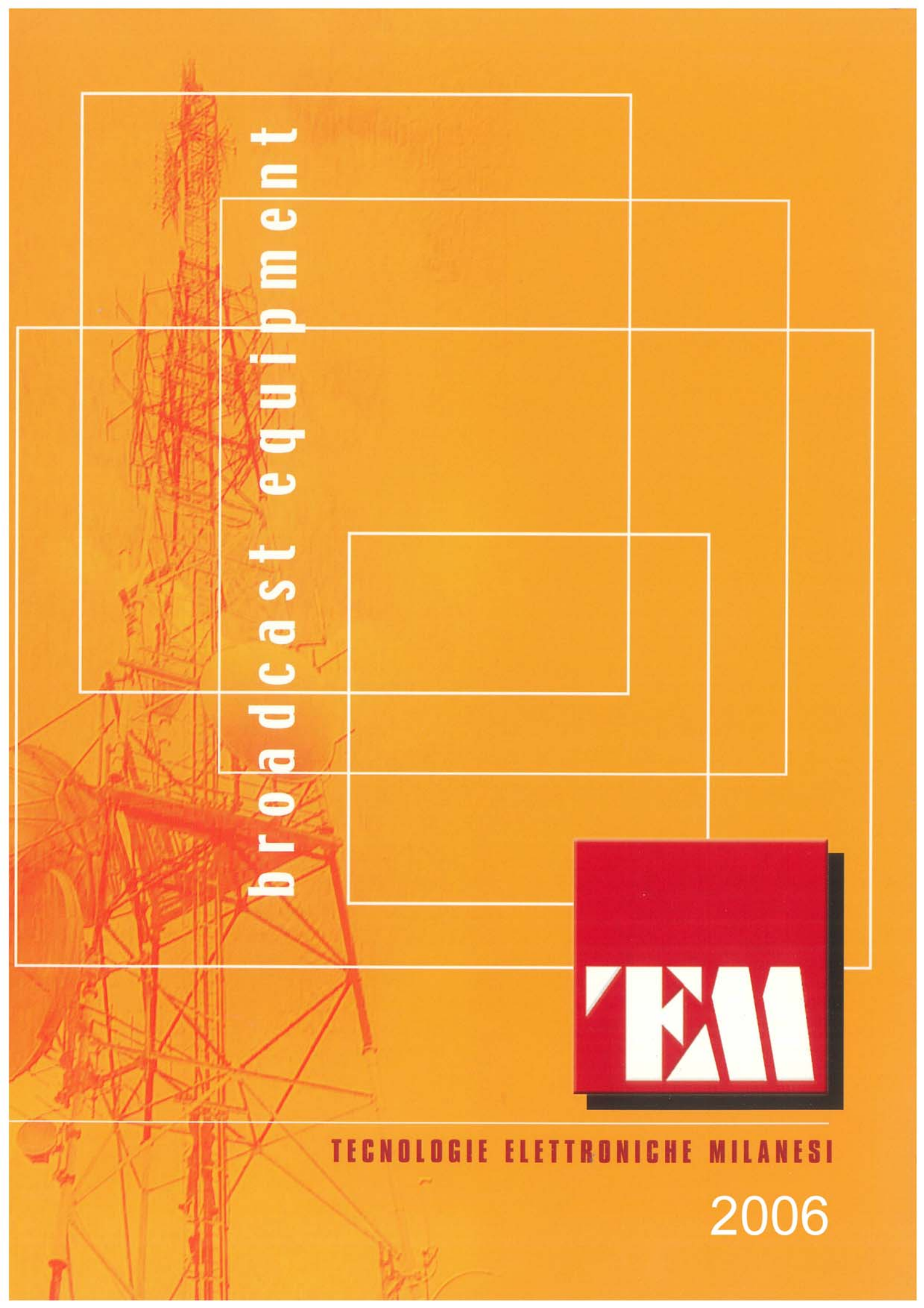

broadcast equipment

TECNOLOGIE ELETTRONICHE MILANESI

2006

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TECNOLOGIE ELETTRONICHE MILANESI

Storia e prodotti

La Società TEM, fondata nel 1977 da un gruppo di specialisti nel campo delle comunicazioni e delle trasmissioni radio, è uno dei più importanti produttori italiani di apparecchiature broadcast per il mercato televisivo, radiofonico e dei trasferimenti a microonde nella fascia alta di qualità e tecnologia
La società si avvale di uomini di vasta esperienza manageriale e tecnica, così come dei supporti tecnologici più avanzati al fine di assicurare sempre il miglior servizio ai propri clienti e il miglior rapporto qualità prezzo ai propri prodotti.
Lo stabilimento e gli ampi uffici operativi sono locati alle porte di Milano, in prossimità della Tangenziale Ovest, facilmente raggiungibile sia dal centro della città sia da altre località.

La TEM costruisce oggi le seguenti linee di prodotti:

Sistemi Radio:

Trasmettitori e Ripetitori per trasmissioni a modulazione di frequenza con potenze da 20 Watt a 10 KW, digitali ed analogici, completamente allo stato solido, in sistemi ridondati, telecomandabili e telecontrollabili tramite RS232, RS485 e GSM, sistemi 1+1 e N+1, STL fino a 10 GHz per il collegamento studio ripetitore e per network nazionali.

Sistemi TV :

Trasmettitori e ripetitori per trasmissioni televisive terrestri sia analogiche che digitali con potenze da 1 Watt a 2 KW completamente allo stato solido, telecomandabili e telecontrollabili tramite RS232, RS485 e GSM, gap filler analogici e digitali.

Sistemi Microonde :

Ponti radio a microonde da 2 a 15 GHz per il trasferimento dei programmi televisivi e la trasmissione dati, sistemi indoor e outdoor analogici e digitali fino a 34 Mbits, modulatori e demodulatori sia 70 MHz 1 video + 4 audio analogici che QPSK fino a 34 Mbits, sistemi da retroparabola.

History and products

TEM was established in 1977 by a team of specialists in the field of Radio Communications and Broadcasting.
Today TEM is one of the most important Italian manufacturers of professional FM, TV and microwave broadcasting equipment in the highest quality and technology range.
TEM can boast large experienced managers and technicians, as well as top advanced technological supports to grant always the best service to its customers and the best ratio between quality and price.
The company is located just near Milan and thanks to its position, close to the motorway, can be easily reached by people coming from the center of the city as well as from other towns.

Today TEM manufactures the following products lines:

Radio Systems:

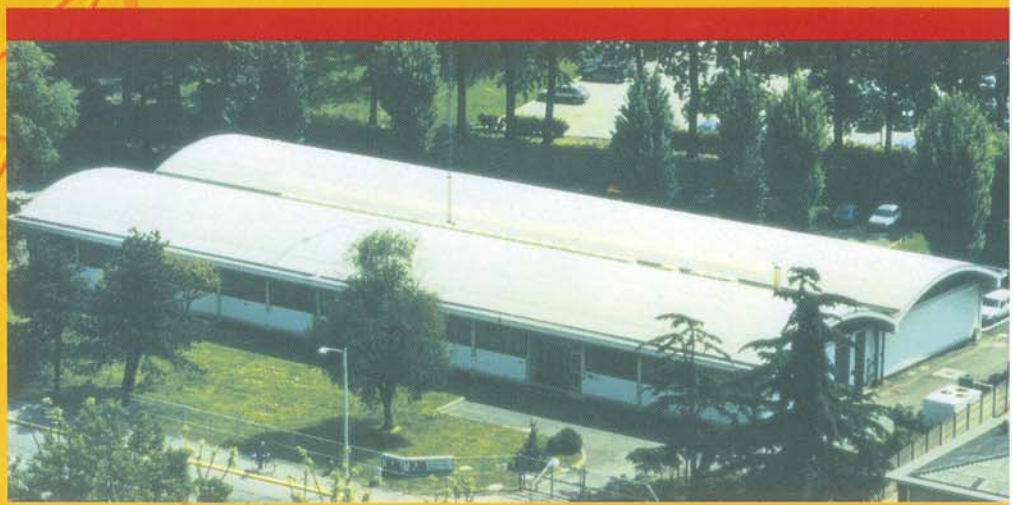
Transmitters and transposers for frequency modulation transmission with output powers from 20W to 10 KW, digitals and analogs, completely solid state , in redundant systems , fully remote controlled by RS232, RS485 and GSM. 1+1 and N+1 systems STL up to 10 GHz

TV Systems:

Transmitters and transposers for terrestrial television transmission digitals and analogs , with output powers from 1W to 2 KW, completely solid state , fully remote controlled by RS232, RS485 and GSM. Analog and digital gap fillers.

Microwave Systems:

Radio links from 2 to 15 GHz for transferring television programs and data transmission.
Indoor and outdoor analog and digital systems up to 34 Mbits. Modulators and demodulators both 70 MHz analog 1 video + 4 audio channels and QPSK up to 34 Mbits.



Tecnologie Elettroniche Milanesi .....is :

8000 Microwave Radio Links installed worldwide

5000 FM and TV transmitters currently operating

650 Satisfied Customers

30 Countries where we operate

28 Years of know-how in the broadcasting field

YOU.....our next customer

completely satisfied

Welcome to the new family!

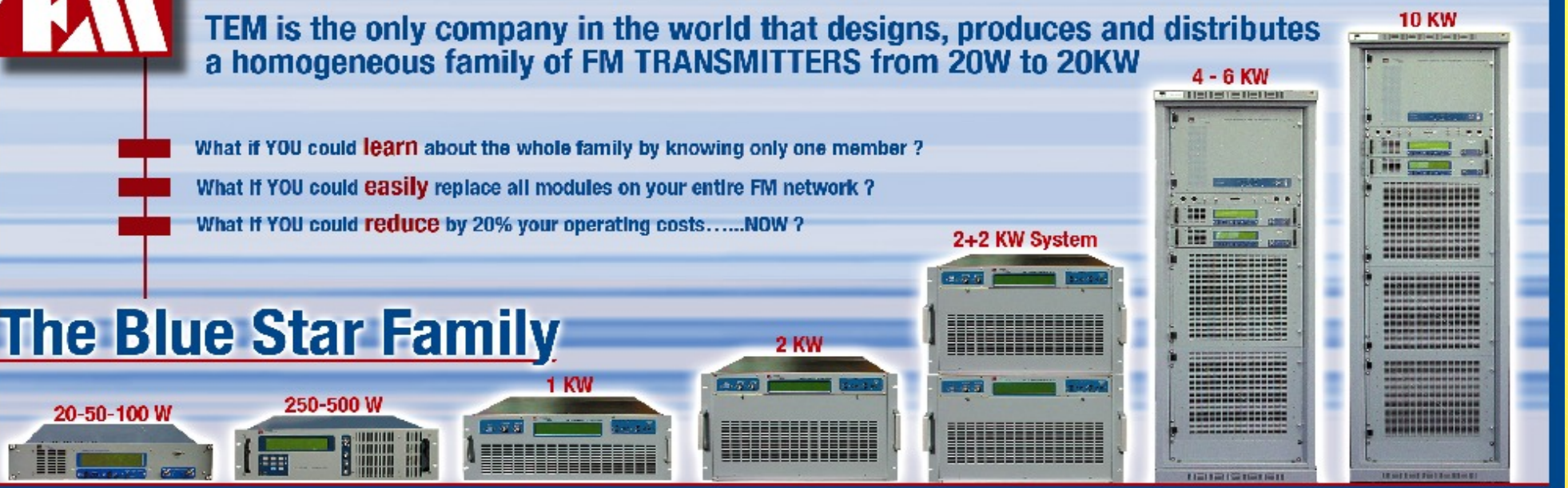
TEM is the only company in the world that designs, produces and distributes a homogeneous family of FM TRANSMITTERS from 20W to 20KW

What if YOU could **learn** about the whole family by knowing only one member ?

What if YOU could **easily** replace all modules on your entire FM network ?

What if YOU could **reduce** by 20% your operating costs…...NOW ?

The Blue Star Family



TEM Tecnologie Elettroniche Milanesi SpA • Italy • www.tem-italy.it • Ph.+39 02 8923961 • Fax +39 02 89239620 • e.mail sales@tem-italy.it

The Blue Star Family equipment are:

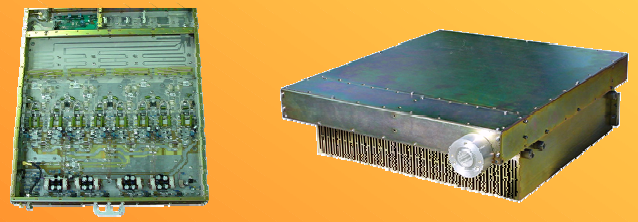
1. Homogeneous
2. Complete
3. Money saver

FREQUENCY	101.30	M	MODULATION		75 K
FORW. PW	478	W	TEMPERATURE		29 C
REFL. PW	3.2	W	250W bal.		2.3 W
LOCK ON	#n5 alarms in memory#			page up>	

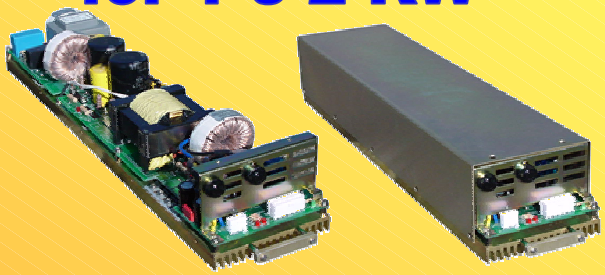
Same LCD display

Same RF Modules

For 2 – 4 – 6 – 10 - 20 KW



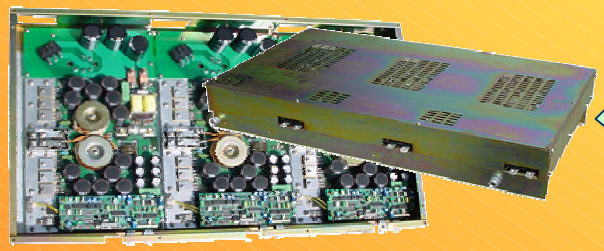
Same Power Supply for 1 e 2 KW



Same Remote Control

Long life battery

Same Power Supply for 4 - 6 - 10 KW

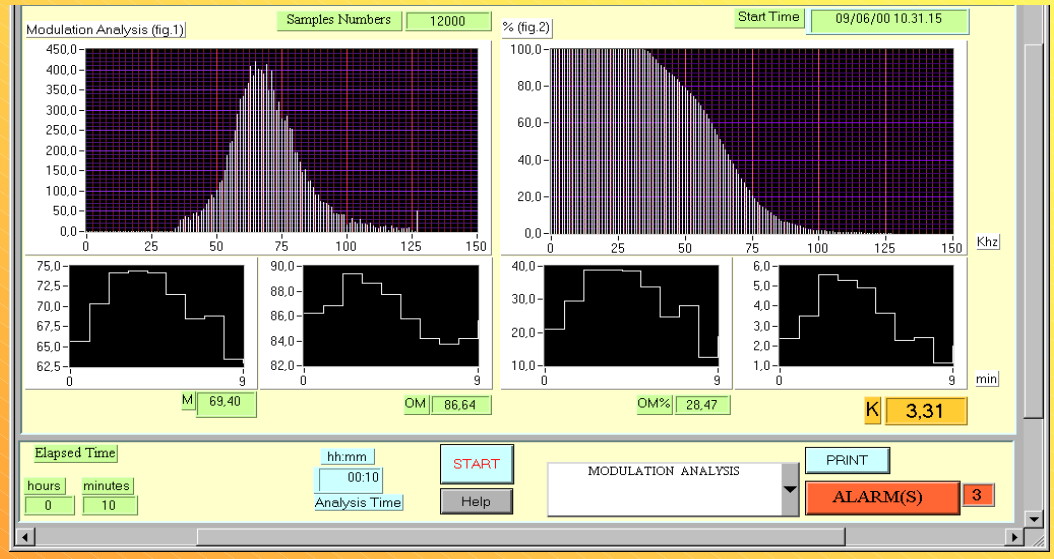


Homogeneous

Homogeneous means:

1-Same circuit philosophy
2-Same RF modules
3-Same FM modulator
4-Same Remote Control
5-Same kind of power supply
6-Same LCD information
7-Same menu structure
8-Same audio input circuits

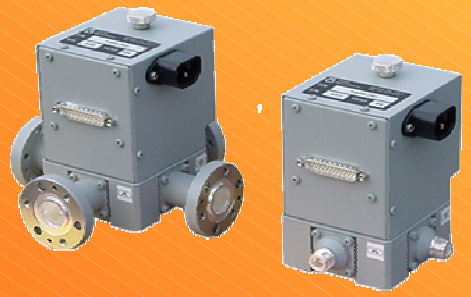
Power modulation metering



5 + 1 System
all included

Dual
Driver

Complete



Coaxial motorized switch

Complete means:

All powers from 20W to 20 KW
Stereo coder and RDS coder
Synchronizing interface
Power modulation metering
Parallel inteface card
Remote control with GSM
Dual driver
1+1 and N+1 Systems

Proof of Gain

Price in Euro	FM Transmitter			SOLUTION WITHOUT TEM			SOLUTION WITH TEM		
				spare without TEM			spare with TEM		
	2 Kw	5 KW	20 KW	2 Kw	5 KW	20 KW	2 Kw	5 KW	20 KW
Transmitter List Price	10.500	27.350	105.800						
Spare Parts List Price (5 years)				7.065	8.415	14.265			15.465
Total			143.650			29.745			15.465
Total Transmitter						173.395			159.115
Gain on Transmitter (Euro)						0			14.280
Gain on Energy Consumption in 5 years (Euro)						0			25.923
Gain on Training Cost for Staff (Euro)						0			8.000
Gain Using TEM in 5 years (Euro)									48.203
Saving On Operational Costs in 5 years using TEM						20%			

Money Saver

Your Gain

Money saver means:

High RF Efficiency
PFC circuits
Very low MTTR
Always on air
Few spare parts
Real time control
Minimum technical training
Reduced place for installation

-20 %

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Blue Star
FM Transmitters

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20W FM Broadcasting Transmitter
Trasmettitore 20W FM

Blue Star

7A10...SERIES

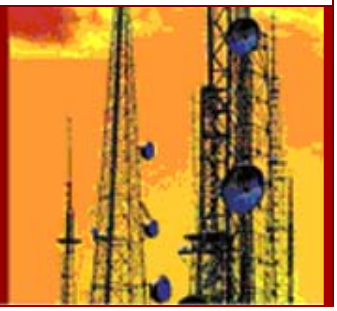
- Power output continuously adjustable 0/20W with Automatic Level Control
- Solid state design with broadband circuitry
- Digital frequency synthesizer with 10KHz/100 KHz
- Up to 3 PPM frequency stability
- Display LCD
- Built-in Stereo Encoder (opt.)
- Timer for RF power control
- RS232 (LAB-VIEW)
- RS485
- Alarms database
- All features controlled by microprocessor
- Measuring maximum FM deviation of trasnsmitter emission in according to
- REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- RDS and SCA facilities
- Slimline size: only 2 standard units high
- Low noise and ultra low distortion performance
- Remote control with frequency programming for N+1 system (opt.)
- Built-in high reliability digital multimeter
- Frequency deviation limiter (opt.)
- Automatic control of RF output Power in case of high VSWR

SERIE 7A10...

- Potenza d'uscita RF regolabile da 0 a 20W con Controllo Automatico di Livello
- Apparati con tecnologia completamente a larga banda
- Sintetizzatore di freq. Digitale, risoluzione 10KHz / 100KHz
- Stabilità di frequenza di 3 PPM
- Display LCD
- Codificatore Stereo incorporato (Opz.)
- Timer per riduzione potenza RF notturna
- RS232 (LAB-VIEW)
- RS485
- Storico Allarmi
- Tutti i parametri regolabili da Micro
- Misura massima deviazione FM, in accordo con le norme REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- Ingressi RDS e SCA
- Rack compatto da 19", alto 2 unità (88 mm)
- Prestazioni a bassissimo rumore e distorsione
- Telecontrollo e programmazione della frequenza a distanza (Opz.)
- Multimetro digitale di alta affidabilità
- Limitatore di deviazione (Opz.)
- Riduzione automatica della potenza di uscita in caso di alto ROS

Serie 7A10 Series

20W FM Broadcasting Transmitter
Trasmettitore 20W FM



Technical Specifications

POWER SUPPLY AND TEMPERATURE RANGE

Operating voltage	115 or 230VAC ±10 %
Line power	<80W
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C

FREQUENCY POWER

Frequency range	87.6 to 107.9MHz
Frequency setting	in 100KHz steps (model XPT-100-S have
Internal setting mode	10 Khz steps) by keys
External setting mode	by remote control (RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
Peak detector error	<0.1dB
RF output power	0 to 20W
Power resolution settin	0.1W
Power control limit setting	1 to 20W
Power control stability	< 0.1dB
Reverse output power control limit	1 to 9.9W
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier enable off)	>60dBc

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

Data may change without notice

SCA CHARACTERISTICS

Input (SCA1, SCA2)	BNC unbalanced
Input impedance	10K ohm
Frequency response (50KHz to 100KHz)	<0.1dB
Distortion	<0.1%
Modulation capability	0 to 10%

MECHANICAL SPECIFICATIONS

19" rackmount	485x88x500mm
Weight	12Kg

REMOTE CONTROL

COM1 (front panel)	RS232
COM2 (rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®
Transmission protocol	AES-EBU SP 490

READOUT ON LCD DISPLAY (40X4 characters)

Forward power resolution	0.1W
Reverse power resolution	0.1W
Modulation resolution	1KHz
Line voltage resolution	1V
Power amplifier voltage resolution	1V
Power amplifier current resolution	0.1A
Heatsink temperature resolution	1°C

STANDARD COMPLYS (R&TTE)

Electrical characteristics	ETS 300-384
EMC characteristics	ETS 300-447
Safety characteristics	EN-60950–EN-60215
Notified Body	0523

Le specifiche possono cambiare senza preavviso

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www.tem-italy.it – e-mail: sales@tem-italy.it

100W FM Broadcasting Transmitter
Trasmettitore FM 100W

Blue Star

7A100...SERIES

- Power output continuously adjustable 0/100W with Automatic Level Control
- Solid state design with broadband circuitry
- Digital frequency synthesizer with 10KHz/100 KHz
- Up to 3 PPM frequency stability
- Display LCD
- Built-in Stereo Encoder (opt.)
- Timer for RF power control
- RS232 (LAB-VIEW)
- RS485
- Alarms database
- All features controlled by microprocessor
- Measuring maximum FM deviation of trasnsmitter emission in according to
- REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- RDS and SCA facilities
- Slimline size: only 2 standard units high
- Low noise and ultra low distortion performance
- Remote control with frequency programming for N+1 system (opt.)
- Built-in high reliability digital multimeter
- Frequency deviation limiter (opt.)
- Automatic control of RF output Power in case of high VSWR

SERIE 7A100...

- Potenza d'uscita RF regolabile da 0 a 100W con Controllo Automatico di Livello
- Apparati con tecnologia completamente a larga banda
- Sintetizzatore di freq. Digitale, risoluzione 10KHz / 100KHz
- Stabilità di frequenza di 3 PPM
- Display LCD
- Codificatore Stereo incorporato (Opz.)
- Timer per riduzione potenza RF notturna
- RS232 (LAB-VIEW)
- RS485
- Storico Allarmi
- Tutti i parametri regolabili da Micro
- Misura massima deviazione FM, in accordo con le norme REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- Ingressi RDS e SCA
- Rack compatto da 19", alto 2 unità (88 mm)
- Prestazioni a bassissimo rumore e distorsione
- Telecontrollo e programmazione della frequenza a distanza (Opz.)
- Multimetro digitale di alta affidabilità
- Limitatore di deviazione (Opz.)
- Riduzione automatica della potenza di uscita in caso di alto ROS

Serie 7A100 Series

100W FM Broadcasting Transmitter
Trasmettitore FM 100W

Technical Specifications

POWER SUPPLY AND TEMPERATURE RANGE

Operating voltage	115 or 230VAC ±10 %
Line power	<150VA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C

FREQUENCY POWER

Frequency range	87.6 to 107.9MHz
Frequency setting	in 100KHz steps (model XPT-100-S have
Internal setting mode	10 Khz steps) by keys
External setting mode	by remote control (RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
Peak detector error	<0.1dB
RF output power	0 to 100W
Power resolution settin	0.1W
Power control limit setting	1 to 100W
Power control stability	< 0.1dB
Reverse output power control limit	1 to 9.9W
Reverse output power steps control	0.1W
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier enable off)	>60dBc

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

Data may change without notice

SCA CHARACTERISTICS

Input (SCA1, SCA2)	BNC unbalanced
Input impedance	10K ohm
Frequency response (50KHz to 100KHz)	<0.1dB
Distortion	<0.1%
Modulation capability	0 to 10%

MECHANICAL SPECIFICATIONS

19” rackmount	485x88x500mm
Weight	12Kg

REMOTE CONTROL

COM1 (front panel)	RS232
COM2 (rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®
Transmission protocol	AES-EBU SP 490

READOUT ON LCD DISPLAY (40X4 characters)

Forward power resolution	0.1W
Reverse power resolution	0.1W
Modulation resolution	1KHz
Line voltage resolution	1V
Power amplifier voltage resolution	1V
Power amplifier current resolution	0.1A
Heatsink temperature resolution	1°C

STANDARD COMPLYS (R&TTE)

Electrical characteristics	ETS 300-384
EMC characteristics	ETS 300-447
Safety characteristics	EN-60950–EN-60215
Notified Body	0523

Le specifiche possono cambiare senza preavviso

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250-500W FM Broadcasting Transmitter
Trasmettitore FM 250 - 500W

Blue Star

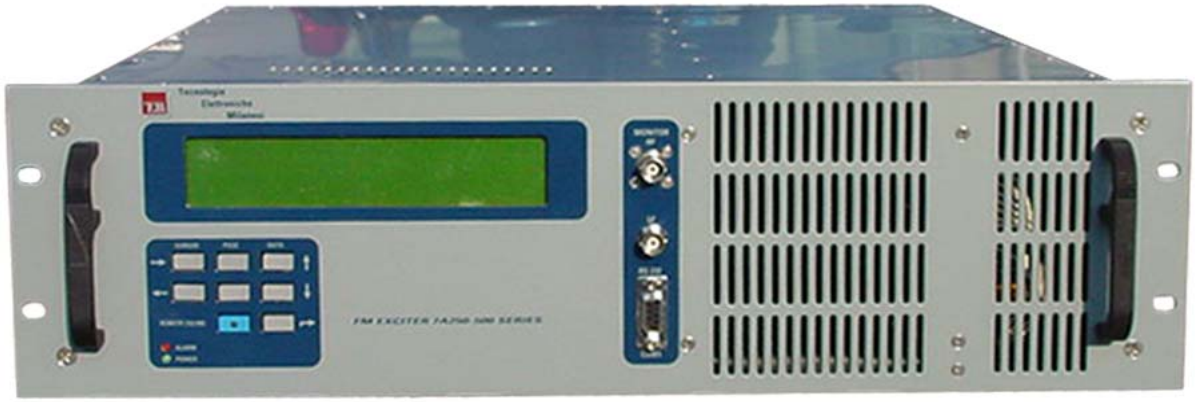
7A250-500...SERIES

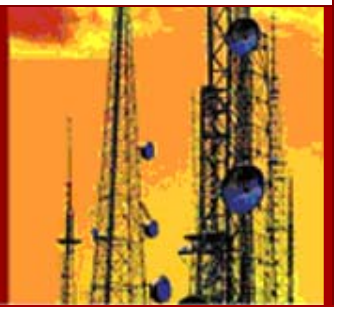
- Power output continuously adjustable 0/250 or 500W with Automatic Level Control
- Solid state design with broadband circuitry
- Digital frequency synthesizer with 10KHz/100 KHz
- Up to 3 PPM frequency stability
- Display LCD
- Built-in Stereo Encoder (opt.)
- Timer for RF power control
- RS232 (LAB-VIEW)
- RS485
- Alarms database
- All features controlled by microprocessor
- Measuring maximum FM deviation of transmitter emission in according to REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- RDS and SCA facilities
- Slimline size: only 3 standard units high
- Low noise and ultra low distortion performance
- Remote control with frequency programming for N+1 system (opt.)
- Built-in high reliability digital multimeter
- Frequency deviation limiter (opt.)
- Automatic control of RF output Power in case of high VSWR

SERIE 7A250-500...

