



**NTI**® NETWORK  
TECHNOLOGIES  
INCORPORATED

1275 Danner Dr Tel:330-562-7070  
Aurora, OH 44202 Fax:330-562-1999  
www.networktechinc.com

## VOPEX® Series

# VOPEX-C5VA/C5V-x(C)

# VOPEX-C5SVA/C5SV-x

# VOPEX-C5CMPSA-x

# VOPEX-M12V-4

## Video/Audio or Video Only Splitter/Extender

## Installation and Operation Manual



(Receiver not included)

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## 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.



**WARNING:** *Never connect a VOPEX Series VOPEX-C5VA / -C5V / -C5SVA / -C5SV / or -C5CMPSA-x Extender/Splitter 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:** *CAT5 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 CAT5 cable could be dangerous and will void the warranty.*

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## INTRODUCTION

The VOPEX® Series Cat5 Video/Audio Splitter/Extender (VOPEX) is designed to enable one Video/Audio source to be viewed and heard in 4, 8, or 16 different remote locations. Remote video and audio devices can be located as much as 600 feet away from the source via Category 5 unshielded twisted-pair cable. The VOPEX-C5VA-x also allows a local video and audio device to be located near the source.

### Models:

VOPEX-C5VA-x(C) Video/Audio Splitter/Extender for VGA video and line level analog audio  
 VOPEX-C5V-x(C) Video-Only Splitter/Extender for VGA video (No Audio Support)  
 VOPEX-C5SVA-x S-Video/Audio Splitter/Extender for S-Video and line level analog audio  
 VOPEX-C5SV-x S-Video-Only Splitter/Extender for S-Video (No Audio Support)  
 VOPEX-C5CMPSA-x HD Video/Stereo Audio Splitter/Extender for high definition video and stereo audio  
 VOPEX-M12V-4 4-Port Video Extender for VGA video with M12 connectors (No Audio Support)

x= 4,8, or 16 for the number of Receivers that can be connected.

**Note: If the audio support is not present, please disregard all audio references.**

The VOPEX-C5VA VGA Audio/Video Splitter/Extender via CAT5 will broadcast up-to-the-minute information to multiple remote monitors in real time. This high-resolution VGA video splitter (video port expander) is the ideal solution for any application requiring the flexibility to share information with several locations. Optional audio functionality using self-powered stereo speakers enhances your presentation.

The VOPEX-C5CMPSA Audio/Video Splitter/Extender via CAT5 is ideal for systems where high resolution YPbPr component video signals along with analog audio signals must be transmitted long distances to multiple displays and speakers.

Possible digital video sources include a DVD player, cable television box, home entertainment system, etc. Some stereo line-level audio source and devices include HDTV Speakers, Home Theater or Stereo System, Stereo Amplifier, Headphones, and Computer Speakers.

The VOPEX Series Video/Audio Splitter/Extender is extremely simple to install and has been thoroughly tested to insure reliable performance. Through the use of Category 5 unshielded twisted-pair cable it is possible to economically increase the flexibility of a computer/home entertainment system. Here are some of the features and ways this can benefit the user:

- Allows the placement of monitors/HDTVs and self-powered stereo speakers/amplifiers in different remote locations where only these parts are needed.
- Provides an additional local access port allowing the A/V source to viewed and heard locally.
- Compatible with
  - XGA, VGA, and SVGA systems (VOPEX-C5VA / -C5V models only)
  - all video sources supporting s-video (VOPEX-C5SVA / -C5SV models only)
  - High and Standard Definition YPbPr component video, S-Video, or composite video (VOPEX-C5CMPSA models only)
- Provides crisp and clear resolution up to 1024x768 (VOPEX-C5VA / -C5V models only) or 800 x 600 (VOPEX-C5SVA / -C5SV models only) @ 60Hz at 600 ft.
- ST-C5CMPSA models support 480i (interlaced), 480p (progressive), 720i, 720p, 1080i, and 1080p formats.
- Video quality adjustment is automatic for varying lengths of CAT5 cable (models with audio support only)
- 'Video Adjustment' button allows video quality to be re-adjusted without powering down the system. (Button is on VOPEX-C5VA / -C5SVA only- video quality adjustment is performed at Receiver for VOPEX-C5V / -C5SV.)
- Digital transmission of audio signals reduces any loss in quality.
- Compatible with all NTI A/V switches and splitters, enabling the joining of products to create a system that satisfies all networking needs.

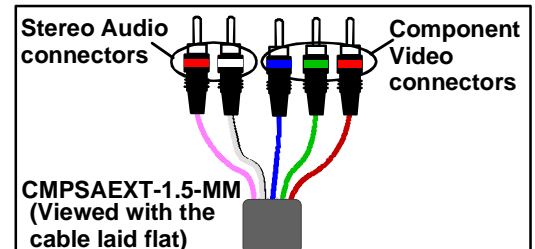
# MATERIALS

**Materials Included with this kit:**

- VOPEX-C5VA-x / -C5V-x / -C5SVA-x / -C5SV-x / -C5CMPSA-x / -M12V-4 (one of these)
- 120VAC or 240VAC at 50 or 60Hz-9VDC/1.5A AC Adapter (not included with M12)
- Or-
- 120VAC or 240VAC at 50 or 60Hz-5VDC/3A AC Adapter (VOPEX-C5V(A)-4C/8C models only)
- Line cord, country specific (not included with M12)
- CD with a pdf file of this manual and pdf file of a Quick Installation Guide
- Quick Installation Guide

**Additional materials Included:**

For Model	Video Cable	Stereo plug Cable
VOPEX-C5VA-x(C)	VEXT-3	SA-3-MM
VOPEX-C5V-x(C)	VEXT-3	Not applicable
VOPEX-C5SVA-x	SVEXT-3-MM	SA-3-MM
VOPEX-C5SV-x	SVEXT-3-MM	Not applicable
VOPEX-C5CMPSA-x	CMPSAEXT-1.5-MM (see image to right)	
VOPEX-M12V-4	VEXT-3	Not applicable



**Legend:**

- x= 4, 8, or 16 for number of ports
- MM- indicates male-male connectors
- VEXT-3- 15HD male-female video cable for connecting the VOPEX to the video source
- SA-3-MM 3.5mm stereo plug -stereo plug cable for connecting the VOPEX to the audio source
- SVEXT-3-MM 4-pin miniDIN male-male s-video cable- for connecting the VOPEX-C5SVA / -C5SV-x to the video source
- CMPSAEXT-1.5-MM 5-in-1 coax cable (3-75 ohm component video and 2-RCA stereo)-for connecting VOPEX-C5CMPSA-x to the audio and video source

**Additional materials not supplied but are required:**

- CAT5 unshielded twisted-pair cable(s) terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see pg. 14 for proper EIA/TIA 568B wiring method)
- One or more of the following XTENDEX receivers:

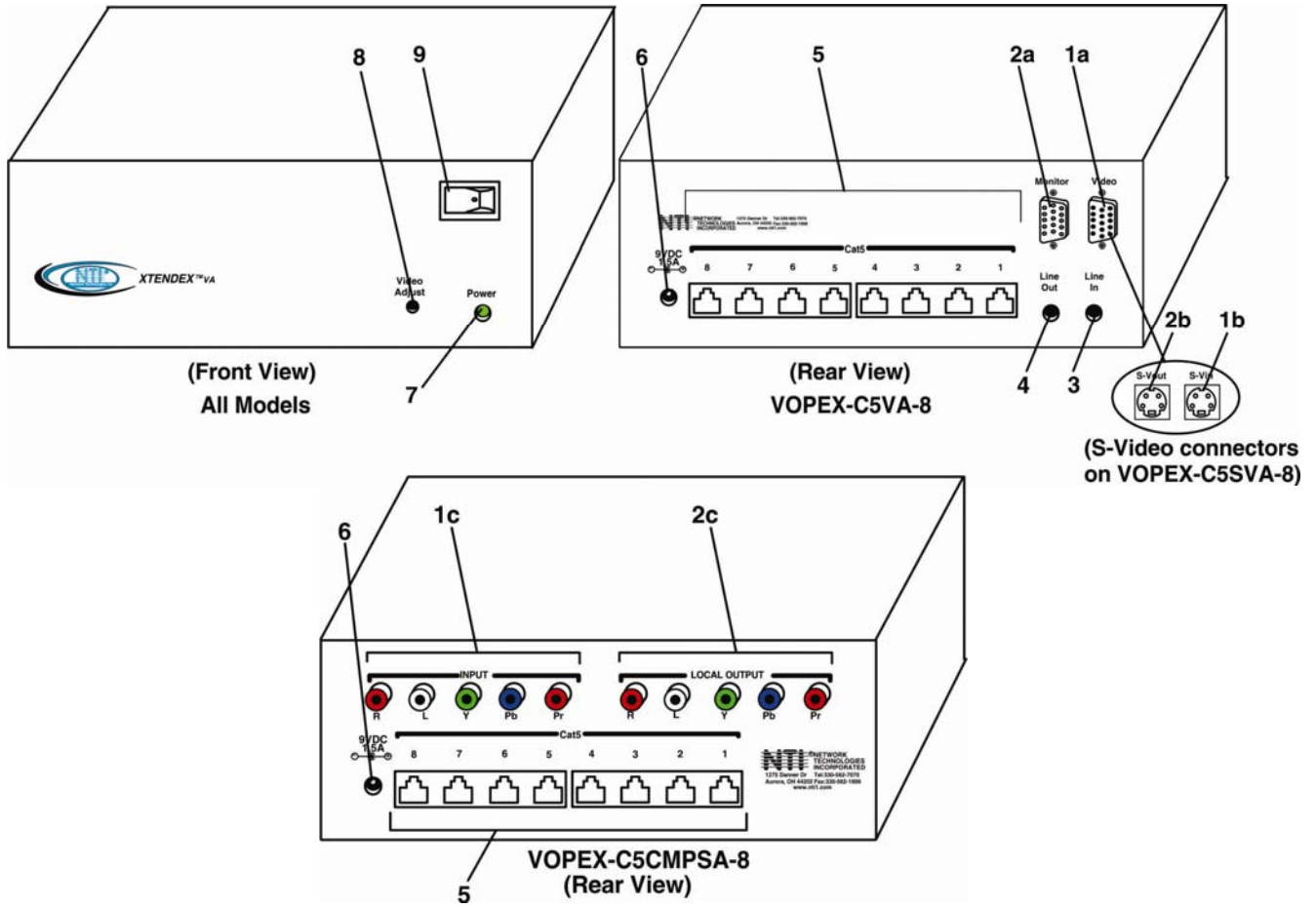
Receiver	For use with
ST-C5VA-R-600	VOPEX-C5VA-x(C)
ST-C5V-R-600	VOPEX-C5V-x(C)
ST-C5SVA-R-600	VOPEX-C5SVA-x
ST-C5SV-R-600	VOPEX-C5SV-x
ST-C5CMPSA-R-600	VOPEX-C5CMPSA-x
ST-M12V-R-600	VOPEX-M12V-4

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 [www.networktechinc.com](http://www.networktechinc.com) and we will be happy to be of assistance.

