ATCA-F120
Installation and Use
P/N: 6806800D06F
February 2009

EMERSON
Network Power

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About this Manual

Overview of Contents

This manual is divided into the following chapters and appendices.

- *Safety Notes* on page 19 lists safety notes applicable to the blade

- *Sicherheitshinweise* on page 25 is the German translation of the previous English safety notes (this had to be included for legal reasons)

- Chapter 1, *Introduction,* on page 31 describes the main features of the ATCA-F120.

- Chapter 2, *Hardware Preparation and Installation,* on page 37 describes installation prerequisites including the blade installation itself.

- Chapter 3, *Controls, LEDs and Connectors,* on page 61 describes external interfaces of the blade. This includes connectors and LEDs.

- Chapter 4, *Functional Description,* on page 79 describes in more detail functional blocks of the blade. This includes a block diagram, description of the main components used and so on.

- Chapter 5, *U-Boot Firmware,* on page 101 describes the main features of the on-board boot firmware U-boot and how to work with it.

- Appendix A, *Related Documentation* provides links to further ATCA-F120-related documentation

Abbreviations

This document uses the following abbreviations:

Abbreviation	Description
ACL	Access Control List
ADC	Analog-to-Digital Conversion
AMC	Advanced Mezzanine Card
BBS	Basic Blade Service
BIX	
BT	Block Transfer
CPU	Central Processing Unit

Abbreviation	Description
CoS	Classes of Service
DDR	Double Data Rate
ECC	Embedded Communications Computing
EMC	Electromagnetic Compatibility
EMV	Elektromagnetische Verträglichkeit
ESD	Electrostatic Discharge
ETSI	European Telecommunications Standards Institute
FFP	Fast Filter Processor
FIFO	First In, First Out
FPGA	Field Programmable Gate Array
FRU	Field Replaceable Unit
I/O	Input/Output
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IMC	IPMC Master Controller
IPMC	Intelligent Peripheral Management Controller
IPMI	Intelligent Platform Management Interface
ISC	IPMC Slave Controller
ISO	International Organization for Standardization
LAN	Local Area Network
LED	Light-Emitting Diode
MMC	Mezzanine Management Controller
NEBS	Network Equipment-Building System
OEM	Original Equipment Manufacturer
OOS	Out Of Service
OS	Operating System
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect

Abbreviation	Description
PICMG	PCI Industrial Computer Manufacturers Group
PMC	PCI Mezzanine Card
POST	Power-On Self-Test
RGMII	Reduced Gigabit Media Independent Interface
RTM	Rear Transition Module
RoHS	Restriction of Hazardous Substances Directive
SATA	Serial Advanced Technology Attachment
SDRAM	Synchronous Dynamic Random Access Memory
SDRs	Sensor Data Record
SELV	Safety Extra Low Voltage Circuits
SERDES	Serializer/Deserializer
SGMII	Serial Gigabit Media Independent Interface
SPI	Serial Peripheral Interface
SRAM	Static Random Access Memory
STP	Shielded Twisted Pair
ShM	Shelf Manager
TPE	Twisted-Pair Ethernet
VLAN	Virtual Local Area Network

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
Reference	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)
|	Logical OR

Notation	Description
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury
NOTICE	Indicates a property damage message
(light bulb icon)	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
6806800D06A	April 2007	First draft (DA release version)
6806800D06B	September 2007	EA version Changes made compared to previous version include: updated standard requirements, updated power requirements, updated environmental requirements, enhanced block diagram figures (fabric and base interface connections as well as shelf manager cross-connection figures), updated IPMI sensor list, added blackplane connector pinouts, added section: "Boot and User Flashes", added figure which shows the location of on-board switches.

Part Number	Publication Date	Description
6806800D06C	December 2007	Added mechanical data, in section "Environmental Requirements" added description of critical temperature spots;in section "Power Requirements" updated table "DC System Power Requirements". in figure "AMC Module B4 Interconnection Scheme" included AdvancedTCA update channel number AND AMC port number to avoid confusion between the term "port" used in different contexts (AMC port and ATCA update channel port) ; updated "'IPMI Sensors Overview" table; added sections "FPGA" and "Central Processing Unit"; updated "U-Boot Firmware" section;
6806800D06D	February 2008	Added note regarding environmental variables to section "U-Boot"; corrected main memory size in section "Main Features"; changed manual to Emerson style (logo, etc.); added "Declaration of Conformity" to section "Standard Compliances"
6806800D06E	February 2008	Corrected wrong year on titlepage
6806800D06F	February 2009	Updated on-board configuration switch description (described additional serial interface routing option towards RTM); enhanced U-Boot upgrade description; added references to RTM-ATCA-F120-OPT

Comments and Suggestions

We welcome and appreciate your comments on our documentation. We want to know what you think about our manuals and how we can make them better.

Mail comments to us by filling out the following online form:
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In "Area of Interest" select "Technical Documentation". Be sure to include the title, part number, and revision of the manual and tell us how you used it.

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.

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

EMC

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 Emerson could void the user's authority to operate the equipment. Blade 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.

Operation

Blade Damage
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.
Do not operate the blade below -5°C.

Overheating and Blade Damage
Operating the blade without forced air cooling may lead to overheating and thus damage of the blade.
When operating the blade, make sure that forced air cooling is available in the shelf.

Injuries or Short Circuits
Blade or power supply
In case the ORing diodes of the blade fail, the blade may trigger a short circuit between input line A and input line B so that line A remains powered even if it is disconnected from the power supply circuit (and vice versa).
To avoid damage or injuries, always check that there is no more voltage on the line that has been disconnected before continuing your work.

Configuration Switches/Jumpers

Blade Malfunction
Switches marked as 'reserved' might carry production-related functions and can cause the blade to malfunction if their setting is changed.
Therefore, do not change settings of switches marked as 'reserved'. The setting of switches which are not marked as 'reserved' has to be checked and changed before blade installation.

Blade Damage
Setting/resetting the switches during operation can cause blade damage.
Therefore, check and change switch settings before you install the blade.

Installation

Blade Damage and Additional Devices and Modules
Incorrect installation or removal of additional devices or modules may damage the blade 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 blade can damage circuits or shorten their life.
Before touching the blade or electronic components, make sure that your are working in an ESD-safe environment.

Blade Damage
Incorrect installation of the blade can cause damage of the blade,
Only use handles when installing/removing the blade to avoid damage/deformation to the face plate and/or PCB.

Damage to blade/Backplane or System Components
Bent pins or loose components can cause damage to the blade, the backplane, or other system components.
Therefore, carefully inspect the blade and the backplane for both pin and component integrity before installation.

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

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.

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 meters.

- 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.

AMC Modules

AMC Module Damage
The two AMC bays only support AMC types/modules which are officially supported by Emerson (refer to *Supported AMC Modules* on page 52 for a details). AMC modules installed into AMC bay 1 or 4 must not exceed a power dissipation of 35W. Installing and operating other AMC modules may damage the AMC modules, the blade and an installed RTM including attached devices.
Only install AMC modules into AMC bay B1 and B4 which are officially supported by Emerson. Consult your local Emerson sales representative, if in doubt.

Limitation of Operating Temperature Range
Installing AMC modules with small operating temperature ranges into the ATCA-F120 may further restrict the operating temperature range of the ATCA-F120.
Make sure that the operating temperature of any installed AMC modules and the ATCA-F120 as a bundle are within allowed limits.

Poor Shelf Cooling and EMC Compliance Violation
An empty AMC bay may result in poor shelf cooling and strong EMC radiation and thus lead to EMC compliance violation.
Therefore, always cover empty or unused AMC bays with a filler panel.

Environment

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

Safety Notes

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 Blades innerhalb Ihrer Betriebsumgebung notwendig sind. Wenn Sie diese Vorsichtsmaßnahmen oder Sicherheitshinweise, die an anderer Stelle diese Handbuchs enthalten sind, nicht beachten, kann das Verletzungen oder Schäden am Blade zur Folge haben.

Emerson ist darauf bedacht, alle notwendigen Informationen zum Einbau und zum Umgang mit dem Blade 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 Emerson.

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 Emerson 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 Blades fern. Entfernen Sie auf keinen Fall Abdeckungen am Blade. 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 Blade durch, sonst verfällt die Garantie. Wenden Sie sich für Wartung oder Reparatur bitte an die für Sie zuständige Geschäftsstelle von Emerson. So stellen Sie sicher, dass alle sicherheitsrelevanten Aspekte beachtet werden.

EMV

Das Produkt wurde in einem Emerson 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.

Wird das Produkt in einem Wohngebiet betrieben, so kann dies mit grosser Wahrscheinlichkeit zu starken Störungen führen, welche dann auf Kosten des Produktanwenders beseitigt werden müssen. Änderungen oder Modifikationen am Produkt, welche ohne ausdrückliche Genehmigung von Emerson ECC durchgeführt werden, können dazu führen, dass der Anwender die Genehmigung zum Betrieb des Produktes verliert. Boardprodukte werden in einem repräsentativen System getestet, um zu zeigen, dass das Board den oben aufgeführten EMV-Richtlinien entspricht. Eine ordnungsgemässe Installation in einem System, welches die EMV-Richtlinien erfüllt, stellt sicher, dass das Produkt gemäss den EMV-Richtlinien betrieben wird. Verwenden Sie nur abgeschirmte Kabel zum Anschluss von Zusatzmodulen. So ist sichergestellt, dass sich die Aussendung von Hochfrequenzstrahlung im Rahmen der erlaubten Grenzwerte bewegt.

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.

Operation

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 und betreiben Sie das Blade nicht unter -5°C.

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.

Verletzungen oder Kurzschlüsse
Blade oder Stromversorgung
Falls die ORing Dioden des Blades durchbrennen, kann das Blade einen Kurzschluss zwischen den Eingangsleitungen A und B verursachen. In diesem Fall ist Leitung A immer noch unter Spannung, auch wenn sie vom Versorgungskreislauf getrennt ist (und umgekehrt).
Prüfen Sie deshalb immer, ob die Leitung spannungsfrei ist, bevor Sie Ihre Arbeit fortsetzen, um Schäden oder Verletzungen zu vermeiden.

Schaltereinstellungen/Jumper

Fehlfunktion des Blades
Schalter, die mit 'Reserved' gekennzeichnet sind, können mit produktionsrelevanten Funktionen belegt sein. Das Ändern dieser Schalter kann im normalen Betrieb Störungen auslösen.
Verstellen Sie nur solche Schalter, die nicht mit 'Reserved' gekennzeichnet sind. Prüfen und ändern Sie die Einstellungen der nicht mit 'Reserved' gekennzeichneten Schalter, bevor Sie das Blade installieren.

Beschädigung der Blade
Das Verstellen von Schaltern während des laufenden Betriebes kann zur Beschädigung des Blades führen.
Prüfen und ändern Sie die Schaltereinstellungen, bevor Sie das Blade installieren.

Installation

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 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.

Beschädigung des Blades
Fehlerhafte Installation des Blades kann zu einer Beschädigung des Blades führen.
Verwenden Sie die Handles, um das Blade zu installieren/deinstallieren. Auf diese Weise vermeiden Sie, dass das Front Panel oder die Platine deformiert oder zerstört wird.

Beschädigung des Blades, der Backplane oder von System Komponenten
Verbogene Pins oder lose Komponenten können zu einer Beschädigung des Blades, der Backplane oder von Systemkomponenten führen.
Überprüfen Sie daher das Blade sowie die Backplane vor der Installation sorgältig und stellen Sie sicher, dass sich beide in einwandfreien Zustand befinden und keine Pins verbogen sind.

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

Datenverlust
Wenn Sie das Blade deinstallieren, obwohl die blaue Hot-Swap-LED noch blinkt, kann dies zu Datenverlust führen.
Warten Sie daher, bis die blaue LED durchgehend leuchtet, bevor Sie das Blade deinstallieren.

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 Meter 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

AMC-Module

Beschädigung von AMC-Modulen
Die zwei AMC-Steckplätze sind ausschliesslich vorgesehen für AMC-Module, welche offiziell von Emerson unterstützt werden. Siehe hierzu *Supported AMC Modules* on page 52. Installierte AMC-Module dürfen eine Verlustleistung von 35W nicht überschreiten. Die Installation und der Betrieb anderer AMC-Module kann sowohl die AMC-Module als auch das Blade sowie ein installiertes RTM und andere angeschlossene Geräte beschädigen.
Installieren Sie daher nur AMC-Module, welche von Emerson offiziell unterstützt werden. Wenden Sie sich bei Fragen an Ihren lokalen Emerson-Ansprechpartner.

Eingeschränkte Betriebstemperaturbereich
Werden AMC-Module auf dem Blade installiert, deren Betriebstemperaturbereiche kleiner sind als der Betriebstemperaturbereich des Blades selber, so führt dies zu einer Einschränkung des Betriebstemperaturbereiches des Blades.
Stellen Sie sicher, dass sich die Betriebstemperaturbereiche des Blades sowie installierter AMC-Module innerhalb erlaubter Bereiche bewegen.

Verletzung von EMV-Grenzwerten und verminderte Kühlung des Shelfs.
Ein leerer AMC-Steckplatz kann zu verminderter Kühlung des Shelfs sowie starker elektromagnetischer Strahlung führen und somit eine Überschreitung von EMV-Grenzwerten zur Folge haben.
Installieren Sie daher immer ein Filler-Panel in einen anderweitig nicht verwendeten AMC-Steckplatz.

Umweltschutz

Entsorgen Sie alte Blades/Systemkomponenten/RTMs stets gemäß der in Ihrem Land gültigen Gesetzgebung, wenn möglich immer umweltfreundlich.

Introduction

1.1 Features

The ATCA-F120 is an AdvancedTCA™ switch blade as defined in the *PICMG 3.0 Revision 2 AdvancedTCA Base Specification* and *PICMG 3.1 Revision 1.0 Specification Ethernet/Fiber Channel for AdvancedTCA Systems*.

The blade provides the following Ethernet interfaces:

- 15 1000BaseT base channel interfaces via backplane
- 15 10G-BX4/1000BX fabric channel interfaces via backplane
- SERDES interface via update channel
- One 1000Base-T management interface via face plate
- One Base Channel extension interface via face plate
- One 1000BaseT face plate interface which connects to AMC bay B1
- Optional Rear Transition Module (RTM)

Further features of the ATCA-F120 are the following:

- Freescale MPC8548E PowerQUICC III CPU
- At least 512 MBytes DDR2 SDRAM main memory with ECC support
- Dual boot flashes of 32 MBytes each
- Two NAND flashes with a size of two GBytes each
- Real-time clock
- Serial interface via face plate
- Serial interface via Update Channel (connection to second ATCA-F120 in the system)
- Support for two AMC bays
- AMC and backplane support for Clock Generator Module
- On-board IPMC

1.2 Standard Compliances

This blade, when installed in a compliant shelf, 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 Emerson system)
NEBS Standard GR-63-CORE ETSI EN 300019 series	Environmental requirements
PICMG 3.0 Rev. 2.0	AdvancedTCA Base Specification. Defines mechanics, blade dimensions, power distribution, power and data connectors, and system management
PICMG 3.1 Rev. 1.0	AdvancedTCA Ethernet/Fibre Channel Specification.
PICMG AMC.0 R2.0 Advanced Mezzanine Card Base Specification	Defines mechanics, interfaces etc. of Advanced Mezzanine Cards.

To fulfill the requirements of Telcordia GR-1089,R4-14, use Shielded Twisted Pair (STP) cables grounded at both ends to connect to the Ethernet ports.

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 2002/95/EC.

Figure 1-1   Declaration of Conformity

Declaration of Conformity

Emerson Network Power -
Embedded Computing GmbH

Lilienthalstr. 15
D-85579 Neubiberg

Declares that the product

Product Name: ATCA-F120

Conforms to the following Product Specifications:

Safety: EN 60950-1/A11:2004
                 UL 60950-1:2003
                 CAN/CSA-C22.2 No. 60950-1:2003

EMC: EN 55022: 1998 + A1:2000 + A2:2003
                 EN 55024: 1998 + A1:2001 + A2:2003
                 EN 300386:V1.3.2:2003-05
                 47 CFR Part 15 Subpart B (FCC)

Supplementary Information:
The product herewith complies with the requirements
of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

This product was tested as an integral part of a
Emerson Network Power defined reference system.

_____   Neubiberg, 15.02.2008
Signature

1.3   Mechanical Data

The following table provides details on the blade's mechanical data.

