ASR 8000

Tengigabit Ethernet L3 Switch

ASR 8000 Installation Guide

waystream

ASR 8000 Installation Guide

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Introduction

The ASR 8000 series is a versatile access-layer switch for broadband networks. The switch is available in models with different number of interfaces and for different operating temperature ranges.

This manual is intended for persons installing ASR 8000 units in a network. You will need to be familiar with the Waystream products including iBOS, and the hardware used in your networking system.

After reading this manual, you will be able to install, power up and handle basic troubleshooting of the ASR 8000 series routers.

This manual describes the following:

- Product Overview
- Installing the ASR 8000
- Checking the ASR 8000 Installation
- Appx A - Product Description
- Appx B - SFP Products

For complete information of the product, including specifications for hardware and software functionality, refer to the *ASR 8000 Product Specification*.

For more information on configuring the boot options of the ASR 8000, refer to the *ASR 8000 Bootloader User Guide*.

Product Overview

This chapter provides an overview of the ASR 8000 for installation purposes only.

For a complete specification of the product, refer to the *Product Description*.

Figure 1. ASR 8000 Series Switch

The ASR 8000 is designed for installation in a standard 19" rack.

Product Models

The ASR 8000 series switches are fan-cooled, and are designed for central office environments. The E-models support an extended temperature range (-20°C to +70°C) which also allows installation in locations with heat-trap provided sufficient room is available for proper air-flow.

This installation guide covers the following models of the ASR 8000 series router.

- ASR 8024
- ASR 8048
- ASR 8024E (extended temperature)
- ASR 8048E (extended temperataure)

ASR 8024 / ASR 8024E

The ASR 8024 has the following interfaces:

- Four (4) 10 GigabitEthernet SFP+ uplink ports
- Twenty four (24) 10 GigabitEhernet SFP+ downlink ports
- One (1) serial console port (using custom Waystream connector)

The ASR 8024 is available with 100-240V internal AC power supply and has a 12V DC connector for redundant power input at the rear side.

The operating temperature range for ASR 8024 is 0°C to 45°C. The operating temperature range for ASR 8024E is -20°C to 70°C.

Figure 2. ASR 8024

All twenty eight 10 GigabitEthernet interfaces are capable of running 1000/2500/10000 Mbps on fibre cables, or copper cable (CAT5/CAT6) if using Copper SFP/SFP+.

ASR 8048 / ASR 8048E

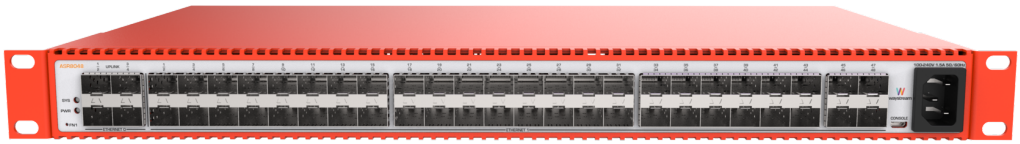
The ASR 8048 has the following interfaces:

- Four (4) 10 GigabitEthernet SFP+ uplink ports
- Fourty eight (48) 10 GigabitEhernet SFP+ downlink ports
- One (1) serial console port (using custom Waystream connector)

The ASR 8048 is available with 100-240V internal AC power supply and has a 12V DC connector for redundant power input at the rear side.

The operating temperature range for ASR 8048 is 0°C to 45°C. The operating temperature range for ASR 8048E is -20°C to 70°C.

Figure 3. ASR 8048

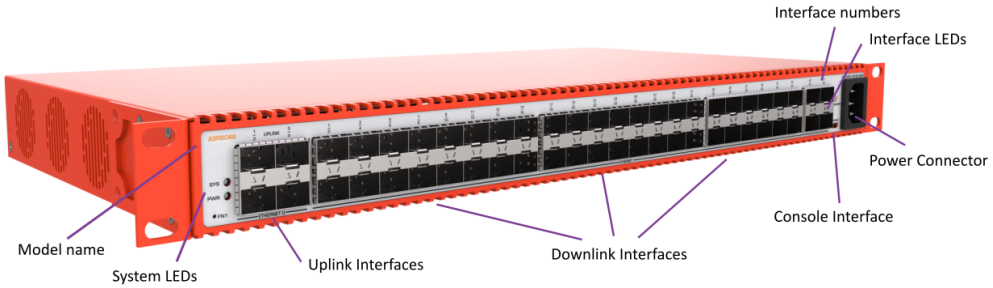


All fifty two 10 GigabitEthernet interfaces are capable of running 1000/2500/10000 Mbps on fibre cables, or copper cable (CAT5/CAT6) if using Copper SFP/SFP+.

