BoT-DAT200

Specification

CONFIDENTEAL INFORMATION

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List of Contents

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1. General

1.1 Overview

This specification covers Bluetooth module (class-2) which complies with Bluetooth specification version 2.1 + EDR (Or version 3.0) and integrates RF & Baseband controller in small package. This Module has deployed CSR's BC04-External EDR chipset.

All detailed specification including pin outs and electrical specification may be changed without notice.

RF

BC04 External

Crystal 26MHz

Flash Memory 8Mb

SPI

UART

PIO

I²C

USB
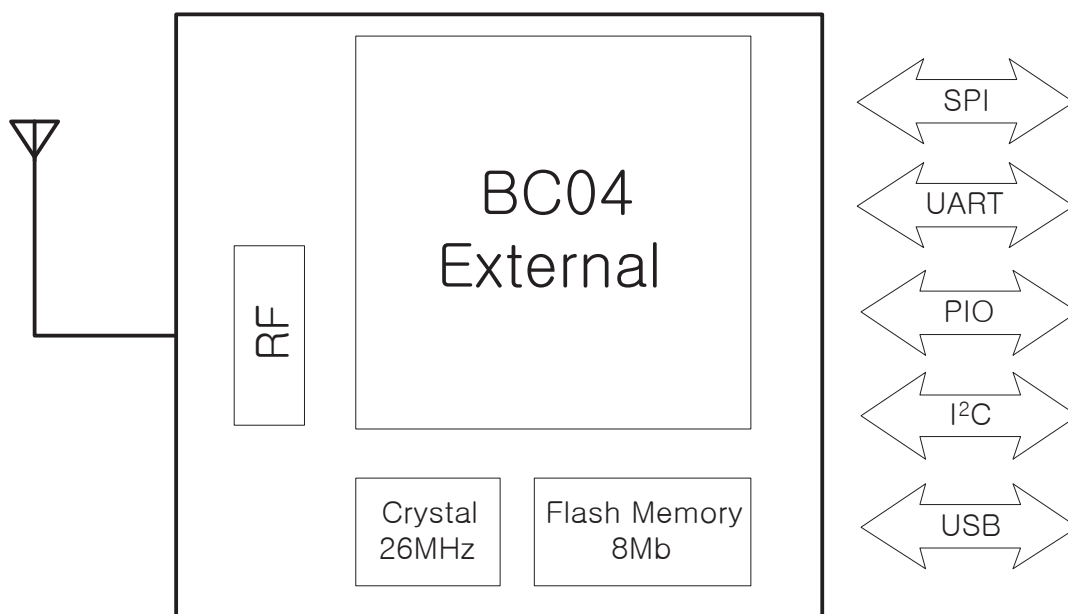
1.2 Features

■ Fully Qualified Bluetooth v2.1 + EDR (Or Support V3.0) System

■ Full-speed Bluetooth Operation with Full Piconet Support

■ Scatternet Support

■ Ultra Low Power Consumption

■ Support for 802.11 Co-existence

■ RoHS Compliant

■ UART interface with programmable band rate up to 3Mbits/s with an optional bypass mode

■ Full-speed USB v2.0 interface supports OHCI and UHCI host interface

■ Standard HCI (UART and USB) support

■ Integrated to 8Mbit external Flash memory

■ Integrated 26MHz Reference Clock

■ Competitive Size (11mm x 11mm x 1.56mm : QFN 36Pin)

■ Operating temperature range (MAX -30℃ ~ 85℃)
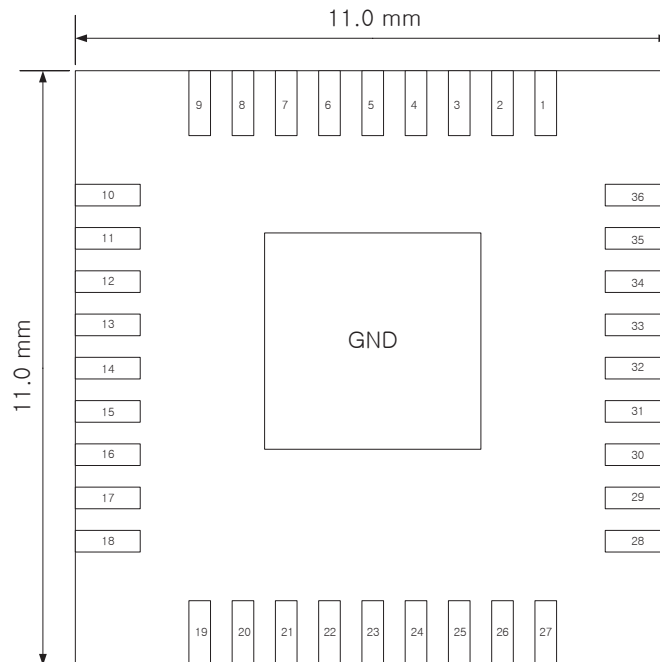
■ Supply voltage range (2.7 V ~ 3.6 V)

