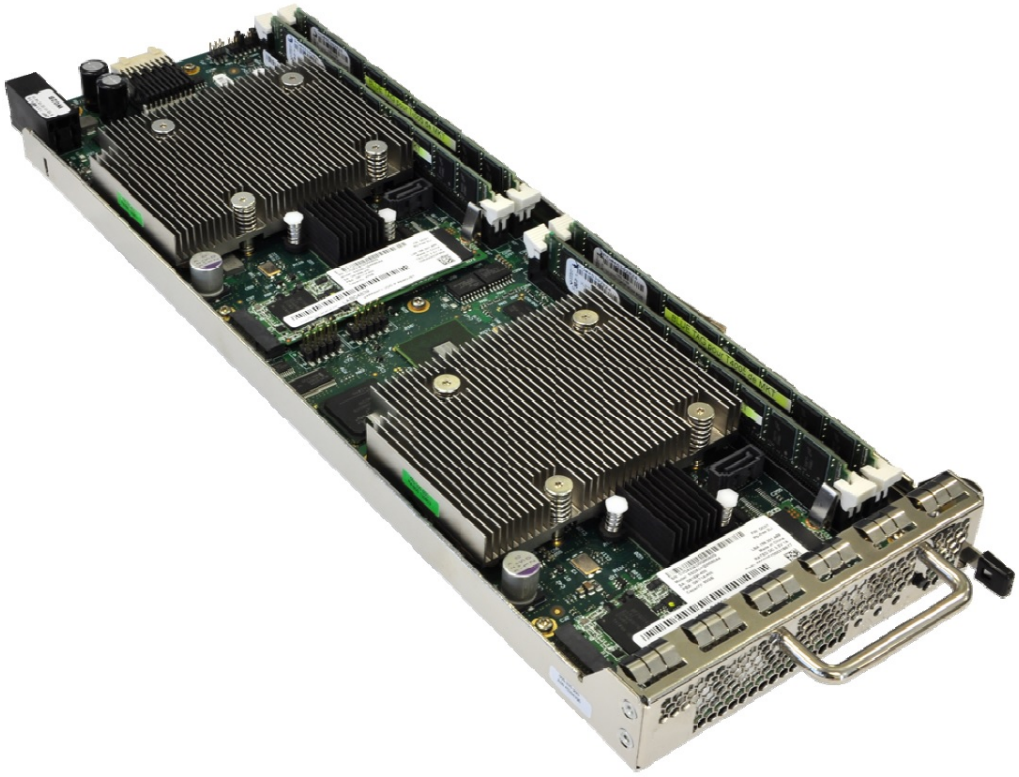
USER GUIDE



MSP8020 Series

Doc. Rev. 1.1

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MSP8020 SERIES USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial issue	2014-Mar-18
1.1	CI, Block diagram correction, Power consumption clarification, KVM hint, SWMI update , Sensors lists add.	2016-May-26

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Customer Comments

If you have any difficulties using this user's guide, discover an error, or just want to provide some feedback, please send a message to Kontron. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user's guide on our website. Thank you.

Symbols Used in this Manual

⚠DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	NOTICE indicates a property damage message.
	Electric Shock! This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material. Please refer also to the "High-Voltage Safety Instructions" portion below in this section.
	ESD Sensitive Device! This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.
	HOT Surface! Do NOT touch! Allow to cool before servicing.
	This symbol indicates general information about the product and the user manual. This symbol also indicates detail information about the specific product configuration.
	This symbol precedes helpful hints and tips for daily use.

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List of Acronyms

BMC	Base Management Controller
CLI	Command-Line Interface
ECC	Error Checking and Correction
ETSI	European Telecommunications Standards Institute
FRU	Field Replaceable Unit
HPM	PICMG Hardware Platform Management specification family
iCLI	Industrial Command-Line Interface
IOL	IPMI-Over-LAN
IPMI	Intelligent Platform Management Interface
KCS	Keyboard Controller Style
KVM	Keyboard Video Mouse
MEI	Management Engine Interface
MMC	Module Management Controller
PCIe	PCI-Express
PICMG®	PCI Industrial Computer Manufacturers Group
RTC	Real Time Clock
SEL	System Event Log
SFP+	Small Form-factor Pluggable that supports data rates up to 10.0 Gbps
ShMC	Shelf Management Controller
SMBus	System Management Bus
SMWI	System Monitor Web Interface
SNMP	Simple Network Management Protocol
SOL	Serial Over LAN
SSH	Secure Shell
STP	Spanning Tree Protocol
THOL	Tested Hardware and Operating System List
VLP	Very Low Profile

Electrostatic Discharge

⚠CAUTION The MSP8020 node is sensitive to electrostatic discharge (ESD). Users must observe the appropriate precautions when handling ESD-sensitive devices.

Limited Warranty

Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

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1/ Product Description

1.1. Product Overview

The MSP8020 Node series are processor nodes for the SYMKLOUD MS2900 platform Series. Nine nodes can be installed in each MS29xx and each node has two CPU engines. When used with two Hubs, each CPU engine supports two 1GbE ports.

MSP802x reference through this guide refers to any variants of this Node Series as describe per Table 2 - node key components, unless specified otherwise.

MS29xx reference through this guide refers to any variants of the SYMKLOUD Platform Series (eg. MS2900, MS2910), unless specified otherwise.

MSH89xx reference through this guide refers to any variants of the SYMKLOUD Hub Series (eg. MSH8900, MSH8910), unless specified otherwise.

An OS must be loaded on the processor nodes for the system to be operational.

