BLACK BOX®
NETWORK SERVICES

ServSwitch Agility™

Extend quality DVI video, digital audio and USB connections across your high speed network to achieve ultimate system flexibility.

ACR1000A provides local and remote units: ACR1000A-T is a local unit (transmitter) only and ACR1000A-R is a remote unit (receiver) only.

LOCAL

ServSwitch Agility™

BLACK BOX KVMoIP EXTENDER

NET SER AUD USB DVI PWR

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Federal Communications Commission and Industry Canada Radio Frequency Interference Statements

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Instrucciones de Seguridad

(Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objetos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

1. Specifications

Approvals:	CE, FCC	
Hardware Compatibility:	All computers with DVI digital video, audio and USB interfaces	
Software Compatibility:	Operates with all known software and operating systems including Windows®, Linux®, Unix®, BSD, all Sun® OS, all Mac® OS, NetWare®, etc.	
Connectors: (local transmitter)	Video:	DVI-D female
	USB:	USB Type B female
	Line in:	3.5-mm stereo jack
	Line out:	3.5-mm stereo jack
	Other:	DB9 male for initial configuration and flash upgrades Power jack
Connectors: (remote receiver)	Video:	DVI-D female
	USB:	(4) USB Type A female
	Line/Mic in:	3.5-mm stereo jack
	Line out:	3.5-mm stereo jack
	Other:	DB9 male for initial configuration and flash upgrades Power jack
Operating Temperature:	32 to 104°F (0 to 40°C)	
Power:	DC jack (power adapter included)	
	Input:	100–240 VAC, 50/60 Hz
	Output:	5VDC, 12.5W
Dimensions (w x h x d):	198mm (7.92") x 44mm (1.76") x 120mm (4.8")	
Weights:	0.75kg (1.65lbs)	

2. Introduction

Thank you for choosing ServSwitch Agility which represents a major advance in the capabilities of digital extenders and switches. By encoding high quality DVI video, digital audio and USB connections into Internet Protocol (IP) messages, ServSwitch Agility offers highly advanced and flexible signal switching capabilities.

Our extensive knowledge of interfacing techniques and high speed networking has allowed us to develop new ways to break the chains of local DVI, USB and audio connections. With ServSwitch Agility, distance is finally no barrier to high specification, high performance computing. Furthermore, since all signals are now IP, the most elaborate and yet simple-to-use switching and multi-cast techniques make possible a great variety of uses.

The ServSwitch Agility units come in two forms: a local transmitter and a remote receiver. The former attaches to a single computer; the latter to your DVI video monitor, microphone, speakers and up to four USB peripherals. The distance between them is limited only by the size of your Gigabit Ethernet network.

In addition to separating one computer and its peripherals, ServSwitch Agility promotes sharing. You can arrange for a limitless number of screens and speakers, distributed anywhere across the network, to receive video and audio. You can also switch between any number of transmitter units from a single screen, keyboard and mouse in order to monitor a potentially vast collection of remote receiver systems.

All units feature browser-based configuration utilities to allow quick and easy set up, from near or far.

2.1 One-to-One Configuration

The simplest configuration links one remote receiver unit to a single local transmitter unit, either by a direct link (up to 100m) or over much greater distances via a Gigabit Ethernet network. Figure 2-1 shows a one-to-one configuration:

Figure 2-1. One-to-one configuration

2.2 One-to-Many Configuration

Using multicast techniques, an unlimited number of receivers* can receive video and audio data streams from a single local transmitter unit. Figure 2-2 shows a one-to-many configuration:
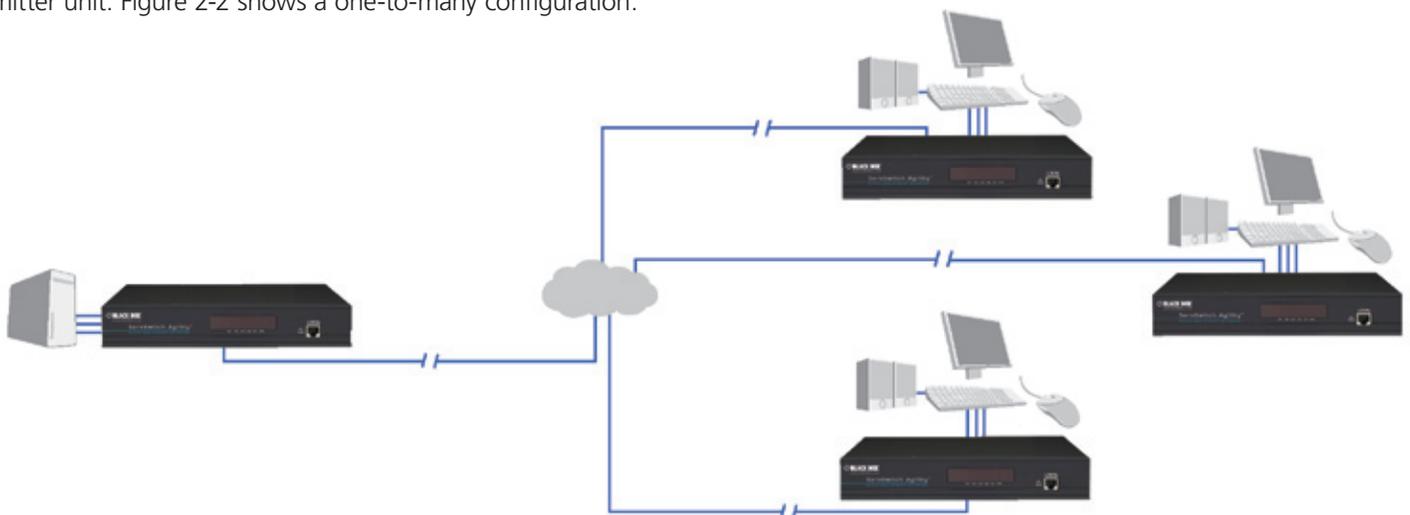

Figure 2-2. One-to-many configuration

2.3 Many-to-One (and Many-to-Many) Configuration

Each remote receiver unit can switch between different local transmitter units. Multiple instances of many-to-one and one-to-many configurations produce a highly flexible many-to-many installation. Figure 2-3 shows a many-to-one configuration:
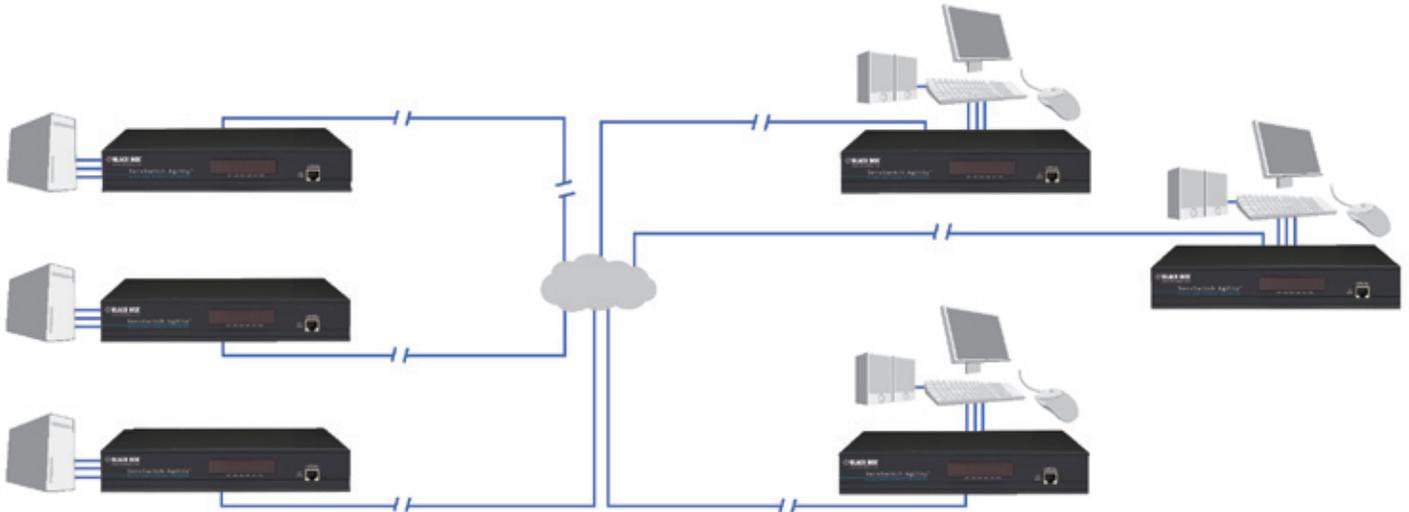

Figure 2-3. Many-to-one configuration

2.4 ServSwitch Agility Local Transmitter and Remote Receiver Unit Features

The ServSwitch Agility units are housed within durable, metallic enclosures with most connectors situated at the rear panel - only the Ethernet ports are situated at the front panel.

2.4.1 Local unit

The smart front faces feature the operation indicators as shown in Figure 2-4:
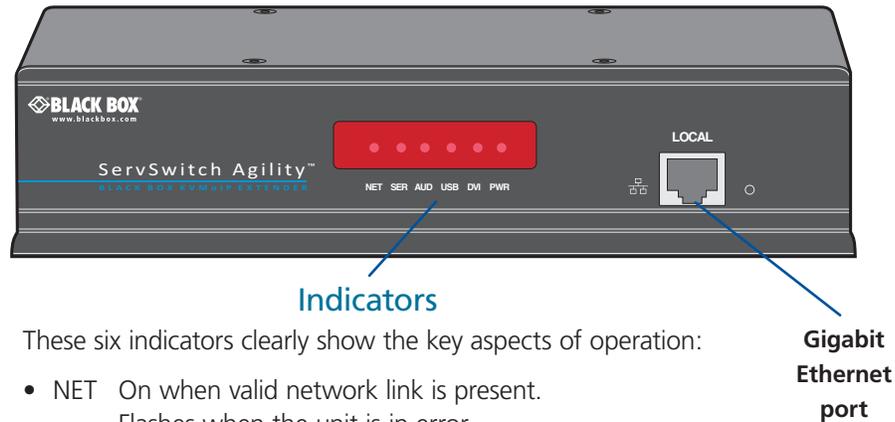
Indicators

These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present.
  Flashes when the unit is in error.
- SER On when the AUX (serial) port is enabled and active.
- AUD On when audio is enabled and active.
- USB On when USB is enabled and active.
- DVI On when DVI video is enabled and active.
- PWR Power indicator.

Gigabit Ethernet port

Figure 2-4. ServSwitch Agility local transmitter unit - front panel

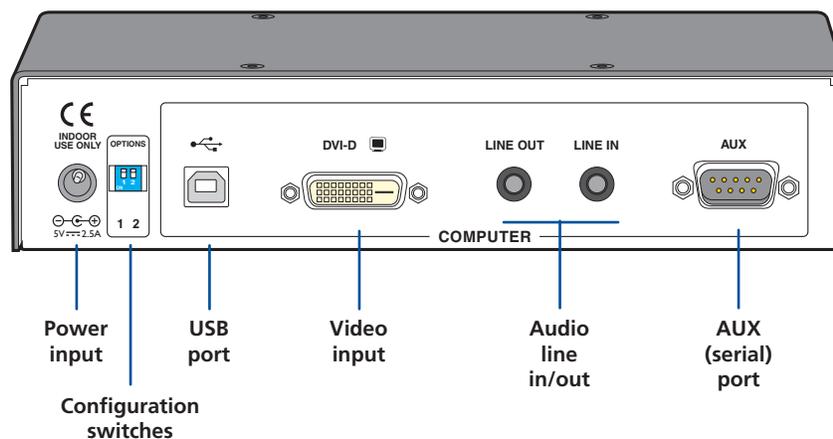Figure 2-5 shows the connectors located on the rear panel of the local transmitter unit:

Figure 2-5. ServSwitch Agility local transmitter unit - rear panel

2.4.2 Remote Unit

The smart front faces feature the operation indicators as shown in Figure 2-6:
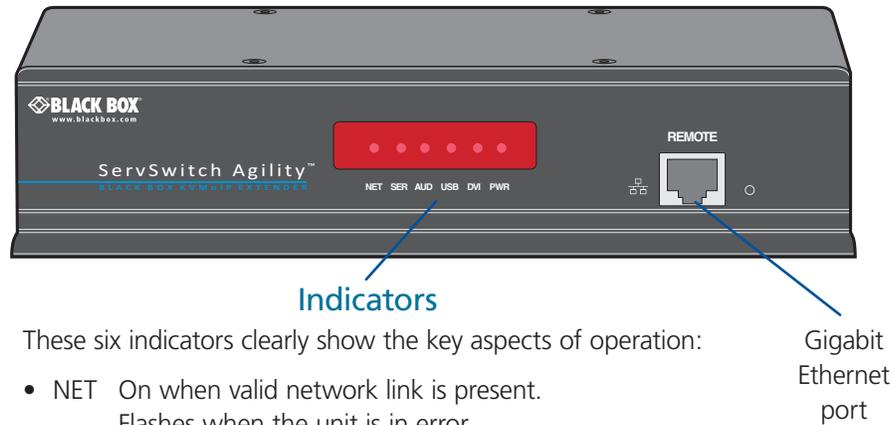
Indicators

These six indicators clearly show the key aspects of operation:

- NET   On when valid network link is present.
  Flashes when the unit is in error.
- SER   On when the AUX (serial) port is enabled and active.
- AUD On when audio is enabled and active.
- USB   On when USB is enabled and active.
- DVI   On when DVI video is enabled and active.
- PWR Power indicator.

Gigabit Ethernet port

Figure 2-6. ServSwitch Agility remote receiver unit - front panel

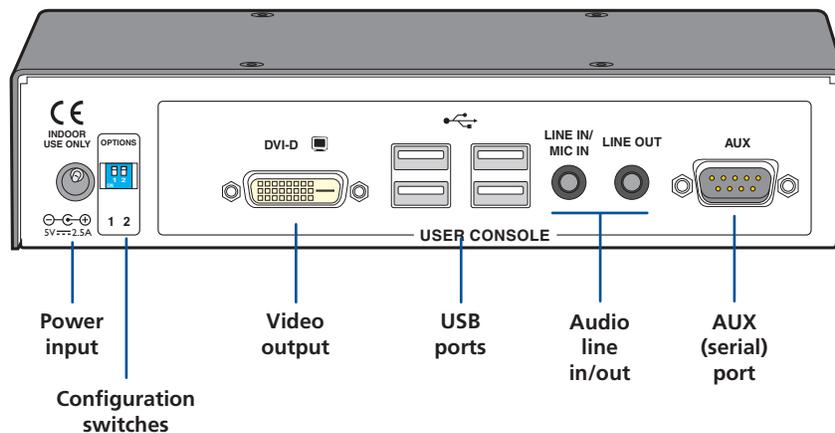Figure 2-7 shows the connectors located on the rear panel of the remote receiver unit:

Power input

Configuration switches

Video output

USB ports

Audio line in/out

AUX (serial) port

Figure 2-7. ServSwitch Agility remote receiver unit - rear panel

2.5 What's Included

Your package should include the following items. If anything is missing or damaged, contact Black Box at 724-746-5500 or info@blackbox.com.

