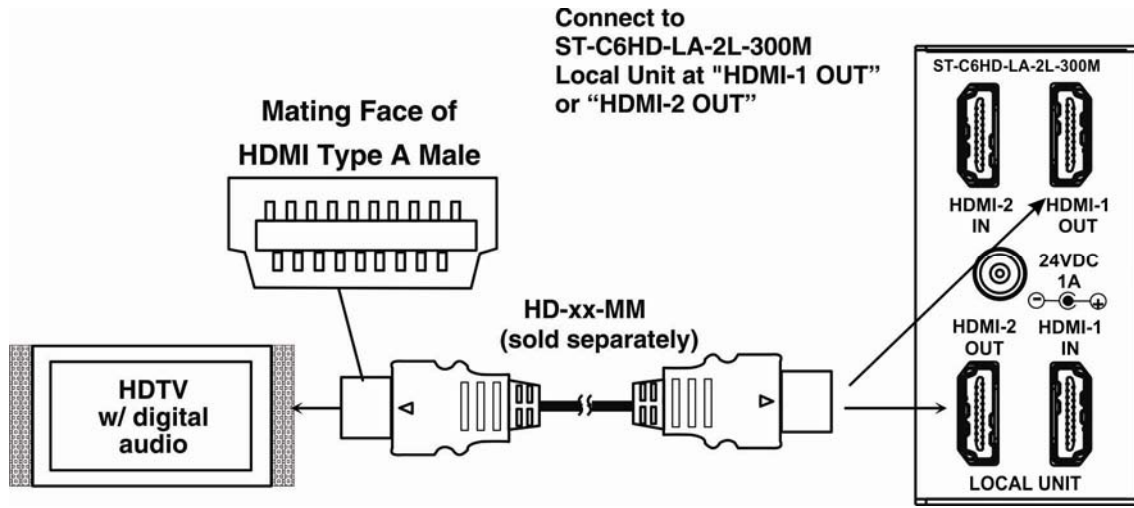
Figure 11- Connect Local Display

Connect the CAT7 cable

Connect the CAT7 cable to a "CATx-1" or "CATX-2" port on the front of the Local Unit (see Figure 12). When properly inserted the cable end should snap into place. Connect the other end of the cable to the "CATx" port on the Remote Unit.

WARNING: Never connect the XTENDEX to an Ethernet card, Ethernet router hub or switch or other Ethernet RJ45 connector of an Ethernet device.   Damage to devices connected to the Ethernet may result.
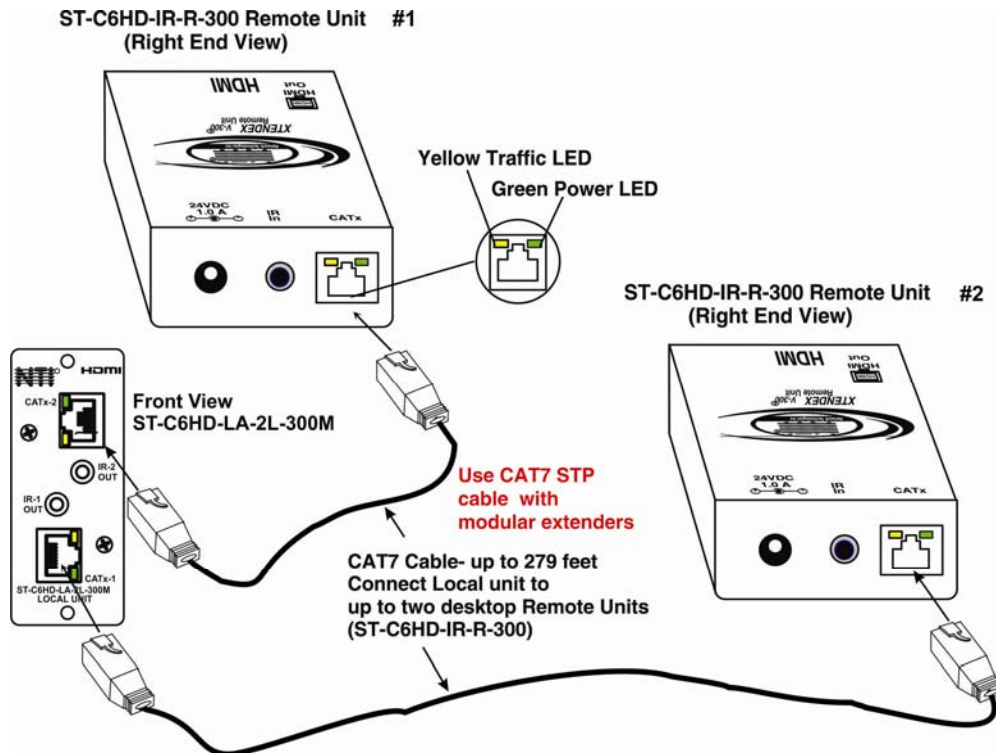
Figure 12- Connect the CAT7 cable between the Local and Remote Units