Figure 1: SYMKLOUD layers

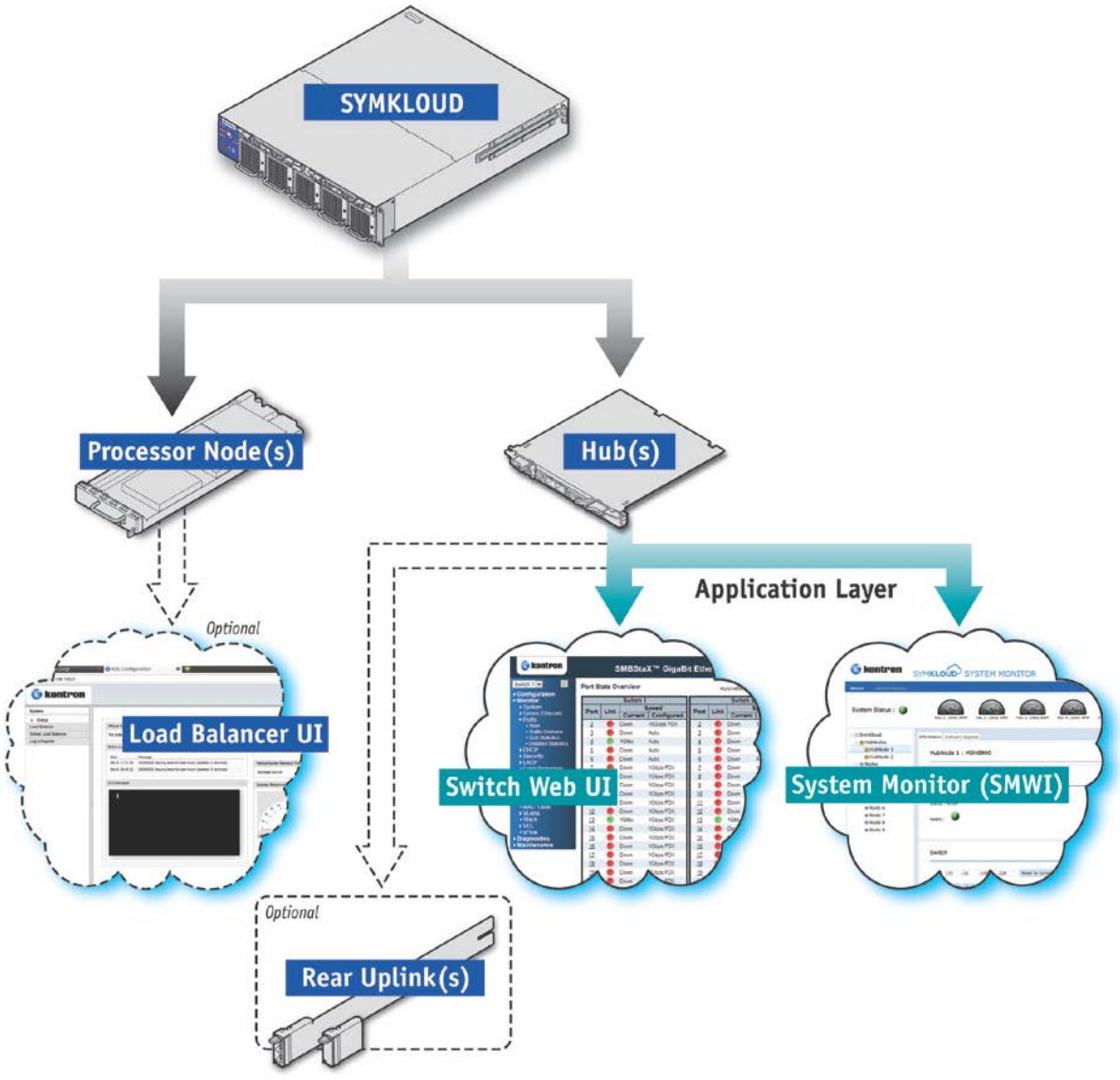

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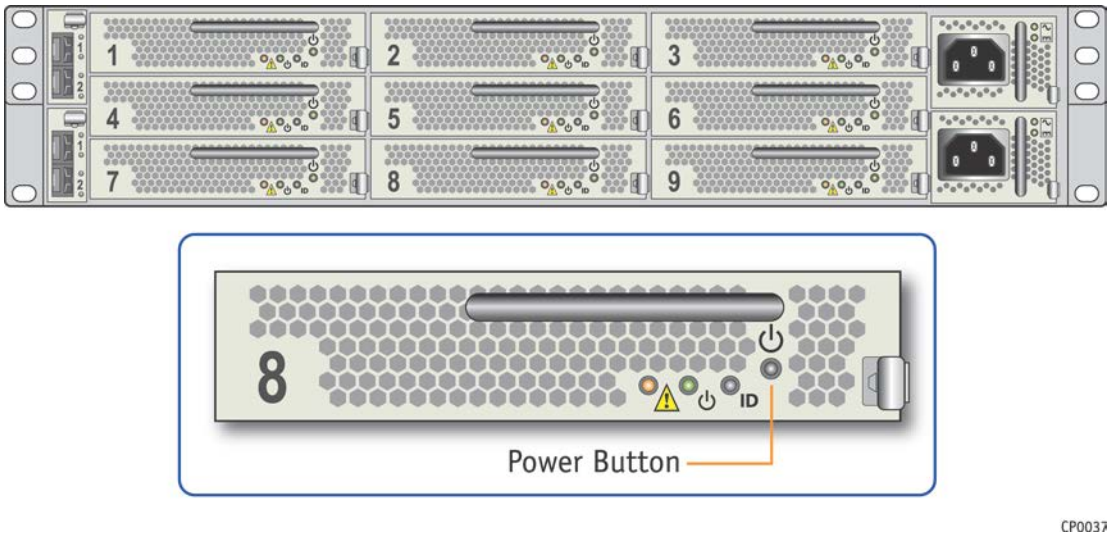
Figure 2: MSP802x in rear of chassis

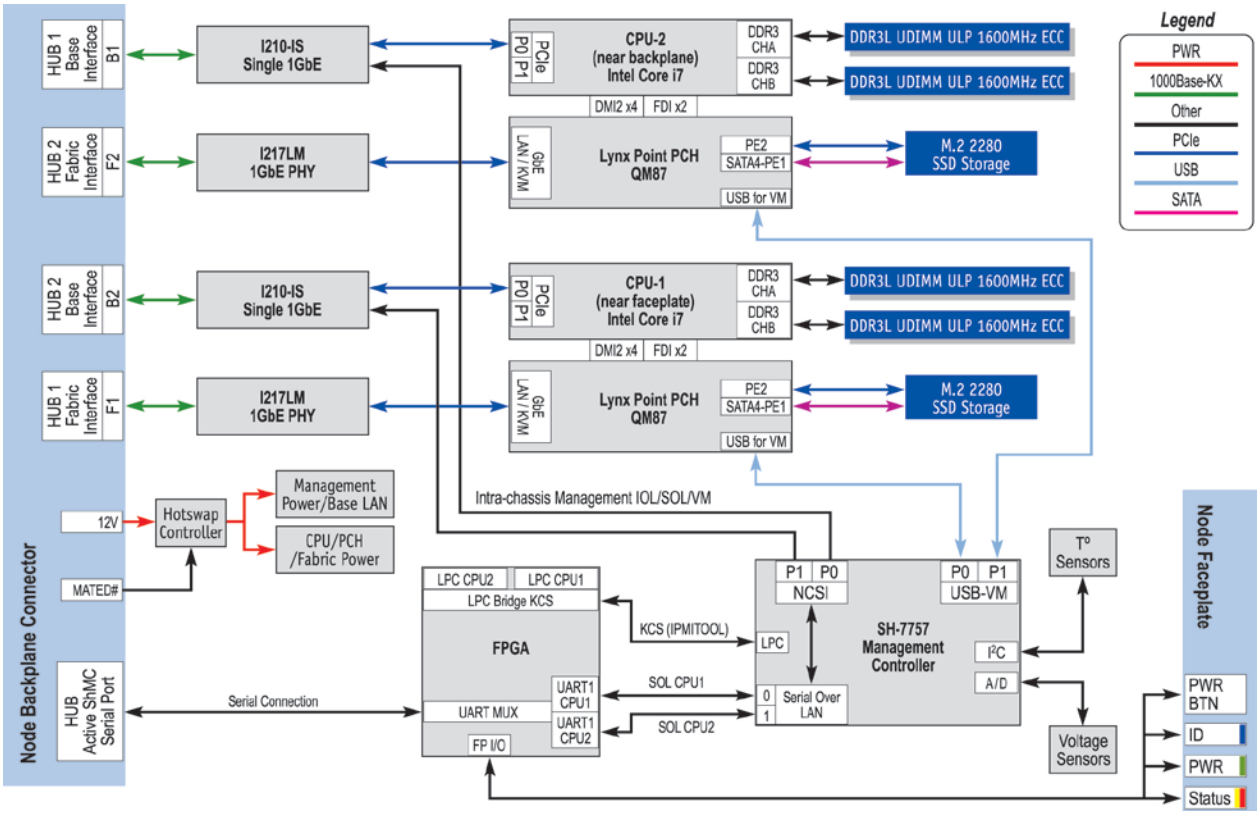


For information on other SYMKLOUD MS29xx components, refer to the specific component's user manual.

