Centellis® 4410, R1.0

AdvancedTCA 10GbE Platform Core

Data Sheet

Centellis 4410 is Artesyn's most cost-effective ATCA based platform core

High performance 10GbE ATCA shelf

- 14-slot, 13U, 19" form factor
- Best-in-class thermal and power characteristics
- CP-TA B.4 compliant thermal performance
- Up to 350 watts/blade power distribution

10GbE switch blades

- Simplex and duplex switch blade configurations available
- Proven 10GbE switch blade integration
- Combined switch/control blades to maximize billable application slots
- Integrated software environment including operating system

Platform core compliance

- RoHS (6 of 6) compliant
- Designed for NEBS/ETSI compliance

The Artesyn Embedded Technologies Centellis™ 4410 AdvancedTCA® platform core is specifically designed to address the unique carrier-grade requirements of the telecommunications industry. Application examples include wireless infrastructure, packetized voice, wireline data, and cable network head-end equipment. Highly integrated and verified hardware and software components, reduced development costs and accelerating time-to-market allow network equipment providers (NEPs) to focus their development resources on critical, differentiating features that provide a competitive advantage.
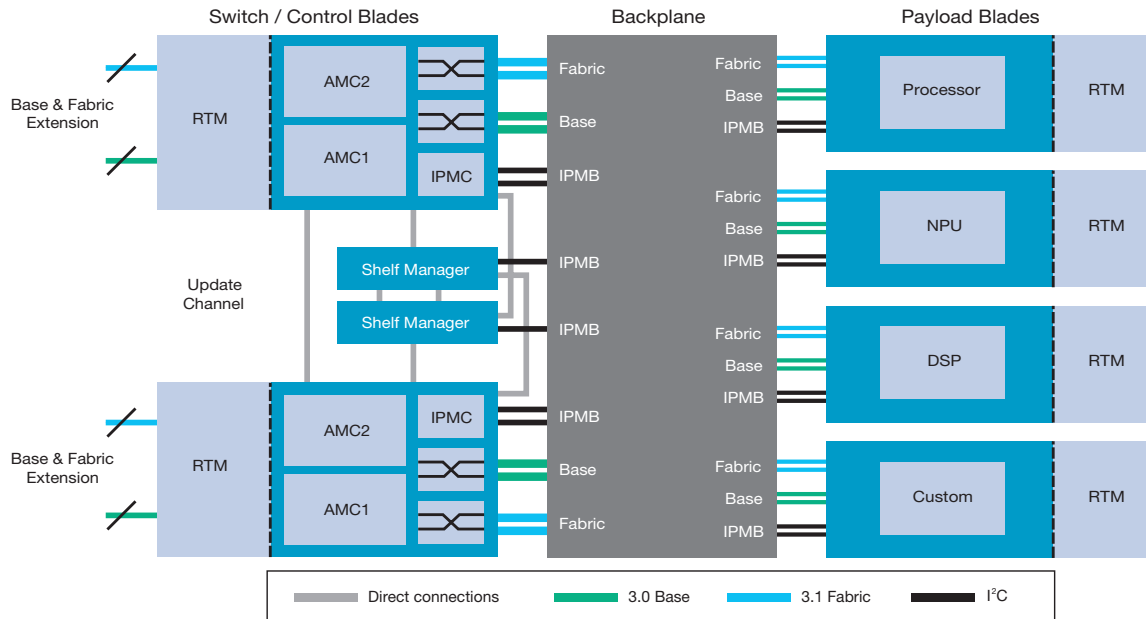
The heart of the Centellis 4410 platform core is the AXP1410 AdvancedTCA (ATCA®) shelf and includes redundant shelf manager and alarm modules, redundant power entry modules (PEMs) and two fan tray modules. The AXP1410 shelf features a 1/10 Gigabit Ethernet (GbE) capable backplane. The thermal characteristics of the AXP1410 shelf are an important feature - it is designed to meet the CP-TA B.4 thermal profile, the highest level possible. As processor technology advances, thermal (heat dissipation) is one of the industries largest challenges - and the AXP1410 meets the challenge.

