NETWORK TECHNOLOGIES INCORPORATED

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XTENDEX® Series

ST-C5USBVT

ST-C5USB2VT

ST-C5USB2V2ARST

200 Foot USB, VGA Video, and Audio Extender
Installation and Operation Manual

Front and Rear View of ST-C5USBVT Remote Unit

TRADEMARK

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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.

Note: CAT5/5e/6/7 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 CAT5/5e/6/7 cable could be dangerous and will void the warranty.

WARNING: The CATx connection cable used between NTI XTENDEX Series Local and Remote or any XTENDEX Series products must be wired straight through (pin 1 to pin 1, pin 2 to pin 2, etc.) The use of a CROSSOVER CABLE will damage the extender and void your warranty.

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INTRODUCTION

The USB Extender with VGA Video extends four USB devices and a VGA monitor up to 200 feet. Each USB extender consists of a local unit that connects to a computer and also supplies video to a local monitor, and a remote unit that connects to four USB devices and a monitor.

- Supports fully transparent USB connections – able to support all common hardware platforms including PC, SUN and MAC and their associated peripherals.

- Extend devices such as keyboards, mice, printers, game controllers, USB flash drives, touch screen monitors, whiteboards, etc.

- Supports local and remote VGA monitors.

- Supports resolutions to 2048x1536 (see Resolution/Distance Chart on page 10).

- DDC2B support for local or remote monitor.

- Compliant with USB 1.1 specifications.

- Supports low speed and full speed USB devices

- Supports Plug-n-Play specification

- Video quality adjustment for different lengths of CAT5e/6/7 cable is done manually

- Optional dual video and dual video + two-way audio support (speakers and microphone)+RS232 support

- Operating temperature range of 32 to 122°F (0 to 50°C) (models ST-C5USB(2)V(2ARS)T)

- Optional industrial rated model with operating temperature range of 32 to 158°F (0 to 70°C) (ST-C5USBVT-**IND**)

- Mounting brackets for easy surface/wall mounting.
  - ST-C5USBVT features integrated brackets.
  - ST-C5USB2VT and ST-C5USB2V2ARST feature detachable brackets.

Models Available:

Model	VGA Monitor Support	2-Way Audio and RS232 Support	Power Supply
ST-C5USBVT(-IND)	Yes	No	1 (Remote Only)
ST-C5USB2VT	Dual Video	No	2
ST-C5USB2V2ARST	Dual Video	Yes	2

MATERIALS

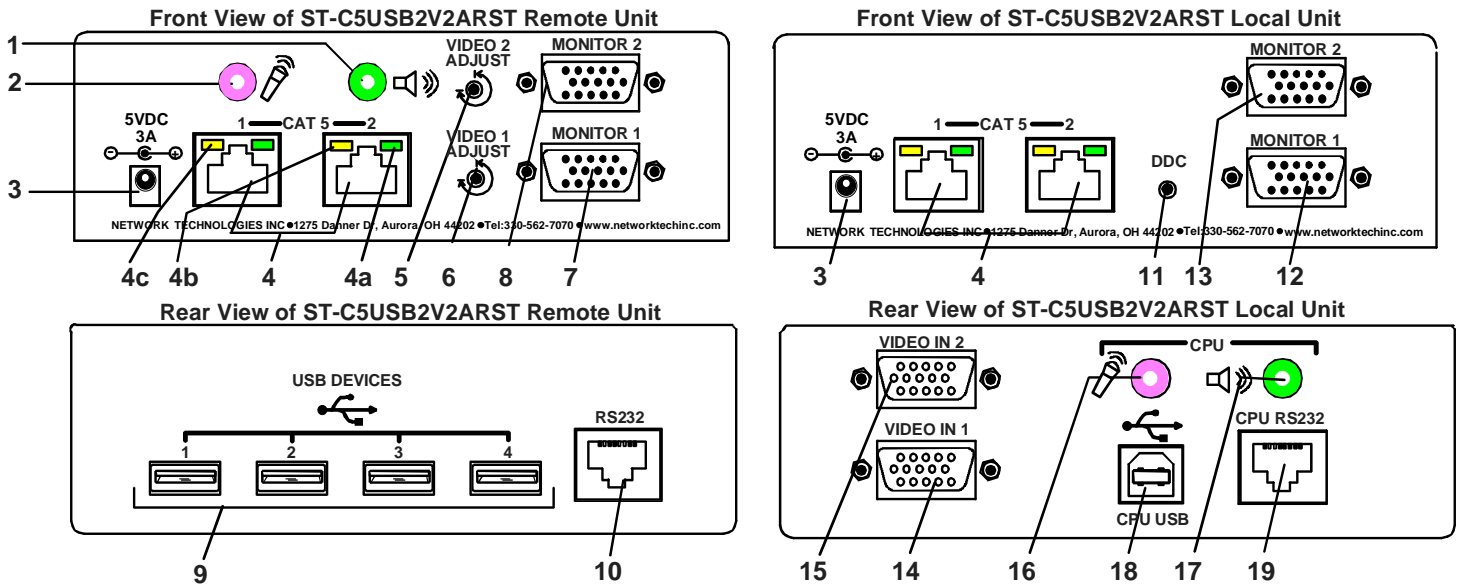**Materials Included with this kit:**

- ✓ NTI XTENDEX Local and Remote Unit
- ✓ 1 or 2- 100VAC to 240VAC at 50 or 60Hz-5VDC/3.0A AC Adapter (see chart on page 1)
     -OR-
- ✓ 1 or 2- 100VAC to 240VAC at 50 or 60Hz-5VDC/**6.0A** AC Adapter **(-IND model**)

