MXN-4100

Switch Sled with
Intel® Ethernet Multi-Host Controller

User's Manual



Manual Revision: 1.0
Revision Date: March 28, 2019
Part No.: 50-1Z270-1000

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Leading EDGE COMPUTING

Preface

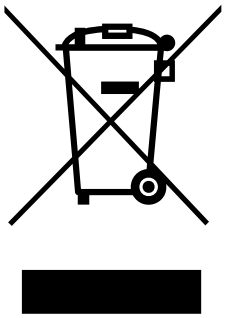
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Revision History

Revision	Release Date	Description of Change(s)
1.0	2019-03-28	Initial release

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Table of Contents

Preface **2**
1 Overview **5**
1.1 Introduction 5
1.2 Specifications 6
1.3 Switch Sled Front Panel 7
1.4 Switch Sled Layout 8
1.5 IO Expansion Module 9
1.6 ADLINK PacketManager 10
2 Getting Started **11**
2.1 Preparing the Switch Sled 11
2.1.1 Installing a COMe Module 11
2.1.2 Installing an mSATA Module 12
2.1.3 Installing a CMM Module 13
2.1.4 Installing an I/O Expansion Module 14
2.2 Front Panel 15
2.3 Inserting and Removing the Switch Sled 16
3 Powering Up the Switch Sled **17**
3.1 Power-Up Behavior 17
3.2 Health/Status Indicators and Buttons 18
4 Using the Switch Sled **19**
4.1 Login to the Switch System 19
4.1.1 Login Via Serial Port 19
4.1.2 Local Login 21
4.1.3 Via Network Port 23
4.2 Switch System IP Setup 24
4.3 COMe OS Version Check 25
4.4 PacketManager on the Switch Sled 26
4.4.1 Check PacketManager Installation Version 26
4.4.2 Command Line Interface and Configure Mode 27
4.4.3 Get Help and Check Version 28
4.5 Fabric Mode 30
5 Maintenance **32**
5.1 Hot-Swapping the Switch Sled 32
5.2 Updating the Switch System BIOS 33
Safety Instructions **34**
Consignes de Sécurité Importantes **36**
Getting Service **38**

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1 Overview

1.1 Introduction

The ADLINK MXN-4100 is a high-throughput high IO density switch sled that functions as an interconnect for four compute nodes on the CSA-7400 Network Appliance and provides up to 4x 100G ports on front panel. The MXN-4100 is a building block used in the construction of next generation high-performance firewalls and virtualized telecom elements.

The main features of the MXN-4100 are summarized as follows:

- Up to two MXN-4100 switch sleds are supported on the CSA-7400 (dual redundant)
- Data plane supports 4x 50Gb Ethernet throughput to four CPU sleds, up to 4x100G ports on front plane
- Control plane supports independent 1G links that connect four compute nodes, Chassis Management Modules (CMM) and 2x RJ45 ports on front panel
- Supports accelerated processing of NVGRE/VXLAN tunneling protocols to meet the needs of Layer 2 connectivity for cloud computing
- ADLINK PacketManager software provides commonly used Layer 2 and Layer 3 switch protocol stacks and control APIs to accelerate application development
- Supports smart system management via on-board CMM module for remote system diagnosis, shutdown, and startup

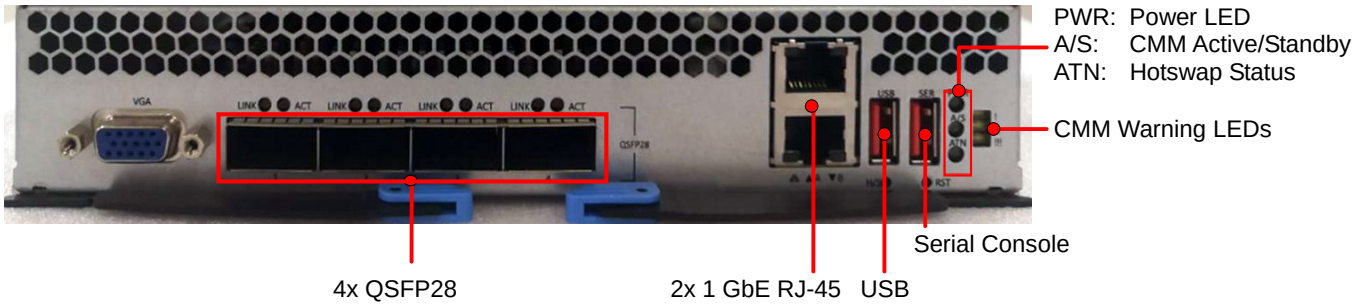
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1.2 Specifications

Core System	
Switch	Intel® Ethernet Multi-host Controller FM10840 (formerly Red Rock Canyon) with 900Mbps bandwidth & 4x PCIe x8 Gen3
CMM	Chassis management module (AST-1250)
COM Express Module	COM Express module with Type 6 interface as local management (optional) Intel® Core™ i7-4700EQ 2.4GHz, 4cores, GT2 Intel® Celeron® 2002E 1.5GHz, 2cores, GT1 2x SODIMM 1600/1333MHz DDR3, up to 16GB
Operating System	Linux Kernel 2.6 or above
I/O Interfaces	
Data Plane	4x 100GBASE-SR4/100GBASE-LR4 QSFP28 ports (front panel) NIM-1610: Switch I/O extension card with 16x 10G SFP+ (NIM-0440 with 4x 40G QSFP+ optional)
Control Plane	6x 1G to four CPU sleds, COMe and CMM 2x RJ-45 ports on switch panel
USB	1x USB 2.0 (one can be used as a console port) 1x USB serial console port to COMe module and CMM
Storage	2x mSATA as local storage
Backplane	4x PCIe x8 Gen3 to CPU nodes
Control Buttons and LEDs	
Reset	1x Reset Button (front) 1x Hot Swap (front, see 5.1 Hot-Swapping the Switch Sled)
LEDs	Power, Active/Standby (A/S), Hot Swap Status (ATN), Alarm (I, II, III)
Mechanical	
Form Factor	213.9mmx 40.44mm x 432.1mm (W x H x D)

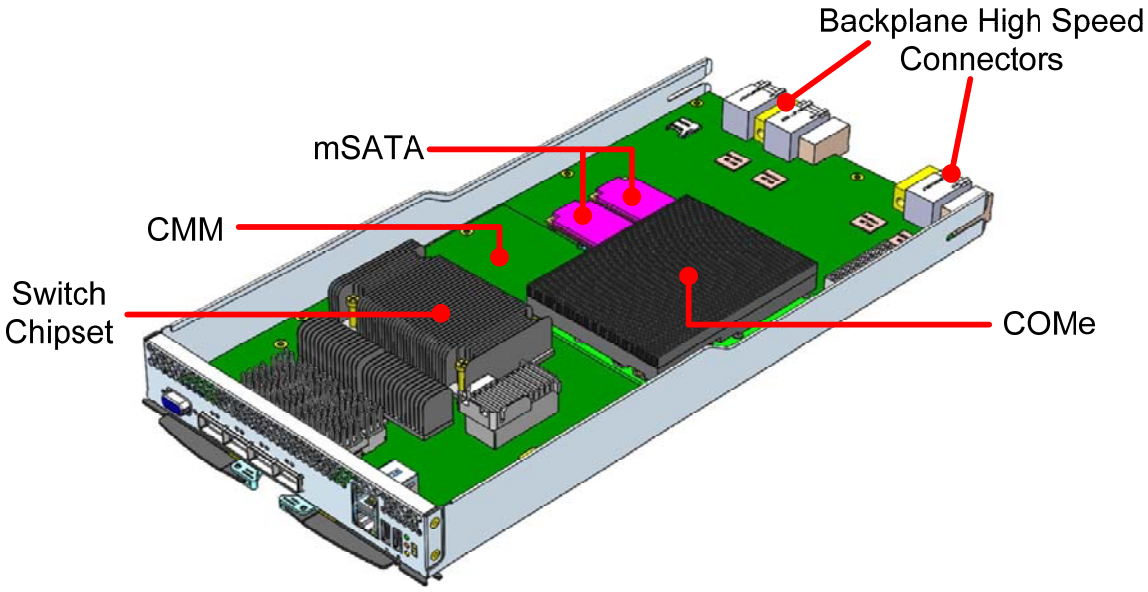
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1.3 Switch Sled Front Panel



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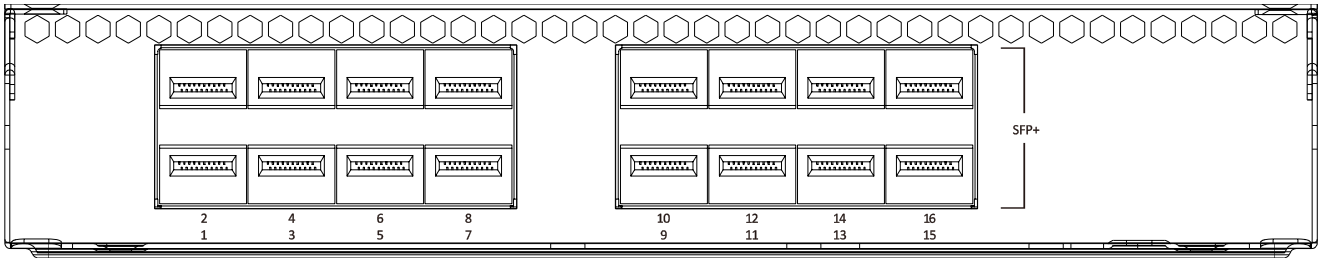
1.4 Switch Sled Layout



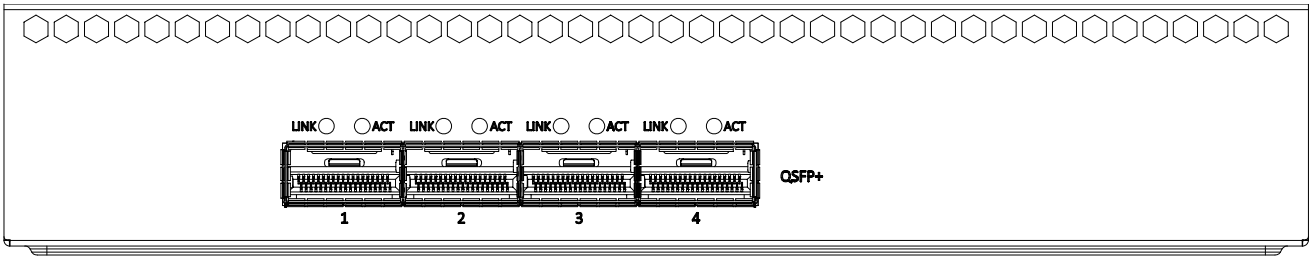
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1.5 IO Expansion Module

NIM-1610
16x 10G SFP+



NIM-0440
4x 40G QSFP+ (optional)



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1.6 ADLINK PacketManager

ADLINK PacketManager runs on the COM Express (COMe) module in the MXN-4100, it includes the most commonly used Layer2/3 stacks and switch management features, including Port Manager, VLAN, LACP, IGMP, RSTP, LLDP, route protocols (RIP, OSPF, BGP), VRRP, ACL and QoS.

