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Preliminary

DN-24 Series

2.4 GHz Wireless Serial Modems

- **2.4 GHz 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**
- **250 kbps RF Data Rate**
- **Transmitter Power up to 100 mW EIRP with 2 dBi Antenna**
- **FCC and Canadian IC Certified for Unlicensed Operation**

The DN-24 series 2.4 GHz serial modems provide a low cost, ready-to-use solution for robust wireless data communications in the 2.4 GHz ISM band. There are currently two products in the DN-24 series, the DN-24G and the DN-24GI. The DN-24G provides an RS-232C serial interface. The DN-24GI offers a selectable RS-232C or two-wire, multi-drop RS-485 interface. DN-24 series modems are based on Murata's DNT24 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT24-based modems and sensor nodes, as well as customer developed products. DN-24 series modems are supplied with a dipole antenna and a wall-plug power supply. DN-24 modems transmit data at 250 kbps. Each modem's output power can be set up to 100 mW EIRP using the supplied 2 dBi dipole antenna. DN-24 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-24 Absolute Maximum Ratings

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

DN-24 Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Frequency Range			2406		2475	MHz
Hop Dwell Time			8		100	ms
Number of RF Channels			15 or 24			
Modulation			FSK			
RF Data Transmission Rate			250			kbps
Receiver Sensitivity @ 10^{-5} BER				-100		dBm
EIRP RF Output Power Level, 2 dBi Antenna					100	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-24G RS-232C Configuration			9-pin connector, hardware flow control optional			
DN-24GI RS-232C Configuration			3-wire, no hardware flow control			
DN-24GI RS-485 Configuration			2-wire, multi-drop capable			

DN-24 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, 250.0			kbps
DC Power Supply Voltage Range	V_{CC}		+9		+24	Vdc
Peak Transmit Mode Current, 100 mW EIRP					190	mA
Average Receive Mode Current:						
Base, Continuous Data Stream				129		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	%
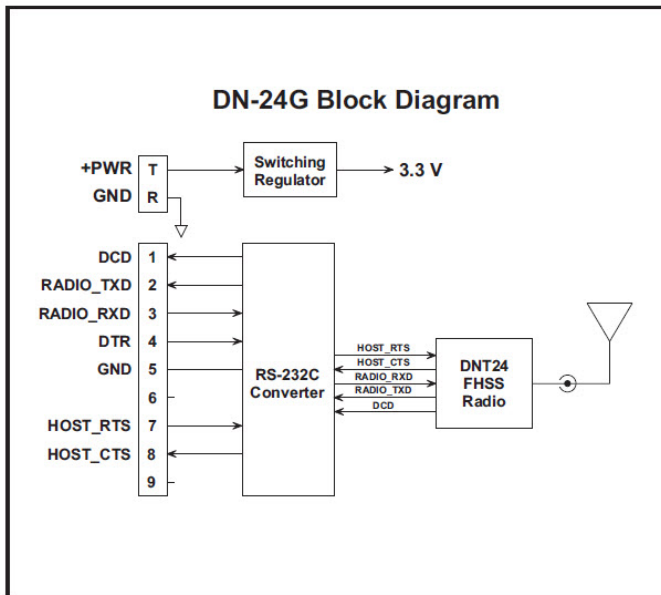
Figure 1
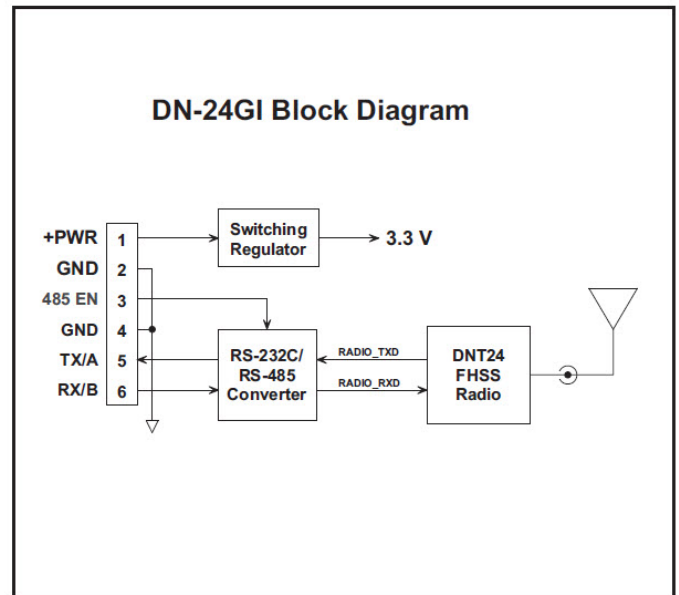
Figure 2

DN-24 Series Modem Operation

The DN-24 series 2.4 GHz modems provide a low cost, ready-to-use solution for robust wireless data communications in the 2.4 GHz ISM band. There are currently two products in the DN-24 series, the DN-24G and the DN-24GI. The DN-24G provides an RS-232C serial interface with optional hardware flow control. The DN-24GI offers a selectable RS-232C three-wire interface or a two-wire, multi-drop RS-485 interface. DN-24 series modems are based on RFM's DNT24 frequency hopping spread spectrum (FHSS) transceiver, and can communicate with other DNT24-based modems and sensor nodes, as well as customer developed products.

