

**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

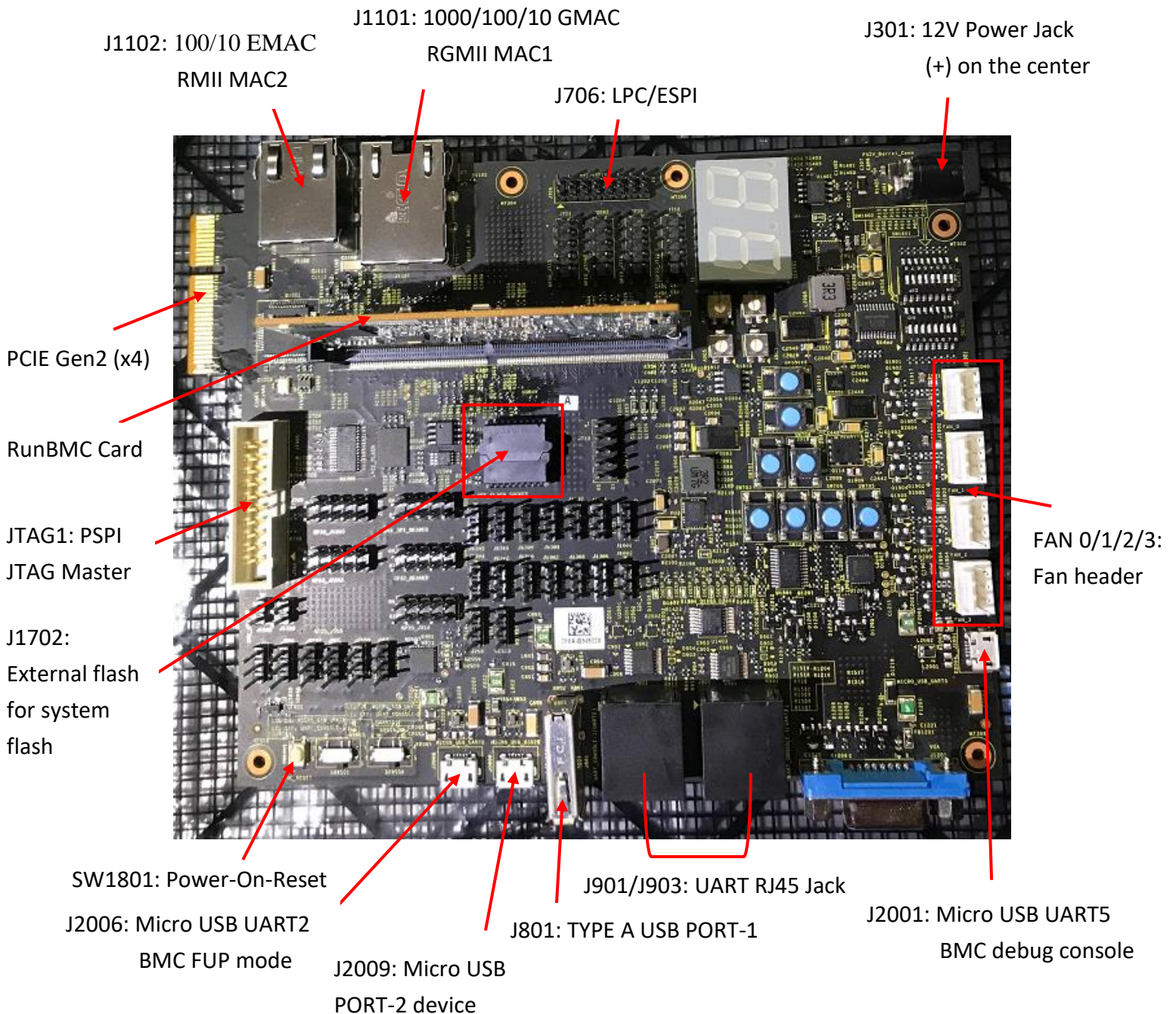


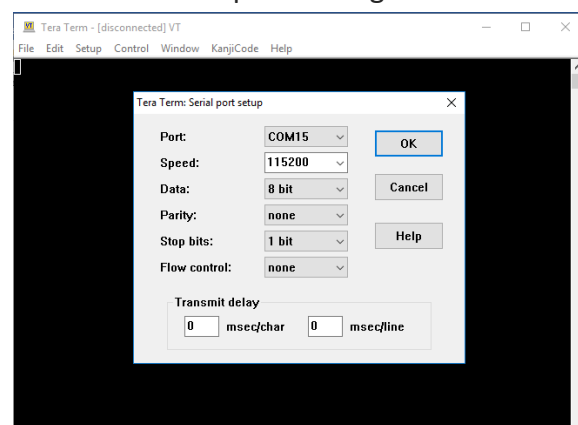
Figure 1: Connectors on the HSBUV Board

**Note:** Instruction refer to Figure 1, above.

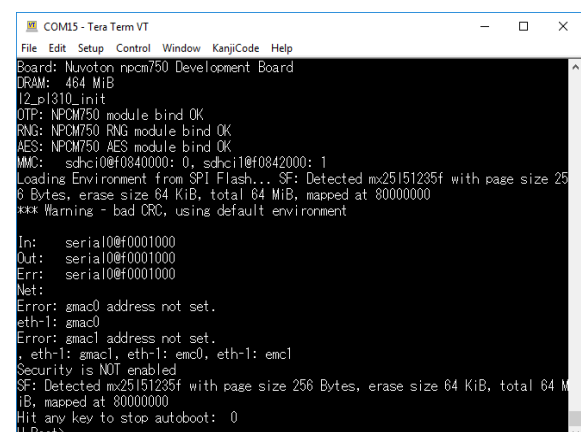
- Power-On and Reset:
  - a. Connect the 12V power supply to power jack J301. The power supply should be 12V and at least 2A; the jack should be 2.5x 5.5 x9.5mm in diameter
  - b. Press and release PWR-ON-RST (SW1801) push-button.
- USB-to-UART5 for BMC debug console:
  - a. Download and install the 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.

**Figure 2: boot into boot block, Uboot**

Tera Term Serial port setting:



boot into Uboot:

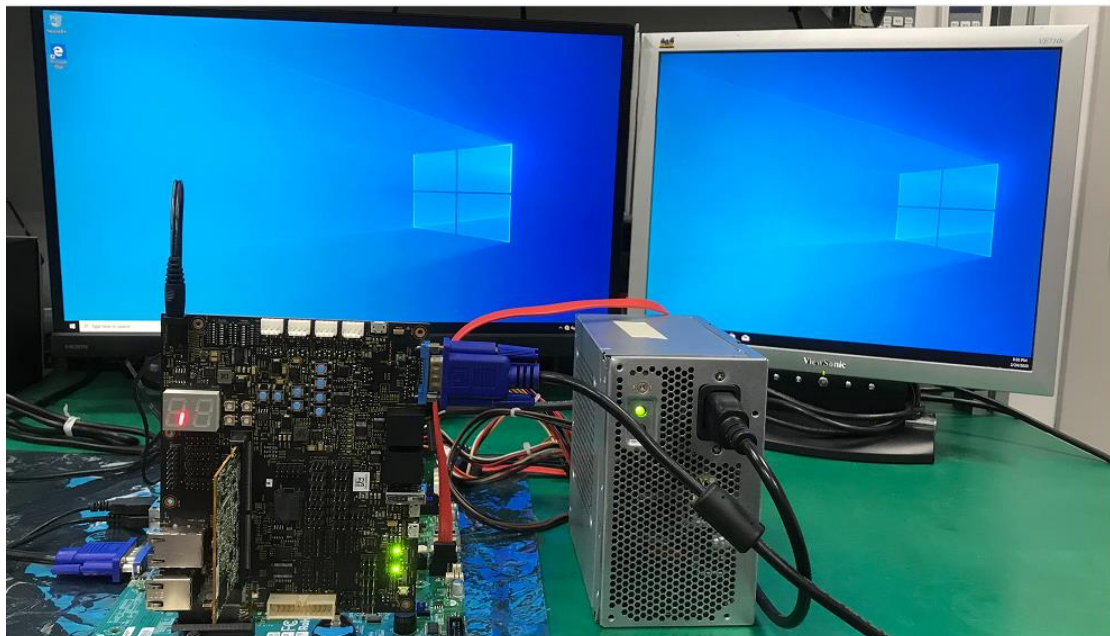


- The PCI-Express Interface which supports a PCIe Gen 2 (x4) connection (Note: ). This interface shall be insert the system MB of PCIe slot for VGA display mailbox function. These signals are expected to be dedicated to PCIe functionality and should not offer a secondary function.

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 -b runbmc --single-branch https://github.com/Nuvoton-Israel/openbmc
```

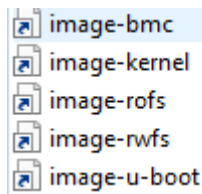
```
$ cd openbmc
```

```
$ export TEMPLATECONF=meta-evb/meta-evb-nuvoton/meta-buv-runbmc/conf
```

```
$ . openbmc-env
```

```
$ bitbake obmc-phosphor-image
```

- If built successfully, you will find images in  
openbmc/build/tmp/deploy/images/buv-runbmc/

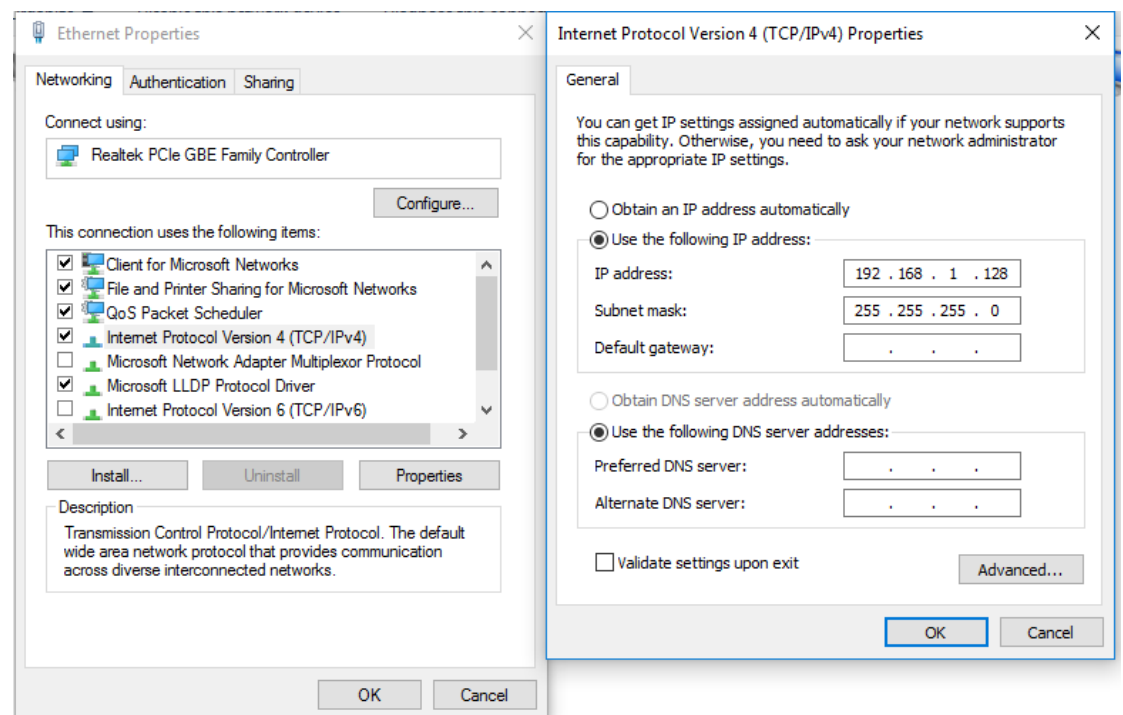


### ➤ How to flash image-bmc

- BMC FW update over u-boot TFTP

- Setup IP Environment:

NB IP: 192.168.1.128



HSBUV IP: 192.168.1.15

Open a Tera Term, press some commands under Uboot as below:

Command as attached:

```
env default -a
```

```
echo Set the MAC address as printed on your board
```

```
echo =====
```

```
setenv mac_offset 01DC
```

```
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
setexpr nibl ${byte} % 10;setenv ethaddr ${mac_base}:${nibh}${nibl}
setexpr nibl ${nibl} + 1;setenv eth1addr ${mac_base}:${nibh}${nibl}
setexpr nibl ${nibl} + 1;setenv eth2addr ${mac_base}:${nibh}${nibl}
setexpr nibl ${nibl} + 1;setenv eth3addr ${mac_base}:${nibh}${nibl}
setenv byte; setenv nibh; setenv nibl; setenv mac_base; setenv mac_offset

```

echo Those setting are according to your specific network parameters

echo =====

```

setenv gatewayip      192.168.1.2
setenv nfspath         192.168.71.153:/home/ubuntu/shared/nfs
setenv serverip       192.168.1.128
setenv ipaddr         192.168.1.15
setenv netmask        255.255.0.0

```

echo choose either dhcp\_on or dhcp\_off by prefix 'echo' before the undesired option

echo =====

```
setenv dhcp_cmd dhcp
```

echo setenv dhcp\_cmd

echo Update the images names and path if needed

echo =====

```
setenv tftp_dir .
```

echo Select the network device for uboot: 0: RMII1, 1: RMII2, 2: RGMII1, 3: RGMII2

echo =====

```
setenv eth_num 2
```

echo Those settings are usefull for booting Poleg linux

echo =====

```

setenv autoload no
setenv autostart no
setenv baudrate 115200
setenv bootcmd 'run romboot'
setenv bootdelay 2
setenv common_bootargs 'setenv bootargs earlycon=${earlycon} root=/dev/ram0 console=${console}
mem=${mem} ramdisk_size=48000'
setenv console 'ttyS0,115200n8'

```



```
setenv earlycon 'uart8250,mmio32,0xf0001000

setenv mem 476M

setenv nfsboot 'setenv ethact ETH${eth_num}; ${dhcp_cmd}; run common_bootargs; setenv bootargs
${bootargs} root=/dev/nfs init=/sbin/init nfsroot=${nfspath}; tftp 10000000 ${tftp_dir}/image-
bmc; bootm 10200000'

setenv romboot 'run common_bootargs; echo Booting Kernel from flash; echo +++ uimage at
0x${uimage_flash_addr}; echo Using bootargs: ${bootargs}; bootm ${uimage_flash_addr}'

setenv stderr serial

setenv stdin serial

setenv stdout serial

setenv uimage_flash_addr 80200000


setenv ftp_m 'setenv ethact ETH2; tftp 10000000 merged_1FF.bin; cp.b 10000000 80000000
${filesize}; saveenv'

setenv ftp_k 'setenv ethact ETH2; tftp 10000000 image-kernel; cp.b 10000000 80200000
${filesize}; saveenv'

setenv ftp_prog 'setenv ethact ETH2; tftp 10000000 image-bmc; cp.b 10000000 80000000
${filesize}; saveenv'

setenv ftp_run 'setenv ethact ETH2 ; tftp 10000000 image-bmc; run common_bootargs; bootm
10200000'

setenv sd_prog 'fatload mmc 0 10000000 image-bmc; cp.b 10000000 80000000 ${filesize};
saveenv'

setenv sd_run 'fatload mmc 0 10000000 image-bmc; run common_bootargs; bootm 10200000'

setenv usb_prog 'usb start; fatload usb 0 10000000 image-bmc; cp.b 10000000 80000000
${filesize}; saveenv'

setenv usb_run 'usb start; fatload usb 0 10000000 image-bmc; run common_bootargs; bootm
10200000'


setenv ftp_uboot 'setenv ethact ETH${eth_num}; ${dhcp_cmd}; tftp 10000000 ${tftp_dir}/image-
u-boot; cp.b 10000000 80000000 ${filesize}'


