



PTX30LCDDSP PTX50LCDDSP PTX60LCDDSP PTX100LCDDSP & PTX150LCDDSP

USER MANUAL
VOLUME1



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PTX-LCDDSP - User Manual
Version 4.0

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Notification of intended purpose and limitations of product use

This product is a FM transmitter intended for FM audio broadcasting. It utilises operating frequencies not harmonised in the intended countries of use.

The user must obtain a license before using the product in intended country of use. Ensure respective country licensing requirements are complied with.

Limitations of use can apply in respect of operating frequency, transmitter power and/or channel spacing.

Declaration of Conformity

Hereby, R.V.R. Elettronica SpA, declares that this FM transmitter is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.





DECLARATION OF CONFORMITY

We, the undersigned,

Manufacturer's Name: **R.V.R. Elettronica SpA**

Manufacturer's Address: **Via del Fonditore 2/2c
Zona Ind. Roveri
40138 Bologna
Italy**

Certify and declare under our sole responsibility that the product:

Product Description: **FM Solid State Transmitter for Broadcast service**

Notified Code: **AFM-PTL1**

Model: **PTX30LCD**

Variants: **PTX30LCD/S, PTX30LCDDSP**

Frequency Range: **87.5 ÷ 108.0 MHz**

RF Power Output: **10 ÷ 30 W**

when used for its intended purpose, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/CE "R&TTE", and therefore carries the "CE" mark.

The conformity assessment procedure referred in Article 10 and detailed in Annex III of Directive 1999/5/EC has been followed.

The following harmonized standard have been applied:

Use of Radio Spectrum (3.2): EN 302018-2 V. 1.1.1

ElectroMagnetic Compatibility (3.1b): EN 301489-11 V. 1.2.1

Safety (3.1a): EN 60215:1989 + A1:1992 + A2:1994 /
CEI EN 60215:1997-10

The technical documentation is held at the location above, as required by the conformity assessment procedure.

Bologna, Italy, 14/06/2005


Ravagnani Stefano
Technical Manager
R.V.R. Elettronica S.p.A.





DECLARATION OF CONFORMITY

We, the undersigned,

Manufacturer's Name: **R.V.R. Elettronica SpA**

Manufacturer's Address: **Via del Fonditore 2/2c
Zona Ind. Roveri
40138 Bologna
Italy**

Certify and declare under our sole responsibility that the product:

Product Description: **FM Solid State Transmitter for Broadcast service**

Notified Code: **AFM-PTL2**

Models: **PTX100LCD⁽¹⁾, PTX50LCD⁽²⁾, PTX60LCD⁽³⁾**

Variants: **PTX100LCD/S⁽¹⁾, PTX100LCDDSP⁽¹⁾, PTX50LCD/S⁽²⁾,
PTX50LCDDSP⁽²⁾, PTX60LCD/S⁽³⁾, PTX60LCDDSP⁽³⁾**

Frequency Range: **87.5 ÷ 108.0 MHz**

RF Power Output: **(¹) 10 ÷ 100 W
(²) 10 ÷ 50 W
(³) 10 ÷ 60 W**

when used for its intended purpose, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/CE "R&TTE", and therefore carries the "CE" mark.

The conformity assessment procedure referred in Article 10 and detailed in Annex III of Directive 1999/5/EC has been followed.

The following harmonized standard have been applied:

Use of Radio Spectrum (3.2): EN 302018-2 V. 1.1.1

ElectroMagnetic Compatibility (3.1b): EN 301489-11 V. 1.2.1

Safety (3.1a): EN 60215:1989 + A1:1992 + A2:1994 /
CEI EN 60215:1997-10

The technical documentation is held at the location above, as required by the conformity assessment procedure.

Bologna, Italy, 14/06/2005


Ravagnani Stefano
Technical Manager
R.V.R. Elettronica S.p.A.





DECLARATION OF CONFORMITY

We, the undersigned,

Manufacturer's Name:

R.V.R. Elettronica SpA

Manufacturer's Address:

**Via del Fonditore 2/2c
Zona Ind. Roveri
40138 Bologna
Italy**

Certify and declare under our sole responsibility that the product:

Product Description:

FM Solid State Transmitter for Broadcast service

Notified Code:

AFM-PTL3

Models:

PTX150LCD

Variants:

PTX150LCD/S, PTX150LCDDSP

Frequency Range:

87.5 ÷ 108.0 MHz

RF Power Output:

10 ÷ 150 W

when used for its intended purpose, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/CE "R&TTE", and therefore carries the "CE" mark.

The conformity assessment procedure referred in Article 10 and detailed in Annex III of Directive 1999/5/EC has been followed.

The following harmonized standard have been applied:

Use of Radio Spectrum (3.2):

EN 302 018-1 V1.2.1 (2006-03) +
EN 302 018-2 V1.2.1 (2006-03)

Compatibilità Elettro Magnetica (3.1b):

EN 301 489-1 V1.9.2 (2011-09) +
EN 301 489-11 V1.3.1 (2006-05)

Sicurezza (3.1a):

EN 60215 (1997-10) +
EN 60065 (2011-01)

The technical documentation is held at the location above, as required by the conformity assessment procedure.

Bologna, Italy, 11/07/2013




Ravagnani Stefano
Technical Manager
R.V.R. Elettronica S.p.A.

Technical Description

Parameters	U/M	PTX30LCDDSP	PTX50LCDDSP	PTX60LCDDSP	Notes	
GENERAL						
Frequency range	MHz	87.5 ± 108	87.5 ± 108	87.5 ± 108		
Rated output power	W	30	50	60	Continuously variable by software from 0 to maximum	
Modulation type		Direct carrier frequency	Direct carrier frequency	Direct carrier frequency		
Operational Mode		Mono, Stereo, Multiplex	Mono, Stereo, Multiplex	Mono, Stereo, Multiplex		
Ambient working temperature	°C	-10 to +50	-10 to +50	-10 to +50	Without condensing	
Frequency programmability		From software, with 10 kHz steps	From software, with 10 kHz steps	From software, with 10 kHz steps		
Frequency stability	WT from -10°C to 50°C	±1	±1	±1		
Modulation capability	kHz	150 Stereo, 200 Mono/MPX	150 Stereo, 200 Mono/MPX	150 Stereo, 200 Mono/MPX	Meets or exceeds all FCC and CCR rules	
Pre-emphasis mode	μS	0, 50 (CCIR), 75 (FCC)	0, 25, 50 (CCIR), 75 (FCC)	0, 25, 50 (CCIR), 75 (FCC)	Selectable by software	
Spurious & harmonic suppression	dBc	<75 (80 typical)	<75 (80 typical)	<75 (80 typical)	Meets or exceeds all FCC and CCR rules	
Asynchronous AM SN ratio	dB	≥ 70	≥ 70	≥ 70		
Synchronous AM SN ratio	dB	≥ 50	≥ 50	≥ 50		
MONO OPERATION						
SN FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - LPF 23 kHz, 50 μS de-emphasis	dB	> 82 (typical 85)	> 83 (typical 85)	> 83 (typical 85)	
	Qpk @ ± 75 kHz peak, CCIR weighted, 50 μS de-emphasis	dB	> 73	> 73	> 73	
	Qpk @ ± 40 kHz peak, CCIR weighted, 50 μS de-emphasis	dB	> 69	> 69	> 69	
Frequency Response	30Hz - 15kHz	dB	± 0.1 dB (typical ± 0.05)	better than ± 0.5 dB (typical ± 0.2)	better than ± 0.5 dB (typical ± 0.2)	
Total Harmonic Distortion	THD+N 30Hz - 15kHz	%	< 0.05 (Typical 0.03%)	< 0.05 (Typical 0.03%)	< 0.05 (Typical 0.03%)	
Intermodulation Distortion	Measured with a 1 kHz, 1.3 kHz tones, 1:ratio, @ 75 kHz FM	%	< 0.02	< 0.02	< 0.02	
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @ 75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	
MPX OPERATION						
Composite SN FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - no LPF, 50 μS de-emphasis	dB	> 82 (typical 85)	> 83 (typical 85)	> 83 (typical 85)	
Frequency Response	30Hz - 53kHz	dB	± 0.08	± 0.2	± 0.2	
Total Harmonic Distortion	THD+N 30Hz - 53kHz	%	< 0.05	< 0.05	< 0.05	
Intermodulation distortion	Measured with a 1 kHz, 1.3 kHz tones, 1:ratio, @ 75 kHz FM	%	< 0.05	< 0.05	< 0.05	
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @ 75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	
Stereo separation	30Hz - 53kHz	dB	> 50 dB (typical 60)	> 50 dB (typical 60)	> 50 dB (typical 60)	
STEREO OPERATION						
Stereo SN FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - LPF 23 kHz, 50 μS de-emphasis, L & R demodulated	dB	> 81 (Typical 83)	> 80 (Typical 82)	> 80 (Typical 82)	
	Qpk @ ± 75 kHz peak, CCIR weighted, 50 μS de-emphasis, L & R demodulated	dB	> 70 dB	> 69 dB	> 69 dB	
	Qpk @ ± 40 kHz peak, CCIR weighted, 50 μS de-emphasis, L & R demodulated	dB	> 69 dB	> 67 dB	> 67 dB	
Frequency Response	30Hz - 15kHz	dB	± 0.2	± 0.5	± 0.5	
Total Harmonic Distortion	THD+N 30Hz - 15kHz	%	< 0.05	< 0.05	< 0.05	
Intermodulation distortion	Measured with a 1 kHz, 1.3 kHz tones, 1:ratio, @ 75 kHz FM	%	≤ 0.03	≤ 0.03	≤ 0.03	
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @ 75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)	
Stereo separation	30Hz - 15kHz	dB	> 60 (typical 65)	> 60 (typical 60)	> 50 (typical 60)	
Main/Sub Ratio	30Hz - 15kHz	dB	> 80 (typical 84)	> 40 (typical 45)	> 40 (typical 45)	
SCA OPERATION						
Frequency response	40kHz - 100kHz	dB	± 0.5	± 0.5	± 0.5	
Crosstalk to main or to stereo channel	RMS, ref @ ± 75 kHz peak, no HPF/LPF, 0μS de-emphasis, with 67 kHz tone on SCA input @ 7.5kHz FM deviation	dB	> 75 (typical 79)	> 75 (typical 79)	> 75 (typical 79)	
	RMS, ref @ ± 75 kHz peak, no HPF/LPF, 0μS de-emphasis, with 52 kHz tone on SCA input @ 7.5kHz FM deviation	dB	> 80 (typical 81)	> 80 (typical 81)	> 80 (typical 81)	
POWER REQUIREMENTS						
AC Power Input	AC Supply Voltage	VAC	115 - 125 - 230 - 250	115 - 125 - 230 - 250	115 - 125 - 230 - 250	
	AC Apparent Power Consumption	VA	135	220	260	
	Active Power Consumption	W	95	150	150	
	Power Factor		0.7	0.68	0.68	
	Overall Efficiency	%	31	33	40	
DC Power Input (option)	DC Supply Voltage	VDC	24	24	24	
	DC Current	ADC	3.5	5	8	
MECHANICAL DIMENSIONS						
Physical Dimensions	Front panel width	mm	483 (19")	483 (19")	483 (19")	
	Front panel height	mm	88 (3 1/2") 2HE	88 (3 1/2") 2HE	88 (3 1/2") 2HE	
	Overall depth	mm	400	400	400	
	Chassis depth	mm	389	389	389	
Weight	kg	About 10	About 13	About 15		
VARIOUS						
Cooling			Forced, with internal fan	Forced, with internal fan	Forced, with internal fan	
Acoustic Noise	dBA	< 60	< 56	< 56	Leq 3 min @ 1 m	
AUDIO INPUTS						
Left / Mono	Connector		XLR F	XLR F	XLR F	
	Type		Balanced	Balanced	Balanced	
	Impedance	Ohm	10 k or 600	10 k or 600	10 k or 600	Selectable by software
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14	-13 to +14	1 dB step variable by software
	externally fine adjustable	dB	±0.5	±0.5	±0.5	
Right / MPX balanced	Connector		XLR F	XLR F	XLR F	
	Type		Balanced	Balanced	Balanced	
	Impedance	Ohm	10 k or 600	10 k or 600	10 k or 600	Selectable by software
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14	-13 to +14	1 dB step variable by software
	externally fine adjustable	dB	±0.5	±0.5	±0.5	
MPX unbalanced	Connector		BNC	BNC	BNC	
	Type		unbalanced	unbalanced	unbalanced	
	Impedance	Ohm	10 k or 50	10 k or 50	10 k or 50	Selectable by internal jumper
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14	-13 to +14	1 dB step variable by software
	externally fine adjustable	dB	±0.5	±0.5	±0.5	
SCARDS	Connector		3 x BNC	3 x BNC	3 x BNC	
	Type		unbalanced	unbalanced	unbalanced	
	Impedance	Ohm	10 k	10 k	10 k	
	Input Level, Adjustment Range	dB	-3 to +15	-3 to +15	-3 to +15	externally adjustable
	2 internal jumpers for SCA 1 & 2 inputs	dB	-20	-20	-20	
AES/EBU	Connector		XLR F	XLR F	XLR F	
	Type		Balanced	Balanced	Balanced	
TOSLink	Connector		110	110	110	
	Type		TOS Link	TOS Link	TOS Link	
OUTPUTS						
RF Output	Connector		N type	N type	N type	
	Impedance	Ohm	50	50	50	
	Connector		BNC	BNC	BNC	
RF Monitor	Connector		BNC	BNC	BNC	
	Impedance	Ohm	50	50	50	
	Output Level	dB	approx -30	approx -30	approx -30	Referred to the RF output
Pilot output	Connector		BNC	BNC	BNC	
	Impedance	Ohm	> 4.7 k	> 4.7 k	> 4.7 k	
	Output Level	Vpp	1	1	1	
MPX Monitor	Connector		BNC	BNC	BNC	
	Impedance	Ohm	> 600	> 600	> 600	
	Output Level	dBu	0	0	0	@ 75 kHz peak FM, externally adjustable +12 / -6 dBu
AUXILIARY CONNECTIONS						
Interlock	Connector		BNC	BNC	BNC	
RS232 Serial Interface	Connector		DB9 F	DB9 F	DB9 F	
Remote Interface	Connector		DB15F	DB15F	DB15F	
Remote RDS Interface	Connector		DB9 M	DB9 M	DB9 M	
FUSES						
On Main			1 External fuse F 6.3 T - 5x20 mm	1 External fuse F 6.3 T - 5x20 mm	1 External fuse F 6.3 T - 5x20 mm	
On PA Supply			1 External fuse F 6.3 A - 5x20 mm	1 External fuse F 10 A - 5x20 mm	1 External fuse F 10 A - 5x20 mm	
HUMAN INTERFACE						
Input device			Optical encoder with pushbutton	Optical encoder with pushbutton	Optical encoder with pushbutton	
Display			Graphical LCD - 240 x 64 pixels	Graphical LCD - 240 x 64 pixels	Graphical LCD - 240 x 64 pixels	
TELEMETRY / TELECONTROL						
Remote connector inputs	Analogical level		FWD fold	FWD fold	FWD fold	
	Analogical level		REF fold	REF fold	REF fold	
Remote connector outputs	ON / OFF level		6 input for P.A. telemetry purpose	6 input for P.A. telemetry purpose	6 input for P.A. telemetry purpose	
	ON / OFF level		Interlock	Interlock	Interlock	
Remote connector others	ON / OFF level		Power good 1	Power good 1	Power good 1	
	ON / OFF level		Power good 2	Power good 2	Power good 2	
Remote RDS connector inputs	ON / OFF level		RDS TP	RDS TP	RDS TP	
	ON / OFF level		RDS TA	RDS TA	RDS TA	
	ON / OFF level		RDS MS	RDS MS	RDS MS	
	ON / OFF level		RDS MS	RDS MS	RDS MS	
	ON / OFF level		1 Hz	1 Hz	1 Hz	

