BLACK BOX®
NETWORK SERVICES

ACR1000A-T-R2 ACR1002A-T ACR1020A-T
ACR1000A-R-R2 ACR1002A-R ACR1020A-R

ServSwitch Agility™, Agility Dual™ and Agility Dual-Head™

Extend high quality DVI Video, Audio and USB connections across your high speed network

ACR1000A

ACR1002A

ACR1020A



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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 objectos 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.

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1. Specifications

ServSwitch Agility, Agility Dual and Agility Dual-Head

Casing (w x h x d):	198mm (7.92") x 44mm (1.76") x 145mm (5.7")
Construction:	1U compact case, robust metal design
Weight:	1.11kg (2.44lbs)
Mount kits:	Rack mount kits: Single (RMK2004) or Double units (RMK2004-2) per 1U slot.
	VESA monitor / wall mount chassis kit: RMKVESA
Input Power:	100-240VAC 50/60Hz, 0.8A,
Output Power:	5VDC 20W
Operating Temperature:	0°C to 40°C (32°F to 104°F)
Approvals:	CE, FCC

2. Introduction

Thank you for choosing the ServSwitch Agility family of high capacity digital extenders/switches. By encoding high quality DVI video, digital audio and USB data into Internet Protocol (IP) messages, ServSwitch Agility units offer flexible ways to link peripherals and systems via standard networks.

This guide covers the ServSwitch Agility (Revision 2), ServSwitch Agility Dual and ServSwitch Agility Dual-Head models, all of which can transfer single link DVI video, digital audio and USB signals across your network. The ServSwitch Agility Dual and Dual-Head models can also handle a second single link DVI video stream, while Agility Dual models (not Agility Dual-Head) can additionally transfer one very high resolution dual link DVI video connection (**or** two single link DVI streams). The capabilities are summarized below:

Model	Agility	Agility Dual-Head	Agility Dual	Agility Dual VNC
Primary video	Single link	Single link	Dual link	Dual link
Secondary video	x	Single link	Single link	Single link
VNC support	x	x	x	Yes

Note: The ServSwitch Agility Dual VNC (ACR1012A-T) unit is covered by a separate user guide.

ServSwitch Agility, Agility Dual and Agility Dual-Head variants all provide a choice of link connections. Each supports both copper-based Gigabit Ethernet cabling as well as Fiber Channel over Ethernet (FCoE). These can be used in parallel to provide up to 2 Gigabit connection speeds with the added benefit of link redundancy that can maintain operation in the event of a failed connection. Additionally, the ServSwitch Agility Dual and Dual-Head models also benefit from a Management port that makes configuration even more straightforward.

ServSwitch Agility and ServSwitch Agility Dual/Dual-Head units promote 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 local units using a single screen, keyboard and mouse in order to monitor a potentially vast collection of remote systems.

2.1 One-to-One Configuration

The simplest configuration links one remote unit to a single local 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:

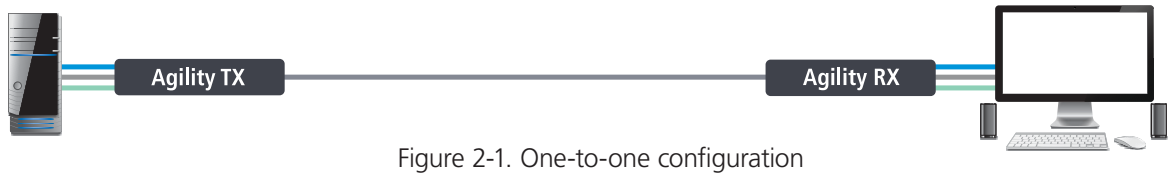
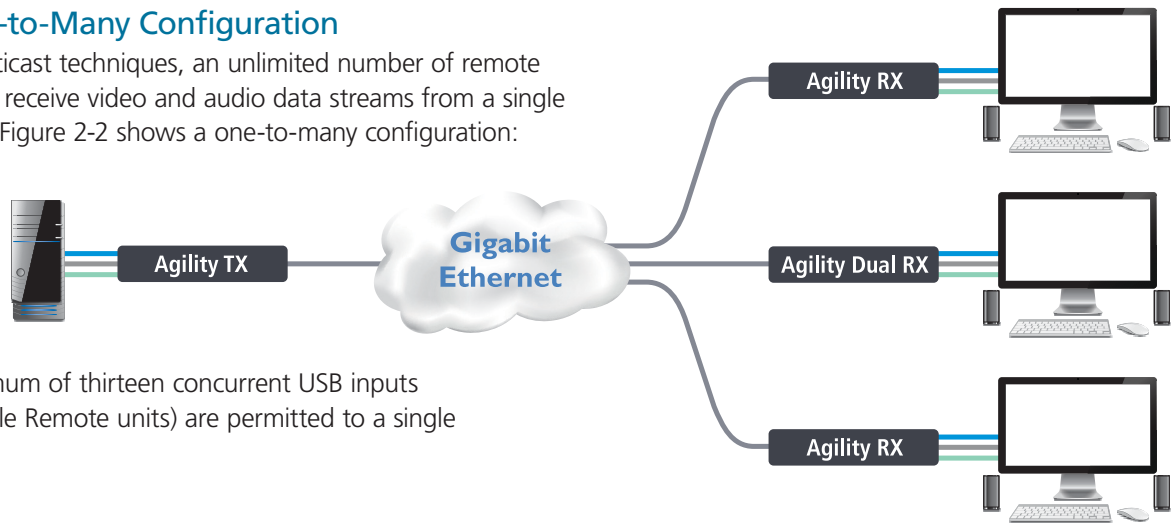


Figure 2-1. One-to-one configuration

2.2 One-to-Many Configuration

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



* A maximum of thirteen concurrent USB inputs (via multiple Remote units) are permitted to a single Local unit.

Figure 2-2. One-to-many configuration

2.3 Mixing ServSwitch Agility, Agility Dual and Agility Dual-Head units

ServSwitch Agility Dual and Dual-Head units are complimentary to the original ServSwitch Agility (Revision 1) models which do not support dual DVI channels or fiber optic linking. It is possible to mix ServSwitch Agility, Agility Dual and Agility Dual-Head local and remote units on a network. However, whenever the two types are cross connected, the extra abilities of the ServSwitch Agility Dual and Dual-Head units will be temporarily disabled.

The newer ServSwitch Agility (Revision 2) models now include the ability for a second Gigabit Ethernet or Fiber Channel over Ethernet connection as per the ServSwitch Agility Dual and Dual-Head models. Newer ServSwitch Agility (Revision 2) units can be mixed with ServSwitch Agility Dual/Dual-Head without any loss of functionality.

2.4 ServSwitch Agility/Dual/Dual-Head and ServSwitch iPATH

Where multiple ServSwitch Agility units are used on a network, we have developed the ServSwitch iPATH manager to allow comprehensive and secure central control of all local units, remote units and users.

When using a ServSwitch iPATH manager to configure Agility units, it is vital that all Agility units that you wish to locate and control are set to their factory default settings. Otherwise they will not be located by the iPATH manager. If necessary, perform a factory reset on each Agility unit.

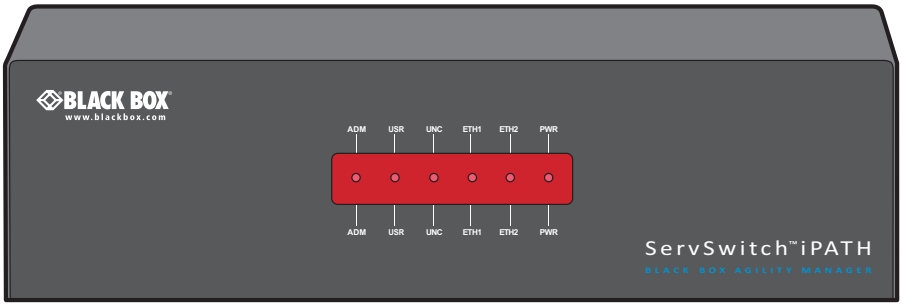


Figure 2-3. ServSwitch iPATH

Please also see Appendix B - Tips for success when networking Agility units

2.5 ServSwitch Agility features

2.5.1 AFZ lossless codec

The AFZ compression scheme is primarily focused on improving the performance for "natural" images (i.e. photographs and movies) and is automatically selected whenever there is a benefit to do so. The AFZ codec is lossless and is very low latency (a small fraction of a frame delay). It generally achieves 50% improvement (in compression) over the RLE scheme for any areas of the screen that consist of images, gradients, shadows etc., elements commonly found in modern desktop environments.

To maintain compatibility with non AFZ -enabled local and remote units there is an automatic switching method which will revert back to RLE compression when a ServSwitch Agility R1 remote unit is connected to the newer Agility R2 series or Agility Dual or Agility Dual-Head.

2.5.2 New feature: AFZ+ codec

AFZ+ compliments the existing AFZ codec by providing greater compression for increased speed where pixel perfect results are not the primary focus. The local unit video configuration page allows you to choose the required compression mode. Choices are:

- 'Pixel perfect' - only uses pixel perfect AFZ,
- 'Adaptive' - guarantees frame rate, builds to pixel perfect,
- 'Smoothest video' - forces the maximum compression, or
- 'Advanced' - allows you to choose the mode:
  - 'AFZ only (pixel perfect),
  - 'AFZ+ Minimum compression',
  - 'AFZ+ Middle compression', or
  - 'AFZ+ Maximum compression'.

2.5.3 Magic Eye (anti-dither support added)

The Magic Eye feature increases performance and reduces network traffic when ServSwitch Agility units are used with Apple Macs and other host computers that have dithered video output. It also improves performance if the video source is noisy (e.g. from a VGA-to-DVI converter).

Dithering is a technique used by some graphics cards to improve perceived image quality by continuously varying the color of each pixel slightly. This gives the illusion of more shades of color than the display can really reproduce, and smooths the appearance of gradually shaded areas in images. Unfortunately dithering is an issue for KVM extenders such as ServSwitch Agility because it makes the image appear to be changing all the time even when it is static, thus creating much more network data than can be carried by a Gigabit Ethernet. The result is a reduction in video frame rate, which the user sees as slow mouse response.

Magic Eye works by ignoring small variations in the video from frame to frame. It is enabled by default as it is not obvious to the user that his poor mouse behavior is caused by dithering. In most cases Magic Eye is invisible, but it can produce slight color inaccuracies on the monitor. For full color accuracy, Magic Eye can be disabled (within the local unit video configuration page) for video sources which are not dithered or noisy.

2.5.4 Transport Layer Security (TLS)

ServSwitch Agility, Agility Dual and Agility Dual-Head units support the industry standard Transport Layer Security (TLS) protocol. This offers protection against eavesdropping and tampering by third parties when data are transferred between ServSwitch Agility local and remote units across networks (and also between ServSwitch Agility units and iPATH servers).

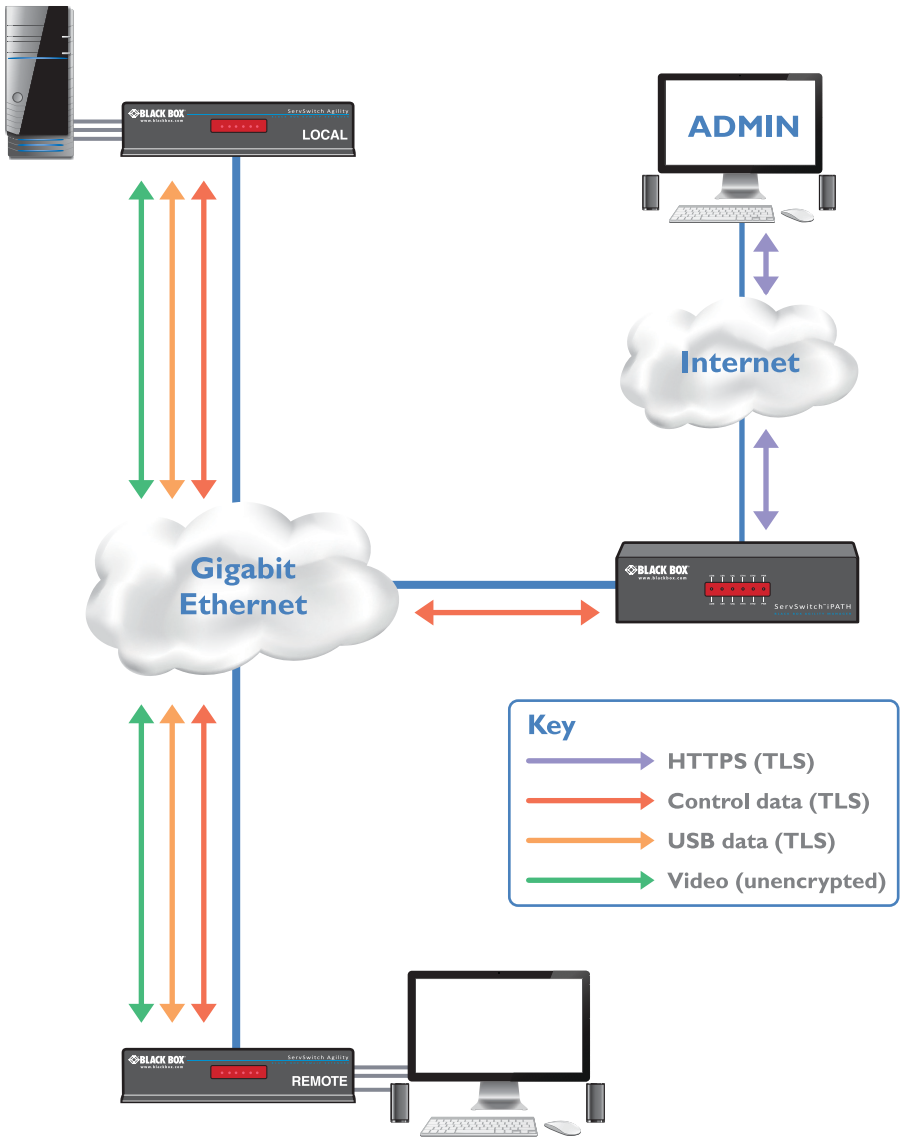


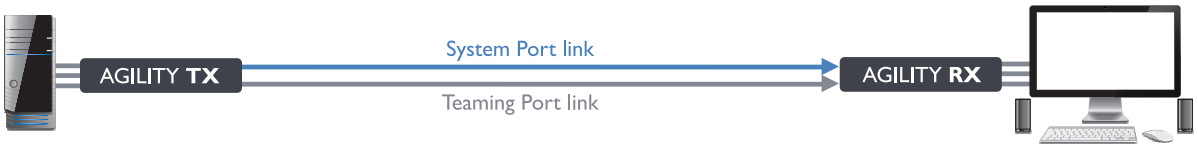
Figure 2-4. Transport Layer Security data diagram

2.6 Teaming operation

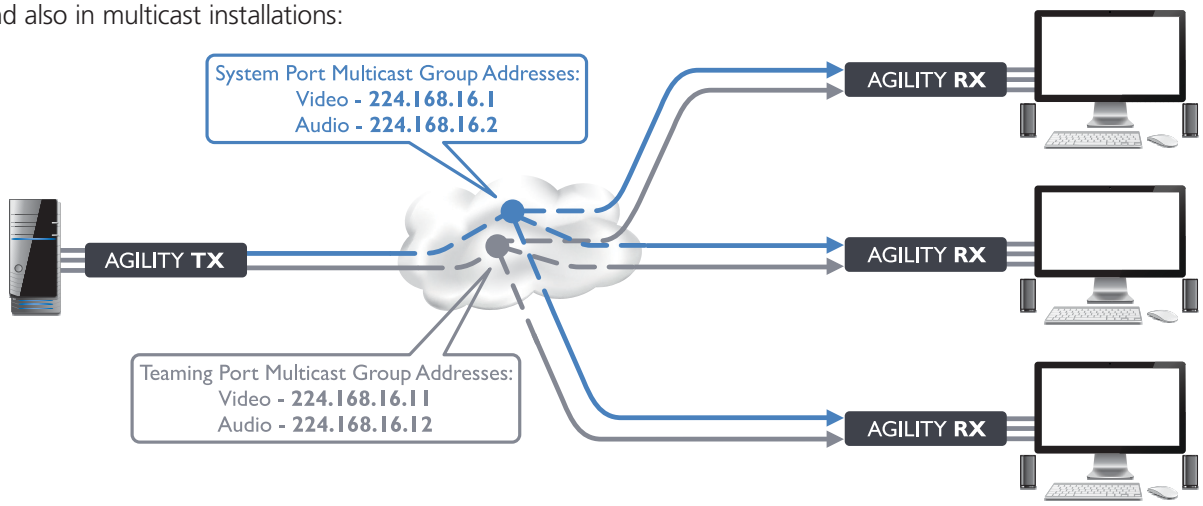
The units have dual network interface ports which can be used in parallel to produce important benefits:

- Improved connection speeds up to 2 Gigabits per second, and
- Important link redundancy that can maintain operation in the event of a failed connection.

Teaming offers immediate speed improvements in a one-to-one arrangement...



...and also in multicast installations:



2.7 Firmware version 3.3 (or greater)

IMPORTANT: Please read this section completely before attempting installation or upgrades.

The basic rule for iPATH-controlled installations is: If firmware version 3.3 (or greater) is to be used **anywhere** in an iPATH-controlled Agility installation, then it must be used **everywhere**.

For Agility installations that **do not** use iPATH servers, it is possible to mix Agility firmware revisions, however, for best results you are recommended to upgrade all Agility units to v3.3 (or greater).

2.7.1 Important upgrade notes

- Always upgrade the iPATH server(s) to v3.3 (or greater) **before** attempting to upgrade (or add) Agility units at or above v3.3* – you will then be prompted to upgrade the Agility units.
- Agility (ACR1000A) revision 2 units are only available with firmware starting at v3.3 (and cannot be downgraded), so if you add one or more ACR1000A units to your installation, it is mandatory to upgrade iPATH to v3.3 or greater (earlier iPATH firmware versions have no knowledge of the new product).
- Agility Dual-Head (ACR1020A) units are only available with firmware starting at v3.4 (and cannot be downgraded), so if you add one or more ACR1020A units to your installation, it is mandatory to upgrade iPATH to v3.3 or greater (earlier iPATH firmware versions have no knowledge of the new product).
- If an Agility unit at v3.3 or greater is added, but you don't want to upgrade your iPATH server; simply upload the current firmware from your iPATH server to the Agility unit in order to downgrade it. This is not possible on ACR1000A and/or ACR1020A units.

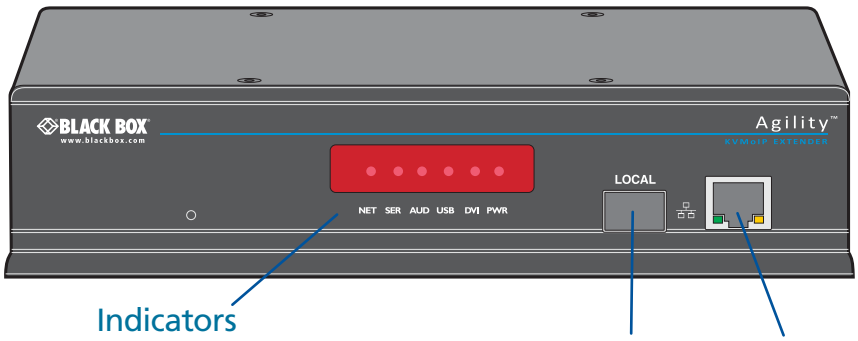
* *If you add an Agility unit at or above v3.3 to an earlier version of iPATH and then upgrade iPATH to v3.3 or greater, the Agility unit will not operate after the upgrade. To rectify this, you will need to delete the record from the iPATH database and factory reset the Agility unit before it will reacquire.*

2.8 ServSwitch Agility 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.

2.8.1 ServSwitch Agility local unit

The smart front faces feature the operation indicators as shown in Figure 2-5:



These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present.
- SER On when the AUX (serial) port is enabled and active.
- AUD On when audio is enabled and active.
- USB On when USB link with the connected PC is active.
- DVI On when a video input signal from the PC is detected.
- PWR Power indicator.

Figure 2-5. ServSwitch Agility local unit - front panel

Figure 2-6 shows the connectors located on the rear panel of the local unit:

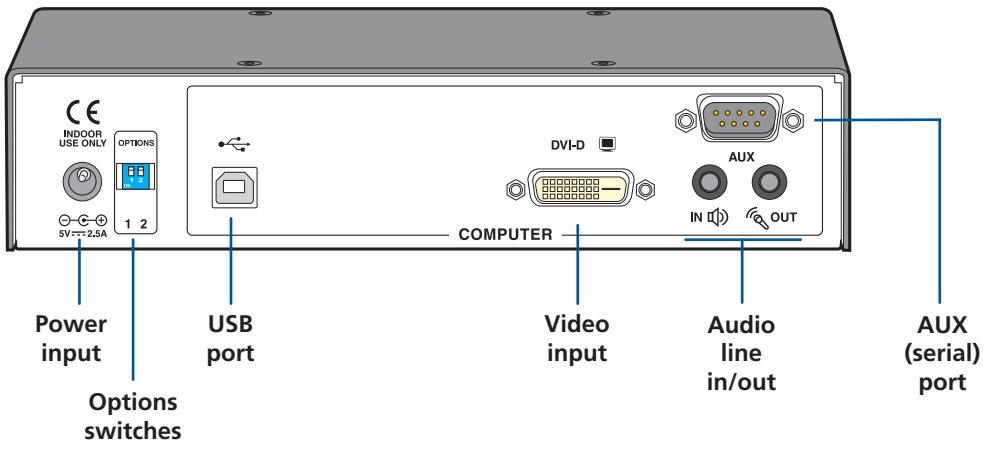
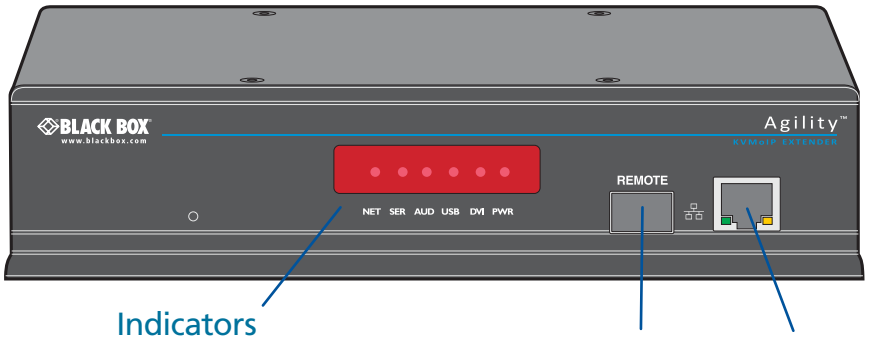


Figure 2-6. ServSwitch Agility local unit - rear panel

2.8.2 ServSwitch Agility remote unit

The smart front faces feature the operation indicators as shown in Figure 2-7:



These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present.
- 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 2-7. ServSwitch Agility remote unit - front panel

Figure 2-8 shows the connectors located on the rear panel of the remote unit:

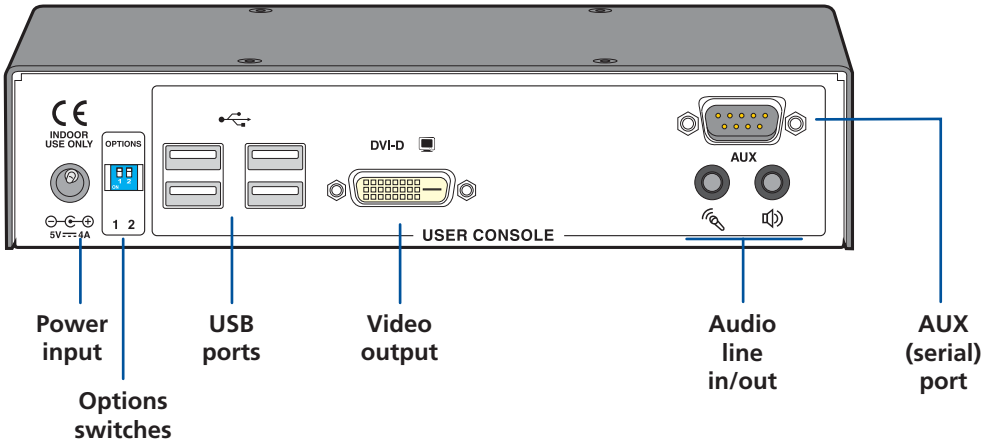


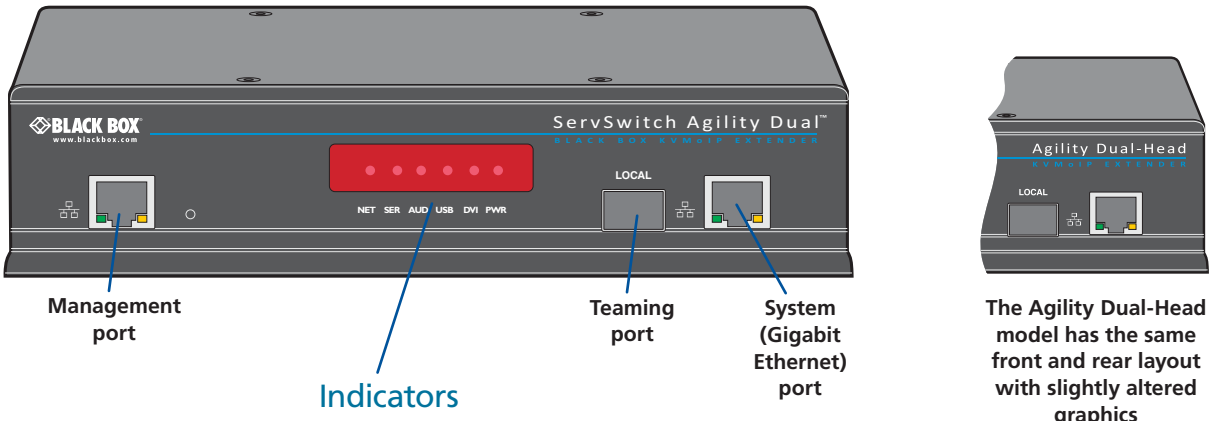
Figure 2-8. ServSwitch Agility remote unit - rear panel

2.9 ServSwitch Agility Dual (and Dual-Head) unit features

The ServSwitch Agility Dual units are housed within durable, metallic enclosures with most connectors situated at the rear panel - the System and Teaming ports are situated on the front panels.