2.5.1 Local Unit Package (ACR1000A-T)

- ServSwitch Agility local transmitter unit

- Power adapter and power cord

- (4) Self-adhesive feet

- CD-ROM containing this user manual in PDF format

- Combined DVI-D and USB cable (6 feet)

- (2) audio cables with 3.5mm stereo jacks (6.5 feet)

- Upgrade (serial null modem) cable (6.5 feet)

2.5.2 Remote Unit Package (ACR1000A-R)

- ServSwitch Agility remote receiver unit

- Power adapter and power cord

- (4) Self-adhesive feet

- CD-ROM containing this user manual in PDF format

2.6 Additional Items You May Need

- Power adapter and power cord (P/N: PS649-R3 and EPXR08)

- Combined DVI-D and USB cable (type A to B) (P/N: EHN900024U)

- Single link DVI-D to DVI-D video cable (P/N: EVNDVI02)

- USB cable type A to B (6.5 feet) (P/N: USB05)

- 3.5mm Audio cable (6.5 feet) (P/N: EJ110)

- Upgrade (serial null modem) cable (6.5 feet) (P/N: EYN257T-XXXX-FF)

- (2) 19" rackmount brackets and (4) screws (P/N: RMK2004 or RMK2004-2)

- VESA mounting bracket and (4) screws

3. Installation

3.1 Mounting

There are three main mounting methods:

- Via the (4) supplied self-adhesive rubber feet

- Via optional rackmount brackets

- Via the optional VESA mounting bracket

3.1.1 Rack Brackets

The optional brackets (plus four screws), enable the unit to be secured within a standard rack slot. See Figure 3-1.
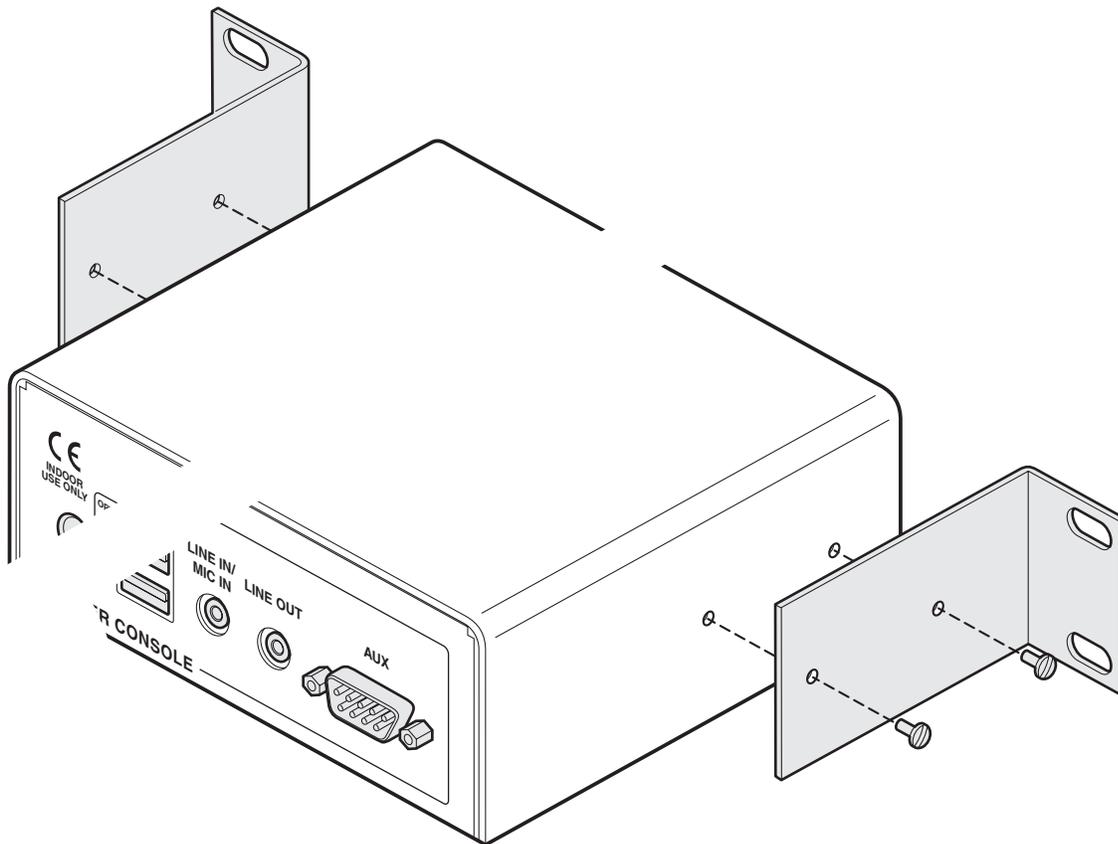
Figure 3-1. Rackmount brackets.

NOTE: Both the ServSwitch Agility units and their power supplies generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 104° F (40° C). Do not place the products in contact with equipment whose surface temperature exceeds 104° F (40° C).

3.1.2 Using the VESA Mounting Bracket

The optional mounting bracket conforms to the VESA mounting standard and so can be used to mount a ServSwitch Agility unit directly to the rear of most video display units. The bracket can also be fixed directly to a wall or other solid surface using appropriate screws or bolts.

1 Orientate the bracket against the rear of the video display so that its small folded-in tabs are lowermost. See Figure 3-2.

VESA mounting bracket

Rear panel of video display

ServSwitch Agility unit
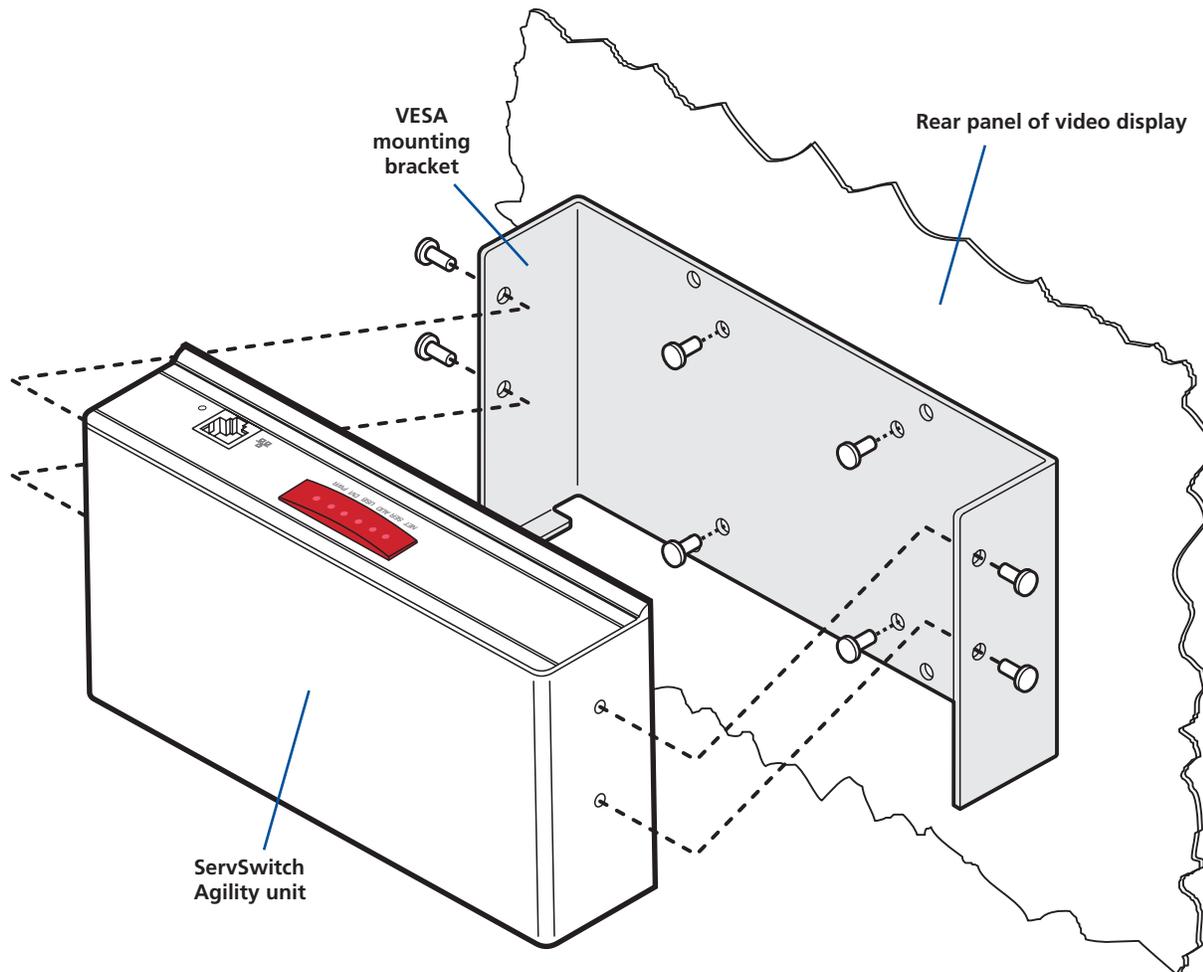
Figure 3-2. VESA mounting bracket.

2 Attach the bracket to the video display using four screws of a size appropriate to the threaded holes within the video display panel - do not overtighten.

3 Place the ServSwitch Agility unit into the bracket with its base facing towards the video display and the front panel of the ServSwitch Agility unit facing upwards.

4 Secure the ServSwitch Agility unit to the bracket using the four supplied screws - do not overtighten.

3.2 Connections

Installation involves linking the ServSwitch Agility local transmitter unit to various ports on the host computer, while the ServSwitch Agility remote receiver unit is attached to your peripherals.

3.2.1 Local Video Link

The ServSwitch Agility units support DVI digital video signals and so use DVI-D video connectors.

1 Wherever possible, ensure that power is disconnected from the ServSwitch Agility and the host computer.

2 Connect a digital video link cable to the DVI-D socket on the Local unit rear panel. See Figure 3-3.
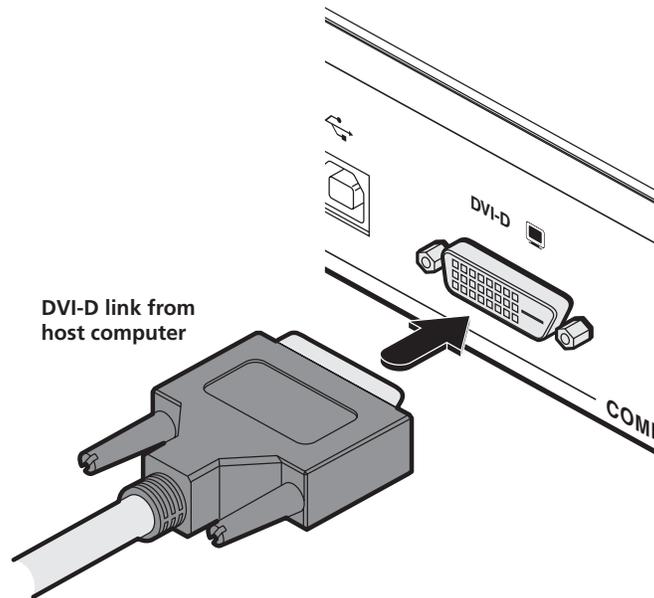
Figure 3-3. Connect the digital video link cable to the DVI-D socket.

3 Connect the plug at the other end of the cable to the corresponding video output socket of the host computer.

3.2.2 Local Audio Links

The ServSwitch Agility units support two way stereo digital sound so that you can use a microphone as well as speakers.

1 Connect an audio link cable between the LINE OUT socket on the local transmitter unit rear panel and the speaker output (line out) socket of the host computer. See Figure 3-4.
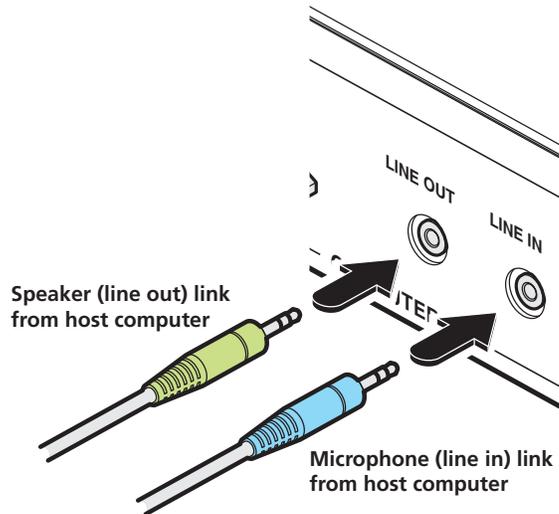
Figure 3-4. Connect the speaker and microphone cables to audio sockets.

2 [Where a microphone is to be used]: Connect a second audio link cable between the LINE IN socket on the local transmitter unit rear panel and the LINE IN socket of the host computer.

3.2.3 Local USB Link

The ServSwitch Agility units act as USB 2.0 hubs and so can provide four sockets at the remote receiver unit with only a single connection at the local transmitter unit.

1 Connect the squarer of the two connectors on a USB cable to the USB port on the Local unit rear panel. See Figure 3-5.

Figure 3-5. Connect the USB link cable to local transmitter unit socket.

2 Connect the other, more rectangular connector of the cable to a vacant USB socket on the host computer.

724-746-5500 l blackbox.com

3.2.4 Local AUX Port

The AUX port connection is not required for normal operation. This is an RS232 serial port that is used when performing an initial setup or firmware upgrade using the Start-of-Day configuration utility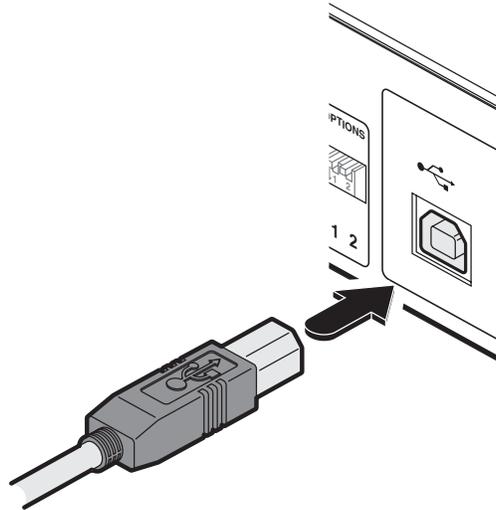. Your computer needs to have a suitable terminal emulator program, such as Windows HyperTerminal. See 4.1.3 Start-of-Day configuration utility for details.

1 Ensure that power is removed from the ServSwitch Agility unit.

2 Connect the supplied serial 'null-modem' cable (see Appendix D for pin-out) between a vacant serial port on your computer and the AUX port on the right hand side of the ServSwitch Agility rear panel. See Figure 3-6.
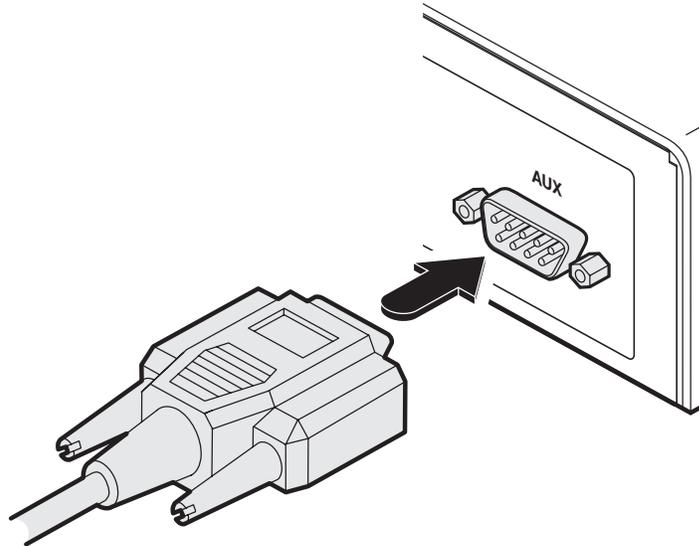
Figure 3-6. Connecting the serial link cable to local transmitter unit socket.

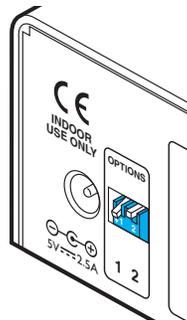3 On the rear panel, click option switch 1 to the ON (down) position. See Figure 3-7.

Figure 3-7. Click down option switch 1 to the ON position.

4 Power up the ServSwitch Agility unit and your computer. You are now ready to use the Start-of-Day configuration utility (See 4.1.3 Start-of-Day configuration utility) or perform an upgrade (See 4.1.7 Performing an upgrade).

3.2.5 Local Power In

Each ServSwitch Agility unit is supplied with a standard power supply. When all other connections have been made, connect and switch on the power supply unit

1 Attach the output lead from the power adapter to the **5V** socket on the rear panel of the unit. See Figure 3-8.

Note: Ensure that Option switches 1 and 2 are both in the 'off' (up) position to enable normal operation of the unit.
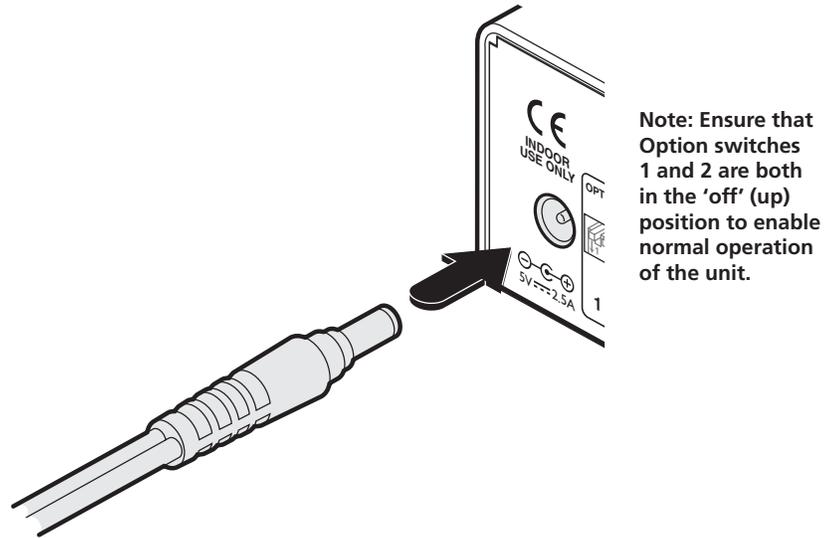
Figure 3-8. Connect the power adapter to the rear panel power socket.

2 Connect the IEC connector of the supplied country-specific power lead to the socket of the power adapter.

3 Connect the power cord to a nearby power supply socket.

Note: Both the unit and its power supply generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40ºC. Do not place the products in contact with equipment whose surface temperature exceeds 40ºC.

