

TDS Water Quality Detector Module

BME63M001

User Guide

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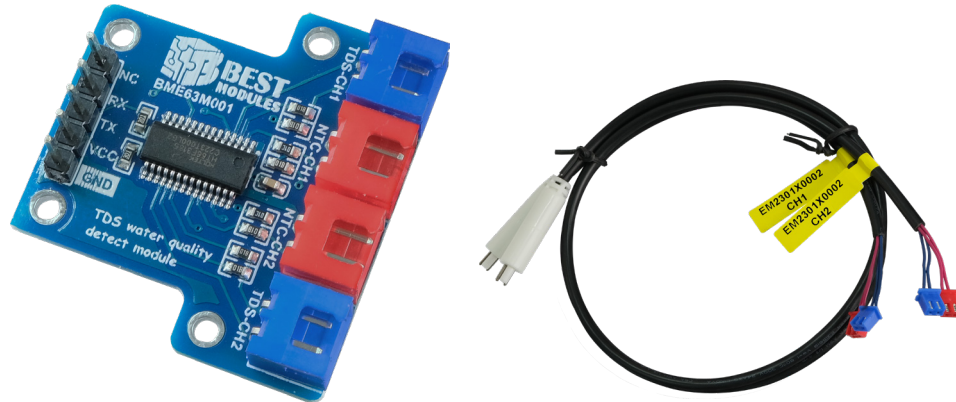
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Introduction

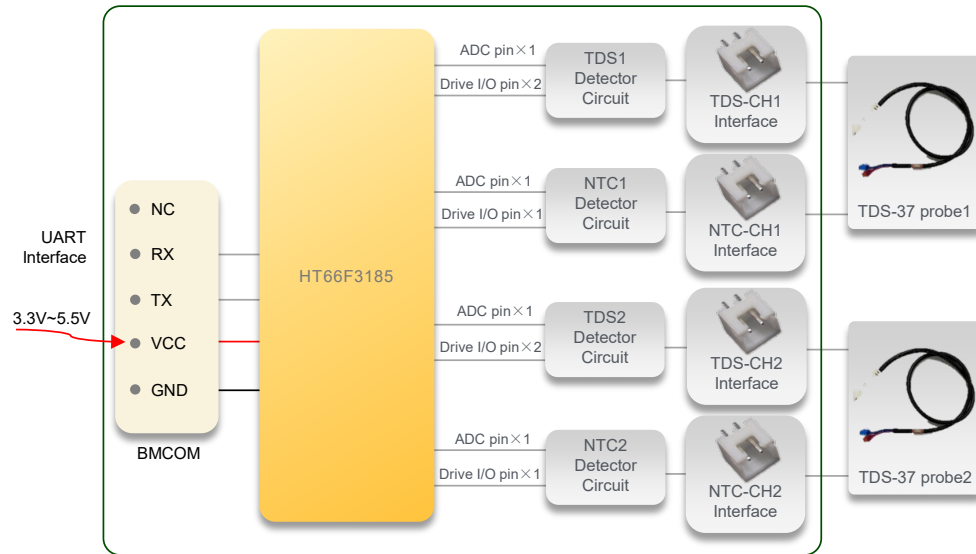
The BME63M001 is a water quality Detector module from Best Modules, which is developed by the HT66F3185. The module supports dual-channel TDS Detector and dual-channel NTC temperature Detector, and operates together with the TDS-37 probe sensor. The module starts to collect the TDS and NTC temperature values automatically after power on. The module is suitable used in the solution that the temperature range of which is 0~60°C and the TDS Detector range can reach 0~5000ppm (1ppm≈2μS/cm). The module uses the BMCOM interface and UART communication method to implement reading TDS value. The module is suitable for use in water quality Detector applications.



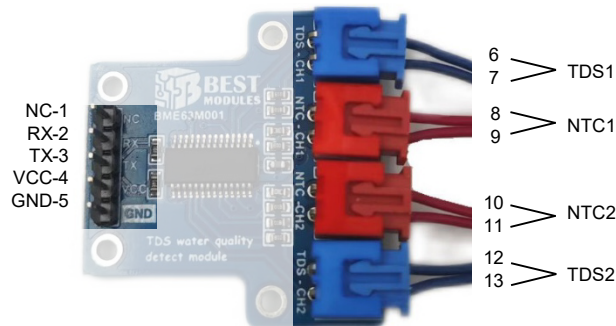
Features

- Operating voltage: 3.3V~5.5V
- Operating current: 1.6mA @ 5.0V
- Standby current: <math><5.0\mu\text{A}</math> @ 5.0V
- MCU: HT66F3185
- Module features:
 - ◆ Adapting probe type: TDS-37 (With NTC)
 - ◆ Channel count: dual-channel TDS & dual-channel NTC
- Communication interface:
 - ◆ BMCOM×1 (NC, RX, TX, VCC, GND)
 - ◆ Communication method: UART (baud rate: 9600bps)
- Provides Arduino Library support
- Module dimension: 32.1mm×34.1mm×10.0mm

