



- 900 MHz RS-232C and RS-232C/RS-485 Serial Modems
- Optional 128-Bit AES Encryption
- Point-to-point, Point-to-multipoint, Peer-to-peer and Store & Forward Capabilities
- Frequency Hopping Spread Spectrum Transceiver
- 100 kbps RF Data Rate
- Transmitter Power up to 158 mW EIRP with 2 dBi Antenna
- FCC and Canadian IC Certified for Unlicensed Operation

The DN-90 series 900 MHz serial modems provide a low cost, ready-to-use solution for robust wireless data communications in the 900 MHz ISM band. There are currently two products in the DN-90 series, the DN-90G and the DN-90GI. The DN-90G provides an RS-232C serial interface. The DN-90GI offers a selectable RS-232C or two-wire, multi-drop RS-485 interface. DN-90 series modems are based on RFM's DNT90 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT90-based RFM modems and sensor nodes, as well as customer developed products. DN-90 series modems are supplied with a dipole antenna and a wall-plug power supply. DN-90 modems transmit data at 100 kbps. Each modem's output power can be set up to 158 mW EIRP using the supplied 2 dBi dipole antenna. DN-90 series modems are well-suited for sensor and data networks carrying moderate traffic that need robust communications in locations with non-ideal RF propagation and/or where RF interference or noise are present.

#### DN-90 Absolute Maximum Ratings

Rating	Value	Units
Power Supply Input Voltage Range	-0.5 to +24	V
Non-Operating Ambient Temperature Range	-40 to +85	°C

#### DN-90 Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Frequency Range			902.76		927.24	MHz
Hop Dwell Time			8		100	ms
Number of RF Channels			25, 26 or 52			
Modulation			FSK			
RF Data Transmission Rate			100			kbps
Receiver Sensitivity @ 10 <sup>-5</sup> BER				-100		dBm
EIRP RF Output Power Level, 2 dBi Antenna					158	mW
Optimum Antenna Impedance				50		Ω
RF Connection			RSMA Coaxial Connector			
Network Topologies			Point-to-Point, Point-to-Multipoint, Peer-to-Peer and Store & Forward			
Access Schemes			Ad Hoc TDMA			
DN-90G RS-232C Configuration			9-pin connector, hardware flow control optional			
DN-90GI RS-232C Configuration			3-wire, no hardware flow control			
DN-90GI RS-485 Configuration			2-wire, multi-drop capable			

## DN-90 Series

## 900 MHz Wireless Serial Modems



**DN-90 Specifications**

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Serial Port Baud Rates			1.2, 2.4, 4.8, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, 115.2, 230.4			kbps
DC Power Supply Voltage Range	V <sub>CC</sub>		+9		+24	Vdc
Peak Transmit Mode Current, 158 mW EIRP					190	mA
Average Receive Mode Current:						
Base, Continuous Data Stream				139		mA
Remote, Linked, No Data				34		mA
Remote, Continuous Data Stream				44		mA
Nominal Dimensions			3.3 x 3.2 x 1 inches (84.6 x 82.0 x 25.4 mm)			
Mounting			Left and Right Flanges, Two Pre-drilled Holes in Each Flange			
Operating Temperature Range			-40		85	°C
Operating Relative Humidity Range, Non-condensing			10		90	%

