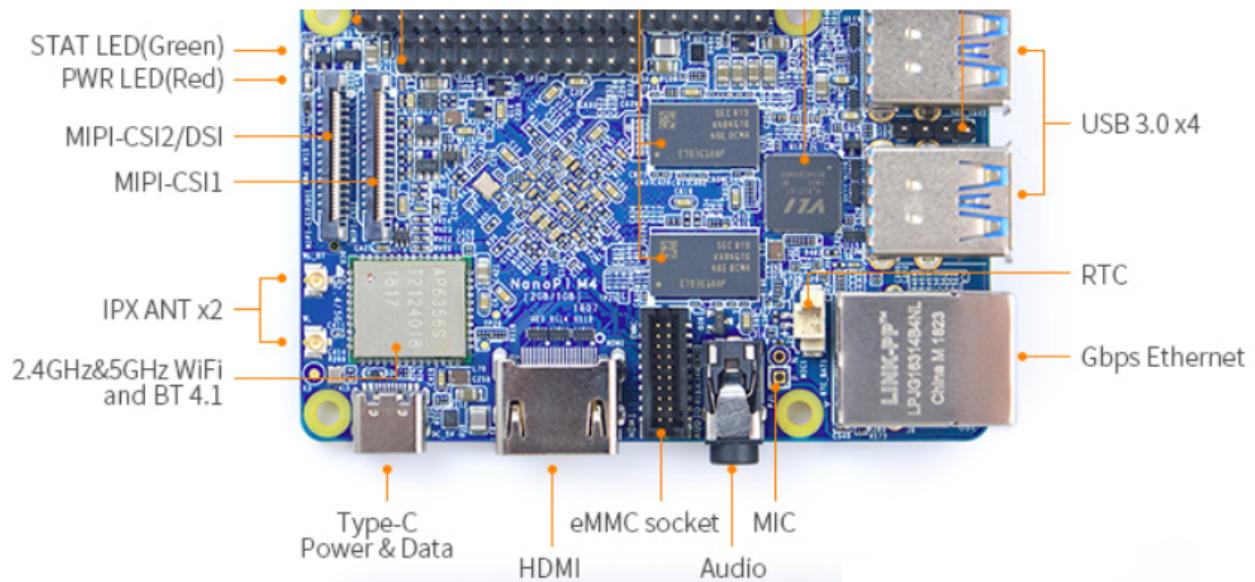


[NaNoPi-M4 Overview]



40-Pin Export GPIO1 Pin Spec

Pin#	Assignment	Pin#	Assignment
1	VCC3V3_SYS	2	VDD_5V
3	I2C2_SDA(3V)	4	VDD_5V
5	I2C2_SCL(3V)	6	GND
7	GPIO1_A0(3V)	8	GPIO4_C1/I2C3_SCL(3V)
9	GND	10	GPIO4_C0/I2C3_SDA(3V)
11	GPIO1_A1(3V)	12	GPIO1_C2(3V)
13	GPIO1_A3(3V)	14	GND
15	GPIO1_A4(3V)	16	GPIO1_C6(3V)
17	VCC3V3_SYS	18	GPIO1_C7(3V)
19	SPI1_TXD/UART4_RX(3V)	20	GND
21	SPI1_RXD/UART4_TX(3V)	22	GPIO1_D0(3V)
23	SPI1_CLK(3V)	24	SPI1_CSn0(3V)
25	GND	26	GPIO4_C5/SPDIF_TX(3V)
27	I2C2_SDA(1.8V)	28	I2C2_SCL(1.8V)
29	I2S0_LRCK_RX(1.8V)	30	GND
31	I2S0_LRCK_TX(1.8V)	32	I2S_CLK(1.8V)
33	I2S0_SCLK(1.8V)	34	GND
35	I2S0_SDI0(1.8V)	36	I2S0_SDO0(1.8V)
37	I2S0_SDI1SDO3(1.8V)	38	I2S0_SDI2SDO2(1.8V)
39	GND	40	I2S0_SDI3SDO1(1.8V)

24-Pin GPIO2 Pin Spec

Pin#	Assignment	Pin#	Assignment
1	VCC5V0_SYS	2	VCC5V0_SYS
3	PCIE_RX1_P	4	PCIE_TX1P
5	PCIE_RX1_N	6	PCIE_TX1N
7	GND	8	GND
9	PCIE_RX0_P	10	PCIE_TX0P
11	PCIE_RX0_N	12	PCIE_TX0N
13	GND	14	GND
15	PCIE_REF_CLKP	16	HOST0_DM
17	PCIE_REF_CLKN	18	HOST0_DP
19	GND	20	GND
21	PWR_KEY	22	HOST1_DM
23	GPIO4_C6/PWM1(3V)	24	HOST1_DP

Debug UART Pin Spec

3V level signals, 1500000bps

Pin#	Assignment	Description
1	GND	0V
2	VCC5V0_SYS	5V power output
3	UART2DBG_TX	output
4	UART2DBG_RX	input

Boot from SD Card

< Get an 4G SDHC card >

Distribution Version	Distribution Prebuild Image
Buildroot	rk3399-sd-buildroot-linux-4.4-arm64-YYYYMMDD.img.zip Buildroot
Ubuntu 18.04	rk3399-sd-friendlydesktop-bionic-4.4-arm64-YYYYMMDD.img.zip FriendlyDesktop
Ubuntu core	rk3399-sd-friendlycore-bionic-4.4-arm64-YYYYMMDD.img.zip FriendlyCore
Lubuntu	rk3399-sd-lubuntu-desktop-xenial-4.4-armhf-YYYYMMDD.img.zip Lubuntu Desktop

