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SMART Embedded Computing, Inc.

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Tempe, Arizona 85282

USA

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About this Manual

Overview of Contents

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Abbreviations

This document uses the following abbreviations:

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<th>Definition</th>
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<tr>
<td>AdvancedTCA, ATCA</td>
<td>Advanced Telecommunications Computing Architecture</td>
</tr>
<tr>
<td>AgentX</td>
<td>Agent Extensibility Protocol</td>
</tr>
<tr>
<td>AMC</td>
<td>Advanced Mezzanine Card</td>
</tr>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>ATIS</td>
<td>AdvancedTCA Interfaces Service</td>
</tr>
<tr>
<td>BBS</td>
<td>Basic Blade Services</td>
</tr>
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</table>
### Abbreviation Definition

<table>
<thead>
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<th>Abbreviation</th>
<th>Definition</th>
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</thead>
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<tr>
<td>BC</td>
<td>Base Channel</td>
</tr>
<tr>
<td>BCM</td>
<td>Baseboard Management Controller</td>
</tr>
<tr>
<td>BIB</td>
<td>Board Information Block</td>
</tr>
<tr>
<td>BIOS</td>
<td>Basic Input Output System</td>
</tr>
<tr>
<td>BITS</td>
<td>Building Integrated Timing Supply</td>
</tr>
<tr>
<td>CGL</td>
<td>Carrier Grade Linux</td>
</tr>
<tr>
<td>CGM</td>
<td>Clock Generator Module</td>
</tr>
<tr>
<td>CMC</td>
<td>Common Mezzanine Card</td>
</tr>
<tr>
<td>CRC</td>
<td>Cyclic Redundancy Check</td>
</tr>
<tr>
<td>DAT</td>
<td>Domain Alarm Table</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DoS</td>
<td>Denial of Service</td>
</tr>
<tr>
<td>ECC</td>
<td>Embedded Communications Computing</td>
</tr>
<tr>
<td>ER</td>
<td>Expected Responder</td>
</tr>
<tr>
<td>EST</td>
<td>Eastern Standard Time</td>
</tr>
<tr>
<td>EVQ</td>
<td>Event Queue</td>
</tr>
<tr>
<td>FC</td>
<td>Fabric Channel</td>
</tr>
<tr>
<td>FCU</td>
<td>FUF Command Line Utility</td>
</tr>
<tr>
<td>FM</td>
<td>Fault Management</td>
</tr>
<tr>
<td>FPGA</td>
<td>Field Programmable Gate Array</td>
</tr>
<tr>
<td>FRI</td>
<td>Firmware Recovery Image</td>
</tr>
<tr>
<td>FRU</td>
<td>Field Replaceable Unit</td>
</tr>
<tr>
<td>FUF</td>
<td>Firmware Upgrade Facility</td>
</tr>
<tr>
<td>FWH</td>
<td>Firmware Hub</td>
</tr>
<tr>
<td>GPIO</td>
<td>General Purpose Input/Output</td>
</tr>
<tr>
<td>HPI</td>
<td>Hardware Platform Interface</td>
</tr>
<tr>
<td>HPI-B</td>
<td>Hardware Platform Interface Version B</td>
</tr>
<tr>
<td><strong>Abbreviation</strong></td>
<td><strong>Definition</strong></td>
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<tr>
<td>-----------------</td>
<td>---------------</td>
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<tr>
<td>HPM</td>
<td>Hardware Platform Management</td>
</tr>
<tr>
<td>IDE</td>
<td>Integrated Device Electronics</td>
</tr>
<tr>
<td>IPM</td>
<td>Intelligent Platform Management</td>
</tr>
<tr>
<td>IPMB</td>
<td>Intelligent Platform Management Bus</td>
</tr>
<tr>
<td>IPMC</td>
<td>Intelligent Platform Management Controller</td>
</tr>
<tr>
<td>IPMI</td>
<td>Intelligent Platform Management Interface</td>
</tr>
<tr>
<td>KCS</td>
<td>Keyboard Control Style</td>
</tr>
<tr>
<td>LCCB</td>
<td>Line Card Control Block</td>
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<tr>
<td>LHC</td>
<td>Link Health Check</td>
</tr>
<tr>
<td>LIUs</td>
<td>Line Interface Units</td>
</tr>
<tr>
<td>LSP</td>
<td>Linux Support Package</td>
</tr>
<tr>
<td>LT</td>
<td>Lower Threshold</td>
</tr>
<tr>
<td>LUN</td>
<td>Logic Unit Number</td>
</tr>
<tr>
<td>MAC</td>
<td>Media Access Control</td>
</tr>
<tr>
<td>MIB</td>
<td>Management Information Base</td>
</tr>
<tr>
<td>MMC</td>
<td>Module Management Controller</td>
</tr>
<tr>
<td>NTP</td>
<td>Network Time Protocol</td>
</tr>
<tr>
<td>OIDs</td>
<td>Object Identifiers</td>
</tr>
<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
</tr>
<tr>
<td>OSDL</td>
<td>Open Source Development Labs</td>
</tr>
<tr>
<td>PBO</td>
<td>Phase Build Out</td>
</tr>
<tr>
<td>PCI</td>
<td>Peripheral Component Interconnect</td>
</tr>
<tr>
<td>PCiEX</td>
<td>PCI Express</td>
</tr>
<tr>
<td>PEM</td>
<td>Power Entry Module</td>
</tr>
<tr>
<td>PICMG</td>
<td>PCI Industrial Computers Manufacturers Group</td>
</tr>
<tr>
<td>PMC</td>
<td>PCI Mezzanine Card</td>
</tr>
<tr>
<td>PNE</td>
<td>Platform for Network Equipment</td>
</tr>
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</table>
### Abbreviation Definition

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>PRC</td>
<td>Primary Reference Clock</td>
</tr>
<tr>
<td>PrPMC</td>
<td>Processor PMC</td>
</tr>
<tr>
<td>PTP</td>
<td>Precision Time Protocol</td>
</tr>
<tr>
<td>PXE</td>
<td>Preboot Execution Environment</td>
</tr>
<tr>
<td>RDR</td>
<td>Resource Data Record</td>
</tr>
<tr>
<td>RMCP</td>
<td>Remote Monitoring and Control Protocol</td>
</tr>
<tr>
<td>RPM</td>
<td>RedHat Package Manager</td>
</tr>
<tr>
<td>RTM</td>
<td>Rear Transition Module</td>
</tr>
<tr>
<td>SAF</td>
<td>Service Availability Forum</td>
</tr>
<tr>
<td>SAM</td>
<td>Shelf Manager and Alarm Module</td>
</tr>
<tr>
<td>SAS</td>
<td>Serial Attached SCSI</td>
</tr>
<tr>
<td>SATA</td>
<td>Serial ATA</td>
</tr>
<tr>
<td>SCSI</td>
<td>Small Computer System Interface</td>
</tr>
<tr>
<td>SCXB</td>
<td>System Controller Switching Blade</td>
</tr>
<tr>
<td>SDH</td>
<td>Synchronous Digital Hierarchy</td>
</tr>
<tr>
<td>SDK</td>
<td>Software Development Kit</td>
</tr>
<tr>
<td>SDR</td>
<td>Sensor Data Record</td>
</tr>
<tr>
<td>SIP</td>
<td>Serial Interface Protocol</td>
</tr>
<tr>
<td>SIT</td>
<td>Simple Internet Transition</td>
</tr>
<tr>
<td>SMI</td>
<td>Serial Management Interface</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
<tr>
<td>SONET</td>
<td>Synchronous Optical Networking</td>
</tr>
<tr>
<td>SPI</td>
<td>Serial Peripheral Interface</td>
</tr>
<tr>
<td>SSH</td>
<td>Secure Shell</td>
</tr>
<tr>
<td>SSU</td>
<td>Synchronization Supply Unit</td>
</tr>
<tr>
<td>SyncE</td>
<td>Synchronous Ethernet</td>
</tr>
<tr>
<td>TAR</td>
<td>Tape Archiver</td>
</tr>
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## Conventions

The following table describes the conventions used throughout this manual.

<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0x00000000</td>
<td>Typical notation for hexadecimal numbers (digits are 0 through F), for example used for addresses and offsets</td>
</tr>
<tr>
<td>0b0000</td>
<td>Same for binary numbers (digits are 0 and 1)</td>
</tr>
<tr>
<td><strong>bold</strong></td>
<td>Used to emphasize a word</td>
</tr>
<tr>
<td>Screen</td>
<td>Used for on-screen output and code related elements or commands. Sample of Programming used in a table (9pt)</td>
</tr>
<tr>
<td><strong>Courier + Bold</strong></td>
<td>Used to characterize user input and to separate it from system output</td>
</tr>
<tr>
<td>Reference</td>
<td>Used for references and for table and figure descriptions</td>
</tr>
<tr>
<td>File &gt; Exit</td>
<td>Notation for selecting a submenu</td>
</tr>
<tr>
<td>&lt;text&gt;</td>
<td>Notation for variables and keys</td>
</tr>
<tr>
<td>[text]</td>
<td>Notation for software buttons to click on the screen and parameter description</td>
</tr>
<tr>
<td>...</td>
<td>Repeated item for example node 1, node 2, ..., node 12</td>
</tr>
</tbody>
</table>
### About this Manual

<table>
<thead>
<tr>
<th>Notation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . .</td>
<td>Omission of information from example/command that is not necessary at the time</td>
</tr>
<tr>
<td>..</td>
<td>Ranges, for example: 0..4 means one of the integers 0,1,2,3, and 4 (used in registers)</td>
</tr>
<tr>
<td></td>
<td>Logical OR</td>
</tr>
<tr>
<td>!</td>
<td>Indicates a hazardous situation which, if not avoided, could result in death or serious injury</td>
</tr>
<tr>
<td>!</td>
<td>Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury</td>
</tr>
<tr>
<td>!</td>
<td>Indicates a property damage message</td>
</tr>
<tr>
<td>!</td>
<td>Indicates a hot surface that could result in moderate or serious injury</td>
</tr>
<tr>
<td>!</td>
<td>Indicates an electrical situation that could result in moderate injury or death</td>
</tr>
<tr>
<td>Use ESD protection</td>
<td>Indicates that when working in an ESD environment care should be taken to use proper ESD practices</td>
</tr>
<tr>
<td>Important Information</td>
<td>No danger encountered, pay attention to important information</td>
</tr>
</tbody>
</table>
## Summary of Changes

See the table below for manual revisions and changes.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6806800N23V</td>
<td>September 2017</td>
<td>Added AXP640-C04 chassis details in Input Files on page 158 and Default Configuration on page 176 and updated the sections 640-C04 SLOT1 Configuration on page 200 and 640-C04 SLOT2 Configuration on page 203.</td>
</tr>
<tr>
<td>6806800N23U</td>
<td>July 2017</td>
<td>Added registered trademark to SRstackware.</td>
</tr>
<tr>
<td>6806800N23T</td>
<td>June 2016</td>
<td>Re-branded to new template.</td>
</tr>
<tr>
<td>6806800N23S</td>
<td>July 2015</td>
<td>Updated Chapter 9, Trident Reconfiguration Utility, on page 153.</td>
</tr>
<tr>
<td>6806800N23R</td>
<td>May 2015</td>
<td>Updated Default Configuration, on page 170 and Overview, on page 57.</td>
</tr>
<tr>
<td>6806800N23P</td>
<td>February 2015</td>
<td>Added a new section Log File Management on page 78, updated the section DHCP Server on page 77, modified Figure 11-1 on page 197, Figure 11-2 on page 198 and Figure 11-3 on page 199.</td>
</tr>
<tr>
<td>6806800N23N</td>
<td>December 2014</td>
<td>Updated Upgrading IPMC Boot Loader Firmware. Added figure AXP14-400-ATCA-F140- Switch Management Fabric Interface Bridge Configuration. Added Licensed Software Module Chapter and removed License Management Chapter. Updated the sections 5.3 Login and 5.4.3 TFTP server.</td>
</tr>
<tr>
<td>6806800N23M</td>
<td>May 2014</td>
<td>Updated Contact Address on page 2.</td>
</tr>
<tr>
<td>6806800N23L</td>
<td>March 2014</td>
<td>Updated Chapter 9, Trident Reconfiguration Utility, on page 402 and changed to Artesyn template.</td>
</tr>
<tr>
<td>6806800N23K</td>
<td>December 2013</td>
<td>Updated Chapter 12, ViewCheck, on page 459.</td>
</tr>
<tr>
<td>6806800N23J</td>
<td>November 2013</td>
<td>Updated Chapter 6, Link Health Check, on page 121 added Appendix C, Related Documentation.</td>
</tr>
<tr>
<td>6806800N23H</td>
<td>August 2013</td>
<td>Updated Chapter 2, Installing BBS on a SATA or USB Device and Configuring the ATCA-F140 to Boot from SATA or USB Drive.</td>
</tr>
</tbody>
</table>
## About this Manual

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6806800N23G</td>
<td>June 2013</td>
<td>Updated Figure 1-1, Table 2-1, License Management, Table 13-1, Obtaining the Activation Record, Fabric Configuration, SRstackware, Appendix A, MUXes Settings, Chapter 15, SYSSTATMGR. Added Chapter 7, Watchdog Behavior, Chapter 10, Fabric Configuration, Chapter 12, ViewCheck, Chapter 15, SYSSTATMGR, on page 475.</td>
</tr>
<tr>
<td>6806800N23F</td>
<td>April 2013</td>
<td>Updated License Management, Obtaining the Activation Record, Fabric Configuration, SRstackware, Appendix A, MUXes Settings, Chapter 15, SYSSTATMGR. Added Chapter 7, Watchdog Behavior, Chapter 10, Fabric Configuration.</td>
</tr>
<tr>
<td>6806800N23E</td>
<td>February 2013</td>
<td>Updated Chapter 13, Obtaining the Activation Record, on page 464.</td>
</tr>
<tr>
<td>6806800N23D</td>
<td>December 2012</td>
<td>Updated Chapter 8, Telco Clocking Module, on page 157 and Chapter 13, Obtaining the Activation Record, on page 464.</td>
</tr>
<tr>
<td>6806800N23C</td>
<td>August 2012</td>
<td>Added Chapter 13, License Management, on page 465.</td>
</tr>
<tr>
<td>6806800N23B</td>
<td>June 2012</td>
<td>Updated Chapter 8, Telco Clocking Module, on page 157.</td>
</tr>
<tr>
<td>6806800N23A</td>
<td>February 2012</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>
Introduction

This manual is applicable to the part number SA-BBS-WR30-F140.

The Basic Blades Services (BBS) software provides a set of services that support the blade on which the software is installed.

BBS includes:

- Several custom hardware management functions for the unique hardware of the blade.
- A set of management routines for Linux and all hardware interfaces. Management access includes support for SNMP and a local console interface based on a standard Linux command shell.

1.1 Software Building Blocks

BBS services include a common set of functionality which is available for all AdvancedTCA blades and AMC modules, and a unique set of functionality which is tailored to a particular blade or module.

The figure below depicts the architecture of the BBS software.

*Figure 1-1  BBS Architecture*

<table>
<thead>
<tr>
<th>HPM CMD</th>
<th>FUF</th>
<th>LHC CMD</th>
<th>SRS Shell</th>
<th>ViewCheck</th>
<th>Customer Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPM Agent</td>
<td>HPI-B</td>
<td>LHC Daemon</td>
<td>SNMP Agent</td>
<td>Fabric Management</td>
<td></td>
</tr>
</tbody>
</table>

Linux Distribution

- IPMC Firmware
- Processor Firmware

HPM: Hardware Platform Management
LHC: Link Health Check
CMD Command Line Tool
FUF: Firmware Upgrade Facility
HPI: Hardware Platform Interface
Introduction

BBS consists of the following software and services:

- **Firmware Upgrade Facility (FUF)**
  The Firmware Upgrade Facility (FUF) provides a uniform way to upgrade firmware on SMART EC blades and AMC modules, regardless on which flash locations the firmware is stored. FUF upgrades the U-Boot firmware as well as the IPMC firmware (via HPM agent). The FUF currently consists of a Firmware Upgrade Command Line Utility (FCU), flash device drivers, and specially prepared firmware recovery image files. The FUF can be used on switch and node blades and on AMC modules.

- **Linux**
  This BBS is based on Wind River Platform for Network Equipment, Linux Edition 3.0. Various Linux services (above the kernel) will be activated by the BBS installation scripts.

- **Hardware Platform Management (HPM)**
  The HPM in AdvancedTCA systems is based on Intelligent Platform Management Interface specification (IPMI). IPMI commands can be complex and cumbersome. Using a certain set of commands, HPM facilitates the blade or module-level hardware management.

- **Link Health Check**
  The Link Health Check (LHC) supports the configuration and operation of the LHC protocol. LHC performs the verification of Layer 2 connectivity and the distribution of the active network plane.

- **SRstackware®**
  SRstackware package supports configuration and operation of switch devices through various protocols that it provides.

**NOTE:** Basic SRstackware features are provided with BBS distribution.

The following table lists the licensed functions of SRstackware.

<table>
<thead>
<tr>
<th>Ordering Part Number</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL-L3F140-01-001-STD</td>
<td>SRS Layer 3</td>
</tr>
<tr>
<td>SL-FPF140-04-001-STD</td>
<td>FlowPilot™</td>
</tr>
</tbody>
</table>

You need to purchase the paper based license for each function separately. These functions are released as separate RPMs, which can be installed on top of the ATCA-F140 BBS package which have SRstackware Base RPM.

To purchase the licenses, contact your local SMART Embedded Computing sales representative.
Introduction

- HPI-B
  This release contains an RPM which has all necessary files for developing HPI-B applications. For further information refer to the *System Management Interface Based on HPI-B (Centellis 31K/4100) User’s Guide*.

- SNMP Agent
  As each BBS blade or module is individually managed, the default installation script installs and initializes the "Net-SNMP" agent.

- ViewCheck
  ViewCheck is a licensed software, which will intimate the user about the current state of devices through XML and CLI interfaces.

**NOTE:** ViewCheck is not part of basic BBS distribution.

The following table provides the ordering information for ViewCheck.

<table>
<thead>
<tr>
<th>Ordering Part Number</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL-DGF140-01-001-STD</td>
<td>ViewCheck™ for ATCA-F140</td>
</tr>
</tbody>
</table>
Introduction
Chapter 2

Installing Basic Blade Services Software

This chapter provides information on how to install the BBS software on ATCA-F140. Consult your local SMART Embedded Computing sales representative on how to obtain BBS images.

2.1 Package Information

The BBS software is packaged with the Red Hat Package Manager (RPM) and it is installed as a part of the standard installation. In general, you will not need to install or upgrade an individual package.

The following table lists all files which constitute the BBS package. These files may vary from release to release.

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>kernel</td>
<td>Operating System Kernel (version 2.6.27)</td>
</tr>
<tr>
<td>nfs.tar.gz</td>
<td>Root file system</td>
</tr>
<tr>
<td>bbs-atcaf140-cpu-<em>&lt;version&gt;</em>.rpm</td>
<td>CPU firmware (U-Boot)</td>
</tr>
<tr>
<td>bbs-atcaf140-dtb-<em>&lt;version&gt;</em>.rpm</td>
<td>Device Tree Binary</td>
</tr>
<tr>
<td>bbs-atcaf140-ipmc-<em>&lt;version&gt;</em>.rpm</td>
<td>IPMC firmware</td>
</tr>
<tr>
<td>bbs-atcaf140-ipmc-boot-<em>&lt;version&gt;</em>.rpm</td>
<td>IPMC Boot Loader</td>
</tr>
<tr>
<td>bbs-atcaf140-kernel-<em>&lt;version&gt;</em>.rpm</td>
<td>Kernel image</td>
</tr>
<tr>
<td>bbs-fuf-atcaf140-<em>&lt;version&gt;</em>.rpm</td>
<td>Firmware upgrade facility</td>
</tr>
<tr>
<td>bbs-hpib-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B package</td>
</tr>
<tr>
<td>bbs-hpib-clientsrc-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B client package</td>
</tr>
<tr>
<td>bbs-hpib-daemon-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B daemon package</td>
</tr>
<tr>
<td>bbs-hpib-debug-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B debugger package</td>
</tr>
<tr>
<td>bbs-hpib-devel-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B developer package</td>
</tr>
<tr>
<td>bbs-hpib-snmp-<em>&lt;version&gt;</em>.rpm</td>
<td>HPI-B SNMP package</td>
</tr>
</tbody>
</table>
## Installing Basic Blade Services Software

### Table 2-1  BBS Distribution Files (continued)

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bbs-hpmagentcmd-atcaf140-&lt;version&gt;.rpm</td>
<td>Hardware Platform Management</td>
</tr>
<tr>
<td>bbs-prom-utils-atcaf140-&lt;version&gt;.rpm</td>
<td>FPGA and PROM Upgrade utilities</td>
</tr>
<tr>
<td>bbs-tcm-atcaf140-&lt;version&gt;.rpm</td>
<td>Telco Clocking Module package</td>
</tr>
<tr>
<td>bbs-version-atcaf140-&lt;version&gt;.rpm</td>
<td>BBS Build Version information</td>
</tr>
<tr>
<td>bbs-atcaf140-bcm-ucode-&lt;version&gt;.rpm</td>
<td>BCM PHY microcode</td>
</tr>
<tr>
<td>bbs-atcaf140-fpga-&lt;version&gt;.rpm</td>
<td>Front panel FPGA image</td>
</tr>
<tr>
<td>bbs-atcaf140-fpga-rtm-&lt;version&gt;.rpm</td>
<td>RTM FPGA image</td>
</tr>
<tr>
<td>bbs-lhc-&lt;version&gt;.windriver.powerpc.rpm</td>
<td>Link Health Check</td>
</tr>
<tr>
<td>bbs-sfptool-atcaf140-&lt;version&gt;-windriver.rpm</td>
<td>SFP utility</td>
</tr>
<tr>
<td>bbs-uboot-utils-atcaf140-&lt;version&gt;-wrspne3.0.rpm</td>
<td>U-Boot environment variable editor</td>
</tr>
</tbody>
</table>

### SRstackware RPM Files

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>srstackware-config-f140-&lt;version&gt;.rpm</td>
<td>SRstackware configuration and script files</td>
</tr>
<tr>
<td>srstackware-demo-config-f140-&lt;version&gt;.rpm</td>
<td>SRstackware demonstration files</td>
</tr>
<tr>
<td>srstackware-f140-&lt;version&gt;.rpm</td>
<td>SRstackware basic features binaries</td>
</tr>
</tbody>
</table>

### Miscellaneous files

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>files.sha1sum</td>
<td>Installation file</td>
</tr>
<tr>
<td>atca-f140.dtb</td>
<td>Device tree for installation</td>
</tr>
<tr>
<td>u-boot-&lt;version&gt;.bin</td>
<td>Raw U-Boot image for installation</td>
</tr>
<tr>
<td>atcaf140-initrd.gz.uboot</td>
<td>INITRD image for installation</td>
</tr>
<tr>
<td>ramdisk.image.gz</td>
<td>Ram disk root file system image</td>
</tr>
<tr>
<td>PrAMC721x-WR-3.0-BBS-RM01-prePINv.tar.bz2</td>
<td>Support file for AMC7211</td>
</tr>
<tr>
<td>kernel.tar.gz</td>
<td>Kernel source files</td>
</tr>
<tr>
<td>modules.tar.gz</td>
<td>Linux Modules</td>
</tr>
</tbody>
</table>
2.2 Configuring a TFTP Server

To install the BBS software over a network, you should prepare a Trivial File Transfer Protocol (TFTP) server on a host and create a directory structure for the boot images and installation files. The following section describes the procedure to configure the TFTP server.

2.2.1 Create /tftpboot Directory and Copy Target Files

You have to place TFTP files in the /tftpboot directory. Regardless of the file system node you specify as the "root" for a TFTP service, the installation scripts expect such a directory structure when retrieving files.

Creating the /tftpboot Directory and Copying the Target Files

To create the expected directory structure and to copy the necessary files, follow these steps:

1. On the host, create a directory, if it does not exist. For example:
   ```bash
   mkdir /tftpboot
   ```
2. Create a subdirectory for the blade. For example:
   ```bash
   mkdir /tftpboot/atca-f140
   ```
3. Copy or move the installation files to the subdirectory.

### Table 2-1 BBS Distribution Files (continued)

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ssf_csim_rel.atcaf140-pne3.0-&lt;version&gt;.ppc.rpm, ssf_diagnosticsTLS_rel.atcaf140-pne3.0-&lt;version&gt;.ppc.rpm, ssf_main_rel.atcaf140-pne3.0-&lt;version&gt;.ppc.rpm</td>
<td>Bsf RPMs to provide XML and CLI interfaces for ViewCheck software</td>
</tr>
<tr>
<td>diagnostics-&lt;version&gt;.windriver3.0.linux.atcaf140.rpm</td>
<td>ViewCheck configuration, Tests, and Monitors</td>
</tr>
<tr>
<td>srstackware-f140-fp-&lt;version&gt;.rpm</td>
<td>SRstackware FlowPilot RPM</td>
</tr>
<tr>
<td>srstackware-f140-l3-&lt;version&gt;.rpm</td>
<td>SRstackware Layer 3 RPM</td>
</tr>
</tbody>
</table>
2.3 Configuring ATCA-F140 for Network Booting

Configure U-Boot Environment Variables

Follow these steps to configure U-Boot environment variables in ATCA-F140 to download images from the network via front-panel Ethernet interface.

1. Power-up or reboot the blade.
2. Press \texttt{Ctrl-C} when you see the message \texttt{Hit Ctrl-C to stop autoboot:} on the console.
3. Type \texttt{printenv} to check the current U-Boot environment variables.
4. Set the \texttt{ethact} variable to use the front-panel Ethernet device.
   \begin{verbatim}
   setenv ethact eTSEC2
   saveenv
   \end{verbatim}
5. Set the \texttt{loadaddr}, \texttt{ramdiskaddr}, and \texttt{blobaddr} variables.
   \begin{verbatim}
   setenv loadaddr 1000000
   setenv ramdiskaddr 2000000
   setenv blobaddr a00000
   saveenv
   \end{verbatim}
6. Set the appropriate network environment variables for your network.
   \begin{verbatim}
   setenv serverip <your TFTP server’s IP address>
   setenv ipaddr <your blade’s IP address>
   setenv gatewayip <your network gateway’s IP address>
   setenv netmask <your network’s netmask>
   setenv hostname <your blade’s network name>
   saveenv
   \end{verbatim}

   Alternatively, if there is a Dynamic Host Configuration Protocol (DHCP) server connected to the same network as the ATCA-F140, these variables can be loaded from the DHCP server via the \texttt{dhcp} U-Boot command.

   \begin{verbatim}
   dhcp
   saveenv
   \end{verbatim}
### 2.4 Booting the ATCA-F140 Using a RAM Disk

This section describes how to network boot the ATCA-F140 from a TFTP server using a RAMDisk image.

#### Configuring the Boot Parameters for RAMDisk Booting

To configure ATCA-F140 to load the images from the network (via the front-panel Ethernet interface) and boot using a RAMDisk.

1. Power-up or reboot the blade.
2. Press `Ctrl-C` when you see the message `Hit Ctrl-C to stop autoboot:` on the console.
3. Type `printenv` to check the current U-Boot environment variables.
4. Update the appropriate environment variables.
   
   ```
   setenv serverip <your TFTP server’s IP address>
   setenv ipaddr <your blade’s IP address>
   setenv gatewayip <your network gateway’s IP address>
   setenv netmask <your network’s netmask>
   saveenv
   ```

5. Set the `bootfile`, `blobfile`, and `ramdiskfile` variables.
   ```
   setenv bootfile atca-f140/kernel
   setenv blobfile atca-f140/atca-f140.dtb
   setenv ramdiskfile atca-f140/ramdisk.image.gz
   saveenv
   ```

6. Set or update the `ramdisksize` value (if required).
   ```
   setenv ramdisksize <your ramdisksize value>
   saveenv
   ```

   Currently, U-Boot maintains a default `ramdisksize` value of 1048576 (1G).

7. Check whether the `rambootargs` script is configured, as required.
   ```
   printenv rambootargs
   ```

   ```
   rambootargs=setenv bootargs root=/dev/ram rw
   ramdisk_size=$ramdisksize init=$lnxinit
   console=$consoledev,$baudrate mem=$mem $othbootargs;
   ```
8. Check whether the `ramboot` script is configured as required.

   ```bash
   printenv ramboot
   ramboot=run rambootargs && tftp $ramdiskaddr $ramdiskfile && tftp $loadaddr $bootfile && tftp $blobaddr $blobfile && bootm $loadaddr $ramdiskaddr $blobaddr
   ```

9. Set the `bootcmd` environment variable to invoke the `ramboot` script after a reset:

   ```bash
   setenv bootcmd 'run ramboot'
   ```

   ```bash
   saveenv
   ```

10. Reset the blade.

    ```bash
    reset
    ```

Booting through the `ramdisk.image.gz` file installs all the BBS RPMs and launches all BBS daemons automatically. For upgrading firmware, refer the section *Upgrading Firmware* on page 71.

### 2.5 SATA and USB Disk Installation Procedure

This section describes how to install BBS onto the SATA or USB device from a TFTP server.

#### 2.5.1 Configuring the Boot Parameters for Network Installation

**Configuring the Boot Parameters for Network Installation**

To configure ATCA-F140 to network boot and install the U-boot, device-tree blob, kernel, root file system, and BBS RPMs:

1. Power-up or reboot the blade.

2. Press `Ctrl-C` when you see message *Hit Ctrl-C to stop autoboot:* on the console.

3. Type `printenv` to check the current U-Boot environment variables.

4. Set the `bootfile`, `blobfile`, and `ramdiskfile` variables.

   ```bash
   setenv bootfile atca-f140/kernel
   setenv blobfile atca-f140/atca-f140.dtb
   setenv ramdiskfile atca-f140/atcaf140-initrd.gz.uboot
   ```

   ```bash
   saveenv
   ```

   The `ramdiskfile` used here is different from that of the `ramdiskfile` used in booting RAMDisk images.
5. Check whether the `rambootargs` script is configured, as required.
   ```bash
   printenv rambootargs
   rambootargs=setenv bootargs root=/dev/ram rw
   ramdisk_size=$ramdisksize init=$lnxinist
   console=$consoledev,$baudrate mem=$mem $othbootargs;
   ```

6. Check whether the `ramboot` script is configured, as required.
   ```bash
   printenv ramboot
   ramboot=run rambootargs && tftp $ramdiskaddr $ramdiskfile && tftp $loadaddr $bootfile && tftp $blobaddr $blobfile && bootm $loadaddr
   $ramdiskaddr $blobaddr
   ```

7. To boot the blade and continue the installation process, execute the `run ramboot` command.

2.5.2 Installing BBS on a SATA or USB Device

**Installing BBS on a SATA or USB Device**

The boot process will invoke the `linuxrc` script which will guide you throughout the installation process.

