



MultiHop Modbus

Modbus Radios and Boards with I/O

- MultiHop Modbus data radios extend the range of Modbus or other Serial communication networks
- Models are available with built in discrete and analog I/O, which can be accessed using the Modbus protocol
- Self-healing, auto routing RF network with multiple hops extends the network's range
- Flexible: dip switch selectable to be a master, repeater or slave
- User selectable communication between RS-485 and RS-232

MultiHop Modbus Radios with I/O, 10-30 V DC
("E" and "H6" models have integrated batteries)

I/O	Frequency	Housing	Models
Inputs: Four discrete, two 0-20 mA analog, one thermistor, one counter Outputs: Two NMOS discrete Switch Power: Two Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H1
		IP54	DX80DR9M-H1E
	2.4 GHz	IP67	DX80DR2M-H1
		IP54	DX80DR2M-H1E
Inputs: Four discrete, two 0-20 mA analog Outputs: Four sourcing discrete, two 0-20 mA analog Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H2
		IP67	DX80DR2M-H2
	2.4 GHz	IP67	DX80DR2M-H2
		IP67	DX80DR2M-H2
Inputs: Two discrete, four thermocouple, one thermistor (internal) Outputs: Two NMOS discrete Serial interface: RS-232	900 MHz	IP67	DX80DR9M-H3
		IP54	DX80DR9M-H3E
	2.4 GHz	IP67	DX80DR2M-H3
		IP54	DX80DR2M-H3E
Inputs: Four 3-wire Pt100 RTD Serial interface: RS-232	900 MHz	IP67	DX80DR9M-H4
		IP54	DX80DR9M-H4E
	2.4 GHz	IP67	DX80DR2M-H4
		IP54	DX80DR2M-H4E
Inputs: Four sinking discrete, four 0-20 mA analog Outputs: Two NMOS discrete Switch Power: Two Serial Interface: RS-485	900 MHz	IP67	DX80DR9M-H5
	2.4 GHz		DX80DR2M-H5
Inputs: 1-Wire serial interface for one 1-wire serial sensing device	900 MHz	IP67	DX80DR9M-H6
	2.4 GHz		DX80DR2M-H6
Inputs: Two discrete, two 0-20 mA analog, one thermistor, one SDI-12 or counter Outputs: Two NMOS discrete Switch Power: Two Serial interface: RS-485	900 MHz	IP67	DX80DR9M-H12
	2.4 GHz		DX80DR2M-H12
Inputs: Two sinking discrete Outputs for DC Latch: DC Latch	900 MHz	IP54	DX80DR9M-DCLATCHE
	2.4 GHz		DX80DR2M-DCLATCHE



Board level MultiHop Modbus Data Radios with I/O

I/O	Frequency	Models
Inputs: Two NPN discrete, two 0 to 20 mA analog Outputs: Two NMOS discrete Switch Power Outputs: Two	900 MHz	DX80DR9M-HB1
	2.4 GHz	DX80DR2M-HB1
Inputs: Two PNP discrete, two 0 to 20 mA analog Outputs: Two PNP discrete, two 0 to 20 mA analog	900 MHz	DX80DR9M-HB2
	2.4 GHz	DX80DR2M-HB2

MultiHop Modbus Specifications

Radio Range	900 MHz, 1 Watt: Up to 9.6 km (6 miles)	2.4 GHz, 65 mW: Up to 3.2 km (2 miles)
Minimum Separation Distance	900 MHz, 1 Watt: 4.57 m (15 ft)	2.4 GHz, 65 mW: 0.3 m (1 ft)
Radio Transmit Power	900 MHz, 1 Watt: 30 dBm (1 W) conducted (up to 36 dBm EIRP)	2.4 GHz, 65 mW: 18 dBm (65 mW) conducted, less than or equal to 20 dBm (100 mW) EIRP
Power	FlexPower models: 10 to 30 V dc (Outside the USA: 12 to 24 V dc, $\pm 10\%$) on the brown wire, or 3.6 to 5.5 V dc low power option on the gray wire 6 Integrated battery models: 3.6 V dc low power option from an internal battery or 10 to 30 V dc Master radio consumption (900 MHz): Maximum current draw is < 100 mA and typical current draw is < 30 mA at 24 V dc (2.4 GHz consumption is less) Repeater/slave radio consumption (900 MHz): Maximum current draw is < 40 mA and typical current draw is < 20 mA at 24 V dc (2.4 GHz consumption is less)	
Compliance	900 MHz Compliance (1 Watt) FCC ID UE3RM1809: This device complies with FCC Part 15, Subpart C, 15.247 IC: 7044A-RM1809	2.4 GHz Compliance FCC ID UE300DX80-2400 - This device complies with FCC Part 15, Subpart C, 15.247 ETSI/EN: In accordance with EN 300 328: V1.8.1 (2012-04) IC: 7044A-DX8024
Spread Spectrum Technology	FHSS (Frequency Hopping Spread Spectrum)	
Antenna Connection	Ext. Reverse Polarity SMA, 50 Ohms Max Tightening Torque: 0.45 N-m (4 lbf-in)	
Interface	Indicators: Two bi-color LEDs Buttons: Two Display: Six character LCD	
Communication Hardware (MultiHop RS-485)	Interface: 2-wire half-duplex RS-485 Baud rates: 9.6k, 19.2k (default), or 38.4k via DIP switches; 1200 and 2400 via the MultiHop Configuration Tool Data format: 8 data bits, no parity, 1 stop bit	
Packet Size (MultiHop)	900 MHz: 175 bytes (85 Modbus registers)	2.4 GHz: 75 bytes (37 Modbus registers)
Intercharacter Timing (MultiHop)	3.5 milliseconds	
Housing	Polycarbonate housing and rotary dial cover; polyester labels; EDPM rubber cover gasket; nitrile rubber, non-sulphur cured button covers Weight: 0.26 kg (0.57 lbs) M-Hx and M-HxC models: Mounting: #10 or M5 (SS M5 hardware included) M-HxE models: Mounting: 1/4-in or M7 (SS M7 hardware included) Max. Tightening Torque: 0.56 N-m (5 lbf-in)	
Wiring Access	M-Hx models: Four PG-7, One 1/2-in NPT, One 5-pin threaded M12/Euro-style male quick-disconnect M-HxC models: External terminals M-HxE models: Two 1/2-in NPT ports	
Environmental Rating	M-Hx: IEC IP67; NEMA 6 "C" Housing Models: IEC IP20; NEMA 1 "E" Housing Models: IEC IP65; NEMA 4X	
Operating Conditions	M-Hx and M-HxC models: -40 to +85 °C (-40 to +185 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) M-HxE models: -40 to +65 °C (-40 to +149 °F) (Electronics); -20 to +80 °C (-4 to +176 °F) (LCD) 95% maximum relative humidity (non-condensing) Radiated Immunity: 10 V/m (EN 61000-4-3)	
Shock and Vibration	IEC 68-2-6 and IEC 68-2-27 Shock: 30g, 11 millisecond half sine wave, 18 shocks Vibration: 0.5 mm p-p, 10 to 60 Hz	
Certifications		