

COMPUTING

RTM-ATCA-F120C

Installation and Use

P/N: 6806800D07K

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ARTESYN[™]
EMBEDDED TECHNOLOGIES

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About this Manual

Overview of Contents

This manual is divided into the following chapters and appendices.

- [Chapter 1, *Introduction*, on page 21](#) describes the main features of the RTM
- [Chapter 2, *Hardware Preparation and Installation*, on page 25](#) describes installation prerequisites and the installation itself
- [Chapter 3, *Controls, LEDs and Connectors*, on page 37](#) describes external interfaces such as connectors and LEDs.
- [Chapter 4, *Functional Description*, on page 55](#) contains a block diagram of the RTM and provides some information on the IPMI functionality of the RTM
- [Appendix A, *Related Documentation*, on page 59](#) lists further Artesyn user manuals that are related to the RTM and the ATCA-F120.

Abbreviations

This document uses the following abbreviations:

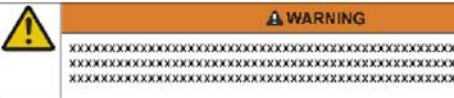

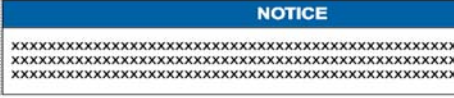

Abbreviation	Description
AMC	Advanced Mezzanine Module
EMC	Electromagnetic Compatibility
EMV	Elektromagnetische Verträglichkeit
ETSI	European Telecommunications Standards Institute
IEC	International Engineering Consortium
IEEE	Institute of Electrical and Electronics Engineers
IPMI	Intelligent Platform Management Interface
IPMC	Intelligent Peripheral Management Controller
MMC	Mezzanine Management Controller
NEBS	Network Equipment-Building System
PCB	Printed Circuit Board
PICMG	PCI Industrial Computer Manufacturers Group

Abbreviation	Description
RTM	Rear Transition Module
RoHS	Restriction of Hazardous Substances Directive
SELV	Safety Extra Low Voltage Circuits
STP	Shielded Twisted Pair

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 in body text
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 being
..	Ranges, for example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers)

Notation	Description
	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
	Indicates a property damage message
	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
6806800D07K	May 2016	Removed <i>Declaration of Conformity</i> .
6806800D07J	September 2015	Updated <i>Safety Notes Summary and Sicherheitshinweise</i> . And updated <i>Chapter 1.2 Standard Compliance</i> on page 21.
6806800D07H	August 2014	Re-branded to Artesyn template.
6806800D07G	December 2012	Updated Chapter 1, Standard Compliances, on page 21 .
6806800D07F	May 2009	Updated order numbers and face plate graphics, added description of telecom clocking connectors, editorial changes
6806800D07E	February 2008	Changed manual to Artesyn-style (logo, addresses, etc.); added DoFC to section "Standard Compliances"

Part Number	Publication Date	Description
6806800D07D	December 2007	Updated face plate figures to reflect latest changes on face plate foil, added safety notes regarding RJ-45 connectors and possible mismatch with telephone connectors, editorial changes, updated section "Mechanical Data", updated power requirements section
6806800D07C	October 2007	Changed name of the RTM throughout manual to reflect change of official RTM name, added section "Mechanical Data", updated section "Power Requirements", added safety note regarding RJ-45 connector to sections which describe RJ-45 connectors at face plate, updated "IPMI Sensors Overview" table
6806800D07B	September 2007	EA version. Compared to the previous manual version, the following changes were made: updated standard compliances, updated product name of RTM throughout the manual, updated section "Environmental Requirements", added description of face plate LEDs, added section "Telecom Clocking Connectors", added section "Reset Key", added section: "Mezzanine Management Controller". added block diagram figure.
6806800D07A	April 2007	First edition

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.

Artesyn 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 Artesyn 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 Artesyn 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 Artesyn representative for service and repair to make sure that all safety features are maintained.

Electrical Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Artesyn could void the user's authority to operate the equipment. Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a compliant system will maintain the required performance. Use only shielded cables when connecting peripherals to assure that appropriate radio frequency emissions compliance is maintained.

Installation

Damage of the RTM and Additional Devices and Modules

Incorrect installation or removal of additional devices or modules may damage the RTM or the additional devices or modules.

Before installing or removing additional devices or modules, read the respective documentation.

Damage of Circuits

Electrostatic discharge and incorrect installation and removal of the RTM 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.

Damage of the RTM

Incorrect installation of the RTM can cause damage of the RTM.

Only use handles when installing/removing the RTM to avoid damage/deformation to the face plate and/or PCB.

Damage to RTM/Backplane or System Components

Bent pins or loose components can cause damage to the RTM, the backplane, or other system components.

Therefore, carefully inspect the RTM and the backplane for both pin and component integrity before installation.

Artesyn and our suppliers take significant steps to ensure there are no bent pins on the backplane or connector damage to the blades/RTMs prior to leaving the factory. Bent pins caused by improper installation or by inserting blades with damaged connectors could void the Artesyn warranty for the backplane or blades.

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

Damage of the RTM

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

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

Cabling and Connectors

Blade Damage

The RJ-45 connector(s) on the face plate are twisted-pair Ethernet (TPE) or E1/T1/J1 interfaces. Connecting an E1/T1/J1 line to an Ethernet connector may damage the product.

- Make sure that TPE connectors near your working area are clearly marked as network connectors.
- Verify that the length of an electric cable connected to a TPE bushing does not exceed 100 m.
- Make sure the TPE bushing of the system is connected only to safety extra low voltage circuits (SELV circuits).

If in doubt, ask your system administrator.

