

FOURTH SERIES

**Ultra-compact
Air-cooled
Transmitters &
Gap-fillers
for Digital TV
networks**



FOURTH SERIES

TRedess Fourth Series is a family of air-cooled UHF Transmitters and Gap-fillers covering low and medium power needs in DTT broadcasting networks, which bring together flexibility, outstanding compactness, high efficiency and smart installation and operation.



Fourth Series Transmitters and Gap-fillers cover a wide range of output power going from 10W up to 2400W, based on one single and unified product design and two system architectures: standalone for low power, and modular for medium power.

Fourth Series works in DVB-T, DVB-T2 and ISDB-T standards, for both MFN and SFN networks: Transmitters can also work in Re-transmitter mode. Gap-fillers can work both as MFN Transposer and in SFN On-Channel-Repeater mode, using TRedess' DEEC, the best echo canceller in the market.

Fourth Series compact units are especially suitable for use in scenarios with space limitations. The units include complete local and remote control, plus all the optional functionalities that the particular scenario may need, such as GNSS receiver, satellite receiver, (DVB-S/S2), terrestrial signal input (DVB-T/T2), and built-in 1+1 and N+1 redundancy functionalities. They incorporate Ultra-Wide-Band Doherty technology, achieving important cost reductions in energy consumption without impacting in a truly smart operation and maintenance.

Fourth Series has been designed by TRedess gathering the experience of the European Specialist in DTT Low and Medium Power. The solution combines top quality and cost effectiveness, giving our customers a product which is fully adapted to their needs and capable to cover both low power and medium power scenarios in an homogeneous way. The product series has the same look and feel from 10W to 2,4 kW and is designed to make onsite and remote tasks as simple as possible.



Product benefits

01 | Flexibility and cost-efficiency to fit every possible scenario:

Fourth Series provides Transmitters, Retransmitters, Transposers and Gap-fillers in a single product family, all of them working in MFN or SFN mode.

Transmitters' DVB-T2 modulator supports multiple PLP, handling up to 8 PLPs. The ISDB-T modulator supports BTS-rate-lock, allowing operation in SFN mode without the need of a GPS.

Transmitters have four fully seamless-switching inputs for signal redundancy: two TS over IP inputs and two ASI inputs. Optionally the Transmitter unit can incorporate a built-in satellite (DVB-S/S2) receiver.

Transmitter units can also work in Retransmitter mode incorporating a built-in DVB-T/T2/ISDB-T/Tb input. In DVB-T2 environments, they are capable to operate in SFN using T2-MI + Mode A encapsulation, so that sites with repeater infrastructure can regenerate the signal, making the most out of the available locations.

A built-in GNSS receiver is also available as an option.

For ISDB-T/Tb networks, an embedded Remux Lite software functionality is available for the adaptation of TS 188 bytes into BTS 204 signal (avoiding the need of additional equipment for conversion), as well as PID and program filtering functionalities.

Gap-filler units can operate as transposers in MFN and as on-channel repeaters in SFN mode. Gap-fillers incorporate Doppler Enhanced Echo Canceller (DEEC), a high-performance echo canceller which is able to resolve the most challenging echo conditions.



- ▶ DVB-T/T2 and ISDB-T modulations supported. MFN and SFN operation.
- ▶ 2xTS over IP inputs and 2xASI inputs (default) with fully seamless switching.
- ▶ Optional built-in Satellite (DVB-S/S2) input and Terrestrial (DVB-T/T2/ISDB-T/Tb) input.
- ▶ Embedded GNSS option.
- ▶ Embedded REMUX software functionality for ISDB-T/Tb.
- ▶ Linear and Non-Linear digital adaptive precorrection (DAP).

02 | Outstanding compactness:

Fourth Series Transmitters and Gap-fillers provide all the functionalities and options required in highly compact units, so the equipment can be installed very easily and take a minimum of space. They are ideal for scenarios with space limitation at the site.

Fourth Series low power range (up to 400W) is covered by three different sizes of standalone units: Up to 75W can be achieved in 1HU, up to 150W in 2HU, and up to 400W in 3HU.

From 600W to 2400W, Fourth Series Medium Power is designed as a modular architecture based on an Exciter module (1HU) and Amplifier modules of 600W output power (3HU).

Redundant configurations as 1+1, N+1, Dual Drive are available, and based on a distributed architecture with no need of an additional unit for the managing

of the redundant system, as each transmitter on the system knows at all times the status of all the remaining transmitters on the system, so reducing the overall size of the redundant systems and increasing the reliability of the system by not centralizing the control of the redundancy in a single unit. Moreover, the control of the entire redundant system is done by using a unique and floating IP address.

Transmitter and Gap-filler units incorporate a front LCD display with keyboard, for easy local control. Remote operation via a very user friendly webserver application or SNMP agent is also included in the units.



- ▶ Compact units, designed and developed to minimize the systems size.
- ▶ Power transistor using 50V LDMOS technology, leading to a higher power density.
- ▶ 1+1, N+1 and Dual Drive systems based on Distributed architecture (no need of additional unit for managing the redundancy).
- ▶ Units incorporate local and remote control.

