

**HSBUV Board with Nuvoton NPCM7mnx RunBMC module
Quick (Standalone) Setup Guide**

This Quick Setup guide describes how to set up the NPCM7mnx HSBUV Board + Nuvoton RunBMC module.

A. HSBUV + Nuvoton RunBMC module Overview

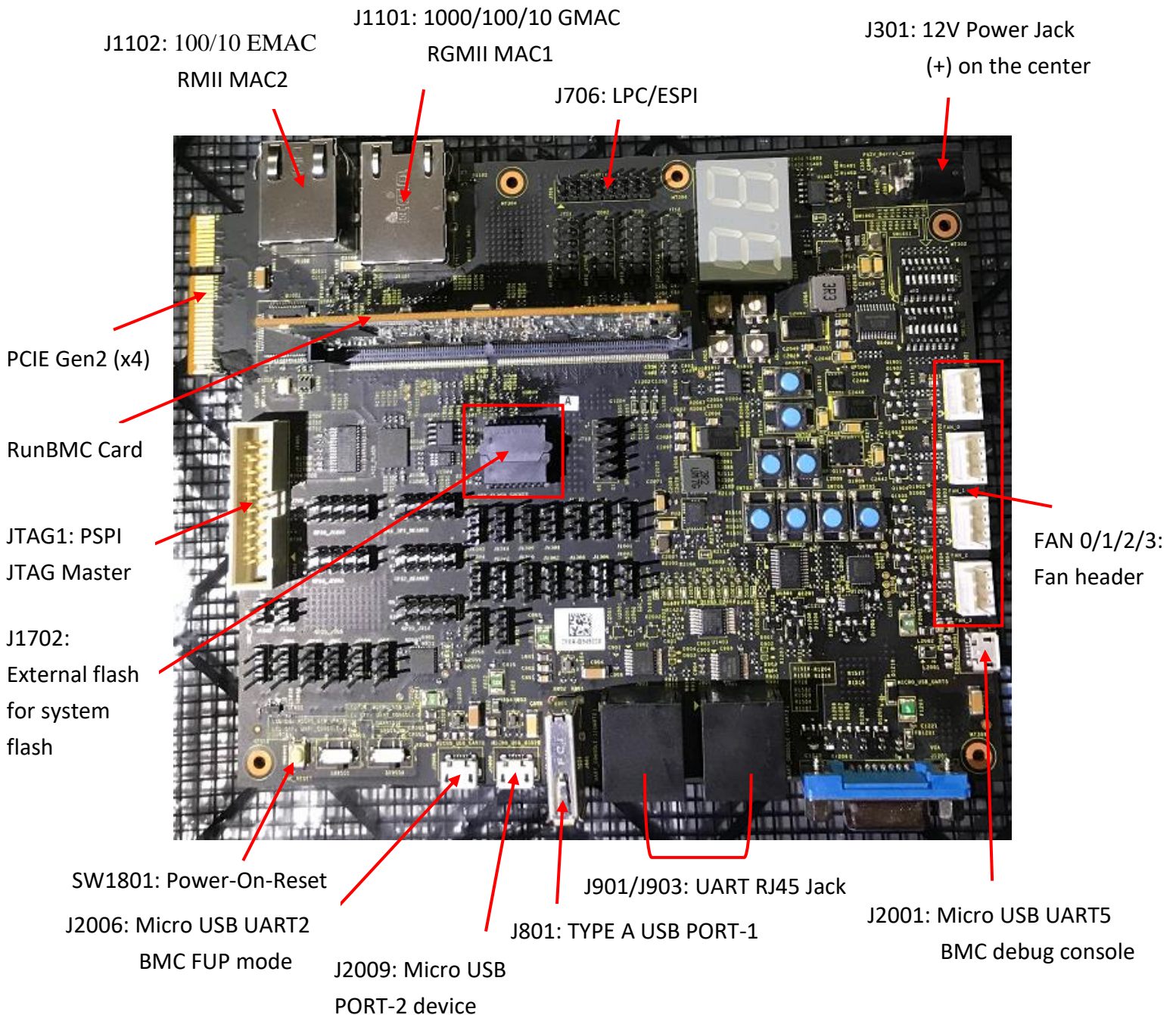
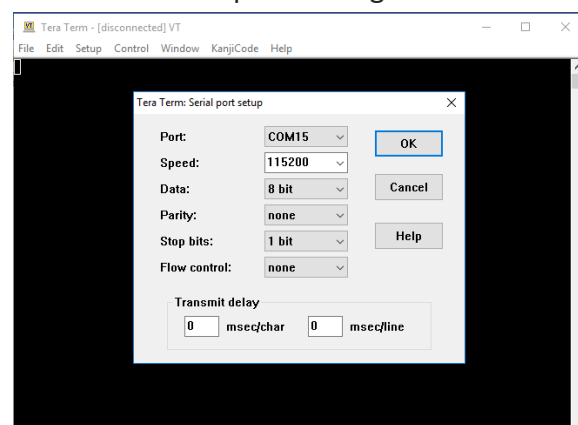


