

Centellis 3406, R3.1

AdvancedTCA based Communications Servers

DATASHEET



KEY FEATURES

Fully integrated and verified AdvancedTCA based communications server

RoHS (6 of 6) compliant

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 Motorola 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, R3.1 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.

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.

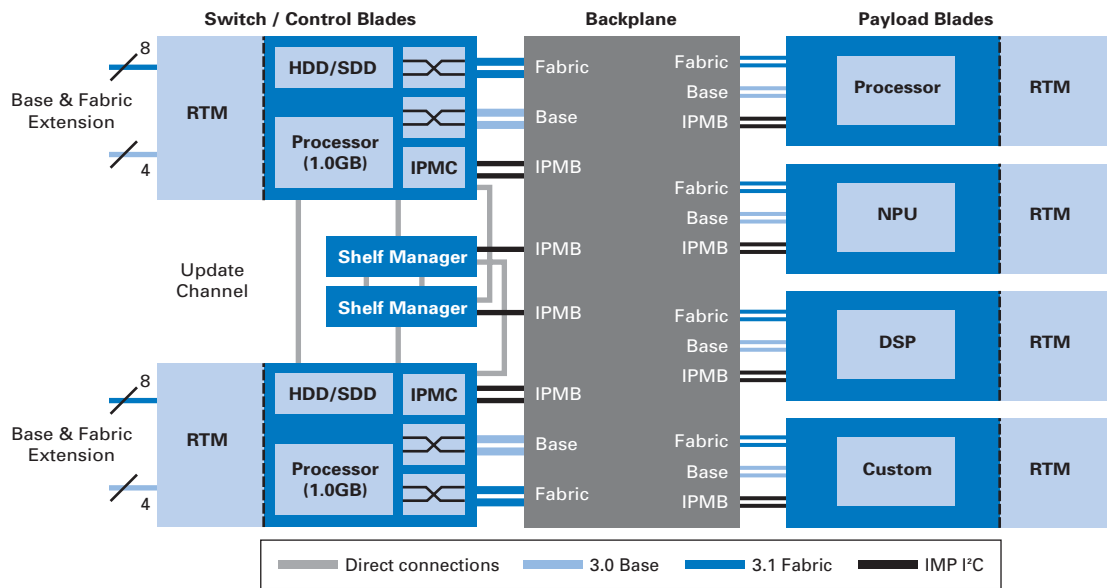
A variety of payload blades are offered for the Centellis 3406 platform including modular computing with the addition of AMC technology. New for the Centellis 3406, R3.1 platform release is an AMC carrier blade and an Intel® Pentium® M processor AMC. The AMC carrier blade supports a virtually unlimited combination of processor and/or I/O AMCs from our technology partners. Basic Blade Services (BBS) software is provided with each blade to create an integrated platform including a standard Carrier Grade Linux (CGL) distribution and Service Availability Forum™ (SA Forum) compliant Hardware Platform Interface (HPI) to user applications.



AdvancedTCA®

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

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

OSDL CGL – OSDL compliant 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	POWER DISTRIBUTION
12.5U chassis	N+1 redundancy architecture
14 slots for 8U blades	Two (2) PEM slots
14 slots for 8U rear transition modules (RTMs)	
Front to rear cooling architecture	COOLING
ESD and earth grounding points	N+1 redundancy architecture
	Six (6) top fan tray module slots
	Two (2) bottom fan tray module slots
BACKPLANE	SHELF MANAGEMENT
Zone 1	N+1 redundancy architecture
<ul style="list-style-type: none"> Redundant, radial IPMI to all blade slots Redundant, bussed – 48 VDC to all blade slots 	Two (2) shelf management & alarm module slots
Zone 2	Embedded Telco Alarm functionality
<ul style="list-style-type: none"> 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	
<ul style="list-style-type: none"> PICMG 3.0 defined open area, application specific 	

SHELF COMPONENTS

SHELF MANAGEMENT AND ALARM MODULE	FRONT PANEL ACCESS
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.	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 & 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

