

## SATELLITE UPLINK - MICROWAVE LINK DIGITAL MODULATOR - DVB-S / DVB-S2 / DVB-DSNG

The high quality, professional and cost-effective solution

### DVB-S2 / DVB-S / DVB-DSNG



The "DME 5000" is a high quality, professional, flexible and truly cost-effective modulator for digital satellite uplinks and terrestrial microwave links.

#### Applications

- Digital satellite Uplinks for Distribution, Contribution, DSNG / ENG Mobile news gathering;
- Digital Microwave Links (Mobile and STL);

#### Features

- Compliant to: **DVB-S** standard ETSI EN 300 421; **DVB-DSNG** standard ETSI EN 301 210; **DVB-S2** standard ETSI EN 302 307 for Broadcast and DSNG applications. Supports all modulation schemes (QPSK, 8PSK, 16APSK and 32APSK), all code rates (both mandatory and optional), CCM (Constant Coding and Modulation), normal FEC-

frame, Dummy frame Insertion, all roll-off factors and null packet deletion/insertion

- Synthesized IF output @ 70MHz or "L" Band
- Digital **non linear pre-corrector** to correct the amplitude and phase vs. level distortions generally introduced by the high power amplifiers (HPAs) so increasing output power, MER and shoulders performances
- 2 Transport Stream inputs with manual or automatic near seamless switching
- Automatic Transport Stream adaptation with PCR time re-stamping
- User-friendly local control with front panel LCD display and keypad
- RS485; Ethernet 10/100 Base-T (SNMP and web server support) remote control interface option.

Featuring modular construction - with easily removable boards and modules, the unit exploits the advantages of SMD technology to achieve high reliability and comprehensive system flexibility - all at reduced size.

The modulator board, the key component of the DME5000 is based on a single FPGA chip and is compliant with the ETSI **DVB-S** standard EN 300 421; **DVB-DSNG** EN 301 210; **DVB-S2** EN 302 307 for Broadcast and DSNG applications.

A key function of the modulator is the **digital non-linear pre-correction** with the possibility to store and recall of several setups. This function allows to correct the amplitude and phase vs. level distortions introduced by the high power amplifiers (HPAs), so increasing output power, MER and shoulders performances.

Two input interfaces are available in order to feed the modulator:

- 2 ASI interfaces, capable of near seamless switching
- GbE interface input for MPEG TS over IP (ProMpeg COP#3 rel.2) (optional)

The Modulator can be supplied with IF 70MHz or “L” band synthesized output frequency.

Features also include a 10MHz reference clock and power supply for the BUC (Block Up Converter) -optional

Optionally, a “oven” high-stability 10 MHz reference oscillator locked to GPS signal can also be supplied.

The DME5000 combined with a BUC and a parabolic antenna for the chosen frequency

range (usually Ku band – 14 to 14.5GHz – of C band 5.85 to 6.43GHz), makes a complete satellite uplink solution. Another application of the DME5000 is as modulator for synthesized terrestrial digital microwave links.

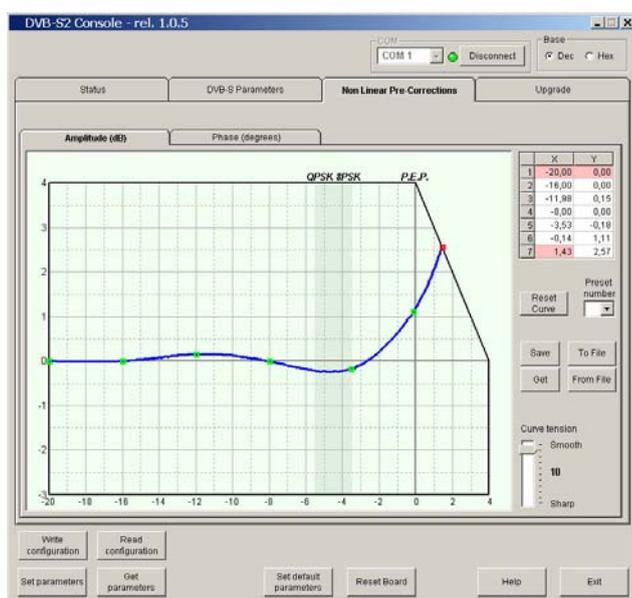
The innovative interface, management and control board of the equipment is built on a 32 bit micro controller.

