

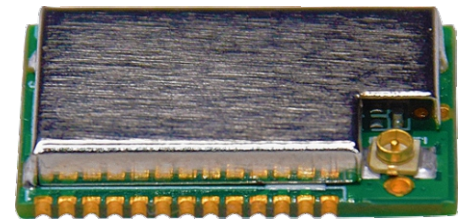
Sub 1GHz Multichannel Radio Transceiver with Hirose antenna connector

It is a low cost sub 1GHz multichannels transceiver designed for low-consumption wireless applications. The hardware is based on Silicon Labs Si1000 component. The main features of this device are: Output power up to +20 dBm (100mWatt) Microcontroller Integrated (8051core), modulation selectable (OOK, FSK, GFSK), low power consumption.



Embedded Software WSN

RadioControlli has developed an WSN (wireless sensor network) architecture of a network of control and measurement. This application allows to manage and customize the WSN via the UART interface connected to a host system.



Technical Characteristics

| Characteristics | | MIN | TYP | MAX | UNIT |
|-----------------|--|---------|-------|---------|--------|
| V _{CC} | Supply Voltage | 2.2 | 3 | 3.6 | VDC |
| I _s | Supply Current (RX mode / TX mode) | | 20/34 | | mA |
| I _s | Assorbimento Corrente (TX mode / +20dBm) | | 85.0 | | mA |
| I _s | Assorbimento Corrente (TX mode / 0 dBm) | | 10 | | mA |
| I _s | Assorbimento Corrente sleep mode | | < 0.1 | | μA |
| T | StartUp Time (Sleep to RX/TX mode) | | < 2 | | μS |
| P _o | RF Output Power | - 3.0 | | +20 | dBm |
| T _{OP} | Operating Temperature Range | -10 | | +55 | °C |
| | RF Sensitivity (1.2 Kb/sec Data Rate) | | -121 | | dBm |
| | RX Frequency Range CEPT/ERC/REC 70-03 | 433/868 | | 434/870 | MHZ |
| | Max Data Rate | | 500 | | Kbit/s |

Applications :

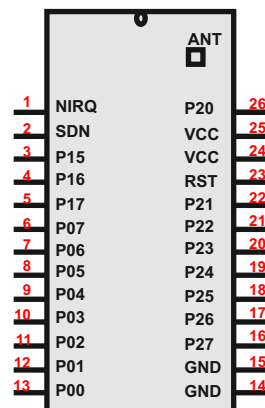
- Wireless security systems
- Home and building automation
- Automatic Measure Reading
- Industrial Control and Monitoring
- Wireless Sensor Network

Feature :

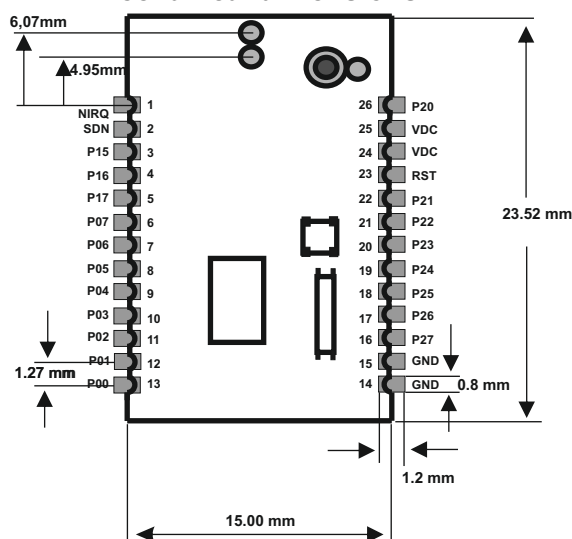
- Bidirectional multichannel Link
- RF Power until +20dBm (100mW)
- Low consumption technology
- High Speed 8051 μC Core.

