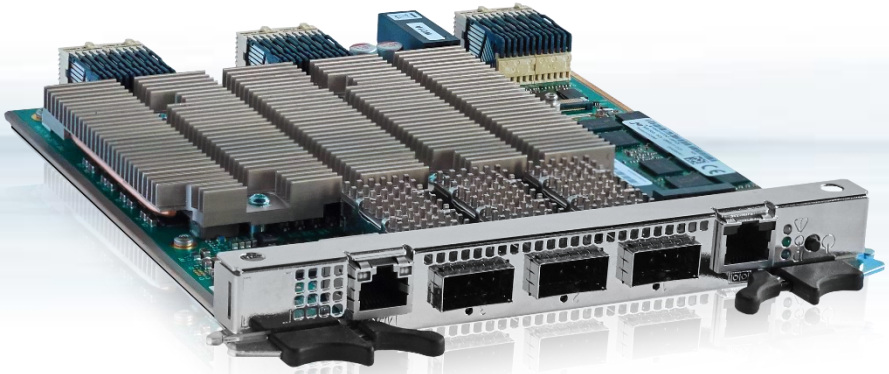
USER GUIDE



MSH8920 Series

Doc. 1.0

POSSIBILITIES START HERE kontron

MSH8920 SERIES - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial Issue	2017-Dec-20

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If you have any difficulties using this guide, discover an error, or just want to provide some feedback, please contact Kontron support. 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

API	Application Programming Interface
BMC	Base Management Controller
CLI	Command-Line Interface
DHCP	Dynamic Host Configuration Protocol
FPGA	Field-Programmable Gate Array
FRU	Field Replaceable Unit
Gbps	Gigabit per second
Hub	Switch with Shelf Management Controller
IOL	IPMI-Over-LAN
IPMI	Intelligent Platform Management Interface
MIB	Management Information Base
MSP node	Modular Server Processing Node

NTP	Network Time Protocol
PCIe	PCI-Express
QSFP	Quad Small Form-factor Pluggable
RTC	Real Time Clock
SEL	System Event Log
ShMC	Shelf Management Controller
SM	System Monitor Web Interface
SNMP	Simple Network Management Protocol
SOL	IPMI based Serial-Over-LAN
SSH	Secure Shell
STP	Spanning Tree Protocol
TIPC	Transparent Inter-process Communication
VLAN	Virtual Local Area Network

Electrostatic Discharge

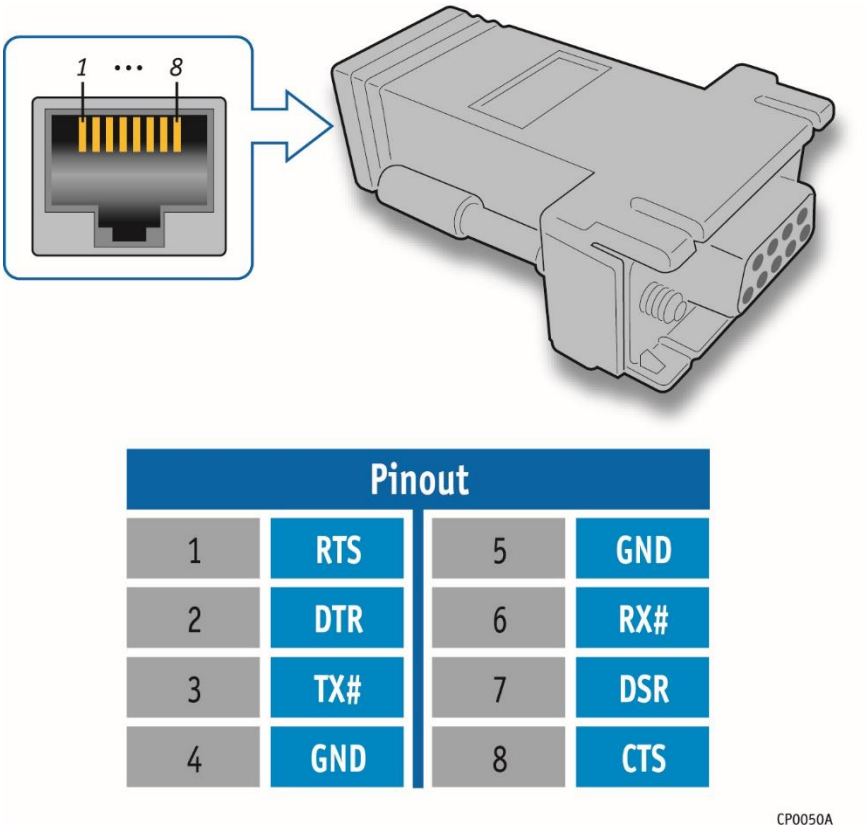
ESD Sensitive Device!

MSH8920 series hubs are sensitive to electrostatic discharge (ESD). Users must take the appropriate precautions when handling ESD-sensitive devices.

Adapters

To establish a serial connection through the RJ45 console port located on the front plate (Figure 3), use the RJ45 to DB9 adapter provided with the system to connect a straight-through Ethernet cable.

Figure 1: RJ45 to DB9 adapter



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

MSH8920 series switches with shelf management controller (hubs) are modules for the SYMKLOUD MS2920 platform. Two hubs can be installed in each MS2920.

Table 1: MSH8920 series features

Component	Description
Switching capabilities	Managed switch with: ▶ MSH8921 - External 3x 100/40 Gbps. Internal 36x 10 Gbps, 12x 1 Gbps and 1x 40 Gbps. Redundant switching in dual hub configuration Full featured Layer 2 switching Multicast support (IPv4 and IPv6) Layer 3 IPv4/IPv6 routing
Shelf Management Controller (ShMC) capabilities	Battery backed central time source for MS2920 platform Cooling management FRU activation management Platform LED control Platform monitoring Comprehensive sensor network and event monitoring
Remote management	IPMI 2.0 (including IOL, SOL) RESTful API SNMP Firmware upgrade Sensor and event aggregation for hubs and nodes Hot swap monitoring and control for hubs and nodes
Hot swap	Supported Refer to section 2.1 for a description of hub behavior during a hot swap procedure
Battery	RTC supply, user-replaceable battery, model BR1225
Power consumption	MSH8921 (at 55°C, with 3 QSFP28 100GBASE-LR4 optical modules): 57 W typical

For a list of approved QSFP modules, refer to the product's THOL.

Figure 2: SYMKLOUD layers

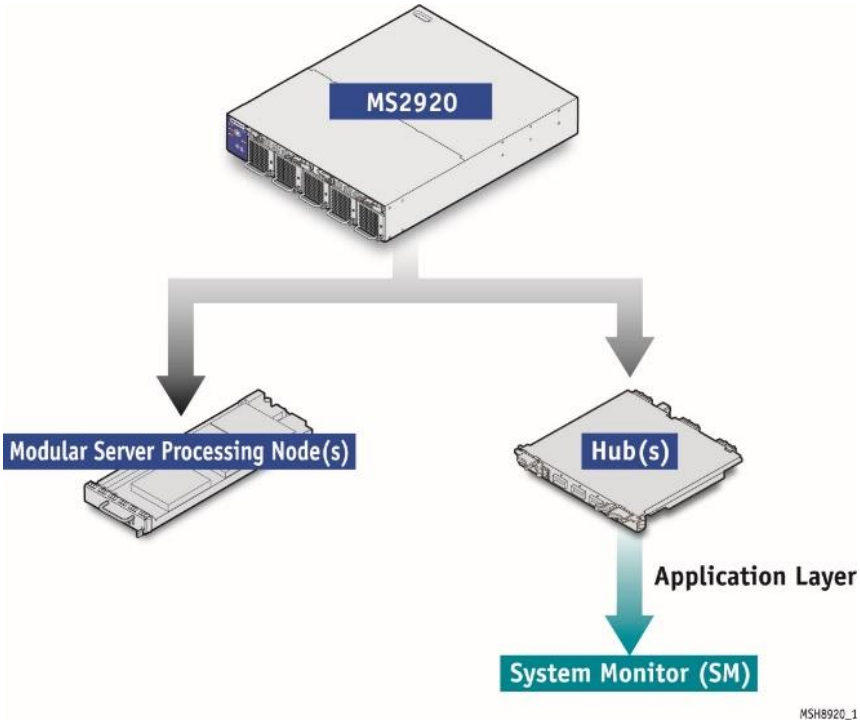
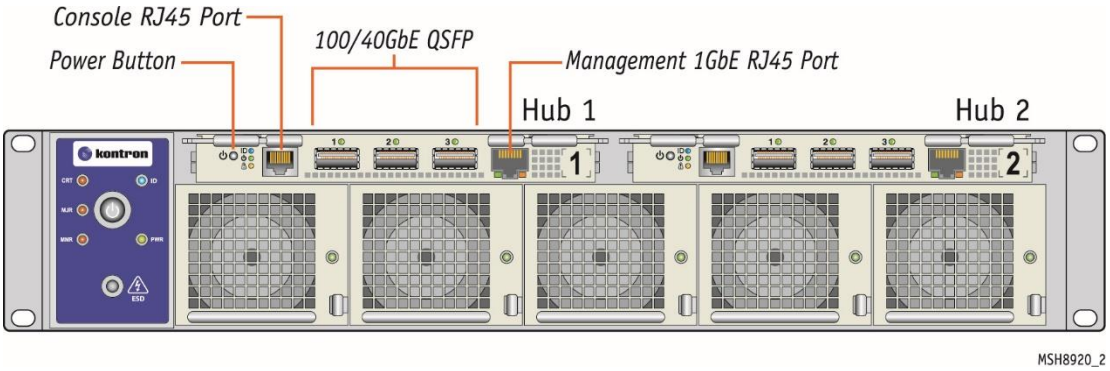


Figure 3: MSH8920 series hubs in front of chassis

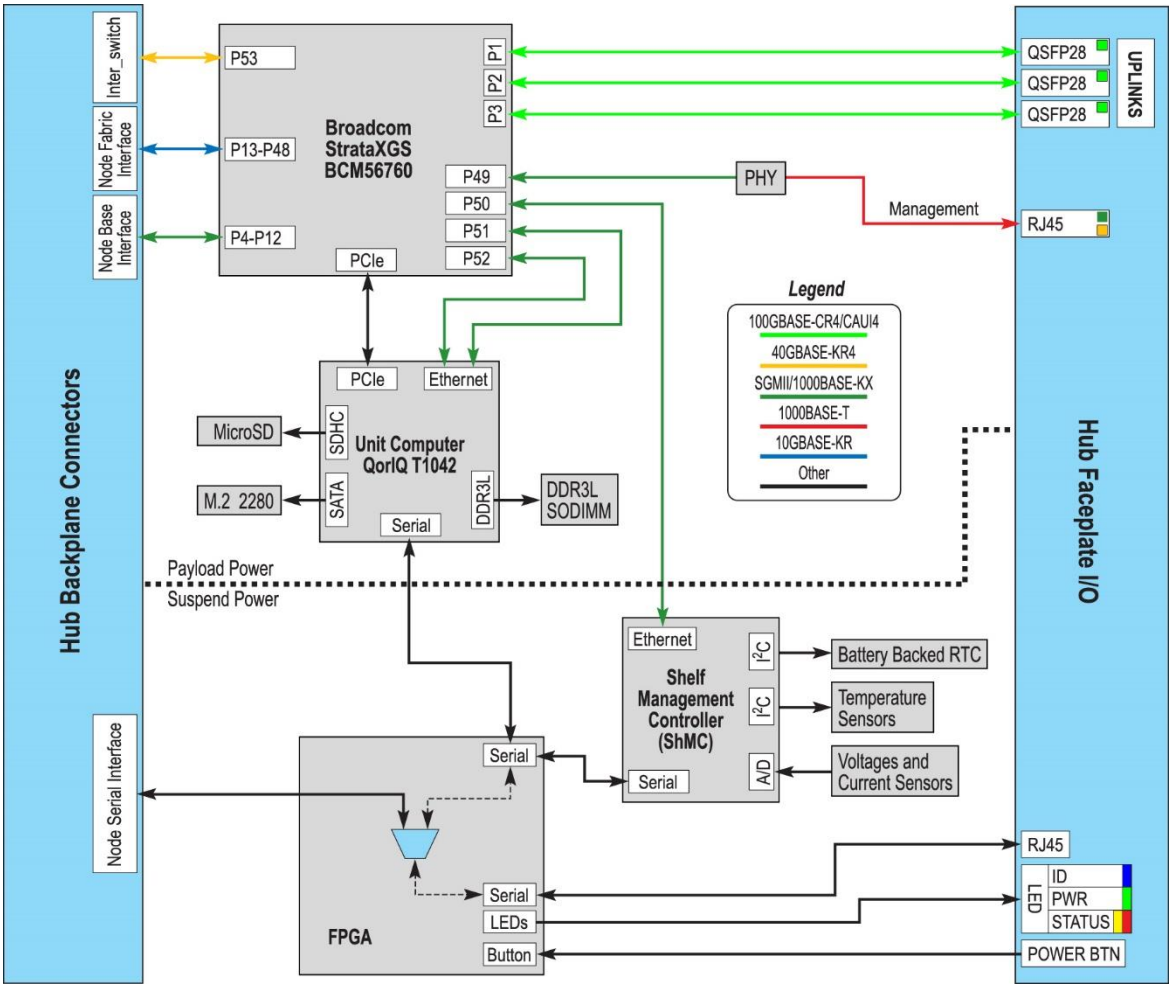


For information on other SYMKLOUD MS2920 components, refer to the specific component's user guide.