- Potenza d'uscita RF regolabile da 0 a 250 o 500W con Controllo Automatico di Livello
- Apparati con tecnologia completamente a larga banda
- Sintetizzatore di freq. Digitale, risoluzione 10KHz / 100KHz
- Stabilità di frequenza di 3 PPM
- Display LCD
- Codificatore Stereo incorporato (Opz.)
- Timer per riduzione potenza RF notturna
- RS232 (LAB-VIEW)
- RS485
- Storico Allarmi
- Tutti i parametri regolabili da Micro
- Misura massima deviazione FM, in accordo con le norme REC-CEPT/ERC 54-01E(1998)-(ANNEX 2)
- Ingressi RDS e SCA
- Rack compatto da 19", alto 3 unità (88 mm)
- Prestazioni a bassissimo rumore e distorsione
- Telecontrollo e programmazione della frequenza a distanza (Opz.)
- Multimetro digitale di alta affidabilità
- Limitatore di deviazione (Opz.)
- Riduzione automatica della potenza di uscita in caso di alto ROS

Serie 7A250-500 Series





250W-500W FM Broadcasting Transmitter
Trasmettitore FM 250-500W

Technical Specifications

POWER SUPPLY AND TEMPERATURE RANGE

Operating voltage	115 or 230VAC ±10 %
Line power 250W	±400VA
Line power 500W	±800VA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C

FREQUENCY POWER

Frequency range	87.6 to 107.9MHz
Frequency setting	in 100KHz steps (model XPT-100-S have
Internal setting mode	10 Khz steps) by keys
External setting mode	by remote control (RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
Peak detector error	<0.1dB
RF output power	0 to 250W or to 500W
Power resolution setting	1 W
Power control limit setting 250W	1 to 250W
Power control limit setting 500W	1 to 500W
Power control stability	< 0.1dB
Reverse output power control limit	1 to 39W (250W) and 1 to 99W (500W)
Reverse output power steps control	1W
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier enable off)	>70dBc

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>90dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>60dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

SCA CHARACTERISTICS

Input (SCA1, SCA2)	BNC unbalanced
Input impedance	10K ohm
Frequency response (50KHz to 100KHz)	<0.1dB
Distortion	<0.1%
Modulation capability	0 to 10%

MECHANICAL SPECIFICATIONS

19" rackmount	485x88x500mm
Weight	12Kg

REMOTE CONTROL

COM1 (front panel)	RS232
COM2 (rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®
Transmission protocol	AES-EBU SP 490

READOUT ON LCD DISPLAY (40X4 characters)

Forward power resolution	1 W
Reverse power resolution	0.1W
Modulation resolution	1KHz
Line voltage resolution	1V
Power amplifier voltage resolution	1V
Power amplifier current resolution	0.1A
Heatsink temperature resolution	1°C

STANDARD COMPLYS (R&TTE)

Electrical characteristics	ETS 300-384
EMC characteristics	ETS 300-447
Safety characteristics	EN-60950–EN-60215
Notified Body	0523

Le specifiche possono cambiare senza preavviso

Data may change without notice

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1000W FM Integrated Transmitter
Trasmettitore FM 1000W integrato

Blue Star

7A1100...SERIES

- Wideband circuits amplifiers with MOSFET technology
- Built-in Exciter with digital frequency synthesiser and stereo encoder
- Low noise and ultra low distortion performances
- Frequency deviation limiter and audio AGC for highest dynamic
- Completely self protected , redundant and with remote control facilities (RS 232 - RS 485 - GSM – Parallel)
- LCD display to check all operating parameters
- Two parallel 600W amplifiers for the highest reliability
- Two switching power supply for highest reliability and efficiency
- Sealed duct cooling air with two blowers

SERIE 7A1100...

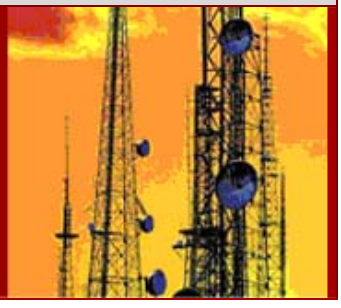
- Amplificatori larga banda con tecnologia MOSFET
- Eccitatore incorporato con sintetizzatore di frequenza digitale e coder stereo
- Prestazioni a bassissimo rumore e distorsione
- Limitatore di deviazione di frequenza e AGC audio per la massima dinamica
- Completamente auto protetto, ridondante e telecomandabile (RS 232 - RS 485 - GSM – Relay)
- Multimetro digitale per controllo dei principali parametri
- 2 amplificatori 600W in parallelo per la massima affidabilità
- 2 alimentatori switching per la massima affidabilità ed efficienza
- Aria di raffreddamento canalizzata con doppio ventilatore

Only 4 RU

This 1 kW transmitter operating in the 87,5÷108 MHz band, uses two 600W amplifiers in parallel. A failure in one amplifier will reduce output power, but will not affect operation of the other in any way. This redundancy is the key to the excellent reliability of this product.
The harmonic filter is built-in.
Operating frequency can be set up in a few seconds by the synthesizer. The equipment is fully microprocessor controlled.
These transmitters are ideally suited for unmanned stations, in fact they do not require periodically maintenance and are fully protected against excessive VSWR, abnormally high ambient temperature by automatic power reduction and supply over voltage and over current.
Normal operation is resumed when abnormal condition disappears.

Questo trasmettitore da 1 KW che opera nella banda di frequenza FM 87,5÷108MHz, usa due moduli da 600W in parallelo. Un guasto in uno degli amplificatori riduce la potenza d'uscita, ma non arresta il servizio in alcun modo: questa ridondanza è la base per una sicura affidabilità
Il filtro per le armoniche é incorporato.
La frequenza di funzionamento può essere cambiata in pochi secondi tramite il sintetizzatore.
L'apparato è completamente controllato da microprocessore.
Questi trasmettitori sono particolarmente adatti a stazioni non sorvegliate, infatti non richiedono manutenzione periodica e sono protetti contro eccessivo VSWR, temperatura ambiente elevata mediante riduzione automatica della potenza nonché sovracorrenti e sovratensioni. Il funzionamento del trasmettitore è ripristinato automaticamente non appena scompare la condizione che aveva generato il guasto

1000W FM Integrated Transmitter
Trasmettitore FM 1000W integrato



Technical Specifications

POWER SUPPLY AND TEMPERATURE RANGE

Operating voltage	230VAC ±10 %
Cooling	Forced air with two built-in blowers
Line power	<2000VA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10KHz or 100 KHz steps
Internal setting mode	by keys
External setting mode	by remote control (RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
Peak detector error	<0.1dB
RF output power	>1kW
Reverse output power control limit	50 to 100W
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction (carrier enable off)	>60dBc
Output connector	7/16”

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

OPTIONS :

- RDS Coder
- GSM Remote Control

Data may change without notice

SCA CHARACTERISTICS

Input (SCA1, SCA2)	BNC unbalanced
Input impedance	10K ohm
Frequency response (50KHz to 100KHz)	<0.1dB
Distortion	<0.1%
Modulation capability	0 to 10%

REMOTE CONTROL

COM1 (front panel)	RS232
COM2 (rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®
Transmission protocol	AES-EBU SP 490

READOUT ON LCD DISPLAY (40X4 characters)

Forward power resolution	1W
Reverse power resolution	1W
Modulation resolution	1KHz
Line voltage resolution	1V
Power amplifier voltage resolution	1V
Power amplifier current resolution	0.1A
Heatsink temperature resolution	1°C

MECHANICAL SPECIFICATIONS

19” rack 4 Units high	485x178x550mm
Weight	18Kg

STANDARD COMPLYS (R&TTE)

Electrical characteristics	ETS 300-384
EMC characteristics	ETS 300-447
Safety characteristics	EN-60950–EN-60215

Le specifiche possono cambiare senza preavviso

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2000W FM Integrated Broadcasting Transmitter
Trasmettitore Integrato 2000W per Broadcasting FM

7A2200...SERIES

- Wideband circuits amplifiers with MOSFET technology
- Built-in Exciter with digital frequency synthesiser and stereo encoder
- Low noise and ultra low distortion performances
- Frequency deviation limiter and audio AGC for highest dynamic
- Completely self protected , redundant and with remote control facilities (RS 232 - RS 485 - GSM – Parallel)
- LCD display to check all operating parameters
- Four parallel 600W amplifiers for the highest reliability
- Four switching power supply for highest reliability and efficiency
- Sealed duct cooling air with two blowers

SERIE 7A2200...

- Amplificatori larga banda con tecnologia MOSFET
- Eccitatore incorporato con sintetizzatore di frequenza digitale e coder stereo
- Prestazioni a bassissimo rumore e distorsione
- Limitatore di deviazione di frequenza e AGC audio per la massima dinamica
- Completamente auto protetto, ridondante e telecomandabile (RS 232 - RS 485 - GSM – Relay)
- Multimetro digitale per controllo dei principali parametri
- 4 amplificatori 600W in parallelo per la massima affidabilità
- 4 alimentatori switching per la massima affidabilità ed efficienza
- Aria di raffreddamento canalizzata con doppio ventilatore

This 2 kW transmitter operating in the 87,5÷108 MHz band, uses four 600W amplifiers in parallel. A failure in one amplifier will reduce output power, but will not affect operation of the other in any way. This redundancy is the key to the excellent reliability of this product.
The amplifiers and the power supplies are easily removable without switching off the transmitter.
The harmonic filter is built-in.
Operating frequency can be set up in a few seconds by the synthesizer. The equipment is fully microprocessor controlled.
These transmitters are ideally suited for unmanned stations, in fact they do not require periodically maintenance and are fully protected against excessive VSWR, abnormally high ambient temperature, supply over voltage and over current.
Normal operation is resumed when abnormal condition disappears.

Questo trasmettitore da 2 KW che opera nella banda di frequenza FM 87,5÷108MHz, usa quattro moduli da 600W in parallelo. Un guasto in uno degli amplificatori riduce la potenza d'uscita, ma non arresta il servizio in alcun modo: questa ridondanza è la base per una sicura affidabilità. I moduli amplificatori e i relativi alimentatori sono facilmente estraibili senza spegnere l'apparato .
Il filtro per le armoniche é incorporato.
La frequenza di funzionamento può essere cambiata in pochi secondi tramite il sintetizzatore.
L'apparato è completamente controllato da microprocessore.
Questi trasmettitori sono particolarmente adatti a stazioni non sorvegliate, infatti non richiedono manutenzione periodica e sono protetti contro eccessivo VSWR, temperatura ambiente elevata nonché sovracorrenti e sovratensioni. Il funzionamento del trasmettitore è ripristinato automaticamente non appena scompare la condizione che aveva generato il guasto

2000W FM Integrated Broadcasting Transmitter
Trasmettitore Integrato 2000W per Broadcasting FM

Technical Specifications

POWER SUPPLY AND TEMPERATURE RANGE

Operating voltage	230VAC ±10 %
Cooling	Forced air with two built-in blowers
Line power	4000VA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10KHz or 100 KHz steps
Internal setting mode	by keys by remote control (RS232-RS485)
External setting mode	±1000Hz/year
Frequency stability	PLL synthesizer
Frequency generation	direct VCO frequency modulation
Modulation type	±75KHz
Nominal frequency deviation	±0.2dB
Deviation linearity in all frequency range	<0.1dB
Peak detector error	0 to 100W
RF output power	2kW
Power resolution setting	10W
Power control limit setting	50 to 2000W
Reverse output power control limit	100 to 200W
Reverse output power steps control	10W
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction (carrier enable off)	>60dBc

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

Data may change without notice

SCA CHARACTERISTICS

Input (SCA1, SCA2)	BNC unbalanced
Input impedance	10K ohm
Frequency response (50KHz to 100KHz)	<0.1dB
Distortion	<0.1%
Modulation capability	0 to 10%

REMOTE CONTROL

COM1 (front panel)	RS232
COM2 (rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®
Transmission protocol	AES-EBU SP 490

READOUT ON LCD DISPLAY (40X4 characters)

Forward power resolution	0.1W
Reverse power resolution	0.1W
Modulation resolution	1KHz
Line voltage resolution	1V
Power amplifier voltage resolution	1V
Power amplifier current resolution	0.1A
Heatsink temperature resolution	1°C

MECHANICAL SPECIFICATIONS

19” rack 7 Units high	485x311x570mm
Weight	40Kg

STANDARD COMPLYS (R&TTE)

Electrical characteristics	ETS 300-384
EMC characteristics	ETS 300-447
Safety characteristics	EN-60950–EN-60215

Le specifiche possono cambiare senza preavviso

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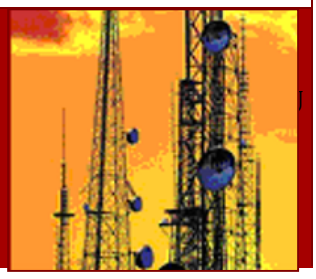
4 KW FM Transmitter

- Single or dual driver
- 2 RF Modules (2.2 KW each)
- 2 DC/DC switching power supply
- High isolation built in transformer
- Completely self protected and redundant
- Remote control facility RS232 -RS485 / GSM / Parallel Alarm Interface

Blue Star

4 KW FM TRANSMITTER



Technical Specifications

GENERAL SPECIFICATIONS

Operating voltage	400 VAC 3 phases
Line power	<8 KVA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
19" Standard cabinet	28 or 32 units
COM1 – COM2 (front and rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10/100KHz steps
Internal setting mode	by keys or by RS232-RS485)
External setting mode	±1000Hz/year
Frequency generation	direct VCO frequency modulation
Modulation type	±75KHz
Nominal frequency deviation	±0.2dB
Deviation linearity in all frequency range	<0.1dB
RF output power	>4 KW
Power control stability	< 0.1dB
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier off)	>60dBc
Output connector	1"+5/8" EIA Flange

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

OPTIONS :

- RDS Coder
- GSM Remote Control

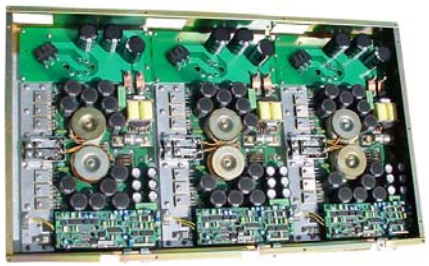
DRIVER

- Digital frequency synthesizer
- Alarms database
- Frequency deviation limiter
- High audio performance
- All features controlled by microprocessor
- Large LCD display for driver and final metering

No. 2 RF 2.2 KW MODULES

- Wide band amplifiers in Mosfet Technology
- 8 x 300W amplifiers
- Wilkinson Combiner
- Built in harmonics filter

No. 2 POWER SUPPLIES



- DC/DC switching power supply
- Completely separated and protected
- Easily Removable
- Built in high isolation transformer

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6 KW FM Transmitter

- Single or dual driver
- 3 RF Modules (2.2 KW each)
- 3 DC/DC switching power supply
- High isolation built in transformer
- Completely self protected and redundant
- Remote control facility RS232 -RS485 / GSM / Parallel Alarm Interface

Blue Star

6 KW FM TRANSMITTER

Technical Specifications

GENERAL SPECIFICATIONS

Operating voltage	400 VAC 3 phases
Line power	<12 KVA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
19" Standard cabinet	32 units
COM1 – COM2 (front and rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10/100KHz steps
Internal setting mode	by keys or by RS232-RS485)
External setting mode	±1000Hz/year
Frequency generation	direct VCO frequency modulation
Modulation type	±75KHz
Nominal frequency deviation	±0.2dB
Deviation linearity in all frequency range	<0.1dB
RF output power	>6 KW
Power control stability	< 0.1dB
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier off)	>60dBc
Output connector	1"+5/8" EIA Flange

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

OPTIONS :

- RDS Coder
- GSM Remote Control

DRIVER

- Digital frequency synthesizer
- Alarms database
- Frequency deviation limiter
- High audio performance
- All features controlled by microprocessor
- Large LCD display for driver and final metering

No. 3 RF 2.2 KW MODULE S

- Wide band amplifiers in Mosfet Technology
- 8 x 300W amplifiers
- Wilkinson Combiner
- Built in harmonics filter

No. 3 POWER SUPPLIES

- DC/DC switching power supply
- Completely separated and protected
- Easily Removable
- Built in high isolation transformer

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10 KW FM Transmitter

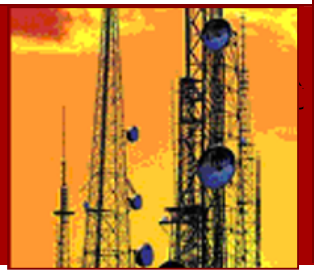
NEW

- Single or dual driver
- 5 RF Modules (2.2 KW each)
- 5 DC/DC switching power supply
- High isolation built in transformer
- Completely self protected and redundant
- Remote control facility RS232 / RS485 / GSM / Parallel Alarm Interface

Blue Star

NEW

10 KW FM TRANSMITTER



Technical Specifications

GENERAL SPECIFICATIONS

Operating voltage	400 VAC 3 phases
Line power	<19 KVA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
19" Standard cabinet	42 units
COM1 – COM2 (front and rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10/100KHz steps
Internal or External setting mode	by keys or by RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
RF output power	>10 KW
Power control stability	< 0.1dB
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier off)	>60dBc
Output connector	1"+5/8" EIA Flange

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

OPTIONS :

- RDS Coder
- GSM Remote Control

DRIVER

- Digital frequency synthesizer
- Alarms database
- Frequency deviation limiter
- High audio performance
- All features controlled by microprocessor
- Large LCD display for driver and final metering

No. 5 2.2 KW RF MODULES

- Wide band amplifiers in Mosfet Technology
- 8 x 300W amplifiers
- Wilkinson Combiner
- Built in harmonics filter

No. 5 POWER SUPPLIES

- DC/DC switching power supply
- Completely separated and protected
- Easily Removable
- Built in high isolation transformer

T.E.M. Tecnologie Elettroniche Milanesi
Tel. +39-02-8923961 r.a. - Fax +39-02-89239620
Via B. Buozzi 18/20 – 20089 Rozzano (MI) – Italy
www.tem-italy.it – e-mail: sales@tem-italy.it

20 KW FM Transmitter

NEW

Blue Star

Blue Star…series

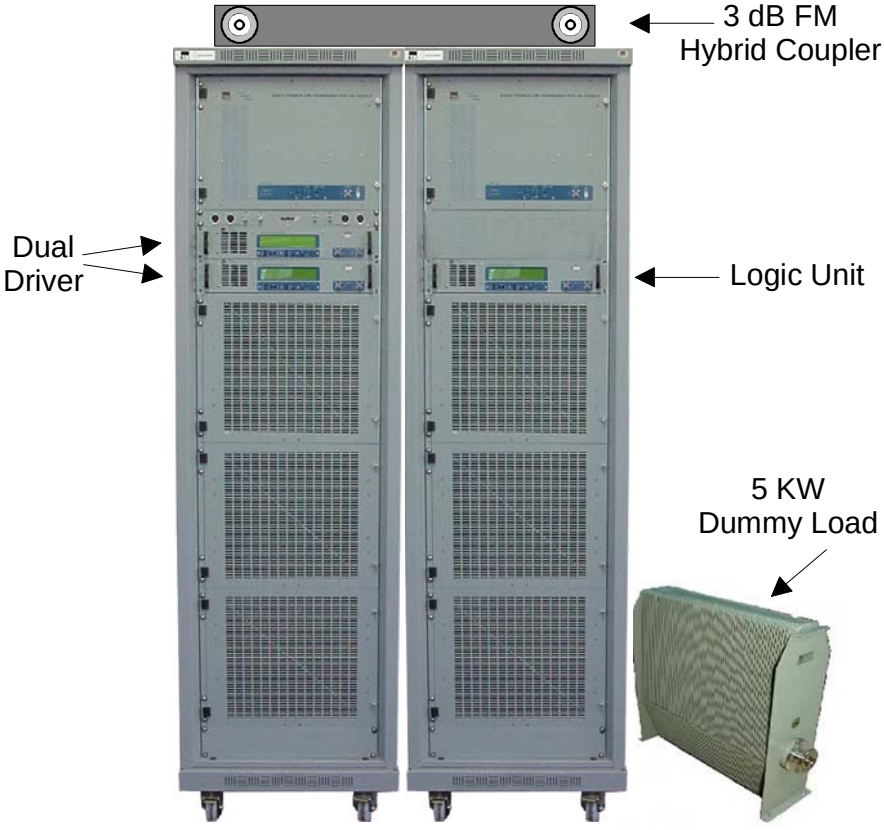
- Dual Driver
- 10 RF Modules (2.2 KW each)
- 10 DC/DC switching power supply
- 2 hight isolation built in transformers
- Completely self protected and redundant
- Remote control facility with LabView (via RS232 / RS485 / GSM)

serie…Blue Star

- Doppio Driver
- 10 Moduli RF (2.2 KW ognuno)
- 10 DC/DC alimentatore switching
- 2 trasformatori ad alto isolamento incorporati
- Completamente auto protetto e ridondante
- Controllo remoto con LabView (via RS232 / RS485 / GSM)

Available Options

- Stereo Coder
- AGC Card
- LabView for Remote Control
- Syncroniser
- RDS Card
- GSM & Battery
- AES-EBU Input Card
- MPX Change Over Card
- Audio Change Over & Emergency Audio Source



20 KW FM Transmitter

Technical Specifications

GENERAL SPECIFICATIONS

Operating voltage	400 VAC 3 phases
Line power	< 40 KVA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
No. 2 cabinet (19" standard)	42 units (each cabinet)
COM1 – COM2 (front and rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10/100KHz steps
Internal or External setting mode	by keys or by RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
RF output power	>20 KW
Power control stability	< 0.1dB
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier off)	>60dBc
Output connector	3"+1/8" EIA Flange

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

CHARACTERISTICS IN MONO

Signal input	Left + Right
Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
Suppression of 38KHz	>80dB
Spurious suppression outside band	in according to ETS 300-384
Pilot reference for RDS encoder (19 Khz out)	1Vpp

DRIVER

- Digital frequency synthesizer
- Alarms database
- Frequency deviation limiter
- High audio performance
- All features controlled by microprocessor
- Large LCD display for driver and final metering

No. 10 2.2 KW RF MODULES

- Wide band amplifiers in Mosfet Technology
- 8 x 300W amplifiers
- Wilkinson Combiner
- Built in harmonics filter

No. 10 POWER SUPPLIES

- DC/DC switching power supply
- Completely separated and protected
- Easily Removable
- Built in high isolation transformer

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40 KW FM Transmitter

NEW

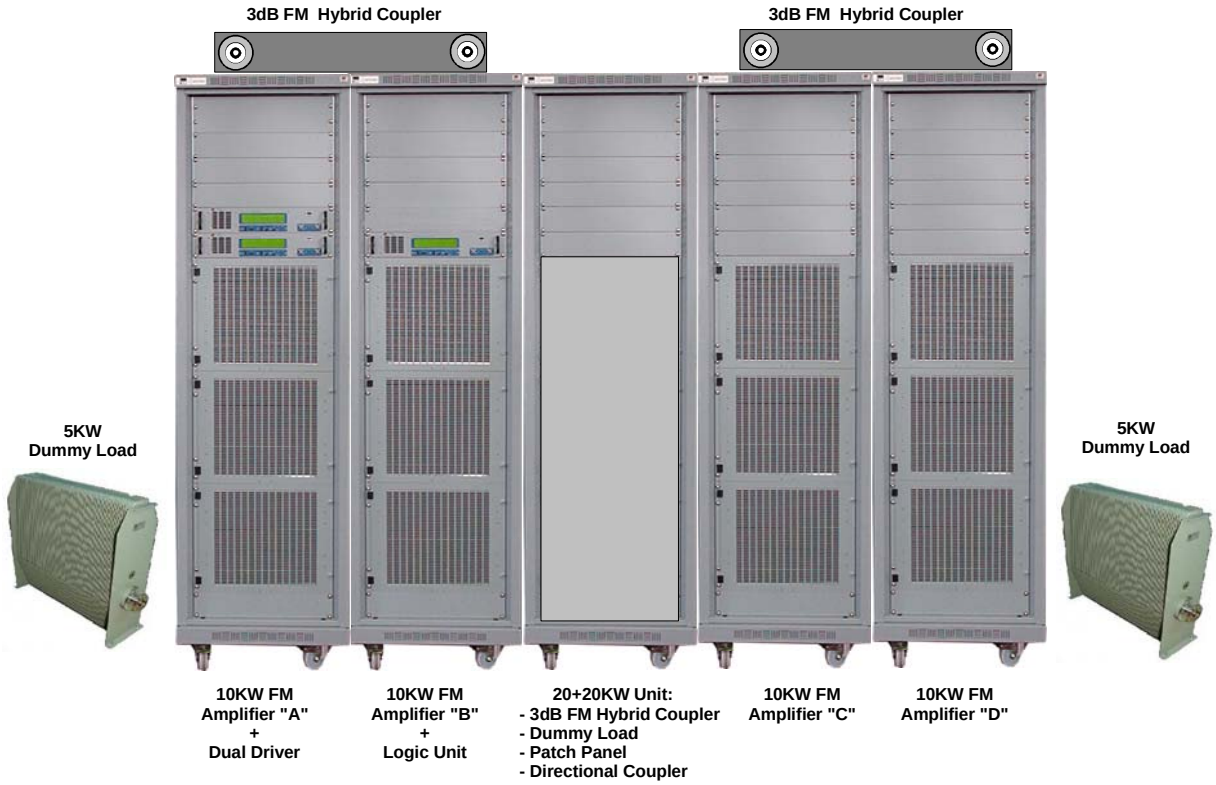
Blue Star

Blue Star…series

- Dual Driver
- Service Patch Panel
- 20 RF Modules (2.2 KW each)
- 20 DC/DC switching power supply
- 4 hight isolation built in transformers
- Completely self protected and redundant
- Remote control facility with LabView (via RS232 / RS485 / GSM)

serie…Blue Star

- Doppio Driver
- Patch Panel di servizio
- 20 Moduli RF (2.2 KW ognuno)
- 20 DC/DC alimentatore switching
- 4 trasformatori ad alto isolamento incorporati
- Completamente auto protetto e ridondante
- Controllo remoto con LabView (via RS232 / RS485 / GSM)



Available Options

- Stereo Coder
- AGC Card
- LabView for Remote Control
- Syncroniser
- RDS Card
- GSM & Battery
- AES-EBU Input Card
- MPX Change Over Card
- Audio Change Over & Emergency Audio Source

40 KW FM Transmitter

Technical Specifications

GENERAL SPECIFICATIONS

Operating voltage	400 VAC 3 phases
Line power	< 80 KVA
Nominal temperature range	-5° to 45°C
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
No. 5 cabinet (19" standard)	42 units (each cabinet)
COM1 – COM2 (front and rear panel)	RS232
COM3 (rear panel)	RS485
Personal computer software	National Instruments LAB-VIEW ®

RADIO FREQUENCY

Frequency range	87.6 to 107.9MHz
Frequency setting	in 10/100KHz steps
Internal or External setting mode	by keys or by RS232-RS485)
Frequency stability	±1000Hz/year
Frequency generation	PLL synthesizer
Modulation type	direct VCO frequency modulation
Nominal frequency deviation	±75KHz
Deviation linearity in all frequency range	±0.2dB
RF output power	>40 KW
Power control stability	< 0.1dB
Harmonics emission	<-70dBc
Spurious emission	<-95dBc
Carrier reduction power (carrier off)	>60dBc
Output connector	3"+1/8" EIA Flange

