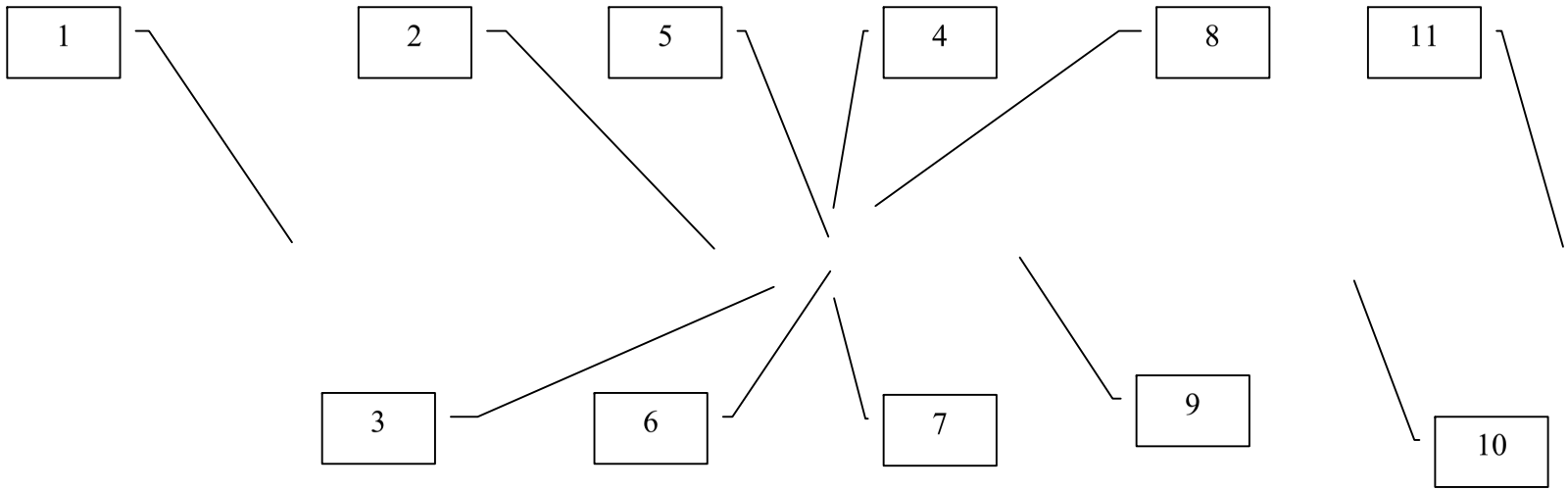
FAL SERIES

User & Service Manual (Version 2.0)

