30078新竹科學工業園區篤行路八號4樓
4F, No.8, Dusing Rd., Hsinchu Science Park, Hsinchu City 30078, Taiwan, R.O.C.
TEL：886-3-577-8385　FAX：886-3-577-8501
www.issc-tech.com

iSSC
創傑科技股份有限公司
ISSC Technologies Corp.

Users' Guide of BM77SPP03 EVB

iSSC Technologies Corp.

Revision History

Date	Revision Content	Version
2012/08/27	Draft Version	0.1

Content

1. Overview 3

1.1. Outlook 3
1.2. Features 3

2. Block Diagram 4

2.1. Placement 4
2.2. Reset/ Clock 4
2.3. Power Tree 4

3. Hardware Configuration 5

1.3. Power Switch Settings 6
1.4. Mode Definitions 6
1.5. Mode Switch Settings 6

4. Getting Started 7

5. Procedure to Update Firmware 11

6. Procedure to Change EEPROM Parameter 12

Appendix A: PIN Assignment 13

Appendix B: Schematic 15

Appendix C: Q & A 17

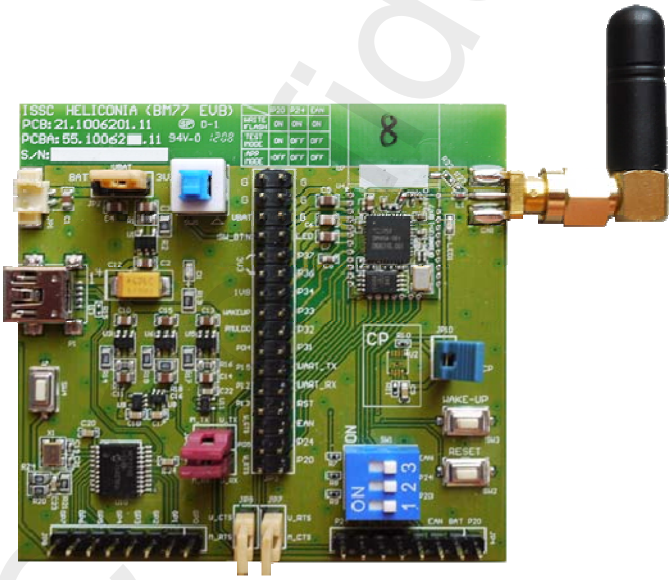
1. Overview

This EVB is for Bluetooth 4.0 dual solutions development and verification. It’s made of ISSC BM77 SPP module. The main power supply of this EVB is USB 5V or Li-Ion BAT. The main power source gets into BM77 module, and the power management unit of this module will generate 3V3 and 1V8 out to provide the power of the IC. The mini USB connector only provides the 5V power from PC, it doesn’t provide the charger function to charge battery.

There are two push buttons of this EVB- the “Reset” and “Wake-Up”. When the module is in idle mode for a long time, it will get into sleep mode automatically for saving power. Press the Wake-Up button when you want to leave the sleep mode.

1.1. Outlook

1. BM77 EVB with BM77SPP Module

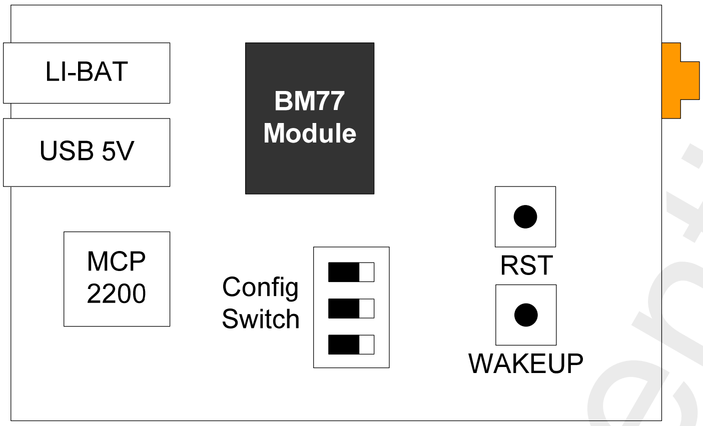


1.2. Features

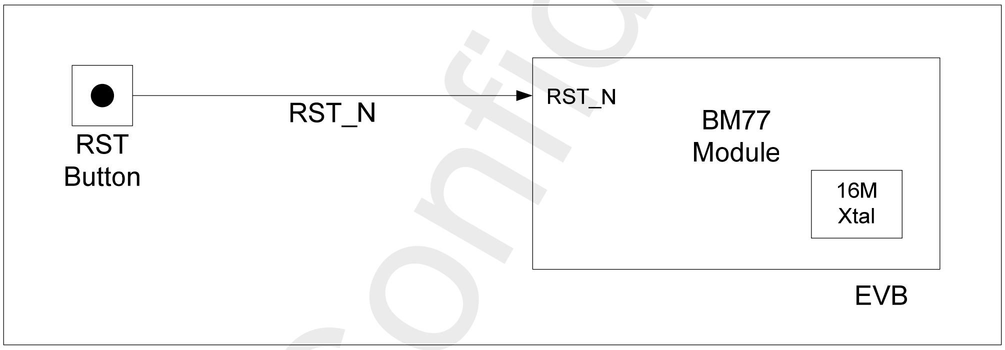
- Easy connect module with MUC or PC without welding
- Easy change EEPROM settings and update firmware code
- Switch for different modes settings (Flash write, EEPROM modified, Application)
- Jumper for 32- pin out
- Embedded MCP2200 USB-UART converter, no need extra convert board or cable
- RF connecter for external Antenna