MODULATION CAPABILITY

MONO (left and right)	30Hz to 15KHz
STEREO (by internal stereo generator)	30Hz to 53KHz
SCA (two channels)	30Hz to 100KHz
COMPOSITE	MONO or STEREO + SCA

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Input impedance	600 ohm (balanced) or 10Kohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<-40dB
Modulation distortion	<0.03%
Signal to noise ratio	>85dB

CHARACTERISTICS IN STEREO

Signal inputs	Left or Right
Input impedance	600ohm (bal.) or 10k ohm
Unbalance rejection	>40dB
Input level	–6 to +12dBm
Pre-emphasis	75 or 50ms
Audio frequency response (30Hz to 15KHz)	<0.15dB
Audio frequency response (19KHz to 100KHz)	<40dB
Cross-talk between left and right channel	>50dB
Distortion at frequency deviation of 75KHz	<0.03%
Distortion at frequency deviation of 100KHz	<0.03%
Signal to noise referred at deviation of 75KHz	>80dB
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Options, Ancillary equipment and Systems

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FM Radio Link
A15T0200*/A15R0200*

NEW

Blue Star

Blue Star…series

- Low Modulation Distortion
- Low noise
- Wide Frequency Range (1.4-2.6 GHz)
- Full and Easy Programmability
- Mains and 24Vdc Battery Power Supply
- High Frequency Stability
- AES/EBU Input/Output
- Alarms Output

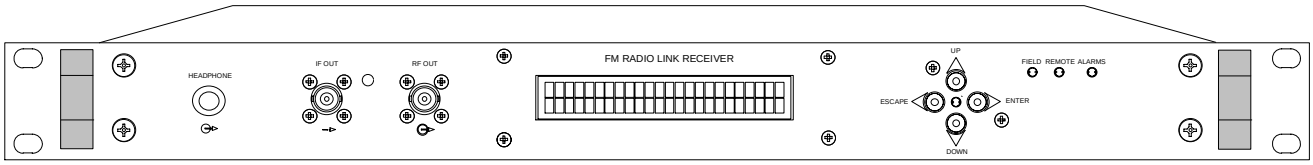
Options:
- Remote control by GSM
- Stereo Encoder/Decoder + Headphone Audio Output
- Main/Reserve Audio Input Automatic Change Over
- RF and IF Input Monitor

serie…Blue Star

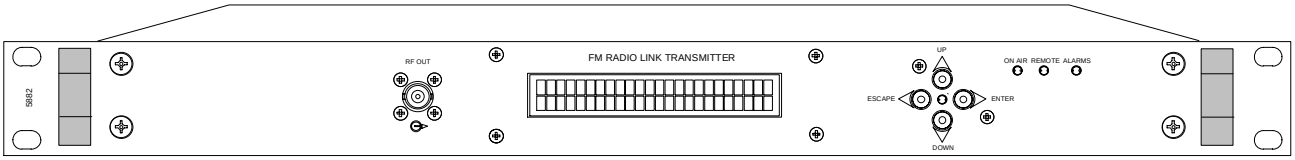
- Bassa Distorsione
- Basso Rumore
- Ampio Spettro di copertura (1.4-2.6 GHz)
- Programmabilita semplice e totale
- Alimentazione da rete e batteria 24Vdc
- Alta Stabilità di Frequenza
- Ingresso/Uscita AES/EBU
- Uscita allarmi

Opzioni:
- Controllo remoto GSM
- Stereo Encoder/Decoder + Uscita BF per ascolto in cuffia
- Scambio Automatico Ingresso Audio Principale/Riserva
- Monitor RF di Ingresso e IF

FM Radio Link Receiver - A15R0200*



FM Radio Link Transmitter - A15T0200*



FM Radio Link

Technical Specifications

GENERAL SPECIFICATIONS

Mains Voltage Range	115 / 230 Vac (+10% -25%)
Battery Backup	24.0÷28.0V - 1.2A @ 24 V
Size	19" 1U std. Rack.
Antenna connector	N / 50 ohm
Monitor Connectors	BNC
I/O Lines	No field

RADIO FREQUENCY

Frequency range	1.4-2.6GHz.
Bands	1429÷1433MHz 1517÷1525MHz 1660÷1670MHz 1700÷1730MHz 1785÷1825MHz 2367.5÷2372.5MHz 2440÷2.450MHz 2468.1÷2483.3MHz
Modulation FM 75 kHz peak dev.	180k F3E mono, 256kF3E stereo
Frequency step size	100 kHz
Long term frequency error	<1 ppm/year
RF Output Power	2W standard (5W options)
RF harmonic products	<-60 dBc, -80 dBc typ.
RF spurious products	<-70 dBc, -80 dBc typ.
Dynamic Selectivity	>+10dB typ @ ΔF=300 kHz >+35dB typ @ ΔF=500 kHz >+45dB typ @ ΔF=1.0 MHz
RF Input Level	-90 ÷ -10dBm (7μV÷70mV)
Typical Sensivity (S/N=60dB)	Sin= -90dBm (7μV) mono Sin= -70dBm (70μV) stereo

AUDIO CHARACTERISTICS

Mpx/mono Output Level	-1.5÷+12dBm (0.5dB steps)
S/N Ratio (30÷20000Hz rms)	>70 dB, 76 typ. Mono >66 dB, 72 typ. Stereo
Modulation Distortion @1kHz/ 00%dev.	Mono≤0.1% (0.03% typ) Stereo, 1ch≤0.30% (0.20% typ)
Stereo Cross-Talk	>50dB(100÷5000Hz) >45dB(30÷15000Hz)
Mpx Input Audio Level	-3.5 ÷ +12.5dBm @ ± 75kHz dev.
Auxiliary Channel Input Level	-12.5÷+3.5dBm@±7.5kHzdev.
MPX Monitor Output Level	0 ÷ +10 dBm @ ±75kHz dev.
Preemphasis	0/50/75 μs ±2%
Audio Frequency Response	30 Hz ÷ 15 kHz ±0.1dB

Data may change without notice

Specifiche Tecniche

SPECIFICHE GENERALI

Alimentazione	115 / 230 Vac (+10% -25%)
Batteria di Backup	24.0÷28.0V - 1.2A @ 24 V
Dimensioni	19" 1U std. Rack.
Connettore d'antenna	N / 50 ohm
Connettori di monitor	BNC
Linee I/O	No field

CARATTERISTICHE DI RADIOFREQUENZA

Campo di frequenza	1.4-2.6GHz.
Sottogamme	1429÷1433MHz 1517÷1525MHz 1660÷1670MHz 1700÷1730MHz 1785÷1825MHz 2367.5÷2372.5MHz 2440÷2.450MHz 2468.1÷2483.3MHz
Modulazione FM 75 kHz dev.	180k F3E mono, 256kF3E stereo
Passo di sintesi	100 kHz
Errore frequenza lungo termine	<1 ppm/year
Potenza RF in uscita	2W standard (5W options)
Prodotti armonici RF	<-60 dBc, -80 dBc typ.
Prodotti spuri RF	<-70 dBc, -80 dBc typ.
Selettività dinamica	>+10dB typ @ ΔF=300 kHz >+35dB typ @ ΔF=500 kHz >+45dB typ @ ΔF=1.0 MHz
Livello IN RF	-90 ÷ -10dBm (7μV÷70mV)
Sensibilità Tipica (S/N=60dB)	Sin= -90dBm (7μV) mono Sin= -70dBm (70μV) stereo

CARATTERISTICHE AUDIO

Livello di uscita Mpx/mono	-1.5÷+12dBm a passo 0.5dB
Rapporto S/D (30÷20000Hz rms)	>70 dB, 76 typ. Mono >66 dB, 72 typ. Stereo
Distorsione Modulaz. @1kHz/ 00%dev.	Mono≤0.1% (0.03% typ) Stereo, 1ch≤0.30% (0.20% typ)
Separazione Stereo	>50dB(100÷5000Hz) >45dB(30÷15000Hz)
Livello Audio IN MPX	-3.5 ÷ +12.5dBm @ ± 75kHz dev.
Livello IN Canale Aux	-12.5÷+3.5dBm@±7.5kHzdev.
Livello uscita monitor MPX	0 ÷ +10 dBm @ ±75kHz dev.
Preenfasi	0/50/75 μs ±2%
Risposta in frequenza	30 Hz ÷ 15 kHz ±0.1dB

Le specifiche possono cambiare senza preavviso

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FM Receiver
A07A93206

NEW

Blue Star

Blue Star…series

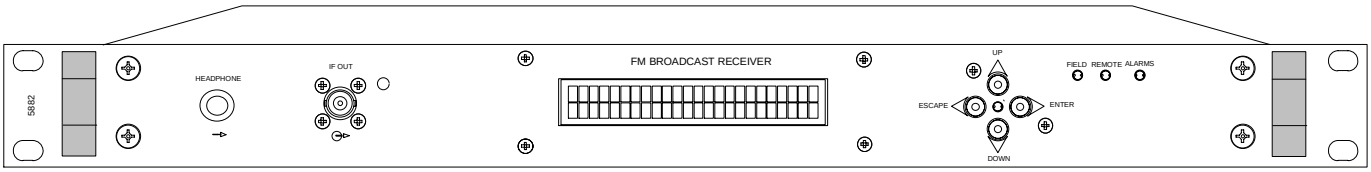
- Fully microprocessor controlled
- Complete front-panel or remote programmability of frequency
- Recommended for FM transponder site
- Very wide audio base-band
- Very flat MPX response
- Mains and 24Vdc Battery Power Supply

Options:
- Stereo Encoder/Decoder + Headphone Audio Output
- IF output monitor

serie…Blue Star

- Completamente controllato da microprocessore
- Completa programmabilità della frequenza da pannello frontale o da remoto
- Ideale per stazioni di ripetizione FM
- Banda base audio estremamente larga
- Uscita MPX estremamente piatta
- Alimentazione da rete e batteria 24Vdc

Opzioni:
- Stereo Encoder/Decoder + Uscita BF per ascolto in cuffia
- Monitor di uscita IF



FM Receiver

Technical Specifications

GENERAL SPECIFICATIONS

Mains Voltage Range	115 / 230 Vac (+10% -25%)
Battery Backup	24.0÷40.0V - 500A @ 24 V
Size	19" 1U std. Rack.
Antenna connector	N / 50 ohm
Monitor Connectors	BNC
I/O Lines	No field

RADIO FREQUENCY

Frequency range	87.5-108 MHz
Modulation FM 75 kHz peak dev.	180k F3E mono, 256kF3E stereo
Synthesis step size	100/10 kHz
Dynamic Selectivity	>+10dB typ @ ΔF=300 kHz >+35dB typ @ ΔF=500 kHz >+45dB typ @ ΔF=1.0 MHz
Usable Input Level	-87 ÷+-10dBm (10μV÷700mV)
Typical Sensivity (S/N=60dB)	Sin= -87dBm (10μV) mono Sin= -67dBm (100μV) stereo
Noise Figure	<10 dB
Image freq. suppression	>60 dB (70 typ.)
AM suppression	>45 dB
IF monitor output	10.7 MHz/0dBm

AUDIO CHARACTERISTICS

Audio/Mpx Output Level	-1.5÷+12dBm (0.5dB steps)
S/N Ratio (30÷20000Hz rms)	>77 dB, 82 typ. Mono >73 dB, 75 typ. Stereo
Modulation Distortion @1kHz/ 100%dev.	Mono≤0.1% (0.03% typ) Stereo, 1ch≤0.30% (0.20% typ)
Stereo Cross-Talk	<-45dB (100÷12000Hz)
Audio Frequency Response	20 Hz ÷ 15 kHz ±0.1dB
MPX Frequency Response	15 Hz ÷ 67 kHz ±0.1/-0.5dB

Data may change without notice

Specifiche Tecniche

SPECIFICHE GENERALI

Alimentazione	115 / 230 Vac (+10% -25%)
Batteria di Backup	24.0÷40.0V - 500A @ 24 V
Dimensioni	19" 1U std. Rack.
Connettore d'antenna	N / 50 ohm
Connettori di monitor	BNC
Linee I/O	No field

CARATTERISTICHE DI RADIOFREQUENZA

Campo di frequenza	87.5-108 MHz
Modulazione FM 75 kHz dev.	180k F3E mono, 256kF3E stereo
Passo di sintesi	100/10 kHz
Selettività dinamica	>+10dB typ @ ΔF=300 kHz >+35dB typ @ ΔF=500 kHz >+45dB typ @ ΔF=1.0 MHz
Livello IN	-87 ÷+-10dBm (10μV÷700mV)
Sensibilità Tipica (S/N=60dB)	Sin= -87dBm (10μV) mono Sin= -67dBm (100μV) stereo
Rumore	<10 dB
Soppressione freq. immagine	>60 dB (70 typ.)
Soppressione AM	>45 dB
Uscita IF monitor	10.7 MHz/0dBm

CARATTERISTICHE AUDIO

Livello di uscita Mpx/Audio	-1.5÷+12dBm a passo 0.5dB
Rapporto S/D (30÷20000Hz rms)	>77 dB, 82 typ. Mono >73 dB, 75 typ. Stereo
Distorsione Modulaz. @1kHz/ 100%dev.	Mono≤0.1% (0.03% typ) Stereo, 1ch≤0.30% (0.20% typ)
Separazione Stereo	<-45dB (100÷12000Hz)
Risposta in frequenza Audio	20 Hz ÷ 15 kHz ±0.1dB
Risposta in frequenza MPX	15 Hz ÷ 67 kHz ±0.1/-0.5dB

Le specifiche possono cambiare senza preavviso

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2 KW Dummy Load
A07ADL2000

NEW

Mechanical Characteristics

- Connections : EIA 7/16”
- Slim Size: standard 19” rack , in only 4 U (176mm)
- Temperature range [°C] : –10 ÷ 40
- Weight [kg.] : 25
- Air Forced cooling system

Caratteristiche Meccaniche

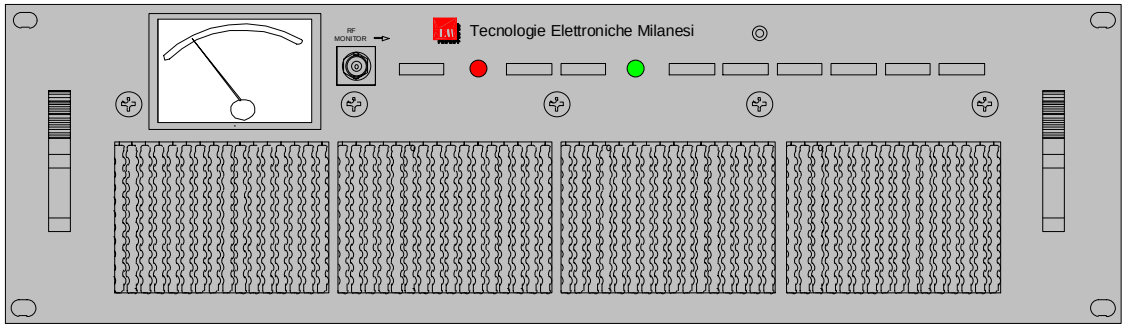
- Connessione : EIA 7/16”
- Rack compatto da 19” , alto 4 Unità (176mm)
- Range di temperatura [°C] : –10 ÷ 40
- Peso [kg.] : 25
- Sistema di raffreddamento ad aria forzata

Electrical Characteristics

- Input Frequency range [MHz] : 88 ÷ 108
- Return loss [dB] : > 26
- Input Impedence [Ohm] : 50
- Input Power [W] : 2000
- Blower AC power supply [V] : 230
- RF Wattmeter built-in
- RF monitor

Caratteristiche Elettriche

- Range frequenza di ingresso [MHz] : 88 ÷ 108
- Adattamento [dB] : > 26
- Impedenza di ingresso [Ohm] : 50
- Potenza di ingresso [W] : 2000
- Alimentazione AC ventole [V] : 230
- Wattmetro RF incorporato
- RF monitor



2 KW Dummy Load

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Automatic Audio Change Over
A06A02

NEW

Blue Star

Blue Star…series	serie…Blue Star
• Audio L/R or MPX Priority Signal Detector • Automatic Change Over Back Up Signal • Programmable Switch Time • Alarm Output • Operating Voltage : 230 VAC ±10 % / +24 VDC • Slim Size: standard 19” rack , in only 1 Unit (44mm)	• Rilevazione mancanza Segnale Audio Prioritario L/R o MPX • Scambio Automatico sul Segnale di Back Up • Tempo di scambio programmabile • Uscita allarmi • Alimentazione : 230 VAC ±10 % / +24 VDC • Rack compatto da 19” , alto 1 Unità (44mm)

Automatic Audio Change Over

General Description

The Change over unit is a device allowing an automatic switch to either a MPX or a L&R back-up signal, when the main input fails. The device will also allow the switch back to the main signal, should it return to normal levels.
Under normal functioning conditions, the circuit is set in order to transmit either the main MPX signal or the main L&R signal. For MPX signal, the switch is made after checking either the 19 kHz pilot tone presence (19 KHz tolerance level +/- 1.5 Hz), extract from the MPX signal, or the 30 Hz – 15kHz base band audio signal input level. In this case, the switch is made if the audio input level is lower than - 6dB, referring to the standard 0dBm level.
For the L&R AUDIO, the switch is made when either the L or the R audio input levels are < -6 dB referring to the standard 0dBm level.
The MPX or L&R input choice has to be made in advance using the relevant switch located on the front panel. Two switch Function green leds close to it disply *while ON* which kind of input signal has been selected.
The change over time (to the back-up signal or the to main signal once at normal levels) can be set between 1 and 1024 sec. adjusting the jumpers located on the board.
The analogue delay on audio signal is preset at 30 sec., after this time the audio change over timer will start and the change over will be made at the set time.
Three green Signal Diagnostic leds on the front panel will inform if the pilot tone, the MPX audio and the L& R audio are available, and a back-up red led on the front panel is ON when the change over has been made.
Two alarm signals are available: an open collector signal and a relay with normally closed/ normally open contacts.
BNC monitor outputs for main and back-up MPX and L&R signals are located on the front panel. Two BNC connectors for priority and back-up MPX signal input and four XLR connectors for priority and back-up L&R AUDIO signal input are available on the rear panel.

Data may change without notice

Descrizione Generale

L'unità di commutazione è un dispositivo che permette di selezionare automaticamente un segnale MPX o un AUDIO L&R di scorta (back-up) quando il prioritario viene a mancare. Qualora il prioritario dovesse ritornare nei livelli standard il dispositivo ricommuterà l'uscita su di esso.
Nel normale funzionamento il sistema fornirà in uscita il segnale prioritario (MPX o AUDIO L&R a seconda della selezione effettuata). Nel caso del segnale MPX la commutazione avviene sentendo la presenza del segnale del tono pilota a 19 KHz estratto dal segnale MPX (l'aggancio con il tono pilota sarà garantito fino a +- 1.5 Hz rispetto a 19 KHz) insieme al segnale audio in banda base 30 Hz – 15 KHz (livello audio accettato fino a –6 dB rispetto al livello standard di 0 dBm). Nel caso invece dell'AUDIO L&R la commutazione avviene anche se uno solo due livelli audio L e R scende sotto i –6 dB rispetto al livello standard di 0 dBm.
La selezione MPX o segnale AUDIO L&R viene effettuata tramite un deviatore posto sul frontale del rack e due led verdi segnaleranno la selezione.
I tempi di commutazione in mancanza del segnale prioritario e di ripristino a quello primario sono regolabili tramite dei jumper sulla scheda fra le tempistiche di 1 sec e 1024 sec. Per quanto riguarda il ritardo analogico sul segnale audio il tempo è prefissato a 30 sec. ; dopo questo periodo di assenza audio, scatterà il timer di scambio audio programmabile appena sopra descritto. Vi sono presenti sul frontale tre led verdi che segnalano con la loro accensione la presenza del tono pilota, dell'audio MPX banda base e dell'AUDIO L&R. Una spia rossa (Back–up) segnalerà l'allarme di mancanza del segnale prioritario e l'avvenuta commutazione. Vi sono inoltre disponibili due uscite di allarme quando manca il segnale prioritario (un'uscita open collector e una a relè con contatti puliti normalmente chiusi/aperti). L'apparato prevede sul frontale uscite di monitor MPX e AUDIO L&R proritario e secondario in BNC. Sul retro invece vi sono due connettori BNC di ingresso per l'MPX prioritario e secondario e quattro connettori XLR di ingresso per l'AUDIO L&R prioritario e secondario.

Le specifiche possono cambiare senza preavviso

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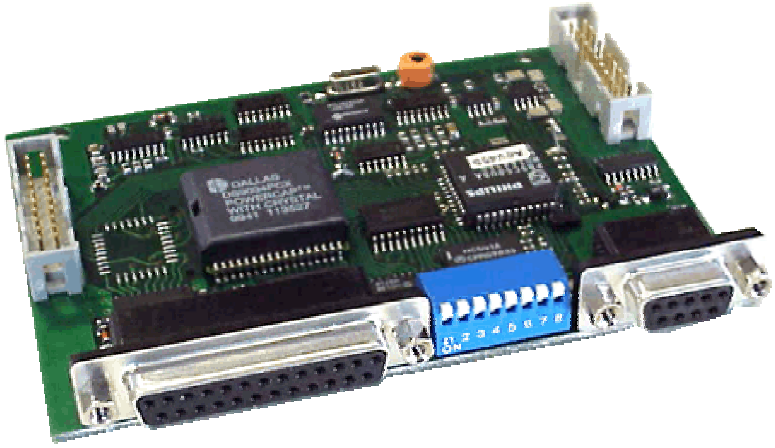
BUILT IN RDS ENCODER



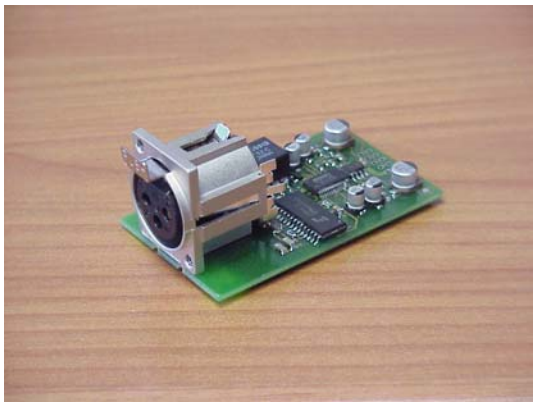
The RDS built in encoder board grants all the RDS facilities to the Blue Star Family transmitters, namely:

- PI, PS, TP, TA, PTY, AF, RT, CT, M/S, DI, PIN, TDC, IH, EON, FT, LIC, PTYN, ECC, LI, TMC
- Software for Windows 9x and NT included
- Transmission of 50 words by 8 characters, recallable manually or by time scheduling
- Detailed date, day and time special functions, available on PSN
- "Fast Tuning" function for fast switching on alternative frequencies

A further accessory to complete the Blue Star Family full optioned transmitters.

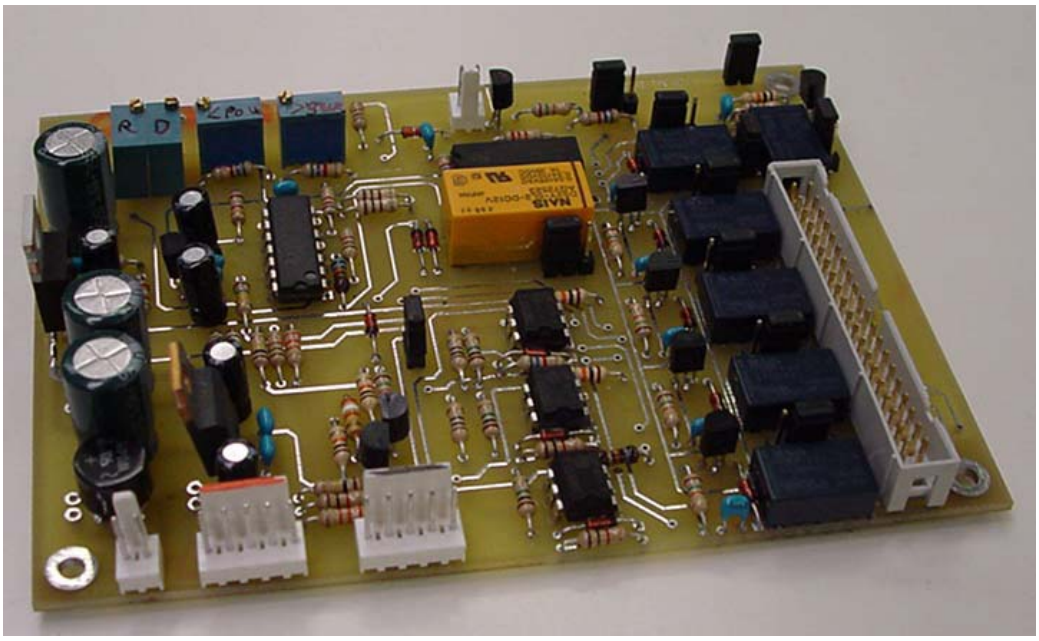
BUILT IN AES-EBU BOARD

This board is a digital/analogue converter, allowing a digital audio input to be broadcasted with analog transmitter, mantaing high quality standards.



TS/TC Board

Optional board for alarms detection. A connector located on the transmitter rear panel forwards the detected alarms and allows the input of signals suitable to command simple operations such as the transmitter turning on and off.



PIN	Functions
1	POWER OFF COMMAND
2	POWER ON COMMAND
3 – 21	-24 V POWER SUPPLY (request only)
4 – 11	+24 V POWER SUPPLY (request only)
5	RESET COMMAND
6	LOW POWER ALARM
8	GENERAL ALARM
13	LOCAL/REMOTE
24	TX OFF
25	TX ON
26	FWD POWER VALUE
28	RFL POWER VALUE
30	AC ALARM
36	RFL POWER ALARM
34 – 37	GND

FM TRANSMITTER REMOTE CONTROL AND TELEMETRY SYSTEM SPECIFICATION

THE BLUE STAR FAMILY

Commands and alarms available by SMS

Commands:

- Forward power setting
- Transmitter power on
- Transmitter power off
- Alarms reset
- Transmitter working conditions

The Blue Star Family transmitters accept the above commands from every mobile phone number, even if the GSM remote control mode has not been previously selected. It is not requested to pre-set any phone number in the mobile memory.
As soon as the owner / technician sends a command to any transmitter, a SMS message replies him, confirming if the command has been executed or not.
The Power off command sets to zero the forward power and the Power on command sets the forward power to the value previously memory set.

