

Series 500

Wireless Link®



High Bandwidth, Programmable

Digital Telemetry System

for Multiple Sensors and Sensor Types

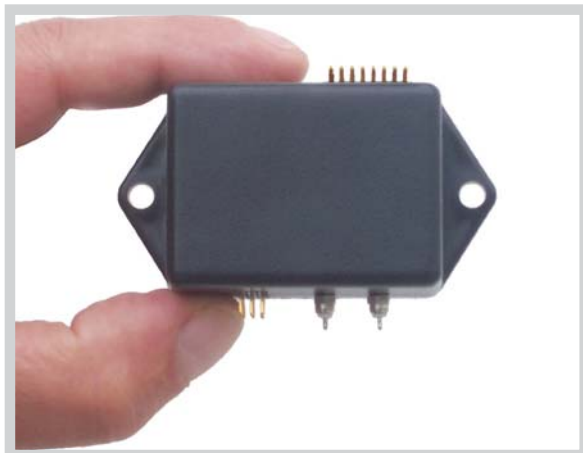
SRI/PMD has been designing and producing ruggedized wireless telemetry systems for over 25 years. The transmit side of these systems have provided access to **temperature, strain, pressure** or other types of critical measurement data from locations where hard wire interconnects or slip rings have proven ineffective, cumbersome, or unreliable.

By applying the latest digital signal processing technology, the **ST-500 Digital Telemetry Transmit System** combined with the companion **SR-500 Receive System** offers a versatile and cost effective solution to telemetry applications:

- Engine and Vehicle Component Test and Development
- Turbines and Generators
- Pumps and Mixers
- Cranes and Heavy Equipment
- Oil Fields, Platforms and Transmission Facilities
- Bridges, Tunnels and Civil Engineering
- Kilns and Industrial Automation Monitoring
- Hydraulic Test Stands and Load Frames
- Other Challenging Measurement Applications



A single general purpose design allows this unique system to be applied to a wide variety of sensor configurations, including multiple and mixed inputs of thermocouple data, strain bridges, and various other types of static or dynamic input voltages. The digital architecture of the implementation not only insures the integrity of the data measurements throughout the detection, transmission, recovery and output processes, but also allows the system to automatically compensate for steady state or dynamic errors introduced by external or internal sources.



The Wireless Link system is ideal for applications requiring high resolution, reliable measurements. The system supports up to 17k Samples per Second and allows users to emphasize either Frequency Response or Resolution with switchable 8 or 12 bit modes. The miniaturized and ruggedized transmitter can be used in a wide variety of difficult or hazardous locations.

The system can be programmed to operate in High-Speed Continuous, Sequential, or Sleep/Burst modes and features programmable RF transmit levels for extended or specialized requirements. The receiver includes analog outputs with selectable ranges to $\pm 10V$ and digital outputs via a USB connection for use with a variety of instruments and analysis programs.

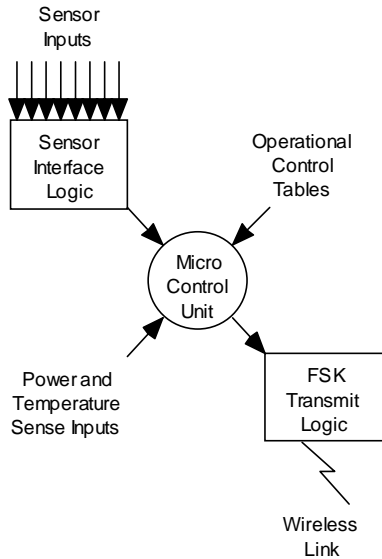
SRI/PMD also offers standardized or custom analysis software packages compatible with execution on most standard PCs. The software utilizes standard interfaces to communicate with the **SR-500 Receive System**, frequently eliminating the need for stand-alone data recorders, strip charts, and/or oscilloscopes. By providing data storage and retrieval functions, operators may capture critical measurement data, alter operational parameters of a system under test and then perform detailed comparison and analysis on new measurements.