DN-24 series modems are supplied with a reverse SMA dipole antenna and a universal wall-plug power supply. DN-24 modems transmit data at 250 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 Murata to extend operating range where allowed by local regulations.

DN-24 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-24G are routed through an RS232C signal converter, and in the case of a DN-24GI are routed through an RS-232C/RS-485 signal converter. When terminal 3 is left unconnected on the DN-24GI, 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-24 modems supports a wide voltage range on the DC power input, from 9 to 24 Vdc.

DN-24 serial modems can operate in point-to-point, point-to-multipoint, peer-to-peer and store & forward DNT24-based wireless networks.

DN-24G 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-24G 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-24G serial data output.
3	RADIO_RXD	I	This pin is the DN-24G serial data input.
4	DTR	I	This pin is the data terminal ready input from the DN-24G 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-24G host.
8	HOST_CTS	O	This pin is the clear to send output from the DN-24G.
9	-	-	No connection.

DN-24GI 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 teminal 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-24G/GI LED Indicator Description

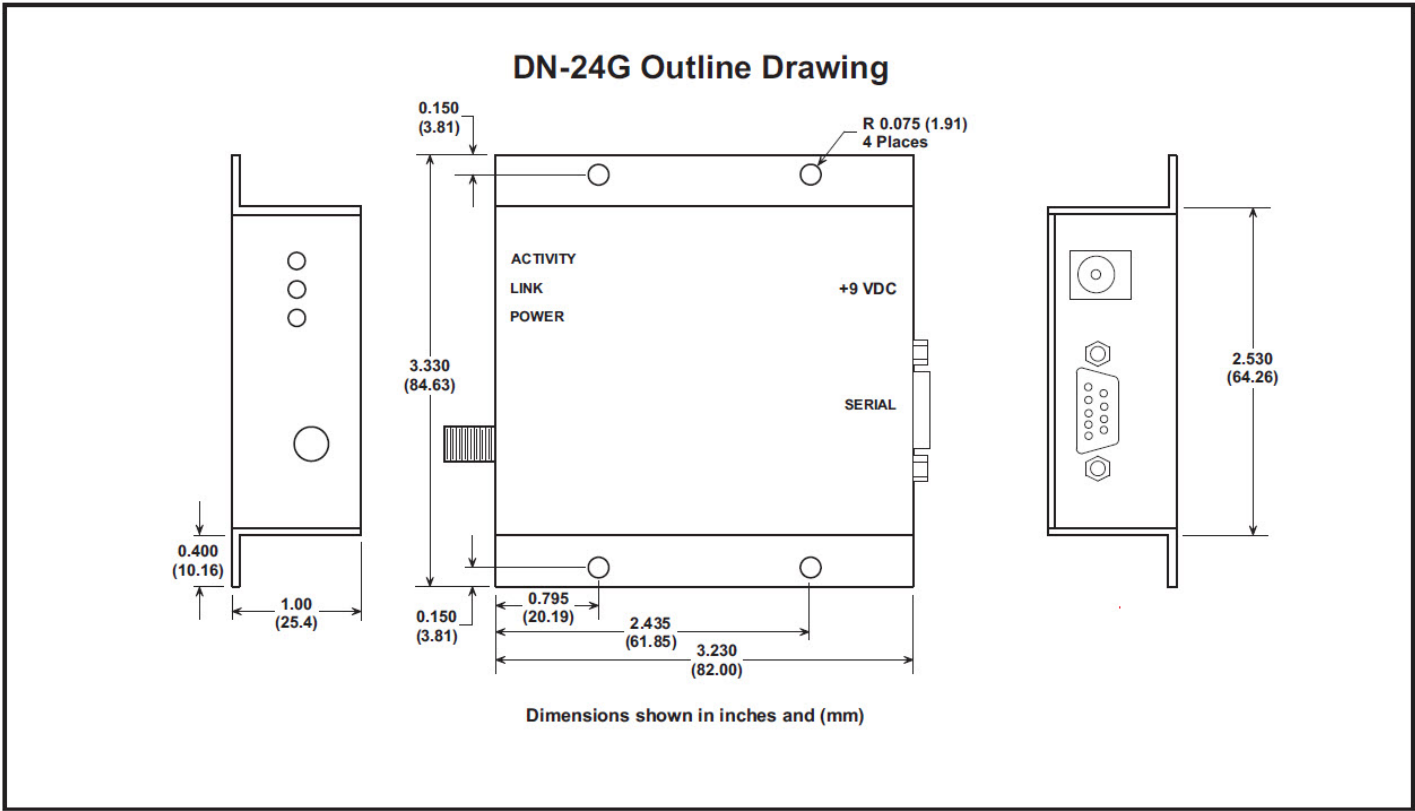| Ref	Name	I/O	Description
1	ACTIVITY	O	Left-most LED on the front of the unit, amber, indicates RF communications activity.
2	LINK	O	Middle LED on the front of the unit, red. On a base, this LED indicates one or more remotes are linked to it. On a remote, this LED indicates it is linked to the base.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