Telephone Damage

The CH2 and CH3 telecom clocking connectors are marked with a crossed-out telephone receiver. If you connect a telephone line to these connectors, your telephone may be damaged.

Use only the CABLE-8001-CLK-3/10 cable for the telecom clocking connectors.

Environment

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

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.

Artesyn 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 Artesyn.

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 Artesyn 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 Artesyn. So stellen Sie sicher, dass alle sicherheitsrelevanten Aspekte beachtet werden.

EMV

Das Produkt wurde in einem Artesyn 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 Produktes in Gewerbe- sowie Industriegebieten gewährleisten.

Das Produkt 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 des RTMs und von Zusatzmodulen

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

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

Beschädigung von Schaltkreisen

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

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

Beschädigung des RTMs

Fehlerhafte Installation des RTMs kann zu einer Beschädigung des RTMs führen.

Verwenden Sie die Handles, um das RTM zu installieren/deinstallieren. Auf diese Weise vermeiden Sie, dass das Face Plate oder die Platine deformiert oder zerstört wird.

Beschädigung des RTMs, der Backplane oder von System Komponenten

Verbogene Pins oder lose Komponenten können zu einer Beschädigung des RTMs, der Backplane oder von Systemkomponenten führen.

Überprüfen Sie daher das RTM sowie die Backplane vor der Installation sorgfältig und stellen Sie sicher, dass sich beide in einwandfreien Zustand befinden und keine Pins verbogen sind.

Artesyn und unsere Zulieferer unternehmen größte Anstrengungen um sicherzustellen, dass sich Pins und Stecker von Blades/RTMs vor dem Verlassen der Produktionsstätte in einwandfreiem Zustand befinden. Verbogene Pins, verursacht durch fehlerhafte Installation oder durch Installation von Blades/RTMs mit beschädigten Steckern kann die durch Artesyn gewährte Garantie für Blades und Backplanes erlöschen lassen.

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 RTMs

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

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

Kabel und Stecker

Beschädigung des Blades

Die RJ-45-Stecker an der Frontblende sind für Anschlüsse vom Typ Twisted-Pair Ethernet (TPE) oder E1/T1/J1 vorgesehen. Der Anschluss eines E1/T1/J1-Interfaces an einen Ethernet-Stecker kann zur Zerstörung des Blades führen.

- Stellen Sie daher sicher, dass TPE-Stecker an Ihrem Arbeitsplatz eindeutig als Netzwerkstecker gekennzeichnet sind.
- Stellen Sie sicher, dass die Länge eines Kabels, welches an den RJ-45-Stecker angeschlossen ist, 100 m nicht überschreitet.
- Stellen Sie sicher, dass der TPE-Stecker ausschließlich mit einem Safety-Extra-Low-Voltage-Stromkreis (SELV) verbunden ist.
- Wenden Sie sich bei Fragen an ihren Systemadministrator

Beschädigung am Telefon

Die CH2 und CH3 Stecker sind mit einem durchgestrichenem Telefonhörer markiert. Wenn Sie an diese Stecker ein Telefon anschließen, kann Ihr Telefon beschädigt werden. Benutzen Sie für diese Stecker ausschließlich das **CABLE-8001-CLK-3/10** Kabel.

Umweltschutz

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

Introduction

1.1 Features

The RTM-ATCA-F120C is a rear transition module (RTM) as defined in the PICMG 3.0 revision 2.0 AdvancedTCA Base Specification for AdvancedTCA systems. The main features of the RTM-ATCA-F120C are:

- Four 10 Gigabit Ethernet Fabric Channel uplinks via CX4 connectors
- Two 10 Gigabit Ethernet Base Channel uplinks via CX4 connectors
- Four 1 Gigabit Ethernet Base Channel interfaces via RJ-45 connectors
- Four 1 Gigabit Ethernet Fabric Channel interfaces via RJ-45 connectors
- Two RJ-45 telecom clocking interface connectors for inter-shelf clocking configurations

1.2 Standard Compliances

This RTM-ATCA-F120C meets 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 CISPR 24 EN 55022 EN 55024 FCC Part 15 Industry Canada ICES-003 VCCI Japan AS/NZS CISPR 22 EN 300 386 NEBS Standard GR-1089 CORE	EMC requirements (legal) on system level (predefined Artesyn system)

Table 1-1 Standard Compliances (continued)

Standard	Description
NEBS Standard GR-63-CORE ETSI EN 300019 series	Environmental requirements
PICMG 3.0 R2.0	Defines mechanics, blade dimensions, power distribution, power and data connectors, and system management



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 2011/65/EU.

1.3 Mechanical Data

The following table lists physical dimensions and weight of the RTM.

Table 1-2 Mechanical Data

Feature	Value
Physical dimension of PCB	322.25 mm x 70 mm
Weight of RTM	0.7 kg

1.4 Ordering Information

When ordering the RTM, use the following order number. This information is subject to changes. Consult your local Artesyn sales representative for further information.

Table 1-3 Order Numbers

Order Number	Description
RTM-ATCA-F120C	Copper RTM for the ATCA-F120
CABLE-8001-CLK-3	Cable for AMC-8001 clock distribution among multiple shelves, 3 m

Table 1-3 Order Numbers (continued)

Order Number	Description
CABLE-8001-CLK-10	Cable for AMC-8001 clock distribution among multiple shelves, 10 m

Hardware Preparation and Installation

2.1 Overview

This chapter describes all necessary steps you need to take in order to install the RTM-ATCA-F120C. The main steps are:

- Inspect the shipment and unpack the RTM
- Make sure environmental and power requirements are met
- Install the RTM

2.2 Unpacking and Inspecting the RTM

NOTICE

Damage of Circuits

Electrostatic discharge and incorrect installation and removal of the blade 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.

