



NTI® NETWORK
TECHNOLOGIES
INCORPORATED

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

XTENDEX™ Series

ST-C5USBV USB KVM EXTENDER Installation and Operation Manual



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 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 ST-C5USBV USB Extender is designed to enable the relocation of a monitor, USB keyboard, and USB mouse from a USB CPU or NTI USB KVM switch by as much as 1000 feet via CAT5 cable in addition to having a monitor, USB keyboard, and USB mouse connected locally. It is extremely simple to install and has been thoroughly tested to insure reliable performance. Through the use of Category 5 shielded or unshielded twisted-pair cable (STP/UTP) or Category 6 unshielded twisted-pair cable (UTP), it is possible to economically increase the flexibility of a computer system.

Features

- Allows the placement of a monitor, USB keyboard, and USB mouse in a location where only these parts are needed without having the CPU there too, taking up valuable space and adding to room noise.
- Provides crisp and clear resolution up to 1024 x 768 /60Hz @ 1000 feet, 1280 x 1024 /60Hz @ 700 feet, 1600 x 1200 /60Hz @ 500 feet, and 1920 x 1440 /60Hz @ 300 feet using CAT5 UTP cable.
- Provides crisp and clear resolution up to 1024 x 768 /60Hz @ 600 feet, 1280 x 1024 /60Hz @ 500 feet, 1600 x 1200 /60Hz @ 400 feet, and 1920 x 1440 /60Hz @ 300 feet using CAT5 STP cable.
- Provides crisp and clear resolution up to 1024 x 768 /60Hz @ 800 feet, 1280 x 1024 /60Hz @ 700 feet, 1600 x 1200 /60Hz @ 600 feet, and 1920 x 1440 /60Hz @ 500 feet using CAT6 UTP cable.
- Video quality adjustment is automatic providing optimum image quality for varying lengths of cable.
- Installation can be between a CPU and devices (keyboard, mouse, and monitor), between a CPU and NTI USB switch, or between a NTI USB switch and devices.
- Allows hot-plugging of keyboards and mice

Types of User Input Devices Supported:

- XGA, VGA, and SVGA systems
- All NTI USB switches
- Microsoft, Logitech or Kensington Wheelmouse or Trackball on MAC CPUs with manufacturer's drivers
- USB keyboard with Windows® layout
- USB keyboard with SUN layout
- USB keyboard with MAC layout
- USB Mouse - (up to 3 buttons)
- USB IntelliMouse® (scrollwheel)
- Logitech Cordless Elite Duo keyboard and mouse
- Crystal Vision keyboard with touchpad
- Gyration keyboard and mouse
- NTI USB-PS/2 Adapter
- NTI USB-SUN Adapter

Operating Systems Supported

- Windows 95,98
- Windows 2000
- Windows ME
- Window XP
- Linux 7.1 or greater
- Sun-Solaris
- MAC OS 9.1 or greater

Limitations

- The ST-C5USBV USB Extender will only work with USB keyboards and mice, other USB devices are not supported.
- PS/2 devices can be connected to the ST-C5USBV USB Extender through an NTI USB-PS/2 adapter, however the translation keys described on page 12 will not function in this application.
- The ST-C5USBV USB Extender can be used between a cascadable NTI switch and a CPU although the cascading features will not function.

MATERIALS

Materials supplied with this kit:

- ✓ NTI ST-C5USBV USB Extender Local Unit
- ✓ NTI ST-C5USBV USB Extender Remote Unit
- ✓ 2-120VAC or 240VAC 50 or 60Hz-5VDC/2A AC Adapters
- ✓ CD with a pdf file of this owner's manual

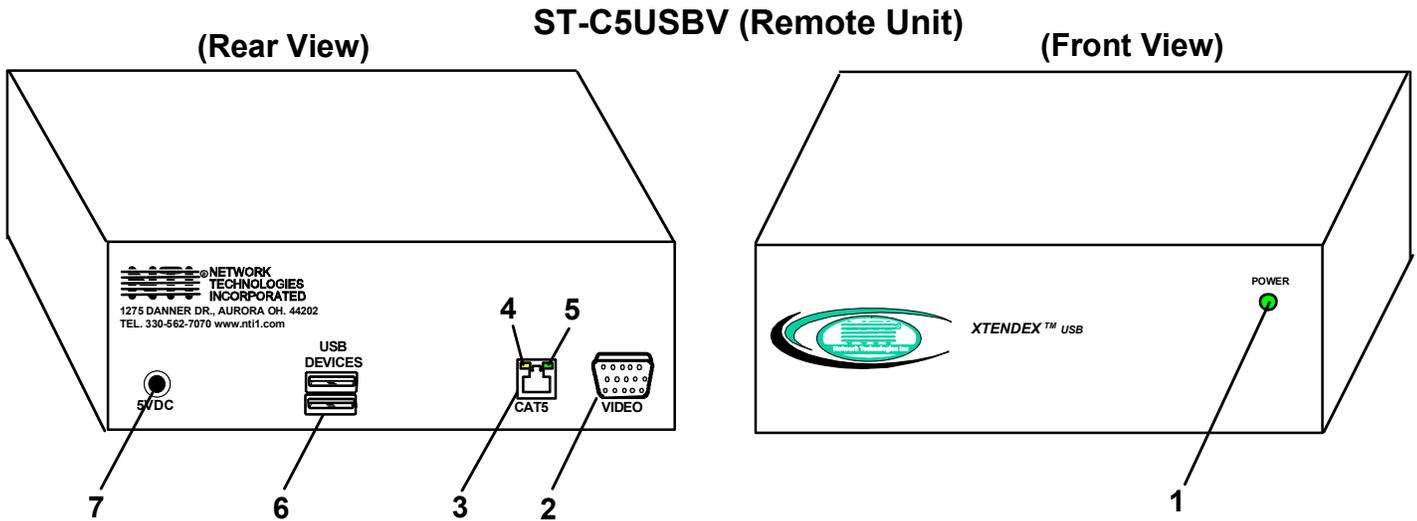
Additional materials may need to be ordered, depending upon the configuration :

- Video adapter for connection between the Local and a non-VGA SUN CPU (13W3M-15HDF)
- USBVEXT-3/6/10 (15HD Male-to-Female and USB Type A Male-to-Female Extension cable) if the Local Unit will be located further than 15" from the CPU or KVM switch
- CAT5/5e shielded/unshielded twisted-pair cable(s) terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see pg. 13 for proper EIA/TIA 568B wiring method)