Technical Description

Parameters	U.M.	PTX100LCDDSP	PTX150LCDDSP	Notes
GENERALS				
Frequency range	MHz	87.5 - 108	87.5 - 108	
Dated output cover	W	100	150	
Modulation type		Direct carrier frequency	Direct carrier frequency	Continuously variable by software from 0 to maximum
Operational Mode		Mono, Stereo, Multiplex	Mono, Stereo, Multiplex	
Ambient working temperature	°C			Without condensing
Frequency programmability		From software, with 10 kHz steps	From software, with 10 kHz steps	
Frequency stability	WT from -10°C to 50°C	±1	±1	
Modulation capability	kHz	150 Stereo, 200 Mono/MPX	150 Stereo, 200 Mono/MPX	Meets or exceeds all FCC and CCIR rules
Pre-emphasis mode	µs	0, 25, 50 (CCIR), 75 (FCC)	0, 25, 50 (CCIR), 75 (FCC)	Selectable by software
Spurious & harmonic suppression	dBc	<75 (80 typical)	<75 (80 typical)	Meets or exceeds all FCC and CCIR rules
Asynchronous AM S/N ratio	dB	≥ 70	≥ 70	
Synchronous AM S/N ratio	dB	≥ 50	≥ 50	
MONO OPERATION				
S/N FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - LPF 23 kHz, 50 µs de-emphasis	dB	> 80 (typical 84)	> 80 (typical 84)
	Qpk @ ± 75 kHz peak, CCR weighted, 50 µs de-emphasis	dB	> 73	> 73
Frequency Response	30Hz + 15kHz	dB	better than ± 0.5 dB (typical ± 0.2)	better than ± 0.5 dB (typical ± 0.2)
	THD+N 30Hz + 15kHz	%	< 0.05 (Typical 0.03%)	< 0.05 (Typical 0.03%)
Total Harmonic Distortion	Measured with a 1 KHz, 1.3 KHz tones	%	< 0.02	< 0.02
Intermodulation Distortion	1:1ratio, @ 75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)
MPX OPERATION				
Composite S/N FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - no LPF, 50 µs de-emphasis	dB	> 80 (typical 84)	> 80 (typical 84)
Frequency Response	30Hz + 53kHz	dB	± 0.2	± 0.2
	53kHz + 100kHz	dB	± 0.5	± 0.5
Total Harmonic Distortion	THD+N 30Hz + 53kHz	%	< 0.05	< 0.05
Intermodulation distortion	THD+N 53kHz + 100kHz	%	< 0.1	< 0.1
	Measured with a 1 KHz, 1.3 KHz tones	%	< 0.05	< 0.05
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)
Stereo separation	30Hz + 53kHz	dB	> 50 dB (typical 60)	> 50 dB (typical 60)
STEREO OPERATION				
Stereo S/N FM Ratio	RMS @ ± 75 kHz peak, HPF 20Hz - LPF 23 kHz, 50 µs de-emphasis, L & R demodulated	dB	> 80 (Typical 82)	> 80 (Typical 82)
	Qpk @ ± 75 kHz peak, CCR weighted, 50 µs de-emphasis, L & R demodulated	dB	> 68 dB	> 68 dB
Frequency Response	30Hz + 15kHz	dB	± 0.5	± 0.5
	THD+N 30Hz + 15kHz	%	< 0.05	< 0.05
Intermodulation distortion	Measured with a 1 KHz, 1.3 KHz tones	%	≤ 0.03	≤ 0.03
Transient intermodulation distortion	3.18 kHz square wave, 15 kHz sine wave @75 kHz FM	%	< 0.1 (typical 0.05)	< 0.1 (typical 0.05)
Stereo separation	Main / Sub Ratio	dB	> 50 (typical 60)	> 50 (typical 60)
SCA OPERATION				
Frequency response	40kHz + 100kHz	dB	± 0.5	± 0.5
Crosstalk to main or to stereo channel	RMS, ref @ ± 75 kHz peak, no HPF/LPF, 0µs de-emphasis, with 67 kHz tone on SCA input @ 7.5kHz FM deviation	dB	> 75 (typical 79)	> 75 (typical 79)
	RMS, ref @ ± 75 kHz peak, no HPF/LPF, 0µs de-emphasis, with 92 kHz tone on SCA input @ 7.5kHz FM deviation	dB	> 80 dB (typical 81)	> 80 dB (typical 81)
POWER REQUIREMENTS				
AC Power Input	AC Supply Voltage	VAC	115 - 125 - 230 - 250	115 - 125 - 230 - 250
	AC Apparent Power Consumption	VA	350	350
	Active Power Consumption	W	250	250
	Power Factor		0.71	0.72
DC Power Input (option)	Overall Efficiency	%	60	65
	DC Supply Voltage	VDC	24	24
	DC Current	ADC	6	6
MECHANICAL DIMENSIONS				
Physical Dimensions	Front panel width	mm	483 (19")	483 (19")
	Front panel height	mm	88 (3.42) 20HE	88 (3.42) 20HE
	Overall depth	mm	400	400
	Chassis depth	mm	389	389
Weight	kg	About 15	About 15	
VARIOS				
Cooling			Forced, with internal fan	Forced, with internal fan
Acoustic Noise	dBA	< 58	< 58	Leq 3 min @ 1 m
AUDIO INPUTS				
Left / Mono	Connector		XLR F	XLR F
	Type		Balanced	Balanced
	Impedance		10 k or 600	10 k or 600
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14
Right / MPX balanced	Connector		XLR F	XLR F
	Type		Balanced	Balanced
	Impedance		10 k or 600	10 k or 600
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14
MPX unbalanced	Connector		BNC	BNC
	Type		unbalanced	unbalanced
	Impedance		10 k or 50	10 k or 50
	Input Level, Adjustment Range	dB	-13 to +14	-13 to +14
SCARDS	Connector		3 x BNC	3 x BNC
	Type		unbalanced	unbalanced
	Impedance		10 k	10 k
	Input Level, Adjustment Range	dB	-3 to +15	-3 to +15
AES/EBU	Connector		Balanced	Balanced
	Type		Balanced	Balanced
	Impedance		110	110
	Input Level, Adjustment Range	dB	-10	-10
TOSLink	Connector		TOS Link	TOS Link
	Type		optical	optical
	Impedance		110	110
	Input Level, Adjustment Range	dB	-10	-10
OUTPUTS				
RF Output	Connector		N type	N type
	Impedance		50	50
RF Monitor	Connector		BNC	BNC
	Impedance		50	50
Pilot output	Connector		BNC	BNC
	Impedance		> 4.7 k	> 4.7 k
MPX Monitor	Connector		BNC	BNC
	Impedance		> 600	> 600
AUXILIARY CONNECTIONS				
Interlock	Connector		BNC	BNC
RS232 Serial Interface	Connector		DB9 F	DB9 F
Remote Interface	Connector		DB15F	DB15F
Remote RDS Interface	Connector		DB9 M	DB9 M
FUSES				
On Mains			1 External fuse F 6.3 T - 5x20 mm	1 External fuse F 6.3 T - 5x20 mm
On PA Supply			1 External fuse F 10 A - 8x20 mm	1 External fuse F 10 A - 8x20 mm
HUMAN INTERFACE				
Input device			Optical encoder with pushbutton	Optical encoder with pushbutton
Display			Graphical LCD - 240 x 64 pixels	Graphical LCD - 240 x 64 pixels
TELEMETRY / TELECONTROL				
Remote connector inputs	Analogical level		FWD fold	FWD fold
	Analogical level		REF fold	REF fold
Remote connector outputs	ON / OFF level		8 input for P.A. telemetry purpose	8 input for P.A. telemetry purpose
	ON / OFF level		Power good 1	Power good 1
Remote connector others	ON / OFF level		Power good 2	Power good 2
	ON / OFF level		ICBUS	ICBUS
Remote RDS connector inputs	ON / OFF level		RDS TP	RDS TP
	ON / OFF level		RDS TA	RDS TA
	ON / OFF level		RDS MS	RDS MS
	ON / OFF level		1 Hz	1 Hz

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IMPORTANT



The symbol of lightning inside a triangle placed on the product, evidences the operations for which is necessary gave it full attention to avoid risk of electric shocks.



The symbol of exclamation mark inside a triangle placed on the product, informs the user about the presence of instructions inside the manual that accompanies the equipment, important for the efficacy and the maintenance (repairs).

1. Preliminary Instructions

• General Warnings

This equipment should only be operated, installed and maintained by "trained" or "qualified" personnel who are familiar with risks involved in working on electric and electronic circuits. "Trained" means personnel who have technical knowledge of equipment operation and who are responsible for their own safety and that of other unqualified personnel placed under their supervision when working on the equipment. "Qualified" means personnel who are trained in and experienced with equipment operation and who are responsible for their own safety and that of other unqualified personnel placed under their supervision when working on the equipment.

 **WARNING: Residual voltage may be present inside the equipment even when the ON/OFF switch is set to Off. Before servicing the equipment, disconnect the power cord or switch off the main power panel and make sure the safety earth connection is connected. Some service situations may require inspecting the equipment with live circuits. Only trained and qualified personnel may work on the equipment live and shall be assisted by a trained person who shall keep ready to disconnect power supply at need.**

R.V.R. Elettronica S.p.A. shall not be liable for injury to persons or damage to property resulting from improper use or operation by trained/untrained and qualified/unqualified persons.

 **WARNING: The equipment is not water resistant. Any water entering the enclosure might impair proper operation. To prevent the risk of electrical shock or fire, do not expose this equipment to rain, dripping or moisture.**

Please observe local codes and fire prevention rules when installing and operating this equipment.

 **WARNING: This equipment contains exposed live parts involving an electrical shock hazard. Always disconnect power supply before removing any covers or other parts of the equipment.**

Ventilation slits and holes are provided to ensure reliable operation and prevent overheating; do not obstruct or cover these slits. Do not obstruct the ventilation slits under any circumstances. The product must not be incorporated in a rack unless adequate ventilation is provided or the manufacturer's instructions are followed closely.

 **WARNING: This equipment can radiate radiofrequency energy and, if not installed in compliance with manual instructions and applicable regulations, may cause interference with radio communications.**

 **WARNING: This equipment is fitted with earth connections both in the power cord and for the chassis.**

Make sure both are properly connected.

Operation of this equipment in a residential area may cause radio interference, in which case the user may be required to take adequate measures.

The specifications and data contained herein are provided for information only and are subject to changes without prior notice. R.V.R. Elettronica S.p.A. disclaims all warranties, express or implied. While R.V.R. Elettronica S.p.A. attempts to provide accurate information, it cannot accept responsibility or liability for any errors or inaccuracies in this manual, including the products and the software described herein. R.V.R. Elettronica S.p.A. reserves the right to make changes to equipment design and/or specifications and to this manual at any time without prior notice.

• Notice concerning product intended purpose and use limitations.

This product is a radio transmitter suitable for frequency-modulation audio radio broadcasting. Its operating frequencies are not harmonised in designated user countries. Before operating this equipment, user must obtain a licence to use radio spectrum from the competent authority in the designated user country. Operating frequency, transmitter power and other characteristics of the transmission system are subject to restrictions as specified in the licence.

2. Warranty

La R.V.R. Elettronica S.p.A. warrants this product to be free from defects in workmanship and its proper operation subject to the limitations set forth in the supplied Terms and Conditions. Please read the Terms and Conditions carefully, as purchase of the product or acceptance of the order acknowledgement imply acceptance of the Terms and Conditions. For the latest updated terms and conditions, please visit our web site at WWW.RVR.IT. The web site may be modified, removed or updated for any reason whatsoever without prior notice. The warranty will become null and void in the event the product enclosure is opened, the product is physically damaged, is repaired by unauthorised persons or is used for purposes other than its intended use, as well as in the event of improper use, unauthorised changes or neglect. In the event a defect is found, follow this procedure:

- 1 Contact the seller or distributor who sold the equipment; provide a description of the problem or malfunction for the event a quick fix is available.

Sellers and Distributors can provide the necessary information to troubleshoot the most frequently encountered problems. Normally, Sellers and Distributors can offer a faster repair service than the Manufacturer would. Please note that Sellers can pinpoint problems due to wrong installation.

- 2 If your Seller cannot help you, contact R.V.R. Elettronica S.p.A. and describe the problem; if our staff deems it appropriate, you will receive an authorisation to return the equipment along with suitable instructions;

- 3 When you have received the authorisation, you may return the unit. Pack the unit carefully before shipment; use the original packaging whenever possible and seal the package perfectly. The customer bears all risks of loss (i.e., R.V.R. shall not be liable for loss or damage) until the package reaches the R.V.R. factory. For this reason, we recommend insuring the goods for their full value. Returns must be sent on a C.I.F. basis (PREPAID) to the address stated on the authorisation as specified by the R.V.R. Service Manager.



Units returned without a return authorisation may be rejected and sent back to the sender.

- 4 Be sure to include a detailed report mentioning all problems you have found and copy of your original invoice (to show when the warranty period began) with the shipment.

Please send spare and warranty replacement parts orders to the address provided below. Make sure to specify equipment model and serial number, as well as part description and quantity.



R.V.R. Elettronica S.p.A.
Via del Fonditore, 2/2c
40138 BOLOGNA ITALY
Tel. +39 051 6010506

3. First Aid

All personnel engaged in equipment installation, operation and maintenance must be familiar with first aid procedures and routines.

3.1 Electric shock treatment

3.1.1 If the victim is unconscious

Follow the first aid procedures outlined below.

- Lay the victim down on his/her back on a firm surface.
- the neck and tilt the head backwards to free the airway system (**Figure 1**).

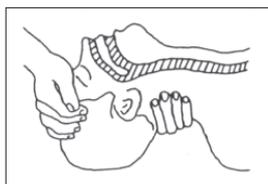


Figure 1

- If needed, open the victim's mouth and check for breathing.
- If there is no breathing, start artificial respiration without delay (**Figure 2**) as follows: tilt the head backwards, pinch the nostrils, seal your mouth around the victim's mouth and give four fast rescue breaths.



Figure 2

- Check for heartbeat (**Figure 3**); if there is no heartbeat, begin chest compressions immediately (**Figure 4**) placing your hands in the centre of the victim's chest (**Figure 5**).

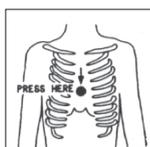
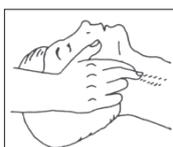


Figure 3

Figure 4

Figure 5

- One rescuer: give 2 quick rescue breaths after each 15 compressions.
- Two rescuers: one rescue breath after each 5 compressions.

- Do not stop chest compressions while giving artificial breathing.
- Call for medical help as soon as possible.

3.1.2 If the victim is conscious

- Cover victim with a blanket.
- Try to reassure the victim.
- Loosen the victim's clothing and have him/her lie down.
- Call for medical help as soon as possible.

3.2 Treatment of electric burns

3.2.1 Large burns and broken skin

- Cover affected area with a clean cloth or linen.
- Do not break any blisters that have formed; remove any clothing or fabric that is stuck to the skin; apply adequate ointment.
- Administer adequate treatment for the type of accident.
- Get the victim to a hospital as quickly as possible.
- Elevate arms and legs if injured.

If medical help is not available within an hour, the victim is conscious and is not retching, administer a solution of table salt and baking soda (one teaspoon of table salt to half teaspoon of baking soda every 250 ml of water).

Have the victim slowly drink half a glass of solution for four times during a period of 15 minutes.

Stop at the first sign of retching.

Do not administer alcoholic beverages.

3.2.2 Minor burns

- Apply cold (not ice cold) strips of gauze or dress wound with clean cloth.
- Do not break any blisters that have formed; remove any clothing or fabric that is stuck to the skin; apply adequate ointment.
- If needed, have the victim change into clean, dry clothing.
- Administer adequate treatment for the type of accident.
- Get the victim to a hospital as quickly as possible.
- Elevate arms and legs if injured.

4. General Description

PTX30LCDDSP, PTX50LCDDSP, PTX60LCDDSP, PTX100LCDDSP & PTX150LCDDSP, are a compact FM exciter manufactured by **R.V.R. Elettronica SpA** for audio radio broadcasting in the 87.5 to 108 MHz band in 10kHz steps, featuring adjustable RF output up to 30, 50, 60, 100 or 150 W, respectively, under 50 Ohm standard load.

PTX30LCDDSP, PTX50LCDDSP, PTX60LCDDSP, PTX100LCDDSP & PTX150LCDDSP, are designed to being contained into a 19" rack box of 2HE.

4.1 Unpacking

The package contains:

- 1 **PTX30LCDDSP, PTX50LCDDSP, PTX60LCDDSP, PTX100LCDDSP & PTX150LCDDSP**,
- 1 User Manual
- 1 Mains power cables

The following accessories are also available from Your R.V.R. Dealer:

- **Accessories, spare parts and cables**

4.2 Features

The **PTX-LCDDSP** may be used for mono or stereo transmission using an external stereo coder.