2. Block Diagram

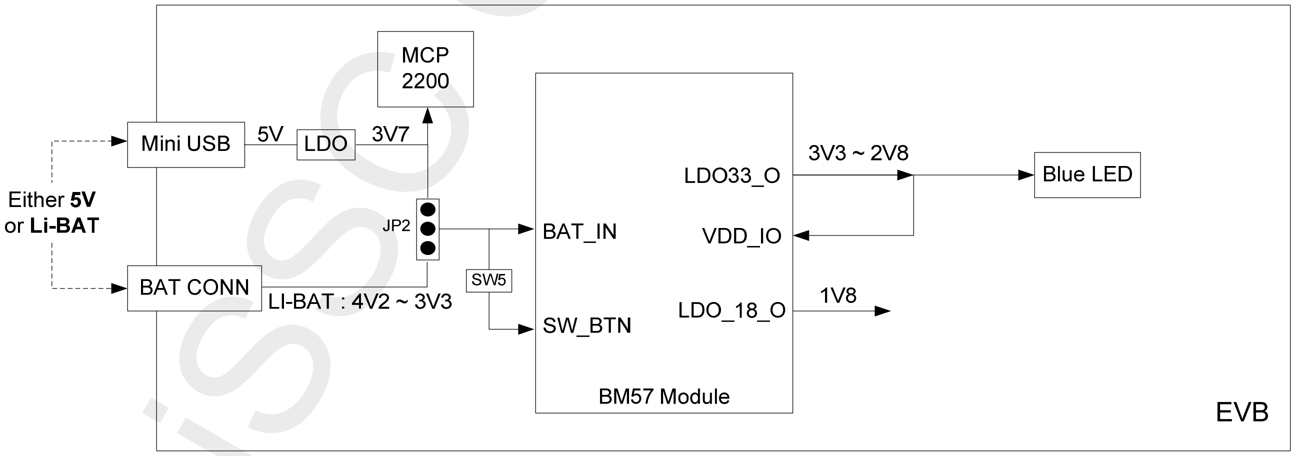
2.1. Placement


LI-BAT
USB 5V
BM77
Module
MCP
2200
Config
Switch
RST
WAKEUP

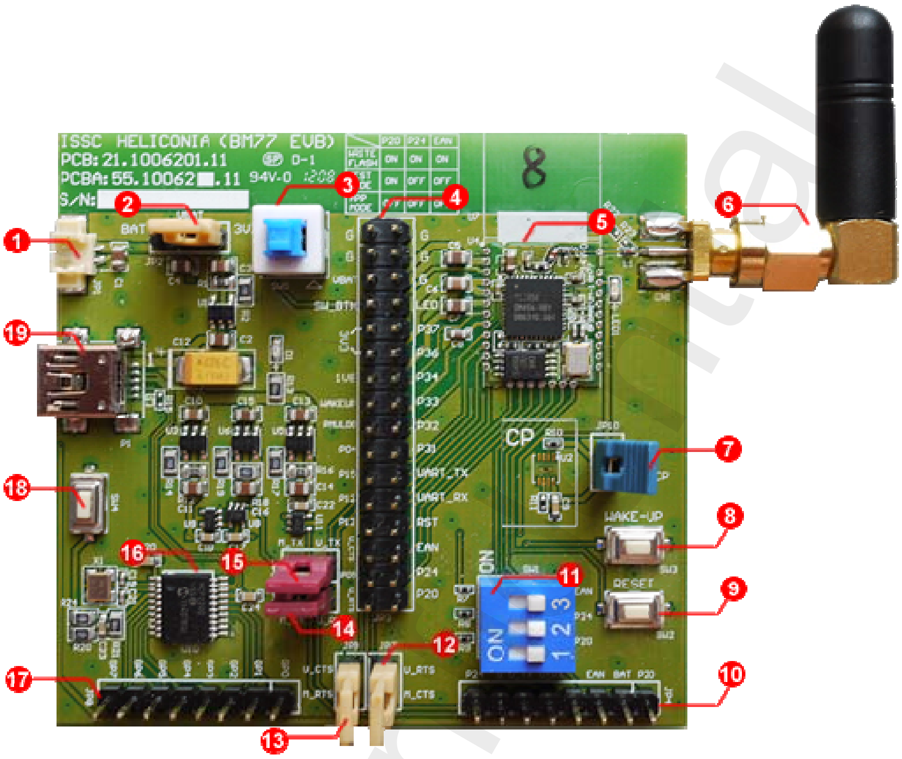
2.2. Reset/ Clock


RST
Button
RST_N
RST_N
BM77
Module
16M
Xtal
EVB

2.3. Power Tree

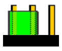
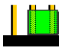

Either 5V
or Li-BAT
Mini USB
5V
LDO
3V7
MCP
2200
JP2
BAT CONN
LI-BAT : 4V2 ~ 3V3
SW5
BAT_IN
SW_BTN
LDO33_O
VDD_IO
LDO_18_O
BM57 Module
3V3 ~ 2V8
1V8
Blue LED
EVB

3. Hardware Configuration



① JP1- Battery connector for Li-Ion Battery, Voltage range 4.2~3.3V

② JP2- Power source jumper

	Source from BAT (4.2V~3.3)
	Source from USB (5V->LDO->3.7V)

③ SW5- The path between SW_BTN & BAT_IN, the button must be pressed down to make BM77 work.

④ JP3- Module 32-PIN out for easy connect the Bluetooth module PIN out to MCU

⑤ Bluetooth Module- BM77

⑥ Dipole Antenna- SMA connector with dipole antenna.

⑦ Reserved.

⑧ SW3- Wake up button to wake up Bluetooth from Shutdown State

⑨ SW2- Reset button for Bluetooth module

⑩ JP4- Connect with iSSC propriety 8 PIN connector (EDGAR). Use Li-Ion battery power and switch SW1 OFF while using EDGAR.

⑪ SW1- Mode Switch (*see 3.2 Mode Definition, 3.3 Mode Settings*)

⑫ JP7- CTS path of UART between BM77 & MCP2200. Remove the jumper if without flow control.

⑬ JP9- RTS path of UART between BM77 & MCP2200. Remove the jumper if without flow control.

⑭ JP6- RX path of UART between BM77 & MCP2200. Remove the jumper if trying to connect MCU & BM77.

⑮ JP5- TX path of UART between BM77 & MCP2200. Remove the jumper if trying to connect MCU & BM77.

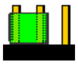
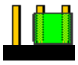
⑯ U10- Microchip MCP2200 chip, UART to USB converter.

⑰ JP8- All the GPIO PIN out of Microchip MCP2200.

