

Model SD-5220

Multi-Mission Demod/Bit-sync/Decoder

Flexible Satellite and Range Solution for Data Recovery

Applications

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



Key Features

- Demodulation, Bit Synchronization and Decoding of Main and/or Subcarriers
- Multi-mode Analog and Digital FM and PM plus BPSK, QPSK, OQPSK and U/AQPSK
- Near theoretical performance for Data Rates from 50 bps to 25 MHz or 50 Mbps for mission flexibility
- Programmable Dual Bit Synchronizers supporting NRZ L/M/S and Bi-Phase L/M/S input formats
- Optional Pre-D Diversity Combiner
- IF, I/Q, or Analog Outputs for Additional Equipment Support
- Dual Viterbi and PCM Conversion and Descrambling
- Programmable Front Panel Ports for Setup and Monitoring
- Front-Panel Graphic Display with Spectrum, I/Q Plots
- 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

By applying state-of-the-art digital signal processing technology, the **SD-5220** provides truly versatile Intermediate Frequency (IF) to data/clock waveform recovery and processing. The unit supports a wide range of input frequencies, modulation formats, bit rates, analog bandwidths, and high speed data decoding. The vast capabilities of the SD-5220 enable cost effective solutions for applications requiring simple or complex waveform processing, and static/dynamic demodulation, bit-synchronization and data processing.

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. Remote control is available via an included RS-232 serial or optional 100baseT Ethernet interface.

With a front panel IF input and corresponding IF monitor output port, many SD-5220 systems can be daisy chained together for multiple waveform recovery. A programmable rear panel analog port provides additional capabilities by providing selectable outputs for baseband waveforms, loop filter responses and other test and system integration signals.

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 .

The firmware-intensive implementation of the SD-5220 readily accommodates custom features and signal processing tasks. Using the latest generation digital signal processing techniques allows upgrades via firmware changes, even for previously fielded systems.

For applications requiring diversity combined signals the SD-5220.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 SD-5220 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 SD-5220 Demod/Bit-Sync/Decoder Specifications

Input Specifications

Input Frequency: 0 to 80 MHz
Frequency Selectivity: 1 KHz
Level: -70 to +5 dBm
Impedance: 50 ohms

Supported Waveforms

Phase Modulation (PM) - Digital or Analog
Phase Shift Keyed (PSK) - B, Q, OQ, AQ, UQ, UAQ
PM/PSK - Configurable subcarrier frequency
Frequency Modulation (FM) - Digital or Analog
ARTM Tier 0 (PCM/FM),
Other Modes On Request

Common Specifications

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

PM Waveform Specifications

Modes: Digital or Analog
Modulation Index: 0 to 2 Pi Radians
Frequency Response: ~ 10 KHz to 20 MHz
Loop Bandwidth: Programmable from 100 Hz
Static Phase Error: < 6°
Residual Phase Error: < 3° RMS

PSK Waveform Specifications

Demodulation Options
 BPSK
 QPSK
 OFFSET-QPSK
 ASYNQ-QPSK
 UNBALANCED-QPSK
 UNBALANCED-ASYNQ-QPSK
Loop Bandwidth: Programmable from 1 Hz

PM/PSK Waveform Specifications

Waveform: PSK Subcarrier Modulated via PM on Main Carrier
PM Subcarrier Frequency: Programmable
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, UAQPSK
PSK Loop Bandwidth: Programmable from 1Hz
PSK Selectivity:
 Operates with Multiple Subcarriers on Main Carrier

FM Waveform Specifications

Modes: Analog or Digital
Modulation: 50 Hz to 5 MHz 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 (SQPSK) 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 BNC For IF 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, BIØM, 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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