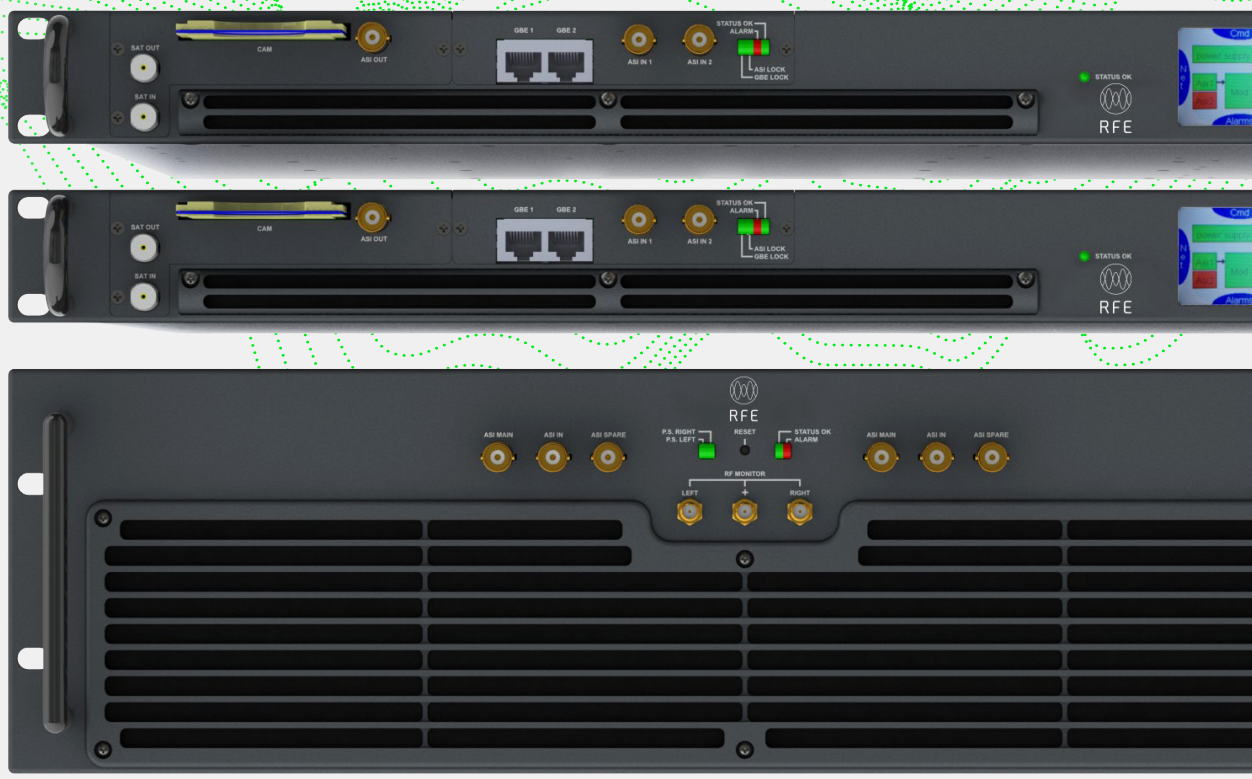
RFE MAKING BROADCAST SMARTER

DAB Transmitter
TS Power

TS POWER



TECHNICAL SHEET - UPDATED FEBRUARY 2019

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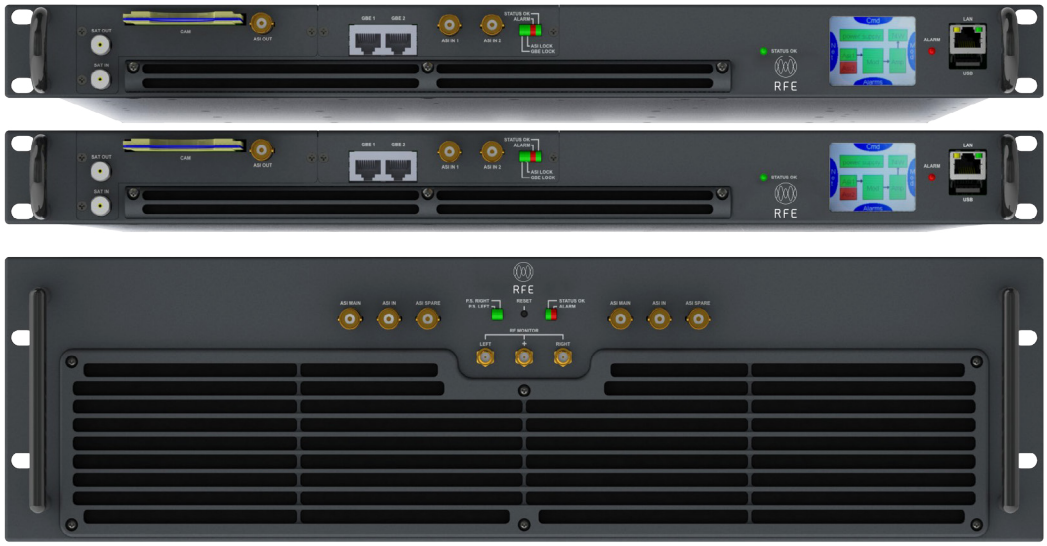

PRODUCT DESCRIPTION

TS Power is the most outstanding last engineering achievement from RFE.
In a compact 3+1U Rack, and with 2 power supplies TS Power delivers up to 2500 W rms of high efficiency digital output power or up to 4000 W p.s. when operating with analogue signals.

