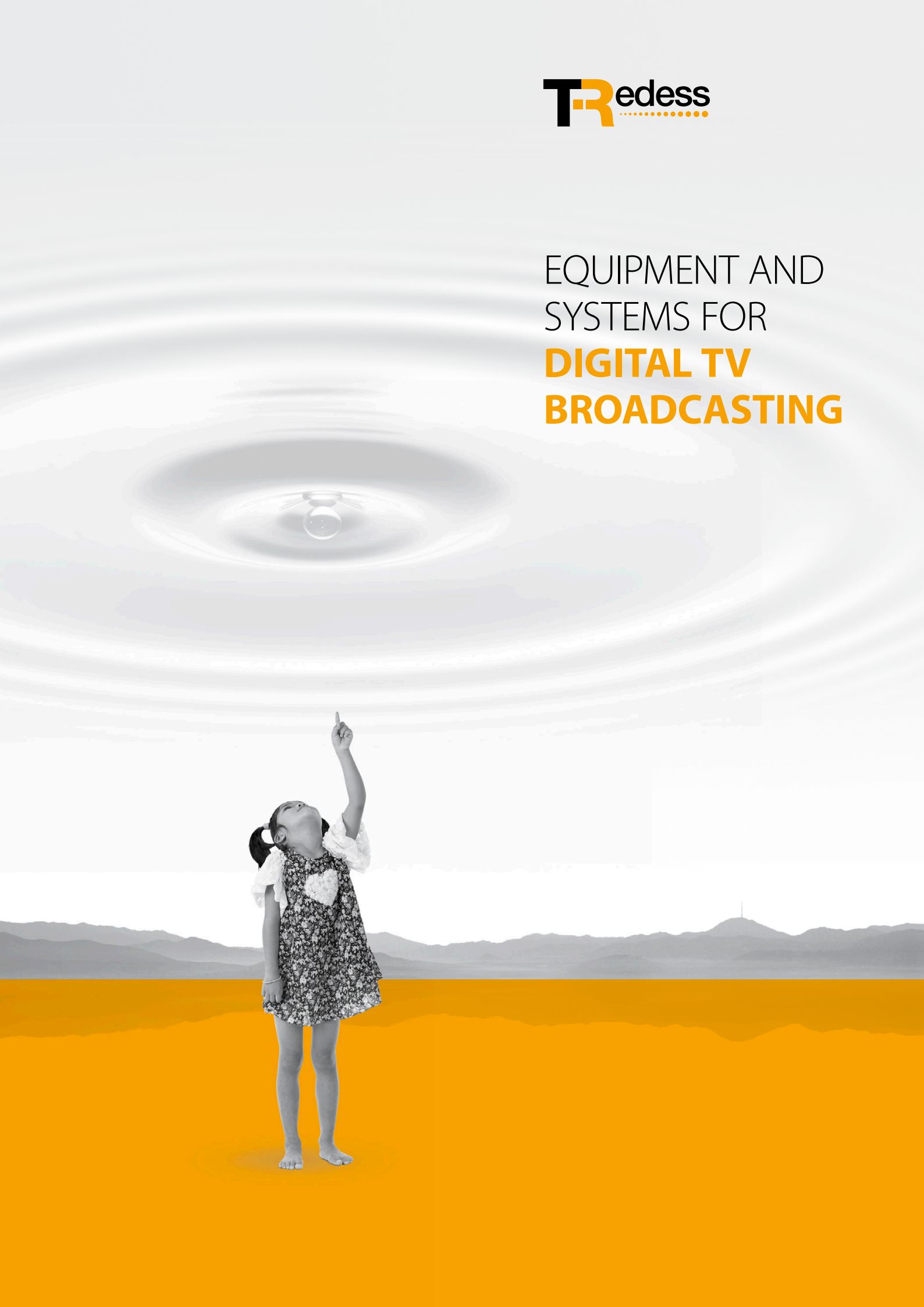
Tredess

EQUIPMENT AND SYSTEMS FOR **DIGITAL TV BROADCASTING**



ABOUT US

TRedess is a leading company in professional telecommunications solutions. We are specialized in the design, development and manufacturing of competitive, reliable and innovative **solutions for the extension of coverage for digital and analog television broadcasting networks.**

Our main products are **Low Power Transmitters**, **Gap Fillers and Regenerative Transposers** for Digital Terrestrial Television Networks (DVB-T/T2), to make the TV signal available where the primary TV network infrastructure cannot reach.

With a solid and constant investment in R&D, we are able to develop competitive, reliable and innovative solutions responding to markets in technological evolution.

Our aim is to provide complete and integral solutions to our customers, combining our high-quality equipment, control and monitoring systems and all the necessary accessories for a complete solution.

EQUIPMENT FOR **TV BROADCASTING**

The TRedess transmitters and gap fillers are developed to optimize the coverage areas extension for digital TV networks in a reliable and cost-competitive way.

We divide our digital TV portfolio into two product series, **Compact Series** and **Broadcast Series**. Both series are DVB-T/T2 compliant, and include remote control and monitoring, power supply redundancy, as well as two channel redundancy options, N+1 and 1+1.

Compact Series is a highly compact solution offering nominal output powers up to 10W. Broadcast Series equipment offers a higher range of output powers up to 150W.

TRedess systems allow both local and remote management and alarm control. The equipment is locally configurable using an external programmer. Besides, it can be controlled and monitored with the TRedess Remote Management system over different interfaces and protocols.

TRedess equipment can also be managed with the TRedess Web Server Management application tool.

TRedess gap fillers can optionally incorporate a very high-performance Echo Canceller, making TRedess gap fillers ideal for operation in single-frequency networks with limited isolation between the receiving and transmitting antennas.

There are two echo cancelling solutions available: DAE (Digital Adaptive Equalizer) and DEEC (Doppler Enhanced Echo Canceller).

DAE echo canceller is used under moderate echo conditions, supporting -10 dB gain margin level. Furthermore, DAE is able to cancel multipath propagation effects in the receiving signal by correcting (equalizing) the distortions in amplitude of the input signal spectrum of the gap filler caused by very close echoes.

The Doppler Enhanced Echo Canceller (DEEC) is able to cancel echoes with greater gain margin (echo levels 24dB higher than the input signal) and can even suppress Doppler effect.

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EQUIPMENT FOR **DIGITAL TERRESTRIAL TELEVISION**

COMPACT SERIES
TRANSMITTERS, GAP FILLERS & REGENERATIVE TRANSPOSERS

Technical description

Compact Series is the new generation of TRedess transmitters and gap fillers, developed to optimize coverage areas for digital TV networks in an economic and reliable way.

Compact series equipment is a highly compact solution: up to 7 transmitters, gap fillers or regenerative transposers can be hosted in a 19"x 5HU subrack, delivering an output power of up to 10W.

Main Characteristics

- High Integration Level: Up to 7 channels in a 5U subrack.
- Up to 10W Transmitters, Gap Fillers and Regenerative Transposers.
- DVB-T/T2 compliant.
- Two very high-performance echo cancellation options.
- SFN and MFN configurations.
- SFN synchronization system (GPS)
- Redundancy system N+1, 1+1.
- Optional power supply redundancy.
- Remote control & monitoring system.
- Hot-Swap Modules.
- Frequency agility.
- Very low power consumption.
- Very low phase noise local oscillators.
- LDMOS amplifiers.
- Independent operating mode.
- Electromagnetic compatibility and safety according to the CE regulation norms.

Seven multiplex 5W DVB-T/T2 Compact Series equipment

Six multiplex 5W DVB-T/T2 Compact Series equipment with redundant power supply

Six multiplex 5W DVB-T/T2 Compact Series equipment with Remote Management

Five multiplex 5W DVB-T/T2 Compact Series equipment with redundant power supply and Remote Management

TRedess DVB-T TRANSMITTERS 1W, 5W, 10W | COMPACT SERIES | Technical specifications

Denomination	MOD ASI-RF DVB-T 1W CS	MOD ASI-RF DVB-T 5W CS	MOD ASI-RF DVB-T 10W CS
Technical specifications			
DVB-T Modulator. Modes			
FFT	2K, 8K		
Guard interval	1/4, 1/8, 1/16, 1/32		
FEC	1/2, 2/3, 3/4, 5/6, 7/8		
Constellation	QPSK, 16 QAM, 64 QAM		
Network	MFN & SFN		
Bandwidth	6, 7, 8 MHz		
MFN adaptation rate	Yes. Jitter PCR Restamping ±40ns		
DVB-T Modulator. Inputs			
MPEG2 / MPEG4	2 ASI seamless (redundant)		
MPEG input impedance	75 Ω		
MPEG input connector	BNC Female		
10MHz (SFN) synchronization input			
Input level	-20 dBm to +10 dBm		
Impedance	50 Ω		
Connector	BNC female (back of module)		
1 pps synchronization input			
Level	0 - 5 V		
Trigger	Selected by rise-edge or fall-edge		
Connector	BNC female (back of module)		
Local oscillators			
Phase noise	> 95 dBc/Hz @ 1KHz (MFN mode). Negligible in SFN mode.		
Frequency stability with temperature (-10 to 60ºC) (without external GPS input)	± 1 x 10e-6		
Frequency stability for a year (without external GPS input)	± 1 x 10e-6		
RF output			
Frequency range	1 UHF 6, 7 or 8 MHz channel		
Maximum output power [W]	1,26W	7W	14W
Maximum output power [dBm]	31 dBm	38,5 dBm	41,5 dBm
Distance to the shoulders	>38 dB		
MER	>34 dB		
Power stability	< ± 0,5 dB		
Return losses	>20 dB		
Spurious emissions out of channel (without Filter)	<-60 dBc		
Impedance	50 Ω		
Connector	BNC Female		N Female
RF test output			
Coupling	27 ± 3 dB	38 ± 3 dB	38 ± 3 dB
Impedance	50 Ω		
Connector	BNC Female		
General			
Control and monitoring interfaces & protocols	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP		
Input voltage range	220 Vac ± 15%		
DC Power Consumption *	23W	65W	85W
Operating temperature range	0 to 45ºC		
Relative humidity	< 95% @ 40ºC, non condensing		
Power factor (Power supply)	0,99		
Dimensions [width x height x depth]	Up to 7 (1W and 5W) or up to 5 (10W) transmitters in 19" x 5HU x 250mm		
Cooling	Active (forced ventilation)		
Directives & standards			
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302296-2, 1999/519/EC		
RoHS	2011/65/EU		
Standards	EN 300744, EN 302304, TS 101191, EN 50083-9, TR 101290, TS 102 773, TS 102 831		

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

TRedess DVB-T/T2 TRANSMITTERS 1W, 5W, 10W | COMPACT SERIES | Technical specifications