Block Diagram



Pin Description



BMCOM pins:

Pin	Function	Description
1	NC	—
2	RX	UART data receive line
3	TX	UART data transmit line
4	VCC	Positive power supply
5	GND	Negative power supply, GND

TDS Detector board pins:

Pin	Function	Description
6&7	TDS-CH1	TDS input interface 1
8&9	NTC-CH1	NTC input interface 1
10&11	NTC-CH2	NTC input interface 2
12&13	TDS-CH2	TDS input interface 2

Technical Specifications

Recommended Operation Conditions

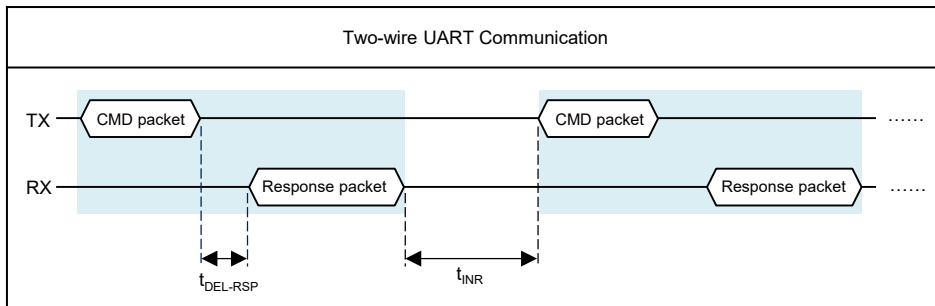
Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Operating Voltage	—	3.3	—	5.5	V
I _{DD}	Operating Current	V _{DD} =3.3V	—	1.1	—	mA
		V _{DD} =5.0V	—	1.6	—	mA
I _{STB}	Standby Current	V _{DD} =3.3V	—	—	3.0	μA
		V _{DD} =5.0V	—	—	5.0	μA
	TDS Detector Range	—	0	—	5000	ppm
	TDS Detector Accuracy	0~2000ppm	—	±5	—	%
		2000~5000ppm	—	±10	—	%
	TDS Resolution	0~500ppm	—	0.1	—	ppm
		500~1500ppm	—	0.5	—	ppm
		1500~2500ppm	—	5	—	ppm
		2500~3500ppm	—	10	—	ppm
		3500~5000ppm	—	25	—	ppm
	Temperature Detector Range	—	0	—	60	°C
	Temperature Detector Accuracy	Ta=0~60°C	—	±1	—	°C

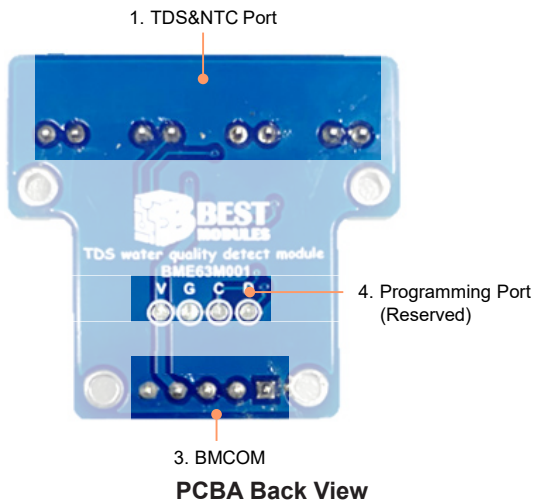
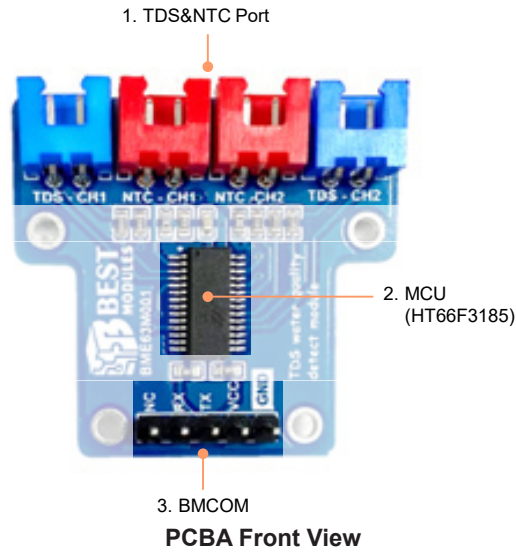
Timing Specification