1. The installation process begins by checking for necessary commands on the system.
   The output screen will be similar to as follows:

   ```
   init started: BusyBox v1.11.1 (2010-05-03 09:25:54 MST)
   starting pid 1023, tty ': '/linuxrc'
   
   *******************************
   ****** Installation Ramdisk ******
   *******************************

   Checking for necessary commands...
   
   mount.................[ exists ]
   umount.................[ exists ]
   tar....................[ exists ]
   gzip...................[ exists ]
   mkdir..................[ exists ]
   rmdir..................[ exists ]
   ```
Installing Basic Blade Services Software

rm..............[ exists ]
cp..............[ exists ]
rm..............[ exists ]
date.............[ exists ]
chord...........[ exists ]
chown...........[ exists ]
grep............[ exists ]
stty............[ exists ]
ping............[ exists ]
set.............[ exists ]
fgrep...........[ exists ]
ifconfig........[ exists ]
reboot..........[ exists ]
hwclock..........[ exists ]
fdisk...........[ exists ]
mkfs.ext3.......[ exists ]
cut.............[ exists ]
tftp............[ exists ]
awk............[ exists ]
seq.............[ exists ]
shasum..........[ exists ]
tr..............[ exists ]
chroot..........[ exists ]
flash_eraseall..[ exists ]
flash_unlock....[ exists ]
flashcp.........[ exists ]

Necessary commands found, safe to continue....

2. Start the installation by answering 'y' to the following query:
Do you wish to begin the installation? [y/n] y

There is no default value for this query. Choosing 'y' will begin the installation procedure. Choosing 'n' will abort the installation.
3. Choose static or dynamic IP configuration.
While using Dynamic Host Configuration Protocol (DHCP), answer 'n' to the following query ('n' is default):
You may choose to alter the default IP management scheme of DHCP here by answering 'yes' to the next question...

Do you wish to use static IP management? [y/N] n

You must ensure that the DHCP server is already configured to provide the ATCA-F140 with the files.sha1sum file and the IP address of the TFTP server in which the installation files are downloaded (especially if the DHCP and TFTP servers are different, refer to the next-server and filename options in dhcpd.conf on the DHCP server). For example:
next-server <your TFTP server's IP address>;
filename "atca-f140/files.sha1sum";

If using DHCP, skip to Step 5.

If choosing static IP configuration, you will need to provide input to the following queries:
Please enter the following information accurately.
Please enter the IP address [xxx.xxx.xxx.xxx]
Please enter the netmask [xxx.xxx.xxx.xxx]
Please enter the gateway [xxx.xxx.xxx.xxx]
Provide a Domain Name Server to use [xxx.xxx.xxx.xxx]
Do you wish to enter another DNS address? [y/N] n
Provide a domain name [domain.company.com]
Which TFTP server do you wish to use? [xxx.xxx.xxx.xxx]

4. Enter the TFTP server installation directory:
What is the installation files directory? [] atca-f140

Enter the directory name without leading or trailing slashes.

5. Downloading installation files.

During the file download process, the files are displayed as shown below:
Downloading 'atca-f140/files.sha1sum' ... Done.
Downloading 'atca-f140/kernel' ... Done.
Installing Basic Blade Services Software

Downloading 'atca-f140/atca-f140.dtb' ... Done.
Downloading 'atca-f140/u-boot-<version>.bin' ... Done.
Downloading 'atca-f140/nfs.tar.gz' ... Done.
Downloading 'atca-f140/bbs-atcaf140-bcm-ucode-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-cpu-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-dtb-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-fpga-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-fpga-rtm-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-ipmc-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-ipmc-boot-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-kernel-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-atcaf140-semtech-<version>.rpm' ... Done.
Downloading 'atca-f140/bbs-fuf-atcaf140-<version>-wrspne3.0.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-clientsrc-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-daemon-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-debug-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-devel-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpib-snmp-<version>-wrspne3.0-linux.rpm' ... Done.
Downloading 'atca-f140/bbs-hpmagentcmd-atcaf140-<version>-wrspne3.0.rpm' ... Done.
Downloading 'atca-f140/bbs-lhc-<version>.windriver.powerpc.rpm' ... Done.
Downloading 'atca-f140/bbs-prom-utils-atcaf140-<version>-wrspne3.0.rpm' ... Done.
Downloading 'atca-f140/bbs-sfptool-atcaf140-<version>-windriver.rpm' ... Done.
Downloading 'atca-f140/bbs-tcm-atcaf140-<version>-wrspne3.0.rpm' ... Done.
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Downloading 'atca-f140/bbs-uboot-utils-atcaf140-<version>-wrspne3.0.rpm' ... Done.
Downloading 'atca-f140/bbs-version-atcaf140-<version>-wrspne3.0.rpm' ... Done.
Downloading 'atca-f140/srstackware-config-f140-<version>.powerpc.rpm' ... Done.
Downloading 'atca-f140/srstackware-demo-config-f140-<version>.powerpc.rpm' ... Done.
Downloading 'atca-f140/srstackware-f140-<version>.powerpc.rpm' ... Done.
Downloading 'atca-f140/srstackware-enhanced-f140-<version>.powerpc.rpm' ... Done.

The `linuxrc` script determines which files to download and install based on the contents of the `files.sha1sum` file. Changing the contents of this file will change the installation process and possibly prevent the installation from succeeding.

6. Set the time.
Before installing the downloaded files, the time on the system has to be set correctly. If you wish to use Network Time Protocol (NTP) to set the system time, answer 'y' (default) to the following query:

If NTP servers were provided by the DHCP server, it will display as follows:

Current date/clock :Fri Aug  6 17:20:27 UTC 2010
DHCP Server assigned NTP server(s) xxx.xxx.xxx.xxx
Do you wish to use NTP to set the current time? [Y/n] y
Using address xxx.xxx.xxx.xxx for NTP server.

If NTP servers were not provided by the DHCP server, an IP address will be requested as shown below:

Current date/clock :Fri Aug  6 17:20:27 UTC 2010
Do you wish to use NTP to set the current time? [Y/n] y
Please enter the NTP server address [xxx.xxx.xxx.xxx]

If you do not have a NTP server, or wish to set the time manually, answer 'n' to the query to use NTP to set the current time:

Current date/clock :Fri Aug  6 17:20:27 UTC 2010
Do you wish to use NTP to set the current time? [Y/n] n

To enter the date and time manually, answer 'y' to the query to manually set the date:
Do you wish to set the date manually? [Y/n] y
Enter date in 'MM/DD/YYYY' format. [] 08/06/2010
Note: Time has to be set in UTC/GMT format
Enter time in 'HH:MM' and 24-hour format. [] 17:20

7. Select the S A T A or USB device as the target to install the root file system.

If the installation script detects both a S A T A device and a USB device, the user will be prompted to select which device to use when installing the root file system.

There is a mux on the A T C A-F140 that controls access to the S A T A drive (either to the P2020 or the AMC). If the mux is set to direct the S A T A drive to the AMC, then only the USB device will be available to the installation process.

If installation is done with the USB as the only device and the S A T A drive is later added by changing the mux setting, the U-boot "rootpartition" variable will need to be changed to /dev/sdb. For more details see Section 2.5.3, Configuring A T C A-F140 to Boot From S A T A or USB Drive on page 42.

If both devices are available, the S A T A drive will always appear first in the list (as /dev/sda) and the USB drive will always appear second (as /dev/sdb). The example here is selecting the S A T A device (#1 in the list) as the installation target.

The following disks are available for root filesystem installation:

1: Disk /dev/sda: 80.0 GB, 80026361856 bytes
2: Disk /dev/sdb: 2013 MB, 2013265920 bytes

Disk number to install the root filesystem? [] 1

The above disk selection query appears only if both S A T A and USB devices are available.

If only one device is available, the installation script will not query the user for a target device. The device, whether it is a S A T A drive or a USB drive, will always appear as /dev/sda. Also the installation script will warn the user that the disk will be reformatted as shown below.

This installation will reformat the target disk /dev/sda.
All data will be lost on the target disk.
Do you wish to proceed? [Y/n]
The above query does not occur if the disk has already two partitions.

8. Select the partition to install the root file system.
   The following partitions are available for root filesystem installation:
   1: /dev/sda1: 40.0 GB
   2: /dev/sda2: 40.0 GB
   Partition number to install the root filesystem? [ ] 1

9. Confirm the target selection and proceed.
   At this point, the target devices will be displayed and the user is queried to proceed with the installation process.

   The kernel, device-tree blob, and U-Boot will be automatically upgraded in the backup boot bank if the images are found in the files.sha1sum file during download.

   Using the following MTD devices for the kernel, DTB, and U-Boot installation(s):
   MTD device /dev/mtd5: (backup-bank-kernel partition)
   MTD device /dev/mtd7: (backup-bank-dtb partition)
   MTD device /dev/mtd9: (backup-bank-u-boot partition)

   Using the following disk for root filesystem installation:
   Disk /dev/sda1: 40.0 GB

   Do you wish to proceed? [Y/n] y

10. Check SHA1 checksums and installation.
    At the time of file downloading progress, their SHA1 checksums are calculated and checked against the checksum as indicated in the files.sha1sum file. If the checksums are matched, the file is installed accordingly. The kernel, device-tree blob, and U-Boot images are installed in the appropriate backup boot bank MTD partitions, all tar balls are uncompressed, and all RPMs are installed using the Red Hat Package Manager.
Installing Basic Blade Services Software

The progress of the installation is displayed in the console and will looks like as follows:

  Formatting root filesystem partition /dev/sda1 ... Done.
-----

  Writing files to root filesystem partition /dev/sda1 ... 
-----

  Checking SHA1 Checksum for kernel ... Good.
  Installing kernel on /dev/mtd5 ... Unlocking ... Erasing ... Copying ... Done.

  Checking SHA1 Checksum for atca-f140.dtb ... Good.
  Installing DTB on /dev/mtd7 ... Unlocking ... Erasing ... Copying ... Done.

  Checking SHA1 Checksum for u-boot-<version>.bin ... Good.
  Installing U-Boot on /dev/mtd9 ... Unlocking ... Erasing ... Copying ... Done.

  Checking SHA1 Checksum for nfs.tar.gz ... Good.
  Uncompressing using TAR ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-bcm-ucode-<version>.rpm ... Good.
  Preparing rpm wrapper script ... Done.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-cpu-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-dtb-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-fpga-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-fpga-rtm-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-ipmc-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-ipmc-boot-<version>.rpm ... Good.
  Installing using RPM ... Done.

  Checking SHA1 Checksum for bbs-atcaf140-kernel-<version>.rpm ... Good.
Installing Basic Blade Services Software

Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-atcaf140-semtech-<version>.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-fuf-atcaf140-<version>-w rspne3.0.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-hpib-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-hpib-clientsrc-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-hpib-daemon-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Executing bbs-hpib-daemon post-install script:
Stopping HPI-B daemon.
HPI-B daemon runs on ATCA-M100 already – exiting.
Done.
Checking SHA1 Checksum for bbs-hpib-debug-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-hpib-devel-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-hpib-snmp-<version>-w rspne3.0-linux.rpm ... Good.
Installing using RPM ... Executing bbs-hpib-snmp post-install script:
Stopping HPI-B SNMP subagent.
Starting HPI-B SNMP subagent.
Done.
Checking SHA1 Checksum for bbs-hpmagentcmd-atcaf140-<version>-w rspne3.0.rpm ... Good.
Installing using RPM ... Done.
Installing Basic Blade Services Software

Checking SHA1 Checksum for bbs-lhc-<version>.windriver.powerpc.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-prom-utils-atcaf140-<version>-wrsyne3.0.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-sfptool-atcaf140-<version>-windriver.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-tcm-atcaf140-<version>-wrsyne3.0.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-uboot-utils-atcaf140-<version>-wrsyne3.0.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for bbs-version-atcaf140-<version>-wrsyne3.0.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for srstackware-config-f140-<version>.powerpc.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for srstackware-demo-config-f140-<version>.powerpc.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for srstackware-f140-<version>.powerpc.rpm ... Good.
   Installing using RPM ... Done.
Checking SHA1 Checksum for srstackware-enhanced-f140-<version>.powerpc.rpm ... Good.
   Installing using RPM ... Done.
Disabling rpm wrapper script ... Done.

11. Final configuration.
   Answer the following queries to set the host name and the root password for this system.
   ------

   Beginning final configuration
   ------
Choose a hostname for this machine [] atca-f140

Set Root password

New UNIX password: <root password>
Retype new UNIX password: <root password again>
passwd: password updated successfully

Root password set.

After setting the root password, the initialization script will attempt to issue a boot bank switch to pick up the new installation at reboot.

-------
Switching boot bank ... Done.
Reboot will occur on boot bank 1.
-------

After installation and final configuration, the blade will reboot automatically. The progress of the reboot is displayed in the console and will look similar to as follows:

Creating admin login...Done.
Cleaning up root filesystem...Done.
Unmounting local filesystems...Done.

Rebooting in 5 seconds... (Ctrl-C to break into shell)
Rebooting...
Restarting system.

12. If the installation script failed to switch the book banks for using the newly installed U-Boot, kernel, and device-tree blob and if the installation process has installed the U-boot, kernel, and the device-tree blob to the **backup boot bank**, in such case, to use the new images, the boot bank must be switched and the blade is to be reset. To switch the boot bank and to reset the blade, enter as follows:

    bootsel switch
    reset

The backup boot bank will become active and the blade will boot with the newly installed images. Proceed to Section 2.5.3 on page 42 to configure U-Boot to boot the blade using the flash devices and the SATA or USB drive.
2.5.3 Configuring ATCA-F140 to Boot From SATA or USB Drive

This section describes how to configure U-Boot to boot the Linux kernel and device-tree blob stored in the flash and to mount the root file system from the SATA or USB drive. The procedure uses the flashboot U-Boot script.

Configuring the ATCA-F140 to Boot From SATA or USB Drive

To configure ATCA-F140 to boot from SATA or USB drive:

1. Power-up or reboot the blade.
2. Press Ctrl-C when you see the message Hit Ctrl-C to stop autoboot: on the console.
3. Check whether the flashbootargs script is configured, as required.
   
   ```
   printenv flashbootargs
   
   flashbootargs=setexpr num 1 + $bootbank && setenv rootpartition $root$num && setenv bootargs root=$rootpartition rw init=$lnxinit
   
   onf console=$consoledev,$baudrate mem=$mem
   ```

   The selection of the root file system device is based on the $bootbank U-Boot environment variable.

<table>
<thead>
<tr>
<th>Root File System</th>
<th>Value ($root$num)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda1</td>
<td>0x0801</td>
</tr>
<tr>
<td>/dev/sda2</td>
<td>0x0802</td>
</tr>
<tr>
<td>/dev/sdb1</td>
<td>0x0811</td>
</tr>
<tr>
<td>/dev/sdb2</td>
<td>0x0812</td>
</tr>
</tbody>
</table>

4. Check whether the flashboot script is configured, as required.
   
   ```
   printenv flashboot
   
   flashboot= run flashbootargs & bootm e0000000 - elf00000
   ```

5. Set the bootcmd environment variable to invoke the flashboot script after a reset:
   
   ```
   setenv bootcmd 'run flashboot'
   ```

6. Reset the blade.
   
   ```
   reset
   ```
The system boots using the U-Boot, kernel, and device-tree blob in the active boot bank and uses the root file system as specified in the rootpartition environment variable.

For upgrading firmware, refer to Section 4.4, Upgrading Firmware on page 60.

2.6 NFS Installation Procedure

This section describes how to install BBS on a TFTP/NFS server, configure ATCA-F140 to boot using TFTP, and mount the root file system from the NFS server.

2.6.1 Configuring the NFS Server

Configure the NFS Server

Assume that you have a working knowledge of NFS and how to configure it. In the examples below, the directory /export/atca-F140 is used for the ATCA-F140 root file system. Your configuration may also vary.

1. Log in as "root" on the NFS server.
2. Create a directory for ATCA-F140 root file system, if it does not exist.
   
   ```
   # mkdir -p /export/atca-f140
   ```
3. All NFS server exports should be defined at /etc/exports location.
   
   ```
   /export/atca-f140 *(rw,sync,no_root_squash,no_all_squash)
   ```
   
   ```
   # /etc/init.d/nfs restart
   ```

2.6.2 Copying and Installing the Root File System

Copying and Installing the Root File System

To copy and install the Root File System:

1. On the NFS server, log in as "root".
2. Change to the ATCA-F140 root file system mount point (created in the earlier section)
   
   ```
   # cd /export/atca-f140
   ```
3. Copy or move the rootfs.tar.gz file into the exported directory.
4. Extract the root file system.
   
   ```
   # tar -xzf rootfs.tar.gz
   ```
2.6.3 Configuring the Boot Parameters for NFS

Configuring the Boot Parameters for NFS

To configure ATCA-F140 to network boot the kernel using NFS mount point:

1. Power-up or reboot the blade.
2. Press `ctrl-c` when you see the message `Hit Ctrl-C to stop autoboot:` on the console.
3. Type `printenv` to check the current U-Boot environment variables.
4. Set the `bootfile`, `blobfile` and `rootpath` environment variables.
   ```
   setenv bootfile atca-f140/kernel
   setenv blobfile atca-f140/atca-f140.dtb
   saveenv
   ```
   Using the NFS configuration examples:
   ```
   setenv rootpath /export/atca-f140
   ```
5. Check for the `nfsbootargs` script setup.
   ```
   print nfsbootargs
   nfsbootargs= setenv bootargs root=/dev/nfs rw
   nfsroot=$serverip:$rootpath init=$lnxinit
   console=$consoledev,$baudrate mem=$mem $othbootargs;
   ```
6. Check for the `nfsboot` script setup.
   ```
   printenv nfsboot
   nfsboot=run nfsbootargs && tftp $loadaddr $bootfile && tftp $blobaddr
   $blobfile && bootm $loadaddr - $blobaddr
   ```
7. Set the `bootcmd` environment variable to invoke the `nfsboot` script after reboot:
   ```
   setenv bootcmd ‘run nfsboot’
   saveenv
   ```
8. Reset the blade.
   ```
   reset
   ```

Following example assumes the TFTP server is also the NFS server and has the same IP address. Alternatively, you can set the `nfsroot=` variable used in `nfsbootargs` to reflect your NFS server’s IP address.
2.6.4 Installing the BBS RPMs

Install the Remaining BBS Files

After the blade boots, BBS RPMs need to be installed. Reboot the blade after installing the RPMs.

1. Log onto ATCA-F140 as root.
2. Change directory to the location where the BBS RPMs exist.
   
   ```
   # cd /opt/bladeservices/rpms
   ```
3. Install the BBS and SRstackware RPM files in the following sequence:
   
   ```
   # rpm -ivh -nodeps bbs-atcaf140-bcm-ucode-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-cpu-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-dtb-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-fpga-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-fpga-rtm-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-ipmc-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-ipmc-boot-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-kernel-<version>.rpm
   # rpm -ivh -nodeps bbs-atcaf140-sentech-<version>.rpm
   # rpm -ivh -nodeps bbs-fuf-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps bbs-hpib-<version>-wrspne3.0-linux.rpm
   # rpm -ivh -nodeps bbs-hpib-clientsrc-<version>-wrspne3.0-linux.rpm
   # rpm -ivh -nodeps bbs-hpib-daemon-<version>-wrspne3.0-linux.rpm
   # rpm -ivh -nodeps bbs-hpib-devel-<version>-wrspne3.0-linux.rpm
   # rpm -ivh -nodeps bbs-hpib-snmp-<version>-wrspne3.0-linux.rpm
   # rpm -ivh -nodeps bbs-hpmagentcmd-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps bbs-prom-utils-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps bbs-sfptool-atcaf140-<version>-windriver.rpm
   # rpm -ivh -nodeps bbs-tcm-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps bbs-uboot-utils-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps bbs-version-atcaf140-<version>-wrspne3.0.rpm
   # rpm -ivh -nodeps srstackware-config-f140-<version>.powerpc.rpm
   # rpm -ivh -nodeps srstackware-demo-config-f140-<version>.powerpc.rpm
   ```
Installing Basic Blade Services Software

```
# rpm -ivh -nodeps srstackware-f140-<version>.powerpc.rpm
# rpm -ivh -nodeps srstackware-enhanced-f140-<version>.powerpc.rpm
# ldconfig
# depmod -ae
```

4. Reboot the blade to activate the BBS.
   ```
   # reboot -f
   ```

For upgrading firmware, refer to Section 4.4, Upgrading Firmware on page 60.

## 2.7 Upgrading the FPGA Firmware

To upgrade the FPGA firmware is a two-step procedure:

1. Upload the firmware image to the AT45 flash device.
2. Trigger the FPGA to upgrade with the latest firmware image.

The following table details the FPGA firmware upgrade command usage and its functionality.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td># fpga_upg -v</td>
<td>Retrieves the current FPGA version</td>
</tr>
<tr>
<td># fpga_upg -u -f /opt/bladeservices/rom/atca-f140-fpga-&lt;version&gt;.bin</td>
<td>Upgrades the front-blade FPGA firmware on ATCA-F140</td>
</tr>
<tr>
<td># fpga_upg -u -r /opt/bladeservices/rom/atca-f140-rtm-fpga-&lt;version&gt;.bin</td>
<td>Upgrades the RTM FPGA firmware on ATCA-F140.</td>
</tr>
<tr>
<td># fpga_upg -c -f /opt/bladeservices/rom/atca-f140-fpga-&lt;version&gt;.bin</td>
<td>Compares the front-blade FPGA firmware with the image.</td>
</tr>
<tr>
<td># fpga_upg -c -r /opt/bladeservices/rom/atca-f140-rtm-fpga-&lt;version&gt;.bin</td>
<td>Compare the RTM FPGA firmware with the image.</td>
</tr>
</tbody>
</table>

The upgrade process automatically verifies whether the image loaded was written correctly to the flash device. The `fpga_upg` utility can also be used to verify the image currently populated on the flash device to an image stored in a file.
To trigger the upload from the flash device to the FPGA, the blade must undergo a power-cycle event. This can either by done via the shelf manager or the blade can be physically reseated.

2.8 Upgrading the BCM 8727/84740/84754 PHY Microcode

To upgrade the BCM 8727/84740/84754 PHY microcode:

1. Upload the microcode to the AT25 flash device.
2. Trigger the BCM 8727/84740/84754 PHYs to upgrade using the microcode.

The BCM 8727/84740/84754 PHY microcode does not have version information to identify itself. You should take care to know when to upload new images to the AT25 flash device.

The front-blade contains BCM 8727 and BCM 84740 devices. To upgrade the front-blade BCM 8727 and BCM 84740 PHY microcode, enter:

```
# prom_upg -u -f bcm8727 /opt/bladeservices/rom/bcm-8727-0511.bin
# prom_upg -u -f bcm84740 /opt/bladeservices/rom/bcm-84740-0106.bin
```

The RTM contains BCM 8727, BCM 84740, and BCM 84754 devices. To upgrade the RTM BCM 8727, BCM 84740, and BCM 84754 PHY microcode, enter:

```
# prom_upg -u -r bcm8727  /opt/bladeservices/rom/bcm-8727-0511.bin
# prom_upg -u -r bcm84740 /opt/bladeservices/rom/bcm-84740-0106.bin
# prom_upg -u -r bcm84754 /opt/bladeservices/rom/bcm-84754-0105.bin
```

The upgrade process automatically verifies that the image loaded is written correctly in to the flash device.

The `prom_upg` utility can also be used to verify the image currently populated on the flash device to an image stored in a file.

To compare the front-blade BCM 8727 and BCM 84740 PHY microcode to the image, enter:

```
# prom_upg -c -f /opt/bladeservices/rom/bcm-8727-0511.bin
# prom_upg -c -f /opt/bladeservices/rom/bcm-84740-0106.bin
```
Installing Basic Blade Services Software

To compare the RTM BCM 8727, BCM 84740, and BCM 84754 PHY microcode to the image, enter:

```
# prom_upg -c -r /opt/bladeservices/rom/bcm-8727-0511.bin
# prom_upg -c -r /opt/bladeservices/rom/bcm-84740-0106.bin
# prom_upg -c -r /opt/bladeservices/rom/bcm-84754-0105.bin
```

The BCM 8727, BCM 84740, and BCM 84754 PHYs are triggered to upload the image during reboot.

There are five flash devices corresponding to the five PHY devices. The target device is selected by the "-f" and "-r" arguments.

There is no check between the device being upgraded and the upload file. You should make sure that they are upgrading the proper device with the proper upgrade file. Upgrading the wrong device with the wrong image can render the PHY unusable.

The `prom_upg` utility shares the same SPI interface as the `fpga_upg` and SFP utilities (`sfptool`). These utilities should be stopped (if running) prior to upgrading BCM PHY microcode. Otherwise, the `prom_upg` utility may fail with "Device or resource busy"."
Licensed Software Modules

In addition to the base BBS, there are several licensed software modules that you can purchase to perform specific tasks. Currently the licensed software modules for the ATCA-F140 include:

- **SRS Layer 3 License for ATCA-F140 (SL-L3F140-01-001-STD)**
  SRstackware Layer3 Licensed Module is required to use Layer 3 protocols supported by SRstackware, such as, OSPFv2, VRRP, RIP etc. Base BBS distribution consists Layer2 features and static configuration of IPv4/IPv6. For more details see, *SRstackware Intelligent Network Software Layer 3 Configuration Guide*.

- **FlowPilot License for ATCA-F140 (SL-FPF140-04-001-STD)**

- **ViewCheck for ATCA-F140 (SL-DGF140-01-001-STD)**
  ViewCheck Licensed Module is required to use extensive diagnostics feature. For more details see, *ViewCheck for ATCA-F140 Installation and Use Guide*.

You need to buy a license for using the licensed software modules. For example, if you buy FlowPilot License for ATCA-F140, you will get FlowPilot software package access. This package can be installed on top of the ATCA-F140-BBS package, which contains only the unlicensed software, including Layer 2 SRstackware.

### 3.1 Installation

License modules are provided as RPMs, which can be installed manually on top of BBS with base SRstackware RPM. However, to facilitate installation of licensed software module RPMs on top of base BBS distribution, a script, *atcaf140_licenseRPMInstall.sh* provided as a reference, is packaged with base BBS, which is located at /opt/bladeservices/scripts. You can use this script for installing or packaging the licensed software module RPMs with flashboot or RAMDisk.

**NOTE:** This script is only for reference. You can customize it, as required for your installation process.

Currently, using this script, you can install only the following licensed modules:

- SRS Layer 3
- SRS FlowPilot
- ViewCheck
Licensed Software Modules

This script is provided to install licensed module RPMs. As of now, there are three license modules which are supported by this script, from input parameters point of view I3 represents SRS Layer3 License module, fp represents SRS FlowPilot License module and vc represents ViewCheck License module.

Usage

Following is the syntax to use the script, for installing the licensed software module RPMs for factory or flash or RAMDisk deployments:

```bash
sh atcaf140_licenseRPMInstall.sh
Usage: sh atcaf140_licenseRPMInstall.sh -t TARGET -f LICENSED_MODULES [OPTION]...
```

Parameters

- `-t TARGET`: It is used to specify the target location for installing the licensed module. It is a mandatory parameter. It can have either of the following values:
  - `ftp_install`: Get the licensed module RPMs from remote system through FTP and install RPMs on ATCA-F140. Prerequisite: FTP server.
  - `flashboot_prep`: Get the licensed module RPMs from local system, copy into rootfs location, and update files.sha1sum.
  - `rpm_install`: Get the licensed module RPMs from local system and install RPMs on ATCA-F140.
  - `ramdisk`: Get the licensed RPMs from local system and update the ramdisk. It retains the backup of original ramdisk.
  - `verify`: Verify if required licensed module RPMs are installed in the blade.

- `-f LICENSED_MODULES`: It is used to specify the licensed module to be installed. Currently it can install only three modules - SRS Layer 3 (I3), SRS FlowPilot (fp), or ViewCheck (vc). It is a mandatory parameter.

This script can take following options:

- `-i IPADDR`: It is used to specify the IP address of FTP server. It is applicable to FTP installation.

- `-u USER`: It is used to specify user name for accessing the FTP server. It does not accept 'root' as user name. It is applicable only to the FTP installation.

- `-p PASSWORD`: It is used to specify password for accessing the FTP server. It is applicable only to the FTP installation.

- `-L RPM_LOCATION`: It is used to specify the location of licensed software module RPM in the FTP server. You can use `-i` option to specify the IP address. By default, the location is initialized to Present Working Directory (PWD).
Licensed Software Modules

-r IMAGE_LOCATION: It is used to specify location of rootfs, files.sha1sum, or ramdisk remote location for FTP installation, if IP address is provided.

By default, the location is initialized to Preset Working Directory (PWD).

-l LOGFILE It is used to redirect install steps into log file.

-v It is used to display version information.

-h It is used to display the command help.

This script can be used for:

- Licensed module installation from remote server
- License modules inclusion to Flashboot image
- Licensed Module RPM Installation
- License Module RPMs inclusion to RAMDisk

License Module Installation from Remote Server

To install the licensed software module RPMs from remote server, specify target as ftp_install.

Currently this script does not support scp_install and tftp_install options, due to their interactive nature.

For licensed module installation from remote server:

1. Set up a FTP server; with user name and password.
2. Get the licensed software module RPMs from SCML/SWORDS (as per licensed module order).
3. In FTP server, copy the required licensed software module RPMs as per licensed module order in a separate directory- do not keep any other RPMs in this location.
4. Execute the installation script with below inputs:
   - IP address of FTP Server
   - List of licensed modules as per licensed module order. For example, l3,fp,vc (separate by commas only)
   - Absolute path of licensed software module RPMs in the FTP server
   - User name and password to login to the FTP server

For example, to install SRS Layer3 and ViewCheck software RPM through an FTP server with IP address 10.10.10.1, the RPMs are located at /tftpboot/ directory.

```
sh atcaf140_licenseRPMInstall.sh -t ftp_install -f l3,vc -u $USER -p $PASSWORD -L /tftpboot/f140_rpms -l install_log -i 10.10.10.1
```
Licensed Software Modules

**NOTE:** The location should not have any other unnecessary files, as this process will copy all of the files available in that location.