⑱ SW4- Reset button for Microchip MCP2200

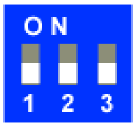
⑲ USB Connector- Mini USB connector

1.3. Power Switch Settings

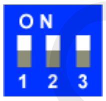
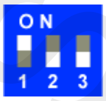
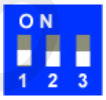
Mode	JP2
USB 5V	
BAT 4.2V~3.3V	

* Notice: SW5 button must be pressed down to make BM77.

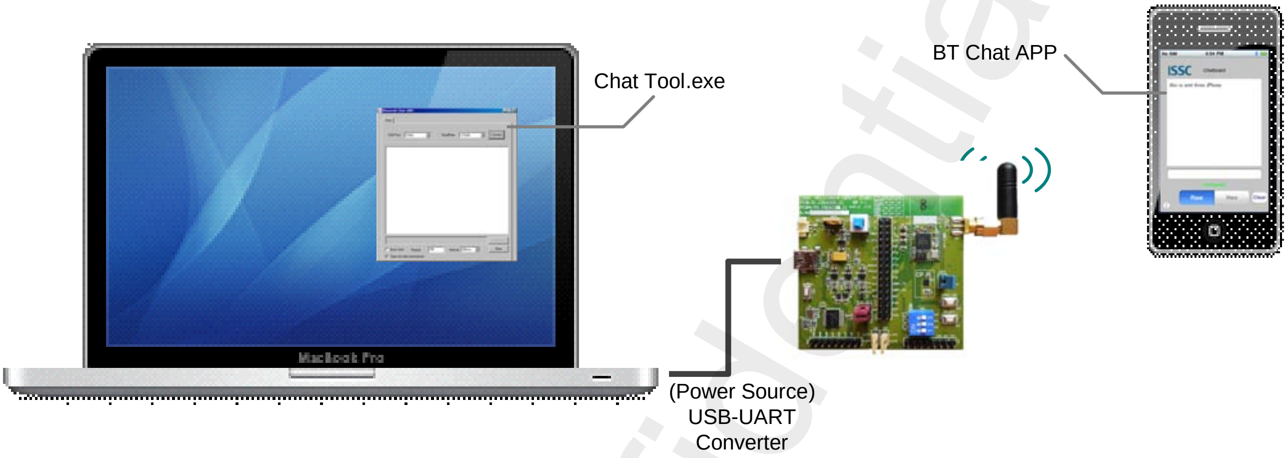
1.4. Mode Definitions

	**Switch Number**	1	2	3
	Pin	P20	P24	EAN
	ON	Low	Low	High
	Function	Test Mode High=Disable/ Application Low=Enable/ Test Mode	Flash Write High=Disable Low=Enable	Boot by Flash or ROM High=ROM Low=Flash

1.5. Mode Switch Settings

Mode	Switch	PIN Definition
Write Flash		1. P20: Low 2. P24: Low 3. EAN: High
Test Mode **(Write EEPROM)**		1. P20: Low 2. P24: High 3. EAN: Low
SPP Application		1. P20: High 2. P24: High 3. EAN: Low

4. Getting Started



Step 1. Check the Power Tree.

Default is using **USB** as the main power supply.

Step 2. Check the Setting of Switch.

Make sure the **SW1** is under the **Application** Mode. 1: *OFF*, 2: *OFF*, 3: *OFF*

Step 3. Connect the **USB** and **dipole antenna** to EVB.

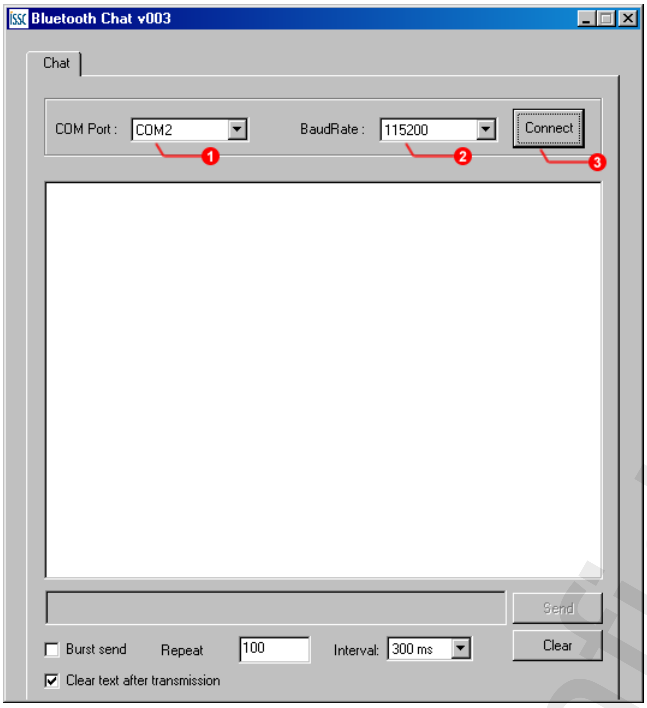
Step 4. Connect the power supply. The default LED behavior:

Stand-by State- the **LED1** of EVB will blink **once** at a time. (Blue)

Pairing, **Connected** State- the **LED01** of EVB will blink **twice** at a time. (Blue)

Step 5. Install Microchip MCP2200 driver. (Search Internet by typing keyword” Microchip MCP2200 Driver”)

Step 6. Run the **Chat Tool v**XXX**.exe** on your PC and make sure the COM Port is connected.

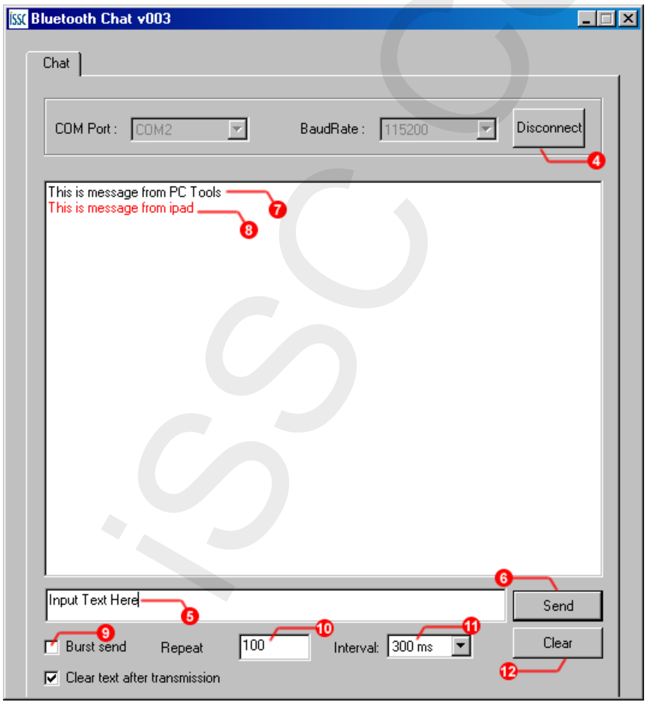

Bluetooth Chat v003
Chat
Connect
Send
Clear
①
②
③

COM Port : COM2
BaudRate : 115200
☐ Burst send
Repeat 100
Interval: 300 ms
☑ Clear text after transmission

① Select the specific **COM Port** by your PC

② Default **BaudRate** is 115200

③ Click **Connect** button.