User interface consists of a graphic liquid crystal display and a knob (encoder). This interface lets you view all parameters relating to machine operation and adjust settable parameters (e.g.: power level or operating frequency).

The exciter has been designed to easily integrate into complex transmission systems. To this end, it is capable of accepting data from, controlling or interacting with external equipments, such as amplifiers, switching units, relays or other exciters.

The **PTX-LCDDSP** design is based on a modular concept: the different functions are performed by modules that are connected directly through male and female connectors or through flat cables terminated by connectors. This design facilitates maintenance and module replacement.

4.3 Frontal Panel Description

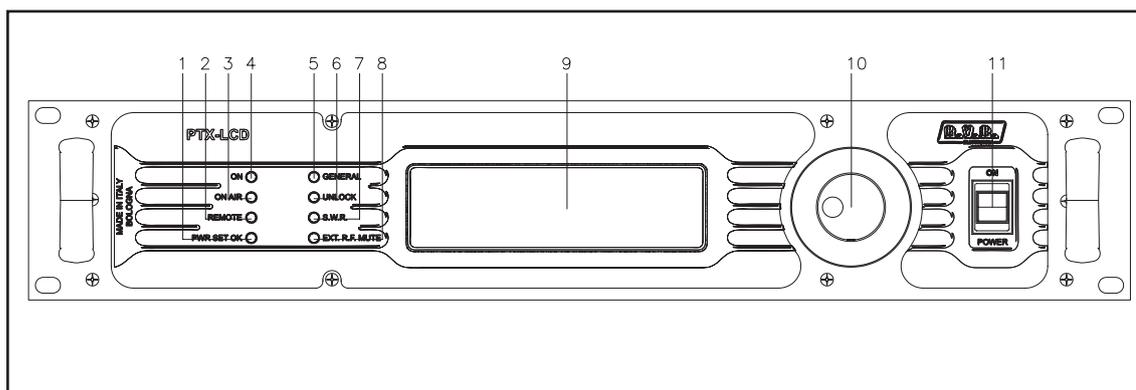


Figure 4.1

- | | |
|-----------------|---|
| [1] PWR SET OK | Lit: the exciter is delivering the set power.
Blinking: the exciter didn't reach the set power for external reasons. |
| [2] REMOTE | Indicates that the exciter is controlled by an external system. |
| [3] ON AIR | Indicates that the exciter is delivering output power (is on air). |
| [4] ON | Indicates that exciter is switched on. |
| [5] GENERAL | Indicates transmitter failure in the event of alarms. |
| [6] UNLOCK | Indicates that PLL is not yet locked to set frequency. |
| [7] SWR | Indicates that the transmitter is blocked due to exceeding SWR. |
| [8] EXT RF MUTE | Indicates that the exciter is not delivering power because inhibited by an interlock. |
| [9] DISPLAY | Liquid Crystal Display, supports both graphics (240x64 pixels) and text (30x8 characters). |
| [10] ENCODER | Software control knob and button. |
| [11] POWER | Mains power switch. |

4.4 Rear Panel Description

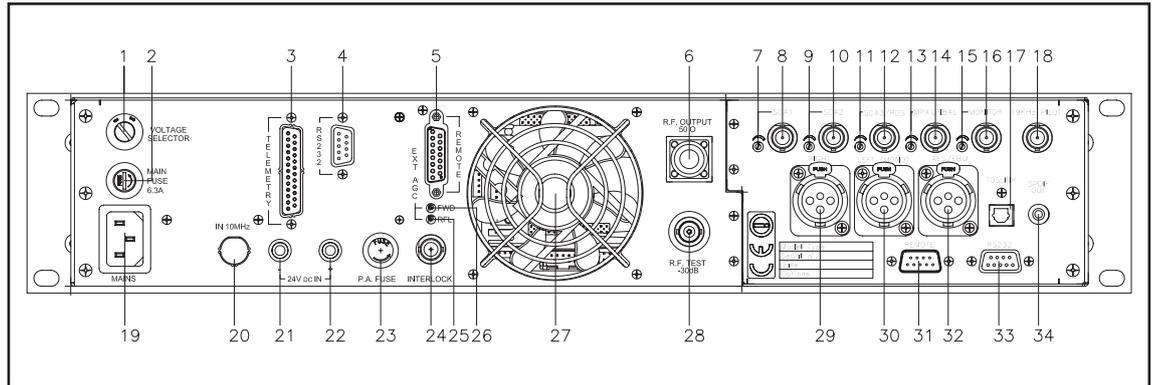


Figure 4.2

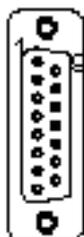
[1] VOLTAGE SELECTOR	Voltage selection block.
[2] FUSE	Mains power supply fuse.
[3] TELEMETRY	DB25 connector of telemetry card (option).
[4] RS232	DB9 connector for direct serial communication.
[5] REMOTE	DB15 connector for interface to remote devices.
[6] RF OUTPUT	N connector for RF output.
[7] SCA1 ADJ	Analogue section - Trimmer for level adjustment.
[8] SCA1 UNBAL	Analogue section - SCA1 BNC connector.
[9] SCA2 ADJ	Analogue section - Trimmer for level adjustment.
[10] SCA2 UNBAL	Analogue section - SCA2 BNC connector.
[11] SCA3/RDS ADJ	Analogue section - Trimmer for level adjustment.
[12] SCA3/RDS UNBAL	Analogue section - SCA3/RDS BNC connector.
[13] MPX UNBAL ADJ	Analogue section - Trimmer for level adjustment.
[14] MPX UNBAL	Analogue section - Unbalanced MPX BNC connector.
[15] MONITOR ADJ	Analogue section - Trimmer for level adjustment.
[16] MONITOR	Analogue section - BNC connector to control the composite modulation signal.
[17] TOSLINK	Digital section - Fiber optics digital audio input connector.
[18] 19 kHz PILOT	Analogue section - BNC connector for output tone control, may be used to synchronise external devices (such as RDS coder).
[19] PLUG	Mains power plug.
[20] IN 10MHZ	BNC input connector of Sync signal for external devices (option).
[21] 24Vdc IN -	Connectors for external 24V power supply (option). Negative (black).
[22] 24Vdc IN +	Connectors for external 24V power supply (option). Positive (red).
[23] P.A. Fuse	Protection fuse of RF final stage.
[24] INTERLOCK	Interlock BNC connector: when central conductor is connected to ground, the transmitter is placed into forced standby mode.
[25] RFL	Trimmer for automatic gain control based on reflected power.
[26] FWD	Trimmer for automatic gain control based on forward power.
[27] VENTOLA	Forced cooling fan.
[28] RF TEST	Test output at -30 dBc with respect to output level.
[29] RIGHT (MPX BAL)	Analogue section - XLR connector for Right / MPX input.
[30] LEFT (MONO)	Analogue section - XLR connector for Left/mono input.

[31] REMOTE	Analogue section - DB15 connector for interface to remote devices.
[32] AES/EBU	Digital section - Balanced XLR connector for AES/EBU digital audio input.
[33] RS232	Analogue section - DB9 connector for direct serial communication.
[34] SPDIF	Digital section - Unbalanced PIN/RCA connector for S/PDIF audio input.

4.5 Connector Pinouts

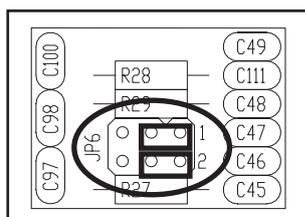
4.5.1 Remote

Type: Female DB15

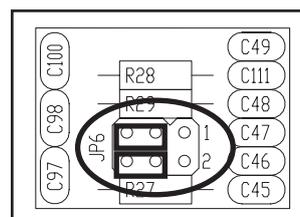


- 1 Ext Rem - Interlock input, disables tx if connected to ground.
- 2 Ext Rfl Pwr - Analogue input (Max. $2_{V_{DC}}$) for reflected power from external amplifier.
- 3 GND
- 4 Analog Input 5 o I2C bus SDA *
- 5 Analog Input 3
- 6 Analog Input 1
- 7 RLY 2 Out - Digital output. Normally open relay contact; it is closed to ground according to a preset on/off time when exciter state changes from ON to OFF. If the ExPwr menu is disabled, the states of this contact have the following meanings: closed = Power Good; open = alarm.
- 8 GND
- 9 GND
- 10 Ext Fwd Pwr - Analogue input (Max. $2_{V_{DC}}$) for forward power from external amplifier.
- 11 Analog Input 6 o I2C bus SCL *
- 12 Analog Input 4
- 13 Analog Input 2
- 14 GND
- 15 RLY 1 Out - Digital output. Normally open relay contact; it is closed to ground according to a preset on/off time when exciter state changes from OFF to ON. If the ExPwr menu is disabled, this contact serves as a "AUDIO alarm": closed = Alarm; open = OK.

* : the function is determined by jumper JP6 on the power supply card. If jumper JP6 was inserted, PIN4 and PIN11 of remote connector become inputs for analog signals.



Analogic inputs



I2C Inputs

4.5.2 RS 232

Type: DB9 female



1	NC
2	TX_D
3	RX_D
4	NC
5	GND
6	+12V
7	NC
8	CTS
9	NC

Note: Normally, PTX-LCDDSP serial communication is configured as DCE (Data Communication Equipment).

4.5.3 Left (MONO) / Right

Type: XLR female



1	GND
2	Positive
3	Negative

5. Quick guide for installation and use

This section provides a step-by-step description of equipment installation and configuration procedure. Follow these procedures closely upon first power-on and each time any change is made to general configuration, such as when a new transmission station is added or the equipment is replaced.

Once the desired configuration has been set up, no more settings are required for normal operation; at each power-up (even after an accidental shutdown), the equipment defaults to the parameters set during the initial configuration procedure.

The topics covered in this section are discussed at greater length in the next sections, with detailed descriptions of all hardware and firmware features and capabilities. Please see the relevant sections for additional details.



IMPORTANT: When configuring and testing the transmitter in which the equipment is integrated, be sure to have the Final Test Table supplied with the equipment ready at hand throughout the whole procedure; the Final Test Table lists all operating parameters as set and tested at the factory.

5.1 Using the encoder

The interaction between the user and the exciter's control software is performed using the encoder (fig. 5.1).

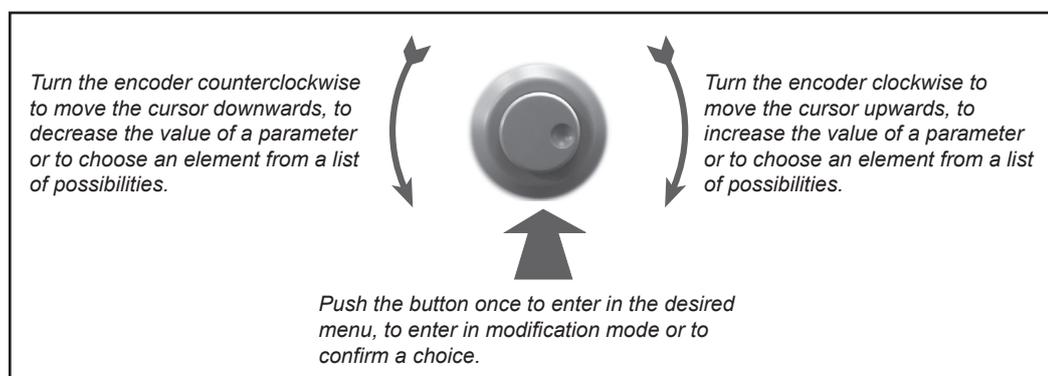


Figure 5.1

The operations that can be performed on the encoder are:

- **rotation:** moves the cursor shown on the display; if you turn the encoder to the left (counterclockwise), the cursor moves downwards, if you turn it right the cursor moves upwards; it also permits to increase or diminish the parameters (turning the encoder left diminishes the parameter, turning it right increases it) or to select an item from a list of options.
- **pression:** push the button once when the cursor is on the name of a menu to enter in that menu, push it when the cursor is on the name of a parameter to enter in modification mod (the cursor starts blinking); after the modification of

a parameter, push the button to save the new value.

After having modified the value of a parameter, the cursor goes on blinking for approximately 30 seconds, waiting for confirmation from the user. If the user doesn't confirm the new value (i.e., the button is not pressed), the device emits a sound to indicate that no modification has been saved; the cursor stops blinking and remains on the selected parameter.

5.2 Preparation

Unpack the transmitter and before any other operation check the unit for any shipping damage and check that all the controls and connectors on the front and rear panels are in good conditions.

Check the mains voltage selector on the rear panel: the selected value is indicated by the angle of changer switch. If required, use a little screwdriver (Fig. 5-2) and rotate the block until that the correct value corresponds.

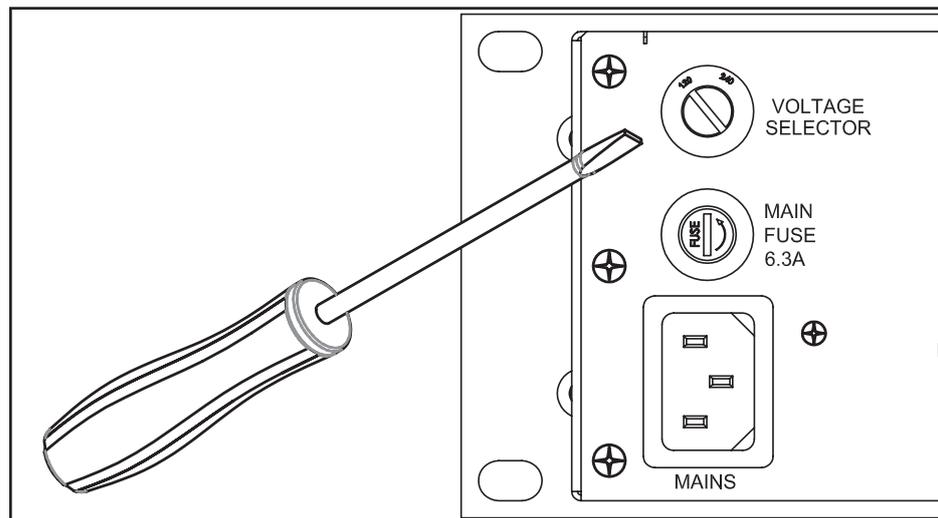


Figure 5.2

If it has been necessary to change voltage, check the fuse value. The required values are the following:

PTX30LCDDSP 240V_{AC} ±10% - 3,16 A (5x20)

120V_{AC} ±10% - 6,30 A (5x20)

PTX50LCDDSP 240 V_{AC} ±10% - 6,30 A (5x20)

120V_{AC} ±10% - 10,0 A (5x20)

PTX60LCDDSP 240 V_{AC} ±10% - 6,30 A (5x20)

120V_{AC} ±10% - 10,0 A (5x20)

PTX100LCDDSP

240 V_{AC} ±10% - 6,30 A (5x20)

120V_{AC} ±10% - 10,0 A (5x20)

PTX150LCDDSP

240 V_{AC} ±10% - 6,30 A (5x20)

120V_{AC} ±10% - 10,0 A (5x20)

It is also possible to check the integrity of the RF amplifier section fuse from the outside.

The values are 4A for the **PTX30LCDDSP** version and 8A for the **PTX50LCDDSP**, **PTX60LCDDSP**, **PTX100LCDDSP** and **PTX150LCDDSP** versions.

Verify that the mains switch on the front panel of the unit is on the OFF position.

Connect to the RF output of the exciter a proper load (a dummy load with suitable dissipation power, an antenna, a final amplifier or a combiner).



Note: When you connect the PTX-LCDDSP to other devices, it is necessary to strictly follow the instructions given by the respective manufacturers, to avoid damages or danger situations.

Connect the mains cable to the plug on the rear of the exciter.



Note: This device shall be correctly connected to ground.

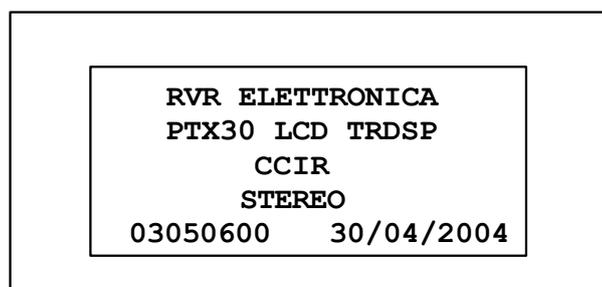
Correct grounding is essential both for safety and to reach the rated performances.

