FSC-BT816

4.0 Dual Mode Bluetooth Module Data Sheet

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Release Record

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Revision 1.0	2013-8-8	First Release
Revision 2.0	2013-12-10	
Revision 2.2	2014-9-29	
Revision 2.3	2014-10-22	
Revision 2.4	2014-10-29	
Revision 2.5	2015-7-21	

1. INTRODUCTION

FSC-BT816 is a fully integrated Bluetooth module that complies with Bluetooth 4.0 dual mode protocols(BR/EDR/LE). It provides several interfaces such as UART, I2C, PCM, AIO, PIO, etc., which can customized different applications.

FSC-BT816 supports various profiles. It integrates MCU, Baseband controller, RF, etc. in a small package, so the designers can have better flexibilities for the product shapes.

FSC-BT816 can be controlled by UART port or other interfaces. Please refer to Feasycom software design guide for the interfacing protocol.

1.1 Block Diagram

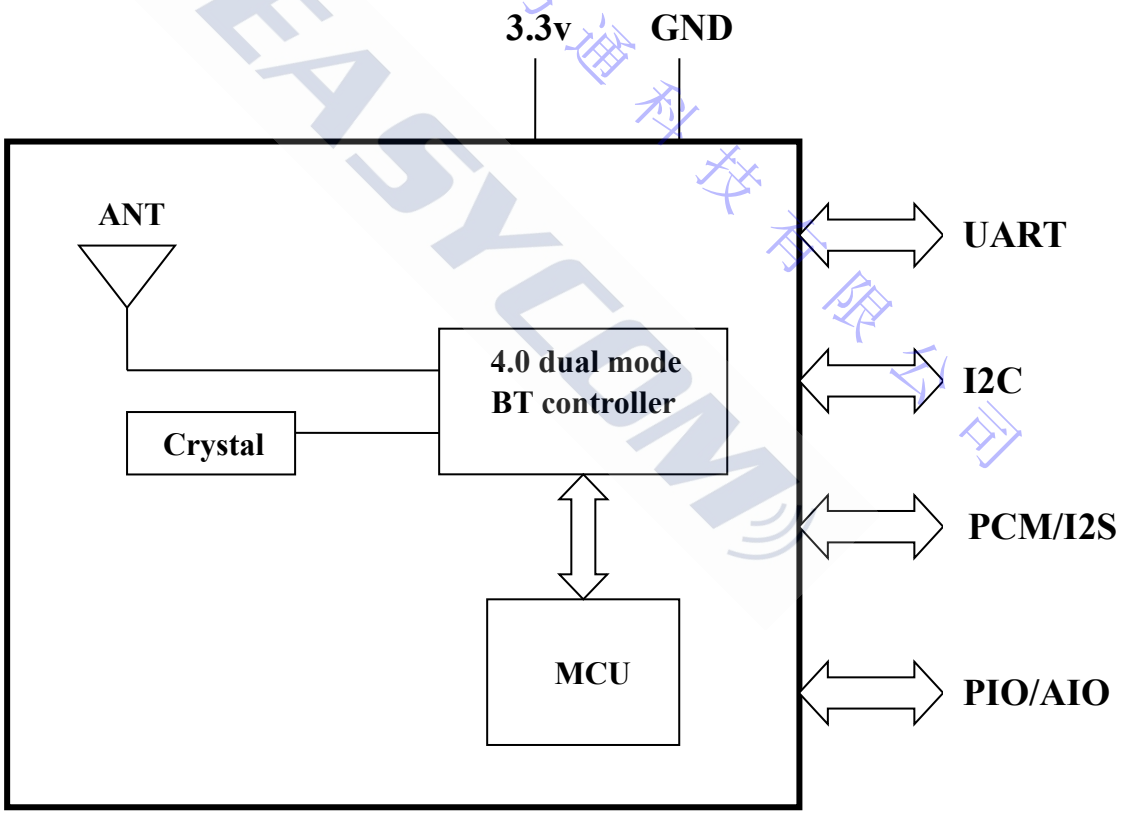

Figure 1

1.2 Feature

- Fully qualified Bluetooth 4.0/3.0/2.1/2.0/1.2/1.1
- Postage stamp sized form factor, 13mm x 27mm x 2mm
- Low power
- Class 1.5 support(high output power)
- The default UART Baud rate is 115.2Kbps and can support from 1200bps up to 921Kbps,.
- UART, I2C , PCM data connection interfaces.
- Embedded Bluetooth stack profiles support(requires no host stack): SPP, HFP/HSP, HID, MAP, and all LE protocols.