- ✓ 1-USB2-AB-1M-5T 1 Meter USB Type A Male-USB Type B Male cable
- ✓ 1-VEXT-3   15HD Male-to-15HD Female 3 foot cable (**Qty 2** in models with dual video support only)
- ✓ 2- SA-3-MM 3.5MM male-to-male audio cables (models with audio support only)
- ✓ 1- DB9M-RJ45F Serial Adapter RJ45 Female-DB9 Male (models with S232 support only)
- ✓ 1- DB9F-RJ45F Serial Adapter RJ45 Female-DB9 Female (models with RS232 support only)
- ✓ 2- 3 foot RJ45-to-RJ45 CAT5 Patch Cables (models with RS232 support only)

Materials *Not* supplied but *REQUIRED:*

- ➢ CAT5e/6/6a/7 unshielded twisted-pair cable(s) terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see page 10 for proper EIA/TIA 568 B wiring method and resolution/distance chart)

Cables can be purchased from Network Technologies Inc by calling **(800) 742-8324** *(800-RGB-TECH) in the US and Canada or* **(330) 562-7070** *(worldwide).*

FEATURES AND FUNCTIONS

Front View of ST-C5USB2V2ARST Remote Unit

Front View of ST-C5USB2V2ARST Local Unit

Rear View of ST-C5USB2V2ARST Remote Unit

Rear View of ST-C5USB2V2ARST Local Unit

1. **Audio Jack**- lime green 3.5mm stereo audio jack- for connecting to remote speakers (models with audio support only)

2. **Audio Jack**- pink 3.5mm stereo audio jack- for connecting to remote microphone (models with audio support only)

3. **5VDC- 3.0A**- connection jack for the AC adapter

4. **CAT 5**- RJ45 females- for connecting the CAT 5 cables (only 1 on ST-C5USBVT model)

    4a. Green LED- power indicator- illuminates when power has been supplied to the unit

    4b. Yellow LED-traffic indicator- blinks when there is communication between the local and remote units

    4c. Yellow LED-traffic indicator- illuminates when second link is established between the local and remote units (model with audio and RS232 support only)

5. **VIDEO ADJUST-2** – adjustment screw for improving video quality on the monitor connected to "MONITOR2"

6. **VIDEO ADJUST-1** – adjustment screw for improving video quality on the monitor connected to "MONITOR1"

7. **MONITOR1**- 15HD female- for connecting the remote user's first VGA monitor

8. **MONITOR2**- 15HD female- for connecting the remote user's second VGA monitor (models with dual video support only)

9. **USB**- Type A connectors- for connecting extended USB devices

10. **RS232 Connector**- RJ45 female- for connecting extended serial device (models with RS232 support only)

11. **DDC button**- for refreshing DDC information between the monitor and video source

12. **MONITOR1**- 15HD female- for connecting the local user's first VGA monitor

13. **MONITOR2**- 15HD female- for connecting the local user's second VGA monitor (models with dual video support only)

14. **VIDEO IN 1**- 15HD male connector- for connecting to the VGA video source

15. **VIDEO IN 2**- 15HD male connector- for connecting to a second VGA video source (models with dual video support only)

16. **CPU Audio Jack**- pink 3.5mm stereo audio jack- for connecting to the microphone input on the CPU (models with audio support only)

17. **CPU Audio Jack**- lime green 3.5mm stereo audio jack- for connecting to the speaker output on the CPU (models with audio support only)

18. **CPU USB**-Type B connector- for connecting to a USB connector on the CPU for USB device support

19. **RS232 Connector**- RJ45 female- for connecting to the serial device port on the CPU (models with RS232 support only)

LIMITATIONS

For models with RS232 support:

- The RS232 port supports all baud rates up to 57.6K bits per second and the attached CPU must be configured accordingly.

For models with 2-way audio support:

- The audio jacks of the XTENDEX with audio support are compatible with the following standard CPU audio connectors:

  - Line out - typically lime green in color
  - Speaker out- typically orange in color
  - Headphone out- typically located on the CD-ROM
  - Microphone in- typically pink in color

- The audio output of the XTENDEX with 2-way audio support is compatible with self-powered stereo speakers.
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PREPARATION FOR INSTALLATION

- Locations should be chosen for the monitors, mice, and keyboards that also have space to connect the Remote and Local Units 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 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, 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 CPU and monitors 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.

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WARNING: The CATx connection cable used between NTI XTENDEX Series Local and Remote or any XTENDEX Series products must be wired straight through (pin 1 to pin 1, pin 2 to pin 2, etc.) The use of a CROSSOVER CABLE will damage the extender and void your warranty.

