
RTM-ATCA-736x-10G

Installation and Use

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About this Manual

Overview of Contents

This Reference Guide is intended for users qualified in electronics or electrical engineering. Users must have a working understanding of Peripheral Component Interconnect (PCI), AdvancedTCA®, and telecommunications.

The manual contains the following chapters and appendices:

Safety Notes on page 15 lists safety notes applicable to the blade.

Sicherheitshinweise on page 19 provides the German translation of the safety notes section.

Chapter 1, Introduction on page 23 describes the main features of the blade.

Chapter 2, Hardware Preparation and Installation on page 27 outlines the installation requirements, hardware accessories, switch settings, installation and removal procedures.

Chapter 3, Controls, LEDs, and Connectors on page 43 describes external interfaces of the blade. This includes connectors and LEDs.

Chapter 4, Sensor Data Records on page 53 provides information on the blade's FRU info and sensor data.

Appendix A, Related Documentation on page 55 provides links to further blade-related documentation.

Abbreviations

This document uses the following abbreviations:

Abbreviation	Definition
ANSI	American National Standards Institute
ATCA	Advanced Telecommunications Computing Architecture
ATN	Attention
BMC	Baseboard Management Controller
CISPR	Comité Internationale Spécial des Perturbations Radioelectrotechnique
CMD	Command
EMC	Electromagnetic Compatibility
EMV	Elektromagnetische Vertraeglichkeit



About this Manual






Abbreviation	Definition
EN	European Norm
ETH	Ethernet
ETSI	European Telecommunications Standards Institute
ESD	Electrostatic Sensitive Device
FAE	Field Application Engineers
FCC	Federal Communications Commission
FRU	Field Replaceable Unit
GB	Gigabyte
GbE	Gigabit Ethernet
GmbH	Gesellschaft mit beschränkter Haftung
HDD	Hard Disk Drive
H/S	Hot Swap
HPM	Hardware Platform Management
IANA	Internet Assigned Numbers Authority
ID	Identifier
IEC	International Electric Code
IEEE	Institute of Electrical and Electronics Engineers
IPMB	Intelligent Platform Management Bus
IPMC	Intelligent Platform Management Controller
IPMI	Intelligent Platform Management Interface
ISO	International Organization for Standardization
JBOD	Just a Bunch Of Disks
KCS	Keyboard Controller Style
LSB	Least Significant Bit/Byte
LUN	Logical Unit Number
MMC	Mezzanine Management Controller
NEBS	Network Equipment Building System

Abbreviation	Definition
NetFn	Network Function
OEM	Original Equipment Manufacturer
OOS	Out-Of-Service
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PICMG	PCI Industrial Computer Manufacturers Group
RAID	Redundant Array of Inexpensive Disks
RoHS	Restriction of Hazardous Substances
RPM	Rounds per Minute
RTM	Rear Transition Module
RoHS	Restriction of the use of Certain Hazardous Substances
SAS	Serial Attached SCSI
SATA	Serial ATA
SDR	Sensor Data Record
SELV	Safety Extra Low Voltages
SFP	Small Form-Factor Pluggable
UL	Underwriters Laboratory Inc.
USB	Universal Serial Bus
VCCI	Voluntary Control Council for Interference

Conventions

The following table describes the conventions used throughout this manual. .

Notation	Description
0x00000000	Typical notation for hexadecimal numbers (digits are 0 through F), for example used for addresses and offsets
0b0000	Same for binary numbers (digits are 0 and 1)
bold	Used to emphasize a word
Screen	Used for on-screen output and code related elements or commands. Sample of Programming used in a table (9pt)
Courier + Bold	Used to characterize user input and to separate it from system output
<i>Reference</i>	Used for references and for table and figure descriptions
File > Exit	Notation for selecting a submenu
<text>	Notation for variables and keys
[text]	Notation for software buttons to click on the screen and parameter description
...	Repeated item for example node 1, node 2, ..., node 12
.	Omission of information from example/command that is not necessary at the time
..	Ranges, for example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers)
	Logical OR
	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury

Notation	Description
	Indicates a property damage message
	Indicates a hot surface that could result in moderate or serious injury
	Indicates an electrical situation that could result in moderate injury or death
<p data-bbox="272 725 386 777">Use ESD protection</p> 	Indicates that when working in an ESD environment care should be taken to use proper ESD practices
	No danger encountered, pay attention to important information

Summary of Changes

This manual has been revised and replaces all prior editions.

Part Number	Publication Date	Description
6806800P29F	October 2019	Rebrand to SMART Embedded Computing. Updated RoHS directive.
6806800P29E	July 2016	Removed declaration of conformity. Updated copyrights information page.
6806800P29D	September 2015	Updated <i>Chapter 1.3 Standard Compliance on page 27</i> . Updated <i>Safety Notes Summary</i> and <i>Sicherheitshinweise</i> .
6806800P29C	June 2014	Re-branded to Artesyn.
6806800P29B	December 2012	Updated Chapter 1, Standard Compliances, on page 26 and Table Power Dissipation on page 33 .
6806800P29A	June 2012	First edition

Safety Notes

This section provides warnings that precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed during all phases of operation, service, and repair of this equipment. You should also employ all other safety precautions necessary for the operation of the equipment in your operating environment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

SMART Embedded Computing intends to provide all necessary information to install and handle the product in this manual. Because of the complexity of this product and its various uses, we do not guarantee that the given information is complete. If you need additional information, ask your SMART EC representative.

The product has been designed to meet the standard industrial safety requirements. It must not be used except in its specific area of office telecommunication industry and industrial control.

Only personnel trained by SMART EC or persons qualified in electronics or electrical engineering are authorized to install, remove or maintain the product.

The information given in this manual is meant to complete the knowledge of a specialist and must not be used as replacement for qualified personnel.

Keep away from live circuits inside the equipment. Operating personnel must not remove equipment covers. Only factory authorized service personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment.

Do not install substitute parts or perform any unauthorized modification of the equipment or the warranty may be voided. Contact your local SMART EC representative for service and repair to make sure that all safety features are maintained.

EMC

The blade has been tested in a standard SMART EC system and found to comply with the limits for a Class A digital device in this system, pursuant to part 15 of the FCC Rules, EN 55022 Class A respectively. These limits are designed to provide reasonable protection against harmful interference when the system is operated in a commercial environment.

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Interference (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Safety Notes

The blade generates and uses radio frequency energy and, if not installed properly and used in accordance with this guide, may cause harmful interference to radio communications. Operating the system 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.

Installation

Damage of Circuits

Electrostatic discharge and incorrect blade installation and removal can damage circuits or shorten their life.

Before touching the blade or electronic components, make sure that you are working in an ESD-safe environment.

Data Loss

Removing the blade with the blue LED still blinking causes data loss.

Wait until the blue LED is permanently illuminated, before removing the blade.

Damage of Blade and Additional Devices and Modules

Incorrect installation of additional devices or modules may damage the blade or the additional devices or modules.

Before installing or removing an additional device or module, read the respective documentation.

System Damage

Warning: The intra-building port (s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port (s) of the equipment or subassembly **MUST NOT** be metalically connected to interfaces that connect to the outside plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.

The intra-building port(s) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.

Operation

Blade Damage - Blade Surface

High humidity and condensation on the blade surface causes short circuits.

Do not operate the blade outside the specified environmental limits. Make sure the blade is completely dry and there is no moisture on any surface before applying power.

Blade Overheating and Blade Damage

Operating the blade without forced air cooling may lead to blade overheating and thus blade damage.

When operating the blade, make sure that forced air cooling is available in the shelf.

When operating the blade in areas of electromagnetic radiation ensure that the blade is bolted on the system and the system is shielded by enclosure.

Environment

Always dispose of used blades, system components and RTMs according to your country's legislation and manufacturer's instructions.

SFP Modules

Personal Injury and Damage of the RTM and SFP Modules

Installing and using SFP modules which are not fully certified and which do not meet all relevant safety standards may damage the RTM and the SFP modules and may lead to personal injury.

Only use and install SFP modules which are fully certified and which meet all relevant safety standards.

Personal Injury

Optical SFP modules may be classified as laser products. When installing and using any of these SFP modules, the regulations which correspond to the respective laser class apply to the whole RTM. Not complying to these regulations may lead to personal injury.

When installing and using optical SFP modules which are classified as laser products, make sure to comply to the respective regulations.

Eye Damage

Optical SFP modules may emit laser radiation when no cable is connected. This laser radiation is harmful to your eyes. Do not look into the optical lens at any time.

