RMDS-500S

PC-Based Multimode (SOQPSK) Telemetry Demodulator, Receiver, Decom, Simulator, Timecode

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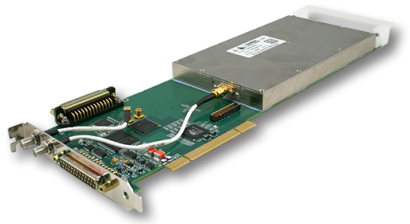


Key Features

- PC-based bus full size card with RF Receiver, Demodulator, Bit Synchronizer, Data Decommutator, Simulator, and IRIG Time Code Reader
  - + 32 Bit/66 Mhz PCI bridge
  - + Transfers data in scatter gather mode
- RF Receiver
  - + L-band, S-band and C-band coverage (select at build)
  - + Selective tuning with 250 kHz tuning steps
  - + 5 IF band widths; 1.5 to 40 MHz
  - + AGC and AM outputs
  - + 70 MHz IF output
- 70 MHz Demodulator
  - + Input: RF receiver or external 70MHz
  - + Processes: SOQPSK, PCM/FM, OQPSK, QPSK and BPSK
- Bit Synchronizer
  - + Inputs: Demod, TTL, RS-422 and analog
  - + Data rates to 40 Mbps
  - + I/O codes: NRZ-(L, M, S), BIØ-(L, M, S), RNRZ-L
  - + Bit error rate tester for PRN (15)
- IRIG-B time code reader
  - + Accepts IRIG AC or DC time in
  - + Time tags incoming PCM minor frames
  - + Provide IRIG time to the PC
- Supported by third party data analysis software
- Microsoft® Windows® compatible driver software included

Applications

- Flight test instrumentation
- Data analysis
- Data archival

Overview

The RMDS-500S combines the functions of RF Receiver, Demodulator, Bit Synchronizer, Data Decommutator and Simulator into a single full size PCI Bus card. The card can be installed in a Desk Top PC for preflight or lab test.

The RF Receiver has L, S or C band coverage (select at build) with a frequency step size of 250 kHz. The Receiver performs a frequency translation from the RF frequency to a 70 MHz IF with Tier 2 phase noise performance. This IF signal is passed through one of five band pass filters (1.5, 5.0., 14, 20, and 40 MHz). The filtered 70 MHz is output from the Receiver and looped back into the 70 MHz IF Demodulator via an external MCX/MCX coax cable. AGC and AM outputs are also available for tracking applications.

The Demodulator input accepts the 70 MHz output from the Receiver or an external 70 MHz signal (-45 to 0 dBm) and can demodulate SOQPSK, PCM/FM, QPSK, OQPSK and BPSK. Digital baseband filtering is automatically adjusted based on modulation type and bit rate. The demodulated 70MHz IF signal is input to the Bit Synchronizer.

The Bit Sync has four inputs: the Demod output, TTL, RS422 and Analog. Data rates up to 40 Mbps (SOQPSK,QPSK and OQPSK), 20Mbps (PCM/FM and BPSK) and 30 Mbps (TTL, RS422 and Analog) can be processed. The Bit Sync performs clock reconstruction and data recovery. NRZ-(L/M/S) and BiØ-(L/M/S) data can be decoded and/or encoded. Data and clock outputs are provided via RS422 and TTL drivers.

