# x900 Series Switch and SwitchBlade® x908
# **Hardware Reference**

AT-8948
x900-48FE
x900-48FE-N
x900-48FS
AT-9924T
AT-9924SP
AT-9924Ts
x900-12XT/S
x900-24XT
x900-24XT-N
x900-24XS
SwitchBlade® x908

Allied Telesis™

# x900 Series Switch and SwitchBlade® x908 Hardware Reference

**AT-8948**
**x900-48FE**
**x900-48FE-N**
**x900-48FS**
**AT-9924T**
**AT-9924SP**
**AT-9924Ts**
**x900-12XT/S**
**x900-24XT**
**x900-24XT-N**
**x900-24XS**
**SwitchBlade   x908**

Download the complete document set from
www.alliedtelesis.com/support/software

Allied Telesis™

x900 Series Switch and SwitchBlade® x908 Hardware Reference
Document Number C613-03092-00 REV H

# Contents

# Devices Covered by this Document

This Hardware Reference contains information on the following devices:

- AT-8948 switch
- x900-48FE switch
- x900-48FE-N switch
- x900-48FS switch
- AT-9924T switch
- AT-9924SP switch
- AT-9924Ts switch
- x900-12XT/S switch
- x900-24XT switch
- x900-24XT-N switch
- x900-24XS switch
- SwitchBlade® x908 switch
- AT-PWR01 AC and DC power supply units
- AT-PWR02 AC power supply unit
- AT-PWR05 AC power supply unit
- AT-FAN01 fan-only module
- AT-FAN03 chassis fan

You can download the complete document set for x900 Series switches and SwitchBlade x908 from www.alliedtelesis.com/support/software. For more information about the document set and other resources, see "Obtaining Documentation and Resources" on page 61.

# 48-Port Fast Ethernet Switches

These Fast Ethernet switches meet the exceptionally high performance demands of high-end applications:

- AT-8948
- x900-48FE
- x900-48FE-N (NEBS compliant model)
- x900-48FS

**Dimensions**
- Height: 44.5mm, plus 5.1mm if the rubber feet are used
- Width: 440mm, excluding rack-mounting brackets
- Depth: 440mm, excluding PSU handles
- Weight: Not more than 7.3kg (16.1lbs) unpackaged, which includes one power supply unit (PSU) and one fan-only module (FOM)

**Mounting system**
- 1U rack
- 19-inch rack-mount kit

**Asynchronous serial port**
- Up to 115kbps
- Universal Asynchronous Receiver Transmitter (UART)
- Standard RJ-45 connector
- Hardware flow control

**Environmental conditions**
- Operating temperature range: 0°C to 50°C (32 to 122°F)
- Storage temperature range: -25°C to 70°C (-13 to 158°F)
- Relative humidity range for operation: 5 to 80% non-condensing
- Relative humidity range for storage: 5 to 95% non-condensing
- Operational altitude: 3,050 metres maximum (10,000 feet)

**Regulatory standards**
- EMC: EN55022 class A, FCC class A, and VCCI class A
- Immunity: EN55024, EN61000-3 levels 2 (Harmonics), and 3 (Flicker)— AC models only
- Safety: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, AS/NZS60950.1, and EN60825-1
- Certification: UL, cUL, and TUV

**Switching core**
- Application-Specific Integrated Circuit (ASIC) switch chip
- Non-blocking Layer 2 and Layer 3 IP switching
- 256kBytes IPv4 address table
- x900-48FE and x900-48FS switches are IPv6-ready in hardware to provide accelerated unicast and multicast routing
- 4096 Layer 2 multicast entries
- 1024 Layer 3 IPv4 multicast entries
- 4096 logical IPv6 interfaces
- Separate packet buffer memory

**Processing core**
- 350 MHz RISC Processor
- 32 MBytes of on-board flash
- 256 MBytes of Synchronous DRAM, expandable to 512 MBytes with DIMM
- CompactFlash slot for hot-swappable expansion of flash memory
- 512 kBytes of SRAM
- 32/66 PCI bus for 32-bit/33 MHz
- Silicon ID chip stores serial number, board ID, and MAC address

**IPv6 accelerator card**

AT-8948 switches have a slot for an optional AT-ACC01 network processor accelerator card to provide accelerated unicast and multicast routing in hardware:
- 4096 Layer 3 IPv6 multicast entries
- 1000 accelerator hardware filters
- 128 MBytes Synchronous DRAM giving 64K IPv6 routes

**AT-8948 and x900-48FE switches**

Key features are:
- Autonegotiating, multi-layer Fast Ethernet switch
- 48 x 10BASE-T/100BASE-TX ports (RJ-45 connectors), auto MDI/MDI-X, full or half duplex
- 4 x 1000BASE-X SFP uplink port, 1000 Mbps, full duplex
- Hot-swappable, load sharing PSUs
- NEBS compliant model x900-48FE-N available
- Optional AT-ACC01 network processor accelerator card for the AT-8948 switch

**x900-48FE front panel**
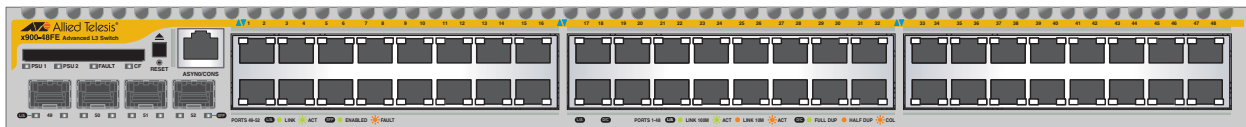


**x900-48FS switch**

Key features are:
- Multi-layer Fast Ethernet switch
- 48 x 100BASE-X SFP ports, 100 Mbps, full or half duplex
- 4 x 1000BASE-X SFP uplink ports, 1000 Mbps, full duplex
- Support for hot-swappable SFP modules
- Hot-swappable, load sharing PSUs

**x900-48FS front panel**
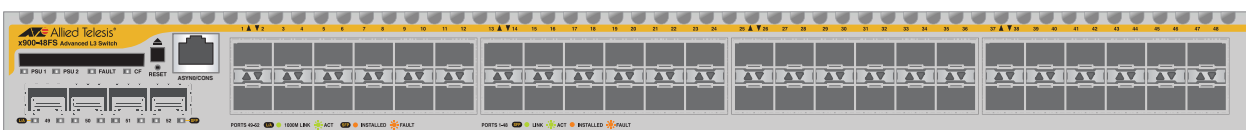
# Gigabit Switches

The AT-9900 series switch provides advanced Gigabit Ethernet multi-layer switches that are perfect for the high-density rack environment where space is at a premium:

- AT-9924T
- AT-9924SP

**Dimensions**

- Height: 44.5mm, plus 5.1mm if the rubber feet are used
- Width: 440mm, excluding rack-mounting brackets
- Depth: 440mm, excluding PSU handles
- Weight: Not more than 7.3kg (16.1lbs) unpackaged, which includes one power supply unit (PSU) and one fan-only module (FOM)

**Mounting system**

- 1U rack
- 19-inch rack-mount kit

**Asynchronous serial port**

- Up to 115kbps
- Universal Asynchronous Receiver Transmitter (UART)
- Standard RJ-45 connector
- Hardware flow control

**Environmental conditions**

- Operating temperature range: 0ºC to 50ºC (32ºF to 122ºF)
- Storage temperature range: -25ºC to 70ºC (-13ºF to 158ºF)
- Relative humidity range for operation: 5% to 80% non-condensing
- Relative humidity range for storage: 5% to 95% non-condensing
- Operational altitude: 3,050 metres maximum (10,000 feet)

**Regulatory standards**

- EMC: EN55022 class A, FCC class A, and VCCI class A.
- Immunity: EN55024, EN61000-3, levels 2 (Harmonics), and 3 (Flicker)—AC models only
- Safety: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, AS/NZS60950.1, and EN60825-1
- Certification: UL, cUL, and TUV

**Switching core**

- Application-Specific Integrated Circuit (ASIC) switch chip
- High performance IPv4 switching with separate packet buffer memory

**Processing core**

- 350MHz RISC Processor
- 16MBytes of on-board flash with provision for an additional 16MBytes
- CompactFlash card slot on the front panel for hot-swappable expansion of flash memory
- 256MBytes of Synchronous DRAM, expandable to 512MBytes with DIMM
- 512kBytes of NVSRAM
- Silicon ID chip storing serial number, board ID, MAC address, and hardware revision level

**AT-9924T switch**  Key features are:

- Autonegotiating, multi-layer gigabit switch
- 24 x 10BASE-T/100BASE-TX/1000BASE-T ports (RJ-45 connectors)
- 4 x SFP ports (see "Network Ports" on page 20 for speeds)
- Hot-swappable, load sharing PSUs

**AT-9924T front panel**
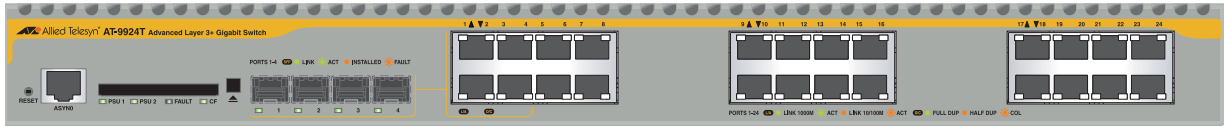


There can be 24 ports operational at one time. The RJ-45 ports 1 to 4 use the same physical interface as the SFP ports 1 to 4. When an SFP is inserted into an SFP port, the corresponding RJ-45 port is disabled. For example, if an SFP is inserted in SFP port 1, then RJ-45 port 1 is disabled. When the SFP is removed from port 1, the RJ-45 port 1 is again operational. All other RJ-45 ports function normally.

**AT-9924SP switch**  Key features are:

- Autonegotiating, multi-layer gigabit switch
- 24 x SFP ports (see "Network Ports" on page 20 for speeds)
- Hot-swappable, load sharing PSUs

**AT-9924SP front panel**
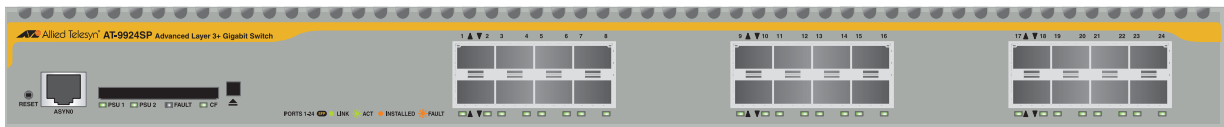
# Expandable Gigabit Switches

These gigabit link aggregation switches operate with other switches that have 10Mb/100Mb/1Gb/10Gb Ethernet ports. These switches can act as a gigabit server backbone or pass aggregated traffic over their gigabit ports. They can also aggregate gigabit desktop user connections and pass traffic to other 10Gigabit Ethernet equipment. These switches are:

- AT-9924Ts
- x900-12XT/S
- x900-24XT
- x900-24XT-N (NEBS compliant model)
- x900-24XS
- SwitchBlade x908

**Dimensions**   AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS

- Height: 44.5mm, plus 5.1mm if the rubber feet are used
- Width: 440mm, excluding rack-mounting brackets
- Depth: 440mm, excluding PSU handles
- Weight: Not more than 7.3kg (16.1lbs) unpackaged, which includes one power supply unit (PSU) and one fan-only module (FOM)

x900-12XT/S

- Height: 44.5mm, plus 5.1mm with rubber feet attached
- Width: 440mm, excluding rack-mounting brackets
- Depth: 350mm
- Weight: Not more than 6kg (13.2lbs) unpackaged, which does not include a XEM

SwitchBlade x908

- Height: 133.5mm, plus 5mm if the rubber feet are used
- Width: 440mm, excluding rack-mounting brackets
- Depth: 455mm
- Weight: Not more than 25kg (55lbs) unpackaged, which includes dual power supply units, dual chassis fans, and eight XEMs

**Mounting system**   AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, and x900-24XS

- 1U rack
- 19-inch rack-mount kit

SwitchBlade x908

- 3U rack
- 19-inch rack-mount kit

**Asynchronous serial port**
- Up to 115 kbps
- Universal Asynchronous Receiver Transmitter (UART)
- Standard RJ-45 connector
- Hardware flow control on switches running the AlliedWare operating system

**Environmental conditions**
- Operating temperature range: 0°C to 40°C (32°F to 104°F) derated by 1°C per 305 Meters (1000 ft)
- Storage temperature range: -25°C to 70°C (-13°F to 158°F)
- Relative humidity range for operation: 5% to 80% non-condensing
- Relative humidity range for storage: 5% to 95% non-condensing
- Operational altitude: 3,050 metres maximum (10,000 feet)

**Regulatory standards**
- EMC: EN55022 class A, FCC class A, and VCCI class A.
- EN61000-3 levels 2 (Harmonics), and 3 (Flicker)—AC models only
- Immunity: EN55024
- Safety: UL60950-1, CAN/CSA-C22.2 NO. 60950-1-03, EN60950-1, AS/NZS60950.1, and EN60825-1
- Certification: UL, cUL, and TUV

**Switching core**
- Application-Specific Integrated Circuit (ASIC) switch chip
- High performance IPv4 switching
- Separate packet buffer memory

**Processing core**
- 667 MHz RISC Processor
- Secure Digital card slot on the front panel for hot-swappable expansion of flash memory
- 512 kBytes of NVSRAM

AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS running the AlliedWare operating system:
- 32 MBytes of on-board flash
- 512 MBytes DDR SDRAM, expandable to 1 GByte

x900-12XT/S, x900-24XT, x900-24XT-N, and x900-24XS running the AlliedWare Plus operating system:
- 64 MBytes of on-board flash
- 512 MBytes DDR SDRAM, expandable to 1 GByte

SwitchBlade x908
- 64 MBytes of on-board flash
- 512 MBytes DDR SDRAM SODIMM, expandable to 1 GByte

**Important** SODIMM memory is not interchangable with the DIMM memory used on other switches.

**AT-9924Ts switch**    Key features are:

- ■ Autonegotiating, multi-layer gigabit switch

- ■ 24 x 10/100/1000BASE-TX ports (RJ-45 connectors)

- ■ Out-of-band 10/100/1000BASE-T Ethernet management port

- ■ Optional Secure Digital memory card

- ■ Supports dual, hot-swappable, load sharing PSUs—a second PSU is optional

- ■ Two high-speed bays to support a combination of expansion modules:

