ARX® Hardware Reference Guide

MAN-0338-00

Publication Date

This manual was published on August 30, 2012.

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This product may be protected by U.S. Patents 7,877,511; 7,958,347. This list is believed to be current as of August 30, 2012.

Export Regulation Notice

This product may include cryptographic software. Under the Export Administration Act, the United States government may consider it a criminal offense to export this product from the United States.

RF Interference Warning

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This unit generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Any modifications to this device, unless expressly approved by the manufacturer, can void the user's authority to operate this equipment under part 15 of the FCC rules.

Canadian Regulatory Compliance

This Class A digital apparatus complies with Canadian ICES-003.

Standards Compliance

This product conforms to the IEC, European Union, ANSI/UL and Canadian CSA standards applicable to Information Technology products at the time of manufacture.

Acknowledgments

Revision History

June 2011 — Rev A. Software Release 6.0.0.

September 2011 — Rev B. Software Release 6.1.0.

December 2011 — Rev C. Software Release 6.1.1. ARX-1500/ARX-2500 status and alarm LEDs.

July 2012 — Rev D. Software Release 6.2.0. Removed references to ARX-1000, ARX-6000. Corrected count for copper ports on ARX-2500.

September 2012 — Rev E. Hardware Release. Added note regarding the alarm light on the ARX-1500 and ARX-2500. Added figures for ARX-1500+ and ARX-2500+.

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1

Introduction

Audience for this Manual

This manual is intended for field engineers and network administrators responsible for setting up and connecting the switch to a network at an enterprise data center.

Document Conventions

This manual uses the following conventions, when applicable:

- `consolas` text represents system output
- **bold** text represents user input
- *italic* text appears for emphasis, new terms, and book titles

Note

Notes provide additional or helpful information about the subject text.

Important

Important notices show how to avoid possible service outage or data loss.

WARNING

Warnings are instructions for avoiding damage to the equipment.

Danger notices help you to avoid personal injury.

Related Documents

In addition to this guide, the following F5 Data Solutions documentation is available:

- *Quick Installation Guide* for your hardware model.
- *ARX CLI Reference*
- *ARX CLI Network-Management Guide*
- *ARX CLI Storage-Management Guide*
- *ARX CLI Maintenance Guide*
- Online Help

Supported Protocols

The ARX supports numerous protocols. The following table lists the ports and services/protocols supported.

Table 1.1 *Ports Required by the ARX*

Port	Service/Protocol	Inbound VIP	Inbound XIP	Inbound MGMT	Outbound VIP	Outbound XIP	Outbound MGMT	Comment
ARX Management								
161	SNMP agent for polling UDP			✓				Disabled by default.
162	SNMP traps TCP/UDP			✓			✓	Disabled by default. The port is configurable.
22	SSH TCP			✓			✓	Enabled by default.
23	TELNET TCP			✓				Disabled by default.
443	HTTPS TCP			✓			✓	GUI enabled by default.
80	HTTP TCP			✓			✓	GUI disabled by default.
514	SYSLOG UDP							If External Syslog is used.
25	SMTP TCP						✓	For Email Home.
139	MMC TCP							
49803	RON UDP			✓			✓	Inband only.
20/21	FTP TCP						✓	Passive mode client only, no server.
	SCP						✓	Client, no server.
123	NTP TCP/UDP						✓	Disabled by default.
1812	RADIUS						✓	Disabled by default.
NFS Proxy								
111	rpcbind TCP/UDP	✓				✓		
2049	server V2 UDP/TCP	✓				✓		

Table 1.1 *Ports Required by the ARX*

Port	Service/Protocol	Inbound VIP	Inbound XIP	Inbound MGMT	Outbound VIP	Outbound XIP	Outbound MGMT	Comment
2049	server V3 UDP	✓				✓		
2049	locked TCP/UDP	✓				✓		
635	mountd TCP/UDP	✓				✓		
637	nlockmgr TCPUDP	✓				✓		
638	status TCP/UDP	✓				✓		
CIFS Proxy/SMB								
445	CIFS (SMB) Server TCP	✓				✓		Preferred port.
139	CIFS (SMB) Server TCP CIFS (SMB) over NETBIOS	✓				✓		
CIFS Authentication/Other								
53	DNS TCP/UDP					✓	✓	Queries.
389	LDAP TCP/UDP					✓	✓	
25805	NTLM agent default TCP					✓	✓	Default, port is configurable.
464	lc passwd					✓	✓	UDP and TCP
137/138	WINS UDP	✓				✓	✓	Name service
88	Kerberos TCP/UDP					✓	✓	
137, 138	NetBIOS TCP/UDP					✓	✓	
445	Microsoft Directory Services TCP					✓	✓	
NFS Authentication (NIS)								
	NIS UDP/TCP					✓	✓	Client, no server. Outbound only.
	DNS UDP/TCP					✓	✓	Client, no server. Outbound only.

Table 1.1 *Ports Required by the ARX*

Port	Service/Protocol	Inbound VIP	XIP	MGMT	Outbound VIP	XIP	MGMT	Comment
Snapshot Management to File Servers								
514	RSH (remote shell) TCP						✓	
22	SSH TCP						✓	Enabled by default.
598, 5986	WINRM (Windows Remote Management) TCP						✓	
High-Availability (HA)								
49800	“rendezvous”							
API (new in 5.2.0)								
83	HTTP-API			✓				
843	HTTPS-API			✓				

ARX Acronyms and Definitions

The following table defines the meaning of acronyms used in this document.

Table 1.2 *Acronyms and Definitions*

Acronym	Definition
AC	alternating current
ACM	Application Control Module
ACPI	Advanced Configuration and Power Interface
ASM	Adaptive Services Module
ARX	Adaptive Resource Switch
AWG	American Wire Gauge
BTU	British Thermal Unit
CIFS	Common Internet File System

***Table 1.2** Acronyms and Definitions (Continued)*

Acronym	Definition
DAS	Direct Attached Storage
DC	direct current
FRU	Field-Replaceable Unit
GbE	gigabit Ethernet
GND	ground (signal)
Hz	Hertz
IB	in-band
IDE	Integrated Drive Electronics
LED	light-emitting diode
LUN	logical unit number
MGMT	management port
NAS	Network Attached Storage
NFS	Network File System
NIC	network interface controller
NMI	non-maskable interrupt
NSM	Network Services Module
NVRAM	Non-Volatile Read-Only Memory
OOB	out-of-band
OCP	over-current protection
OVP	over-voltage protection
PCI-E	Peripheral Component Interconnect-Express
POST	Power On System Test
RAID1	Redundant Array of Independent Disks Level 1 (mirrored)
RON	Resilient Overlay Network
RU (as in 2RU)	rack unit
RxD	receive (signal)

***Table 1.2** Acronyms and Definitions (Continued)*

Acronym	Definition
SAS	Serial Attached SCSI
SATA	Serial ATA (Advanced Technology Attachment)
SCSI	Small Computer System Interface
SFP	small form factor pluggable
SNMP	Simple Network Management Protocol
TxD	transmit (signal)
U (as in 1U or 2U)	unit
VAC	Volts Alternating Current
VDC	Volts Direct Current

Contacting Customer Service

You can use the following methods to contact F5 Networks Customer Service:

F5 Networks Online Knowledge Base Online repository of answers to frequently-asked questions.	http://support.f5.com
F5 Networks Services Support Online Online customer support request system	https://websupport.f5.com
Telephone	Follow this link for a list of Support numbers: http://www.f5.com/support/support-services/contact/

Safety and Regulatory Notices

Important

The ambient room temperature range that the device can operate in is 5 – 35° C.

Important

Do not block power supply vents or otherwise restrict airflow when installing the device in a rack.

WARNING

Mechanical loading of rack should be considered so that the rack remains stable and unlikely to tip over.

Regulatory Compliance

The ARX complies with the safety and emissions requirements in the following table.

Table 1.3 *ARX Safety and Emissions Compliance.*

Category	Compliance
Safety	• UL 60950 • cUL listed to CSA C22.2 No. 950 • IEC950 (EN60950) CE Marking
Emissions	• FCC Part 15 Class A • CISPR22 Class A (EN55022) CE Marking • EN 55024 • VCCI Class A

FCC Compliance

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference when the device is operated in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the manufacturer could void your FCC-granted authority to operate this device.

Class A ITE Labe

l

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this device is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

Note the following radiation emission-related warning if the device is installed in a Class B environment.

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Class A Warning

警告使用者

這是甲類的資訊產品，在居住的環境中使用時，可能

會造成射頻干擾，在這種情況下，使用者會被要求採

取某些適當的對策。

Qualified Personnel Warning

WARNING

Only trained and qualified personnel should be allowed to install, replace, or service this device.

Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.

Battery Warning

小心-可能提供多個電源，維修前請斷開

所有電源，以便降低電擊風險

Environmental

High Temperature Warning

WARNING

To prevent the device from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 104° F (40° C). To prevent airflow restriction, allow at least 3 inches (7.6 cm) of clearance around the ventilation openings.

Pour éviter une surchauffe du commutateur, ne pas le faire fonctionner dans un local dont la température ambiante dépasse le maximum recommandé de 40 \xb0 C (104 F). Pour faciliter la circulation d'air, aménager un dégagement d'au moins 7,6 cm (3 pouces) autour des bouches d'aération.

Restricted Area Warning

WARNING

This device is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.

Warning for Rack-Mounting and Servicing

WARNING

To prevent bodily injury when mounting or servicing this device in a rack, you must take special precautions to ensure that it remains stable. The following guidelines are provided to ensure your safety:

- This device should be mounted at the bottom of the rack if it is the only device in the rack.
- When mounting this device in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the device in the rack.

Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:

- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

Power

International Power Cord Requirements

International power cords should have the following characteristics:

- Maximum length: 4.5 m/15 feet
- Female End: IEC-320-C13
- Capacity: 10A/250V
- Nominal Conductor size(s): 1.0mm2
- Approvals: Appropriate to the country in which it is to be used

Power Cord Usage

WARNING

The power supply cords were designed to be connected and used for F5 devices, and the safety for this purpose has been confirmed.

Please do not use them for other devices or usages. There may be danger of causing fire or electric shock..

注意 - 添付の電源コードを他の装置や用途に使用しない。
添付の電源コードは本装置に接続し、使用することを目的に設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないで下さい。火災や感電の原因となる恐れがあります。

Electric Shock Warning

The ARX is configured with the same number of power cords as power supplies. If you must remove AC power, disconnect each power cord before servicing the device.

L'ARX possède plusieurs blocs d'alimentation; prenez soin de débrancher tous les cables d'alimentation si vous souhaitez mettre l'équipement hors tension.

SELV Circuit Warning

WARNING

The ports labeled LINK, 1/1 through 1/6, CONSOLE, MGMT, MIRROR, and DEBUG are safety extra-low voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits.

Les ports étiquetés LINK, 1/1 through 1/6, CONSOLE, MGMT, MIRROR, et DEBUG sont des circuits de sécurité basse tension (safety extra-low voltage ou SELV). Les circuits SELV ne doivent être interconnectés qu'avec d'autres circuits SELV.

Circuit Breaker (15A)

WARNING

This device relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240 VAC, 10A international) is used on the phase conductors (all current-carrying conductors).

Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 120 V alt., 15 A U.S. maximum (240 V alt., 10 A international) est utilisé sur les conducteurs de phase (conducteurs de charge).