Denomination	MOD ASI-RF DVB-T2 1W CS	MOD ASI-RF DVB-T2 5W CS	MOD ASI-RF DVB-T2 10W CS
Technical specifications			
DVB-T Modulator. Modes			
FFT	2K, 8K		
Guard interval	1/4, 1/8, 1/16, 1/32		
FEC	1/2, 2/3, 3/4, 5/6, 7/8		
Constellation	QPSK, 16 QAM, 64 QAM		
Network	MFN & SFN		
Bandwidth	6, 7, 8 MHz		
MFN adaptation rate	Yes. Jitter PCR Restamping ±40ns		
DVB-T2 Modulator. Modes			
FFT	1K, 2K, 4K, 8K, 16K, 32K (normal or extended)		
Guard interval	1/4, 19/256, 1/8, 19/128, 1/16, 1/32, 1/128		
FEC	1/2, 3/5, 2/3, 3/4, 4/5, 5/6		
Constellation	QPSK, 16 QAM, 64 QAM, 256 QAM (normal or rotated)		
Network	MFN & SFN		
Bandwidth	1.7, 5, 6, 7, 8 MHz		
MFN adaptation rate	Yes. Jitter PCR Restamping ±40ns		
Input modes	TS(SPLP) over ASI · T2MI (SPLP & MPLP*) over ASI		
PLPs	Up to 8 PLPs		
Pilot patterns	PP1 … PP8		
Efficiency mode	Normal & High		
Operation mode	SISO and/or MISO		
DVB-T/T2 Modulator. Inputs			
MPEG2 / MPEG4	2 ASI seamless (DVB-T mode). 2 ASI redundant (DVB-T2 mode).		
MPEG input impedance	75 Ω		
MPEG input connector	BNC Female		
10MHz (SFN) synchronization input			
Input level	-20 dBm to +10 dBm		
Impedance	50 Ω		
Connector	BNC female (back of module)		
1 pps synchronization input			
Level	0 - 5 V		
Trigger	Selected by rise-edge or fall-edge		
Connector	BNC female (back of module)		
Local oscillators			
Phase noise	> 95 dBc/Hz @ 1KHz (MFN mode). Negligible in SFN mode.		
Frequency stability with temperature (-10 to 60ºC) (without external GPS input)	± 1 x 10e-6		
Frequency stability for a year (without external GPS input)	± 1 x 10e-6		
RF output			
Frequency range	1 UHF 6, 7 or 8 MHz channel		
Maximum Output Power [W]	1,58W	7,9W	14W
Maximum Output Power [dBm]	32 dBm	39 dBm	41,5 dBm
Distance to the shoulders	>38 dB		
MER	>35 dB		
Precorrection	Digital		
Power stability	< ± 0,5 dB		
Return losses	>20 dB		
Spurious emissions out of channel (without Filter)	<-60 dBc		
Impedance	50 Ω		
Connector	BNC Female		N Female
RF test output			
Coupling	27 ± 3 dB	38 ± 3 dB	38 ± 3 dB
Impedance	50 Ω		
Connector	BNC Female		
General			
Control and monitoring interfaces & protocols	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP		
Input voltage range	220 Vac ± 15%		
DC Power Consumption *	26W	68W	88W
Operating temperature range	0 to 45ºC		
Relative humidity	< 95% @ 40ºC, non condensing		
Power factor	0,99		
Dimensions [width x height x depth]	Up to 7 (1W and 5W) or up to 5 (10W) transmitters in 19" x 5HU x 250mm		
Cooling	Active (forced ventilation)		
Directives & standards			
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302296-2, 1999/519/EC		
RoHS	2011/65/EU		
Standards	EN 300744, EN 302304, EN 302775, TS 101191, EN 50083-9, TR 101290, TS 102 773, TS 102 831		

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range. Values correspond to DVB-T2 mode; consumption in DVB-T mode is 3W less for every power range.

TRedess DVB-T/T2 GAP-FILLERS 1W, 5W, 10W | COMPACT SERIES | Technical specifications

Denomination	MOD RF-RF 1W CS	MOD RF-RF 5W CS	MOD RF-RF 10W CS
Technical specifications			
RF input			
Frequency range	1 UHF 8 MHz channel		
Input signal range	-70 to -20 dBm		
Noise figure	≤ 8 dB		
Return losses	≥ 15 dB		
Image frequency rejection	≥ 65 dB		
Adjacent channel rejection	≥ 80 dB		
Impedance	50 Ω		
Connector	BNC Female		
DAE (Digital Adaptive Equalizer)			
Gain Margin (signal - echo)	-10 dB		
Cancelation window	0 - 8 µs		
Output power adaptive regulation	Yes		
DEEC (Doppler Enhanced Echo Canceller)			
Gain Margin (signal - echo)	-24 dB		
Cancellation window	3 configurable cancellation windows. Selective cancellation up to 37,6 µs.		
Doppler cancellation	Yes		
External synchronization input			
Frequency	10 MHz		
Input level range	-20 to +10 dBm		
Connector	BNC Female		
Local oscillators			
Phase noise	> 95 dBc/Hz @ 1KHz (MFN mode). Negligible in SFN mode.		
Frequency stability with temperature (-10 to 60ºC) (without external GPS input)	± 1 x 10e-6		
Frequency stability for a year (without external GPS input)	± 1 x 10e-6		
RF output			
Frequency range	1 UHF 8 MHz channel		
Maximum output power [W]	1,26W	7W	14W
Maximum output power [dBm]	31 dBm	38,5 dBm	41,5 dBm
Distance to the shoulders	>38 dB		
Power stability	< ± 0,5 dB		
Return losses	>20 dB		
Spurious emissions out of channel (without Filter)	<-60 dBc		
Impedance	50 Ω		
Connector	BNC Female		N Female
RF test output			
Coupling	27 ± 3 dB	38 ± 3 dB	38 ± 3 dB
Connector	BNC Female		
General			
Control and monitoring interfaces & protocols	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP		
Input voltage range	220 Vac ± 15%		
DC Power Consumption *	23W	65W	85W
Operating temperature range	0 to 45ºC		
Relative humidity	< 95% @ 40ºC, non condensing		
Power factor (Power supply)	0,99		
Dimensions [width x height x depth]	Up to 7 (1W and 5W) or up to 5 (10W) transmitters in 19" x 5HU x 250mm		
Cooling	Active (forced ventilation)		
Directives & standards			
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302 296-2, 1999/519/EC		
RoHS	2011/65/EU		
Standards	EN 300744, EN 302304, EN 302755, TS 101191, EN 50083-9, TR 101290, AC 106		

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

TRedess DVB-T REGENERATIVE TRANSPOSERS 1W, 5W, 10W | COMPACT SERIES | Technical specifications

Denomination	MOD REGENERATIVE 1W CS	MOD REGENERATIVE 5W CS	MOD REGENERATIVE 10W CS
References	**880130**	**880140**	**880150**

Technical specifications			
RF input			
Frequency range	1 UHF 6, 7 or 8 MHz channel		
Input signal range	-80 to -20 dBm		
Noise figure	≤ 6 dB		
Return losses	≥ 15 dB		
Image rejection	≥ 55 dB		
Impedance	50 Ω		
Connector	BNC Female		
DVB-T Modulator			
FFT	2K, 8K		
Guard interval	1/4, 1/8, 1/16, 1/32		
FEC	1/2, 2/3, 3/4, 5/6, 7/8		
Constellation	QPSK, 16 QAM, 64 QAM		
Bandwidth	6, 7, 8 MHz		
MFN adaptation rate	Yes. Jitter PCR Restamping ±40ns		
Local oscillators			
Phase noise	> 95 dBc/Hz @ 1KHz (MFN mode). Negligible in SFN mode.		
Frequency stability with temperature (-10 to 60ºC) (without external GPS input)	± 1 x 10e-6		
Frequency stability for a year (without external GPS input)	± 1 x 10e-6		
RF output			
Frequency range	1 UHF 6, 7 or 8 MHz channel		
Maximum output power [W]	1,26W	7W	14W
Maximum output power [dBm]	31 dBm	38,5 dBm	41,5 dBm
Distance to the shoulders	>38 dB		
MER	>34 dB		
Power stability	< ± 0,5 dB		
Return losses	>20 dB		
Spurious emissions out of channel (without Filter)	<-60 dBc		
Impedance	50 Ω		
Connector	BNC Female		N Female
RF test output			
Coupling	27 ± 3 dB	38 ± 3 dB	38 ± 3 dB
Connector	BNC Female		
External synchronization input			
Frequency	10 MHz		
Input level range	-20 to +10 dBm		
Connector	BNC Female (back of module)		
General			
Control and monitoring interfaces & protocols	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP		
Input voltage range	220 Vac ± 15%		
DC Power Consumption *	23W	65W	85W
Operating temperature range	0 to 45ºC		
Relative humidity	< 95% @ 40ºC, non condensing		
Power factor	0,99		
Dimensions [width x height x depth]	Up to 7 (1W and 5W) or up to 5 (10W) transmitters in 19" x 5HU x 250mm		
Cooling	Active (forced ventilation)		
Directives & standards			
R&TTE	199/05/EC, EN 301489-1, EN 301489-14, EN 60950		
RoHS	2011/65/EU		
Standards	EN 300744, EN 302304, TS 101191, EN 50083-9, TR 101290, AC 106		

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

REMOTE **MANAGEMENT**

Compact Series management system is a highly integrated solution that allows remote control and monitoring through all the available interfaces in a single unit, supporting HTTP, SNMP, PPTP, IPsec and TCP-IP protocols. It includes alarms/relays and DVB-T receiver and optionally a GSM/GPRS/UMTS/ HSDPA modem.

TRedess REMOTE MANAGEMENT

COMPACT SERIES | Technical specifications

Denomination	MOD MGMT CS
Management	
Interfaces	Ethernet 10/100 Mbps · USB 2.0 compatible
Protocols	IPv4, DHCP, NTP, HTTP, SNMPv1/v2c
Supported	IPv6, FTP, SSH
DVB-T Receiver	
Input frequency	1 UHF 6, 7 or 8 MHz channel
Noise figure	≤6dB
Lock margin	±500KHz
Freq image rejection	≥65dB
Input level	-40 to +15dBm
Standard	ETS300744
Relays	
External alarm inputs	5 Optocouplers
Input-Output isolation	5000V
Response	5µs
Number of outputs	5 Free potential contact relays
GSM/UMTS Modem (Optional)	
Features	HSDPA 7.2Mbps UMTS/HSDPA 2100MHz EGSM Quad-band GPRS multi-slot class 12 EDGE multi-slot class 12
Frequency bands	EGSM 850/900/1800/1900MHz UMTS 2100MHz
Output power	Class 4 (2W, 33dBm) @ GSM 850/900 Class 1 (1W, 30dBm) @ GSM 1800/1900 Class 3 (0,25W, 24dBm) @ UMTS Class E2 (0,5W, 27dBm) @ EDGE 850/900 Class E2 (0,4W, 26dBm) @ EDGE 1800/1900
Sensitivity	-107dBm @ GSM 850/900 MHz -106dBm @ DCS1800 / PCS1900 MHz -108,2 dBm @ WCDMA 2100 MHz
General	
Input voltage range	220 Vac ± 15%
DC Power Consumption	Management: 2,7W Management + modem (@worst network conditions): 5,5W Management + charging battery (maximum): 13,5W
Operating temperature range	0 to 45ºC
Relative humidity	< 95% @ 40ºC, non condensing
Power factor	0,99

SYNCHRONIZATION

Compact Series provides a complete synchronization system in a 19"x1HU, composed by one or two GPS receivers (optional GPS redundancy) and a GPS splitter. GPS splitters are stackable, so that the 1pps and 10MHz synchronization signals can be supplied to all the equipment.