[Update Nanopi-M4 Image To SD Card-1]

<Step 1> Extract sd-fuse_rk3399_slash.tar.bz2

```
$ cd ~/nanopim4-slash/  
$ tar -xvf sd-fuse_rk3399.tar.bz2  
$ cd sd-fuse_rk3399_slash
```

<Step 2> Look for your SD or MMC device in Linux

```
$ dmesg | tail  
$ lsblk
```

[For MMCX Style]

```
slash@slash-ThinkPad-T420:sd-fuse_rk3399_slash$ dmesg | tail  
[12211.057969] mmc0: new high speed SDHC card at address b368  
[12211.058530] mmcblk0: mmc0:b368 NCard 3.74 GiB  
[12211.060233] mmcblk0: p1  
[12211.460825] EXT4-fs (mmcblk0p1): mounted filesystem with ordered data mode. Opts: (null)  
[12366.561279] mmc0: card b368 removed  
[12366.569512] lxqt-panel[2895]: segfault at 7fc91ebcd720 ip 00007fc93e329059 sp 00007ffd618cfad0  
0+659000]  
[12369.259449] mmc0: new high speed SDHC card at address b368  
[12369.259728] mmcblk0: mmc0:b368 NCard 3.74 GiB  
[12369.261046] mmcblk0: p1  
[12369.644292] EXT4-fs (mmcblk0p1): mounted filesystem with ordered data mode. Opts: (null)  
slash@slash-ThinkPad-T420:sd-fuse_rk3399_slash$
```

[For SDX Style]

```
slash@slash-ThinkPad-T420:sd-fuse_rk3399$ dmesg | tail  
[58112.516225] usb-storage 1-1.1:1.0: USB Mass Storage device detected  
[58112.516519] scsi host6: usb-storage 1-1.1:1.0  
[58113.549697] scsi 6:0:0:0: Direct-Access TS-RDF5 SD Transcend TS38 PQ: 0 ANSI: 6  
[58113.550712] sd 6:0:0:0: Attached scsi generic sg2 type 0  
[58113.853885] sd 6:0:0:0: [sdc] 62333952 512-byte logical blocks: (31.9 GB/29.7 GiB)  
[58113.855345] sd 6:0:0:0: [sdc] Write Protect is off  
[58113.855348] sd 6:0:0:0: [sdc] Mode Sense: 23 00 00 00  
[58113.856822] sd 6:0:0:0: [sdc] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA  
[58113.864242] sdc: sdc1 sdc2  
[58113.869071] sd 6:0:0:0: [sdc] Attached SCSI removable disk  
slash@slash-ThinkPad-T420:sd-fuse_rk3399$ lsblk  
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT  
sdb 8:16 0 931.5G 0 disk  
└─sdb5 8:21 0 7.9G 0 part  
└─sdb1 8:17 0 923.6G 0 part /media/slash/64b5c3f1-b277-46d3-a615-45e2545ac95e  
sdc 8:32 1 29.7G 0 disk  
└─sdc2 8:34 1 3G 0 part  
└─sdc1 8:33 1 604M 0 part  
sda 8:0 0 111.8G 0 disk  
└─sda5 8:5 0 975M 0 part [SWAP]  
└─sda1 8:1 0 110.9G 0 part /  
slash@slash-ThinkPad-T420:sd-fuse_rk3399$
```

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<Step 3.1> For SDX Style Write Image to MMC Card

```
$ sudo ./slash_update.sh sdX [sdX → sda, sdb, sdc, sdd ...]
```

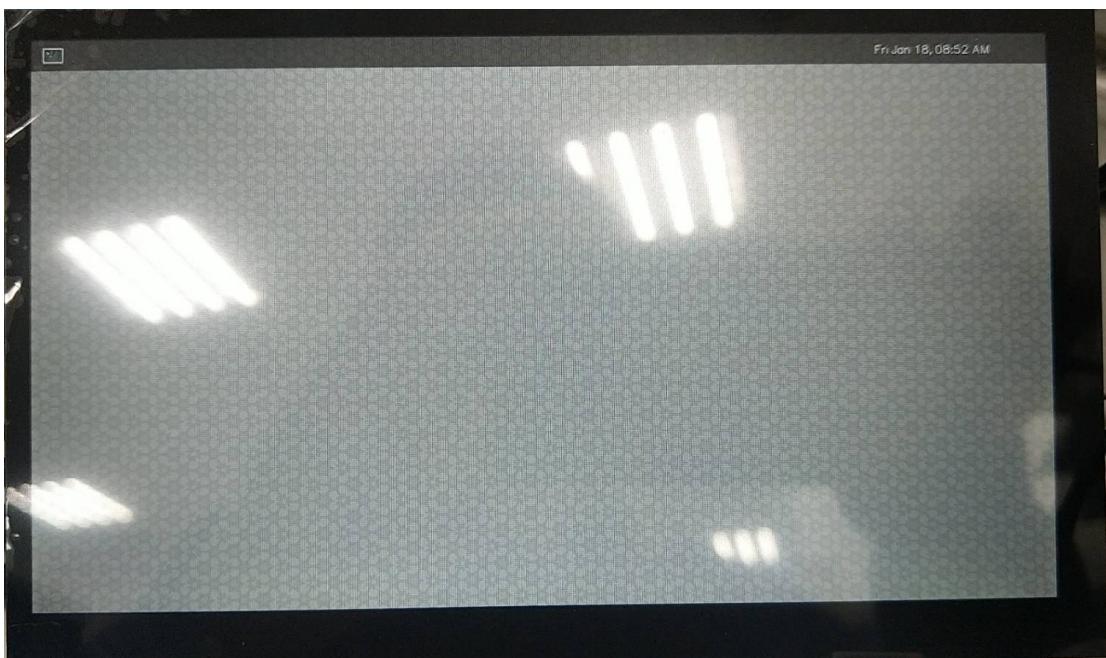
<Step 3.2> For MMC Style Write Image to SD Card

```
$ sudo ./slash_update.sh mmcX [mmcX → mmc0, mmc1, mmc2, mmc3 ...]
```