Another important element of the Centellis 4410, R1.0 platform core is the ATCA-F120 system controller and switching blade. The ATCA-F120 combines PICMG® compliant base and fabric interface switching functionality with two AMC slots for additional processing and/or local storage. Assuming an HA environment with redundant ATCA-F120 switch blades, combining these key functions provides customers with two additional slots for billable applications.

A variety of payload blades, AMCs and accessory products are available for the Centellis 4410, R1.0 platform core depending on application requirements.

RoHS 6/6 COMPLIANT

AdvancedTCA®

ARTESYN™
EMBEDDED TECHNOLOGIES

Block Diagram

| Switch / Control Blades | Backplane | Payload Blades |

Direct connections | 3.0 Base | 3.1 Fabric | I²C

Platform Architecture

The Centellis 4410 platform core was designed to provide a common platform on which multiple 1 and 10 Gigabit Ethernet applications can be deployed. In order to leverage the platform across a wide range of applications, a standards-based approach was essential and deployed at all levels of design.

- PICMG 3.0 – Chassis/mechanical form factor and power/cooling design
- PICMG 3.1 – High performance fabric interface capable of 1 and 10Gbps operation
- OSDL CGL – OSDL compliant Carrier Grade Linux distribution
- SA Forum – Standard interface support at the hardware level (HPI) and HPI to ATCA mapping

The availability of industry standards for hardware and software components clearly paves the way for overall platform cost reduction, freedom of choice and resource preservation. However, to provide a true open platform requires the integration and verification of these components into a system for which a tele-communications vendor can simply port their application. This critical integration and verification activity represents significant time and resources that could otherwise be devoted to higher level

application development or other activities to create competitive product features. The Centellis 4410 platform core integrates industry standards, hardware and software components and verifies them to create an operational platform ready for customer application development.

AXP1410 Shelf Overview

The AXP1410 shelf includes all the components required to create a complete, redundant ATCA platform. Redundant shelf manager and alarm modules, redundant power entry modules and an N+1 cooling architecture via two tray modules are all included. The shelf form factor allows for three complete AXP1410 shelves configured in a standard 42U telecom rack with several U slots available for breaker panels and management elements. Some of the salient features/functions of the AXP1410 shelf include:

- Multiple fabric bandwidth options – 1 and 10 GbE
- Designed for CP-TA B.4 thermal compliance
- Excellent cable management
- Power distribution up to 350 watts per slot

ENCLOSURE

- 14 slots for 8U blades
- 14 slots for 8U rear transition modules (RTMs)
- 1G/10G backplane
- Front to rear cooling architecture
- ESD and earth grounding points

ENCLOSURE DIMENSIONS

- Height – 573.0 mm
- Width – 448.8 mm (not including the mounting ears)
- Depth – 527.2 mm
- Weight – 90.8 lbs. (estimated)

SHELF MANAGEMENT

- N+1 redundancy architecture
- Two (2) shelf management & alarm module slots
- Telco Alarm functionality

POWER DISTRIBUTION

- N+1 redundancy architecture
- Two (2) PEM slots

COOLING

- One (1) top fan tray module slot
- One (1) bottom fan tray module slot

FRONT ALARM DISPLAY PANEL (ADP)

- Two COM ports (one for each shelf manager)
- LEDs to indicate "active" shelf manager
- Telco alarm indicators (PWR, Minor, Major, Critical)
- Alarm reset

BACKPLANE

- Zone 1
  - Redundant, bussed IPMI to all blade slots
  - Redundant, bussed –48 VDC to all blade slots
- Zone 2
  - Dual star configuration for the base interface
  - Dual star configuration for the fabric interface
  - Update channel routing for all blade slots
  - Three redundant, bussed telecom clock signals to all blade slots
- Zone 3
  - PICMG 3.0 defined open area, application specific

Shelf Management

The purpose of shelf management, as defined by the PICMG 3.0 standard, is to assure proper operation of AdvancedTCA blades and other shelf components within the shelf. The shelf management entity continually monitors all low-level, hardware functionality (inventory, sensor, status data, etc.) and reports status to the system manager. It also provides control access to these attributes. Management access to this information is provided via local console and Ethernet interfaces as well as the SA Forum defined HPI interface. Each blade and major shelf accessory has an Intelligent Platform Management Controller (IPMC) that is responsible for providing this information to the shelf management entity.