Table 1-2 Mechanical Data

Data Type	Value
Dimensions (width x height x depth)	30 mm x 351 mm x 312 mm
Weight	2.3 Kg

1.4   Ordering Information

This section provides details on available blade variants and accessories.

1.4.1   Supported Blade Models

As of writing this guide, the following blade variants were available. Consult your local Emerson sales representative for further variants that may be available.

Table 1-3 Blade Variants

Blade Variant	Description
ATCA-F120-6E	ATCA-F120 equipped with 512 MBytes main memory. 6E RoHS compliant.

1.4.2   Blade Accessories

As of the printing date of this manual, the following blade accessories were available.

Table 1-4 Available Blade Accessories

Accessory	Description
RTM-ATCA-F120C	Rear Transition Module (RTM) with copper uplinks. It provides access to: ● Four 10 Gigabit Ethernet Fabric Channel uplinks via CX4 connectors ● Four 1 Gigabit Ethernet Base Channel interfaces via RJ-45 connectors ● Two 10 Gigabit Ethernet Base Channel uplinks via CX4 connectors ● Four 1 Gigabit Ethernet Fabric Channel interfaces via RJ-45 connectors ● Two RJ-45 telecom clocking interface connectors for inter-shelf clocking configurations The RTM is 6E RoHS compliant.
RTM-ATCA-F120-OPT	The main features of this RTM are: ● Four 10 Gigabit Ethernet Fabric Channel uplinks via SFP+ connectors ● Two 10 Gigabit Ethernet Base Channel uplinks via SFP+ connectors ● Four 1 Gigabit Ethernet Base Channel interfaces via SFP connectors ● Two 1 Gigabit Ethernet Fabric Channel interfaces via SFP connectors ● Two RJ-45 telecom clocking interface connectors for inter-shelf clocking configurations ● One serial RS-232 interface for accessing the base blade ● On-board mezzanine management controller (MMC) compliant to IPMI 2.0

Hardware Preparation and Installation

2.1 Overview

This chapter provides all the information that you need in order to install the ATCA-F120 incl. accessories into your AdvancedTCA system. For completeness purposes and because of the similarity with the installation procedures, the respective removal procedures are also given in this chapter. The structure of this chapter reflects the sequence of the main steps that you will typically take in order to install the ATCA-F120 and accessories into your AdvancedTCA system. These main steps and their sequence are:

1. Unpack and inspect the blade
2. Make sure environmental and power requirements are met
3. If applicable, install Rear Transition Module (RTM)
4. Configure the ATCA-F120
5. Install the ATCA-F120
6. If applicable, install AMC modules

2.2 Unpacking and Inspecting the Blade

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 your 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 "Getting Started" guide
   ATCA-F120 blade

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.

2.3 Environmental and Power Requirements

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

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 blade, and not to component temperatures.

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

NOTICE

Blade Damage
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.
Do not operate the blade below -5°C.

Table 2-1 Environmental Requirements

Requirement	Operating	Non-Operating
Temperature	+5ºC (41°F) to +40ºC (104°F): normal operation according to NEBS Standard GR-63-CORE -5ºC (23°F) to +55ºC (131°F): exceptional operation according to NEBS Standard GR-63-CORE	-40ºC (-40°F) to +70ºC (158°F) - may be further limited by installed accessories
Temp. Change	+/- 0.25ºC/min according to NEBS Standard GR-63-CORE	+/- 0.25ºC/min
Rel. Humidity	5% to 90% non-condensing according to Emerson-internal environmental requirements	5% to 95% non-condensing according to Emerson-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, 30 mSec/sec^2	Blade level packaging Half-sine, 6 mSec at 180 m/Sec^2
Free Fall		1,200 mm/all edges and corners 1.0m (packaged) per ETSI 300 019-2-2 (blade level packaging) 100mm (unpackaged) per GR-63-CORE

During the safety qualification of this blade, the following on-board locations were identified as critical with regards to the maximum temperature during blade operation. To guarantee proper blade 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 temperatures should be measured by placing a sensor exactly at the given locations. For your convenience all temperature spots are shown in a figure that provides a detailed view of the blade.

Figure 2-1   Critical Temperature Spots
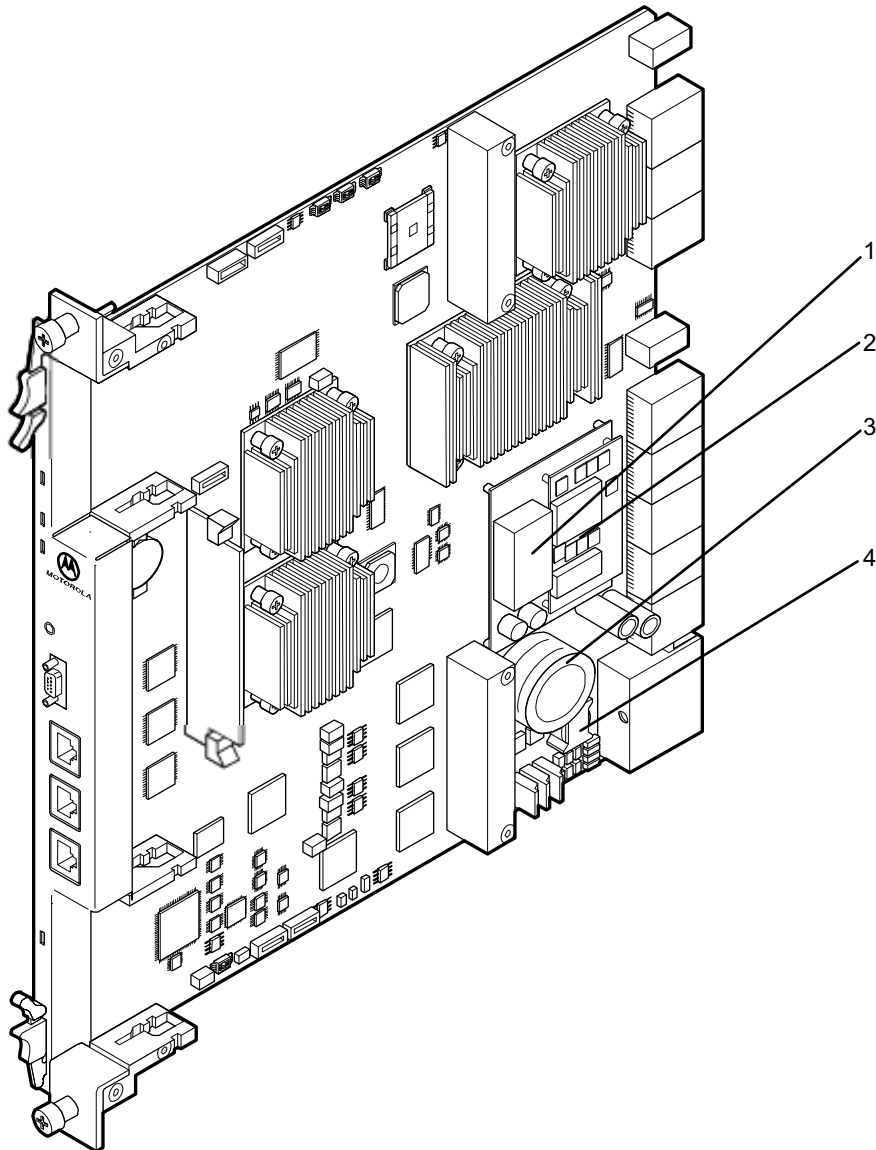
Table 2-2 Critical Temperature Limits

Location	Temperature in Celsius	Temperature in Fahrenheit	Description
1	85°C	185°F	Top center of DC/DC converter used for management power
2	100°C	212°F	PCB surface of main DC/DC converter
3	105°C	221°F	Big capacitor, margin which faces the DC/DC converter
4	90°C	194°F	Top center of filter coil

2.3.2   Power Requirements

Make sure that the blade is used in an AdvancedTCA shelf connected to -48VDC up to -60VDC, according to Telecommunication Network Voltage (TNV-2). A TNV-2 circuit is a circuit whose normal operating voltages exceed the limits for a safety-extra-low-voltage (SELV) under normal operating conditions, and which is not subject to overvoltages from telecommunication networks.

Table 2-3 DC System Power Requirements

Feature	Value
Rated voltage	-48VDC to -60VDC US and Canada: -48VDC
Operating voltage	-40.0VDC to -72VDC US and Canada: -40.0 to -60VDC
Input current	max. 5.0A@40V
Power dissipation	max. 200W The tested blade was a ATCA-F120 blade, including two installed AMC modules (35W each), and an RTM-ATCA-F120-COP (30W).

2.4 Installing Rear Transition Modules

As of writing this guide, the following rear transition module (RTM) were available: RTM-ATCA-F120C and RTM-ATCA-F120-OPT

The RTMs are not hot-swappable. Before you install them, you must make sure that either no front blade is installed in the respective slot, or that the front blade is powered-down. For further details about the RTM installation refer to the Installation and Use guide of the respective RTM.

2.5 Configuring the Blade

The blade provides the configuration switches SW1, SW2, SW3 and SW4. Their location is shown in the following figure. The switch settings shown in the figure correspond to the default settings. The switches are displayed as the small white squares.

Figure 2-2   On-Board Configuration Switches
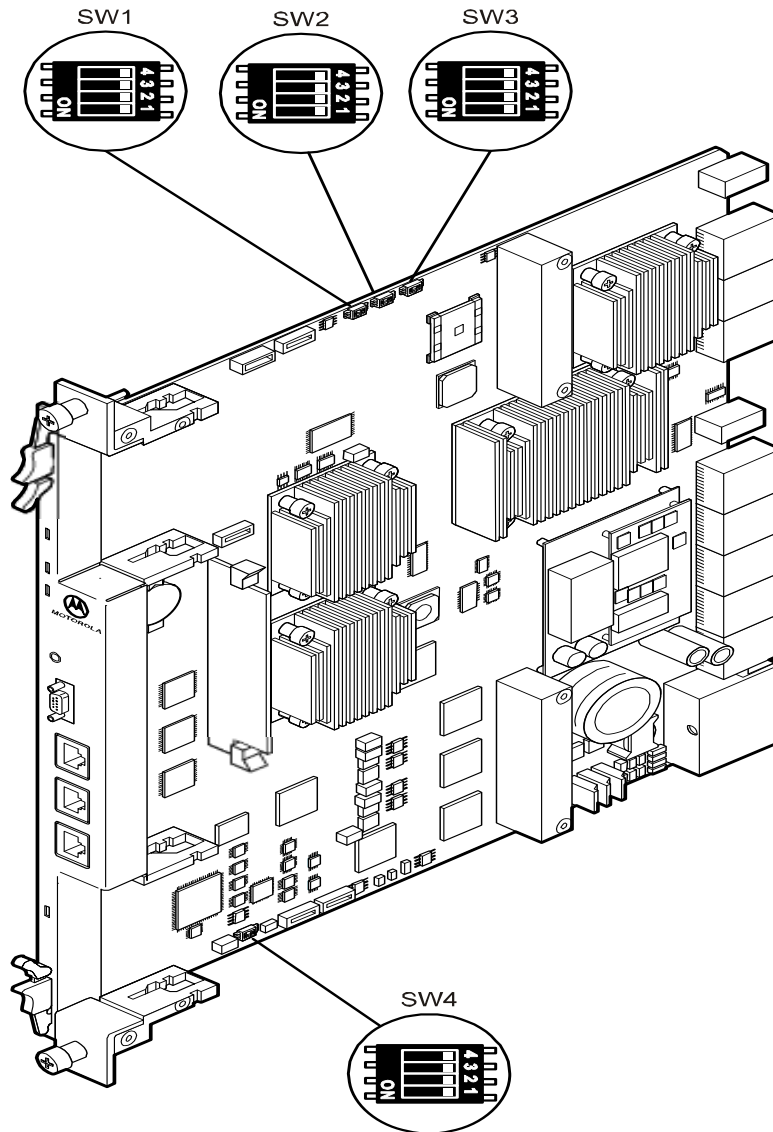
<table>
<tr><td colspan="2" align="center">**NOTICE**</td></tr>
<tr><td colspan="2">**Blade Malfunction**
Switches marked as 'reserved' might carry production-related functions and can cause the blade to malfunction if their setting is changed.
Therefore, do not change settings of switches marked as 'reserved'. The setting of switches which are not marked as 'reserved' has to be checked and changed before blade installation.

Blade Damage
Setting/resetting the switches during operation can cause blade damage.
Therefore, check and change switch settings before you install the blade.</td></tr>
</table>

Table 2-4 Switch Settings

Switch	Description
SW1-1	Selects whether the shelf manager (ShM) is accessed through Base Channel port 1 or Update channel port 0. For details refer to *Shelf Manager Cross Connection* on page 92. **Note that this switch setting can be overwritten via IPMI.** OFF: ShM is accessed through Update Channel port 0 (default) ON: ShM is accessed through Base Channel port 1
SW1-2	Reserved (default: OFF)
SW1-3	Reserved (default: OFF)
SW1-4	Reserved (default: OFF)
SW2-1 and SW2-2	Serial interface routing SW2-1 OFF and SW2-2 OFF (default): Serial interface of CPU is routed to the F120 face blade and serial interface at RTM is disabled SW2-1 ON and SW2-2 OFF: serial interface of CPU is routed to theRTM's face plate and serial interface of IPMC is routed to the F120 face plate (for debugging only) Other switch settings: Reserved
SW2-3	User flash #1 write protection. See *User Flashes* on page 83 and *Memory Map* on page 109 for further details. OFF: User flash #1 write-enabled (default) ON: User flash #2 write-protected

Table 2-4 Switch Settings (continued)

Switch	Description
SW2-4	User flash #2 write-protection. See *User Flashes* on page 83 and *Memory Map* on page 109 for further details. OFF: User flash #2 write-enabled (default) ON: User flash #2 write-protected
SW3-1	Boot flash selection. See *Boot Flashes* on page 83 and *Memory Map* on page 109 for further details. OFF: IPMI selects boot flash (default) ON: Switch SW3-2 determines boot flash
SW3-2	Determines boot flash (only if switch SW3-1 is set to ON). See *Boot Flashes* on page 83 for further details. OFF: Blade boots from boot flash #1 (default) ON: Blade boots from boot flash #2
SW3-3	Watchdog timer enabling. This switch allows to enable/disable the watchdog inside the FPGA. See *Glue Logic FPGA* on page 81 for further details. OFF: Watchdog enabled (default) ON: Watchdog disabled
SW3-4	Reserved (default: OFF)
SW4-1	Reserved (default: OFF)
SW4-2	Reserved (default: OFF)
SW4-3	Reserved (default: OFF)
SW4-4	Reserved (default: OFF)

2.6 Blade Installation and Removal

The blade is fully compatible to the AdvancedTCA standard and is designed to be used in AdvancedTCA shelves.

The blade must only be installed into hub slots of your shelf. Refer to the system's documentation for information which slots these are in your particular configuration.

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.** **Damage of the blade** **Incorrect installation of the blade can cause damage of the blade,** **Only use handles when installing/removing the blade to avoid damage/deformation to the face plate and/or PCB.**

2.6.1 Installing the Blade

To install the blade into an AdvancedTCA shelf, proceed as follows.

Installation Procedure

The following procedure describes the installation of the blade. 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. Ensure that the top and bottom ejector handles are in the outward position by squeezing the lever and the latch together.
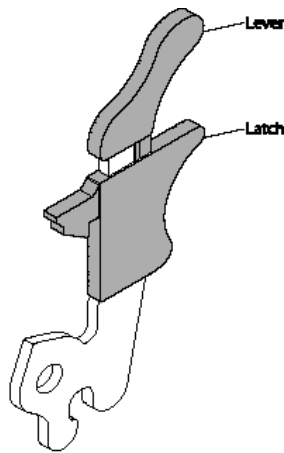
2. Insert blade into the shelf by placing the top and bottom edges of the blade in the card guides of the shelf. Ensure that the guiding module of shelf and blade are aligned properly.

3. Apply equal and steady pressure to the blade to carefully slide the blade into the shelf until you feel resistance. Continue to gently push the blade until the blade connectors engage.

4. Squeeze the lever and the latch together and hook the lower and the upper handle into the shelf rail recesses.

5. Fully insert the blade and lock it to the shelf by squeezing the lever and the latch together and turning the handles towards the face plate.
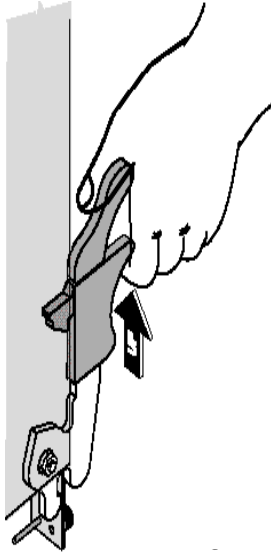
If your shelf is powered, as soon as the blade is connected to the backplane power pins, the blue LED is illuminated.
When the blade is completely installed, the blue LED starts to blink. This indicates that the blade announces its presence to the shelf management controller.