INDEX

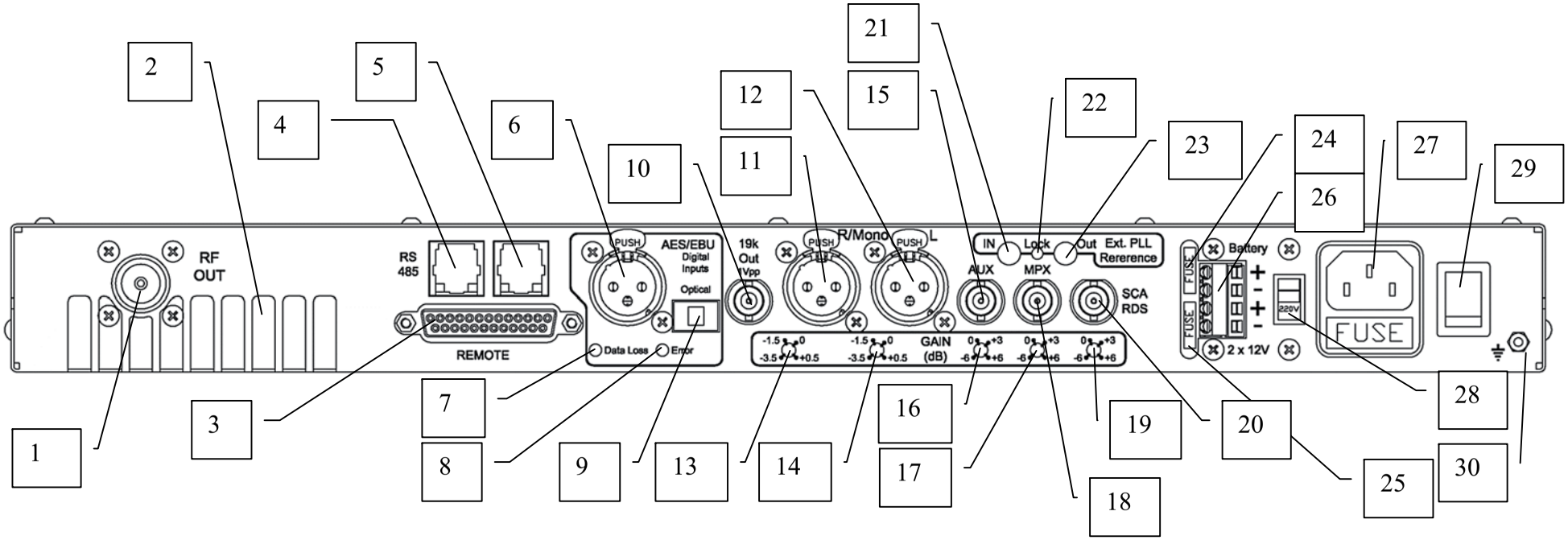
MECHANICAL LAYOUT

Fal 30-50-100-150 Front View



1	Air Grid Input Inlet	7	Local/Remote Mode Led
2	USB Connector	8	Memory Activation and Indicators
3	USB Enable Indicator	9	Two- row, sixteen-character LCD Display
4	Lock Indicator	10	Rotary Encoder
5	Program Mode Led	11	RF Output Monitor
6	Data Flow Indicator		

Fal 30-50-100-150 Rear View



1	RF Output N Female Connector	11	XLR Balanced Input Right +MONO	21	External Lock Input (Optional)
2	Air Grid Input Outlet	12	XLR Balanced Input Left	22	External Lock Indicator (Optional)
3	DB25 Connector - Remote control	13	Right + MONO Fine Gain	23	External Lock Signal Output
4	RS485 Connector # 1 (RJ45)	14	Left Fine Gain	24	Battery Fuse # 1
5	RS485 Connector # 2 (RJ45)	15	AUX Input	25	Battery Fuse # 2
6	AES-EBU Balanced Input (Optional)	16	AUX Input Sensitivity	26	Battery Connector
7	Digital Data Loss Indicator (Optional)	17	MPX Input Sensitivity	27	VDE Mains Socket + Fuse
8	Digital Data Error Indicator (Optional)	18	MPX EXT Unbalanced Input	28	Mains Voltage Selector
9	AES-EBU TOS Optical Input (Optional)	19	SCA/RDS Input Sensitivity	29	ON/OFF Switch
10	19 kHz Output for External Sync	20	SCA/RDS Unbalanced Input	30	Heart Connection

Section *One* ❶

Introduction & General Information

Preface

Congratulations on your purchase of our FM transmitter.

Our goal is to bring you the most accurately crafted equipment to exceed current specifications and world-class quality standards. Our products are designed to withstand severe environment conditions.

Your new transmitter is manufactured using the most advanced production processes available today and the highest quality materials to ensure years of trouble-free service.
BEFORE USING THE AMPLIFIER, PLEASE READ MANUAL CAREFULLY. PARTICULAR ATTENTION MUST BE PAID TO GROUND CONNECTIONS AND OTHER MAINS SECURITY RULES.

Thank you

About Eletec

Eletec is dedicated to developing and refining the newest technologies which can satisfy the ever-increasing needs of the FM Broadcast industry.

Our innovative engineering staff has designed our new FM Amplifier after a ten-year experience in the research and development of FM equipment.

We are located in Sud France where an exceptionally mild climate and a long-established culinary tradition offer a high quality of life.

Equipment developed and manufactured by **EB systems** has undergone extensive computer simulation, followed a rigorous R&D method and often results from cooperation with Research Institutes or Universities.

Quark is committed to meet your FM broadcast requirements by providing the most advanced, reliable and cost-effective FM equipment available in the market today

Welcome INTO an idea!