Figure 1: Connectors on the HSBUV Board

- Power-On and Reset:
 - a. Connect the 12V power supply to power jack J301. The power supply should be 12V and at least 2A; the jack should be 2.5x 5.5 x9.5mm in diameter
 - b. Press and release PWR-ON-RST (SW1801) push-button.
- USB-to-UART5 for BMC debug console:
 - a. Download and install the USB-to-UART driver from:
<http://www.ftdichip.com/Drivers/VCP.htm>
according to the host OS.
 - b. Connect a mini-USB cable between the PC host and HSBUV J2001. J2001 is Micro_USB_UART5.
connector to the Serial Interface (SI2) of the BMC. Uboot and Linux terminal messages are sent though this port.
 - c. Wait for the FTDI driver to be installed automatically. The COM port of number is assigned automatically.
 - d. Verify that one green power LED (D2008) is ON.
- Terminal:
 - a. Open a terminal (e.g., Tera Term version 4.87) and set the correct COM port number assigned by the FTDI driver (in Step 2c).
The COM port should be configured as follows:
115200 Kbps, 8 bit, 1 stop-bit, no parity no flow control.
 - b. Press and release the PWR-ON-RST (SW1801) push-button to issue a Power-On reset.
 - c. Verify that the boot block, Uboot and Linux versions are up-to-date. Check with Nuvoton support for the most recent versions.

Tera Term Serial port setting:



```
COM15 - Tera Term VT
File Edit Setup Control Window KanjiCode Help
Board: Nuoton npc1750 Development Board
DRAM: 484 MiB
I2C: i2c0, i2c1
OTP: NPCM750 module bind OK
RNG: NPCM750 RNG module bind OK
AES: NPCM750 AES module bind OK
MMC: sdhci0@f0840000: 0, sdhci1@f0842000: 1
Loading Environment from SPI Flash... SF: Detected mx25l51235f with page size 256 Bytes, erase size 64 KiB, total 64 MiB, mapped at 80000000
*** Warning - bad CRC, using default environment

In: serial0@f0001000
Out: serial0@f0001000
Err: serial0@f0001000
Net:

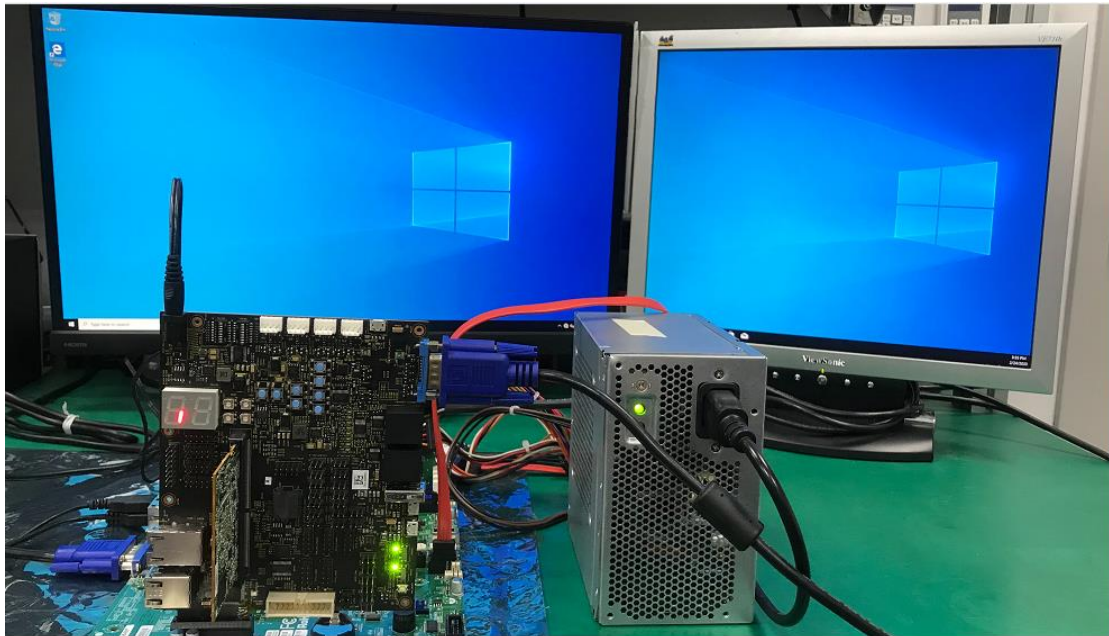
Error: gmac0 address not set.
eth-1: gmac0
Error: gmac1 address not set.
, eth-1: gmac1, eth-1: emc0, eth-1: emc1
Security is NOT enabled
SF: Detected mx25l51235f with page size 256 Bytes, erase size 64 KiB, total 64 MiB, mapped at 80000000
Hit any key to stop autoboot: 0
```