DN-24G Outline Drawing

ACTIVITY
LINK
POWER

+9 VDC

SERIAL

0.150 (3.81)

R 0.075 (1.91) 4 Places

3.330 (84.63)

2.530 (64.26)

0.400 (10.16)

1.00 (25.4)

0.150 (3.81)

0.795 (20.19)

2.435 (61.85)

3.230 (82.00)

Dimensions shown in inches and (mm)

Figure 3

DN-24GI Outline Drawing

ACTIVITY
LINK
POWER

B/DI
A/DO
SIG GND
485 EN
-
+

0.150 (3.81)

R 0.075 (1.91) 4 Places

3.330 (84.63)

2.530 (64.26)

0.400 (10.16)

1.00 (25.4)

0.150 (3.81)

0.795 (20.19)
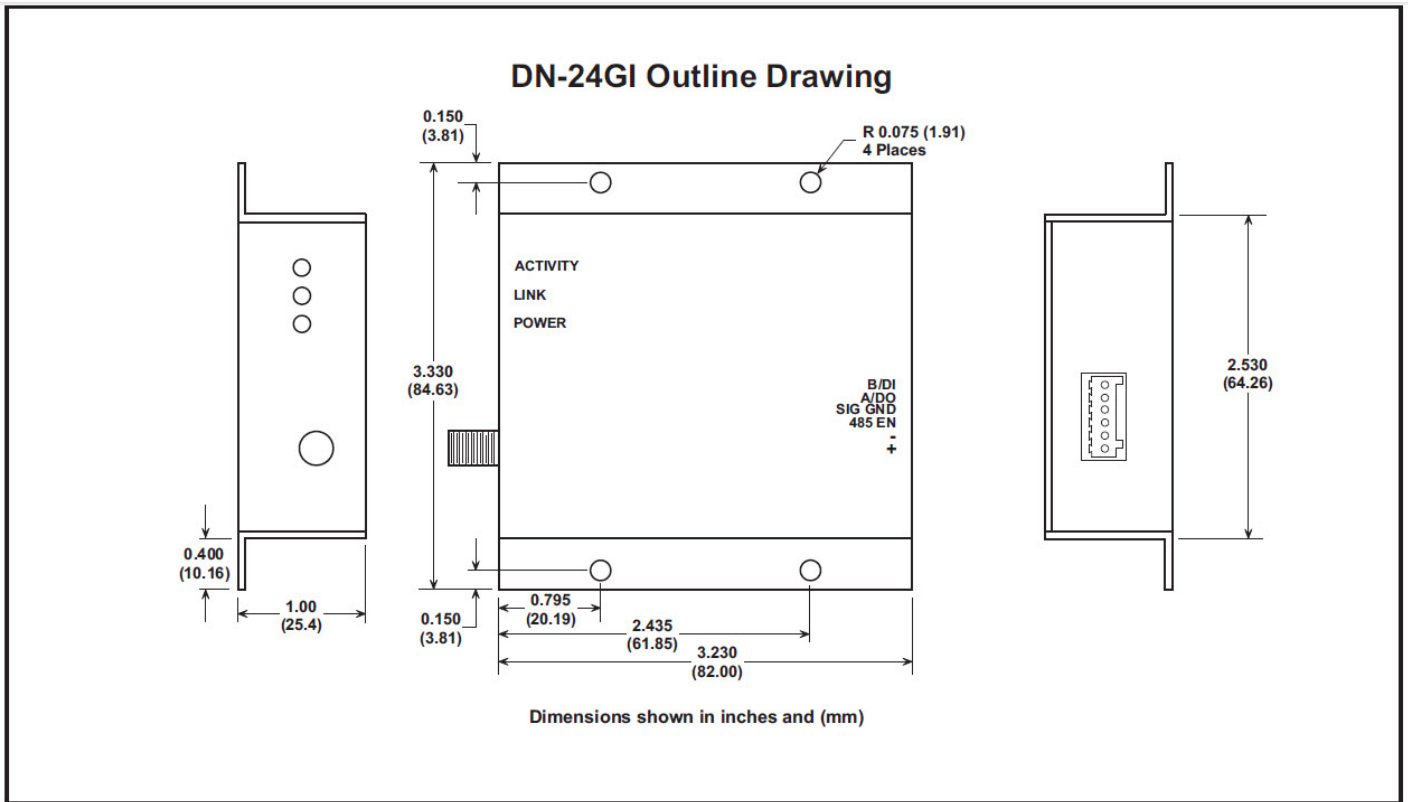
2.435 (61.85)

3.230 (82.00)

Dimensions shown in inches and (mm)

Figure 4

Note: Specifications subject to change without notice.