About This Manual

A step-by step guide to simple installation and setup of Jazz Transmitter, the manual contains the following sections:

1. **Introduction & General Information:** current section
2. **General Description:** key features, technical specifications and mechanical layouts
3. **Installation & Use:** how to install, set up and test Transmitter
4. **Visual Mode:** how to read main parameters and settings (consultation only)
5. **Program Mode**: how to program main parameters and settings
6. **Special Program mode:** how to program the special one-off operation of firmware loading
7. **Protections & Alarms:** HW & SW protections, AC or Temperature alarms
8. **System Realization:** Integration of transmitter in a system
9. **Service & Maintenance:** repair and maintenance, outlines, component location, parts lists and other technical information

Important Note On Dangerous Voltage

Hazardous Voltage

WARNING:
Voltage within equipment is high enough to endanger life!

External or internal covers are NOT to be removed, except by authorized personnell

Important Note - Serial Number

Serial Number can be read directly on front panel display. Press the encoder knob and turn it to select the slide showing **"ABOUT"**. This section contains serial number, firmware version and other general and useful information.

Some product versions might show serial number on rear panel label

Disclaimer

If you find any inaccuracies, please kindly inform us

EB is not liable for any typing or technical errors and it reserves the right to make changes to product and/or manuals without prior notice

Warranty

Eletec product is guaranteed against defects in materials and workmanship for a period of TWO YEARS from date of shipment. The standard warranty may be extended beyond the two-year period. A record of warranty extensions is listed on sales orders of each product purchased. Standard warranty conditions apply to extended warranty period.

During warranty **Eletec** will repair or replace product proved to be faulty prior to authorization. The warranty validation only applies if product is returned to **Eletec** after release of Return of Merchandise Authorization and provided that maintenance procedures are followed as listed in the manual. Warranty does not cover repair resulting from product carelessness, incorrect or improper use.
NO OTHER WARRANTY APPLY

QUARK IS NOT LIABLE FOR DAMAGES RESULTING FROM PRODUCT MISUSE
QUARK DOES NOT GUARANTEE ERROR-FREE EQUIPMENT, UNINTERRUPTED OPERATION, FIRMWARE OR FIRMWARE BUGS.

If your equipment needs repair call **Eletec** promptly and ask for customer service department. It is important to contact **Eletec** immediately since many problems may be quickly solved over the phone or by e-mail. Please have your Serial Number ready before you contact **Eletec** and clearly explain the nature of your problem. Once we acknowledge your equipment requires service we will send you an electronic form to fill in with your name, address, phone number, e-mail and an accurate description of problem or failure. We will issue an **RMA** number.
Send unit with prepaid shipment to indicated maintenance lab and place equipment in the original box or a suitable container to protect product from damage. **Eletec** will not be held responsible for damage incurred during shipping. Please ensure RMA number is clearly marked onto shipping container. Our standard terms are to fix or repair equipment within **five working days**. If equipment requires parts ordering or more than five working days, **Eletec** service technician will contact you. We also provide service for equipment if warranty has expired. Follow same instructions described above, but tick in the

☑ "not in warranty" box. Warranty is valid on condition that proper maintenance procedures have been complied with, as listed in the manual. Damage caused by product misuse is NOT covered by warranty.

Other General Information

File Name: Manual Falcon 30-50-100-150 ENG.doc

Edition Date: Dec 31, 2008

Basic CPR technique

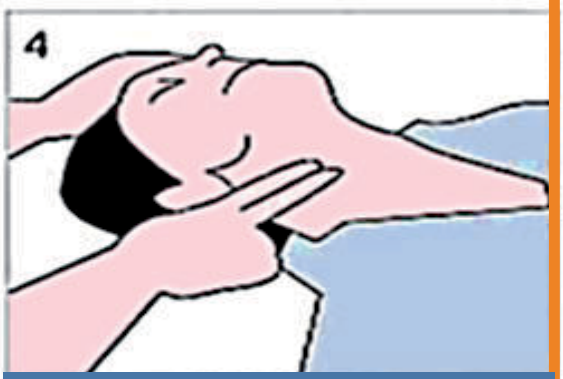
Basic CPR technique

For adults

1: Call your local emergency number

2: Tilt head, lift chin, check breathing

3: Pinch nose shut and give two breaths



4: Check pulse

5: If there is no pulse, position hands in the center of chest

6: Place one hand over other and push down two inches on the chest 15 times

7: If there is no pulse, continue with two breaths and 15 pumps for one minute and recheck pulse – if no pulse – continue until arrives

Manual Revision Record

This record page is intended for recording revisions to your **User & Service Manual** for Jazz 30-50-100W Transmitter**.** Revisions can only be published by **Eletec** or its authorized representatives. We recommend that only authorized or appointed personnel make changes, or insert revised pages and ensure that obsolete pages are withdrawn and, either disposed of immediately, or marked as superseded and placed in a superseded document file.