Power Supply Disconnection Warning

WARNING

Before working on a device or working near power supplies, unplug the power cord on AC units.

Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher lecordon d'alimentation des unités en courant.

Battery Handling Warning

WARNING

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

Laser Product Notice

The following laser warnings apply only to devices using fiber optics, such as the ARX-2500 and ARX-4000.

WARNING

Class 1 laser product.

Produit laser de classe I.

Class 1 lasers are defined as products which do not permit human access to laser radiation in excess of the accessible limits of Class 1 for applicable wavelengths and durations. These lasers are safe under reasonably foreseeable conditions of operation.

WARNING

Do not stare into the beam or view the beam with optical instruments.

Harmonized IC Label Requirements: The following statement is applicable to devices that are intended for market in Canada under the harmonized FCC-DOC EMI requirements. Equipment Requirements for devices imported into Canada shall bear both English and French translations as follows:

> This digital apparatus does not exceed the Class A or B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.
>
> This Class A or B digital apparatus complies with ICES-003.
>
> Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.
>
> Cet appareil numerique de la classe A or B est conforme a la norme NMB-003 du Canada.

2

ARX Overview

ARX Functional Overview

The F5 Adaptive Resource Switch (ARX) enables enterprises to globally access, manage, deliver and optimize information resources. The ARX offers the following features:

- Access. Simplified, flexible, location-independent access to enterprise-wide data.
- Data protection. Failover of large file systems, centralized backup, and scaled backup performance.
- Data migration. Seamless, transparent data migration across heterogeneous NAS, and file servers with DAS.
- Dynamically-tiered storage.
- Storage aggregation. Aggregation of multiple shares into a single client volume.
- Capacity management. Inline management of storage capacity to adapt the storage to client demands.
- Seamless storage addition/removal. Ability to add or remove storage without any effect on clients.
- Inline management of storage capacity to adapt the back-end storage to client demands.

The following table lists and describes the features for each ARX model.

Table 2.1 *ARX Models and Description*

Model	Description	Hardware Features
500	Cost-effective, small-form-factor device designed small data centers and branch/remote offices. Combines application processing and control, switch fabric throughput, and external interfaces in a single FRU (field-replaceable unit) compact design.	• Throughput (Fast Ethernet and Gigabit Ethernet): – Out-of-band management port – 100/1000 BASE-T client/server port for connecting network infrastructure and NAS – 100/1000 BASE-T port for a dedicated link to a redundant peer (called the redundancy link) – RJ-45 connector for serial console connection • Throughput: 100 MB/s • Height: 1U compact • Weight: 31 pounds • System status: LEDs on front panel • ACM status: LEDs on rear panel • Disk drives: 1 IDE hard disk • Power supply: not redundant

***Table 2.1** ARX Models and Description (Continued)*

Model	Description	Hardware Features
1500	Cost-effective, small-form-factor device designed for small data centers and branch/remote offices. Combines application processing and control, fabric throughput, and external interfaces in a single FRU (field-replaceable unit) compact design. Offers the same software features as other ARX platforms, differing only in performance and scale.	• Ports: 8 x 1GbE copper (1 MGMT/data and 7 data) • Throughput: 500MB/s • Files: 768M • Power supply: redundant • Disk drives: dual, hot-swappable • NVRAM: with SuperCap (No Battery required) • Height: 1U • Weight: 22.5 pounds • Shipping weight: 35 pounds (includes packaging) • Licensing and entitlement tracking: F5 Licensing
2000	Cost-effective, small-form-factor device designed for use in small data centers and branch/remote offices. Combines application processing and control, switch fabric throughput, and external interfaces into a single FRU (field-replaceable unit) compact design. Offers the same software features as the other ARX platforms, differing only in performance and scale.	• Throughput (Fast Ethernet and Gigabit Ethernet): – 10/100/1000 Mbps out-of-band management port – 100/1000 BASE-T client/server port for connecting network infrastructure and NAS – 100/1000 BASE-T ports (12, copper) for for connectivity to network infrastructure – RJ-45 connector for serial console connection • Height: 2U compact • Weight: 35 pounds • Power supply: auto-sensing, redundant (110-220V) • Disk drives: 146GB internal SAS drives (2), hot-swappable, configured as RAID1 • AC power cords (2): rated for 15 A/120 VAC with IEC-320 type connector • Box-to-box failover capability for redundancy

***Table 2.1** ARX Models and Description (Continued)*

Model	Description	Hardware Features
2500	Cost-effective, small-form-factor device designed for use in small data centers and branch/remote offices. Similar to the ARX-2000, the ARX-2500 combines application processing and control, switch fabric throughput, and external interfaces into a single FRU (field-replaceable unit) compact design. It offers the same software features as the other ARX platforms, differing only in performance and scale.	• Ports: 1 MGMT/data, 3 1 GbE, and 2 x 10GbE (optical with SFP+ transceivers) • Throughput: 400 to 500 MB/s • Files: 1536M • Power supply: redundant • Disk drives: dual, hot-swappable • NVRAM: with SuperCap (no battery required) • Height: 1U • Weight: 22.5 • Shipping weight: 35 pounds (includes packaging) • Licensing and entitlement tracking: F5 Licensing
4000	Cost-effective device that combines application processing and control, switch fabric throughput, and external interfaces into a compact design consisting of 2 FRUs (field-replaceable units). Includes a removable front bezel which, when attached, covers all components except the Ethernet ports and a set of data plane LEDs.	• Throughput (Ethernet): – Serial console port – 10/100 Mbps out-of-band management port – 100/1000 gigabit (12 ports, copper) – 10-gigabit (2 ports, fiber-optic) • Throughput: 1050 MB/s • Height: 4U compact (2U control plane, 2U data plane) • Weight: 96 pounds • Box-to-box failover capability for redundancy • Single bezel covering control and data plane components • AC power cords (4): 15 amp, 110 volts and 220 volts • PCI-E interconnect cable (control plane to data plane) • System status: front control panel LEDs that indicate port activity, disk drive activity, system status, and power • Status: front data panel LEDs that indicate PCI link status, NVRAM battery status, power supply status, and various operational states

Table 2.1 ARX Models and Description (Continued)

Model	Description	Hardware Features
		• Power supplies: (4) with the following characteristics: 1:1 redundant, load-sharing, universal, auto-sensing, hot-swappable (110 volts and 220 volts) • Disk drives (2): 146 GB internal SAS disks, hot-swappable, configured as RAID1

ARX Platform Models

The various ARX models are shown in the following figures:

Figure 2.1 ARX-500

Figure 2.2 ARX-1500

Figure 2.3 ARX-1500+

The ARX-1500 and the ARX-1500+ appliances are functionally equivalent. The ARX-1500+ introduces a new hard disk drive (HDD) tray. This new disk tray contains 2 LEDs on the disk tray, replacing the single disk LED on the main face plate of the ARX-1500 appliance. The new platform also includes fans that run at a faster speed. Users may notice that the units run louder and produce a greater air flow.

The disk LED indicator design has changed from the old appliance design to the new appliance design. The disk LED indicator was moved from the appliance face plate to the disk tray sled. Included with the new disk drive sled tray are two LED indicators. The LED on the left indicates power and the LED on the right indicates disk activity.

For supporting detail on the LEDs, see *ARX-1500 Hard Disk Drive LEDs, on page 4-11*.

The new HDD tray cannot be used in the older appliances, and old HDD disk trays cannot be used in the new appliances.

Figure 2.4 *ARX-2000*

Figure 2.5 ARX-2500

Figure 2.6 ARX-2500+

The ARX-2500 and the ARX-2500+ appliances are functionally equivalent. The ARX-2500+ introduces a new hard disk drive (HDD) tray. This new disk tray contains 2 LEDs on the disk tray, replacing the single disk LED on the main face plate of the ARX-2500 appliance. The new platform also includes fans that run at a faster speed. Users may notice that the units run louder and produce a greater air flow.

The disk LED indicator design has changed from the old appliance design to the new appliance design. The disk LED indicator was moved from the appliance face plate to the disk tray sled. Included with the new disk drive sled tray are two LED indicators. The LED on the left indicates power and the LED on the right indicates disk activity.

For supporting detail on the LEDs, see *ARX-2500 Hard Disk Drive LEDs, on page 4-20*.

The new HDD tray cannot be used in the older appliances, and old HDD disk trays cannot be used in the new appliances.

ARX-4000

Redundant Pairs

You can purchase two ARX devices and configure them as a redundant pair. If the primary switch fails, all services *fail over* to the secondary switch. The redundant switches are interconnected through one or more of their gigabit Ethernet ports. You can use the CLI to configure the ports for redundant-link traffic (as opposed to client/server traffic). This provides a highly-available (HA) service with fault tolerance and no single point of failure.

This redundant design provides the following features:

- For two switches in a redundant pair, one switch starts as primary and the other switch starts as secondary. If a module in the primary switch fails, the switch fails over to the secondary.
- RAID Level 1 protected boot/configuration disk drives.
- Redundant power supplies installed to share the power load.
- Redundant connections to the fan tray.
- Redundant AC/DC power.

For information about configuring redundant switches, see the *ARX® CLI Network-Management Guide* and *ARX® CLI Reference*.

If you are installing the second switch in a redundant pair, there are differences in the initial-boot procedure. Consult the hardware installation guide for your specific ARX platform.

Resilient Overlay Network

You can connect multiple ARX devices through one or more gigabit Ethernet ports to form a Resilient Overlay Network (RON), a series of IP tunnels between the switches. The switches in a RON can be of any platform type.

The RON provides a network for distributing and accessing file storage. ARX devices can replicate storage to other switches in the same RON, updating the replicas periodically as the writable master files change. This

process is called *shadow copy*. With shadow copy, clients are granted read-only access to shadow target volumes at multiple geographic locations, independent of where the shadow source volume resides.

For some platforms, the link between redundant peers runs over a RON tunnel.

For information about configuring RON tunnels, see the *ARX® CLI Network-Management Guide*, the *ARX® CLI Reference,* or if you use the ARX Manager, use the online Help.

Managing the Switch

For local and remote management, the ARX provides the following management interfaces:

- Serial console port for access and management through a local (serial) console terminal and the CLI (labeled CONSOLE).
- Out-of-band 10/100/1000 Ethernet port for accessing the CLI or the ARX Manager from your management network (labeled MGMT).
- Inband Ethernet interfaces for accessing client/server networks.

For general information about using the CLI, see the *ARX CLI Network-Management Guide* and *ARX CLI Reference*.

Some ARX models offer additional management interfaces, as follows:

- Gigabit Ethernet Interfaces (copper), used to access the CLI from client or server networks (ARX-2500 and ARX-4000).
- 10-gigabit Ethernet interfaces (optical), used to access the CLI from client or server networks (ARX-2500 and ARX-4000).

3

System Specifications

System Specifications

For details on system specifications for each platform, choose from the following:

ARX-500 System Specifications

The following table lists the ARX-500 system specifications.

Table 3.1 *ARX-500 System Specifications*

Component	Specification
Chassis Dimensions	Height: 1.703 in. Width: 16.930 in. Depth: 26.457 in.
Chassis Weight	31 lb (14.061 kg)
Power Load	8.55 amps @ 110Vac, 4.3 amps @ 220Vac
Environmental Requirements	Altitude -200 ft. (-60 m) min. to 8000 ft. (2500 m) max.
	Humidity Operating: 90% relative humidity (non-condensing) at 30 deg. C Storage: 5% to 95%
	Temperature Operating: 50 deg. to 95 deg. F (10 deg. to 35 deg. C) Storage: -40 deg. to 158 deg. F (-40 deg. to 70 deg. C)

ARX-1500 System Specifications

The following table describes the ARX-1500 system specifications.