To inspect the shipment, perform the following steps.

Shipment Inspection

Proceed as follows:

1. Verify that you have received all items of your shipment:
 - Printed user manual (Getting Started guide)
 - RTM-ATCA-F120C

Any optional items ordered

2. Check for damage and report any damage or differences to the customer service.



- The RTM is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, please contact our customer's service immediately.
- Remove the desiccant bag shipped together with the blade and dispose of it according to your country's legislation.

2.3 Environmental and Power Requirements

The following environmental and power requirements are applicable to the board.

2.3.1 Environmental Requirements

You must make sure that the blade, when operated in your particular system configuration, meets the environmental requirements specified below.



Operating temperatures refer to the temperature of the air circulating around the RTM, and not to component temperatures.

If you integrate the RTM in your own, non-Artesyn, system, please contact your local sales representative for further safety information.

NOTICE

RTM Damage

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

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

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 °C) (exceptional operation) according to NEBS Standard GR-63-CORE	-40 °C (-40 °F) to +70 °C (+158 °F)
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 Artesyn-internal environmental requirements	5% to 95% non-condensing according to Artesyn-internal environmental requirements
Vibration	0.1g from 5 to 100 Hz and back to 5 Hz at a rate of 0.1 octave/minute	5-20 Hz at 0.01 g ² /Hz 20-200 Hz at -3.0 dB/octave Random 5-20 Hz at 1 m ² /Sec ³ Random 20-200 Hz at -3 m/Sec ²
Shock	Half-sine, 11 m/Sec, 30mSec/sec ²	Blade level packaging Half-sine, 6 mSec at 180 m/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 (unpackaged) per GR-63-CORE

2.3.2 Power Requirements

The RTM has a typical power dissipation of 22 W, and a maximum power dissipation of 30 W.

2.4 Module Installation and Removal

The RTM can be installed into a powered or non-powered system.

NOTICE

RTM Damage

Installing the RTM with other blades than the ATCA-F120 may damage the RTM and the front blade.

Only install the RTM with the Artesyn ATCA-F120 blade.

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.

2.4.1 Installing the RTM

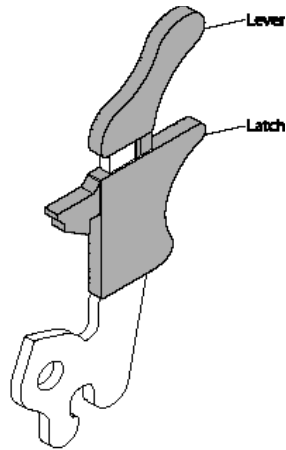
You can install the RTM into a system if the front blade is already installed or if it is not installed. If the front blade is already installed, its payload has to be powered down first.

Installation Procedure with Installed Front Blade

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.

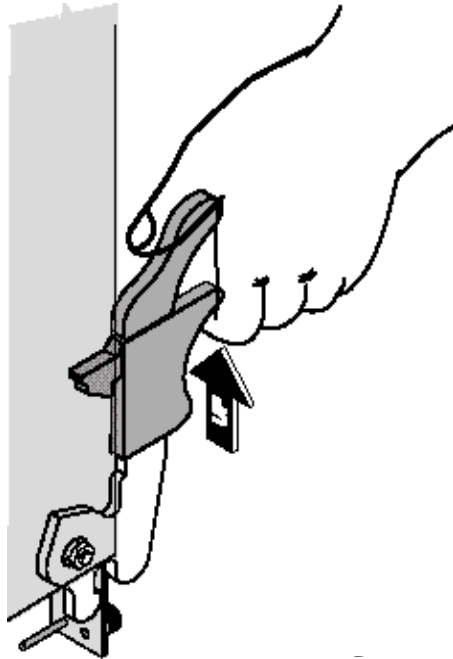
1. Locate the slot the RTM is to be installed into the shelf's rear which must be the same as that of the front blade.
2. Open the lower handle of the front blade in order to power down its payload. The blue LED on the front blade starts to flash. This indicates that the front blade is informing the shelf manager about its desire to power down its payload.
3. Wait until the blue LED on the front blade is ON. This indicates that the front blade's payload is powered down.

4. Ensure that the top and the bottom handles of the RTM are in an outward position by squeezing the lever and the latch together.



5. Insert the RTM into the shelf by placing the top and bottom edges in the card guides of the slot.
6. Slide the RTM into the slot.
7. 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.
8. Squeeze the lever and the latch together and hook the lower and the upper handle into the shelf rail recesses.

9. 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.



If your shelf is powered, as soon as the RTM is connected to the front blade, the blue LED is illuminated, and will remain illuminated until both the lower handle of the RTM and the lower handle of the front blade are closed.

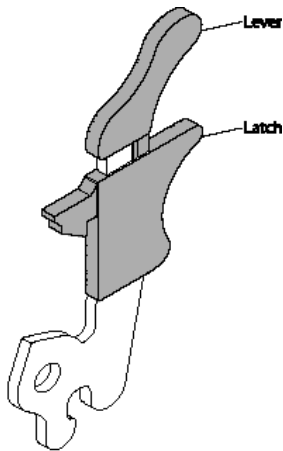
10. Close the lower handle of the front blade in order to power up the payload of both the front blade and the RTM.
The blue LEDs of both the front blade and the RTM start to flash. This indicates that the front blade is informing the shelf manager about its desire to power up the payload of both the front blade and the RTM.
11. Tighten both face plate screws on the RTM.

12. Wait until the blue LEDs of both the front blade and the RTM are OFF.
A switched OFF blue LED indicates that the payload of the respective blade or RTM has been powered up and is active.
13. Plug interface cable into face plate connectors, if applicable.