Connect your source audio (for example the mixer or STL output) to the suitable input connector. Depending on the version, the PTX-LCDDSP offers a number of input choices, L+R, MPX or even digital; see the connectors description for details.

5.3 Operation

Switch on the exciter with the mains switch on the front panel.

All the STATUS and ALARMS leds are lit on to permit the verification of their good working status. The display than shows some information regarding the exciter.



After a few seconds, an intermittent beep and a display message prompt the user to push the button if operating parameters are not.

!!! ATTENTION !!!

The setting parameters are:

Frequency: 98.000 Mhz

Power : 8 %

Push encoder button if you
don't accept these parameters

Pushing the button places the transmitter in standby mode, which provides full operation, but disables RF power output.

If the button is not pushed, the start-up sequence will continue.

The transmitter stores set parameters in a non volatile memory so that the correct configuration is retained upon power-off.

When settings are not correct, as may be the case on first power-on, or need to be changed for some reason before beginning transmission, the transmitter may be placed in standby mode as mentioned above.

This is only necessary when you wish to change machine settings before beginning transmission.

The PTX-LCDDSP menu system enables the user to control all operating parameters of the machine.

Before enabling exciter power output, check the following key parameters and adjust as required:

- frequency
- power
- audio input level
- audio input impedance
- preemphasis
- audio input type (depending on version, MONO or MPX; or MONO, MPX_U, MPX_B, STEREO)
- if in STEREO mode, ensure that pilot tone is active

If RF power output was disabled, you may now enable it from the MAIN menu as follows: select the first item and change setting from OFF to ON.

The RF power output of the **PTX-LCDDSP** may be disabled from the main menu at any time.

During machine operation, all available parameters can be viewed or edited using the menu system.

5.4 Calibration

The **PTX-LCDDSP** trimmers can be accessed from the rear panel and can be adjusted by the user. There are two EXT AGC (FWD and RFL) trimmers and the LEVEL ADJ trimmers.

The LEVEL ADJ trimmers are used to control modulation levels to the matching inputs.

For SCA input levels, only trimmer adjustment is available.

The EXT AGC trimmers enable the user to limit exciter output power according to the levels reached by two analogue quantities acquired through the Remote connector.



Nota: *this function should not be used if you are using amplifiers of Green Line series, and to avoid the possible rupture of final which invalidates any kind of warranty.*

The two trimmers use the same mode of operation: EXT AGC - FWD is connected to pin 10 of the Remote connector, whereas EXT AGC-RFL is connected to pin 2. If voltage at either of the pins exceeds the threshold set at the matching trimmer, exciter output power is reduced until the monitored quantity drops below the set limit.

These trimmers are very useful when the exciter is part of a transmission system. For example, assuming that the PTX-LCDDSP is connected to a power amplifier, a proportional signal may be linked to amplifier output power at pin 10 and another proportional signal may be linked to reflected power at pin 2. This way, power is kept steady at varying operating frequencies even though amplifier gain is variable and reflected power limitation is achieved for the whole system without triggering amplifier protection equipments.

The calibration procedure for the EXT AGC trimmers of PTX-LCDDSP in a configuration with power amplifier is described below.

Perform the connections shown in figure 5.3. The cable to connect the two equipments is available from R.V.R. Elettronica on request, or the user may ask a skilled technician to provide a cable to match the pinout of the amplifier used.

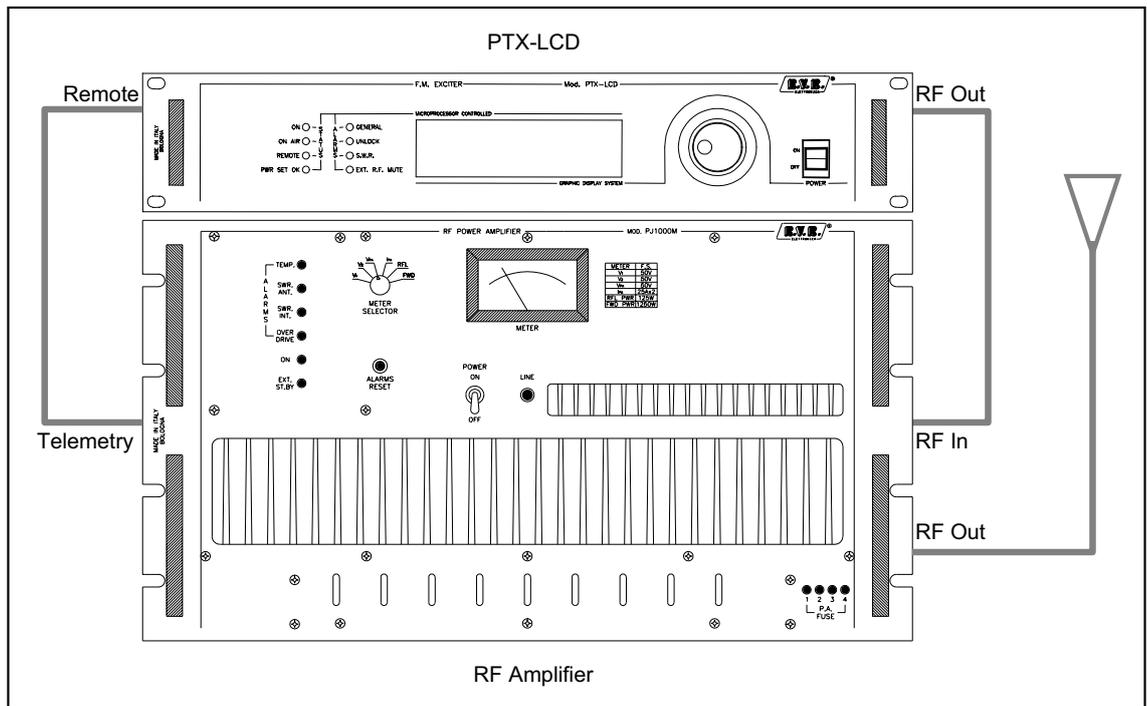


Figura 5.3

Switch on amplifier and exciter set to minimum power.

Turn both trimmers fully anticlockwise.

Gradually increase exciter output power until the forward power reading on the amplifier meter is just below the desired threshold.

Turn the EXT AGC - FWD trimmer clockwise until the reading of amplifier output power begins to decrease.

Set exciter power to minimum setting.

Disconnect the dummy load from the amplifier and replace it with a mismatch load so that part of the output power is reflected back and set amplifier meter to measure reflected power.

Gradually increase exciter output power until the reflected power reading on the amplifier meter is just above the desired threshold.

Turn the EXT AGC - RFL trimmer clockwise until the reading of amplifier reflected power begins to decrease.

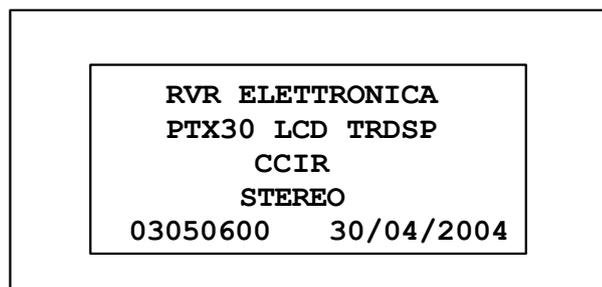
The trimmer calibration procedure is completed. Thanks to this system, the user may choose the preferred power setting at the exciter, while amplifier forward and reflected power remains within the set thresholds.

6. Operating System

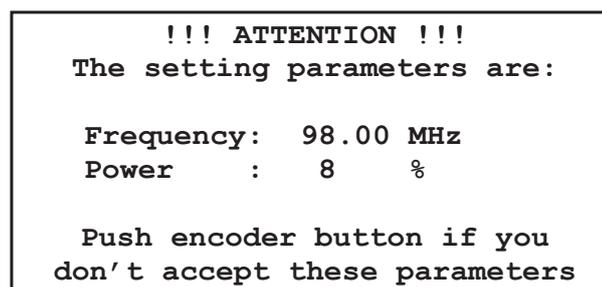
The exciter is controlled by a microprocessor system. Software operations may be grouped into two broad categories: start-up and normal operation.

6.1 Start-up

Upon switch-on, a window that holds machine information appears on the display. Label "CCIR" identifies the set of default values the machine will revert to in the event the software is reinitialised.



After 10 seconds, a new window appears with an intermittent beep signal.



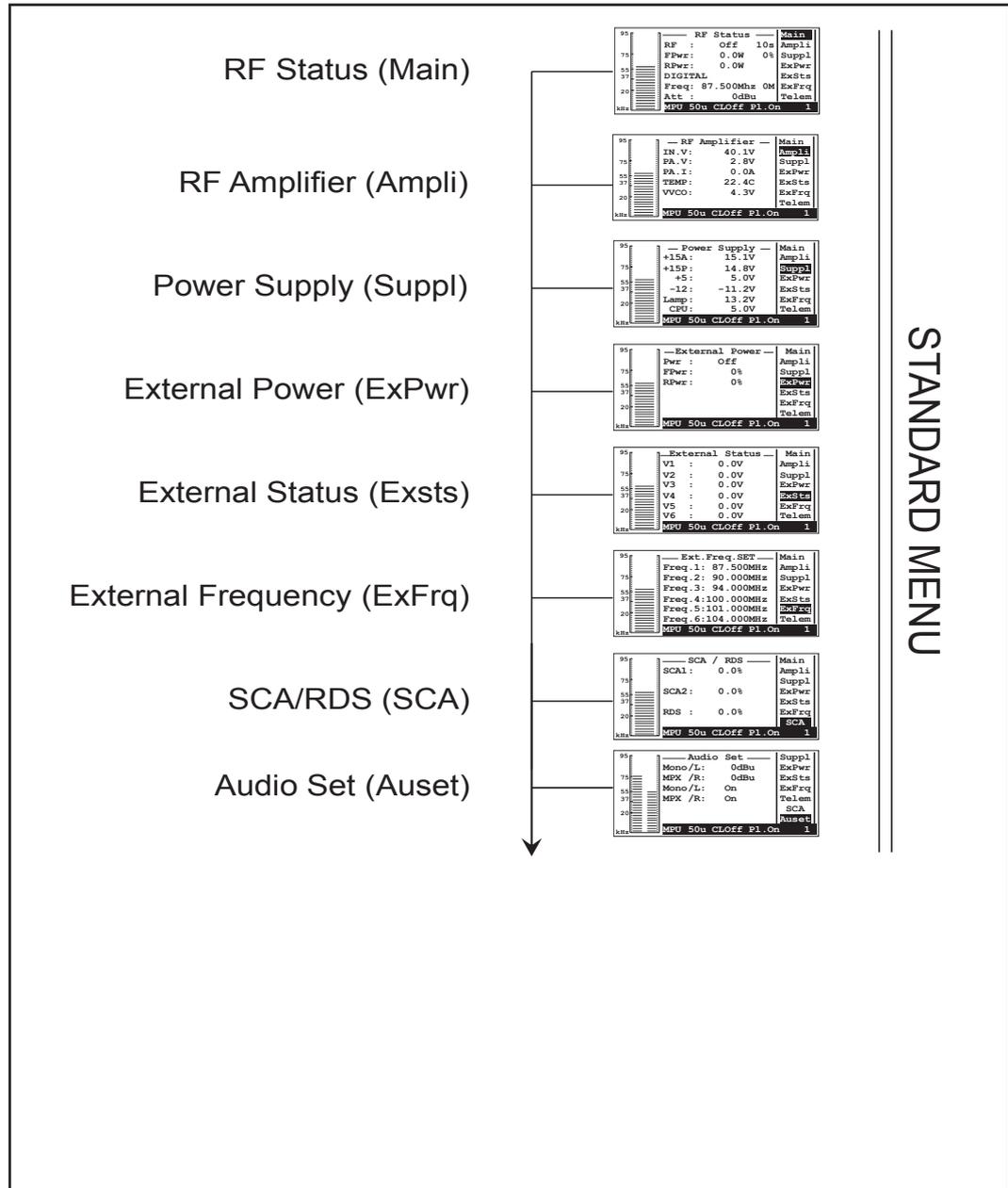
Pressing the encoder while this screen is displayed disables exciter power output. This way, the user may make any necessary changes to operating parameters before beginning transmission.

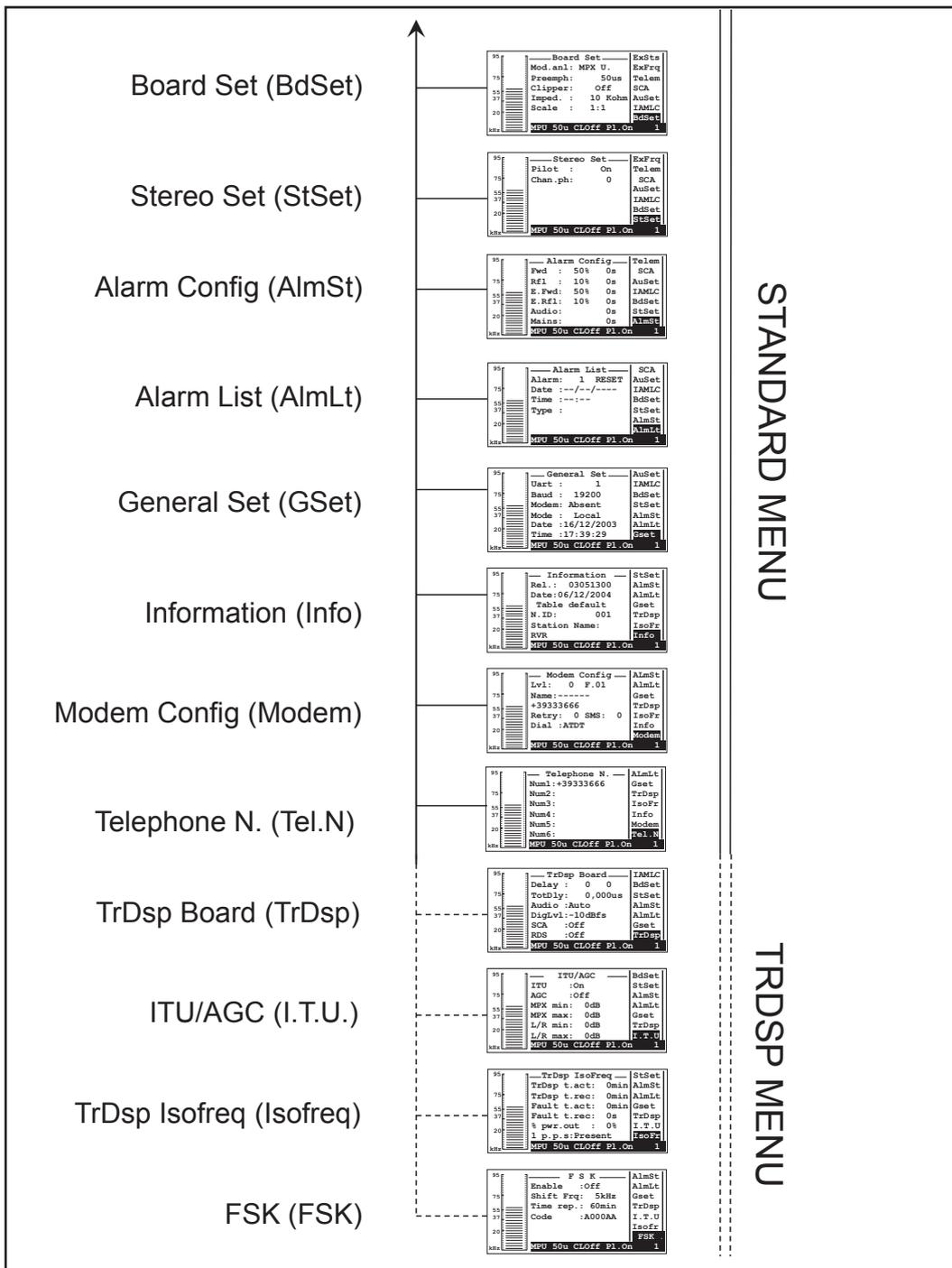
If no controls are operated during 5 seconds, or if the encoder is pressed, the exciter goes to the main screen (MAIN).

6.2 Operating System

The PTX-LCDDSP menu system consists of a default menu and set of administration menus.

The figure below provides an overview of the menu system.





6.2.1 Common menu elements

6.2.1.1 Input modulation deviation bar

Right and left channel input levels are displayed as vertical bars in the left portion of the screen.

