



BTESA
BROAD TELECOM

LIQUID COOLED TV TRANSMITTERS

High power

1.5kW to 20kWrms in DVB-T/T2

1.5kW to 20kWrms in ISDB-T

2kW to 30kWrms in ATSC

3.5kW to 45kWps in Analogue

Analogue / Digital

VHF / UHF



LTD SERIES

6kWrms DVB-T/T2 transmitter

The new LTD-C series of TV transmitters power ranges from 1.5kW to 20kWrms in DVB-T/H/T2 and from 3.5kW to 45kWps in Analogue TV (common amplification).

The highly modular and scaleable architecture allows easy power upgrade. Up to 6,5kWrms DVB-T/T2 is housed in one single rack. Liquid cooling pump system can be installed in an open frame, or alternatively (for transmitters $\leq 5\text{kWrms}$) inside to the transmitter rack.

The **core** of the transmitter are **the driver and the amplifiers**.

Multistandard driver



This compact driver with LCD screen allows transmission in **all DTV standards** (DVB-T/H, DVB-T2, ATSC and ISDB-T). Adaptive pre-correction is an option

It also offers **Dual-Cast** possibility (Software switching from analogue to digital) for countries where the analogue switch-off has not yet taken place.

The change of frequency is immediate thanks to its **agile** Up-Converter. It also fits **Low-Noise** Local Oscillators

For SFN GPS reception, it accepts **external GPS** reference or includes **internal GPS** receiver board.

Automatic Switchover unit (hardware) for **dual driver**

Power Amplifier modules

Each **hot-plug** module includes its own Power Supply, composed of 2 switch-mode converters for easier maintenance and higher reliability .

A third switch-mode converter can be added for **full redundancy of Power supply** at each amplifier

The module is fitted with its **own Control** micro-processor, with **protections** against temperature, VSWR and transients, connected to the Main Control logic



But a transmitter is not only a driver and some amplifiers.

When it comes to 24/7 operating transmitters, **protection** and redundancy, **monitoring** and control, and easy **maintenance** are the key factors you may want to be sure of. For a reliable transmission and user-friendly operation, BTESA transmitters offer:

Control Logic



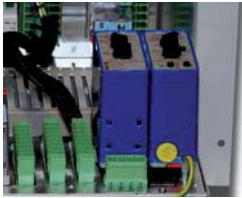
User-Friendly, with a 6.5" **Colour Touch-Screen** with intuitive navigation showing complete module info (status, voltage, current, temperature,..)

All events are logged and all modules have their own led indicators to ensure supervision is never a problem.

N+1 automatic switchover system available

Ethernet connector allows remote monitoring over TCP/IP. BTESA's **own supervision system** is conceived for an optimal performance with a minimum data rate. **SNMP** Agents are also available, allowing the integration in third party Management Systems.

Protection: Electrical system



Self-designed power supplies, adapted to the hard conditions found in a TV station, using **IGBT's** supporting peaks of 1200V

Robust surge protections at **transmitter input** and also at **each amplifier**: hot-swappable high energy absorption **varistors**, **Gas discharger**, thermal-magnetic **breakers**



Large mains input voltage range ($\pm 20\%$)

Power factor > 0.95

Step-start power switching systems for lower inrush current

Mains **Phase inversion** and **high level monitor** (cuts if voltage $>+30\%$)

Protection: Liquid cooling system



2 pumps, powerful enough for **real redundancy**

2 fans in heat exchanger, temperature controlled speed

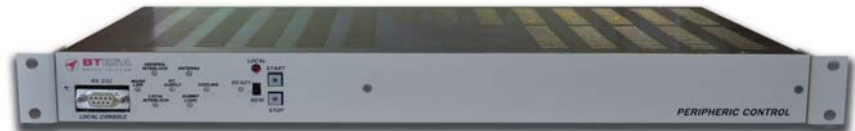
Flow meter to detect obstruction of pipes, dirty filters, blocked fans...

Liquid Filter with Micro-bubble separator, Automatic Air purgers, etc

Protection: Control Logic



Control Logic can be **removed even in operation**, and the transmitter can work **SAFELY** thanks to all its hardware based protections that can be used when software is failing



Hardware based logic control **protection for every module**, and **peripheral control unit** that ensures safety operation in case of failure of Central Control Unit

Easy Maintenance



Dedicated **training courses** and hot-line support

Comfortable **rear access**: open space, everything within hand reach, all components (combiners, balance loads) can be replaced in operation

Pumps, gauges, etc. **replacement in operation** (open frame)

Liquid filter **cleaning in operation**

Hot-plug Power Amplifier Modules, with quick-release RF and liquid connectors.

Hot-plug surge protections

Test bench for amplifiers



SPECIFICATIONS

General

Standards	PAL B/G/K/I, NTSC M/N, SECAM DVB-T/H, DVB-T2, ATSC, ISDB-T, DAB	Dual cast optional NICAM and IRT sound optional
Frequency	174-230 MHz 470-862 MHz	8 MHz standard. Also 7, 6 & 5 MHz
Liquid Cooling	Redundant pump system	External open pump frame is optional for power \leq 5kWrms
	Dual blower heat exchanger	Copper fins are optional
Input Connector	- Analogue: Video CVBS (BNC). Audio Balanced 2xXLR or 2xBNC, or unbalanced - Digital: 2xASI (seamless switching) (BNC)	Option hierarchical modulation: 2xASI, option 4xASI (2 backup) Option TSolP: RJ45 input
Output Connector	1 5/8", 3 1/8" or 4 1/2"	Depending on power

Quality parameters

MER (DVB-T) (at nominal output power)	> 35dB with manual precorrection > 37dB with adaptive precorrection	Measured in the worst channel, higher in other channels. UHF Adaptive precorrection optional
Shoulders (DVB-T) (at nominal output power)	< -37 dB with manual precorrection < -40 dB with adaptive precorrection	Measured in accordance with ETSI 101 290 before output filter
Intermodulation (analogue)	<-60dB	(-5dB, -16dB, -10dB)
Non-essential radiations	< -100 dBc	With respect to r.m.s. power
Short term stability	$\pm 5 \times 10^{-11}$ when locked to GPS (SFN) $\pm 1 \times 10^{-8}$ when locked to optional OCXO (MFN) $\pm 1 \times 10^{-7}$ when locked to VTCXO (MFN)	
LO Phase noise	< -90 dBc/Hz @ 1kHz	For UHF (for VHF is even better)
Frequency resolution	1 Hz steps	Based on DDS

Local and remote control

Interfaces	RS-232, RJ-45, RS-485	
Local control	Color Touchscreen GUI, RS-232	
Remote control	1. User console to access all parameters 2. BTESA network management system for minimum data rate (Optional) 3. SNMP agent (Optional)	

Environmental

Power supply	Three-phase 220/380Vac \pm 20%, 50Hz/60Hz	Others upon request
Power Factor	> 0.95	Dynamic PF correction
Temperature range	0° to +45° C in the room -30° to +50° C outside	
Humidity	Up to 95%	without condensation
Altitude	Up to 2.500 m above sea level	Higher upon request

Specifications subject to change without notice



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