The AXP1410 shelf provides redundant shelf management functionality utilizing an active/standby architecture and is based on an internally developed, hardened and proven shelf management design.

PANEL ACCESS & INTERFACES

- One (1) 10/100BaseT Ethernet, RJ-45
- One (1) Telco Alarm interface, dry relay contact, DB-15

TELCO STATUS INDICATORS

- Critical/major/minor
- In service/out-of-service: green/red

SHELF MANAGER LED STATUS INDICATORS
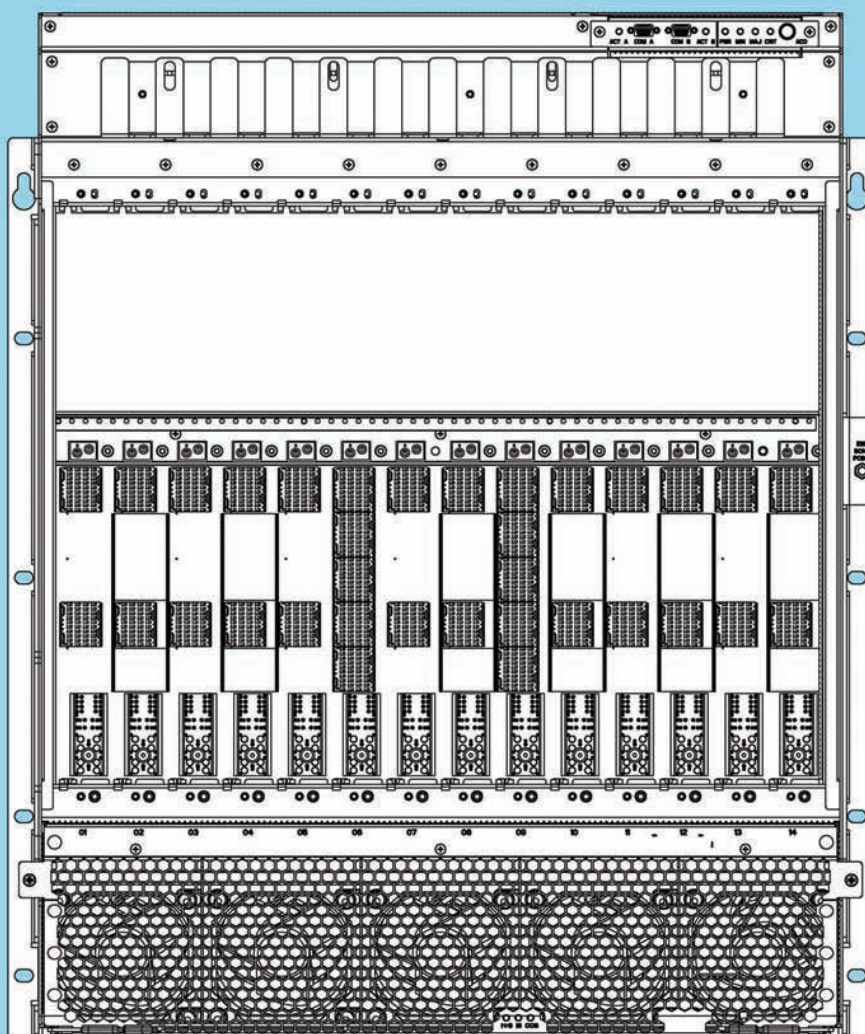
- Hot swap: blue

Shelf Layout

FRONT (TOP TO BOTTOM)