The numbers at the side identify the level corresponding to the deviation; for example, index “75” identifies the overall 75KHz deviation of the channels.

6.2.1.2 Status Bar

This “status bar” relates to certain settings that can be modified from the administration submenus; these settings are discussed in greater detail further below.

- **STE 50u CL.On P1.On 001**
 - Ste Audio operating mode: Stereo/Mono/MPX_U/MPX_B
 - 50u Preemphasis: 0, 25, 50, 75 microseconds
 - CL Clipper feature, On or Off
 - P1 Pilot tone transmission, On or Off
 - 001 Machine address (from 001 to 200), relevant when machine is integrated into a telemetry transmission system.

Turning the encoder moves the cursor to the next submenu label, while its content appears in the centre of the window.

If the encoder is pressed when a menu indicator is highlighted on the navigation bar, and that menu contains editable parameters, the cursor jumps into the window in the centre of the display to enable editing.

All menus of this type contain an “EXIT” field: press the encoder when this field is highlighted to exit the submenu and return to navigation mode.

6.2.2 Administration menu

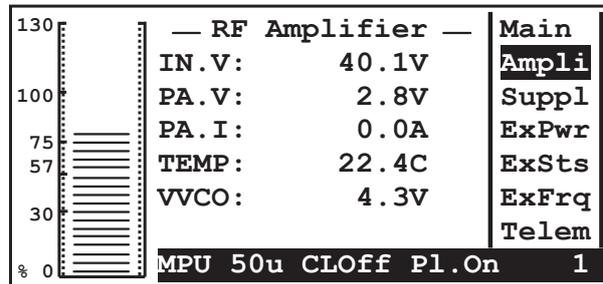
6.2.2.1 RF Status

130 100 75 57 30 % 0	RF Status		Main
	RF :	Off 10s	Ampli
	FPwr:	0.0W 0%	Suppl
	RPwr:	0.0W	ExPwr
	DIGITAL		ExSts
	Freq:	87.500Mhz 0M	ExFrq
	Att :	0dBu	Telem
	MPU 50u CLOff Pl.On		1

- RF** RF power output On / Off. Reading and setting of time taken by the PTX to reach set power; setting range 1 to 100s
- FPwr** Output power reading and setting. Reading is expressed in Watts, whereas setting is a percentage of maximum power. If the encoder is pressed when the cursor is on this option, measurement unit label changes from “W” to “%” and the desired percentage can be set by turning the encoder. Press the encoder to store the new setting.
- RPwr** Reflected power reading in watts.
- DIGITAL**
Mode of operation of TRDSP card.
- 0%** Output power setting in percent.
- Freq** Operating frequency. Press the encoder when this parameter is highlighted and then turn the encoder to change frequency value. When the encoder is pressed to store the new frequency setting, the software will prompt for a confirmation (“Are you sure?”). Highlight “Yes” and press the encoder to confirm the new frequency setting or select “No” to abandon change. Value “0M” near the MHz indication identifies the current frequency selection (set from menu “ExFrq”) in the event the frequency switching feature is on (switching occurs based on the voltage present at connector DB15).
- Att** Gain set at audio inputs.

6.2.2.2 RF Amplifier

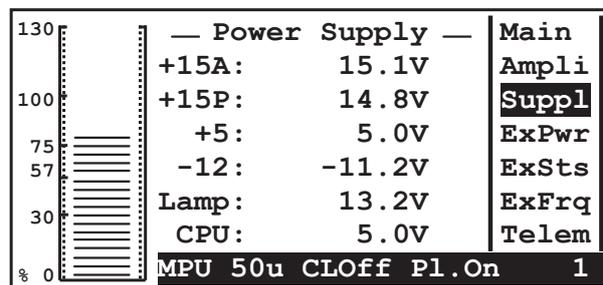
This is an information screen; it shows amplifier voltage, current and temperature values, which cannot be modified.



- IN.V Power supply input voltage.
- PA.V Voltage applied to final stage of amplifier.
- PA.I Current applied to final stage of amplifier.
- TEMP Amplifier module temperature.
- VVCO Voltage applied to VCO section.

6.2.2.3 Power Supply

This is an information screen showing the different voltages supplied by the amplifier:

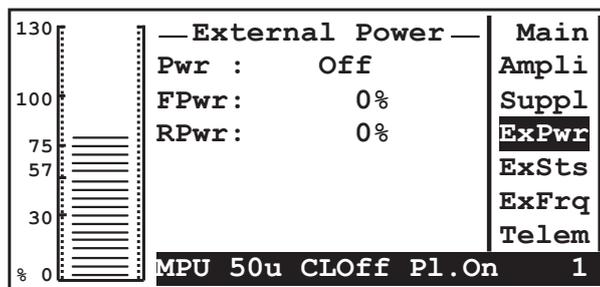


- +15A Main supply voltage to audio, pll, coder circuits; it is reduced to 8 Volts on the MAIN AUDIO BOARD.
- +15P Supply voltage to control logic panel.
- +5 Voltage in power supply digital circuits.
- 12 Negative voltage of main power supply.
- LAMP Display lamp supply voltage; typically, 13 Volts.
- CPU CPU supply voltage.

6.2.2.4 External Power

External amplifier control menu.

This menu may or may not be available, depending on machine jumper settings. Use of this menu requires certain power amplifier features (amplifier may be turned on and off by opening a contact and is capable of providing proportional voltages to forward and reflected power).



PWR Status indicator, command relates to the PTX-LCDDSP mode (MAIN menu).

FPWR Forward power supplied by external amplifier expressed in percent. You can adjust the trimmer FWD of power supply module, and externally accessible from rear panel, to be displayed properly on the screen of 100%.

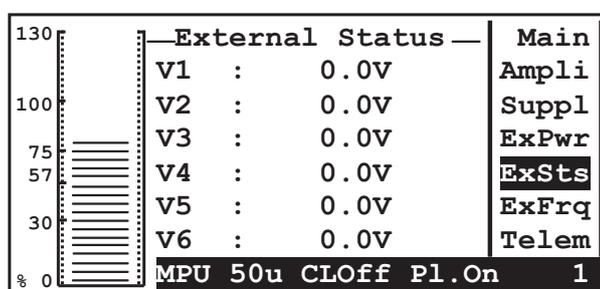
E' possibile regolare il trimmer FWD del modulo alimentatore, ed accessibile esternamente dal pannello posteriore, per avere una corretta visualizzazione a video del 100%.

RPWR Reflected power supplied by external amplifier expressed in percent. E' possibile regolare il trimmer RFL del modulo alimentatore, ed accessibile esternamente dal pannello posteriore, per avere una corretta visualizzazione a video del 100%.

6.2.2.5 External Status

Monitoring menu for input voltages from a telemetry-equipped equipment.

This menu may or may not be available, depending on machine jumper settings.

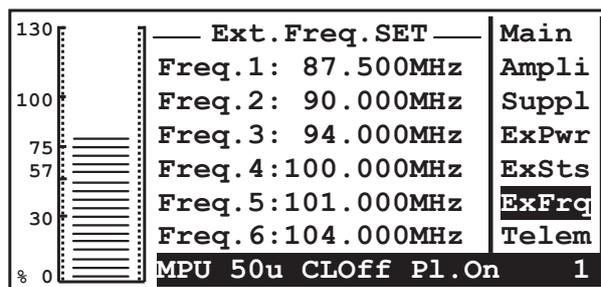


- V1 Input voltage at pin 6 of REMOTE connector expressed in Volts (max 5 Volts).
- V2 Input voltage at pin 13 of REMOTE connector expressed in Volts (max 5 Volts).
- V3 Input voltage at pin 5 of REMOTE connector expressed in Volts (max 5 Volts).
- V4 Input voltage at pin 12 of REMOTE connector expressed in Volts (max 5 Volts).
- V5 Input voltage at pin 4 of REMOTE connector expressed in Volts (max 5 Volts).
- V6 Input voltage at pin 11 of REMOTE connector expressed in Volts (max 5 Volts).

6.2.2.6 Ext. Freq. SET

Frequency switching menu, switching is based on voltage present in previous menu.

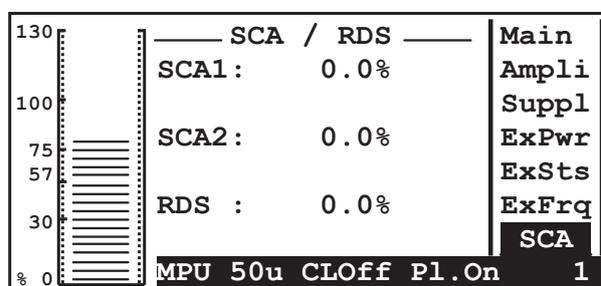
This menu may or may not be available, depending on machine jumper settings.



- Freq 1 Default service frequency.
- Freq 2-6 Service frequencies of transmitters 2-6.

6.2.2.7 SCA / RDS

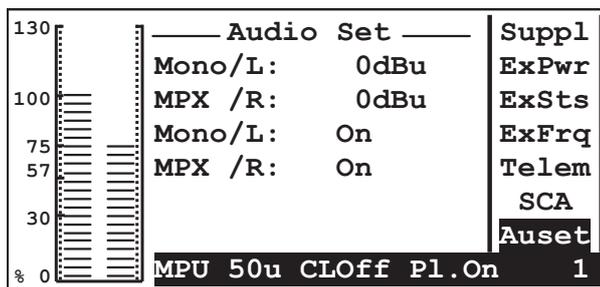
This menu shows the modulation levels achieved by the SCA and RDS inputs in the PTX-LCDDSP.



The PTX-LCDDSP has three subcarrier transmission inputs named SCA1, SCA2 and RDS. This menu shows the modulation level achieved by each input both in kHz and in percent.

6.2.2.8 Audio Set

Audio settings: channels on/off and level adjustment.



MONO/L

Setting of audio input level on MONO channel (left channel if stereo version). It is adjusted in 1 dBu steps in a -13 to +14 dBu range. If parameter is set to X dBmu, the system generates a 75 kHz deviation for an X dBu input.

MPX/R Setting of audio input level on MPX channel (right channel if stereo version). It is adjusted in 1 dBu steps in a -13 to +14 dBu range. Set level has the same meaning as for the first channel.

MONO/L

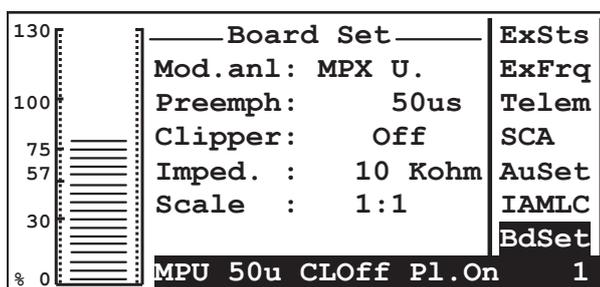
Software switch to set MONO channel On / Off (left channel if stereo version).

MPX/R Software switch to set MPX channel On / Off (right channel if stereo version).

When the exciter is placed in STEREO mode from the BdSet menu (for stereo version), the same level adjustment is forced on both channels.

6.2.2.9 BoardSet

Modulation mode configuration.



Mode Transmission mode selector: MONO, MPX_U (unbalanced MPX BNC input), MBX_B (balanced MPX XLR input), STEREO. The latter option is only enabled on the version with stereo coder.

Preemph

Preemphasis setting, 0, 25, 50 or 75 us. Preemphasis affects the right and left inputs in stereo mode and the mono input. MPX inputs are not affected by preemphasis setting.

Clipper

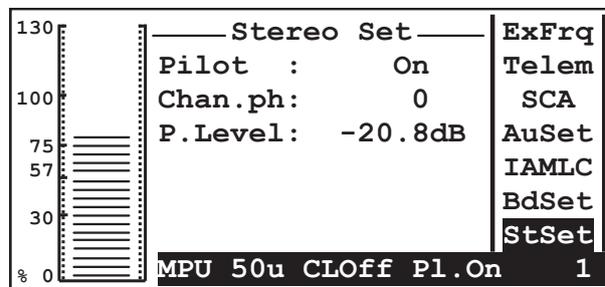
Deviation limiter enable/disable. Limits deviation to 81.5 kHz for input levels 6 dB greater than input reference (main menu).

Imped Impedance of balance audio inputs; setting possibilities are 600 or 10k Ohm.

Scale Modulation level graphic scale ratio. It can be set to 1:1 (standard scale) or 1:10 (magnified 10 times, convenient when evaluating modulation for low input levels).

6.2.2.10 Stereo Set

Configuration menu for stereo coder card.



Pilot Add/remove pilot tone (convenient for some types of measurements).

Chan.ph

Right channel phase, may be 0 or 180 (signal reversal, convenient when measuring “Sub to Main”).

P.Level

Pilot tone phase adjustment from -32.8dB to -7.3 dB (only available if PTX-LCD has the optional TRDSP card installed).

6.2.2.11 Alarm Config

Telemetry and remote alarm reporting management menu.

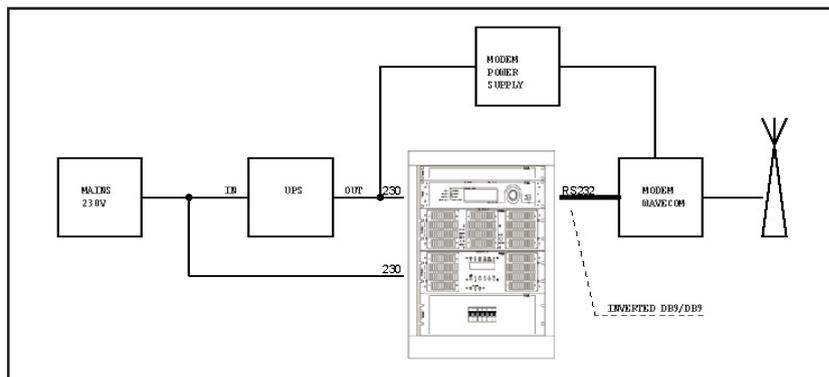


Note: Before accessing edit mode for the different parameters, ensure that the machine has been placed into “LOCAL” mode from the General Set menu, or you will keep getting alarm messages during the whole setting procedure. When finished, place machine back into “REMOTE” mode to activate remote alarm reporting.

FWD Setting of the PTX-LCDDSP forward power alarm. Alarm is triggered when output power drops below the set percent threshold for the set time (expressed in seconds).

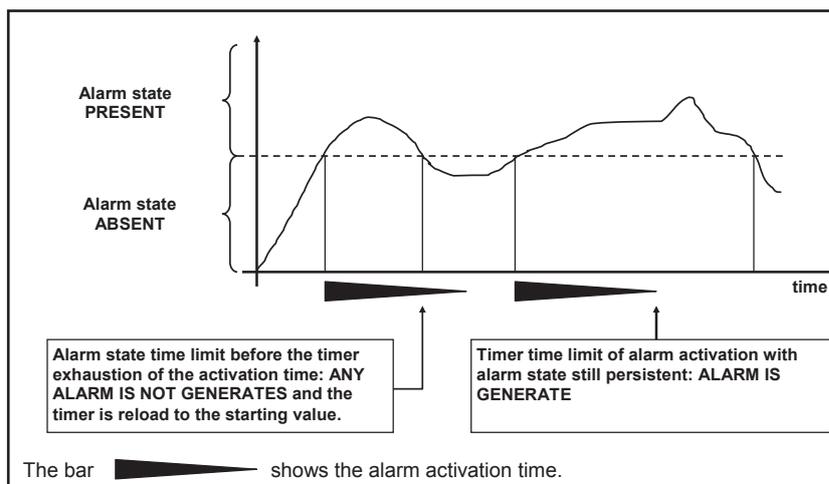
RFL Setting of the PTX-LCDDSP reflected power alarm. Alarm is triggered when output power rises above the set percent threshold for the set time (expressed in seconds).

- E . FWD Setting of external exciter forward power alarm. Alarm is triggered when output power drops below the set percent threshold for the set time (expressed in seconds).
- E . RFL Setting of external exciter reflected power alarm. Alarm is triggered when output power rises above the set percent threshold for the set time (expressed in seconds).
- AUDIO Alarm setting for audio input signal to the PTX-LCDDSP. Alarm is triggered for the set time.
- MAINS To handle MAINS alarm, attach jumper no. 10 to JP8 on the PTX panel board and move the jumpers at JP6 on the power supply card from positions 3-5 and 4-6 to 1-3 and 2-4. Provide an auxiliary power supply source for the PTX-LCDDSP through a generating set, a UPS unit or through the 24V power supply terminals (if available on the PTX-LCDDSP) for the event of mains outage. Shown below is a hookup diagram for an R.V.R. station, where the PTX-LCDDSP is configured to handle MAINS alarm.