For easy deployment and management, ADLINK PacketManager not only provides a friendly command line interface (CLI), but also includes remote procedure call (RPC) based APIs to allow further customization and integration with the customers' management systems.

To learn more about the ADLINK PacketManager, please download the latest ADLINK PacketManager documents from the ADLINK website:
https://www.adlinktech.com/Products/AdvancedTCA/ARiPSoftware/PacketManager

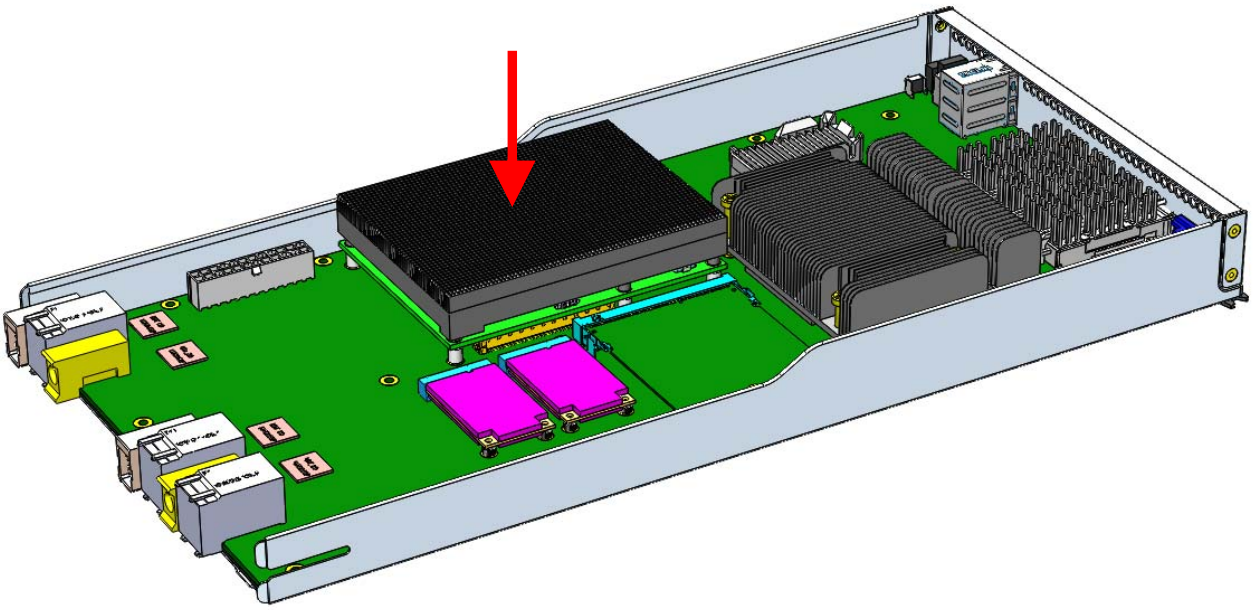
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2 Getting Started

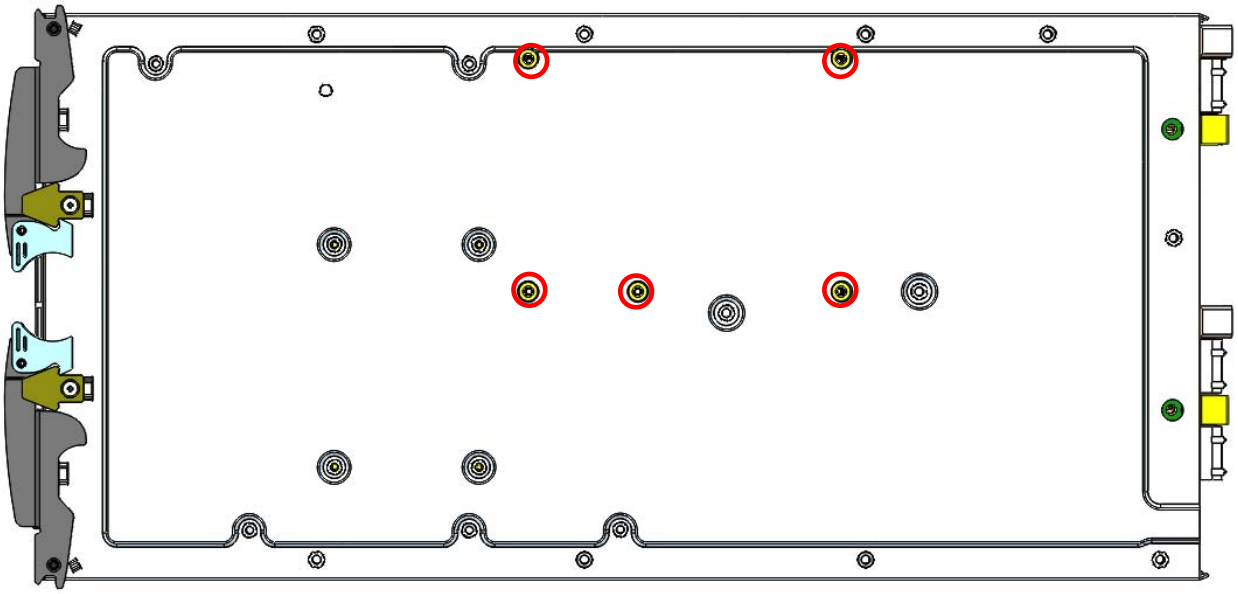
2.1 Preparing the Switch Sled

2.1.1 Installing a COMe Module

1. Carefully align and press the COMe module onto the connectors on the MXN-4100 board.



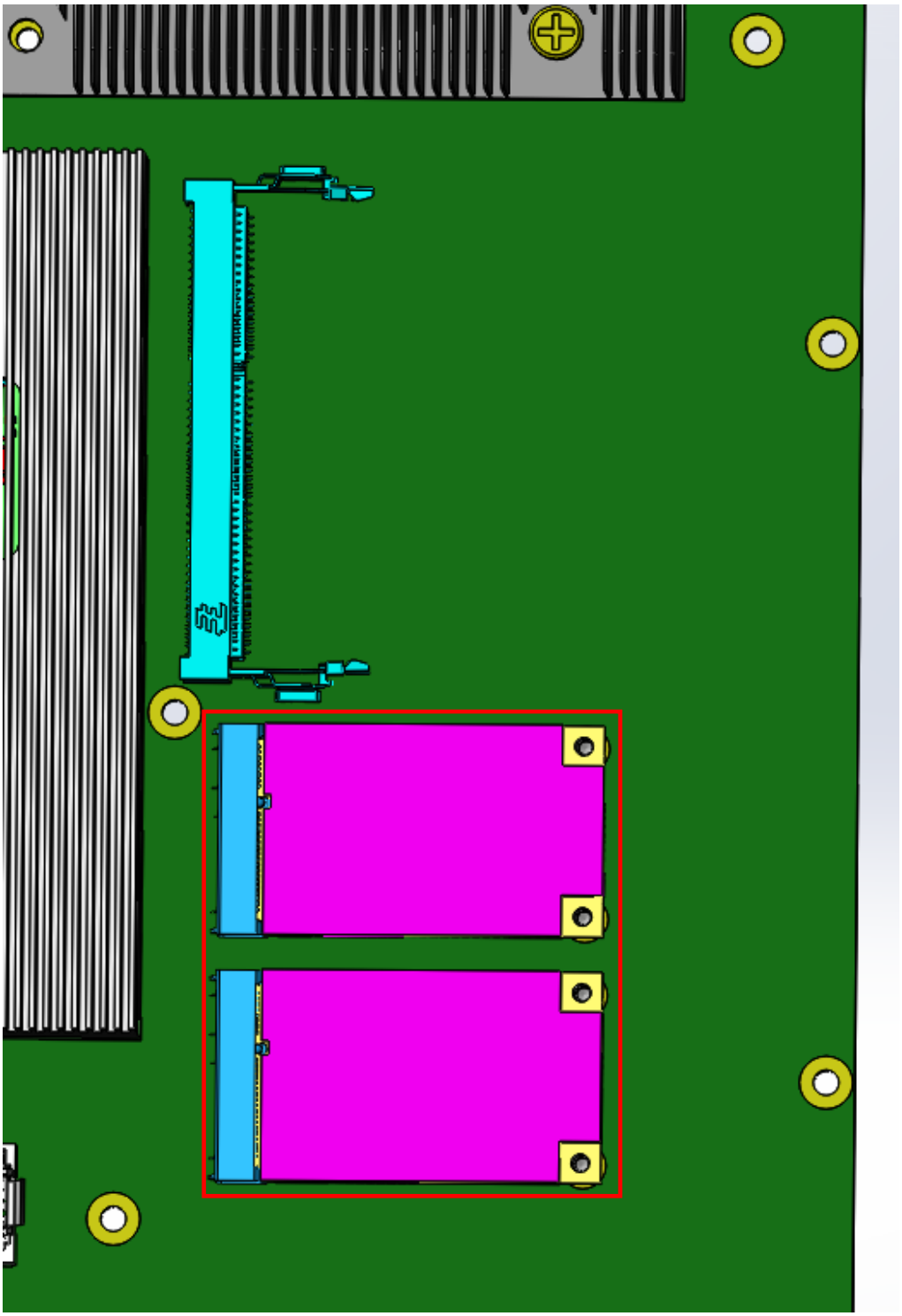
2. Secure the COMe module with 5 screws on bottom side. Do NOT over tighten the screws.