Bluetooth Chat v003
Chat
Disconnect
Send
Clear
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫

COM Port : COM2
BaudRate : 115200
This is message from PC Tools
This is message from ipad
Input Text Here
☐ Burst send
Repeat 100
Interval: 300 ms
☑ Clear text after transmission

④ The **Connect** button will turn into **Disconnect** after connected.

⑤ **Input the Texts or dialogue in this box.**

⑥ Click **Send** to transmit texts from Bluetooth EVB to smart phone.

⑦ The **Black** texts are sent from PC tool (Bluetooth EVB)

⑧ The **Red** texts are sent from smart phone

⑨ Click the check box of **Burst Send** will be continuous to send text from this tool.

⑩ **Repeat** column means the how many times these texts will be resend.

⑪ **Interval** means the interval between two records.

⑫ **Clear** button will clear up the texts on the screen.

Step 7. Get your smart phone and APP ready. (iSSC offer an Android test APP, please check with your iSSC agent)

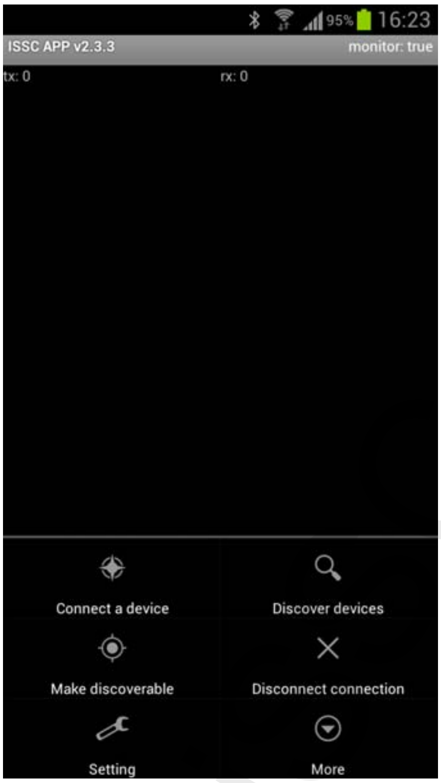
Step 8. Set up the smart phone **Bluetooth connection**

EX: on Samsung Galaxy S3

① Go to **Settings/ Bluetooth** Page.

② Turn **ON** the Bluetooth**,** and **Scan** the Devices. Find the **Dual-SPP** device and press to start Pairing Bluetooth device.

③ After Paired, RUN the ISSC **APP** on Android and Press the **Connect a device** in the Menu.



ISSC APP v2.3.3 monitor: true

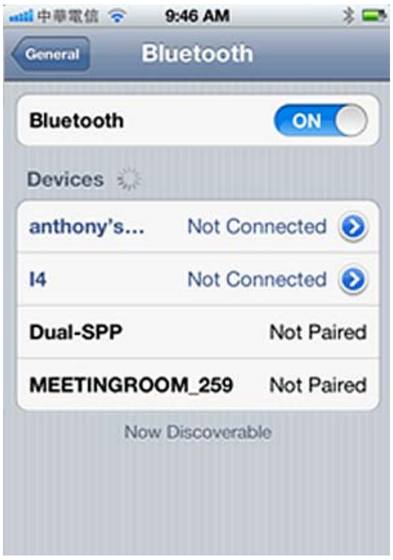
tx: 0 rx: 0

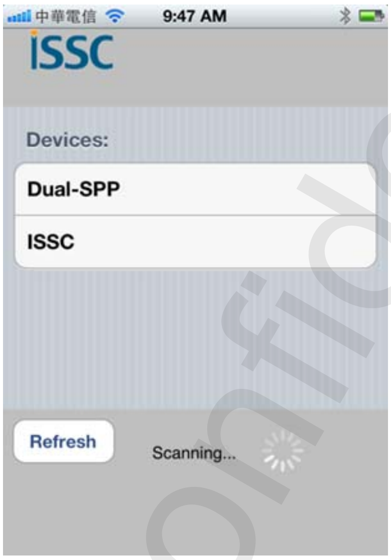
Step 9. This Android is very simple and could show the TX and RX data bytes. And could echo the TX data back the PC. (enable in Setting/ Echo Setting)

Step 10. **ISSC BLE** Chat APP could be downloading from APP Store (Search by **ISSC BT**)

① Get your iPhone 4S or New iPad device ready and install “**ISSC BLE Chat**” APP.

② Set up the iPhone, iPod or iPad **Bluetooth connection** by following operations.


中華電信
9:46 AM
General
Bluetooth
Bluetooth
ON
Devices
anthony's... Not Connected
I4 Not Connected
Dual-SPP Not Paired
MEETINGROOM_259 Not Paired
Now Discoverable

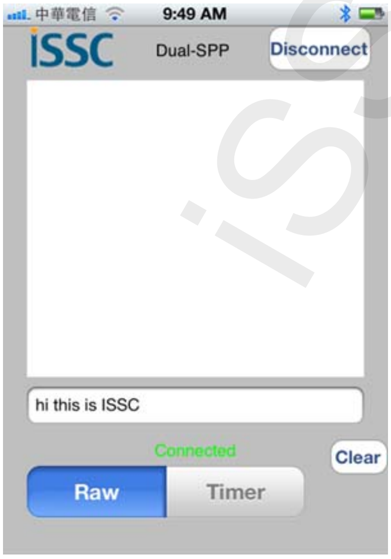

中華電信
9:47 AM
iSSC
Devices:
Dual-SPP
ISSC
Refresh
Scanning...

