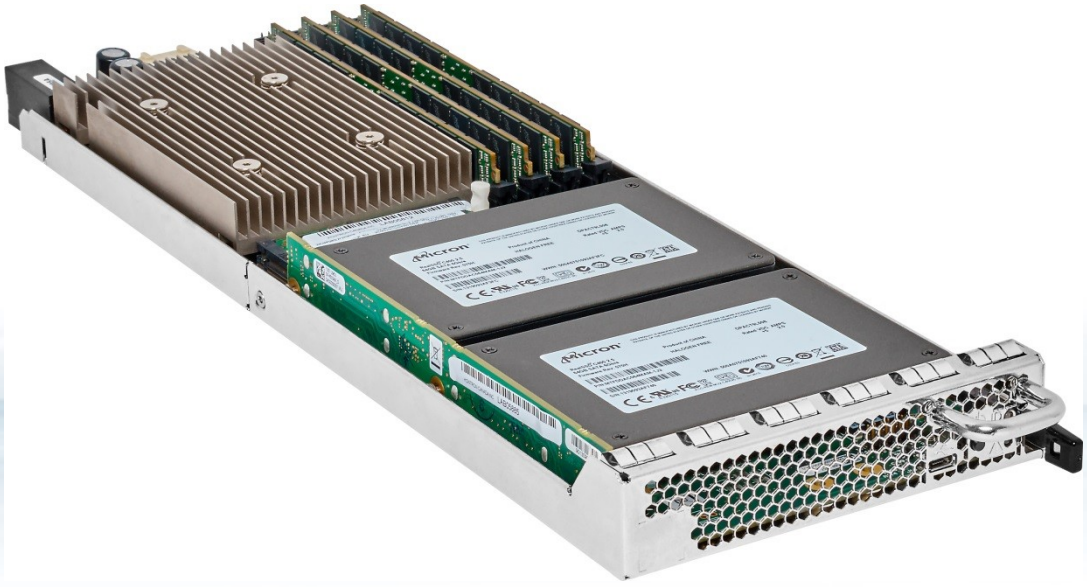
USER GUIDE



MSP8040 Series

Doc Rev. 1.2

[Objet]

POSSIBILITIES START HERE kontron

MSP8040 SERIES - USER GUIDE

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Kontron Ag

Lise-Meitner-Str. 3-5
86156 Augsburg
Germany
www.kontron.com

Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial Issue	2016-Mar-01
1.1	Corporate Identity and updated TPM information	2016-May-20
1.2	Added Xeon D-1559 support information.	2016-Oct-04

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Customer Comments

If you have any difficulties using this 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 guide on our website. Thank you.

Symbols

The following symbols may be 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

AMI	American Megatrends Inc
API	Application Programming Interface
BMC	Base Management Controller
BP	Backplane
CLI	Command-Line Interface
DMI	Desktop Management Interface
ECC	Error Checking and Correction
HHHL	Half height, half length
HPM	PICMG Hardware Platform Management specification family
IOL	IPMI-Over-LAN
IPMI	Intelligent Platform Management Interface
KCS	Keyboard Controller Style
KVM	Keyboard Video Mouse
MEI	Management Engine Interface
NCSI	Network Communications Services Interface
PCIe	PCI-Express
PXE	Preboot eXecution Environment
RAM	Random Access Memory
ShMC	Shelf Management Controller
SKU	Stock-Keeping Unit
SM	System Monitor
SOC	System on a Chip
SOL	Serial Over LAN
SSD	Solid-State Drive
SSH	Secure SHell
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface
VLP	Very Low Profile

Electrostatic Discharge

⚠CAUTION The MSP804x nodes are sensitive to electrostatic discharge (ESD). Users must take 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.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long-term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

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 MSP804x is a processor node for the MS2910 platform. Up to nine nodes can be installed in this platform, and each node has one CPU engine.

MSP804x references through this guide refer to any variants of this Node Series as described in Table 2 - Node key components, unless specified otherwise.

MSH89xx references through this guide refer to any variants of the SYMKLOUD Hub Series (e.g., MSH8900, MSH8910), unless specified otherwise.