setenv tftpblocksize 512


saveenv
```



command.txt

```

echo =====
setenv eth_num 2

echo Those settings are usefull for booting Poleg linux
echo =====
setenv autoload no
setenv autostart no
setenv baudrate 115200
setenv bootcmd 'run romboot'
setenv bootdelay 2
setenv common_bootargs 'setenv bootargs earlycon=${earlycon} root=/dev/ram0 console=${console} mem=${mem} ramdisk_size=48000'
setenv console 'ttyS0,115200n8'
setenv earlycon 'uart8250,mmio32,0xf0001000'
setenv mem 476M
setenv nfsboot 'setenv ethact ETH${eth_num};${dhcp_cmd};run common_bootargs;setenv bootargs ${bootargs} root=/dev/nfs init=/sbin/init nfsroot=${nfsroot};tftp 10000000 ${tftp_dir}/image-bmc; bootm 10200000'
setenv romboot 'run common_bootargs; echo Booting Kernel from flash; echo ++ image at 0x${uimage_flash_addr}; echo Using bootargs: ${bootargs};bootm ${uimage_flash_addr}'
setenv stderr serial
setenv stdin serial
setenv stdout serial
setenv uimage_flash_addr 80200000

setenv ftp_m 'setenv ethact ETH2; tftp 10000000 merged_1FF.bin; cp.b 10000000 80000000 ${filesize}; saveenv'
setenv ftp_k 'setenv ethact ETH2; tftp 10000000 image-kernel; cp.b 10000000 80200000 ${filesize}; saveenv'
setenv ftp_prog 'setenv ethact ETH2; tftp 10000000 image-bmc; cp.b 10000000 80000000 ${filesize}; saveenv'

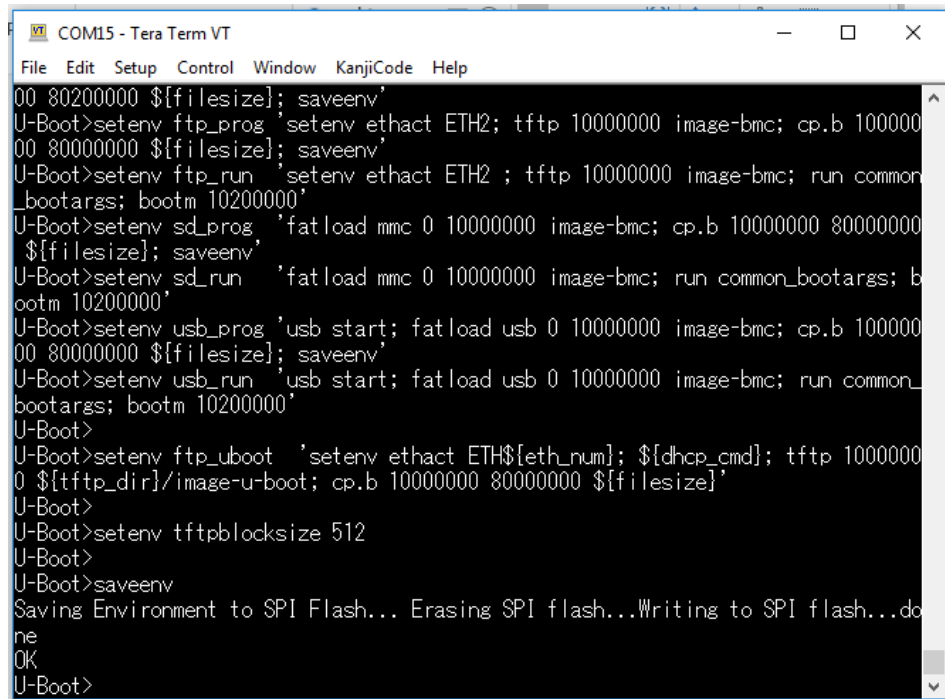
setenv ftp_run 'setenv ethact ETH2 ; tftp 10000000 image-bmc; run common_bootargs; bootm 10200000'
setenv sd_prog 'fatload mmc 0 10000000 image-bmc; cp.b 10000000 80000000 ${filesize}; saveenv'
setenv sd_run 'fatload mmc 0 10000000 image-bmc; run common_bootargs; bootm 10200000'
setenv usb_prog 'usb start; fatload usb 0 10000000 image-bmc; cp.b 10000000 80000000 ${filesize}; saveenv'
setenv usb_run 'usb start; fatload usb 0 10000000 image-bmc; run common_bootargs; bootm 10200000'