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: MSH8920 series block diagram



1.3. Network OS License

A PicOS license is required to use the MSH8920 switch. A license is included with the hub and installed by Kontron before delivery. To extend the features or support coverage of the license and enable updates, communicate with Kontron's customer service. To obtain information about the license installed on an MSH8920 series hub, please refer to section 4.16.

1.4. Port Mapping

Figure 5: MSH8921 port mapping

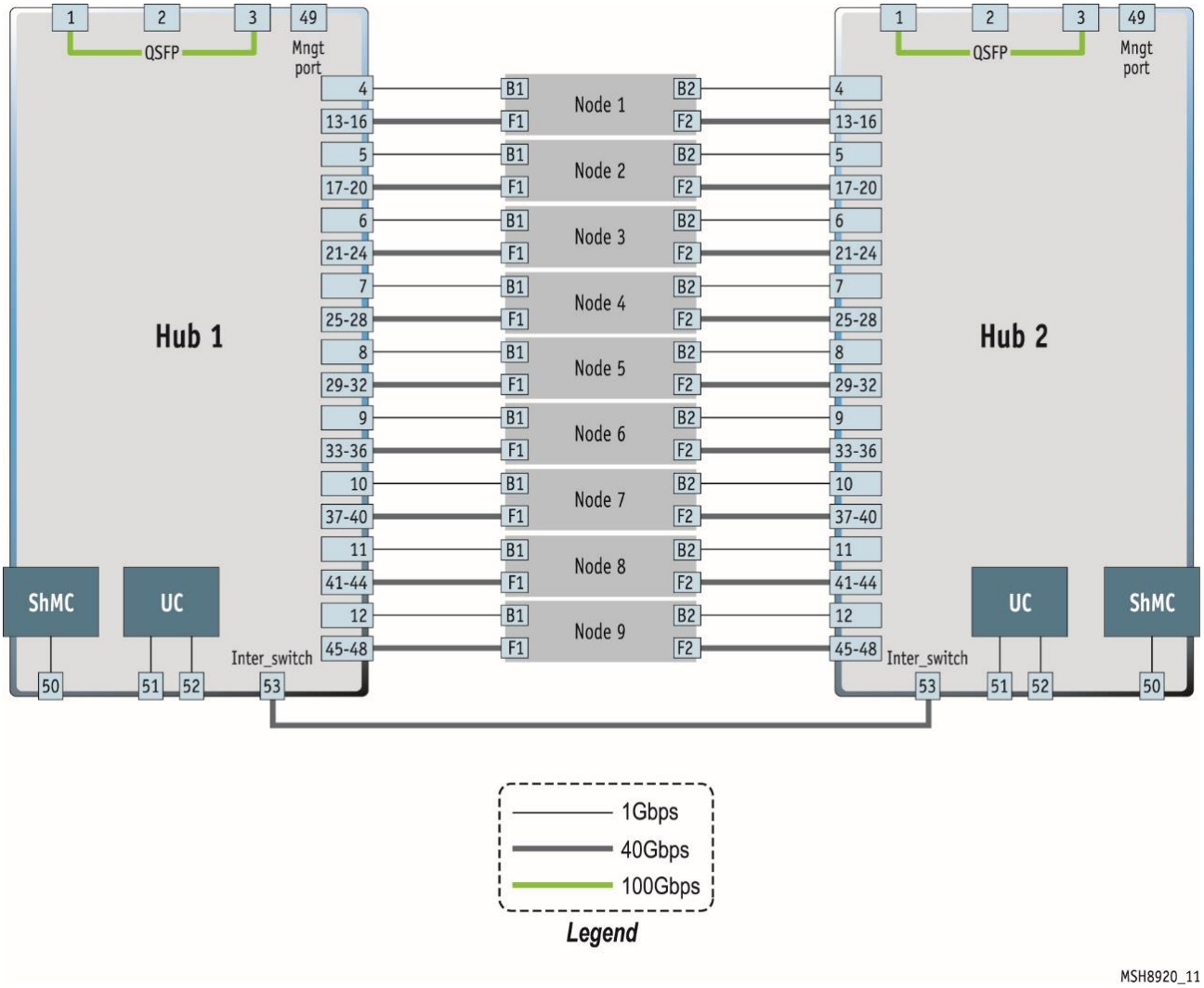


Table 2: MSH8921 port mapping

Port Number	PicOS Interface	Description
1.1*	xe-1/1/1.1	Front_QSFP_1_p1
1.2	xe-1/1/1.2	Front_QSFP_1_p2
1.3	xe-1/1/1.3	Front_QSFP_1_p3
1.4	xe-1/1/1.4	Front_QSFP_1_p4
2.1*	xe-1/1/2.1	Front_QSFP_2_p1
2.2	xe-1/1/2.2	Front_QSFP_2_p2
2.3	xe-1/1/2.3	Front_QSFP_2_p3
2.4	xe-1/1/2.4	Front_QSFP_2_p4
3.1*	xe-1/1/3.1	Front_QSFP_3_p1
3.2	xe-1/1/3.2	Front_QSFP_3_p2
3.3	xe-1/1/3.3	Front_QSFP_3_p3
3.4	xe-1/1/3.4	Front_QSFP_3_p4
4	xe-1/1/4	Base_Node_1
5	xe-1/1/5	Base_Node_2
6	xe-1/1/6	Base_Node_3
7	xe-1/1/7	Base_Node_4
8	xe-1/1/8	Base_Node_5
9	xe-1/1/9	Base_Node_6
10	xe-1/1/10	Base_Node_7
11	xe-1/1/11	Base_Node_8
12	xe-1/1/12	Base_Node_9
13	xe-1/1/13	Fabric_Node_1_p1
14	xe-1/1/14	Fabric_Node_1_p2
15	xe-1/1/15	Fabric_Node_1_p3
16	xe-1/1/16	Fabric_Node_1_p4
17	xe-1/1/17	Fabric_Node_2_p1
18	xe-1/1/18	Fabric_Node_2_p2
19	xe-1/1/19	Fabric_Node_2_p3
20	xe-1/1/20	Fabric_Node_2_p4
21	xe-1/1/21	Fabric_Node_3_p1
22	xe-1/1/22	Fabric_Node_3_p2
23	xe-1/1/23	Fabric_Node_3_p3
24	xe-1/1/24	Fabric_Node_3_p4
25	xe-1/1/25	Fabric_Node_4_p1
26	xe-1/1/26	Fabric_Node_4_p2
27	xe-1/1/27	Fabric_Node_4_p3
28	xe-1/1/28	Fabric_Node_4_p4
29	xe-1/1/29	Fabric_Node_5_p1
30	xe-1/1/30	Fabric_Node_5_p2
31	xe-1/1/31	Fabric_Node_5_p3
32	xe-1/1/32	Fabric_Node_5_p4
33	xe-1/1/33	Fabric_Node_6_p1
34	xe-1/1/34	Fabric_Node_6_p2
35	xe-1/1/35	Fabric_Node_6_p3
36	xe-1/1/36	Fabric_Node_6_p4
37	xe-1/1/37	Fabric_Node_7_p1
38	xe-1/1/38	Fabric_Node_7_p2
39	xe-1/1/39	Fabric_Node_7_p3
40	xe-1/1/40	Fabric_Node_7_p4
41	xe-1/1/41	Fabric_Node_8_p1
42	xe-1/1/42	Fabric_Node_8_p2
43	xe-1/1/43	Fabric_Node_8_p3
44	xe-1/1/44	Fabric_Node_8_p4
45	xe-1/1/45	Fabric_Node_9_p1
46	xe-1/1/46	Fabric_Node_9_p2
47	xe-1/1/47	Fabric_Node_9_p3
48	xe-1/1/48	Fabric_Node_9_p4
49	xe-1/1/49	Front_Management
50	xe-1/1/50	ShMC
51	xe-1/1/51	Switch_Controller_1
52	xe-1/1/52	Switch_Controller_2
53	xe-1/1/53	Inter_Switch

*The asterisk indicates a port that can be configured as one single logical interface or as four independent logical interfaces. When four independent logical interfaces are used, it will be possible to configure the three active logical interfaces written in purple. Please refer to section 4.7 for more details.

1.5. MSP Node Network Links

MSP node network connectivity is model-dependent and will be established as described in the figures and tables of this section. The figures show examples for an MSP installed in slot 1.

1.5.1. MSP8020 series nodes in an MS2920 chassis with MSH8921 hubs

Figure 6: MSP8020 fabric connectivity

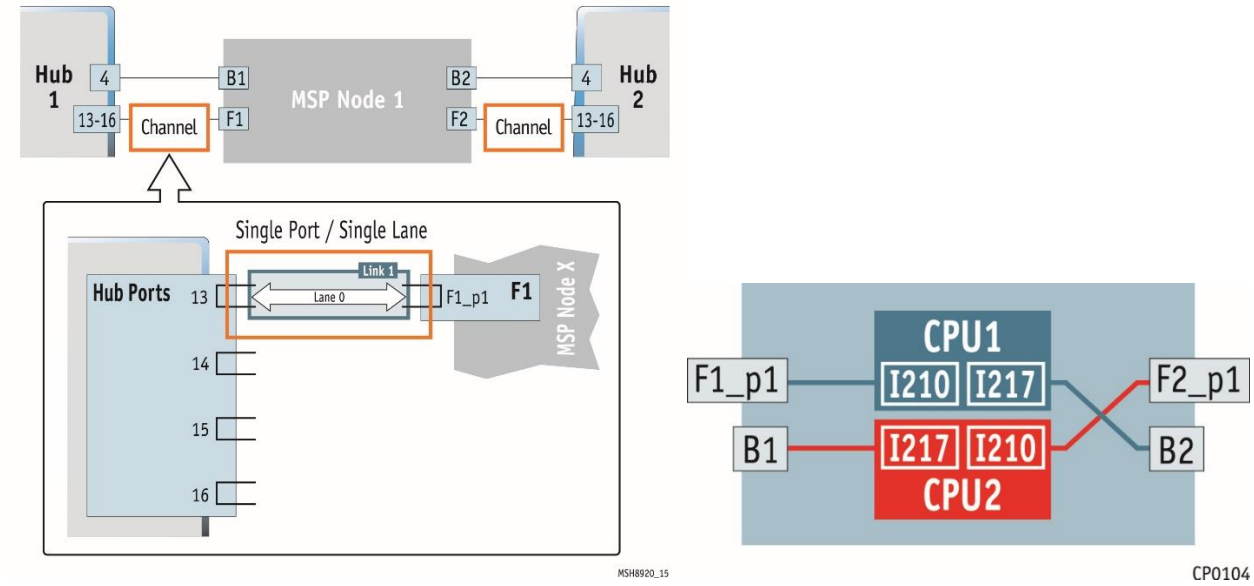


Table 3: MSP8020 fabric connectivity

	CPU 1		CPU 2	
Node Port	Fabric 1_p1	Base 2	Fabric 2_p1	Base 1
PCI Device	0000:00:19.0	0000:01:00.0	0000:00:19.0	0000:01:00.0
Speed	1Gbps	1Gbps	1Gbps	1Gbps
Node #	Hub 1 Port #	Hub 2 Port #	Hub 2 Port #	Hub 1 Port #
1	xe-1/1/13	xe-1/1/4	xe-1/1/13	xe-1/1/4
2	xe-1/1/17	xe-1/1/5	xe-1/1/17	xe-1/1/5
3	xe-1/1/21	xe-1/1/6	xe-1/1/21	xe-1/1/6
4	xe-1/1/25	xe-1/1/7	xe-1/1/25	xe-1/1/7
5	xe-1/1/29	xe-1/1/8	xe-1/1/29	xe-1/1/8
6	xe-1/1/33	xe-1/1/9	xe-1/1/33	xe-1/1/9
7	xe-1/1/37	xe-1/1/10	xe-1/1/37	xe-1/1/10
8	xe-1/1/41	xe-1/1/11	xe-1/1/41	xe-1/1/11
9	xe-1/1/45	xe-1/1/12	xe-1/1/45	xe-1/1/12

