

Centellis 3406, R3.2

AdvancedTCA Communications Servers

■ Embedded Computing for Business-Critical Continuity™

PRELIMINARY DATA SHEET

The Centellis 3406 platform is one in a series of AdvancedTCA based communications servers from Emerson.

- Fully integrated and verified AdvancedTCA based communications server
- 14-slot, 19", 12.5U form factor
- Modular computing via AMC technology
- Verified shelf level thermals and PICMG® standards compliance
- Redundant PICMG 3.0 & 3.1 base/fabric switching blades
- Combined switch/control blades to maximize billable application slots
- Variety of payload blades
- Integrated software operating environment including operating system
- Designed for NEBS/ETSI compliance

The Emerson Centellis™ 3000 series of AdvancedTCA® based communications servers are 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.

The Centellis 3406, R3.2 platform core is RoHS (6 of 6) compliant, eliminating the need for customers to incur the time, resource and expense associated with creating and/or converting existing product to meet this international requirement.

These platforms provide highly integrated and verified hardware and software components, reduce development costs and accelerate time-to-market. This allows network equipment providers (NEPS) to focus their development resources on critical, differentiating features that provide a competitive advantage.

The heart of the Centellis 3406 platform is the AXP1406 AdvancedTCA (ATCA®) shelf and the ATCA-F102 system controller and switch blade. The AXP1406 shelf includes redundant shelf manager and alarm modules, redundant power entry modules (PEMs) and four fan tray modules. The ATCA-F102 system controller and switching blade combines PICMG compliant base and fabric interface switching functionality with a full processor complex for high availability (HA) middleware or user applications. Assuming a redundant switch and HA middleware environment, combining these key functions provides customers with two additional slots for billable applications.

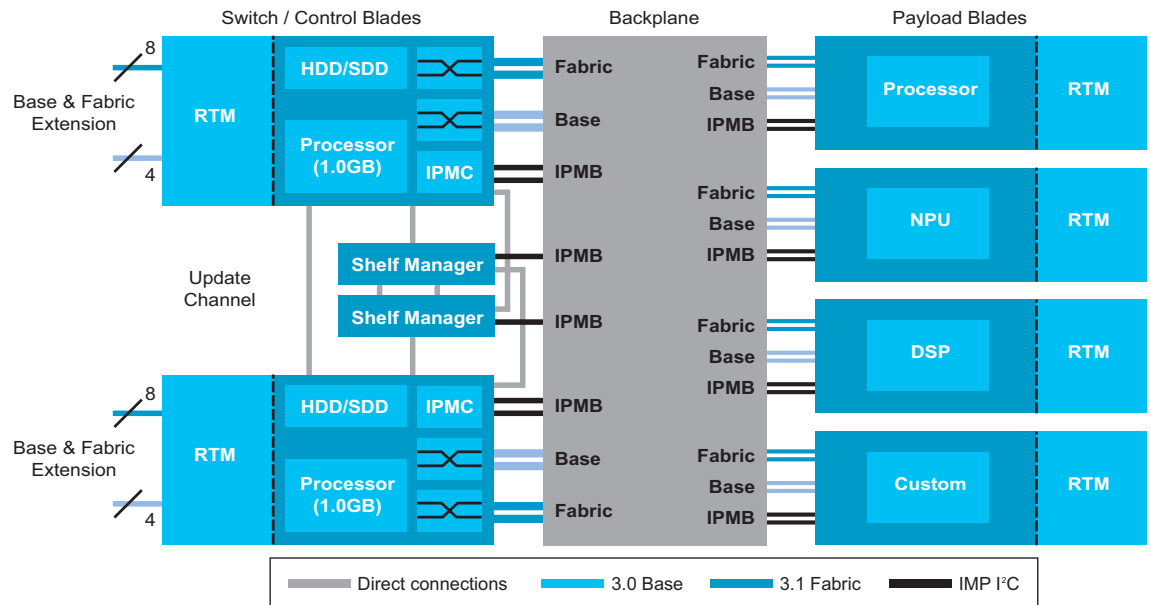
A variety of payload blades are offered for the Centellis 3406 platform including modular computing with the addition of AMC technology. New for the Centellis 3000, R3.2 platform release is a high performance processor blade and support for the Service Availability Forum™ (SA Forum) Hardware Platform Interface (HPI) B.01.01 standard. Basic Blade Services (BBS) software is provided with each blade to create an integrated platform including a standard Carrier Grade Linux (CGL) distribution and SA Forum compliant HPI to user applications.



