ABLE42M1

Specification

USER MANUAL v1.05

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Revision History

Rev	Date	Description	Page
1.05	2018/1/18	Chapter 3, table3-3: Add Power Down Mode Setting Information.	10
1.04	2018/1/12	1. Section 1.3: Add description for Table1-1: Pin2, Pin5, Pin16, Pin21. 2. Chapter 3: Add new data for Table 3-2. 3. Section 3.1: Modify Figure3-1. 4. Chapter 4: Modify Figure 4-1.	-
1.03	2017/9/29	Modify Pin Description.	-
1.02	2017/9/27	Fix the Advertising length <= 31.	-
1.01	2017/9/22	Add ABLE42M1 Upper Extension Board information.	-
		Correct the Advertising length >= 19.	-
1.00	2017/9/20	New Release	-

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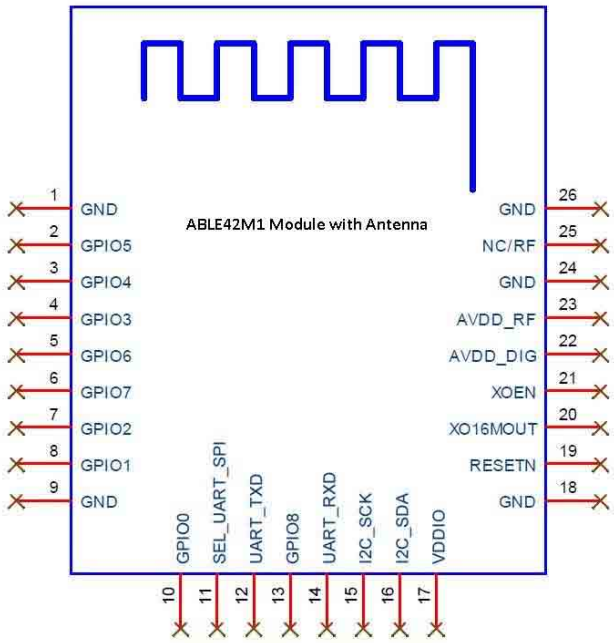


Figure1-1 Pin Definition

1.2 Application Schematic

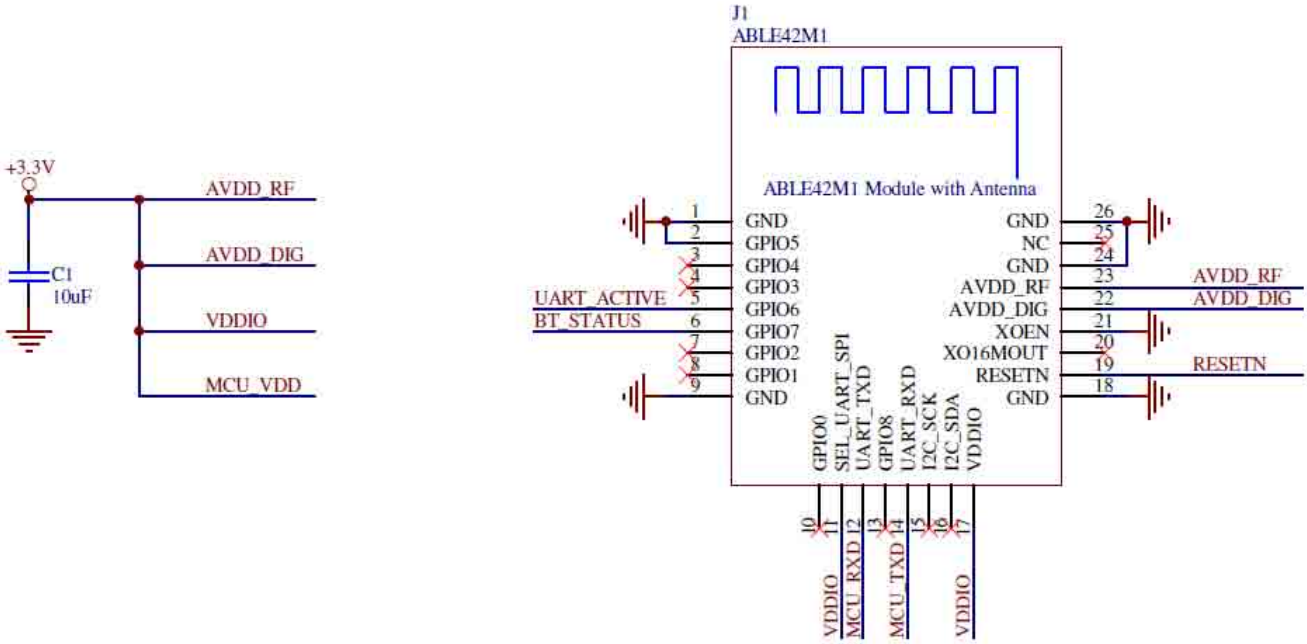


Figure1-2 Application Schematic

1.3 Pin Description

Table1-1 Pin Description

PIN	SIGNAL	TYPE	DESCRIPTION
1	GND	Ground	Ground reference
2	GPIO5	**Input pull-high**	SEL_CMD_DATA, switch HCI mode and Data Mode. ➢ 0: Low, Data transfer mode. (TRSPX Mode), 6uA current ➢ 1: High, HCI Command mode
3	GPIO4	Input pull-high	No used
4	GPIO3	Input pull-high	No used
5	GPIO6	**Input pull-high**	UART Active ➢ 0: Low, UART interface active, 6uA current ➢ 1: High, UART interface inactive
6	GPIO7	Output	BT_STATUS, BT status output ➢ 0: Low, BT Connected ➢ 1: High, BT Disconnected
7	GPIO2	Input pull-high	No used
8	GPIO1	Input pull-high	No used
9	GND	Ground	Ground reference
10	GPIO0	Output high	No used
11	SEL_UART_SPI	Input floating	SEL_UART_SPI, select UART/SPI interface. **(Don't floating)** ➢ 0: Low, No support. ➢ 1: High, UART interface
12	UART_TXD	Output	UART TX Pin
13	GPIO8	Input pull-low	No used
14	UART_RXD	Input pull-high	UART RX Pin
15	I2C_SCK	Output high	I2C_CLK connected with EEPROM
16	I2C_SDA	Input / Output	I2C_SDA connected with EEPROM
17	VDDIO	Supply, 1.8V~3.3V	VCC for IO
18	GND	Ground	Ground reference
19	RESETN	Input	Global reset, active low ➢ 0: Low, Power-Down ➢ 1: High, Power-on
20	XO16MOUT	Output only	XO16M output