1.3 Application

■ Digital camera & printer

■ Cellular Handsets

■ Personal Digital Assistants (PDA)

■ Space critical application

■ GPS,POS, Barcode Reader

■ USB Dongle

■ Access Points

## 1.4 Pin Configuration & Outline Size
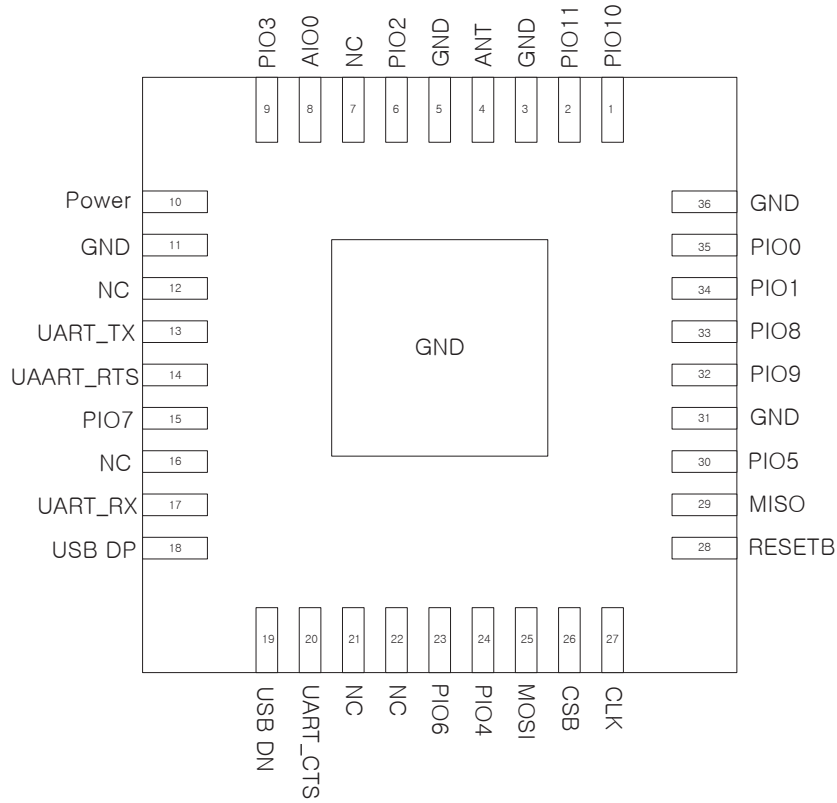

Pin Configuration (TOP VIEW)

1.5 Device Terminal Functions

Function	Pin Name			Pin No.	Description
UART	UART_TX			13	UART data output
	UART_RX			17	UART data input
	UART_RTS			14	UART request to send active low
	UART_CTS			20	UART clear to send active low
SPI	SPI_MISO			29	SPI data output
	SPI_MOSI			25	SPI data input
	SPI_CSB			26	Chip select for Serial Peripheral Interface (SPI), active low
	SPI_CLK			27	SPI Clock
USB	USB_DN			19	USB data minus
	USB_DP			18	USB data plus with selectable internal 1.5kohm pull-up resistor
PIO	PIO0			35	Programmable input/output line
	PIO1			34	Programmable input/output line
	PIO2			6	Programmable input/output line
	PIO3			9	Programmable input/output line
	PIO4		RX	24	Programmable input/output line
	PIO5		CTS	30	Programmable input/output line
	PIO6	SCL	RTS	23	Programmable input/output line Or I2C SCL
	PIO7	SDA	TX	15	Programmable input/output line Or I2C SDA
	PIO8	WP		33	Programmable input/output line Or I2C WP
	PIO9			32	Programmable input/output line
	PIO10			1	Programmable input/output line
	PIO11			2	Programmable input/output line
AIO	AIO0			8	General purpose analogue interface
Other Pins	VCC			10	D.C input voltage for operation (2.7 ~ 3.6)
	ANT			4	RF connection to antenna
	RESETB			28	Reset if low. Input debounced so must be low for >5ms to cause a reset
	GND			3,5,11, 31,36, 37	Ground (37Pin BOTTOM GND PAD)
	NC			7,12,21,16,22	