- Cables for connecting the HD video and stereo/digital audio devices to the VOPEX-C5CMPSA :

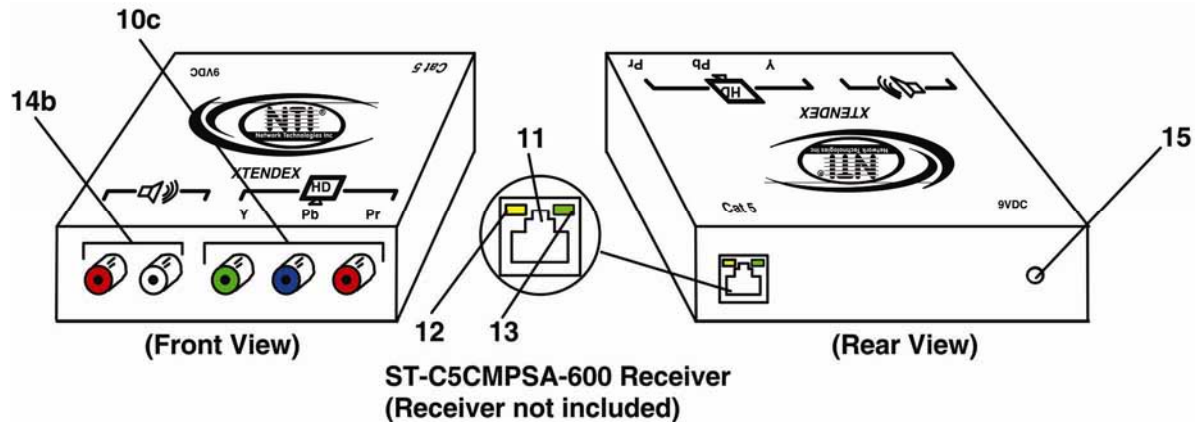
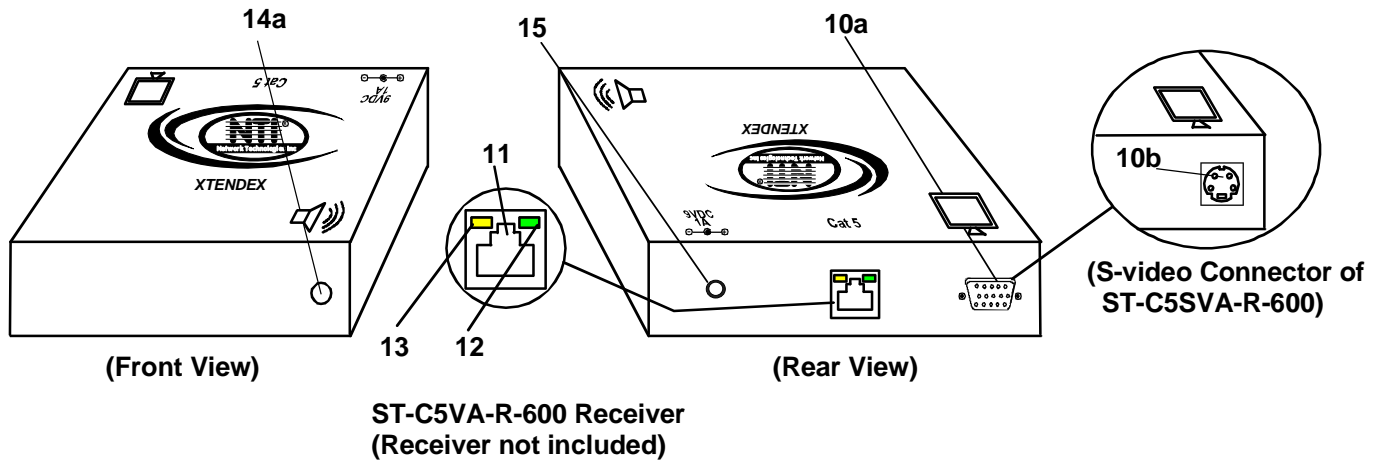
DESCRIPTION	PURPOSE
75 ohm RCA cable with green, blue, red connectors	Connect HDTV to VOPEX
Stereo audio cable	Connect stereo audio device to VOPEX (VOPEX-C5CMPSA only)

**FEATURES AND FUNCTIONS**



- 1a. **Video** -15HD male connector - for connecting the cable from the video source
- 1b. **S-Vin** - 4-pin miniDIN female connector - for connecting the cable from the video source
- 1c. **INPUT** - RCA connectors - for connecting component video (Y, Pb, Pr) and stereo audio source (R,L)
- 2a. **Monitor** -15HD female connector - for connecting the local user's monitor
- 2b. **S-Vout** - 4-pin miniDIN female S-Video Connector - for connecting the local user's S-video compatible monitor
- 2c. **Local Output** - RCA connectors - for connecting local component video (Y, Pb, Pr) and stereo audio device (R,L)
- 3. **Line In** - 3.5mm female stereo audio connector- for connecting the cable from the audio source (VOPEX-C5VA/-C5SVA models only)
- 4. **Line Out** - 3.5mm female stereo audio connector- for connecting the local self-powered stereo speakers (VOPEX-C5VA/-C5SVA only)
- 5. **Cat 5** - RJ45 female- for connecting CAT5 cables from XTENDEX Receivers
- 6. **9VDC 1.5A**- connection jack for the 9VDC 1.5A AC adapter
- 7. **Power** - Green LED- illuminates when power has been supplied to the VOPEX
- 8. **Video Adjust** - forces the VOPEX to re-adjust the video on all channels (models with audio support only)
- 9. **Power switch**- to turn unit ON and OFF
- 10a. **15HD female VGA video connector** - for connecting the remote user's monitor
- 10b. **4-pin miniDIN female S-Video connector** - for connecting the remote user's S-video compatible monitor
- 10c. **RCA Video Connectors** - connection for remote component video (Y,Pb,Pr) cable
- 11. **Cat 5**- RJ45 female - for connecting CAT5 cable from the VOPEX

- 12. **Traffic LED**- communication indicator- illuminates when there is valid communication between the VOPEX and the XTENDEX Receiver. (illuminates only in models with audio support)
- 13. **Power LED**- illuminates when power has been supplied to the unit
- 14a. **Audio Connector**- 3.5mm female stereo audio connector- for connecting remote self-powered speakers
- 14b. **Stereo Audio Connectors**-RCA- connection for right and left channel stereo audio amplifier
- 15. **9VDC 1.0A**- connection jack for 9VDC 1A AC adapter



### LIMITATIONS

- The audio input of the VOPEX-C5VA is compatible with the following standard CPU audio outputs:
  - Line out - typically lime green in color
  - Speaker out- typically orange in color
  - Headphone out- typically located on the CD-ROM
- The audio outputs of the VOPEX and the XTENDEX Receiver are compatible with self-powered stereo speakers.

### PREPARATION FOR INSTALLATION

- Locations should be chosen for the monitors and speakers that also have space to connect the VOPEX and XTENDEX Receivers within the distance provided by the cables. If extension cables are needed, contact NTI for the cables required.
- The CAT5 cables must be run to the locations where the VOPEX and XTENDEX Receivers 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, etc.). **NOTE:** If CAT5 cable is already installed in the wall and there are RJ45 wall outlets, it will be necessary to obtain male-to-male straight through connection cables long enough to reach from the wall outlets to the connection locations of the VOPEX and XTENDEX Receivers.
- A properly grounded, polarized, and preferably surge-protected 120V or 240V electrical outlet (depending on the AC adapter being used) must be installed close enough to the connection location of the VOPEX and XTENDEX Receivers, monitors, stereo speakers, and CPU to plug them into.
- 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 all devices 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 re-connection procedures before proceeding.

**Note:** *CAT5 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 CAT5 cable could be dangerous and will void the warranty.*



# VOPEX INSTALLATION

## VOPEX-C5VA-x and VOPEX-C5V-x


**Note: VOPEX-C5V-x Video Only Splitter/Extender does not have audio support. If the audio support is not present, please disregard all audio references.**

1. Make connections between the VOPEX-C5VA-x and the audio and video source(s). (See Fig. 1.)
  - a) Connect the male 15HD cable end of a VEXT-3 to the VGA connector on the back of the video source.
  - b) Connect the female 15HD cable end of the VEXT-3 cable to the 15HD male connector marked "Video" on the VOPEX-C5VA-x.
  - c) Connect one 3.5mm stereo plug end of the SA-3-MM cable into the 3.5mm female audio connector marked "line out", "spkr", or "headphones" on the audio source.

**Notes:**

**If all 3 connectors are available, use the connector marked "line out".**

**The "line out" connector is typically lime green and may be marked with this symbol** 

**The "spkr" connector is typically orange, and may be marked with this symbol** 

**The "headphones" connector may be marked with this symbol** 

- d) Connect the other 3.5mm stereo plug end of the SA-3-MM cable into the 3.5mm female stereo audio connector marked "Line In" on the VOPEX-C5VA-x.

