



Soil Moisture Detection Module

BME34M101 User Guide

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www.bestmodulescorp.com

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Introduction

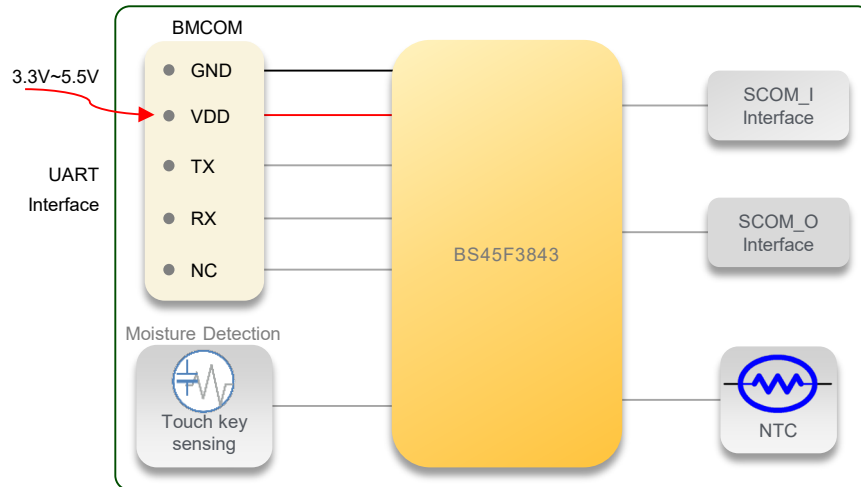
The Best Modules BME34M101 is a soil moisture detection module, which is developed using an MCU, the BS45F3843. The module is mainly used to obtain information such as soil moisture. The module can be cascaded and uses the UART communication method through the BMCOM interface to obtain soil temperature value, moisture value and other functions. The module is suitable for use in applications such as flower and vegetable planting and agricultural irrigation.



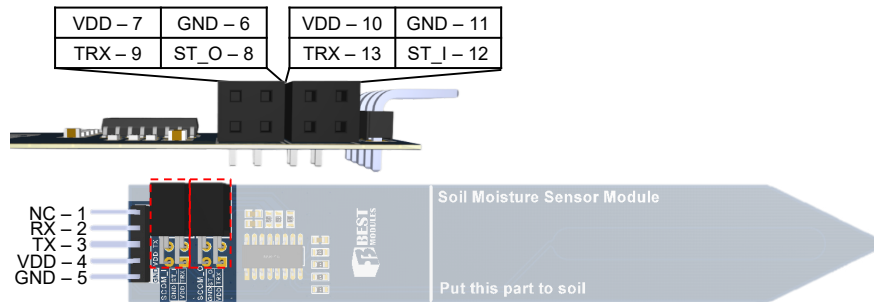
Features

- Operating voltage: 3.3V~5.5V
- Operating current: 2.37mA @ 5V
- MCU: BS45F3843
- Soil moisture:
 - ◆ Range: 0~75%
- Ambient temperature:
 - ◆ Range: 5~60°C
- Cascade interface:
 - ◆ SCOM_I×1 (GND, VDD, ST_I, TRX)
 - ◆ SCOM_O×1 (GND, VDD, ST_O, TRX)
 - ◆ Cascade maximum number: 4
- Communication interface:
 - ◆ BMCOM×1 (NC, RX, TX, VDD, GND)
 - ◆ Communication method: UART (Baud rate: 9600bps)
- Provides Arduino Library support
- Module size: 125.07mm×19.2mm×2.54mm

Block Diagram



Pin Description



BMCOM pins:

Pin	Function	Description
1	NC	—
2	RX	UART receiving data line
3	TX	UART transmitting data line
4	VDD	Positive power supply
5	GND	Negative power supply, ground

Cascade SCOM_O pins:

Pin	Function	Description
6	GND	Negative power supply, ground
7	VDD	Positive power supply
8	ST_O	Cascade status output pin
9	TRX	Cascade single-bus communication pin

Cascade SCOM_I pins:

Pin	Function	Description
10	VDD	Positive power supply
11	GND	Negative power supply, ground
12	ST_I	Cascade status input pin
13	TRX	Cascade single-bus communication pin