1.6 Package Dimensions & Land Pattern
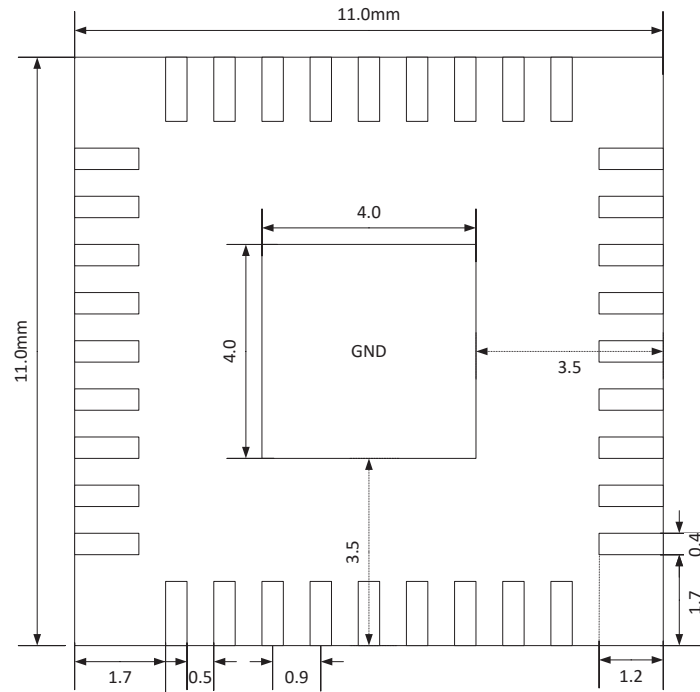
Top view
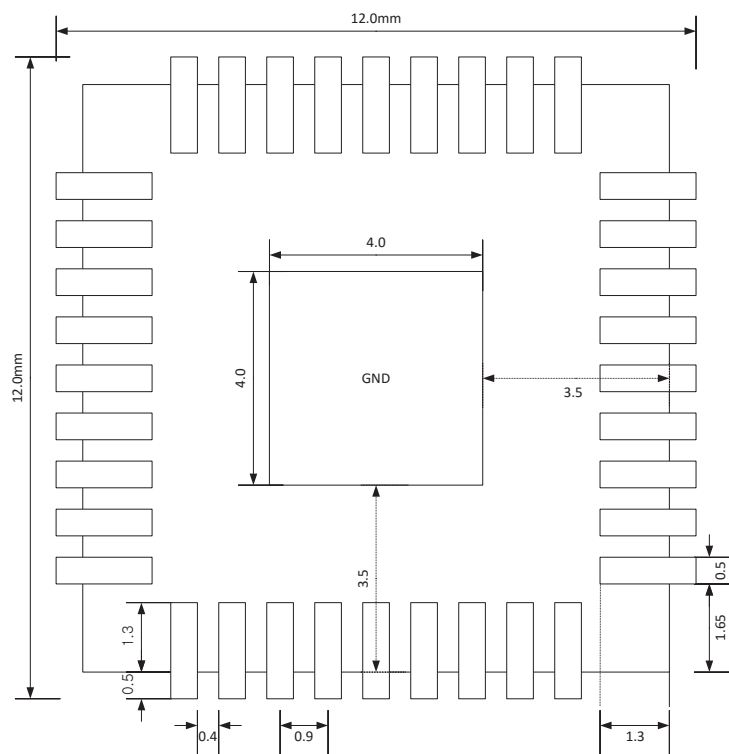
Land Pattern