③ Go to **Settings/ General/ Bluetooth** Page.

④ Turn **ON** the Bluetooth.

⑤ Launch the iSSC BLE Chat APP and it will scan the Devices automatically. Find the **Dual-SPP** device and press to start connecting Bluetooth device.

⑥ After Connected, the screen on iDevice is as following. You could type texts in the column and data will send through BLE. It will show on BT Chat screen of your PC.


中華電信
9:49 AM
iSSC
Dual-SPP
Disconnect
Connected
Clear
Raw
Timer

hi this is ISSC

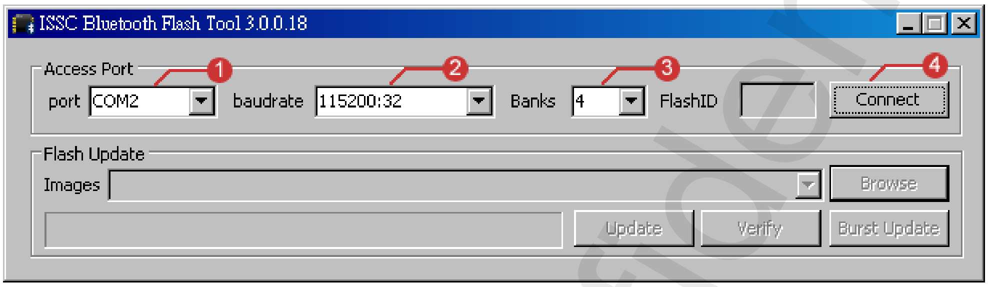
5. Procedure to Update Firmware

The firmware code of BM77 could be updated by following procedures. Make sure you got the correct and official released code from ISSC before starting the procedure.

Step 1. Switch the SW4 to **Write Flash** mode (2:ON, 3:ON, 4:ON), and connect the RS232 cable and Power supply (Default USB 5V) and then turn on the SW1 to **2:ON, 1:OFF** (the number was marked on PCB).

* LED1 will blink very quickly (around 20 msec)

Step 2. Run the **isbtflash.exe** program on WinXP PC, and the window as below:



port COM2
baudrate 115200:32
Banks 4
FlashID

ISSC Bluetooth Flash Tool 3.0.0.18
Access Port
1
2
3
4
Connect
Flash Update
Images
Browse
Update
Verify
Burst Update

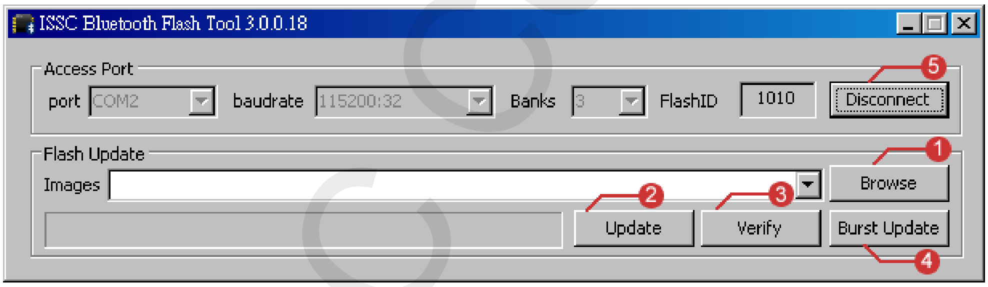
① Select the **Com Port** by your PC environment

② Set the baud rate (default is **115200**)

③ Select the banks as **4**

④ Click the **connect**

Step 3. Select the Flash code files and update the flash on chip.



port COM2
baudrate 115200:32
Banks 3
FlashID 1010

ISSC Bluetooth Flash Tool 3.0.0.18
Access Port
5
Disconnect
Flash Update
Images
1
Browse
2
Update
3
Verify
Burst Update
4

① Click **Browse** to select the new flash code files **(4 files have to be selected)**

② Click **Update** to start update

③ **Verify** is used for comparing the on chip flash code and selected files.

④ **Burst Update** is force updating

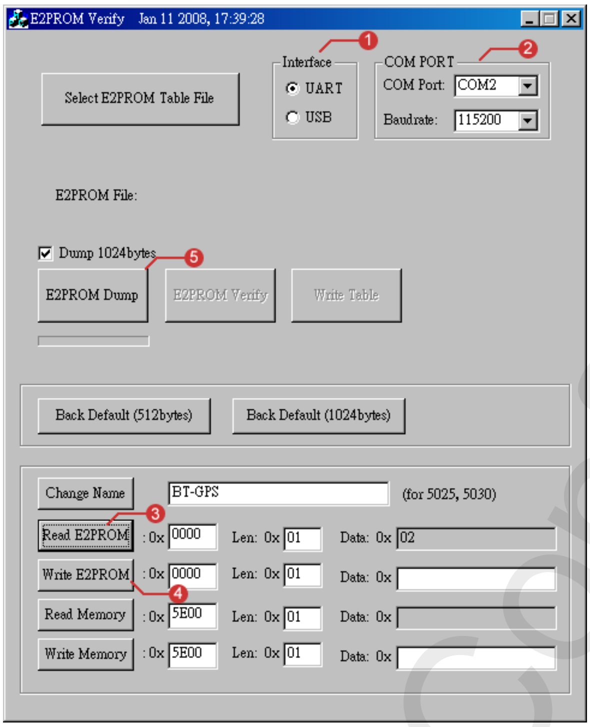
⑤ Click **Disconnect** after the update procedure is finished

6. Procedure to Change EEPROM Parameter

Step 1. Switch the SW4 to **Test Mode** (2:ON, 3:OFF, 4:OFF), and connect the RS232 cable and Power supply (Default USB 5V) and then turn on the SW1 to **2:ON, 1:OFF** (the number was marked on PCB).

* LED1 will keep lighting.