2.9.1 ServSwitch Agility Dual (and Dual-Head) local unit

The smart front faces feature the operation indicators as shown in Figure 2-9:



These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present.
- SER On when the AUX (serial) port is enabled and active.
- AUD On when audio is enabled and active.
- USB On when the USB link with the connected PC is active.
- DVI On when a video input signal from the PC is detected.
- PWR Power indicator.

Figure 2-9. ServSwitch Agility Dual local unit - front panel

Figure 2-10 shows the connectors located on the rear panel of the local unit:

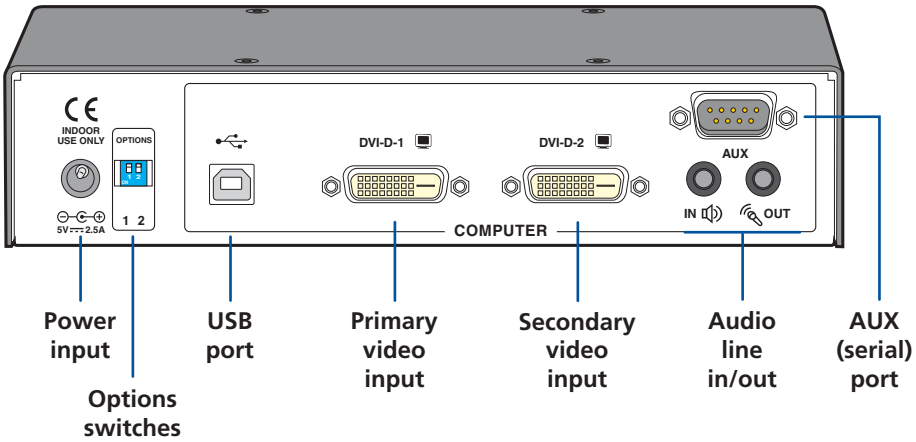
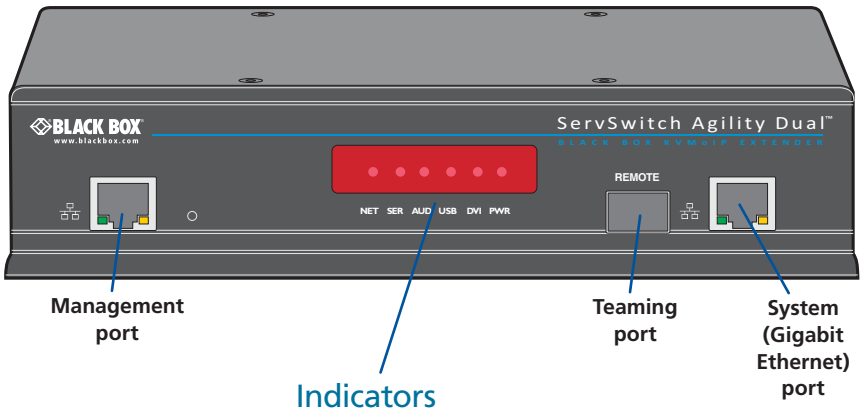
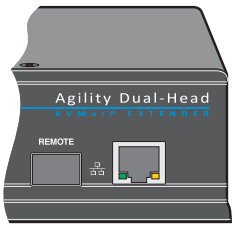


Figure 2-10. ServSwitch Agility Dual local unit - rear panel

2.9.2 ServSwitch Agility Dual (and Dual-Head) remote unit

The smart front faces feature the operation indicators as shown in Figure 2-11:





The Agility Dual-Head model has the same front and rear layout with slightly altered graphics

These six indicators clearly show the key aspects of operation:

- NET On when valid network link is present.
- 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 2-11. ServSwitch Agility Dual remote unit - front panel

Figure 2-12 shows the connectors located on the rear panel of the remote unit:

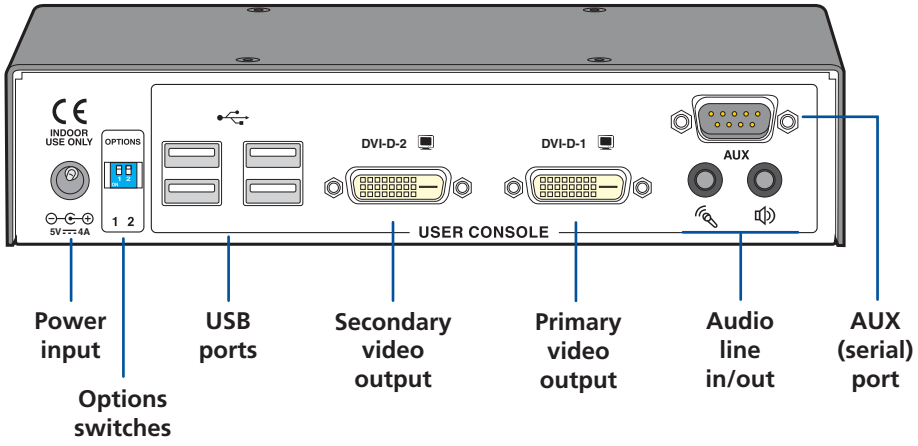


Figure 2-12. ServSwitch Agility Dual remote unit - rear panel

2.10 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.

2.10.1 ServSwitch Agility Local Unit Package (ACR1000A-T-R2)

- ServSwitch Agility local unit
- Power adapter and power cord
- Info wallet
- Combined DVI-D and USB cable (6 feet)
- (2) audio cables with 3.5mm stereo jacks (6.5 feet)

2.10.2 ServSwitch Agility Remote Unit Package (ACR1000A-R-R2)

- ServSwitch Agility remote unit
- Power adapter and power cord
- Info wallet

2.10.3 ServSwitch Agility Pair Package (ACR1000A)

- All contents of ServSwitch Agility local unit package
- All contents of ServSwitch Agility remote unit package

2.10.4 ServSwitch Agility Dual Local Unit Package (ACR1002A-T)

- ServSwitch Agility Dual local unit
- Power adapter and power cord
- Info wallet
- Combined DVI-D and USB cable (6 feet)
- 2M DVI-D Single Link Video cable
- (2) audio cables with 3.5mm stereo jacks (6.5 feet)

2.10.5 ServSwitch Agility Dual Remote Unit Package (ACR1002A-R)

- ServSwitch Agility Dual remote unit
- Power adapter and power cord
- Info wallet

2.10.6 ServSwitch Agility Dual-Head Local Unit Package (ACR1020A-T)

- ServSwitch Agility Dual-Head local unit
- Power adapter and power cord
- Info wallet
- Combined DVI-D and USB cable (6 feet)
- 2M DVI-D Single Link Video cable
- (2) audio cables with 3.5mm stereo jacks (6.5 feet)

2.10.7 ServSwitch Agility Dual-Head Remote Unit Package (ACR1020A-R)

- ServSwitch Agility Dual-Head remote unit
- Power adapter and power cord
- Info wallet

2.11 Additional Items You May Need

- Power adapter (P/N: PS650)
- 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)
- Suitable fiber modules (for Agility Dual/Dual-Head units)
- 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 (P/N: RMKVESA)

3. Installation

3.1 Mounting

For details about mounting options, please see Appendix H.

3.2 Connections

Installation involves linking the ServSwitch Agility (or ServSwitch Agility Dual or Agility Dual-Head) local unit to various ports on the host computer, while the ServSwitch Agility (or ServSwitch Agility Dual or Agility Dual-Head) remote unit is attached to your peripherals.

3.2.1 Local Video Link

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

- ServSwitch Agility models units support one Single Link video display at pixel clocks up to 165MHz (equivalent to a maximum resolution of 1920 x 1200 at 60Hz).
- ServSwitch Agility Dual-Head can simultaneously support up to two Single Link high resolution video displays at pixel clocks up to 165MHz (1920 x 1200 at 60Hz maximum).
- ServSwitch Agility Dual can simultaneously support up to two Single Link high resolution video displays at pixel clocks up to 165MHz (1920 x 1200 at 60Hz maximum); or can alternatively support a single Dual Link very high Resolution video display at pixel clocks up to 330MHz (equating to an example display mode of 2560 x 1600 at 60Hz).

3.2.1.1 To make a single video link on ServSwitch Agility

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

2 Connect a standard DVI-D link cable to the DVI-D socket on the Local unit rear panel. See Figure 3-1.

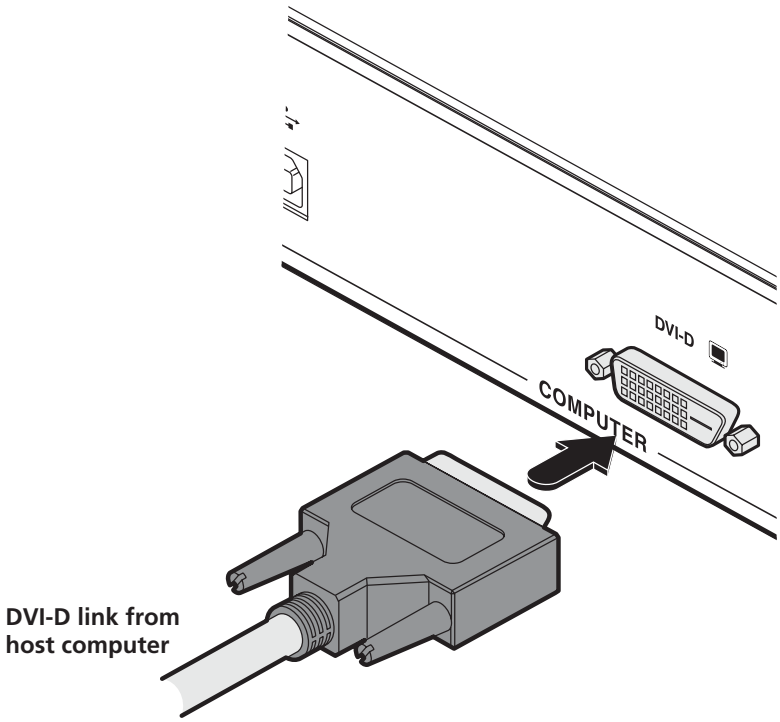


Figure 3-1. Connect a standard DVI-D link cable to the DVI-D socket.

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

3.2.1.2 To make a single video link on ServSwitch Agility Dual or Dual-Head

Use either a standard DVI-D cable (or optionally a Dual Link DVI-D cable) to connect the primary video port of the computer system to the DVI-D-1 connector of the ServSwitch Agility Dual (or Dual-Head). For dual link connections (not supported on Dual-Head models), a similar dual link cable must also be used at the remote unit.

1 Wherever possible, ensure that power is disconnected from the ServSwitch Agility Dual (or Dual-Head) and the host computer.

2 Connect a standard or dual DVI-D link cable to the DVI-D-1 socket on the Local unit rear panel. See Figure 3-2.

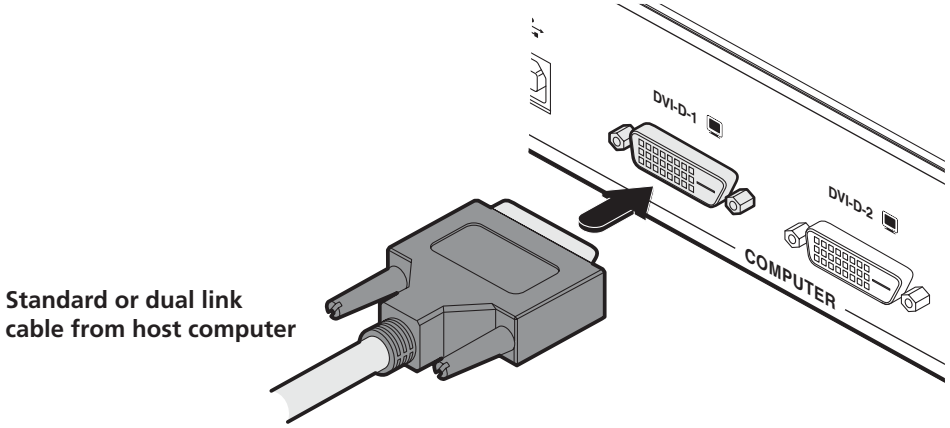


Figure 3-2. Connect a standard or dual link DVI-D cable to the DVI-D-1 socket.

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

3.2.1.3 To make two video links on ServSwitch Agility Dual or Dual-Head

Use two single link DVI-D cables to connect the primary and secondary DVI video ports of the computer to allow two video displays to be used at the remote unit.

1 Wherever possible, ensure that power is disconnected from the ServSwitch Agility Dual (or Dual-Head) and the host computer.

2 Connect standard DVI link cables to the DVI-D-1 and DVI-D-2 sockets on the Local unit rear panel. See Figure 3-3.

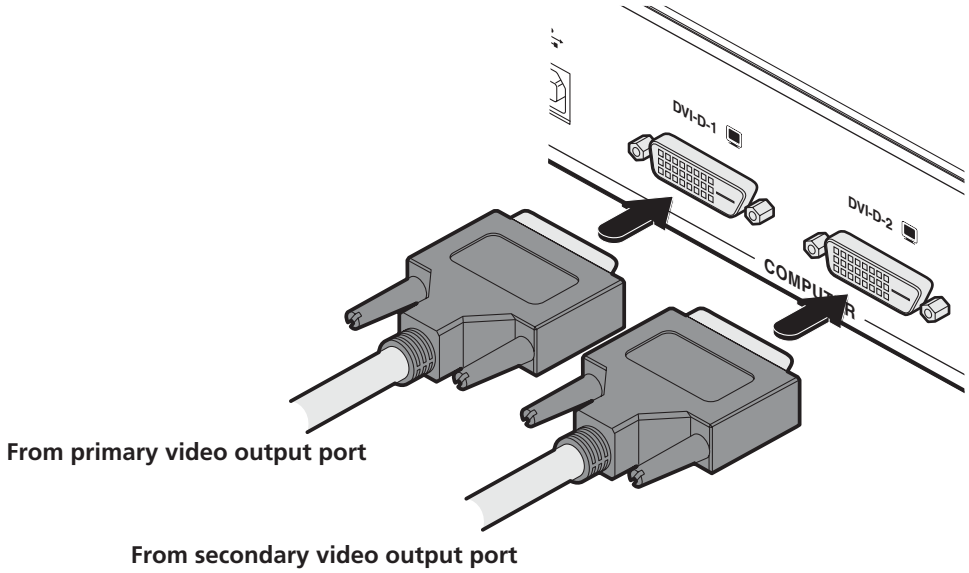


Figure 3-3. Connect standard DVI-D link cables to the DVI-D-1 and DVI-D-2 sockets.

3 At the other end of the link cables, connect the cable from socket DVI-D-1 to the computer's primary video port and the cable from socket DVI-D-2 to the computer's secondary video port.

3.2.2 Local Audio Links

The ServSwitch Agility (and Agility Dual/Dual-Head) 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 IN socket on the Local unit rear panel and the speaker output socket of the host computer. See Figure 3-4.

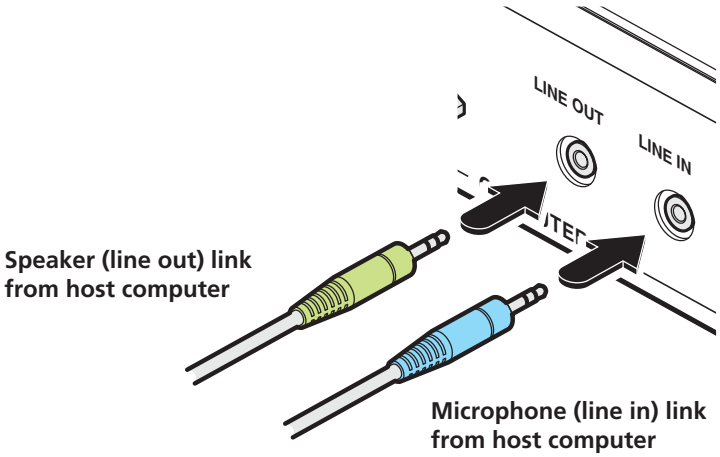


Figure 3-4. Connect the speaker and microphone cables to audio sockets.

2 [Where a microphone is to be used]: Connect a second audio link cable between the OUT socket on the Local unit rear panel and the Line In socket of the host computer.

3.2.3 Local USB Link

The ServSwitch Agility (and Agility Dual/Dual-Head) units act as USB 2.0 hubs and so can provide four sockets at the Remote unit with only a single connection at the Local unit.

1 Connect the type B connector on a USB cable to the USB port on the Local unit rear panel. See Figure 3-5.

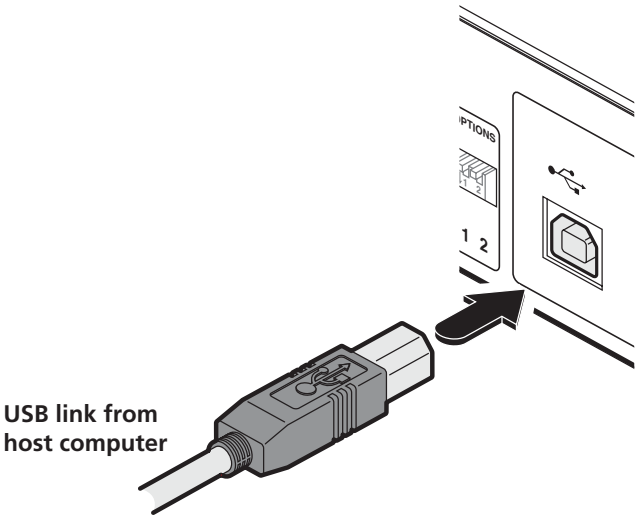


Figure 3-5. Connect the USB link cable to Local unit socket.

2 Connect the type A connector of the cable to a vacant USB socket on the host computer.

3.2.4 Local AUX Port

The AUX port is an RS232 serial port that allows extension of RS232 signals up to a baud rate of 115200. The port has software flow control, but no hardware flow control.

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

2 Connect a suitable serial 'null-modem' cable (see Appendix E 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.

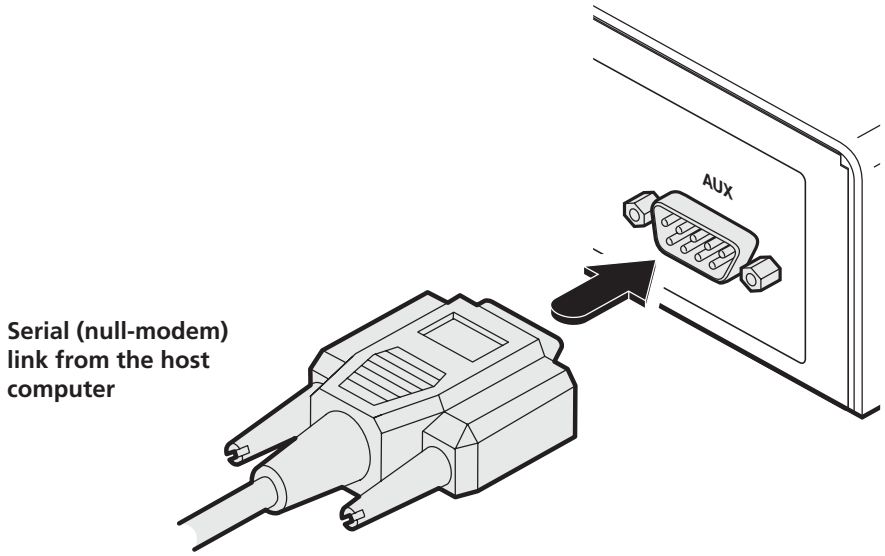


Figure 3-6. Connecting the serial link cable to Local unit socket.

3.2.5 Local Power In

Each ServSwitch Agility unit is supplied with an appropriate power supply.

1 Attach the output lead from the supplied power adapter to the 5V socket on the rear panel of the unit. See Figure 3-7.

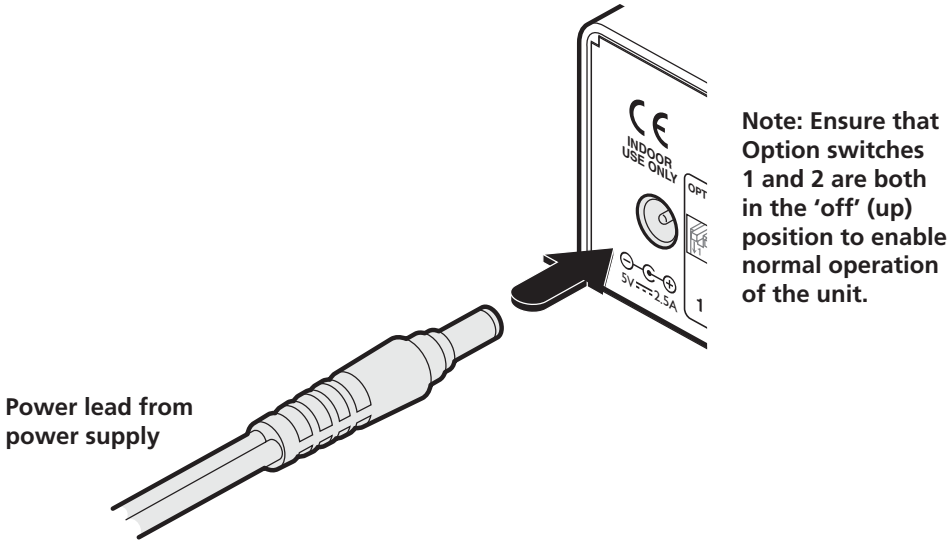


Figure 3-7. Connect the power supply to the rear panel power socket.