Plug-in and Boot Up

1. Plug the power cord(s) from the video and audio source(s) into power outlet(s).

2. Connect the AC adapter power connectors to the 24VDC port on **either** the Remote or Local Unit.   (AC adapter shown in Figure 13)

3. Plug the AC adapter into a power outlet. The "Power" LED (green) on the CAT5 connector of each unit should illuminate, indicating that a proper power connection has been made.

4. Turn ON the video/audio source(s) and display devices. They should each react as if they were directly connected to each other.   The yellow "Traffic" LEDs on the Remote and Local Units (see Figure 12) should blink indicating there is proper communication between them.

Note: A loss of signal (blank screen) may be experienced for an instant during the automatic video quality adjustment process after powering-up.   This may also occur if the XTENDEX senses a loss of or weak signal connection in the CATx cable.
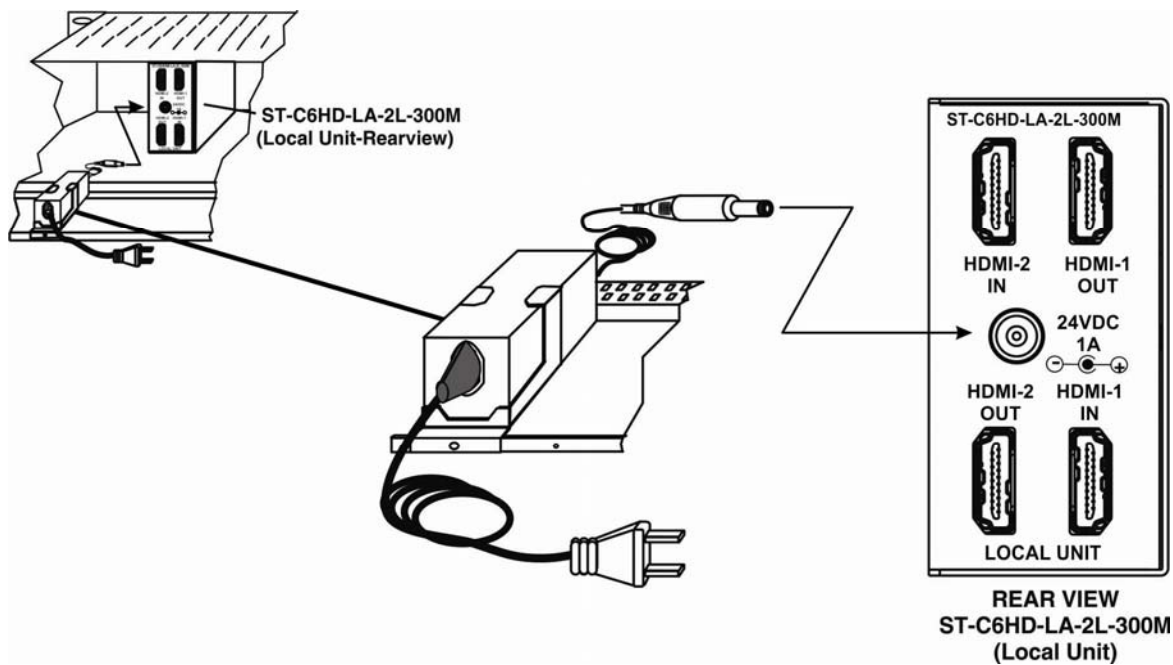
Figure 13- Connect AC adapters