2. Characteristics

2.1 Electrical Characteristics

Absolute Maximum Ratings

Rating		Min	Max.	Unit
Storage temperature range		-40	105	℃
Supply voltage	VCC	2.7	3.6	V
I/O Output voltage	VDD_PIO	VSS-0.4V	VCC+0.4V	V

Recommended Operating Conditions

Rating		Min	Typ.	Max.	Unit
Commercial Grade Operating Temperature range		-20	25	70	℃
Industrial Grade Operating Temperature range		-30	-	85	°C
Supply voltage	VCC	2.7	3.3	3.6	V
I/O Output voltage	VDD_PIO	2.7	3.3	3.6	V

2.2 RF Characteristics

RF	Specification	Condition	Min.	Typ.	Max	Unit
Transmitter	Output transmit power	Normal	–	3	4	dBm
	Transmit power density	Normal			4	dBm
	Transmit power control	Normal	2		8	dBm
	Frequency Range	Normal	2400		2483.5	MHz
	20dB bandwidth for modulated carrier	Normal		790	1000	MHz
	Adjacent channel transmit power	±2MHz		-35	-20	dBm
		±3MHz		-45	-40	dBm
		±4Mhz		-50	-40	dBm
	Modulation Characteristics	Δf1avg	140		175	KHz
		Δf2max	115			KHz
		Δf2avg/Δf1avg			80	%
	Initial carrier frequency tolerance	Normal	-20		20	KHz
	Carrier frequency Drift	One slot packet(DH1)	-25		25	KHz
		Three slot packet(DH3)	-40		40	KHz
		Five slot packet(DH5)	-40		40	KHz
Transceiver	Carrier frequency Drift	30MHz ~ 1GHz			-36	dBm
		1GHz~12.75GHz			-30	dBm
		1.8GHz~5.1GHz			-47	dBm
		5.1GHz~5.3Ghz			-47	dBm
Receiver	Sensitivity level(0.1% BER)	Single slot packet	-83	-85	-87	dBm
		Multi slot packets	-83	-85	-87	dBm
	C/I performance	Co-channel			11	dB
		1MHz(Adjacent channel)			0	dB
		2MHz(2nd Adjacent channel			-30	dB
		3MHz(3rd Adjacent channel			-40	dB
	Blocking performance	30MHz ~2GHz	-10			dBm
		2GHz~2.4GHz	-27			dBm
		2.5GHz~3GHz	-27			dBm
		3GHz~12.75GHz	-10			dBm
	Intermodulation performance	n-5	-39			dBm
	Maximum input level		-20	-10		dBm

3. Terminal Description

3.1 UART Interface

 BoT-DAT200 has a standard UART serial interface that provides a simple Mechanism for communicating with other serial devices using the RS232 Protocol.

UART_TX

UART_RX
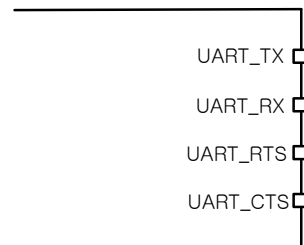
UART_RTS

UART_CTS

 The 4 signals that implement the UART function. When BoT-DAT200 is connected to another digital device, UART_RX and UART_TX transfer data between the 2 devices. The remaining 2 signals, UART_CTS and UART_RTS, can implement RS232 hardware flow control where both are active low indicators.

 a. UART Setting

User can change data format the following selection using PSKEY.
 However, host shall communicate with default setting UART connection initiated at first time.

$$\text{Baud Rate} = \frac{\text{PSKEY\_UART\_BAUDRATE}}{0.004096}$$

Parameter		Possible values
Baud rate	Minimum	1200 baud(≤2% Error)
		9600 baud(≤1% Error)
	Maximum	3M baud(≤1% Error)
Flow control		RTS/CTS or None
Parity		None, Odd or Even
Number of stop bits		1 or 2
Bits per byte		8