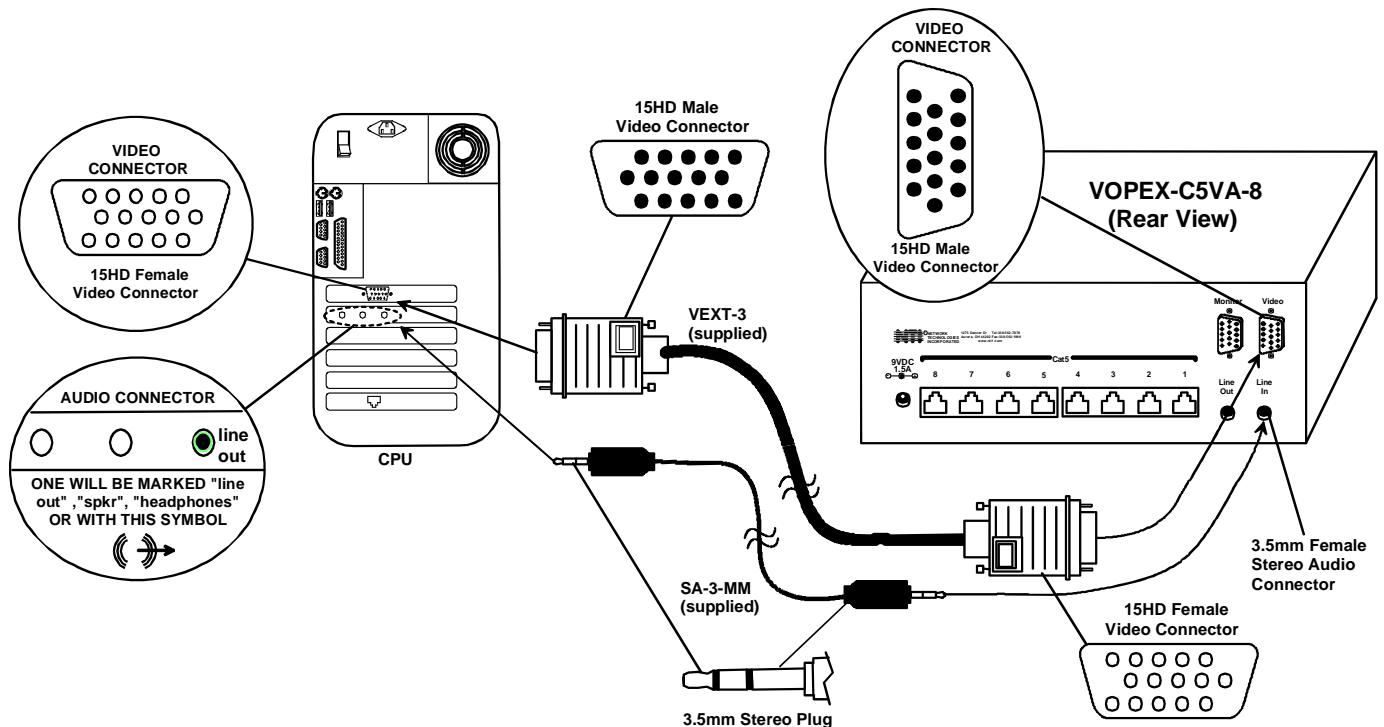
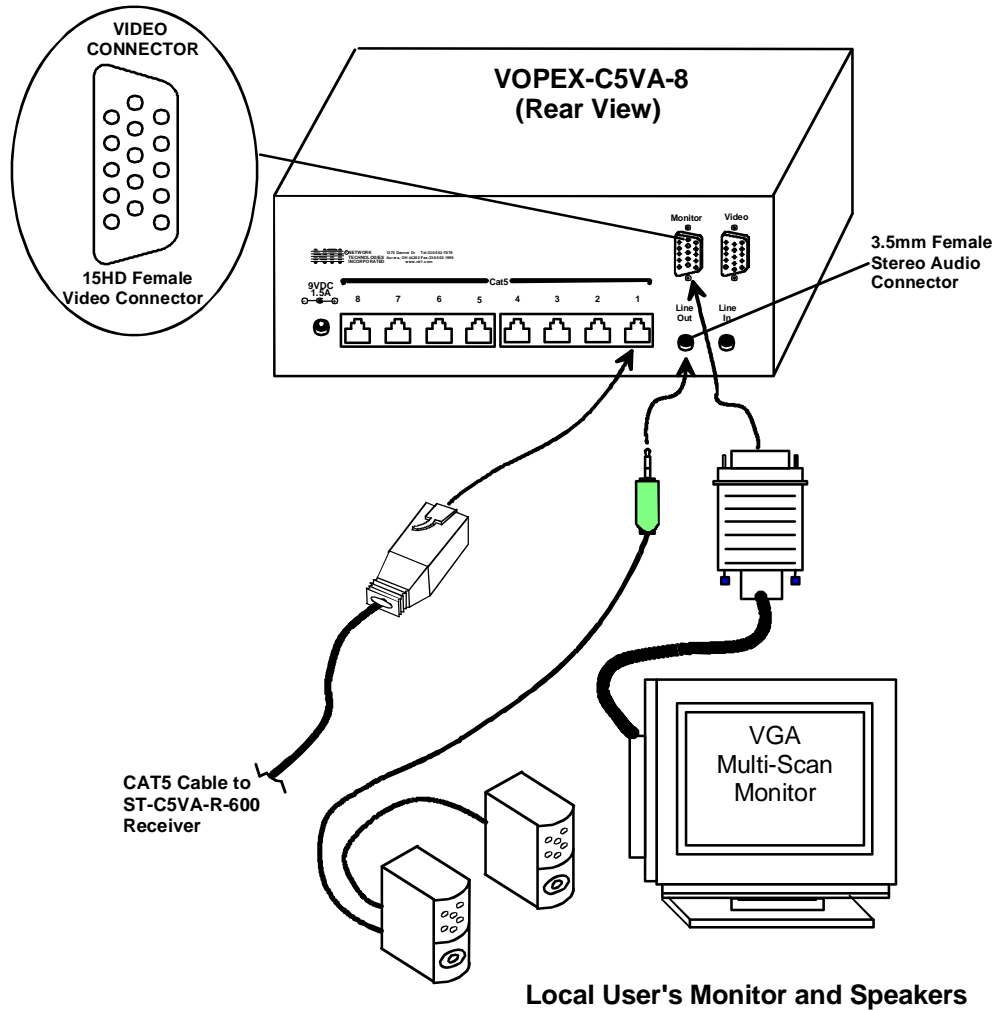


Figure 1- Connecting a VOPEX-C5VA-8 to a CPU

2. Connect the local user to the VOPEX-C5VA-x (see Fig. 2)
  - a) Connect the cable from the local user's VGA monitor to the 15HD female connector marked "Monitor" on the VOPEX-C5VA-x.
  - b) Connect the cable from the local speakers into the 3.5mm stereo audio connector marked "Line Out" on the VOPEX-C5VA-x.



**Figure 2- Connect Local User components and CAT5 cable to VOPEX-C5VA-8**

3. Connect a CAT5 cable to any one of the "Cat5x" ports on the VOPEX-C5VA-x. (See Fig. 2) When properly inserted the cable end should snap into place.
4. Repeat step 3 for each ST-C5VA-R-600 Receiver to be connected to the VOPEX-C5VA-x.

**Note:** If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.



**WARNING:** Never connect the VOPEX-C5VA-x Extender/Splitter 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.

## VOPEX-C5SVA-x and VOPEX-C5SV-x


**Note: VOPEX-C5SV-x S-Video Only Splitter/Extender does not have audio support. If the audio support is not present, please disregard all audio references.**

1. Make connections between the VOPEX-C5SVA-x and the audio and video source(s). (See Fig. 3)
  - a) Connect a 4-pin miniDIN cable end of a SVEXT-3-MM to the VGA connector on the back of the video source.
  - b) Connect the other 4-pin miniDIN cable end of the SVEXT-3-MM cable to the 4-pin miniDIN female connector marked "S-Vin" on the VOPEX-C5SVA-x.
  - c) Connect one 3.5mm stereo plug end of the SA-3-MM cable into the 3.5mm female audio connector marked "line out", "spkr", or "headphones" on the audio source.

**Notes:**

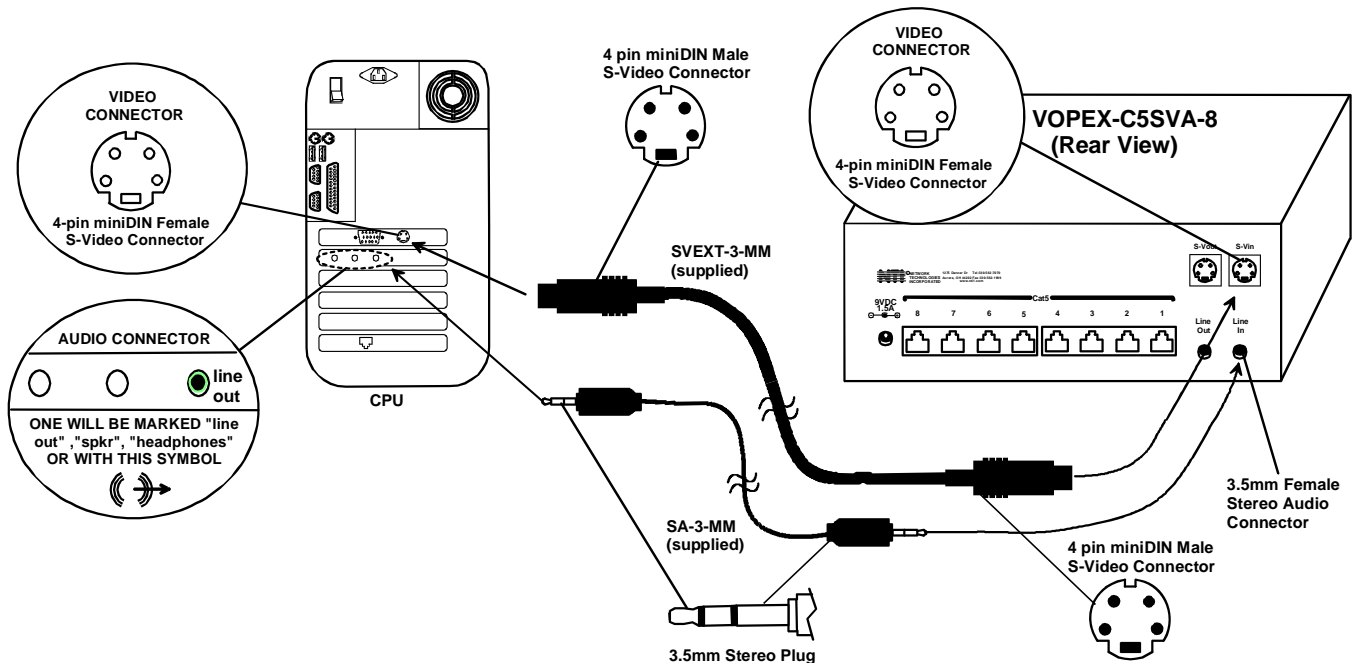
**If all 3 connectors are available, use the connector marked "line out".**