1.5.2. MSP8040 series nodes in an MS2920 chassis with MSH8921 hubs

Figure 7: MSP8040 fabric connectivity

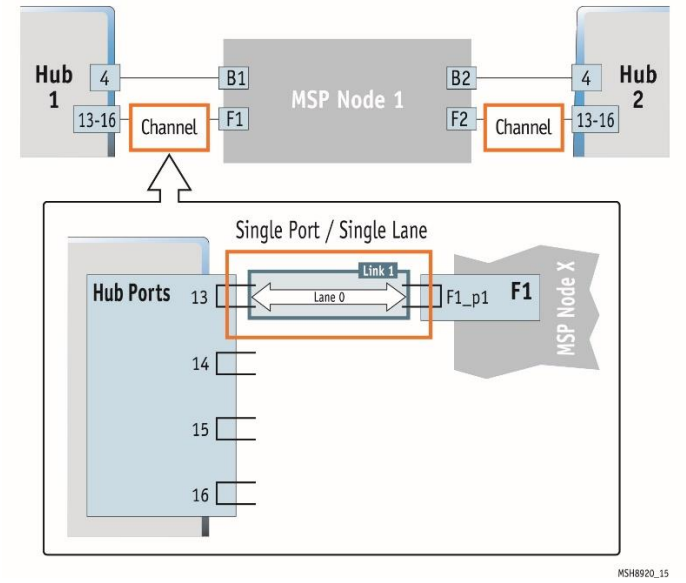


Table 4: MSP8040 fabric connectivity

Node Port	Fabric 1_p1	Base 1	Fabric 2_p1	Base 2
PCI Device	0000:03:00.0	0000:0b:00.0	0000:03:00.1	0000:0c:00.0
Speed	10Gbps	1Gbps	10Gbps	1Gbps
Node #	Hub 1 Port #	Hub 1 Port #	Hub 2 Port #	Hub 2 Port #
1	xe-1/1/13	xe-1/1/4	xe-1/1/13	xe-1/1/4
2	xe-1/1/17	xe-1/1/5	xe-1/1/17	xe-1/1/5
3	xe-1/1/21	xe-1/1/6	xe-1/1/21	xe-1/1/6
4	xe-1/1/25	xe-1/1/7	xe-1/1/25	xe-1/1/7
5	xe-1/1/29	xe-1/1/8	xe-1/1/29	xe-1/1/8
6	xe-1/1/33	xe-1/1/9	xe-1/1/33	xe-1/1/9
7	xe-1/1/37	xe-1/1/10	xe-1/1/37	xe-1/1/10
8	xe-1/1/41	xe-1/1/11	xe-1/1/41	xe-1/1/11
9	xe-1/1/45	xe-1/1/12	xe-1/1/45	xe-1/1/12

1.5.3. MSP8050 series nodes in an MS2920 chassis with MSH8921 hubs

Figure 8: MSP8050 fabric connectivity

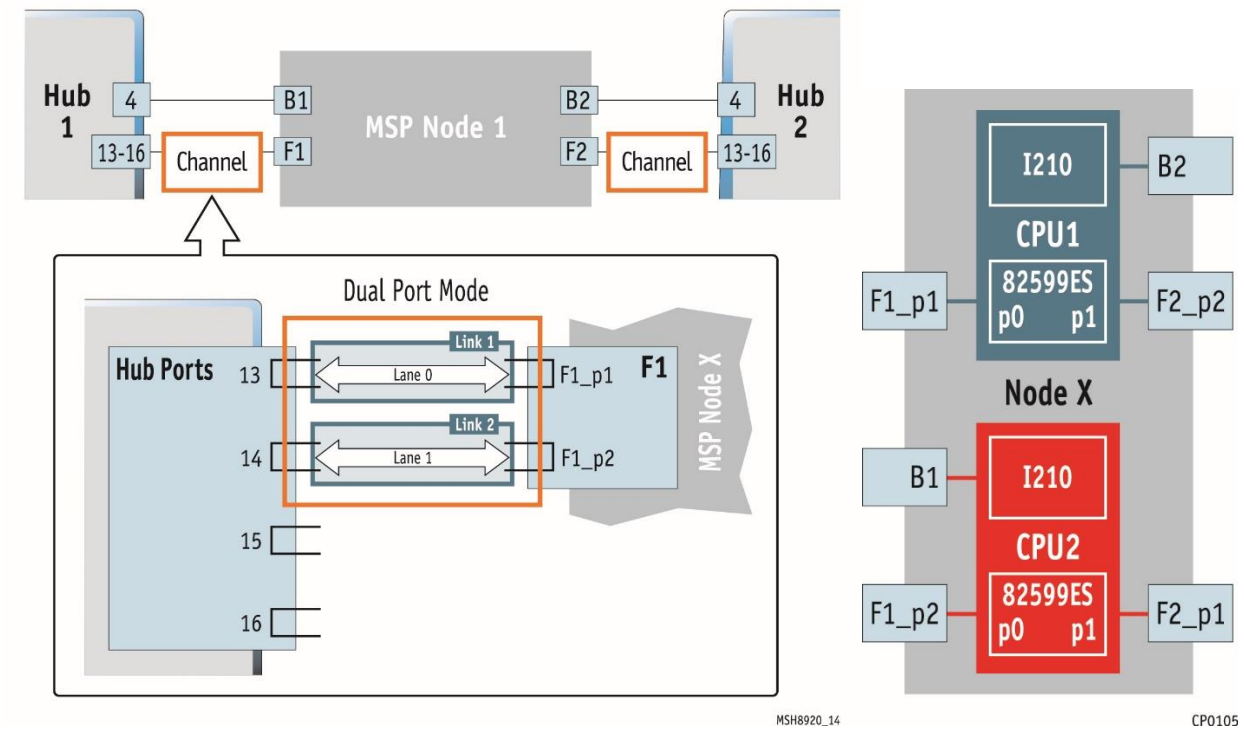
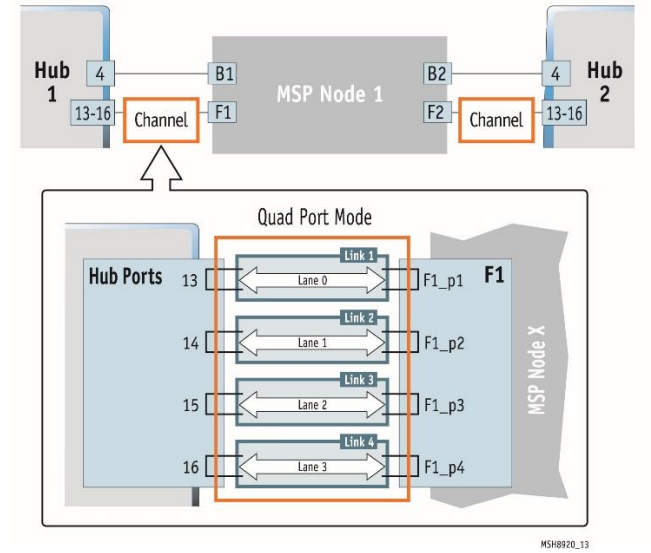


Table 5: MSP8050 fabric connectivity

	CPU 1			CPU 2		
Node Port	Fabric 1_p1	Fabric 2_p2	Base 2	Fabric 1_p2	Fabric 2_p1	Base 1
PCI Device	0000:01:00.0	0000:01:00.1	0000:04:00.0	0000:01:00.0	0000:01:00.1	0000:04:00.0
Speed	10Gbps	10Gbps	1Gbps	10Gbps	10Gbps	1Gbps
Node #	Hub 1 Port #	Hub 2 Port #	Hub 2 Port #	Hub 1 Port #	Hub 2 Port #	Hub 1 Port #
1	xe-1/1/13	xe-1/1/14	xe-1/1/4	xe-1/1/14	xe-1/1/13	xe-1/1/4
2	xe-1/1/17	xe-1/1/18	xe-1/1/5	xe-1/1/18	xe-1/1/17	xe-1/1/5
3	xe-1/1/21	xe-1/1/22	xe-1/1/6	xe-1/1/22	xe-1/1/21	xe-1/1/6
4	xe-1/1/25	xe-1/1/26	xe-1/1/7	xe-1/1/26	xe-1/1/25	xe-1/1/7
5	xe-1/1/29	xe-1/1/30	xe-1/1/8	xe-1/1/30	xe-1/1/29	xe-1/1/8
6	xe-1/1/33	xe-1/1/34	xe-1/1/9	xe-1/1/34	xe-1/1/33	xe-1/1/9
7	xe-1/1/37	xe-1/1/38	xe-1/1/10	xe-1/1/38	xe-1/1/37	xe-1/1/10
8	xe-1/1/41	xe-1/1/42	xe-1/1/11	xe-1/1/42	xe-1/1/41	xe-1/1/11
9	xe-1/1/45	xe-1/1/46	xe-1/1/12	xe-1/1/46	xe-1/1/45	xe-1/1/12