03 | High efficiency:

Cost efficiency is assured throughout the equipment lifetime minimizing OPEX, as amplifiers as from 400W output power count on Ultra-Wide-Band Doherty amplifiers.

Amplifiers based on Ultra Wide Band Doherty technology reach first-class efficiency levels, featuring an overall transmitter efficiency of up to 37% (system level), thus delivering an excellent efficiency and enabling decisive energy costs reductions.

And this, while keeping the considerable advantage of using the same Power Amplifier module for the entire UHF TV band (Wide Band Doherty). No adjustment or power amplifier replacement is required to change the RF channel, so channel changes remain a simple configuration task. This also simplifies and reduces costs in the spare parts management.

UWB Doherty



- ▶ High-efficiency Doherty amplifiers as from 400W.
- ▶ Overall Transmitter efficiency of up to 37% (system level).
- ▶ Key advantage of using the same Power Amplifier module for the entire UHF TV band.

04 | Smart operation:

Fourth Series local and remote interfaces incorporate advanced features as MER and Efficiency measurements, Output Spectrum view, Efficiency vs MER optimization tool, and a helpful internal Monitoring tool to simplify and reduce costs in installation, operation and maintenance.

Each transmitting unit counts on a front LCD display with keyboard for local operation and configuration. Status LEDs show the overall functioning. A micro-SD card slot in the front panel is available to save system logs, configurations or load pre-saved configurations making a one-step full setup. Furthermore it can be used to locally run software upgrades.

Remote operation can be done via SNMP agent, using any SNMP-based network management system (a proprietary MIB and IRT MIB according to EBU Tech 3323 are available) and also via a very visual and easy to use webserver multisession application, that allows full remote management of the system.

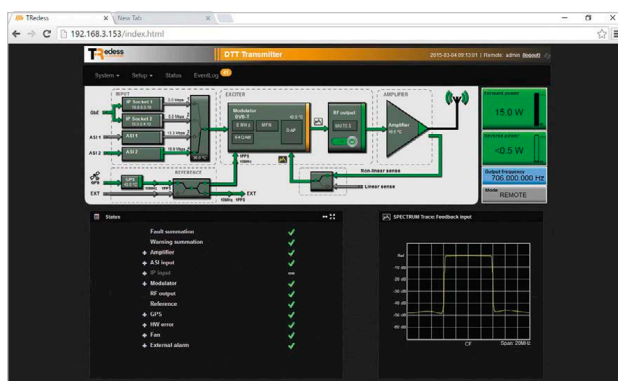
A Spectrum View on the web interface gives a real-time graph of the output signal spectrum. MER, Efficiency and Shoulder values are also available and displayed (via web server or SNMP), so it is possible to remotely supervise the quality and efficiency of the transmitted signal locally or remotely from the operation center

without need of an external analyzer device. Web interface also includes a tool for the optimization of the transmitter efficiency by setting up a target value of the MER or Shoulders.

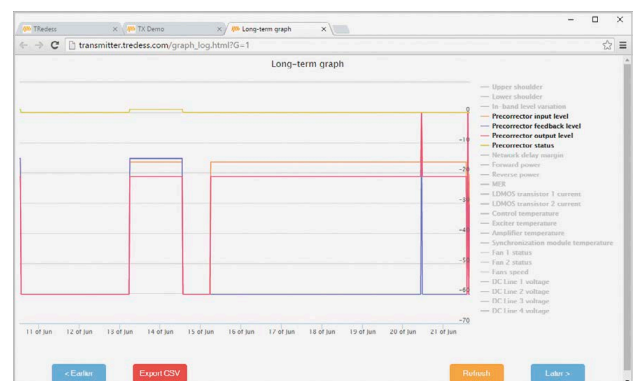
Transmitters and Gap-fillers count on linear and non-linear Digital Adaptive Pre-correction (DAP), which automatically and in real time equalizes the transmitter system in a quick and easy way, optimizing shoulders and MER values to ensure the highest quality in the transmitted signal.

A Monitoring tool keeps a detailed long-term track of the key system internal parameters, both at service and at internal HW level, increasing the control and improving the preventive and corrective maintenance of the device. Also a short-term monitoring can be launched in a precise time period, providing with valuable information for troubleshooting to resolve any incident during operation.

Real time display of output Spectrum Graphs, MER and Shoulder values



Monitoring tool



- ▶ Easy operation based on smart-design local and remote interfaces: LCD display and web server application.
- ▶ SD card on the exciter front panel, for a fast transmitter configuration.
- ▶ Simple system configuration with fast start-up.
- ▶ Outstanding Real-time DAP performance.
- ▶ Real time display of output Spectrum Graphs, MER, Shoulder and AC Efficiency values (via Web server or SNMP).
- ▶ Monitoring tool for smart equipment control and troubleshooting.
- ▶ Tool available on web interface for Efficiency optimization versus MER.