Step 2. Run the **E2PROM_Tool.exe** program and a window will show up as below



E2PROM Verify Jan 11 2008, 17:39:28

Interface: ● UART ○ USB

COM PORT
COM Port: COM2
Baudrate: 115200

E2PROM File:

☑ Dump 1024bytes

Change Name: BT-GPS (for 5025, 5030)

Read E2PROM : 0x 0000 Len: 0x 01 Data: 0x 02
Write E2PROM : 0x 0000 Len: 0x 01 Data: 0x
Read Memory : 0x 5E00 Len: 0x 01 Data: 0x
Write Memory : 0x 5E00 Len: 0x 01 Data: 0x

Step 3.

① Select the Interface as **UART**.

② Specify the COM Port and baud rate (default is **115200**).

③ Fill in the address that you are going to read and the length of the parameter, and then click the **Read E2PROM** button to read the value.

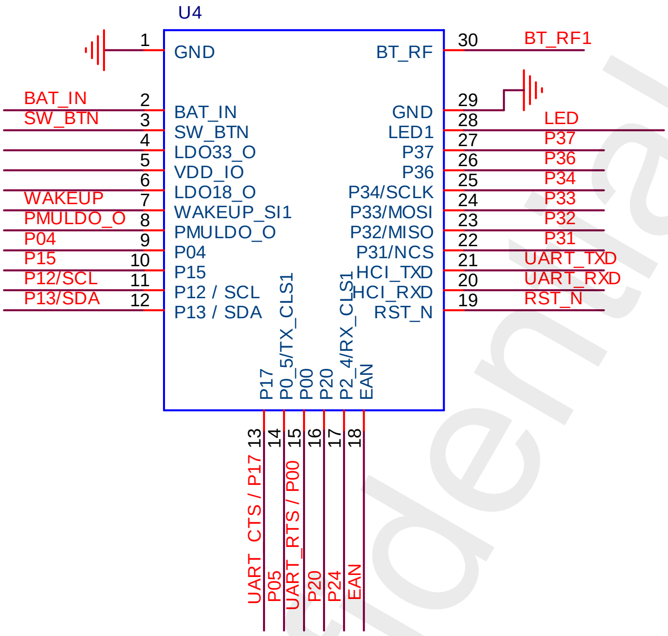
④ Fill in the address that you are going to change and the length of the parameter, and then click the **Write E2PROM** button to change the parameter.

⑤ **E2PROM Dump** can dump the EEPROM table from chip and save into text format.

Notice: Do **NOT** press the **Back Default (512bytes)** or **Back Default (1024bytes)** buttons; otherwise all the **calibration parameters** will be lost.

* Calibration parameters- for example: RF Frequency, Transmit Power and LDO Power