The ASR 8000 Front Panel

All connectors are placed in the front of the switch for easy operation. Each interface has a LED indicating link status, speed and activity. There are two additional LED's, one for indicating power and one for system status.

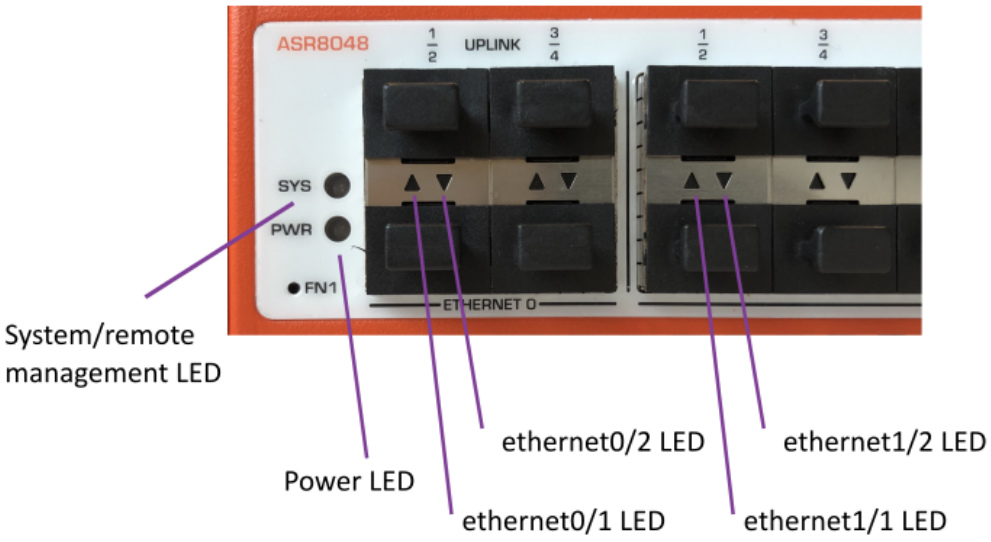
Figure 4. ASR 8000 Front Panel



LEDs

The front panel has LEDs to show the status of the power supply, system status, as well as for the uplink and downlink interfaces.

Figure 5. ASR 8000 LEDs



System LEDs

The ASR 8000 has two LEDs for showing system status; SYS and PWR.

Table 1. System Status LED Status

LED	STATE	Description
PWR	OFF	Power is OFF
	GREEN	Power is ON
	AMBER	A critical error has occured
SYS	OFF	System is not loaded
	FLASHING GREEN	System is booting
	GREEN	System successfully booted
	AMBER	Connected to remote management system

LED for Uplink and Downlink Interfaces

For the uplink and downlink interfaces, the unit has slots for SFP+ modules that can reach speeds of up to 10 Gbps. Read more about the SFPs in SFP Products.

When an interface is active, the status is shown on the LED panel. See the table below

Table 2. Link LED Status

LED	STATE	Description
1-2	OFF	No link established
	ON	Link is established • GREEN =10 Gbps • AMBER = 1 Gbps
	FLASHING	Port is active, packets sent on port • GREEN = 10 Gbps • AMBER = 1 Gbps

Console Port

Warning

The console port on the ASR 8000 is not compatible with the USB standard. Use only with Waystream provided adapter cable!

The ASR 8000 has one serial console port for management of the unit that is able to operate from 9600 to 115200 bps. The connector type is Waystream specific that requires an adapter cable to convert it to RS-232 RJ45. Default speed is 115200 bps, but can be changed through the command line interface of the Bootloader or iBOS software. Refer *ASR 8000 Bootloader Configuration Guide*.

To connect to the console port, the adapter is used together with a serial console cable. Adapter and console cable are not included for environmental reasons, but can be ordered separately from Waystream or approved partner. Your terminal software should be configured to 8 data bits, no parity and 1 stop bit (8N1). No flow-control or hardware flow-control (RTS/CTS) should be used.

