



ECO-Series

DTV, DAB/DAB+, T-DMB

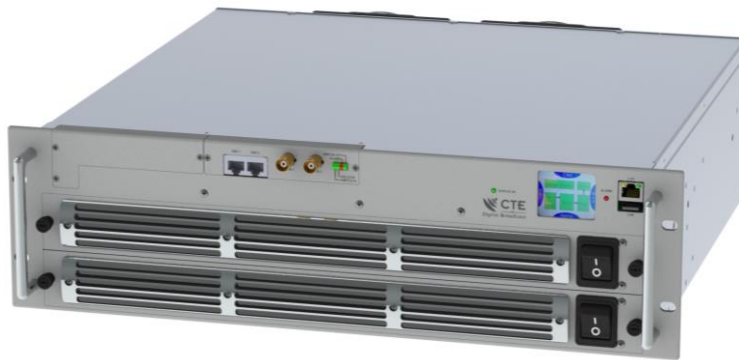
CTE High Efficiency Broadband Doherty TV Transmitters



CTE DB compact air cooled transmitter range, available in different versions with different output powers from 200 to 750 Wrms

In a compact 2U or 3U Rack, and with 2 power supplies, Transmitter delivers up to 650W rms (COFDM: DVB-T/T2, ISDB-T/Tb) and up to 750 rms (ATSC) of high efficiency digital output power or up to 1200W p.s. when operating with analogue signals.

Transmitter is available in two version, 2U rack and 3U rack and it's fully supporting DVB-T/H/T2, ISDB-T/Tb, DAB/DAB+/TDMB, ATSC, PAL or NTSC modulation with native adaptive pre-correction circuits, built in GPS/ GLONASS receiver for accurate synchronization and SFN operations, and multiple input interfaces (Satellite Receiver, ASI, Gigabit Ethernet or RF) so to be configured as Terrestrial or Satellite fed transmitter or even transposer.



2U rack version



3U rack version

For the ISDB-Tb market, CTE DB compact transmitter is today the only solution in the market combining Satellite Receiver, Re-Multiplexer/Layer Combiner/TS to BTS (188 to 204 byte) converter and Transmitter in a single box.

UHF Models	Output Power ¹				Frequency Band	Standard	Configuration
	COFDM (rms)		ATSC (rms)	ATV (p.s.)			
	UHF Broadband	15 channels Band					
ECO-200	200 W	200 W	300 W	600 W	UHF IV & V	DTV ²	2U compact
ECO-350	350 W	400 W	400 W	600 W			2U compact
ECO-350/2PS	350 W	400 W	600 W	1200 W			3U compact
ECO-600	600 W	650 W	750 W	1200 W			3U compact
VHF Models	DVB/ISDB (rms)	DAB/DAB+ (rms)	ATSC (rms)	ATV (p.s.)	Frequency Band	Standard	Configuration
D-250V	250 W	250 W	250 W	600 W	VHF III	DTV ² DAB ²	2U compact
D-450V	450 W	500 W	650 W	1200 W			3U compact

1(Before Filter), 2(See Modulator details)



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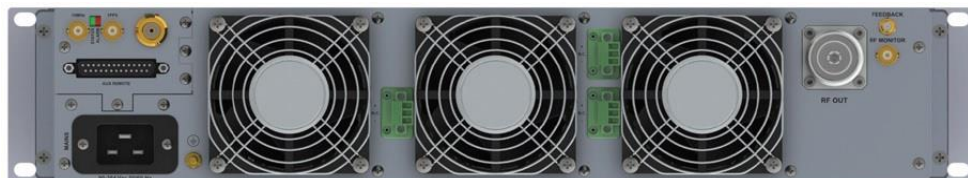
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Main Features

- Compact 2U or 3U 19" Rack chassis.
- Output Power up to 650W rms (COFDM), up to 750W rms (ATSC) or up to 1200W p.s. (analogue)
- High efficiency broadband or 120MHz Band (15 channels @8MHz, 20 channels @6MHz) amplifier technology
- Built in ASI/RF matrix for automatic switch over, without the need of using an external switch over unit
- DVB-T/H/T2, ISDB-T/Tb, DAB/DAB+/T-DMB, ATSC, PAL, NTSC modulations fully supported
- Embedded Re-Multiplexer/Layer Combiner/TS to BTS (188 to 204 byte) converter for ISDB-Tb
- Adaptive pre-correction circuits
- On-board high stability GPS / GLONASS receiver with battery
- Flexible input interfaces:
 - 4 x ASI inputs (TS, BTS, T2MI, SMPTE-310M) + Analog input
 - 2 x ASI inputs and 2 x Gigabit Ethernet
 - 1 x DVB-S/S2 Satellite Receiver input
 - 1 x RF input