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

INSTALLATION

Installing The Local Unit

1. Connect cables from the Local Unit to the back of the CPU. (See Figure 1.)

    a) Connect the blue 15HD male cable end of the VEXT-3 (supplied) to the VGA port on the back of the CPU.

    b) Connect the USB Type A male cable end of the USB2-AB-01M to a USB Type A female connector on the CPU.

    c) Connect the blue 15HD female cable of the VEXT-3 to the "VIDEO IN 1" connector on the Local Unit.

    d) Connect the USB Type B male cable end of the USB2-AB-01M to the USB Type B female connector on the Local Unit.

    e) If your Local Unit has dual video support, connect the VEXT-3 cable (supplied) between the second video source and the "VIDEO IN 2" connector on the Local Unit.
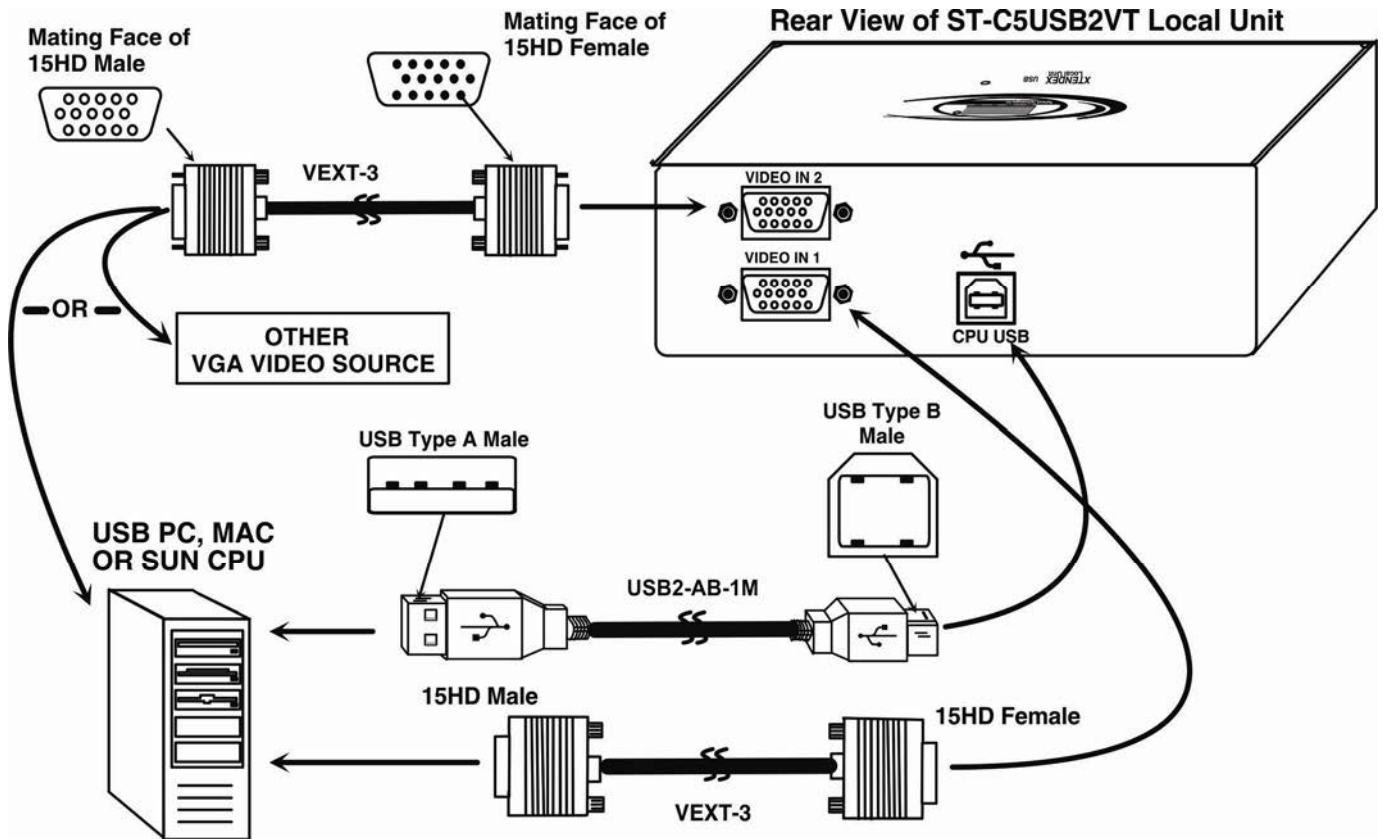

Figure 1- Connect video and device cables to the Local Unit

Units with 2-Way Audio and RS232 Support

The ST-C5USB2V2ARST includes support for 2-way audio and RS232.   Optionally, make the connections at the Local Unit as follows:

1. Connect an SA-3-MM stereo audio cable (supplied) between the pink "CPU" connector on the Local Unit and the "line in" or microphone jack (typically pink) on the CPU (see Figure 2).

2. Connect a second SA-3-MM stereo audio cable (supplied) between the green "CPU" connector on the Local Unit and "line out" or speaker jack (typically green) on the CPU (see Figure 2).

