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DN-900 Series

900 MHz Wireless Serial Modems

- *900 MHz RS-232C, RS-485/RS-232C and USB Serial Modems*
- *Optional 128-Bit AES Encryption*
- *Point-to-point, Point-to-multipoint, Peer-to-peer and Tree-routing Network Capabilities*
- *Frequency Hopping Spread Spectrum Transceiver*
- *Transceiver Housed in a NEMA 4X/IP66 Waterproof Case*
- *RF Data Rate Configurable from 38.4 to 500 kbps*
- *Transmitter Power up to 1.58 W EIRP using Internal Antenna*
- *FCC and Canadian IC Certified for Unlicensed Operation*

The DN-900 series 900 MHz serial modems provide ready-to-use solutions for robust wireless data communications in the 900 MHz ISM band. There are currently three products in the DN-900 series, the DN-900G, the DN-900I and the DN-900U. The DN-900G provides an RS-232C serial interface. The DN-900I offers a two-wire, multi-drop RS-485 interface plus a selectable RS-232C interface for configuration programming. The DN-900U provides a USB interface. DN-900 series modems are based on Murata's DNT900 frequency hopping spread spectrum (FHSS) transceiver, and communicates with other DNT900-based products as well as customer developed products. DN-900 series modems consist of a radio module in a NEMA 4X/IP66 waterproof case connected to a serial interface adapter by a power and signal cable that allows the radio module to be located remotely at a point of good RF propagation. DN-900 series modems are well-suited for serial 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-900 Series 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-900 Series Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Frequency Range			902.75		927.25	MHz
Hop Dwell Time			5		200	ms
Number of RF Channels in a Subband				50		
Modulation				FSK		
RF Data Transmission Rates				38.4, 115.2, 200 and 500		kbps
Standard Antenna				Internal 2 dBi directional antenna		
Receiver Sensitivity through 2 dBi Antenna:						
10^{-5} BER @ 38.4 kb/s				-110		dBm
10^{-5} BER @ 200 kb/s				-100		dBm
10^{-5} BER @ 500 kb/s				-96		dBm
EIRP Output Power Levels through 2 dBi Antenna:						
38.4 to 200 kbps				1.58, 15.8, 100, 395, 790, 1580		mW
500 kbps				1.58, 15.8, 135		mW

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DN-900 Series Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Optional External Antenna Connector			Reverse TNC (RTNC)			
External Antenna Impedance			50 ohms, VSWR < 3:1			
Direct Receiver Sensitivity through RTNC Connector:						
10^{-5} BER @ 38.4 kb/s				-108		dBm
10^{-5} BER @ 200 kb/s				-98		dBm
10^{-5} BER @ 500 kb/s				-94		dBm
Direct Output Power Levels through RTNC Connector:						
38.4 to 200 kbps			1, 10, 63, 250, 500, 1000			mW
500 kbps			1, 10, 85			mW
Network Topologies			Point-to-Point, Point-to-Multipoint, Peer-to-Peer, Tree-Routing			
Access Scheme			TDMA/CSMA			
Number of Remote Nodes, TDMA Mode			1		16	
Number of Remote Nodes, CSMA Mode			Limited only by traffic density			
DN-900G RS-232C Configuration			9-pin connector, hardware flow control optional			
DN-900I RS-232C Configuration			3-wire, no hardware flow control			
DN-900I RS-485 Configuration			2-wire, multi-drop capable			
DN-900U USB Configuration			USB Type B connector			
Serial Port Baud Rates			1.2, 2.4, 4.8, 9.6, 19.2, 28.8, 38.4, 57.6, 76.8, 115.2, 230.4, 460.8			kbps
Signal Cable Length Options (see Ordering Guide on Page 5)			4, 50, 100, 300			ft
DC Power Supply Voltage Range, up to 50 ft signal cable			+6		+24	Vdc
DC Power Supply Voltage Range, 50 ft to 300 ft cable			+12		+24	Vdc
DC Power Supply Ripple, 1.5 A load					250	mV_{P-P}
Peak Transmit Mode DC Power					6.8	W
Average Receive Mode Power:						
Base, Continuous Data Stream				760		mW
Remote, Linked, No Data				317		mW
Remote, Continuous Data Stream, 9.6 kbps				345		mW
Remote, Continuous Data Stream, 115.2 kbps				428		mW
Interface Adapter Nominal Dimensions			3.85 x 1.70 x 0.85 inches (80 x 43 x 22 mm)			
Radio Module Case Rating			NEMA 4X/IP66 outdoor enclosure			
Radio Module Nominal Dimensions			5.15 x 5.00 x 1.40 inches (131 x 127 x 36 mm)			
Radio Module Mounting			Flange with pre-drilled mounting holes; mount flange to mast with bolts or hose clamps			
Operating Temperature Range			-40		85	°C
Operating Relative Humidity Range, Non-condensing			10		90	%

