CELESTIA | C-STS

DATA RECEPTION & PROCESSING FOR OPTICAL GROUND STATIONS

The O3K Modem provides reception and processing functionality of digital bitstreams output by free-space optical (FSO) receiver modules, capable of receiving data rates of at least 2Gbps (designed to be scalable to 10Gbps).

The O3K Modem is ideal for use in FSO terminals, optical communication ground stations and for use in experimental setups for optical communication.

Optical Digital Converter

The O3K Modem processing is based on the (currently evolving) CCSDS O3K recommendations. However, all processing can be adapted as needed by C-STS for a specific application.

The baseline support of the O3K Modem is for the Reed-Solomon based CR=223/255 FEC. This can be expanded to support the LDPC based schemes upon request.

The O3K Modem interfaces directly to the optical detector, providing data interfaces via SMA, power for the optical detector, and serial control/status.

KEY FEATURES

General
- CCSDS O3K Optical Digital Converter
- CCSDS O3K physical to frame layer processing
- RS based FEC with expansion for LDPC
- Direct connection to FSO terminal (data, power and control/ status interfaces)
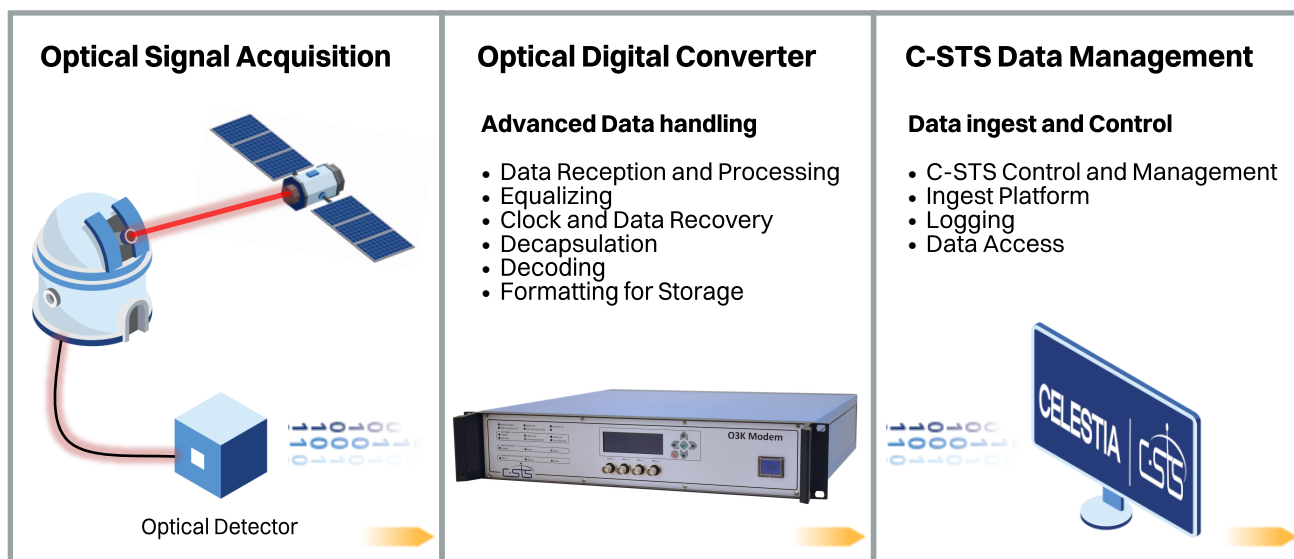- Gigabit LAN (Control and Monitoring) & 10Gbit LAN for Data Offloading

Data Processing and Conversion
- Hardware processing of digital bitstream from FSO receiver
- Bitstream Decoding, FEC Decoding and Data Extraction
- Supports 100Mbps, 1Gbps and 2Gbps with expansion to 10Gbps (and more!)
- High-Speed Digital Interface to FSO Receiver (using SMA)
- Internal BER (PRBS) data generation, frame processing and BER testing

Customer Specific & On-Demand Features
- Data rates below 100Mbps, above 2Gbps and custom data rates.
- Custom on-line and offline data processing and error checking.

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OPTICAL DIGITAL CONVERTER

Optical Signal Acquisition

Optical Detector

Optical Digital Converter

Advanced Data handling

- Data Reception and Processing
- Equalizing
- Clock and Data Recovery
- Decapsulation
- Decoding
- Formatting for Storage

C-STS Data Management

Data ingest and Control

- C-STS Control and Management
- Ingest Platform
- Logging
- Data Access

The O3K Modem receives data from the optical detector, performs the appropriate layers of synchronization, error correction, de-slicing etc. and outputs the resulting frames via 10G LAN TCP-IP. It includes a test generator that can be used to generate O3K compliant data to an optical transmitter thus allowing closed/loop testing on the ground.

The 2U 19"Unit that can be used as a stand-alone unit connected directly to a customer's ingest/processing system or C-STS can provide a commercial server platform for data storage to local disks (SSD or HDD).

The O3K Modem can be upgraded with custom data processing (such as forward error correction decoding, protocol handling, deciphering, etc.) to support the needs of the program/project.

A low-latency TCP/IP stack directly within the hardware provides back-end independence, allowing commercial servers with standard 10G ethernet cards to be used. The O3K Modem is provided with back-end software for control, monitoring, data storage /archiving and offline data processing (when required).

Interface to Detector	Electrical (Differential SMA)	Dimensions H x W x D	133 x 448 x 500 mm
Baud Rate	2 Gbit/s (extendable)	Weight	<15kg
Monitoring Interfaces	4 x BNC ports	Input Power Range	100 - 240VAC 50 - 60Hz
Control Interfaces	Gigabit Ethernet	Operating Temperature	+10°C to +40°C
Compatibility	CCSDS, Custom	Operating Humidity	30% - 85% (non-condensing)
10G TCP/IP Data Offload	SFP+ Optical or Copper	Storage Temperature	-10°C to +60°C
		Storage Humidity	Up to 85% (non-condensing)

Scan the QR code to access the C-STS website for all data sheets and more information

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