setenv ftp_uboot 'setenv ethact ETH${eth_num}; ${dhcp_cmd}; tftp 10000000 ${tftp_dir}/image-u-boot; cp.b 10000000 80000000 ${filesize}'

setenv tftpblocksize 512

saveenv

```



The screenshot shows a Tera Term window titled 'COM15 - Tera Term VT'. The window contains a series of U-Boot commands and their outputs. The commands are: 'setenv ftp\_prog', 'setenv ftp\_run', 'setenv sd\_prog', 'setenv sd\_run', 'setenv usb\_prog', 'setenv usb\_run', 'setenv ftp\_uboot', 'setenv tftpblocksize', and 'saveenv'. The outputs show the commands being executed and the resulting environment variables being set. The window also shows the U-Boot prompt 'U-Boot>' and the output of the 'saveenv' command, which is 'Saving Environment to SPI Flash... Erasing SPI flash...Writing to SPI flash...done'.

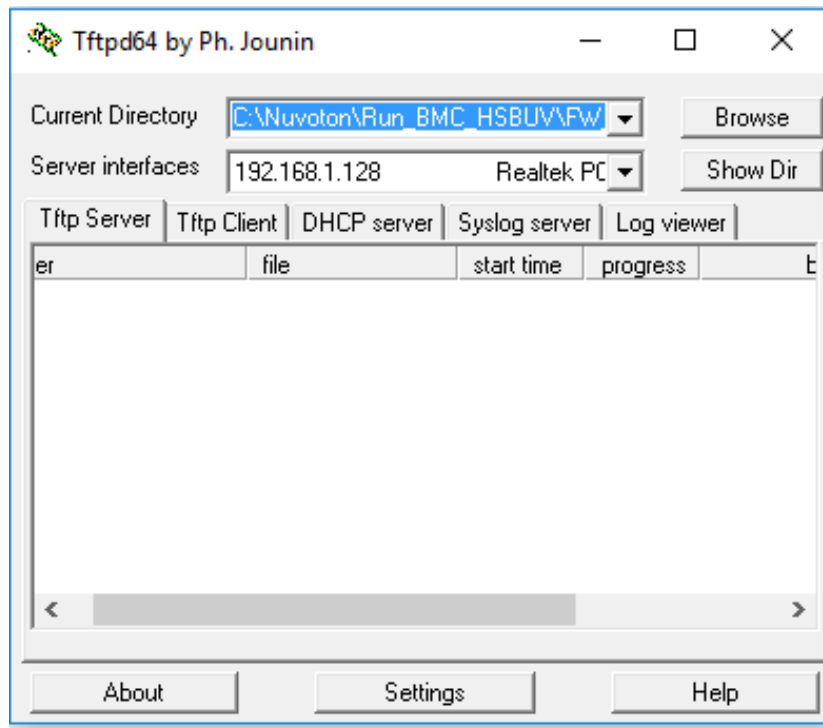
```