3.2.6 Local/Remote Network Link

The ServSwitch Agility units can be either connected directly to each other or via a Gigabit Ethernet network. For direct links, the length of cable should not exceed 100 metres (328 feet). Network cables used for connections may be category 5, 5e, 6 or 7 twisted-pair cable. The ServSwitch Agility local transmitter unit has an autosensing capability on its network interface, so for direct point-to-point connections, no 'crossover' Ethernet cable is required.

1 Connect a CAT 5, 5e, 6, or 7 cable to the socket on the front panel of the ServSwitch Agility unit. See Figure 3-9.
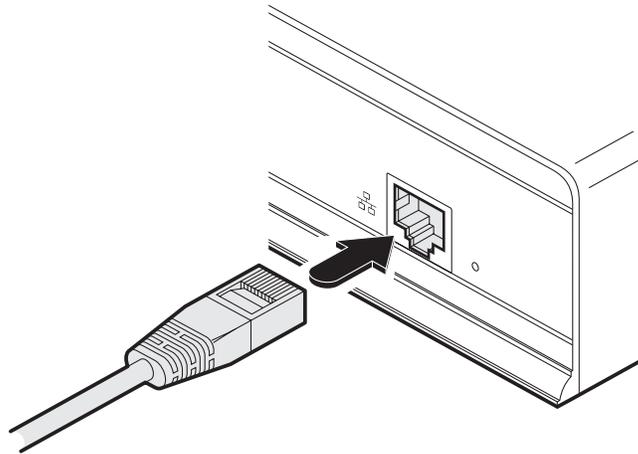
Figure 3-9. CAT 5, 5e, 6, or 7 link either directly from the other
ServSwitch Agility unit or from a Gigabit Ethernet switch.

2 Connect the other end of the cable either to the other ServSwitch Agility unit or to a Gigabit Ethernet switch, as appropriate.

3 [For connections via a network] repeat steps 1 and 2 for the other ServSwitch Agility unit.

3.2.7 Remote Video Display

The ServSwitch Agility unit supports a single DVI-D (no analog signals) video display via the socket on the rear panel. See Appendix E – Supported video modes for details.

1 Connect the lead from the video display to the DVI-D socket on the rear panel of the ServSwitch Agility unit. See Figure 3-10.
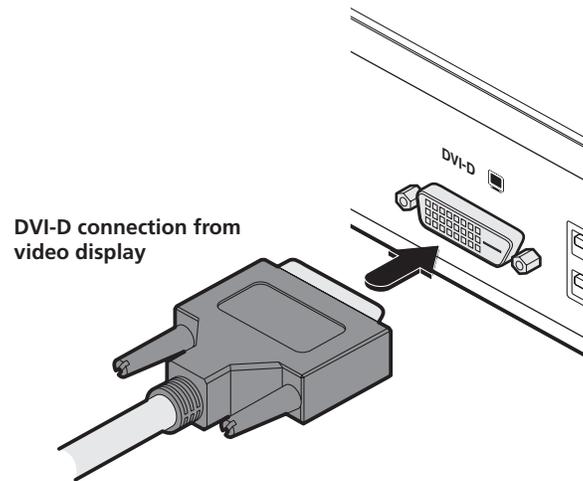
Figure 3-10. Connect the digital video link cable to the DVI-D socket.

3.2.8 Remote Microphone & Speakers

The ServSwitch Agility unit can support a microphone as well as speakers providing the necessary connections have been made between the ServSwitch Agility local transmitter unit and the host computer.

1   Connect the lead from a mono microphone or, alternatively, a line in connection from an audio device to the 3.5mm socket labelled LINE IN/MIC IN on the rear panel. See Figure 3-11.

Connection from microphone or line in from audio device

Connection from speakers or line out to audio device
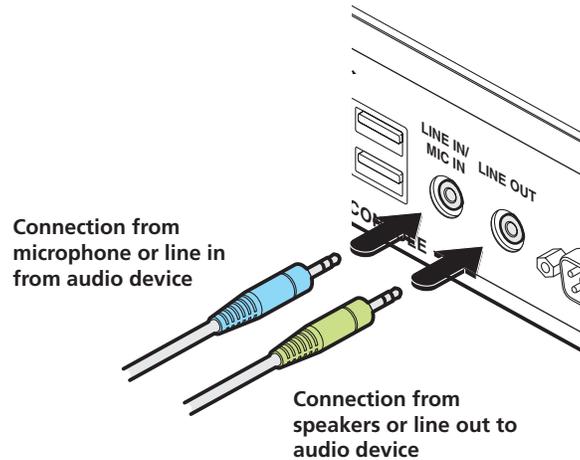
Figure 3-11. Connect the speaker and microphone cables to audio sockets.

2   Connect the lead from stereo speakers or, alternatively, a line out connection from an audio device to the 3.5mm socket labelled LINE OUT on the rear panel.

3   Once the unit has been fully connected and powered on, access the RX System Configuration page to check that the *Audio Input Type* setting matches the connection that you have made to the port: *line*, *mic* or *mic boost* (the latter provides +20dB gain).

3.2.9 USB Devices

The ServSwitch Agility remote receiver unit has four USB ports to which peripherals may be connected. The ports are interchangeable. To connect more than four peripherals, one or more USB hubs may be used. The total current that may be drawn from the USB ports is 1.2A, which should be sufficient for a keyboard, mouse (no more than 100mA each) and any two other devices (500mA maximum each). If more power for USB devices is required, use a powered USB hub.

1 Connect the lead from the device to any of the four USB sockets on the rear panel of the ServSwitch Agility unit. See Figure 3-12.

Connection from USB device
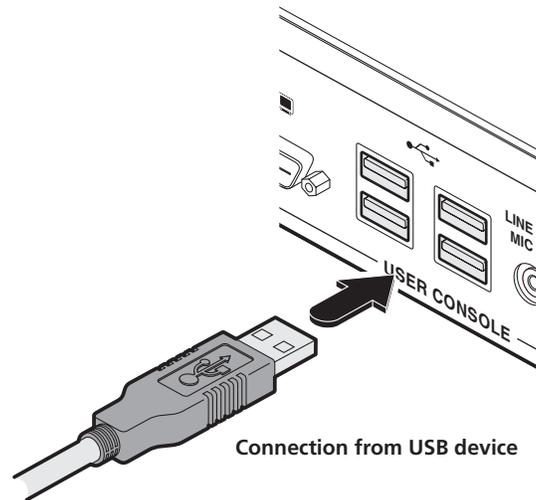
Figure 3-12. Connecting a USB device to the remote receiver unit.

3.2.9.1 Supported USB Devices

USB devices are supported using True Emulation technology. This means that the signals of each USB peripheral are emulated to the computer so that full functionality is available, subject to the following limitations:

• Keyboards, mice and other HID devices are supported.

• Storage devices (i.e. flash drives, USB hard disks, CD-ROM drives) are supported, but they may operate more slowly than with a direct connection.

• Isochronous devices (including microphones, speakers, webcams and TV receivers) are not currently supported.

• Many other devices (such as printers, scanners, serial adapters and specialist USB devices) will work, but due to the huge variety of devices available, successful operation cannot be guaranteed.

3.2.10 Remote AUX Port

The AUX port connection is not required for normal operation. This is an RS232 serial port which is used when performing an initial setup or firmware upgrade using the Start-of-Day configuration utility. Your computer needs to have a suitable terminal emulator program, such as Windows HyperTerminal. See 4.1.3 Start-of-Day configuration utility for details.

1 Ensure that power is removed from the ServSwitch Agility unit.

2 Connect a suitable serial 'null-modem' cable (see Appendix D for pin-out) between a vacant serial port on your computer and the AUX port on the right hand side of the ServSwitch Agility rear panel. See Figure 3-13.
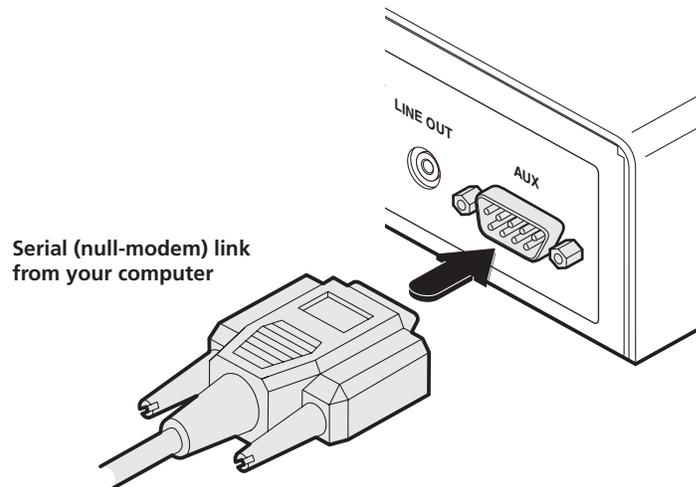
Figure 3-13. Connecting the serial link cable to local transmitter unit socket.

3 On the rear panel, click option switch 1 to the ON (down) position. See Figure 3-14.
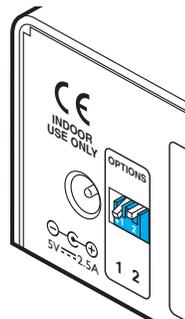
Figure 3-14. Click down option switch 1 to the ON position.

4 Power up the ServSwitch Agility unit and your computer. You are now ready to use the Start-of-Day configuration utility (See 4.1.3 Start-of-Day configuration utility) or perform an upgrade (See 4.1.7 Performing an upgrade).

3.2.11 Remote Power In

Each ServSwitch Agility unit is supplied with a standard power supply. When all other connections have been made, connect and switch on the power supply unit

1 Attach the output lead from the power adapter to the 5V socket on the rear panel of the unit. See Figure 3-15.

Power lead from power adapter

Note: Ensure that Option switches 1 and 2 are both in the 'off' (up) position to enable normal operation of the unit.
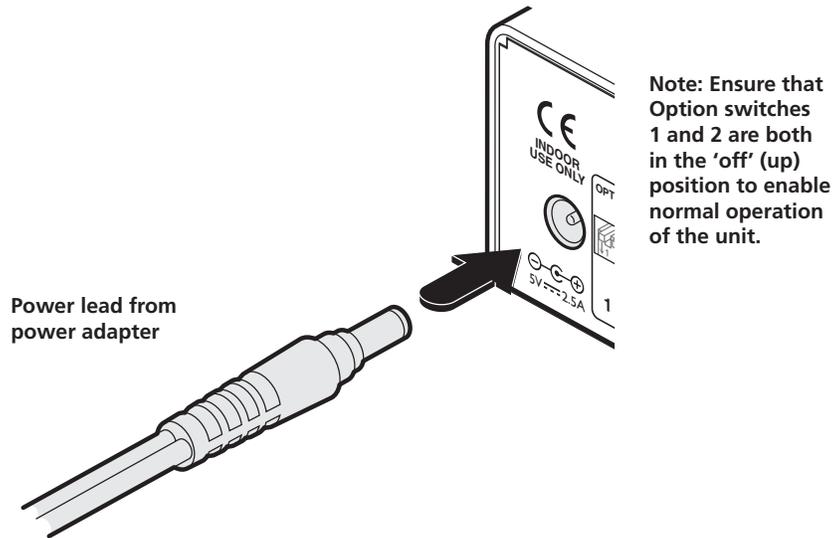
Figure 3-15. Connect the power adapter to the rear panel power socket.

2 Connect the IEC connector of the supplied country-specific power lead to the socket of the power adapter.

3 Connect the power lead to a nearby power outlet.

Note: Both the unit and its power supply generate heat when in operation and will become warm to the touch. Do not enclose them or place them in locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40°C. Do not place the products in contact with equipment whose surface temperature exceeds 40°C.

Chapter 4: Configuration

4. Configuration

4.1 Initial Configuration

The ServSwitch Agility units are designed to be as flexible as possible, and this principle extends also to their configuration.

- Where a ServSwitch Agility local transmitter unit and a ServSwitch Agility remote receiver unit are directly linked to each other, no configuration action is required, provided that they have their factory default settings in place. If the standard settings have been changed in a previous installation, you merely need to perform a factory reset on each unit. See 4.1.2 Manual factory reset.

- Where ServSwitch Agility units are connected via network links, you will need to specify their network address details. This can be done using a computer system temporarily linked to each ServSwitch Agility unit, in either of two ways:

- Using a direct serial port connection and the Start-of-Day configuration utility.

- Using a network connection and the browser-based configuration utility. This configuration utility also allows numerous other settings to be altered.

    Note: For basic one-to-one installations, the factory default addresses may be acceptable for immediate use within your network without the need to use a configuration utility or change their values:
    Local transmitter unit (169.254.1.33), Remote receiver unit (169.254.1.32).

4.1.1 Configuring Network Switches to Ensure Efficient Operation

With IP Multicast there is a risk that network segments can get saturated with data that are not destined for any device on that segment. Unless some intelligence is applied, it's possible for a naive IP switch to pass multicast data onto every port on the switch. This can lead to performance degradation and wasted network bandwidth. Fortunately, however, modern switches employ a technique known as IGMP Snooping (Internet Group Management Protocol) which enables them to be selective about where they route multicast IP traffic - routing it only through switch ports which contain devices that are specifically interested in such traffic.

IGMP Snooping can significantly reduce the amount of traffic generated by ServSwitch Agility Local units that are configured for multicast operation. It is beyond the scope of this document to detail how to enable and configure IGMP snooping for particular Gigabit IP Switches. However, we strongly recommend that when deploying a ServSwitch Agility Network you should select IP switches that support IGMP snooping, and this snooping should be enabled and appropriately configured.

4.1.2 Manual Factory Reset

A factory reset returns a ServSwitch Agility local transmitter or remote receiver unit to its default configuration. You can perform factory resets using either of the two configuration utilities or by using this direct manual method.

1 Remove power from the ServSwitch Agility unit.

2 Use a narrow implement (e.g. a straightened-out paper clip) press and hold the reset button adjacent to the front panel network socket. Power on the unit and then release the reset switch. See Figure 4-1.
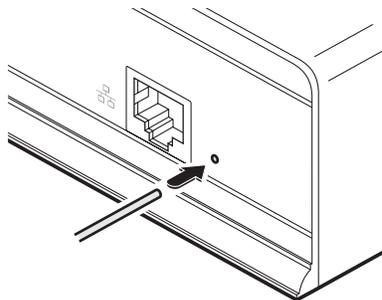

Figure 4-1. Use a straightened-out paper clip to press the reset button while powering on the unit.

    After roughly eight seconds, when the factory reset has completed, five of the front panel indicators will flash for a period of three seconds to indicate a successful reset operation.

3 Remove and then re-apply power to start the unit in its default configuration.

4.1.3 Start-of-Day Configuration Utility

The Start-of-Day configuration utility is useful when you are not able to make a network connection between your computer and a ServSwitch Agility unit in order to use the more comprehensive browser-based configuration utility. The rudimentary Start-of-Day configuration utility requires a direct serial port link between your computer and the ServSwitch Agility unit and allows you to perform only the following functions:

- View/edit the IP network address, netmask and gateway for the ServSwitch Agility unit,

- Perform a firmware upgrade,

- Perform a factory reset.

4.1.3.1 Connecting a Computer System via the AUX Port

1 Ensure that power is removed from the ServSwitch Agility unit.

2 Connect a suitable serial 'null-modem' cable (see Appendix D for pin-out) between a vacant serial port on your computer and the AUX port on the right hand side of the ServSwitch Agility rear panel. See Figure 4-2.
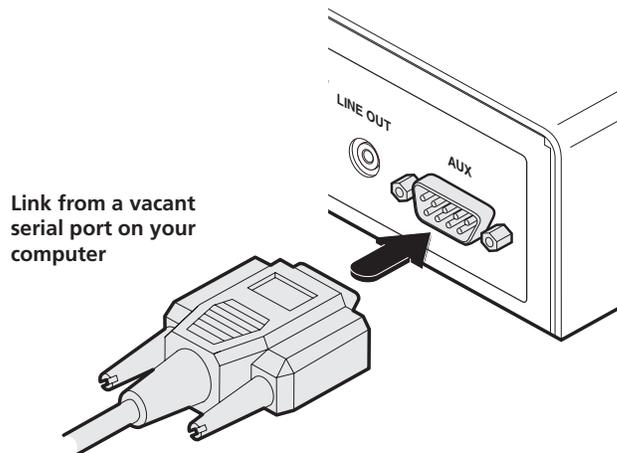

Figure 4-2. Connect a serial 'null-modem' cable to the AUX port.

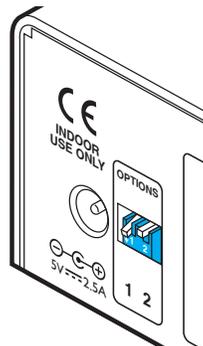3 On the rear panel, click option switch 1 to the ON (down) position. See Figure 4-3.

Figure 4-3. Click option switch 1 to the ON (down) position.

4 Power up the ServSwitch Agility unit and your computer. You are now ready to use the Start-of-Day configuration utility.