3. Connect a CAT5 patch cable (3 foot cable supplied) between the "RS232" connector on the Local Unit and the serial connector on the CPU.   A DB9 female to RJ45 adapter may be required (supplied) to make this connection.
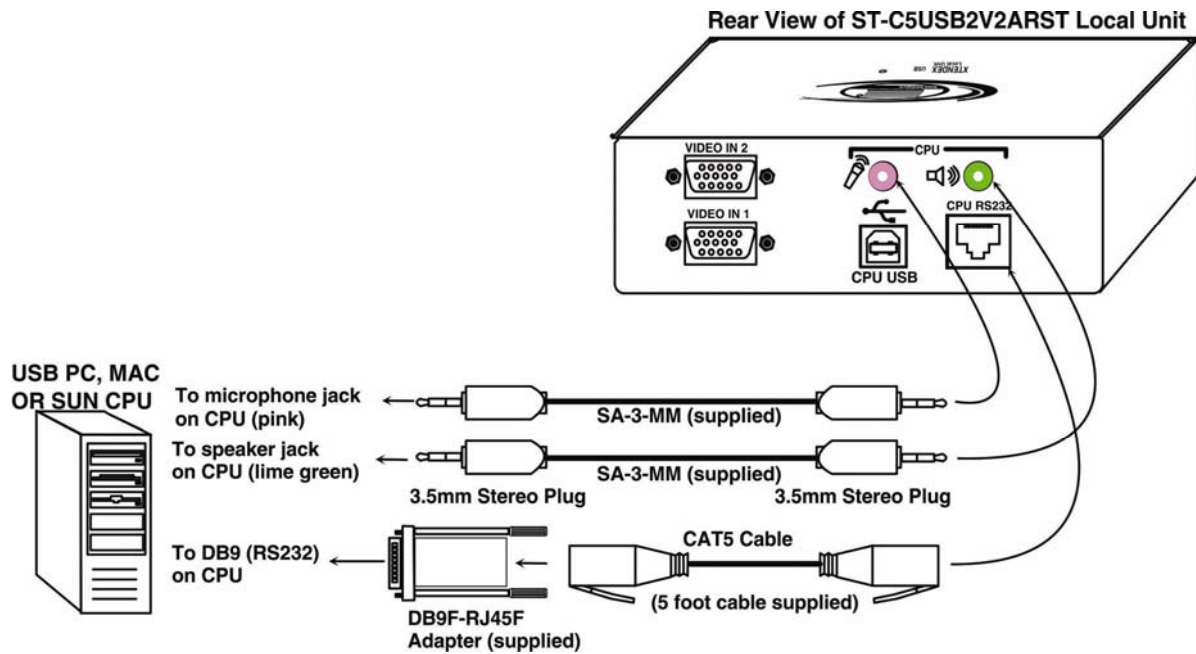

Figure 2- Connect audio and RS232 cables to the Local Unit

Connect Local Monitor(s)

To make connection of a local monitor (or two if you have dual video support), connect each VGA monitor to the "MONITOR1" and "MONITOR2" connectors on the Local Unit, as desired.
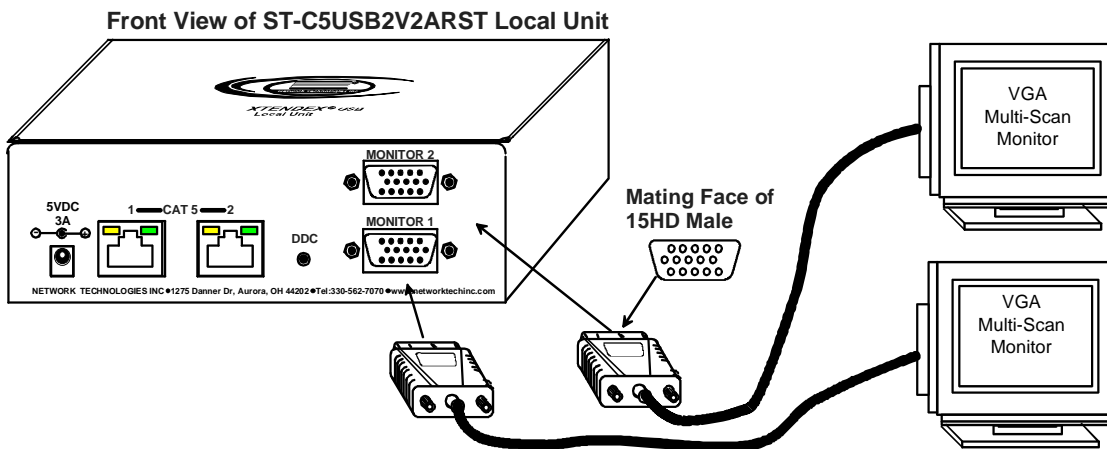