- Alarm Display panel
- Cable management system
- 14 vertical, 8U blade slots
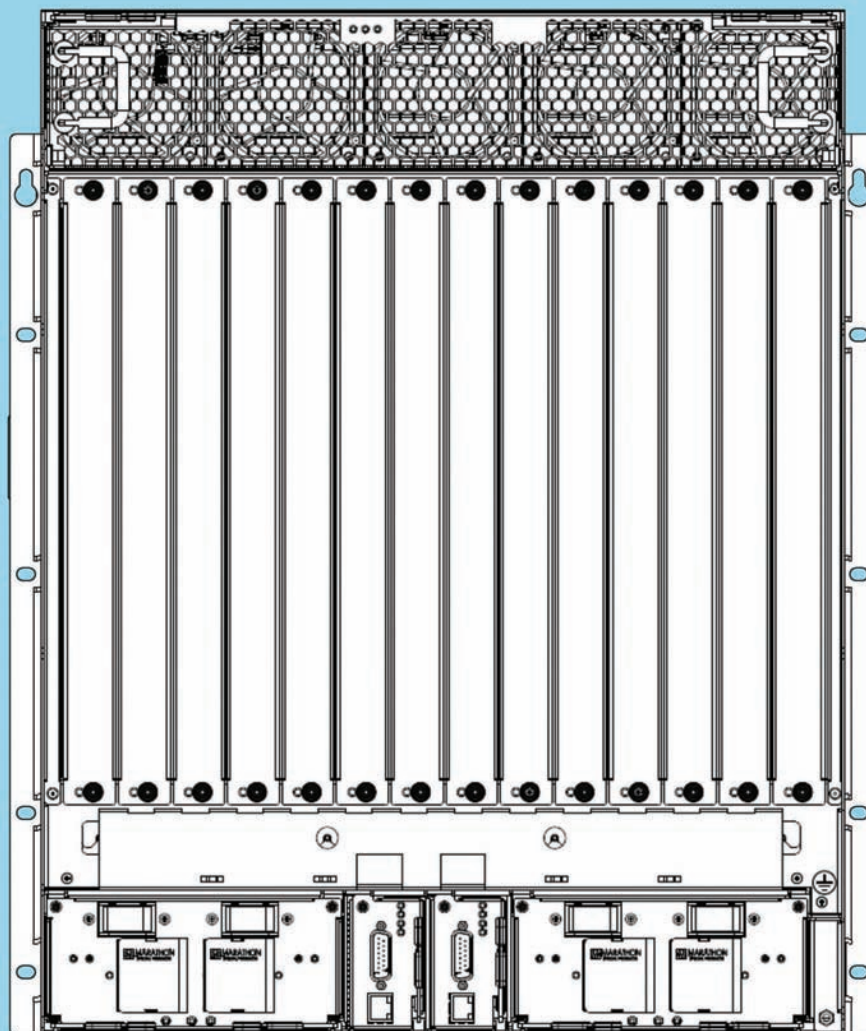- One (1) bottom fan tray module slot

REAR (TOP TO BOTTOM)

- Air outlet/top rear fan tray slot
- One (1) top fan tray module slot
- 14 vertical, 8U RTM slots
- Cable management system
- Two (2) shelf management modules
- Two (2) PEM slotsAXP1410 Shelf

FRONT VIEW

REAR VIEW

Fan Tray Modules

The AXP1410 shelf provides fault-tolerant cooling to all front blades and RTM slots in an N+1 cooling architecture and is implemented using two fan tray modules, one front/bottom and one rear/top Each fan tray module has redundant fans with voltage and fan speed monitoring.