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2.1.2 Installing an mSATA Module

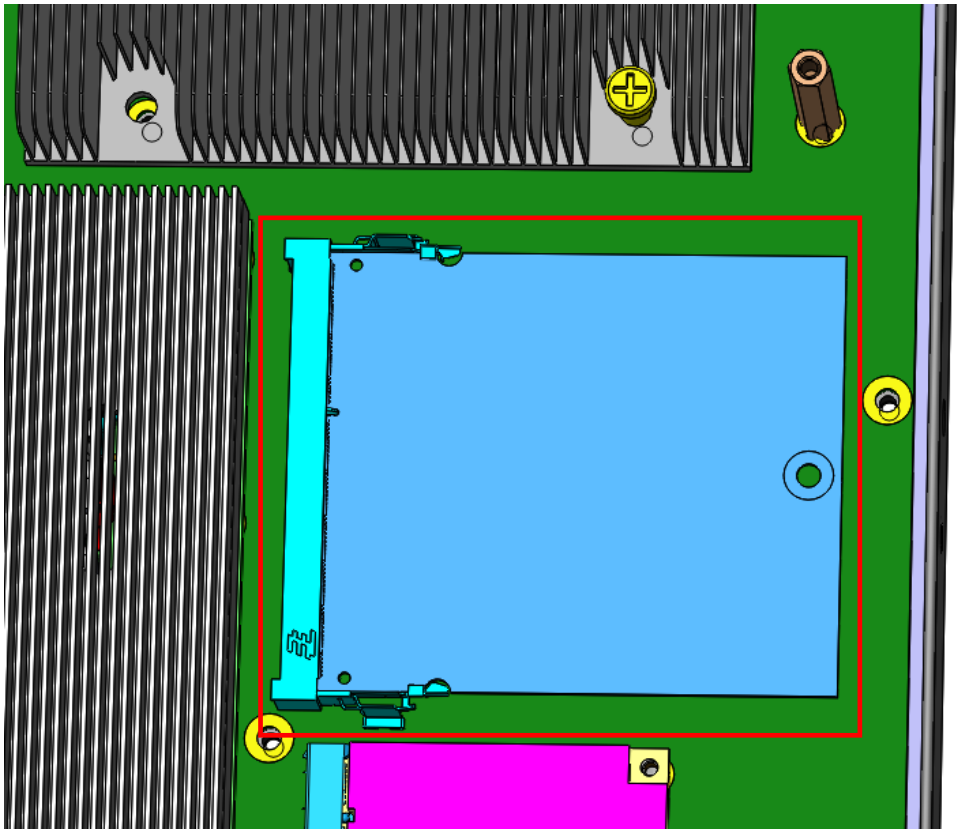
1. Insert an mSATA module into the onboard slot as shown.
2. Secure it to the board with 2 screws.



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2.1.3 Installing a CMM Module

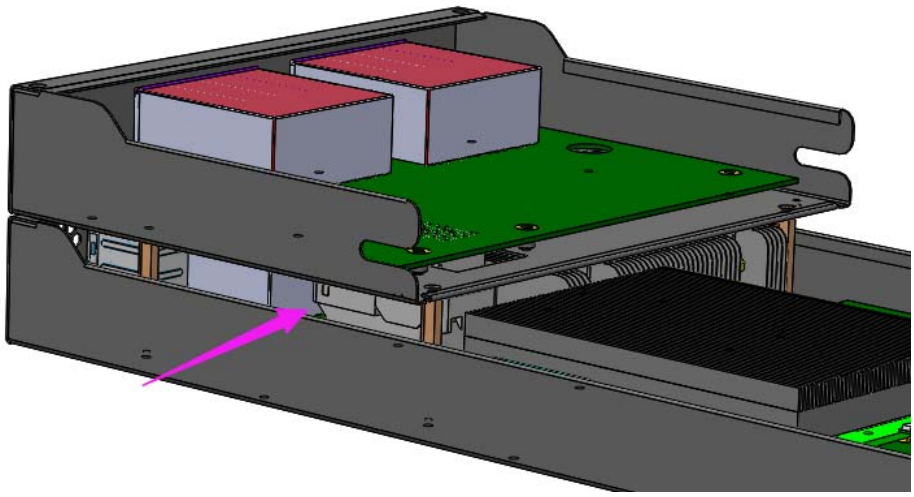
Insert a chassis management (CMM) module into the onboard slot as shown.



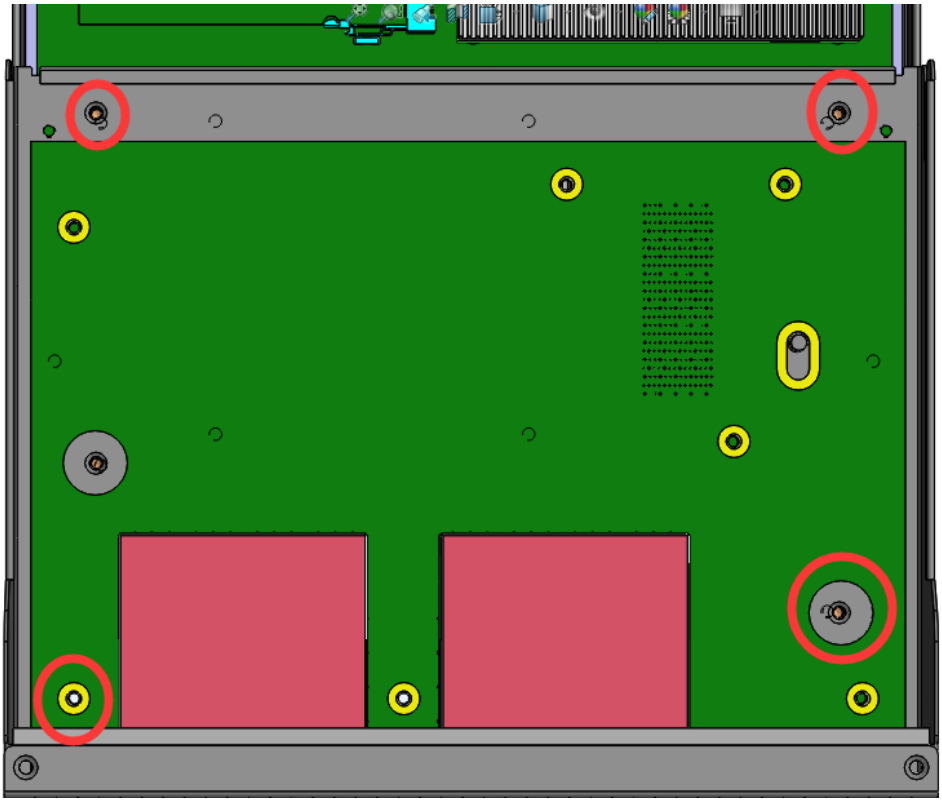
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2.1.4 Installing an I/O Expansion Module

1. Press the I/O expansion module onto the board-to-board connectors on the MXN-4100 as shown.



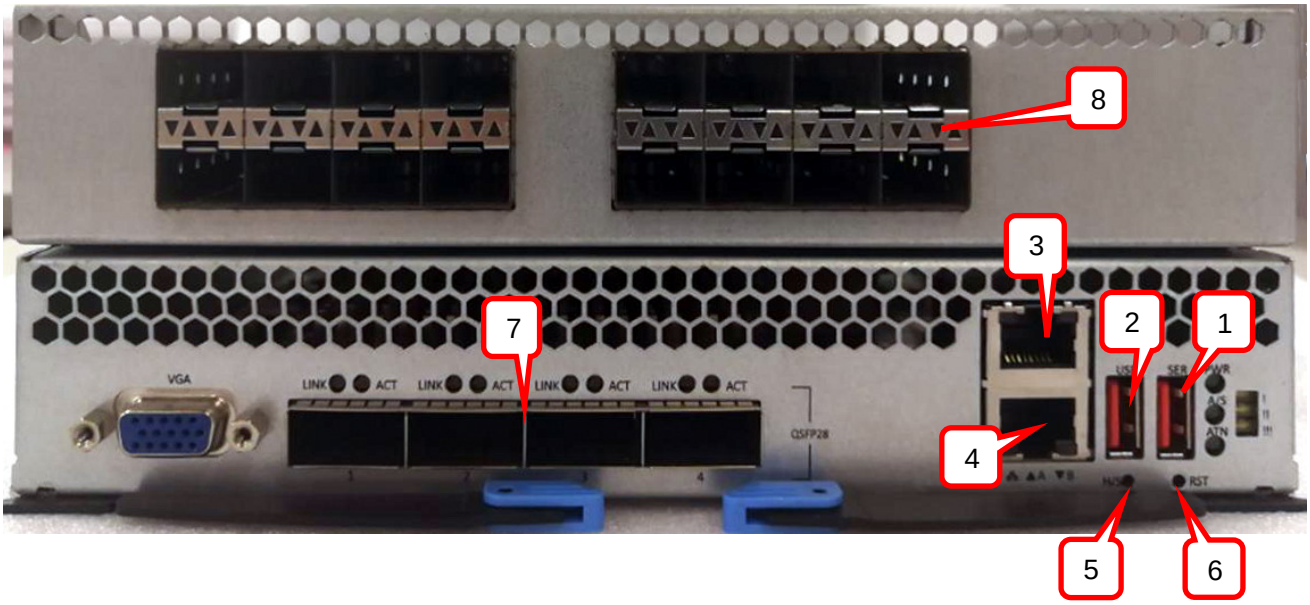
2. Secure the I/O expansion module with 4 screws as shown.



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2.2 Front Panel

The MXN-4100 provides I/O connections from the front panel. There are two 1GbE RJ-45 LAN ports (top: COMe module, bottom: CMM), a total of 4x 100GbE QSFP28 ports, one USB 2.0 port and one USB serial port, as shown below.



I/O port	Description
1	Two-in-one USB serial console to COMe module and CMM (“SER”; baud rate: COMe module 115200, CMM 38400)
2	USB 2.0 (“USB”)
3	10/100/1000BASE-T RJ-45 port of COMe module (“A”)
4	10/100/1000BASE-T RJ-45 port of CMM (“B”)
5	Hot-swap button (“H/S”)
6	Reset button (“RST”)
7	MXN-4100: 4x 100G QSFP28 ports
8	NIM-1610: Switch I/O extension card with 16x 10G SFP+ (4x 40G QSFP optional)

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2.3 Inserting and Removing the Switch Sled

Refer to the chapter **Assembling the CSA-7400** of the **CSA-7400 User's Manual** for instructions on inserting and removing the MXN-4100 Switch Sled.