PIN	SIGNAL	TYPE	DESCRIPTION
21	XOEN	Input floating	XO16M Enable/Disable. **(Don't floating)** ➢ 0: Low, Disable ➢ 1: High, Enable (Approximately 850uA current is exisisted in Operation Mode or Sleep Mode)
22	AVDD_DIG	Supply, 1.8V~3.3V	VCC for Digital
23	AVDD_RF	Supply, 1.8V~3.3V	VCC for Analog
24	GND	Ground	Ground reference
25	NC	NC	No used
26	GND	Ground	Ground reference

2. General Schematic

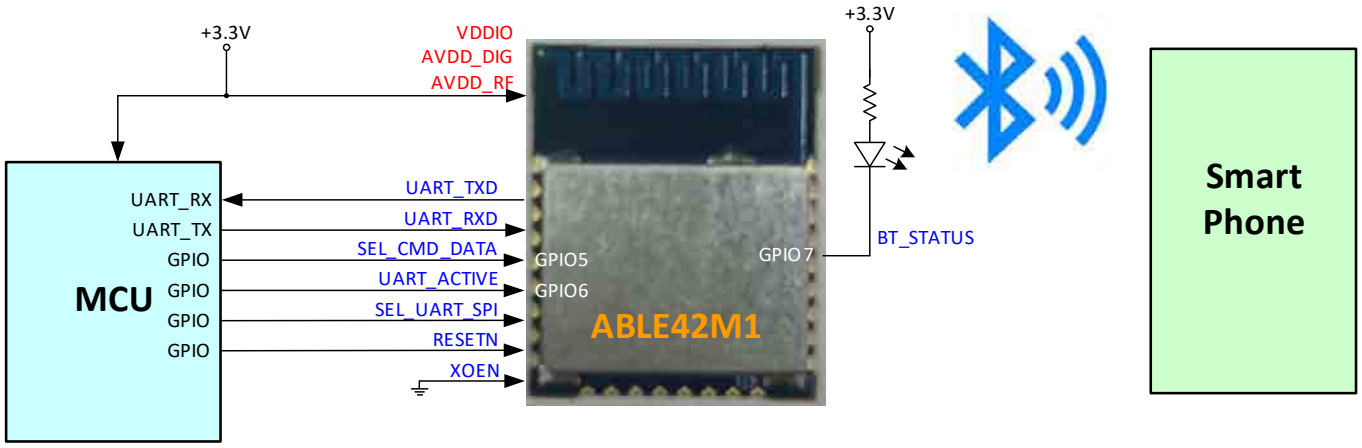


Figure2-1 General Schematic

3. Data Transfer Mode / Power Down Mode

The UART Transport Layer uses the following setting for RS232:

Table3-1 UART Setting

Baud rate	115200
Number of data bits	8
Parity bit	No parity
Start bit	1 start bit
Stop bit	1 stop bit
Flow control	Not Used

Table3-2 Data Transfer Mode Setting

	Data Transfer Mode
GPIO5 (SEL_CMD_DATA)	Low
GPIO6 (UART Active)	Low
SEL_UART_SPI	High
RESETN	High
XOEN	Low

Table3-3 Power Down Mode Setting

	Power Down Mode
GPIO5 (SEL_CMD_DATA)	High
GPIO6 (UART Active)	High
SEL_UART_SPI	High
RESETN	Low
XOEN	Low

3.1 Data Transfer Mode Testing Environment

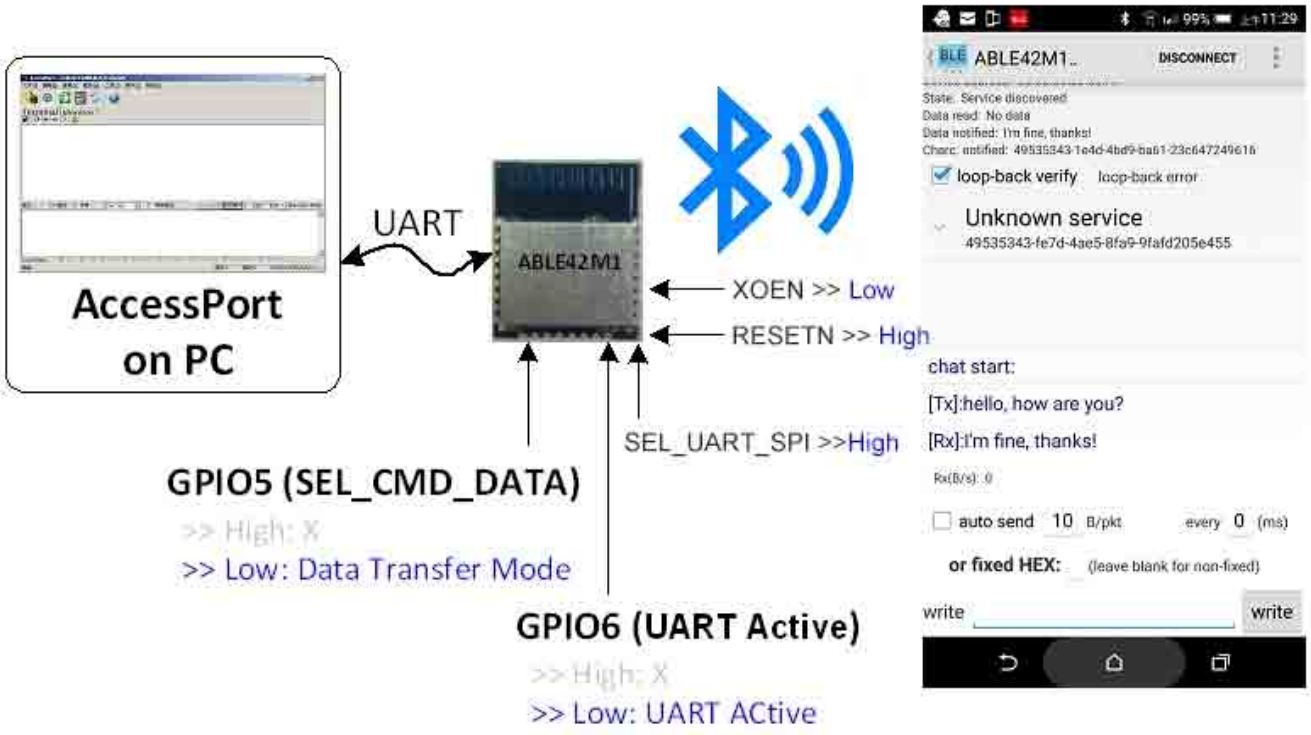


Figure3-1 Data Transfer Mode Environmant

3.2 Data Transfer Example

(1) Connect UART_TXD and UART_RXD to PC. Set baud rate 115200 and turn on AccessPort power. Shown as below:

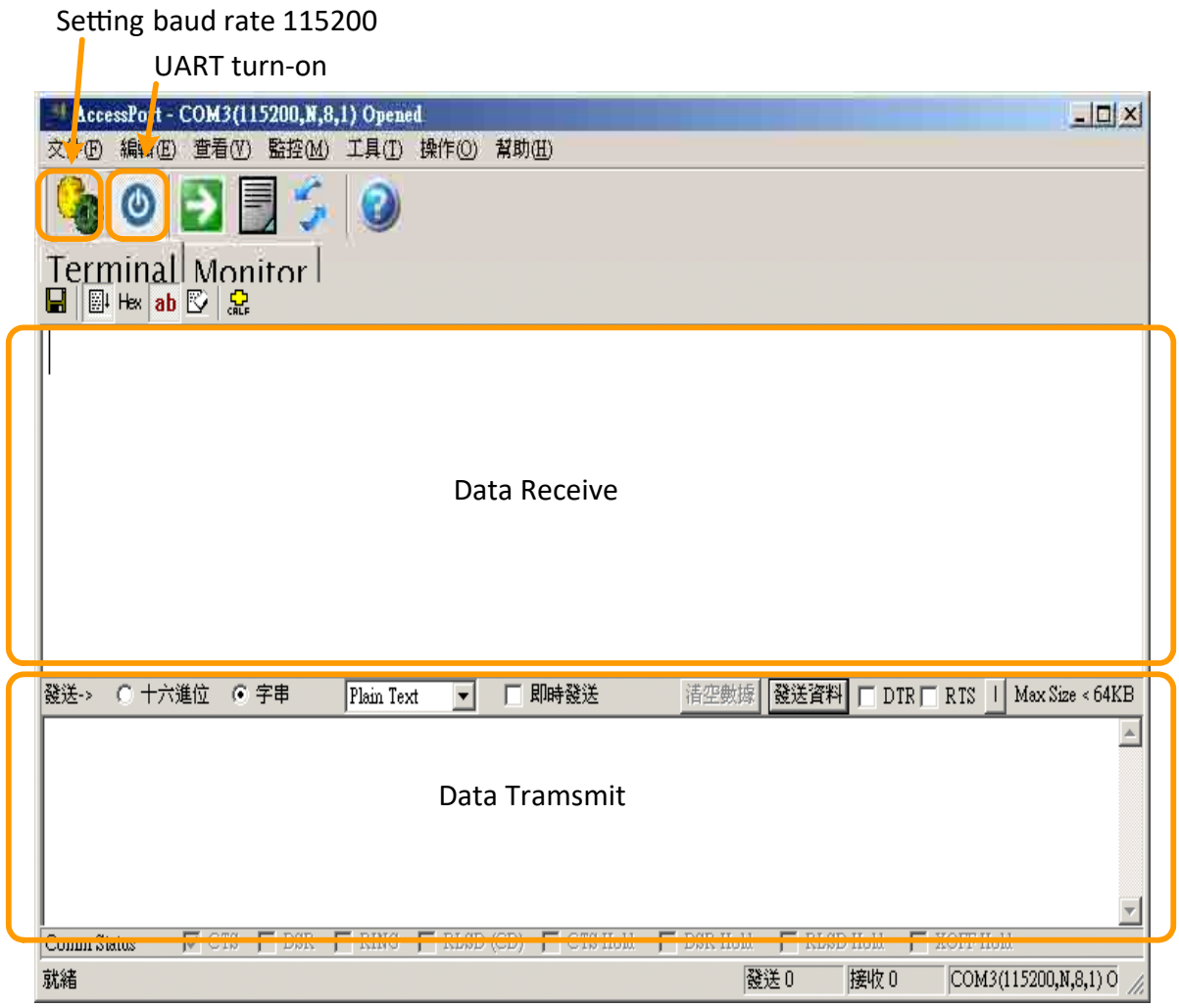


Figure3-2 Open a new AccessPort window

(2) Install ”BLETester” within Android system mobile phone. Search and connect ”ABLE42M1”. You will see the following picture:

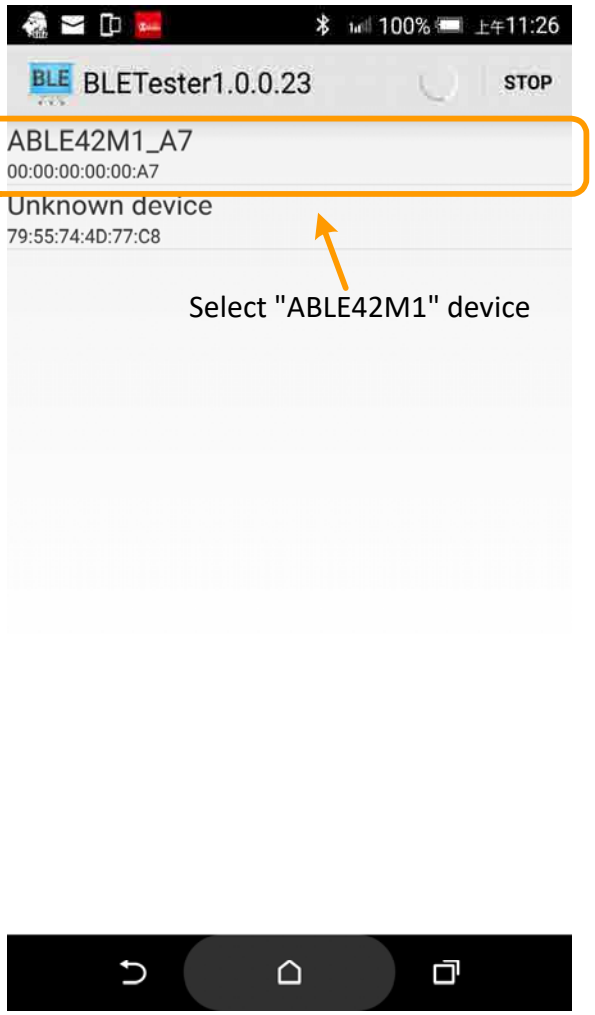


Figure3-3 APP search “ABLE42M1” device

(3) When message of ”hello, how are you?” is sent by mobile phone, the Data Receive page of AccessPort software will receive ”hello, how are you?” and send ”I’m fine, thanks!” from TX Transmit page at the same time. Your mobile phone will then receive ”I’m fine, thanks!”, shown as below:

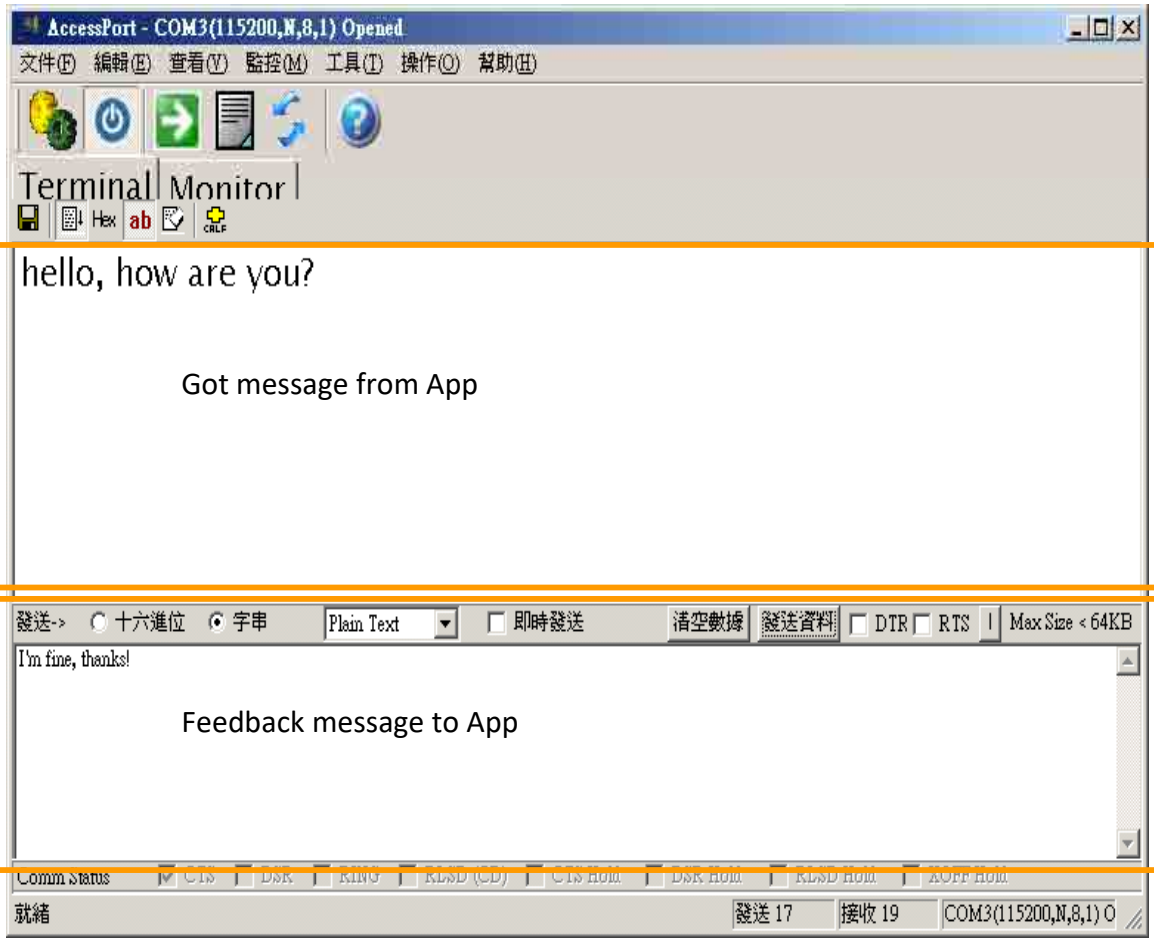


Figure3-4 Transmitting and receiving by AccessPort

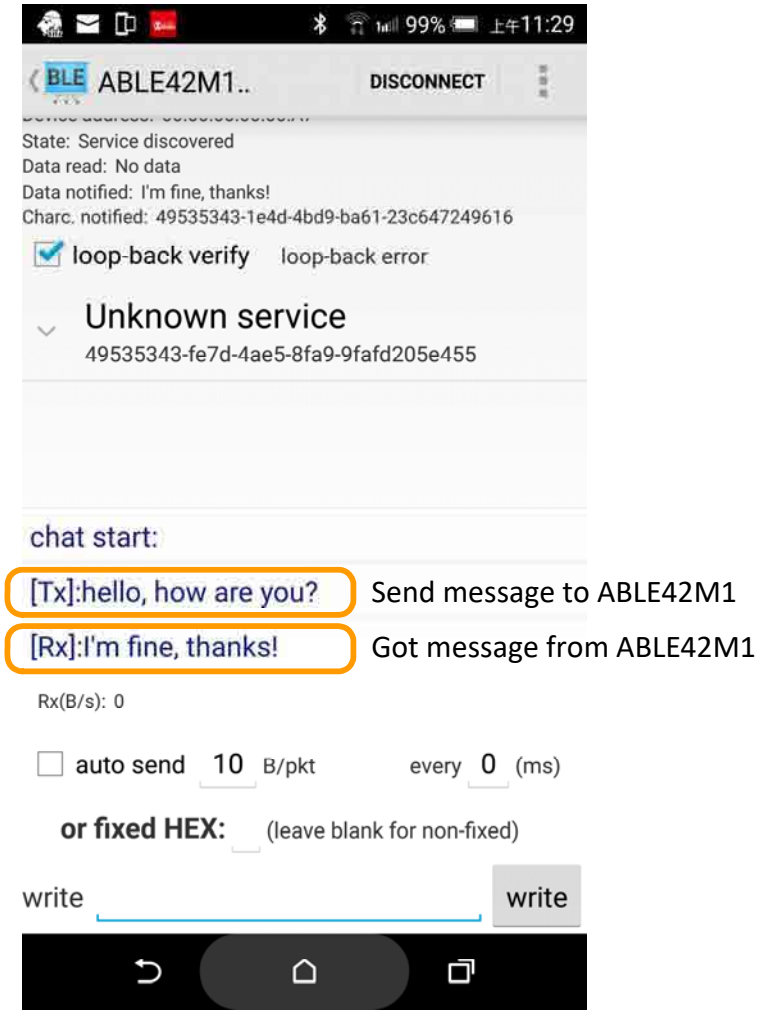


Figure3-5 Transmitting and receiving by APP

4. AM5B RSSI Distance Sensor Demo

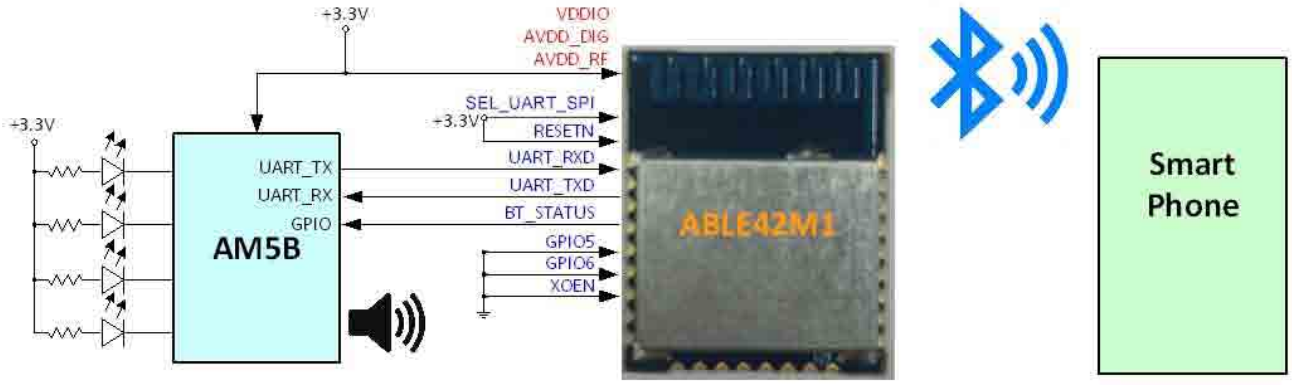


Figure4-1 Functional Diagram

4.1 Schematic

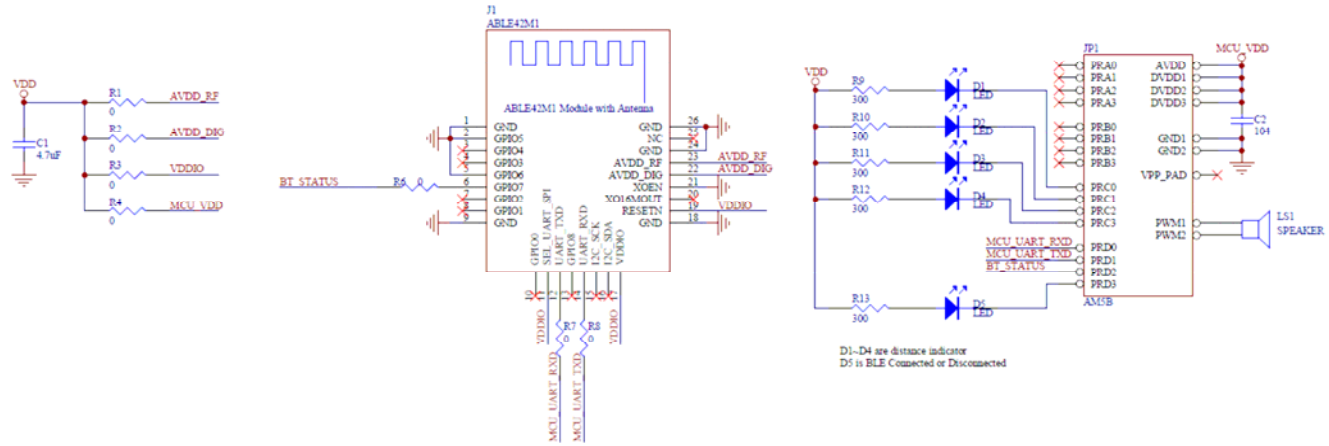


Figure4-2 Schematic

4.2 APP

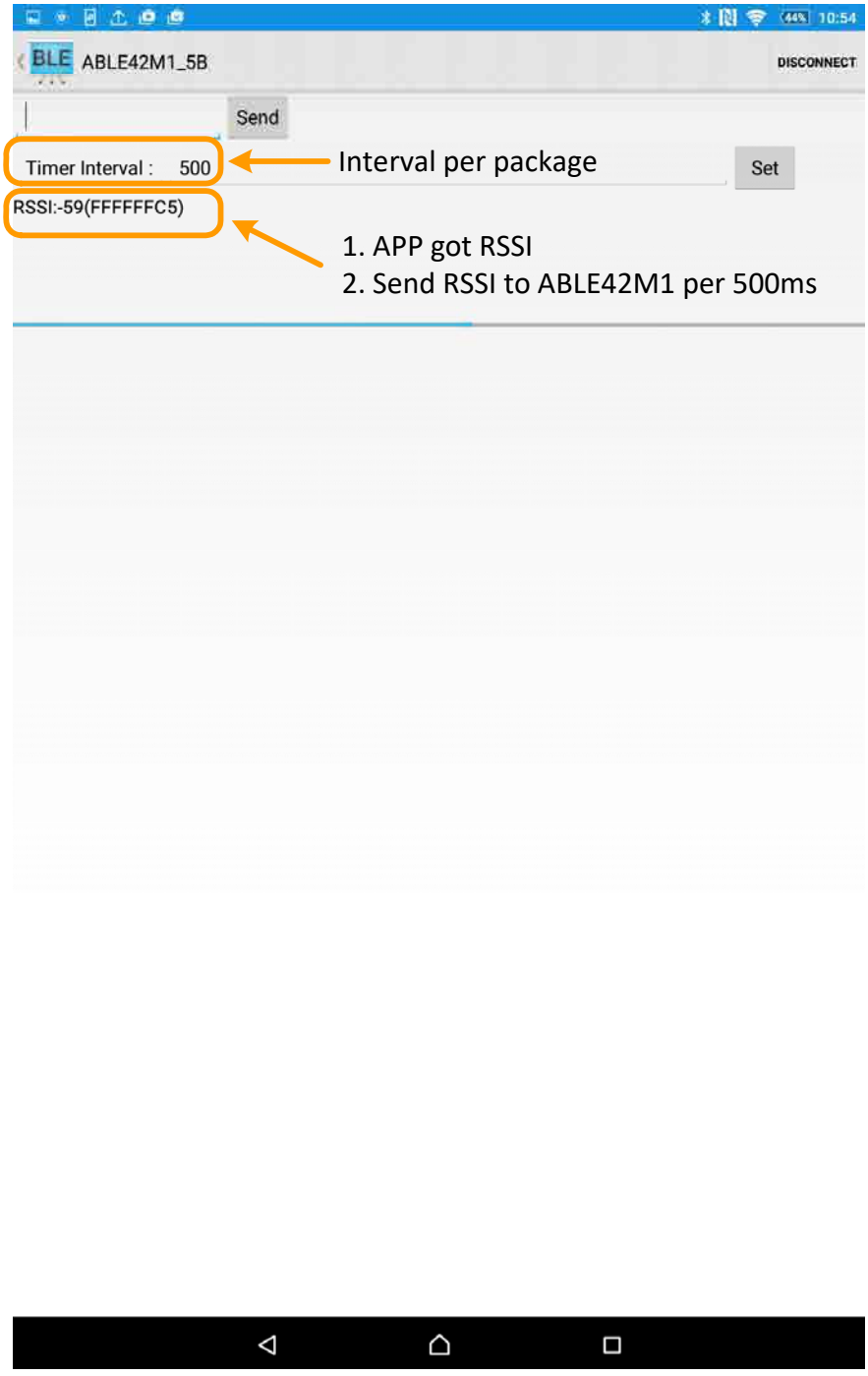


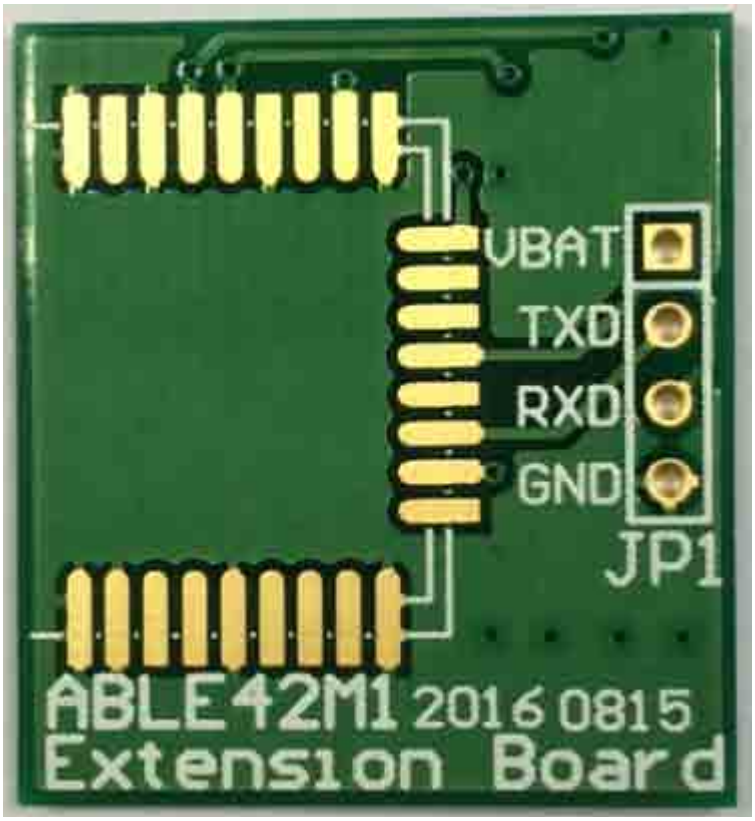
Figure4-3 APP

4.3 Functional Description

(1) This sample demonstrates how far or closes the distance between cell phone and *AM5B* system. The cell phone judges the relative distance by the receiving power of ABLE42M1; however, there might be error caused while judging RSSI since the Bluetooth chip for each cell phone is different.

(2) After cell phone and ABLE42M1 are connected, the cell phone will receive RSSI value and transmit back to ABLE42M1 mode, AM5B system will judge the relative distance after receiving RSSI. 4bits LED is used to indicate the distance; 4 LED all light up means a closed distance while less LED means farther distance until all lights are turned off.

