



HyperSDRTM

Satellite Ground Station
Modem

Signal received. Performance proven.

The ultimate all-in-one satellite modem

YTTEK HyperSDR is an all-in-one SDR satellite ground station modem, integrating modulation, signal analysis, PCIe high-speed data transfer, and massive data storage in a single platform. Proven in space missions, it delivers up to 15 GHz frequency coverage and 2.25 Gbps throughput per channel for demanding space applications.

International satellite standards compliant

HyperSDR fully supports CCSDS 131.0-B-4, CCSDS 131.2-B-1, and the ETSI EN 302 307-1 DVB-S2 waveform for satellite broadcast.

Mission-proven performance. Risk-free reliability.

Trusted by the Taiwan Space Agency (TASA), HyperSDR has successfully received and decoded signals from TASA's FORMOSAT-5, and processed signals from NASA's Landsat-8 and Landsat-9, proving its reliability for mission-critical satellite communications.

15 GHz wideband coverage with X & Ku band support

HyperSDR supports a wide frequency range from 10 MHz to 15 GHz, covering X and Ku bands without extra up/down converters.

Applications

Satellite communication

Key features

- Fully CCSDS and DVB-S2 compliant
- Proven success in real-world space missions
- Ultra-wide frequency support up to 15 GHz
- Ultra-fast 2.25 Gbps throughput per channel
- 500 Msps RF recording for in-depth signal analysis
- SDR flexibility to adapt to future requirement changes

RF recorder for testing & validation

Featuring a 500 Msps RF recorder with up to 1,800 seconds of recording time, HyperSDR enables detailed signal evaluation, post-processing, and long-duration high-speed data analysis. This makes it an indispensable tool for ground station testing and satellite validation.

Specifications

RF parameters

Frequency range	10 MHz – 15 GHz
Bandwidth	400 MHz
No. of RF chains	2
TX output power	-50 to +10 dBm
RX receive power	-50 to +5 dBm
Modulations	BPSK, QPSK, OQPSK, 8PSK, 16APSK, 16QAM, 32APSK, 64APSK
Max baud rate	375 Msps per channel
Max throughput	2.25 Gbps per channel
Pulse shaping filter	SRRC, user-defined
NRZ type	NRZ-L, NRZ-M, NRZ-S, DNRZ

RF recorder

Down-convert to baseband I/Q raw data and recording to SSD

Max sample rate	10 MHz – 491.52 Msps
Max recording duration	30 mins @ 491.52 Msps (Varies by sample rate and SSD capacity)
SSD storage	4 TB NVMe SSD
NRZ type	NRZ-L, NRZ-M, NRZ-S, DNRZ

Frequency reference

Ports	1 INPUT / 1 OUTPUT
Frequency	10 MHz sine
Impedance	50 Ω

CCSDS 131.0-B-4

Modulation & channel coding combination

Uncoded	Without channel coding
Convolutional Code Only (CCSDS 131.0-B-4, Chapter.3)	Code rates: 1/2, 2/3, 3/4, 5/6, 7/8

Highly flexible, SDR architecture

Built on a software-defined radio (SDR) architecture, HyperSDR offers unmatched flexibility, adapting to future requirement changes without hardware modifications. Powered by FPGA and Linux, it delivers programmable capabilities for seamless integration.

Reed-Solomon Code Only (CCSDS 131.0-B-4, Chapter.4)	Interleave depths: I=1,2,3,4,5,8 Virtual bits: q=0-15 for (255,232), q=0-15 for (255,239)
Concatenated CC and RS (CCSDS 131.0-B-4, Chapter.5)	Any parameter combination of CC only and RS only
Turbo Code (CCSDS 131.0-B-4, Chapter.6)	Code rates: 1/3, 1/4, 1/6 Information block sizes: k=1784, 3568, 7136, 8920 Total 16 possible cases of combination of code rate and information block size
LDPC for TF (CCSDS 131.0-B-4, Chapter.7)	Basic LDPC code rate: 7136/8160 AR4JA LDPC code rate: 1/2, 2/3, 4/5 AR4JA LDPC code information block size: 1024, 4096, 16384 - Total 10 possible cases - One basic LDPC - Nine AR4JA LDPC combination of code rate and information block size
LDPC for SMTF (CCSDS 131.0-B-4, Chapter.8)	Basic LDPC code rate: 7136/8160 AR4JA LDPC code rate: 1/2, 2/3, 4/5 AR4JA LDPC code information block size: 1024, 4096, 16384 - Total 10 possible cases - One basic LDPC - Nine AR4JA LDPC combination of code rate and information block size

CCSDS 131.2-B-1

Modulation & channel coding combination

Standard	CCSDS 131.2-B-1
Modulation (S2)	QPSK, 8PSK, 16APSK, 32APSK, 64APSK
Channel code	SCCC
FRAME and Coding rate	Support all ACM
Pilot symbols	On / Off
Scrambling	PL scrambler, gold code n = 0 - 133440
Roll-off (S2)	User-defined
Pulse shaping	SRRC, user-defined

DVB-S2

Modulation & channel coding combination

Standard	ETSI EN 302 307-1 (DVB-S2)
Modulation (S2)	QPSK, 8PSK, 16APSK, 32APSK
Inner code	LDPC (64 800 / 16 200 bits)
Outer code	BCH (error floor suppression)
FECFRAME	Normal = 64 800 bits, Short = 16 200 bits
Code rates (S2)	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Pilot symbols	On / Off, 36-symbol pilot blocks
Scrambling	PL scrambler, gold code n = 0 - 262141
Roll-off (S2)	User-defined
Pulse shaping	SRRC, user-defined



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