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3 Powering Up the Switch Sled

3.1 Power-Up Behavior

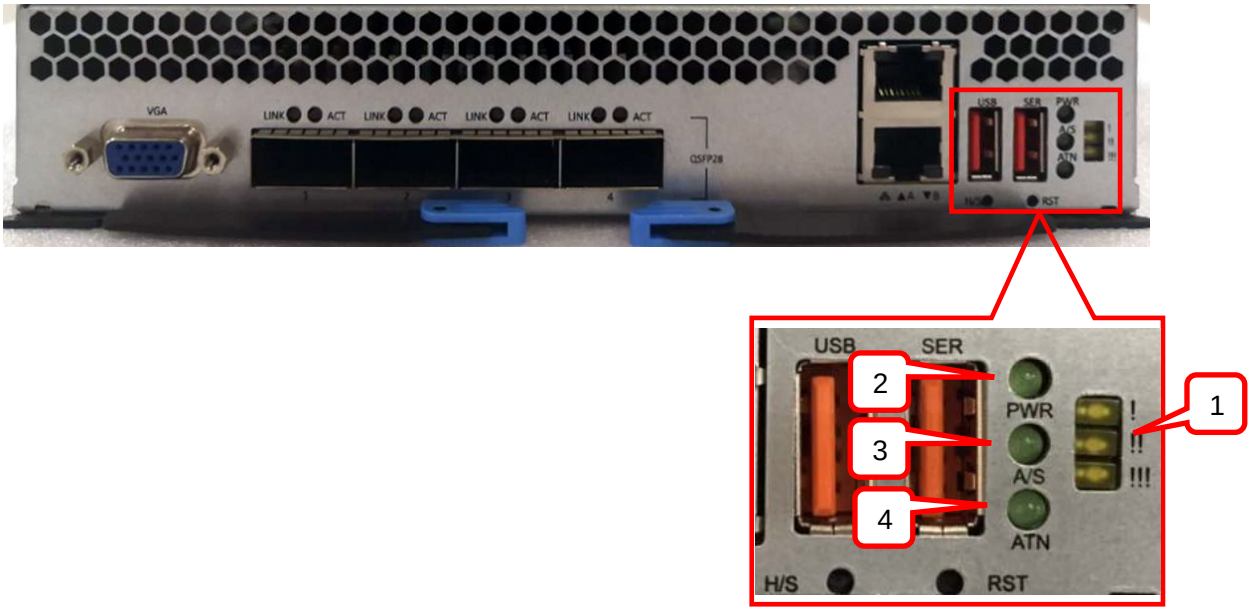
When power is supplied to the CSA-7400, all components will power up automatically. The behavior of the system when powered up is described below.

1. Cooling fans start speeding up as soon as power is applied to the system.
2. Power LEDs of both CPU and switch nodes turn ON (green).
3. CPU nodes start booting up: The status LED turns ON (red), indicating BIOS POST status. After BIOS POST is completed, the status LED changes from red to green, Indicating system status
   Note: The BMC Watchdog timeout will turn off the status LED. If the BMC watchdog is not enabled, the green status LED will stay on.
4. After a few seconds, the switch node A/S LED turns ON (steady or blinking) indicating CM Active/Standby status.

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3.2 Health/Status Indicators and Buttons

This section covers all of the LEDs on the MXN-4100 as show below.



See the table below for LED descriptions.

	LED #	Description
MXN-4100	1	Alarm LED: indicates CMM alarm level
	2	Power LED (power on: Green)
	3	Active/Standby (A/S) LED: Steady Green means CMM is active Blinking Green means CMM is standby
	4	ATN LED: Lights Green to indicate OK to hot-swap

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4 Using the Switch Sled

On the CSA-7400 platform, the switch sleds are shipped with a pre-installed operating systems and the CPU sleds are shipped without a pre-installed operating system. This chapter covers how to run the MXN-4100's operating system.

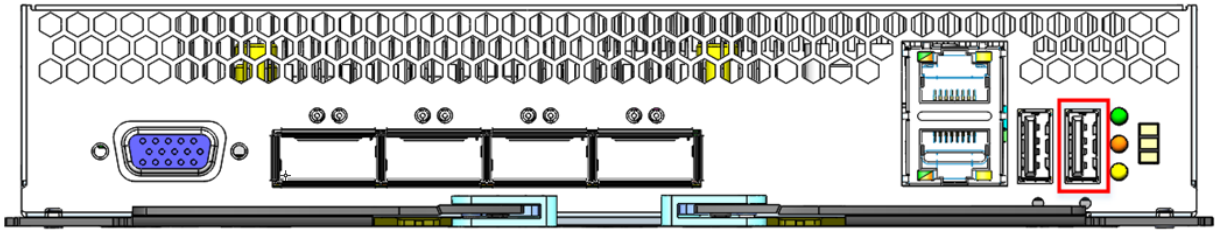
4.1 Login to the Switch System

The switch sled is shipped with an operating system pre-installed on the COMe module. Users can login to the system through the following modes.

- Via USB Serial Port
- Local login
- Via Network Port

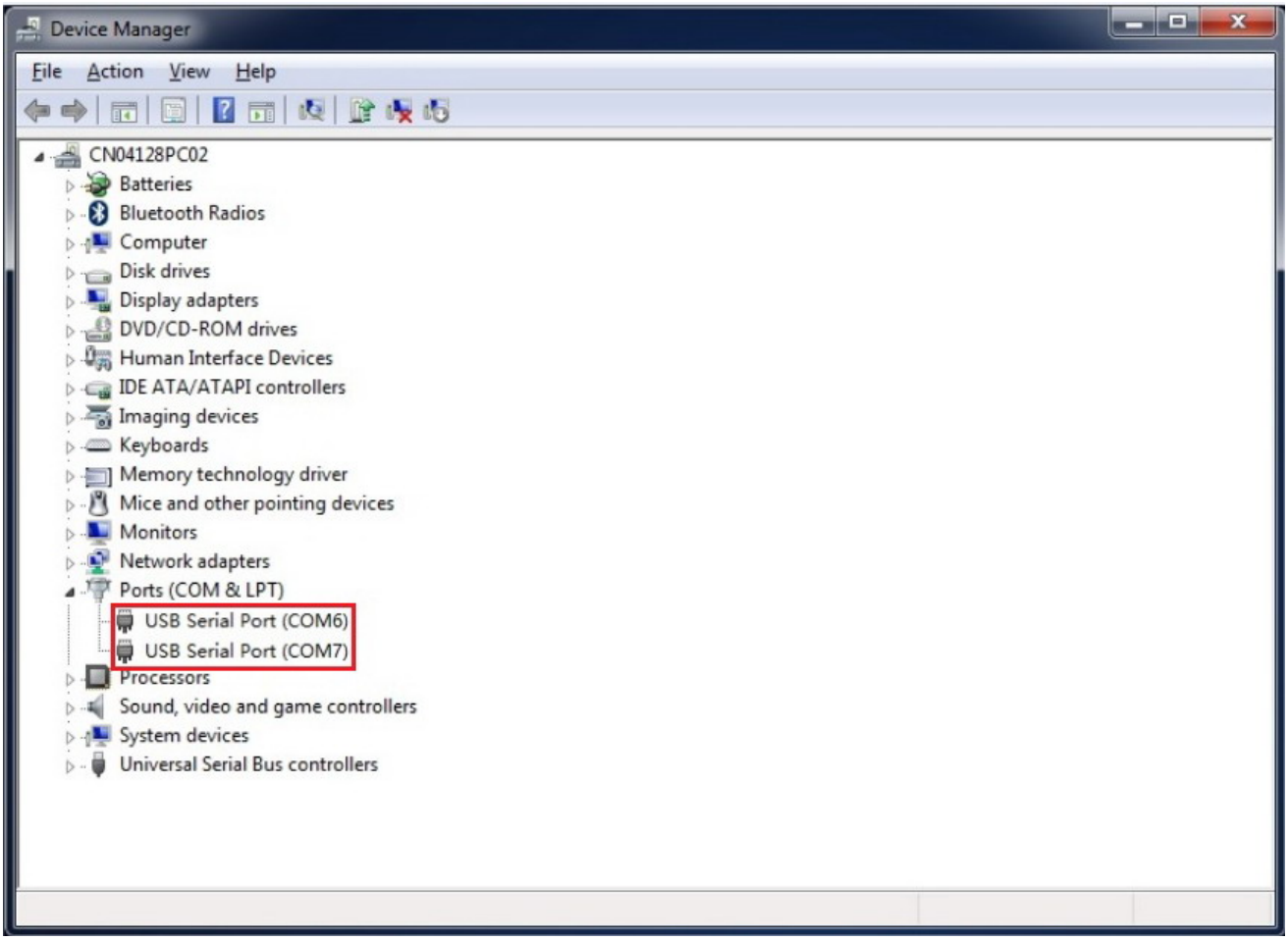
4.1.1 Login Via Serial Port

Step 1
Connect a PC to the USB port labeled "SER" on the front panel of the MXN-4100 with a USB-to-USB cable.



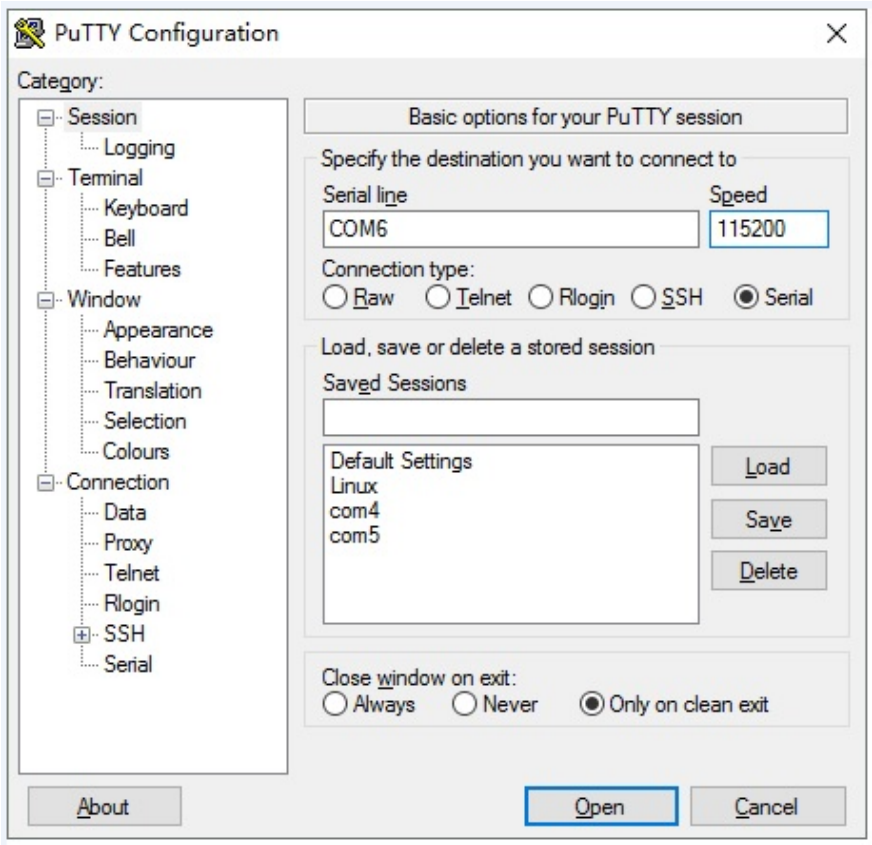
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Step 2
Install the USB-serial chip driver “CDM v2.12.06 WHQL Certified.zip” or “CDM v2.12.06 WHQL Certified_64.zip” on the PC. Check the COM number in the Device Manager.