Figure 3-Connect local monitors

Installing the Remote Unit

Connect cables from the Remote Unit to the extended devices as shown below.   (Some features may not be applicable to the model you have. See chart on page 1.)
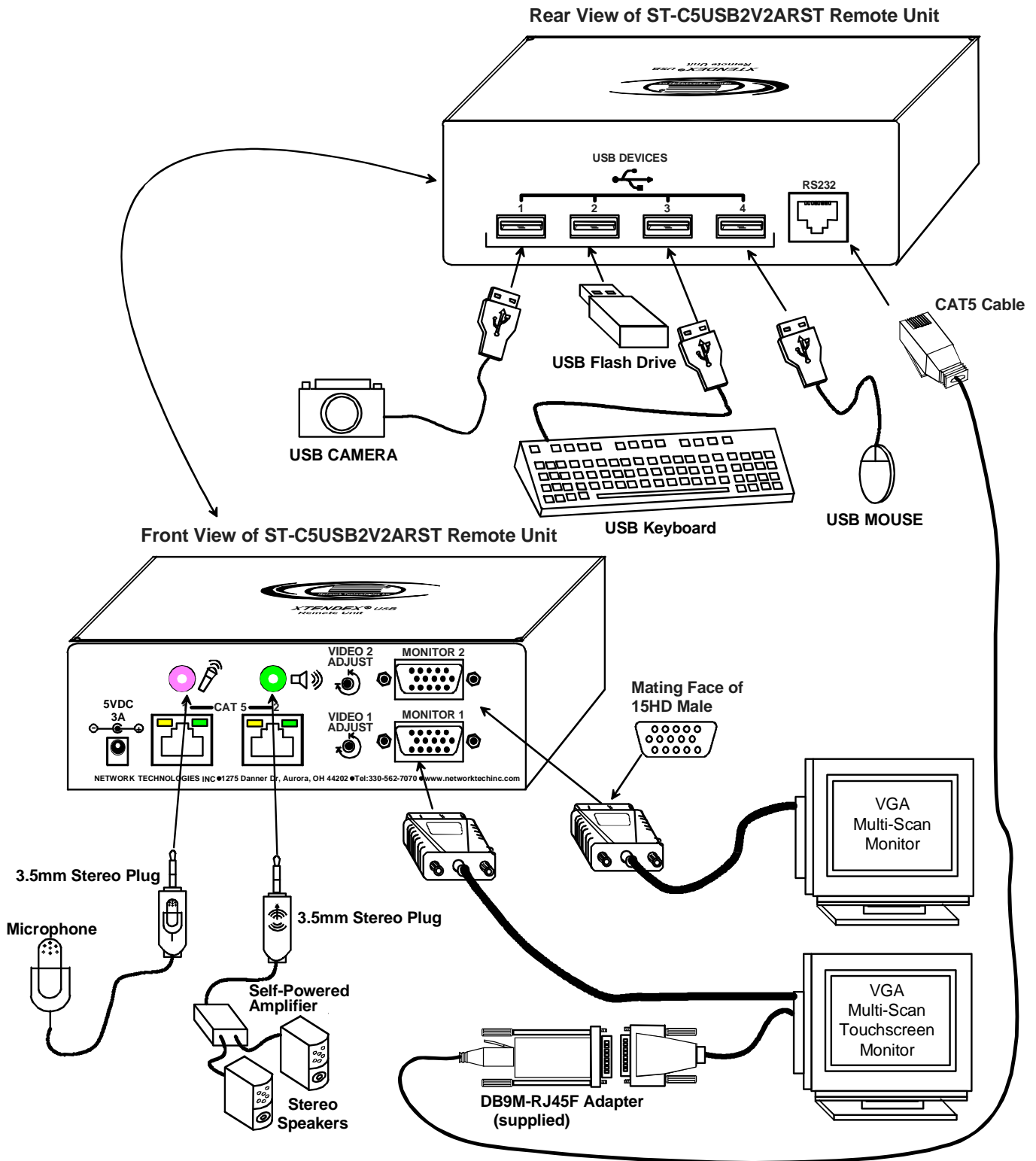
Rear View of ST-C5USB2V2ARST Remote Unit

Figure 4- Connect extended devices to the Remote Unit

Connect The CATx Cable

Connect the CATx cable(s) between the "Cat 5" port(s) on the Local and Remote Units. (See Figure 5.) When properly inserted the cable end should snap into place.   If your model has two "CAT5" ports, be sure to connect the cables to the same numbered ports at each end (connect port 1 at the Local to port 1 at the Remote, and port 2 to port 2).
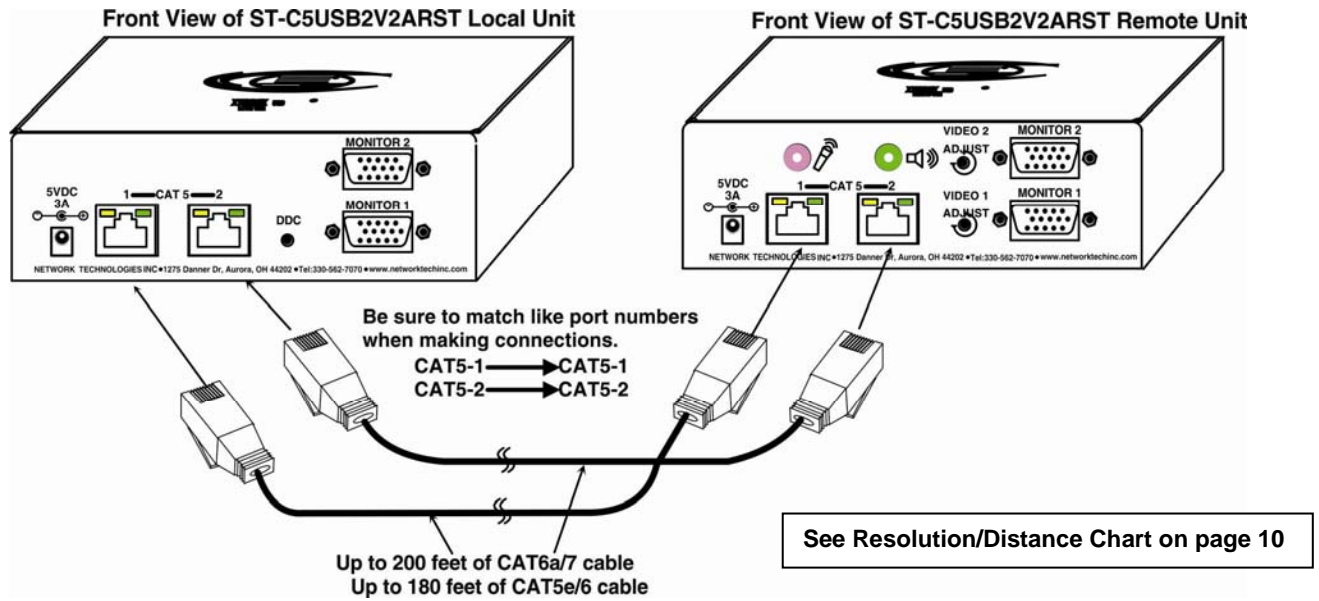