Appendix A: PIN Assignment

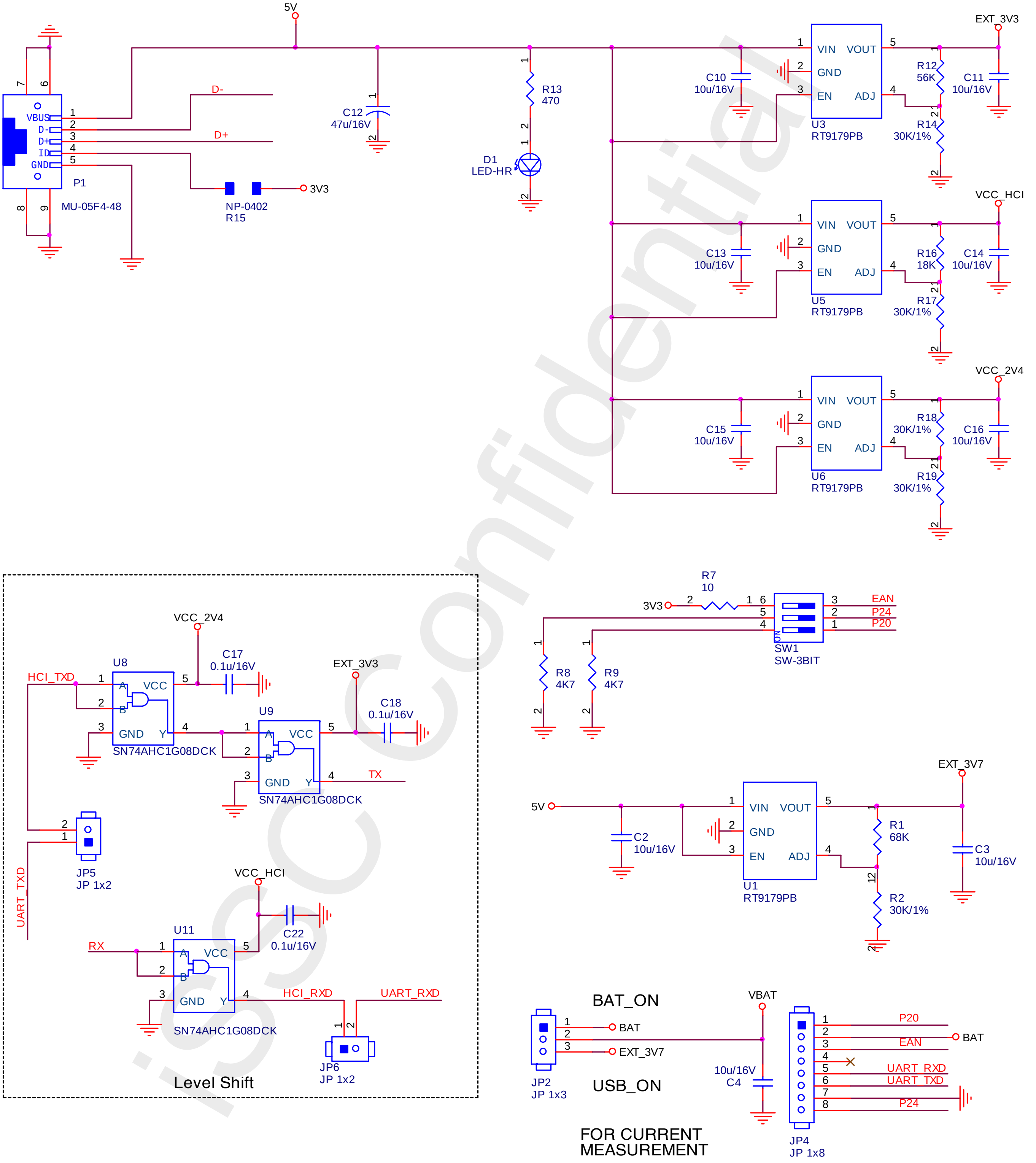

U4
1 GND
2 BAT_IN BAT_IN
3 SW_BTN SW_BTN
4 LDO33_O
5 VDD_IO
6 LDO18_O
7 WAKEUP WAKEUP_SI1
8 PMULDO_O PMULDO_O
9 P04 P04
10 P15 P15
11 P12/SCL P12 / SCL
12 P13/SDA P13 / SDA
13 P17 UART_CTS / P17
14 P0_5/TX_CLS1 P05
15 P00 UART_RTS / P00
16 P20 P20
17 P2_4/RX_CLS1 P24
18 EAN EAN
19 RST_N RST_N
20 HCI_RXD UART_RXD
21 HCI_TXD UART_TXD
22 P31/NCS P31
23 P32/MISO P32
24 P33/MOSI P33
25 P34/SCLK P34
26 P36 P36
27 P37 P37
28 LED1 LED
29 GND
30 BT_RF BT_RF1

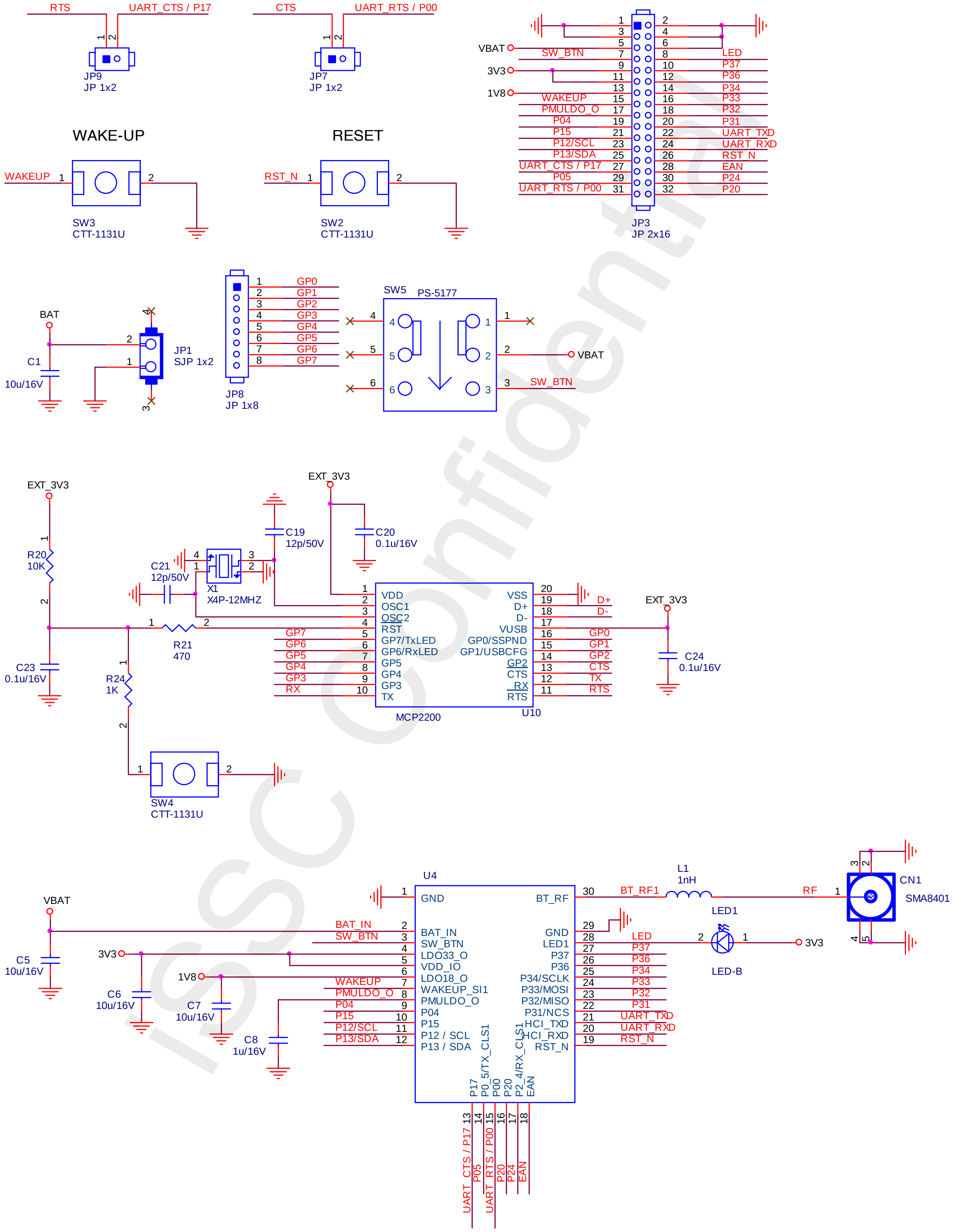
BM77 Module PIN Define

P/N	I/O	Name	Description
1	P	GND	Ground
2	P	BAT_IN	4.2~3.3V Power input
3	I	SW_BTN	Input for software button. H: Power On L: Power Off
4	P	LDO33_O	3V3 LDO output
5	P	VDD_IO	Main power supply
6	P	LDO18_O	LDO18 output
7	I	WAKEUP	Wakeup BM77 from Shutdown State. (Low Active) It is only valid while BM77 into Shutdown State.
8	P	PMULDO_O	Output of PMULDO
9	O	P04	UART_TX_IND: H: BM77 indicate UART data will be transmitted out after a certain timing. (Setting by EEPROM, default 5ms) L: Otherwise. STATUS_IND_2: BM77 State indication , refer to P15