4.1.3.2 Using the Start-of-Day Configuration Utility

1 On the connected computer, run a suitable terminal emulator application, such as Windows HyperTerminal.

2 Within the terminal emulator, ensure that the serial port settings are configured as follows: 115200 baud, no parity bits, 8 data bits, 1 stop bit. Within the terminal emulator console, you should see a screen similar to the following:

```
System Configuration (type "help" for help)
System Information:
        Unit type:    TX
        IP address:   192.168.16.101
        Netmask:      255.255.255.0
        Gateway:      192.168.16.1
        MAC address:  00:0F:58:01:3A:9F
        Build no:     1.0.9890:9893M
        Built by:     snm
        Built on:     "Tue Sep 09 14:17:35 BST 2009"
Type 'help' for help
% >
```

• To see a summary of valid commands, type help and press Enter.

• To view the current IP address for the unit, type ip and press Enter.

• To change the IP address, type ip nnn.nnn.nnn.nnn and press Enter, (where nnn represents each octet of the appropriate address).

```
% >ip
IP Address set to 192.168.16.101
% > ip 192.168.16.109
```
Here the IP address is first requested and then changed.

• To view the current netmask for the unit, type netmask and press Enter.

• To change the mask, type netmask nnn.nnn.nnn.nnn and press Enter, (where nnn represents each octet of the appropriate mask).

```
% >netmask
Netmask set to 255.255.255.0
% > netmask 255.255.0.0
```
Here the netmask is first requested and then changed.

• To view the current gateway address, type gateway and press Enter.

• To change the gateway, type gateway nnn.nnn.nnn.nnn and press Enter, (where nnn represents each octet of the appropriate address).

```
% >gateway
Gateway set to 192.168.16.1
% > gateway 192.168.16.2
```
Here the gateway address is first requested and then changed.

3 When you have completed your settings (changes are saved as they are made), remove power from the ServSwitch Agility unit; on the rear panel click option switch 1 to the OFF (up) position and disconnect the serial lead.

4.1.4 Browser-Based Configuration Utility

The browser-based configuration utility within all local transmitter and remote receiver units requires a network connection between the ServSwitch Agility unit and a computer. This configuration utility allows you to perform all of the following functions:

• View/edit the IP network address and netmask,

• Configure separate IP network addresses for video, audio and USB,

• Configure multicast settings (on remote receiver units),

• Configure video bandwidth settings (on Local units),

• View the current video output (on Local units),

• Perform a firmware upgrade,

• Perform a factory reset.

4.1.4.1 Connecting a Computer System for Browser-Based Configuration

1 Connect a suitable network cable to the Ethernet port on the front panel of the ServSwitch Agility unit. See Figure 4-4.

Figure 4-4. Link from Ethernet switch.
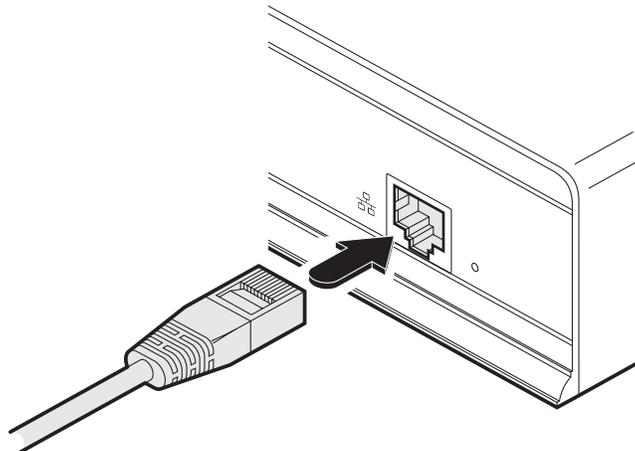
2 Connect the other end of the link cable to a network switch.

3 Similarly, link your computer to the same, or different, switch located on the same network. Note: A Gigabit connection is not essential for configuration purposes.

4 If not already switched on, power up your computer and the ServSwitch Agility unit. You are now ready to use the browser-based configuration utility.

4.1.4.2 Accessing the Browser-Based Configuration Utility

1 Temporarily connect the ServSwitch Agility unit and a computer via a network, as discussed opposite.

2 Run a web browser on your computer and enter the IP address of the ServSwitch Agility unit, e.g. http://169.254.1.33

The default settings are as follows:

- Local units - IP address: 169.254.1.33 Netmask: 255.255.0.0

- Remote units - IP address: 169.254.1.32 Netmask: 255.255.0.0

Where the address of a unit is not known, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset to restore the default address.

The opening page of the ServSwitch Agility configuration utility should be displayed. See Figure 4-5.

**Use the menu options to choose
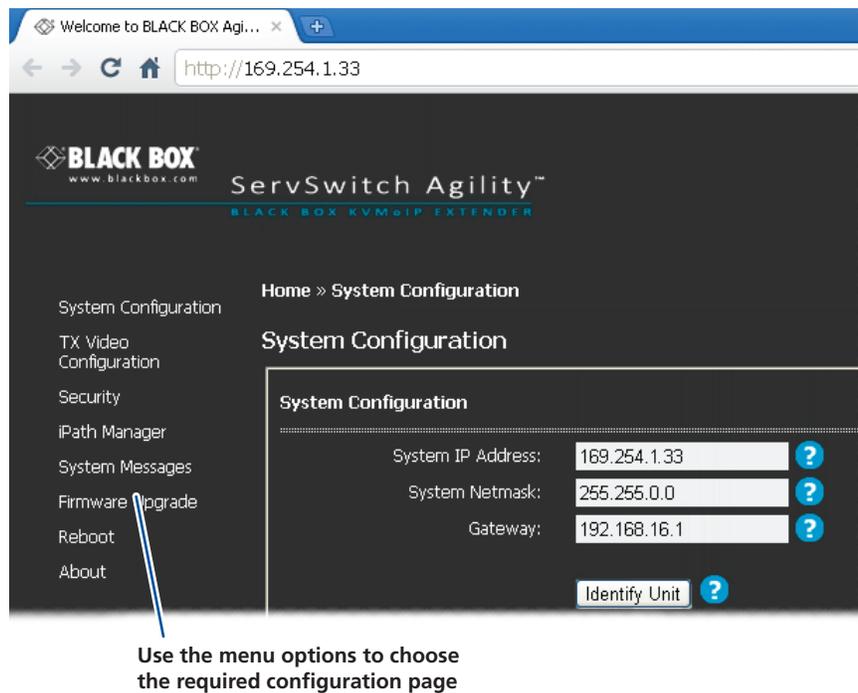the required configuration page**

Figure 4-5. Configuration utility opening page.

The configuration utilities for the local transmitter and remote receiver units contain different options and will be covered separately in the remainder of this section:

- Local transmitter unit configuration.

- Remote receiver unit configuration.

4.1.5 Local Transmitter Unit Configuration

In the ServSwitch Agility system, the majority of configuration settings are dictated by the remote receiver units. Therefore, the local transmitter unit setup (using its browser-based configuration utility) is concerned only with three main factors: Its IP address details, the data streams to enable/disable and video signal optimization. Other local transmitter unit pages, such as System Messages, Firmware Upgrades and Reboot are generally not used or altered during the majority of installations and are discussed elsewhere in this guide. See Appendix C for configuration examples.

4.1.5.1 Using the System Configuration Page

1 Display the local transmitter unit System Configuration page.

2 Ensure that the IP address and netmask for the local transmitter unit are correct. The default settings are 169.254.1.33 and 255.255.0.0 respectively. Where changes are necessary, enter the new values and click the Update Now button. You will need to declare the System IP Address that is set here to the remote receiver unit(s) linked to the local transmitter unit.

3 Check that the data streams (Video TX, Audio TX/RX, USB TX/RX and Serial TX/RX) are enabled (ticked) or disabled (unticked) as appropriate. There are similar options within the ServSwitch Agility remote receiver unit configuration and it is important that the settings in both units are the same. If one of these options is ticked in one unit but unticked in the other, then that data stream will remain disabled. If you make a change, remember to click the Update Now button. See Figure 4-6.
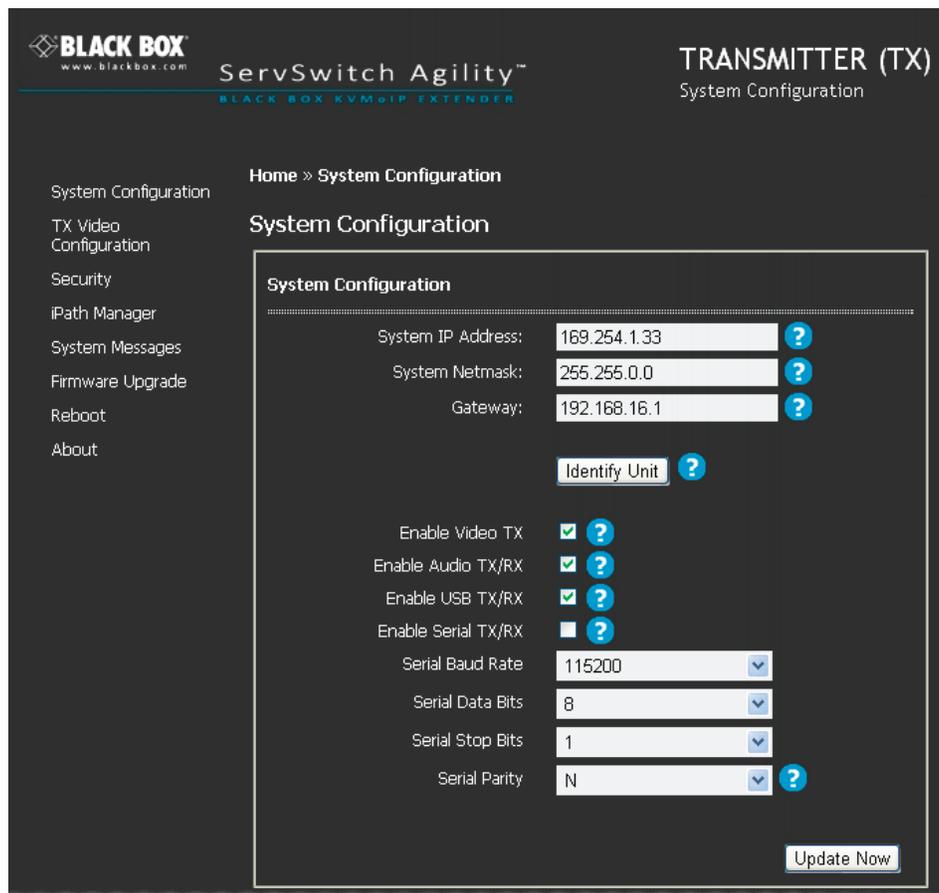

Figure 4-6. System Configuration page.

4.1.5.2 Using the TX Video Configuration Page

Note: Where the ServSwitch Agility system is connected to a Gigabit Ethernet network with sufficient available bandwidth, there should be no need to alter the default settings on this page.

1 Display the TX unit System Configuration page and then change to the TX Video Configuration page.

2 Make changes to the controls as necessary. There is no single combination of adjustments that will suit all installations, but generally:

   • If color quality is important, then leave ColorDepth at 24 bits and adjust other controls,

   • If moving video images are being shown frequently, then leave Frame Skipping at a low percentage and instead reduce the Peak bandwidth limiter and ColorDepth.

   • Where screens are quite static, try increasing the Background Refresh interval and/or increasing the Frame skipping percentage setting.

   Make changes one at a time, in small steps, and view typical video images so that you can attribute positive or negative results to the appropriate control.

   See TX Video Configuration for individual explanations of the controls.

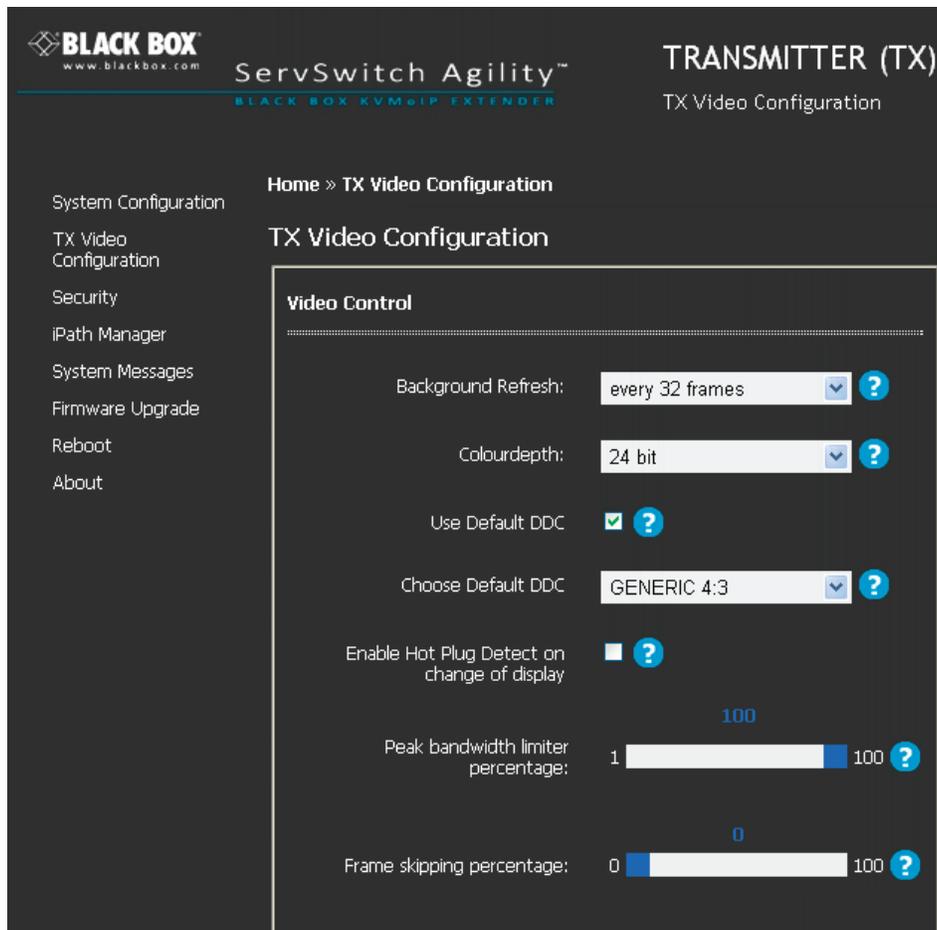3 Click Update Now to apply each setting change. See Figure 4-7.

Figure 4-7. Video Configuration page.

4.1.6 Remote Receiver Unit Configuration

In the ServSwitch Agility system, it is the remote receiver unit that determines where and how data signals are sent (and received) by the local transmitter unit. Although numerous ServSwitch Agility topologies (one-to-one, one-to-many, many-to-one, etc.) are made possible by the ServSwitch Agility system, they are all dependent on two underlying modes of operation: either Unicast or Multicast transmission. Where multicast transmission is not invoked for video and/or audio data, operation will be automatically served by unicast network transmission technologies.

The remote receiver unit setup (using the System Configuration page of its browser-based configuration utility) is concerned with four main factors: Its own IP address details, the data streams to enable/disable, the IP address of the local transmitter unit and multicast transmission details. Other pages, such as System Messages, Firmware Upgrades and Reboot are generally not used or altered during the majority of installations and are discussed elsewhere in this guide.

See Appendix C for configuration examples.