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 104°F (40°C). Do not place the products in contact with equipment whose surface temperature exceeds 104°F (40°C).

3.2.6 Local/Remote Network Link

ServSwitch Agility (and Agility Dual/Dual-Head) units can be either connected directly to each other or via a high speed network. The connections can be copper-based Gigabit Ethernet as well as Fiber Channel over Ethernet (FCoE). These can be used in parallel to provide up to 2 Gigabit connections speeds.

A single System port (Gigabit Ethernet) is provided as standard on the right side of the front panel. Additionally, the Teaming port, located just to the left, allows you to insert either an optional Fiber Channel SFP module or Active Copper SFP module. The chosen module can then allow either a fiber optic or additional Gigabit Ethernet link to be used in parallel with the fixed System (Gigabit Ethernet) port.

3.2.6.1 Cable and fiber details

- For direct links over Ethernet cable, the length of cable should not exceed 100 meters (328 feet). Network cables used for connections may be category 5, 5e, 6 or 7 twisted-pair cable. Local units have an autosensing capability on their network interfaces, so for direct point-to-point connections, no 'crossover' Ethernet cable is required.
- For direct links via fiber, varying distances can be achieved depending on the module and cable types used. Please refer to the table in Appendix G for detailed information. The fiber links must have crossovers.
- Please see Appendix B for important tips about networking Agility units.

3.2.6.2 To link Agility (and Agility Dual/Dual-Head) units using the System port

1 Connect a CAT 5, 5e, 6, or 7 cable to the socket on the front panel of the ServSwitch Agility unit. See Figure 3-8.

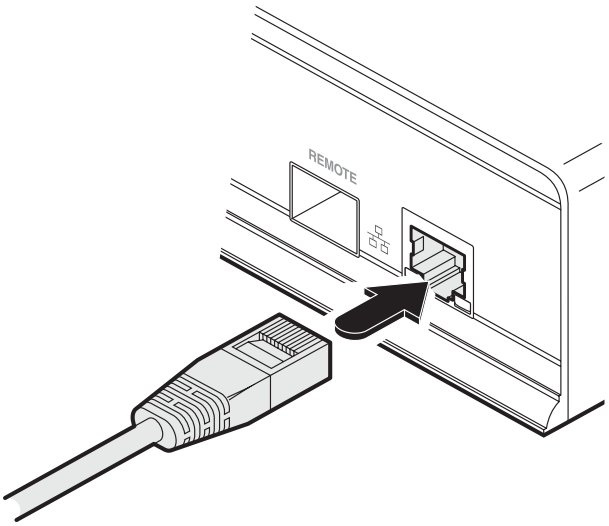


Figure 3-8. CAT 5, 5e, 6, or 7 link either directly from the other ServSwitch Agility unit or from a Gigabit Ethernet switch.

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.

3.2.6.3 To link Agility (and Agility Dual/Dual-Head) units using the Teaming port

1 Insert the appropriate optional SFP module into the aperture on the ServSwitch Agility Dual/Dual-Head front panel. See Figure 3-9.

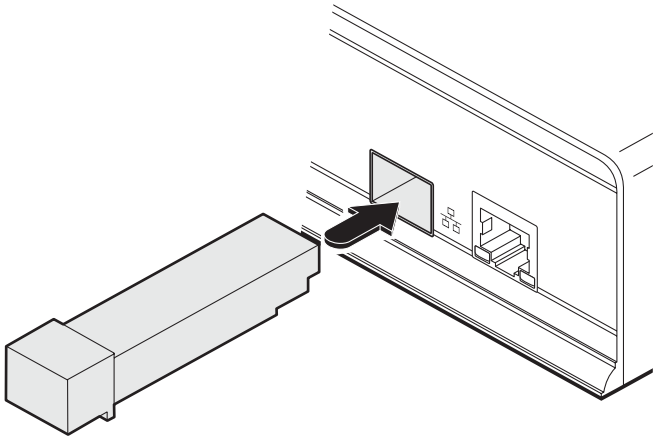


Figure 3-9. Insert an appropriate single mode or multi mode fiber module.

2 Make your connection(s) between the chosen module and either the other Agility unit or a suitable network switch. See Figures 3-10 and 3-11.

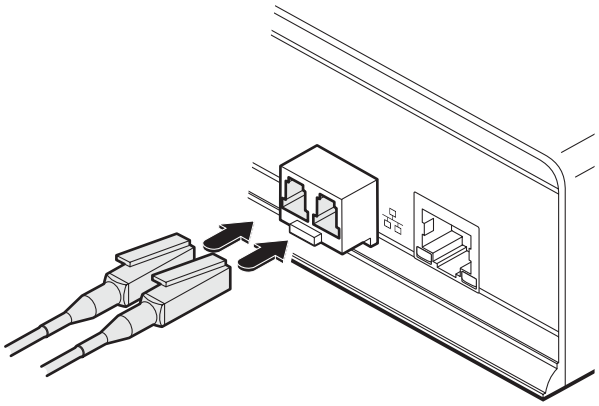


Figure 3-10. Connect the transmit and receive fiber optic links to the sockets on the Fiber Channel module. Then close the latch over the link connectors to lock them into place.

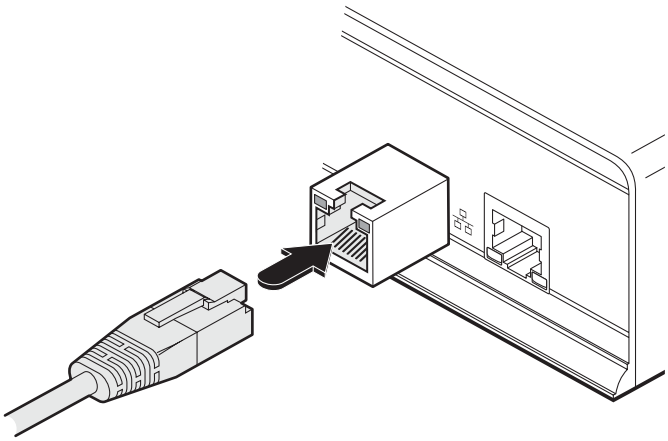


Figure 3-11. Connect a CAT 5, 5e, 6, or 7 cable to the socket on the Active Copper module.

3.2.7 Using the Management port (ServSwitch Agility Dual/Dual-Head units only)

The Management port on each ServSwitch Agility Dual/Dual-Head unit provides a consistent method to gain access to the internal configuration utility of each ServSwitch Agility Dual/Dual-Head. Although the configuration utility is accessible via the System (Gigabit Ethernet) port and also the Teaming port; if the ServSwitch Agility Dual/Dual-Head units are being used in a point-to-point arrangement, then it would be necessary to temporarily reconnect each unit to a network in order to make configuration changes. The Management port allows the admin user to simply connect a computer directly to each ServSwitch Agility Dual/Dual-Head unit and access the configuration utility using a consistent IP address - thus negating the need to know the main port addresses of each ServSwitch Agility Dual/Dual-Head unit in advance.

To connect a computer to access the configuration utility

1 Connect a CAT 5, 5e, 6, or 7 link cable to the Management port socket located on the far left side of the ServSwitch Agility Dual/Dual-Head front panel. The port automatically configures itself, so no cross-over cable is required (but is supported if you do use one). See Figure 3-12.

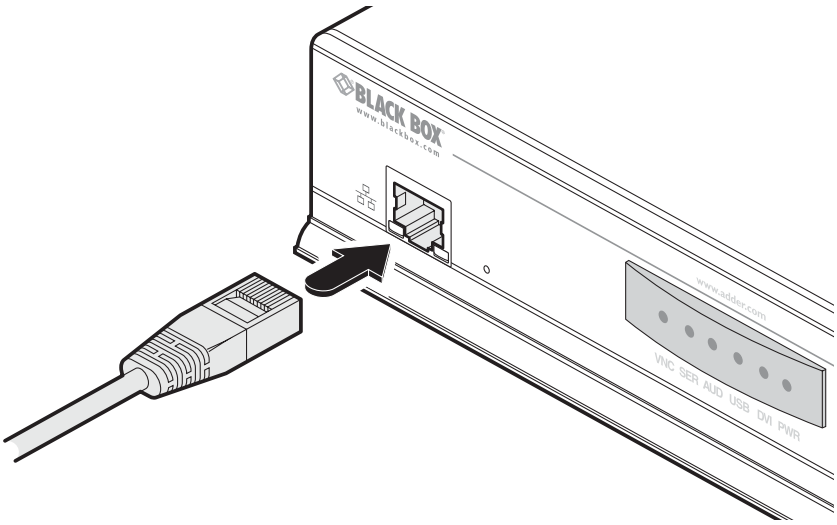


Figure 3-12. Connect a CAT 5, 5e, 6, or 7 link cable to the Management port socket

2 Connect the other end of the link cable directly to the network port of your computer.

3 Use a web browser to gain access to the internal configuration utility. The standard IP address of the Management port is 192.168.1.42

Note: This standard IP address can be changed within the configuration utility.

Please see the section 4.1.3 Browser-based configuration utility for further details.

3.2.8 Remote Video Display

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

- ServSwitch Agility models can support a single high resolution DVI-D video display at pixel clocks up to 165MHz (equating to an example display mode of 1920 x 1200 at 60Hz refresh).
- ServSwitch Agility Dual-Head models can simultaneously support up to two high resolution video displays at pixel clocks up to 165MHz.
- ServSwitch Agility Dual models can simultaneously support up to two high resolution video displays at pixel clocks up to 165MHz; or can alternatively support one very high resolution video display (at pixel clocks up to 330MHz).

3.2.8.1 To connect a single DVI display to the ServSwitch Agility

1 Connect the lead from the video display to the DVI-D-1 socket on the rear panel of the ServSwitch Agility remote unit. See Figure 3-13.

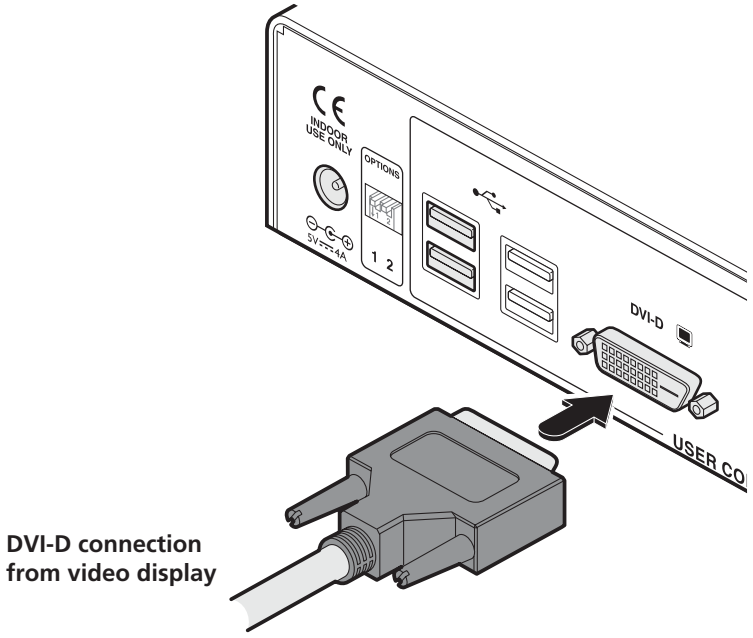


Figure 3-13. Connect the digital video link cable to the DVI-D socket.

3.2.8.2 To connect a single DVI display to the ServSwitch Agility Dual/Dual-Head

1 Use either a standard or Dual Link DVI-D cable to connect the video display to the DVI-D-1 connector of the ServSwitch Agility Dual/Dual-Head remote unit. See Figure 3-14. Note: When using dual link on DVI-D-1, the DVI-D-2 port will be disabled. If DVI-D-2 is already being used, then it must be disconnected before dual link operation can occur on DVI-D-1. For very high resolution displays (not Dual-Head models), a dual link cable must also be used at the Local unit.

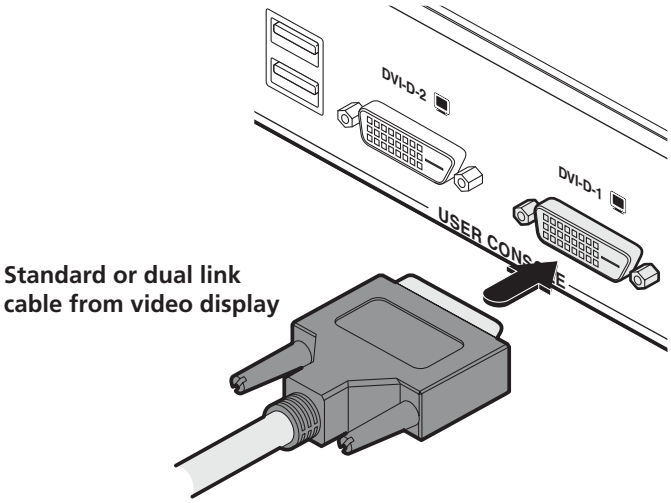


Figure 3-14. Connect the standard or dual link digital video cable to the DVI-D-1 socket.

3.2.8.3 To connect two DVI displays to the ServSwitch Agility Dual/Dual-Head

1 Connect your primary DVI display to the DVI-D-1 socket and your second DVI display to the DVI-D-2 socket on the Remote unit rear panel. See Figure 3-15.

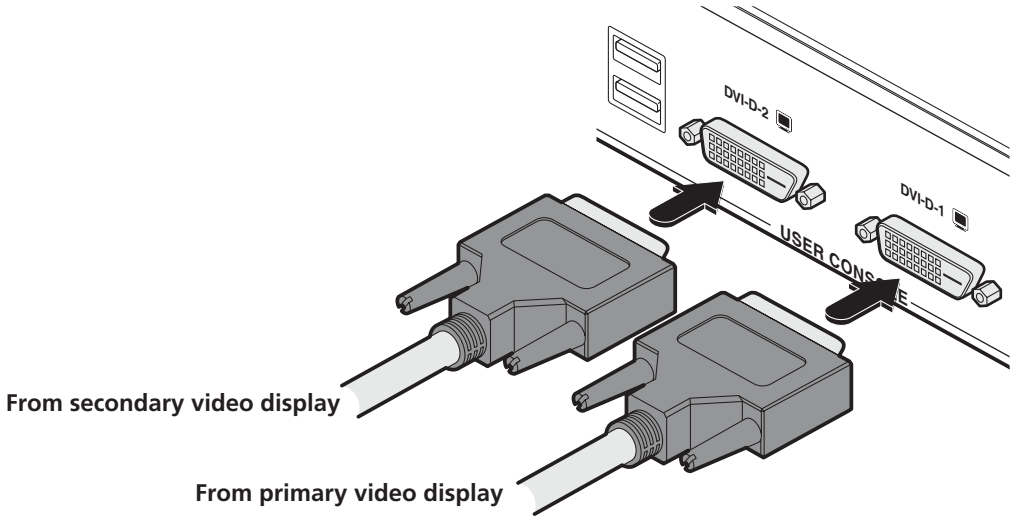


Figure 3-15. Connect two standard DVI-D link cables to the DVI-D-1 and DVI-D-2 sockets.

3.2.9 Remote Microphone & Speakers

ServSwitch Agility (and Agility Dual/Dual-Head) remote units can support a microphone as well as speakers providing the necessary connections have been made between the ServSwitch Agility local unit and the host computer.

3.2.9.1 To connect a microphone (or line in) and/or speakers

1 Connect the lead from a mono microphone to the 3.5mm socket labeled on the rear panel.

2 Connect the lead from stereo speakers to the 3.5mm socket labeled on the rear panel. See Figure 3-16.

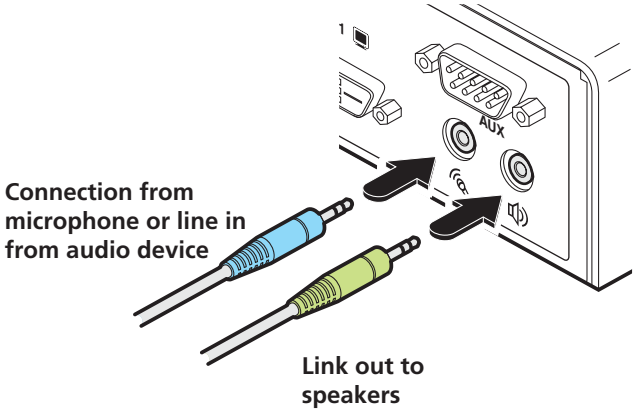


Figure 3-16. Connect the speaker and microphone cables to audio sockets.

3 Once the unit has been fully connected and powered on, access the Remote 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).

3.2.10 Remote USB Devices

ServSwitch Agility and Agility Dual/Dual-Head remote units have 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 3-17.

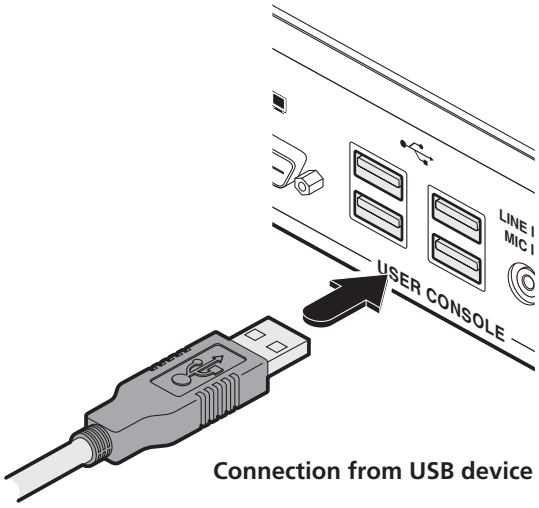


Figure 3-17. Connecting a USB device to the remote unit.

3.2.10.1 Supported USB Devices

The local unit emulates the signals of certain USB peripherals to the computer. This means that those peripherals appear to the computer to be permanently connected, even when the remote units are switched elsewhere. This enables faster keyboard and mouse switching and allows for more than 13 identical USB devices. If the keyboards and mice are identical across the connected remote units, they are only enumerated once by the host. The following limitations apply:

- 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.
- If a device cannot be made to work, please contact technical support as a special entry within the advanced configuration may solve it.

3.2.11 Remote AUX Port

The AUX port is an RS232 serial port that allows extension of RS232 signals up to a baud rate of 115200. The port has software flow control, but no hardware flow control.

1 Connect a suitable serial 'null-modem' cable (see Appendix E for pin-out) between the AUX port on the right hand side of the ServSwitch Agility rear panel and your remote serial device. See Figure 3-18.

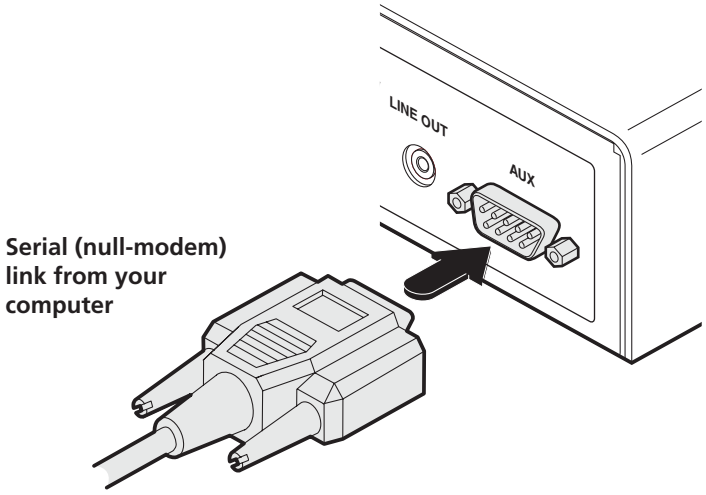


Figure 3-18. Connecting the serial link cable to local unit socket.

3.2.12 Remote Power In

Each ServSwitch Agility unit is supplied with an appropriate power supply.

1 Attach the output lead from the supplied power adapter to the 5V socket on the rear panel of the unit. See Figure 3-19.

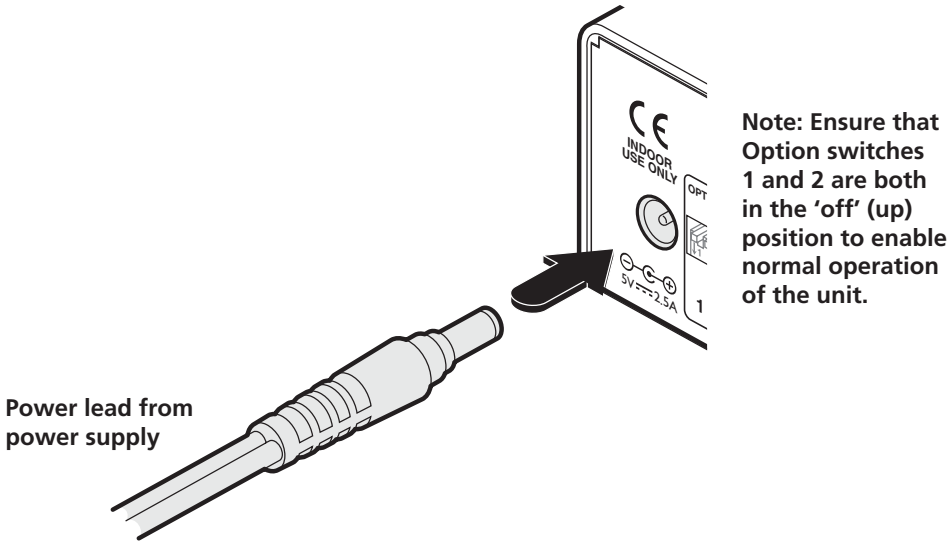


Figure 3-19. Connect the power supply to the rear panel power socket.

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. When all other connections have been made, switch on the power supply unit.

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 (104°C) 40°C. Do not place the products in contact with equipment whose surface temperature exceeds (104°C) 40°C.

4. Configuration

4.1 Initial configuration

Where a Agility or Agility Dual/Dual-Head local and remote units are directly linked to each other, no configuration action is required, provided 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 - please see section 4.1.3 below.

4.1.1 Networked linking

Where Agility or Agility Dual/Dual-Head units are connected via networked links, you can either configure them individually, or configure them collectively using a ServSwitch iPATH manager:

- **Configuring networked Agility (and Agility Dual/Dual-Head) units individually** - You need to specify the network addresses of the Agility units so that they can locate each other. This is done by running the browser-based configuration utility on a computer system linked to the same network as the Agility units.
- **Configuring Agility (and Agility Dual/Dual-Head) units collectively** - The ServSwitch iPATH manager allows you to configure, control and coordinate any number of Agility local and remote units from a single application.

  IMPORTANT: When using the ServSwitch iPATH manager to configure Agility units, it is vital that all Agility units that you wish to locate and control are set to their factory default settings. Otherwise they will not be located by the ServSwitch iPATH manager. If necessary, perform a factory reset on each Agility unit.

4.1.2 Manual Factory Reset

A factory reset returns a ServSwitch Agility local or remote unit to its default configuration. You can perform factory resets using the browser-based configuration utility or by using this direct manual method.

4.1.2.1 To perform a manual factory reset

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.