**The "line out" connector is typically lime green and may be marked with this symbol** 

**The "spkr" connector is typically orange, and may be marked with this symbol** 

**The "headphones" connector may be marked with this symbol** 

- d) Connect the other 3.5mm stereo plug end of the SA-3-MM cable into the 3.5mm female stereo audio connector marked "Line In" on the VOPEX-C5SVA-x.



**Figure 3- Connecting a VOPEX-C5SVA-8 to a CPU**

2. Connect the local user to the VOPEX-C5SVA-x (see Fig. 4)
  - a. Connect one end of another SVEXT-xx-MM cable to the 4-pin miniDIN female connector marked "S-Vout" on the VOPEX-C5SVA-x.
  - b. Connect the other end of the SVEXT-xx-MM cable to the 4-pin miniDIN female connector on the local s-video display.
  - c. Connect the cable from the local speakers into the 3.5mm stereo audio connector marked "Line Out" on the VOPEX-C5SVA-x.

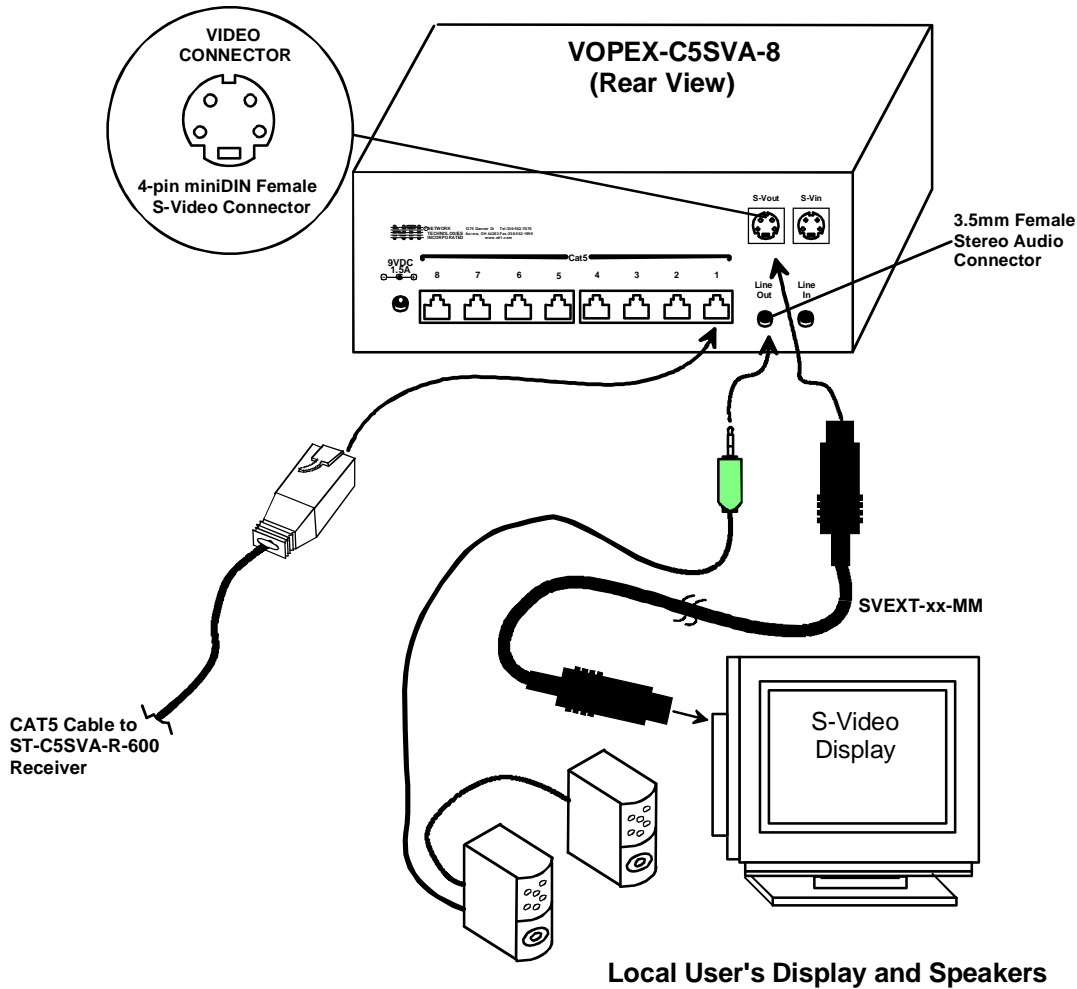


Figure 4- Connect Local User components and CAT5 cable to VOPEX-C5SVA-8

3. Connect a CAT5 cable to any one of the "Cat5x" ports on the VOPEX-C5SVA-x. (See Fig. 4) When properly inserted the cable end should snap into place.
4. Repeat step 3 for each ST-C5SVA-R-600 Receiver to be connected to the VOPEX-C5SVA-x.

**Note: If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.**

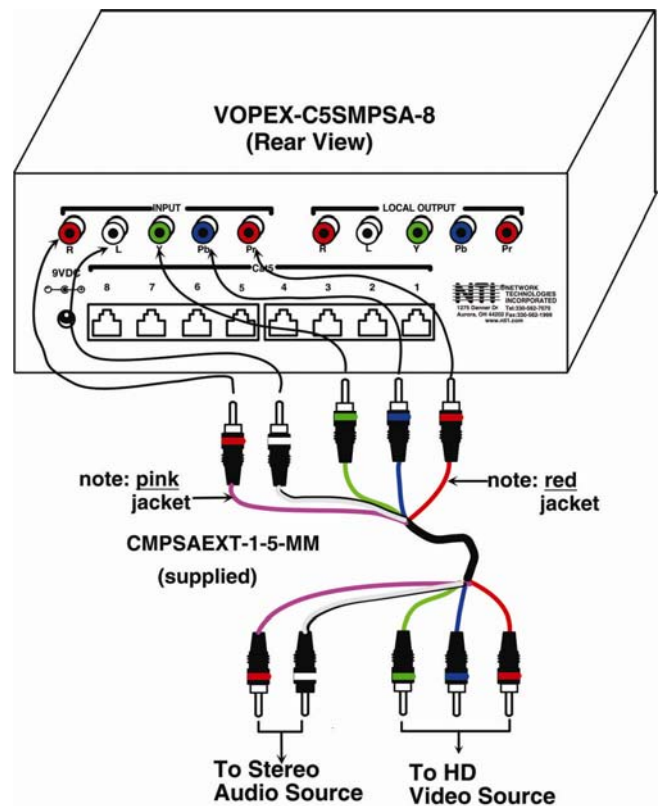


**WARNING: Never connect the VOPEX-C5SVA-x Extender/Splitter to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device. Damage to devices connected to the Ethernet may result.**

## VOPEX-C5CMPSA-x

1. Make connections between the VOPEX-C5CMPSA-x and the stereo audio and HD video source. (See Fig. 5.)
  - a) Connect the video ends of the CMPSAEXT-1.5-MM RCA coax cable (supplied) to the HD video source.
  - b) Connect the video ends on the other end of the CMPSAEXT-1.5-MM RCA coax cable to connectors marked "INPUT" on the VOPEX-C5CMPSA-x. Connect the RCA cables to their proper matching colors- green to "Y", blue to "Pb", and red to "Pr".
  - c) Connect the stereo audio ends of the CMPSAEXT-1.5-MM cable between the audio source and the "R" (right channel) and "L" (left channel) connectors on the VOPEX.

**Note:**  
 The jacket of the red RCA coax (on the CMPSAEXT-1.5-MM) for connection to the "R" (right channel) stereo connection is pink.  
 The jacket of the red RCA coax for connection to the "Pr" video connector is red.



**Figure 5- Connect HD Video and Stereo Audio sources**

2. Connect the local user to the VOPEX-C5CMPSA-x (see Fig. 6)
  - a) Connect one end a set of 75 ohm RCA cables to an HDTV.
  - b) Connect the other end of the RCA coax cables to connectors marked "LOCAL OUTPUT" on the VOPEX-C5CMPSA-x. Connect the RCA cables their proper matching colors- green to "Y", blue to "Pb", and red to "Pr".
  - c) Connect a stereo audio cable between a stereo audio device and the "R" (right channel) and "L" (left channel) connectors on the VOPEX under "LOCAL OUTPUT".