<Step 4> Insert SD/MMC card to Target Slot then Power On



<Step 5> Check LCD Panel



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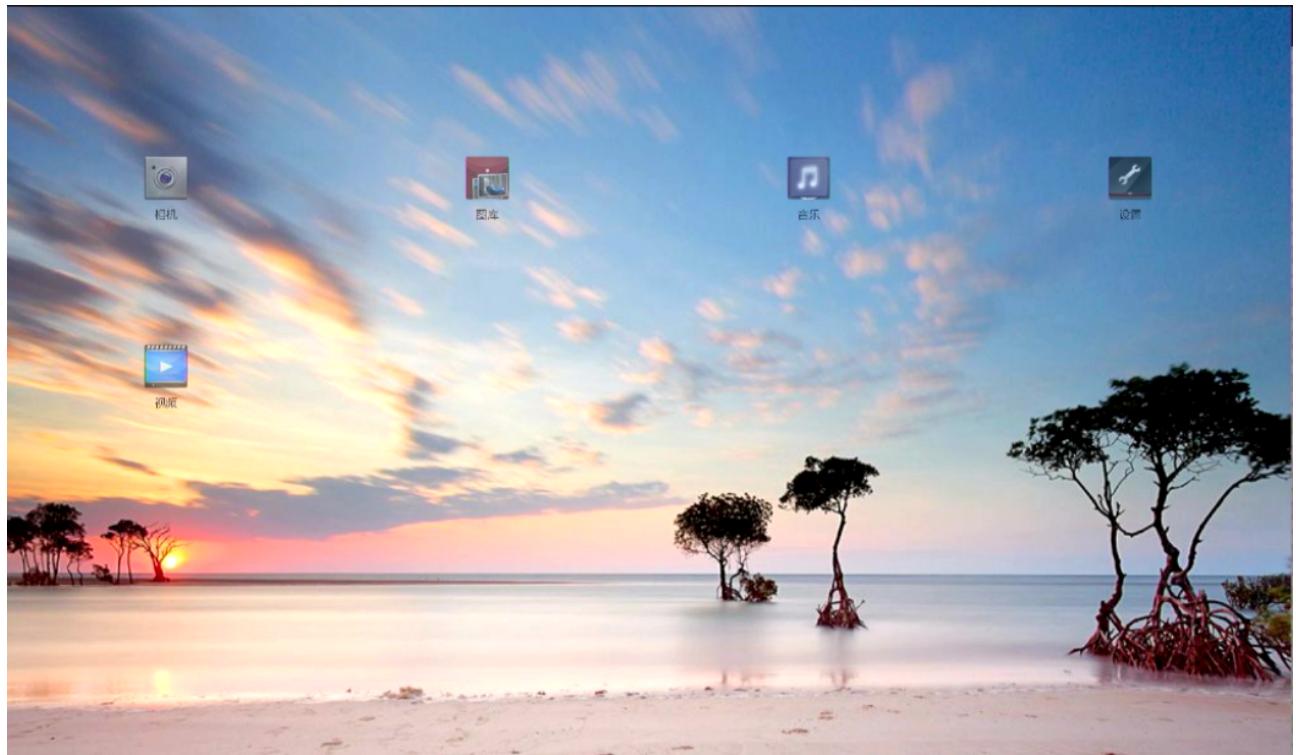
[Update Nanopi-M4 Image To SD Card-2]

https://wiki.friendlyarm.com/wiki/index.php/NanoPi_M4#Boot_from_SD_Card

Download Image (Buildroot)

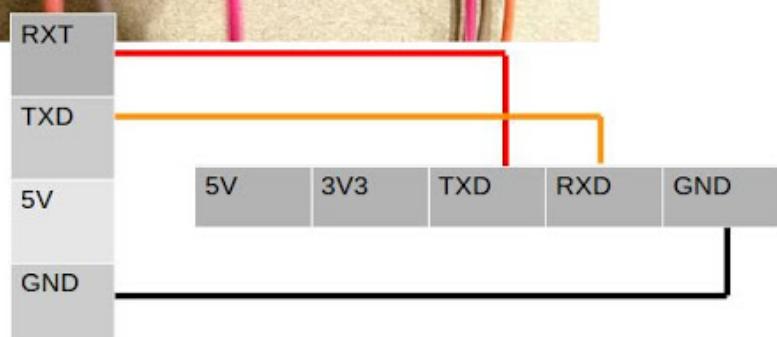
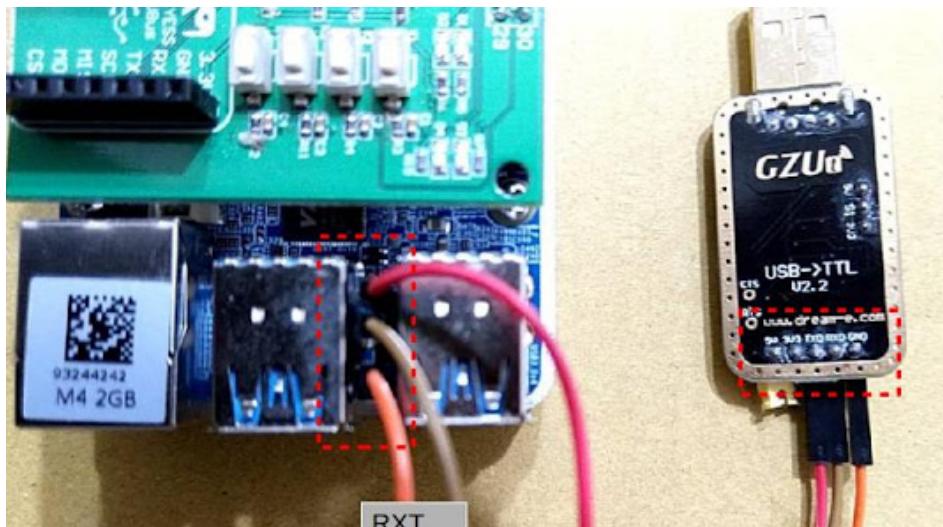
https://drive.google.com/file/d/1Fh_YAmDZFlU6uoKLnKkLTzBB_RKobPUW/view?usp=sharing

```
$ sudo dd if=./rk3399-sd-buildroot-linux-4.4-arm64-20201226.img of=/dev/sdX bs=1M  
status=progress
```