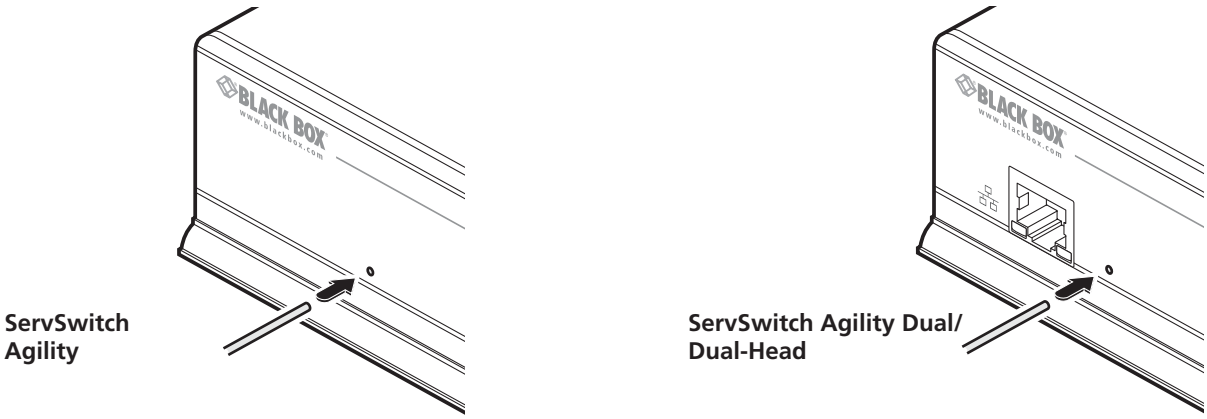


Figure 4-1. Use a straightened-out paper clip to press the reset button while powering on the unit.

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.

4.1.3 Browser-Based Configuration Utility

The browser-based configuration utility within all Local and Remote units requires a network connection between the Agility unit and a computer on the same network. The configuration utility allows you to perform many important functions. Please see Appendix A for details.

It is possible to gain access to the internal configuration utility via any of the ports located on the front panel of each Agility Dual/Dual-Head unit. For temporary connections on Agility Dual/Dual-Head units, you are recommended to use the Management port. There is no Management port on standard Agility models, so use the System port instead.

4.1.3.1 Connecting a Computer System for Browser-Based Configuration

1 Connect a CAT 5, 5e, 6, or 7 link cable to either the Management (Agility Dual/Dual-Head only) or System port socket on the front panel. The port automatically configures itself, so no cross-over cable is required (but is supported if you do use one). See Figure 4-2.

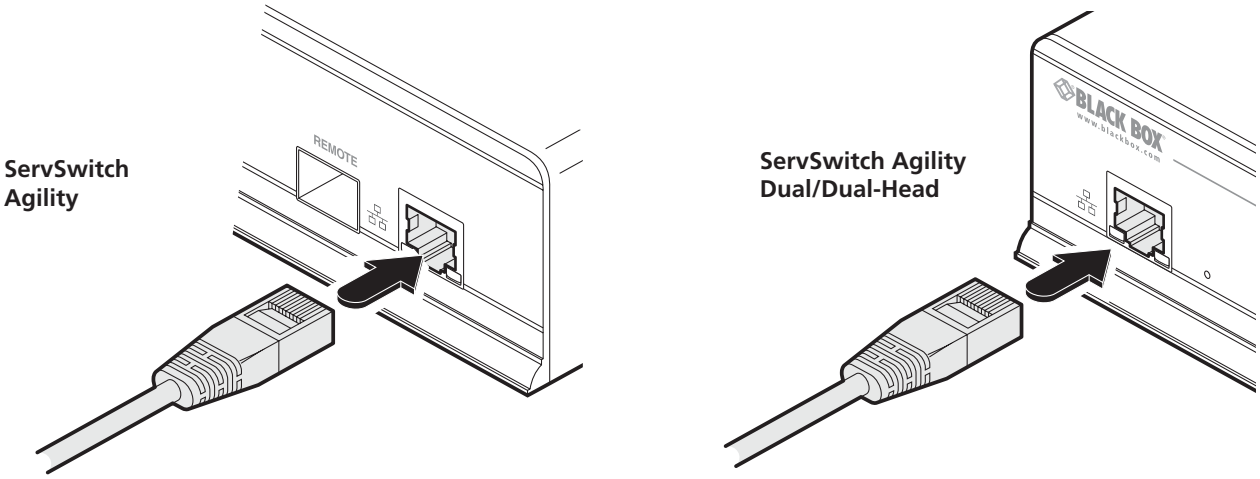


Figure 4-2. Connect the ServSwitch Agility to your computer.

2 Connect the other end of the link cable directly to the network port of your computer.

4.1.3.2 Accessing the Browser-Based Configuration Utility

1 Temporarily connect the ServSwitch Agility (or Agility Dual/Dual-Head) unit and a computer, as discussed above.

2 Run a web browser on your computer and enter the IP address of the unit. The default settings are as follows:

	Local (TX) units	Remote (RX) units	
Management port	192.168.1.42	192.168.1.42	< Agility Dual/Dual-Head only
System port	169.254.1.33	169.254.1.32	
Teaming port	169.254.1.43	169.254.1.42	

Where the address of a unit is not known, perform a manual factory reset (see section 4.1.3) to restore the default address.

The opening page of the ServSwitch Agility configuration utility should be displayed and you can now use on-screen help for details of the functions that you wish to perform.

4.1.4 Performing an upgrade

Agility units are flash upgradeable using the method outlined here. However, for larger installations we recommend that you use the iPATH to upgrade multiple Agility units. When using the method below, the Agility unit will be upgraded in sequence.

IMPORTANT: Upgrades must be performed on both the Local and the Remote units at the same time. Mixed firmware operation is not supported.

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

If the upgrade process is interrupted and fails, it may be necessary to switch to the backup firmware image in order to regain operation. See below for details.

4.1.4.1 To upgrade a single unit via network link

1 Download the latest upgrade file (Please contact Black Box technical support for details).
Note: There are separate upgrade files for Local and Remote units.

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

3 Run a web browser on your computer and enter the IP address of the ServSwitch Agility unit to be upgraded.

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. The file contains main and backup images, you can choose to upgrade either the Main or the Backup.

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.

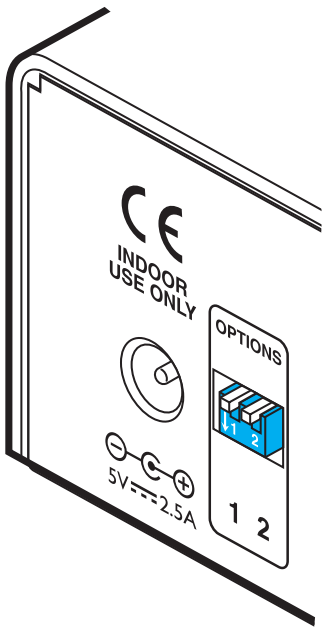
6 The indicators should stop flashing in less than one minute, after which the unit will automatically reboot itself. The upgrade process is complete.

Note: It is possible to downgrade the firmware. After installing the older firmware, perform a factory reset on each Agility unit in order to clear the configuration file.

Note: If you have an Agility unit at v3.3 or higher, and you wish to downgrade its firmware via iPATH v2.5 to v2.9 (so as to use it within an iPATH v2.5 system), this can only be done via the copper interface and not the fiber interface.

4.1.5 Options switches

A pair of Options switches are located on the rear panel of every Agility unit.



Switch 1 - firmware image select

Each Agility unit retains a backup firmware image which can be used in situations where the primary firmware becomes corrupted (most often through failed upgrade operations). Using the backup firmware will allow you to regain operation of the unit.

Option switch 1	OFF	Normal operation using the main firmware
	ON	Operate using the backup firmware image

Option switch 2 is reserved and must remain in the OFF (up) position for normal operation.

5. Operation

In operation, many ServSwitch Agility and Agility Dual/Dual-Head installations require no intervention once configured. The local and remote 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.
- 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 either or both DVI video channels are enabled.
- PWR Power indicator.

Figure 5-1. Front panel indicators.

6. Further information

This chapter contains a variety of information, including the following:

- Appendix A - Local and remote unit configuration pages
- Appendix B - Tips for success when networking Agility units
- Appendix C - Troubleshooting
- Appendix D - Glossary
- Appendix E - RS232 'null modem' cable
- Appendix F - Safety information
- Appendix G - Fiber modules and cables
- Appendix H - Mounting options

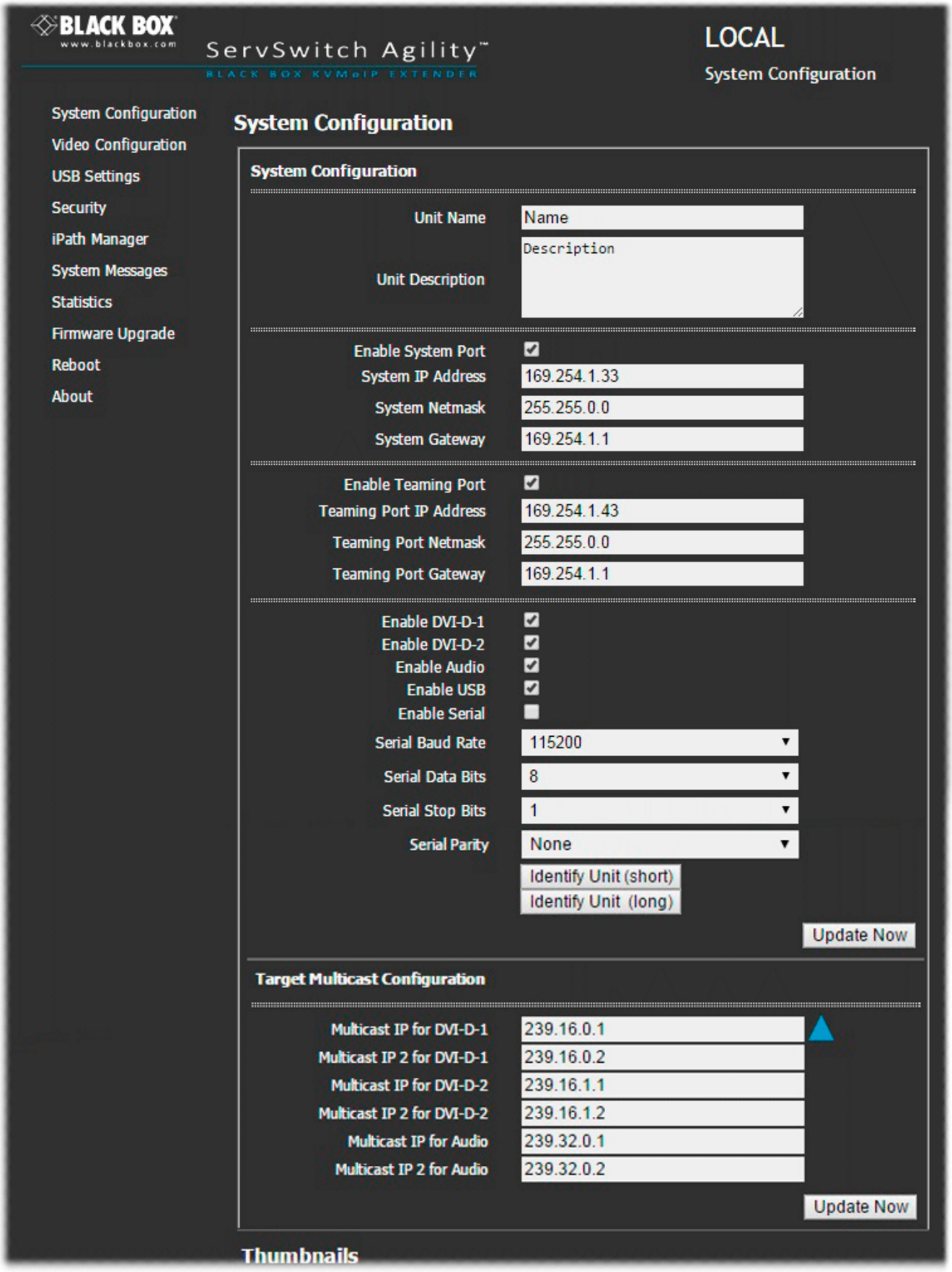
Appendix A - Local and remote unit configuration pages

Local unit

- System Configuration pages 38 and 39
- Video Configuration pages 40 and 41
- USB Settings pages 42 and 43
- Security Settings pages 42 and 43
- iPATH Manager pages 44 and 45
- System Messages pages 44 and 45
- Statistics pages 46 and 47
- Firmware Upgrade pages 46 and 47
- Reboot pages 46 and 47
- About Information pages 48 and 49

Remote unit

- System Configuration (1 of 2) pages 50 and 51
- System Configuration (2 of 2) pages 52 and 53
- USB Settings pages 54 and 55
- Security Settings pages 56 and 57
- iPATH Manager pages 58 and 59
- System Messages pages 58 and 59
- Statistics pages 60 and 61
- Firmware Upgrade pages 60 and 61
- Reboot pages 60 and 61
- About pages 62 and 63


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LOCAL
System Configuration
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
System Configuration
System Configuration
Unit Name
Name
Unit Description
Description
Enable System Port
System IP Address
169.254.1.33
System Netmask
255.255.0.0
System Gateway
169.254.1.1
Enable Teaming Port
Teaming Port IP Address
169.254.1.43
Teaming Port Netmask
255.255.0.0
Teaming Port Gateway
169.254.1.1
Enable DVI-D-1
Enable DVI-D-2
Enable Audio
Enable USB
Enable Serial
Serial Baud Rate
115200
Serial Data Bits
8
Serial Stop Bits
1
Serial Parity
None
Identify Unit (short)
Identify Unit (long)
Update Now
Target Multicast Configuration
Multicast IP for DVI-D-1
239.16.0.1
Multicast IP 2 for DVI-D-1
239.16.0.2
Multicast IP for DVI-D-2
239.16.1.1
Multicast IP 2 for DVI-D-2
239.16.1.2
Multicast IP for Audio
239.32.0.1
Multicast IP 2 for Audio
239.32.0.2
Update Now
Thumbnails

Local System Configuration

Unit Name
Name details that you can alter to distinguish this unit from all others. The name entered here will be read by iPATH units (if used) for administration purposes.

Unit Description
Allows you to optionally add a description of the unit, such as its location. Useful when many Agility units are being used.

System port
This section determines the IP address, netmask and gateway details for the main Gigabit Ethernet port located on the right side of the front panel. The default IP address is 169.254.1.33 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx
The default netmask is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0 The default gateway address is 169.254.1.1

Management port (Agility Dual/Dual-Head models only - not shown in screenshot left)
Determines whether the port on the left side of the front panel is enabled and which IP address details it should use. The default IP address is 192.168.1.42. You are recommended to leave this address unchanged (or at least keep such addresses constant across all of your Agility Dual/Dual-Head units) so that all visiting engineers will know which address to use.

Teaming port
Determines whether the SFP socket on the right side of the front panel is enabled and which IP address details it should use. The default IP address is 169.254.1.43 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx The default netmask is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0
The default gateway address is 169.254.1.1 *Note: Before the Teaming port can be used for connection via a network, you need to ensure that the System port has been configured away from its zero config IP address.*

Enable options
These checkboxes allow you to determine which peripheral options will be used: Video, audio, USB and serial.

Serial port options
These allow you to match the serial configuration being used by the attached PC host.

Identify unit
When clicked, these buttons cause the front panel indicators to flash to assist with identifying the Agility unit within a rack.

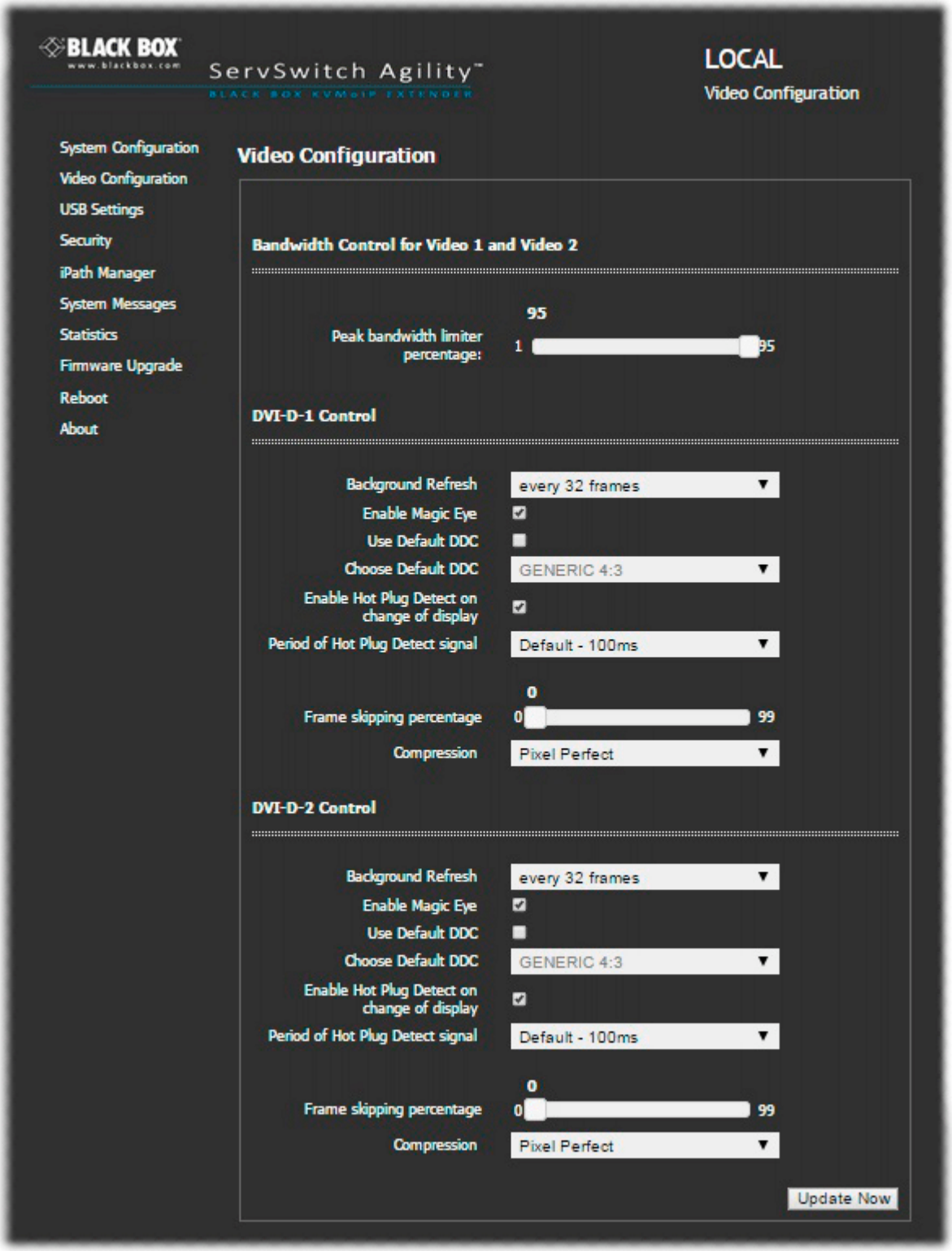
- The Identify Unit (short) button flashes the indicators for five seconds.
- The Identify Unit (long) button flashes the indicators for one hour but can be overridden by clicking the Identify Unit (short) button.

Thumbnail
The Thumbnail shows snap shots of the video feeds that are connected and reports the video resolutions/color depths that have been detected. Click the Refresh Thumbnail button to update.

Target Multicast Configuration
The items within this section are required if a multicast group is being arranged i.e. many remote units connected to the one local unit. For the video port(s) and/or audio channel, you need to enter the multicast IP addresses. In each case, the first address relates to the System (Gigabit Ethernet) port and the second address to the optional Teaming port.

In previous revisions of firmware, the destination IP address for video was decided by the Remote. If multiple Remote units requested the same video source then all had to provide the same multicast destination IP address. In revision 3.3 and above, the Local now decides the destination IP address for video and automatically informs any interested Remote units. In a system with a mix of new and old units, both Remote and Local units must be configured with the same destination IP address for video.

Note: All multicast addresses for each service endpoint must be unique across the whole Agility installation.



Note: Agility Dual/Dual-Head screenshot shown above. Agility (ACR1000A) models will provide options for a single video port.

Local Video Configuration

Peak bandwidth limiter percentage
The Local 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 unit will use considerably less than the maximum available. In order to prevent the Local 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 unit. Range: 0 to 95%.

Note: All of the following controls are available separately for each video port:

Background Refresh
The Local unit sends portions of the video image only when they change. In order to give the best user experience, the Local 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 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.

Enable Magic Eye
This feature, enabled as standard, aims to reduce the effect of dithering - a technique used by some graphics cards to improve the perceived quality and color depth of images by diffusing or altering the colour of pixels between video frames. The Magic Eye feature increases the frame rate and eliminates unnecessary network traffic by ignoring the color dithering where it occurs. If the video source is not noisy or dithered then you can switch off Magic Eye to enable full colour accuracy.

Use Default DDC and Choose Default DDC
When the *Use Default DDC* option is unticked, Agility will use the EDID that is reported by the monitor connected to the remote unit. However, if you tick the *Use Default DDC* option, you can then select from a range of preset video resolutions from the *Choose Default DDC* drop down box. Once selected, the Local will report itself capable of only supporting this one video resolution. Please note that all of the listed video resolutions are single link DVI with a maximum pixel clock of 165MHz and a 60Hz refresh rate.

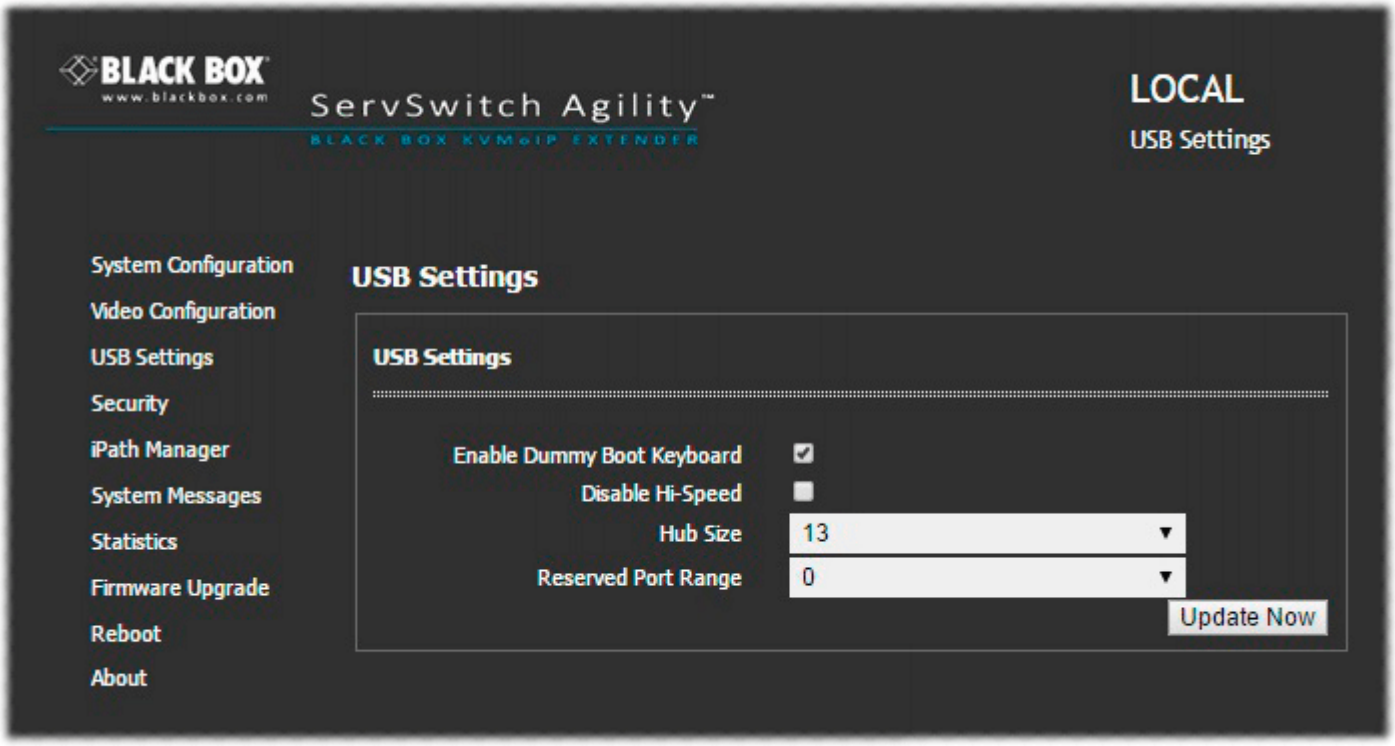
Enable Hot Plug Detect...
When this option is ticked, every time the monitor is changed at the remote unit, a hot plug detect message will be sent to the graphics card of the PC attached to the Local unit.