INFRARED CONTROL

Model ST-C6HD-IR-300 (and each rackmount module) includes ports for connecting an infrared emitter and receiver (included) to work in conjunction with the IR remote control used to operate the video/audio source.   Connect the receiver to the "IR IN" port on the Remote Unit and the emitter to the "IR OUT" port on the Local unit.   Position the end of the receiver such that the signal from the remote control can easily reach the IR sensor.   Position the end of the emitter such that the extended signal can be sent to the video/audio source.

> **Note: The IR Emitter and Receiver work within a frequency range of 33-40kHz.   Check the specifications for the device you are extending to make sure the XTENDEX will work with it.**

Figure 14- Connect IR Emitter and Receiver (models with IR support only)

TECHNICAL SPECIFICATIONS

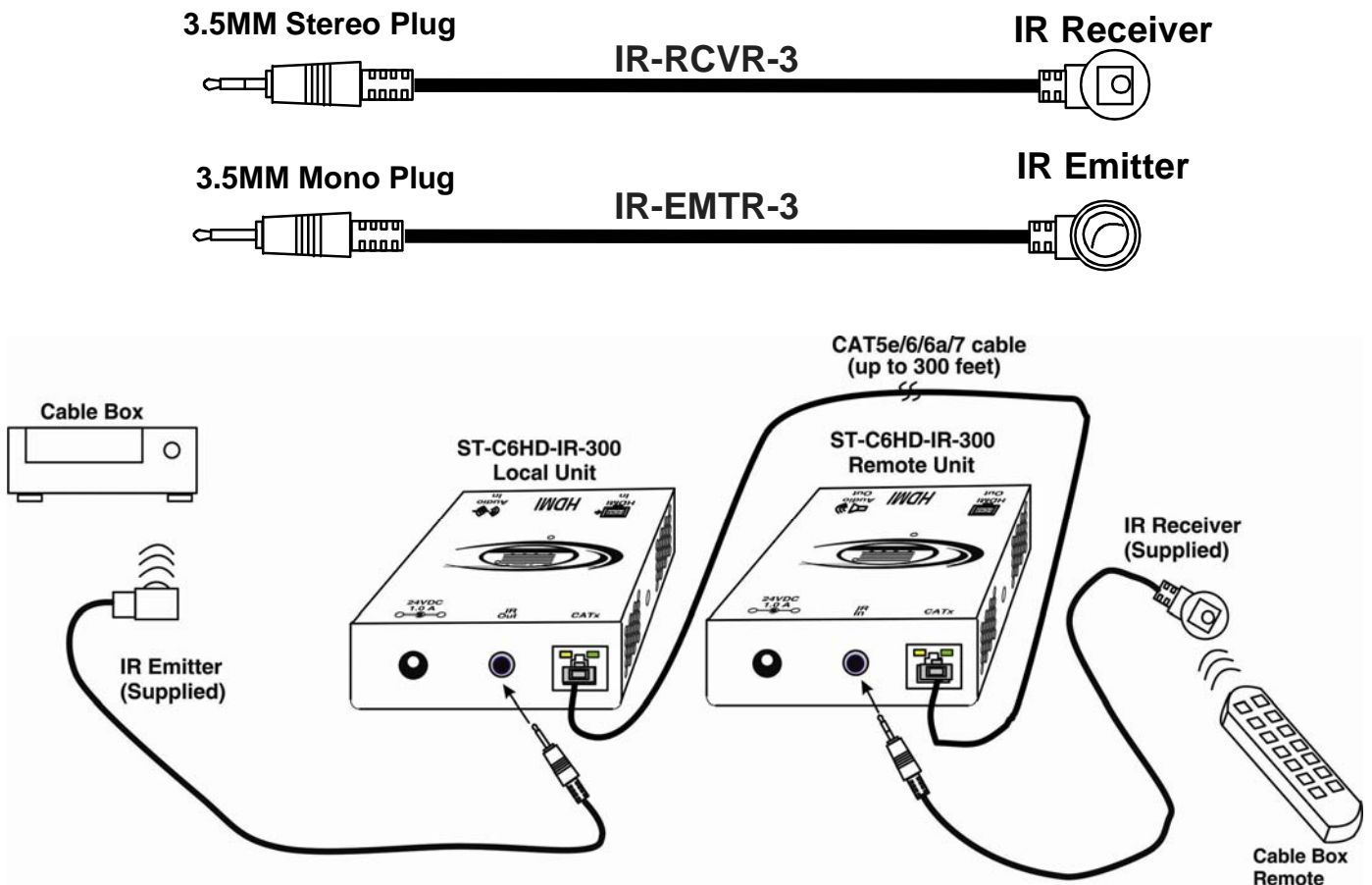| Video	
Video Compatibility	PC Resolution up to 1920x1200 @60Hz / HDTV resolution up to 1080p
Video Connectors	HDMI Type A Female
Input Video Signal	TMDS
Video Color Format	Standard (24bit); Deep color (30,36bit);RGB, 4:2:2, 4:4:4
HDMI Version	HDMI 1.3a
DVI Support	DVI 1.0
DDC Support	DDC2b
HDCP Version	HDCP 1.2
Digital Audio	
Digital Audio Format	LPCM,Dolby Digital (AC3)(Plus),DTS,DSD, Dolby TrueHD,DTS-HD Master Audio
Stereo Audio	
Audio Connectors	3.5mm stereo jack
Signal Type	Line Level, stereo, unbalanced
Audio Frequency Response	20Hz to 20Khz, $\pm$ 1dB
