



M.2A OOB

M.2 Out Of Band Module Compact BMC (cBMC)
User's Manual



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FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated 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 manual, 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 the 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.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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About this Manual

This manual can be downloaded from the website.

The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that occur from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

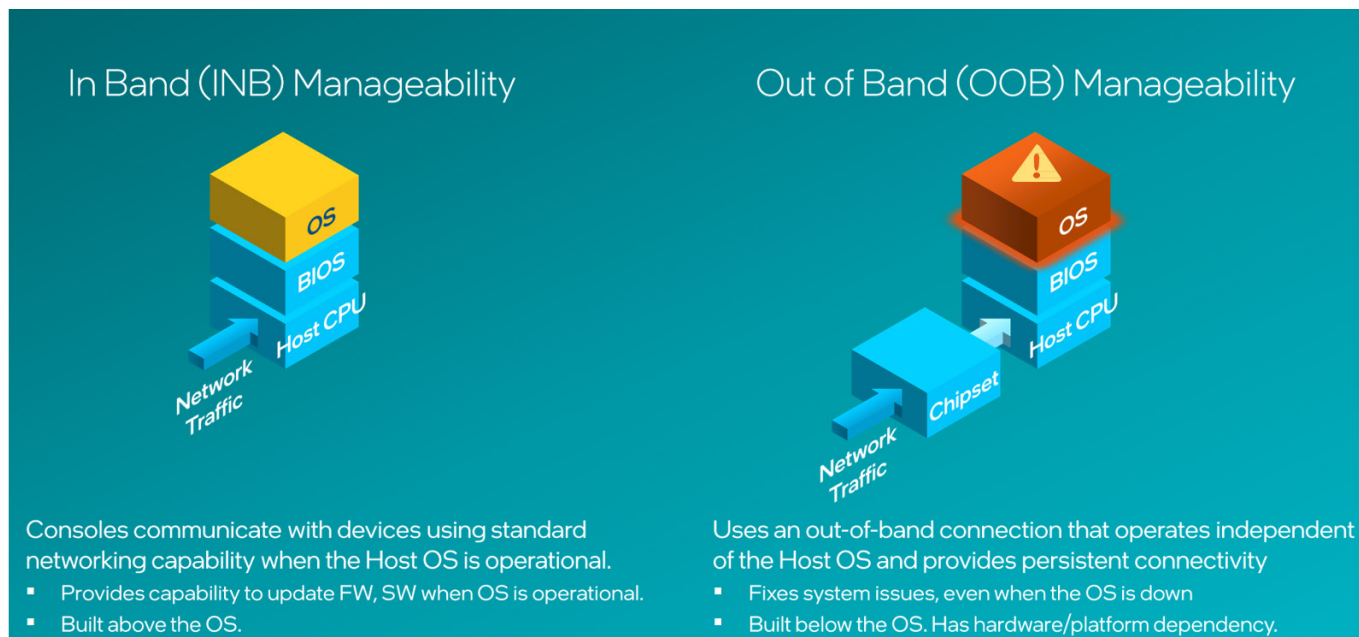
- To avoid damage to the system, use the correct AC input voltage range.
- To reduce the risk of electric shock, unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Chapter 1 - Introduction

► What's OOB (Out-Of-Band) Management

As Industrial IoT demands rise in recent decades, the number of connected IoT devices drastically grow. However, the personnel responsible for equipment maintenance cannot meet the growing numbers of IoT devices; additionally, unexpected factors occur, e.g. the global pandemic. It seems like it is harder to maintain and repair the equipment in a timely manner.

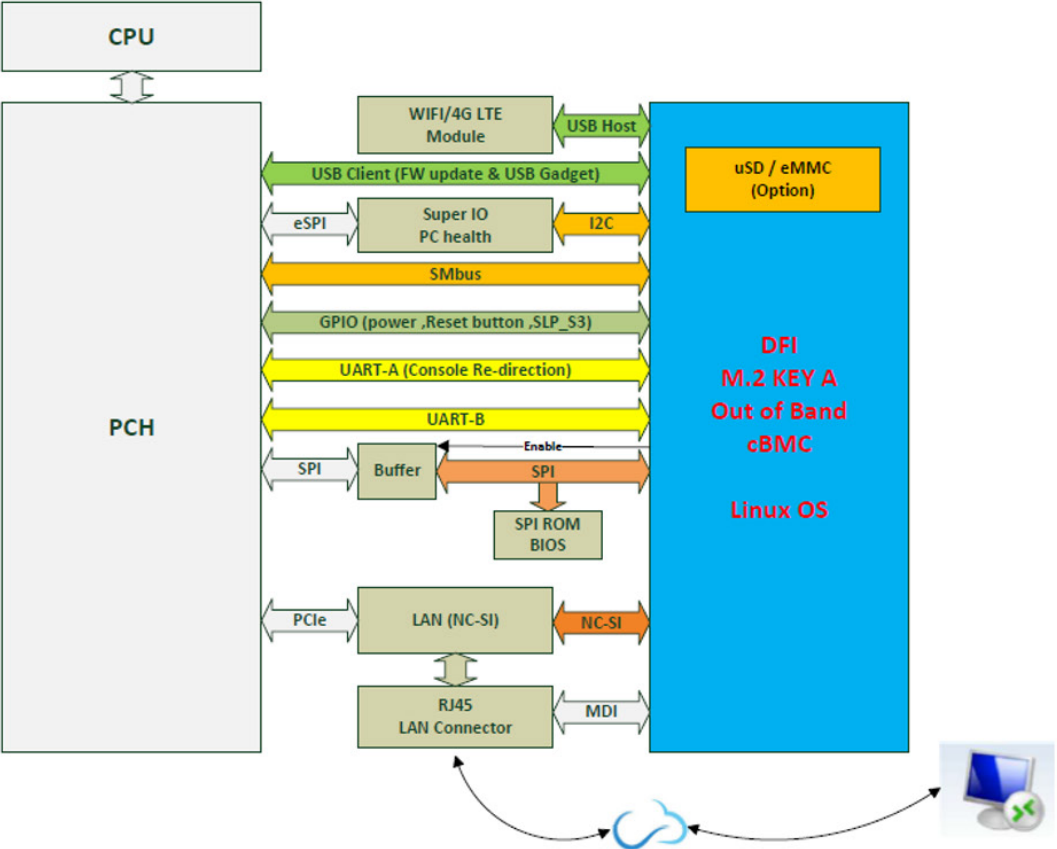
Remote management without running OS benefits from Innodisk's innoAge and out-of-band (OOB) technology, and can timely predict equipment status before its shutdown and efficiently activate OS auto-backup and recovery despite host crashes. Furthermore, the data of device health status are collected automatically to the cloud, and users can easily monitor all connected devices through a customizable UX dashboard.