The “transmitter working conditions” command will forward the following information:

- Customer phone number
- Transmitter site
- Transmitter type and serial number
- Transmitter working (on air / fail)
- Frequency set
- Max forward power set
- Max reflected power set
- Forward power set
- Reflected power set
- Power module current
- Power module voltage
- Transmitter temperature
- Mains voltage
- Memory stored alarms
- End of SMS (character //)

Automatically sent SMS alarms (when the GSM remote control mode has been previously selected)

- First equipment turning on (or turning on after the GSM battery has been recharged)
- “-3dB forward power” alarm
- temperature over 75 °C: “threshold” alarm
- “modulation off” alarm (only available if the AGC module is present)
- “no power to RF module” alarm
- “mains power off” (AC < 160V) and “equipment turning off” alarm
- “mains power on” after an off alarm (AC >160V) and correct equipment restarting

The transmitters can send the SMS alarms to two phone numbers as maximum, once they have been memory pre-set. Find hereunder some SMS alarm examples. In this case the TRANSMITTER NAME is 7a2200, the SERIAL NUMBER is 0018 and the TRANSMITTER SITE is MILANO:

Alarm	Alarm SMS text sent by the transmitter
First equipment turning on	MILANO POWER-UP FROM 7a2200 SN 0018
“-3dB forward power” alarm	MILANO ALARM: 7a2200 SN 0018 –3dB F.PWR
Temperature over 75 °C: “threshold”	MILANO ALARM: 7a2200 SN 0018 TEMP. >75C
“modulation off” alarm	MILANO ALARM: 7a2200 SN 0018 MOD. OFF
“no power to RF module” alarm	MILANO ALARM: 7a2200 SN 0018 PWR SUPPLY
“mains power off”	MILANO ALARM: 7a2200 SN 0018 AC FAULT
“mains power on” after an off alarm	MILANO ALARM: 7a2200 SN 0018 AC OK

SMS commands text protocol

The SMS command text has to be sent as follows: TRANSMITTER NAME, SERIAL NUMBER, COMMAND. Type all the words in the text using small characters, do not leave any blank space within them but use a comma instead. If the SMS command text is not correct, the transmitters will neither start any operation nor reply any SMS message to the owner / technician. The character // states the end of the SMS message. Find hereunder some SMS command examples. In these examples the TRANSMITTER NAME is 7a2200, the SERIAL NUMBER is 0018 and the TRANSMITTER SITE is MILANO:

SMS Command	SMS Command text to be sent to the transmitter
TRANSMITTER WORKING CONDITIONS	7a2200,0018,status
TRANSMITTER POWER ON	7a2200,0018,start
TRANSMITTER POWER OFF	7a2200,0018,stop
ALARMS RESET	7a2200,0018,reset
FORWARD POWER SETTING	7a2200,0018,pwr=02100

The forward power value to set has always to be typed using 5 figures
(for instance: to set a 200W forward power it’s necessary to type 00200).
The transmitter serial number has always to be typed using 4 figures.

Hereunder an example of “transmitter working conditions” SMS reply message:	Hereunder an example of “transmitter power on” SMS reply message:	BLUE STAR Transmitters	Transmitter name to be used in SMS text
+393484514xxx MILANO 7a2200,0018 Tx:OnAir F:102.25M MaxF:2100W MaxR:100W FWD:2100W RFL:000W V:49,49,49,49V I:16,16,16,16A T:29C Ac:230V Alr:0 //	+393484514xxx MILANO 7a2200,0018 Cmd:START Result:OK //	1 KW	7a1000
		2 KW	7a2200
		4 KW	7a4k0
		6 KW	7a6k0
		10 KW	7a10k0

FM NETWORKS REMOTE CONTROL AND TELEMETRY MANAGING SOFTWARE

THE BLUE STAR FAMILY

GENERAL DESCRIPTION

In case of any alarm all the Blue Star FM transmitters, pre-set to *GSM remote* status, are able to send SMS messages to two memory stored GSM numbers. The SMS messages contain the following information:

- The transmitter model (i.e.: 2kW FM TX A07A2200)
- The serial number
- The name of the site
- The kind of entered alarm

A specific software, developed by TEM engineers using the LabView system (National Instruments), is able to manage all the SMS created by a FM transmitters network, with a maximum of 10,000 equipment. The software can be used in a **NETWORK CONTROL CENTRE.**
Whatever alarm sent from the any transmitter will be displayed, classified by kind and transmitter model and stored on the PC in a text file containing all the necessary information.
The software also allows to send command SMS messages simply by using the PC. Furthermore, any operator using a GMS phone can send SMS messages to the Blue Star transmitters for both telemetry and tele-control purposes. This operation is possible even if the GSM number was not previously memory stored in the equipment. The Blue Star transmitters will later send a reply SMS message, confirming that the command has been executed or not.

As a matter of fact, the Blue Star transmitters are able to send alarm SMS massages not only to the Network Control Center but also to the **GSM MOBILE PHONE OF THE TECHNICIAN IN CHARGE OF MAINTENANCE**.

For further details refer to the REMOTE CONTROL AND TELEMETRY SYSTEM SPECIFICATION file.

SOFTWARE MAIN FEATURES

1. each transmitter is identified with an ID number, and the record store all the info related to the equipment, including its GSM phone number.

2. an Alarm Window is displayed on the remote PC monitor every time each transmitter sends an Alarm SMS.
The Alarm Window contains the following information:

- The transmitter model (i.e.: 2kW FM TX)
- The serial number
- The name of the site and the region where the site is located
- The kind of entered alarm (note that, in case of mains failure alarm, another message is sent once the mains is back to normal)

3. a file including all information about the alarms is created and stored in the database

4. an automatic forwarded *status* message is sent to all the transmitters or only to some of them time by time (for ex. every day, every hour...); a file for each transmitter is created and stored in the database, including the status replay messages information

5. the possibility to send SMS commands using the standard GSM phone is left unchanged (to check the status, to start or stop the equipment, to increase or decrease the Forward power, to reset of the memorized the alarms and so on)

6. by making a data base query using the ID numbers, it will be possible to know how many SMS have been sent and received, and their kind.

N + 1 System

Always ON AIR

Slovak Telecom

5+1 FM Transmitters system

ONT Tunis

3+1 FM Transposer System with complete monitoring for audio control

Automatic Programs switching-Remote Control by GSM-Dummy Load for testing-Included

N + 1 System

+ **N + 1 Logic Unit**
  N..until 32 units
+ **Program Change over**
  LEFT - RIGHT – RDS - SCA
+ **Blue Star Family**
+ **FM Transmitters**
+ **Coaxial relay**

= ALWAYS ON AIR

Tecnologie
Elettroniche
Milanesi SpA

1+1 and N+1 Systems

This system has been designed to grant Your radio network/station to be always ON AIR even in case of a single transmitter failure.

Very important sites, as well as unattended or difficult to be reached sites have to be kept always working.

The purpose in the development of this system is the same for the BLUE STAR FAMILY, to be: **homogeneous – complete – expansible**

The system was born as 1+1 (passive stand by) and easily grows up to N+1 (passive stand by for more transmitters).

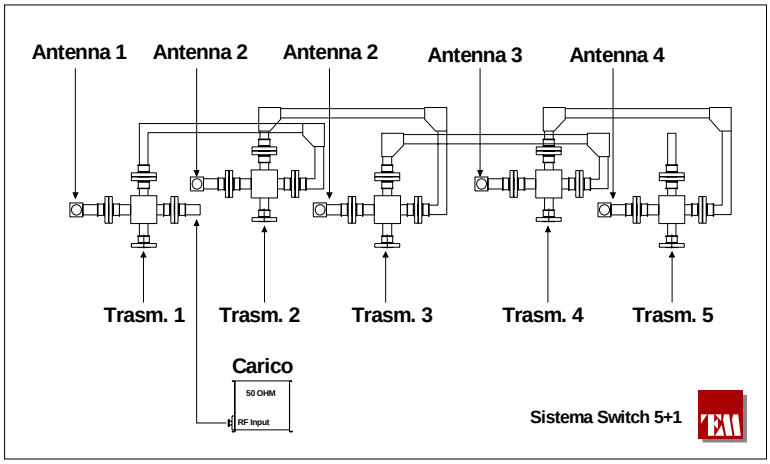
Systems members are:

1. All BLUE STAR TRANSMITERS

2. **Control logic unit.** Microprocessor controlled, linked through RS485 protocol, is housed in 2 units 19” Rack; a long life battery keeps the information stored in the control logic memory and allows a remote control via GSM even in case of very long black out.

3. **Automatic audio change over unit.** Housed in a 2 units 19” Rack, makes it possible to switch over till 3 audio programs (balanced L/R, MPX, RDS and SCA). The unit can be easily increased (2 racks for 6 programs, 3 racks for 9 programs change over and so on).

4. **RF antenna automatic change over.** The motorized coaxial switch (as well as on the dummy load) depend on the transmitters RF output power



Commutatori coassiali motorizzati

5. **Remote control by both GSM and PC**

This bi-directional remote control and telemetry via GSM allows a check of both the complete system and of the parameters of each single transmitter

6. **FM relay receivers.** If the system includes receivers in the FM band, an additional control logic unit can switch the stand by receiver (RX jolly), also changing the receiving frequency.

3 +1 System including monitoring

5 + 1 System

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Remote Control System

Innovative, flexible and powerful remote control system, with a very good quality/price ratio, suitable to control from remote both a single station and a complete network, even nationwide.

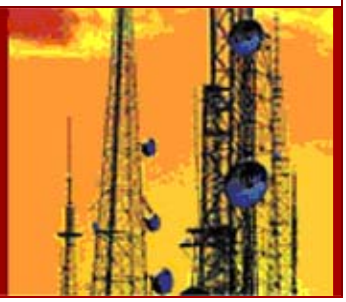
HOW THE SYSTEM WORKS

- via TCP/IP connection (in this case a LAN in each site – allowing real time monitoring – has to be present)
- Via Iso-frequency radio connection, suitable to link (with only a few seconds of delay) a complete network using the most suitable path
- Via phone connection per medium of a standard PSTN, GSM or BASEBAND modem
- Via Mixed connection (phone, radio and TCP/IP)
- The control centre is able to cope with all kind of connections at the same time, even using SNMP protocol that links the control centre to the equipment to be controlled

COMPOSITION OF THE SYSTEM: HW AND SW

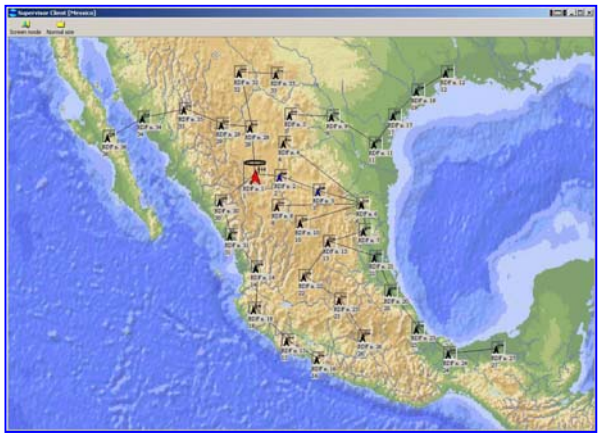
A SERVER software, resident in whatever PC, is linked to the Remote Control Equipment – transmiting and receiving data at site - and its Graphical User Interface, allowing the data to be displayed on user's PC. Many users can connect at the same time to the server to control the network

Remote Control System



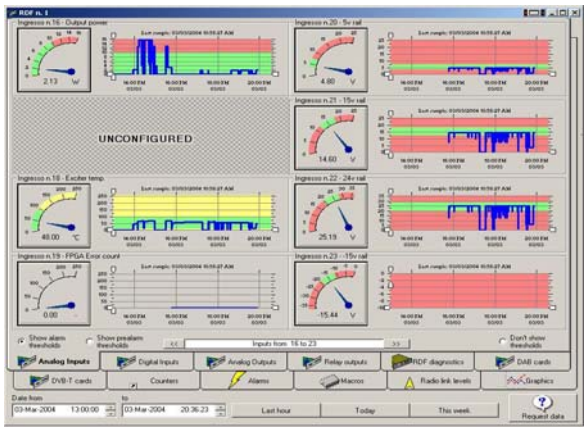
GENERAL FEATURES

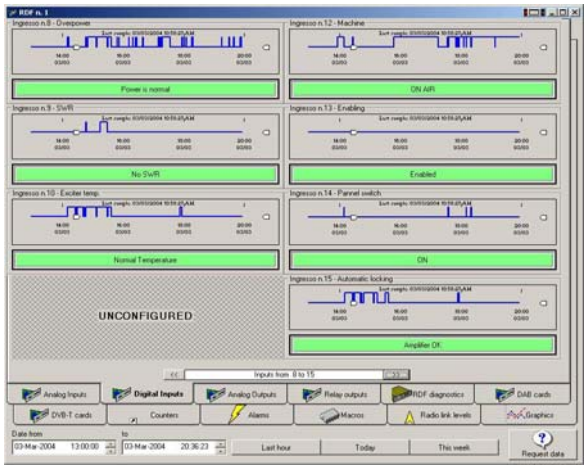
- map based system - the sites to be controlled can be selected on the map simply using the mouse
- graphical interface for management, control and monitoring, further than screens configuration
- database available to store the data for selected periods of time
- usernames and passwords available for any level and/or group
- auto configuration of remote HW
- working with Microsoft Windows NT / 2000 / XP operating systems expansion cards available



TECHNICAL FEATURES

- 8 analog input w/ 8 or 10 bit resolution, input voltages from 0 to 5 VDC
- 8 optically isolated digital inputs 5 mA, w/selectable polarity
- 8 relay outputs. Max current 1A @ 48VCC
- 6 internal inputs for out diagnostic purposes
- 1 RS485 for equipment intercommunication using various protocols
- 2 RS232 for general purposes or modem connection
- 1 RS232 for general purposes or PC connection
- 1 FFSK (MSK) modulated synchronous output for direct radio connection





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Tecnologie Elettroniche Milanesi

Introduce

The FM Synchronised System

Why to synchronise?

To cover wide areas

To have master transmitter and gap fillers

To use a single frequency in long highways

To avoid your audience changing the frequency very soon

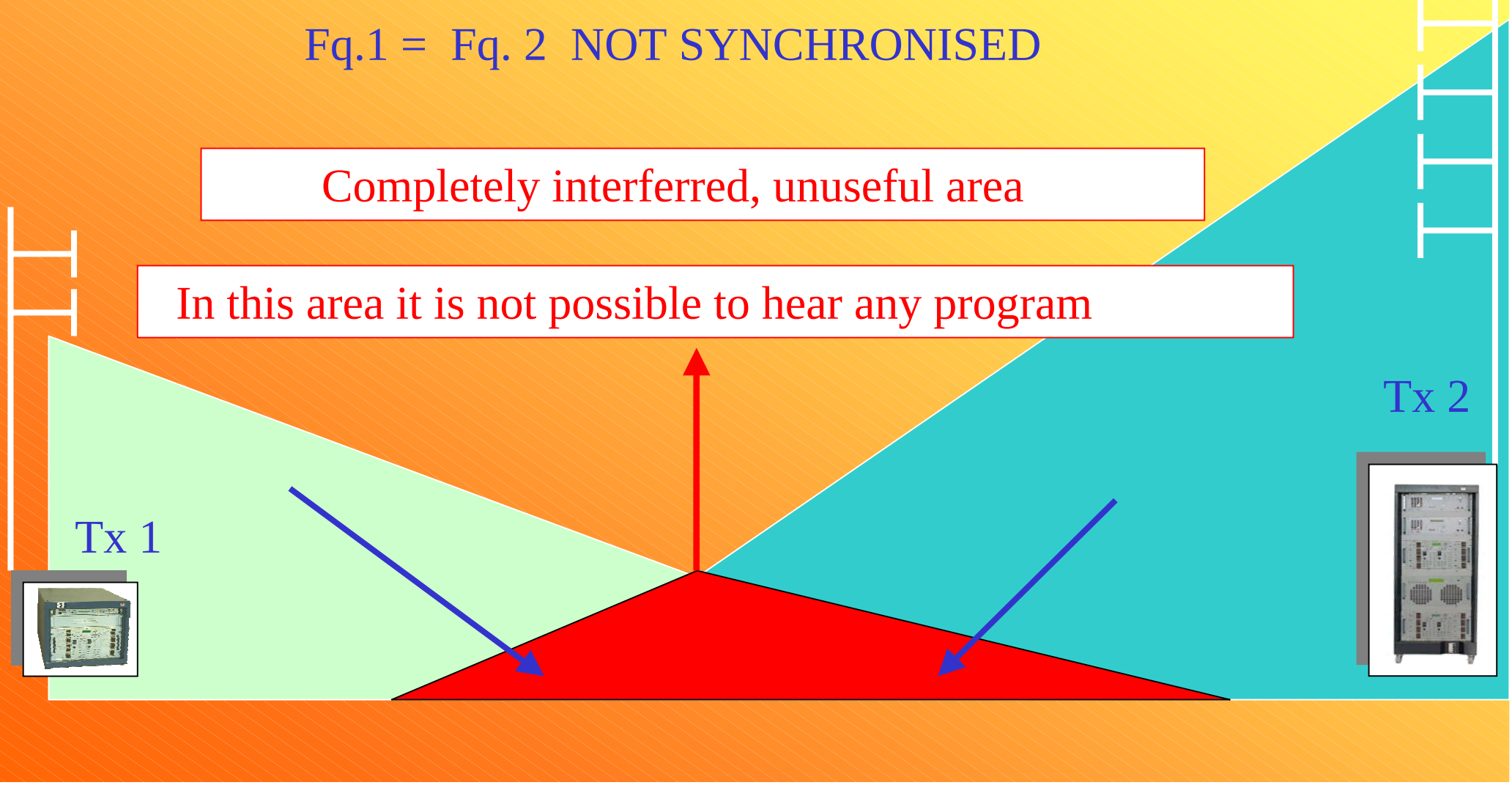
....Two FM Transmitters in the same area....

1

Fq.1 = Fq. 2 NOT SYNCHRONISED

Completely interferred, unuseful area

In this area it is not possible to hear any program



How to synchronise?

Get in all your network transmitters :

1- the same frequency reference

2- the highest relative frequency stability

3- the same modulation and controlled stereo subcarrier

4- the same modulation index

....Two synchronised FM Transmitters in the same area....

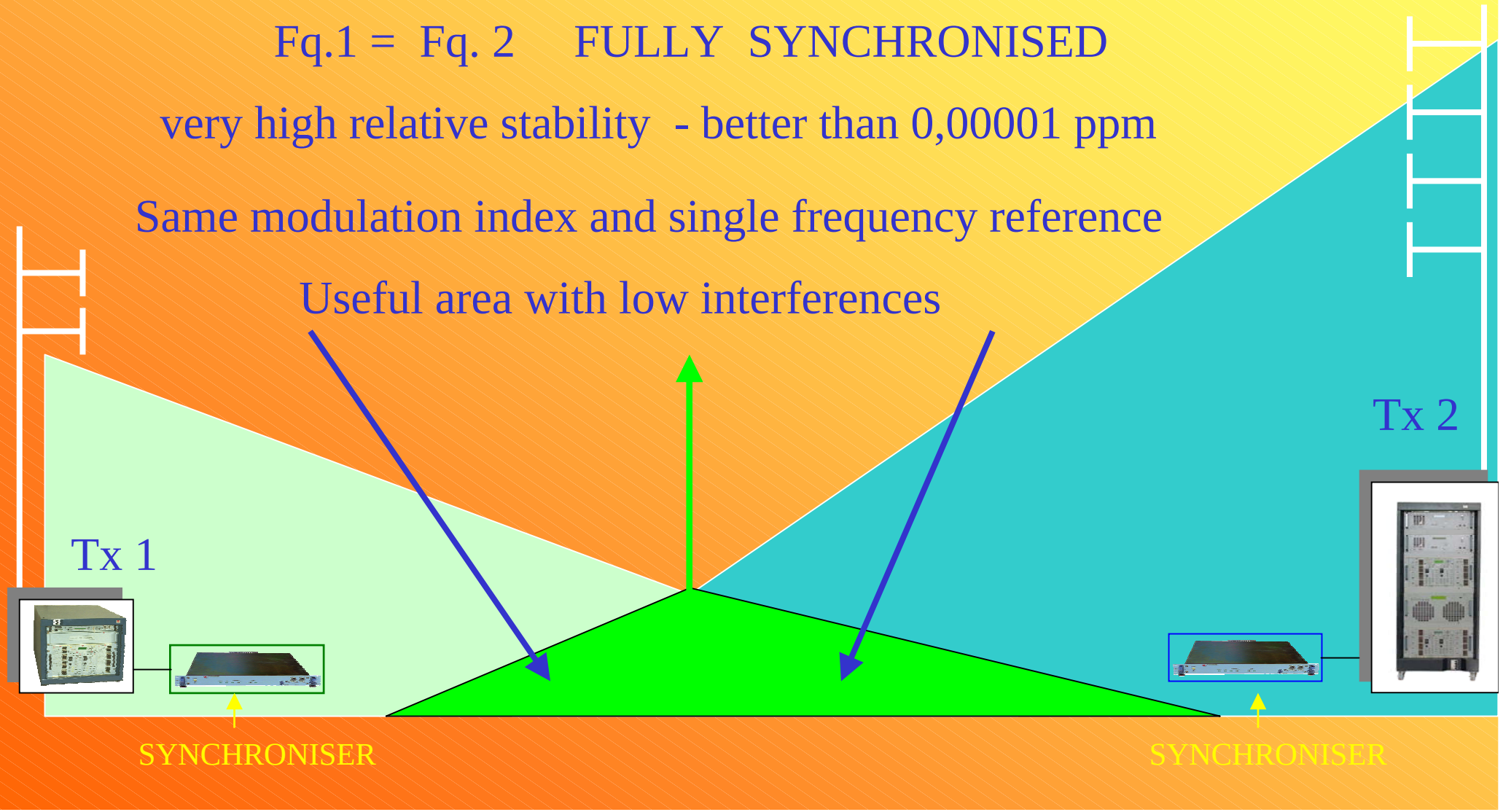
2

Fq.1 = Fq. 2 FULLY SYNCHRONISED

very high relative stability - better than 0,00001 ppm

Same modulation index and single frequency reference

Useful area with low interferences



Frequency references

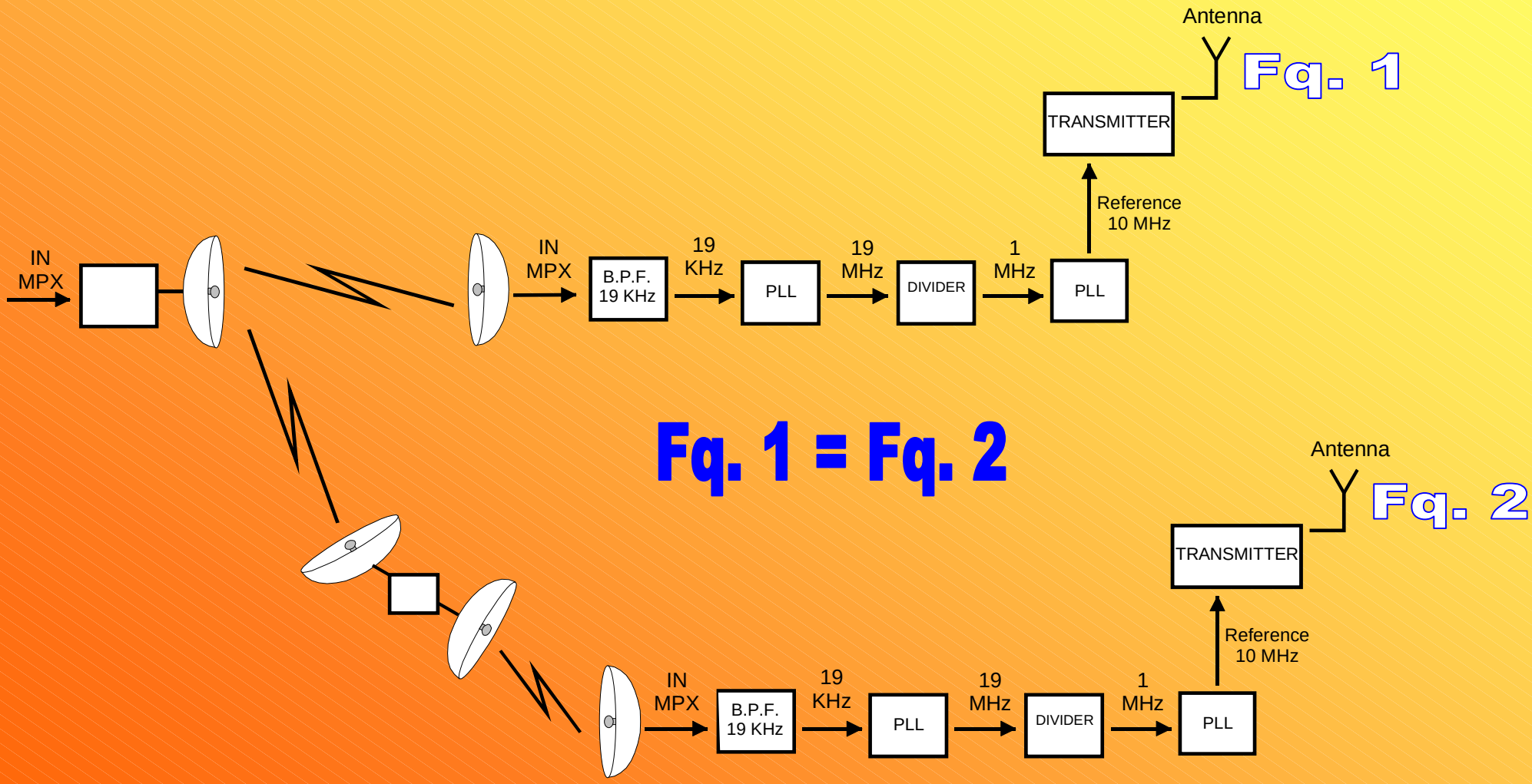
1. 19 KHz from mpx signal
2. 10 MHz from GPS

Frequency references

1. 19 KHz from MPX signal

The 19 KHz, separated from the MPX signal, is referred as reference in the modulator PLL circuit. The 19 KHz syncronizing system can be used when the same MPX signal (usually coming from a STL) is employed to modulate all the network transmitters

19 KHz from MPX signal Block Diagram

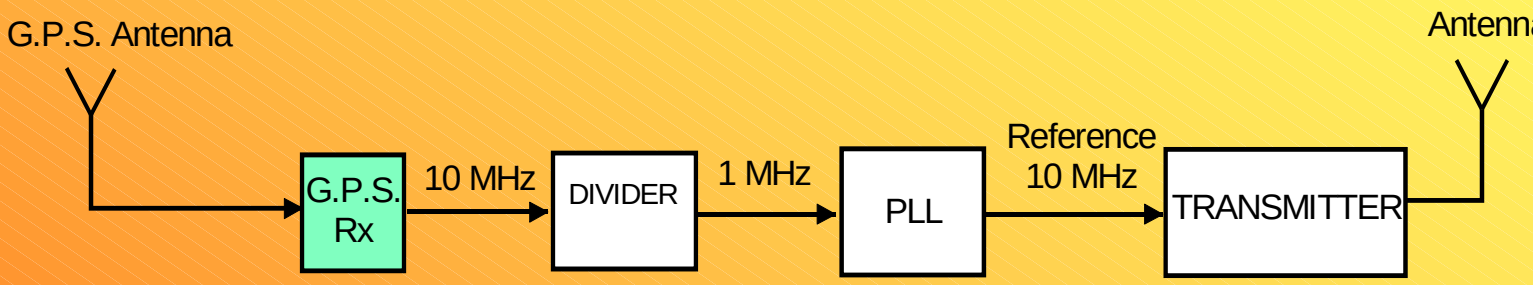


Frequency references

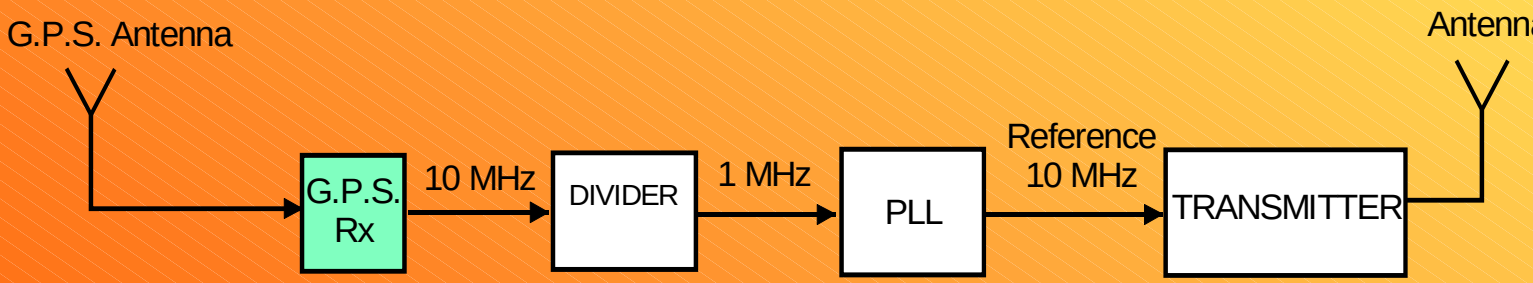
2. 10 MHz from GPS

The 10 Mhz synchronizing system is used when the same 19 KHz signal is not available, for instance when there is a built-in stereo encoder and left and right audio inputs are applied.