COM15 - Tera Term VT
File Edit Setup Control Window KanjiCode Help
00 80200000 ${filesize}; saveenv'
U-Boot>setenv ftp_prog 'setenv ethact ETH2; tftp 10000000 image-bmc; cp.b 100000
00 80000000 ${filesize}; saveenv'
U-Boot>setenv ftp_run 'setenv ethact ETH2 ; tftp 10000000 image-bmc; run common
_bootargs; bootm 10200000'
U-Boot>setenv sd_prog 'fatload mmc 0 10000000 image-bmc; cp.b 10000000 80000000
${filesize}; saveenv'
U-Boot>setenv sd_run 'fatload mmc 0 10000000 image-bmc; run common_bootargs; b
ootm 10200000'
U-Boot>setenv usb_prog 'usb start; fatload usb 0 10000000 image-bmc; cp.b 100000
00 80000000 ${filesize}; saveenv'
U-Boot>setenv usb_run 'usb start; fatload usb 0 10000000 image-bmc; run common_
bootargs; bootm 10200000'
U-Boot>
U-Boot>setenv ftp_uboot 'setenv ethact ETH${eth_num}; ${dhcp_cmd}; tftp 1000000
0 ${tftp_dir}/image-u-boot; cp.b 10000000 80000000 ${filesize}'
U-Boot>
U-Boot>setenv tftpblocksize 512
U-Boot>
U-Boot>saveenv
Saving Environment to SPI Flash... Erasing SPI flash...Writing to SPI flash...do
ne
OK
U-Boot>

```



- Put image-bmc into your tftp server IP:



- Update u-boot env with [https://github.com/Nuvoton-Israel/nuvoton-info/blob/master/npcm7xx-poleg/evaluation-board/sw\\_deliverables/u-boot\\_env\\_parameters.txt](https://github.com/Nuvoton-Israel/nuvoton-info/blob/master/npcm7xx-poleg/evaluation-board/sw_deliverables/u-boot_env_parameters.txt)  
(please make sure the serverip is your tftp server)
- Input command in u-boot console:

**U-Boot> run ftp\_prog; reset**

```
U-Boot>run ftp_prog; reset
mdio_register: non unique device name 'emc0'
mdio_register: non unique device name 'emc1'
Speed: 1000, full duplex
Using gmac0 device
TFTP from server 192.168.1.128; our IP address is 192.168.1.15
Filename 'image-bmc'.
Load address: 0x10000000
Loading: #####
#####
```

- Update fw done and boot into Linux kernel:

```

Starting Phosphor Network Manager...
Starting OpenBMC Software Update Manager...
Starting Phosphor BMC State Manager...
Starting Phosphor Chassis State Manager...
[ OK ] Started Phosphor Settings Daemon.
[ OK ] Started Phosphor Log Manager.
[ OK ] Started Phosphor Download Manager.
[ OK ] Started Avahi mDNS/DNS-SD Stack.
[ OK ] Started Phosphor Dump Manager.
[ OK ] Started Rsyslog config updater.
[ OK ] Started Phosphor LDAP privilege mapper.
[ OK ] Started Wait for /xyz/open...ontrol/host0/restriction_mode.
[ OK ] Started Wait for /xyz/open...t/control/host0/boot/one_time.
[ OK ] Started Wait for /xyz/open...ol/host0/power_restore_policy.

Phosphor OpenBMC (Phosphor OpenBMC Project Reference Distro) 0.1.0 buv-runbmc tt
yS0

buv-runbmc login: root
Password:
npcm7xx-emc f0825000.eth:

npcm7xx_get_settings
root@buv-runbmc:~#

```

- BMC FW update over OpenBMC

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

### C. Enjoy OpenBMC


[https://<BMC\\_IP>](https://<BMC_IP>)

Username: root

Password: openBmc


A screenshot of the OpenBMC web interface login page. It features a light blue background with a white login form. The form has three input fields: "BMC HOST OR BMC IP ADDRESS" with the value "192.168.1.6", "USERNAME" with the value "root", and "PASSWORD" with masked characters ".....". Below the password field is a blue "Log in" button.

OpenBMC



buu-runbmc

192.168.1.6

Server health >

Good

Server power >

Off

Data last refreshed

Jan 21, 2020 上午10:59:40 [GMT+8]

Refresh

Server overview

Server health

Server control

Server configuration

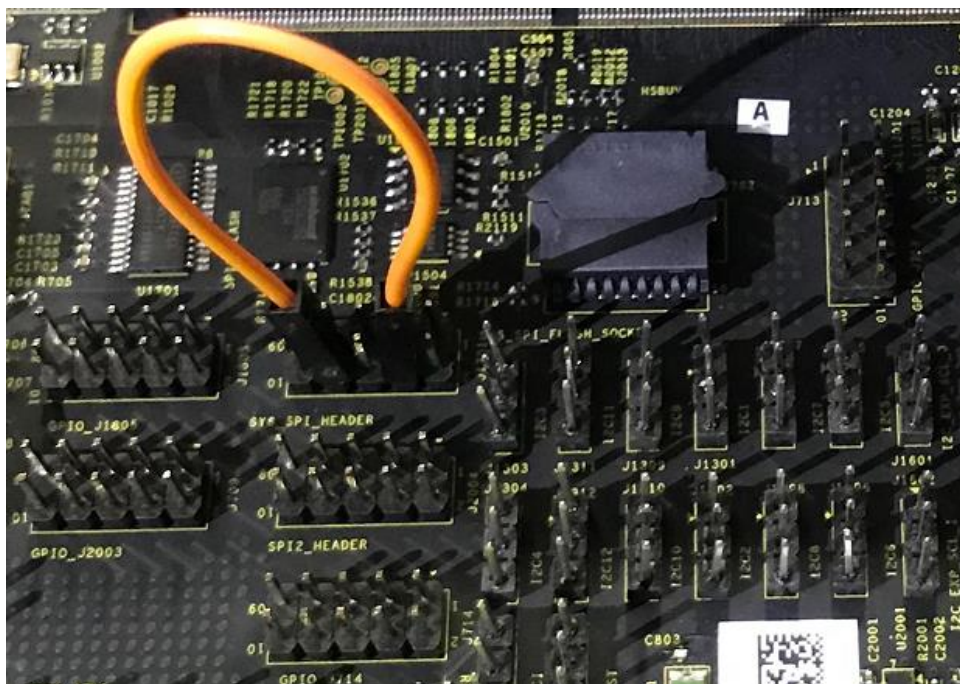
Access control

Sensors (20)	Low critical	Low warning	Current	High warning	High critical
Temperature Buv Board	NaN ° C	NaN ° C	25.25 ° C	NaN ° C	NaN ° C
Fan Tach Fan1	-- RPMs	-- RPMs	0 RPMs	-- RPMs	-- RPMs
Fan Tach Fan2	-- RPMs	-- RPMs	0 RPMs	-- RPMs	-- RPMs
Fan Tach Fan3	-- RPMs	-- RPMs	0 RPMs	-- RPMs	-- RPMs
Fan Tach Fan4	-- RPMs	-- RPMs	0 RPMs	-- RPMs	-- RPMs
Voltage 3V3 Input	NaN VOLTS	NaN VOLTS	3.388 VOLTS	NaN VOLTS	NaN VOLTS
Voltage 12V Input	NaN VOLTS	NaN VOLTS	0.168 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC0	NaN VOLTS	NaN VOLTS	2.997 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC1	NaN VOLTS	NaN VOLTS	3.346 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC2	NaN VOLTS	NaN VOLTS	3.363 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC3	NaN VOLTS	NaN VOLTS	3.332 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC4	NaN VOLTS	NaN VOLTS	3.288 VOLTS	NaN VOLTS	NaN VOLTS
Voltage ADC5	NaN VOLTS	NaN VOLTS	1.954 VOLTS	NaN VOLTS	NaN VOLTS

## 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)**

Name
IGPS_2.1.12
py_scripts
GenerateAll.bat
Program_Basic_1FF.bat
Program_Fuses.bat
Program_OpenBMC.bat
Program_Secure_1FF.bat
ProgramAll_Basic.bat
ProgramAll_Secure.bat
ProgramBootblock_Basic.bat
ProgramBootblock_Secure.bat
UpdateInputsBinaries_EB.bat
UpdateInputsBinaries_RunBMC.bat
UpdateInputsBinaries_SVB.bat

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-Image 4.17.4.01.03.RE2_customer to ImageGeneration\inputs\image
Copy ImageGeneration\versions\runbmc-uRamdisk 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 :
```