ST Engineering

OM6000
OEM SATELLITE MODULATOR BOARD

Description

Being fully compliant with the S2 Extensions standard for Digital Video Broadcasting over Satellite (DVB-S2X), the OEM satellite modulator board OM6000 offers the following advantages:

- Backward compatible to the former NTC/7029, NTC/7039 and NTC/7139 OEM modulator boards in form-fit-function
- IF or L-band output selectable by software command
- Clean Channel Technology® compliant
- Support for all S2 Extensions modulation schemes and DVB-S, DVB-DSBNG and DVB-S2 standards
- Addition of a simple ASI interface
- RF Carrier ID compliant (fully managed by the OM6000)

ST Engineering iDirect's Satellite OEM Modulator board Supports S2 Extensions and ModCods up to 64APSK and is software upgradeable to the DVB-S2X standard.

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This product provides the OEM integrator a smooth upgrade path starting as a drop-in replacement for current functionality (Form Fit Function backward compatible with NTC/7029, NTC/7039 and NTC/7139) and moving towards Newtec state of the art technology features. A new logical JSON-RPC based management interface is introduced, replacing the legacy RMCP protocol. This interface can be accessed through a couple of physical interfaces: serial as used for RMCP or serial and Ethernet as used for JSON-RPC, depending on the interposer board.

The board has been designed for both DVB contribution and distribution. It handles symbol rates from 0.05 up to 72 Msps applicable to all modulation schemes compliant to DVB-S2X (acc. DVB document A83-2, excluding VL-SNR), the EN 302307 DVB-S2, EN 301210 DVB-DSNG and EN 300421 DVB-S Standards and S2 Extensions.

Both the high data rate (72 Msps) and the choice of modulation standards and modulation schemes allow it to work in full compliance with the most recent commercially available IRD's and demodulators.

The user can upgrade different rate capabilities after ordering the corresponding license file.

The integrated DVB modulator provides a comprehensive range of monitoring and control functions. It has a built-in PRBS pattern generator. When used with Newtec demodulators, this feature enables link testing without additional test equipment.

The R1.1 release has a dedicated interposer board for backward compatibility. Its 50-pin connector guarantees backward compatibility with previous generations of boards but excludes the use of the ASI and Ethernet interfaces. The flat cable is attached to the interface board and has a female 50-pin header. The RMCP protocol supports monitoring & control as well as license upgrades. The JSON-RPC protocol is needed for firmware upgrades.

Applications

- For use in MPEG encoders with integrated modulators
- Up to 72 Msps data rate transmission for satellite services such as broadcast, distribution or contribution (including Digital Satellite News Gathering) of Digital TV (UHDTV/HDTV/SDTV) signals

Key Features

- Single Transport Stream modulator with optional MPE encapsulator
- Supports S2 Extensions and ModCods up to 64APSK and the new DVB-S2X standard
- Baud-Rate range: 0.05 – 72 MBaud
- Frequency ranges: 950-2150 MHz (extended L-band) and 50-90 and 100-180 MHz (IF-band), selectable by a software command – see options list
- Best in class spectral purity
- RF Carrier ID (DVB-CID) – see options list
- Legacy RMCP interface for backward compatibility or JSON-RPC alike management interface
- On-board reference

For more information please contact your Sales Representative at **sales@idirect.net.**

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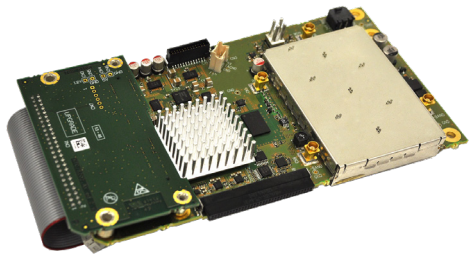

Interfaces

Traffic Interfaces:

188-byte Transport Streams	
Clock offset	< 30 ppm
Baseband Synchronous Parallel (DVB-SPI) Interface:	
Signals:	IFCLK, IFDATA[7:0], IFCE, IFSYNC
Connector:	IDC HE-10, 50-pin female (interposer board dependent)
Interface rate:	50 kbps – 216 Mbps (FEC and interface dependent)
ASI input (if supported on interposer board)	

L-Band Output:

Connector	MCX(F) - 50 Ohm
Frequency	950 - 2150 MHz in steps of 10 Hz
Level	-35/+5 dBm (+/- 2dB) in 0.1 dB steps
Return loss	> 15 dB
Stability	+/-0.2 dB/10°C
1-dB compression point @ output:	>+20 dBm
Switchable 10 MHz reference output:	+3 dBm (+/- 3dB) mute <-100 dBm
Spurious performance	
Signal related:	better than - 70 dBc/4kHz over -35/ +5 dBm output range and >50 kBaud
Non-signal related	< - 80 dBc @ +5 dBm output
Mute	<-100 dBm
DC	switchable up to 600 mA/24 V with 1.5A current limiting Requires DC voltage input on 2-pin input connector

IF Output:

Connector	MCX(F) - 50 Ohm
Frequency	50 – 90 and 100 – 180 MHz in steps of 10 Hz
Level	-35/+5 dBm (+/- 2dB) in 0.1 dB steps
Return loss	> 16 dB @ 75 Ohm >20 dB @ 50 Ohm
Stability	+/-0.2 dB/10°C
1-dB compression point @ output:	>+20 dBm
Spurious performance:	
Signal related:	better than - 65 dBc/4kHz @ +5 dBm output level and > 50 kBaud
Non-signal related:	< - 80 dBc @ +5 dBm output
Mute	<-100 dBm