Fourth Series at a glance

Scenarios:

**600 to
2400 W**

Technical Solution:

Fourth Series **Medium
Power** Transmitters



KEY TECHNICAL ASPECTS | Fourth Series **Medium Power** Transmitters

- ▶ Architecture based on an Exciter and separate Amplifiers:
 - 1 amplifier > 600W
 - 2 amplifier > 1200W
 - 3 amplifier > 1800W
 - 4 amplifier > 2400W
- ▶ Amplifiers of 600W output power, including optional redundant hot-plug power supplies.
- ▶ Amplifiers use **Ultra Wide Band Doherty Technology**: High efficiency using the same amplifier for the entire UHF TV band.
- ▶ Exciter in 1HU including:
 - 2xASI and 2xIP fully seamless inputs.
 - Optional built-in satellite receiver and terrestrial receiver.
 - Optional built-in GNSS receiver.
- ▶ Single Drive, Dual drive, 1+1 & N+1 configurations based on distributed architecture with no need of additional unit for managing the redundancy.
- ▶ Smart design, easy to install, operate and maintain.
- ▶ Ideal for scenarios requiring a small footprint.

Scenarios:

**10 to
400 W**

Technical Solution:

Fourth Series **Low Power** Transmitters & Gap-fillers



KEY TECHNICAL ASPECTS | Fourth Series **Low Power** Transmitters & Gap-fillers

- ▶ Based on a very compact standalone architecture: Exciter and amplifier in the same chassis.
 - 75W in 1HU
 - 150W in 2HU
 - 275W in 3HU (Class AB)
 - 400W in 3HU (UWB Doherty)
- ▶ All the units have easy-to-extract power supplies. 3HU units can host optional redundant hot-plug power supplies.
- ▶ The 3HU model of 400W output power incorporates **Ultra Wide Band Doherty Technology**: High efficiency using the same amplifier for the entire UHF TV band.
- ▶ Standalone Transmitter units include:
 - 2xASI and 2xIP fully seamless inputs.
 - Optional built-in satellite receiver and terrestrial receiver.
 - Optional embedded GPS receiver.
- ▶ Standalone Gap-filler units operate as MFN Transposer or SFN on-channel-repeaters, using DEEC, the best echo canceller in the market.
- ▶ 1+1 & N+1 configurations based on distributed architecture with no need of an additional unit for managing the redundancy.
- ▶ Smart design, easy to install, operate and maintain.
- ▶ Ideal for scenarios requiring a small footprint.

Fourth Series Medium Power

600 to 2400 W

Architecture and system key features

Fourth Series Medium Power Air-Cooled UHF Transmitters cover the power range from 600W to 2,4kW, bringing together maximum flexibility, high efficiency based on the use of the latest Ultra-Wide Band Doherty technology, very smart installation and operation, high reliability and a compact design.

They are based on a modular architecture, fully oriented to minimize the rack space and the total cost of ownership: Single Drive transmitters are composed by one Exciter module and the needed number of Power Amplifier modules, with an output power of 600W rms each.

Fourth Series Medium Power Transmitter 600W UWB Doherty

Front view



High system reliability:

- ▶ Power amplifiers count on power supply redundancy. Power supply unit can be hot-swapped without turning off the AC source.
- ▶ Multiple redundant configurations are available at system level: Dual Drive, 1+1 and N+1 based on a distributed architecture with no need of an additional unit for the managing of the redundant system.
- ▶ The interconnection of all the system elements is done over one single CAN control bus, eliminating points of failure and leading to higher system robustness.

Easy installation and maintenance:

- ▶ The simplicity of its architecture allows an optimum spare parts strategy, based on the high commonality of spares.
- ▶ Power supply modules are hot-plug, removable from the front panel.
- ▶ Very user friendly web interface with MER and Shoulders measurement display, spectrum view, plus optimization and maintenance tools facilitating the installation and maintenance.



Configuration examples:

Rear views



DTT Transmitter **2,4kW Dual-Drive**
Ultra-Wideband Doherty in **14 HU**



DTT Transmitter **1,2kW Single-Drive**
Ultra-Wideband Doherty in **7 HU**



DTT Transmitter **600W (1+1)**
Ultra-Wideband Doherty in **8 HU**



TRedess DTT TRANSMITTERS 600 W to 2400 W | FOURTH SERIES MEDIUM POWER | Technical specifications

MAIN CHARACTERISTICS	
Frequency range	UHF Band IV/V 470 to 790 MHz
Standards	DVB-T, DVB-T2, ISDB-T/Tb
System Configurations	Single Drive, Dual Drive, 1+1, N+1
INPUTS	
ASI inputs	2x BNC female / 75Ω
TSolIP inputs	2x RJ-45 10/100/1000 Mbps
Encapsulation	UDP / RTP / RTP-FEC
Jitter tolerance	Configurable
DVB-T/T2 input (optional)	1x N female / 50Ω
RF input frequency	470 to 862 MHz
DVB-S/S2 input (optional)	1x N female / 75Ω
RF input frequency	950 MHz to 2150 MHz
Seamless switching	Programmable seamless switching between all inputs
RF OUTPUT	
Nominal output powers	600W · 1200W · 1800W · 2400W
MER	>35 dB
Shoulder distance	>38 dB
Precorrection	Digital adaptive, linear and non-linear
Power stability	≤ ± 0,5 dB
Return losses	> 20 dB
RF Test output	SMA female / 50 Ω
SYNCHRONIZATION	
10MHz external reference input	BNC female / 50 Ω
10MHz input level	-20 dBm to +10 dBm
1PPS external reference input	BNC female / 50 Ω
1PPS input level	0-5V
GNSS receiver (optional)	
10 MHz output	BNC female / 50 Ω
1PPS output	5V TTL
Medium Term Stability	< ±2 × 10 exp-10 / 24 hours
Phase noise (typical, static conditions)	-120 dBc/Hz @10 Hz -135 dBc/Hz @100 Hz
Holdover	5μs max. Over 24h continuous operation. < 18 μs over 48 hours < 40 μs over 72 hours
GPS antenna & GNSS antenna (optional)	
Connector	SMA female / 50 Ω
Gain	35 dB typical