b. UART Bypass Mode

In order to apply the UART bypass mode, a BCCMD command will be issued to BoT-200 upon this, it will switch the bypass to PIO 4,5,6,7 as shown in figure. When the bypass mode has been invoked, module enters the deep sleep state indefinitely
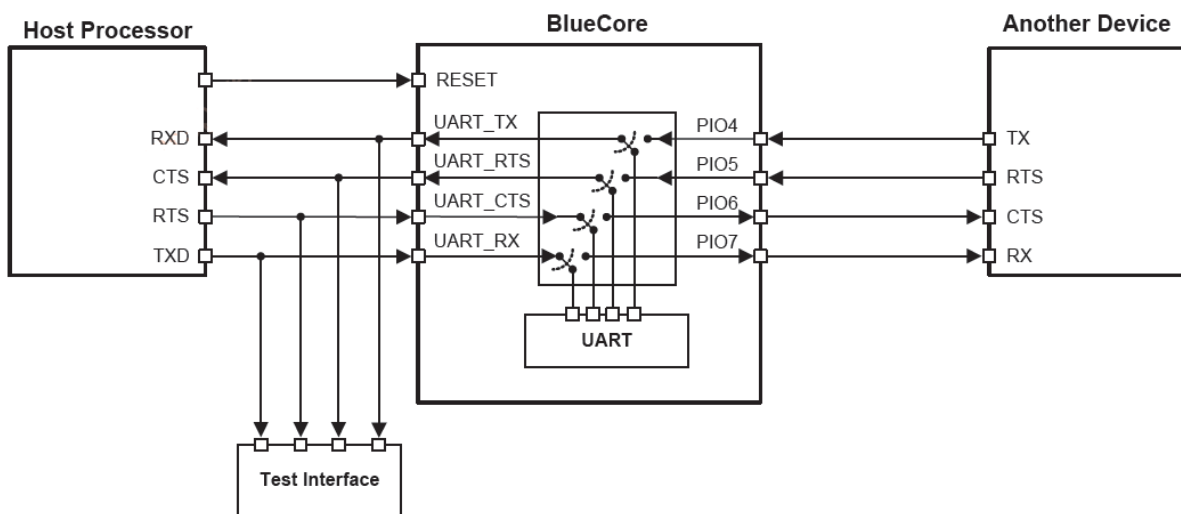
3.2 USB Interface

This is a full speed (12Mbits/s) USB interface for communicating with other compatible digital devices. BoT-DAT200 acts as a USB peripheral, responding to requests from a master host controller such as a PC.
The USB interface is capable of driving a USB cable directly. No external USB transceiver is required. The device
operates as a USB peripheral, responding to requests from a master host controller such as a PC. Both the OHCI and the UHCI standards are supported. The set of USB endpoints implemented can behave as specified in the USB
section of the Bluetooth v2.1 + EDR specification or alternatively can appear as a set of endpoints appropriate to USB audio devices such as speakers.
As USB is a master/slave oriented system (in common with other USB peripherals), BoT-DAT200 only supports USB Slave operation.

3.3 I^{2}C Interface

PIO[8:6] can be used to form a master I^{2}C interface. The interface is formed using software to drive these lines. Therefore it is suited only to relatively slow functions such as driving a dot matrix LCD, keyboard scanner or EEPROM

