

## SkyMote TLB (Temp, Light, Bump)

SkyMote TLB, TLB-RH

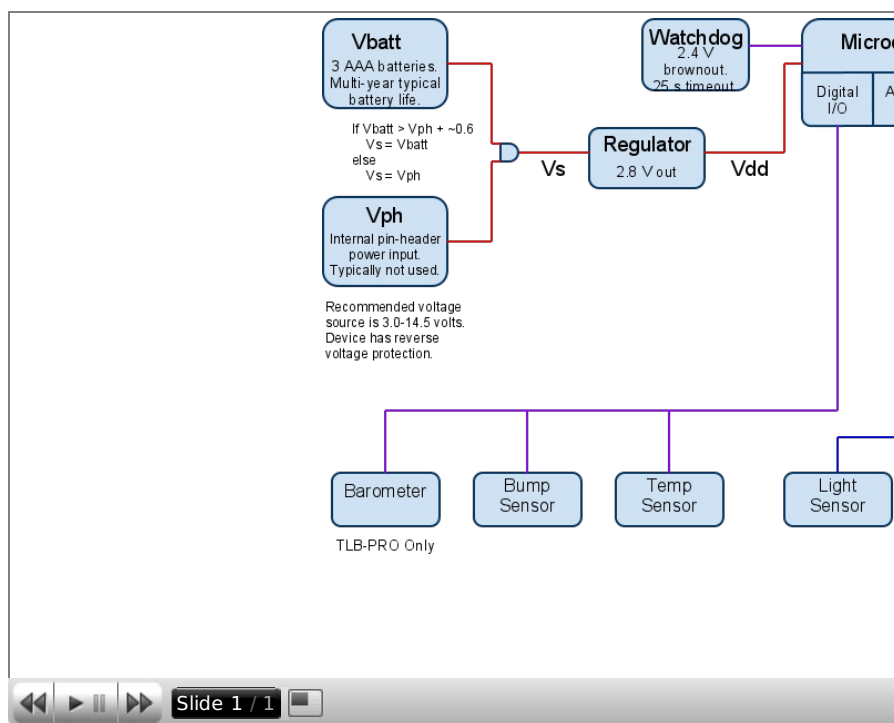
SM-TLB, SM-TLB-RH

TLB is for temperature, light, and bump. This mote also has a microphone that can do some limited sound level measurements. The TLB-RH adds a humidity sensor.

802.15.4 end-device with 4 built-in sensors for temperature, light, motion, and sound.

Housed in a weather-resistant wall-mountable enclosure designed for indoor or outdoor use. No external connections. 3 AA batteries power the mote, and battery life is multiple years in typical use.

From Wikipedia: Motes - Small, battery-operated sensor nodes operating as part of a Wireless Sensor Network.



**Temperature:** Sensor is accurate to 0.5 deg C max from -20 to +85 deg C, and 1.0 deg C max from -40 to +85 deg C (note that operating temperature of the mote is likely limited by the batteries).

**Light:** Sensor range is 3 to 70k lux, although actual response might be limited and altered by the enclosure. One reading consists of the average of many samples collected over 1/60th of a second (or 1/50th if in 50 Hz mode).

**Bump:** Sensor is binary (true/false) and detects movement of the mote itself with a threshold of 50-500 mG. When this sensor is read, you get 1 count if there has been any detected movement since the last read.

**Sound:** One reading consists of the average of many samples collected over 1/60th of a second (or 1/50th if in 50 Hz mode). Performance is TBD, but the idea is to detect a substantial increase in sound level if it happens during a read.

**Relative Humidity:** TBD.

MMA stands for maximum/minimum/average.

Check-In Report: Status ?, RX LQI (1), Vbatt (4), Bump Count (2), # MMA Samples (2), Temp (4 or 12), Light (4 or 12), Sound (4 or 12), RH (4 or 12), Reserved (4 or 12).

Status: Errors?, 4 bits to tell if L/S/RH/Reserved are disabled.

All times specified in milliseconds (ms).

Process Interval: 100-15000 ms, 30 s, 45 s, or 60 s. Default = 5 s. Interval at which device wakes up and takes readings from all enabled sensors.

Check-In Interval: 100-15000 ms, 30 s, 45 s, or 60 s. Default = 60 s. This must be a multiple of Process Interval. Sends the Check-In Report, then polls to see if there are any commands waiting.

Rapid Check-In Interval: Default = 2 s. This is a temporary mode the device enters where the check-in interval is changed to something else (typically faster). Device enters this mode on initial power-up and when commanded.

Rapid Timeout: Default = 60 s. A value of 0 disables rapid mode. Device will exit rapid mode if it does not receive any commands within this time.

Line Frequency: 1=60 Hz, 2=50 Hz. Determines the period over which light and sound readings are collected.

Disable Light/Sound/RH/Reserved/MM: These parameters disable certain sensors and turn off the Max/Min feature for all applicable sensors. This can reduce power because the sensor is not used, and by bringing the size of the Check-In Report to within 1 packet. If disable MM is true, no Max & Min is done, and only the average of readings is calculated and transmitted.

Events: If x op y, do something. "x" is something like "current reading". "op" is >, <, or delta. "y" is constant or last sent value (max, min, or avg). "do something" is send report.

If the Check-In Interval is greater than 7 seconds, command must be sent to the mote 0-7 seconds before a Check-In occurs. If a command is sent to a mote, and the mote does not wake up and poll for the command within 7 seconds, that command will fail, and if such a failure happens 5 times without success the mote will unjoin from the network. It will try to rejoin later, but that uses extra energy.

## FCC PART 15 STATEMENTS

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 UNDESIRE OPERATION.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: 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.

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