

RFE

MAKING
BROADCAST
SMARTER

TV Transmitter TS Driver

TS DRIVER SERIES





TV Transmitter TS Driver



PRODUCT DESCRIPTION

TS Driver is RFE's most amazing achievement, as it combines a complete transmitter with output power up to 150W rms or 250W p.s. and multiple input interfaces in a single 1U 19" rack chassis. This astonishing engineering is today a unique and unequalled solution in the market.

Supporting DVB-T/H/T2, ISDB-T/Tb, DAB/DAB+/T-DMB, ATSC, PAL and NTSC modulations (dual-cast Analog and Digital is also supported), TS Driver natively offers adaptive pre-correction circuits and built in GPS / GLONASS receiver for accurate synchronization and SFN operations.

Whether you need a Terrestrial or Satellite fed transmitter, re-generative repeater, transposer, or even regenerative gap-filler, then TS Driver is the required solution as it can be equipped and configured with different input interfaces (Satellite Receiver, ASI, ETI, EDI, Gigabit Ethernet or RF).

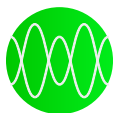
Gap-filling operation is made possible by a powerful echo-canceller and, if necessary, by our award winning Spectrum Restorer regenerative gap-filler [EDOCR].

For the South American ISDB-Tb market, TS Driver combines Satellite Receiver, Re-Multiplexer/Layer Combiner/TS to BTS (188 to 204 byte) converter and up to 130W Transmitter in a single 1U box 19" rack!

MAIN FEATURES

- Compact 1U 19" Rack chassis
- Output Power up to 150W rms in digital or up to 250W p.s. in analogue
- High efficiency broadband amplifier technology both in UHF and VHF bands
- DVB-T/H/T2, ISDB-T/Tb, DAB/DAB+/T-DMB, ATSC, PAL, NTSC, NICAM modulations fully supported
- Embedded Re-Multiplexer/Layer Combiner/TS to BTS (188 to 204 byte) converter for ISDB-Tb
- Adaptive pre-correction circuits
- Powerful echo canceller when TS Driver is used as an on-channel repeater
- Optional internal demodulator with equalizer for regenerative transposers
- Equalized Digital On-Channel Repeater (Spectrum Restorer) configuration available
- 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
 - 4 x ETI or 2 x ETI + 2 x EDI inputs
 - 1 x DVB-S/S2 Satellite Receiver input
 - 1 x RF input
- SNMP, Web Interface and Touch Screen display





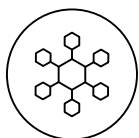
Software Energy Saving

Energy and time saving through RFE smart software, directly installed on the Transmitter: the innovative firmware ensuring easy control and high performance.



Evolution Touch

Quick and intuitive control of the Transmitter thanks to the full colour touch screen, an easy-to-use LCD display installed on the device front panel.



Multiple Interface

Different television standards, being either analogue or digital, implemented on the same TV Transmitter, extending broadcasting operation.



TS Driver transmitter dual cast [ASI and analog inputs]



OneDriver transmitter IP and ASI [or ETI] inputs



TS Driver transposer or Spectrum Restorer [EDOCR]

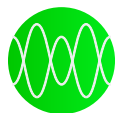


TS Driver with satellite receiver, IP and ASI [or ETI] inputs



TS Driver with satellite receiver, IP and ASI [or ETI] inputs





TRANSMITTERS

UHF digital output power	15 W, 30 W, 50 W, 80 W and 130 W rms @ MER 40 dB typ.
UHF analogue output power	50 W, 70 W, 125 W, 220 W p.s.
VHF digital output power	80 W, 150 W rms @ MER 38 dB typ. (DVB, ISDB) 80 W, 150 W rms @ MER 34 dB typ. (DAB/DAB+/T-DMB)
VHF analogue output power	200 W, 250 W p.s.
Frequency agility	UHF Band IV and V or VHF Band III
Frequency resolution	1 Hz
Pre-correction	Adaptive
RF connector	N(f), 50 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 TS oIP 10/100/1000 Seamless switch between any input 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)