1.5.4. MSP8060 series nodes in an MS2920 chassis with MSH8921 hubs

Figure 9: MSP8060 fabric connectivity



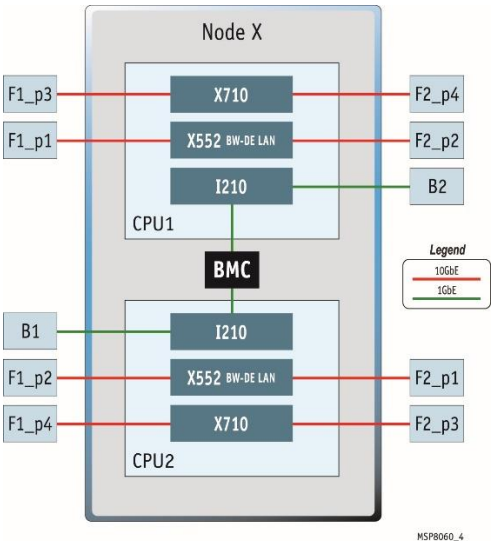


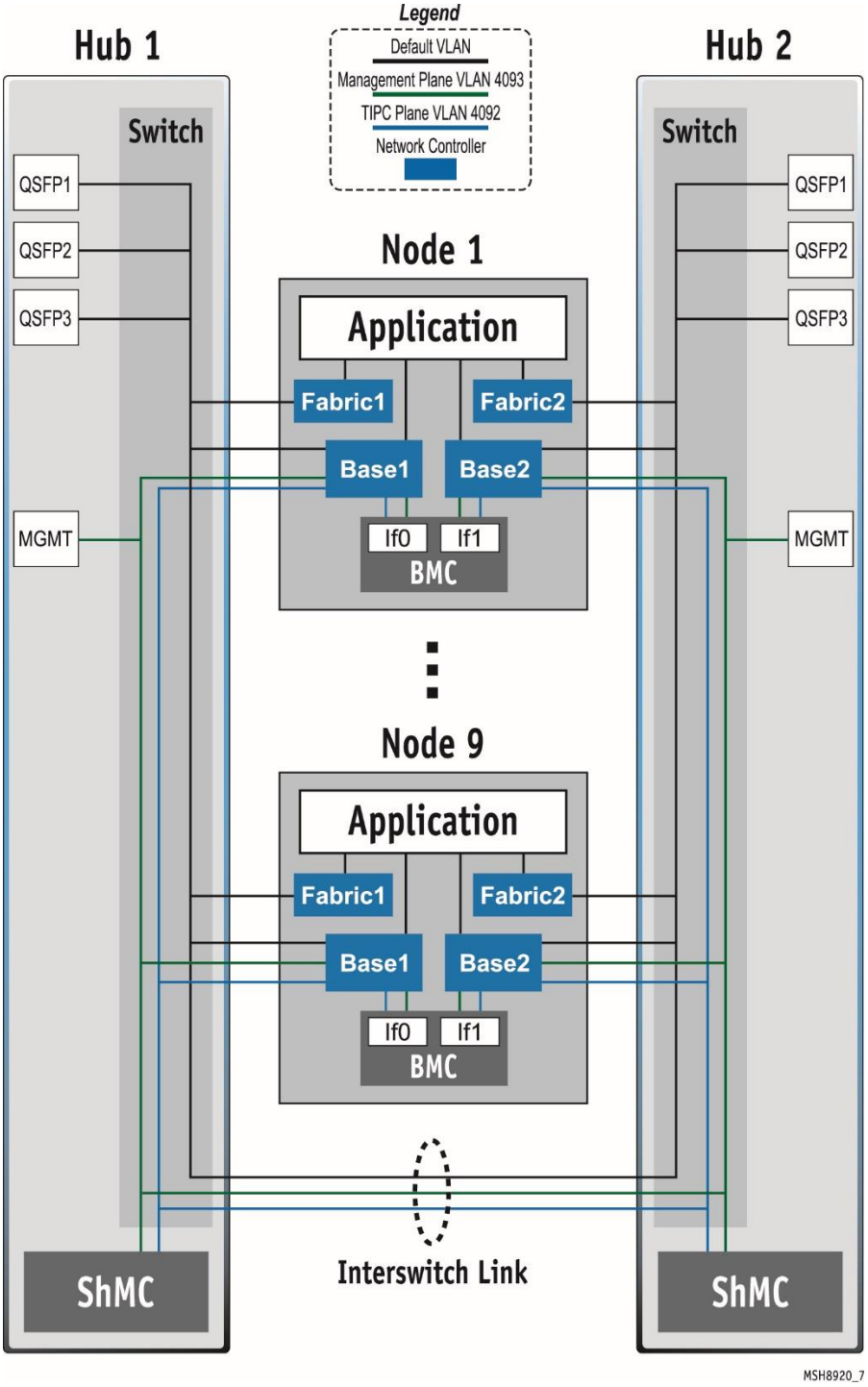
Table 6: MSP8060 fabric connectivity

CPU 1					
Node Port	Fabric 1_p1	Fabric 2_p2	Fabric 2_p4	Fabric 1_p3	Base 2
PCI Device	0000:03:00.0	0000:03:00.1	0000:05:00.0	0000:05:00.1	0000:08:00.0
Speed	10Gbps	10Gbps	10Gbps	10Gbps	1Gbps
Node #	Hub 1 Port #	Hub 2 Port #	Hub 2 Port #	Hub 1 Port #	Hub 2 Port #
1	xe-1/1/13	xe-1/1/14	xe-1/1/16	xe-1/1/15	xe-1/1/4
2	xe-1/1/17	xe-1/1/18	xe-1/1/20	xe-1/1/19	xe-1/1/5
3	xe-1/1/21	xe-1/1/22	xe-1/1/24*	xe-1/1/23*	xe-1/1/6
4	xe-1/1/25	xe-1/1/26	xe-1/1/28	xe-1/1/27	xe-1/1/7
5	xe-1/1/29	xe-1/1/30	xe-1/1/32	xe-1/1/31	xe-1/1/8
6	xe-1/1/33	xe-1/1/34	xe-1/1/36*	xe-1/1/35*	xe-1/1/9
7	xe-1/1/37	xe-1/1/38	xe-1/1/40	xe-1/1/39	xe-1/1/10
8	xe-1/1/41	xe-1/1/42	xe-1/1/44	xe-1/1/43	xe-1/1/11
9	xe-1/1/45	xe-1/1/46	xe-1/1/48*	xe-1/1/47*	xe-1/1/12
CPU 2					
Node Port	Fabric 1_p2	Fabric 2_p1	Fabric 2_p3	Fabric 1_p4	Base 1
PCI Device	0000:03:00.0	0000:03:00.1	0000:05:00.0	0000:05:00.1	0000:08:00.0
Speed	10Gbps	10Gbps	10Gbps	10Gbps	1Gbps
Node #	Hub 1 Port #	Hub 2 Port #	Hub 2 Port #	Hub 1 Port #	Hub 1 Port #
1	xe-1/1/14	xe-1/1/13	xe-1/1/15	xe-1/1/16	xe-1/1/4
2	xe-1/1/18	xe-1/1/17	xe-1/1/19	xe-1/1/20	xe-1/1/5
3	xe-1/1/22	xe-1/1/21	xe-1/1/23*	xe-1/1/24*	xe-1/1/6
4	xe-1/1/26	xe-1/1/25	xe-1/1/27	xe-1/1/28	xe-1/1/7
5	xe-1/1/30	xe-1/1/29	xe-1/1/31	xe-1/1/32	xe-1/1/8
6	xe-1/1/34	xe-1/1/33	xe-1/1/35*	xe-1/1/36*	xe-1/1/9
7	xe-1/1/38	xe-1/1/37	xe-1/1/39	xe-1/1/40	xe-1/1/10
8	xe-1/1/42	xe-1/1/41	xe-1/1/43	xe-1/1/44	xe-1/1/11
9	xe-1/1/46	xe-1/1/45	xe-1/1/47*	xe-1/1/48*	xe-1/1/12

The MSH8921 does not support both the 3 QSFP ports at 100Gbps and Quad Port Mode for all nine nodes. If the 3 QSFP ports are configured at 100Gbps, the ports tagged with "" for MSP nodes 3, 6 and 9 are not available. To configure the MSH8921 portmap, please refer to section 4.6.

1.6. Network Topology

Figure 10: Network topology



Changes made to VLAN 4092 can prevent proper system operation.

1.7. MAC Addresses

Table 7: MAC addresses

Interface description	MAC address
Reserved	MAC_BASE + 0
UC eth1 (switch port xe-1/1/51)	MAC_BASE + 1
UC eth2 (switch port xe-1/1/52)	MAC_BASE + 2
PicOS L3 interface	MAC_BASE + 3
Reserved	MAC_BASE + 4
Reserved	MAC_BASE + 5
Reserved	MAC_BASE + 6
Reserved	MAC_BASE + 7
ShMC (switch port xe-1/1/50)	MAC_BASE + 8
Reserved	MAC_BASE + 9

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

1.8. LEDs and Buttons

Figure 11: MSH8920 series LEDs and buttons

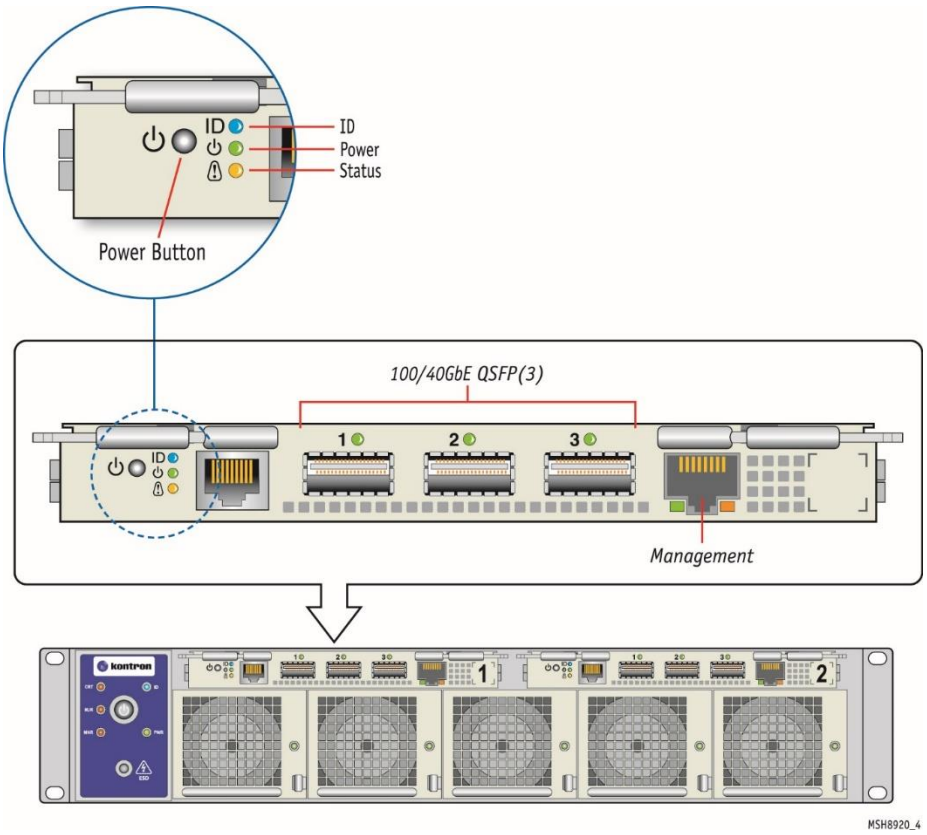


Table 8: LED status description and button behavior

State	ID (blue)	Power (green)	Status (amber)
Identify command in progress	Blinking[1]	Not affected	Not affected
Active ShMC with hub payload (switch) power ON	OFF	ON	ON: not healthy OFF: healthy
Standby ShMC with hub payload (switch) power ON	OFF	Blinking[2]	ON: not healthy OFF: healthy
Hub payload (switch) power OFF	ON	OFF	ON: not healthy OFF: healthy

State	QSFP (green)
Link established, no activity	ON: Speed 100/40/10
Activity	Blinking[3]: Speed 100/40/10
No link	OFF

State	Management (green)
Link established, no activity	ON: Speed 1 Gbps or 100 Mbps OFF: Speed 10 Mbps
Activity	Blinking[3]: Speed 1 Gbps or 100 Mbps OFF: Speed 10 Mbps
No link	OFF

[1]Fast blink, 1 Hz, 50%
[2]Slow blink, 0.5 Hz, 20%
[3]6 Hz, 50%

Power button of hub with a standby ShMC		
State	Short press	Long press (4 seconds)
Power OFF	Powers the hub	Nothing happens
Power ON	Performs a clean shutdown of the hub	Turns hub off immediately
Power button of hub with an active ShMC		
State	Short press	Long press (4 seconds)
Power ON	Switches over to the standby ShMC Unsuccessful switchover: nothing happens	Nothing happens

1.9. Interfacing

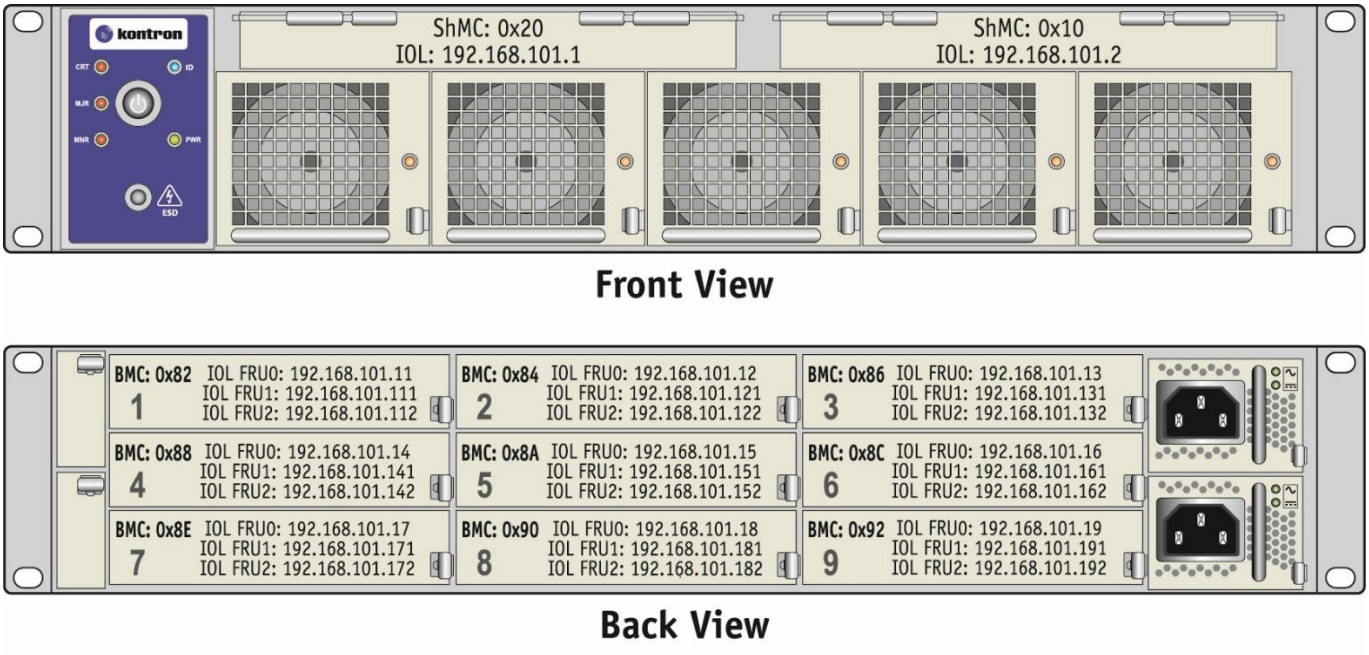
MSH8920 series hubs offer two types of management connections: a networking connection and a serial console connection.

1.9.1. 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 12.

Figure 12: Default IP addresses



IOL FRU1 and IOL FRU2 addresses are required for certain MSP node models.

Hub IOL IP

The IOL IP of a hub (front view in Figure 12) 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.