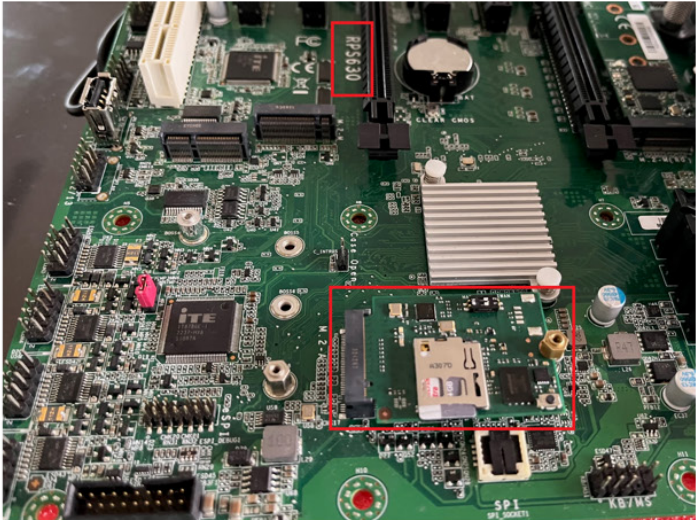
▶ **Key Features**

- ▶ Open SSH login
- ▶ Remote power on/off & reset control
- ▶ Remote hardware monitor log
- ▶ Remote web on/off control (http server)
- ▶ Recovery (Factory Mode)
- ▶ Remote BIOS setup & uefi shell (serial over lan)
- ▶ Remote BIOS update SPI-NAND
- ▶ Remote BIOS update SOL & DFI USB-Storage
- ▶ Remote Recovery OS image (uSD or eMMC)

► (RPS630) M.2 KEY A cBMC



RPS630



Chapter 2 - Getting Started

Please follow the steps to configure M.2A OOB.

► Hardware Requirements

- 1 x86 PC RPS630 x1
- 2 LAN Cable x1
- 3 x86 PC x1
- 4 OOB x1

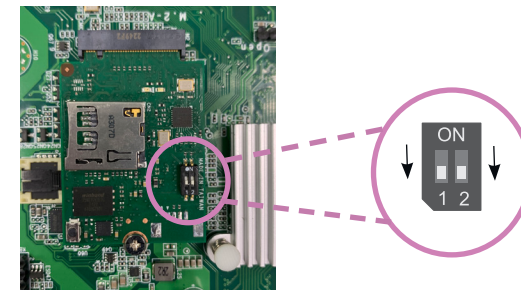
► System Requirements

- 1 TeraTerm:
[\\DFI_SW_NAS\SoftwareNAS\Software2\Release\ARMv2\NUC980\OOB\Test_package\PA_PE\teraterm](#)
- 2 Console Redirection Files:
[\\DFI_SW_NAS\SoftwareNAS\Software2\Release\ARMv2\NUC980\OOB\Test_package\PA_PE\console_redirection](#)

► OOB Normal Boot

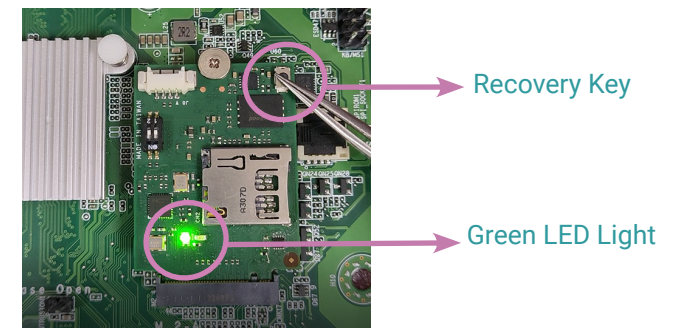
Step 1:

Make sure the switch 1 & 2 change to off.



Step 2:

The green LED lights up right after the main board is power on. Within 15 seconds, use a pair of metal tweezers to press and hold the recovery key. The green LED light starts blinking for a few seconds until the light stays back on. Then the recovery actions are completed. It takes about 2 minutes.



► Default Password Setting

Step 1:

Install **Teraterm**.