5. Extension Board



VDDIO/AVDD_DIG/AVDD_RF

UART_TXD

UART_RXD

GND

Figure5-1 ABLE42M1 Extension Board – Ver. 20160815

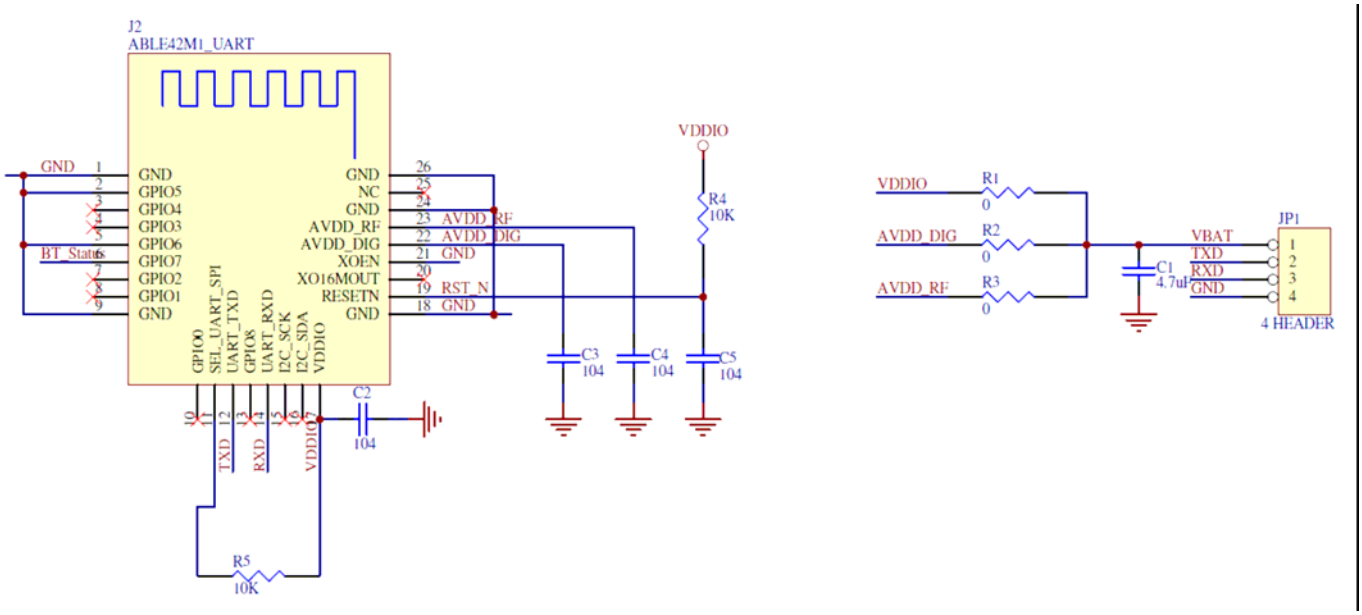
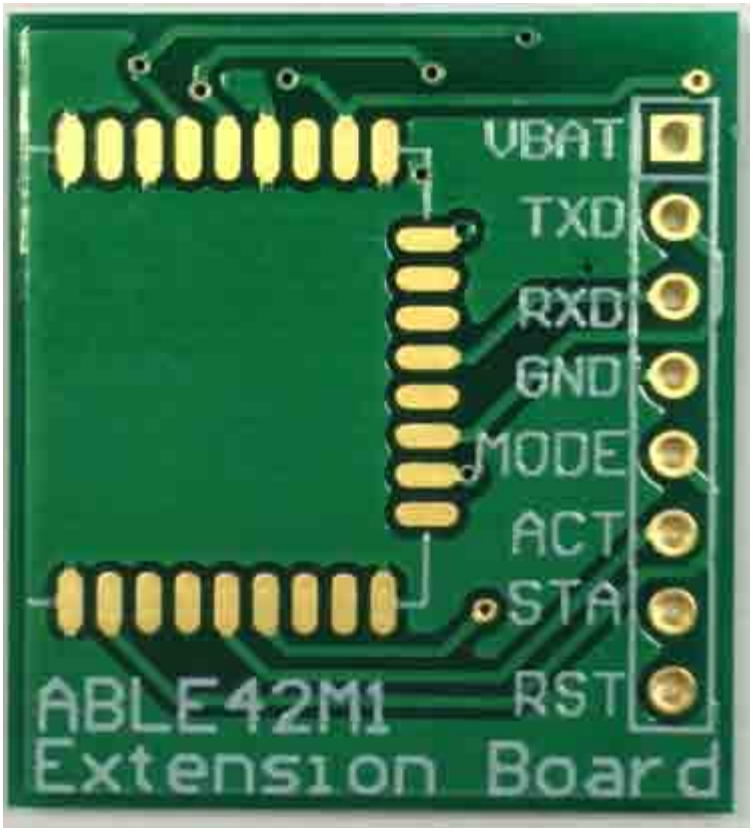