Safety Notes

SFP Module Damage

The optical port plug protects the optical fibres against dirt and damage. Dirt and damage can render the SFP module inoperable.

Only remove the optical plug when you are ready to connect a cable to the SFP module. When no cable is connected, cover the port with an optical port plug.

Sicherheitshinweise

Dieses Kapitel enthält Hinweise, die potentiell gefährlichen Prozeduren innerhalb dieses Handbuchs vorrangestellt sind. Beachten Sie unbedingt in allen Phasen des Betriebs, der Wartung und der Reparatur des Systems die Anweisungen, die diesen Hinweisen enthalten sind. Sie sollten außerdem alle anderen Vorsichtsmaßnahmen treffen, die für den Betrieb des Produktes innerhalb Ihrer Betriebsumgebung notwendig sind. Wenn Sie diese Vorsichtsmaßnahmen oder Sicherheitshinweise, die an anderer Stelle dieses Handbuchs enthalten sind, nicht beachten, kann das Verletzungen oder Schäden am Produkt zur Folge haben.

SMART Embedded Computing ist darauf bedacht, alle notwendigen Informationen zum Einbau und zum Umgang mit dem Produkt in diesem Handbuch bereit zu stellen. Da es sich jedoch um ein komplexes Produkt mit vielfältigen Einsatzmöglichkeiten handelt, können wir die Vollständigkeit der im Handbuch enthaltenen Informationen nicht garantieren. Falls Sie weitere Informationen benötigen sollten, wenden Sie sich bitte an die für Sie zuständige Geschäftsstelle von SMART EC.

Das System erfüllt die für die Industrie geforderten Sicherheitsvorschriften und darf ausschließlich für Anwendungen in der Telekommunikationsindustrie und im Zusammenhang mit Industriesteuerungen verwendet werden.

Einbau, Wartung und Betrieb dürfen nur von durch SMART EC ausgebildetem oder im Bereich Elektronik oder Elektrotechnik qualifiziertem Personal durchgeführt werden. Die in diesem Handbuch enthaltenen Informationen dienen ausschließlich dazu, das Wissen von Fachpersonal zu ergänzen, können dieses jedoch nicht ersetzen.

Halten Sie sich von stromführenden Leitungen innerhalb des Produktes fern. Entfernen Sie auf keinen Fall Abdeckungen am Produkt. Nur werksseitig zugelassenes Wartungspersonal oder anderweitig qualifiziertes Wartungspersonal darf Abdeckungen entfernen, um Komponenten zu ersetzen oder andere Anpassungen vorzunehmen.

Installieren Sie keine Ersatzteile oder führen Sie keine unerlaubten Veränderungen am Produkt durch, sonst verfällt die Garantie. Wenden Sie sich für Wartung oder Reparatur bitte an die für Sie zuständige Geschäftsstelle von SMART EC. So stellen Sie sicher, dass alle sicherheitsrelevanten Aspekte beachtet werden.

EMV

Das Blade wurde in einem SMART EC Standardsystem getestet. Es erfüllt die für digitale Geräte der Klasse A gültigen Grenzwerte in einem solchen System gemäß den FCC-Richtlinien Abschnitt 15 bzw. EN 55022 Klasse A. Diese Grenzwerte sollen einen angemessenen Schutz vor Störstrahlung beim Betrieb des Blades in Gewerbe- sowie Industriegebieten gewährleisten.

Sicherheitshinweise

Das Blade arbeitet im Hochfrequenzbereich und erzeugt Störstrahlung. Bei unsachgemäßem Einbau und anderem als in diesem Handbuch beschriebenen Betrieb können Störungen im Hochfrequenzbereich auftreten.

Warnung! Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen. In diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen.

Installation

Beschädigung von Schaltkreisen

Elektrostatische Entladung und unsachgemäßer Ein- und Ausbau von Blades kann Schaltkreise beschädigen oder ihre Lebensdauer verkürzen.

Bevor Sie Blades oder elektronische Komponenten berühren, vergewissern Sie sich, daß Sie in einem ESD-geschützten Bereich arbeiten.

Datenverlust

Wenn Sie das Blade aus dem Shelf herausziehen, und die blaue LED blinkt noch, gehen Daten verloren.

Warten Sie bis die blaue LED durchgehend leuchtet, bevor Sie das Blade herausziehen.

Beschädigung des Blades und von Zusatzmodulen

Fehlerhafte Installation von Zusatzmodulen, kann zur Beschädigung des Blades und der Zusatzmodule führen.

Lesen Sie daher vor der Installation von Zusatzmodulen die zugehörige Dokumentation.

Beschädigung des Systems

Warnung: Die intra-Gebäude Port (s) des Geräts oder Baugruppe ist für den Anschluss an den inner Gebäude oder unbelichteten Verdrahtung oder Verkabelung nur. Die intra-Gebäude Port (s) des Geräts oder Baugruppe muss nicht metallisch mit Schnittstellen, die an der Außenanlage (OSP) oder dessen Verkabelung anschließen angeschlossen werden. Diese Schnittstellen sind für die Verwendung als intra Gebäude Schnittstellen nur entworfen, (Typ 2 oder Typ 4 Ports wie in GR-1089 beschrieben) und erfordern Isolierung von der freiliegenden OSP-Verkabelung. Die Zugabe von primären Schutz nicht ausreichenden Schutz, um diese Schnittstellen metallisch mit OSP Verdrahtung verbinden.

Die intra-Gebäude Port (s) des Gerätes oder einer Unterbaugruppe müssen abgeschirmte innerGebäudeVerkabelung / Verdrahtung, die an beiden Enden geerdet ist zu verwenden.

Betrieb

Beschädigung des Blades

Hohe Luftfeuchtigkeit und Kondensat auf der Oberfläche des Blades können zu Kurzschlüssen führen.

Betreiben Sie das Blade nur innerhalb der angegebenen Grenzwerte für die relative Luftfeuchtigkeit und Temperatur. Stellen Sie vor dem Einschalten des Stroms sicher, dass sich auf dem Blade kein Kondensat befindet.

Überhitzung und Beschädigung des Blades

Betreiben Sie das Blade ohne Zwangsbelüftung, kann das Blade überhitzt und schließlich beschädigt werden.

Bevor Sie das Blade betreiben, müssen Sie sicher stellen, dass das Shelf über eine Zwangskühlung verfügt.

Wenn Sie das Blade in Gebieten mit starker elektromagnetischer Strahlung betreiben, stellen Sie sicher, dass das Blade mit dem System verschraubt ist und das System durch ein Gehäuse abgeschirmt wird.

Umweltschutz

Entsorgen Sie alte Batterien und/oder Blades/Systemkomponenten/RTMs stets gemäß der in Ihrem Land gültigen Gesetzgebung und den Empfehlungen des Herstellers.

SFP Modules

Gefahr von Verletzungen sowie von Beschädigung des RTMs und SFP-Modulen

Die Installation und der Betrieb von SFP-Modulen, welche nicht zertifiziert sind und welche nicht den Sicherheitsstandards entsprechen, kann Verletzungen zur Folge haben sowie zur Beschädigung des RTMs und von SFP-Modulen führen.

Verwenden Sie daher nur SFP-Module, die zertifiziert sind und die den Sicherheitsstandards entsprechen.

Verletzungsgefahr

Optische SFP-Module können als Laserprodukte klassifiziert sein. Wenn Sie solche SFP-Module installieren und betreiben, so gelten die entsprechenden Bestimmungen für Laserprodukte für das gesamte RTM. Werden diese Bestimmungen nicht eingehalten, so können Verletzungen die Folge sein.

Wenn Sie SFP-Module betreiben, die als Laserprodukte klassifiziert sind, stellen Sie sicher, dass die entsprechenden Bestimmungen für Laserprodukte eingehalten werden.

Sicherheitshinweise

Verletzungsgefahr der Augen

Optische SFP-Module können Laserstrahlen aussenden, wenn kein Kabel angeschlossen ist.

Blicken Sie daher nicht direkt in die Öffnung eines SFP-Moduls, um Verletzungen der Augen zu vermeiden.

Beschädigung von SFP-Modulen

Die Schutzkappe eines SFP-Modules dient dazu, die sensible Optik des SFP-Modules gegen Staub und Schmutz zu schützen.

Entfernen Sie die Schutzkappe nur dann, wenn Sie beabsichtigen, ein Kabel anzuschließen. Andernfalls belassen Sie die Schutzkappe auf dem SFP-Modul.