-OR-

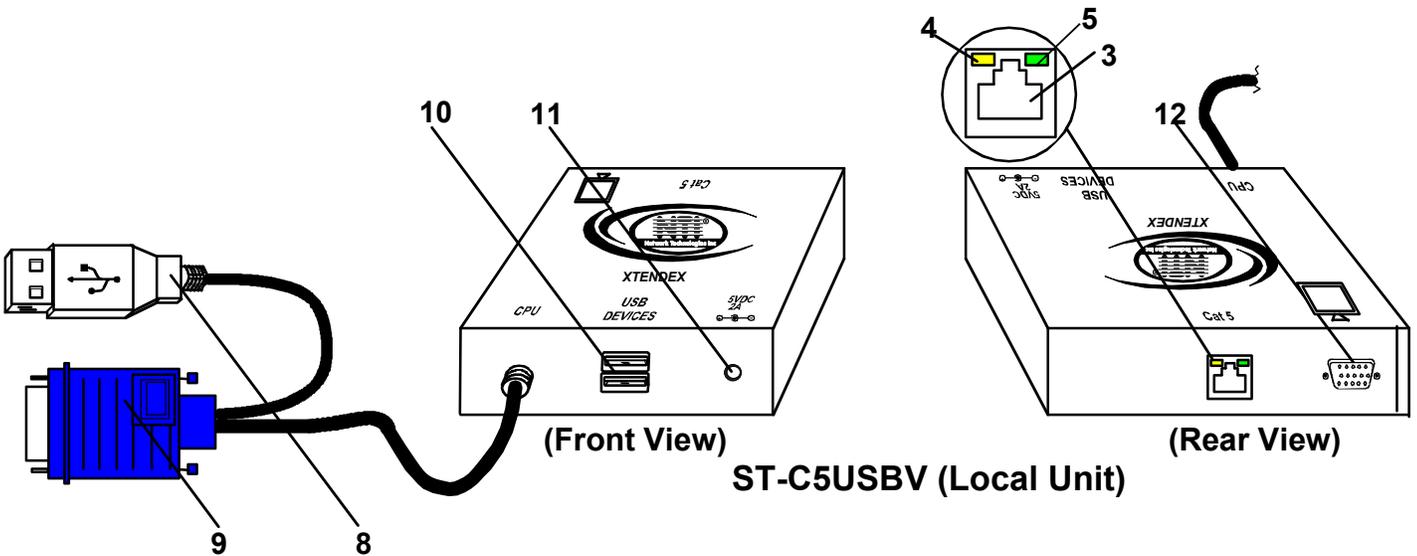
CAT6 unshielded twisted-pair cable(s) terminated with RJ45 connectors wired straight thru- pin 1 to pin 1, etc. (see pg. 13 for proper EIA/TIA 568B wiring method)

Contact your nearest NTI distributor or NTI directly for all of your KVM needs at 800-742-8324 (800-RGB-TECH) 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.



FEATURES AND FUNCTIONS

1. **Power LED**- for visual indication of power to Remote Unit
2. **VIDEO**- 15HD female for connection of video cable from remote monitor
3. **CAT5**- RJ45 female for connection of CAT5 cable between Local Unit and Remote Unit
4. **Yellow LED**- power indicator- illuminates when power has been supplied to the unit
5. **Green LED**- communication indicator- blinks when there is valid communication between the Local and Remote Units.
6. **USB DEVICES**- USB type A female for connection of remote user USB device(s)
7. **5VDC**- connection jack for remote AC adapter
8. **Devices Cable**- USB Type A male connector for connection to CPU
9. **Video Cable**- 15HD male for connection to video connector of CPU
10. **USB DEVICES**- USB Type A female for connection of local user USB device(s)
11. **5VDC**- connection jack for local AC adapter
12. **Monitor (symbol)**-15HD female for connection of video cable from local monitor



PREPARATION FOR INSTALLATION

- A location should be chosen for the monitor, mouse, and keyboard that also has space to mount the Remote Unit within the distance provided by the cables from the monitor, mouse, and keyboard. If extension cables are needed, contact NTI for the cables required. If a local user will be connected, a proper location must be chosen for these devices too.
- The CAT5 cable(s) must be run to the locations where the Remote and Local Units will be placed. 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 mounting locations of the Remote and Local Units.
- 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 mounting location of the Remote Unit and monitor to plug them into.
- All cables should be installed in a fashion that will avoid 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 prevent this.
- Properly shut down and disconnect the power of the CPU and monitor. Disconnect the monitor, keyboard, and mouse. 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: *Outdoor or underground runs of CAT5 cable could be dangerous and will void the warranty.*

INSTALLATION

The Local Unit

Connect to the CPU

1. Plug the cables of the Local Unit into the back of the CPU. (See Fig. 1.)
 - a) Connect the blue 15HD cable from the Local Unit to the female VGA port on the back of the CPU.
 - b) Connect the USB Type A cable from the Local Unit to a female USB Type A port on the back of the CPU.

Note: If a SUN CPU is being connected, depending upon the video connector of the SUN CPU, it may be necessary to attach an NTI #13W3M-15HDF (SUN video port-to-VGA adapter) to the video port on the CPU first, and then connect the video cable to the adapter.

