

SN90RC

900 MHz RTD/CT Sensor Node

- **Wireless Sensor Node for RTD, CT and Contact Inputs**
- **Supports 2, 3 or 4-wire 100 ohm Platinum RTDs**
- **Robust 900 MHz FHSS Radio**
- **Internal Antenna or External 2 dBi Antenna Options**
- **Optional 128-Bit AES Encryption**
- **Compatible with LG90E and LG90C Gateways**
- **Configuration Through Serial Port**
- **Up to 10 Years Battery Life**

The SN90RC is a battery-powered wireless sensor node providing support for one 100 ohm Platinum RTD input, one current transformer input and one contact closure input. Wireless connectivity is provided through a 158 mW 900 MHz Frequency Hopping Spread Spectrum (FHSS) wireless connection, making use of the companion LG90E Ethernet gateway or LG90C cellular gateway. The unique low-power DNT90 FHSS radio and signal conditioning circuitry used in the SN90RC provide years of battery operation. Sensor data plus battery status is automatically transmitted based on user-configurable conditions, simplifying application software design. The wireless sensor node is configured through its serial port.



SN90RC Specifications

| Characteristic | Sym | Notes | Minimum | Typical | Maximum | Units |
|--------------------------------------|-----|-------|---|---------|---------|-------------------|
| Sensor Inputs | | | 2, 3 or 4-wire 100 ohm Platinum RTD Current Transformer Contact Closure | | | |
| RTD Type | | | 100 ohm Platinum, 0.00385 Alpha | | | |
| RTD Temperature Range | | | -200 | | +158 | °C |
| RTD Resolution | | | | 0.0625 | | °C |
| RTD Accuracy | | | | ±0.3 | | °C |
| RTD Measurement Data Format | | | 16-bit Signed Value | | | |
| Input Range for Current Transformer | | | 0 | | 6.67 | mA _{RMS} |
| Current Measurement Resolution | | | | 12 | | bits |
| Current Measurement Accuracy | | | | | ±2 | % |
| Current Measurement Data Format | | | 12-bit Unsigned Value | | | |
| Open Contact Voltage | | | | 3.3 | | V |
| Closed Contact Current | | | | 33 | | µA |
| Contact Status Data Format | | | 8-bit Unsigned Value | | | |
| Internal Battery Voltage Range | | | 3.0 | | 3.6 | V |
| Internal Battery Voltage Accuracy | | | | | ±2 | % |
| Internal Battery Voltage Data Format | | | 12-bit Unsigned Value | | | |

SN90RC Specifications

| Characteristic | Sym | Notes | Minimum | Typical | Maximum | Units |
|---|-----|-------|---|---------|---------|--------|
| Serial Interface | | | RS232C, 38.4 kbps, 8N1, no flow control | | | |
| Radio | | | RFM DNT90 FHSS Radio | | | |
| Operating Frequency Range | | | 902.76 | | 927.24 | MHz |
| RF Data Rate | | | 100 | | | kbps |
| Number of RF Channels | | | 25, 26 or 52 | | | |
| RF Transmit Power | | | 40 or 158 | | | mW |
| Receiver Sensitivity, 10E-5 BER: | | | | -100 | | dBm |
| Internal Antenna | | | SMD Chip Antenna | | | |
| Optional External Antenna | | | 2 dBi RPSMA Dipole Antenna | | | |
| Supplied Battery | | | Lithium Thionyl Chloride (LTC) C Cell, 8.5 A-hr | | | |
| Operating LTC Battery Life, -40 to +85 °C: | | | | | | |
| 1 Minute Report Interval | | | | 1.5 | | years |
| 15 Minute Reprt Interval | | | | 10* | | years |
| 1 Hour Report Interval | | | | 10* | | years |
| Optional Battery | | | 3 Alkaline AA Cells, 2.5 A-hr | | | |
| Operating Alkaline Battery Life, -20 to +50 °C: | | | | | | |
| 1 Minute Report Interval | | | | 4.5 | | months |
| 15 Minute Reprt Interval | | | | 2.8 | | years |
| 1 Hour Report Interval | | | | 4.2 | | years |
| Sensor Sampling Rate | | | | | 2000 | Hz |
| Report Triggers: | | | | | | |
| Timer | | | 100 ms to > 1 year | | | |
| Measurement Value | | | High and Low Measurement Thresholds | | | |
| Switch Closure | | | Upon Closure | | | |
| Operating Temperature Range | | | -40 | | +85 | °C |
| Operating Humidity Range, Non-condensing | | | 5 | | 95 | %RH |
| Nominal Dimensions | | | 5.5 x 2.5 x 1.3 inches 140 x 64 x 33 mm | | | |
| Mounting | | | Left and Right Flanges, Two Pre-drilled Holes Plus Slot in Each Flange | | | |

*LTC battery life specified by manufacturer is 10 years. Operation with 15 minute and 1 hour report intervals does not consume rated battery capacity during 10 years of operation.