1.3 Application

- Smart Watch and Bluetooth Bracelet
- Health & Medical devices
- Measurement and monitoring systems
- Industrial sensors and controls
- Asset tacking

2. GENERAL SPECIFICATION

General Specification	
Chip Set	CC2564
Product ID	FSC-BT816
Dimension	13mm x 27mm x 2mm
Bluetooth Specification	Bluetooth V4.0 (Dual Mode)
Power Supply	3.3 Volt DC
Output Power	10.5 dBm (Class 1.5)
Sensitivity	-82dBm@0.1%BER
Frequency Band	2.402GHz -2.480GHz ISM band
Modulation	FHSS,GFSK,DPSK,DQPSK
Baseband Crystal OSC	26MHz
Hopping & channels	1600hops/sec, 1MHz channel space,79 Channels
RF Input Impedance	50 ohms
Antenna	Internal (Default)
Interface	Data: UART (Standard), I2C Audio: PCM/I2S Others: PIO, AIO, Touch sensor, PWM.
Profile	SPP, BLE (Standard) HFP, A2DP, AVRCP, MAP, PBAP
Temperature	-40ºC to +85ºC
Humidity	10%~95% Non-Condensing
Environmental	RoHS Compliant

Table 1

3. PHYSICAL CHARACTERISTIC

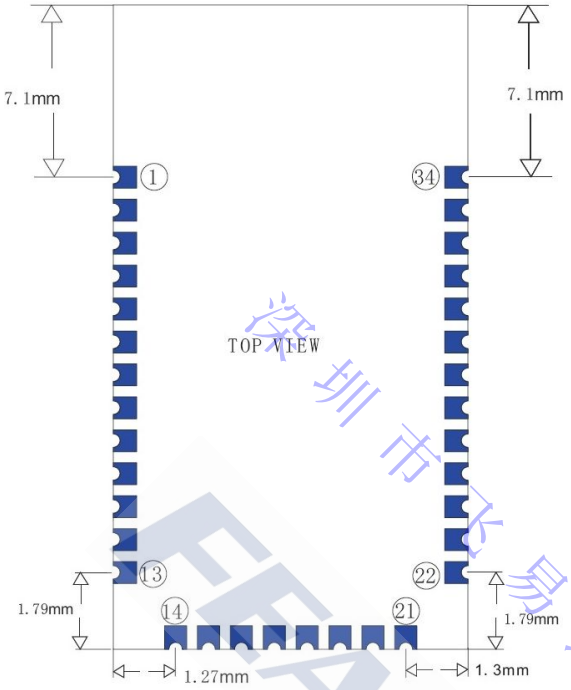

Figure 2

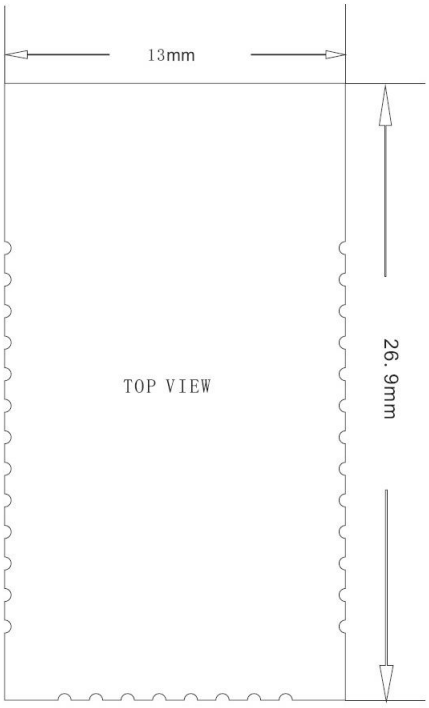

Figure 3

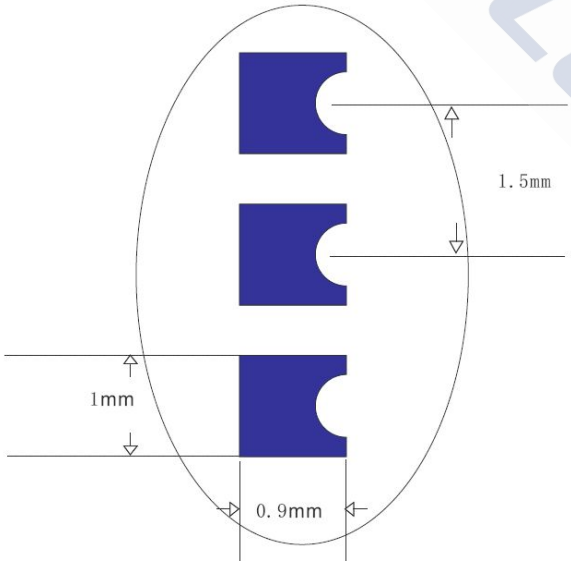

Figure 4

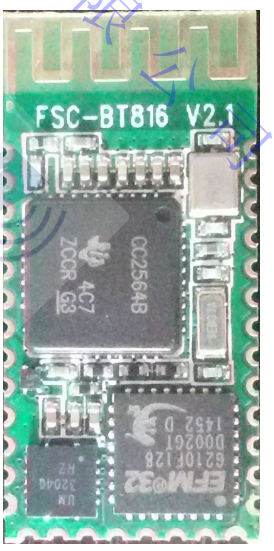

Figure 5

4. PIN DEFINITION DESCRIPTIONS

Pin NO.	Pin Name	Type	Pin Descriptions
1	UART-TX	CMOS output	UART data output
2	UART-RX	CMOS input	UART data input
3	UART-CTS	CMOS input	UART clear to send active low Alternative Function:Programmable input/output line
4	UART-RTS	CMOS output	UART request to send active low Alternative Function:Programmable input/output line
5	PCM-CLK	Bi-directional	Synchronous data clock(Operating voltage level: 1.8V)
6	PCM-OUT	CMOS output	Synchronous data output(Operating voltage level: 1.8V)
7	PCM-IN	CMOS input	Synchronous data input(Operating voltage level: 1.8V)
8	PCM-SYNC	Bi-directional	Synchronous data sync(Operating voltage level: 1.8V)
9	AIO0	Bi-directional	Programmable input/output line
10	AIO1	Bi-directional	Programmable input/output line
11	REST	CMOS input	Reset if low. Input debounced so must be low for >5ms to cause a reset.
12	VDD-3V3	VDD	Power supply voltage 3.3V
13	GND	VSS	Power Ground
14	NC	NC	NC
15	NC	NC	NC
16	SPI_CSB	Input with strong pull-up	Chip select for SPI(For upgrading)
