QNX 6.6.0
Setup Manual
For Raspberry Pi2 Board

User's Manual: Software

BCM 2836

www.swhwc.com

Rev.1.0 September 09, 2016

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1. Overview

1.1 Features

In the case of V.1.0.0 BSP, following drivers/libraries/utilities are supported:

1) Startup
2) ARM timer
3) Mailbox
4) Serial driver

1.2 Scope

This document scope applies to the evaluation of reproducing QNX6.6.0 image and testing QNX BSP drivers for Raspberry Pi2 platform.

1.3 Target System

1) Target platform: Raspberry Pi2 platform.
2) Target software: QNX SDP 6.6.0

1.4 List of Abbreviations and Acronym

Abbreviation	Full Form
BSP	Board Support Package
Mailbox	BCM2836 Mail box
SDP	Software Development Platform - A software is used to build BSP
Momentics IDE	QNX Momentics Integrated Development Environment

1.5 Environmental Requirement

Table 1.1 Environment Requirement

Equipment	Explanation
Windows Host PC	Windows 7 or higher
Terminal software	TeraTerm (version 4.75 or newer)

2. Building QNX6.6.0 OS image

2.1 Prerequisites

1) QNX6.6.0 SDP installed on Windows Host PC.

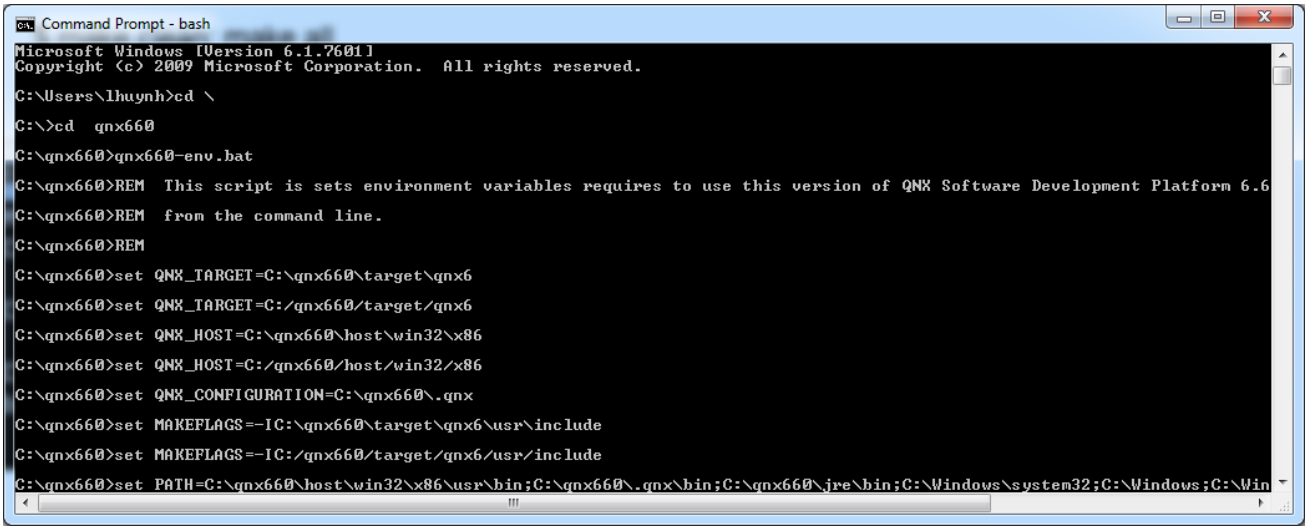
2) QNX6.6.0 BSP for Raspberry Pi2 board project folder
Download bsp-ntotrunk-broadcom-bcm2836-trunk.zip and extract it into a folder on Windows Host PC (ex: C:\bsp-ntotrunk-broadcom-bcm2836-trunk)

3) Valid active key (bcm2836.build)
Replace (overwrite) valid active key (bcm2836.build) onto bsp-ntotrunk-broadcom-bcm2836-trunk\prebuilt\armle-v7\boot\build\bcm2836.build
A valid active key is not required to build QNX6.6 image from bsp-ntotrunk-broadcom-bcm2836-trunk.zip, but you can't successfully boot QNX6.6 with an invalid active key.
To obtain a valid active please get your Raspberry Pi2 board's serial number and send this serial number to SHC.

2.2 Build QNX 6.6.0 BSP

To generate the QNX image for Raspberry Pi2 board, enter following commands from the command prompt console:

```
$ cd QNX 6.6.0 install
$ qnx660-env.bat
$ cd <QNX_BSP_Root_Directory>
$ bash
$ make clean; make all
```



QNX 6.6.0 image is created at: bsp-ntotrunk-broadcom-bcm2836-trunk/images/ifs-bcm2836.bin

3. Boot up QNX 6.6.0 for Raspberry Pi2 board

3.1 Prerequisites

- A SD Card which the first partition is formatted as FAT32.
- ifs-bcm2836.bin: a QNX 6.6 image for Raspberry Pi2 board, which is built by a valid active key as guide in 2.2 section Build QNX 6.6.0 BSP.
- SD_boot_binaries.zip which is patched in the release package.
- Tera Term software installed on Windows PC.