SN90RC Block Diagram

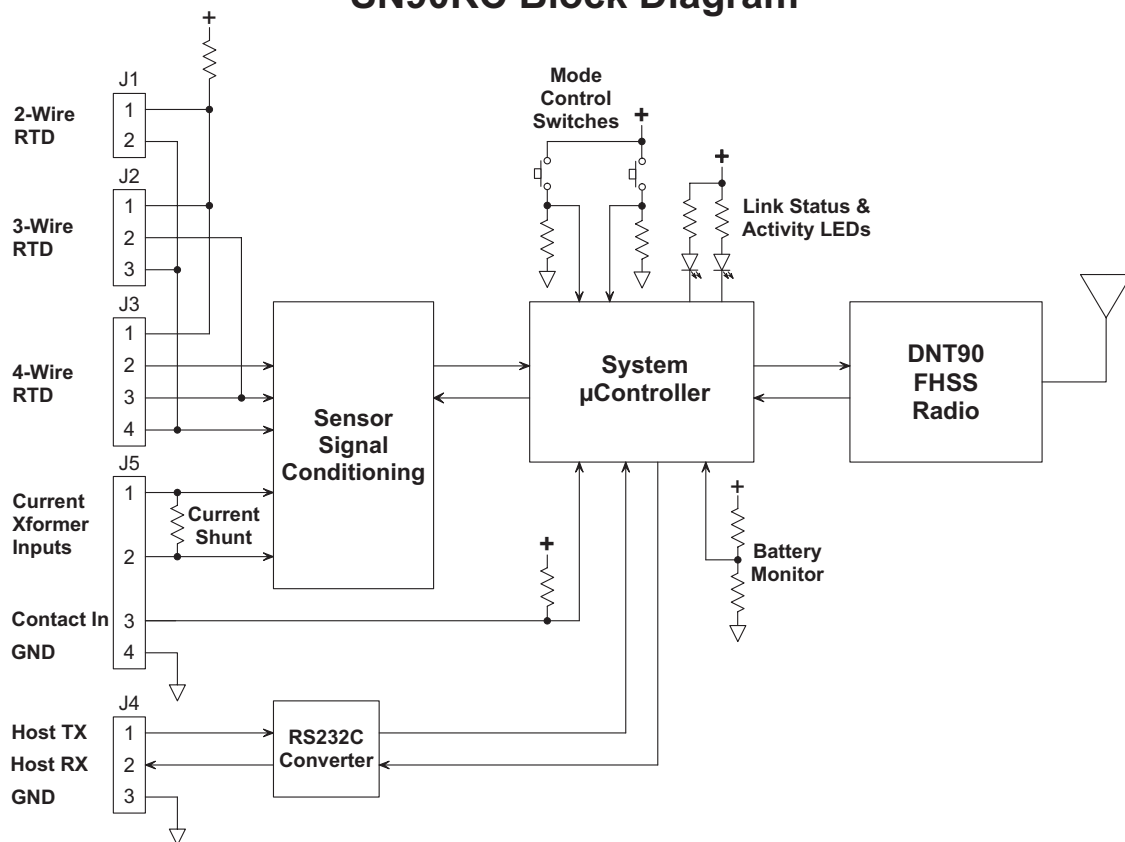


Figure 1

SN90RC Operation

The SN90RC is a 900 MHz Frequency Hopping Spread Spectrum (FHSS) based wireless sensor node. The SN90RC supports 100 ohm platinum RTD, current transformer and switch closure inputs. The SN90RC's very low average power consumption provides up to 10 years of operation from a 8.5 A-hr C cell LTC battery. Alternately, the SN90RC can be powered from three inexpensive AA batteries in limited temperature range applications where shorter battery operating life is acceptable.

The SN90RC sensor node is available with either an internal antenna or external 2 dBi dipole antenna.

The SN90RC includes two LED indicators and two buttons to facilitate installation, activation, configuration and testing.

J1, J2 and J3 provide connection points for 2, 3 or 4-wire RTDs respectively, with a 4-wire RTD preferred for best accuracy. J4 provides connection points for 3-wire RS232 communication with a host computer, and J5 provides connection points for the current transformer and contact status inputs.

The SN90RC automatically reports the sensor input readings on user defined intervals and conditions, eliminating the need for application polling. When the SN90RC sends data, it wakes up, synchronizes with its gateway, transmits the data and quickly returns to sleep, maximizing battery life.

The internal battery voltage is included in each sensor report, providing continual information on the battery status. The SN90RC is configured through its serial port using a standard 3-wire RS-232 connection.