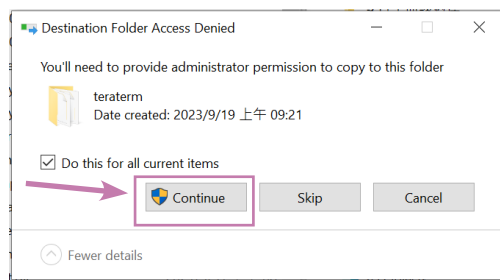
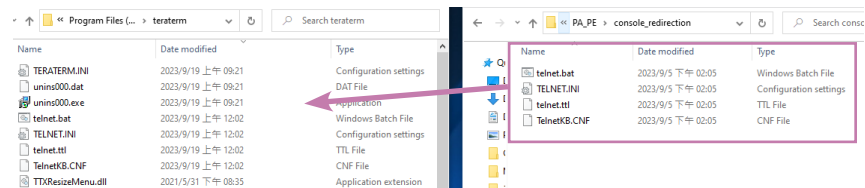
After Teraterm is being installed, move the four files from **Console Redirection Files** folder to Teraterm setup file folder. If pop-up window shows Access denied, press continue.

TeraTerm:

\\DFL_SW_NAS\SoftwareNAS\Software2\Release\ARMv2\NUC980\OOB\Test_package\PA_PE\teraterm

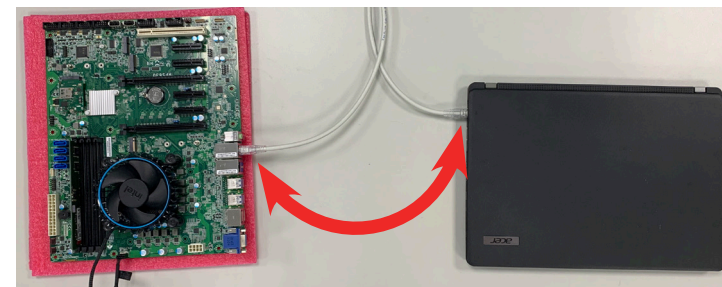
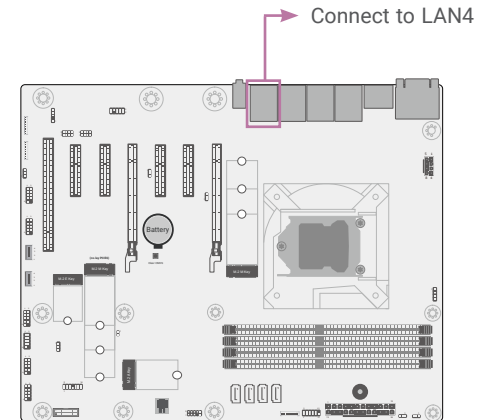
Console Redirection Files:

\\DFL_SW_NAS\SoftwareNAS\Software2\Release\ARMv2\NUC980\OOB\Test_package\PA_PE\console_redirection



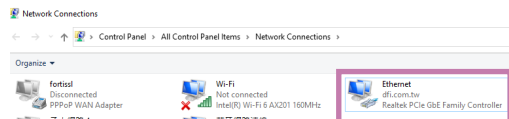
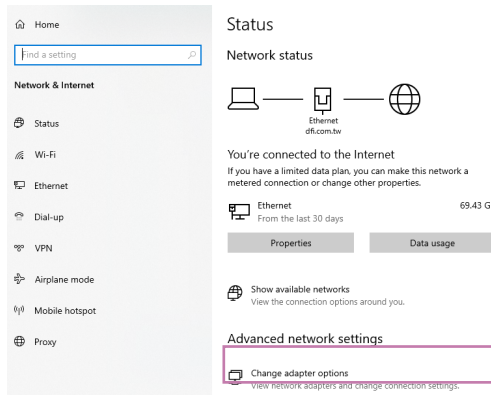
Step 2:

Use a LAN cable to connect one end of the Lan cable to the RPS630 LAN4 and the other end to the Server Lan port.



Step 3: (Please note that this setup is only required for the first time use.)

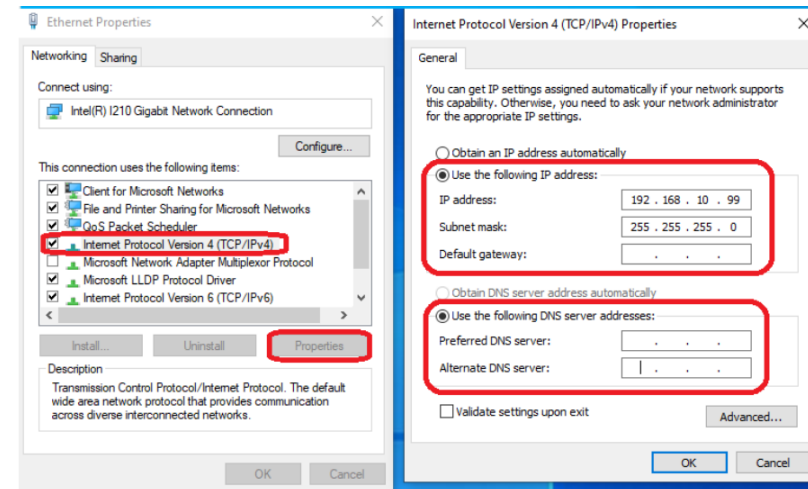
Setup Lan IP Address - Open **Network Status** go to **Advanced network settings** and click **Change adapter options**, double click **Ethernet**.



Click **Priorities** - Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Priorities**.
Type in the following information, then press **OK**.

