



Network Appliance Platforms

Hardware Platforms for Network Computing

VP-200 User Manual

Version: 1.0

Date of Release: 2023-04-28

About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the [Lanner Download Center](#) page with a login account and password.

Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:

Icon	Usage
 Note or Information	This mark indicates that there is something you should pay special attention to while using the product.
 Warning or Important	This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the [Lanner Download Center](#). As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at <http://www.lannerinc.com/> to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, if there are any technical queries, you could submit a support ticket to our [Lanner Technical Support](#) department.

Documentation Feedback

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ▶ Reorient or relocate the receiving antenna.
- ▶ Increase the separation between the equipment and receiver.
- ▶ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ▶ Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

- ▶ Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- ▶ This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

- ▶ Keep the chassis area clear and dust-free during and after installation.
- ▶ Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ▶ Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ▶ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ▶ Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ▶ Do not work alone if potentially hazardous conditions exist.
- ▶ Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- ▶ Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- ▶ Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- ▶ Portez des lunettes de sécurité pour protéger vos yeux.

- ▶ N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- ▶ Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- ▶ Ne travaillez pas seul si des conditions dangereuses sont présentes.
- ▶ Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- ▶ There is risk of explosion if the battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures and device specifications which are to be applied.
- ▶ Do not carry the handle of power supplies when moving to another place.
- ▶ Please conform to your local laws and regulations regarding safe disposal of lithium battery.
- ▶ Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- ▶ Leaving a battery in an extremely high temperature environment can result in an explosion or the leakage of flammable liquid or gas.
- ▶ A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

Avertissement concernant la pile au lithium

- ▶ Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- ▶ Jetez les piles usagées conformément aux instructions.
- ▶ L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- ▶ Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- ▶ Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ▶ Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- ▶ Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- ▶ Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- ▶ L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- ▶ Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- ▶ Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- ▶ Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- ▶ Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- ▶ Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- ▶ Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- ▶ Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation & Operation

- ▶ This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- ▶ Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- ▶ The machine can only be used in a restricted access location and must be installed by a skilled person.
Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.
- ▶ Some USB devices may not be compatible with the system. If you encounter an error, please remove the USB device and restart the system.

Warning

Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

"Product shall be used with Class 1 laser device modules."

Avertissement

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.

"Le produit doit être utilisé avec des modules de dispositifs laser de classe 1."



CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.

注意：要断开电源，请将所有电源线从本机上拔下。

WARNUNG: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.

ATTENTION: DÉBRANCHER LES TOUT CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

Electrical Safety Instructions

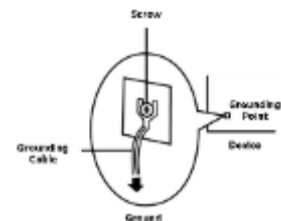
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire (green-and-yellow) is required and the part connecting the conductor must be greater than 4 mm² or 10 AWG.

Consignes de sécurité électrique

- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- ▶ Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- ▶ Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm² ou 10 AWG.

Grounding Procedure for DC Power Source

- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the DC power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before DC power.



Procédure de mise à la terre pour source d'alimentation CC

- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.

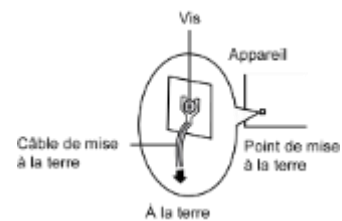


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CHAPTER 1: PRODUCT OVERVIEW

The VP-200, a fanless desktop network security platform with NXP® Layerscape® LS1046A SOC, is designed for networking, industrial applications and virtualized networks and embedded systems that require an advanced data path and network peripheral interfaces.

Main Features

- ▶ NXP® Layerscape® LS1046A SoC
- ▶ DDR4 2100MHz UDIMM, Max. 64GB
- ▶ 2x SFP/RJ45 Combo Ports, 4x RJ45 Ports
- ▶ 1x Console, 1x USB 3.0, 1x Pair of Gen3 Bypass (by SKU)
- ▶ 4x SMA Connectors (LTE/5G), 2x SMA Connectors (Wi-Fi)
- ▶ 1x Mini-PCIe, 1x M.2, 2x Nano SIM Slots
- ▶ Optional Support for 2x PoE+ Through PoE+ Add-on Card

Package Content

Your package contains the following items:

- ▶ 1x Network Security Platform
- ▶ 1x Power Adaptor, 1x Console Cable
- ▶ 1x Nameplate

Ordering Information

SKU No.	Main Features
VP-200A	NXP® LS1046A SoC, 2x SFP/RJ45 Combo Ports, 4x RJ45 Ports, 40W PSU, 1x Pair of Gen3 Bypass
VP-200B	NXP® LS1046A SoC, 2x SFP/RJ45 Combo Ports, 4x RJ45 Ports, 40W PSU, No Bypass

Optional Accessories

Model	Description
PoE Add-on Card Kit	IO-1516P1A, screws pack, and adapter
5G Kit	5G Module Kit w/ screws pack, internal antenna cables, external antennas
LTE Kit	LTE Module Kit w/ screws pack, internal antenna cables, external antennas
Wi-Fi Kit	Wi-Fi Module Kit w/ screws pack
Rack Mount Kit	Rackmount with Adapter Holder Kit
Wall Mount Kit	Wall Mount Kit with brackets and screws pack
Din Rail Kit	Din Rail Kit with brackets and screws pack

System Specifications

Form Factor		Desktop
Platform	CPU Processor	NXP® LS1046A
	Frequency	1.8GHz
	CPU Cores	4 Cores
	Chipset	SoC
BIOS		N/A
System Memory	Technology	DDR4 2100 MHz UDIMM
	Max. Capacity	Up to 32GB
	Socket	1x 260-pin SODIMM
Networking	Ethernet Ports	2x SFP/RJ45 GbE Combo Ports via 2x Realtek RTL8211FS 4x GbE RJ45 from Realtek RTL8211FS
	Speed	10/100/1000 Mbps
	Interface	RJ45 (Optional Support for 2x PoE+)
	Bypass	1x pair of Gen3 Bypass (By SKU)
PoE+	PoE+	Default N/A; 2x RJ45 Ports support PoE+ via PoE+ add-on card (Optional)
	PoE+ Power Inlet	2x 24 Pins 54V Power Inlet
I/O Interface	Reset Button	1x Reset Button
	LED Indicators	Status LED Indicators
	Power Button	1x Power ON/OFF Button
	Console Port	1x RJ45 Console Port
	USB Port	1x USB 3.0 Port
	Power Input	2x DC Jack with Lock
	Antenna Hole	2x Front Antenna holes; 4x Rear Antenna holes
Storage	Onboard Slots	1x M.2 (SATA) 2280 Onboard EMMC 16G
Expansion	Mini-PCle	1x M.2 for 5G 1x M.2 for Wi-Fi
	SIM Card Slot	2x Nano SIM slot
Miscellaneous	Watchdog	YES
	Internal RTC with Li Battery	YES
	TPM	YES
Cooling	Processor	Passive CPU Heatsink
	System	Fanless
Environmental Parameters	Temperature	0~40°C Operating, -40~70°C Non-Operating
	Humidity (RH)	5~90% Operating, 5~ 95% Non-Operating
System Dimensions	(WxDxH)	231 x 200 x 44mm
	Weight	2 kg
Package Dimensions	(WxDxH)	TBC
	Weight	TBC
Power	Type/Watts	40W
	Input	AC 90~264V @47~63 Hz
OS Support		Linux
Approvals and Compliance		RoHS, CE/FCC Class B (with PoE function will be Class A), UL, VCCI, UKCA