To ensure you have the latest document version or to consult other SYMKLOUD documents, visit Kontron website at http://kontron.com/.

1.2. Block Diagram

Figure 3: MSP802x block diagram



For a block diagram of the entire MS29xx system, refer to the SYMKLOUD MS29xx Platform User's Guide

1.3. PCI Mapping

Table 1: PCI Mapping

Bus:Device :Function	Device ID	Component	Description	Note
CPU*				
00:00.0	0d04	Host bridge	Intel Corporation (rev. 08)	GT3
00:01.0	0d01	PCI bridge	Intel Corporation (rev. 08)	GT3
00:02.0	0d26	VGA compatible controller	Intel Corporation (rev. 08)	GT3
00.03.0	0d0c	Audio device	Intel Corporation (rev. 08)	GT3
Chipset				
00:16.0	8c3a	Communication controller	Intel Corporation Lynx Point MEI Controller No. 1 (rev. 04)	
00:16.3	8c3d	Serial controller	Intel Corporation Lynx Point KT Controller (rev. 04)	
00:19.0	153a	Ethernet controller	Intel Corporation Ethernet Connection I217-LM	
00:1a.0	8c2d	USB controller	Intel Corporation Lynx Point USB Enhanced Host Controller No. 2	
00:1d.0	8c26	USB controller	Intel Corporation Lynx Point USB Enhanced Host Controller No. 1	
00:1f.0	8c4f	ISA bridge	Intel Corporation Lynx Point LPC Controller (rev. 05)	
00:1f.2	8c03	SATA controller	Intel Corporation Lynx Point 6-Port SATA AHCI Controller	
00:1f.3	8c22	SMBus	Intel Corporation Lynx Point SMBus Controller (rev. 05)	
Network devices				
01:00.0	1537	Ethernet controller	Intel Corporation I210 Gigabit Backplane Connection (rev. 03)	

*Other CPUs could be available for this node.

PCI mapping is CPU-dependent; the mapping might change depending on the CPU.

1.4. Node Key Components

Table 2: Node key components per CPU engine

Component[1]	Description
CPU[2]	MSP8020: Intel® Core™ i7-4860EQ GT3, 6 MB cache, 1.8 GHz, quad-core, 47 W, 750-MHz Iris™ Pro graphics 5200 MSP8021: Intel® Core™ i7-4700EQ GT2, 6 MB cache, 2.4-3.4 GHz, quad-core, 47 W, 400-1000 MHz Intel® HD Graphics 4600 MSP8022: Intel® Xeon® E3-1278L v4, 6M Cache, 2-3.3 GHz, quad-core, 47W, 800-1000 Mhz Intel® Iris™ Pro Graphics P6300
Chipset	One Intel® QM87 PCH
System memory	2 DIMM slots for up to 16 GB DDR3, supports ULP/VLP unbuffered 1.35V DDR3 with ECC MSP8022: E3-1278L v4 support 16G dimm for 32GB total/cpu
Network connections	1 Intel® 1GbE controller I210-IS 1 chipset integrated MAC with Intel® 1GbE I217-LM PHY
Storage	1 M.2 SSD
M.2 connectivity	1 SATA 6 Gbps 1 USB 3.0 1 PCIe x2 Gen 2
I/O devices	1 serial port accessible through: ▶ MS29xx Hub serial RJ45 (one connection shared by both CPUs), refer to Figure 7 ▶ SOL via the BMC 1 KVM (Keyboard, Video, Mouse) accessible over LAN
BIOS	16 MB SPI Phoenix UEFI BIOS

Refer to the Intel website ark.intel.com for more information on Intel components

[1] Some of the components are optional.
[2] Other CPUs could be available for this node

1.5. Node Features

Table 3: Node features

Feature	Description
Remote management	IPMI 2.0 IOL SOL KVM/virtual media Comprehensive sensor network and event monitoring ▶ Refer to the *MSP802x Sensor List* for a list of sensors.
Validated OS	Ubuntu Server, 64-bit, long-term support release 12.04 Windows 7, 64-bit, SP1 CentOS Linux, 64-bit, release 6.4 ▶ For a list of current validated OS, refer to the product's THOL.
Hot swap	Supported ▶ Refer to the *MSH89xx User's Guide* for information on system behavior upon hot swap.
Power consumption	82W typical Peak measured with 32 GB of 1600 MHz DDR3 and 2 SSDs running a combination of CPU, GPU, memory, storage and network stress test applications.