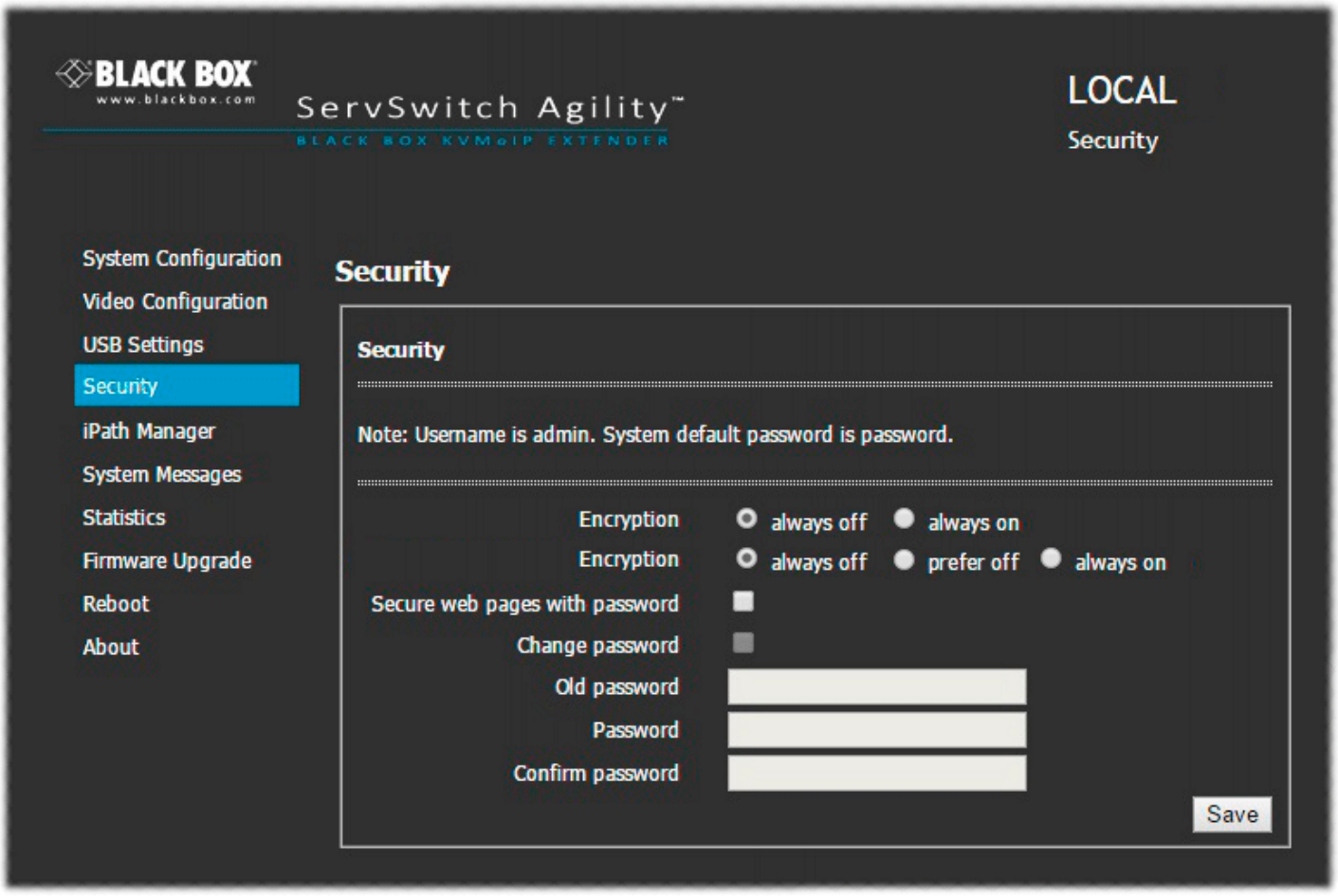
Period of Hot Plug Detect signal
This is the length of time that a hot-plug detect signal is applied. The default of 100mS is sufficient for the majority of graphics cards, however, a small minority may need to be given a longer a period.

Frame skipping percentage
Frame Skipping involves 'missing out' video frames between those captured by the Local 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%.

Compression
Determines the (AFZ and AFZ+) compression method used for video transmission. Choices are:

- '*Pixel Perfect*' - only uses pixel perfect AFZ,
- '*Adaptive*' - guarantees frame rate, builds to pixel perfect,
- '*Smoothest Video*' - forces the maximum compression, or
- '*Advanced*' - allows you to choose a fixed compression mode:
  - *'AFZ only (pixel perfect),*
  - *'AFZ+ Minimum compression',*
  - *'AFZ+ Middle compression', or*
  - *'AFZ+ Maximum compression'.*


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LOCAL
USB Settings
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
USB Settings
USB Settings
Enable Dummy Boot Keyboard
Disable Hi-Speed
Hub Size
13
Reserved Port Range
0
Update Now


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LOCAL
Security
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Security
Security
Note: Username is admin. System default password is password.
Encryption
always off
always on
Encryption
always off
prefer off
always on
Secure web pages with password
Change password
Old password
Password
Confirm password
Save

Local USB Settings

Enable Dummy Boot Keyboard
When ticked, the Local unit reports a virtual dummy boot keyboard to the attached PC to ensure that a keyboard is always reported when the PC boots up. The dummy boot keyboard uses one of the 13 USB endpoints, therefore if all 13 endpoints are required elsewhere for USB devices (or a KVM switch only supports two HID devices) then it can be disabled by deselecting this option. See also *Reserved Port Range* below.

Disable Hi-Speed
This option allows you to force the system to run at the low/full USB speed of 12Mb/s, thus forcing USB 2.0 Hi-Speed devices to adapt to the lower rate.

Hub Size
Using this option you can select whether the local unit should report itself as a 13 or a 7 port USB hub. Some USB hosts are only able to support 7 port USB hubs. If this option is set to 7, then only 7 USB devices are supported by the PC.

Reserved Port Range
For some devices, e.g. touch screens, you may wish to ensure that they are always reported to the same USB port number so that the USB driver will always find the device. This option allows you reserve up to 8 ports for certain devices. At the Remote unit, the devices are assigned to the reserved ports. If a port reservation is to be applied, then the dummy boot keyboard should be disabled. The default value for this option is '0', i.e. *disabled*. See Port Reservation on Remote unit for further details.

Local Security Settings

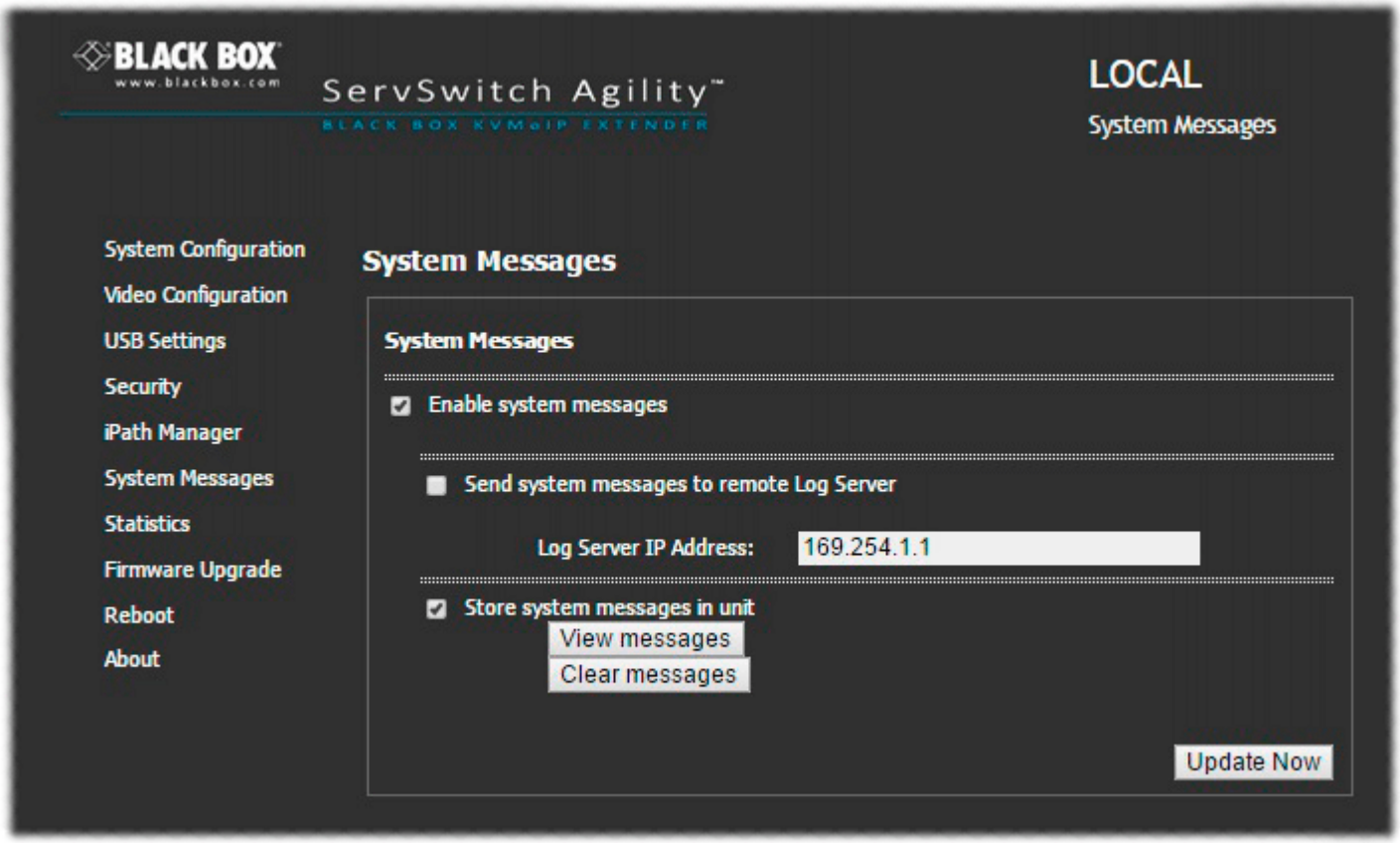
USB Encryption
This setting determines whether encryption should be applied to the USB data passed across the link. Note that video data is never encrypted.

Control Encryption
This setting determines whether encryption should be applied to the control data passed across the link. Note that video data is never encrypted.

Secure Web pages with password
When ticked, this option enables https security so that the configuration pages are only accessible to the admin user with a password.

Change/confirm password
These options allow you to change the admin password for the system.


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LOCAL
iPath Manager
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
iPath Manager
Enable iPath control over this unit
Enable iPath Control


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LOCAL
System Messages
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
System Messages
System Messages
Enable system messages
Send system messages to remote Log Server
Log Server IP Address:
169.254.1.1
Store system messages in unit
View messages
Clear messages
Update Now

Local iPATH Manager

Enable iPATH Control
Click this button to allow an iPATH box to take control of this Local. When the button is clicked, the Local unit will be rebooted to allow the iPATH box to discover and control it.

Local System Messages

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

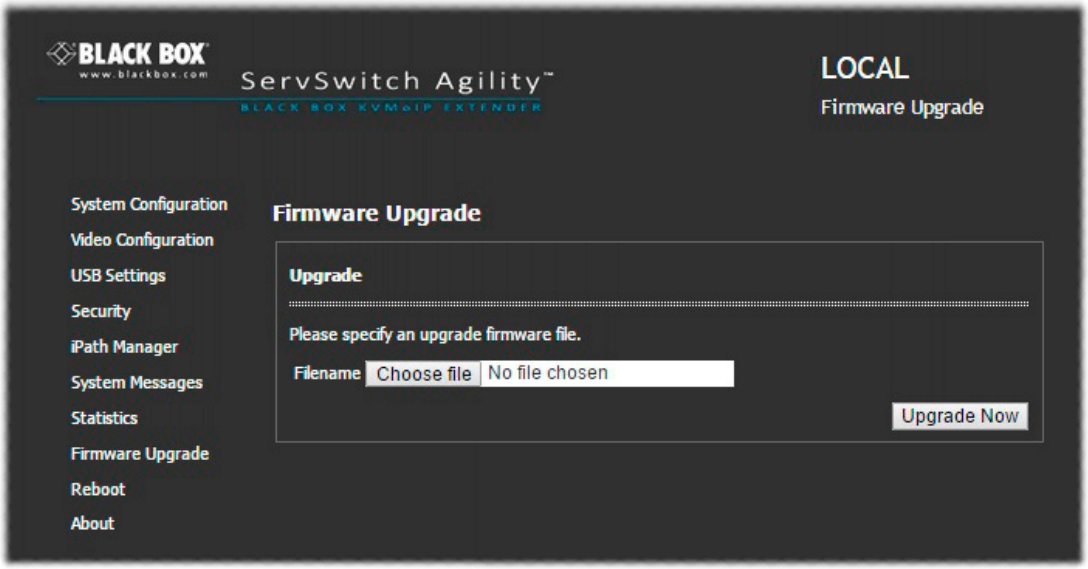
Send system messages to remote Log Server
Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

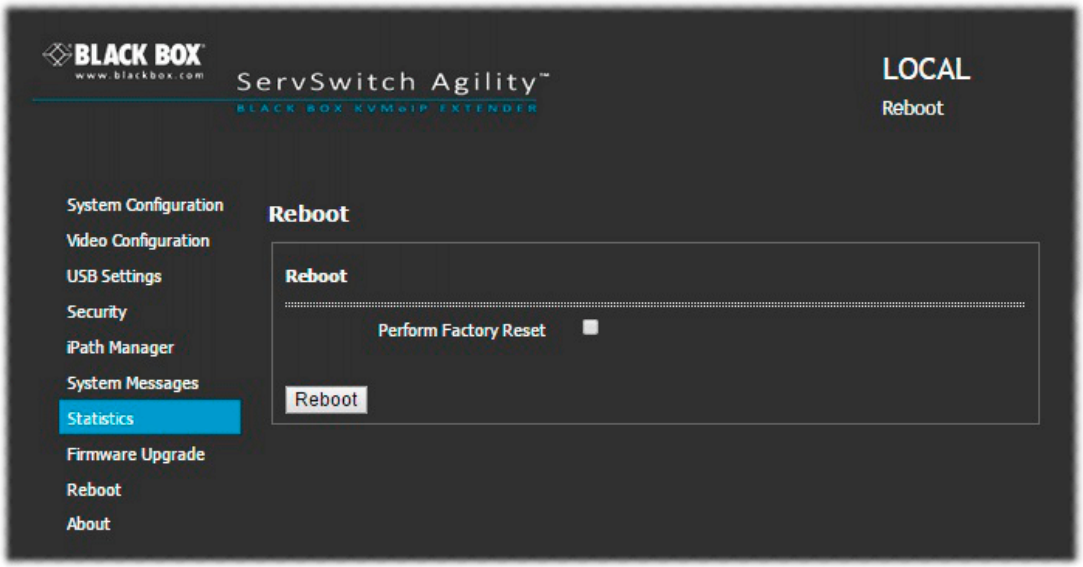
Agility servers use the User Datagram Protocol (UDP) for all Syslog traffic.

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 or the *Clear messages* button to delete the list.

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


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LOCAL
Statistics
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Statistics
Statistics Monitor
Enable collection of statistics
Submit


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LOCAL
Firmware Upgrade
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Firmware Upgrade
Upgrade
Please specify an upgrade firmware file.
Filename
Choose file
No file chosen
Upgrade Now


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LOCAL
Reboot
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Reboot
Reboot
Perform Factory Reset
Reboot

Local Statistics

Enable collection of bandwidth statistics
Agility units can record data transfer statistics from the System port and plot them on a graph for troubleshooting and optimization purposes. When you enable this option, you will first be presented with a pop up from which you can choose which aspects you would like to graph: Data throughput, various packet rates and/or frame rates.

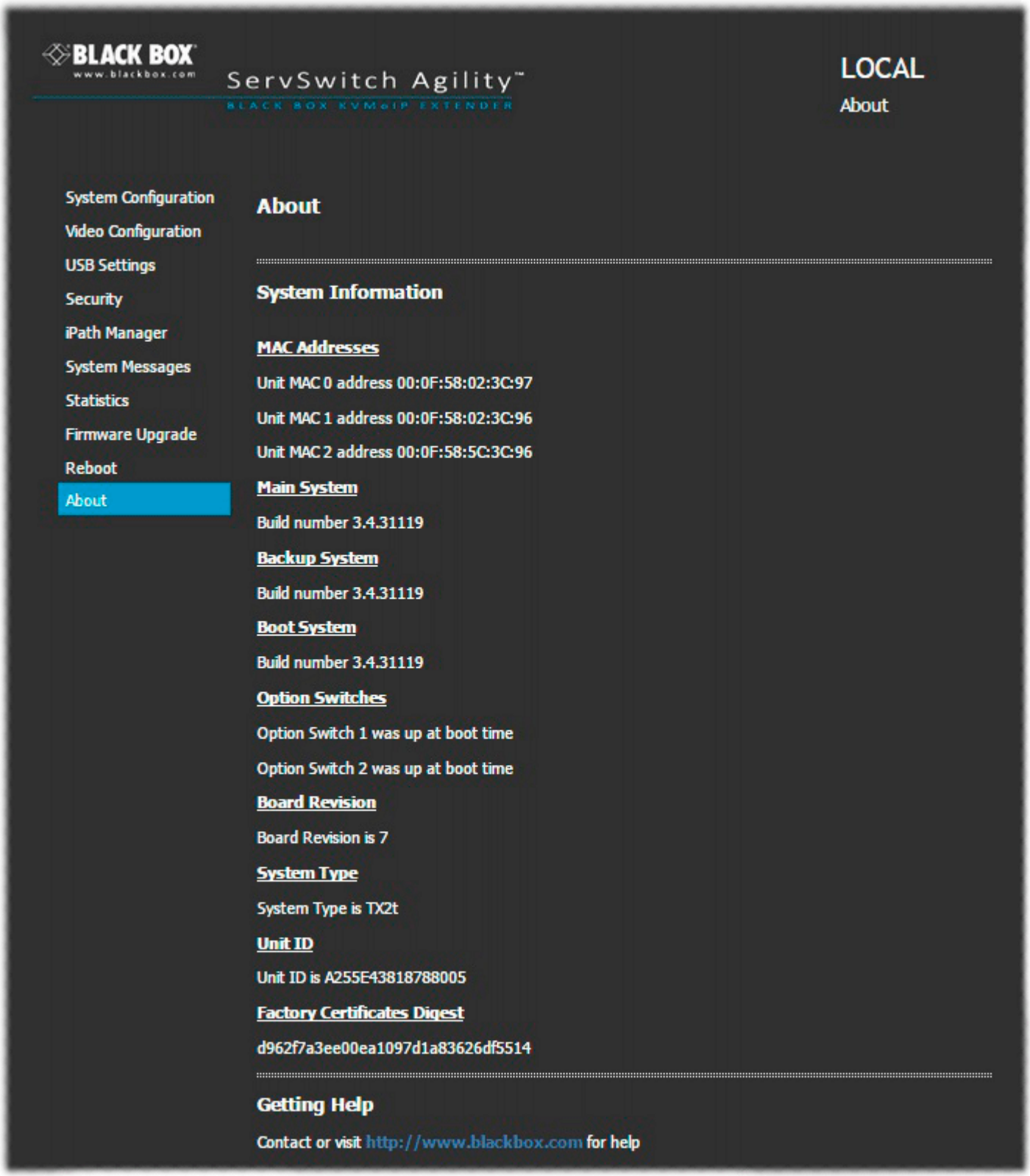
Submit
Click this button after ticking the above checkbox to plot the chosen statistics on a pop up graph.

Local Firmware Upgrade

Upgrade
Use this page to upgrade the main or backup firmware image on the unit. Please see the section Performing an upgrade for details.

Local Reboot

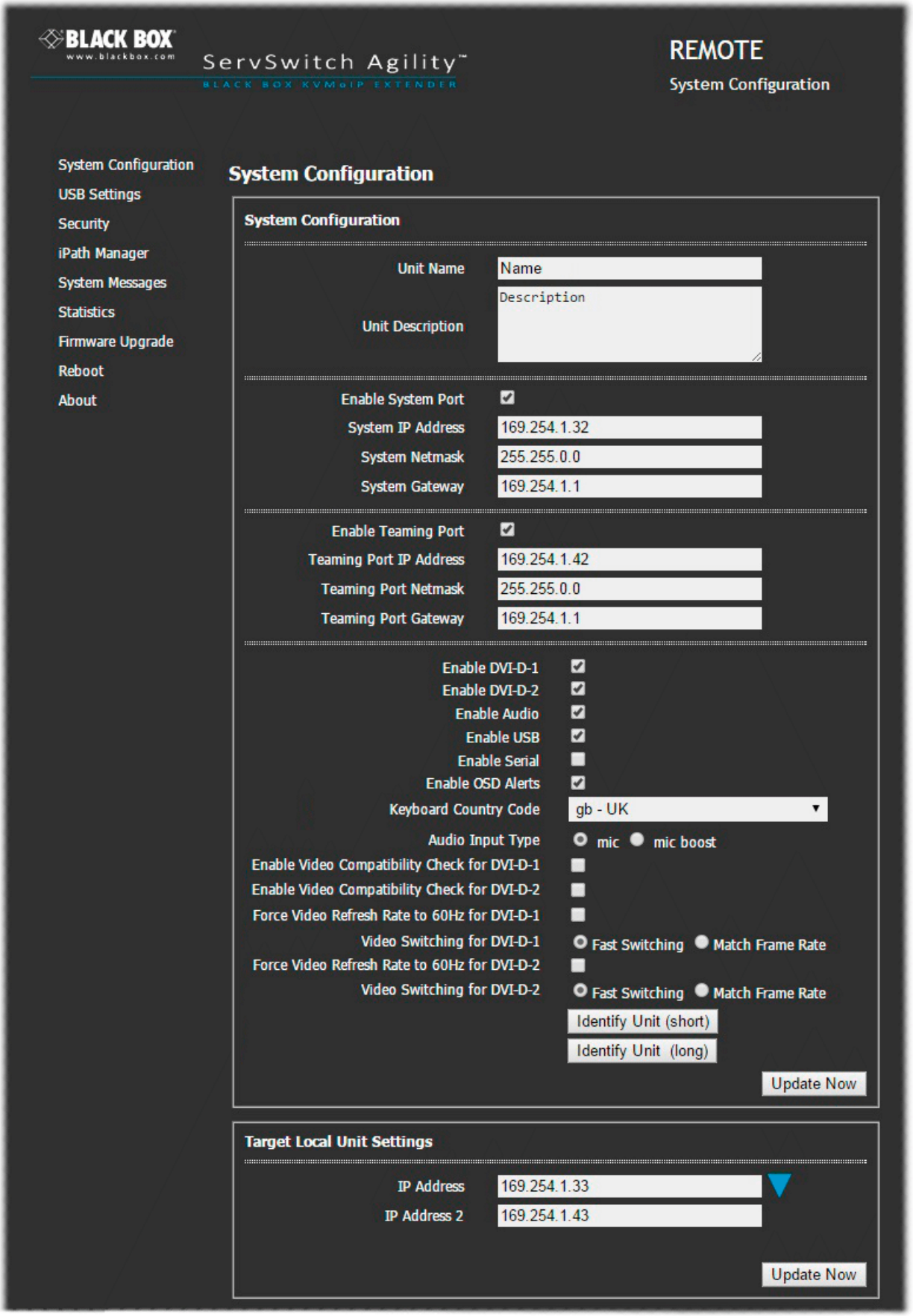
Reboot
Use this page to perform a reboot or a factory reset. Please see the section Manual factory reset for details.