IP address: 192.168.10.99

Subnet mask: 255.255.255.0

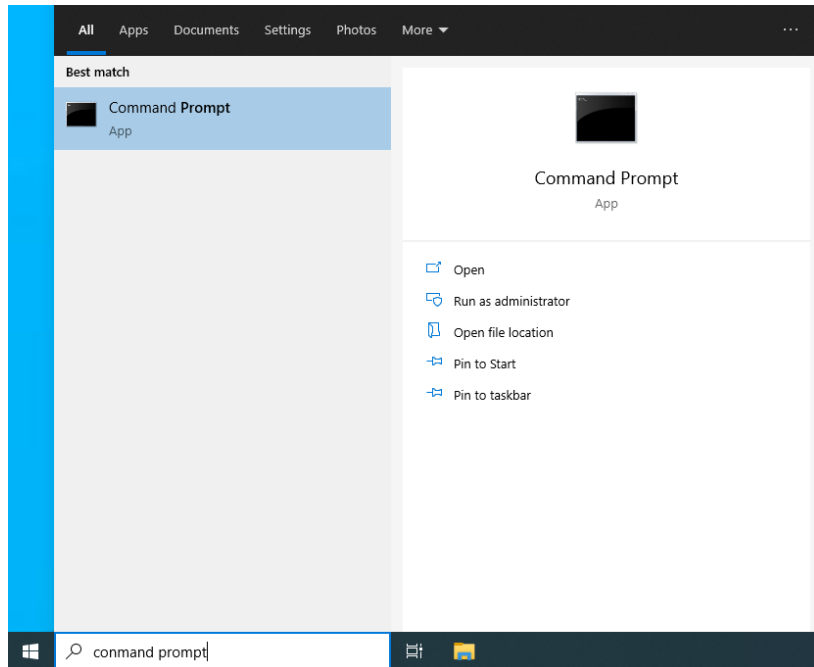


Step 4:

Execute windows Command Prompt.

To run the command prompt:

- Pressing Windows key + R key to open "Run" box. Type "cmd" and then click "OK".
- Or
- Using the search bar in the Windows 10, type "cmd" into the search bar and press enter.



Please type in the information as follows:

C:\users\user name> : ssh root@192.168.10.100

Are you sure you want to continue connecting : yes
(This question only appears for the first time log in)

root@192.168.10.100's password:

Enter MAC Address where you can find the sticker located on LAN4 of the board.

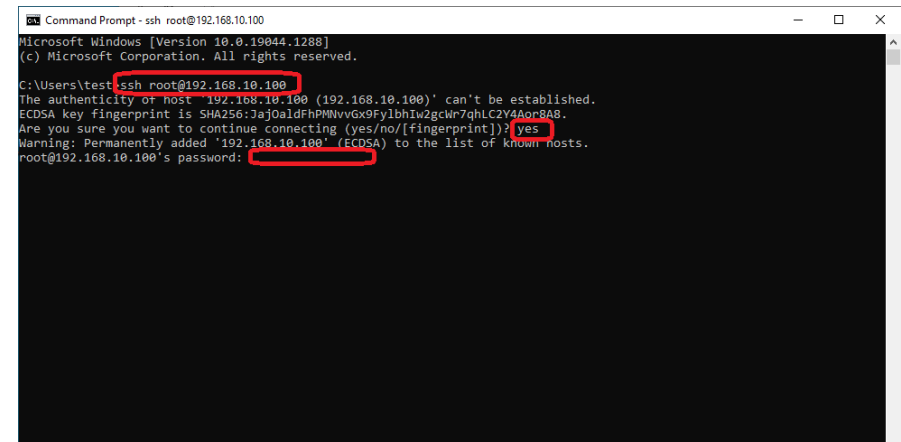


Note:

When you type in MAC address in Command Prompt, it doesn't appear or show up on the screen. Please enter the password by typing in. It is unable to use a shortcut.



MAC Address on LAN4



After entering the password, you will see `~#`

Then type in `cd DFI`.

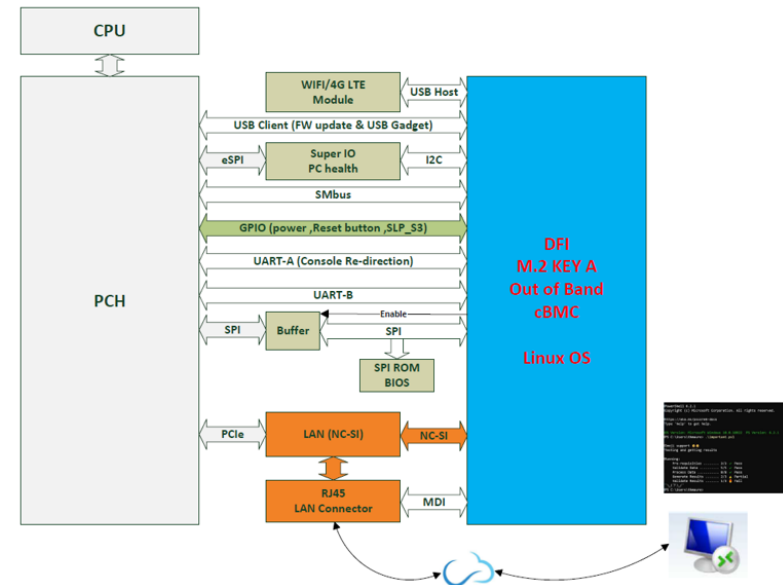
When it displays `/DFI #`, you may now start typing in commands for each function.

```

OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
~ # cd DFI
/DFI #
    
```

► Remote Control PC Power On/Off



PC Power On/Off Status Check

Please complete step 4 (p.11) before entering the following command.
Check the current power On/Off status remotely by typing in following command.