Figure 6. ASR 8000 Waystream to RS-232 RJ-45 adapter cable

ASR 8000 AC Power Connector

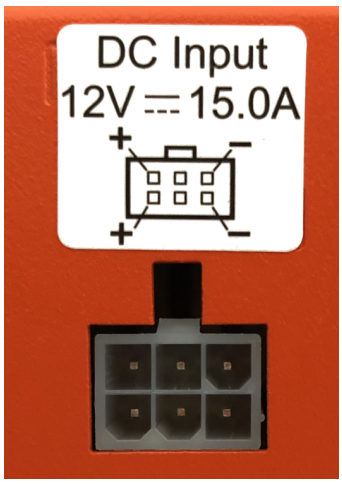
The power connector is located at the front of the ASR 8000. A standard IEC C13 EU power cable is supplied. The unit can operate using either the front AC power input or the rear DC power input. For redundant power input, both DC and AC can be used at the same time.

Figure 7. ASR 8000 AC Power Connector

ASR 8000 DC Power Connector

An additional 12V DC power connector is located at the rear of the unit. The connector type is DMH-06 and the pin layout is as indicated on the label above the connector.

Figure 8. ASR 8000 DC Power Connector



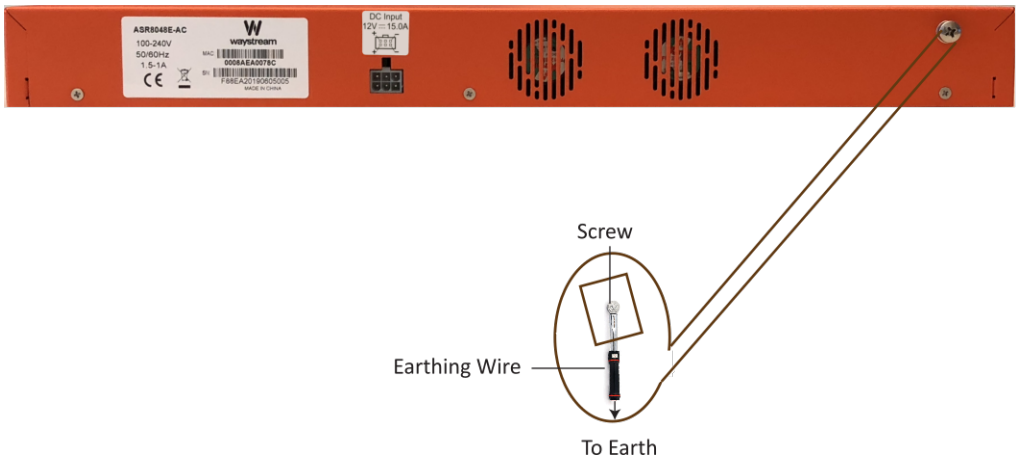
The rear power connector requries 12VDC 15A. A compatible external AC-to-DC power supply is available from Waystream, but other DC-power sources can also be used. The unit can operate using either the rear DC or the front AC power input. For redundant power input, both DC and AC can be used at the same time.

ASR 8000 Ground Connector

If required, a ground connector screw is located on the back of the switch. Using the ground screw and washer supplied, fasten the ground cable to the chassis in the following way:

1. Loosen the ground terminal screw
2. Attach the lug of the grounding cable between screw and washer and ensure that the other end of the grounding cable is connected to GND
3. Tighten the screw and check that the grounding cable is securely fixed to the chassis.

Figure 9. Attach Grounding Cable to ASR8000 Chassis



Warning

- Connect the switch casing to earth before it is powered ON for the first time,
- Proper grounding (connection to earth) is very important to protect the switch from bad effects of external noise and to reduce the risk of electrocution in the event of a direct lightning strike.
- For removal of the switch, disconnect the grounding cable after the power is switched OFF and all other cables are disconnected.
- For the earthing wire, green and yellow insulation is required and the cross-sectional area of the conductor must not be less than 0.75 mm2 or 18 AWG.

Installing the ASR8000

Tools Required

The ASR 8000 does not include any tools required to install the units. Appropriate screwdrivers, ratchets etc. must be obtained elsewhere.

To complete this installation, the following extra materials are also needed:

- 10 GigabitEthernet (SFP+) or GigabitEthernet (SFP) modules for uplink and down-link ports
- 1-4 patch cables, fibre for uplink ports
- 1-48 patch cables, fibre for downlink ports

Safety Guidelines

Follow these guidelines to ensure the required level of safety.