5. Execute the script to verify if the RPMs are installed. Provide input parameter as verify along with the list of licensed software modules.
   
   ```
   sh atcaf140_licenseRPMInstall.sh -t verify -f l3,vc
   ```

**License modules inclusion to Flashboot image**

You can include licensed software modules to the flashboot image by updating files.sha1sum file with the licensed module RPMs information.

In this case target type should be provided as `flashboot_prep`.

**NOTE:** It only prepares the image to use in next flashboot installation, it does not install RPMs.

To include licensed module software to flashboot installation:

1. Copy "`sh atcaf140_licenseRPMInstall.sh`" script to the server where flashboot image containing files.sha1sum file is present.
2. Copy the licensed module RPMs to the server.
3. Execute the script with the required inputs:
   - List of licensed modules as per licensed module order. For example, l3,fp,vc (separate by commas only)
   - Absolute path of licensed module RPMs (default path is PWD).
   - Absolute path of flashboot image with files.sha1sum file (default path is PWD)

For example, to prepare a flashboot image with SRS FlowPilot and ViewCheck software RPM.

   ```
   sh atcaf140_licenseRPMInstall.sh -t flashboot_prep -f fp,vc -L /f140_rpms -r /rootfs_location
   ```

**Licensed Module RPM Installation**

To install license RPMs in an already installed system that has, base BBS, you have to just install the licensed module RPMs.

In this case target type should be provided as `rpm_install`.

To install licensed module RPMs:

1. Copy the licensed module RPMs to the blade.
2. Execute the script with required inputs:
- List of licensed modules as per licensed module order. For example, l3,fp,vc (separate by commas only)
- Absolute path of licensed RPMs (default path is PWD). For example, to install SRS FlowPilot and ViewCheck software RPM.

```
sh atcaf140_licenseRPMInstall.sh -t rpm_install -f fp,vc -L /f140_rpms
```

3. Execute script to verify if the RPMs are installed. Provide input parameter as verify along with the list of license modules.

```
sh atcaf140_licenseRPMInstall.sh -t verify -f l3,vc
```

**License module RPMs inclusion to RAMDisk**

To prepare RAMDisk image with licensed RPMs, specify target as ramdisk.

To add licensed module RPMs to RAMDisk:

1. Copy "sh atcaf140_licenseRPMInstall.sh" script to the server where RAMDisk image is present.
2. Copy licensed module RPMs to the server.
3. Execute the script with required inputs:
   - List of licensed modules as per licensed module order. For example, l3,fp,vc (separate by commas only)
   - Absolute path of licensed RPMs (default path is PWD).
   - Absolute path of ramdisk image file (default path is PWD). For example, to prepare a ramdisk with SRS Layer3, FlowPilot and ViewCheck software RPM.

```
sh atcaf140_licenseRPMInstall.sh -t ramdisk -f l3,fp,vc -L /f140_rpms -r /ramdisk_location
```
Firmware Upgrade Facility

The Firmware Upgrade Facility (FUF) provides a uniform way to upgrade firmware on SMART Embedded Computing hub blades, node blades, and AMC modules. It consists of a Firmware Upgrade Command-line Utility (FCU), flash device drivers, and specially prepared firmware recovery image files.

4.1 Firmware Recovery Image Files

FCU supports specially prepared Firmware Recovery Image (FRI) files as well as firmware images in the Hardware Platform Management (HPM.1) format. HPM.1 is a PICMG standard to upgrade IPMCs.

By default, the image files for the current hardware configurations are loaded as part of the BBS software at /opt/bladeservices/rom when the blade-specific firmware support packages are installed.

The image files mentioned in the following table are currently supported.

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>atca-f140-kernel.fri</td>
<td>Kernel image for ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-cpu.fri</td>
<td>U-boot firmware image for ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-dtb.fri</td>
<td>Device Tree Binary for ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-ipmc-&lt;version&gt;.hpm</td>
<td>IPMC firmware image for ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-ipmc-boot-&lt;version&gt;.hpm</td>
<td>IPMC Boot Loader firmware image for ATCA-F140</td>
</tr>
</tbody>
</table>

4.2 Backup Concept

Firmware for the IPMC on the SMART Embedded Computing ATCA-F140 switch is stored in an on-chip flash which has one active and one backup section. When upgrading the IPMC firmware, only the firmware in the backup section is updated. After the upgrade, the new firmware is checked and if it is functional and valid, the IPMC switches to the new, updated firmware. This happens without causing a payload reset.

This upgrade mechanism prevents both sections from having bad IPMC firmware and allows for the next firmware upgrade to be done easily.

When upgrading the U-Boot firmware, or Device Tree Binary image, or Linux kernel, FCU only writes into the currently stand-by bank. After the upgrade, the stand-by bank must be marked for next use, this means it will be executed after the next reboot.
4.3  fcu–Firmware Upgrade Command-Line Utility

Description

The Firmware Upgrade Command-line Utility (FCU) allows you to:

- Query the current versions of firmware installed on a blade and determine which firmware devices are active.
- Verify that a specified upgrade image is sound and compatible with the current hardware.
- Upgrade a firmware image.
- Mark a device to be used as the boot source on the next reset.
- Switch between the active and stand-by IPMC firmware banks without causing a payload reset.
- Show the version of a firmware image file and compare the version of a firmware image file with the version of the currently installed firmware.

By default, the FCU binary executable is installed at /opt/bladeservices/bin. This directory has been added to the PATH environment variable.

The FCU verify and upgrade operations require specially prepared FRI files or HPM files (see Firmware Recovery Image Files on page 55).

Synopsis

fcu --help [-t<slave address>]
fcu --version
fcu -q [-d <device-id>] [-t<slave address>]
fcu -v -f <filename> [-t<slave address>]
fcu -u -f <filename> [-t<slave address>]
fcu -a -f <filename>
fcu -m -b <bank-letter> -d <device-id> [-t<slave address>]
fcu -s -f <filename>
fcu -c -f <filename>
fcu --activate -b <bank-letter> -d <device-id>

Parameters

-a
--full-upgrade

This option is a shortcut for performing the verify, upgrade, and mark operations. The file option -f is required. This option should not be combined with other operations.
Firmware Upgrade Facility

- **r**
  --activate
  This command is available for IPMC devices and images which conform to the HPM.1 standard.

  HPM.1 compliant IPMCs store a redundant set of firmware images which may have the states operational, rollback or deferred. Using the --activate option, you can set the state of the addressed firmware bank to "operational". Unlike the --mark option, the --activate command does not affect the payload operation, this means you can set a previously "rollback" firmware bank to "operational" without rebooting or resetting the payload. The target IPMC is immediately functional after switching to the new firmware.

  You can obtain the current states of the firmware banks by using the --q command. The state appears as part of the bank name, for example, "B - Rollback".

- **b <bank-letter>**
  --bank=<bank-letter>
  Specifies a flash bank (A or B, for example), where <bank-letter> is the letter designating a specific bank. This option can be used with the mark or activate operation. Use the query option --q to list available banks.

- **c**
  --compare
  Compares the image contained in the specified device with a specified file in the file system. This may be useful after an image upgrade to verify that the device actually contains a new and different image.

- **d <device-id>**
  --device=<device-id>
  Specifies a target firmware device, where <device-id> is the name of the device. This option is used with the mark or query operations. Device ID values vary by hardware. You can display supported devices on a given blade by using fcu --help. Currently supported values are listed in the following table.

<table>
<thead>
<tr>
<th>Device ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>atca-f140-cpu</td>
<td>U-Boot firmware device for ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-kernel</td>
<td>Kernel device of ATCA-F140</td>
</tr>
<tr>
<td>atca-f140-hpm.1-ipmc</td>
<td>IPMC firmware device</td>
</tr>
</tbody>
</table>
Firmware Upgrade Facility

-f <filename>
--file=<filename>

Specifies the FRI file, where <filename> is the complete path and filename of the image file. This option is used with the verify and upgrade operations.

--force

This option allows the installation of images with non-matching part-number and part-revision FRU data fields. This option should be used with extreme caution only because installing an incompatible image on a device may render it inoperable.

--help

Displays a brief message describing command usage. It also displays a list of the devices supported on the blade. This option is exclusive and should not be used with other options.

-m
--mark

Informs FCU to set the boot select so that on the next boot the specified firmware bank will be active. When mark is combined with the upgrade operation, there is no need to specify a bank; the bank just upgraded will be marked. Otherwise, you must specify a bank and a device.

Note that on the ATCA-F140 the firmware image and the kernel image are coupled, this means when you mark a U-Boot image for the next reboot, the corresponding Linux kernel image is automatically marked as well. Refer also to the ATCA-F140 Installation and Use guide for details about the flash memory layout.

-q
--query

Informs FCU to return firmware information for a specific device (if used with -d) or information about all firmware devices. The query operation is exclusive and is not intended to be combined with other operations.

Some firmware images are stored in redundant flash devices which can be marked for use after the next reboot (using the -m command). For these firmware images, the -q command displays whether image is marked or not. For HMP.1 compliant firmware images, the -q command displays the state of the image, i.e., operational, rollback or deferred.

-s
--show

Shows detailed information about a specified file. The information shown includes for example image type, version, manufacturer name etc. This command may be useful before a firmware upgrade to determine the version of a new image file.
-t
--target
   This option is needed to specify the IPMC address if the operation is to be done on a remote IPMC. If you do not specify this option, the software tries to access the local IPMC. The -t option provides a possibility to perform the firmware upgrade on a different blade.

-u
--upgrade
   Tells FCU to upgrade the currently inactive bank of the device specified by the target FRI file. The file option -f is required. The upgrade operation may be combined with the verify and mark operations.

-v
--verify
   Tells FCU to verify the image file specified by the required -f option. This operation verifies that the specified file is sound and compatible with the current hardware. The verify operation may be combined with the upgrade and mark operations.

--version
   Displays version information for the utility. This option is exclusive and should not be used with other options.

Usage

Some FCU options can be combined. Some options are exclusive. The following list describes the valid option combinations:

- --compare --file=<filename>
- --full-upgrade --file=<filename>
- --full-upgrade --file=<filename> --target=xxxxxx
- --help
- --mark --bank=<bank-letter> --device=<device-id>
- --query
- --query --device=<device-id>
- --show --file=<filename>
- --upgrade --file=<filename>
- --upgrade --mark --file=<filename>
- --verify --file=<filename> --target=xxxxxx
Firmware Upgrade Facility

- --verify --upgrade --file=\<filename> 
- --activate --bank=\<bankletter> --device=\<deviceID> 
- --verify --upgrade --mark --file=\<filename> 
- --version 

Multi-character options may be abbreviated so long as they are unique. For example, --full is equivalent to --full-upgrade. Typing --ver, however, will not work since it matches both --verify and --version.

Single-character options may be combined without repeating the hyphen, as shown in the following examples:

- fcu –vf /opt/bladeservices/rom/\<filename> 
- fcu –q –d \<device-id> 
- fcu –q –t 0x90 \<device-id> 
- fcu –mb a –d \<device-id> 

Options are not case-sensitive. For example, --help is equivalent to --HeLp. However, option arguments, such as filename and device ID are case-sensitive.

When upgrading firmware, it is strongly recommended that you upgrade only one device at a time. While FCU performs many checks during upgrade to ensure success, if something goes wrong and both firmware banks become corrupted, the blade will be inoperable.

### 4.4 Upgrading Firmware

This section describes recommended procedures for upgrading firmware devices.

#### 4.4.1 Upgrading CPU Firmware

**Upgrading CPU Firmware**

Follow these steps to upgrade the CPU firmware (U-Boot):

1. Query the current and backup U-Boot firmware on the ATCA-F140 blade.
   
   # fcu –qd atca-f140-cpu

2. Show the version of the new U-Boot image.

   # fcu –s –f /opt/bladeservices/rom/atca-f140-cpu.fri

3. If the U-Boot image is newer than the current version, upgrade the U-Boot firmware.

   # fcu –v –u –f /opt/bladeservices/rom/atca-f140-cpu.fri

4. Query the device to ensure that the backup was upgraded.

   # fcu –qd atca-f140-cpu
4.4.2 **Upgrading the Device-Tree Blob**

**Upgrading the Device-Tree Blob**

Follow these steps to upgrade the device-tree blob:

1. Query the current and backup device-tree blob images.
   
   ```
   # fcu -q -d atca-f140-dtb
   ```

2. Show the version of the new device-tree blob.
   
   ```
   # fcu -s -f /opt/bladeservices/rom/atca-f140-dtb.fri
   ```

3. If the device-tree-blob version in the release is newer than the current version installed, upgrade the device-tree blob.
   
   ```
   # fcu -v -u -f /opt/bladeservices/rom/atca-f140-dtb.fri
   ```

4. Query the device to ensure whether the backup is upgraded.
   
   ```
   # fcu -q -d atca-f140-dtb
   ```

4.4.3 **Upgrading the Kernel**

**Upgrading the Kernel**

Follow these steps to upgrade the kernel:

1. Query the current and backup kernel images.
   
   ```
   # fcu -q -d atca-f140-kernel
   ```

2. Show the version of the new kernel.
   
   ```
   # fcu -s -f /opt/bladeservices/rom/atca-f140-kernel.fri
   ```

3. If the kernel version in the release is newer than the current version installed, upgrade the kernel.
   
   ```
   # fcu -v -u -f /opt/bladeservices/rom/atca-f140-kernel.fri
   ```

4. Query the device to ensure that the backup was upgraded.
   
   ```
   # fcu -q -d atca-f140-kernel
   ```

4.4.4 **Activating the Backup Boot Bank**

**Activating the Backup Boot Bank**

After upgrading the backup boot bank with new U-Boot, device-tree blob, and kernel images, the backup boot bank must be marked as active for next boot and reboot the system. This can be done via FCU, or via U-Boot, or via the Shelf Manager.

**Activating the Backup Boot Bank via FCU**

1. To mark the backup boot bank, first query which bank is "Marked for next use"
   
   ```
   # fcu -q -d atca-f140-cpu
   ```
Firmware Upgrade Facility

2. Mark the backup boot bank for next use after the next reboot.
   If Bank A is "Marked for next use", mark Bank 'B' for the next reboot.
   # fcu -mb B -d atca-f140-cpu
   If Bank B is "Marked for next use", mark Bank 'A' for the next reboot.
   # fcu -mb A -d atca-f140-cpu

   The -mb option allows you to select which boot bank to use at the next boot and it
   is done through marking U-Boot. By extension, using the -mb option to mark U-boot
   also marks the device-tree blob and kernel as well. All three must be at the desired
   version in the target bank while booting that bank.

3. Reboot the blade.
   # reboot -f

Activating the Backup Boot Bank via U-Boot

1. Power-up or reboot the blade.
2. Press Ctrl-C when you see the message Hit Ctrl-C to stop autobo: on the
   console.
3. To switch the boot banks and to use the newly installed U-Boot, kernel, and device-tree
   blob, enter
   bootsel switch
   reset

   The backup boot bank will become active after the restart.

Activating the Backup Boot Bank via the Shelf Manager

Refer to the Shelf Manager documentation for the IPMI command to initiate a boot bank
switch. Reboot the blade for the boot bank switch to take effect.

4.4.5 Upgrading IPMC Boot Loader Firmware

Upgrading IPMC Boot Loader Firmware

Follow these steps to upgrade the IPMC boot loader firmware. The IPMC boot loader
becomes active immediately after the successful upgrade.

1. Query the current IPMC boot loader on the ATCA-F140.
   # fcu -q -d atca-f140-hpm.1-ipmc
2. Show the version of the new IPMC boot loader.
   
   ```bash
   # fcu -s -f /opt/bladeservices/rom/atca-f140-ipmc-boot-<version>.hpm
   ```

3. If the IPMC boot loader version in the release is newer than the current version installed, upgrade the IPMC boot loader.
   
   ```bash
   # fcu -v -u -f /opt/bladeservices/rom/atca-f140-ipmc-boot-<version>.hpm
   ```

4. Query the IPMC boot loader to ensure the new version is installed and activated.
   
   ```bash
   # fcu -qd atca-f140-hpm.1-ipmc
   ```

**NOTE:** It is recommended that a delay of at least 120 seconds to be maintained between IPMC/IPMC boot loader upgrades.

### 4.4.6 Upgrading IPMC Firmware

**Upgrading IPMC Firmware**

The IPMC firmware becomes active immediately after the successful upgrade. To upgrade the IPMC firmware:

1. Query the current IPMC firmware on the ATCA-F140.
   
   ```bash
   # fcu -q -d atca-f140-hpm.1-ipmc
   ```

2. Show the version of the new IPMC image.
   
   ```bash
   # fcu -s -f /opt/bladeservices/rom/atca-f140-ipmc-<version>.hpm
   ```

3. If the IPMC version in the release is newer than the current version installed, upgrade the IPMC firmware.
   
   ```bash
   # fcu -v -u -f /opt/bladeservices/rom/atca-f140-ipmc-<version>.hpm
   ```

4. Query the IPMC to ensure whether the new version is installed and activated.
   
   ```bash
   # fcu -q -d atca-f140-hpm.1-ipmc
   ```
Firmware Upgrade Facility
Linux Distribution Description

The BBS for the ATCA-F140 is based on Wind River Platform for Network Equipment, Linux Edition 3.0, built on Linux 2.6 kernel technology.

5.1 Reliability

The majority of errors caused by improper shutdown are fixed automatically during boot.

5.2 Login

A Linux shell can be accessed via the face plate serial port.

If you use a serial console or terminal emulator, the serial/RTM port settings are 9600 baud, no parity, eight data bits, and one stop bit.

If you use SSH, see Network Services Configuration below for default IP address assignments.

If you want to login as "root" via SSH, you need to first configure SSH using the console serial port. In the /etc/ssh/sshd_config file, set PermitRootLogin to yes. For this change to take effect, you must either reboot the blade/module or run the command /etc/init.d/sshd restart.

The following table lists available default login accounts, see Section 11.2, Default Configuration on page 146.

<table>
<thead>
<tr>
<th>Login Name</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>root</td>
</tr>
</tbody>
</table>

5.3 Network Services Configuration

The following sections describe the default configuration for network services.

Network services configuration varies for ATCA-F140 blades depending on whether the blade is inserted into logical slot 1 or logical slot 2. Configuration scripts rely on HPM software to determine the slot location (see Chapter 6, Hardware Platform Management on page 71). If scripts are unable to determine the slot location, they default to a slot 1 configuration regardless of the actual slot. This may result in network conflicts.
## 5.3.1 ATCA-F140 Ethernet Interfaces

The following interfaces are configured at startup.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
<th>VLAN</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Slot 1 Configuration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vlan1.21</td>
<td>Base channel 1</td>
<td>21</td>
<td>192.168.21.1</td>
</tr>
<tr>
<td>vlan1.22</td>
<td>Base channel 2</td>
<td>22</td>
<td>192.168.22.1</td>
</tr>
<tr>
<td>vlan1.24</td>
<td>Base channel 3</td>
<td>24</td>
<td>192.168.24.1</td>
</tr>
<tr>
<td>vlan2.11</td>
<td>Fabric channel 1</td>
<td>11</td>
<td>192.168.11.1</td>
</tr>
<tr>
<td>vlan2.12</td>
<td>Fabric channel 2</td>
<td>12</td>
<td>192.168.12.1</td>
</tr>
<tr>
<td>eth0</td>
<td>Update Channel Ethernet</td>
<td>None</td>
<td>Configured in U-Boot</td>
</tr>
<tr>
<td>eth1</td>
<td>Front panel Ethernet</td>
<td>None</td>
<td>Configured in U-Boot</td>
</tr>
<tr>
<td><strong>Slot 2 Configuration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vlan1.21</td>
<td>Base channel 1</td>
<td>21</td>
<td>192.168.21.2</td>
</tr>
<tr>
<td>vlan1.22</td>
<td>Base channel 2</td>
<td>22</td>
<td>192.168.22.2</td>
</tr>
<tr>
<td>vlan1.24</td>
<td>Base channel 3</td>
<td>24</td>
<td>192.168.24.2</td>
</tr>
<tr>
<td>vlan2.11</td>
<td>Fabric channel 1</td>
<td>11</td>
<td>192.168.11.2</td>
</tr>
<tr>
<td>vlan2.12</td>
<td>Fabric channel 2</td>
<td>12</td>
<td>192.168.12.2</td>
</tr>
<tr>
<td>eth0</td>
<td>Update Channel Ethernet</td>
<td>None</td>
<td>Configured in U-Boot</td>
</tr>
<tr>
<td>eth1</td>
<td>Front panel Ethernet</td>
<td>None</td>
<td>Configured in U-Boot</td>
</tr>
</tbody>
</table>

The following interfaces remain as not configured:

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan1</td>
<td>Connection to base interface switch. vlan1.21, vlan1.22, and vlan1.24 are associated with tagged VLANs on this interface. BBS does not configure IP addresses on this interface and instead instantiates VLAN devices (vlan1.21, for example) on it with the <code>vconfig</code> command.</td>
</tr>
<tr>
<td>vlan2</td>
<td>Connection to fabric interface switch. vlan2.11 and vlan2.12 are associated with tagged VLANs on this interface. BBS does not configure IP addresses on this interface and instead instantiates VLAN devices (vlan2.11, for example) on it with the <code>vconfig</code> command.</td>
</tr>
<tr>
<td>eth0</td>
<td>Update Channel Ethernet</td>
</tr>
</tbody>
</table>
5.3.2 **DHCP Server**

A DHCP server on the ATCA-F140 starts at run levels 2–5. The server configuration varies depending on the slot location.

<table>
<thead>
<tr>
<th>Slot Location</th>
<th>Listens On</th>
<th>Address Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1</td>
<td>Base channel 1</td>
<td>192.168.21.100 to 192.168.21.125</td>
</tr>
<tr>
<td></td>
<td>Fabric channel 1</td>
<td>192.168.11.100 to 192.168.11.125</td>
</tr>
<tr>
<td>Slot 2</td>
<td>Base channel 2</td>
<td>192.168.22.100 to 192.168.22.125</td>
</tr>
<tr>
<td></td>
<td>Fabric channel 2</td>
<td>192.168.12.100 to 192.168.12.125</td>
</tr>
<tr>
<td>Slot 3</td>
<td>Fabric channel 3</td>
<td>192.168.13.100 to 192.168.13.125</td>
</tr>
</tbody>
</table>

**NOTE:** Slot 3 and Slot 4 configurations mentioned in the above table are applicable to AXP14-400 chassis.

5.3.3 **TFTP Server**

The "xinetd" daemon starts running the TFTP server on the ATCA-F140 blade, when required. The "xinetd" daemon starts at run levels 3, 4, and 5.

5.3.4 **SSH**

A secure shell server starts at run levels 2–5 and listens on all Ethernet interfaces listed in *ATCA-F140 Ethernet Interfaces on page 66*. 
5.4 Log File Management

BBS, as well as Linux in general, generates various log files which are found in the /var/log directory. System administrators should take care that the log files do not grow too large, which may have a negative impact on their systems.

BBS provides the standard Linux logrotate package for managing the system log files as well as a set of configuration files for managing each log file individually or in groups. Configuration options allow system administrators to tailor the management of log files including, but not limited to, the following items:

- Maximum size of a log file before triggering logrotate
- Compression options
- Frequency of rotations
- Number of older log files to keep before being removed
- Notification options

The logrotate configuration files and scripts can be found in the /etc/logrotate.d directory. For more information on how to tailor these to your system's specific needs, refer to the Linux man page for logrotate.

5.4.1 Log Files

The following is the list of log files managed by logrotate:

- /var/log/ha-debug
- /var/log/ha-log
- /var/log/hpibSubagent.log
- /var/log/named.log
- /var/log/ppp/connect-errors
- /var/log/sfptool.log
- /var/log/snmpd.log
- /var/log/srstackware.log
- /var/log/kern.log
- /var/log/messages
- /var/log/secue
- /var/log/maillog
- /var/log/spooler
- /var/log/boot.log
Linux Distribution Description

- /var/log/cron
- /var/log/tcm/tclk_agent.log
- /var/log/vsftpd.log
- /var/log/wtmp
Linux Distribution Description
Hardware Platform Management

Hardware management in AdvancedTCA systems is based on the Intelligent Platform Management Interface (IPMI) specification. IPMI commands can be complex and cumbersome. To facilitate blade-level management, SMART Embedded Computing provides the Hardware Platform Management (HPM) package, which provides a set of commands that are based on IPMI commands. These commands are easier to use than the IPMI command itself. An HPM command can encapsulate a sequence of IPMI commands, for example upgrade the firmware or read the FRU data. An HPM command can be the unifier for OEM IPMI commands, which are different on different blade types, for example reading the CPU boot bank. For a catalogue of supported IPMI commands of the blade, refer to the respective IPMI manual.

The HPM package consists of:

- HPM daemon called hpmagentd
- Command line client called hpmcmd
- Script framework for managing shutdown and reboot events

The hpmcmd sends a given HPM command to the hpmagentd and displays the received response on the console. The hpmagentd executes the incoming HPM commands and returns the result to a hpmcmd client.

HPM commands include:

- Retrieving and modifying FRU data
- Reading and controlling status of IPMI-controlled LEDs
- Relaying e-key events to SRstackware on both hub and node blades
- Executing shutdown and reboot scripts in response to cold reset or graceful reboot requests
- Communicating local slot location information
The hpmagentd uses OpenIPMI to communicate with the local IPMC. OpenIPMI consists of two main parts: A device driver that goes into the Linux kernel, and a user-level library. The following picture shows the software levels that are involved in the HPM architecture.

**Figure 6-1  Software Levels of the HPM Architecture**

- Hpmagentd
- OpenIPMI library

---

**Kernel Space**

- IPMI driver
  - SMI: BT, KCS, SIP

---

**User Space**

- IPMC

**BT**  Block Transfer Interface  
**SIP**  Serial Interface Protocol  
**SMI**  System Management Interface  
**KCS**  Keyboard Control Style

The SMI (System Management Interface) driver provides the KCS interface to communicate with the IPMC.

If you need more information about the software aspects of the blade IPM controller, refer to the respective IPMI manual.

### 6.1 hpmagentd–HPM Agent Daemon

**Description**

The HPM agent daemon handles local communication to the intelligent platform management controller (IPMC) on a blade using the SMI. This SMI gets set up by the OpenIPMI driver.

By default, the hpmagentd binary executable is installed in `/opt/bladeservices/bin`. This directory has been added to the PATH environment variable.

This daemon has an Init script called `hpm`, which starts the daemon at run level 3 with the default settings.

When hpmagentd receives a graceful reboot or shutdown alert from the IPMC, it calls the respective script to run the reboot or shutdown sequence.
Synopsis

hpmagentd [-l log-level] [-r reboot-script] [-s shutdown-script]
hpmagentd {-i | -u | -h | -v}

Parameters

-l log-level
Specifies the level of message logging, where log-level is one of the standard syslog levels.

<table>
<thead>
<tr>
<th>Log Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Emergency</td>
</tr>
<tr>
<td>1</td>
<td>Alert</td>
</tr>
<tr>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td>3</td>
<td>Error</td>
</tr>
<tr>
<td>4</td>
<td>Warning</td>
</tr>
<tr>
<td>5</td>
<td>Notice (default)</td>
</tr>
<tr>
<td>6</td>
<td>Information</td>
</tr>
<tr>
<td>7</td>
<td>Debug</td>
</tr>
</tbody>
</table>

-r reboot-script
Specifies a graceful reboot script, which is called when a blade graceful reboot request is received by the IPMC, where reboot-script is the complete path and filename of the target script. The default script is /opt/bladeservices/bin/hpmreboot (see hpm–Shutdown and Reboot Scripts on page 74).

-s shutdown-script
Specifies a shutdown script that will be called when a blade shutdown request is received by the IPMC, where shutdown-script is the complete path and filename of the target script. The default script is /opt/bladeservices/bin/hpmshutdown (see hpm–Shutdown and Reboot Scripts on page 74).

-L
Disable LED management

-i
hpmagentd runs interactively, that is it will not run as daemon.
6.2 **hpm—Start-Up Script**

**Description**

An HPM agent init script, hpm, allows you to start, stop, and restart the HPM agent daemon using the agent's default option settings. By default, this script is installed in the `/opt/bladeservices/etc/init.d` directory during installation of the BBS software. It is also linked to `/etc/rc.d/rc3.d` to automatically start the HPM agent when the system boots.

**Synopsis**

```
   hpm {start | stop | restart | force-reload}
```

**Parameters**

- `start`
  - Starts the hpm agent daemon.

- `stop`
  - Terminates the hpm agent daemon.

- `restart`
  - Terminates and then starts the hpm agent daemon.

- `force-reload`
  - Terminates and then starts the hpm agent daemon.

6.3 **hpm—Shutdown and Reboot Scripts**

**Description**

At any time during normal operation, a shelf manager may issue a shutdown (FRU Activation Deactivate) or graceful reboot (FRU Control Reboot) request to the IPMC on a given blade. The IPMC then forwards this information to the HPM agent. When the HPM agent receives such request, it calls the respective script to run the reboot or shutdown sequence. In case of a shutdown indication, all running processes should be notified about
the shutdown. In case of a reboot notification, the payload is responsible for invoking the reboot procedure. The IPMC is not involved in this process. This allows processes currently running on the blade to prepare for shutdown. After the notification, it takes roughly 30 seconds before the payload is powered off.

Two default scripts, `hpmshutdown` and `hpmreboot`, are installed by default at `/opt/bladeservices/bin` directory. Currently, these scripts print a banner indicating they have run and then issue `shutdown -h now` (`hpmshutdown` script) or `reboot` (`hpmreboot` script).

You can modify the default scripts to suit the needs of your system application or create new scripts. If you create new scripts, use the `-s` and `-r` options when starting `hpmagentd` to specify the new locations and names of the scripts. You may also need to update the hpm start up script at `/opt/bladeservices/etc/init.d/hpm`

**Synopsis**

```
hpmshutdown
hpmreboot
```

## 6.4 `hpmcmd`–HPM Command Utility

**Description**

The HPM command utility uses a socket to send commands to the HPM agent. The HPM agent takes care of translating the user-friendly commands into the elaborated IPMI commands that the IPMC is able to understand. Those IPMI commands are transferred to the local IPMC.