Technical Specifications

Recommended Operation Conditions

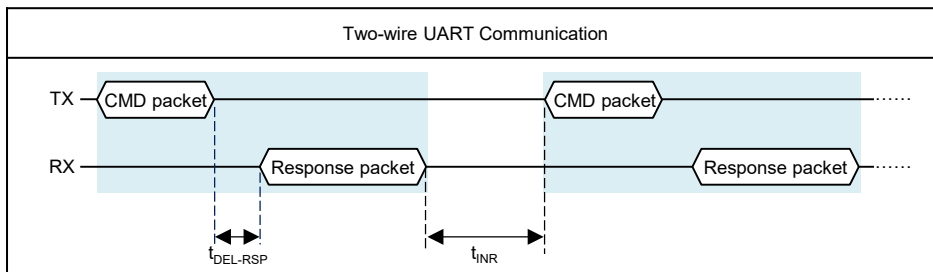
Ta=25°C, unless otherwise specified

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Operating Voltage	—	3.3	—	5.5	V
I _{DD}	Operating Current	V _{DD} =5.0V	—	2.37	—	mA
	Soil Moisture Detection Range	—	0	—	75	%
	Soil Moisture Detection Accuracy	—	—	±5	—	%
	Soil Moisture Detection Resolution	—	—	1	—	%
	Temperature Measurement Range	—	5	—	60	°C
	Temperature Measurement Accuracy	Ta=5°C~60°C	—	±1.5	—	°C
	Temperature Detection Resolution	—	—	1.0	—	°C
	Cascade Number	—	1	—	4	

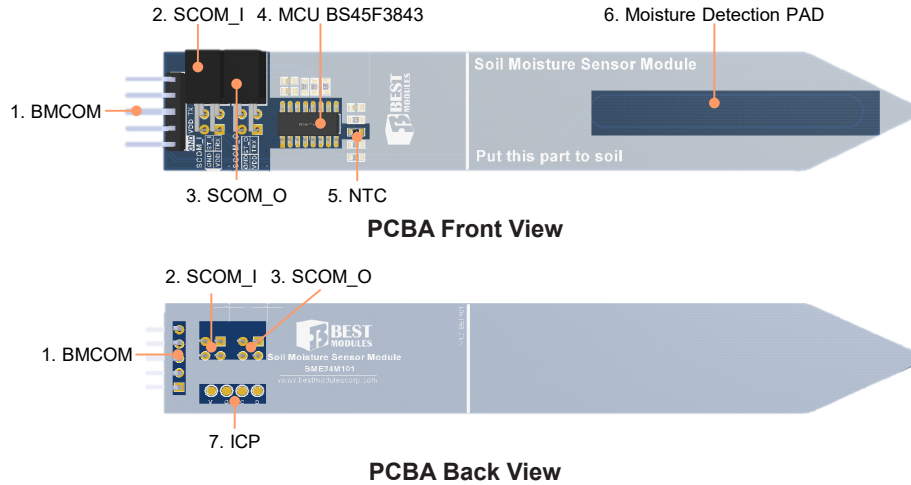
Timing Specification

Ta=25°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{DEL-RSP}	Response Delay Time	V _{DD} =5.0V	—	10	—	ms
t _{INR}	Interval Time	Not reset command	—	12	—	ms
		Reset command	—	25	—	ms



Hardware Overview



Power Supply



- BMCOM pin: Provided by the VDD input, 3.3V~5.5V

Communication Interface

- Communication method: UART
- Baud rate: 9600bps
- Communication logic reference voltage: 3.3V~5.5V

Communication Protocol

There are two instruction frame formats, known as parameter obtain instruction frame and special instruction frame.

Parameter Obtain Instruction

- Host → Module

ID&LEN	CMD	Checksum
1-byte	1-byte	1-byte

• **Module → Host**

ID&LEN	Status	Data	CheckSum
1-byte	1-byte	N-bytes	1-byte

Frame content introduction:

- ◆ ID&LEN: The upper 4 bits are the ID that is automatically assigned when the same modules are cascaded, the lower 4 bits are the byte lengths of CMD, Data and CheckSum
 - ID=N: Cascade Nth module ($1 \leq N \leq 4$)
 - ID=0: Broadcast command that acts on all cascade modules
- ◆ CMD: Command code, each command code corresponds to a different function
- ◆ Status: Command execution
 - 0x00: Command sent successful
 - 0x40: CheckSum error
 - 0x80: Instruction is not supported
- ◆ Data: Data
- ◆ CheckSum: CheckSum = ID&LEN + CMD/Status + Data

Special Instruction Frame

• **Host → Module**

ID&LEN	CMD	CheckSum
0x02	0x12	0x14

• **Module → Host**

ID&LEN	Status	CheckSum
1-byte	1-byte	1-byte

Frame content introduction:

- ◆ Status: 0x00 – The module is connected

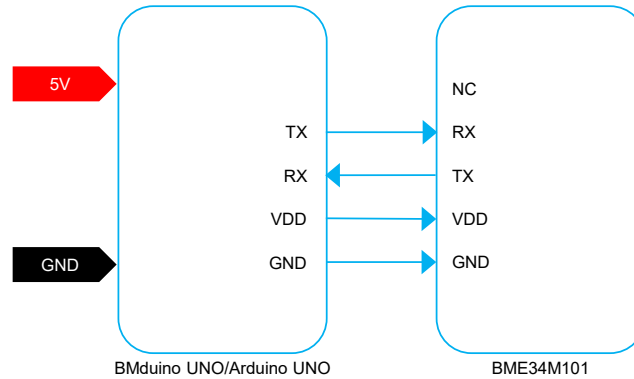
Parameter Obtain Instruction Set

No.	Function Description	CMD	ID	Response Data	Note
1	Obtain the cascade module number	0x11	0	D ₁ : Cascade module number	
2	Obtain the soil moisture detection value of all cascade modules	0x01	0	D ₁ : Cascade module number N D ₂ ~D _{N+1} : The soil moisture detection value of the 1~N modules	
	Obtain the soil moisture detection value of the N th module		N	D ₁ : The soil moisture detection value of the N th module	
3	Obtain the temperature detection value of all cascade modules	0x02	0	D ₁ : Cascade module number N D ₂ ~D _{N+1} : The temperature detection value of the 1~N modules	
	Obtain the temperature detection value of the N th module		N	D ₁ : The temperature detection value of the N th module	

Special Instruction Set

No.	Function Description	CMD	ID	Note
1	Obtain the module connection status	0x12	0	Response Status=0, which indicates that the module is connected

Application Circuit



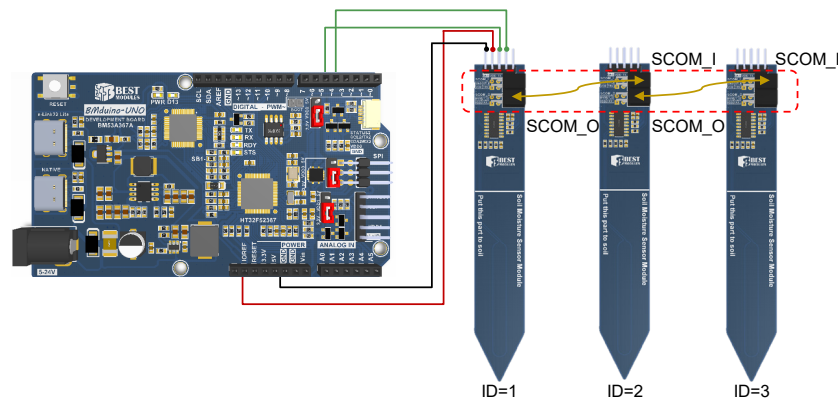
Connection Diagram

Multi-board Cascade

This module can be cascaded up to 4, the corresponding ID=1~4. The module directly connected to the BMduino UNO board will have a cascade ID value of 1.

Multiple modules are cascaded using a 2.54mm, double-row, 2P and male-to-male DuPont line in series. The former module SCOM_O interface should be connected to the latter module SCOM_I interface.

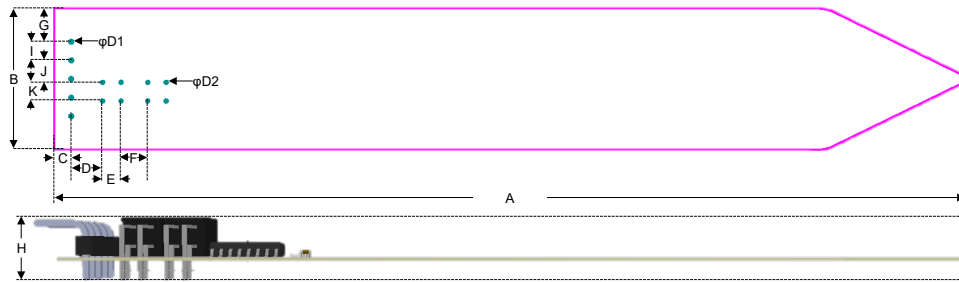
Take the case of 3 modules cascading as an example.



Cascade Diagram

- Note: 1. The module ID is only assigned once when the overall modules are initially powered on, it should be ensured that the cascade module connection is completed before power-on, otherwise it will affect the module ID assignment. Modules cannot be plugged and plugged during use.
2. When cascading multiple modules, the SCOM_I and SCOM_O interfaces should be connected. The module that is connected to the host has an ID of 1. This module SCOM_O interface should be connected to the next module SCOM_I interface. When connecting two modules, pay attention to the connection to ensure that there is no wrong connection.
3. ID=0 is a broadcast command that acts on all cascade modules, refer to the Communication Protocol section for details.

Dimensions



Dimension Information

Symbol	Unit	mm	inch
A (Board length)		125.07	4.92
B (Board width)		19.20	0.76
C		2.27	0.09
D		4.31	0.17
E		2.54	0.10
F		3.66	0.14
G		4.52	0.18
H		2.54	0.10
I		3.00	0.12
J		2.54	0.10
D1		0.9	0.04
D2		0.8	0.03

Dimension List

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