PIN OUT RCS1KSMT-XXX

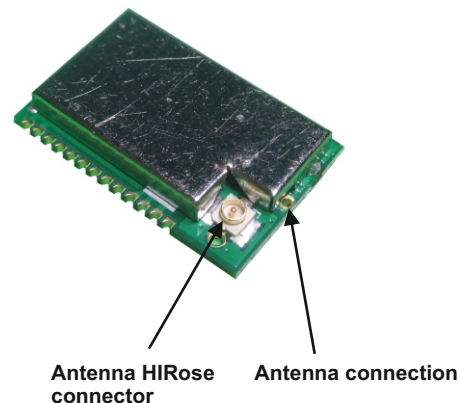
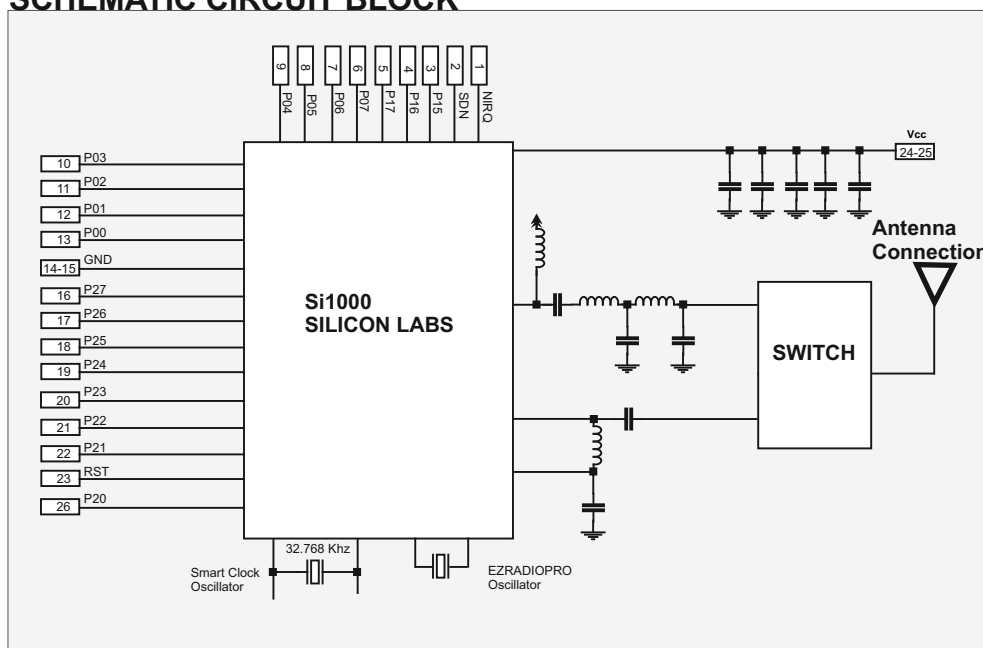
| Pads | Name | Type | Description |
|------|----------|--------------|--|
| 1 | NIRQ | D O | EZRadioPRO peripheral interrupt status pin. |
| 2 | SDN | D I | EZRadioPRO peripheral shutdown pin. |
| 3 | P15 | D I/O or A I | Digital I/O or Analog I |
| 4 | P16 | D I/O or A I | Digital I/O or Analog I |
| 5 | P17 | D I/O or A I | Digital I/O or Analog I |
| 6 | P07 | D I/O or A I | Digital I/O or Analog I |
| 7 | P06 | D I/O or A I | Digital I/O or Analog I |
| 8 | P05 | D I/O or A I | Digital I/O or Analog I - UART RX Pin |
| 9 | P04 | D I/O or A I | Digital I/O or Analog I - UART TX Pin |
| 10 | P03 | D I/O or A I | Digital I/O or Analog I |
| 11 | P02 | D I/O or A I | Digital I/O or Analog I |
| 12 | P01 | D I/O or A I | Digital I/O or Analog I |
| 13 | P00 | D I/O or A I | Digital I/O or Analog I |
| 14 | GND | Ground | Ground |
| 15 | GND | Ground | Ground |
| 16 | P27/C2D | D I/O or A I | Digital I/O or Analog I - C2 debug interface |
| 17 | P26 | D I/O or A I | Digital I/O or Analog I |
| 18 | P25 | D I/O or A I | Digital I/O or Analog I |
| 19 | P24 | D I/O or A I | Digital I/O or Analog I |
| 20 | P23 | D I/O or A I | Digital I/O or Analog I |
| 21 | P22 | D I/O or A I | Digital I/O or Analog I |
| 22 | P21 | D I/O or A I | Digital I/O or Analog I |
| 23 | RST/C2CK | D I/O | Device Reset C2 Debug Interface |
| 24 | VCC | Power | Power supply voltage |
| 25 | VCC | Power | Power supply voltage |
| 26 | P20 | D I/O or A I | Digital I/O or Analog I |



Mechanical dimensions



SCHEMATIC CIRCUIT BLOCK



It is possible buy this component even with the WSN application inside.