GENERAL CHARACTERISTICS

- CP-TA B.4 compliant cooling architecture
- Front blade cooling capacity: 40 cubic feet per minute (CFM) at 55°C

- RTM cooling capacity: 5 CFM at 55°C
- Automatic fan speed control
- Operating range: –5°C to 55°C

LED STATUS INDICATORS

- In service/out-of-service: green/red
- Hot swap: blue

Power Entry Module (PEM)

Power conditioning for the AXP1410 shelf is provided by a pair of redundant PEMs. They provide wiring studs for connection to redundant –48 VDC or –60 VDC power sources and provide power to the backplane on the redundant –48 VDC power rails for blades, RTMs and other shelf components.

GENERAL CHARACTERISTICS

- Input voltage range (-40 VDC to -72 VDC)
- 160 amp, dual feed PEM (80A + 80A)
- Power infrastructure capable of supporting 350 watts/slot
- EMI filtering
- Transient voltage suppression

ATCA-F120 System Controller and 10GbE Switch

The Artesyn ATCA-F120 system controller and 10GbE switching blade is a key element within the Centellis 4410 platform. This blade combines standard PICMG 3.0 base interface and PICMG 3.1 fabric interface 10Gb Ethernet switching (hub functionality) with two AMC slots to support a wide variety of applications, including processing, storage, security and light I/O. By combining these essential functions on a single blade, the ATCA-F120 can provide a completely redundant switching and system management environment while consuming only two slots in the shelf, maximizing the number of slots available for billable applications.
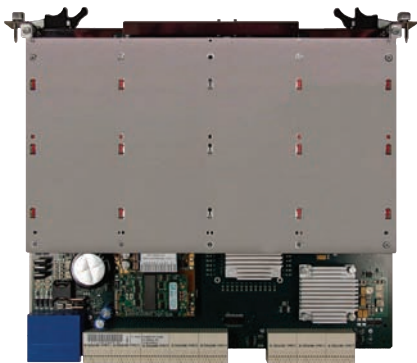
Standard Networking Support

The Artesyn ATCA-F120 blade provides dual star, hub switching functions for the PICMG 3.0 base interface and the PICMG 3.1 fabric 10GbE interface within the AXP series of telecom shelves. The ATCA-F120 blade is designed to occupy logical slots 1 and 2 within the shelf as specified in the PICMG 3.0 standard.

The PICMG 3.0 base interface switch supports redundant Gigabit Ethernet links to all slots within the AXP series of telecom shelves. The PICMG 3.1 fabric interface supports PICMG 3.1 Option 1 Gigabit Ethernet and PICMG 3.1 Option 9, 10 Gigabit Ethernet links to all slots, providing a bandwidth to support high bandwidth and/or latency sensitive traffic.

The ATCA-F120 provides base and fabric extension interfaces which allow multiple AXP telecom shelves to be interconnected within, or across, a frame, creating a single access point for management and control. These extensions can be used to scale the networks to multiple shelves or frames—for example in a large distributed application environment. Multiple network extension interfaces provide redundant connections to reduce fault domains in the event of connectivity failure.

The ATCA-F120 blade uses the PICMG standard Update Channel to create a high performance, low latency data synchronization channels between redundant ATCA-F120 blades. This provides seamless, stateful system fail-over in the event of connectivity and/ or blade failure.

Intelligent Platform Management Controller

The PICMG 3.0 AdvancedTCA standard specifies a low-level, environmental management architecture referred to as Intelligent Platform Management Interface (IPMI). The ATCA-F120 blade implements this functionality utilizing an off-the-shelf hardware and software based IPM controller (IPMC) that monitors all local, blade specific environmental information. Management access to this information is provided through the Service Availability Forum (SA Forum) defined HPI.

External Interfaces

The ATCA-F120 blade supports a full suite of standard external interfaces including a RS-232 serial and management Ethernet interfaces.