The system is composed by 1 or 2 TS Power exciter/s (1RU) and an RF amplifier (2 or 3 RU), which makes a DVB-T/H/T2, ISDB-T/Tb, DAB/DAB+/T-DMB, ATSC, PAL or NTSC complete transmitter with native adaptive pre-correction circuits, built in GPS / GLONASS receiver for accurate synchronization and SFN operations, and multiple input interfaces (Satellite Receiver, ASI, ETI, EDI, Gigabit Ethernet or RF) so to be configured as Terrestrial or Satellite fed transmitter or even transposer.

TS Power final stage embeds 2 hot swappable power supply units, as well as a built in ASI and RF matrix, so 2 TS Driver can be connected to it to ensure a maximum level of redundancy and avoid the use of an additional external switch over unit.

MAIN FEATURES

- Compact 3+1U (or 3+2 in dual driver configuration) 19" Rack chassis
- Output power up to 1600W rms (COFDM), up to 2500W rms (ATSC) or up to 4000W p.s. (analogue)
- High efficiency broadband or wideband amplifier technology both in UHF and VHF bands
- 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, NICAM 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
  4 x ETI or 2 x ETI + 2 x EDI inputs
  1 x DVB-S/S2 Satellite Receiver input
  1 x RF input
- Easy connection to 1 or 2 TS Power exciters

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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

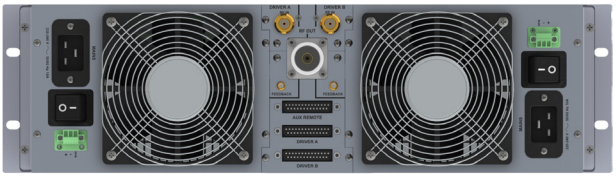
Quick and intuitive control of the Transmitter thanks to the full colour touch screen, an easy-to-use LCD display installed on the device front panel.

Multiple Interface

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

TS Power 800/1200C/1500C Single driver version

TS Power 800/1200C/1500C Dual driver version



TS Ampli 800H rear panel

TRANSMITTERS	**UHF digital output power**	from 200 W to 1500 W rms @ MER 38 dB typ. (DVB, ISDB) from 300 W to 2000 W rms (ATSC)
	UHF analogue output power	from 600 W to 2500 W p.s.
	VHF digital output power	from 250 W to 1600 W rms @ MER 37 dB typ. (DVB, ISDB) from 250 W to 1800 W rms @ MER 34 dB typ. (DAB/DAB+/T-DMB) from 300 W to 2500 W rms (ATSC)
	VHF analogue output power	from 600 W to 4000 W p.s.
	Configurations	Single or dual driver
	RF connector	7/16 (f), 50 Ohm (TS Power 800) 7/8" (f), 50 Ohm (TS Power 1200C and 1500C)
	Frequency agility	UHF Band IV and V or VHF Band III
	Frequency resolution	1 Hz
	Pre-correction	Adaptive
	Exciter	Onedriver Series
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 modalities 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	44x 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
	Partial reception	Supported
DAB/DAB+/T-DMB	**Standard**	EN 300401, ETS 300 799
	Inputs	x 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)
GPS / GLONASS	**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 µs after 5 hours (optional 1 µs after 24 hours)

MECHANICAL Exciter	**Chassis**	1U rack 19"
	Width	482 mm
	Height	43.6 mm
	Depth	460.5 mm without fans
	Weight	7.5 kg
RF Amplifier	**Chassis**	2U or 3U rack 19"
	Width	482 mm
	Height	87.1 mm (TS Power H) 132.5 mm (TS Power P, 800, 1200C, 1500C)
	Depth	460,5 mm (TS Power H); 530 mm (TS Power P) 558.5 mm (TS Power 800); 710 mm (TS Power 1200C and 1500C)
	Weight	14 kg (TS Power H); 21 kg (TS Power P); 26 kg (TS Power 800); 35 kg (TS Power 1200C and 1500C)
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**	2 hot swappable power supplies feeding one half of the amplification stages each
	Exciter	Single Phase 100÷240 V~ 50/60 Hz, IEC320 C14 Plug
	Amplifier	Single Phase 185÷264 V~ 50/60 Hz, IEC320 C20 Plug
	Efficiency	Up to 40% efficiency in digital
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.**	

UHF BAND IV & V	OUTPUT POWER [1]			
	COFDM (rms)		ATSC (rms)	ATV (p.s.)
MODEL	Broadband	Wideband		
TS Power hul	200 W	200 W	300 W	600 W
TS Power HU	350 W	400 W	400 W	600 W
TS Power PU	600 W	650 W	750 W	1200 W
TS Power 800hu	800 W	900 W	1200 W	2500 W
TS Power 1200Cu	1100 W	1200 W	1800 W	2500 W
TS Power 1500Cu	1300 W	1500 W	2000 W	2500 W

[1] Before bandpass filter

VHF BAND III	OUTPUT POWER [1]			
	COFDM (rms)		ATSC (rms)	ATV (p.s.)
MODEL	DVB/ISDB	DAB/DAB+		
TS POWER HVL	250 W	250 W	300 W	600 W
TS Power HV	500 W	500 W	500 W	600 W
TS Power PV	700 W	700 W	900 W	1500 W
TS POWER 800HV	850 W	900 W	1200 W	2300 W
TS POWER 1200CV	1250 W	1400 W	1800 W	3000 W
TS POWER 1500CV	1600 W	1800 W	2500 W	4000 W

[1] Before bandpass filter

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