Only one HPM command can be outstanding with the HPM agent at any particular moment. This means that even though multiple instances of `hpmcmd` can be started, the HPM agent will handle only one command at a time. Once a command is sent, the `hpmcmd` program waits until the answer from the HPM agent is received or until a time-out occurs.

The HPM command utility can be started in interactive mode, where a prompt is displayed and the user enters commands; it can read in a file of commands; or it can process a single command.

By default, the `hpmcmd` binary executable is installed at `/opt/bladeservices/bin`. During installation of the BBS software, this directory is added to the PATH environment variable.

If you do not provide any options, you will see the prompt `hpmcmd>` once the program starts running.

From there you can start executing commands.
Hardware Platform Management

Synopsis

hpmcmd [-p new-prompt] [-o output] [-i input | -c command]
hpmcmd [--prompt new_prompt] [--output_file output] [--input_file
input | -cmd_line command]

Parameters

-p new-prompt
Specifies the prompt you would like to have for the hpmcmd interactive mode, where new-prompt is any string. The default prompt is hpmcmd>. This option should not be combined with the -i or -c options.

-i input-file
Specifies the name of a file with HPM commands, where input-file is the complete path and filename of the target file, a standard ASCII file with one command per line (comments are not supported). The default is Standard Input (stdin). This option should not be combined with the -c option.

Once it has executed all commands in the file, hpmcmd terminates.

-o output-file
Specifies the name of an output file, where output-file is the complete path and filename of the target file. The default is Standard Output (stdout).

-c command
This option executes a single command and terminates, where command is one of the supported commands. This allows you to use the arrow history functions supported in the base shell; a history is not available inside the hpmcmd program. This option should not be combined with the -i option.

If this option is combined with -o, -c should be last option entered, since all arguments that follow -c on the command line will be considered part of the command.
6.4.1 Command Overview

The following table lists all commands from the hpmcmd program available on the ATCA-F140. You can display this list and a short command description using the help command (see section help on page 85). A detailed description of the commands is given in section Supported Commands on page 79.

Table 6-1 Command Overview

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bootbankget</td>
<td>Gets the bootbank to boot from</td>
</tr>
<tr>
<td>bootbankset</td>
<td>Sets the bootbank to boot from</td>
</tr>
<tr>
<td>bye</td>
<td>Exits the hpmcmd program</td>
</tr>
<tr>
<td>cmd</td>
<td>Executes any IPMI command</td>
</tr>
<tr>
<td>deviceid</td>
<td>Gets the Device Id</td>
</tr>
<tr>
<td>ekeydownpath</td>
<td>Gets the location/path of a script which is invoked on ekeying port down events</td>
</tr>
<tr>
<td>ekeyuppath</td>
<td>Gets the location/path of a script which is invoked on ekeying port up events</td>
</tr>
<tr>
<td>exit</td>
<td>Exits the hpmcmd program</td>
</tr>
<tr>
<td>frudata</td>
<td>Gets FRU info in hex numbers</td>
</tr>
<tr>
<td>fruinfoget</td>
<td>Gets string fields from the FRU</td>
</tr>
<tr>
<td>fruinv</td>
<td>Gets the FRU size and addressable units</td>
</tr>
<tr>
<td>fruread</td>
<td>Gets x number of bytes from the FRU</td>
</tr>
<tr>
<td>fruwrite</td>
<td>Writes x number of bytes from the FRU</td>
</tr>
<tr>
<td>help</td>
<td>Gets list of hpmcmd commands</td>
</tr>
<tr>
<td>ipmbaddress</td>
<td>Gets the local board IPMB address</td>
</tr>
<tr>
<td>ipmcdevice</td>
<td>Gets the payload interface to the IPMC</td>
</tr>
<tr>
<td>ledget</td>
<td>Gets the state of a specific FRU LED</td>
</tr>
<tr>
<td>ledprop</td>
<td>Get the LED properties for this FRU</td>
</tr>
<tr>
<td>ledset</td>
<td>Controls the state of a specific FRU LED</td>
</tr>
<tr>
<td>loglevelget</td>
<td>Gets the hpmagentd log level</td>
</tr>
<tr>
<td>loglevelset</td>
<td>Sets the hpmagentd log level (0-7)</td>
</tr>
</tbody>
</table>
## Command Overview (continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>macaddress</code></td>
<td>Gets the MAC addresses</td>
</tr>
<tr>
<td><code>motshelftype</code></td>
<td>Gets the SMART EC Shelf Type from the Shelf FRU (Board Product Name)</td>
</tr>
<tr>
<td><code>muxctrl</code></td>
<td>Sets the specified MUX control signal</td>
</tr>
<tr>
<td><code>partnumber</code></td>
<td>Gets the board part number</td>
</tr>
<tr>
<td><code>physlotnumber</code></td>
<td>Gets the board physical slot number</td>
</tr>
<tr>
<td><code>portget</code></td>
<td>Gets the current state E-Key governed intfs</td>
</tr>
<tr>
<td><code>portset</code></td>
<td>Enables/Disables ports in a channel</td>
</tr>
<tr>
<td><code>posttypeget</code></td>
<td>Gets the POST type from the IPMC</td>
</tr>
<tr>
<td><code>posttypeset</code></td>
<td>Sets the POST type to run at boot time</td>
</tr>
<tr>
<td><code>quit</code></td>
<td>Exits the hpmcmd program</td>
</tr>
<tr>
<td><code>rebootpath</code></td>
<td>Gets hpmagentd reboot script path</td>
</tr>
<tr>
<td><code>sdr</code></td>
<td>Gets the SDR records</td>
</tr>
<tr>
<td><code>sdr_dump</code></td>
<td>Gets the SDR records in raw format</td>
</tr>
<tr>
<td><code>sdrinfo</code></td>
<td>Gets SDR information</td>
</tr>
<tr>
<td><code>sendamc</code></td>
<td>Sends an IPMI command to a remote AMC or MMC of a remote IPMC</td>
</tr>
<tr>
<td><code>sendcmd</code></td>
<td>Sends an IPMI command</td>
</tr>
<tr>
<td><code>shelfaddress</code></td>
<td>Gets the Shelf Address String</td>
</tr>
<tr>
<td><code>shelfslots</code></td>
<td>Gets number of slots in the shelf</td>
</tr>
<tr>
<td><code>shutdownpath</code></td>
<td>Gets hpmagentd shutdown script path</td>
</tr>
<tr>
<td><code>slotmap</code></td>
<td>Gets the slotmap of the shelf</td>
</tr>
<tr>
<td><code>slotnumber</code></td>
<td>Gets the board logical slot number</td>
</tr>
<tr>
<td><code>version</code></td>
<td>Gets the hpmcmd version and the hpmagentd version</td>
</tr>
<tr>
<td><code>watchdog</code></td>
<td>Controls Payload WDT functionality</td>
</tr>
</tbody>
</table>
6.4.2 Supported Commands

This section lists the supported commands. All commands are case insensitive. The examples illustrate the use of hpmcmd in single-command mode (\(-c\)). If you start hpmcmd without the \(-c\) or \(-i\) options (that is, interactive mode), you simply enter these commands at the HPM command prompt.

Some of the hpm commands can be sent to a remote IPMC by specifying the \(-t\) option. This option is not mandatory. If it is not specified, the command is sent to the local IPMC. The following sections describe the available commands.

6.4.2.1 bye

Description

This command is for exiting the hpmcmd program when running in interactive mode.

Synopsis

```
bye
```

6.4.2.2 bootbankget

Description

This command retrieves the boot bank, which is currently marked as active for the CPU specified by payload_cpu_selector.

Firmware for the CPU on SMART Embedded Computing AdvancedTCA blades is stored in redundant, persistent memory devices. This allows the firmware image in one bank to serve as a backup for the other bank. During normal operation, the CPU on a blade determines which bank to boot from based on a GPIO signal controlled by the IPMC. This bank is considered the active boot device.

Because you can change the “active” device with the hpmcmd bootbankset command, active status does not necessarily indicate which device was used on the last boot. It simply represents which device is set to be used on the next boot.

Synopsis

```
bootbankget <payload_cpu_selector>
```

Parameters

```
payload_cpu_selector
```

Is an integer between 0 and the number of CPU devices supported on the blade.

On the PrAMC-7201, the only valid value for `payload_cpu_selector` is 0.

Example

```
hpmcmd -c bootbankget 0
```
6.4.2.3  bootbankset

Description
This command sets the boot bank for a particular CPU from which the blade is supposed to boot.

Synopsis
bootbankset <payload_cpu_selector> <newBootBank>

Parameters
payload_cpu_selector
   Is an integer between 0 and the number of CPU devices supported on the blade.
newBootBank
   Can be set to BANK0 or BANK1

Example
hpmcmd -c bootbankset 0 bank1

6.4.2.4  cmd

Description
This command allows you to enter commands understood by the IPMC. Commands are entered as a sequence of hexadecimal numbers as defined in the IPMI 1.5 Specification.

Synopsis
cmd <ipmi_address> <netfn cmd> <cmd data>

Parameters
ipmi address
   The IPMI address specifies the IPMC that receives the command, it can be the local IPMC or another IPMC on the IPMB. The IPMI address for the local IPMC consists of <f LUN> where f is the BMC channel number. The IPMI address for a remote IPMC consists of <0 SA LUN>.

netfn cmd
   Identifies the command type.

cmd data
   Specifies the message data associated with the command.

Example
GetDeviceId command to the local IMPC:
   hpmcmd -c cmd f 0 6 1
GetDeviceId command to the remote IPMC on address 9a:
```
hpmcmd -c cmd 0 9a 0 6 1
```
GetDeviceId command to the remote IPMC on address 7a:
```
hpmcmd -c cmd 0 7a 0 6 1
```

### 6.4.2.5 deviceid

**Description**

This command retrieves the raw IPMI Get Device ID response and decodes the IPMI message.

**Synopsis**

```
deviceid [-t ipmbAddr[:mmcAddr]]
```

**Parameters**

- `-t`

  Sends the command to `ipmbAddr[:mmcAddr]`. `ipmbAddr` is the string `lc` if it is a local `mmcAddr`.

**Example**

```
hpmcmd -c deviceid
```

**Important Information**

The least significant byte of the Auxiliary Revision indicates the build number inside the release.

### 6.4.2.6 ekeydownpath

**Description**

Gets the location/path of a script which is invoked whenever an interface port is to be closed. The script is used to implement an e-keying mechanism in software and will invoke `ifconfig` to close the port. You may want to do modifications to this script.

**Synopsis**

```
ekeydownpath
```

### 6.4.2.7 ekeyuppath

**Description**

Gets the location/path of a script which is invoked whenever an interface port is to be opened. The script is used to implement an e-keying mechanism in software and will invoke `ifconfig` to open the port. You may want to do modifications to this script.
Hardware Platform Management

6.4.2.8 exit

Description
This command is to exit the hpmcmd program when running in interactive mode.

Synopsis
exit

6.4.2.9 frudata

Description
This command dumps the content of the FRU data in hexadecimal format.

Synopsis
frudata <fruid> [-t ipmbAddr[:mmcAddr]]

Parameters
fruid
Is 0 for the main blade and 1 for the RTM.
-t
Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example
hpmcmd -c frudata 0

6.4.2.10 fruinfoget

Description
This command retrieves information from the specified FRU.

Synopsis
fruinfoget <fruid> [field] [-v] [-t ipmbAddr[:mmcAddr]]

Parameters
fruid
Is 0 for the main blade and 1 for the RTM.
**field**

Is one of the following data fields. If no field is specified, it retrieves the whole fruinfo for that FRU.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bmanufacturer</td>
<td>Board manufacturer</td>
</tr>
<tr>
<td>bproductname</td>
<td>Board product name</td>
</tr>
<tr>
<td>bserialnumber</td>
<td>Board serial number</td>
</tr>
<tr>
<td>bpartnumber</td>
<td>Board part number</td>
</tr>
<tr>
<td>pmanufacturer</td>
<td>Product manufacturer</td>
</tr>
<tr>
<td>pproductname</td>
<td>Product product name</td>
</tr>
<tr>
<td>ppartnumber</td>
<td>Product part number</td>
</tr>
<tr>
<td>pversion</td>
<td>Product version number</td>
</tr>
<tr>
<td>pserialnumber</td>
<td>Product serial number</td>
</tr>
<tr>
<td>passettag</td>
<td>Product inventory asset identifier</td>
</tr>
</tbody>
</table>

**-v**

Verbose mode to get point-to-point connectivity information where no specific field is requested.

**-t**

Sends the command to `ipmbAddr[:mmcAddr]`. `ipmbAddr` is the string lc if it is a local `mmcAddr`.

**Example**

```
hpmmcmd -c fruinfoget 1 bmanufacturer
```

The following example for `fruinfoget` is without fields and `-v` option.

```
hpmmcmd -c fruinfoget 0
```

### 6.4.2.11 fruinv

**Description**

This command retrieves the FRU size and the addressable unit for the specified FRU.

**Synopsis**

```
fruinv <fruid> [-t ipmbAddr[:mmcAddr]]
```
Hardware Platform Management

Parameters

fruid
Is 0 for the main blade and 1 for the RTM (if supported).

-t
Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example
hpmcmd -c fruin 0

6.4.2.12 fruread

Description
This command gets a range of data from the specified FRU.

Synopsis
fruread <fruid> <startAddress> <nBytes> [-t ipmbAddr[:mmcAddr]]

Parameters
fruid
Is 0 for the main blade and 1 for the RTM (if supported).

startAddress
Is the starting address in decimal.

nBytes
Number of bytes to read in decimal; cannot exceed 16 because of IPMI message size limitations.

-t
Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example
hpmcmd -c fruread 0 0 8

6.4.2.13 fruwrite

Description
This command allows to write x number of bytes to a FRU.

Synopsis
fruwrite <fruid> <startAddress> <nBytes> [-t ipmbAddr[:mmcAddr]]
Parameters

fruid
   Is 0 for the main blade.
startAddress
   Starting address in decimal numbers.
nBytes
   is the number of bytes to write in decimal. nBytes cannot exceed 16 because of IPMI message size limitations.
-t
   Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

6.4.2.14 help

Description
This command lists the available commands from the hpmcmd program with a brief explanation about the command.

Synopsis
help

6.4.2.15 ipmbaddress

Description
This command retrieves the blade IPMB address.

Synopsis
ipmbaddress

6.4.2.16 ipmcdevice

Description
This command retrieves the payload tty device.

Synopsis
ipmcdevice

6.4.2.17 ledget

Description
This command gets information about a specified LED controlled by the IPMC.
**Synopsis**

`ledget <fruid> <led> [-t ipmbAddr[:mmcAddr]]`

**Parameters**

`fruid`
Is 0 for the main blade and 1 for the RTM (if supported).

`led`
Is BLUE for the hot swap LED or LEDN for FRU LED<n>. <n> is a number between 1 and the maximum FRU LEDs supported by the blade.

`-t`
Sends the command to `ipmbAddr[:mmcAddr]`. `ipmbAddr` is the string lc if it is a local `mmcAddr`.

**Example**

`hpmcmd -c ledget 0 led1`

**6.4.2.18 ledprop**

**Description**

This command displays the FRU LED properties under IPMC control.

**Synopsis**

`ledprop <fruid>`

**Parameters**

`fruid`
Is 0 for the main board and 1 for the RTM.

**Example**

`hpmcmd -c ledprop 0`

FRU LEDs under IPMC control:
- LED0 = BLUE
- LED1 = RED or AMBER
- LED2 = GREEN

**6.4.2.19 ledset**

**Description**

This command controls the override state of a specific FRU LED. The RTM FRU LEDs reflect the state of the main blade (FRU 0) LEDs. Therefore, overriding the state to something different than the main FRU LED state will not have any effect.
The blue LED is the only one that can be controlled separately.

**Synopsis**

\[ \text{ledset} \ <\text{fruid}>\ <\text{led}>\ <\text{operation}>\ [\text{offms}]\ [\text{onms}]\ [\text{color}]\ [-t\ \text{ipmbAddr}[:\text{mmcAddr}]] \]

**Parameters**

- **fruid**
  - Is 0 for the main blade and 1 for the RTM (if supported).

- **led**
  - Is BLUE for the hot swap LED or LEDN for FRU LED<n>. <n> is a number between 1 and the maximum FRU LEDs supported by the blade.

- **operation**
  - ON = enable override state and turn LED on.
  - OFF = enable override state and turn LED off.
  - BLINK = enable override state and blink LED; off_duration and on_duration specify the blink duration; the default on and off duration is 300 ms.
  - LOCAL = cancel override state and restore LED control to the IPMC, that is, local state.
  - TEST = run lamp test for specified on_duration, then restore prior state.

- **offms**
  - 10–2500 in 10-millisecond increments; only valid if operation is BLINK

- **onms**
  - Only valid if operation is BLINK or TEST:
    - If operation is BLINK, 10–2500 in 10-millisecond increments
    - If operation is TEST, 100-12800 in 100-millisecond increments

- **color**
  - LED0 = BLUE
  - LED1 = RED
  - LED2 = GREEN
  - LED3 = AMBER

- **-t**
  - Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

**Example**

```
hpccmd -c ledset 0 led1 on
```
6.4.2.20 loglevelget

Description
This command retrieves the current `hpmagentd` log level. See loglevelset for more detail.

Synopsis
loglevelget

Example
hpmcmd -c loglevelget
Loglevel 5 (NOTICE)

6.4.2.21 loglevelset

Description
This command sets the level of message logging for hpmagentd.

Synopsis
loglevelset <newLogLevel>

Parameters
newLogLevel

Is one of the standard syslog levels:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Emergency</td>
</tr>
<tr>
<td>1</td>
<td>Alert</td>
</tr>
<tr>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td>3</td>
<td>Error</td>
</tr>
<tr>
<td>4</td>
<td>Warning</td>
</tr>
<tr>
<td>5</td>
<td>Notice</td>
</tr>
<tr>
<td>6</td>
<td>Information</td>
</tr>
<tr>
<td>7</td>
<td>Debug</td>
</tr>
</tbody>
</table>

Example
hpmcmd -c loglevelset 7
6.4.2.22 **macaddress**

**Description**
This command retrieves a list of available MAC addresses.

**Synopsis**
macaddress [-t ipmbAddr]

**Parameters**
-t
   Sends the command to ipmbAddr.

**Example**
```
hpmcmd -c macaddress
```
BASE Interface Channel 0: 00:0E:0C:85:E9:91
BASE Interface Channel 1: 00:0E:0C:85:E9:90

6.4.2.23 **motshelftype**

**Description**
This command retrieves the shelf FRU (IPMB 20) Board Area Product Name (FRU 254).

**Synopsis**
motshelftype

**Example**
```
hpmcmd -c motshelftype
```
CHS1406

6.4.2.24 **muxctrl**

**Description**
This command sets the specified MUX control signal.

**Synopsis**
muxctrl mux value

**Parameters**
mux
   mux1
   mux2
   ...

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mux15
value
B1
B2
For more information on setting different MUXes, see Appendix A, MUXes Settings on page 217.

6.4.2.25 partnumber

Description
This command retrieves the part number of the main blade.

Synopsis
partnumber [-t ipmbAddr[:mmcAddr]]

Parameters
-t
Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example
hpmcmd -c partnumber

6.4.2.26 physlotnumber

Description
This command retrieves the physical slot number in which the blade is plugged in.

Synopsis
physlotnumber

6.4.2.27 portget

Description
This command shows the current state of interfaces governed by e-keying. If no channel is specified, portget returns data for all channels in the specified interface. If neither interface nor channel are specified, portget will return data for all interfaces.

Synopsis
portget [interface] [channel] [-t ipmbAddr[:mmcAddr]]
Parameters

interface

Valid values are:
BASE | FABRIC | UPDATE

channel

an integer in the following range:
1–16 for Base
1–15 for Fabric
1 for Update
The value of channel must be valid for the blade. For example, node blades have only 2 channels for the base interface; using a value of 4 will return an error.

-t

Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example

hpmcmd -c portget AMC 0

6.4.2.28 portset

Description

This command enables and disables ports in a channel. The following table lists the valid values for each parameter.

Synopsis

portset <intf> <chan> <grpid> <type> <typeX> <ports> <oper> [-t ipmbAddr[:mmcAddr]]

Parameters

intf

Valid values are:
BASE | FABRIC | UPDATE

chan

an integer in the following range:
1–16 for Base
1–15 for Fabric
1 for Update
The value of channel must be valid for the blade. For example, node blades have only 2 channels for the base interface; using a value of 4 will return an error.

grpid
Hardware Platform Management

Always 0 according to current shelf FRU information

type
Valid values are:

<table>
<thead>
<tr>
<th>Valid Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE</td>
<td>for base interface</td>
</tr>
<tr>
<td>ETHER</td>
<td>for fabric interface</td>
</tr>
<tr>
<td>OEM</td>
<td>for the update interface, which is SMART EC specific</td>
</tr>
</tbody>
</table>

typeX
Always 0 in current implementation. Valid values are:

0 (for 1000Base-BX)
1 (for 10GBase-BX4)
2 (for FC-PI)

ports
A sequence of ports to act on.
For base and update channels, port is always 0.
For fabric channels, port can specify up to 4 ports as specified in PICMG 3.1:
Option 1: 0
Option 2: 01
Option 3: 0123
Option 7: 3

oper
Valid values are DISABLE or ENABLE.

-t
Sends the command to ipmbAddr[:mmcAddr]. ipmbAddr is the string lc if it is a local mmcAddr.

Example
hpmcmd -c portset base 1 0 base 0 0 enable

6.4.2.29 posttypeget

Description
This command retrieves the posttype to which the board is currently set to run at boot time.

Synopsis
posttypeget
6.4.2.30 posttypeset

**Description**
This command sets the posttype to which the board is currently set to run at boot time.

**Synopsis**
posttypeset <newPostType>

**Parameters**
newPosttype
  SHORT
  LONG
  OFF (disabled in system boot parameters)

6.4.2.31 quit

**Description**
This command is for exiting the hpmcmd program when running in interactive mode.

**Synopsis**
quit

6.4.2.32 rebootpath

**Description**
This command retrieves the path and filename of the current hpmagentd reboot script.

**Synopsis**
rebootpath

**Example**
```
hpmcmd -c rebootpath
```
```
/opt/bladeservices/bin/hpmreboot
```

6.4.2.33 sdr

**Description**
This command shows the SDR records.

**Synopsis**
sdr
Hardware Platform Management

Example

hpmcmd -c sdr

recID 1: full sensor record
  owner is IPMB 20 sensor num 10 on lun 00 channel 00
  logical entity: power module - instance 61
  SBC +1.05V Vtt : voltage : threshold

recID 2: full sensor record
  owner is IPMB 20 sensor num 11 on lun 00 channel 00
  logical entity: power module - instance 61
  SBC +1.1V : voltage : threshold

recID 3: full sensor record
  owner is IPMB 20 sensor num 12 on lun 00 channel 00
  logical entity: power module - instance 61
  SBC +1.2V SAS : voltage : threshold

.  
.  
.  
recID 74: OEM sensor record

6.4.2.34  sdr_dump

Description

This command shows the SDR records in binary and hex format.

Synopsis

sdr_dump

Example

hpmcmd -c sdr_dump

SDR Records:
01 00 51 01 39 20 00 10 14 61 7f 69 02 01 04 22 "..Q.9 ...a.i..."
04 22 12 12 00 04 00 00 33 00 00 00 00 c0 07 cd "."......3......Í"
d0 ca ff 00 00 d8 00 00 c2 00 01 01 00 00 00 ce "....................Í"
53 42 43 20 2b 31 2e 30 35 56 20 56 74 74 "SBC +1.05V Vtt"

.  
.  
.  
61 67 65 20 45 "age E"
6.4.2.35  **sendcmd**

**Description**
This command allows a user to send any of the commands supported in the IPMI spec to a remote IPMC.

**Synopsis**
sendcmd <IPMBaddress> <netfn> <cmd> <data0> ... <dataN>

**Parameters**

- **IPMBaddress**
  Destination IPMB address in hex digits.

- **netfn**
  IPMI request net function in hex digits.

- **cmd**
  IPMI request command in hex digits.

- **data0 ... dataN**
  IPMI request data bytes. if any, in hex digits.

**Example**

```
hpmcmd -c sendcmd 90 06 59 07 59 C1
```

6.4.2.36  **sdrinfo**

**Description**
This command shows the SDR information.

**Synopsis**
sdrinfo

**Example**

```
hpmcmd -c sdrinfo
```

SDR Information:
LUN 0 has 066 sensors; static sensor population
LUN 1 has 000 sensors; static sensor population
LUN 2 has 000 sensors; static sensor population
LUN 3 has 000 sensors; static sensor population


### 6.4.2.37 sendamc

**Description**
This command allows sending any of the commands supported in the IPMI spec to a remote AMC or MMC of a remote IPMC IPMB-L.

**Synopsis**
```plaintext
sendamc <IPMBaddress> <MMCaddress> <netfn> <cmd> <data0> ... <datan>
```

**Parameters**
- **IPMBaddress**
  Destination IPMB address in hex digits.
- **MMCaddress**
  Destination MMC address in hex digits.
- **netfn**
  IPMI request net function in hex digits.
- **cmd**
  IPMI request command in hex digits.
- **data0-datan**
  IPMI request data bytes, if any, in hex digits.

### 6.4.2.38 shelfaddress

**Description**
This command retrieves the shelf address string from the shelf FRU.

**Synopsis**
```plaintext
shelfaddress
```

**Example**
```plaintext
hpmcmd -c shelfaddress
01
```

### 6.4.2.39 shelfslots

**Description**
This command retrieves the total number of blade slots in the shelf.

**Synopsis**
```plaintext
shelfslots
```
Example
hpmcmd -c shelfslots
14 slots

6.4.2.40 shutdownpath

Description
This command retrieves the path and filename of the current hpmagentd shutdown script.

Synopsis
shutdownpath

Example
hpmcmd -c shutdownpath
/opt/bladeservices/bin/hpmshutdown

6.4.2.41 slotmap

Description
This command prints a slotmap table for the shelf the blade is installed in.

Synopsis
slotmap

Example
hpmcmd -c slotmap

-------------------------------------------------------------
Physical Slot: 01 02 03 04 . 05 06 07 08 09 10 . 11 12 13 14
Logical Slot : 01 03 05 07 . 09 11 13 04 06 08 . 10 12 14 02
IPMB Address : 82 86 8A 8E . 92 96 9A 88 8C 90 . 94 98 9C 84
-------------------------------------------------------------

The command output may vary based on the chassis in which the command is executed.
6.4.2.42 slotnumber

Description

This command retrieves the logical slot number of the slot where the blade is plugged in.

Synopsis

slotnumber

Example

hpmcmd -c slotnumber
2

6.4.2.43 version

Description

This command retrieves the version of the hpmcmd software and sends a request to get the version of the hpmagent daemon that is running. Once the information is gathered, it is printed.

Synopsis

version

Example

hpmcmd -c version
hpmcmd version bbs 3.1.0 build X
hpmagentd version bbs 3.1.0 build X

6.4.2.44 watchdog

Description

This command is used handle the payload BMC watchdog.

Synopsis

watchdog set <tmr_use> <tmr_action> <pre_timeout> <flags> <lsb_val> <msb_val>
watchdog set default
watchdog get
watchdog start
watchdog stop
watchdog reset
### Parameters

**set**

Following are the possible values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>tmr_use</td>
<td>dont_stop, stop</td>
</tr>
<tr>
<td>tmr_action</td>
<td>no_action, hard_reset, power_cycle, power_down</td>
</tr>
<tr>
<td>pre_timeout</td>
<td>0-255</td>
</tr>
<tr>
<td>flags</td>
<td>clear, dont_clear</td>
</tr>
<tr>
<td>lsb_val</td>
<td>0-255</td>
</tr>
<tr>
<td>msb_val</td>
<td>0-255</td>
</tr>
</tbody>
</table>
Hardware Platform Management
Link Health Check

The Link Health Check (LHC) package supports configuration and operation of the LHC protocol.

LHC performs two functions within a Centellis system:
- Verification of Layer2 connectivity
- Distribution of active network plane

The LHC daemon can be configured to manage one or more instances. Each instance has a role of either proctor or responder. In the proctor role, LHC periodically sends QUERY messages and expects RESPONSE messages. It also sends RESPONSE messages in response to QUERY messages received from other proctors. In the responder role, LHC sends RESPONSE messages in response to received QUERY messages.

Generally, the LHC daemon on hub blades will be configured with one instance with a proctor role. The LHC daemon on a payload blade with no internal switches will be configured with an instance with a responder role. The LHC daemon on carrier blades with an internal switch will be configured with two instances. One instance with a responder role with respect to the system network and the other with a proctor role with respect to the blade’s internal network that connects to the AMCs/PMCs. The LHC daemon on an AMC/PMC will be configured with the instance with a responder role.

The LHC package includes:
- SNMP access to LHC
- Configuration and management daemon
- Command line utility program

7.1 LHC MIB

LHC makes its internal structures available as MIB tables and objects. To enable SNMP access, you must link to the enterprise MIB provided in the LHC package and enable SNMP access on the blade. You can also configure LHC by using the lhcd configuration script or via the lhccmd command line utility.

7.1.1 Browsing the LHC MIB

To support LHC, SMART Embedded Computing has created an enterprise MIB known as the LHC MIB, /opt/bladeservices/mibs/LHC-MIB.txt. This MIB defines the tables, objects, and MIB variables used to control and monitor LHC.

This MIB can be reviewed with any SNMPv2 compatible MIB browser.
### 7.1.2 Enabling SNMP Access to the LHC MIB

By default, the LHC MIB is installed at `/opt/bladeservices/mibs`. Add this directory to the MIBDIRS environment variable:

```
export MIBDIRS=$MIBDIRS:/opt/bladeservices/mibs
```

SNMP is enabled automatically when SRS is installed. The configuration `/etc/opt/srstackware/config/snmpd.conf` creates the user (SNMP3) with user name, "admin" and password, “adminpwd123”.

By default, SNMP is disabled when BBS is installed without SRS. In this case, to start `snmpd` at boot time, the user has to create a symbolic link under `/etc/rc.d/rc3.d/` directory pointing at `/etc/init.d/snmpd.bbs` and edit `/etc/snmp/snmp.conf`.

### 7.2 lhcd–LHC Daemon

**Description**

The Link Health Check (LHC) management daemon, lhcd, manages the LHC protocol. It serves several purposes:

- Provides through a command interface, the ability to customize operation of the LHC protocol.
- Collects operational statistics which allow monitoring of the LHC protocol.
- Accepts commands from fault management to change the active network plane.
- Notifies fault management of events of interest, such as responder not responding.

