Model SD-4220
Demod/Bit-sync/Decoder

Advanced Signal Processing for Programmable Demodulation, Bit-Synchronization, and Data Decoding

Versatile Demodulation/Bit-Synchronization/Decoding for Most Common Satellite Comm Links

PM, PSK, PM/PSK, FM, or Custom Waveform Processing

Analog Output or Bit-Synchronization from 50 bps to 20 Mbps for Recovered Data/Clock

Full Soft Radio Implementation Provides for Ease of Customization for Unique Data Links

Compatible with a Wide Variety of External RF Front-ends

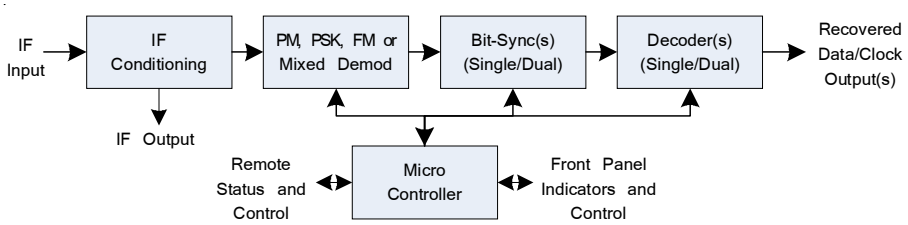
By applying state-of-the-art digital signal processing technology, the SD-4220 provides truly versatile intermediate frequency (IF) to data/clock waveform recovery and processing. The design supports a wide range of input frequencies, modulation formats, bit rates, analog bandwidths, and high speed data decoding logic. The vast capabilities of the product enable cost effective solutions for applications requiring simple/complex waveform processing, and static/dynamic demodulation, bit-synchronization and data processing.

Packaged in an industry standard 1U 19 inch rack mountable chassis, the ruggedized design satisfies requirements ranging from laboratory test sets and ground stations to mobile transport case environments.

Complete, user-friendly front-panel status and control capabilities are provided in addition to a remote computer interface via a standard RS-232 serial port. Controllable selections include input frequency, demodulation and bit-synchronization modes, as well as decoding and descrambling processing. Status information includes acquisition state, estimated signal to noise ratios and general system built-in-test results.

With a front panel IF input and corresponding IF monitor output port, many SD-4220 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 so forth.

With all data processing capabilities implemented via field programmable Micro-Controllers and Gate Arrays, the SD-4220 is uniquely capable of being completely upgraded in the field for system upgrades and custom user requirements.



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Model SD-4220 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
Other Modes On Request

Common Specifications

Data Rates: 50 bps to 20 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 1 dB 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
    ASYNC-QPSK
    UNBALANCED-QPSK
    UNBALANCED-ASYNC-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 1 Hz
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 100 Hz
Detection: Non-Coherent Discrimination

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 (1111001)
    G2 = 133 Octal (1011011)
Symbol Ordering:
    G1 followed by G2
    G2 followed by G1
Data Scrambling
    Optional G2 Invert in any Mode

Data Descrambler

Algorithms: V.35 (CCITT) or V.36 (Intelsat)
Shift Register Length: 20 Bits

Remote Status/Control Specifications

Serial RS-232 @ 9600 bps (Custom Interfaces Available)
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)
    15 Inch Depth (Excluding Connectors)
Connectors
    1 BNC For IF Input (Front Panel)
    1 BNC for IF Monitor Output (Front Panel)
    4 BNC'S For Data/Clock Outputs
        (NRZ-L, BIØM, 0° CLK, and 180° CLK)
    1 9 PIN D for Differential Data/Clock Outputs
        (NRZ-L, BIØM, and CLK)
    2 BNCs for Programmable DAC Monitors (Front Panel)
    1 9 PIN D for Remote Status/Control
    Standard 3 Prong Male Primary Power Input
Primary Power: 85-264 VAC 47-63 Hz
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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