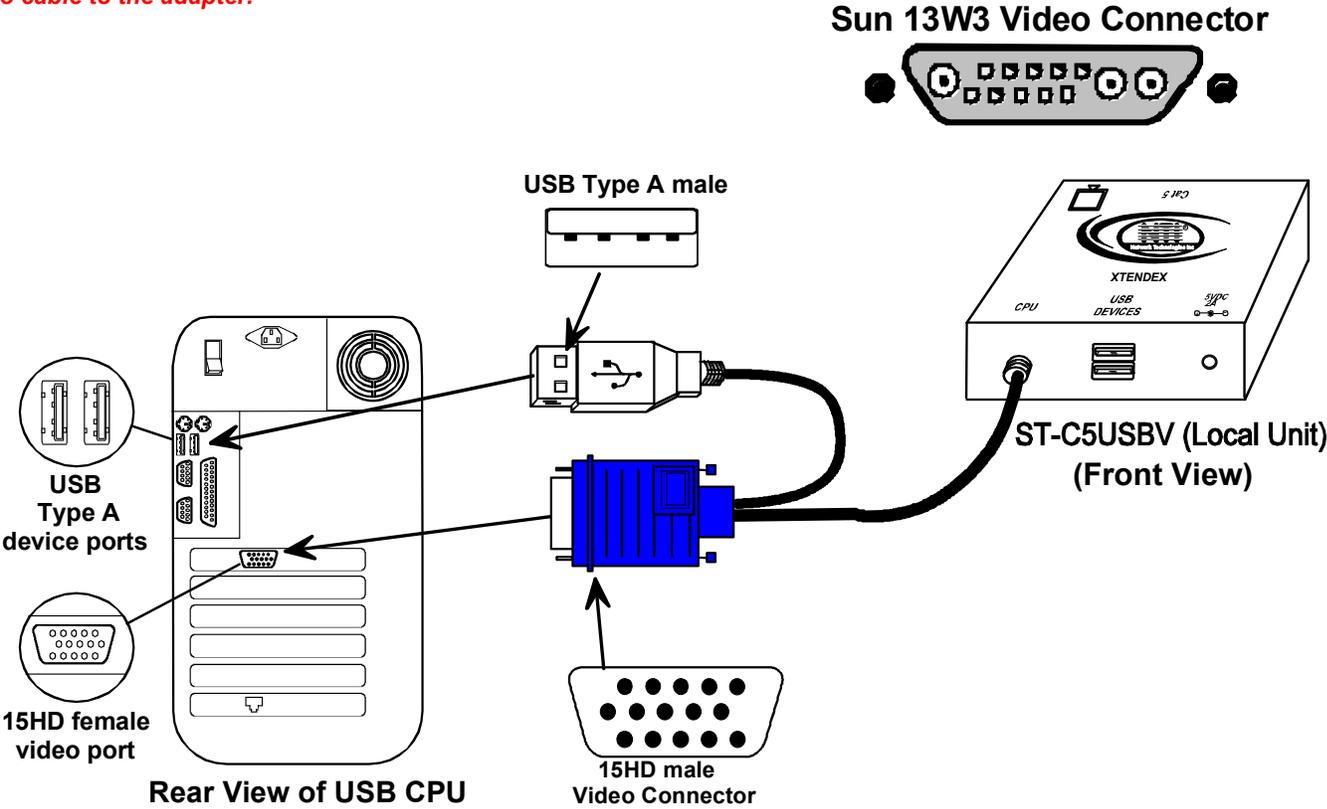


Figure 1- Connect the Local Unit to a CPU

Connect the Local Devices

If desired, connect the local user devices to the Local Unit as shown in Fig. 2.

1. Connect a USB keyboard and mouse to the USB type A female connectors on the Local Unit.
2. Connect a monitor to the 15HD female connector on the Local Unit.

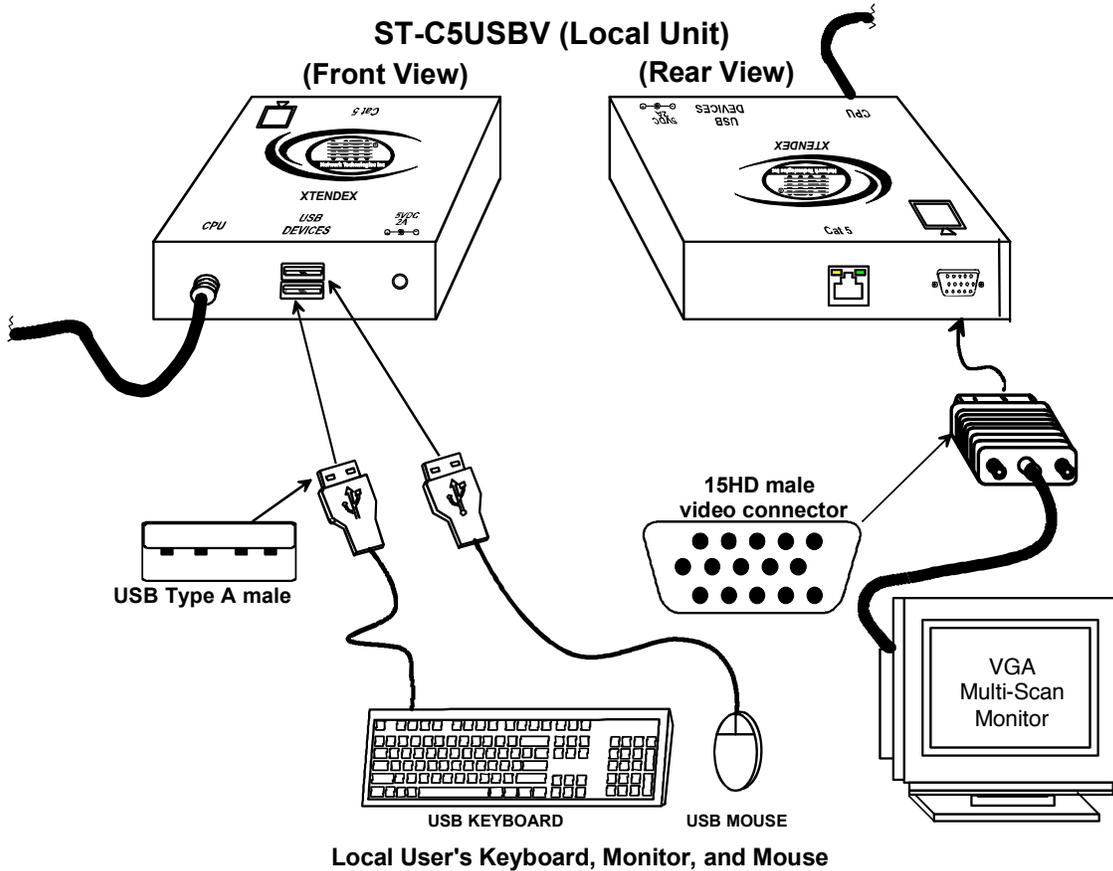


Figure 2- Connect local user devices to the Local Unit

Connect the CAT5 Cable

Connect the CAT5 cable to the "CAT5" port on the rear of the Local Unit (see Fig. 3). (If an RJ45 wall outlet is being used, connect the other end of the extension cable to it.) When properly inserted the cable end should snap into place.