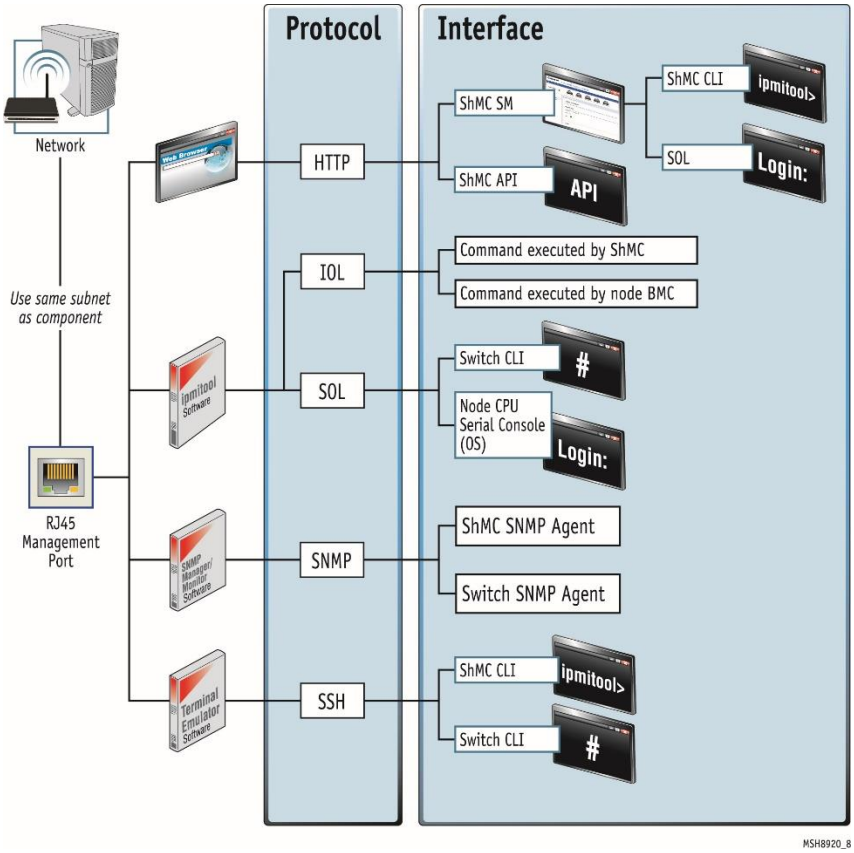
Switch Management IP

The switches of SYMKLOUD platforms have a switch management IP. This IP is required to remotely access the switch CLI.

- In MSH8920 series hubs, each switch is independently managed.
- The default switch management IP of a switch using PicOS is configured by DHCP.

Figure 13 shows the possible network paths to access the various interfaces of the system components.

Figure 13: Diagram of interface paths with a management networking connection



- To access the ShMC CLI from the SM:
  - Log in to the SM;
  - From the Console Access dropdown list under the Power Consumption Graph of the Dashboard screen, select a platform/hub;
  - Log in with the ShMC username and password;
  - Follow the on-screen instructions to connect to the target CPU or switch.
- To access MS2920 devices via SOL from the SM:
  - Log in to the SM;
  - From the Dashboard, select "Remote Access";
  - Click on the appropriate "WEB CLI" button for the device you wish to reach.
- For SSH access, a terminal emulator software such as PuTTY can be used.
- API calls can be made using a tool such as cURL. Refer to the API documentation (available from the kontron.com SYMKLOUD platform page or the SM web interface).
- An IOL connection allows users to send ipmitool commands over the LAN for immediate execution by the addressed node BMC. The Kontron ipmitool package can be downloaded from kontron.com, in the "Tools" section of the SYMKLOUD platform page.

Example of an SSH connection to the ShMC CLI:

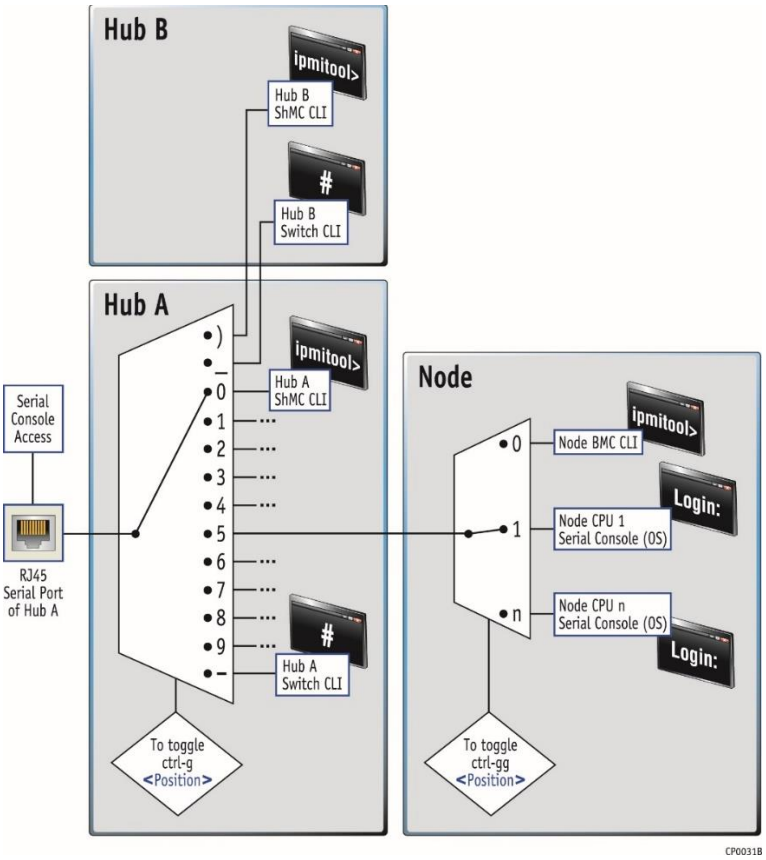
1. Connect to the management port (Figure 3) with a cable or via a network.
2. Establish an SSH connection through a terminal emulator using the ShMC IP address.
3. Log in using the appropriate username and password (refer to section 1.9.4).
4. Prompt ipmitool> is displayed.

1.9.2. 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 14).

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 14: Diagram of interface paths with a serial console connection



The redundancy feature of the serial ports ensures access to all MS2920 platform device serial ports (nodes, ShMC and switches), regardless of which hub's physical serial port is used. In the figure above, if hub A is in slot 1, hub B is in slot 2, and vice versa. The serial port communication parameters are 115200 baud, no parity, 8 data bits and backspace key set to "Ctrl-h". Recommended terminal emulation mode 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 switch CLI of hub A:

1. **Connect to the console port (Figure 3) using the RJ45 to DB9 adapter (Figure 1) or via a device such as a terminal server.**
2. **Establish a connection through a terminal emulator using the serial port communication parameters.**
3. **Access a component by toggling the MUX, e.g. to access the switch CLI, type Ctrl-g and then -.**

1.9.3. SNMP Agents

Two prerequisites are necessary to access the ShMC SNMP agent:

- The IP address of the active ShMC must be configured (refer to section 5.1).
- The SNMP agent must be enabled (refer to section 5.8).

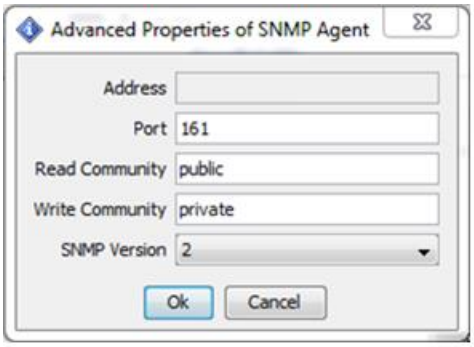
Two prerequisites are necessary to access the switch SNMP agent:

- The IP address of the switch must be configured (refer to section 4.3).
- The SNMP agent must be enabled (refer to section 4.12).

Once the required IP address is configured:

1. Install the appropriate MIB files. The MIB package includes a folder containing two files for the platform (ShMC) and one file for the MSH8920 series switches (Switch).
2. Open the SNMP manager.
3. Set the parameters as shown in Figure 15. In the **Address** field, enter the IP address of the component you want to connect to.

Figure 15: SNMP agent access configuration



1.9.4. Default Usernames and Passwords

Table 9: Default usernames and passwords

Configuration interface	Username and password
SM (UI)	admin admin
ShMC CLI	admin admin
Switch CLI	admin admin

2/ Extracting and Inserting a Module

2.1. 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 MSH8920 series hubs, the following systems and functionalities could be affected:

- The nodes lose half of their fabric and base connections. For some models, notably multi CPU engine MSP nodes, this means one CPU loses its single base connection.

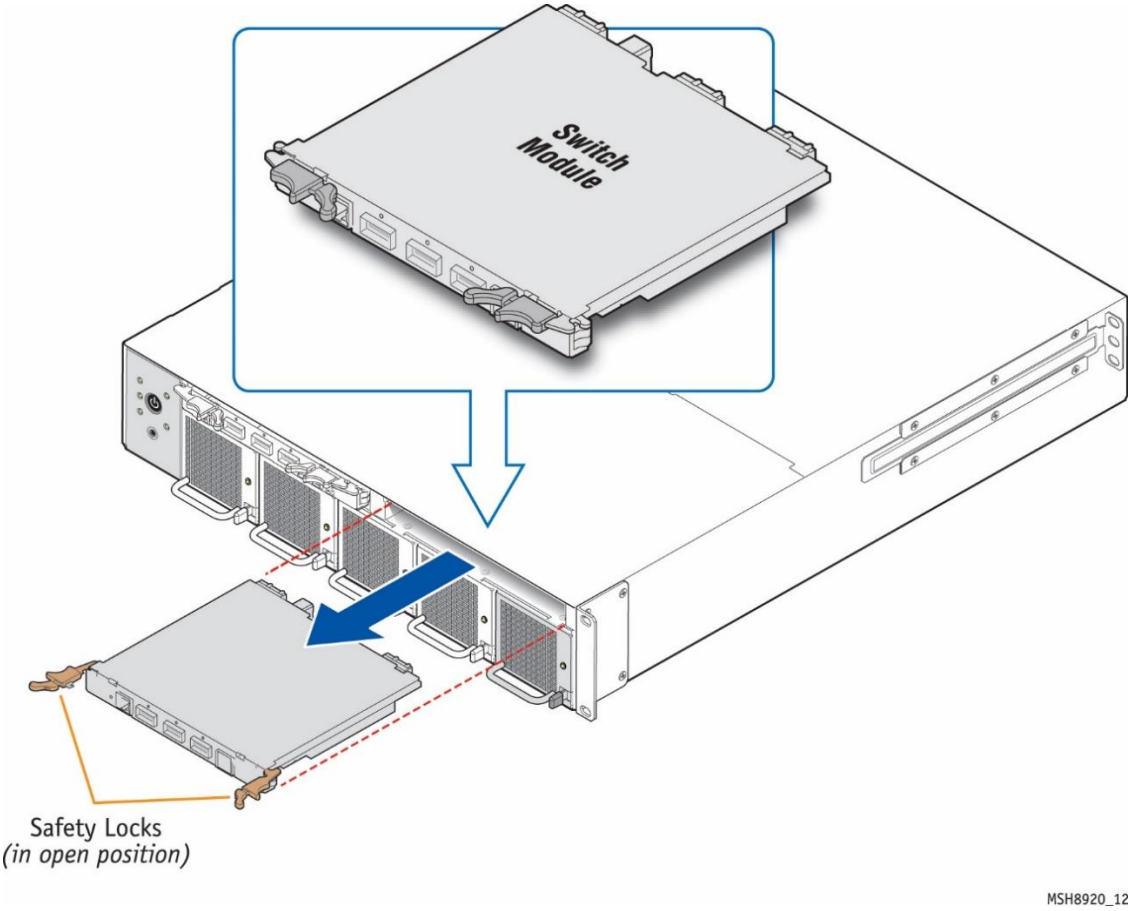
2.2. Extracting a Module

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 hub to be extracted to turn it off (see Table 8 for button behavior).
2. The ID LED of the hub becomes steady blue: the hub is ready to be extracted.
3. To release the safety locks, simultaneously squeeze the black moving parts against the black fixed parts and move the safety locks to a 90° position to unhook the hub from the frame of the MS2920 (Figure 16).
4. Hold the safety locks and extract the module by pulling it from the slot.

Figure 16: Module safety lock location



2.3. Inserting a Module

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

1. Holding the safety locks (90° position), insert a hub module in the appropriate slot until the safety locks rest against the faceplate.
2. Gently push the safety locks against the frame of the hub until you hear a click.
3. The power LED of the hub then becomes steady or blinking green: the hub is powered on and ready to use.

3/ Software Configurations and Conventions

This section contains useful information for performing the tasks described in the following sections.

Conventions:

- Elements between < > in blue are parameters. The value shown is an example or an instruction of what to enter. Items between () show a value range for the parameter spelled out, e.g. <VLAN (1-3)> means valid entries for the VLAN are between 1 and 3.
- Elements between [ ] in blue are optional parameters.
- 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 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.

Configuration command tables:

Sections 4/, 5/, 6/ and 7/ contain tables with one or two columns. The first column describes steps that can be performed in the Web-type interface(s) specified in the header. The second column describes steps that can be performed in the CLI-type interface(s) specified in the header. See Figure 13 and Figure 14 for available options for accessing the various Web interfaces or CLIs.