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Step 3
Open a serial port console tool (e.g. PuTTY), choose the COM port with the smaller number (if this port doesn't work, try the other one), then set the baud rate to 115200. Power up the system and click the 'Open' button.



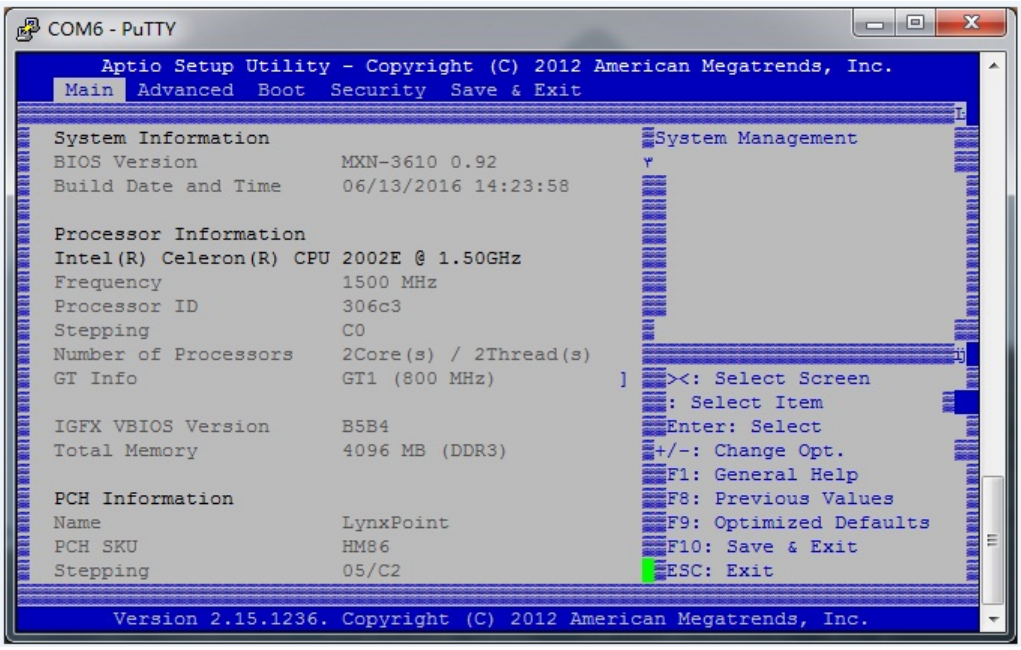
Step 4
Input the user name "root" and password "adlink" to login to the system on the COMe module.

4.1.2 Local Login

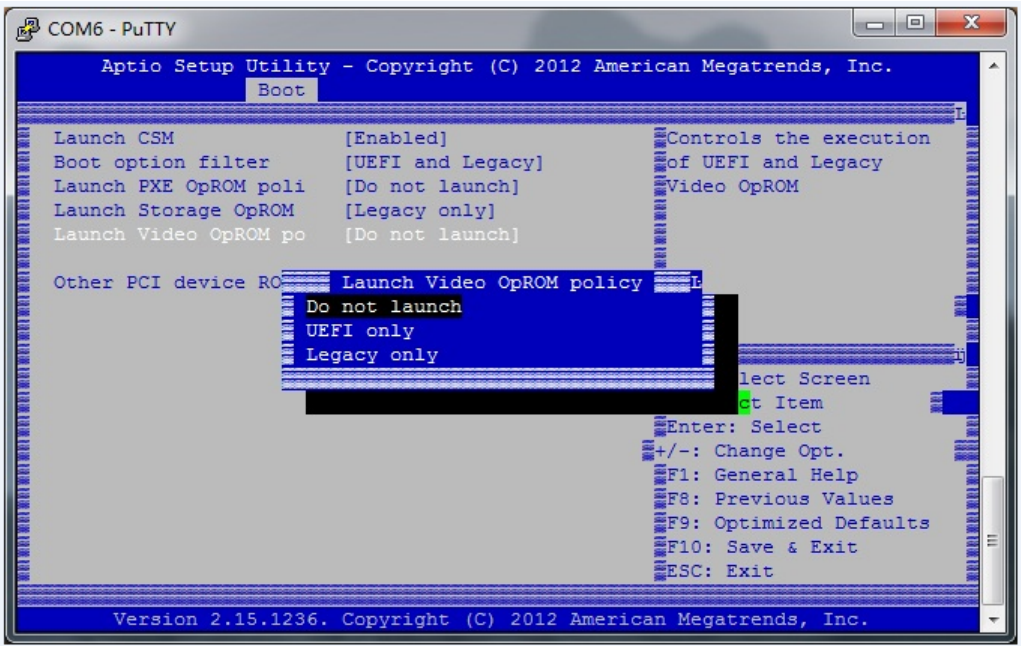
The MXN-4100 COMe BIOS default setting does not enable the VGA display. Therefore, the first login to the MXN-4100 must be via the serial port: To enable local login using the VGA display:

1. Perform steps 1 to 3 of **4.1.1 Login Via Serial Port** above. In step 3, click the "Open" button as soon as possible after powering on the system.
2. During the POST sequence, (when the screen begins receiving output), press the <ESC> or <Del> key to enter the BIOS setup.

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To enable the VGA display, change the *Boot* > *CSM parameters* > *Launch Video OpROM policy* setting from “Do not launch” to “Legacy Only”. Save the settings and restart the system.

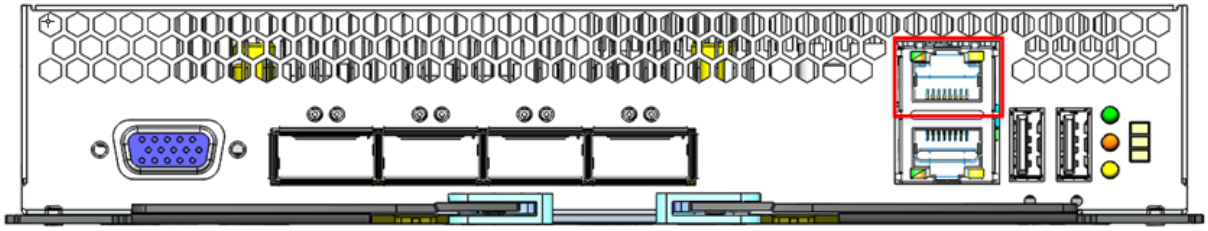


Connect the MXN-4100 to a monitor using the VGA connector on the front panel. Login to the system on the COMe module with the user name “root” and password “adlink”.

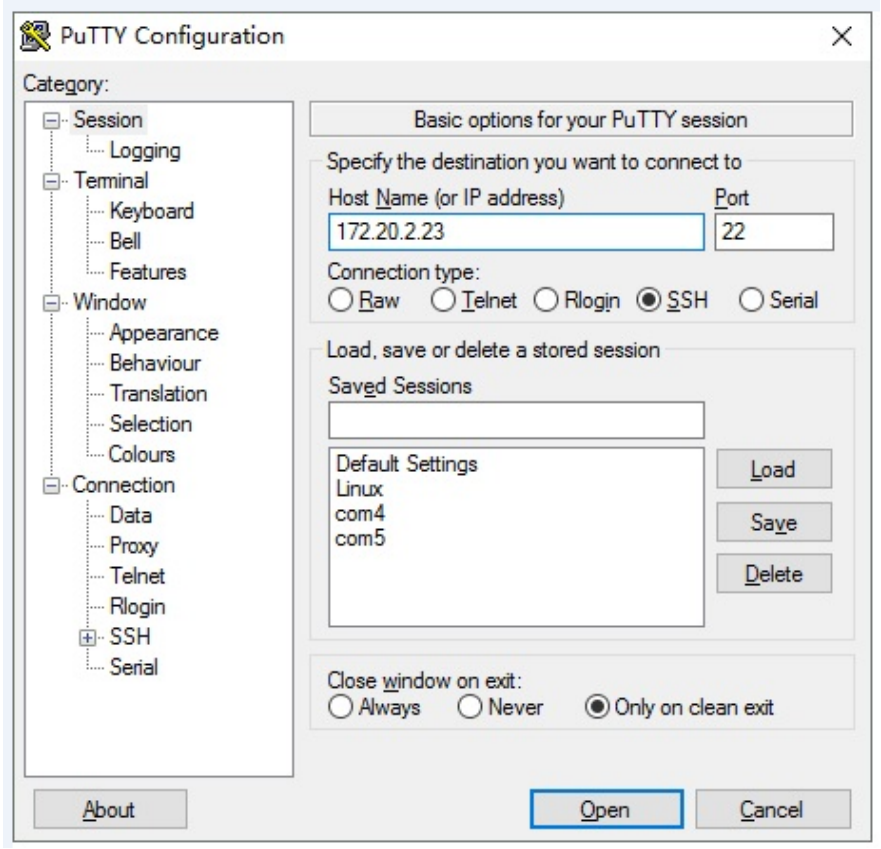
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4.1.3 Via Network Port

Step 1
Connect the LAN port (“A”)of the COMe module to the DHCP server.



Step 2
Open an SSH tool (such as PuTTY) and input the host name “172.20.2.23” (you can login to the system on COMe module via serial port to confirm the IP address).