General Safety

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewellery that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or that makes the equipment unsafe.
- Disconnect all power by turning OFF the power and unplugging the power cord before installing or removing a chassis or working near power supplies.
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit first.

Warning

The unit has multiple power inputs. Ensure that both the front and rear power inputs are disconnected before performing work on the unit.

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- Wear an ESD-prevention wrist strap, ensuring that it has good skin contact, If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the anti-static strap, which should be between 1 and 10 megaohms.

Warning

Optical modules may reach temperatures in excess of 55 degrees. Risk of burn damage if touched or handled unprotected.

EMC Notice

This equipment has been tested and found to comply with Class A of EN55032:2015+AC:2016 and EN55035:2017. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this document, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case owners will be required to correct the interference at their own expense.

Equipment List

The following table lists the typical quantities of items supplied with each ASR 8000 unit.

- ASR 8000 unit
- One (1) 180 cm EU power cable with mains plug
- Rack kit (pre-installed) including;
  - Two (2) angle brackets
  - Eight (8) screws for angle bracket

  - Four (4) cage nuts and screws (M6) with plastic washers
- Grounding kit including:
  - Two (2) screws for grounding (M5) with lock washers

Note

a console adapter cable (to RJ45) is not included and must be ordered separately.

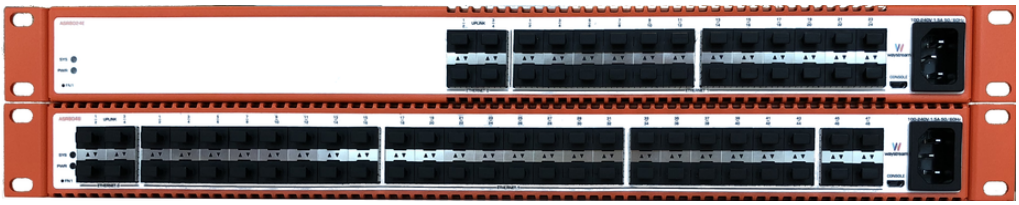
ASR 8000 Environment

The ASR 8000 is designed to be mounted in a 19-inch rack in a restricted access location. For restricted access locations, the following applies:

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a TOOL or lock and key, or other means of security, and controlled by the authority responsible for the location.

The switch is designed to be mounted in a single shelf of a 19-inch rack. The cooling fans are located on the side of the unit so ventilation must be available to allow free airflow so that the fans can maintain a persistent and satisfactory ambient temperature.

Figure 10. ASR 8000 in Rack



For rack installations, the following considerations must be taken:

- **Elevated Operating Ambient Temperature** - When installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient. Therefore, consideration should be given to installing the equipment in an rack environment compatible with the maximum ambient temperature, refer to the ASR 8000 Product Description.
- **Reduced Air Flow** - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical Loading** - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading** - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might

have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- **Reliable Earthing** - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Ventilation of ASR 8000

The ASR 8000 is cooled by built-in fans. Ensure that air can flow freely from the front to the sides in the cabinet. On the E-models air also need to flow out on the rear side. A free distance of 4 cm the unit is recommended for proper air flow when using the E-model. To extend the lifetime of the fans, ensure that the air is filtered and free from dust particles.

Table 3. Ventilation

Model	Fans	Air-flow
ASR8024	2	front-to-sides
ASR8024E	5	front-to-sides-and-rear
ASR8048	4	front-to-sides
ASR8048E	8	front-to-sides-and-rear

Rack Installation of ASR 8000

As shown in *ASR 8000 in Rack*, multiple ASR 8000 units can be mounted in a 19-inch rack on top of each other. All connectors are located in the front of the ASR 8000 for easy access.

The rack brackets are pre-attached for fast installation. When the switch is installed, the front panel will be flush with the front of the rack frame, see *Default rack bracket on ASR 8000* below.

Figure 11. Default rack bracket on ASR 8000

For cabinets with doors that require more space for cables etc. in front of the unit, it is possible to remove the four bracket screws and reposition the brackets using the extra screwholes to provide 25 mm space in front of the switch, see *Rack bracket installed for extra space* below.

Figure 12. Rack bracket installed for extra space

To install the switch in the rack, hold the ASR 8000 firmly in position and use the supplied screws and nut baskets to fix the unit in the 19-inch rack space.