ST-500

Wireless Link[®]

TRANSMITTER

Transmission Overview



TRANSMITTER SIMPLIFIED OVERVIEW

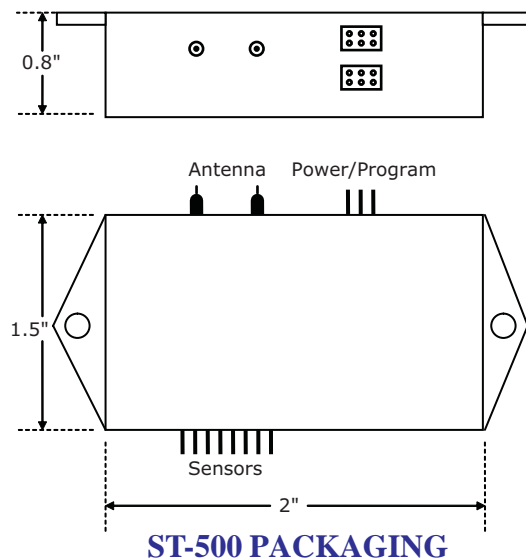
The heart of the **ST-500 Transmitter** is a powerful and versatile micro-controller unit (MCU) capable of up to 30 million operations per second. Firmware loaded into the MCU at the factory supports a wide variety of sensor types to satisfy most common applications of the system.

Tables loaded within electronically erasable PROM (EEPROM) memory space establish the sensor configuration of each transmitter. Referring to these tables, the controller invokes configuration settings for the analog sensor interface circuitry, altering the various input offset and gain parameters in order to accurately detect the input voltages. Up to eight (8) differential sensor inputs, including excitation voltage, can be configured for a standard **ST-500 Transmitter**.

The EEPROM tables also control the operational parameters associated with sampling frequency for each sensor input. These settings directly affect the system transmission rate, allowing users to easily trade off transmission distance and noise immunity with sensor sampling rates. Sensor channels can also be selectively deactivated to increase the sampling rates for more critical measurements, adding to the flexibility of the unit. Setup is simple with default configuration values for most common sensor types and comprehensive gain, offset, and digital filtering adjustment capability.

An on-board temperature sensor combined with primary power voltage regulation logic allows the design to compensate for measurement errors associated with temperature or voltage drifts. For most applications, the **ST-500** can guarantee better than 1% accuracy of most typical measurements and can support in excess of 0.1% accuracy for extremely critical measurement requirements.

Primary power input for the transmitter is largely dictated by the user's application. At typical power consumption levels of under 200 milli-Watts, either 9V or 3V battery power can frequently satisfy limited time frame measurement functions. Additional parameters, such as transmitted RF power level, link data rate, sampling schemes, and excitation voltages can be adjusted to maximize battery life. On a custom basis, SRI/PMD can develop special transmit power capabilities including rechargeable batteries or even inductively supplied power options.



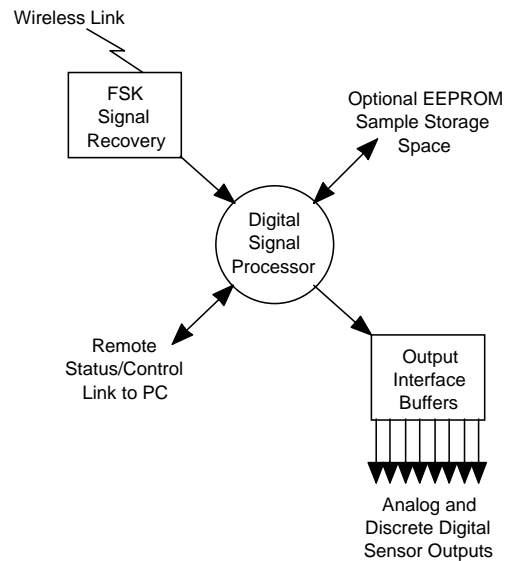
ST-500 PACKAGING

The **ST-500 Transmitter** is encapsulated within a hermetically sealed case, allowing it to be installed in locations presenting severe environmental and/or contaminated conditions. The small footprint also allows for flexible mounting options. Contact the factory for applications which require custom packaging to suit unique end-user installation form/fit specifications.

