



ITM-D566

IEEE 2.4GHz 1T1R Wi-Fi with BLE v5.0 IoT Module Datasheet

V0.1

Revision History

Date	Revision Content	Revised By	Version
2021/05/06	- Initial released (Preliminary)	Issac Chen	0.1
2021/09/03	- Initial released (Preliminary)	Issac Chen	0.2
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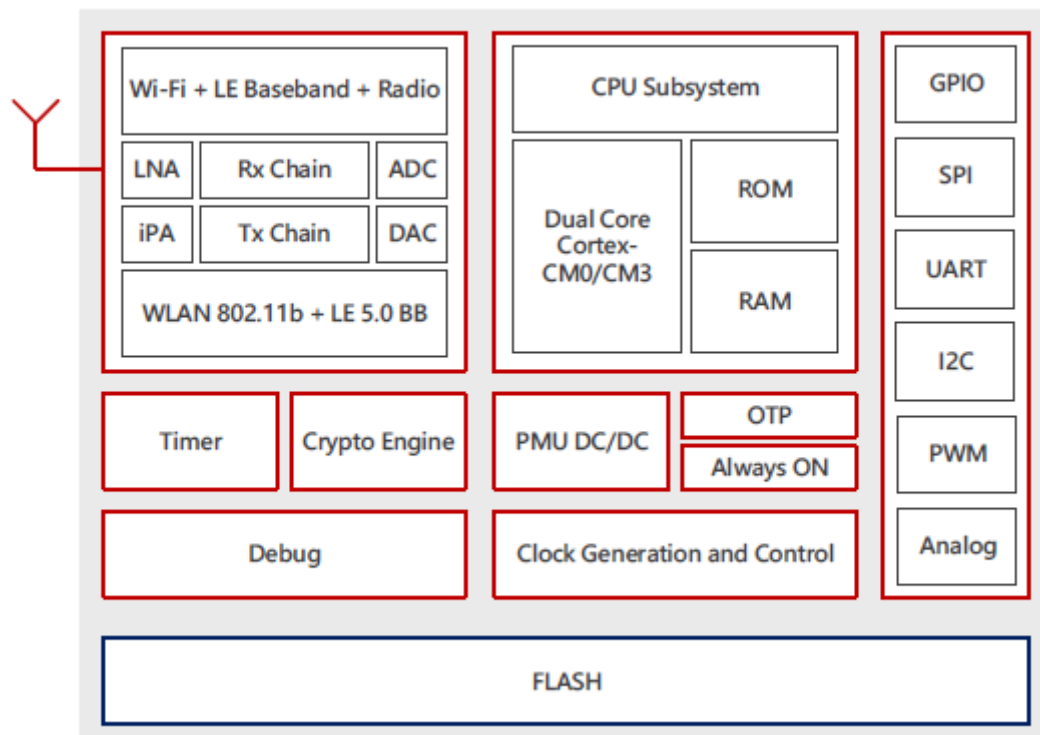
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1. General Description

iTM-D566 module features a fully integrated 2.4GHz radio transceiver and baseband processor for Wi-Fi 802.11b and Bluetooth® Smart applications. It can be used as a standalone application-specific communication processor or as a wireless data link in hosted MCU systems where ultra-low power is critical. It supports flexible memory architecture for storing profiles, stacks and custom application codes, and can be updated using Over-The-Air (OTA) technology. Qualified Bluetooth Smart protocol stack and Wi-Fi TCP/IP stack are stored in a dedicated ROM.

iTM-D566 module uses OPULINKS OPL1600 SoC. It is equipped with dual processors, ARM® Cortex®-M0 and M3, for handling different processes. All software runs on the ARM® Cortex®-M0 processor while more intensive application-specific activities run on the ARM® Cortex®-M3 processor. iTM-D566 can be connected to any external MCU through SPI, I2C or UART interfaces and sensors or other devices through GPIOs. The transceiver interfaces directly to the antenna and is fully compliant with the Wi-Fi 802.11b and Bluetooth 5.0 BLE standards. With integrated antenna switch, RF balun, power amplifier (PA) and low noise amplifier (LNA), the OPL1600 allows both Wi-Fi and Bluetooth Smart to minimize PCB design area and external component requirement. The block diagram for OPL1600 is shown as below.