Connecting Power to the ASR 8000

The information below is valid for all ASR 8000 units.

The ASR 8000 runs on 100-240V 50/60Hz AC. Installation of 100-240V mains power outlets must be performed by a licensed electrician.

Warning

The ASR 8000 unit must be connected to ground before power supply units, computers or other electrical or electronic equipment is connected to the ASR 8000 (including the serial console port).

Optionally the ASR 8000 runs on 12V DC using an external power supply.

Power ON

When the mains power is connected to the ASR 8000, the ASR 8000 will automatically boot and attempt to establish the uplink connection with the network. To prevent any sudden power surges at startup, it is recommended to have a separate ON/OFF switch for the main power supply.

To power up the ASR 8000, do the following:

1. Connect the mains power cable to the ASR 8000 power connector.
2. Connect the mains power cable to the power socket.
3. If there is an ON/OFF switch, then flip the ON/OFF switch to ON.

The ASR 8000 power LED will now light up.

You can also use the rear DC power input, or both the front and rear power inputs.

Installing SFP Modules

The ASR 8000 is designed to use Small Form Factor Pluggables (SFP+) modules for 10 GigabitEthernet uplinks. For information about insertion and removal of SFP+ modules and important safety information, please refer to the *SFP Products*.

Connecting the ASR 8000 to the Network

In most network topologies, the 10 GigabitEthernet SFP+ modules will be used as uplinks, connecting the ASR 8000 to the network.

Connecting Uplink Interfaces

To connect the uplink interfaces to the ASR 8000:

1. Select the appropriate patch cables for the SFP modules installed.
2. Remove dust cover on SFP and connect the patch cable to the SFP
3. Connect the patch cable to the network fibre patch panel or fibre connector

If the ASR 8000 establishes an uplink, connection the uplink LED will light up.

Connecting Downlink Interfaces

To connect the downlink interfaces to the ASR 8000:

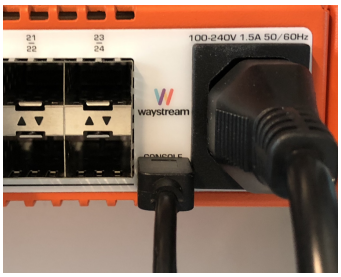
1. Select the appropriate patch cables for the SFP modules installed.
2. Remove dust cover on SFP and connect the patch cable to the SFP
3. Connect the patch cable to the network fibre patch panel or fibre connector

If the ASR 8000 has received configuration and there are client devices connected at the subscriber side of the connection, the LED will indicate that link is present on the interface.

Checking the ASR8000 Installation

The ASR 8000 router has a console interface that is used to view configuration information when the switch is running. During the boot process, the switch outputs information about the boot progress, and if any problems are encountered.

Figure 13. ASR 8000 Console port



To connect to the console port, you need a Waystream to RJ-45 adapter cable and a serial console cable that can be ordered separately.

Connecting to the Console Interface Port

1. Connect your terminal to the console port using the Waystream to RJ45 adapter cable and then an RS-232 RJ45 cable.
2. Configure your terminal software using the following settings:
   - 8 data bits, no parity and 1 stop bit (8N1)
   - No flow-control or hardware flow-control (RTS/CTS)
   - 115200 bps send rate

The Boot Process

When the power is first turned on, the ASR 8000 immediately starts the bootloader software. The bootloader performs basic system initialization, decompresses, and runs the iBOS software image that is stored on flash memory. The boot process can be followed on the console.

The Bootloader locates a bootable image either on the flash memory (if it exists) . The image is compressed to conserve file system space, and must therefore be decompressed when read into memory. The Bootloader displays the following message when it is decompressing the iBOS image:

```
Decompressing ibos-cma-7.5.0-ED-R.bz2 (press any key to abort)
```

Note

The local filename of the image being decompressed is displayed, e.g. the image filename is *ibos-cma-7.5.0-ED-R.bz2*.

When the iBOS image has been loaded into RAM, the Bootloader will start the main software. The following message is displayed:

```
Running ELF executable at address: 0x80200000
```

Troubleshooting the Bootloader

When a terminal is connected to the switch console port, pressing any key aborts the boot process and enters the bootloader command line interface. Situations where the bootloader fails to complete the boot process are:

- If the boot process is looping, it may be necessary to download new software or to make changes to the boot configuration if the switch is not able to complete the boot process.
- If there is no valid iBOS image on the flash file system .