- The PCI-Express Interface which supports a PCIe Gen 2 (x4) connection (Note:). This interface shall be insert the system MB of PCIe slot for VGA display mailbox function. These signals are expected to be dedicated to PCIe functionality and should not offer a secondary function.

Note:

- Only x1 lane is been used.
- RunBMC can be used as a secondary video card since RunBMC card does not include on-board VGA BIOS and since MB does not include Matrox VGA BIOS.

Figure 3: HSBUV + RunBMC module boot into Win 10, the VGA display is ok



B. Build OpenBMC

<https://github.com/Nuvoton-Israel/openbmc/tree/runbmc>

➤ How to Build

- Ubuntu 18.04 as example

```
$ sudo apt-get install -y git build-essential libssl1.2-dev texinfo gawk chrpath diffstat  
$ git clone https://github.com/Nuvoton-Israel/openbmc.git  
$ cd openbmc  
$ . setup buv-runbmc  
$ bitbake obmc-phosphor-image
```

- After running above commands and building image successfully, you will find a image under the following folder:

- **../build/buv-runbmc/tmp/deploy/images/buv-runbmc/**

- which named:

- **obmc-phosphor-image-buv-runbmc-<build id>.static.mtd**



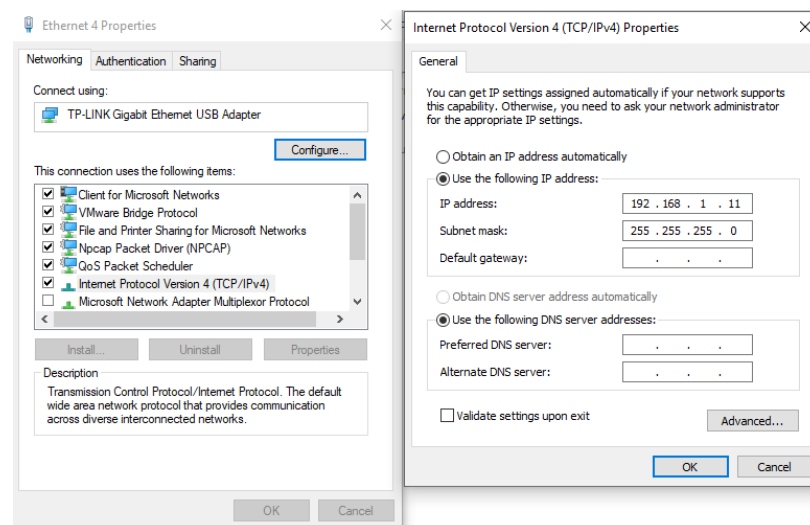
- This is the image (image-bmc) you will flash to runbmc card.