During normal operation, the LHC daemon process, lhcd, is created and runs as a system daemon. An `init` script, lhc, allows you to start and stop the LHC daemon. For further information, see *lhcd–Lhc Start-Stop Script on page 104*.

**Synopsis**

```
lhcd [-c config_file] -f shelfnum -s slotnum -t sitenum
     [-l log-level][-p pid-file]

lhcd -v
```

**Parameters**

- `h`
  
  Displays a brief usage.

- `c config_file`
  
  If supplied, LHC reads in the specified file (including path) that contains commands to configure LHC.
-f shelfnum
  Blade is in shelf specified by shelfnum. This is a required option. The shelf number, slot number, site number, and instance number are used in MIB indices to uniquely identify each LHC instance. This is particularly significant in multishelf configurations.

-s slotnum
  Blade is in slot specified by slotnum, where slotnum is the logical slot number where the blade is inserted. You can retrieve the slot number by entering `hpmcmd -c slotnumber`. This is a required option. The shelf number, slot number, site number, and instance number are used in MIB indices to uniquely identify each LHC instance.

-t sitenum
  Blade is in site specified by sitenum, where sitenum is the logical site number where the blade is inserted. This is a required option. The shelf number, slot number, site number, and instance number are used in MIB indices to uniquely identify each LHC instance. Even though the site number is used to identify an AMC on a carrier blade, a site number must be supplied for LHC instances that are not running on an AMC/PMC. The recommended value for non-AMC/PMC is 255.

-l log-level
  Sets log level to one of the standard syslog levels:

<table>
<thead>
<tr>
<th>Log Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Emergency</td>
</tr>
<tr>
<td>1</td>
<td>Alert</td>
</tr>
<tr>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td>3</td>
<td>Error</td>
</tr>
<tr>
<td>4</td>
<td>Warning</td>
</tr>
<tr>
<td>5</td>
<td>Notice (default)</td>
</tr>
<tr>
<td>6</td>
<td>Information</td>
</tr>
<tr>
<td>7</td>
<td>Debug</td>
</tr>
</tbody>
</table>

-p pidfile
  Is the complete path and filename for the daemon’s process ID file. This file is used by start-stop daemon to locate the correct lhcd process when stopping the daemon. If no PID file is specified, the file lhc.pid is created in the current working directory (pwd) from which LHC was started.
Link Health Check

-v

Displays the version information.

7.3 Ihc–lhcd Start-Stop Script

Description

The lh init script allows you to start, stop, and restart the LHC daemon. The script relies on the HPM agent to retrieve important blade-specific information.

By default, this script is installed in the /opt/bladeservices/etc/init.d directory during installation of the BBS software.

It is linked to /etc/rc.d/rc2.d so that LHC starts automatically in the run level 3.

You can use this script to start, stop, or restart the LHC daemon by changing to the /opt/bladeservices/etc/init.d directory and typing lh with the appropriate option, for example:

.

Synopsis

lh {start|debug_start|start_no_cfg|stop|restart|
force-reload|generate_config}

Parameters

start

Starts lhcd.

debug_start

Starts lhcd with debug-level logging (7) rather than the default (5).

start_no_cfg

Starts lhcd without reading in a configuration file.

stop

Terminates lhcd.

restart

Terminates lhcd, and then starts lhcd.

force-reload

Terminates lhcd, and then starts lhcd.

Note that after starting LHC using the start parameter, the daemon automatically reads in a configuration file in the /opt/bladeservices/etc/lhc directory. The filename is of the form lh.<shelf>.<slot>.<site>.cfg.
generate_config

Deletes the configuration file of the form, if it exists, and then regenerates it by executing the file lhcConfig.gen in the /opt/bladeservices/etc/lhc directory.

Environment Variables

You do not need to explicitly set the following variables. Under normal operating conditions the init script sets the environmental variables by executing /etc/default/hpmvars.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHELF_NUMBER</td>
<td>Specifies the shelf number used with the lhcd -f option.</td>
</tr>
<tr>
<td>SLOT_NUMBER</td>
<td>Specifies the logical slot number of the blade used with the lhcd -s option.</td>
</tr>
<tr>
<td>SITE_NUMBER</td>
<td>Specifies the site number used with the lhcd -t option.</td>
</tr>
</tbody>
</table>

7.4 Lhc–LHC Command Line Utility

Description

The LHC command utility, lhccmd, provides shell-level access to the LHC daemon management component (lhcd) for LHC configuration and monitoring.

Synopsis

lhccmd [-v]

lhccmd command

Parameters

-v

Shows version of lhccmd. Also displays version of lhcd if it is running.

7.4.1 Command Overview

The following table lists the commands provided by the lhccmd utility. For complete command information, see Available Commands on page 108.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Command Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>get objectName index</td>
<td>MIB Get</td>
<td>get on page 108</td>
</tr>
<tr>
<td>get tableName index</td>
<td>MIB Getrow</td>
<td>get on page 108</td>
</tr>
<tr>
<td>help</td>
<td>?</td>
<td>Print usage information</td>
</tr>
</tbody>
</table>
## Command Usage for Common Parameters

Many commands support common parameters to specify MIB objects to operate on. The common command parameters include:

- **tablename**
  
  Name of a MIB table. For specific values, use the `lhccmd tables` command. The `tableName` parameter is case-sensitive. Table names must be entered exactly as they appear in the MIB.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Command Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>index tableName</code></td>
<td>Show MIB index information for a table</td>
<td><code>index on page 109</code></td>
</tr>
<tr>
<td><code>loglevel 0...7</code></td>
<td>Set/Show log level</td>
<td><code>loglevel on page 109</code></td>
</tr>
<tr>
<td><code>mem dump</code></td>
<td>Dump LEAP memory</td>
<td></td>
</tr>
<tr>
<td><code>mem ignore</code></td>
<td>Ignore allocated LEAP memory</td>
<td></td>
</tr>
<tr>
<td><code>mem unignore</code></td>
<td>Un-ignore all LEAP memory</td>
<td></td>
</tr>
<tr>
<td><code>next objectName index</code></td>
<td>MIB Next</td>
<td><code>next on page 110</code></td>
</tr>
<tr>
<td><code>next tableName index</code></td>
<td>MIB Nextrow</td>
<td><code>next on page 110</code></td>
</tr>
<tr>
<td><code>objects tableName</code></td>
<td>Show MIB object IDs for table</td>
<td><code>objects on page 110</code></td>
</tr>
<tr>
<td>`quit</td>
<td>q</td>
<td>exit`</td>
</tr>
<tr>
<td><code>set objectName index value_keyword</code></td>
<td>MIB Enumerated Value Set</td>
<td><code>set on page 110</code></td>
</tr>
<tr>
<td><code>setc objectName index &quot;value&quot;</code></td>
<td>MIB Character String Set</td>
<td><code>set on page 110</code></td>
</tr>
<tr>
<td><code>seti objectName index value</code></td>
<td>MIB Integer Set</td>
<td><code>set on page 110</code></td>
</tr>
<tr>
<td><code>seto objectName index value</code></td>
<td>MIB Octet String Set</td>
<td><code>set on page 110</code></td>
</tr>
<tr>
<td><code>tables</code></td>
<td>Show MIB table IDs</td>
<td><code>tables on page 111</code></td>
</tr>
<tr>
<td><code>values objectName</code></td>
<td>Show values for MIB object</td>
<td><code>values on page 112</code></td>
</tr>
<tr>
<td><code>version</code></td>
<td>Display version information</td>
<td><code>values on page 112</code></td>
</tr>
<tr>
<td><code>walk tableName</code></td>
<td>MIB table Walk</td>
<td><code>walk on page 112</code></td>
</tr>
</tbody>
</table>
- **objectName**
  Name of a MIB object within a table. For specific values, use the `lhccmd objects tableName` command, where `tableName` is the name of a specific table. The `objectName` parameter is case-sensitive. Object names must be entered exactly as they appear in the MIB.

- **index**
  MIB index as a sequence of numbers (for example, 2.1.1.12). The format of the index parameter is a dot-separated group of fields. In general, each field of the index is a single 32-bit value. However, fields that denote a MAC address or an IP address have multiple dot-separated elements.

  A MAC address has six elements; each element is eight bits of the 48-bit MAC address.

  The MAC addresses are ordinarily expressed as a sequence of hexadecimal octets, for example: `00.0E.83.EB.33.6F`. To indicate that an index element is a hexadecimal value, prefix it with "0x" as follows: `0x00.0x0E.0x83.0xEB.0x33.0x6F`.

  The fields that make up index vary for each type of object, as described in the following table. For more information about specific indices, refer to the LHC MIB `/opt/bladeservices/mibs/LHC-MIB.txt`.

<table>
<thead>
<tr>
<th>MIB Table</th>
<th>Index Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>lhcTable</td>
<td>shelf.slot.site</td>
</tr>
<tr>
<td>lhcComTable</td>
<td>shelf.slot.site.instance</td>
</tr>
<tr>
<td>lhcProctorTable</td>
<td>shelf.slot.site.instance</td>
</tr>
<tr>
<td>lhcResponderTable</td>
<td>shelf.slot.site.instance</td>
</tr>
<tr>
<td>lhcL2InterfaceTable</td>
<td>shelf.slot.site.instance.L2interfaceindex</td>
</tr>
<tr>
<td>lhcProctorL2InterfaceTable</td>
<td>shelf.slot.site.instance.L2interfaceindex</td>
</tr>
<tr>
<td>lhcProctorResponderGroupTable</td>
<td>shelf.slot.site.instance.L2interfaceindex.RGL2address</td>
</tr>
<tr>
<td>lhcProctorExpectedResponderTable</td>
<td>shelf.slot.site.instance.L2interfaceindex.RGL2address.ERshelf.Ersite</td>
</tr>
<tr>
<td>lhcAuthorizedProctorTable</td>
<td>shelf.slot.site.instance.L2interfaceindex.RGL2address.APshelf.APslot.APsite</td>
</tr>
</tbody>
</table>

- **value**
  Value to set for a read-write object. For specific values, see the LHC MIB `/opt/bladeservices/mibs/LHC-MIB.txt`. 
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7.4.3 Available Commands

This section lists the supported commands.

7.4.3.1 exit | q | quit

Description
Terminates lhcd. MIB tables for status and control of LHC are destroyed.

Synopsis
- exit
- q
- quit

7.4.3.2 get

Description
This command gets the specified MIB object or table row. Depending on whether objectName or tableName is used, the command corresponds to a MIB get or MIB getrow command.

Synopsis
- get [objectName] [index]
- get [tableName] [index]

Parameters
- objectName
  See Command Usage for Common Parameters on page 106.
- tableName
  See Command Usage for Common Parameters on page 106.
- index
  See Command Usage for Common Parameters on page 106.

7.4.3.3 help

Description
This command displays all available commands.

Synopsis
- help <command>
- ?
7.4.3.4 index

Description
This command displays the list of elements that make up the MIB index for the table name provided as an argument. For each index element, the number of 32-bit values required for the element appears in parentheses. For example, an IP address will use four 32-bit values (x.x.x.x) when appearing in a MIB index.

Synopsis
index [tableName]

Parameters
tableName

See Command Usage for Common Parameters on page 106.

7.4.3.5 loglevel

Description
This command is used to set the LHC level.

Synopsis
loglevel [level]

Parameters
level

Is a valid syslog log level from 0 to 7.

All log messages with a level equal to or numerically lower than the selected level will appear in the system log file. A value of 0 indicates that only the most critical log messages will appear. A value of 7 indicates that all log messages will appear.

<table>
<thead>
<tr>
<th>Log Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Emergency</td>
</tr>
<tr>
<td>1</td>
<td>Alert</td>
</tr>
<tr>
<td>2</td>
<td>Critical</td>
</tr>
<tr>
<td>3</td>
<td>Error</td>
</tr>
<tr>
<td>4</td>
<td>Warning</td>
</tr>
<tr>
<td>5</td>
<td>Notice (default)</td>
</tr>
<tr>
<td>6</td>
<td>Information</td>
</tr>
<tr>
<td>7</td>
<td>Debug</td>
</tr>
</tbody>
</table>
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7.4.3.6 next

Description
This command gets the next MIB object or table row after the specified object or table row. Depending on whether objectName or tableName is used, the command corresponds to a MIB next or MIB nextrow command.

Synopsis
next [objectName] [index]
next [tableName] [index]

Parameters
objectName

See Command Usage for Common Parameters on page 106

index

See Command Usage for Common Parameters on page 106.

7.4.3.7 objects

Description
This command displays a list of MIB objects within lhcd.

Synopsis
objects [tableName]

Parameters
tableName

See Command Usage for Common Parameters on page 106.

7.4.3.8 set

Description
This command sets the value of a specified object.

Synopsis
set [objectName] [index] [value_keyword]
seti [objectName] [index] [value]
setc [objectName] [index] ["value"]
seto [objectName] [index] [value]
### Parameters

objectName

See *Command Usage for Common Parameters on page 106.*

index

See *Command Usage for Common Parameters on page 106.*

value

See *Command Usage for Common Parameters on page 106.*

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
</table>
| set     | Enumerated value set. This command sets the requested MIB object to the integer value associated with the value_keyword argument, where value_keyword is the textual representation of the integer value as defined in LHC-MIB. Allowable values are found in the SYNTAX section of a particular MIB object. Values for value_keyword are case-sensitive. For example, the SYNTAX of lhcRole is defined by the MIB as:

SYNTAX lhcRole

To set lhcRowStatus for index 2.2.255.1 to up, either of the following two commands may be used:

```
seti lhcRowStatus 2.2.255.1 1 (integer set)
```

```
set lhcRowStatus 2.2.255.1 up (enumerated value set)
```

<table>
<thead>
<tr>
<th>seti</th>
<th>Integer set. Sets the object using an integer value, where value in this case is a specific integer. Value may be a decimal integer or hexadecimal integer (that is, preceded by 0x, for example, 0x100).</th>
</tr>
</thead>
<tbody>
<tr>
<td>setc</td>
<td>Character string set. Sets the object using a character string, where value this case is a character string. Double quotes are a required part of the command syntax. When used with lhccmd from a shell prompt or shell script, the double quotes must be escaped by using backslashes before each double quote or by enclosing the quoted value in single quotes.</td>
</tr>
<tr>
<td>seto</td>
<td>Octet string set. Sets the object using an octet string, where value in this case is a dot separated hexadecimal string of the form hh.hh...hh, for example, FF.01.02.A1.</td>
</tr>
</tbody>
</table>

### 7.4.3.9 tables

**Description**

This command displays a list of MIB tables supported by lhcd.

**Synopsis**

```
tables
```
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7.4.3.10 values

Description
When an object is defined in the MIB as having an enumerated list of integer values, this command will display both the text (which may be provided as the value argument in the lhccmd set command) and the associated integer value (which may be provided as the value argument in the lhccmd command).

Synopsis
values [objectName]

Parameters
objectName

See Command Usage for Common Parameters on page 106.

7.4.3.11 version

Description
Displays the version of the loaded lhcd executable.

Synopsis
version

7.4.3.12 walk

Description
This command walks the specified MIB table, displaying every row.

Synopsis
walk [tableName]

Parameters
tableName

See Command Usage for Common Parameters on page 106.
7.5 LHC Configuration Script and Configuration File

LHC ships with a configuration script called lhcConfig.gen. It is located at /opt/bladeservices/etc/lhc/. The first time the LHC start-stop script (see lhc–lhcd Start-Stop Script on page 104) is used to start the LHC daemon, the configuration script is executed and generates a configuration file with a name of the format lhc.<shelf>.<slot>.<site>.cfg. The start-stop script then starts the LHC daemon, passing the generated configuration file name as a command line argument. The LHC daemon reads in the generated configuration file in order to learn its initial configuration.

7.6 LHC Fault Management

LHC exists as an aid to Fault Management (FM). LHC checks that the internal system network links are healthy, and reports failure and subsequent recovery of the links. Additionally, LHC is responsible for ensuring that all blades in a system use the same network plane. When FM (or some other entity) on a system controller determines that a switchover of the active network plane must be performed, LHC proctor is notified via its API. LHC then distributes the current active network plane to all blades in the system. On a ATCA-7107 or ATCA-7221 payload blade (responder), the LHC daemon receives the QUERY message indicating that the active plane has changed. LHC informs FM via an "active plane" FM notification. It is then up to the FM software to decide what to do.

7.6.1 Determining to Change Active Network Plane

When FM receives a “RESPONSE delinquent” or “QUERY delinquent” notification, it is an indication that there is a link failure to the blade identified in the notification. Either of these notifications could cause FM to decide to switchover the active network plane.

7.6.2 Controlling the Active Network Plane

If FM decides to switchover the active network plane, a MIB set communicates this fact to LHC. The following LHC command may be used to set the MIB variable, or an actual MIB set could be used: lhccmd seti lhcProctorRequestedActivePlane 1.2.255.1 2

This command would tell the (local) Proctor with indexing <shelf 1, slot 2, site 255, instance 1> to make plane 2 the active network plane.
### 7.6.3 Monitoring for Changes to the Active Network Plane

When LHC determines that an active network plane switchover has occurred, LHC generates an “Active Plane” FM notification. The same FM notification is generated whether the LHC role is Proctor or Responder.

### 7.6.4 Fault Management Notifications

When LHC detects a fault, LHC generates a Fault Management notification. LHC uses syslog to send the notifications to FM. Each FM notification begins with the standard syslog preamble including timestamp, followed by the string "LHC #<instance number>:" where <instance number> is the LHC instance number as used in the MIB indexing. The rest of the notification varies depending upon what fault is being notified. The format of each notification is shown in the following table.

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition/ Semantics</th>
<th>Syntax</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Plane</td>
<td>Inform which plane is active</td>
<td>LHC #&lt;inst_num&gt;: active plane &lt;plane_num&gt;, originator sh &lt;shelf&gt; sl &lt;slot&gt; st &lt;site&gt; serial &lt;ser_num&gt;</td>
<td></td>
</tr>
<tr>
<td>Config file not found</td>
<td>The configuration file specified on the command line was not found.</td>
<td>LHC: Config file (&lt;file_name&gt;) not found, errno=&lt;error_number&gt;</td>
<td></td>
</tr>
<tr>
<td>Duplicate Response</td>
<td>RESPONSE message has been received with the same sequence number from the same source.</td>
<td>LHC #&lt;inst_num&gt;: RESPONSE duplicate &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt; seq_num=&lt;sequence_num&gt; src MAC=&lt;source mac address&gt;</td>
<td></td>
</tr>
<tr>
<td>Late or spurious response</td>
<td>RESPONSE message was received containing an unknown sequence number. The message either arrived late or was sent in error.</td>
<td>LHC #&lt;inst_num&gt;: RESPONSE late or spurious &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt; seq_num=&lt;sequence_num&gt; src MAC=&lt;source mac address&gt;</td>
<td></td>
</tr>
<tr>
<td>Layer 2 connection failed</td>
<td>The layer 2 connection failed to open. LHC will not be able to communicate on the indicated interface.</td>
<td>LHC #&lt;inst_num&gt;: L2 connection (&lt;eth_name&gt;) failed with error &lt;error_number&gt;</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Definition/ Semantics</td>
<td>Syntax</td>
<td>Dependencies</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Layer 2 connection restored</td>
<td>The layer 2 connection that previously failed has now been successfully opened.</td>
<td>LHC #&lt;inst_num&gt;: L2 connection (&lt;eth_name&gt;) restored</td>
<td>-</td>
</tr>
<tr>
<td>QUERY Delinquent</td>
<td>QUERY message has not been received from an authorized proctor</td>
<td>LHC #&lt;inst_num&gt;: QUERY delinquent &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt;</td>
<td>For a particular Authorized Proctor, once this notification appears, it will not appear again until the &quot;QUERY Received&quot; notification appears</td>
</tr>
<tr>
<td>QUERY Received</td>
<td>QUERY message has been received from an authorized proctor</td>
<td>LHC #&lt;inst_num&gt;: QUERY received &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt;</td>
<td>For a particular Authorized Proctor, once this notification appears, it will not appear again until the &quot;QUERY Delinquent&quot; notification appears</td>
</tr>
<tr>
<td>QUERY from unauthorized proctor</td>
<td>QUERY message has been received from an unauthorized proctor</td>
<td>LHC #&lt;inst_num&gt;: QUERY from unauthorized proctor &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt;</td>
<td>-</td>
</tr>
<tr>
<td>RESPONSE Delinquent</td>
<td>RESPONSE message not received from an expected responder</td>
<td>LHC #&lt;inst_num&gt;: RESPONSE delinquent &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt;</td>
<td>For a particular expected responder, once this notification appears, it will not appear again until the &quot;RESPONSE received&quot; notification appears</td>
</tr>
</tbody>
</table>
# Link Health Check

## Link Health Check Examples

### 7.7 LHC Configuration Examples

This section provides some examples on how to configure LHC. LHC configuration is done via the LHC MIB.

An L2 Interface entry represents an L2 interface, such as eth2, or a VLAN on an L2 interface, such as eth2.21. A Responder Group entry represents an LHC QUERY message sent to a configured MAC address (usually a multicast address) on a periodic basis, to which some number of expected Responders should respond with an LHC RESPONSE message. An Expected Responder entry represents an entity from whom an LHC RESPONSE message is expected to be received. An Authorized Proctor entry represents an entity from whom an LHC QUERY message is expected and allowed to be received.

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition/Semantics</th>
<th>Syntax</th>
<th>Dependencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE Received</td>
<td>RESPONSE message has been received from an expected responder</td>
<td>LHC #&lt;inst_num&gt;: RESPONSE received &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt;</td>
<td>For a particular expected responder, once this notification appears, it will not appear again until the &quot;RESPONSE Delinquent&quot; notification appears</td>
</tr>
<tr>
<td>RESPONSE from unexpected responder</td>
<td>RESPONSE message has been received from an unexpected responder</td>
<td>LHC #&lt;inst_num&gt;: RESPONSE from unexpected responder &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;</td>
<td></td>
</tr>
<tr>
<td>Src MAC address changed</td>
<td>The source MAC address in the QUERY message is different from the MAC address received in the previous QUERY. This could indicate a misconfiguration, i.e., two proctors are configured with the same shelf/slot/site.</td>
<td>LHC &lt;inst_num&gt;: src MAC changed since last QUERY &lt;eth_name&gt;/&lt;shelf&gt;/&lt;slot&gt;/&lt;site&gt;/&lt;mcast_mac_address&gt; new MAC=&lt;new mac address&gt; prev MAC=&lt;previous mac address&gt;</td>
<td></td>
</tr>
</tbody>
</table>
The examples in this section are all based on the following single shelf system (shelf #1). Configuration of only the base interface is shown, whereas normally, the base and fabric interfaces are configured. The example single shelf system contains two switches (in logical slots 1 & 2) and two payload blades (in logical slots 4 & 5). Node blade #4 is a "standard" blade, while #5 is a carrier blade with two AMCs (in sites 7 & 8). On SCxB #1, VLAN eth0.21 connects to the node blades and SCxB #2 while VLAN eth0.22 connects to SCxB #2. On node blade #4, eth0 connects to SCxB #1 and eth1 connects to SCxB #2. On Node blade #5 baseboard processor, eth0.21 connects to SCxB #1, eth0.35 connects to AMC #7 and AMC #8. On the AMCs, eth0.35 connects to the baseboard processor. Note that the site number in MIB indexing for non-AMCs is 255.

### 7.7.1 Proctor Configuration Examples

Configuration for a proctor involves creating L2 Interfaces, responder groups, expected responders, and typically, authorized proctors.

LHC Instance #1 is created with role proctor. (shelf 1 slot 1 site 255 instance 1)

```
lhccmd set lhcrStatus 1.1.255.1 createAndWait
lhccmd set lhcrRole 1.1.255.1 proctor
lhccmd set lhcrStatus 1.1.255.1 active
```

Two L2 interfaces are created within the LHC instance #1, interface #1 for eth0.21 and #2 for eth0.22. (shelf 1 slot 1 site 255 instance 1 index 1) and (shelf 1 slot 1 site 255 instance 1 index 2).

```
lhccmd set lhcl2InterfaceStatus 1.1.255.1.1 createAndWait
lhccmd setc lhcl2InterfaceName 1.1.255.1.1 "eth0.21"
lhccmd set lhcl2InterfaceStatus 1.1.255.1.1 active
lhccmd set lhcl2InterfaceStatus 1.1.255.1.2 active
```

Within interface #1, create a single responder group #1 with destination MAC address 01.c0.f9.00.00.01. This responder group fields RESPONSE messages from the payload blades and SCxB #2. (shelf 1 slot 1 site 255 instance 1 index 1 MAC 01c0f9000001)

```
lhccmd set lhcrProctorResponderGroupStatus 1.1.255.1.1.0x01.0xcf.0x09.0x00.0x00.0x01 createAndGo
```

Within that Responder Group, create three expected responders to represent the two payload blades and SCxB #2. (shelf 1 slot 1 site 255 instance 1 index 1 MAC 01c0f9000001 ERshelf 1 ERslot 2 ERsite 255) and (shelf 1 slot 1 site 255 instance 1 index 1 MAC 01c0f9000001 ERshelf 1 ERslot 4 ERsite 255) and (shelf 1 slot 1 site 255 instance 1 index 1 MAC 01c0f9000001 ERshelf 1 ERslot 5 ERsite 255)
Link Health Check

Within interface #2, create an authorized proctor #1 with destination MAC address 01.c0.f9.00.00.01. This AP fields QUERY messages from SCxB #2. (shelf 1 slot 1 site 255 instance 1 index 2 MAC 01c0f9000001 APshelf 1 APslot 2 APsite 255)

```
lhccmd set lhcAuthorizedProctorRowStatus 1.1.255.1.2.0x01.0xc0.0xf9.0x00.0x00.0x01.1.2.255 createAndWait
lhccmd set lhcAuthorizedProctorGuardTimerEnable 1.1.255.1.2.0x01.0xc0.0xf9.0x00.0x00.0x01.1.2.255 true
lhccmd set lhcProctorExpectedResponderRowStatus 1.1.255.1.2.0x01.0xc0.0xf9.0x00.0x00.0x01.1.2.255 active
```

7.7.2 Responder Configuration Examples

Configuration for a responder involves creating L2 Interfaces and authorized proctors.

LHC Instance #1 is created with role responder. (shelf 1 slot 4 site 255 instance 1)

```
lhccmd set lhcRowStatus 1.4.255.1 1.4.255.1 createAndWait
lhccmd set lhcRole 1.4.255.1 responder
lhccmd set lhcRowStatus 1.4.255.1 active
```

Two L2 interfaces are created within LHC instance#1, interface#1 for eth0 and #2 for eth1. (shelf1 slot 4 site 255 instance 1index 1) and (shelf 1 slot 4 site 255 instance 1 index 2)

```
lhccmd set lhcL2InterfaceRowStatus 1.4.255.1.1 createAndGo
lhccmd setc lhcL2InterfaceName 1.4.255.1.1 "eth0"
lhccmd set lhcL2InterfaceRowStatus 1.4.255.1.1 active
lhccmd set lhcL2InterfaceRowStatus 1.4.255.1.2 createAndGo
lhccmd setc lhcL2InterfaceName 1.4.255.1.2 "eth1"
lhccmd set lhcL2InterfaceRowStatus 1.4.255.1.2 active
```
Within interface #1, create a single authorized proctor #1 with destination MAC address 01.c0.f9.00.00.1. This AP fields QUERY messages from SCxB #1. (shelf 1 slot 4 site 255 instance 1 index 1 MAC 01c0f9000001 AP shelf 1 AP slot 1 AP site 255)

```bash
lhccmd set lhcAuthorizedProctorRowStatus
1.4.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.1.1.255
createAndWait
```

```bash
lhccmd set lhcAuthorizedProctorGuardTimerEnable
1.4.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.1.1.255 true
```

```bash
lhccmd set lhcAuthorizedProctorRowStatus
1.4.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.1.1.255 active
```

Within interface #2, create a single authorized proctor #1 with destination MAC address 01.c0.f9.00.00.01. This AP fields QUERY messages from SCxB #2. (shelf 1 slot 4 site 255 instance 1 index 2 MAC 01c0f9000001 AP shelf 1 AP slot 2 AP site 255)

```bash
lhccmd set lhcAuthorizedProctorRowStatus
1.4.255.1.2.0x01.0xc0.0xf9.0x00.0x00.0x01.2.2.255
createAndWait
```

```bash
lhccmd set lhcAuthorizedProctorGuardTimerEnable
1.4.255.1.2.0x01.0xc0.0xf9.0x00.0x00.0x01.2.2.255 true
```

```bash
lhccmd set lhcAuthorizedProctorRowStatus
1.4.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.1.1.2.255 active
```

### 7.7.3 Baseboard Processor on Carrier Blade Configuration Example

Configuration on a carrier blade baseboard processor involves creating two LHC instances, one with role responder to handle the LHC conversation to the SCxBs and one with role proctor to handle the LHC conversation to the AMCs.