  - • AT-A60, 1 x 10GbE XFP port

  - • AT-A61, 12 x SFP ports

  - • AT-A62, 12 x RJ-45 ports

**AT-9924Ts front panel**
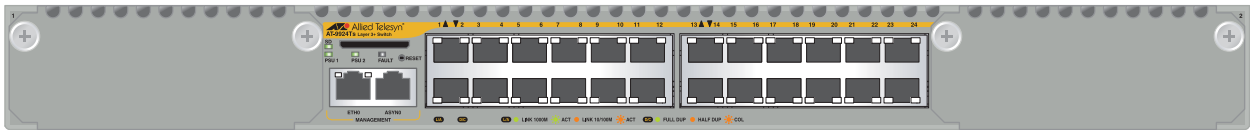


**x900-12XT/S switch**    Key features are:

- ■ Autonegotiating, multi-layer gigabit switch

- ■ 12 x combo ports that can be either 10/100/1000BASE-TX (RJ-45 connectors) or 100/1000BASE-X SFP ports

- ■ Out-of-band 10/100/1000BASE-T Ethernet management port

- ■ Optional Secure Digital memory card

- ■ Support for hot-swappable SFP modules

- ■ One high-speed bay to support the following expansion modules:

  - • XEM-1XP, 1 x 10GbE XFP port

  - • XEM-12S, 12 x SFP ports

  - • XEM-12T, 12 x RJ-45 ports

  - • XEM-STK, 2 stacking ports

**x900-12XT/S front panel**
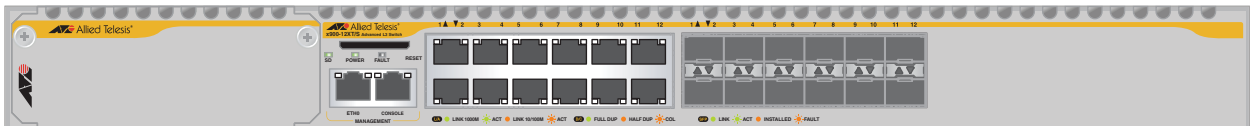
**x900-24XT switch**   Key features are:

■ Autonegotiating, multi-layer gigabit switch

■ 24 x 10/100/1000BASE-TX ports (RJ-45 connectors)

■ Out-of-band 10/100/1000BASE-T Ethernet management port

■ Optional Secure Digital memory card

■ Supports dual, hot-swappable, load sharing PSUs—a second PSU is optional

■ NEBS compliant model available, x900-24XT-N

■ Two high-speed bays to support a combination of expansion modules:

• XEM-1XP, 1 x 10GbE XFP port

• XEM-12S, 12 x SFP ports

• XEM-12T, 12 x RJ-45 ports

• XEM-STK, 2 stacking ports (when running the AlliedWare Plus operating system)

**x900-24XT front panel**
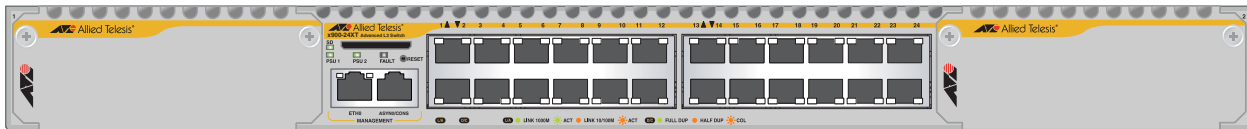


**x900-24XS switch**   Key features are:

■ Autonegotiating, multi-layer gigabit switch

■ 24 1000BASE-X SFP ports

■ Out-of-band 10/100/1000BASE-T Ethernet management port

■ Optional Secure Digital memory card

■ Supports dual, hot-swappable, load sharing PSUs—a second PSU is optional

■ Two high-speed bays to support a combination of expansion modules:

• XEM-1XP, 1 x 10GbE XFP port

• XEM-12S, 12 x SFP ports

• XEM-12T, 12 x RJ-45 ports

• XEM-STK, 2 stacking ports (when running the AlliedWare Plus operating system)

**x900-24XS front panel**
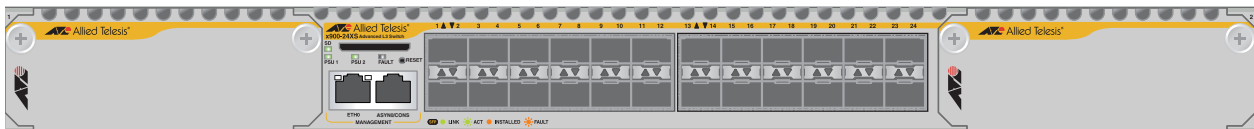


**SwitchBlade x908**   Key features are:

- Autonegotiating, multi-layer gigabit switch
- Out-of-band 10/100/1000BASE-T Ethernet management port
- Optional Secure Digital memory card
- Supports dual, hot-swappable, load sharing PSUs
- Dual, hot-swappable chassis fans
- Two fixed stacking connectors on the rear of the chassis
- RoHS compliant
- Eight high-speed bays to support a combination of expansion modules:
  - XEM-1XP, 1 x 10GbE XFP port
  - XEM-12S, 12 x SFP ports
  - XEM-12T, 12 x RJ-45 ports
  - XEM-STK, 2 stacking ports

## SwitchBlade x908 front panel with 8 XEMs
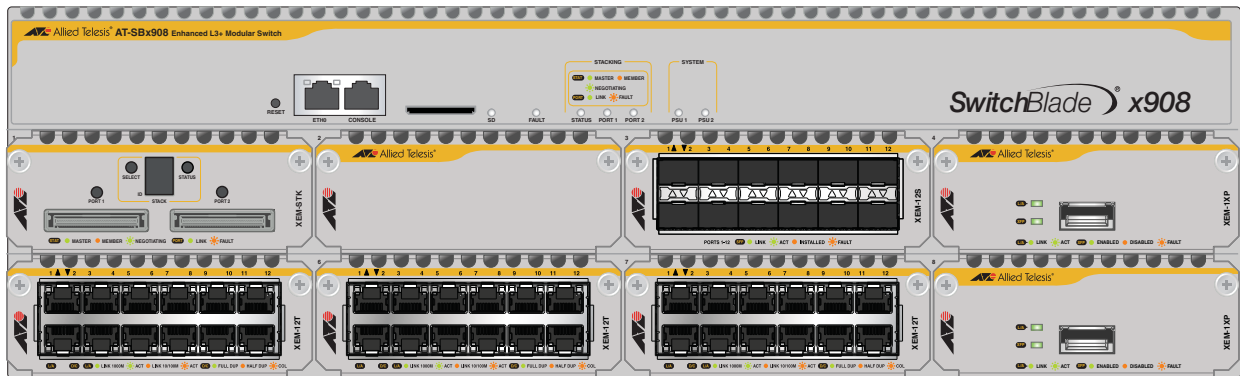
# Switch LEDs

The following LEDs report operations and faults on the x900 series switch and SwitchBlade x908:

■ **Fast Ethernet RJ-45 port LEDs**

■ **Gigabit RJ-45 port LEDs**

■ **XFP port LEDs**

■ **SFP port LEDs**

■ **System LEDs**

■ **Stacking LEDs**

**Fast Ethernet RJ-45 port LEDs**

The following LEDs report operations and faults on Fast Ethernet RJ-45 ports.

| LED | State | Description |
|---|---|---|
| L/A (Link Activity) | Green | A 100 Mbps link has been established. |
| | Green flashing | 100 Mbps activity is occurring. |
| | Amber | A 10 Mbps link has been established. |
| | Amber flashing | 10 Mbps activity is occurring. |
| D/C (Duplex/Collision) | Green | The port is operating in full duplex mode. |
| | Amber | The port is operating in half duplex mode. |
| | Amber flashing | Collisions are occurring. |

**Gigabit RJ-45 port LEDs**

The following LEDs report operations and faults on Gigabit RJ-45 ports.

| LED | State | Description |
|---|---|---|
| L/A (Link Activity) | Green | A 1000 Mbps link has been established. |
| | Green flashing | 1000 Mbps activity is occurring. |
| | Amber | A 10/100 Mbps link has been established. |
| | Amber flashing | 10/100 Mbps activity is occurring. |
| D/C (Duplex/Collision) | Green | The port is operating in full duplex mode. |
| | Amber | The port is operating in half duplex mode. |
| | Amber flashing | Collisions are occurring. |

**XFP port LEDs**

The following LEDs report operations and faults on XFP ports.

| LED | State | Description |
|---|---|---|
| L/A (Link Activity) | Green | An XFP transceiver is installed and a 10 Gb link has been established. |
| | Green flashing | An XFP transceiver is installed and link activity is occurring. |
| XFP | Green | An XFP transceiver is installed and enabled. No XFP is installed if this light is off. |
| | Amber | An XFP transceiver is installed but not operating. |
| | Amber flashing | The installed XFP transceiver has a transmission fault. |

**SFP port LEDs**   The following LEDs report operations and faults on SFP ports.

| LED | State | Description |
|---|---|---|
| L/A<br>(Link Activity) | Green | A 1000 Mbps link has been established on uplink ports on these switches:<br>AT-8948<br>x900-48FE<br>x900-48FS |
| | Green flashing | Full duplex activity is occurring at 1000 Mbps on uplink ports on these switches:<br>AT-8948<br>x900-48FE<br>x900-48FS |
| | Off | An SFP is installed but a link has not been established on Uplink ports on these switches:<br>AT-8948<br>x900-48FE<br>x900-48FS |
| SFP | Green | An SFP transceiver is installed and a link has been established on:<br>AT-9900 series<br>x900-12XT/S<br>x900-24XT<br>x900-24XT-N<br>x900-24XS<br>x900-48FS switch ports<br>Not valid for uplink ports on AT-8948, x900-48FE or x900-48FS switches. |
| | Green flashing | An SFP transceiver is installed and a link activity is occurring on the following:<br>AT-9900 series<br>x900-12XT/S<br>x900-24XT<br>x900-24XT-N<br>x900-24XS<br>x900-48FS switch ports<br>Not valid for uplink ports on AT-8948, x900-48FE or x900-48FS switches. |
| | Amber | An SFP transceiver is installed but a link has not been established. |
| | Amber flashing | An SFP transceiver is installed but there is a transmission fault. |

**System LEDs**   The following LEDs report operations and faults on the switch.

| LED | State | Description |
|-----|-------|-------------|
| PSU 1 and PSU 2 | Green | The PSU is installed and supplying power to the switch. The voltage output is within specification. |
| | Red | One of the following: <br> The PSU is installed in the switch, and a fan has failed or the PSU has exceeded its recommended temperature threshold. <br> A FOM is installed in the switch and a fan has failed. Note that the SwitchBlade x908 switches do not support FOMs. <br> The bay is empty. Applies to AT-8948, AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS switches since they require a FOM when only one PSU is installed. <br> Dual PSUs are installed, but the PSU is not receiving power. |
| | Off | A FOM is installed and operating at an acceptable speed. <br> For the AT-9924T, x900-48FE, x900-48FS, and SwitchBlade x908 switches, a blanking plate is installed. |
| POWER | Green | The PSU is operating and supplying power to the switch. The voltage output is within specification. Valid for the x900-12XT/S. |
| Fault | Red | The switch or management software is malfunctioning. This LED lights and then turns off after hardware initialises. |
| | Red flashing | The following flash sequences indicate a hardware-related fault. After sequences of two or more flashes, the LED stops briefly, then repeats the sequence. If multiple faults occur, the LED flashes each sequence in turn, stops briefly, then repeats the sequences. |
| | 1 Flash | One or more heatsink fans has failed or is operating below the recommended speed. |
| | 2 Flashes | For SwitchBlade x908 switches, one or both of the chassis fans are not installed, or the fans are operating below the recommended speed. |
| | 3 Flashes | For AT-9924T, AT-9924SP, AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS switches, the ability to monitor temperature and fans has failed, and it cannot report whether they are in the supported ranges. |
| | 4 Flashes | For switches running the AlliedWare Plus operating system, an XEM failed to initialise or is incompatible. |
| | 6 Flashes | The switch's temperature has exceeded the recommended threshold. |
| | Slow flashing at startup | The SDRAM (DIMM) has not been detected. Does not apply to AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches. |
| | Rapid flashing at startup | The SDRAM (DIMM) is not compatible with the switch. Does not apply to AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, or SwitchBlade x908 switches. |
| CF | Green flashing | The CompactFlash memory card is active and should not be ejected. The card can be safely ejected when the LED remains off. Valid for AT-8948, x900-48FE, x900-48FS, AT-9924T, and AT-9924SP switches. |
| SD | Green flashing | The Secure Digital memory card is active and should not be ejected. The card can be safely ejected when the LED remains off. Valid for the AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches. |

**Stacking LEDs**     The following LEDs report stacking operations and faults on the
SwitchBlade x908 switch and the XEM-STK expansion module.

| LED | State | Description |
| --- | --- | --- |
| Port 1 and Port 2 | Green | A link has been established. |
| | Amber slow flashing | The link has a transmission fault. |
| Status | Green | The switch is the stack master. |
| | Amber | The switch is a stack member. |
| | Green flashing | The switch is in the process of learning the stack topology and selecting the stack master. |
| | Off | The switch is not a stack member. |
| numeric ID (XEM-STK only) | 1 to 8 | Numeric ID of the stack member. |
| | Off | The switch is not a stack member. |

# Management Ports

The following management ports let you configure, monitor, and upgrade the switch:

■ **RS-232 Terminal Port**

■ **Out-of-Band Ethernet Management Port**

## RS-232 Terminal Port

The RS-232 ASYN0/CONSOLE port is standard for the x900 series switches and SwitchBlade x908, and connects them to a management device for initial configuration. This port allows the software on the switch to be accessed from a terminal or a PC running terminal emulation software.