Introduction

1.1 Features

The RTM-ATCA-736x-10G is a high performance AdvancedTCA Rear Transition Module, designed according to PICMG 3.0 Revision 3.0 AdvancedTCA Base Specification. The RTM-ATCA-736x-10G has the following variants:

- RTM-ATCA-736x-10G
- RTM-ATCA-737x-10G
- RTM-ATCA-736x-10G-SP

The RTM-ATCA-736x-10G and RTM-ATCA-737x-10G RTMs offers the following features:

- 4x10G interfaces using SFP+ modules
- Four 10/100/1000Base-T Ethernet ports
- One hot swappable 2.5" SAS HD. The HDD is supported through on-board SAS controller (for RTM-ATCA-736x-10G) or Front board SAS interface (for RTM-ATCA-737x-10G).
- Two SAS ports to support external SAS JBOD and storage clustering
- Two SAS ports to access local disk drive and redundant disk in a logically paired ATCA slot
- Local hot swappable SAS HDD, different capacity options available (separate order item)

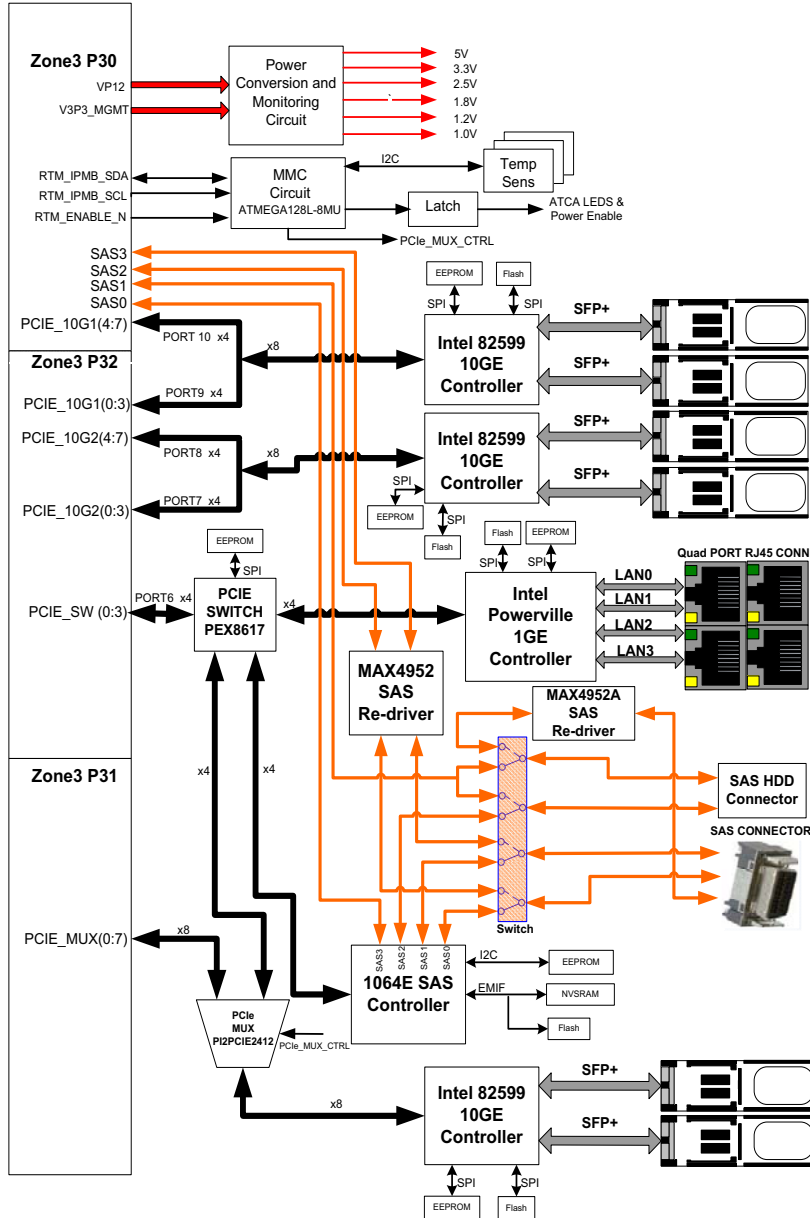
The RTM-ATCA-736x-10G-SP offers the following features:

- 6x10G interfaces using SFP+ modules
- Four 10/100/1000Base-T Ethernet ports

1.2 Block Diagram

The following figure shows the block diagram of the RTM.

Figure 1-1 RTM Block Diagram





The SAS switches can be implemented using discrete mount/no-mount option.

1.3 Standard Compliances

The product is designed to meet the following standards.

Table 1-1 Standard Compliances

Standard	Description
UL 60950-1 EN 60950-1 IEC 60950-1 CAN/CSA C22.2 No 60950-1	Legal safety requirements
CISPR 22 EN 55022 EN 55024 FCC Part 15 EN 300386 NEBS Standard GR-1089 CORE	EMC requirements on system level (predefined SMART Embedded Computing system)
ISO 8601	Y2K compliance
NEBS Standard GR-63-CORE ¹ ETSI EN 300019 series	NEBS level three Product is designed to support NEBS level three. The compliance tests must be done with the customer target system.
PICMG 3.0 and 3.1	Defines mechanics, blade dimensions, power distribution, power and data connectors, and system management

1. The blade does not fulfill the "Unpacked Equipment Shock Criteria" as defined in NEBS GR63 4.3.2. During tests which consisted of dropping the blade from 100 mm height, we observed that on some blades the ATCA zone 2 and 3 connectors got damaged. Although it was possible to manually repair the connectors and the blade was fully functional again afterwards, the criteria imposed by the NEBS standard were not fulfilled.



The product has been designed to meet the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) Directive (EU) 2015/863 (amending Annex II to Directive 2011/65/EU).

1.4 Mechanical Data

The following table provides details about the blade's mechanical data, such as dimensions and weight.

Table 1-2 Mechanical Data

Feature	Value
Dimensions (width x height x depth)	6HP wide, 8U high, 70mm deep
Weight	0.64kg (without HDD carrier and drive installed) 0.90kg (with HDD carrier and drive installed)

1.5 Ordering and Support Information

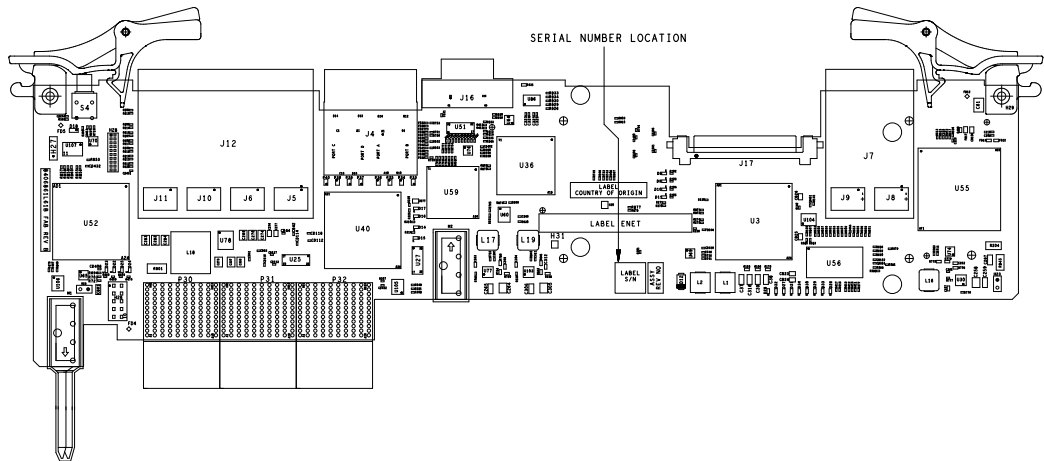
Refer to the data sheet for the ATCA-7370 for a complete list of available variants and accessories. Refer to [Appendix A, Related Documentation on page 55](#) or consult your local SMART Embedded Computing sales representative for the availability of other variants.

For technical assistance, documentation, or to report product damage or shortages, contact your local SMART EC sales representative or visit <https://www.smartembedded.com/ec/support/>.

1.6 Product Identification

The following graphic shows the location of the serial number label.

Figure 1-2 Serial Number Location



Hardware Preparation and Installation

2.1 Unpacking and Inspecting the Module

NOTICE

Damage of Circuits

Electrostatic discharge and incorrect blade installation and removal can damage circuits or shorten their life.