Front Panel



No.	Description	
F1	Antenna	4x SMA Antenna Holes
F2	LED Indicators	LED Indicators
F3	SIM Cover	2x Nano SIM Slots w/ Cover

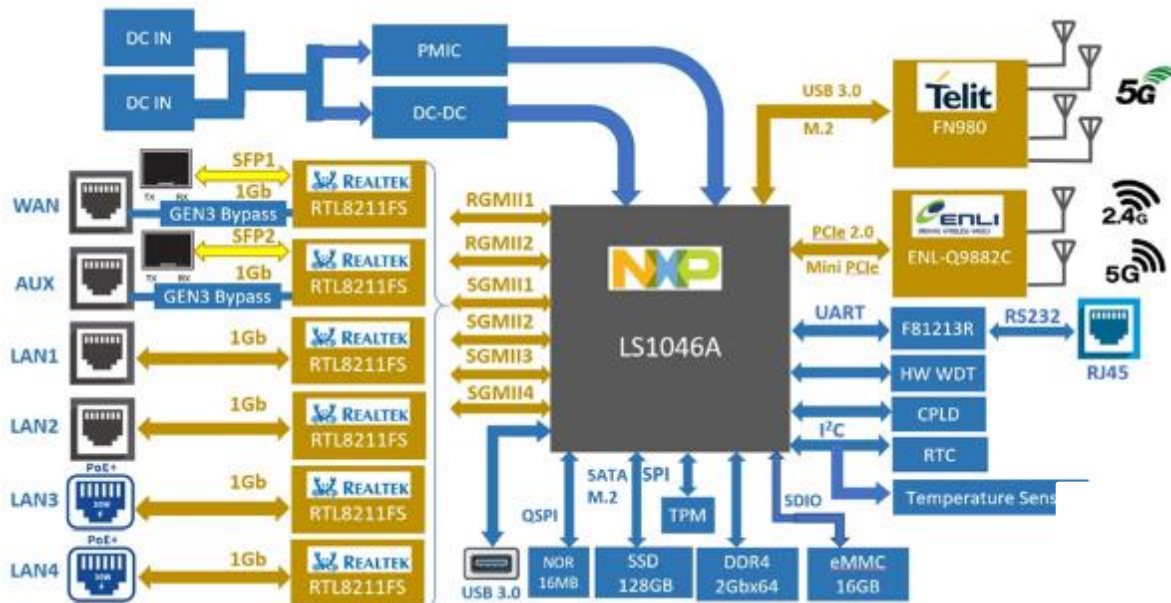
Rear Panel



No.	Description	
R1	Reset Button	1x Reset Button
R2	Power Switch	1x Power ON/OFF Switch
R3	Power Inlet	2x DC Jack Power-IN
R4	USB Port	2x USB 3.0 Ports
R5	Console Port	1x RJ45 Console Port
R6	SFP/LAN Ports	2x SFP/RJ45 Combo Ports
R7	LAN Ports	4x RJ45 GbE Ethernet Ports
R8	PoE+ Power Inlet	1x 65W, 54V, 1.2A Power for PoE+ (Optional))
R9	Antenna	4x SMA Antenna Holes

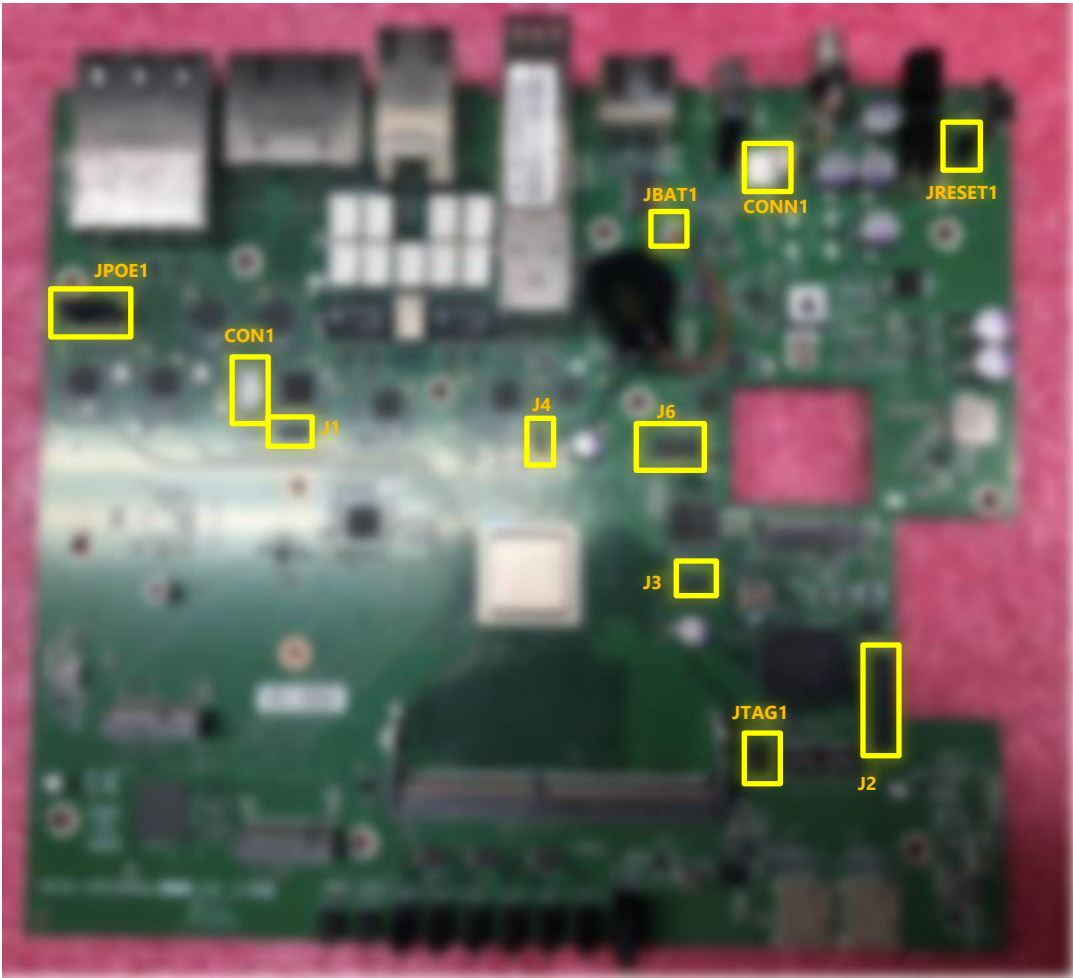
CHAPTER 2: MOTHERBOARD INFORMATION

Block Diagram



Jumpers and Connectors

The following displays the connectors and jumpers on the motherboard layout.

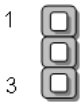


Jumper Setting and Connector Pin-out

The following references the pin assignments and internal connectors of VP-200.

