



FT20K

20 KW LDMOS FM POWER TRANSMITTER



The FT20K FM Transmitter is designed to provide more reliable high power FM transmitters using the LDMOS transistors for the FM broadcast market.

RGUI (Remote Graphical User Interface) system allows control, monitoring, fault analysis, and event logging using an I.P. based tool.

FT20K Transmitter has been designed to operate in the whole FM frequency range (87.5 to 108.0 MHz), able to deliver an output power adjustable from 0 to 20KW.

This unit is factory calibrated therefore it does not require any adjustment or calibration in place before starting its operation.

It consist of high efficiency latest generation LDMOS BLF574 transistors from NXP.

This LDMOS technology allows higher performance compared to the traditional MOSFET transistors:

- Higher efficiency.
- Higher gain (thanks to high transconductance value and low internal reaction capacitance of MOS transistors).
- Higher thermal stability (negative coefficient for drain current).
- Smaller dimensions at the same RF output power.

An output low pass filter guarantees a clean signal spectrum at any selected operating frequency.

In case of fault of the Transmitter or antenna system, a protection board lowers automatically the output power, in order to bring back the operating conditions to a safe area without causing a system shut down.

The protection board reduces the output power in case of:

- V.S.W.R. too high.
- Room temperature too high or cooling stops (OVER HEAT).

An automatic gain control circuit on the same board allows limiting the output power at an adjustable desired level ($\pm 1\%$ tolerance)

The switch-mode power supply is largely oversized and guarantees a regular operation even in the presence of wide main voltage fluctuations: the switching converters contribute to obtain a very high AC to RF efficiency (> 67%).

A front panel meter combined with LED indicators enable the quick checking of the most important parameters of the equipment.

The system cooling is achieved by means of a heat sink and in order to guarantee a safe operation even in hard climatic conditions.



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TECHNICAL SPECIFICATIONS

EXCITER SECTION (OM150)

RF Data

Power	150 W adjustable from front panel
RF output impedance	50 Ohm unbalanced, VSWR less than 1.5:1
Frequency range	87.5 to 108 MHz,
Frequency control	Synthesizer *processor controlled
Lock in Time	from starting to any programmed frequency: typically 4 sec.
Off lock attenuation	> 75 dBc (typical -80 dB)
Type of modulation	F3E / F8E direct FM at the carrier frequency
Modulation mode	Mono, Stereo, Multiplex, SCA, RDS, AUX (input selected by front panel)
Frequency deviation	± 75 kHz =100 %, ± 150 kHz capability
Reference	TCXO = 12.8 MHz
Constancy of freq. dev.	± 1 % over six months.
Variation of frequency.	≤ 1 kHz/year (internal TCXO)
Short term stability	± 1 ppm from -5 to +45 °C, Can be synchronized by 1-2-2.5-5-10 MHz
Instantaneous BW	>20 MHz
RF harmonics	Exceeds EBU/CCIR/FCC requirements > -70dBc
RF spurious	Exceeds EBU/CCIR/FCC requirements < -100 dBc @ ± 1 MHz min. out of carrier (typical -110 dB)
Pre-emphasis	Flat/50/75 μ s selectable via front panel
Pre-emphasis precision	Nominal 1% (typical 0.4%)
Stereo operation	CCIR 450/S2 "pilot tone system"

AUDIO CHARACTERISTICS

Audio response	0.15 dB da 20 Hz to 15 kHz (+0/-2%)
Audio filter attenuation	55 dB @ 19 kHz, > 45dB 19 to 100 kHz
Common mode rejection	20 Hz to 15 kHz 45 dB
Stereo Separation	30-80Hz >53dB (typ. 56), 80Hz-15kHz >60 dB (typ.70)
Crosstalk attenuation (M / S)	40 dB 30 Hz to 15 kHz (typ. 55dB / 100Hz to 8 kHz)
Spurious products	53 kHz > 50 dB
38 kHz suppression	70 dB (Typ. -85dB)
Subcarrier frequency	38 kHz ± 2 Hz
Subcarrier generation	internal crystal
Pilot frequency	19 ± 1 Hz
Phase difference	19/38 kHz 0° \pm 2° adjustable
THD+N on encoded channels	0.03 % 30 Hz TO 15 kHz (typ. -74dB)
IMD	Measured with a 1 KHz and 1.3 KHz tones, 1:1 ratio, at FM 75 kHz 0.03% Typ. IMD D2 < -83 dB D3 < -88 dB
TIM (DIM30)	0.03 % (square/sinus) Typ. < -77 dB
Nominal pilot deviation	± 7 kHz
Audio Inputs	L, R, Composite, SCA, RDS, Aux
Input Levels	-3 to +9 dBm / (L&R) -3 to +6 dBm / (Others)
Bandwidth	30 Hz – 15 kHz 0.1 dB (L&R, Composite Channels) 40-100 kHz 0.15 dB SCA/RDS/Aux Channels
Connectors	L&R: XLR Others: BNC



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AMPLIFIER SECTION (FA20K)

RF Data

Operating Frequency	87.5-108.0 MHz
RF Power Input	120W
RF Power Output	20,000W
RF Input Connector	N
RF Output Connector	EIA 3-1/8
In/Out Impedances	50 Ω
RF Probe	-50 dB, 50 Ω , BNC
Power Stability	< 1%
Overall Efficiency	67%
Spurious and harmonic suppression (ref. to carrier)	< - 80 dBc
Synchronous AM (ref. 100% mod.)	< - 58 dB
Asynchronous AM (ref. 100% mod.)	< - 50 dB

Measured Values

Forward power
Reflected power
DC supply voltage of each RF stage
DC supply current of each RF stage
Heat sink Temperature
Environmental Temperature
AC Mains voltages

Environmental

Cooling	forced air by internal fans
Service	continuous 7/24 h
Operating temperature	15 to +45 °C/ 5 to +104 °F
Max. Installation altitude	4000m on sea levels

Power

AC Voltage	3 Ph. 320/450V AC – 47-63 Hz
Power Consumption	30000VA

Physical Features

Height	33U (147 cm)
Width	60 cm Rack Mountable.
Depth	110 cm deep including connectors.
Weight	560 kg.