If an RTM is connected to the front blade, make sure that the handles of both the RTM and the front blade are closed in order to power up the blade`s payload.

6. Wait until the blue LED is switched off, then tighten the face plate screws which secure the blade to the shelf.

When the blue LED is switched OFF and the green LED "OK" is switched ON, this indicates that the blade`s payload has been powered up and that the blade is active.

7. Connect cables to the face plate, if applicable.

2.6.2   Removing the Blade

This section describes how to remove the blade from an AdvancedTCA system.

| 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.

Damage of the blade
Incorrect installation of the blade can cause damage of the blade,
Only use handles when installing/removing the blade to avoid damage/deformation to the face plate and/or PCB. |

Removal Procedure

The following procedure describes how to remove the blade from a system. It assumes that the system is powered. If the system is unpowered, you can disregards the blue LED and thus skip the respective step. In that case it is a purely mechanical procedure.

1. Unlatch the lower handle by squeezing the lever and the latch together and turning the handle outward only enough to unlatch the handle from the face plate. Do not rotate the handle fully outward.
   The blue LED blinks indicating that the blade power-down process is ongoing.

NOTICE
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.**

2. Wait until the blue LED is illuminated permanently, then unlatch the upper handle and rotate both handles fully outward.

If the LED continues to blink, a possible reason may be that upper layer software rejects the blade extraction request.

3. Remove face plate cables, if applicable.

4. Unfasten the screws of face plate until the blade is detached from shelf.

5. Remove the blade from the shelf.

2.7   AMC Modules

The blade provides two AMC bays: AMC B4 and AMC B1. Their location is shown in the following figure.

Figure 2-3   Location of AMC Bays

AMC B1

AMC B4
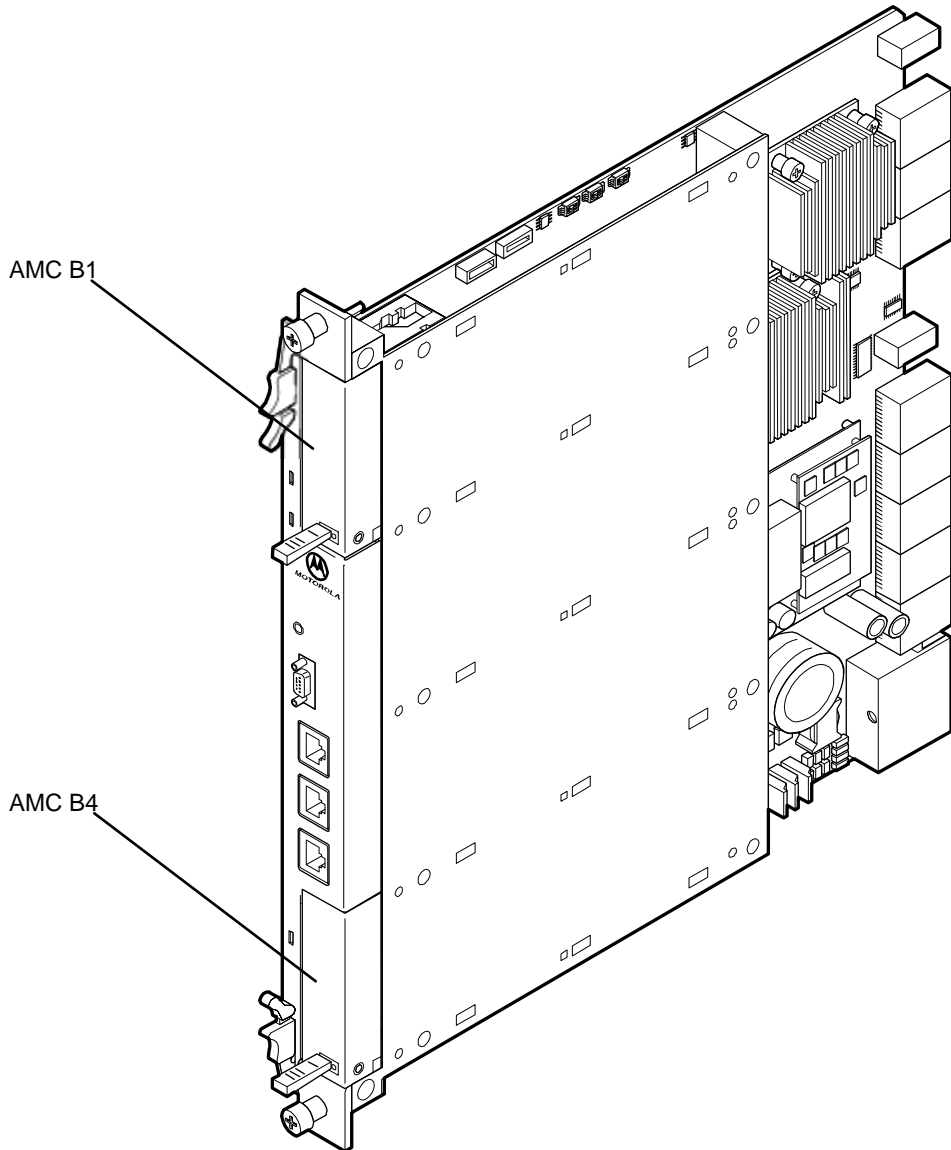
The following sections describe which type of AMC modules are supported for each AMC bay. Furthermore, the installation/removal procedure for AMC modules will be given. This procedure is identical for all AMC modules in both AMC bays.

2.7.1   Supported AMC Modules

The AMC bays AMC B4 and AMC B1 are designed to support different types of AMC modules. Both AMC bays are compliant to AMC.0 R2.0.

Consult your local Emerson sales representative for a list of AMC modules which Emerson has validated for the use in AMC B1 and AMC B4.

2.7.1.1   AMC Bay B4

This AMC bay is designed to support Emerson processor AMC modules. The following table describes how the AMC ports are assigned.

Table 2-5 AMC Bay B4 - Port Assignments

Connector Region	AMC Port #	Usage on ATCA-F120
Clocking	1	Unused
	2	Unused
	3	PCI Express HCSL 100 MHz clock
Common Options	0	AdvancedTCA update channel port 2/3
	1	AdvancedTCA update channel port 4
	2	AMC Bay B1 port 2
	3	AMC Bay B1 port 3
Fat Pipes	4	AMC Bay B1 port 4
	5	AMC Bay B1 port 5
	6	AMC Bay B1 port 6
	7	AMC Bay B1 port 7

Table 2-5 AMC Bay B4 - Port Assignments (continued)

Connector Region	AMC Port #	Usage on ATCA-F120
	8	Ethernet Dual MAC (Intel 82671EB)
	9	Ethernet Dual MAC (Intel 82671EB)
	10	Ethernet Dual MAC (Intel 82671EB)
	11	Ethernet Dual MAC (Intel 82671EB)
Extended Options	12 - 18	Unused
	19	Zone 3 connector P30 row 7 pin pair A-B
	20	Unused

The AMC modules installed in AMC bay B4 of both ATCA-F120 blades in a shelf are interconnected via the AdvancedTCA update Channel interface (ports 2 and 3) through the backplane. The following figure illustrates the interconnection scheme. It is applicable to all Emerson AdvancedTCA shelves.

Figure 2-4   AMC Module B4 Interconnection Scheme
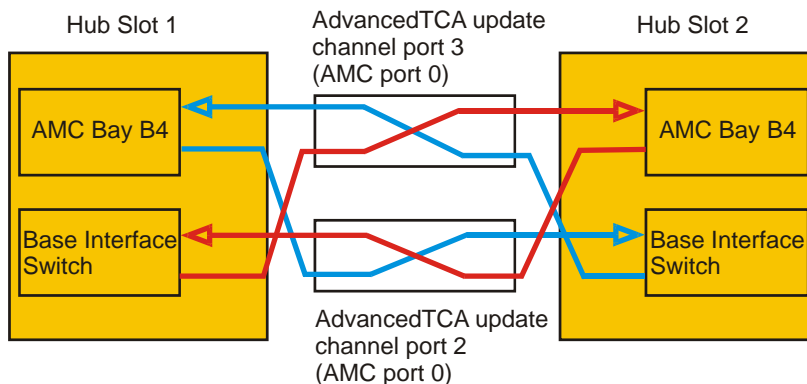
2.7.1.2   AMC Bay B1

This AMC bay is designed to support different types of AMC modules. The mechanical design allows to install single-width AMCs with midsize face plates.

The AMC interfaces of AMC bay B1 provide support for the following types of AMC modules:

- Network security AMCs
- Telecom clocking AMCs
- Storage AMCs

The following table describes in detail how the AMC ports of Bay B1 are assigned on the ATCA-F120.

Table 2-6 AMC Bay B1- Port Assignments

Connector Region	AMC Port #	Usage on ATCA-F120
Clocking	1	CH1-CLK1
	2	CH1-CLK2
	3	PCI Express HCSL 100 MHz clock
Common Options	0	Base Channel switch port 21
	1	Fabric channel switch 2 port 17
	2	AMC B4 port 2
	3	AMC B4 port 3
Fat Pipes	4	AMC B4 port 4
	5	AMC B4 port 5
	6	AMC B4 port 6
	7	AMC B4 port 7
	8	Fabric Channel switch 2 port 18
	9	Fabric Channel switch 2 port 19
	10	Fabric Channel Switch 2 Port 20
	11	Fabric Channel Switch 2 Port 16
Extended Option	12	SERDES (1000BaseT on ATCA-F120 face plate)
	13	Unused
	14	Unused
	15	Unused

Table 2-6 AMC Bay B1- Port Assignments (continued)

Connector Region	AMC Port #	Usage on ATCA-F120
	16	Differential telecom clock to and from the AMC
	17	Unused
	18	Unused
	19	Unused
	20	Unused

2.7.2   AMC Module Installation and Removal

This section describes how to install and remove an AMC module.

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 your are working in an ESD-safe environment.

AMC Module Damage
The two AMC bays only support AMC types/modules which are officially supported by Emerson (refer to *Supported AMC Modules* on page 52 for a details). AMC modules installed into AMC bay 1 or 4 must not exceed a power dissipation of 35W. Installing and operating other AMC modules may damage the AMC modules, the blade and an installed RTM including attached devices.
Only install AMC modules into AMC bay B1 and B4 which are officially supported by Emerson. Consult your local Emerson sales representative, if in doubt.

Limitation of Operating Temperature Range
Installing AMC modules with small operating temperature ranges into the ATCA-F120 may further restrict the operating temperature range of the ATCA-F120.
Make sure that the operating temperature of any installed AMC modules and the ATCA-F120 as a bundle are within allowed limits.

Poor Shelf Cooling and EMC Compliance Violation
An empty AMC bay may result in poor shelf cooling and strong EMC radiation and thus lead to EMC compliance violation.
Therefore, always cover empty or unused AMC bays with a filler panel.

Installation Procedure

The following describes how to install an AMC module into AMC bay B1 and B4. The installation procedure assumes that the AMC module is being hot-inserted, that means the ATCA-F120 is powered. The procedure for the cold insertion, that means the ATCA-F120 is not powered, is the same, except that you need not wait for the blue LED indications to proceed.

1. Make sure you are in an ESD-safe environment.

2. Identify the AMC bay to be used for the installation.
   Refer to *Supported AMC Modules* on page 52 for more details.

3. If the required AMC bay is occupied by an AMC filler panel, you will need to remove the filler panel before proceeding with the installation procedure. The removal procedure for the filler panel is the same as described in the Removal procedure which follows immediately after this procedure. Ignore steps that mention the blue LED.

4. Ensure that the AMC module handle is in the extracted position: pulled outward, away from the face plate.

5. Using your thumb, apply equal and steady pressure on the face plate as necessary to carefully slide the AMC module into the guides rails.

6. Continue to gently push the module along the guide rails till the module is fully engaged with the connector.
   Avoid using excessive force during this operation.

7. Wait for the blue LED to glow.
   The blue LED glows when the AMC module is completely engaged with the connector.

8. Press module handle inwards towards the face plate to lock the AMC module on AMC bay.

9. Wait for the blue LED to perform a series of long blinks.

The blue LED blinks when the handle is locked in position indicating module detection and activation by the carrier board.

10. Observe blue LED status/activity. The module is fully installed when the blue LED stops blinking and stays OFF.

Removal Procedure

The following describes how to remove an AMC module from the ATCA-F120. The procedure assumes that the ATCA-F120 is powered. If it is not powered, the steps regarding the blue LED can be ignored and skipped.

1. Make sure you are in an ESD safe environment.

2. Remove any cables that are connected to the AMC module face plate connectors.

3. Gently pull the module latch outwards, approximately 3mm from its locked position.

4. Wait for the blue LED to first perform short blinks, and then glow persistently.

NOTICE
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.**

5. Once the blue LED glows persistently, gently pull the AMC module handles outwards to disconnect the module from the AMC connectors. Continue to gently slide the module outwards along the guide rails.

NOTICE

Poor Shelf Cooling and EMC Compliance Violation
An empty AMC bay may result in poor shelf cooling and strong EMC radiation and thus lead to EMC compliance violation.
Therefore, always cover empty or unused AMC bays with a filler panel.

---

6. Install filler panel.

2.8 Configuring and Setting Up the Software

After the ATCA-F120 has been installed into a shelf and powered up, it starts to execute the U-Boot firmware. For details about U-Boot and how it can be configured, refer to Chapter 5, *U-Boot Firmware,* on page 101.

Eventually, U-Boot will boot an operating system. Typically this operating system will be a Basic Blade Services (BBS) distribution from Emerson. BBS is basically a Linux distribution with some hardware-specific add-ons. It consist of the following parts:

● A carrier-grade operating system.

● Several custom hardware management functions for the unique hardware of the blade.

● A set of management routines for Linux and all hardware interfaces. Management access includes support for SNMP and a local console interface based on a standard Linux command shell.

For detailed information about the BBS that is available for the ATCA-F120, refer to the *Basic Blade Services Software on ATCA-F120 Programmer's Reference*. This manual also contains information about standard configurations of the ATCA-F120, such as preconfigured VLANs etc.

In some system configurations, the ATCA-F120 may be used as a system manager or at least as a key component within a system management implementation. The system management functionality may be based on the widely adopted Hardware Platform Interface (HPI). For this purpose Emerson offers an HPI distribution which provides a set of libraries that can be used as a basis for implementing system management functionalities. For details refer to the following manuals: *System Management Interface Based on HPI-B (Centellis 4000 Series)* and *System Management Interface Based on HPI-B (Centellis CO 31kX /4100)*.

Controls, LEDs and Connectors

3.1   Overview

This chapter describes:

- Mechanical layout of the blade

- Face plate connectors and LEDs

- Rear panel connectors

- On-board connectors

3.2 Blade Layout

The following figure provides an overview of the mechanical layout of the blade.