JRESET1

Pin	Description
1	HW_RST
2	COM
3	SW_RST



CONN1

Pin	Description
1	V12A_DC_B
2	GND



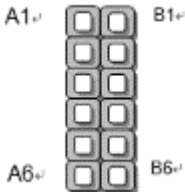
JBAT1

Pin	Description
1	VBAT
2	GND



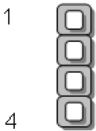
JPOE1

Pin	Description	Pin	Description
A1	POE_VPORT_OUT1	B1	
A2	POE_VPORT_OUT2	B2	
A3	POE_GND	B3	GND
A4	POE_GND	B4	GND
A5		B5	P3V3_POE
A6		B6	P3V3_POE



CON1

Pin	Description
1	3.3V
2	RXD
3	GND
4	TXD



J1

Pin	Description
1	VDD
2	PIO0_1
3	GND



J2

Pin	Description
1	3.3V
2	TDO
3	TDI
4	
5	
6	TMS
7	GND
8	TCK



J3

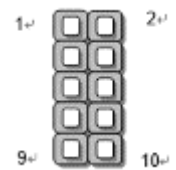
Pin	Description
1	PWR_PROG_SFP
2	1.8V

**J4**

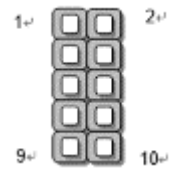
Pin	Description
1	VDD_FA_VDD
2	CPU_VDD

**J6**

Pin	Description	Pin	Description
1	1.8V	2	
3	CS0	4	1.8V
5	DATA1	6	DATA3
7	DATA2	8	SCK
9	GND	10	DATA0

**JTAG1**

Pin	Description	Pin	Description
1	1.8V	2	TMS
3	GND	4	TCK
5	GND	6	TDO
7		8	TDI
9	GND	10	RST



CHAPTER 3: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely and wear ESD protection gloves when handling the installation steps.

Opening the Chassis

1. Power off the system and remove all power connections.
2. Locate and remove the six (6) screws on the chassis cover.

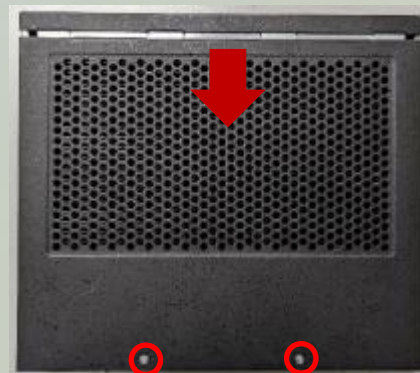
Right Side



Left Side



Top Side



3. Gently slide the chassis cover away from the system and lift the cover to remove.

In order to access the motherboard, we need to remove the heatsink.



4. Next, locate and remove the nine (9) screws on the heatsink.



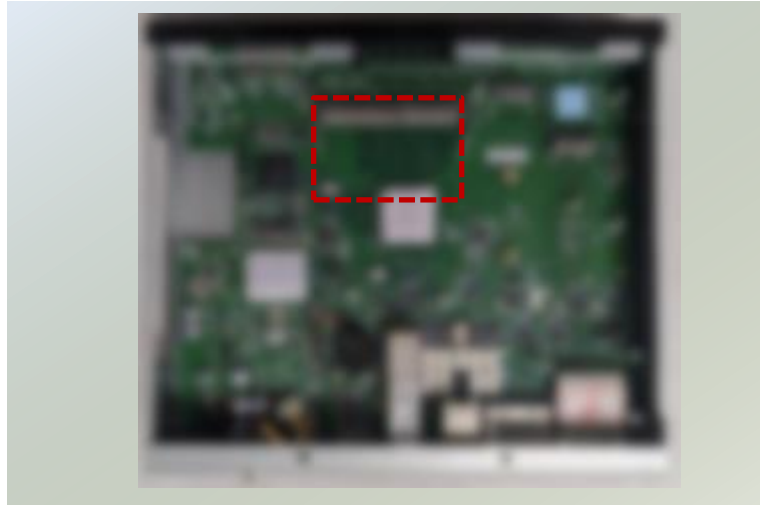
5. Then, remove the heatsink.



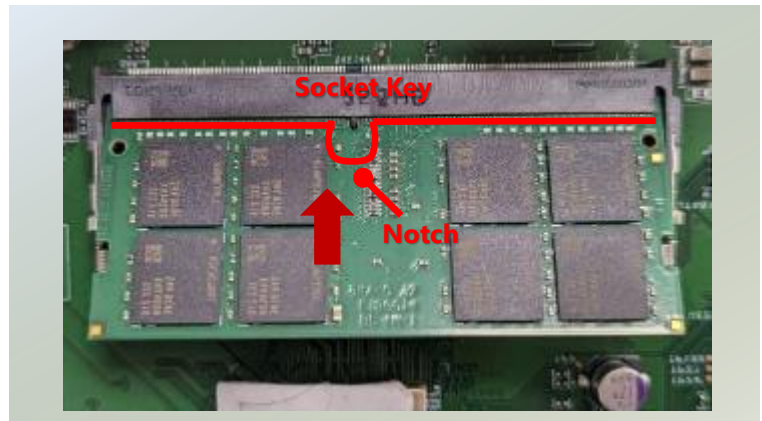
Installing the System Memory

The motherboard supports one DDR4 2100MHz SO-DIMM system memory. Please follow the steps below to install the DIMM memory module.

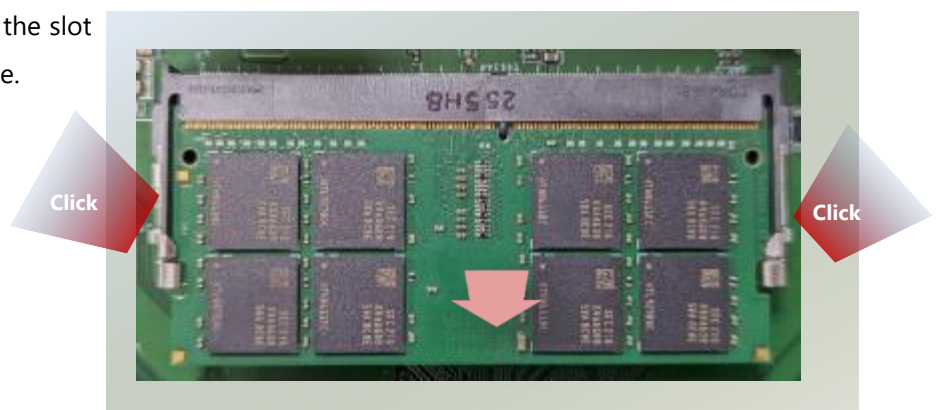
1. Power off the system and open the chassis cover.
2. Locate the system memory slot.



3. Align the notch of the module with the socket key in the slot. Insert the pins at 30 degrees into the socket key until it is fully seated.



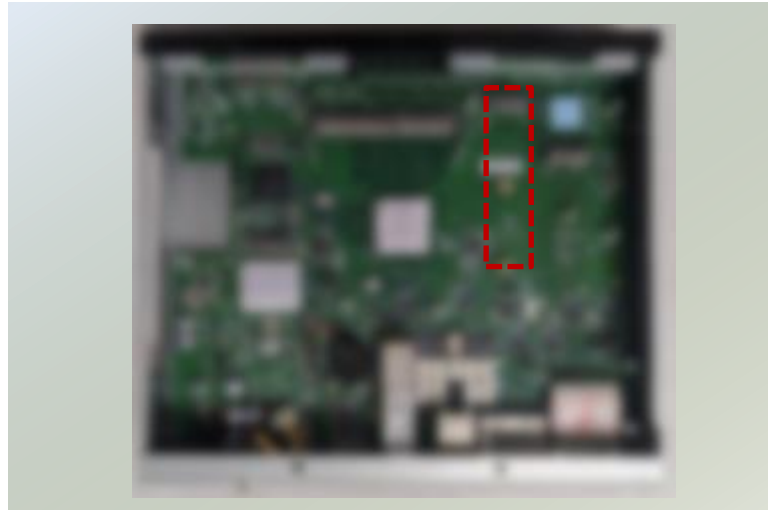
4. Push down on the module until the slot latch catches and clicks into place.