***Table 3.2** ARX-1500 System Specifications*

Component	Specification
Chassis Dimensions	Height: 44.5 mm (1.75 in.) Width: 443 mm (17. 44 in.) Depth: 481 mm (18.93 in.)
Chassis Weight	Weight: 22.5 lb (10.2 kg)
Power Load	2.5A @ 110V, 1.3A @ 220V
AC/DC Power Supply	Input 100Vac @ 4 Amps/240Vac @ 2Amps, 47-63Hz 100-240VAC, 47-63Hz, 4-2A
Environmental Requirements	Altitude 60m (197ft) min. to 1800m (6000 ft) max.
	Humidity Operating: 10% min. to 95% max. (non condensing) Storage: 5% to 95%
	Temperature Operating: 32 deg. to 104 deg. F (0 deg. to 40 deg. C) Storage: -40 deg. to 149 deg. F (-20 deg. to 65 deg. C)

ARX-2000 System Specifications

The following table describes the ARX-2000 system specifications.

***Table 3.3** ARX-2000 System Specifications*

Component	Specification
Chassis Dimensions (includes front bezel)	Height: 3.5 in. Width: 19.00 in. (including mounting ear assemblies) Depth: 24 in.
Chassis Weight	40 lb (18.14 kg)
Power Consumption	Typical power consumption: 2.5A @ 110VAC (280W; 0.98 PF) Maximum power consumption: 8.4A @ 100VAC (maximum rated current) Maximum rated power: 450W (maximum rated power)

Table 3.3 *ARX-2000 System Specifications (Continued)*

Component	Specification
AC/DC Power Supply	700 Watts 1+1 redundancy > 80% efficiency Input: 100VAC – 240VAC, 47/63HZ Output: -12V @ 1A, +3.3V @ 32A, +5V 30A, +12V 62A
Environmental Requirements	Altitude -200 ft. (-60 m) min. to 8000 ft. (2500 m) max. Humidity Operating: 5 % min. to 95% max. (non condensing) Storage: 5% to 95% Temperature Operating: 41 deg. to 95 deg. F (5 deg. to 35 deg. C) Storage: -4 deg. to 149 deg. F (-20 deg. to 65 deg. C)

ARX-2500 System Specifications

The following table describes the ARX-2500 system specifications.

Table 3.4 *ARX-2500 System Specifications*

Component	Specification
Chassis Dimensions	Height: 44.5 mm (1.75 in.) Width: 443 mm (17. 44 in.) Depth: 481 mm (18.93 in.)
Chassis Weight	22.5 lb (10.2 kg)
Power Load	2.5A @ 110V, 1.3A @ 220V
AC/DC Power Supply	Input 100Vac @ 4 Amps/240Vac @ 2Amps, 47-63Hz 100-240VAC, 47-63Hz, 4-2A

***Table 3.4** ARX-2500 System Specifications (Continued)*

Component	Specification
Environmental Requirements	Altitude 60m (197ft) min. to 1800m (6000 ft) max
	Humidity Operating: 5% min. to 95% max. (non condensing) Storage: 5% to 95%
	Temperature Operating: 32 deg. to 104 deg. F (0 deg. to 40 deg. C) Storage: -40 deg. to 149 deg. F (-20 deg. to 65 deg. C)

ARX-4000 System Specifications

The following table describes the ARX-4000 system specifications.

***Table 3.5** ARX-4000 System Specifications*

Component	Specification
Chassis Dimensions (includes front bezel)	Height: 7.00 in. Width: 19.00 in. (including the fixed mounting ears) Depth: 24.0 in.
Chassis Weight	96 lb (43.54 kg)
Power Load	Control plane: 5.5 amps @ 110VAC and 2.75 amps @ 220VAC Data plane: 3.5 amps @ 110VAC and 1.75 amps @ 220VAC
Environmental Requirements	Altitude –200 ft. (–60 m) min. to 8000 ft. (2500 m) max.
	Humidity Operating: 5 % min. to 95% max. (non condensing) Storage: 5% to 95%
	Temperature Operating: 50° to 95° F (10° to 35° C) Storage: -40° to 149° F (-20° to 65° C)

System Power Requirements

For details on the system power requirements for all the ARX models, choose from the following:

ARX-500 System Power Requirements

The ARX-500 power supply:

- Distributes up to 600 Watts of DC power to the chassis components.
- Runs at 72% efficiency.
- Consumes up to 833 Watts of AC power (833/0.72) to meet the 600-Watt demand.
- Equivalent to 2,843 BTUs/hour.

ARX-1500 System Power Requirements

The ARX-1500 is powered by two power supplies (1+1 redundancy) system) consisting of two power modules and one power system frame.

Two power modules are recommended for full redundancy and load-sharing.

The power supplies require a 10A / 220VAC input cord, which is provided with the chassis. The AC outlet to the switch must be properly grounded.

ARX-2000 System Power Requirements

The ARX-2000 uses two power supplies (1+1 redundancy).

The power supplies:

- Distribute up to 700 Watts of DC power to the chassis components.
- Run at a minimum of 80% efficiency.
- Consume up to 563 Watts of AC power (700 * 0.80).
- Equivalent to 1,536BTUs/hour.
- Require a 10A / 220VAC input cord, which is provided with the chassis. The AC outlet to the switch must be properly grounded.

ARX-2500 System Power Requirements

The ARX-2500 is powered by two power supplies (1+1 redundancy) consisting of two power modules and one power system frame. Two power modules are recommended for full redundancy and load-sharing.

The power supplies require a 10A / 220VAC input cord, which is provided with the chassis. The AC outlet to the switch must be properly grounded.

ARX-4000 System Power Requirements

The ARX-4000 chassis dissipates 975 watts of power. The control plane dissipates 600 watts and the data plane dissipates 375 watts. This is equivalent to 3328 BTUs/hour.

Cable Requirements

For details on the cable requirements for all the ARX models, choose from the following:

- *ARX-500 Cable Requirements, on page 3-8*
- *ARX-1500 Cable Requirements, on page 3-9*
- *ARX-2000 Cable Requirements, on page 3-10*
- *ARX-2500 Cable Requirements, on page 3-11*
- *ARX-4000 Cable Requirements, on page 3-12*

ARX-500 Cable Requirements

The following table lists the required cables and power cords for the ARX-500.

All cables are customer-supplied *except* the AC power cord and console cable.

Table 3.6 *ARX-500 Required Power and Data Cables*

Qty.	Cable/Cord	Used on...	Specification
1	AC power cord	AC/DC power supply	Choose from the cables shipped with the switch: • 20 A/250 Vac or • 15 A/120 Vac Both have IEC-320-type connectors.

***Table 3.6** ARX-500 Required Power and Data Cables (Continued)*

Qty.	Cable/Cord	Used on...	Specification
			For sites in Europe and Great Britain, a power cord is shipped that is compatible with local standards.
1	Console cable with RJ-45-to-DB9 adapter	Serial console interface (labeled 10101 on rear panel)	100 BASE-T Category 5 unshielded twisted pair (UTP); 24 AWG
1	Ethernet cables for connection to 10/100 Mbps Ethernet management port (RJ-45 connector)	OOB management interface (labeled "2" on the rear panel)	
2	Ethernet cables for connection to 100/1000 Mbps Ethernet (RJ-45 connectors)	Copper Gigabit Ethernet ports (2): • Client/server traffic (port 1/1) • Dedicated redundancy link (port 1/2)	[a]100/1000 BASE-T Category 5/6, unshielded twisted pair (UTP) cable; 24 AWG

a.Gigabit Ethernet ports support automatic MDI/MDIX cross-over. This feature automatically corrects the polarity of the attached CAT5 cable, regardless whether it is a cross-over or straight-through type. However, for this feature to work, the port speed must be set to auto (auto-negotiate) through the CLI. When the port speed/duplex is forced (auto-negotiate is disabled), automatic MDI/MDIX cross-over is disabled, and you must cable the port using standard cross-over or straight-through cabling.

ARX-1500 Cable Requirements

The following table lists the required cables and power cords for the switch.

All cables are customer-supplied *except* the AC power cord and console cable.

***Table 3.7** ARX-1500 Required Power and Data Cables*

Qty.	Cable/Cord	Used on...	Specification
2	AC power cord	AC/DC power supply	10A/220 VAC
1	Console cable with RJ-45-to-DB9 adapter	Console port (labeled CONSOLE)	100 BASE-T Category 5 unshielded twisted pair (UTP); 24 AWG

***Table 3.7** ARX-1500 Required Power and Data Cables (Continued)*

Qty.	Cable/Cord	Used on...	Specification
1	Ethernet cable (RJ-45 connector)	Management port (labeled MGMT)	
4	Ethernet cable (RJ-45 connectors)	Gigabit Ethernet ports, copper	[a]100/1000 BASE-T Category 5/6, unshielded twisted pair (UTP) cable; 24 AWG

a.Gigabit Ethernet ports support automatic MDI/MDIX cross-over. This feature automatically corrects the polarity of the attached CAT5 cable, regardless whether it is a cross-over or straight-through type. However, for this feature to work, the port speed must be set to auto (auto-negotiate) through the CLI. When the port speed/duplex is forced (auto-negotiate is disabled), automatic MDI/MDIX cross-over is disabled, and you must cable the port using standard cross-over or straight-through cabling.

ARX-2000 Cable Requirements

The following table lists the required cables and power cords for the switch.

All cables are customer-supplied *except* the AC power cord and console cable.

***Table 3.8** ARX-2000 Required Power and Data Cables*

Qty.	Cable/Cord	Used on...	Specification
2	AC power cord	AC/DC power supply	15 A/120 VAC with IEC-320 type connector
1	Console cable with RJ-45-to-DB9 adapter	Console port (labeled CONSOLE)	100 BASE-T Category 5 unshielded twisted pair (UTP); 24 AWG
1	Ethernet cable (RJ-45 connector)	Management port (labeled MGMT)	
4	Ethernet cable (RJ-45 connectors)	Gigabit Ethernet ports, copper	[a]100/1000 BASE-T Category 5/6, unshielded twisted pair (UTP) cable; 24 AWG

a.Gigabit Ethernet ports support automatic MDI/MDIX cross-over. This feature automatically corrects the polarity of the attached CAT5 cable, regardless whether it is a cross-over or straight-through type. However, for this feature to work, the port speed must be set to auto (auto-negotiate) through the CLI. When the port speed/duplex is forced (auto-negotiate is disabled), automatic MDI/MDIX cross-over is disabled, and you must cable the port using standard cross-over or straight-through cabling.

ARX-2500 Cable Requirements

The following table lists the required cables and power cords for the switch.

All cables are customer-supplied *except* the AC power cord and console cable.

