USER GUIDE

MSP8060 series

Doc. Rev. 1.0

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MSP8060 SERIES - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
0.91	Beta Issue. Section 6 not included.	2017-Dec-01
1.0	Initial issue	2017-Dec-22

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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 life/health and/or result in damage to 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

API	Application Programming Interface
BMC	Baseboard Management Controller
CLI	Command-Line Interface
ECC	Error Checking and Correction
FRU	Field Replaceable Unit
Hub	Switch with Shelf Management Controller
IOL	IPMI-Over-LAN
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
KCS	Keyboard Controller Style
MMC	Module Management Controller
MSP node	Modular Server Processing Node

NCSI	Network Communications Services Interface
PCIe	PCI-Express
PCU	Platform Controller Hub
PIC	Programmable Interrupt Controller
RDP	Remote Desktop
SEL	System Event Log
ShMC	Shelf Management Controller
SM	System Monitor Web Interface
SOC	System on a Chip
SOL	Serial Over LAN
SSH	Secure Shell
TPM	Trusted Platform Module
VLP	Very Low Profile

Electrostatic Discharge

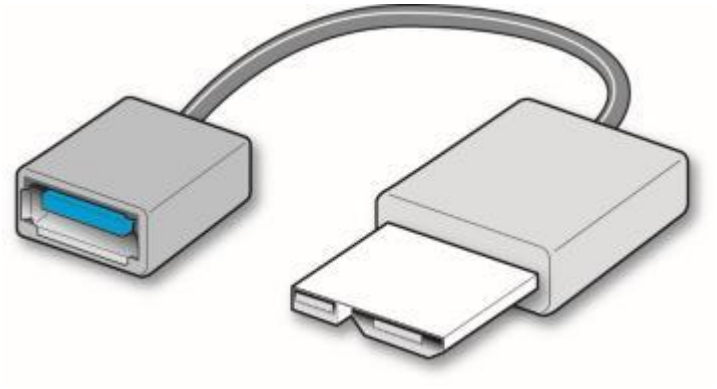
ESD Sensitive Device!

MSP8060 series modular server processing nodes are sensitive to electrostatic discharge (ESD). Users must take the appropriate precautions when handling ESD-sensitive devices.

Adapters

To connect USB devices such as a mouse, keyboard or DVD drive to a CPU engine, a Micro USB 3.0 to USB Type A adapter can be used.

Figure 1: Micro USB 3.0 to USB Type A



Limited Warranty

Please refer to the full terms and conditions of the Standard Warranty on Kontron's website at:

https://www.kontron.com/support-and-services/rma/canada/standard_warranty_policy_canada.pdf.

1/ Product Description

1.1. Product Overview

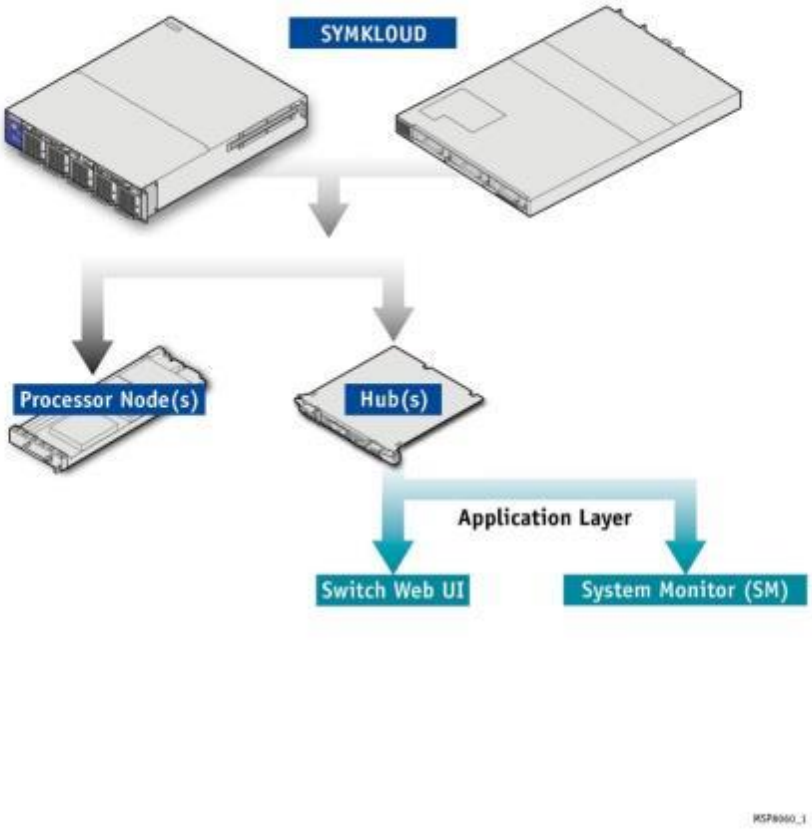
MSP8060 series nodes are modular server processing nodes (MSP nodes) designed for SYMKLOUD MS platforms. MSP8060 series nodes have two CPU engines and a BMC architecture boasting two virtual MMCs.

An OS must be loaded on the CPU engines for the system to be operational.

Table 1: Node features

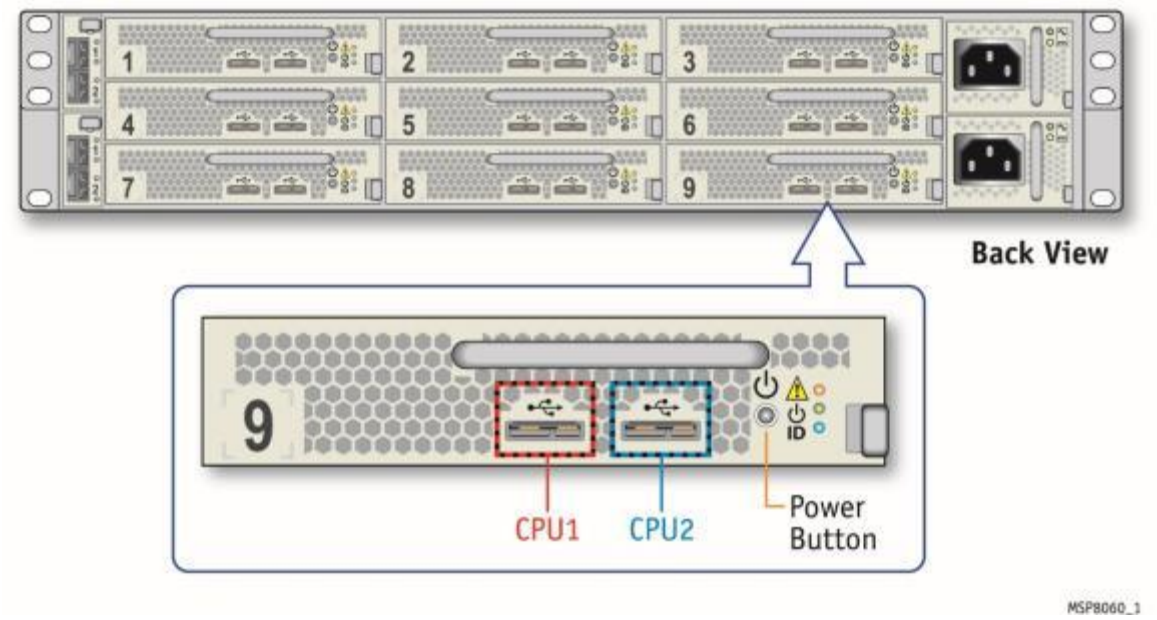
Feature	Description
Remote management	IPMI 2.0 IOL SOL Remote firmware upgrade Comprehensive sensor network and event monitoring
OS certifications	Red Hat Enterprise Linux 64-bit, release 7.4 Red Hat OpenStack Platform, release 10.0 and 11.0 Ubuntu 16.04 LTS 64-bit VMware ESXi 6.5
Hot swap	Supported Refer to the user guide of the hub used in the platform for information on system behavior upon hot swap.
Power management	S0 or S5 only

Figure 2: SYMKLOUD layers



The figures in this manual use the MS2900 platform (up to 9 MSP nodes) for illustration purposes; however, all the information provided also applies to the MS1300 platform (up to 3 MSP nodes).

Figure 3: MSP8060 series nodes in an MS2900 series chassis



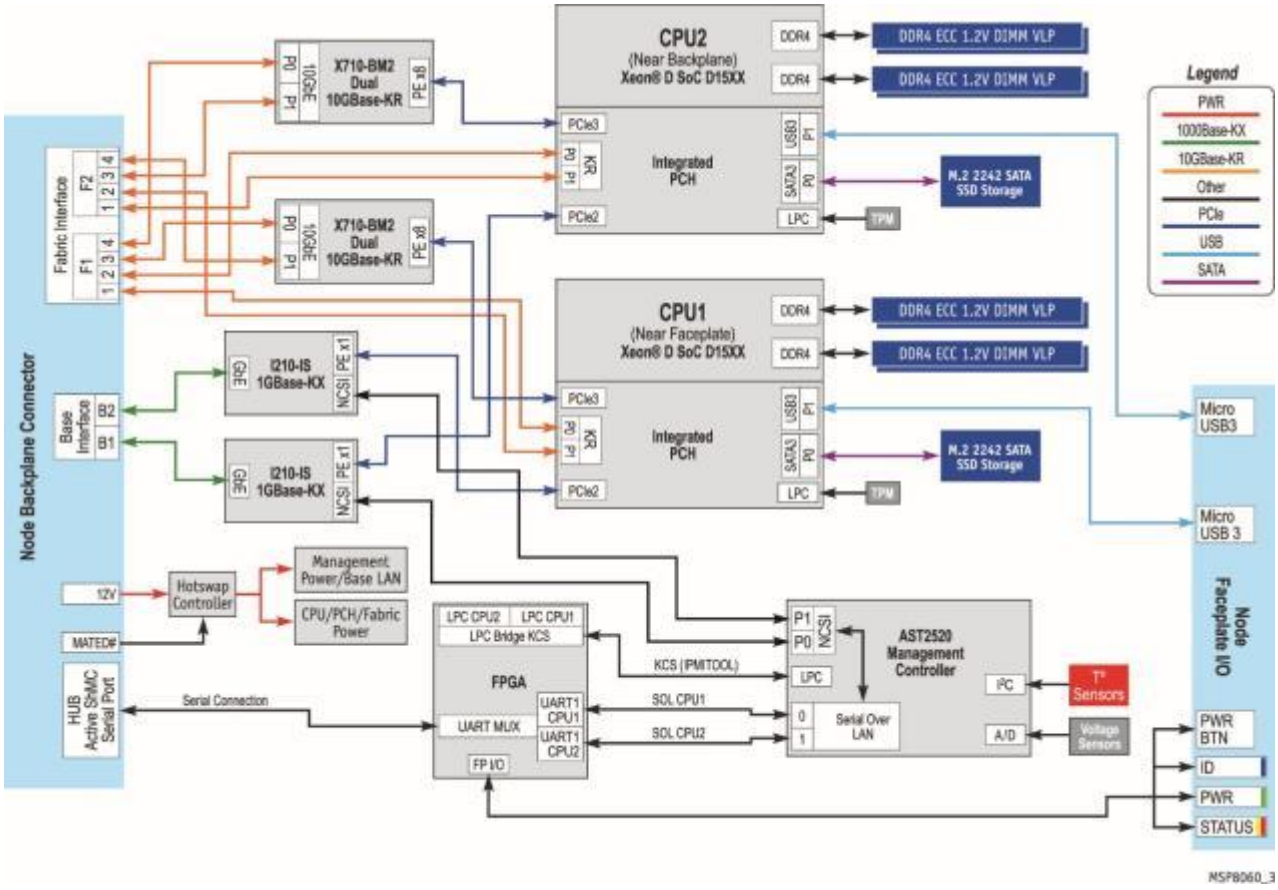
Kontron products have a QR code. This code will provide the following information: serial number, part number, batch ID, and base MAC address.

