

SMB Theory of Operation

The SMB provides a bridge between a SkyMote 2.4 GHz 802.15.4 Wireless Sensor Network (WSN) and host computer. Alternatively, the SMB can be a simple repeater for wireless traffic on the SkyMote 802.15.4 network.

A command is sent by a host computer to the SMB over USB or Ethernet. The USB or Ethernet Controller on the SMB accepts this command and passes it on to the main Microcontroller which has an 802.15.4 transceiver built-in. The Microcontroller determines which child the command should be sent to, and stores it until that child checks-in and requests any available commands. At that time the Microcontroller sends the command and waits for the response from the child. When the response is received the Microcontroller passes it on to the USB or Ethernet Controller which then sends it back to the host.

The SMB is powered by a 4.5-20 volt supply. Power comes from a power jack, screw-terminals, or USB. The supplies are ORed to choose the one with the highest voltage. This is converted to 3.3 volts using a switching DC-DC converter, and 3.3 volts is the main system voltage for the SMB.

The SMB has a swivel whip antenna for the 2.4 GHz wireless communication. It is about 110 mm long with a typical gain of 2 dB.

A SkyMote network has a tree topology with the following components:

Bridge: A bridge is used to connect the wireless network to a host via Ethernet or USB. Each network has only 1 bridge. The wireless transceiver on a bridge is always on. A bridge can have up to 16 children (repeaters and motes).

Repeater: Creates a wireless link between 1 parent and up to 16 children. The wireless transceiver on a repeater is always on.

Mote: End-device with sensors and actuators. Generally operated in sleeping mode, where the device (including wireless transceiver) is shut down most of the time, and wakes up periodically. A sleeping mote cannot have children.