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

Figure 1: SYMKLOUD layers

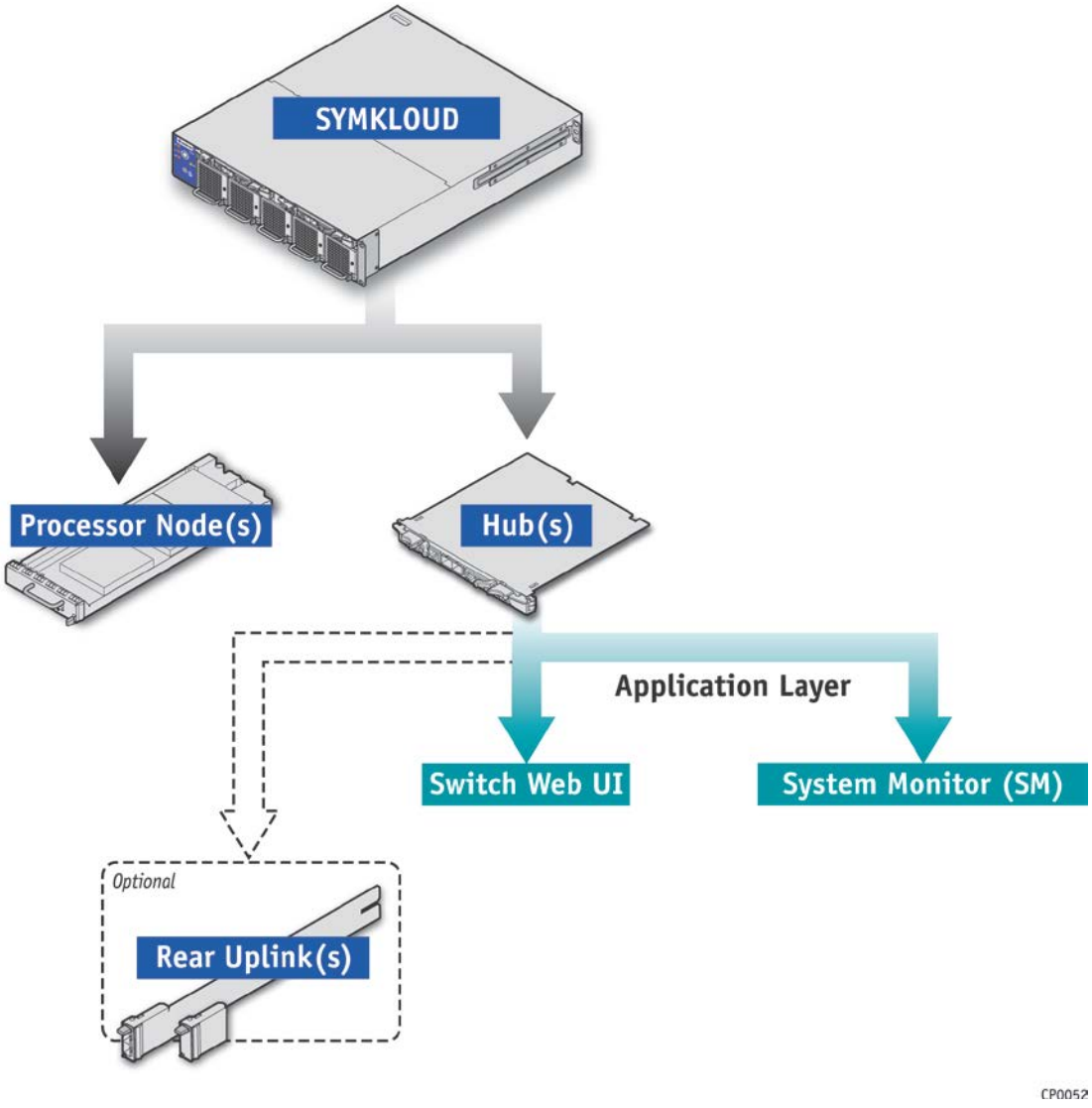
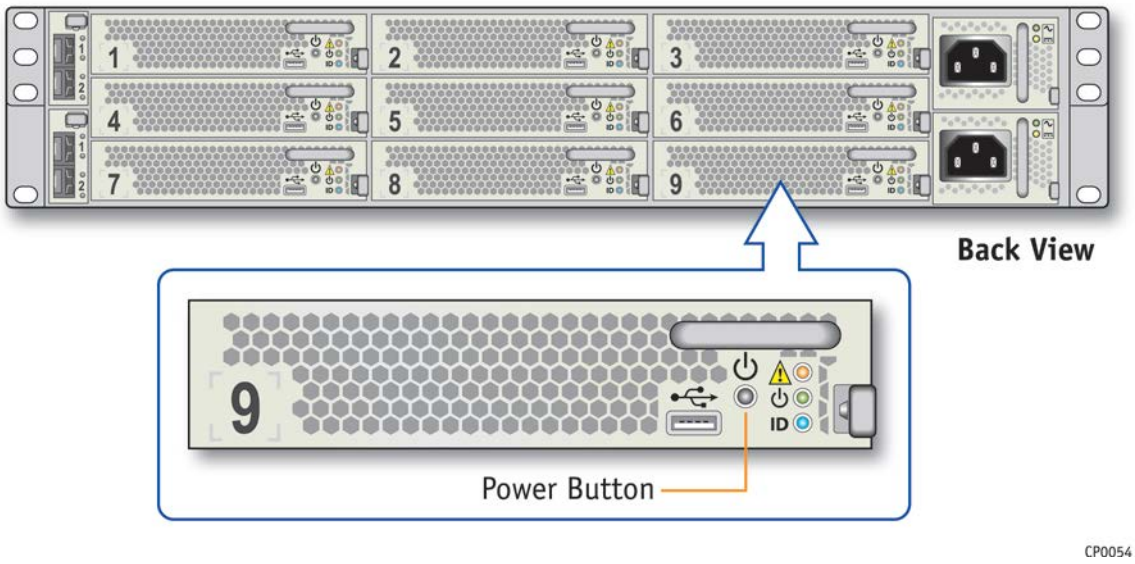


Figure 2: MSP804x in rear of chassis

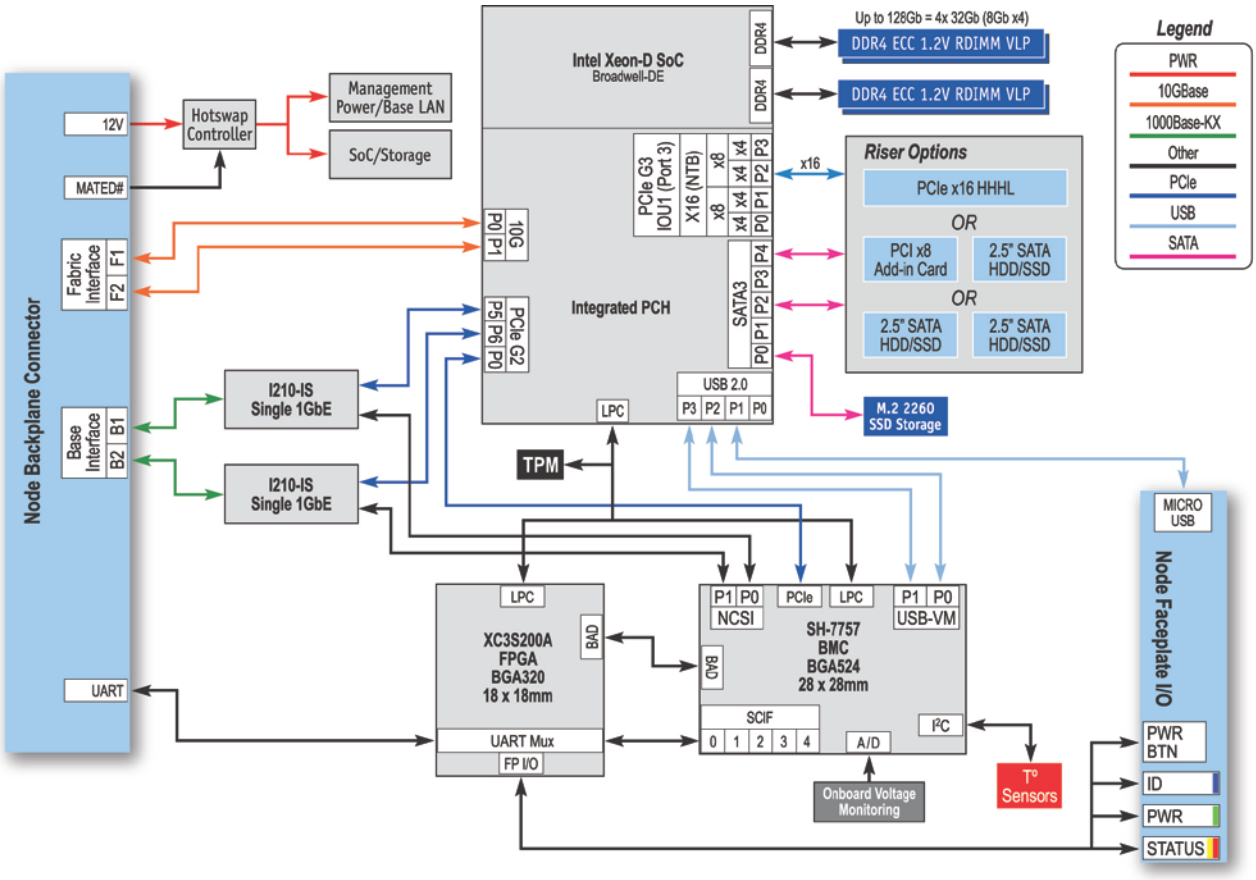


For information on other SYMKLOUD MS2910 components, refer to the specific component's user manual.