1.6. Node Module LEDs and Buttons

Figure 4: MSP802x LEDs and buttons

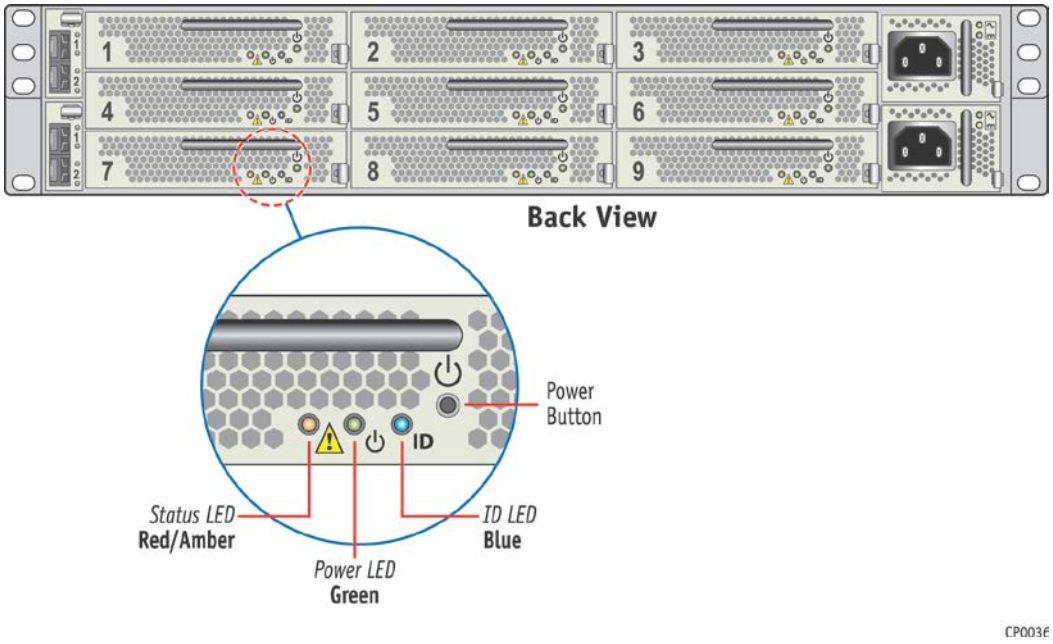


Table 4: LED status description and button behavior

LED status			
State	**ID (blue)**	**Power (green)**	**Status (amber)**
Identify command in progress	Blinking[3]	Not affected	Not affected
Payload power ON for at least one CPU engine	OFF	ON	ON: not healthy OFF: healthy
Payload power OFF OR Both payloads are OFF	ON	OFF	ON: not healthy OFF: healthy
Both payloads are OFF	ON	OFF	ON: not healthy OFF: healthy

Power button		
State	**Short press**	**Long press**
Power OFF for both CPU engines	Powers the node	Nothing happens
Power ON for only one of the CPU engines	Performs a clean shutdown of both CPUs	Turns node off immediately
Power ON for both CPU engines	Performs a clean shutdown of the node	Turns node off immediately

[3] Fast blink, 1 Hz, 50%

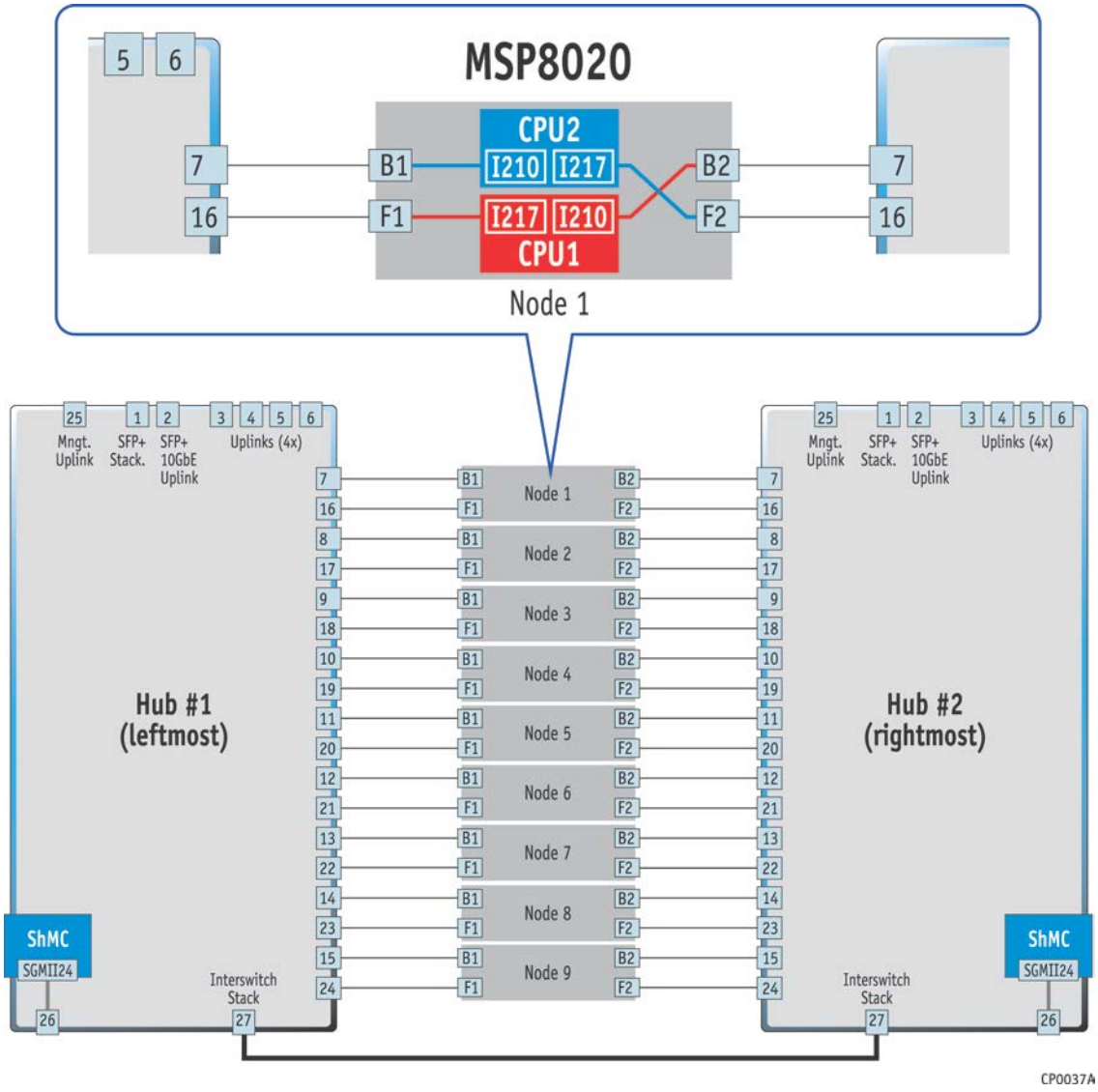
1.7. Network Interfacing

The F1 (fabric 1) port of CPU 1 connects to hub 1, the B2 (base 2) port of CPU 1 connects to hub 2, the F2 port of CPU 2 connects to hub 2, and the B1 port of CPU 2 connects to hub 1 (Figure 5). The KVM functionality of each CPU is on each one's respective fabric port. Therefore, if the connection to a hub is lost, the KVM functionality of a CPU will be lost.

Each CPU supports two 1GbE links for the application level.

For a complete port mapping and network topology of the system, refer to the *MSH89xx User's Guide.*

Figure 5: CPU connections



For more information, refer to the MSP802x block diagram (Figure 3).

1.8. Management Interfacing

Two types of connections can be established with node components: a management networking connection or a serial console connection.

The SYMKLOUD platform comes with a System Monitor Web Interface (SMWI). The SMWI can be used to update node components.

Refer to the *SYMKLOUD MS29xx Platform Quick Start Guide* for an overview of the SMWI and for information on how to access it as well as for the locations of the management and console ports.

The IP address of the component you want to connect to might be required when using certain paths. For a list of the default IP addresses of components, refer to the *SYMKLOUD MS29xx Platform Quick Start Guide.*

The MSP802x node has a KVM functionality that gives users remote access to the CPU engines. The remote console is the redirected screen, keyboard and mouse of the remote host system. Through media redirection, this functionality allows users to mount a device, e.g. a USB drive or ISO image, to the CPU engine as a remote device. Once mounted, the device appears as a local device.