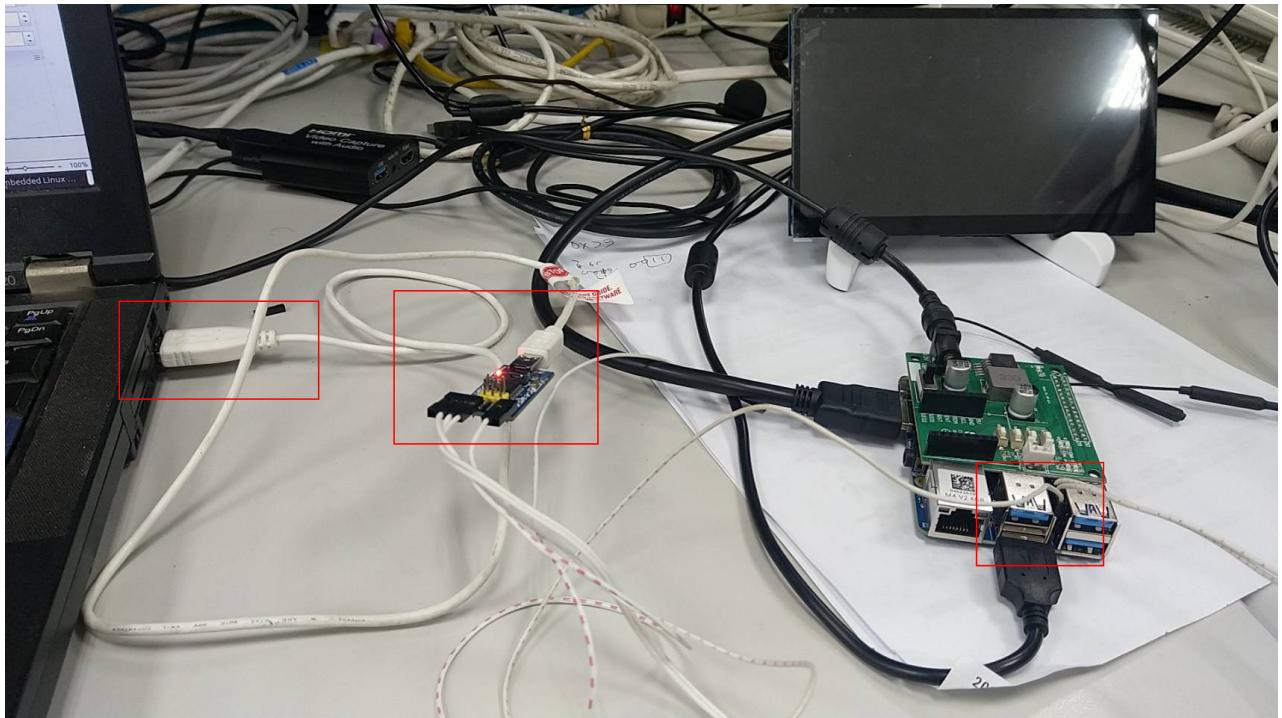
[Setup Up Debug Port]

<Step 1> Hardware setting



<Step 2> Install Terminal

```
$ apt-get install minicom  
# insert Debug Danger to Host PC
```

