PENGUIN™
SOLUTIONS

Penguin Edge™ ATCA-F140 Series

Installation and Use

P/N: 6806800M67V

July 2022

PENGUIN™
EDGE

Legal Disclaimer*

SMART Embedded Computing, Inc. (SMART EC), dba Penguin Solutions™, assumes no responsibility for errors or omissions in these materials. **These materials are provided "AS IS" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement.** SMART EC further does not warrant the accuracy or completeness of the information, text, graphics, links, or other items contained within these materials. SMART EC shall not be liable for any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of these materials. SMART EC may make changes to these materials, or to the products described therein, at any time without notice. SMART EC makes no commitment to update the information contained within these materials.

Electronic versions of this material may be read online, downloaded for personal use, or referenced in another document as a URL to a SMART EC website. The text itself may not be published commercially in print or electronic form, edited, translated, or otherwise altered without the permission of SMART EC.

It is possible that this publication may contain reference to or information about SMART EC products, programming, or services that are not available in your country. Such references or information must not be construed to mean that SMART EC intends to announce such SMART EC products, programming, or services in your country.

Limited and Restricted Rights Legend

If the documentation contained herein is supplied, directly or indirectly, to the U.S. Government, the following notice shall apply unless otherwise agreed to in writing by SMART EC.

Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data clause at DFARS 252.227-7013 (Nov. 1995) and of the Rights in Noncommercial Computer Software and Documentation clause at DFARS 252.227-7014 (Jun. 1995).

SMART Embedded Computing, Inc., dba Penguin Solutions

2900 S. Diablo Way, Suite 190

Tempe, Arizona 85282

USA

*For full legal terms and conditions, visit *https://www.penguinsolutions.com/edge/legal/*

Table of Contents

List of Tables

List of Tables

List of Figures

List of Figures

About this Manual

Overview of Contents

This manual is divided into the following chapters and appendices.

Safety Notes on page 19 summarizes the safety instructions in the manual.

Notice de Sécurité on page 27 provides a French translation of the Safety Notes section.

Sicherheitshinweise on page 35 provides a German translation of the Safety Notes section.

Chapter 1, Introduction on page 45 gives an overview of the features of the product, standard compliances, mechanical data, and ordering information.

Chapter 2, Hardware Preparation and Installation on page 49 outlines the installation requirements, hardware accessories, and installation procedures.

Chapter 3, Controls, LEDs, and Connectors on page 69 describes external interfaces of the blade. This include connectors, LEDs, and mechanical switches.

Chapter 4, Functional Description on page 93 includes a block diagram and functional description of major components of the blade.

Chapter 5, U-Boot on page 117 describes the boot firmware.

Appendix A, ATCA-F140-TCLK3 Information on page 131 contains information specific to the ATCA-F140-TCLK3 blade.

Appendix B, Ruggedized ATCA-F140 Information on page 137 contains information specific to the ruggedized ATCA-F140 blade.

Appendix C, Related Documentation on page 143 provides a listing of related product documentation, manufacturer's documents, and industry standard specifications.

Abbreviations

This document uses the following abbreviations:

Abbreviation	Description
ATCA	Advanced Telecom Computing Architecture
AMC	Advanced Mezzanine Card
BITS	Building Integrated Timing Supply
BIX	Base Interface Switch
CMOS	Complimentary Metal-oxide-semiconductor
COP	Common On-chip Processor
COTS	Commercial Off-the-shelf
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
DDR3	Dual Data Rate 3
DIMM	Dual In-line Memory Module
DMA	Direct Memory Access
DRAM	Dynamic Random Access Memory
ECC	Error Correction Code
EEPROM	Electrically Erasable Programmable Read-Only Memory
EMC	Electromagnetic Compatibility
FIX	Fabric Interface Switch
FPGA	Field Programmable Gate Array
IPMB	Intelligent Platform Management Bus
IPMC	Intelligent Platform Management Controller
IPMI	Intelligent Platform Management Interface
JTAG	Joint Test Action Group
KCS	Keyboard Controller Style
LED	Light Emitting Diode
LPC	Low Pin Count

Abbreviation	Description
MAC	Media Access Control
OEM	Original Equipment Manufacturer
OS	Operating System
OSP	Open Settlement Protocol
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCI	Peripheral Component Interconnect
PCIe or PCIE	Peripheral Component Interconnect Express
PHY	Physical Layer
PICMG	PCI Industrial Computer Manufacturers Group
PIC	Programmable Interrupt Controller
POL	Point Of Load
POST	Power-on Self Test
PrAMC	Processor Advanced Mezzanine Card
PROM	Programmable Read-only Memory
QSFP+	Quad Small Form Factor Pluggable Plus
RAM	Random Access Memory
RTC	Real Time Clock
RTM	Rear Transition Module
SAS	Serial Attached SCSI
SATA	Serial AT Attachment
SDRAM	Synchronous Dynamic Random Access Memory
SELV	Safety Extra Low Voltage
SFP	Small Form Factor Pluggable
SFP+	Small Form Factor Pluggable Plus
SGMII	Serial Gigabit Media Independent Interface
ShMC	Shelf Management Controller

Abbreviation	Description
SPD	Serial Present Detect
SPI	Serial Peripheral Interface
SRAM	Static Random Access Memory
SROM	Serial Read-only Memory
SSU	Synchronization Supply Unit
TPE	Twisted-pair Ethernet
TSEC	Triple Speed Ethernet Controller
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VLP	Very Low Profile
XAUI	10Gb Attachment Unit Interface

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

Notation	Description
. . .	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
	Indicates a hazardous situation which could result in death or serious injury
	Indicates a hazardous situation which may result in minor or moderate injury
	Indicates a property or equipment damage message
	Indicates a hot surface that could result in moderate or serious injury
	Indicates an electrical situation that could result in moderate injury or death
	Indicates that when working in an ESD environment care should be taken to use proper ESD practices
	No danger encountered; pay attention to important information

Summary of Changes

This manual has been revised and replaces all prior editions.

Part Number	Publication Date	Description
6806800M67V	July 2022	Rebrand to Penguin Edge.Updated Section 1.1 Overview. Updated Appendix B and C.
6806800M67U	December 2020	Updated Safety Notes and Table 1-1 for 62368-1 compliance.
6806800M67T	September 2020	Updated ruggedized information in Section 1.1 Introduction; Table 1-2 Mechanical Data; Updated Section B.1 ATCA-F140-D Overview; added Table B-1 Mechanical Data. Updated to EN55032 compliance in SN and Table 1-1. Updated Figures B-3, B-4 and B-5.
6806800M67S	September 2019	Re-branded to SMART Embedded Computing template. Updated to include references to ATCA-F140-D. Added Appendices for ATCA-F140-D and ATCA-F140-TCKL3 information. Added face plate diagram for telecom clock variant. Updated block diagram to show telecom clock circuitry. Incorporated *Replacing the Battery* information from an appendix into the *Hardware Preparation and Installation* chapter; renumbered appendices. Updated *Ordering Information* section. Added data sheets to *Related Documentation* table. Updated Safety Notes and German translations; added French translations.
6806800M67R	March 2017	Updated *SFP+ Modules* on page 98 and Copyrights page.
6806800M67P	May 2016	Removed Declaration of Conformity (DoC). Updated Copyrights page.
6806800M67N	September 2015	Updated GR-1089 related information in the *Standard Compliances* section on page 34. Updated the *Installation* sections in the *Safety Notes* on pages 19 and 27.

Part Number	Publication Date	Description
6806800M67M	September 2014	Updated Figure 4-1 on page 87. Updated Figure 1-1 on page 38, Figure 3-1 on page 65 and Figure 3-2 on page 78 with ELMA variant figures. Updated *Blade Installation and Removal* instructions on page 46 as per ELMA variant handle usage.
6806800M67L	July 2014	Added a new section *Real Time Clock* on page 114.
6806800M67K	June 2014	Updated *Chapter 6 Switches*.
6806800M67J	May 2014	Re-branded to Artesyn template and updated Table 4-6 on page 102.
6806800M67H	November 2013	Updated Table 2-1 on page 41.
6806800M67G	November 2013	Updated the section *Accessing U-Boot* on page 115.
6806800M67F	October 2013	Updated Table 2-2 on page 44.
6806800M67E	May 2013	Updated table 3-1 on page 66.
6806800M67D	March 2013	Updated figures in *Chapter 4, Functional Description*.
6806800M67C	December 2012	Updated *Standard Compliances* on page 34.
6806800M67B	April 2012	GA Release
6806800M67A	February 2012	EA Version

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.

This manual 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 Penguin Solutions™ representative.

The product has been designed to meet the standard industrial safety requirements. It must not be used in safety critical components, life supporting devices or on aircraft.

Only personnel trained by Penguin Solutions 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 is allowed to 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 Penguin Solutions representative for service and repair to make sure that all safety features are maintained.

EMC

The product has been tested in a standard Penguin Edge™ system and found to comply with the limits for a Class A digital device in this system, pursuant to part 15 of the FCC Rules, EN 55032 Class A respectively. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial, business or industrial environment. The product conducts, radiates and uses radio frequency energy and, if not installed properly and used in accordance with this user documentation, may cause harmful interference to radio communications.

Operating the product in a residential area is likely to cause harmful interference. If this occurs, the user will be required to correct the interference at the user's expense. Changes or modifications not expressly approved by Penguin Solutions personnel could void the user's authority to operate the equipment. Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a compliant system will maintain the required performance.

Use only shielded cables when connecting peripherals to help assure that appropriate radio frequency emissions compliance is maintained. For proper EMC shielding, only operate the system with face plates installed and all vacant slots covered or populated with filler cards.

The Serial Console interfaces are considered debug/maintenance ports. During normal operation, no cables should be connected to these ports. Cables attached to these ports during maintenance must not exceed a length of 10 feet (3 meters).

VCCI

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

Grounding

If the product is not properly grounded, it may be damaged by electrostatic discharge.

The system contains EMI gaskets at the shelf and module level. Make sure that each of the system's parts contact the EMI gasket.

The shelf is also fitted with an ESD jack/snap for use with conductive wrist straps. Make sure the operator uses proper ESD protection.

Installation

Personal Injury

This product operates with dangerous voltages that can cause injury or death. Use extreme caution when handling, testing, and adjusting this equipment and its components.

Damage of Circuits

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

Before touching the product make sure that you are working in an ESD-safe environment or wearing an ESD wrist strap or ESD shoes. Hold the product by its edges and do not touch any components or circuits.

Data Loss

Wait until the blue LED is permanently illuminated before removing the blade. Removing the blade with the blue LED still blinking causes data loss.

Restricted Access Area

This product is only to be installed in a restricted access area.

Damage of the Blade and Additional Devices and Modules

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

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

Blade Damage

Incorrect installation of the blade can cause damage to the blade.

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. Carefully inspect the blade and the backplane for both pin and component integrity before installation.

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

System Damage

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

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

Rear Transition Module

Damage of the RTM

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

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

Damage to RTM/Backplane or System Components

Bent pins or loose components can cause damage to the RTM, the backplane, or other system components. Carefully inspect the RTM and the backplane for both pin and component integrity before installation.

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

Operation

Make sure that the display devices that are permanently connected to the VGA interface provide a fire enclosure according to the IEC/EN/UL/CSA 62368-1 and 60950-1 requirements.

All other devices that are only connected to the VGA interface for service purposes need supervision during operation and must be disconnected after maintenance.

Product Damage - Product Surface

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

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

Overheating and Blade Damage

When operating the product, make sure that forced air cooling is available in the shelf or enclosure. Operating the product without forced air cooling may lead to overheating and product damage. When operating the product in areas of electromagnetic radiation, secure the product in the system using the front panel screws. Make sure the product is fully shielded by the enclosure.

Data Corruption

If power to the unit is removed while a firmware update is in progress to the product's flash memory, the changes will not be saved or the flash memory may be corrupted. In such case, the product is likely to remain in a non-operable state and will require reconditioning by qualified repair services.

Injuries or Short Circuits - Blade or Power Supply

In case the OR-ing diodes of the blade fail, the blade may trigger a short circuit between input line A and input line B so that input 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 voltage on the line that has been disconnected before continuing your work.

The EMI radiation compliancy of the product has been qualified in a reference system. Please note that the integrator needs to verify the EMI radiation compliancy of other configurations/settings.

Switch Settings

Product Malfunction

Do not change settings of switches marked as **Reserved**. Switches marked **Reserved** might carry production-related functions and can cause the product to malfunction if their setting is changed.

Check and change the setting of any switch not marked **Reserved** before installing the product.

Product Damage

Check and change switch settings before you install the product.

Setting/resetting the switches during operation can cause damage to the product.

Use minimal force when pressing the reset switch. Too much force may damage the reset switch.

RJ-45 Connector

System Damage

RJ-45 connectors on the front panel are either twisted-pair Ethernet (TPE) or E1/T1/J1 network interfaces. Connecting an E1/T1/J1 line to an Ethernet connector may damage your system.

- 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 or approximately 328 feet.
- 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.

For more information, see the documentation of the respective product.

AMC Module

Limitation of Operating Temperature Range

Installing AMC modules with small operating temperature ranges into the ATCA-F140 may further restrict the operating temperature range of the ATCA-F140. Make sure that the operating temperature of any installed AMC modules and the ATCA-F140 as a bundle are within allowed limits.

Shelf Cooling and EMC Compliance Violation

An empty AMC bay may result in poor shelf cooling and strong EMC radiation and leads to EMC compliance violation. Always cover empty or unused AMC bays with a filler panel.

Hot Swap

Data Loss

Wait until the blue LED is permanently illuminated before removing the product. Removing the product with the blue LED still blinking causes data loss.

SFP/SFP+ Modules

Personal Injury and Damage of the RTM and SFP/SFP+ Modules

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

Only use and install SFP/SFP+ modules that are fully certified and meet all relevant safety standards.

Personal Injury

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

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

Eye Damage

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

SFP/SFP+ Module Damage

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

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

Laser

Personal Injury

If a label with the words CLASS 1 LASER PRODUCT is affixed to your system, the unit is equipped with a laser device. These devices contain a laser system that produces visible or invisible laser radiation (or both) and can be harmful to the eyes.

Seek supplemental information (power, wavelength, visibility, pulse duration, applicable standards) prior to servicing equipment. Do not look at laser device with an optical instrument at any time.

Battery

Blade Damage

Incorrect battery installation may result in a hazardous explosion and blade damage.

Always use the same type of lithium battery as is installed and make sure the battery is installed as described in the manual.

Data Loss

Installing another battery type than the one mounted at product delivery may cause data loss.

PCB and Battery Holder Damage

Do not use a screw driver to remove the battery from its holder. Removing the battery with a screw driver may damage the PCB or the battery holder.

Environment

Environmental Damage

Improper disposal of used products may harm the environment.

Always dispose of used products according to your country’s legislation and manufacturer’s instructions.

Notice de Sécurité

Cette section présente, à travers ce manuel, des avertissements qui précèdent les procédures potentiellement dangereuses. Les instructions contenues dans les avertissements doivent être suivies durant toutes les phases d'opération, de service et de réparation de cet équipement. Vous devriez aussi employer toute autre précaution nécessaire pour l'utilisation de l'équipement dans l'environnement d'opération. Le défaut de se conformer à ces précautions ou aux avertissements spécifiques contenus ailleurs dans ce manuel, peut engendrer des lésions corporelles ou dommages à l'équipement.

Ce manuel fournit toutes les informations nécessaire pour installer et manipuler le produit. En raison de la complexité de ce produit et de ses diverses utilisations, nous ne pouvons pas garantir que les informations fournies sont complètes. Si vous avez besoin d'information supplémentaire, contactez votre représentant Penguin Solutions™.

Le produit a été conçu pour répondre aux exigences de sécurité standards de l'industrie. Il ne doit pas être utilisé dans des composantes critiques pour la sécurité, des appareils de maintien de vie ou sur un aéronef.

Seul le personnel formé par Penguin Solutions ou les personnes qualifiées dans le domaine de l'électronique ou du génie électrique sont autorisés à installer, retirer ou faire l'entretien du produit. Les informations contenues dans ce manuel sont destinées à compléter les connaissances d'un spécialiste et ne peuvent être utilisées en remplacement de personnel qualifié.

Ne touchez pas les circuits sous tension à l'intérieur de l'équipement. Le personnel d'opération ne doit pas enlever les couvercles de l'équipement. Seul le personnel de maintenance autorisé par l'usine ou autre personnel de maintenance qualifié peut retirer les couvercles des équipements pour le sous-assemblage interne ou pour le remplacement de composantes, ou pour tout réglage interne.

N'installez aucune pièce de remplacement et n'effectuez aucune modification non autorisée de l'équipement, sinon, la garantie pourrait être annulée. Contactez votre représentant Penguin Solutions local pour le service et la réparation, afin de vous assurer que toutes les fonctions de sécurité soient maintenues.

EMC

Le produit a été testé et est déclaré conforme aux limites imposées à un appareil numérique de classe A dans ce système, conformément à la section 15 de la Réglementation FCC, EN 55032 classe A, respectivement.

Ces limites sont conçues pour offrir une protection raisonnable contre les interférences néfastes lorsque le produit est utilisé dans un environnement commercial ou industriel.

Le produit conduit, émet et utilise de l'énergie à radiofréquence et, s'il n'est pas installé correctement et utilisé conformément à cette documentation de l'utilisateur, il peut causer des interférences néfastes aux communications radio.

Opérer ce produit dans une région résidentielle est susceptible de causer des interférences néfastes. Si cela se produit, l'utilisateur devra corriger les interférences à ses frais.

Les changements ou les modifications qui ne sont pas expressément approuvés par Penguin Solutions pourraient annuler la conformité réglementaire de l'utilisateur. Les cartes sont testées dans un système représentatif pour démontrer la conformité aux exigences mentionnées ci-dessus. Une installation adéquate dans un système conforme maintiendra les performances requises.

Utilisez uniquement des câbles blindés lorsque vous connectez des périphériques pour vous assurer que la conformité aux normes d'émission de radiofréquences est respectée. Pour un blindage CEM adéquat, utilisez le système uniquement avec les plaques frontales installées et tous les ports d'extension vacants couverts ou équipés de cartes obturatrices.

Les interface Serial Console sont considérées comme des ports de débogage/maintenance. Durant une opération normale, aucun câble ne devrait être connecté à ces ports. Les câbles attachés à ces ports pendant la maintenance ne doivent pas excéder une longueur de 10 pieds (3 mètres).

VCCI

Ceci est un produit de classe A basé sur la norme du Conseil volontaire de contrôle des interférences (VCCI) par Information Technology Interference (Interférence des technologies de l'information). Si cet équipement est utilisé dans un environnement domestique, des perturbations radio peuvent survenir. Lorsque de tels problèmes surviennent, l'utilisateur peut être amené à prendre des mesures correctrices.

Mise à la terre

Si le produit n'est pas adéquatement mis à la terre, il peut être endommagé par une décharge électrostatique.

Le système contient des joints EMI au niveau des étagères et des modules. Assurez-vous que chacune des pièces du système est en contact avec le joint EMI.

L'étagère est également équipée d'une prise/déclic ESD pour une utilisation avec des dragonnes conductrices. Assurez-vous que l'opérateur utilise la protection de décharge électrostatique ESD appropriée.

Installation

Lésions corporelles

Ce produit opère à des voltages dangereux qui peuvent causer des blessures ou la mort. Faites preuve de prudence lorsque vous manipulez, testez ou ajustez l'équipement et ses composantes.

Endommagement des circuits

Les décharges électrostatiques, ainsi que l'installation inadéquate et le retrait du produit peuvent endommager les circuits ou réduire leur durée de vie.

Avant de toucher le produit, assurez-vous que vous travaillez dans un environnement exempt de décharge électrostatique. Tenez le produit par ses extrémités et ne touchez aucune composante ou circuit.

Perte de données

Attendez jusqu'à ce que le DEL bleu soit illuminé de façon permanente avant de retirer la lame.

Retirer la lame lorsque le DEL bleu continue de clignoter peut causer une perte de données.

Zone à accès restreint

Ce produit peut seulement être installé dans les zones à accès restreint.

Endommagement de la lame et appareils ou modules supplémentaires

Avant d'installer ou de retirer un appareil ou un module supplémentaire, lisez la documentation appropriée.

Une installation inadéquate d'appareils ou modules supplémentaires peut endommager la lame ou les appareils ou modules supplémentaires.

Endommagement de la lame

Une installation inadéquate de la lame peut lui causer des dommages.

Utilisez les poignées lorsque vous installez/retirez la lame pour éviter un dommage/déformation de la plaque frontale et/ou PCB.

Dommage à la lame/fond de panier ou aux composantes du système

Des broches tordues ou des composantes desserrées peuvent causer des dommages à la lame, au fond de panier ou à d'autres composantes du système. Inspectez soigneusement la lame et le fond de panier pour vérifier l'intégrité des broches et des composantes avant l'installation.

Nous et nos fournisseurs prenons des mesures significatives pour s'assurer qu'il n'y ait pas de broches tordues sur le fond de panier ou qu'il n'y ait pas de dommages de connecteur à la lame/MTA avant de quitter l'usine. Des broches tordues causées par une installation inadéquate ou par l'insertion de cartes avec des connecteurs endommagés peuvent annuler la garantie du fond de panier ou les lames.

Endommagement du système

AVERTISSEMENT: le port intra-bâtiment de l'équipement ou du sous-ensemble convient uniquement pour la connexion à un câblage intra-bâtiment ou à un filage non exposé uniquement. Le port intra-bâtiment de l'équipement ou du sous-ensemble NE DOIT PAS être relié métalliquement à des interfaces qui se connectent à l'installation extérieure (OSP) ou à son filage. Ces interfaces sont conçues pour être utilisées uniquement comme interfaces intra-bâtiment (ports de type 2 ou de type 4 décrits dans le document GR-1089) et nécessitent une isolation du câblage OSP exposé. L'ajout de protecteurs primaires ne constitue pas une protection suffisante pour connecter ces interfaces de manière métallique au câblage OSP.

Le port intra-bâtiment de l'équipement ou du sous-ensemble doit utiliser un filage/câblage intra-bâtiment blindé mis à la terre aux deux extrémités.

Modules de Transition Arriére (MTA)

Endommagement du MTA

Une installation inadéquate du MTA peut causer des dommages au MTA.

Utilisez les poignées lorsque vous installez/retirez le MTA pour éviter les dommages/déformation de la plaque frontale et/ou du PCB.

Endommagement du MTA/ du fond de panier ou des composants du système

Des broches tordues ou des composants desserrés peuvent causer des dommages au MTA, au fond de panier ou autres composants du système. Inspectez soigneusement le MTA et le fond de panier pour vérifier l’intégrité des broches et des composantes avant l’installation.

Nous et nos fournisseurs prenons des mesures significatives pour s'assurer qu’il n’y ait pas de broches tordues sur le fond de panier ou qu’il n’y ait pas de dommages de connecteur à la lame/MTA avant de quitter l’usine. Des broches tordues causées par une installation inadéquate ou par l’insertion de cartes avec des connecteurs endommagés peuvent annuler la garantie du fond de panier ou les lames.

Opération

Assurez-vous que les appareils d’affichage qui sont connectés en permanence à l’interface VGA offrent un boîtier anti-incendie conforme aux exigences IEC/EN/UL/CSA 62368-1 et 60950-1.

Tous les autres appareils qui sont seulement connectés à l'interface VGA à des fins de maintenance doivent être surveillés durant l’opération et doivent être déconnectés après la maintenance.

Endommagement du produit – Surface du produit

Une humidité élevée ou la condensation sur la surface du produit cause des courts-circuits.

Ne pas opérer le produit en dehors des limites environnementales spécifiées. Assurez-vous que le produit soit complètement sec et qu'il n'y ait aucune humidité sur aucune surface avant de mettre en marche.

Surchauffe et endommagement du produit

Lorsque vous opérez le produit, assurez-vous qu'un refroidissement par air forcé est disponible dans l'étagère ou le boîtier.