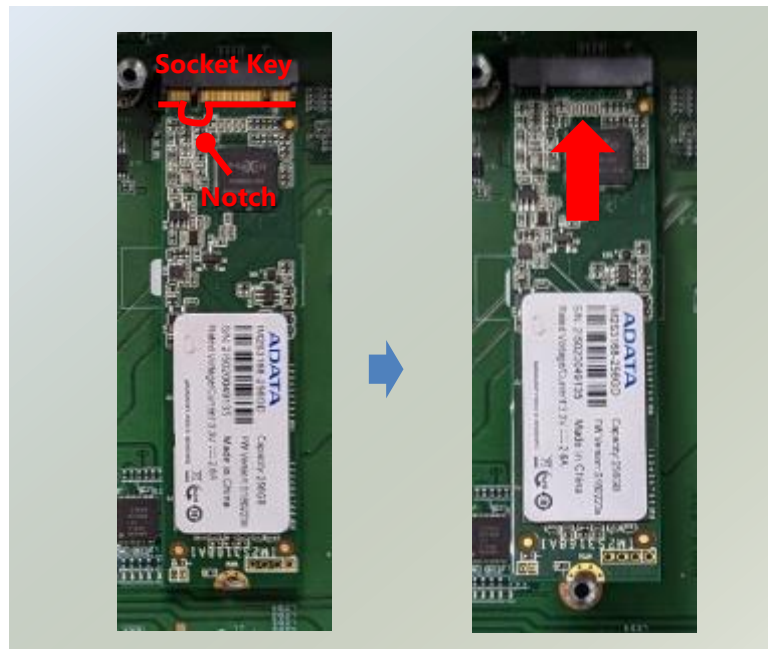
Installing M.2 Storage Module (Optional)

The system supports one M.2 slot for additional data storage. Please follow the steps for installation.

1. Power off the system and open the chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the M.2 memory card with the socket key in the pin slot.
4. Insert the M.2 memory card pins at 30 degrees into the socket until it is fully seated.



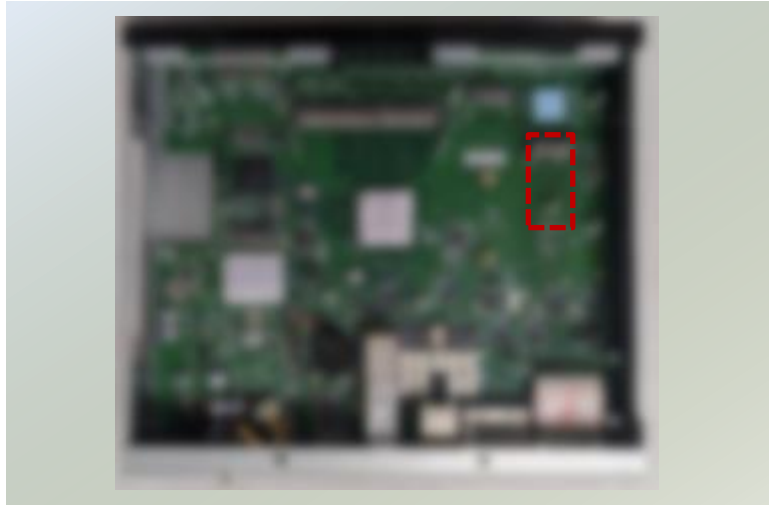
5. Push down on the module card and secure it with a screw.



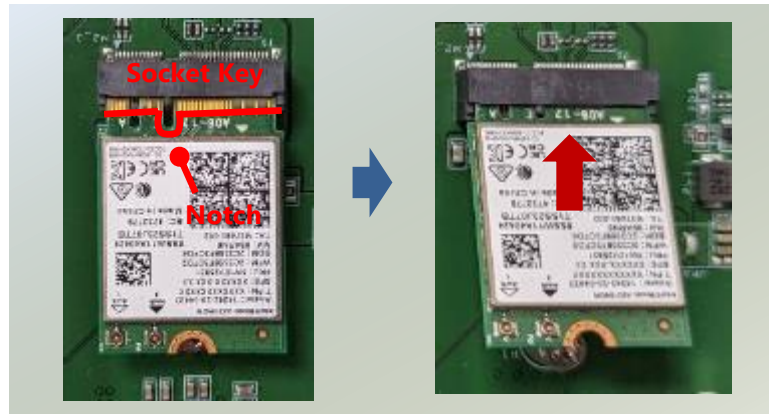
Installing Wi-Fi Module Card (Optional)

The system supports one M.2 slot for a Wi-Fi module. Wi-Fi module requires two antennas. Please follow the steps to install the Wi-Fi module card.

1. Power off the system and open the chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the Wi-Fi module card with the socket key in the pin slot.
4. Insert the Wi-Fi module card pins at 30 degrees into the socket until it is fully seated.



5. Push down on the module card and secure it with a screw.



Installing Wi-Fi Antennas

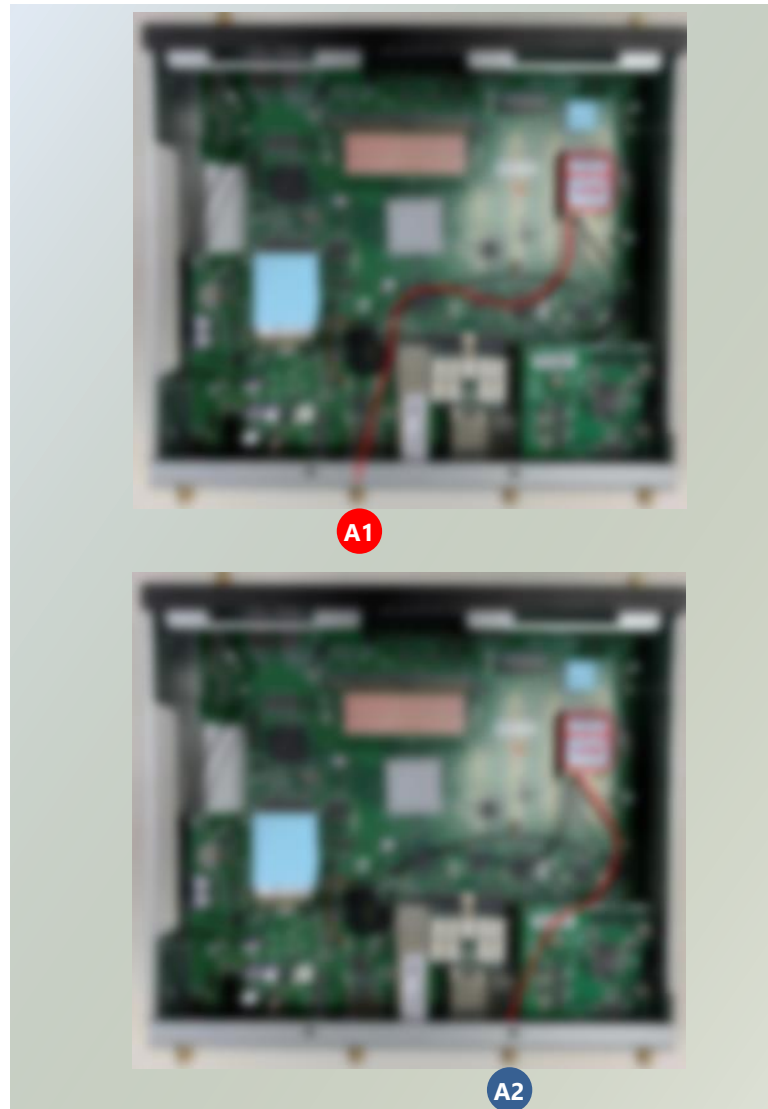
Rear Panel



1. Locate the two (2) antenna hole placements (A1, A2). Locate the two (2) antenna IPEX connectors on the Wi-Fi module card.