4.1.6.1 Configuring the Remote Receiver Unit

1 Display the remote receiver unit System Configuration page. See Figure 4-8.
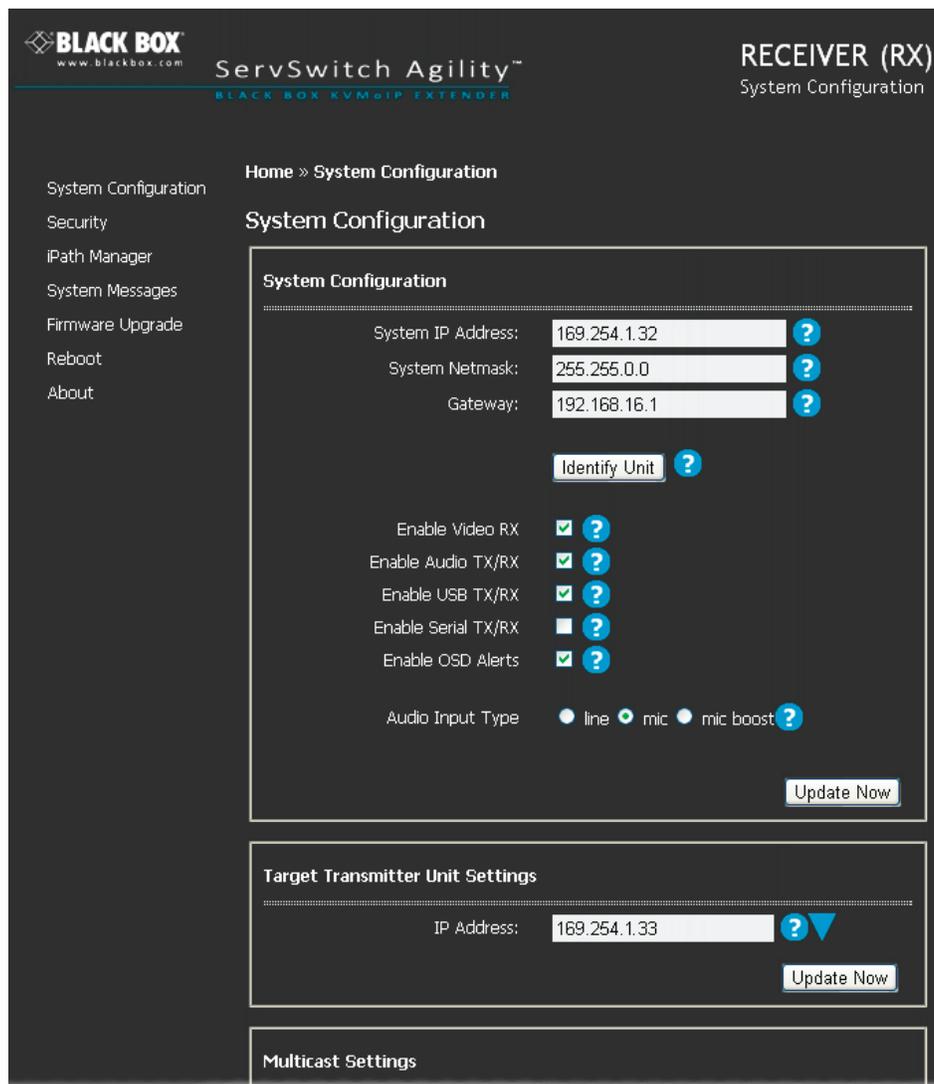

Figure 4-8. System Configuration page. For individual explanations of the controls, see Appendix B.

2 In the System Configuration section, ensure that the System IP address and System Netmask for this remote receiver unit are correct. Their default settings are 169.254.1.32 and 255.255.0.0 respectively. Where changes are necessary, enter the new values and click the Update Now button. The System IP Address that is set here will be sent to the local transmitter unit as the destination for transmitted data (when operating in unicast mode). The Gateway entry is only necessary when the local transmitter unit is located on a separate network to the remote receiver unit.

3 Check that the data streams (Video RX, Audio TX/RX, USB TX/RX and Serial TX/RX) are enabled (ticked) or disabled (unticked) as appropriate. There are similar options within the ServSwitch Agility local (transmitter) unit configuration; If one of these options is ticked in one unit but unticked in the other, then that data stream will remain disabled. If you make a change, click the Update Now button.

4 If necessary, alter the Audio Input Type to match your audio input. The line option is for a stereo line input, mic and mic boost are for mono microphones, the latter benefiting from a +20dB gain boost.

5 In the Target Transmitter Unit Settings section, enter the IP address for the local transmitter unit that will be supplying the video, audio and USB data streams. Most often all three streams are supplied by the same local transmitter unit, so a single IP address can be used. However, it is possible to receive them from different locations, in which case, click the blue arrow to reveal the three separate video, audio and USB addresses. The default setting for all of these three entries are the standard IP address that is factory set within every local transmitter unit (169.254.1.33). If any changes are made, click the Update Now button to save and activate them.

6 For installations that will include more than one remote receiver unit, for either video or audio or both, then you need to configure the Multicast Settings section. See Figure 4-9.
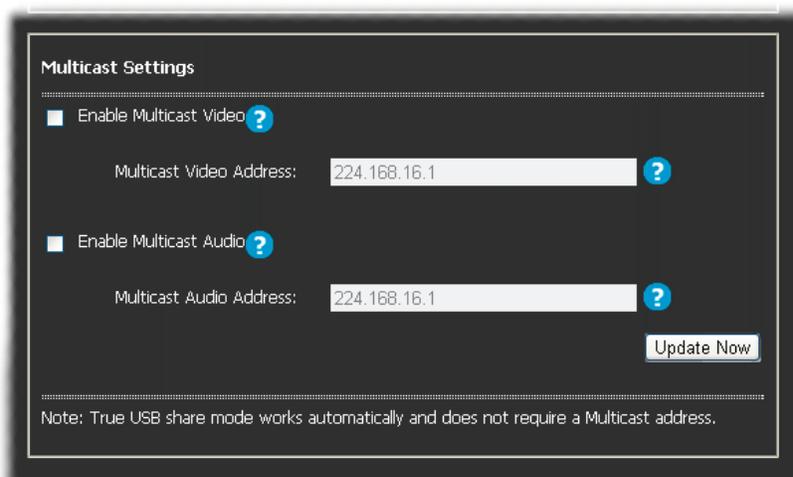
Figure 4-9. Multicast settings.

The Video and Audio sub-sections are configured in exactly the same way:

• First, tick the Enable Multicast Video / Enable Multicast Audio check box.

• Next, enter an appropriate Multicast Address for the Video/Audio data stream(s). The set of IP addresses between 224.0.0.0 and 239.255.255.255 are specifically reserved for multicast operations. Within a private enterprise network, you merely need to choose a location that is currently unused. However, if your link will pass through public networks, then attention must be given to finding an address within these limits that is not already reserved for special use. The IANA (Internet Assigned Numbers Authority) website: iana.org provides a list of publically reserved addresses. See Figure 4-10.

Multicast Group Address:
224.168.16.1

During operation, the local transmitter unit sends data streams to the multicast group addresses, which can then be received by all members of the group.
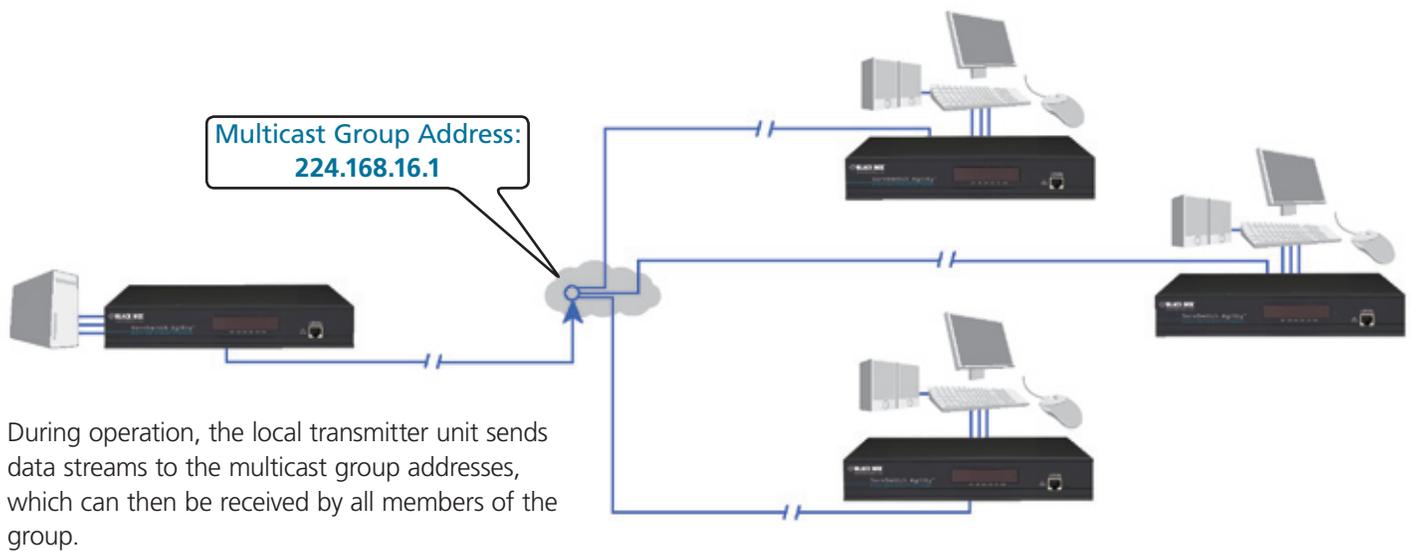
Figure 4-10. Multicast operation representation.

The address that you enter will be used by the remote receiver unit to 'listen-in' on the data stream from the local transmitter unit. This same IP address needs to be set on every remote receiver unit that will similarly receive the data stream. The video and audio multicast addresses must be different.

• Click the Update Now button to save

Repeat the IP addressing and multicast configuration steps for all remote receiver units that will be part of the one-to-many installation.

For most installations, the successful implementation of these configuration steps will result in a correctly working system.

4.1.7 Performing an Upgrade

ServSwitch Agility units are fully upgradeable via flash upgrade. Such upgrades require a computer system to either be attached via a network link or directly to the AUX port of the ServSwitch Agility unit.

Warning: During the upgrade process, ensure that power is not interrupted as this may leave the unit in an inoperable state.

4.1.7.1 Upgrading via Network Link

1 Download the latest upgrade file—contact Black Box Technical Support or visit ftp.blackbox.com.
   Note: There are separate upgrade files for local transmitter and remote receiver units.

2 Temporarily connect the ServSwitch Agility unit and a computer via a network (see 4.1.4 Browser-based configuration utility section for details).

3 Open a web browser on your computer and enter the IP address of the ServSwitch Agility unit to be upgraded, e.g.
   http://169.254.1.32 or http://169.254.1.33

4 Click the Firmware Upgrade link. Within the Firmware Upgrade page, click the Choose File button. In the subsequent file dialog, locate the downloaded upgrade file - check that the file is correct for the unit being upgraded. See Figure 4-11.
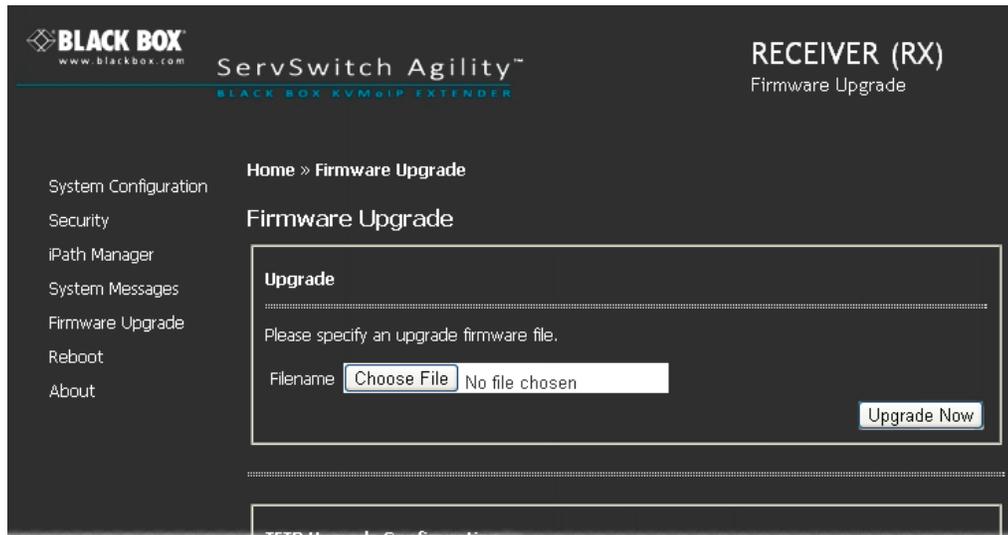
Figure 4-11. Receiver firmware upgrade page.

5 Click the Upgrade Now button. A progress bar will be displayed (however, if your screen is connected to the unit being upgraded then video may be interrupted) and the indicators on the front panel will flash while the upgrade is in progress.

6 The indicators should stop flashing in less than one minute, after which the unit will automatically reboot itself. The upgrade process is complete.

4.1.7.2 Upgrading via the AUX Port

1 Download the latest upgrade file—contact Black Box Technical Support or visit ftp.blackbox.com.
   Note: There are separate upgrade files for local transmitter and remote receiver units.

2 Ensure that power is removed from the ServSwitch Agility unit.

3 Connect a null-modem serial cable between your computer and the AUX port on the rear panel of the ServSwitch Agility unit (see ServSwitch Agility Start of Day Configuration Utility section for details).

4 On the rear panel of the ServSwitch Agility unit, click switch 1 to the ON (down) position.

5 Apply power to the ServSwitch Agility unit.

6 On the connected computer, run a suitable terminal emulator application, that supports the Zmodem protocol, such as Windows HyperTerminal.

7 Within the terminal emulator, ensure that the serial port settings are configured as follows: 115200 baud, no parity bits, 8 data bits, 1 stop bit (115200, N, 8, 1). Within the terminal emulator console, you should see the Start-of-Day opening screen.

8 Type upgrade and press Enter. You will be asked to transfer the binary upgrade file using the Zmodem protocol.

9 If using Windows Hyperterminal: Click the Transfer menu and select the Send File option. In the subsequent file dialog, select Zmodem from the protocol list. Then, click the Browse button and locate the downloaded upgrade file - check that the file is correct for the unit being upgraded.

10 Click the Send button to begin the file transfer. The indicators on the front panel will flash while the upgrade is in progress. When the indicators stop flashing (after less than one minute) it is safe to reboot the unit and the upgrade will be complete.

11 Remove power from the unit, disconnect the serial cable and, on the rear panel of the ServSwitch Agility unit, return switch 1 to its OFF (up) position.

12 Re-apply power to start the upgraded system.

5. Operation

In operation, many ServSwitch Agility installations require no intervention once configured. The local transmitter and remote receiver units take care of all connection control behind the scenes so that you can continue to work unhindered.

5.1 Front Panel Indicators

The six front panel indicators on each unit provide a useful guide to operation. See Figure 5-1.

These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present. Flashes when the unit is in error.
- SER On when the AUX (serial) port is enabled and active.
- AUD On when audio is enabled and active.
- USB On when USB is enabled and active.
- DVI On when DVI video is enabled and active.
- PWR Power indicator.

Figure 5-1. Front panel indicators.

5.2 True Share

The ServSwitch Agility system allows two or more users (each connected to separate ServSwitch Agility remote receiver units) to share access to a computer system (linked to a ServSwitch Agility local transmitter unit). This is called *True Share* and provides an efficient way to distribute resources between users who may be widely dispersed. See Figure 5-2.
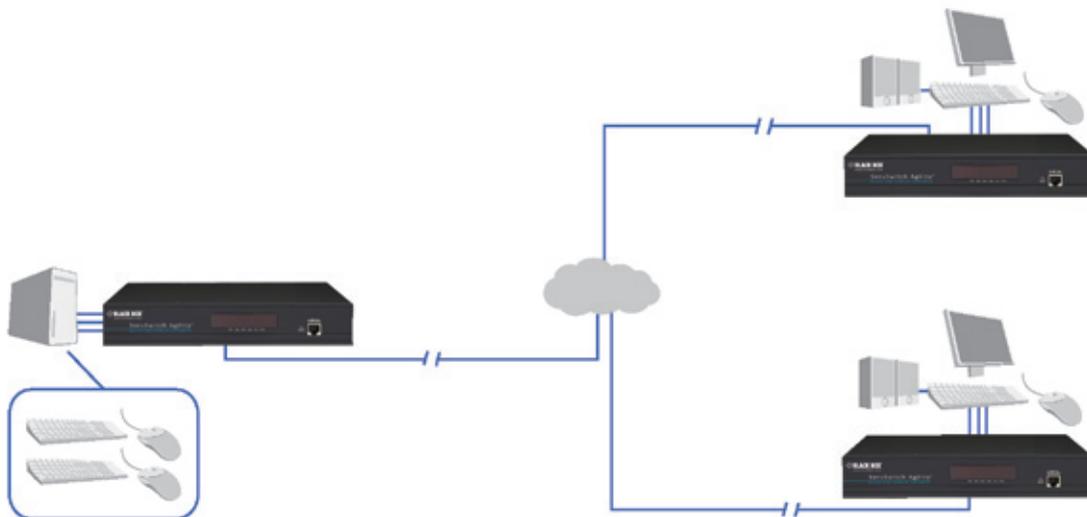
Figure 5-2. True Share allows multiple users to gain control of a single computer system.

During operation, every user has equal and concurrent access rights to the computer. Arbitration between the actions of different users is handled by the computer's operating system.

True Share is not limited to handling the signals from keyboards and mice. True Share acts as a complete virtual USB hub that can accept up to twelve USB devices concurrently, each of which could be attached to a different remote receiver unit.

5.3 Many-to-One Control

When using ServSwitch Agility units in a many-to-one configuration, the remote receiver unit can switch between the various local transmitter units that are connected to different computer systems. See Figure 5-3.