For configuration, refer to the MSP802x KVM Configuration guide on Kontron website under product MS2900 Manuals

- http://www.kontron.com/products/systems/cloud-systems/symkloud-ms2900-media.html

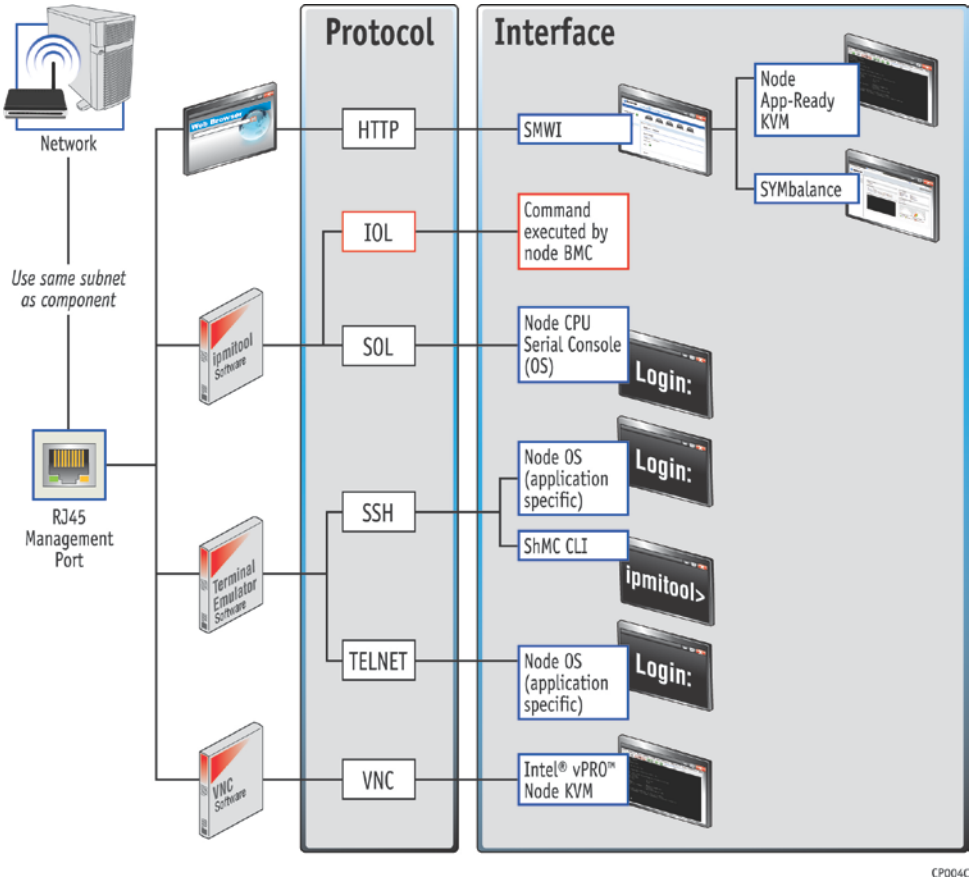
The Kontron ipmitool package can be downloaded from the Kontron MS2900 web page under Tool:

- http://www.kontron.com/products/solutions/cloud-computing-platform-solutions/symkloud-ms2900-web.html

Ensure the protocol is enabled for the interface you want to access.

Figure 6 and Figure 7 show the steps required to access the system's various interfaces.

Figure 6: Diagram of interface paths with a management networking connection



SOL cannot be active at the same time as a serial port backplane connection on the MSH89xx hub. When a connection is attempted via the serial port while an SOL session is open, SOL will be disconnected. When an SOL connection is attempted while a serial port connection is active, the serial port connection will be disconnected.

Example of an SOL connection to the node CPU serial console (OS):

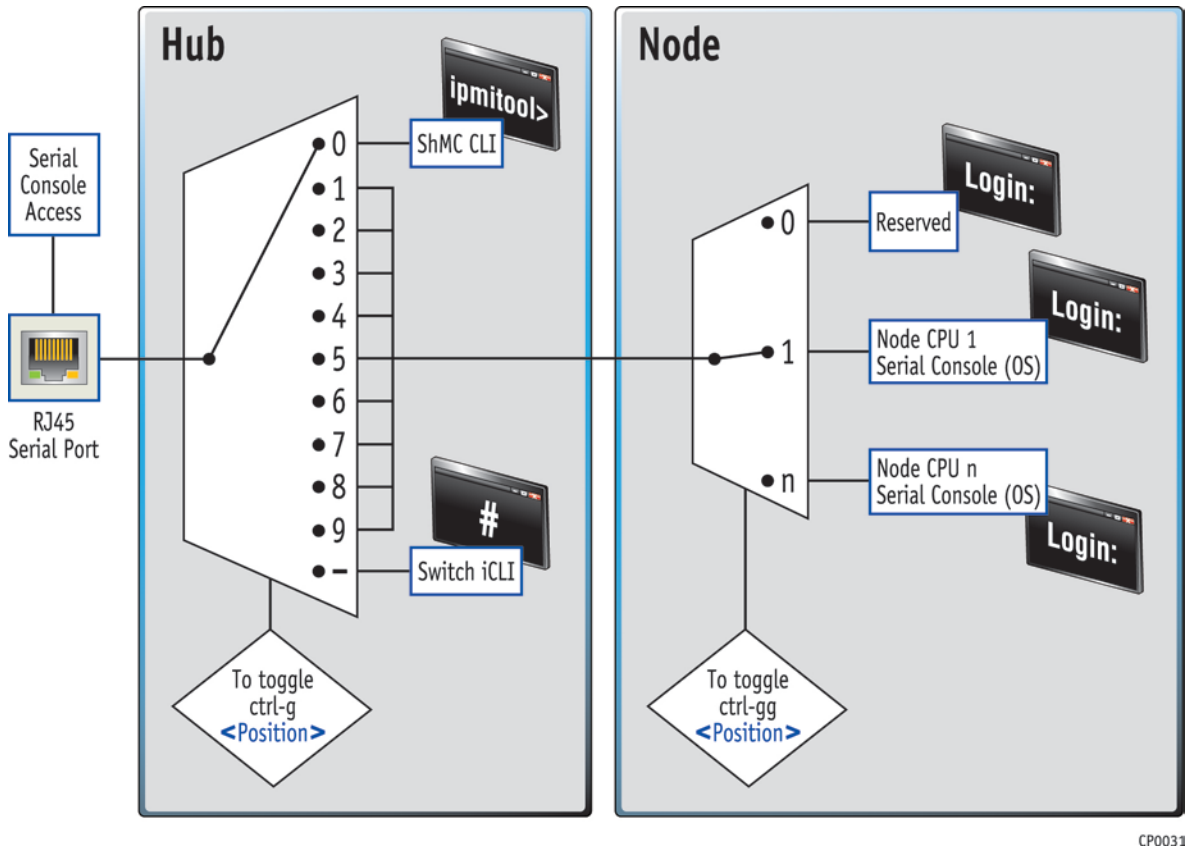
1. Connect to the management port with a cable or via a network.
2. Establish an SOL connection using ipmitool:
   - From a PC: ipmitool –H <node BMC ip address> -U admin –P admin –I lanplus sol activate (CPU1)
   - From a PC: ipmitool –H <node BMC ip address> -U admin –P admin –I lanplus sol activate 2 (CPU2)
3. The OS specific prompt is displayed, e.g., Login.