Switch CLI help:

- The switch CLI contains a context-sensitive help feature.
- Use the ? symbol anytime to display the next possible commands/arguments and short descriptions.
- The switch Linux prompt contains information about the physical location of the switch. The information is presented in the following format: MSH8920:H1 where the "1" in "H1" indicates this is the switch in the MSH8920 installed in hub slot #1.
- Configuration commands have a corresponding "delete" form. The "delete" form is syntactically similar (but not necessarily identical) to the configuration command; it either resets the parameters to default values or reverses the action of a command.

Ipmitool shell interface

The ipmitool shell accessible via the ShMC or BMC of the MS2920 platform has an integrated help function. To obtain help on possible commands or parameters, enter or append "help" in the command line.

System Monitor user interface

The help menu in the upper-right corner of the screen provides access to the documentation of the API (click on the **?** icon and then on **API Doc**). Refer to the API documentation for the calls available for performing various tasks. If a task can be accomplished using an API call, it will be specified in the tables of the configuration sections. A user guide is also available for the System Monitor.

4 / Configuring Switches

By default, the CLIs can be accessed via the networking configuration described in section 1.9.1. The CLIs can also be accessed via the serial connection shown in section 1.9.2. Procedures to access interfaces are also available in section 1.9.3.

The commands described in the tables are sometimes simple examples. It is strongly recommended that you refer to the *PicOS Routing and Switching Commands Reference Guide* or the *System Monitor User Guide* for a more comprehensive explanation of individual commands.

PicOS does not support stacking. All changes must therefore be applied to both switches when necessary.

There is no Web user interface for PicOS configuration. All tasks must be performed using the CLI or supported APIs.

4.1. CLI Access and Modes

CLI (serial, SSH, SOL)
To enter the CLI from the Linux shell and use Operation mode (prompt >): admin@MSH8920:H1$ **cli** admin@XorPlus> *To exit Operation mode and return to the Linux prompt:* admin@XorPlus> **exit** *To enter Configuration mode (prompt #):* admin@XorPlus> **configure** admin@XorPlus# *To exit Configuration mode and return to Operation mode:* admin@XorPlus# **exit** *In Configuration mode, an Operation command can be executed by putting run in front:* admin@XorPlus# **run <operation command>**
Note
The $ sign is the prompt of the Linux shell. The > sign is the prompt of Operation mode. The # sign is the prompt of Configuration mode.

4.2. Configuration Management

CLI (serial, SSH, SOL)
Changes are not effective until a "commit" command is issued: admin@XorPlus# **commit** *The "commit confirmed" command allows committing a change with a rollback if a confirmation is not issued within a configurable timeout:* admin@XorPlus# **commit confirmed [timeout in seconds]** *To revert to the switch default from the CLI in Configuration mode:* admin@XorPlus# **load override /home/admin/pica_startup.boot** admin@XorPlus# **commit** Note that this can affect the switch management interface configuration and result in loss of connectivity to PicOS

4.3. Switch Management Interface Configuration

To assign an IP address to the switch management interface:

CLI (serial, SSH, SOL)
To display the details of the management interfaces: admin@XorPlus> **show system management-ethernet** *For a static IP address, use:* admin@XorPlus# **set system management-ethernet eth1 ip-address IPv4 192.168.101.10/24** admin@XorPlus# **commit** *For a DHCP address, use (default):* admin@XorPlus# **set system management-ethernet eth1 ip-address IPv4 dhcp** admin@XorPlus# **commit**
Note
▶ PicOS is configured by default to obtain an address via DHCP for its management interface. ▶ The PicOS management interface is connected to the switch via interface xe-1/1/51 "Switch_Controller_1". This interface is configured by default with its native VLAN ID to 4093. This means that even though the PicOS management interface is not configured for VLAN, it is still part of the "Management Plane VLAN 4093".

4.4. Date and Time Configuration

The switch gets the date and time from the ShMC when it boots. It is, however, possible to use the NTP to adjust the switch date and time. To adjust the switch date and time, refer to section 5.2 and the following commands:

CLI (serial, SSH, SOL)
To configure time with the NTP: admin@XorPlus# **set system ntp-server-ip 10.1.2.12** admin@XorPlus# **commit** *To configure the time zone:* admin@XorPlus# **set system timezone ?** admin@XorPlus# **set system timezone America/Montreal** admin@XorPlus# **commit**
Note
Example provided for timezone America/Montreal.

4.5. Switch Configuration Information

To obtain switch configuration information:

CLI (serial, SSH, SOL)
To display the current configuration, including the built-in defaults: admin@XorPlus> **show running-config | display all** *To display the current configuration, but only the changes from the built-in defaults:* admin@XorPlus> **show running-config** *To display the complete current configuration of a specific port:* admin@XorPlus> **show running-config interface gigabit-ethernet xe-1/1/50 | display all** *To get information about the current list of rollbacks:* admin@XorPlus> **file list /pica/config** *To display changes in successive commits versus the current configuration, piping to the "compare" command can be used:* admin@XorPlus> **show running-config | compare rollback 01** *Comparing to successive rollback files will give differences between commits to the current configuration.* *Note that it is possible to filter the results to obtain more specific information. Piping the results to the "match" command allows using a regular expression to filter. For example, the following will give a list of all ports indicating which have a "native VLAN" setting:* admin@XorPlus> **show running-config | display all | match "xe-1|native"**

4.6. Switch Portmap Configuration

Not all MSH8921 ports can be supported at full speed. Two choices are available to configure the portmap:

Table 10: Portmap options

Portmap name	Front I/O bandwidth	Backplane fabric bandwidth
3x100G_QSFP	QSFP 1-3 at 100Gbps	Node slots 3,6,9 at 2x10Gbps Node slots 1-2,4-5,7,8 at 4x10Gbps
9x40G_FABRIC*	QSFP 1,3 at 100Gbps QSFP 2 at 40Gbps	Node slots 1-9 at 4x10Gbps

*Default MSH8921 configuration

CLI (serial, SSH, SOL)
To check the current operating mode, if the interface list contains 4 interfaces for slots 3, 6 or 9, it means the current mode is "9x40G_FABRIC": admin@Xorplus> **show interface brief | match Fabric_Node_3** *To change the configuration:* admin@Xorplus# **set interface portmap 3x100G_QSFP** admin@Xorplus# **commit** admin@XorPlus# **run request system reboot**

4.7. QSFP Interface Breakout

The three front panel QSFP interfaces can be configured as either a single logical interface using the full bandwidth or be split into four logical interfaces, each using a quarter of the full bandwidth:

CLI (serial, SSH, SOL)
To show the current configuration of the QSFP interfaces: admin@Xorplus> **show interface brief** In single interface mode, three interfaces will be shown In breakout mode, twelve interfaces will be shown *To breakout interfaces into four interfaces:* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/1.1 breakout 25g-4x** admin@XorPlus# **set interface gigabit-ethernet xe-1/1/3.1 breakout 25g-4x** admin@XorPlus# **commit** admin@XorPlus# **run request system reboot** *To merge interfaces into one interface:* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/1.1 breakout donot** admin@XorPlus# **set interface gigabit-ethernet xe-1/1/3.1 breakout donot** admin@XorPlus# **commit** admin@XorPlus# **run request system reboot**
Note
Note that all 100Gbps interfaces must be configured in the same breakout mode. For example, in 9x40G_FABRIC mode: ▶ Ports 1 and 3 must both be configured as one single logical interface or as four logical interfaces. ▶ Port 2, which is a 40Gbps port in this case, can be configured as a single interface or as four interfaces, irrespective of the breakout mode chosen for ports 1 and 3. Refer to section 4.6 for more information on configuring the portmap.

4.8. Port Configuration and Information

To enable or disable ports and to configure them:

CLI (serial, SSH, SOL)
To list the connection status and description of the interfaces, to help determine the logical connections within the platform: admin@XorPlus> **show interface brief** *To display a list of interfaces to configure:* admin@XorPlus# **set interface gigabit-ethernet ?** *To display a list of possible commands for a specific interface (xe-1/1/4 in this example):* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/4 ?** *To disable an interface (xe-1/1/50 in this example):* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/50 disable true** admin@XorPlus# **commit** *To display the complete current configuration of a specific interface (xe-1/1/50 in this example):* admin@XorPlus> **show running-config interface gigabit-ethernet xe-1/1/50 | display all**
Note
The PicOS CLI does not support range commands for interfaces. All settings need to be applied individually.

4.9. Basic VLAN Configuration

Changes made to VLANs 4093 and 4092 could prevent proper system operation.

Three VLANs are preconfigured on the switch, i.e. VLANs 1 (default), 4093 (management) and 4092 (TIPC) (see Figure 10). To configure a VLAN:

CLI (serial, SSH, SOL)
To show which VLAN is associated with which port: admin@XorPlus> **show vlans** *To create a VLAN (range):* admin@XorPlus# **set vlans vlan-id 2-4** admin@XorPlus# **commit** *To configure VLAN port-mode (access or trunk):* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/13 family ethernet-switching port-mode trunk** admin@XorPlus# **commit** *To configure native VLAN (also known as "PVID" in other NOS) on a port:* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/13 family ethernet-switching native-vlan-id 2** admin@XorPlus# **commit** *To configure VLAN membership (tagged egress – default):* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/13 family ethernet-switching vlan members 2** admin@XorPlus# **commit** *To configure VLAN membership (untagged egress):* admin@XorPlus# **set interface gigabit-ethernet xe-1/1/13 family ethernet-switching vlan members 2 untagged** admin@XorPlus# **commit**
Note
VLAN membership configurations can be performed for a range of VLANs.

4.10. Spanning Tree Protocol Configuration

STP is enabled by default in MSH8920 hubs:

CLI (serial, SSH, SOL)
Show spanning-tree configuration: admin@XorPlus> **show spanning-tree ?** A list of possible configuration commands appears *Show current spanning-tree interface status:* admin@Xorplus> **show spanning-tree mstp interface** A list of interfaces is shown with information on the status imposed on the traffic by STP for each interface *Choose a spanning-tree version (default is MSTP):* admin@XorPlus# **set protocols spanning-tree force-version ?** 0-STP, 2-RSTP, 3-MSTP, 4-PVST admin@XorPlus# **set protocols spanning-tree force-version 4** admin@XorPlus# **commit** *Spanning-tree configuration:* admin@XorPlus# **set protocols spanning-tree?** A list of possible configuration commands appears Proceed with configuration *Disable spanning-tree version:* admin@XorPlus# **set protocols spanning-tree enable false** admin@XorPlus# **commit**

4.11. SSH/Telnet Configuration

SSH access is enabled by default. Telnet can be enabled as follows:

CLI (serial, SSH, SOL)
To enable Telnet access: admin@XorPlus# **set system services telnet disable false** admin@XorPlus# **commit**

4.12. SNMP Configuration

These two settings are the minimal configuration changes necessary to activate SNMP. Many more configuration options are available.

CLI (serial, SSH, SOL)
To enable SNMP access: admin@XorPlus# **set protocols snmp community** **<msh8920> <authorization> <read-only | read-write>** admin@XorPlus# **set protocols snmp contact** **<support@kontron.com>** admin@XorPlus# **commit**

4.13. Revert to Switch Factory Default

This can change the switch management IP address configuration and result in loss of connectivity.

CLI (serial, SSH, SOL)
admin@XorPlus# **load override /home/admin/pica_startup.boot** admin@XorPlus# **commit**

4.14. Switch Reboot

To reboot the switch:

CLI (serial, SSH, SOL)
To reboot the switch from the CLI in Operation mode: admin@XorPlus> **request system reboot** *To reboot the switch from the Linux shell:* admin@XorPlus$ **sudo reboot**

4.15. Switch Log

To view switch log information:

CLI (serial, SSH, SOL)
admin@XorPlus> **show log last-rows 100**
Note
This command will list the last 100 rows of the log file. 100 can be replaced by any number.

4.16. Switch Technical Support Information

To view switch technical support information:

CLI (serial, SSH, SOL)
To display the current running version from the Linux shell (both MSH8920/PicOS [integrated] and base PicOS can be obtained): admin@MSH8920:H1$ **kontron_version** *To display the current status of feature and support coverage of the installed license, from the Linux shell:* admin@MSH8920:H1$ **license -s** *To display the current running version from the CLI (only the base PicOS can be obtained):* admin@Xorplus> **show version** *To view technical support information and generate a file:* admin@XorPlus> **show tech_support** Start..... Item 1: Display system version finished! […] Item 28: Display license! The information has been stored in /tmp/XorPlus-197001010406-techSupport.log *To display the file using a cat command:* admin@XorPlus> bash "cat **/tmp/XorPlus-197001010406-**techSupport.log"
Note
Support for MSH8920 series hubs is only available from Kontron including for the PicOS implementation for the MSH8920 series hubs.