For information on other components of SYMKLOUD MS platforms, 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 4: MSP8060 series nodes block diagram



1.3. Node Key Components

Table 2: Node key components per CPU engine

Component[1]	Description
SOC	*CPU* 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 per CPU, supports VLP RDIMM and UDIMM 1.2V DDR4 with ECC, up to 2400 MHz
Network connections	1 Intel® I210-IS 1GbE controllers 1 Intel® dual 10GbE controller (integrated in SOC) 1 Intel® X710-BM2 dual 10GbE controller
Security	Optional TPM 2.0 SLB9660 TT2.0
Storage	Onboard M.2 42 mm SATA module *When the ambient temperature exceeds 40°C, the temperature of the M.2 SSD may exceed 70°C under some conditions.
I/O devices	1 serial port through backplane and switch with ShMC or through SOL via the integrated BMC 1 Micro USB 3.0 AB type connector on faceplate
BIOS	16 MB SPI AMI UEFI BIOS

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

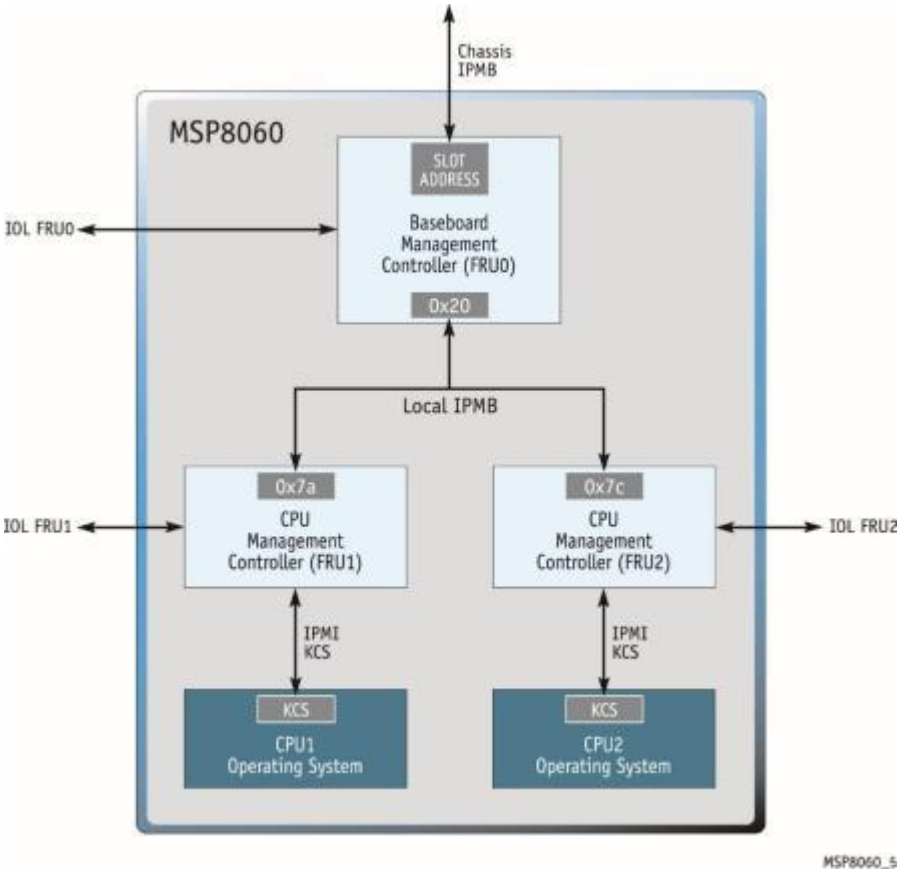
[1]Some of the components are optional.

1.4. BMC Architecture Overview

To facilitate OpenStack integration, an architecture based on a BMC split into two virtual MMCs was created. This enables the OpenStack logic where one CPU is associated with one BMC.

The MSP8060 node may require additional BMC configurations in order to fully leverage the benefits of its architecture. Refer to section 3/ and Appendix C for instructions.

Figure 5: BMC architecture



Components	Description
Chassis IPMB	The chassis IPMB is the communication channel to and from the BMCs of other MSP nodes in an MS platform.
Slot address	The slot address is the IPMB address of the node BMC (e.g. 0x82 for node 1) and is linked to the node's position in the platform (refer to Figure 8 and Figure 9 for a list of these addresses).
Local IPMB	The local IPMB link is the IPMI communication channel linking the baseboard management controller (FRU0) and the management controllers of CPU1 and CPU2 (FRU1/FRU2).
IPMI KCS	The IPMI KCS is the communication channel linking the management controller of CPU1 (FRU1) to the OS of CPU1 and the management controller of CPU2 (FRU2) to the OS of CPU2.

Some parameters configured on FRU0 are reflected/configured automatically on FRU1 and FRU2 (refer to Figure 5 for the BMC architecture):

- **Access Mode**: Always enabled on all IOL interfaces; it cannot be disabled.
- **VLAN ID**: Can only be configured on the baseboard management controller (FRU0). The management controllers of CPU1 and CPU2 will reflect the value of the controller of FRU0. This means the same VLAN must be used for all the IPMI-Over-LAN accesses on MSP8060.
- **Default Gateway IP**: Can only be configured on the baseboard management controller (FRU0). The management controllers of CPU1 and CPU2 will reflect the value of the controller of FRU0. This means there can only be one default gateway for all the IPMI-Over-LAN interfaces on MSP8060 nodes.

Some configurations done on FRU0 are automatically reflected/configured on FRU1 and FRU2 and some configurations can only be done on FRU0 (refer to Appendix B).

1.5. Node Module LEDs and Buttons

Figure 6: MSP8060 series node LEDs and buttons

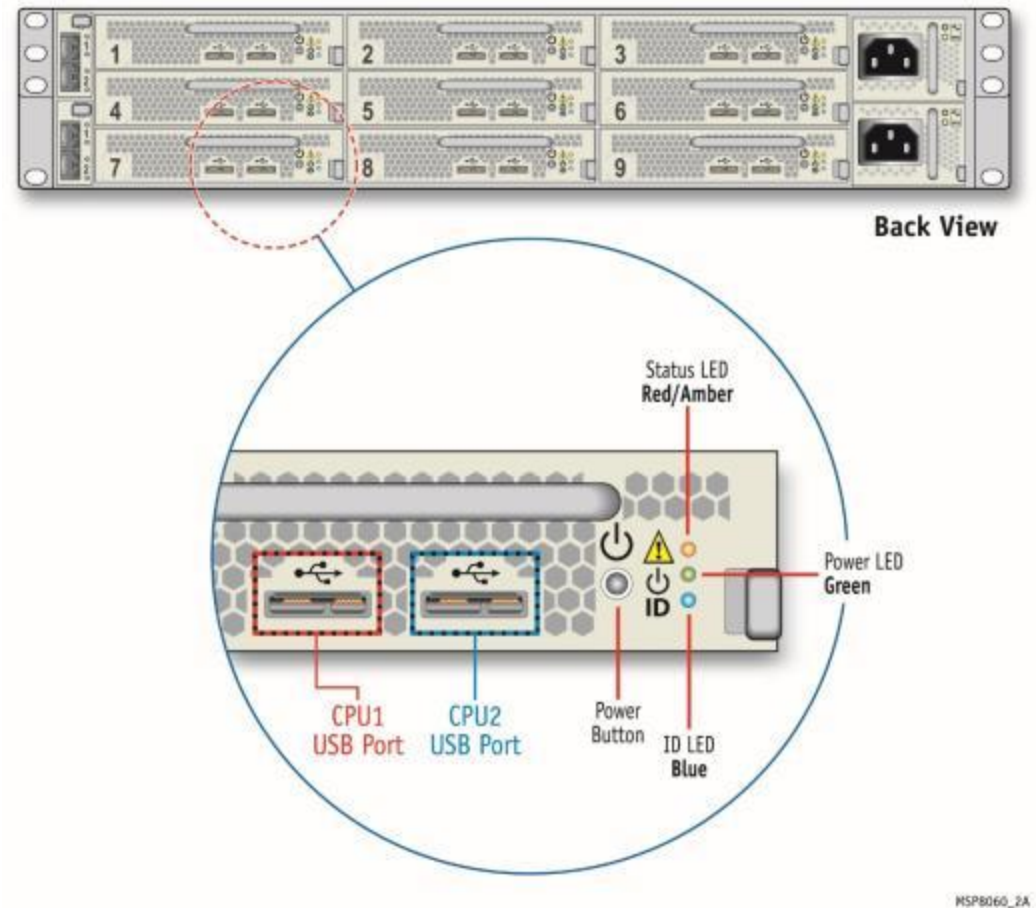


Table 3: LED status description and button behavior

MSP8060 series			
State	ID (blue)	Power (green)	Status (amber)
Identify command in progress	Blinking	Not affected	Not affected
Server power ON for at least one CPU engine	OFF	ON	ON: not healthy OFF: healthy
Server power OFF	ON	OFF	ON: not healthy OFF: healthy

Power button		
State	Short press	Long press (4 seconds)
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

1.6. PCI Mapping

Table 4: PCI mapping

Bus:Device.Function	Vendor ID	Device ID	Component	Description
00:00.0	8086	6F00	Host Bridge	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D DMI2 (rev 04)
00:01.0	8086	6F02	PCI Bridge	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PCI Express Root Port 1 (rev 04)
00:02.0	8086	6F04	PCI Bridge	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PCI Express Root Port 2 (rev 04)
00:02.2	8086	6F04	PCI Bridge	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PCI Express Root Port 2 (rev 04)
00:03.0	8086	6F08	PCI Bridge	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D PCI Express Root Port 3 (rev 04)
00:05.0	8086	6F28	System Peripheral	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D Map/VTd_Misc/System Management (rev 04)
00:05.1	8086	6F29	System Peripheral	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D IIO Hot Plug (rev 04)
00:05.2	8086	6F2A	System Peripheral	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D IIO RAS/Control Status/Global Errors (rev 04)
00:05.4	8086	6F2C	PIC	Intel Corporation Xeon E7 v4/Xeon E5 v4/Xeon E3 v4/Xeon D I/O APIC (rev 04)
00:14.0	8086	8C31	USB Controller	Intel Corporation 8 Series/C220 Series Chipset Family USB xHCI (rev 05)
00:16.0	8086	8C3A	Communication Controller	Intel Corporation 8 Series/C220 Series Chipset Family MEI Controller #1 (rev 04)
00:16.1	8086	8C3B	Communication Controller	Intel Corporation 8 Series/C220 Series Chipset Family MEI Controller #2 (rev 04)
00:1C.0	8086	8C10	PCI Bridge	Intel Corporation 8 Series/C220 Series Chipset Family PCI Express Root Port #1 (rev d5)
00:1C.5	8086	8C1A	PCI Bridge	Intel Corporation 8 Series/C220 Series Chipset Family PCI Express Root Port #6 (rev d5)
00:1D.0	8086	8C26	USB Controller	Intel Corporation 8 Series/C220 Series Chipset Family USB EHCI #1 (rev 05)
00:1F.0	8086	8C54	ISA Bridge	Intel Corporation C224 Series Chipset Family Server Standard SKU LPC Controller (rev 05)
00:1F.2	8086	8C02	SATA Controller	Intel Corporation 8 Series/C220 Series Chipset Family 6-port SATA Controller 1 [AHCI mode] (rev 05)
00:1F.3	8086	8C22	SMBus	Intel Corporation 8 Series/C220 Series Chipset Family SMBus Controller (rev 05)
02:00.0	8086	6F50	System Peripheral	Intel Corporation Xeon Processor D Family QuickData Technology Register DMA Channel 0

Bus:Device.Function	Vendor ID	Device ID	Component	Description
02:00.1	8086	6F51	System Peripheral	Intel Corporation Xeon Processor D Family QuickData Technology Register DMA Channel 1
02:00.2	8086	6F52	System Peripheral	Intel Corporation Xeon Processor D Family QuickData Technology Register DMA Channel 2
02:00.3	8086	6F53	System Peripheral	Intel Corporation Xeon Processor D Family QuickData Technology Register DMA Channel 3
03:00.0	8086	15AB	Ethernet Controller	Intel Corporation Ethernet Connection X552 10 GbE Backplane
03:00.1	8086	15AB	Ethernet Controller	Intel Corporation Ethernet Connection X552 10 GbE Backplane
05:00.0	8086	1581	Ethernet Controller	Intel Corporation Ethernet Controller X710 for 10GbE backplane (rev 02)
05:00.1	8086	1581	Ethernet Controller	Intel Corporation Ethernet Controller X710 for 10GbE backplane (rev 02)
08:00.0	8086	1537	Ethernet Controller	Intel Corporation I210 Gigabit Backplane Connection (rev 03)

1.7. Network Interconnections to Switch with ShMC

SYMKLOUD MSP nodes all have specific interconnections with the SYMKLOUD switches. Different combinations will lead to different capabilities (refer to the tables below).