The wireless network for control and measurement is composed from a gateway and from a series of unit for Control and Measurement at Low Power (sensor) connected at star.

Each Unit for Control and Measurement (sensor) is characterized by a unique address "sensor address" and the address of a gateway that can communicate "gateway address".

The WSN can be managed by an external control unit (an embedded system or a PC) connected to the gateway via UART interface.

The WSN integrates the low consumption technology.

The WSN can be customized according to customer requirements (firmware), it is always possible to integrate the intelligent functions of the sensor by using the MCU resources of the unit control and measurement.

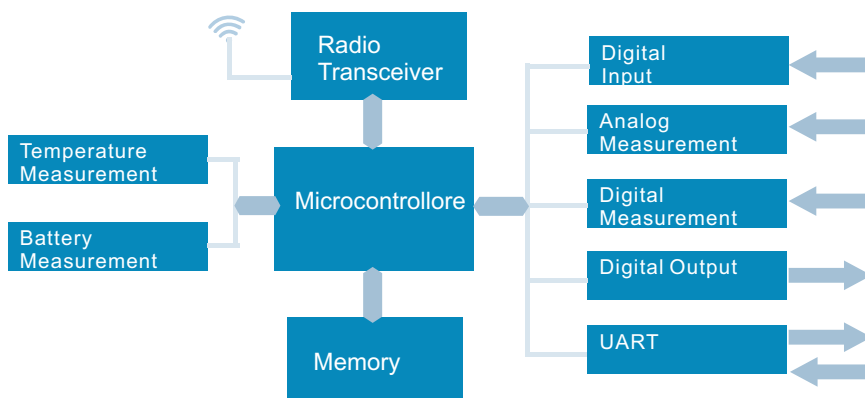
SENSØNET User Manual.pdf

Estimated consumption for the application WSN

The average absorption depends of many factors (time of wake up, transmission power, a radio bit rate, type of modulation ect) .

follow an average estimate of consumption (modulation GFSK 50K Manchester).

| Wake-Up Timer (secondi) | Power RF (dBm) | Average consumption (μ A) |
|-----------------------------|--------------------|-----------------------------------|
| 5 | 0 | 117,0 |
| 15 | 0 | 39,30 |
| 30 | 0 | 19,60 |
| 60 | 0 | 9,80 |
| 5 | + 20 | 188,00 |
| 15 | + 20 | 62,60 |
| 30 | + 20 | 31,30 |
| 60 | + 20 | 15,60 |



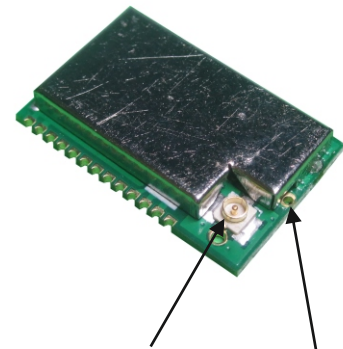
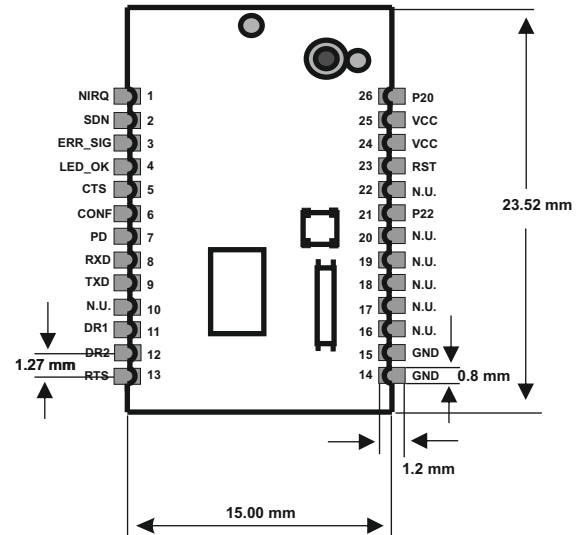
Hardware Resources