**LHC Instance #1 is created with role proctor (shelf 1 slot 5 site 255 instance 1).**

```bash
lhccmd set lhcRowStatus 1.5.255.1 proctor
```

```bash
lhccmd set lhcRole 1.5.255.1 proctor
```

```bash
lhccmd set lhcRowStatus 1.5.255.1 active
```

**One L2 Interface is created within LHC instance #1, interface #1 for eth0.35 (shelf 1 slot 5 site 255 instance 1 index 1).**

```bash
lhccmd set lhcL2InterfaceRowStatus 1.5.255.1.1 createAndWait
```

```bash
lhccmd setc lhcL2InterfaceName1.5.255.1.1 "eth0.35"
```
Link Health Check

lhccmd set lhcl2InterfaceRowStatus 1.5.255.1.1 active

Within interface #1, create a single responder Group #1 with destination MAC address 01.c0.f9.00.00.01. This Responder Group fields RESPONSE messages from the AMCs.

lhccmd set lhcProctorResponderGroupRowStatus 1.5.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.0 active

Within that responder group, create two expected responders to represent the two AMCs.

lhccmd set lhcProtorExpectedResponderRowStatus 1.5.255.1.1.0x01.0xc0.0xf9.0x00.0x00.0x01.1.1.5.7 createAndGo

LHC Instance #2 is created with role responder. (shelf 1 slot 5 site 255 instance 2)

lhccmd set lhcRowStatus 1.5.255.2 createAndWait
lhccmd set lhcRole 1.5.255.2 responder

One L2 Interface is created within LHC instance #2, interface #1 for eth0.21. (shelf 1 slot 5 site 255 instance 2 index 1)

lhccmd set lhcl2InterfaceRowStatus 1.5.255.2.1 createAndWait
lhccmd setc lhcl2InterfaceName 1.5.255.2.1 "eth0.21"

Within interface #1, create an authorized proctor #1 with destination MAC address 01.c0.f9.00.00.01. This AP fields QUERY messages from SCxB #1 (shelf 1 slot 5 site 255 instance 2 index 1 APshelf 1 APslot 1 APsite 255).

lhccmd set lhcauthorizedProctorRowStatus 1.5.255.2.1.0xc0.0xf9.0x00.0x00.0x01.1.1.255 createAndWait
lhccmd set lhcauthorizedProctorGuardTimerEnable 1.5.255.2.1.0xc0.0xf9.0x00.0x00.0x01.1.1.255 true

lhccmd set lhcauthorizedProctorRowStatus 1.5.255.2.1.0xc0.0xf9.0x00.0x00.0x01.1.1.255 active
7.7.4 AMC/PMC Module on Carrier Blade Configuration Example

The configuration on an AMC/PMC is similar to a standard payload blade except that there is only a single L2 interface for the base. The two AMC/PMC modules have duplicate configurations except for the site number, so only AMC/PMC #7 is shown here.

LHC Instance #1 is created with the role responder. (shelf 1 slot 5 site 7 instance 1)

```
lhccmd set lhcTRowStatus 1.5.7.1 createAndWait
lhccmd set lhcRole 1.5.7.1 responder
lhccmd set lhcRowStatus 1.5.7.1 active
```

One L2 Interface is created within LHC instance #1, interface #1 for eth0.35. (shelf 1 slot 5 site 7 instance 1 index 1)

```
lhccmd set lhcL2InterfaceRowStatus 1.5.7.1.1 createAndWait
lhccmd setc lhcL2InterfaceName 1.5.7.1.1 "eth0.35"
lhccmd set lhcL2InterfaceRowStatus 1.5.7.1.1 active
```

Within interface #1, create a single authorized proctor #1 with destination MAC address 01.c0.f9.00.00.01. This AP fields QUERY messages from the baseboard processor. (shelf 1 slot 5 site 7 instance 1 index 1 MAC 01c0f9000001 APshelf 1 APslot 5 APsite 255)

```
lhccmd set lhcAuthorizedProctorRowStatus 1.5.7.1.1.xc0.0xf9.0x00.0x00.0x01.1.5.255 createAndWait
lhccmd set lhcAuthorizedProctorGuardTimerEnable 1.5.7.1.1.xc0.0xf9.0x00.0x00.0x01.1.5.255 true
lhccmd set lhcAuthorizedProctorRowStatus 1.5.7.1.1.xc0.0xf9.0x00.0x00.0x01.1.5.255 active
```

7.7.5 Leaky Bucket Description and Configuration Example

LHC uses a 'leaky bucket' mechanism (described below) to give the user control over the frequency of certain FM notifications. The FM notifications that have this control are:

- RESPONSE Delinquent
- RESPONSE Received
- QUERY Delinquent
- QUERY Received

There are two independent leaky buckets, one that controls the RESPONSE pair of FM notifications and one that controls the QUERY pair of FM notifications.
There are two writeable MIB objects to control each leaky bucket: upper threshold (UT) and lower threshold (LT). The UT and LT are controlled on a per-responder group and per-authorized proctor basis.

The following description applies to both the RESPONSE leaky bucket and the QUERY leaky bucket, but is described from the RESPONSE leaky bucket perspective.

When a proctor sends a QUERY message, a response timer is started. Each time that the response timer expires, if a RESPONSE message has not been received from an expected responder (ER), then a drop is added to the leaky bucket for that ER. If a RESPONSE message is received from an ER, then a drop is removed from the leaky bucket for that ER. The bucket size does not go below zero and does not get larger than the UT. LHC uses an internal variable to track whether the most recent FM notification was "Delinquent" or "Received". If upon adding a drop to the leaky bucket it equals UT and the most recent notification was "Received", then a "Delinquent" notification is generated. If upon removing a drop from the leaky bucket it equals LT and the most recent notification was "Delinquent" then a "Received" notification is generated.

By changing the UT and LT values, one can control the frequency of FM notifications such that not every dropped RESPONSE or QUERY is reported and that the reception of a single RESPONSE or QUERY is reported.

### 7.8 LHC Configuration for ATCA-F140

The following tables are excerpts from the ATCA-F140 LHC configuration, showing the rows for the Authorized Proctors, Responder Groups, and Expected Responders.

On the ATCA-F140, there is one LHC instance configured as a proctor.

In the following tables, the first five index elements in each row are shelf.slot.site.instance.interface and the next six elements are the multicast address. For this example, the ATCA-F140 is assumed to be in shelf 2 and logical slot 1.

#### Table 7-1 ATCA-F140 Base Interface LHC Configuration

<table>
<thead>
<tr>
<th>Row Index</th>
<th>Row Type</th>
<th>Represents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.255.1.2.1.192.249.0.0.1.2.2.255</td>
<td>Authorized Proctor</td>
<td>Queries from ATCA-F140 in logical slot 2</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1</td>
<td>Responder Group</td>
<td>Queries to other ATCA-F140 and payload blades</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.2.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 2 ATCA-F140</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.3.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 3 payload blade</td>
</tr>
</tbody>
</table>
### Table 7-1  ATCA-F140 Base Interface LHC Configuration (continued)

<table>
<thead>
<tr>
<th>Row Index</th>
<th>Row Type</th>
<th>Represents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.4.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 4 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.5.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 5 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.6.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 6 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.7.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 7 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.8.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 8 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.9.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 9 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.10.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 10 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.11.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 11 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.12.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 12 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.13.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 13 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.14.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 14 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.15.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 15 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.1.1.192.249.0.0.1.2.16.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 16 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.3.1.192.249.0.0.1</td>
<td>Responder Group</td>
<td>Queries to shelf managers</td>
</tr>
<tr>
<td>2.1.255.1.3.1.192.249.0.0.1.2.101.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 101 shelf manager</td>
</tr>
<tr>
<td>2.1.255.1.3.1.192.249.0.0.1.2.102.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 102 shelf manager</td>
</tr>
</tbody>
</table>
### ATCA-F140 Fabric Interface LHC Configuration

<table>
<thead>
<tr>
<th>Row Index</th>
<th>Row Type</th>
<th>Represents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.255.1.5.1.192.249.0.0.1.2.2.255</td>
<td>Authorized Proctor</td>
<td>Queries from ATCA-F140 in logical slot 2</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1</td>
<td>Responder Group</td>
<td>Queries to other ATCA-F140 and payload blades</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.2.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 2 ATCA-F140</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.3.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 3 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.4.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 4 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.5.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 5 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.6.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 6 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.7.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 7 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.8.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 8 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.9.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 9 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.10.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 10 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.11.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 11 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.12.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 12 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.13.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 13 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.14.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 14 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.15.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 15 payload blade</td>
</tr>
<tr>
<td>2.1.255.1.4.1.192.249.0.0.1.2.16.255</td>
<td>Expected Responder</td>
<td>Response from logical slot 16 payload blade</td>
</tr>
</tbody>
</table>
Watchdog Behavior

This section describes the types of watchdogs that are available and configurable with ATCA-F140 and the way how they behave when used.

ATCA-F140 provides two programmable watchdogs: the IPMC (or BMC) watchdog and the FPGA watchdog. The system response varies based on the type of Watchdog triggered.

8.1 BMC Watchdog

The Baseboard Management Controller (BMC) watchdog protects against boot failures when transferring control from the IPMC to the system boot loader (U-Boot). Before transferring control to U-Boot, the IPMC starts the BMC watchdog with a timeout value of 20 seconds by default.

U-Boot uses the BMC watchdog timer when transferring control from the system boot loader to Linux to protect against boot hangs, until the system starts the Field Programmable Gate Array (FPGA) watchdog. By default, U-Boot sets the BMC watchdog with a value of 600 seconds. This is controllable via the U-Boot environment variable oswatchdog.

When the BMC watchdog timer triggers, the IPMC resets the blade. This is reflected by the SEL event log and is also reported by U-Boot as "IPMC" for the "Reset Cause" condition.

In addition, when the BMC watchdog triggers, the default behavior of the IPMC is to initiate a boot bank switch, if the Timer Use field is set to "BIOS FRB2" (001b), "BIOS/POST" (010b), or "OS Load" (011b). Both the IPMC and system boot loader set the Timer Use field such that a boot bank switch occur that makes the BMC watchdog to trigger. Refer Boot Bank Switch on BMC Watchdog Timeout on page 126 for more information on bank switch behavior and how it can be controlled.

Refer the ATCA-F140 Control via IPMI Programmer’s Reference manual, for further examples related to BMC watchdog timer commands.

Alternatively, see Section 6.4 on page 75, for how to use the watchdog sub-command to Get and Set the BMC watchdog timer once Linux is booted.

NOTE: The hpmcmd does not set the Timer Use field to "BIOS FRB2" (001b), "BIOS/POST" (010b), or "OS Load" (011b) when managing the BMC watchdog, so no boot bank switch will occur if the BMC watchdog triggers after being set and started by hpmcmd.
8.2 FPGA Watchdog

The FPGA provides a software watchdog, which protects against system hangs after Linux has booted. This watchdog does not cause the IPMC to initiate a boot bank switch as it does not interact with the IPMC at all, but rather asserts the reset signal to the P2020 processor.

The FPGA watchdog is a two-stage watchdog that generates an interrupt to the P2020 processor when the first stage time outs (which is set to one-half the value of the timeout value). When the first stage time outs, an interrupt is sent to the P2020 processor which is registered in the P2020 system log (/var/log/messages) to indicate the system is in trouble. When the second stage time outs, a hard reset is sent to the P2020 processor to initiate a reboot. This is a hard reset to the processor which generates no log entries; however, this can be detected by U-Boot and is reported as "SwWatchdog" for the "Reset Cause" condition.

After the FPGA watchdog timer is started, the BMC watchdog timer is stopped. The BMC watchdog timer is then available for use by the user.

The default value of the FPGA watchdog is 60 seconds. A user can set a different value for the FPGA watchdog timeout by modifying the kernel command line via the U-Boot environment variable "bootargs". This can be done by appending the following string to the "bootargs" environment variable. The following example shows how to change the timeout value to 30 seconds.

   atca_f140_wdt.timeout=30

Acceptable values for the FPGA watchdog are between 1 and 60 (inclusive).

**NOTE:** Lowering the timeout value of the FPGA watchdog (from its default value of 60) may require configuring the system watchdog daemon to reset the FPGA watchdog more frequently to prevent unwanted resets or interrupts (should the system be loaded). The default value of the reset interval is 10 seconds (see /etc/watchdog.conf).

8.3 Boot Bank Switch on BMC Watchdog Timeout

Under normal conditions, when the BMC Watchdog time outs, the IPMC will force a boot bank switch before resetting the processor and repeating the boot cycle. This protects against boot hangs when U-Boot or Linux fail to operate or otherwise fail to boot the system properly. This is not the case for the FPGA watchdog (that means no boot bank switch occurs when the FPGA watchdog triggers).
The default behavior is to switch boot banks when the BMC watchdog triggers [when the Timer Use field is set to "BIOS FRB2" (001b), "BIOS/POST" (010b), or "OS Load" (011b)], but this behavior can be controlled by the user through the use of the "Payload Upgrade Mode" and "Boot Bank Swap Control" flags.

For more information on how to Get and Set these flags and more detailed explanation about them, refer to the *ATCA-F140 Control via IPMI Programmer's Reference* manual.

The following table details the circumstances when a boot bank switch occurs, when any of the watchdogs is triggered.

**Table 8-1  Boot Bank Switch on BMC Watchdog Timeout**

<table>
<thead>
<tr>
<th>Execution Phase</th>
<th>Governing Watchdog</th>
<th>Flags</th>
<th>Boot Bank Switch on Watchdog Timeout?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>Next Source</td>
<td>Default Value</td>
<td>Boot Bank Swap</td>
</tr>
<tr>
<td>IPMC</td>
<td>U-Boot</td>
<td>IPMC 20 seconds</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>U-Boot</td>
<td>Linux</td>
<td>IPMC 600 seconds</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Linux</td>
<td>n/a</td>
<td>FPGA 60 seconds</td>
<td>Don't Care</td>
</tr>
</tbody>
</table>
Trident Reconfiguration Utility

Trident Reconfiguration Utility allows for the easy reconfiguration of the ports connected to the Broadcom Trident 40G - fabric switch. This utility is called `trid-cfg` and is installed in the `/opt/bladeservices/bin` directory. Use this utility only if you want to deviate from the two default configurations provided in Table 9-1 and Table 9-2. The default configurations are based on the two chassis types AXP1440, AXP-640, and AXP640-C04 in which the ATCA-F140 is currently supported.

Table 9-1  Default Fabric Configuration-1440 Chassis

<table>
<thead>
<tr>
<th>Fabric Channel</th>
<th>Physical Slot</th>
<th>Configuration Type</th>
<th>Port Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC1</td>
<td></td>
<td>4x1G</td>
<td></td>
</tr>
<tr>
<td>FC2</td>
<td>7</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC3</td>
<td>8</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC4</td>
<td>5</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC5</td>
<td>10</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC6</td>
<td>4</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC7</td>
<td>11</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC8</td>
<td>3</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC9</td>
<td>12</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC10</td>
<td>2</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC11</td>
<td>13</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC12</td>
<td>1</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC13</td>
<td>14</td>
<td>40G-KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>RTM1</td>
<td></td>
<td>40G-KR4</td>
<td>RTM QSFP RTM ETH7</td>
</tr>
<tr>
<td>RTM2</td>
<td></td>
<td>10G-4KR</td>
<td>RTM SFP+ ETH6, 5, 4, 3</td>
</tr>
<tr>
<td>FP1</td>
<td></td>
<td>40G-KR4</td>
<td>FP QSFP ETH1</td>
</tr>
<tr>
<td>FP2</td>
<td></td>
<td>40G-KR4</td>
<td>FP QSFP ETH2</td>
</tr>
</tbody>
</table>
Trident Reconfiguration Utility

**Table 9-2  Default Fabric Configuration-640 Chassis**

<table>
<thead>
<tr>
<th>Fabric Channel</th>
<th>Physical Slot</th>
<th>Configuration Type</th>
<th>Port Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC1</td>
<td></td>
<td>4x1G</td>
<td></td>
</tr>
<tr>
<td>FC2-Xlink</td>
<td></td>
<td>10G-KX4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC10</td>
<td>2</td>
<td>40G -KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC11</td>
<td>5</td>
<td>40G -KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC12</td>
<td>1</td>
<td>40G -KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>FC13</td>
<td>6</td>
<td>40G -KR4</td>
<td>Backplane</td>
</tr>
<tr>
<td>RTM 1</td>
<td></td>
<td>40G -KR4</td>
<td>RTM QSFP RTM ETH7</td>
</tr>
<tr>
<td>RTM 2</td>
<td></td>
<td>10G-4KR</td>
<td>RTM SFP+ ETH6, 5, 4, 3</td>
</tr>
<tr>
<td>FP 1</td>
<td></td>
<td>40G -KR4</td>
<td>FP QSFP ETH1</td>
</tr>
<tr>
<td>FP 2</td>
<td></td>
<td>40G -KR4</td>
<td>FP QSFP ETH2</td>
</tr>
</tbody>
</table>

**NOTICE**

The Broadcom Trident switch chip (fabric) can be configured for a total of 64 ports. The HW is divided into two parts, called the X and Y pipelines. The X pipeline encompasses WarpCore 0 - WarpCore 8. The Y pipeline encompasses WarpCore 9 - WarpCore 17. Besides the overall 64 port limitation, no pipeline (X or Y) can be configured for more than 32 ports. The “trid-cfg” utility has been developed to validate this HW design limitation.

The trid-cfg utility will run on the ATCA-F140 after logging in as the super user (root).

Command syntax:

```
trid-cfg [-i <inp_file>] [-r backup_ver] [-calyhv]
```

Where:

- **h** Help
- **i** Specify input file (full path)
  - default = /opt/bladeservices/cfg/trid_config
- **c** Display the current configuration
Trident Reconfiguration Utility

- **a** Activate the current configuration
- **-l** List the available backup versions
- **-r** Restore the specified backup version
- **-y** Suppress the confirmation step
- **-v** Verbose mode

Examples:

To display currently activated configuration:

```
trid-cfg -c
```

To validate and display a new configuration:

```
trid-cfg -i /opt/bladeservices/cfg/trid_config
```

To activate and install a new configuration (creates a new backup version):

```
trid-cfg -i /opt/bladeservices/cfg/trid_config -a
```

To list all available backup versions:

```
trid-cfg -l
```

To restore a specific backup version:

```
trid-cfg -r 20110712143010
```

**NOTICE**

It is required to execute `trid-cfg` with default configuration file, if the blade is moved from one chassis to another chassis or from one slot to another slot.

### 9.1 Input Files

Four input files are included in the `/opt/bladeservices/cfg` directory that match with the four default configurations:

"**trid_1440_def**":

```
# Input file for Trident configuration on F140
# Chassis Type values = 1440, 640, 14400, 640c04

CTYPE=1440
# Fabric channel identifiers: FC2 - FC13
```

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Trident Reconfiguration Utility

# Descriptors:
#   G - grouped mode, covering 40GBase-KR4, 10GBase-KX4, and
#   10GBase-BX4.
#   I - independent mode, covering 4x10GBase-KR, 4x1000Base-KX, 4x1000Base-BX,
#   2x10GBase-KR, 2x1000Base-KX, 2x1000Base-BX, 1x10GBase-KR, 1000Base-KX,
#   and 1000Base-BX.
#   N - not connected
FC2=G
FC3=G
FC4=G
FC5=G
FC6=G
FC7=G
FC8=G
FC9=G
FC10=G
FC11=G
FC12=G
FC13=G
# Fabric QSFP identifiers: QSFP1 - QSFP3
# QSFP1 is FP ETH1, QSFP2 is FP ETH2, QSFP3 is RTM ETH7
# Descriptors: G, I, N
QSFP1=G
QSFP2=G
QSFP3=G

"trid_14400_def":
#
# Input file for Trident configuration on F140
#
# Chassis Type values = 1440, 14400, 640
CTYPE=14400
# Fabric channel identifiers: FC2 - FC13
# Descriptors:
# G - grouped mode, covering 40GBase-KR4, 10GBase-KX4, and 10GBase-BX4.
# I - independent mode, covering 4x10GBase-KR, 4x1000Base-KX, 4x1000Base-BX, 2x10GBase-KR, 2x1000Base-KX, 2x1000Base-BX, 1x10GBase-KR, 1000Base-KX, and 1000Base-BX.
# N - not connected
FC2=I
FC3=I
FC4=G
FC5=G
FC6=G
FC7=G
FC8=G
FC9=G
FC10=G
FC11=G
FC12=G
FC13=G
# Fabric QSFP identifiers: QSFP1 - QSFP3
# QSFP1 is FP ETH1, QSFP2 is FP ETH2, QSFP3 is RTM ETH7
# Descriptors: G, I, N
QSFP1=G
QSFP2=G
QSFP3=G
"trid_640_def":
#
# Input file for Trident configuration on F140
#
# Chassis Type values = 1440, 640, 14400, 640c04
CTYPE=640
# Fabric channel identifiers: FC2 - FC13
# Descriptors:
# G - grouped mode, covering 40GBase-KR4, 10GBase-KX4, and 10GBase-BX4.
Trident Reconfiguration Utility

#   I - independent mode, covering 4x10GBase-KR, 4x1000Base-KX, 4x1000Base-BX,
#       2x10GBase-KR, 2x1000Base-KX, 2x1000Base-BX, 1x10GBase-KR, 1000Base-KX,
#       and 1000Base-BX.
#   N - not connected
FC2=G
FC3=N
FC4=N
FC5=N
FC6=N
FC7=N
FC8=N
FC9=N
FC10=G
FC11=G
FC12=G
FC13=G
# Fabric QSFP identifiers: QSFP1 - QSFP3
# QSFP1 is FP ETH1, QSFP2 is FP ETH2, QSFP3 is RTM ETH7
# Descriptors: G, I, N
QSFP1=G
QSFP2=G
QSFP3=G

"trid_640c04_def":
#
# Input file for Trident configuration on F140
#
# Chassis Type values = 1440, 14400, 640, 640c04
CTYPE=640c04
# Fabric channel identifiers: FC2 - FC13
# Descriptors:
#   G - grouped mode, covering 40GBase-KR4, 10GBase-KX4, and 10GBase-BX4.
9.2 Customize Trident Configuration

Based on the topology or on the system requirement, you can modify the modes of the ports either from group mode to independent mode or from independent mode to group mode.

To reconfigure the ports, perform the following steps:
Trident Reconfiguration Utility

1. Go to `/opt/bladeservices/cfg` directory,
   `cd /opt/bladeservices/cfg`

   The default trident configurations of various chassis’ are available at
   `/opt/bladeservices/cfg/trid_<chassis>_def`

2. Create a copy of any of the default configuration files.
   If in a 1440 chassis, copy the configuration using the following command:
   `cp trid_1440_def trid_config`
   If in a 14400 chassis, copy the configuration using the following command:
   `cp trid_14400_def trid_config`
   If in a 640 chassis, copy the configuration using the following command:
   `cp trid_640_def trid_config`
   If in a 640-C04 chassis, copy the configuration using the following command:
   `cp trid_640c04_def trid_config`

3. Modify the `trid_config` file with new port/slot settings. You can modify the port modes
   from independent to group or from group to independent.

4. Validate the new configuration.
   `trid-cfg`

5. Activate the new configuration, if no errors are displayed.
   `trid-cfg -a`

6. Reboot the F140.

For example, if you want to change the mode of FC7 (Logical slot 8) from group mode to
independent mode.

1. Create a copy of `trid_1440_def` configuration as `trid_config`
2. Change “FC7=G” to “FC7=I”.
3. Execute `trid-cfg` as shown below to create configuration files. The `config.bcm` and
   `rc.soc` files are created, which are used for next reboot.
   `trid-cfg -a -i /opt/bladeservices/cfg/trid_config`
4. After reboot, update the SRstackware port configuration of the ports, which are
   impacted due to mode changes. That means, in group mode, FC7 is represented as
   1X40G port (xe13) and in independent mode it is represented as 4X10G ports (xe13, xe14, xe15, and xe16). In this case, xe14, xe15, and xe16 do not have any
   configuration and you have to manually configure all the ports as per topology
   requirement.
9.2.1 Backups

During the activate step, a backup is created for all the files being modified. These versions are stamped with date and time using the format = YYYYMMDDHHMMSS. The modified files are:

- active_cfg
- config bcm
- hpm_arrays
- rc.f140.fabric2
- rc.soc

9.2.1.1 Restoring a backup

1. List all backup versions.
   trid-cfg -l

2. Restore the backup version.
   trid-cfg -r <backup-version>

3. Reboot the F140.

9.3 SRS Initialization

When an ATCA-F140 is rebooted, the SRS initialization script performs the following logic with regard to the Trident fabric switch configuration:

Check for the "active_cfg" file in the '/opt/bladeservices/cfg' directory?
If present then initialize with this configuration.
If not present {
Check for the "trid_config" file in the /opt/bladeservices/cfg' directory?
If present {
Execute the "trid-cfg" utility with the "-a" and "-y" options.
}
If not present {
Determine the chassis type (1440 [default] or 640).
Install default files based on the chassis type.
}
10.1 Fabric Interface Configuration Service

Some node blades require special configuration settings applied to the fabric interface, especially when operating at higher speeds (10G-BaseKR and 40G-BaseKR4).

In order to avoid performing these configuration steps manual, a service/tool "fabconfig" is provided. This tool determines the blade type in a specific slot and configures the F140 fabric interface as required for the blade.

10.1.1 Usage

```
fabconfig -c <fabric-channel>
  Configures blade connected to a specific fabric channel.

fabconfig -s <logical slot>
  Configures fabric interface for a blade in a specific logical slot.

fabconfig -i <srs-interface>
  Configures fabric interface as named by SRStackware.
```

In addition "fabconfig" is called whenever an IPMI e-keying event is bringing a fabric port "up". This happens when a blade is inserted or restarted, so under normal circumstances it is not required to call "fabconfig" manually.

Create the following file to disable the background operating mode (no special content is required):

```
/opt/bladeservices/etc/fabconfig/ekey_disable
```

10.1.2 Logging

The fabconfig tool will log its actions via syslog (/var/log/messages file) using tag "fabconfig", and a severity of "local0.err" or "local0.info" for errors or information messages respectively.

Sample output when a fabric channel is brought up:

```
fabconfig[3030]: Configuring port 4 (Channel 6) for blade ATCA-9405[unknown] to [kr4] (Grouped mode), options [kr], tap [DriverCurrent=0x04 PreDriverCurrent=0x04 Preemphasis=0xCEC0]
```
10.2 Configuration Files

End users, blade or chassis developers/integrators have the possibility to configure and extend the fabconfig tool by modifying or adding scripts located in /opt/bladeservices/etc/fabconfig.

10.2.1 slotconfig

The slotconfig file (/opt/bladeservices/etc/fabconfig/slotconfig) can be edited by the user to select specific options for specific blades.

It contains a table which is searched from top to bottom, trying to match a specific chassis, blade name, blade revision and fabric channel. When a match is found, the specified options are applied to the corresponding fabric port(s) on the ATCA-F140.

The default entries are:

<table>
<thead>
<tr>
<th>Chassis</th>
<th>Blade</th>
<th>Rev.</th>
<th>Channel</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>4440</td>
<td>ATCA-9405</td>
<td>all</td>
<td>all</td>
<td>kr</td>
</tr>
<tr>
<td>4440</td>
<td>ATCA-7470</td>
<td>all</td>
<td>all</td>
<td>auto</td>
</tr>
</tbody>
</table>

The first four columns are:

1. Chassis type.
   Currently supported are "4440" for SMART Embedded Computing AXP-1440/4440 and "640" for AXP 640. Additional chassis names can be provided via the "fabconfig.rc" file.

2. Blade name.
   This name is retrieved via HPM/IPMI from the FRU data of the node blade. FRU contents can be mapped to blade names in the "fabconfig.rc" file.

   This information is retrieved via HPM/IPMI from the FRU data of a node blade.

4. Channel.
   The fabric channel number (which is the logical slot number of a blade minus 1).

The keyword "all" acts as wildcard matching everything.

All keywords beginning with the 5th column are treated as configuration options. The following options are currently defined (additional options might be implemented in future versions of the tool, or implemented by blade specific configuration files):

"auto"

   Enables auto-negotiation on the port
Fabric Configuration

""kr"
Disables auto-negotiation and configures the fabric interface to
– 10GBase-KR mode if the channel is configured to "Independent" mode by trid-cfg, or
– 40GBase-KR4 mode if the channel is configured to "Grouped" mode.

""kx"
Disables auto-negotiation and configures the fabric interface to
– 1000BaseX mode if the channel is configured to "Independent" mode by trid-cfg, or
– 10GBase-KX4 (XGMII) mode if the channel is configured to "Grouped" mode.

""fec"
Enables forward error correction "FEC" for KR/KR4 mode. By default it is disabled if auto-negotiation has been disabled.

""ignore"
Ignores the blade, no changes to the current port setup are done.

""no_txswap"
This option is specific to the ATCA-9405, which requires swapping the SerDes polarity for some tx lines. It disables the swapping and leaves the SerDes lanes in default mode.

If no entry is found for a node blade the port is set to "auto" mode with no further options.

Example for configuring:

- auto-negotiation for all ATCA-7470 blades.
- No modifications applied when an unknown blade is present/inserted.

<table>
<thead>
<tr>
<th># Chassis</th>
<th>Blade</th>
<th>Rev.</th>
<th>Channel Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>#----------</td>
<td>-----------</td>
<td>------</td>
<td>-----------------</td>
</tr>
<tr>
<td>4440</td>
<td>ATCA-9405</td>
<td>all</td>
<td>5</td>
</tr>
<tr>
<td>4440</td>
<td>ATCA-9405</td>
<td>all</td>
<td>all</td>
</tr>
<tr>
<td>4440</td>
<td>ATCA-7470</td>
<td>all</td>
<td>all</td>
</tr>
<tr>
<td>all</td>
<td>all</td>
<td>all</td>
<td>all</td>
</tr>
</tbody>
</table>

ignore
10.2.2 fabconfig.rc

This configuration file can be edited to add support for additional blades and chassis types.

It contains two shell functions:

1. chassis_names
   This function prints a table with two columns:
   - A regular expression string which is compared against the chassis name as reported by the "hpmcmd -c shelftype" command, with all spaces removed. A simple substring match is performed for values without special regular expression characters.
   - The identifier used throughout the tool for this chassis (for example, Column 1 in the "slotconfig" table).

2. blade_names
   This function maps a blade name as it is stored in the blade's FRU data to an identifier used throughout the tool.
   It prints a table with two columns:
   - A regular expression string which is compared against the blade's FRU content (product name in the FRU data's product info area as reported by "hpmcmd -c fruinfoget 0 pproductname").
     A simple substring match is performed for values without special regular expression characters.
   - The identifier used throughout the tool for this blade (for example, Column 2 in the "slotconfig" table).

Examples:

Example to add a shelf "myshelf" if hpmcmd reports a string containing "foo-bar":
chassis_names()
{
    echo AXP-1440 4440
    echo AXP-4440 4440
    echo foo-bar myshelf
}

"myshelf" can now be used as chassis identifier in the slotmap file.

Example to map a blade to the identifier "ATCA-0815" if the fru-data contains the sub-string "ATCA-0815" or "Somevendor-ATCA-0815-Rev1.99".
The default entries map FRU names containing the string "ATCA-9405" and "ATCA-7470" to the same blade identifier:

```bash
blade_names()
{
    echo ATCA-9405 ATCA-9405
    echo ATCA-7470 ATCA-7470
    echo ATCA-0815 ATCA-0815
    echo Somevendor-ATCA-0815-Rev1.99 ATCA-0815
}
```

The identifier ATCA-0815 can now be used as blade identifier in the slotmap file.