Table 3.9 *ARX-2500 Required Power and Data Cables*

Qty.	Cable/Cord	Used on...	Specification
2	AC power cord	AC/DC power supply	10A/220 VAC
1	Console cable with RJ-45-to-DB9 adapter	Console port (labeled CONSOLE)	100 BASE-T Category 5 unshielded twisted pair (UTP); 24 AWG
1	Ethernet cable (RJ-45 connector)	Management port (labeled MGMT)	
2	Fiber-optic cables for connection to 10-Gbps Ethernet X2 MSA-compliant form factor	10-gigabit Ethernet ports	10G BASE-SR (gigabit Ethernet) fiber cable: Short-reach multi-mode fiber (MMF) with duplex LC-style connectors. Distances up to 82m on 50/125um MMF, or 26m on 62.5/125um MMF.
4	Ethernet cable (RJ-45 connectors)	Gigabit Ethernet ports, copper	[a]100/1000 BASE-T Category 5/6, unshielded twisted pair (UTP) cable; 24 AWG

a.Gigabit Ethernet ports support automatic MDI/MDIX cross-over. This feature automatically corrects the polarity of the attached CAT5 cable, regardless whether it is a cross-over or straight-through type. However, for this feature to work, the port speed must be set to auto (auto-negotiate) through the CLI. When the port speed/duplex is forced (auto-negotiate is disabled), automatic MDI/MDIX cross-over is disabled, and you must cable the port using standard cross-over or straight-through cabling.

ARX-4000 Cable Requirements

The following table lists the required power cords and cables.

All cables are customer-supplied *except* the AC power cord and console cable.

Table 3.10 *ARX-4000 Required Cables and Power Cords*

Qty.	Cord/Cable	Used on...	Specification
4	AC power cords	AC/DC power supplies	You can choose from the following types of cables shipped with the switch: • 20 A/250 VAC or • 15 A/120 VAC Both types have IEC-320 type connectors.
1	Console cable (flat, crossover) with RJ-45-to-DB9 adapter	Console port	100BASE-T Category 5 unshielded twisted pair (UTP); 24 AWG
1	PCI-E interconnect cable	Control plane to data plane	
1	Ethernet cable for connection to 10/100/1000 Mbps Ethernet management port (RJ-45 connector)	Management interface	
12	Ethernet cables for connection to 100/1000 Mbps Ethernet (RJ-45 connectors)	Gigabit Ethernet ports	[a]100/1000BASE-T Category 5/6, unshielded twisted pair (UTP) cable; 24 AWG
2	Fiber-optic cables for connection to 10-Gbps Ethernet X2 MSA-compliant form factor	10-gigabit Ethernet ports	10GBASE-SR (gigabit Ethernet) fiber cable: Short-reach multi-mode fiber (MMF) with duplex SC-style connectors. Distances up to 300m on 50/125um MMF, or 33m on 62.5/125um MMF.

a.Gigabit Ethernet ports support automatic MDI/MDIX cross-over. This feature automatically corrects the polarity of the attached CAT5 cable, regardless of whether it is a cross-over or straight-through type. However, for this feature to work, the port speed must be set to auto (auto-negotiate) through the CLI. When the port speed/duplex is forced (auto-negotiate is disabled), automatic MDI/MDIX cross-over is disabled, and you must cable the port using standard cross-over or straight-through cabling.

Cable Connectors

The serial console port requires a rollover cable (RJ-45 to RJ-45) that is included with the ARX-installation kit. This cable is sufficient for connecting to a Terminal Server. For a direct connection to the serial port on a management station (such as a laptop), an RJ-45 to DB9 adapter is also included in the kit.

Figure 3.1 *RJ-45 Male Connector*

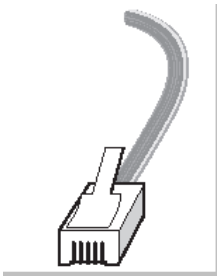


Figure 3.2 *RJ-45 to Serial DB9 Adapter*

Pinout Assignments

The pinout assignments for the ARX-500, ARX-2000, and ARX-4000 are identical. The ARX-1500 and ARX-2500 have a different pinout.

Pinout Assignments for ARX-500, ARX-2000, and ARX-4000

The following table lists the RJ-45 pinout assignments for the rollover cable and the adapter.

The left column shows the transmit (TxD), ground (GND), and receive (RxD) signals. and the right column shows the signals reversed at the console device. The intervening columns show the pins that carry each of those signals.

Table 3.11 *SCM/ACM console port signaling/cabling for ARX-500, ARX-2000, and ARX-4000.*

SCM/ACM Console Port	RJ-45 Rollover Cable			RJ-45 to DB9 Adapter			Console Device
DTE Signal	**RJ-45 Pinout**	**USOC Color**	**RJ-45 Pinout**	**RJ-45 Pinout**	**T568 Color**	**DB9F Pinout**	**DTE Signal**
TxD	3	yellow	6	6	yellow	2	RxD
GND	4	green	5	5	green	5	Signal Ground
GND	5	red	4	4	red		
RxD	6	black	3	3	black	3	TxD

Pinout Assignments for the ARX-1500 and the ARX-2500

The following table shows the pinout assignments for the ARX-1500 and the ARX-2500.

Table 3.12 *Pinout assignments for theARX-1500 and the ARX-2500*

Signal Type	RJ45 Pin Numbers
RTS	1
DTR	2
TD	3
SGND	4
RI	5
RD	6
DSR	7
CTS	8

SFP Optical Connector for the ARX-500

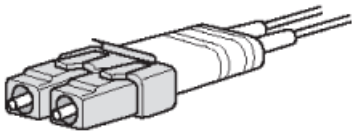
The gigabit Ethernet optical ports use small form-factor pluggable (SFP) optical transceivers that accept LC-style multi-mode fiber connectors. These

are for connection to Ethernet over fiber-optic cable.

Important

Fiber-optic ports are shipped with SFP optics installed. These ports must be protected by a rubber grommet filler or a cable connector at all times to prevent dust from collecting in the transceiver.

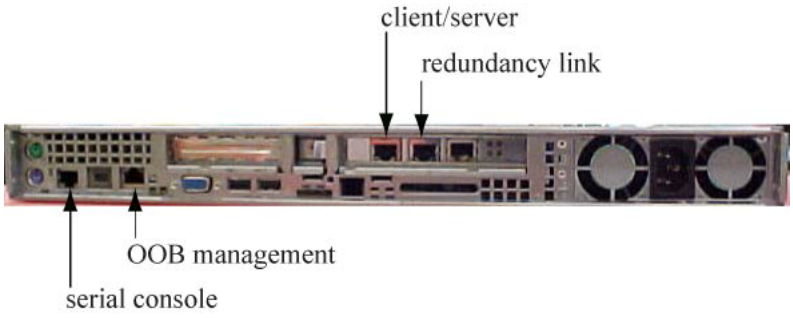
Figure 3.3 *Rubber grommet filler or a cable connector*



ARX-500 Connectors

The ARX-500 has four rear-panel ports for cabling, as shown in the following figure.

Figure 3.4 *ARX-500 rear-panel ports*



The following table describes the cable connectors used on the ARX-500.

Table 3.13 *ARX-500 Cable Connectors*

Interface	Connector	Purpose
serial console (labeled 10101)	RJ-45	Serial port for CLI access
OOB management (labeled 2)	RJ-45	100/1000 BASE-T Ethernet (copper) port for CLI access

***Table 3.13** ARX-500 Cable Connectors (Continued)*

Interface	Connector	Purpose
client/server port (labeled Port 1/1)	RJ-45	100/1000 BASE-T Ethernet (copper) port for client/server traffic and inband management
redundancy-link port (labeled Port 1/2)	RJ-45	100/1000 BASE-T Ethernet (copper) port for dedicated connection to a redundant peer

ARX-1500 Connectors

The following table describes the cable connectors used on the ARX-1500.

***Table 3.14** ARX-1500 Cable Connectors*

Interface	Connector	Purpose
Console (labeled CONSOLE on back of switch)	RJ-45	Serial port for CLI access
Management (labeled MGMT on back of switch)	RJ-45	Ethernet port for CLI or GUI access
Gigabit Ethernet (on front of switch)	RJ-45	100/1000 BASE-T Ethernet ports for access to client/server networks

ARX-2000 Connectors

The following table describes the cable connectors used on the ARX-2000.

***Table 3.15** ARX-2000 Cable Connectors*

Interface	Connector	Purpose
Console (labeled CONSOLE on back of switch)	RJ-45	Serial port for CLI access
Management (labeled MGMT on back of switch)	RJ-45	Ethernet port for CLI or GUI access
Gigabit Ethernet (on front of switch)	RJ-45	100/1000BASE-T Ethernet ports for access to client/server networks

ARX-2500 Connectors

The following table describes the cable connectors used on the ARX-2500.

***Table 3.16** ARX-2500 Cable Connectors*

Interface	Connector	Purpose
Console (labeled CONSOLE on back of switch)	RJ-45	Serial port for CLI access
Management (labeled MGMT on back of switch)	RJ-45	Ethernet port for CLI or GUI access
Gigabit Ethernet		
Optical ports	small form-factor Pluggable (SFP) Connectors are available to support short-reach or long-reach fiber cable.	Optical ports for 10-Gbps Ethernet connections over multi mode fiber (2)
Copper ports	RJ-45 Connectors are available to support short-reach copper cable.	100/1000 Base-T Ethernet ports (4)

ARX-4000 Connectors

The following table describes the cable connectors used on the ARX-4000.

***Table 3.17** ARX-4000 Cable Connectors*

Interface	Connector	Purpose
Serial console port	RJ-45	Serial console port for CLI access. Requires a serial rollover cable (RJ-45 to RJ-45) that is included in the Accessory Kit. This cable is sufficient for connecting to a terminal server. Do not use an Ethernet cable. For a direct connection to the serial port on a management station (such as a laptop), an RJ-45 to serial DB9 adapter is also included in the Accessory Kit.

Table 3.17 *ARX-4000 Cable Connectors (Continued)*

Interface	Connector	Purpose
Out-of-band management port	RJ-45	Ethernet port for CLI or GUI access
Gigabit Ethernet copper ports	RJ-45	100/1000 BASE-T Ethernet ports
10-gigabit Ethernet optical ports	X2 MSA form factor	Optical ports (2) for 10-gigabit Ethernet connections over multi-mode fiber. Shipped with small form-factor pluggable (SFP) optical transceivers installed. Transceivers accept SC-style multi-mode fiber connectors for connection to Ethernet over fiber-optic cable.
		Important *Ports must be protected by blank covers, a rubber grommet filler, or a cable connector at all times to prevent dust from collecting in the transceiver.*

4

Switch Hardware and Functionality

Chassis Overview

For details on your chassis model, choose from the following:

ARX-500 Chassis Overview

The ARX-500 is a 1U chassis designed for a standard 19-inch rack installation to maintain proper ventilation and cooling.

The front panel of the ARX-500 includes the control panel with its components and indicators such as the power and reset buttons and the NIC and status LEDs. When attached, the removable bezel covers all components except the LEDs.

The following figure shows the front of the ARX-500 with the bezel attached.

Figure 4.1 *ARX-500 Front Panel – Bezel Attached*

The following figure shows the front of the ARX-500 with the bezel removed.

Figure 4.2 *ARX-500 Front Panel – Bezel Removed*

The control panel is on the right side of the front panel. Components on the control panel are called out in the following figure; functions are described in *Table 4.1*.

Figure 4.3 *ARX-500 Front Panel Components* .

