



PROCESS CONTROL
REMOTE MONITORING
HVAC CONTROL
WATER & WASTEWATER
OIL & GAS

*Long-range 900MHz and 2.4GHz spread spectrum **Serial Data Radios** designed for reliable high-speed operation in harsh environments and extremely wide temperature ranges.*



FREEWAVE SERIAL WIRELESS DATA TRANSCEIVER

- **License Free**
- **>60+ mile range in one hop**
- **Very High Noise Immunity**
- **Enhanced Security Features**
- **Built-in repeater functions**
- **Up to 188kbps "over-the-air"**
- **32-bit CRC error checking**
- **Automatic Error Correction**
- **On-line radio net diagnostics**
- **Very Low Power Operation**
- **Wide Power Voltage Range**
- **Wide Temperature Operation**
- **RS-232/422/485 Interfaces**
- **3 Year Factory Warranty**

Freewave Serial Wireless Data Transceivers offer a unique wireless solution that combines RS-232, RS-422 or RS-485 connectivity with long distance spread spectrum license-free communications. Both 900MHz and 2.4GHz models are available, either one providing data throughputs of up to 115K baud with superior noise immunity and data integrity. Designed for use in harsh environments, these transceivers operate over an extremely wide temperature range; ideal for SCADA systems.

Open Architecture

Freewave Serial Wireless Data Transceivers provide an error-free transparent link between two or more points regardless of the message protocol; "like a wire through the sky". This includes timing sensitive protocols such as Modbus.

Performance Plus

Freewave Serial Wireless Data Transceivers operate up to the maximum legal output power, combined with a superior front-end design that "digs-out" weak received signals. Built-in 32-bit error detection AND correction ensures high throughput even in noisy environments. A built-in repeater capability transparently extends the effective reach of a system well beyond the 60+ mile range (900MHz) of a single radio "hop".

Support Tools

Using a laptop or desktop PC, Freewave's support software provides real-time access to operating status information ANYWHERE IN THE RADIO NETWORK. Look at signal quality, error rates; even voltages and temperatures at any site in the network. Long-term trending tools and powerful spectrum analyzer software simplify troubleshooting if required. Even configuration and firmware updates can be done remotely "over the air", protecting your investment over time.



Industrial Control Links
(800) 888-1893 www.iclinks.com

FREEWAVE SERIAL WIRELESS DATA TRANSCIVER

900MHz Model# 98-1001

TRANSMITTER

Frequency Range	902 to 928 MHz
RF Output Power	100mW to 1.0 watt / +30dBm (user programmable)
Range, Line of Sight	60+ miles
Hopping Bands	7 (user selectable)

RECEIVER

Sensitivity	-108dBm for 10^{-6} BER
Selectivity	20dB at $f_c \pm 230$ KHz 60dB at $f_c \pm 290$ KHz
Power	6 to 30Vdc
Operating Current	
Transmit	1000mA at 6Vdc 500mA at 12Vdc 200mA at 30Vdc
Receive	110mA at 6Vdc 60mA at 12Vdc 40mA at 30Vdc
Idle Current	30mA at 6Vdc 16mA at 12Vdc 9mA at 30Vdc
Sleep	8mA at 6Vdc 5mA at 12Vdc 2mA at 30Vdc

2.4GHz Model# 98-1002

TRANSMITTER

Frequency Range	2.4000 to 2.4835 MHz
RF Output Power	500mW (+27dBm), 10 to 30Vdc 400mW (+26dBm), 8 to 10Vdc
Range, Line of Sight	20 miles (with 5dB omni antenna)
Hopping Bands	6 (user selectable)

RECEIVER

Sensitivity	-108dBm at 10^{-6} raw BER
Selectivity	40dB at $f_c \pm 230$ KHz 60dB at $f_c \pm 460$ KHz
Power	8.5 to 30Vdc
Operating Current	
Transmit	650mA at 12Vdc, 500mW output 600mA at 9Vdc, 400mW output
Receive	100mA at 12Vdc
Idle Current	65mA at 12Vdc

DATA TRANSMISSION COMMON SPECIFICATIONS

Modulation	Spread Spectrum GFSK 120 Kbps to 170 Kbps
Occupied Bandwidth	230KHz
Spreading Method	Frequency Hopping
Hopping Patterns	15 (user selectable)
Hopping Channels	50 to 112 (user selectable)
Error Detection	32-bit CRC
Error Recovery	Retransmit on Error (automatic, transparent to user)
Data Encryption	Substitution, Dynamic Key

SERIAL DATA SPECIFICATIONS

Data Interface	RS-232, RS-422 and RS-485
Maximum Throughput	115Kbps

GENERAL SPECIFICATIONS

Dimensions	3.0" W x 6.5" L x 2.3" D (75mm x 165mm x 59mm)
Wiring Terminations	
Serial Data Port	9-pin "D" Female
Serial Diagnostic Port	9-pin "D" Female w/supplied cable
Power	2.1mm "Barrel" Connector center pin positive
Antenna	Type N Female

Status LEDs

CD	Carrier Detect
TX	Transmit Data
CTS	Clear to Send

The status LEDs have multiple functions in combination with each other to provide detailed status information. See manual for details.

Operating Temperature	-40°C to 75°C (-40°F to 167°F)
Enclosure	Extruded Aluminum
Weight	15.5 oz. (441 grams)

SOFTWARE TOOLS

Serial Data Transceiver Starter Kit	
consisting of:	Diagnostic Software RS-232 Cable Documentation on CD

ORDER PART NUMBERS:

HARDWARE

98-1001	Freewave 900MHz Serial Data Transceiver
98-1002	Freewave 2.4GHz Serial Data Transceiver

SOFTWARE

91-5001	Serial Data Transceiver Starter Kit Radio network diagnostic, installation and test tools, RS-232 cable, and documentation on CD.
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