Opérer le produit sans refroidissement par air forcé peut mener à une surchauffe et un endommagement du produit.

Lorsque vous opérez le produit dans des régions de rayonnement électromagnétique, sécurisez le produit dans le système en utilisant les vis du panneau avant. Assurez-vous que le produit soit entièrement protégé par le boîtier.

Corruption des données

Si l'appareil est mis hors tension alors qu'une mise à jour du microprogramme est en cours dans la mémoire flash du produit, les modifications ne seront pas enregistrées ou la mémoire flash pourrait être corrompue. Dans un tel cas, le produit restera probablement dans un état inutilisable et nécessitera un reconditionnement par des services de réparation qualifiés.

Blessures ou courts-circuits – Lame ou source de courant

Si les diodes O-Ring de la lame tombent en panne, la lame peut déclencher un court-circuit entre la ligne d'entrée A et la ligne d'entrée B, de sorte que la ligne A reste alimentée même si elle est déconnectée du circuit d'alimentation (et inversement).

Pour éviter tout dommage ou blessure, vérifiez toujours qu'il n'y ait aucun voltage sur la ligne qui a été déconnectée avant de continuer votre travail.

La conformité du produit aux rayonnements EMI a été qualifiée dans un système de référence. Veuillez noter que l'intégrateur doit vérifier la conformité aux rayonnements EMI d'autres configurations/réglages.

Modifier les Paramètres

Mauvais fonctionnement du produit

Ne modifiez pas les configurations des commutateurs marqués Reserved. Les commutateurs marqués Reserved peuvent comporter des fonctions liées à la production et entraîner un mauvais fonctionnement du produit si les paramètres sont modifiés.

Vérifiez et modifiez les paramètres de tout commutateur non marqué Reserved avant d'installer le produit.

Endommagement du produit

Vérifiez et modifiez les paramètres du commutateur avant d'installer le produit.

Le configuration/réinitialisation des commutateurs pendant le fonctionnement peut causer des dommages au produit.

Utilisez une force minimale lorsque vous appuyez sur le commutateur de réinitialisation. Une force excessive pourrait endommager le commutateur de réinitialisation.

Les Connecteurs RJ-45

Endommagement du système

Les connecteurs RJ-45 du module d'I/O du système ou des cartes PCIe sont des interfaces réseau Ethernet à paire torsadée (TPE) ou E1/T1/J1. La connexion d'une ligne E1/T1/J1 à un connecteur Ethernet peut endommager votre système.

Les connecteurs RJ-45 situés sur le panneau avant sont des interfaces réseau Ethernet à paire torsadée (TPE) ou E1/T1/J1. La connexion d'une ligne E1 / T1 / J1 à un connecteur Ethernet peut endommager votre système.

- Assurez-vous que les connecteurs TPE situés près de votre zone de travail soient clairement identifiés comme étant des connecteurs réseau.
- Vérifiez que la longueur d'un câble Ethernet connecté à un connecteur TPE ne dépasse pas 100 mètres (environ 328 pieds).
- Assurez-vous que le connecteur TPE du système soit uniquement connecté aux circuits de sécurité très basse tension (SELV).
- En cas de doute, demandez à votre administrateur de système.

Pour plus d'informations, voir la documentation du produit respectif.

MODULE AMC

Limite l’intervalle de température de fonctionnement

L'installation de modules AMC avec de faibles intervalles de température de fonctionnement dans l'ATCA-F140 peut limiter davantage l’intervalle de température de fonctionnement de l'ATCA-F140. Assurez-vous que la température de fonctionnement de tous les modules AMC installés et de l'ATCA-F140 en tant qu'ensemble se situent dans les limites autorisées.

Violation de la conformité du refroidissement de l'étagère et de la CEM

Une baie AMC vide peut entraîner un refroidissement insuffisant des étagères, un fort rayonnement CEM menant à une violation de la conformité CEM. Toujours couvrir les baies AMC vides ou non utilisées avec un panneau de remplissage.

Hot Swap

Perte de données

Attendez jusqu'à ce que le DEL bleu soit illuminé de façon permanente avant de retirer la lame.

Retirer la lame lorsque le DEL bleu continue de clignoter peut causer une perte de données.

Modules SFP/SFP+

Lésions corporelles et endommagement du MTA et des modules SFP/SFP+

L'installation et l'utilisation de modules SFP/SFP+ qui ne sont pas entièrement certifiés et qui ne répondent pas à toutes les normes de sécurité applicables peuvent endommager le MTA et les modules SFP/SFP+ et entraîner des lésions corporelles.

Utilisez et installez uniquement des modules SFP/SFP+ qui sont entièrement certifiés et qui rencontrent toutes les normes de sécurité applicables.

Lésions corporelles

Les modules optiques SFP/SFP+ peuvent être classés comme produit laser. Lors de l'installation et de l'utilisation de l'un de ces modules SFP/SFP+, les réglementations qui correspondent à la classe de laser correspondante s'appliquent à l'ensemble du MTA. Le non-respect de ces réglementations peut entraîner des lésions corporelles.

Lors de l'installation et de l'utilisation des modules optiques SFP/SFP+ classés comme produits laser, assurez-vous de respecter les réglementations en vigueur.

Dommages aux yeux

Les modules optiques SFP/SFP+ peuvent émettre un rayonnement laser lorsqu'aucun câble n'est connecté. Ce rayonnement laser est nocif pour vos yeux. Ne regardez jamais dans la lentille optique.

Endommagement du module SFP/SFP+

La fiche du port optique protège les fibres optiques contre la saleté et les dommages. Les saletés et les dommages peuvent rendre le module SFP/SFP+ inutilisable.

Ne retirez la fiche optique que lorsque vous êtes prêt à connecter un câble au module SFP/SFP+. Si aucun câble n'est connecté, couvrez le port avec une fiche de port optique.

Laser

Lésions corporelles

Si une étiquette avec les mots PRODUIT LASER DE CLASSE 1 est apposée sur votre système, l'unité est équipée d'un appareil laser. Ces appareils contiennent un système laser qui produit des rayonnements visibles ou invisibles (ou les deux) et peut être nocif pour les yeux.

Recherchez de l'information supplémentaire (puissance, longueur d'onde, visibilité, durée d'impulsion, normes applicables) avant de faire le maintien de l'équipement. Ne regardez jamais un appareil laser avec un instrument optique.

Batterie

Endommagement de la lame

Une installation inadéquate de la batterie peut causer un risque d'explosion ou d'endommagement de la lame.

Utilisez toujours le même type de batterie au lithium tel qu'installé et assurez-vous que la batterie soit installée tel que décrit dans le manuel.

Perte de données

L'installation d'un autre type de batterie que celle montée à la livraison du produit peut causer une perte de données.

Endommagement du PCB ou du support de batterie

N'utilisez pas de tournevis pour retirer la batterie de son support. Retirer la batterie avec un tournevis peut endommager le PCB ou le support de batterie.

Environnement

Dommage Environnemental

Une disposition impropre des produits usagés peut être nocif pour l'environnement.

Éliminez les produits usagés toujours conformément à la législation de votre pays et aux instructions du fabricant.

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 Systems 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 System zur Folge haben.

Penguin Solutions™ ist darauf bedacht, alle notwendigen Informationen zum Einbau und zum Umgang mit dem System in diesem Handbuch bereit zu stellen. Da es sich jedoch bei dem System 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 Penguin Solutions.

Das Produkt wurde so entwickelt, dass es die Anforderungen für die von der Industrie geforderten Sicherheitsvorschriften erfüllt. Es darf nicht in sicherheitskritischen Komponenten, lebenserhaltenden Geräten oder in Flugzeugen verwendet werden.

Einbau, Wartung und Betrieb dürfen nur von durch Penguin Solutions 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 Systems fern. Entfernen Sie auf keinen Fall die Systemabdeckung. Nur werksseitig zugelassenes Wartungspersonal oder anderweitig qualifiziertes Wartungspersonal darf die Systemabdeckung entfernen, um Systemkomponenten zu ersetzen oder andere Anpassungen vorzunehmen.

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

EMV

Das Produkt wurde in einem Penguin Edge™ 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 55032 Klasse A.

Diese Grenzwerte sollen einen angemessenen Schutz vor Störstrahlung beim Betrieb des Produktes in einer gewerblichen, geschäftlichen oder industriellen Umgebung gewährleisten.

Das Produkt leitet, strahlt und verwendet Hochfrequenzenergie und kann, wenn es nicht ordnungsgemäß installiert und in Übereinstimmung mit dieser Bediehnungsanweisung verwendet wird, schädliche Störungen des Funkverkehrs verursachen.

Der Betrieb des Produkts in einem Wohnbereich verursacht wahrscheinlich schädliche Interferenzen. In diesem Fall muss der Benutzer die Störung auf seine Kosten beheben.

Änderungen oder Modifikationen, die nicht ausdrücklich von Penguin Solutions genehmigt wurden, können einzuhaltene Normen oder Vorschriften verletzen. Board Produkte werden in einem repräsentativen System getestet, um die Einhaltung der oben genannten Anfordernungen zu gewährleisten. Um die Leistungsfähigkeit zu erhalten is eine ordungsgemäße Installation in einem konformen System erforderlich.

Um sicherzustellen, dass die entsprechenden Vorschriften für die Funkfrequenzen einghalten werden, verwenden Sie beim Anschließen von Peripheriegeräten nur abgeschirmte Kabel. Zur ordnungsgemäßen EMV-Abschirmung, ist das System nur mit installierten Frontblenden zu betreiben und alle freien Steckplätze sind abzudecken oder mit Steckkarten zu fuellen.

Die Serial Console Schnittstelle(n) sind als Wartungsanschlüsse zu betrachten. Während des Normalbetriebs sollte an diesen Schnittstellen kein Kabel angeschlossen sein. Im Wartungsfall dürfen die angeschlossene Kabel eine Länge von 10 Fuß (3m) nicht überschreiten.

VCCI

Dies ist ein Klasse A Produkt, basierend auf dem Standard des „Voluntary Control Council for Interference” (VCCI) von der „Information Technology Interference”. Wenn dieses Gerät in einem häuslichen Umfeld verwendet wird, können Funkstörungen auftreten. Wenn solche Probleme auftreten, muss der Benutzer möglicherweise Korrekturmaßnahmen ergreifen.

Erdung

Wenn das Produkt nicht richtig geerdet ist, kann es es durch elektrostatische Entladungen beschädigt werden.

Das System enthält EMI-Dichtungen sowohl am System als auch an den einzelnen Modulen. Stellen Sie sicher, dass alle Systemteile die EMV-Dichtung berühren.

Am System befinden sich auch ESD-Kontakte fuer ESD-Bändern. Stellen Sie sicher, dass jede Person, die mit dem System arbeitet, diese als ESD-Schutz benutzt.

Installation

Verletzungsgefahr

Dieses Produkt wird mit gefährlichen Spannungen betrieben, die zu Verletzungen und Tod führen können. Seien Sie äußerst vorsichtig, wenn Sie dieses Gerät und seine Komponenten handhaben, testen und einstellen.

Beschädigung von Schaltkreise

Elektrostatische Entladungen und falsche Installation und Entfernung des Produkts können die Schaltkreise beschädigen oder ihre Lebensdauer verkürzen.

Bevor Sie das Produkt, vergewissern Sie sich, dass Sie in einem ESD-geschützten Bereich arbeiten. Fassen Sie das Produkt nur an den Kanten an und berühren Sie keine Komponenten oder Schaltkreise.

Datenverlust

Warten Sie bis die blaue LED durchgehend leuchtet, bevor Sie das bord herausziehen. Es wird Datenverlust geben, wenn das Bord aus dem System gezogen wird und die blaue LED blinkt noch.

Bereich mit eingeschränktem Zugang

Installieren Sie das Board in ein System nur in Bereichen mit eingeschränktem Zugang.

Beschädigung des Blade und der Zusatzmodule

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

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

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 die Frontblende oder die Platine deformiert oder zerstört werden.

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 das Blades und die Rückwandplatine vor der Installation sorgfältig auf Pin- und Komponentenintegrität.

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

Beschädigung des Systems

WARNUG: Die Gebäude-internen Schnittstellen ("intra-building ports" per GR-1089-CORE) der Geräte oder Baugruppen sind nur für gebäudeinterne Verkabelung vorgesehen. Die Schnittstellen sind als Typ 2 oder Typ 4 definiert (wie in GR-1089-Core beschrieben) und erfordern eine Isolation zu Leitungen außerhalb des Gebäudes. Die Gebäude-internen Schnittstellen dürfen keine elektrisch leitende Verbindung zu Leitungen außerhalb des Gebäudes haben. Ein "Primary Protector" (wie in GR-1089-CORE beschrieben) ist keine ausreichende Absicherung, um die Gebäude-internen Schnittstellen mit Leitungen außerhalb des Gebäudes zu verbinden.

Die Gebäude-internen Schnittstellen ("intra-building ports" per GR-1089-CORE) der Geräte oder Baugruppen müssen abgeschirmte Gebäude-interne Verkabelungen verwenden, die an beiden Enden geerdet ist.

RTMs

Beschädigung des RTMs

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

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

Beschädigung des RTMs, der Backplane oder von System Komponenten

Verbogene Pins oder lose Komponenten können zu einer Beschädigung des RTMs, der Backplane oder von Systemkomponenten führen. Überprüfen Sie das RTM und die Rückwandplatine vor der Installation sorgfältig auf Pin- und Komponentenintegrität.

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

Betrieb

Stellen Sie sicher, dass die Anzeigegeräte, die dauerhaft an die VGA-Schnittstelle angeschlossen sind, ein Brandgehäuse gemäß den Anforderungen von IEC/EN/UL/CSA 62368-1 und 60950-1 bereitstellen.

Alle anderen Geräte, die nur zu Servicezwecken mit der VGA-Schnittstelle verbunden sind, müssen während des Betriebs überwacht werden und müssen nach den Wartungsarbeiten getrennt werden.

Beschädigung des Produktes - Oberflaeche

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

Betreiben Sie das Produkt nicht außerhalb der angegebenen Grenzwerte. Stellen Sie sicher, dass das Produkt vollständig trocken ist und keine Feuchtigkeit auf der Oberfläche ist, bevor Sie den Strom einschalten.

Überhitzung und Beschädigung des Produktes

Stellen Sie beim Betrieb des Produkts sicher, dass das Shelf oder Gehaeuse über eine Zwangsbelüftung verfügt. Betreiben Sie das Produkt ohne Zwangsbelüftung, kann dies zur Überhitzung und Beschädigung des Produktes führen. Wenn das Produkt in Bereichen mit elektromagnetischer Strahlung betrieben wird, sichern Sie das Produkt mit den Schrauben an der Frontblende im System. Stellen Sie sicher, dass das Produkt vollständig vom Gehäuse abgeschirmt ist.

Datenschaden

Wenn die Stromversorgung des Geräts während eines Firmware-Updates des Flash Memory des Geräts unterbrochen wird, werden die Änderungen nicht gespeichert oder der Flash Memory kann beschädigt werden. In diesem Fall bleibt das Produkt wahrscheinlich in einem nicht betriebsbereiten Zustand und muss von qualifizierten Reparaturdiensten überholt werden.

Verletzungen oder Kurzschlüsse — Blade oder Stromversorgung

Falls die OR-ing 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).Um Schäden oder Verletzungen zu vermeiden, überprüfen Sie vor dem Fortsetzen Ihrer Arbeit immer, dass keine Spannung an der Leitung anliegt.

Die Messung der EMV Abstrahlung wurde in einem Referenzsystem . Beachten Sie, dass der Betreiber die EMVAbstrahlungsanforderung von anderer Anforderungen / Einstellungen überprüfen muss.

Schaltereinstellungen

Fehlfunktion des Produkt

Ändern Sie nicht die Schaltereinstellungen, die als **Reserved** gekennzeichnet sind. Schalter, die mit **Reserved** gekennzeichnet sind, können produktionsbedingte Funktionen enthalten und zu einer Fehlfunktion des Produktes führen, wenn die Einstellungen geändert werden.

Überprüfen und ändern Sie die Schaltereinstellung, die nicht mit **Reserved** gekennzeichnet sind, bevor Sie das Blade installieren.

Beschädigung des Produkt

Überprüfen und ändern Sie die Schaltereinstellung, bevor Sie das Produkt installieren.

Das Verstellen von Schaltern während des laufenden Betriebes kann zur Beschädigung des Produkt führenn.

Drücken Sie den Reset Schalter nur leicht. Zu viel Druck kann den Reset Schalter beschädigen.

RJ-45 Stecker

Beschädigung des Systems

Bei den RJ-45-Anschlüssen an der Vorderseite handelt es sich entweder um Twisted-Pair-Ethernet- (TPE) oder E1 / T1 / J1-Netzwerkschnittstellen. Wenn Sie eine E1 / T1 / J1-Leitung an einen Ethernet-Anschluss anschließen, kann Ihr System beschädigt werden.

- Kennzeichnen Sie deshalb TPE-Anschlüsse in der Nähe Ihres Arbeitsplatzes deutlich als Netzwerkanschlüsse.
- Stellen Sie sicher, dass die Länge eines Ethernet Kabels, das mit Ihrem System verbundenen ist, 100 m oder 328 feet nicht überschreitet.
- Stellen Sie sicher, dass der TPE-Anschluss des Systems nur mit einem Sicherheits-Kleinspannungs- Stromkreis (SELV - Safety Extra Low Voltage) verbunden werden.
- Bei Fragen wenden Sie sich an Ihren Systemverwalter.

Weitere Informationen finden Sie in der Dokumentation des jeweiligen Produkt.

AMC-Module

Begrenzung des Betriebstemperaturbereichs

Die Installation von AMC-Modulen mit kleineren Betriebstemperaturbereichen auf dem ATCA-F140 Board, kann den Betriebstemperaturbereich des ATCA-F140 Boards weiter einschränken. Stellen Sie sicher, dass die Betriebstemperatur aller installierten AMC-Module und von dem ATCA-F140 Board als Paket innerhalb der zulässigen Grenzen liegen.

Verletzung von EMV-Grenzwerten und 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 AMCSteckplatz.

Hot Swap

Datenverlust

Warten Sie bis die blaue LED durchgehend leuchtet, bevor Sie das bord herausziehen. Es wird Datenverlust geben, wenn das Bord aus dem System gezogen wird und die blaue LED blinkt noch.

SFP/SFP+ Modules

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

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

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

Verletzungsgefahr

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

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

Verletzungsgefahr der Augen

Optische SFP/SFP+-Module können Laserstrahlen aussenden, wenn kein Kabel angeschlossen ist. Blicken Sie daher nicht direkt in die Öffnung eines SFP/SFP+-Moduls, um Verletzungen der Augen zu vermeiden.

Beschädigung von SFP/SFP+-Modulen

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

Ziehen Sie den optischen Stecker erst dann ab, wenn Sie zum Anschließen eines Kabels an das SFP/SFP + -Modul bereit sind. Wenn kein Kabel angeschlossen ist, verdecken Sie den Anschluss mit einem optischen Anschlussstecker.

Laser

Verletzungsgefahr

Wenn ein Etikett mit der Aufschrift CLASS 1 LASER PRODUCT auf Ihrem System angebracht ist, ist das Gerät mit einem Lasergerät ausgestattet. Diese Geräte enthalten ein Lasersystem, das sichtbare oder unsichtbare Laserstrahlung (oder beides) erzeugt und für die Augen schädlich sein kann.

Suchen Sie zusätzliche Informationen (Leistung, Wellenlänge, Sichtbarkeit, Impulsdauer, anwendbare Normen), bevor Sie Geräte warten. Blicken Sie niemals mit einem optischen Gerät auf das Lasergeräte.

Batterie

Beschädigung des Blades

Unsachgemäßer Einbau der Batterie kann gefährliche Explosionen und Beschädigungen des Blades zur Folge haben.

Verwenden Sie deshalb nur den Batterietyp, der auch bereits eingesetzt wurde und befolgen Sie die Installationsanleitung.

Datenverlust

Wenn Sie einen anderen Batterietyp installieren als den, der bei Lieferung des Produkts montiert wurde, kann dies zu Datenverlust führen.

Beschädigung des PCBs und der Batteriehalterung

Benutzen Sie keinesfalls einen Schraubenzieher, um die Batterie aus der Halterung zu nehmen. Wenn Sie die Batterie mit einem Schraubenzieher ausbauen, können das PCB und die Batteriehalterung beschädigt werden.

Umweltschutz

Umweltschäden

Unsachgemäße Entsorgung von gebrauchten Produkten kann die Umwelt schädigen.

Entsorgen Sie gebrauchte Produkte stets gemäß der in Ihrem Land gültigen Gesetzgebung und den Empfehlungen des Herstellers.

Introduction

1.1 Overview

The **Penguin Edge™ ATCA-F140** is a hub blade as defined *in PICMG® 3.0 Revision 3.0 AdvancedTCA® Base Specification* and *PICMG 3.1 Revision 1.0 Specification Ethernet/Fiber Channel for AdvancedTCA Systems*. It supports several base and fabric channel Ethernet interfaces to the Zone 2 backplane. It also supports 1Gb, 10Gb, and 40Gb Ethernet uplinks to the front panel and to a Rear Transition Module (RTM) through the Zone 3 connector. Broadcom Ethernet switches and PHYs are used for the base and fabric channels. The entire blade is managed by a NXP® QorIQ® P2020 Integrated Processor. The AMC bay on the blade is designed to support a processor AMC module for additional applications processing capabilities.

The **ATCA-F140-TCLK3** blade includes Telecom Stratum Clocking features. Please review *Appendix A, ATCA-F140-TCLK3 Information on page 131* for specific information regarding the ATCA-F140-TCLK3.

Ruggedized configurations of the ATCA-F140 are also available. Please review *Appendix B, Ruggedized ATCA-F140 Information on page 137* for information specific to the ruggedized configurations of the ATCA-F140 blade. The ruggedized configurations feature attachment blocks and captive screws specifically designed to enable the blade to be secured in a ruggedized AXP1440 shelf for use in rugged environments. The ruggedized ATCA-F140 configurations are electrically identical to the non-rugged ATCA-F140 blade. References to the ATCA-F140 in this manual also apply to the ruggedized variants of the ATCA-F140 blade.

SMART Embedded Computing company branding has changed to Penguin Solutions™. The SMART Embedded Computing product line has been rebranded as Penguin Edge™. No changes were made to the ATCA-F140 product line through this rebranding of the company and product line in April of 2022.