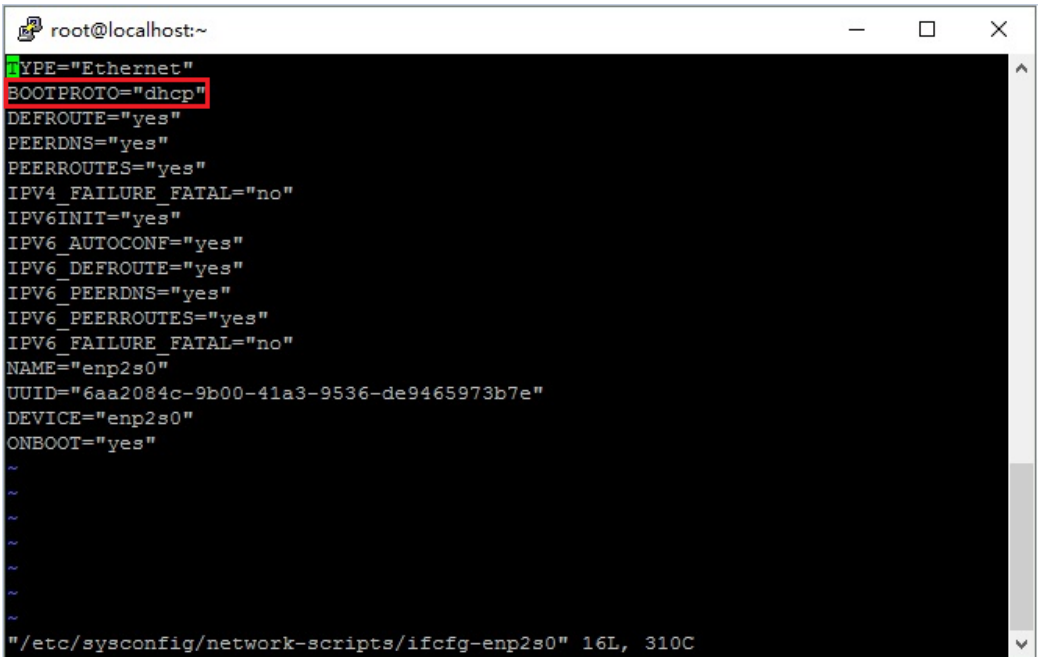
Step 3
Input the user name “root” and password “adlink” to login to the system on the COMe module.

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4.2 Switch System IP Setup

Users can set the network to “DHCP” or “Static” mode by logging into the switch system via serial console and editing “/etc/sysconfig/network-scripts/ifcfg-enp2s0”. The default mode is “DHCP”.

After editing, save the change, and run “reboot” for the change to take effect.



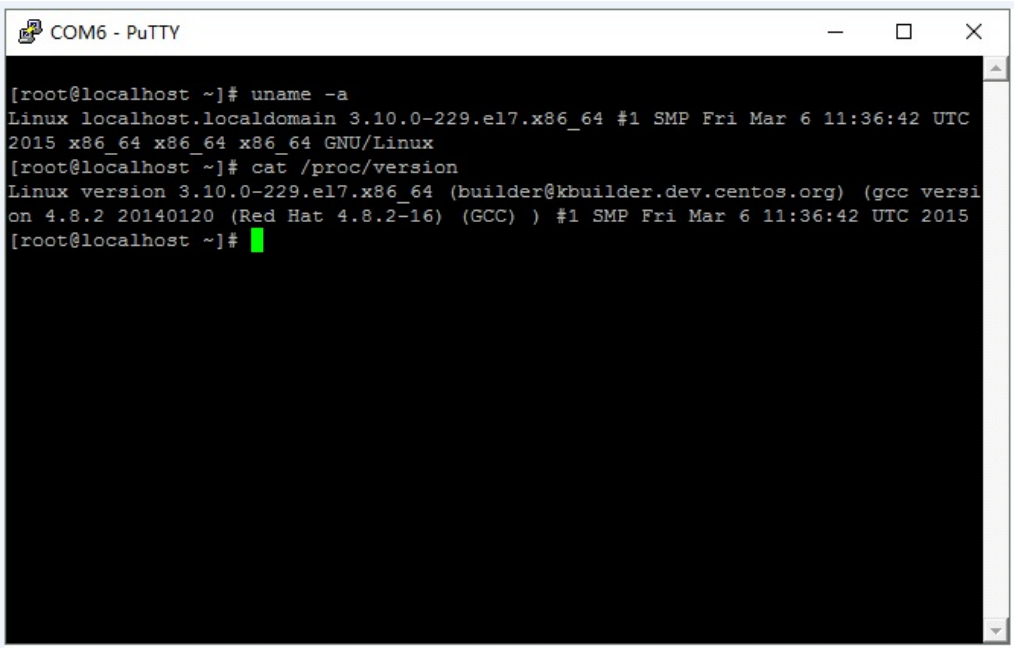
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4.3 COMe OS Version Check

After logging in to the switch system, you can check OS version by using the following command:

uname –a or cat /proc/version

The shipped system version is CentOS 7 (Linux kernel 3.10.0-229.e17.x86_64), as shown below.



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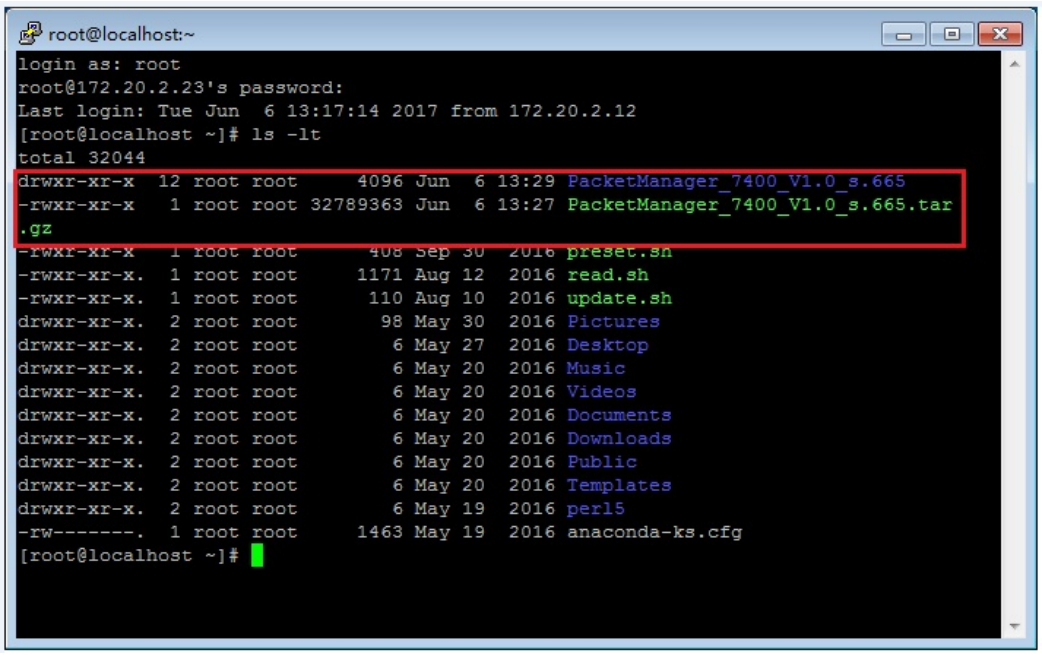
4.4 PacketManager on the Switch Sled

ADLINK PacketManager runs on the switch system COMe module under Linux OS. It includes the most commonly used Layer2/3 stacks and switch management features.

The following sub-sections describe how to check the version, enter Configure Mode and get help.

4.4.1 Check PacketManager Installation Version

Go to the Linux file path “/root” to check the PacketManager version. The file “PacketManager_xxx_Vxx_s.xxx.tar.gz” is the software installation package. The package will be unzipped to the directory “PacketManager_xxx_Vxx_s.xxx”.



The PacketManager version number consists of three parts: “7400” represents the platform, “V1.0” is the major version number, and “S.665” is the secondary version number.

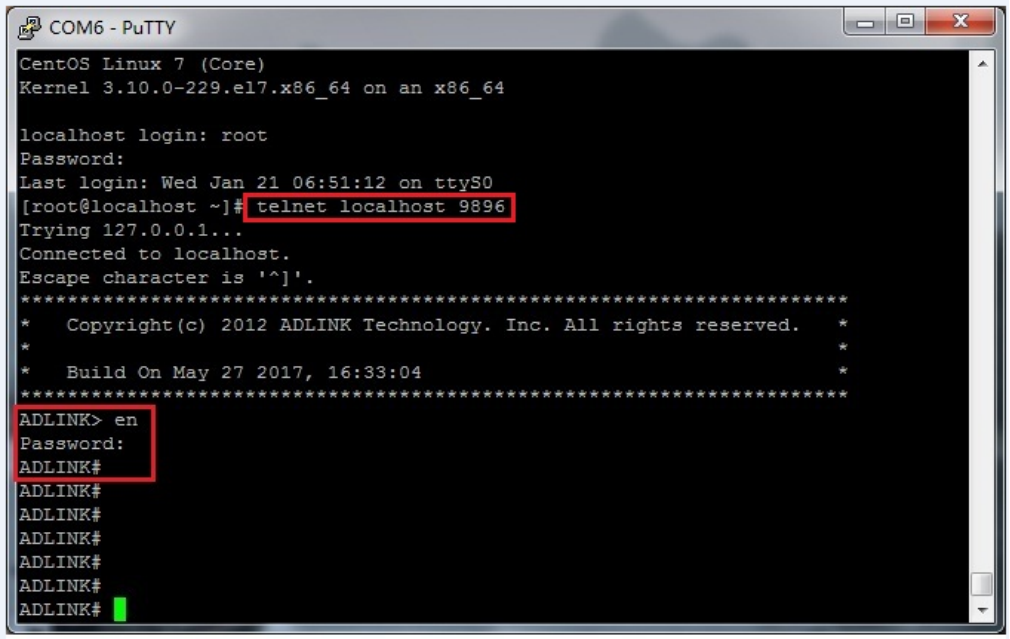
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4.4.2 Command Line Interface and Configure Mode