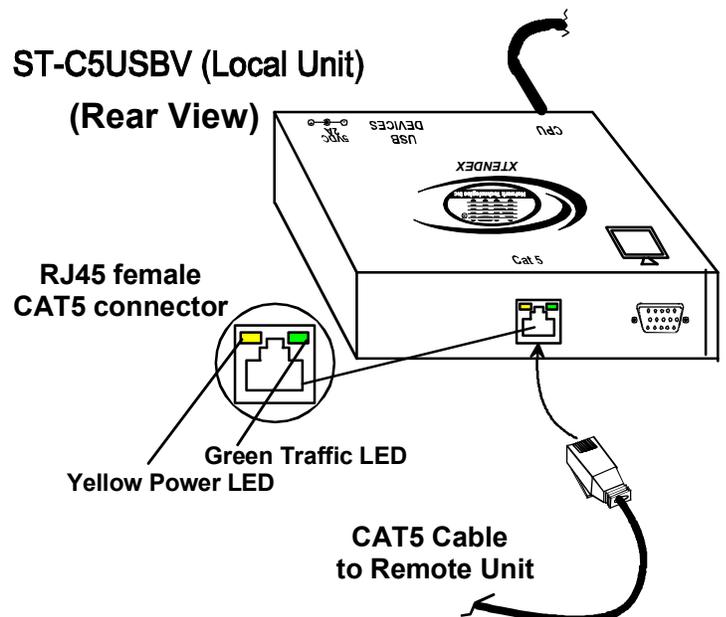


Figure 3- Connect the CAT5 cable to the Local Unit

The Remote Unit

1. Position the Remote Unit such that the CAT5 cable, the monitor cable, the keyboard and mouse, and the AC adapter power connector can each reach the Remote Unit comfortably.
2. Connect the monitor cable to the 15HD female VIDEO port on the back of the Remote Unit. (See Fig. 4)
3. Connect the devices to the Remote Unit.
 - a. Connect the USB keyboard cable to one of the USB Type A female ports labeled "USB DEVICES" on the back of the Remote Unit. (Either one will work.)
 - b. Connect the USB mouse cable to the remaining USB Type A female port on the back of the Remote Unit.
4. Make sure the CAT5 cable has been installed in accordance with the "Preparation for Installation" instructions on page 4. Connect the CAT5 cable to the "CAT5" port on the back of the Remote Unit. (If an RJ45 wall outlet is being used, connect the other end of the extension cable to the RJ45 wall outlet.) When properly inserted the CAT5 cable end should snap into place.



WARNING: Never connect the ST-C5USBV Extender 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.

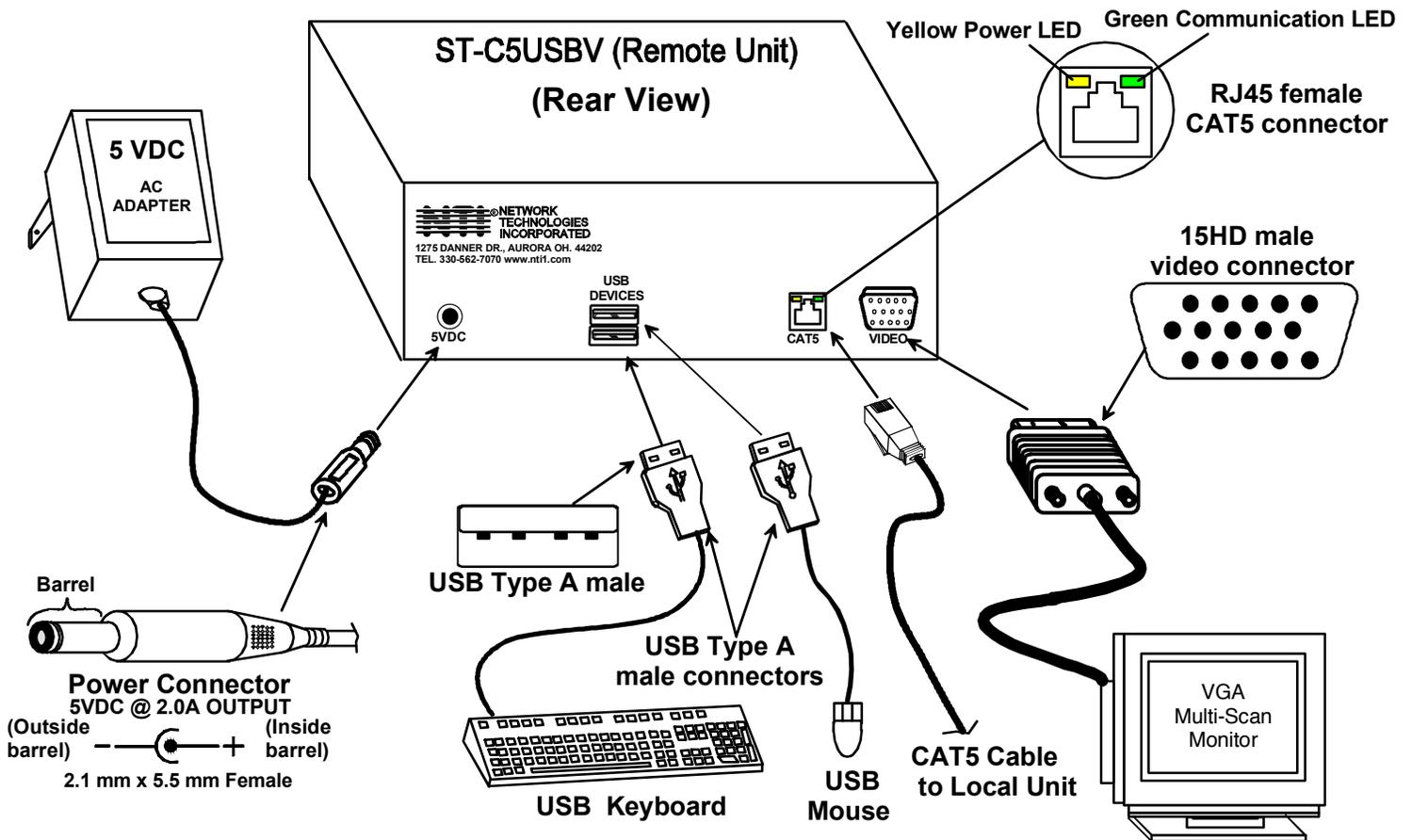


Figure 4- Connect the Monitor and Devices to the Remote Unit

Plug-in and Boot Up

1. Plug the power cord from the monitor into the power outlet.
2. Connect one AC adapter power connector to the 5VDC port on the back of the Remote Unit. (AC adapter shown in Fig. 4)
3. Plug the AC adapter into a power outlet. The "Power" LED on the Remote Unit should illuminate, indicating that a proper power connection has been made to the Remote Unit.
4. Connect the other AC adapter power connector to the 5VDC port on the Local Unit (Fig. 5).
5. Plug the AC adapter into a power outlet. The "Power" LED on the Local Unit should illuminate, indicating that a proper power connection has been made to the Local Unit.
6. Turn ON the CPU and monitor. The CPU and monitor should each react as if they were directly connected to each other. The green communication LEDs on the Remote and Local Units (see fig. 3) should blink indicating there is proper communication between them.