10 MHz from GPS Block Diagram



Fq. 1



Fq. 2

Fq. 1 = Fq. 2

TV equipment

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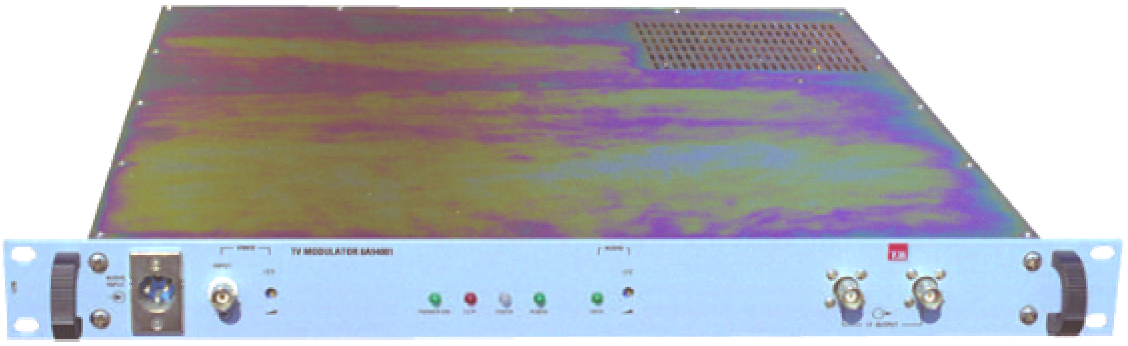
TV VSB IF Modulator 08A940
Slimline Family

- Slimline dimensions: only one unit (44.45mm) high
- White Clip automatic limiter circuit
- SAW vestigial sideband filter
- Front/rear inputs for Sound/Vision signals
- Optional 'Dual Sound' operation.
- Adjustment of output level in calibrated steps
- Available in the major important TV standard



The professional slimline TV Modulator model 08A94000 provides high quality, reliable performance in a compact and economic 19" package, only one standard unit high: two 940 modulators and an automatic IF switching unit for main-reserve operation can be assembled in 3 units of rack space.
This Modulator has been designed for unattended operation in remote locations and can be supplied for common amplification or separate amplification service.
Synthesiser type Sound Modulator allows many different IF Sound Carrier Frequencies to be accommodated by changing internal P.C. board jumpers. The heart of this Modulator is the quality component guarantees ideal and stable characteristics for the output spectrum and for the group delay. The group delay predistortion circuit is realised at vision-frequency to insure accurate and stable characteristics.
Sound & Vision inputs are located on the back panel and are conveniently jumped to the front panel to simplify maintenance and installation. The output level on the two IF outputs can be adjusted in accurate 2 dB steps by means of a calibrated PIN diode attenuator.
Vision and Sound carriers are locked to the same reference crystal for precision intercarrier spacing: when an 'out of frequency' condition is revealed, an automatic circuit attenuates the output signal. All internal circuitry is built on three high quality planar circuit boards, which are completely accessible on both sides for easy inspection and maintenance.
By addition of model 08A9400 Precision Offset Unit, any 08A940 TV Modulator can be upgraded to Precision Offset Operation, thus avoiding any interference with other stations operating in the same TV channel.
Our product is backed by a 12 months warranty for parts and labour.

TV VSB IF Modulator slimline family

Technical Specifications

GENERAL

Operating temperature range	-10 ÷ +45°C
Storage temperature range	-40 ÷ +70°C
AC Supply	110/120/220/240V, 50/60 Hz, 1 Phase
DC Supply	+24V, Negative Ground
Power Consumption	=60 W
Dimensions	19” Rack, 44.45 mm high, 460 mm
Weight	deep.
Television Standards	8 kg
Colour System	All main international standard
Classes of Emission	available.
IF Output Level	PAL/NTSC
Output Impedance	C3F (A5C) negative, Vision; F3E (F3),
Spurious Suppression	Sound
Intermodulation Products	-20 ÷ - 10 dBm adjustable.
Vision Carrier	50 Ohm / twin BNC Connectors
Sound Carrier	>70 dB
Vision/Audio Nominal Ratio	= 65 dB
Frequency Accuracy	According to standard used
	According to standard used
Frequency Stability	10 dB
	±250 Hz
Frequency Stability, long term	(other specifications on request)
	±5 PPM 0°C + 45°C
Deviation of Sound Carrier	(other specifications on request)
	±500 Hz/3 months
	(other specifications on request)
	±50 kHz, nominal

VISION

Input Impedance	75Ohm balanced
Return Loss	>30 dB
Input Voltage	1V p.p.
Max Input DC Component	±5 V
White Clip Threshold	set to + 105% for f<1.5 MHz
Video Bandwidth	25 Hz + 5MHz within ± 0.25 dB
Clamp Circuit	Feedback type with Back Porch
	or Sync. reading
Input Hum Rejection	>35 dB
Differential Gain Distortion	<1%
Differential Phase Distortion	<1°
Low Frequency Tilt	K factor 1% max.
Group Delay Tolerance	± 20 ns. predistortion circuits;
	25 µs. VSB filter
Noise & Hum	<50 dB

SOUND

Audio Input Voltage	-6+10 dBm
Audio Input Impedance	600 Ohm balanced
Audio Bandwidth	± 0.5 dB 40 Hz+15 kHz
Preemphasis	50 µs
Harmonic Distortion	<0.5% 40Hz to 15 kHz
Intermodulation Distortion	<0.6% 2^{nd} order; <1% 3^{rd} order
Unweighted S7N Ratio	>60 dB ref. To 30 kHz deviation
Weighted S7N Ratio	>63 dB according to CCIR Rec. 1949

MULTIMETER READINGS (Except Light Version)

Video Level (1.5V p.p.f.s.)
Sync. Level (0.45V p.p.f.s.)
Audio Level (1.5V RMS f.s.)
Audio Carrier Deviation (75kHz f.s.)

Data may change without notice

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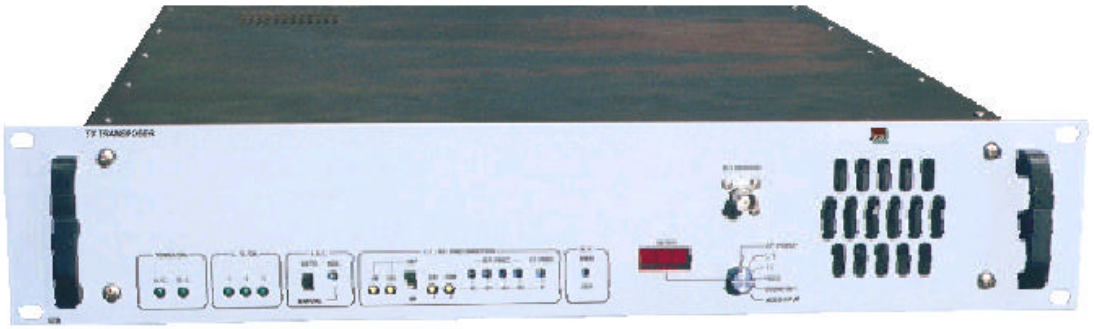
2-5W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 2-5W

- 38.9 MHz (39.2 K 1) Intermediate frequency
- High selectivity (Saw Filter)
- Wide power range capability
- Frequency agility
- A.G.C. & A.L.C. control
- Multislope amplitude precorrection
- 2 unit rack
- Low noise figure
- 230V A.C. and +24V D.C. power supplies

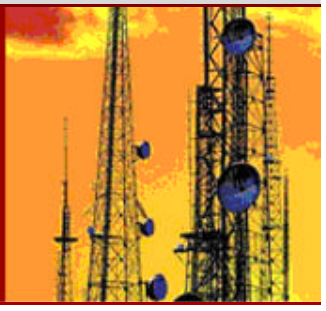
- Frequenza intermedia 38,9 MHz (39,2 K1)
- Selettività canale adiacente
- Potenza d'uscita 1-2-5W
- Agilità di frequenza
- Controllo di A.G.C. & A.L.C.
- Precorrezione di ampiezza multipendenza
- Meccanica in 2 unità
- Bassa figura di rumore
- Alimentazione +24V D.C. /230V A.C.



This kind of TV repeater has been especially designed for low power repeater stations operating in difficult environments.
All models are built in 2 units 19" rack.
Thanks to the frequency agility no turning RF(filter apart) adjustment is required to change the channel as all input and output amplifiers are wideband.
This transposer works with AC or DC supplies (for example solar batteries)
Precorrection circuit null out the intermodulation products so that they are in accordance wit h all the international standard values.
A digital multimeter placed on the front panel allows the measure and the control of the most important parameters of the equipment.

Questa serie di ripetitori TV è stata progettata per stazioni a bassa potenza operanti in condizioni ambientali difficili.
I modelli sono tutti costruiti in rack da 19" 2 unità.
Grazie all'agilità di frequenza non è richiesta alcuna sintonia (filtri RF a parte) per cambiare il canale di funzionamento poi che tutti gli amplificatori RF sono a larga banda.
Il ripetitore lavora sia con alimentazioni A.C. sia C.C. (ad esempio batterie solari)
Il sistema di precorrezione minimizza i prodotti di intermodulazione portandoli ai valori prescritti dagli standard internazionali.
Un multimetro digitale posto sul pannello frontale permette la misura ed il controllo dei piu' importanti parametri dell'apparato.

2-5W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 2-5W



Technical Specifications

GENERAL

Primary power for 2W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 2W	70W max
Primary power for 5W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 5W	250W max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, temperature
Dimensions	Std. 19" rack 2 U
Weight for 2 W model	12 Kg. Approx.
Weight for 5W model	14 Kg. Approx.

INPUT PARAMETERS

Input frequency ranges	VHF - UHF
Input impedance	50 Ohm unbalanced
Input return loss	> 20 dB
Input level range	200 uV ÷ 10 mV
Noise figure	8 dB VHF - 9 db UHF @1 mV input

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. IV-V
Output impedance	50 Ohm unbalanced
Output UHF power	2 and 5W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 5%
Differential phase error	< 5°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 60dB @ 50 KHz deviation
Sound distortion	< 0.5% THD @ 50 KHz deviation

Data may change without notice

GENERALI

Tensione di rete modello 2W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 2W	70W max (piena potenza)
Tensione di rete modello 5W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 5W	250W max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, temperatura
Dimensioni	Std. 19" rack 2 unità
Peso (modello 2W)	12 Kg. circa
Peso (modello 5W))	14 Kg. circa

PARAMETRI DI INGRESSO

Frequenza ingresso	VHF - UHF
Impedenza ingresso	50 Ohm sbilanciato
Perdita di ritorno	> 20 dB
Livello ingresso	200 uV ÷ 10 mV
Figura di rumore	8 dB VHF - 9 dB UHF @1 mV ingresso

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B. IV-V
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita in UHF	2 - 5W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

QUALITA' DI TRASMISSIONE

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 5%
Errore fase differenziale	< 5°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 60 dB @ 50 KHz deviazione
Distorsione suono	< 0.5% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
Tel. +39-02-8923961 r.a. - Fax +39-02-89239620
Via B. Buozzi 18/20 – 20089 Rozzano (MI) – Italy
www.tem-italy.it – e-mail: sales@tem-italy.it

2/5W UHF TV Transmitter
Trasmettitore TV UHF 2 / 5W

- Synthesized and ovenized local oscillator
- Can be modified in trasnsposer easily.
- 2 power range capability 2 – 5 W
- Frequency agility
- Built in output notch filter
- Multislope amplitude precorrection
- IF modulator and up converter in 2 separated racks
- Multimeter to check the most important parameter
- 230V A.C. and +24V D.C. power supplies

- Oscillatore locale sintetizzato e termostato
- Facilmente trasformabile in ripetitore
- Potenza d'uscita 2 – 5 W
- Agilità di frequenza
- Filtro notch di uscita incorporato
- Precorrezione di ampiezza multipendenza
- Modulatore FI e convertitore in racks separati
- Parametri più importanti controllabili da multimetro
- Alimentazione +24V D.C. /230V C.A.

This kind of TV transmitter has been especially designed for low power repeater stations operating in difficult environments.
All models are built in 2 19" std racks.
Thanks to the frequency agility no turning RF(filter apart) adjustment is required to change the channel as all input and output amplifiers are wideband.
This transmitter works with AC or DC supplies (for example solar batteries)
Precorrection circuit null out the intermodulation products so that they are in accordance with all the international standard values.
A digital multimeter placed on the front panel allows the measure and the control of the most important parameters of the equipment.

Questa serie di trasmettitori TV è stata progettata per stazioni a bassa potenza operanti in condizioni ambientali difficili.
I modelli sono tutti costruiti in 2 racks da 19" .
Grazie all'agilità di frequenza non è richiesta alcuna sintonia (filtri RF a parte) per cambiare il canale di funzionamento poi che tutti gli amplificatori RF sono a larga banda.
Il trasmettitore lavora sia con alimentazioni C.a. sia C.C. (ad esempio batterie solari)
Il sistema di precorrezione minimizza i prodotti di intermodulazione portandoli ai valori prescritti dagli standard internazionali.
Un multimetro digitale posto sul pannello frontale permette la misura ed il controllo dei piu' importanti parametri dell'apparato.

2-5W UHF TV Transmitter
Trasmettitore TV UHF 2-5W

Technical Specifications

GENERAL

A.C. Supply voltage	230V A.C. ± 15%, 47 to 60 Hz
D.C. Supply voltage	24 V +/- 10%
Power consumption	100 – 250 VA
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, temperature
Dimensions	Std. 19" rack 2 units
Weight for 2 W model	12 Kg. Approx.
Weight for 5 W model	14 Kg. Approx.

VIDEO INPUT PARAMETERS

Video input signal level	1V p.p
Video input impedance	75 Ohm unbalanced
Input return loss	> 36 dB up to 5 MHz
Video input manual gain adj.	± 3 dB
Video clamping	Synch type
White clipping set at	95% of modulation depth.

AUDIO INPUT PARAMETERS

Audio input signal level	+8 dBU for ± 50 KHz freq. Dev.
Audio input manual gain adj	+ 10 / - 3 dB
Audio input impedance	3 KΩ - on request

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B.IV-V 470 ÷860 MHz
Output impedance	50 Ohm unbalanced
Output power	2 and 5W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 3%
Differential phase error	< 3°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 60 dB @ 50 KHz deviation
Sound distortion	< 0.4% THD @ 50 KHz deviation

Data may change without notice

GENERALI

Tensione di rete	230V A.C. ± 15%, 47 to 60 Hz
Tensione di batteria	24 V C.C. +/- 10%
Consumi	100 – 250 VA
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, temperatura
Dimensioni	Std. 19" rack
Peso modello 2W	12 Kg. circa
Peso modello 5W	14 Kg. Circa

PARAMETRI DI INGRESSO VIDEO

Livello segnale video	1V p.p
Impedenza	75 Ohm sbilanciato
Perdita di ritorno	> 36 dB fino a 5 MHz
Regolazione manuale guad. Ingr.	± 3 dB
"Clamping video"	Al sincronismo
Limitatore del bianco	95% prof. di modulazione

PARAMETRI INGRESSO AUDIO

Livello segnale audio ingresso	+8 dBU per ± 50 KHz Dev. Freq.
Regolazione manuale guad. Ingr.	+ 10 / - 3 dB
Impedenza	3 KΩ o a richiesta

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.IV-V 470 ÷860 MHz
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita	2 e 5W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

TRANSMISSION QUALITY

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 3%
Errore fase differenziale	< 3°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 60dB @ 50 KHz deviazione
Distorsione suono	< 0.4% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

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www.tem-italy.it – e-mail: sales@tem-italy.it

4-10-50W VHF/UHF TV Transmitter
Trasmettitore TV VHF/UHF 4-10-50W

- Available in the VHF and UHF band
- Synthesized and ovenized local oscillator
- Wide power range capability 4 – 10 – 50 W in only one rack
- Frequency agility – All RF amplifier are wideband
- A.G.C. & A.L.C. control
- Output notch filter built-in
- 3 units rack with plug-in modules
- Analog multimeter to check the most important parameters
- 230V A.C.

- Disponibili in VHF e UHF
- Oscillatore locale sintetizzato e termostatato
- Potenza d'uscita 4 – 10 – 50 W in unico rack
- Agilità di frequenza - circuiti amplificatori a larga banda
- Controllo di A.G.C. & A.L.C.
- Completi di filtro notch di uscita
- Meccanica in 3 unità con moduli plug-in
- Parametri più importanti controllabili da multimetro
- Alimentazione 230V C.A.

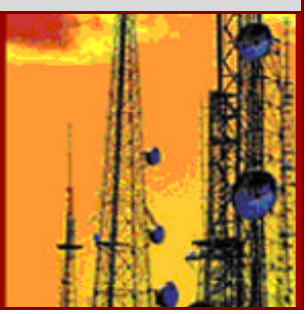
Base model

Professional

This kind of TV transmitter has been especially designed for low power stations operating in difficult environments.
All models are built in 3 units 19" rack.
Thanks to the frequency agility no RF(filter apart) adjustment is required to change the channel as all input and output amplifiers are wideband.
This transmitter can be modified in transposer easily
Precorrection circuit null out the intermodulation products so that they are in accordance with all the international standard values.
A analog multimeter placed on the front panel allows the measure and the control of the most important parameters of the equipment.

Questa serie di trasmettitori TV è stata progettata per stazioni a bassa potenza operanti in condizioni ambientali difficili.
I modelli sono tutti costruiti in rack da 19" 3 unità.
Grazie all'agilità di frequenza non è richiesta alcuna sintonia (filtri RF a parte) per cambiare il canale di funzionamento poi che tutti gli amplificatori RF sono a larga banda.
Il trasmettitore è predisposto per essere facilmente modificato in ripetitore.
Il sistema di precorrezione minimizza i prodotti di intermodulazione portandoli ai valori prescritti dagli standard internazionali.
Un multimetro analogico posto sul pannello frontale permette la misura ed il controllo dei più importanti parametri dell'apparato.

4-10-50W VHF/UHF TV Transmitter
Trasmettitore TV VHF/UHF 4-10-50W



Technical Specifications

Specifiche Tecniche

GENERAL

Primary power for 4W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 4W	100W max (full power) 40W max stand by.
Primary power for 10W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 10W	200W max (full power) 40W max stand by.
Primary power for 50W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 50W	250W max (full power) 40W max stand by.
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, low output power.
Dimensions	Std. 19" rack
Weight for 4 W model	12 Kg. Approx.
Weight for higher output power	15 Kg. Approx.

VIDEO INPUT PARAMETERS

Video input signal level	1V p.p
Video input impedance	75 Ohm unbalanced
Input return loss	> 30 dB up to 5 MHz
Video input manual gain adj.	± 3 dB
Video clamping	Synch type
White clipping set at	95% of modulation depth.

AUDIO INPUT PARAMETERS

Audio input signal level	+8 dBU for ± 50 KHz freq. Dev.
Audio input manual gain adj	+ 10 / - 3 dB
Audio input impedance	3 KΩ

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. III – IV - V
Output impedance	50 Ohm unbalanced
Output VHF power	10 and 50W
Output UHF power	4 – 10 and 50W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 3%
Differential phase error	< 3°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 64 dB @ 50 KHz deviation
Sound distortion	< 0.4% THD @ 50 KHz deviation

Data may change without notice

GENERALI

Tensione di rete modello 4W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 4W	100W max (piena potenza) 40W max stand by.
Tensione di rete modello 10W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 10W	200W max (piena potenza) 40W max stand by.
Tensione di rete modello 50W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 50W	250W max (piena potenza) 40W max stand by.
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, bassa potenza
Dimensioni	Std. 19" rack
Peso (modello 4 W)	12 Kg. circa
Peso (modelli di potenza superiore)	15 Kg. circa

PARAMETRI DI INGRESSO VIDEO

Livello segnale video	1V p.p
Impedenza	75 Ohm sbilanciato
Perdita di ritorno	> 30 dB fino a 5 MHz
Regolazione manuale guad. Ingr.	± 3 dB
"Clamping video"	Al sincronismo
Limitazione del "bianco"	95% della prof. Di modulazione

PARAMETRI INGRESSO AUDIO

Livello segnale audio ingresso	+8 dBU per ± 50 KHz Dev. Freq.
Regolazione manuale guad. Ingr.	+ 10 / - 3 dB
Impedenza	3 KΩ

PARAMETRI IF

Frequenza intermedia	38.9 MHz
Filtro FI	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B. III – IV - V
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita in VHF	10 e 50W
Potenza d'uscita in UHF	4 – 10 e 50W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

TRANSMISSION QUALITY

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 3%
Errore fase differenziale	< 3°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 64 dB @ 50 KHz deviazione
Distorsione suono	< 0.4% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

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4-10-50W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 4-10-50W

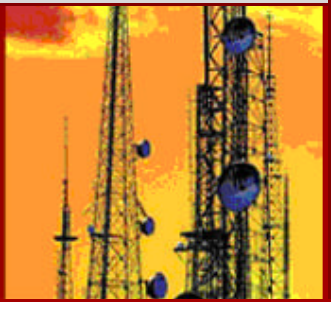
- 38.9 MHz Intermediate frequency
- High selectivity (Saw Filter)
- Wide power range capability 4 – 10 –50 W
- Frequency agility – All RF amplifiers are wideband
- A.G.C. & A.L.C. control
- Built in output notch filter
- 3 unit rack with plug-in modules
- Low noise figure
- 230V A.C. power supplies

- Frequenza intermedia 38,9 MHz
- Alta selettività canale adiacente
- Potenza d'uscita 4 – 10 –50 W
- Agilità di frequenza – circuiti amplificatori a larga banda
- Controllo di A.G.C. & A.L.C.
- Completi di filtro notch di uscita
- Meccanica in 3 unità con moduli plug-in
- Bassa figura di rumore
- Alimentazione 230V C.A.

This kind of TV transposer, available in VHF and UHF, has been especially designed for low power repeater stations operating in difficult environments.
All models are built in 3 units 19" rack.
Thanks to the frequency agility no RF(filter apart) adjustment is required to change the channel as all input and output amplifiers are wideband.
This transposer can be modified in transmitter easily.
Precorrection circuit null out the intermodulation products so that they are in accordance with all the international standard values.
An analog multimeter placed on the front panel allows the measure and the control of the most important parameters of the equipment.

Questa serie di ripetitori TV, disponibili sia in VHF che in UHF, è stata progettata per stazioni a bassa potenza operanti in condizioni ambientali difficili.
I modelli sono tutti costruiti in rack da 19" 3 unità.
Grazie all'agilità di frequenza non è richiesta alcuna sintonia (filtri RF a parte) per cambiare il canale di funzionamento poi che tutti gli amplificatori RF sono a larga banda.
Il ripetitore è predisposto per essere facilmente modificato in trasmettitore.
Il sistema di precorrezione minimizza i prodotti di intermodulazione portandoli ai valori prescritti dagli standard internazionali.
Un multimetro analogico posto sul pannello frontale permette la misura ed il controllo dei più importanti parametri dell'apparato.

4-10-50W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 4-10-50W



Technical Specifications

GENERAL

Primary power for 4W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 4W	100W max (full power) 40W max stand by.
Primary power for 10W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 10W	200W max (full power) 40W max stand by.
Primary power for 50W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 50W	250W max (full power) 40W max stand by.
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, low output power.
Dimensions	Std. 19" rack
Weight for 4 W model	12 Kg. Approx.
Weight for higher output power	15 Kg. Approx.

INPUT PARAMETERS

Input frequency ranges	VHF - UHF
Input impedance	50 Ohm unbalanced
Input return loss	> 20 dB 1
Input level range	100 uV ÷ 10 mV
Noise figure	8 dB VHF - 9 db UHF @1 mV input

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 40 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. III-IV-V
Output impedance	50 Ohm unbalanced
Output VHF power	10 and 50W
Output UHF power	4 –10 and 50W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 3%
Differential phase error	< 3°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 64 dB @ 50 KHz deviation
Sound distortion	< 0.4% THD @ 50 KHz deviation

Data may change without notice

GENERALI

Tensione di rete modello 4W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 4W	100W max (piena potenza) 40W max stand by.
Tensione di rete modello 10W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 10W	200W max (piena potenza) 40W max stand by.
Tensione di rete modello 50W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 50W	250W max (piena potenza) 40W max stand by.
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, bassa potenza
Dimensioni	Std. 19" rack
Peso (modello 4 W)	12 Kg. circa
Peso (modelli di potenza superiore)	15 Kg. circa

PARAMETRI DI INGRESSO

Frequenza ingresso	VHF - UHF
Impedenza ingresso	50 Ohm sbilanciato
Perdita di ritorno	> 20 dB
Livello ingresso	100 uV ÷ 10 mV
Figura di rumore	8 dB VHF - 9 dB UHF @1 mV ingresso

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 40 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.III-IV-V
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita in VHF	10 e 50W
Potenza d'uscita in UHF	4 – 10 e 50W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

QUALITA' DI TRASMISSIONE

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 3%
Errore fase differenziale	< 3°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 64 dB @ 50 KHz deviazione
Distorsione suono	< 0.4% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
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100 / 200W VHF / UHF TV Transmitter
Trasmettitore TV VHF / UHF 100 / 200W

100/200W VHF / UHF TV Transmitter

- In only 2 standard 19” racks
- Models for VHF Bands III and UHF Bands IV-V
- Simple and reliable operation with common and cl AB amplification for high efficiency
- Can be supplied in any standard
- Completely self protected with microprocessor.
- Digital multimeter to check all most important parameter
- Sealed duct-cooling air
- Output notch filter built-in
- Wideband circuits amplifiers
- Synthesized and ovenized local oscillator

Trasmettitore 100/200W TV VHF / UHF

- In soli 2 rack 19” standard
- Disponibile sia in VHF che in UHF bande
- Funzionamento semplice ed affidabile in amplificazione comune e in classe AB ad alta efficienza con precorrezione a frequenza intermedia.
- Disponibile in tutti gli standard televisivi
- Completamente autoprotetto da microprocessore
- Multimetro per il controllo dei più importanti parametri.
- Aria di raffreddamento canalizzata.
- Filtro notch d’uscita incorporato
- Circuiti amplificatori a larga banda
- Oscillatore locale sintetizzato e termostatato

Exciters

Amplifier

This kind of TV transmitter has been designed for medium powe stations operating in difficult environments.
All models are built in 2 19” std racks.

Questa serie di trasmettitori è stata progettata per stazioni di media potenza operanti in condizioni ambientali difficili
Tutti i vari modelli VHF e UHF sono costruiti in 2 rack standard da 19”.

100 / 200W VHF / UHF TV Transmitter
Trasmettitore TV VHF / UHF 100 / 200W

Technical Specifications

GENERAL

Primary power for 100W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 100W	400W max (full power)
Primary power for 200W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 200W	600W max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, low output power.
Dimensions	3+4U Std. 19" rack
Weight for 100 W model	12 + 23 Kg. Approx.
Weight for 200 W model	12 + 25 Kg. Approx.

VIDEO INPUT PARAMETERS

Video input signal level	1V p.p
Video input impedance	75 Ohm unbalanced
Input return loss	> 30 dB up to 5 MHz
Video input manual gain adj.	± 3 dB
Video clamping	Synch type
White clipping set at	95% of modulation depth.