Figure 5- Connect CATx cables

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.

WARNING: The CATx connection cable used between NTI XTENDEX Series Local and Remote or any XTENDEX Series products must be wired straight through (pin 1 to pin 1, pin 2 to pin 2, etc.) The use of a CROSSOVER CABLE will damage the extender and void your warranty.

Plug-in and Boot Up

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

2. Connect each AC adapter power connector to the 5VDC ports on the Remote and Local Units. (Model ST-C5USBVT only has a power supply at the Remote Unit.   The Local Unit is powered by the CPU.)   Plug each 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.)
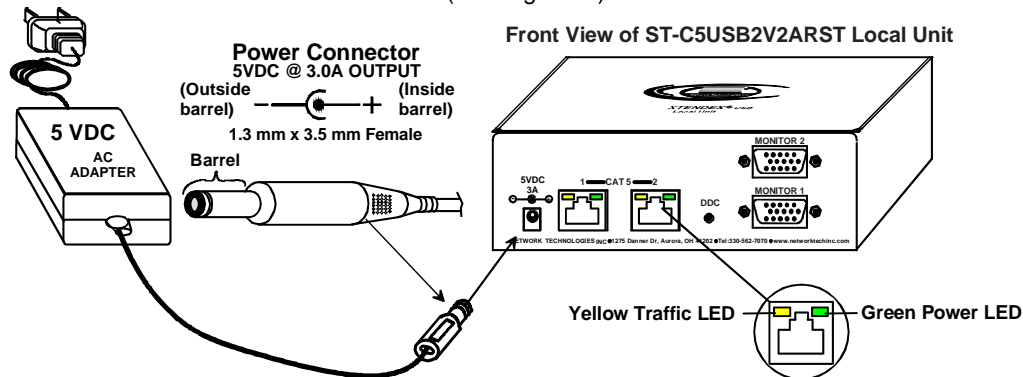

Figure 6- Connect the AC adapter(s)

3.   Turn ON the CPU and Monitor(s).   They should each react as if they were directly connected to each other.
Note: The yellow LED on RJ45 connector "CAT5 #1" will illuminate and "CAT5 #2" will blink anytime data traffic is passing between the Local and Remote Units, indicating proper CAT5 cable connection and communication.
(See Figure 6)

DDC

The XTENDEX provides DDC emulation on the Local unit so that the CPU is able to receive EDID data about the monitor it connects to whether the monitor is connected to the XTENDEX or not. On models with dual video support, each video channel (MONITOR1 and MONITOR2) has its own memory to store EDID data.

DDC information (the EDID table) is only downloaded from the monitor attached to "MONITOR1" <u>on the Local Unit</u>. It can be downloaded by pressing the "DDC" button.

Note: The Local Unit must be powered ON for the DDC button to work.

<u>Using the "DDC" button</u>:

      Press once- to record DDC to channel 1

      Press twice (no more than 1 second between each press) – to record DDC to channel 2

      Press and hold 4 seconds- to erase DDC information for both channels

Once the DDC information is recorded, the monitor can either remain connected to the Local Unit or be moved to the Remote Unit. We recommend that monitors on the same channel be the same make and model. If two different monitors are going to be used (one local, and one remote), best results will be achieved by recording the EDID data from the monitor with the lowest resolution.

Note: The monitor to be connected to "MONITOR2" must first be connected to "MONITOR1" <u>at the Local Unit</u> to record the DDC information to channel 2 as described above. After recording the DDC data, reconnect the monitor to a "MONITOR2" connector on either the Local or Remote Unit.

TIP: If the monitor to be extended cannot be easily brought to the mounting location of the Local Unit, you may want to connect the Local Unit to the remote monitor and record the DDC data (powering it using the Remote Power supply). Once it is recorded, it can be returned to the location near the video source.

VIDEO QUALITY ADJUSTMENT

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 turn the "VIDEO ADJUST" screw on the Remote Unit to equalize the signal between the Local and Remote Units. Turn the "VIDEO ADJUST" screw using a very small screwdriver (see Figure 7) until the image is crisp and clear.   Turn the screw counterclockwise if the image is not crisp and clear enough.   Turn the screw clockwise if the image has been over-corrected (such that horizontal lines appear to trail or shadow at the edge of an open window).   A very small amount of rotation will make a minor change in the image. Ultimately, the image quality should improve to a satisfactory level.