17	SPI_MOSI	Input with weak pull-down	SPI data input(For upgrading)
18	SPI_MISO	Output with weak pull-down	SPI data output(For upgrading)
19	SPI_CLK	Input with weak pull-down	SPI clock(For upgrading)
20	PIO12	NC	NC
21	GND	VSS	Power Ground
22	GND	VSS	Power Ground

23	PIO0	Bi-directional	Programmable input/output line
24	PIO1	Bi-directional	Programmable input/output line
25	PIO2	Bi-directional	Programmable input/output line
26	PIO3	Bi-directional	Programmable input/output line
27	PIO4	Bi-directional	Programmable input/output line
28	PIO5	Bi-directional	Programmable input/output line
29	PIO6	Bi-directional	Programmable input/output line Alternative Function: I2C Serial Clock input/output
30	PIO7	Bi-directional	Programmable input/output line Alternative Function: BT Status(Default) I2C Serial Data input/output(Optional)
31	PIO8	Bi-directional	Programmable input/output line
32	PIO9	Bi-directional	Programmable input/output line Alternative Function: LED
33	PIO10	Bi-directional	Programmable input/output line
34	PIO11	Bi-directional	Programmable input/output line

Table 2

5. Interface Characteristics

5.1 UART Interface

Four signals are used to implement the UART function. When FSC-BT816 is connected to another digital device, UART_RX and UART_TX transfer data between the two devices. The remaining two signals, UART_CTS and UART_RTS, can be used to implement RS232 hardware flow control where both are active low indicators.

The interface consists of four-line connection as described in below:

Signal name	Driving source	Description
UART-TX	FSC-BT816 module	Data from FSC-BT816 module
UART-RX	Host	Data from Host
UART-RTS	FSC-BT816 module	Request to send output of FSC-BT816 module
UART-CTS	Host	Clear to send input of FSC-BT816 module

Table 3

Possible UART Settings

Property	Possible Values
BCSP-Specific Hardware	Enable or Disable
Baudrate	1200bps to 921Kbps
Flow Control	RTS/CTS or None
Data bit length	8bits
Parity	None, Odd or Even
Number of Stop Bits	1 or 2

Table 4

Default Data Format

Property	Possible Values
Baudrate	115.2Kbps
Flow Control	None
Data bit length	8bit
Parity	None
Number of Stop Bits	1