Ta=25°C

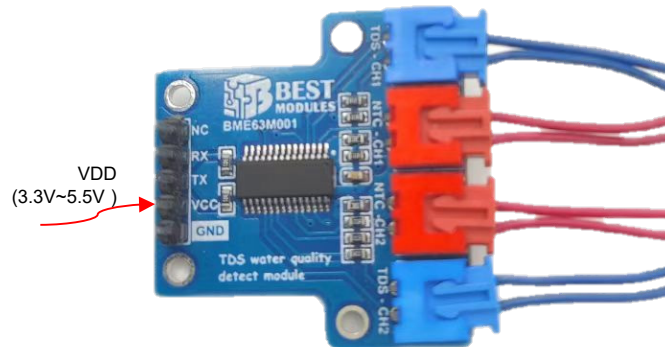
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{DEL-RSP}	Response Delay Time	—	—	—	12	ms
t _{INR}	Interval Time	Non Reset Command	—	—	150	μs
		Reset Command	—	—	25	ms
	Refresh Time of TDS Value and Temperature Value	—	450	500	550	ms



Hardware Overview

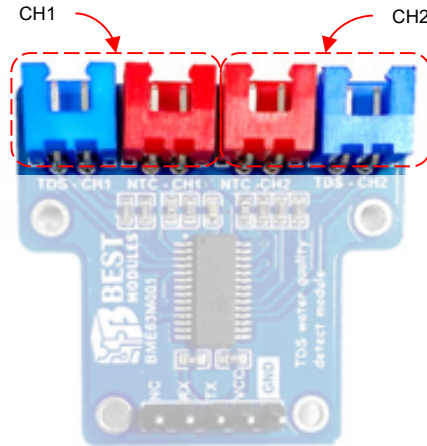


Power Supply



- BCOM pin: provided by the VDD input, 3.3V~5.5V

TDS Channel Port



The module has two channels, CH1 and CH2. The CHx consists of a TDS (blue) interface and a NTC (red) interface and it can adapt up to two TDS-37 probes. The red and blue interfaces in the probe are connected to the corresponding channels according to their colors.

Communication Interface

- Communication method: UART
- Baud rate: 9600
- Communication logic level: 3.3V~5.5V

Communication Protocol

There are three instruction frame formats: general instruction frame, read instruction frame and special instruction frame.

General Instruction Frame

• Host → Module

Header	MID	LEN	CMD	Checksum
0x55	0x6301	1-byte	1-byte	1-byte

• Module → Host

Header	MID	LEN	CMD	Data	Checksum
0x55	0x6301	1-byte	1-byte	2-byte	1-byte

Frame Introduction:

- Header: Frame Header, fixed as 0x55
- MID: Module Code, fixed as 0x6301
- LEN: Length
 - ◆ Host → Module: CMD byte count
 - ◆ Module → Host: CMD + Data byte count
- CMD: Command Code, each command code corresponds to a different function

- CheckSum:
 - ◆ Host → Module: CheckSum= ~ (Header + MID + LEN + CMD)
 - ◆ Module → Host: CheckSum= ~ (Header + MID + LEN + CMD + Data)

Read Instruction Frame

• Host → Module

Header	MID	LEN	CMD	Data	CheckSum
0x55	0x6301	1-byte	1-byte	1-byte	1-byte

• Module → Host

Header	MID	LEN	CMD	Data	CheckSum
0x55	0x6301	1-byte	1-byte	6-byte	1-byte

Special Instruction Frame

• Host → Module

Header	MID	LEN	CMD	CheckSum
0x55	0x6301	1-byte	1-byte	1-byte

• Module → Host

Header	MID	LEN	CMD	CheckSum
0x55	0x6301	1-byte	1-byte	1-byte

General Instruction Set

No.	Functional Description	CMD	Data	Response Data	Note
1	Get the version information	0x00	—	D ₁ : major version number D ₂ : minor version number If the D ₁ =0x01, D ₂ =0x00, the version number is V1.0	

Read Instruction Set

No.	Functional Description	CMD	Data	Response Data	Note
1	Get the conductivity and NTC temperature values	0x01	D ₁ : get the channel 0x01: channel 1 0x02: channel 2	D ₁ : get the channel D ₂ ~D ₄ : conductivity value D ₅ ~D ₆ : temperature value Conductivity: = conductivity value/10(unit: μS/cm) = conductivity value/10/2(unit: ppm) Note: 1ppm≈2μS/cm Temperature: = temperature value/10(unit: °C)	Note: If the temperature value = 0x05dc, it means the NTC input interface is short, if the temperature value = 0xffce, it means the NTC input interface is open.