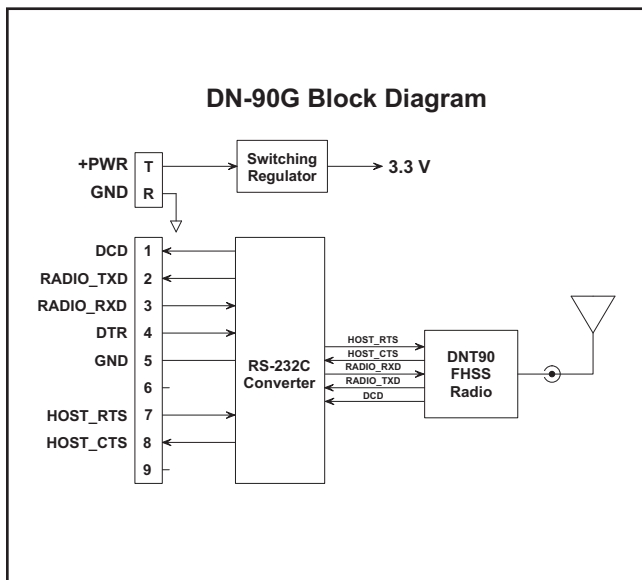


Figure 1

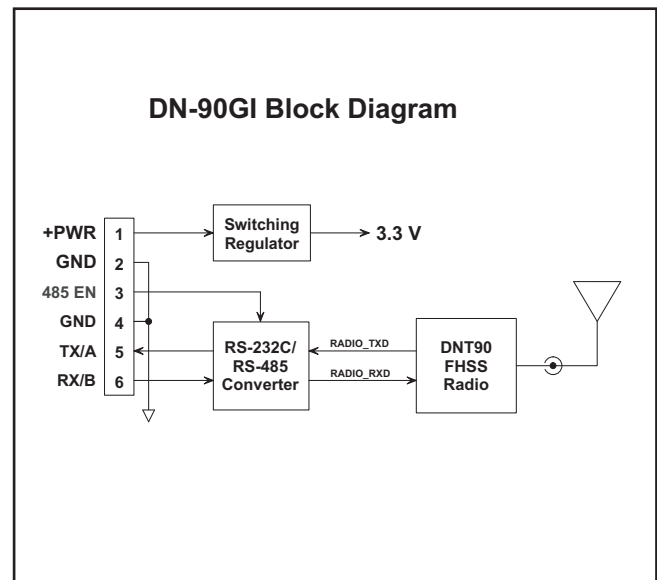


Figure 2

## DN-90 Series Modem Operation

The DN-90 series 900 MHz modems provide a low cost, ready-to-use solution for robust wireless data communications in the 900 MHz ISM band. There are currently two products in the DN-90 series, the DN-90G and the DN-90GI. The DN-90G provides an RS-232C serial interface with optional hardware flow control. The DN-90GI offers a selectable RS-232C three-wire interface or a two-wire, multi-drop RS-485 interface. DN-90 series modems are based on RFM's DNT90 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT90-based RFM modems and sensor nodes, as well as customer developed products.

DN-90 series modems are supplied with a reverse SMA dipole antenna and a universal wall-plug power supply. DN-90 modems transmit data at 100 kbps. The transmitter output power can be set up to 100 mW EIRP using the supplied 2 dBi dipole antenna.

Optional high gain directional and omni-directional antennas are available from RFM to extend operating range where allowed by local regulations.

DN-90 series modems are well-suited for sensor and data networks carrying moderate traffic that need robust communications in locations with non-ideal RF propagation and/or where RF interference or noise are present.

As shown in the block diagrams above, data to and from a DN-90G are routed through an RS232C signal converter, and in the case of a DN-90GI are routed through an RS-232C/RS-485 signal converter. When terminal 3 is left unconnected on the DN-90GI, serial communication is 3-wire RS-232C. When terminal 3 is connected to terminal 2 or 4, serial communication is 2-wire, multi-drop capable RS-485.

The switching regulator used in all DN-90 modems supports a wide voltage range on the DC power input, from 9 to 24 Vdc.

DN-90 serial modems can operate in point-to-point, point-to-multipoint, peer-to-peer and store & forward DNT90-based wireless networks.

## DN-90G Power Connector Description

Ref	Name	I/O	Description
T	+PWR	O	The center coaxial conductor (tip) is the positive DC power input.
R	GND	O	The outer coaxial conductor (ring) is the DC power ground.