Rev. No	Date Entered	Reason	Signature of Person Entering Change

Symbols

This section contains a list of most commonly used symbols.

It is important to become familiar with symbols to understand the information contained in the manual. Additionally, some graphical signs are used to draw further or extra attention to specific operations.

This manual is divided into two main sections: use of equipment and maintenance. The two sections are separated by one blue page. The operator who has experience in using the equipment must not try to perform any maintenance operation.

Any incorrect operation may cause damage to electronics and be also potentially dangerous for operator's safety.

This symbol means: "Notice"

This symbol means: "Read carefully before operating"

This symbol means: "Please contact Manufacturer"

This symbol means: "Information relevant to the Software"

This symbol means: "Maintenance Procedure"

This symbol means: "DANGER!"

This symbol means: "Danger - High Voltage"

This symbol means: "European Union Accepted"

Section *Two* ❷

GENERAL DESCRIPTION

KEY FEATURES

Equipment is designed using the latest technologies and techniques available for Hardware and Software and includes the following key features.

- State of the art performance at reasonable cost
- P controlled
- Extremely low distortion: **THD, IMD & TIM** (Transient Intermodulation Distortion) specified
- Very quiet operation (S/N)
- Highest stereo performance: separation 80 Hz-15 kHz, **typ. 70 dB** (30-80Hz typ. 60dB)
- L, R (balanced & unbalanced), RDS / SCA, AUX, MPX, Digital inputs AES-EBU XLR & Optical (Optional), External Reference Oscillator input & output (Optional)
- Lin, 50, 75 s pre-emphasis
- Seven complete programs (frequency, sensitivity, power, etc. etc.) which can be stored and selected in local or remote mode, without retuning or re-adjustments. Ready for (6+1) systems
- Completely broadband: instantaneous BW > 20 MHz
- Easy to handle: self-explaining monitoring and setting of all important parameters
- Remote control for telemetry and DB25 and DB9 connectors available on rear panel
- Two independent RS485 ports on rear panel
- Modular construction specifically designed to minimize spare parts set
- Auxiliary functions as multi-frequency external synchronization (1;2; 2,5;5;10 MHz) on request

- RF amplifiers using the latest generation of semiconductors: **RF Power LDMOS** both in driver and at output stages
- **A**utomatic **P**ower **C**ontrol **(APC)** maintaining stable pre-set RF power @ 45°C ; 1.5:1 VSWR. Higher VSWR value causes power reduction
- Lightweight RF power modules that can be removed and replaced from mainframe in less than two minutes
- Very fast acquisition latching indicators showing transient conditions
- Nominal RF o/p level = 30W (50, 100W). Typical max power in excess of 35W (60, 110W). Continuously adjustable power output
- Built-in RF harmonics filter and true wattmeter
- High spectral purity: > -100 dBc spurious and >-75 dBc harmonics (type)
- Output provided: RF, RF monitor, 19 kHz to lock RDS, RS485, USB, remote alarm, and remote memory setting. Tele-measurement. External Battery socket (Optional) with built-in charger, (2x12V) for emergency
- AC mains (90-260V in two ranges); reliable PWS
- CCIR & FCC compliant
- All functions controlled by a knob encoder and a two-row, sixteen character LCD display. Intuitive parameters configuration
- External control of alarms, active memory, interlock, force to internal stereo, TX-on, TX-off, ack-on, ack-off, mains absence, power good, IPA, VPA, Modulation, Reflected PWR, Forward PWR through DB25 connector located on rear panel
- Seven memories (M1 to M7). All data such as frequency, audio sensitivity, RF power, etc. etc can be stored in any flash memory of the microprocessor and be recalled by internal/external command
- Windows program supplied for complete management of all transmitter functions