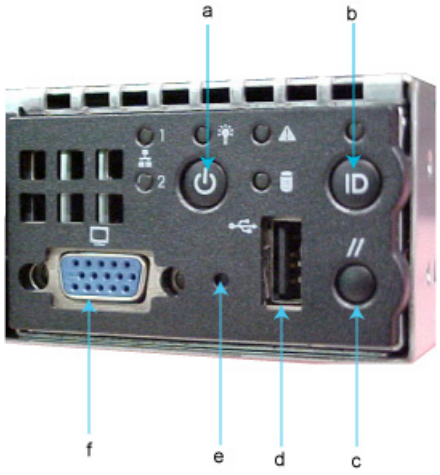


Table 4.1 *ARX-500 Front Panel Components and Functions*

Callout	Component	Function
a	Power/sleep button	Toggles power to the device on and off. The sleep feature is for ACPI-compatible operating systems.
b	System ID button	Causes two ID LEDs to light: one on the front panel and one on the rear panel. On earlier models, the LEDs both blinked 14 times and then stopped; on newer models, they light up until the button is pressed again. This is useful for locating the device.
c	Reset button	Reboots the switch.
d	USB 2.0 port	For field personnel only.
e	NMI button	Unsupported.
f	Video port	For field personnel only. Enables the attachment of a video monitor to the front of the chassis. You cannot use the front and rear video ports at the same time.

ARX-500 LED Indicators

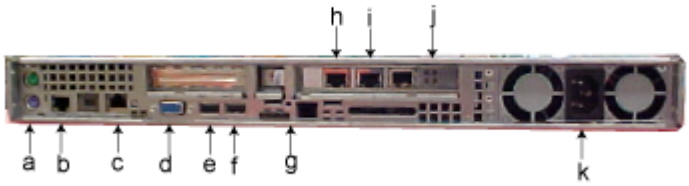
The following sections describe the ARX-500 LEDs, including:

- *ARX-500 Rear Panel Ports and LEDs, on page 4-5*
- *ARX-500 Front Panel LEDs, on page 4-7*
- *ARX-500 ACM Status LEDs, on page 4-8*

ARX-500 Rear Panel Ports and LEDs

The rear panel of the ARX-500 includes the I/O connectors, AC power connectors and the rear panel LEDs shown in the following figure and *Figure 4.5*.

Figure 4.4 *ARX-500 Rear Panel Ports and LEDs*



The following table lists and describes the rear panel ports and LEDs:

Table 4.2 *ARX-500 Rear Panel Ports and LEDs*

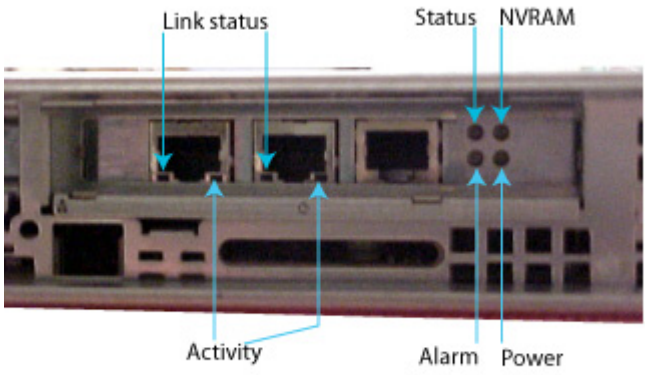
Callout	Feature	Function
a	Keyboard and mouse ports	For field personnel only
b	Serial console port	Serial interface for the CLI (labeled 10101).
c	OOB management port	Ethernet port for accessing the CLI or GUI (NIC2, labeled 2).
d	Video port	Enables the attachment of a video monitor to the rear of the chassis. You cannot use the front and rear video ports at the same time. As with the front video port, this port is for field personnel only.
e	USB 2.0 port	For field personnel only.
f	Second USB 2.0 port	For field personnel only.
g	ID LED	Flashes 14 times when the ID button on the front panel is pressed.

***Table 4.2** ARX-500 Rear Panel Ports and LEDs (Continued)*

Callout	Feature	Function
h	Client/server port	Ethernet port for all client/server traffic (copper, 1000/100 Base-T, labeled Port 1/1). Can be used for inband management.
i	Redundancy-link port	Dedicated connection to a redundant peer (copper, 1000/100 Base-T, Port 1/2).
j	ACM LEDs (4)	For details, see *ARX-500 ACM Status LEDs, on page 4-8*.
k	Connector for power cord	

The following figure shows the rear panel port and system status LEDs.

***Figure 4.5** ARX-500 Rear Panel LEDs.*



The two communication ports on the ARX-500, the client/server port and redundancy-link port, each have two LEDs located in their lower corners. Status and activity are conveyed as follows:

- Link-status LED: Located in the lower left; steady green indicates that the link is established.
- Activity LED: Located in the lower right; blinking yellow indicates packet traffic.

ARX-500 Front Panel LEDs

The ARX-500 LEDs are located on the right side of the control panel.

LEDs on the control panel are called out in the following figure. Each LED's function is described in *Table 4.3*.

Figure 4.6 *ARX-500 Front Panel LEDs .*

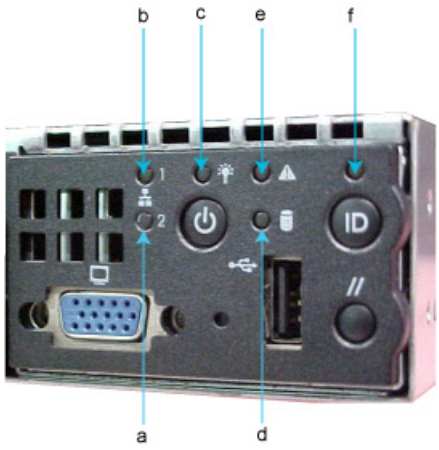


Table 4.3 *ARX-500 Front Panel LEDs*

Callout	LED	Function
a	Out-of-band management (NIC2)	Continuous green light indicates a link between the system and the management network to which it is connected. Blinking green light indicates network activity.
b	NIC1	Not supported.
c	Power	Continuous green light indicates the system has power applied to it. No light indicates the power is off.
d	Hard drive activity	• Random blinking green light indicates hard disk activity (IDE). • The hard disk is used by system management processes such as the CLI and GUI. • No light indicates no hard disk drive activity.

***Table 4.3** ARX-500 Front Panel LEDs (Continued)*

Callout	LED	Function
e	System fault	• Solid green indicates normal operation. • Blinking green indicates degraded performance. • Solid yellow indicates a critical or non-recoverable condition. • Blinking yellow indicates a non-critical condition. • No light indicates POST is running or the system is off.
f	System ID	Blinking blue indicates system identification is active. No light indicates system identification is not activated. Use this to help find the chassis in a densely-populated rack. Press the ID button on the front panel to activate the LED on the rear panel.

ARX-500 ACM Status LEDs

There are additional status LEDs on the right side of the rear panel that apply to the ACM board only (not the chassis as a whole):

- ARX-500 NVRAM LED

  The following table lists the colors and states for the non-volatile RAM (NVRAM) LED, also known as the battery-charging LED. These are labeled NVR.

  ***Table 4.4** ARX-500 NVRAM LED*

LED Color	Description/Action
Yellow	Battery-backup mode.
Off	Not in battery-backup mode.

- ARX-500 alarm and status LEDs

  The combined states of the Alarm (ALM) and Status (STAT) LEDs indicate the status of the ACM. The following table lists these colors and states.

  ***Table 4.5** ARX-500 ACM Alarm LED Patterns*

Alarm	Status	Module State
(Off)	Green	Online.
Red	Green (Blinking)	ACM failed or is powering down.

***Table 4.5** ARX-500 ACM Alarm LED Patterns (Continued)*

Alarm	Status	Module State
(Off)	Yellow (Blinking)	ACM powering up and running all POST tests.
(Off)	Yellow	Online Partial: at least one processor is online, and at least one is not online yet. If the offline processor does not come up in 5 minutes, this state changes to Failed Partial.
Red	Yellow	Failed Partial: at least one processor is online, but at least one other processor failed.
(Off)	(Off)	Power failure.

- ARX-500 power LED

  The following table lists the colors and states for the Power (PWR) LED.

***Table 4.6** ARX-500 Power LED*

LED Color	State Description/Action
Green	Normal functioning.
Clear (off)	Power problem. Contact customer support.

ARX-1500 Chassis Overview

The ARX-1500 is a 1U chassis designed for a standard 19-inch rack installation to maintain proper ventilation and cooling.

The ARX-1500 is shipped in a single box with all components installed. It weighs approximately 22.5 lb (10.2 kg)—not including packing materials.

The ARX-1500 provides the following management ports:

- Console. Serial console port for connecting a console terminal. Labeled CONSOLE on the front.
- Management. 10/100/1000 Ethernet port for connecting an out-of-band management station. Labeled 1/1 MGMT on the front. This port can be used as either a management or a client/server port.

ARX-1500 LED Indicators

The following sections describe the ARX-1500 LEDs, including:

- *ARX-1500 Ethernet LEDs, on page 4-10*
- *ARX-1500 Power LEDs, on page 4-11*
- *ARX-1500 Hard Disk Drive LEDs, on page 4-11*

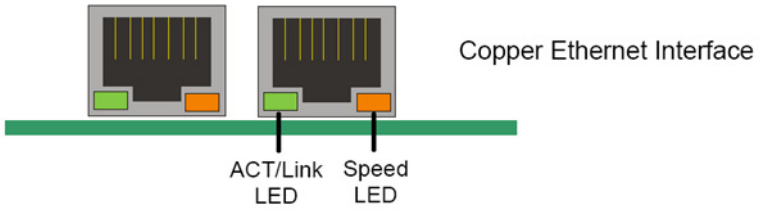
- *ARX-1500 Alarm and Status LEDs, on page 4-11*

ARX-1500 Ethernet LEDs

The following table provides details on the LEDs for the ARX-1500 10/100/1000 Mbps copper interfaces.

***Table 4.7** ARX-1500 Ethernet LEDs*

Label	Color	Indicator	Status
ACT/LINK	Green or other	On	• Ethernet is receiving power. • Good linkage between the Ethernet port and its supporting hub.
		Off	• Adapter and device are not receiving power. • No connection between both ends of network cable. • Drivers of Ethernet have not been loaded or do not function correctly.
	Green or other	Flashing	Adapter is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.
SPEED	Yellow/ amber	On	ACT/LINK LED: when on, the device is operating at 1000 Mbps.
	Green	On	ACT/LINK LED: when on, the device is operating at 100 Mbps.
		Off	ACT/LINK LED: when on, the device is operating at 10 Mbps.



ARX-1500 Power LEDs

The power LEDs are located to the right of the console port. Details are provided in the following table.

Table 4.8 *ARX-1500 Power LEDs*

Symbol	Function	Indicator	Status
⏻	Power status	Green	Off: No power, system off. On: Power good, system on.

ARX-1500 Hard Disk Drive LEDs

Each drive includes 2 LEDs located on the front of the drive.

The left LED indicates power. Possible states:

- Off. No power; the system is off.
- Green. Power has been applied; the system is on.

The right LED indicates disk activity. Possible states:

- Off. No data activity.
- Green. Disk activity.

ARX-1500 Alarm and Status LEDs

The alarm and status LEDs are located to the right of the drive LEDs.

The combined alarm and status LEDs indicate the state of the device as described in the following table.

Table 4.9 *ARX-1500 Alarm and Status LEDs*

Alarm	Status	State
Off	Green	Online.
Off	Yellow	ARX-1500 is powering up and the ARX software is initializing. These activities occur after the LED driver is loaded. Also displayed when the reload command is issued.
		Displayed when the reload command is executing or immediately after the interview process has finished.