OPERATION	
Local control	Front LCD display with keyboard and LED indicators Micro-SD card to save and restore configuration settings.
Remote control and monitoring	Ethernet (Web application and SNMP) I/O contacts
ENVIRONMENTAL	
Operating temperature range	0 to 45°C
Relative humidity (max.)	95%, non condensing
Altitude of operation	≤ 2500 m above sea level (higher altitudes upon request)
Cooling	Forced air
ELECTRICAL	
AC power supply	AC supply voltage (Exciter): 90-264V AC supply voltage (Amplifier): 200-254V/100-120V AC supply frequency (Exciter): 47Hz-63Hz AC supply frequency (Amplifier): 47Hz-63Hz
Amplifier	Ultra-Wide Band Doherty technology
COMPLIANCE	
Safety	EN 60950-1:2006+A1:2010+A11:2009+A12:2011 EN 60215:1989+A1:92+A2:94
EMC	ETSI EN 301 489-1 V1.9.2 (2011-09) ETSI EN 301 489-14 V1.2.1 (2003-05) EN 61000-4-5, heavy Industry level.
Spectrum efficiency	ETSI EN 302 296-2 V1.2.1 (2011-05)
R&TTE	1999/5/EC
RoHS	2011/65/EU
WEEE	2012/19/EU
Standards	EN 300744 · EN 302755 ARIB STD-B31 v1.6 ABNT NBR15601:2007 TS 101191 · EN 50083-9 · TR 101290 TS 102773 · TS 102831 · TS 102034 ISO/IEC 13818 · RFC 1122 · RFC 791 · RFC 768 RFC 3550 · RFC 2250 · RFC 2733 SMTPE 2022-1/-2 · EN 300421 · EN 302307

Fourth Series Medium Power DTT Transmitter 1200W UWB Doherty

Front view

Fourth Series Low Power

10 to 400 W

Architecture and system key features

Fourth Series Low Power Air-Cooled UHF Transmitters and Gap-fillers cover the power range from 10W to 400W, bringing together maximum flexibility, high efficiency, very smart installation and operation, high reliability and a compact design.

They are based on a all-in-a-box standalone architecture, fully oriented to minimize the rack space and the total cost of ownership: Power supply, Exciter and Amplifier in the same chassis.

Fourth Series Low Power ultra-compact units are ideal for scenarios with space limitation at the site.

Five different appliances are available, with rms output powers of 10, 40 and 75W in 1HU, 150W in 2HU and 275W (Class AB amplifier) or 400W (UWB Doherty amplifier) in 3HU, so the hardware is always well dimensioned and optimized for each DTT network infrastructure.

Two type of units are available: Transmitters and Gap-fillers: Transmitter units can work in Retransmitter mode. Gap-filler units can work as MFN Transposers, or in SFN On-channel Repeater mode, using TRedess' DEEC, the best echo canceller in the market.



High system reliability:

- ▶ The standalone architecture eliminates the interconnections between elements, and thus reducing points of failure and leading to higher system robustness.
- ▶ 275W and 400W units count on power supply redundancy.
- ▶ 1+1 and N+1 redundant configurations are available, connection between appliances is done over one single CAN control bus.

Easy installation and maintenance:

- ▶ Each appliance has a very wide output power range, allowing a smart spare parts strategy where one appliance can be used for sites of different typologies and output powers, minimizing spare units.
- ▶ Power supply modules are easily removable from the front panel.
- ▶ 1+1 and N+1 systems are implemented in a distributed architecture, with no need of an additional unit for managing the redundancy so reducing the overall size of the redundant systems and increasing the reliability of the system. The control of the entire redundant system is done by using a unique and floating IP address.

Fourth Series Low Power Transmitter 400W UWB Doherty & Low Power Gap-Filler 75W

Front and rear views



Fourth Series Low Power

DEEC Echo Cancelling

High performance DEEC echo cancelling

Doppler Enhanced Echo Canceller is a high-performance echo canceller that makes Fourth Series Gap-fillers able to retransmit the RF signal under the most challenging echo conditions. It can suppress high feedback echo levels giving an outstanding MER performance.