TECHNICAL SPECIFICATIONS

RF FEATURES	
Power	30-50-100 W adjustable from front panel
RF Output impedance	50Ω unbalanced, VSWR less than 1.5:1
Frequency range	87.5 to 108 MHz, 7 channels (10kHz / step p selected) can be stored and recalled from panel, rear contacts, or via USB connection
Frequency control	Synthesizer processor controlled
Lock-in time	From starting to any programmed frequency : typically 4 secs
Off-lock attenuation	> 75 dBc (typical -80 dB)
Type of modulation	F3E / F8E direct FM at the carrier frequency
Modulation mode	Mono, Stereo, Multiplex, SCA, RDS, AUX (input selected by front panel)
Frequency deviation	±75 kHz =100 %, ±150 kHz capability
Reference	TCXO = 12.8 MHz.
Constancy of freq. dev.	±1 % over six months
Variation of freq.	≤ 1kHz/year (internal TCXO)
Short term stability	± 1 ppm from -5 to +45 °C, Can be synchronized by 1-2-2.5-5-10MHz self select external clock (OPT 01)
Instantaneous BW	>20 MHz
RF harmonics	Exceeds EBU/CCIR/FCC requirements > -70dBc
RF spurious	Exceeds EBU/CCIR/FCC requirements < -100 dBc @ ± 1 MHz min. out of carrier (typical -110dB)
Pre-emphasis	Flat/50/75µs selectable via front panel
Pre-emphasis precision	Nominal 1% (typical 0.4%)
Stereo operation	CCIR 450/S2 "pilot tone system"

STEREO OPERATION	
Audio response	±0.15 dB da 20 Hz to 15 kHz (+0/-2%)
Audio filter attenuation	> 55 dB @ 19 kHz, >45dB 19 to 100kHz
Common mode rejection	20 Hz to 15 kHz > 45 dB
Stereo Separation	30-80Hz >53dB (typ. 56), 80Hz-15kHz >60 dB (typ.70)
Crosstalk attenuation (M / S)	> 40 dB 30 Hz to 15 kHz (typ. 55dB / 100Hz to 8kHz)
Spurious products	> 53 kHz > 50 dB
38 kHz suppression	> 70 dB (Typ -85dB)
Subcarrier frequency	38 kHz ± 2 Hz
Subcarrier generation	Internal crystal
Pilot frequency	19 kHz ± 1 Hz
Phase difference	19/38 kHz 0°±2° adjustable
THD+N on encoded channels	< 0.03 % 30 Hz TO 15 kHz (typ -74dB)
IMD	Measured with a 1 KHz and 1.3 KHz tones; 1:1ratio at FM 75 kHz < 0.03 % . Typ. IMD D2 < -83 dB D3 < -88 dB
TIM (DIM30)	< 0.03 % (square/sinus) Typ. < -77 dB
Nominal pilot deviation	±7 kHz

MONO OPERATION	
Audio response	±0.15 dB 20 Hz to 15 kHz (+0/-2%)
THD+N on encoded channels	30 Hz to 15 kHz < 0.02% (typ. 0.03 %) typ. -74dB
IMD	Measured with a 1 KHz and 1.3 KHz tones; 1:1ratio at FM 75 kHz D2 < -75 dB D3 < -80 dB Typ. D2<-80dB D3< -85 dB
TIM (DIM30)	Measured with a 2.96 kHz square wave and a 14 kHz sine wave at 75 kHz FM < -70 dB Typ. < -77 dB

MPX OPERATION (External coder)		
Audio response	30Hz - 53kHz	± 0.1 dB
	53kHz - 100kHz	± 0.2 dB
THD+N on encoded channels	30 Hz to 15 kHz < 0.03% (typ. 0.02% , < -75dB)	
IMD	Measured with a 1 KHz and 1.3 KHz tones; 1:1ratio at FM 75 kHz D2<-75 dB D3<-80 dB Typ. D2<-80dB D3< -85 dB	
TIM (DIM30)	Measured with a 2.96 kHz square wave and a 14 kHz sine wave at 75 kHz FM < -70 dB Typ. <-75 dB	

S/N RATIO (Typical Values)			
Type	**Condition**	**Value (Peak CCIR)**	**Value (RMS detector)**
Mono **Ref. ± 75kHz**	Weighted (CCIR 468/2) Unweighted 20 Hz - 23kHz	85 dB/50 s 80 dB/flat	89 dB/50 s 83 dB/flat 92 dB/50 s 88 dB/flat
Built-in stereo encoder **L & R** **Or external stereo**	Weighted (CCIR 468/2) Unweighted 20 Hz ÷23kHz	75 dB/50 s 69 dB/flat	79 dB/50 s 72 dB/flat 86 dB/50 s 80 dB/flat
AM synchronous **AM=400 Hz** **FM=400 Hz ± 75 kHz** **Ref. = 100 % AM**	Unweighted 20 Hz ÷23kHz	69 dB (detector $\frac{P^+ + P^-}{2}$)	
AM asynchronous **FM = no modulation** **Ref. = 100 % AM**	Weighted & unweighted	70 dB (detector $\frac{P^+ + P^-}{2}$)	