Before touching the blade or electronic components, make sure that you are working in an ESD-safe environment.

Shipment Inspection

To inspect the shipment, perform the following steps:

1. Verify that you have received all items of your shipment:
 - Printed *Quick Start Guide* and *Safety Notes Summary*
 - RTM-ATCA-736x-10G
 - Any optional items ordered
2. Check for damage and report any damage or differences to the customer service.
3. Remove the desiccant bag shipped together with the blade and dispose of it according to your country's legislation.



The blade is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, please contact our customer's service immediately.

2.2 Environmental and Power Requirements

In order to meet the environmental requirements, the blade has to be tested in the system in which it is to be installed.

Before you power up the blade, calculate the power needed according to your combination of blade upgrades and accessories.

Hardware Preparation and Installation

2.2.1 Environmental Requirements

The environmental conditions must be tested and proven in the shelf configuration used. The conditions refer to the surrounding of the blade within the user environment.



The environmental requirements of the blade may be further limited down due to installed accessories, such as hard disks or PMC modules, with more restrictive environmental requirements.

Operating temperatures refer to the temperature of the air circulating around the blade and not to the actual component temperature.

NOTICE

Blade Damage - Blade Surface

High humidity and condensation on the blade surface causes short circuits.

Do not operate the blade outside the specified environmental limits. Make sure the blade is completely dry and there is no moisture on any surface before applying power.

Blade Overheating and Blade Damage

Operating the blade without forced air cooling may lead to blade overheating and thus blade damage.

When operating the blade, make sure that forced air cooling is available in the shelf.

Table 2-1 Environmental Requirements

Requirement	Operating	Non-Operating
Temperature	+5°C (41°F) to +40°C (104°F) (normal operation) according to NEBS Standard GR-63-CORE -5°C (23°F) to +55°C (131°F) (exceptional operation) according to NEBS Standard GR-63-CORE	-40°C (-40°F) to +70°C (158°F) (may be further limited by installed accessories)
Temp. Change	± 0.25°C/min according to NEBS Standard GR-63-CORE	± 0.25°C/min
Rel. Humidity	5% to 90% non-condensing according to SMART EC-internal environmental requirements	5% to 95% non-condensing according to SMART EC-internal environmental requirements

Table 2-1 Environmental Requirements (continued)

Requirement	Operating	Non-Operating
Vibration (with HDD Installed)	0.1g from 5 to 100Hz and back to 5Hz at a rate of 0.1 octave/minute	5-20Hz at 0.01g ² /Hz 20-200Hz at -3.0 dB/octave Random 5-20Hz at 1m ² /Sec ³ Random 20-200Hz at -3m/Sec ²
Shock (with HDD Installed)	Half-sine, 11m/Sec, 30mSec/Sec ²	Blade level packaging Half-sine, 6mSec at 180m/Sec ²
Free Fall	-	1,200 mm/all edges and corners 1.0 m (packaged) per ETSI 300 019-2-2 (blade level packaging) 100 mm (unpacked) per GR-63-CORE

During the safety qualification of this product, the following on-board locations were identified as critical with regards to the maximum temperature during blade operation. To guarantee proper product operation and to ensure safety, you have to make sure that the temperatures at the locations specified in the following are not exceeded. If not stated otherwise, the temperature should be measured by placing a sensor exactly at the given locations. For your convenience all temperature spots are shown in the figure below that provides a detailed view of the product.

Table 2-2 Critical Temperature Limits

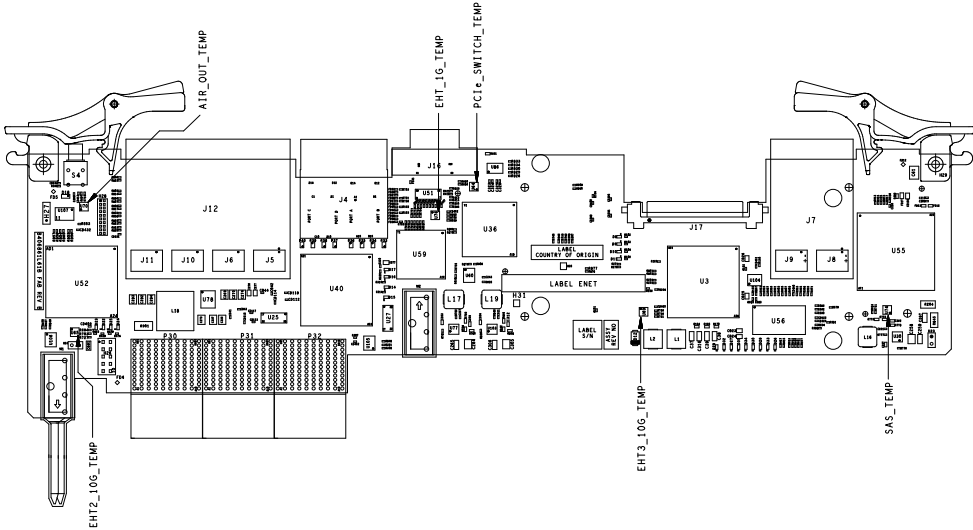
Location	Component	Temperature Limit
U3, U40, U52	Dual Port 10 Gigabit Ethernet Controllers	70°C
U59	Quad Gigabit Ethernet LAN Controller	70°C
U55	Four Port SAS Controller	70°C
U36	Four Port PCI Express Switch	70°C



Temperature limit is valid when measured on the component heat sink.

Hardware Preparation and Installation

Figure 2-1 Location of Critical Temperature Spots (Top Side)



If you integrate the blade in your own system please contact your local sales representative for further safety information.

2.2.2 Power Requirements

The RTM gets safety extra low voltage (SELV) power from the front blade.

Table 2-3 Power Dissipation

Characteristic	Value
Measured Max Power dissipation of RTM-ATCA-736x-10G	30W

2.3 Installing the Hard Disk Module

The RTM provides a hot swappable SAS hard disk module. In this section you can find information on how to install the hard disk module. The RTM is shipped with an HDD slot cover.

NOTICE

Damage of Circuits

Electrostatic discharge and incorrect RTM installation and removal can damage circuits or shorten their life.

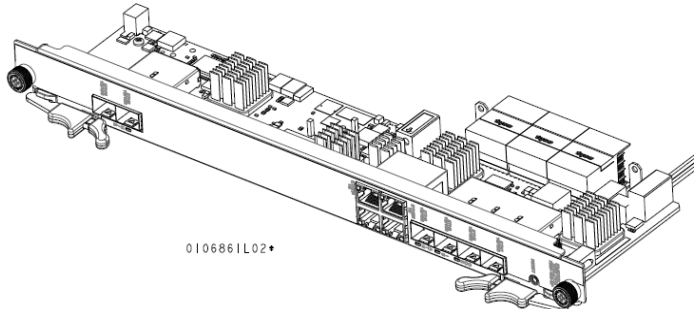
Before touching the RTM or electronic components, make sure that you are working in an ESD-safe environment.



Installing/removing the HDDs do not automatically invoke the OS intervention. The OS related steps have to be defined by the user.

Installation procedure

1. Remove the HDD slot cover of the RTM by loosening and removing the screws that attach the plate to the RTM.



2. With the HDD slot cover removed, align the hard disk module to the guiding rails of the hard disk slot.
3. Insert the hard disk module into the slot until it is fully inserted.
4. Tighten the two thumb screws of the hard disk module.
5. Take all necessary steps in your operating system to make the hard disk operable (the steps depend on the OS you are using).

2.4 Replacing the Hard Disk Module

In this section you can find information on how to replace the hard disk module.



Important Information

If the hot swap feature is not supported on your RTM, you cannot replace the hard disk module yourself. Please send the RTM to your local support representative to have the hard disk module replaced.

NOTICE

Damage of Circuits

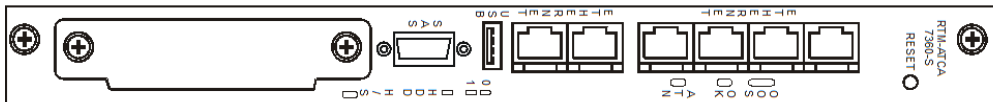
Electrostatic discharge and incorrect RTM installation and removal can damage circuits or shorten their life.

Before touching the RTM or electronic components, make sure that you are working in an ESD-safe environment.

Replacement procedure

To replace the hard disk, proceed as follows.