The Kontron ipmitool package can be downloaded from the Kontron MS2900 web page under Tool:

- http://www.kontron.com/products/solutions/cloud-computing-platform-solutions/symkloud-ms2900-web.html

Ensure the protocol is enabled for the interface you want to access.

Figure 7: Diagram of interface paths with a serial console connection



The serial port communication parameters are 115200 baud, no parity, 8 data bits and backspace key set to "Ctrl-h". BIOS POST and configuration menu redirection is VT100+. OS console support/configuration is customer specific.

The ASCII control code for “Ctrl-g” is 7. To type “Ctrl-gg”, use the “Ctrl-g” ASCII control code 2 times in a row.

Example of a serial connection to the node CPU serial console (OS):

1. Connect a PC to the active hub’s console port
2. Establish a connection using the PC terminal emulator with the parameters 115200 baud, no parity and one stop bit
3. To configure the hub console port MUX, type Ctrl-g <Node No. (1-9)>, then Ctrl-gg <Node CPU No. (1-2)>

Table 4: Default usernames and passwords of management interfaces

Configuration interface	Username	Password
Node SMWI	admin	admin
ShMC CLI	admin	admin
Node CPU serial console (OS)	Customer specific	Customer specific

2/ Extracting and Inserting a Node Module

2.1. Extracting a Node Module

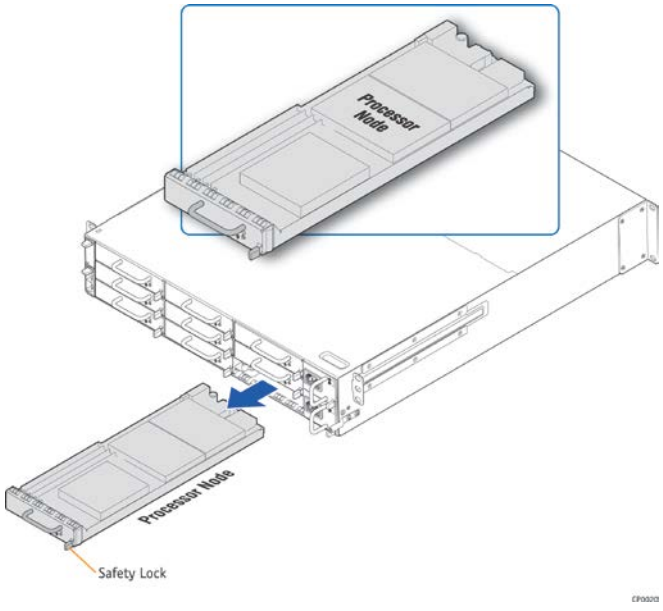
ESD Sensitive Device!

Take all necessary ESD protection measures.

Steps in blue apply only to hot swap procedures.

1. Press the power button of the node to be extracted. (The power button should be configured in the operating system so that it performs a clean shutdown when pressed.)
2. The ID LED of the node becomes steady blue: the node is ready to be extracted.
3. To extract the node module from the slot, pull on the handle while pressing the safety lock (*Figure 8*) towards the left.

Figure 8: Processor node module safety lock location



2.2. Inserting a Node Module

ESD Sensitive Device!

Take all necessary ESD protection measures.

1. Holding the handle, insert a node module.
2. Push it in until the safety lock locks in place. The ID LED becomes steady blue and then turns off during BMC initialization.
3. After BMC initialization, the power LED of the processor node module becomes steady green: the processor node module is powered on and ready to use.

2.3. System Behavior upon Hot Swap

The system is electrically designed to support a surprise extraction. However, this type of extraction is not recommended and could affect system performance and functionalities.

When a hot swap procedure is performed on node MSP802x, the following systems and functionalities could be affected:

- All nodes: Node-dedicated applications could be affected.

3/ Software Configurations and Conventions

Before you start configuring node modules, read the following list of mandatory tasks. You can refer to this list to ensure you have performed the basic tasks required for proper system operation. Note that some of these tasks may already have been done.

Mandatory tasks:

- Booting from LAN, from virtual media or from onboard storage
- Installing an OS

Conventions:

The following conventions are used in this guide:

- Elements between **< >** in blue are variables. The value shown is an example or an instruction of what to enter. Items between **( )** show a value range for the variable spelled out, e.g., <Switch No. (1-5)> means that you must enter the number of the switch and that this number can be between 1 and 5.
- The **|** symbol indicates a choice between two or more alternatives, e.g. x|y|z reads “x or y or z”.
- Elements in **black bold** are selectable menu items or button names.
- Elements in *blue italics* are configuration options or types.
- The > symbol separates a series of operations required to access a specific element.

Refer to the MSH89xx User’s Guide for the IPMI mapping of the system.

Refer to the SYMKLOUD MS29xx Platform Quick Start Guide for a list of default IP addresses.

Configuration command tables:

Sections 5/ contain 2-column tables. The first column describes steps that can be performed in the Web-type interface(s) named in the header. The second column describes steps that can be performed in CLI-type interface(s) specified in the header. See Figure 6 and Figure 7 to find out how to access the specified Web-type or CLI-type interface.

4/ Configuring Node Modules

4.1. Node Reset

To reset the CPU engines of a node:

From the Node CPU serial console

Send a break sequence (ctrl-break)

From the SMWI

Navigate to the target CPU Node

Under Power Commands, select Reset.

From the ShMC CLI

ipmitool>

ipmitool> set targetaddr <node BMC ipmi address>

ipmitool> power reset (both cpu)

From an IOL remote PC

ipmitool –H <node BMC ip address> -U admin –P admin power reset

OR

ipmitool –H <ShMC ip address > -U admin –P admin –t <node BMC ipmi address> power reset

All tasks described in this section reset both CPUs except the serial port Ctrl-break.

For the node CPU serial console connection, the method is terminal emulator specific, e.g. with PuTTY, type Ctrl-break or use menu Special command and select Break.

4.2. Boot Order

To choose the boot order of one of the CPU engines of a processor node:

Perform a node reset (section 4.1)

Press **F2** when prompted to enter the bios setup menu

Select the **Boot** tab to display the current boot order

To choose the Boot Option Priority

Use the up or down arrow key to select a boot device

Use the **+** or **–** key to move the boot device up or down

Select the **Save & Exit** tab

Select **Save Changes and Reset**

You can boot from a LAN or from onboard storage.

The default Boot Priority Order is as follows: SATA storage (if installed), Base Interface LAN, Fabric Interface LAN.