For more information on the Bootloader CLI, refer to the *ASR 8000 Bootloader User Guide*.

Troubleshooting iBOS

The iBOS software is the switch operating system that enables services and also has internet connection features. When connected to the switch using the console port or the management port, an iBOS command line interface appears after a successful boot process.

Access to iBOS command line normally requires login. There is no default username or password configured, and if the switch is unconfigured simply press the Enter key when prompted for username and password.

Note

If local or remote user authentication has been configured in the switch, the correct username and password must be used to gain access to the command line interface via the console port.

The command line interface displays the ASR 8000 hostname (if configured), the system uptime etc.

Check System

To display the system information, use the **show version** command. The information displayed includes the version of iBOS running in the system, the system hostname and uptime, the model and characteristics of the ASR 8000, its serial number, and other information.

Example 1. show version

```
ibos> show version
Intelligent Broadband Operating System (iBOS), Version 7.5.0-ED-R
Copyright (c) 2001-2019 by Waystream AB
Routing Engine Copyright (C) 2001-2011 IP Infusion Inc.
Compiled Tue Jun 18 17:34:20 CEST 2019 by builder
Source ID: 73edd14664d8b72d3bb4d12b4806703211606ebc

ibos uptime is 0 minutes
Last boot: warm start

System image file is "ibos-cma-7.5.0-ED-R.bz2", version ibos-cma-7.5.0-ED-R
System: ASR8048-AC, 4 1/10GE SFP+, 48 1/10G SFP+, L3 Switch, AC
Bootloader version: wsboot-cma-5.0.0-R
Board type/version: 0/0
Product ID: 7350008015975
Serial number/Base MAC address: 0008AEA002BC
Processor: CN7130 [pass 1.2] (mipseb)
524288K bytes CPU RAM
CPLD1 revision: 0.5
CPLD2 revision: 0.5

ibos>
```

Check Available Devices

The PFDP protocol is exchanged between all Waystream network products. The iBOS command **show pfdp neighbours** displays a summary of all known Waystream devices that are connected this system. The information is valuable to identify what other PFDP-enabled devices (ASR, MS, etc.) are connected to this system.

Example 2. show pfdp neighbours

```
ibos> show pfdp neighbours
ethernet1/23     with 1 neighbour(s):
  "DRG800" running "drgosl-drg800-1.1.0-R" on model "DRG886"
    remote interface uplink1, last activity 0s ago, unidirectional

ethernet1/24 with 1 neighbour(s):
  "DRG508s_MK1" running "DMA0081-R2N20" on model "DRG508s_MK1"
   remote interface wan1, last activity 53s ago, unidirectional

ethernet0/1 with 1 neighbour(s):
  "Small-BTU1-2" running "iBOS 7.5.0-ED-R" on model "ASR6126"
   remote interface gigabitethernet2, last activity 22s ago, bidirectional

ethernet0/2 with 1 neighbour(s):
  "Small-BTU1-8" running "iBOS 7.5.0-ED-R" on model "ASR6026"
   remote interface gigabitethernet1, last activity 28s ago, bidirectional
ibos>
```

If LLDP has been enabled the iBOS command **show lldp neighbours** may also be used to display known neighbours.

Check SFP Interface

To examine the SFP statistics on the uplink interface, use the iBOS command **show interface sfp** for one of the uplink interfaces. (Pay special attention to the TX/RX input/output power details).

Example 3. show interfaces sfp

```
ibos# show interface ethernet0/1 sfp
  Small Form-factor Pluggable (SFP) at ethernet0/1
  LC connector
  10000-SR capable
  64B/66B encoding, nominal bitrate: 10300 Mbps
  Supported links
    50um multi mode fiber: 80 m
    62.5um multi mode fiber: 30 m
  Laser wavelength: 850 nm

Diagnostics                                    Normal          Warning
Entity            Status   Unit  Current      Low     High      Low     High
-------------------------------------------------------------------------------
Operating temp:   OK       C       40.88    -3.00    73.00    -5.00    75.00
Supply voltage:   OK       V        3.27     3.14     3.47     2.97     3.63
TX current:       OK       mA       5.30     2.00    11.00     1.00    12.00
TX output power:  OK       mW       0.55     0.32     0.66     0.25     0.83
RX input power:   ALRM(L)  mW       0.00     0.02     0.79     0.01     1.00

ibos#
```

Check the Uplink Interface

To check that the uplink interface gets an IP address from the network boot server, use the command **show ip bootp**.