TRedess GPS RECEIVER

COMPACT SERIES I Technical specifications

Denomination	MOD GPS CS
Frequency output (10 MHz)	
Accuracy: with GPS (average over 24 hours when GPS locked)	< ±1 × 10 exp–12 Hz
Accuracy: without GPS	< ±2 Hz
Medium Term Stability (without input reference, constant temp., after 2 weeks of continuous operation locked on input source)	< ±2 × 10 exp–10/day
Short time stability (Allan Variance)	1x10 exp -11 @ 1s 3x10 exp -11 @ 10s & 100s
Temperature Stability (peak to peak)	1 × 10 exp–9 (from -5ºC to 70ºC)
Phase noise (typical, static conditions)	- 120 dBc/Hz @ 10Hz - 135 dBc/Hz @ 100Hz - 145 dBc/Hz @ 1kHz, 10kHz & 100kHz
Harmonic distortion	–40dBc
Signal Waveform / Impedance	Sine wave / 50 Ω
Time output (1PPS)	
Accuracy to UTC (GPS locked)	±25ns (1σ)
Holdover Mode after 4 hours	0.8µs
Holdover Mode after 1 day (at constant temp., after 24 hours of GPS lock)	12µs
Signal Waveform / Impedance	TTL / 50 Ω
Operating mode	
Cold start-up time	< 20 minutes
Hot start-up time	< 5 minutes
Permanent self-test of main function	Yes
Interfaces	
Antenna input connector	BNC female
Antenna input inpedance	50 Ω
Output 10MHz/1PPS & data:	DIN 41612 32pins 2A male
Antenna	
Frequency range	1575,42 MHz ± 1.023 MHz
Gain	35 dB typical
Noise figure	< 2.2 dB (1.8dB typical)
Out Band Rejection @ 1575.42 ± 50MHz	60dB typical
Power supply	5V/27mA
Operating Temperature	-40ºC to 85ºC
Relative humidity	<95% @ 40ºC, non condensing
Connector	N female
Impedance	50 Ω

TRedess SPLITTER GPS

COMPACT SERIES I Technical specifications

Denomination	MOD SPLITTER GPS CS
Switching unit	
Frequency (10 MHz) inputs	3 redundant (2 from GPS + 1 external)
Frequency (10 MHz) outputs	8
External input (10MHz) connector	BNC female
External input (10MHz) impedance	50Ω
Output (10MHz) connector	BNC female
Output (10MHz) impedance	50Ω
Output (10MHz) level (from GPS receiver)	-2.5dBm ± 1.5dB
10MHz insertion losses	< 4 dB
Time (1 pps) inputs	3 redundant (2 from GPS + 1 external)
Time (1 pps) outputs	8
External input (1pps) connector	BNC female
External input (1pps) impedance	50Ω
Output (1pps) connector	BNC female
Output (1pps) impedance	50Ω
Output (1 pps) signal	TTL
Power supply	
DC input voltage	27 ± 0,3 VDC
DC input voltage connector	2 x SMD power jack male (2.1mm ID, 5.5mm OD)
DC voltage reset connector	2 x SMD jack female (2.5mm)
DC Power Consumption	
GPS switcher without GPS receivers	3W
GPS switcher with 2 GPS receivers (at 25ºC)	15W
GPS switcher with 2 GPS receivers (during warm-up time)	20W
Temperature	
Operating temperature	0 to 45º
Relative humidity	<95% @ 40ºC, non condensing
Dimensions	
GPS splitter (WxHxD)	483 x 43 x 166 mm
GPS receiver (WxHxD)	483 x 43 x 166 mm
Antenna GPS (External diameter)	90 mm
Antenna GPS (Heigh without connector)	98.4 mm
Weight	
GPS switcher	2,8 Kg
GPS receiverer (WxHxD)	0,6 Kg
Antenna GPS	0,3 Kg

REDUNDANCY

The TRedess Compact systems offer two redundancy solutions: 1+1 and N+1.

In a system with 1+1 redundancy, every channel has a spare unit in hot stand-by status. If a multiplex meets any of the switching criteria, the system automatically switches to its spare channel.

In a system with N+1 redundancy, one spare channel is in hot stand-by status. If any of the N multiplex meets at least one of the switching criteria, the system automatically configures the spare channel and performs the switching.

The system can be configured for auto-recovering its original status when the switching criteria condition has been cleared. In multiple fault case (N+1 only) switching priorities can be established. The switching criteria are based on different alarms and are user configurable.

TRedess REDUNDANCY | **COMPACT SERIES** | Technical specifications

Denomination	MOD UCA N+1 TX CS	MOD UCA N+1 GF CS
Input distribution/switching		
ASI inputs	6 + 1 (loop from another UCAN+1)	-
RF inputs	-	2
Input connector	BNC female	
Input impedance	75 Ω	50 Ω
ASI outputs	6 + 1 (reserve)	-
Relay Type	Latch with indication of state	-
RF outputs	-	8
Switching RF output		
Output connector	SMA female	
Output impedance	50 Ω	
Maximum Number of relays	6	
Relay Type	Latch with indication of state	
Insertion Loss	< 0.2dB	
Return loss	> 20dB	
Isolation between inputs	70dB	
Maximum power	100W @ 1 GHz	
General		
Power supply	27V	
Input power connector	Jack male	
Output power connector	Jack male	
Consumption	3W	
Peak consumption	7W (100 ms)	
Temperature range	0º to 45ºC	
Dimensions	482 (19") x 43(1U) x 90 mm	

DVB-S2/ASI Converter

Compact Series provides a complete satellite reception system in a 19"x1HU, composed by four dual satellite tuners implemented in a multi-switch platform with PLS scrambling functionality. With only 127mm depth, the satellite converter unit is DVB-S and DVB-S2, Single- and Multistream compatible. The satellite inputs support loop-through, so that a single satellite reception can provide the information for all the tuners.

TRedess DVB-S2/ASI CONVERTER | COMPACT SERIES | Technical specifications

Denomination: DVB-S2 / ASI CONVERTER CS

Satellite Receiver	
RF input frequency	950 to 2150 Mhz
Number of RF inputs	4
Number of RF loop-through outputs	4
Loop-through outputs insertion loss	< 3dB
Input connector	F female
Input impedance	75 Ω
Return losses	> 11,5 dB
RF input power for a single carrier	-80 dBm to -10 dBm
Roll-Off	0.2, 0.25, 0.35
DVB-S Demodulation	
Constellation	QPSK
Symbol rate [MSymbols/s]	1 to 45
FEC	Automatic | 1/2, 2/3, 3/4, 5/6, 7/8 Viterbi and RS dual decoder
DVB-S2 Demodulation	
Modes	CCM, VCM and ACM, Single & Multi-stream, Normal & Short FEC frames
Constellation	QPSK, 8PSK, 16APSK and 32APSK
Symbol rate [MSymbols/s]	QPSK: 67.5 (Single), 47 (Dual) 8PSK: 63 (Single), 31.5 (Dual) 16APSK: 47 (Single) 32APSK: 38 (Single)
FEC	Automatic | 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 LDPC + BCH dual decoder

ASI outputs	
Number of outputs	7
Output connector	BNC female
Output impedance	75 Ω
Transport stream formats	188 bytes structure | Byte or packet mode.
Max Transport stream bit rate	120 Mbit/s
General	
DC input voltage	27 ± 3 VDC
DC input connector	2 x SMD power jack male (2.1mm ID, 5.5mm OD)
Reset connector	2 x SMD jack female (2.5mm)
Control connector	2 x SMD jack female (2.5mm)
Operating temperature range	0 to 45ºC
Relative humidity	< 95% @ 40ºC, non condensing
Dimensions (WxHxD)	483 x 43 x 127 mm
Weight	1Kg
Directives & standards	
R&TTE	1999/05/EC, EN 301489-1, EN 301489-14, EN 60950-1:2006+A1:2010+A11:2009+A12:2011, EN 60215:1989+A1:92+A2:94, EN 61000-3-2:2006+A1+A2, EN 61000-3-3:2008, EN 50364:2010, EN 50413:2008, EN 62369-1:2011
RoHS	2011/65/EU
Standards	EN 300421, EN 302307, EN 50083-9

IP/ASI Converter

The TRedess Compact Series IP to ASI conversion system is based on an embedded Gigabit Ethernet switch with two GbE ports. The 19" x 1HU x 127mm IP/ASI CONVERTER unit can generate up to seven Transport Streams, using single or multiple IP addresses.

TRedess IP/ASI CONVERTER | COMPACT SERIES | Technical specifications

Denomination: IP / ASI CONVERTER CS

GbE Port	
Physical Layer	IEEE 802.3af
Data Rate	10/100/1000 base-T
Input connectors	RJ-45
Number of inputs	2 (1 also working as loop-through output)
Port capabilities	Switch GbE
ASI Port	
Physical Layer	DVB-ASI
Number of outputs	7
Output connector	BNC female
Impedance	75Ω
Data Rate	270 Mbps
Return losses	>15 dB @ 270 MHz
Transport Stream	
TS per IP	Up to 7
Encapsulation	UDP / RTP
Network protocols	
IP-address assignment	DHCP or static
Number of IP addresses	Up to 7
Multicast	IGMP v2
Protocols	IPv4, RTP, UDP

General	
DC Input voltage	27 ± 3 VDC
DC Input connector	2 x SMD power jack male (2.1mm ID, 5.5mm OD)
Reset connector	2 x SMD jack female (2.5mm)
Control connector	2 x SMD jack female (2.5mm)
Operating temperature range	0 to 45ºC
Relative humidity	< 95% @ 40ºC, non condensing
Dimensions (WxHxD)	483 x 43 x 127 mm
Weight	1Kg
Directives & standards	
R&TTE	1999/05/EC, EN 301489-1, EN 301489-14, EN 60950-1:2006+A1:2010+A11:2009+A12:2011, EN 60215:1989+A1:92+A2:94, EN 61000-3-2:2006+A1+A2, EN 61000-3-3:2008, EN 50364:2010, EN 50413:2008, EN 62369-1:2011
RoHS	2011/65/EU
Standards	EN 50083-9, TS 102 034, ISO/IEC 13818 RFC 1122, RFC 791, RFC 768, RFC 3550, SMPTE 2022