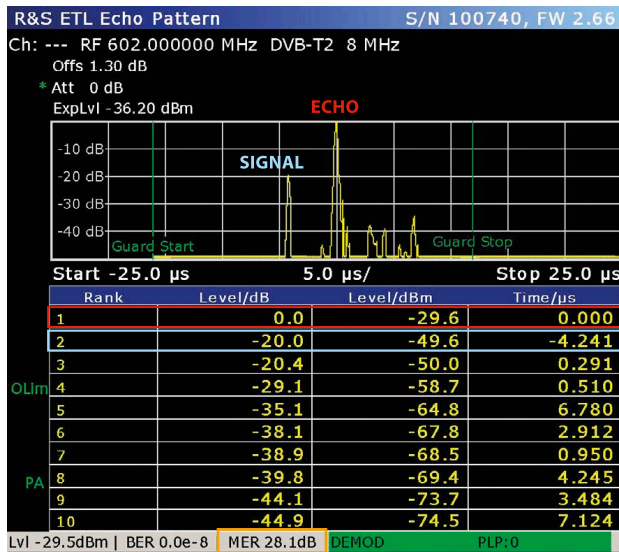
Key features of DEEC:

- ▶ **Gain margin of 24 db** and outstanding output MER performance on complicated SFN echo conditions: A Gain Margin of 24 dB means that an output MER > 24 dB is guaranteed when the feedback echo is 24 dB higher than the main signal. When the echo is 20 dB higher than signal, the guaranteed output MER is > 27 dB.
- ▶ **Very flexible cancellation window system**, based in 16 windows allowing to do an optimum configuration for each particular echo scenario at the input and consequently improving the Gap Filler performance.
- ▶ **Cancelling of echoes with variable amplitude or frequency: doppler, rice...** solving problems in stations close to forest, trains, sea, lakes, ...
- ▶ **Fourth Series Gap-fillers include digital adaptative precorrector**, delivering shoulder and Output MER optimization and leading to Outstanding MER performance (with and without feedback echo).
- ▶ **Smart web graphical interface**, with two graphs showing the echo pattern before and after the echo canceller (echo pattern view & cancellation result) simplifying the installation and facilitating the local and remote optimum configuration of the echo canceller, optimizing the performance of the GapFiller.
- ▶ **Very short processing time:** a very low latency makes possible that the Gap-filler can be installed in a site much closer to the Guard Interval limit, this is, further away from main transmitter.

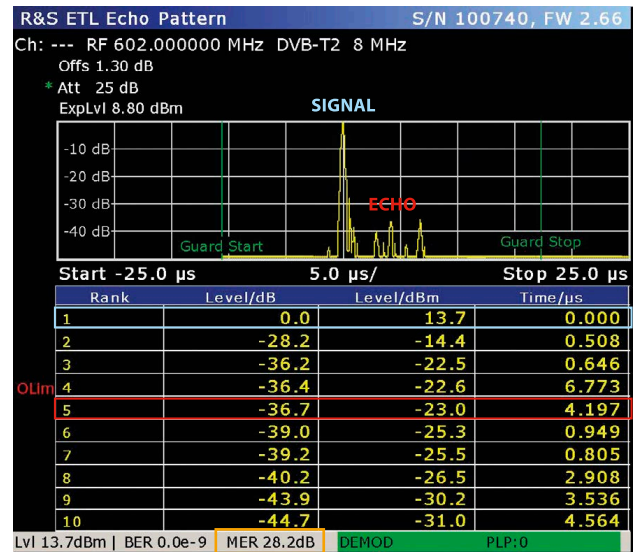
Consequences of having the best echo canceller in your network:

- ▶ **Being able to install gap fillers in the same sites where other competitors will need to install a transmitter:** with all the extra cost this would imply in terms of additional devices as GPS, sat receiver/microwave link, etc., and also implying a much simpler maintenance of a Gap Filler and a Transmitter site.
- ▶ **Being able to use a higher output power than any other competitor on the same gap filler site,** hence reaching a bigger coverage from the same site.
- ▶ **And also the much better echo cancelling performance leads to a much more stable operation at the site,** implying that the long term performance of the Gap-filler is not affected by the fluctuations of the input signal, and leading to less need of site visits (cost savings) and also very importantly leading to a much better customer satisfaction.