Note: A loss of signal (blank screen) may be experienced for an instant during the auto-compensation process after powering-up. This may also occur if the CAT5 USB KVM Extender senses a loss of or weak signal connection in the CAT5 cable.

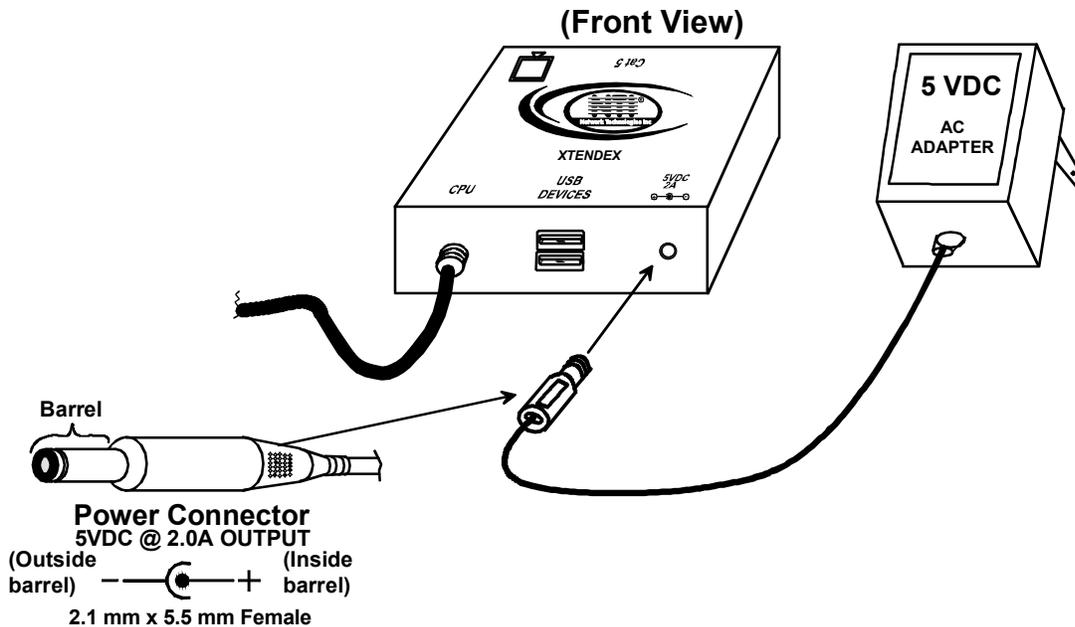


Figure 5- Connect AC adapter to Local Unit

SETUP MENU

The Setup Menu is an On Screen Display (OSD) menu that allows users to change the configuration of the ST-C5USBV USB Extender. The following configuration changes can be made:

- Video Adjustments- for adjusting video resolution based on varying cable lengths
- Port Configuration- for adjusting compatibility with MAC versus PC and SUN CPUs
- DDC Update- for updating DDC information between the monitor and the Extender

To access the Setup Menu, simultaneously press the left and right <Shift> keys on the keyboard. The menu in Figure 4 will appear.

Note: The OSD menu is only accessible from the Remote Unit.

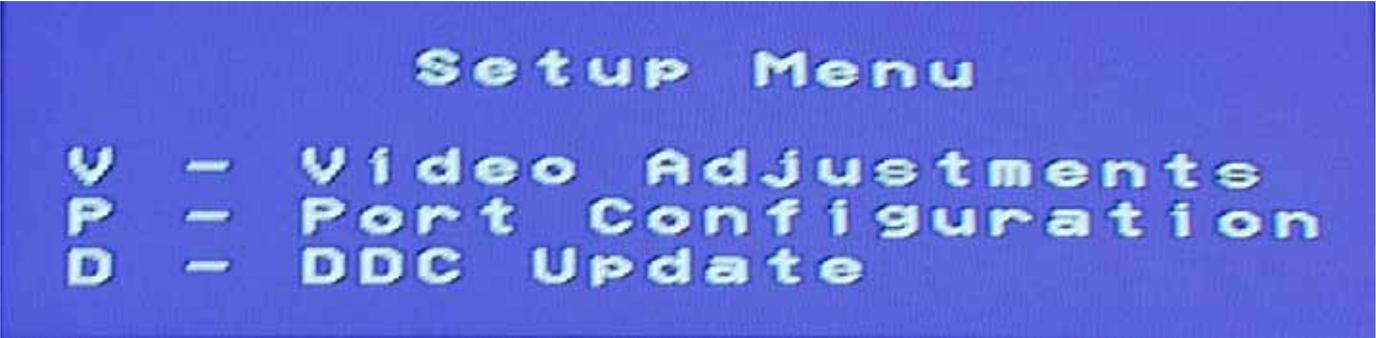


Figure 6- Setup Menu

Function:	Keys:
Go to Video Adjustments screen	Press <V>
Go to Port Configuration screen	Press <P>
Update DDC information	Press <D>
Exit Setup Menu	Press <Esc>

Note: The window can be moved across the screen by moving the mouse.

Video Adjustment Screen

Video quality adjustment is done automatically to assure the image is as clear as possible. However, due to the different twisting rates of each pair of wires in the CAT5 cable, variations in the signal delays between the red, green, and blue channels will occur when the cable is longer than 400 feet. The variations could result in poor image convergence (i.e. instead of a white vertical line the user will see three vertical lines: red, green, and blue). These variations may be adjusted by changing the settings in the first three horizontal scroll bars. Changing the settings will vary the timing of the signals and ultimately balance them out.