AdvancedTCA®


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Block Diagram



Platform Architecture

The Centellis 3406 platform was designed to provide a common platform on which multiple 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
- Linux Foundation Carrier Grade Linux distribution
- SA Forum – Standard interface support at the hardware level (HPI)
- SA Forum – Standard interface support at the application level (AIS)

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 telecommunications 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 3406 platform integrates industry standards, hardware and software components and verifies them to create an operational platform ready for customer application development.

AXP1406 Shelf Overview

The AXP1406 shelf includes all the components required to create a complete AdvancedTCA based communications server. Redundant shelf manager and alarm modules, redundant power entry modules and an N+1 cooling architecture via four tray modules are all included. The 12.5U form factor allows for three complete AdvancedTCA shelves configured in a standard 42U telecom rack with several U slots available for breaker panels and management elements.

Shelf Hardware

CHASSIS

- 12.5U chassis
- 14 slots for 8U blades
- 14 slots for 8U rear transition modules (RTMs)
- Front to rear cooling architecture
- ESD and earth grounding points

BACKPLANE

- Zone 1
 - ▲ Redundant, radial IPMI to all blade slots
 - ▲ Redundant, bussed -48 VDC to all blade slots
- Zone 2
 - ▲ Dual star configuration for the base interface
 - ▲ 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

POWER DISTRIBUTION

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

COOLING

- N+1 redundancy architecture
- Six (6) top fan tray module slots
- Two (2) bottom fan tray module slots

SHELF MANAGEMENT

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

Shelf Components

SHELF MANAGEMENT AND ALARM MODULE

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 AXP1406 shelf provides redundant shelf management functionality utilizing an active/standby architecture. In addition, the Telco Alarm functionality is integrated into the same module to maximize critical real estate within the shelf, this functionality is also redundant. Visual indicators, as well as physical interfaces are provided for direct, front panel access.

FRONT PANEL ACCESS

- RS-232 console, RJ-11
- 10/100BaseT Ethernet, RJ-45
- Telco Alarm interface, dry relay contact, DB-15

TELCO ALARM LED STATUS INDICATORS

- Critical/major/minor: red/red/amber
- In service/out-of-service: green/red (US) or green/amber (Europe)

SHELF MANAGER LED STATUS INDICATORS

- Hot swap: blue

Shelf Layout and Dimensions

FRONT (TOP TO BOTTOM)