Installation Procedure without Installed Front Blade

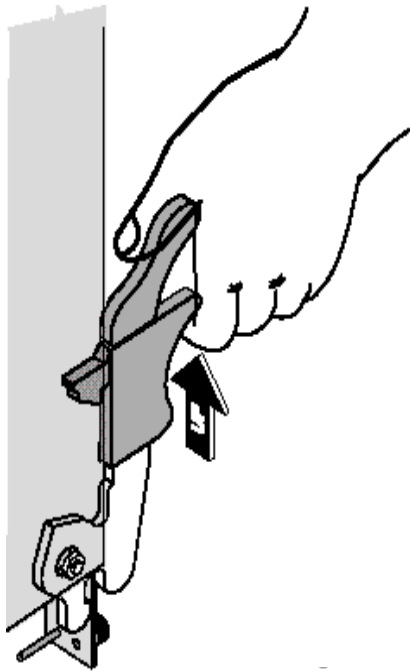
The following procedure describes the installation of the RTM.

1. Locate the slot the RTM is 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.
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. Insert the front blade from the system's front into the same slot as the RTM. For a detailed instruction of the installation procedure for the front blade please refer to *ATCA-F120 Installation and Use*.
As soon as the front blade is connected to the backplane, the blue hot swap LEDs of both the front blade and the RTM are illuminated permanently. This indicates that the IPMC of the front blade and the MMC of the RTM are powered up.

10. Close the handles of the front blade.
The blue LEDs on both the front blade and the RTM start flashing. This indicates that the front blade is informing the shelf manager about its desire to power up the payload of both the front blade and the RTM.
11. Tighten the two face plate screws on the front blade.
12. Wait until the blue LEDs on both the front blade and the RTM are OFF.
Switched off blue LEDs indicate that the payload of the respective blade or RTM has become active.
13. Plug interface cable into face plate connectors, if applicable.

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.

NOTICE

Damage of RTM and Front Blade

Removing the RTM from the system while the payload of the front blade is powered up may damage the front blade and RTM.

Whenever removing the RTM from the system, you have to power down the payload of the front blade first.

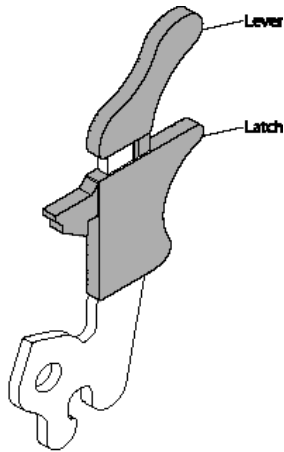
1. Unlatch the lower handle outward by squeezing the lever and the latch together and turning the handle outward only enough to unlatch the handle from the face plate, that means until you feel a resistance. Do not rotate the handle fully outwards.
The blue LED blinks indicating that the shelf manager 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.

NOTICE

Data Loss

Removing the RTM with the system power on and the blue LED on the front blade still flashing causes data loss.

Before removing the RTM from a powered system, power down the slot by opening the lower handle of the front blade and wait until the blue LED is permanently ON.



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

3.1 Overview

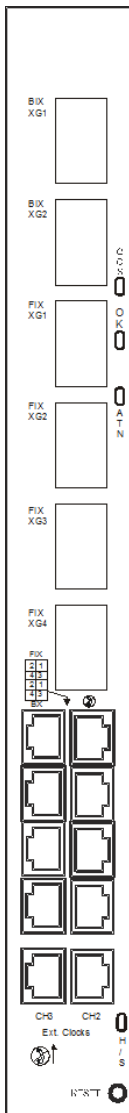
This chapter describes:

- Face plate connectors
- Face plate LEDs
- Reset key
- Rear panel connectors

3.2 Face Plate Connectors and LEDs

The following figure shows the face plate of the RTM.

Figure 3-1 Face Plate



3.2.1 LEDs

The RTM provides four LEDs at its face plate. Their meaning is described in the following table.

Table 3-1 Face Plate LEDs

LED	Description
OOS	Out-Of-Service This LED is controlled by upper-layer software, such as middleware or applications. It works in parallel to the OOS LED at the face plate of the front blade. An example of middleware that may use this LED is Avantellis HA software which runs on Centellis hardware.
OK	RTM Power Status Green: The RTM power has been enabled by the MMC. OFF: RTM power is disabled.
ATN	This LED is controlled by upper layer software, such as middleware or applications. It works in parallel to the ATTN LED at the front blade's face plate. An example of middleware that may use this LED is Avantellis HA software which runs on Centellis hardware.
H/S	Indicates whether the RTM can be installed or removed. During RTM installation: Permanently blue: RTM powers up. OFF: RTM is active. During RTM removal: Flashing blue: RTM notifies shelf management controller of desired deactivation. In this state the RTM must not be removed. Permanently blue: RTM is powered down and is ready to be extracted. OFF: RTM is active and cannot be removed.

3.2.2 Connectors

The RTM provides the following interface connectors at its face plate.