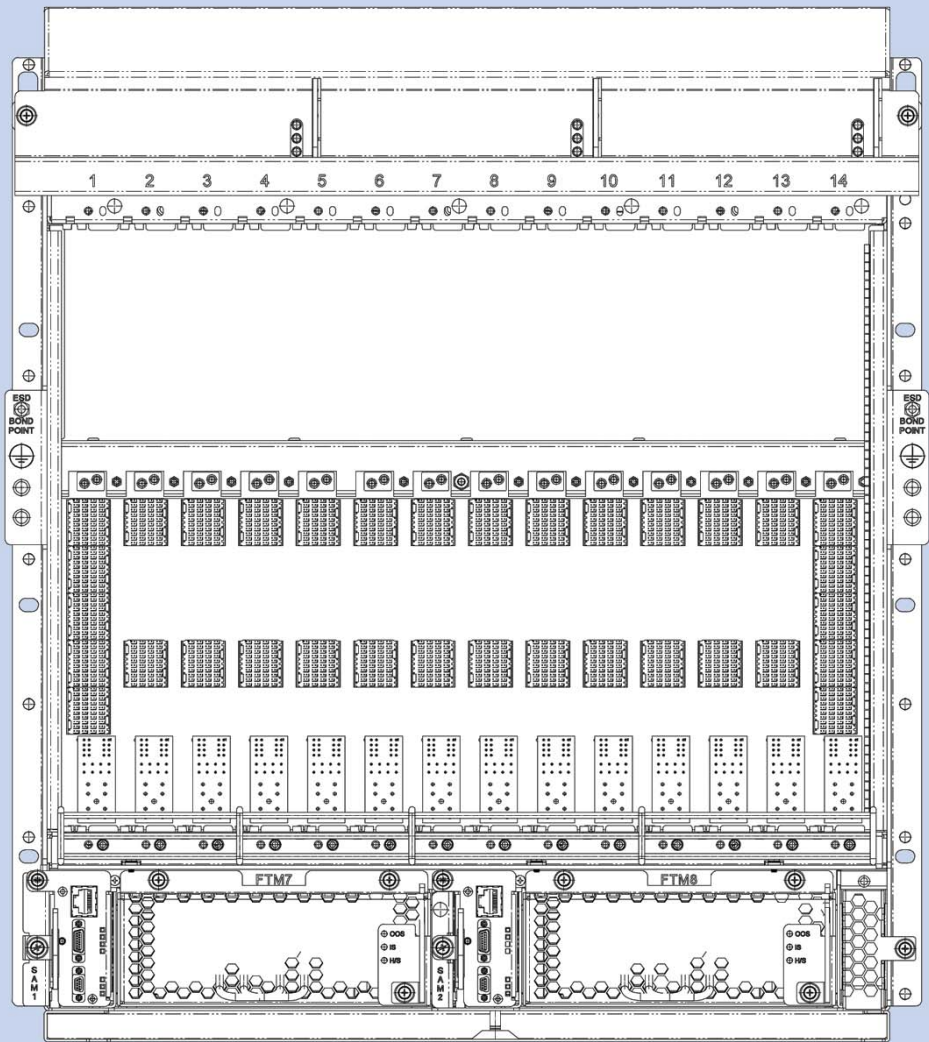
REAR (TOP TO BOTTOM)