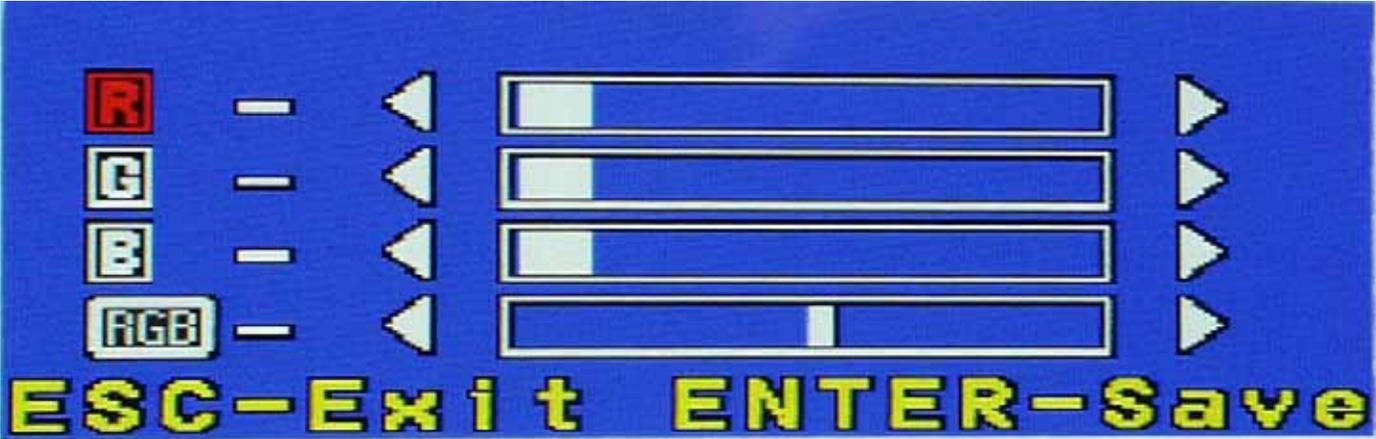


Figure 7- Video Adjustment Screen

Function:	Keys:
To move between the scroll bars	Press <Up Arrow> or <Down Arrow>, the selected scrollbar will have a red label
To adjust the scroll bar setting	Press <Left Arrow> or <Right Arrow>
Save changes and exit menu	Press <Enter>
Exit menu without saving	Press <Esc>

The "RGB" scroll bar is used for fine video quality adjustment of all colors. This allows the user to "fine tune" the quality of the adjusted video.

To verify if such an adjustment is actually needed, open an application with a white window (i.e. Microsoft Word) and move the window to the right side of the screen to create a white-to-black transition. If a colored vertical line can be seen at the edge of the white window the adjustment may be needed. According to the color of the line, change the setting of the corresponding horizontal scroll bar until a clean white-to-black transition is obtained.

Note: For additional quality adjustment, it may be necessary to adjust the brightness and contrast settings of the monitor.

Port Configuration Screen

Port Configuration enables the user to configure the Local Unit to be connected to a MAC CPU for passing mouse information to the MAC CPU. This is useful when the user wants to use mouse drivers provided by the mouse vendor, which allows the use of programmable functions for each mouse button. The Local Unit can be configured whenever necessary.

NOTE: When the port is connected to a PC or SUN CPU, the configuration should be at the default setting of "W: Computer is not Mac".



Figure 8- Port Configuration Screen

Function:	Keys:
Configure for connection to MAC CPU	Press <M> or <Up Arrow>
Configure for connection to PC or SUN CPU (default)	Press <W> or <Down Arrow>
Save changes and exit Port Configuration	Press <Enter>
Exit Port Configuration without saving	Press <Esc>

The corresponding check-box will reflect the port configuration. After setting, the configuration is stored in memory and will be retrieved whenever the ST-C5USBV Extender is powered ON.

DDC Update

DDC information allows the CPU to automatically select the optimal resolution for your monitor. Updating the DDC information is to be done at initial power-ON of the ST-C5USBV Extender or whenever a different monitor is connected to the Extender. Both the Local and Remote Units must be powered in order to update the DDC information.

Pressing D from the Setup Menu (page 9) will instruct the ST-C5USBV USB KVM Extender to read the DDC information from the monitor and store it in memory. A progress bar will show the status of the update operation. The OSD will return to the Setup Menu once the update is complete. It will be necessary to restart the CPU after updating the DDC information.

Attention: Some graphics cards will not send a video signal to the monitor until it has received the DDC information from the monitor. In this case, the monitor may not display anything until the DDC information is read. This may occur if this is the first time the monitor is being connected to the Extender. The DDC information must be updated in the Extender to achieve video.

To update the DDC information without video;

1. With everything connected, power ON the CPU, Remote Unit, the Local Unit, and the monitor.
2. Press the left and right <Shift> keys on the Remote keyboard to get into Setup Menu. (The OSD may not be visible.) The Green Communication LED on the ST-C5USBV RJ45 connector should stop blinking.
3. Press <D> to update DDC information. The Green Communication LED will blink for 2-3 seconds. Wait until it stops blinking.
4. Press <Esc> to exit the Setup Menu.
5. Restart the CPU.

COMMON APPLICATIONS

Figure 9 (below) illustrates three common applications for the ST-C5USBV USB KVM Extender.

