High-Rate Receiver 800

For remote sensing and Earth observation

High-rate reception for the small-satellite market

- Multi-mission
- Small-Sat/Cube-Sat ready
- Reliable and secure
- Innovative
- Fully upgradeable

From the world leader in Earth Observation ground systems, the Viasat High-Rate Receiver 800 provides high-speed demodulation and decoding of wideband transmissions at X-band. Supporting both the emerging small-satellite market and the legacy large-satellite market, a single receiver can provide multi-channel support up to 900 Mbps data rate. With two IF inputs, each with one demodulator, it is particularly suited for dual-channel or dual polarization satellites with wideband downlinks.

Built on the same hardware platform as the High-Rate Receiver 1200, the 800 is suited for lower-rate applications, but with the same exceptional performance. The receiver is designed to grow as the user's demands increase, whether it be with evolving small-satellite fleet designs or entirely new satellites and constellations. The unit is fully and remotely upgradeable to the 1200, when higher rates and more complex modulations are needed, providing a solid investment well into the future.

The entire ground station is more efficient since the receiver simplifies the station design and maximizes reliability. With user selectable IF frequency bands and multi-channel tuning, legacy station components can be eliminated and overall station design optimized. The high-reliability, FPGA/Linux-based design maximizes station reliability, ensuring images are received when it counts.

The receiver interfaces to popular image processors through ECL or 10 GbE connections and is typically used with a companion Viasat data processor to provide further data processing, data storage, and FTP and TCP forwarding.

The true multi-mission design allows it to be used in a variety of applications, from multi-satellite ground stations to satellite test-bench environments.

High-Rate Receiver 800 at-a-glance

HARDWARE ADVANTAGES

- Two IF inputs
- One demodulator per IF
- Test modulator
- 900 Mbps total throughput
- Advanced coding
- Adaptive equalization
- Compact 2U design

OPTIMIZES SYSTEM DESIGN

- User selectable input band
- Tunable IF frequency
- Multi-mission design

USER FRIENDLY

- All web GUI design
- Intuitive JSON interface

SECURITY

- Hardware-based design
- Linux-based M&C

RELIABILITY

- Non-PC based
- Redundant power supplies
- User serviceable fans
- MIL-STD-810 tested

OPTIONS

- VDP processor/storage
- LVDS or CML output
- Customized waveforms

High-Rate Receiver 800

MODULATIONS AND RATES

Modulations	BPSK, QPSK, OQPSK, 8PSK
Symbol rates	7.5 to 150 MBd x 2 channels
Baseband interfaces	› Dual 10 GbE › ECL, data/clock interface
Data rates	7.5 to 450 Mbps x 2 channels
Pulse shaping filters	Root-raised cosine (0.2 to 1.0), Unshaped (sinc spectrum/I&D)

FEC

Convolutional/Viterbi	CCSDS r=1/2 (131.0-B)
› **Puncturing**[1]	2/3, 7/8 (131.0-B)
4D-8PSK-TCM	All CCSDS rates (401.0-B)
Reed-Solomon	CCSDS-223, -239 (131.0-B); DVB-S-239 (ETSI EN 300 421); Intelsat-235 (IESS-308)
› **Shortening**	0 to 32
› **Interleave type**	CCSDS; Convolutional
› **Interleave depth**	1 to 16

FEC THROUGHPUT

BPSK	› Uncoded: 150 MBd › Reed-Solomon: 150 MBd
QPSK AND OQPSK	› Uncoded: 150 MBd › Convolutional/Viterbi: 150 MBd › Reed-Solomon: 150 MBd
8PSK	› Uncoded: 150 MBd › 4D-8PSK-TCM: 150 MBd › Reed-Solomon: 150 MBd

ADDITIONAL FRAME PROCESSING

Randomization	CCSDS, DVB-S, Intelsat, WorldView
Primary framing layer	CCSDS, DVB-S, Intelsat
Secondary framing layer	Asynchronous
Frame length	16 to 4096 bytes
Advanced data processing, recording, and TCP/IP data distribution	Available with Viasat Data Processor (VDP)[2]

OTHER

Size	19 × 3.5 × 21 in (EIA rack-mountable)
Weight	≤15 kg
Certification	CE

ADDITIONAL FEATURES

Receive equalization	› Static tilt compensation › Digital adaptive equalization
Built-in Test	
› **Bit error rate tester**	Transmit and receive; 2^{23}-1, 2^{15}-1, 2^{11}-1, 2^{9}-1 PRBS (ITU-T O.150) and other sequences
› **Link reporting**	Es/N0, offsets, decoder and frame processing statistics
› **GUI**	Constellation, spectrum, digital equalizer display
› **IF loopback**	Internal loopback without cable changes
› **TX noise generator**	AWGN with calibrated Es/N0 (0 to 30 dB)
Baseband data metadata	Time-tagging, frame quality information

INTERFACES

IF signal	
› **Connector**	SMA female
› **720 MHz band frequency**	720 ± 200 MHz; tunable
› **1200 MHz band frequency**	1200 ± 400 MHz; tunable
› **2400 MHz band frequency**	2400 ± 750 MHz; tunable
› **TX signal level**	–50 to 0 dBm
› **RX receive level**	–50 to –10 dBm
Baseband data	
› **Protocol**	› ECL (SMA) › 10G Ethernet (SFP+)
› **Optional Protocols**[1]	CML (SMA), LVDS (SMA/RJ45/D-SUB)
› **Data format**	Framed or unframed; with metadata
Monitor and control	
› **Remote connector**	› 10/100/1000 Ethernet (RJ-45)
› **Remote protocol**	JSON-RPC over TCP/IP
› **Remote GUI**	Web browser
› **Local interface**	Front panel display
External reference input	10 MHz (SMA)
Mains power	90 to 264 VAC, 47 to 63 Hz; ≤300 W
Power supply redundancy	1:1; dual inputs

[1] Non-standard functionality, consult factory for availability

[2] Separate optional unit

Global headquarters
6155 El Camino Real, Carlsbad, CA 92009-1699, USA

Sales
TEL +1 888 842 7281 (US Toll Free)
+1 678 924 2400
EMAIL AS-Sales@viasat.com
WEB viasat.com/antenna-systems

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