Note. PIO[7:6] dual functions, UART bypass and EEPROM support, therefore devices using an EEPROM connect support UART bypass mode. PIO Lines need to be pulled-up through 2.2KΩ resisters.
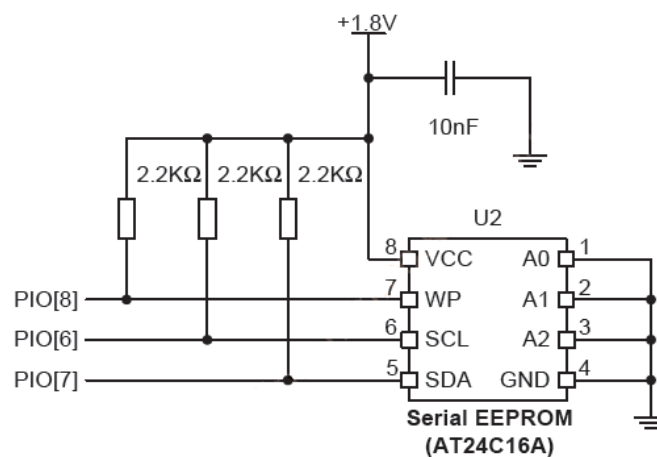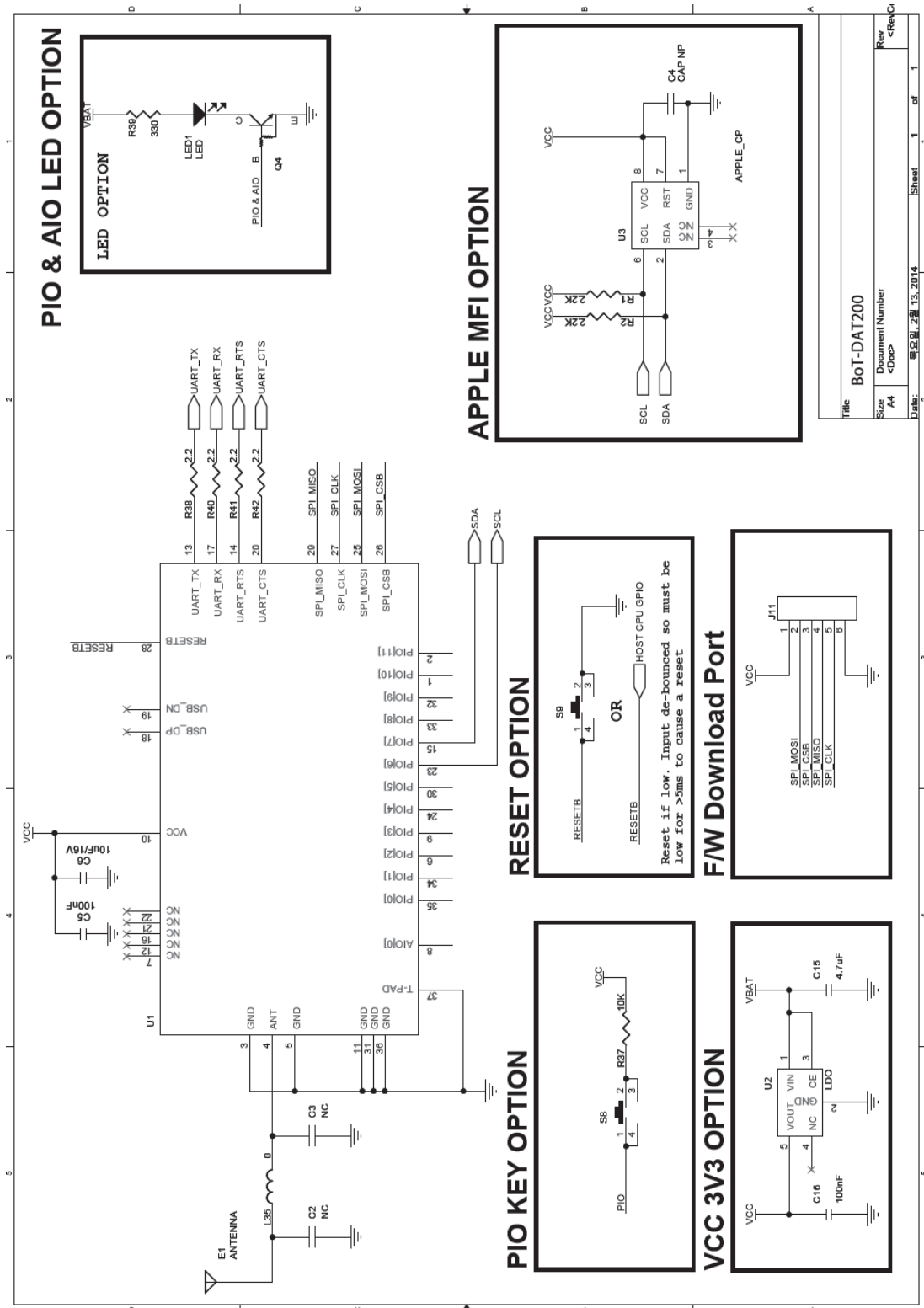

3.4 SPI Interface

The synchronous serial port interface (SPI) is used to program configure and debug Module.
It can also be used for programming the Flash memory. SPI interface is connected by using the MOSI, MISO, CSB and CLK pins.

It is required in production and product certification. Ensure the 4 SPI signals are brought out to either test points or a header.

SPI interface can't be used for any application purposes.

4. Application Schematic