The PT3182 DVB-T2 OEM ProTelevision Technologies’ Software defined modulator, provides maximum integration flexibility for transmitter manufacturers.

The remarkable performance and robustness of the PT3182, makes it the perfect choice for your VHF and UHF DVB-T/T2 transmitters.

**Future proof technology** based on a fully reconfigurable, software defined modulator platform, that allows upgrading of the board to other DTT standards (ISDB-T/Tb, DVB-T/T2 or ATSC 1.0).

- **Interface B** input mode for support of MFN, SFN ([MISO and SISO]), single PLP and Multiple PLP DVB-T2 transmission based on T2-MI.
- **Optional Interface A** input mode for standalone support of DVB-T2 in MFN single PLP mode with legacy MPEG-2 TS input.

- **High performance digital adaptive linear and nonlinear precorrection** for maximum transmitter performance (Option PT3754).
- **User friendly intuitive WEB GUI control** for use with standard Web Browser (Internet Explorer, Mozilla Firefox, Google Chrome and Opera compatible).
- **SNMP** client Get/Set/Trap.
- **SCPI control** over RS232/RS485 and over IP.
- **4x Ethernet Gigabit interfaces** for control and data transport. Two of them optimized for TSoIP Input (Option PT3720/00).
- **OPTIPOWER®** – market leading enhanced adaptive precorrection and PAPR clipping technology for maximum optimization of transmitter power efficiency and/or transmitter MER performance (Option PT3756).

- **Integrated Multi Standard Global Navigation Satellite System (GNSS) receiver** for time and frequency reference based on GPS and GLONASS systems (Option PT3711).
- **VHF and UHF** (selectable frequency from 30MHz to 860 MHz in steps of 1Hz).
- **Power Supply acceptance range**: from 5V to 52V. That allows the usage of existing power supply mounted in the system.
- **Three choices of internal precision (Local Oscillator) according to the network requirements** 2ppm, 0.25ppm or 0.01ppm.
- **Power Output selectable** from -10dBm to +10dBm in steps of 0.1dB.
- **Available SW based Automatic Level Control** to regulate any third party power amplifier output. (Option PT3770/00).

**Seamless switching** between any of the ASI and/or IP inputs.
Optipower is a ProTelevision Technologies’ proprietary solution developed to provide an increase of quality (MER) and efficiency to new or existing TV transmitters.

### Application

The **PT3182** DVB-T2 modulator is characterized by a high RF and MER performance and by its unique ability to optimize the performance of any third party power amplifier being utilized together with the modulator.

The PT3182 OEM DVB-T2 modulator provides a versatile, robust and unsurpassed performance solution for integration and manufacturing of high quality DVB-T/T2 transmitters.

The integration of the OEM PT3182 into any transmitter system, is an easy process, ProTelevision Technologies will provide full support during this process which will only be necessary to do once in life, since ProTelevision’s OEM hardware platforms are always backwards compatible with previous versions.

In addition, only one electrical and mechanical integration will automatically multiply the range of products, due to the feasibility of reconfiguring the modulation standard of the board to another terrestrial broadcasting format (for example ATSC or ISDB-T/Tb), by simply loading an alternative firmware image and licensing key.

The board is prepared for implementation of any future OFDM based solution.

The PT3182 DVB-T2 modulators accept input in ASI format and in TSoIP format subject to the particular configuration; The PT3182 DVB-T modulators have four Ethernet Gigabit ports with different MAC addresses. Either one or two of these ports are optimized for TSoIP (PT3720/00).

When operating in the Interface A input mode (ref. TS 102 733 paragraph 4.2, system architecture) the modulator accepts input of legacy MPEG-2 transport steam over the ASI and TSoIP interfaces.

When operating in the Interface B input mode (ref. TS 102 773 paragraph 4.2, system architecture) the modulator accepts input of T2-MI over the ASI and TSoIP interfaces (T2-MI encapsulated in MPEG-2 TS).

The PT3182 Modulator, is transparent to any compression format carried by the MPEG-2 TS (MPEG-2, MPEG-4, H.264, HEVC or any future format).

The PT3182 DVB-T2 modulator is designed in accordance with the ETSI standards TS 102 773 (T2-MI) and EN 302 755 (DVB-T2 channel coding and modulation).

If DVB-T/H is the standard of choice. The type code for the modulator is changed to PT3180. The PT3180 DVB-T/H can be upgraded to DVB-T2 by loading a different software licence key or alternatively be delivered with a Dual SW image. (option PT3726)

Please refer to Signal Processing DVB-T/H (PT3180) description in the specification section.

**Seamless switching** between any combination of inputs (ASI and/or IP) is fully supported for both DVB-T and DVB-T2 in SFN mode.