ISDB-Tb

MISO processing	Supported
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 Seamless switch between any input
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

DAB/DAB+/T-DMB

Partial reception	Supported
Standard	EN 300401, ETS 300 799
Inputs	4x ETI (NI[G703], NA5376[G704] or NA5592[G704]) BNC (f), 75 Ohm or 2x ETI BNC (f), 75 Ohm + 2x EDI (ETSI TS 102 693) RJ45 10/100/1000 Seamless switch between any input
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 Seamless switch between any input
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
Integrated NICAM encoder	Available

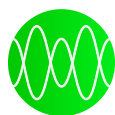
**SATELLITE
RECEIVER
(OPTION)**

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
CA mode [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/GAP
FILLER
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 on regenerative transposers]
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





Echo Cancellor	Cancellation level:	40 dB, typical
	Cancellation window:	20 μ s
	Selective cancellation window:	2.4 μ s [time shift from 10 to 500 μ s]
	Doppler cancellation:	yes
	Maximum echo/signal ratio:	+15 dB [over the main signal], typical
	Total delay:	< 10 μ s
GPS / GLONASS (OPTION)	Input connector:	N [f], 50 Ohm
	Input/Monitor output 10 MHz:	BNC [f], 75 Ohm
	Input/Monitor 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 μ s after 5 hours [optional 1 μ s after 24 hours]
MECHANICAL	Chassis:	1U rack 19"
	Width:	482 mm
	Height:	43.6 mm
	Depth:	460.5 mm without fans
	Weight:	7.5 Kg
CONTROLS	TFT touchscreen	
	Web GUI	
	SNMP	
	GPIO	
ENVIRONMENTAL	Operating temperature range:	-5°C ÷ 40°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~ 50/60 Hz, IEC320 C14 Plug
	Efficiency:	Up to 33% efficiency in digital [according to model and power]
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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ORDERING INFO

DESCRIPTION

MODEL

15 W rms / 50 W p.s. UHF TV transmitter, 1RU	TS DRIVER 15U
30 W rms / 70 W p.s. UHF TV transmitter, 1RU	TS DRIVER 30U
50 W rms / 125 W p.s. UHF TV transmitter, 1RU	TS DRIVER 50U
80 W rms / 220 W p.s. UHF TV transmitter, High efficiency, 1RU	TS DRIVER 80HU
130 W rms / 220 W p.s. UHF TV transmitter, High efficiency, 1RU	TS DRIVER 130HU
80 W rms / 200 W p.s. VHF Band III TV transmitter, 1RU	TS DRIVER 80V
150 W rms / 250 W p.s. VHF Band III TV transmitter, 1RU	TS DRIVER 150V
Spectrum restorer version (EDOCR)	SR
GPS / GLONASS integrated receiver	Opt. G
26 dB LNA GPS / GLONASS antenna including mounting kit and 25 mt. coaxial cable	Opt. KA
DVB-S/S2 integrated receiver board, single and multistream, with CAM slot	Opt. S
Additional input board, 4x ASI	Opt. IA
Additional input board, 2x ASI + 2x GbE	Opt. IG
Additional input board, RF in	Opt. R
Additional input board for regenerative transposers, RF in	Opt. RG
Software option for ISDB-Tb Remux/Layer Combiner/TS to BTS [188 to 204 byte] converter	Opt. L
Dual-cast software option, adds DVB-T modulation	Opt. T
Dual-cast software option, adds DVB-T2 modulation	Opt. T2
Dual-cast software option, adds ISDB-T modulation	Opt. I
Dual-cast software option, adds ATSC modulation	Opt. AT
Dual-cast software option, adds PAL modulation	Opt. P
Dual-cast software option, adds NTSC or PAL-M modulation	Opt. N
Integrated NICAM encoder option	Opt. NC



TS Driver back panel