- Eight fabric channel interface connectors
- Six base channel interface connectors
- Two RJ-45 telecom clocking interface connectors for inter-shelf clocking configurations

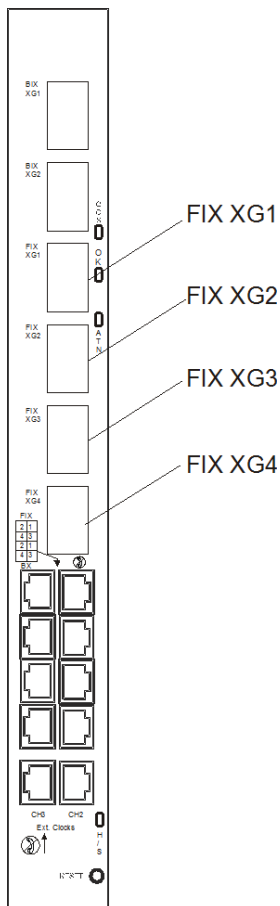
3.2.2.1 Fabric Channel Interface Connectors

The RTM provides eight Ethernet fabric channel interface connectors at its face plate. These interfaces are subdivided into:

- Four 10 Gigabit Ethernet uplink interfaces via CX4 connectors
- Four 1 Gigabit Ethernet interfaces via RJ-45 connectors

The four face plate connectors labelled FIX-XG1 to FIX-XG4 are 10 Gigabit Ethernet uplink interfaces which provide access to the system's fabric channel interfaces via CX4-type connectors. The location of these connectors is shown in the following figure.

Figure 3-2 Location of Fabric Channel 10 Gigabit Ethernet Uplink Interface Connectors



The connectors support 10GBASE-CX4 Ethernet connections in compliance with the IEEE 802.3ak standard.

The connector signals are routed to the Broadcom switch device BCM56800 (FIX#1) on the ATCA-F120 front blade. The following table shows which physical ports on this switch device the connectors are assigned to.

Table 3-2 Fabric Channel Uplink Connectors - Port Assignment

RTM Face Plate Connector	Physical Port
FIX XG1	xe17
FIX XG2	xe18
FIX XG3	xe15
FIX XG4	xe15

The RTM furthermore provides four RJ-45 connectors labelled FIX1 to FIX4. They provide access to the system's fabric channel interface via 1 Gigabit Ethernet interfaces. The location of these connectors is shown in the following figure.

NOTICE

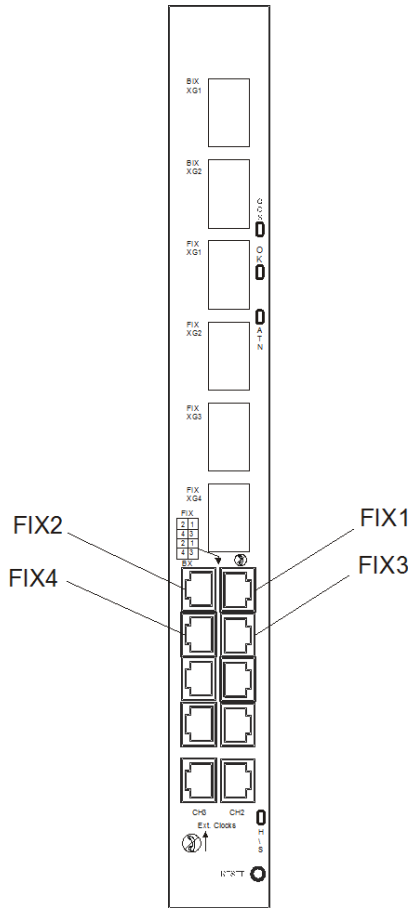
Blade Damage

The RJ-45 connector(s) on the face plate are twisted-pair Ethernet (TPE) or E1/T1/J1 interfaces. Connecting an E1/T1/J1 line to an Ethernet connector may damage the product.

- Make sure that TPE connectors near your working area are clearly marked as network connectors.
- Verify that the length of an electric cable connected to a TPE bushing does not exceed 100 m.
- Make sure the TPE bushing of the system is connected only to safety extra low voltage circuits (SELV circuits).

If in doubt, ask your system administrator.

Figure 3-3 Location of Fabric Channel 1 Gigabit Ethernet Connectors



The connectors support standard 1000Base-T Ethernet connections.

The connector signals are routed to the Broadcom switch device BCM56502 (FIX#2) on the ATCA-F120 front blade. The following table shows which physical ports on this switch device the connectors are assigned to.

Table 3-3 Fabric Channel 1 Gigabit Ethernet Connectors - Port Assignment

RTM Face Plate Connector	Physical Port
FIX1	ge20
FIX2	ge21
FIX3	ge22
FIX4	ge23

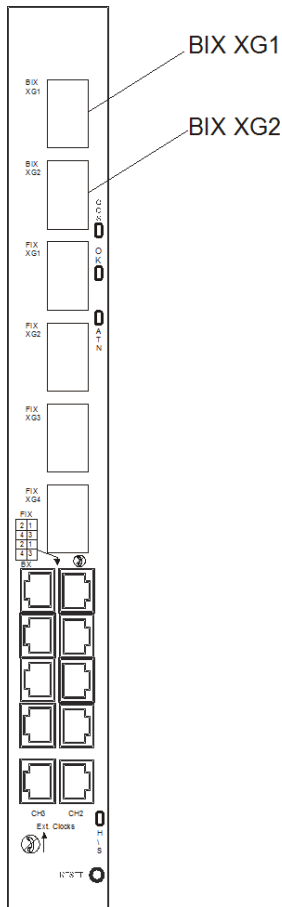
3.2.2.2 Base Channel Interface Connectors

The RTM provides six Ethernet base channel interface connectors at its face plate. These interfaces are subdivided into:

- Two 10 Gigabit Ethernet uplinks via CX4 connectors
- Four 1 Gigabit Ethernet interfaces via RJ-45 connectors

The two face plate connectors labelled BIX-XG1 and BIX-XG4 are 10 Gigabit Ethernet uplink interface connectors which provide access to the system's base channel interfaces via CX4-type connectors. The location of these connectors is shown in the following figure.

Figure 3-4 Location of Base Channel 10 Gigabit Ethernet Uplink Connectors



The connectors support 10GBASE-CX4 Ethernet connections in compliance with the IEEE 802.3ak standard.