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LOCAL
About
System Configuration
Video Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
About
System Information
MAC Addresses
Unit MAC 0 address 00:0F:58:02:3C:97
Unit MAC 1 address 00:0F:58:02:3C:96
Unit MAC 2 address 00:0F:58:5C:3C:96
Main System
Build number 3.4.31119
Backup System
Build number 3.4.31119
Boot System
Build number 3.4.31119
Option Switches
Option Switch 1 was up at boot time
Option Switch 2 was up at boot time
Board Revision
Board Revision is 7
System Type
System Type is TX2t
Unit ID
Unit ID is A255E43818788005
Factory Certificates Digest
d962f7a3ee00ea1097d1a83626df5514
Getting Help
Contact or visit http://www.blackbox.com for help

Local About Information

About

This page displays key information about the Local unit that may be requested by Technical Support.


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REMOTE
System Configuration
System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
System Configuration
System Configuration
Unit Name
Name
Unit Description
Description
Enable System Port
System IP Address
169.254.1.32
System Netmask
255.255.0.0
System Gateway
169.254.1.1
Enable Teaming Port
Teaming Port IP Address
169.254.1.42
Teaming Port Netmask
255.255.0.0
Teaming Port Gateway
169.254.1.1
Enable DVI-D-1
Enable DVI-D-2
Enable Audio
Enable USB
Enable Serial
Enable OSD Alerts
Keyboard Country Code
gb - UK
Audio Input Type
mic
mic boost
Enable Video Compatibility Check for DVI-D-1
Enable Video Compatibility Check for DVI-D-2
Force Video Refresh Rate to 60Hz for DVI-D-1
Video Switching for DVI-D-1
Fast Switching
Match Frame Rate
Force Video Refresh Rate to 60Hz for DVI-D-2
Video Switching for DVI-D-2
Fast Switching
Match Frame Rate
Identify Unit (short)
Identify Unit (long)
Update Now
Target Local Unit Settings
IP Address
169.254.1.33
IP Address 2
169.254.1.43
Update Now

Remote System Configuration (1 of 2)

Unit Name
Name details that you can alter to distinguish this unit from all others.

Unit Description
Allows you to add a description of the unit, such as its location. Useful when many Agility units are being used.

System port
This section determines the IP address, netmask and gateway details for the main Gigabit Ethernet port located on the right side of the front panel. The default IP address is 169.254.1.32 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx
The default netmask is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0 The default gateway address is 169.254.1.1

Management port (Agility Dual/Dual-Head models only - not shown in screenshot left)
Determines whether the port on the left side of the front panel is enabled and which IP address details it should use. The default IP address is 192.168.1.42. You are recommended to leave this address unchanged (or at least keep such addresses constant across all of your Agility units) so that all visiting engineers will know which address to use.

Teaming port
Determines whether the SFP socket on the right side of the front panel is enabled and which IP address details it should use. The default IP address is 169.254.1.42 which is the zero config IP address that allows the unit to work immediately in point-to-point mode. You are recommended to change this to an appropriate address in the private IP range 192.168.xxx.xxx The default netmask is 255.255.0.0. If you change the IP address to the private range, you are recommended to change this to 255.255.255.0
The default gateway address is 169.254.1.1 *Note: Before the Teaming port can be used for connection via a network, you need to ensure that the System port has been configured away from its zero config IP address.*

Enable options
These checkboxes allow you to determine which peripheral options will be used: Video, audio, USB and serial.

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).

Enable Video Compatibility Check (for DVI-D 1 and 2 on Agility Dual/Dual-Head models)
If enabled, this option compares the EDID reported by the PC graphics card and determines whether the display connected to the Remote is capable of displaying the chosen video resolution. If not, an error message is generated and the connection is not made.

Force Video Refresh Rate to 60Hz
If enabled, the remote unit frame rate is held at 60Hz regardless of the video input frame rate. The Video Switching options (below) cannot be altered when this option is enabled.

Video switching
Provides two options for video switching:

- *Fast Switching* (default state) - Retains the same frame rate (at either 50Hz or 60Hz) depending upon which video resolution was displayed first.
- *Match Frame Rate* - Follows the source frame rate and will change the frame rate every time this changes even if the video resolution doesn't change. If you have one remote unit switching between 1920x1080@60Hz and 1920x1080@50Hz then this setting will change the frame rate from 60Hz to 50 Hz every time that you switch.

Identify unit
These buttons cause the front panel indicators to flash. The (short) button flashes indicators for 5 seconds; the (long) button for one hour. Click the (short) button to override.



Note: Agility Dual/Dual-Head screenshot shown above. Agility (ACR1000A) models will provide options for a single video port.

Remote System Configuration (2 of 2)

Target Local Unit Settings

This section is where you configure the IP address details of the Agility local unit(s) that this remote unit will connect with. You can quickly set all peripheral feeds (video 1/2, audio, USB and serial) to use the same primary (and secondary) locations using the *IP Address* (System port) and *IP Address 2* (Teaming port) entries.

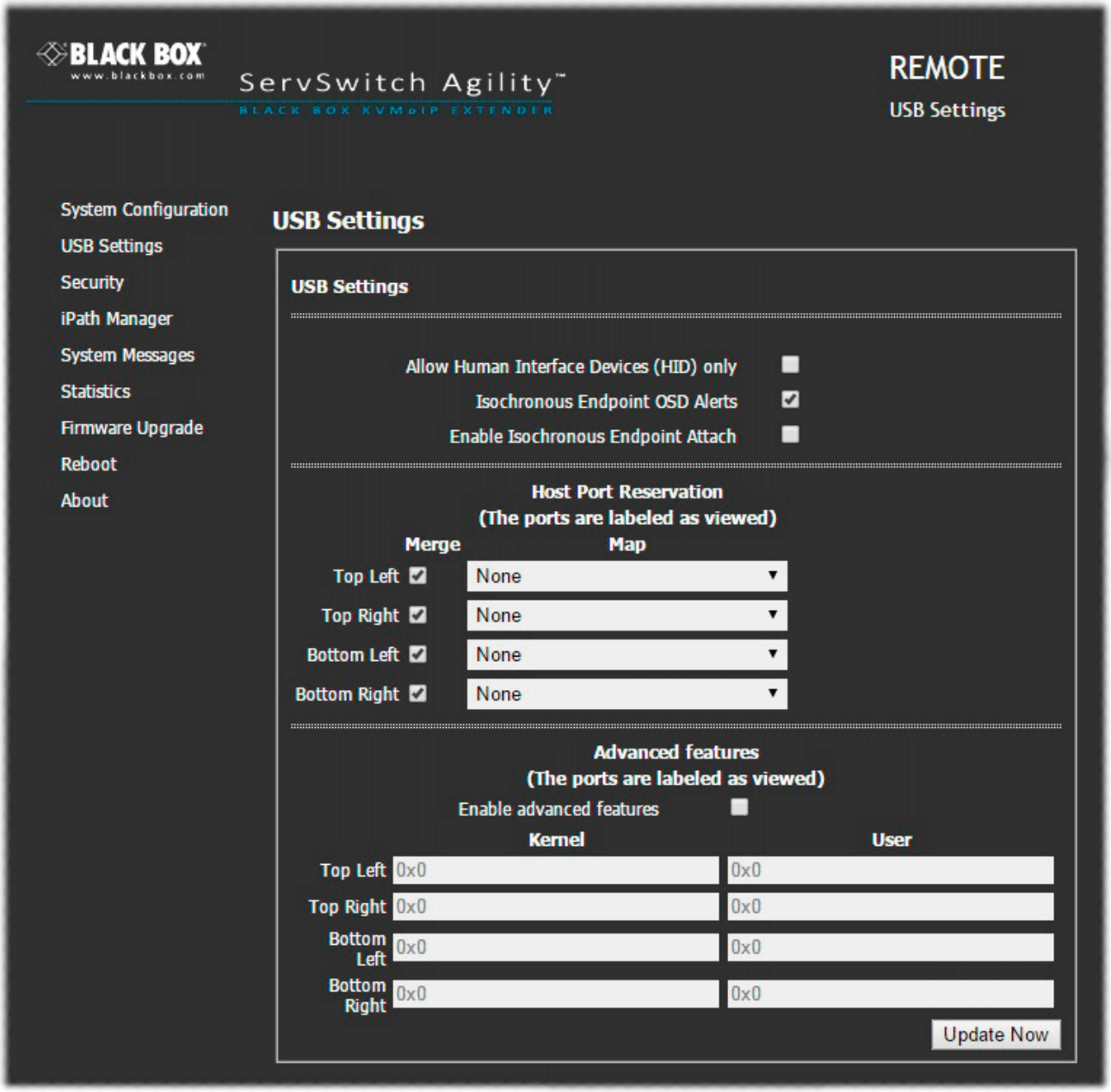
For normal one-to-one connections enter the IP address(es) that match the System IP Address and Teaming Port IP Address settings of the target local unit in this section. However, if this remote unit is to take part in a multicast connection then you need to enter the IP address(es) that are set within the local unit's Target Multicast Configuration section.

Alternatively, click the ▼ arrow to expand the section as shown bottom left.

In the expanded view, for each peripheral feed, the first IP address is that of the targeted Local unit's System port (to match the address(es). *IP Address 2* corresponds to the optional Teaming port (when used).

The use of the Teaming port as a parallel secondary link offers a degree of redundancy for your Agility installation. With the Teaming ports of the Local and Remote units connected in addition to the System ports, if one of the links should fail for any reason, there will be a short delay for a few video frames (and possibly some on-screen corruption) as all the data packets are rearranged to be sent down the other link. Obviously the bandwidth will be halved and frame rate will automatically drop, but a fully usable system will remain.

[Agility Dual/Dual-Head only] The *Video No. for DVI-D-x* option allows you to determine which video feed is sent to each output port. By default, the primary video feed is presented at port 1 while the secondary feed goes to port 2. These options allow you to 'clone' one of the video signals and deliver it to both ports - thus, requiring only one remote unit to drive two displays. This solution is commonly used where two signage displays are mounted back-to-back and need to show the same video feed. With these options, you can also swap the two video feeds between the two ports.


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System Configuration
USB Settings
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iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
USB Settings
USB Settings
Allow Human Interface Devices (HID) only
Isochronous Endpoint OSD Alerts
Enable Isochronous Endpoint Attach
Host Port Reservation
(The ports are labeled as viewed)
Merge
Map
Top Left
None
Top Right
None
Bottom Left
None
Bottom Right
None
Advanced features
(The ports are labeled as viewed)
Enable advanced features
Kernel
User
Top Left
0x0
0x0
Top Right
0x0
0x0
Bottom Left
0x0
0x0
Bottom Right
0x0
0x0
Update Now

Remote USB Settings

Allow Human Interface Devices (HID) only
When enabled, this option restricts supported USB devices to keyboards and mice only. The use of memory sticks and other devices will be disabled.

Isochronous Endpoint OSD Alerts
The Agility USB system does not support Isochronous USB. When enabled, this option will alert the user when an Isochronous USB device is connected.

Enable Isochronous Endpoint Attach
When enabled, this option will allow for an exchange of control information with an Isochronous device. Some devices have multiple endpoints e.g. a keyboard with an audio controller. By enabling this option, the keyboard functionality will work even though the isochronous audio functionality will not. Without this setting, the entire keyboard would be rejected as it would be detected as being solely an isochronous device.

Port Reservation
This section allows you map the four USB connectors on the remote unit to a specific USB port that has been reserved on the local unit. It is useful if you have a specific device e.g. a touch screen that must allows be reported to a specific USB port on the USB host device. If you have two touch screens of the same type for each of the video displays, then using Port Reservation disables the USB merging mechanism and assigns individual USB ports for each display. This means that the driver can now separate the left hand screen from the right hand screen. See *Reserved Port Range* on the Local unit for further details.

Advanced features
This section is used for special configuration and is disabled by default. If a USB device fails to operate as expected, this section allows special codes to be inserted to attempt to solve the issue.

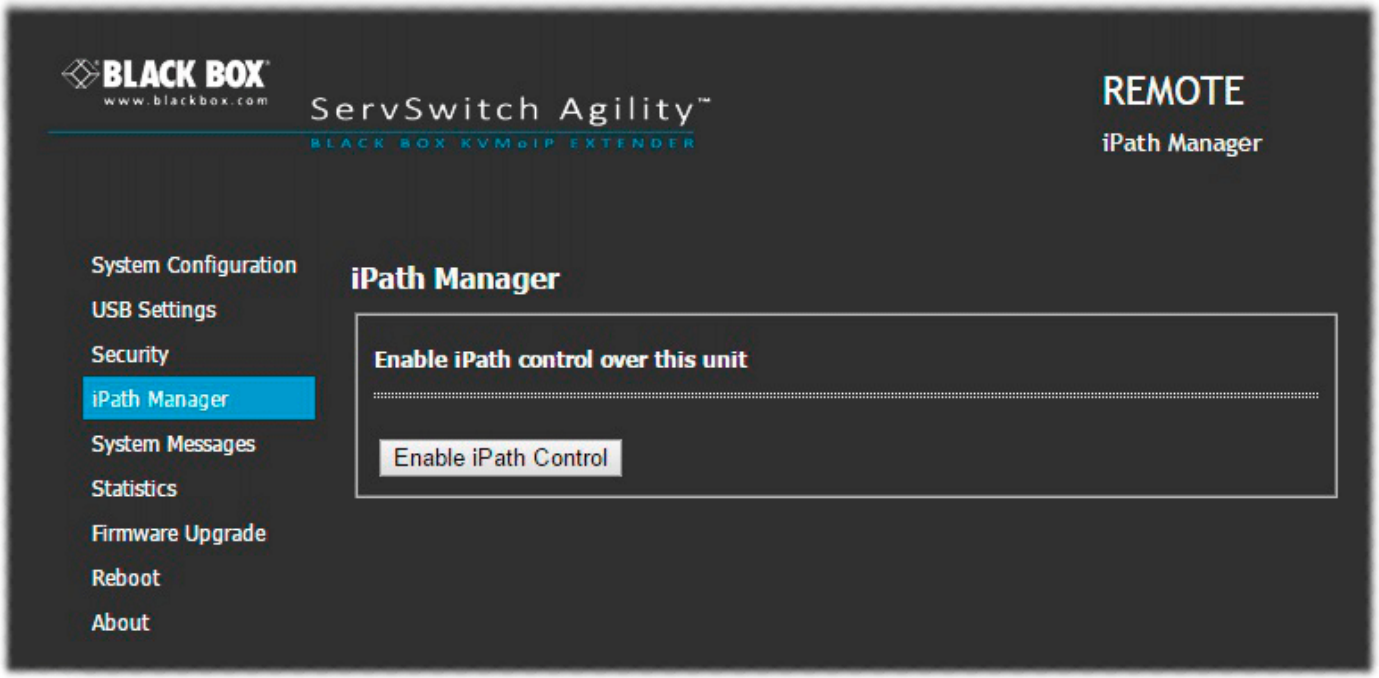

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Security
System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Security
Security
Note: Username is admin. System default password is password.
Encryption
chosen by local unit
always on
Secure web pages with password
Change password
Old password
Password
Confirm password
Save

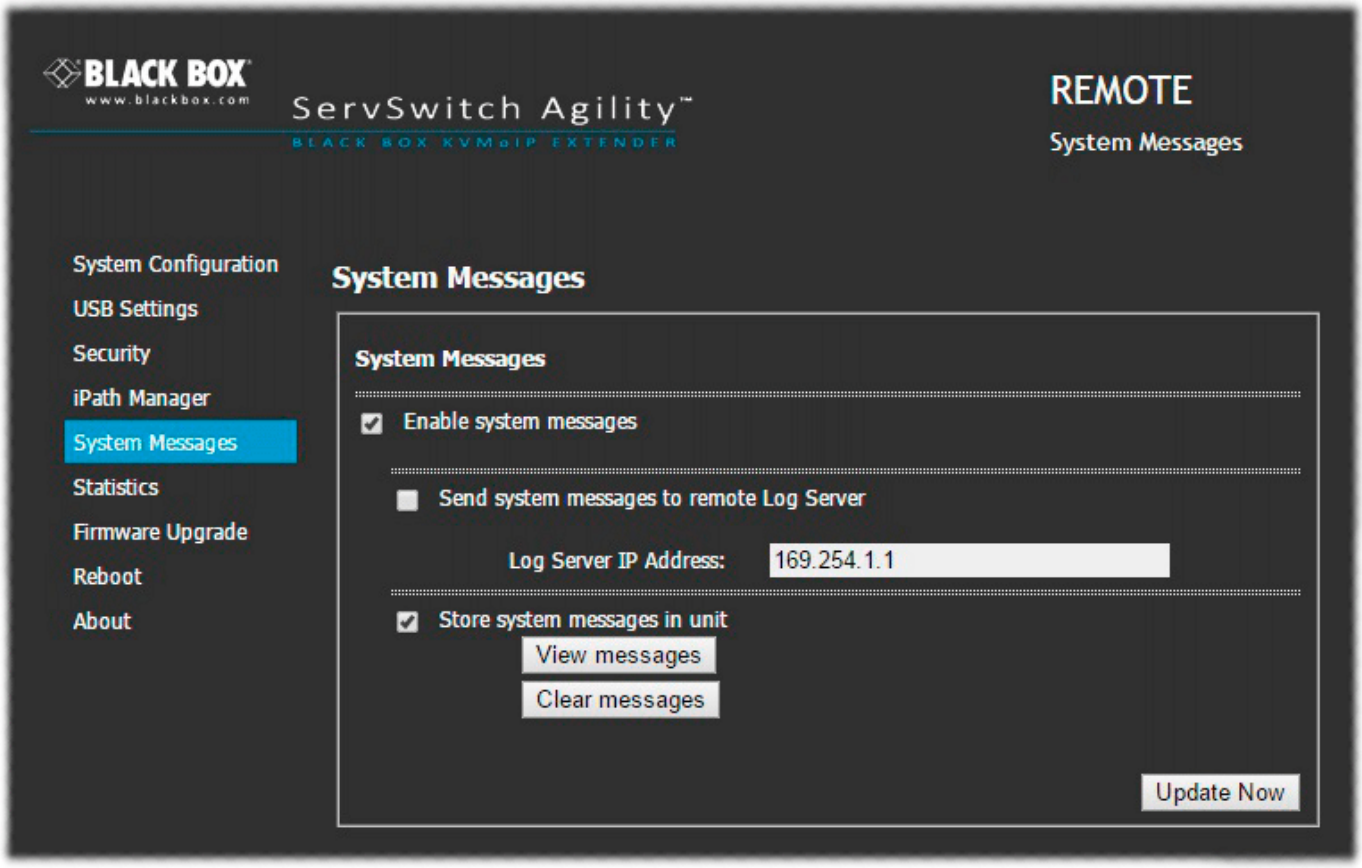
Remote Security Settings

Encryption
This setting allows you to apply encryption to the USB and control data passed across the link. Note that video data is never encrypted.

Secure Web pages with password
When ticked, this option enables https security so that the configuration pages are only accessible to the admin user with a password.

Change/confirm password
These options allow you to change the admin password for the system.


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iPath Manager
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Statistics
Firmware Upgrade
Reboot
About
iPath Manager
Enable iPath control over this unit
Enable iPath Control


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System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
System Messages
System Messages
Enable system messages
Send system messages to remote Log Server
Log Server IP Address:
169.254.1.1
Store system messages in unit
View messages
Clear messages
Update Now

Remote iPATH Manager

Enable AIM Control
Click this button to allow an iPATH box to take control of this Remote. When the button is clicked, the Remote unit will be rebooted to allow the iPATH box to discover and control it.

Remote System Messages

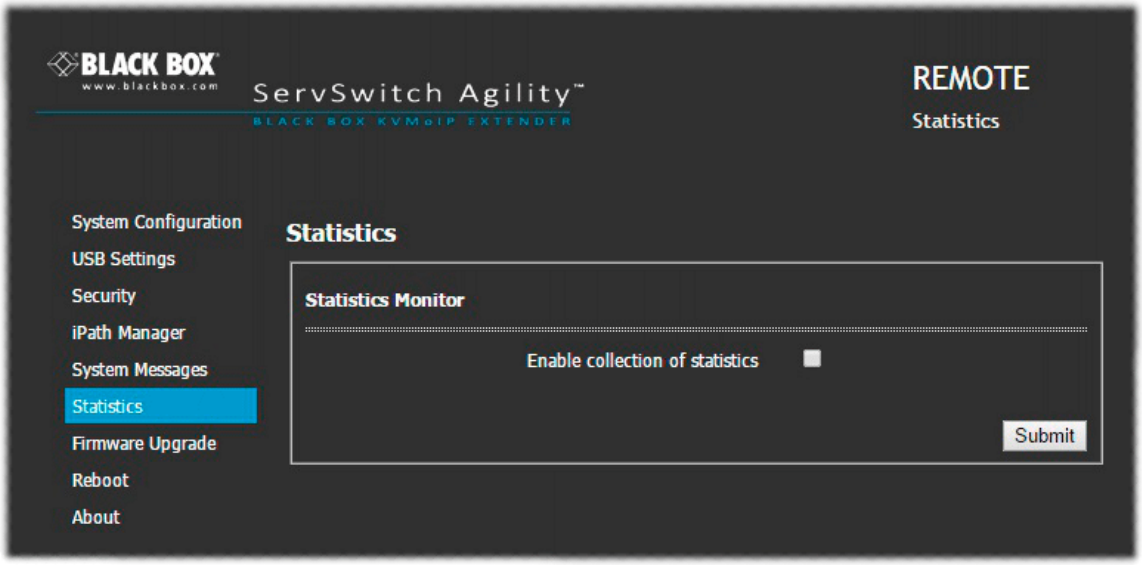
Enable system messages
Tick to allow the creation of status and error messages by the unit.

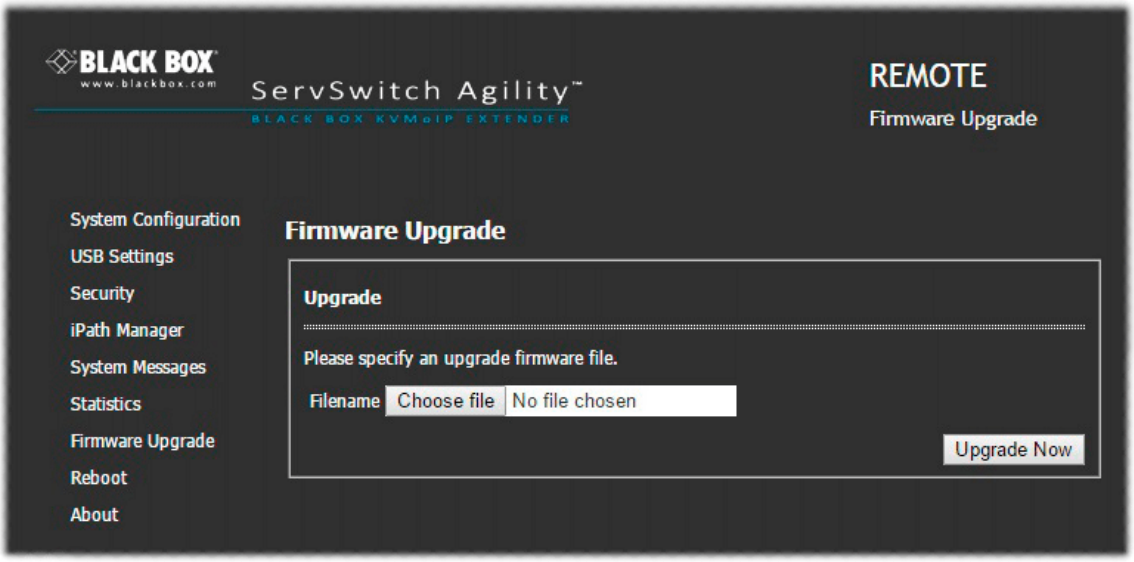
Send system messages to remote Log Server
Choose this option to send the system messages to a remote server via the network. Provide the IP address of a suitable server here also.