The ASYN0/CONSOLE port has an RJ-45 socket with an industry recognised pinout. This requires using a straight-through RJ-45 cable with an RJ-45 DB9 connector when the switch is connected to a terminal or PC. The socket is wired as a DTE and the pin layout is shown in the following table. Pins a re numbered from right to left

| Pin | Role |
| --- | --- |
| 1 | RTS |
| 2 | DTR (DSR and DTR are connected but have no other internal connection) |
| 3 | TXD |
| 4 | GND |
| 5 | GND |
| 6 | RXD |
| 7 | DSR (DTR and DSR are connected but have no other internal connection) |
| 8 | CTS |

## Out-of-Band Ethernet Management Port

The out-of-band 10/100/1000 Mbps Ethernet port (Eth0) is dedicated to management traffic on the following switches:

■ AT-9924Ts

■ x900-12XT/S

■ x900-24X series

■ SwitchBlade x908

Use the management port for initial configuration and on-going management tasks. For remote access, use the default IP address, 192.168.242.242. This port is reserved for management **only;** the switch does not transmit frames between this port and switch ports.

On the SwitchBlade x908, the management port can also be used to create a stack resiliency link when the switch is part of a virtual chassis stack. For more information about resiliency links, see the *Stacking Introduction* chapter of the *AlliedWare Plus™ Operating System Software Reference*.

# Network Ports

The following ports are on the switches and XEMs:

■ **SFP Ports**

■ **XFP Ports**

■ **RJ-45 Ports**

■ **Stacking Ports**

## SFP Ports

SFP transceivers are compact, hot-swappable, and high speed. Different fibre and copper SFP transceivers are supported so that you can interchange port types to meet changing network requirements. SFP transceivers must be purchased separately. For the latest list of approved SFP transceivers, contact your authorised Allied Telesis distributor or reseller.

**Approved SFPs**   SFP modules in the following table are approved for use with these devices:

■ AT-8948, x900-48FE, x900-48FS, and AT-9924T switches

■ AT-9924SP and x900-24XS switches

■ AT-A61 100/1000BASE-X SFP expansion module for the AT-9924Ts switch

■ XEM-12S 100/1000BASE-X SFP expansion module for x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches.

| Model | Media Type | Description |
|---|---|---|
| AT-SPTX | 10/100/1000BASE-T | Copper, 100m at 1000Mbps, RJ-45 connector (except for AT-9924SP). |
| AT-SPFXBD-13[1] | 100BASE-BX | Bi-Di (1310nm Tx, 1550 nm Rx) SM fibre up to 15 km. |
| AT-SPFXBD-15[1] | 100BASE-BX | Bi-Di (1550nm Tx, 1310nm Rx) SM fibre up to 15 km. |
| AT-SPFX/2 | 100BASE-FX | 1310nm MM fibre up to 2km. |
| AT-SPFX/15 | 100BASE-FX | 1310nm SM fibre up to 15km. |
| AT-SPFX/40 | 100BASE-FX | 1310nm SM fibre up to 40km. |
| AT-SPSX | 1000BASE-SX | 850nm, 2m to 500m with 50/125$\mu$m MM fibre, 2m to 275m with 62.5/125$\mu$m MM fibre, LC connector. |
| AT-SPLX10 | 1000BASE-LX | 1310nm, 2m to 10km with 9$\mu$m SM fibre, 2m to 550m with 50$\mu$m MM fibre, 2m to 550m with 62.5$\mu$m MM fibre, LC connector. |
| AT-SPLX40 | 1000BASE-LX | 1310nm SM fibre up to 40km, LC connector |
| AT-SPLX40/1550 | 1000BASE-LX | 1550nm SM fibre up to 40km, LC connector. |
| AT-SPZX80 | 1000BASE-ZX | 1550nm, 80km with 9$\mu$m SM fibre, LC connector. |
| AT-SPZX80/xxxx[1] where xxxx is: 1610, 1590, 1570, 1550, 1530, 1510, 1490, 1470, 1310 | 1000BASE-ZX CWDM | 1610nm to 1470nm (20nm intervals) and 1310nm, 80km with 9 micron SM fibre, LC connector. |

1. Both ends of an individual fibre must use SFPs of a compatible wavelength.

**Speed and duplex modes**

Speed and duplex settings differ depending on the type of SFP transceiver installed in the port.

The following table shows supported speeds for copper and fibre SFPs.

| Port Type | Copper (Mbps) | | | Fibre (Mbps) | |
|---|---|---|---|---|---|
| | 1000 | 100 | 10 | 1000 | 100 |
| AT-8948 uplink ports | ✓ | | | ✓ | |
| x900-48FE uplink ports | ✓ | | | ✓ | |
| x900-48FE-N uplink ports | ✓ | | | ✓ | |
| x900-48FS uplink ports | ✓ | | | ✓ | |
| x900-48FS switch ports | | | | | ✓ |
| AT-9924T switch ports | ✓ | ✓ | ✓ | ✓ | |
| AT-9924SP switch ports | ✓ | ✓ | ✓ | ✓ | ✓[1] |
| x900-12XT/S combo ports | ✓ | | | ✓ | ✓ |
| x900-24XS switch ports | ✓ | ✓ | ✓ | ✓ | ✓ |
| XEM-12S switch ports | ✓ | ✓ | ✓ | ✓ | ✓ |

1. Requires M4 revision of hardware. Use the **show system** command to check the hardware revision level.

The following table shows supported duplex and autonegotiation options for copper and fibre SFPs.

| Port Type | Copper | Fibre |
|---|---|---|
| AT-8948 uplink ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>1000 Mbps full duplex |
| x900-48FE uplink ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>1000 Mbps full duplex |
| x900-48FE-N uplink ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>1000 Mbps full duplex |
| x900-48FS uplink ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>1000 Mbps full duplex |
| x900-48FS switch ports | n/a | no autonegotiation<br>100 Mbps half/full duplex |
| AT-9924T switch ports | autonegotiate<br>10 Mbps half/full duplex<br>100 Mbps half/full duplex<br>1000 Mbps half/full duplex | autonegotiate<br>1000 Mbps full duplex |
| AT-9924SP switch ports | autonegotiate<br>10 Mbps half/full duplex<br>100 Mbps half/full duplex<br>1000 Mbps half/full duplex | no autonegotiation<br>100 Mbps half/full duplex<br><br>autonegotiate<br>1000 Mbps full duplex |
| x900-12XT/S combo ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>100 Mbps half/full duplex<br>1000 Mbps half/full duplex |

| Port Type (cont) | Copper (cont) | Fibre (cont) |
|---|---|---|
| x900-24XS switch ports | autonegotiate<br>10 Mbps half/full duplex<br>100 Mbps half/full duplex<br>1000 Mbps half/full duplex | no autonegotiation<br>100 Mbps half/full duplex<br>autonegotiate<br>1000 Mbps full duplex |
| XEM-12S switch ports | autonegotiate<br>1000 Mbps half/full duplex | autonegotiate<br>100 Mbps half/full duplex<br>1000 Mbps half/full duplex |

An error message is displayed when an SFP port cannot operate at the specified speed or duplex mode.

When using SFP ports 1 to 4 on AT-9924T switches, the corresponding RJ-45 ports (1 to 4) are disabled. However, when the SFP transceiver is removed, the RJ-45 port becomes operational again.

**Inserting and removing an SFP transceiver**

The SFP transceiver must be inserted the correct way in the socket, which varies depending on whether the switch has a single or dual row of sockets. For example, x900-48FE switches have single-row sockets, but AT-9900 series switches have a dual row. See the example of dual-row sockets for a copper SFP transceiver in the figure below. Notice the varying position of the release lever.

**Warning** Do not look into SFP cables or transceivers. Even disconnected fibres and connectors can emit invisible laser radiation.
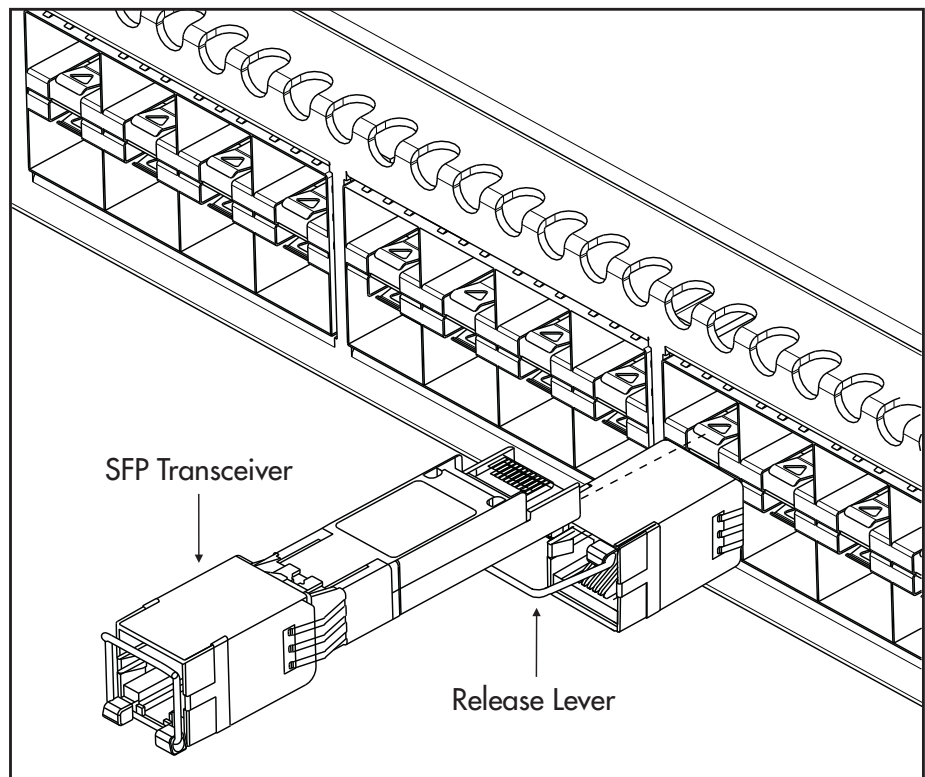


Slide the transceiver into the SFP socket, and firmly press it until it engages. To remove it, first release it by gently pulling the release lever, and then pull the transceiver out of the socket. **Never** force a transceiver into or out of a socket.

## XFP Ports

The following XFPs are approved for use with the AT-A60 and XEM-1XP expansion modules. The AT-A60 is supported on the AT-9924Ts switch. The XEM-1XP is supported on the x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches.

| Model | Media Type | Description |
| --- | --- | --- |
| AT-XPSR | 10GBASE-SR | 850nm short-haul transmission, 300m with MM fibre. |
| AT-XPLR | 10GBASE-LR | 1310nm medium-haul transmission, 10km with SM fibre |
| AT-XPER40 | 10GBASE-ER | 1550nm long-haul transmission, 40km with SM fibre. |

## RJ-45 Ports

The following devices have RJ-45 ports:

■ AT-8948 and x900-48FE switches

■ AT-9924T, AT-9924T, and x900-24XT switches

■ AT-A62 expansion module for the AT-9924Ts switch

■ XEM-12T expansion module for the x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches

These ports feature the following:

■ gigabit ports that support speeds of 10/100/1000Mbps

■ status LEDs

■ Separate packet buffer memory

■ cable fault detection and distance-to-fault diagnostics are available on switches running the AlliedWare operating system (see the *Test Facility* chapter in the *AlliedWare® Operating System Software Reference* for the switch)

## Stacking Ports

The x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches support the XEM-STK virtual chassis stacking module which features:

■ two high-speed stacking connections

■ LEDs showing port and stack member status

■ numeric display identifying status of stack members

■ Select button to reset the stack ID of the switch to 1

The SwitchBlade x908 switch also has two fixed stacking ports on its rear panel, which feature:

■ two high-speed stacking connections

■ LEDs showing port and stack member status

# Expansion Options

Optional expansion modules make the AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches some of the most flexible units available. They provide economical combinations of speed and port density.

The AT-9924Ts supports the following expansion modules:

- AT-A60, 1 x 10 GbE XFP port
- AT-A61, 12 x SFP ports
- AT-A62, 12 x RJ-45 ports

The x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches support:

- XEM-1XP, 1 x 10 GbE XFP port
- XEM-12S, 12 x SFP ports
- XEM-12T, 12 x RJ-45 ports
- XEM-STK, 2 stacking ports (when running the AlliedWare Plus operating system)

For more information about AT-A6x expansion modules, see the *AT-9900s Series Switch Expansion Module Installation Guide*.

For more information about XEM expansion modules, see the *x900 Series Switch and SwitchBlade® x908 Expansion Module Installation Guide*.

For the latest list of approved transceiver modules, contact your authorised Allied Telesis distributor or reseller.

# Memory Options

The following memory expansion options are available:

- **CompactFlash Card**

- **Secure Digital (SD) Card**

- **Dual In-line Memory Module (DIMM)**

## CompactFlash Card

CompactFlash (CFlash) cards are a memory expansion option for the following switches running the AlliedWare operating system:

- AT-8948

- x900-48FE

- x900-48FS

- AT-9924T

- AT-9924SP

Data such as releases, patches, and configurations can be stored on these cards, and files can be manipulated with the command line interface (CLI). However, release and patch files cannot be run directly from the card, but must be loaded into either NVS or on-board flash.

**Important** Anyone with a compliant reader can read CFlash cards so do not keep sensitive data on them.

**Approved CFlash card**
The CompactFlash card approved for the x900-48FE, x900-48FS, and AT-9900 series switches is AT-CF128A-00 128MBytes. Other cards are unlikely to work with the switch.

**Inserting and removing a CFlash card**
You can insert the card into the CompactFlash slot at any time; it takes about two seconds to initialise. The following CLI message confirms that the card has been inserted:

```
Info (1106257): Compact flash card inserted.
```

The following message confirms that the card is ready to use:

```
Info (1106268): Compact flash card initialisation successful.
```

The following message means that the CFlash card is not compatible with the switch:

```
Info (3106300): Compact flash card initialisation
    unsuccessful.
```

**Important** When data is being written to or read from the card, the CF LED on the front panel of the switch is green. Do **not** remove the card when it is active or you will corrupt the data. Wait until the LED is off before ejecting the card.

**Displaying data about a CFlash card**
To display information about a CompactFlash card, including card size, file count, and serial number, insert the card and enter the command:

```
show cflash
```

To display cluster ranges on a card, insert the card and enter the command:

```
show cflash test
```

The following figure is an example of output from the **show cflash test** command when no test is running.

```
Clusters available for testing
        Ranges:
                [42645--61944]
        Number of free clusters  = 19300
        Number of ranges         = 1
        Number of used clusters  = 42645
```

**Testing a CFlash card**    It is important to fully test the hardware interface of the switch to the CFlash card. This test consists of reading vendor information and reading and writing to every part of the card.