Table 4.9 *ARX-1500 Alarm and Status LEDs (Continued)*

Alarm	Status	State
Red	Green	Waiting for execution of a switch interview. After the LEDs change to Red/Green, check the console. It will display a message telling you to press **Enter** when ready to run the initial boot script (also called the Switch Configuration wizard). The alarm LED will remain red; this is normal until the Switch Configuration process is complete.
Red	Yellow	The initial boot script has been run (prompting for basic configuration and security information required to access the device and manage it remotely). The device should be ready for configuration through the CLI or GUI. However, the *System Record* is missing and, as a result, the device will automatically reboot. This scenario is unlikely but if it should occur, call F5 Support.
Red	Off	One of the power supplies failed. Examine the power supply LEDs on the back to determine which power supply was the cause of the failure.
Off	Off	No power. Both power supplies have failed or no power has been applied. Also displayed during the early boot phase prior to the LED driver being loaded.

The alarm and status LEDs on the ARX-1500 remain lit continuously even after the device's power switch has been set to the Off position and reflect the state of the power supplies prior to powering down the device.

The LEDs remain lit as long as the power cord is plugged in. If the power switch is turned off and the power cord is unplugged, the LEDs will turn off and remain off—even if the power cord is subsequently plugged back in.

When the device is turned on again, the LEDs will update normally in the expected sequence.

ARX-2000 Chassis Overview

To maintain proper ventilation and cooling, the 2-rack unit (2RU) chassis has been designed for installation in a standard 19-inch rack.

The following figure shows the front panel of the ARX-2000 with the bezel removed and the ear assemblies attached. The figure displays the location of front panel components and LED indicators. For details, see *Table 4.10*.

Figure 4.7 *ARX-2000 Front Panel*

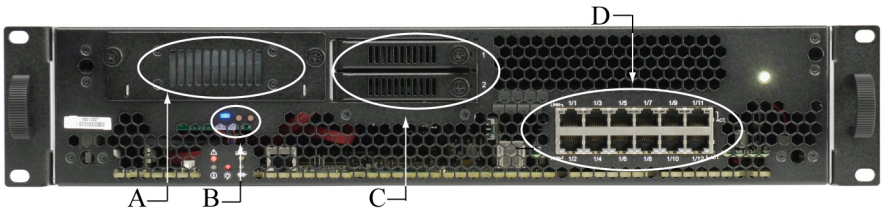


Table 4.10 *ARX-2000 Front Panel Components*

Callout	Component	Description
A	NVRAM	NV (Non-Volatile) RAM battery.
B	Power LED, power button, and reset button	Indicates that power has been applied.
C	Drive bays	Includes two redundant 146 GB internal SAS hard disks. The software image, configuration files, log files, and other maintenance-related data are stored on these internal disk drives, configured as RAID1. These drives are connected to the primary controller on the Application Control Module (ACM), These drives are FRUs.
D	Ethernet ports	Copper 100/1000 gigabit Ethernet ports (12). Used to access the CLI from client or server networks.

The following figure shows the ARX-2000 back panel. The figure displays the location of the console and management ports and the location of the power supplies. For a brief description of these components, see *Table 4.11*.

Figure 4.8 *ARX-2000 Back Panel*

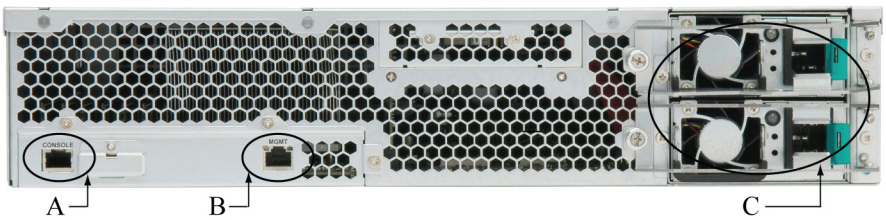


***Table 4.11** ARX-2000 Back Panel Components*

Callout	Component	Description
A	Serial console port	Used to access and manage the switch through a local console terminal and the command-line interface (CLI).
B	Out-of-band management port	Used to access the CLI or the GUI from the management network.
C	Power supplies and fans	2 power supplies (1+1 redundancy). There is a fan on each power supply.

ARX-2000 LED Indicators

This section describes the ARX-2000 LEDs, including:

- *ARX-2000 Status and Alarm LEDs, on page 4-14*
- *ARX-2000 Ethernet Port Link Status LEDs, on page 4-16*
- *ARX-2000 Ethernet Management Port LEDs, on page 4-17*
- *ARX-2000 Power Supply LEDs, on page 4-17*

The following table defines the various LED states.

***Table 4.12** ARX-2000 LED Definitions*

LED State	Definition
Blinking	LED turns on and off at a steady rate.
Flashing	LED is off most of the time. Occasionally, the LED lights.
Flickering	LED turns on and off at an erratic (not constant) rate.

ARX-2000 Status and Alarm LEDs

The lower left of the front panel contains the LEDs shown in the following figure. For details on the functions associated with each LED, see *Table 4.12*.

Figure 4.9 *ARX-2000 Status and Alarm LEDs*

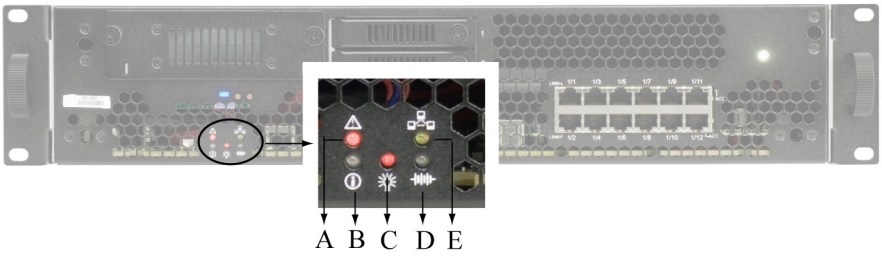


Table 4.13 *ARX-2000 Status and Alarm LED Functions*

Callout	Feature	Function
A	Alarm LED	Indicates various alarm states. When blinking, the LEDs blink ON for a half second and OFF for a half second. For details on the LED colors and blinking patterns, see *Table 4.14*.
B	Status LED	The status LED displays green, yellow, or red with intermittent blinking patterns, depending on the state. When blinking, the LEDs blink ON for a half second and OFF for a half second. For details on the LED colors and blinking patterns, see *Table 4.14*.
C	Power Supply LED (status of both power supplies aggregated into one LED)	The LED displays: • Green, indicating power is on. If you receive an SNMP trap indicating a power supply failure, go to the back of the switch and examine the power supplies to determine which has failed. The LED on the failed power supply will be amber. For details on the states indicated by the power supply LED, see *ARX-2000 Power Supply LEDs, on page 4-17*. • Red, indicating the unit is in standby mode. The unit has AC power applied at the back, but the switch is not powered on.
D	NVRAM LED	• Amber. Battery is in backup mode. • Off. Battery is not in backup mode.
E	PCI-E Cable Link Status LED	• Green. Link established. • Amber. Link faulted.

The following table describes the LED colors and patterns that occur during various operational states, such as booting, diagnostics, and so on.

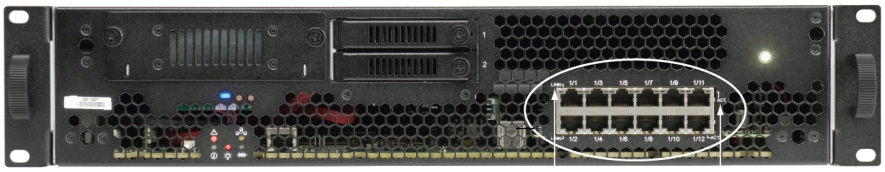
***Table 4.14** ARX-2000 Alarm and Status LED States*

Alarm LED	Status LED	Module State
Off	Green	Online.
Red	Green (blinking)	In the process of booting.
Off	Amber	Online Partial. At least one processor is online, but at least one processor is not yet online. If the offline processor does not come online in 5 minutes, this status changes to Failed Partial.
Red	Amber	Failed Partial. At least one processor is online, but at least one processor has failed.
Off	Off	No power.

ARX-2000 Ethernet Port Link Status LEDs

The Ethernet ports are located on the lower right front panel. The Ethernet port LED labels are pointed out in the following figure. For details and associated status, see *Table 4.15*.

***Figure 4.10** ARX-2000 Ethernet Port LED Labels*



Ethernet port LED labels

***Table 4.15** ARX-2000 Ethernet Port Link Status LEDs*

LED	Status
LED in upper left connector corner	• Steady amber. Port is enabled and a link established at 100MB. • Steady green. Port is enabled and a link is established at 1000MB.
LED in upper right connector corner	Activity status. Flashing green indicates packet traffic.

ARX-2000 Ethernet Management Port LEDs

The out-of-band Ethernet management port is located on the back panel and is labeled MGMT. The port provides two LEDs (speed and link/activity) located on the network interface connector. The speed LED is located in the upper left corner of the connector. For details on the LED and NIC states for the speed LED, see the following table.

Table 4.16 *ARX-2000 Management Port Speed LED Indicator*

LED State	NIC State
Off	10 Mbps
On green	100 Mbps
On amber	1000 Mbps

The link/activity LED is located in the upper right corner of the connector. For details on the LED and NIC states for the link/activity LED, see the following table.

Table 4.17 *ARX-2000 Management Port Link/Activity LEDs*

LED State	NIC State
On steady green	Active connection (Linked)
Flickering green	Transmit/receive activity

ARX-2000 Disk Drive LEDs

Each disk drive has a single LED to the right of the drive. This LED does not provide status details. The LED is either off (not illuminated), which indicates no drive activity, or it is flickering (blue), which indicates activity on the drive.

ARX-2000 Power Supply LEDs

Each power supply has a single LED located to the right of the fan. The LED locations are called out in the following figure.

Figure 4.11 *ARX-2000 Power Supply LEDs*

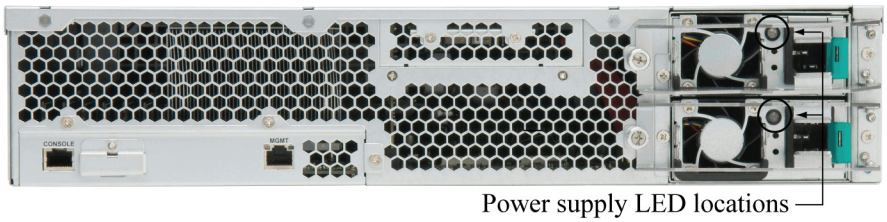


Table 4.18 lists and describes the power supply LED indicator states.

***Table 4.18** ARX-2000 Power Supply LED States*

LED State	Power Supply Condition
Off	No AC power applied to the power supply.
Green	Power supply on and healthy.
Amber	Power supply is on but experiencing a critical event causing a shutdown. Examples that can cause a shutdown include: • Fan failure • Over-voltage protection (OVP) • Over-current protection (OCP) In a 1+1 configuration where both power supplies are plugged in but AC has been removed from one power supply, the LED signal will still operate with the redundant power supply in parallel and will, thus, be lit amber. To bring a power supply back into full service after correcting an error condition, remove and then re-apply AC power. This can be as simple as unplugging the power supply and then plugging it back in.
Blinking amber	Power supply is on and continuing to operate but experiencing a warning condition (for example: high temperature, high power, high current, slow fan). The warning condition will transition to a failure and the power supply will shut down. If you have any concerns, replace the power supply using the instructions in the section, see the *ARX-2000 Hardware Installation Guide*.