Example 4. show ip bootp

```
ibos> show ip bootp
BOOTP Client state: Standby
              mode: Persistent
            serial: 0008.ae86.0440
            protos: http,tftp
           version: ibos-cma-7.5.0-ED-R

 Interface ethernet0/2
  BOOTP mode is Standby, interface is Up
  Last assigned: 10.130.1.29/30 gateway 0.0.0.0 server 10.66.110.10 (1D17h49m41s
 ago)
  Packet counters:
   1 sent, 1 received
   0 dropped due to erroneous data
   0 dropped because we couldn't comply
   0 with matching addresses, 1 used assignments

 Interface ethernet0/1
  BOOTP mode is Standby, interface is Up
  Last assigned: 10.130.1.2/30 gateway 10.130.1.1 server 10.66.110.10 (1D17h49m40s
 ago)
  Packet counters:
   1 sent, 1 received
   0 dropped due to erroneous data
   0 dropped because we couldn't comply
   0 with matching addresses, 1 used assignments

ibos#
```

Check OSPF

To check that OSPF Routing is functioning properly, display the active OSPF processes with the command **show ip ospf neighbor**.

Example 5. show ip ospf neighbor

```
ibos# show ip ospf neighbor
OSPF process 0:
Neighbor ID    Pri   State         Dead Time  Address        Interface
-------------------------------------------------------------------------------
10.130.0.1      1     Full/Backup   00:00:37   10.130.1.1      ethernet0/1
10.130.0.5      1     Full/DR       00:00:35   10.130.1.30     ethernet0/2
```

Appx A - Product Description

This appendix describes product details for specific models that may be required while installing the switch.

ASR 8000 Interfaces

- Four SFP+ module slots for 10 GigabitEthernet uplink ports
- ASR8024: Twenty four SFP+ module slots for 10 GigabitEthernet downlink ports
- ASR8048: Fourty eight SFP+ module slots for 10 GigabitEthernet downlink ports

Interface Specification

For a detailed specification and pictures of the interfaces for each specific model, refer to the *Product Overview*.

Technical Data

Physical Dimensions

Table 4. Physical Dimensions

ASR 8000
H x W x D (mm) = 43 x 441 x 240
Weight: 4 kg
Standard 19-inch rack mounting

Power and Safety

Power

- Single AC power input 100-240V, 50/60 Hz, compliant with ETSI EN 300132 V2.1.1 Part1.
- Single DC power input 12V, 15A.

Safety

- LVD (2014/35/EU)
- IEC/EN 60825-1, IEC/EN 60825-2
- CE mark: EN 62368-1:2014+A11
- CB scheme: IEC/EC 62368-1

EMC

- CE EMC (2014/30/EU)
- Emission:
  - EN55032: 2015+AC:2016 Class A
  - EN 61000-3-2: 2014
  - EN 61000-3-3: 2013
- Immunity:
  - EN55035: 2017
  - EN 61000-4-2 :2009
  - EN 61000-4-3:2006+A1:2008+A2:2010
  - EN 61000-4-4:2012
  - EN 61000-4-5:2014
  - EN 61000-4-6:2014
  - EN 61000-4-8:2010
  - EN 61000-4-11:2004

RoHS, WEEE and REACH

- RoHS 2011/65/EU and its subsequent amendments (EU) 2015/863
- WEEE 2012/19/EU
- SFS2016:1067
- REACH

Environmental

All ASR 8000 models:

- ASR8024/ASR8048: Operating temperature: 0° to 45° C
- ASR8024E/ASR8048E: Operating temperature: -20° to 70° C
- Storage temperature: -10° to 70° C
- Operating humidity: 5% to 95%, non-condensing
- Max heat dissipation:
  - ASR 8024 AC/DC: 35W
  - ASR 8024E AC/DC: 41W
  - ASR 8048 AC/DC: 85W
  - ASR 8048E AC/DC: 87W

Appx B - SFP Products

Overview

The Waystream SFP (Small Formfactor Pluggable) GigabitEthernet products are a series of optical transceiver modules that enable the ASR 8000 to be fitted with suitable network interfaces for different needs.