To change the boot order of one CPU engine of a processor node temporarily:

Perform a node reset (section 4.1)

Press **F5** when prompted to enter the **Boot Menu**

Detected boot devices are displayed

Use the up or down arrow key to select a boot device

Press **Enter**

You can boot from a LAN or from onboard storage

5/ Performing Updates

A ZIP file provided by Kontron contains firmware updates for node components.

5.1. Processor Node Update

To update the firmware of the node BMC, BIOS and FPGA:

SMWI	Computer command prompt
Dashboard > OneClick Upgrade Click on **advanced settings** Select the platform from the dropdown list Select the node to update from the dropdown list Click on **bundle settings** Click on **CHANGE BUNDLE FILE** Select the proper .zip file Click on **Open** Wait for the transfer to finish Click on **START UPGRADE**	*To update all updatable firmware of the node* ipmitool –H <node BMC ip address> -U admin –P admin hpm upgrade <HPM file> all activate
API calls available to update a node	
Notes	
This operation must be done for all nodes	The IPMI command to update the BIOS firmware upgrades both CPUs.

5.2. OneClick Update for all Nodes

To update the firmware of the node BMC, BIOS and FPGA of all nodes sequentially:

SMWI	Computer command prompt
Dashboard > OneClick Upgrade Click on **bundle settings** Click on **CHANGE BUNDLE FILE** Select the proper .zip file Click on **Open** Wait for the transfer to finish Click on **START UPGRADE**	API
API calls available to update a node	
Notes	
The update will be performed only for components with files included in the HPM file bundle.	

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6/ Appendix A – Sensor Lists

The following tables contain information on the sensors of the MSP802x. Table 7 provides detailed information on the sensors described in blue in either Table 5 BMC sensor list or Table 6 MMC sensor list.

Table 5: BMC Sensor list

ID	Hex ID	Sensor Name	Sensor Type Code	Reading Type Code	Description
0	0x00	FRU0 Hot Swap	F0h ATCA HotSwap Sensor	6Fh (Sensor Specific)	ATCA HotSwap Sensor
1	0x01	FRU1 Hot Swap	F0h ATCA HotSwap Sensor	6Fh (Sensor Specific)	ATCA HotSwap Sensor
2	0x02	FRU2 Hot Swap	F0h ATCA HotSwap Sensor	6Fh (Sensor Specific)	ATCA HotSwap Sensor
3	0x03	FRU0 Reconfig	12h System Event	6Fh (Sensor Specific)	Sensor population change on carrier
4	0x04	Temp Brd Inlet	01h (Temperature)	01h (Threshold Based)	Board Inlet Temperature
5	0x05	Temp Brd Outlet	01h (Temperature)	01h (Threshold Based)	Board Outlet Temperature
6	0x06	Temp Vcore Out.	01h (Temperature)	01h (Threshold Based)	Board Outlet Temperature
7	0x07	Temp BMC	01h (Temperature)	01h (Threshold Based)	BMC Temperature
8	0x08	Temp CPU 1	01h (Temperature)	01h (Threshold Based)	CPU1 Temperature
9	0x09	Temp CPU 2	01h (Temperature)	01h (Threshold Based)	CPU2 Temperature
10	0x0A	Temp DIMM A CPU1	01h (Temperature)	01h (Threshold Based)	DIMM A CPU1 Temperature via SPD

ID	Hex ID	Sensor Name	Sensor Type Code	Reading Type Code	Description
11	0x0B	Temp DIMM A CPU2	01h (Temperature)	01h (Threshold Based)	DIMM A CPU2 Temperature via SPD
12	0x0C	Temp DIMM B CPU1	01h (Temperature)	01h (Threshold Based)	DIMM B CPU1 Temperature via SPD
13	0x0D	Temp DIMM B CPU2	01h (Temperature)	01h (Threshold Based)	DIMM B CPU2 Temperature via SPD
14	0x0E	Vcc +12.0V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 12V suspend power supply
15	0x0F	Vcc +3.3V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 3.3V suspend power supply
16	0x10	Vcc +1.5V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.5V suspend power supply
17	0x11	Vcc +1.2V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.2V suspend power supply
18	0x12	Brd Inp. Current	03h (Current)	01h (Threshold Based)	Board current in Amps
19	0x13	Brd Inp. Power	0Bh (Watt)	01h (Threshold Based)	Power consumption in watts of the complete blade
20	0x14	Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State
21	0x15	Ver Change BMC	2Bh (Version Change)	6Fh (Sensor Specific)	BMC Firmware Change Detection
22	0x16	Ver Change FPGA	2Bh (Version Change)	6Fh (Sensor Specific)	FPGA Firmware Change Detection
23	0x17	Ver Change BIOS	2Bh (Version Change)	6Fh (Sensor Specific)	BIOS Firmware Change Detection

ID	Hex ID	Sensor Name	Sensor Type Code	Reading Type Code	Description
24	0x18	IPMI Info-1	C0h (OEM Firmware Info)	70h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic
25	0x19	IPMI Info-2	C0h (OEM Firmware Info)	71h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic
26	0x1A	POST Value	C6h (OEM POST Value)	6Fh (Sensor Specific)	Show current postcode value (No event generated)
27	0x1B	Health Status	24h (Platform Alert)	7Fh (OEM Health Status)	General health status (Aggregation of critical sensors)
28	0x1C	EventRcv ComLost	1Bh Cable/Interconnect	03h (Digital Discrete)	Communication loss with the event receiver (ShMC)
29	0x1D	BMC Reboot	24h (Platform Alert)	03h (Digital Discrete)	BMC Reboot detection
30	0x1E	BMC Storage Err	28h (Management Subsystem Health)	6Fh (Sensor Specific)	Management sub-system health (non volatile memory error)
31	0x1F	BMC SEL State	10h (Event Logging Disable)	6Fh (Sensor Specific)	Specify the status of the SEL (Cleared/Almost full/Full)
32	0x20	SEL Time Set	12h (System)	6Fh (Sensor Specific)	Specify when SEL time change
33	0x21	Jumper Status	D3h (OEM Jumper Status)	6Fh (Sensor Specific)	Reflects on-board jumper presence
34	0x22	Thermal Error	0Ah (Cooling Device)	03h (Digital Discrete)	Cooling problem

Table 6: MMC Sensor list

ID	Hex ID	Sensor Name	Sensor Type Code	Reading Type Code	Description
0	0x00	Bx:IPMI Info-1	C0h (OEM Firmware Info)	70h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic
1	0x01	Bx:IPMI Info-2	C0h (OEM Firmware Info)	71h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic
2	0x02	Bx:ModuleHotSwap	F2h Module Hot Swap	6Fh (Sensor Specific)	Module Hot Swap
3	0x03	Bx:MMC Stor Err	28h (Management Subsystem Health)	6Fh (Sensor Specific)	Management sub-system health (non volatile memory error)
4	0x04	Bx:IPMI Watchdog	23h (Watchdog)	6Fh (Sensor Specific)	IPMI Watchdog (payload watchdog)
5	0x05	Bx:CPU Reset	CFh (Board Reset)	03h (Digital Discrete)	Board reset type and sources
6	0x06	Bx:Vddq	02h (Voltage)	01h (Threshold Based)	Voltage on board Vddq payload power supply
7	0x07	Bx:Vcc +3.3V	02h (Voltage)	01h (Threshold Based)	Voltage on board 3.3V payload power supply
8	0x08	Bx:Vcc +3.3V L	02h (Voltage)	01h (Threshold Based)	Voltage on board 3.3V L payload power supply
9	0x09	Bx:Vcc +1.5V	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.5V payload power supply
10	0x0A	Bx:Vcc +1.05V	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.05V payload power supply
11	0x0B	Bx:Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State