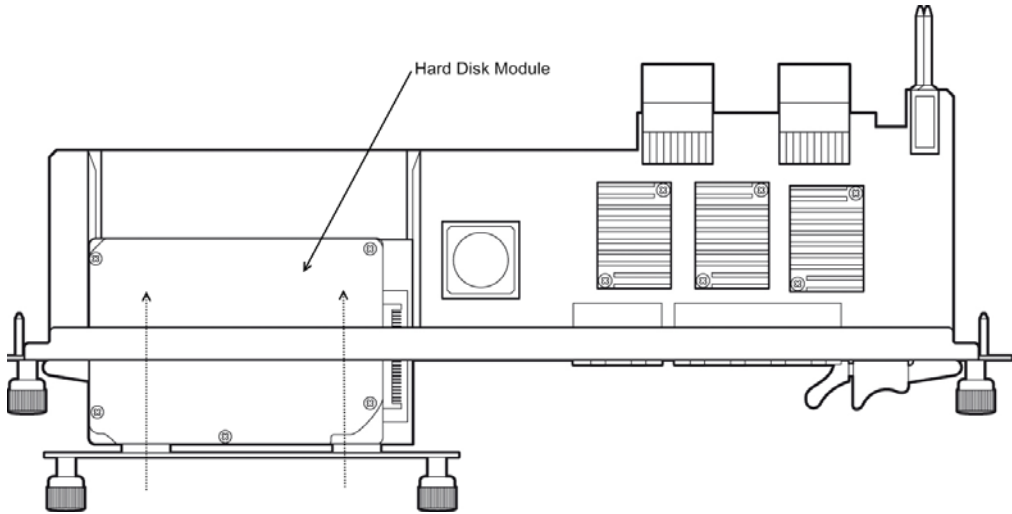
1. Make sure a replacement hard disk module is available.
2. Take all necessary steps in your operating system to make the hard disk module ready for removal (the steps depend on the OS you are using).
3. Loosen the two thumb screws of the hard disk module.



4. Pull the hard disk module outward by holding both screws and exerting equal force to keep it straight.
5. Align the replacement hard disk module to the guiding rails of the hard disk slot.

6. Insert the hard disk module into the slot until it is fully inserted.

Figure 2-2 Inserting the Hard Disk Module



7. Tighten the two thumb screws of the hard disk module.
8. Take all necessary steps in your operating system to make the hard disk operable (the step depend on the OS you are using).

2.5 Installing and Removing the RTM

The RTM must be installed into a ATCA system without a Zone 3 midplane.



The RTM provides support for basic hot swap, that means it can be installed, removed and replaced in a powered system. However, after the RTM is installed or replaced in a powered system the front blade has to be rebooted so that the OS can recognize the SAS controller or other PCI devices located on the RTM.

NOTICE

RTM Damage

Installing the RTM with other blades than those listed in the table below may damage the RTM and the front blade.

Only install the RTM with the SMART EC blades listed in the table below.

Damage of Circuits

Electrostatic discharge and incorrect RTM installation and removal can damage circuits or shorten their life.

Before touching the RTM or electronic components, make sure that you are working in an ESD-safe environment.

Data Loss

If you remove the RTM from a powered system, data that is in the process of being written to the hard disk located on the RTM may be lost.

Disconnect the RTM hard disk from OS services before removing the RTM from a powered system.

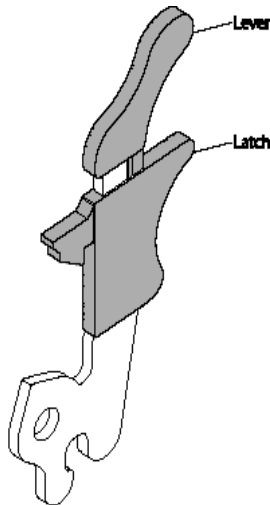
Product	Operates with		
	ATCA-7365	ATCA-7370	ATCA-7470
RTM_ATCA-736x-10G	Yes	Yes	Yes
RTM-ATCA-736x-10G-SP	Yes	Yes	Yes
RTM-ATCA-737x-10G	No	Yes	No

2.5.1 Installing the RTM

Installation Procedure

The following procedure describes the installation of the RTM. It assumes that your system is powered. If your system is unpowered, you can disregard the blue LED and thus skip the respective step. In this case it is a purely mechanical installation.

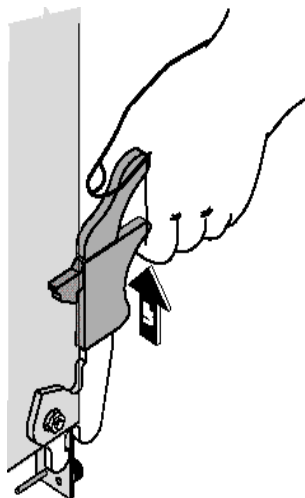
1. Locate the slot where the RTM has to be installed into the shelf's rear, which must be the same as that of the front blade.
2. Ensure that the top and the bottom handles of the RTM are in an outward position by squeezing the lever and the latch together.



3. Insert the RTM into the shelf by placing the top and bottom edges in the card guides of the slot.
4. Slide the RTM into the slot.
5. Apply equal and steady pressure to the RTM to carefully slide the RTM into the shelf until you feel resistance. Continue to gently push the RTM until the RTM connectors engage.
6. Squeeze the lever and the latch together and hook the lower and the upper handle into the shelf rail recesses.

Hardware Preparation and Installation

7. Fully insert the RTM and lock it to the shelf by pressing the two components of the lower and the upper handles together and turning the handles toward the face plate.



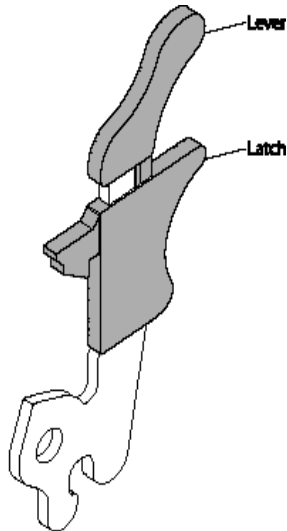
8. Tighten both face plate screws on the RTM.
9. Wait until the blue LED on the RTM is OFF.
A switched off blue LED indicates that the payload of the RTM has become active.
10. Plug interface cable into face plate connectors, if applicable.
11. Reboot the front blade.
This is necessary so that the OS of the front blade can recognize the SAS controller or any other PCI device located on the RTM.

2.5.2 Removing the RTM

Removal Procedure

The following procedure describes the removal of the RTM. It assumes that your system is powered. If your system is unpowered, you can disregard the blue LED and thus skip the respective step. In this case it is a purely mechanical procedure.

1. Unlatch the lower handle outward by squeezing the lever and the latch together, and turning the handle outward only enough to unlatch the handle from the face plate, that means until you feel a resistance. Do not rotate the handle fully outward. The blue LED blinks indicating that the shelf manager is informed about the desire of the blade to power down the payload of both the front blade and the RTM and the power-down process is ongoing.



2. Wait until the blue LED of the RTM is permanently ON. A permanently switched ON LED indicates that the payload of the RTM has been powered down.
3. Remove interface cables from face plate connectors, if applicable.
4. Loosen the two RTM face plate screws.
5. Unlatch the upper handle and rotate both handles fully outward.
6. Remove the RTM from the slot.

2.6 Installing and Removing SFP/SFP+ Modules

This section describes how to install and remove SFP modules.



Eye Damage

Optical SFP modules may emit laser radiation when no cable is connected. Avoid staring into open apertures to avoid damage to your eyes.

Personal Injury and Damage of the RTM and SFP Modules

Installing and using SFP modules which are not fully certified and which do not meet all relevant safety standards may damage the RTM and the SFP modules and may lead to personal injury.

Only use and install SFP modules which are fully certified and which meet all relevant safety standards.

Personal Injury

Optical SFP modules may be classified as laser products. When installing and using any of these SFP modules, the regulations which correspond to the respective laser class apply to the whole RTM. Not complying to these regulations, may lead to personal injury.

When installing and using optical SFP modules which are classified as laser products, make sure to comply to the respective regulations.



- SFP/SFP+ modules can be installed/removed both while the RTM is powered and non-powered. The presence and also the type of SFP/SFP+ modules is automatically detected.
- The maximum power consumption of all installed SFP/SFP+ modules must not exceed 12W.
- The SFP/SFP+ modules are not included as part of the RTM-ATCA-737x-10G deliverables. For more information on ordering them, contact your local SMART EC sales representative.

The following table provides the list of SFP/SFP+ modules tested to use with RTM.