L-band Monitoring Output:

Connector	MCX (F) - 50 Ohm
Return loss	(50 Ohm) >14 dB
Frequencies	transmit frequency (L-band output selected) or 1050 MHz (IF output selected)
Level	-45 dBm (+/- 5 dB)

External Reference Input:

Connector	MCX (F) - 50 Ohm
Frequency	1,2, 5 & 10 MHz
Level	-3 to +7 dBm

DC Voltage Input for DC on L-band Output

Voltage	up to 24 V
Current	up to 600 mA
Connector	2-pin (MOLEX 43650-201 Micro-Fit)

Internal 10 MHz Reference (VCTCXO)

Stability	
± 1.0ppm	at 25°C ± 2°C
± 2ppm	-30 to 75°C
± 1ppm	over the first year
± 3ppm	over ten years
Phase Noise	
10 Hz	< -100 dBc/Hz
100 Hz	< -125 dBc/Hz
1 kHz	< -140 dBc/Hz
10 kHz	< -149 dBc/Hz
100 kHz	< -153 dBc/Hz

Phase Noise (L-band and IF Output)

10 Hz	< -70 dBc/Hz
100 Hz	< -80 dBc/Hz
1 kHz	< -90 dBc/Hz
10 kHz	< -95 dBc/Hz
100 kHz	< -105 dBc/Hz
1 MHz	< -130 dBc/Hz

Symbol Rate (L-band and IF Output)

0.05 – 72 Msps

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Modulation

Supported Modulation Schemes and FEC

DVB-S - Compliant (EN 300421)	
Outer/Inner FEC:	Reed Solomon / Viterbi
MODCODS	
QPSK:	1/2, 2/3, 3/4, 5/6, 7/8
DVB-DSNG - Compliant (EN 302307)	
Outer / Inner FEC:	Reed Solomon / Viterbi
MODCODS	
8PSK:	2/3, 5/6, 8/9
16QAM:	3/4, 7/8
DVB-S2 (acc. ETSI EN 302 307 v1.2.1)	
Outer/Inner FEC: BCH/LDPC	BCH/LDPC
52 MODCODs (short & normal frames)	
QPSK:	from 1/4 to 9/10
8PSK:	from 3/5 to 9/10
16APSK:	from 2/3 to 9/10
32APSK:	from 3/4 to 9/10
Single Transport Stream/data Input interface	
BaseBand Shaping (roll-off 0.2, 0.25, 0.35)	
S2 Extensions	
Outer/Inner FEC:	BCH/LDPC
54 MODCODs	
QPSK:	from 45/180 to 144/180
8PSK:	from 80/180 to 150/180
16APSK:	from 80/180 to 162/180
32APSK:	from 100/180 to 162/180
64APSK:	from 90/180 to 162/180
29 Linear MODCODs	
8PSK-L:	from 80/180 to 120/180
16APSK-L:	from 80/180 to 162/180
64APSK-L:	from 90/180 to 162/180
DVB-S2X - Compliant (DVB A83-2)	
Outer/Inner FEC:	BCH/LDPC
53 MODCODs (normal frames)	
QPSK:	from 1/4 to 9/10
8PSK:	from 3/5 to 9/10
16APSK:	from 26/45 to 9/10
32APSK:	from 32/45 to 9/10
64APSK:	from 11/15 to 5/6
128APSK:	3/4; 7/9
256APSK:	32/45; 3/4
13 Linear MODCODs (normal frames)	
8APSK-L:	5/9; 26/45
16APSK-L:	from 1/2 to 2/3
32APSK-L:	2/3
64APSK-L:	32/45
256APSK-L:	29/45 to 11/15

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41 MODCODs (short frames)	
QPSK:	from 11/45 to 8/9
8PSK:	from 7/15 to 8/9
16APSK:	from 7/15 to 8/9
32APSK:	from 2/3 to 8/9
BaseBand Shaping (roll-off 0.05, 0.10, 0.15)	

Not in scope: the VL-SNR Header MODCODs Also excluded are: Super-frame, Extended PL HEADER for wide-band mode and Channel bonding acc. table 1 of DVB Document A83-2

Clean Channel Technology

Roll-off :	5%, 10%, 15%, 20%, 25%, 35% for all modulations

Generic

Monitoring and Control Interfaces:

Serial: Async serial TTL link, even parity, 1 start bit, 1 stop bit, Baudrate 115.2 kBaud, RMCP v2 protocol / JSON-RPC protocol
Ethernet (if available on the interposer board) for JSON/RPC protocol

Control

Physical layer pilot insertion
FEC frame type (normal or short)
Physical layer scrambler signature
Test generator
Interface bitrate and symbol rate
Modulation standard
FEC rate and modulation
Spectrum inversion
Output frequency and level
Transmit ON/OFF

Monitoring

Occupied bandwidth
Output level
Clock offset
Transmit status
Device temperature

Alarm - A full set of alarm monitoring,among others:

General device
PLL lock
Input signal
Synthesizer, etc.

Physical

Mechanical

Form factor	Single PCB
Dimensions	170x89 mm including interface board with cable

Tempurature

Operational	0°C to 60°C @ airflow 1.5 m/s (17CFM)
Storage	-40° to +70°C (-40°F to +158°F)

Humidity

Operational	5% to 85% non-condensing

Input Voltage Requirements

	5 V/1.5 A and 12 V/0.6 A
Power dissipation:	<15 W