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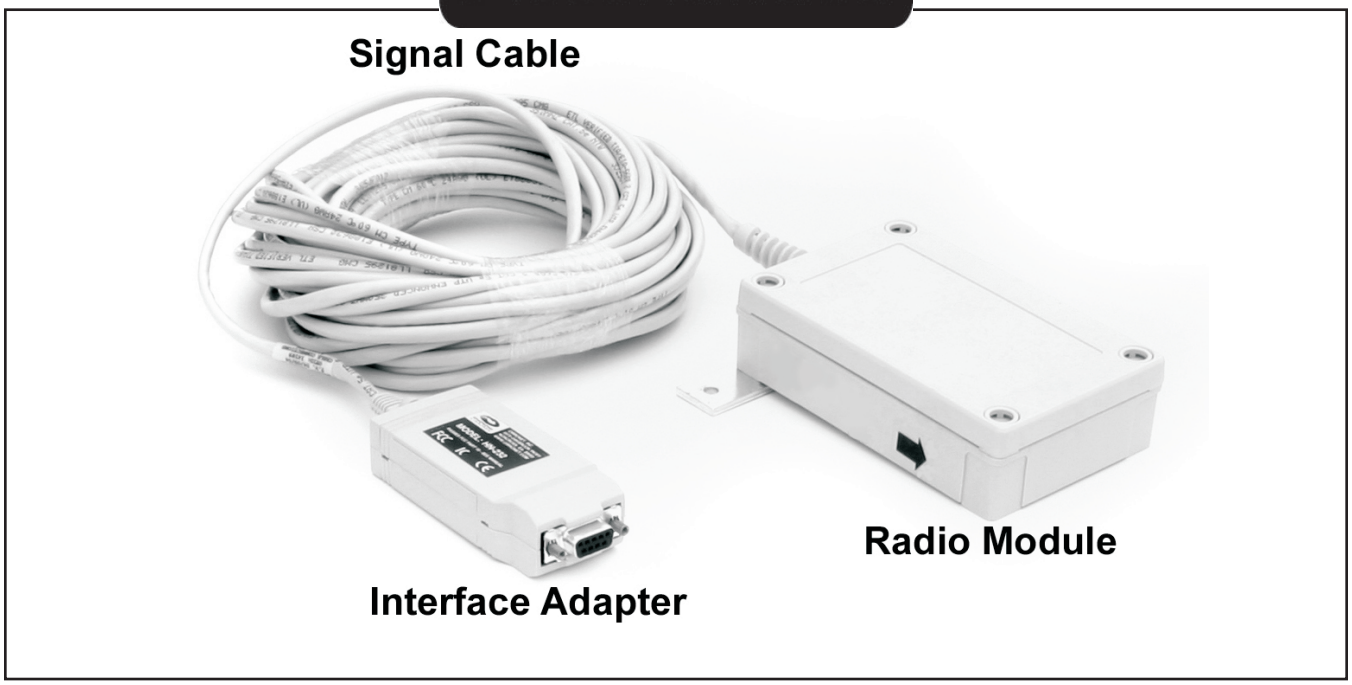

Figure 1

DN-900 Series Modem Operation

The DN-900 series 900 MHz modems provide high performance, ready-to-use solutions for robust wireless data communications in the 900 MHz ISM band. There are currently three products in the DN-900 series, the DN-900G, the DN-900I, and the DN-900U. The DN-900G provides an RS-232C serial interface with optional flow control. The DN-900I offers a two-wire, multi-drop RS-485 interface plus a selectable three-wire RS-232C interface for configuration programming. The DN-900U provides a USB interface. DN-900 series modems are based on RFM's DNT900 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT900-based products, as well as customer developed products.

As shown in Figure 1, DN-900 series modems consist of a radio module in a NEMA 4X/IP66 waterproof case with an internal 2 dBi directional antenna, a signal cable that carries power and data, and an interface adaptor that includes a power supply connector and the appropriate serial data connector. The radio module can optionally be provided with a RTNC antenna connector in lieu of the internal antenna (see Ordering Guide on Page 5). DN-900 serial modems with the RTNC connector are compatible with RFM's complete line of 900 MHz antennas, allowing extended operating range where allowed by local regulations.