Connector J1 Description

| Pin | Name | I/O | Description |
|-----|------|-----|--|
| 1 | RTD+ | I | 2-wire RTD positive (red) input. This input is connected to the RTD current source. |
| 2 | RTD- | I | 2-wire RTD negative (black) input. This input is connected to the RTD ground return. |

Connector J2 Description

| Pin | Name | I/O | Description |
|-----|------|-----|--|
| 1 | RTD+ | I | 3-wire RTD positive (red) input. This input is connected to the RTD current source. |
| 2 | RTD- | I | First 3-wire RTD negative (black) input. This input is connected to the ADC negative differential input. |
| 3 | RTD- | I | Second 3-wire RTD negative (black) input. This input is connected to the RTD ground return. |

Connector J3 Description

| Ref | Name | I/O | Description |
|-----|------|-----|---|
| 1 | RTD+ | I | First 4-wire RTD positive (red) input. This input is connected to the RTD current source. |
| 2 | RTD+ | I | Second 4-wire RTD positive (red) input. This input is connected to the ADC positive differential input. If a 2-wire RTD is being used on J1 or a 3-wire RTD is being used on 2, jumper this input to J3 terminal 1. |
| 3 | RTD- | I | First 4-wire RTD negative (black) input. This input is connected to the ADC negative differential input. If a 2-wire RTD is being used on J1, jumper this input to J3 terminal 4. |
| 4 | RTD- | I | Second 4-wire RTD negative (black) input. This input is connected to the RTD ground return. |

Connector J4 Description

| Ref | Name | I/O | Description |
|-----|---------|-----|------------------------------------|
| 1 | HOST TX | I | Input terminal for host RS232 TX. |
| 2 | HOST RX | O | Output terminal for host RS232 RX. |
| 3 | GND | - | RS232 ground terminal. |

Connector J5 Description

| Ref | Name | I/O | Description |
|-----|-----------|-----|--|
| 1 | CURRENT 1 | I | First current transformer input. There is a 150 ohm current shunt between this terminal and J5 terminal 2. |
| 2 | CURRENT 2 | I | Second current transformer input. |
| 3 | CONTACT | I | Contact input. This terminal is connected to +3.3 V through a 100 K resistor. |
| 4 | GND | - | Contact ground terminal. |

SN90RC Case Dimensions

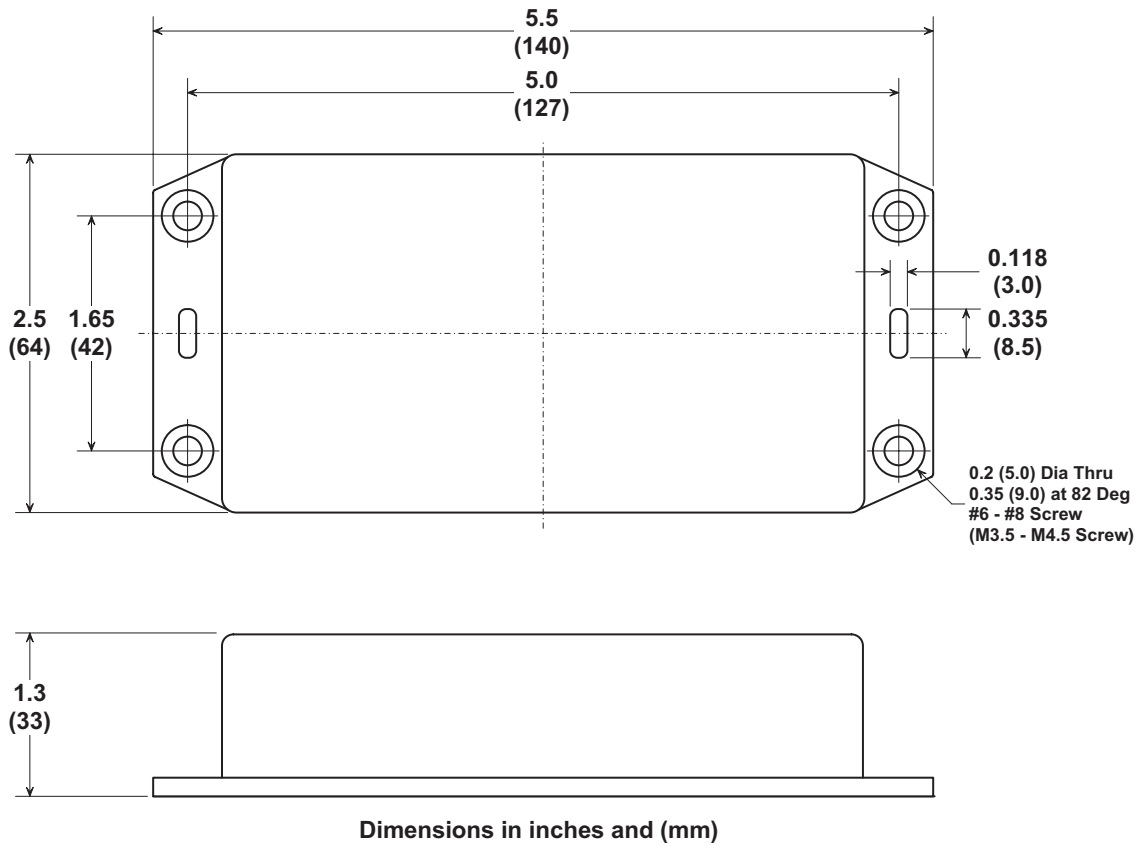


Figure 2

Note: Specifications subject to change without notice.

Part # M-0090-4001, Rev A