To obtain the latest document version or to consult other SYMKLOUD documents, visit the Kontron portal at kontron.com.

1.2. Block Diagram

Figure 3: MSP804x block diagram



1.3. PCI Mapping

Table 1: PCI mapping

Bus:Device. Function	Device ID	Component	Description	Note
CPU				
00:00.0	6F00	Host bridge	Intel Corporation Broadwell DMI2 (rev. 01)	Intel XEON D-15xx processor
00:03.1	6F09	PCI bridge	Intel Corporation Broadwell PCI Express Root Port 3 (rev. 01)	NVMe port
00:03.3	6F0b	PCI bridge	Intel Corporation Broadwell PCI Express Root Port 3 (rev. 01)	NVMe port
Chipset				
00:16.0	8C3A	Communication controller	Intel Corporation 8 Series/C220 Series Chipset Family MEI Controller No. 1 (rev. 04)	Broadwell-DE integrated chipset
00:1c.0	8C10	PCI bridge	Intel Corporation 8 Series/C220 Series Chipset Family PCI Express Root Port No. 1 (rev. d5)	
00:1c.5	8C1A	PCI bridge	Intel Corporation 8 Series/C220 Series Chipset Family PCI Express Root Port No. 6 (rev. d5)	
00:1c.6	8C1C	PCI bridge	Intel Corporation 8 Series/C220 Series Chipset Family PCI Express Root Port No. 7 (rev. d5)	
00:1d.0	8C26	USB controller	Intel Corporation 8 Series/C220 Series Chipset Family USB EHCI No. 1 (rev. 05)	
00:1a.0	8C2D	USB controller	Intel Corporation 8 Series/C220 Series Chipset Family USB EHCI No. 2 (rev. 05)	
00:1f.0	8C54	ISA bridge	Intel Corporation 8 Series/C220 Series Chipset Family Desktop Super SKU LPC Controller (rev. 05)	
00:1f.2	8C02	SATA controller	Intel Corporation 8 Series/C220 Series Chipset Family 6-port SATA Controller 1 [AHCI mode] (rev. 05)	
00:1f.3	8C22	SMBus	Intel Corporation 8 Series/C220 Series Chipset Family SMBus Controller (rev. 05)	
Network devices				
0b:00.0	1537	Ethernet controller	Intel Corporation (rev. 03)	Intel I210-IS 1Gb Ethernet to hub 1
0b:00.0	1537	Ethernet controller	Intel Corporation (rev. 03)	Intel I210-IS 1Gb Ethernet to hub 2
BMC				
06:00.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	Renesas SH7757 BMC
07:00.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	
07:01.0	0013	PCI bridge	Renesas Technology Corp. SH7757 PCIe Switch [PS]	
08:00.0	0012	PCI bridge	Renesas Technology Corp. SH7757 PCIe-PCI Bridge [PPB]	
09:00.0	0534	VGA compatible controller	Matrox Electronics Systems Ltd. G200eR2	Video controller of the remote access
Network devices				
03:00.0	15AB	Ethernet controller	Intel® Ethernet Connection X552 10GbE Backplane	Intel X552 1Gb/10Gb to hub 1
03:00.1	15AB	Ethernet controller	Intel® Ethernet Connection X552 10GbE Backplane	Intel X552 1Gb/10Gb to hub 2

1.4. Node Key Components

Table 2: Node key components

Component[1]	Description
SOC	*CPU* 1 Intel® Storage/Comms 4 Cores Xeon® D-1518, 1.5 MB/core cache, 2.2 GHz, 35 W **OR** 1 Intel® Storage/Comms 8 Cores Xeon® D-1548, 1.5 MB/core cache, 2.0 GHz, 45 W **OR** 1 Intel® Storage/Comms 12 Cores Xeon® D-1559, 1.5 MB/core cache, 1.5 GHz, 45 W **OR** 1 Intel® Storage/Comms 16 Cores Xeon® D-1577, 1.5 MB/core cache, 1.4 GHz, 45 W *PCH* Integrated
System memory	4 DIMM slots for up to 128 GB DDR4, supports VLP RDIMM and UDIMM 1.2V DDR4 with ECC, up to 2400 MHz
Network connections	2 Intel® I210-IS 1GbE controllers 1 Intel® dual 10GbE controller (integrated in SOC)
Security	Optional TPM 2.0 SLB9660 TT2.0
Storage	Onboard M.2 42 mm or 60 mm SATA module
I/O devices	1 serial port through backplane and hub or through SOL via the integrated BMC 1 KVM (Keyboard, Video, Mouse) accessible over LAN 1 USB storage via virtual media over LAN 1 micro-USB connection in faceplate
BIOS	16 MB SPI AMI UEFI BIOS
Optional configuration	2x HDD/SSD 2.5" up to 15 mm high (SATA) **OR** PCIe x8 add-on card plus 1x HDD/SSD 2.5" up to 15 mm high (SATA)[2] **OR** PCIe x16 HHHL add-on card[2]

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

[1] Some of the components are optional.
[2] For more information about the PCIe option, please contact Kontron.

1.5. Node Features

Table 3: Node features

Feature	Description
Remote management	IPMI 2.0 (subset) IOL SOL KVM/virtual media Remote firmware update Comprehensive sensor network and event monitoring
Hot swap	Supported Refer to the user guide of the hub used in the platform for information on system behavior upon hot swap
Power consumption	May vary depending on CPU and riser options MSP804x: 80 W without storage or PCIe option Dual SATA storage adds up to 20 W PCIe option power budget is 50 W The maximums are typical. Tests were conducted with CPU D-1548, 128 GB of 2133 MHz DDR4 RDIMMs, running a combination of CPU, memory, storage and network stress test applications.
Power management	S0 or S5 only

