

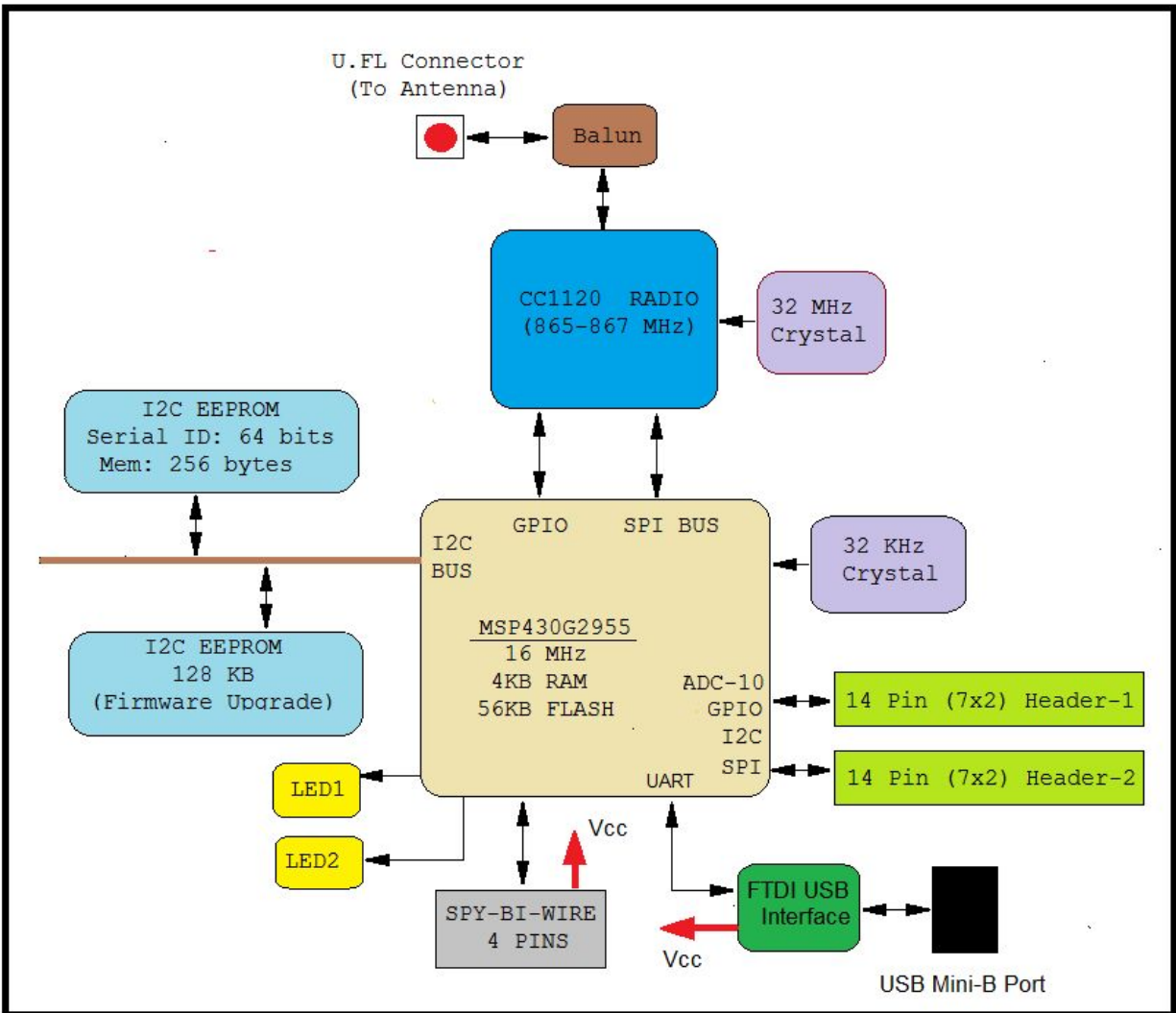
WiSense WSN1120CL

Datasheet



- The WSN1120CL is a low profiler WiSense wireless mesh coordinator node. It includes the CC1120 high performance sub-ghz radio (from TI) and the MSP430G2955 microcontroller (from TI). The radio board has a PCB antenna as well as an U.FL connector for external antenna.

The module comprises two PCBs as seen in the image above. The top one is the radio PCB (WSR1120) while the bottom one (WSC2955) has the microcontroller and EEPROM ICs.



WSN1120CL HW Architecture

Microcontroller PCB:

- MSP430G2955
 - Ultra low power microcontroller from TI
 - 56KB flash, 4KB SRAM
 - Standby current (in LPM3) as low as 1 micro amp.
 - Operating voltage: 1.8 V – 3.6 V
 - Multiple On-chip 10 bit ADC channels
 - Peripheral support (in hw): SPI/I2C/UART
 - I2C and 1-wire (software)
 - UART/SPI (hardware)
 - On chip power supply voltage measurement
 - On chip temperature sensor
 - 2 pin Spy-Bi-Wire protocol for development (Programming and debugging).
- SPI/GPIO interface to the radio module
- I2C/1-wire/GPIO interface to sensors
- On board serial (I2C) EEPROM (AT24MAC602) with hardwired and globally unique 48 bit and 64 bit addresses.
- On board 128 Kilo-Bytes EEPROM (M24M01) for firmware upgrade. EEPROM can store two full images.
- On board high accuracy 32 kHz crystal
- 1 four pin right angled header (Spy-Bi-Wire) – Vcc, Gnd, Test, Reset
- 1 USB Mini-B port for power and serial interface (UART @ 38400 bps over USB)
- 2 LEDs
- 2 2x7 headers which expose most of the MSP430G2955 pins.
- Dimensions: 42 mm x 42 mm