Figure 7: Node connections to hubs

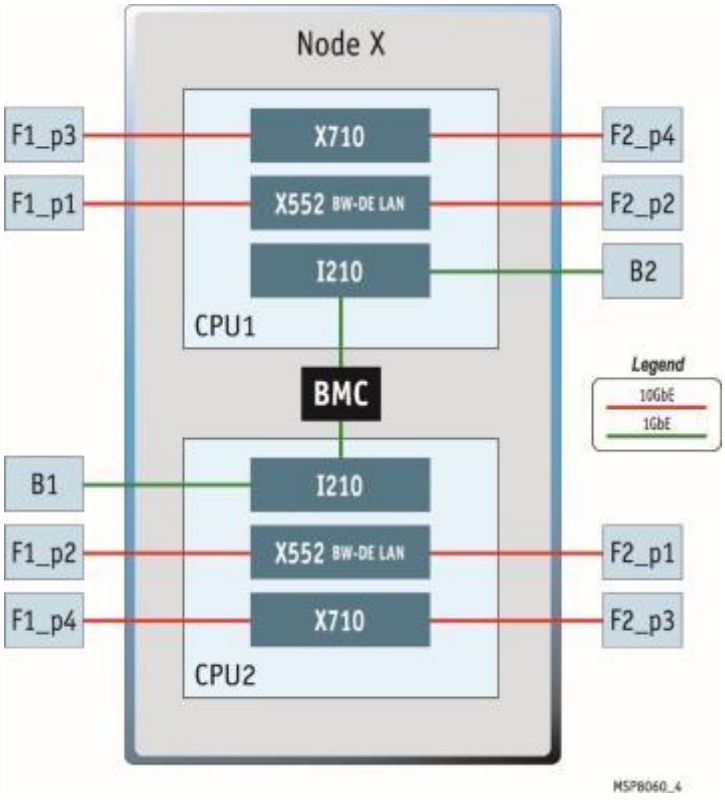


Table 5: MS2900/MS2910 platform link status and speed configurations

Configuration	B1	B2	F1_p1	F1_p2	F1_p3	F1_p4	F2_p1	F2_p2	F2_p3	F2_p4
MSH8900	1GbE	1GbE	1GbE	No link	No link	No link	1GbE	No link	No link	No link
MSH8910	1GbE	1GbE	10GbE	No link	No link	No link	10GbE	No link	No link	No link
MSH8911	1GbE	1GbE	10GbE	10GbE	No link	No link	10GbE	10GbE	No link	No link
MSH8920	1GbE	1GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE

Table 6: MS1300 platform link status and speed configurations

Configuration	B1	B2	F1_p1	F1_p2	F1_p3	F1_p4	F2_p1	F2_p2	F2_p3	F2_p4
MSH8900	1GbE	1GbE	1GbE	No link	No link	No link	1GbE	No link	No link	No link
MSH8910	1GbE	1GbE	10GbE	10GbE	No link	No link	10GbE	10GbE	No link	No link
MSH8911	1GbE	1GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE
MSH8920	1GbE	1GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE	10GbE

For a complete port mapping and network topology of the system as well as link speeds, refer to the user guide of the switch with ShMC used in the platform.

1.8. MAC Addresses

Table 7: MAC addresses

Interface description	MAC address
Base port CPU1	MAC_BASE
Fabric 1 port 1 BWDE CPU1	MAC_BASE + 1
Fabric 2 port 2 BWDE CPU1	MAC_BASE + 2
Fabric 1 port 3 X710-BM2	MAC_BASE + 3
Fabric 2 port 4 X710-BM2	MAC_BASE + 4
Base port CPU2	MAC_BASE + 5
Fabric 2 port 1 BWDE CPU2	MAC_BASE + 6
Fabric 1 port 2 BWDE CPU2	MAC_BASE + 7
Fabric 2 port 3 X710-BM2	MAC_BASE + 8
Fabric 1 port 4 X710-BM2	MAC_BASE + 9
FRU0 Management controller IOL	MAC_BASE + 10
FRU1 IOL port CPU1	MAC_BASE + 11
FRU2 IOL port CPU2	MAC_BASE + 12

To obtain the value of the MAC_BASE, access FRU0 and use command `ipmitool fru print`. The MAC_BASE will be in the Board Extra section.

1.9. Interfaces

This section describes the default IP addresses and the various interfaces of the platform. For instructions on how to access an interface using a specific path, refer to section 2/. For the serial console connection, refer to section 3/.

The IOL IP address of the specific component to connect to may 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 the following figures.

Figure 8: Default IP addresses in an MS2900 platform filled with MSP8060

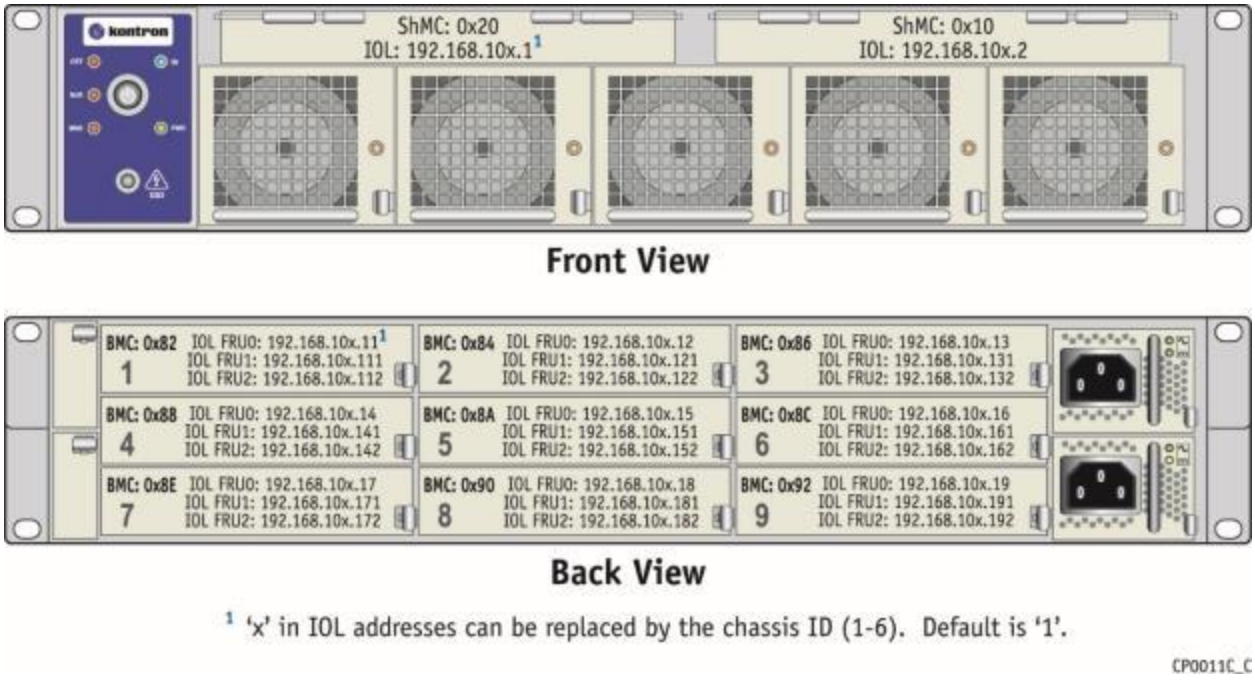
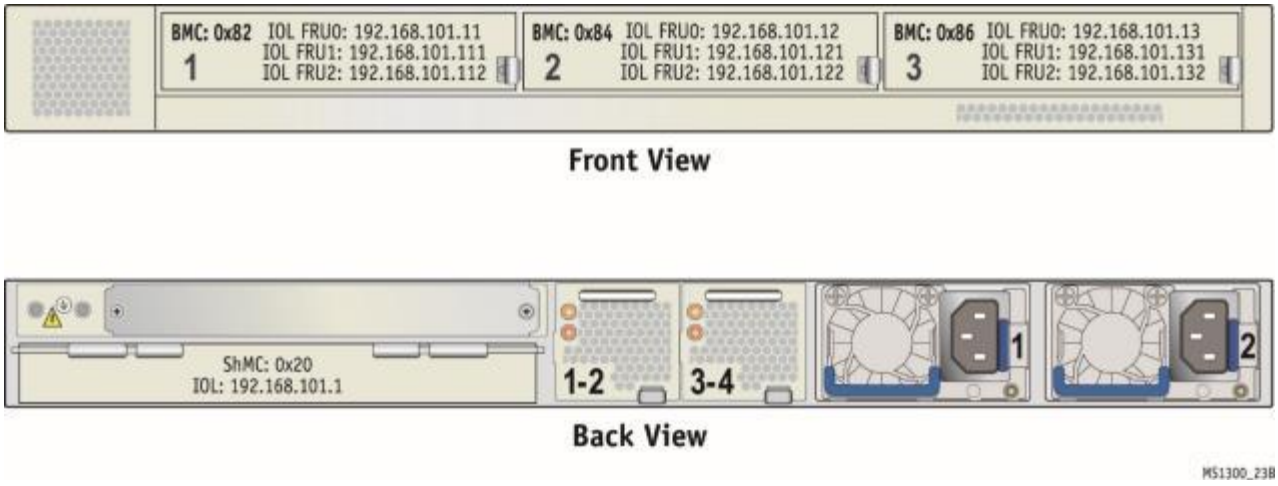


Figure 9: Default IP addresses in an MS1300 filled with MSP8060



Hub IOL IP

The IOL IP of a hub (Figure 8 and Figure 9) is the address of its ShMC. This IP is required to access the ShMC and the System Monitor. To access the System Monitor, the IP of hub 1 or of hub 2 can be used.

Switch Management IP

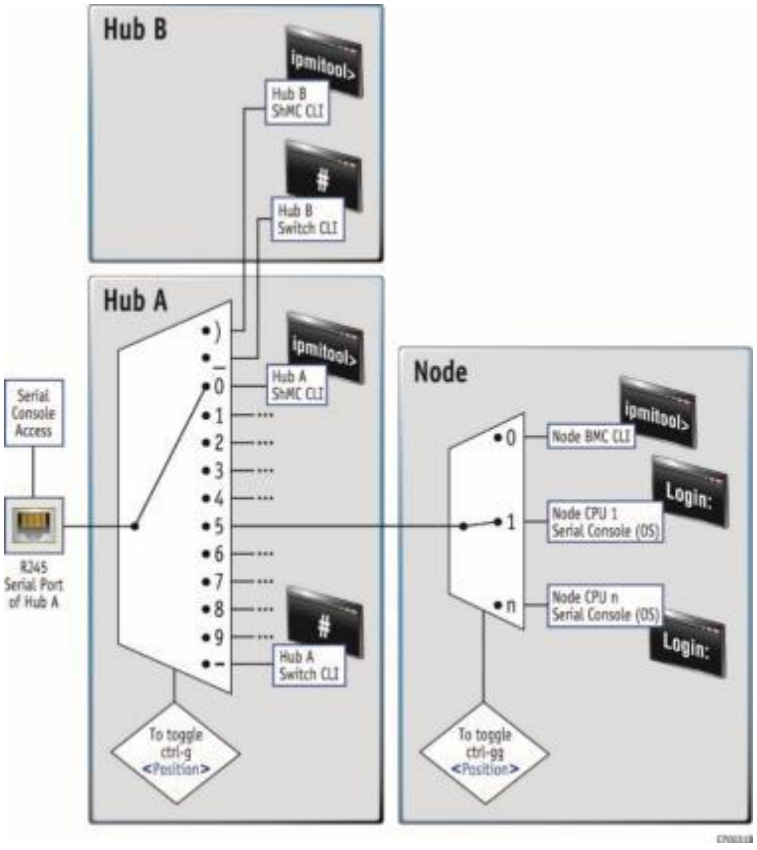
The switches of SYMKLOUD platforms have a switch management IP. This IP is required to remotely access the switch web UI (if available) and the switch CLI via SSH. Switches are usually stacked together to act as a single switch, but they can also be independently managed based on the network operating system being used.