ARX-2500 Chassis Overview

The ARX-2500 is a 1U chassis designed for installation in a standard 19-inch rack to maintain proper ventilation and cooling.

The ARX-2500 is shipped in a single box with all components installed. It weighs approximately 22.5 lb (10.2 kg)—not including packing materials.

If you ordered optical tranceivers, you can locate them in the Accessory Kit, packaged in their own box.

The ARX-2500 provides the following management ports:

- Console. Serial console port for connecting a console terminal. Labeled CONSOLE on the front.
- Management. 10/100/1000 Ethernet port for connecting an out-of-band management station. Labeled 1/1 MGMT on the front. This port can be used as either a management or a client/server port.

ARX-2500 LED Indicators

The following sections describe the ARX-2500 LEDs, including:

ARX-2500 Ethernet LEDs

The ARX-2500 supports both copper and fiber/SFP interfaces. *Table 4.19* provides details on these LEDs for these interfaces.

Important

For the 10G interface, the SPEED LED blinks blue.

Table 4.19 *ARX-2500 Ethernet LED States*

Label	Color	Indicator	Status
ACT/LINK	Green or other	On	• Ethernet is receiving power. • Good linkage between the Ethernet port and its supporting hub.
		Off	• Adapter and switch are not receiving power. • No connection between both ends of network cable. • The Ethernet drivers have not been loaded or do not function correctly.
	Green or other	Flashing	Adapter is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.
SPEED	Blue	On	When ACT/LINK LED is on, the switch is operating at 10 Gbps.
	Red	On	When ACT/LINK LED is on, the switch is operating at 1 Gbps.

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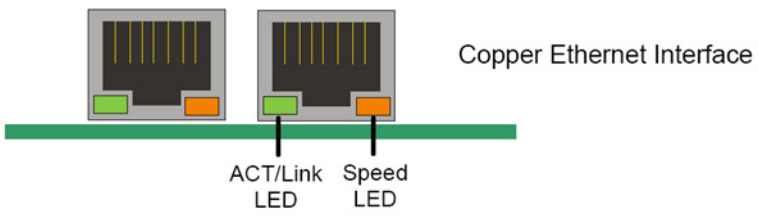


ARX-2500 Power LEDs

The power LEDs are found to the right of the console port.

Table 4.20 *ARX-1500 Power LEDs*

Symbol	Function	Indicator	Status
⏻	Power status	Green	Off: No power, system off. On: Power good, system on.

ARX-2500 Hard Disk Drive LEDs

Each drive includes 2 LEDs located on the front of the drive.

The left LED indicates power. Possible states:

- Off. No power; the system is off.
- Green. Power has been applied; the system is on.

The right LED indicates disk activity. Possible states:

- Off. No data activity.
- Green. Disk activity.

ARX-2500 Alarm and Status LEDs

The alarm and status LEDs are located to the right of the hard drive LEDs.

The combined alarm and status LEDs indicate the state of the device. For details, see *Table 4.21*.

Table 4.21 *ARX-2500 Alarm and Status LEDs*

Alarm	Status	State
Off	Green	Online.
Off	Yellow	ARX-2500 is powering up and the ARX software is initializing. These activities occur after the LED driver is loaded. Also displayed when the reload command is issued.

Table 4.21 *ARX-2500 Alarm and Status LEDs (Continued)*

Alarm	Status	State
		Displayed when the reload command is executing or immediately after the interview process has finished.
Red	Green	Waiting for execution of a switch interview. After the LEDs change to Red/Green, check the console. It will display a message telling you to press **Enter** when ready to run the initial boot script (also called the Switch Configuration wizard). The alarm LED will remain red; this is normal until the Switch Configuration process is complete.
Red	Yellow	The initial boot script has been run (prompting for basic configuration and security information required to access the device and manage it remotely). The device should be ready for configuration through the CLI or GUI. However, the *System Record* is missing and, as a result, the device will automatically reboot. This scenario is unlikely but if it should occur, call F5 Support.
Red	Off	One of the power supplies failed. Examine the power supply LEDs on the back to determine which power supply was the cause of the failure.
Off	Off	No power. Both power supplies have failed or no power has been applied. Also displayed during the early boot phase prior to the LED driver being loaded.

The alarm and status LEDs on the ARX-2500 remain lit continuously even after the device's power switch has been set to the Off position and reflect the state of the power supplies prior to powering down the device.

The LEDs remain lit as long as the power cord is plugged in. If the power cord is unplugged after the power switch has been turned off, the LEDs will turn off, and the LEDs will remain off even if the power cord is subsequently plugged back in. When the device is turned on again, the LEDs will update normally in the expected sequence.

ARX-4000 Chassis Overview

The ARX-4000 is a 4U chassis designed to be intalled in a standard 19-inch rack to maintain proper ventilation and cooling.

The following figure shows the front panel of the ARX-4000 with the bezel removed. The figure displays the location of front panel components (the drive bays and Ethernet ports, for example) and indicators such as status LEDs. For a description of these components and indicators, see *Table 4.22*.

Figure 4.12 *ARX-4000 Front Panel– Bezel Removed*

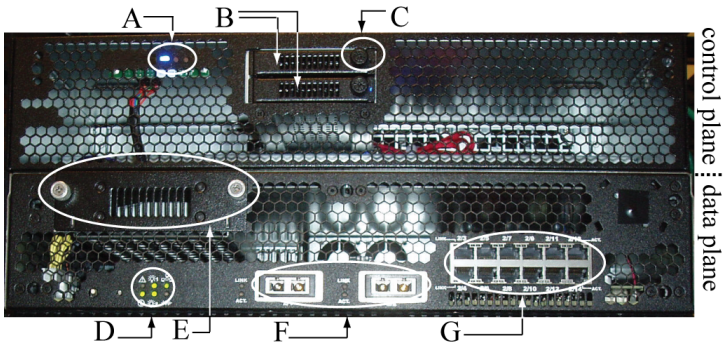


Table 4.22 *ARX-4000 Front Panel Components and Descriptions*

Callout	Component	Description
A	Control plane LED and power and reset buttons	Front control plane LED, indicating the application of power. For specifics, see *ARX-4000 Control Plane LED and Button Functions, on page 4-24*.
B	Drive bays	The ARX-4000 includes two redundant 146 GB internal SAS hard disks, that store the software image, configuration files, log files, and other maintenance-related data, configured as RAID1. These drives are connected to the primary controller on the ACM. These drives are FRUs.
C	Drive LEDs	Each drive has an LED to the right of the drive. The possible LED states are as follows: • Flickering blue indicates disk activity. • Continuous amber indicates a critical or non-recoverable error condition.
D	Data plane LEDs	Front panel data plane LEDs indicate PCI link status, NVRAM battery status, data plane power supply status, and various operational states. For specifics, see *ARX-4000 Data Plane LED Functions, on page 4-25*.
E	NVRAM	NV (Non-Volatile) RAM battery.

***Table 4.22** ARX-4000 Front Panel Components and Descriptions*

Callout	Component	Description
F	Optical ports	Fiber-optic 10-gigabit ports (2).
G	Ethernet ports	Copper 100/1000 gigabit Ethernet ports (12). Used to access the CLI from client or server networks.

The following figure displays the location of ARX-4000 back panel components. For descriptions, see the table following the figure.

***Figure 4.13** ARX-4000 Back Panel*

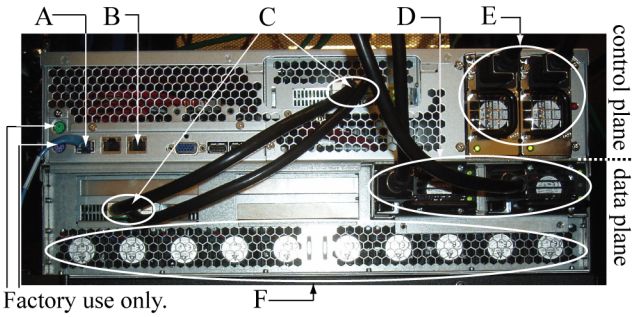


***Table 4.23** ARX-4000 Back Panel Components and Descriptions*

Callout	Component	Description
A	Serial console port	Used to access and manage the switch through a local console terminal and the CLI.
B	OOB management port	Used to access the CLI or the GUI from the management network.
C	PCI-E cable connections	Used to connect the control plane and data plane.
D	Power supplies and fans (data plane)	2 power supplies (redundant) located in the data plane. There is a fan on each power supply.
E	Power supplies and fans (control plane)	2 power supplies (redundant) located in the control plane. There is a fan on each power supply.
F	Fans	The internal fans comprise an environmentally-controlled cooling system. The ACM is connected to the fan unit for temperature control and status monitoring at 60-second intervals.

ARX-4000 LEDs and Buttons

The following sections describe the ARX-4000 LEDs and buttons, including:

ARX-4000 Control Plane LEDs and Buttons

The front upper left corner of the control plane contains the LED and buttons shown in the following figure. For details on the functions associated with each LED or button, see *Table 4.24*.

Figure 4.14 *ARX-4000 Control Plane LEDs and Buttons*

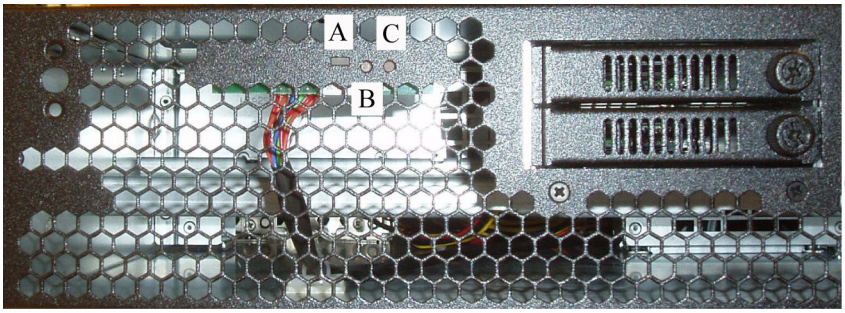


Table 4.24 *ARX-4000 Control Plane LED and Button Functions*

Callout	Feature	Function
A	Power LED	Displays blue when the system is powered up.
B	Power Button	Push and hold this button until the system powers up. To power down, push and hold this button until the system powers down.
C	Reset Button	Push and hold to reset the system.

ARX-4000 Data Plane LEDs

The front lower left corner of the data plane contains a control panel, consisting of the LEDs shown in the following figure. For details on the functions associated with each LED or button, see *Table 4.25*.