1.6. Node Module LEDs and Buttons

Figure 4: MSP804x LEDs and buttons

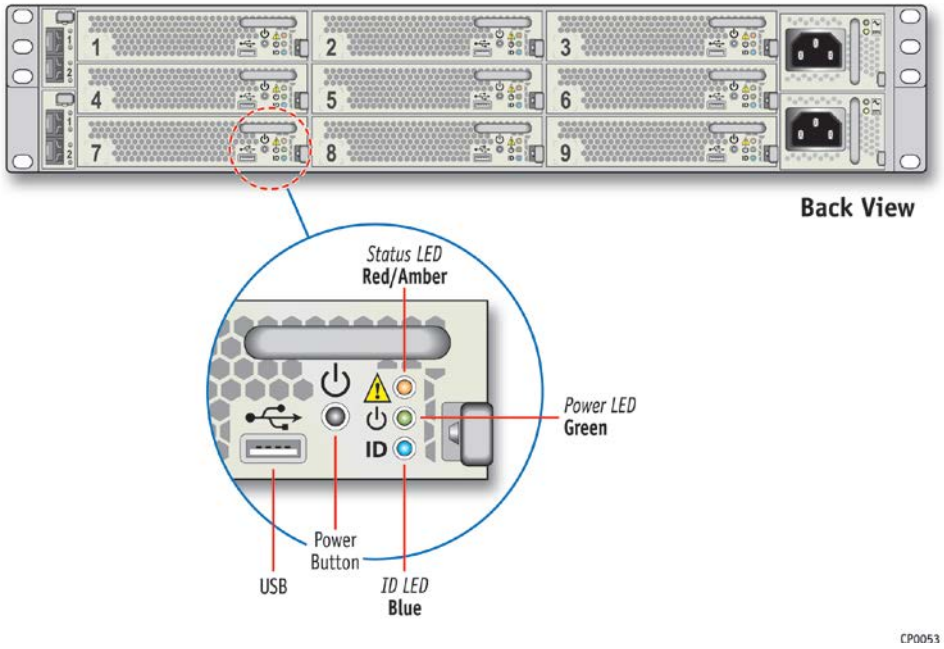


Table 4: LED status description and button behavior

MSP804x			
State	**ID (blue)**	**Power (green)**	**Status (amber)**
Identify command in progress	Blinking[1]	Not affected	Not affected
Payload power ON	OFF	ON	ON: not healthy OFF: healthy
Payload power OFF	ON	OFF	ON: not healthy OFF: healthy

[1]Fast blink, 1 Hz, 50%

Power button		
State	**Short press**	**Long press (4 seconds)**
Power OFF	Powers ON the CPU engine	Nothing happens
Power ON	Performs a clean shutdown of the CPU engine	Turns the CPU off immediately

1.7. Interfacing

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

Refer to the user guide of the hub used in the platform for information on how to access the SM and for the locations of the management and console ports.

Node used with hub MSH8900

When used with hub MSH8900, the MSP804x node supports four 1GbE ports when it is installed in chassis slots 1-6 or 8.

In slots 7 and 9, the link speed of the MSH8900 must be set to 1GbE for a link to be established with all four ports. If the speed is set to 10GbE, no link will be established with F1 and F2 (see Table 5).

For a complete port mapping and network topology of the system, refer to the hub user guide.

Node used with hub MSH8910

When used with hub MSH8910, no matter the slot the MSP804x is installed in, two 1GbE ports (B1 and B2) and two 10GbE ports (F1 and F2) are available.

For a complete port mapping and network topology of the system, refer to the hub user guide.

Table 5: Link status and speed configurations

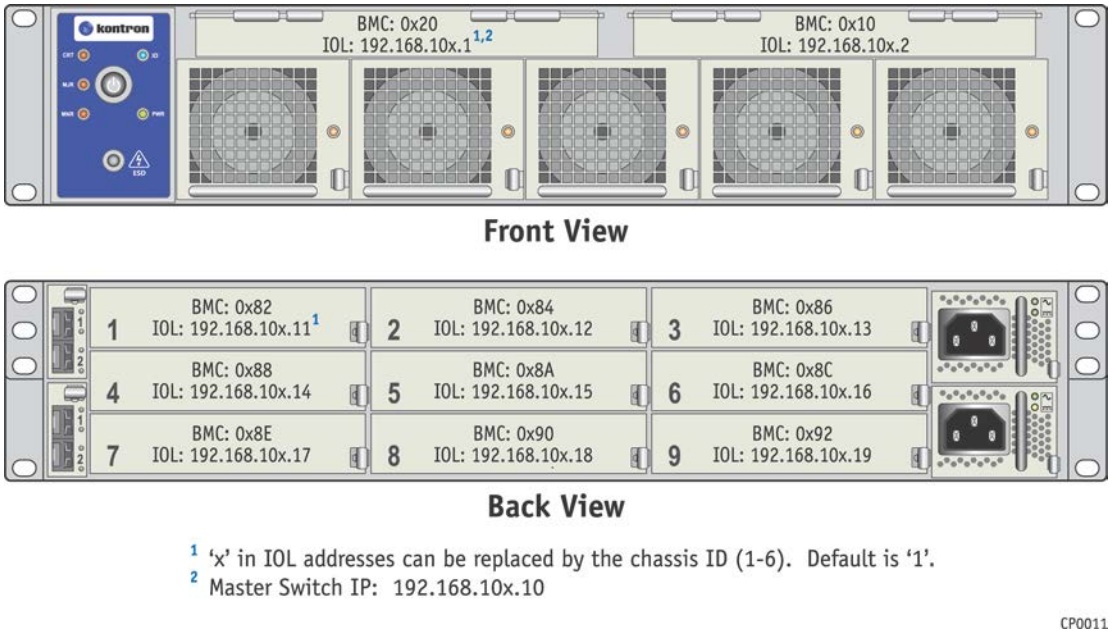
Configuration	B1	B2	F1	F2
MSH8900 when speed of slots 7 and 9 is set to 1GbE	1GbE	1GbE	1GbE	1GbE
MSH8900 when speed of slots 7 and 9 is set to 10GbE	1GbE	1GbE	No link	No link
MSH8910	1GbE	1GbE	10GbE	10GbE

1.7.1. Management Networking Connection

The SYMKLOUD platform comes with a System Monitor (SM). The SM includes a web user interface and a programmatic API to access system components, including its ShMC and nodes.

The IOL IP address of the component you want to connect to might be required when using certain paths. The IP address of external entities must be in the same subnet as that of the SYMKLOUD components as no default gateway is configured. The default IOL IP addresses are shown in Figure 5.