Step 1
After logging into the switch system, you can input the following command to enter the command line interface (CLI):

telnet localhost 9896

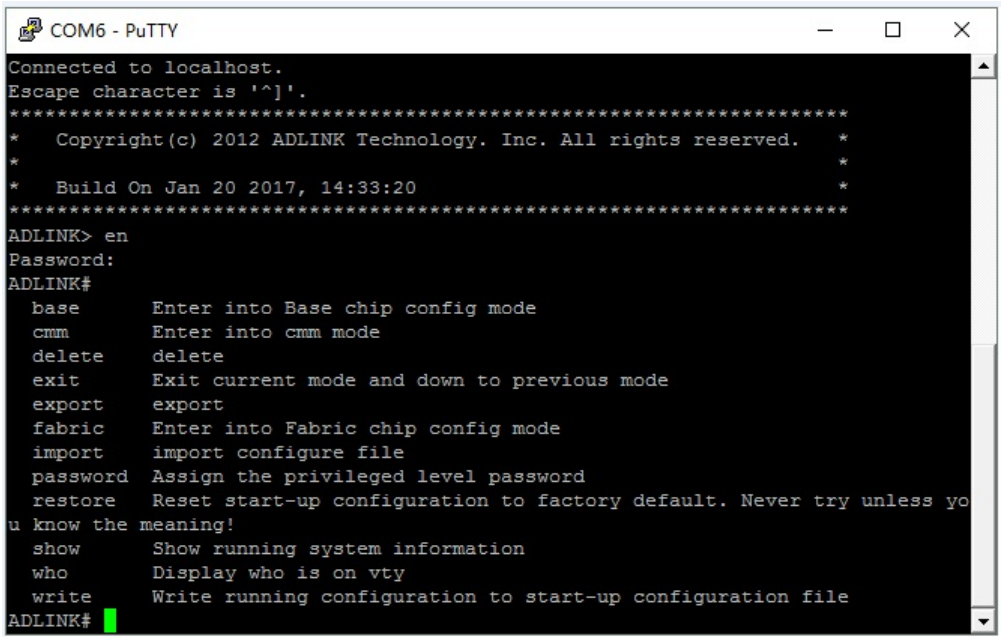
Step 2
To enter Configure Mode, use the enable command “en” or “enable” and default password “adlink”. The display will not echo the password. After entering Configure Mode successfully, the prompt will change from ">" to "#", as show below.



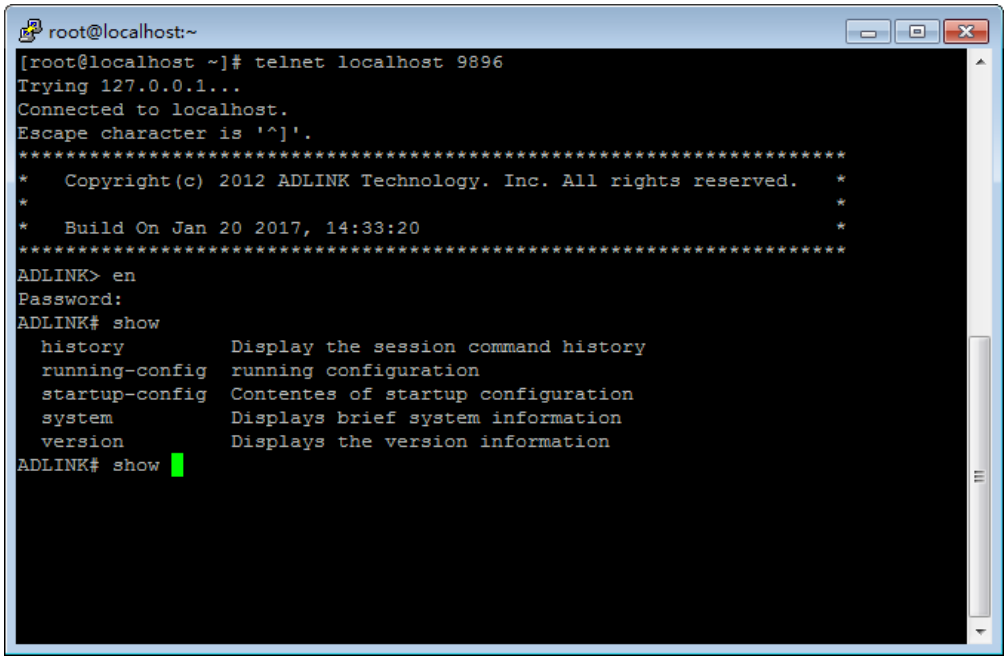
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4.4.3 Get Help and Check Version

Entering a question mark “?” at the system prompt will display a list of commands or sub commands available for the current command mode. You can also type a “?” in the middle of a command line to view the list of valid arguments or parameters needed to complete the command.

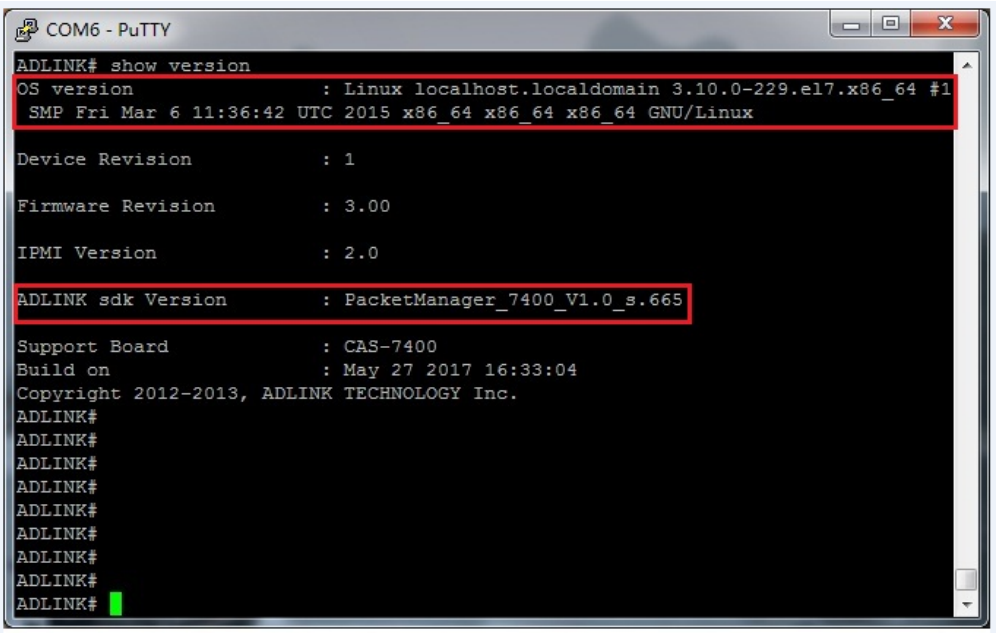


You can also enter “*command<space>?*” to get help for a specific command, such as “*show ?*”.



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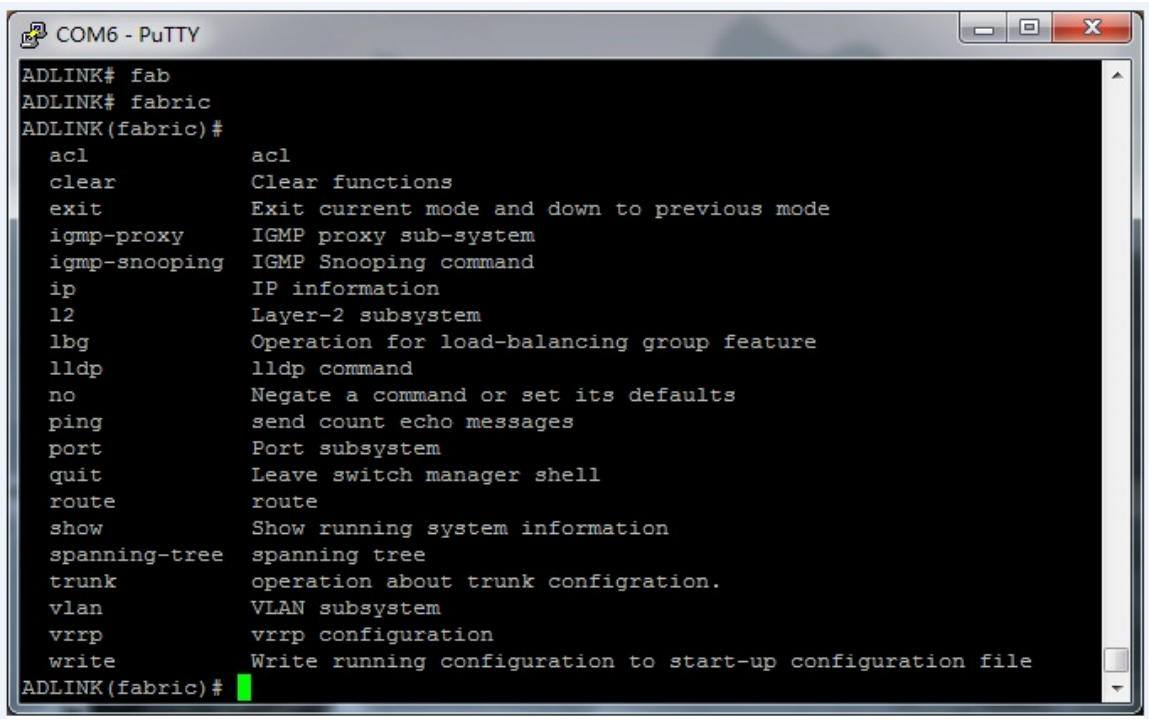
Use the “*show version*” command to check the OS and SDK versions.