Figure 3-1 *Mechanical Layout*
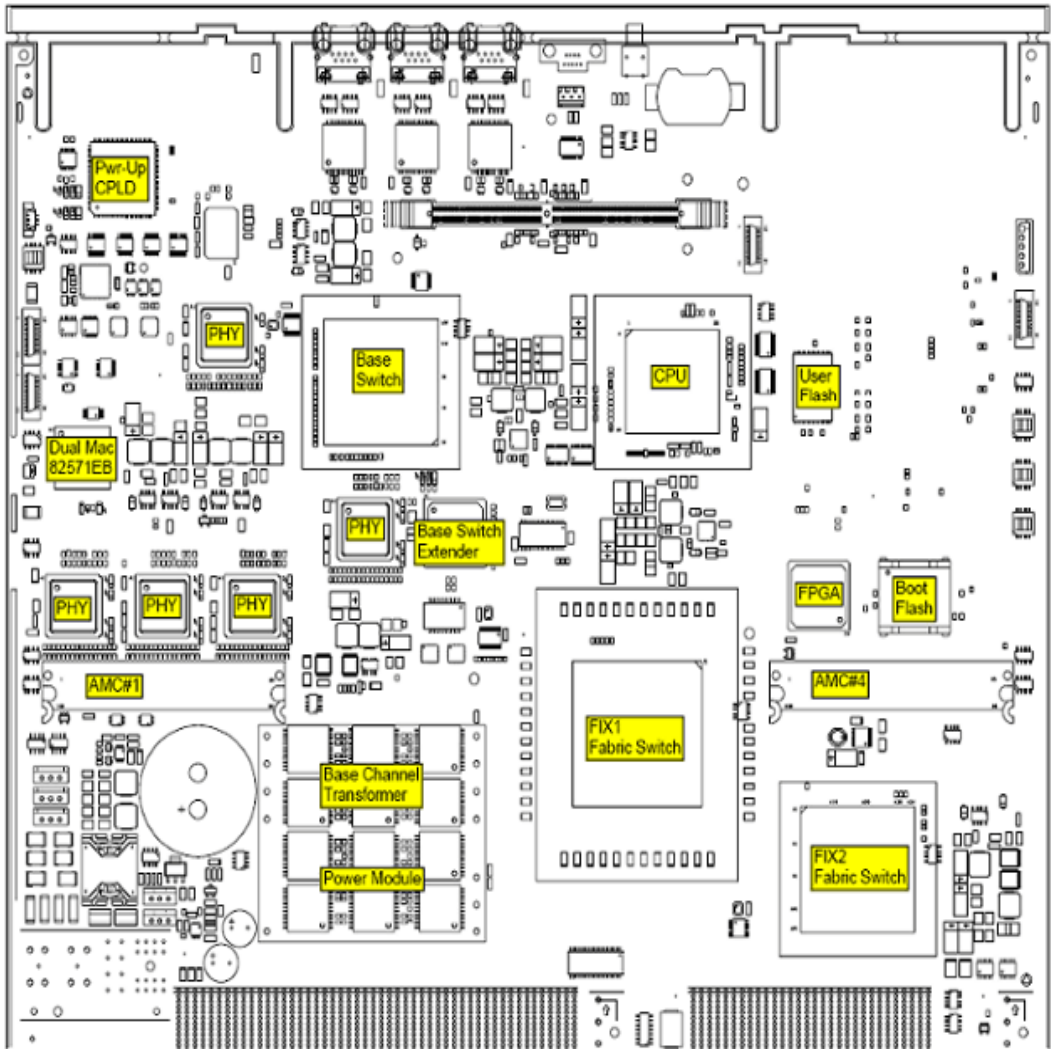
3.3 Face Plate Connectors and LEDs

This section describes the connectors and LEDs of the blade's face plate. The following figure shows the face plate.

Figure 3-2   Face Plate

3.3.1 Connectors

The blade provides the following connectors at its face plate:

- One serial interface

- Ethernet management interface

- AMC bay B1 Ethernet management interface

- Ethernet Base Channel interface

3.3.1.1 Serial Interface

The serial interface connector allows to establish a serial console connection between the ATCA-F120 and an external computer, for example a laptop. The serial interface is primarily intended for management purposes and allows for example to access the blade's U-Boot firmware (see Chapter 5, *U-Boot Firmware,* on page 101).

The following figure shows the location of the connector.

Figure 3-3   Location of Serial Interface Connector

This interface is typically used to connect to and configure the U-Boot firmware. Refer to the chapter "U-Boot Firmware" for further details.

The connector pinout is as follows.

Table 3-1 Serial Connector Pinout

Pin	Signal
1	n.c.
2	RXD
3	TXD
4	n.c.
5	GND
6	n.c.
7	n.c.
8	n.c.
9	n.c.

3.3.1.2   Ethernet Management Interface

The blade provides an Ethernet interface at its face plate which is intended for management purposes. It provides access to port 1 of the Ethernet controller integrated in the MPC8548E PowerQUICC III CPU. The following figure shows the location and the pinout of this connector. Two LEDs next to the connector indicate the Ethernet connection status. The LEDs are labelled "A" (activity) and "L" (link).

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 meters.**

- **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 3-4   Location of Ethernet Management Interface
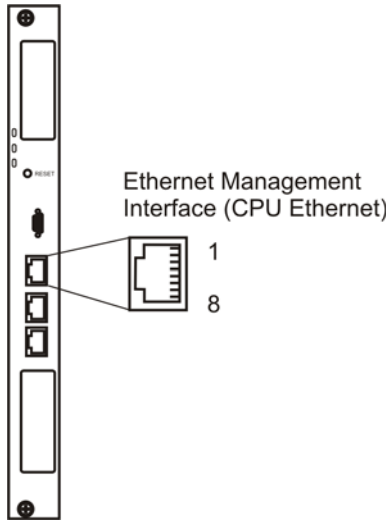
Table 3-2 Ethernet Management Connector Pinout

Pin	Signal (1000Base-T)
1	ETH_DA+
2	ETH_DA-
3	ETH_DB+
4	ETH_DC+
5	ETH_DC-
6	ETH_DB-
7	ETH_DD+
8	ETH_DD-

3.3.1.3 AMC Module Ethernet Access Interface

This interface provides 1000Base-T Ethernet access to an AMC module installed in AMC bay B1. It corresponds to port 20 of the AMC Extended Options interface and is primarily intended as management interface. Two LEDs next to the connector indicate the Ethernet connection status. The LEDs are labelled "A" (activity) and "L" (link).

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 meters.

- 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.

The following figure shows the connector location and pinout.

Figure 3-5   Location of AMC Module Ethernet Management Interface Connector
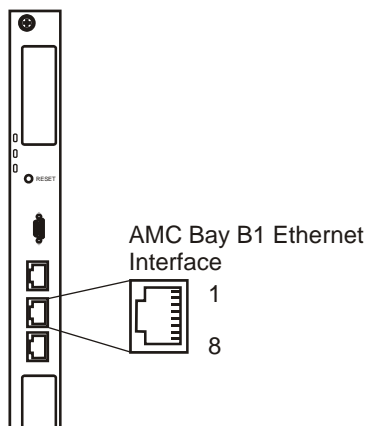
Table 3-3 AMC Module Ethernet Interface Connector Pinout

Pin	Signal (1000Base-T)
1	ETH_DA+
2	ETH_DA-
3	ETH_DB+
4	ETH_DC+
5	ETH_DC-
6	ETH_DB-
7	ETH_DD+
8	ETH_DD-

3.3.1.4   Ethernet Base Channel Extension

This interface provides access to the system's Base Channel network. It supports 1000BaseT Ethernet and corresponds to port 1 of the on-board Broadcom BCM56502 switch. The connector location and the connector pinout are given in the following. Two LEDs next to the connector indicate the Ethernet connection status. The LEDs are labelled "A" (activity) and "L" (link).

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 meters.**

- **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 3-6   Location of Base Channel Extension Connector
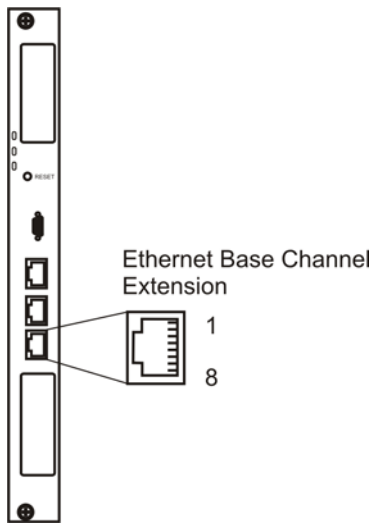
Table 3-4 Base Channel Extension Connector Pinout

Pin	Signal (1000Base-T)
1	ETH_DA+
2	ETH_DA-
3	ETH_DB+
4	ETH_DC+
5	ETH_DC-
6	ETH_DB-
7	ETH_DD+
8	ETH_DD-

3.3.2   LEDs

The following figure highlights the LEDs available at the face plate.

Figure 3-7   Face Plate LEDs
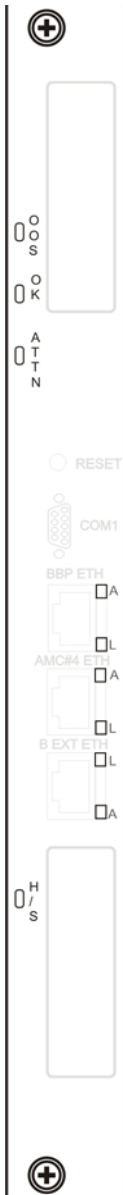
The following table describes the meaning of theses LEDs.

Table 3-5 Face Plate LEDs

LED	Color	Description
OOS	Red	Out Of Service This LED is controlled by higher layer software, such as middleware or applications.
OK	Green	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
ATTN	Amber	This LED is controlled by higher layer software, such as middleware or applications.
H/S	Blue	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
L	Green	Green: Ethernet link established Off: No Ethernet link
A	Amber	Amber: Ethernet activity Off: No activity

3.4 Rear Panel

The blade provides the following AdvancedTCA backplane connectors:

- P10
- P20 - P24
- P30 - P32

Their location is shown in the following figure.

Figure 3-8   Location of AdvancedTCA Connectors

P30
P31
P32

P20
P21
P22
P23
P24

P10

The pinouts of the connectors P10 and P20 to P24 are defined in the AdvancedTCA specifications. Refer to the respective documents for details.

The pinouts of the connectors P30 to P32, however, are Emerson-specific. They are described in the following.
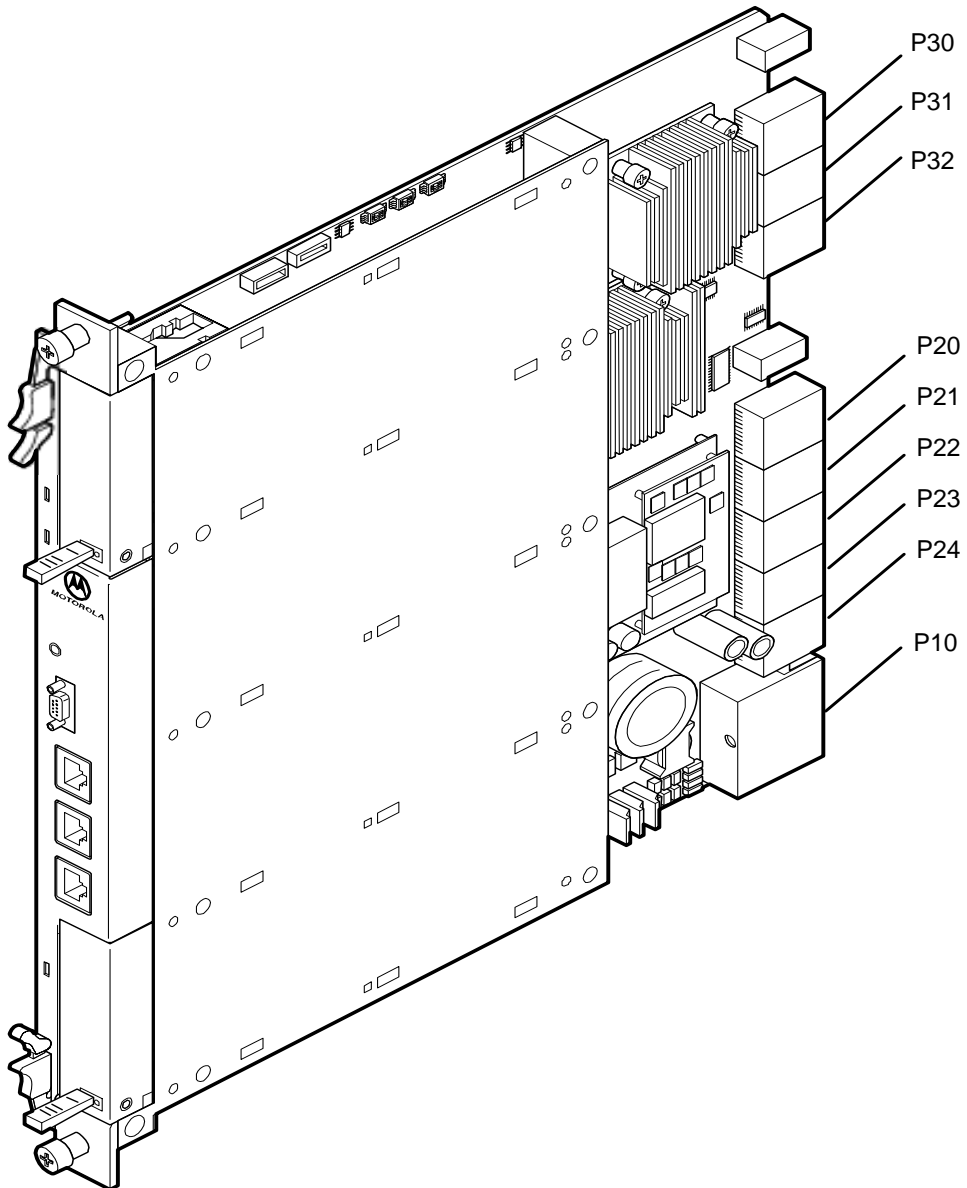
Figure 3-9   P30 Connector Pinout (Columns A to D)

	a	b					c	d	
1	FPGA_SER_RX	FPGA_SER_TX					n.c.	n.c.	1
2	n.c.	n.c.					n.c.	n.c.	2
3	FPGA_MDC	FPGA_MDIO					n.c.	n.c.	3
4	CPU_SD_TX0_P	CPU_SD_TX0_M					CPU_SD_RX0_P	CPU_SD_RX0_M	4
5	n.c.	n.c.					n.c.	n.c.	5
6	n.c.	n.c.					n.c.	n.c.	6
7	BIX_P15_U_TX+	BIX_P15_U_TX-					BIX_P15_U_RX+	BIX_P15_U_RX-	7
8	BIX_B16_U_TX+	BIX_P16_U_TX-					BIX_P16_U_RX+	BIX_P16_U_RX-	8
9	IPMB1_SCL	IPMB1_SDA					IPMI_V3P3	RTM_IMC_RS_N	9
10	VP12_RTM	VP12_RTM					V3P3_RTM	V3P3_RTM	10

Figure 3-10   P30 Connector Pinout (Columns E to H)

	e	f					g	h	
1	AMC1_P19_RX	AMC1_P19_TX					RTM_PS1_N	RTM_PWR_GD	1
2	BIX_P17_TX+	BIX_P17_TX-					BIX_P17_RX+	BIX_P17_TX-	2
3	BIX_P18_TX+	BIX_P18_TX-					FIX2_P21_RX+	FIX2_P21_RX-	3
4	BIX_P19_TX+	BIX_P19_TX-					FIX2_P22_RX+	FIX2_P22_RX-	4
5	BIX_P20_TX+	BIX_P20_TX-					BIX_P18_RX+	BIX_P18_RX-	5
6	FIX2_P21_TX+	FIX2_P21_TX-					BIX_P19_RX+	BIX_P19_RX-	6
7	FIX2_P22_TX+	FIX2_P22_TX-					BIX_P20_RX+	BIX_P20_RX-	7
8	BIX_XG0_TX1+	BIX_XG0_TXT-					n.c.	n.c.	8
9	BRD_PS0_N	RTM_PS0_N					RTM_RS_KEY_N	RTM_RS_OUT_N	9
10	VP5_RTM	RTM_ENABLE_N					I2C_1_SCL	I2C_1_SDA	10

Figure 3-11   P31 Connector Pinout (Columns A to D)

	a	b	a b	c d	e f	g h	c	d	
1	CLK3_FR_RTM	SYS_REF_CLK					n.c.	RTM_GPO1	1
2	CH3_CLK3A	n.c.					CH3_CLK3B	n.c.	2
3	CH2_CLK3A	n.c.					CH2_CLK3B	n.c.	3
4	BIX_MDC	BIX_MDIO					BIX_XG_MDC	BIX_XG_MDIO	4
5	CHX_CLK1_OUT	n.c.					CHx_CLK2_OUT	n.c.	5
6	INT_SHIFT_CLK	INT_LATCH_CLK					INT_SHIFT_D	n.c.	6
7	CLK3A_TO_RTM	N_SYS_CLK3_EN					CLK3B_TO_RTM	n.c.	7
8	CHX_CLK3_OUT	n.c.					n.c.	n.c.	8
9	n.c.	n.c.					n.c.	n.c.	9
10	VP12_RTM	VP5_RTM					V3P3_RTM	n.c.	10