To test the card, insert it in the CF slot and enter the command:

    enable cflash test start=*startnumber* end=*endnumber*

where *startnumber* and *endnumber* are positive integers within a cluster range. The end number must be higher than the start number. Cluster ranges are displayed in the output of the **show cflash test** command.

The test software reads the file allocation table and displays a list of free sectors. Sectors can be tested as single sectors or as a range. The test consists of a write/read/verify cycle.

To stop the test, use the **disable cflash test** command. To display test results while a test is in process, enter the **show cflash test** command. Also, use this command when testing is not active to display the blank clusters range on the card.

The following is example output from the **show cflash test** command when a test is running.

```
Test Progress
        Starting cluster           = 700
        Ending cluster             = 1700
        Current cluster            = 1185

        Passed clusters number     = 485
        Passed sectors  number     = 1940

        Failed clusters number     = 0
        Failed sectors  number     = 0
        Used Clusters encountered = 0

        Duration...............  4417 ms
```

Error messages are displayed when a file write fails. Failure could be because of the card being removed or an error in the card itself. For more information about these test commands and others for CFlash, see the *Managing the File System* chapter in the *AlliedWare® Operating System Software Reference*.

# Secure Digital (SD) Card

Secure Digital cards are a memory expansion option for the following switches:

- AT-9924Ts

- x900-12XT/S

- x900-24XT

- x900-24XT-N

- x900-24XS

- SwitchBlade x908

Data such as releases and configurations can be stored on SD cards, and files can be manipulated with the command line interface (CLI). On switches running the AlliedWare Plus operating system, you can boot from an SD card using the Bootloader menu. However, under normal operating conditions you cannot run release or package files directly from the SD card; they must be loaded into NVS or on-board flash.

SD cards are smaller than CompactFlash cards and have a large storage capacity. Switches accept most SD cards with various capacities. Be sure to verify operation before attempting to store data.

**Important**  Do not keep sensitive data on SD cards because anyone with a compliant reader can read them.

**Inserting and removing an SD card**

You can insert a card into the SD slot at any time. Just push the card into the slot until you feel it latch.

When data is being written to or read from the card, the SD LED on the front panel of the switch flashes green. Do not remove the card when it is active or you will corrupt the data being read or written, and may corrupt other data on the card. Wait until the LED remains off before releasing the card. To remove the card, use a press-and-release action. Avoid touching the metal contacts.

To safeguard the data, store the card immediately in its case or somewhere away from heat, humidity, or dust. Do not store it near electrostatic, electromagnetic, magnetic or radioactive fields. If necessary, clean with a soft dry cloth.

**Displaying data about an SD card**

To display information about an SD card, such as card size, file count, and volume label, insert the card.

On switches running the AlliedWare operating system, use the command:

```
show card
```

The following figure is an example of output from the **show card** command.

```
Volume label ........   SD_512
Files total size .....   13367336 bytes   (30 files)
Used space ..........   13434880 bytes
Free space ..........  497754112 bytes
Total space ..........  511188992 bytes
```

You can also use the **show card** command to verify whether the switch recognises the card. For more information about this command, see the

*Managing the File System* chapter in the *AlliedWare® Operating System Software Reference*.

On switches running the AlliedWare Plus operating system, use the commands:

```
awplus#show file systems

awplus#dir card:/
```

**Testing the slot**   On switches running the AlliedWare operating system, you can test the SD card slot on front of the switch to verify that the hardware does the following:

■   detects the presence of a card

■   detects whether a card has been exchanged

■   detects write-protection on a card

■   transfers data to and from a card

The test does not write data to the card or harm existing data. To test the slot, use the command:

```
enable test device=card type=slot
```

Output is sent to the management asynchronous port. For more information about testing the card slot, see the *Test Facility* chapter in the *AlliedWare® Operating System Software Reference*.

# Dual In-line Memory Module (DIMM)

Synchronous DRAM (SDRAM) is provided by a single DIMM. Only DIMMs supplied by Allied Telesis have been tested and approved for use. **Using unapproved DIMMs may cause unreliable operation and will invalidate the warranty for the switch**.

The following SDRAM options are supported:

- AT-8948, x900-48FE, x900-48FS, AT-9924T, and AT-9924SP switches ship with 256MBytes of SDRAM, expandable to 512MBytes with a DIMM.

- AT-9924Ts, x900-12XT/S, x900-24XT, x900-24XT-N, and x900-24XS switches are shipped with a 512MBytes of DDR SDRAM, expandable to 1GByte.

- AT-9924Ts, x900-24XT, and x900-24XS switches are shipped with a 512MBytes SDRAM DIMM; no upgrades are available.

- SwitchBlade x908 switches are shipped with a 512MBytes DDR SDRAM SODIMM, expandable to 1 GByte. The SODIMM memory is not interchangable with the DIMM memory in other switches.

**Warning**  Only authorised service personnel should install DIMMs. Opening the switch's lid may cause personal injury from electric shock and could damage the switch.

**Verifying DIMM installation**

The switch is unlikely to boot unless the DIMM is correctly installed. You will not be able to issue any diagnostic commands, and will have to rely solely on LED fault codes.

If the switch boots up but you suspect the DIMM is malfunctioning, display system information by using the **show system** command. See "Verifying installation" on page 39 for output.

The size of SDRAM is in the memory section of the output. If the SDRAM size is less than the size of DIMM that has been installed, then the switch has not detected the DIMM. The most likely cause is that the DIMM connector is not correctly plugged into the slot.

Record the switch's serial number and revision details for later reference. If you have questions or problems with the DIMM at any time, contact your authorised Allied Telesis distributor or reseller and supply these serial numbers.

# Cables

This section describes the following:

- **RS-232 Terminal and Modem Cables**
- **Cables for RJ-45 Ethernet LAN Interfaces**
- **Cables for Stacking**
- **Cable Guidelines**
- **Troubleshooting Cables**

## RS-232 Terminal and Modem Cables

The terminal and modem cables described in this section are:

- RS-232 RJ-45 to DB9 female terminal cable
- DCE RS-232 terminal port RJ-45 to DB9 male modem cable

Figures in this section show pin wiring diagrams to connect a standard VT100 compatible terminal or modem to ASYN0.

**RJ-45 to DB9 female terminal cable**



```
              RJ-45                                    DB9 Female
              (to switch)                              (to terminal)

                 4 ─────────────────────────────────── 1
                 3 ─────────────────────────────────── 2
                 6 ─────────────────────────────────── 3
                 7 ─────────────────────────────────── 4
                 5 ─────────────────────────────────── 5
                 2 ─────────────────────────────────── 6
                 8 ─────────────────────────────────── 7
                 1 ─────────────────────────────────── 8
                                                        9 not connected

              Note
              This cable supplied as part number C855-84903-00.
              Now at version B.
                                                        RJ45DB9F_x900
```

**RJ-45 to DB9 male modem cable**



```
              RJ-45                              DB9 Male
           (to switch)                          (to modem)

              7 ─────────────────────────────────── 1
              6 ─────────────────────────────────── 2
              3 ─────────────────────────────────── 3
              2 ─────────────────────────────────── 4
              5 ─────────────────────────────────── 5
              4 not connected                        6 not connected
              1 ─────────────────────────────────── 7
              8 ─────────────────────────────────── 8
                                                     9 not connected
```

**Note**
Cable version 1.0

RJ45DB9M_x900
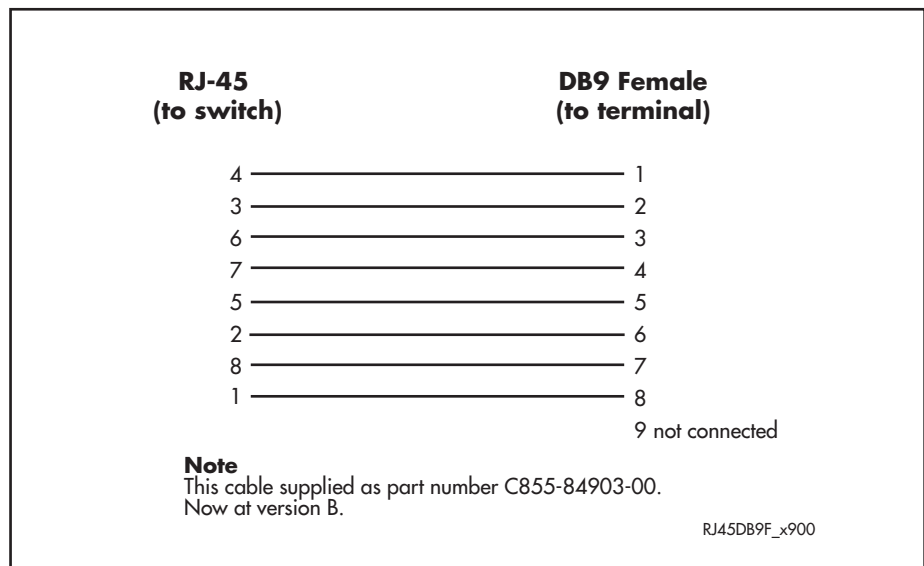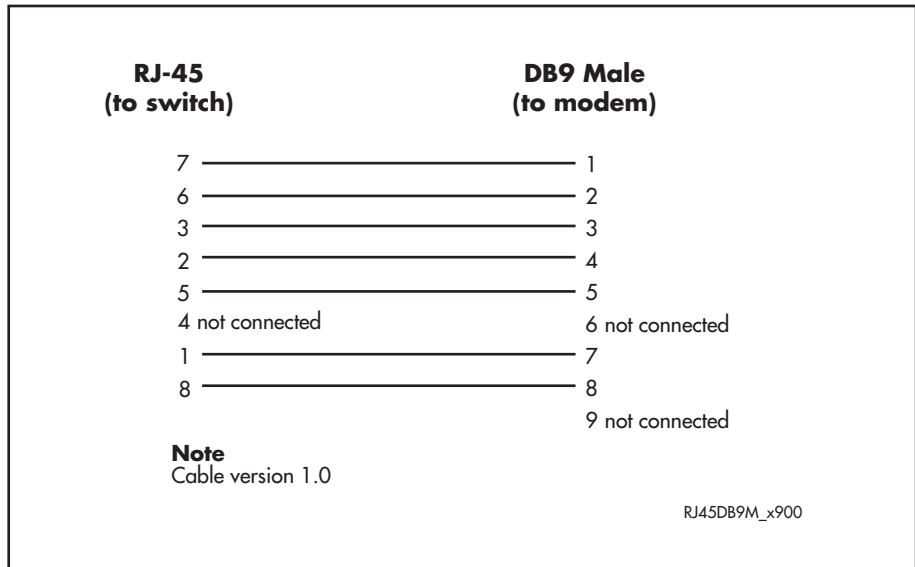
For more information on pin assignments for the RS-232 port, see "RS-232 Terminal Port" on page 19.

# Cables for RJ-45 Ethernet LAN Interfaces

A twisted pair cable with four pairs and RJ-45 connectors must be used for 10BASE-T/100BASE-TX/1000BASE-T connections.

**Caution**  Do not plug a phone jack into an RJ-45 switch port because you could damage the switch. Use only twisted pair cables with RJ-45 connectors.

**Pin assignments**  Each pair of twisted pair cables is identified by related colours. For example, one wire might be red and the related wire would be red-and-white stripe. An RJ-45 connector must be fitted to both ends of the cable. The following diagram shows RJ-45 connectors and the pin layout.



```
1        8        8        1
```

rjpin
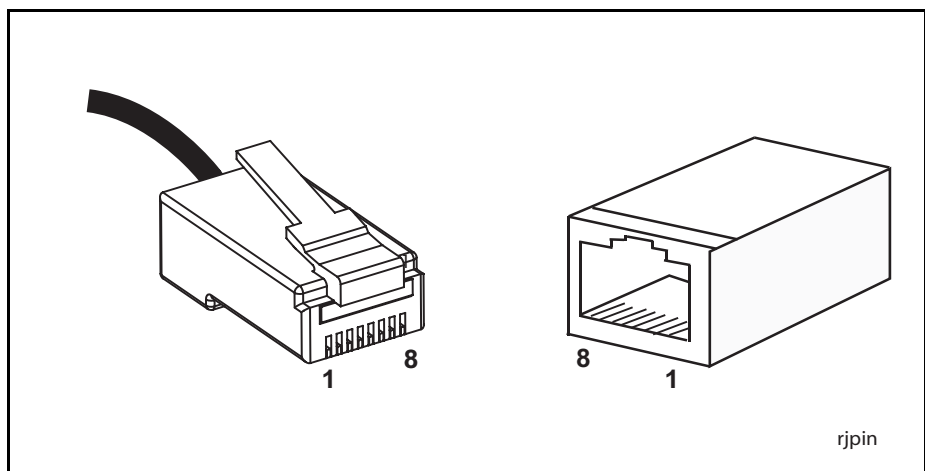
**1000BASE straight-through cable**

For 1000BASE network connections, all four pairs are used and the cable is wired in a straight-through configuration. You can use this cable with the software test facility to test 1000BASE network ports. The following table lists pin assignments for a 10/100/1000BASE-T RJ-45 four pair straight-through cable.

| End 1 | | End 2 | |
|-------|------|-------|------|
| Pin | Pair | Pin | Pair |
| 1 | Pair 1+ | 1 | Pair 1+ |
| 2 | Pair 1- | 2 | Pair 1- |
| 3 | Pair 2+ | 3 | Pair 2+ |
| 6 | Pair 2- | 6 | Pair 2- |
| 4 | Pair 3+ | 4 | Pair 3+ |
| 5 | Pair 3- | 5 | Pair 3- |
| 7 | Pair 4+ | 7 | Pair 4+ |
| 8 | Pair 4- | 8 | Pair 4- |

**1000BASE crossover cable**

For 1000BASE test cables, all four pairs are used and the cable is wired in either a crossover or straight-through configuration. The following table lists pin assignments for a 10/100/1000BASE-T RJ-45 four pair crossover cable.

| End 1 | | End 2 | |
|-------|------|-------|------|
| Pin | Pair | Pin | Pair |
| 1 | Pair 1+ | 1 | Pair 2+ |
| 2 | Pair 1- | 2 | Pair 2- |
| 3 | Pair 2+ | 3 | Pair 1+ |
| 6 | Pair 2- | 6 | Pair 1- |
| 4 | Pair 3+ | 4 | Pair 4+ |
| 5 | Pair 3- | 5 | Pair 4- |
| 7 | Pair 4+ | 7 | Pair 3+ |
| 8 | Pair 4- | 8 | Pair 3- |

# Cables for Stacking

Cables for virtual chassis stacking using the XEM-STK expansion module or the rear panel stacking connectors on the SwitchBlade x908 must be purchased separately from your authorised Allied Telesis distributor or reseller. See for a list of part numbers.

