



# HyperSDR<sup>TM</sup>

## Satellite Ground Station Modem

### Signal received. Performance proven. Successfully received signals from TASA's Formosat-5 mission

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YTTEK HyperSDR is a high-speed, SDR-based satellite ground station modem with a proven track record in real-world space missions. Featuring ultra-wide frequency coverage up to 15 GHz and blazing-fast throughput of 2.4 Gbps per channel, HyperSDR delivers the speed, stability, and reliability essential for the most demanding space applications.

#### **Mission-proven performance. Risk-free reliability.**

Trusted by Taiwan Space Agency (TASA), HyperSDR successfully received and decoded signals from TASA's Formosat-5 and processed signals from the NASA's Landsat-8 and Landsat-9. Its field-proven performance makes it the reliable choice for mission-critical satellite communications.

#### **15 GHz wideband coverage with X & Ku band support**

HyperSDR supports a broad frequency range from 10 MHz to 15 GHz, covering X and Ku bands without extra up/down converters. With dual RF channels and 2.4 Gbps throughput per channel, it delivers high-speed signal transmission, ideal for space science and earth observation missions.

#### **Applications**

Satellite communication

#### **Key features**

- Proven success in real-world space missions
- Ultra-wide frequency support up to 15 GHz
- Ultra-fast 2.4 Gbps throughput per channel
- 500 Msps RF recording for in-depth signal analysis
- SDR flexibility to adapt to future requirement changes
- Fully CCSDS compliant

## RF recorder for testing & validation

Featuring a 500 Msps RF recorder with up to 600 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, ensuring seamless real-world integration.

## 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
Maximum baud rate	375 Msps
Maximum throughput	2.4 Gbps
Pulse shaping filter	SRRC, user-defined
NRZ type	NRZ-L, NRZ-M, NRZ-S, DNRZ

### Frequency reference

Ports	1 INPUT / 1 OUTPUT
Frequency	10 MHz sine
Impedance	50 $\Omega$

### Channel coding combination

Uncoded	Without channel coding
Convolutional Code Only	Code rates: 1/2, 2/3, 3/4, 5/6, 7/8
(CCSDS 131.0-B-4, Chapter.3)	
Reed-Solomon Code Only	Code Supported code rates: (255,232), (255,239)
(CCSDS 131.0-B-4, Chapter.4)	
	Interleave depths: I=1,2,3,4,5,8
	Virtual bits: q=015 for (255,232), q=015 for (255,239)

## 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.

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, 1/3, 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  <ul style="list-style-type: none"> <li>Total 10 possible cases</li> <li>One basic LDPC</li> <li>Nine AR4JA LDPC combination of code rate and information block size</li> </ul>
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  <ul style="list-style-type: none"> <li>Total 10 possible cases</li> <li>One basic LDPC</li> <li>Nine AR4JA LDPC combination of code rate and information block size</li> </ul>



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