

STI-MM06 Data Sheet



Overview

The Synaptic Technologies STI-MM06 is a multi-function MIOTY[™] sensor node. The STI-MM06 offers 6 measurement parameters, including air temperature, air pressure, humidity, acceleration, discrete circuit status and analog circuit status.

The STI-MM06 includes an internal 3.6v battery pack capable of powering the device for up to 6 years, depending on configuration and environmental conditions. The internal battery pack is not rechargeable, but can be replaced with the STI-BT5200 replacement battery.

MIOTY[™] wireless transmission range of the STI-MM06 is up to 15km line-of-sight to the MIOTY[™] Gateway, or up to 5km in urban environments.

Intended use of the STI-MM06 include indoor environmental monitoring, bump-sensing and monitoring existing discrete or analog circuits.

The STI-MM06 is available in 916Mhz version for North America and an 868Mhz version for use in Europe.

Measurement Parameters

STI-MM06 measurement parameters:		
Temperature	-40°C to 85°C, ±1	
Humidity	0% RH to 90% RH, ±10	
Pressure	300 hPa to 1100 hPa, ±1	
Acceleration	X, Y, Z axis from -2g to 2g	
Discrete Input (2)	Contact closure	
16-bit Analog Input (1)	-2 vDC to 2 vDC, 16-bit AD	
Battery life remaining	100% to 0%	

Physical Characteristics

STI-MM06 physical characteristics		
Length	130mm (5.12")	
Width	65mm (2.56")	
Height	25mm (0.97")	
Enclosure Material	Flame retardant ABS plastic (UL 94V-0)	
IP Rating	IP30	
ROHS	STI-MM06 is ROHS compliant	

Battery

The STI-MM06 is powered by a replaceable, internal battery pack. Replacement battery packs are supplied by Synaptic Technologies: order code STI-BT5200.

STI-BT5200 high-capacity battery pack		
Voltage	3.6v DC	
Capacity	5200 mAh	
Chemistry	Lithium Thionyl Chloride (Li-SOCI2)	
Non-Rechargable	Do not attempt to recharge the STI-BT5200	
Connector	Molex Microfit 3.0	
Shipping	The STI-BT5200 is <u>not</u> restricted for transport. It does <u>not</u> contain Li- Ion chemistry and is <u>not</u> listed as a UN Class 9 device.	

Data Packet

Data packets are transmitted using the MIOTY[™] protocol. Transmissions can be triggered by timer, by change on discrete input or when a bump is detected by the internal accelerometer. The STI-MM06 transmits a consistent data packet, containing all data points, on every transmission regardless of the transmission trigger.

STI-MM06 data packet specification			
Byte.bit	Туре	Description	
0	int8_t	Battery Percentage: 100% - 0% (0x64 - 0x00)	
1	uint16_t	Temperature in K * 10	
2			
3	uint8_t	Relative Humidity %	
4	uint16_t	Pressure	
5			
6	int8_t	X-Axis	
7	int8_t	Y-Axis	
8	int8_t	Z-Axis	
9	int16_t	Analog Input Value	
10			
11.0	bit	Set when Shock Detected, 0 otherwise	
11.1	bit	Set when Discrete 1 circuit closed, 0 otherwise	
11.2	bit	Set when Discrete 2 circuit closed, 0 otherwise	
11.3	3-bits	Orientation. 200: Accelerometer Not Configured, 111: Accelerometer Not Responding	
11.4		001: X axis, 010: -X axis, 011: X axis, 100: X axis,	
11.5		101: Z axis, 110: -Z axis.	
11.6	bit	Set when internal error detected, 0 otherwise	
11.7	bit	RESERVED (0b0)	
12	uint8_t	RESERVED (0x00)	

RF Characteristics & Antenna

STI-MM06 RF characteristics		
Protocol	ΜΙΟΤΥ™	
RF Power (916Mhz NA version)	23.3 dBm	
RF Power (868Mhz EU version)	14.0 dBm	
Antenna Connector	SMA	
Antenna Impedance	50Ω	

Message Transmission Triggers

The STI-MM06 offers several mechanisms for triggering RF transmissions:

Timer

The STI-MM06 can be configured to transmit messages every ~1m, ~5m, ~15m or ~60m.

Unless a configuration was specified at the time of order, the STI-MM06 will be configured to transmit a data packet every ~1m.

See *Configuration Options* in this document for details on changing the data transmission timer.

Wake-on-Bump

The STI-MM06 offers a user-configurable trigger to transmit a message when the internal accelerometer detects an acceleration of 1.5g or greater.

Unless a configuration was specified at the time of order, the STI-MM06 will be configured with the Wake-on-Bump feature active by default.

See *Configuration Options* in this document for details on configuring the Wake-on-Bump feature.

