ATTOWAVE

BTM0

Bluetooth Module

User Manual

ATTOWAVE CO., LTD.

ATTOWAVE

Table of Contents

ATTOWAVE

1. Introduction

1.1 Product Overview

The BTM0 was an Attowave co., Ltd. Bluetooth Module. The BTM0 is used to add Bluetooth to Radar detectors. It uses Bluetooth Low Energy to communicate between the Radar detector and a Bluetooth LE equipped smartphone.

1.2 Features

1.2.1 Bluetooth

- **DA14585(Bluetooth Low Energy 4.2)**
  - **Processor**
    - ARM Cortex-M0, 32bit, 16MHz
    - Dedicated Link Layer Processor
    - AES-128bit encryption Processor
  - **Memory**
    - 64 KB OTP Memory
    - 128 KB ROM
    - 96 KB Retention SRAM
  - **External Flash**
    - 8M-Byte SPI Flash
  - **Operating Clock**
    - 16MHz
  - **Antenna**
    - Embedded Antenna
  - **IO Interfaces**
    - UART
    - SWD
    - GPIO
  - **Power Input**
    - Single 3.3V Power Input
  - **Package**
    - Module – 25 x 15 x 1 mm (L x W x H)

1.3 Specifications Table

1.3.1 General

Feature	Description
Product Description	Bluetooth Module
Major Chipset	Dialog DA14585
Host Interface	UART
Dimension	25 x 15 x 1 mm (L x W x H)
Antenna	Micro-strip Antenna (Built-in)

1.3.2 Bluetooth

Feature	Description
Bluetooth version	BLE 4.2
Frequency Range	2402 ~ 2480 MHz
Modulation	GFSK for Bluetooth
Target power	-2dBm

Mode	Target Power	Measured Power
	[dBm]	[dBm]
BLE_1Mbps_Lowest	-2	-2.38
BLE_1Mbps_Middle	-2	-2.07
BLE_1Mbps_Highest	-2	-1.8

1.3.3 Operating Conditions

Feature	Description
Operating Conditions	
Voltage	3.3V
Operating Temperature	-30 ~ 85℃
Operating Humidity	TBD
Storage Temperature	-40 ~ 85℃
Storage Humidity	TBD
ESD Protection	
Human Body Model	TBD
Changed Device Model	TBD

2. Pin Definition

Pin name	Basic Description	Type	Level
Power Supply			
VBAT3V	3.3V Power Supply	AIO	3.3V
VBAT_RF	3.3V Power Supply	AIO	3.3V
GND	Ground	AIO	
Debug Interface and Reset			
SWDIO	JTAG Data input/output	I/O	3.3V
SWCLK	JTAG clock signal input	I/O	3.3V
RST	Reset signal (active high). Must be connected to GND if not used	I	3.3V
SPI Bus Interface			
SPI_CLK	Input/Output, SPI clock	DO	3.3V
SPI_EN	Output, SPO chip enable	DO	3.3V
SPI_DO	Output, SPI Data output	DO	3.3V
SPI_DI	Input, SPI Data input	DI	3.3V
UART Interface			
URX	Input, UART receive data	DI	3.3V
UTX	Output, UART transmit data	DO	3.3V
GPIO			
P1.3	GPIO	I/O	3.3V
Clock			
XTAL16Mm	Output, Crystal output for the 16 MHz XTAL	AO	
XTAL16Mp	Input, Crystal input for the 16 MHz XTAL	AI	

3. **Electrical Characteristics**

3.1 Absolute Maximum Ratings

Symbol	Parameter	Min	Typ	Max	Unit
VBAT3V	3.3V power supply		3.3	3.6	V

3.2 Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VBAT3V	3.3V power supply	3.0	3.3	3.6	V

3.3 Digital IO Pin DC Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
VIH	Input High Voltage	0.84			V
VIL	Input Low Voltage			0.36	V

Federal Communications Commission Interference Statement

1.1 Liability for illegal acts

Anyone who uses this product for illegal purposes shall be liable and he or she shall be held responsible for all and any consequences.

1.2 FCC licensing information

λ Federal Communications Commission Interference statement

NOTE: Change or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio, TV technician for help.

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.

NOTE: To comply with FCC RF exposure limits for general population/uncontrolled exposure, the antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

RF exposure statements

NOTE: This module does not have RF shielding and needs to be tested inside a host device and submit for C2PC filing whenever the host changed.

This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body or nearby persons.

CFR 47 FCC PART 15 SUBPART C (Part 15.247) has been investigated. It is applicable to the modular transmitter.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

We will retain control over the final installation of the modular such that compliance of the end product is assured. In such cases, an operating condition on the limit modular approval for the module must be only

approved for use when installed in devices produced by a specific manufacturer. If any hardware modify or RF control software modify will be made by host manufacturer, C2PC or new certificate should be apply to get approval, if those change and modification made by host manufacturer not expressly approved by the party responsible for compliance ,then it is illegal.

If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “CONTAINS FCC ID:W75-BTM0”

Any company of the host device which install this modular with limit modular approval should perform the test of radiated & conducted emission and spurious emission,etc. according to FCC part 15C : 15.247 and15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.209 &15.207 ,15B Class B requirement, then the host can be sold legally.