Hardware

PROCESSOR

- MPC8548E PowerQuicc III processor

MEMORY

- 512MB ECC-protected SDRAM
- 16KB NVRAM
- 1.0MB boot flash, single bank architecture
- 31MB application flash, dual bank architecture
- 16MB CPU reset-persistent memory

COUNTERS/TIMERS

- Four 32-bit programmable timer/counters
- Watchdog timer

BASE AND FABRIC INTERFACES

- Dual star configuration
- PICMG 3.0 base interface switching – Gigabit Ethernet (1.0Gbps)
- PICMG 3.1, Option 1, 9 fabric interface – Gigabit Ethernet (1.0Gbps, 10Gbps)

EXPANSION

- AMC slots (2)

EXTERNAL INTERFACES

- Front Panel
  - 10/100BaseT Ethernet, RJ-45 (1)
  - Serial, mini DB-9 (1)
- Via Optional RTM
  - Base interface extension, 10GbE CX4 (2), 1GbE RJ-45 (4)
  - Fabric interface extension, 10GbE CX4 (4), 1GbE RJ-45 (4)

BLADE SIZE

- 8U form factor, 280 mm x 322.5 mm, single slot

RELEVANT STANDARDS

- PICMG 3.0 (form factor, IPMI, base interface, hot swap, RTM)
- PICMG 3.1, Options 1 and 9

POWER REQUIREMENTS

- Dual redundant –48V rails
- Input range: -39.5 VDC to -72 VDC

## CHARACTERISTICS

- Operating range: –5° C to +55° C

ATCA-F120 Software

The ATCA-F120 switch blades come complete with a software package that includes firmware, operating system and Basic Blades Services (BBS) software. This software combines all the essential features required for a fully functional switch infrastructure, allowing customers to focus on revenue-generating software development projects.

Below is a brief summary of the software features. For additional details, please refer to the Basic Blade Services software data sheet.

- Blade-Specific Firmware (FW)
- Operating System (OS)
- Firmware Upgrade Facility (FUF)
- Hardware Platform Interface (HPI)
- Hardware Platform Management (HPM)
- Link Health Check (LHC)
- SRstackware switch software