The connector signals are routed to the Broadcom switch device BCM56502 (BIX) on the ATCA-F120 front blade. The following table shows which physical ports on this switch device the connectors are assigned to.

Table 3-4 Base Channel 10 Gigabit Ethernet Uplink Connectors - Port Assignment

RTM Face Plate Connector	Physical Port
BIX XG1	xe0
BIX XG2	xe1

The RTM furthermore provides four RJ-45 connectors labelled BIX1 to BIX4. They provide access to the system's base channel interface via 1 GBit Ethernet interfaces. The location of these connectors is shown in the following figure.

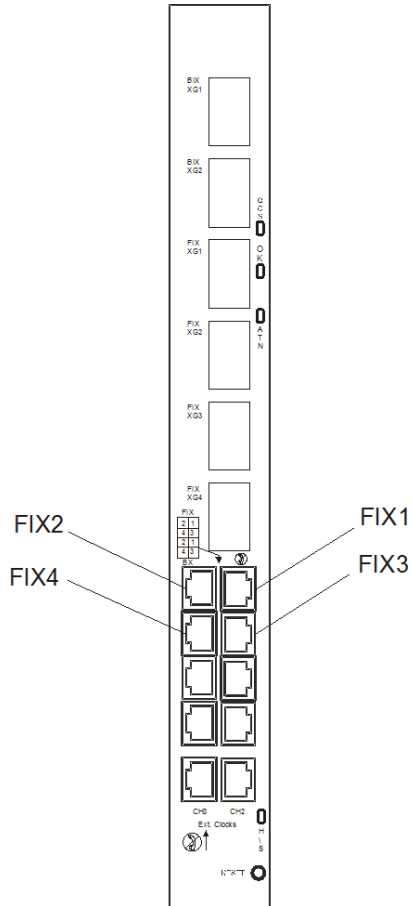
NOTICE

Blade Damage
The RJ-45 connector(s) on the face plate are twisted-pair Ethernet (TPE) or E1/T1/J1 interfaces. Connecting an E1/T1/J1 line to an Ethernet connector may damage the product.

- Make sure that TPE connectors near your working area are clearly marked as network connectors.
- Verify that the length of an electric cable connected to a TPE bushing does not exceed 100 m.
- Make sure the TPE bushing of the system is connected only to safety extra low voltage circuits (SELV circuits).

If in doubt, ask your system administrator.

Figure 3-5 Location of Base Channel 1 GBit Ethernet Connectors



The connectors support standard 1000Base-T Ethernet connections.

The connector signals are routed to the Broadcom switch device BCM56502 (FIX#2) on the ATCA-F120 front blade. The following table shows which physical ports on this switch device the connectors are assigned to.

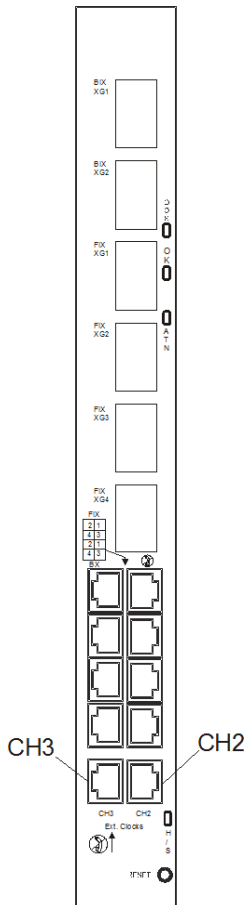
Table 3-5 Base Channel 1 Gigabit Ethernet Connectors - Port Assignment

RTM Face Plate Connector	Physical Port
BIX1	ge16
BIX2	ge17
BIX3	ge18
BIX4	ge19

3.2.2.3 Telecom Clocking Connectors

The RTM provides two telecom clock extension connectors, named CH2 and CH3, at its face plate. Their location is shown in the following figure.

Figure 3-6 Location of Clock Extension Connectors



NOTICE

Blade Damage

The RJ-45 connector(s) on the face plate are twisted-pair Ethernet (TPE) or E1/T1/J1 interfaces. Connecting an E1/T1/J1 line to an Ethernet connector may damage the product.

- Make sure that TPE connectors near your working area are clearly marked as network connectors.
- Verify that the length of an electric cable connected to a TPE bushing does not exceed 100 m.
- Make sure the TPE bushing of the system is connected only to safety extra low voltage circuits (SELV circuits).

If in doubt, ask your system administrator.

Product Damage

The CH2 and CH3 telecom clocking connectors are marked with a crossed-out telephone receiver. If you connect a telephone line to these connectors, your telephone may be damaged.

Use only the CABLE-8001-CLK-3/10 cable for the telecom clocking connectors.

These connectors allow to distribute telecom clocking signals generated by an appropriate AMC module (for example the Artesyn AMC-8001) installed on the ATCA-F120 to two external shelves.



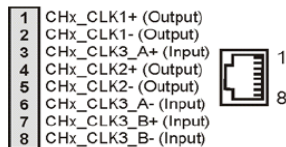
The clock synchronization connectors are designed for safety-extra-low-voltage (SELV) circuits.

In the following you find the pinouts of each connector (where CHx stands for either CH2 or CH3). The nomenclature used for the signal names of a master shelf and of an extension shelf is explained in the following table.