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

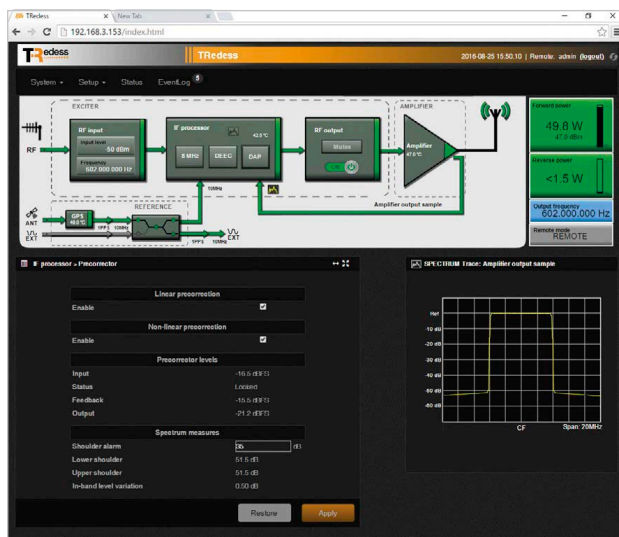


Input signal

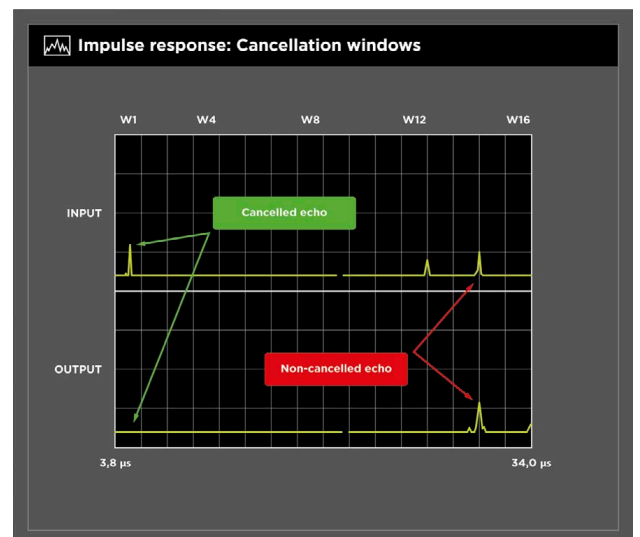


Output signal

Smart Web Interface.



Cancellation Window System.



TRedess DTT TRANSMITTERS 10 W to 400 W | **FOURTH SERIES LOW POWER** | Technical specifications

MAIN CHARACTERISTICS	
Frequency range	UHF Band IV/V 470 to 862 MHz UHF Band IV/V 470 to 790 MHz (400W UWB Doherty)
Standards	DVB-T, DVB-T2, ISDB-T/Tb
System Configurations	Single Drive, 1+1, N+1
INPUTS	
ASI inputs	2x BNC female / 75Ω
TSolP inputs	2x RJ-45 10/100/1000 Mbps
Encapsulation	UDP / RTP / RTP-FEC
Jitter tolerance	Configurable
DVB-T/T2 input (optional)	1x SMA female / 50Ω
RF input frequency	470 to 862 MHz
DVB-S/S2 input (optional)	1x N female / 75Ω
RF input frequency	950 MHz to 2150 MHz
Seamless switching	Programmable seamless switching between all inputs
RF OUTPUT	
Nominal output power	10W · 40W · 75W · 150W · 275W (Class AB) 400W (UWB Doherty)
MER	>35 dB
Shoulder distance	>38 dB
Pre-correction	Digital adaptive, linear and non-linear
Power stability	≤ ± 0,1 dB
Return losses	> 20 dB
RF Test output	SMA female / 50 Ω
SYNCHRONIZATION	
10MHz external reference input	BNC female / 50 Ω
10MHz input level	-20 dBm to +10 dBm
1PPS external reference input	BNC female / 50 Ω
1PPS input level	0-5V
GNSS receiver (optional)	
10 MHz output	BNC female / 50 Ω
1PPS output	5V TTL
Medium Term Stability	< ±2 × 10 exp-10 / 24 hours
Phase noise (typical, static conditions)	-120 dBc/Hz @10 Hz -135 dBc/Hz @100 Hz
Holdover	5µs max. Over 24h continuous operation. < 18 µs over 48 hours < 40 µs over 72 hours
GPS antenna & GNSS antenna (optional)	
Connector	SMA female / 50 Ω
Gain	35 dB typical

OPERATION	
Local control	Front LCD display with keyboard and LED indicators · Micro-SD card to save and restore configuration settings.
Remote control and monitoring	Ethernet (Web application and SNMP) · I/O contacts
ENVIRONMENTAL	
Operating temperature range	0 to 45°C
Relative humidity (max.)	95%, non condensing
Altitude of operation	≤ 2500 m above sea level (higher altitudes upon request)
Cooling	Forced air
ELECTRICAL	
AC power supply	AC supply voltage: 85-264V (1HU); 90-264V (2HU); 108-264V (3HU) AC supply frequency: 47Hz-63Hz
COMPLIANCE	
Safety	EN 60950-1:2006+A1:2010+A11:2009+A12:2011 EN 60215:1989+A1:92+A2:94
EMC	ETSI EN 301 489-1 V1.9.2 (2011-09) ETSI EN 301 489-14 V1.2.1 (2003-05) EN 61000-4-5, heavy Industry level.
Spectrum efficiency	ETSI EN 302 296-2 V1.2.1 (2011-05)
R&TTE	1999/5/EC
RoHS	2011/65/EU
WEEE	2012/19/EU
Standards	EN 300744 · EN 302755 ARIB STD-B31 v1.6 · ABNT NBR15601:2007 TS 101191 · EN 50083-9 · TR 101290 TS 102773 · TS 102831 · TS 102034 ISO/IEC 13818 · RFC 1122 · RFC 791 · RFC 768 RFC 3550 · RFC 2250 · RFC 2733 SMTPE 2022-1/-2 · EN 300421 · EN 302307

**Fourth Series Low Power Transmitter 75W**

Front view

TRedess GAP-FILLERS 10 W to 275 W | FOURTH SERIES LOW POWER | Technical specifications