➤ How to flash image

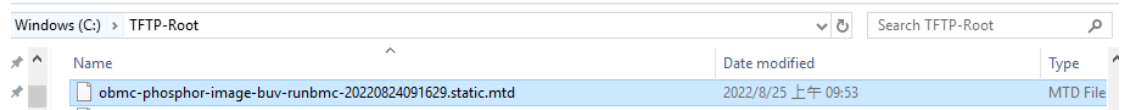
- Update BMC image via u-boot and TFTP.
- Setup IP for NB(TFTP server) and BUV(TFTP client):

NB IP: 192.168.1.11

HSBUV IP: 192.168.1.22



- Put image-bmc into your tftp server folder:



- Reboot BUV (power on or press SW1801 button) and enter UBoot:

```
Found phy_id=0x03625e6a addr=0x00 eth1: eth@f0802000, eth0: eth@f0825000
Security is NOT enabled
SF: Detected mx66l51235l with page size 256 Bytes, erase size 64 KiB, total 64 MiB
Hit any key to stop autoboot: 0
U-Boot>
U-Boot>
U-Boot>
U-Boot>
U-Boot>
```

- Setup u-boot env, please refer:

- https://github.com/Nuvoton-Israel/nuvoton-info/blob/master/npcm7xx-poleg/evaluation-board/sw_deliverables/uboot_env_parameters.txt

e.g. (use J1101: 1000/100/10 GMACRGMII MAC1)

```
setenv mac_offset 01C0
setenv mac_base 00:00:F7:A0
setexpr byte ${mac_offset} / 100;setexpr nibh ${byte} /
10;setexpr nibl ${byte} % 10;setenv mac_base
${mac_base}:${nibh}${nibl}
setexpr byte ${mac_offset} % 100;setexpr nibh ${byte} / 10
setenv byte; setenv nibh; setenv nibl; setenv mac_base; setenv
mac_offset
setenv eth_num 2
setenv gatewayip 192.168.1.254
setenv ipaddr 192.168.1.22
setenv serverip 192.168.1.11
setenv autostart no
setenv autoload no
setenv ethact ETH${eth_num}
saveenv
ping 192.168.1.11
```

- Upload BMC image:

```
tftp 10000000 obmc-phosphor-image-buv-runbmc-tftp
10000000 obmc-phosphor-image-buv-runbmc-
20220824091629.static.mtd
```



```
#####  
#####  
#####  
#####  
#####  
#####  
#####  
#####  
  
done  
Bytes transferred = 67108864 (4000000 hex)  
U-Boot>
```

- ```
cp.b 10000000 80000000 ${filesize}
boot
```



```
Phosphor OpenBMC (Phosphor OpenBMC Project Reference Distro) nodistro.0 buv-runbmc ttyS0
buv-runbmc login: using random self ethernet address
using random host ethernet address
ssif open
usb0: HOST MAC 1e:23:ac:59:8f:45
usb0: MAC d2:d8:ae:f8:6e:67
npcm-udc: bind to driver configs-gadget
buv-runbmc login: █
```

- ```
Username:  root
Password:  OpenBmc
```

◆

C. OpenBMC WebUI

- Set BMC_IP before using
 - e.g.(use J1101: 1000/100/10 GMACRGMII MAC1)