COMPACT SERIES **REFERENCES LIST**

CORE COMPONENTS | COMPACT SERIES

Reference	Denomination	Description
853040	MOD ASI-RF 1W CS	DVB-T Transmitter module 1W
853041	MOD ASI-RF 5W CS	DVB-T Transmitter module 5W
868621	MOD ASI-RF 10W CS	DVB-T Transmitter module 10W
853040T2	MOD ASI-RF T/T2 1W CS	DVB-T/T2 Transmitter module 1W
853041T2	MOD ASI-RF T/T2 5W CS	DVB-T/T2 Transmitter module 5W
868621T2	MOD ASI-RF T/T2 10W CS	DVB-T/T2 Transmitter module 10W
852030	MOD RF-RF 1W CS	Gap filler module 1W
852031	MOD RF-RF 5W CS	Gap filler module 5W
858618	MOD RF-RF 10W CS	Gap filler module 10W
85203001	MOD RF-RF 1W DAE CS	Gap filler module 1W with DAE echo canceller
85203101	MOD RF-RF 5W DAE CS	Gap filler module 5W with DAE echo canceller
858619	MOD RF-RF 10W DAE CS	Gap filler module 10W with DAE echo canceller
85203002	MOD RF-RF 1W DEEC CS	Gap filler module 1W with DEEC echo canceller
85203102	MOD RF-RF 5W DEEC CS	Gap filler module 5W with DEEC echo canceller
858620	MOD RF-RF10W DEEC CS	Gap filler module 10W with DEEC echo canceller
852032	MOD REGENERATIVE 1W CS	Regenerative transposer module 1W
852033	MOD REGENERATIVE 5W CS	Regenerative transposer module 5W
852034	MOD REGENERATIVE 10W CS	Regenerative transposer module 10W
858011	MOD PSU CS	Power Supply Unit
857115	CHASSIS CS	Chassis 5HUx19" with backpannel

OPTIONS | COMPACT SERIES

Reference	Denomination	Description	Option code
858011	MOD PSU CS	Redundant power supply unit	RPSU
858140	OPT DAE CS	Option DAE for a gap filler module	DAE
858141	OPT DEEC CS	Option DEEC for a gap filler module	DEEC
858142	MOD MGMT CS	Management module, including TRedess Web Server Management, DVB-T/H receiver, alarms, battery.	MGMT
858145	OPT GSM/GPRS CS	Option GSM/GPRS interface	GSM
858154	OPT UMTS/HSDPA CS	Option UMTS/HSDPA interface	UMTS
858146	OPT SNMP CS	Option SNMP protocol	SNMP
858144	MOD GPS CS	GPS module	GPS
858143	MOD SPLITTER GPS CS	GPS switching unit and 10MHz, 1PPS splitter	
858144	MOD GPS CS	GPS module (second GPS unit working in redundancy)	RGPS
8581580N	MOD UCAN+1 TX CS	Automatic Switching Unit N+1 for Transmitters	UCANTX
8581560N	MOD UCAN+1 GF CS	Automatic Switching Unit N+1 for Gapfillers	UCANGF
858163	DVB-S2/ASI CONVERTER CS	DVB-S and -S2 to ASI converter unit	S2ASI
858165	IP/ASI CONVERTER CS	IP to ASI converter with 2x IP inputs & 1x ASI active output	IPASI
858167	IP/ASI ADDITIONAL OUTPUT ACTIV.	Activation of 1x ASI output (up to)	IPASIOUT

COMPACT SERIES **ORDERING INFORMATION**

Compact Series equipment is fully configurable, being possible to combine the modules in a mixed equipment and customize to your needs with additional options and features. The following naming convention can be used to give a description of the components and options required. Based on them, we will design the best equipment configuration for you.

CS_ EEnC_ pW (code for the equipment description)

p = power in Watts (up to 10)
EE = type of equipment: **TX** (transmitter), **GF** (gap filler), **RT** (regenerative transposer)
n = number of channels
CS = Indicator for Compact Series

Options: Option codes (see options table)

EXAMPLES

5W, 3 channels transmitter.
1W, 2 channels gap filler.
1W, 2 channels regenerative transposer.

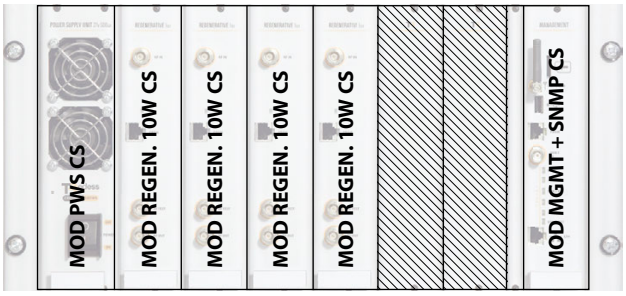
CS_TX3C_ **5**W
CS_GF2C_ **1**W
CS_RT2C_ **1**W

5W, 6 channels gap filler with DEEC and redundant power supply:

CS_GF6C_**5**W
Options: RPSU, **DEEC**

10W, 4 channels regenerative transposer with remote management including SNMP:

CS_RT4C_**10**W_**MGMT**
Options: MGMT, **SNMP**



BROADCAST SERIES
TRANSMITTERS & GAP FILLERS

Technical description

Equipment from the Broadcast Series are developed to expand DTT covering areas where direct terrestrial signal reception is not possible.

In Broadcast Series there are output power options from 5W to 50W. The equipment modules are placed into a 19" x 5HU subrack. Each transmitter consists of a DVB-T/T2 modulator module and a power amplifier.

A 19" subrack can house up to three 5W transmitters/gap fillers and up to two 10W, 20W, 50W or 100W of them.

The Broadcast Series are based on a modular concept, using separate modules for power amplification and digital processing: modulator (transmitter) and channel processor (gap filler).

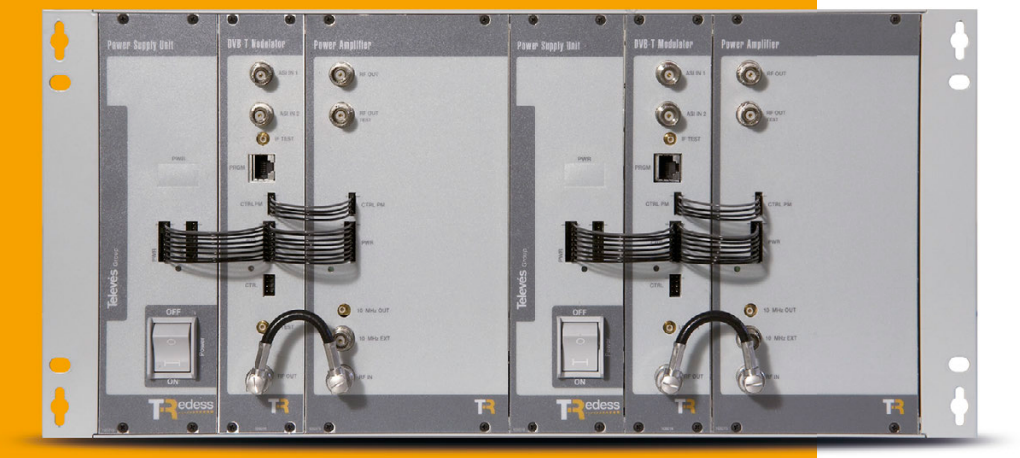
Main Characteristics

- Up to 100W Transmitters and Gap Fillers.
- DVB-T/T2 compliant.
- Two very high-performance echo cancellation options.
- SFN and MFN configurations.
- SFN synchronization system (GPS).
- Redundancy system N+1, 1+1.
- Remote control & monitoring system.
- Frequency agility.
- Low power consumption.
- Very low phase noise oscillator. DDS Technology.
- LDMOS amplifiers.
- Independent operating mode.
- Electromagnetic compatibility and safety according to the CE regulation norms.

Two multiplex 100W modular DVB-T/T2 Broadcast Series transmitter

Two multiplex 50W modular DVB-T/T2 Broadcast Series gap filler

TRANSMITTERS



Two multiplex 10W modular DVB-T/T2 Broadcast Series transmitter

Two multiplex 100W modular DVB-T/T2 Broadcast Series transmitter

Reference DVB-T transmitter	853012	853013	853014	853010	853011	853018	853019	853031	853032
Denomination	TXGB VF nC-5W			TXGB nC-10W		TXGB nC-20W		TXGB nC-50W	

Technical Specifications									
Components									
Power supply unit	1	1	1	1	2	1	2	1	2
DVB-T Modulator (n)	1	2	3	1	2	1	2	1	2
Power amplifier	1	2	3	1	2	1	2	1	2
DVB-T Modulator. Modes.									
FFT	2K, 8K								
Guard interval	1/4, 1/8, 1/16, 1/32								
FEC	1/2, 2/3, 3/4, 5/6, 7/8								
Constellation	QPSK, 16 QAM, 64 QAM								
Network	MFN & SFN								
Bandwidth	6, 7, 8 MHz								
DVB-T Modulator. Inputs									
MPEG2 / MPEG4	2 ASI seamless (redundant)								
Impedance	75 Ω								
Connector	BNC Female								
10MHz synchronization input									
Input level	-15 dBm to +10 dBm								
Impedance	50 Ω								
Connector	BNC female (back of module)								
1pps synchronization input									
Level	0 - 5 V								
Trigger	Selected by rise-edge or fall-edge								
Connector	BNC female (back of module)								
Local Oscillators									
Phase noise	≥90 dBc/Hz @ 1kHz								
Frequency stability with temperature (-10º to 60ºC) (without external GPS input)	Standard: ± 1 x 10e-6 Optional: ± 1 x 10e-7								
Frequency stability for a year (without external GPS input)	Standard: ± 1 x 10e-6 Optional: ± 1 x 10e-7								
RF output									
Frequency range	1 UHF 8 MHz channel								
Maximum output power [W]	7,9 W			15 W		31,6 W		80 W	
Maximum output power [dBm]	39 dBm			41,75 dBm		45 dBm		49 dBm	
Distance to the shoulders	>38 dB								
MER	>34 dB								
Power stability	≤ ± 0,5 dB								
Return losses	> 20 dB								
Spurious emissions out of channel	< -60 dBc								
Impedance	50 Ohm								
Connector	BNC Female					N Female			
RF test output									
Coupling	27 ± 3dB					42 ± 3dB		43 ± 3dB	
Connector	BNC Female								
IF test output									
Output level	-35 dBm								
Central frequency of the channel	36,15 MHz								
Connector	SMB Female								
Local oscillator test output									
Output level	-30 ± 3 dBm								
Connector	SMB Female								
General									
Control and monitoring	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP								
Input voltage range	220 Vac ± 15%								
DC Power Consumption *	85W	170W	255W	125W	250W	160W	320W	400W	800W
Operating temperature range	0 to 45ºC								
Relative humidity (max.)	95%, non condensing								
Power factor	0,60							0,99	
Dimensions [width x height x depth]	Up to 3 tx. in [19"x5HUx250mm]			Up to 2 transmitters in [19"x5HUx250mm]					
Weight	6'5kg	9kg	11'5kg	9kg	18kg	9kg	18kg	9kg	18kg
Cooling	Active (forced ventilation)								
Directives & standards									
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302296-2, 1999/519/EC								
RoHS	2011/65/EU								
Standards	EN 300744, EN 302304, TS 101191, EN 50083-9, TR 101290, TS 102 773, TS 102 831								

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

TRedess DVB-T/T2 TRANSMITTERS 5W, 10W, 20W, 50W, 100W | BROADCAST SERIES | Technical specifications (part 1 of 2)

