Wireless Link® - Series 500 Digital Telemetry Systems

SRI PMD has been designing and producing ruggedized wireless telemetry systems for more than 20 years. The transmit side of these systems, capable of withstanding temperatures of 85°C and acceleration forces of up to 5,000 Gs, 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. Series 500 Digital Telemetry Systems enable real-time, dynamic, environmentally secure sensor connectivity.

ST-500 Transmitter
SR-500 Receiver

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 for sensor telemetry applications.

Telemetry applications include:

- Engine and Vehicle Component Test and Development
- Oil fields and Platforms
- Turbines and Generators
- Cranes and Heavy Equipment
- Bridges, Tunnels, and Civil Engineering
- Kilns and Industrial Automation Monitoring
- Other hard-to-get-at places.

The miniaturized, ruggedized design of the ST-500 Transmitter allows wireless connectivity in conditions that are difficult or impossible to reach with other telemetry systems. The ST-500 Transmitter is encapsulated within a hermetically sealed case allowing it to be installed in locations presenting severe environmental or
contaminated conditions, such as engine test, oil field, civil engineering, and heavy machinery applications. Applications requiring custom packaging to suit unique installation form/fit needs can often be accommodated through SRI PMD's custom engineering services.

Click here to see the Wireless Link in action on aircraft propellers.

Click here to see the Wireless Link in action on a commercial brush cutter.

The Wireless Link system is ideal for applications requiring high resolution, reliable measurements:

- Up to 17k Samples per Second
- Accuracy better than ±0.5% typical, ±0.1% achievable
- Emphasize Frequency Response or Resolution with Switchable 8 or 12 Bit Resolution
- Selectable Sensor Excitation to 5V
- Programmable Channel Offsets and Gains
- Standard On-Board Temperature and Primary Power Measurement and Gain/Offset Compensation
- Programmable Anti-Alias filtering with digital Averaging, IIR or Custom filtration

The programmable, digital architecture of the system accommodates a wide variety of sensor types. Transmitters are available to support mixed inputs of up to 8 strain, pressure, temperature, acceleration, or other sensors.

- Up to 8 Differential Inputs including Excitation Voltage; Other Configurations Available
- Miniaturized Transmitter For Use In Difficult Locations

- Digital and Analog Outputs
- Analog Outputs With Selectable Range to ±10 V
- Programmable RF Transmit Levels
- High-Speed Continuous, Sequential or Optional Sleep-Mode/Burst Operation

Furthermore, the price of these products offers effective alternative solutions to simple applications, such as transferring analog signals across a city street. The system is available for use in unlicensed ISM frequency bands around the world.

SRI/PMD also offers standardized or custom analysis software packages. 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.

**Wireless Link® - 500 Digital Telemetry Systems**

**SR-500 Receive System - ST-500 Digital Telemetry Transmit System**

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 ranging from turbines, generators, kilns, car engines and other hard-to-get-at places. Furthermore, the price of these products offers effective alternative solutions to simple applications, such as transferring analog signals across a city street. 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.

SRI PMD offers standard and custom analysis software packages compatible with execution on most standard Personal Computers (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 Transmitter**

The ST-500 Transmitter is usually encapsulated within thermally conductive epoxy, allowing it to be installed in locations presenting severe environmental and/or contaminated conditions.

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 and permits software programming of sensor gains and offsets. The miniaturized 2” x 1.5” x 0.8” form factor and <2.5 oz weight allows the Transmitter to be used in applications where typical telemetry transmitters are not possible.

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) sensor inputs can be configured for a standard single ST-500 Transmitter. Custom input configurations are available for unique applications.

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 detection logic allows the design to compensate for measurement errors associated with temperature or voltage drifts. For most applications, the ST-500 can provide better than ±0.5% accuracy of most typical measurements can can support in excess of ±0.1% accuracy for extremely critical measurement requirements.

Primary power input for the design is largely dictated by the user’s application. At typical power consumption levels of under 35 mA, either 9 or 3V battery power can frequently satisfy limited time frame measurement functions. On a custom basis, PMD can develop special transmit power capabilities including rechargeable batteries of even inductively supplied power options.
SR-500 Receiver

The SR-500 requires a standard 12 Volt direct current (DC) power input. This enables 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, enabling it to be connected directly to standard AC power outlets.

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 date 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 an optional data capture and display package may be installed on a PC for applications requiring these capabilities.

In its standard mode of operation, the receive process automatically scans the input frequency spectrum and detects the selected ST-500 transmit waveform. This eliminates the need for tedious and cumbersome manual tuning of the FSK demodulator. Override control of this process is also supported which, when combined with a built-in signal strength detection meter, allows an operator to assess the potential transmit spectrum and establish an optimum frequency for the particular application of the system.

Once valid signal recovery has been achieved, the logic automatically detects 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 operational environment.

To Contact Us, use our Info Request Form

Specifications: PDF / Operations and Maintenance

ST-500 Transmitter Specifications

General Specifications

Sensor Inputs: Up to 8 with multiplexed excitation
Sample Rate: Up to 17ksps (8 bit mode), or 9.5 ksps (12 bit mode)
Sample Res: Selectable between 8 or 12 bit sample width
Accuracy: ±0.5 % Typical Measurement Acc.
±0.1% Obtainable
Frequency Response: Up to 2 KHz steady state
Radio Frequency: Unlicensed ISM, select 915, 868, or 433 MHz Bands
Range: Up to 500 feet
Modulation: FSK
Primary Power: <35mA at 5 VDC
Operating Temp: 0° to +85° C (Consult Factory for extended high or low temperature capability)

Typical Instruments Supported

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

SR-500 Receiver Specifications
General Specifications

Supports: Up to 16 Defined Transmitters
Acquisition: Automatic
Status Indicators: Signal Lock/Data Error Detect
Analog Outputs: Up to 18 selectable for 0-5, 0-10, ±5, ±10 VDC
Digital Outputs: 12 Bits Measurement Data plus Channel, Strobe, Error Ind.
Data Processing: Compensation (Temp Dependent), Filtering, Ave, …
Packaging: Desktop Enclosure
Operating Temp: 0° to 85°C

Remote Interface

Specifications: RS-232, DTE, up to 115 kbps
Connector: Standard 9 Pin D
Functions: Standard Status/Control
Firmware Upgrade
Real-time Data Transfer
Sensor Reconfiguration
Measurement Calibration

Accessory Equipment

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

Software Support Package:
Link Analysis, Data Calibration
Sample Display (Custom Options)
TX/TX Configuration Control