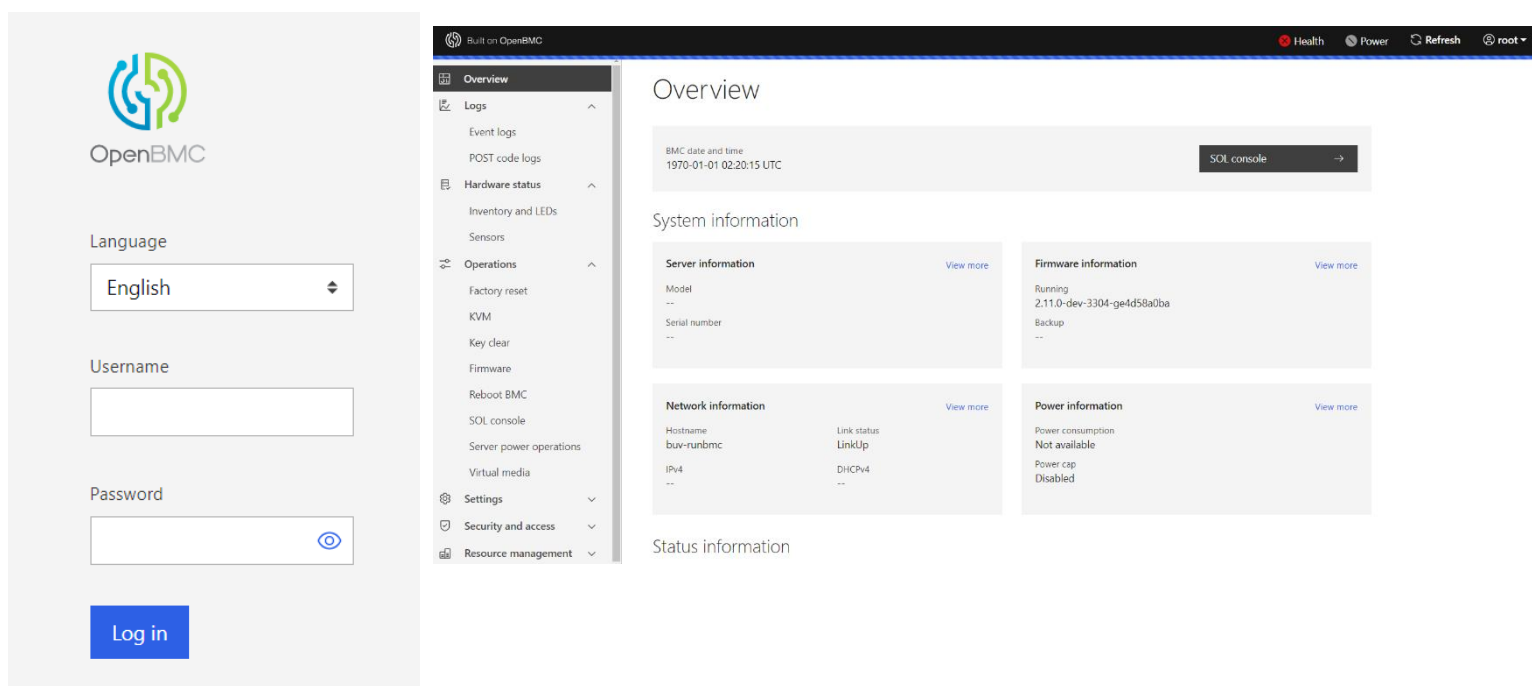
```
root@buv-runbmc:~# ifconfig eth1 192.168.1.22
root@buv-runbmc:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:00:F7:A0:00:FC
          inet addr:169.254.1.129  Bcast:169.254.255.255  Mask:255.255.0.0
          inet6 addr: fe80::200:f7ff:fea0:fc/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0  errors:0  dropped:0  overruns:0  frame:0
          TX packets:26  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:64
          RX bytes:0 (0.0 B)  TX bytes:2908 (2.8 KiB)

eth1      Link encap:Ethernet  HWaddr 00:00:F7:A0:00:FD
          inet addr:192.168.1.22  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::200:f7ff:fea0:fd/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:118  errors:0  dropped:3  overruns:0  frame:0
          TX packets:29  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:12107 (11.8 KiB)  TX bytes:3371 (3.2 KiB)
          Interrupt:27
```

https://<BMC_IP>

Username: root

Password: OpenBmc



The image displays the OpenBMC WebUI interface. On the left is the login page, featuring the OpenBMC logo, a language dropdown set to 'English', and input fields for 'Username' and 'Password' with a 'Log in' button. On the right is the 'Overview' page, which includes a sidebar menu with options like Logs, Hardware status, Operations, Settings, Security and access, and Resource management. The main content area shows system information: BMC date and time (1970-01-01 02:20:15 UTC), System information (Server and Firmware details), Network information (Hostname: buv-runbmc, Link status: LinkUp), and Power information (Power consumption: Not available, Power cap: Disabled).