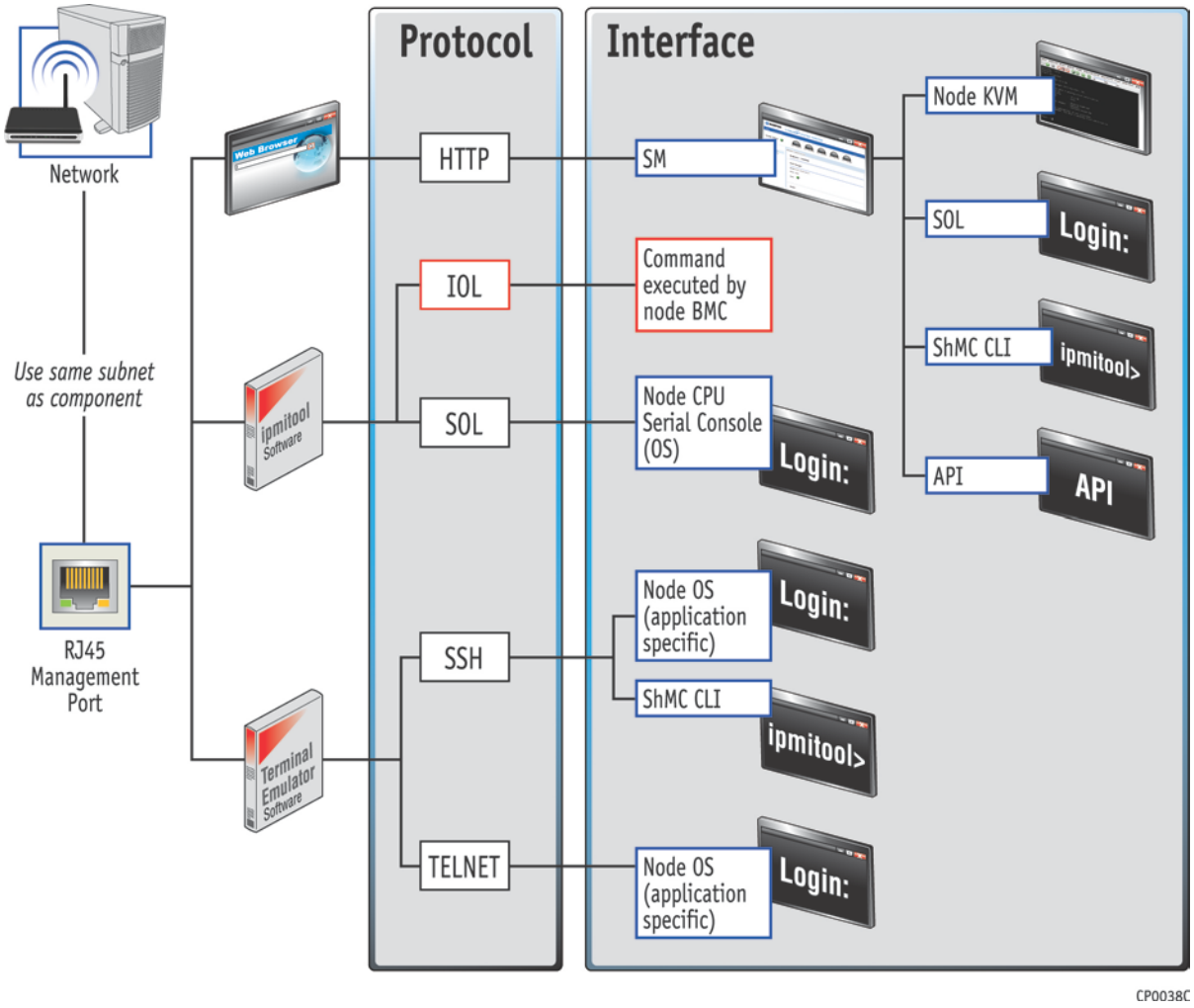
Figure 5: Default IP addresses



The MSP804x nodes have a KVM functionality that allows users remote access to the CPU engine. The remote console redirects the screen, keyboard and mouse of the remote host system. Through media redirection, users can mount a device, e.g. a USB drive or ISO image, as a remote device to the CPU engine. Once mounted, the device appears as a local device.

Figure 6 shows the possible network paths to access the various interfaces of the system components.

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



- Terminal emulator software such as PuTTY can be used.
- The Kontron ipmitool package can be downloaded from kontron.com, in the "Software Tools" section.
- Ensure the protocol is enabled for the interface you want to access (SSH, TELNET, etc).
- API calls can be made using a tool such as cURL. The configuration sections of this document detail the availability of such calls for specific configurations. Refer to the API documentation (available from the SM).
- To access SOL from the SM dashboard Console Access:
    - Log in to the SM;
    - From the Console Access dropdown list of the Dashboard screen, select a platform;
    - Log in with username "console" and password "admin";
    - When prompted, enter the number of the node to connect to;
    - When prompted, enter the payload number (the number is always 1).
- An IOL connection allows users to send ipmitool commands over the LAN for immediate execution by the addressed node BMC.

Example of 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: ipmitool –H <node BMC ip address> -U admin –P admin –I lanplus sol activate.
3. The OS specific prompt is displayed, e.g. Login.

* When an SOL session is activated on a node, the serial connection via the hub is no longer available until the session is deactivated.

Example of an HTTP connection to the node KVM:

1. Connect to the management port with a cable or via a network.
2. Open a web browser and enter the IP address of the hub to access the SM.
3. From the Dashboard screen, click on **REMOTE ACCESS**.
4. Click on **Node** n under the platform in which the node is installed.
5. Click on **REMOTE ACCESS** to start the session.