Figure 4.15 *ARX-4000 Data Plane LEDs*

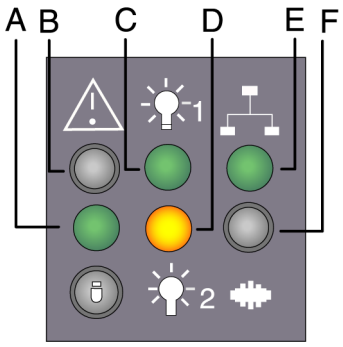


Table 4.25 *ARX-4000 Data Plane LED Functions*

Callout	LED	Function
A	Status	Displays green, yellow, or red with intermittent blinking patterns, depending on the state. When blinking, the LEDs blink ON for a half second and OFF for a half second. For details on the LED colors and blinking patterns that occur during various operational states, see *Table 4.26*.
B	Alarm	The front of the data plane provides an alarm LED to indicate various states. When blinking, the LEDs blink ON for a half second and OFF for a half second. For details on the LED colors and blinking patterns that occur during various operational states, see *Table 4.26*.
C	Power Supply 1	• Green. Power on. • Red. Fault detected. When a fault is indicated, go to the back of the data plane to the corresponding power supply (PS 1, which is the power supply on the right). Examine the 3 LEDS on the power supply unit to gather additional information. To assist in troubleshooting, consult *Table 4.28* for a description of the power supply LEDS and states,

***Table 4.25** ARX-4000 Data Plane LED Functions (Continued)*

Callout	LED	Function
D	Power Supply 2	• Green. Power on. • Red. Fault detected. When a fault is indicated, go to the back of the data plane to the corresponding power supply (PS 2, which is the power supply on the left). Examine the 3 LEDS on the power supply unit to gather additional information. To assist in troubleshooting, consult *Table 4.28* for a description of the power supply LEDS and states,
E	PCI-E Cable Link Status	• Green. Link established. • Amber. Link faulted.
F	NVRAM	• Yellow. In battery backup mode. • Off. Not in battery backup mode.

Table 4.26 describes the LED colors and blinking patterns that occur during various operational states, such as booting, diagnostics, and so on.

***Table 4.26** ARX-4000 Operational States and LED Patterns*

Alarm	Status	Module State
Off	Green	Online.
Red	Green (Blinking)	Failed or powering down.
Off	Yellow (Blinking)	Powering up and running all POST tests.
Off	Yellow	Online partial. At least one processor is online, at least one is not online yet. If the offline processor does not come up in 5 minutes, this changes to Failed Partial.
Red	Yellow	Failed Partial: at least one processor is online; but at least one other processor failed.
(Off)	(Off)	Power failure.

External Interfaces

External interfaces (all ARX models/platforms):

- ARX-500 external interfaces

  The ARX-500 supports Fast Ethernet and Gigabit Ethernet throughput and provides 100/1000 BASE-T external ports for connectivity to network infrastructure, NAS devices, and file servers with DAS.

- ARX-1500 external interfaces

  Support for 8 x 1 GbE copper (1 mgmt and 7 data), a serial console port, and a USB port.

- ARX-2000 external interfaces

  Support for the following external interfaces: copper 100/1000 Ethernet ports (12), serial console interface, and Ethernet management interface. The following figure calls out the Ethernet ports and *Figure 4.17* calls out the console and management interfaces.

Figure 4.16 *ARX-2000 Ethernet Interfaces*

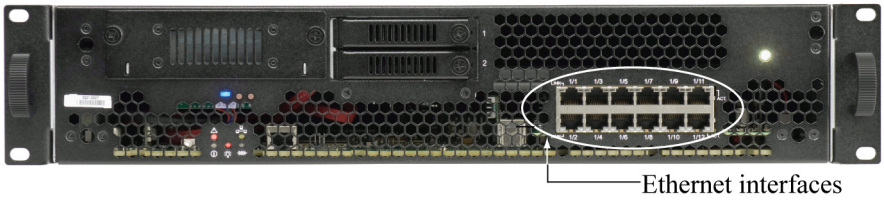
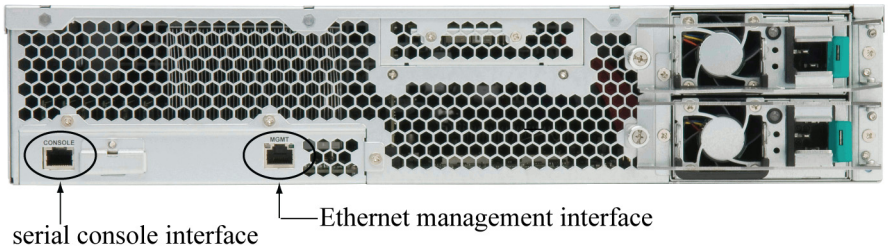


Figure 4.17 *ARX-2000 Console and Management Interfaces*



- ARX-2500 external interfaces

  Support for the following external interfaces: (3) 1 G copper Ethernet ports, (1) Ethernet management/data interface, (2) 10 G Ethernet SFP, a serial console port, and a USB port.

- ARX-4000 external interfaces

  Enables Fast Ethernet and gigabit Ethernet throughput and supports 12 100/1000 BASE-T external ports for connectivity to network infrastructure, NAS devices, and file servers with DAS. External interfaces include:

  – Serial console port

  – 10/100 Mbps out-of-band Ethernet management port

  – 100/1000 gigabit Ethernet ports (12 ports, copper)

  – 10-gigabit Ethernet port

Application Control Module

For all ARX models, functionality is provided through one basic module, the Application Control Module (ACM). For details, consult the following sections.

Control and Management Functions

The ACM supports the following switch fabric and control functions:

- RS232/Console serial interface for local switch management
- Out-of-band 10/100 Ethernet interface for local/remote switch management
- Service definition and policy enforcement
- Failover signaling and configuration information
- Port mirroring and debugging
- MAC address assignment for Ethernet ports
- Real-time clock synchronization for user interfaces
- Health status and statistics monitoring and management through LEDs and software
- Temperature and power monitoring

Adaptive Services

The ACM module provides the following core distributed file server functions:

- Virtual distribution of front-end file services for NFS v 2/3 and CIFS protocols
- Volume management and file server capabilities
- Back-end NAS aggregation

Network Services

The ACM supports the following network services:

- Standard Ethernet and jumbo frame (9K) packet sizes
- Full-duplex switching at line rates for Layer 2 processing
- Low latency, store and forward switching, with built-in multicast support
- Load balancing and resource switching
- NFS Fast Path
- CIFS Fast Path

Power Supplies

ARX power supplies (all models/platforms):

- ARX-500 Power Supply

  The ARX-500 power supply distributes up to 600 Watts of DC power to the chassis components. The power supply runs at 72% efficiency, so it consumes up to 833 Watts of AC power (833/0.72) to meet the 600-Watt demand. This is equivalent to 2,843 BTUs/hour.

- ARX-1500 Power Supply

  The ARX-1500 is powered by a 1+1 redundant power system consisting of two power modules and one power system frame. Two power modules are recommended for full redundancy and load-sharing.

  Each power supply can provide the following:

  – Hot-swappable/hot-pluggable, redundant power

  – Load sharing between two power modules

  – Separate AC line power cord for each power module

  – Power Module Input: 100-240 VAC; 47-63Hz, 4 -2A

  – Active Power Factor Correction (PFC)

  If the power unit is operating properly, then the individual LEDs and external warning LEDs are lit green. If you remove a power supply, then the warning buzzer in the power system sounds, and the external warning LED, which displays the status of the total power supply system, begins to blink. The LEDs on the front of the power module, which indicate the power supply's status will not light. The power supply continues to back up the power output without affecting the computer system's operation.

  When the warning buzzer sounds, you can reset the warning buzzer by pressing the buzzer reset. When you re-insert the power module that was removed earlier, then the sound of the warning buzzer disappears and the LEDs above the power supply turn green.

- ARX-2000 Power Supply

  The AC/DC power supplies provide the following functions:

  – Input: 100VAC – 240VAC, 47/63HZ

  – Output: -12V @ 1A, +3.3V @ 32A, +5V 30A, +12V 62A

  – Remote sensing to maintain stable voltage and to account for any DC loss in cabling.

  – AC alarm to indicate when power is about to be removed from the system. When this alarm is activated, the power supply maintains full regulated load for a minimum of 20 milliseconds, enabling the system to power down gracefully.

- ARX-2500 Power Supply

  The ARX-2500 is powered by a 1+1 redundant power system consisting of two power modules and one power system frame. Two power modules are recommended for full redundancy and load-sharing.

Each power supply can provide the following:

– Hot-swappable/hot-pluggable, redundant power
– Load sharing between two power modules
– Separate AC line power cord for each power module
– Power Module Input: 100-240 VAC; 47-63Hz, 4 -2A
– Active Power Factor Correction (PFC)

If the power unit is operating properly, then the individual LEDs and external warning LEDs are lit green. If you remove a power supply, then the warning buzzer in the power system sounds, and the external warning LED, which displays the status of the total power supply system, begins to blink. The LEDs on the front of the power module, which indicate the power supply's status will not light. The power supply continues to back up the power output without affecting the computer system's operation.

When the warning buzzer sounds, you can reset it by pressing the buzzer reset or by using the reset switch on the system chassis. When you re-insert the power module removed earlier, the sound of the warning buzzer disappears and the external warning LED turns green again.

• ARX-4000 Power Supply

To provide full redundancy and load-sharing, the ARX-4000 is powered by four fully-managed AC/DC power supplies.

The AC/DC power supplies provide the following functions:

– 400 Watts @ +2.5 V, +3.3 V, and +12.0 V for switch operations. The power supply draws a total of 440W from the AC power cord due to its operating efficiency.
– Remote sensing to maintain stable voltage and to account for any DC loss in cabling.

The power supplies in the control plane and data plane differ in appearance and in LEDs. The power supplies in the control plane have one LED. The following table lists and describes the states indicated by this LED.

***Table 4.27** ARX-4000 Control Plane Power Supply LED States*

LED	State
Solid green	AC power present.
Amber	Fault detected (for example: power removed, fan faulted). However, the LED is able to light amber only if the redundant control plane power supply still has power. If power has been removed from both power supplies, the LED will be off.
Off	AC power absent.

The power supplies in the data plane have three LEDs. The following table lists and describes the states indicated by these LEDs.

Table 4.28 *ARX-4000 Data Plane Power Supply LEDs and States*

LED	State
Top green	AC power present.
Top off	AC power absent or fault detected.
Middle amber	Power supply has faulted, indicating a fan failure or some other failure. However, the LED is able to light amber only if the redundant control plane power supply still has power. If power has been removed from both power supplies, the LED will be off.
Middle off	Status is Good or power absent from both data plane power supplies.
Bottom green	AC power present.
Bottom off.	AC power absent.

Internal Disk Drives

Internal disk drives for all ARX models:

- ARX-500 internal disk drives. Stores its software image, configuration files, log files, and other maintenance-related data on disk drives.

  The drives are field-replaceable units.

- ARX-1500 internal disk drives. Contains two, redundant,146GB SAS drives, configured as RAID1. Used to store the software image, configuration files, log files, and other maintenance-related data.

  The drives are field-replaceable units.

- ARX-2000 internal disk drives. Contains two, redundant, 146GB SAS drives, configured as RAID1. Used to store the software image, configuration files, log files, and other maintenance-related data.

  The drives are connected to the primary controller on the ACM.

  The drives are field-replaceable units.

- ARX-2500 internal disk drives. Contains two, redundant, 146GB SAS drives, configured as RAID1. Used to store the software image, configuration files, log files, and other maintenance-related data on disk.

  The drives are field-replaceable units.

- ARX-4000 internal disk drives. Contains two, redundant, 146GB SAS drives, configured as RAID1. Used to store the software image, configuration files, log files, and other maintenance-related data, configured as RAID1.

These drives are connected to the primary controller on the ACM.

These drives are field-replaceable units.

Fan Units

The ARX internal fans comprise an environmentally-controlled cooling system. The ACM is connected to the fan unit for temperature control and status monitoring at 60-second intervals.

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