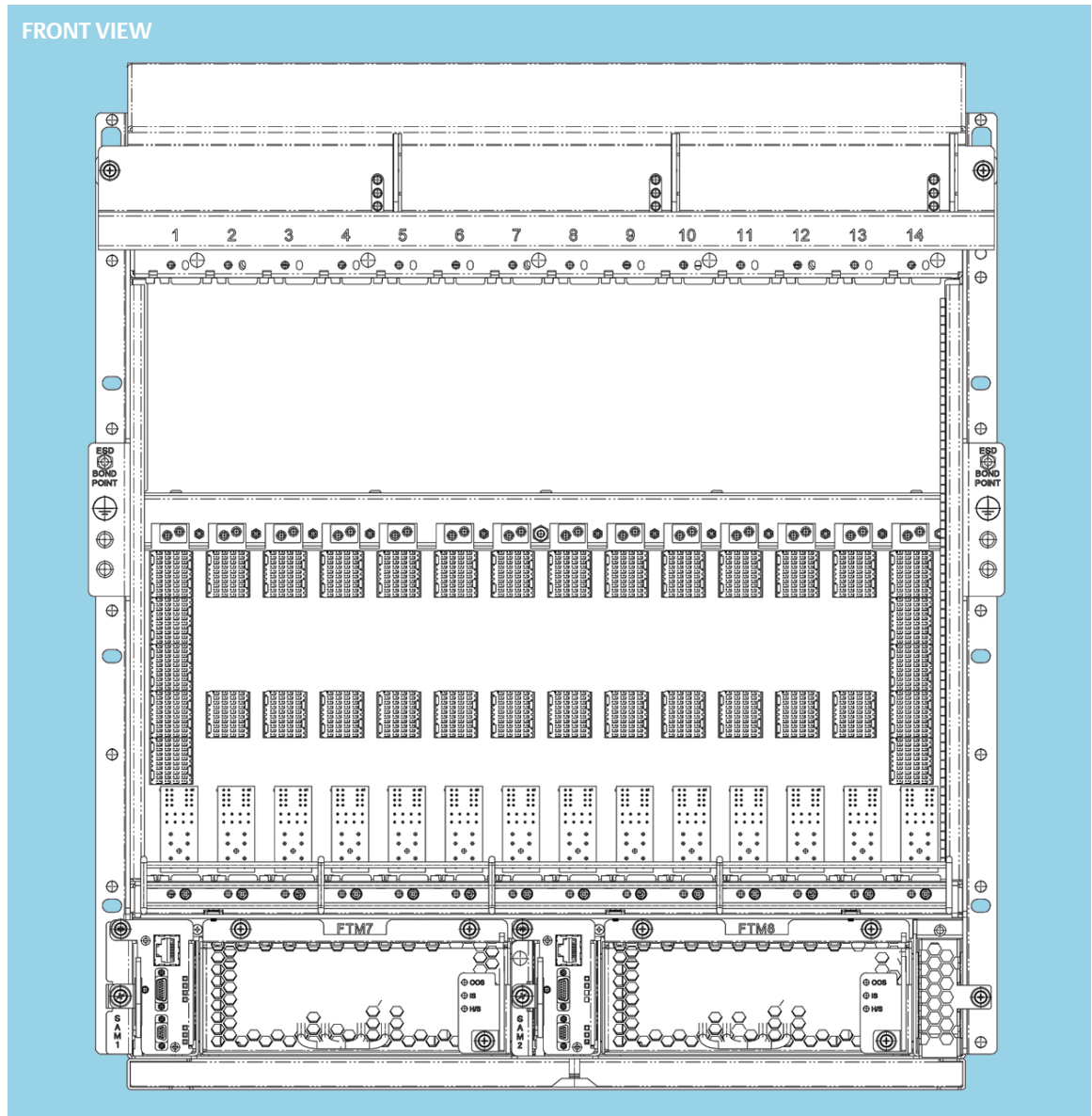
- Three (3) top fan tray module slots
- 14 vertical 8U blade slots
- Two (2) shelf management and alarm module slots (left side)
- One (1) air filter slot
- Air inlet/air filter tray
- Cable management system
- Two (2) bottom fan tray module slots

REAR (TOP TO BOTTOM)

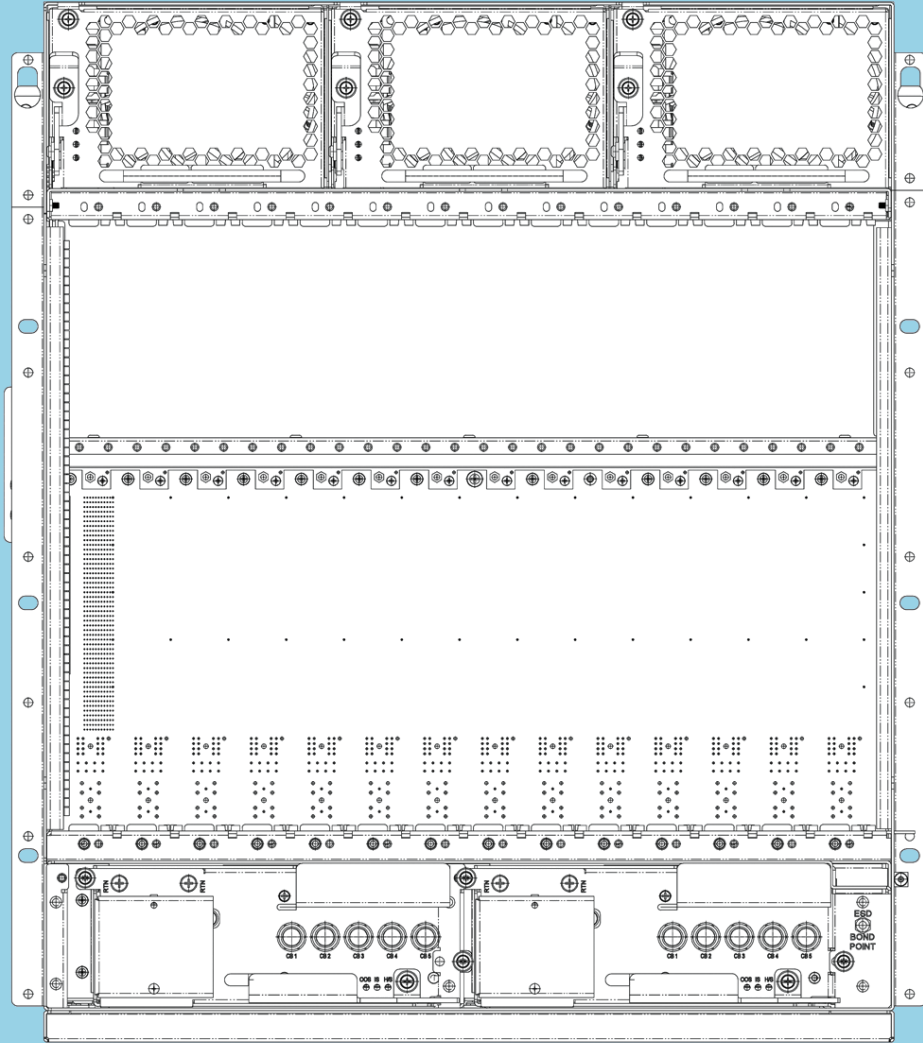
- Air outlet
- Three (3) top fan tray module slots
- 14 vertical 8U RTM slots
- Two (2) PEM slots