Table 5

5.2 PCM CODEC Interface

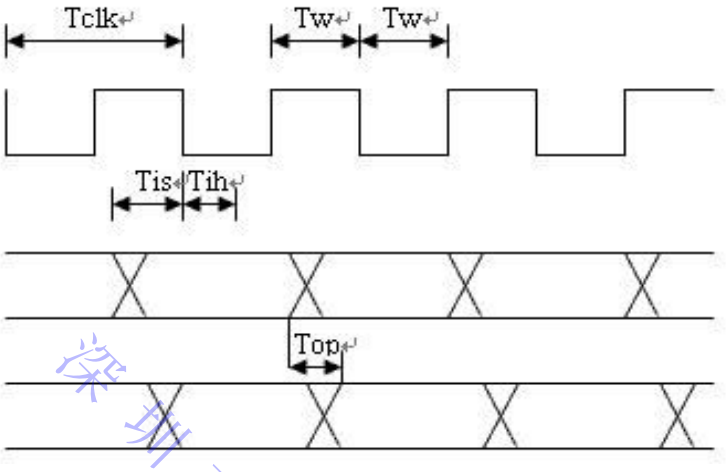

Figure 6

5.2.1 PCM Master

Symbol	Parameter	Condition	Min	Max	Unit
Tclk	Cycle time		166.67(6MHZ)	15625(64kHZ)	ns
Tw	High or low pulse width		50% of Tclk time		
Tis	PCM-IN setup time		25		
Tih	PCM-IN hold time		0		
Top	PCM-OUT propagation time	40pF load	0	10	
Top	PCM-SYNC propagation time	40pF load	0	10	

Table 6

5.2.2 PCM Slave

Symbol	Parameter	Condition	Min	Max	Unit
Tclk	Cycle time		62.5(16MHZ)		ns
Tw	High or low pulse width		40% of Tclk time		
Tis	PCM-IN setup time		8		
Tih	PCM-IN hold time		0		
tis	PCM-SYNC setup time		8		
tih	PCM-SYNC hold time		0		
Top	PCM-OUT propagation time	40pF load	0	21	

Table 7

5.3 AIO and PIO lines

11 programmable bi-directional input/output (I/O) can be used.

Two general purpose analogue interface pin can be used.

PIO0 – PIO3 can be used as PWM channels to control LED or motor

PIO6 and PIO7 can be used as I2C interface.

6. RECOMMENDED TEMPERATURE REFLOW PROFILE

The soldering profile depends on various parameters necessitating a set up for each Application. The data here is given only for guidance on solder reflow.