1.2 Features

The main features of the ATCA-F140 include:

- Single slot ATCA form factor (280mm x 322mm)
- NXP QorIQ P2020 Integrated Processor for the on-board service processor functions
- Two DDR3 memory DIMM slots, each of which can support up to 2GB of DDR3 SDRAM with ECC for a total memory capacity of 4GB
- Two redundant banks of 32MB boot flash memory
- 2GB or 4GB embedded USB flash module for user flash memory

- On-board SATA connector for a 2.5" SATA drive with selectable interface to either the service processor or the processor AMC
- Real time clock
- RJ-45 UART console interface to service processor on front panel
- RJ-45 10/100/1000 BaseTx Ethernet Management port on the front panel for P2020 QorIQ Integrated Processor
- Broadcom BCM56334 managed switch device for the Base Channel (24 1G-SGMII and four 10G-XAUI ports)
- Two Fabric Channel 40G (QSFP+) uplink ports on the front panel
- Multiple 1GbE SGMII and 10GbE XAUI ports routed to Zone 3 connectors for base and fabric uplink channels on RTM
- Two 40G ports routed to Zone 3 connectors for fabric uplink on RTM
- Stratum 3 Telco clock option with master/slave sync and five inter-shelf sync connectors on front panel along with two BITS/SSU front panel connectors (specific to the ATCA-F140-TCLK3 blade)
- One AMC bay for application processor support
- IPMC functionality for the board management by the Shelf Management Controller

1.3 Standard Compliances

This blade, when installed in a compliant shelf, meets the following standards:

Table 1-1 Standard Compliances

Standard	Description
UL/CSA No. 62368-1 and 60950-1 EN 62368-1 and 60950-1 IEC 62368-1 and 60950-1 CB Scheme UL/CSA No.62368-1 and 60950-1	Legal safety requirements
ANSI T1.319-2002 NEBS GR-63-CORE	ANSI Fire Spread Criteria
AT&T Document ATT-TP-76200	Network Equipment Power, Grounding, Environmental, and Physical Design Requirements
ETSI Acoustic Noise ETS 300 753 Class 3.1	ETSI acoustic noise requirements
ETSI Stationary Use: EN 300 019-2-3 Class 3.1	ETSI stationary use requirements (temperature-controlled locations)

Table 1-1 Standard Compliances (continued)

Standard	Description
ETSI Storage EN 300 019-2-1 Class 1.2	ETSI storage requirements in system level (not temperature-controlled storage locations)
ETSI Transportation: EN 300 019-2-2 Class 2.3	ETSI public transportation requirement on system level
Directive (EU) 2015/863 (amending Annex II to Directive 2011/65/EU)	Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
Telcordia GR-1089-CORE	Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
Telcordia GR-63-CORE	NEBS Requirements: Physical Protection
Telcordia SR-3580	NEBS Criteria Level 3
EN55032 Class A (EU) EN 55024 (EU) FCC 47 CFR Part 15 Subpart B (US), Class A AS/NZS CISPR 22 Class A (Australia/New Zealand) VCCI Class A (Japan)	EMC requirements (legal) on system level (predefined Penguin Edge™ system)
Verizon Document VZ.NEBS.TE.NPI.2004.015: NEBS Checklist	Telecommunications Carrier Group NEBS Checklist

1.4 Mechanical Data

The following table provides the dimensions and weight of the ATCA-F140 blade. Reference *Appendix B, Ruggedized ATCA-F140 Information on page 137* for mechanical information for the ruggedized variants of this blade.

Table 1-2 Mechanical Data

Data	Value
Dimensions (8U form factor)	30mm x 351mm x 328mm (12 x 13.8 x 12.9 inches)
Weight	2.8kg (6.2 lbs)

1.5 Ordering and Support Information

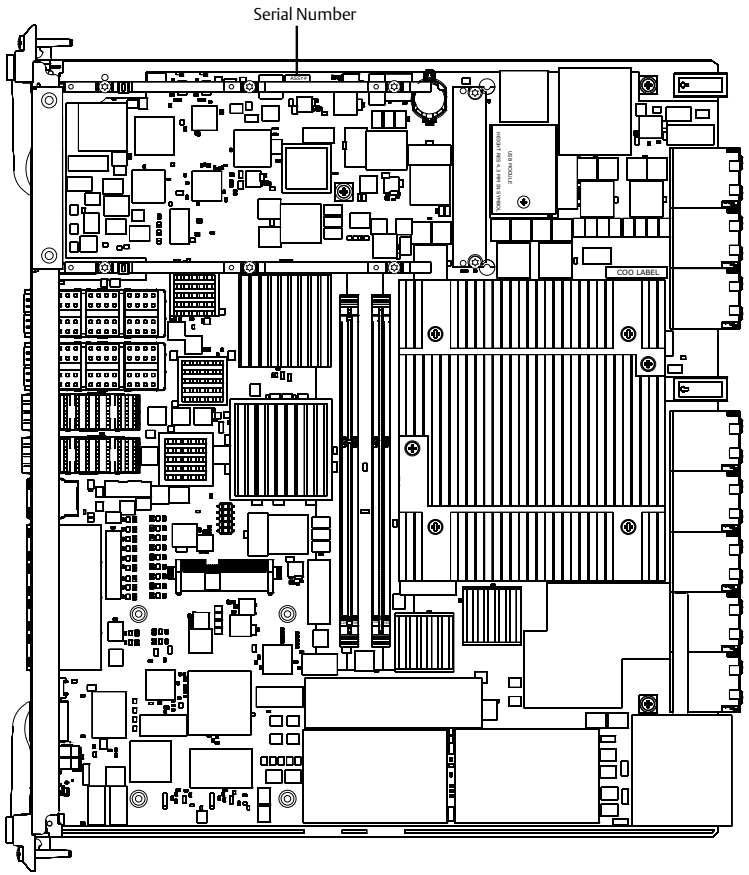
The data sheets for the ATCA-F140 series of blades contain a complete list of available blade variants and blade accessories. Refer to Appendix C or consult your local Penguin Solutions™ sales representative for the availability of other variants.

For technical assistance, documentation, or to report product damage or shortages, contact your local Penguin Solutions sales representative or visit *https://www.penguinsolutions.com/edge/support/*.

1.6 Product Identification

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

Figure 1-1 Serial Number Location



Hardware Preparation and Installation

2.1 Overview

This chapter provides the information that you need to install the ATCA-F140 and its accessories into your AdvancedTCA system. Removal procedures are also included.

To install the blade, follow these steps:

1. Unpack and inspect the blade.
2. Make sure that environmental, thermal, and power requirements are met.
3. If applicable, install the Rear Transition Module.
4. Configure the ATCA-F140.
5. Install the ATCA-F140.
6. If applicable, install the AMC module.
7. Configure the software.

2.2 Unpacking and Inspecting the Blade

Electrostatic discharge and incorrect installation and removal of the blade can damage circuits or shorten its life.

Before touching the product make sure that you are working in an ESD-safe environment or wearing an ESD wrist strap or ESD shoes. Hold the product by its edges and do not touch any components or circuits.

Product Damage

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.

Shipment Inspection

1. Verify that you have received all items of your shipment:
   - One printed copy of Safety Notes Summary
   - One ATCA-F140 blade
   - Any other items that were ordered
2. Check for damage and report any damage or differences to our Contact Center at *https://www.penguinsolutions.com/edge/support/*.

The blade is thoroughly inspected before shipment. If any damage occurs during transportation or any items are missing, please notify our Contact Center via *https://www.penguinsolutions.com/edge/support/* **immediately.**

3. Remove the desiccant bag shipped together with the blade.

NOTE: Improper disposal of used products may harm the environment. Always dispose of used products according to your country's legislation and manufacturer's instructions.

2.3 Requirements

This section shows the environmental and power requirements of the ATCA-F140 blade.

This product operates with dangerous voltages that can cause injury or death. Use extreme caution when handling, testing, and adjusting this equipment and its components.

2.3.1 Environmental Requirements

When operated in your particular system configuration, make sure that the blade meets the environmental requirements specified in this section.

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-Penguin Edge™ system, please contact your local sales representative for further safety information.

NOTICE

Blade Damage

High humidity and condensation on the blade surface may cause it to short circuit.

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	Normal Operation: +5°C (41°F) to +40°C (104°F) according to Telcordia GR-63-CORE (NEBS) and ETSI EN 300 019-1-3, Class 3.1 Exceptional Operation: -5°C (23°F) to +55°C (131°F) according to Telcordia GR-63-CORE (NEBS) **Note**: this exceeds ETSI EN 300 019-1-3, Class 3.1E requirements (-5°C to +45°C)	-40°C (-40°F) to +70°C (158°F) according Telcordia GR-63-CORE (NEBS) and ETSI EN 300 019-1-2, Class 2.3 **Note**: This exceeds ETSI EN 300 019-1-1, Class 1.2 requirements (storage from -25°C to +55°C **Note**: This may be further limited by installed accessories
Temperature Change	± 0.25°C/min according to Telcordia GR-63-CORE	± 0.25°C/min
Relative Humidity	Normal Operation: 5%rH to 85%rh non-condensing Exceptional Operation: 5%rH to 90%rh non-condensing According to Telcordia GR-63-CORE (NEBS) and EN 300 019-1-3, Classes 3.1 and 3.1E	5%rH to 95%rH non-condensing According to Telcordia GR-63-CORE (NEBS) and EN 300 019-1-1, Classes 1.2 and 2.3
Vibration	1g from 5 to 200Hz and back to 5Hz at a rate of 0.25 octave/minute (according to Telcordia GR-63-core)	5-20Hz at 0.01 g^2/Hz (according to Telcordia GR-63-core and ETSI EN 300 019-2-2) 20-200Hz at -3dB/octave Hz (according to Telcordia GR-63-core and ETSI EN 300 019-2-2) Random 5-20Hz at 1m^2/s^3 Random 20-200Hz at 3m^2/s^3
Shock	Half-sine, 11ms at 30m/s^2	Blade level packaging Half-sine, 6ms at 180m/s^2
Free Fall	NA	1.2 m/ packaged (according to ETSI 300 019-2-2) 100 mm unpackaged (according to Telcordia GR-63-core)

2.3.2 Thermal Requirements

In order for the ATCA-F140 to cool properly when the operating temperature is at the maximum (55°C), the chassis must meet or exceed PICMG 3.7 R1 Class B.3 ATCA Chassis Specification. PICMG 3.7 R1 Class B.4 compliance is preferred.

Contact your Penguin Solutions sales representative for current information on the detailed thermal information including airflow and resistance of the blade.

System Overheating - Cooling Vents

Improper cooling can lead to system damage and can void the manufacturer's warranty.

To ensure proper cooling and undisturbed airflow through the system, do not obstruct the ventilation openings of the system. Make sure that the fresh air supply is not mixed with hot exhaust from other devices.

Personal Injury

During operation, hot surfaces may be present on the heat sinks and the components of the product.

To prevent injury from hot surface, do not touch any of the exposed components or heatsinks on the product when handing. Use the handle and face plate, where applicable, or the board edge when removing the product from the enclosure.

2.3.3 Power Requirements

The blade's power requirements depend on the installed hardware accessories. To install the accessories on the blade, the load of the respective accessory has to be added to that of the blade. The following table show typical examples of the power requirements, with and without accessories installed. For information on the accessories' power requirements, refer to the documentation delivered together with the respective accessory or consult your local Penguin Solutions representative for further details.

The blade must be connected to a TNV-2 or a safety-extra-low-voltage (SELV) circuit. A TNV-2 circuit is a circuit whose normal operating voltages exceed the limits for a SELV circuit under normal operating conditions, and which is not subject to overvoltages from telecommunication networks.

Table 2-2 Power Requirements

Characteristic	Value
Rated Voltage	-48VDC to -60VDC, US and -48VDC, Canada
Operating Voltage	-39VDC to -72VDC, US and -39VDC to -60VDC, Canada

Table 2-2 Power Requirements (continued)

Characteristic	Value
Max. power consumption of ATCA-F140 with SATA drive and RTM-ATCA-F140	200W max, 135W typical No AMC installed
Max. power consumption of ATCA-F140 with SATA drive (without RTM-ATCA-F140)	170W max, 110W typical No AMC installed

2.4 Rear Transition Modules

If applicable, install a rear transition module. For more information, refer the *RTM-ATCA-F140 Series Installation and Use* manual.

The RTMs are not hot-swappable. Before installation, make sure that no front blade is installed in its 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.

Product Damage

Incorrect installation or removal of additional devices or modules damages the product or the additional devices or modules.

Before installing or removing additional devices or modules, read the respective documentation and use appropriate tools.

2.5 Blade Configuration

There are no configuration switch settings for normal operational mode. Switch changes are for activating various debug modes. Setting any switch to the ON state may cause unpredictable operation.

NOTICE

Product Malfunction

Switches marked as RESERVED may carry production-related functions and can cause the product to malfunction if the setting is changed.

Do not change settings of switches marked as RESERVED.

Product Damage

Setting/resetting the switches during operation can cause damage to the product.

Check and change switch settings before installing the product.

Too much force may damage the reset switch.

Use minimal force when pressing the reset switch.

2.5.1 SATA Drive Installation

An optional SATA drive can be installed on the ATCA-F140. This is a 2.5 inch form factor drive, designed for extreme temperature and vibration environments and has been tested and approved for use on the ATCA-F140. The hard drive kits available at the time of release include the hard drive, all required mounting hardware, and installation instructions. The hard drive kits are listed in the respective product data sheets - refer to Appendix C on page 143 for all related documentation.

2.6 Blade Installation and Removal

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

The blade must be installed into the proper slot type of shelf only, hub blades in hub slots, payload blades in blade slots. The proper slots may vary by system type. Refer to the system's documentation for more information on how the slots are arranged in your particular configuration.

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

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

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

Blade Damage

Incorrect installation of the blade can cause damage to 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

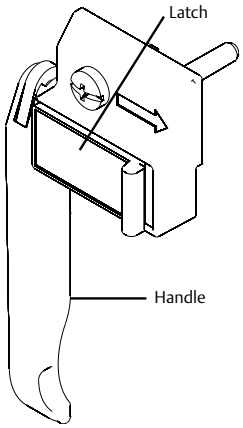
To install the blade into an AdvancedTCA shelf, proceed as follows.

The following procedure describes the installation of the blade in a hub slot that does not have an RTM. It assumes that your system is powered. If your system is powered down, you can disregard the blue LED and thus skip its respective step. In this case it is a purely mechanical installation.

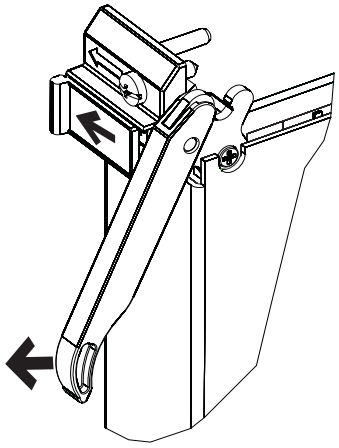
If there is a Rear Transition Module (RTM) to install, install and secure the RTM first as described in the *RTM-ATCA-F140 Series Installation and Use Guide*, then install the front blade. If an RTM is already installed, make sure that the RTM face plate screws are fully tightened to secure the RTM to the shelf.

Installation Procedure

1. Visually inspect the blade and backplane connectors for damage or bent pins before attempting to insert a blade. If any connector damage or pin damage in observed, stop before inserting the blade and send the damaged item through proper repair channels.

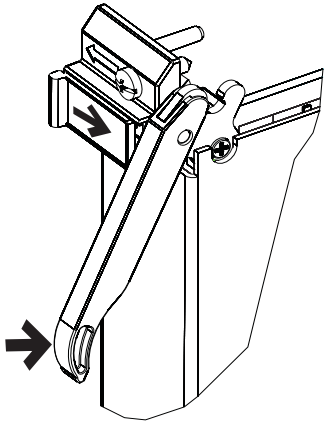


2. Slide the latch into the release position and pull out the handle outward to unlatch the handle from the face plate. Do not pull the handle fully outward.



3. Insert blade into the shelf by placing the top and bottom edges of the blade in the card guides of the shelf. Make sure that the guiding module of shelf and blade are aligned properly.
4. 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.

5. Fully insert the blade and push the handle towards the face plate. The latch automatically slides inwards and locks the handle.



If you feel that you need an abnormal amount of force during blade insertion to insert the blade into the slot, please extract the blade, then carefully inspect the blade and slot for problems to prevent damage.

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 has announced 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 shows IS (In Service) is switched ON, this indicates that the 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.

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

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

Before touching the blade or electronic components, make sure that you 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.

Removal Procedure

1. Unlatch the handle from the face plate by sliding the latch into the release position and pull out the handle outward. Do not pull the handle fully outward. The blue LED blinks indicating that the blade power-down process is ongoing.

Data Loss

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

Wait until the blue LED is steadily lit before removing the blade.

2. Wait until the blue LED is illuminated permanently. Unfasten the screws of the face plate, then unlatch the handle and pull the handle fully outward until the blade is detached from the shelf.

If the LED continues to blink, it is possible that the upper layer software has rejected the blade extraction request.

3. Remove the face plate cables, if applicable.
4. Remove the blade from the shelf.

2.7 AMC Module Installation and Removal

The blade comes with an AMC bay. For more information, see *AMC Bay,* on page 107.

Electrostatic discharge and incorrect installation and removal of the blade can damage circuits or shorten its life.

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

AMC Module Damage

The AMC bay should only be used with AMC modules that are officially supported by Penguin Solutions. Installing and operating other AMC modules may damage the AMC bay and the blade.

NOTICE

Limitation of Operating Temperature Range

Installing AMC modules with small operating temperature ranges into the ATCA-F140 may further restrict the operating temperature range of the ATCA-F140.

Make sure that the operating temperature of any installed AMC modules and the ATCA-F140 as a bundle are within allowed limits.

NOTICE

Shelf Cooling and EMC Compliance Violation

An empty AMC bay may result in poor shelf cooling and strong EMC radiation and lead to EMC compliance violation.

Always cover empty or unused AMC bays with a filler panel.

Installation Procedure

This procedure assumes that the AdvancedATCA system is powered. If your system is powered down, you can disregard the instructions regarding the blue LED.

1. If the AMC bay is occupied by an AMC filler panel, remove the filler panel.
2. Make sure that the AMC module handle is in the extracted position: pulled outward, away from the face plate.

3. Using your thumb, apply equal and steady pressure on the face plate as necessary to carefully slide the AMC module into the guide rails.
4. Continue pushing the module gently along the guide rails until the module is fully engaged with the connector. Avoid using excessive force.
5. Wait for the blue LED to glow. The blue LED glows when the AMC module is completely engaged with the connector.
6. Press module handle inwards towards the face plate to lock the AMC module into the AMC bay.
7. 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.
8. Observe blue LED status/activity. The module is fully installed when the blue LED stops blinking and stays OFF.

Removal Procedure

This procedure assumes that the AdvancedATCA system is powered. If your system is powered down, you can disregard the instructions regarding the blue LED.

1. Remove any cables that are connected to the AMC module face plate connectors.
2. Gently pull the module latch outwards, approximately 3mm away from its locked position.
3. Wait for the blue LED to perform short blinks, and then glow steadily.

NOTICE
Data Loss **Removing the blade with the blue LED still blinking causes data loss.** **Wait until the blue LED is steadily lit, before removing the blade.**

4. Once the blue LED glows steadily, 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.
5. Install the filler panel.

2.8 Installing and Removing SFP Modules

This section describes how to install and remove SFP modules.

Eye Damage

Optical SFP modules may emit laser radiation when no cable is connected.

Avoid staring into open apertures to avoid damage to your eyes.

Personal Injury and Damage of the Blade, RTM and SFP Modules

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

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

Personal Injury

Optical SFP modules may be classified as laser products. When installing and using any of these SFP modules, the regulations which correspond to the respective laser class apply to the whole blade and RTM. Non-compliance with these regulations may lead to personal injury.

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

SFP modules can be installed/removed while the blade and RTM is both powered and or powered off. The presence and also the type of SFP modules is automatically detected.

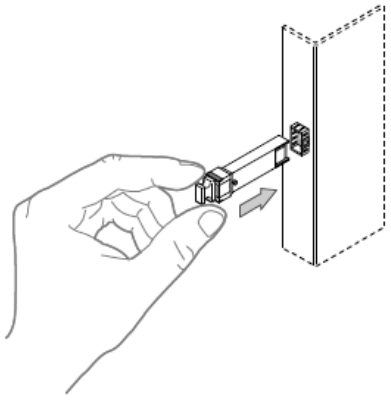
The maximum power consumption of each SFP module should be 1W. The maximum power consumption of each SFP+ module should be 1.5W.

2.8.1 Installing an SFP Module

Installation Procedure

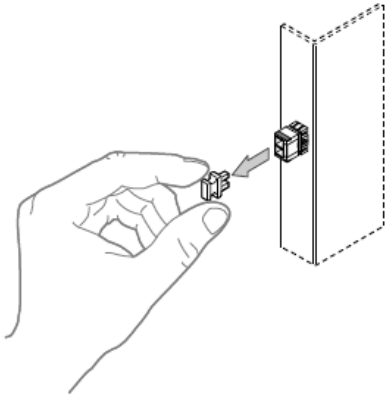
In order to install an SFP module, proceed as follows:

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



The SFP/SFP+ module will fully insert only if it is installed in the proper orientation. If it does not fully insert, rotate it 180 degrees and re-install.

2. Remove the optical port plug.

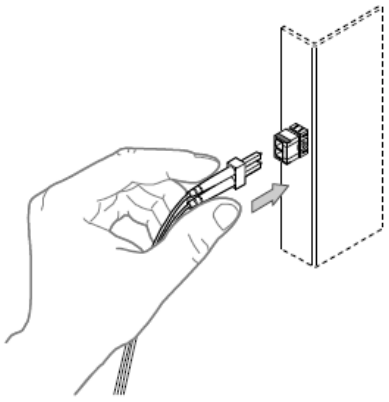


SFP Module Damage

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

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

3. Connect the network cable to the SFP module.

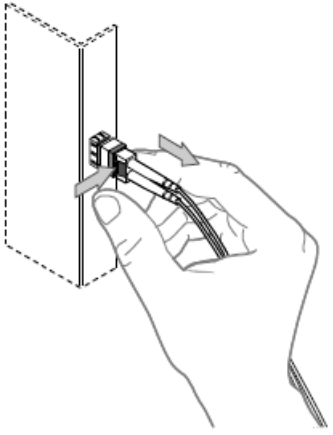


2.8.2 Removing an SFP Module

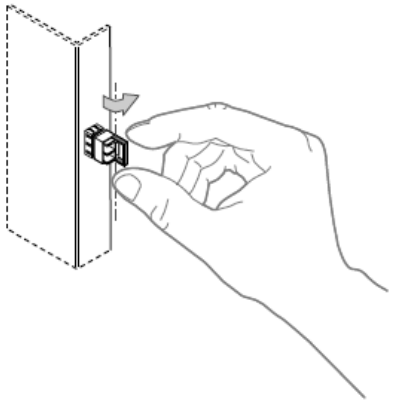
Removal Procedure

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

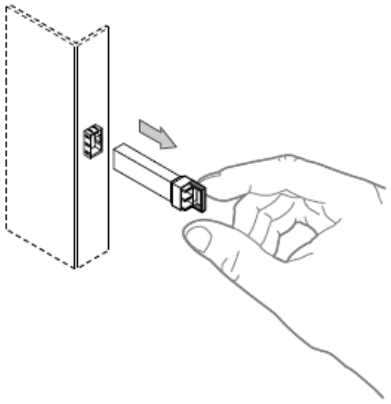
1. Remove any connected cable from the SFP module.



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



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



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

SFP Module Damage

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

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

2.9 Installing and Removing QSFP+ Modules

This section describes the installation and removal process of the Quad Small Form-factor Pluggable Plus (QSFP+) transceiver modules.

Eye Damage

Optical QSFP+ modules may emit laser radiation when no cable is connected.

Avoid staring into open apertures to avoid damage to your eyes.

Personal Injury and Damage of the Blade, RTM and QSFP+ Modules

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

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

Personal Injury

Optical QSFP+ modules may be classified as laser products. When installing and using any of these QSFP+ modules, the regulations which correspond to the respective laser class apply to the whole blade and RTM. Non-compliance with these regulations may lead to personal injury.

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

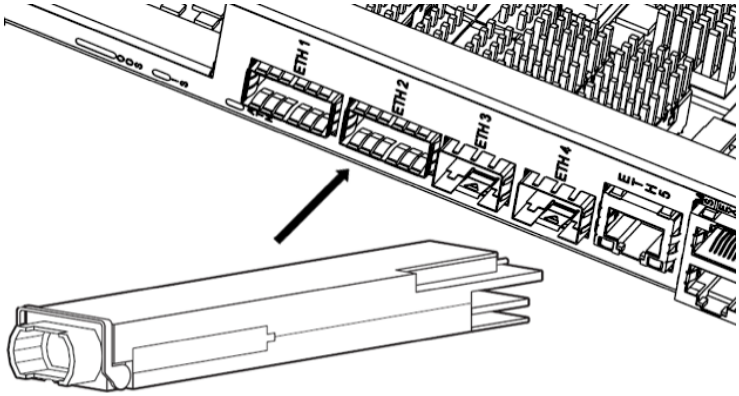
The maximum power consumption of each QSFP+ module should be 2W.

2.9.1 Installing QSFP+ Transceiver Modules

Installation Procedure

Before proceeding wit h the installation, make sure that you are working in an ESD-safe environment or wearing an ESD wrist strap or ESD shoes.