P/N	I/O	Name	Description
10	O	P15	STATUS_IND: Bluetooth link status indication P15/P04: HH → Power default value and Shutdown State. P15/P04: HL → Access State. P15/P04: LL → Link State w/o UART_TXD. P15/P04: LH → Link State with UART_TXD.
11	N/A	P12/ SCL	I2C_SCL, Reserved
12	N/A	P13/ SDA	I2C_SDA, Reserved
13	I	**P17**	- UART_CTS: - Configurable Functional GPIO
14	I/O	**P05**	Configurable Functional GPIO
15	O	**P00**	- UART_RTS - Configurable Functional GPIO
16	I	P20	System configuration, refer to P2_4. (No drive under APP Mode)
17	I	P24	Boot mode selection. (No drive under APP Mode) P2_0/ P2_4: HH → Application LL → Boot mode LH → HCI UART mode for testing and system configuration.
18	I	EAN	ROM/Flash selection. (No drive under APP Mode) H: ROM code; L: Flash code
19	I	RST_N	External reset input (Low Active), Clock period 62.5n at least
20	I	HCI_RXD	UART_RXD
21	O	HCI_TXD	UART_TXD
22	I/O	**P31**	Configurable Functional GPIO
23	I	**P32**	Configurable Functional GPIO
24	I	**P33**	Configurable Functional GPIO
25	I	**P34**	Configurable Functional GPIO
26	O	P36	Reserved
27	I/O	**P37**	Configurable Functional GPIO
28	O	LED1	LED1 driver
29	P	GND	Ground
30	RI/O	BT_RF	RF Port

Appendix B: Schematic


5V
VBUS
D-
D+
ID
GND
P1
MU-05F4-48
D-
D+
NP-0402
R15
3V3
C12
47u/16V
R13
470
D1
LED-HR
EXT_3V3
VIN
VOUT
GND
EN
ADJ
C10
10u/16V
U3
RT9179PB
R12
56K
R14
30K/1%
C11
10u/16V
VCC_HCI
C13
10u/16V
U5
RT9179PB
R16
18K
R17
30K/1%
C14
10u/16V
VCC_2V4
C15
10u/16V
U6
RT9179PB
R18
30K/1%
R19
30K/1%
C16
10u/16V
VCC_2V4
HCI_TXD
U8
C17
0.1u/16V
VCC
A
B
GND
Y
SN74AHC1G08DCK
EXT_3V3
U9
C18
0.1u/16V
SN74AHC1G08DCK
TX
JP5
JP 1x2
UART_TXD
VCC_HCI
C22
0.1u/16V
RX
U11
SN74AHC1G08DCK
HCI_RXD
UART_RXD
JP6
JP 1x2
Level Shift
R7
10
3V3
EAN
P24
P20
SW1
SW-3BIT
R8
4K7
R9
4K7
EXT_3V7
5V
C2
10u/16V
U1
RT9179PB
R1
68K
R2
30K/1%
C3
10u/16V
BAT_ON
VBAT
BAT
EXT_3V7
JP2
JP 1x3
USB_ON
10u/16V
C4
P20
BAT
EAN
UART_RXD
UART_TXD
P24
JP4
JP 1x8
FOR CURRENT
MEASUREMENT


RTS
UART_CTS / P17
JP9
JP 1x2
CTS
UART_RTS / P00
JP7
JP 1x2
WAKE-UP
WAKEUP
SW3
CTT-1131U
RESET
RST_N
SW2
CTT-1131U
VBAT
3V3
1V8
SW_BTN
WAKEUP
PMULDO_O
P04
P15
P12/SCL
P13/SDA
UART_CTS / P17
P05
UART_RTS / P00
LED
P37
P36
P34
P33
P32
P31
UART_TXD
UART_RXD
RST_N
EAN
P24
P20
JP3
JP 2x16
BAT
C1
10u/16V
JP1
SJP 1x2
JP8
JP 1x8
GP0
GP1
GP2
GP3
GP4
GP5
GP6
GP7
SW5
PS-5177
VBAT
SW_BTN
EXT_3V3
R20
10K
C21
12p/50V
X1
X4P-12MHZ
C19
12p/50V
C20
0.1u/16V
R21
470
C23
0.1u/16V
R24
1K
VDD
OSC1
OSC2
RST
GP7/TxLED
GP6/RxLED
GP5
GP4
GP3
TX
VSS
D+
D-
VUSB
GP0/SSPND
GP1/USBCFG
GP2
CTS
RX
RTS
MCP2200
U10
D+
D-
RX
CTS
TX
RTS
C24
0.1u/16V
SW4
CTT-1131U
U4
VBAT
C5
10u/16V
3V3
C6
10u/16V
1V8
C7
10u/16V
C8
1u/16V
BAT_IN
SW_BTN
WAKEUP
PMULDO_O
P04
P15
P12/SCL
P13/SDA
GND
BAT_IN
SW_BTN
LDO33_O
VDD_IO
LDO18_O
WAKEUP_SI1
PMULDO_O
P04
P15
P12 / SCL
P13 / SDA
P17
P0_5/TX_CLS1
P00
P20
P2_4/RX_CLS1
EAN
BT_RF
GND
LED1
P37
P36
P34/SCLK
P33/MOSI
P32/MISO
P31/NCS
HCI_TXD
HCI_RXD
RST_N
UART_CTS / P17
P05
UART_RTS / P00
P20
P24
EAN
BT_RF1
L1
1nH
RF
CN1
SMA8401
LED1
LED-B
LED
P37
P36
P34
P33
P32
P31
UART_TXD
UART_RXD
RST_N
3V3

Appendix C: Q & A

1. What is the maximum current which LDO33_O and LDO18_O can offer?

Ans:

Output Source	**Min**	**Typ**	**Max**	**Unit**
LDO18_O Output Current		60	100	mA
LDO33_O Output Current		100	150	mA

The output current has to contain the RF, GPIO, Flash so the maximum current for others usage would be:

Output Source	**Max**
LDO18_O	20mA
LDO33_O	70mA

2. Maximum baudrate of 16MHz?

Ans: 11520

Clock	**Support Baudrate**
16 MHz	2400
	4800
	9600
	14400
	19200
	28800
	38400
	57600
	115200

3. Can **EEPROM** be read/ wrote from UART port using “E2PROM_Tool”?

Ans: Yes, just adjust the switch to **Test Mode (Write EEPROM)** (*see 3.3 Mode Switch Settings*). And set baudrate as 115200. For more detail *please see chapter 6.*

4. How to flash the **new code** (Firmware) into the module?

Ans: Please *see the Chapter 5* for more detail.

Appendix D: Reversion History

Version	Date	History
0.1	2012/8/27	Draft Version