Figure 3-12   P31 Connector Pinout (Columns E to H)

	e	f	a b	c d	e f	g h	g	h	
1	n.c.	n.c.					BIX_XG1_RX1+	BIX_XG1_RX1-	1
2	BIX_XG0_TX0+	BIX_XG0_TX0+					BIX_XG1_RX0+	BIX_XG1_RX0-	2
3	BIX_XG0_TX2+	BIX_XG0_TX2-					BIX_XG0_RX2+	BIX_XG0_RX2-	3
4	FIX2_MDC	FIX2_MDIO					FIX1_XG_MDC	FIX1_XG_MDIO	4
5	BIX_XG1_TX0+	BIX_XG1_TX0-					BIX_XG1_RX3+	BIX_XG1_RX3-	5
6	BIX_XG0_TX3+	BIX_XG0_TX3_					BIX_XG1_RX2+	BIX_XG1_RX2-	6
7	BIX_XG1_TX2+	BIX_XG1_TX2-					BIX_XG0_RX0+	BIX_XG0_RX0-	7
8	BIX_XG1_TX1+	BIX_XG1_TX1-					BIX_XG0_RX1+	BIX_XG0_RX1-	8
9	BIX_XG1_TX3+	BIX_XG1_TX3-					BIX_XG0_RX3+	BIX_XG0_RX3-	9
10	TXDIS_SH_CLK	TXDIS_LTH_CLK					TXDIS_SHIFT_D	TXDIS_SFT_DIN	10

Figure 3-13   P32 Connector Pinout (Columns A to D)

	a	b	a b	c d	e f	g h	c	d	
1	FIX1_P19_TX2+	FIX1_P19_TX2-					FIX1_P19_RX2+	FIX1_P19_RX2-	1
2	FIX1_P19_TX0+	FIX1_P19_TX0-					FIX1_P19_RX0+	FIX1_P19_RX0-	2
3	FIX1_P18_TX2+	FIX1_P18_TX2-					FIX1_P18_RX0+	FIX1_P18_RX0-	3
4	FIX1_P18_TX0+	FIX1_P18_TX0-					FIX1_P18_RX2+	FIX1_P18_RX2-	4
5	FIX1_P17_TX2+	FIX1_P17_TX2-					FIX1_P17_RX2+	FIX1_P17_RX2-	5
6	FIX1_P17_TX0+	FIX1_P17_TX0-					FIX1_P17_RX0+	FIX1_P17_RX0-	6
7	FIX1_P16_TX2+	FIX1_P16_TX2-					FIX1_P16_RX2+	FIX1_P16_RX2-	7
8	FIX1_P16_TX0+	FIX1_P16_TX0-					FIX1_P16_RX0+	FIX1_P16_RX0-	8
9	FIX2_P24_TX+	FIX2_P24_TX-					FIX2_P24_RX+	FIX2_P24_RX-	9
10	VP12_RTM	VP5_RTM					V3P3_RTM	n.c.	10

Figure 3-14   P32 Connector Pinout (Columns E to H)

|	e	f	a b	c d	e f	g h	g	h	
1	FIX1_P19_TX3+	FIX1_P19_TX3-					FIX1_P19_RX3+	FIX1_P19_RX3-	1
2	FIX1_P19_TX1+	FIX1_P19_TX1-					FIX1_P19_RX1+	FIX1_P19_RX1-	2
3	FIX1_P18_TX3+	FIX1_P18_TX3-					FIX1_P18_RX1+	FIX1_P18_RX1-	3
4	FIX1_P18_TX1+	FIX1_P18_TX1-					FIX1_P18_RX3+	FIX1_P18_RX3-	4
5	FIX1_P17_TX3+	FIX1_17_TX3-					FIX1_P17_RX1+	FIX1_P17_RX1-	5
6	FIX1_P17_TX1+	FIX1_P17_TX1-					FIX1_P17_RX3+	FIX1_P17_RX3-	6
7	FIX1_P16_TX3+	FIX1_P16_TX3-					FIX1_P16_RX1+	FIX1_P16_RX1-	7
8	FIX1_P16_TX1+	FIX1_P16_TX1-					FIX1_P16_RX3+	FIX1_P16_RX3-	8
9	FIX2_P23_TX+	FIX2_P23_TX-					FIX2_P23_RX+	FIX2_P23_RX-	9
10	n.c.	RTM_PS0_N					n.c.	n.c.	10

Functional Description

4.1   Overview

In this chapter you will find the following information:

- Block diagram
- Central Processing Unit
- Main memory
- Glue Logic FPGA
- Boot and user flashes
- Fabric channel interfaces
- Base channel interfaces
- Base interface extension
- Intelligent Peripheral Management Controller

4.2 Block Diagram

The following figure provides an overview of the main function blocks of the ATCA-F120 and how they are interconnected.

Figure 4-1   Block Diagram
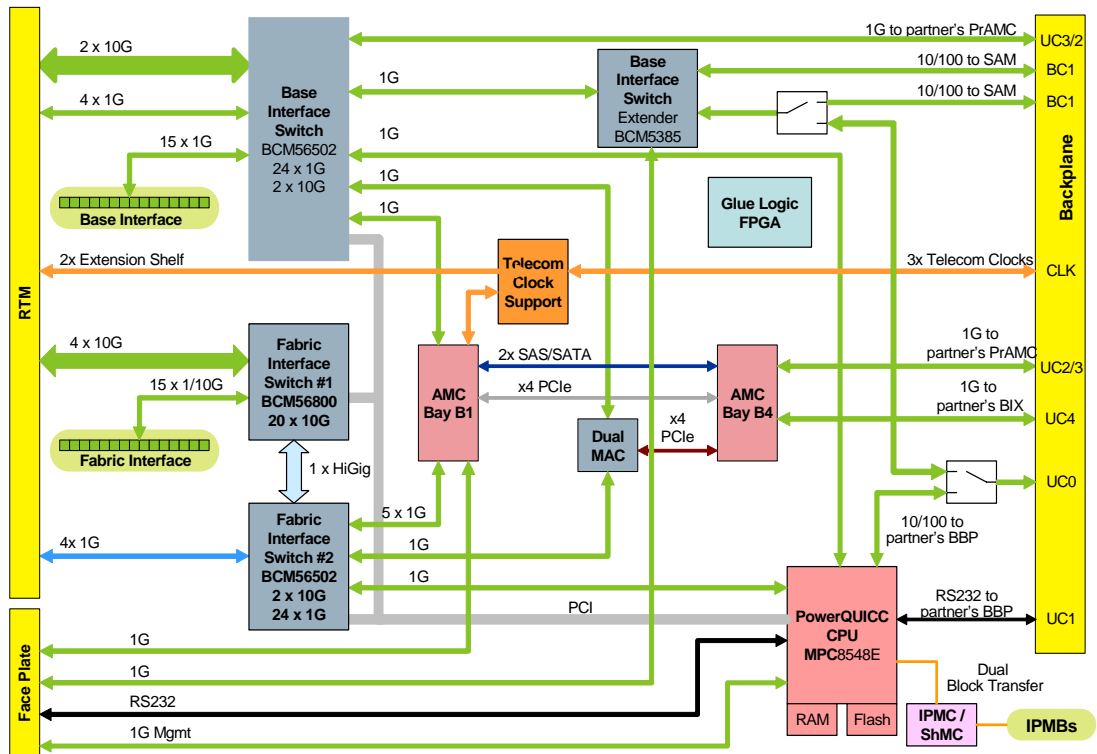
4.3 Central Processing Unit

The blade's Central Processing Unit (CPU) is a MPC8548E PowerQUICC III processor. It supports CPU speeds of 1000 MHz, 1200 MHz and 1333 MHz. On the ATCA-F120, the default CPU speed is 1333 MHz.

The main features of the CPU are as follows:

- On-die L1 cache

- On-die L2 cache

- DDR2 memory controller and interface

- Local bus controller and interface

- DUART

- Programmable interrupt controller

- Two 32-bit/66 MHz PCI buses

- x1 PCI Express interface to RTM

- 4-channel DMA controller

- Four 10/100/1000 GBit Ethernet MACs

- Two I2C controller

- Security engine

- XOR engine

- JTAG interface

- Watchdog (not used on ATCA-F120)

4.4   Main Memory

The memory controller resides inside the MPC8548E PowerQUICC III CPU. The memory bus is 64 bit wide and ECC protected. It connects the CPU to the on-board memory modules. The memory data bus runs at a maximum frequency of 266 MHz providing a total bandwidth of 4.267 GBytes/s.

The ATCA-F120 supports up to 1 GByte of main memory.

4.5   Glue Logic FPGA

The ATCA-F120 provides a Glue Logic FPGA which is used for various purposes. Details are given in the following two subsections.

4.5.1 General Features

The main features of the on-board FPGA are the following:

- Local bus interface
- Local bus decoder
- IPMI Block Transfer Interface between host and IPMC
- Interrupt routing logic
- Reset controller
- Glue logic
- JTAG interface
- SPI interface
- Telecom clocking support
- COM port routing
- Watchdog

During initialization, the FPGA loads its bit stream from one out of two serial PROMs connected to the FPGA. One serial PROM acts as stand-by, the other as active device. During blade production, both serial PROMs are programmed with identical images. You can switch between active and stand-by serial PROM via an IPMI command. For details refer to the *ATCA-F120: Control via IPMI Programmer's Reference -> Section: System Boot Options Commands*.

For information about how to upgrade the FPGA images and how to obtain new FPGA images, consult your local sales representative.

4.5.2 Watchdog

The FPGA contains a watchdog which is enabled by default.

After power-up, the watchdog is served by the U-boot firmware. Once an operating system (OS) has successfully booted, the OS is in charge of serving the watchdog. The OS distributions which are distributed for the ATCA-F120, i.e. in particular the Basic Blade Services software for the ATCA-F120, serve the watchdog by default. On expiry, the watchdog resets the ATCA-F120.

If required, you can switch off the watchdog via an on-board switch. See *Configuring the Blade* for details.

4.6   Boot and User Flashes

The ATCA-F120 is equipped with two boot and two user flash devices.

4.6.1   Boot Flashes

In order to support high availability requirements, the ATCA-F120 is equipped with two redundant boot flash devices, in the following named boot flash #1 and boot flash #2. Both are Intel Strata flash devices which are programmed with identical images during the blade production. Each flash device has a size of 32 MBytes.

The boot flashes contain the U-Boot firmware as well as the Linux kernel images. For details refer to *Memory Map* .

By default, the ATCA-F120 always boots from boot flash #1. The boot flash device from which to boot after the next reset/power cycle can be determined via IPMI and on-board switches. For further information refer to *Configuring the Blade* and the *ATCA-F120: Control via IPMI Programmer's Reference* (section: Supported Commands->Chassis Device Commands->System Boot Options Commands).

4.6.2   User Flashes

The ATCA-F120 is equipped with two user flash devices. Both are standard NAND flash devices which are connected to the local bus of the MPC8548E PowerQUICC III CPU. Each NAND flash has a size of 2 GByte.

In its default configuration, the ATCA-F120 has two redundant root file systems preprogrammed in the NAND flashes. See *Memory Map* for further details.

Via on-board switches you can control the write-protection status of both flashes. By default, both user flash devices are write-enabled. For further details refer to *Configuring the Blade* on

4.7 Fabric Channel Interfaces

The fabric channel interfaces on the ATCA-F120 are implemented via the following two switch devices:

- Broadcom BCM56800

- Broadcom BCM56502

The following table lists the main features of these two switch devices.

*Table 4-1 Main Features of Fabric Channel Interface Switches*

Feature	Broadcom BCM56800	Broadcom BCM56502
Switch Ports	Twenty 10GbE/1GbEthernet ports	Twenty four 1Gb Ethernet ports + two 10GbEthernet ports
Architecture	StrataXGS™	StrataXGS™
Switching capacity	200 Gbps at line rate	196 Gbps at line rate
Service classes	Support for eight classes of service (CoS) per port	Support for eight classes of Service (CoS) plus two additional classes for Flow Control and system management per port
Scheduling mechanism	Support for deficit round robin, weighted round robin and strict priority scheduling	Support for deficit round robin, weighted round robin and strict priority scheduling
Cut-Through switching mode	Supported	Supported
Port trunking and remote mirroring mode	Supported	Supported
Advanced packet flow control	Support for head of line blocking prevention and full-duplex flow control (802.3x)	Support for head of line blocking prevention and full-duplex flow control (802.3x)

Table 4-1 Main Features of Fabric Channel Interface Switches (continued)

Feature	Broadcom BCM56800	Broadcom BCM56502
ContentAware™ network processing per port	Support for: • Line rate multifield packet classification • Supports IEEE 802.1p, TOS/DiffServ, rate limiting, policing priority tagging, and remapping • Extended security and ACL filtering	Support for: • Line rate multifield packet classification • Supports IEEE 802.1p, TOS/DiffServ, rate limiting, policing priority tagging, and remapping • Extended security and ACL filtering
IPv6 Support	Fully supported	Fully supported

The following figure provides an overview of how the Ethernet interfaces of the previously described switch devices are interconnected. A detailed description of the port assignment is given afterward.

Figure 4-2   On-Board Routing of Fabric Interfaces
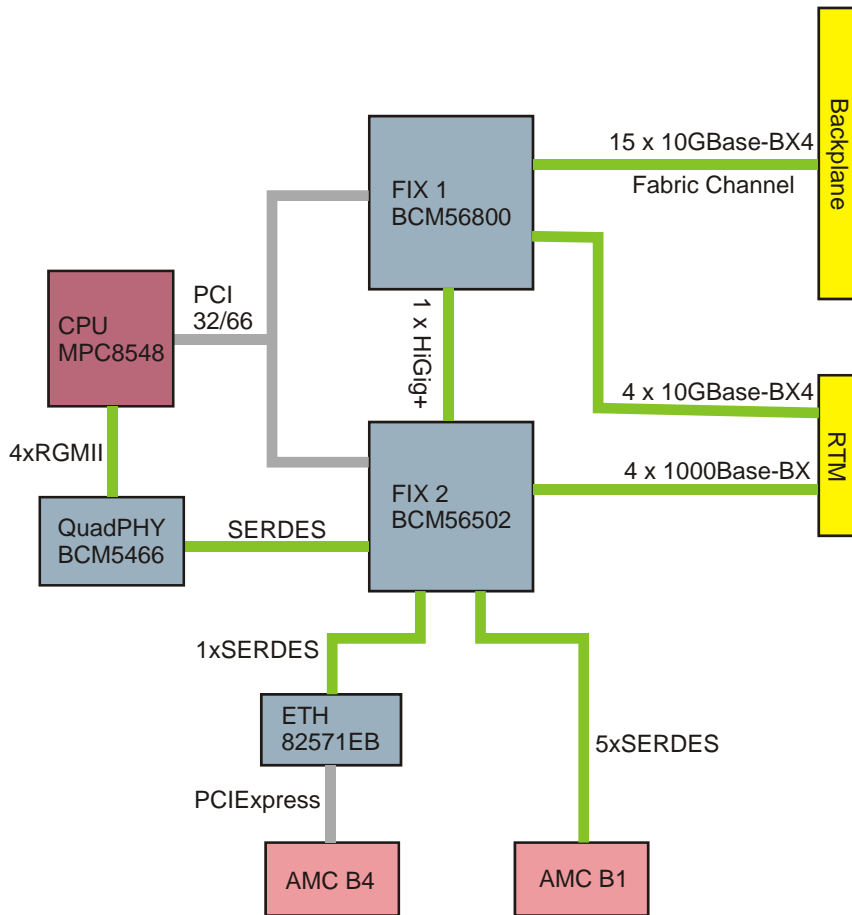
The following table describes the physical Ethernet port assignment of the BCM56800 switch device (FIX1). For information about logical port assignments, switch default configurations, preconfigured VLANs etc, refer to the *Basic Blade Services Software on ATCA-F120 Programmer's Reference*.

Table 4-2 FIX 1 Ethernet Port Assignment

Physical Port	PHY/SERDES	Destination	Interface Type
xe0	SERDES	Fabric Channel 1	10GBase-BX4
xe1	SERDES	Fabric Channel 2	10GBase-BX4
xe2	SERDES	Fabric Channel 3	10GBase-BX4
xe3	SERDES	Fabric Channel 4	10GBase-BX4
xe4	SERDES	Fabric Channel 5	10GBase-BX4
xe5	SERDES	Fabric Channel 6	10GBase-BX4
xe6	SERDES	Fabric Channel 7	10GBase-BX4
xe7	SERDES	Fabric Channel 8	10GBase-BX4
xe8	SERDES	Fabric Channel 9	10GBase-BX4
xe9	SERDES	Fabric Channel 10	10GBase-BX4
xe10	SERDES	Fabric Channel 11	10GBase-BX4
xe11	SERDES	Fabric Channel 12	10GBase-BX4
xe12	SERDES	Fabric Channel 13	10GBase-BX4
xe13	SERDES	Fabric Channel 14	10GBase-BX4
xe14	SERDES	Fabric Channel 15	10GBase-BX4
xe15	SERDES	RTM	10GBase-BX4
xe16	SERDES	RTM	10GBase-BX4
xe17	SERDES	RTM	10GBase-BX4
xe18	SERDES	RTM	10GBase-BX4
hg0	SERDES	FIX 2 Port XG0	HiGig+

The following table describes the physical port assignment of the switch FIX2.