Signal-to-noise ratio	76 dBA
Stereo Crosstalk	-70 dB
Audio Maximum I/O Levels	3.1Vp-p
Output Impedance	Max 2K Ohms, unbalanced
THD+N	0.017%,F=20-20KHz, RL=2K Ohm, Vout=1 Vrms
IR	
Input/Output	3.5mm Stereo Jack
Signal Type	TTL, 0-5VDC
Input Impedance	1.5 kohm
Output Impedance	33 ohm
Maximum Input/Output Level	5.2 Vp-p
Center Carrier Frequency	36kHz
Frequency Range	33-40kHz
Maximum Distance (from receiver)	14 feet, straight; 6 feet at 45 degree angle
General	
Interconnect Cable	CAT5e solid/stranded UTP (550MHz or better); CAT6/6a Solid UTP; CAT7 Solid STP EIA/TIA 568 B wiring with male RJ45 connectors
Operating Temperature	0-50º C
Operating Humidity Range	5 to 90% non-condensing RH
Remote Unit Power	100V to 240VAC at 50 or 60Hz-24VDC/1.0A via AC Adapter
Enclosure type	Electro-galvanized steel black powder coated
Size (In.) WxDxH Desktop Units Rackmount Modules	2.5x3.1x1.2 1.38x3.51.3.5
Compliance Certifications	CE, RoHS

Distances and Resolutions for CAT5e,CAT6 and CAT7 Cables
Solid and Stranded Unshielded (UTP) and Shielded (STP) Twisted Pair Resolutions

Cable	Length ft.	Max. Resolution
CAT6 Solid UTP	50	1080p / 60Hz / 36-bit 1920x1200 / 60Hz / 32-bit
	75	1080p / 60Hz / 30-bit 1080i / 60Hz / 36-bit 1920x1200 / 60Hz / 32-bit
	100	1080p / 60Hz / 24-bit 1080i / 60Hz / 36-bit
	150	1080p / 60Hz / 24-bit 1080i / 60Hz / 36-bit
	200	1080p / 24Hz 1080i / 60Hz / 36-bit 720p / 60Hz / 36-bit
	250	1080p / 24Hz 1080i / 60Hz / 24-bit 480p / 60Hz / 36-bit