Local unit (IP: 169.254.1.33)

Local unit (IP: 169.254.1.34)

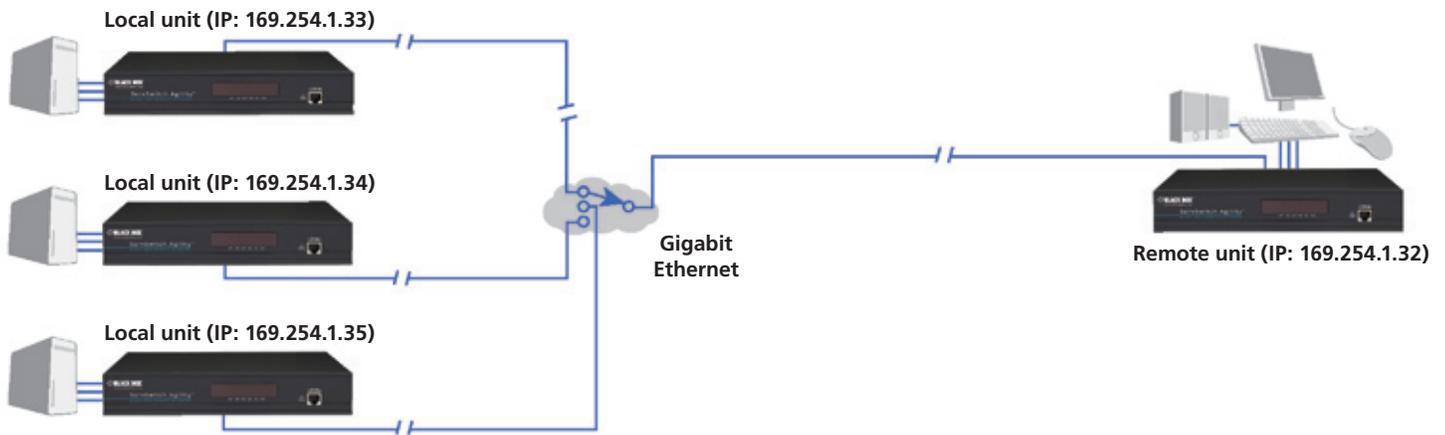**Local unit (IP: 169.254.1.35)**

Gigabit Ethernet

Remote unit (IP: 169.254.1.32)

Figure 5-3. In a many-to-one installation, the remote receiver unit can switch between many different local transmitter units and their computers.

5.3.1 Switching Between Systems

1 Run a web browser and enter the IP address of your local ServSwitch Agility remote receiver unit, (e.g. *http://169.254.1.32)* - this can be done through the remote computer that you are using via the ServSwitch Agility system, provided that it is linked via its own connection to the network.

2 In the System Configuration page, within the Target Transmitter Unit Settings section, change the current IP address to the address of the new local (transmitter) unit. See Figure 5-4.
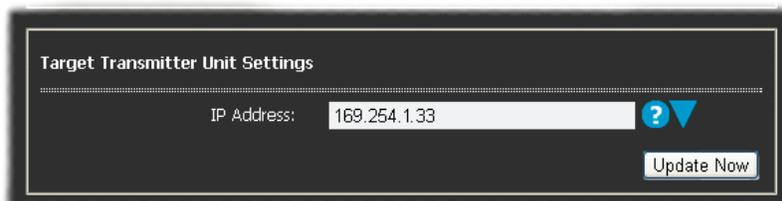
Figure 5-4. The (combined) IP address for the remote receiver unit.

Note: If you need to connect video, audio and USB to separate local units, click the blue arrow to reveal the individual video, audio and USB IP addresses. See Figure 5-5.
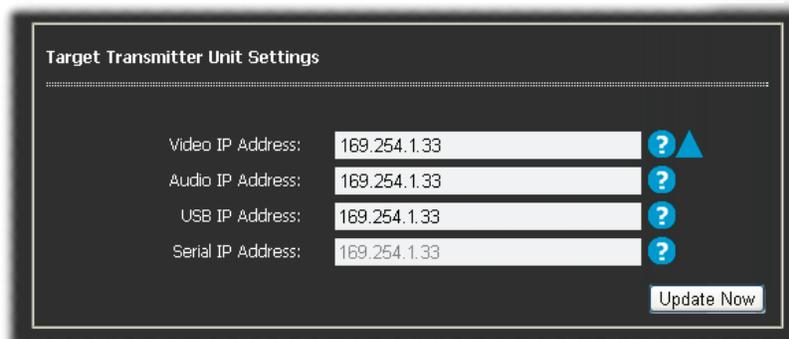

Figure 5-5. The individual IP addresses for the remote receiver unit video, audio and USB sections.

3 Click the Update Now button. The chosen connection(s) will be broken with the current local unit and initiated with the newly selected local unit(s).

724-746-5500 l blackbox.com

Appendix A. Local Configuration Utility

This section covers the browser-based configuration utility for the ServSwitch Agility local transmitter unit. The TX utility has six pages, titled as follows:

- System Configuration - Sets address and data stream options - See A.1,

- TX Video Configuration - Allows you to optimize for slow connections - See A.2,

- Security - Allows you to determine important security settings - See A.3,

- iPath Manager - Allows you to prepare the unit for control by the iPath Manager utility - See A.4,

- System Messages - Options for handling status messages from the unit - See A.5,

- Firmware Upgrade - Handles the updating of internal software - See A.6,

- Reboot - Cold restart and factory reset options - See A.7,

- About - Version details and support information - See A.8.

A.1 TX System Configuration Page

This page allows you to set the IP address and netmask for the unit and also to determine which of its data streams should be enabled. The page also provides a thumbnail preview of the video output which is useful for troubleshooting purposes.
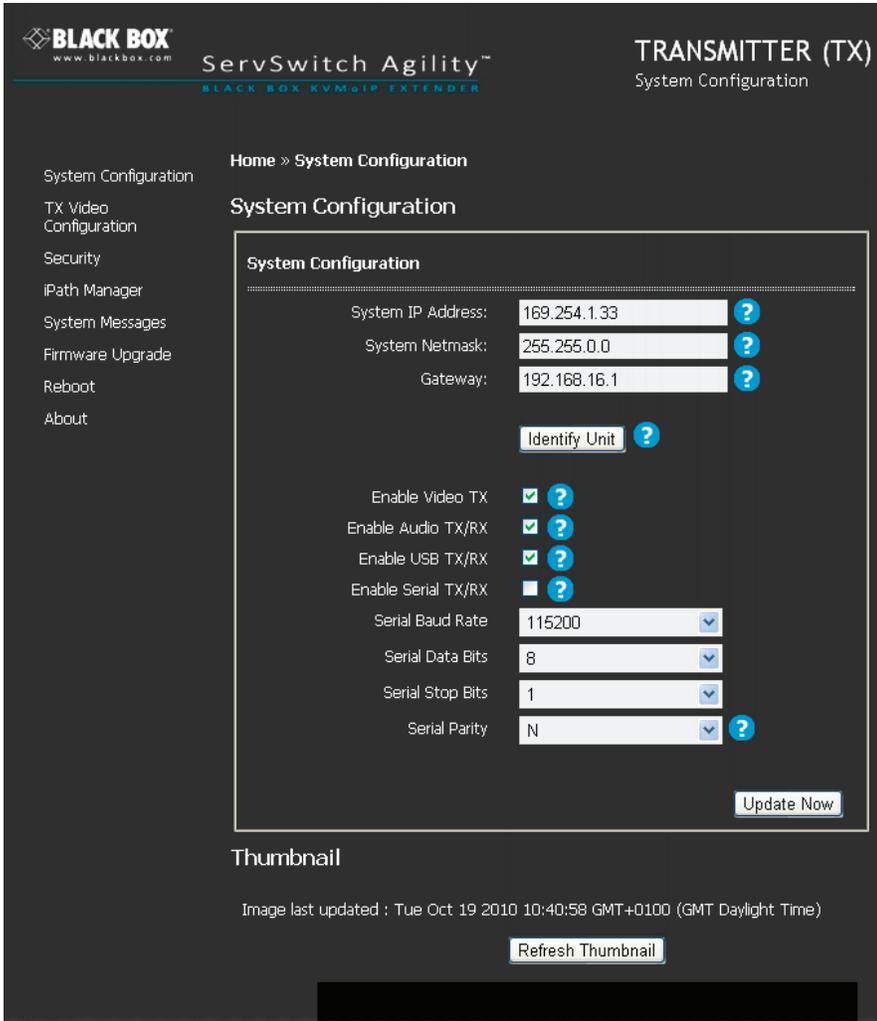
System IP Address
Enter the IP address that you wish to use for this local transmitter unit. The default address is: 169.254.1.33.

System Netmask
Enter the netmask that you wish to use for this local transmitter unit. The default netmask is: 255.255.0.0.

Gateway
Necessary only when remote receiver units may be placed on a different network.

Identify unit
Click to flash the front panel indicators (useful when numerous units are mounted together).

Enable Video TX
When ticked, the local transmitter unit will send video on condition that the similar option is ticked at the remote receiver unit.

Enable Audio TX/RX
When ticked, the local transmitter unit will use audio on condition that the similar option is ticked at the remote receiver unit.

Enable USB TX/RX
When ticked, the local transmitter unit will use USB on condition that the similar option is ticked at the remote receiver unit.

Enable Serial TX/RX
When ticked, enables the AUX serial port on the rear panel.

Serial Baud Rate, Data Bits, Stop Bits, Parity
Allows you to determine the communication details for the AUX serial port.

Update Now
Click to save your changes and, where necessary, communicate those changes to other units.

Thumbnail
Displays the video image currently being received at the DVI input port. Click the Refresh Thumbnail button to refresh.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the System Configuration link.

A.2 TX Video Configuration Page

This page contains four controls which allow you to optimize video transmission for use with network links that may not be able to offer full bandwidth availability. Where bandwidth is plentiful, you should not need to alter the default settings. See Using the TX Video Configuration page for tips on optimization of these controls.
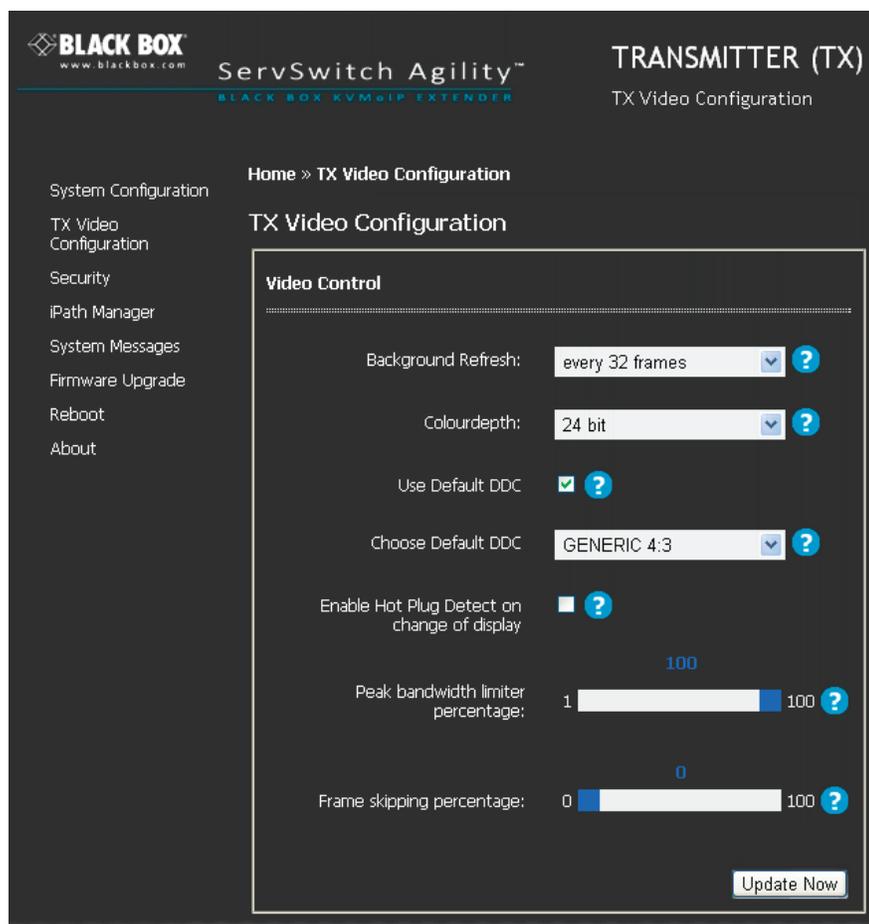
Background Refresh

The local transmitter unit sends portions of the video image only when they change. In order to give the best user experience, the local transmitter unit also sends the whole video image, at a lower frame rate, in the background. The Background Refresh parameter controls the rate at which this background image is sent. The default value is 'every 32 frames', meaning that a full frame is sent in the background every 32 frames. Reducing this to 'every 64 frames' or more will reduce the amount of bandwidth that the local transmitter unit consumes. On a high-traffic network this parameter should be reduced in this way to improve overall system performance. Options: every 32 frames, every 64 frames, every 128 frames, every 256 frames or disabled.

Color depth

This parameter determines the number of bits required to define the color of every pixel. The maximum (and default) value is '24 bit'. By reducing the value you can significantly reduce bandwidth consumption, at the cost of video color reproduction. Options: 24 bit, 16 bit or 8 bit.

Use Default DDC

When ticked, enables the DDC profile selected below.

Choose Default DDC

Allows you to choose the most appropriate DDC profile for the

Enable Hot Plug Detect on change of display

Peak bandwidth limiter

The local transmitter unit will employ a 'best effort' strategy in sending video and other data over the IP network. This means it will use as much of the available network bandwidth as necessary to achieve optimal data quality, although typically the local transmitter unit will use considerably less than the maximum available. In order to prevent the local transmitter unit from 'hogging' too much of the network capacity, you can reduce this setting to place a tighter limit on the maximum bandwidth permissible to the local transmitter unit. Range: 1 to 1000.

Frame skipping percentage

Frame Skipping involves 'missing out' video frames between those captured by the local transmitter unit. For video sources that update only infrequently or for those that update very frequently but where high fidelity is not required, frame skipping is a good strategy for reducing the overall bandwidth consumed by the system. Range: 0 to 100%.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the TX Video Configuration link.

A.3 TX Security Page

This page allows you to determine important security settings for this unit and the network link.

Encryption
Allows you to determine how encryption settings should be negotiated between the local (transmitter) and remote (receiver) units.

- Always off - When selected, the unit will ensure that the link is not encrypted, regardless of the setting of the other unit(s).
- Prefer off - When selected, the unit will negotiate for an unencrypted link unless the other unit(s) is/are set to 'Always on'.
- Always on - When selected, the unit will ensure that the link is encrypted, regardless of the setting of the other unit(s).

Note: If the local unit is set to 'Always off' and the remote unit is set to 'Always on', an error message will be shown on the OSD of the remote unit, prompting the user to intervene in these conflicting settings.

Secure webpages with password
When ticked, access to this configuration utility will be protected by a username (fixed as 'admin') and password. You also need a secure connection to access the utility, i.e. http**s**://unitaddress

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Security link.

A.4 TX iPath Manager Page

This page contains just one control which allows you to prepare the unit to be administered by the Black Box iPath Manager utility.

Enable iPath Control
Click this button to reset the unit to factory settings and make itself available for discovery and control by the Black Box iPath Manager utility.
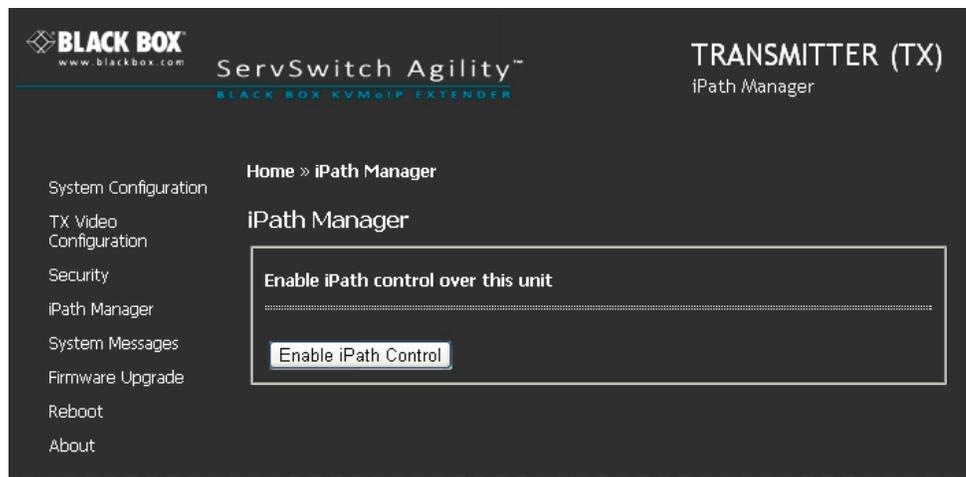
To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the iPath Manager link.

A.5 TX System Messages Page

This page allows you to determine how to handle status and error messages that are produced by the ServSwitch Agility unit. You can choose to store the messages locally within the unit, send them to a named server or disable them completely.

Enable system messages
Tick to allow the creation of status and error messages by the unit.

Send system messages to remote Log Server
Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

Store system messages in unit
When ticked, this option will store system messages within the memory of the unit. Click the View messages button to view the list.

Update Now
Click to save and implement any changes that you make.