ID	Hex ID	Sensor Name	Sensor Type Code	Reading Type Code	Description
12	0x0C	Bx:Power Good	08h (Power Supply)	77h (OEM)	Actual power good status
13	0x0D	Bx:PowerGood Evt	08h (Power Supply)	03h (Digital Discrete)	Power good status event that occur since the last power on or reset
14	0x0E	Bx:PWROK Capt. 1	08h (Power Supply)	03h (Digital Discrete)	Latched power rail status
15	0x0F	Bx:PWROK Capt. 2	08h (Power Supply)	03h (Digital Discrete)	Latched power rail status
16	0x10	Bx:CPU Status	07h (Processor)	6Fh (Sensor Specific)	Processor 0 Status
17	0x11	Bx:ACPI State	22h (System ACPI Power State)	6Fh (Sensor Specific)	Advance Configuration and Power Interface State
18	0x12	Bx:MMC SEL State	10h (Event Logging Disable)	6Fh (Sensor Specific)	Specify the status of the SEL (Cleared/Almost full/Full)
19	0x13	Bx:Health Status	24h (Platform Alert)	7Fh (OEM Health Status)	General health status (Aggregation of critical sensors)
20	0x14	Bx:POST Value	C6h (OEM POST Value)	6Fh (Sensor Specific)	Show current postcode value (No event generated)

Table 7: Detailed information for specific sensors

Sensor Name	Event/Reading type code	Sensor Type	Sensor Specific offset	Event Trigger
IPMI Info-1 Bx:IPMI Info-1	70h OEM Kontron Firmware Info 1	C0h OEM Kontron Firmware Info	00h 01h 02h to 0Eh 0Fh	Event Code Assert Trigger Event Overflow Trigger Code Assert Line (Binary Encoded) Unused, Reserved
IPMI Info-2 Bx:IPMI Info-2	75h OEM Kontron Firmware Info 2	C0h OEM Kontron Firmware Info	00h 01h 02h to 0Eh 0Fh	Event Code Assert Trigger Unused Trigger Code Assert File Id (Binary Encoded) Unused, Reserved
Bx:Power Good	77h OEM Kontron Power Good	08h Standard IPMI Power Supply	00h 01h 02h 03h 04h 05h 06h 07h 08h 09h 0Ah 0Bh 0Ch 0Dh 0Eh 0Fh	1.05V_M 0.75V_SUS 1.25V_SUS 1.5V_SUS 3.3V_SUS Combined (3.3V_SUS & 1.5V_SUS & 1.25V_SUS & 0.75V_SUS) 1.5V_S0 3.3V_S0 Vcore 1.05V_S0 VttDdr Vddq Unused Unused Unused Unused
Jumper Status	6Fh Standard IPMI sensor specific	D3h Kontron OEM Jumper Status Sensor	00h 01h 02h 03h 04h 05h 06h 07h 08h 09h	Jumper 00 Present (JP4: 1-2) Jumper 01 Present (JP4: 3-4) Jumper 02 Present (JP4: 5-6) Jumper 03 Present (JP4: 7-8) Jumper 04 Present (JP4: 9-10) Jumper 05 Present (JP4: 11-12) Jumper 06 Present (JP4: 13-14) Jumper 07 Present (JP3: 1-2) Jumper 08 Present (JP3: 3-4) Jumper 09 Present (JP3: 5-6)
Power State Bx: Power State	6Fh Standard IPMI sensor specific	D1h Kontron OEM Power state sensor	00h 01h 02h 03h	Power ON Power OFF Power ON Request Power OFF Request

Sensor Name	Event/Reading type code	Sensor Type	Sensor Specific offset	Event Trigger
			04h	Full Reset In Progress
POST Value Bx:POST Value	6Fh Standard IPMI sensor specific	C6h OEM Kontron POST Code Value	00h to 07h 14h	POST code LOW byte value, no event genarated on these offsets POST Code Error Event Trigger Event Data 2: POST Low Nibble Event Data 3: POST High Nibble
Bx:CPU Reset	03h Standard IPMI Discrete	CFh OEM Kontron Reset	00h 01h State Asserted / State Deasserted	Event Data 2: Reset Type 00h: Warm reset 01h: Cold reset 02h: Forced Cold [Warm reset reverted to Cold] 03h: Soft reset [Software jump] 04h: Hard Reset 05h: Forced Hard [Warm reset reverted to Hard] Event Data 3: Reset Source 00h: IPMI Watchdog [cold, warm or forced cold] (IPMI Watchdog2 sensors gives additionnal details) 01h: IPMI commands [cold, warm or forced cold] (chassis control, FRU control) 02h: Processor internal checkstop 03h: Processor internal reset request 04h: Reset button [warm or forced cold] 05h: Power up [cold] 06h: Legacy Initial Watchdog / Warm Reset Loop Detection * [cold reset] 07h: Legacy Programmable Watchdog [cold, warm or forced cold] 08h: Software Initiated [soft, cold, warm of forced cold] 09h: Setup Reset [Software Initiated Cold] 0Ah: Power Cycle / Full Reset / Global Platform Reset FFh: Unknown

Sensor Name	Event/Reading type code	Sensor Type	Sensor Specific offset	Event Trigger
Health Status Bx: Health Status	7Fh (OEM Health Status)	24h (Platform Alert)	00h Status not available in current state 01h Healthy 02h Informational fault 03h Minor fault 04h Major fault 05h Critical fault	Event Data 3: If the sensor is an aggregation sensor, then event data 2 is used to return the ID of the first sensor from the aggregation that caused the fault. Sensor Aggregation List: FRU0 ID: Sensor Name 04h: Temp Brd Inlet 05h: Temp Brd Outlet 07h: Temp BMC 08h: Temp CPU 1 09h: Temp CPU 2 0Eh: Vcc +12.0V SUS 0Fh: Vcc +3.3V SUS 10h: Vcc +1.5V SUS 11h: Vcc +1.2V SUS FRU1/2: ID: Sensor Name 04h: Bx:IPMI Watchdog 06h: Bx:Vddq 07h: Bx:Vcc +3.3V 08h: Bx:Vcc +3.3V L 09h: Bx:Vcc +1.5V 0Ah: Bx:Vcc +1.05V 0Eh: Bx:PWROK Capt. 1 0Fh: Bx:PWROK Capt. 2

About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC". For more information, please visit: **http://www.kontron.com/**

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