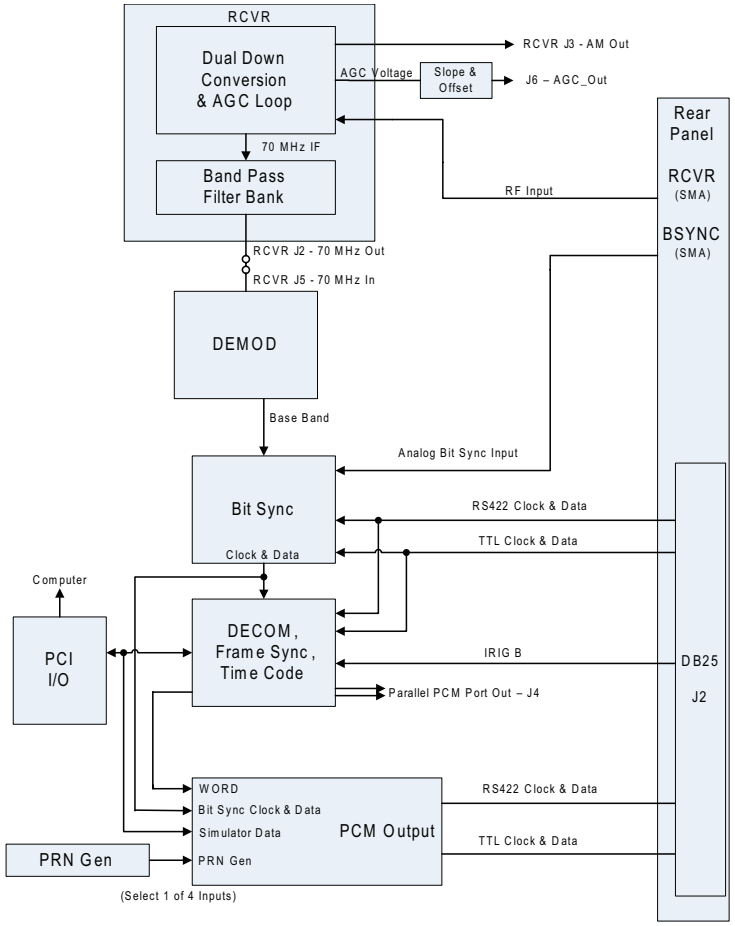
The Bit Sync output is also internally connected to the on card Data Decommutator. The Data Decommutator provides full IRIG Frame Synchronization and data Decommutation. The Decom accepts PCM data at rates up to 40 Mbps from either an external source or the on-card Bit Sync. The Decom external data and clock inputs are programmable for RS422 (120 ohms) or TTL (50 ohms).

Decommutated data words and frame time tags are made available via the PCI bus for analysis, archival, and monitoring. A Parallel Output Port provides the customer with the Frame Data and control signals. The customer can Cherry Pick any or all desired words from the Frame.

A DB25 connector is used for each the Parallel Output Port (top of card) and the I/O port (rear of card on rear I/O plate). The rear I/O plate is also equipped with two SMA connectors, for the RF Receiver and Analog Bit Sync input.

Additional Features

- Data Decommutator
  - + PCM input rate up to 40 Mbps
  - + Accepts Bit Sync output, RS-422 or TTL input data and clock
  - + Onboard minor frame time tag
- Data simulator
  - + Regenerate and playback archived PCM data
  - + Random number generator: PRN (15)
  - + Programmable up to 40 Mbps



RMDS-500S block diagram

Specifications

General

- Supply current: +5V @ 2A, +3.3V @ 1.4A, +12V @ 0.4A, -12V @ 0.1A
- Power consumption: 20W maximum
- Operating temperature: 0 to 45ºC (box ambient temp)
- Storage temperature: -20 to 85ºC

Dimensions and Mechanical

- Weight: 16 oz. (454 grams)
- Connectors: Standard PC, PCI connector and SMA RF connectors
- PCI card: Standard full size PCI card conforming to PCI spec r2.2 (Length=13.4”)

Status Indicators (over Bus)

- Bit slip indicator bit
- Flywheel indicator bit
- Decom in check state
- Decom in search state
- Clock present indicator
- Data present indicator
- Minor frame lock indicator
- Major frame lock (by software application)

Bit Synchronizer (Internal or External Access)