4.17. User Account Configuration

To create a user account and password:

CLI (serial, SSH, SOL)
To create a user account and password: admin@XorPlus# **set system login user kontron authentication plain-text-password Pa55word** admin@XorPlus# **commit** *Make user account a super user:* admin@XorPlus# **set system login user kontron class super-user** admin@XorPlus# **commit**
Note
There are two types of user accounts: super-user and read-only. By default, an account is read-only.

5/ Configuring and Monitoring Shelf Managers

5.1. ShMC Management Interface Configuration

For proper operation, the ShMC and node BMC must have an IP interface in the same subnet.

Changing the ShMC IP address may interrupt network connectivity.

To view and configure the ShMC IP interface:

System Monitor	ShMC CLI (serial, IOL, SSH)
To view the ShMC IP: Dashboard > Monitor > Platform <No.> > Hub <No.> See IP under **Management IP** *To set the ShMC IP:* Dashboard > Network Configuration • Under **IPMI Over Lan Configuration**, the addresses of each individual ShMC can be configured • Under **System Monitor Shared IP**, an address can be set that will always target the active ShMC	*To view the ShMC IP:* ipmitool> **lan print** Existing configuration is displayed *To set the ShMC IP:* ipmitool> **lan set 1** Command syntax and possible configurations are displayed Proceed with configuration
API calls available to view and set the ShMC IP	

5.2. Date and Time Configuration

At power up, the active ShMC gets the date and time from the onboard RTC. The active ShMC then uses it to set the date and time of the SEL and the nodes.

Not possible through a Web interface	ShMC CLI (serial, IOL, SSH)
	ipmitool> ipmitool> sel time set "<mm/dd/yyyy hh:mm:ss>"
Notes	
	Quotation marks (") must surround your configured date and time. A platform power cycle is the simplest way to propagate the time to the SYMKLOUD platform. Otherwise, the management controller and payload (BIOS/OS) must be updated manually.

5.3. User Account Configuration

Separate user accounts must be created for access to the ShMC (for CLI and IOL) and SM (UI).

5.3.1. SM User Account Configuration

To configure user accounts for the SM (user, password and role):

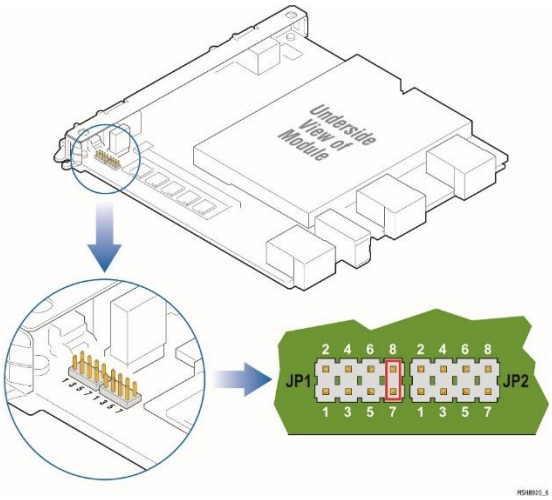
System Monitor	Not possible from a CLI-type interface
Dashboard > Click on the **Profile** icon Select **Settings** Click **User Management** Click **Create New User** Enter the required information Click **Create User**	
	API calls available to configure user accounts
Notes	
Roles are: Administrator (full access) or Technician (read-only).	

5.3.2. SM User Account Password Reset

To reset the password of the SM "admin" account, follow this procedure:

- Install a jumper across JP1 connector pins 7-8 (see Figure 17)
- Reinsert the MSH8920 in the system
- Power on the system if necessary
- Wait for the SM Web page login to be active.
- Test the admin/admin credentials
- Extract the MSH8920 and remove the jumper

Figure 17: Jumper position for password reset



5.3.3. ShMC CLI and IOL User Account Configuration

A valid user/password is required to send IOL commands and access the ipmitool shell. To configure user accounts for the ShMC (user ID and associated username, password and privilege level):

Not possible through a Web interface	ShMC CLI (serial, IOL, SSH)
	ipmitool> ipmitool> **user list 1** A list of all users is displayed *To add a user:* ipmitool> **user enable <user ID>** *To configure user parameters:* ipmitool> **user set name <user ID> <username>** ipmitool> **user set password <user ID> <password>** ipmitool> **user priv <user ID> <privilege level (1-4)> <channel No.>**
Notes	
	Privilege levels are from 1 to 4 (1: CALLBACK; 2: USER; 3: OPERATOR; 4: ADMINISTRATOR). Channel No. is always 1.

5.4. System Event Log Access

To access the SEL:

System Monitor	ShMC CLI (serial, IOL, SSH)
To view the SEL: Dashboard > System Event Log	*To view SEL status:* ipmitool> **sel** *To view the SEL:* ipmitool> **sel list** A list of event logs sent to the ShMC is displayed *To empty the SEL:* ipmitool> **sel clear**
	API calls available for system event logs

5.5. Sensor Information Access

Refer to the sensor list in Appendix A.

To view system sensor information:

Not possible through a Web interface	ShMC CLI (serial, IOL, SSH)
	ipmitool> **sensor list**
	API calls available to view information on some system sensors
Notes	
	System information is displayed in the following order: ▶ Sensor name ▶ Analog reading—reading for analog sensor and 0x0 for discrete sensor ▶ Type—unit for analog sensor and discrete for discrete sensor ▶ Sensor status—ok or not ok for analog sensor and bytes for discrete sensor ▶ Threshold values (last 6 columns): lower non-recoverable, lower critical, lower non-critical, upper non-critical, upper critical, upper non-recoverable

5.6. Active ShMC and Standby ShMC

To view the status of a ShMC:

System Monitor	ShMC CLI (serial, IOL, SSH)
Dashboard > Monitor > Platform <No.> > Hub <No.> See status under **HA Status**	ipmitool> **sensor** See value under ShMC Redun State Value 0x0280 is assigned to an active ShMC and value 0x0880 is assigned to a standby ShMC
Notes	
Refer to Table 8 to determine the state of a ShMC using the LEDs.	

5.7. ShMC FRU Information

To access ShMC FRU data information:

System Monitor	ShMC CLI (serial, IOL, SSH)
Dashboard > Monitor > Platform <No.> > Hub <No.> See data under **Board Information**	ipmitool> **fru print**

5.8. ShMC SNMP Agent Configuration

The SNMP agent is only accessible via the active ShMC (refer to section 5.6). Available commands for the ShMC SNMP agent are:

Not possible through a Web interface	ShMC CLI (serial, IOL, SSH)
	SNMP agent status: ipmitool> **raw 0x3e 0x21 0xC8** Value 00 means the agent is inactive. Value 01 means the agent is active. SNMP start command: ipmitool> **raw 0x3e 0x20 0xC8 0x1** SNMP stop command: ipmitool> **raw 0x3e 0x20 0xC8 0x0**
	API calls available to enable/disable the SNMP agent

6/ Using Ipmitool to View and Configure Node BMCs

6.1. IPMI Mapping

From the ShMC CLI ipmitool interface, you can access node BMCs using their local IPMI addresses.

Component	IPMI address
Active ShMC	0x20
Standby ShMC	0x10
Node 1	0x82
Node 2	0x84
Node 3	0x86
Node 4	0x88
Node 5	0x8a
Node 6	0x8c
Node 7	0x8e
Node 8	0x90
Node 9	0x92

To establish a connection with another MS2920 component and direct the commands to this component:

System Monitor	ShMC CLI (serial, SSH)
Dashboard > Monitor > Platform No. > Hub <n> or Node <n>	ipmitool> **set targetaddr <ipmi address>** Proceed with configuration as described in the appropriate MSP node User Guide. Commands in section 5/ (5.1, 5.3.3, 0 and 5.7) can also be used as a reference.
Notes	
IPMI mapping is not required in the SM. You can connect to a component by clicking on it.	To break the connection and go back to the initial component, exit the CLI and reestablish a connection with the initial component.

7/ Performing Updates

7.1. Switch Update

The switch firmware update will interrupt network connectivity of devices in the platform where the MSH8920 series hub is operating.

To update the firmware of the switch in an MSH8920 series hub:

CLI (serial, SSH, SOL)
Download PicOS image (wget): admin@XorPlus$ **sudo wget –nc -P /cftmp ftp://<server IP>/<path>/<kontron_msh89xx_picos_v.w.x-y.tar.gz>** admin@XorPlus$ **sudo wget –nc -P /cftmp ftp://<server IP>/<path>/<kontron_msh89xx_picos_v.w.x-y.tar.gz>.md5** Or *Download PicOS image (scp):* admin@XorPlus$ **sudo scp username@<server IP>:/<path>/<kontron_msh89xx_picos_v.w.x-y.tar.gz> /cftmp/** admin@XorPlus$ **sudo scp username@<server IP>:/<path>/<kontron_msh89xx_picos_v.w.x-y.tar.gz>.md5 /cftmp/** *Once the download has completed successfully, to proceed with update:* admin@XorPlus$ **sync** admin@XorPlus$ **cd /cftmp** admin@XorPlus$ **sudo upgrade <kontron_msh89xx_picos_v.w.x-y.tar.gz>** The script will prepare the update, including a backup of current configuration, and reboot the switch
Notes
IMPORTANT: ▶ MSH8920 PicOS update images must be obtained from Kontron. ▶ The update must be done individually for the switches of both MSH8920 series hubs installed in an MS2920 platform.

7.2. ShMC Update

ShMC firmware updates that include the FPGA component will interrupt network connectivity of devices in the platform where the MSH8920 series hub is operating. The "Active" ShMC will also pass control to the "Standby".

To update the ShMC of an MSH8920 series hub:

SM	Remote computer IPMITOOL
Dashboard > OneClick Upgrade View Advanced Settings > Upgrade specific component > Platform #1 View Advanced Settings > Upgrade specific component > HubNode 1 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 a remote computer using Kontron's version of IPMITOOL (available from kontron.com, in the "Tools" section of the SYMKLOUD platform page)* RemoteComputer_OSPrompt:~# **ipmitool -I lanplus -H** <MSH8920_IOL_IP> **-U** <MSH8920_IOL_user> **-P** <MSH8920_IOL_password> **hpm upgrade** <HPM bundle(hpm file)> **all activate**
	API calls available to update the MS2920

Appendix A: Sensor Lists

The following tables contain information on the sensors of MSH8920 series hubs. Table 12 provides detailed information on the sensors described in blue in Table 11.

Table 11: 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	Remote Hub HotSw			Remote Hub HotSwap Sensor	
2	Node1 Hot Swap			Node 1 HotSwap Sensor	
3	Node2 Hot Swap			Node 2 HotSwap Sensor	
4	Node3 Hot Swap			Node 3 HotSwap Sensor	
5	Node4 Hot Swap			Node 4 HotSwap Sensor	
6	Node5 Hot Swap			Node 5 HotSwap Sensor	
7	Node6 Hot Swap			Node 7 HotSwap Sensor	
8	Node7 Hot Swap			Node 7 HotSwap Sensor	
9	Node8 Hot Swap			Node 8 HotSwap Sensor	
10	Node9 Hot Swap			Node 9 HotSwap Sensor	
11	Temp Board	01h (Temperature)	01h (Threshold Based)	On Board Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
12	Temp UC			Unit Computer (UC) Temperature (Degrees C)	
13	Temp ShMC PCB			ShMC Temperature (Degrees C)	
14	Temp SODIMM			UC SODIMM Temperature (Degrees C)	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
15	Temp Switch			UC Switch Temperature (Degrees C)	
16	Temp Switch PCB	01h (Temperature)	01h (Threshold Based)	Ethernet Switch Temperature (Degrees C)	See IPMI v2.0 table 42-2 for threshold based event
17	Temp QSFP 1			UC QSFP 1 Temperature (Degrees C)	
18	Temp QSFP 2			UC QSFP 2 Temperature (Degrees C)	
19	Temp QSFP 3			UC QSFP 3 Temperature (Degrees C)	
20	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
21	Vcc +5V SUS			Voltage on board 5.0V suspend power supply	
22	Vcc +3.3V SUS			Voltage on board 3.3V suspend power supply	
23	Vcc +2.5V SUS			Voltage on board 2.5V suspend power supply	
24	Vcc +1.8V SUS			Voltage on board 1.8V suspend power supply	
25	Vcc +1.35V_SUS			Voltage on board 1.35V suspend power supply	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
26	Vcc +1.2V_SUS			Voltage on board 1.2V suspend power supply	
27	Vcc SDXC	02h (Voltage)	01h (Threshold Based)	Voltage on board SDXC payload power supply	See IPMI v2.0 table 42-2 for threshold based event
28	Vcc VTT DDR			Voltage on board VTT DDR payload power supply	
29	Vcc +3.3V			Voltage on board 3.3V payload power supply	
30	Vcc +1.8V			Voltage on board 1.8V payload power supply	
31	Vcc +1.35V			Voltage on board 1.35V payload power supply	
32	Vcc +3.3V MDIO			Voltage on board +3.3V MDIO payload power supply	
33	Vcc +1.15V_SUS			Voltage on board 1.15V suspend power supply	
34	Vcc +1.25V			Voltage on board 1.25V payload power supply	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
35	Vcc +1.0V UC			Voltage on board 1.0V (UC) payload power supply	
36	Vcc +1.0V Core	02h (Voltage)	01h (Threshold Based)	Voltage on board 1.0V (Core) payload power supply	See IPMI v2.0 table 42-2 for threshold based event
37	Vcc +1.0V Analog			Voltage on board 1.0V (Analog) payload power supply	
38	VBAT +3V			Voltage on board 3V Battery	
39	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
40	Icc +1.0V Core			Current on 1.0V (Core) power rail	
41	Icc +1.0V Analog			Current on 1.0V (Analog) power rail	
42	Power Board	0Bh (Watt)	01h (Threshold Based)	Board Input Power	See IPMI v2.0 table 42-2 for threshold based event
43	Power Chassis			System Input Power	
44	PSU1:Status	08h (Power Supply)	6Fh (Sensor	Power Supply 1 Status	See IPMI v2.0 table 42-3, Sensor