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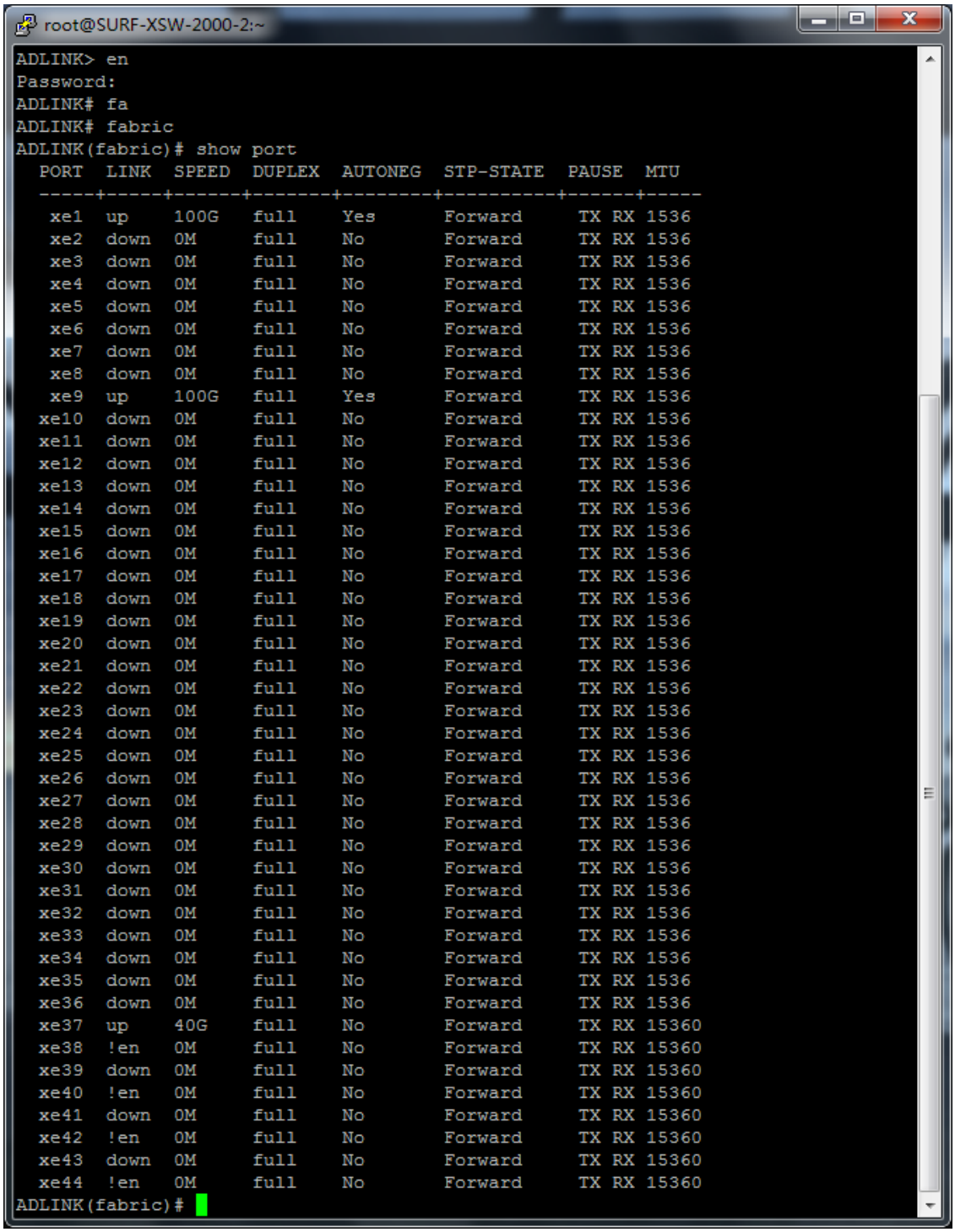
4.5 Fabric Mode

At the system prompt, enter the command “*fabric*” to enter fabric mode:



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In fabric mode, you can configure the switch. An example command is “show port” which can be used to check the port list. For detailed information about configuration commands, please refer to the **ADLINK PacketManager Configuration Guide**.

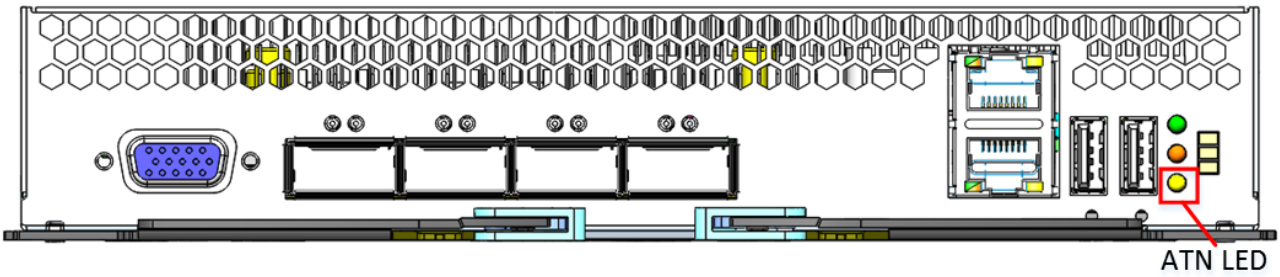


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5 Maintenance

5.1 Hot-Swapping the Switch Sled

When hot-swapping the switch sled, the user must first push the hot-swap (H/S) button at the lower right of the front panel, and wait until the ATN LED turns on before removing the switch sled from the chassis.



A detailed description of the hot-swap process is outlined below:

- When the H/S button is pushed, the signal is replicated by a logic module on the mid plane and sent to the four CPU sleds. At the same time, a graceful shutdown of the COMe module is triggered by briefly pulling the COMe PWR_BTN GPIO high, emulating a user to push the power button.
- When the CPU sled detects the H/S signal, it will perform a PCIe device removal on CPU sled based on the PCIe hot-swap specification. When the CPU sled finishes this task, it asserts its ATN LED line.
- After the logic module on the midplane detects that all ATN LED lines are asserted and the COMe module S5 signal is also asserted, it will turn on the ATN LED on the switch front panel.

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5.2 Updating the Switch System BIOS

Users can use the Intel Flash Programming Tool (FPT) to update the system BIOS on the COMe module, including Intel Management Engine (ME), while preserving the MAC address of the internal NIC on the PCH of the COMe module.

1. Boot to DOS
2. Flash BIOS (not including ME) command: *fpt -f xxx.rom –bios*
3. Flash BIOS (including ME) command: *fpt -f xxx.bin –savemac*

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Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

1. Read these safety instructions carefully.
2. Keep this user's manual for future reference.
3. Read the specifications section of this manual for detailed information on the operating environment of this equipment.
4. The equipment can be operated at an ambient temperature of 40°C.
5. When installing/mounting or uninstalling/removing equipment; or when removal of the chassis lid required for user servicing (Section 3.1-3.5):
   - Turn off power and unplug any power cords/cables, and
   - Reinstall the chassis lid before restoring power.
6. To avoid electrical shock and/or damage to equipment:
   - Keep equipment away from water or liquid sources;
   - Keep equipment away from high heat or high humidity;
   - Keep equipment properly ventilated (do not block or cover ventilation openings);
   - Make sure to use recommended voltage and power source settings;
   - Always install and operate equipment near an easily accessible electrical socket-outlet;
   - Secure the power cord (do not place any object on/over the power cord);
   - Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
   - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
7. Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
8. A Lithium-type battery may be provided for uninterrupted, backup or emergency power.
   CAUTION! Risk of explosion if battery is replaced with one of an incorrect type. Please dispose of used batteries appropriately.
9. Equipment must be serviced by authorized technicians when:
   - The power cord or plug is damaged;
   - Liquid has penetrated the equipment;
   - It has been exposed to high humidity/moisture;
   - It is not functioning or does not function according to the user's manual;
   - It has been dropped and/or damaged; and/or,
   - It has an obvious sign of breakage.
10. Please pay strict attention to all warnings and advisories appearing on the device, to avoid injury or damage.
11. The equipment may have more than one power supply input. To reduce the risk of electrical shock, trained personnel should disconnect all power supply inputs before servicing.
    CAUTION! Disconnect all power supply inputs before servicing.
12. It is recommended that equipment be installed only in a server room or computer room where access is:

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- Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required;
- Only afforded by the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

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Consignes de Sécurité Importantes

Pour assurer la sécurité de l'utilisateur, veuillez lire et suivre toutes les **directives**, ainsi que les **AVERTISSEMENTS**, **MISES EN GARDE** et **REMARQUES** de ce manuel et indiqués sur l'équipement associé avant de manipuler ou utiliser l'équipement.

1. Veuillez lire attentivement ces instructions de sécurité avec soin.
2. Veuillez conserver ce manuel pour référence future.
3. Veuillez lire la section des spécifications de ce manuel pour avoir des informations détaillées sur l'environnement d'exploitation de cet équipement.
4. L'équipement peut être utilisé à une température ambiante de 40 °C.
5. Lors de l'installation ou du montage et de la désinstallation ou de la dépose de l'équipement; ou lors de la dépose du couvercle du châssis pour procéder à l'entretien par l'utilisateur (Sections 3.1-3.5):
   - Coupez l'alimentation et débranchez les cordons et les câbles d'alimentation, et
   - Reposez le couvercle du châssis avant de remettre l'alimentation.
6. Pour éviter un risque d'électrocution et pour éviter d'endommager l'équipement :
   - Éloignez l'équipement de l'eau et de toute source liquide;
   - Éloignez l'équipement de toute source de chaleur ou d'humidité élevée;
   - Gardez l'équipement correctement ventilé (ne pas bloquer ou couvrir les ouvertures de ventilation);
   - Veillez à utiliser la tension recommandée et les réglages adéquats pour la source d'alimentation;
   - Veuillez toujours installer et exploiter l'équipement à proximité d'une prise de courant facilement accessible;
   - Assurez-vous que le cordon d'alimentation est acheminé de manière sécuritaire (ne déposez aucun objet dessus);
   - Installez, fixez et utilisez l'équipement sur des surfaces stables ou sur les fixations recommandées uniquement;
   - Si l'équipement n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.
7. N'essayez jamais de réparer l'équipement. L'équipement ne doit être réparé que par du personnel qualifié.
8. Une pile au lithium peut être installée pour assurer l'alimentation de secours ou d'urgence en continu.
   ATTENTION! Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.
9. L'équipement doit être entretenu par des techniciens agréés lorsque :
   - le cordon d'alimentation est endommagé ou lorsque la fiche électrique est endommagée;
   - du liquide a pénétré à l'intérieur de l'équipement;
   - l'équipement a été exposé à un taux d'humidité élevé;
   - l'équipement ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur;
   - l'équipement est tombé ou lorsqu'il a été endommagé;
   - l'équipement présente un signe évident de défaillance.
10. Veuillez porter une attention rigoureuse à tous les avertissements et à tous les avis figurant sur l'appareil, pour éviter des blessures ou des dommages.

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11. **ATTENTION!** L’équipement peut avoir plus d’une entrée d’alimentation. Pour réduire le` risque d’électrocution, le personnel qualifié devrait déconnecter toutes les entrées d’alimentation avant de procéder à l’entretien.
12. Il est recommandé que l'équipement soit installé que dans une salle de serveur ou de la salle informatique où:
    - L'accès est limité au personnel de maintenance qualifié ou utilisateurs familiers avec les restrictions appliquées à l'emplacement, motifs, et tout les précautions nécessaires, et;
    - L'accès est uniquement assurée par l'utilisation d'un outil ou clé, ou d'autres moyens de sécurité, et est contrôlé par l'autorité responsable de l'emplacement.

51.06 pt

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Getting Service

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