Peak Temperature : <250°C

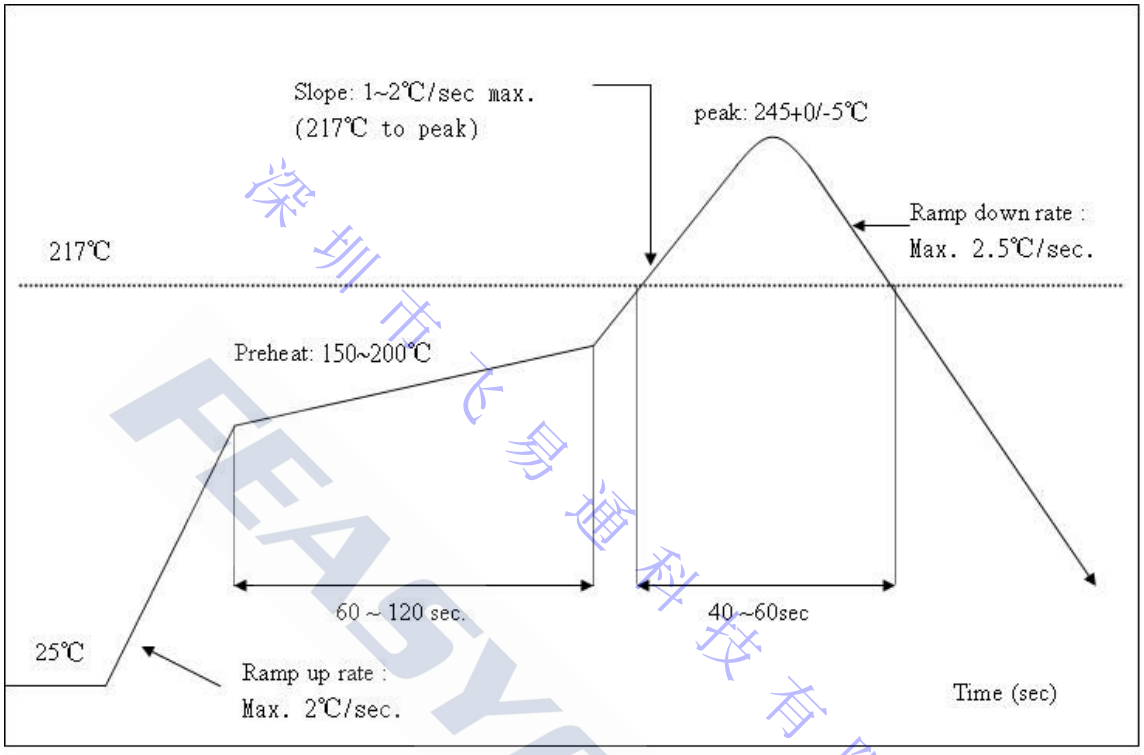

Figure 7

7. APPLICATION SCHEMATIC

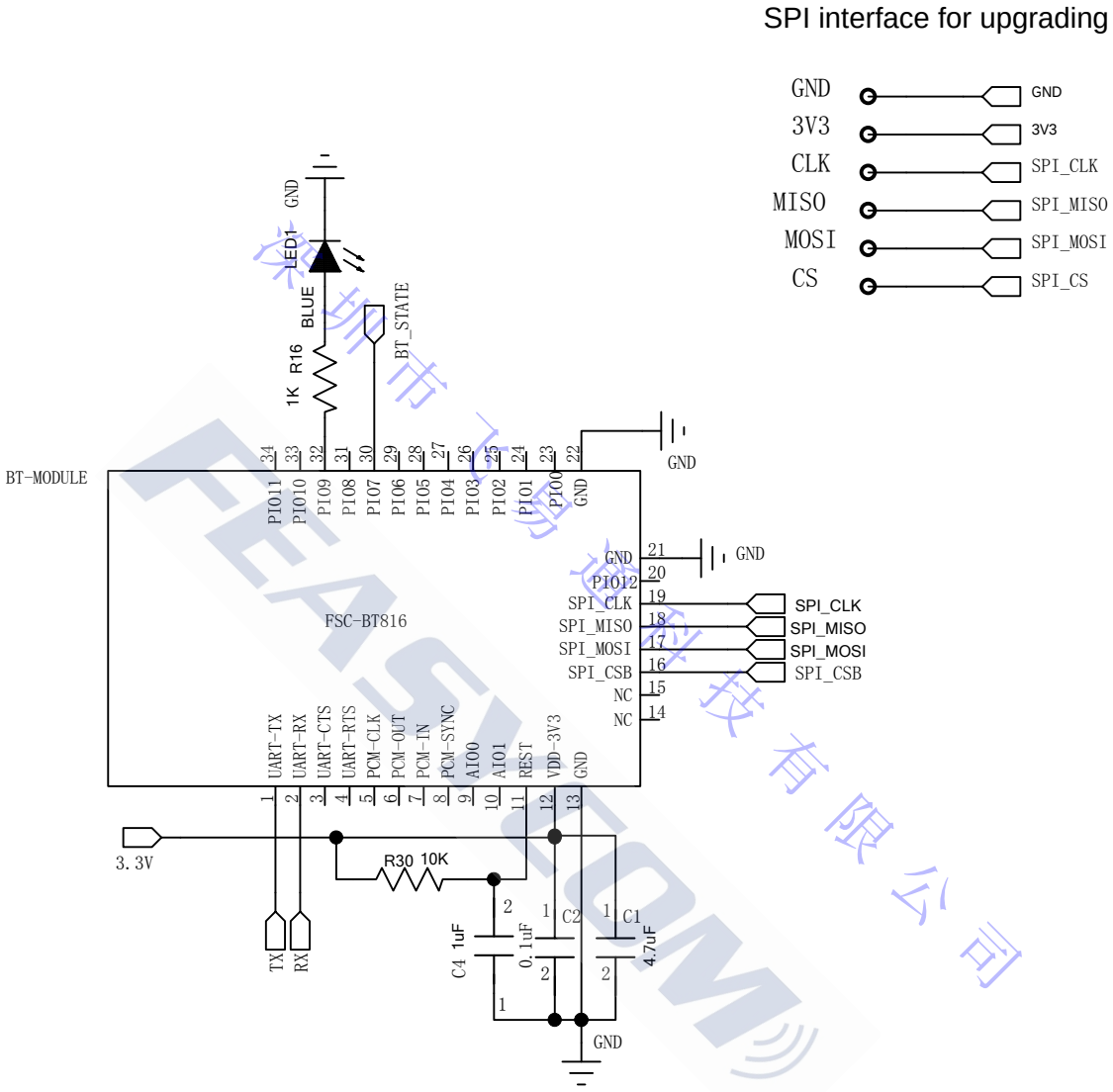

Figure 8