Model SR-5210

S/L-Band Multi-Mission Receive System

Integrated Satellite and Range Receiver, Demod, & Bit-Sync

Applications

- RF Reception of Satellite and Range Telemetry, Telecommand and Most Communications Links
- SatCom, Science, and Military Missions
- SGLS, USB, and STDN Ground Stations
- RF Link Testing and Monitoring
- Payload Integration, Simulation and Testing
- Supports ARTM PCM/FM and SOQPSK

Key Features

- Single or Dual-Band Reception, Demodulation, Bit Synchronization and Decoding of Main and Subcarriers
- Multi-mode Analog and Digital FM and PM plus BPSK, QPSK, OQPSK and U/AQPSK
- Optional Pre-D Diversity Combiner
- IF, I/Q and Analog Outputs for Additional Uses
- Dual Viterbi and PCM Conversion and Descrambling
- Programmable Front Panel Ports for Setup and Monitoring
- Programmable Dual Bit Synchronizers supporting NRZ L/M/S and Bi-Phase L/M/S input formats
- IF, I/Q and Analog Outputs for Additional Uses
- Dual Viterbi and PCM Conversion and Descrambling
- Programmable Front Panel Ports for Setup and Monitoring
- Programmable Dual Bit Synchronizers supporting NRZ L/M/S and Bi-Phase L/M/S input formats
- Front-Panel Graphic Display with Spectrum, I/Q Plots
- A priori power and high reliability applications
- Compact 1U chassis not requiring 3rd party Operating System or hard drive for increased reliability and security
- Also available as PCI PC-Cards for integration options

The SR-5210 provides a complete communications receive system solution by incorporating radio frequency signal reception, phase/frequency/amplitude analog and digital waveform recovery, and optional configurable bit-synchronization and data decoding features. The unique mixture of state-of-the-art RF, analog, and digital circuitry provides an extremely compact package fully supporting low power and high reliability applications.

Starting with the downconverter, the design provides high performance signal recovery, supporting a wide dynamic range, narrow to wide signal bandwidths, and near theoretical data/clock recovery even for low Eb/No signals.

The soft-radio nature of the implementation allows the design to be tailored to unique end user requirements for acquisition bandwidth, sensitivity, and loop tracking characteristics to account for transmit source variations of Doppler, frequency stability, and other operating parameters. Using the latest generation digital signal processing techniques allows upgrades via firmware changes, even for previously fielded systems.

Simplified local operation is accomplished through menu-driven front panel graphical display allowing a wide selection of operating formats to meet user requirements. Key performance values including a Spectrum View and I/Q Plot are available. User selections are accessible locally or remotely via an included RS-232 serial or optional 100baseT Ethernet interface.

Up to 32 Configuration Profiles can be stored with user-defined link names and recalled with a single command, simplifying fast and accurate configuration changes.

For applications requiring diversity combined signals the SR-5210.C is available with an on-board high-performance Pre-Detection diversity combiner. This state-of-the-art combiner can increase link performance in space or range applications supporting dual downlinks.

The SR-5210 is available as a standard 1U 19 inch rack mountable chassis or as PCI cards and API for integration into other systems. The Chassis version is not based on a PC platform, avoiding the requirement for 3rd Party Operating Systems and hard drives and reducing the need for system patches and IT security concerns.
Model SR-5210 Receive System Specifications

**RF Input**

Frequency Range:
- 2200 to 2297.5MHz
- 1690 to 1850MHz
Other Bands on Request
Frequency Selectivity: 500KHz
Dynamic Range: -10dBm to Noise Threshold
Noise Figure: <8dB Typical
Image Rejection: >60dB
Interfering Signal Rejection: >60dB (+/- 8MHz from FC)
AGC Modes: Automatic or Manual (Local or Remote)

**Supported Waveforms**

Phase Modulation (PM) - Digital or Analog
Phase Shift Keyed (PSK) - B, Q, OQ, AQ, UQ
PM/PSK - Configurable subcarrier frequency
Frequency Modulation (FM) - Digital or Analog
Other Modes On Request