1. Remove the QSFP+ transceiver module from its protective packaging. Make sure that it is the correct model and build for your system.
2. If you are using an optical QSFP+ transceiver, remove the optical bore dust plug and set it aside.
3. Align the QSFP+ transceiver to the front of the module's transceiver socket opening. Slide it carefully into the socket until the QSFP+ transceiver connects with the socket electrical connector.
   – For QSFP+ transceivers with a bail-clasp latch, keep it aligned in a vertical position.



- For QSFP+ transceivers with a pull-tab, make sure that the identifier label is on top.
- Firmly press the front of the QSFP+ transceiver to push fully the transceiver in the module's transceiver socket. Make sure that it is fully engaged to prevent it from being accidentally disconnected.
- For optical QSFP+ modules, reinstall the dust plug into the portal. Do not remove it until the network interface cable will be attached.

2.9.2 Removing QSFP+ Transceiver Modules

Removal Procedure

1. For optical QSFP+ transceivers, disconnect the network interface cable from the QSFP+ transceiver connector.
2. Perform the following steps to remove QSFP+ transceivers with a bail-clasp latch:
   - Turn the bail-clasp down to the horizontal position.
   - Install the dust plug into the transceivers optical bore.
   - Hold the sides of the QSFP+ transceiver and slide it out of the module socket.
3. Perform the following steps to remove QSFP+ transceivers with a pull tab latch:
   - Install the dust plug into the transceiver' optical bore.
   - Hold the tab and pull the receiver gently to release the transceiver from the socket.
   - Slide the transceiver from the socket.
4. Place the QSFP+ transceiver into an anti-static bag.

2.10 Replacing the Battery

The battery provides data retention of seven years summing up all periods of actual data use. Penguin Solutions therefore assumes that there is usually no need to replace the battery except, for example, in case of long-term spare part handling.

Blade/System Damage

Incorrect replacement of lithium batteries can result in a hazardous explosion. Replace the battery as described in this chapter.

PCB and Battery Holder Damage

Removing the battery with a screw driver may damage the PCB or the battery holder. To prevent this damage, do not use a screw driver to remove the battery from its holder.

Data Loss

If the battery voltage drops below the minimum required level, the RTC time will be lost. Replace the battery before seven years of actual battery use have elapsed.

Replacing the battery will result in RTC data loss. The RTC will have to be re-initialized after the battery is replaced.

Installing another battery type other than what is mounted at blade delivery may cause limited operation. This is because other battery types may be specified for other environments or may have a shorter lifespan. Therefore, only use the same type of lithium battery as is already installed.

Replacement Procedure

To replace the battery, proceed as follows:

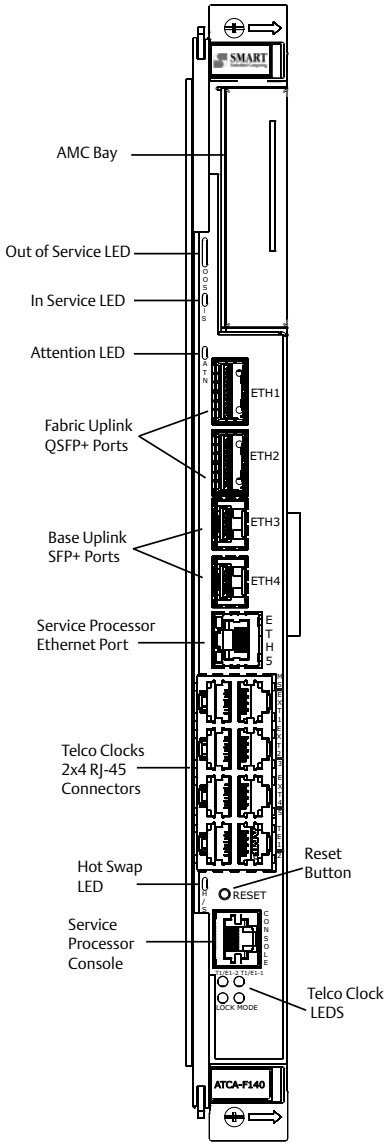
1. Remove the battery. See *Module Connector Locations on page 83* for location.
2. Install the new battery following the positive (+) and negative (-) signs.

Controls, LEDs, and Connectors

3.1 Face Plate

This section describes the details of the ATCA-F140 face plate LEDs. The following figure illustrates the face plate of the blade.

Figure 3-1 ATCA-F140 Face Plate



3.1.1 LEDs

The following table describes the functions of the front panel LEDs.

Table 3-1 Front Panel LEDs

LED	Color	Function
Out of Service	Red	Blade out of service
	Amber	Not used, available only for application usage
In Service	Green	Blade in service
Attention	Yellow	Blade attention required
Hot Swap	Blue	Blade hot swap status
ETH5 Activity	Green	Blinking - ETH5 activity
ETH5 Link	Yellow	10/100/1000 Ethernet link
T1/E1-1 (Telco Clock LED 2)	Yellow	Loss of Signal
	Green	Status OK
	Red	Blinking - Status unknown
T1/E1-2 (Telco Clock LED 4)	Yellow	Loss of Signal
	Green	Status OK
	Red	Blinking - Status unknown
MODE (Telco Clock LED 1)	Yellow	Slave Clock Generator
	Green	On - Master Clock Generator Blinking - Stand Alone Master
	Red	Blinking - Status unknown
LOCK (Telco Clock LED 3)	Yellow	On -Hold Over Blinking - Free Run
	Green	Locked
	Red	Blinking - Status unknown

NOTE: Shaded lines for Telco Clock LED 1, 2, 3 & 4 apply only to the ATCA-F140-TCLK3 blade.

3.2 Face Plate Connectors

The following tables provide the pinout for the face plate connectors.

Table 3-2 Service Processor Ethernet RJ-45 Connector Pin Assignment (J9)

RJ-45 Pin	10Base-T or 100Base-TX	1000Base-T
1	ETH_TX+	ETH_DA+
2	ETH_TX-	ETH_DA-
3	ETH_RX+	ETH_DB+
4		ETH_DC+
5		ETH_DC-
6	ETH_RX-	ETH_DB-
7		ETH_DD+
8		ETH_DD-

Table 3-3 Service Processor Serial RS-232 RJ-45 Connector (J1)

RJ-45 Pin	Function (RS-232)
1	RTS
2	Not used
3	TX
4	GND
5	GND
6	RX
7	Not used
8	CTS

Table 3-4 QSFP+ Connector Pin Assignment

Contact Number	Function	Contact Number	Function
1	GND	38	GND
2	TX2n	37	TX1n
3	TX2p	36	TX1p
4	GND	35	GND
5	TX4n	34	TX3n
6	TX4p	33	TX3p
7	GND	32	GND
8	ModselL	31	LPMode
9	ResetL	30	Vcc1
10	VccRx	29	VccTx
11	SCL	28	IntL
12	SCA	27	ModPrsL
13	GND	26	GND
14	RX3p	25	RX4p
15	RX3n	24	RX4n
16	GND	23	GND
17	RX1p	22	RX2p
18	RX1n	21	RX2n
19	GND	20	GND

Table 3-5 SFP+ Connector Pin Assignment

Contact Number	Function	Contact Number	Function
1	GND	11	GND
2	TX_FAULT	12	RX-
3	TX_DISABLE	13	RX+
4	I2C_SDA	14	GND
5	I2C_SCL	15	VCCr (+3.3V)
6	MOD_ABS	16	VCCt (+3.3V)
7	RS0	17	GND
8	LOS	18	TX+
9	RS1	19	TX-
10	GND	20	GND

3.3 Backplane Connectors

3.3.1 Zone 1

The following table shows the pinout assignment for the Zone 1 ATCA power connector.

Table 3-6 Zone 1 Connector P10 Pin Assignment

Contact Number	Description
1 - 4	Reserved
5	Hardware Address Bit 0
6	Hardware Address Bit 1
7	Hardware Address Bit 2
8	Hardware Address Bit 3
9	Hardware Address Bit 4
10	Hardware Address Bit 5

Table 3-6 Zone 1 Connector P10 Pin Assignment (continued)

Contact Number	Description
11	Hardware Address Bit 6
12	Hardware Address Bit 7
13	IPMB Clock Port A
14	IPMB Data Port A
15	IPMB Clock Port B
16	IPMB Data Port A
17 - 24	Not used
25	Shelf Ground
26	Logic Ground
27	Enable B
28	Voltage Return A
29	Voltage Return B
30	Early -48V A
31	Early -48V B
32	Enable A
33	-48V A
34	-48V A

3.3.2 Zone 2

The following table shows the pinout assignment for the Zone 2 ATCA connectors.

Table 3-7 Connector J20 Pin Assignment

J20								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	CLK1A+	CLK1A-	CLK1B+	CLK1B-	CLK2A+	CLK2A-	CLK2B+	CLK2B-
2	UC_P4_TX+	UC_P4_TX-	UC_P4_RX+	UC_P4_RX-	CLK3A+	CLK3A-	CLK3B+	CLK3B-
3	UC_P2_TX+	UC_P2_TX-	UC_P2_RX+	UC_P2_RX-	UC_P3_TX+	UC_P3_TX-	UC_P3_RX+	UC_P3_RX-
4	UC_P0_TX+	UC_P0_TX-	UC_P0_RX+	UC_P0_RX-	UC_P1_TX+	UC_P1_TX-	UC_P1_RX+	UC_P1_RX-
5								
6								
7								
8								
9	FIX_P12_TX2+	FIX_P12_TX2-	FIX_P12_RX2+	FIX_P12_RX2-	FIX_P12_TX3+	FIX_P12_TX3-	FIX_P12_RX3+	FIX_P12_RX3-
10	FIX_P12_TX0+	FIX_P12_TX0-	FIX_P12_RX0+	FIX_P12_RX0-	FIX_P12_TX1+	FIX_P12_TX1-	FIX_P12_RX1+	FIX_P12_RX1-

Table 3-8 Connector J21 Pin Assignment

J21								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	FIX_P11_TX2+	FIX_P11_TX2-	FIX_P11_RX2+	FIX_P11_RX2-	FIX_P11_TX3+	FIX_P11_TX3-	FIX_P11_RX3+	FIX_P11_RX3-
2	FIX_P11_TX0+	FIX_P11_TX0-	FIX_P11_RX0+	FIX_P11_RX0-	FIX_P11_TX1+	FIX_P11_TX1-	FIX_P11_RX1+	FIX_P11_RX1-
3	FIX_P10_TX2+	FIX_P10_TX2-	FIX_P10_RX2+	FIX_P10_RX2-	FIX_P10_TX3+	FIX_P10_TX3-	FIX_P10_RX3+	FIX_P10_RX3-
4	FIX_P10_TX0+	FIX_P10_TX0-	FIX_P10_RX0+	FIX_P10_RX0-	FIX_P10_TX1+	FIX_P10_TX1-	FIX_P10_RX1+	FIX_P10_RX1-
5	FIX_P9_TX2+	FIX_P9_TX2-	FIX_P9_RX2+	FIX_P9_RX2-	FIX_P9_TX3+	FIX_P9_TX3-	FIX_P9_RX3+	FIX_P9_RX3-
6	FIX_P9_TX0+	FIX_P9_TX0-	FIX_P9_RX0+	FIX_P9_RX0-	FIX_P9_TX1+	FIX_P9_TX1-	FIX_P9_RX1+	FIX_P9_RX1-
7	FIX_P8_TX2+	FIX_P8_TX2-	FIX_P8_RX2+	FIX_P8_RX2-	FIX_P8_TX3+	FIX_P8_TX3-	FIX_P8_RX3+	FIX_P8_RX3-
8	FIX_P8_TX0+	FIX_P8_TX0-	FIX_P8_RX0+	FIX_P8_RX0-	FIX_P8_TX1+	FIX_P8_TX1-	FIX_P8_RX1+	FIX_P8_RX1-
9	FIX_P7_TX2+	FIX_P7_TX2-	FIX_P7_RX2+	FIX_P7_RX2-	FIX_P7_TX3+	FIX_P7_TX3-	FIX_P7_RX3+	FIX_P7_RX3-
10	FIX_P7_TX0+	FIX_P7_TX0-	FIX_P7_RX0+	FIX_P7_RX0-	FIX_P7_TX1+	FIX_P7_TX1-	FIX_P7_RX1+	FIX_P7_RX1-

Table 3-9 Connector J22 Pin Assignment

J22								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	FIX_P6_TX2+	FIX_P6_TX2-	FIX_P6_RX2+	FIX_P6_RX2-	FIX_P6_TX3+	FIX_P6_TX3-	FIX_P6_RX3+	FIX_P6_RX3-
2	FIX_P6_TX0+	FIX_P6_TX0-	FIX_P6_RX0+	FIX_P6_RX0-	FIX_P6_TX1+	FIX_P6_TX1-	FIX_P6_RX1+	FIX_P6_RX1-
3	FIX_P5_TX2+	FIX_P5_TX2-	FIX_P5_RX2+	FIX_P5_RX2-	FIX_P5_TX3+	FIX_P5_TX3-	FIX_P5_RX3+	FIX_P5_RX3-
4	FIX_P5_TX0+	FIX_P5_TX0-	FIX_P5_RX0+	FIX_P5_RX0-	FIX_P5_TX1+	FIX_P5_TX1-	FIX_P5_RX1+	FIX_P5_RX1-
5	FIX_P4_TX2+	FIX_P4_TX2-	FIX_P4_RX2+	FIX_P4_RX2-	FIX_P4_TX3+	FIX_P4_TX3-	FIX_P4_RX3+	FIX_P4_RX3-
6	FIX_P4_TX0+	FIX_P4_TX0-	FIX_P4_RX0+	FIX_P4_RX0-	FIX_P4_TX1+	FIX_P4_TX1-	FIX_P4_RX1+	FIX_P4_RX1-
7	FIX_P3_TX2+	FIX_P3_TX2-	FIX_P3_RX2+	FIX_P3_RX2-	FIX_P3_TX3+	FIX_P3_TX3-	FIX_P3_RX3+	FIX_P3_RX3-
8	FIX_P3_TX0+	FIX_P3_TX0-	FIX_P3_RX0+	FIX_P3_RX0-	FIX_P3_TX1+	FIX_P3_TX1-	FIX_P3_RX1+	FIX_P3_RX1-
9	FIX_P2_TX2+	FIX_P2_TX2-	FIX_P2_RX2+	FIX_P2_RX2-	FIX_P2_TX3+	FIX_P2_TX3-	FIX_P2_RX3+	FIX_P2_RX3-
10	FIX_P2_TX0+	FIX_P2_TX0-	FIX_P2_RX0+	FIX_P2_RX0-	FIX_P2_TX1+	FIX_P2_TX1-	FIX_P2_RX1+	FIX_P2_RX1-

Table 3-10 Connector J23 Pin Assignment

J23								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	FIX_P1_TX2+	FIX_P1_TX2-	FIX_P1_RX2+	FIX_P1_RX2-	FIX_P1_TX3+	FIX_P1_TX3-	FIX_P1_RX3+	FIX_P1_RX3-
2	FIX_P1_TX0+	FIX_P1_TX0-	FIX_P1_RX0+	FIX_P1_RX0-	FIX_P1_TX1+	FIX_P1_TX1-	FIX_P1_RX1+	FIX_P1_RX1-
3								
4								
5	BIX_P1A_TX+	BIX_P1A_TX-	BIX_P1A_RX+	BIX_P1A_RX-	BIX_P1B_TX+	BIX_P1B_TX-	BIX_P1B_RX+	BIX_P1B_RX-
6	BIX_P2_DA+	BIX_P2_DA-	BIX_P2_DB+	BIX_P2_DB-	BIX_P2_DC+	BIX_P2_DC-	BIX_P2_DD+	BIX_P2_DD-
7	BIX_P3_DA+	BIX_P3_DA-	BIX_P3_DB+	BIX_P3_DB-	BIX_P3_DC+	BIX_P3_DC-	BIX_P3_DD+	BIX_P3_DD-
8	BIX_P4_DA+	BIX_P4_DA-	BIX_P4_DB+	BIX_P4_DB-	BIX_P4_DC+	BIX_P4_DC-	BIX_P4_DD+	BIX_P4_DD-
9	BIX_P5_DA+	BIX_P5_DA-	BIX_P5_DB+	BIX_P5_DB-	BIX_P5_DC+	BIX_P5_DC-	BIX_P5_DD+	BIX_P5_DD-
10	BIX_P6_DA+	BIX_P6_DA-	BIX_P6_DB+	BIX_P6_DB-	BIX_P6_DC+	BIX_P6_DC-	BIX_P6_DD+	BIX_P6_DD-

Table 3-11 Connector J24 Pin Assignment

J24								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	BIX_P7_DA+	BIX_P7_DA-	BIX_P7_DB+	BIX_P7_DB-	BIX_P7_DC+	BIX_P7_DC-	BIX_P7_DD+	BIX_P7_DD-
2	BIX_P8_DA+	BIX_P8_DA-	BIX_P8_DB+	BIX_P8_DB-	BIX_P8_DC+	BIX_P8_DC-	BIX_P8_DD+	BIX_P8_DD-
3	BIX_P9_DA+	BIX_P9_DA-	BIX_P9_DB+	BIX_P9_DB-	BIX_P9_DC+	BIX_P9_DC-	BIX_P9_DD+	BIX_P9_DD-
4	BIX_P10_DA+	BIX_P10_DA-	BIX_P10_DB+	BIX_P10_DB-	BIX_P10_DC+	BIX_P10_DC-	BIX_P10_DD+	BIX_P10_DD-
5	BIX_P11_DA+	BIX_P11_DA-	BIX_P11_DB+	BIX_P11_DB-	BIX_P11_DC+	BIX_P11_DC-	BIX_P11_DD+	BIX_P11_DD-
6	BIX_P12_DA+	BIX_P12_DA-	BIX_P12_DB+	BIX_P12_DB-	BIX_P12_DC+	BIX_P12_DC-	BIX_P12_DD+	BIX_P12_DD-
7	BIX_P13_DA+	BIX_P13_DA-	BIX_P13_DB+	BIX_P13_DB-	BIX_P13_DC+	BIX_P13_DC-	BIX_P13_DD+	BIX_P13_DD-
8	BIX_P14_DA+	BIX_P14_DA-	BIX_P14_DB+	BIX_P14_DB-	BIX_P14_DC+	BIX_P14_DC-	BIX_P14_DD+	BIX_P14_DD-
9	BIX_P15_DA+	BIX_P15_DA-	BIX_P15_DB+	BIX_P15_DB-	BIX_P15_DC+	BIX_P15_DC-	BIX_P15_DD+	BIX_P15_DD-
10	BIX_P16_DA+	BIX_P16_DA-	BIX_P16_DB+	BIX_P16_DB-	BIX_P16_DC+	BIX_P16_DC-	BIX_P16_DD+	BIX_P16_DD-

3.3.3 Zone 3

The position of the Zone 3 connectors is specified in the ATCA Rear Transition Module I/O Specification JETIS L1.3-601. The connector pinouts are listed in the following table.

Table 3-12 Connector J30 Pin Assignment

J30								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	+12V_RTM	RTM_INT_L	SynchE_CLK_O+	SynchE_CLK_O-	RTM_REF_CLK	RTM_PS1_L	BIX_P20_RTM_TX+	BIX_P20_RTM_TX-
2	BIX_MDC	BIX_MDIO	BIX_XG_MDC	BIX_XG_MDIO	FIX_XG_MDC	FIX_XG_MDIO	BIX_P20_RTM_RX+	BIX_P20_RTM_RX-
3	BCM84740_RTM1_PCS_LINK	BCM84740_RTM2_PCS_LINK	SyncE_CLK25_0+	SyncE_CLK25_O-				
4	FIX_GE0_TX+	FIX_GE0_TX-	FIX_GE0_RX+	FIX_GE0_RX-	FIX_GE1_TX+	FIX_GE1_TX-	FIX_GE1_RX+	FIX_GE1_RX-
5								
6								
7								
8								
9								
10								

Table 3-13 Connector J31 Pin Assignment

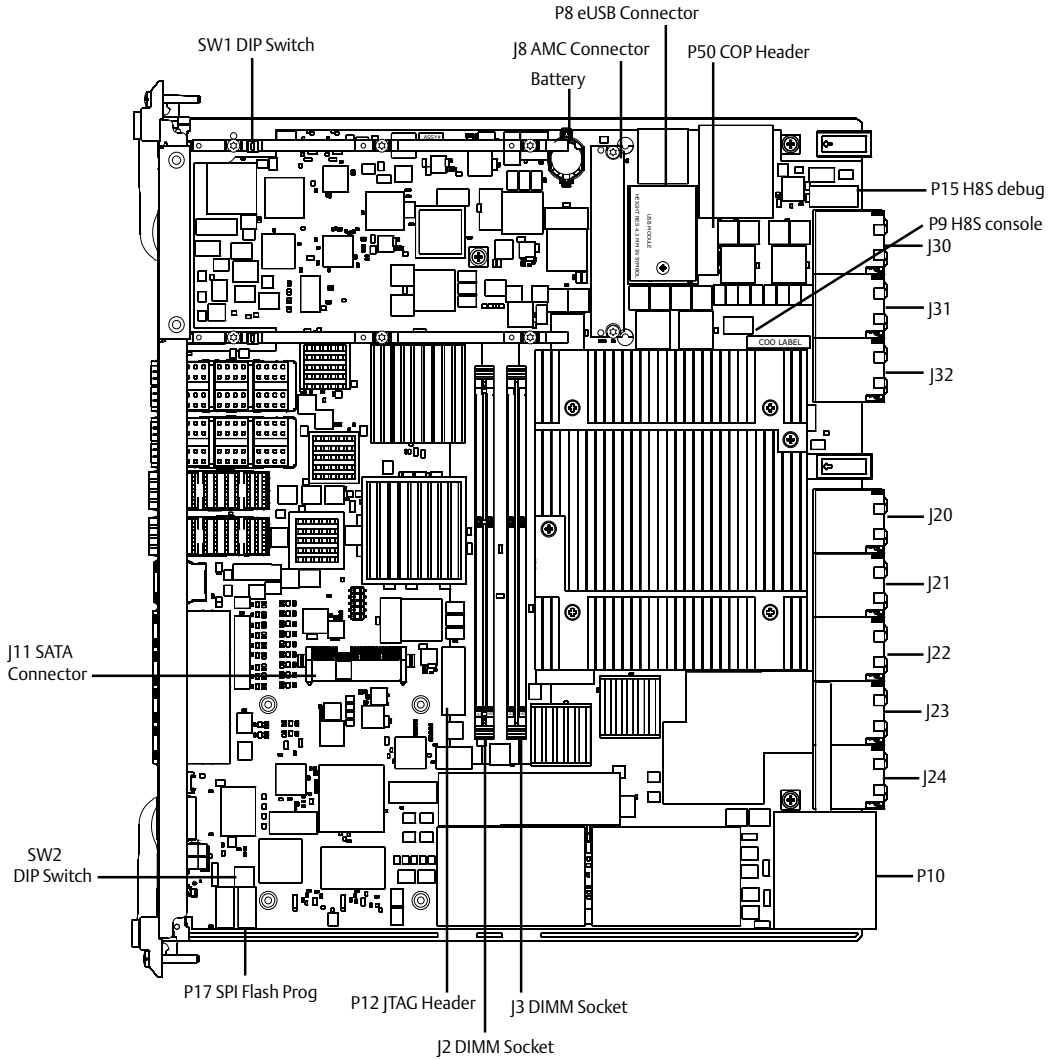
J31								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	BIX_XG0_TX2+	BIX_XG0_TX2-	BIX_XG0_RX2+	BIX_XG0_RX2-	BIX_XG0_TX3+	BIX_XG0_TX3-	BIX_XG0_RX3+	BIX_XG0_RX3-
2	BIX_XG0_TX0+	BIX_XG0_TX0-	BIX_XG0_RX0+	BIX_XG0_RX0-	BIX_XG0_TX1+	BIX_XG0_TX1-	BIX_XG0_RX1+	BIX_XG0_RX1-
3	BIX_XG1_TX2+	BIX_XG1_TX2-	BIX_XG1_RX2+	BIX_XG1_RX2-	BIX_XG1_TX3+	BIX_XG1_TX3-	BIX_XG1_RX3+	BIX_XG1_RX3-
4	BIX_XG1_TX0+	BIX_XG1_TX0-	BIX_XG1_RX0+	BIX_XG1_RX0-	BIX_XG1_TX1+	BIX_XG1_TX1-	BIX_XG1_RX1+	BIX_XG1_RX1-
5	AMC_TX8+	AMC_TX8-	AMC_RX8+	AMC_RX8-	BIX_P21_TX+	BIX_P21_TX-	BIX_P21_RX+	BIX_P21_RX-
6	AMC_TX9+	AMC_TX9-	AMC_RX9+	AMC_RX9-	BIX_P22_TX+	BIX_P22_TX-	BIX_P22_RX+	BIX_P22_RX-
7	AMC_TX10+	AMC_TX10-	AMC_RX10+	AMC_RX10-	BIX_P23_TX+	BIX_P23_TX-	BIX_P23_RX+	BIX_P23_RX-
8	AMC_TX11+	AMC_TX11-	AMC_RX11+	AMC_RX11-	BIX_P24_TX+	BIX_P24_TX-	BIX_P24_RX+	BIX_P24_RX-
9	BIX_P13_TX+	BIX_P13_TX-	BIX_P13_RX+	BIX_P13_RX-	BIX_P14_TX+	BIX_P14_TX-	BIX_P14_RX+	BIX_P14_RX-
10	+12V_RTM	+3.3_MP_RTM	PCIE_REFCLK+	PCIE_REFCLK-	SYNCHE_RC2	GPS_1PPS	SYNCHE_RC1	RTM_ENABLE_L

Table 3-14 Connector J32 Pin Assignment

J32								
Row	**Column A**	**Column B**	**Column C**	**Column D**	**Column E**	**Column F**	**Column G**	**Column H**
1	FIX_P15_TX2+	FIX_P15_TX2-	FIX_P15_RX2+	FIX_P15_RX2-	FIX_P15_TX3+	FIX_P15_TX3-	FIX_P15_RX3+	FIX_P15_RX3-
2	FIX_P15_TX0+	FIX_P15_TX0-	FIX_P15_RX0+	FIX_P15_RX0-	FIX_P15_TX1+	FIX_P15_TX1-	FIX_P15_RX1+	FIX_P15_RX1-
3	FIX_P14_TX2+	FIX_P14_TX2-	FIX_P14_RX2+	FIX_P14_RX2-	FIX_P14_TX3+	FIX_P14_TX3-	FIX_P14_RX3+	FIX_P14_RX3-
4	FIX_P14_TX0+	FIX_P14_TX0-	FIX_P14_RX0+	FIX_P14_RX0-	FIX_P14_TX1+	FIX_P14_TX1-	FIX_P14_RX1+	FIX_P14_RX1-
5								
6								
7								
8								
9	RTM_SCL	RTM_SDA	SPI_CS2_L	RTM_RST_L	RTM_SW_CLOSED_L	RTM_PWRGOOD	BIX_P19_RTM_TX+	BIX_P19_RTM_TX-
10	+12V_RTM	+12V_RTM	SPI_MISO	SPI_MOSI	SPI_SCK	RTM_PS0_L	BIX_P19_RTM_RX+	BIX_P19_RTM_RX-

3.4 Module Connectors

Figure 3-2 Module Connector Locations



3.4.1 AMC Connector

The following table shows the AMC connector pinout assignment.