Figure5-2 ABLE42M1 Extension Board Schematic – Ver. 20160815



VDDIO/AVDD_DIG/AVDD_RF

UART_TXD

UART_RXD

GND

GPIO5

UART_ACTIVE

BT_STATUS

RESETN

Figure5-3 ABLE42M1 Extension Board – Ver. 20170522

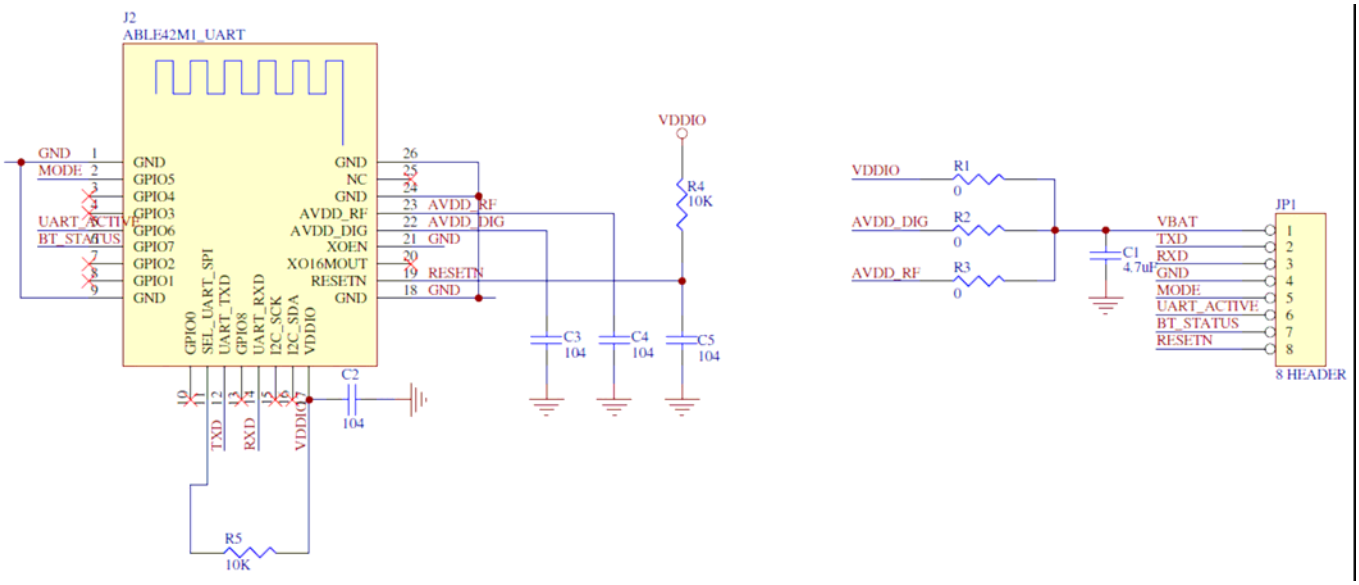


Figure5-4 ABLE42M1 Extension Board Schematic – Ver. 20170522

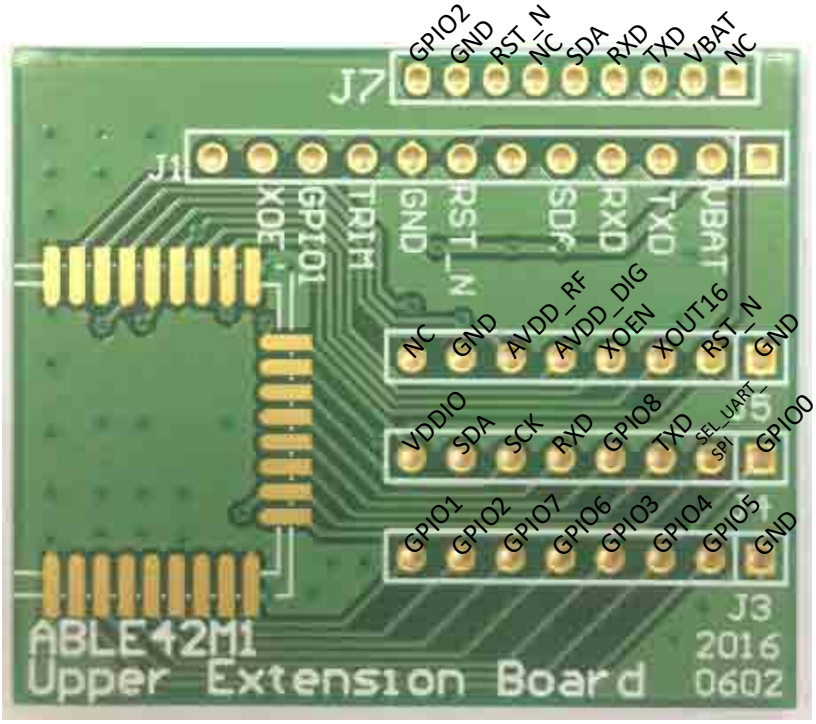


Figure5-5ABLE42M1 Upper Extension Board – Ver. 20160602

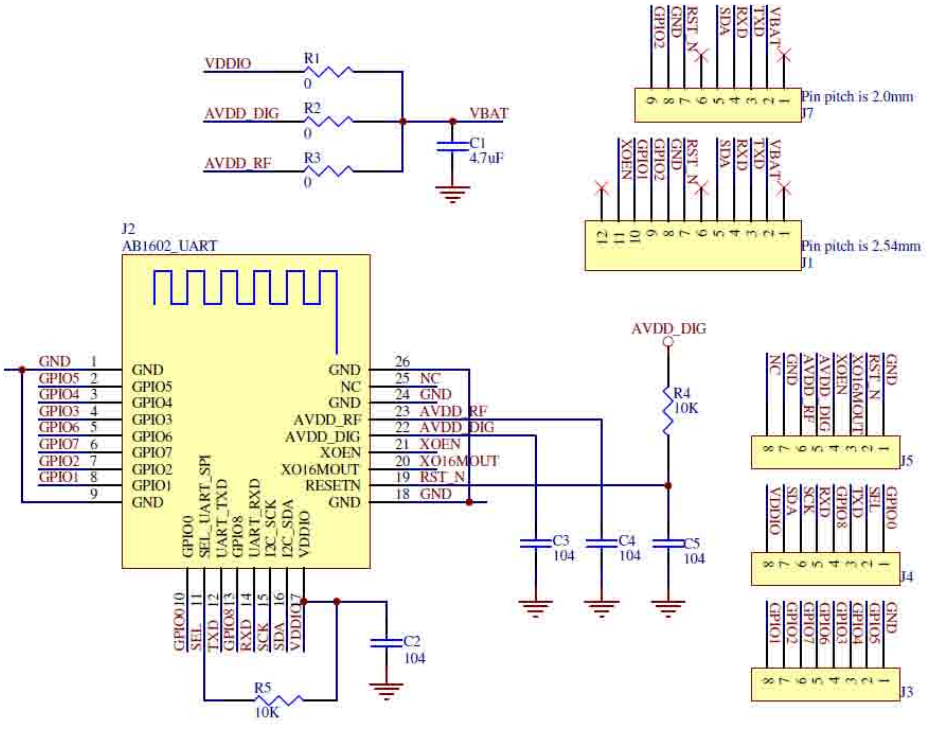


Figure5-6 ABLE42M1 Upper Extension Board Schematic – Ver. 20160602

6. BLE Firmware Version

6.1 20160728

(1) UUID: 49535343-FE7D-4AE5-8FA9-9FAFD205E455

- Data transfer mode. (TRSPX Mode)

6.2 20170712

(1) UUID: 0000E455-0000-1000-8000-00805F9B34FB

- Data transfer mode. (TRSPX Mode)

(2) UUID: 0000FFE0-0000-1000-8000-00805F9B34FB

- App can modify the BDName, BDAddr and ADV interval.
- GPIO4 outputs high pulse at first and applies on wake-up MCU before RX data is sent.

6.3 How to use “20170712 firmware” to modify BDName, BDAddr and ADV inteaval?

Download  “**Alpha BLE**” app in app store for iOS device.

Download  “**nRF Connect**” app in google play store for android device.

Select 0xFFE0 service, and follow the data format below:

Feature	Header	Length	Value	Example
Advertising data	Data[0]= 0x01	Data[1]= Advertising length Data[5]= BD Name length+1	Data[7]~data[19] BD Name	Advertising length <= 18(0x12) Ex1: Modify BD Name to “ABC” 01 08 02 01 05 04 09 41 42 43 Ex2: Modify BD Name to “ABCDEFGHIJK” 01 10 02 01 05 0C 09 41 42 43 44 45 46 47 48 49 4A 4B Ex3: Modify BD Name to “ABCDEFGHIJKLM” 01 12 02 01 05 0E 09 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D