- Default switch management IP of a platform **using FastPath or SMBStaX** network operating system with **one switch or stacked switches**: 192.168.10x.10 (where x is the chassis ID)
- Default switch management IP of a switch **using PicOS** network operating system: configured by DHCP by default

Node BMC addresses (IPMB addresses)

The BMC IPMB address of any MSP node is the address of FRU0. Refer to section 1.4 for a complete description of the BMC architecture.

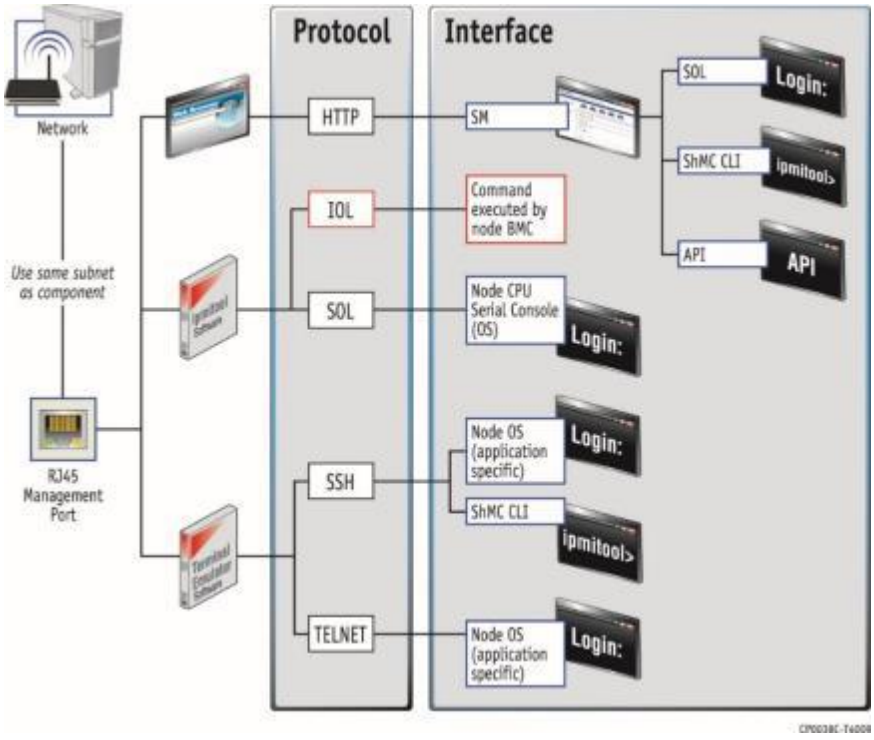
Figure 10: Diagram of interface paths with a serial console connection



The serial interface of the hubs includes a multiplexing functionality that can establish a link with each component through a series of hotkeys (Figure 10).

The console port of MSH8910/MSH8920 series hubs has a serial-port redundancy feature between partner hubs. This means that the console port of either hub installed in a SYMKLOUD chassis can be used to communicate with any hub (ShMC/switch) or MSP node in the chassis. The ports are mirror images of each other: any output or user input is reflected in both.

Figure 11: 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 Tools section of the SYMKLOUD platform page.
- Ensure the protocol is enabled for the interface to be accessed (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. For more details, refer to the API documentation (available from the SM).
- An IOL connection allows users to send ipmitool commands over the LAN for immediate execution by the addressed node BMC (FRU0/FRU1/FRU2).

Table 8: Default usernames and passwords

Configuration interface	Username and password	Used for access via
SM (UI)	admin admin	Web UI API
Hub ShMC CLI	admin admin	Serial port Shell-in-a-box IOL
Node BMC CLI	admin admin	Serial port IOL
Node CPU serial console (OS)	Installation-specific	Serial port Shell-in-a-box SOL Other (installation-specific)

2/ Description of Interface Access Methods

This section describes various access methods to the OS prompt and the management controllers. For a visual representation of the paths, refer to section 1.9. For the serial console connection, refer to section 3/.

To configure, monitor and troubleshoot MSP8060 series nodes, many interfaces can be used:

OS prompt – through the serial port of the hub, through the management port of the hub, or through the data uplinks of the hub

BMC ipmitool shell – through the serial port of the hub or through the management port of the hub

System Monitor (not described in this guide) – through the Web, includes a web user interface and a programmatic API to monitor and control system components, including the ShMC and nodes (refer to the user guide of the switch with ShMC installed on the platform)

Using a serial console connection is the safest way to proceed when making configurations. It is the method recommended by Kontron and described in the Getting Started section.

To access interfaces via the management connection, the ShMC management IP address is required. Refer to SYMKLOUD MS platform application notes and switch with ShMC user guides to configure and get this address.

2.1. Paths to the Operating System Prompt

For any type of connection to the server, an operating system must be installed. Redirection to the serial port must be configured in the OS (e.g., console=ttys0,115200n8). If the system delivered has an OS installed by Kontron, console redirection will be enabled by default.

Path to the Operating System prompt and the BIOS setup menu				
Path	OS	BIOS	Main reasons for use	Prerequisites
Serial Console (Physical connection) *Fail-safe path to access all platform components when elements (switch, OS, BMC, etc.) get misconfigured*	Yes	Yes	1. Initial configuration 2. No configuration performed on OS network interfaces 3. No configuration performed on BMCs/ShMCs	• Serial console port connected and accessible from an external computer • Serial console tool (e.g.: PuTTY) installed on the external computer using the following parameters: Speed: 115200 Data bits: 8 Stop bits: 1 Parity: none Flow control: none

Path to the Operating System prompt and the BIOS setup menu				
Path	OS	BIOS	Main reasons for use	Prerequisites
SSH/RDP/Customer application protocols (Remote connection) *It is recommended to use the front uplink instead of the management port to access the OS (no VLAN tagging required on the OS side)* *Ideal path once the initial platform configuration has been performed*	Yes	No	1. Preferred method when OS network interfaces are configured and accessible from an external computer	• OS network interfaces configured and accessible from an external computer • OS network IP configured with VLAN tagging 4093 (e.g., eth0.4093) when accessing from the management port, known and accessible from an external computer
Serial Over Lan (SOL) via IPMITOOL (Remote connection)	Yes	Yes	1. Unable to establish an SSH session to the OS 2. OS network interfaces are not configured, but network access to the BMC of the MSP node is available	• BMC network configured and accessible • Kontron version of IPMITOOL installed on the external computer • Console redirection enabled in OS (e.g., 115200, ttyS0) or BIOS (enabled by default on Kontron products)
Serial Over Lan (SOL) via System Monitor (Remote connection)	Yes	Yes	1. Unable to establish an SSH session to the OS 2. OS network interfaces are not configured, but network access to the BMC of the MSP node is available	• ShMC network configured and accessible • BMC network configured and accessible • Console redirection enabled in OS (115200 ttyS0, OS dependent) • BIOS console redirection enabled (enabled by default on Kontron products)

2.2. Paths to the IPMITOOL shell (BMC and ShMC)

Paths to the IPMITOOL shell (BMC and ShMC)		
Path	Main reasons for use	Prerequisites
Serial Console (Physical access) *Fail-safe path to access all platform components; it is independent of configuration*	1. Initial configuration 2. No configuration performed on BMCs/ShMCs	• Serial console port connected and accessible from an external computer • Serial console tool (e.g.: PUTTY) installed on the external computer using the following parameters: Speed: 115200 Data bits: 8 Stop bits: 1 Parity: none Flow control: none

Paths to the IPMITOOL shell (BMC and ShMC)		
Path	Main reasons for use	Prerequisites
IPMI Over Lan (IOL) (Remote request) *Path recommended for automated monitoring/control script once the initial platform configuration has been performed*	1. Remote server monitoring 2. Remote server control	• BMC network configured and accessible • Kontron version of IPMITOOL installed on the external computer
API (Remote request) *Path recommended for automated monitoring/control script once the initial platform configuration has been performed*	1. Remote server monitoring 2. Remote server control	• ShMC network configured and accessible • BMC network configured and accessible • REST client installed on the external computer (e.g., cURL)
System Monitor (Remote access)	1. Remote server monitoring 2. Remote server control 3. Unable to establish an SSH session to the BMC 4. OS network interfaces not configured, but the network of the BMC of the MSP node is configured and accessible	• ShMC network configured and accessible
SSH (Remote access)	1. BMC network configured and accessible from an external computer having access to the subnet of the network connected to the management port	• BMC network interface configured and accessible from an external computer

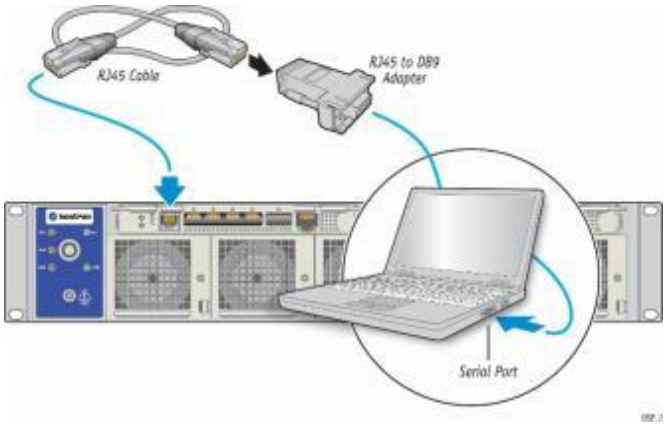
3/ Getting Started

Multiple methods can be used to configure the management network of the MSP8060. The following configuration steps use the serial console multiplexing feature of the platform. Please refer to Appendix C for all available methods.

3.1. Serial Console Connection and Configuration

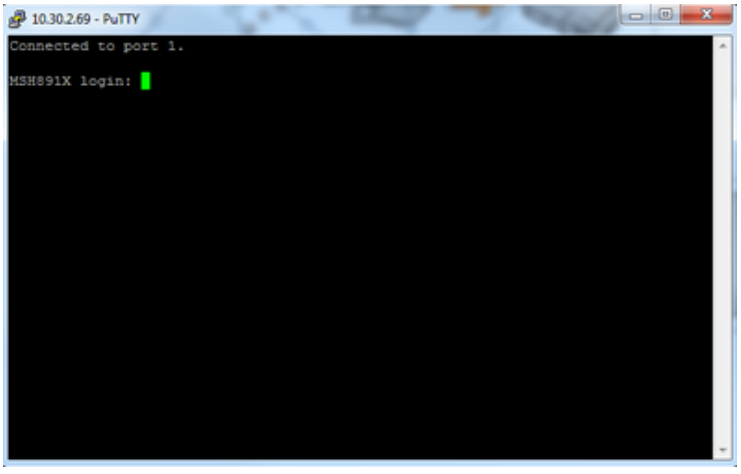
Use the RJ45 to DB9 adapter provided with the platform to connect a (non-crossover) Ethernet cable to establish a serial connection between the technician's PC and the RJ45 console port of the **hub with the active ShMC** (faceplate marking "10101").

In dual hub platforms, the **hub with the active ShMC** is the one with the solid green Power LED. The hub with the standby ShMC has the blinking green Power LED.



Configure a serial console tool (e.g.: PuTTY) with the correct COM-port for your system using the following parameters:

Parameters	Value
Speed (Baud)	115200
Data bits	8
Stop bits	1
Parity	none
Flow Control	none



The prompt displayed will reflect the MSH hub installed in the platform:

- MSH890X login:
- MSH891X login:
- MSH892X login:

3.2. Log in to the BMC/FRU0 of the MSP Node

Set up the access by directing the serial connection to the BMC (example provided for node 1) and log in to the node.

