Discontinued

DN-2400 Series

2.4 GHz Wireless Serial Modems

- *2.4 GHz 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 250 mW EIRP using Internal Antenna*
- *FCC and Canadian IC Certified for Unlicensed Operation*

The DN-2400 series 2.4 GHz serial modems provide ready-to-use solutions for robust wireless data communications in the 2.4 GHz ISM band. There are currently three products in the DN-2400 series, the DN-2400G, the DN-2400GI and the DN-2400U. The DN-2400G provides an RS-232C serial interface. The DN-2400I offers a two-wire, multi-drop RS-485 interface plus a selectable RS-232C interface for configuration programming. The DN-2400U provides a USB interface. DN-2400 series modems are based on RFM's DNT2400 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT2400-based Murata products as well as customer developed products. DN-2400 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-2400 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-2400 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-2400 Series Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Frequency Range			2409.3		2467.1	MHz
Hop Dwell Time			5		200	ms
Number of FHSS Subbands				9		
Number of RF Channels in a Subband				15 or 37		
Modulation				FSK/MSK		
RF Data Transmission Rates				38.4, 115.2, 200 and 500		kbps
Standard Antenna				Internal 6 dBi directional antenna		
Receiver Sensitivity through 6 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 6 dBi Antenna:				4, 40, 250		mW

DN-2400 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				-104		dBm
10^{-5} BER @ 200 kb/s				-96		dBm
10^{-5} BER @ 500 kb/s				-90		dBm
Direct Output Power Levels through RTNC Connector:			1, 10, 63			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-2400G RS-232C Configuration			9-pin connector, hardware flow control optional			
DN-2400I RS-232C Configuration			3-wire, no hardware flow control			
DN-2400I RS-485 Configuration			2-wire, multi-drop capable			
DN-2400U 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 A load					250	mV_{P-P}
Peak Transmit Mode DC Power					1.1	W
Average Receive Mode Power:						
Base, Continuous Data Stream				720		mW
Remote, Linked, No Data				190		mW
Remote, Continuous Data Stream				245		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	%

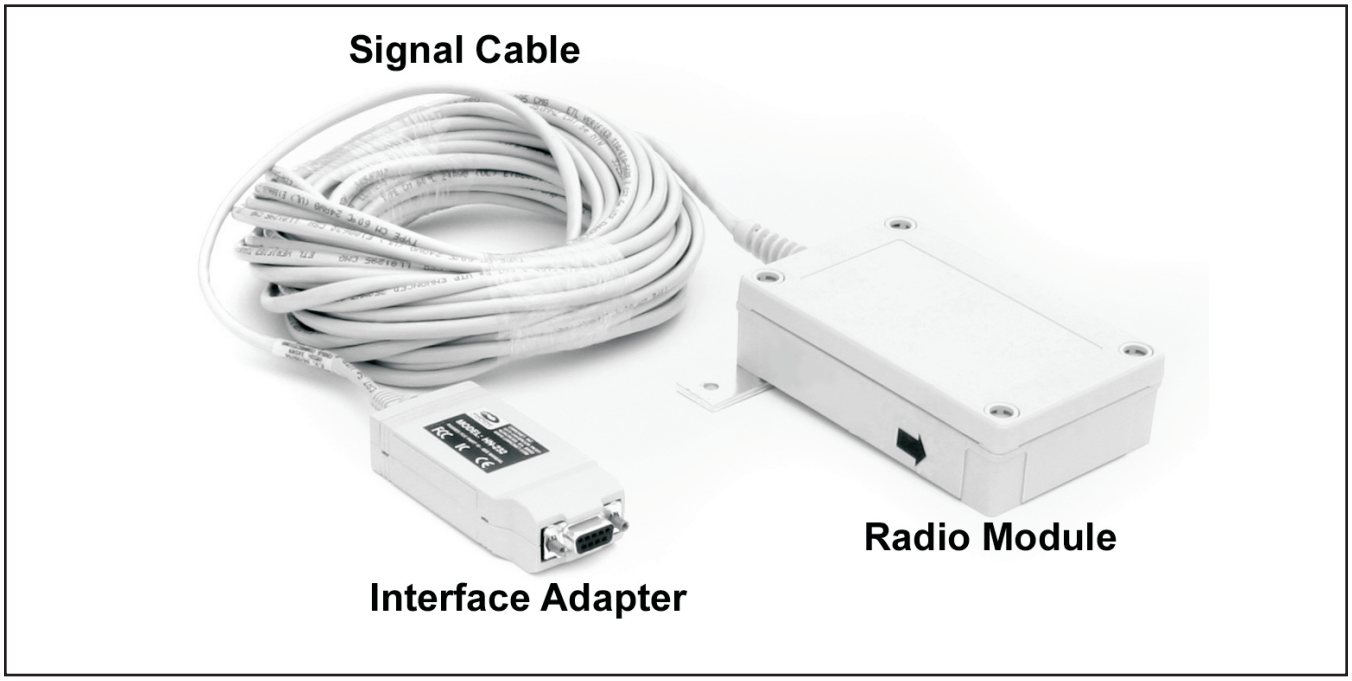

Figure 1

DN-2400 Series Modem Operation

The DN-2400 series 2.4 GHz modems provide high performance, ready-to-use solutions for robust wireless data communications in the 2.4 GHz ISM band. There are currently three products in the DN-2400 series, the DN-2400G, the DN-2400I, and the DN-2400U. The DN-2400G provides an RS-232C serial interface with optional flow control. The DN-2400I offers a two-wire, multi-drop RS-485 interface plus a selectable three-wire RS-232C interface for configuration programming. The DN-2400U provides a USB interface. DN-2400 series modems are based on RFM's DNT2400 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT2400-based Murata products, as well as customer developed products.