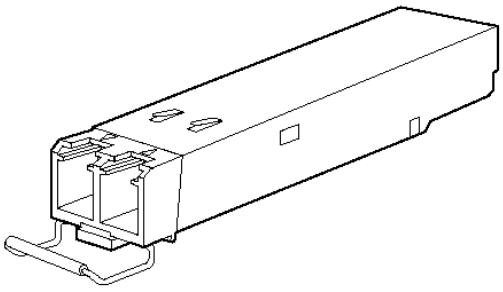
Using standardized safety requirements, the modules are certified for use together with the Waystream products.

Waystream-approved SFP modules have a serial EEPROM that contains the module serial number, the vendor name and ID, a unique security code, and cyclic redundancy checksum (CRC).

This manual does not describe the full product specifications for all approved SFP modules. Model and data for Waystream SFPs is listed in separate data sheets. The SFPs named in this document are used for examples only, and are not ranked in any preferential order.

All Waystream SFPs have bale-clasp latches for safe operation.

Figure 14. SFP with bale-clasp Latch



When the SFP is inserted, the ASR 8000 software reads the EEPROM to check the serial number, vendor name and ID, and recomputes the security code and CRC.

The SFP also provides link status information and other valuble statistics to determine the operation and quality of the connection to the adjacent device. This information is displayed using the iBOS command **show interface sfp**.

Warning

Use of non-Waystream approved SFPs will void the product warranty.

Safety

Before installing an SFP module or handling a Waystream broadband router equipped with SFP slots, you should read and understand the safety information in this document. Laser warnings only apply to fiber-optic SFP modules.

Table 5. Warning symbol

Table 6. Caution symbols

Warning

Class 1 laser product. Do not position your eye directly infront of the SFP if the dust plugs are not installed!

Warning

Laser beam is exposed when dust plug is removed and fiber not installed.

Warning

Only trained staff should install or replace SFPs.

Warning

Optical modules may reach temperatures in excess of 55 degrees. Risk of burn damage if touched or handled unprotected.

Caution

SFPs are electronic devices and sensitive to static electricity. Always use an ESD-preventive wrist strap when handling an SFP. ESD damages can cause performance and lifetime degradation.

Caution

Protect your fiber-optic components, like SFPs and cables, by inserting clean dust plugs when not connected to other equipment. Clean the optic components whenever you intend to connect them. Avoid getting dust and other contaminants into the optical receptacles, as fibre optics do not work correctly when obstructed with dust.

Caution

When using shorter distances of single-mode fiber cable, you may need to insert an inline optical attenuator in the link to avoid overloading the receiver. When the fiber-optic cable is less than 20 km and the link budget is more than 15dB, insert a 5 to 10 dB optical attenuator between the fiber-optic cable plant and the receiving port of the SFP.

Caution

Under no circumstances should the SFP insertion or removal require physical force. handling. Always be gentle and use only your thumb and index finger!

Insertion and Removal

When inserting or removing SFPs, always observe the following precautions:

- Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface on the chassis or the common ground connector at the back of the module.
- Hold the SFP modules by the side only and do not touch the connectors on the insertion end of the module

Note

For other SFPs, please see the manufacturer instructions for installation and removal.

Inserting an SFP module

1. Align the SFP module in front of the SFP slot. Note that the top side (with Waystream sticker) faces up for upper row slots but faces down for lower row slots. This allows more space for connecting the cables to the SFPs.
2. Carefully slide the SFP module into the slot until you feel the connector on the module snap into place.
3. Push the bale-clasp latch up until it locks the SFP in position.
4. Remove the dust plugs from the cable and the SFP. Clean the connectors and the SFP with dedicated fibre cleaning tools and carefully insert the cable(s) until they snap into place.
5. The SFP is now ready. The SFP state is indicated by the port LED

Note

Do not remove the dust plugs from the fiber-optic SFP module port or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the SFP module ports and cables from contamination and ambient light.

Removing an SFP Module

1. Disconnect the cable from the SFP module and reinstall the dust plugs.
2. All Waystream SFPs have bale-clasp latches. Gently pull the bale-clasp latch out and down until the SFP releases.

Note

For other SFPs, please see the manufacturer instructions for installation and removal

3. Place the removed SFP module in an antistatic bag or other protective environment.

Warning

Optical modules may reach temperatures in excess of 55 degrees. Risk of burn damage if touched or handled unprotected.

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