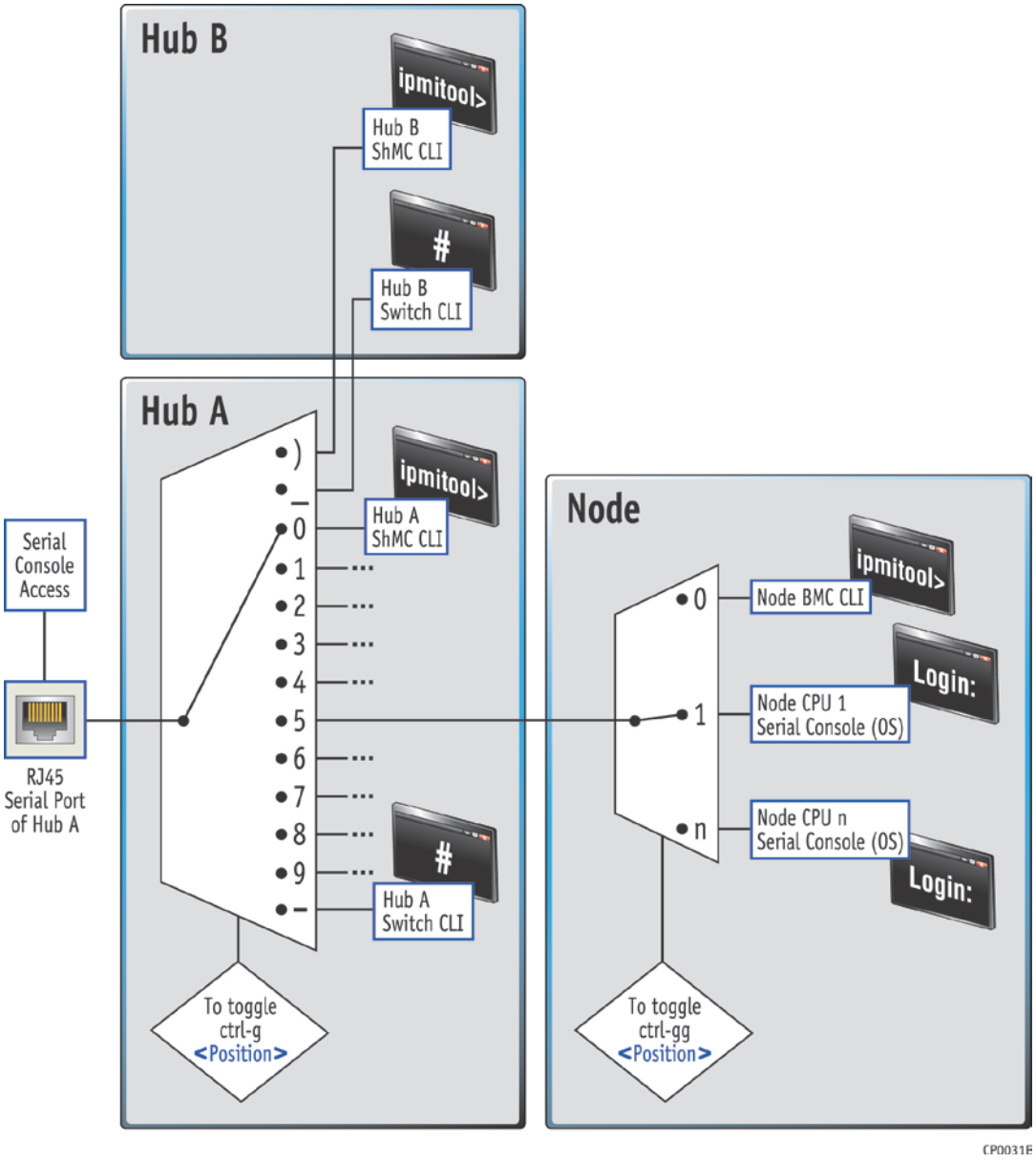
*In the examples above, the IP addresses of the SM (Shared IP and/or ShMC IP) and the target node (BMC IP) must be in the same subnet.

1.7.2. Serial Console Connection

The serial interface of the hubs includes a multiplexing functionality that can establish a link with each component through a series of hotkeys (Figure 7).

The console port of the hubs has a redundancy feature with its partner hub. This means that the console port of either hub installed in a SYMKLOUD chassis can be used to communicate with any hub/node in the chassis. The ports are mirror images of each other: any output or user input is reflected in both.

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+.

The ASCII control code for "Ctrl-g" is 7. To type "Ctrl-gg", use the "Ctrl-g" ASCII control code twice in a row.

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

1. Connect a PC's serial port to the active hub's console port.
2. Establish a connection using the PC terminal emulator with parameters 115200 8n1.
3. To configure the hub console port MUX, type Ctrl-g <Node No. (1-9)>, then Ctrl-gg 1.

1.7.3. Default User Names and Passwords

Table 6: Default usernames and passwords

Configuration interface	Username and password
SM (UI)	admin admin
ShMC CLI	admin admin
Node CPU serial console (OS)	Customer specific

2/ Extracting and Inserting a Node Module

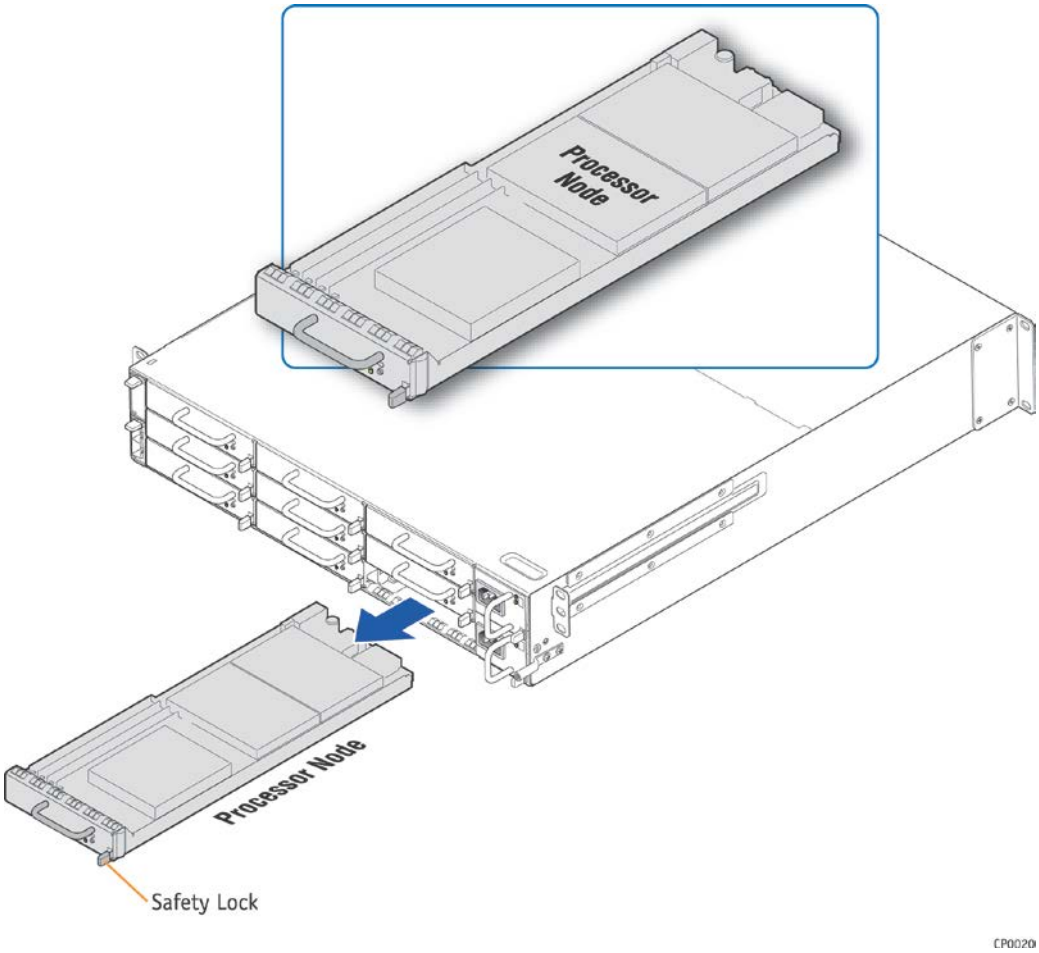
2.1. Extracting a Node Module

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 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 clicks in place.
3. Wait for the power LED of the processor node module to become steady green (30 to 120 seconds): the node 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 MSP804x nodes, the systems and functionalities could be affected.