COMMAND	PURPOSE

`MSH891X login: Ctrl+g 1`
`CentOS Linux 7 (Core)`
`Kernel 3.10.0-229.el7.x86_64 on an x86_64`
 	
`sk9013075860 login: Ctrl+gg 0`
`MSP8060 login: admin`
`Password: admin`
`ipmitool>`
	`Use HOTKEY to redirect serial console multiplexer to MSP node 1 components.`
	
	`Use HOTKEY to redirect serial console multiplexer to the BMC of MSP node 1.`

The "Ctrl+g 1" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on 1 (the MSP node number), followed by the Enter key. This sets the serial multiplexer mechanism to the latest targeted component of the MSP node (for an MSP node with dual CPUs, the default redirection will be on server 1).

If there is an OS installed on the MSP node, you should get something similar to the example above. Otherwise, the console may not show anything at this point.

The "Ctrl+gg 0" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the g key again, followed by the 0 key and the Enter key. This will toggle the multiplexer to target the BMC instead of the server (see Figure 10).

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

You have reached the BMC/FRU0 of node 1. Prompt '' ipmitool>'' should be displayed. You can refer to the sections below for configuration instructions.

3.3. Configure and Set the IP Address of FRU0 (Static or DHCP)

Some parameters configured on FRU0 are reflected/configured automatically on FRU1 and FRU2 (refer to Figure 5 for the BMC architecture):

- **Access Mode**: Always enabled on all IOL interfaces; it cannot be disabled.
- **VLAN ID**: Can only be configured on the baseboard management controller (FRU0). The management controllers of CPU1 and CPU2 will reflect the value of the controller of FRU0. This means the same VLAN must be used for all the IPMI-Over-LAN accesses on MSP8060.
- **Default Gateway IP**: Can only be configured on the baseboard management controller (FRU0). The management controllers of CPU1 and CPU2 will reflect the value of the controller of FRU0. This means there can only be one default gateway for all the IPMI-Over-LAN interfaces on MSP8060 nodes.

Configure and set the IP address, the netmask and the gateway (optional for a static IP) of FRU0 (0x20). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

COMMAND	PURPOSE
ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.11** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to static. Define static IP address. Define netmask. Define default gateway IP address.

Option 2 – Network using DHCP IP

COMMAND	PURPOSE
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

Note that it may take several seconds to gather an IP from the DHCP server.

3.4. Verify BMC/FRU0 Network Configuration

Check the following configurations: IP address source (static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID. The results shown in the table below are for a static IP.

COMMAND	PURPOSE
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.11 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:00:00:01 IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

3.5. Configure and Set the IP Address of FRU1 (Static or DHCP)

Configure and set the IP address and the netmask (optional for a static IP) of FRU1 (0x7a). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7a** ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.111** ipmitool> **lan set 1 netmask 255.255.255.0**	Target FRU1. Configure IP source to static. Define static IP address. Define netmask.

Option 2 – Network using DHCP IP

COMMAND	PURPOSE
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

Note that it may take several seconds to gather an IP from the DHCP server.

3.6. Verify BMC/FRU1 Network Configuration

Check the following configurations: IP address source (static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID. The results shown in the table below are for a static IP.

COMMAND	PURPOSE
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.111 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:00:00:02 IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

3.7. Configure and Set the IP Address of FRU2 (Static or DHCP)

Configure and set the IP address and the netmask of FRU2 (0x7c). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Option 1 – Static IP

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7c** ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.112** ipmitool> **lan set 1 netmask 255.255.255.0**	Target FRU2. Configure IP source to static. Define static IP address. Define netmask.

Option 2 – Network using DHCP IP

COMMAND	PURPOSE
ipmitool> **lan set 1 ipsrc dhcp**	Configure IP source to DHCP.

Note that it may take several seconds to gather an IP from the DHCP server.

3.8. Verify BMC/FRU2 Network Configuration

Check the following configurations: IP address source (static or DHCP), IP address, subnet mask, default gateway IP and 802.1q VLAN ID. The results shown in the table below are for a static IP.

COMMAND	PURPOSE
ipmitool> **lan print** Access Mode : Enable IP Address Source : Static IP Address : 192.168.101.112 Subnet Mask : 255.255.255.0 MAC Address : 00:a0:a5:00:00:03 IP Header : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10 Default Gateway IP : 192.168.101.254 Default Gateway MAC : 00:00:00:00:00:00 802.1q VLAN ID : 4093 802.1q VLAN Priority : 0 HPM.2 Draft Capabilities: Supported Hostname (OEM) :	Display the current network configuration.

4/ Optional Configurations, Monitoring and Operation

The following conventions are used in the sections below:

- Elements between < > in blue are variables. The value shown is an example or an indication of what to enter.
- Items between () show a value range for the variable spelled out, e.g. <Switch No. (1-2)> means the switch number is to be entered, and that its value 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* precede configuration options or types.
- The > symbol separates a series of operations required to access a specific element.

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.

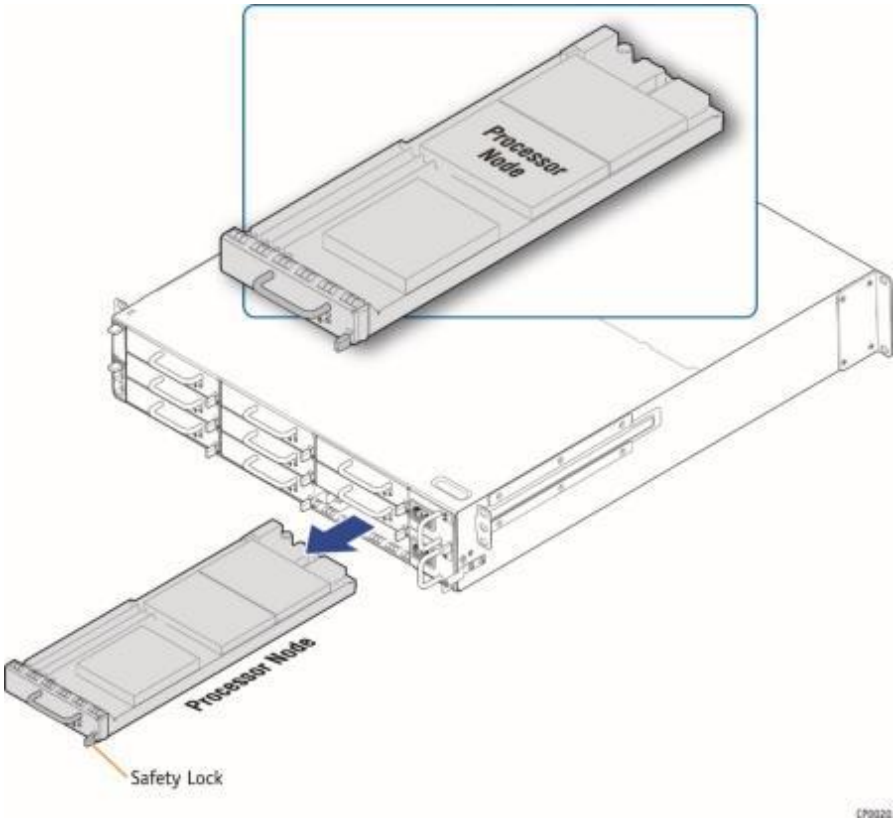
4.1. Extracting and Inserting a Node Module

ESD-Sensitive Device!
Take all necessary ESD protection measures.

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 SYMKLOUD MSP nodes, the systems and functionalities could be affected.

Not possible form a Web-type interface	Node CPU serial console, IPMITOOL
	Extracting an MSP node 1. Press the power button of the MSP 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 MSP node becomes steady blue: the MSP node is ready to be extracted. To extract the MSP node from the slot, pull on the handle while pressing the safety lock (3. Figure 12) towards the left. *Inserting an MSP node* 1. Holding the handle, insert a node module. 2. Push it in until the safety lock clicks in place. Wait for the power LED of the MSP node to become steady green (30 to 120 seconds): the MSP node is powered on and ready to use.

Figure 12: MSP node extraction and safety lock location



4.2. MSP Node Power ON, Power OFF and Reset

To power ON both CPUs of an MSP node:

SM	IPMITOOL
Dashboard > Monitor Select the platform Click on the MSP node to reset In section Power Commands, click on **ACTIVATE**	*From the IPMITOOL prompt of the BMC (FRU0) of the targeted MSP node:* ipmitool> **power off** *From an external computer using Kontron's version of IPMITOOL:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H <MSP8060_FRU0_IP> -U admin -P admin power on**

To power OFF both CPUs of an MSP node:

SM	IPMITOOL
Dashboard > Monitor Select the platform Click on the MSP node to reset In section Power Commands, click on **DEACTIVATE**	*From the IPMITOOL prompt of the BMC (FRU0) of the targeted MSP node:* ipmitool> **power off** *From an external computer using Kontron's version of IPMITOOL:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H <MSP8060_FRU0_IP> -U admin -P admin power off**

To reset both CPUs of an MSP node:

SM	IPMITOOL
Dashboard > Monitor Select the platform Click on the MSP node to reset In section Power Commands, click on **RESET**	*From the IPMITOOL prompt of the BMC (FRU0) of the targeted MSP node:* ipmitool> **power reset** *From an external computer using Kontron's version of IPMITOOL:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H <MSP8060_FRU0_IP> -U admin -P admin power reset**

Power can be individually controlled for each CPU on the MSP8060.

As seen in the BMC Architecture Overview block diagram (Figure 5), the MSP8060 BMC includes 3 individual management processes, of which 2 are used to manage their respective CPUs (FRU ID 1 and 2). The third management entity (FRU ID 0) is used to:

- Represent the whole node to the ShMC in terms of Health Status reporting
- Report temperature data for the whole MSP node for proper cooling management of the chassis
- Handle firmware upgrades for the MSP node (BMC, FPGA and both BIOS)

While not tied to a physical CPU, this additional management process has its own logical power state, and because it acts as a carrier for both CPUs, it must be in an "Activated" state to allow power control over the CPUs.

The following use cases are possible on the MSP8060:

- When FRU0 is in a logical OFF state, power control commands to FRU1/2 have no effect.
- When FRU0 is in a logical ON state, power control commands to FRU1/2 are functional and each CPU can be independently controlled normally.
- When FRU0 is in a logical OFF state, sending it a power ON command will power on all CPUs.
- When FRU0 is in a logical ON state, sending it a power OFF command will power off all CPUs.

Note that because the MSP node activates automatically on insertion or system power up, there should be no reason to target FRU0 with power control commands unless the MSP node needs to be extracted or you want to control the power states of both CPUs at the same time.

4.3. Boot Order

To choose the boot order of an MSP node:

Node CPU serial console
Perform a node reset (see section 4.2) *From the Node CPU serial console:* 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
Each CPU can boot from LAN, from a USB device connected to the external USB port or from onboard storage. The default Boot Priority Order is: hard drive (if installed), base interface LAN and shell UISI.

To change the boot order of an MSP node temporarily:

Node CPU serial console, IPMITOOL
Perform a node reset (see section 4.2) *From the Node CPU serial console:* 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** *OR* For a one-time boot Press **[F7]** when prompted to enter the Boot Menu Select the device to boot from *From IPMITOOL:* ipmitool> **chassis bootdev** <device> *Within 30 seconds, issue the following command to reset the server:* ipmitool> **power reset** The possible values for <device> are: **none**: Do not change boot device order **pxe**: Force PXE boot **disk**: Force boot from default hard drive **bios**: Force boot into BIOS Setup
Notes
Each CPU can boot from LAN, from a USB device connected to the external USB port or from onboard storage.

4.4. OS Installation

To install an OS:

Node CPU serial console, IPMITOOL SOL
Boot from LAN or from a USB device connected to the external USB port Proceed with installation

5/ Performing Updates

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

5.1. Update a Specific MSP Node

To update the firmware of a specific MSP node's BMC, BIOS and FPGA:

SM	IPMITOOL
Dashboard > OneClick Upgrade Click on **advanced settings** Select the platform from the dropdown list Select the MSP 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**	*From an external computer using Kontron's version of IPMITOOL:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H <MSP8060_FRU0_IP> -U admin -P admin power off** *To confirm the MSP node power status is OFF:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H** <MSP8060_FRU0_IP> **-U admin -P admin power status** *To proceed with firmware upgrade:* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H <MSP8060_FRU0_IP> -U admin -P admin hpm upgrade <HPM bundle(hpm file)> all activate**
API calls available to update an MSP node	
Notes	
This operation must be repeated for each MSP node to be upgraded.	