Data Reception and Processing Overview

The SR-500 Receive System also employs advanced technology digital signal processing in order to recover the transmitted bit-stream from the wireless link, synchronize the data for frame detection purposes, and demultiplex the telemetry data samples to the corresponding sensor channel. Both analog and digital sample outputs are provided on a per channel basis and a data capture and display package may be installed on a PC for applications desiring these capabilities.

In its standard mode of operation, the receive process automatically scans the configured input frequency spectrum and detects the selected ST-500 transmit waveform. This feature eliminates the need for tedious and cumbersome manual tuning of the FSK demodulator. A built-in signal strength detection meter allows an operator to assess the potential transmit frequency and establish an optimum frequency for the particular application of the system.



RECEIVER SIMPLIFIED OVERVIEW

Once valid signal recovery has been achieved, the logic automatically reads the sensor configuration and operational sampling parameters of the transmitter and processes the telemetry data accordingly to produce the channelized output waveforms. Configurable sample filtering may also be performed on a per channel basis to eliminate noise corruption which may be present due to the application environment.

The SR-500 requires a standard 12 Volt direct current (DC) power input enabling the system to be utilized in mobile applications operating from standard automobile battery power. The system is also shipped with an AC to DC power adapter for connection to standard AC power outlets.



Series 500 Part Number Sequence : S a - 5b0 - cd - e - f

- a Component type designator as follows:
 - T Transmitter module only
 - R Receiver module only
 - S Complete telemetry system (both transmitter and receiver)
- b Frequency Band
 - 4 915 MHz
 - 5 868 MHz
- c Number of sensor and analog outputs:
 - 1, 4, or 8 for # of transmitter sensor channels
- d Sensor interface options
 - X Multiplexed excitation voltage
- e Transmitter Power supply options
 - L 1 to 4 VDC external power input
 - M 5 VDC external power input
 - H 7-11 VDC external power input
 - I 9-15 VDC external power input
- f Temperature rating
 - C 0 to 70 degrees C
 - I 0 to 85 degrees C

SS-500

Wireless Link[®]

Digital Telemetry System

ST-500 Specifications *

General Specifications

Sensor Inputs: Up to 8 Selectable and/or Mixed
Sample Rates: Up to 17 Ksps (8 bit mode) or
9.5+ Ksps (12 bit mode) Aggregate
Sample Res: Selectable between 8 or 12 bit
sample width
Accuracy: +/- 1% Typical Measurement Acc.
+/- 0.1% Obtainable
Frequency Resp: Up to 4+ KHz
Radio Frequency: 915 or 868 MHz Band (specify)
Range: Up to 500 feet
Modulation: FSK
Primary Power: < 35 milliAmps at 5 VDC
Operating Temp: 0° to +85° C

Typical Instruments Supported

Temperature: Type J or K Thermocouples
0° to +1000° C
Strain Gage: 1-4 Arm Bridge, 120/350 Ohm
0.625-5 VDC Excitation Provided
To 0.125 Microstrain Sensitivity
Generic Voltages: Static or Dynamic to 4+ KHz
Differential or Single Ended
Unipolar or Bipolar
Selectable from 2 mV,
to 5 V Input Range
Other Typical Sensors: Pressure Transducers
Displacement Gages
Weather Sensors
Custom

Optionally available interfaces will accommodate most sensors and measurement sensitivities. Consult factory for details.

SR-500 Specifications *

General Specifications

Supports: Up to 8 Defined Transmitters
Acquisition: Automatic
Status Indicators: Signal Lock/Data Error Detect
Analog Outputs: Up to 8 selectable for 0-5, 0-10,
+/- 5, or +/- 10 VDC
Digital Outputs: USB, 12 Mbps
Data Processing: Compensation (Temp Dependent),
IIR Filtering, Averaging
Packaging: Desktop Enclosure
Operating Temp: 0° to +70° C

Remote Interface

Specifications: Serial RS-232
Functions: Standard Status/Control
Firmware Upgrade
Real-time Data Transfer
Sensor Reconfiguration
Measurement Calibration
Dimensions: 5.5" wide x 8.25" long x 1.5" high

Accessory Equipment

Antennas (Enclosure, Desktop, or Magnet Mount)
Batteries (Disposable or Rechargeable)

PC Compatible Software Support Package
Link Analysis, Data Calibration
Sample Display
RX/TX Configuration Control

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