3/ Software Configurations and Conventions

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

Mandatory tasks:

- Booting from LAN, or from virtual media, or USB storage in faceplate, or from disk onboard
- Installing an OS

Conventions:

- Elements between < > in blue are variables. The value shown is an example or an instruction on what to enter.
- Items between () show a value range for the variable spelled out, e.g. <Switch No. (1-5)> means you must enter the switch number 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 user guide of the hub used for the IPMI mapping of the system.

Configuration command tables:

Sections 4/ and 5/ contain tables with two columns. 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 the 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.

IPMI command convention:

In the following sections, when you see “From IPMITOOL”, one of the three options below can be selected. The generic “PROMPT” will be used to identify the access command or path (e.g., PROMPT <IPMI command>):

From the ShMC CLI

ipmitool> set targetaddr <node ipmi address>

ipmitool> <IPMI command>

From an IOL remote PC

> ipmitool –H <node BMC ip address> -U admin –P admin –I lanplus <IPMI command>

From an IOL remote PC via ShMC

> ipmitool –H <ShMC ip address > -U admin –P admin –t <node ipmi address> <IPMI command>

4/ Configuring Node Modules

4.1. Node Reset

To reset the CPU of a node:

SM	Node CPU serial console, IPMITOOL
From the SM Dashboard > Monitor Select the platform Click on the node to reset In section Power Commands, click on **RESET**	*From the Node CPU serial console* Send a break sequence *From IPMITOOL* PROMPT **power reset**
Notes	
	For the node CPU serial console connection, the method is terminal emulator specific, e.g. with a putty–type terminal use Ctrl-break or use menu **Special command** and select **Break.**

4.2. Boot Order

To choose the boot order of a processor node:

KVM	Node CPU serial console
Perform a node reset (section 4.1) Press **[Del]** or **[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 Press **Enter** to select the device to position Select the **Save & Exit** tab Select **Save Changes and Reset**	Perform a node reset (section 4.1) Press **[Del]** or **[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 Press **Enter** to select the device to position Select the **Save & Exit** tab Select **Save Changes and Reset**
Notes	
You could boot from LAN, from virtual media or from disk on board. The default Boot Priority Order is: virtual media (if open), hard drive (if installed), Fabric Interface LAN, Base Interface LAN.	

To change the boot order of a processor node temporarily:

KVM	Node CPU serial console, IPMITOOL
Perform a node reset (section 4.1) Press **[Del]** or **[F2]** when prompted to enter the bios setup menu Select the **Save & Exit** tab Bootable devices are listed under Boot Override *To choose the Boot Override* Use the up or down arrow key to select a boot device Press **Enter**	Perform a node reset (section 4.1) Press **[Del]** or **[F2]** when prompted to enter the bios setup menu Select the **Save & Exit** tab Bootable devices are listed under Boot Override *To choose the Boot Override* Use the up or down arrow key to select a boot device Press **Enter** *From IPMITOOL* PROMPT chassis bootdev <device> *Within 30 seconds, issue the following command to reset the payload:* PROMPT power reset The possible values for <device> are: none: Do not change boot device order pxe: Force PXE boot cdrom: Force boot from CD/DVD bios: Force boot into BIOS Setup floppy: Force boot from Floppy/primary removable media
Notes	
You could boot from LAN, from virtual media or from disk on board.	

4.3. Boot from Virtual Media

To boot a processor node from a virtual media:

KVM	Not possible from a CLI-type interface
Select the **Media** tab Connect the media device and select the appropriate option Click on **Close** Perform a node reset (section 4.1) Set the boot priority of your media device (section 4.2)	
Notes	
The possible options are virtual floppy, virtual CD and virtual hard disk.	

4.4. OS Installation

To install an OS:

KVM	Not possible from a CLI-type interface
Boot from LAN or from virtual media (section 4.3) Select the **CD/DVD** option Proceed with installation	

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:

SM	Not possible from a CLI-type interface
Dashboard > OnClick 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**	
API calls available to update a node	
Notes	
This operation must be done for all nodes.	

5.2. One Click Upgrade to Update all Nodes

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

SM	Not possible from a CLI-type interface
Dashboard > OnClick 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 calls available to update all nodes	
Notes	
The update will be performed only on the components for which files are included in the ZIP file bundle.	

Appendix A – Sensor List

The following tables contain information on the sensors of the MSP804x hub. Table 8 provides detailed information on the sensors described in blue in Table 7.