SHELF DIMENSIONS

- Height: 555.6 mm (12.5U)
- Width: 480 mm
- Depth: 534 mm



REAR VIEW



Fan Tray Modules

The AXP1406 shelf provides fault-tolerant cooling to all front blades and RTM slots in an N+1 cooling architecture that is implemented using eight fan tray modules; three front/top, three front/rear, and two front/rear. Each fan tray module has redundant fans and a complete IPMC complex to interface with the shelf management entity.

GENERAL CHARACTERISTICS

- Front blade cooling capacity: 200 watts per blade
- RTM blade cooling capacity: 20 watts per blade
- Automatic fan speed control
- Front access
- Operating range: -5° C to 55° C

TOP FAN TRAY MODULE

- Two (2) fans per fan tray module
- Local voltage and fan speed status

LED STATUS INDICATORS

- In service/out-of-service: green/red (US) or green/amber (Europe)
- Hot swap: blue

BOTTOM FAN TRAY MODULE

- Two (2) fans per fan tray module
- Local voltage and fan speed status

Power Entry Module

Power conditioning for the AXP1406 shelf is provided by a pair of redundant PEMs. They provide wiring studs for connection to redundant –48 VDC and/or –60 VDC power sources and provide power to the backplane on the redundant –48 VDC power rails for blades and other shelf components.

GENERAL CHARACTERISTICS

- Input voltage range (–36 VDC to –75 VDC)
- 100 amp maximum capacity via four (4) 25 amp circuits
- EMI filtering
- Transient voltage suppression
- Internal redundant fans
- Rear access

ATCA-F102 System Controller & Switch Blade

The Emerson ATCA-F102 system controller and switching blade is a key element within any Emerson Centellis 3000 communications server. This blade combines standard PICMG 3.0 base interface and PICMG 3.1 fabric interface switching (hub functionality) with a PowerPC® processor complex to support a wide variety of applications, including shelf-wide and/or frame-wide management. By combining these essential functions on a single blade, the ATCA-F102 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.

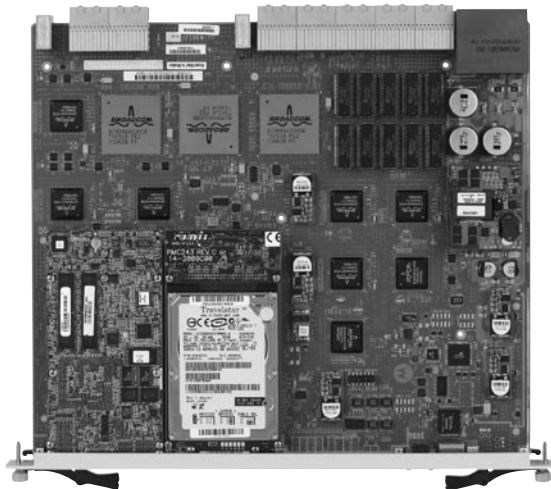
Standard Networking Support

The Emerson ATCA-F102 blade provides dual star, hub switching functions for the PICMG 3.0 base interface and the PICMG 3.1 fabric interface within the AXP series of telecom shelves. The ATCA-F102 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 switch supports PICMG 3.1 Option 1 Gigabit Ethernet links to all slots and PICMG 3.1 Option 2 and 3 links to selected slots, providing a bandwidth of up to 4Gbps to support high bandwidth and/or latency sensitive traffic.