Shell Script : `./pc_status.sh`

```

ca. OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
# cd DFI
DFI # ./pc_status.sh
PC power off
/DFI # _
  
```

Turn On/Off PC Remotely

After the status check, you can control PC power on/off remotely.
Please complete step 4 (p.11) before entering the following command.
To toggle power on or power off, just type in the same command again.

Shell Script : `./power_button.sh`

```

ca. OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
# cd DFI
DFI # ./pc_status.sh
PC power off

DFI # ./power_button.sh
DFI # ./pc_status.sh
PC power on

DFI # ./power_button.sh
DFI # ./pc_status.sh
PC power off

/DFI #
  
```

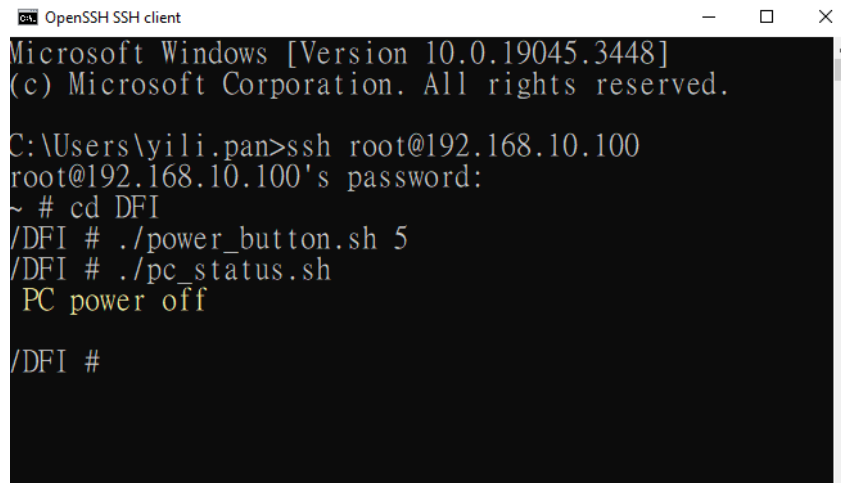


1. Check the PC power on/off status to make sure the current power status.
2. Type in shell script: `./power_button.sh` to power on or power off the PC.
3. Then check the status again.

Perform a Timed Force Shutdown

To forcibly shut down the PC, please type in the following command.
Please complete step 4 (p.11) before entering the following command.
Numbers means this will force shutdown your PC in xx seconds (waiting time).
Setting it to 05 will shutdown your PC after 05 seconds.

Shell Script : **./power_button.sh 5**



```
OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

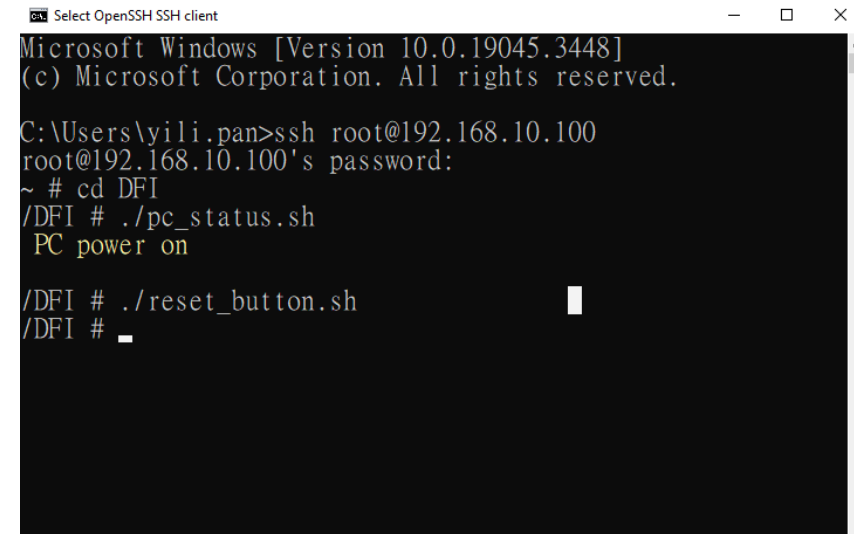
C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
~ # cd DFI
/DFI # ./power_button.sh 5
/DFI # ./pc_status.sh
PC power off

/DFI #
```

PC Rebooting

To reboot the PC, please type in the following command.
You will hear a single beep, it means PC rebooted successfully.
Please complete step 4 (p.11) before entering the following command.

Shell Script : **./reset_button.sh**



```
Select OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
~ # cd DFI
/DFI # ./pc_status.sh
PC power on

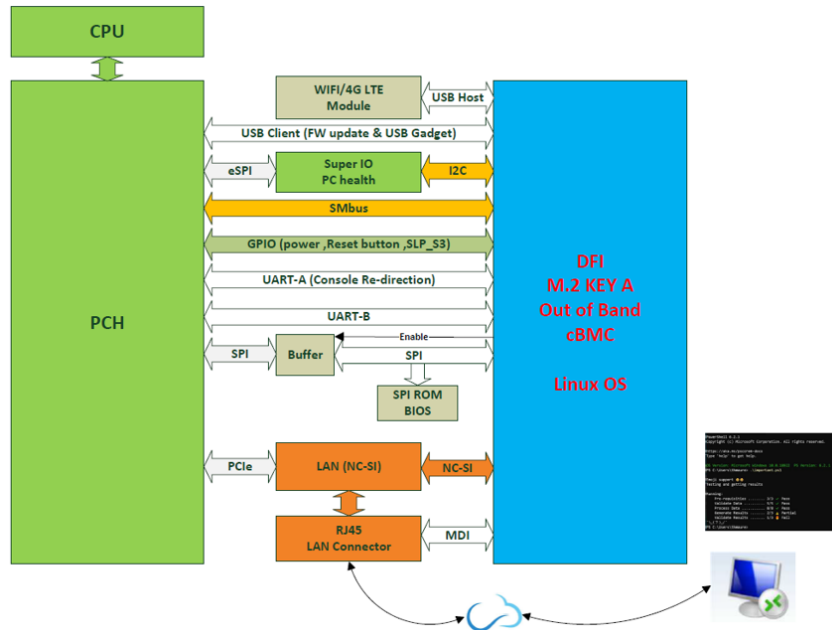
/DFI # ./reset_button.sh
/DFI #
```