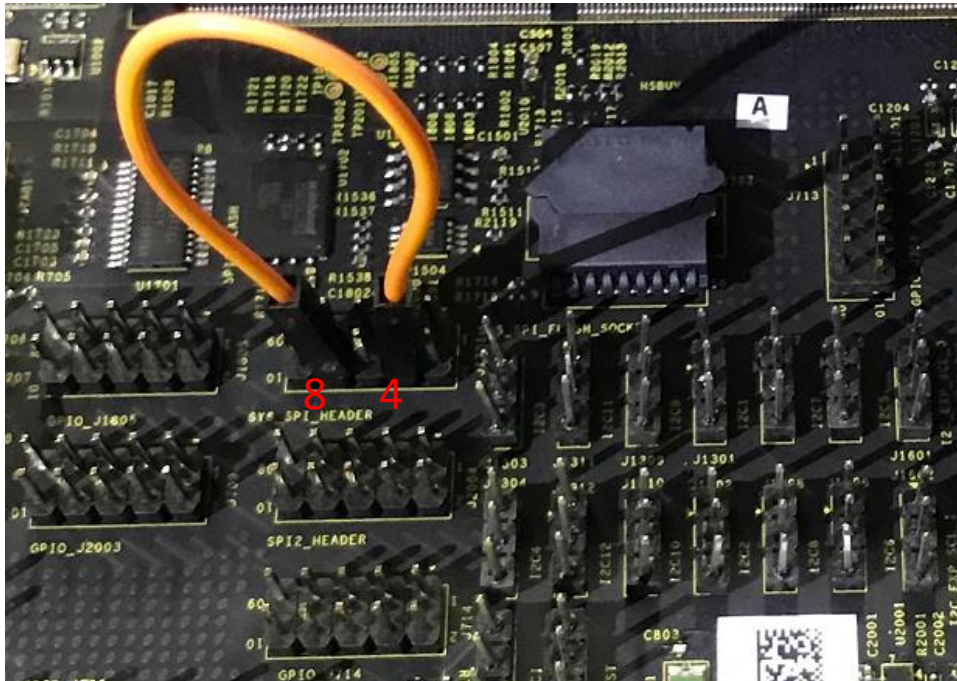
- BMC FW update over OpenBMC

<https://github.com/Nuvoton-Israel/openbmc/tree/runbmc/meta-quanta/meta-olympus-nuvoton#bmc-firmware-update>

D. FUP mode for emergency firmware update (Boot-Block and Uboot)

Steps:

1. Remove HSBUV board AC Power 12V(J301) and Micro USB UART - BMC Debug UART (J2001)
2. Connects pin8 and pin4 of J1701 header



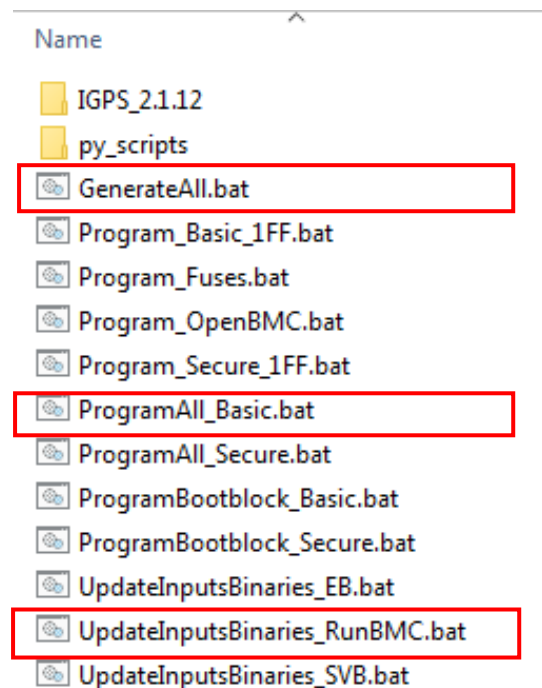
3. Connects USB cable to Micro USB UART - BMC FUP mode (J2006)