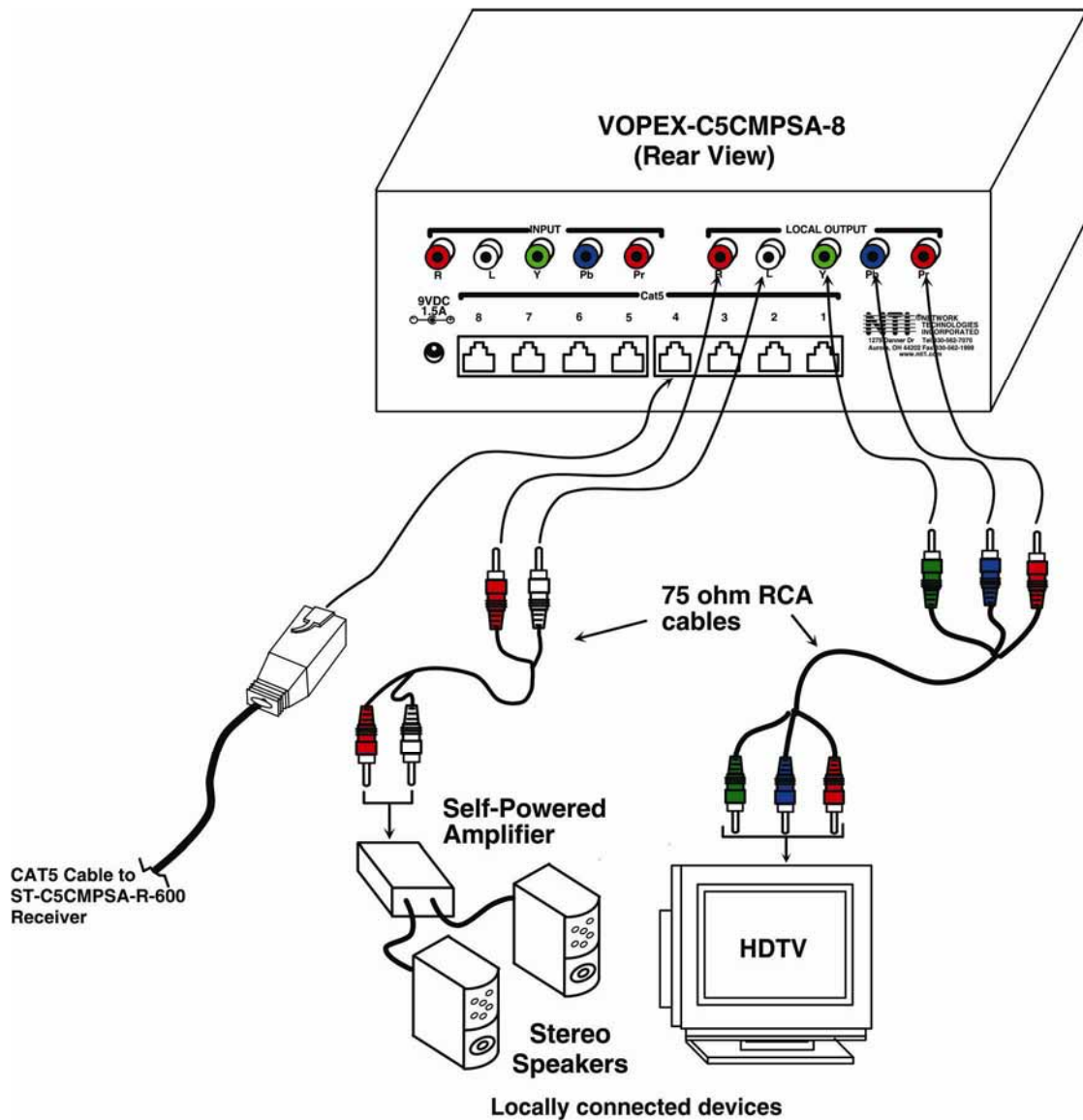


Figure 6- Connect local HDTV and stereo speakers

3. Connect a CAT5 cable to any one of the “Cat5x” ports on the VOPEX-C5CMPSA-x. (See Fig. 6) When properly inserted the cable end should snap into place.
4. Repeat step 3 for each ST-C5CMPSA-R-600 Receiver to be connected to the VOPEX-C5CMPSA-x.

**Note:** If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.



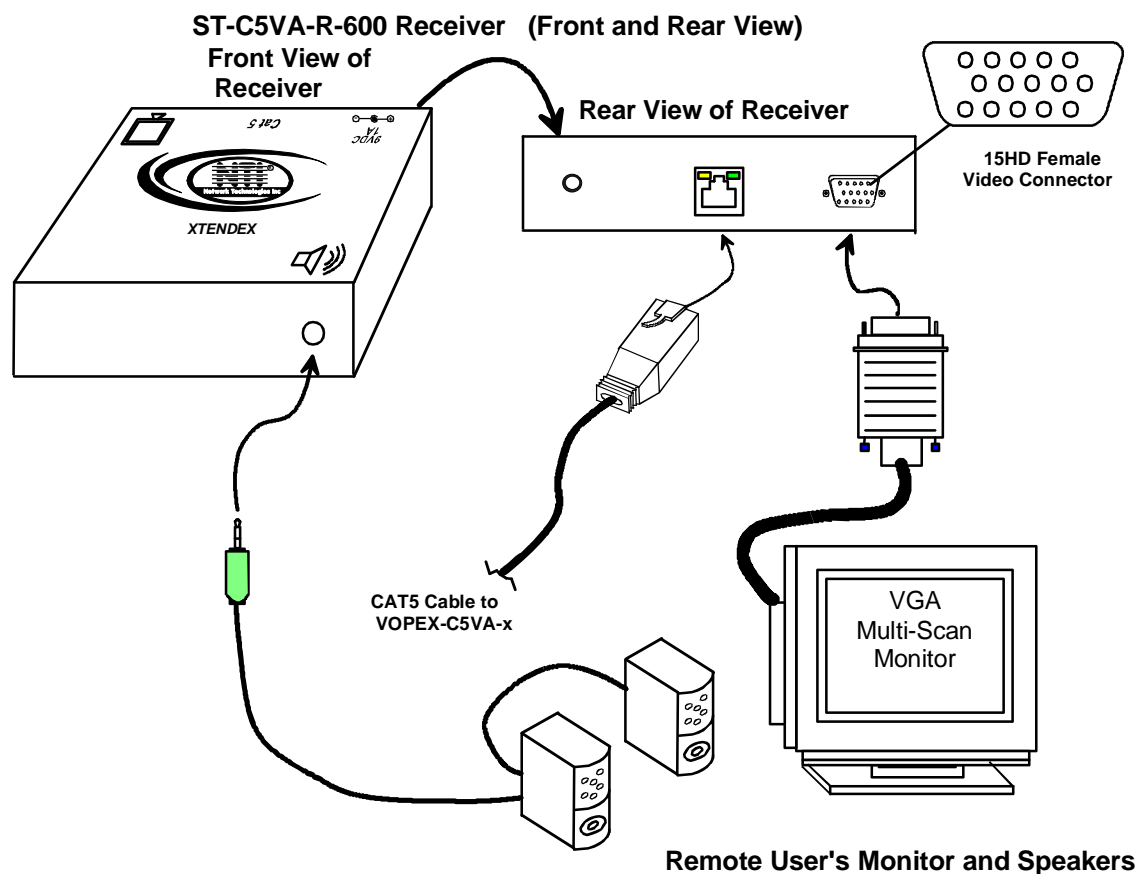
**WARNING:** Never connect the VOPEX-C5CMPSA-x Extender/Splitter to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device. Damage to devices connected to the Ethernet may result.

## RECEIVER INSTALLATION

### ST-C5VA-R-600 and ST-C5V-R-600 Receiver

**Note:** This section is applicable to both models of Receiver except for step 3. When installing ST-C5V-R-600 Receivers (no audio support), disregard step 3.

1. Position a ST-C5VA-R-600 Receiver such that the CAT5 cable, the monitor cable, speaker cable, and the AC adapter power connector can each reach the Receiver comfortably.
2. Connect the remote user's monitor cable to the female 15HD video connector on the Receiver.
3. Connect the remote user's speakers to the 3.5mm female stereo connector on the Receiver (see Fig. 9).



**Figure 7- Connect the Extended Components to the ST-C5VA-R-600 Receiver**

4. Make sure the CAT5 cable has been installed in accordance with the "Preparation for Installation" instructions on page 5. Connect the CAT5 cable to the "Cat 5" port on the Receiver. (See Fig. 9) When properly inserted the CAT5 cable end should snap into place.

**Note:** If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.



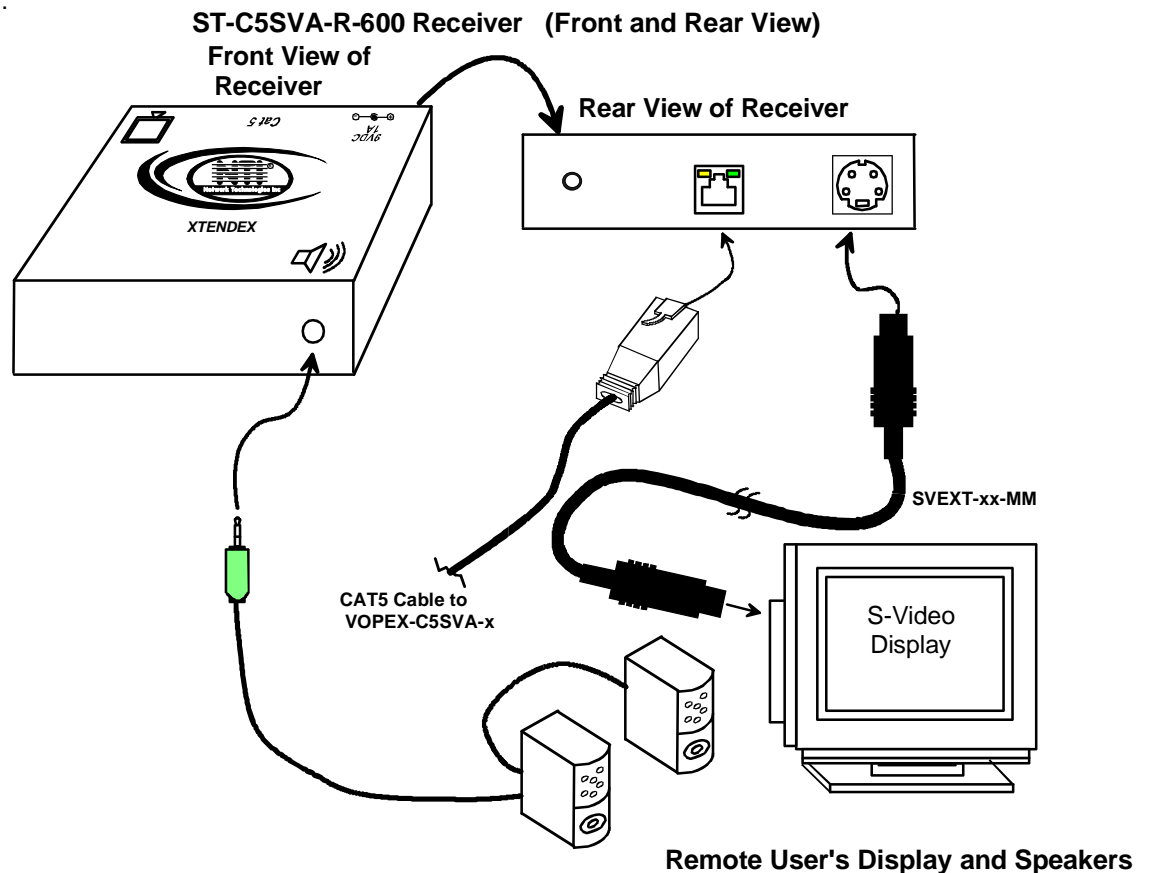
**WARNING:** Never connect the ST-C5VA-R-600 Receiver to an Ethernet card, Ethernet router, hub or switch or other Ethernet RJ45 connector of an Ethernet device. Damage to devices connected to the Ethernet may result.