# Cable Guidelines

The following table lists port, connector, and cable combinations for switches and expansion modules.

| Switch / Expansion module | Port Type | Connector Type | Cable Type[1] | Max Cable Length |
|---|---|---|---|---|
| AT-8948<br>x900-48FE<br>x900-48FE-N | 10BASE-T/<br>100BASE-TX | RJ-45 | CAT5 | 100m Max<br>120m Max |
| AT-9924T<br>AT-9924Ts<br>x900-12XT/S<br>x900-24XT<br>x900-24XT-N<br>AT-A62<br>XEM-12T | 10BASE-T/<br>100BASE-TX/<br>1000BASE-T | RJ-45 | CAT5<br>CAT5<br>CAT5E | 100m Max<br>120m Max<br>100m Max |
| x900-48FS | 100BASE-X | Varies with SFP | Refer to documentation with SFP | Refer to documentation with SFP |
| AT-8948<br>x900-48FE<br>x900-48FE-N<br>x900-48FS<br>AT-9924T<br>AT-9924SP<br>AT-A61<br>x900-12XT/S<br>x900-24XS<br>XEM-12S | 1000BASE-X | Varies with SFP | Refer to documentation with SFP | Refer to documentation with SFP |
| AT-A60<br>XEM-1XP | 10GBASE | | Refer to documentation with XFP | Refer to documentation with XFP |
| XEM-STK | Stacking | PCIe x8 | AT-XEM-STK-CBL0.5<br>AT-XEM-STK-CBL2.0 | 0.5m<br>2.0m |
| SwitchBlade x908 | Stacking | PCIe x16 | AT-HS-STK-CBL1.0 | 1.0m |

1. Refer to the IEEE Standard 802.3 for additional cable information

# Troubleshooting Cables

**Cable test**     The virtual cable test facility diagnoses cable faults and the approximate
distance to them on Gigabit Ethernet RJ-45 ports for the following switches
running the AlliedWare operating system:

- AT-9924T

- x900-24XT

- x900-24XT-N

- x900-24XS

See "Test Facility" on page 56 for more information or the *Test Facility* chapter
in the *AlliedWare® Operating System Software Reference*. Not all copper SFPs
support this feature; however, those listed in "SFP Ports" on page 20 do
support it.

The virtual cable test facility is not supported in the AlliedWare Plus operating
system.

**Cable lengths**     Approximate cable lengths are reported for gigabit Ethernet RJ-45 ports on the
following switches running the AlliedWare operating system:

- AT-9924T

- x900-24XT

- x900-24XT-N

- x900-24XS

Cable length is reported after the link is established. To check the length, use
the **show switch port** command described in the *Switching* chapter in the
*AlliedWare® Operating System Software Reference*. The Cable Length parameter in
the output of this command can be one of the following values:

- <50m

- 50–80m

- 80–110m

- 110–140m

- >140m

- - (either the port link is down, or the port is operating at 10 Mbps or
  100 Mbps)

Cable length reporting is not supported in the AlliedWare Plus operating
system.

# Power Supply Units (PSUs) and Fans

Depending on the model, single or dual PSUs can be fitted on the rear of the switch, as either AC or DC. Some models also have fan-only modules (FOM) and chassis fans.

| Model | Description |
|---|---|
| AT-8948<br>x900-48FE<br>x900-48FS<br>AT-9924T<br>AT-9924SP | Supports 1 PSU and 1 FOM, or 2 PSUs.<br><br>A second PSU is available for optional redundancy. When two are fitted, they must be the same type of current, either AC or DC.<br><br>When there is just one PSU in an AT-9900 series switch, it must be in Bay 2 for optimised cooling. |
| x900-12XT/S | Supports 1 fixed PSU. |
| AT-9924Ts<br>x900-24XT<br>x900-24XS | Supports 1 PSU and 1 FOM, or 2 PSUs.<br><br>A second PSU is available for optional redundancy. |
| SwitchBlade x908 | Supports 2 System PSUs and 2 chassis fan modules. |
| AT-PWR01 | AC or DC power supply unit. |
| AT-PWR02 | AC power supply unit. |
| AT-PWR05 | AC power supply unit. |
| AT-FAN01 | Fan-only module (FOM). |
| AT-FAN03 | Chassis fan module. |

Each PSU and FOM contains an EPROM chip that contains information, such as the type of module, serial number, and revision of the PSU. This information is available through the command line interface (CLI).

How to install a PSU or fan in the switch is described in the *Removable Power Supply and Fan Installation Guide*.

## PSU and FOM installed in an x900-24XT switch
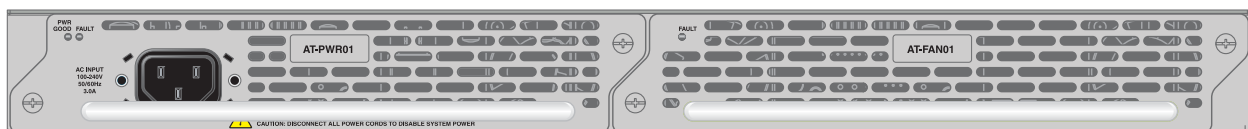


## PSUs and chassis fans installed in a SwitchBlade x908

**Approved PSUs and fans**
The following table shows which models of PSUs and fans are appropriate for individual switches.

| Switch | PWR01 | PWR02 | PWR05 | FAN01 | FAN03 |
|---|---|---|---|---|---|
| AT-8948 | ✓ | | | ✓ | |
| x900-48FE | ✓ | | | ✓ | |
| x900-48FS | | ✓ | | ✓ | |
| AT-9924T | ✓ | | | ✓ | |
| AT-9924SP | ✓ | | | ✓ | |
| AT-9924Ts | ✓ | | | ✓ | |
| x900-24XT | ✓ | | | ✓ | |
| x900-24XS | ✓ | | | ✓ | |
| SwitchBlade x908 | | | ✓ | | ✓ |

**PWR01 AC and DC PSUs**
Key features are:

- Hot-swappable and load sharing
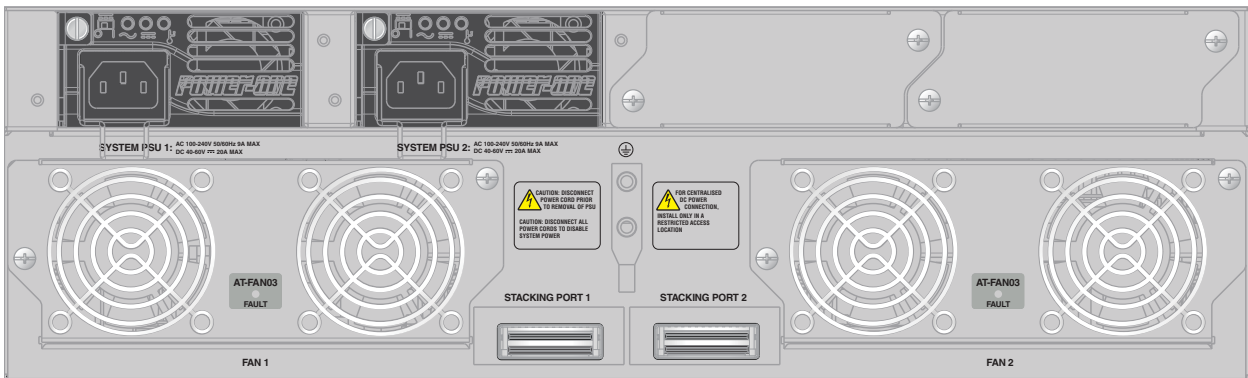- Physical dimensions
  - Height: 40.9 mm
  - Width: 193 mm
  - Depth: 130 mm
- Do not combine PWR01 and PWR02 PSUs in the same switch.
- For the x900-24XT and x900-24XS running AlliedWare Plus Operating System you may combine AC and DC PSUs in the same switch. Do not combine AC and DC PSUs in the same switch for any other models.

**Warning** When combining AC and DC PSUs in the same switch, take special care, to avoid earth loops between the AC and DC power supply systems. If you are unsure about correct procedures, contact your authorised Allied Telesis distributor or reseller.

AC model:

- Universal 100–240 VAC 47/63 Hz input
- Maximum continuous current draw: 3.0 A at 230 V at full-rated load
- Maximum inrush surge current (cold start at 25ºC/77ºF): 70 A at 240 V, 32 A at 115 V
- Fuse rating for FH101 and FH102: 250 V, 5 A

**Warning** Double pole/neutral fusing. Electric shock is possible since there are dual primary fuses, one on the phase circuit and one on the neutral circuit. If the neutral opens, the phase may still be live.

DC model:

- 40 V to 60 V, 48 V nominal
- Supports either positive grounded or negative grounded operation
- Maximum continuous current draw: 3.9 A at 40 V
- Maximum standby current: 100 mA

■   Run/Standby switch

The following LEDs report operations and faults on the PWR01 PSU.

| LED | State | Description |
|-----|-------|-------------|
| PWR | Green | A PSU is installed in the switch and is delivering power. |
| Fault | Red | There is either a fan failure, or the temperature has exceeded its limit of 70°C (158°F). |

**PWR02 AC PSU**   Key features are:

■   Hot-swappable and load sharing

■   Physical dimensions

•   Height: 40.9 mm

•   Width: 193 mm

•   Depth: 130 mm

■   Do not combine PWR01 and PWR02 PSUs in the same switch.

■   Universal 100–240 VAC 47/63 Hz input

■   Maximum continuous current draw: 2.2 A at 100 V, 1.1 A at 230 V at full-rated load

■   Maximum inrush surge current (cold start at 25°C/77°F): 33 A at 115 V

The following LEDs report operations and faults on the PWR02 PSU.

| LED | State | Description |
|-----|-------|-------------|
| PWR | Green | A PSU is installed in the switch and is delivering power. |
| Fault | Red | There is either a fan failure, or the temperature has exceeded its limit of 70°C (158°F). |

**PWR05 AC PSU**   Key features are:

■   Hot-swappable and load sharing

■   Physical dimensions

•   Height: 40.6 mm

•   Width: 83.8 mm

•   Depth: 298.2 mm

■   Universal 100–240 VAC 50/60 Hz input

■   Maximum continuous current draw: 9 A at 85 V, 3.3 A at 230 V at full-rated load

■   Maximum inrush surge current (cold start at 25°C/77°F): 34 A peak at 230 V

The following LEDs report operations and faults on the PWR05 PSU

.

| LED | State | Description |
| --- | --- | --- |
| ~ | Green | AC input voltage is within 90–264VAC, 47–63Hz. |
|  | Off | AC input voltage is outside the acceptable range. |
| --- | Green | DC output voltage is within 12V +/- 10%. |
|  | Off | DC output voltage is outside the acceptable range. |
| ⊔̣ | Red | A fault has occurred. There is either a fan failure, or the temperature has exceeded its limit of 70°C (158°F). |
|  | Off | No fault conditions detected. |

**x900-12XT/S fixed AC PSU**

Key features are:

■  Universal 100–240VAC 50/60 Hz input

■  Maximum continuous current draw: 2A at 90V, 0.8A at 230V at full-rated load

■  Maximum inrush surge current (cold start at 25º C/77º F): 33A peak at 115VAC

A single LED on the front panel of the switch reports operations and faults on the PSU. See "System LEDs" on page 17 for more information.

# IPv6 Accelerator Card

An optional AT-ACC01 network processor accelerator card accelerates IPv6 unicast and multicast routing in hardware on AT-8948 switches. For full functionality, 512MBytes SDRAM must be installed in the switch.

**How the card works**

When the switch receives an IPv6 packet to route, the packet is sent to the network processor accelerator card. The card processes the packet and sends it out the correct port with appropriate alterations to the packet. Other IPv6 functions are passed to software, such as routing protocol control packets, encryption, authentication, and hop-by-hop headers.

No configuration is necessary for the accelerator card to function; the card is enabled at installation. If you disable the card (using software), the switch handles IPv6 routing in the software.

Use the hardware filter and QoS commands to enable Quality of Service (QoS) functionality on the accelerator card. For information about QoS functionality and hardware filters, see the *Quality of Service* and *Switching* chapters in the Software Reference.

**Warning**  Only authorised service personnel should install a network processor accelerator card. Opening the switch's lid may cause personal injury from electric shock, could damage the switch, and will invalidate the product warranty.

**Verifying installation**

To confirm that the network processor accelerator card is installed and operating correctly, check that the switch has recognised it. Turn on the switch and enter the **show system** command to display system information. The following figure is an example of output from the **show system** command for the AT-8948 model.

```
Switch System Status          Time 14:50:14 Date 18-Apr-2007
Board      ID Bay  Board Name     Host Id Rev  Serial number
-------------------------------------------------------------
Base       201      AT-8948         0 P4-3       58823566
Accel      214      AT-ACC01        0 M1-1       61101175
PSU        212  1   AT-PWR01-AC     0 P3-0       58494001
-------------------------------------------------------------
Memory -   DRAM :131072 kB    FLASH : 32768 kB
-------------------------------------------------------------
SysDescription
Allied Telesis AT-8948 version 2.8.1-06 30-Jan-2007
SysContact


SysLocation


SysName


SysDistName


SysUpTime
26588  ( 00:04:25 )
Boot Image      : 89_120.fbr size 1038496 30-May-2006
Software Version: 2.8.1-06 30-Jan-2007
Release Version : 2.8.1-00 23-Jun-2006
Patch Installed : NONE
Territory       : europe
Country         : none
Help File       : help.hlp


PSU1: (AC)    Fan: Normal    Temp: Normal    Power: Normal


Current temperature : Normal


Current accelerator card temperature: Normal


FAN
-----------------
Main fan              Normal
Accelerator fan 1     Normal
Accelerator fan 2     Normal
-----------------

Configuration
Boot configuration file: flash:boot.cfg (exists)
Current configuration: flash:boot.cfg

Security Mode   : Disabled
```

The first section of the output shows information about boards installed in the switch. There are details about the switch base card, the accelerator card if installed, and the type of power supply unit or fan-only module. Both the part names and serial numbers of the base card and accelerator card are displayed.