Cable	Length ft.	Max. Resolution
CAT6 Solid UTP	300	480p /60Hz / 36-bit 800x600/ 75hz / 32-bit
CAT5e Solid UTP	100	1080p / 24Hz 1080i / 60Hz / 36-bit 720p / 60Hz / 36-bit
CAT5e Stranded UTP	100	1080p / 24Hz 1080i / 60Hz / 36-bit 720p / 60Hz / 36-bit
CAT7 Solid STP	150	1080p / 60Hz / 24-bit 1080i / 60Hz / 36-bit
	200	1080p / 60Hz / 24-bit 1080i / 60Hz / 36-bit
	279	1080p / 24Hz 1080i / 60Hz / 24-bit 480p / 60Hz / 36-bit

INTERCONNECTION CABLE WIRING METHOD

The CATx connection cables between the Remote and Local are terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard.   Wiring is per the table and drawing below.

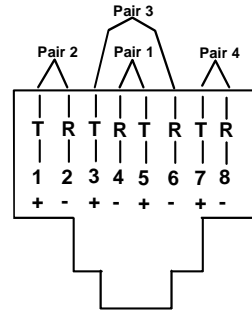| Pin	Wire Color	Pair	Function
1	White/Orange	2	T
2	Orange	2	R
3	White/Green	3	T
4	Blue	1	R
5	White/Blue	1	T
6	Green	3	R
7	White/Brown	4	T
8	Brown	4	R

Figure 15- View looking into RJ45 female

TROUBLESHOOTING

Each and every piece of every product produced by Network Technologies Inc is 100% tested to exacting specifications.   We make every effort to insure trouble-free installation and operation of our products. If problems are experienced while installing this product, please look over the troubleshooting chart below to see if perhaps we can answer any questions that arise.   If the answer is not found in the chart, please check the FAQs (Frequently Asked Questions) on our website at http://www.networktechinc.com or contact us directly for help at 1-800-742-8324 (800-RGB-TECH) in US & Canada or 1-330-562-7070 worldwide.   We will be happy to assist in any way we can.

Problem	Cause	Solution
Power LED does not illuminate	• Power supply is not connected or plugged-in.	• Make sure outlet is live and AC adapter is plugged-in. • Make sure 24VDC jack is fully connected
No Video on monitor	• One or more video cables is loose or disconnected. • No power to Remote Unit. • CATx cable is not connected. • CATx cable is too long • HDMI/DVI cable is too long • CATx cable from other unit(s) running too close to each other between Remote and Local	• Check all video cable connections • Make sure "Power" LED is illuminated on local and remote. If not, see solutions for first problem above. • With all the cables properly connected, power cycle the video/audio source. Make sure "Traffic" LED on local and remote is illuminated. • Make sure they are snapped-in properly and completely and reboot. • Switch to shorter cable or lower resolution (see table on page 13) • Increase distance between parallel running CAT5e/6 cables or change to CAT7 cable
Video Picture is noisy	• All Video Cables are not firmly seated. • CATx cable is too long • HDMI/DVI cable is too long • The CATx cable is not properly connected.	• Check all connections. Make sure all cables are fully seated. • Switch to shorter cable or lower resolution (see table on page 13) • Check cable connections. Make sure they are snapped-in properly and completely.
Monitor flashes or goes blank for a second or two	• Electrical power system is very noisy, particularly the ground. • The CATx cable is not properly connected. • CATx cable is too long • HDMI/DVI cable is too long	• Make sure the interconnection cable is not near any power lines. • Check cable connections. Make sure ends are snapped-in properly and completely. • Switch to shorter cable or lower resolution (see table on page 13)

WARRANTY INFORMATION

The warranty period on this product (parts and labor) is two (2) years from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** or visit our website at http://www.networktechinc.com/return-policy.html for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

Manual 111 Rev. 11/21/12