AUDIO INPUTS						
Function	**Input level / Adjustment range**	**BW**	**Impedance**	**Type**	**Conn.**	**N°**
Composite	-3 to +6 dBm	0.15 dB 30 Hz÷100kHz	~1.2 kΩ	Unbal.	BNC	1
SCA/RDS	-3 to +6 dBm	0.15 dB 40kHz÷100kHz	~3 kΩ	Unbal.	BNC	2
Aux	-3 to +6 dBm	0.15 dB 40kHz÷100kHz	~3 kΩ	Unbal.	BNC	3
L	**(3 dB step adjustable by software)** -3 to +9 dBm ± 0.5 dBm	0.1 dB 30Hz÷15kHz	10 kΩ 600 Ω	Unbal. Bal.	XLR	4
R	**(3 dB step adjustable by software)** -3 to +9 dBm ± 0.5 dBm	0.1 dB 30Hz-15kHz	10 kΩ 600 Ω	Unbal. Bal.	XLR	5

AUDIO OUTPUTS	
RF connector	N female
Monitor RF output	-44dBc±2dB from 87.5 to 108 MHz
Pilot	BNC connector 19 kHz Squarewave, level 1 Vpp, impedance >5kΩ, unbalanced type

AUXILIARY CONNECTIONS	
USB	USB type B-female
RS485 Serial Interface #1	RJ45
RS485 Serial Interface #2	RJ45
Telemetry/Telecontrol Interface	DB25F
External clock 1-2-2.5-5-10 MHz	SMA female (Optional)
Telemetry/Telecontrol Interface	DB25F
Telemetry/Telecontrol Interface	DB25F

OPTIONS		
External Clock	JZOP-01	For PLL synchronizing purpose. 1-2-2.5-5-10 MHz EXT Ref. Oscillator with self-selection of the incoming frequency
Digital audio Input	JZOP-04	AES-EBU facilities XLR balanced (S/PDIF) & TOS-LINK supplied
RDS	JZOP-05	RDS simple coder programmable via PC
OIRT Version	JZOP-06	Different band of frequency
FSK identification (FCC)Version	JZOP-07	LPFM frequency shift-key Morse code for station identification
Only MONO Version	JZOP-08	

STANDARD COMPLIANCE	
Safety	EN 60215:1989
EMC	EN 301 489-11 V1, 2,1
Spectrum Optimization	ETS 300 447

FUSES	
Mains	1 External fuse F 2 T - 5x20 mm 2Ax30W, 3Ax50W, 4Ax100W
Battery supply	1 External fuse F 10 A

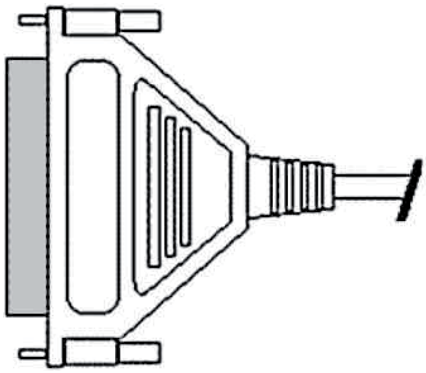
ENVIRONMENT	
Storage temperature	-20°C TO + 60 °C
Operating temperature	-5 °C TO + 45 °C
Guaranteed performance temperature	0 °C TO + 40 °C
Relative non-condensing humidity	90 % MA
Max operating altitude	2000 mt.
Max extraneous field strength	≤10 V/m; ≤ 4 A/m

