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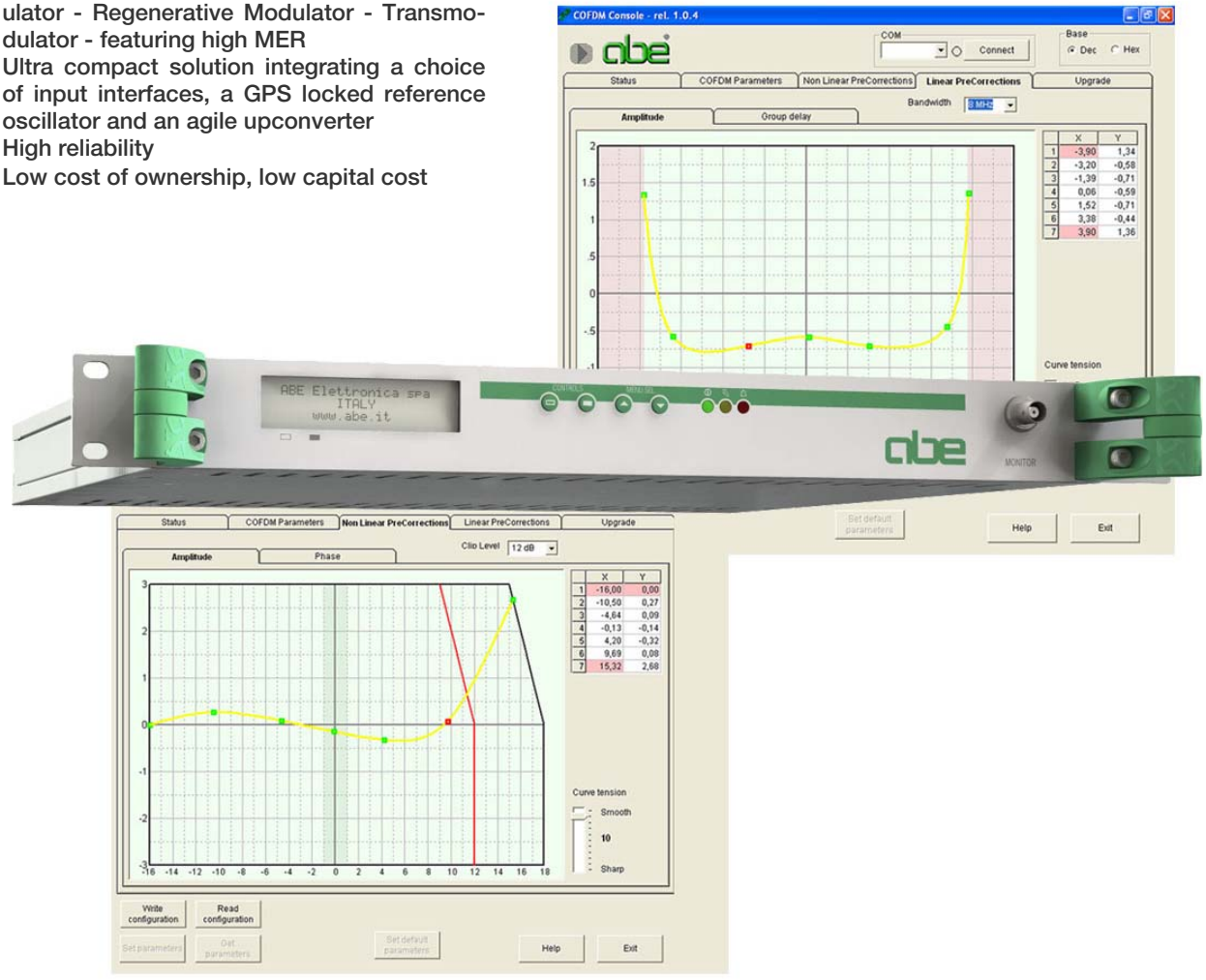
DVM 1000-T/H

DIGITAL DVB-T & DVB-H MODULATOR

The high quality, professional and cost-effective solution

FEATURES:

- A high performance digital COFDM TV Modulator - Regenerative Modulator - Transmodulator - featuring high MER
- Ultra compact solution integrating a choice of input interfaces, a GPS locked reference oscillator and an agile upconverter
- High reliability
- Low cost of ownership, low capital cost



ABE Elettronica is proud to present the "**DVM1000-T/H**" Modulator for DVB-T and DVB-H Digital Terrestrial Television Broadcasting.
Building on the "State-of-the-art" image established by ABE's digital and analog TV Modulators/ Transmitters range in over 30 years, the "**DVM1000-T/H**" has been designed to bring together the excellence of the COFDM Digital Modulation with the latest technological solutions.