### 10.2.3 Blade Specific Configuration File

By default, the "fabconfig" tool supports two SMART EC node blades (ATCA-9405 and ATCA-7470). If required, support for additional blades can be provided by adding an additional blade configuration file named:

```
/opt/bladeservices/etc/fabconfig/fabconfig.<blade-name> [.<blade-revision>]
```

<blade-name> is the name resolved via the `blade_names()` method in `fabconfig.rc` (see previous section). <blade-rev> is the blade revision as stored in the blades FRU data (Product version field in the Product info area, "hpmcmd -c fruinfoget 0 pversion").

The tool first searches for a file with the revision suffix. If none is found, a file without revision index is searched.

As final fallback, the file "fabconfig.unknown-blade" is used.

The blade specific configuration file must provide two shell functions named "board_get_txtap" and "board_get_workaround". Refer to the "fabconfig.unknown-blade" file for more details (this file can be used as template for new blades).
10.3 Supported Blades

10.3.1 ATCA-9405

The ATCA-9405 packet processing blade has the following restrictions which are covered by the fabconfig tool:

- Auto-negotiation is not supported on the fabric interface.
- "The transmit polarity needs to be swapped for specific SerDes lanes (can be disabled with the "no_txswap" option).

10.3.2 ATCA-7470

The ATCA-7470 blade requires the following settings which are covered by the fabconfig tool:

- The Driver/PreDriver current of the SerDes transmitters needs to be adjusted.
The Switching and Routing stackware (SRstackware) is a protocol suite bundled along with BBS as an installable package on the ATCA blade systems. SRstackware Release 2.1 provides features to perform ATCA-F140 switch configuration and checks the statistics in addition to the protocol stack support. SRstackware Release 2.1 supports the following features and protocols:

- IEEE 802.1p and IEEE 802.1q VLAN and bridge configuration, IEEE 802.1d - Spanning Tree Protocol (STP)
- IEEE 802.1w - Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s - Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- Class of Service (CoS) and Quality of Service (QoS)
- IGMP Snooping, IGMPv3 Protocol (IGMP)
- Open Shortest Path First version 2 (OSPFv2)
- Static routing
- IEEE 802.1q GVRP, GMRP, GARP protocols
- Q-in-Q or VLAN Stacking
- Virtual Router Redundancy Protocol (VRRP)
- Router Information Protocol (RIPv2)
- Bidirectional Forwarding Detection (BFD)
- Optical RTM
- Simple Network Management Protocol (SNMP)
- Linux OS version Wind River PNE 3.0 support with Broadcom BCM SDK 5.10.2
- ATCA-F140 switching blade

11.1 Configuring SRstackware

SRstackware, after installation, comes up with the default configuration. You can update the configuration using CLI. Refer Appendix C, Related Documentation, for the list of CLI documents.
SRstackware

You can reconfigure the ports connected to the Broadcom Trident 40G - fabric switch using the Trident Reconfiguration Utility. For more information, see Chapter 9, Trident Reconfiguration Utility on page 129.

Use the Trident Reconfiguration Utility (trid-cfg), only if you want to deviate from the default fabric configurations on the 1440, 14-100, 14-400, 640, and 640-C04 chassis.

11.2 Default Configuration

The SRstackware default configuration creates two bridges, one for the base network and another for the fabric network. The switch ports are named as ge# for the 1G switch ports and xe# for the 10G/40G switch ports. These switch ports are accessible using the SRstackware CLI.

The base channel and fabric channel are configured as two bridges, with the corresponding VLAN ports associated to each bridge. You can modify the configuration using the SRstackware CLI and store it as default configuration. The default configuration file is saved at /etc/opt/srstackware/config/srs.<slot#>.cfg. During first boot based on the chassis type, slot number, active_cfg file, SRstackware init scripts will pick the default configuration file.

/etc/opt/srstackware/config/srs.<chassis>.<slot#>.cfg and copy in place of /etc/opt/srstackware/config/srs.<slot#>.cfg.

Chassis types:
14400: 14 slots chassis with 4 hub blades.
14100: 14 slots chassis with 2 hub blades.
1440: 14 slot chassis (1440,4440), with 2 hub blades.
640: 6 slots chassis (640), with 2 hub blades.
640-C04: 6 slots chassis (640-C04), with 2 hub blades. With Different Physical Logical Slot Mapping

By default, the SRstackware does not enable any protocol on the ports.

The following sub sections lists the switch ports and associated VLANs. The VLAN configuration depends on whether ATCA-F140 is placed in slot 1 or 2.

The default configuration of SRstackware is similar to the configuration of the Centellis BBS release, with minor differences.
### 11.2.1 1440 and 14-100 SLOT1 Configuration

**Base Channel**

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN(s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge1</td>
<td>ge0</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC3</td>
<td>21(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge2</td>
<td>ge1</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC4</td>
<td>21(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge3</td>
<td>ge2</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC5</td>
<td>21(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge4</td>
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## 11.2.2 1440 and 14-100 SLOT2 Configuration

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## 11.2.3 14-400 SLOT1 Configuration

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### VLAN Configuration

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### 11.2.4 14-400 SLOT2 Configuration

**Base Channel**

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### 11.2.5 14-400 SLOT3 Configuration

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Fabric Configuration

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11.2.6 14-400 SLOT4 Configuration

**Base Channel**

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<td>ge2</td>
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<td>-</td>
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<td>ge8</td>
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<td>BIX-RTM</td>
<td>93(u)</td>
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<td>XAUI</td>
<td>BIX-RTM</td>
<td>93(u)</td>
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<td>BIX-RTM</td>
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### Fabric Configuration

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<th>Interface description</th>
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## VLAN Configuration

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<th>Untagged ports</th>
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## 11.2.7 640 SLOT1 Configuration

**NOTICE**

On a 640 chassis with single ATCA-F140, it is recommended to place the Hub-blade in SLOT2. In such configuration, SLOT1 can be used for placing a payload blade.

### Base Channel

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM interface name</th>
<th>Interface description</th>
<th>Destination</th>
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<th>Default Enabled</th>
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### Interface Table

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### Fabric Channel Table

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### VLAN Configuration

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### 11.2.8 640 SLOT2 Configuration

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## Interface Description

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## Fabric Channel

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### VLAN Configuration

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# 11.2.9 640-C04 SLOT1 Configuration

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**Fabric Channel**

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<td>none</td>
<td>ge21, ge22, ge23, ge24, xe1, xe2, xe3, xe4</td>
</tr>
</tbody>
</table>
### 11.2.10 640-C04 SLOT2 Configuration

#### Base Channel

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM Interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN(s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge1</td>
<td>ge0</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC3</td>
<td>22(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge2</td>
<td>ge1</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC4</td>
<td>22(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge3</td>
<td>ge2</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC5</td>
<td>22(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge4</td>
<td>ge3</td>
<td>1000Base-T</td>
<td>BIX - Backplane BC6</td>
<td>22(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge5</td>
<td>ge4</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge6</td>
<td>ge5</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge7</td>
<td>ge6</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge8</td>
<td>ge7</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge9</td>
<td>ge8</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge10</td>
<td>ge9</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge11</td>
<td>ge10</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge12</td>
<td>ge11</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge13</td>
<td>ge12</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge14</td>
<td>ge13</td>
<td>1000Base-T</td>
<td>Not Connected</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ge15</td>
<td>ge14</td>
<td>10/100B-T</td>
<td>BIX - BC 1A</td>
<td>24(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge16</td>
<td>ge15</td>
<td>10/100B-T</td>
<td>BIX - BC 1B</td>
<td>24(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge17</td>
<td>ge16</td>
<td>1000Base-T</td>
<td>BIX - X-Connect BC 2</td>
<td>21(t), 22(t)</td>
<td>NO</td>
</tr>
<tr>
<td>ge18</td>
<td>ge17</td>
<td>SERDES</td>
<td>BIX - PrAMC/P0</td>
<td>22(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge19</td>
<td>ge18</td>
<td>SGMII</td>
<td>BIX - UC-0/1 X-Connect PrAMC</td>
<td>22(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge20</td>
<td>ge19</td>
<td>SGMII</td>
<td>Clock TopSync or RTM</td>
<td>22(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge21</td>
<td>ge20</td>
<td>SGMII</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge22</td>
<td>ge21</td>
<td>SGMII</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge23</td>
<td>ge22</td>
<td>SGMII</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
</tbody>
</table>
## SRstackware

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM Interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN(s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge24</td>
<td>ge23</td>
<td>SGMII</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe1</td>
<td>xe0</td>
<td>XAUI</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe2</td>
<td>xe1</td>
<td>XAUI</td>
<td>BIX-RTM</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe3</td>
<td>xe2</td>
<td>XAUI</td>
<td>BIX- FP SFP+</td>
<td>94(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe4</td>
<td>xe3</td>
<td>XAUI</td>
<td>BIX- FP SFP+</td>
<td>94(u)</td>
<td>NO</td>
</tr>
</tbody>
</table>

### Fabric Channel

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM Interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN(s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe5</td>
<td>xe0</td>
<td>40GBase-KR4</td>
<td>FIX -Backplane FC2</td>
<td>12(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe9</td>
<td>xe1</td>
<td>40GBase-KR4</td>
<td>FIX - Backplane FC3</td>
<td>12(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe13</td>
<td>xe2</td>
<td>40GBase-KR4</td>
<td>FIX - Backplane FC4</td>
<td>12(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe17</td>
<td>xe3</td>
<td>40GBase-KR4</td>
<td>FIX - Backplane FC5</td>
<td>12(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe21</td>
<td>xe4</td>
<td>XLAUI</td>
<td>FIX-RTM QSFP+ ETH7</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe25</td>
<td>xe5</td>
<td>XFI</td>
<td>FIX-RTM SFP+ ETH6</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe26</td>
<td>xe6</td>
<td>XFI</td>
<td>FIX-RTM SFP+ ETH5</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe27</td>
<td>xe7</td>
<td>XFI</td>
<td>FIX-RTM SFP+ ETH4</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe28</td>
<td>xe8</td>
<td>XFI</td>
<td>FIX-RTM SFP+ ETH3</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe29</td>
<td>xe9</td>
<td>XLAUI</td>
<td>FIX-Fabric Front ETH1 QSFP+</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>xe33</td>
<td>xe10</td>
<td>XLAUI</td>
<td>FIX-Fabric Front ETH2 QSFP+</td>
<td>92(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge25</td>
<td>ge0</td>
<td>1G-SGMII</td>
<td>FIX - Logical Slot 15 or TopSync</td>
<td>12(u)</td>
<td>NO</td>
</tr>
<tr>
<td>ge26</td>
<td>ge1</td>
<td>1G-SGMII</td>
<td>FIX - Logical Slot 16 or X-connect FC1</td>
<td>11(t), 12(t)</td>
<td>NO</td>
</tr>
<tr>
<td>ge27</td>
<td>ge2</td>
<td>1G-SGMII</td>
<td>FIX-UC [3/4]</td>
<td>12(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge28</td>
<td>ge3</td>
<td>SerDes</td>
<td>FIX - AMC Port 1</td>
<td>12(u)</td>
<td>YES</td>
</tr>
</tbody>
</table>
## VLAN Configuration

<table>
<thead>
<tr>
<th>VLAN ID</th>
<th>Description</th>
<th>Tagged ports</th>
<th>Untagged ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Fabric Interface-2</td>
<td>ge26</td>
<td>none</td>
</tr>
<tr>
<td>12</td>
<td>Fabric Interface-1</td>
<td>ge26</td>
<td>xe5, xe9, xe13, xe17, ge25, ge27, ge28</td>
</tr>
<tr>
<td>92</td>
<td>Fabric RTM 1</td>
<td>none</td>
<td>xe21, xe25, xe26, xe27, xe28, xe29, xe33</td>
</tr>
<tr>
<td>21</td>
<td>Base Interface-1</td>
<td>ge17</td>
<td>none</td>
</tr>
<tr>
<td>22</td>
<td>Base Interface-2</td>
<td>ge17</td>
<td>ge1, ge2, ge3, ge4, ge18, ge19, ge20</td>
</tr>
<tr>
<td>24</td>
<td>Base Interface-3</td>
<td>none</td>
<td>ge15, ge16</td>
</tr>
<tr>
<td>94</td>
<td>Base RTM 1</td>
<td>none</td>
<td>ge21, ge22, ge23, ge24, xe1, xe2, xe3, xe4</td>
</tr>
</tbody>
</table>
11.3 Additional Configuration

The chassis with the SHM1500 shelf manager needs additional configuration, along with the generic default configuration of VLANs for ATCA-F140. This configuration is automatically done after identifying the chassis during startup.

The following sub sections detail the additional configuration information.

11.3.1 SLOT1 Configuration

Base Channel

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM Interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN (s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge15</td>
<td>ge0</td>
<td>10/100B-T</td>
<td>BIX - BC 1A</td>
<td>24(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge16</td>
<td>ge1</td>
<td>10/100B-T</td>
<td>BIX - BC 1A</td>
<td>24(u)</td>
<td>YES</td>
</tr>
</tbody>
</table>

VLAN Configuration

<table>
<thead>
<tr>
<th>VLAN ID</th>
<th>Description</th>
<th>Tagged ports</th>
<th>Untagged ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Shelf Management</td>
<td></td>
<td>ge15, ge16</td>
</tr>
</tbody>
</table>

Also vlan1.24 is assigned with the IP address 192.168.24.1/24.

11.3.2 SLOT2 Configuration

Base Channel

<table>
<thead>
<tr>
<th>Interface name</th>
<th>BCM Interface name</th>
<th>Interface description</th>
<th>Destination</th>
<th>VLAN(s) assigned</th>
<th>Default Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge15</td>
<td>ge0</td>
<td>10/100B-T</td>
<td>BIX - BC 1A</td>
<td>24(u)</td>
<td>YES</td>
</tr>
<tr>
<td>ge16</td>
<td>ge1</td>
<td>10/100B-T</td>
<td>BIX - BC 1A</td>
<td>24(u)</td>
<td>YES</td>
</tr>
</tbody>
</table>

VLAN Configuration

<table>
<thead>
<tr>
<th>VLAN ID</th>
<th>Description</th>
<th>Tagged ports</th>
<th>Untagged ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Shelf Management</td>
<td></td>
<td>ge15, ge16</td>
</tr>
</tbody>
</table>

Also Vlan1.24 is assigned with the IP address 192.168.24.2/24.
### 11.3.3 Mapping Physical RTM Interfaces to SRstackware Ports

Default Switch Configuration Examples.

**Table 11-1  Mapping Physical RTM Interfaces to SRstackware Ports**

<table>
<thead>
<tr>
<th>Physical Interface</th>
<th>SRstackware Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETH8</td>
<td>ge21</td>
</tr>
<tr>
<td>ETH9</td>
<td>ge22</td>
</tr>
<tr>
<td>ETH10</td>
<td>ge23</td>
</tr>
<tr>
<td>ETH11</td>
<td>ge24</td>
</tr>
<tr>
<td>ETH1</td>
<td>xe1</td>
</tr>
<tr>
<td>ETH2</td>
<td>xe2</td>
</tr>
<tr>
<td>ETH7</td>
<td>xe53</td>
</tr>
<tr>
<td>ETH6</td>
<td>xe57</td>
</tr>
<tr>
<td>ETH5</td>
<td>xe58</td>
</tr>
<tr>
<td>ETH4</td>
<td>xe59</td>
</tr>
<tr>
<td>ETH3</td>
<td>xe60</td>
</tr>
</tbody>
</table>
11.3.4 ATCA-F140 Switch Configuration Examples

The following figures show the VLAN configuration of the blade.

*Figure 11-1 ATCA-F140 Switch Management Fabric Interface Bridge Configuration*

**NOTE:** The Fabric interface name of PrAMC-7311 varies with the type of Linux flavor installed. For Ubuntu it is eth3 and for Wind River and RedHat/CentOS it is eth2.
NOTE: The Base2 interface name of PrAMC-7311 varies with the type of Linux flavor installed. For Ubuntu it is eth2 and for Wind River and RedHat/CentOS it is eth3. This configuration is applicable for AMC7311.
**NOTE:** The Fabric interface name of PrAMC-7311 varies with the type of Linux flavor installed. For Ubuntu it is eth3 and for Wind River and RedHat/CentOS it is eth2.

### 11.4 Custom Configuration

You can customize SRstackware after starting the SRstackware CLI using the following steps:

1. Login as root at the ATCA-F140 console or using the SSH session.
2. Run `/opt/srstackware/bin/imish`. 
A sample output of the above steps is shown below.

```
root@Slot-1_f140:/opt/srstackware/bin> ./imish
ZebOS version 7.6.1.e0 IPIRouter 07/14/08 22:33:20
Slot-1_f140> enable
Slot-1_f140# show interface
```

### 11.4.1 Enabling Protocols

You can enable protocols on the base or fabric switch port of ATCA-F140. By default, the protocols are disabled. The base and fabric switch ports are associated with two bridges, bridge 1 and bridge 2 that are configured by default. You can enable any protocol on these bridges and enable the respective interfaces for the protocol to function properly on the bridge. Even though STP is enabled on these bridges they are administratively down on the interfaces.

In case a bridge is removed from an interface, all the default configurations associated to that interface are also removed. You need to enable the desired VLANs and protocols on those interfaces.

It is not advisable to connect the base and fabric channel ports.

### 11.4.2 Enabling RTM ports

The SRstackware default configuration disables the base and fabric RTM ports, with STP protocol disabled. You can enable the desired ports and configure to avoid any looping.

### 11.4.3 Sample Configurations

This section provides a quick reference to the sequence of CLI commands for enabling protocols on the RTM ports or back plane ports.

- To check if the link at `ge17` interface is up or down:
  ```
  root@Slot-1_f140:/opt/srstackware/bin> ./imish
  ZebOS version 7.6.1.e0 IPIRouter 11/09/10 07:31:33
  Slot-1_f140> enable
  Slot-1_f140# show interface ge17
  Interface ge17
  Hardware is Ethernet
  Current HW addr: 00fd.96bf.0013
  Physical:00fd.96bf.0013
  Description: BC2-XLink
  ```
index 5017 metric 1 mtu 1500 duplex-full arp ageing timeout 0
<UP, BROADCAST, RUNNING, MULTICAST>
VRF Binding: Not bound
Bandwidth 1g
VRRP Master of: VRRP is not configured on this interface.
    input packets 075743, bytes 04850346, dropped 03, multicast packets 014
    output packets 011, bytes 02266, multicast packets 06 broadcast packets 075732
In the above sample output, UP in the following line indicates that the interface is administratively up, whereas RUNNING indicates that the interface link is operationally up.
<UP, BROADCAST, RUNNING, MULTICAST>
In case the link is operationally down, the sample output contains the following line.
<UP, BROADCAST, MULTICAST>

- To show all the interfaces (switch ports):
  root@Slot-1_f140:/opt/srstackware/bin> ./imish
  ZebOS version 7.6.1 IPIRouter 11/09/10 07:31:33
  Slot-1_f140>enable
  Slot-1_f140#conf t
  Enter configuration commands, one per line. End with CNTL/Z.
  Slot-1_f140(config)#bridge 2 protocol ieee
  Slot-1_f140(config)#

- To configure a bridge with STP enabled on it:
  root@Slot-1_f140:/opt/srstackware/bin> ./imish
  ZebOS version 7.6.1 IPIRouter 11/09/10 07:31:33
  Slot-1_f140>enable
  Slot-1_f140#conf t
  Enter configuration commands, one per line. End with CNTL/Z.
  Slot-1_f140(config)#bridge 2 protocol ieee
  Slot-1_f140(config)#

- To configure a VLAN and associate it to a bridge:
  root@Slot-1_f140:/opt/srstackware/bin> ./imish
  ZebOS version 7.6.1 IPIRouter 11/09/10 07:31:33
Slot-1_f140>**enable**
Slot-1_f140#**conf t**
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#**bridge 2 protocol ieee vlan-bridge**
Slot-1_f140(config)#**vlan database**
Slot-1_f140(config-vlan)#**vlan 23 bridge 1 name VLAN23 state enable**
You can use the following command to configure the VLAN, with intervlan routing enabled:
Slot-1_f140(config-vlan)#**vlan 23 bridge 1 name VLAN23 state enable intervlan-route enable**

- **To associate the VLAN 23** (mentioned in the above sample) to a switch port:
  ```
  root@Slot-1_f140:/opt/srstackware/bin> ./imish
  ZebOS version 7.6.1 IPIRouter 11/09/10 07:31:33
  Slot-1_f140>**enable**
  Slot-1_f140#**conf t**
  Enter configuration commands, one per line. End with CNTL/Z.
  Slot-1_f140(config)#**interface ge17**
  Slot-1_f140(config-if)#**switchport mode access**
  Slot-1_f140(config-if)#**switchport access vlan 23**
  ```

- **To enable STP on Base Port:**
  Bridge level configuration
  
  - Create a bridge, if required. (By default, the bridges are created as a part of the default configuration.) In case, the interface has to be associated to the VLAN, tag it with `vlan-bridge` (as mentioned in the code below), while creating the bridge.
  
  - Enable the L2 protocol, such as STP, RSTP, or MSTP on the bridge.
  
  Interface level configuration
  
  - Associate the interface with the bridge, it automatically enables the corresponding protocol of the bridge.
  
  - Associate the interface to the VLAN.
Slot-1_f140#
Slot-1_f140#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.

/*** Associate STP to bridge-1 ***/
Slot-1_f140(config)#bridge 1 protocol ieee vlan-bridge

/* Go to interface mode */
Slot-1_f140(config)#interface ge21

/* Remove bridge so that STP can be enabled */
Slot-1_f140(config-if)# no bridge-group 1

/* Enables STP on the interface */
Slot-1_f140(config-if)# bridge-group 1

/* Re-configure the necessary VLANs; because VLANs disappear if bridge is removed */
Slot-1_f140(config-if)# switchport mode hybrid
Slot-1_f140(config-if)# switchport hybrid vlan 93
Slot-1_f140(config-if)# switchport mode hybrid acceptable-frame-type all
Slot-1_f140(config-if)# switchport hybrid allowed vlan add 93 egress-tagged disable

/* Enable the interface */
Slot-1_f140(config-if)# no shutdown
Slot-1_f140(config-if)# exit

- To enable RSTP on the base RTM port 1:
  Configuring RSTP is similar to configuring STP as mentioned in the above section, To enable STP on the base RTM port 1. To configure RSTP replace ieee with rstp, as in the following code.

/* Associate RSTP to bridge-1 */
Slot-1_f140(config)# bridge 1 protocol rstp vlan-bridge
To enable MSTP on the fabric RTM port 1:

```
root@Slot-1_f140:/opt/srstackware/bin> ./imish
ZebOS version 7.6.1 IPIRouter 11/09/10 07:31:33
Slot-1_f140>enable
Slot-1_f140#
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#bridge 2 protocol mstp
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)# bridge-group 2
Slot-1_f140(config-if)#no shutdown
```

LACP related configuration

Enable LACP on two base RTM ports as per the following topology.

```
| Payload          | 1Gig | ATCA-F140 | RTM 1Gig | Host/switch |
```

Only bandwidth, duplex value, vlan, and bridge configuration are propagated to the aggregator port from the first member port. All other desired configuration should be done on the aggregator port (po#/sa#) itself.

Following are the assumptions while configuring channel-group or static-channel-group on a set of ports in different modes:

- LACP (channel-group) in auto-negotiation mode
  When the first port is up while adding to aggregator, the aggregator assumes that these are the master port properties. While adding second port onwards to the aggregator, the bandwidth and duplex have to be same as the first port added to aggregator. This requires that the ports have to be linked up and auto-negotiated properly to match the first port values. To avoid the above situation, all the ports should be added to aggregator in shutdown state. After adding all the ports, bring up the aggregator port using no shutdown CLI.
-- LACP (channel-group) in manually configured duplex mode
   All the member ports should match the first port's manual configuration.

-- Static-channel-group in manually configured duplex mode or in auto-negotiation mode
   All the member ports should be administratively up and in operationally running state and all the member ports should match the first port's configuration.

The following example explains how to configure VLAN 93 in the trunk mode for the interfaces `ge21` and `ge22`, aggregate them, and configure source IP based load balancing on the aggregator.

This example assumes that VLAN 93 is configured on the interface connected to the payload. Note that the payload side interface settings are not mentioned here.

```
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport trunk allowed vlan add 93
Slot-1_f140(config-if)#switchport trunk native vlan 93
Slot-1_f140(config-if)#channel-group 2 mode active
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface ge22
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport trunk allowed vlan add 93
Slot-1_f140(config-if)#switchport trunk native vlan 93
Slot-1_f140(config-if)#channel-group 2 mode active
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface po2
Slot-1_f140(config-if)#port-channel load-balance src-ip
```

In the above code, interface `po2` is the aggregated interface of `ge21` and `ge22`. You can use multiple traffic streams to test the load balancing.

The configuration of normal or enhanced load balanced algorithm can be performed only at chipset level.
Save the aggregator configuration only when the aggregator is functionally up, in sync and running. This is very important to have the configuration to be persistent.

- To set the IP address to an interface:
  
  ```
  Slot-1_f140(config)#interface ge21
  Slot-1_f140(config-if)#no switchport
  Slot-1_f140(config-if)#ip address 11.11.11.1/24
  Slot-1_f140(config-if)#exit
  ```

- QoS related configuration:
  
  - To enable QoS with strict priority:
    ```
    Slot-1_f140>enable
    Slot-1_f140#conf t
    ```
    Enter configuration commands, one per line. End with CNTL/Z.
    ```
    Slot-1_f140(config)#mls qos 0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7
    ```

  To assign the value 7 to DSCP in the IP header, for source IP address 11.11.11.11 going through ge17.

  ```
  Slot-1_f140(config)#ip-access-list 1 permit 11.11.11.11 0.0.0.255
  Slot-1_f140(config)#class-map cmap1
  Slot-1_f140(config-cmap)#match access-group 1
  Slot-1_f140(config-cmap)#exit
  Slot-1_f140(config)#policy-map pmap1
  Slot-1_f140(config-pmap)#class cmap1
  Slot-1_f140(config-pmap-c)#set ip-dscp 7
  Slot-1_f140(config-pmap-c)#exit
  ```
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Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#service-policy input pmap1
Slot-1_f140(config-if)#exit

To block the packets with source IP address 11.11.11.11 going through ge21:
Slot-1_f140(config)#ip-access-list 1  deny 11.11.11.11 0.0.0.255
Slot-1_f140(config)#class-map cmap1
Slot-1_f140(config-cmap)#match access-group 1
Slot-1_f140(config-cmap)#exit
Slot-1_f140(config)#policy-map pmap1
Slot-1_f140(config-pmap)#class cmap1
Slot-1_f140(config-pmap-c)#exit
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#service-policy input pmap1
Slot-1_f140(config-if)#exit

To set the COS value for an ingress packet:
SLOT2-f140>
SLOT2-f140>enable
SLOT2-f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
SLOT2-f140(config)#bridge 1 protocol ieee vlan-bridge
SLOT2-f140(config)#vlan database
SLOT2-f140(config-vlan)#vlan 2 bridge 1 state enable
SLOT2-f140(config-vlan)#exit
SLOT2-f140(config)#interface ge21
SLOT2-f140(config-if)#shutdown
SLOT2-f140(config-if)#bridge-group 1 spanning-tree disable
SLOT2-f140(config-if)#switchport mode trunk
SLOT2-f140(config-if)#switchport trunk allowed vlan add 2
SLOT2-f140(config-if)#no shutdown
SLOT2-f140(config-if)#exit
SLOT2-f140(config)#mls qos 0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7
SLOT2-f140(config)#class-map cmap1
SLOT2-f140(config-cmap)#match vlan 2
SLOT2-f140(config-cmap)#exit
SLOT2-f140(config)#policy-map pmap1
SLOT2-f140(config-pmap)#class cmap1
SLOT2-f140(config-pmap-c)#set cos 6
SLOT2-f140(config-pmap-c)#exit
SLOT2-f140(config-pmap)#exit
SLOT2-f140(config)#interface ge21
SLOT2-f140(config-if)#service-policy input pmap1
SLOT2-f140(config-if)#

To block the packets with source MAC address 00:04:5A:46:98:FF going through ge21.

Slot-1_f140(config)#mac-access-list 2002 deny 0004.5a46.98ff 0000.0000.ffff any 2
Slot-1_f140(config)#class-map cmap1
Slot-1_f140(config-cmap)#match access-group 2002
Slot-1_f140(config-cmap)#exit
Slot-1_f140(config)#policy-map pmap1
Slot-1_f140(config-pmap)#class cmap1
Slot-1_f140(config-pmap-c)#exit
Slot-1_f140(config-pmap)#exit
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#service-policy input pmap1
Slot-1_f140(config-if)#exit
IGMP related configuration:
Enable IGMP snooping on two base RTM ports using the following topology.

To enable IGMP snooping on the ge21 and ge22 interfaces:
```
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Slot-1_f140(config)#bridge 1 protocol ieee vlan-bridge
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#bridge-group 1
Slot-1_f140(config-if)#switchport mode access
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface ge22
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#bridge-group 1
Slot-1_f140(config-if)#switchport mode access
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface ge23
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#bridge-group 1
```
Slot-1_f140(config-if)#switchport mode access
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#ip igmp snooping
Slot-1_f140(config)#interface vlan1.1
Slot-1_f140(config-if)#ip igmp snooping mrouter interface ge23

To enable IGMP proxy on the base RTM ports with the following topology.

To enable IGMP proxy on ge21, ge22, and ge23 interfaces.
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.168.3.1/24
Slot-1_f140(config-if)#ip igmp proxy-service
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface ge22
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#no switchport
To enable static routing within the following topology.

On the payload blade:
ifconfig fabric0 192.1.1.1/24
route add -net 192.1.2.0/24 gw 192.1.1.2 dev fabric0.5
Slot-1_f140>en
Slot-1_f140#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Slot-1_f140(config)#interface xe10
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.1.2/24
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.2.2/24
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#ip forwarding
Slot-2_f140>en
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface xe21
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.2.1/24
Slot-1_f140(config-if)#no shutdown
Slot-2_f140(config-if)#exit
Slot-2_f140(config)#ip route 192.1.1.0/24 192.1.2.2

To enable static routing through VLAN interfaces within the following topology.