Record the details of the base card and the network processor accelerator card for later reference. If you have questions or problems with the network

processor accelerator card at any time, contact your authorised Allied Telesis distributor or reseller and supply the serial numbers for them.

If there is no entry for the accelerator card, then the switch's boot process has not detected the card. The most likely cause is that the card is incorrectly plugged into the slot on the switch's base board.

**Displaying information about the card**

To display information about the status and memory of a network processor accelerator card on AT-8948 switch, use the **show switch accelerator** command.

The following figure is an example of output from the **show switch accelerator** command.

```
Switch Accelerator Configuration
-------------------------------------------------
Hardware Type .............. AT-ACC01
Mode ...................... IPv6 Acceleration
Status .................... IPv6 active
Search memory size ........ 128 Mb
Counter memory size ........ 2 Mb
-------------------------------------------------
```

# Using AT-TFTP Server

This section explains how to access and use the AT-TFTP Server. You can transfer configuration files as well as download software upgrades with AT-TFTP Server.

1.  If AT-TFTP Server has not been installed, install it now. You can download it from www.alliedtelesis.com/support/software/.

    Select AT-TFTP Server from the Start > Programs > Allied Telesis > AT-TFTP Server menu.

2.  To set preferences for the AT-TFTP Server, select Options from the File menu to display the Set Options dialog box.
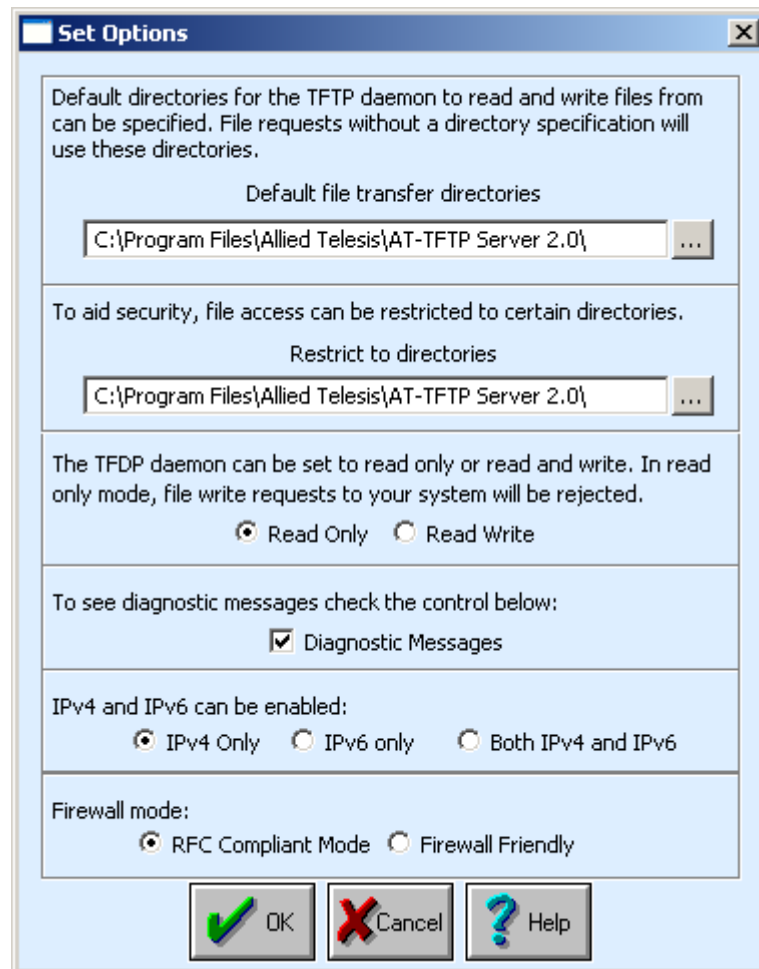


- **Default file transfer directories:** one or more directories that AT-TFTP Server will read from or write to, for requests that do not include a directory specification. Separate multiple directories with semi-colons (";").

- **Restrict to directories:** To prevent unauthorised access to private directories, AT-TFTP Server will only use these directories, even if requests explicitly reference other directories. Separate multiple directories with semi-colons (";").

- **Read Only/Read Write:** For added security, select "Read only" to prevent AT-TFTP Server writing files to the PC. If you wish to use the PC to archive scripts created using the **create config** command, you must enable the "Read Write" option.

- **Diagnostic Messages:** Check "Diagnostics Messages" to display additional diagnostic messages in the AT-TFTP Server window when debugging file transfers.

- **IPv4 and IPv6:** Choose whether AT-TFTP Server should respond to TFTP requests received via IPv4 only, IPv6 only, or both IPv4 and IPv6.

- **Firewall mode:** select "RFC Compliant Mode" to allow multiple files to be transferred simultaneously, or "Firewall Friendly" to force all TFTP traffic to use port 69 as either the source or destination port. This will only allow one file to be transferred at a time.

- Click the OK button when you finish.

3.  To download a file from AT-TFTP Server:

    On switches running the AlliedWare® operating system, at the command line interface type the following command:

    ```
    load method=tftp file=filename server=ipadd dest=flash
    ```

    On switches running the AlliedWare Plus™ operating system, enter Privileged Exec mode and enter the command:

    ```
    awplus#copy tftp://ipadd/filename flash
    ```

    *filename* is the name of the file to download and *ipadd* is the IP address of the PC running AT-TFTP Server.

4.  TFTP requests are logged to the AT-TFTP Server main window. To save a TFTP Server log, select Save As from the File menu.

# Using Windows Terminal and HyperTerminal

You can use a PC running terminal emulation software as the manager console, instead of a terminal. There are many terminal emulation applications available for PCs, but the most readily available are the Terminal and HyperTerminal applications included in Microsoft Windows 98, 2000, and XP Professional. In standard Windows installations, HyperTerminal is available from the Communications submenu.

The key to successful use of terminal emulation software with the switch is to configure the software and switch with matching communications parameters. The following procedure can be applied to most terminal emulation programs. Dialog boxes in the procedure are from Windows 2000 and XP Professional.

**To configure Windows HyperTerminal for 2000 and XP Professional**

1.  Start the program in Windows by doing one of the following:

    •   Select Programs > Accessories > Communications > HyperTerminal.

    •   Double-click the Hypertrm.exe icon.

2.  In the Connection Description dialog box:

    •   Enter a name for the connection, such as Admin.

    •   Select an icon from the scrollable list and click the OK button.
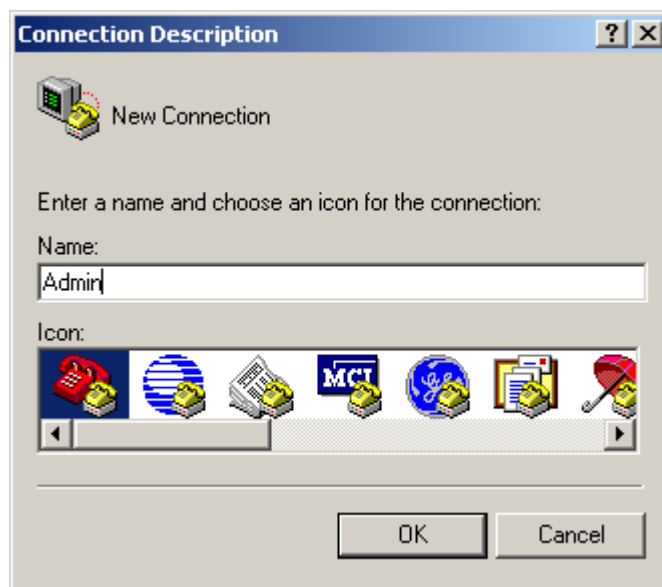
3.  In the "Connect using" field on the Connect To dialog box, select the COM port on the PC used to connect to the switch. and click the OK button.
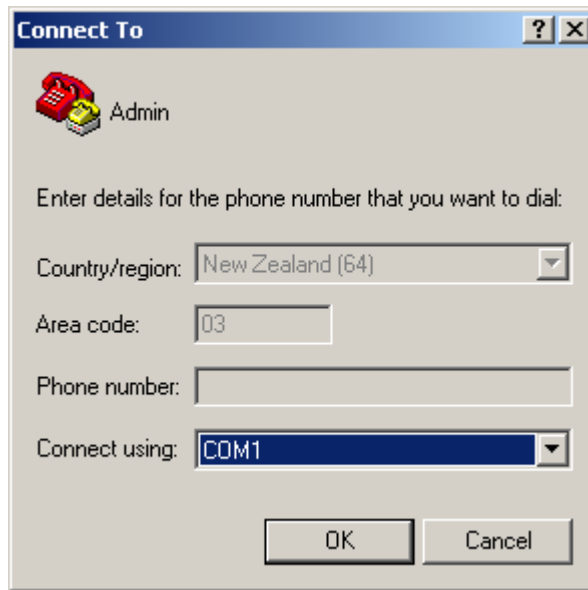
4.  In the COM*n* Properties dialog box, set the port to 9600 bits per second, 8 data bits, no parity, and 1 stop bit.

    •   For switches running the AlliedWare® operating system, set the flow control to Hardware.

    •   For switches running the AlliedWare Plus™ operating system, set the flow control to None.

    Click the OK button.
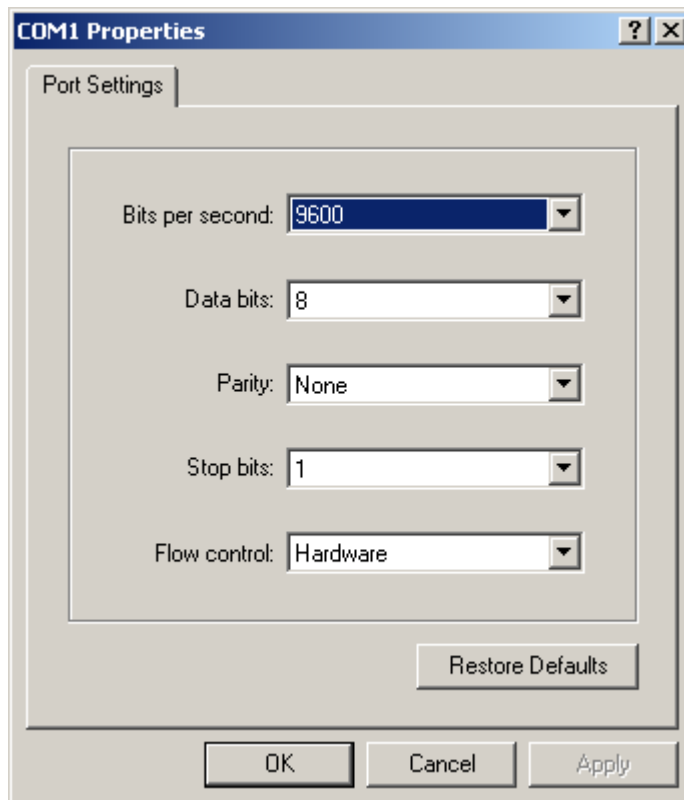
5. From the main HyperTerminal window, select Properties from the File menu. Click the Settings tab, and set the Properties dialog box as follows.
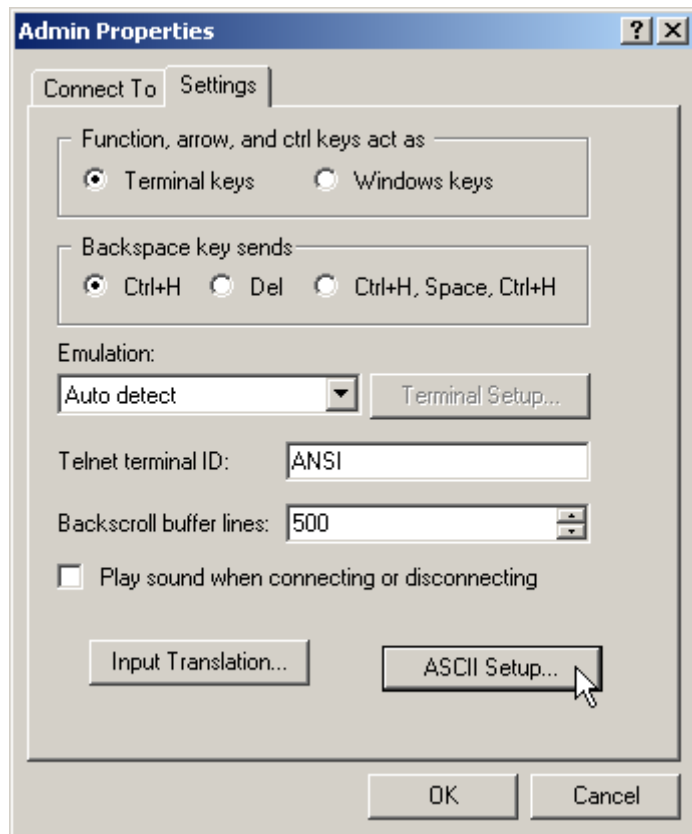


6. Click ASCII Setup to display the ASCII Setup dialog box, and ensure the following options are **not** selected:

- Echo typed characters locally

- Append line feeds to incoming line ends

Set other parameters as necessary and click the OK buttons on both dialog boxes to close them.
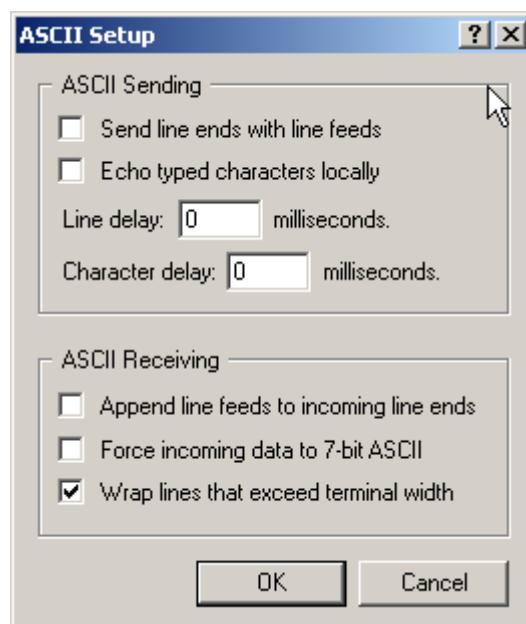
7.  Save the current session by selecting Save from the File menu on the main HyperTerminal window. This creates a connection icon with the name you assigned in the HyperTerminal group.