5. Repeat steps 1-4 for each ST-C5VA-R-600 Receiver to be connected to the VOPEX-C5VA-x.

## ST-C5SVA-R-600 and ST-C5SV-R-600 Receiver

**Note:** This section is applicable to both models of Receiver except for step 4. When installing ST-C5SV-R-600 Receivers (no audio support), disregard step 4.

1. Position a ST-C5SVA-R-600 Receiver such that the CAT5 cable, the SVEXT-xx-MM cable, speaker cable, and the AC adapter power connector can each reach the Receiver comfortably.
2. Connect one end of another SVEXT-xx-MM cable to the female 4-pin miniDIN video connector on the Receiver.
3. Connect the other end of the SVEXT-xx-MM to the female s-video connector of the remote s-video display.
4. Connect the remote user's speakers to the 3.5mm female stereo connector on the Receiver (see Fig. 10).



**Figure 8- Connect the Extended Components to the ST-C5SVA-R-600 Receiver**

5. Make sure the CAT5 cable has been installed in accordance with the "Preparation for Installation" instructions on page 5. Connect the CAT5 cable to the "Cat 5" port on the Receiver. (See Fig. 10) When properly inserted the CAT5 cable end should snap into place.

**Note:** If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.

6. Repeat steps 1-4 for each ST-C5SVA-R-600 Receiver to be connected to the VOPEX-C5SVA-x.



**WARNING:** Never connect the ST-C5SVA-R-600 Receiver 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.



## ST-C5CMPSA-R-600 Receiver

1. Position the ST-C5CMPSA-R-600 Receiver such that the CAT5 cable, the HD television cable, the speakers, and the AC adapter power connector can each reach the Receiver comfortably.
2. Connect 75 ohm RCA cables between the remote HDTV and the RCA connectors marked "Y", "Pb", and "Pr" on the Receiver as shown in Fig. 11.
3. Connect coax cable for stereo audio cable between the audio connection(s) on the Receiver and the audio device. (See Fig. 11)

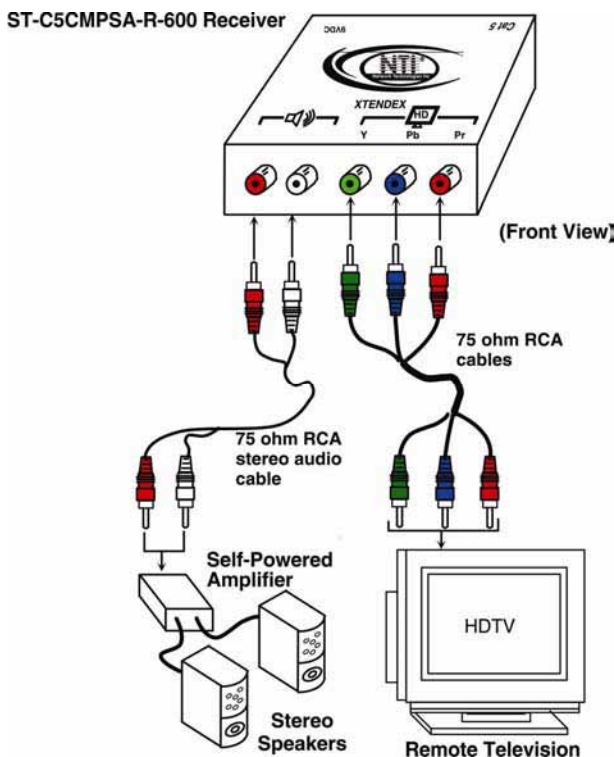


Figure 9- Connect the Extended Components to the Receiver

## Connect the CAT5 cable

Make sure the CAT5 cable has been installed in accordance with the "Preparation for Installation" instructions on page 5. Connect the CAT5 cable to the "Cat 5" port on the Remote Unit. (See Fig. 12) When properly inserted the CAT5 cable end should snap into place.

**Note:** If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.



**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.

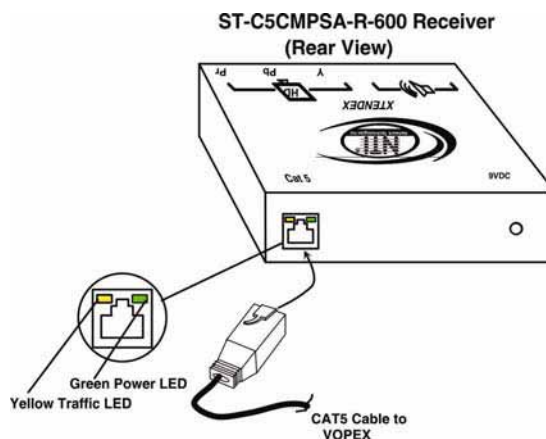


Figure 10- Connect the CAT5 cable to the Receiver

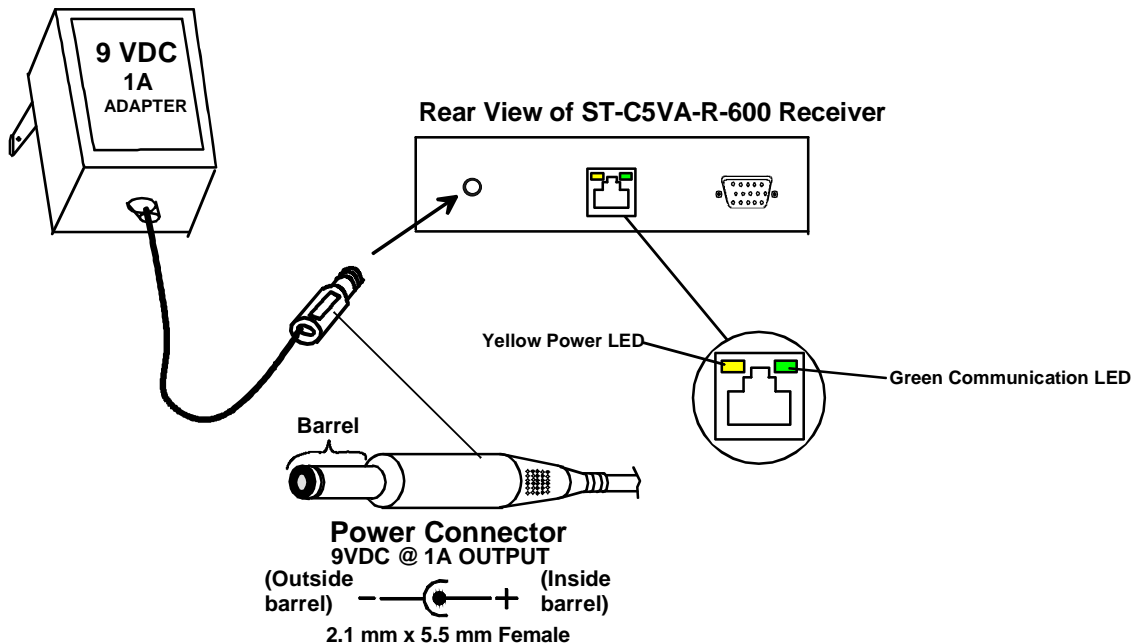
## PLUG-IN AND BOOT UP

1. Plug the power cord from each video device and the power supply for each audio device into a power outlet.
2. Connect the **9VDC 1.5A AC** adapter (or **5VDC 3A**, see product markings) power connector to the power port on the VOPEX.
3. Connect a **9VDC 1A AC** adapter to each XTENDEX Receiver. Make sure the power connectors go into each port all the way.



**WARNING:** The AC adapter for the Receivers is rated at 1A only. Be sure to plug the 9VDC 1A AC adapter into the Receiver, NOT into the VOPEX! The 1A AC adapter, if connected to the VOPEX, is not powerful enough to supply the VOPEX for very long and will be damaged.

4. Plug each AC adapter into a power outlet. The green LED on the VOPEX and the yellow LED on the RJ45 connector of each XTENDEX Receiver should illuminate, indicating that a proper power connection has been made to them. (See Fig. 13)



**Figure 11- Connect an AC adapter to a ST-C5VA-R-600 Receiver**

5. Turn ON the audio and video source(s), stereo speakers, and monitors. They should react as if they were directly connected to each other.