4. Recovery BMC over IGPS:

<https://github.com/Nuvoton-Israel/igps>

Programmer fw list (.bat file)



Steps:

(1) Run UpdateInputsBinaries_RunBMC.bat

```
C:\windows\system32\cmd.exe
C:\Nuvoton\Run_BMC_HSBUV\FW_update\IGPS_2.1.12>echo off
Updating input binaries for Nuvoton's RunBMC
Copy ImageGeneration\versions\Poleg_bootblock_secure.10.10.09.bin to ImageGeneration\inputs\Poleg_bootblock.bin
Copy ImageGeneration\references\BootBlockAndHeader_RunBMC.xml to ImageGeneration\inputs\BootBlockAndHeader.xml
Copy ImageGeneration\versions\u-boot_2019.01.7.5.bin to ImageGeneration\inputs\u-boot.bin
Copy ImageGeneration\references\UbootHeader_RunBMC.xml to ImageGeneration\inputs\UbootHeader.xml
Copy ImageGeneration\versions\runbmc-uimage_4.17.4.01.03.RE2_customer to ImageGeneration\inputs\uimage
Copy ImageGeneration\versions\runbmc-nRamdisk_4.17.4.01.03.RE2_customer to ImageGeneration\inputs\uRamdisk
Copy ImageGeneration\versions\runbmc-npcm750-evb_4.17.4.01.03.RE2_customer.dtb to ImageGeneration\inputs\npcm750.dtb
Copy ImageGeneration\references\uboot_env_runbmc.bin to ImageGeneration\inputs\uboot_env.bin
Binaries for Nuvoton's RunBMC are ready in 'inputs'
Press any key to continue . . . .
Microsoft Bopomofo 半 :
```

(2) Run GenerateAll.bat

```
C:\windows\system32\cmd.exe
Bingo version 0.0.2
Input XML path: inputs\poleg_key_map.xml      Output Bin path: output_binaries\Secure\poleg_key_map.bin
SUCCESS
=====
Generating output_binaries\Secure\poleg_fuse_map.bin
Bingo - Binary Construction and Generation Tool
Bingo version 0.0.2
Input XML path: inputs\poleg_fuse_map.xml      Output Bin path: output_binaries\Secure\poleg_fuse_map.bin
SUCCESS
=====
Generating output_binaries\Secure\mergedFuses.bin
Bingo - Binary Construction and Generation Tool
Bingo version 0.0.2
Input XML path: inputs\mergedFuses.xml      Output Bin path: output_binaries\Secure\mergedFuses.bin
SUCCESS
=====
Merging secure output_binaries\Secure\mergedBootBlockAndUboot.bin and output_binaries\Secure\mergedFuses.bin
Bingo - Binary Construction and Generation Tool
Bingo version 0.0.2
Input XML path: inputs\mergedSecureBoot.xml      Output Bin path: output_binaries\Secure\mergedSecureBoot.bin
SUCCESS
Press any key to continue . . .
Microsoft Bopomofo 半 :
```

(3) Run ProgramAll_Basic.bat

```
C:\windows\system32\cmd.exe
=====
Reading 0x6a3d8 bytes from SPI...
=====
Port \\.\COM17 Opened
Performing a Host/Device synchronization check...
Reading [435160] bytes in [1700] packets
Received packet of size 216 bytes, packet [1700] out of [1700]
=====
Read monitor log to file cmp_flash_prog_monitor_log.bin
=====
Port \\.\COM17 Opened
Performing a Host/Device synchronization check...
Reading [256] bytes in [1] packets
Received packet of size 256 bytes, packet [1] out of [1]
SPI Reading Passed
=====
read monitor log to cmp_flash_prog_monitor_log.bin
=====
Port \\.\COM17 Opened
Performing a Host/Device synchronization check...
Reading [256] bytes in [1] packets
Received packet of size 256 bytes, packet [1] out of [1]
Loading Monitor Log Passed
=====
Program C:\Nuvoton\Run_BMC_HSBUV\FW_update\IGPS_2.1.12\py_scripts\ImageGeneration\output_binaries\Basic\mergedBootBlockAndUboot.bin Passed
Press any key to continue . . .
Microsoft Bopomofo 半 :
```