Table 7: Sensor list

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
0	FRU0 Hot Swap	F0h ATCA HotSwap Sensor	6Fh (Sensor Specific)	ATCA HotSwap Sensor	See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
1	Temp Inlet	01h (Temperature)	01h (Threshold Based)	Board Inlet Temperature	See IPMI v2.0 table 42-2 for threshold based event
2	Temp Vcore			Board Outlet Temperature	
3	Temp M2			Board Temperature near the M.2 slot	
4	Temp BMC			BMC Temperature	
5	Temp CPU			CPU Temperature	
6	Temp DIMM A			DIMM A Temperature via SPD	
7	Temp DIMM B			DIMM B Temperature via SPD	
8	Temp DIMM C			DIMM C Temperature via SPD	
9	Temp DIMM D			DIMM D Temperature via SPD	
10	Temp PCIe Slot			PCIe slot temperature	
11	Vcc +12V IN	02h (Voltage)	01h (Threshold Based)	Voltage on board 12V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
12	Vcc +5V SUS			Voltage on board 5V suspend power supply	
13	Vcc +3.3V SUS			Voltage on board 3.3V suspend power supply	
14	Vcc +1.7V SUS			Voltage on board 1.7V suspend power supply	
15	Vcc +1.5V SUS			Voltage on board 1.5V suspend power supply	
16	Vcc +1.3V SUS			Voltage on board 1.3V suspend power supply	
17	Vcc +1.25V SUS			Voltage on board 1.25V suspend power supply	
18	Vcc +1.2V SUS			Voltage on board 1.2V suspend power supply	
19	Vcc +1.05V SUS			Voltage on board 1.05V suspend power supply	
20	Vcc +12V			Voltage on board 12V payload power supply	
21	Vcc +5V			Voltage on board 5V payload power supply	
22	Vpp +2.5V			Voltage on board 2.5V payload power supply	
23	Vddq +1.2V			Voltage on board 1.2V Vddq power supply	
24	Vtt ddr 0.6V			Voltage on board 0.6V VttDDR power supply	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
25	Power NODE	0Bh (Watt)	01h (Threshold Based)	Power consumption in watts of the complete blade	See IPMI v2.0 table 42-2 for threshold based event
26	Power PCIe			Power consumption in watts of the PCIe slot	
27	Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State	Sensor type code D1h for sensor definition
28	Power Good	08h (Power Supply)	77h (OEM)	Actual power good status	Event/Reading type code 77h for sensor definition
29	Power Good Event	08h (Power Supply)	03h (Digital Discrete)	Power good status event that occurred since the last power on or reset	See IPMI v2.0 table 42-3, Sensor type code 2B for sensor definition
30	PWROK Capture 1			Latched power rail status	
31	PWROK Capture 2			Latched power rail status	
32	Ver Change BMC	2Bh (Version Change)	6Fh (Sensor Specific)	IPMC Firmware Change Detection	See IPMI v2.0 table 42-3, Sensor type code 2B for sensor definition
33	Ver Change FPGA			FPGA Firmware Change Detection	
34	Ver Change BIOS			BIOS Firmware Change Detection	
35	IPMI Info-1	C0h (OEM Firmware Info)	70h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic	Sensor type code C0h (Kontron OEM Firmware Info) forsensor definition and Event/Reading type code 70h (Kontron OEM Internal Diagnostic)
36	IPMI Info-2				
37	IPMI Watchdog	23h (Watchdog)	6Fh (Sensor Specific)	IPMI Watchdog (payload watchdog)	Only offset 0,1,2,3,8 are used See IPMI v2.0 table 42-3, Sensor type code 23h (Watchdog 2) for sensor definition
38	POST Value	C6h (OEM POST Value)	6Fh (Sensor Specific)	Show current postcode value (No event generated)	Only offset 0 to 7 and 14 are used Sensor type code C6h for sensor definition
39	Board Reset	CFh (OEM Kontron POST Code Value)	03h (Digital Discrete)	Board reset type and sources	Only offset 0,1 are used Sensor type code CFh for sensor definition
40	ACPI State	22h (System ACPI Power State)	6Fh (Sensor Specific)	Advance Configuration and Power Interface State	Only offset 0,4,5,10,11,12,14 are used See IPMI v2.0 table 42-3, Sensor type code 22h (ACPI Power State) for sensor definition
41	Health Status	24h (Platform Alert)	7Fh (OEM Health Status)	General health status (Aggregation of critical sensors)	Event/Reading type code 7Fh for sensor definition
42	CPU Status	07h (Processor)	6Fh (Sensor Specific)	Processor 0 Status	Only offset 0,1,5 are used See IPMI v2.0 table 42-3, Sensor type code 07h for sensor definition
43	EventRcv ComLost	1Bh (Cable / Interconnect)	03h (Digital Discrete)	Event Receiver Communication lost detection	Only offset 0,1 are used See IPMI v2.0 table 42-3, Sensor type code 24h for sensor definition

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
44	BMC Reboot	24h (Platform Alert)	03h (Digital Discrete)	BMC Reboot detection	Only offset 0,1 are used See IPMI v2.0 table 42-3, Sensor type code 24h for sensor definition
45	BMC Storage Err	28h (Management Subsystem Health)	6Fh (Sensor Specific)	Management sub-system health (non-volatile memory error)	Only offset 1 is used See IPMI v2.0 table 42-3, Sensor type code 28h for sensor definition
46	BMC SEL State	10h (Event Logging Disable)	6Fh (Sensor Specific)	Specify the status of the SEL (Cleared/Almost full/Full)	Only offset 2,4,5 are used See IPMI v2.0 table 42-3, Sensor type code 10h (Event Log Disable) for sensor definition
47	SEL Time Set	12h (System)	6Fh (Sensor Specific)	Specify when SEL time change	Only offset 5 is used See IPMI v2.0 table 42-3, Sensor type code 12h for sensor definition
48	Jumper Status	D3h (OEM Jumper Status)	6Fh (Sensor Specific)	Reflects on-board jumper presence	Offsets 0 to 14 are used Sensor type code D3h (Kontron OEM Jumper Status) for sensor definition
49	Thermal Error	0Ah (Cooling Device)	03h (Digital Discrete)	Cooling problem	See IPMI v2.0 table 42-3, Sensor type 0Ah (Cooling Device) for sensor definition

Table 8: Detailed information for specific sensors

Sensor Name	Event/Reading type code	Sensor Type	Sensor Specific offset	Event Trigger
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	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
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	5V 1.05V_SUS 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) 12V Slot Vcore 1.3V_SUS 1.7V_SUS 2.5V_Vpp VttDdr VddqDdr Unused Unused
Jumper Status	6Fh Standard IPMI sensor specific	D3h Kontron OEM Jumper Status Sensor	00h 01h 02h 03h 04h 05h 06h	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)
Power State	6Fh Standard IPMI sensor specific	D1h Kontron OEM Power state sensor	00h 01h 02h 03h 04h	Power ON Power OFF Power ON Request Power OFF Request Full Reset In Progress
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

Sensor Name	Event/Reading type code	Sensor Type	Sensor Specific offset	Event Trigger	
Board 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	
Health Status	7Fh OEM Health Severity Status Sensor	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: ID - Sensor Name 01h - Temp Inlet 02h - Temp Vcore 03h - Temp M2 04h - Temp BMC 05h - Temp CPU 06h - Temp DIMM A 07h - Temp DIMM B 08h - Temp DIMM C 09h - Temp DIMM D 0Ah - Temp PCIe Slot 0Bh - Vcc +12V IN 0Ch - Vcc +5V SUS 0Dh - Vcc +3.3V SUS	0Eh - Vcc +1.7V SUS 0Fh - Vcc +1.5V SUS 10h - Vcc +1.3V SUS 11h - Vcc +1.25V SUS 12h - Vcc +1.2V SUS 13h - Vcc +1.05V SUS 14h - Vcc +12V 15h - Vcc +5V 16h - Vpp +2.5V 17h - Vddq +1.2V 18h - Vtt Ddr 0.6V 1Eh - PWROK Capture 1 1Fh - PWROK Capture 2 25h - IPMI Watchdog

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/

CORPORATE OFFICES

EUROPE, MIDDLE EAST & AFRICA

Lise-Meitner-Str. 3-5
86156 Augsburg
Germany
Tel.: + 49 821 4086-0
Fax: + 49 821 4086-111
info@kontron.com

NORTH AMERICA

14118 Stowe Drive
Poway, CA 92064-7147
USA
Tel.: + 1 888 294 4558
Fax: + 1 858 677 0898
info@us.kontron.com

ASIA PACIFIC

1~2F, 10 Building, No. 8 Liangshuihe 2nd Street,
Economical & Technological Development Zone,
Beijing, 100176, P.R. China
Tel.: + 86 10 63751188
Fax: + 86 10 83682438
info@kontron.cn