AUDIO INPUT PARAMETERS

Audio input signal level	+8 dBU for ± 50 KHz freq. Dev.
Audio input manual gain adj	+ 10 / - 3 dB
Audio input impedance	3 KΩ

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. III- IV-V 470 ÷860 MHz
Output impedance	50 Ohm unbalanced
Output VHF power	200W
Output UHF power	100 – 200W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 3%
Differential phase error	< 3°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 64 dB @ 50 KHz deviation
Sound distortion	< 0.4% THD @ 50 KHz deviation

Data may change without notice

Specifiche Tecniche

GENERALI

Tensione modello 100W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 100W	400W max (piena potenza)
Tensione modello 200W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 200W	600W max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, bassa potenza
Dimensioni	3+4U rack 19" std.
Peso (modello 100W)	12 + 23 Kg. circa
Peso (modello 200W)	12 + 25 Kg. circa

PARAMETRI DI INGRESSO VIDEO

Livello segnale video	1V p.p
Impedenza	75 Ohm sbilanciato
Perdita di ritorno	> 30 dB fino a 5 MHz
Regolazione manuale guad. Ingr.	± 3 dB
"Clamping" video	Agganciato al sincronismo
Limitatozione del bianco	95% della profondità di modulazione

PARAMETRI INGRESSO AUDIO

Livello segnale audio ingresso	+8 dBU per ± 50 KHz Dev. Freq.
Regolazione manuale guad. Ingr.	+ 10 / - 3 dB
Impedenza	3 KΩ

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.III-IV-V 470 ÷860 MHz
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita in VHF	200W
Potenza d'uscita in UHF	100 – 200W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

TRANSMISSION QUALITY

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 3%
Errore fase differenziale	< 3°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 64 dB @ 50 KHz deviazione
Distorsione suono	< 0.4% THD @ 50 KHz deviazione

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100 / 200W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 100 / 200W

100/200W VHF / UHF TV Transposer

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- Sealed duct-cooling air
- Output notch filter bult-in
- Wideband circuits amplifiers
- Synthesized and ovenized local oscillator

Ripetitore 100/200W TV VHF / UHF

- In soli 2 rack 19" standard
- Disponibile sia in VHF che in UHF
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- Aria di raffreddamento canalizzata.
- Filtro notch d'uscita incorporato
- Circuiti amplificatori a larga banda
- Oscillatore locale sintetizzato e termostatato

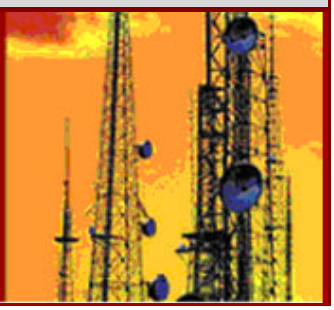
Exciter

Amplifier

This kind of TV transposer has been designed for medium power stations operating in difficult environments.
All models are built in 2 19" std racks.

Questa serie di ripetitori è stata progettata per stazioni di media potenza operanti in condizioni ambientali difficili
Tutti i vari modelli VHF e UHF sono costruiti in 2 rack standard da 19".

100 / 200W VHF/UHF TV Transposer
Ripetitore TV VHF/UHF 100 / 200W



Technical Specifications

GENERAL

Primary power for 100W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 100W	40W max stand-by 400W max (full power)
Primary power for 200W model	230V a.c. ± 15%, 47 to 60 Hz
Power consumption for 200W	40W max (stand by) 600W max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, low output power.
Dimensions	3+4U Std. 19" rack
Weight for 100 W model	12 + 23 Kg. Approx.
Weight for 200 W model	12 + 25 Kg. Approx.

INPUT PARAMETERS

Input frequency ranges	VHF - UHF
Input impedance	50 Ohm unbalanced
Input return loss	> 20 dB
Input level range	100 uV ÷ 10 mV
Noise figure	8 dB VHF - 9 db UHF @1 mV input

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 40 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. III-IV-V
Output impedance	50 Ohm unbalanced
Output VHF power	100-200W
Output UHF power	100 - 200W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 3%
Differential phase error	< 3°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 64 dB @ 50 KHz deviation
Sound distortion	< 0.4% THD @ 50 KHz deviation

Data may change without notice

Specifiche Tecniche

GENERALI

Tensione di rete modello 10W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 100W	40W max (stand by) 400W max (piena potenza)
Tensione di rete modello 200W	230V a.c. ± 15%, 47 to 60 Hz
Consumo modello 200W	40W max (stand by) 600W max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, bassa potenza
Dimensioni	3+4U rack 19" std.
Peso (modello 100 W)	12 + 23 Kg. circa
Peso (modello 200 w)	12 + 25 Kg. circa

PARAMETRI DI INGRESSO

Frequenza ingresso	VHF - UHF
Impedenza ingresso	50 Ohm sbilanciato
Perdita di ritorno	> 20 dB
Livello ingresso	100 uV ÷ 10 mV
Figura di rumore	8 dB VHF - 9 dB UHF @1 mV ingresso

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 40 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.III-IV-V
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita in VHF	100-200W
Soppressione spurie	100 – 200 W
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	> 60 dB Risol. Freq.. 10 KHz a ± 50 KHz

QUALITA' DI TRASMISSIONE

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 3%
Errore fase differenziale	< 3°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 64 dB @ 50 KHz deviazione
Distorsione suono	< 0.4% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

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200 / 350 / 600 UHF TV Transmitter
Trasmettitore TV UHF 200 / 350 / 600W

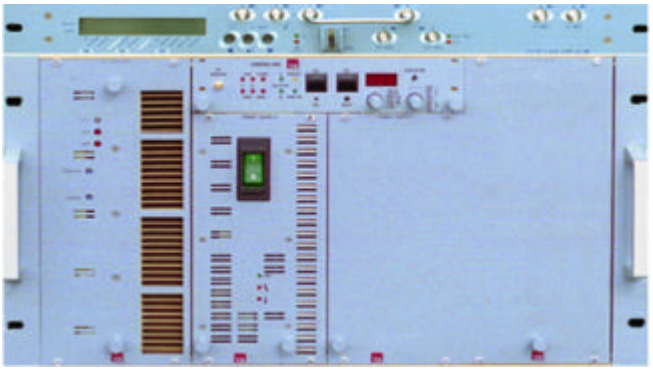
Solid state broadband technology

- In 2 19” rack only
- Plug-in power supplies and RF amplifiers modules
- Simple and reliable operation in class AB common amplification
- High efficiency
- Self protected with automatic recycling
- Digital multimeter to control all operating parameters
- Cooling air sealed duct with built in blower
- Stabilised power supply
- Wideband amplifiers
- Remote control
- Automatic gain control

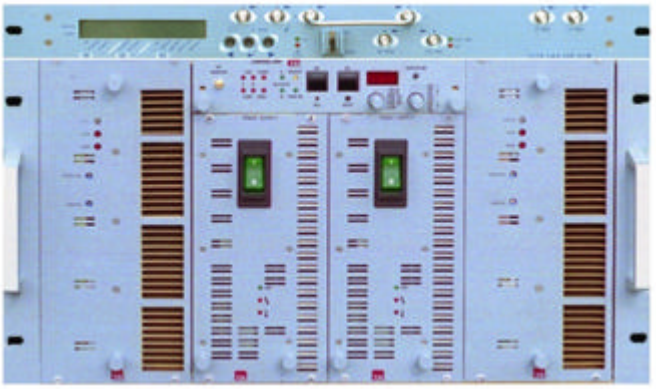
Tecnologia stato solido a larga banda

- In soli 2 rack 19” std.
- Moduli alimentatori ed amplificatori facilmente estraibili dal frontale
- Amplificazione comune in classe AB
- Alta efficienza per ottenere bassi costi di esercizio
- Autoprotetto con riciclo automatico
- Multimetro digitale per il controllo di tutti i parametri di funzionamento
- Aria di raffreddamento canalizzata con ventilatore interno
- Alimentazioni stabilizzate
- Circuiti amplificatori a larga banda
- Possibilità di telecomando
- Controllo automatico di guadagno

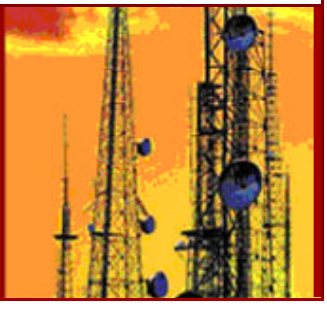
200 - 350W UHF



600W UHF



200 / 350 / 600W UHF TV Transmitter
Trasmettitore TV UHF 200 / 350 / 600W



Technical Specifications

GENERAL

Primary power for 200W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 200W	650W max (full power)
Primary power for 350W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 350W	1100W max (full power)
Primary power for 600W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 600W	1700W max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms (depending on model)	Over voltage (crowbar), over current, excessive reflected power, high RF output power, temperature.
Dimensions	1+6U Std. 19" racks
Weight for 200-350W model	35 Kg. Approx.
Weight for 600W model	45 Kg. Approx.

VIDEO INPUT PARAMETERS

Video input signal level	1V p.p
Video input impedance	75 Ohm unbalanced
Input return loss	> 36 dB up to 5 MHz
Video input manual gain adj.	± 3 dB
Video clamping	Synch type
White clipping set at	95% of modulation depth.

AUDIO INPUT PARAMETERS

Audio input signal level	+6 dBU for ± 50 KHz freq. Dev.
Audio input manual gain adj	+ 10 / - 3 dB
Audio input impedance	600 Ω

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B.IV-V 470 ÷860 MHz
Output impedance	50 Ohm unbalanced
Output power	200 – 350 – 600W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 5%
Differential phase error	< 5°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 60 dB @ 50 KHz deviation
Sound distortion	< 0.5% THD @ 50 KHz deviation

Data may change without notice

Specifiche Tecniche

GENERALI

Tensione modello 200W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 200W	650W max (piena potenza)
Tensione modello 350W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 350W	1100W max (piena potenza)
Tensione modello 600W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 600W	1700W max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, eccessiva potenza RF d'uscita, temperatura
Dimensioni	1+6U rack std da 19"
Peso (modello 200-350W)	35 Kg. circa
Peso (modelli 600W)	45 Kg. circa

PARAMETRI DI INGRESSO VIDEO

Livello segnale video	1V p.p
Impedenza	75 Ohm sbilanciato
Perdita di ritorno	> 36 dB fino a 5 MHz
Regolazione manuale guad. Ingr.	± 3 dB
"Clamping" video	Agganciato al sincronismo
Limitatozione del bianco	95% della profondità di modulazione

PARAMETRI INGRESSO AUDIO

Livello segnale audio ingresso	+6 dBU per ± 50 KHz Dev. Freq.
Regolazione manuale guad. Ingr.	+ 10 / - 3 dB
Impedenza	600 Ω

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.IV-V 470 ÷860 MHz
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita	200 – 350 - 600W
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

TRANSMISSION QUALITY

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 5%
Errore fase differenziale	< 5°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 60 dB @ 50 KHz deviazione
Distorsione suono	< 0.5% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

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- Remote control
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Tecnologia stato solido a larga banda

- In soli 2 rack 19” standard
- Moduli alimentatori ed amplificatori facilmente estraibili dal frontale
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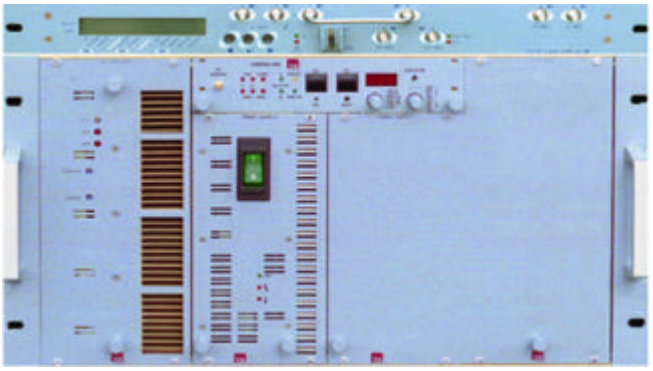
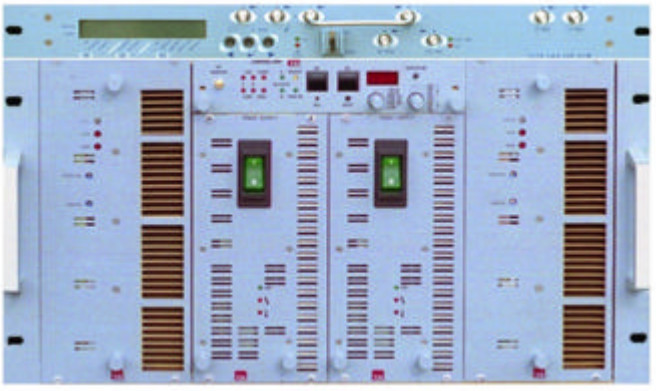
- Multimetro digitale per il controllo di tutti i parametri di funzionamento
- Aria di raffreddamento canalizzata con ventilatore interno
- Alimentazioni stabilizzate
- Circuiti amplificatori a larga banda
- Possibilità di telecomando
- Controllo automatico di guadagno

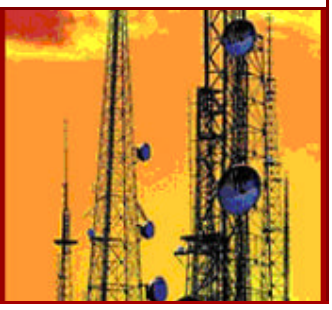
200 - 350W UHF



600W UHF



200 / 350 / 600W UHF TV Transposer
Ripetitore TV UHF 200 / 350 / 600W



Technical Specifications

GENERAL

Primary power for 200W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 200W	650W max (full power)
Primary power for 350W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 350W	1100W max (full power)
Primary power for 600W model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 600W	1700W max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms	Over voltage (crowbar), over current, excessive reflected power, high output RF power, temperature.
Dimensions	1+6U Std. 19" racks
Weight for 200-350 W model	35 Kg. Approx.
Weight for 600 W model	45 Kg. Approx.

INPUT PARAMETERS

Input frequency ranges	VHF - UHF
Input impedance	50 Ohm unbalanced
Input return loss	> 20 dB
Input level range	200 uV ÷ 10 mV
Noise figure	9 db UHF @1 mV input

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B. IV-V
Output impedance	50 Ohm unbalanced
Output power	200 – 350 - 600W
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 5%
Differential phase error	< 5°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 60 dB @ 50 KHz deviation
Sound distortion	< 0.5% THD @ 50 KHz deviation

Data may change without notice

Specifiche Tecniche

GENERALI

Tensione di rete modello 200W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 200W	650W max (piena potenza)
Tensione di rete modello 350W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 350W	1100W max (piena potenza)
Tensione di rete modello 600W	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 600W	1700W max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi (secondo il modello)	sovratensione, sovracorrente eccessiva riflessa, eccessiva potenza RF di uscita, temperatura
Dimensioni	1+6U rack std da 19"
Peso (modello 4 W)	35 Kg. circa
Peso (modelli di potenza superiore)	45 Kg. circa

PARAMETRI DI INGRESSO

Frequenza ingresso	VHF - UHF
Impedenza ingresso	50 Ohm sbilanciato
Perdita di ritorno	> 20 dB
Livello ingresso	200 uV ÷ 10 mV
Figura di rumore	9 dB UHF @1 mV ingresso

PARAMETRI IF

Frequenza intermed.	38.9 MHz
Filtro IF	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B. IV-V
Impedenza d'uscita	200 – 350 – 600W
Potenza d'uscita	> 60 dB
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	Risol. Freq.. 10 KHz a ± 50 KHz
O.L. sintetizzato	

QUALITA' DI TRASMISSIONE

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 5%
Errore fase differenziale	< 5°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 60 dB @ 50 KHz deviazione
Distorsione suono	< 0.5% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
Tel. +39-02-8923961 r.a. - Fax +39-02-89239620
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www.tem-italy.it – e-mail: sales@tem-italy.it

Class AB 1-2 KW UHF TV Transmitter
Trasmettitore TV 1-2 KW UHF Classe AB

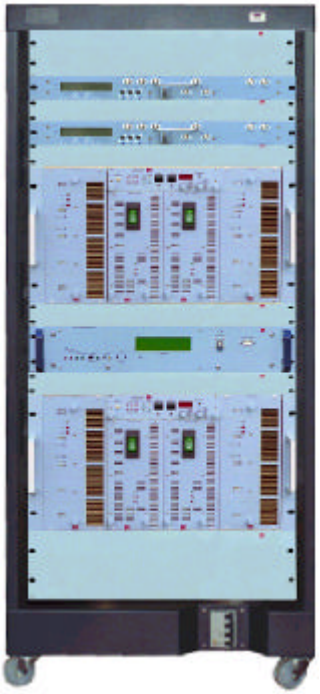
Solid state broadband technology

- 19” standard cabinet
- Plug-in power supplies and RF amplifiers modules
- Simple and reliable operation in class AB common amplification for highest efficiency and low service cost
- Self protected with automatic recycling
- Digital multimeter to control all operating parameters
- Cooling air sealed duct with built in blower
- Stabilised power supply
- Wideband amplifiers with output circulators (one for each RF module) – Fully redundant (4 x 350 W)
- Remote control
- Automatic gain control
- Synthesized and ovenized local oscillator with prec. offset capability

Tecnologia stato solido a larga banda

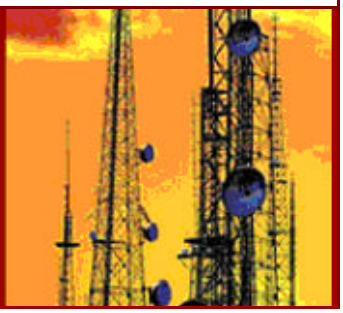
- Armadio 19” standard
- Moduli alimentatori ed amplificatori facilmente estraibili dal frontale
- Amplificazione comune in classe AB ad alta efficienza per ottenere bassi costi di esercizio
- Autoprotetto con riciclo automatico
- Multimetro digitale per il controllo di tutti i parametri di funzionamento
- Aria di raffreddamento canalizzata con ventilatore interno
- Alimentazioni stabilizzate
- Circuiti amplificatori a larga banda con circolatori d’uscita
- Possibilità di telecomando
- Controllo automatico di guadagno
- Oscillatore locale sintetizzato e termostatato con offset di frequenza
- Completamente ridondato (4 x 350 W)

1 KW



2 KW

Class AB 1-2 KW UHF TV Transmitter
Trasmettitore TV 1-2 KW UHF Classe AB



Technical Specifications

Specifiche Tecniche

GENERAL

Primary power for 1KW model	230V a.c. ± 10%, 47 to 60 Hz
Power consumption for 1KW	3,5 KW max (full power)
Primary power for 2 KW model	380V a.c. trheephases ± 10%, 47 to 60 Hz
Power consumption for 10W	7 KW max (full power)
Operating temperature range	0° C to + 45° C
Storage temperature range	-10° C to + 70° C
Protection & alarms	Over voltage (crowbar), over current, excessive reflected power, low output power.
Dimensions	Std. 19" rack
Weight for 1 KW model	180 Kg. Approx.
Weight for 2 KW model	250 Kg. Approx.

VIDEO INPUT PARAMETERS

Video input signal level	1V p.p
Video input impedance	75 Ohm unbalanced
Input return loss	> 36 dB up to 5 MHz
Video input manual gain adj.	± 3 dB
Video clamping	Synch type
White clipping set at	95% of modulation depth.

AUDIO INPUT PARAMETERS

Audio input signal level	+8 dBU for ± 50 KHz freq. Dev.
Audio input manual gain adj	+ 10 / - 3 dB
Audio input impedance	600 Ω

IF PARAMETERS

Vision Intermediate Freq.	38.9 MHz
IF Filter	SAW acoustic device
Group delay tolerance	± 50 nS
Different specifications	TEM can provide most TV std.

OUTPUT PARAMETERS

Output frequency ranges	B.IV-V 470 ÷860 MHz
Output impedance	50 Ohm unbalanced
Output power	1 – 2 kW
Spurious suppression	> 60 dB
Harmonic suppression	> 60 dB
Rejection of out-of band IMD	> 60 dB
Synth. Local Oscillator	Freq. Resol. 10 KHz to ± 50 KHz

TRANSMISSION QUALITY

Unweigted vision S/N ratio	> 60 dB
Amplitude-frequency response	± 0.5 dB within the vision band
2T K factor	< 2.5%
Luminance non linearity	< 2%
Synch pulse compression	< 3%
Differential gain error	< 5%
Differential phase error	< 5°
Audio amplitude-frequency response	± 0.5 dB, ref 500 Hz with pre-emphasis incl.
Sound S/N ratio	> 60 dB @ 50 KHz deviation
Sound distortion	< 0.5% THD @ 50 KHz deviation

Data may change without notice

GENERALI

Tensione di rete modello 1 KW	230V a.c. ± 10%, 47 to 60 Hz
Consumo modello 1 KW	3,5 KW max (piena potenza)
Tensione di rete modello 2 KW	380V trifase ± 10%, 47 to 60 Hz
Consumo modello 2 KW	7 KW max (piena potenza)
Temperatura d'esercizio	0° C to + 45° C
Temperatura d'immagazzinaggio	-10° C to + 70° C
Protezioni e allarmi	sovratensione, sovracorrente eccessiva riflessa, bassa potenza
Dimensioni	Std. 19" rack
Peso per modello 1KW	180 Kg. circa
Peso per modello 2KW	250 Kg. circa

PARAMETRI DI INGRESSO VIDEO

Livello segnale video	1V p.p
Impedenza	75 Ohm sbilanciato
Perdita di ritorno	> 36 dB fino a 5 MHz
Regolazione manuale guad. Ingr.	± 3 dB
"Clamping video"	Al sincronismo
Limitazione del "bianco"	95% della prof. di modulazione

PARAMETRI INGRESSO AUDIO

Livello segnale audio ingresso	+8 dBU per ± 50 KHz Dev. Freq.
Regolazione manuale guad. Ingr.	+ 10 / - 3 dB
Impedenza	600 Ω

PARAMETRI IF

Frequenza intermedia	38.9 MHz
Filtro FI	SAW
Ritardo di gruppo	± 50 nS
Specifiche diverse	TEM può fornire altri standard TV

PARAMETRI DI USCITA

Frequenza d'uscita	B.IV-V 470 ÷860 MHz
Impedenza d'uscita	50 Ohm sbilanciato
Potenza d'uscita	1 – 2KW
Soppressione spurie	> 60 dB
Soppressione armoniche	> 60 dB
Prod. Intermod. Fuori banda	> 60 dB
O.L. sintetizzato	Risol. Freq.. 10 KHz a ± 50 KHz

QUALITA' DI TRASMISSIONE

Rapporto S/N non pesato	> 60 dB
Risposta ampiezza frequenza	± 0.5 dB
Fattore 2T K	< 2.5%
Non linearità di luminanza	< 2%
Compressione del sincronismo	< 3%
Errore guadagno differenziale	< 5%
Errore fase differenziale	< 5°
Risposta ampiezza frequenza audio	± 0.5 dB, ref 500 Hz con pre enfasi
Rapporto S/N suono	> 60 dB @ 50 KHz deviazione
Distorsione suono	< 0.5% THD @ 50 KHz deviazione

Le specifiche possono cambiare senza preavviso

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Microwave and Radio link equipment

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Microwave Link Family

Analog

Digital

Homogeneous

Complete

Money Saver

You are always connected

The know how comes from 8000 installations

Analog means:

From 2 to 18 GHz

Indoor or Outdoor version

1 Video up to 4 Audio

Remote control RS 232 and RS 485

Completely microprocessor controlled

230V AC or 20/56 V DC

Digital ready

Digital means:

1- Replace 70 MHz Modulator and Demodulator units only

- Easily convert up to 6 TV programs into digital

- Convert analogue audio to digital or carry digital audio

Telecom system completely open means:

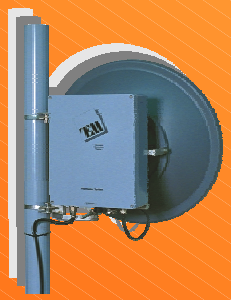
Two kinds mod. and demod.