Figure 1: OPL1600 Block Diagram



2. Features

- Processors
 - ARM® Cortex®-M3 Application Processor
 - ARM® Cortex®-M0 Link Controller
- Wi-Fi
 - 802.11b up to 11Mbps
 - Supports STA mode
 - WPA/WPA2 security supported
 - Automatic beacon scanning and discovery
 - Built-in TCP/IP stack
 - Integrated dual power amplifiers: low (-2 dBm), high (+10 dBm)
- Bluetooth Smart
 - Compliant with Bluetooth 5.0 BLE specifications with 2Mbps rate capability
 - Slave mode support
 - All GATT-based profiles supported
 - Built-in BLE stack
 - 0 to 10 dBm transmit output power
 - -93 dBm receive sensitivity
- Memories
 - 4Kbit One-Time-Programmable (OTP) memory
 - 384 KB System SRAM
 - 768 KB ROM
 - 8Mbit embedded flash
- HW Crypto Engine
 - AES-128/256 bits Encryption
 - P-192/256 ECDH (Elliptic Curve Diffie-Hellman) Key Generation
 - SHA2
 - TRNG
- Power Management
 - Integrated Buck DC-DC converter

- Supports coin cell and alkaline battery
- Clock
 - Built-in low power 32 KHz RC oscillator and support optional 32KHz crystal.
 - Optional external 32 kHz crystal (± 150 ppm max) and built-in low power oscillator
- General purpose, capture and sleep timers
- FW OTA (Over-The-Air) update support
- Digital Interfaces
 - General purpose I/Os: 24
 - Two UARTs with hardware flow control up to 3Mbps
 - Three SPI+™ interfaces
 - One I2C bus at 100 kHz, 400 kHz
- Analog Interfaces
 - 10-bit Auxiliary ADC inputs up to 16 channels
 - 6 GPIO pins with 16mA driving capability
 - 6 PWMs
- Radio Transceiver
 - Fully integrated dual-mode 2.4 GHz CMOS transceiver
 - Single wire antenna: no external matching and no external T/R switch required
- Current Consumption
 - Deep sleep current ~ 3 uA
 - Timed sleep current ~ 4 uA

3. General Specification

3.1 Voltages

3.1.1 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Unit
VBAT	Input supply Voltage	-0.3	3.6	V

3.1.2 Recommended Operating Ratings

Test conditions: At room temperature				
Symbol	Min.	Typ.	Max.	Unit
VBAT	2.7	3.3	3.6	V

Note: The I/O voltage of ITM-D566 is same as VBAT.

Test conditions: At operating temperature -10°C ~70°C				
Symbol	Min.	Typ.	Max.	Unit
VBAT	2.7	3.3	3.6	V

3.2 Wi-Fi RF Specification (RX)

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2412		2484	MHz
RX Sensitivity 11b @ 8% PER	- 1Mbps			-83	dBm
	- 11Mbps			-76	dBm
Maximum Receive Level	802.11b	-15			dBm

3.3 Wi-Fi RF Specification (TX)

Parameters	Conditions	Min.	Typ.	Max.	Unit
Frequency Range		2412		2484	MHz
Output Power	802.11b	--	10	--	dBm
@EVM	802.11b / 11Mbps	--	-20	--	dB

3.4 Power Consumption

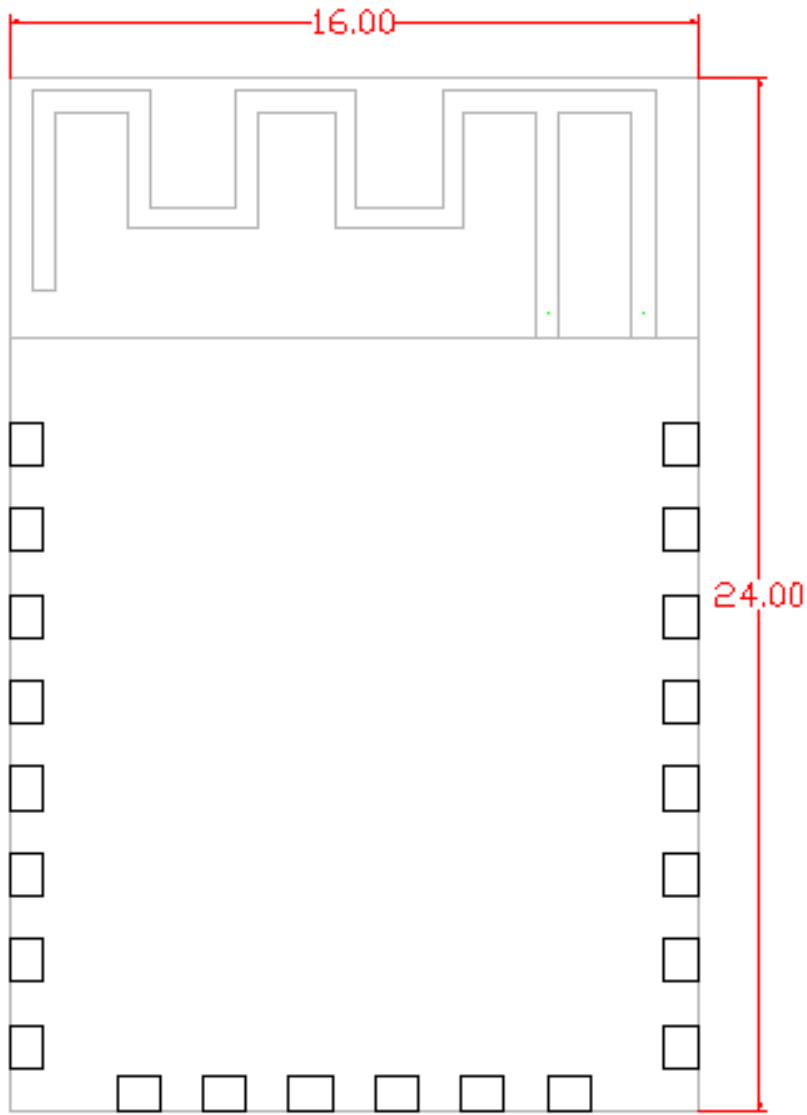
WiFi only:

TX Mode: (Continuous)	115 mA (802.11b/11M/10dBm)
RX Mode:	17.5 mA (802.11b/11M)
Associated Idle	800 uA @DTIM=1
	400 uA @DTIM=3
Sleep Mode	30 uA

Bluetooth Smart:

TX Mode: (Continuous)	63 mA (10 dBm)
	12 mA (0 dBm)
RX Mode:	12 mA

< BOTTOM VIEW >



4.2 Pin Definition

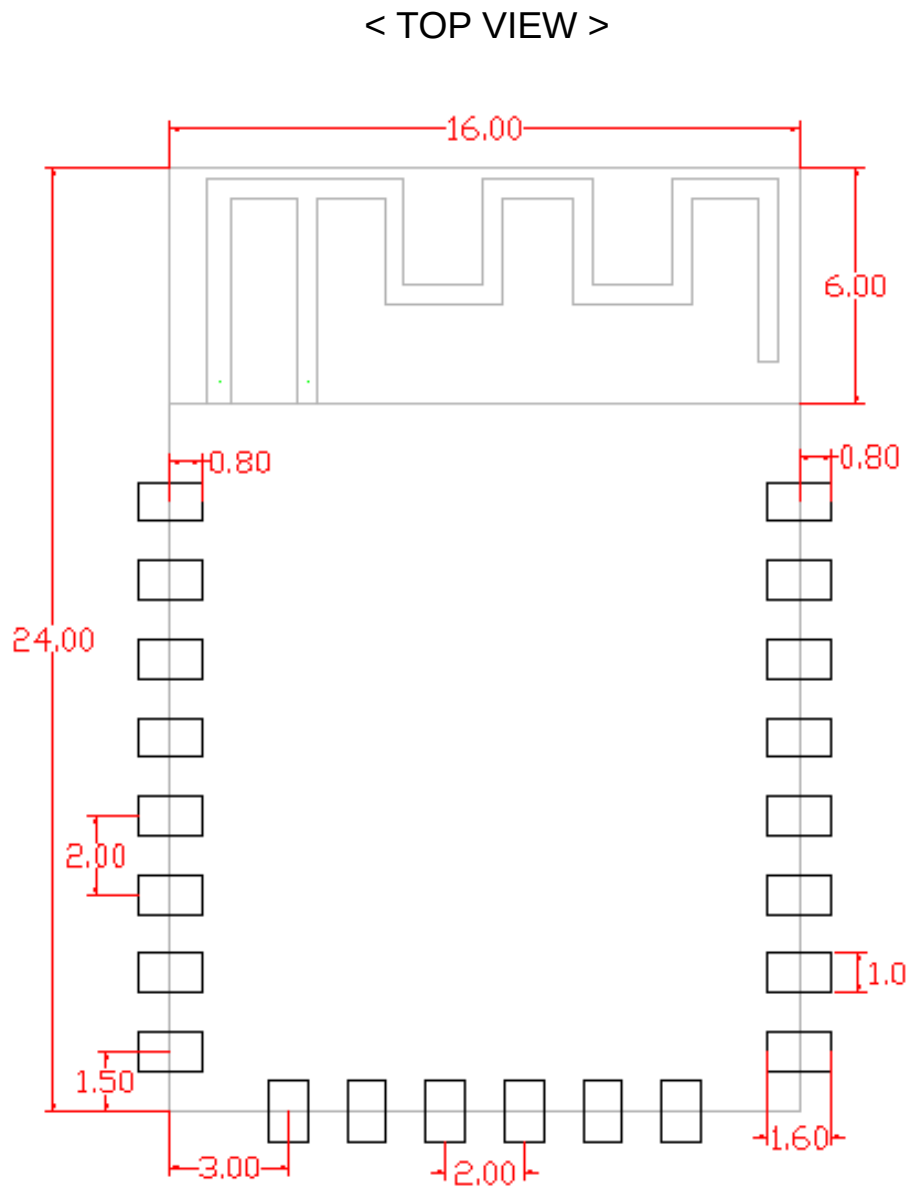
Pin No.	Pin-Define	Type	Description
1	RST_N	I	Pull Low to reset whole module Should keep High when operating
2	GPIO5 / ADC	I/O	General Purpose Input/Output Analog-to-Digital Converter Input
3	RST_N	I	Internal connected with Pin1
4	GPIO7 / ADC	I/O	General Purpose Input/Output Analog-to-Digital Converter Input
5	GPIO4 / ADC	I/O	General Purpose Input/Output Analog-to-Digital Converter Input
6	GPIO3 / UART0_RXD	I/O	General Purpose Input/Output UART0 Serial Data Receive
7	GPIO2 / UART0_TXD	I/O	General Purpose Input/Output UART0 Serial Data Transmit
8	VBAT	P	Main Power Supply Input 3.3V
9	GPIO23 / PWM	I/O	General Purpose Input/Output PWM Function Output
10	GPIO10 / I2C_SCL	I/O	General Purpose Input/Output I2C Clock Signal
11	GPIO11 / I2C_SDA	I/O	General Purpose Input/Output I2C Data Signal
12	GPIO12	I/O	General Purpose Input/Output
13	GPIO18 / CS	I/O	General Purpose Input/Output SPI CS Signal
14	GPIO19 / CLK	I/O	General Purpose Input/Output SPI CLK Signal
15	GND	G	Ground
16	GPIO20 / MOSI	I/O	General Purpose Input/Output SPI MOSI Signal
17	GPIO0 / Debug_TX	I/O	General Purpose Input/Output UART Serial Data Transmit for debugging
18	GPIO1 / Debug_RX	I/O	General Purpose Input/Output UART Serial Data Receive for debugging
19	GPIO21 / MISO	I/O	General Purpose Input/Output SPI MOSI Signal