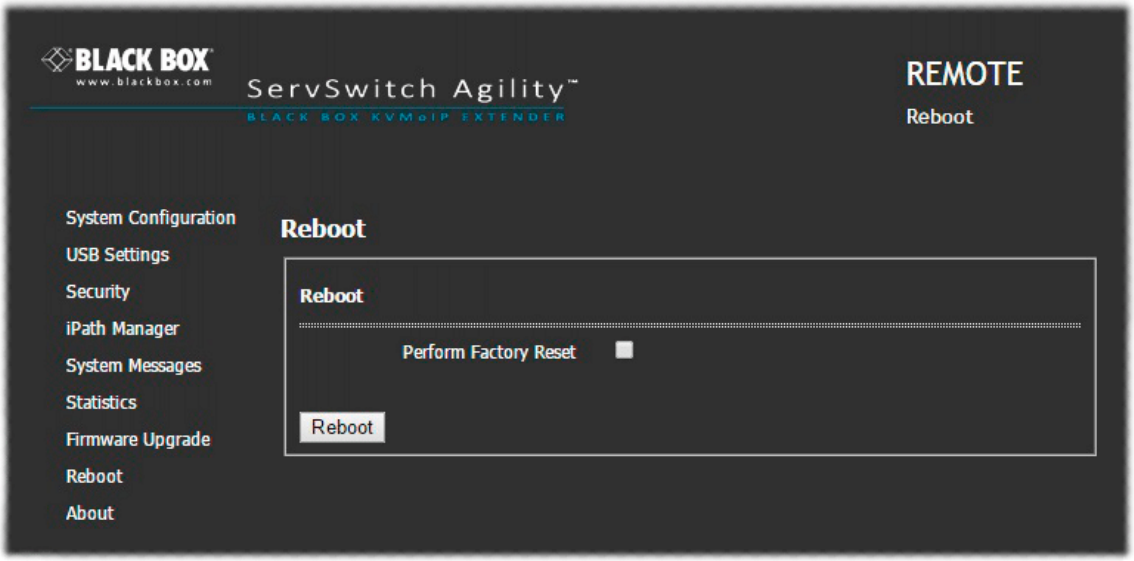
Agility servers use the User Datagram Protocol (UDP) for all Syslog traffic.

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 or the *Clear messages* button to delete the list.

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


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Statistics
System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Statistics
Statistics Monitor
Enable collection of statistics
Submit


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Firmware Upgrade
System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Firmware Upgrade
Upgrade
Please specify an upgrade firmware file.
Filename
Choose file
No file chosen
Upgrade Now


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REMOTE
Reboot
System Configuration
USB Settings
Security
iPath Manager
System Messages
Statistics
Firmware Upgrade
Reboot
About
Reboot
Reboot
Perform Factory Reset
Reboot

Remote Statistics

Enable collection of bandwidth statistics
The Agility unit can record data transfer statistics from the System port and plot them on a graph for troubleshooting and optimization purposes. When you enable this option, you will first be presented with a pop up from which you can choose which aspects you would like to graph: Data throughput, various packet rates and/or frame rates.

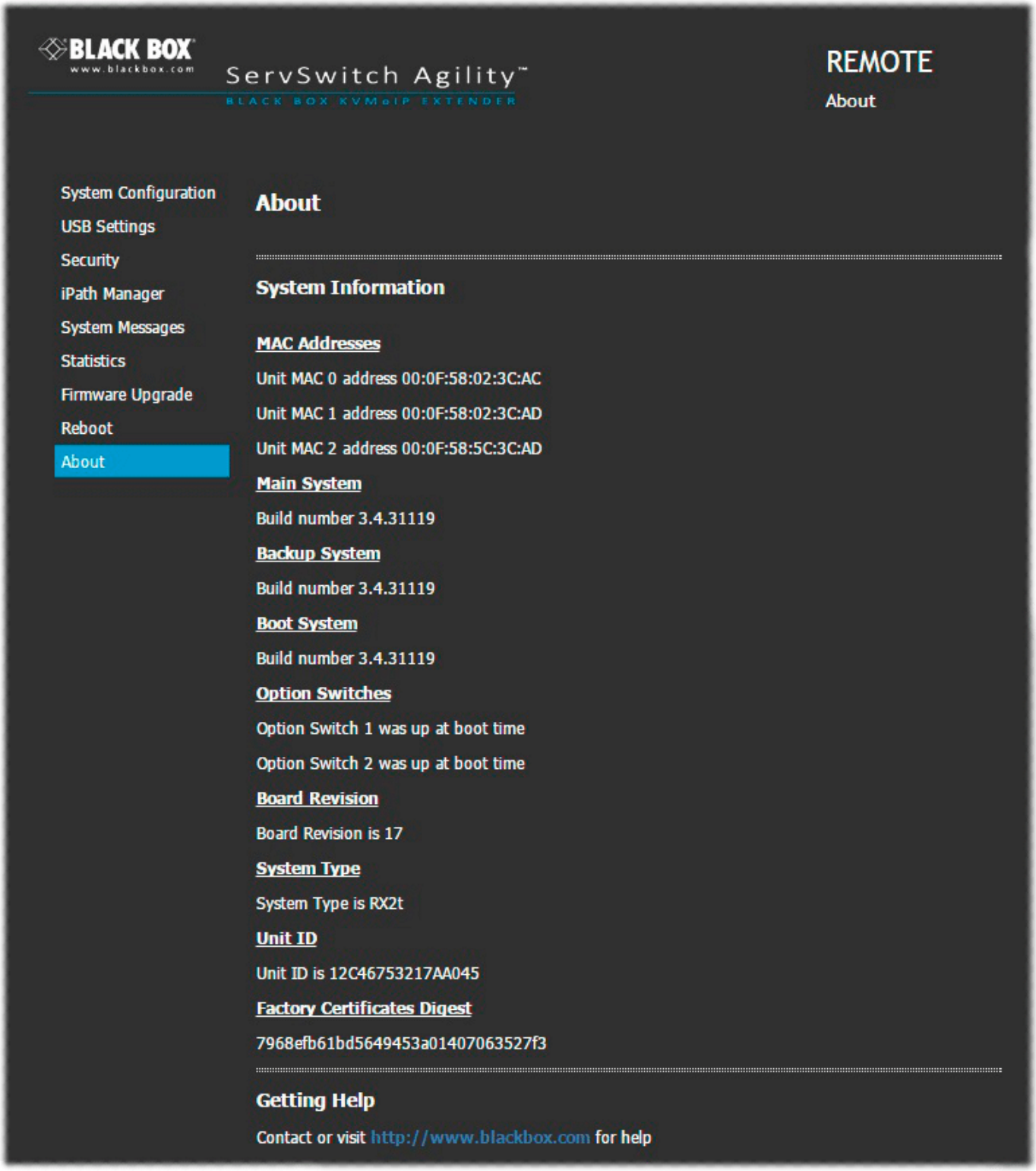
Submit
Click this button after ticking the above checkbox to plot the chosen statistics on a pop up graph.

Remote Firmware Upgrade

Upgrade
Use this page to upgrade the main or backup firmware image on the unit. Please see the section Performing an upgrade for details.

Remote Reboot

Reboot
Use this page to perform a reboot or a factory reset. Please see the section Manual factory reset for details.


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About
System Configuration
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Security
iPath Manager
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Firmware Upgrade
Reboot
About
About
System Information
MAC Addresses
Unit MAC 0 address 00:0F:58:02:3C:AC
Unit MAC 1 address 00:0F:58:02:3C:AD
Unit MAC 2 address 00:0F:58:5C:3C:AD
Main System
Build number 3.4.31119
Backup System
Build number 3.4.31119
Boot System
Build number 3.4.31119
Option Switches
Option Switch 1 was up at boot time
Option Switch 2 was up at boot time
Board Revision
Board Revision is 17
System Type
System Type is RX2t
Unit ID
Unit ID is 12C46753217AA045
Factory Certificates Digest
7968efb61bd5649453a01407063527f3
Getting Help
Contact or visit http://www.blackbox.com for help

Remote About

About

This page displays key information about the Remote unit that may be requested by Technical Support.

Appendix B. Tips for success when networking Agility units

Agility units use multiple strategies to minimise the amount of data that they send across networks. However, data overheads can be quite high, particularly when very high resolution video is being transferred, so it is important to take steps to maximise network efficiency and help minimise data output. The tips given in this section have been proven to produce very beneficial results.

B.1 Summary of steps

- Choose the right kind of switch.
- Create an efficient network layout.
- Configure the switches and devices correctly.

B.2 Choosing the right switch

Layer 2 switches are what bind all of the hosts together in the subnet. However, they are all not created equally, so choose carefully. In particular look for the following:

- Gigabit (1000Mbps) or faster Ethernet ports,
- Support for IGMP v2 (or v3) snooping,
- Support for Jumbo frames up to 9216-byte size,
- High bandwidth connections between switches, preferably Fiber Channel.
- Look for switches that perform their most onerous tasks (e.g. IGMP snooping) using multiple dedicated processors (ASICS).
- Ensure the maximum number of concurrent 'snoopable groups' the switch can handle meets or exceeds the number of ServSwitch Agility local units that will be used to create multicast groups.
- Check the throughput of the switch: Full duplex, 1Gbps up- and down- stream speeds per port.
- Use the same switch make and model throughout a single subnet.
- You also need a Layer 3 switch. Ensure that it can operate efficiently as an IGMP Querier.

B.2.1 Layer 2 (and Layer 3) switches known to work

- Cisco 2960
- Cisco 3750
- Cisco 4500
- Cisco 6500
- Extreme Networks X480
- HP Procurve 2810
- HP Procurve 2910
- H3C 5120
- HuaWei Quidway s5328c-E1 (Layer 3)

B.3 Creating an efficient network layout

Network layout is vital. The use of IGMP snooping also introduces certain constraints, so take heed:

- Keep it flat. Use a basic line-cascade structure rather than a pyramid or tree arrangement (see below).
- Keep the distances between the switches as short as possible.
- Ensure sufficient bandwidth between switches to eliminate bottlenecks.
- Where the ServSwitch iPATH manager is used to administer multiple ServSwitch Agility transceivers, ensure the ServSwitch iPATH manager and all ServSwitch Agility units reside in the same subnet.
- Do not use VGA to DVI converters, instead replace VGA video cards in older systems with suitable DVI replacements. Converters cause ServSwitch Agility local units to massively increase data output.
- Wherever possible, create a private network.

B.3.1 The recommended layout

The layout shown in Figure B-1 below has been found to provide the most efficient network layout for rapid throughput when using IGMP snooping:

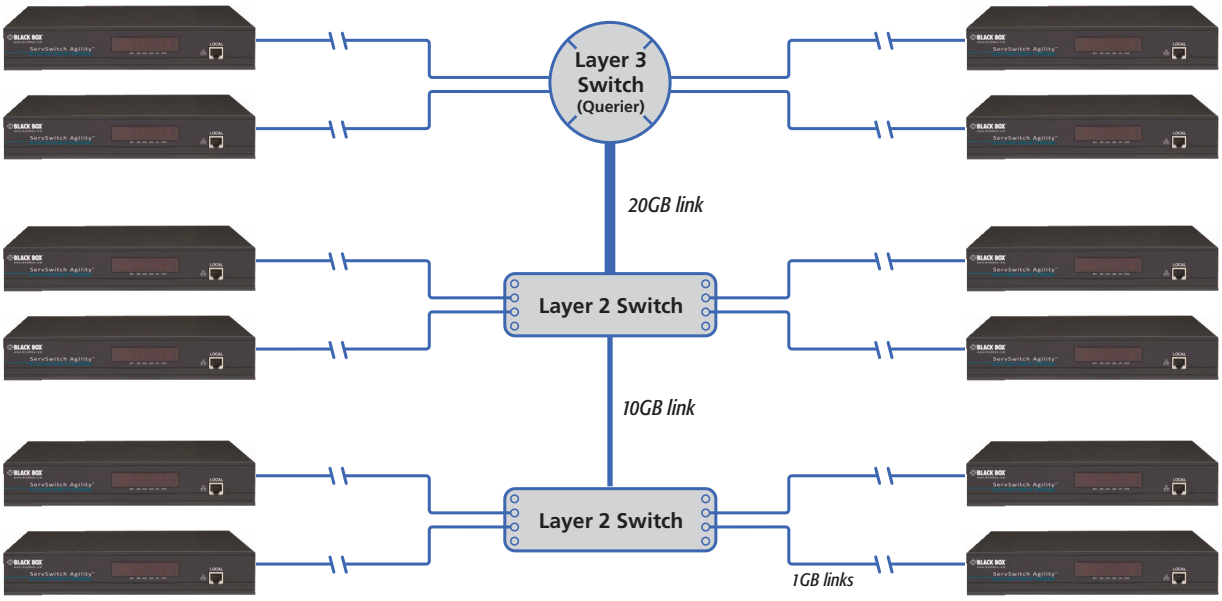


Figure B-1. Recommended layout for networking ServSwitch Agility local and remote units where IGMP snooping is used

Note: From firmware version 3.1, tree and hierarchical structures of network switches are also supported. The local unit now joins its own multicast group so there is always a route from the querier to the local unit which was previously missing in earlier firmware versions.

- Use no more than two cascade levels.
- Ensure high bandwidth between the two L2 switches and very high bandwidth between the top L2 and the L3. Typically 10GB and 20GB, respectively for 48 port L2 switches.

B.4 Configuring the switches and devices

The layout is vital but so too is the configuration:

- Enable IGMP Snooping on all L2 switches.
- Ensure that IGMP Fast-Leave is enabled on all switches with ServSwitch Agility units connected directly to them.
- Enable the L3 switch as an IGMP Querier.
- Enable Spanning Tree Protocol (STP) on all switches and importantly also enable portfast (only) on all switch ports that have ServSwitch Agility units connected.
- If any hosts will use any video resolutions using 2048 horizontal pixels (e.g. 2048 x 1152), ensure that Jumbo Frames are enabled on all switches.
- Choose an appropriate forwarding mode on all switches. Use Cut-through if available, otherwise Store and forward.
- Optimize the settings on the ServSwitch Agility local units:
  - If moving video images are being shown frequently, then leave Frame Skipping at a low percentage and instead reduce the Peak bandwidth limiter.
  - Where screens are quite static, try increasing the Background Refresh interval and/or increasing the Frame skipping percentage setting.

  Make changes to the ServSwitch Agility local units 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.
- Ensure that all ServSwitch Agility units are fully updated to the latest firmware version (at least v2.1).

Appendix C. Troubleshooting

Problem: The video image of the ServSwitch Agility remote unit shows horizontal lines across the screen.

This issue is known as *Blinding* because the resulting video image looks as though you're viewing it through a venetian blind.

When video is transmitted by ServSwitch Agility units, the various lines of each screen are divided up and transmitted as separate data packets. If the reception of those packets is disturbed, then blinding is caused. The lines are displayed in place of the missing video data packets.

There are several possible causes for the loss of data packets:

- Incorrect switch configuration. The problem could be caused by multicast flooding, which causes unnecessary network traffic. This is what IGMP snooping is designed to combat, however, there can be numerous causes of the flooding.
- Speed/memory bandwidth issues within one or more switches. The speed and capabilities of different switch models varies greatly. If a switch cannot maintain pace with the quantity of data being sent through it, then it will inevitably start dropping packets.
- One or more ServSwitch Agility units may be outputting Jumbo frames due to the video resolution (2048 horizontal pixels) being used. If jumbo frames are output by a ServSwitch Agility unit, but the network switches have not been configured to use jumbo frames, the switches will attempt to break the large packets down into standard packets. This process introduces a certain latency and could be a cause for dropped packets.
- One or more ServSwitch Agility units may be using an old firmware version. Firmware versions prior to v2.1 exhibited an issue with the timing of IGMP join and leave commands that caused multicast flooding in certain configurations.

Remedies:

- Ensure that IGMP snooping is enabled on all switches within the subnet.
- Where each ServSwitch Agility unit is connected as the sole device on a port connection to a switch, enable IGMP Fast-Leave (aka Immediate Leave) to reduce unnecessary processing on each switch.
- Check the video resolution(s) being fed into the ServSwitch Agility local units. If resolutions using 2048 horizontal pixels are unavoidable then ensure that Jumbo frames are enabled on all switches.
- Check the forwarding mode on the switches. If *Store and forward* is being used, try selecting *Cut-through* as this mode causes reduced latency on lesser switch designs.
- Ensure that one device within the subnet is correctly configured as an IGMP Querier, usually a layer 3 switch or multicast router.
- Ensure that the firmware in every ServSwitch Agility unit is version 2.1 or greater.
- Try adjusting the local unit settings on each ServSwitch Agility to make the output data stream as efficient as possible.

Problem: The audio output of the ServSwitch Agility remote unit sounds like a scratched record.

This issue is called Audio crackle and is a symptom of the same problem that produces blinding (see previous page). The issue is related to missing data packets.

Remedies:

As per blinding discussed above.

Problem: The mouse pointer of the ServSwitch Agility remote unit is slow or sluggish when moved across the screen.

This issue is often related to either using dithering on the video output of one or more transmitting computers or using VGA-to-DVI video converters.

Dithering is used to improve the perceived quality and color depth of images by diffusing or altering the color of pixels between video frames. This practice is commonly used on Apple Mac computers using ATI or Nvidia graphics cards. VGA-to-DVI converters unwittingly produce a similar issue by creating high levels of pixel background noise.

ServSwitch Agility units attempt to considerably reduce network traffic by transmitting only the pixels that change between successive video frames. When dithering is enabled and/or VGA-to-DVI converters are used, this can have the effect of changing almost every pixel between each frame, thus forcing the ServSwitch Agility local unit to send the whole of every frame: resulting in greatly increased network traffic and what's perceived as sluggish performance.

Remedies:

- Linux PCs

  Check the video settings on the PC. If the Dither video box option is enabled, disable it.

- Apple Mac with Nvidia graphics

  Use the Black Box utility for Mac's – Contact technical support.

- Apple Mac with ATI graphics

  Use the ServSwitch Agility Dual series unit with Magic Eye dither removal feature.

- Windows PCs

  If you suspect these issues with PC's, contact technical support for assistance.

- Replace old VGA adapters on host computers with DVI video cards.

Problem: ServSwitch iPATH cannot locate working ServSwitch Agility units.

There are a few possible causes:

- The ServSwitch Agility units must be reset back to their zero config IP addresses for ServSwitch iPATH discovery. If you have a working network of ServSwitch Agility unit's without ServSwitch iPATH and then add ServSwitch iPATH to the network, the iPATH manager will not discover the ServSwitch Agility units until they are reset to the zero config IP addresses.
- This could be caused by Layer 2 Cisco switches that have Spanning Tree Protocol (STP) enabled but do not also have *port-fast* enabled on the ports to which ServSwitch Agility units are connected. Without portfast enabled, ServSwitch Agility units will all be assigned the same zero config IP address at reboot and ServSwitch iPATH will only acquire them one at a time on a random basis.

  You can easily tell whether portfast is enabled on a switch that is running STP: When you plug the link cable from a working ServSwitch Agility unit into the switch port, check how long it takes for the port indicator to change from orange to green. If it takes roughly one second, portfast is on; if it takes roughly thirty seconds then portfast is disabled.

Remedies:

- Ensure that the ServSwitch Agility units and the ServSwitch iPATH manager are located within the same subnet. ServSwitch iPATH cannot cross subnet boundaries.
- Manually reset the ServSwitch Agility units to their zero config IP addresses.
- Enable portfast on all switch ports that have ServSwitch Agility units attached to them or try temporarily disabling STP on the switches while ServSwitch iPATH is attempting to locate ServSwitch Agility units.

Problem: My monitor is displaying a pink screen

It is possible that the source computer and Agility local unit are sending a high resolution Dual Link signal in response to a request from your Dual Link monitor. However, your Agility receiver is unable to correctly process the signal, causing the pink screen issue (DVI resolutions above 1920 x 1200 are generally Dual Link).

Agility Dual (ACR1002A-T) and Agility Dual VNC (ACR1012A-T) local units are able to send Dual Link video when requested, however, an Agility Dual (ACR1002A-R) receiver is required to process the higher resolution signal fully at the other end. Other receivers, such as the Agility, and Agility Dual-Head units cannot process Dual Link DVI as they are Single Link devices.

Ensure that the Agility transmitter is set to supply a Single Link EDID to the graphics card. When the video source is changed to a Single Link video resolution, the pink screen should disappear and the video should be displayed normally. Alternatively, change the monitor to a Single Link DVI monitor.

It is important not to mix Dual Link Transmitters with Single Link Receivers.

On an iPATH controlled system, ensure that the Video compatibility check is enabled as this ensures that the correct video mode is displayed for the monitor being used.

Appendix D. Glossary

D.1 Internet Group Management Protocol

Where an ServSwitch Agility local unit is required to stream video to two or more remote units, multicasting is the method used.

Multicasting involves the delivery of identical data to multiple remote units simultaneously without the need to maintain individual links. When multicast data packets enter a subnet, the natural reaction of the switches that bind all the hosts together within the subnet, is to spread the multicast data to all of their ports. This is referred to as Multicast flooding and means that the hosts (or at least their network interfaces) are required to process plenty of data that they didn't request. IGMP offers a partial solution.

The Internet Group Management Protocol (IGMP) is designed to prevent multicast flooding by allowing Layer 3 switches to check whether host computers within their care are interested in receiving particular multicast transmissions. They can then direct multicast data only to those points that require it and can shut off a multicast stream if the subnet has no recipients.

There are currently three IGMP versions: 1, 2 and 3, with each version building upon the capabilities of the previous one:

- IGMPv1 allows host computers to opt into a multicast transmission using a Join Group message, it is then incumbent on the router to discover when they no longer wish to receive; this is achieved by polling them (see IGMP Querier below) until they no longer respond.
- IGMPv2 includes the means for hosts to opt out as well as in, using a Leave Group message.
- IGMPv3 encompasses the abilities of versions 1 and 2 but also adds the ability for hosts to specify particular sources of multicast data.

ServSwitch Agility units make use of IGMPv2 when performing multicasts to ensure that no unnecessary congestion is caused.

D.1.2 IGMP Snooping

The IGMP messages are effective but only operate at layer 2 - intended for routers to determine whether multicast data should enter a subnet. A relatively recent development has taken place within the switches that glue together all of the hosts within each subnet: IGMP Snooping. IGMP snooping means these layer 2 devices now have the ability to take a peek at the IGMP messages. As a result, the switches can then determine exactly which of their own hosts have requested to receive a multicast – and only pass on multicast data to those hosts.

D.1.3 IGMP Querier

When IGMP is used, each subnet requires one Layer 3 switch to act as a Querier. In this lead role, the switch periodically sends out IGMP Query messages and in response all hosts report which multicast streams they wish to receive. The Querier device and all snooping Layer 2 switches, then update their lists accordingly (the lists are also updated when Join Group and Leave Group (IGMPv2) messages are received).