Signal Name	Description
CHx	Shelf number (2 to 3)
CLK1+/- (output)	System clock (CLK1) as output signal in master shelf NETREF_A (CLK3_A) as output signal in extension shelf
CLK2+/- (output)	System clock (CLK2) as output signal in master shelf NETREF_B (CLK3_B) as output signal in extension shelf
CLK3_A+/- (input)	Reference clock as input signal in master shelf System clock (CLK1) as input signal in extension shelf
CLK3_B+/- (input)	Reference clock as input signal in master shelf System clock (CLK2) as input signal in extension shelf

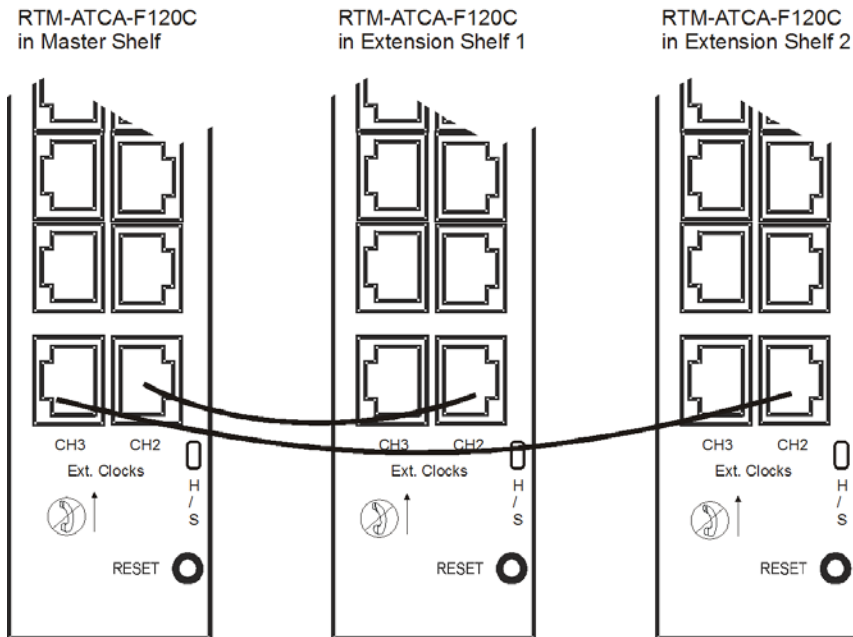
Customers with their own clock generator entity that use the RTM for clock distribution must comply to the nomenclature used for the signal names in an extension shelf.

Figure 3-7 Inter Shelf Clock Synchronization Connectors CH2 and CH3 Pinout



The following figure shows how master and extension shelves need to be interconnected.

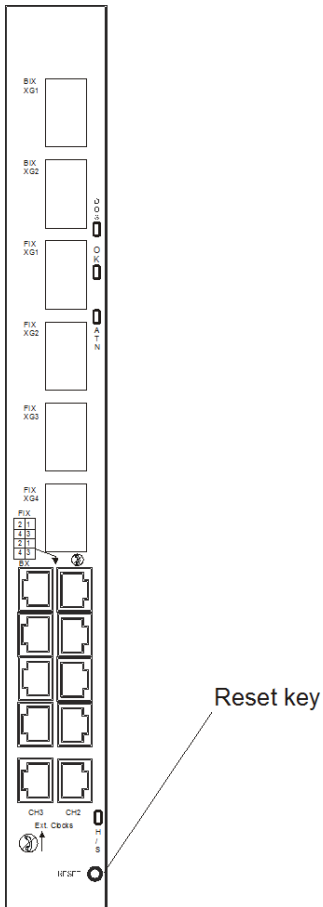
Figure 3-8 Connecting Master and Extension Shelves



3.3 Reset Key

The RTM provides a reset key at its face plate. Its location is shown in the following figure.

Figure 3-9 Location of Reset Key



By pressing this key, you reset the RTM and the front blade.



The MMC on the RTM and the IPMC on the front blade are not reset via this reset key.

Functional Description

4.1 Overview

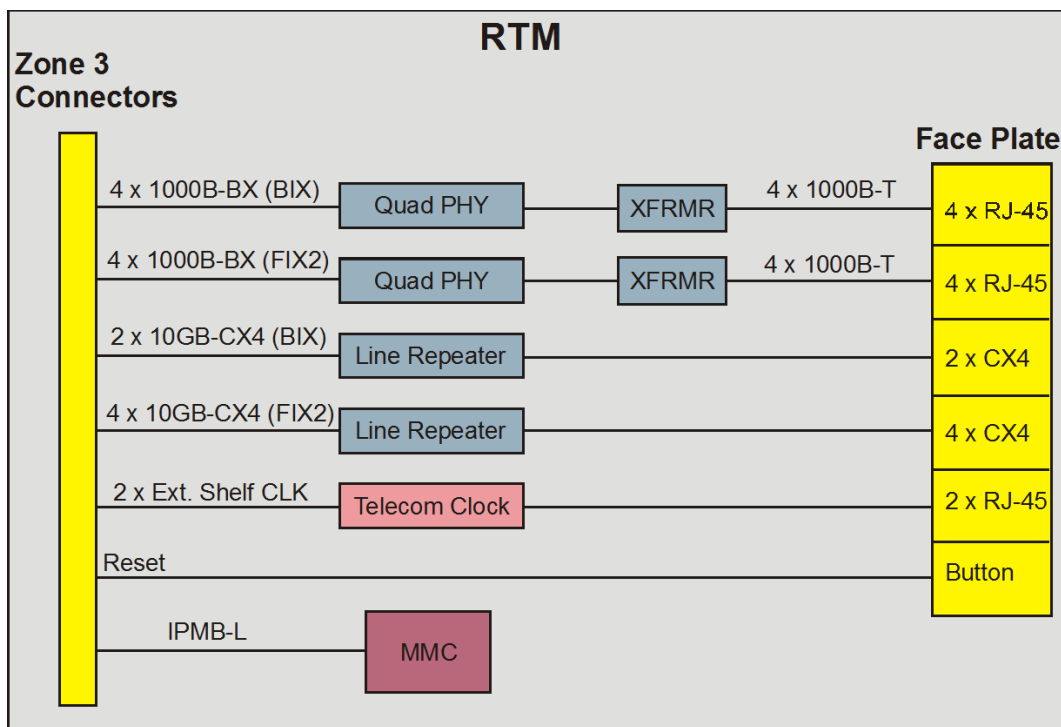
This chapter contains the following information:

- Block diagram
- Mezzanine management controller

4.2 Block Diagram

The following figure shows the main functional blocks of the RTM.