To use the configuration, double-click the connection icon. When the HyperTerminal window appears, press the Enter key several times; the switch's login prompt is then displayed.

# How the Switch Starts Up

When the switch starts up following a power cycle or an operator-initiated reboot (using the reset button or **restart** command), it performs a series of tests and sends messages to the terminal or PC connected to the ASYN0/CONSOLE port. After the switch successfully starts, a prompt is displayed for you to log in. Refer to the *x900 Series Switch and SwitchBlade® x908 Installation and Safety Guide* for basic login instructions.

The startup sequence, messages, and options varies depending on the switch and the operating system:

■ "AlliedWare Plus Operating System Startup" on page 47

■ "AlliedWare Operating System Startup on AT-9924Ts, x900-24XT, and x900-24XS Switches" on page 47

■ "AlliedWare Operating System Startup on AT-8948, x900-48FE, x900-48FS, and AT-9900 Switches" on page 53

## AlliedWare Plus Operating System Startup

The startup sequence for x900-12XT/S, x900-24XT, x900-24XT-N, x900-24XS, and SwitchBlade x908 switches running the AlliedWare Plus operating system is described in detail in the *Startup Sequence* chapter of the *AlliedWare Plus™ Operating System Software Reference*.

## AlliedWare Operating System Startup on AT-9924Ts, x900-24XT, and x900-24XS Switches

This section explains how AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS switches start initially, including error messages. The following types of software play key roles during startup.

| Software | Description |
|---|---|
| Base | Product software that is typically the "preferred" base package installed. It constitutes a feature set—similar to a "release"—and runs the switch. A software licence must be enabled for specific base packages. |
| Fallback | A small subset of the base package that runs when the base package is unavailable. It can download and install a base package, modify configuration scripts, and monitor the system. |
| Bootloader | Software that runs the switch when it first powers up. It performs basic initialisation, provides a basic interface for hardware diagnostics, and executes either the base or fallback software. |

**Process flow** When the switch starts, it performs the following operations.

| Stage | This happens... | Done by... |
|---|---|---|
| 1 | Self-tests run that check basic operations. | Bootloader |
| 2 | A prompt is displayed briefly to allow a user-override. Users can change the startup process by pressing special keys (see **Overrides**). If they enter nothing, the process continues. | Bootloader |
| 3 | Product software or fallback software is executed, depending on what the user installed. | Bootloader |

| Stage | This happens... | Done by... |
|---|---|---|
| 4 | Hardware boards and software components are initialised. | Base or Fallback |
| 5 | The startup configuration script that the user specified is executed. | Base or Fallback |
| 6 | Startup is complete and the switch starts switching traffic if devices connected to it are sending traffic. | Base |

**Overrides**  The switch pauses briefly during startup messages to display the following prompt:

```
Boot fallback software (Y)?
```

If you do nothing, the installed base package is loaded along with a preconfigured startup script. For troubleshooting, change the process by using the following keys.

| Pressing this key... | Forces the switch to... |
|---|---|
| Y | Load the fallback software instead of the base package. |
| S (skip) | Load the base package and skip the startup configuration script. |
| Ctrl+B | Display a bootloader prompt. To upgrade a bootloader file, load the new .bin file into the file system, and enter the command:<br><br>```copy filename.bin bootloader```<br><br>For information about the **load** command, see the *Managing Configuration Files and Software Versions* chapter in the Software Reference. |
| Ctrl+D | Enter diagnostics mode. For more information, see "Diagnostics" on page 57. |

**Regular output**  AlliedWare operating system bootloader and product software display a series of messages similar to those in the following figure during routine startup.

```
    --------------------------------------------------------------
             Bootloader v3-00, built 6 Mar 2006
    --------------------------------------------------------------
     Identifying RAM ................................... 512 MB
     Initial RAM test .................................. passed
     Relocating the bootloader to execute from RAM .... done

     Boot fallback software (Y) ?

     Initialising file system access .................. done
     Booting preferred base package: AT9924s_311-00.pkg
     Installing system.img (1775093 bytes) ............ done
     Initiating system software ....................... done


    --------------------------------------------------------------
            AlliedWare v3.1.1-00, built 23 Jun 2006
    --------------------------------------------------------------
     Initialising file system access .................. done
     Validating package licence ....................... done
     Installing product_apps.img (9705444 bytes) ...... done

     Executing configuration script <startup.cfg>
     Switch startup complete
```

**Fallback output**  Fallback software is a subset of the base package and runs when the base package is unavailable. When the switch runs fallback software, a series of messages similar to those in the following figure are displayed.

```
 .                                                          .
 .                   (bootloader messages)                 .
 .                                                          .
 Booting fallback software
 Installing system.img (1219098 bytes) ............ done
  Initiating system software ..................... done

 ------------------------------------------------------------
     AlliedWare Fallback v3.1.1-00, built 7 Jun 2006
 ------------------------------------------------------------
     WARNING: Fallback software will not allow normal
     network operation

 Initialising file system access ................. done
 Installing product_apps.img (1646897 bytes) ...... done

 Executing configuration script <startup.cfg>
 Switch startup complete
```

**Bootloader messages**  The following table explains messages that bootloader software displays at initial startup.

| Message | Description |
|---|---|
| Bootloader <version>, built <date> | Banner that identifies the bootloader software. |
| Identifying RAM...512 MB or Identifying RAM...failed | The switch contains the amount of memory indicated. If memory identification fails, the switch displays a brief description of the failure and pauses indefinitely. Contact your authorised distributor or reseller. |
| Initial RAM test...passed or Initial RAM test...failed | Whether initial RAM tests are successful. If tests detect a problem with DRAM, the switch cannot be used. Contact your authorised distributor or reseller. |
| Relocating the bootloader to execute from RAM...done or Relocating the bootloader to execute from RAM...failed | Whether bootloader software is successfully running from RAM instead of flash memory. If not successful, the system pauses indefinitely; contact your authorised distributor or reseller. |
| Boot fallback software (Y) ? | Prompt that lets you override the standard startup sequence, typically when troubleshooting. If you press Y, the switch boots from fallback software, and a confirmation message is displayed. For more information, see fallback output. |
| Initialising file system access...done or Initialising file system access...failed | Whether bootloader software has initialised access to the file system. Failure means a problem with the file system or memory device. The switch reformats memory and processing continues but data will have been lost. Contact your authorised distributor or reseller. |

| Message | Description (cont) |
|---|---|
| Booting *install-type filename*.pkg. | Name of the software package to be installed: preferred base package, temporary base package, or fallback. For information about types of install, see "Install Process" in the *Managing Configuration Files and Software Versions* chapter in the Software Reference. |
| Installing system.img \<bytes>...done or Installing system.img \<bytes>...failed | Whether the system software image of the given size is successfully installed in RAM and able to execute. This image is extracted from the installed package. If this fails when booting from a base package, the switch goes to the fallback software. If this file cannot be extracted from the fallback package, there may be a problem with fallback; contact your authorised distributor or reseller. |
| Initiating system software...done or Initiating system software...failed | Whether bootloader software has initiated execution of product software or fallback software, whichever the user selected, and is shifting control to it. If not successful, the system pauses indefinitely; contact your authorised distributor or reseller. |
| | **Bootloader Error Messages** |
| WARNING: Base package start-up failed too many times | The base package has a problem that prevents it from starting up. The switch starts up the fallback software. |
| WARNING: Fallback start-up failed too many times | The fallback software has a problem that prevents it from starting up. The switch shifts to bootloader software and displays a bootloader prompt. Contact your authorised distributor or reseller before proceeding. |
| ERROR: Fallback area is corrupt - launching the bootloader CLI | The switch is shifting to bootloader software because the fallback area in flash is unformatted or corrupt. It displays a bootloader prompt. Contact your authorised distributor or reseller before proceeding. |
| ERROR: No main board personality - launching the bootloader CLI | Unique information about the main PCB has not been programmed and the switch cannot start without it. Contact your authorised distributor or reseller. |
| No valid installed package - booting fallback software | The switch cannot find valid installed software, or files with install information are corrupt and the fallback area does not contain a valid file. The switch starts from fallback software. See the *Managing Configuration Files and Software Versions* chapter in the Software Reference for information about installation procedures, including the **set install** command. |
| ERROR: No valid software available - launching the bootloader CLI | The switch is shifting to bootloader software because it cannot find a valid package. It displays a bootloader prompt. Contact your authorised distributor or reseller before proceeding. |
| ERROR: Package *filename*.pkg is not valid | The switch could not extract the system image file because of a problem with the given package. Install a different package from fallback. Contact your authorised distributor or reseller if the problem continues. |
| ERROR: ELF header has *problem* | The system image file is corrupt or invalid for the reason given. The switch tries to start from fallback software. If this fails, contact your authorised distributor or reseller. |

| Message | Description (cont) |
|---|---|
| ERROR: System image has no section headers | The system image file is corrupt or invalid because it has no section header information. Contact your authorised distributor or reseller. |
| ERROR: No memory available for storing *ELF element* | A serious problem exists with memory allocation software or memory on the switch. Contact your authorised distributor or reseller. |

**AlliedWare operating system messages**

The following table explains messages that the base and fallback software display at startup.

| Message | Description |
|---|---|
| Alliedware <version>, built <date> | Banner that identifies the product software the switch is executing—base or fallback. |
| WARNING: Fallback software will not allow normal network operation | When starting from fallback software, a reminder that fallback is a subset of the product software and does not have its full functionality. |
| Initialising file system access...done or Initialising file system access...failed | Product software has initialised access to the file system.<br>Failure means a problem with the file system or flash. Processing will continue but data will be lost. Contact your authorised distributor or reseller. |
| Validating package licence...done or Validating package licence...failed | Whether a valid licence has been found for the base package. Verify licence, version, and switch model and contact your authorised distributor or reseller if necessary. Not displayed for fallback. |
| Installing product_apps.img <bytes>...done or Installing product_apps.img < bytes>...failed | Whether the product application image of the given size is installed in RAM and able to execute. This file is part of the installed package.<br>Failure could mean not enough RAM or the package is corrupt. Contact your authorised distributor or reseller. |
| IGMP packet trapping has been activated for IGMP snooping | IGMP packet trapping is enabled to allow IGMP snooping to function. A warning is displayed if this function could not be activated. Not displayed for fallback. |
| Executing configuration script <startup.cfg> | Configuration commands in the given script file begin executing if selected by the user. If the script has an error, appropriate error messages are displayed. |
| Switch startup complete | The startup process is complete and the switch is ready. If devices connected to it are sending traffic, then the switch begins switching operations. |
| **AlliedWare Operating System Error Messages** | |
| ERROR: Phase 1 of Software Manager startup failed - rebooting | Software Manager is part of the system software that controls startup of the product software. It failed to complete the first phase of its initialisation and cannot boot the fallback software. Manually restart the switch with fallback software (for details, see "Overrides" on page 48).<br>If this error occurs while rebooting from fallback, contact your authorised distributor or reseller. |

| Message | Description (cont) |
|---|---|
| WARNING: Bad board of type <number> in Expansion Bay <number> | Board personality of the given type in the given bay could not be read. Possible causes include:<br><br>unprogrammed personality PROM on the board<br><br>faulty hardware on expansion or host board<br><br>For information about boards, see the **show system boards** command in the *Configuring and Monitoring the System* chapter in the Software Reference. |
| WARNING: Unsupported board of type <number> in Expansion Bay <number> | Software does not support the board of the given type in the given bay. |
| Unit was rebooted because of a system exception | The switch is restarting after a system exception. Depending on the exception, you may need to contact your authorised distributor or reseller. |
| Creating core file system_*release-number*.core...done<br>or<br>Creating core file system_*release-number*.core...failed | Displayed after the switch restarts itself, and indicates whether system core information has been written to the specified file. Each image file creates its own core file and coredump. This information is loaded into RAM after a system exception and before the switch restarts. Contact your authorised distributor or reseller. |
| ERROR: Unable to read fallback package information | Information about fallback software is not available. Contact your authorised distributor or reseller. |
| ERROR: Unable to read preferred or temporary install information | Information is not available about the type of install indicated. The switch tries to start from fallback software. If this fails, contact your authorised distributor or reseller. |
| ERROR: Failed to extract product_apps.img from package to RAM | The product application image could not be extracted from the package file because the package file is corrupt or there is not enough RAM.<br><br>Manually restart the switch with fallback software (for details, see "Overrides" on page 48), and install another base package.<br><br>If this error occurs while rebooting from fallback, contact your authorised distributor or reseller. |
| ERROR: Failed to run product_apps.img | The operating system could not execute the product application image file.<br><br>Manually restart the switch with fallback software (for details, see "Overrides" on page 48), and install another base package.<br><br>If this error occurs while rebooting from fallback, contact your authorised distributor or reseller. |
| ERROR: Phase 2 of Software Manager startup failed - rebooting to fallback software | Software Manager is part of the system software that controls startup of the product software.The install information for it is invalid or the installed software is not licenced. Therefore, the switch boots up from the fallback software. |

# AlliedWare Operating System Startup on AT-8948, x900-48FE, x900-48FS, and AT-9900 Switches

**Process flow**   When the AT-8948, x900-48FE, x900-48FS, or AT-9900 switches start, they perform the following operations.

| Stage | This happens... | Done by... |
|-------|-----------------|------------|
| 1 | Self-tests run that check basic operations. | Boot ROM |
| 2 | A prompt is displayed briefly to allow a user-override. Users can change the startup process by pressing special keys (see **Overrides**). If they enter nothing, the process continues. | Boot ROM |
| 3 | The flash boot release is loaded as the install software. | Boot ROM |
| 4 | Install information is checked and the switch boots up from either the preferred or default install. | Boot ROM |
| 5 | The startup configuration script that the user specified is executed. | Preferred or default software |
| 6 | Startup is complete and the switch starts switching traffic if devices connected to it are sending traffic. | Release software |

**Overrides**   The switch pauses briefly during routine startup messages to display the following prompt:

```
Force EPROM download (Y)?
```