- N. 4 Digital Input with interrupt (DIN1,DIN2,DIN3)
- N. 2 Digital measurement (DIN4,DIN5)
- N. 3 Analog Input (ADC1,ADC2,ADC3)
- N. 3 Digital Output (OUT1, OUT2)
- N. 1 Digital Counter (DIN6)
- N. 1 Battery voltage meter
- N. 1 Temperature meter
- N. 1 UART interface

RCS1KSMT-XXX configured as CONCENTRATOR/GATEWAY

| Pads | Name | Type | Description |
|------|---------|---------|--|
| 1 | NIRQ | CONTROL | In the WSN application must be connected with pin 21 (see schematic below).. |
| 2 | SDN | CONTROL | In the WSN application must be connected with pin 26 (see schematic below). |
| 3 | ERR_SIG | CONTROL | LED Error |
| 4 | LED_OK | CONTROL | Led OK / Programming |
| 5 | CTS | UART | UART Clear to Send |
| 6 | CONF | CONTROL | Configuration |
| 7 | PD | CONTROL | Power Down Mode |
| 8 | RXD | UART | Uart TX |
| 9 | TXD | UART | Uart RX |
| 10 | N.U. | N.U. | Not Used |
| 11 | DR1 | D I/O | DR1 Baude rate selection |
| 12 | DR2 | D I/O | DR2 Baude rate selection |
| 13 | RTS | UART | UART Request to Send |
| 14 | GND | Ground | Ground |
| 15 | GND | Ground | Ground |
| 16 | N.U. | N.U. | Not Used |
| 17 | N.U. | N.U. | Not Used |
| 18 | N.U. | N.U. | Not Used |
| 19 | N.U. | N.U. | Not Used |
| 20 | N.U. | N.U. | Not Used |
| 21 | P22 | CONTROL | Connected with pin1 (see schematics below). |
| 22 | N.U. | N.U. | Not Used |
| 23 | RST | D I/O | Device Reset |
| 24 | VCC | Power | Power supply voltage |
| 25 | VCC | Power | Power supply voltage |
| 26 | P20 | CONTROL | Connected with pin 2 (see schematics below). |