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

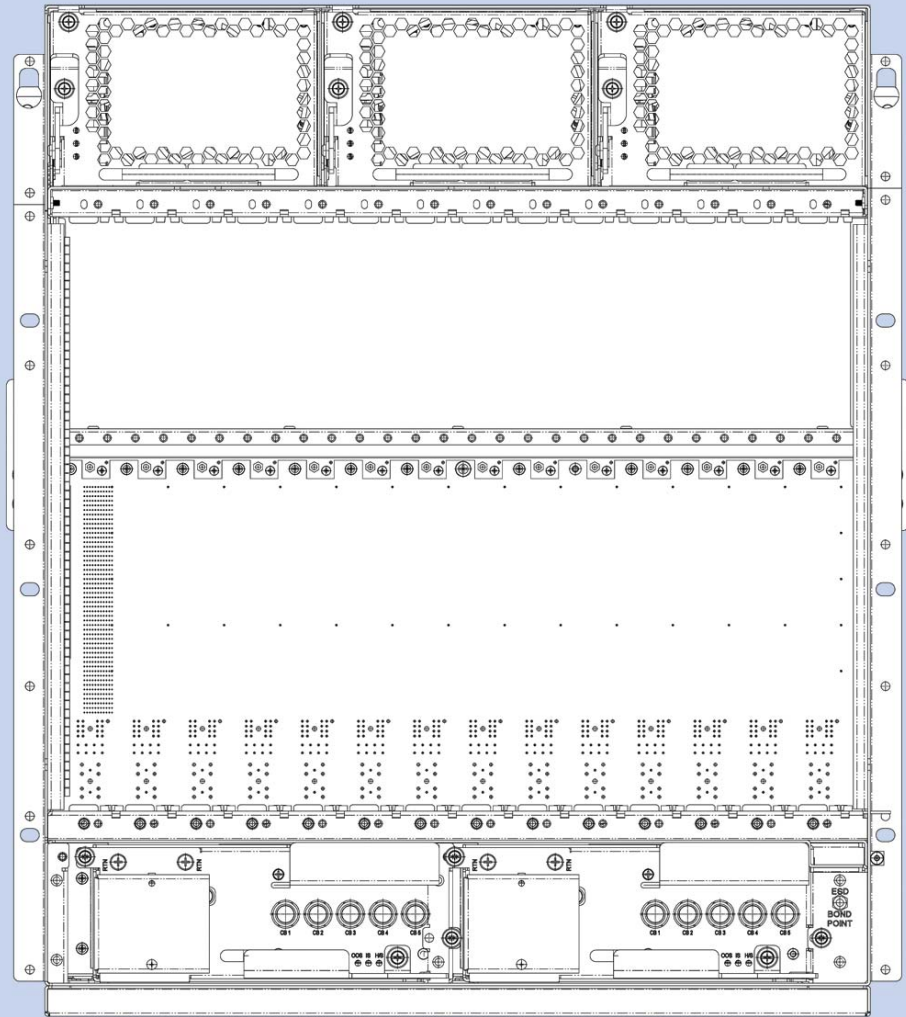
SHELF DIMENSIONS

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

FRONT VIEW



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

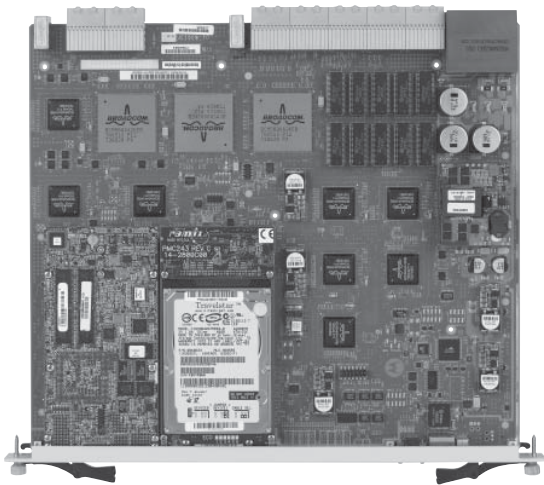
POWER ENTRY MODULE

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 Motorola ATCA-F102 system controller and switching blade is a key element within any Motorola 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.

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

STANDARD NETWORKING
SUPPORT

The Motorola 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.

PROCESSOR COMPLEX

Powered by a Motorola 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	EXTERNAL INTERFACES
MPC7447 PowerPC microprocessor at 1.0 GHz	Front Panel
Marvell Discovery II system controller	<ul style="list-style-type: none">– USB 2.0 (1)– 10/100BaseT Ethernet, RJ-45 (1)– Serial, mini DB-9 (1)
MEMORY	Via Optional RTM
1.0GB ECC-protected SDRAM	<ul style="list-style-type: none">– 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)
16KB NVRAM	
1.0MB boot flash, single bank architecture	
31MB application flash, dual bank architecture	
16MB CPU reset-persistent memory	
COUNTERS/TIMERS	BLADE SIZE
Four 32-bit programmable timer/counters	8U form factor, 280 mm x 322.5 mm, single slot
Watchdog timer	
BASE AND FABRIC INTERFACES	RELEVANT STANDARDS
Dual star configuration	PICMG 3.0 (form factor, IPMI, base interface, hot swap, RTM)
PICMG 3.0 base interface switching – Gigabit Ethernet (1.0Gbps)	PICMG 3.1, Options 1, 2, and 3
PICMG 3.1, Option 1, 2, 3 fabric interface – Gigabit Ethernet (1.0Gbps, 2.0Gbps, and 4.0Gbps)	
STORAGE	POWER REQUIREMENTS
40GB hard disk drive (HDD) or 16GB solid state disk (SSD)	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 Motorola 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 Motorola 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