**Note:** The green LED on the RJ45 connector of each XTENDEX Receiver will blink anytime data traffic is passing between the VOPEX and the XTENDEX Receivers, indicating proper CAT5 cable connection and communication. (See Fig. 13)

## INSTALLATION FOR VOPEX-M12V-4 AND ST-M12V-4

Installation of the VOPEX splitter and receivers with M12 connectors is the same as those with RJ45 connectors, except that M12 male connectors must be applied to the ends of the CAT5 cables. See the images below for the required connections and proper wiring pinout of the male M12 connector (wired to EIA/TIA 568B standard).

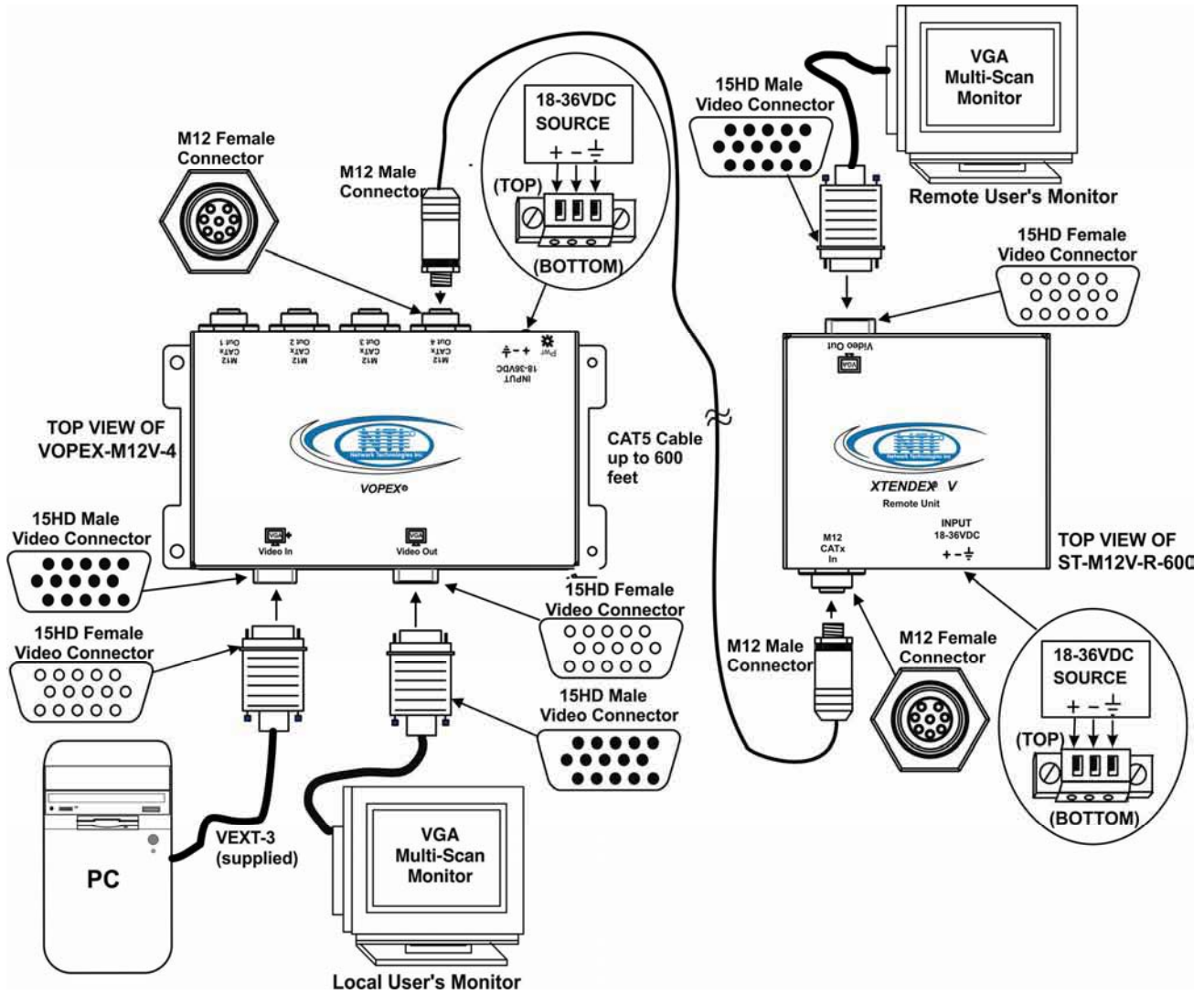


Figure 12- Connections for VOPEX with M12 Connectors

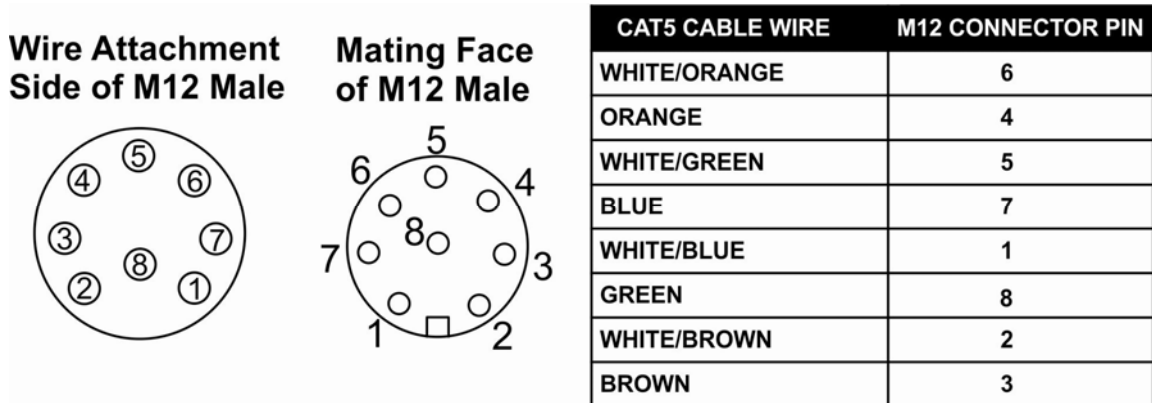


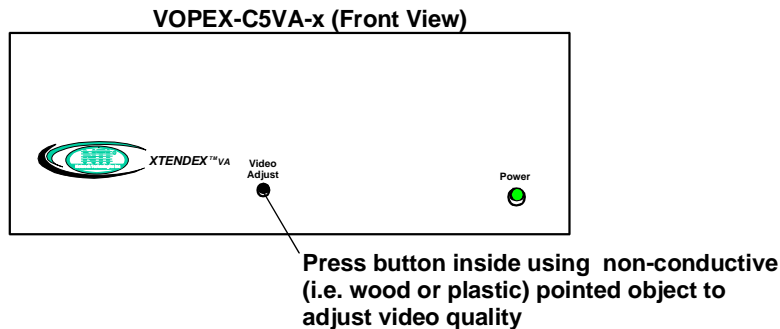
Figure 13- M12 Connector Wiring Method

## VIDEO QUALITY ADJUSTMENT

### VOPEX-C5VA-x / -C5SVA-x / -C5CMPSA-x

When powering ON the VOPEX-C5VA-x/-C5SVA-x/-C5CMPSA-x, video quality adjustment is done automatically to assure the image is as clear as possible. Once the VOPEX is up and running, the video quality can be re-adjusted at any time by pressing the recessed "Video Adjust" button. (See Fig. 16) Using a non-conductive pointed object, a momentary press of the button will force the system to automatically re-adjust the video quality.

**Note: Video quality adjustment of the VOPEX-C5V-x or VOPEX-C5SV-x is performed manually at the Receiver. See "Video Quality Adjustment for VOPEX-C5V-x / -C5SV-x" below.**



**Figure 14- Video Adjust button for manual video quality adjustment**

Video quality may need to be re-adjusted if any of the following situations occur:

- A CAT5 cable is replaced, for any reason
- A new XTENDEX Receiver is connected to the system
- CAT5 cable becomes disconnected from the VOPEX or any of the Receivers

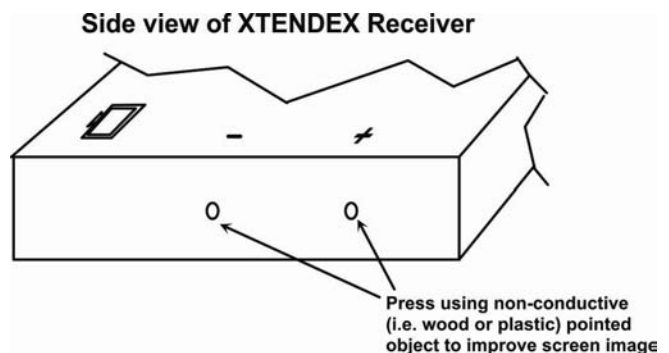
**Note: When the cable is longer than 300 feet some colored lines can be seen at the black-to-white transitions. This is a normal behavior and is caused by the different twisting rates of each pair of wires in the CAT5 cable.**

### VOPEX-C5V-x / -C5SV-x / -M12V-4

Video quality adjustment of the VOPEX-C5V-x, VOPEX-C5SV-x and VOPEX-M12V-4 is performed manually at the Receiver.

It is possible that on initial startup the image on the monitor will not be as crisp as the image normally is. This is due to the frequency characteristics of the CAT5 cable. It may be necessary to press the "+" or "-" buttons on the Receiver (see Fig. 17) until the image is crisp and clear. Press the "+" button if the image is not crisp and clear enough. Press the "-" button if the image has been over-corrected (such that horizontal lines appear to trail or shadow at the edge of an open window). A momentary press of either button will make a minor change in the image. If either button is pressed and held, the changes made will be gradual and continuous. Ultimately, the image quality should improve to a satisfactory level. Once the adjustment is made, it should not be necessary to change it again as the new settings are stored in memory and become the default settings with each startup.