Figure 4-1 Block Diagram



4.3 Mezzanine Management Controller

The RTM provides the a Mezzanine Management Controller (MMC) based on the Atmega128L controller which is fully compliant to the IPMI v1.5 standard. The MMC is connected to the front blade's IPMC via IPMB-L.

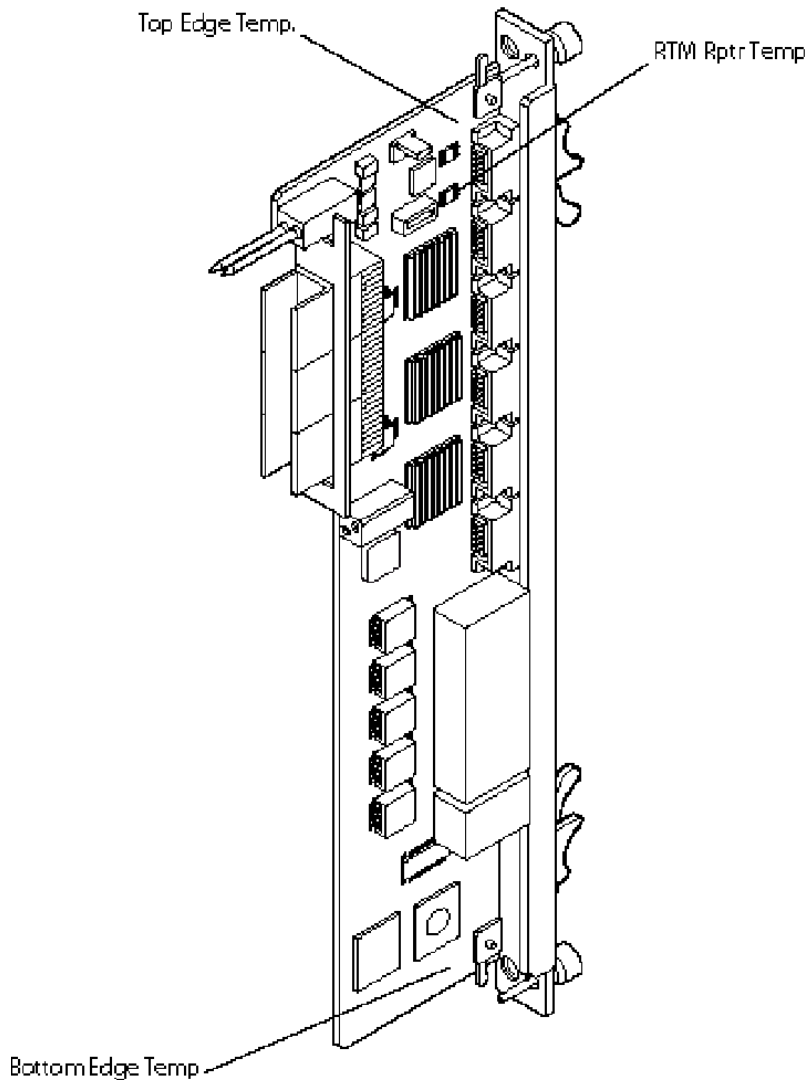
The MMC provides several status sensors that are accessible via IPMI. These sensors are listed in the following table.

Table 4-1 IPMI Sensors Overview

Sensor Name	Type of Measurement	What Does It Measure?	Sensor Type	Availability
ARTM +1.2V	Voltage	Voltage	Threshold	Always present
ARTM +1.8V	Voltage	Voltage	Threshold	Always present
ARTM +3.3V	Voltage	Voltage	Threshold	Always present
ARTM +2.5V	Voltage	Voltage	Threshold	Always present
ARTM +12V	Voltage	Voltage	Threshold	Always present
Bottom Edge Temp.	Temperature	Temperature	Threshold	Always present
Top Edge Temp	Temperature	Temperature	Threshold	Always present
ARTM Rptr Temp.	Temperature	Temperature	Threshold	Always present
Ejector State	Button / Switch	RTM handle switch status	Discrete	Always present
ARTM-F120 MMC	Artesyn OEM IPMC Status	Artesyn OEM IPMC Status	Discrete	Always present

The following figure shows the location of the three temperature sensors.

Figure 4-2 Location of IPMI Temperature Sensors



For further details about these sensors as well as further IPMI-related information, refer to the *RTM-ATCA-F120C: Control via IPMI Programmer's Reference*.

Related Documentation

A.1 Artesyn Embedded Technologies - Embedded Computing Documentation

The publications listed below are referenced in this manual. You can obtain electronic copies of Artesyn Embedded Technologies - Embedded Computing publications by contacting your local Artesyn sales office. For released products, you can also visit our Web site for the latest copies of our product documentation.

1. Go to www.artesyn.com/computing.
2. Under SUPPORT, click TECHNICAL DOCUMENTATION.
3. Under FILTER OPTIONS, click the Document types drop-down list box to select the type of document you are looking for.
4. In the Search text box, type the product name and click GO.

Table A-1 Artesyn Embedded Technologies - Embedded Computing Publications

Document Title and Source	Publication Number
ATCA-F120 Installation and Use	6806800D06



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