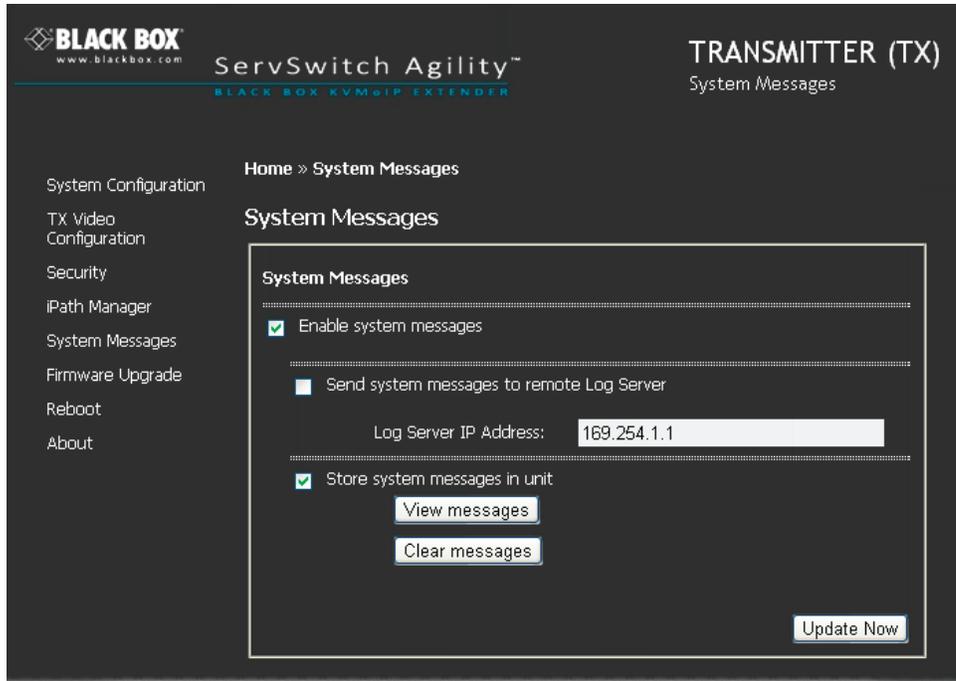### To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the System Messages link.

A.6 TX Firmware Upgrade Page

This page allows you to choose and then implement a suitable firmware upgrade for the unit. Take care to ensure that the firmware file is named (TX) for the unit being upgraded.

Choose File
Click to display a file dialog so that you may locate an appropriate firmware upgrade file.

Upgrade Now
When the firmware upgrade file has been selected, click this button to begin the upgrade process.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Firmware Upgrade link.

A.7 TX Reboot Page

This page allows you to perform a cold boot procedure (as if power had been removed and reinstated) on the unit, remotely if necessary. You also have the option of restoring factory default settings (such as the standard IP addresses and video settings, etc.).

Perform Factory Reset
Tick this box if you need to restore all of the standard factory default settings to the unit as part of the reboot procedure.

Reboot
Click to commence the cold reboot procedure.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Reboot link.

A.8 TX Support Page

This page provides useful build number details for support purposes and also provides contact details for technical support.
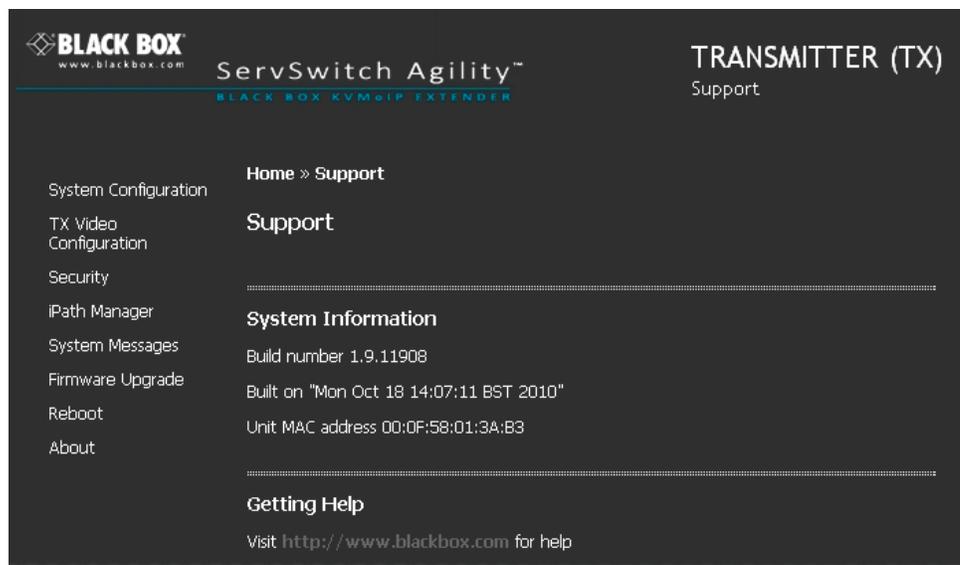
System Information
Provides build number details which may be requested during support calls.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility local transmitter unit. Default: **http://169.254.1.33**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the About link.

Appendix B. RX Configuration Utility

This section covers the browser-based configuration utility for the ServSwitch Agility remote receiver unit. The utility has five pages, titled as follows:

- RX System Configuration - Contains various important options - See B.1,

- RX Security - Allows you to determine important security settings - See B.2,

- RX iPath Manager - Allows you to prepare the unit for control by the iPath Manager utility - See B.3,

- RX System Messages - Options for handling status messages from the unit - See B.4,

- RX Firmware Upgrade - Handles the updating of internal software - See B.5,

- RX Reboot - Cold restart and factory reset options - See B.6,

- RX About - Version details and support information - See B.7.

B.1 RX System Configuration Page (Part 1 of 2)

This page allows you to set the IP address and netmask for the unit, determine which of its data streams should be enabled and also configure multicast operation settings.
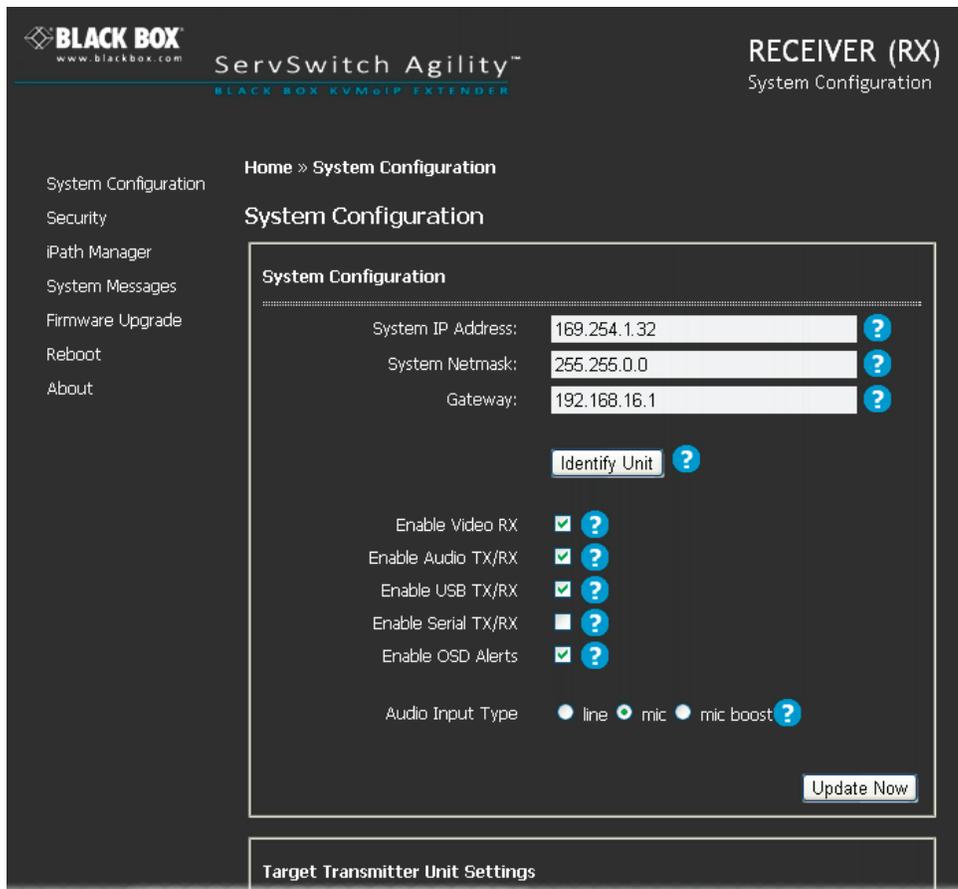
See next page for lower half of this screen.

System IP Address
Enter the IP address that you wish to use for this remote receiver unit. The default address is: 169.254.1.32.

System Netmask
Enter the netmask that you wish to use for this remote receiver unit. The default netmask is: 255.255.0.0.

Gateway
Necessary only when the local transmitter unit is placed on a different network.

Identify unit
Click to flash the front panel indicators (useful when numerous units are mounted together).

Enable Video RX
When ticked, the remote receiver unit will request video (the similar option at the local transmitter unit must also be ticked).

Enable Audio TX/RX
When ticked, the remote receiver unit will use audio on condition that the similar option is ticked at the local transmitter unit.

Enable USB TX/RX
When ticked, the remote receiver unit will use USB on condition that the similar option is ticked at the local transmitter unit.

Enable Serial TX/RX
When ticked, the remote receiver unit will use the AUX serial port on condition that the similar option is ticked at the local transmitter unit.

Enable OSD Alerts
When ticked, the remote receiver unit will show status messages on the attached monitor display.

Audio Input Type
Choose 'line' for stereo line input, 'mic' for mono microphone or 'mic boost' for a mono microphone that requires extra gain (+20dB).

Update Now
Click to save your changes and, where necessary, communicate those changes to other units.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the System Configuration link.

B.1 RX System Configuration Page (Part 2 of 2)

The lower section of the page is concerned with IP addresses for the remote receiver unit and also multicast settings.

See previous page for upper half of this screen.

Target Transmitter Unit Settings
This section is initially presented as a single field: 'IP Address' where a common IP address for a single transmitter unit can be declared. If separate transmitter units for video, audio, USB and./or serial need to be configured, click the blue arrow to reveal the four separate fields.

Click the Update Now button to save and implement any changes.

Enable Multicast Video
Tick this option to sign up this remote unit to receive a multicast video data stream from the network location listed below.

Multicast Video Address
Defines the network address where the video data stream can be found. Valid entries are 224.0.0.0 to 239.255.255.255 inclusive. The default address is: 224.168.16.1

Enable Multicast Audio
Tick this option to sign up this remote unit to receive a multicast audio data stream from the network location listed below.

Multicast Audio Address
Defines the network address where the audio data stream can be found. Valid entries are 224.0.0.0 to 239.255.255.255 inclusive. The default address is: 224.168.16.1

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility lremote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the System Configuration link.

B.2 RX Security Page

This page allows you to determine important security settings for this unit and the network link.

Encryption
Allows you to determine how encryption settings should be negotiated between the local (transmitter) and remote (receiver) units.

- Chosen by TX unit - When selected, the decision about whether to encrypt the link or not will be determined solely by the security settings within the transmitter unit.

- Always on - When selected, the unit will ensure that the link is encrypted, regardless of the setting of the other unit(s).

Note: If the remote unit is set to 'Always on' and the local unit is set to 'Always off', an error message will be shown on the OSD of the remote unit, prompting the user to intervene in these conflicting settings.

Secure webpages with password
When ticked, access to this configuration utility will be protected by a username (fixed as 'admin') and password. You also need a secure connection to access the utility, i.e. http**s**://unitaddress

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Security link.

B.3 RX iPath Manager Page

This page contains just one control which allows you to prepare the unit to be administered by the Black Box iPath Manager utility.

Enable iPath Control

Click this button to reset the unit to factory settings and make itself available for discovery and control by the Black Box iPath Manager utility.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the iPath Manager link.

B.4 RX System Messages Page

This page allows you to determine how to handle status and error messages that are produced by the ServSwitch Agility unit. You can choose to store the messages locally within the unit, send them to a named server or disable them completely.

Enable system messages
Tick to allow the creation of status and error messages by the unit.

Send system messages to remote Log Server
Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

Store system messages in unit
When ticked, this option will store system messages within the memory of the unit. Click the View messages button to view the list.

Update Now
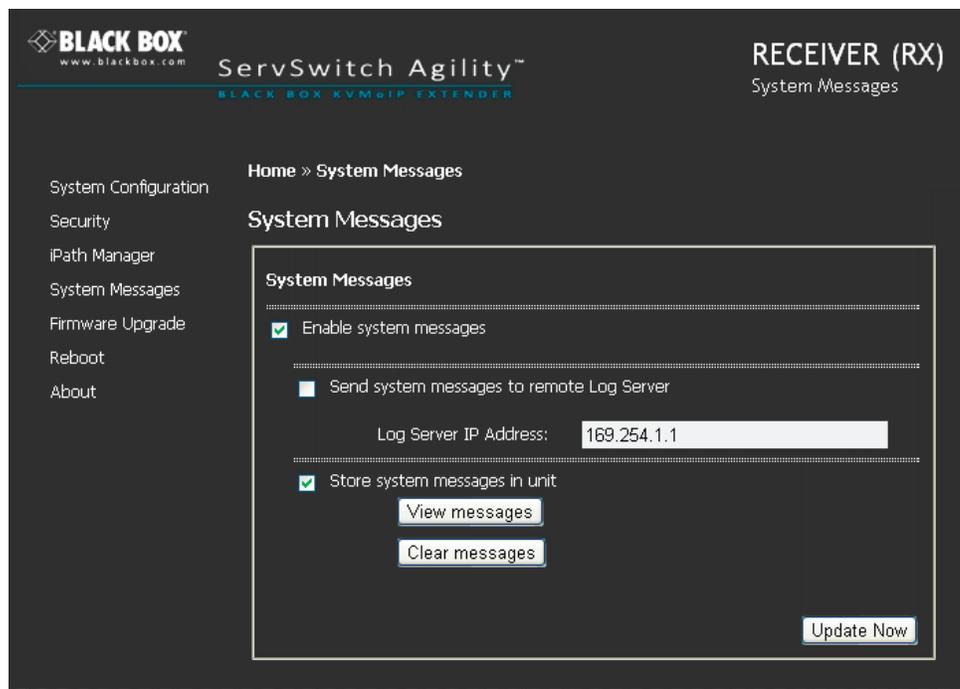Click to save and implement any changes that you make.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the System Messages link.

B.5 RX Firmware Upgrade Page

This page allows you to choose and then implement a suitable firmware upgrade for the unit. Take care to ensure that the firmware file is named (RX) for the unit being upgraded.

Choose File
Click to display a file dialog so that you may locate an appropriate firmware upgrade file.

Upgrade Now
When the firmware upgrade file has been selected, click this button to begin the upgrade process.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Firmware Upgrade link.

B.6 RX Reboot Page

This page allows you to perform a cold boot procedure (as if power had been removed and reinstated) on the unit, remotely if necessary. You also have the option of restoring factory default settings (such as the standard IP addresses and video settings, etc.).

Perform Factory Reset
Tick this box if you need to restore all of the standard factory default settings to the unit as part of the reboot procedure.

Reboot
Click to commence the cold reboot procedure.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the Reboot link.

B.7 RX Support Page

This page provides useful build number details for support purposes and also provides contact details for technical support.

System Information
Provides build number details for the unit, which may be requested during support calls.

To get here

1 If not already connected, temporarily connect the ServSwitch Agility unit and a computer via a network. See 3.2 Connections.

2 Run a web browser and enter the IP address of the ServSwitch Agility remote receiver unit. Default: **http://169.254.1.32**

   If the address is unknown, either use the Start-of-Day configuration utility to discover it, or perform a manual factory reset. See 4. Configuration.

3 If necessary, click the About link.

Appendix C. Configuration Examples

This section takes you through the key stages required to use ServSwitch Agility units in the two most common configurations:

- One-to-one - below

- One-to-many (True Share) - see next page

C.1 One-to-One Configuration

Use this procedure when linking a single remote receiver unit to a single local transmitter unit.

1 Set up and configure the local transmitter unit.

Use the browser-based configuration utility to ensure that the IP address of the local unit is appropriate (unique) within your network.
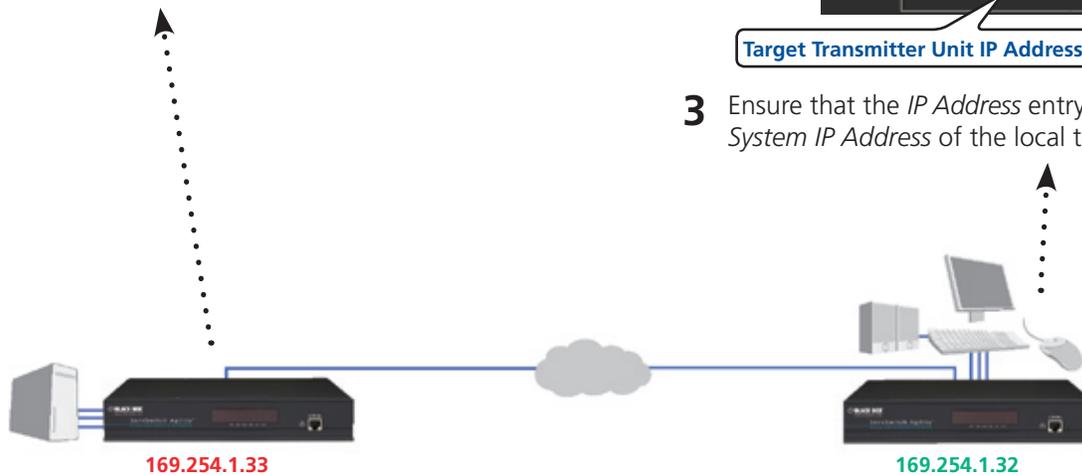
(TX) System IP Address: **169.254.1.33**

2 Set up and configure the remote receiver unit.

Use the browser-based configuration utility to ensure that the IP address of the remote receiver is appropriate (unique) within your network.