Table 2-4 SFP/SFP+ Modules

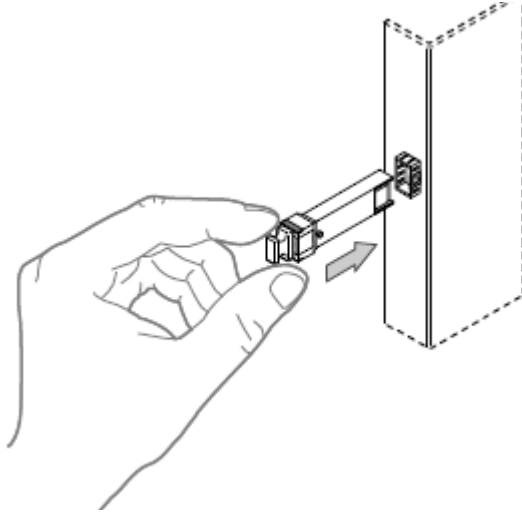
SMART EC Part Number	Manufacturer Part Number	Description	Manufacturer
SFP-CO-RJ-45	DM7041-R-L	1G copper small form-factor pluggable (SFP) transceiver module - RJ-45 connector	Methode Electronic Inc
SFPP-SM-LR-LC	FTLX1471D3BCL	10G fiber small form-factor pluggable plus (SFP+) transceiver module - 1310nm, LR, LC connector	Finisar
SFPP-MM-SR-LC	FTLX8571D3BCL	10G fiber small form-factor pluggable plus (SFP+) transceiver module - 850nm, SR, LC connector	Finisar

2.6.1 Installing an SFP/SFP+ Module

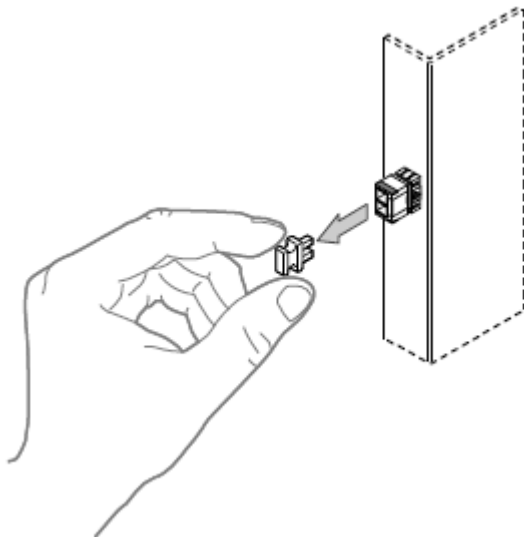
Procedure

In order to install an SFP/SFP+ module, proceed as follows:

1. Slide SFP/SFP+ module into the slot until it locks into position.



2. Remove the optical port plug.



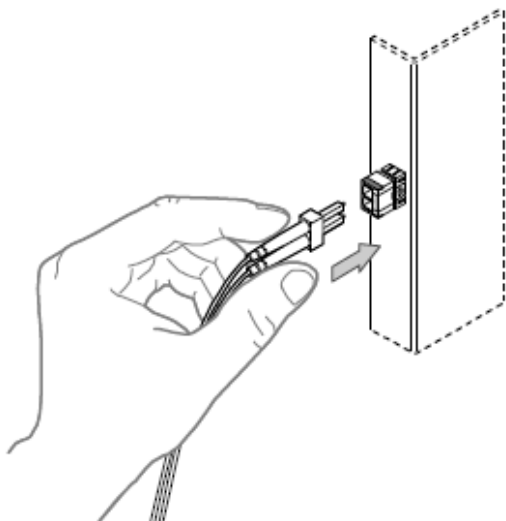
NOTICE

SFP/SFP+ Module Damage

The optical port plug protects the sensitive optical fibres against dirt and damage. Dirt and damage can render SFP/SFP+ module inoperable.

Only remove the optical plug when you are ready to connect a cable to the SFP/SFP+ module. When no cable is connected, cover the port with an optical port plug.

3. Connect the network cable to SFP/SFP+ module

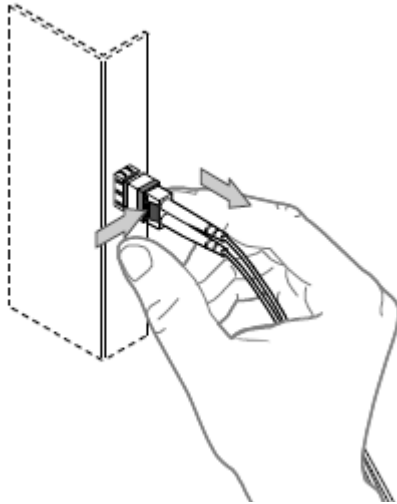


2.6.2 Removing an SFP/SFP+ Module

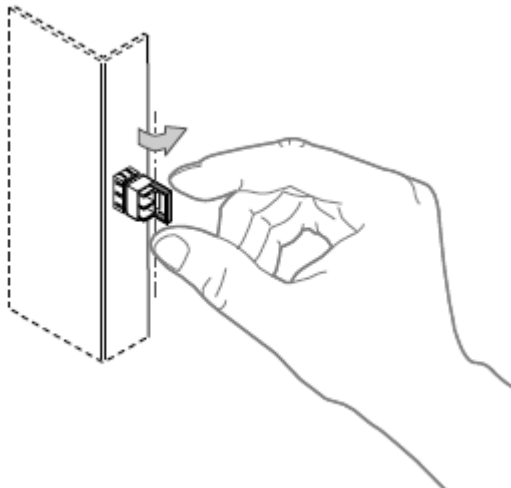
Procedure

In order to remove an SFP/SFP+ module, proceed as follows.

1. Remove any connected cable from SFP/SFP+ module.

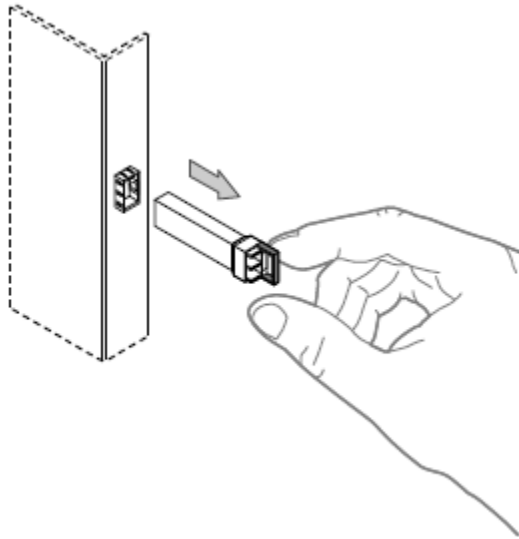


2. Open the SFP/SFP+ latch. Note that the latch mechanism of your SFP/SFP+ module may be slightly different compared to the latch shown in the following figure.



Hardware Preparation and Installation

3. Grasp the SFP/SFP+ module and carefully slide it out of the slot.



4. Cover the optical port with the optical port plug.

NOTICE

SFP/SFP+ Module Damage

The optical port plug protects the sensitive optical fibres against dirt and damage. Dirt and damage can render the SFP/SFP+ module inoperable.

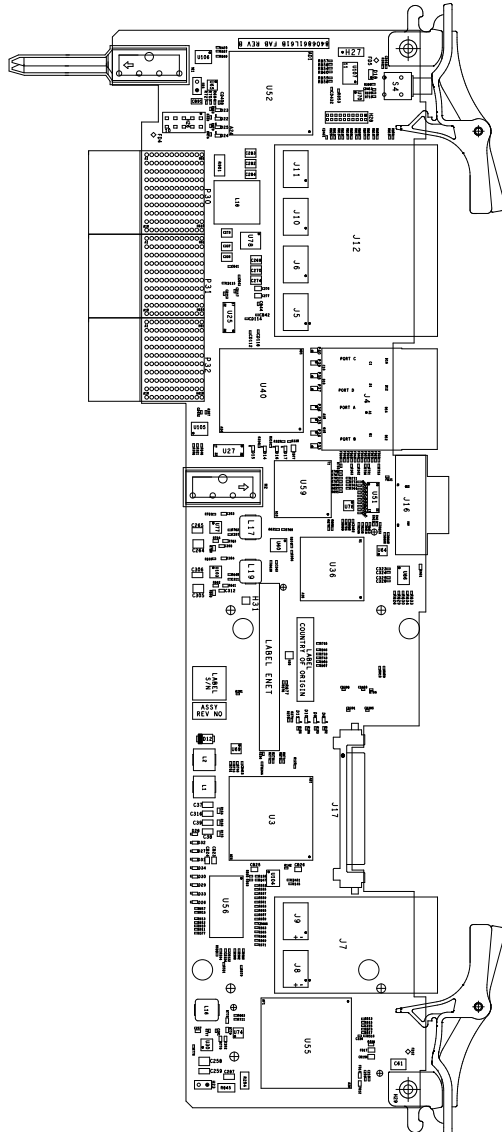
Only remove the optical plug when you are ready to connect a cable to the SFP/SFP+ module. When no cable is connected, cover the port with an optical port plug.