Table 3-15 AMC Bay Connector Pin Assignment

AMC Bay									
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	GND	35	Unused	69	AMC_RX7- (to 82571EB)	103	AMC_TX10+ (to RTM)	137	GND
2	+12V	36	Unused	70	GND	104	GND	138	TCLKD-
3	PS1#	37	GND	71	IPMI_SDA_L	105	AMC_RX11- (to RTM)	139	TCLKD+
4	+3.3V IPMI	38	Unused	72	+12V	106	AMC_RX11+ (to RTM)	140	GND
5	GA0	39	Unused	73	GND	107	GND	141	Unused
6	Reserved	40	GND	74	TCLKA+	108	AMC_TX11- (to RTM)	142	Unused
7	GND	41	ENABLE#	75	TCLKA-	109	AMC_TX11+ (to RTM)	143	GND
8	Reserved	42	+12V	76	GND	110	GND	144	Unused
9	+12V	43	GND	77	TCLKB+	111	Unused	145	Unused
10	GND	44	AMC_TX4+ (to 82571EB)	78	TCLKB-	112	Unused	146	GND
11	AMC_TX0+ (to BIX_P18)	45	AMC_TX4- (to 82571EB)	79	GND	113	GND	147	Unused
12	AMC_TX0- (to BIX_P18)	46	GND	80	PCIe_CLK+	114	Unused	148	Unused
13	GND	47	AMC_RX4+ (to 82571EB)	81	PCIe_CLK-	115	Unused	149	GND
14	AMC_RX0+ (to BIX_P18)	48	AMC_RX4- (to 82571EB)	82	GND	116	GND	150	Unused
15	AMC_RX0- (to BIX_P18)	49	GND	83	PS0#	117	Unused	151	Unused

Table 3-15 AMC Bay Connector Pin Assignment (continued)

AMC Bay									
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
16	GND	50	AMC_TX5+ (to 82571EB)	84	+12V	118	Unused	152	GND
17	GA1	51	AMC_TX5- (to 82571EB)	85	GND	119	GND	153	P30_B7
18	+12V	52	GND	86	GND	120	Unused	154	P30_A7
19	GND	53	AMC_RX5+ (to 82571EB)	87	AMC_RX8- (to RTM)	121	Unused	155	GND
20	AMC_TX1+ (to FIX_GE3)	54	AMC_RX5- (to 82571EB)	88	AMC_RX8+ (to RTM)	122	GND	156	Unused
21	AMC_TX1- (to FIX_GE3)	55	GND	89	GND	123	Unused	157	Unused
22	GND	56	IPMI_SCL_L	90	AMC_TX8- (to RTM)	124	Unused	158	GND
23	AMC_RX1+ (to FIX_GE3)	57	+12V	91	AMC_TX8+ (to RTM)	125	GND	159	Unused
24	AMC_RX1- (to FIX_GE3)	58	GND	92	GND	126	Unused	160	Unused
25	GND	59	AMC_TX6+ (to 82571EB)	93	AMC_RX9- (to RTM)	127	Unused	161	GND
26	GA2	60	AMC_TX6- (to 82571EB)	94	AMC_RX9+ (to RTM)	128	GND	162	Unused
27	+12V	61	GND	95	GND	129	Unused	163	Unused
28	GND	62	AMC_RX6+ (to 82571EB)	96	AMC_TX9- (to RTM)	130	Unused	164	GND
29	AMC_TX2+ (to SATA mux)	63	AMC_RX6- (to 82571EB)	97	AMC_TX9+ (to RTM)	131	GND	165	TCK
30	AMC_TX2- (to SATA mux)	64	GND	98	GND	132	Unused	166	TMS

Table 3-15 AMC Bay Connector Pin Assignment (continued)

AMC Bay									
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
31	GND	65	AMC_TX7+ (to 82571EB)	99	AMC_RX10- (to RTM)	133	Unused	167	TRST#
32	AMC_RX2+ (to SATA mux)	66	AMC_TX7- (to 82571EB)	100	AMC_RX10+ (to RTM)	134	GND	168	TDO
33	AMC_RX2- (to SATA mux)	67	GND	101	GND	135	TCLKC-	169	TDI
34	GND	68	AMC_RX7+ (to 82571EB)	102	AMC_TX10- (to RTM)	136	TCLKC+	170	GND

3.4.2 Memory DIMM Socket

The following table provides the pinout for the 240-pin memory DIMM socket.

Table 3-16 J2/J3 Memory Socket Pin Assignment

240-Pin DDR3 DIMM Socket													
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	VREF	36	DQ26	71	BA0	106	DQ51	141	DQ21	176	+1.5V	211	GND
2	GND	37	DQ27	72	+1.5V	107	GND	142	GND	177	A8	212	DM5
3	DQ0	38	GND	73	WE#	108	DQ56	143	DM2	178	A6	213	NU
4	DQ1	39	CB0	74	CAS#	109	DQ57	144	NU	179	+1.5V	214	GND
5	GND	40	CB1	75	+1.5V	110	GND	145	GND	180	A3	215	DQ46
6	DQS0#	41	GND	76	CS1#	111	DQS7#	146	DQ22	181	A1	216	DQ47
7	DQS0	42	DQS8#	77	ODT1	112	DQS7	147	DQ23	182	+1.5V	217	GND
8	GND	43	DQS8	78	+1.5V	113	GND	148	GND	183	+1.5V	218	DQ52
9	DQ2	44	GND	79	NU	114	DQ58	149	DQ28	184	CK0	219	DQ53
10	DQ3	45	CB2	80	GND	115	DQ59	150	DQ29	185	CK0#	220	GND

Table 3-16 J2/J3 Memory Socket Pin Assignment (continued)

240-Pin DDR3 DIMM Socket													
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
11	GND	46	CB3	81	DQ32	116	GND	151	GND	186	+1.5V	221	DM6
12	DQ8	47	GND	82	DQ33	117	SA0	152	DM3	187	EVENT #	222	NU
13	DQ9	48	VTT	83	GND	118	SCL	153	NU	188	A0	223	GND
14	GND	49	VTT	84	DQS4#	119	SA2	154	GND	189	+1.5V	224	DQ54
15	DQS1#	50	CKE0	85	DQS4	120	VTT	155	DQ30	190	BA1	225	DQ55
16	DQS1	51	+1.5V	86	GND	121	GND	156	DQ31	191	+1.5V	226	GND
17	GND	52	BA2	87	DQ34	122	DQ4	157	GND	192	RAS#	227	DQ60
18	DQ10	53	ERROUT	88	DQ35	123	DQ5	158	CB4	193	CS0#	228	DQ61
19	DQ11	54	+1.5V	89	GND	124	GND	159	CB5	194	+1.5V	229	GND
20	GND	55	A11	90	DQ40	125	DM0	160	GND	195	ODT0	230	DM7
21	DQ16	56	A7	91	DQ41	126	NU	161	DM8	196	A13	231	NU
22	DQ17	57	+1.5V	92	GND	127	GND	162	NU	197	+1.5V	232	GND
23	GND	58	A5	93	DQS5#	128	DQ6	163	GND	198	NC	233	DQ62
24	DQS2#	59	A4	94	DQS5	129	DQ7	164	CB6	199	GND	234	DQ63
25	DQS2	60	+1.5V	95	GND	130	GND	165	CB7	200	DQ36	235	GND
26	GND	61	A2	96	DQ42	131	DQ12	166	GND	201	DQ37	236	+3.3V
27	DQ18	62	+1.5V	97	DQ43	132	DQ13	167	NC	202	GND	237	SA1
28	DQ19	63	CK1	98	GND	133	GND	168	RESET #	203	DM4	238	SDA
29	GND	64	CK1#	99	DQ48	134	DM1	169	CKE1	204	NU	239	GND
30	DQ24	65	+1.5V	100	DQ49	135	NU	170	+1.5V	205	GND	240	VTT
31	DQ25	66	+1.5V	101	GND	136	GND	171	A15	206	DQ38		
32	GND	67	Vrefca	102	DQS6#	137	DQ14	172	A14	207	DQ39		

Table 3-16 J2/J3 Memory Socket Pin Assignment (continued)

240-Pin DDR3 DIMM Socket													
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
33	DQS3#	68	Par_In	103	DQS6	138	DQ15	173	+1.5V	208	GND		
34	DQS3	69	+1.5V	104	GND	139	GND	174	A12	209	DQ44		
35	GND	70	A10	105	DQ50	140	DQ20	175	A9	210	DQ45		

3.4.3 SAS/SATA Connector

The following table shows the pinout assignment for the SAS/SATA connector. The blade only supports SATA drives.

Table 3-17 J11 SAS/SATA Connector Pin Assignment

Contact Number	Description	Contact Number	Description
P1	NC	S1	GND
GE21	NC	S2	DRIVE_RX+ (input)
P3	NC	S3	DRIVE_RX- (input)
P4	GND	S4	GND
P5	GND	S5	DRIVE_TX- (output)
P6	GND	S6	DRIVE_TX+ (output)
P7	+5V	S7	GND
P8	+5V	S8	NC
P9	+5V	S9	NC
P10	GND	S10	NC
P11	NC	S11	NC
P12	GND	S12	NC
P13	NC	S13	NC
P14	NC	S14	NC

Table 3-17 J11 SAS/SATA Connector Pin Assignment (continued)

Contact Number	Description	Contact Number	Description
P15	NC		

3.4.4 Embedded USB Connector

The ATCA-F140 contains a 10-pin 2mm header for an embedded USB module. The following table shows the pinout assignment for the eUSB header.

Table 3-18 P8 eUSB Header Pin Assignment

Contact Number	Description	Contact Number	Description
1	+5V	2	No Connect
3	Data-	4	No Connect
5	Data+	6	No Connect
7	GND	8	No Connect
9	No Pin Key	10	No Connect

3.4.5 Processor COP Header

The ATCA-F140 contains a 16-pin 0.1" header for the P2020 JTAG COP header. The following table shows the pinout assignment for the processor COP header.

Table 3-19 P50 COP Header Pin Assignment

Contact Number	Description	Contact Number	Description
1	COP_TDO	2	+3.3V pull-up
3	COP_TDI	4	COP_TRST_L
5	+3.3V pull-up	6	COP_VDD_SENSE
7	COP_TCK	8	COP_CHKSTP_IN_L
9	COP_TMS	10	No Connect
11	COP_SRESET_L	12	COP_PRESENT_L

Table 3-19 P50 COP Header Pin Assignment (continued)

Contact Number	Description	Contact Number	Description
13	COP_HRESET_L	14	No Pin Key
15	COP_CHKSTP_OUT_L	16	GND

3.4.6 Asset JTAG Header

The ATCA-F140 contains a 20-pin 0.1" header for an Asset JTAG header. The pinout for the header is given in the following table.

Table 3-20 P12 Asset JTAG Header Pin Assignment

Contact Number	Description	Contact Number	Description
1	TCK	2	JTAG_EN_L (GND on cable)
3	TDO	4	GND
5	TMS	6	GND
7	TRST_L	8	GND
9	TDI	10	GND
11	No Pin Key	12	Reserved
13	GND	14	AUTO_WRITE_L
15	GND	16	DIO1
17	GND	18	DIO2
19	GND	20	DIO3

3.4.7 H8S Console and Programming Header

The ATCA-F140 contains an 8-pin 0.1" header to provide access to the H8S serial console and to enable the H8S boot loader for initial programming. The H8S boot loader is enabled when shunts are installed shorting pins 2 to pin 4 and pin 6 to pin 8. The following table shows the pinout assignment for this header.

Table 3-21 P9 H8S Console Header Pin Assignment

Contact Number	Description	Dir	Contact Number	Description	Dir
1	H8S_TXD	Out	2	H8S_MD1	In
3	GND	N/A	4	Pull down	Out
5	H8S_RXD	IN	6	H8S_MD2#	In
7	GND	NA	8	Pull down	Out

3.5 Switches

Mechanical switches are provided for debug configuration only. All switches settings are OFF by default. Setting any switches to the ON state may conflict with normal blade operation.

Table 3-22 Mechanical Switches

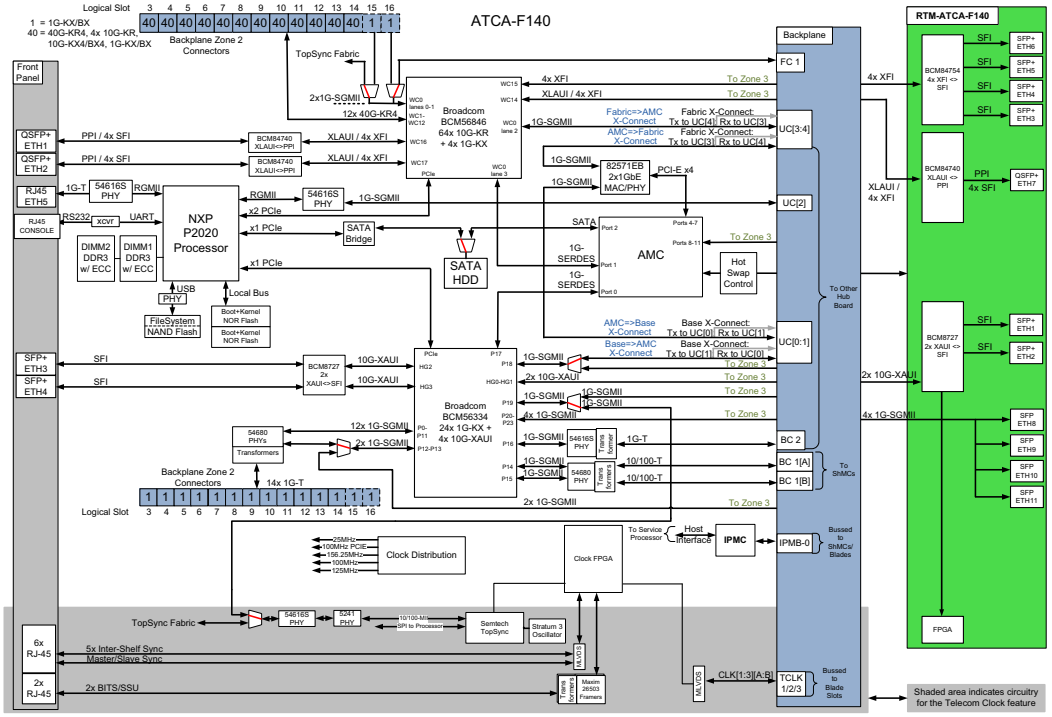
Switch	Options	Default
SW1.1	Manual power enable of +12V OFF: +12V power is controlled by IPMC ON: +12V power enabled	OFF
SW1.2	Manual power enable of POL supplies OFF: POL power is controlled by IPMC ON: POL supplies enabled	OFF
SW1.3	Manual power enable of AMC and RTM OFF: AMC and RTM power are controlled by IPMC ON: AMC and RTM power enabled	OFF
SW1.4	Disable IPMC Watchdog Timer OFF: IPMC watchdog timer enabled ON: IPMC watchdog timer disabled	OFF

Functional Description

4.1 Block Diagram

The following block diagram provides a high level functional view of the ATCA-F140 blade and its interfaces to the front panel, backplane, and RTM.

Figure 4-1 ATCA-F140 Block Diagram



4.2 Processor

The ATCA-F140 utilizes an NXP QorIQ P2020 processor. The speed grade used on the ATCA-F140 is 1.0GHz.

The QorIQ P2020 Integrated Processor provides the following features:

- Dual e500 cores
- On-die 32KB L1 cache for each core
- On-die common 512KB L2 cache with ECC
- DDR3 memory controller and interface

- Programmable interrupt controller
- Three PCI Express interfaces
- 4-channel DMA controller
- Three 10/100/1000 Gigabit Ethernet MACs
- One high speed USB interface
- Enhanced secure digital (SD) host controller
- SPI interface
- Two I^2C controllers
- Security engine with XOR acceleration
- JTAG interface

4.3 Memory

4.3.1 Memory Interface

The QorIQ P2020 Integrated Processor provides an on-chip DDR3 compliant memory controller with the following features:

- Programmable timing supporting DDR3 SDRAM
- 64-bit data interface
- Full ECC support
- Sleep mode support for self-refresh SDRAM
- On-die termination support when using DDR3
- Supports auto refreshing
- Registered DIMM support
- +1.5V DDR3 compatible interface

4.3.2 Memory Sockets

Two 240-pin DDR3 DIMM sockets are provided on the ATCA-F140 to host up to 2GB of memory in each DIMM socket using readily available single or dual rank DDR3 registered DIMMs. The memory sockets are keyed for DDR3 modules using a 1.5V supply voltage.

4.3.3 Memory Modules

The ATCA-F140 requires very low profile (VLP) DDR3 DIMM modules to fit within the maximum component height profile of an ATCA blade. The ATCA-F140 comes standard with a 2GB SG572568EMR069P2SG module from Smart Modular. Operation with other memory modules is not guaranteed.

Each DIMM module has a serial presents detect (SPD) SROM that provides all necessary information (such as speed, size and type) to the boot firmware. The SPD SROM is read using the I^2C bus that is connected to the processor.

4.3.4 Persistent Memory

Persistent memory is part of the ATCA-F140 DDR memory subsystem. A dedicated register is available in the FPGA to enable or disable persistent memory by software. If persistent memory is enabled, the memory contents of the main memory stays unchanged after any applied reset, except power-up reset. After power-up reset, the persistent memory features is disabled by default.

A special procedure is followed to use the persistent memory feature.

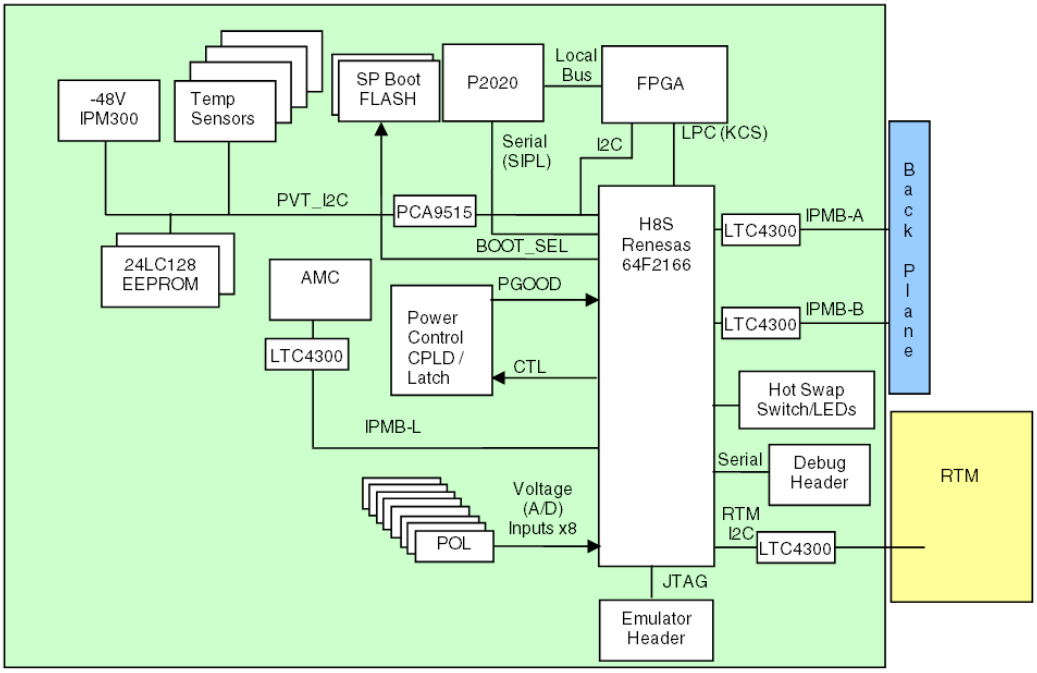
- Set DDR_SDRAM_CFG_2[SR_IE] bit inside the memory controller of the QorIQ P2020Integrated Processor.
- Set these fields in the programmable interrupt controller (PIC) of QorIQ P2020 Integrated Processor.
  - EIVPRn[PRIORITY] to 0xF (highest priority)
  - EIDRn[EP]
- Enable persistent memory feature by setting persistent memory bit inside the FPGA.
- Any reset may occur except for power-up reset.
- The FPGA generates and interrupt (IRQ_L[11]) to the QorIQ P2020 Integrated Processor.
- This external interrupt is steered through the PIC of QorIQ P2020 Integrated Processor to the IRQ_OUT signal.
- The IRQ_OUT signal from the interrupt controller is then automatically detected by the DDR controller, which immediately causes main memory to enter self-refresh mode.
- 1ms after the interrupt signal (IRQ_L[11]) the FPGA asserts the reset signal for at least 50ms.
- Read persistent memory bit in FPGA.
- Initialize main memory but do not clear persistent memory area.