► Remote Hardware Monitor Log (Super I/O)

I2C bus:

Super I/O: Voltage, Temperature, Fan Speed

PCH: CPU Temperature



Super I/O Log

To access super I/O log, please type in the following command.

Please complete step 4 (p.11) before entering the following command.

Shell Script : `./sio_start_log.sh YYYY-MM-DD hh:mm:ss hours /DFI/sio_log &`

For example: `./sio_start_log.sh 2023-08-22 09:00:00 24 /DFI/sio_log &`

```

OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
~ # cd DFI
/DFI # ./sio_start_log.sh
Please input parameter to start

You need input ./sio_start_log.sh YYYY-MM-DD hh:mm:ss hours save path
for example: ./sio_start_log.sh 2023-08-22 09:00:00 24 /DFI/sio_log
/DFI #
    
```

```

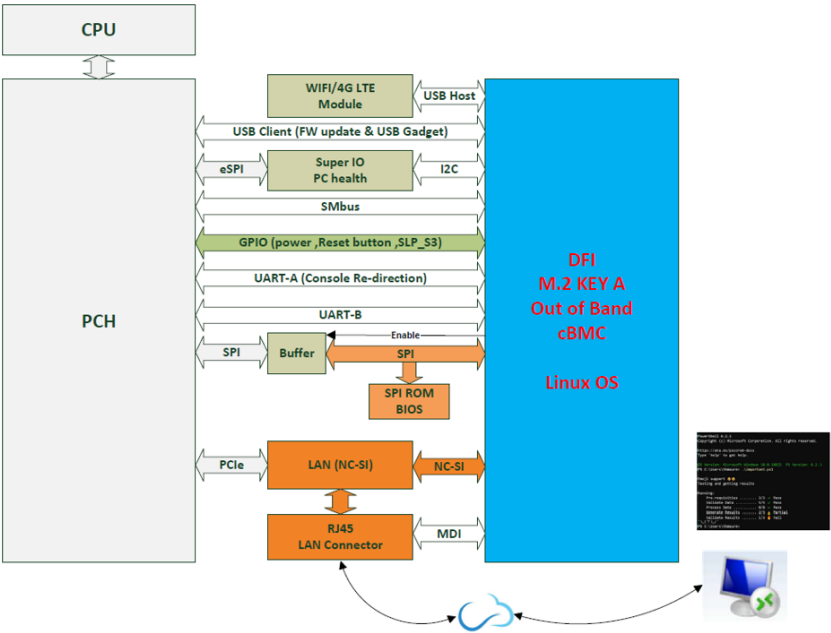
OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
Permission denied, please try again.
root@192.168.10.100's password:
~ # cd DFI
/DFI # ./sio_start_log.sh 2023-09-27 09:00:00 24/DFI/S_log &
/DFI # Wed Sep 27 09:00:00 UTC 2023
Save Path=/DFI/sio_log
./sio_start_log.sh: line 48: divide by zero

[1]+  Done(2) ./sio_start_log.sh 2023-09-27 09:00:00 24/DFI/S_log
/DFI #
    
```

Chapter 3 - BIOS

Remote BIOS Update



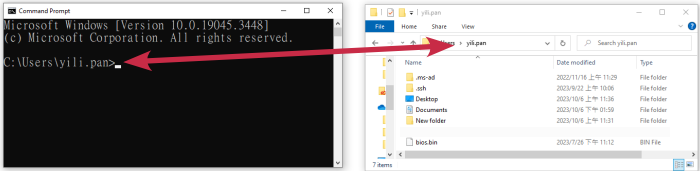
Step 1:

BIOS file name changes on each update and does not have the same name every time.

To prevent having to type in different BIOS file name as a command, please rename the BIOS file you wish to update to **bios.bin**.

Step 2:

After renaming the file, move **bios.bin** file to its corresponding users folder in C drive.



Step 3:

Open command prompt and type in the command below.

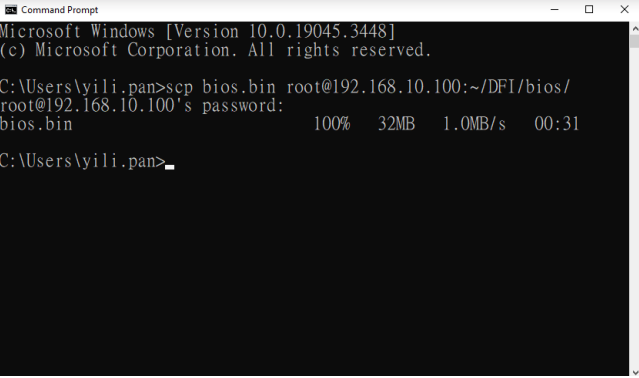
```
Shell Script : scp bios.bin root@192.168.10.100:~/DFI/bios/
```

Please type in the password (MAC Address) :

root@192.168.10.100's password:

Enter MAC Address where you can find the sticker loacted on LAN4 of the board.