The ATCA-F102 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-F102 blade uses the PICMG standard Update Channel to create a high performance, low latency data synchronization channels between redundant ATCA-F102 blades. This provides seamless, stateful system fail-over in the event of connectivity and/or blade failure.



The ATCA-F102 introduces several new features and options making it more powerful and flexible for a wider variety of applications.

- The ATCA-F102 PowerPC processor complex includes 1.0GB of main memory (upgraded from 512MB on the previous generation ATCA-F101)
- Optional, optical RTM with modular fiber interfaces
- Optional, 16GB solid state disk

Processor Complex

Powered by a Emerson MPC7447, the PowerPC processor complex is designed to support any customer application including a complete high availability middleware application suite. Also included is flash memory for persistent storage requirements, 1.0GB of main memory, and hard disk drive or solid state disk for local storage.

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-F102 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-F102 blade supports a full suite of standard external interfaces including a USB 2.0, RS-232 serial, and management Ethernet interfaces. An IPMI controller debug interface is also provided.

Hardware

PROCESSOR

- MPC7447 PowerPC microprocessor at 1.0 GHz
- Marvell Discovery II system controller

MEMORY

- 1.0GB 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, 2, 3 fabric interface – Gigabit Ethernet (1.0Gbps, 2.0Gbps, and 4.0Gbps)

STORAGE

- 40GB hard disk drive (HDD) or 16GB solid state disk (SSD)

EXTERNAL INTERFACES

- Front Panel
 - ▲ USB 2.0 (1)
 - ▲ 10/100BaseT Ethernet, RJ-45 (1)
 - ▲ Serial, mini DB-9 (1)
- Via Optional RTM
 - ▲ Base interface extension, 10/100/1000BaseT Ethernet RJ-45 (4)
 - ▲ Fabric interface extension, 10/100/1000BaseT Ethernet or BaseCX, RJ-45 (8)
 - ▲ 10/100/1000BaseT Ethernet, RJ-45 (1)
 - ▲ IPMI debug, mini DB-9 (1)

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, 2, and 3

POWER REQUIREMENTS

- Dual redundant –48V rails
- Input range: –36 VDC to –75 VDC

THERMAL CHARACTERISTICS

- Operating range: –5° C to 55° C

Centellis 3000 Series software

All Emerson AdvancedTCA blades within a Centellis 3000 series communications server come complete with software that, when combined with the hardware, creates a fully integrated and verified telecom platform. This software is referred to as the Centellis 3000 software package.

The Centellis 3000 software package comes complete with, and are verified to, a standard Carrier Grade Linux (CGL) distribution – MontaVista CGE 4.0, the market leader in Carrier Grade Linux. MontaVista CGE 4.0 includes all required Linux Support Packages (LSPs) to support Emerson ATCA blades as well an assortment of userland applications.

The Centellis 3000 software package includes:

- MontaVista CGE 4.0
- Basic Blade Services

Basic Blades Services (BBS) software is provided to enable a set of ATCA hardware and software components into a fully integrated and verified telecom platform – the Centellis 3000 platform. This platform is ready for a customer's HA middleware and application environment.

Basic Blade Services (generic to all ATCA blades):

- Hardware Platform Management including local IPMC, LED, EKeying and blade extraction software
- Firmware upgrade utility
- Local management access (SNMP, CLI)

Basic Blade Services (ATCA-F102 specific):

- OpenHPI support – Centralized access to blade specific HPI information from the shelf manager and presentation to a higher level systems management application.
- Switch management software – Includes hardened network drivers, default network configuration scripts and network configuration tools.

RELEVANT STANDARDS

- Linux Foundation
- SA Forum
 - ▲ Hardware Platform Interface (HPI) rev.1.0, A.01.01
 - ▲ Hardware Platform Interface (HPI) rev. 1.0, B.01.01