On the payload blade:

vconfig add fabric0 5
ifconfig fabric0.5 192.1.1.1/24
route add -net 192.1.2.0/24 gw 192.1.1.2 dev fabric0.5

On Slot 7:
Create VLAN 5 and 6, with intervlan routing enabled, and associate it to Bridge 2.
/** If static routing through VLANs has to be done through ports of two fabric chip sets, then these VLANs should be added on hi-gig using "vlan <vlan-id> hi-gig". **/
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface xe10
Slot-1_f140(config-if)#bridge-group 2 spanning-tree disable
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport trunk allowed vlan add 5
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface vlan2.5
Slot-1_f140(config-if)#ip address 192.1.1.2/24
Slot-1_f140(config-if)#no shutdown
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Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)#bridge-group 2 spanning-tree disable
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport trunk allowed vlan add 6
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface vlan2.6
Slot-1_f140(config-if)#ip address 192.1.2.2/24
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#ip forwarding

On Slot 8:
Create VLAN 6, with intervlan routing enabled, and associate it to Bridge 2.
Slot-2_f140>enable
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface xe21
Slot-2_f140(config-if)#bridge-group 2 spanning-tree disable
Slot-2_f140(config-if)#switchport mode trunk
Slot-2_f140(config-if)#switchport trunk allowed vlan add 6
Slot-2_f140(config-if)#no shutdown
Slot-2_f140(config-if)#exit
Slot-2_f140(config)#interface vlan2.6
Slot-2_f140(config-if)#ip address 192.1.2.1/24
Slot-1_f140(config-if)#no shutdown
Slot-2_f140(config-if)#exit
Slot-2_f140(config)#ip route 192.1.1.0/24 192.1.2.2

To enable Q-in-Q (VLAN stacking) on the ATCA-F140 with the following topology.
To enable VLAN Classification based on Source IP network with the following topology.

```
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#bridge 2 protocol ieee vlan-bridge
Slot-1_f140(config)#vlan database
Slot-1_f140(config-vlan)#vlan 5 bridge 2 state enable
Slot-1_f140(config-vlan)#exit
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#bridge-group 2
Slot-1_f140(config-if)#switchport mode access
Slot-1_f140(config-if)#switchport vlan-stacking customer-edge-port
Slot-1_f140(config-if)#switchport access vlan 5
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface xe22
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#bridge-group 2
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport mode trunk allowed vlan add 5
Slot-1_f140(config-if)#switchport vlan-stacking provider-port
Slot-1_f140(config-if)#exit
```
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Slot-1_f140(config-vlan)#exit
Slot-1_f140(config)# vlan classifier rule 2 ipv4 192.168.10.0/24 vlan 5
Slot-1_f140(config)# vlan classifier group 10 add rule 2
Slot-1_f140(config)#interface xe10
Slot-1_f140(config-if)#bridge-group 2
Slot-1_f140(config-if)#switchport mode trunk
Slot-1_f140(config-if)#switchport trunk allowed vlan add 5
Slot-1_f140(config-if)# vlan classifier rule 2 ipv4 192.168.10.0/24 vlan 5
Slot-1_f140(config-if)#no shutdown

- **OSPF related configuration:**
  Enable OSPF on the two ATCA-F140s using the following topology.

![OSPF Configuration Diagram]

Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface ge21
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.1.1/24
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#router ospf 1
Slot-1_f140(config-router)#network 192.1.1.0/24 area 1.1.1.1
Slot-2_f140>enable
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface ge21
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.1.2/24
Slot-2_f140(config-if)#exit
Slot-2-f140(config)#router ospf 1
Slot-2-f140(config-router)#network 192.1.1.0/24 area 1.1.1.1

- RIP related configuration:
  To enable RIP on the two ATCA-F140s with the following topology.

Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface ge26
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.1.1/24
Slot-1_f140(config-if)#exit
Slot-1-f140(config)#router rip
Slot-1-f140(config-router)#network 192.1.1.0/24
Slot-2_f140>enable
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface ge26
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.1.2/24
Slot-2_f140(config-if)#exit
Slot-2-f140(config)#router rip
Slot-2-f140(config-router)#network 192.1.1.0/24
VRRP related configuration
To enable VRRP on the following topology.

On Host 1:
ifconfig eth0 192.1.1.3/24
route add -net 192.1.2.0/24 gw 192.1.1.1 dev eth0

On Host 2:
ifconfig eth0 192.1.2.3/24
route add -net 192.1.1.0/24 gw 192.1.2.1 dev eth0

On ATCA-F140 Slot 7:
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.1.1/24
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#interface xe22
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.2.1/24
Slot-1_f140(config-if)#no shutdown
Slot-1_f140(config-if)#exit
Slot-1_f140(config)#router vrrp 1 xe21
Slot-1_f140(config-router)# virtual-ip 192.1.1.1 master
Slot-1_f140(config-router)# enable
Slot-1_f140(config-router)# exit
Slot-1_f140(config)#ip forwarding

On ATCA-F140 Slot 8:
Slot-2_f140>enable
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface xe21
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.1.2/24
Slot-2_f140(config-if)#no shutdown
Slot-2_f140(config-if)#exit
Slot-2_f140(config)#interface xe22
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.2.2/24
Slot-2_f140(config-if)#no shutdown
Slot-2_f140(config-if)#exit
Slot-2_f140(config)#router vrrp 1 xe21
Slot-2_f140(config-router)# virtual-ip 192.1.1.1 backup
Slot-2_f140(config-router)# enable
Slot-2_f140(config-router)# exit
Slot-2_f140(config)#ip forwarding

With the above configuration:
  – the xe21 interface of ATCA-F140 Slot 7 should be elected as master.
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- the xe21 interface of ATCA-F140 Slot 8 should recognize itself as backup.
- Host 1 should be able to ping Host 2 through xe21, xe22 of ATCA-F140 Slot 7.

You can shut down xe21 of ATCA-F140 Slot 7 to verify whether the VRRP backup router is taking up the role of Master, when the actual is down.

```
Slot-1_f140(config)#interface xe21
Slot-1_f140(config-if)#shutdown
Slot-1_f140(config-if)#exit
```

Change the route to network 192.1.1.0/24 at Host 2, to go via 192.1.2.2 gateway, instead of 192.1.2.1 gateway.

```
route add -net 192.1.1.0/24 gw 192.1.2.2 dev eth0
```

With this configuration:
- the link of xe21 on ATCA-F140 Slot 7, should be down.
- the xe21 interface of ATCA-F140 Slot 8, should elect itself as Master now.
- Host 1 should be able to ping Host 2 through xe21, xe22 of ATCA-F140 Slot 8.

- RIPng related configuration:
To enable RIPng on the two ATCA-F140s with the following topology:

```
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface ge26
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ipv6 address fec0:0:0:c400::21/54
Slot-1_f140(config-if)#ipv6 router rip
Slot-1_f140(config-if)#exit
Slot-1-f140(config)#router ipv6 rip
Slot-2_f140>enable
```
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface ge26
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ipv6 address fec0:0:0:c400::22/54
Slot-2_f140(config-if)#ipv6 router rip
Slot-2_f140(config-if)#exit
Slot-2-f140(config)#router ipv6 rip

- **BFD related configuration:**
  To enable BFD on the two ATCA-F140s with the following topology:

  ![ATCA-F140 Topology](image)

Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140(config)#interface ge26
Slot-1_f140(config-if)#no switchport
Slot-1_f140(config-if)#ip address 192.1.1.1/24
Slot-1_f140(config-if)#bfd interval 1000 minRx 1000 multiplier 3 sipv4 192.1.1.1 dipv4 192.1.1.2
Slot-2_f140>enable
Slot-2_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-2_f140(config)#interface ge26
Slot-2_f140(config-if)#no switchport
Slot-2_f140(config-if)#ip address 192.1.1.2/24
Slot-2_f140(config-if)#bfd interval 1000 minRx 1000 multiplier 3 sipv4 192.1.1.2 dipv4 192.1.1.1
Slot-2_f140(config-if)#exit
Slot-2-f140(config)#router ipv6 rip
Slot-2_f140#end
Slot-2_f140#bfd show
11.5 SNMP Usage Guidelines

For Bridge-based MIBs, the context parameter of the snmp commands (snmpget/snmpset/snmpwalk) is used to specify the bridge_number and the details of the corresponding bridge are processed.

The string Bridge to be specified with the context parameter is case-sensitive.

The exact string to be used in the command can be obtained by doing a snmpwalk on the object "srsBridgeName" which is a proprietary mib-object provided by SRstackware.

In case of F140,"Bridge1" represents Base switch and "Bridge2" represents Fabric switch.

Example of an snmp command:
```
snmpget -v3 -u admin -n "Bridge1" -l noAuthNoPriv -a MD5 -A adminpwd123 localhost dot1dBaseBridgeAddress.0
```

Here, the option 'n' is used to specify the context. The above command will return the MAC address used by this bridge when it must be referred to in a unique fashion.

For the mibs that do not distinguish based on the bridge, needs to be run with null context (that is -n "") or the context option can be entirely removed from the snmp command.

- BRIDGE MIB
- P-BRIDGE MIB
- Q-BRIDGE MIB
- RSTP MIB

The following are the mibs, currently supported, that do not need any context to be specified:

- OSPF MIB
- RIP MIB
- IF MIB
- IEEE8023-LAG-MIB
- SRS MIB (SMART EC Proprietary MIB)
11.6 SNMP Traps Usage Guidelines

SNMP traps and SNMP Inform requests are the two SNMP notifications supported with SRstackware package. The following sections detail the configurations to be made at SNMP agent and manager in order to facilitate these notifications.

11.6.1 Configuring Agent to Send SNMP Notifications

Description

In order to configure SRstackware to send SNMP traps and Inform requests, a shell command has been provided as part of SRstackware package.

This shell command has the following syntax.

**Synopsis**

```
#srs_trap_config <IPv4 Address> <NONE/TRAP/INFORM>
```

**Parameters**

- **NONE**
  
  Neither SNMP traps nor Inform requests are sent to the SNMP manager running on the machine with IPv4 Address.

- **TRAP**
  
  Trap messages are sent to SNMP manager running on the machine with IPv4 Address.

- **INFORM**
  
  SNMP Inform requests are sent to SNMP manager running on the machine with IPv4 Address.

**Example**

In order to send traps to a system with IP address 10.10.10.10, run the command at the agent as follows:

```
#srs_trap_config 10.10.10.10 TRAP
```

Please note that the parameters **NONE**, **TRAP**, and **INFORM** are case sensitive.
11.6.2 Configuring SNMP Manager to Receive SNMP Notifications

Description

The snmptrapd daemon needs to be run at the receiver to receive the SNMP notifications sent by the agent. Also snmptrapd needs a configuration file with proper configuration in order to receive the traps properly. The snmptrapd configuration file must have the below syntax.

Synopsis

createUser -e <Agent's Engine-ID> admin MD5 adminpwd123 DES
authUser log,execute admin

Parameters

Agent's Engine-ID

The Engine-ID with which SNMP Agent is running.

To obtain the Agent's Engine-ID, type the following command:

snmpget -v3 -u admin -A adminpwd123 <Agent's IP address> snmpEngineID.0

The result of this command will be in hexadecimal format and needs to be passed as a single string in the configuration file.

Example

snmpget -v3 -u admin -A adminpwd123 10.10.10.20 snmpEngineID.0

The output for the above example will be similar to as follows:

SNMP-FRAMEWORK-MIB::snmpEngineID.0 = Hex-STRING: 80 00 1F 88 04 65 6D 65 72 73 6F 6E

Finally, the snmptrapd configuration file will look as follows:

createUser -e 0x80001F8804656D6572736F6E admin MD5 adminpwd123 DES
authUser log,execute admin

The snmptrapd daemon may be run at the receiver (SNMP manager) as follows:

/usr/sbin/snmptrapd -x tcp:localhost:705 -c
"<snmptrapd_configuration_file>" -C -f -Le

The formatting options can be modified as desired by the user, please refer the man pages of snmptrapd for more details.
11.7 Configuring Logs

You can configure SRstackware to store the logs in a specified file or syslog, using the log command. As a general practice the logs are stored in /var/log/messages. As ATCA-F140 has limited flash space, it is recommended to configure ATCA-F140 to store logs on a remote syslog server.

```
Slot-1_f140>enable
Slot-1_f140#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Slot-1_f140#log file log_file1
```

By default, logs are stored in var/log/srstackware.log file.

11.8 Switch Ports

11.8.1 Base Switch Port

The following figure illustrates the mapping of payload slots to the corresponding base switch ports.

*Figure 11-4 Base Switch Port Mapping*
11.8.2 Fabric Switch Port

The following figure illustrates the mapping of payload slots to the corresponding fabric switch ports.

*Figure 11-5 Fabric Switch Port Mapping*
HPI-B Software

To help implementation of highly available systems with off-the-shelf building blocks, the Service Availability Forum (SA Forum) Hardware Platform Interface (HPI) specification HPI-B defines a set of platform-independent programming interfaces to monitor and control systems, such as AdvancedTCA systems, designed to provide high availability. HPI provides applications and middleware a consistent, standardized interface for managing hardware components.

This BBS release contains an HPI-B library package. For more information on SMART Embedded Computing's HPI-B implementation, refer to System Management Interface Based on HPI-B User's Guide.
Chapter 13

SYSSTATMGR

The SYSSTATMGR software package includes a daemon and a number of system status monitors. The daemon provides the infrastructures to start the monitors, log the status reported by the monitors to the syslog as well as the IPMI event system, and perform the pre-configured actions for corresponding status.

SYSTAT Sensor

Table 13-1  SMART EC OEM Sensor Type Codes

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Sensor Type Code</th>
<th>Sensor-specific Offset</th>
<th>Event Data 2</th>
<th>Event Data 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSSTAT</td>
<td>CEh</td>
<td>No Sensor specific offsets. Instead, use the standard severity event states offsets. That is, the sensor Event / Reading Type code is 07h. For more details, refer to IPMI V1.5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 00h Transition to OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 01h Transition to Non-Critical from OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 02h Transition to Critical from less severe.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 03h Transition to Non-Recoverable from less severe.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 04h Transition to Non-Critical from more severe.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 05h Transition to Critical from Non-Recoverable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 06h Transition to Non-Recoverable. Not used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 07h Monitor. Indicating the board is under recovering, and monitoring is required to get updated status.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● 08h Informational.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor Identifier. Configuration defined. FFh if not used.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Status Modifier: This byte provides extra information to help diagnostic. Monitor implementation specific. FFh if not used. FFh if not used or unspecified error. FEh reserved, time out of the monitor. FDh reserved, unknown monitor, if Event Data 2 is FFh.
13.1 Installation

This section describes installation of SYSSTAT Manager on ATCA-F140.

<table>
<thead>
<tr>
<th>RPM</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rpm -i sysstatmgr-atca-f140-0.0.0-1-windriver.rpm</td>
<td>SYSSTAT Manager RPM for installing on ATCA-F140.</td>
</tr>
</tbody>
</table>

To install SYSSTAT Manager, run the following command:

```
rpm -i sysstatmgr-atca-f140-0.0.0-1-windriver.rpm
```

After installation, the directory structure listed in the following table is created at /opt/sysstatmgr.

**Table 13-2  Directory Structure of SYSSTAT Manager**

<table>
<thead>
<tr>
<th>Folder</th>
<th>Description</th>
<th>Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>/opt/sysstatmgr/bin</td>
<td>Contains executable files.</td>
<td>sysstatmgr/bin: sysstatagentd sysstatcmd</td>
</tr>
<tr>
<td>/opt/sysstatmgr/etc</td>
<td>Contains configuration files of sysstatmgr.</td>
<td>sysstatmgr/etc: sysstat.conf sysstat_factory.conf</td>
</tr>
<tr>
<td>/opt/sysstatmgr/lib</td>
<td>Contains library files</td>
<td>sysstatmgr/lib: libssmapi.a</td>
</tr>
</tbody>
</table>
**13.2 Monitors**

The SYSSTAT Manager provides following monitoring commands to check health of the ATCA-F140 blade and its components.

- cpuMonitor
- memMonitor
- dfMonitor
- fcuMonitor
- hpmMonitor
- fpgaMonitor
- srsMonitor
- tclkMonitor

**13.2.1 cpuMonitor**

cpuMonitor scripts monitor the percentage of the idle CPU using the `top` command for every 10 minutes. Following are its threshold values defined in `/opt/sysstatmgr/monitors/cpuMonitor.sh`

- HIGH_CPU_WARNING (idle <10%)
- HIGH_CPU_CRITICAL (idle <5%)
- HIGH_CPU_ABS_HIGH (idle <2%)

**13.2.2 memMonitor**

memMonitor scripts monitor the amount of free memory space reported by `/proc/meminfo` for every 5 minutes. Following are its threshold values defined in `/opt/sysstatmgr/monitors/memMonitor.sh`

---

**NOTICE**

All these monitoring scripts commands are located at `/opt/sysstatmgr/monitors`. 

---

- To start the daemon, run the following command:
  
  ```bash
  /opt/sysstatmgr/bin/sysstatagentd
  ```

- To get the status of all monitors, run the following command:
  
  ```bash
  /opt/sysstatmgr/bin/sysstatcmd list
  ```
13.2.3 dfMonitor

dfMonitor scripts monitor the available spaces in percentage from rootfs for every 10 minutes. Following are its threshold values defined in /opt/sysstatmgr/monitors/dfMonitor.sh

- DISK_SPACE_WARNING (free space < 10%)
- DISK_SPACE_CRITICAL (free space < 5%)
- DISK_SPACE_ABS_LOW (free space < 2%)

Devices to be monitored are listed in /opt/sysstatmgr/monitors/monitors_config.sh.

13.2.4 fcuMonitor

fcuMonitor scripts verify whether FCU queries each device successfully for every 4 hours.

- FCU_NOT_FOUND ("fcu" utility not found)
- FCU_CPU_ERROR (query “atca-f140-cpu” failed)
- FCU_DTB_ERROR (query “atca-f140-dtb” failed)
- FCU_KERNEL_ERROR (query “atca-f140-kernel” failed)
- FCU_IPMC_ERROR (query “atca-f140-hpm.1-ipmc” failed)

13.2.5 hpmMonitor

hpmMonitor scripts verify the hpmagentd and hpmcmd for every 4 hours.

- HPMAGENTD_NO_PS (“hpmagentd” daemon not running)
- HPMAGENTD_NO_BIN (“hpmagentd” file not found)
- HPMAGENTD_NO_UTIL (“hpmcmd” utility not found)
- HPMAGENTD_OOS (IPMC not respond to “hpmcmd”)

13.2.6 fpgaMonitor

fpgaMonitor scripts verify FPGA access and version for every 4 hours.

- FPGA_TOOL_NOT_FOUND (“fpga_upg” utility not found)
13.2.7 srsMonitor

srsMonitor scripts monitor a set of ATCA-F140 SRS utility for every 1 hour.

- SRS_NSM_NOT_FOUND ("nsm" utility not found)
- SRS_NSM_NO_PS ("nsm" process not found)
- SRS_MSTPD_NOT_FOUND ("mstpd" utility not found)
- SRS_MSTPD_NO_PS ("mstpd" process not found)
- SRS_IMI_NOT_FOUND ("imi" utility not found)
- SRS_IMI_NO_PS ("imi" process not found)
- SRS_LACPD_NOT_FOUND ("lacpd" utility not found)
- SRS_LACPD_NO_PS ("lacpd" process not found)
- SRS_OSPFD_NOT_FOUND ("ospfd" utility not found)
- SRS_OSPFD_NO_PS ("ospfd" process not found)
- SRS_RIPD_NOT_FOUND ("ripd" utility not found)
- SRS_RIPD_NO_PS ("ripd" process not found)
- SRS_RIPNGD_NOT_FOUND ("ripngd" utility not found)
- SRS_RIPNGD_NO_PS ("ripngd" process not found)

13.2.8 tclkMonitor

tclkMonitor scripts verifies the tclk agent and tclk firmware version for every 4 hours.

- SNMPD_NO_SNMPGET ("snmpget" utility not found)
- SNMPD_OFFLINE ("snmpd" process not found)
- SNMPD_TIMEOUT ("snmpget" timeout)
- TCLK_NOT_FOUND ("tclk_agent" utility not found)
- TCLK_NO_PS ("tclk_agent" process not found)
- TCLK_SNMPD_TIMEOUT (tclk fw query timeout)

The FPGA versions are defined in /opt/sysstatmgr/monitors/monitors_config.sh
SYSSTATMGR

- TCLK_NOT_AVAIL (tclk fw query not available)
- TCLK_UNEXPECTED_VERSION (unexpected tclk fw version)
- TCLK_UNKNOWN_VERSION (unrecognized tclk fw version)

The tclk firmware versions are defined in
/opt/sysstatmgr/monitors/monitors_config.sh
# MUXes Settings

## A.1 Overview

This section provides information about setting the different MUXes.

### Table A-1 Mux Control Signals

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>FIX WC0-0 Topsync</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FIX WC0-1 Fabric channel 1 (Switch X-Connect)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>FIX WC0-0 Fabric Interface logical slot 15</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>FIX WC0-1 Fabric Interface logical slot 16</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>default HDD SATA P2020 SATA</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>default HDD SATA AMC Port 2</td>
<td>14</td>
</tr>
<tr>
<td>default</td>
<td>default BIX_GE_P18 Base X Connect (UC0:1)</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>default BIX_GE_P18 Zone 3 connector</td>
<td>B1</td>
</tr>
<tr>
<td>default</td>
<td>default BIX_GE_P19 Topsync</td>
<td>default</td>
</tr>
<tr>
<td></td>
<td>default BIX_GE_P19 Zone 3 connector</td>
<td>B1</td>
</tr>
<tr>
<td>default</td>
<td>default BIX_GE_P12 Base Interface logical slot 15</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>default BIX_GE_P13 Base Interface logical slot 16</td>
<td>B2</td>
</tr>
<tr>
<td></td>
<td>default BIX_GE_P12 Zone 3 connector</td>
<td>B1</td>
</tr>
<tr>
<td></td>
<td>BIX_GE_P13 Zone 3 connector</td>
<td>B2</td>
</tr>
</tbody>
</table>

---

**FIX_GE0 GE1 MUX_SEL**

**SATA_MUX_SEL**

**BIX_P19_MUX_SEL**

**BIX_P20_MUX_SEL**

**BIX_P13 P14_MUX_SEL**

**TOPSYNC_MUX_SEL**
MUXes Settings

To program a Mux for the B1 path, write 0 to the Ethernet Mux control register bit corresponding to the Mux control signal as shown in the Table A-1 on page 217. The default state of the Ethernet Mux control register bits is 0, except for Mux 1, which has a default value of 1. To program the Mux for the B2 path, write 1 to the corresponding Ethernet Mux control register bit. Some signal paths require two Mux control bits to be programmed. For example, to change the Topsync routing from the default base switch port BIX_GE_P19 to fabric switch port FIX_WC0-0, perform the following steps:

- Write 1 to FIX_GEO_GE1_MUX_SEL bit
- Write 1 to TOPSYNC_MUX_SEL bit

The Mux settings can be changed in Linux using the hpmcmd command. For example, to change the default direction of SATA_MUX_SEL (MUX #15) from the P2020 (B1) to the AMC (B2), use the following syntax:

```
hpncmd -c muxctrl mux15 B2
```

The same Mux change can be accomplished in U-boot by writing 0x03 to FPGA register address 0x8:

```
mw.b ffdf0008 03 1
```

For more information, see FPGA MUX Control Registers on page 219.

For a Mux setting that is desired to be made on every power-up, env parameters can be set up in uboot. The following example shows uboot env parameter settings that can be used to set the SATA Mux to connect the on board SATA drive to the AMC and then netboot the ATCA-F140:

```
setenv ipaddr 192.168.1.105
setenv serverip 192.168.1.199
setenv bootargs 'root=/dev/ram0 rw ramdisk_size=1048576 console=ttyS0,9600 IMG="
setenv tftpkernel 'tftp 1000000 ATCA-F140/ATCAF140.kernel'
setenv tftpramdisk 'tftp 2000000 ATCA-F140/ATCAF140.initrd'
setenv tftpdtb 'tftp a00000 ATCA-F140/ATCAF140.dtb'
setenv amcsatatamux 'mw.b ffdf0008 3 1'
setenv bootcmd 'run amcsatatamux & & run tftpkernel & & run tftpdtb & & run tftpramdisk & & bootm 1000000 2000000 a00000'
```
A.2 FPGA MUX Control Registers

The following table shows the Mux Lock and SATA Mux Control Register (offset 0x08).

**Table A-2  Mux Lock and SATA Mux Control Register (offset 0x08)**

<table>
<thead>
<tr>
<th>Register</th>
<th>Bit</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x08</td>
<td>7</td>
<td>RW</td>
<td>Lock access to Mux settings</td>
</tr>
<tr>
<td>0x08</td>
<td>3</td>
<td>RO</td>
<td>Current SATA Mux setting</td>
</tr>
<tr>
<td>0x08</td>
<td>2</td>
<td>RO</td>
<td>IPMC SATA Mux setting</td>
</tr>
<tr>
<td>0x08</td>
<td>1</td>
<td>RW</td>
<td>SATA Mux control</td>
</tr>
<tr>
<td>0x08</td>
<td>0</td>
<td>RW</td>
<td>SATA Mux control source (0 = IPMC, 1 = register)</td>
</tr>
</tbody>
</table>

Bit 7 of this register can only be written by the IPMC, but can be read by both the IPMC and service processor. When bit 7 is set, the service processor is prevented from writing to any of the mux control registers.

Bits 0 and 1 control how the SATA Mux select is driven. If bit 0 is clear, the SATA mux is controlled by a dedicated hardware signal directly from the IPMC. If bit 0 is set, the SATA mux control is driven by bit 1 of this register. In all cases, bit 2 reflects the state of the hard control signal from the IPMC and bit 3 reflects the actual state of the SATA mux (which depends on the hardware control and bits 0 and 1).

**Table A-3  Ethernet Mux Control Register 2 (offset 0x0B)**

<table>
<thead>
<tr>
<th>Register</th>
<th>Bit</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0B</td>
<td>6</td>
<td>RW</td>
<td>BIX_P20_MUX_SEL</td>
</tr>
<tr>
<td>0x0B</td>
<td>3</td>
<td>RW</td>
<td>BIX_P19_MUX_SEL</td>
</tr>
<tr>
<td>0x0B</td>
<td>2</td>
<td>RW</td>
<td>FIX_GE0_GE1_MUX_SEL</td>
</tr>
<tr>
<td>0x0B</td>
<td>1</td>
<td>RW</td>
<td>BIX_P13_P14_MUX_SEL</td>
</tr>
<tr>
<td>0x0B</td>
<td>0</td>
<td>RW</td>
<td>TOPSYNC_MUX_SEL</td>
</tr>
</tbody>
</table>

The read/write register controls the Ethernet multiplexers. Table A-3, shows which bits correspond to which physical signals. Bits not listed are reserved. Refer to the hardware specification for details of the function that each signal switches.

These registers are not reset to default values by a payload reset, but are reset to defaults by an FPGA reset from the IPMC or by a power cycle.
MUXes Settings
# SFP Module Configuration

## B.1 Overview

Certain SFP and SFP+ modules require reconfiguration in order to take advantage of their multifunction capabilities.

## B.2 Tri-Speed Copper

Some copper SFP modules support a tri-mode speed capability where they will auto-negotiate and automatically link at 10, 100, or 1000 Mbps.

For example, the Finisar FCLF8522P2BTL. These modules do not power-up in this mode and therefore must be reconfigured to do so.

This support is only available on the 1G RTM ports. For both ATCA-F125 and ATCA-F140, these are the ports numbered between 4-7. A new `sfptool` option (-m) is used to enable this feature. There is no `sfptool` option to disable this feature. To restore the module to the default configuration, the user can remove and reinsert it or reboot/power-cycle the switch itself.

Example:
```
sfptool -p4 -m
```
Enable tri-mode support for the SFP attached to port number 4.

## B.3 Dual-rate SFP+ modules

Some SFP+ modules support a dual-rate capability and they link at 1G or 10G.

For example, the Finisar FTLX8571D3BCV. By default, these modules will be configured for the 1G or low speed mode. A new `sfptool` option “-R1” allows the user to reconfigure the module for high speed mode or “-R0” for low rate mode. The high speed mode does not survive a switch reboot or power-cycle and must be specified on every boot.

Examples:
```
sfptool -p10 -R1
```
Enable high speed mode for the SFP+ attached to port number 10.
```
sfptool -p0 -R0
```
Enable low speed mode for the SFP+ attached to port number 0.

**NOTE:** The “-R” option does not interface to SRS. So, the user must also make sure that the desired rate matches the SRS configuration of the port. This is typically done using the SRS `imish` command or by modifying the SRS configuration file directly.
## Related Documentation

### C.1 SMART Embedded Computing Documentation

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

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<th>Table C-1</th>
<th>SMART EC Documentation</th>
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</thead>
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<tr>
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<td><strong>Document Number</strong></td>
</tr>
<tr>
<td>PrAMC-7311 Data Sheet</td>
<td>PrAMC-7311-DS</td>
</tr>
<tr>
<td>ATCA-7470 Data Sheet</td>
<td>ATCA-7470-DS</td>
</tr>
<tr>
<td>ATCA-F140 Series Data Sheet</td>
<td>ATCA-F140-DS</td>
</tr>
<tr>
<td>ATCA-9405 Data Sheet</td>
<td>ATCA-9405-DS</td>
</tr>
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<td>6806800P34</td>
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<tr>
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</tr>
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<td>ATCA-F140 Installation and Use</td>
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</tr>
<tr>
<td>ATCA-9405 Installation and Use</td>
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<td>6806800L39</td>
</tr>
<tr>
<td>SRstackware Intelligent Network Software OSPF Command Reference</td>
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<td>SRstackware Intelligent Network Software Layer 2 Command Reference</td>
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<td>SRstackware Intelligent Network Software Troubleshooting guide</td>
<td>6806800L34</td>
</tr>
<tr>
<td>SRstackware FAQ</td>
<td>6806800L44</td>
</tr>
</tbody>
</table>
# Table C-1  SMART EC Documentation

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<thead>
<tr>
<th>Document Title</th>
<th>Document Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRstackware Intelligent Network Software Layer3 Command Reference</td>
<td>6806800L87</td>
</tr>
<tr>
<td>SRstackware Application Programming Interface Developer Guide</td>
<td>6806800L43</td>
</tr>
<tr>
<td>ATCA-F140 Telco Clocking Module Reference Guide</td>
<td>6806800T38</td>
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