Reference DVB-T/T2 transmitter	853012T2	853013T2	853014T2	853010T2	853011T2	853018T2	853019T2	853031T2	853032T2	853042T2	853043T2
Denomination	**TXGB VF nC-5W**			**TXGB nC-10W**		**TXGB nC-20W**		**TXGB nC-50W**		**TXGB nC-100W**	

Technical Specifications											
Components											
Power supply unit	1	1	1	1	2	1	2	1	2	1	2
DVB-T/T2 Modulator (n)	1	2	3	1	2	1	2	1	2	1	2
Power amplifier	1	2	3	1	2	1	2	1	2	1	2
DVB-T Modulator. Modes.											
FFT	2K, 8K										
Guard interval	1/4, 1/8, 1/16, 1/32										
FEC	1/2, 2/3, 3/4, 5/6, 7/8										
Constellation	QPSK, 16 QAM, 64 QAM										
Network	MFN & SFN										
Bandwidth	6, 7, 8 MHz										
DVB-T2 Modulator. Modes											
FFT	1K, 2K, 4K, 8K, 16K, 32K (normal or extended)										
Guard interval	1/4, 19/256, 1/8, 19/128, 1/16, 1/32, 1/128										
FEC	1/2, 3/5, 2/3, 3/4, 4/5, 5/6										
Constellation	QPSK, 16 QAM, 64 QAM, 256 QAM (normal or rotated)										
Network	MFN & SFN										
Bandwidth	1.7, 5, 6, 7, 8 MHz										
Input modes	TS (SPLP) over ASI · T2MI (SPLP & MPLP*) over ASI										
PLPs	Up to 8 PLPs										
Pilot patterns	PP1 to PP8										
Efficiency mode	Normal & High										
Operation mode	SISO and/or MISO										
DVB-T/T2 Modulator. Inputs											
MPEG2 / MPEG4	2 ASI seamless (DVB-T mode). 2 ASI redundant (DVB-T2 mode).										
Impedance	75 Ω										
Connector	BNC Female										
10MHz synchronization input											
Input level	-20 dBm to +10 dBm										
Impedance	50 Ω										
Connector	BNC female (back of module)										
1pps synchronization input											
Level	0 - 5 V										
Trigger	Selected by rise-edge or fall-edge										
Connector	BNC female (back of module)										
Local Oscillators											
Phase noise	≥90 dBc/Hz @ 1kHz										
Frequency stability with temperature (-10º to 60ºC) (without external GPS input)	Standard: ± 1 x 10e-6 Optional: ± 1 x 10e-7										
Frequency stability for a year (without external GPS input)	Standard: ± 1 x 10e-6 Optional: ± 1 x 10e-7										

Continues in the next page

TRedess DVB-T/T2 TRANSMITTERS 5W, 10W, 20W, 50W, 100W | BROADCAST SERIES | Technical specifications (part 2 of 2)

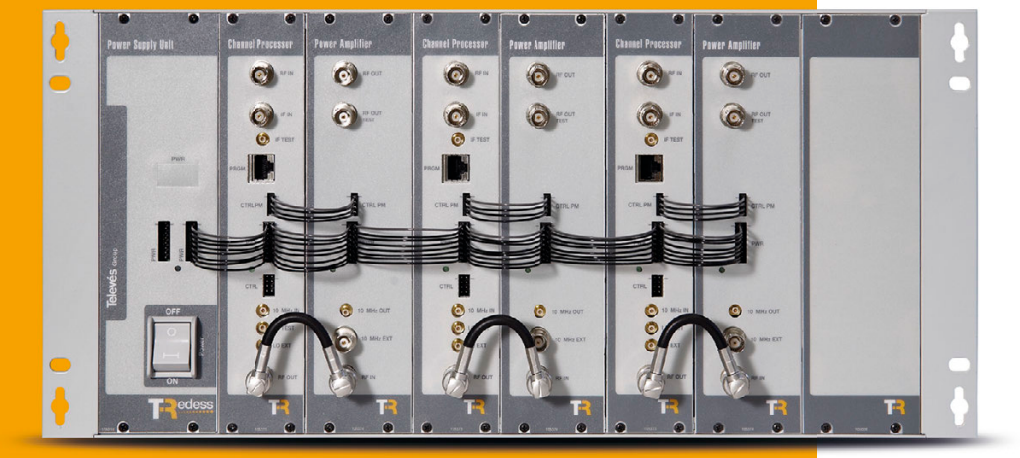
Reference DVB-T/T2 transmitter	853012T2	853013T2	853014T2	853010T2	853011T2	853018T2	853019T2	853031T2	853032T2	853042T2	853043T2
Denomination	**TXGB VF nC-5W**			**TXGB nC-10W**		**TXGB nC-20W**		**TXGB nC-50W**		**TXGB nC-100W**	

Continuation from the previous page

Technical Specifications											
RF output											
Frequency range	1 UHF 6, 7 or 8 MHz channel										
Maximum output power [W]	7,9 W			15 W		31,6 W		100 W		120 W	
Maximum output power [dBm]	39 dBm			41,75 dBm		45 dBm		50 dBm		50,8 dBm	
Distance to the shoulders	>38 dB										
MER	>35 dB										
Precorrection	Digital										
Power stability	≤ ± 0,5 dB										
Return losses	> 20 dB										
Spurious emissions out of channel	< -60 dBc										
Impedance	50 Ohm										
Connector	BNC Female					N Female					
RF test output											
Coupling	27 ± 3dB			27 ± 3dB		42 ± 3dB		43 ± 3dB		43 ± 3dB	
Connector	BNC Female										
IF test output											
Output level	-35 dBm										
Central frequency of the channel	36,15 MHz										
Connector	SMB Female										
Local oscillator test output											
Output level	-30 ± 3 dBm										
Connector	SMB Female										
General											
Control and monitoring	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP										
Input voltage range	220 Vac ± 15%										
DC Power Consumption *	85W	170W	255W	125W	250W	160W	320W	400W	800W	600W	1200 W
Operating temperature range	0 to 45ºC										
Relative humidity (max.)	95%, non condensing										
Power factor	0,60							0,99			
Dimensions [width x height x depth]	Up to 3 tx. in [19" x 5HU x 250mm]			Up to 2 transmitters in [19" x 5HU x 250mm]							
Weight	6'5kg	9kg	11'5kg	9kg	18kg	9kg	18kg	9kg	18kg	9kg	18kg
Cooling	Active (forced ventilation)										
Directives & standards											
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302296-2, 1999/519/EC										
RoHS	2011/65/EU										
Standards	EN 300744, EN 302304, EN 302775, TS 101191, EN 50083-9, TR 101290, TS 102 773, TS 102 831										

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

GAP FILLERS



Three multiplex 5W modular DVB-T/T2 Broadcast Series gap filler

Two multiplex 50W modular DVB-T/T2 Broadcast Series gap filler

References Gap-filler	851018	851019	851020	851016	851017	851024	851025	851031	851032
Denomination	RXGB VF nC-5W			RXGB nC-10W		RXGB nC-20W		RXGB nC-50W	
References Gap-filler with DAE	852013	852014	-	852016	852017	85102401	85102501	-	-
References Gap-filler with DEEC	851052	851053	851054	851046	851047	851048	851049	851044	851045

Technical Specifications									
Components									
Power supply unit	1	1	2	1	2	1	2	1	2
Channel processor	1	2	3	1	2	1	2	1	2
Power amplifier	1	2	3	1	2	1	2	1	2
RF input									
Frequency range	1 UHF 8 MHz Channel								
Input signal range	-70 to -20 dBm								
Noise figure	< 8 dB								
Return losses	> 20 dB (with DAE) • > 15 dB (with DEEC)								
Frequency image rejection	> 90 dB (with DAE) • > 65 dB (with DEEC)								
Adjacent channel rejection	> 80 dB								
Impedance	50 Ω								
Connector	BNC Female								
DAE (Digital Adaptive Equalizer)									
Gain Margin (signal - echo)	-10 dB								
Cancellation window	0 - 8 µs								
Output power adaptive regulation	Yes								
IF TEST INPUT									
Input signal range	-30 to -10 dBm								
Input central frequency	36,125 MHz								
Connector	SMB Female								
IF TEST OUTPUT									
Output level	-30 ± 3 dB								
Connector	SMB Female								
Local oscillator test output									
Output level	-30 ± 3 dB								
Connector	SMB Female								
DEEC (Doppler Enhanced Echo Canceller)									
Gain Margin (signal - echo)	-24 dB								
Cancelation window	3 configurable cancellation windows • Selective cancellation up to 37,6 µs								
Doppler cancellation	Yes								
External synchronization input									
Frequency	10 MHz								
Input level range	-10 to +10 dBm (with DAE) • -20 to +10 dBm (with DEEC)								
Connector	BNC Female								
Local oscillators									
Phase noise	> 90 dBc/Hz @ 1KHz (in MFN mode). Negligible in SFN mode.								
Frequency stability with temperature (-10º to 60ºC) (without external GPS input)	± 1 x 10e-6								
Frequency stability for a year (without external GPS input)	± 1 x 10e-6								
RF output									
Frequency range	1 UHF 8 MHz Channel								
Maximum output power [W]	7,9 W			15 W		31,6 W		80 W	
Maximum output power [dBm]	39 dBm			41,75 dBm		45 dBm		49 dBm	
Distance to the shoulders	>38 dB								
Power stability	± 0,5 dB								
Return losses	>20 dB								
Spurious emissions out of channel	<-60 dBc								
Impedance	50 Ω								
Connector	BNC Female					N Female			
RF test output									
Coupling	27 ± 3dB			27 ± 3dB		42 ± 3dB		43 ± 3dB	
Connector	BNC Female								
General									
Control and monitoring	Ethernet, Relays · IP, HTTP, FTP, GSM/GPRS, UMTS/HSDPA, SNMP								
Input voltage range	220 Vac ± 15%								
DC Power Consumption *	85W	170W	255W	125W	250W	160W	320W	400W	800W
Operating temperature range	0 to 45ºC								
Relative humidity (max.)	95%, non condensing								
Power factor	0,60							0,99	
Dimensions [width x height x depth]	Up to 3 gf. in [19" x 5HU x 250mm]			Up to 2 gap-fillers in [19" x 5HU x 250mm]					
Weight	6kg	8,5kg	13kg	9kg	18kg	9kg	18kg	9kg	18kg
Cooling	Active (forced ventilation)								
Directives & standards									
R&TTE	1999/5/EC, EN 301489-1, EN 301489-14, EN 60950, EN 60215:1989+A1:92+A2:94, EN 61000-3-2: 2006 + A1 + A2, EN 61000-3-3: 2008, EN 302296-2, 1999/519/EC								
RoHS	2011/65/EU								
Standards	EN 300744, EN 302304, EN 302775, TS 101191, EN 50083-9, TR 101290, TS 102 773, TS 102 831								

* DC Power Consumption is specified at the Maximum Output Power transmitted for every power range.

REMOTE **MANAGEMENT**

Technical description

Control and monitoring system for TRedess Broadcast Series transmitters and gap fillers allows remote system management and remote alarm control. This solution is configurable according to customer needs and requirements and it is placed in a 19" subrack with 5HU and 250mm depth dimensions. Thanks to its modular configuration is possible to carry out system supervision through different interfaces and different protocols.