## DN-90G Serial Port Connector Description

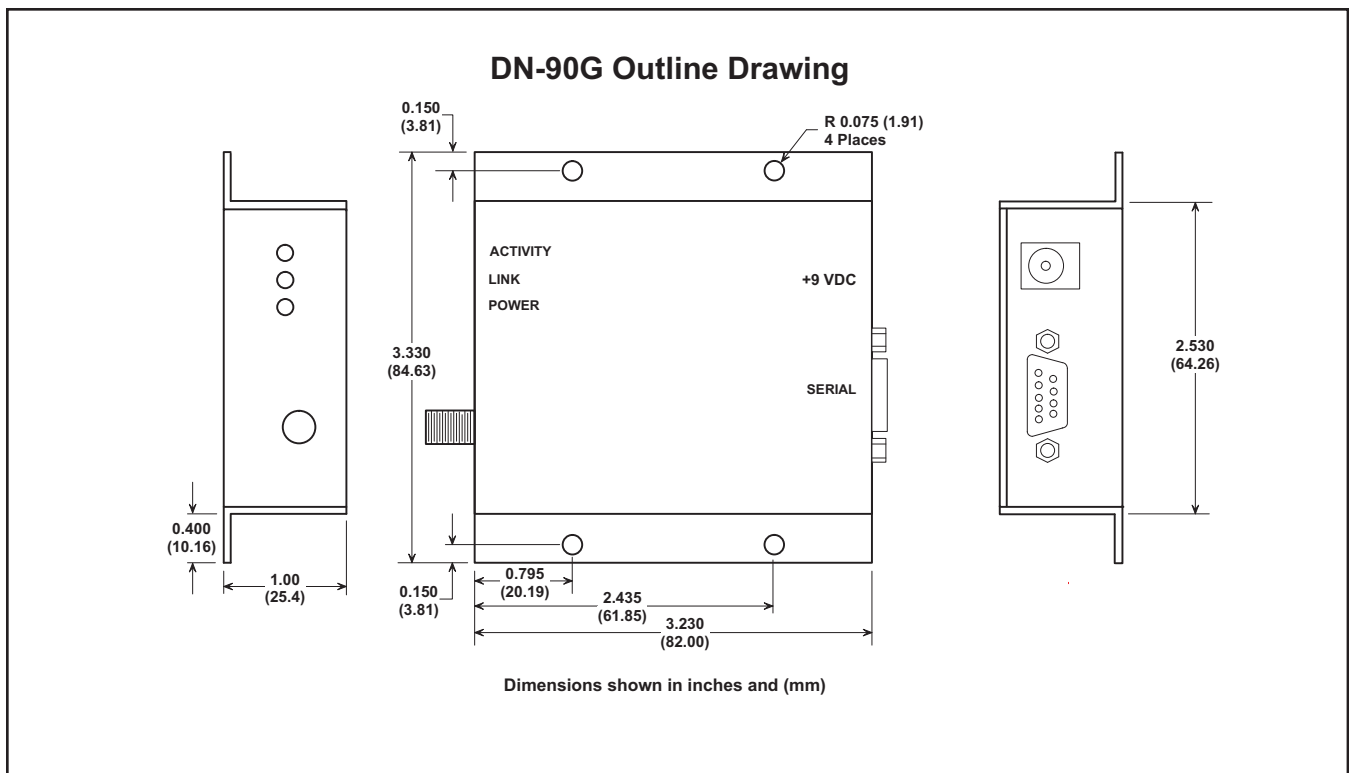
Pin	Name	I/O	Description
1	DCD	O	This pin is an output indicating the modem is linked to the radio network.
2	RADIO_TXD	O	This pin is the DN-90G serial data output.
3	RADIO_RXD	I	This pin is the DN-90G serial data input.
4	DTR	I	This pin is the data terminal ready input from the DN-90G host.
5	GND	-	This pin is signal ground.
6	-	-	No connection.
7	HOST_RTS	I	This pin is the request to send input from the DN-90G host.
8	HOST_CTS	O	This pin is the clear to send output from the DN-90G.
9	-	-	No connection.