2. Connect the RF cables to the IPEX connectors on the Wi-Fi module card and screw the other end of the cables in the antenna holes.



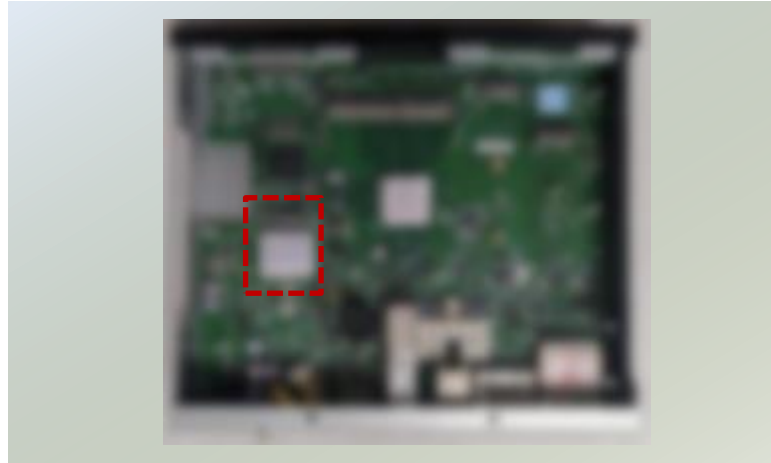
3. Then, screw on the antennas on the outside of the system.



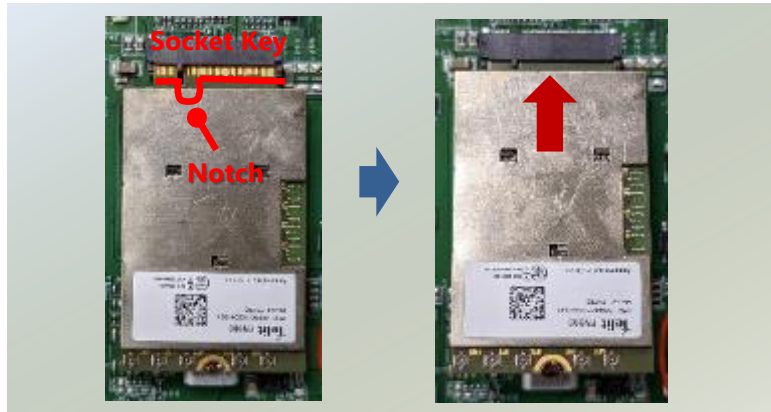
Installing 5G Module Card (Optional)

The motherboard provides one M.2 slot for 5G module card expansion. A 5G module requires four antennas. Please follow the procedures for installation.

1. Power off the system and open the chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the 5G module card with the socket key in the pin slot.