1. QPSK Modulator & demodulator

34 Mbit/sec

E3 - ASI Interfaces

Outdoor



Outdoor

2 - 18 GHz

Indoor

Indoor

2- QPSK & 16QAM Mod & Dem

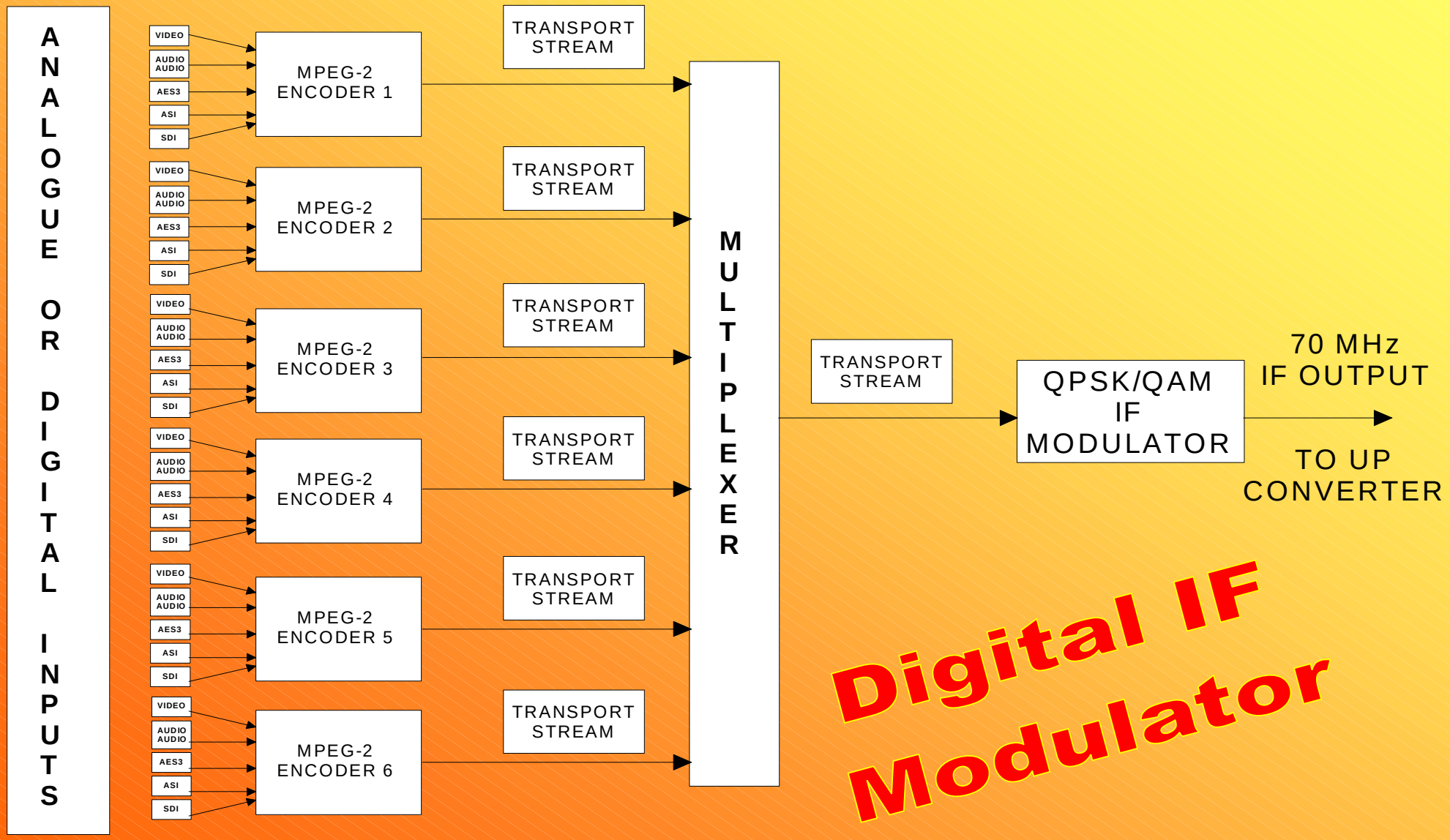
34-45-51 Mbit/sec

ASI - E3 - DS3 - STS-1 Interfaces

Digistar means:

1. Mpeg-2 coders and decoders
2. Built-in Multiplexer and Demultiplexer
3. ASI output for DVBT transmitter
4. ASI or HDB3 Input and output for microwave links

MPEG-2 ENCODER & DIGITAL MODULATOR
GENERAL BLOCK DIAGRAM



QPSK/QAM Digital MultiChannel Modulator with MPEG-2 Encoders and Mux

NEW

DigiStar

DigiStar…series

- Up to 6 MPEG-2 Encoders Plug-in
- Up to 6 Channels
- Input for each Channel : 1 Analog Video and 2 Analog Audio or 1 AES3 or 1 SDI (or 1 ASI or 1 HDB3 for all Channels)
- Output : IF 70 MHz and ASI or HDB3
- Modulation : QPSK/QAM
- All parameters controlled by Microprocessor
- Remote Control by RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT for Video Monitoring
- LCD Display for settings
- Alarms Database
- Battery Power Supply facility available
- Slim Size: standard 19” rack , in only 2 U (88mm)

serie…DigiStar

- Fino a 6 MPEG-2 Encoders Plug-in
- Fino a 6 Canali
- Ingressi per ogni Canale : 1 Video Analogico e 2 Audio Analogici o 1 AES3 o 1 SDI (o 1 ASI o 1 HDB3 per tutti i Canali)
- Uscite : IF 70 MHz e ASI o HDB3
- Modulazione : QPSK/QAM
- Tutti i parametri controllabili da Microprocessore
- Controllo Remoto tramite RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT per monitoraggio Video
- Display LCD per settaggio parametri apparato
- Storico degli Allarmi
- Disponibile con Alimentazione a Batteria
- Rack compatto da 19” , alto 2 Unità (88mm)

QPSK/QAM Digital MultiChannel Modulator with MPEG-2 Encoders and Mux

Technical Specifications

GENERAL CHARACTERISTICS

Operating voltage	115 or 230 VAC ±10 % / +24 VDC
Power Consumption	200VA
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
External Reference Frequency	10 MHz
MPEG-2 Encoder Video Input	BNC
MPEG-2 Encoder Audio Input	Mini-Din
ASI In Connector	BNC
ASI Out Connector	BNC
HDB3 Input Connector	BNC
IF Test Connector	BNC
IF Output Connector	N
Return Losses	> 26 dB @ Fo ± 10 MHz
Freq. Stability	± 10 ppm

QPSK/QAM TRANSMITTER CHARACTERISTICS

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
70 MHz Output Impedence	50 Ohm
70 MHz Output Level	-10 ÷ +2 dBm
Data IN	HDB3 / 120 Ohm

VIDEO ENCODING

Compliant to	ISO/IEC 13818-2 (MPEG-2 video) MP @ ML and ISO/IEC 11172-2 (MPEG-1 video)
Bit rate	Up to 15 Mbps
Video Resolution	Up to 720x576
Processor	Embedded 9-bit video input (SAA7113), 4:2:2 output format, 4:2:0 MPEG Encoding
Support to	External Enhanced Video AD Converters and SDI digital input interface

AUDIO ENCODING

Compliant to	ISO/IEC 11172-3 (MPEG-1 audio) layer ½
Signal support	Single / Dual / Joint Stereo / Stereo
Sampling Rates	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Bitrate	Up to 448 Kbit
Processor	Embedded 16-bit ADC (PCM1800E) with line level input
Digital Input Interface	I2S interface for external ACD or AES/EBU

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di alimentazione	115 o 230 VAC ± 10% / +24 VDC
Potenza di assorbimento	200VA
Temperatura di esercizio	-10° to 50°C
Temperatura di immagazinamento	-40° to 50°C
Frequenza di Riferimento Esterna	10 MHz
Connettore Video Ing. MPEG-2 Encoder	BNC
Connettore Audio Ing. MPEG-2 Encoder	Mini-Din
Connettore ASI Ingresso	BNC
Connettore ASI Uscita	BNC
Connettore d'ingresso HDB3	BNC
Connettore IF Test	BNC
Connettore d'uscita IF	N
Adattamento di ingresso	> 26 dB @ Fo ± 10 MHz
Stabilità di Frequenza	± 10 ppm

CARATTERISTICHE TRASMETTITORE QPSK/QAM

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
Inpedenza d'uscita 70 MHz	50 Ohm
Livello d'uscita 70 MHz	-10 ÷ +2 dBm
Ingresso Dati	HDB3 / 120 Ohm

CODIFICA VIDEO

Rispettante le specifiche	ISO/IEC 13818-2 (MPEG-2 video) MP @ ML e ISO/IEC 11172-2 (MPEG-1 video)
Bit rate	Fino a 15 Mbps
Risoluzione Video	Fino a 720x576
Processore	Integrato a 9-bit (SAA7113), formato d'uscita 4:2:2 , codifica MPEG 4:2:0
Supporto per	AD converter video esterno e ingresso video digitale SDI

CODIFICA AUDIO

Rispettante le specifiche	ISO/IEC 11172-3 (MPEG-1 audio) layer ½
Segnali supportati	Single / Dual / Joint Stereo / Stereo
Risoluzione Video	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Bitrate	Fino a 448 Kbit
Processore	ADC integrato a 16-bit (PCM1800E) con ingresso di linea
Supporto per	Interfaccia I2Sper ADC esterni o interfaccia digitale AES/EBU

Le specifiche possono cambiare senza preavviso

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www.tem-italy.it – e-mail: sales@tem-italy.it

QPSK/QAM Digital MultiChannel Demodulator with MPEG-2 Decoders and Demux

NEW

DigiStar

DigiStar…series

- Up to 6 MPEG-2 Decoders Plug-in
- Up to 6 Channels
- Output for each Channel : 1 Analog Video and 2 Analog Audio or 1 AES3 or 1 SDI (or 1 ASI or 1 HDB3 for all Channels)
- Input : IF 70 MHz
- Demodulation : QPSK/QAM
- All parameters controlled by Microprocessor
- Remote Control by RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT for Video Monitoring
- LCD Display for settings
- Alarms Database
- Battery Power Supply facility available
- Slim Size: standard 19” rack , in only 2 U (88mm)

serie…DigiStar

- Fino a 6 MPEG-2 Decoders Plug-in
- Fino a 6 Canali
- Uscite per ogni Canale : 1 Video Analogico e 2 Audio Analogici o 1 AES3 o 1 SDI (o 1 ASI o 1 HDB3 per tutti i Canali)
- Ingresso : IF 70 MHz
- Demodulazione : QPSK/QAM
- Tutti i parametri controllabili da Microprocessore
- Controllo Remoto tramite RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT per monitoraggio Video
- Display LCD per settaggio parametri apparato
- Storico degli Allarmi
- Disponibile con Alimentazione a Batteria
- Rack compatto da 19” , alto 2 Unità (88mm)

QPSK/QAM Digital MultiChannel Demodulator with MPEG-2 Decoders and Demux

Technical Specifications

GENERAL CHARACTERISTICS

Operating voltage	115 or 230 VAC ±10 % / +24 VDC
Power Consumption	200VA
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
External Reference Frequency	10 MHz
MPEG-2 Decoder Video Output	BNC
MPEG-2 Decoder Audio Output	Mini-Din
ASI Out Connector	BNC
HDB3 Out Connector	BNC
IF Test Connector	BNC
IF Output Connector	N
RF Input Connector	N
Return Losses	> 26 dB @ Fo ± 10 MHz
Freq. Stability	± 10 ppm

QPSK/QAM TRANSMITTER CHARACTERISTICS

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
70 MHz Output Impedence	50 Ohm
70 MHz Output Level	-10 ÷ +2 dBm
Data Out	HDB3 / 120 Ohm

VIDEO DECODING

Decoding of	MPEG-2 Video MP @ ML ISO/IEC 13818-2 , MP @ LL , SP @ ML
Error Conceal	Error concealment using syntax checked and concealment vectors
Bitstream	MPEG-1 bitstream inside ISO-11172-2 decoded DVB compliant
Conversion	4:2:0 -> 4:2:2 conversion for video processing DAC
Teletext	Digital insertion for Teletext into the VBI
Processor	Embedded 9-bit digital video encoder
Support	Support for external video DAC and for SDI digital video output

AUDIO DECODING

Compliant to	ISO/IEC 11172-3 (MPEG-1 Audio) and ISO/IEC 13818-3 (MPEG-2 Audio in 2 ch. mode)
Decoding	Layer I & Layer II
Signal support	Single / Dual / Joint Stereo / Stereo
Sampling Rates	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Oversampling clock	384 fs / 256 fs
Processor	Embedded 16-bit DAC with line level input
Digital Output Interface	I2S interface for external DAC or AES/EBU

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di alimentazione	115 o 230 VAC ± 10% / +24 VDC
Potenza di assorbimento	200VA
Temperatura di esercizio	-10° to 50°C
Temperatura di immagazinamento	-40° to 50°C
Frequenza di Riferimento Esterna	10 MHz
Connettore Video Ing. MPEG-2 Decoder	BNC
Connettore Audio Ing. MPEG-2 Decoder	Mini-Din
Connettore di uscita ASI	BNC
Connettore di uscita HDB3	BNC
Connettore IF Test	BNC
Connettore d'uscita IF	N
Connettore di ingresso RF	N
Adattamento di ingresso	> 26 dB @ Fo ± 10 MHz
Stabilità di Frequenza	± 10 ppm

CARATTERISTICHE TRASMETTITORE QPSK/QAM

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
Inpedenza d'uscita 70 MHz	50 Ohm
Livello d'uscita 70 MHz	-10 ÷ +2 dBm
Uscita Dati	HDB3 / 120 Ohm

CEDIFICA VIDEO

Decodifica	Video MPEG-2 MP @ ML ISO/IEC 13818-2, MP @ LL, SP @ ML
Correzioni Errori	Correzioni Errori nel flusso tramite syntax checker
Bitstream	MPEG-1 bitstream nello standard ISO-11172-2
Coversione	Conversione 4:2:0 -> 4:2:2 per processo video
Teletext	Inserzione Teletext nel segnale video
Processor	Encoder video digitale integrato a 9-bit
Supporto per	DA converter video esterno e uscita video digitale SDI

CEDIFICA AUDIO

Rispettante le specifiche	ISO/IEC 11172-3 (MPEG-1 Audio) and ISO/IEC 13818-3 (MPEG-2 Audio in 2 ch. mode)
Decodifica	Layer I & Layer II
Segnali supportati	Single / Dual / Joint Stereo / Stereo
Risoluzione Video	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Oversampling clock	384 fs / 256 fs
Processore	DAC integrato con a 16 bit con uscita seriale
Supporto per	Interfaccia I2S per DAC esterni o interfaccia digitale AES/EBU

Le specifiche possono cambiare senza preavviso

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www.tem-italy.it – e-mail: sales@tem-italy.it

70 MHz Audio/Video Modulator & Demodulator
Modulatore e Demodulatore 70 MHz

Slimline Series

- Only one standard unit high
- Analogic FDM television operation
- Base band FM modulator and demodulator ultralow distortion
- 1 Video + 4 Sound programs or data capability up to 64 Kbits (per channel)
- All audio channels synthesised
- Completely microprocessor controlled
- Full remote control facilities RS232 RS485
- LCD to check all operating parameters
- 230V AC or 20/56V DC
- AGC Video Input and IF cable equaliser
- Wide range of options

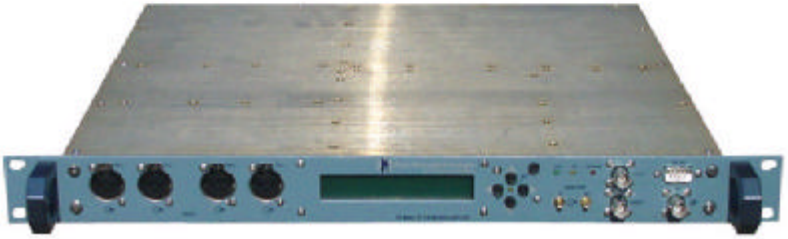
Serie Slimline

- Rack 19” altezza 44.45 mm
- Servizio televisivo FDM analogico
- Bassissima distorsione
- Capacità di trasmissione di 1 Video e 4
- Audio o dati sino a 64 Kbit per canale
- Interfaccia RS232 e RS 485
- Tutti parametri principali monitorati su display LCD
- Alimentazione sia a rete 230V che a batteria 20/56V
- Controllo automatico ingresso video
- Equalizzatore cavo FI (fino a 300m)
- Ampia scelta d’opzioni

Serie Slimline Series

70 MHz Audio Video Modulator
Modulatore Audio Video 70 MHz

70 MHz Audio Video Demodulator
Demodulatore Audio Video 70 MHz



70 MHz Audio Video Modulator/Demodulator
Modulatore/Demodulatore Audio Video 70 MHZ

Technical Specifications

PERFORMANCE OVERALL RATINGS

A.C. Mains	230V AC±10%
D.C. Power supply	± 20/56V
Operating temperature	+5C° ÷ +40C°
Relative humidity	45% ÷ 85%
Modulation	FDM
Enphasis	CCIR405 – 1
Intermediate frequency	70 MHz
Traffic capability	1video + 4audio + 1pilot (rec. 289-4CCIR) channels

OVERALL PERFORMANCE BB/BB

Video freq./Amp. Response	25Hz ÷ 5MHz ± 0,5dB 5 MHz ÷ 9 MHz ±1dB
Group delay	<20 nS (100Hz ÷ 5MHz)
Diff. Gain	< 2% 1% typical
Diff. Phase	< 2° 1° typical
S/N Video (Weighted)	>65dB 70dB Typical
Audio distortion	< 0,5% (6dB overload) < 0,1 oper.
Audio Freq./Amp. Response	40Hz ÷ 15KHz ± 0,5dB
S/N Audio	= 60 dB (white) = 56 dBq Ops (colour bar 75%)

OVERALL PERFORMANCE IF/IF

Freq./Amp. Response	± 0,5 dB @ 70 ± 10MHz
Group delay	=3 nS @ 70 ± 8MHz

70MHz MODULATOR CHARACTERISTICS

Video input connector	BNC
Video input level (AGC)	1V pp adj. ± 1dB
Video input impedance	75 Ohm
Audio input connector	Male XLR Cannon
Audio input level	(?f=70KHz pp) 2,2V pp
Audio input impedance	600 Ohm balanced
70MHz IF output connector	BNC
70MHz If output impedance	75 Ohm
70MHz IF output level	+5dBm ± 0,5dB
70MHz IF precision	70MHz ± 10KHz
Alarms	15 pole connector (opt)
Frequency deviation	8MHz pp
Max Df for each subcarrier	900KHz pp
Spurious	= 65 dBc
Harmonics	= 30 dBc
Pilot frequency	9.023MHz
Max 70MHz deviation due to the pilot	100KHz RMS adj. ±3dB
Audio subcarriers frequency	7.020; 7.500 MHz
(with synthesiser)	8.065; 8.590 MHz
Audio preenphasys	50 µS
Interface	RS232/RS485

70MHz DEMODULATOR CHARACTERISTICS

Video output level (AGC)	1V pp adj.
Audio output level	2,2 V pp
Audio output impedance	30 Ohm balanced
Subcarrier selectivity	0,5 dB@ Fo ±250 KHz
Subcarrier level	40 dB@ Fo ±600 KHz
Alarm	15 pole female (opt)
Interface	RS232/RS485

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di rete	230V ± 10%
Tensione batteria	± 20/56V
Temperatura d'esercizio	+5C° ÷ +40C°
Umidità	45% ÷ 85%
Tipo di Modulazione	FDM
Enfasi	CCIR 405 – 1
Frequenza Intermedia (F.I.)	70 MHz
Prestazioni	1video + 4audio + 1pilot (rec. 289-4 CCIR)

CARATTERISTICHE DI BB/BB

Risposta Video Freq./Amp.	25Hz ÷ 5MHz ± 0,5dB 5 MHz ÷ 9 MHz ± 1dB
Ritardo di gruppo	<20 nS (100Hz ÷ 5MHz)
Differenza di guadagno	< 2% 1% tipica
Differenza di fase	< 2° 1° tipica
S/D Video (pesato)	>65 dB 70dB tipica
Distorsione Audio	< 0,5% (6 dB Overload) < 0,1 oper.
Risposta Audio Freq./Amp.	40Hz ÷ 15KHz ± 0,5dB
Rapporto Segnale/Disturbo	= 60 dB (bianco) = 56 dBq Ops (barra colori 75%)

CARATTERISTICHE DEL F.I./F.I.

Risposta Freq./Amp	± 0,5 dB @ 70 ± 10MHz
Ritardo di gruppo	=3 nS @ 70 ± 8MHz

CARATTERISTICHE MODULATORE 70 MHz

Connettore ingresso Video	BNC
Ingresso Livello Video (AGC)	1V pp regolabile ±1dB
Impedenza ingresso Video	75 Ohm
Connettore ingresso Audio	Maschio XLR Cannon
Livello ingresso Audio	(?f=70KHz pp) 2,2V pp
Impedenza Audio	600 Ohm bilanciati
Connettore uscita F.I.	BNC
Impedenza d'uscita F.I.	75 Ohm
Livello uscita F.I.	+5dBm ± 0,5dB
Precisione F.I.	70MHz ± 10KHz
Allarmi	15 poli (opt)
Deviazione di frequenza	8MHz pp
Deviazione di sottoportante	900KHz pp
Spurie	= 65 dBc
Armoniche	= 30 dBc
Frequenza del Pilot	9.023MHz
Deviazione dovuta al Pilot	100KHz RMS reg. ± 3 dB
Frequenze sottoportanti Audio	7.020; 7500MHz
(con sintetizzatore)	8.065; 8.590MHz
Preenfasi	50 µS
Interfaccia	RS232/RS485

CARATTERISTICHE DEL DEMODULATORE 70 MHz

Livello uscita Video (AGC)	1V pp (regolabile)
Livello uscita Audio	2,2 V pp
Uscita impedenza Audio	30 Ohm bilanciati
Selettività sottoportanti	0,5 dB @ Fo ±250KHz
Livello sottoportanti	40 dB @Fo ± 600KHz
Allarmi	15 poli femmina (opt)
Interfaccia	RS232/RS485

Le specifiche possono essere modificate senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
Tel. +39-02-8923961 r.a. - Fax +39-02-89239620
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www.tem-italy.it – e-mail: sales@tem-italy.it

70 MHz QPSK Modulator & Demodulator
Modulatore e Demodulatore 70 MHz QPSK

Slimline Series

- Mod-dem in one standard unit high rack
- 230V AC or 20/56V DC
- Digital operation QPSK 2-8-34 Mbit/s
- Full remote control facilities
- RS232 / RS485 interface
- SMD technology
- IF 70 MHz
- 4 service channels 64 Kbit/s (as option)
- FEC circuit (as option)
- LCD display to check all operating parameters
- Fully microprocessor controlled
- Wide range of option.

Serie Slimline

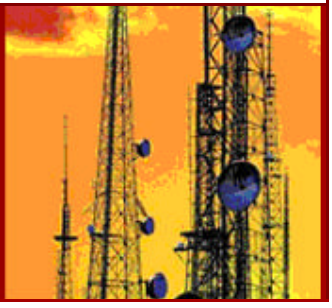
- Rack 19" alto 44.45 mm
- Alimentazione 230V rete o 20/56V batteria
- Modulazione digitale QPSK 2-8-34 Mbit/s
- Capacità di controllo remoto
- Interfaccia RS232/RS485
- Montaggio con tecnica SMD
- Frequenza 70 MHz
- 4 canali di servizio 64 Kbit/s (opzione)
- Circuito FEC (opzione)
- Parametri principali monitorati su LCD
- Completamente controllato da microprocessore
- Ampia scelta di opzioni

Serie Slimline Series

Modulator

Demodulator

Modulator & Demodulator in only a rack



QPSK 70 MHz Modulator & Demodulator
Modulatore e Demodulatore 70 MHz QPSK

Technical Specifications

PERFORMANCE OVERALL RATINGS

A.C. Mains	230V AC ± 10%
DC Power Supply	± 20/56V
Operating temperature	5 C° ÷ 40 C°
Relative humidity	45% ÷ 85%
Frequency	70 MHz
Modulation type	QPSK
Data rate	2-8-34 Mbit/s

DIGITAL INTERFACE

Type	E1/E2/E3 G.703
Line code	HDB3
Input and Output Impedance	75? unbalanced
Input and Output Connectors	BNC

SERVICE CHANNELS

No. Of Channels	4
Protocol	NRZ synch. 64 Kbits RS232 up to 14.4 bps
User Interface	DB-9 Connector

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di rete	230V AC ± 10%
Tensione batteria	± 20/56V
Temperatura d'esercizio	5 C° ÷ 40 C°
Umidità	45% ÷ 85%
Frequenza	70 MHz
Tipo di modulazione	QPSK
Bit rate	2-8-34 Mbit/s

INTERFACCIA DIGITALE

Tipo	E1/E2/E3 G.703
Codice di linea	HDB3
Impedenza Ingresso/Uscita	75? sbilanciati
Connettori Ingresso/Uscita	BNC

CANALI DI SERVIZIO

No. Canali	4
Protocollo	NRZ sincrono 64 Kbits RS232 fino a 14.4 bps
Interfaccia Utente	Connettore DB-9

Le specifiche possono essere modificate senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
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www.tem-italy.it – e-mail: sales@tem-italy.it

QPSK/QAM Digital MultiChannel Transmitter with MPEG-2 Encoders and Mux

NEW

DigiStar

DigiStar…series

- Up to 6 MPEG-2 Encoders Plug-in
- Up to 6 Channels
- Input for each Channel : 1 Analog Video and 2 Analog Audio or 1 AES3 or 1 SDI (or 1 ASI or 1 HDB3 for all Channels)
- Output : IF 70 MHz and ASI or HDB3
- Modulation : QPSK/QAM
- Frequency Output : 2 ÷ 14 GHz
- RF Output Power : +20 ÷ +30 dBm
- Synthetized Frequncy Control
- All parameters controlled by Microprocessor
- Remote Control by RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT for Video Monitoring
- LCD Display for settings
- Alarms Database
- Battery Power Supply facility available
- Slim Size: standard 19” rack , in only 2 U (88mm)

serie…DigiStar

- Fino a 6 MPEG-2 Encoders Plug-in
- Fino a 6 Canali
- Ingressi per ogni Canale : 1 Video Analogico e 2 Audio Analogici o 1 AES3 o 1 SDI (o 1 ASI o 1 HDB3 per tutti i Canali)
- Uscite : IF 70 MHz e ASI o HDB3
- Modulazione : QPSK/QAM
- Frequenza di uscita : 2 ÷ 14 GHz
- Potenza di uscita RF : +20 ÷ +30 dBm
- Controllo di Frequenza Sintetizzato
- Tutti i parametri controllabili da Microprocessore
- Controllo Remoto tramite RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT per monitoraggio Video
- Display LCD per settaggio parametri apparato
- Storico degli Allarmi
- Disponibile con Alimentazione a Batteria
- Rack compatto da 19” , alto 2 Unità (88mm)

QPSK/QAM Digital MultiChannel Transmitter with MPEG-2 Encoders and Mux

Technical Specifications

GENERAL CHARACTERISTICS

Operating voltage	115 or 230 VAC ±10 % / +24 VDC
Power Consumption	200VA
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
External Reference Frequency	10 MHz
MPEG-2 Encoder Video Input	BNC
MPEG-2 Encoder Audio Input	Mini-Din
ASI In Connector	BNC
ASI Out Connector	BNC
HDB3 Input Connector	BNC
IF Test Connector	BNC
RF Test Connector	BNC
IF Output Connector	N
RF Output Connector	N
QPSK/QAM RF Freq. Range	2 ÷ 14 GHz
Return Losses	> 26 dB @ Fo ± 10 MHz
Freq. Stability	± 10 ppm
Output Power	1 W

QPSK/QAM TRANSMITTER CHARACTERISTICS

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
70 MHz Output Impedence	50 Ohm
70 MHz Output Level	-10 ÷ +2 dBm
Data IN	HDB3 / 120 Ohm

VIDEO ENCODING

Compliant to	ISO/IEC 13818-2 (MPEG-2 video) MP @ ML and ISO/IEC 11172-2 (MPEG-1)
Bit rate	Up to 15 Mbps
Video Resolution	Up to 720x576
Processor	Embedded 9-bit video input (SAA7113), 4:2:2 output format, 4:2:0 MPEG Encoding
Support to	External Enhanced Video AD Converters and SDI digital input interface

AUDIO ENCODING

Compliant to	ISO/IEC 11172-3 (MPEG-1 audio) layer ½
Signal support	Single / Dual / Joint Stereo / Stereo
Sampling Rates	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Bitrate	Up to 448 Kbit
Processor	Embedded 16-bit ADC (PCM1800E) with line level input
Digital Input Interface	I2S interface for external ACD or AES/EBU

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di alimentazione	115 o 230 VAC ± 10% / +24 VDC
Potenza di assorbimento	200VA
Temperatura di esercizio	-10° to 50°C
Temperatura di immagazinamento	-40° to 50°C
Frequenza di Riferimento Esterna	10 MHz
Connettore Video Ing. MPEG-2 Encoder	BNC
Connettore Audio Ing. MPEG-2 Encoder	Mini-Din
Connettore ASI Ingresso	BNC
Connettore ASI Uscita	BNC
Connettore d'ingresso HDB3	BNC
Connettore IF Test	BNC
Connettore RF Test	BNC
Connettore d'uscita IF	N
Connettore d'uscita RF	N
Range di Frequenza RF QPSK/QAM	2 ÷ 14 GHz
Adattamento di ingresso	> 26 dB @ Fo ± 10 MHz
Stabilità di Frequenza	± 10 ppm
Potenza di uscita	1 W

CARATTERISTICHE TRASMETTITORE QPSK/QAM

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
Inpedenza d'uscita 70 MHz	50 Ohm
Livello d'uscita 70 MHz	-10 ÷ +2 dBm
Ingresso Dati	HDB3 / 120 Ohm

CODIFICA VIDEO

Rispettante le specifiche	ISO/IEC 13818-2 (MPEG-2 video) MP @ ML e ISO/IEC 11172-2 (MPEG-1)
Bit rate	Fino a 15 Mbps
Risoluzione Video	Fino a 720x576
Processore	Integrato a 9-bit (SAA7113), formato d'uscita 4:2:2 , codifica MPEG 4:2:0
Supporto per	AD converter video esterno e ingresso video digitale SDI

CODIFICA AUDIO

Rispettante le specifiche	ISO/IEC 11172-3 (MPEG-1 audio) layer ½
Segnali supportati	Single / Dual / Joint Stereo / Stereo
Risoluzione Video	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Bitrate	Fino a 448 Kbit
Processore	ADC integrato a 16-bit (PCM1800E) con ingresso di linea
Supporto per	Interfaccia I2Sper ADC esterni o interfaccia digitale AES/EBU

Le specifiche possono cambiare senza preavviso

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QPSK/QAM Digital MultiChannel Receiver with MPEG-2 Decoders and Demux