Key characteristics are:

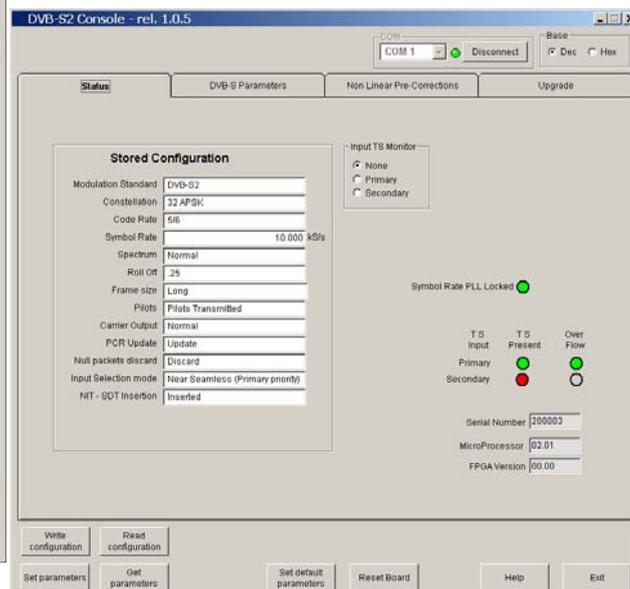
- LAN interface (Ethernet 10/100 Base-T – RJ45 connector) in addition to RS485
- User friendly web server securely protected with username / password (with 3 different control levels) able to read and set all equipment parameters for local and remote management and diagnostics (TCP/IP protocol)
- SNMP AGENT able to send alerts (traps), read equipment parameters (e.g. the modulator status through the “get” command), manage the equipment (e.g. to reset through the “set” command)
- Control board software (firmware) remotely upgradeable
- Event logger (register all alarms, switch-on, faults, etc. with date and time log) with the capacity to store over 5,000 events that can be downloaded through the embedded web server.
- e-mail client to automatically notify, via e-mail (to pre-registered e-mail addresses) variations in the alarm conditions.

A graphic display on the front panel allows onsite control and adjustment of the most important parameters.

A screenshot of the DVB-S2 configuration software



A screenshot of the DVB-S2 Console “non-linear pre-correction”



## Modulator

### DIGITAL MODULATOR

Modulation scheme:	QPSK (EN300 421 DVB-S) QPSK, 8PSK, 16QAM (EN 301 210 DVB-DSNG) QPSK, 8PSK, 16APSK, 32APSK (EN 302 307 DVB-S2)
Output frequency options:	50 to 90MHz or 950 to 1750MHz in 10KHz steps (option: smaller frequency steps)
L band local oscillator side band phase noise (typical values):	@10Hz offset: -65dBc/Hz @1KHz offset: -84dBc/Hz @100KHz offset: -95dBc/Hz @1MHz offset: -118dBc/Hz
Frequency reference clock:	Internal: 10MHz (stability +/- 5x10 <sup>-7</sup> ) available also for BUC reference Options: higher stability, external reference, GPS locked reference
Output level:	0dBm (Typ. adj. range: -30 to +5dBm – option: different output levels)
Output impedance and connector:	50 Ω “N” socket (option: 75 Ω)
Input Transport Stream Bit Rate:	Up to around 100 Mb/s (according to modulation scheme, Symbol Rate and Code Rate settings)
Symbol Rate:	200KS/s to 30 MS/s in 1KS/s steps
Encryption option:	BISS1/E, PL (Physical Layer scrambler with Gold Code insertion - DVB-S2 only)
Multistream option (DVB-S2 only):	Supported up to 6 TS inputs
Baseband Shaping (roll-off), forward error correction (FEC) encoding and data scrambling:	According to the standard (EN 300 421 DVB-S; EN 301 210 DVB-DSNG; EN 302 307 DVB-S2 for Broadcast and DSNG applications)