3.2 Boot up steps

Please follow the steps:

3.2.1 Step 1: Copy the necessary files to SD card.

- Put file ifs-bcm2836.bin which located at bsp-ntotrunk-broadcom-bcm2836-trunk/images/ifs-bcm2836.bin to the root folder of the SD card.
- Extract files in SD_boot_binaries.zip to the root folder of the SD card. After this step, in the root folder of SD card should have these following files:
    - config.txt
    - bootcode.bin
    - start.elf
    - start_cd.elf
    - start_db.elf
    - start_x.elf
    - fixup.dat
    - fixup_cd.dat
    - fixup_db.dat
    - fixup_x.dat
    - ifs-bcm2836.bin

3.2.2 Step 2: Insert SD to Raspberry Pi2 board

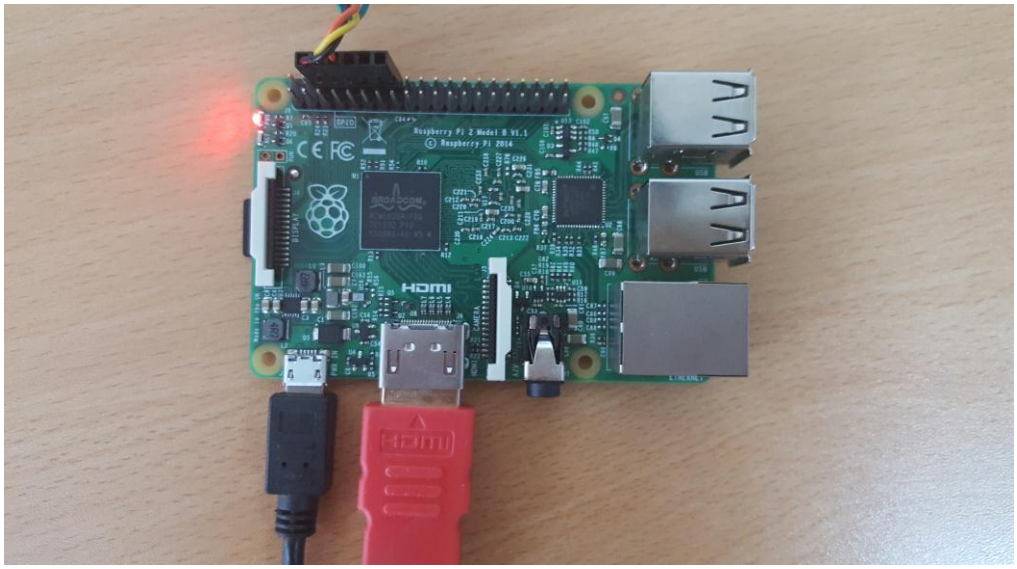
Insert SD card which has the necessary files into SD slot of Raspberry Pi2 board.

3.2.3 Step 3: Connect serial port of Raspberry Pi2 to Window PC

Please use TTL-232R-3V3 (http://www.ftdichip.com/Products/Cables/USBTTLSerial.htm) to connect Raspberry Pi2 board to Window PC as following:

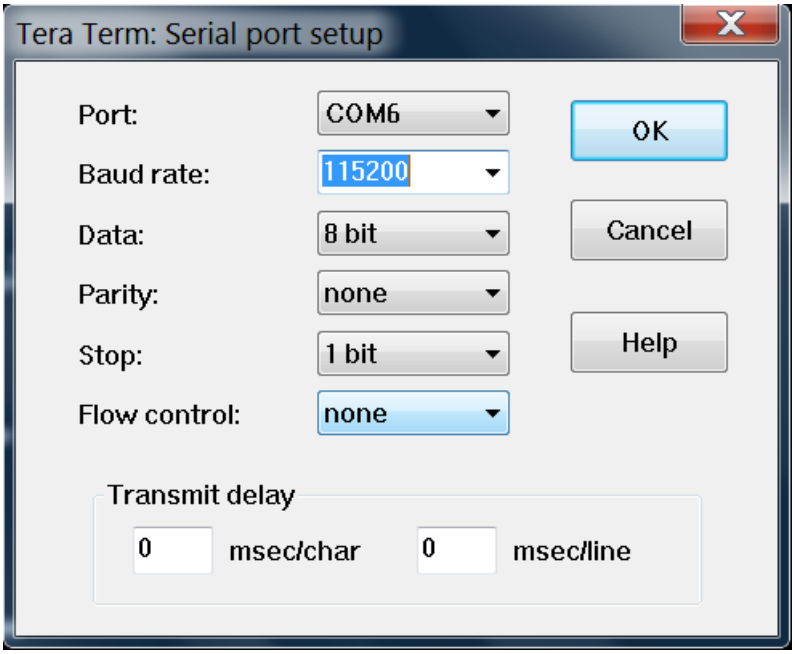
GND:	TTL-232R-3V3 pin1 (Black)	<-------->	RPi2 J8 pin 6
Rx :	TTL-232R-3V3 pin5 (Yellow)	<-------->	RPi2 J8 pin 8
Tx :	TTL-232R-3V3 pin4 (Orange)	<-------->	RPi2 J8 pin 10

Please note: you must use the TTL-232R-3V3 version. The version TTL-232R-5V could damage your Raspberry Pi GPIO because of 5V logic.