Table 4-3 FIX 2 Ethernet Port Assignment

Physical Port	PHY/SERDES	Destination	Interface Type
hg0	-	FIX 1 Port XG0	HiGig+
hg1	-	Unused	-
ge0	SERDES	CPU	1000Base-BX
ge1	SERDES	Dual MAC device	1000Base-BX
ge2		unused	
ge3		unused	
ge4		unused	
ge5		unused	
ge6		unused	
ge7		unused	
ge8		unused	
ge9		unused	
ge10		unused	
ge11		unused	
ge12		unused	
ge13		unused	
ge14		unused	
ge15	SERDES	AMC Bay B1 Port 11	1000Base-BX
ge16	SERDES	AMC Bay B1 Port 1	1000Base-BX
ge17	SERDES	AMC Bay B 1 Port 8	1000Base-BX
ge18	SERDES	AMC Bay B 1 Port 9	1000Base-BX
ge19	SERDES	AMC Bay B 1 Port 10	1000Base-BX
ge20	SERDES	RTM	1000Base-BX
ge21	SERDES	RTM	1000Base-BX
ge22	SERDES	RTM	1000Base-BX

Table 4-3 FIX 2 Ethernet Port Assignment (continued)

Physical Port	PHY/SERDES	Destination	Interface Type
ge23	SERDES	RTM	1000Base-BX

4.8   Base Channel Interfaces

The ATCA-F120 uses the Broadcom BCM56502 as main switch device for Base Channel interfaces. Since this is the same device that is used for one of the fabric switch devices, you can find the features here: Table "Main Features of Fabric Channel Interface Switches" on page 84.

The following figure provides an overview of how the Base Channel interfaces are routed on-board the ATCA-F120.

Figure 4-3   On-Board Routing of Base Interfaces
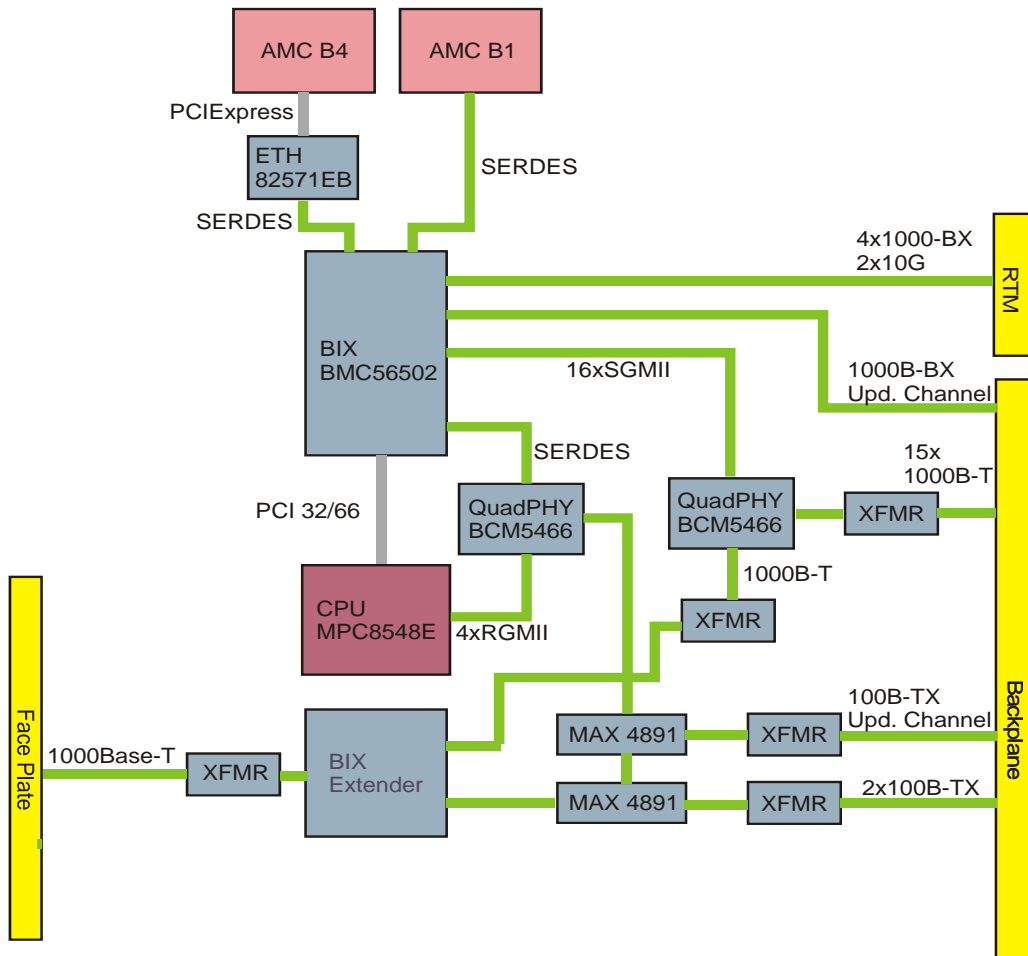
The following table describes how the physical Ethernet ports of the BCM56502 Base Channel switch are assigned. For information about logical port assignments, pre-configured VLANs etc., refer to the *Basic Blade Services Software on ATCA-F120 Programmer's Reference*.

Table 4-4 Base Channel Switch Port Assignment

Physical Port	PHY/SERDES	Destination	Interface Type
ge0	PHY	Base Interface Extender	1000Base-T
ge1	PHY	Base Channel 2	1000Base-T
ge2	PHY	Base Channel 3	1000Base-T
ge3	PHY	Base Channel 4	1000Base-T
ge4	PHY	Base Channel 5	1000Base-T
ge5	PHY	Base Channel 6	1000Base-T
ge6	PHY	Base Channel 7	1000Base-T
ge7	PHY	Base Channel 8	1000Base-T
ge8	PHY	Base Channel 9	1000Base-T
ge9	PHY	Base Channel 10	1000Base-T
ge10	PHY	Base Channel 11	1000Base-T
ge11	PHY	Base Channel 12	1000Base-T
ge12	PHY	Base Channel 13	1000Base-T
ge13	PHY	Base Channel 14	1000Base-T
ge14	PHY	Base Channel 15	1000Base-T
ge15	PHY	Base Channel 16	1000Base-T
ge16	SERDES	RTM	SGMII
ge17	SERDES	RTM	SGMII
ge18	SERDES	RTM	SGMII
ge19	SERDES	RTM	SGMII
ge20	SERDES	AMC in Bay B1 Port 0	SERDES
ge21	SERDES	CPU MPC8548E	SERDES
ge22	SERDES	Dual MAC Ethernet device	SERDES

Table 4-4 Base Channel Switch Port Assignment (continued)

Physical Port	PHY/SERDES	Destination	Interface Type
ge23	SERDES	Base interface update channel	1000Base-T
xe0	SERDES	RTM	XAUI
xe1	SERDES	RTM	XAUI

4.9 Base Interface Extension

The ATCA-F120 provides an additional switch device: the Broadcom BCM5385. It is connected to the previously described BCM56502 devices and is used to provide additional Ethernet interfaces.

4.9.1 Port Assignment

The following table shows how the Ethernet ports of the BCM5385 device are assigned.

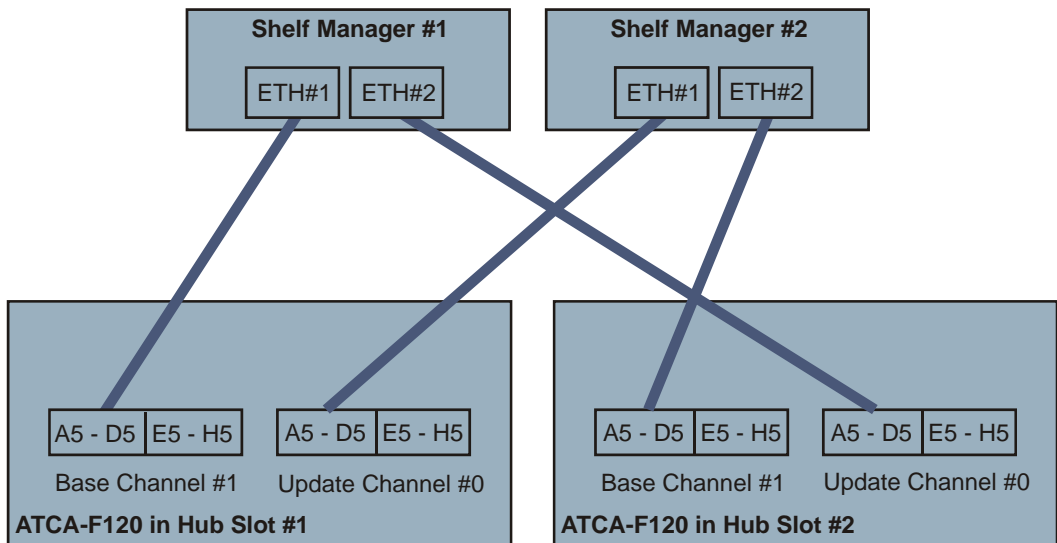*Table 4-5 Base Interface Extension - Port Assignment*

Port	Destination	Interface Type
1	Base Interface Channel #1 Port 0	100Base-TX
2	Base Interface Channel #1 Port 1 or Update Channel #0. See *Shelf Manager Cross Connection* on page 92 for further details.	100Base-TX
3	Broadcom BCM56502, physical port ge0	1000Base-T
4	Face Plate	1000Base-TX
5	not connected	-

4.9.2 Shelf Manager Cross Connection

The ATCA-F120 provides two different options for the interconnection of the shelf managers (ShM) in a system. The selection between these two options is done via an on-board configuration switch and via an OEM IPMI command, where the OEM IPMI command overrides the on-board switch if both settings are different. Refer to section *Configuring the Blade* on page 42 and the *ATCA-F120: Control via IPMI Programmer's Reference* for further details.

One configuration supports the use of the Update Channel interface for the connection to the shelf managers. This type of interconnection is used in Centellis 4620 and Centellis 4000 systems. When this option is selected, one shelf manager is connected via Base Channel Port 1, and the second via the Update Channel Port 0. The following figure illustrates this interconnection option.

Figure 4-4   Shelf Manager Cross Connection via Update Channel

```
   Shelf Manager #1              Shelf Manager #2

   ETH#1   ETH#2                 ETH#1   ETH#2


A5 - D5  E5 - H5   A5 - D5  E5 - H5     A5 - D5  E5 - H5   A5 - D5  E5 - H5
Base Channel #1    Update Channel #0    Base Channel #1    Update Channel #0
ATCA-F120 in Hub Slot #1                ATCA-F120 in Hub Slot #2
```

Alternatively, port 0 and 1 of Base Channel Interface #1 are used to connect to the two shelf managers in a system. This type of shelf manager interconnection is compliant to the PICMG 3.0 R2.0 ECN 3.0-2.0-001 standard and is used in Centellis 4100 systems.

At the same time, port 0 of the Update channel is used for a connection to the CPU of the partner ATCA-F120 in the system. The following figure illustrates this configuration.

Figure 4-5   Shelf Manager Cross Connection via Base Channel
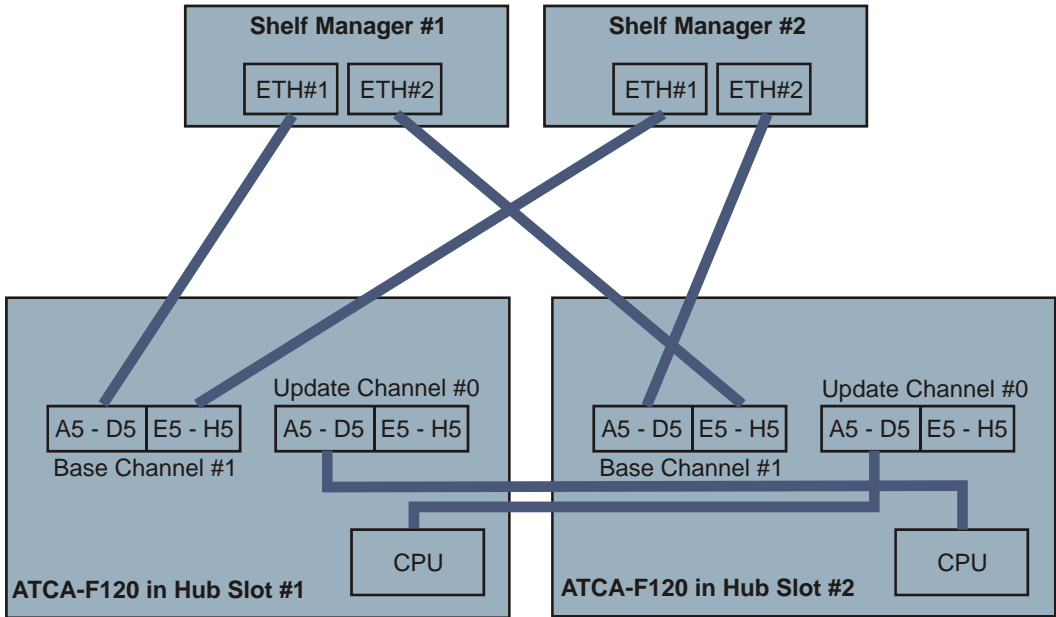
4.10   Intelligent Peripheral Management Controller

The blade provides an Intelligent Peripheral Management Controller (IPMC) unit based on three Atmel ATmega AVR micro controllers. One micro controller, the Atmega2561V serves as IPMC Master Controller (IMC) and provides an on-board flash memory of 256 KBytes. The remaining two micro controllers, both are Atmega168L devices, serve as IPMC Slave Controllers (ISC) and provide an on-board memory flash memory of 168 kBytes each. Both are referred to as ISC0 and ISC1.

An installed RTM furthermore provides an Mezzanine Management Controller (MMC) which is connected to the IPMC through an IPMB-L bus. The MMC contains an Atmega 128L micro controller. For details about the MMC refer to the documentation delivered with the respective RTM.

The IPMC is fully compliant to the IPMI V1.5 standard and provides the following interfaces:

- IPMB0A and IPMB0B available via the backplane

- IPMB-L connected to rear transition module and the two AMC bays on-board

- I2C interface connected to on-board PMC slot and sensors

- Analog-to-Digital Conversion (ADC) interfaces connected to on-board sensors

- Digital I/O interfaces connected to on-board sensors

- Watchdog

One of the main tasks of the IPMC is to control the power up and power down of the blade. For this purpose the IPMC is connected to the on-board power supply module via control and status lines. Various on-board IPMI sensors provide detailed information on the current power status of the blade to any interested party connected to the IPMI network.

The following figure gives an overview of the IPMI structure used on-board.

Figure 4-6   IPMI Structure
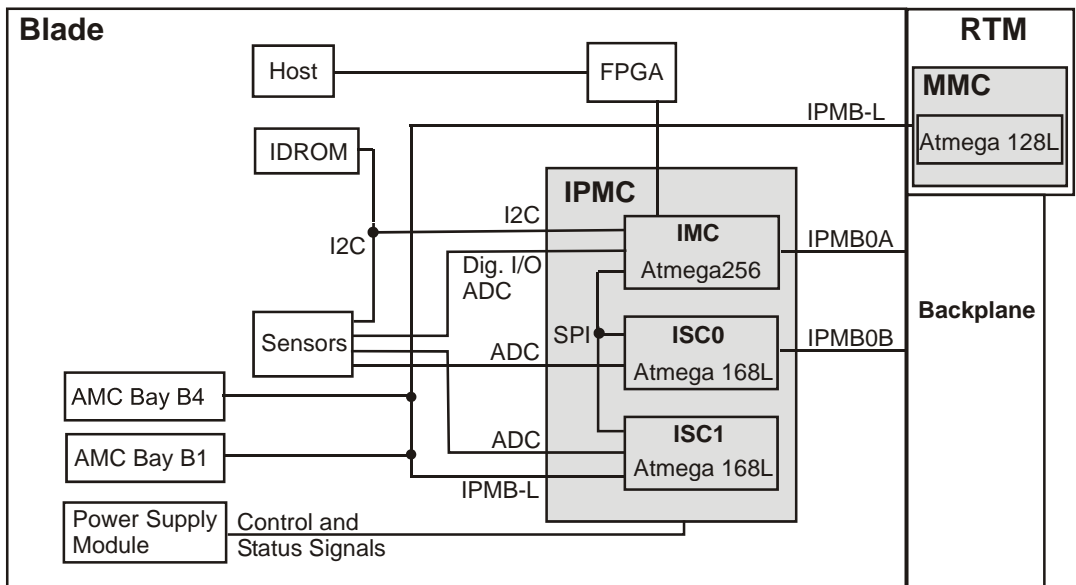
The IMC, ISC0, ISC1 and the micro controller of the MMC provide each on-board memory which can be accessed externally, for example via the BBS software. Three different memory types are used to store different types of data. The following table provides details.