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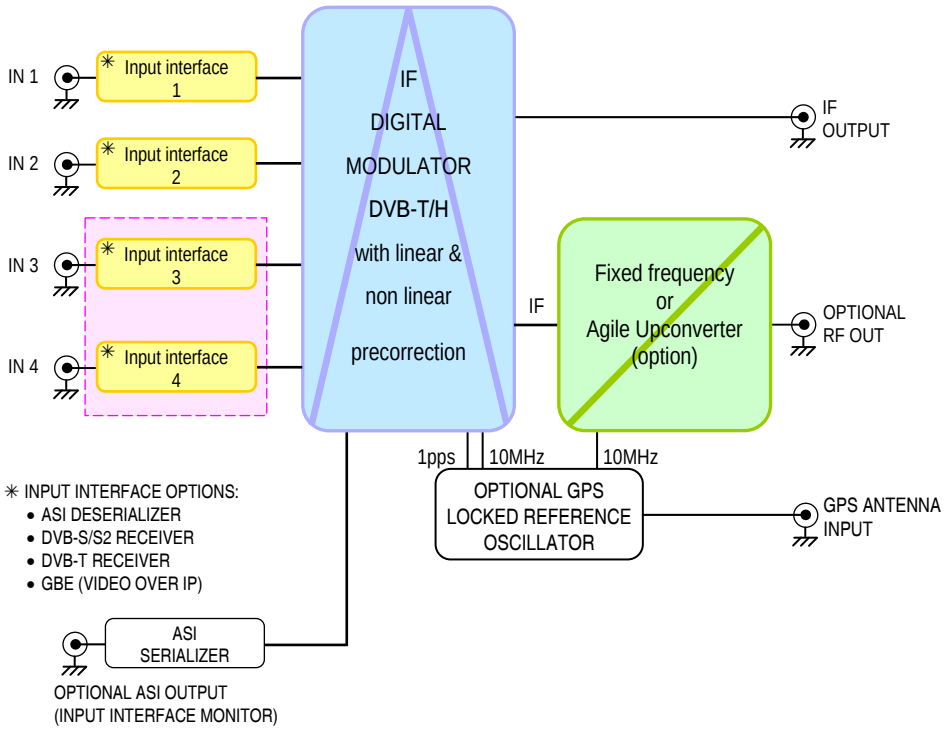
DVM1000-T/H Modulator - Regenerative Modulator - Transmodulator
Block diagram



The DVM1000-T/H Digital Modulator is a high quality, professional and cost-effective solution, suitable to drive digital television transmitters; the Modulator is fully contained in a single 19" 1U rack drawer.
The DVM1000-T/H can be equipped with a choice of input interfaces (including a satellite receiver) and a reference oscillator locked to a GPS receiver.
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.
Maintenance as well as output frequency changing operations are simple and easy to perform.

The OFDM modulator board, the key component of the DVM1000-T/H, is based on a single FPGA and is fully compliant with the ETSI standard EN 300 744 for DVB-T & DVB-H.
A key function of the modulator is the digital linear and non-linear pre-correction with the possibility to store and recall of several setups.
Linear pre-correction prevents the distortions introduced by the RF output filter. The result is a significant improvement in deploying SFN networks as well as cost optimisation thanks to the lower performing requirements of the output filters.
Non-linear pre-correction is able to correct the distortions (normally amplitude and phase vs. level) introduced by the high power amplifiers, so increasing output power, MER and shoulders performances.

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

- #2 ASI interfaces, capable of near seamless switching and supporting hierarchical modulation
- GbE interfaces with up to 2 inputs for MPEG TS over IP (ProMpeg COP#3 rel.2)
- QPSK (and optionally also 8PSK) receiver for microwave or satellite (DVB-S/S2) link
- DVB-T receiver to employ the unit as a re-

The optional upconverter is equipped with low phase noise local oscillators and is frequency agile over the VHF and/or UHF band with a 1Hz resolution.