As shown in Figure 1, DN-2400 series modems consist of a radio module in a NEMA 4X/IP66 waterproof case with an internal 6 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-2400 serial modems with the RTNC connector are compatible with Murata's complete line of 2.4 GHz antennas, allowing extended operating range where allowed by local regulations.

DN-2400 series modems are supplied with a 110/220 VAC wall-plug power supply that includes an international plug set. Optionally, DN-2400 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-2400 modems can transmit data from 38.4 to 500 kbps, and the transmitter output power can be set from 4 to 250 mW EIRP when using the internal antenna.

DN-2400 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-2400 serial modems can operate in point-to-point, point-to-multipoint, peer-to-peer and tree routing DNT2400-based wireless networks.

DN-2400 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-2400 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-2400G/DN-2400U 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-2400G 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-2400G serial data output.
3	RADIO_RXD	I	This pin is the DN-2400G serial data input.
4	DTR	I	This pin is the data terminal ready input from the DN-2400G 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-2400G host.
8	HOST_CTS	O	This pin is the clear to send output from the DN-2400G.
9	-	-	No connection.

DN-2400I 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).

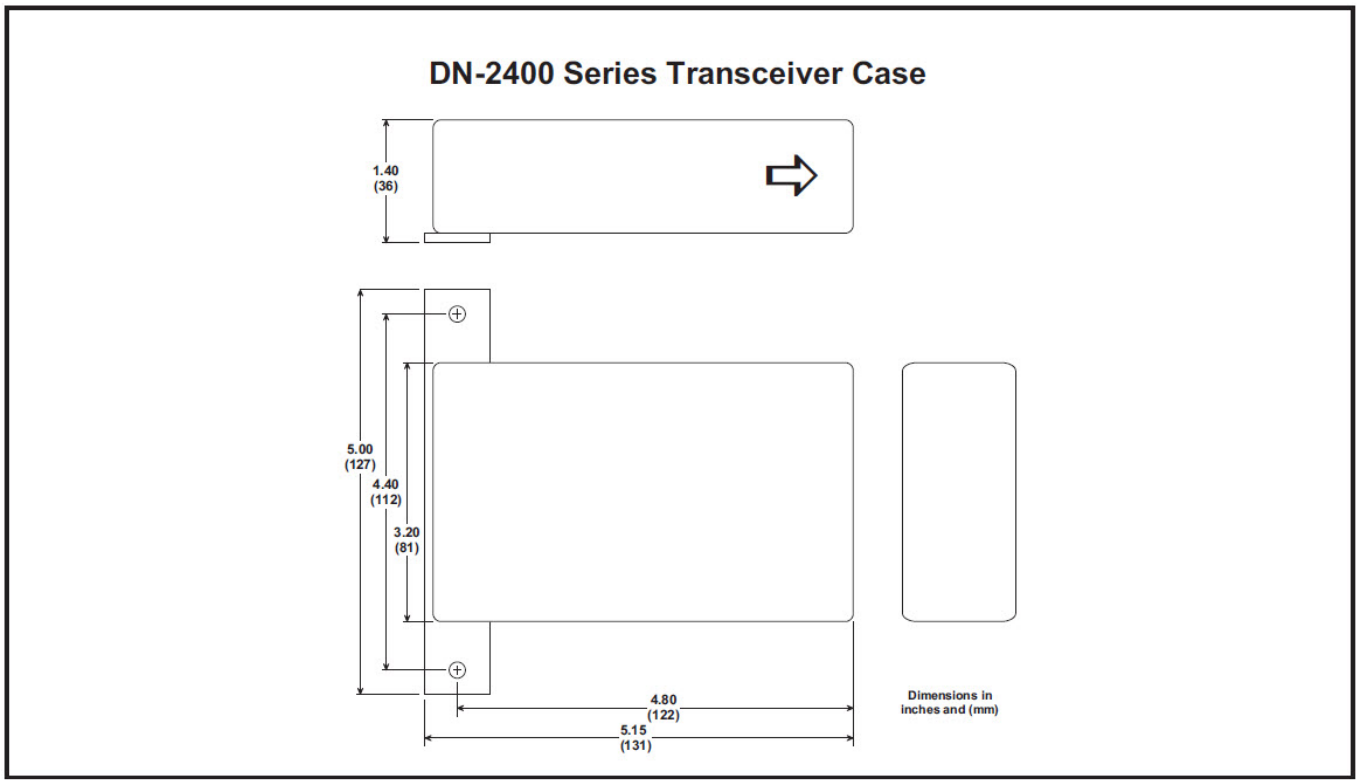

Figure 2

DN-2400 Serial Modem Part Number Ordering Guide

Serial Interface	Antenna/Connector	Cable Length, feet			
		4	50	100	300
RS-232C, DB9 Connector	Internal 6 dBi Antenna	DN-2400G-4	DN-2400G	DN-2400G-100	DN-2400G-300
RS-232C, DB9 Connector	RTNC Connector	DN-2400GX-4	DN-2400GX	DN-2400GX-100	DN-2400GX-300
RS-485/RS-232C, 6-Pin Terminal Block	Internal 6 dBi Antenna	DN-2400I-4	DN-2400I	DN-2400I-100	DN-2400I-300
RS-485/RS-232C, 6-Pin Terminal Block	RTNC Connector	DN2400IX-4	DN-2400IX	DN-2400IX-100	DN-2400IX-300
USB Type B Connector	Internal 6 dBi Antenna	DN2400U-4	DN-2400U	DN-2400U-100	DN-2400U-300
USB Type B Connector	RTNC Connector	DN2400UX-4	DN-2400UX	DN-2400UX-100	DN-2400UX-300

Note: Specifications subject to change without notice.