Optipower consists of:

1) Enhanced Nonlinear Precorrection algorithm with **DEEP MEMORY EFFECTS** based on the Volterra polynomial series.

2) Adaptive PAPR clipper.

These two adaptive mechanisms, allow achieving the maximum MER value on any transmitter system (VHF, UHF, Class AB, Doherty, etc.) compared with other precorrection solutions on the market.

This MER extra increase, can be used to **enhance the overall efficiency of the transmitter system**.

In addition, ProTelevision Optipower (Option PT3756) will provide **live measurements** on the WEB Graphical User Interface: Shoulders, MER, PAPR, MER vs Carrier and a Spectrum graphic on the channel transmitted (see picture).

Main specifications for (Optipower) precorrection and feedback signals: Connectors: SMA 50 ohm // Level: -10dBm to +10dBm // Return Loss > 20dB //Frequency: 30MHz to 860MHz.
### Supported Interface modes:

<table>
<thead>
<tr>
<th>Interface:</th>
<th>Input:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface A:</td>
<td>Input of ‘legacy’ MPEG-2 TS for MFN single PLP transmission (requires option PT3784)</td>
</tr>
<tr>
<td>Interface B:</td>
<td>Input of T2-MI from external T2 gateway (Single and multi PLP, MFN and SFN)</td>
</tr>
</tbody>
</table>

### System main characteristics

(All listed system main characteristics are for Interface B mode subject to the modes supported by the T2 gateway used):

- **Supported T2 versions and profiles:** 1.1.1/Main, 1.2.1/Main, 1.3.1/Main and Lite
- **System bandwidth:** 1.7 MHz, 5 MHz, 6 MHz, 7 MHz and 8 MHz

### PLP configuration

(All listed PLP configurations are for Interface B mode subject to the modes supported by the T2 gateway used):

- **Number of PLPs:**
  - Interface A mode: Single PLP only
  - Interface B mode: Single PLP and Multiple PLP mode up to 255 PLPs equal to the maximum given by the T2 standard.

(In practice the number of PLPs will be limited by the T2 gateway that supplies T2-MI input to the modulator).  

- **Number of PLPs:**
  - Interface A mode: Single PLP only
  - Interface B mode: Single PLP and Multiple PLP mode up to 255 PLPs equal to the maximum given by the T2 standard.

### T2 frame configuration

(All listed T2 frame configurations are for Interface B mode subject to the modes supported by the T2 gateway used):

- **IFFT:** 1K, 2K, 4K, 8K, 16K, 32K (including extended carrier modes)
- **Guard intervals:** 1/4, 1/16, 1/32, 1/128
- **Pilot pattern:** PP1, PP2, PP3, PP4, PP5, PP6, PP7, PP8
- **PAPR control:** L1-ACE / P2-TR with T2 version 1.2.1 and 1.3.1
- **L1 Modulation:** QPSK, 16-QAM, 64-QAM (rotated and none-rotated)
- **Network modes:** MFN & SFN (relative & absolute timestamp, MISO/SISO)
- **Test modes:** Single carrier, PRBS, NULL-P1

### Electrical Specifications

<table>
<thead>
<tr>
<th>Inputs</th>
<th>ASI inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of ASI inputs:</td>
<td>2</td>
</tr>
<tr>
<td>Connector:</td>
<td>Coax contact in DIN41612M_6_0, 4 main PCB conn.</td>
</tr>
<tr>
<td>Input impedance:</td>
<td>75 ohm</td>
</tr>
<tr>
<td>Return loss:</td>
<td>&gt; 13 dB</td>
</tr>
<tr>
<td>Redundancy:</td>
<td>User selectable switching policy between “Primary” and “Secondary” ASI source</td>
</tr>
</tbody>
</table>

- **Ethernet ports (1 Gbit/sec):**
  - No. of ethernet ports: 4
  - Connector: Quadruple RJ45 mounted on the board |

- **GNSS Receiver Input (option PT3711):**
  - Connector: Routed via DINA41612M_6_0, 4 main PCB conn. |
  - Frequency: 1.575 GHz (GPS) / 1.602-1.603 GHz (GLONASS) |
  - Antenna gain range: 0 to 32 dB |
  - Antenna: Passive or active antenna (not included) |
  - Antenna DC supply: OFF, 3 Vdc or 5 Vdc (±0.5 V), user selectable |
  - Antenna DC current: max 50 mA |

- **External Clock Reference (carrier frequency and SFN timing):**
  - Connector: Routed via DINA41612M_6_0, 4 main PCB conn. |
  - Frequency: 10 MHz |
  - Level: 100 mV-3 Vpp |
  - Impedance: 50 ohm and > 1 kohm, user selectable |