4.4 IPMI

The IPMI function of the ATCA-F140 is implemented using the Penguin Edge™ common ATCA base IPMI design. This building block is based on the Pigeon Point Systems IPMI implementation using the Renesas HD64F2166 microcontroller which is part of the H8S controller family. The IPMI building block implementation provides the following features:

- Two IPMB interfaces to the backplane
- One local IPMB interface for on-board IPMI
- One I^2C/IPMB interface for intelligent or non-intelligent RTMs
- One private I^2C interface for non-intelligent I^2C devices
- Serial UART (SIPL) and KCS/LPC interfaces to the P2020 service processor
- Analog voltage sensor inputs
- Service processor boot flash fall over selection
- Watch-dog timer
- Hot swap control
- Temperature sensors

Figure 4-2 IPMI Block Diagram



4.4.1 Temperature Sensors

The on-board temperature sensors are implemented using National LM75 digital temperature sensors. The following table provides the upper non-critical, critical and non-recoverable temperature thresholds for each of the on-board temperature sensors.

Table 4-1 Temperature Sensors

Device	Temperature Thresholds			Sensor Type
	Non Critical	Critical	Non Recoverable	
Air Inlet Component Side 1	45°C	55°C	72°C	LM75
BIX (BCM56334)	55°C	70°C	115°C	LM75
FIX (BCM56846)	55°C	70°C	110°C	On-die thermal diodes
Service Processor (P2020)	55°C	65°C	115°C	LM75

Table 4-1 Temperature Sensors

Device	Temperature Thresholds			Sensor Type
	Non Critical	Critical	Non Recoverable	
Stratum Clock Oscillator	50°C	55°C	85°C	LM75

4.5 FPGA

A Xilinx XC3S400A Spartan 3A family FPGA is used on the blade to provide a combination of glue logic functions and telecom clock support functions. These functions include the following:

- Local Bus Interface
- Local Bus Decoder
- Low pin count interface between Host and IPMC
- Interrupt Routing Unit
- Reset Controller
- Local Bus to SPI
- Telecom Clocking Support

4.5.1 Serial Configuration PROM

The FPGA is configured at power up by loading the contents of the SPI PROM device. This configuration uses standard SPI flashes. For applications that demand fault recovery during remote upgrade of the FPGA PROM, the ATCA-F140 blade provides a build option to install a backup device. Both PROMs are programmed with identical images during production process. The IPMI infrastructure can be used to select the secondary boot device. The primary PROM device is selected by default.

The SPI device chain also includes the SPI devices for the BCM8727 and BCM84740 microcode so they can be upgraded by the service processor.

There are six different modes of operation for the serial configuration PROM:

- FPGA configuration - The FPGA automatically controls the CSO_B, CCLK and MOSI pins and reads the configuration data over DIN. Whether the configuration data is supplied by SPI flash 1 or 2 is determined by the routing of the CSO_B signal which is controlled by the IPMC. AUX_SS1 and AUX_SS2 are deasserted by virtue of the fact the FPGA is not configured.

- FPGA configuration flash programming - A SPI controller in the FPGA (driven by the service processor over the local bus) controls CSO_B, CCLK and MOSI, and monitors DIN. The IPMC controls the chip select routing to determine which of SPI flash 1 or 2 is programmed. AUX_SS1 and AUX_SS2 are deasserted by the SPI controller.
- BCM8727 microcode flash programming - The same SPI controller in the FPGA is used as with configuration Flash programming, but now AUX_SS1 is driven instead of CSO_B (which is deasserted), allowing SPI flash 3 to be programmed.
- BCM84740 microcode flash programming - The same SPI controller in the FPGA is used as with configuration flash programming, but now AUX_SS2 is driven instead of CSO_B (which is deasserted), allowing SPI flash 4 to be programmed.
- BCM8727 microcode loading - The SPI port from the BCM8727 is routed to AUX_CS, CCLK, MOSI and DIN pins in the FPGA to allow the microcode to be read from SPI flash 3.
- BCM84740 microcode loading - The SPI port from the BCM84740 devices are routed to AUX_CS, CCLK, MOSI and DIN pins in the FPGA to allow the microcode to be read from SPI flash 4.

4.6 Boot and User Flashes

4.6.1 Boot Flash

On the ATCA-F140, two 256 Mbit NOR flash devices are used as boot devices for the service processor. The flash devices used will be Micron PC28F256P33BF or equivalent devices. The data bus width to the flash devices is 16 bit, supporting word accesses only.

4.6.2 Boot Bank Selection and Reprogramming

By default, the payload processor boots from Boot Flash device #1. An IPMI OEM command can be used to send a message to the IPMC to change the boot device. The IPMC provides an IPMI sensor to control the signal BOOT_BANK. If the BOOT_BANK signal is set high, the payload processor will boot from Boot Flash device #2 after reset. The boot device from which the service processor has booted (active bank) is write protected, whereas the redundant boot device can be erased and reprogrammed. This is to prevent inadvertent corruption of both boot banks during firmware updates.

For example, in order to update the firmware in both devices, the user could boot from flash device #1 and update flash device #2. Then the user must switch the active boot bank and boot from flash device #2, which would then enable writes to flash device #1. At this point, the blade has successfully booted the updated firmware image in flash device #2, so it is safe to allow the firmware update of flash device #1

Figure 4-3 Boot Bank Selection Logic

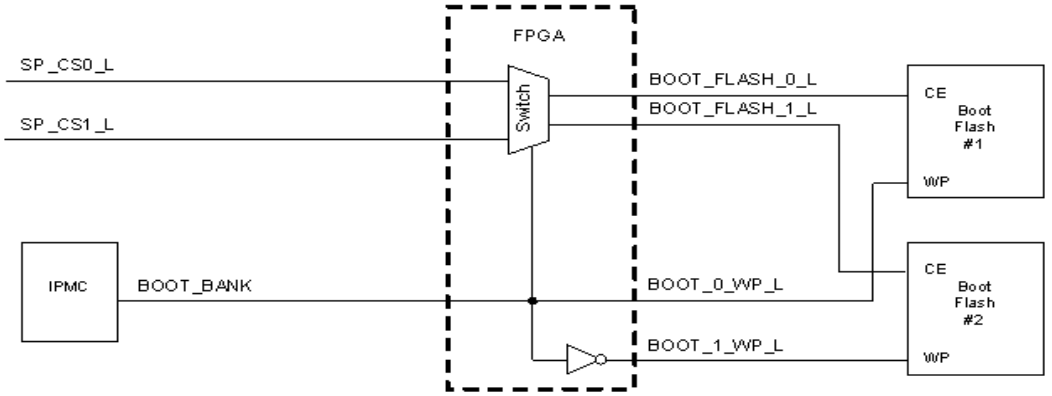


Table 4-2 Boot Bank Write Protection

BOOT SELECT	Chip Select Mapping	Boot Device	Write Protection
Low	BOOT_FLASH_0_L = SP_CS0_L BOOT_FLASH_1_L = SP_CS1_L	Boot Flash #1	Boot Flash #1 = Write Protected Boot Flash #2 = Not Write Protected
High	BOOT_FLASH_0_L = SP_CS1_L BOOT_FLASH_1_L = SP_CS0_L	Boot Flash #2	Boot Flash #1 = Not Write Protected Boot Flash #2 = Write Protected

In case of an IPMC firmware upgrade, the BOOT_BANK signal stays unchanged. After IPMC firmware update is finished, the IPMC reads the status of BOOT_BANK before driving it again. During debugging, it is possible to disconnect the BOOT_BANK signal driven by IPMC and select its value by a mechanical switch setting.

4.6.3 eUSB Flash Module

The ATCA-F140 provides a 2mm eUSB header (P8). This 10-pin header is designed to support industry-standard low profile 5V eUSB modules. The ATCA-F140 is delivered with an eUSB module installed. Use the blade operating system disk utilities to determine the available storage.

4.7 Base Channel Interface

The ATCA-F140 uses Broadcom BCM56334 as its base channel interface. It provides 24 10/100/1000 Mbps ports and four 10G stacking ports. It supports advanced Layer2 switching, L3 routing, ACL and key carrier protocols. The PCI Express 1x interface of the Broadcom BCM56334 is attached to one of the PCI Express ports of the integrated processor to provide service processor configuration and management capability to switch.

Some of the 1GbE SGMII ports from the BCM56334 have the option of being routed through muxes to two different destinations as seen in the block diagram above. The ATCA-F140 blade uses 2 channel or 4 channel high speed broadband 2:1 multiplexer/demultiplexer switches to perform this function. The select pins for these mux/demux switches are routed to the FGPA. Through the P2020 local bus interface, the service processor can program registers in the FPGA to route the SGMII ports to the desired destination.

4.7.1 Base Channel PHYs

The ATCA-F140 uses two Broadcom BCM54680 octal PHYs, two BCM54616S PHYs, and a BCM8727 PHY for the base channel. Each BCM54680 supports eight SGMII channels to the BCM56334 and provides the physical layer functions for the 10/100/1000Base-T connections and 10/100Base-TX connections to the backplane. The BCM54616S is a single PHY that supports an SGMII channel to the BCM56334 and provides the physical layer functions for a 10/100/1000Base-T connection to the backplane.

The BCM8727 PHY is a two port XAUI to 10Gb SFI PHY that provides the interface between two of the Base Switch 10GbE stacking ports and the front panel SFP+ modules. The BCM8727 requires an external SPI flash device of at least 16 Kbytes to load microcode into the device. An AT25128B or equivalent SPI flash device will be used for this purpose.

4.7.2 ShMC Cross-Connect

Two 100 Base-Tx ports of the base channel switch are connected to the split Base Interface ShMC port (BC1) connector at the backplane. This connection is compliant to the ShMC cross-connect in PICMG 3.0 R3.0.

Table 4-3 Base Switch Mapping

Port Name	Destination	Front Panel Label
ge0	Base Ch 3 (LS 3)	n/a
ge1	Base Ch 4 (LS 4)	n/a
ge2	Base Ch 5 (LS 5)	n/a

Table 4-3 Base Switch Mapping (continued)

Port Name	Destination	Front Panel Label
ge3	Base Ch 6 (LS 6)	n/a
ge4	Base Ch 7 (LS 7)	n/a
ge5	Base Ch 8 (LS 8)	n/a
ge6	Base Ch 9 (LS 9)	n/a
ge7	Base Ch 10 (LS 10)	n/a
ge8	Base Ch 11 (LS 11)	n/a
ge9	Base Ch 12 (LS 12)	n/a
ge10	Base Ch 13 (LS 13)	n/a
ge11	Base Ch 14 (LS 14)	n/a
ge12	Base Ch 15 (LS 15)	n/a
ge13	Base Ch 16 (LS 16)	n/a
ge14	Base Ch 1A (ShMC)	n/a
ge15	Base Ch 1B (ShMC)	n/a
ge16	Base Ch 2 (other SW)	n/a
ge17	AMC Port 0	n/a
ge18	Backplane UC0/1	n/a
ge19	Topsync	n/a
ge20	RTM SFP	RTM ETH8
ge21	RTM SFP	RTM ETH9
ge22	RTM SFP	RTM ETH10
ge23	RTM SFP	RTM ETH11
xe0	RTM SFP+	RTM ETH1
xe1	RTM SFP+	RTM ETH2
xe2	Front SFP+	Front ETH3

Table 4-3 Base Switch Mapping (continued)

Port Name	Destination	Front Panel Label
xe3	Front SFP+	Front ETH4

4.8 Fabric Channel Interface

The ATCA-F140 uses Broadcom BCM56846 switch device for the fabric channel interface. It is a high-performance 640Gbps network switch with 18 integrated warpCores (16 active). Each warpCore has four integrated 10G SerDes allowing native support of one 40GbE or four 10GbE ports. On the ATCA-F140, the BCM56846 is used to provide sixteen (16) 40G ports and four 1G ports.

12 of the 40Gbps ports are routed to the backplane switch fabric support of a 14-slot chassis. Two 40Gbps uplink interfaces from the switch are routed to the Zone 3 connectors for use by an RTM. Two other 40Gbps uplink ports are routed to BCM84740PHYs to provide two QSFP+ uplinks on the front panel. The P2020 service processor communicates with the BCM56846 through the PCI Express interface to initialize and manage the switch.

Two 1G-SGMII ports are routed to the backplane for switch fabric support of the two extra slots in a 16-slot chassis, or optionally, to the TopSync device and Fabric Channel 1. One 1G-SerDes port is routed to AMC port 1. One 1G-SGMII port is routed to update channels 3 and 4 to form a fabric switch-to-AMC cross-connect with the other switch blade across the backplane.

Table 4-4 Fabric Switch Mapping (Default AXP1440 Chassis Configuration)

BCM56846 Physical Port	Port Name	Destination	Front Panel Label
wc0-0	ge0	Fabric Ch 14 (LS 15)	n/a
wc0-1	ge1	Fabric Ch 15 (LS 16)	n/a
wc0-2	ge2	Backplane UC3/4	n/a
wc0-3	ge3	AMC Port 1	n/a
wc1	xe0	Fabric Ch 2 (LS 3)	n/a
wc2	xe1	Fabric Ch 3 (LS 4)	n/a
wc3	xe2	Fabric Ch 4 (LS 5)	n/a
wc4	xe3	Fabric Ch 5 (LS 6)	n/a
wc5-0	xe4	Fabric Ch 6 (LS 7)	n/a

Table 4-4 Fabric Switch Mapping (Default AXP1440 Chassis Configuration) (continued)

BCM56846 Physical Port	Port Name	Destination	Front Panel Label
wc5-1	xe5	Fabric Ch 6 (LS 7)	n/a
wc5-2	xe6	Fabric Ch 6 (LS 7)	n/a
wc5-3	xe7	Fabric Ch 6 (LS 7)	n/a
wc6-0	xe8	Fabric Ch 7 (LS 8)	n/a
wc6-1	xe9	Fabric Ch 7 (LS 8)	n/a
wc6-2	xe10	Fabric Ch 7 (LS 8)	n/a
wc6-3	xe11	Fabric Ch 7 (LS 8)	n/a
wc7	xe12	Fabric Ch 8 (LS 9)	n/a
wc8	xe13	Fabric Ch 9 (LS 10)	n/a
wc9	xe14	Fabric Ch 10 (LS 11)	n/a
wc10	xe15	Fabric Ch 11 (LS 12)	n/a
wc11-0	xe16	Fabric Ch 12 (LS 13)	n/a
wc11-1	xe17	Fabric Ch 12 (LS 13)	n/a
wc11-2	xe18	Fabric Ch 12 (LS 13)	n/a
wc11-3	xe19	Fabric Ch 12 (LS 13)	n/a
wc12-0	xe20	Fabric Ch 13 (LS 14)	n/a
wc12-1	xe21	Fabric Ch 13 (LS 14)	n/a
wc12-2	xe22	Fabric Ch 13 (LS 14)	n/a
wc12-3	xe23	Fabric Ch 13 (LS 14)	n/a
wc13	not used		
wc14	xe24	RTM QSFP+	RTM ETH7
wc15-0	xe25	RTM SFP+	RTM ETH6
wc15-1	xe26	RTM SFP+	RTM ETH5
wc15-2	xe27	RTM SFP+	RTM ETH4

Table 4-4 Fabric Switch Mapping (Default AXP1440 Chassis Configuration) (continued)

BCM56846 Physical Port	Port Name	Destination	Front Panel Label
wc15-3	xe28	RTM SFP+	RTM ETH3
wc16-0	xe29	Front QSFP+	Front ETH1
wc16-1	xe30		
wc16-2	xe31		
wc16-3	xe32		
wc17	xe33	Front QSFP+	Front ETH2

4.9 SFP+ and QSFP+ Modules

The ATCA-F140 provides two SFP+ and two QSFP+ module receptacles on the front panel, the SFP+ for base uplinks and the QSFP+ for fabric uplinks.

4.9.1 SFP+ Modules

The SFP+ signals RX_LOS, TX_FAULT and MOD_ABS are monitored for status by the BCM8727 PHY. Status changes will result in a service processor interrupt through the PHY's LASI signal. The service processor can then access the module status registers inside the BCM8727. The signals are also connected to the FPGA to allow faster detection of a loss of signal condition. Each SFP+ signal TX_DIS can be driven by the BCM8727 to disable the SFP+ module's transmitter (laser output).

Each SFP+ module's I^2C signals are routed to the BCM8727 PHY which provides two separate SFP+ I^2C interfaces. The service processor uses these I^2C interfaces, accessed through the PHY management port, to read the module's on-board EEPROM information to determine type and vendor specific information.

The SFP+ module receptacles are designed to support standard SFP+ modules as well as direct attach copper SFP+ modules less than 10m in length.

Table 4-5 Tested SFP+ Modules

Penguin Edge Part Number	**Vendor Part Number**	**Vendor**	**Description**
SFPP-MM-SR-LC	FTLX8571D3BCL	Finisar	10Gb/s 850nm multimode SFP+ transceiver
SFPP-SM-LR-LC	FTLX1471D3BCL	Finisar	SFP+ 10GB LR Optical Module

Table 4-5 Tested SFP+ Modules (continued)

Penguin Edge Part Number	Vendor Part Number	Vendor	Description
SFP-MM-SX-LC	AFBR-57L5APZ	Avago	SFP optical module
SFPP-CO-RJ-45-3M	74752-1301	Molex	3m direct attach copper SFP+ cable

4.9.2 QSFP+ Modules

The QSFP+ signals INTL and MODPRSL are monitored for status by the BCM84740 PHYs and the FPGA. Status changes will result in a service processor interrupt through the PHY's LASI signal. The service processor can then access the module status registers inside the BCM84740. Each BCM84740 transceiver's LASI interrupt signal is routed to the FPGA to generate an interrupt to the service processor. The TXONOFF signals for both BCM84740s are controlled by the FIX_TXONOFF signals from the FPGA. This allows the FPGA to keep the transmitters OFF until the software can come up and take control. The FPGA also provides the QSFP+ LPMODE signals that control whether the module is in low-power mode or high-power mode.

Each QSFP+ module's I^2C signals are routed to the corresponding BCM84740 PHY. The service processor uses these I^2C interfaces, accessed through the PHY management port, to read the module's on-board EEPROM information to determine type and vendor specific information. QSFP+ status and control registers can also be accessed through the I^2C interface.

The ATCA-F140 blade is designed to be compatible with QSFP+ modules up to Power Level 2, corresponding to a maximum power of 2W each.

Table 4-6 Tested QSFP+ Modules and Cables

Part Number	Vendor Part Number	Vendor	Description
QSFPP-40G-SR4-MODULE	AFBR-79EQDZ	Avago	40GBase-SR4 Optical QSFP+ Module
CABLE-COP-QSFPP-3M	2053638-3	Tyco	Direct Attach Copper QSFP+ Cable, 3m
CABLE-OPT-QSFPP-5M	106283-0005	Molex	Optical MTP Cable, 5m
CABLE-B-OPT-QSFPP-5M	106283-5003	Molex	Optical MTP to Quad LC Duplex Cable, 5m

4.10 AMC Bay

The ATCA-F140 provides one AMC bay to support a processor AMC as an application processor. The slot is connected by an AMC type B+ connector and supports a midsize single width PrAMC module. The PrAMC has access to an on-board SATA drive and to a dual Gigabit Ethernet controller through the AMC.0 ports. The IPMC sets a control output pin during E-keying configuration to control the direction of a Pericom PI2EQX3421 SATA mux, which determines whether the service processor or the PrAMC will have access to the SATA hard disk drive. For debug purposes, the SATA mux control from the IPMC is routed through the FPGA so that the SATA mux control can be manipulated by the service processor through the FPGA.

The ATCA-F140 routes AMC ports 8-11 directly to the RTM for support of PCI Express controllers on future versions of RTMs.

The ATCA-F140 provides current limited power control to the AMC. An electronic circuit breaker device is used to control the 12V payload power and 3.3V management power to the AMC as well as providing current limiting.

Table 4-7 AMC Bay Port Usage

AMC.0 Regions	Port No.	PrAMC Usage	ATCA-F140 Target
Clocking	1	TCLKA	From Telecom Clock logic
	2	TCLKB	From Telecom Clock logic
	3	TCLKC	From Telecom Clock logic
	4	TCLKD	From Telecom Clock logic
	5	FCLKA	From PCIe 100MHz differential clock distribution
Common Options	0	Gigabit Ethernet Link 0	To BCM56334 (BIX)
	1	Gigabit Ethernet Link 1	To BCM56846 (FIX)
	2	SATA Link 0	To SATA HDD mux
	3	SATA Link 1	Unused

Table 4-7 AMC Bay Port Usage (continued)

AMC.0 Regions	Port No.	PrAMC Usage	ATCA-F140 Target
Fat Pipes	4	PCIE/SGMII	To Dual Ethernet MAC/PHY for AMC cross-connect
	5	PCIE/SGMII	
	6	PCIE/SGMII	
	7	PCIE/SGMII	
	8	PCI Express Lane 0	To RTM
	9	PCI Express Lane 1	
	10	PCI Express Lane 2	
	11	PCI Express Lane 2	
Extended Options	12		Unused
	13-20	Unused	Unused

4.10.1 82571EB Dual Gigabit Ethernet MAC/PHY

The Intel 82571EB is a PCI Express based single-chip dual Gigabit Ethernet MAC controller with integrated PHY and SerDes cores. Controller 0 is routed to the AMC-to-base cross-connect on update channels (0:1). Controller 1 is routed to the AMC-to-fabric cross-connect on update channels (3:4).

The 82571EB uses an external SPI flash device to store configuration data, MAC addresses, etc. An Atmel AT25128B device is used for this purpose.