Front View of ST-C5USB2V2ARST Remote Unit

Note: The "VIDEO ADJUST" screw is limited to approximately 270° rotation. Do not attempt to turn it past its stops. Doing so will void the warranty.
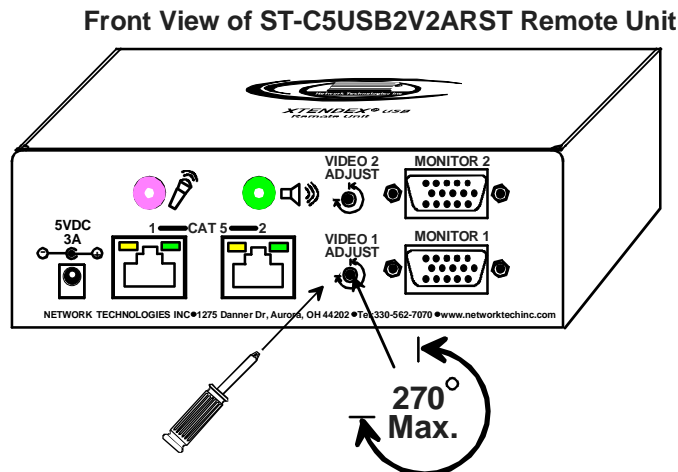

Figure 7- Turn "VIDEO ADJUST" screw for video quality adjustment

INTERCONNECTION CABLE WIRING METHOD

The connection cable between the remote and local is 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.
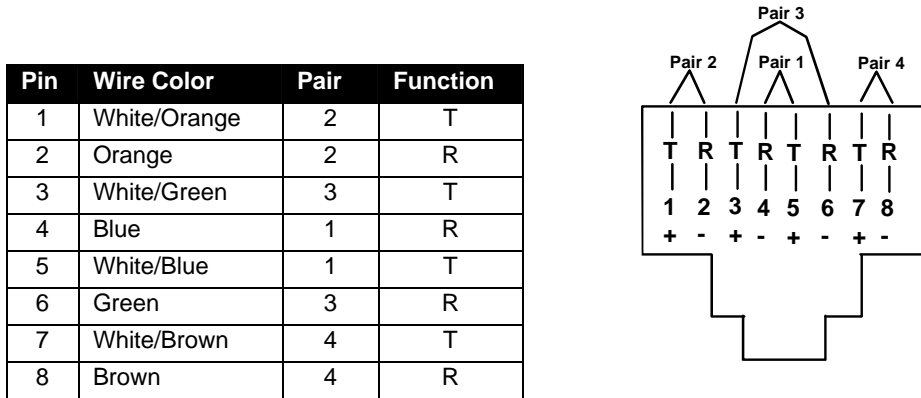
Pin	Wire Color	Pair	Function
1	White/Orange	2	T
2	Orange	2	R
3	White/Green	3	T
4	Blue	1	R
5	White/Blue	1	T
6	Green	3	R
7	White/Brown	4	T
8	Brown	4	R

Figure 8- View looking into RJ45 female

Resolution/Distance Chart

Cable	Distance (ft)	Maximum Resolution	USB Device Type
CAT5e Solid UTP	180	2048x1536 at 60 Hz	USB 1.1/1.0
	150	2048x1536 at 60 Hz	USB 2.0/1.1/1.0
CAT5e Solid STP	175	1920x1200 at 60 Hz	USB 1.1/1.0
	150	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
CAT5e Stranded, UTP or STP	175	1600x1200 at 60 Hz	USB 1.1/1.0
	150	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
	100	2048x1536 at 60 Hz	USB 2.0/1.1/1.0
CAT6 Solid UTP	150	1600x1200 at 60 Hz	USB 2.0/1.1/1.0
	100	1920x1440 at 60 Hz	USB 2.0/1.1/1.0
CAT6 550 MHz Solid UTP	175	1920x1200 at 60 Hz	USB 1.1/1.0
	150	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
	100	2048x1536 at 60 Hz	USB 2.0/1.1/1.0
CAT6 Solid STP	150	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
	100	2048x1536 at 60 Hz	USB 2.0/1.1/1.0
CAT6 Stranded, UTP or STP	180	1920x1080 at 60 Hz	USB 1.1/1.0
	150	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
CAT6a Solid UTP	200	1920x1200 at 60 Hz	USB 1.1/1.0
	180	1920x1200 at 60 Hz	USB 2.0/1.1/1.0
CAT7 Solid SSTP	200	2048x1536 at 60 Hz	USB 1.1/1.0
	180	2048x1536 at 60 Hz	USB 2.0/1.1/1.0
CAT7 600 MHz Stranded STP	185	1920x1080 at 60 Hz	USB 1.1/1.0
	170	1920x1080 at 60 Hz	USB 2.0/1.1/1.0
	100	2048x1536 at 60 Hz	USB 2.0/1.1/1.0