Power supply units. The remote management subrack can include two power supply units working in redundancy. It can also host one or two (redundancy) GPS receivers.

REMOTE MANAGEMENT & SYNCHRONIZATION OPTIONS
BROADCAST SERIES

Reference	Description	Option code
858002	Simple Power Supply Unit	FA
858002 (x2)	Two redundant Power Supply Unit (forced ventilation)	2FAVF
858130	Power Supply switching unit with battery	
858114	Management module, including TRedess Web Server application.	MNG
858115	Option GSM/GPRS interface	GSM
858116	Option DVB-T Receiver	DEMOD
858117	GPS module	GPS
858117 (x2)	Two GPS modules working in redundancy	2GPS
858113	GPS switching unit and 10MHz/1pps Splitter	
858119	Option Contacts/Alarms module	CON
858123	Option SNMP protocol	SNMP

MANAGEMENT MODULE

It centralises the different system alarms and events from every detected module making a periodic checking. The Management unit supplies, without any additional module, remote control and monitoring through Ethernet and serial communication (HTTP, SNMP, PPTP, IPsec, TCP-IP).

Technical Specifications
Hardware settings
Interfaces: Ethernet 10/100 Mbps USB 2.0 compatible RS232 external (modem) Local programmer RS485 (control bus)
Software settings
Protocols: IPv4, DHCP, NTP, HTTP, SNMP v1/v2c
Supported: IPv6, FTP, SSH
Applications: SNMP agent Web server VPN client
General
DC Power Consumption: 2W
Operating temp. range: 0 to 45ºC
Relative humidity: < 95% @ 40ºC, non condensing

GSM/GPRS

Connected to the remote control module (Management) through a serial port, it allows system communication through mobile networks.

Technical Specifications
Modem
Frequency bands: EGSM 850/900/1800/1900MHz
Output power: 2W @ 850/900MHz 1W @ 1800/1900MHz
Sensitivity: -107dBm @ 850/900MHz -106 dBm @ 1800/1900MHz
General
DC Power Consumption: 26µA (power off) < 4mA (power save) 200mA (direct mode) 370mA (max consumption mGPRS)
Operating temp. range: 0 to 45ºC
Relative humidity: < 95% @ 40ºC, non condensing

ALARMS

Allows exporting system alarms using electrical relays, receiving remote control commands from external equipment through optical couplers and acting over external equipment using electrical relays.

Technical Specifications
Optocoupler inputs
External alarm inputs: 15 (12 in connector2, 3 in connector1)
Input-Output isolation: 5000V
Response: 5µs
Outputs
Outputs: 21 (9 in connector1, 12 in connector3)
Impedance: 75mΩ
Max power: 60W
Max voltage: 220Vdc, 125 Vac
Max current: 2A
Expected life: 10 exp 8 switchings
General
DC Power Consumption: 50mW (per active input) 70mW (per relay)
Operating temp. range: 0 to 45ºC
Relative humidity: < 95% @ 40ºC, non condensing

DVB-T RECEIVER

It analyses DVB-T transmitted signals and informs to control module (Management) about their quality.

Technical Specifications
DVB-T demodulator
Inputs: 2 x BNC female
Input frequency: 174-230 / 474-858MHz
Noise figure: ≤6dB
Lock margin: ±500KHz
Freq image rejection: ≥65dB
Input level: -30 to +10dBm
Standard: ETS300744
General
DC Power Consumption: 4.5W
Operating temp. range: 0 to 45ºC
Relative humidity: < 95% @ 40ºC, non condensing

SYNCHRONIZATION

GPS **MODULE**

For transmitters and MFN-SFN gap fillers we supply a GPS synchronization system that can work in redundancy. Synchronization signals (10MHz and 1pps) from each GPS module are distributed and switched through the GPS switching unit.

Denomination	MOD GPS BS
Frequency output (10 MHz)	
Accuracy: with GPS (average over 24 hours when GPS locked)	< ±1 × 10 exp–12 Hz
Accuracy: without GPS	< ±2 Hz
Medium Term Stability (without input reference, constant temp., after 2 weeks of continuous operation locked on input source)	< ±2 × 10 exp–10/day
Short time stability (Allan Variance):	1x10 exp -11 @ 1s 3x10 exp -11 @ 10s & 100s
Temperature Stability (peak to peak)	1 × 10 exp–9 (from -5ºC to 70ºC)
Phase noise (typical, static conditions)	- 120 dBc/Hz @ 10Hz - 135 dBc/Hz @ 100Hz - 145 dBc/Hz @ 1kHz, 10kHz & 100kHz
Harmonic distortion	–40dBc
Signal Waveform / Impedance	Sine wave / 50 Ω
Signal level	5 ± 2 dBm
Connector	BNC female
Time output (1PPS)	
Accuracy to UTC (GPS locked)	±25ns (1σ)
Holdover Mode after 4 hours	0.8µs
Holdover Mode after 1 day (at constant temp., after 24 hours of GPS lock)	12µs
Signal Waveform / Impedance	TTL / 50 Ω
Connector	BNC female
Operating mode	
Cold start-up time	< 20 minutes
Hot start-up time	< 5 minutes
Permanent self-test of main function	Yes
Interfaces	
Antenna input connector	BNC female
Antenna input inpedance	50 Ω
Antenna	
Frequency range	1575,42 MHz ± 1.023 MHz
Gain	35 dB typical
Noise figure	< 2.2 dB (1.8dB typical)
Out Band Rejection @ 1575.42 ± 50MHz	60dB typical
Power supply	5V/27mA
Operating Temperature	–40ºC to 85ºC
Relative humidity	<95% @ 40ºC, non condensing
Connector	N female
Impedance	50 Ω
DC Power Consumption	
Consumption (at 25ºC)	6,5 W
Consumption (during warm-up time)	9 W

GPS **SWITCHING UNIT**

It manages the 1pps and 10MHz synchronization signals received from the GPS modules, selecting the locked one. It includes the needed circuits for eight 10MHz and 1pps signals generation (all of them available through BNC connectors placed on the back side of the module).

It also informs about the power supply units' status to the monitoring system.

Denomination	MOD GPS SPLITTER BS
Switching unit	
10MHz inputs	2 (redundant)
1PPS inputs	2 (redundant)
10MHz outputs	8
1PPS outputs	8
10MHz and 1PPS inputs and outputs connectors	BNC female
10MHz and 1PPS inputs and outputs Impedance	50Ω
Insertion loss (10MHz)	< 7 dB
General	
Battery	Lithium
Temperature range	0 to 45ºC
Dimensions (WxHxD)	482x43x90mm
Weight	1,5Kg
DC Power Consumption	2W
Relative humidity	< 95% @ 40ºC, non condensing

REDUNDANCY

The TRedess Broadcast systems offer two redundancy solutions: 1+1 and N+1.

In a system with 1+1 redundancy, every channel has a spare unit in hot stand-by status. If a multiplex meets at least one of the switching criteria, the system automatically switches to its spare channel.

In a system with N+1 redundancy, one spare channel is in hot stand-by status. If any of the N multiplex meets at least one of the switching criteria, the system automatically configures the spare channel and performs the switching.

The system can be configured for auto-recovering its original status when the switching criteria condition has been cleared. In multiple fault case (N+1 only) switching priorities can be established. The switching criteria are based on different alarms and are user configurable.

Reference	858126	858127
Denomination	MOD UCA1+1 GB	MOD UCAN+1 GB
Input distribution/switching		
Switching input	No	Yes
Relay Type	-	Latch
Insertion Loss	-	< 1,5dB
Number of inputs	2	6
Input connector	BNC female	
Switching RF output		
Relay Type	Latch with indication of state	Latch
Insertion Loss	< 0.2dB	
Return loss	> 20dB	
Isolation between inputs	70dB	
Maximum power	100W @ 860MHz	
Number of outputs	2	N (up to 6)
Output connector	SMA female	
Impedance	50 Ω	
General		
Power supply	13,5 V	
Maximum consumption	5W	
Input power connector	Jack male	
Output power connector	Jack male	-
Temperature range	0º to 45ºC	
Dimensions	482(19") x 43(1HU) x 90 mm	
Weight	1,1 kg	1,6 kg

Broadcast Series UCA 1+1 redundancy

Broadcast Series UCA N+1 redundancy

ECHO CANCELLING

Our two very high-performance echo cancellers make TRedess gap fillers ideal for operation in single-frequency networks with limited isolation between the receiving and transmitting antennas. Two different versions are available: **DAE** and **DEEC**.

As general rule, it can be stated that a gap filler without echo canceller can be installed in a SFN (using the same input and output channel), but needs an echo signal level 10dB lower than the main signal.

A TRedess gap filler can be installed in locations where the echo signal level is up to 10dB (using DAE) or 20dB (using DEEC) higher than the main signal (recommended reference values).

COMPARATIVE TABLE	DEEC Doppler Enhanced Echo Canceller	DAE Digital Adaptive Equalizer
Gain Range (signal-echo)	-24dB	-10dB
Cancellation window	0'5 - 18'5µs*	0 - 8 µs
Features	Doppler cancellation	Spectrum equalization

DAE
DIGITAL ADAPTIVE EQUALIZER

Technical description

The DAE echo canceller is indicated to be used under moderate echo conditions, supports a 10dB gain margin level and performs spectrum equalization.

In addition to cancelling the echo produced by the coupling between the transmitting and receiving antenna, it is able to cancel any echo of the input signal whose delay with the main beam is between 0 and 8µs.

Thus, the echo canceller circuit allows correcting the distortions in amplitude of the input signal of the gap filler when they are caused by multipath propagation, in the case of rays that are within the cancellation window.

DEEC
DOPPLER ENHANCED ECHO CANCELLER

Technical description

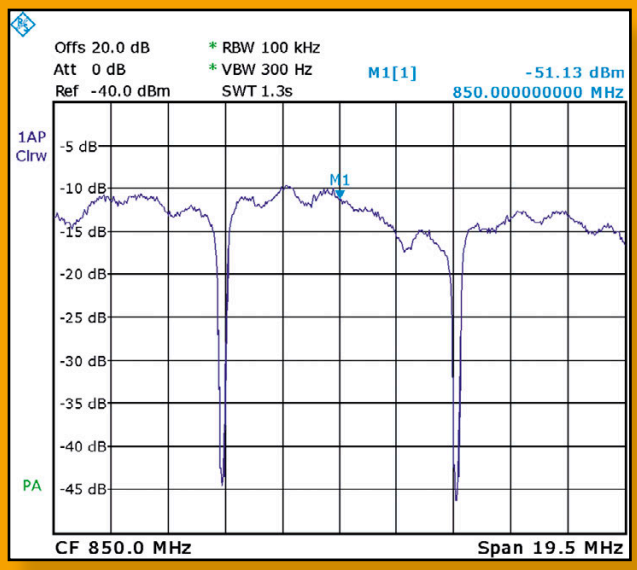
The Doppler Enhanced Echo Canceller can suppress Doppler effect and echoes with greater gain margin, giving a better MER performance:

· Output MER > 27dB for a 20dB gain margin.
· Output MER > 24dB for a 24dB gain margin.