2U rack version



3U rack version





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Technical Specifications

TRANSMITTERS

UHF digital power:	from 200 Wrms to 650 Wrms @ MER 38 dB typ. (DVB, ISDB)
UHF analogue power:	from 300 Wrms to 750 Wrms (ATSC) from 600 W p.s. to 1200 W p.s.
VHF digital power:	from 250 Wrms to 450 Wrms @ MER 37 dB typ. (DVB, ISDB) from 250 Wrms to 500 Wrms @ MER 34 dB typ. (DAB, TDMB)
VHF analogue power:	from 300 Wrms to 750 Wrms (ATSC) from 600 W p.s. to 1200 W p.s.
RF output connector:	7/16" f 50 Ohm
Frequency agility:	UHF Band IV and V or VHF Band III
Frequency resolution:	1 Hz
Precorrection:	Adaptive
matrix circuits:	ASI/BTS/Video (dual), audio and RF
ASI/Video connectors:	BNC (f), 75 Ohm
Audio connectors:	Tini-QG "Mini XLR", 6 Pin (m), 600 Ohm

MODULATOR

DVB-T/H/T2	
Standard:	EN300744, EN302304, EN302755 V1.3.1 (DVB-T2-Lite), TS101191, TS102773 (T2-MI), TS102034
Inputs:	4x ASI BNC (f), 75 Ohm or 2x ASI BNC (f), 75 Ohm and 2x RJ45 TSolP 10/100/1000 Switch seamless between ASI inputs. Hierarchical and not hierarchical (DVB-T)
FFT:	1K (DVB-T2), 2K, 4K, 8K, 8K ext. (DVB-T2), 16K & 16K ext. (DVB-T2), 32K & 32K ext. (DVB-T2)
Code rate:	All modes available according to the standard Block Short or Normal (DVB-T2) DVB-T: Reed-Solomon (204, 188) DVB-T2: BCH, LDPC
Guard Interval:	1/32, 1/16, 1/8, 1/4, 19/256 (DVB-T2), 19/128 (DVB-T2), 1/128 (DVB-T2)
Constellation:	QPSK, 16QAM, 64QAM, 256QAM (DVB-T2). Rotated and non-rotated (DVB-T2)
MISO processing:	Supported
ISDB-Tb	
Standard:	ABNT NBR 15601, ABNT NBR 15603
Inputs:	4x ASI TS/BTS BNC (f), 75 Ohm or 2x ASI TS/BTS BNC (f), 75 Ohm and 2x RJ45 TS/BTS oIP 10/100/1000
FFT:	Mode 1 (2K), Mode 2 (4K), Mode 3 (8K)
Code rate:	1/2, 2/3, 3/4, 5/6, 7/8
Guard interval:	1/4, 1/8, 1/16, 1/32
Hierarchical modulation:	Up to 3 layers
Constellation:	QPSK, 16QAM, 64QAM
Time interleaver:	Fully supported
Partial reception:	Supported

DAB/DAB+/T-DMB

Standard:	EN 300401, ETS 300 799
Inputs:	4x ETI (NI[G703], NA5376[G704] or NA5592[G704]) BNC (f), 75 Ohm EDI (on request)
Transmission modes:	Mode I, II, III, IV (Automatically detected from the ETI stream, or user selectable)
Operation:	MFN or SFN operations

ATSC

Standard:	A/53, A/110
Inputs:	4x ASI / SMPTE-310M BNC (f), 75 Ohm or 2x ASI / SMPTE-310M BNC (f), 75 Ohm and 2x RJ45 TS oIP 10/100/1000
Modulation:	8-VSB
Input bit rate:	19.39 Mbit/s
Bandwidth:	6 MHz
Max processing delay:	Up to 1 second (programmable)

Analogue

Standard:	B, G, D, K, M, N, I
Inputs:	Video BNC (f), 75 Ohm, audio Tini-QG "Mini XLR", 6 Pin (m), 600 Ohm
Color system:	PAL, NTSC