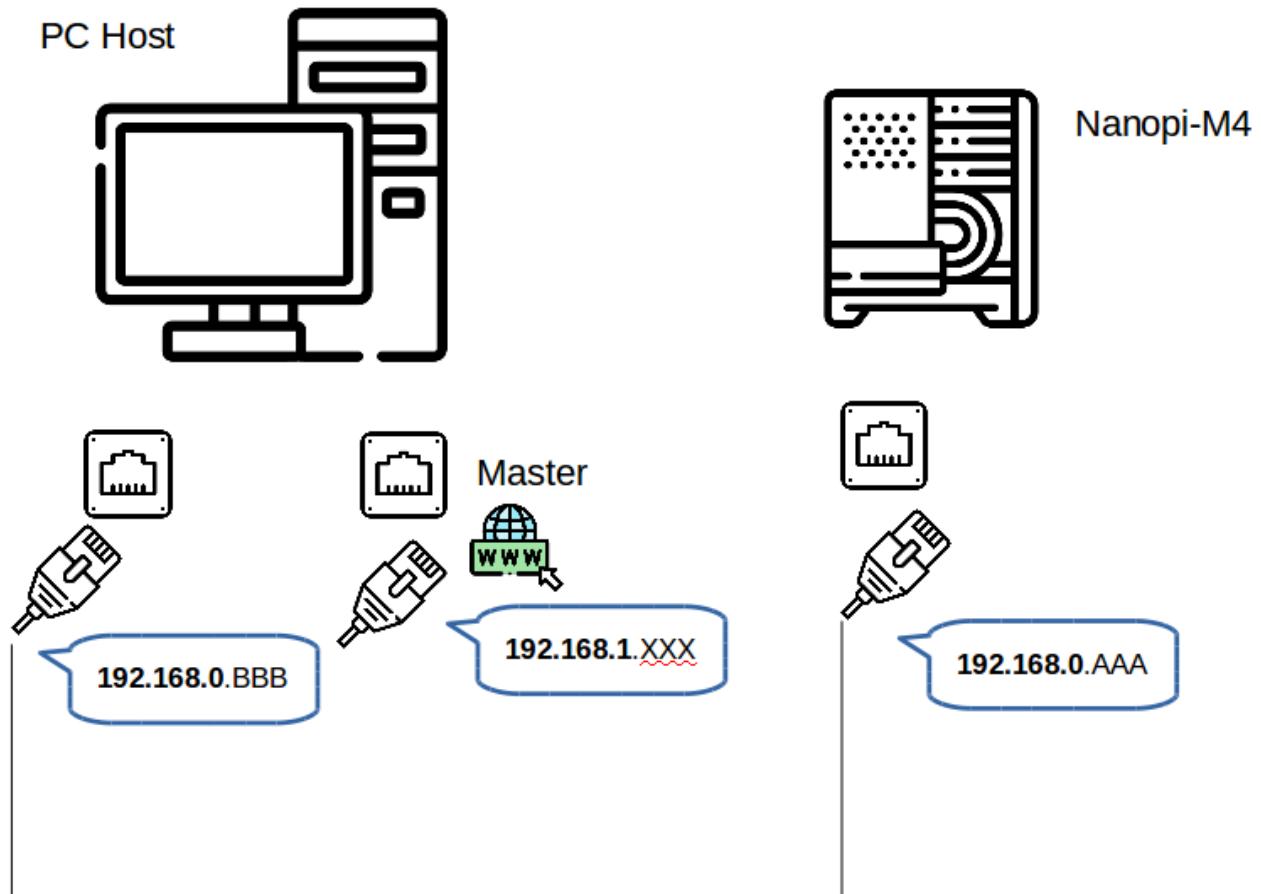


```
# Open minicon then power on targget board
```

```
$ sudo minicom -D /dev/ttyUSB0 -b 1500000
```

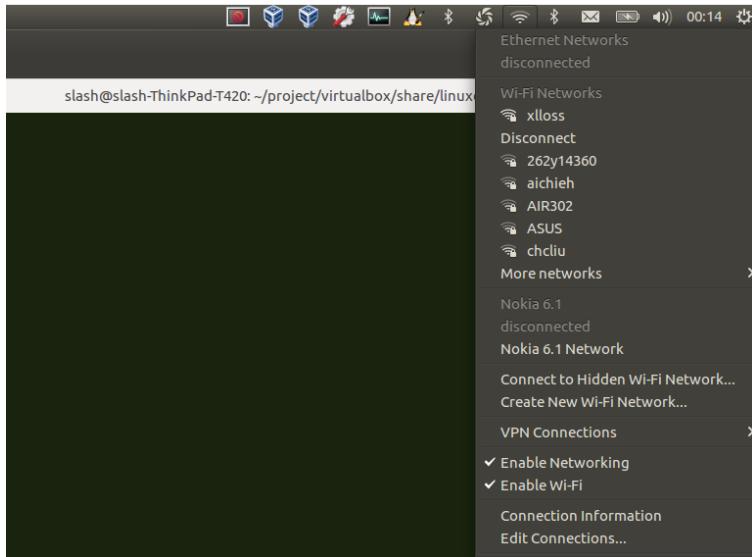
```
1.266121] [WLAN_RFKILL]: wlan_platdata_parse_dt: The ref_wifi_clk not found !
1.266786] [WLAN_RFKILL]: rfkill_wlan_probe: init gpio
1.267267] [WLAN_RFKILL]: Exit rfkill_wlan_probe
1.267769] [BT_RFKILL]: Enter rfkill_rfkill_init
1.268810] [BT_RFKILL]: bluetooth_platdata_parse_dt: get property: uart_rts_gpios = 83.
1.269593] [BT_RFKILL]: bluetooth_platdata_parse_dt: get property: BT_reset_gpio = 9.
1.270335] [BT_RFKILL]: bluetooth_platdata_parse_dt: get property: BT_wake_gpio = 90.
1.271064] [BT_RFKILL]: bluetooth_platdata_parse_dt: get property: BT_wake_host_irq = 4.
1.272907] [BT_RFKILL]: Request irq for bt wakeup host
1.273520] [BT_RFKILL]: ** disable irq
1.274042] [BT_RFKILL]: bt shut off power
1.295355] [BT_RFKILL]: bt_default device registered.
1.295996] Key type dns_resolver registered
1.296744] sensor_register_slave:mpu6880_gyro, id=50
1.297710] ov4689 1-0036: driver version: 00.01.01
1.298172] ov4689 1-0036: could not get module information!
1.299132] 1-0036 supply avdd not found, using dummy regulator
1.299752] 1-0036 supply dvdd not found, using dummy regulator
1.300352] 1-0036 supply dvdd not found, using dummy regulator
1.303340] ov4689 1-0036: Unexpected sensor id(000000), ret(-5)
1.304857] ov13850 1-0010: driver version: 00.01.01
1.305335] ov13850 1-0010: could not get module information!
1.306077] 1-0010 supply avdd not found, using dummy regulator
1.306700] 1-0010 supply dvdd not found, using dummy regulator
1.307323] 1-0010 supply dvdd not found, using dummy regulator
[    7.101762] 17958 1: 2010: 0000000000000000 f(x)(TW)
```