DN-900 series modems are supplied with a 110/220 VAC wall-plug power supply that includes an international plug set. Optionally, DN-900 series modems can be powered from a user-supplied DC source as described in the specifications table. The signal cable can specified as 4, 50, 100 or 300 feet in length (see Ordering Guide on Page 5), which allows the radio module to be located remotely indoors or outdoors at a point of good RF propagation. DN-900 modems can transmit data from 38.4 to 500 kbps, and the transmitter output power can be set from 1.58 mW to 1.58 W EIRP when using the internal antenna.

DN-900 series modems are well-suited for serial 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-900 serial modems can operate in point-to-point, point-to-multipoint, peer-to-peer and tree routing DNT900-based wireless networks.

DN-900 data modems are shipped configured to transmit transparent data, which requires no protocol formatting. All that is required to set up a transparent point-to-point serial data link to configure one modem as a base unit using a simple PC-based utility. DN-900 series modems can also operate in protocol mode, which is supported by a rich set of configuration parameters that allow a wide range of network layouts and configurations to be optimized.

DN-900G/DN-900U Power Connector and LED Description

Ref	Name	I/O	Description
T	+PWR	I	The center coaxial conductor (tip) is the positive DC power input.
R	GND	-	The outer coaxial conductor (ring) is the DC power ground.
G	PWR	O	Green LED indicates the unit is powered.
A	LINK	O	Amber LED indicates the unit is linked.

DN-900G Serial Port DB9 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-900G serial data output.
3	RADIO_RXD	I	This pin is the DN-900G serial data input.
4	DTR	I	This pin is the data terminal ready input from the DN-900G 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-900G host.
8	HOST_CTS	O	This pin is the clear to send output from the DN-900G.
9	-	-	No connection.

DN-900I Serial Port Terminal Block Description

Pin	Name	I/O	Description
1	+PWR	I	This terminal is the positive power supply input, +6 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).

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DN-900 Series Transceiver Case

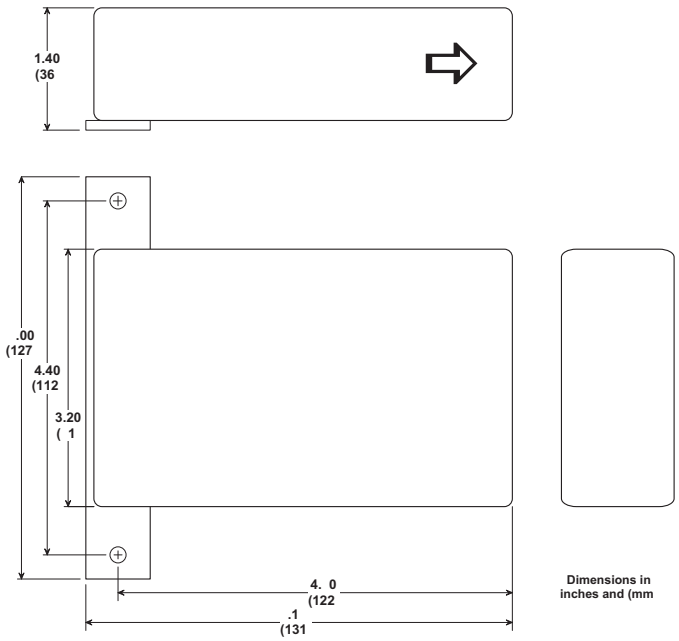

Figure 2

DN-900 Serial Modem Part Number Ordering Guide

Serial Interface	Antenna/Connector	Cable Length, feet			
		4	50	100	300
RS-232C, DB9 Connector	Internal 2 dBi Antenna	DN-900G-4	DN-900G	DN-900G-100	DN-900G-300
RS-232C, DB9 Connector	RTNC Connector	DN-900GX-4	DN-900GX	DN-900GX-100	DN-900GX-300
RS-485/RS-232C, 6-Pin Terminal Block	Internal 2 dBi Antenna	DN-900I-4	DN-900I	DN-900I-100	DN-900I-300
RS-485/RS-232C, 6-Pin Terminal Block	RTNC Connector	DN900IX-4	DN-900IX	DN-900IX-100	DN-900IX-300
USB Type B Connector	Internal 2 dBi Antenna	DN900U-4	DN-900U	DN-900U-100	DN-900U-300
USB Type B Connector	RTNC Connector	DN900UX-4	DN-900UX	DN-900UX-100	DN-900UX-300

Note: Specifications subject to change without notice.