5.2. OneClick Upgrade to Update All MSP Nodes

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

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

Appendix A: Sensor Lists

The following tables contain information on the sensors of MSP8060 series nodes. Table 11 provides detailed information on the sensors described in blue in Table 9 and Table 10.

Table 9: BMC sensor list

ID	Sensor name	Sensor type code	Reading type code	Description	Event offset
0	FRU0 Hot Swap	F0h (HotSwap Sensor)	6Fh (Sensor Specific)	FRU0 HotSwap Sensor	See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
1	FRU1 Hot Swap	F0h (HotSwap Sensor)	6Fh (Sensor Specific)	FRU1 HotSwap Sensor	See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
2	FRU2 Hot Swap	F0h (HotSwap Sensor)	6Fh (Sensor Specific)	FRU2 HotSwap Sensor	See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
3	FRU0 Reconfig	12h (System Event)	6Fh (Sensor Specific)	Sensor population change on carrier	Event offset: Only offset 0 is used See IPMI v2.0 table 42-3, Sensor type code 12h for sensor definition See AMC.0 R2.0 REQ 3.123
4	Temp BMC	01h (Temperature)	01h (Threshold Based)	BMC Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
5	Temp Vcore CPU1	01h (Temperature)	01h (Threshold Based)	Vcore CPU1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
6	Temp Vcore CPU2	01h (Temperature)	01h (Threshold Based)	Vcore CPU2 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
7	Temp M.2 CPU2	01h (Temperature)	01h (Threshold Based)	Temp M.2 CPU2 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
8	Temp CPU 1	01h (Temperature)	01h (Threshold Based)	CPU1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
9	Temp CPU 2	01h (Temperature)	01h (Threshold Based)	CPU2 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
10	Temp DIMMA0 CPU1	01h (Temperature)	01h (Threshold Based)	CPU1 DIMM A0 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
11	Temp DIMMA1 CPU1	01h (Temperature)	01h (Threshold Based)	CPU1 DIMM A1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
12	Temp DIMMB0 CPU1	01h (Temperature)	01h (Threshold Based)	CPU1 DIMM B0 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
13	Temp DIMMB1 CPU1	01h (Temperature)	01h (Threshold Based)	CPU1 DIMM B1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event

ID	Sensor name	Sensor type code	Reading type code	Description	Event offset
14	Temp DIMMA0 CPU2	01h (Temperature)	01h (Threshold Based)	CPU2 DIMM A0 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
15	Temp DIMMA1 CPU2	01h (Temperature)	01h (Threshold Based)	CPU2 DIMM A1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
16	Temp DIMMB0 CPU2	01h (Temperature)	01h (Threshold Based)	CPU2 DIMM B0 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
17	Temp DIMMB1 CPU2	01h (Temperature)	01h (Threshold Based)	CPU2 DIMM B1 Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
18	Vcc +12V IN	02h (Voltage)	01h (Threshold Based)	Voltage on board 12V Input from backplane	See IPMI v2.0 table 42-2 for threshold based event
19	Vcc +5V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 5.0V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
20	Vcc +3.3V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 3.3V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
21	Vcc +1.5V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.5V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
22	Vcc +1.35V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.35V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
23	Vcc +1.17V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.17V suspend power supply	See IPMI v2.0 table 42-2 for threshold based event
24	Icc +12V IN	03h (Current)	01h (Threshold Based)	Current on 12V (IN) power rail	See IPMI v2.0 table 42-2 for threshold based event
25	Power NODE	0Bh (Watt)	01h (Threshold Based)	Board Input Power	See IPMI v2.0 table 42-2 for threshold based event
26	Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State	See OEM sensor table, Sensor type code D1h for sensor definition
27	Ver Change BMC	2Bh (Version Change)	6Fh (Sensor Specific)	IPMC Firmware Change Detection	See IPMI v2.0 table 42-3, Sensor type code 2Bh for sensor definition
28	Ver Change FPGA	2Bh (Version Change)	6Fh (Sensor Specific)	FPGA Firmware Change Detection	See IPMI v2.0 table 42-3, Sensor type code 2Bh for sensor definition
29	Ver Change BIOS	2Bh (Version Change)	6Fh (Sensor Specific)	BIOS Firmware Change Detection	See IPMI v2.0 table 42-3, Sensor type code 2Bh for sensor definition

ID	Sensor name	Sensor type code	Reading type code	Description	Event offset
30	Health Status	24h (Platform Alert)	7Fh (OEM Health Severity Status Sensor)	General health status (Aggregation of critical sensors)	See OEM table, Sensor type code 24h (Platform Alert) for sensor definition and Event/Reading type code 7Fh (OEM Health Severity Status Sensor)
31	EventRcv ComLost	1Bh (Cable/Interconnect)	03h (Digital Discrete)	Event Receiver Comm Lost	See IPMI v2.0 table 42-3, Sensor type code 1Bh for sensor definition
32	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
33	BMC Storage Err	28h (Management Subsystem Health)	6Fh (Sensor Specific)	Management subsystem health (non volatile memory error)	Only offset 1 is used See IPMI v2.0 table 42-3, Sensor type code 28h for sensor definition
34	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
35	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
36	Jumper Status	D3h (OEM Jumper Status)	6Fh (Sensor Specific)	Reflects on-board jumper presence	Offsets 0 to 14 are used See OEM table, Sensor type code D3h (Kontron OEM Jumper Status) for sensor definition
37	IPMI Info-1	C0h (OEM Firmware Info)	70h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic	See OEM table, Sensor type code C0h (Kontron OEM Firmware Info) for sensor definition and Event/Reading type code 70h (Kontron OEM Internal Diagnostic)
38	IPMI Info-2	C0h (OEM Firmware Info)	71h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic	See OEM table, Sensor type code C0h (Kontron OEM Firmware Info) for sensor definition and Event/Reading type code 71h (Kontron OEM Internal Diagnostic)

Table 10: MMC sensor list

ID	Sensor name	Sensor type code	Reading type code	Description	Event offset
0	Bx: IPMI Info-1	C0h (OEM Firmware Info)	70h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic	See OEM table, Sensor type code C0h (Kontron OEM Firmware Info) for sensor definition and Event/Reading type code 70h (Kontron OEM Internal Diagnostic)
1	Bx: IPMI Info-2	C0h (OEM Firmware Info)	71h (OEM Kontron Internal Diagnostic)	Internal Management Controller firmware diagnostic	See OEM table, Sensor type code C0h (Kontron OEM Firmware Info) for sensor definition and Event/Reading type code 71h (Kontron OEM Internal Diagnostic)
2	Bx:ModuleHotSwap	F2h (Module HotSwap)	6Fh (Sensor Specific)	Module Hot Swap	Event offset: Only offset 0,1,2,3,4 are used See AMC.0 R2.0 Section 3.6.6 Module Hot Swap Sensor for sensor definition
3	Bx:MMC Stor Err	28h (Management Subsystem Health)	6Fh (Sensor Specific)	Management subsystem health (non volatile memory error)	Only offset 1 is used See IPMI v2.0 table 42-3, Sensor type code 28h for sensor definition
4	Bx: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
5	Bx:CPU Reset	CFh (OEM Kontron Reset)	03h (Standard IPMI Discrete)	CPU Reset status	See OEM sensor table, Sensor type code CFh for sensor definition
6	Bx:V_VCCD	02h (Voltage)	01h (Threshold Based)	Voltage on board V_VCCD payload power supply	See IPMI v2.0 table 42-2 for threshold based event
7	Bx:V_VPPB	02h (Voltage)	01h (Threshold Based)	Voltage on board V_VPPB payload power supply	See IPMI v2.0 table 42-2 for threshold based event
8	Bx:V_VPPA	02h (Voltage)	01h (Threshold Based)	Voltage on board V_VPPA payload power supply	See IPMI v2.0 table 42-2 for threshold based event
9	Bx:V_VTTDDR	02h (Voltage)	01h (Threshold Based)	Voltage on board V_VTTDDR payload power supply	See IPMI v2.0 table 42-2 for threshold based event
10	Bx:V_VDDQ	02h (Voltage)	01h (Threshold Based)	Voltage on board V_VDDQ payload power supply	See IPMI v2.0 table 42-2 for threshold based event
11	Bx:Vcc+1.05V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.05V payload power supply	See IPMI v2.0 table 42-2 for threshold based event

ID	Sensor name	Sensor type code	Reading type code	Description	Event offset
12	Bx:Vcc+1.3V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.3V payload power supply	See IPMI v2.0 table 42-2 for threshold based event
13	Bx:Vcc+1.7V SUS	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.7V payload power supply	See IPMI v2.0 table 42-2 for threshold based event
14	Bx:Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State	See OEM sensor table, Sensor type code D1h for sensor definition
15	Bx:Power Good	08h (Power Supply)	77h (OEM Kontron Power Good)	Actual power good status	See OEM table, Sensor type code 08h (Power Supply) for sensor definition and Event/Reading type code 77h (OEM Kontron Power Good Sensor)
16	Bx:PWROK Capture	08h (Power Supply)	03h (Digital Discrete)	Power good latch status	See IPMI v2.0 table 42-3, Sensor type code 08h for sensor definition
17	Bx:CPU Status	07h (Processor)	6Fh (Sensor Specific)	Processor Status	Only offset 0,1,5 are used See IPMI v2.0 table 42-3, Sensor type code 07h for sensor definition
18	Bx:ACPI State	22h (System ACPI Power State)	6Fh (Sensor Specific)	Advance Configuration and Power Interface State	Only offset 0,5 are used See IPMI v2.0 table 42-3, Sensor type code 22h (ACPI Power State) for sensor definition
19	Bx:MMC 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
20	Bx:Health Status	24h (Platform Alert)	7Fh (OEM Health Severity Status Sensor)	General health status (Aggregation of critical sensors)	See OEM table, Sensor type code 24h (Platform Alert) for sensor definition and Event/Reading type code 7Fh (OEM Health Severity Status Sensor)
21	Bx:POST Value	C6h (OEM Post Value)	6Fh (Sensor Specific)	Show current postcode value	See OEM sensor table, Sensor type code C6h for sensor definition

Table 11: Detailed information for Kontron-specific sensors

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Power State Bx: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
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	1.5V SUS 1.35V SUS 1.7V SUS 1.3V SUS 1.05V SUS V_VPP V_VDDQ V_VTTDDR V_VCCIN 1.05V 1.5V 3.3V V_VCCD Unused Unused Unused
Bx:PWROK Capture	03h Standard IPMI Discrete	08h Standard IPMI Power Supply	00h 01h State Asserted / State Deasserted	Event Data 2 : BIT0 = V_1V5_SUS BIT1 = V_1V35_SUS BIT2 = V_1V7_SUS BIT3 = V_1V3_SUS BIT4 = V_1V05_SUS BIT5 = V_VPP BIT6 = V_VDDQ BIT7 = V_VTTDDR Event Data 3 : BIT0 = V_VCCIN BIT1 = V_1V05 BIT2 = V_1V5 BIT3 = V_3V3 BIT4 = V_VCCD BIT5 = MC_HTO BIT6 = BMC_HTO BIT7 = BP_HTO

Sensor name	Event / reading type code	Sensor type	Sensor specific offset	Event trigger
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	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 Data2: The ID of the first sensor from the aggregation that caused the fault. Event Data3: Not used Sensor Aggregation List (FRU0): ID - Sensor Name 4 - Temp BMC 5 - Temp Vcore CPU1 6 - Temp Vcore CPU2 7 - Temp M.2 CPU2 8 - Temp CPU1 9 - Temp CPU2 10 - Temp DIMMA0 CPU1 11 - Temp DIMMA1 CPU1 12 - Temp DIMMB0 CPU1 13 - Temp DIMMB1 CPU1 14 - Temp DIMMA0 CPU2 15 - Temp DIMMA1 CPU2 16 - Temp DIMMB0 CPU2 17 - Temp DIMMB1 CPU2 18 - Vcc +12V IN 19 - Vcc +5V SUS 20 - Vcc +3.3V SUS 21 - Vcc +1.5V SUS 22 - Vcc +1.35V SUS 23 - Vcc +1.17V SUS 24 - Icc +12V IN
Bx: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 Data2: The ID of the first sensor from the aggregation that caused the fault. Event Data3: Not used Sensor Aggregation List (FRU1/2): ID - Sensor Name 4 - Bx:IPMI Watchdog 6 - Bx:V_VCCD 7 - Bx:V_VPPB 8 - Bx:V_VPPA 9 - Bx:V_VTTDDR 10 - Bx:V_VDDQ 11 - Bx:Vcc+1.05V SUS 12 - Bx:Vcc+1.3V SUS 13 - Bx:Vcc+1.7V SUS 16 - Bx:PWROK Capture