3.2.4 Step 4: Setup serial port for Window PC

From Window PC open Tera Term program and set up as following:



3.2.5 Step 5: Power up Raspberry Pi2 board

Raspberry Pi2 board is powered up by plug the board to an USB power source. You could power it by your PC USB port if it could supply more than 800mA.

3.2.6 Step 6: Image QNX 6.6.0 will be loaded

Image will be loaded and the [Tera Term] terminal will output as bellows:

```
CPU0: L1 Icache: 1024x32
CPU0: L1 Dcache: 512x64 WB
CPU0: L2 Dcache: 8192x64 WB
CPU0: VFP-d32 FPSID=41023075
CPU0: NEON MVFR0=10110222 MVFR1=11111111
CPU0: 410fc075: Cortex A7 rev 5 600MHz
```

```
Loading IFS...decompressing...done
CPU1: L1 Icache: 1024x32
CPU1: L1 Dcache: 512x64 WB
CPU1: L2 Dcache: 8192x64 WB
CPU1: VFP-d32 FPSID=41023075
CPU1: NEON MVFR0=10110222 MVFR1=11111111
CPU1: 410fc075: Cortex A7 rev 5 600MHz
CPU2: L1 Icache: 1024x32
CPU2: L1 Dcache: 512x64 WB
CPU2: L2 Dcache: 8192x64 WB
CPU2: VFP-d32 FPSID=41023075
CPU2: NEON MVFR0=10110222 MVFR1=11111111
CPU2: 410fc075: Cortex A7 rev 5 600MHz
CPU3: L1 Icache: 1024x32
CPU3: L1 Dcache: 512x64 WB
CPU3: L2 Dcache: 8192x64 WB
CPU3: VFP-d32 FPSID=41023075
CPU3: NEON MVFR0=10110222 MVFR1=11111111
CPU3: 410fc075: Cortex A7 rev 5 600MHz
alloc_syspage_memory: syspage size:00000dc8 _syspage_ptr:0037e000
callout_io_map: mapping paddr:3f00b200 returns:fc419200
callout_io_map: mapping paddr:40000000 returns:fc41a000
callout_io_map: mapping paddr:3f00b200 returns:fc41b200
callout_io_map: mapping paddr:40000000 returns:fc41c000
callout_io_map: mapping paddr:3f00b200 returns:fc41d200
callout_io_map: mapping paddr:40000000 returns:fc41e000
callout_io_map: mapping paddr:3f00b200 returns:fc41f200
callout_io_map: mapping paddr:40000000 returns:fc420000
callout_io_map: mapping paddr:00000000 returns:fc421000
callout_io_map: mapping paddr:3f100000 returns:fc422000
callout_io_map: mapping paddr:3f00b400 returns:fc423400
callout_io_map: mapping paddr:3f00b400 returns:fc425400
callout_io_map: mapping paddr:3f00b400 returns:fc427400
callout_io_map: mapping paddr:3f201000 returns:fc429000
callout_io_map: mapping paddr:3f201000 returns:fc42a000
callout_io_map: mapping paddr:3f201000 returns:fc42b000
cpu_startnext: cpu1 -> fc410b50
cpu_startnext: cpu2 -> fc410b50
cpu_startnext: cpu3 -> fc410b50

System page at phys:0037e000 user:fc410000 kern:fc410000
Starting next program at vfe058e3c
cpu_startnext: cpu0 -> fe058e3c
VFPv3: fpsid=41023075
coproc_attach(10): attach fe074c34 (fe076b68)
coproc_attach(11): attach fe074c34 (fe076b68)
Welcome to Neutrino 6.6.0 on the RaspBerry P2 Board(ARMv7 Cortex-A7 core)
Starting pl011 driver...
Starting slogger and pipe servers...
RPi2#
```

3.2.7 Step 8: Boot up finish.

Boot up is finished with prompt “RPi2#” and user could enter command from this prompt

4. Test driver

4.1 Serial driver

Make sure can type some commands.

REVISION HISTORY	QNX 6.6.0 Setup Manual For Raspberry Pi2 Board

Rev.	Date	Description	
		Page	Summary
1.00	September 09, 2016	-	First release