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
45	PSU1:Status Ext		Specific)	Power Supply 1 Status Extended (PMBUS Status Extended registers)	type 08h (Power Supply) for sensor definition
46	PSU1:Power In	0Bh (Watt)	01h (Threshold Based)	Power consumption of Power Supply 1 Input in watts	See IPMI v2.0 table 42-2 for threshold based event
47	PSU1:Power Out			Power consumption of Power Supply 1 Output in watts	
48	PSU1:Volt In	02h (Voltage)	01h (Threshold Based)	Power Supply 1 Input Voltage	See IPMI v2.0 table 42-2 for threshold based event
49	PSU1:Current In	03h (Current)	01h (Threshold Based)	Power Supply 1 Input Current	See IPMI v2.0 table 42-2 for threshold based event
50	PSU1:Volt Out	02h (Voltage)		Power Supply 1 Output Voltage	
51	PSU1:Current Out	03h (Current)		Power Supply 1 Output Current	
52	PSU1:Temp Inlet	01h (Temperature)	01h (Threshold Based)	Power Supply 1 Inlet Temperature	See IPMI v2.0 table 42-2 for threshold based event
53	PSU1:Temp Outlet			Power Supply 1 Outlet Temperature	
54	PSU1:Fan Speed	04h (Fan)	01h (Threshold Based)	Power Supply 1 Fan Speed	See IPMI v2.0 table 42-2 for threshold based event

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
55	PSU2:Status	08h (Power Supply)	6Fh (Sensor Specific)	Power Supply 2 Status	See IPMI v2.0 table 42-3, Sensor type 08h (Power Supply) for sensor definition
56	PSU2:Status Ext			Power Supply 2 Status Extended (PMBUS Status Extended registers)	
57	PSU2:Power In	0Bh (Watt)	01h (Threshold Based)	Power consumption of Power Supply 2 Input in watts	See IPMI v2.0 table 42-2 for threshold based event
58	PSU2:Power Out			Power consumption of Power Supply 2 Output in watts	
59	PSU2:Volt in	02h (Voltage)	01h (Threshold Based)	Power Supply 2 Input Voltage	See IPMI v2.0 table 42-2 for threshold based event
60	PSU2:Current In	03h (Current)	01h (Threshold Based)	Power Supply 2 Input Current	See IPMI v2.0 table 42-2 for threshold based event
61	PSU2:Volt Out	02h (Voltage)		Power Supply 2 Output Voltage	
62	PSU2:Current Out	03h (Current)		Power Supply 2 Output Current	
63	PSU2:Temp Inlet	01h (Temperature)	01h (Threshold Based)	Power Supply 2 Inlet Temperature	See IPMI v2.0 table 42-2 for threshold based event
64	PSU2:Temp Outlet			Power Supply 2 Outlet Temperature	
65	PSU2:Fan Speed	04h (Fan)	01h (Threshold Based)	Power Supply 2 Fan Speed	See IPMI v2.0 table 42-2 for threshold based event

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
66	Fan Presence	04h (Fan)	7Dh (OEM Kontron Instance-specifier)	Fan Presence sensor	See OEM table, Event/Reading type code 7Dh (OEM Health Severity Status Sensor) for sensor definition
67	Fan Fault			Fan Fault sensor	
68	Fan1:Speed	04h (Fan)	01h (Threshold Based)	Fan 1 Speed	See IPMI v2.0 table 42-2 for threshold based event
69	Fan2:Speed			Fan 2 Speed	
70	Fan3:Speed			Fan 3 Speed	
71	Fan4:Speed			Fan 4 Speed	
72	Fan5:Speed			Fan 5 Speed	
73	Power State	D1h (OEM Power State)	6Fh (Sensor Specific)	Board Power State	See OEM sensor table, Sensor type code D1h for sensor definition
74	Power Good Susp	08h (Power Supply)	77h (OEM Kontron Power Good)	Actual power good status	See Registers 0x02 and 0x03 definition from FPGA datasheet
75	Power Good				
76	Power Susp Latch	08h (Power Supply)	03h (Digital Discrete)	Power good latch status	See IPMI v2.0 table 42-3, Sensor type code 08h for sensor definition
77	Power Good Latch				

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
78	Board Reset	CFh (OEM Board Reset)	03h (Digital Discrete)	Board reset type and sources	See OEM sensor table, Sensor type code CFh for sensor definition
79	POST Value	C6h (OEM Post Value)	6Fh Sensor specific, offset 0 to 7 and 14 are used	Show current postcode value	See OEM sensor table, Sensor type code C6h for sensor definition
80	POST Error	0Fh (System Firmware Progress)	6Fh Sensor specific, offset 0 is used	CPU Power On Self Test Error	See IPMI v1.5 table 36.3, Sensor type code 0Fh for sensor definition
81	Fwupg Status	CAh (OEM Firmware Upgrade)	6Fh Sensor specific, offset 0 to 2 are used	System Firmware Update Status	See OEM table, Sensor type code CAh for sensor definition
82	FPGA RW Status	24h (Platform Alert)	7Fh (OEM Health Severity Status Sensor)	FPGA RW Status	See OEM table, Sensor type code 24h (Platform Alert) for sensor definition and Event/Reading type code 7Fh (OEM Health Severity Status Sensor)
83	FPGA Heartbeat			FPGA Heartbeat	
84	Remote Sh Health			Remote ShMC Health	
85	Health Status			General health status (Aggregation of critical sensors)	
86	Chassis Health			Chassis Health Status	
87	Ver Change ShMC	2Bh (Version Change)	6Fh (Sensor Specific)	IPMC Firmware Change Detection	See IPMI v2.0 table 42-3, Sensor type code 2Bh for sensor definition
88	Ver Change FPGA			FPGA Firmware Change Detection	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
89	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
90	ShMC Redun State	D4h (OEM Redundancy State)	7Eh (OEM Redundancy State)	ShMC Redundancy State	See OEM table, Sensor type code D4h (OEM Redundancy State) for definition
91	ShMC Redun Loss	28h (Management Subsystem Health)	6Fh (Sensor Specific)	ShMC Redundancy Loss	Only offset 3 is used See IPMI v2.0 table 42-3, Sensor type code 28h for sensor definition
92	ShMC Reboot	24h (Platform Alert)	03h (Digital Discrete)	IPMC reboot detection	Only offset 0,1 are used See IPMI v2.0 table 42-3, Sensor type code 24h for sensor definition
93	ShMC 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

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
94	ShMC 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
95	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
96	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
97	Node1:Present	25h (Entity Presence)	6Fh (Sensor Specific)	Node 1 Presence Sensor	See IPMI v2.0 table 42-3, Sensor type 25h (Entity Presence) for sensor definition
98	Node2:Present			Node 2 Presence Sensor	
99	Node3:Present			Node 3 Presence Sensor	
100	Node4:Present			Node 4 Presence Sensor	
101	Node5:Present			Node 5 Presence Sensor	
102	Node6:Present			Node 6 Presence Sensor	

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
103	Node7:Present			Node 7 Presence Sensor	
104	Node8:Present			Node 8 Presence Sensor	
105	Node9:Present			Node 9 Presence Sensor	
106	Uplink:Present			Uplink Presence Sensor	
107	Thermal Error	0Ah (Digital Discrete)	03h (Digital Discrete)	Thermal Error Sensor	See IPMI v2.0 table 42-3, Sensor type 0Ah (Cooling Device) for sensor definition
108	Port Mode Error	1Bh (Cable/Interconnect)	6Fh (Sensor Specific)	Fabric Port Mode Configuration Error Sensor	Only offset 1 is used See IPMI v2.0 table 42-3, Sensor type code 1Bh for sensor definition
109	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)

ID	Sensor Name	Sensor Type Code	Reading Type Code	Description	Event Offset
110	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 12: Detailed information for specific sensors

Sensor name	Event / reading type code	Sensor type	Sensor specific offset	Event trigger
Power State	6Fh Standard IPMI sensor specific	D1h Kontron OEM Power state sensor	00h 01h 02h 03h	Power ON Power OFF Power ON Request Power OFF Request
Power Good Susp	77h OEM Kontron Power Good	08h Standard IPMI Power Supply	00h 01h 02h 03h 04h 05h	V_1V15S V_1V2S V_1V35S V_1V8S V_2V5S V_3V3S
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	V_1V0_A V_1V0 VR_HOT_n V_1V2 V_1V8 V_3V3 V_3V3_MDIO Unused Unused Unused Unused Unused V_VTT V_1V35 V_1V0_UC V_1V25_A

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Power Susp Latch	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	Event Data 2 : BIT0 = V_1V15S BIT1 = V_1V2S BIT2 = V_1V35S BIT3 = V_1V8S BIT4 = V_2V5S BIT5 = V_3V3S BIT6 = Always 1 BIT7 = Always 1 Event Data 3 : Unused

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

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Fwupg Status	6Fh Standard IPMI sensor specific	CAh Kontron OEM Upgrade Status	01h 02h 04h	Upgrade Started Upgrade Passed Upgrade Failed
FPGA RW 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: 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. Event Data3: Not used
FPGA Heartbeat	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: 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. Event Data3: Not used

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Remote Sh Health	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: 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. Event Data3: Not used

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: ID - Sensor Name 11 - Temp Board 12 - Temp UC 13 - Temp ShMC PCB 14 - Temp SODIMM 15 - Temp Switch 16 - Temp Switch PCB 17 - Temp QSFP 1 18 - Temp QSFP 2 19 - Temp QSFP 3 20 - Vcc +12V IN 21 - Vcc +5V SUS 22 - Vcc +3.3V SUS 23 - Vcc +2.5V SUS 24 - Vcc +1.8V SUS 25 - Vcc +1.35V_SUS 26 - Vcc +1.2V_SUS 27 - Vcc SDXC 28 - Vcc VTT DDR 29 - Vcc +3.3V 30 - Vcc +1.8V 31 - Vcc +1.35V 32 - Vcc +3.3V MDIO 33 - Vcc +1.15V_SUS 34 - Vcc +1.25V 35 - Vcc +1.0V UC 36 - Vcc +1.0V Core 37 - Vcc +1.0V Analog 39 - Icc +12V IN 40 - Icc +1.0V Core 41 - Icc +1.0V Analog 42 - Power Board 67 - Fan Fault 76 - Power Susp Latch 77 - Power Good Latch 82 - FPGA RW Status 83 - FPGA Heartbeat 90 - ShMC Redun State 108 - Port Mode Error

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Chassis Health	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 generator ID of the device in the system that generated the event. Event Data3: Will be the sensor ID of the sensor that generated the event. This is the sensor ID of the device that generated the event.
ShMC Redun State	7Eh OEM ShMC Redundancy State	D4h OEM ShMC Redundancy State	00h Out Of Service 01h Acitve 02h Going Stand-By 03h Stand-By 04h Activating 05h Shutdown	Event Data2: bit[3:0]: previous state bit[7:4]: Geographical Address 00h = ShMC Slot 0 01h = ShMC Slot 1 Event Data3: bit[7:0]: Cause of transition
Jumper Status	6Fh Standard IPMI sensor specific	D3h Kontron OEM Jumper Status Sensor	00h 01h 02h 03h 04h 05h 06h 07h	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 (JP2: 1-2) Jumper 05 Present (JP2: 3-4) Jumper 06 Present (JP2: 5-6) Jumper 07 Present (JP2: 7-8)
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	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

Sensor name	Event/reading type code	Sensor type	Sensor specific offset	Event trigger
Fan Presence Fan Fault	7Dh OEM Kontron Instance-specifier	04h (Fan)	00h Fan1 01h Fan2 02h Fan3 03h Fan4 04h Fan5	0 = State Deasserted 1 = State Asserted State for the fan status described by sensor name, for the fan instance specified by the offset

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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