Table 4-6 On-Board Memory of IMC, ISC0/1 and MMC

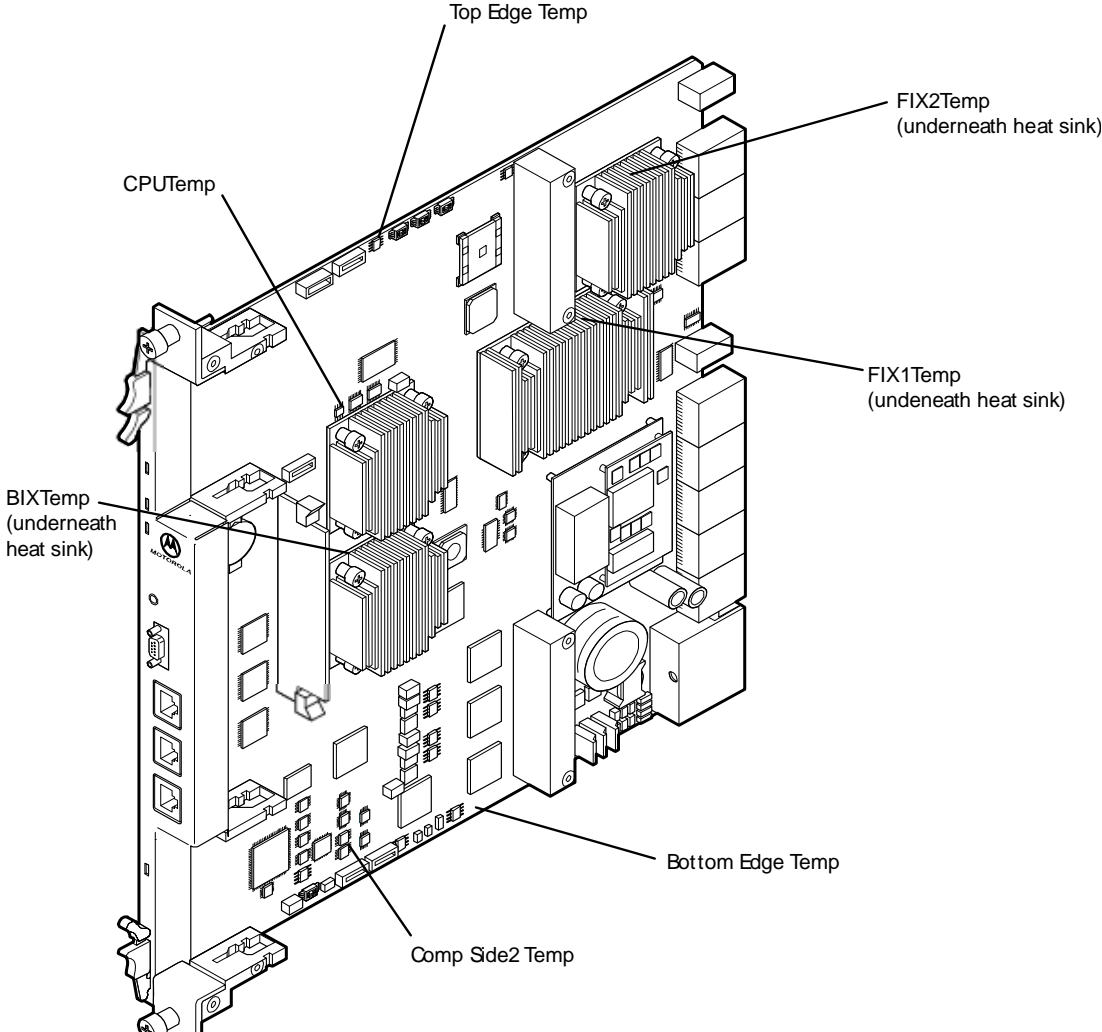| Data Type	Memory Type
Firmware	Flash and EEPROM (both are accessible externally, for example via BBS)
Temporary data	SRAM

The IPMI provides a two-channel BT interface towards the host CPU. The 64-byte FIFO of the BT interface resides in the Glue Logic FPGA. The first channel is used for standard operation between CPU and IPMC. The second channel is used for system-critical events to bypass the first channel.

For details about supported IPMI commands as well as Sensor Data Records (SDRs) and Field Replaceable Unit (FRU) information provided by the IPMC, refer to the *ATCA-F120: Control via IPMI Programmer's Reference*.

4.10.1   Sensors

The blade provides various sensors which are accessible via IPMI. Some of these sensors measure on-board temperatures. Their names and locations are shown in the following figure.

Figure 4-7   Location of IPMI Temperature Sensors

Top Edge Temp

FIX2Temp
(underneath heat sink)

CPUTemp

FIX1Temp
(undeneath heat sink)

BIXTemp
(underneath
heat sink)

Bottom Edge Temp

Comp Side2 Temp

Other sensors available on-board include voltage sensors and sensors which provide particular status information. A summary of all sensors is given in the following table. For detailed descriptions refer to the *ATCA-F120: Control via IPMI Programmer's Reference*.

Table 4-7 IPMI Sensors Overview

Sensor Name	Sensor Type	Availability
-48V FEED A	Voltage	Always
-48V FEED B	Voltage	Always
1.0V FIX1	Voltage	While payload powered
1.1V CPU	Voltage	While payload powered
1.25V BIX	Voltage	While payload powered
1.25V FIX2	Voltage	While payload powered
1.2V Base	Voltage	While payload powered
1.8V Base	Voltage	While payload powered
1.8V CPU	Voltage	While payload powered
12V Primary	Voltage	While payload powered
2.5V	Voltage	While payload powered
3.3V MAC	Voltage	Always
3.3V Mgmt AMC B1	Voltage	Always
3.3V Mgmt AMC B4	Voltage	Always
3.3V Mgmt RTM	Voltage	Always
3.3V Payload	Voltage	While payload powered
BIX Temp	Temperature	Always
Boot Error	Boot Error	Always
Bottom Edge Temp	Temperature	Always
CPU Temp	Temperature	Always
Comp Side2 Temp	Temperature	Always
Ejector State	Button / Switch	Always
F120 Active Boot	Emerson-specific Discrete Digital	Always

Table 4-7 IPMI Sensors Overview (continued)

Sensor Name	Sensor Type	Availability
F120 CPLD Code	Emerson-specific Discrete Digital	Always
F120 CPLD Vers.	Emerson Firmware Revision	While payload powered
F120 FPGA Vers.	Emerson Firmware Revision	Always
F120 HotSwap	PICMG 3.0: FRU HotSwap	Always
F120 IPMB0 State	PICMG 3.0: IPMB Physical Link	Always
F120 IPMC	Emerson IPMC Status	Always
F120 Watchdog	Watchdog 2	Always
FIX1 Temp	Temperature	Always
FIX2 Temp	Temperature	Always
HotSwap AMC B1	PICMG 3.0: FRU HotSwap	Always
HotSwap AMC B4	PICMG 3.0: FRU HotSwap	Always
HotSwap F120 RTM	PICMG 3.0: FRU HotSwap	Always
OS Boot	OS Boot	While payload powered
Payload Power	Current	Always
SYS FW PROGRESS	System Firmware Progress	While payload powered
Top Edge Temp	Temperature	Always

4.10.2   Available IPMI Drivers

An IPMI driver is included in the Linux distribution available for the blade.

4.10.3   Watchdog

The IPMC contains two watchdogs.

One watchdog is implemented in the IPMC hardware and supervises the operation of the IPMC itself. This watchdog is not configurable and is permanently enabled.

The second watchdog is implemented in the IPMC firmware. It is configured via IPMI commands and controls the operation of the blade's payload. Your software may enable/disable and configure the watchdog at any time using IPMI commands. For details, refer to the IPMI V. 1.5 specification. By default the watchdog is disabled.

U-Boot Firmware

5.1   Overview

The ATCA-F120 uses the boot loader software U-Boot (current version V1.1.6). U-Boot is open source software based on a GPL license model and is the first software to be executed on the ATCA-F120 after powering up the blade. It is stored in the boot flashes and its main functions are:

- Initialize the hardware

- Pass boot parameters to the Linux kernel

- Starting the Linux kernel

- Update Linux kernel and U-boot images

The following sections describe U-Boot features and procedures which are specific to the ATCA-F120. For general information about U-Boot, refer to the following website:
http://www.denx.de/wiki/UBoot/WebHome.

5.2   Accessing U-Boot via the Serial Console

Procedure

You can access U-boot via the serial interface connector at the face plate of the ATCA-F120. For this purpose you need a computer, such as a laptop, with a terminal emulation software such as HyperTerm running on it. Furthermore, this computer must have a serial interface connector. The detailed access procedure is given in the following.

1. Connect the serial interface connector of the ATCA-F120 with the serial interface connector of your computer.

2. Configure your terminal software to use the access parameters that are specified in U-Boot. By default, the access parameters are as follows:
Baud rate: 9600
Flow control: XON/XOFF
PC ANSI
8 data bits
No parity

1 stop bit

These serial access parameters are the default values. They can be changed from within U-boot. For details refer to the U-boot documentation.

3. Boot the ATCA-F120 by resetting it or powering it up.

4. Press any key when you see the following message followed by a number counting down on the screen: `Hit any key to stop autoboot`
   After pressing a key, U-Boot will abort the boot sequence and enter into a command line interface mode.
   If you want to disable the auto-boot feature of U-boot and thus make sure that U-boots directly enters into the command line interface mode after the next reboot/power up, enter the following command:
   `setenv bootdelay -1`
   `saveenv`

5.3 Selecting Boot Options

This section describes how to configure U-boot for different boot options.

5.3.1   Configuring U-Boot for Network Boot

Procedure

This procedure describes how to configure U-Boot to boot Linux from network. In this mode, U-Boot downloads and boots the Linux kernel from an external TFTP server and mounts a root file system located on a connected network server. For the connection to the root file system, U-Boot uses the Network File Service (NFS) protocol. The procedure assumes that the ATCA-F120 has network access to a TFTP server which contains the Linux kernel image. Furthermore it is assumed that the U-Boot command `nfsboot` has been previously been defined. Refer to the U-Boot documentation for details.

> The external TFTP server must be connected via the ATCA-F120 face plate connector "BBP ETH", which is the Ethernet management interface. Any other interfaces, such as base or fabric interfaces, are not yet functional at this stage of the boot phase, as the corresponding drivers are not initialized yet.

1. Connect to U-boot as described in *Accessing U-Boot via the Serial Console* on page 101

2. Specify the IP address of the ATCA-F120 itself and of the TFTP server which contains the Linux kernel image by entering the following U-Boot commands:
    ```
    setenv ipaddr <IP address of ATCA-F120>
    setenv serverip <IP address of TFTP server>
    ```

3. Specify the names of the Linux kernel image and of the NFS root directory.
    ```
    setenv bootfile <Linux kernel image file name>
    setenv rootpath <NFS root directory>
    ```

4. Configure U-boot to use NFS boot .
    ```
    setenv bootcmd $nfsboot
    ```

5. Depending on your network configuration, you may have to specify a gateway IP address as well as a netmask. To do so, use the following commands:
    ```
    setenv gatewyip <gateway IP>
    setenv netmask <netmask>
    ```

6. Make all previously done configurations persistent by entering:

```
saveenv
```

7. Boot Linux by entering:
```
boot
```

5.3.2   Configuring U-Boot to Boot from RAM Disk

You can configure U-Boot to boot from a RAM disk. In order to do this, proceed as follows.

Procedure

If you have the Linux kernel and a root file system available as a RAM disk image, then you may want to boot from that RAM disk. In order to configure U-Boot accordingly, proceed as follows. It is assumed that the RAM disk image is stored on an external TFTP server which is connected to the ATCA-F120. During each boot process, the RAM disk image will be downloaded from the TFTP server into the main memory of the ATCA-F120. Furthermore it is assumed that the U-Boot command `ramboot` has previously been defined. Refer to the U-Boot documentation for details.

> The external TFTP server must be connected via the ATCA-F120 face plate connector "BBP ETH", which is the Ethernet management interface. Any other interfaces, such as base or fabric interfaces, are not yet functional at this stage of the boot phase, as the corresponding drivers are not initialized yet.

1. Connect to U-boot as described in *Accessing U-Boot via the Serial Console* on page 101.

2. Specify the IP address of the ATCA-F120 itself and of the TFTP server which contains the RAM disk image file by entering the following U-Boot commands:.
```
setenv ipaddr <IP address of ATCA-F120>
setenv serverip <IP address of TFTP server>
```

3. Depending on your network configuration, you may have to specify a gateway IP address as well as a netmask. To do so, use the following commands:
```
setenv gatewyip <gateway IP>
setenv netmask <netmask>
```

4. Specify the name of the RAM disk image file
   setenv ramdiskfile <filename>

5. Configure U-Boot to boot from RAM disk
   setenv bootcmd run $ramboot

6. Specify the name of the kernel image file
   setenv bootfile <filename>

7. Make all previously done configurations persistent.
   saveenv

8. Boot Linux by entering:
   boot

5.3.3   Configuring U-Boot to Boot from Flash

The ATCA-F120 provides two redundant boot flashes which contain the U-boot images and also Linux kernel images. It also provides two redundant user flashes which contain two redundant root file systems. The user flashes are NAND flash devices. See also Table "Linux Devices" on page 110 for details.

This section describes how to configure U-boot to boot a Linux kernel stored in the boot flash and to mount the root file system in the user flash. The procedure uses the U-Boot script `flashboot` which has been predefined by Emerson.

Procedure

In order to configure U-boot to boot the Linux kernel from the on-board boot flash, proceed as follows.

1. Connect to U-boot as described in *Accessing U-Boot via the Serial Console* on page 101.

2. Configure U-boot to persistently boot from flash, i.e. make the configuration persistent.
   setenv bootcmd run $flashboot

3. Depending on your system configuration, you may want to specify network parameters as follows:

```
setenv serverip <IP address>
setenv serverip <IP address>
setenv netmask <netmask>
setenv gatewayip <IP address>
```

4. Make all previously done configurations persistent by entering:
   saveenv

5. Boot Linux by entering:
   boot

5.4   Selecting the Boot Flashes

There are two ways to select the boot flashes and thus determine which flash the ATCA-F120 is to boot from during the next restart:

- Via IPMI

- Via an U-Boot command

One way to switch between the two boot flashes and thus determine which boot flash the ATCA-F120 is to boot from, is via IPMI using the System Boot Options feature. Refer to the *ATCA-F120: Control via IPMI Programmer's Reference* for details.

Alternatively, you can use the U-Boot command `bootsel`. Its usage is: `bootsel 0|1|switch`, where `0` selects boot flash 0, `1` selects boot flash 1 and `switch` selects the currently stand-by boot flash.

Generally, there is a fixed link between the U-Boot firmware and the kernel image in the respective boot flash. This means that when the U-Boot in a particular flash is executed, it will subsequently boot the kernel image in the same flash.

If necessary, however, you can select the kernel to boot manually via the following commands: **setenv kerneladdr fe020000** (for the kernel in the currently active boot flash) and **setenv kerneladdr fc020000** (for the kernel in the currently stand-by boot flash). Use these commands with care.

Use the environment variable `mtdroot` to select the Linux device (NAND flash) which holds the desired root file system. By default, the device is `/dev/mtdblock:`, i.e. by default the root file system in NAND flash #1 is used. The device corresponding to the NAND flash #2 is called `/dev/mtdblock;`.

> **Each of the two U-Boot firmware images in the two flashes holds a separate set of U-Boot environmental variables/boot parameters. Therefore, after switching to another boot flash, you may need to reconfigure the boot parameters/environmental variables of the new U-Boot image according to your needs.**

5.5 Using the Persistent Memory Feature

Persistent memory means that the memory RAM is not deleted during a reset, i.e. it still contains the content it had before the reset. The only way to delete the memory content is via a power cycle, i.e. by temporarily removing the power and then power up the blade again. The persistent memory feature is enabled by default on the ATCA-F120.