GPS / GLONASS

Input connector:	N (f), 50 Ohm
Input/ output 10 MHz:	BNC (f), 75 Ohm
Input/ output 1 PPS:	BNC (f), 75 Ohm
Phase noise:	-140 dBc/Hz @ 10 kHz -150 dBc/Hz @ 100 kHz
Stability:	1e-12 / 24 H with disciplined OCXO
Hold-over stability:	5 µs after 5 hours (optional 1 µs after 24 hours)

SATELLITE RECEIVER

Standard:	ETSI EN 300 421 (QPSK) (DVB-S) ETSI EN 302 307 (QPSK, 8PSK, 16APSK) (DVB-S2) ETSI EN 50083-9 (ASI) ETSI EN 50221 (Common Interface)
DVB-S2:	VCM, CCM, Multi Stream and Single Stream, Normal & Short FEC frames
Symbol rate:	1 - 45 Msym/s (DVB-S) 2 - 45 Msym/s (DVB-S2)
Constellation:	QPSK, 8PSK, 16APSK
FEC:	Automatic, all modalities available according to the standard Block Short or Normal DVB-S: Reed-Solomon (204,188) DVB-S2: BCH, LDPC
Roll-Off:	0.2, 0.25, 0.35
Input connector:	F (f), 75 Ohm
Frequency:	L-band 930÷2250 MHz
LNB control voltage:	Off, +13/18 Vdc, 22 kHz, 0.25 A (overload protection)
RF input level:	40 ÷ 100 db/µV (with attenuator)
Output connector:	BNC (f), 75 Ohm
Modality:	188 bytes
Max input bit rate:	80 Mbps (CAM limit: 72 Mbps)
CAM interface:	PCMCIA DVB-CI Common Interface
Conditional Access:	Multicrypt, Simulcrypt
CAS support:	Mediaguard, Viaccess, Irdeto, Conax, BISS with Professional multiprogram CAM (descrambling of up to 24 Elementary Streams) Betacrypt, Cryptoworks, Nagravision with standard consumer CAM (descrambling of up to 4 services)

REPEATER

RF Input	
Signal type:	One DTV channel (DVB-T/H/T2, ISDB-T/Tb, ATSC)
Frequency range:	170 ÷ 862 MHz (agile tuning)
Sensitivity:	-75 ÷ -15 dBm (-75 ÷ 0 dBm if regenerative transp.)
Selectivity:	> 60 dB ± 4.2 MHz
NF (Pi=-50 dBm):	< 6 dB
Conversion type:	Direct Base Band Conversion (Zero IF)
Return losses:	> 15 dB
Connector:	N (f), 50 Ohm

MECHANICALS

Rack:	2U rack 19" 3U rack 19"
Width:	482 mm
Rack height:	87 mm (2U version) or 131 mm (3U version)
Depth:	461 mm
Weight	14 kg (2U) 21kg (3U)

CONTROLS

TFT touchscreen	
Web GUI	
SNMP	
GPIO	

ENVIRONMENTAL

Operating temperature range:	-5°C ÷ 45°C
Max. relative humidity:	90% non condensing
Max. operating altitude:	2500 m. a.s.l. (>2500 m. optional)

ELECTRICAL

Power supply:	single phase 100- 240 V, 50/60Hz
Efficiency:	Up to 40% efficiency in digital (UHF models)

NOTES

To comply with the applicable standards and limit values for the suppression of out-of-band emissions (and in the case of digital standards, also for maintaining the required shoulder distance), the transmitter may only be operated with suitable filters at the RF output.

Specifications are subject to change without notice.



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Options

Options	
G	GPS / GLONASS integrated receiver
KA	26 dB LNA GPS / GLONASS antenna including mounting kit and 25 mt. coaxial cable
S	DVB-S/S2 integrated receiver board, single and multistream, with CAM slot
IA	Additional input board, 4x ASI
IG	Additional input board, 2x ASI + 2x GbE
R	Additional input board, RF in
L	Software option for ISDB-Tb Remux/Layer Combiner/TS to BTS (188 to 204 byte) converter
T	Dual-cast software option, adds DVB-T modulation
T2	Dual-cast software option, adds DVB-T2 modulation
I	Dual-cast software option, adds ISDB-T modulation
AT	Dual-cast software option, adds ATSC modulation
P	Dual-cast software option, adds PAL modulation
N	Dual-cast software option, adds NTSC or PAL-M modulation