4. Insert the 5G module card pins at 30 degrees into the socket until it is fully seated.

5. Push down on the module card and secure it with a screw.



Installing 5G Antennas

Front Panel



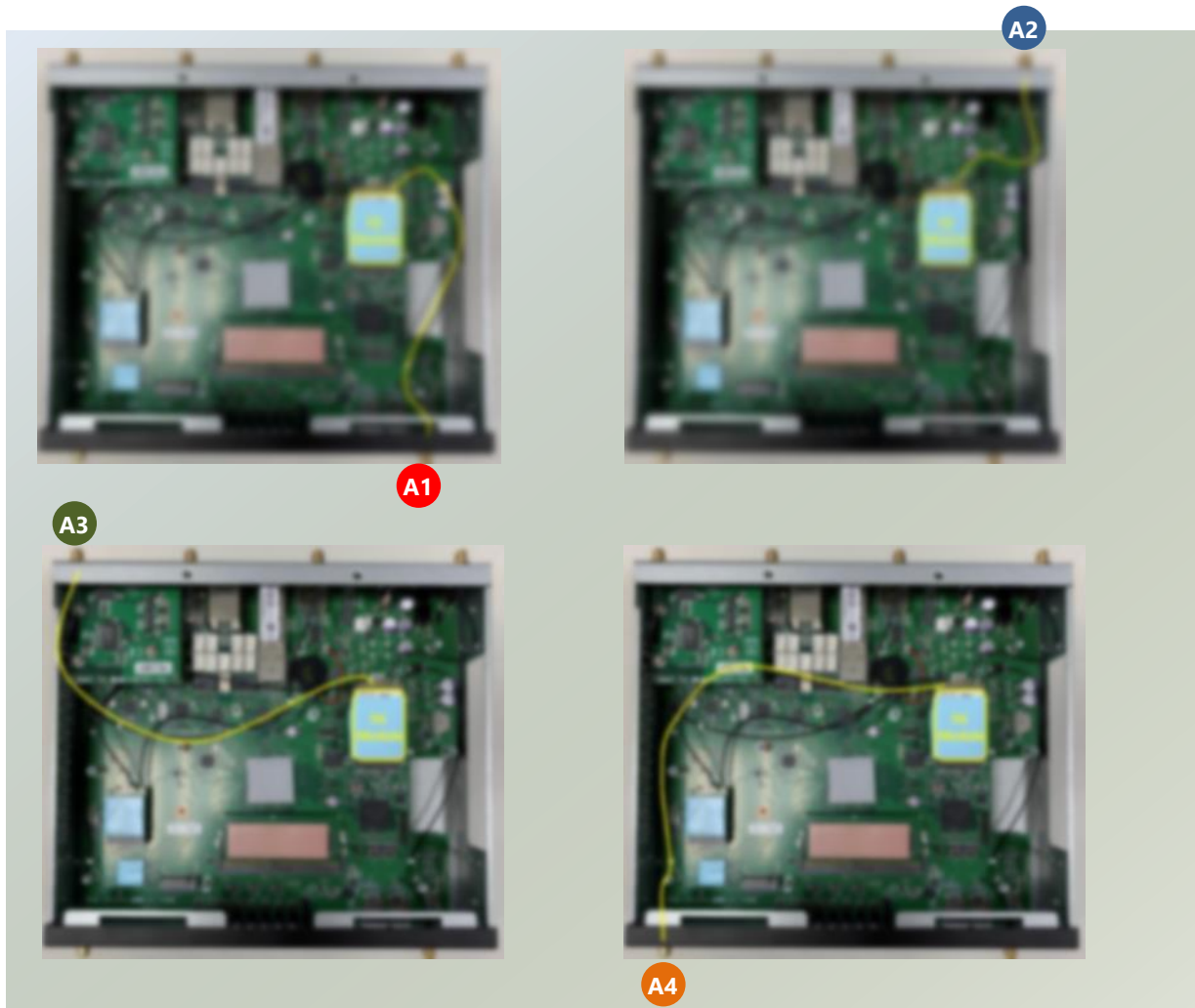
Rear Panel



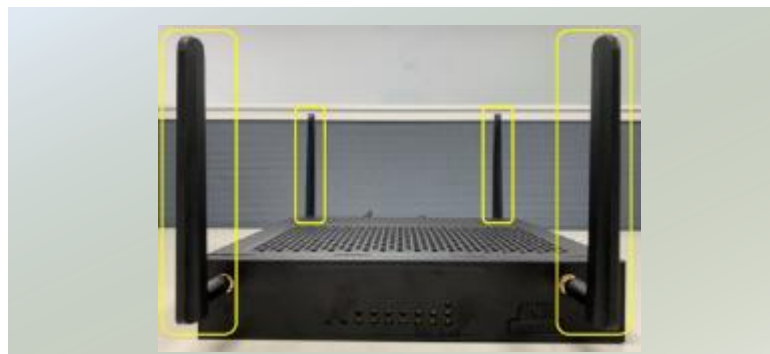
1. Locate the four (4) antenna hole placement (A1, A2, A3, A4). Locate the four (4) antenna IPEX connectors on the 5G module card.



2. Connect the RF cables to the IPEX connectors on the 5G module card and screw the other end of the cables in the antenna holes.



3. Then, screw on the four (4) antennas on the outside of the system.



Installing SIM card (Optional)

The SIM slot on the front panel supports the 5G module card. Please follow the steps below for SIM card placement.

1. Power off the system.
2. Locate the SIM slot cover. Unscrew the two (2) screw securing the cover.



3. Gently remove the SIM slot cover.
4. Insert and push the Nano-SIM card, gold contacts facing downwards, all the way in until it clicks into place. Repeat if dual Nano-SIM cards will be place.



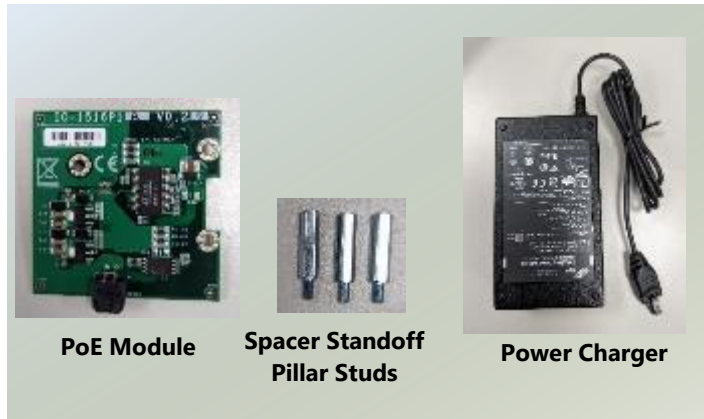
5. To remove the Nano-SIM cards, use your fingertips to push it once, to have the card automatically eject.
6. Place the slot door back and tighten the one (1) screw.

Installing PoE Module Kit (Optional)

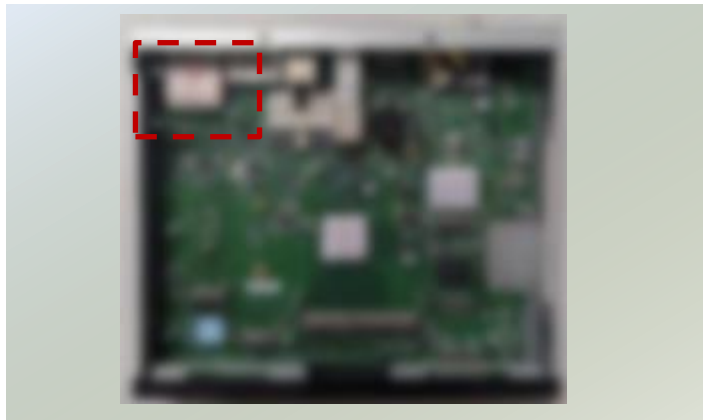
The motherboard supports one PoE module slot. Please follow the steps below to install the PoE kit.

1. The PoE Module Kit includes:

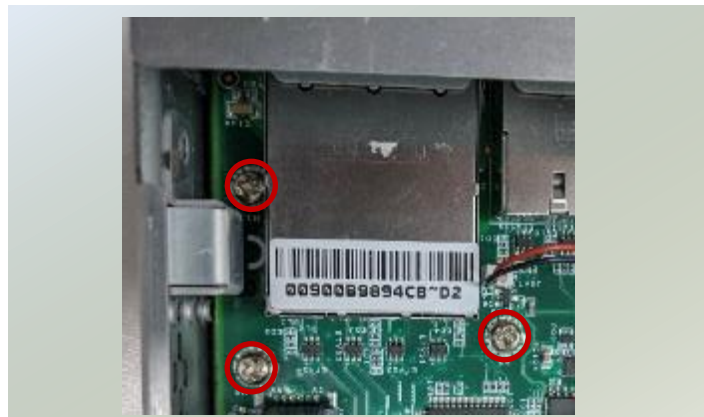
- ▶ 1x PoE Module
- ▶ 3x Spacer standoff pillar studs
- ▶ 1x Power Adapter



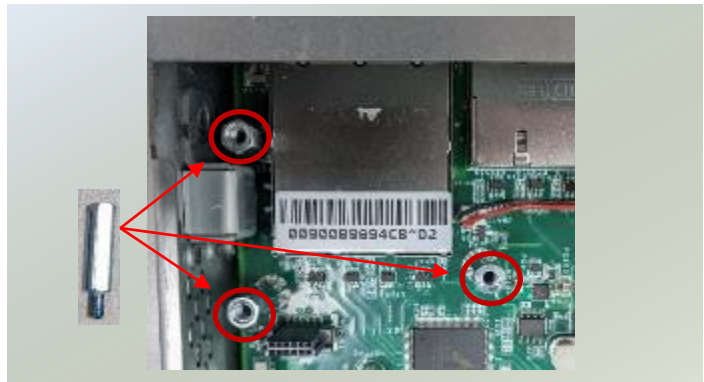
2. Power off the system and open the chassis cover.
3. Locate the PoE Module slot placement.