Radio PCB:

- CC1120
 - Low-cost sub-1 GHz transceiver designed for low bandwidth and low-power wireless applications.
 - Programmed by WiSense stack to operate in the 865-867 MHz license free band in India
 - Operating voltage: 1.8 V – 3.6 V
 - Sensitivity: -123 dBm @ 1.2 kBaud
 - Modulation: 2-FSK, 4-FSK, GFSK, and MSK supported as well as OOK and flexible ASK shaping. Default modulation is 2-GFSK. WiSense stack uses 2-GFSK.

- Programmable output power up to +13 dBm for all supported frequencies. Default output power is +13 dBm. Note that max allowed output power in the 865-867 MHz license free Indian band is +30 dBm (1 watt).
 - Programmable data rate from 0.6 kbps to 600 kbps. Lower the programmed data rate, higher the range.
 - Default WiSense coordinator firmware currently supports two run time baud rates (1.2 kbps and 20 kbps). Anytime the baud rate is changed, the coordinator will reboot and run at the newly configured baud rate.
- U.FL antenna connector. Can use U.FL to SMA cable assembly to connect to antenna outside weatherproof enclosure.
 - PCB antenna
 - On board high accuracy 32 MHz crystal
 - Uses 2 1x7 2.54 mm pitch headers for mating with microcontroller board
 - Dimensions: 37mm x 38mm

The WSN1120CL comes pre-programmed out of the box to operate as a WiSense mesh network coordinator node operating in the 865-867 MHz license free band (in India). The coordinator node is responsible for setting up and maintaining a single instance of a WiSense LPWMN. It allocates a unique 16 bit address to each registering node. It also serves as the gateway for the entire network. All communication between the nodes in the network and the outside world happens through the coordinator node.

WiSense provides a Linux/Cygwin based CLI to configure and query the WSN1120CL and associated LPWMN (low power wireless mesh network).

The Linux/Cygwin based CLI can be used (for example) to:

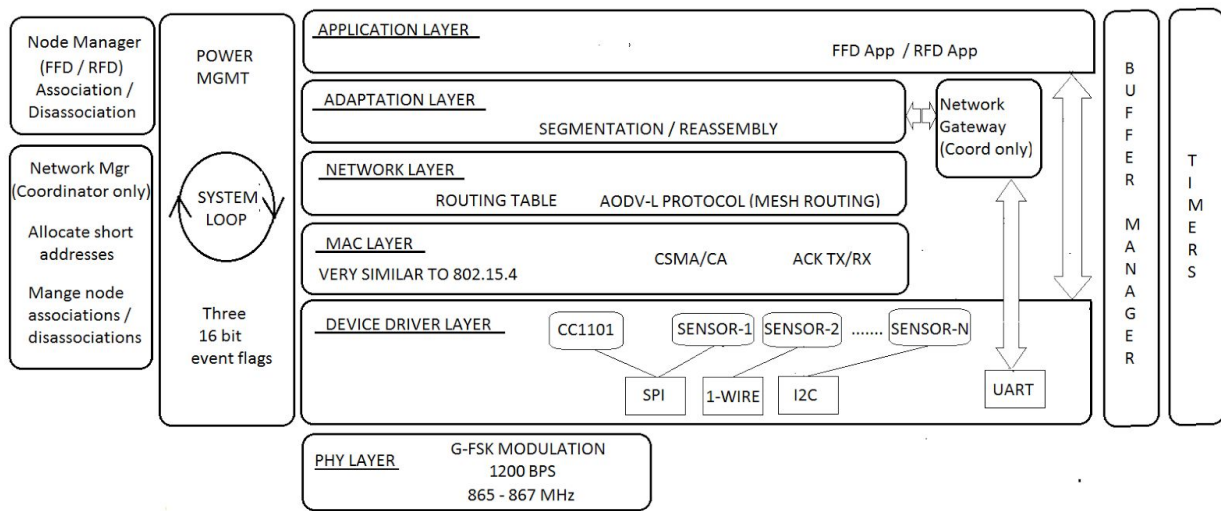
- Set the RF channel (channel 1 to channel 9) on which the LPWMN will operate.
- Set the 16 bit LPWMN identifier (LPWMN Id).
- Configure baud rate (1.2 kbps / 20 kbps)
- Add node to white-list / remove nodes from white-list / display white-list
- Add node to black-list / removed node from black-list / display black-list
- List all the nodes in the network.
- Get routing information
- Get/Set attributes on the Coordinator and other nodes in the network.
- Request the coordinator to reboot itself.
- Request any node in the network to reboot.
- Upgrade the firmware running on the Coordinator.
- Upgrade the firmware on any node in the network (over the air upgrade).

- Get information on the version of firmware running on the coordinator or any other node in the LPWMN.
- Monitor sensor data messages received from any node in the network



WSN1120CL with enclosure

WiSense Network Stack Layers



WiSense Network Stack