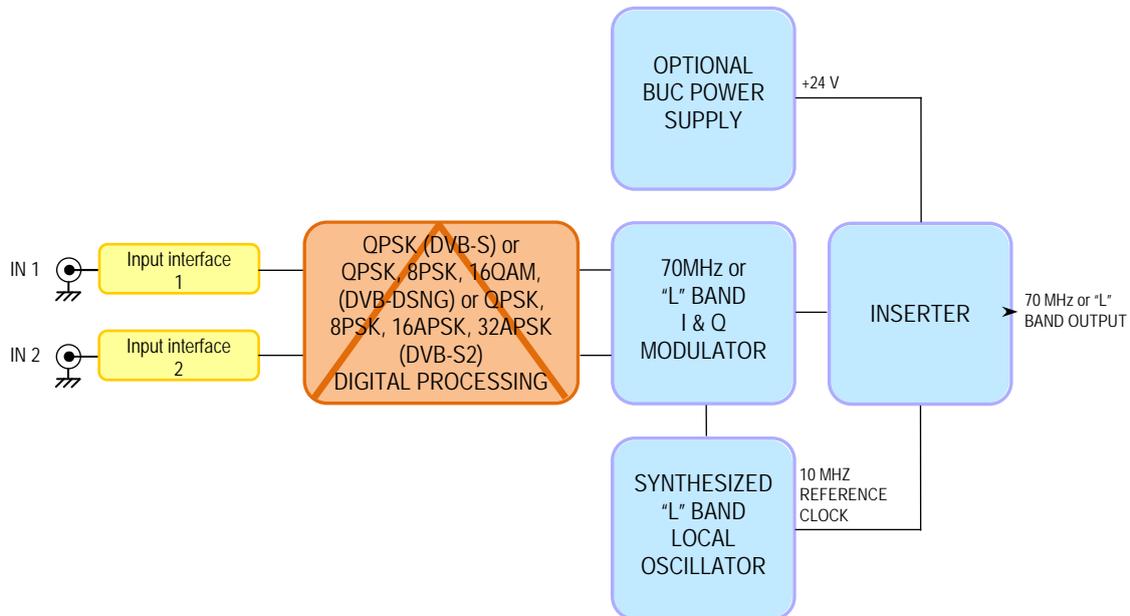
## Modulator input interface

2 ASI inputs - HP (high priority), LP (low priority):	MPEG/DVB Transport Stream - 75Ω BNC Female - 270MBit/s ±100ppm
Optional GBE (video over IP):	MPEG Transport Stream over IP reception (encapsulation as per Pro-MPEG Code of Practice #3 release 2)

## General specifications

Power supply:	85 to 264Vac 50/60 Hz (Different power supplies available on request)
Remote control interface options:	RS485; Ethernet 10/100 Base-T (SNMP and web server support)
Optional BUC power supply:	24V 1.9A
Housing:	Rack drawer 19” 1U
Operating temperature range:	0 to 45° C.

## DME5000 Digital Modulator general block diagram



## ORDERING INFORMATION

DME5000 - DVB-S/S2/DENG Modulator with 70 MHz output

DME5000L - DVB-S/S2/DENG Modulator with L-band output (950-1750 MHz)

## AVAILABLE OPTIONS

OPT-GBE - Ethernet input (T.S. over IP)

OPT-BISS - BISS-1/E encryption

OPT-MST - Multistream support for DVB-S2 - up to 6 TS

OPT-10M - "Oven" high stability 10MHz reference oscillator, external reference, GPS locked reference

OPT-BPS - Power supply for BUC (24V 1.9A)

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All specifications contained in this document may be changed without prior notice.