

TS4000 Radio Modem Specifications

Data Interfaces

Data Rates	300, 1200, 2400, 4800, 9600, 19200, 38400 baud
Data Format	Asynchronous, 8 or 9 bit words
Signal Levels	RS-232 or TTL (Data Port 1), RS-232 (Data Port 2) RS-485 (with adapter)
Handshake Protocols	Data Activation (3 wire): Requires only TD, RD and ground (SG) Full Handshake: Supports RTS, CTS, DCD, DSR, DTR
Data Only Time Out	1 to 500 character periods
CTS Control Line	Buffer, Channel, or RTS Driven
DCD Control Line	Data and/or Channel Driven
DSR Control Line	Active when Operational, Transmitting, or Receiving
DTR Control Line	Enabled or Disabled (receive data flow control)
RTS to CTS delay	Programmable: 0 to 999 milliseconds
Data Connectors	9 pin D, female, DCE (standard case), LEMO connector (watertight case)

Radio *(general specifications, depends on model)*

Frequency Ranges	132-174, 340-512, 928-960 MHz
Number of Channels	99 receive/transmit pairs, stored in non-volatile memory
Channel Spacing	5, 6.25, 7.5, 10, 12.5, 15, 25 and 30 kHz (depends on model)
Channel Rate	4,000 to 19,200 bps - GMSK
RF Output Power	0.1 watts to 5 watts (depends on model) external amplifiers available for up to 100 watts
Receive Data Sensitivity	-103 dBm for less than 1 x 10E-4 BER (Bit Error Rate) (typical)
Carrier Detect Threshold	-110 to -60 dBm, programmable
RF Connector	BNC (standard case), TNC (watertight case), N (optional), SMA (optional)
RF Connector Type	female, 50 ohm

Channel Options

Data Protocol	Transparent or Packet (AirNet)
Data Security	254 Selectable Scrambling Codes
FEC (Error Correction Coding)	None or 12,8 Hamming code with 16 bit Interleaving
Clear Channel Scan	Automatic and dynamic selection from up to 9 channel based on minimizing the effects of interference

AirNet Packet Protocol (optional)

Channel Access	Master-Slave or Carrier Sense Multiple Access (CSMA) with Programmable Attempt Rate
Protocol	Automatic Repeat reQuest (ARQ)
Packet Size	1 to 9999 characters
Retries	0 to 50 per packet
Address Space	999 Individual Addresses per Group, up to 60 Groups
Transfers	Individual with Acknowledgment (to any address) Individual without Acknowledgment (to any address) Group Broadcast (to all addresses in a single group) Network Broadcast (to all addresses in all groups) Multicast Reception (from up to 20 other groups)
Relay Operation	Store and Forward Data Repeating with: Address Filtering – minimizes additional traffic Slotted MAC (Medium Access Control) – prevents collisions Multiple Store and Forward Capability – allows complex topologies Any unit can be a store and forward repeater – minimizes equipment

Diagnostics

Internally Monitored Values	Supply Voltages, Temperature, Receive Signal Level (RSSI) - all models Forward and Reflected Transmit Power - 5 watt models
Remote Diagnostics	Firmware option

General

Supply Voltage	9 to 28 VDC (lowest voltage varies by specific model)
Power	1.5 watts receive (typical) (varies by specific model) 7 to 25 watts transmit (depends on RF output power)



Power Connector	2 pin Molex or through Data Ports
Data Buffer	128 kByte SRAM
Program Storage	512 kByte Flash ROM (supports in field firmware upgrades)
LED Indicators	Transmit, Receive, Power
Operating Temperature	-22 to +140 °F (-30 to +60 °C)
Dimensions	4.3" x 3.1" x 1.8" (109 mm x 79 mm x 46 mm) - without heat sink 6.5" x 3.1" x 1.8" (165 mm x 79 mm x 46 mm) - with heat sink
Enclosure Options	Standard and Watertight

This product is available for domestic and international sale. For domestic sale, some frequency bands cannot be approved by the Federal Communications Commission. Therefore, some devices are not, and may not be, offered for sale or lease, or sold or leased within the United States and its territories.



TS4000 Radio Modem

Standard Enclosure