4.10.2 Channel Cross-Connect

The base and fabric channel cross-connect scheme using the 82571EB is shown in the figures below

Figure 4-4 Base Channel Cross-Connect

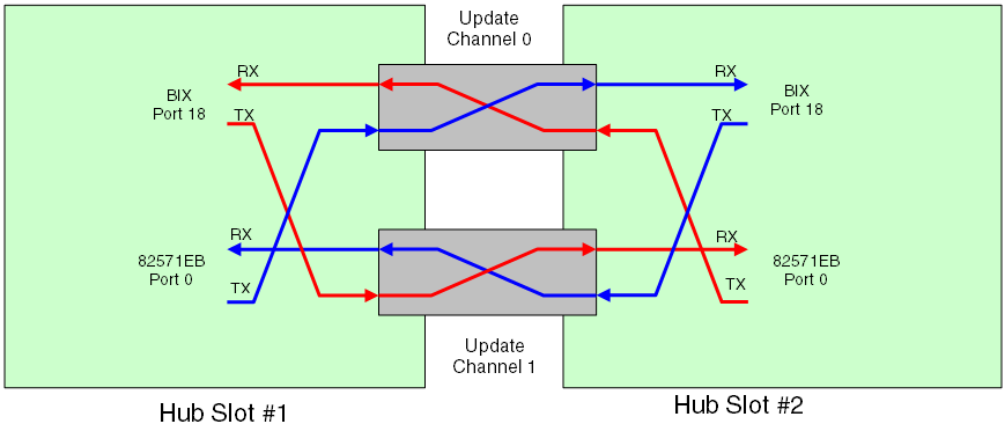
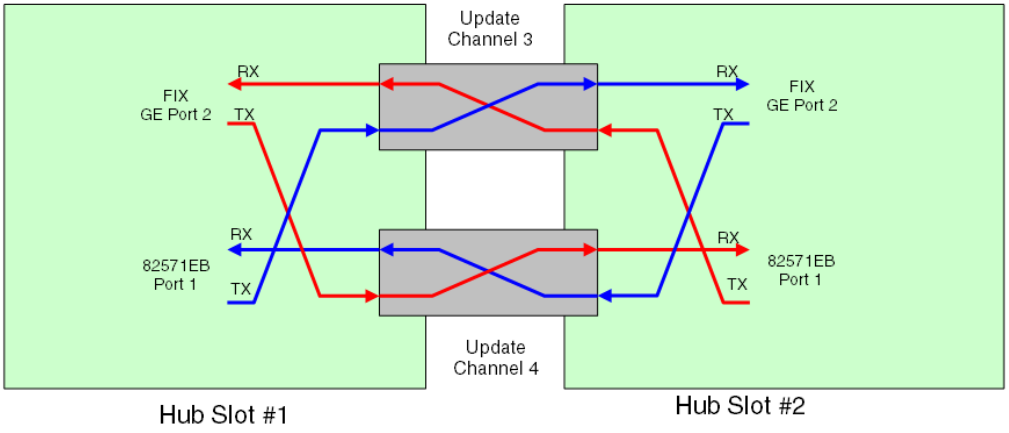


Figure 4-5 Fabric Channel Cross-Connect



4.10.3 Storage Hard Disk Drive

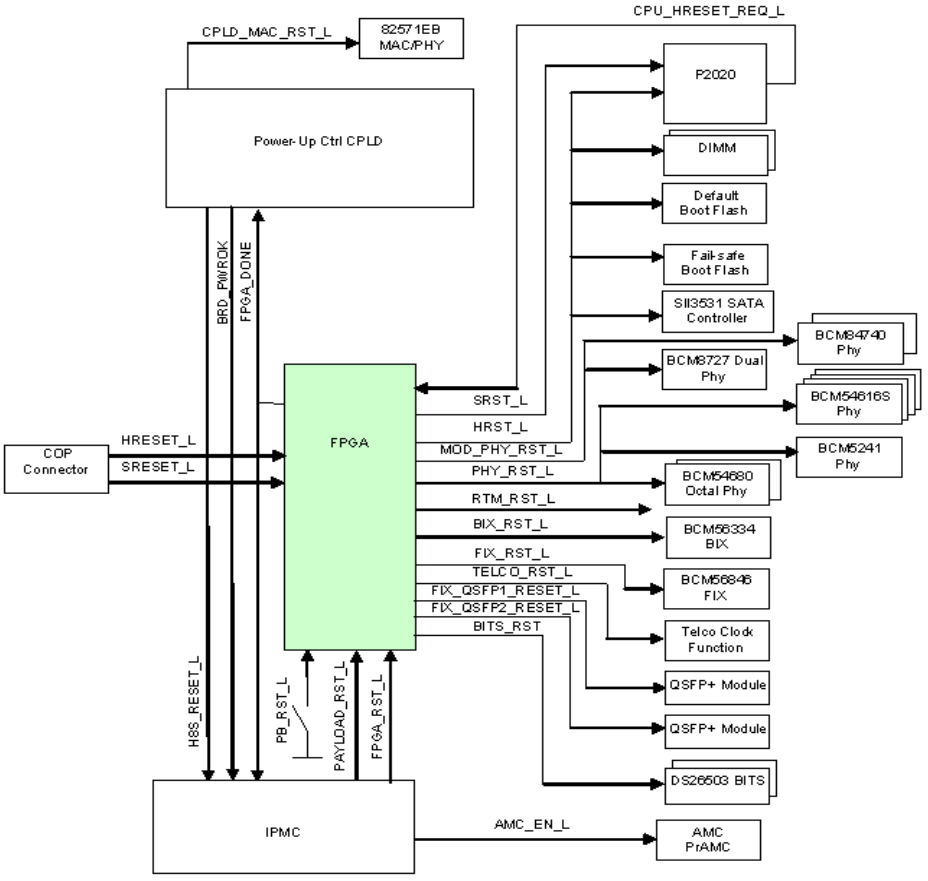
The ATCA-F140 provides a SATA connector and mounting features to install a 2.5" SATA hard disk drive on the blade. This HDD can be used to store system management data, configuration data, and boot images for the service processor or the PrAMC.

The HDD can be accessed by either the service processor or the PrAMC processor depending on the state of the on-board SATA mux. The mux is controlled by an output of the IPMC which sets the selection bit during E-keying initialization. By default, the mux is configured to connect the SATA drive to the service processor.

4.11 Reset Structure

The resets for the ATCA-F140 are controlled by the FPGA.

Figure 4-6 Reset Structure Diagram



A software controlled reset register within the FPGA provides software controlled resets to the FIX, BIX and PHY functions. The FPGA also implements a last reset register to capture the source of the last reset generated on the blade. The various on-board devices get reset by the sources as shown in the following table.

Table 4-8 Reset Sources Versus Reset Outputs

Reset Output / Reset Source	HRST_L	SRST_L	FIX_RST_L	BIX_RST_L	MOD_PHY_RST_L	PHY_RST_L	TELCO_RST_L	BITS_RST_L	AMC	FPGA	RTM_RST_L
BRD_PWROK	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
PAYLOAD_RST_L	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
PB_RST_L	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
HRST_REQ_L	Yes	No	No	No	No	No	No	No	No	No	No
COP_HRESET_L	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
COP_SRESET_L	No		No	No	No	No	No	No	No	No	No
AMC_EN	No	No	No	No	No	No	No	No	No	No	No
AMC_PWR_GOOD	No	No	No	No	No	No	No	No	Yes	No	No
Software Control in FPGA	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes

4.11.1 Service Processor Core Reset Domain

The service processor core includes the QorIQ P2020 Integrated Processor, its memory and the on-board resources attached to the local bus.

4.11.1.1 Service Processor

The hard reset signal HRST_L causes the QorIQ P2020 Integrated Processor to abort all current internal and external transactions and set all registers to their default values. HRST_L may be asserted at any time completely asynchronously. HRST_L needs to be asserted during power-on reset. During HRST_L assertion, the configuration input signals are sampled into registers inside the QorIQ P2020 Integrated Processor.

The request output signal HRESET_REQ_L of the QorIQ P2020 Integrated Processor indicates to the blade that a condition requiring the assertion of HRST_L has been detected. HRESET_REQ_L may be activated by a watchdog timer inside the QorIQ P2020 Integrated Processor, a boot sequence failure or by software. HRESET_REQ_L may occur at any time synchronous to the core complex bus clock and stays active until HRST_L is asserted.

The soft reset input signal SRST_L causes a machine check interrupt to both e500 cores of the QorIQ P2020 Integrated Processor. SRST_L need not to be asserted during a hard reset. SRST_L may be asserted at any time completely asynchronously.

An output signal READY from each core indicates to the blade that the cores have completed the reset operation and are not in a power-down state. This information is monitored by the IPMC.

4.11.1.2 Memory

The registers of the registered DIMM(s) will be reset in parallel to the HRST_L signal of the QorIQ P2020 Integrated Processor.

4.11.1.3 On-board Flash

All on-board boot flash devices which are attached to the local bus are reset in parallel when the HRST_L signal is asserted.

4.11.1.4 Persistent Memory

The persistent memory is only reset after power-on reset. In all other on-board reset events, the persistent memory is not reset if the persistent memory feature has been enabled.

4.11.2 Ethernet Switch Resets

4.11.2.1 Broadcom BCM56334

A power-on or hard reset is initiated by an active low pulse on the RESET_L signal of the Broadcom BCM56334 Base Channel Switch. The initialization process loads all the pin configurable modes, clears all switching tables and places the switch in a disabled and idle state.

4.11.2.2 Broadcom BCM56846

A power-on or hard reset is initiated by an active low pulse on the SYS_RST_L signal of the Broadcom BCM56846 Fabric Channel Switch. The initialization process loads all the pin configurable modes, clears all switching tables and places the switch in a disabled and idle state.

4.11.3 Physical Interconnect Devices

Broadcom PHYs use a hardware reset pin RESET_L, which resets all internal nodes to a known state. RESET_L is always asserted after power-up. Mode pins are latched at the time that hardware reset is deasserted.

4.11.4 AMC Bay

The IPMC on the ATCA-F140 is responsible for resetting the AMC bay. It initiates a reset cycle after an AMC module is plugged in or if the payload power of the carrier board is in a power cycle. The IPMC drives the ENABLE# signal active low as an input to the AMC module. The 82571EB device is reset in parallel to the AMC.

4.11.5 Rear Transition Module

The RTM-ATCA-F140 is reset by two reset sources, the IPMC and the reset controller inside the FPGA. During normal operation, the RTM-ATCA-F140 and the ATCA-F140 front blade are treated as one reset domain using the RTM_RST_L signal from the FPGA.

4.12 Interrupt Structure

All external interrupts belonging to the service processor interrupt structure are routed to the QorIQ P2020 Integrated Processor. The PIC inside the QorIQ P2020 Integrated Processor is compliant with the OpenPIC architecture. The interrupt controller provides interrupt management, and is responsible for receiving hardware-generated interrupts from different sources (both internal and external), prioritizing them, and delivering them to the CPU for servicing. The PIC is set to the mixed mode on ATCA-F140 so that both internal and external interrupts are delivered using normal priority and delivery mechanisms.

The interrupt sources are collected by the on-board FPGA. This FPGA includes an interrupt source register, which reflects the actual interrupt status. The interrupt inputs of the FPGA are mapped to the IRQ[11:0] signals, which are connected to the QorIQ P2020 Integrated Processor.

Table 4-9 Interrupt Mapping

Interrupt Source		Port	Signal	Source	Type		Voltage	P2020 IRQ
BCM56334	INTA		P2020 PCIE 1 INTA	Internal				0
BITS Framer 1 DS26503	INT_L		BITS1_INT_L	Direct	Active Low	OD	3.3	1

Table 4-9 Interrupt Mapping (continued)

Interrupt Source		Port	Signal	Source	Type		Voltage	P2020 IRQ
BITS Framer 2 DS26503	INT_L		BITS2_INT_L	Direct	Active Low	OD	3.3	2
DIMMs	EVENT_L		DIMM_EVENT_L	Direct	Active Low	OD	3.3	3
SIL3531A SATA	INTA		P2020 PCIE 2 INTA	Internal				4
RTM FPGA	INT_L		RTM_INT_L	Direct	Active Low	LVTTL	3.3	5
TopSync ACS9510	INTREQ_L		CLOCK_INT_L	FPGA (ORed)	Active Low	LVTTL	3.3	6
ACS8595	INT_L							
BIX Octal PHY 1 BCM54680-1	IRQ_L	1-8	COPPER_PHY_INT_L	FPGA (ORed)	Active Low	LVTTL	3.3	7
BIX Octal PHY 2	IRQ_L	1-8						
BCM54680-2								
BIX PHY 3 BCM54616S-1	IRQ_L	1						
TopSync PHY BCM54616S-2	IRQ_L	1						
Front Panel PHY	IRQ_L	1						
BCM54616S-3								
P2020 – UC2 PHY BCM54616S-4	IRQ_L	1						
BCM56846	INTA		P2020 PCIE 3 INTA	Internal				8

Table 4-9 Interrupt Mapping (continued)

Interrupt Source		Port	Signal	Source	Type		Voltage	P2020 IRQ
Dual Optical PHY BCM8727	LASI1_L-LASI2_L	1-2	OPTICAL_PHY_INT_L	FPGA (ORed)	Active Low	LVTTL	3.3	9
Optical PHY 1 BCM84740-1	LASI_L							
Optical PHY 2 BCM84740-2	LASI_L							
QSFP+ Module 1	INT_L							
QSFP+ Module 2	INT_L							
IPMC LPC	SERIRQ		To FPGA LPC interface only					10
Persistent Memory	FPGA		IRQ11_L	FPGA	Active Low	LVTTL	3.3	11

4.13 JTAG Support

The ATCA-F140 JTAG configuration consists of multiple JTAG chains controlled by a JTAG multiplexer. This device has seven local JTAG slave ports. The ATCA-F140 has devices which reside in the 3.3V management power and the 12V payload power domains. The JTAG multiplexer, the power control CPLD and the H8S processor are powered from 3.3V management power. The rest of the JTAG devices are powered from payload power.

When the Asset JTAG programming cable is installed on the header, the payload power bypass enable signal is grounded, enabling the +12V payload power supply and each of the on-board point of load supplies. This allows all of the JTAG devices to be accessed regardless of the state of the power control CPLD.

4.14 Real Time Clock

An external 32.768kHz crystal sources the internal real time clock inside ICH10R with a frequency tolerance of 20PPM. The RTC is fully DS1287, MC14618, PC87911 and Y2K compliant and provides 256 bytes of backed up CMOS RAM (of which 14 bytes containing the RTC time and date info and RTC configuration). During power-down, the RTC

consumes 0.9uA/hr. The optional power-down backup method uses a Super CAP with a 1 Farad capacity. This provides 300 hours of RTC/SRAM backup. The default battery is an external +3V lithium battery with a capacity of 200mAh, which provides three years of backup.

U-Boot

5.1 Overview

This product uses the U-Boot, a boot loader software based on the GNU Public License. It boots the blade and is the first software to be executed on after it is powered on. 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

This section describes U-Boot features and procedures that are specific to the ATCA-F140. For general information on U-Boot, refer to *http://www.denx.de/wiki/U-Boot/WebHome*.

5.2 Accessing U-Boot

The U-boot can be accessed using the serial interface connector at the face plate of the ATCA-F140. To connect, you need a computer with a serial interface connector and a terminal emulation software such as HyperTerm running on it.

1. Connect the console interface connector of the ATCA-F140 to the serial interface connector of the computer.
2. Configure the 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
   - Eight data bits
   - No parity
   - One stop bit

These serial access parameters are the default values. These can be changed from within U-Boot. The console port of the F140 blade also supports the baud rates of 38400 and 115200. For details refer to the U-boot documentation.

3. Boot the ATCA-F140 by resetting it or powering it up.
4. Press CTRL+C when you see a prompt onscreen.
   U-Boot aborts the boot sequence and enters into a command line interface mode.

If you want to disable the auto-boot feature of U-boot and make sure that U-Boot directly enters into the command line interface mode after the next reboot/power up, enter the following command:

```
setenv bootdelay -1
saveenv
```

5.3 Configuring Boot Options

5.3.1 Configuring U-Boot for Network Boot

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 network server.

This procedure assumes that the ATCA-F140 is connected to a TFTP server and that the U-Boot command nfsboot has been defined. The external TFTP server must be connected using the ATCA-F140 face plate connector ETH5, which is the Ethernet management interface. Any other interfaces, such as the base or fabric interfaces, are not yet functional at this stage of the boot phase, as the corresponding drivers are not initialized yet.

For more information, see the U-Boot documentation.

1. Execute the following commands to specify the IP addresses of the ATCA-F140 and the TFTP server by entering the following commands:
   ```
   setenv ipaddr <IP address of ATCA-F140>
   setenv serverip <IP address of TFTP server>
   ```
2. Specify the names of the Linux kernel image and the NFS root directory.
   ```
   setenv bootfile <Linux kernel image file name>
   setenv rootpath <NFS root directory>
   setenv blobfile <dtb file name>
   ```
3. Configure U-Boot to use NFS boot.
   ```
   setenv bootcmd $nfsboot
   ```
4. Depending on your network configuration, you may have to specify a gateway IP address and a netmask. Use the following commands:
   ```
   setenv gatewayip <gateway IP>
   setenv netmask <netmask>
   ```
5. Enter saveenv, and then enter `boot`.

5.3.2 Configuring U-Boot to Boot from RAM Disk

If the Linux kernel and root file system are available as RAM disk image, you may want to boot from that RAM disk.

This procedure assumes that the U-Boot command `ramboot` has been defined and that the RAM disk image is stored on an external TFTP server that is connected to the ATCA-F140. During each boot process, the image is downloaded from the TFTP server into the main memory of the blade. The external TFTP server must be connected using the ATCA-F140 face plate connector "ETH5", which is the Ethernet management interface. Any other interfaces, such as the base or fabric interfaces, are not yet functional at this stage of the boot phase, as the corresponding drivers are not initialized yet.

1. Specify the IP address of the ATCA-F140 and the TFTP server that contains the RAM disk:
   ```
   setenv ipaddr <IP address of ATCA-F140>
   setenv serverip <IP address of TFTP server>
   ```
2. Depending on your network configuration, you may have to specify a gateway IP address and a netmask. Use the following commands:
   ```
   setenv gatewayip <gateway IP>
   setenv netmask <netmask>
   ```
3. Specify the name of the RAM disk image file:
   ```
   setenv ramdiskfile <filename>
   setenv blobfile <dtb file name>
   ```
4. Configure U-Boot to boot from RAM disk:
   ```
   setenv bootcmd $ramboot
   ```
5. Specify the name of the kernel image file:
   ```
   setenv bootfile <filename>
   ```
6. Enter saveenv, and then enter `boot.`

5.3.3 Configuring U-Boot to Boot from Flash

The blade provides two redundant boot flashes which contain the U-boot images and also Linux kernel images. It also contains two redundant root file systems.

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 Penguin Solutions.

1. Configure U-boot to boot from flash:
   ```
   setenv bootcmd $flashboot
   ```

2. Depending on your system configuration, you may want to specify network parameters as follows:
```
setenv ipaddr <IP address>
setenv serverip <IP address>
setenv netmask <netmask>
setenv gatewayip <IP address>
```
3. Enter saveenv, and then enter boot.

5.4 Selecting the Boot Flashes

This configuration determines which flash the blade is to boot from on the next restart. You can either boot through IPMI or through a U-Boot command.

- Using IPMI - This option uses the System Boot Options feature. For more information, see the ATCA-F140: Control using IPMI Programmer's Reference.
- Using U-Boot command - Use `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 subsequently boots the kernel image in the same flash.

If necessary, you can select the kernel to boot manually using the following commands:

- `setenv kerneladdr e0000000` (for the kernel in the currently active boot flash)
- `setenv kerneladdr e2000000` (for the kernel in the currently standby boot flash)

NOTE: Use these commands with care.

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. Memory content can be deleted by performing a power cycle or by temporarily removing the power and then powering up the blade again. This feature is enabled by default on the ATCA-F140.

This feature can be useful in many situations, including:

- Analyzing kernel logs after a Linux kernel panic
- Defining 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 the ATCA-F140 indicates a kernel panic and you wish to analyze the cause, then you can issue a reset (using 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.

To analyze the kernel log files:

1. Issue a reset.
2. Connect to U-Boot. For more information, see *Accessing U-Boot on page 117*.
3. Using the kernel memory map, find the memory addresses of the kernel logs.
4. To display the kernel logfile at any of these memory addresses, enter the following command: `.printf (<memory address)`

The persistent memory feature can also be useful in the storage of application-specific data. Use the standard U-Boot variable `pram` to reserve a memory region (at the end of the physical memory). This allows the reserved region to not be overwritten by U-Boot. U-Boot reports less memory to the Linux kernel (through the `mem` parameter) so that Linux will not use it either.

5.6 Memory Map

The following table shows the physical address map of the ATCA-F140.

Table 5-1 Physical Address Map

Device	Start Address	Size
DDR3-RAM	0x00000000	Max. 4GByte
Active boot flash	0xE0000000	32Mbytes
Standby boot flash	0xE2000000	32Mbytes
BITS1	0xFFA00000	32Kbytes
BITS2	0xFFA100000	32Kbytes
FPGA	0xFFDF0000	32Kbytes
P2020 CPU	0xFFE00000	32Kbytes

Regardless which of the two boot flashes is selected as the currently active boot device (using IPMI), the start address is always mapped to 0xE0000000.

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	Kernel image	0xE0000000 - 0xE05FFFFF	Active boot flash
/dev/mtd1	Empty	0xE0600000 - 0xE1EFFFFF	Active boot flash
/dev/mtd2	Kernel DTB	0xE1F00000 - 0xE1F1FFFF	Active boot flash
/dev/mtd3	U-boot parameters	0xE1F40000- 0xE1F5FFFF	Active boot flash
/dev/mtd4	U-Boot image	0xE1F80000- 0xE1FFFFFF	Active boot flash
/dev/mtd5	Kernel image	0xE2000000 - 0xE25FFFFF	Standby boot flash
/dev/mtd6	Empty	0xE2600000 - 0xE3EFFFFF	Standby boot flash
/dev/mtd7	Kernel DTB	0xE3F00000 - 0xE3F1FFFF	Standby boot flash
/dev/mtd8	U-Boot boot parameters	0xE3F40000 - 0xE3F5FFFF	Standby boot flash
/dev/mtd9	U-Boot image	0xE3F80000 - 0xE3FFFFFF	Standby boot flash
/dev/mtd10	FPGA	-	-

5.8 Power-On Self Test

When the ATCA-F140 is booted, U-boot executes a series of Power-On Self test (POST) routines. These routines check the functionality of different controllers and other on-board resources. The result is stored in memory and has the following format.

Table 5-3 POST Result Format

Offset	Description
0x0	Magic word: 0xAA55FCE0
0x4	CRC32 checksum over the POST result string

0x8	POST result string. This is a zero-terminated string 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>`

Information about the POST status can also be obtained by reading the SYS FW PROGRESS IPMI sensor. Depending on the POST status, the 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	Penguin Edge specific POST error code. For more information, see *SYS FW PROGRESS IPMI Sensor - POST Error Event Codes on page 124*.
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 I^2C 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 that 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
I^2C buses	Check whether bus addresses 0x50,0x51, 0x52 are accessible on bus 0 and 0x50, 0x6E on bus 1.

Table 5-6 POST Routines (continued)

Device	Description
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.
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
off	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 through 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 U-Boot Commands

Table 5-8 ATCA-F140-Specific U-Boot Commands

Command	Description
bparams_set	Allows to configure IPMI system boot options
hreset	Issues a hard reset on the ATCA-F140. A hard reset resets the entire payload.
bootsel 0|1|switch	Selects the boot flash which the ATCA-F140 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 U-Boot Environment Variables

Table 5-9 ATCA-F140-Specific U-Boot Environment Variables

Environment Variable	Description
post_control	See *Environment Variable post_control on page 125*.
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
drvargs	Contains blade-specific values for the Linux kernel command line. It should be part of the bootargs environment variable.

Table 5-9 ATCA-F140-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
rom_corruption	Set to 1 if the CRC of the u-boot image is incorrect

5.11 Updating U-Boot

This procedure describes how you can update U-Boot using 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-F140. All file names and IP addresses shown below are for illustration purposes. This 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-F140 boots from the new active, previously updated boot flash.

It is recommended that you update the U-boot firmware using the BBS/Linux or 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 *Linux Devices on page 122*.

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. For more information, see *Accessing U-Boot on page 117*.

2. Specify the IP address of the ATCA-F140 and the TFTP server by entering the following commands:
   `setenv ipaddr <IP address of ATCA-F140>`
   `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:
   `etenv gatewayip <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 e3f80000 e3ffffff`
   `........ done`
   `Erased 4 sectors`

The currently stand-by U-boot bank is always mapped to the start address 0xE2000000, while the currently active U-boot bank is always mapped to 0xE0000000.

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 e3f80000 80000`
   `Copy to Flash...`
   done
8. Make stand-by U-boot active and vice versa, by entering the following command:
   `bootsel switch`
9. To boot the new U-Boot, reset the blade.

ATCA-F140-TCLK3 Information

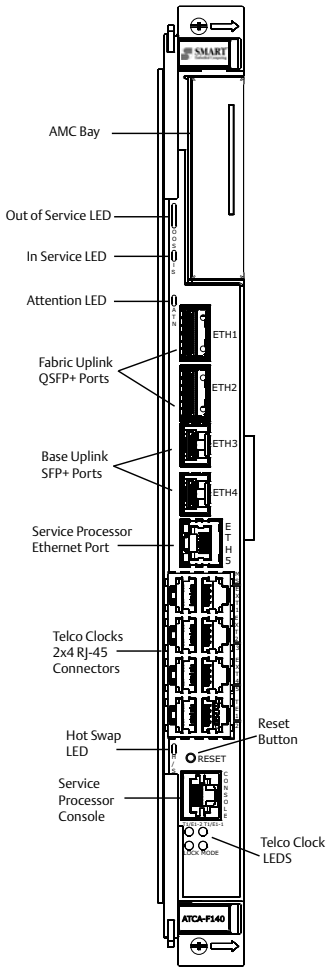
A.1 ATCA-F140-TCLK3 Overview

The ATCA-F140-TCLK3 switch blade features Telecom Stratum Clocking.