The optional GPS receiver, specifically developed for the timing function, provides the 1pps (one pulse per second) and lock a 10 MHz reference oscillator necessary for the synchronization in SFN network mode operation. The unit has been specifically designed to minimize problems in SFN networks (i.e. cumulated error and wander). The GPS receiver is equipped with a high-stability "oven" reference oscillator in order to maintain the synchronization in case of GPS signal unavailability (holdover).

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.

The LAN connection between the ABE equipment and the control centre can be established through a GPRS or UMTS modem / router, a data link or an ADSL / PSTN modem.

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

Additional features of the DVM1000-T/H modulator include the soft start to avoid output power surges.

Technical specification

COFDM MODULATOR SPECIFICATIONS

IFFT:	**2K, 4K and 8K selectable (with normal or inverted spectrum - selectable)**
Bandwidth:	**5, 6, 7 and 8MHz selectable**
Guard intervals:	**1/4, 1/8, 1/16 and 1/32, selectable**
Code rates:	**1/2, 2/3, 3/4, 5/6 and 7/8 selectable**
Interleaver:	**Native or in-depth selectable**
Data scrambling:	**Per ETSI EN 300 744**
Modulation schemes (constellations):	**QPSK, 16QAM and 64QAM selectable (16QAM and 64QAM hierarchical or non hierarchical modes supported - α = 1, 2 or 4 selectable)**
Bit rate:	**Up to 31.67Mb/s (according to bandwidth, constellation, guard interval and code rate settings)**
Network mode:	**MFN or SFN selectable (SFN mode needs GPS receiver option)**
Modulator settings in SFN mode:	**Manual or automatic from MIP data + adjustable additional delay in 0.1µS steps**
Digital precorrection:	**Linear (amplitude and group-delay versus frequency) and Non Linear (amplitude and phase versus level). Up to 8 stored presettings**
Output level clipping:	**Adjustable**
Inputs:	**Up to №4 MPEG/DVB Transport Streams with manual or automatic near seamless switching**
Transport stream output option:	**Input transport stream monitoring ASI output selectable among inputs**

MODULATOR INPUT INTERFACE OPTIONS (maximum #4)

ASI:	**MPEG/DVB Transport Stream - 75Ω BNC Female - 270MBit/s ±100ppm**
DVB-S receiver: **(as option, DVB-S2 receiver)**	**Input: -25 to -65dBm - 75Ω "F" Female - 950 to 2150MHz with LNB power supply; Symbol rate: 2 to 45MS/s; Code rate: 1/2 to 7/8 - automatic or manual; Roll-off: 35%**
DVB-T receiver:	**Input: -35 to -74/92dBm - 75Ω "F" Female - 45 to 860MHz;**
GBE (video over IP):	**MPEG Transport Stream over IP reception** **(encapsulation as per Pro-MPEG Code of Practice #3 release 2)**

IF OUTPUT SECTION

Output level:	**Up to 0dBm (adjustable)**
IF Output frequency:	**36MHz ±1MHz in 1Hz steps**
Output impedance and connector:	**50Ω "BNC" Female**
MER (Modulation Error Ratio):	**≥ 45dB**

OPTIONAL RF VHF/UHF AGILE UPCONVERTER

Output level:	**Up to +4dBm (adjustable)**
Output frequency range:	**Broadband VHF+UHF (50 to 860MHz) or UHF 470 to 860MHz in 1Hz steps**
Output frequency stability:	**±500Hz (aging: ≤100Hz/month – after 6 months operation)** **Option: higher stabilities, including GPS locked reference oscillator**

GPS LOCKED REFERENCE OSCILLATOR OPTION:

GPS Receiver:	**12 channels**
Input sensitivity:	**-154dBm**
Input connector and impedance:	**TNC female 50Ω**
1pps rms accuracy:	**30nS**
Power supply (for amplified antenna):	**+5V (excludible)**
10MHz oven oscillator aging:	**1•10-9/day**

GENERAL SPECIFICATIONS

Power supply:	**100 to 264 Vac 50 to 60Hz** **Different power supplies and tolerances available on request**
Remote control interface options:	**RS485; Ethernet 10/100 Base-T (SNMP support – web browser TCP/IP protocol).** **Remote firmware upgrade: supported**
Housing:	**Rack drawer 19" 1U**
Operating temperature range:	**0 to 45° C.**
Maximum operative humidity:	**90% non condensing**

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

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