**Note: When the cable is longer than 300 feet some colored lines can be seen at the black-to-white transitions. This is a normal behavior and is caused by the different twisting rates of each pair of wires in the CAT5 cable.**



**Figure 15- Video quality adjustment buttons on XTENDEX Receiver**

**TECHNICAL SPECIFICATIONS**

<b>VOPEX-C5VA / -C5V Models</b>		
Maximum Resolution	See chart next page	
Video Compatibility	SVGA, XGA, VGA	
Video Connectors	HD15 female for monitor connection HD15 male for CPU video connection	
<b>VOPEX-C5SVA / -C5SV Models</b>		
Maximum Resolution (refresh frequency 60Hz)	800 x 600 - up to 600 feet	
Video Compatibility	All s-video displays and sources	
Video Connectors	4-pin miniDIN female	
<b>All Above Models</b>		
Video Quality Adjustment	Automatic, for up to 600 feet of CAT5 cable, with manual override (video quality adjustment can only be performed manually at the Receiver for VOPEX-C5V / -C5SV)	
Video Coupling	DC	
Video Maximum I/O Levels	1.45Vp-p	
Input / Output Impedance	75 Ohms	
Input Horizontal Frequency Range	15kHz to 130 kHz	
Input Vertical Frequency Range	30 Hz to 150 Hz	
Sync Types Supported	Separate and composite TTL Level and sync on green	
Audio Connectors	3.5mm female stereo audio connectors	
Signal Type	Line Level, stereo, unbalanced	
Audio Frequency Response	20Hz to 20Khz, $\pm$ 1dB	
Signal-to-noise ratio	76 dBA	
Total Harmonic Distortion and Noise	0.017%	
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	
<b>VOPEX-C5CMPSA Models</b>		
Video Compatibility	HDTV Component- Y,Pb, Pr	
Connectors	RCA	
Video Maximum I/O Levels	1.45Vp-p (no offset)	
Input / Output Impedance	75 Ohms	
Maximum Resolutions	1080i and 720p @ 600ft 1080p @ 400ft	
Stereo Audio	Signal Type	Line Level, stereo, unbalanced
	Audio Connectors	RCA
	Audio Frequency Response	20Hz to 20Khz, $\pm$ 1dB
	Signal-to-Noise Ratio (SNR)	76 dBA
	Total Harmonic Distortion and Noise	0.017%
	Stereo Crosstalk	-70 dB
	Audio Maximum I/O Levels	3.1Vp-p
	Output Impedance	Max 2K Ohms, unbalanced

<b>General (All Above Models)</b>	
Interconnect Cable	CAT5/5e Solid UTP EIA/TIA 568B wiring w/ male RJ45 connectors
VOPEX-C5 Power	120V or 240V at 50 or 60Hz-9VDC/ <b>1.5A</b> via AC Adapter
VOPEX-C5V(A)-4/8C Power	120V or 240V at 50 or 60Hz- <b>5VDC/3A</b> via AC Adapter
Receiver Power	120V or 240V at 50 or 60Hz-9VDC/ <b>1.0A</b> via AC Adapter
AC Adapter Power Connector	2.1 x 5mm connector, center positive
Operating Temperature Range	32°F to 100°F (0°C to 38°C)
VOPEX Size (In.) WxDxH	
VOPEX-C5V(A)-x	8.5x6x2.5
VOPEX-C5V(A)-4C	5.1x3.4x1.1
VOPEX-C5V(A)-8C	5.1x3.4x1.7
XTENDEX Receiver Size (In.) WxDxH	3.25x3.4x1

<b>VOPEX-M12V-4</b>	
Maximum Resolution	See chart below
Video Compatibility	SVGA, XGA, VGA
Video Connectors	HD15 female for monitor connection HD15 male for CPU video connection
CAT5 Connectors	M12 Female
VOPEX-M12V-4 Power	18-36VDC, <b>1.0A</b>
ST-M12V-R-600 Power	18-36VDC, <b>1.0A</b>
Operating Temperature Range	-4°F to 158°F (-20°C to 70°C)
VOPEX Size (In.) WxDxH	5.6x3.5x1.7
XTENDEX Receiver Size (In.) WxDxH	3.25x3.4x1
Interconnect Cable	CAT5 shielded stranded EXANE cable

**Distances and Resolutions for CAT5/CAT5e and CAT6 Cables (VOPEX-C5VA / -C5V ONLY)**

<b>CABLE</b>	<b>DISTANCE (feet)</b>	<b>RESOLUTION</b>
CAT5/CAT5e (UTP)	600	1024x768 at 60Hz
CAT5/CAT5e (UTP)	400	1280x1024 at 60Hz
CAT5/CAT5e (UTP)	300	1600x1200 at 60Hz
CAT5/CAT5e (UTP)	100	1920x1440 at 60Hz
CAT6 (UTP)	300	1024x768 at 60Hz
CAT6 (UTP)	200	1280x1024 at 60Hz
CAT6 (UTP)	100	1920x1440 at 60Hz

**Distances and Resolutions for CAT5 EXANE Cable (VOPEX-M12V-4 ONLY)**

<b>DISTANCE (feet)</b>	<b>RESOLUTION</b>
200	1280x1024 at 60Hz
100	1920x1440 at 60Hz
50	1920x1440 at 60Hz

## INTERCONNECTION CABLE WIRING METHOD

The connection cable between the VOPEX and each XTENDEX Receiver is terminated with either RJ45 connectors or M12 connectors (see installation instruction for you model) and must be wired according to the EIA/TIA 568B industry standard. Wiring is as per the tables and drawings below.

### RJ45 Connector Wiring

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

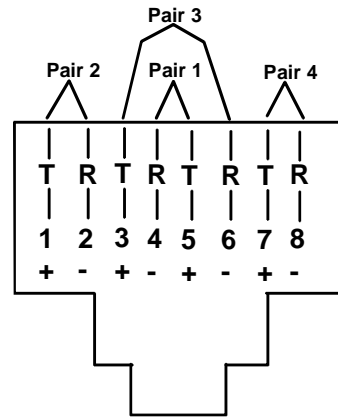


Figure 16- View looking into RJ45 female

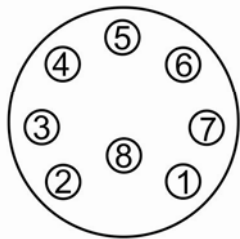
**Note:** CAT5 connection cable used between NTI XTENDEX Series Local and Remote or any XTENDEX Series products should not be run underground, outdoors or between buildings.



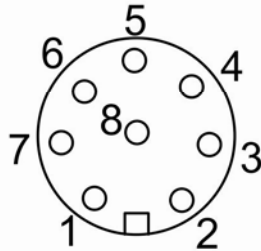
**WARNING:** Outdoor or underground runs of CAT5 cable could be dangerous and will void the warranty.

### M12 Connector Wiring

Wire Attachment Side of M12 Male



Mating Face of M12 Male



CAT5 CABLE WIRE	M12 CONNECTOR PIN
WHITE/ORANGE	6
ORANGE	4
WHITE/GREEN	5
BLUE	7
WHITE/BLUE	1
GREEN	8
WHITE/BROWN	2
BROWN	3

## 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) at 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
<b>VOPEX or XTENDEX power LED does not illuminate</b>	<ul style="list-style-type: none"> <li>Power supply is not connected or plugged-in.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure each outlet is live and the AC adapters are plugged-in. (one for each Remote and one for the VOPEX)</li> <li>Make sure DC plugs are fully connected</li> </ul>
<b>No video on monitor/display</b>	<ul style="list-style-type: none"> <li>One or more video cables is loose or disconnected.</li> <li>No power to the VOPEX or the XTENDEX Receiver.</li> <li>Video Cable was not attached when CPU was booted.</li> <li>CAT5 cable is not connected.</li> </ul>	<ul style="list-style-type: none"> <li>Check all video cable connections</li> <li>Make sure power LEDs are illuminated for local and remote. If not, see solution for problem above.</li> <li>With all the cables properly connected, reboot the CPU.</li> <li>Check cable connections. Make sure they are snapped-in properly and completely and reboot.</li> </ul>
<b>The picture on the monitor is black and white, rather than color</b>	The video cable was not attached to the CPU when it was booted.	With the cables all properly connected, reboot the CPU.
<b>Monitor sometimes loses sync, causing it to go blank for a second or two</b>	<ul style="list-style-type: none"> <li>Electrical power system is very noisy, particularly the ground.</li> <li>The CAT5 cable is not properly connected.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure the interconnection cable is not near any power lines.</li> <li>Check cable connections. Make sure they are snapped-in properly and completely.</li> </ul>
<b>A constant vertical wobble appears down the screen</b>	<ul style="list-style-type: none"> <li>CAT5 cable is too close to a strong power source.</li> <li>Monitor is too close to a power source or another monitor.</li> </ul>	<ul style="list-style-type: none"> <li>Reroute CAT5 cable if possible.</li> <li>Move the monitor</li> </ul>
<b>Video picture is not sharp or is smeared</b>	<ul style="list-style-type: none"> <li>All Video Cables are not firmly seated.</li> <li>CAT5 cable is too long.</li> <li>The CAT5 cable is not properly connected.</li> <li>A cabling change has been made while the system was powered.</li> <li>A new receiver was connected while the system was powered</li> <li>Video was not manually adjusted</li> </ul>	<ul style="list-style-type: none"> <li>Check all connections. Make sure all cables are fully seated.</li> <li>Verify length is within specified limits-600'.</li> <li>Check cable connections. Make sure they are snapped-in properly and completely.</li> <li>Press the "Video Adjust" button. (See "Video Quality" on page 18.)</li> <li>Press the "Video Adjust" button. (See "Video Quality" on page 18.)</li> <li>Adjust video at the receiver (See "Video Quality" on page 18.)</li> </ul>
<b>No audio</b>	<ul style="list-style-type: none"> <li>Audio cable is not properly plugged in</li> <li>Speakers are not plugged in</li> <li>CAT5 cable is not properly connected</li> </ul>	<ul style="list-style-type: none"> <li>Check all cable connections</li> <li>Verify speakers are powered (if applicable)</li> <li>Check CAT5 cable connections</li> </ul>



## 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> for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

Manual 071 Rev. 9/17/13