Mechanical dimensions



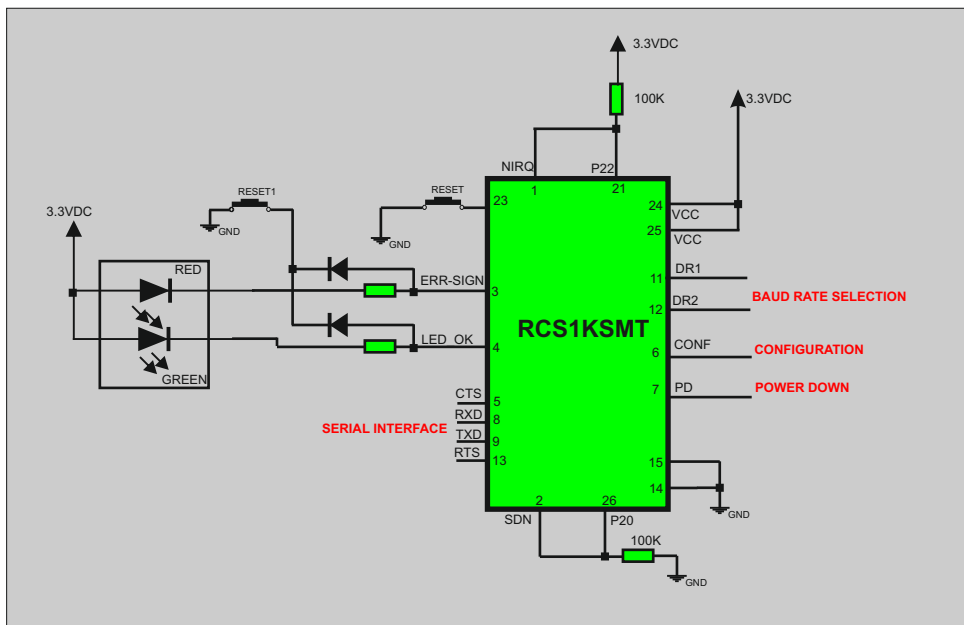
Antenna HI-Rose connector

Antenna connection connector

CONCENTRATOR/GATEWAY Application Note

BAUDE RATE SELECTION

| baud/rate | DR1 | DR2 |
|-----------|------|------|
| 9600 | Low | Low |
| 19200 | High | Low |
| 38400 | Low | High |
| 115200 | High | High |

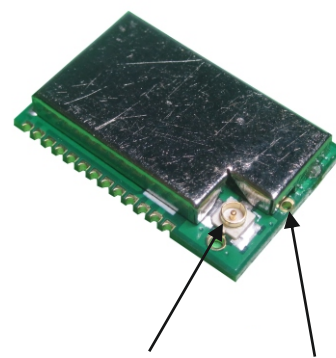
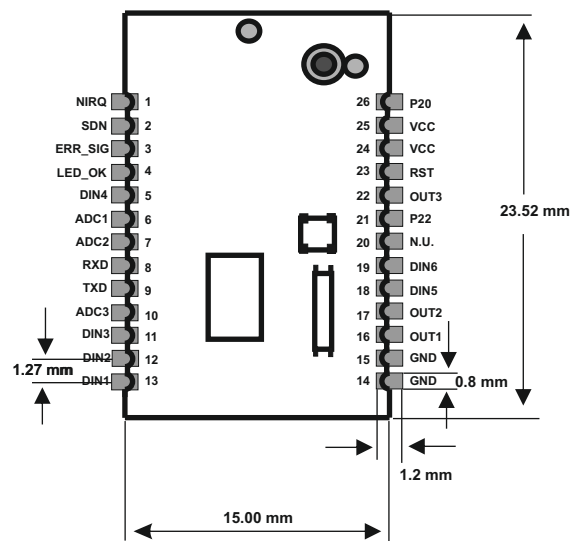


RCS1KSMT-XXX configured as SENSOR (Low consumption unit)

PIN OUT

| Pads | Name | Type | Description |
|------|---------|---------|--|
| 1 | NIRQ | CONTROL | In the WSN application must be connected with pin 21 (see schematic below).. |
| 2 | SDN | CONTROL | In the WSN application must be connected with pin 26 (see schematic below). |
| 3 | ERR_SIG | CONTROL | LED Error |
| 4 | LED_OK | CONTROL | Led OK / Programming |
| 5 | DIN4 | D I/O | Digital Input |
| 6 | ADC1 | A I | Analog Input (0 - Vcc) |
| 7 | ADC2 | A I | Analog Input (0 - Vcc) |
| 8 | RXD | UART | Uart TX |
| 9 | TXD | UART | Uart RX |
| 10 | ADC3 | A I | Analog Input (0 - Vcc) |
| 11 | DIN3 | D I/O | Digital Input |
| 12 | DIN2 | D I/O | Digital Input |
| 13 | DIN1 | D I/O | Digital Input . |
| 14 | GND | Ground | Ground |
| 15 | GND | Ground | Ground |
| 16 | OUT1 | DOUT | Digital Output |
| 17 | OUT2 | DOUT | Digital OutputDigitale |
| 18 | DIN5 | D I/O | Digital Measurement |
| 19 | DIN6 | D I/O | Digital Measurement and Counter |
| 20 | N.U. | N.U. | Not Used |
| 21 | P22 | CONTROL | Connected with pin1 (see schematics below). |
| 22 | OUT3 | DOUT | Digital Output |
| 23 | RST | D I/O | Device Reset |
| 24 | VCC | Power | Power supply voltage |
| 25 | VCC | Power | Power supply voltage |
| 26 | P20 | CONTROL | Connected with pin 2 (see schematics below). |

Mechanical dimensions



Antenna HI-Rose connector

Antenna connection connector

SENSOR Low Consumption Unit Application Note