Block Diagram
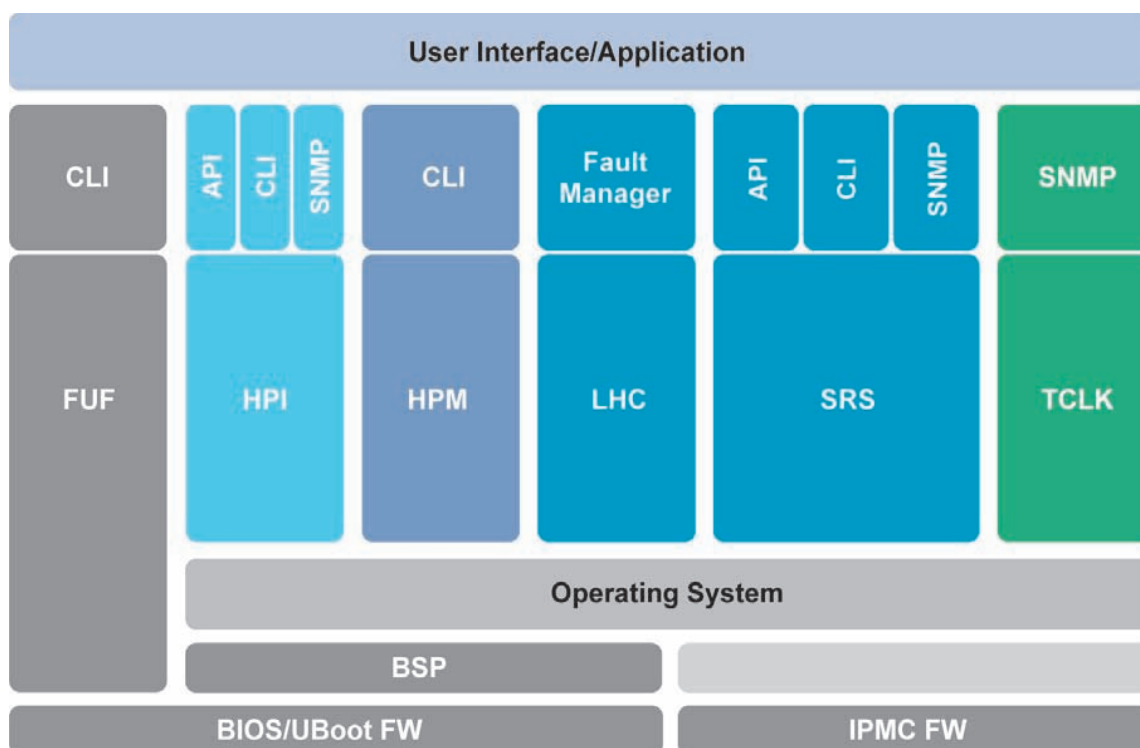
Ordering Information

Marketing Number	Description
Platform Core Products	
CENT-4410-R10-01	(1) AXP1410, (1) ATCA-F120, (1) SA-BBS-WR20-F120
CENT-4410-R10-02	(1) AXP1410, (2) ATCA-F120, (2) SA-BBS-WR20-F120
Optional Platform Core Products	
RTM-ATCA-F120C	Copper RTM for the ATCA-F120
RTM-ATCA-F120OPT	Optical RTM for the ATCA-F120
SFP-MM-SX-LC	1G single form factor (SFP) module - 850NM, SX, LC connector
SFPP-MM-SR-LC	10G single form factor plus (SFPP) module - 850NM, SR, LC connector
SFPP-SM-LR-LC	10G single form factor plus (SFPP) module - 1310NM, LR, LC connector
CABLE-OPT-F102-5M	Optical cable for multi-mode, SFP and SFPP connections (5M)
AMC-FILLER-MS	AMC filler panel mid-size for ATCA-F120
PRAMC-7211	AMC CPU blade w/Intel® Core™2 Duo processor 64GB @ 1.5 GHz, 2G DDR2 and mid-size
SA-BBS-721X	PrAMC-721x, BBS only, binary RPMS, PNE 2.x, CD
SA-BBS-WR2X-721X	PrAMC-721x, BBS binary RPMS, eval kernel + runtime, PNE LE 2.x, CD
AMC-S320-M-80G	Storage AMC with 80GB HDD-Extreme temp-SATA
AXP-F-FILL-PANEL	Blank filler panel, AXP1620, AXP1440, AXP1410 – Front
AXP-R-FILL-PANEL	Blank filler panel, AXP1620, AXP1440, AXP1410 – Rear

Regulatory Compliance

Item	Description
Designed to comply with NEBS	GR-63-CORE, NEBS Physical Protection, Level 3
	GR-1089-CORE, Electromagnetic Compatibility and Electrical Safety — Generic Criteria for Network Telecommunications Equipment. Level 3, Equipment Type 2
Designed to comply with ETSI	ETSI Storage, ETS 300 019-2-1, Class 1.2 equipment, Not Temperature Controlled Storage Locations
	ETSI Transportation, ETS 300 019-2-2, Class 2.3 equipment, Public Transportation
	ETS 300-132-2 Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)
	ETSI Operation, ETS 300 019-2-3, Class 3.1 equipment, Partly Temperature Controlled Locations
Designed to comply with Acoustic	ETS-300-753, Equipment Engineering (EE); Acoustic noise emitted by telecommunications equipment
EMC	EN-300-386 Electromagnetic compatibility and Radio spectrum Matters (ERM); telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements, Telecommunication equipment room (attended)
	FCC 47 CFR Part 15 Subpart B (US), Class A
	EMC Directive 89/336/EEC (EU)
	AS/NZS 3548 (Australia/New Zealand), Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
	VCCI Class A (Japan), Voluntary Control Council for Interference by Information Technology Equipment
	Industry Canada ICES-003 Class A
Safety	Compliance to UL/CSA 60950-1, EN 60950-1 and IEC 60950-1 CB Scheme. Marked with U.S. NRTL, Canadian Safety and CE Mark.
RoHS/WEEE compliance	DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
	DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on waste electrical and electronic equipment (WEEE)

SOLUTION SERVICES

Artesyn Embedded Technologies provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh.

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