MAIN CHARACTERISTICS	
Frequency range	UHF Band IV/V, 470 to 862 MHz
Transmission standards	DVB-T, DVB-T2, ISDB-T/Tb
Network types	MFN (Transposer mode) & SFN (On-channel repeater mode)
Latency	< 7 μ s (including DEEC)
RF INPUT	
Input signal range	-70 to -20 dBm
Noise figure	< 8 dB
Connector	N Female / 50 Ω
DEEC (Doppler Enhanced Echo Canceller)	
Gain Margin (signal - echo)	-24 dB
Cancellation window	Flexible cancellation window
Doppler cancellation	Yes
RF OUTPUT	
Nominal output power	10W · 40W · 75W · 150W · 275W
MER for nominal input level (average value)	> 33 dB (input signal MER > 38dB without echo)
Shoulder distance	>38 dB
MER with DEEC 20dB margin	> 27dB
MER with DEEC 24dB margin	> 24dB
Linear & nonlinear precorrection	Digital adaptive, linear and non-linear
Output power stability	$\leq \pm 0,5$ dB
Return losses	> 18 dB
RF Test output	SMA female / 50 Ω
SYNCHRONIZATION	
10MHz external reference input	BNC female / 50 Ω
10MHz input level	-20 dBm to +10 dBm
1PPS external reference input	BNC female / 50 Ω
1PPS input level	0-5V
GNSS receiver (optional)	
10 MHz output	BNC female / 50 Ω
1PPS output	5V TTL
Medium Term Stability	$< \pm 2 \times 10 \exp -10$ / 24 hours
Phase noise (typical, static conditions)	-120 dBc/Hz @10 Hz -135 dBc/Hz @100 Hz
Holdover	5 μ s max. Over 24h continuous operation. < 18 μ s over 48 hours < 40 μ s over 72 hours
GPS antenna & GNSS antenna (optional)	
Connector	SMA female / 50 Ω
Gain	35 dB typical

OPERATION	
Local control	Front LCD display with keyboard and LED indicators · Micro-SD card to save and restore configuration settings.
Remote control and monitoring	Ethernet (Web application and SNMP) I/O contacts
ENVIRONMENTAL	
Operating temperature range	0 to 45°C
Relative humidity (max.)	95%, non condensing
Altitude of operation	≤ 2500 m above sea level (higher output powers upon request)
Cooling	Forced air
ELECTRICAL	
AC power supply	AC supply voltage: 85-264V (1HU); 90-264V (2HU); 108-264V (3HU) AC supply frequency: 47Hz-63Hz
COMPLIANCE	
Safety	EN 60950-1:2006+A1:2010+A11:2009+A12:2011 EN 60215:1989+A1:92+A2:94
EMC	ETSI EN 301 489-1 V1.9.2 (2011-09) ETSI EN 301 489-14 V1.2.1 (2003-05) EN 61000-4-5, heavy industry level.
Spectrum efficiency	ETSI EN 302 296-2 V1.2.1 (2011-05)
R&TTE	1999/5/EC
RoHS	2011/65/EU
WEEE	2012/19/EU
Standards	EN 300744 · EN 302755 ARIB STD-B31 v1.6 · ABNT NBR15601:2007 TS 101191 · EN 50083-9 · TR 101290 TS 102773 · TS 102831 · TS 102034 ISO/IEC 13818 · RFC 1122 · RFC 791 · RFC 768 RFC 3550 · RFC 2250 · RFC 2733 SMTPE 2022-1/-2 · EN 300421 · EN 302307

**Fourth Series Low Power Gap-Filler 150W**

Front view

Ordering information

Ordering information | FOURTH SERIES MEDIUM POWER

DTT TRANSMITTER SINGLE DRIVE CONFIGURATIONS	Nominal Output Power	RF Output connector (default)	N° of Amplifiers	Dimensions
DTT TRANSMITTER 600W SD FS	600 W	7/16"	1	4HU x 19" x 480 mm
DTT TRANSMITTER 1200W SD FS	1200 W	7/8"	2	7HU x 19" x 480 mm
DTT TRANSMITTER 1800W SD FS	1800 W	EIA 1 5/8"	3	10HU x 19" x 480 mm
DTT TRANSMITTER 2400W SD FS	2400 W		4	13HU x 19" x 480 mm

OPTIONS	FUNCTIONALITY
OPTION DVB-S/S2 IN FS	DVB-S/S2 Satellite Receiver (for Transmitter)
OPTION DVB-T/T2 IN FS	Terrestrial Receiver: Retransmitter mode (for Transmitter)
OPTION SNMP	SNMP agent activation key
OPTION GNSS FS	Embedded GNSS Receiver
OPTION GNSS ANTENNA FS	GNSS Antenna for the GNSS Receiver
OPTION AMPLIFIER 600W RPSU FS	Redundant PSU for the DTT AMPLIFIER 600W UWB-Doherty FS unit
OPTION DUAL DRIVE FS	Redundant DTT EXCITER FS unit
OPTION N+1 FS	Full N+1 system redundancy

Ordering information | FOURTH SERIES LOW POWER

DTT TRANSMITTER/GAP-FILLER STANDALONE UNITS	Nominal Output Power	RF Output Connector	Weight	Dimensions
DTT TRANSMITTER 1U-10W FS	10 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT TRANSMITTER 1U-40W FS	40 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT TRANSMITTER 1U-75W FS	75 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT TRANSMITTER 2U-150W FS	150 W	N female	11,4 kg	2HU x 19" x 480 mm
DTT TRANSMITTER 3U-275W FS	275 W	7/16" female	15,4 kg	3HU x 19" x 480 mm
DTT TRANSMITTER 3U-400W UWB Doherty FS	400 W	7/16" female	15,6 kg	3HU x 19" x 480 mm