D.1.4 IGMP Fast-Leave (aka Immediate Leave)

When a device/host no longer wishes to receive a multicast transmission, it can issue an IGMP Leave Group message as mentioned above. This causes the switch to issue an IGMP Group-Specific Query message on the port (that the Leave Group was received on) to check no other remote units exist on that connection that wish to remain a part of the multicast. This process has a cost in terms of switch processor activity and time.

Where ServSwitch Agility units are connected directly to the switch (with no other devices on the same port) then enabling IGMP Fast-Leave mode means that switches can immediately remove remote units without going through a full checking procedure. Where multiple units are regularly joining and leaving multicasts, this can speed up performance considerably.

D.2 Jumbo frames (Jumbo packets)

Since its commercial introduction in 1980, the Ethernet standard has been successfully extended and adapted to keep pace with the ever improving capabilities of computer systems. The achievable data rates, for instance, have risen in ten-fold leaps from the original 10Mbit/s to a current maximum of 100Gbit/s.

While data speeds have increased massively, the standard defining the number of bytes (known as the Payload) placed into each data packet has remained resolutely stuck at its original level of 1500 bytes. This standard was set during the original speed era (10Mbits/s) and offered the best compromise at that speed between the time taken to process each packet and the time required to resend faulty packets due to transmission errors.

But now networks are much faster and files/data streams are much larger; so time for a change? Unfortunately, a wholesale change to the packet size is not straightforward as it is a fundamental standard and changing it would mean a loss of backward compatibility with older systems.

Larger payload options have been around for a while, however, they have often been vendor specific and at present they remain outside the official standard. There is, however, increased consensus on an optional 'Jumbo' payload size of 9000 bytes and this is fully supported by the ServSwitch Agility units.

Jumbo frames (or Jumbo packets) offer advantages for ServSwitch Agility units when transmitting certain high resolution video signals across a network. This is because the increased data in each packet reduces the number of packets that need to be transferred and dealt with - thus reducing latency times.

The main problem is that for jumbo frames to be possible on a network, all of the devices on the network must support them.

D.3 Spanning Tree Protocol (STP)

In order to build a robust network, it is necessary to include certain levels of redundancy within the interconnections between switches. This will help to ensure that a failure of one link does not lead to a complete failure of the whole network.

The danger of multiple links is that data packets, especially multicast packets, become involved in continual loops as neighbouring switches use the duplicated links to send and resend them to each other.

To prevent such bridging loops from occurring, the Spanning Tree Protocol (STP), operating at layer 2, is used within each switch. STP encourages all switches to communicate and learn about each other. It prevents bridging loops by blocking newly discovered links until it can discover the nature of the link: is it a new host or a new switch?

The problem with this is that the discovery process can take up to 50 seconds before the block is lifted, causing problematic time-outs.

The answer to this issue is to enable the portfast variable for all host links on a switch. This will cause any new connection to go immediately into forwarding mode. However, take particular care not to enable portfast on any switch to switch connections as this will result in bridging loops.

D.4 Forwarding modes

In essence, the job of a layer 2 switch is to transfer as fast as possible, data packets arriving at one port out to another port as determined by the destination address. This is known as data forwarding and most switches offer a choice of methods to achieve this. Choosing the most appropriate forwarding method can often have a sizeable impact on the overall speed of switching:

- **Store and forward** is the original method and requires the switch to save each entire data packet to buffer memory, run an error check and then forward if no error is found (or otherwise discard it).
- **Cut-through** was developed to address the latency issues suffered by some store and forward switches. The switch begins interpreting each data packet as it arrives. Once the initial addressing information has been read, the switch immediately begins forwarding the data packet while the remainder is still arriving. Once all of the packet has been received, an error check is performed and, if necessary, the packet is tagged as being in error. This checking 'on-the-fly' means that cut-through switches cannot discard faulty packets themselves. However, on receipt of the marked packet, a host will carry out the discard process.
- **Fragment-free** is a hybrid of the above two methods. It waits until the first 64 bits have been received before beginning to forward each data packet. This way the switch is more likely to locate and discard faulty packets that are fragmented due to collisions with other data packets.
- **Adaptive** switches automatically choose between the above methods. Usually they start out as a cut-through switches and change to store and forward or fragment-free methods if large number of errors or collisions are detected.

So which one to choose? The *Cut-through* method has the least latency so is usually the best to use with Agility units. However, if the network components and/or cabling generate a lot of errors, the *Store and forward* method should probably be used. On higher end store and forward switches, latency is rarely an issue.

D.5 Layer 2 and Layer 3: The OSI model

When discussing network switches, the terms Layer 2 and Layer 3 are very often used. These refer to parts of the Open System Interconnection (OSI) model, a standardized way to categorize the necessary functions of any standard network.

There are seven layers in the OSI model (see Figure D-1) and these define the steps needed to get the data created by you (imagine that you are Layer 8) reliably down onto the transmission medium (the cable, optical fiber, radio wave, etc.) that carries the data to another user; to complete the picture, consider the transmission medium is Layer 0. In general, think of the functions carried out by the layers at the top as being complex, becoming less complex as you go lower down.

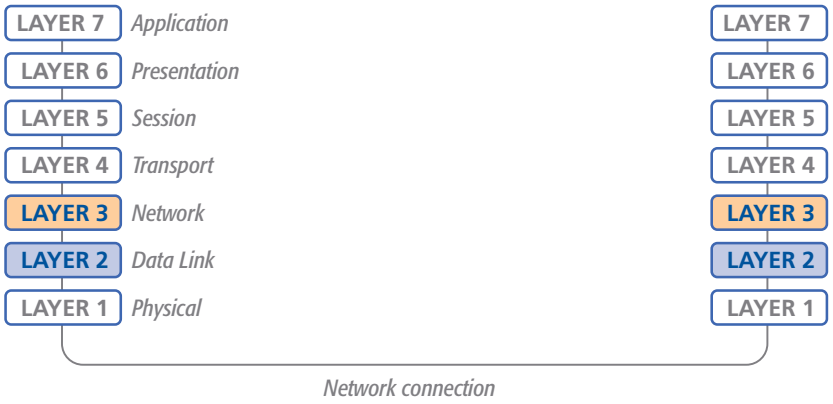


Figure D-1. A representation of the seven layers defined by the OSI Model

As your data travel down from you towards the transmission medium (the cable), they are successively encapsulated at each layer within a new wrapper (along with a few instructions), ready for transport. Once transmission has been made to the intended destination, the reverse occurs: Each wrapper is stripped away and the instructions examined until finally only the original data are left.

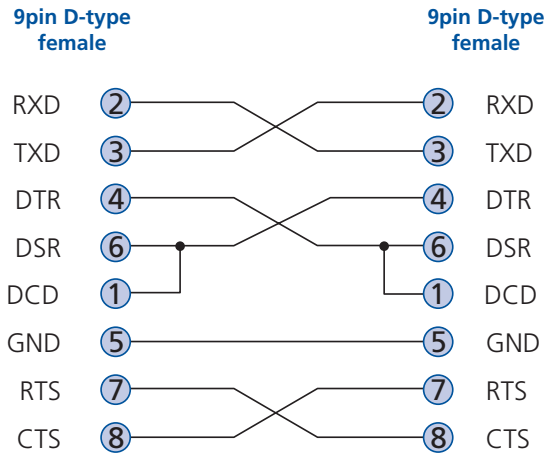
So why are Layer 2 and Layer 3 of particular importance when discussing ServSwitch Agility? Because the successful transmission of data relies upon fast and reliable passage through network switches – and most of these operate at either Layer 2 or Layer 3.

The job of any network switch is to receive each incoming network packet, strip away only the first few wrappers to discover the intended destination then rewrap the packet and send it in the correct direction.

In simplified terms, the wrapper that is added at Layer 2 (by the sending system) includes the physical address of the intended recipient system, i.e. the unique MAC address (for example, 09:f8:33:d7:66:12) that is assigned to every networking device at manufacture. Deciphering recipients at this level is more straightforward than at Layer 3, where the address of the recipient is represented by a logical IP address (e.g. 192.168.0.10) and requires greater knowledge of the surrounding network structure. Due to their more complex circuitry, Layer 3 switches are more expensive than Layer 2 switches of a similar build quality and are used more sparingly within installations.

Appendix E. Cable and Connector Specifications

E.1 RS232 'Null-Modem' Cable



E.2 Supported video modes

ServSwitch Agility, Agility Dual and Agility Dual-Head units support all VESA and CEA video modes.

Appendix F. 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.

Appendix G. Fiber modules and cables

To suit your installation layout, two fiber modules are available for the Agility Dual/Dual-Head units to suit various fiber optic cables. The specifications for all are summarized in the table below:

Fiber Type	Fiber size	Fiber Type	Coding			Distance at 1Gbps	Bar color	Conn. type
			Normal Applications	Military Applications	Suggested Print Nomenclature			
OM1	(62.5/125)	Multimode (TIA-492AAAA)	Orange	Slate	62.5/125	220m	Black	LC
OM2	(50/125)	Multimode (TIA-492AAAB)	Orange	Orange	50/125	550m	"	"
OM3	(50/125)	Multimode (850 nm Laser-optimized) (TIA-492AAAC)	Aqua	Undefined	850 LO 50 /125	550m	"	"
OM4	(50/125)	Multimode (850 nm Laser-optimized) (TIA-492AAAC)	Aqua	Undefined	850 LO 50 /125	550m	"	"
OS1 and OS2	(9/125)	Single-mode (TIA-492C000 / TIA-492E000)	Yellow	Yellow	SM/NZDS, SM	10Km	Blue	LC

Appendix H. Mounting options

There are several main mounting methods:

- Via the (4) supplied self-adhesive rubber feet
- Via optional single- or double- unit rack brackets
- Via the optional VESA mounting bracket

H.1 Single Unit Rack Brackets

The optional single unit brackets (plus four screws), enable a unit to be secured within a standard rack half width slot. See Figure H-1.

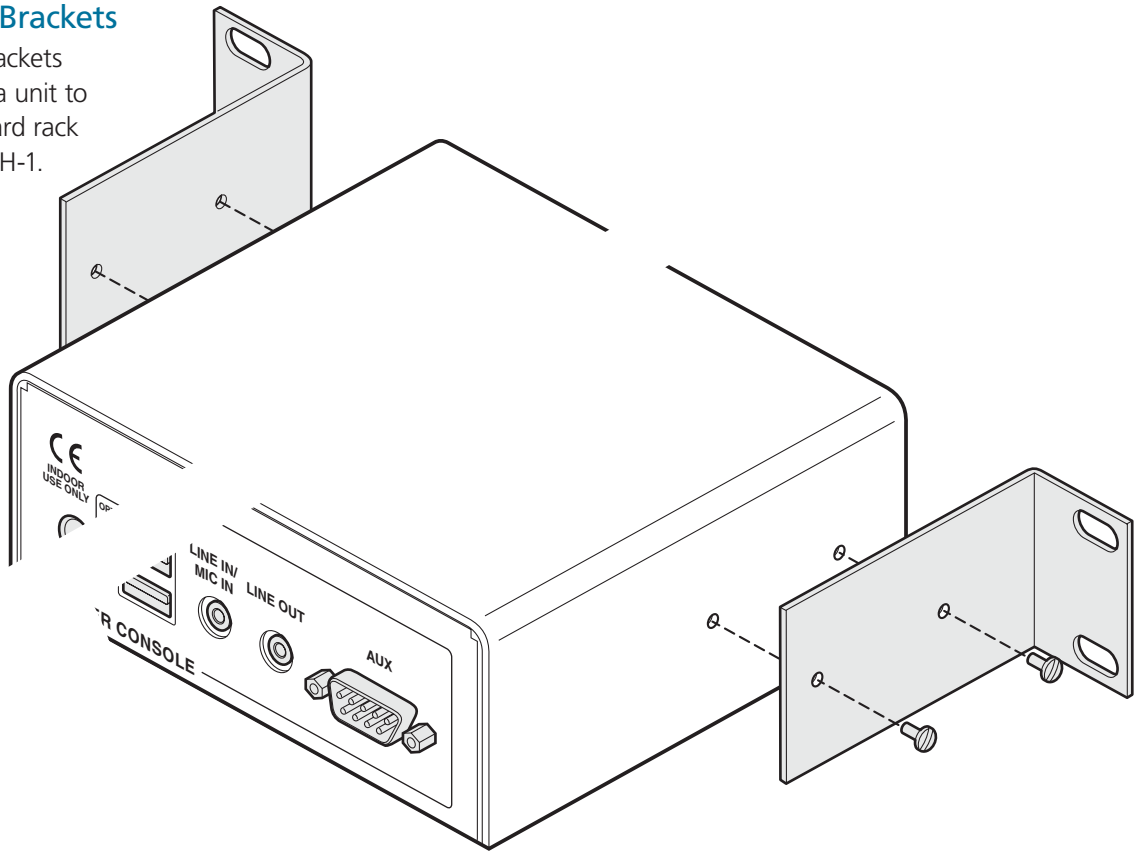


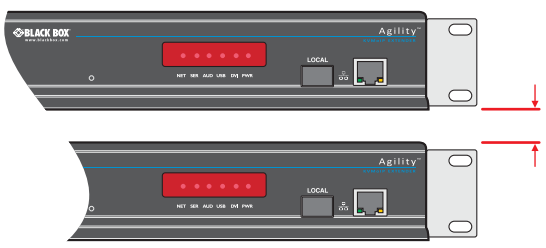
Figure H-1. Rackmount brackets.

IMPORTANT - allow space for airflow

The ServSwitch Agility (and Agility Dual/Dual-Head) units and their power supplies generate heat when in operation and will become warm to the touch.

Do not place them in locations where air cannot circulate to cool the equipment. When mounting units within a rack chassis, allow a 1/3rd U space (1.5cm) between rows of devices:

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).



H.2 Double Unit Rack Brackets

This optional kit comprises four brackets (plus twelve screws) and allows two Agility units to be mounted side by side and fitted into a 1U rack slot. See Figure H-2.

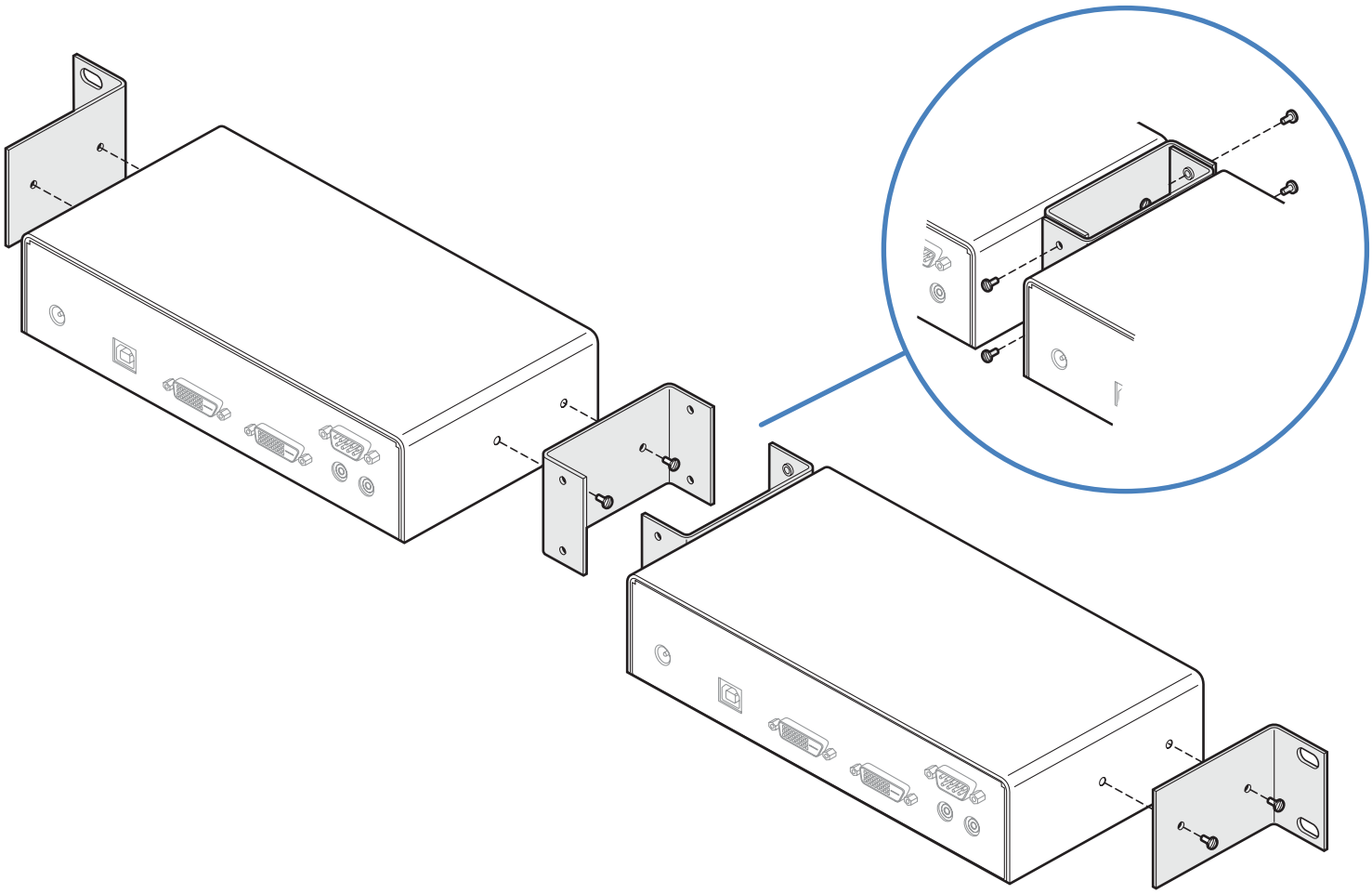


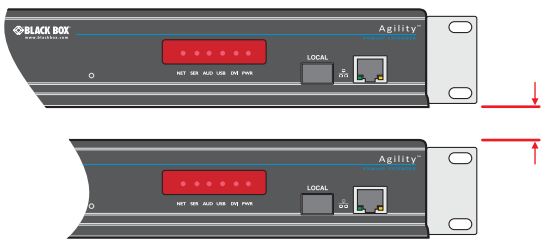
Figure H-2. Rackmount brackets.

IMPORTANT - allow space for airflow

The ServSwitch Agility (and Agility Dual/Dual-Head) units and their power supplies generate heat when in operation and will become warm to the touch.

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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).



H.3 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 H-3.

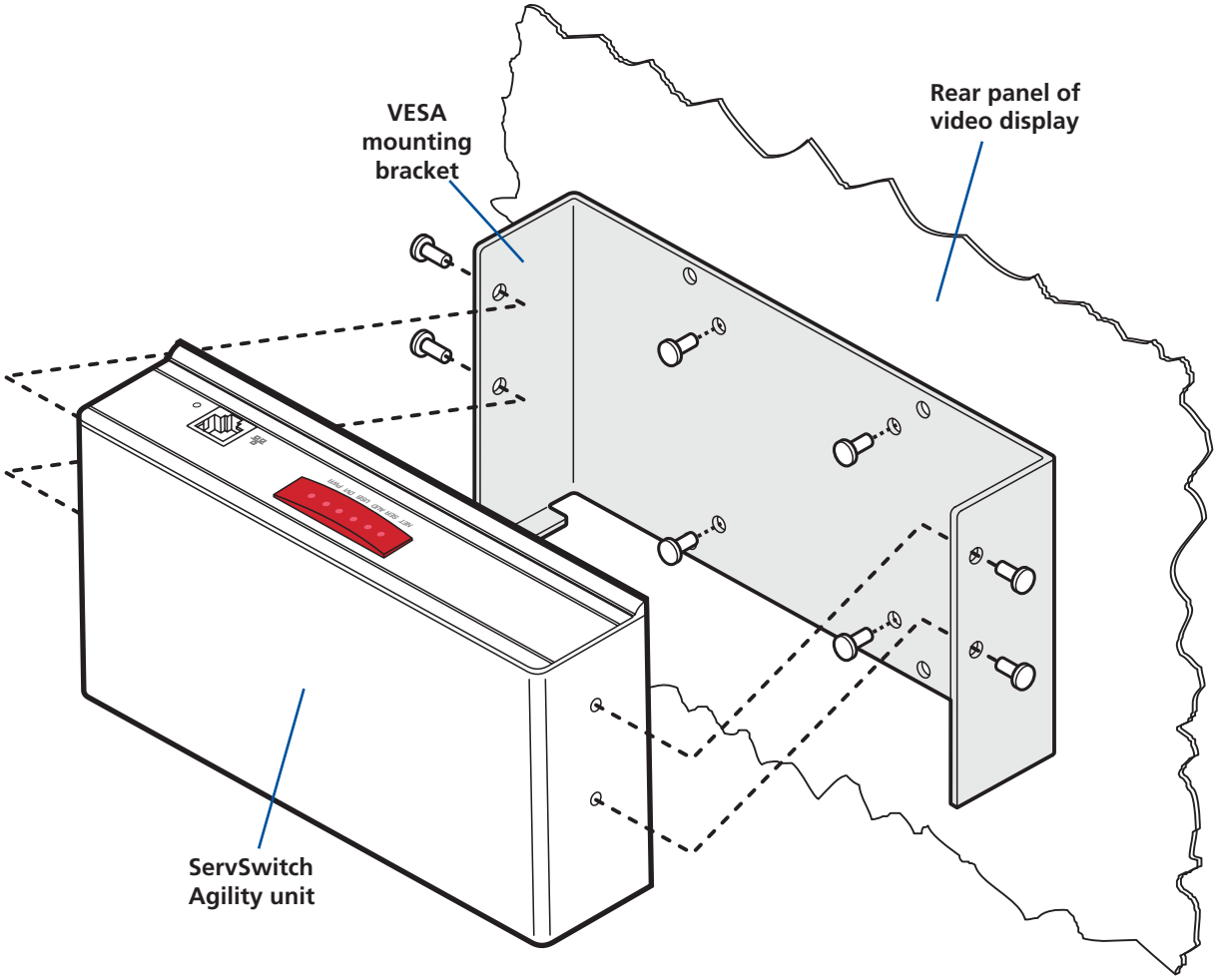


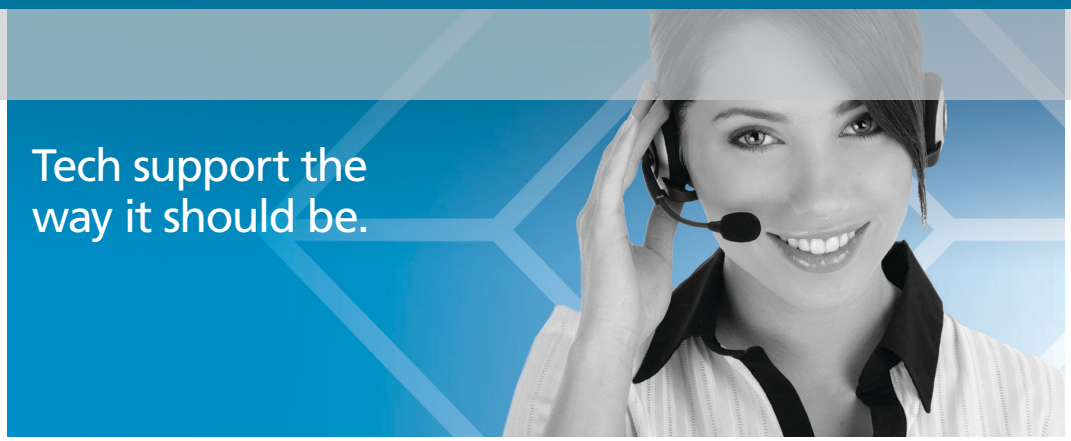
Figure H-3. VESA mounting bracket.

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.

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ACR1002A, rev. 3.3