If you do nothing, switch software is loaded along with a preconfigured startup script. For troubleshooting, change the process by using the following keys.

| Pressing this key... | Forces the switch to... |
|----------------------|-------------------------|
| Y | Load the flash boot release with no patch. |
| S | Start with the default configuration so that any boot script is ignored. |
| Ctrl+D | Enter diagnostics mode. For more information, see "Diagnostics" on page 57. |

**Regular output**   The following messages are an example of output from the AT-8948, x900-48FE, x900-48FS, and AT-9900 series switches.

```
INFO: Self tests beginning.
INFO: RAM test beginning.
PASS: RAM test, 131072k bytes found.
INFO: BBR tests beginning.
PASS: BBR test, 512k bytes found.
INFO: Self tests complete
INFO: Downloading switch software.

Force EPROM download (Y) ?

INFO: Initial download succeeded
INFO: Executing configuration script <boot.cfg>
INFO: Switch startup complete
```

**Types of messages**    The following table explains the types of messages that the AT-8948, x900-48FE, x900-48FS, and AT-9900 series switches generate during initial startup.

| Type | Description |
| --- | --- |
| INFO | An action has been taken by the system. |
| PASS | A test has been completed successfully. |
| ERROR | An error message that a test has failed but the system continues to operate. |
| FAIL | An error message that a fatal error condition has caused the system to halt in an unrecoverable fashion. |

**AlliedWare operating system messages**    The following table explains messages in the output of the AT-8948, x900-48FE, x900-48FS, and AT-9900 series switches.

| Message | Description |
| --- | --- |
| INFO: Self tests beginning. | Code loader tests are about to begin. |
| INFO: RAM tests beginning | RAM tests are about to begin. |
| PASS: RAM test, 131072k bytes found | RAM test passed and the switch is using the indicated amount of memory. |
| ERROR: RAM test *test-number*. Error address = *address* <br><br> For example: <br> ERROR: RAM test 5. Error address = 00345678 | The given RAM test failed at the given address, which means the memory system is faulty. The test repeats until it passes. If the error continues, contact your authorised distributor or reseller. |
| INFO: BBR tests beginning | BBR battery tests are about to begin. |
| PASS: BBR test. Battery OK | BBR battery tests passed. |
| ERROR: BBR Battery low | BBR battery test failed, indicating that the battery is running low. The BBR battery must be replaced. Contact your authorised Allied Telesis distributor or reseller. |
| PASS: BBR test, 512k bytes found | BBR size/location test passed with the indicated amount of BBR found. |
| FAIL: BBR test. Error address = *location* | BBR size/location test failed at the given location. The test at this location failed, indicating the end of memory, but a valid location was discovered in the 255 long words following this location. The BBR system must be replaced. Contact your authorised distributor or reseller. |
| FAIL: BBR test, only 16k bytes found | The BBR size/location test completed, but only the displayed amount of memory was found. This amount is less than the minimum required to run the switch software. |
| INFO: Self tests complete | Startup tests have finished. |
| INFO: Downloading switch software | The process of downloading the switch software and vector table from ROM is about to begin. |
| ERROR: Code load retried <br><br> FAIL: Code load failed | Loading code from ROM to RAM failed. The load is retried a number of times, and the error message is displayed each time it fails. The fail message is displayed if the switch reaches the maximum number of attempts. |
| Force EPROM download (Y) ? | Prompt that lets you override the standard startup sequence, typically when troubleshooting. |

| Message | Description (cont) |
|---|---|
| INFO: Initial download succeeded | Startup tests and download are complete, and the switch software is about to be started.The release is now decompressed. This may take a few seconds. |
| INFO: Downloading compressed release. This may take up to 1 minute... <br><br> INFO: Loading software into memory. This may take up to 1 minute... | The main switch software is decompressed before being loaded into RAM. |
| INFO: Executing configuration script <script-name> | Configuration commands in the given script file begin executing if selected by the user. If the script has an error, appropriate error messages are displayed. |
| INFO: Switch startup complete | The startup process is complete and the switch is ready. If devices connected to it are sending traffic, then the switch begins switching operations. |

# Test Facility

The test facility is a hardware test tool in the AlliedWare operating system. Its primary function is to validate that there are no hardware problems after installation of the switch or expansion options. You can also use it as a troubleshooting tool, but it is just one of many such tools. You could consider the test facility to be a specialised interface module, such as PPP or Frame Relay, where the interfaces under test are dedicated to the test facility.

Before you use the test facility, disable configurations by using the **set configuration=none** command, and restart or reboot the switch. For more information about the test facility, see the *Test Facility* chapter in the *AlliedWare® Operating System Software Reference*.

## Testing Ethernet LAN Ports

A crossover cable is required to run an Ethernet LAN test. How to make a suitable cable is described in "Cables for RJ-45 Ethernet LAN Interfaces" on page 31. To start the test, loop a four-pair crossover or straight-through cable between two RJ-45 ports and enter the **enable test interface=all** command. Interfaces connected by crossover cables are tested. If a test fails, contact your authorised Allied Telesis distributor or reseller.

To display test results, use the **show test** command. To display detailed output with frame counts, use the **show test count** command. For example output from these commands, see the *Test Facility* chapter in the *AlliedWare® Operating System Software Reference*. This chapter also contains information on how to test other interfaces.

# Diagnostics

The AlliedWare and AlliedWare Plus operating systems include a set of diagnostic programs that perform basic checks of all system components. These diagnostics do not run with normal operating code and require that the system be totally dedicated to their use. The switch does **not** perform switching operations when diagnostics are running.

This section describes the diagnostics available in the AlliedWare operating system. For information about diagnostics available in the AlliedWare Plus operating system, see the *Startup Sequence* chapter of the *AlliedWare Plus™ Operating System Software Reference*.

**Caution**  Diagnostics are designed to be run by service personnel only. This section is **not** intended as a guide to diagnostics software. Detailed knowledge of how the switch hardware functions is necessary in order to effectively use diagnostic programs. For more information, contact your authorised Allied Telesis distributor or reseller.

**Enabling diagnostics mode**

1.  Connect a terminal to the RS-232 terminal port.

    Use a terminal cable to connect a terminal to the RS-232 port (ASYN0/ CONSOLE) on the switch. For more information on terminal cables, see "RS-232 Terminal and Modem Cables" on page 30.

    Set the terminal communication parameters as follows:

    - Baud rate: **9600**

    - Data bits: **8**

    - Parity: **None**

    - Stop bits: **1**

    - Flow control: **Hardware**

    For more information, see "Using Windows Terminal and HyperTerminal" on page 43.

2.  Restart the switch.

    To restart the switch, use a small diameter pin to press the recessed Reset button on the front panel of the switch. You can also log in at the terminal and enter the command:

    ```
    restart reboot
    ```

    How to log in is described in the Installation and Safety Guide.

3.  Enable diagnostics mode during self-tests at startup.

    The switch pauses briefly during its self-tests to allow an override.

    For the AT-8948, x900-48FE, x900-48FS, and AT-9900 series switches, the following prompt is displayed:

    ```
    Force EPROM download (Y)?
    ```

    For AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS switches, the following prompt is displayed:

    ```
    Boot fallback software (Y)?
    ```

    Press **Ctrl+D** to enable diagnostics mode. Press Ctrl+D **just once** to ensure you send no other characters to the switch.

One of the following menus is displayed depending on the switch model. When you see the menu, you know that the terminal is connected.

Menu for AT-8948, x900-48FE, x900-48FS, and AT-9900 series switches.

```
* * * Diagnostic Mode * * *

  version: Nov 10 2005 11:08:34

Main Menu:
  0. Restart
  1. Full RAM test
  2. ROM checksum test
  5. Battery backed RAM test
  7. Display PCI devices (not shown for x900-48FE switches)
  8. Watchdog test (not shown for x900-48FE switches)
Enter selection ==>
```

**Caution**   If you have an EPROM chip and you perform a full flash test or erase flash, you will delete all configuration and release files. We recommend that you know how to reload these files before you erase flash or perform a flash test.

Menu for AT-9924Ts, x900-24XT, x900-24XT-N, and x900-24XS switches.

```
Diagnostics Menu:
  0. Restart
  1. Full RAM test
  2. Bootloader ROM checksum test
  3. Full FLASH test
  4. Erase FLASH file system
  5. Battery backed RAM (NVS) test
  6. Quick RAM test
  7. PCI bus search
  8. Quit and continue booting
Enter selection ==>
```

**Caution**   If you perform a full flash test or erase flash, you will delete all configuration files and the product software that runs the switch. We recommend that you know how to reload these files before you erase flash or perform a flash test.

**Running a diagnostic program**

There are several sub-menus that cover the available options. Control keys for diagnostic operations are in the following table.

| Key | Function |
| --- | --- |
| Q | Quits tests that are running. Displays a banner page or restarts, depending on the switch. |
| S | Prints a summary of test results thus far for AT-9900 series switches only. |

To restore the switch to normal operation, use a small diameter pin to press the recessed reset button on the front panel of the switch, or press 0 to restart.

# Troubleshooting

This section provides information on how to troubleshoot the x900 series switch and SwitchBlade x908 to resolve the following basic problems:

■ **L/A LED on a port is off**

■ **Power LED is off**

■ **Fault LED is on**

**What to check first**
■ Check power cord connections.

■ Check that the power supply voltage is stable.

■ Check that the correct data cables are used and that their connections are secure.

■ Make sure that other network devices work properly.

■ Check that the latest software release is loaded. The Software Reference describes how to obtain the latest software release.

 • On switches running the AlliedWare operating system, use the **show install** command.

 • On switches running the AlliedWare Plus operating system, use the **show version** command.

■ If the switch malfunctions, reboot it using one of the following methods:

 • use a small diameter pin to operate the recessed Reset button on the switch's front panel

 • shut down and restart the switch at the main power source (AC models) or use the Run/Standby switch on the PSU (DC models).

 • On switches running the AlliedWare operating system, use the **restart reboot** command.

 • On switches running the AlliedWare Plus operating system, use the **reload** command.

**L/A LED on a port is off**
If the Link/Activity LED is off, it may indicate the following:

■ a loose data cable

■ the device at the other end of the connection does not work properly or is turned off

■ the data cable is not wired correctly

■ the network administrator has manually disabled the port through the software

■ the port's selected transmission mode does not match that of the attached device

Follow these suggestions to resolve the problem:

1. Make sure the data cable connections are secure.

2. Make sure the device at the other end of the connection is powered on and works properly.

3. Check that the data cable is wired correctly.

4. If you can, log in and check the port status. How to log in is described in the *x900 Series Switch and SwitchBlade® x908 Installation and Safety Guide*.

5.  If the port is enabled, make sure the transmission speed matches that of the connected device (autonegotiating, full or half-duplex).

6.  If the port is disabled, someone disabled it with the software. Find out why before you enable it.

**Power LED is off**   If the power LED is off, it may indicate the following:

■   a loose power cord

■   a power supply failure

■   a FOM is installed in that bay

Follow these suggestions to resolve the problem:

1.  Check that the power cord connections are secure.

2.  Check that all switches and circuit protection devices are in the "on" position.

3.  Ensure that the supply voltage is within the operational range. See "Power Supply Units (PSUs) and Fans" on page 35.

**Fault LED is on**   If the fault LED is on, it may indicate the following:

■   there is a problem with the switch

■   the switch or management software is malfunctioning

■   a hardware fault is preventing switch startup

Follow these suggestions to resolve the problem:

1.  Read the descriptions of LED flashing sequences for explanations of what to do (see "Switch LEDs" on page 15).

2.  Reset the switch. Use a small diameter pin to press the recessed reset button on the front panel of the switch.

3.  If you were attempting to download software or manage the switch over the RS-232 terminal port, check that connections between the terminal port and local terminal or PC are secure.

    If you cannot access the switch software because of a faulty RS-232 terminal port connection, you can still manage the switch by using Telnet or SNMP until the problem is resolved.

4.  Download the most current software. The Software Reference describes how to obtain the latest software product.

**Additional resources**   ■   www.alliedtelesis.com/support/software

■   the *Test Facility* chapter in the *AlliedWare® Operating System Software Reference*

■   How To notes from www.alliedtelesis.co.uk/en-gb/solutions/ techdocs.asp

# Obtaining Documentation and Resources

The complete document set for x900 Series switches and SwitchBlade x908 includes:

■ this Hardware Reference, which contains detailed information on the switch and its hardware features

■ the *x900 Series Switch and SwitchBlade® x908 Installation and Safety Guide*, which describes how to install the switch and includes important safety and statutory information

■ the *Removable Power Supply and Fan Installation Guide*, which describes how to install power supply units and fan-only modules in the switch

■ the *x900 Series Switch and SwitchBlade® x908 Expansion Module Installation Guide*, which describes how to install expansion modules in x900 Series and SwitchBlade x908 switches

■ the *AT-9900s Series Switch Expansion Module Installation Guide*, which describes how to install expansion modules in AT-9900s Series switches

■ the *x900 Series Switch AlliedWare® Operating System Software Reference*, which contains detailed information on configuring switches running the AlliedWare operating system

■ the *AlliedWare Plus™ Operating System Software Reference*, which contains detailed information on configuring switches running the AlliedWare Plus operating system

You can download these documents and updates from www.alliedtelesis.com/support/software.

You need Adobe® Acrobat® Reader® software to view, search, or print these documents. You can download it from www.adobe.com.

**Other resources** How-To Notes describe a range of standard Allied Telesis solutions, and include technical tips and guides to configuring specific hardware and software features. You can download the latest How-To Notes from www.alliedtelesis.com/resources/literature/howto.aspx.

MIBs supported by Allied Telesis products can be downloaded from www.alliedtelesis.com/support/software.

Microsoft® Visio® stencils for Allied Telesis products can be downloaded from www.alliedtelesis.com/resources/images/visio.aspx.

AT-TFTP Server for Windows is a TFTP (*Trivial File Transfer Protocol*) server for transferring software versions, configuration scripts and other files between a PC and the switch. You download AT-TFTP Server from www.alliedtelesis.com/support/software.

**CD-ROM** Some products ship with a Documentation and Tools CD-ROM, which includes:

■ the complete document set

■ Adobe® Acrobat® Reader®

■ AT-TFTP Server

■ Supported MIBs

■ How-To Notes, white papers, Microsoft® Visio® stencils and other resources

■ Tryouts of networking software

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