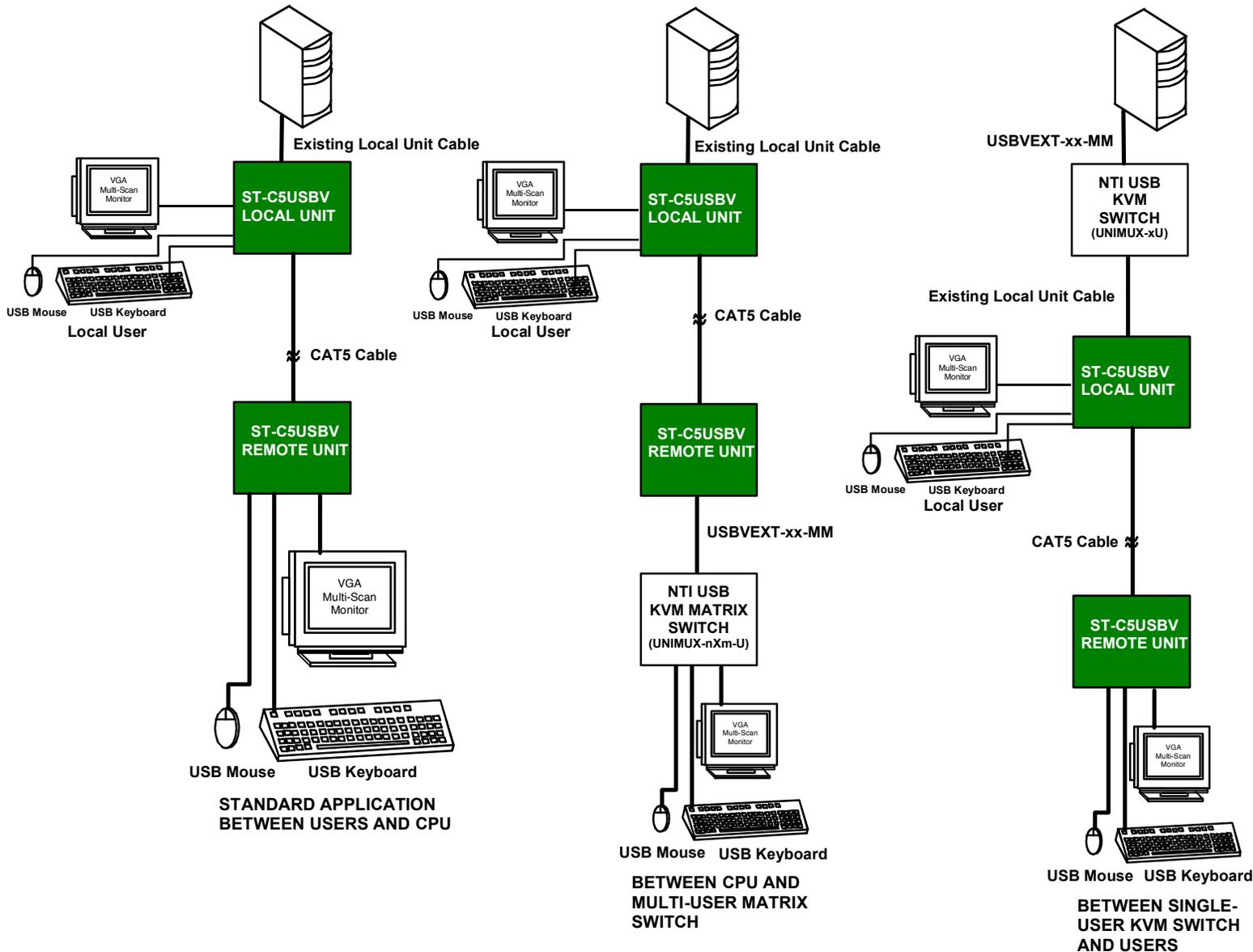


Figure 9- Examples of common applications for the ST-C5USBV USB KVM Extender

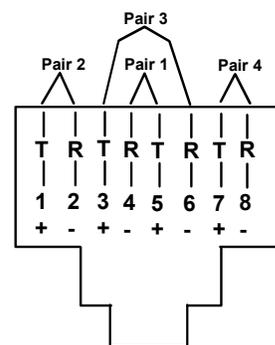
TECHNICAL SPECIFICATIONS

Maximum Resolution w/ CAT5 UTP (refresh frequency 60Hz)	1024 X 768 @ 60Hz- up to 1000 feet 1280 x 1024 @ 60Hz- up to 700 feet 1600 x 1200 @ 60Hz- up to 500 feet 1920 x 1440 @ 60 Hz- up to 300 feet
Maximum Resolution w/ CAT5 STP (refresh frequency 60Hz)	1024 x 768 @ 60Hz- up to 600 feet 1280 x 1024 @ 60Hz- up to 500 feet 1600 x 1200 @ 60Hz- up to 400 feet 1920 x 1440 @ 60Hz- up to 300 feet
Maximum Resolution w/ CAT6 UTP (refresh frequency 60Hz)	1024 x 768 @ 60Hz- up to 800 feet 1280 x 1024 @ 60Hz- up to 700 feet 1600 x 1200 @ 60Hz- up to 600 feet 1920 x 1440 @ 60Hz- up to 500 feet
Video Compatibility	SVGA, XGA, VGA
Video Quality	Variable (via OSD menus) for up to 1000 feet of CAT5 cable
Video Coupling	DC
Video Connectors	HD15 male to CPU HD15 female to local and remote monitors
Sync Types Supported	Separate and composite TTL Level and sync on green
Video Signal Type	Analog RGBHV, RGBS, RGsB
Maximum Input/Output Levels	1.45Vp-p (no offset)
Input / Output Impedance	75 Ohms
Input Horizontal Frequency Range	15kHz to 150 Hz
Input Vertical Frequency Range	30 Hz to 150 Hz
Keyboard/Mouse Connectors	USB Type A female- to local and remote keyboard/mouse USB Type A male- to CPU
Interconnect Cable	CAT5/5e Solid UTP/STP EIA/TIA 568B wiring w/ male RJ45 connectors - OR - CAT6 Solid UTP EIA/TIA 568B wiring w/ male RJ45 connectors
Remote and Local Unit Power	120V or 240V (50 or 60Hz) 5VDC/2.0A AC Adapters
Operating Temperature Range	+10°C to +40°C
ESD protection	Complies with EN61000-4-2 Specification
Dimensions WxDxH (In.)	Local Unit- 3.5x3.1x1.2 Remote Unit- 8x6.2x2.6

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 568B industry standard. Wiring is as 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



(View looking into RJ45 female)

Figure 10- Pin positions in female RJ45 connector

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.



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KEYBOARD TRANSLATION

Key Equivalents

Using the chart below, find the character needed to be typed on the CPU being accessed, then follow the row across for the equivalent on the keyboard being used. (See Fig. 11 on page 14 for reference.)

USB 101	WINxx	MAC (Apple USB)	SUN
L-Ctrl	L-Ctrl	L-Ctrl	L-Ctrl
L-Alt	L-Alt	L-Option	L-Alt
SB+F12	Application	SB+F12	Compose
R-Alt	R-Alt	R-Option	Alt-Graph
SB+Alt	Windows Logo	Command	Meta
SB+R Arrow	SB+R Arrow	Power	Suspend

SB = Space Bar

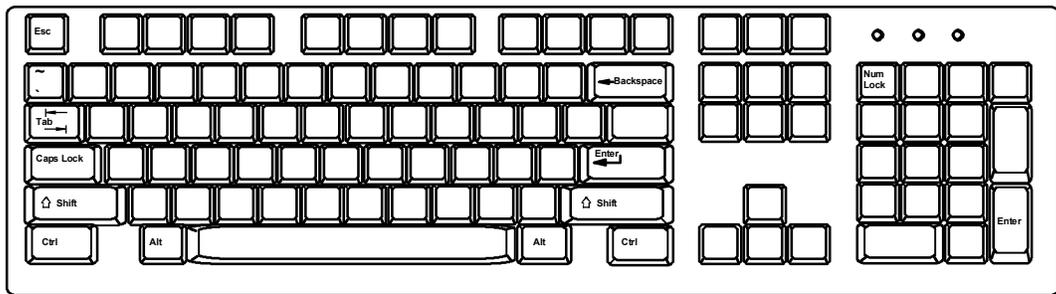
L and R = Left and Right keys when two keys are marked the same on a keyboard.