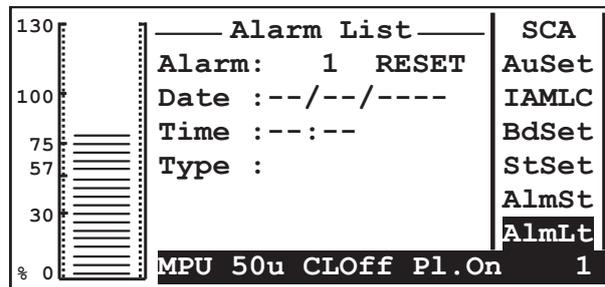
The MAINS alarms is triggered when mains outage duration equals set time.

Shown below is the operating logic of an alarm:



6.2.2.12 Alarm List

Triggered alarms are stored in a non volatile memory and the six events occurred last can be viewed in the “Alarm List” menu.



ALARM Display of stored alarm number. Select one of the six alarms as follows: select number and choose from the list of alarms 1 ... 6 using the encoder. Again using the encoder, move cursor to “RESET” and confirm reset operation to clear all stored events.

DATE Display of alarm record date.

TIME Display of alarm record time.

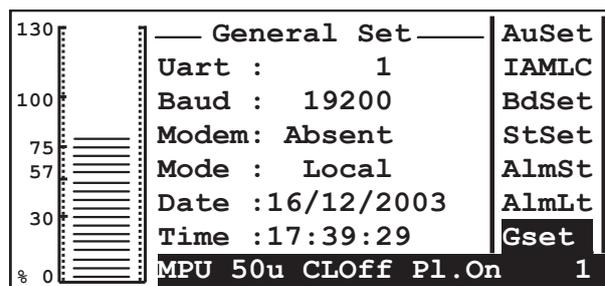
TYPE Display of stored alarm type.



Note: On start-up, the PTX-LCDDSP inhibits alarm reporting for a preset time selected at parameter “StartUp Time” (default setting is 60 seconds); after this delay times out, an INFO SMS on the PTX-LCDDSP operation state is transmitted. The “StartUp Time” delay also applies to MAINS alarm; on start-up, the PTX-LCDDSP will wait for the set time before sending an INFO SMS.

6.2.2.13 General Set

General Setup Menu.



Uart Adr

IIC address of the PTX-LCDDSP, selectable from 1 to 200. Unless the exciter is part of a transmission system (for example, N+1), this address must be to 1.

Baud Rate

Baud rate setting for the PTX-LCD serial port data transfer.

MODEM Configures machine to use a modem (Present), for direct cable connection, (Absent), GSM and Pager.

MODE Local: The machine will not accept changes to parameters from external devices. Remote: Enables remote setting of machine parameters.

6.2.2.14 Information

This menu provides general information on the exciter.

```

130 |----- Information -----| StSet
    | Rel.: 03051300           | AlmSt
    | Date:06/12/2004        | AlmLt
    | Table default          | Gset
    | N.ID:      001         | TrDsp
    | Station Name:         | IsoFr
    | RVR                   | Info
    | MPU 50u CLOff Pl.On  | 1
    % 0
    
```

Rel Exciter software release information.

Date Software Release date.

N.ID Identifier used when system is made up of several machines; it may be modified using the TELECON software (please read relevant manual for more details).

Station Name

Name of the station the machine is part of; station name may be modified using the TELECON software (please read relevant manual for more details).

6.2.2.15 Modem

This menu lets you view modem configuration state.

```

130 |----- Modem Config -----| ALmSt
    | Lvl: 0 F.01            | AlmLt
    | Name:-----          | Gset
    | +39333666             | TrDsp
    | Retry: 0 SMS: 0       | IsoFr
    | Dial :ATDT            | Info
    |                       | Modem
    | MPU 50u CLOff Pl.On  | 1
    % 0
    
```

Lvl Signal level indication. Modem state is reported at the side: ST.BY (Stand by), CKSMS (Check SMS), TXSMS (Transmission SMS).

Name Name of SIM card service provider. The value right below the name is the set service centre number.

Retry SMS transmission attempts indication.

SMS Maximum number of SMS's the SIM card can store.

Dial Type of initialisation string used by Modem.

6.2.2.16 Telephone

This menu displays the first six of ten preset telephone numbers to which an SMS message is to be sent in the event of an alarm.

130	— Telephone N. —	ALmLt
	Num1 : +39333666	Gset
100	Num2 :	TrDsp
	Num3 :	IsoFr
75	Num4 :	Info
57	Num5 :	Modem
30	Num6 :	Tel.N
% 0	MPU 50u CLOff Pl.On	1

6.2.2.17 TrDsp

Optional TrDsp card setup menu.

130	— TrDsp Board —	IAMLC
	Delay : 0 0	BdSet
100	TotDly: 0,000us	StSet
	Audio :Auto	AlmSt
75	DigLvl: -10dBfs	AlmLt
57	SCA :Off	Gset
30	RDS :Off	TrDsp
% 0	MPU 50u CLOff Pl.On	1

Delay Signal time delay setting, when used for isofrequency applications with poor step adjustment. The setting range for the first parameter is from 0 to 1900 steps of 5,25 μ s each. The second parameter range is from 0 to 127 steps of 0,05 μ s. The maximum time delay that can be set is 5.47 milliseconds. The actual time delay set is shown under item "Totdly"; it is expressed in microseconds up to a maximum value of 9981,35 μ s.

If PTX-LCDDSP is interfaced with a GSM modem, parameter DELAY can be set via SMS.

Two SMS commands are available: DELAY and STEP. DELAY is used to set delay in microseconds. For example, message "DELAY 624" would set delay to 624 μ s (with some minor approximation). STEP is used to make corrections in steps of 0.05 ms each (+ or -). For example, message "STEP +10" adds 0.5 μ s to the time delay set previously, giving 624.5 μ s. The PTX- LCDDSP sends back an SMS message that contains total time delay set, for example "Total Delay Set: 624.5 μ s".

TELECON adds two items to the "General" window: "Delay 1" and "Delay 2 ". They can be adjusted in steps; meaning is as outlined above.

Audio Input channel mode selection; possible options are digital, analogue or automatic mode.

DigLvl

Digital audio input level setting. It can be adjusted in 1 dBm steps from 0 to -10 dBfs.

SCA Software switch to enable or disable the SCA inputs of the RDS coder.

RDS Software switch to enable or disable the RDS coder.

6.2.2.18 I.T.U.

I.T.U. and A.G.C. (Automatic Gain Control) feature setup menu.

130	ITU/AGC	BdSet
	ITU :On	StSet
100	AGC :Off	AlmSt
75	MPX min: 0dB	AlmLt
57	MPX max: 0dB	Gset
30	L/R min: 0dB	TrDsp
	L/R max: 0dB	I.T.U
% 0	MPU 50u CLOff Pl.On	1

ITU Enables automatic reduction of signal modulation energy according to standard I.T.U. 412. This feature is always given priority over the A.G.C. feature.

AGC Mean operation time for Automatic Gain Control. Available options are "OFF", "SLOW", "MIDDLE" and "FAST" mode.

MPX min

Minimum audio level operation threshold in the MPX mode; A.G.C. kicks in when threshold is exceeded; range is 0 to -4 dB.

MPX man

Maximum audio level operation threshold in the MPX mode; A.G.C. kicks in when threshold is exceeded; range is 0 to +4 dB.

L/R min

Minimum audio level operation threshold in the Mono/Stereo mode; A.G.C. kicks in when threshold is exceeded; range is 0 to -12 dB.

L/R min

Maximum audio level operation threshold in the Mono/Stereo mode; A.G.C. kicks in when threshold is exceeded; range is 0 to +12 dB.

6.2.2.19 Isofreq

Setup menu for PTX-LCDDSP isofrequency mode operating parameters.

TrDsp IsoFreq		StSet
TrDsp t.act:	0min	AlmSt
TrDsp t.rec:	0min	AlmLt
Fault t.act:	0min	Gset
Fault t.rec:	0s	TrDsp
% pwr.out :	0%	I.T.U
1 p.p.s:	Present	IsoFr
MPU 50u	CLOff	Pl.On
		1

TrDsp t.act

Hysteresis setting for automatic power reduction activation, adjustable from 0 to 120minutes. After the set time has elapsed, power is reduced by the specified percent. The timer starts counting the sync loss reported by the TRDSP card; this feature activates when sync loss duration exceeds set time.

TrDsp t.rec

Power restore hysteresis time setting, can be adjusted from 0 to 120 minutes. Principle of operation is as described above; when back in sync, PTX-LCDDSP goes back to delivering the same output power as before reduction.

Fault t.act

Hysteresis setting for automatic power reduction activation, can be adjusted from 0 to 6 hours in 6 min. steps. After the set time, power is reduced by the specified percent. The timer starts counting the sync loss caused by an external "FAULT" indication (e.g.: problems with GPS antenna, etc.), which must persist longer than set time in order for the related feature to activate. Fault signal is provided by PIN4 of the telemetry DB15 connector.

Fault t.rec

Power restore hysteresis time setting, can be adjusted from 0 to 6 hours. Principle of operation is as described above; when back in sync, the PTX-LCDDSP goes back to delivering the same output power as before reduction.

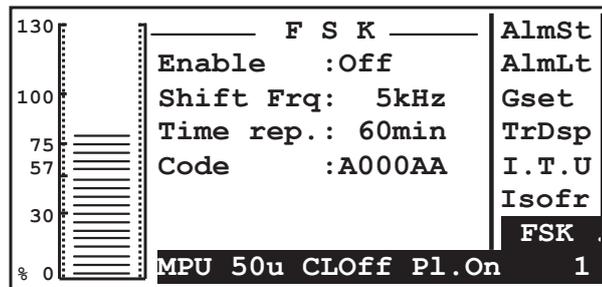
% pwr.out

Power reduction percent of power set in menu "RF Status" under item FPwr. For example, if % pwr.out is set to 50%, and item FPwr in "RF Status" menu is set to 30% of power output, resulting output is 15%.

These parameters can also be set using the “Telecon” software. If power reduction occurs when “low FWD Power” alarm is active, an SMS message that reads “ALARM: low FWD power - Out of Sync” is transmitted.

6.2.2.18 FSK

The PTX-LCDDSP operating parameter setup menu for FSK signalling, in which a Morse-coded 6-character alphanumeric code is sent at regular intervals using transmission frequency shift.



Enable

Enables / disable the FSK feature.

Shift Frq

Frequency shift with respect to carrier, can be adjusted from 5 to 25 KHz.

Time rep.

Repetition time for Morse code transmission, can be adjusted from 0 to 240 minutes.

Code

Morse Code sended (composed from a character, three figures and two characters).

7. Interrogazione sullo Stato del Sistema

The exciter is controlled by a microprocessor system. The software operations can be distinguished at startup and during regime.

7.1 Local enquires

Locally, PTX-LCDDSP provides status indications through the front panel lights, whereas more detailed information is available in the setup and configuration menu.

7.2 Remote enquiries using remote control software

Using a PC with the “TELECON” telemetry and remote control software installed, the user can get an accurate picture of all system operating parameters and all device settings (including connected equipments).

7.3 Remote enquiries using GSM modem+SMS

Thanks to this system, equipments can be enquired using a common GSM phone; possible equipment responses are listed in the tables included in the following paragraphs.

Before enquiring the system using SMS messages, establish a connection using the “TELECON” programme and set the provider service centre number and the telephone numbers authorized to send these commands to the equipments.

7.3.1 List of supported commands that can be sent via SMS

- These commands can be sent to the PTX-LCDDSP:

STANDARD

INFO	Information sent on the system operating state
TXON	“OnAir” PTX-LCDDSP Switch On
TXOFF	“OnAir” PTX-LCDDSP Switch Off
ALARM	Information sent on the alarms present into PTX-LCDDSP list
RESET	Reset of all stored alarms.
RESMOD	Reset of GSM modem and all SMS present into SIM.

TRDSP E ISOFREQUENCY OPT.

DELAY xxxxx	TRDSP card delay setting. xxxxx is equivalent to the forward regulation of the delay expressed in μ s, between 0 and 10 ms.
STEP +/-xx	Fine setting of the TRDSP card delay, in adding (+) or in reduction (-). xx are the regulation steps, between 0 and 20, equivalent to 0,05 μ s each.
PH +/-	Phase setting: (+) normalized, (-) inverted.

- Example of the PTX-LCDDSP response to received SMS enquires:

STANDARD

INFO	001- TestStation =Pwr On,FWD: 12.5W,RFL: 0.1W,ExFWD: 50%, ExRFL: 1%,Frq: 88.520 MHz,Audio Present,GSM lvl=-77,MAINS Present
TXON	001- TestStation =ON Command
TXOFF	001- TestStation =OFF Command
ALARM	001- TestStation =Tot 1/6 -Alarm 02u= 11/02/2004,11:43,Low FWD Power
RESET	Alarm Reset
RESMOD	Reset Modem

TRDSP AND ISOFREQUENZA OPT.

DELAY 624	001-TestStation=Total Delay Set: 624,00 us
STEP +10	001-TestStation =Total Delay Set: 624,50 us
PH +/-	(+) Normalized phase; (-) Inverted phase



Note: The *DELAY* and *STEP* commands are only available if the optional *TRDSP* card is installed.



Note: For *PTX-LCDDSP* to actually process the reply or requested command, the *GSM* number used to send the request must be stored in the list of numbers set in *PTX-LCDDSP*. This does not apply to *INFO* SMS messages; *PTX-LCDDSP* will answer regardless of whether the originating number is registered or not.

8. Factory Settings

Each time a change is made to a PTX-LCDDSP parameter, the new setting is added to machine configuration information, which is stored in a non-volatile memory area. On switch on, the exciter will retain the same configuration it had been using before the last switch off.

At the factory, the exciter may be set to meet application-specific requirements (for example, when the customer specifies operating frequency and mode of operation of the system the exciter is to be incorporated into on order), or to a preset configuration.

The PTX-LCDDSP preset configuration is determined by the position of a set of jumpers located inside the machine. When the exciter is switched on, the name of the selected preset configuration appears on the display.