	Data[0]= 0x02	NA	Data[1]~data[19] BD Name	Advertising length >= 19(0x13), and <=31(0x1F) EX4: Modify BD Name to “ABCDEFGHIJKLMN” 01 13 02 01 05 0F 09 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 02 4E Ex5: Modify BD Name to “ABCDEFGHIJKLMNOPQRST” 01 19 02 01 05 15 09 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 02 4E 4F 50 51 52 53 54 Ex6: Modify BD Name to “ABCDEFGHIJKLMNOPQRSTUVWXYZ” 01 1F 02 01 05 1B 09 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 02 4E 4F 50 51 52 53 54 55 56 57 58 59 5A
Advertising interval	Data[0]= 0x03	NA	Data[1]~data[4] adverting	Ex7: Modify advertiting interval to “0.625ms x 0x00A0 = 100ms” 03 A0 00 A0 00

Feature	Header	Length	Value	Example
			interval	Ex8: Modify advertiting interval to “0.625ms x 0x0320 = 500ms” 03 20 03 20 03
BD Address	Data[0]= 0x04	NA	Data[2]~data[6] BD Address	Ex9: Modify BD Address to “0x060504030201” 04 01 02 03 04 05 06

7. FCC & IC statement

FCC statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IC statement

This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux
appareils radio exempts de licence. L'exploitation est autorisée aux deux conditionssuivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage
radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF exposure statements: Section 2.1091(d) (3) - Mobile devices (a minimum separation distance may be required).
e.g. This device must be used in fixed locations and in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.