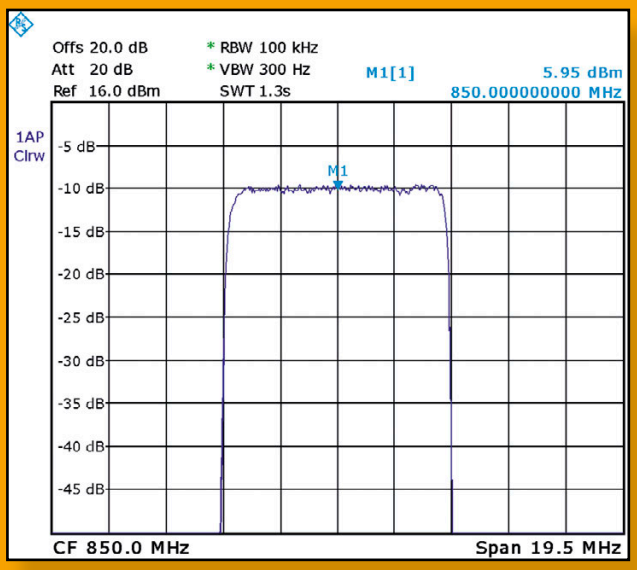
***** The cancellation coverage is based on three temporal windows of approximately 6µs wide each. Placed in continuous mode, they fully cover a range from 0,5µs to 18,5µs. The three windows can shift independently in a range going up to 37,6 µs.

DAE GRAPHS

Spectrum equalization with DAE echo canceller.



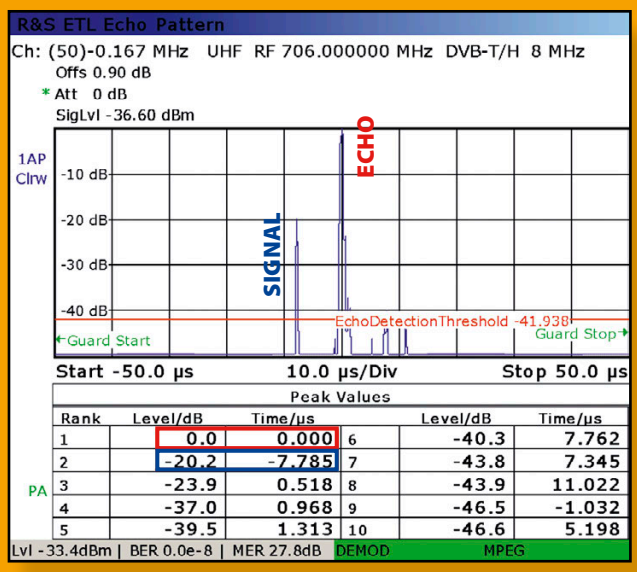
Input signal



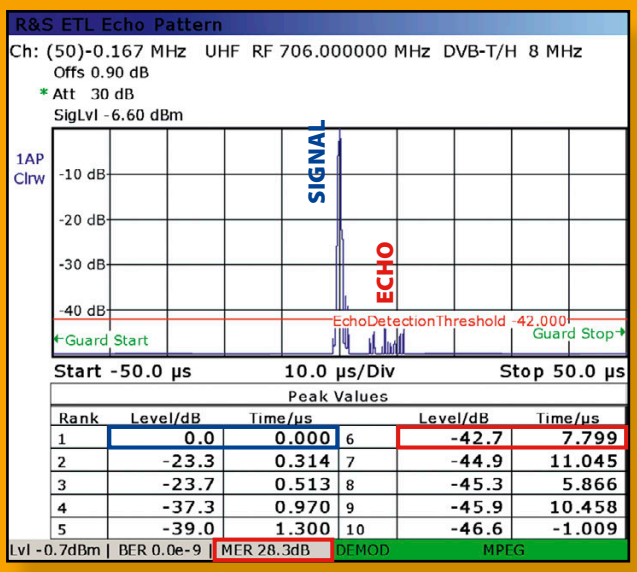
Output signal

DEEC GRAPHS

Cancellation of an echo 20dB higher than the signal with DEEC echo canceller, with output MER > 27dB.



Input signal



Output signal

CONTROL AND MONITORING SYSTEMS

The Control and Monitoring system for TRedess transmitters and gap fillers allows remote system management and remote alarm control. This solution is configurable according to customer needs and allows system supervision through different interfaces (Ethernet, serial communication, GPRS/HSDPA, electrical relays) and protocols (HTTP, SNMP, PPTP, IPSec, TCP/IP).

Third party equipment can be integrated in the monitoring system using the electrical relays.

TRedess systems can also be managed with the ***TRedess Web Server Management*** application tool.

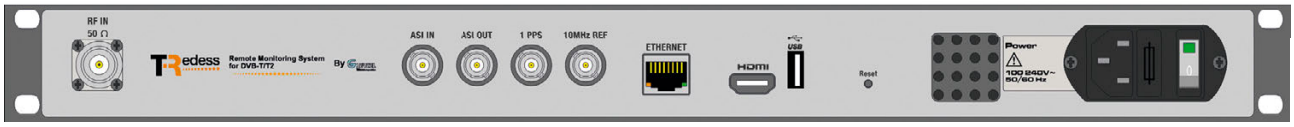
TREDESS **WEB SERVER MANAGEMENT**

TRedess equipments can be managed and controlled (local or remotely) with our ***Web Server Management*** application tool. Through an IP connection it is possible to configure and control the system (modules, alarms, …) and configure all the transmission parameters (IP settings, GSM/GPRS parameters, VPN, serial port).

Using its user friendly graphical interface it is possible to obtain all parameters details and internal diagrams, alarm log, module status, etc, and modify and upgrade the system.

REMOTE MONITORING SYSTEM FOR DVBT/T2

Professional monitoring system for DVB-T and DVB-T2 distribution networks to analyze and ensure the quality of the network.



RF Analysis

- Real-time spectrum.
- PWR, MER, BER signal quality measures.
- Constellation representation.
- Up to 4 simultaneous RF inputs.

TS Analysis

- Level 1, 2 and 3 priority error analysis as TR 101 290 recommendations.
- PCR Jitter analysis.
- MPEG2 buffer analysis.
- Network delay and Max. MIP network delay measurement.
- Alarm log analysis.
- Up to 4 simultaneous TS inputs.

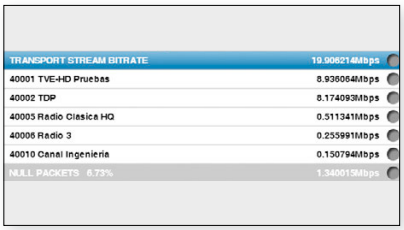
And much more...

- MPEG2 and MPEG4 video streaming.
- Cost-effective solution. Low consumption and size (Rack 1U 19").
- Local display of measures and alarms.
- Ethernet conectivity.
- HTML5 control application.
- SNMP v2.0 alarms.
- HDMI audio/video output.

MANAGEMENT SYSTEM

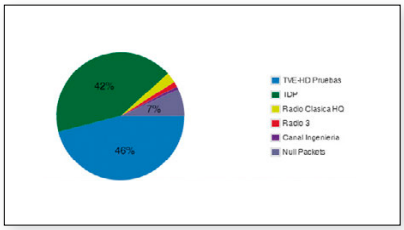
Web browser accesible control and presentation environment.

All-in-one visualization:
Presents a brief system status. It shows spectrum, services, measures, alarms, PIDs... All integrated in a single view for quick analysis.

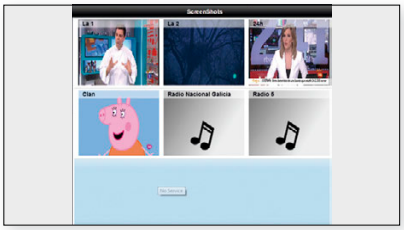


PID visualization:
It shows a list of PIDs with ratio, bandwidth and several information.

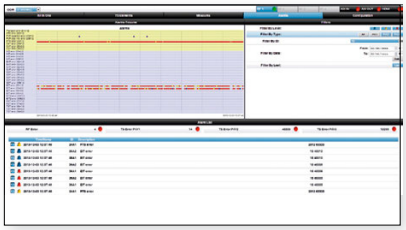
Analyzer view:
It represents the spectrum of the monitorized channel with detailed measures.



Services visualization:
It shows in detail channel services ifnormation. Several views are configurable.



Screenshots:
It shows realtime captures of the monitored channel services.



Alarm summary:
It represents the alarms counter since the beggining of the monitorization.

REMOTE MONITORING SYSTEM FOR DVBT/T2 | Technical specifications

Standards	
ETSI EN 300 744 (DVB-T) ETSI EN 302 755 (DVB-T2) (opt.) ETSI TR 101 290	
Inputs	
RF	1 x 50 Ω N connector 4 x 50 Ω N connector (opt.)
RF Input frequency	47MHz a 1GHz
SYNC	1 x 1PPS BNC 50 Ω 10Mhz BNC 50 Ω
TS	1 x ASI IN BNC 50 Ω
Outputs	
TS	1 x ASI OUT BNC 50 Ω
A/V	1 x HDMI
RF Measures	
Spectrum Signal power MER CBER, VBER Link Margin, BCHBER, LDPCBER (opt.) Carrier MER (opt.) Constelation (opt.) Echos (opc.)	

MPEG Measures
Level 1,2 y 3 priority errors MPEG2 buffer analysis Alarms log analysis PCR Jitter (opt.) Network delay (opt.) MIP network maximum delay (opt.)
Mechanical characteristics
1U 19" rackable unit. Size: 482mm W x 348mm D x 41mm H Working temperature 0 a 40 ºC Storage temperature 0 a 50 ºC
Electrical characteristics
Input 100 - 240 VAC 50-60Hz 1.4A
Interfaces
1 x USB 2.0 1 x Ethernet RJ45 LCD Graphic display
Control protocols
HTML & SNMP