Note:
 When you type in MAC address in Command Prompt, it doesn't appear or show up on the screen. Please enter the password by typing it in. It is unable to use a shortcut.



Step 4:

Run SSH command:

Please type in the information as follows:

C:\users\user name> : ssh root@192.168.10.100


Are you sure you want to continue connecting : yes
(This question only appears for the first time log in)

root@192.168.10.100's password:

Enter MAC Address where you can find the sticker loacted on LAN4 of the board.

After entering the password, you will see **~#**. Then type in **cd DFI/bios/**.

Enter the following command to start updating BIOS:
Shell Script : **/DFI/bios #./updatebios.sh bios.bin**

 **Note:**
When you type in MAC address in Command Prompt, it doesn't appear or show up on the screen. Please enter the password by typing it in. It is unable to use a shortcut.

Step 5:

For the next step, you will have to shut down the PC and restart it again.

To turn off the pc, enter **cd ..** to go back one level.

Type in **./power_button.sh** to execute shutdown.

Then type in **cd bios/**

and the final step, type in **/DFI/bios #./update_bios.sh bios.bin** to begin the BIOS update.

```

OpenSSH SSH client
Microsoft Windows [Version 10.0.19045.3448]
(c) Microsoft Corporation. All rights reserved.

C:\Users\yili.pan>ssh root@192.168.10.100
root@192.168.10.100's password:
~ # cd DFI/bios/.
/DFI/bios # ./updatebios.sh bios.bin
Please shut down the PC, and execute again

/DFI/bios # cd ..
/DFI # ./power_button.sh
/DFI # cd bios/.
/DFI/bios # ./updatebios.sh bios.bin

=== DFI OOB ===
Using clock_gettime for delay loops (clk_id: 1, resolution: 1ns).
The following protocols are supported: SPI.
Probing for Winbond W25Q256JV_Q, 32768 kB; compare_id: id1 0xef, id2 0x4019
Found Winbond flash chip "W25Q256JV_Q" (32768 kB, SPI) on linux_spi.
Chip status register is 0x00.

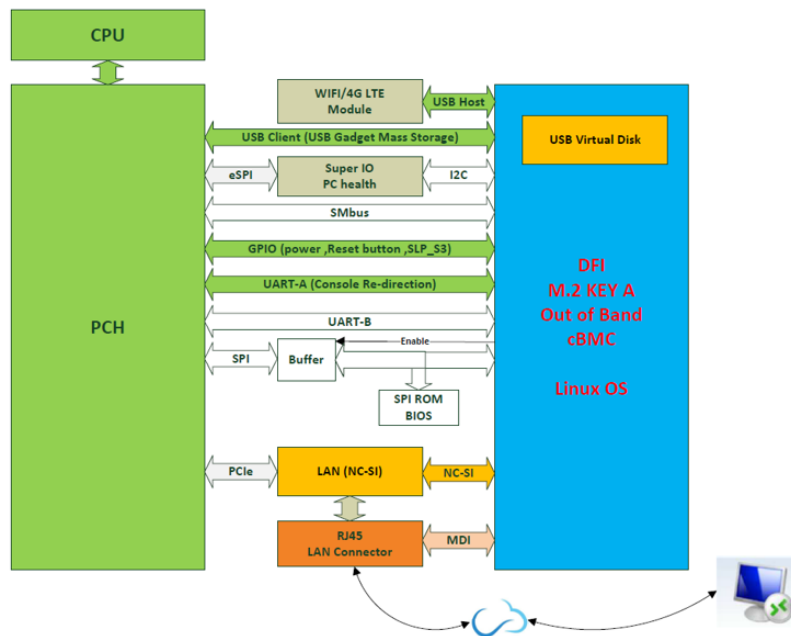
Please wait...

Reading old flash chip contents... Reading old flash chip contents... done.
Erasing and writing flash chip... ..
Verifying flash... VERIFIED.
BIOS update is finished

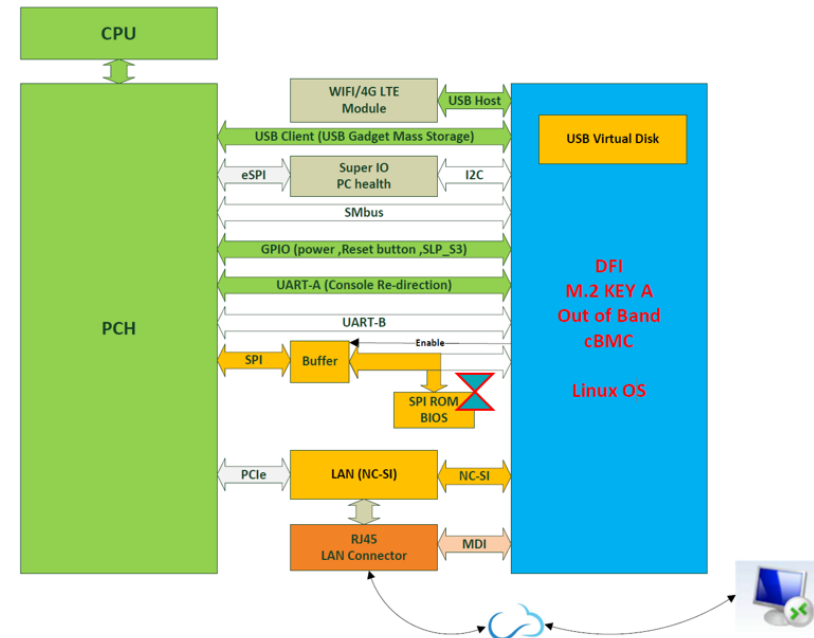
/DFI/bios # _
    
```