[Setup Up Network]

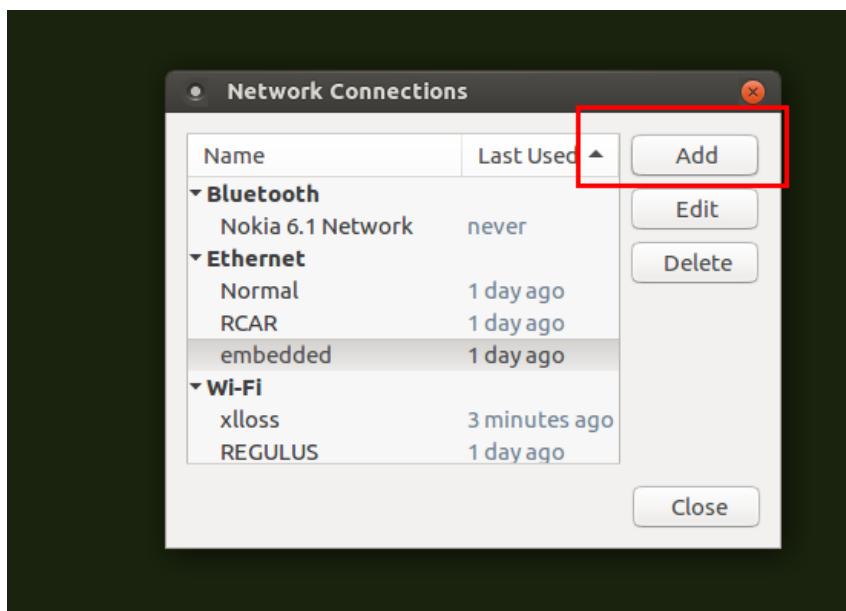


[PC Hosts 端 網路設定]

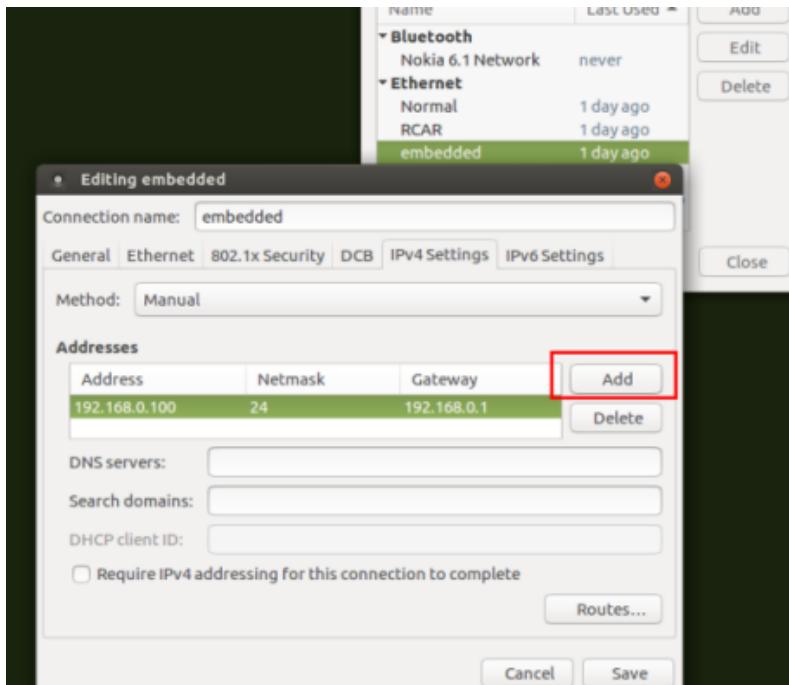
< Step 1> Ubuntu 桌面右上右角網路設定管理員



<Step 2> 新增一組給開發板的網路卡設定



<Step 3> 設定 IP Address



< Step 4> 確認 IP Address

```
$ ifconfig
```

```
slash@slash-ThinkPad-T420:tiny4412$ ifconfig
enp0s25    Link encap:Ethernet  HWaddr 00:21:cc:6d:74:4d
            UP BROADCAST MULTICAST  MTU:1500  Metric:1
            RX packets:0 errors:0 dropped:0 overruns:0 frame:0
            TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
            Interrupt:20 Memory:f2600000-f2620000

lo         Link encap:Local Loopback
            inet addr:127.0.0.1  Mask:255.0.0.0
            inet6 addr: ::1/128 Scope:Host
            UP LOOPBACK RUNNING  MTU:65536  Metric:1
            RX packets:5952 errors:0 dropped:0 overruns:0 frame:0
            TX packets:5952 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:531134 (531.1 KB)  TX bytes:531134 (531.1 KB)

wlp3s0    Link encap:Ethernet  HWaddr 08:11:96:66:1e:d0
            inet addr:192.168.0.13  Bcast:192.168.0.255  Mask:255.255.255.0
            inet6 addr: fe80::f2e1:dddc:c25d:7be3/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
            RX packets:295860 errors:0 dropped:0 overruns:0 frame:0
            TX packets:250583 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:165787913 (165.7 MB)  TX bytes:39528999 (39.5 MB)
```