Special Instruction Set

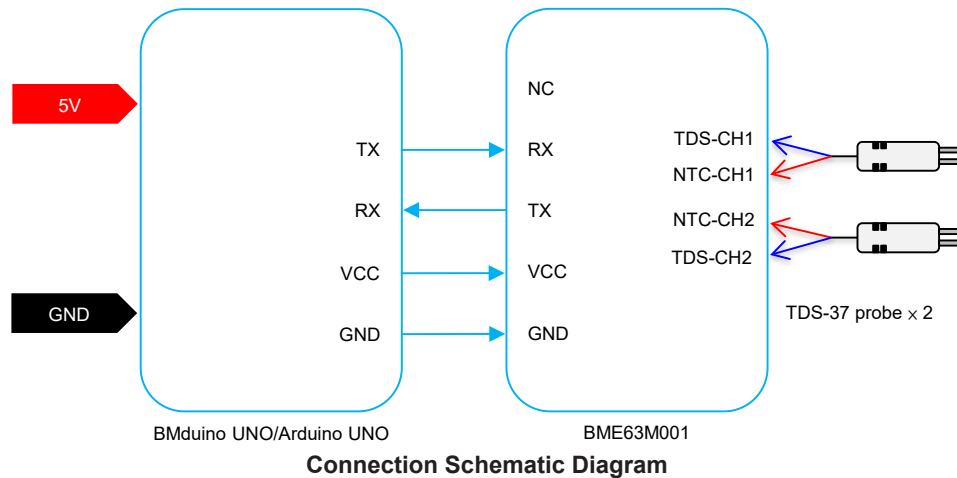
No.	Functional Description	CMD	Note
1	Sleep	0x02	
2	Reset	0x03	

Accessory: TDS-37 Probe Sensor

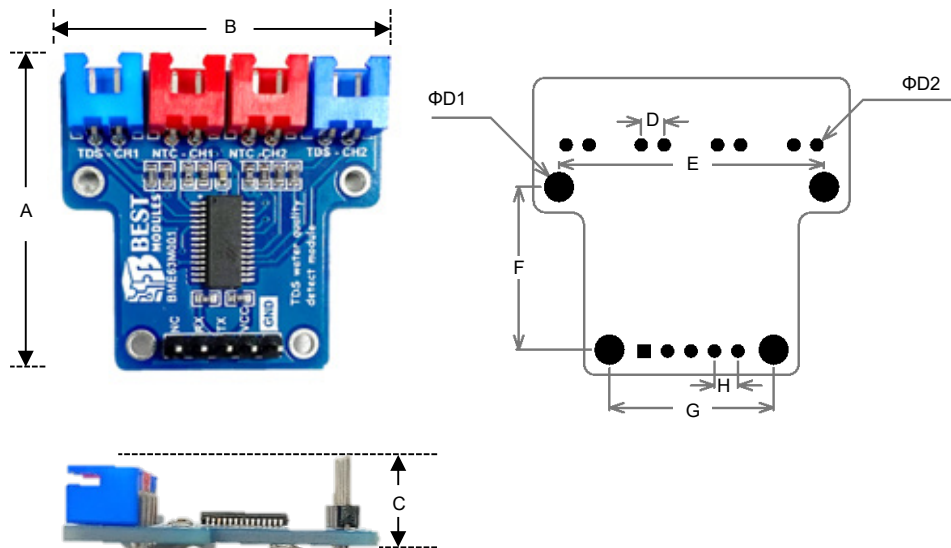


- Thermistor (NTC): Nominal resistance $R_{25}=10K\pm 1\%$ $B_{25/85}=3435K\pm 1\%$
- Insulation performance: 500VAC/1min/50Hz, the switch has no flashover and breakdown
- Operating voltage: $\leq 5V$, operating current: $\leq 10mA$; the smaller the current, the longer service life of the probe
- The probe is made of titanium, its surface is smooth, without cracks, dents, bending, etc., and it meets the RoHS standard
- Probe length: 54cm

Application Circuit



Dimensions



Dimension Information

No.	Unit	mm	inch
A		32.1	1.263
B		34.1	1.342
C		10	0.393
D		2.5	0.098
E		28.6	1.125
F		17.5	0.688
G		17.7	0.696
H		2.5	0.098
D1		2.2	0.086
D2		0.9	0.035

Dimension List

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