Wake-on-Change

The STI-MM06 transmits a message whenever a change to either of the 2 discrete inputs is detected.

Wake-on-Change functionality is not user configurable.

Configuration Options

The STI-MM06 offers configuration options selectable via three internal DIP switches.

To access configuration DIP switches:

- 1) Move power switch to the OFF position
- 2) Remove antenna or SMA cable
- 3) Remove 4 case screws
- 4) Lift cover from the base, exposing the battery and circuit board



To reassemble your STI-MM06, follow these instructions in reverse order. DIP switches 1 and 2 control the message transmission timer interval. Users may select between 4 intervals: ~1m (actual: 1m18s), ~5m (actual 4m46s), ~15m (actual: 13m31s) and ~60m (actual: 55m12s). Select the desired timer interval from the following chart:

Transmitting a message draws additional power from the internal battery. For longest battery life, select the longest message transmission interval that will meet your requirements.

Wake-on-Bump can be activated using DIP 3 as follows:

The Wake-on-Bump feature requires the internal accelerometer remain powered at all times, drawing power from the internal battery. For extended battery life, disable the Wake-on-Bump feature.

Unless a configuration was specified at the time of order, the STI-MM06 is configured by default as DIP 1: ON, DIP 2: ON, DIP 3: ON.

Custom Configurations

Synaptic Technologies offers the STI-MM06 in custom configurations beyond the useraccessible configuration options documented within this document. Additional charges may apply to custom configurations.

Please contact Synpatic Technologies by email: <u>info@synaptictec.ca</u> or by telephone: 1-705-521-8324 x.289 for more information on custom configurations.

Discrete Inputs

The STI-MM06 offers 2 discrete inputs. These inputs are self-powered and detect contact

DIP 1	DIP 2	Interval		DIP 1	DIP 2	Interval
ON	ON	78 seconds	-	OFF	ON	13 minutes, 31 seconds
ON	OFF	4 minutes, 46 seconds		OFF	OFF	55 minutes, 12 seconds

closure. These inputs are suitable for detecting the position of a switch, pushbutton, microswitch, reed switch or for connecting to the relay output of a PLC (or similar.)

Note: As self powered inputs, the discrete inputs can slightly reduce battery life if connected to normally closed circuits. Battery life is maximized when the discrete inputs are connected to normally open circuits, or when not connected.

DIP 3	Wake-on-Bump status	
ON	Wake-on-Bump activated	
OFF	Wake-on-Bump disabled	

Figure 1 depicts two types of switches wired to the STI-MM06 Discrete inputs.

Analog Input

The STI-MM06 is equipped with a 2v analog input suitable for measuring voltages in circuits or analog sensors with 0-2vDC output. The analog input is not powered — the sensor (or circuit) must provide voltage for the STI-MM06 to measure on the analog input terminals.

For a positive value, a sensor must be connected correctly to the + and - terminals. If a sensor is connected in reverse (sensor + to STI-MM06 -, sensor - to STI-MM06 +), the STI-MM06 will report a negative value on the analog input.

Analog value is reported as a signed 16-bit integer. The formula to translate the 16-bit value to voltage is as follows:

voltage = (*int*16_*t*)*value* / 16383.5

The maximum value reported by the STI-MM06 is (int16_t) 32,767 and occurs at 2.00vDC. Maximum input voltage on the STI-MM06 input is 2.30vDC, however the value reported by the STI-MM06 will remain 32,767 above 2.00vDC.

Figure 1 depicts a 0-2v sensor connected to the STI-MM06 Analog input.



Figure 1: Wiring switches to discrete inputs and analog sensor to analog input.

MIOTY™

The STI-MM06 is a purpose-built MIOTY[™] Node.

To register the STI-MM06 to a MIOTY[™] Gateway, follow your gateway instructions to enter the following information:

Registering an STI-MM06 on a MIOTY™ Gateway		
Туре	70-B3-D5-C1-F0-00-A0-00	
EUI	Unique to each unit	
Network Key	Unique to each unit	

Type, EUI, Network Key and other values are printed on the bottom of the STI-MM06 unit and encoded in the QR code on top of the unit.

Order Numbers

STI-MM06 Order Codes		
Order Code	Description	
STI-MM06-NA	STI-MM06 916Mhz for North America	
STI-MM06-EU	STI-MM06 868Mhz for Europe	
STI-BT5200	Internal 5200 mAh battery pack for STI-MM06	

Contact Synaptic Technologies

Web:

http://www.synaptictech.ca

Mail:

Synaptic Technologies Inc. 1545 Maley Drive Sudbury, ON P3A 4R7 Support:

support@synaptictech.ca

Sales:

sales@synaptictech.ca

General inquiries: info@synaptictech.ca

Phone:

1-705-521-8324 x.289