(RX) System IP Address: **169.254.1.32**

Target Transmitter Unit IP Address: **169.254.1.33**

3 Ensure that the *IP Address* entry matches the *System IP Address* of the local transmitter unit.

169.254.1.33

169.254.1.32

4 Click the Update Now button.

The remote receiver unit now contacts the local transmitter unit with the following request: **"Give me video & audio, and supply them to my IP address**: **169.254.1.32"**

If the local transmitter unit is not already linked to an alternative remote receiver unit, it will set up the necessary channels. Once set up, no other remote receiver unit will be able to reconfigure the local transmitter unit (or receive signals from it) until the original remote receiver unit relinquishes its link.

The magic moment
The crucial stage in any ServSwitch Agility configuration is when the remote receiver unit contacts the local transmitter unit with the following request "Give me video and audio, and supply them to this address", where 'this address' is either the remote receiver unit's IP address or specified multicast addresses. This is where the special relationship commences.

C.2 One-to-Many Configuration

This page details the key stages required to multicast video and audio signals to two or more ServSwitch Agility remote receiver units. True USB sharing occurs as soon as you point the remote receiver at the local transmitter unit, regardless of the multicast video and audio settings.

1 Set up and configure the local transmitter unit.

Use the browser-based configuration utility to ensure that the IP address of the local unit is appropriate (unique) within your network.

(TX) System IP Address: 169.254.1.33

2 Set up and configure the remote receiver unit.

Use the browser-based configuration utility to ensure that the IP address of the remote receiver unit is appropriate (unique) within your network.

(RX) System IP Address: 169.254.1.32

Target Transmitter Unit IP Address: 169.254.1.33

3 Ensure that the *IP Address* entry matches the *System IP Address* of the local transmitter unit.

Multicast Addresses: 224.168.16.1 and 224.168.16.2

4 In the Multicast Settings section, tick the *Enable Multicast Video* and *Audio* checkboxes. Enter suitable IP addresses* in the two address fields.

* Suitable Multicast Addresses for the video and audio data stream(s) lie between 224.0.0.0 and 239.255.255.255 and are specifically reserved for multicast operations.

Multicast Video and Audio Addresses:
224.168.16.1 and **224.168.16.2**

169.254.1.32

169.254.1.33

169.254.1.34

169.254.1.35
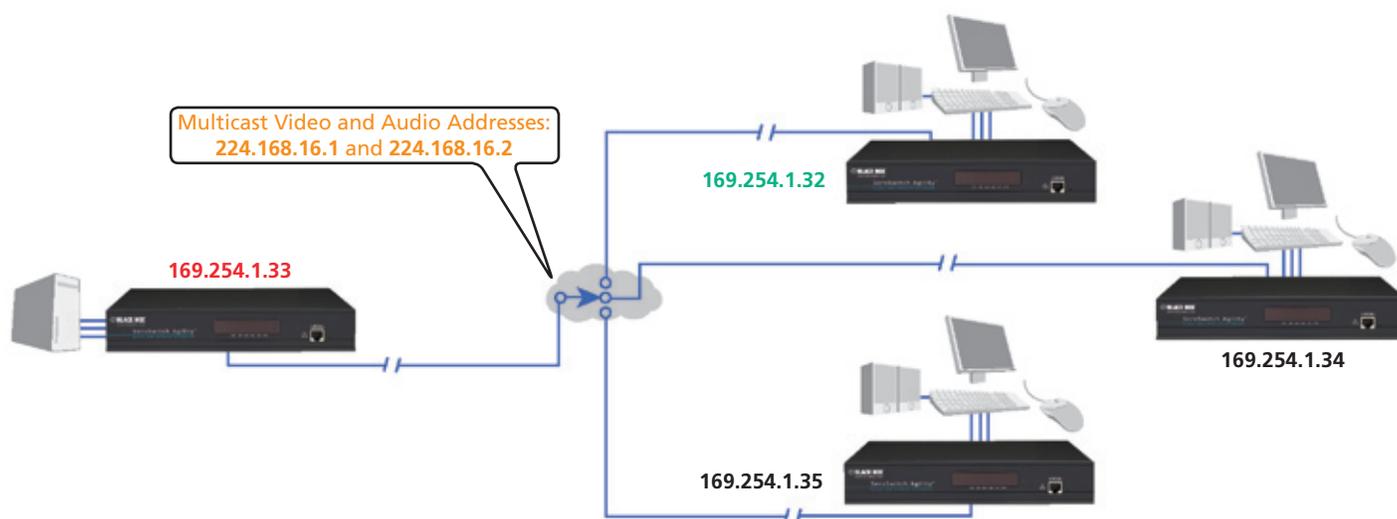
5   Click the Update Now button.

The remote receiver unit now contacts the local transmitter unit with the following request: **"Give me video & audio, and supply them to these common multicast addresses: 224.168.16.1 and 224.168.16.2**"

6   Configure each of the remaining remote receiver units with their own unique IP addresses but with their *Target Local IP Address* and *Multicast Video and Audio Addresses* set to exactly the same values as the first remote receiver unit.

The remaining remote receiver units will then monitor the common multicast addresses: **224.168.16.1** and **224.168.16.2**

Note: If the first remote receiver unit is switched off or disconnected, the local transmitter unit will use the multicast settings contained within the next remote receiver unit that made contact. Therefore, it is good practice to ensure that all remote receiver units contain the same multicast settings.

Appendix D. Addresses and Net Masks

IP address and network masks are closely linked in the quest for one device to find another across disparate network links.

D.1 IP Addresses

As a rough analogy, consider how you use the telephone system. The phone number for Black Box in the US is **1-724-746-5500**. This number consists of three distinct parts:

• **1** connects from another country to the US,

• **724** connects into Pennsylvania,

• **746** selects the telephone exchange in Lawrence, and

• **5500** is the unique code for Black Box within Lawrence.

The important parts of the whole number depend on where you are. If you were based in the same local area as Black Box, there would be no point in dialling out of the US, or even out of the area. The only part of the whole number that you are interested in is the final part: **5500**.

In a similar way to the various parts of the telephone number, the four sections (or *Octets*) of every IP address have different meanings or "weights". Consider the following typical IP address:

192.168.142.154

192 is the most global part of the number (akin to the *1* of the phone number) and **154** is the most local (similar to the *5500* unique local code of the phone number).
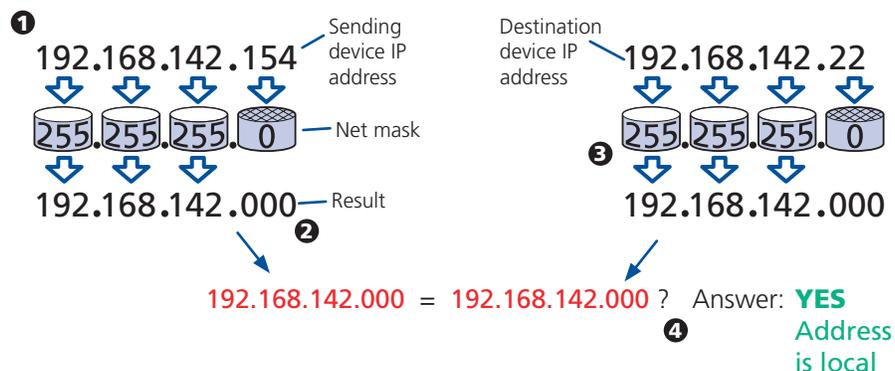
When two network devices communicate with each other, they always "dial the whole number" regardless of their respective locations in a network. However, they still need to know whether the other device is local to them or not, and this is where the net mask comes into play.

D.2 Net Masks

The net mask (or sub-net mask) informs a device as to its own position within a network. From this it can determine whether any other device is within the same local network or is situated further afield.

Taking the telephone number analogy given in the IP address section, in order to use the telephone system efficiently, it is vital for you to know your location relative to the person you are calling. In this way you avoid dialling unnecessary numbers.

When one network device needs to talk to another, the first thing that it will do is a quick calculation using its own IP address, the other device's IP address and its own net mask. Suppose a device with address **192.168.142.154** and net mask **255.255.255.0** needed to communicate with a device at address **192.168.142.22**. The sending device would perform several calculations:

❶ 192.168.142.154 — Sending device IP address

255.255.255.0 — Net mask

192.168.142.000 — Result ❷

Destination device IP address — 192.168.142.22

255.255.255.0 ❸

192.168.142.000

192.168.142.000 = 192.168.142.000 ? Answer: **YES**
❹ Address is local

1 The net mask is used to determine the local and global parts of the sender's IP address. Where there is 255 in the mask, the corresponding address slips through, where there is a 0, it is blocked.

2 Where the net mask was 0, the corresponding part of the result is also zero - this section is now known to be the local part of the IP address.

3 The same process is carried out for the destination address, again using the sender's net mask. Now the local parts of both addresses have been equalised to zero, because their values are not important in determining whether they are both in the same local network.

4 The results of the two net mask operations are now compared, if they match, the destination is local. If not, then the sender will still use the same full destination IP address but will also flag the message to go via the local network gateway and out into the wider world.

The reason for doing this? It makes the network, as a whole, much more efficient. If every message for every recipient was shoved straight out onto the Internet, the whole thing would grind to a halt within seconds. Net masks keep local traffic just that - local.

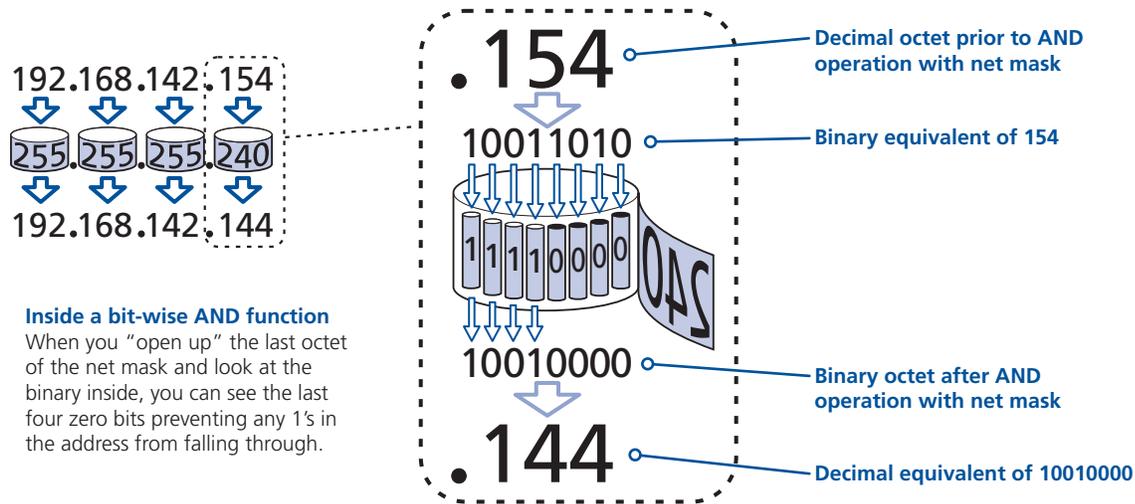Want to know more? - See the next page.

D.2.1 Net Masks - The Binary Explanation

To really understand the operation of a net mask it is necessary to delve deeper into the life blood of computers – *binary*; this is native digital, where everything is either a 1 (one) or 0 (zero), on or off, yes or no.

The net mask operation described on the previous page is known as a 'bit-wise AND function'. The example of 255.255.255.0 is handy because the last octet is completely zero and is "clean" for illustrative purposes. However, actual net mask calculations are carried out, not on whole decimal numbers, but bit by bit on binary numbers, hence the term 'bit-wise'. In a real local network, a net mask might be **255.255.255.240**. Such an example would no longer be quite so clear, until you look at the net mask in its binary form:

11111111.11111111.11111111.11110000

In this case, the four zeroes at the end of the net mask indicate that the local part of the address is formed by only the last four bits. If you use the diagram from the previous example and insert the new net mask, it will have the following effect on the final result:

Inside a bit-wise AND function
When you "open up" the last octet of the net mask and look at the binary inside, you can see the last four zero bits preventing any 1's in the address from falling through.

Thus, when 154 is *bit-wise ANDed* with 240, the result is 144. Likewise, any local address from 192.168.142.**144** through to 192.168.142.**159** would produce exactly the same result when combined with this net mask, hence they would all be local addresses. However, any difference in the upper three octets or the upper four bits of the last octet would slip through the mask and the address would be flagged as not being local.

Appendix E. Cable and Connector Specifications

E.1 RS232 'Null-Modem' Cable
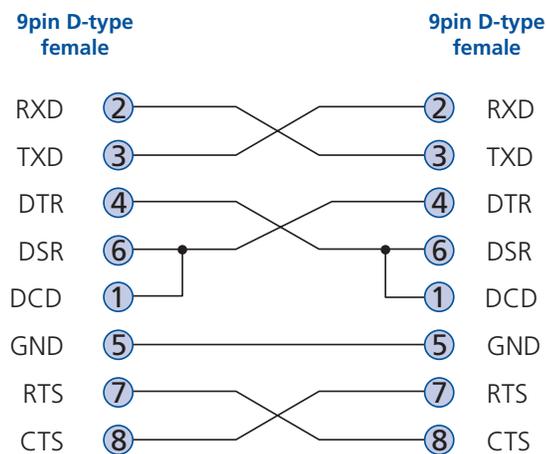
Appendix F. Supported Video Modes

The following video modes are supported and can be automatically configured by the ServSwitch Agility units. If a recognized video mode cannot be found, the ServSwitch Agility Local unit will gradually change some of the key parameters to discover whether a video lock can be achieved. All display timings, except for 1920 x 1200 mode, use VESA GTF (Generalized Timing Formula) timings

vesa 720 x 400 @ 85Hz
vesa 640 x 480 @ 60Hz
vesa 640 x 480 @ 72Hz
vesa 640 x 480 @ 75Hz
vesa 640 x 480 @ 85Hz
vesa 800 x 600 @ 56Hz
vesa 800 x 600 @ 60Hz
vesa 800 x 600 @ 72Hz
vesa 800 x 600 @ 75Hz
vesa 800 x 600 @ 85Hz
vesa 1024 x 768 @ 60Hz
vesa 1024 x 768 @ 70Hz
vesa 1024 x 768 @ 75Hz
vesa 1024 x 768 @ 85Hz
vesa 1152 x 864 @ 75Hz
vesa 1280 x 960 @ 60Hz
vesa 1280 x 1024 @ 60Hz
vesa 1280 x 1024 @ 75Hz
vesa 1600 x 1200 @ 60Hz
vesa 720 x 400 @ 70Hz*
sun 1152 x 900 @ 66Hz
sun 1152 x 900 @ 76Hz
sun 1280 x 1024 @ 67Hz

apple 640 x 480 @ 67Hz
apple 832 x 624 @ 75Hz
apple 1152 x 870 @ 75Hz

1920 x 1200 @ 60Hz

* Not actually a VESA mode but a common DOS/BIOS mode

Appendix G. Safety Information

- For use in dry, oil free indoor environments only.

- The units and their power supplies generate heat when in operation and will become warm to the touch. Do not enclose them or place them locations where air cannot circulate to cool the equipment. Do not operate the equipment in ambient temperatures exceeding 40 degrees Centigrade. Do not place the products in contact with equipment whose surface temperature exceeds 40 degrees Centigrade.

- Warning - live parts contained within power adapter.

- No user serviceable parts within power adapter - do not dismantle.

- Plug the power adapter into a socket outlet close to the module that it is powering.

- Replace the power adapter with a manufacturer approved type only.

- Do not use the power adapter if the power adapter case becomes damaged, cracked or broken or if you suspect that it is not operating properly.

- If you use a power extension cord with a unit, make sure the total ampere rating of the devices plugged into the extension cord does not exceed the cord's ampere rating. Also, make sure that the total ampere rating of all the devices plugged into the wall outlet does not exceed the wall outlet's ampere rating.

- Do not attempt to service the units yourself.

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About Black Box

Black Box Network Services is your source for more than 118,000 networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

ACR1000A, rev. 1