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Jumper Status	6Fh Standard IPMI sensor specific	D3h Kontron OEM Jumper Status Sensor	00h 01h 02h 03h 04h 05h 06h	Jumper 00 Present (JP1: 1-2) Jumper 01 Present (JP1: 3-4) Jumper 02 Present (JP1: 5-6) Jumper 03 Present (JP1: 7-8) Jumper 04 Present (JP1: 9-10) Jumper 05 Present (JP1: 11-12) Jumper 06 Present (JP1: 13-14)
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
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	71h 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

<table>
<tr><th>Sensor name</th><th>Event/reading type code</th><th>Sensor type</th><th>Sensor specific offset</th><th colspan="2">Event trigger</th></tr>
<tr><td>Bx:CPU Reset</td><td>03h
Standard IPMI Discrete</td><td>CFh
OEM Kontron Reset</td><td>00h
01h
State Asserted
/
State Deasserted</td><td colspan="2">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 additional details)
01h: IPMI commands [cold, warm or forced cold] (chassis control, fru control)
02h: Processor internal check stop
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</td></tr>
<tr><td>Health Status</td><td>7Fh
(OEM Health Status)</td><td>24h
(Platform Alert)</td><td>00h Status not available in current state
01h Healthy
02h Informational fault
03h Minor fault
04h Major fault
05h Critical fault</td><td colspan="2">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</td></tr>
<tr><td></td><td></td><td></td><td></td><td>ID - Sensor Name
04h - Temp Inlet
05h - Temp Outlet
07h - Temp BMC
08h - Temp CPU 1
09h - Temp CPU 2
0Eh - Vcc +12V SUS</td><td>0Fh - Vcc +5V SUS
10h - Vcc +2.5V SUS
11h - Vcc +1.8V SUS
12h - Vcc +1.5V SUS
13h - Vcc +1.25V SUS
14h - Vcc +0.75V SUS</td></tr>
</table>

<table>
<tr><th>Sensor name</th><th>Event/reading type code</th><th>Sensor type</th><th>Sensor specific offset</th><th colspan="2">Event trigger</th></tr>
<tr><td rowspan="2">Bx:Health Status</td><td rowspan="2">7Fh
(OEM Health Status)</td><td rowspan="2">24h
(Platform Alert)</td><td rowspan="2">00h Status not available in current state
01h Healthy
02h Informational fault
03h Minor fault
04h Major fault
05h Critical fault</td><td colspan="2">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: FRU1/2</td></tr>
<tr><td>ID - Sensor Name
04h - Bx:IPMI Watchdog
06h - Bx:Vcc +VPP
07h - Bx:Vcc +1.8V OPC
08h - Bx:Vddq
09h - Bx:Vcc +VCCEOPIO
0Ah - Bx:Vcc +VCCOPC</td><td>0Bh - Bx:Vcc +1V
0Ch - Bx:Vcc +VCCIO
0Dh - Bx:Vcc +VTT_DDR
11h - Bx:PWROK Capt. 1
12h - Bx:PWROK Capt. 2</td></tr>
</table>

Appendix B: IPMI Command List

Table 12 lists the commands that are supported and unsupported by FRU0 and FRU1 and FRU2.

Table 12: Supported and unsupported commands for FRU0 and FRU1 and FRU2

Command	MSP8060 (FRU0)	MSP8060 (FRU1/FRU2)
IPM Device "Global" Commands (NetFN/LUN 06h/0h)		
Get Device ID (01h)	Supported	Supported
Cold Reset (02h)	Supported	Supported
Warm Reset (03h)	Unsupported	Unsupported
Get Self Test Results (04h)	Supported	Supported
Manufacturing Test On (05h)	Supported	Supported
Set ACPI Power State (06h)	Unsupported	Supported
Get ACPI Power State (07h)	Unsupported	Supported
Get Device GUID (08h)	Supported	Supported
Broadcast "Get Device ID" (00h)	Supported	Supported
BMC Watchdog Timer Commands (NetFN/LUN 06h/0h)		
Reset Watchdog Timer (22h)	Unsupported	Supported
Set Watchdog Timer (24h)	Unsupported	Supported
Get Watchdog Timer (25h)	Unsupported	Supported
BMC Device and Messaging Commands (NetFN/LUN 06h/0h)		
Set BMC Global Enables (2Eh)	Unsupported	Supported
Get BMC Global Enables (2Fh)	Unsupported	Supported
Clear Message Flags (30h)	Unsupported	Supported
Get Message Flags (31h)	Unsupported	Supported
Enable Message Channel Receive (32h)	Unsupported	Supported
Get Message (33h)	Unsupported	Supported
Send Message (34h)	Supported	Supported
Read Event Message Buffer (35h)	Unsupported	Supported
Get BT Interface Capabilities (36h)	Unsupported	Unsupported
Get System GUID (37h)	Supported	Supported
Get Channel Authentication Capabilities (38h)	Supported	Supported
Get Session Challenge (39h)	Supported	Supported
Activate Session (3Ah)	Supported	Supported
Set Session Privilege Level (3Bh)	Supported	Supported
Close Session (3Ch)	Supported	Supported
Get Session Info (3Dh)	Supported	Supported
Get AuthCode (3Fh)	Unsupported	Unsupported
Set Channel Access (40h)	Supported	Supported
Get Channel Access (41h)	Supported	Supported
Get Channel Info (42h)	Supported	Supported

Command	MSP8060 (FRU0)	MSP8060 (FRU1/FRU2)
Set User Access (43h)	Supported	Supported
Get User Access (44h)	Supported	Supported
Set User Name (45h)	Supported	Supported
Get User Name (46h)	Supported	Supported
Set User Password (47h)	Supported	Supported
Master Write-Read (52h)	Supported	Unsupported
Get Channel Cipher Suites (54h)	Supported	Supported
Set Channel Security Keys (56h)	Unsupported	Unsupported
Get System Interface Capabilities (57h)	Unsupported	Supported
RMCP+ Support and Payload Commands (NetFN/LUN 06h/0h)		
Activate Payload (48h)	Supported	Unsupported
Deactivate Payload (49h)	Supported	Unsupported
Get Payload Activation Status (4Ah)	Supported	Unsupported
Get Payload Instance Info (4Bh)	Supported	Unsupported
Set User Payload Access (4Ch)	Supported	Unsupported
Get User Payload Access (4Dh)	Supported	Unsupported
Get Channel Payload Support (4Eh)	Supported	Supported
Get Channel Payload Version (4Fh)	Supported	Supported
Get Channel OEM Payload Info (50h)	Unsupported	Unsupported
Suspend/Resume Payload Encryption (55h)	Supported	Supported
Chassis Device Commands (NetFN/LUN 00h/0h)		
Get Chassis Capabilities (00h)	Supported	Supported
Get Chassis Status (01h)	Supported	Supported
Chassis Control (02h)	Supported	Supported
Chassis Reset (03h)	Unsupported	Unsupported
Chassis Identify (04h)	Supported	Unsupported
Set Chassis Capabilities (05h)	Unsupported	Unsupported
Set Power Restore Policy (06h)	Unsupported	Unsupported
Get System Restart Cause (07h)	Unsupported	Unsupported
Set System Boot Options (08h)	Unsupported	Supported
Get System Boot Options (09h)	Unsupported	Supported
Get POH Counter (0Fh)	Unsupported	Unsupported
Event Commands (NetFN/LUN 04h/0h)		
Set Event Receiver (00h)	Supported	Supported
Get Event Receiver (01h)	Supported	Supported
Platform Event (02h)	Supported	Supported
PEF and Alerting Commands (NetFN/LUN 04h/0h)		
Get PEF Capabilities (10h)	Supported	Unsupported
Arm PEF Postpone Timer (11h)	Supported	Unsupported
Set PEF Configuration Parameters (12h)	Supported	Unsupported
Get PEF Configuration Parameters (13h)	Supported	Unsupported

Command	MSP8060 (FRU0)	MSP8060 (FRU1/FRU2)
Set Last Processed Event ID (14h)	Supported	Unsupported
Get Last Processed Event ID (15h)	Supported	Unsupported
Alert Immediate (16h)	Unsupported	Unsupported
PET Acknowledge (17h)	Unsupported	Unsupported
Sensor Device Commands (NetFN/LUN 04h/0h)		
Get Device SDR Info (20h)	Supported	Supported
Get Device SDR (21h)	Supported	Supported
Reserve Device SDR Repository (22h)	Supported	Supported
Get Sensor Reading Factors (23h)	Unsupported	Unsupported
Set Sensor Hysteresis (24h)	Supported	Supported
Get Sensor Hysteresis (25h)	Supported	Supported
Set Sensor Threshold (26h)	Supported	Supported
Get Sensor Threshold (27h)	Supported	Supported
Set Sensor Event Enable (28h)	Supported	Supported
Get Sensor Event Enable (29h)	Supported	Supported
Re-arm Sensor Events (2Ah)	Unsupported	Unsupported
Get Sensor Event Status (2Bh)	Unsupported	Unsupported
Get Sensor Reading (2Dh)	Supported	Supported
Set Sensor Type (2Eh)	Unsupported	Unsupported
Get Sensor Type (2Fh)	Unsupported	Unsupported
Set Sensor Reading and Event Status (30h)	Supported	Supported
FRU Device Commands (NetFN/LUN 0Ah/0h)		
Get FRU Inventory Area Info (10h)	Supported	Supported
Read FRU Data (11h)	Supported	Supported
Write FRU Data (12h)	Supported	Supported
SDR Device Commands (NetFN/LUN 0Ah/0h) ** UNSUPPORTED FEATURE		
Get SDR Repository Info (20h)	Unsupported	Unsupported
Get SDR Repository Allocation Info (21h)	Unsupported	Unsupported
Reserve SDR Repository (22h)	Unsupported	Unsupported
Get SDR (23h)	Unsupported	Unsupported
Add SDR (24h)	Unsupported	Unsupported
Partial Add SDR (25h)	Unsupported	Unsupported
Delete SDR (26h)	Unsupported	Unsupported
Clear SDR Repository (27h)	Unsupported	Unsupported
Get SDR Repository Time (28h)	Unsupported	Unsupported
Set SDR Repository Time (29h)	Unsupported	Unsupported
Enter SDR Rep Update Mode (2Ah)	Unsupported	Unsupported
Exit SDR Repository Update Mode (2Bh)	Unsupported	Unsupported
Run Initialization Agent (2Ch)	Unsupported	Unsupported
SEL Device Commands (NetFN/LUN 0Ah/0h)		
Get SEL Info (40h)	Supported	Supported

