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)
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.

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.
## 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
**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

- 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
- 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

**Clean Channel Technology**

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

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**Generic**

**Monitoring and Control Interfaces:**

- Serial: Async serial TTL link, even parity, 1 start bit, 1 stop bit, Baudrate 115.2 kBaud, RWCP 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

**Temperature**

- 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

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