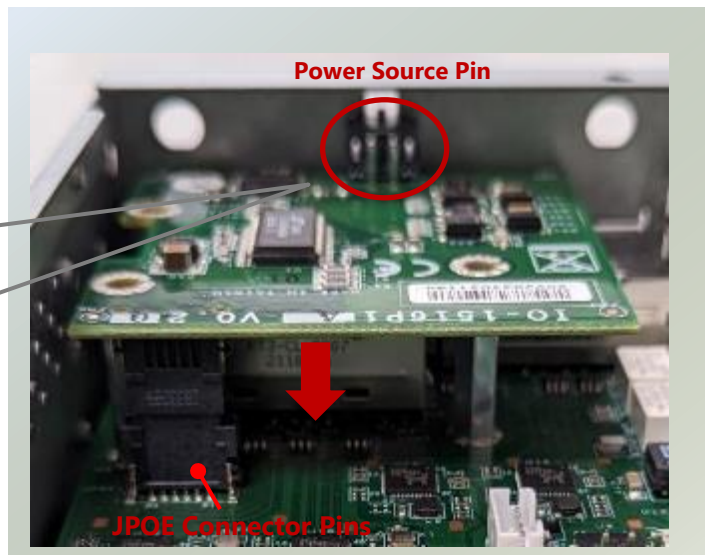
4. Remove the three (3) screws



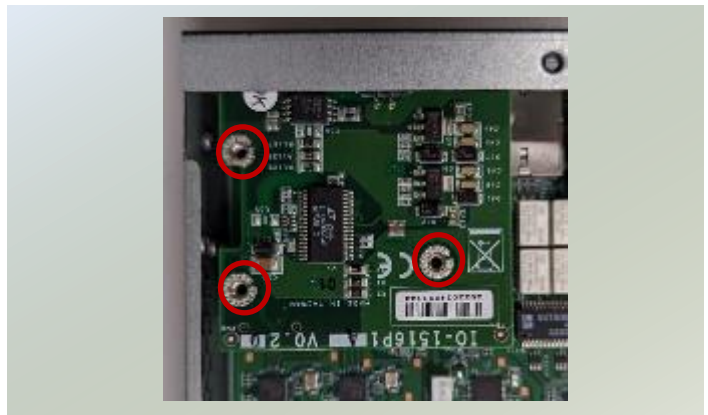
5. Replace the three (3) screws with the spacer standoff pillar studs.



6. Align the top power source pin to the chassis rear opening spot, and insert the bottom pins into JPOE connector pins.



7. Screw in the original three (3) screws to secure the PoE module board.



8. Connect the power source pin to the power adapter.



CHAPTER 4: SOFTWARE SETUP

Installing SOP Base LSDK 21.08

Development Environment Requirements

LSDK 21.08 : OS Version Ubuntu 20.04 Server Version

Ubuntu 20.04 - ubuntu-20.04.4-live-server-amd64.iso

LSDK 21.08 Installation

1. Download SDK

Download SDK after registration on NXP official website:

<https://www.nxp.com/design/software/embedded-software/linux-software-and-development-tools/layercape-software-development-kit-v21-08:LAYERSCAPE-SDK>

2. Compile LS1046A

VP-200's motherboard was developed referencing LS106A EVB, therefore it is recommended to complete the setup of LS1046A EVB environment according to procedure first.

1. Login by User Name
2. Make sure you are connected to the network.

~# ping www.google.com

Installation Kit

~# sudo apt-get install python

Unzip SDK

~# tar xpvf flexbuild_lsdk2108.tgz

~# cd flexbuild_lsdk2108

~#

Modify JOB count

~# cat /proc/cpuinfo | grep -c processor

32

~# vim configs/yocto/local_arm64_devel.conf

```
from
BB_NUMBER_THREADS = "4"
PARALLEL_MAKE = "-j 4"
to
BB_NUMBER_THREADS = "32"
PARALLEL_MAKE = "-j 32"
```

Generate Ubuntu devel arm64 userland

Compile OS: ubuntu

Compile mode: devel

```

~# cd flexbuild_lsdk2108
~# source setup.env
~# flex-builder -i mkrfs -r ubuntu:devel
DISTRO TYPE:ubuntu
DISTRO SCALE: devel
[sudo] password for lanner:

```

After wait Longer time

Note It is recommended to use high speed internet to reduce waiting speed.

Execute a few times and once the following screen is displayed then it is ready to go.

```

I: Validating xxd 2:8.1.2269-1ubuntu5
I: Retrieving xz-utils 5.2.4-1
I: Validating xz-utils 5.2.4-1
I: Retrieving zlib1g 1:1.2.11.dfsg-2ubuntu1
I: Validating zlib1g 1:1.2.11.dfsg-2ubuntu1
E: Couldn't download packages: libtext-charwidth-perl libtext-iconv-perl libtext-wrapi18n-perl
lanner@lanner:~/flexbuild_lsdk2108$
lanner@lanner:~/flexbuild_lsdk2108$

```

Create Linux

The kernel needs to be compiled first as "Create Firmware" will capture the dtb file under linux.

```

~# cd flexbuild_lsdk2108
~# source setup.env
~# flex-builder -c linux -a arm64 -m ls1046ardb
~# flex-builder -i mkbootpartition -m ls1046ardb
~#
~# ls build/images/boot_LS_arm64_lts_5.10.tgz

```

Note It is recommended to use high speed internet to reduce waiting speed.

Create Firmware

rcw: reset configuration word

```

~# cd flexbuild_lsdk2108
~# source setup.env
~# flex-builder -c rcw -m ls1046ardb -b qspi
~# flex-builder -c atf -m ls1046ardb -b qspi
~# flex-builder -c uboot -m ls1046ardb -b qspi
~# flex-builder -i mkfw -m ls1046ardb -b qspi
~#
~# ls build/images/firmware_ls1046ardb_qspiboot.img

```

Note Parameter -b means boot device sd,qspi

Create Root File System

```
~# cd flexbuild_lsdk2108
~# source setup.env
~# flex-builder -i packrfs -r ubuntu:devel
~#
~# ls build/images/rootfs_lsdk_2108_ubuntu_devel_arm64.tgz
```

ADD NXP APP

Example: RESTOOL

Enable RESTOOL

```
~# vim config/sdk.yml
RESTOOL: y
```

ADD to rootfile system

```
~# source setup.env
~# flex-builder -c restool
~# ls components/apps/networking/restool
~# flex-builder -i merge-component -r ubuntu:devel
~# flex-builder -i packrfs -r ubuntu:devel
```

Install SD Boot disk

Example: SD card device is sdb

```
~# cd flexbuild_lsdk2108
~# source setup.env
~# cd build/images
~# flex-installer -i pf -d /dev/sdb
~# flex-installer -b boot_ls_arm64_lts_5.10.tgz -r rootfs_lsdk_2108_ubuntu_devel_arm64.tgz -d /dev/sdb
~# sync
~# sudo umount /mnt/sdb*
```

Update VP-200

1. Update Manifest

Modify Manifest

```
~# cp <PATH_DIR>/manifest_vp200 configs/board/ls1046ardb/manifest
```

```
machine="ls1046ardb"

# default RCW
-rcw_qspi="firmware/rcw/ls1046ardb/RR_FFSSPPPH_1133_5559/rcw_1800_qspiboot.bin"
+#rcw_qspi="firmware/rcw/ls1046ardb/RR_FFSSPPPH_1133_5559/rcw_1800_qspiboot.bin"
+rcw_qspi="firmware/rcw/ls1046ardb/RR_SSSPPPH_3333_5559/rcw_1800_qspiboot.bin"
rcw_qspi_sec="firmware/rcw/ls1046ardb/RR_FFSSPPPH_1133_5559/rcw_1600_qspiboot_sben.bin"
rcw_sd="firmware/rcw/ls1046ardb/RR_FFSSPPPH_1133_5559/rcw_1800_sdboot.bin"
rcw_sd_sec="firmware/rcw/ls1046ardb/RR_FFSSPPPH_1133_5559/rcw_1800_sdboot_sben.bin"
```

Update extra_packages_list

```
~# cp <PATH_DIR>/extra_packages_list <SDK_ROOT>/configs/ubuntu/
```