Possible configurations are as follows:

CCIR

Parameter	Menu	Value
Power Output	Preset	On
Minimum frequency	/	87.5 MHz
Maximum frequency	/	108.0 MHz
Frequency step	/	10 kHz
Preset frequencies	Admin-ExFrq	87.5, 90.0, 92.0, 94.0, 96.0, 98.0, 100.0, 102.0, 104.0, 106.0 MHz
Power	Preset	0 %
Input level Mono/L	Admin->AuSet->Mono/L X dBm	0 dBm
Input level MPX/R	Admin->AuSet->MPX/R X dBm	0 dBm
Input state Mono/L	Admin->AuSet->Mono/L X dBm	On
Input state MPX/R	Admin->AuSet->MPX/R	On
Preemphasis	Admin->BdSet->Preemph	50 ms
Clipper	Admin->BdSet->Clipper	Off
Mode of operation	Admin->BdSet->Mode	Stereo (if stereo coder is present) MPX (if stereo coder is not present)
Pilot tone	Admin->StSet->Pilot	On (if stereo coder is present)
Phase difference btw Ch.	Admin->StSet->Chan	0 (if stereo coder is present)

FCC

Same as CCIR, except:

Parameter	Menu	Value
Preemphasis	Admin->BdSet->Preenph	75 ms
Mode of operation	Admin->BdSet->Mode	Stereo (if stereo coder is present) Mono (if stereo coder is not present)

OIRT

Same as CCIR, except:

Parameter	Menu	Value
Minimum frequency	/	66.0 MHz
Maximum frequency	/	74.0 MHz
Preset frequencies	Admin-ExFrq	66.0, 67.00, 68.00, 68.00, 69.00, 70.00, 71.00, 72.00, 73.00, 74.00 MHz
Mode of operation	Admin->BdSet->Mode	Stereo (if stereo coder is present) Mono (if stereo coder is not present)

JAPAN

Same as CCIR, except:

Parameter	Menu	Value
Minimum frequency	/	76.0 MHz
Maximum frequency	/	90.0 MHz
Preset frequencies	Admin-ExFrq	76.0, 78.0, 80.0, 82.0, 83.0, 84.0, 85.0, 86.0, 88.0, 90.0 MHz
Mode of operation	Admin->BdSet->Mode	Stereo (if stereo coder is present) Mono (if stereo coder is not present)

ITALY

Same as CCIR, except:

Parameter	Menu	Value
Minimum frequency	/	87.6 MHz
Maximum frequency	/	107.9 MHz
Frequency step	/	100 kHz
Preset frequencies	Admin-ExFrq	87.6, 90.0, 92.0, 94.0, 96.0, 98.0, 100.0, 102.0, 104.0, 106.0 MHz
Clipper	Admin->BdSet->Preenph	On
Mode of Operation	Admin->BdSet->Mode	Stereo (if stereo coder is present) Mono (if stereo coder is not present)

C.S.I

Same as CCIR, except:

Parameter	Menu	Value
Minimum frequency	/	100.0 MHz
Maximum frequency	/	108.0 MHz
Preset frequencies	Admin-ExFrq	100.0, 100.5, 100.1, 101.5, 102.0, 103.0, 104.0, 105.0, 106.0, 108.0 MHz

CHINA

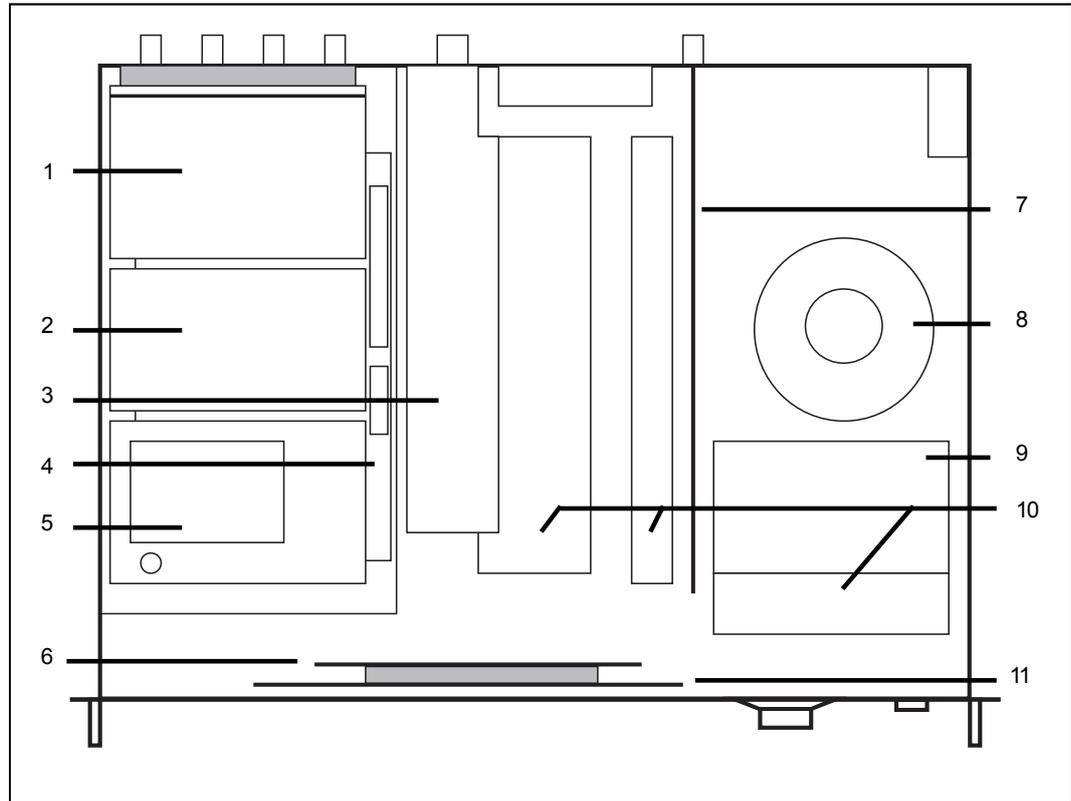
Same as CCIR, except:

Parameter	Menu	Value
Minimum frequency	/	87.0 MHz
Maximum frequency	/	108.0 MHz
Preset frequencies	Admin-ExFrq	87.5, 90.0, 92.0, 94.0, 96.0, 98.0, 100.0, 102.0, 104.0, 106.0 MHz

9. Identification and access to the modules

9.1 Modules identification

The figure shows a top view of machine inner components. Component descriptions are listed below.



- [1] TRDSP card
- [2] TRDSPcard
- [3] RF power amplifier
- [4] Audio mainboard
- [5] PLL & VCO card
- [6] CPU Section (CPU Interface + 16Bit CPU card)
- [7] Power supply
- [8] Transformer
- [9] Switching power supply
- [10] Cooling fins
- [11] Panel card - display

9.2 Access to the modules

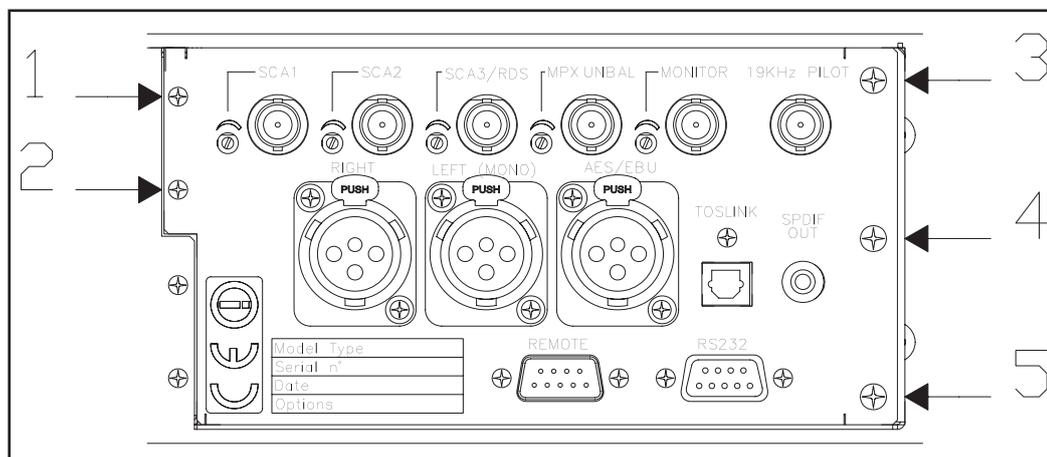


Warning: *Dangerous voltages or currents inside! Be careful when opening the device. Always disconnect power supply before removing the covers or any device component.*

Remove all screws on the top cover of the machine. Remove the cover and refer to the block diagram to identify and locate all exciter components.

To remove the (stereo or mono) coder and PLL cards, simply undo the hexagon nuts that secure the cards over the stud bolts. Both cards have strip connectors at the bottom and these connectors are coupled to the audio mainboard.

To remove the audio input card (which is secured to the audio connector card and to the right side of the exciter rear panel), undo the four nuts that retain the card to the audio mainboard stud bolts and then remove the five screws on the rear panel and the three bottom screws that retain the connector support.



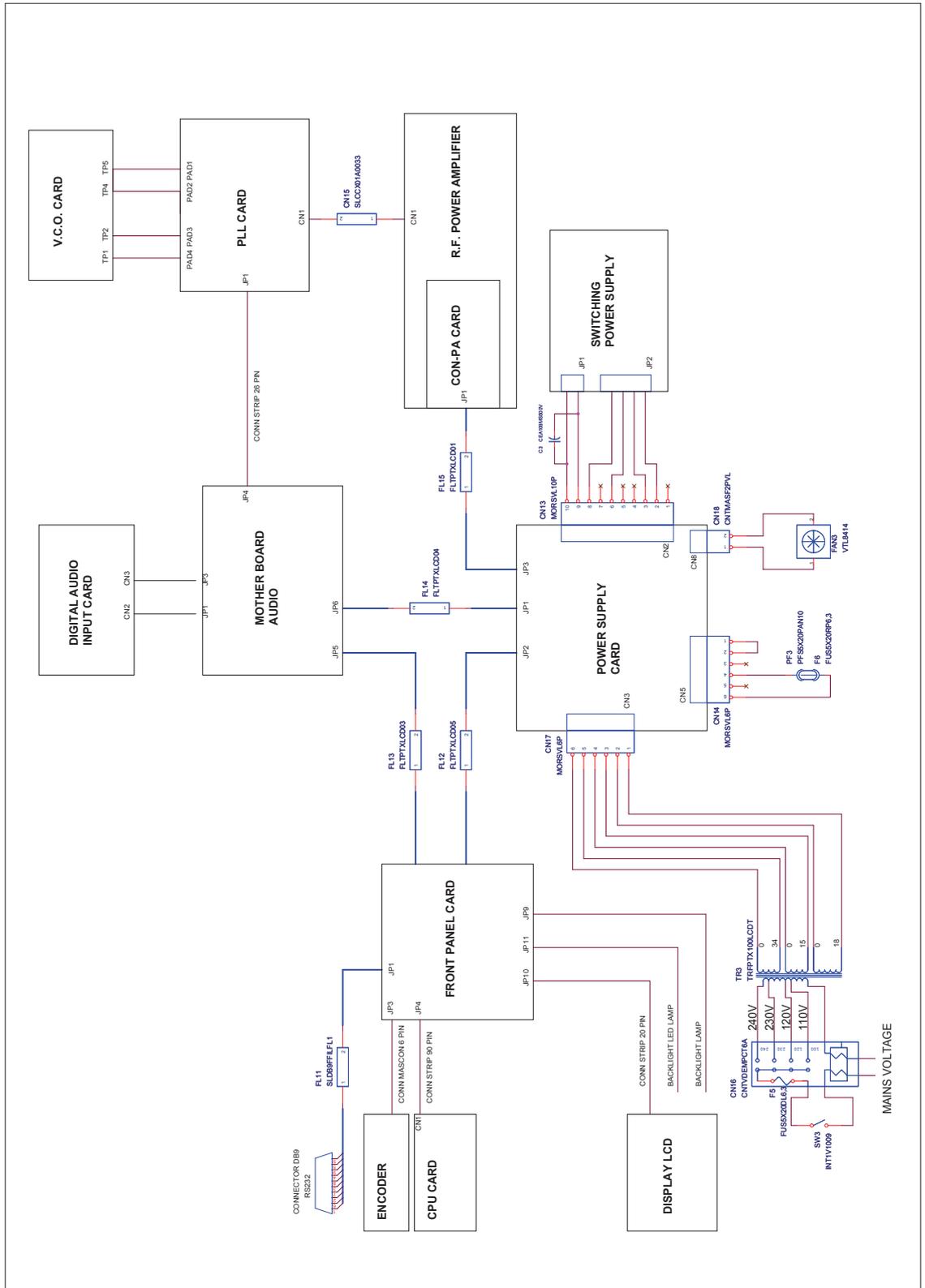
The RF power amplifier is secured to its cooling fin and is held in position by three screws located on exciter bottom. The screws hold the fin in place; remove these screws to release the amplifier.

Power supply and switching power supply use the same fastening system and can be released by removing the screws that secure the fins to machine bottom. Note, however, that the interlock connector soldered to the power supply is retained to the rear panel by a nut, and you will need to undo this nut before you can remove the power supply.

The panel card and the CPU card are held in place by nuts screwed onto the stud bolts. Detach the front panel from the box before removing these cards.

10. Operating principles

The figure below provides an overview of the PTX-LCDDSP modules and connections..

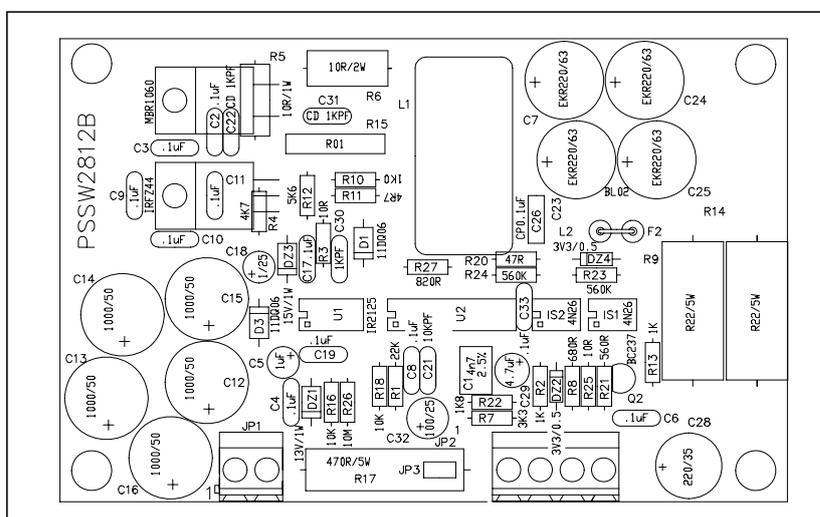


Following is a brief description of the different module functions.

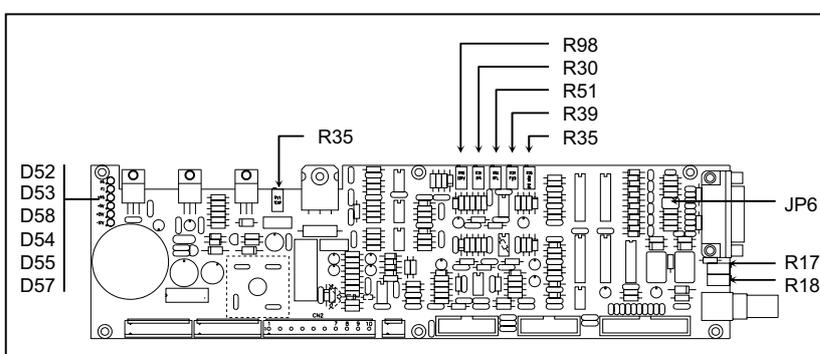
10.1 Power Supply

There are two separate power supply sections.

A first section provides power supply for power final stage. It consists in a switching power supply unit mounted on a cooling fin.



The second section consists in a card mounted on a heat sink located centrally in the machine. This card accommodates the power supply that feeds the different machine cards (audio, CPU...), a section that handles analogue inputs from the "Remote" connector and the automatic power level control system.



10.1.1 Adjustments, settings and indicators

While the switching power supply requires no adjustments, the power supply card accommodates several indicators and adjustable components.

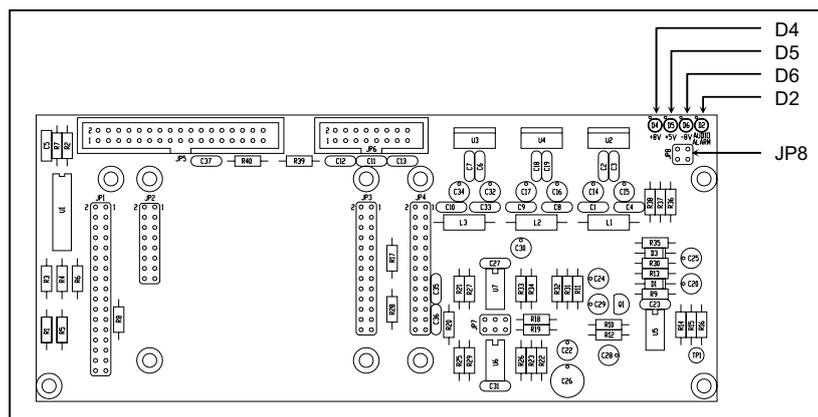
- D52 on: power amplifier fuse fault
- D53 on: fuse PF1 fault
- D54 on: +5V present
- D55 on: +15V present
- D57 on: -12V present
- D58 on: supply voltage present at power supply section.
- R35 temperature measure setting
- R17 level adjustment for external AGC

- R18 level adjustment for external AGC
- R30 PA current measurement adjustment
- R35 PA maximum current adjustment
- R39 Forward power measurement adjustment
- R51 Reflected power measurement adjustment
- R98 Driver current measurement adjustment
- JP6 1-3, 2-4 the pins on the remote connector are used as analogue inputs.
3-5, 4-6 the pins on the remote connector are used for IIC communication.

10.2 Audio mainboard

This board provides an interface between audio section and PPL cards and the remaining exciter cards. The audio mainboard is secured to the left bottom section of the machine. The other cards are plugged to the connectors mounted on this board.

This module includes the circuit that mixes MPX signals and SCA/RDS subcarriers.



