



Model 900DS and 2400DS Spread Spectrum Radios



FEATURES

- * Multiple Protocols
- * No user license required, 900 MHz and 2.4 GHz
- * Multiple network configurations
- * Software configurable with built-in link diagnostics
- * US FCC and Canada IC certified
- * Wireless connectivity up to 50km or greater with repeater

Description

The GDI Direct Sequence line of spread spectrum radios provides an off-the-shelf, ready-to-install solution to a number of long-range communication applications. The product was designed from the ground up with emphasis on performance, reliability, and flexibility and has been qualified under the most stringent temperature, shock, and vibration.

SPREAD SPECTRUM TECHNOLOGY

The GDI Direct Sequence line of Spread Spectrum radios uses direct sequence spread spectrum technology implemented with the Stanford Telecom STEL-2000A. This integrated circuit was developed with the participation of GDI specifically for the GDI Direct Sequence product line. The STEL-2000A matched-filter despreading technique provides unsurpassed synchronization speed, required for burst communications. Pseudonoise (P/N) spreading codes up to 63 chips ensure high processing gain to maintain communications in the most adverse environments.

TDD or CSMA COMMUNICATIONS PROTOCOLS

The GDI products may be ordered using either Time Division Duplexing or Carrier Sense Multiple Access protocols. This versatility allows use in a wide variety of applications where timing or special system software integration may be required or desired.

Network Configurations

The GDI products can be set up for a wide variety of network configurations. These configurations include point-to-point, multi-point-to-point, "star" networks, and point-to-multipoint links. The GDI product can also be set up as a repeater when a line of sight obstruction must be bypassed or ranges greater than 50 km are required.

High-Performance 2.4 GHz OPERATION

For long-range communications, a high antenna tower may be required, necessitating long cable runs between the antenna and the radio. There is some signal loss in all cables, increasing with cable length and signal frequency. In the 900-MHz band, performance can be maintained with reasonably priced cables. However, minimizing signal loss at 2.4 GHz requires the use of very expensive large-diameter cables.

To address this problem, GDI has separated the 2.4-GHz radio into two sections: an indoor unit, operating at a lower intermediate frequency, and an outdoor up/down converter located at the antenna. The up/down converter includes the system's low-noise 2.4 GHz receiver and the transmitter power amplifier, so the received and transmitted signals are not degraded by cable losses. Between the up/down converter and the indoor unit, signals are at a lower frequency, so losses are substantially reduced. This allows the use of less expensive cable with no loss of transmitter output power and receive sensitivity.

TIME DIVISION MULTIPLE ACCESS (TDMA)

The GDI product can be configured for TDMA operation, allowing multiple radios to share one channel without mutual interference. This is accomplished by coordinated allocation of transmit/receive time slots to each radio in the channel. TDMA is essential when the number of communication links required in a limited geographical area exceeds the number of available channels. For example, if 12 channels are available, 48 links

Flexible User Interface

The GDI product is shipped ready to operate with default parameters that are suitable for most applications. However, a large number of parameters are configurable, allowing the user to customize the radio for many non-standard applications. Some of the programmable parameters include:

- * Separate transmit and receive channels in 128 KHz steps.
- * Spreading Codes and code length (15/31/63).
- * BPSK or QPSK modulation
- * Number of TDMA slots and slot time
- * Synch/asynch modes, data rates, and clock sources
- * RS-232, EIA530 (RS-422), or V.35 electrical interfaces
- * RTS/CTS flow control options

These and other parameters are easily configurable using GDI's Windows 95 Graphical User Interface, or a Hayes compatible command set sent by a terminal connected to the radio's rear panel connector. Configuration changes can be stored in the radio's non-volatile memory and automatically recalled on power up.

BUILT-IN RF LINK DIAGNOSTICS

The GDI product can check the performance of the RF link without any external test equipment. This is achieved by commanding the remote radio to a loopback mode while generating and checking a Bit Error Rate (BER) pattern over the air. The radio also reports the receive signal strength in dBm. This is used to perform initial antenna alignment and check for proper link margins. An automatic channel scan can also be performed to survey the RF environment over the whole ISM band.

IN-FIELD SOFTWARE UPDATES

GDI offers the features required for a vast range of configuration and performance options. However, features as yet unforeseen will inevitably become desirable or even essential in the future. The GDI product will not be made obsolete by such technological changes, since its operation is controlled by software contained in Flash EPROM. When new features become available, the radio can be upgraded in less than 20 seconds by software available at GDI's web site.

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Model 900DS and 2400DS Spread Spectrum Radios Specifications

L-Band Models (902-928 MHz)

Model	Async Data Rate (kbps)	Sync Data Rate (kbps)	Xmitter Bandwidth (MHz)	Receiver Sensitivity (dBm)	Number of Channels	Output Power (dBm)	Processing Gain (dBm)
SS900DS-1	19.2	24	1.6	-103	16	29	15
SS900DS-2	57.6	64	7.2	-93	4	29	18
SS900DS-3	115.2	128	7.2	-90	4	29	15
SS900DS-4	115.2	256	7.2	-87	4	29	12
SS900DS-5	57.6	64	1.6	-103	16	29	15
SS900DS-6	115.2	297	7.2	-90	4	29	15

S-Band Models (2.4-2.5 GHz)

Model	Async Data Rate (kbps)	Sync Data Rate (kbps)	Xmitter Bandwidth (MHz)	Receiver Sensitivity (dBm)	Number of Channels	Output Power (dBm)	Processing Gain (dBm)
SS2400DS-1	19.2	24	1.6	-110	50	18	15
SS2400DS-2	57.6	64	7.2	-101	16	18	18
SS2400DS-3	115.2	128	7.2	-98	16	18	15
SS2400DS-4	115.2	256	7.2	-95	16	18	12
SS2400DS-5	57.6	64	1.6	-103	50	18	15
SS2400DS-6	115.2	297	7.2	-98	16	18	15

Input Power	115 or 230 VAC 8-16 VDC
Power Consumption	15 Watt
Control Connection	DB9F
Data Connection	DB25F
Interfaces	RS232, EIA530, RS485, V.35
Synchronization	BNC

Indoor Unit Dimensions	4.25"W x 1.5"H x 6.5"D
Indoor Unit Weight	710 g
Outdoor Unit Dimensions	5.25"W x 5.25"H x 2.25"D
Outdoor Unit Weight	1.1 Kg
Operating Temperature	-40 to +75 °C
Maximum Humidity	90% non-condensing

Specifications subject to change without notice

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