2. Build Kernel

Update Dts and Patch

```
~# cd <SDK_ROOT>
~# cd components/linux/linux
~# patch -p1 < /<PATCH_DIR>/linux/vp200_linux_0001.patch
~# patch -p1 < /<PATCH_DIR>/linux/lsdk-21.08_linux-5.10.32_sdx55-pcie.patch
~# cp /<PATCH_DIR>/linux/fsl-ls1046a-rdb.dts arch/arm64/boot/dts/freescale/
~# sync
~#
```

Make menuconfig

```
~# source setup.env
~# flex-builder -c linux:custom
[*] Networking support ---
  *- Wireless ---
    <*> cfg80211 - wireless configuration API

    <*> Generic IEEE 802.11 Networking Stack (mac80211)

  Networking options ---
    Network testing ---
      <*> Packet Generator (USE WITH CAUTION)

Device Drivers ---
  Generic Driver Options ---
    Firmware loader ---
      ath10k/QCA988X/hw2.0/firmware-5.bin

  [*] Real Time Clock ---
    <*> Ricoh R2025S/D, R55C372A/B, RV5C386, RV5C387A

  Bus devices ---
    <*> Modem Host Interface (MHI) bus
    <*> MHI PCI controller driver

  [*] Network device support ---
    [*] Wan interfaces support ---

    [*] Network core driver support
      <M> MHI network driver

    <*> USB Network Adapters ---
      <*> QMI WWAN driver for Qualcomm MSM based 3G and LTE modems

  [*] Wireless LAN ---
    [*] Atheros/Qualcomm devices
    <*> Atheros 802.11ac wireless cards support
    <*> Atheros ath10k PCI support

  Wireless WAN ---
    <*> WWAN Driver Core
    [*] WWAN devices debugfs interface
    <*> MHI WWAN control driver for QCOM-based PCIe modems
    <*> MHI WWAN MBIM network driver for QCOM-based PCIe modems

  [*] USB support ---
    <*> USB Wireless Device Management support
    <*> USB Serial Converter support ---
      <*> USB driver for GSM and CDMA modems

    <*> Hardware Monitoring support ---
      <*> National Semiconductor LM90 and compatibles

  Character devices ---
    <*> TPM Hardware Support ---
      <*> TPM Interface Specification 1.3 Interface / TPM 2.0 FIFO Interface - (SPI)
```

Rebuild kernel

```
~# flex-builder -c linux
~# flex-builder -i mkbootpartition -m ls1046ardb
~# ls build/images/boot_LS_arm64_lts_5.10.tgz
```


3. Build Boot Firmware

1. Update RCW (Reset Configuration Word)

Update new RCW config

```
~# cd <SDK_ROOT>/components/firmware/rcw/
~# patch -p1 < /<PATCH_DIR>/rcw/vp200_rcw_0001.patch
~#
```

2. Update Arm Trusted Firmware

```
~# cd <SDK_ROOT>/components/firmware/atf/
~# patch -p1 < /<PATCH_DIR>/atf/vp200_atf_0001.patch
~#
```

3. Update uboot

```
~# cd <SDK_ROOT>/components/firmware/uboot/
~# patch -p1 < /<PATCH_DIR>/uboot/vp200_uboot_0001.patch
~# cp <PATCH_DIR>/uboot/fsl-ls1046a-rdb.dts arch/arm/dts
~#
```

4. Re-compiler

```
~# source setup.env
~# rm -rf build/firmware/mc_utils
~# rm -rf build/firmware/atf
~# rm -rf build/firmware/rcw
~# rm -rf build/firmware/u-boot
~# flex-builder -c rcw -m ls1046ardb -b qspi
~# flex-builder -c atf -m ls1046ardb -b qspi
~# flex-builder -c uboot -m ls1046ardb -b qspi
~# flex-builder -i mkfw -m ls1046ardb -b qspi
~# ls build/images/firmware_ls1046ardb_qspiboot.img
```

4. Build Ubuntu Devel rfs

1. ADD package

~# vim configs/ubuntu/extra_packages_list

```
--- extra_packages_list 2022-10-25 05:19:13.741869561 +0000
+++ extra_packages_list_v00 2022-10-25 05:17:18.362816330 +0000
@@ -47,7 +47,8 @@
     blktrace sysfsutils cpufrequtils iotop busybox ipsec-tools lmbench watchdog
     lttng-tools xterm can-utils python3-virtualenv gdb memtester usbutils apitrace
     linuxptp redis-server libhdf5-serial-dev python3-wheel python3-h5py mmc-utils
-   meson scons netdata stress-ng
+   meson scons netdata stress-ng iw wireless-tools wpasupplicant minicom udhccp
+   libqmi-utils speedtest-cli smartmontools
```

2. Rebuild

~# source setup.env

~# ping www.google.com

~# sudo rm build/rfs/rootfs_lsdk2108_ubuntu_devel_arm64

~# flex-builder -i mkrfs -r ubuntu:devel

~# flex-builder -i packrfs -r ubuntu:devel

DPDK

Update DTB File

```
~# cd /boot
~# mv fsl-ls1046a-rdb-sdk.dtb fsl-ls1046a-rdb-sdk.dtb.org
~# ln -s fsl-ls1046a-rdb-usdpaa.dtb fsl-ls1046a-rdb-sdk.dtb
~# reboot
```

Bootcmd

Memory Size < 4G

```
=> setenv othbootargs "isolcpus=1-3 iommu.passthrough=1"
=> run bootcmd
```

Memory Size > 4G

```
=> setenv othbootargs "default_hugepagesz=1024m hugepagesz=1024m hugepages=8 isolcpus=1-3 iommu.passthrough=1"
=> run bootcmd
```

Bind Device

```
~# fmc -x
~# mkdir -p /mnt/hugepages
~# mount -t hugetlbfs none /mnt/hugepages
~# echo 1024 > /proc/sys/vm/nr_hugepages
~# export DPAA_FMC_MODE=1
~# cd /usr/local/dpdk/dpaa
~# fmc -c usdpaa_config_ls1046.xml -p usdpaa_policy_hash_ipv4_1queue.xml -a
~# export DPAA_NUM_RX_QUEUES=2
```

Enable Testpmd

```
~# dpdk-testpmd -c 0xe -n 4 -- -i --nb-cores=2
```

APPENDIX A: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after-service freight charges for goods returned to the user.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service, "RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
 - ▶ Improper or inadequate maintenance by the customer
 - ▶ Unauthorized modification, misuse, or reversed engineering of the product
 - ▶ Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.



Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:		Reasons to Return: ☐ Repair(Please include failure details)	
		☐ Testing Purpose	
Company:		Contact Person:	
Phone No.		Purchased Date:	
Fax No.:		Applied Date:	
Return Shipping Address: _____			
Shipping by: ☐ Air Freight ☐ Sea ☐ Express _____			
☐ Others: _____			
Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

***Problem Code:**

01: D.O.A. 02: Second Time R.M.A. 03: CMOS Data Lost 04: FDC Fail 05: HDC Fail 06: Bad Slot	07: BIOS Problem 08: Keyboard Controller Fail 09: Cache RMA Problem 10: Memory Socket Bad 11: Hang Up Software 12: Out Look Damage	13: SCSI 14: LPT Port 15: PS2 16: LAN 17: COM Port 18: Watchdog Timer	19: DIO 20: Buzzer 21: Shut Down 22: Panel Fail 23: CRT Fail 24: Others (Pls specify)
--	---	--	--

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date