10.2.1 Adjustments, settings and indicators

- D2 On: audio missing alarm
- D4 On: voltage present
- D5 On: voltage present
- D6 On: voltage present
- JP8 Factory setting - do not alter

10.3 PLL/Driver card & VCO Card

The PLL/Driver card is located on the left side of the PTX-LCDDSP and is plugged into the audio mainboard.

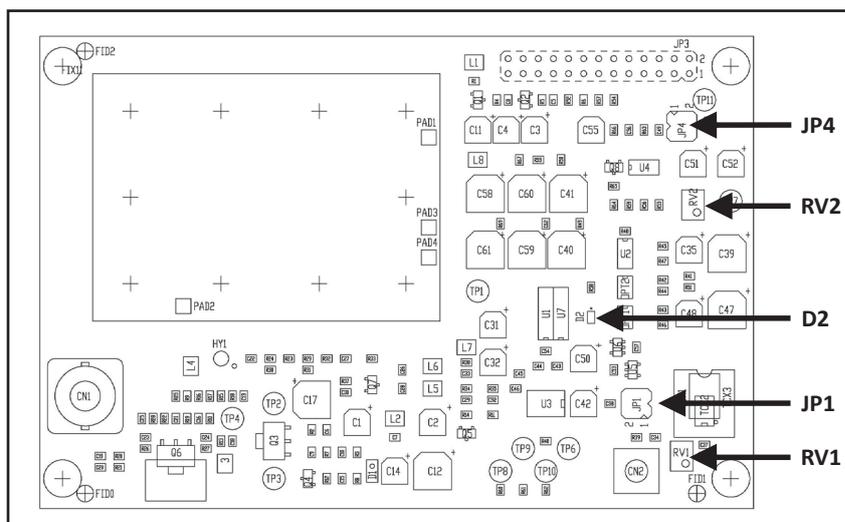
The digital PLL module consists of a high-stability oscillator with temperature control and a digital circuit that divides and compares operating frequency. The oscillator generates a 10 Mhz frequency that is divided to give a fixed 1 kHz signal.

This signal is sent to the digital comparator/divider circuit that compares it to the VCO output signal, which has been divided according to exciter operating frequency.

The comparator AFC output signal is sent to the varicap diodes mounted on the VCO card and added to the audio signal provided by the Coder card.

The Voltage Controlled Oscillator (VCO) generates the signal on exciter operating frequency; this signal is amplified up to about 300mW (25dBm), which is the necessary level to pilot the R.F. Power Amplifier block.

Note: The VCO card is housed in a nickel silver brass box secured to the PLL & Driver card.



10.3.1 Adjustments, settings and indicators

- D2 On: PLL not locked
- RV1 Frequency adjustment
- RV2 Deviation adjustment
- JP1 1-2 exchanger between internal reference and 10 MHz external input in equipments with SFN option
- JP4 Factory setting - do not alter

10.4 Power amplifier

The power amplifier is available in 30W, 50/60/100W and 150W.

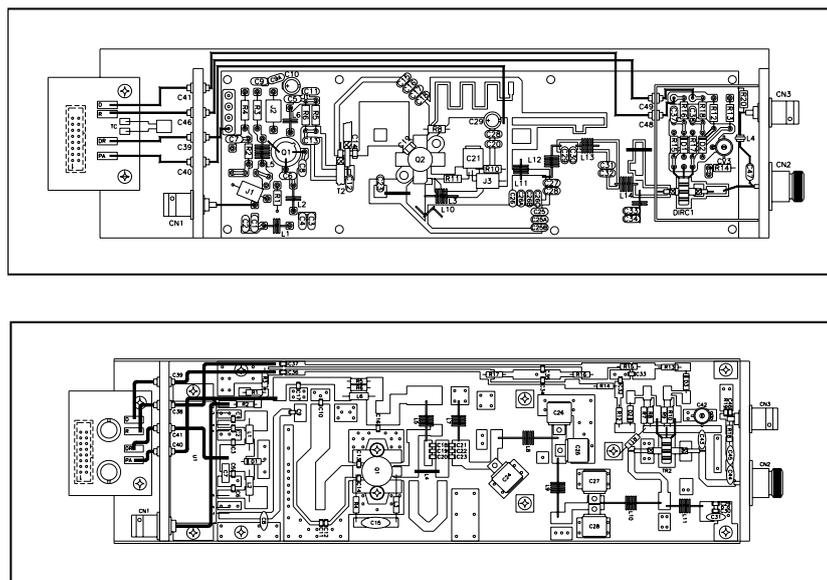
Final power stage is secured to a heat-sink fin in the centre of the device and housed in a fully shielded metal enclosure secured to the central section of the equipment.

The R.F. signal from the PLL/DRIVER CARD, which is about 200mW, reaches the pilot, is amplified by an intermediate stage and sent to the final stage which provides to the last amplification.

The resulting signal is filtered by a low-pass filter to remove harmonic components.

A directional coupler located inside the final stage measures forward and reflected power of the load and sends the relating signals to the power supply for verification.

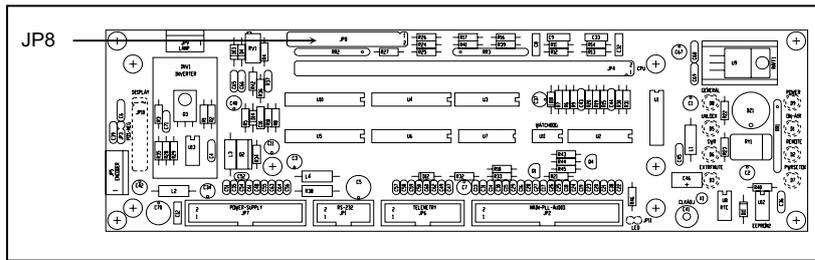
A -30dBc level output for output power is available on a BNC connector located on the rear panel, under the transmitter output connector.



10.5 Panel Card

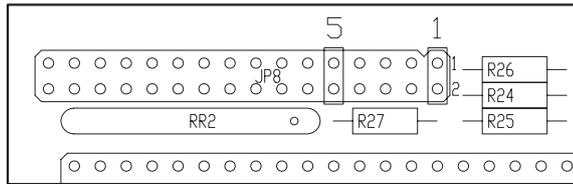
This card is located in the front end of the device and provides an interface between the CPU card and the remaining PTX-LCDDSP cards.

This card handles all signals from/to LCD, Encoder, LED Indicators, Power Supply Card, Audio Mainboard and external telemetry card, in other words, all input/output signals of the CPU card.



10.5.1 Adjustments, settings and indicators

JP8 Position of panel card jumpers.



The software denotes jumper positions as follows (1 signifies a closed jumper, 0 open jumper, X jumper not necessary for this type of configuration):

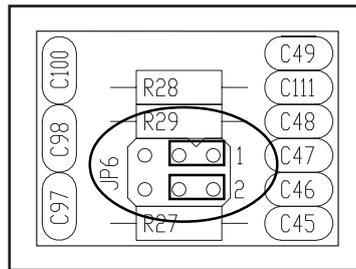
Jump 5	Jump 6	Jump 7	Jump 8	Jump 9	Jump 10	Jump 11	Jump 12	Jump 13	Jump 14	Significato
0	0	X	X	X	X	X	X	X	X	Menu ExPwr, ExSts e ExFrq disabilitati
1	0	X	X	X	X	X	X	X	X	Menu ExPwr e ExSts abilitati, ExFrq disabilitato
0	1	X	X	X	X	X	X	X	X	Menu ExPwr e ExSts disabilitati, ExFrq abilitato
1	1	X	X	X	X	X	X	X	X	Menu ExPwr, ExSts e ExFrq disabilitati
X	X	0	0	0	X	X	X	X	X	Parametri predefiniti per reset: CCIR per PLL a 10MHz
X	X	1	0	0	X	X	X	X	X	Parametri predefiniti per reset: FCC
X	X	0	1	0	X	X	X	X	X	Parametri predefiniti per reset: OIRT
X	X	1	1	0	X	X	X	X	X	Parametri predefiniti per reset: Giappone
X	X	0	0	1	X	X	X	X	X	Parametri predefiniti per reset: Italia
X	X	1	0	1	X	X	X	X	X	Parametri predefiniti per reset: CSI
X	X	0	1	1	X	X	X	X	X	Parametri predefiniti per reset: Cina
X	X	1	1	1	X	X	X	X	X	Parametri predefiniti per reset: FCC
X	X	X	X	X	1	X	X	X	X	Abilitazione allarme MAINS. NOTA: in questo caso è necessario spostare i due jumper dalle posizioni 3-5 e 4-6 nelle posizioni 1-3 e 2-4, del jumper JP6 della scheda alimentatore (vedi fig. sottostante)
X	X	X	X	X	X	1	X	X	X	Presenza scheda opzionale TRDSP
X	X	X	X	X	X	X	1	X	X	Quarzo a 13 MHz su scheda PLL
X	X	X	X	X	X	X	X	1	X	Presenza scheda opzionale Telemetria
X	X	X	X	X	X	X	X	X	1	Versione software SFN (solo per TRDSP)



NOTE: please never use the first three positions of the jumper, for A proper functioning of machine.

1) In case of ExFrq enabled is necessary to modify the jumper JP6 on power supply, as indicated in the following figure, in order to enabled the alternatives frequencies that shall be used when the exciter is used as backup in a N+1 system.

2) In case of MAINS alarm enabled is necessary to modify jumper the JP6 on power supply, as indicated in the following figure, in order to validate the activation of the alarm.



10.6 CPU board (16bit)

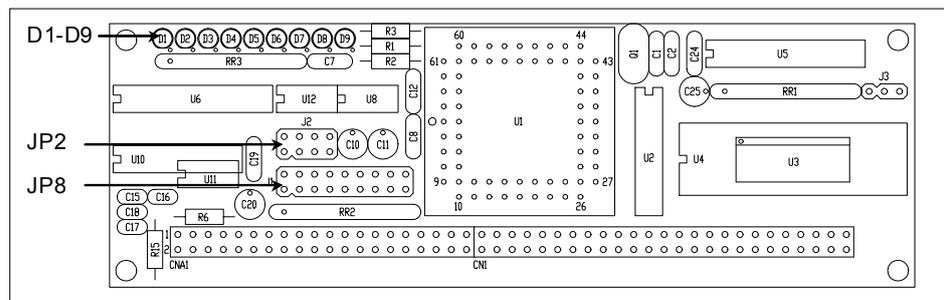
The CPU board is on the front part of the device, fixed to the panel board.

This board is the heart of the transmitter, since it manages and elaborates all the information coming from the other boards and possibly from other devices via the serial interface or the telemetry board.

The main characteristics of the CPU board are:

- **Microprocessor:** 90F5436
- **EPROM Memory size:** 1MBytes
- **Static RAM size:** 32KBytes
- **Communication Interface:** RS232-RS485 e I2C Bus
- **EEPROM size:** 2KBytes
- **Self-diagnosis LED:** 1 led rosso

The board requires no adjustment.



10.7 TRDSP card

Option TRDSP is a DSP-based digital circuit that performs the following tasks:

- input selection, level adjustment and processing (filtering and preemphasis)
- stereophonic coding
- RDS (Radio Data System) signal generation

The TRDSP accepts audio inputs in digital form (AES/EBU) or Left and Right analogue inputs that are immediately converted into digital format (A/D). A digital input is automatically selected when present, but analogue input selection can be forced with the appropriate software settings.

The MPX stereophonic signal (“Main”, “Sub” and 19 kHz subcarrier) is generated directly in digital form, starting with the Left and Right digital (or digitalised) channels.

The RDS is generated directly by DSP and then digitally added to the stereophonic audio signal. The messages transmitted by the RDS coder are programmed using a PC software supplied with the machine. It is also possible to disable the internal RDS coder and use an external coder.

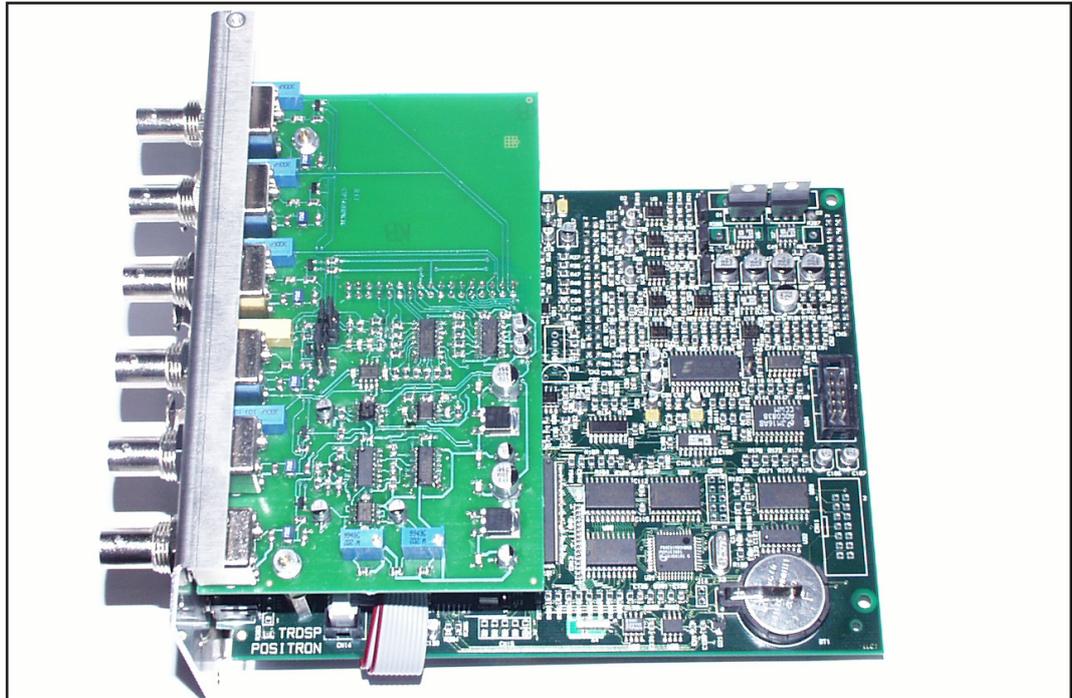
The TRDSP option includes two electronic cards and a support panel with the input and output connectors. This subassembly is installed into PTX-LCDDSP in place of the audio input and stereo coder sections (or Mono/MPX card). It can be easily retrofitted to standard PTX-LCDDSP exciters.

The key advantage offered by the TRDSP option is enhanced performance in terms of:

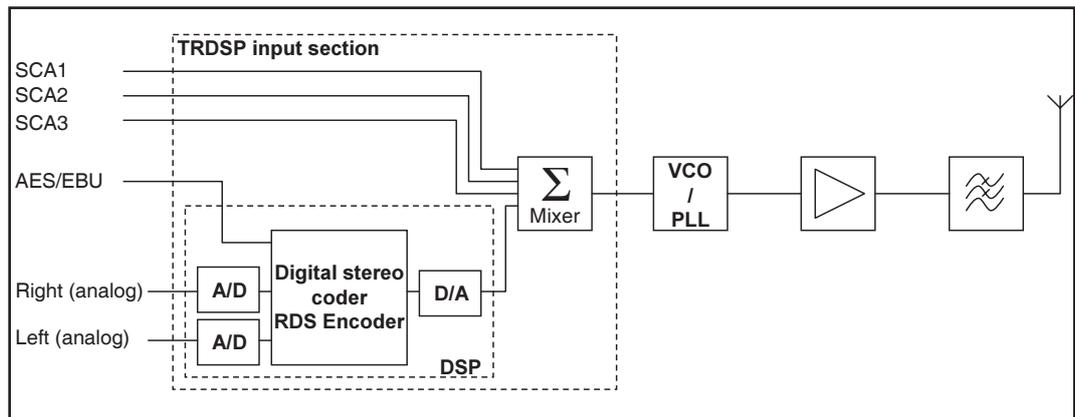
- Amplitude/frequency response (± 0.01 dB, 30 Hz - 15 kHz)
- Stereophonic separation (65 dB, 30 Hz - 15 kHz)
- Distortion (< 0.03%)

In addition, the digitally processed signal enables frequency deviation limitation while avoiding the distortion issues typically experienced with analogue clippers.

At TRDSP output, the total signal (MPX + RDS) is converted into analogue form (D/A) and passed on to the standard VCO/PLL section of PTX-LCDDSP.



The block diagrams of a standard PTX-LCD exciter and a PTX-LCD equipped with TRDSP are compared in the figure below, with special regard to the input card.



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