[Target EVB 端 網路設定 – Static]

<Step 1> 確認網路狀態

```
$ ifconfig
```

```
[root@rk3399:/]# ifconfig
eth0      Link encap:Ethernet HWaddr 12:1F:A7:EE:18:FC
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:525 (525.0 B)
          Interrupt:24

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

<Step 2> 設定 IP

```
$ ifconfig eth0 192.168.0.100
```

```
[root@rk3399:/]# ifconfig eth0 192.168.0.100
[root@rk3399:/]# ifconfig
eth0      Link encap:Ethernet HWaddr 12:1F:A7:EE:18:FC
          inet addr:192.168.0.100 Bcast:192.168.0.255 Mask:255.255.255.0
          UP BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:525 (525.0 B)
          Interrupt:24

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

wlan0    Link encap:Ethernet HWaddr 6C:21:A2:B3:B7:24
          inet addr:169.254.172.22 Bcast:169.254.255.255 Mask:255.255.0.0
          inet6 addr: fe80::fc88:2769:99b4:1a85/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:20 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:2992 (2.9 KiB)
```

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<Step 3> 測試 EVB 與 Host PC 網路連線狀態

```
$ ping [Host PC IP]
```

例如 : ping 192.168.0.1

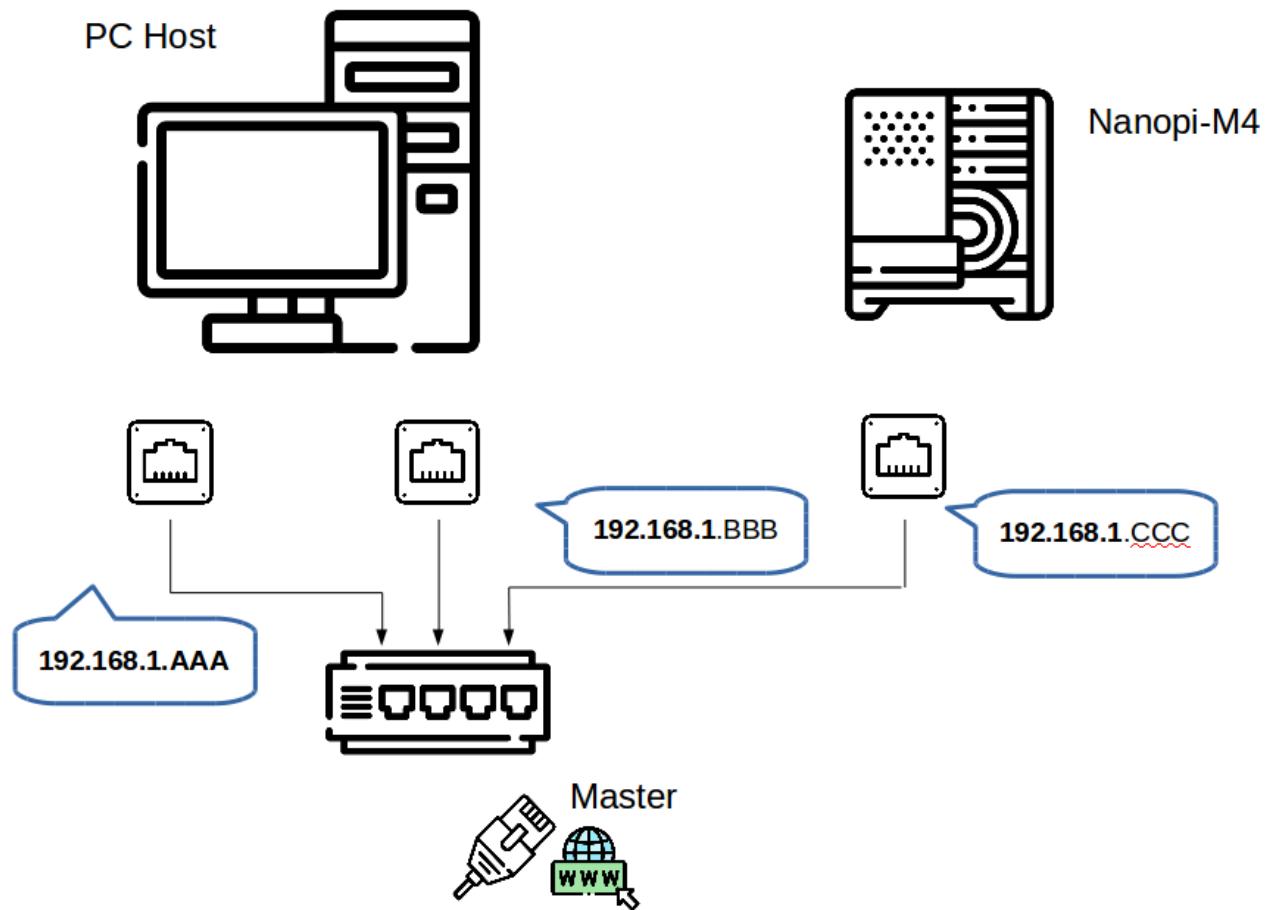
```
[root@rk3399:/]# ifconfig eth0 192.168.0.100
[root@rk3399:/]# ifconfig
eth0      Link encap:Ethernet HWaddr 12:1F:A7:EE:18:FC
          inet addr:192.168.0.100 Bcast:192.168.0.255 Mask:255.255.255.0
                  UP BROADCAST MULTICAST MTU:1500 Metric:1
                  RX packets:0 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:0 (0.0 B) TX bytes:525 (525.0 B)
                  Interrupt:24