Controls, LEDs, and Connectors

3.1 Mechanical Layout

The following figure shows the mechanical layout of the RTM.

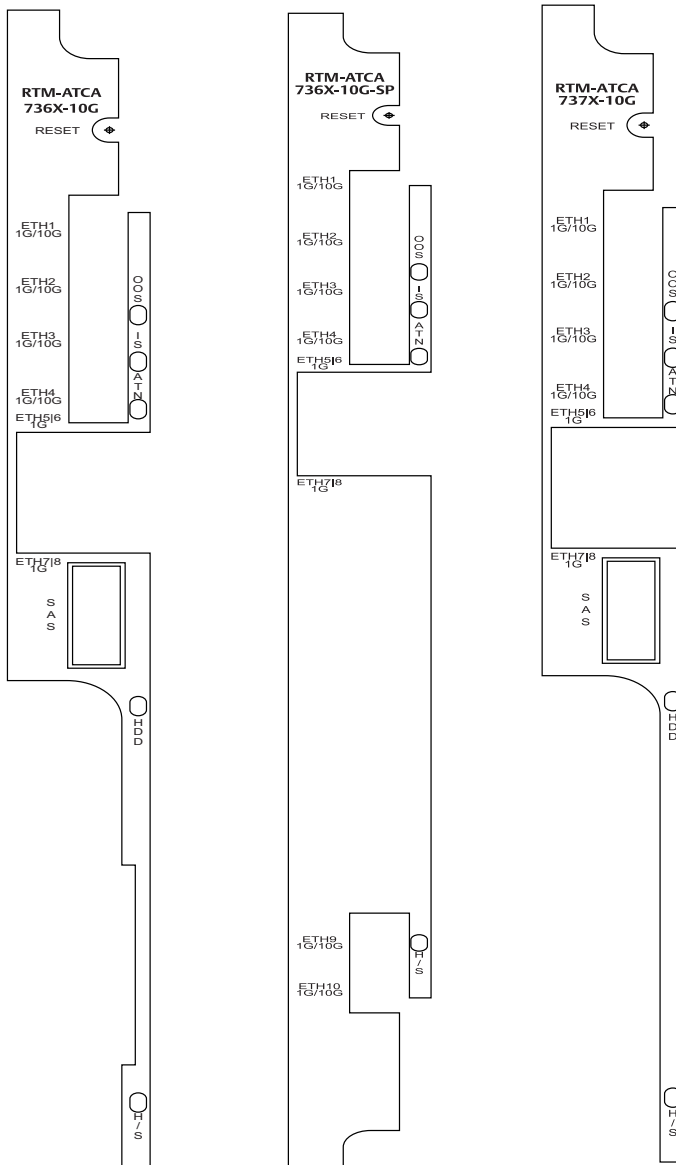
Figure 3-1 Mechanical Layout



3.2 Face Plate

The following figure shows the connectors, keys and LEDs available at the face plate of the RTM variants.

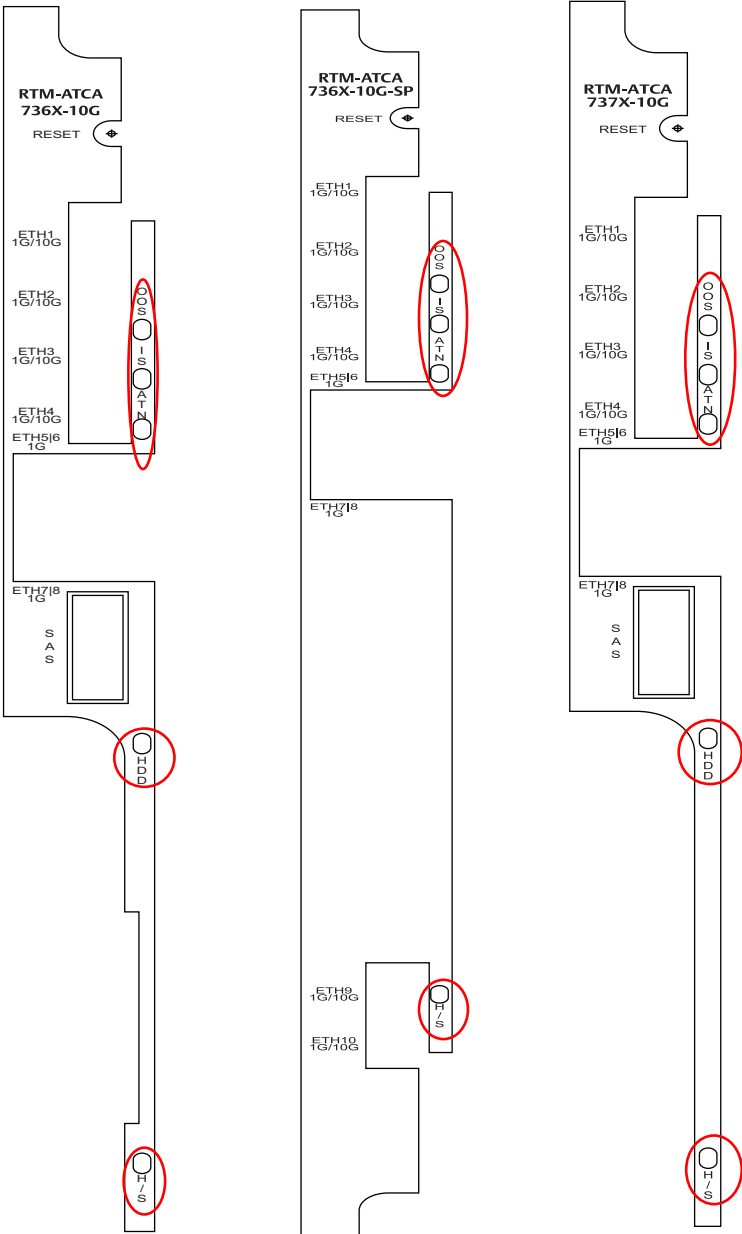
Figure 3-2 Face Plate



3.2.1 LEDs

The following figure shows all the LEDs available at the face plate.

Figure 3-3 Location of LEDs



Controls, LEDs, and Connectors

The meaning of these LEDs is described in the following table.

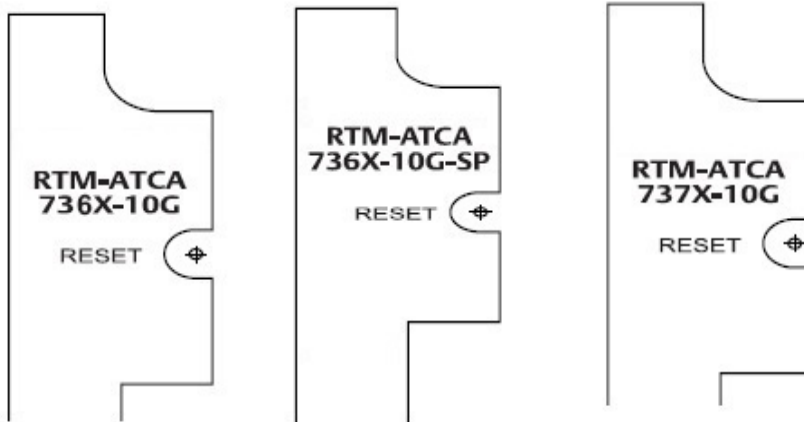
Table 3-1 Face Plate LED Descriptions

LED	Description
OOS	Out Of Service Red: This LED is controlled by higher layer software, such as middle ware or applications.
IS	Payload Power Status Green: The payload power has been enabled by the IPMC. Note that this LED indicates the payload power status both in the early power state and the normal blade operation. OFF: Payload power is disabled Note: This LED is multicolored (red/green/yellow) and is programmable by IPMC.
ATN	Amber: This LED is controlled by higher layer software, such as middle ware or applications.
SAS port activity LEDs 0/1	Shows activity on the respective link
HDD	HDD activity LED
H/S	FRU State Machine During blade installation: Permanently blue: On-board IPMC powers up Blinking blue: Blade communicates with shelf manager OFF: Blade is active During blade removal: Blinking blue: Blade notifies shelf manager of its desire to deactivate Permanently blue: Blade is ready to be extracted

3.2.2 Keys

The module provides one face plate reset key.