Command	MSP8060 (FRU0)	MSP8060 (FRU1/FRU2)
Get SEL Allocation Info (41h)	Supported	Supported
Reserve SEL (42h)	Supported	Supported
Get SEL Entry (43h)	Supported	Supported
Add SEL Entry (44h)	Supported	Supported
Partial Add SEL Entry (45h)	Unsupported	Unsupported
Delete SEL Entry (46h)	Unsupported	Unsupported
Clear SEL (47h)	Supported	Supported
Get SEL Time (48h)	Supported	Supported
Set SEL Time (49h)	Supported	Supported
Get Auxiliary Log Status (5Ah)	Unsupported	Unsupported
Set Auxiliary Log Status (5Bh)	Unsupported	Unsupported
LAN Device Commands (NetFN/LUN 0Ch/0h)		
Set LAN Configuration Parameters (01h)	Supported	Supported
Get LAN Configuration Parameters (02h)	Supported	Supported
Suspend BMC ARPs (03h)	Supported	Supported
Get IP/UDP/RMCP Statistics (04h)	Supported	Supported
Serial/Model Device Commands (NetFN/LUN 0Ch/0h) ** UNSUPPORTED FEATURE		
Set Serial/Modem Configuration (10h)	Unsupported	Unsupported
Get Serial/Modem Configuration (11h)	Unsupported	Unsupported
Set Serial/Modem Mux (12h)	Unsupported	Unsupported
Get TAP Response Codes (13h)	Unsupported	Unsupported
Set PPP UDP Proxy Transmit Data (14h)	Unsupported	Unsupported
Get PPP UDP Proxy Transmit Data (15h)	Unsupported	Unsupported
Send PPP UDP Proxy Packet (16h)	Unsupported	Unsupported
Get PPP UDP Proxy Receive Data (17h)	Unsupported	Unsupported
Serial/Modem Connection Active (18h)	Unsupported	Unsupported
Callback (19h)	Unsupported	Unsupported
Set User Callback Options (1Ah)	Unsupported	Unsupported
Get User Callback Options (1Bh)	Unsupported	Unsupported
Serial-Over-LAN (SOL) Commands (NetFN/LUN 0Ch/0h)		
SOL Activating (20h)	Supported	Unsupported
Set SOL Configuration Params (21h)	Supported	Unsupported
Get SOL Configuration Params (22h)	Supported	Unsupported
HPM.1 Commands (NetFN/LUN 2Ch/0h)		
Get Target Upgrade Capabilities (2Eh)	Supported	Unsupported
Get Component Properties (2Fh)	Supported	Unsupported
Abort Firmware Upgrade (30h)	Supported	Unsupported
Initiate Upgrade Action (31h)	Supported	Unsupported
Upload Firmware Block (32h)	Supported	Unsupported
Finish Firmware Upload (33h)	Supported	Unsupported
Get Upgrade Status (34h)	Supported	Unsupported
Activate Firmware (35h)	Supported	Unsupported

Command	MSP8060 (FRU0)	MSP8060 (FRU1/FRU2)
Query Self-Test Results (36h)	Supported	Unsupported
Query Rollback Status (37h)	Supported	Unsupported
Initiate Manual Rollback (38h)	Supported	Unsupported

Appendix C: Configuring IOL Interfaces

Five methods are available to configure IOL interfaces. One is described in the Getting Started section and the four others are described in this appendix.

IOL configuration methods:

1. Using CPU/Operating System (KCS)
2. Using ShMC dual bridging (IOL + Chassis IPMB)
3. Using MSP8060 FRU0 IOL bridging (IOL + Local IPMB)
4. Using local ipmitool shell from MSP8060 (Local IPMB)

1. Using CPU/Operating System (KCS)

For each CPU payload:

1 - Install OS with OpenIPMI KCS support.
2 - Install Kontron's version of ipmitool.
3 - Configure IOL using LAN commands (IOL 1 - from CPU1 / IOL 2 - from CPU2):

Configure and set the IP address, the netmask and the gateway (optional for a static IP). Choose Option 1 for a static IP or Option 2 for a DHCP IP.

Note that the default gateway configured on FRU0 will be reflected/configured automatically for FRU1 and FRU2.

Option 1 – Static IP

Configure and set the IP address of FRU0 from the OS of CPU1 (0x7a) or CPU2 (0x7c):

FRU0 from CPU1 operating system (0x7a):

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool -m 0x7a -t 0x20 lan set 1 ipsrc static** CPU1_OSPrompt:~# **ipmitool -m 0x7a -t 0x20 lan set 1 ip addr 192.168.101.13** CPU1_OSPrompt:~# **ipmitool -m 0x7a -t 0x20 lan set 1 netmask 255.255.255.0** CPU1_OSPrompt:~# **ipmitool -m 0x7a -t 0x20 lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to STATIC for FRU0. Define static IP address for FRU0. Define netmask for FRU0. Define default gateway IP address for FRU0/FRU1/FRU2.

FRU0 from CPU2 operating system (0x7c):

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool -m 0x7c -t 0x20 lan set 1 ipsrc static** CPU2_OSPrompt:~# **ipmitool -m 0x7c -t 0x20 lan set 1 ip addr 192.168.101.13** CPU2_OSPrompt:~# **ipmitool -m 0x7c -t 0x20 lan set 1 netmask 255.255.255.0** CPU2_OSPrompt:~# **ipmitool -m 0x7c -t 0x20 lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to STATIC for FRU0. Define static IP address for FRU0. Define netmask for FRU0. Define default gateway IP address for FRU0/FRU1/FRU2.

Configure and set the IP address of FRU1 and FRU2

FRU1 from CPU1 operating system:

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool lan set 1 ipsrc static** CPU1_OSPrompt:~# **ipmitool lan set 1 ip addr 192.168.101.131** CPU1_OSPrompt:~# **ipmitool lan set 1 netmask 255.255.255.0**	Configure IP source to STATIC for FRU1. Define static IP address for FRU1. Define netmask for FRU1.

FRU2 from CPU2 operating system:

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool lan set 1 ipsrc static** CPU2_OSPrompt:~# **ipmitool lan set 1 ip addr 192.168.101.132** CPU2_OSPrompt:~# **ipmitool lan set 1 netmask 255.255.255.0**	Configure IP source to STATIC for FRU2. Define static IP address for FRU2. Define netmask for FRU2.

Option 2 – DHCP IP

Configure and set the IP address of FRU0 from the OS of CPU1 (0x7a) or CPU2 (0x7c):

FRU0 from CPU1 operating system (0x7a):

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool -m 0x7a -t 0x20 lan set 1 dhcp**	Configure IP source to DHCP for FRU0 from CPU1 OS.

FRU0 from CPU2 operating system (0x7c):

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool -m 0x7c -t 0x20 lan set 1 dhcp**	Configure IP source to DHCP for FRU0 from CPU2 OS.

Configure and set the IP address of FRU1 and FRU2

FRU1 from CPU1 operating system:

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU1.

FRU2 from CPU2 operating system:

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU2.

2. Using ShMC dual bridging (IOL + Chassis IPMB)

1 - Configure IOL on ShMC.
2 - Use Kontron's version of ipmitool:

Option 1 – Static IP

Configure and set the IP address of FRU0

Refer to the following IPMI slot address to configure the desired BMC

SLOT NUMBER	SLOT ADDRESS (CHASSIS IPMB ADRESS)
1	0x82
2	0x84
3	0x86
4	0x88
5	0x8a
6	0x8c
7	0x8e
8	0x90
9	0x92

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ipsrc static**	Configure IP source to STATIC for FRU0.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ip addr 192.168.101.13**	Define static IP address for FRU0.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 netmask 255.255.255.0**	Define netmask for FRU0.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 defgw ipaddr 192.168.101.254**	Define default gateway IP address for FRU0/FRU1/FRU2.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7a lan set 1 ipsrc static**	Configure IP source to STATIC for FRU1.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7a lan set 1 ip addr 192.168.101.131**	Define static IP address for FRU1.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7a lan set 1 netmask 255.255.255.0**	Define netmask for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7c lan set 1 ipsrc static**	Configure IP source to STATIC for FRU2.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7c lan set 1 ip addr 192.168.101.132**	Define static IP address for FRU2.
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7c lan set 1 netmask 255.255.255.0**	Define netmask for FRU2.

Option 2 – DHCP IP

Configure and set the IP address of FRU0

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU0.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7a lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -T [SLOT_ADDRESS] -b7 -t0x7c lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU2.

3. Using MSP8060 FRU0 IOL bridging (IOL + Local IPMB)

1 - Configure IOL on FRU0.
2 - Use Kontron's version of ipmitool.

Option 1 – Static IP

Configure and set the IP address of FRU0

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ipsrc static** RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ip addr 192.168.101.13** RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 netmask 255.255.255.0** RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 defgw ipaddr 192.168.101.254**	Configure IP source to STATIC for FRU0. Define static IP address for FRU0. Define netmask for FRU0. Define default gateway IP address for FRU0/FRU1/FRU2.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7a lan set 1 ipsrc static** CPU1_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7a lan set 1 ip addr 192.168.101.131** CPU1_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7a lan set 1 netmask 255.255.255.0**	Configure IP source to STATIC for FRU1. Define static IP address for FRU1. Define netmask for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7c lan set 1 ipsrc static** CPU2_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7c lan set 1 ip addr 192.168.101.132** CPU2_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7c lan set 1 netmask 255.255.255.0**	Configure IP source to STATIC for FRU2. Define static IP address for FRU2. Define netmask for FRU2.

Option 2 – DHCP IP

Configure and set the IP address of FRU0

COMMAND	PURPOSE
RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H [SHMC_IP] -U admin -P admin -t [SLOT_ADDRESS] lan set 1 ipsrc DHCP**	Configure IP source to DHCP for FRU0.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
CPU1_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7a lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
CPU2_OSPrompt:~# **ipmitool -I lanplus -H [MSP8060_FRU0_IP] -U admin -P admin -b7 -m 0x20 -t 0x7c lan set 1 ipsrc dhcp**	Configure IP source to DHCP for FRU2.

4. Using local ipmitool shell from MSP8060 (Local IPMB)

1- Log in to the ipmitool shell through the Serial Port.

2- From the ipmitool shell, select which local controllers to access using the "set localtarget" command. Note: Default local target is **0x20** (FRU0) and possible values are **0x20** (FRU0), **0x7a** (FRU1) and **0x7c** (FRU2).

Set up the access by directing the serial connection to the BMC (example provided for MSP node 1)

COMMAND	PURPOSE
ipmitool> **Ctrl+g 1** CentOS Linux 7 (Core) Kernel 3.10.0-229.el7.x86_64 on an x86_64 sk9013075860 login: **Ctrl+gg 0** MSP8060 login: **admin** Password: **admin** ipmitool>	Use HOTKEY to redirect serial console multiplexer to MSP node 1 components. Use HOTKEY to redirect serial console multiplexer to the BMC of MSP node 1. Enter admin credential.

The "Ctrl+g 1" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on 1 (the MSP node number), followed by the Enter key. This sets the serial multiplexer mechanism to the latest targeted component of the MSP node (for an MSP node with dual CPUs, the default redirection will be on server 1).

If there is an OS installed on the MSP node, you should get something similar to the example above. Otherwise, the console may not show anything at this point.

The "Ctrl+gg 0" command is performed by pressing the Ctrl and g keys simultaneously, then pressing on the g key again, followed by the 0 key and the Enter key. This will toggle the multiplexer to target the BMC instead of the server (see Figure 10).

Option 1 – Static IP

Configure and set the IP address of FRU0

COMMAND	PURPOSE
ipmitool> **set localtarget 0x20** ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.13** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **lan set 1 defgw ipaddr 192.168.101.254**	Target FRU0 (Default value). Configure IP source to STATIC for FRU0. Define static IP address for FRU0. Define netmask for FRU0. Define default gateway IP address for FRU0/FRU1/FRU2.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7a** ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.131** ipmitool> **lan set 1 netmask 255.255.255.0**	Target FRU1. Configure IP source to STATIC for FRU1. Define static IP address for FRU1. Define netmask for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7c** ipmitool> **lan set 1 ipsrc static** ipmitool> **lan set 1 ip addr 192.168.101.132** ipmitool> **lan set 1 netmask 255.255.255.0** ipmitool> **set localtarget 0x20**	Target FRU2. Configure IP source to STATIC for FRU2. Define static IP address for FRU2. Define netmask for FRU2. Change target to FRU0 (Default value).

Option 2 – DHCP IP

Configure and set the IP address of FRU0

COMMAND	PURPOSE
ipmitool> **set localtarget 0x20** ipmitool> **lan set 1 ipsrc dhcp**	Target FRU0 (Default value). Configure IP source to DHCP for FRU0.

Configure and set the IP address of FRU1 (0x7a) and FRU2 (0x7c)

Configure and set the IP address of FRU1 (0x7a)

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7a** ipmitool> **lan set 1 ipsrc dhcp**	Target FRU1. Configure IP source to DHCP for FRU1.

Configure and set the IP address of FRU2 (0x7c)

COMMAND	PURPOSE
ipmitool> **set localtarget 0x7c** ipmitool> **lan set 1 ipsrc dhcp** ipmitool> **set localtarget 0x20**	Target FRU2. Configure IP source to DHCP for FRU2. Change target to FRU0 (Default value).

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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