► Remote BIOS Update (Via Teraterm)

Remote BIOS Setup & UEFI shell (Serial Over Lan)



Remote BIOS Update (SOL & DFI USB-Storage)



Step 1:

Before starting the update, you will have to prepare two files:

- 1. *AfuEfiU.efi*
- 2. *startup.nsh*

How to request to obtain the files and update BIOS, please watch the video below for more information:

<https://www.dfi.com/tw/knowledge/video/5>

Step 2:

Go to Teraterm folder and open *telnet.bat*. Press "ESC" key ,when system power on. Run SSH command:

Please type in the information as follows:

- [Copy BIOS from local PC to remote OOB module](#)
`scp AfuEfiU.efi root@192.168.10.100:~/DFI/USB/files`
`scp startup.nsh root@192.168.10.100:~/DFI/USB/files`

- [Login & Update BIOS](#)

`C:\users\user name> : ssh root@192.168.10.100`

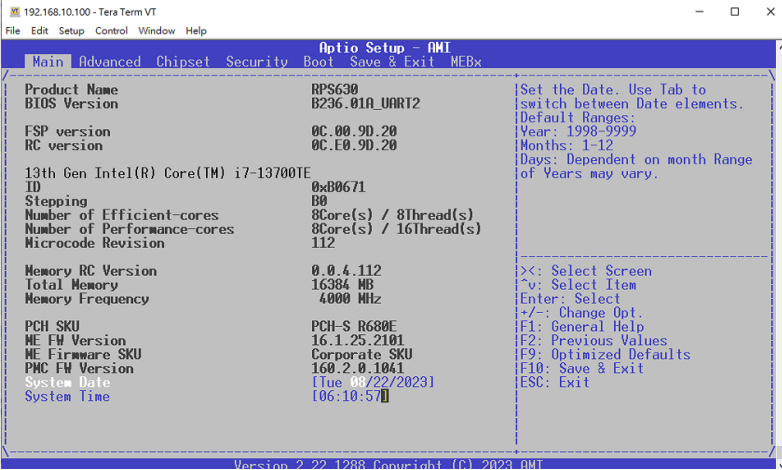
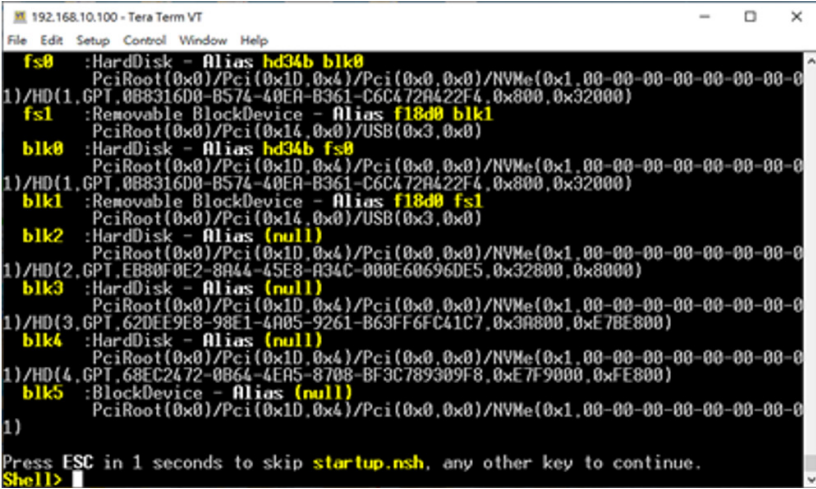
Are you sure you want to continue connecting : yes
(This question only appears for the first time log in)

root@192.168.10.100's password:

Enter MAC Address where you can find the sticker loacted on LAN4 of the board.

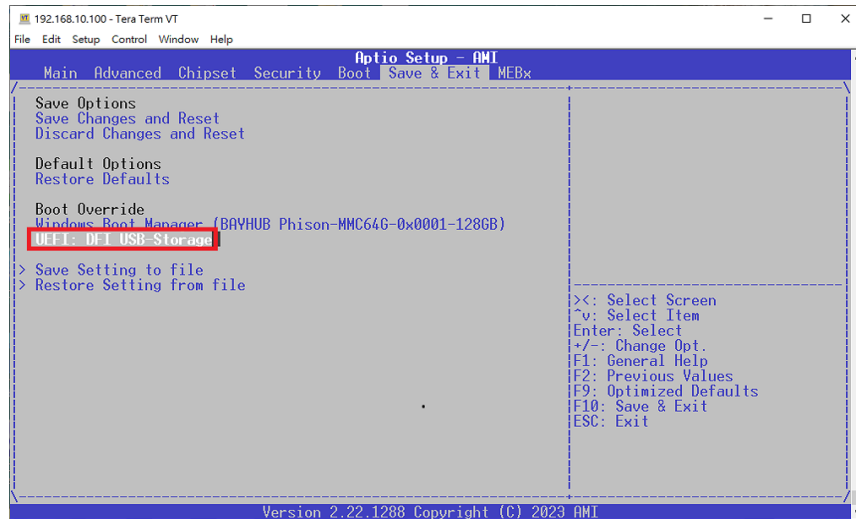
After entering the password, you will see **~#**. type in `cd DFI/`.

and then reboot the system again by typing in `/DFI# ./reset_button.sh`



Step 3:

Boot from DFI USB-Storage device & Update BIOS in uefi mode.
 Use arrow key to select **Save & Exit ---> UEFI: DFI USB-Storage**



Step 4:

When there is no error message displayed, the BIOS update will be completed successfully.