**Common Specifications**

Data Rates: 50bps to 50Mbps
Data Rate Selectivity: 0.001Kbps Steps
Acquisition/Tracking Range:
- Programmable up to +/- 255KHz
Locking Threshold: Programmable to -15dB C/N IN IF Bandwidth -or- 6dB Eb/No
Performance:
- Within 1dB of Theory for Typical Waveform Modes

**PM Waveform Specifications**

Modes: Digital or Analog
Modulation: 0 to 2 Pi Radians
Frequency Response: ~ 10KHz to 25MHz
Loop Bandwidth: Programmable from 100Hz
Static Phase Error: < 6°
Residual Phase Error: < 3° RMS

**PSK Waveform Specifications**

Modulation Options
- BPSK
- QPSK
- OFFSET-QPSK
- ASYNC-QPSK
- UNBALANCED-QPSK
Loop Bandwidth: Programmable from 1Hz

**PM/PSK Waveform Specifications**

Waveform: PSK Subcarrier Modulated via PM on Main Carrier
PM Subcarrier Frequency: Programmable to 5MHz
PM Modulation Index: 0 to 2 Pi Radians
PM Static Phase Error: < 6°
PM Residual Phase Error: < 3° RMS
Subcarrier Tracking Range: Programmable
PSK Modulation Options:
- BPSK, QPSK, OQPSK, AQPSK, UQPSK
PSK Loop Bandwidth: Programmable from 1Hz
PSK Selectivity:
- Operates with Multiple Subcarriers on Main Carrier

**FM Waveform Specifications**

Modes: Analog or Digital
Modulation: 50Hz to 5MHz Deviation
Loop Bandwidth: Programmable from 100Hz
Detection: Non-Coherent Discrimination

**ARTM Waveform Specifications**

Modulation Types:
- ARTM Tier 0 (PCM/FM) to 25 M bit/s
- ARTM Tier I (SOQPSK) to 50 M bit/s, 25 M baud/s
Modulation Characteristics:
- Premodulation Filtering per IRIG 106

**PCM Conversion Specifications**

Input PCM Formats:
- Non-return-to-zero (NRZ): Mark, Space, Level
- Bi-phase (BIØ): Mark, Space, Level
Output PCM Formats: NRZ-L AND BIØ-M

**Viterbi Decoder**

Constraint Length: 7 (K=7)
Rate: 1/2 or 3/4 (punctured)
Convolutional Polynomials:
- G1 = 171 Octal, G2 = 133 Octal
Symbol Ordering: G1 followed by G2, G2 followed by G1
Data Scrambling: Optional G2 Invert in any Mode
Modes: Optional Dual Decoding for Independent I/Q data

**Data Descrambler**

Algorithms: V.35 (CCITT), V.36 (Intelsat), RCC IRIG 106
Shift Register Length: 20 Bits

**Remote Status/Control Specifications**

Serial RS-232 @ 9600 bps (10/100baseT Option)
Commands: Control Over All Configurable Parameters
Status:
- Search/Lock Status
- Self-Test Status
- Detailed Operational Information

**Other Specifications**

Chassis
- 19 Inch Rack Mountable
- 1.75 Inch Height (1U)
- 20 Inch Depth (Excluding Connectors)

Connectors:
- 1 N For RF Input
- 1 BNC for IF Monitor Output (Front Panel)
- 4 BNCs for Data/Clock Outputs
- 2 BNCs for TTL1 and TTL2
- 1 25 PIN D for Differential Data/Clock Outputs
  (NRZ-L, BIØ-M, and CLK)
- 4 BNCs for Programmable DAC Monitors (2 Front, 2 Rear)
- 1 9 PIN D for Remote Status/Control
- RJ-45 for 10/100baseT (Option)
- Standard 3 Prong Male Primary Power Input
Primary Power: 85-264VAC 47-63Hz
Temperature:
- -25° TO 60°C Operational
- -45° TO +65°C Storage

* All specifications subject to change without notice or obligation to retrofit. Consult factory for custom options and/or alternate specifications

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