SUN's 16 Extra Keys

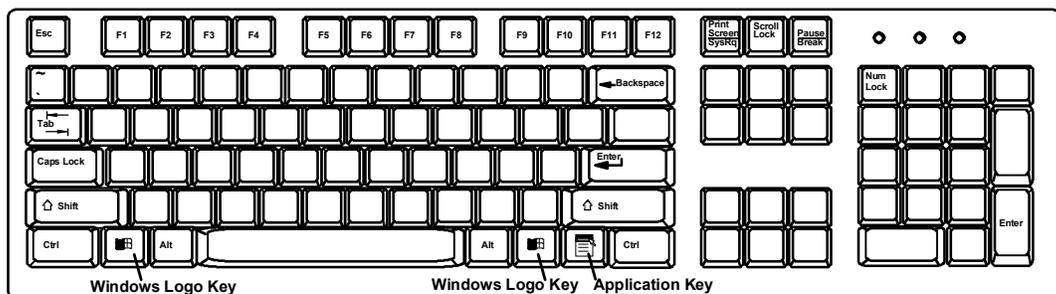
Use the chart below to type SUN's additional 16 keys using a 101, WINxx, or MAC (Apple) USB keyboard).

101,WINxx,MAC Keyboards	SUN Extras	101,WINxx,MAC Keyboards	SUN Extras
SB+F1	Stop (L1)	SB+F9	Find (L9)
SB+F2	Again (L2)	SB+F10	Cut (L10)
SB+F3	Props (L3)	SB+F11	Help
SB+F4	Undo (L4)	SB+F12	Compose
SB+F5	Front (L5)	SB + Up Arrow	Vol +
SB+F6	Copy (L6)	SB + Down Arrow	Vol -
SB+F7	Open (L7)	SB + L Arrow	Mute
SB+F8	Paste (L8)	SB + R Arrow	Suspend

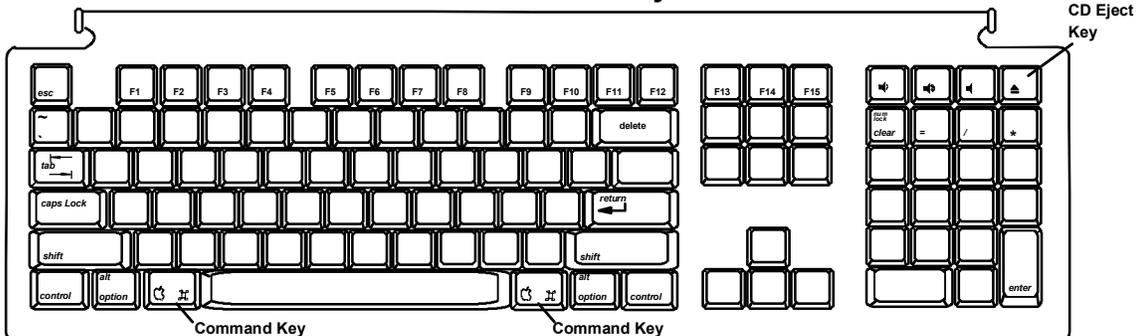
SB = Spacebar



Typical 101 Keyboard



Windows USB Keyboard



Apple Pro USB Keyboard



SUN USB Keyboard

Figure 11- Keyboard Layouts

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. We will be happy to assist in any way we can.

Problem	Cause	Solution
Remote Unit power LED does not illuminate	<ul style="list-style-type: none"> Power supply is not connected or plugged-in. 	<ul style="list-style-type: none"> Make sure outlet is live and transformer is plugged-in. Make sure 5VDC jack is fully connected to the Remote Unit.
Local Unit power LED does not illuminate	<ul style="list-style-type: none"> Local is not connected to CPU. 	<ul style="list-style-type: none"> Make sure proper connection is made to CPU.
No video on monitor	<ul style="list-style-type: none"> 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. CAT5 cable is not connected. DDC Information needs to be updated in CPU 	<ul style="list-style-type: none"> Check all video cable connections Make sure power LED is illuminated for local and remote. If not, see both solutions above. With all the cables properly connected, reboot the CPU. Check cable connections. Make sure they are snapped-in properly and completely. Check cable connections. Make sure they are snapped-in properly and completely. See "DDC Update" on page 11.
Video picture is not sharp or is smeared	<ul style="list-style-type: none"> All Video Cables are not firmly seated. CAT5 cable is too long. The CAT5 cable is not properly connected. Video quality is not set properly. 	<ul style="list-style-type: none"> Check all connections. Make sure all cables are fully seated. Verify length is within specified limits-1000'. Check cable connections. Make sure they are snapped-in properly and completely. See pg. 9 for instruction on "Video Quality Adjustment".
Monitor sometimes loses sync, causing it to go blank for a second or two	<ul style="list-style-type: none"> Electrical power system is very noisy, particularly the ground. The CAT5 cable is not properly connected. 	<ul style="list-style-type: none"> Make sure the interconnection cable is not near any power lines. Check cable connections. Make sure they are snapped-in properly and completely.
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	CAT5 cable is too close to a strong power source.	Reroute CAT5 cable if possible.
PC boots with no error messages, but the keyboard does not work	<ul style="list-style-type: none"> Keyboard cable is loose. Keyboard in use is not compatible. 	<ul style="list-style-type: none"> Reseat Keyboard cable and check again. Make sure Keyboard is directly connected, not through a PS/2 to USB adapter.
Wrong or missing characters from those typed	The keyboard may be in the wrong mode.	<ul style="list-style-type: none"> Disconnect keyboard at Remote Unit end and reconnect. Reboot the system.
Connecting the keyboard effects the video	Older keyboards may require higher current than our unit supplies.	Change to a newer keyboard.
Mouse cursor appears on the screen, but the mouse does not work	<ul style="list-style-type: none"> Mouse cable is loose or disconnected. Mouse is not compatible. Remote connections didn't initialize. 	<ul style="list-style-type: none"> Check for quality cable connections to mouse at Remote Unit end. Make sure mouse is USB type. Power down the Remote Unit and then power up again.
OSD menu will not come up	User is trying to access the OSD from the devices connected to the Local Unit	The OSD menu is not accessible at the Local Unit. Try again from devices connected to the Remote Unit. (See page 9.)

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.

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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