A.2 Face Plate

The following figure shows the ATCA-F140-TCLK3 face plate LEDs. The tables that follow show the connectors. Refer to *LEDs on page 70* for details of the ATCA-F140-TCLK3 face plate LEDs.

Figure A-1 ATCA-F140-TCLK3 Face Plate



A.2.1 Face Plate Connectors

Table A-1 Master/Slave Sync Connector (J12-Upper 1)

RJ-45 Pin	Function
1	Transmit +
2	Transmit -
3	Receive +
4	
5	
6	Receive -
7	
8	

Table A-2 Inter-Shelf Connectors (J12-Lower 1, 2, 3, and Upper 2, 3)

RJ-45 Pin	Function
1	Port 1 +
2	Port 1 -
3	Port 2 +
4	Port 3 +
5	Port 3 -
6	Port 2 -
7	Port 4 +
8	Port 4 -

Table A-3 T1/E1 Port Connectors (J12-Lower 4 and J12-Upper 4)

RJ-45 Pin	Function
1	RX Ring
2	RX Tip
3	
4	TX Ring
5	TX Tip
6	Port 2 -
7	Shield
8	Shield

A.3 Telecom Clocking

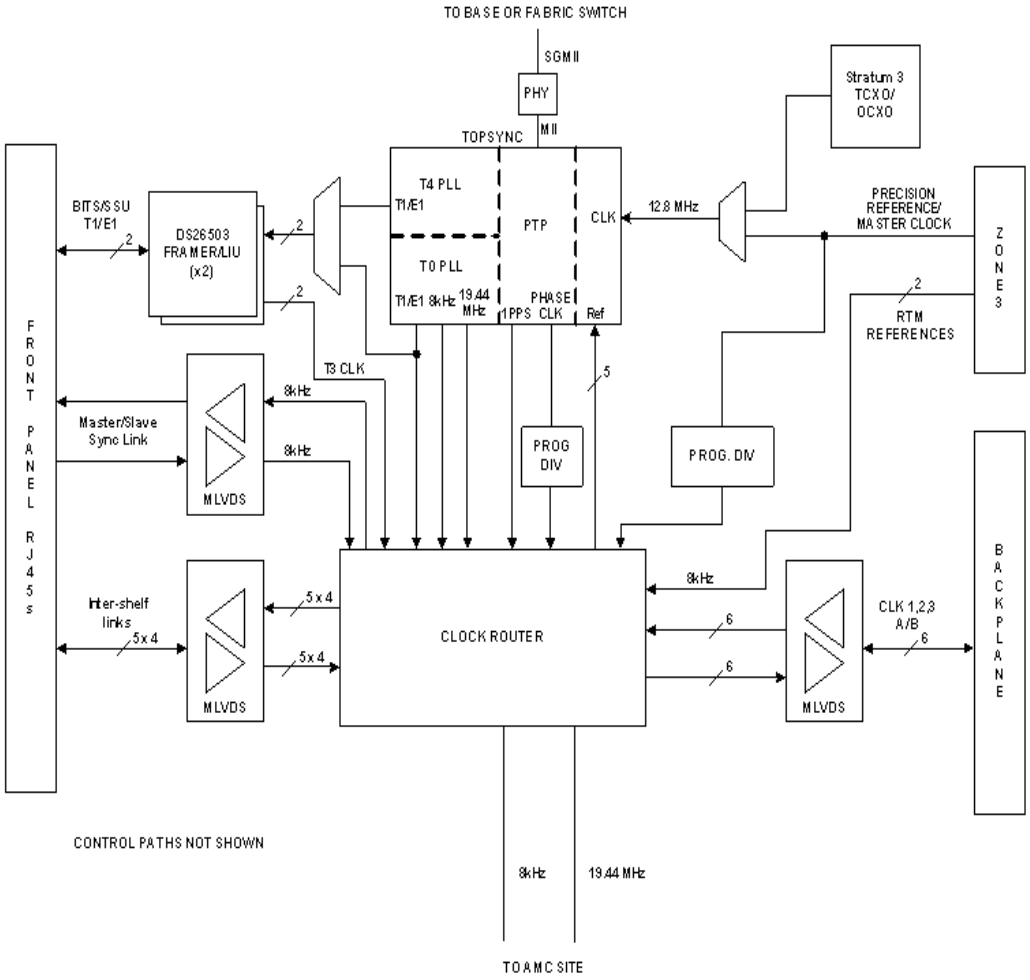
The ATCA-F140-TCLK3 supports an optional telecom clocking subsystem that is responsible for the generation and distribution of traceable telecom clocks for use throughout the local shelf and up to five connected extension shelves.

- T0 and T4 PLLs for the generation of T[0] system clocks and a T[4] SSU clock
- Dual T1/E1 ports to allow reception of redundant T[3] BITS/SSU clocks
- Generation of a traceable clock
- Routing of telecom clocks to AMC site
- Statum 3 oscillator

A.3.1 Telecom Clocking Subsystem

This section shows an overall block diagram of the telecom clocking subsystem. Later sections elaborate on the functionality of each block.

Figure A-2 Telecom Clocking Subsystem



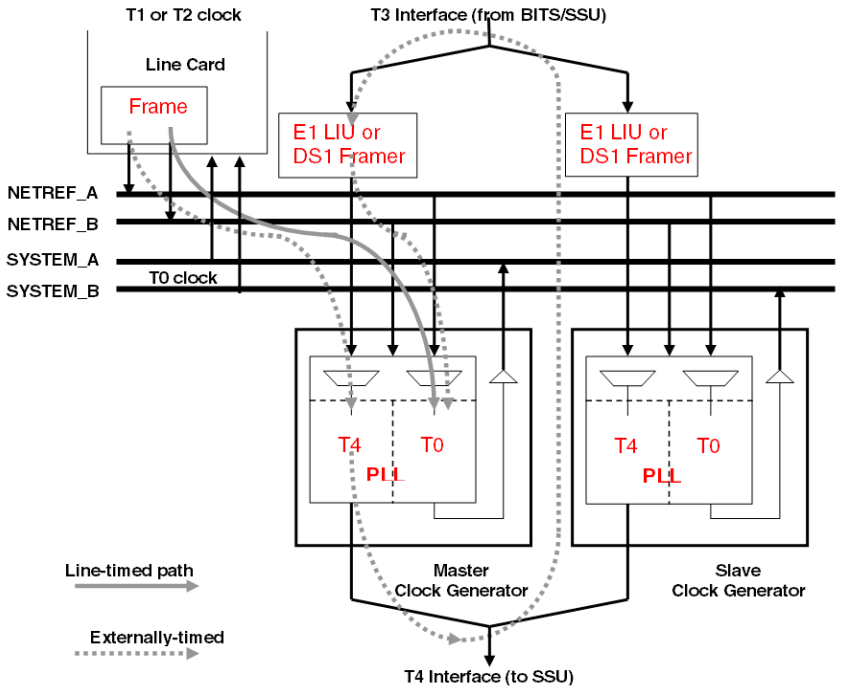
A.3.2 BIT/SSU Support

Many offices where the ATCA-F140-TCLK3 is likely to be deployed includes a central Building Integrated Timing Supply (BITS) or Source Synchronization Unit (SSU).

A BITS is typically an output-only device that provides a precision timing reference, known as the T[3] clock, to shelf-level products that use this for synchronizing the local telecom clocks. An SSU is similar to a BITS but can in turn synchronize itself to a linecard derived reference known as a T[4] clock.

The ATCA-F140-TCLK3 provides dual T1/E1 interfaces to support both BITS and SSU operation. The following figure illustrates the clock flow in a system employing a BITS or SSU.

Figure A-3 BITS/SSU Clock Flow



A.4 Ordering and Support Information

The data sheet for the ATCA-F140-TCLK3 contains a complete list of available blade variants and blade accessories. Refer to *Appendix CRelated Documentation*or consult your local Penguin Solutions sales representative for the availability of other variants.

For technical assistance, documentation, or to report product damage or shortages, contact your local Penguin Solutions sales representative or visit *https://www.penguinsolutions.com/edge/support/*.

Ruggedized ATCA-F140 Information

B.1 Ruggedized ATCA-F140 Overview

The ruggedized configurations of the ATCA-F140 feature attachment blocks specifically designed to enable the blade to be secured in a ruggedized AXP1440 shelf. Captive screws on the ruggedized AXP1440 shelf are used to securely attach the blade to the backplane for use in rugged environments. The ruggedized configurations of the ATCA-F140 are electrically identical to the non-ruggedized ATCA-F140. References to the ATCA-F140 in this manual also apply to the ruggedized configurations of the ATCA-F140.

B.2 Mechanical Data

The following table provides dimensions and weights for the ruggedized configurations of the ATCA-F140 blade.

Table B-1 Mechanical Data for Ruggedized Configurations

Data	Value
Dimensions (8U form factor)	30mm x 351mm x 328mm (12 x 13.8 x 12.9 inches)
Weight (ATCA-F140-C06)	2.8 kg (6.2 lbs)
Weight (ATCA-F140-C07)	2.7 kg (6.0 lbs)

B.3 Mechanical

The following figures show the location of the specially designed attachment blocks, attachment block drawings, and the captive screws in the ruggedized configurations of the AXP1440.

Figure B-1 Location of Attachment Blocks on the Ruggedized ATCA-F140

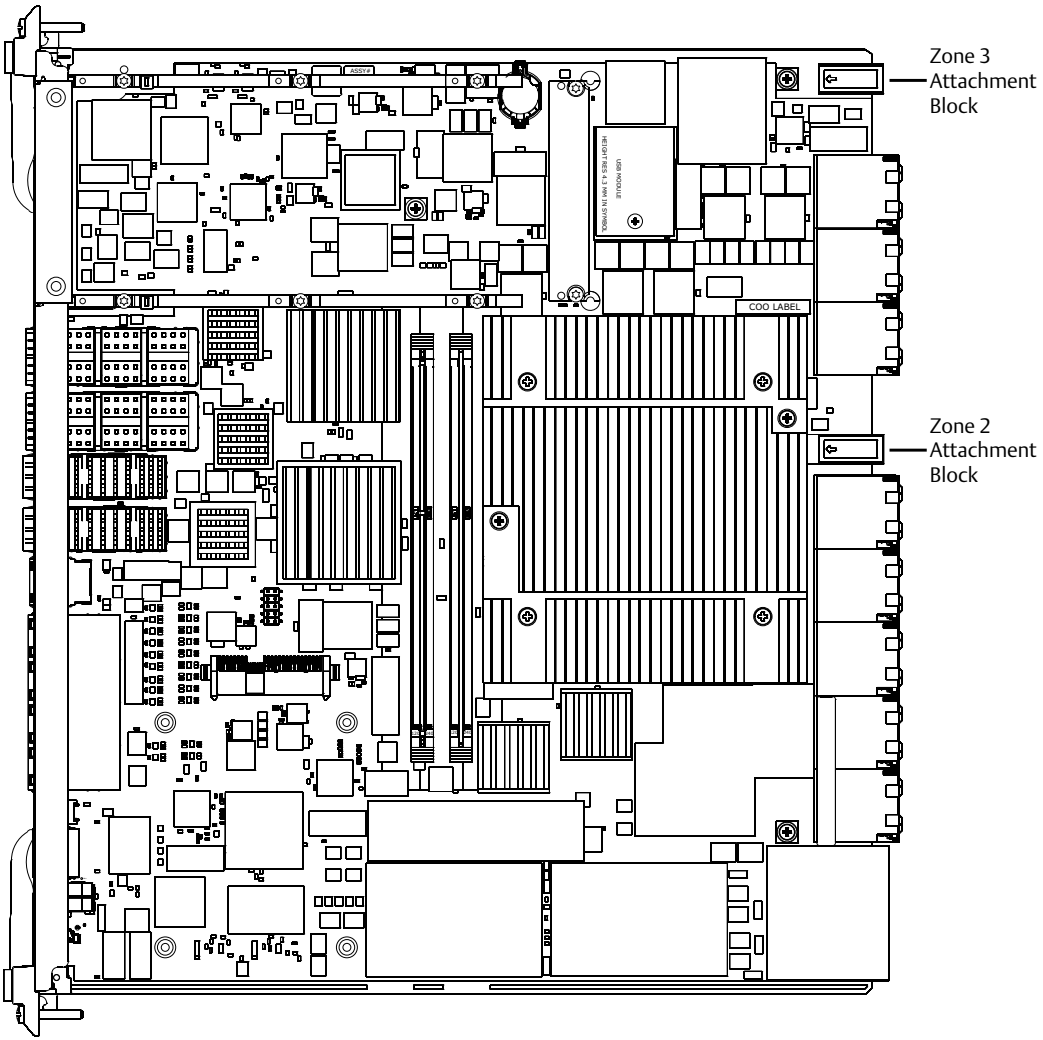


Figure B-2 Attachment Blocks Used on the Ruggedized ATCA-F140

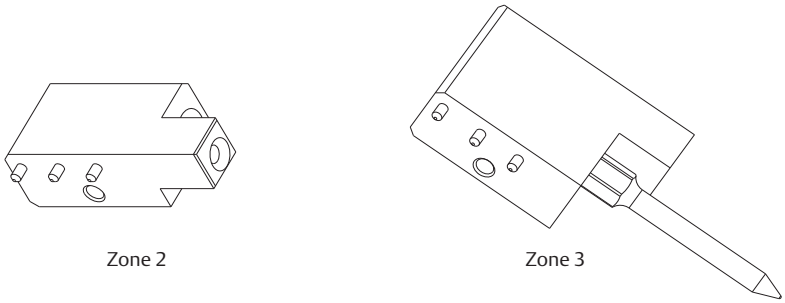
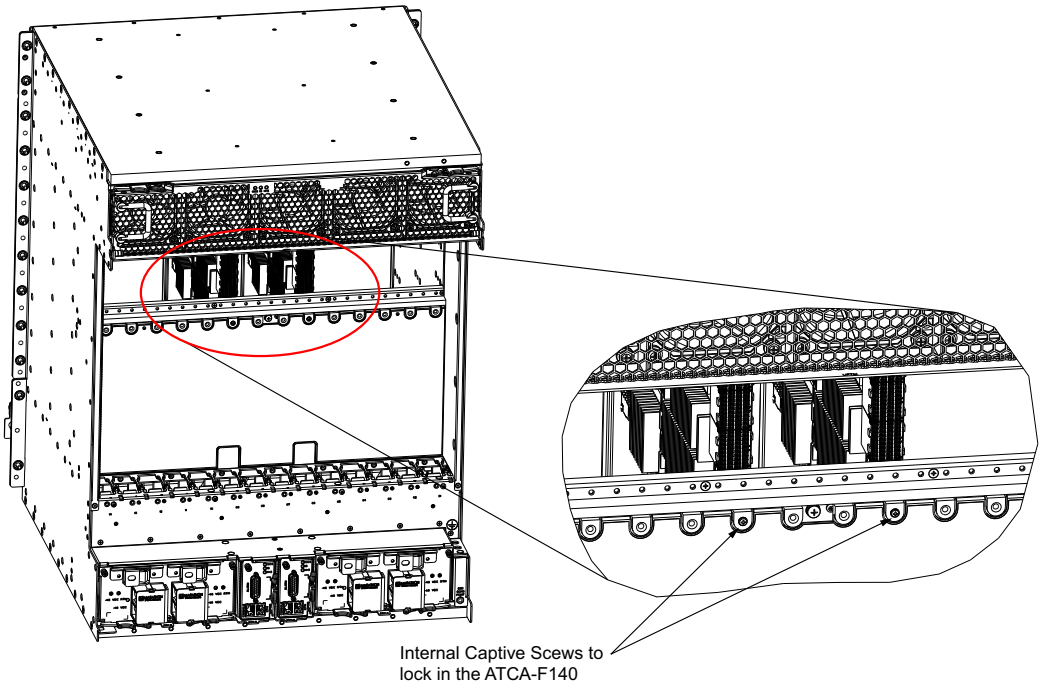


Figure B-3 Captive Screws in the Ruggedized AXP1440 Chassis



B.3.1 Installation

Figure B-3, Captive Screws in the Ruggedized AXP1440 Chassis on page 139 depicts the ATCA blades installed from the front of the chassis. Two internal captive screws in the rear of the chassis are used to lock the two ruggedized ATCA-F140 blades to the backplane. Two screws in the rear of the chassis are fastened to the specialized locking attachment blocks on the ruggedized ATCA-F140 blade.

More detailed installation instructions can be found in the *AXP1440-C06 Installation and Use* manual. Refer to *Appendix C Related Documentation*.

Installation Procedure

1. If the ruggedized RTM-ATCA-F140 RTM is present, loosen all screws on the RTM, including those on the Zone 3 block and remove the RTM.
2. Remove the alignment tool from its stowed location on the rear of the chassis and secure it to the RTM side of the slot where you wish to remove the ruggedized ATCA-F140 front blade. Refer to the following figure for location of the alignment tool. The *AXP1440-C06 Installation and Use* manual has additional information on the use of the alignment tool.

Figure B-4 Alignment Tool Location on Rear of Chassis (Stowed Position)

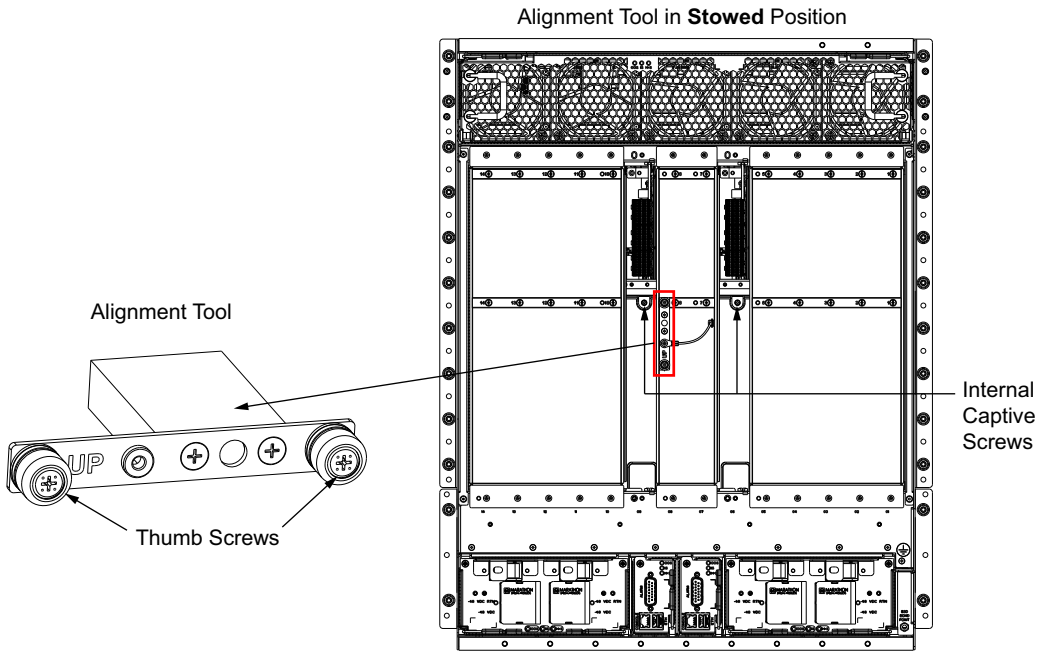
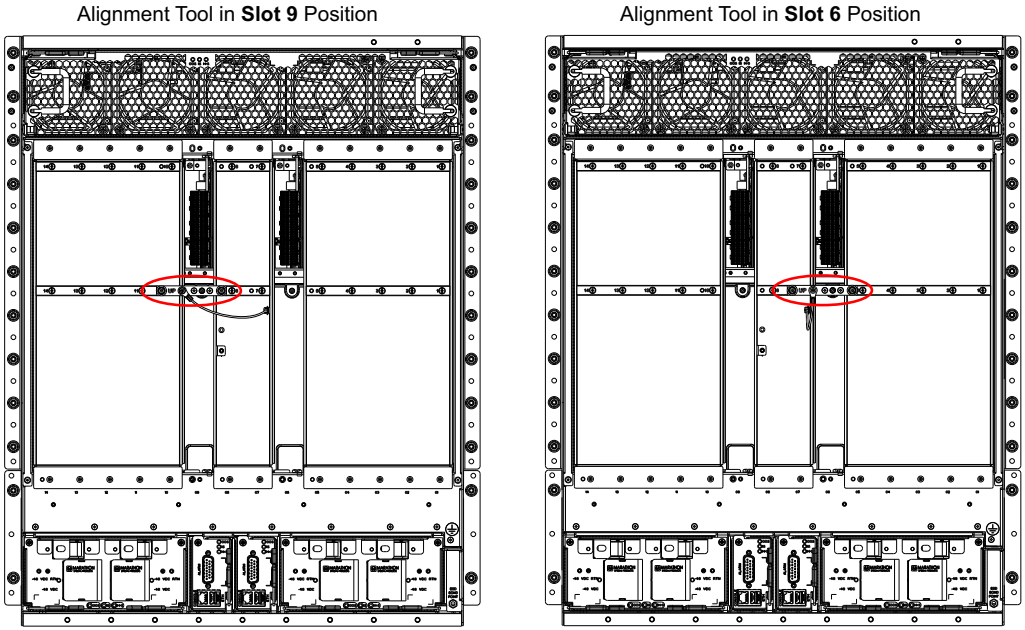


Figure B-5 Alignment Tool Location on Rear of Chassis (Slot 9 and Slot 6)



3. Using a screw driver, insert the tip into the locator hole on the alignment tool and loosen the screw to the Zone 2 attachment block.
4. Refer to *Blade Installation and Removal on page 54* for additional blade installation and removal instructions.
5. When installing the RTM screws, torque should be 1.325 in-lbs (0.15 N-m).

B.4 Ordering and Support Information

The data sheet for the ATCA-F140 contains a complete list of available blade variants and blade accessories. Refer to *Appendix C Related Documentation* or consult your local Penguin Solutions sales representative for the availability of other variants.

For technical assistance, documentation, or to report product damage or shortages, contact your local Penguin Solutions sales representative or visit *https://www.penguinsolutions.com/edge/support/*.

Related Documentation

C.1 Penguin Edge™ Documentation

The documentation listed referenced in this manual. Technical documentation can be found by using the Documentation Search at *https://www.penguinsolutions.com/edge/support/* or you can obtain electronic copies of Penguin Edge documentation by contacting your local Penguin Solutions sales representative.

Table C-1 Penguin Edge Documentation

Document Title	Document Number
ATCA-F140 Data Sheet	ATCA-F140 DS
ATCA-F140 Quick Start Guide	6806800M68
RTM-ATCA-F140 Series Installation and Use	6806800M97
AXP1440-C06 Installation and Use	6806800U21
BBS on ATCA-F140 with SRstackware	6806800N23
SRstackware Intelligent Network Software Protocol Demo Guide	6806800N07
SRstackware Intelligent Network Software VRRP Command Reference	6806800N84
SRstackware Intelligent Network Software RIP Command Reference	6806800N85
SRstackware Intelligent Network Software Layer3 Command Reference	6806800N93
SRstackware Intelligent Network Software OSPF Command Reference	6806800N87
SRstackware Intelligent Network Software Layer 2 Command Reference	6806800N88
SRstackware Intelligent Network Software Layer 3 Configuration Guide	6806800N89
SRstackware Intelligent Network Software Troubleshooting guide	6806800N83
SRstackware Intelligent Network Software Layer 2 Configuration Guide	6806800N86
SRstackware Application Programming Interface Developer Guide	6806800N90
SRstackware FAQ	6806800N91

C.2 Related Specifications

Refer to the table below for related specifications. Note that the information in these documents are subject to change without notice.

Table C-2 Specifications

Organization	Document
PICMG	ATCA Base Specification Revision 3.0 Ethernet/Fiber Channel Specification Revision 1.0 Advanced Mezzanine Card Base Specification Revision 2.0

PENGUIN™
SOLUTIONS