TREDESS
INTEGRATED SOLUTIONS

GLOBAL SYSTEM SOLUTION

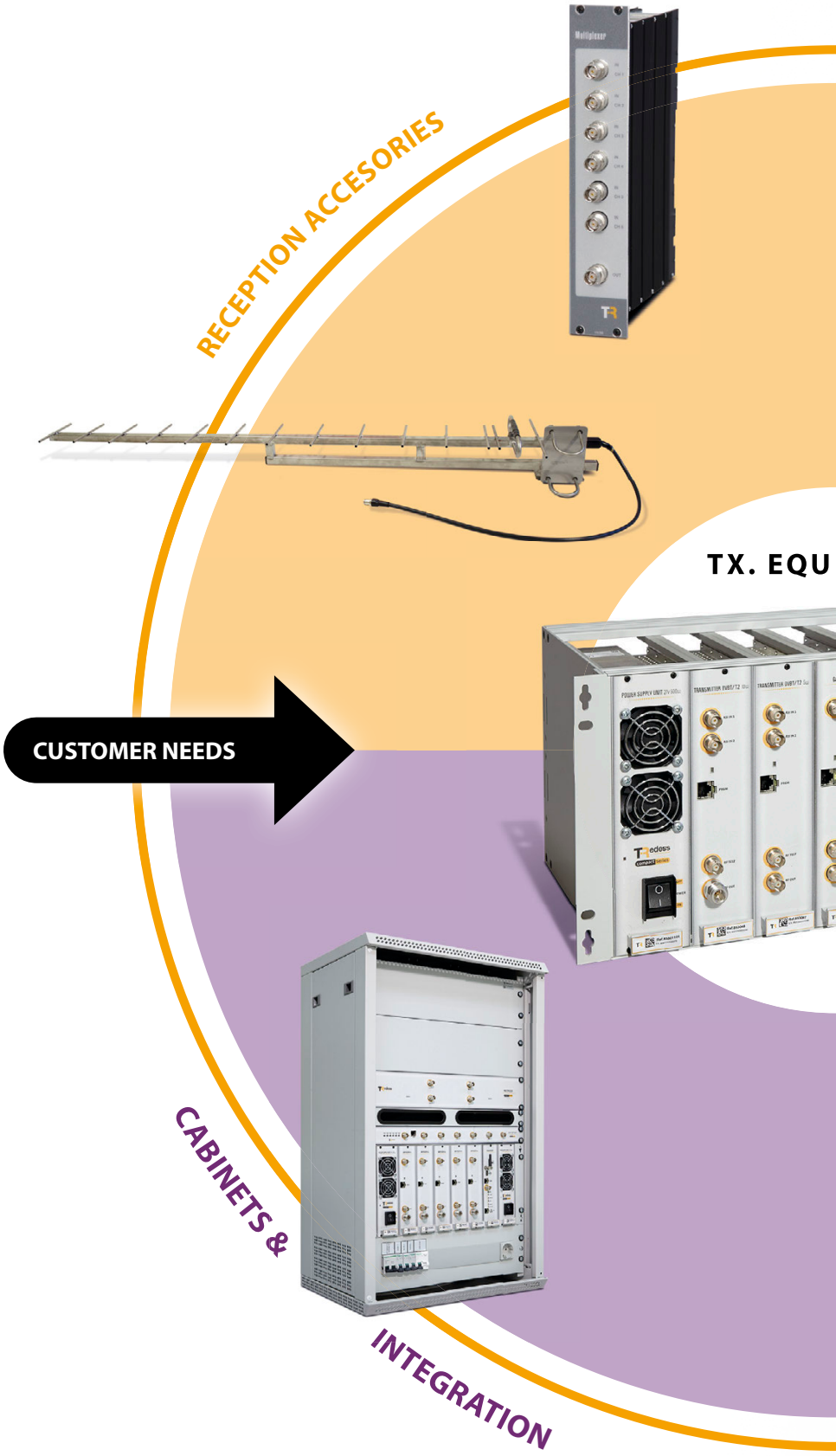
TRedess offers more than TV broadcast equipment. Our aim is to deliver a global system solution to cover our customer needs.

Plug&Play solutions. TRedess equipment and systems are built, configured and adjusted in our factory according to the specific requirements of our customers, so the delivered solution is ready to be used.

Technical Advice and Support. We work closely with customers to ensure they get the maximum benefit of our systems, so we provide advice in system configuration, training and technical support.

Integration of 3rd party equipment. TRedess integrates 3rd party devices with our systems if required.

Flexibility. Our equipment and systems are flexible to adapt the solution to the customer needs.




TRANSMISSION ACCESORIES
IPMENT
CUSTOMER SATISFACTION
TRAINING & CUSTOMER SUPPORT

ACCESORIES FOR THE BROADCASTING EQUIPMENT

COFDM-ASI CONVERTER FOR BROADCAST SERIES

Reference	858131
Denomination	MOD COFDM-ASI
Frequency range	470 - 862MHz
Noise Figure	≤6dB
Frequency image rejection	≥65dB
Lock margin	±500KHz
Input signal range (64QAM, 2/3, 1/4, 8MHz)	-80dBm to -10dBm
Bandwidth	6MHz, 7MHz, 8MHz
Constelation	QPSK, 16 QAM, 64 QAM
FFT	2K, 8K
Guard interval	1/4, 1/8, 1/16, 1/32
FEC	1/2, 2/3, 3/4, 5/6, 7/8
Standard	ETS300744
Decoder MPEG-2 input format	TSMPEG-2/DVB
RF input impedance	50Ω
RF input connector	BNC female
MPEG-2 output	ASI
ASI modes	Byte, Packet
MPEG-2 output connector	BNC female
MPEG-2 output impedance	75Ω
Comsumption	5V : 550mA
Working temperature	0 to 45ºC
Dimensions	45x218(5HU)x152mm
Weight	0,7Kg

ACTIVE DEMULTIPLEXER

Reference	858120
Denomination	MOD ACTIVE DEMUX
Frequency range	470 – 862 MHz
Impedance	50 Ohm
Inputs	1
Outputs	8
Gain margin (per output)	9.5 +/- 1 dB
Band oscillation	< 1.5 dB
Attenuation @ 100 MHz	> 65 dB
Attenuation @ 950 MHz	> 20 dB
Noise figure	< 5 dB
IP3 output	+20 dBm
Input return losses	> 13 dB (15 dB typ)
Output return losses	>18 dB
Outputs isolation	>25dB
Input connector	BNC
Output connector	BNC
Power supply	13.5V / 110mA (two inputs)

MULTIPLEXER FILTERS

References	858507	858508	858509	858510	858511	858512
Denomination	MONOPLEXER	DIPLEXER	TRIPLEXER	TETRAPLEXER	DOUBLE DIPLEXER	PENTAPLEXER
Frequency range	470 - 862 MHz					
Inpedance	50 Ohm					
Number of resonants	3					
Input/output return losses	> 20 dB					
Bandwidth	1 TV Channel (CCIR 8 MHz)					
Insertion losses	1 dB					
Maximum input power	10 W DVB-T / 50 W analog					
Channel N±3 rejection	> 30 dB					
Number of Inputs	1	2	3	4	4	5
Input connectors	BNC Female					
Output connector	Type N Female					
Size	19" x 2HU x 250mm					19" x 3HU x 250mm

TRANSMISSION PANELS

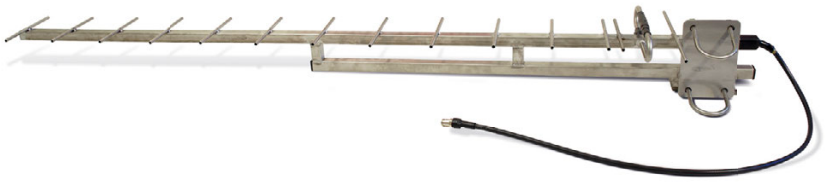
Reference	857025	857031
Denomination	**PANEL PH**	**PANEL PV**
Gain	13 dBi	
Bandwith	470 - 862 MHz	
Front-to-back ratio	> 18 dB	
Impedance	50 Ω	
VSWR	< 1.1 : 1	
Max. input power	400 W (N conn.) · 1000 W (DIN 7/16 conn.)	
Polarization	Horizontal	Vertical
H Beamwidth	60º	
V Beamwidth	26º	
Wind speed	180 km/h	
Wind load	1000 N (front) · 350 N (side)	
Materials	Dipoles in aluminium · Radome in fiber glass	
Temperature	-40ºC to +70ºC	
Dimensions	990 x 490 x 190 mm	
Weight	12 kg	
Connector	N Female or DIN 7/16 Female	

POWER DISTRIBUTORS

References	857027	857028	857029
Denomination	**DIST-2OUT**	**DIST-3OUT**	**DIST-4OUT**
Number of outputs	2	3	4
Bandwith	470 - 862 MHz		
Insertion loss	< 0,05 dB		
Impedance	50 Ω		
VSWR	< 1.1 : 1 dB Broadband		
Power	1 kW		
Materials	Silver brass, copper and stainless steel		
Typical Length	850 mm		
Input connector	DIN 7/16 Female		
Output connector	DIN 7/16 Female		

RECEPTION ANTENNAS

Denomination	YAGI
Gain	17 dBi
Bandwith	470 - 862 MHz
Front to Back Ratio	≥ 25 dB
Impedance	50 Ω
VSWR	< 1.5 : 1 dB
Power	100 W
Polarization	Linear (Horizontal or Vertical)
H Beamwidth	30º
V Beamwidth	30º
Wind Speed	200 km/h
Wind load	800 N (front) · 1100 N (side)
Materials	Dipoles in aluminium Radome in polyester
Dimensions	2000 x 565 x 495 mm
Weight	7 kg
Connector	N Female



Reference	Frequency (MHz)
857011	470 - 566
857012	566 - 654
857013	654 - 734
857014	734 - 862

INDOOR CABINETS

INDOOR CABINETS | REFERENCES AND SPECIFICATIONS

References	857108	857106	857105	857104
Denomination	RACK INDOOR 42H	RACK INDOOR 38H	RACK INDOOR 33H	RACK INDOOR 24H
Material	Metal	Metal	Metal	Metal
Color	RAL 7035	RAL 7035	RAL 7035	RAL 7035
Key	Included	Included	Included	Included
Venting kit	Included	Included	Included	Included
Thermostat	Included	Included	Included	Included
Electrical connection kit	Included	Included	Included	Included
Size (HU)	42 HU	38 HU	33 HU	24 HU
Size (HxWxD)	2000x600x600 mm	1800x600x600 mm	1600x600x600 mm	1200x600x600 mm
Extras	Nozzle with connector (H:120mm) · Wheels (H:100mm)			
Weight	93 kg	83 kg	68 kg	54 kg
Frontal door	Transparent	Transparent	Transparent	Transparent
Regulable base	Included	Included	Included	Included

OUTDOOR CABINETS

OUTDOOR CABINETS | REFERENCES AND SPECIFICATIONS

References	857109	857103	857119	857101
Denomination	**RACK EXT 42HU**	**RACK EXT 24+24HU**	**RACK EXT SWING 18HU**	**RACK EXT POL 17HU**
Material	Metal	Metal	Metal	Polyester
Color	RAL 7032	RAL 7032	RAL 7032	RAL 7032
Key	Included	Included	Included	Included
Venting kit	-	Included	Included	Included
Air conditioning	Included	-	-	-
Thermostat	Included	Included	Included	Included
Electrical connection kit	Included	Included	Included	Included
Post kit	-	-	Included	Included
Swing chassis	-	-	Included	-
Size (HU)	42HU	24+24HU	18HU	17HU
Size (HxWxD)	2000x600x600 mm	1200x1200x600 mm	970x630x400 mm	860x640x300 mm
Extras (size)	Air conditioning (W:195mm)	Base (H:100mm)	-	-
Weight	125 kg	160 kg	40 kg	20 kg
Frontal door	Opaque	Opaque	Opaque	Opaque

TRedess 2010, S.L.
Volta do Castro, s/n
15706 Santiago de Compostela
S P A I N

GPS N: 42° 51' 52.93", W: 8° 34' 5.19"
T +34 981 534 203
F +34 981 522 052
international@tredess.com
www.tredess.com

TRedess is certified by
UNE - EN ISO 9001:2008