- **Time Reference (SFN timing):**
  - Connector: Routed via DINA41612M_6_0, 4 main PCB conn. |
  - Frequency: 1 PPS |
  - Level: 0.5 V, user selectable trigger point 1V or 1.6V |
  - Trigger: Rising or falling edge, user selectable |
  - Impedance: 50 ohm and > 1 kohm, user selectable |

### Output

- **RF-out:** SMA female, 50 ohm |
- **Centre frequency:** Adjustable 30-860 MHz in steps of 1 Hz |
- **Time reference:** 1 PPS |
- **Harmonics and spurious:** <= -55 dBc |
- **MER:** > 45 dB (typically 50 dB) |

#### Electrical Specifications

- **S A P L E**: 0 dB |
- **Return Loss:** > 16 dB |
- **Spectrum outside band:** <= 3.8 MHz: 0 dB |
- **Spectrum outside band:** <= 4.25 MHz (shoulders): <= -50 dB (typically -55 dB) |
- **Power and voltage:** <= -55 dB |
- **Input Impedance:** 50 ohm/ > 1 kohm, user selectable |
- **Return loss:** > 16 dB |
- **MER:** > 45 dB (typically 50 dB) |

#### Control Interface

- **Input:** Separate Reset control and Output muting control |
- **Alarm lines:** Two user programmable output collector alarm lines |
- **Network modes:** MFN and SFN |

### Signal Processing DVB-T/H (PT3180)

<table>
<thead>
<tr>
<th>Supported modes</th>
<th>2K, 4K and 8K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interleaver:</td>
<td>Native as well as depth and native (DVB-H mod)</td>
</tr>
<tr>
<td>Guard intervals:</td>
<td>1/4, 1/8, 1/16, 1/32</td>
</tr>
<tr>
<td>Code rates:</td>
<td>1/2, 2/3, 3/4, 5/6, 7/8</td>
</tr>
<tr>
<td>Constellations:</td>
<td>QPSK, 16-QAM, 64-QAM</td>
</tr>
<tr>
<td>Hierarchical modes:</td>
<td>16-QAM and 64-QAM in alpha-1, alpha-2 and alpha-4</td>
</tr>
<tr>
<td>Network mode:</td>
<td>MFN and SFN</td>
</tr>
<tr>
<td>Bandwidth:</td>
<td>8 MHz, 7 MHz, 6 MHz and 5 MHz</td>
</tr>
</tbody>
</table>
**ENVIRONMENTAL SPECIFICATIONS**

The environmental specifications for a solution based on the PT3182 OEM card will depend on the specific chassis solution chosen in each individual case. The values shown are for ProTelevision own rack integration solution (PT3082).

**Climatic Temperature**
- Operating: -5°C to +50°C (23°F to 122°F)
- Within specs: +5°C to +45°C (41°F to 113°F)
- Storage: -30°C to +70°C (-22°F to 158°F)

**Humidity**
- Operating: max 90% RH
- Storage: max 90% RH

**EMC**
Compliant to EN55022 (emission) and EN55024 (immunity)

**Safety**
Compliant to EN60950-1

**RoHs**
Compliant with directive 2011/65/EU

**POWER SUPPLY**

| Voltage: Accepts all the AC range from 5V to 52V |
| Power Consumption: Max. 18 W (Typical 16W) |

**MECHANICAL SPECIFICATION**

<table>
<thead>
<tr>
<th>Open PCB</th>
<th>EURO module size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width:</td>
<td>100mm</td>
</tr>
<tr>
<td>Depth:</td>
<td>220 mm (PCB footprint excluding connectors), 240 mm end-to-end including SMA and DIN connector</td>
</tr>
<tr>
<td>Build height:</td>
<td>Approximately 30 mm including allowance for recommended clearance of 7 mm between PCB underside and chassis. 3D step file available</td>
</tr>
<tr>
<td>Weight:</td>
<td>0.5 kg</td>
</tr>
<tr>
<td>Cooling:</td>
<td>Designed for air-cooling. Recommended airflow along the PT3182 card is 250 l/minute</td>
</tr>
</tbody>
</table>

**Ordering codes:**

**OEM Modulator**
- PT3180 DVB-T/H OEM modulator
- PT3182 DVB-T2 OEM modulator

**Options, software**
- PT3720/00 2x TSoIP interface (Gigabit)
- PT3754 Adaptive digital Pre-corrector
- PT3756 OPTIPOWER® Enhanced pre-correction and adaptive PAPR clipper
- PT3784 Interface-A input option
- PT3783 DVB-T2 Lite Support (FEF transmission mode)
- PT3770/00 Automatic Level Control
- PT3726 DVB-T & DVB-T2 Dualcast Support

**Options, hardware**
- PT3711 GNSS module (GPS and GLONASS support)
- PT3710/10 Medium Precision Oscillator OCVCXO 0.25 ppm
- PT3710/20 High Precision Oscillator OCVCXO 0.01 ppm

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