TV TRANSMITTER

ECUAPOWER 720U-RACK *Air cooled*

The Ecuapower 720U-RACK ìs the light low power transmitter solution from Ecuapower family. 5U rack module-19”std the model Ecuapower 720U-RACK it’s capable of digital power up to 720Wrms ISDBT-DVB / 800W ATSC, 1200Wps Analog power. It is the ideal solution for a broadcaster who need full redundancy also in a low power transmitterHigh efficiency PPT option available. (PPT: registered proprietary mark, patent pending). The overall efficiency of a single final stage is about 42% and the efficiency of the whole transmitter is about 38%.

Key facts:

- Multimode platform – same hardware: System driver, low power transmitter, heterodyne transposer, regenerative transmitter, translator (integrated DVB-S2 receiver), gapfiller and Single Frequency Echo Canceller.
- Multistandard Transmitter: All digital / All analog in the same hardware
- 2x INPUT= SAT (S2 with CAMSlot), Ethernet, ASI= Hitless switch
- Single or multiple redundant power supply each HPA
- Regenerative and SFN Gapfiller functionalty
- Freq. agile with static or adaptive pre-correction
- BUILT in GPS receiver
- Easy to use: web graphic interface GUI response.

The Compact line by Ecuaroma offers air cooled TV transmitters, with one or more amplifier modules. The product lineup covers from low to high power levels, featuring excellent signal quality and small size.

The Ecuapower models are available also as repeaters of the offair signal, with a wide choice of operation settings, or as retransmitters, with satellite or Ethernet input. Ecuapower line is one of the “best Seller” of Ecuaroma, some of Ecuapower model are actually operating since 90’.
Ecuapower line represents the state of the art of the low-medium RF transmitter technology. Ecuapower always count on Ecuadriver line driver, the unique investment exciter thanks to its capability to modulate in all Digital standard, TV o as the TV analog too.3

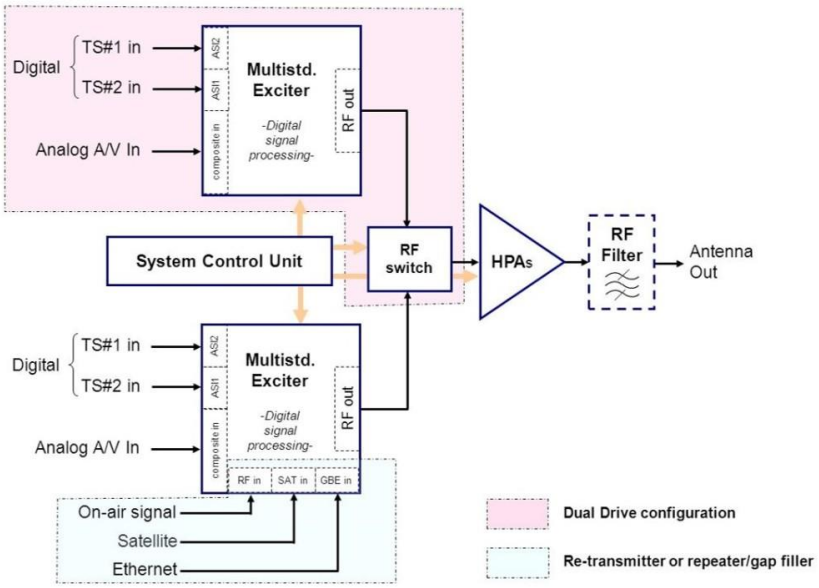
Transmitter configurations are based on single or multiple identical amplifier units (PA), Ecuapower type. The equipment layout depends on the desired output power level and operational requirements. The PA(s) are directly fed by the exciter. The choice of redundancy configurations can include dual drive (exciter std-by), passive reserve (1+1 or n+1) and more others.

The equipment parts are suitable to be assembled in a cabinet, 19”rack std., typically containing also the RF output filter. Single-PA - single-drive models are typically supplied as loose 19”modules.

For redundancy configurations and/or multichannel transmission, important space savings are allowed by the “N-in-one” configurations, with N transmitters in a single cabinet.
Cooling is by forced air, with redundant blowers for each module and hot air extraction from the cabinet top.

Equipment operation is supervised by the Ecuaroma designed control unit.

BLOCK DIAGRAM



TECHNICAL FEATURES

RF PERFORMANCES ECUAPOWER 720U-RACK version (2 Final stages)			
RF frequency range (output)		UHF Band IV & V (470MHz-860MHz)	
RF	Output power	720 W rms ISDB-Tb / 800 W rms ATSC	1200 W p.s.
	Spurious / Harmonics	EN 302-296-2	
	MER	>35 dB	n.a.
	Shoulders	>40 dB	n.a
	Frequency stability	± 1Hz	
	RF Final stage	N° 4 Pallets, 2 final transistor each (LDMOS latest technology) Graceful degradation: 1 fault transistor>>> 76% of max output power	
Mains	Voltage	90÷264 Vac (single phase) ±20% @ 47 to 63 Hz (autorange p.s.) PF>0.97	
	Power supplies	One power supply each module	
	Power consumption (class AB configuration)	2850 W	2000 W
	Power consumption (High efficiency configuration)	1650W η>38%	n.a.
	Electrical efficiency	36 – 38%	
MECHANICAL DATA			
Cooling system /Air flow rate m3/h		forced air / 600 m3/h	
Size	Width/Height/ Depth	600 mm / 1800 mm / 800 mm (5 or 8 RU used)	
Weight		105 kg	
Number of Tx / one rack 36U		Max 3	
DIGITAL MODULATION			
DVB-T	ref. standards	ETS 300 744 / EN 50083-9 / TR 101 190 / TR 101 891	