- Inputs: Demod, RS-422, TTL and analog (0.1 to 20 Vp-p, ±10V max)
- Analog impedance: 50, 75, Hi-Z
- Rate: Internal up to 40 Mbps; external up to 30 Mbps
- Input codes: NRZ-(L,M,S) BiØ-(L,M,S) RNRZ-L(F/R)
- Output codes: NRZ-(L,M,S) BiØ-(L,M,S) RNRZ-L
- BER measurement: Measures errors on a PRN (n=15) up to 255 errors counted over (up to) 255M clock periods per measurement

Data Decommutator (Input Data)

- Inputs: NRZ-L data and clock. RS-422 (120 ohm), TTL (50 ohm) or Bit sync
- Rate: Up to 40 Mbps
- Time source: IRIG AC, DC or free-run from time circuitry
- Sync pattern: Up to 32 bits programmable
- Sync mask: Any bit/s mask, programmable
- Lock strategy: Programmable for 1 to 16 good frames to acquire LOCK
- Drop lock: Programmable for 1 to 16 bad frames to drop LOCK
- Bit slip: 0, ±1, ±2, ±3 bits programmable
- Bits per word: 8 to 16 programmable
- Time: Time tagged on each minor frame, with one microsecond resolution
- Minor frame length: Up to 1024 words per minor frame
- Major frame length: Up to 256 minor frames per major frame
- Major frame: Major frames are handled by PC application
- Major frame synch: SFID and sync bits
- SFID: Programmable at any word

Simulator/PCM Output

- PCM output port: Programmable bit rate up to 40Mbps, TTL and RS-422 with four (4) output modes:
  - Playback: Playback of stored files
  - Bit sync out
  - Word select: Any or all words from decom can be steered to PCM output
  - Random Number Generator: PRN (15)
- Parallel output port: Provides 16 bit frame word data and all control signals necessary to cherry pick any or all words from frame
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70 MHz Demodulator

- Input level: -45 dBm to -0 dBm
- Damage free level: +20 dBm
- Modulation types: SOQPSK, PCM/FM, OQPSK, QPSK, BPSK
- Carrier sweep: User selectable 10 to 100kHz in 10kHz steps

IRIG-B Time Code Reader

- Input format: Accepts IRIG-B in either AC or DC forms
- IRIG-B AC in: 0.5V to 10V p-p with nominal ratio of 3:1
- IRIG-B DC in: TTL differential per RS-422
- Acquisition/tracking: Automatically synchronizes to an externally applied input. Will flywheel upon removal of input
- Time lock output: Provides TTL level lock signal indicating “LOCK” to the selected time source (IRIG-B AC or DC)

RF Receiver

- RF tuning range (select at build):
  - Lower L-band (1430 to 1540 MHz)
  - Upper L-band (1710 to 1850 MHz)
  - Extended S-band (2185 to 2485 MHz)
  - C-band (4400 to 5400 MHz)
  - Upper C-band (5925 to 6700 MHz)
- IF bandwidths: Five (5), 1.5, 5.0, 14, 20, 40MHz
- Tuner resolution: 250kHz
- Frequency accuracy: 0.001%
- Noise figure:
  - 2185 to 2485 MHz 6dB or better
  - 1430 to 1540 MHz 8dB or better
  - 1710 to 1850 MHz 8dB or better
  - 4400 to 5400 MHz 6dB or better
- Phase noise: Tier 2
- Input level: -95 to -10 dBm
- Damage free level: +10dBm
- 1st IF frequency: 480MHz
- 2nd IF frequency: 70MHz (output @ -10 dBM)
- AM output: 2Vp-p minimum (50 ohms)
- AGC output: Greater than -6.5 to +6.5 V (1 k ohm)
- AGC slope: +/-50, 20 and 10 dB/V
- AGC offset: -6.0 to +6.0 in 0.1V steps

Ordering Information

- RMDS-500S: RF Receiver, Demod, Bit Sync, Decom, Simulator, IRIG-B Time Code Reader
- Extra Mating Connector: Contact Curtiss-Wright for ordering information
- Programming software application: Included

Model Number Description