HRD-200B High-Rate Demodulator
Digital Signal Processing of X-Band EOS satellite reception

Orbital’s HRD-200B high-rate demodulator is a versatile digital receiver used in the reception of standard EOS-DB Satellite formats, down-linked in X-band. This high-quality Quorum Communications Digital Signal Processing (DSP) demodulator provides repeatable performance, long-term operation without component drift, and flexible multi-mode operation for current and future satellite formats.

Features

- 1U Rack Enclosure.
- FPGA based software defined demodulator
- SQPSK/QPSK/BPSK demodulation up to 40 MSPS
- SQPSK/QPSK/BPSK BER performance within 0.2 dB of theoretical, typical
- Hardware Viterbi decoding for FEC Encoded downlinks
  - Supports single and dual channel decoding
- 720 MHz RF input
- -60 dBm to 0 dBm input range
- USB (optional), RS-422, LVDS, and 50 ohm TTL clock and NRZ data outputs
- Ethernet and USB (optional) control for setup, tuning, mode selection, and status
- 2 line, 20 character LCD display for status and signal level readout
- Displays estimated received Eb/No
- Variable root raised-cosine filters (RRC)
- Demodulates the following satellites X-Band downlink provided on 720MHz IF
  - Terra, Aqua, NPP, JPSS1, FY3-MPT, and Oceansat 2 (optional) satellite reception

Applications

- Demodulation of EOS satellite signal formats
- Aqua, Terra, NPP, JPSS1, FY3-MPT, and Oceansat 2 (optional) satellite reception

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**HRD-200B High-Rate Demodulator**

## Specifications

### RF

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Frequency</td>
<td>720 MHz</td>
</tr>
<tr>
<td>Frequency Tuning Step Size</td>
<td>Fixed 720 MHz</td>
</tr>
<tr>
<td>Input Dynamic Range</td>
<td>-60 to 0 dBm nominal</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50 ohms</td>
</tr>
<tr>
<td>Image Rejection</td>
<td>&gt;60 dB</td>
</tr>
<tr>
<td>IF Frequency</td>
<td>140 MHz</td>
</tr>
<tr>
<td>IF Bandwidth (SAW Filter)</td>
<td>57 MHz</td>
</tr>
<tr>
<td>Signal Strength (RSSI) Output</td>
<td>0.5 to 3 VDC, 30mV/dB nominal</td>
</tr>
</tbody>
</table>

### Demodulator (DSP)

- **Demodulator Modes**: SQPSK, QPSK, BPSK
- **Demodulator Implementation Loss**: < 0.2 dB at 10E-6 BER (QPSK/BPSK), typical
- **Baseband Filters**: Root Raised Cosine (RRC), variable α

### Data

- **Supported Symbol Rates**: 1 - 40 MSPS
- **Convolutional Decoding**: Viterbi rate 1/2, single and dual channel

### Interface

- **RF Input / IF Test Port**: Female Type N
- **Control Interface**: Ethernet / USB
- **Control Interface Connector**: Ethernet / RJ45
- **USB**: USB Type B
- **Data / Clock Interface**: RS-422, LVDS, and 50 ohm TTL
- **Data / Clock Interface Connector**: 50 ohm TTL - SMA female
- **RS-422, LVDS Outputs**: 15p Female Subminiature D

### Electrical, Mechanical, and Environmental

- **Input Voltage Frequency**: 100-240 VAC, .5A max, 50/60Hz
- **Input Power Connector**: NEMA Socket
- **Power Consumption**: 120VAC x 0.247amp = 29.64watts
- **Operating Temperature**: 0-50° C (32-122° F) non-condensing
- **Size**: 19” rack standard, 1U, ~25cm (10”) deep
- **Support**: Fixed rear side rails
- **Weight**: 4.1 kg (9 lbs)

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Prices and specifications are subject to change without notice.

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