The persistent memory feature can be useful in many situations. Two examples are:

● Analyze kernel logs after a Linux kernel panic

● Define a particular memory region for the persistent storage of application specific data

Analyzing Kernel Log Files after a Kernel Panic

If the Linux OS running on your ATCA-F120 indicates a kernel panic and you wish to analyze the cause of it, then you can issue a reset (via the face plate button for example) and subsequently analyze kernel log files. Because of the persistent memory feature, these log files are still available in the memory. In order to analyze the kernel log files, proceed as follows.

1. Issue a reset

2. Connect to U-Boot as described in *Accessing U-Boot via the Serial Console* on page 101

3. Enter the following command to obtain memory addresses of kernel log files
   `.locate_kernel_log (1)`
   The memory addresses of any found kernel log files will be displayed.

---

4. To display the kernel logfile at any of these memory addresses, enter the following command:

```
.printf (<memory address>)
```

Another scenario where the persistent memory feature might be useful, is the definition of a persistent memory region which you can use for the storage of application-specific data. In order to define such a memory region, you may want to use the standard U-Boot variable `pram`. It allows to reserve a memory region (at the end of the physical memory) which is not overwritten by U-Boot. Furthermore, U-Boot will report less memory to the Linux kernel (via the `mem` parameter) so that Linux will not use it either. Refer to the U-boot documentation for further details.

5.6 Memory Map

The following table shows the physical address map of the ATCA-F120.

Table 5-1 Physical Address Map

Device	Start Address	Size
DDR2-RAM	0x00000000	Max. 2 GByte
MPC8548E CPU	0xE0000000	64 KBytes
FPGA	0xF2000000	64 KBytes
User (NAND) flash 1, bank 1 (control registers)	0xF4000000	64 KBytes
User (NAND) flash 1, bank 2 (control register)	0xF4100000	64 KBytes
User (NAND) flash 2, bank 1 (control registers)	0xF5000000	64 KBytes
User (NAND) flash 2, bank 2 (control registers)	0xF5100000	64 KBytes
Stand-by boot flash	0xFC000000	32 MBytes
Active boot flash	0xFE000000	32 MBytes

Regardless which of the two boot flashes is selected as the currently active boot device (via IPMI), its start address is always mapped to 0xFE000000.

5.7   Linux Devices

The following table lists all predefined Linux character devices and the respective memory blocks which they are assigned to.

Table 5-2 Linux Devices

Linux Device Name	Content	Memory Area	Hardware Device
/dev/mtd0	U-Boot boot parameters	0xFE000000 - 0xFE01FFFF	Active boot flash
/dev/mtd1	Kernel image	0xFE020000 - 0xFE51FFFF	Active boot flash
/dev/mtd2	Empty	0xFE052000 - 0xFFF7FFFF	Active boot flash
/dev/mtd3	U-boot image	0xFFF80000 - 0xFFFFFFFF	Active boot flash
/dev/mtd4	-combined-	0xFE000000 - 0xFFFFFFFF	Active boot flash
/dev/mtd5	U-Boot boot parameters	0xFC000000 - 0xFC01FFFF	Stand-by boot flash
/dev/mtd6	Kernel image	0xFC020000 - 0xFC51FFFF	Stand-by boot flash
/dev/mtd7	Empty	0xFC052000 - 0xFD7FFFFF	Stand-by boot flash
/dev/mtd8	U-Boot image	0xFDF80000 - 0xFDFFFFFF	Stand-by boot flash
/dev/mtd9	-combined-	0xFE000000 - 0xFFFFFFFF	Stand-by boot flash
/dev/mtd10 /dev/mtdblock: (device name used by Linux kernel for booting)	NAND flash # 1	n.a.	NAND flash # 1
/dev/mtd11 /dev/mtdblock; (device name used by Linux kernel for booting)	NAND flash # 2	n.a.	NAND flash # 2

Table 5-2 Linux Devices (continued)

Linux Device Name	Content	Memory Area	Hardware Device
/dev/mtd12	/tftpboot partition	-	-

5.8   Power-On Self Test

When the ATCA-F120 is booted, U-boot executes a series of Power-On Self test (POST) routines. They check the functionality of different controllers and other on-board resources. The result of the POST is stored in memory and has the following format.

Table 5-3 POST Result Format

Offset	Description
0x0	Magic word: 0xAA55FCE0
0x04	CRC32 checksum over the POST result string

0x08	POST result string.
	
	 This is a zero-terminated string which is based on the following XML-like syntax:
	
	 `[<T=tag>[<E>Error_description</E>]*</T>]*`
	
	 `tag` identifies the device that was tested. If no POST error was detected, then the closing tag `</T>` follows immediately after the opening tag.
	
	 `Error_Description` contains an error description of the corresponding <T> tag. Note that the <T> tags can be nested, if for example several subtests are performed in one device. See the following example.
	
	 `<T=FPGA></T>`
	 `<T=DRAM><E>Address line</E></T>`
	 `<T=PCI><T=BIX></T><T=FIX2></T><T=FIX1></T></T>`
	 `<T=SPI><T=BEXT></T></T>`
	 `<T=I2C><T=CTRL1></T><T=CTRL2></T></T>`
	 `<T=MDIO><T=PHY0></T><T=PHY1></T><T=PHY2></T><T=PHY3></T></T>`

The results of POST are also stored in the environment variable `post_result`.

Furthermore, information about the POST status can be obtained by reading the SYS FW PROGRESS IPMI sensor. Depending on the POST status, this sensor holds the following values.

Table 5-4 Post Results in SYS FW PROGRESS IPMI Sensor Reading Data

Value	Description
0x01	No memory detected
0x02	Memory error. The address and data line test failed.
0x0b	U-boot image CRC mismatch detected
0x0D	Wrong CPU speed.
0xfd	Emerson specific POST error code. Further information is provided in the event data byte 3 (see Table "SYS FW PROGRESS IPMI Sensor - POST Error Event Codes" on page 112)
0x00	One of the remaining POST errors was detected.

Table 5-5 SYS FW PROGRESS IPMI Sensor - POST Error Event Codes

Event Data (Byte 3)	Description
0x1E	Error accessing the switch devices
0x03	Error in network loop back test
0x20	Error in network PHY test
0x1F	Error in glue logic (FPGA) test
0x0A	Error in I2C bus test
0x16	Error in RTC test
0x09	Error in flash test
0x21	Error in CPU test
0x22	Error in PCI bus test

5.8.1 POST Routines

The following table describes in detail which POST routines are performed.

Table 5-6 POST Routines

Device	Description
CPU	Check PLL configuration (PORPLLSR register). Check device configuration (PORDEVSR register)
FPGA	Register sanity check. The version code is checked. It must not be 0x00 or 0xFF.
DRAM	Address line and data-line test.
Switch devices	The PCI interface is checked as follows: ● Check for configuration space access (vendor/device ID) ● Perform walking-one test on first memory-mapped register
Base interface extender/SPI	Data test on LED register page 0, offset 0x12
I2C buses	Check whether bus addresses 0x31, 0x44, 0x46, 0x47, 0x50, 0x51 are accessible on bus 0 and 0x50, 0x70 on bus 1.
RTC	Checks whether the second counter is advancing. Compares the number of CPU ticks in one second against the expected system clock frequency (66 MHz)
MDIO/PHY	Attempts to read model and device ID from PHY address 0..3
TSEC network port	The PHY for each TSEC port is configured to loop back mode, 100 and 1000 MBPS, and 10000 loop back packets are sent and verified.
Boot flash	Flash devices are sent into CFI query mode and the query string is verified.
User (NAND) flash	Check connectivity of NAND flash devices.
RTM	Check connectivity of 10G repeater devices on RTM

5.8.2   Controlling the Execution of the POST

The environment variable `post_control` allows to configure when POST is executed. Possible values of `post_control` and their meaning are described in the following table.

Table 5-7 Environment Variable post_control

Value	Description
`never`	Disables POST altogether.
`always`	POST is executed after all types of blade resets.
`hard`	POST is executed only after hard resets. A hard reset is a reset of the entire payload and can be issued by the following reset sources: ● Watchdog inside CPU ● Boot sequence failure ● Software ● Face plate reset key A hard reset is NOT an CPU internal reset, such as a reset issued via the U-Boot command `reset` or the Linux command `reboot`.

You can start the POST execution manually by invoking the following command at the U-Boot command line interface: **`.post_all()`**

As you can see from the syntax, this command invokes an underlying C function which starts the POST execution. This command can be invoked at any time and it is independent of the environment variable `post_enable`.

5.9   ATCA-F120 Specific U-Boot Commands

The following table lists ATCA-F120 specific U-boot commands.

Table 5-8 ATCA-F120 Specific U-Boot Commands

Command	Description
`bparams_set`	Allows to configure IPMI system boot options
`hreset`	Issues a hard reset on the ATCA-F120. A hard reset resets the entire payload.

Table 5-8 ATCA-F120 Specific U-Boot Commands (continued)

Command	Description
`bootsel 0|1|switch`	Selects the boot flash which the ATCA-F120 is to boot from after the next restart. `0` selects boot flash 0, `1` selects boot flash 1, and `switch` selects the currently not selected boot flash, i.e. switches between the boot flashes.

5.10 ATCA-F120-Specific U-Boot Environment Variables

The following table lists ATCA-F120 specific U-Boot environment variables.

Table 5-9 ATCA-F120 Specific U-Boot Environment Variables

Environment Variable	Description
`post_control`	See
`phy_localloop`	Can be set to 10/100/1000 to configure a ETSEC port into PHY local loopback mode
`firmware_build`	Firmware-build count. (read-only)
`inicmd`	Can be used to define a command sequence to be executed at the end of the boot sequence, i.e. before the shell or bootcmd are executed.
`noboot`	When set to 1, the boot sequence is stopped before control is transferred to the Linux operating system. and the boot parameters are printed on the screen.
`drvargs`	Contains blade-specific values for the Linux kernel command line. It should be part of the `bootargs` environment variable.
`disable_of_auto`	Normally the execution interface to the Linux kernel is the one for the "powerpc" architecture, i.e. the pointer to the OpenFirmware tree is passed to the kernel. disable_of_auto is a string (or a set of strings) against which the name of the executed kernel image is compared; if a match is found, the execution interface is switched to traditional "ppc" (board info, inited start, initrd end, ...). Note that the "ppc" interface can be enforced by defining "disable_of".

Table 5-9 ATCA-F120 Specific U-Boot Environment Variables (continued)

Environment Variable	Description
reset_cause	Indicates the reason for the last reset. Possible values are: ● `warm`: CPU reset ● `power`: Power-on ● `frpl_pb`: Face plate push button ● `rtm_pb`: RTM push button) ● `cpu_hreset`: CPU HRESET_REQ ● `cop_hreset`: COP HRESET ● `ipmc`: IPMC reset request ● `sw_wdog`: Software watchdog reset ● `ini_wdog`: Initial watchdog reset
post_result	Contains the POST result string, if POST has been executed.
post_result_adrs	Address where the POST result string is copied to immediately before executing the operating system.
mtdroot	When using the "flashboot" boot parameter this specifies what mtd device is to be used as root device (default is "/dev/mtdblock:").
rom_corruption	Set to 1 if the CRC of the u-boot image is incorrect.

5.11 Updating U-Boot

Procedure

This procedure describes how you can update U-Boot via the U-Boot command line interface. It is assumed that the new U-Boot image is placed in the download directory of a TFTP server which has network access to the ATCA-F120. All shown files names and IP addresses were only chosen for illustration purposes. The described procedure consists of updating the stand-by boot flash and then switching the boot flashes, so that after the next reset/boot flash the ATCA-F120 boots from the new active, previously updated boot flash.

> **We recommend to update the U-boot firmware via BBS/Linux or via the shelf manager. Refer to the respective documentation for further details.**
>
> **When updating the U-Boot image, the U-Boot boot parameters are not updated. They remain as they were before the update. The boot parameters are stored separately from the U-Boot image in a memory area within each boot flash. See also Table "Linux Devices" on page 110.**
>
> **Each of the two U-Boot firmware images in the two flashes holds a separate set of U-Boot environmental variables/boot parameters. Therefore, after switching to another boot flash, you may need to reconfigure the boot parameters/environmental variables of the new U-Boot image according to your needs.**

1. Connect to U-boot as described in *Accessing U-Boot via the Serial Console* on page 101

2. Specify the IP address of the ATCA-F120 itself and of the TFTP server which contains the U-boot image by entering the following U-Boot commands:
   ```
   setenv ipaddr <IP address of ATCA-F120>
   setenv serverip <IP address of TFTP server>
   ```

3. Depending on your network configuration, you may have to specify a gateway IP address as well as a netmask. To do so, use the following commands:
   ```
   setenv gatewyip <gateway IP>
   setenv netmask <netmask>
   ```

4. Load the image to the RAM.

```
tftpboot $loadaddr <U-boot file name, for example: u-boot-
1.1.6-59.bin>

Speed: 1000, full duplex
Using eTSEC0 device
TFTP from server 172.16.128.254; our IP address is 172.16.13.2
Filename 'u-boot-1.1.6-59.rom'.
Load address: 0x300000
Loading:
#################################################################
        ###################################
done
Bytes transferred = 524288 (80000 hex)
```

5. Unprotect the currently stand-by U-Boot bank.

protect off 2:252-258

```
Un-Protect Flash Sectors 252-258 in Bank # 1
....... done
```

protect off 2:252-258 addresses to the currently stand-by U-Boot bank, while **protect off 1:252-258** addresses the currently active U-Boot bank.

6. Erase the following flash area in the currently stand-by U-Boot bank.

erase fdf80000 fdffffff

```
........ done
Erased 7 sectors
```

The currently stand-by U-boot bank is always mapped to the start address 0xFD000000, while the currently active U-boot bank is always mapped to 0xFE000000.

If you wish to set a particular U-boot bank into the active state, then you need to set the System Boot Options Parameter #96 (bit 0) appropriately and reboot. If this bit is set to 0, then U-boot bank 1 will be active after the next reboot. If the bit is set to 1, then U-boot bank 2 will be active. Note that depending on the blade's IPMI firmware version, the switch between the U-boot banks may be effective immediately.

7. Copy the image from the RAM to the currently stand-by U-boot bank.
   cp.b $loadaddr fdf80000 80000

   ```
   Copy to Flash...
   done
   ```

8. Make stand-by U-boot active and vice versa, by entering the following command:
   bootsel switch

9. In order to boot the new U-Boot, reset the blade.

Related Documentation

A.1 Emerson Network Power - Embedded Computing Documents

The Emerson Network Power - Embedded Computing publications listed below are referenced in this manual. You can obtain electronic copies of these publications by contacting your local Emerson sales office or by visiting the following web site:
www.emersonnetworkpower.com/embeddedcomputing -> Resource Center -> Technical Documentation Search. This site provides the most up-to-date copies of Emerson Network Power - Embedded Computing product documentation.

> **Check the Emerson website or consult your local Emerson sales representative for release notes or errata sheets that may be applicable to the ATCA-F120 , RTM-ATCA-F120C or RTM-ATCA-F120-OPT.**

Table A-1 Emerson Publications

Document Title and Source	Publication Number
RTM-ATCA-F120 Installation and Use	6806800D07
ATCA-F120: Control via IPMI Programmer's Reference	6806800D18
RTM-ATCA-F120: Control via IPMI Programmer's Reference	6806800D17
Basic Blade Services Software on ATCA-F120 Programmer's Reference	6806800E20
RTM-ATCA-F120-OPT Installation and Use	6806800G29
RTM-ATCA-F120-OPT: Control via IPMI Programmer's Reference	6806800G30
System Management Interface Based on HPI-B (Centellis 4620/4440)	6806800D85
System Management Interface Based on HPI-B (Centellis CO 31kX /4100/2000)	6806800D84

A.2   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-2 Related Specifications

Organization	Document Title
Intel developer.intel.com/design/servers/ipmi	Platform Management FRU Information Storage Definition v1.0 IPMI Specification v1.5
PICMG picmg.org/specifications.stm	PICMG 3.0 Revision 2.0 Advanced TCA Base Specification PICMG 3.1 Revision 1.0 Specification Ethernet/Fiber Channel PICMG AMC.0 R2.0 Advanced Mezzanine Card Base Specification, December 3,2004
DENX Software Engineering	http://www.denx.de/wiki/UBoot/WebHome U-boot firmware documentation

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