Open Source Development Labs (OSDL), rev. 1.0

SA Forum

– Hardware Platform Interface (HPI) rev.1.0, A.01.01

CENTELLIS 3406, R3.1
PAYLOAD BLADE OPTIONS

Marketing Number	Description
Platform Core Products	
CENT-3406-R3.1-01	(1) AXP1406/6E, (1) ATCA-F102, (1) SA-BBS-MV-F102-R3.1 (RoHS 6/6)
CENT-3406-R3.1-02	(1) AXP1406/6E, (2) ATCA-F102, (2) SA-BBS-MV-F102-R3.1 (RoHS 6/6)
Optional Platform Core Products	
RTM-ATCA-F101/6E	RTM for the ATCA-F101 blade (RoHS 6/6)
RTM-ATCA-F102-OPT	Optional RTM for the ATCA-F102 blade (RoHS 6/6)
SFP-MM-SX-LC	Single form-factor pluggable - 850NM, 1000BASE-SX, LC connector
CABLE-OPT-F102-LOOP	Optical loop back cable for the RTM-ATCA-F102-OPT
CABLE-OPT-F102-5M	Optical cable for the RTM-ATCA-F102-OPT (5M)
SFP-FILLER	SFP EMI plug for the RTM-ATCA-F102-OPT
SSD-IDE-0016	PMC module with solid state disk drive - 16GB (RoHS 6/6)
HDD-IDE-0040-6E	PMC hard disk drive - 40GB (RoHS 6/6)
AXP-F-PANEL	Blank filler panel, AXP1406 and AXP1600-Front
AXP-R-PANEL	Blank filler panel, AXP1406 and AXP1600-Rear
Optional Payload Blades	
ATCA-7107-2G-C3R3.1	ATCA processor blade with Intel® Pentium® M processor, 2GB memory and four PMC slots, C3000R3.1 (RoHS 5/6)
ATCA-7107-4G-C3R3.1	ATCA processor blade with Intel Pentium M processor, 4GB memory and four PMC slots, C3000R3.1 (RoHS 5/6)
RTM-7107-C3R3.1	RTM for the ATCA-7107 blade C3000R3.1 (RoHS 5/6)
ATCA-7107/HDD/6E	30GB IDE PATA HDD and mounting kit for the ATCA-7107 (RoHS 6/6)
ATCA-7107/HD-SATA/6E	60GB IDE SATA HDD and mounting kit for the ATCA-7107 (RoHS 6/6)
ATCA-S100-300-C3R3.1	ATCA storage blade with 300GB and Fibre Channel interface, C3000R3.1 (RoHS 5/6)
ATCA-S100-150-C3R3.1	ATCA storage blade with 150GB and Fibre Channel interface, C3000R3.1 (RoHS 5/6)
ATCA-S100-F/6E	Fiber cable (2M) with two fibre SFP transceivers for ATCA-S100 (RoHS 6/6)
ATCA-S100-C/6E	Copper cable (1M) with two fibre SFP transceivers for ATCA-S100 (RoHS 6/6)
ATCA-7221-2G-C3R3.1	ATCA processor blade with 2.8 GHz dual Intel® Xeon® processors, 2GB memory and one PMC slot, C3000R3.1 (RoHS 6/6)
RTM-7221-SCS-C3R3.1	RTM for the ATCA-7221 blade with dual SCSI and GE interfaces, optional SAS HDD, C3000R3.1 (RoHS 6/6)
RTM-7221-FC-C3R3.1	RTM for the ATCA-7221 blade with dual FC interfaces (copper), optional SATA HDD, C3000R3.1 (RoHS 6/6)
ATCA-7221/HD/SAS/6E	72GB SAS HDD and mounting kit for the RTM-7221-SCS-C3R3.1 (RoHS 6/6)
ATCA-7221/HD/SATA/6E	60GB SATA HDD and mounting kit for the RTM-7221-FC-C3R3.1 (RoHS 6/6)
ATCA-7221/MEM-2G-/6E	2GB DDR memory module for ATCA-7221 (RoHS 6/6)
ATCA-C110/1G-1GB/6E	ATCA AMC carrier blade with 4 AMC sites (RoHS 6/6)
ACC/RTM-C110/6E	RTM for the ATCA-C110 AMC carrier blade
AMC-FILLER	AMC filler panel for the ATCA-C110 AMC carrier blade
PRAMC-7201/1.4GHZ/6E	AMC module - 1.4 GHz Intel Pentium M processor (RoHS 6/6)

Motorola AdvancedTCA blades have several options such as extra memory, hard drive options, rear transitional modules (RTMs) and assorted cables and connectors. Please see the particular blade-level datasheets to get a complete listing of these options.

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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Motorola 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. And solution extras include enhanced warranty and repairs.

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