	RF channel width	6 MHz, 7 MHz, 8 MHz	
	FEC	CC+RS	
DVB-T2	ref. standards	EN 302 755 V1.3.1 , TS 102 831, T2-MI	
	Streams	Single stream (System A) or up to 8-PLPs (System B)	
	RF channel width	6 MHz, 7 MHz, 8 MHz	
	FEC	LDPC+BCH	
ISDB-T SBTVD	ref. standards	ABNT NBR 15601 - ARIB STD B31	
	Multiple segment operation	total 13 segments, distributed over the existing layers (1seg supported)	
	RF channel width	6 MHz	
ATSC 8VSB	Standards	ATSC DOC.A/53	
	Modulation mode	8-VSB	
	Channel spacing	6 MHz	
DTMB	Standard	DTMB (GB20200/2006)	
	Symbol rate / Modulation	Symbol rate: 7.56Msps / TDS-OFDM	
	Channel bandwidth	8 MHz or 6 MHz	
Test Mode		PRBS	
Inputs		2xASI (BNC f, 75W) - seamless/hitless switching (SFN) / BTS / SMPTE / T2 MI / AA/VV	
IP input		2xGBE (ProMPEG Cop3) - Electrical + 1XSFP GBE - Opt./Elec.*	
NETWORK OPERATION			
Mode		MFN/SFN	
Network delay (SFN mode)		Up to 1000 ms	
Network synchronization (SFN Mode)		±4ms	
PRECORRECTION			
Manual precorrection		Available	
Automatic precorrection		Available : continuous/ scheduled / on call	
Type		Linear/ non linear	
PAPR		Provided	
Protection Clipping		Provided	
ANALOGUE MODULATION			
TV System		PAL std. B/G, H, K, I, I1, M, N – NTSC std. M – SECAM D/K	
Ref. Standard		ITU-R BT.470-6	
Audio system		MONO/ IRT	
Video input	Level	1V $_{pp}$ (0.5 to 2 V)(DC component level in the range -5 to 5 V)	
	Ret. Loss	better than -30 dB (0 to 6 MHz) (75 W)	
	Connector	1xBNC female, 75 W	
Audio input	Level	6 dBm ± 6 dB (Df= 25 to 50 kHz)	
	Ret. Loss	better than -30 dB (40 Hz to 15 kHz) (600 W, bal.)	
	Connector	DB9 with patch cable for 2xXLR female, 600 W (IRT config. : 2 inputs)	
REPEATER		**SFN gap-filler**	**MFN re-transmitter**
RF input	Rfin frequency range	146 to 861 MHz	
	Input level	-10dBm to -60dBm	-20dBm to -70dBm (QEF reception)
	Input ret. Loss	better than -16 dB	
	RF in connector	N female, 50 W	
Echo Canceller	residual echo suppression	up to more than 30 dB (30dB are obtained at 0dB input echo)	n.a.
Noise figure		max 10 dB	max 8 dB
immunity to other chan	N+1	OFDM/OFDM > 30 dB	
	others	OFDM/OFDM > 40 dB	
SATELLITE TRANSPOSER			
SatTV standard		DVB-S – DVB-S2 – EN300421	
Frequency range		950 – 2150 MHz	
Signal level		-65 to -25 dBm	
Connector – Cond. Access		SMA f – CAM slot	
LNB control		available, through RF input PS, polarity / band selection: by standard 13/18VDC and 22kHz signalling	
MONITORING			
RF Monitoring Connectors		FWD/REF: SMA female , 50 W	
Local Control		front panel (keys/display/USB port) / standard web browser	
Remote control port		Ethernet port (10/100/1000) RS 485	
Remote Control	Netw. Mgmt.	web browser / SNMP agent - upgrade also through ASI TS (OTA)	
	Direct signalling	IEC 60864-1	
TIME & REFERENCE			
Built-in ref.	Frequency	10 MHz OCXO	
	Stability	time: max ±10^{-7} /year - temperature: max ±2.5 10^{-8} (-20° to 70°C)	
Ext. ref.	Frequency	10 MHz - 1pps	
	Level	1 V$_{pp}$ (0.7 to 1.4 V)	
VCO tuning step		1 Hz	

ENVIRONMENTAL		
Operating temp. range		0° to 50°C*
Max rel. air humidity		95% @ 30°C, no condensation
Max altitude		4000 m *a.s.l.*
Immunity	bursts	<4kV (AC) / <1kV (input) - IEC61000-4-4
	surges	<2kV (differential mode) - <4kV (common mode) - IEC61000-4-5
Safety		EN 60215 (IEC 215)

Redundancy type