A-Series DOG-FE
Optical Modem Front-End

www.work-microwave.com

The A-Series is a family of next generation satellite modem platforms built on versatile FPGA- and software-based architecture. The Digital Optical Groundstation (DOG) suite of products is designed for optical communication up to multi-GHz bandwidths, supporting the full variety of space missions from LEO to Deep Space. Exceptional analog and digital engineering provides teleport-grade devices with future-proof expandability.

Through an all-IP structure, the platform supports both native network operation as well as data streaming over IP. Built-in protocol stacks support an increasing number of space data formats as well as streaming of transparent baseband data and synchronized symbols for user-defined processing and integration into virtualized infrastructures.

The **DOG-FE Optical Modem Front-End** is a digitizer to enhance the DOG-1 Multi-Mission Optical Modem. It samples multi-Gsps signals and provides the early stages of signal processing from symbol synchronization to LLR computation for Optical On-Off-Keying (O3K) and High-Photon-Efficiency (HPE) transmissions.

Key Features

- Multi-Mission support
- Hard-decision and soft-decision decoding
- Optical On-Off Keying (O3K)
- High-Photon-Efficiency (HPE) future upgradable extension
- CCSDS 141.0-B-x support
- CCSDS 142.0-B-x support
- O3K symbol rate up to 10 Gsps
- Customizable processing infrastructure for easy integration into large communication systems
- Flexible software architecture for easy extension and future virtualization of functionality
- Teleport-grade M&C capabilities for seamless integration into professional ground station systems
- **3 years warranty**

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RX Signal Specifications

Signal input:	Connector:	SMA female
	Input power level:	-70...0 dBm
	Max. gain control rate:	10 dB/s
Demodulation O3K:	Optical symbol rates:	100 Msps 1.25 Gsps 625 / 312.5 / 156.25 / 78.125 / 39.063 / 19.531 / 9.766 / 4.884 / 2.441 / 1.221 Msps 2 / 1 Gsps 500 / 250 / 125 / 62.5 / 31.25 / 15.625 / 7.813 / 3.906 / 1.953 Msps 10 / 8 / 5 / 4 / 2.5 Gsps ***w/ option DUAL10G***
	Symbol rate tolerance:	± 1000 ppm for rates < 1 Gsps ± 400 ppm for rates >= 1 Gsps all according to CCSDS 141.0-B-x and CCSDS 142.0-B-x ***Contact factory for other symbol rates.***
Demodulation HPE: ***w/ license HPERX***	Optical symbol rates:	8 / 4 / 2 Gsps ***w/ option DUAL10G*** 1 Gsps 500 / 250 / 125 / 62.5 / 31.25 / 15.625 / 7.813 / 3.906 / 1.953 Msps
	Symbol rate tolerance:	± 1000 ppm for rates < 1 Gsps ± 400 ppm for rates >= 1 Gsps all according to CCSDS 141.0-B-x and CCSDS 142.0-B-x ***Contact factory for other symbol rates.***

Specifications are subject to change

Data Processing and Device Specifications

Device connectors:	Data interface:	1x QSFP+
	M&C network:	1x Ethernet RJ-45, 10/100/1000Base-T auto sensing
	10 MHz reference input:	BNC female, 50 Ohm ***w/ option RI***
Data output:	LLR interface:	QSFP+
	Data format:	8-bit LLR values, frame synchronized, 64b/66b encoded
Frontpanel interface:	LCD-Display 2x40 characters, 4 cursor keys, 4 function keys VFD-Display 2x40 characters, 4 cursor keys, 4 function keys ***w/ option EXT***	
Remote monitoring and control:	Protocol: Connection:	SNMP UDP/IP over Ethernet/RJ-45 or in-band via satellite link
	Protocol: Connection:	HTTP web browser interface TCP/IP over Ethernet/RJ-45 or in-band via satellite link
Temperature range:	Operating:	0°C...50°C -30°C...60°C ***w/ option EXT***
	Storage:	-30°C...80°C
	Relative humidity:	< 95% non condensing
Mains power:	Input:	100...240 V AC nominal, 90...264 V AC max, 50...60 Hz
	Consumption:	65 VA / 45 W typical
	Connector:	IEC C14
	Fuse:	2x 3.15 A time-lag fuse
Dimension and weight:	483 x 44 x 505 mm³ (WxHxD), 1 RU 19" up to approx. 10 kg depending on device type	

Specifications are subject to change

Order information:

DOG-FE	Optical Modem Front-End

Hardware options:

Hardware options have to be defined with the order and are not field-upgradable. Not all device types may support all combinations. Contact factory with specific requests.

RI	external 10 MHz reference input
EXT	extended operating temperature range of -30°C...60°C
DUAL10G	Dual channel high rate device version

License based functions:

License based functions are field-upgradable by uploading a license file to the device.

HPERX	HPE downlink processing