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING MTU:65536 Metric:1
                  RX packets:0 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1
                  RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

wlan0    Link encap:Ethernet HWaddr 6C:21:A2:B3:B7:24
          inet addr:169.254.172.22 Bcast:169.254.255.255 Mask:255.255.0.0
          inet6 addr: fe80::fc88:2769:99b4:1a85/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                  RX packets:0 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:20 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:0 (0.0 B) TX bytes:2992 (2.9 KiB)
```

```
[root@rk3399:/]# ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=5.88 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=64 time=0.461 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=64 time=0.672 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=64 time=0.780 ms
64 bytes from 192.168.0.1: icmp_seq=5 ttl=64 time=0.689 ms
64 bytes from 192.168.0.1: icmp_seq=6 ttl=64 time=0.772 ms
64 bytes from 192.168.0.1: icmp_seq=7 ttl=64 time=0.457 ms
64 bytes from 192.168.0.1: icmp_seq=8 ttl=64 time=0.666 ms
```

[Target EVB 端 網路設定 – HUB]



< Step 1> Catch network IP address from dynamic server

[Target]

```
$ udhcpc -i eth0
```

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[SSH]

透過 SSH 傳送一個檔案 從 Host PC 至 開發板

<Target>

先在 EVB 設定密碼

\$ password

<Host PC>

傳送測試檔案

```
$ scp [檔案] [EVB 帳號]@[EVB IP]:[EVB PATH]
```

例如：

```
$ scp testme root@192.168.0.100:/tmp
```

```
slash@slash-HD631-Q87CRM:rk3399$ scp ./NanoPi-M4-2GB-1807-Schematic.pdf root@192.168.0.100:/tmp  
The authenticity of host '192.168.0.100 (192.168.0.100)' can't be established.  
ECDSA key fingerprint is SHA256:Qj0Ykd756neqzaRTx3rrNF830fAPKotNESl7ks2chUI.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '192.168.0.100' (ECDSA) to the list of known hosts.  
root@192.168.0.100's password:  
NanoPi-M4-2GB-1807-Schematic.pdf  
slash@slash-HD631-Q87CRM:rk3399$ █
```

假設遇到如下狀況，請依紅色框框執行命令

[建立 NFS Server 環境]

[Host]

< Step 1 > install NFS software package

```
$ sudo apt-get install nfs-kernel-server nfs-common portmap
```

< Step 2 > comfigure exports

```
$ sudo gedit /etc/exports
```

```
$ add your share file folder
```

```
example :
```

```
/home/cadtc/nfs/ *(rw,sync,no_root_squash)
```

< Step 3 > Restart Host PC

```
$ sudo /etc/init.d/nfs-kernel-server restart
```

< Step 4 > (option) [Host] :

```
ifconfig ethx 192.168.0.10
```

< Step 5>

```
$ touch /home/cadtc/nfs/
```

[Target Board]

< Step 6 >

```
$ sudo mount -t nfs 192.168.0.10:/home/cadtc/nfs/ /mnt/
```

```
$ ls -l /mnt
```

```
$ sudo umount /mnt
```

[設定 Toolchain]

```
$ cd ~/nanopim4-slash  
# 修改 設定檔裡面 Toolchain 路徑
```

```
$ vim ./set_toolchain.sh
```

```
===== set_toolchain.sh 內容 =====  
export PATH=$PATH:/home/cadtc/nanopim4-slash/toolchain/gcc-linaro-6.3.1-2017.05-  
x86_64_aarch64-linux-gnu/bin/  
  
export CROSS_COMPILE=aarch64-linux-gnu-  
export ARCH=arm64  
export KERNELDIR=/home/cadtc/nanopim4-slash/kernel/rockchip-rk3399-nanopi-m4  
=====
```

#測試 Toolchain 設定

```
$ source ./set_toolchain.sh  
$ aarch64-linux-gnu-gcc -v
```

```
slash@slash-HD631-Q87CRM:rk3399$ aarch64-linux-gnu-gcc -v  
Using built-in specs.  
COLLECT_GCC=aarch64-linux-gnu-gcc  
COLLECT_LTO_WRAPPER=/home/slash/work/special_task/cadtc/toolchain/gcc-lin  
Target: aarch64-linux-gnu  
Configured with: '/home/tcwg-buildslave/workspace/tcwg-make-release/build  
home/tcwg-buildslave/workspace/tcwg-make-release/builder_arch/amd64/label  
-make-release/builder_arch/amd64/label/tcwg-x86_64-build/target/aarch64-l  
el/tcwg-x86_64-build/target/aarch64-linux-gnu/_build/builds/destdir/x86_6  
-disable-sjlj-exceptions --enable-gnu-unique-object --enable-linker-build  
ith-isl=no --enable-multilib --enable-fix-cortex-a53-835769 --enable-fix  
--with-build-sysroot=/home/tcwg-buildslave/workspace/tcwg-make-release/b  
orkspace/tcwg-make-release/builder_arch/amd64/label/tcwg-x86_64-build/tar  
-enable-languages=c,c++,fortran,lto --build=x86_64-unknown-linux-gnu --ho  
tcwg-x86_64-build/target/aarch64-linux-gnu/_build/builds/destdir/x86_64-u  
Thread model: posix  
gcc version 6.3.1 20170404 (Linaro GCC 6.3-2017.05)
```

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