Figure 3-4 Location of Face Plate Reset Key



On pressing it, a hard reset is triggered and all attached on-board devices are reset.



You cannot reset the IPMC through Reset key.

3.2.3 Connectors

The module provides the following connectors at its face plate:

- Ethernet
- USB
- SAS

3.2.3.1 Ethernet Connectors

The RTM provides 4x10G (for RTM-ATCA-736x-10G and RTM-ATCA-737x-10G) or 6x10G (for RTM-ATCA-736x-10G-SP) interface connectors and 4x1G Ethernet 10/100/1000Base-T interface connectors at its face plate. The location of the Ethernet connectors is shown in the following figure.

Figure 3-5 Location of Ethernet Connector



The following table lists the types of Ethernet controllers.

Table 3-2 Ethernet Controller Types

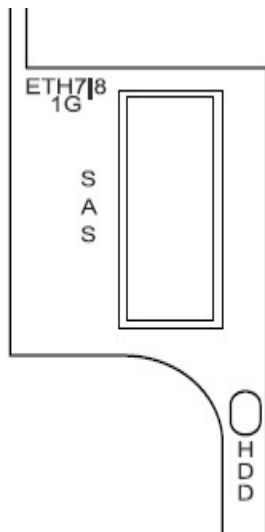
Front Panel Location	Controller	Count	Ethernet Type
ETH1 1G/10G	Intel 82599 (U52)	2x	1G SFP,10G SFP+
ETH2 1G/10G			
ETH3 1G/10G	Intel 82599 (U40)	2x	1G SFP,10G SFP+
ETH4 1G/10G			
ETH5/6 1G	Intel i350 (U59)	4x	10,100,1Gb Copper
ETH7/8 1G			
ETH9 1G/10G	Intel 82599 (U3)	2x	1G SFP,10G SFP+
ETH10 1G/10G			

3.2.3.2 SAS Connector

The RTM-ATCA-736x-10G and RTM-ATCA-737x-10G blades provides one SAS connector at its face plate. The location of the connector is shown in the following figure.

The RTM-ATCA-736x-10G-SP does not contain SAS connector.

Figure 3-6 Location of SAS Connector



Controls, LEDs, and Connectors

The pinout of the serial interface connector is shown below.

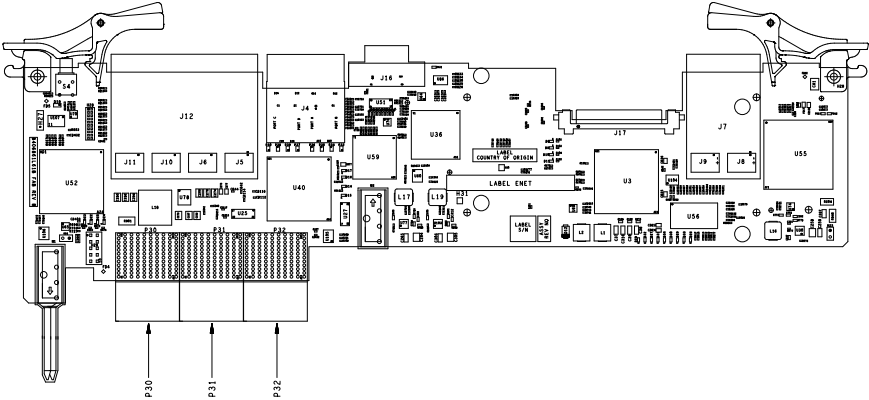
Figure 3-7 SAS Connector Pinout

G1	GND
S1	Rx 0+
S2	Rx 0-
G2	GND
S3	Rx 1+
S4	Rx 1-
G3	GND
S5	EXT_SAS_HDD_Rx+
S6	EXT_SAS_HDD_Rx-
G4	GND
S7	NC
S8	NC
G5	GND
S9	NC
S10	NC
G6	GND
S11	EXT_SAS_HDD_Tx-
S12	EXT_SAS_HDD_Tx+
G7	GND
S13	Tx 1-
S14	Tx 1+
G8	GND
S15	Tx 0-
S16	Tx 0+
G9	GND

3.3 ATCA Backplane Connectors

The AdvancedTCA backplane connectors reside in zone 3 as specified by the AdvancedTCA standard and are called P30 and P32. For a pinout description of all these connectors refer to the *ATCA-736X Installation and Use* manual.

Figure 3-8 Location of AdvancedTCA Connectors



Sensor Data Records

The sensors available on the blades are detailed in the following.

For sensor threshold definition please use the ipmitool found on <http://sourceforge.net/projects/ipmitool/files/ipmitool/> with the parameter **sensor**.

Sensor Data Records

Table 4-1 Sensor Data Records

Sensor Number	Sensor Name	Sensor Type	Event/ Reading Type	Event Data Byte 1	Event Data Byte 2	Event Data Byte 3	Event Threshold/ Description	Assertion Deassertion	Rearm
52	+3.3V RTM	Voltage 0x02	Threshold 0x01		Reading	Threshold	unr uc lnr lc	Asrt / Deass	Auto
53	+12V RTM	Voltage 0x02	Threshold 0x01		Reading	Threshold	unr uc lnr lc	Asrt / Deass	Auto
54	+1.2V RTM	Voltage 0x02	Threshold 0x01		Reading	Threshold	unr uc lnr lc	Asrt / Deass	Auto
55	+1.0V RTM	Voltage 0x02	Threshold 0x01		Reading	Threshold	unr uc lnr lc	Asrt / Deass	Auto
56	temp in RTM	Watchdog 2 0x23	Threshold 0x01		Reading	Threshold	uc unc	Asrt / Deass	Auto
57	temp SAS	Voltage 0x02	Threshold 0x01		Reading	Threshold	uc unc	Asrt / Deass	Auto
58	temp ETH	Voltage 0x02	Threshold 0x01		Reading	Threshold	uc unc	Asrt / Deass	Auto
59	Hot Swap HDD	Voltage 0x02	Sensor-specific discrete 0x6F	0x0	0xFF	0xFF	0x0: Hotswap HDD detected	Asrt	Auto
Asrt: Assertion		Unr: Upper non-recoverable threshold		Uc: Upper critical threshold		Unc: Upper non-critical threshold			
Deass: Deassertion		Lnr: Lower non-recoverable threshold		Lc: Lower critical threshold		Lnc: Lower non-critical threshold			

Related Documentation

A.1 SMART Embedded Computing Documentation

The documentation listed is referenced in this manual. Technical documentation can be found by using the Documentation Search at <https://www.smartembedded.com/ec/support/> or you can obtain electronic copies of SMART EC documentation by contacting your local sales representative.

Table A-1 SMART EC Documentation

Document Title	Publication Number
ATCA-7370 Data Sheet	ATCA-7370-DS
ATCA-7365 Data Sheet	ATCA-7365-DS
ATCA-7365 Installation and Use	6806800K65
ATCA-7365 Release Notes	6806800K70
ATCA-7365 Quick Start Guide	6806800K66
ATCA-7365 Safety Notes Summary	6806800K67

A.2 Manufacturers' Documents

For additional information, refer to the following table for manufacturers' data sheets or user's manuals. As an additional help, a source for the listed document is provided. Please note that, while these sources have been verified, the information is subject to change without notice.

Table A-2 Manufacturers' Documents

Company	Document Title
Intel	Intel 82599 10GbE Datasheet Intel Powerville Ethernet Controller i350 Datasheet
LSI Logic	LSI SAS1064E Datasheet And Design Guides

A.3 Related Specifications

For additional information, refer to the following table for related specifications. As an additional help, a source for the listed document is provided. Please note that, while these sources have been verified, the information is subject to change without notice.

Table A-3 Related Specifications

Organization	Document Title
PCI-SIG	PCI Express Base Specification 2.0 PCI-X Addendum to the PCI Local Bus Specification 1.0
PICMG	PICMG 3.0 Revision 3.0 AdvancedTCA Base Specification PICMG 3.1 Revision 1.0 Specification Ethernet/Fiber Channel for AdvancedTCA Systems