TECHNICAL SPECIFICATIONS

All Models	
Video Compatibility	VGA thru QXGA
Video Coupling	DC
Video Connectors	HD15 male to connect to CPU
	HD15 female to connect to monitor
Input / Output Impedance	75 Ohms
Input Horizontal Frequency Range	15kHz to 130kHz
Input Vertical Frequency Range	30 Hz to 150 Hz
Sync Types Supported	Separate and composite TTL Level
Video Maximum I/O Levels	1.45Vp-p
USB to host CPU	USB Type B female
USB to device	USB Type A female
USB output power	5V, 1.4A for 4 ports (<500mA per port)
Models with 2-Way Audio Support	
Audio Connectors	3.5mm stereo jack (lime) to CPU and speakers
Signal Type	Line Level, stereo, unbalanced
Audio Frequency Response	20Hz to 20kHz, $\pm$ 1dB
Signal-to-Noise Ratio	>76 dBA
Stereo Crosstalk	-70 dB @ 1kHz
Audio Maximum I/O Levels	2.8Vp-p
Maximum Load	2k Ohms, unbalanced
Input Impedance	10k Ohms
Total Harmonic Distortion and Noise	<0.1%
Models with Microphone Support	
Microphone Type	Electret
Audio Connector	3.5mm stereo jack (pink) to CPU and microphone
Models with RS232 Support	
RS232 Connectors	RJ45 female
RS232 Baud Rate	57.6K bps maximum (no adjustment for baud rate is needed)
RS232 Compatibility	RXD, TXD, RTS, DTR, CTS, DSR, DCD
General	
Interconnect Cable	CAT5/5e/6/7 Solid/Stranded UTP/STP EIA/TIA 568 B wiring
Remote and Local Unit Power	100V to 240V at 50 or 60Hz-5VDC/3.0A via AC adapters (2)- except only 1 for ST-C5USBVT
	ST-C5USBVT-IND - 100V to 240V at 50 or 60Hz-5VDC/6.0A via AC adapter
Operating temperature	• 32°F to 122°F (0°C to 50°C) (ST-C5USB(2)V(2ARS)T)
	• 32°F to 158°F (0°C to 70°C) ST-C5USBVT-**IND**
Storage temperature	• -22°F to 140°F (-30°C to 60°C) (ST-C5USB(2)V(2ARS)T)
	• -22°F to 158°F (-30°C to 70°C) (ST-C5USBVT-**IND**)
Operating and Storage Relative Humidity	5 to 90% non-condensing RH
Size (In.) WxDxH ST-C5USBVT(-IND)	5.14x3.07x1.09
ST-C5USB2VT and ST-C5USB2V2ARST	5.14x3.07x1.69
Regulatory Approvals	RoHS, CE

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, a solution may be found in the knowledgebase on our website at http://information.networktechinc.com/jive/kbindex.jspa or please call us directly at (**800) 742-8324 (800-RGB-TECH)** or **(330) 562-7070** and we will be happy to assist in any way we can.

Problem	Cause	Solution
Remote or Local Unit green power LED does not illuminate	• Power supply is not connected or plugged-in.	• Make sure outlet is live and AC adapter(s) is plugged-in. • For ST-C5USBVT, make sure USB cable is fully inserted on both ends. • Make sure 5VDC jack is fully connected
No Video on monitor	• One or more video cables is loose or disconnected. • No power to Remote or Local Units. • Video Cable was not attached when CPU was booted. • CATx cable is not connected.	• Check all video cable connections • Make sure green LEDs are illuminated for local and remote. If not, see solutions for problem above. • With all the cables properly connected, reboot the CPU. • Check cable connections. Make sure they are snapped-in properly and completely and reboot.
Video Picture is not sharp or is smeared	• All Video Cables are not firmly seated. • CATx cable is too long. • The CATx cable is not properly connected. • Video not adjusted	• Check all connections. Make sure all cables are fully seated. • Verify length is within specified limits-200'. • Check cable connections. Make sure they are snapped-in properly and completely. • Check cable connections and power cycle. See page 9 for video quality adjustment instruction.
The picture on the monitor is black and white, rather than color	The video cable was not attached to the CPU when it was booted.	With the cables all properly connected, reboot the CPU.
A constant vertical wobble appears down the screen	CATx cable is too close to a strong power source.	Reroute CATx cable if possible.
Monitor sometimes loses sync, causing it to go blank for a second or two	• Electrical power system is very noisy, particularly the ground. • The CATx cable is not properly connected.	• Make sure the interconnection cable is not near any power lines. • Check cable connections. Make sure they are snapped-in properly and completely.
CPU doesn't detect the keyboard and the mouse	• Keyboard cable or mouse cable are loose • Cat 5 cable is too long	• Check cable connections • CATx cable can be no more than 200 feet in length
Image is not displayed properly, lacks definition	Signal is being skewed by the CATx cable and not being received correctly by the monitor.	• Check the user's manual for the monitor, projector, or display equipment for an "automatic adjustment" or "auto-configure". This is most common to LCD type monitors.
Models with RS232 Support		
No RS232 communication	• One or more RS232 cables is loose or disconnected	• Check all RS232 cable connections
Models with audio Support		
No audio	• Audio cable is not properly plugged in • Speakers are not plugged in • CATx cable is not properly connected	• Check all cable connections • Verify speakers are connected and powered • Check CATx cable connections

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.

MAN006   Rev. 3/30/23