DTT GAP-FILLER 1U-10W FS	10 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT GAP-FILLER 1U-40W FS	40 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT GAP-FILLER 1U-75W FS	75 W	N female	6,4 kg	1HU x 19" x 465 mm
DTT GAP-FILLER 2U-150W FS	150 W	N female	11,4 kg	2HU x 19" x 480 mm
DTT GAP-FILLER 3U-275W FS	275 W	7/16" female	15,4 kg	3HU x 19" x 480 mm

OPTIONS	FUNCTIONALITY
OPTION DVB-S/S2 IN FS	DVB-S/S2 Satellite Receiver (for Transmitter)
OPTION DVB-T/T2 IN FS	Terrestrial Receiver: Retransmitter mode (for Transmitter)
OPTION DEEC	DEEC echo canceller activation key (for Gap-filler)
OPTION SNMP	SNMP agent activation key
OPTION GNSS FS	Embedded GNSS Receiver
OPTION GNSS ANTENNA FS	GNSS Antenna for the GNSS Receiver
OPTION 3U RPSU FS	Redundant PSU for the DTT TRANSMITTER/GAP-FILLER 3HU units
OPTION N+1 FS	Full N+1 system redundancy

Integrated solutions

TRedess offers more than TV broadcast equipment. Our aim is to deliver complete solutions to give response to our customer needs in DTT transmission:



Plug & Play Solutions:

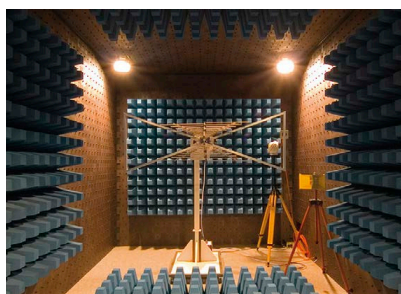
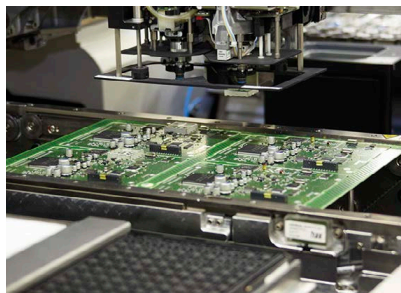
TRedess systems are built, configured and adjusted in our factory according to the specific requirements of our customers, so the delivered solution is ready to be easily installed and put into operation with a minimum effort.

Complete Solutions:

TRedess has wide experience in supplying fully integrated racks, including all the necessary 3rd party equipment required such as combiner systems or satellite reception systems, as well as auxiliary elements for the transmitting sites: reception and transmission antenna systems, cabling, etc., integrated at our factory with TRedess transmission systems.

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 a close and professional technical support.



About TRedess

Our Company

TRedess is highly specialized in the design, development and manufacturing of competitive, reliable and innovative low and medium power solutions for digital TV broadcasting networks.

Our main products are air-cooled Low and Medium power DVB-T/T2 Transmitters and Gap Fillers, counting with a huge technical experience in this market sector and in coverage extension scenarios.

High Manufacturing Capabilities

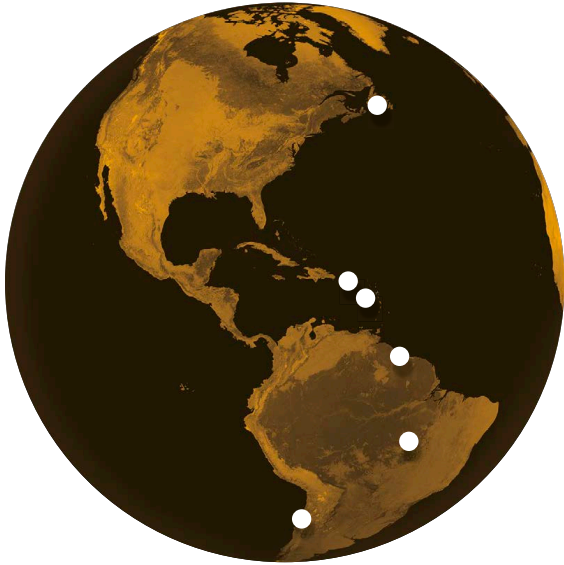
TRedess belongs to the **Televes Corporation**, and our products are manufactured in the Televes Corporation State-of-the-Art manufacturing facilities in Santiago de Compostela (Spain), and tested with the most advanced quality control techniques.

We have full control on our production, and this leads to having very reliable products, the flexibility to adapt to customer requirements, and the capacity to respond to demanding delivery times and volumes.

Worldwide Experience

TRedess supplies reliable and efficient digital TV transmission equipment to main DTT operators worldwide. We have a consolidated experience as the European Specialist in DTT networks coverage extension, having participated in major DTT rollout projects.

There are nowadays more than 15.000 TRedess transmitter and gap-filler devices up and running, on the field, and TRedess solutions are present in more than 30 countries worldwide.



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TRedess is certified by
UNE - EN ISO 9001:2008



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