20	GPIO22 / PWM	I/O	General Purpose Input/Output Pulse-Width Modulated O/P
21	GPIO9 / UART1_RXD	I/O	General Purpose Input/Output UART1 Serial Data Receive
22	GPIO8 / UART1_TXD	I/O	General Purpose Input/Output UART1 Serial Data Transmit

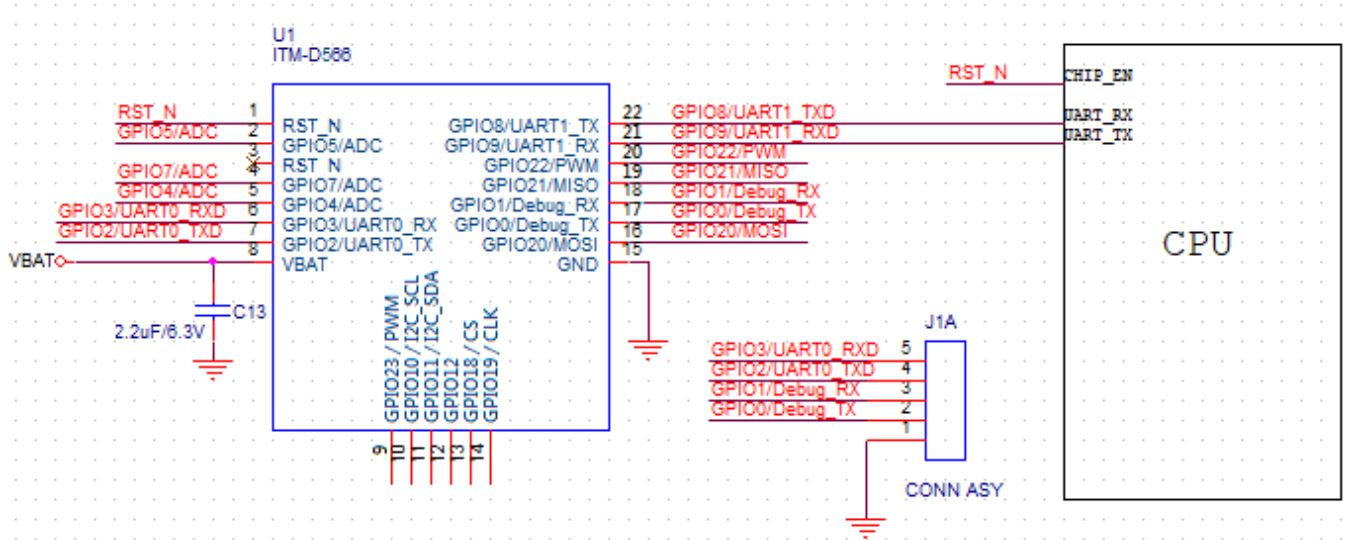
5. Dimensions

5.1 Layout Recommendation

(Unit: mm)



6. Reference Design



7. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times