Ordering Information	
Marketing Number	Description
Platform Core Products	
CENT-3406-R32-01	(1) AXP1406, (1) ATCA-F102, (1) SABBSMV710232-F (RoHS 6/6)
CENT-3406-R32-02	(1) AXP1406, (2) ATCA-F102, (2) SA-BBS-MV-F102-R32-F (RoHS 6/6)
Optional Platform Core Products	
HDD-IDE-0040-F	PMC hard disk drive - 40GB (RoHS 6/6)
SSD-IDE-0016-F	PMC module with solid state disk drive - 16GB (RoHS 6/6)
RTM-ATCA-F101-F	RTM for the ATCA-F101 blade (RoHS 6/6)
RTM-F102OPT-F or RTM-F102OPT-CK	Optional RTM for the ATCA-F102 blade (RoHS 6/6)
SFP-MM-SX-LC-F	Single form-factor pluggable - 850NM, 1000BASE-SX, LC connector
AXP-F-PANEL-F	Blank filler panel, AXP1406 and AXP1600-Front
AXP-R-PANEL-F	Blank filler panel, AXP1406 and AXP1600-Front
Optional Payload Blades	
ATCAC110-1G-R32-F or ATCAC110-1G-R32-CK	ATCA AMC carrier blade with 4 AMC sites (RoHS 6/6)
PRAMC7201-4-R32-F or PRAMC7201-4-R32-CK	AMC module - 1.4 GHz Intel® Pentium® M processor (RoHS 6/6)
AMC-FILLER-F	AMC filler panel for the ATCA-C110 AMC carrier blade
RTM-C110-R32-F	RTM for the ATCA-C110 AMC carrier blade
ATCA7140-0GB-F or ATCA7140-0GB-CK	ATCA processor blade with dual Intel® Xeon® processor (2.13 GHz), 0GB, 1 AMC Slot, C3000R3.2 (RoHS 6/6)
ATCA7140-MEM-4G-F	4GB FB-DIMM memory module for ATCA-7140 (RoHS 6/6)
ATCA7140-MEM-2G-F	2GB FB-DIMM memory module for ATCA-7140 (RoHS 6/6)
SABBSMV7140R32-F	BBS SW and MV CGE 4.0 for ATCA-7221-C3000R3.2
RTMATCA-7140-F or RTMATCA-7140-CK	RTM for the ATCA-7140 blade, C3000R3.2 (RoHS 6/6)
ATCA7140-HDD-SAS-F	146GB SAS HDD and mounting kit for the RTMATCA-7140 (RoHS 6/6)
ATCA7221-0G-R32-F or ATCA7221-0G-R32-CK	ATCA processor blade with 2.8 GHz dual Intel Xeon processors, 0GB memory and one PMC slot, C3000R3.2 (RoHS 6/6)
ATCA7221-MEM-2G-F	2GB DDR memory module for ATCA-7221 (RoHS 6/6)
ATCA7221-MEM-4G-F	4GB DDR memory module for ATCA-7221 (RoHS 6/6)
RTM7221-SCS-R32-F or RTM7221-SCS-R32-CK	RTM for the ATCA-7221 blade with dual SCSI and Gigabit Ethernet interfaces, optional SAS HDD, C3000R3.2 (RoHS 6/6)
ATCA7221-HD-SATA-F	60GB SATA HDD and mounting kit for the RTM7221-SCS-R32 (RoHS 6/6)
RTM7221-FC-R32-F or RTM7221-FC-R32-CK	RTM for the ATCA-7221 blade with dual Fibre Channel interfaces (copper), optional SATA HDD, C3000R3.2 (RoHS 6/6)
ATCA7221-HD-SAS-F	72GB SAS HDD and mounting kit for the RTM7221-SCS-R32 (RoHS 6/6)
ATCA7107-2G-R32-F or ATCA7107-2G-R32-CK	ATCA processor blade with Intel Pentium M processor, 2GB memory and four PMC slots, C3000R3.2 (RoHS 5/6)
ATCA7107-HDD-F	30GB IDE PATA HDD and mounting kit for the ATCA-7107 (RoHS 6/6)
ATCA7107-HD-SATA-F	60GB IDE SATA HDD and mounting kit for the ATCA-7107 (RoHS 6/6)
ATCA7107-4G-R32-F or ATCA7107-4G-R32-CK	ATCA processor blade with Intel Pentium M processor, 4GB memory and four PMC slots, C3000R3.2 (RoHS 5/6)
RTM7107-R32-F	RTM for the ATCA7107 blade (RoHS 5/6)
ATCAS100-300-R32-F	ATCA storage blade with 300GB and Fibre Channel interface (RoHS 5/6)
ATCAS100-150-R32-F	ATCA storage blade with 150GB and Fibre Channel interface (RoHS 5/6)
ATCA-S100FC-F	Fiber cable (2M) with two fibre SFP transceivers for ATCA-S100 (RoHS 6/6)
ATCA-S100CC-F	Copper cable (1M) with two fibre SFP transceivers for ATCA-S100 (RoHS 6/6)

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
	ETSI Operation, ETS 300 019-2-3, Class 3.2 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
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. Safety of information technology equipment, including electrical business equipment
	ETS 300-132-2 Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)
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)

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