## DN-90GI DC Power/Serial Port Terminal Block Description

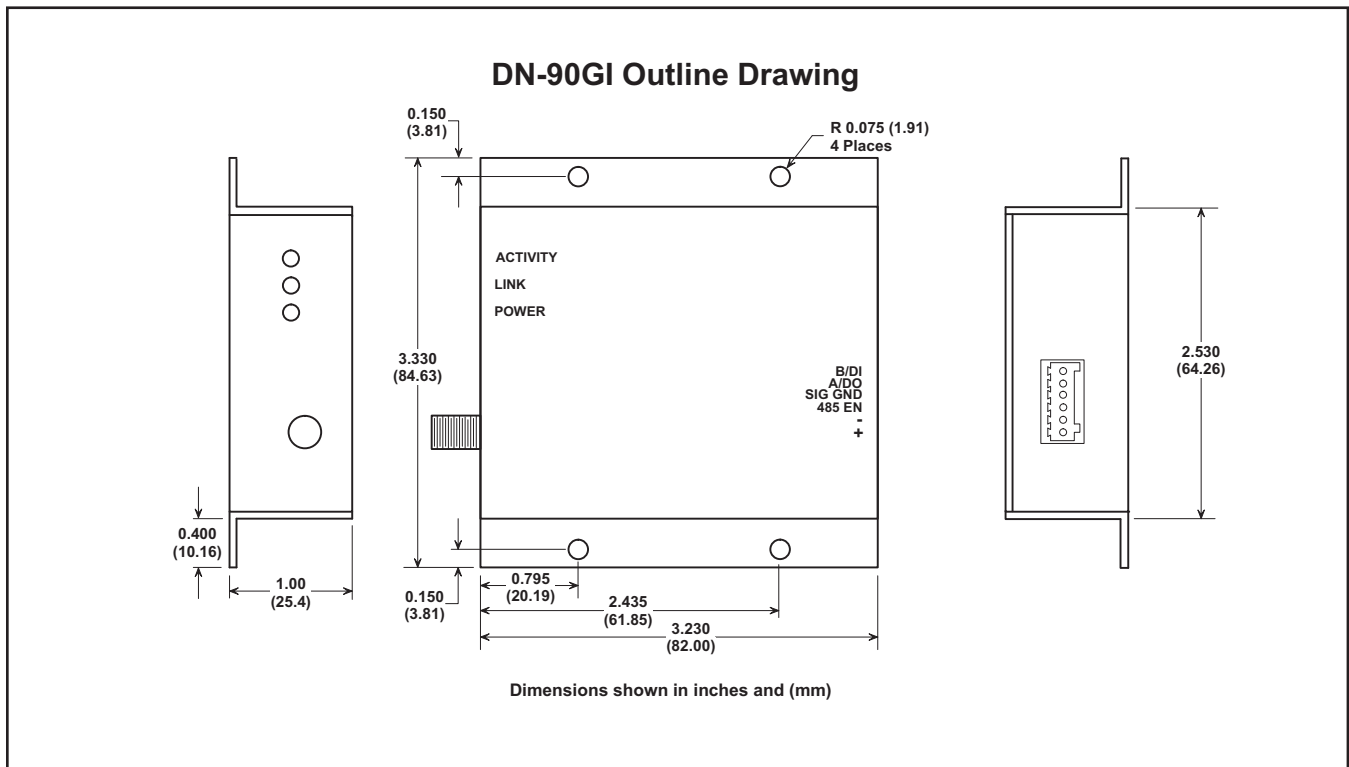
Pin	Name	I/O	Description
1	+PWR	I	This terminal is the positive power supply input, +9 to +24 V.
2	GND	-	This terminal is a power supply and signal ground.
3	485 EN	I	When this terminal is unconnected, serial operation is RS-232C. When this terminal is grounded to terminal 2 or 4, serial operation is RS-485.
4	GND	-	This terminal is a power supply and signal ground.
5	TX/A	O	This terminal transmits data to the host (RS-232C TxD or RS-485 A signal).
6	RX/B	I	This terminal receives data from the host (RS-232C RxD or RS-485 B signal).

## DN-90G/GI LED Indicator Description

Ref	Name	I/O	Description
1	ACTIVITY	O	Left-most LED on the front of the unit, amber, indicates RF communications activity.
2	LINK	O	Middle LED on the front of the unit, red. On a base, this LED indicates one or more remotes are linked to it. On a remote, this LED indicates it is linked to the base.
3	POWER	O	Right-most LED on the front of the unit, green, indicates the unit is powered up.



**Figure 3**



**Figure 4**

*Note: Specifications subject to change without notice.*

Part # M-DN-90-4000, Rev A