NEW

DigiStar

DigiStar…series

- Up to 6 MPEG-2 Decoders Plug-in
- Up to 6 Channels
- Output for each Channel : 1 Analog Video and 2 Analog Audio or 1 AES3 or 1 SDI (or 1 ASI or 1 HDB3 for all Channels)
- Input : IF 70 MHz
- Demodulation : QPSK/QAM
- Synthetized Frequncy Control
- All parameters controlled by Microprocessor
- Remote Control by RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT for Video Monitoring
- LCD Display for settings
- Alarms Database
- Battery Power Supply facility available
- Slim Size: standard 19” rack , in only 2 U (88mm)

serie…DigiStar

- Fino a 6 MPEG-2 Decoders Plug-in
- Fino a 6 Canali
- Uscite per ogni Canale : 1 Video Analogico e 2 Audio Analogici o 1 AES3 o 1 SDI (o 1 ASI o 1 HDB3 per tutti i Canali)
- Ingresso : IF 70 MHz
- Demodulazione : QPSK/QAM
- Controllo di Frequenza Sintetizzato
- Tutti i parametri controllabili da Microprocessore
- Controllo Remoto tramite RS 232/485 , Ethernet 10/100 , GSM
- LCD TFT per monitoraggio Video
- Display LCD per settaggio parametri apparato
- Storico degli Allarmi
- Disponibile con Alimentazione a Batteria
- Rack compatto da 19” , alto 2 Unità (88mm)

QPSK/QAM Digital MultiChannel Receiver with MPEG-2 Decoders and Demux

Technical Specifications

GENERAL CHARACTERISTICS

Operating voltage	115 or 230 VAC ±10 % / +24 VDC
Line power	200VA
Operating temperature range	-10° to 50°C
Storage temperature range	-40° to 50°C
External Reference Frequency	10 MHz
MPEG-2 Decoder Video Output	BNC
MPEG-2 Decoder Audio Output	Mini-Din
ASI Out Connector	BNC
HDB3 Out Connector	BNC
IF Test Connector	BNC
IF Output Connector	N
RF Input Connector	N
QPSK/QAM RF Freq. Range	2 ÷ 14 GHz
Return Losses	> 26 dB @ Fo ± 10 MHz
Freq. Stability	± 10 ppm

QPSK/QAM TRANSMITTER CHARACTERISTICS

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
70 MHz Output Impedence	50 Ohm
70 MHz Output Level	-10 ÷ +2 dBm
Data Out	HDB3 / 120 Ohm

VIDEO DECODING

Decoding of	MPEG-2 Video MP @ ML ISO/IEC 13818-2 , MP @ LL , SP @ ML
Error Conceal	Error concealment using syntax checked and concealment vectors
Bitstream	MPEG-1 bitstream inside ISO-11172-2 decoded DVB compliant
Conversion	4:2:0 -> 4:2:2 conversion for video processing DAC
Teletext	Digital insertion for Teletext into the VBI
Processor	Embedded 9-bit digital video encoder
Support	Support for external video DAC and for SDI digital video output

AUDIO DECODING

Compliant to	ISO/IEC 11172-3 (MPEG-1 Audio) and ISO/IEC 13818-3 (MPEG-2 Audio in 2 ch. mode)
Decoding	Layer I & Layer II
Signal support	Single / Dual / Joint Stereo / Stereo
Sampling Rates	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Oversampling clock	384 fs / 256 fs
Processor	Embedded 16-bit DAC with line level input
Digital Output Interface	I2S interface for external DAC or AES/EBU

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di alimentazione	115 o 230 VAC ± 10% / +24 VDC
Potenza di assorbimento	200VA
Temperatura di esercizio	-10° to 50°C
Temperatura di storaggio	-40° to 50°C
Frequenza di Riferimento Esterna	10 MHz
Connettore Video Ing. MPEG-2 Decoder	BNC
Connettore Audio Ing. MPEG-2 Decoder	Mini-Din
Connettore ASI Uscita	BNC
Connettore di uscita HDB3	BNC
Connettore IF Test	BNC
Connettore d'uscita IF	N
Connettore di ingresso RF	N
Range di Frequenza RF QPSK/QAM	2 ÷ 14 GHz
Adattamento di ingresso	> 26 dB @ Fo ± 10 MHz
Stabilità di Frequenza	± 10 ppm

CARATTERISTICHE TRASMETTITORE QPSK/QAM

IF	70 MHz
16QAM Bit rate	34-45-51 Mbit/sec
QPSK Bit rate	34 Mbit/sec
Inpedenza d'uscita 70 MHz	50 Ohm
Livello d'uscita 70 MHz	-10 ÷ +2 dBm
Uscita Dati	HDB3 / 120 Ohm

CEDIFICA VIDEO

Decodifica	Video MPEG-2 MP @ ML ISO/IEC 13818-2, MP @ LL, SP @ ML
Correzioni Errori	Correzioni Errori nel flusso tramite syntax checker
Bitstream	MPEG-1 bitstream nello standard ISO-11172-2
Coversione	Conversione 4:2:0 -> 4:2:2 per processo video
Teletext	Inserzione Teletext nel segnale video
Processor	Encoder video digitale integrato a 9-bit
Supporto per	DA converter video esterno e uscita video digitale SDI

CEDIFICA AUDIO

Rispettante le specifiche	ISO/IEC 11172-3 (MPEG-1 Audio) and ISO/IEC 13818-3 (MPEG-2 Audio in 2 ch. mode)
Decodifica	Layer I & Layer II
Segnali supportati	Single / Dual / Joint Stereo / Stereo
Risoluzione Video	32 KHz / 44,1 KHz , 48 KHz , 16 KHz , 22,05 KHz , 24 KHz
Oversampling clock	384 fs / 256 fs
Processore	DAC integrato con a 16 bit con uscita seriale
Supporto per	Interfaccia I2S per DAC esterni o interfaccia digitale AES/EBU

Le specifiche possono cambiare senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
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www.tem-italy.it – e-mail: sales@tem-italy.it

Digital Ready Microwave Transmitters & Receivers
Trasmettitori e Ricevitori Microonde "Digital Ready"

Slimline Series

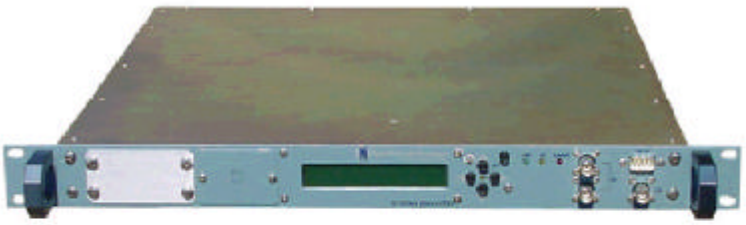
- Only one standard unit high
- 230V AC or 20/56V DC
- Analogic FDM television operation
- 1 Video + 4 audio traffic capability
- Digital operation QPSK , 8 QPSK, 16 QAM
- Automatic 70MHz reinsertion
- Full remote control facilities
- RS232 / RS485 interface
- Branching filter built in
- Very low noise figure
- Link equaliser and IF cable compensation
- LCD display to check all operating parameters
- Fully microprocessor controlled
- Synthesised local oscillator
- Wide range of option.

Serie Slimline

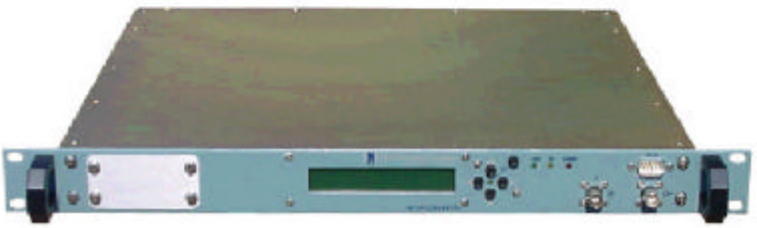
- Rack 19" alto 44.45 mm
- Alimentazione 230V rete o 20/56V batteria
- Servizio televisivo FDM analogico
- Capacità di traffico: 1 Video + 4 Audio
- In digitale con modulazione QPSK, 8 QPSK e 16 QAM
- Reinserzione automatica della FI 70MHz
- Capacità di controllo remoto
- Interfaccia RS232/RS485
- Possibilità filtro branching all'interno
- Bassa figura di rumore
- Equalizzatore di tratta e compensazione cavo FI
- Parametri principali monitorati su LCD
- Completamente controllato da microprocessore
- Oscillatori locali sintetizzati
- Ampia scelta di opzioni

Serie Slimline Series

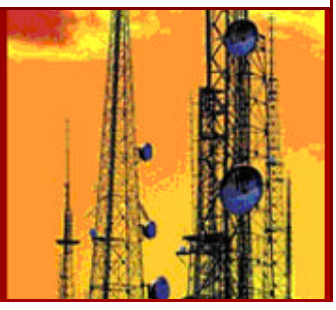
Microwave Receiver
Ricevitore a Microonde



Microwave Transmitter
Trasmettitore a Microonde



Digital Ready Microwave Transmitters & Receivers
Trasmettitori e Ricevitori Microonde "Digital Ready"



Technical Specifications

PERFORMANCE OVERALL RATINGS

A.C. Mains	230V AC ± 10%
DC Power Supply	± 20/56V
Operating temperature	5 C° ÷ 40 C°
Relative humidity	45% ÷ 85%
Modulation type	FM
Enphasis	CCIR 405-1
Intermediate frequency	70MHz
Analogic Traffic capability	1 video+4 audio+1 pilot (rec. 289-4 CCIR)
Digital Traffic capability	Up to 34 Mbits

OVERALL PERFORMANCE BB/BB

Video Freq./Amp. Response	25Hz÷5MHz ± 0,5dB 5MHz÷9MHz ± 1dB
Group delay	<20 nS(100Hz÷5MHz)
Diff. Gain	<2% 1% typical
Diff. Phase	<2° 1° typical

OVERALL PERFORMANCE IF/IF

Freq./Amp: response	± 0,5 dB @ 70 ± 10MHz
Group delay	= 3 nS @ 70 ± 8MHz

TRANSMITTER

Freq. range	2 -14 GHz Other freq. on request
Return losses	= 26 dB @ Fo ± 10MHz
Freq. Stability	± 10 ppm
Output power	+20/+30/+37 dBm
Spourious	= 65 dB
70MHz input connector	BNC
70MHz input impedance	75 Ohm
70MHz input level with AGC	-5 ÷ +5dBm
Interface	RS232/RS485
Alarms (Optional)	15 pole connector “D”serie
Reinsertion precision	± 200KHz
RF monitor	SMA connector

RECEIVER

Frequency range	2 – 14 GHz Other freq. on request
Return losses	= 26dB @ Fo ± 10MHz
Noise figure	< 6 dB
Image attenuation	= 65 dB
Frequency stability	± 10 ppm
IF Impedance	75 Ohm
IF connector	BNC
IF output level	1 dBm -0+0,5 dB
Freq. / Amplitude response	± 0,5 dB @ ± 10MHz
IF Monitor	BNC
Link equaliser	Built in

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di rete	230V AC ± 10%
Tensione batteria	± 20/56V
Temperatura d’esercizio	5 C° ÷ 40 C°
Umidità	45% ÷ 85%
Tipo di modulazione	FM
Enfasi	CCIR 405-1
Frequenza intermedia (F.I.)	70MHz
Prestazioni	1 video+4 audio+1 pilot (rec.289-4 CCIR)
Capacità di trasporto	fino a 34 Mbits

CARATTERISTICHE DI BB/BB

Risposta Video Freq./Amp.	25Hz÷5MHz ± 0,5 dB
Ritardo di gruppo	5MHz÷9MHz ± 1 dB
Differenza di guadagno	<20nS (100Hz÷5MHz) <2% 1% tipico
Differenza di fase	<2° 1° tipico

CARATTERISTICHE DEL F.I./F.I.

Risposta Freq./Amp.	± 0,5 dB @ 70 ± 10MHz
Ritardo di gruppo	=3 nS @ 70 ± 8MHz

TRASMISSIONE

Frequenze	2 – 14 GHz altre freq. a richiesta
Adattamento d’ingresso	= 26 dB @ Fo ± 10MHz
Stabilità di frequenza	± 10 ppm
Potenza d’uscita	+20/+30/+37 dBm
Spurie	= 65 dB
Connettore ingresso 70MHz	BNC
Impedenza ingresso	75 Ohm
Livello ingresso 70MHz (CAG)	-5 ÷ +5 dBm
Soglia bassa potenza	0 ÷ -6 dB regolabile
Allarmi (opzione)	connettore 15 poli serie “D”
Precisione F.I. 70MHz	± 200KHz
Connettore RF monitor	SMA

RICEVITORE

Frequenze	2 – 14 GHz altre freq. a richiesta
Adattamento d’ingresso	= 26 dB @ Fo ± 10MHz
Figura di rumore	<< 6 dB
Attenuazione freq. Immagine	= 65 dB
Stabilità frequenza (DRO)	± 40 ppm
Impendenza F.I.	75 Ohm
Connettore F.I.	BNC
Uscita livello F.I.	1 dBm –0 +0,5dB
Risposta Freq./amplif.	± 0,5 dB @ ± 10MHz
Monitor F.I. 70MHz	BNC
Equalizzatore di tratta	Interno

Le specifiche possono essere modificate senza preavviso

T.E.M. Tecnologie Elettroniche Milanesi
Tel. +39-02-8923961 r.a. - Fax +39-02-89239620
Via B. Buozzi 18/20 – 20089 Rozzano (MI) – Italy
www.tem-italy.it – e-mail: sales@tem-italy.it

Microwave Transmitters & Receiver
Trasmettitori e Ricevitori a microonde

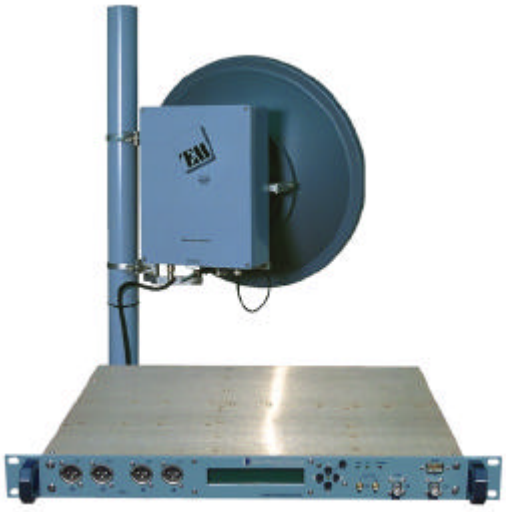
Slimline Series

- Indoor system in only two 19” std racks 1U
- Outdoor system in one 19” std rack + waterproof external box
- 230V AC or 20/56V DC
- Analogic FDM television operation
- 1 Video + 4 audio traffic capability
- Automatic 70MHz reinsertion
- Full remote control facilities - RS232 / RS485 interface
- Branching filter built in
- Very low noise figure
- Link equaliser and IF cable compensation (until 200 mt)
- LCD display to check all operating parameters
- Fully microprocessor controlled
- Synthesised local oscillator
- Wide range of option.
- Supply of external RF head trough IF cable

Serie Slimline

- Sistema da interno in 2 rack std da 19” 1U
- Sistema da esterno in 1 rck 19” 1U + testata esterna da retroparabola
- Alimentazione 230V rete o 20/56V batteria
- Servizio televisivo FDM analogico
- Capacità di traffico: 1 Video + 4 Audio
- Reinserzione automatica della FI 70MHz
- Capacità di controllo remoto
- Interfaccia RS232/RS485
- Possibilità filtro branching all’interno
- Equalizzazione e compensazione cavo FI (fino a 200m)
- Parametri principali monitorati su LCD
- Completamente controllato da microprocessore
- Oscillatori locali sintetizzati
- Ampia scelta di opzioni
- Alimentazione testata esterna tramite cavo FI

Serie Slimline Series



Outdoor microwave system
70 MHz indoor modulator or demodulator
+ DIGITAL READY
Up or Down converter in waterproof external box

Indoor microwave system
70 MHz modulator or demodulator
+ DIGITAL READY
Up or Down converter

Microwave Receivers/Transmitters
Ricevitori/Trasmettitori a Microonde

Technical Specifications

PERFORMANCE OVERALL RATINGS

A.C. Mains	230V AC ± 10%
DC Power Supply	± 20/56V
Operating temperature	5 C° ÷ 40 C° (indoor operation)
Relative humidity	45% ÷ 85%
Modulation type	FM
Enphasis	CCIR 405-1
Intermediate frequency	70MHz
Analogic Traffic capability	1 video+4 audio+1 pilot (rec.289-4 CCIR)

OVERALL PERFORMANCE BB/BB

Video Freq./Amp. Response	25Hz÷5MHz ± 0,5dB 5MHz÷9MHz ± 1dB
Group delay	<20 nS(100Hz÷5MHz)
Diff. Gain	<2% 1% typical
Diff. Phase	<2° 1° typical

OVERALL PERFORMANCE IF/IF

Freq./Amp: response	± 0,5 dB @ 70 ± 10MHz
Group delay	= 3 nS @ 70 ± 8MHz

TRANSMITTER

Freq. range	2 -14 GHz Other freq. on request
Return losses	= 26 dB @ Fo ± 10MHz
Freq. Stability	± 10 ppm
Output power	+20/+30/+37 dBm
Spourious	= 65 dB
70MHz input connector	BNC
70MHz input impedance	75 Ohm
70MHz input level with AGC	-5 ÷ +5dBm
Interface	RS232/RS485
Alarms (Optional)	15 pole connector “D”serie
Reinsertion precision	± 200KHz
RF monitor	SMA connector

RECEIVER

Frequency range	2 – 14 GHz Other freq. on request
Return losses	= 26dB @ Fo ± 10MHz
Noise figure	< 6 dB
Image attenuation	= 65 dB
Frequency stability	± 10 ppm
IF Impedance	75 Ohm
IF connector	BNC
IF output level	1 dBm -0+0,5 dB
Freq. / Amplitude response	± 0,5 dB @ ± 10MHz
IF Monitor	BNC
Link equaliser	Built in

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di rete	230V AC ± 10%
Tensione batteria	± 20/56V
Temperatura d’esercizio	5 C° ÷ 40 C° (da interno)
Umidità	45% ÷ 85%
Tipo di modulazione	FM
Enfasi	CCIR 405-1
Frequenza intermedia (F.I.)	70MHz
Prestazioni	1 video+4 audio+1 pilot (rec.289-4 CCIR)

CARATTERISTICHE DI BB/BB

Risposta Video Freq./Amp.	25Hz÷5MHz ± 0,5 dB
Ritardo di gruppo	5MHz÷9MHz ± 1 dB
Differenza di guadagno	<20nS (100Hz÷5MHz) <2% 1% tipico
Differenza di fase	<2° 1° tipico

CARATTERISTICHE DEL F.I./F.I.

Risposta Freq./Amp.	± 0,5 dB @ 70 ± 10MHz
Ritardo di gruppo	=3 nS @ 70 ± 8MHz

TRASMISSIONE

Frequenze	2 – 14 GHz altre freq. a richiesta
Adattamento d’ingresso	= 26 dB @ Fo ± 10MHz
Stabilità di frequenza	± 10 ppm
Potenza d’uscita	+20/+30/+37 dBm
Spurie	= 65 dB
Connettore ingresso 70MHz	BNC
Impedenza ingresso	75 Ohm
Livello ingresso 70MHz (CAG)	-5 ÷ +5 dBm
Soglia bassa potenza	0 ÷ -6 dB regolabile
Allarmi (opzione)	connettore 15 poli serie “D”
Precisione F.I. 70MHz	± 200KHz
Connettore RF monitor	SMA

RICEVITORE

Frequenze	2 – 14 GHz altre freq. a richiesta
Adattamento d’ingresso	= 26 dB @ Fo ± 10MHz
Figura di rumore	<< 6 dB
Attenuazione freq. Immagine	= 65 dB
Stabilità frequenza (DRO)	± 40 ppm
Impendenza F.I.	75 Ohm
Connettore F.I.	BNC
Uscita livello F.I.	1 dBm –0 +0,5dB
Risposta Freq./amplif.	± 0,5 dB @ ± 10MHz
Monitor F.I. 70MHz	BNC
Equalizzatore di tratta	Interno

Le specifiche possono essere modificate senza preavviso

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Digital Microwave Transmitter & Receiver
Trasmettitori e Ricevitori Microonde Digitali

Slimline Series

- Indoor system in only two 19” std racks 1U
- Outdoor system in one 19” std rack + waterproof ezternal box
- 230V AC or 20/56V DC
- Digital operation QPSK 2-8-34 Mbit/s
- Full remote control facilities-RS232 / RS485 interface
- IF 70 MHz
- 4 service channels 64 Kbit/s (as option)
- FEC circuit (as option)
- LCD display to check all operating parameters
- Fully microprocessor controlled
- Wide range of option.
- Supply of external RF head trugh IF cable

Serie Slimline

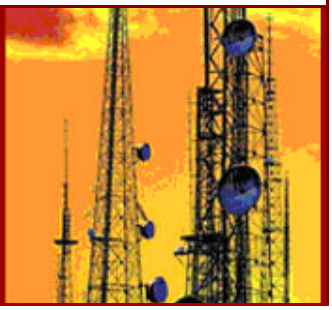
- Sistema da interno in 2 rack std da 19” 1U
- Sistema da esterno in 1 rack 19” 1U + testata esterna da retroparabola
- Alimentazione 230V rete o 20/56V batteria
- Modulazione digitale QPSK 2-8-34 Mbit/s
- Capacità di controllo remoto - Interfaccia RS232/RS485
- Frequenza 70 MHz
- 4 canali di servizio 64 Kbit/s (opzione)
- Circuito FEC (opzione)
- Parametri principali monitorati su LCD
- Completamente controllato da microprocessore
- Ampia scelta di opzioni
- Alimentazione testata esterna tramite cavo FI

Serie Slimline Series

Outdoor microwave digital system
70 MHz QPSK modulator or demodulator
+ up or down converter D.R. in waterproof external box

Indoor microwave digital System
70 MHz QPSK modulator or demodulator
+ up or down converter digital ready

Digital Microwave Transmitter & Receiver
Trasmettitori e Ricevitori Microonde Digitali



Technical Specifications

PERFORMANCE OVERALL RATINGS

A.C. Mains	230V AC ± 10%
DC Power Supply	± 20/56V
Operating temperature	5 C° ÷ 40 C°
Relative humidity	45% ÷ 85%
Frequency	70 MHz
Modulation type	QPSK
Data rate	2-8-34 Mbit/s

DIGITAL INTERFACE

Type	E1/E2/E3 G.703
Line code	HDB3
Input and Output Impedance	75? unbalanced
Input and Output Connectors	BNC

SERVICE CHANNELS

No. Of Channels	4
Protocol	NRZ synch. 64 Kbits RS232 up to 14.4 bps
User Interface	DB-9 Connector

TRANSMITTER

Freq. range	2 -14 GHz Other freq. on request
Return losses	= 26 dB @ Fo ± 10MHz
Freq. Stability	± 10 ppm
Output power	+20/+30/+37 dBm
Spourious	= 65 dB
70MHz input connector	BNC
70MHz input impedance	75 Ohm
70MHz input level with AGC	-5 ÷ +5dBm
Interface	RS232/RS485
Alarms (Optional)	15 pole connector “D”serie
Reinsertion precision	± 200KHz
RF monitor	SMA connector

RECEIVER

Frequency range	2 – 14 GHz Other freq. on request
Return losses	= 26dB @ Fo ± 10MHz
Noise figure	< 6 dB
Image attenuation	= 65 dB
Frequency stability	± 10 ppm
IF Impedance	75 Ohm
IF connector	BNC
IF output level	1 dBm -0+0,5 dB
Freq. / Amplitude response	± 0,5 dB @ ± 10MHz
IF Monitor	BNC
Link equaliser	Built in

Data may change without notice

Specifiche Tecniche

CARATTERISTICHE GENERALI

Tensione di rete	230V AC ± 10%
Tensione batteria	± 20/56V
Temperatura d’esercizio	5 C° ÷ 40 C°
Umidità	45% ÷ 85%
Frequenza	70 MHz
Tipo di modulazione	QPSK
Bit rate	2-8-34 Mbit/s

INTERFACCIA DIGITALE

Tipo	E1/E2/E3 G.703
Codice di linea	HDB3
Impedenza Ingresso/Uscita	75? sbilanciati
Connettori Ingresso/Uscita	BNC

CANALI DI SERVIZIO

No. Canali	4
Protocollo	NRZ sincrono 64 Kbits RS232 fino a 14.4 bps
Interfaccia Utente	Connettore DB-9

TRASMISSIONE

Frequenze	2 – 14 GHz altre freq. a richiesta
Adattamento d’ingresso	= 26 dB @ Fo ± 10MHz
Stabilità di frequenza	± 10 ppm
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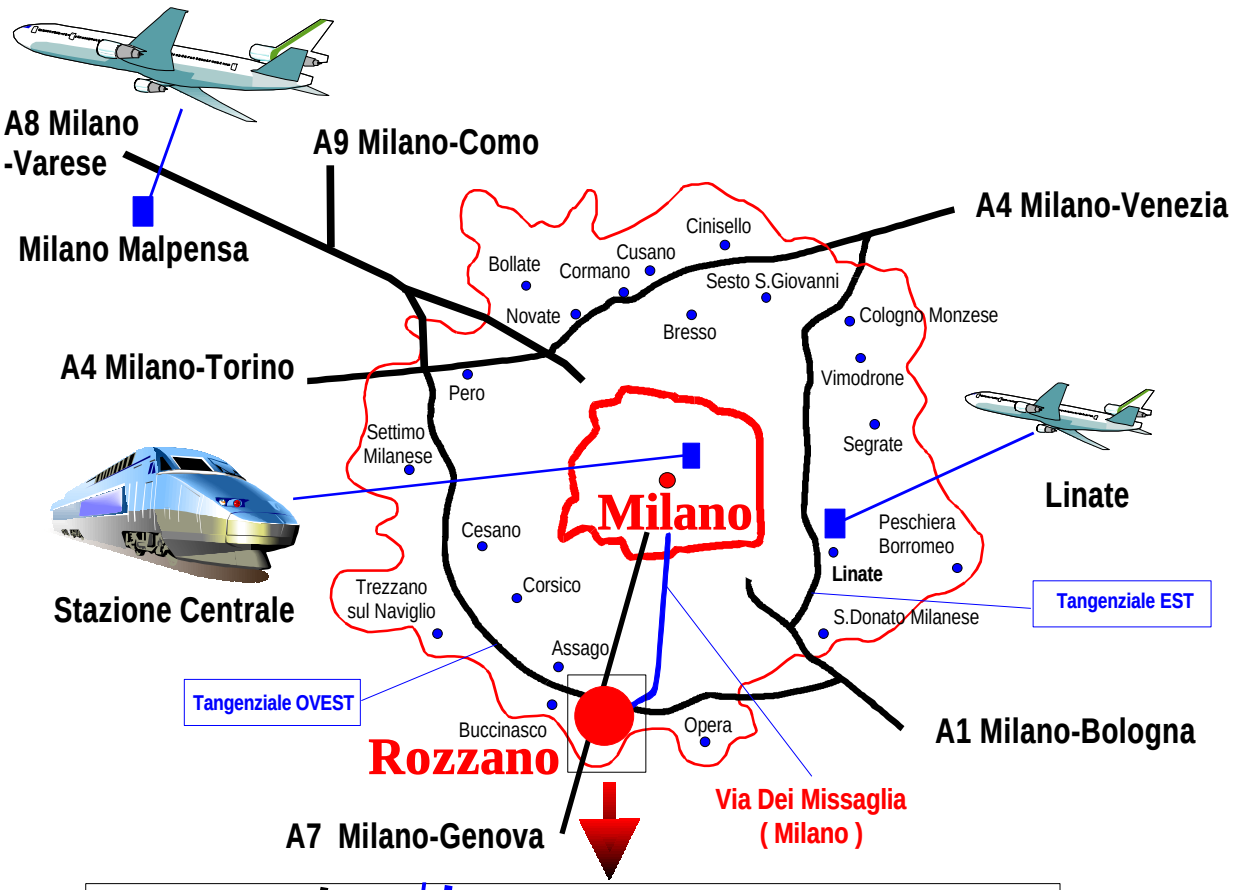

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