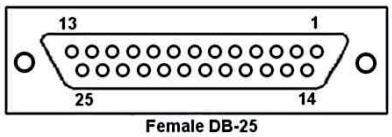
SIZE & ELECTRICS	
Dimensions	Standard 19" chassis /1 U rack
Cabinet	385 mm deep by 485 mm wide; 44 mm height
Weight	Approx. 4.5 kg.
Finish	Plastic film on aluminum (front panels). Stainless steel (cabinet)
Power supply	110/220V single phase AC (+10 / -15 %) 50-60Hz/ ± 5%
DC Battery supply voltage	2 x 12 - 14V Gelled Lead Acid Batteries
DC supply current	Measured at full power and 28VDC, 2A
AC Apparent Power Consumption	Measured at full power and nominal voltage; 115-135-180 VA (30-50-100 W)
Power Consumption	Measured at full power and nominal voltage; 65-95-145 W (30-50-100 W)
Human interface input device	Rotary encoder with pushbutton
Display	Green-Yellow back panel; 2 raw 16 character LCD
Acoustics Noise	< 56 dBA Leq 3 min @ 1 m
Cooling	Forced air, with internal long life brushless ball bearing fan

DB25 Pinout

TELEMETRY/TELECONTROL ON DB25 REAR PANEL						
PIN	**Description**	**Acronym**	**Type**	**Value**	**@**	**Operating Capability**
1	Forward Power		Measurement	3 V	30W	560 Ω
2	Modulation Output		Measurement	3 V	117 Khz	560 Ω
3	IPA		Measurement	3V	4,5A	560 Ω
4	Power Good Alarm		Status	Open Drain		Max 18V/100mA
5	Acknowledge OFF		Status	Open Collector		Max 24V/10mA Zout= 220Ω
6	General Alarm		Status	Open Collector		Max 24V/10mA Zout= 220Ω
7	Input Analog 1		Analog IN	TBD		
8	Tx-Off		Control		+9V to set	
9	Interlock		Control		GND to set	
10	Set Mem 6		Control		GND to set	
11	Set Mem 4		Control		GND to set	
12	Set Mem 2		Control		GND to set	
13	--	GND	Ground	--	--	--
14	Reflected Power		Measurement	3 V	12,5W	
15	VPA		Measurement	3 V	30V	
16	--		Ground	--	--	--
17	Bat (Mains)		Status	Open Collector		Max 24V/10mA Zout= 220Ω
18	Acknowledge ON		Status	Open Collector		Max 24V/10mA Zout= 220Ω
19	Local/Remote		Status	Open Collector		Max 24V/10mA Zout= 220Ω
20	Tx-ON		Control		9V to set	
21	Force to internal Stereo		Control		GND to set	
22	Set Mem 7		Control		GND to set	
23	Set Mem 5		Control		GND to set	
24	Set Mem 3		Control		GND to set	
25	Fuse Protected Aux		Supply	Output	+9 Volt	100mA max

DB25 CONNECTOR





Female DB-25

METER READINGS

The following parameters can be read on front display

- Forward power (FWD)
- Reflected power (REF)
- DC Supply voltage
- Frequency (active channel)
- Frequency (stored channels 1 to 6)
- Mono and stereo sensitivity (0,25 dB step)
- Programmed output power
- MPX peak modulation
- L & R peak level
- RDS, SCA, Aux, MPX external modulation
- Programmed audio parameters (+L or -L, +R or -R, L on/off, R on/off, Pre-emphasis lin, 50, 75 S, Limiter on/off, Input Impedance Z=10KOhm/ 600 Ohm)
- Alarm status
- Memory status
- Internal voltage
- Serial Number

ST Microelectronics RF LDMOS is used in Power Amplifiers for very conservative RF output power.

- 1 x 45 W for 30W output
- 2 x 45W for 50 W output

Freescale 300W RF LDMOS is used in Power Amplifier stage for very conservative RF output power in 100 & 150W version

This page was intentionally left blank

Section *Three* ❸

INSTALLATION & USE

DELIVERY

Please **CAREFULLY CHECK** Quark delivery box for any punctures or other evidence of damage. If any, please notify Quark as soon as possible.

When unit is delivered as STAND ALONE equipment the following items are included:

1. Transmitter
2. The RS485 connection cable RJ45/RJ 45 50 cm long (approx. 20 inches)
3. One CD containing the manual's electronic version
4. Mains cable - in some countries cable is supplied with one connector only. Customers must use matching connector to adapt to local standard mains socket

The above content could not be included in equipment delivered to Customers already integrated in a system.

OPERATING RECOMMENDATIONS

To prevent failure please **strictly follow** these **IMPORTANT** recommendations

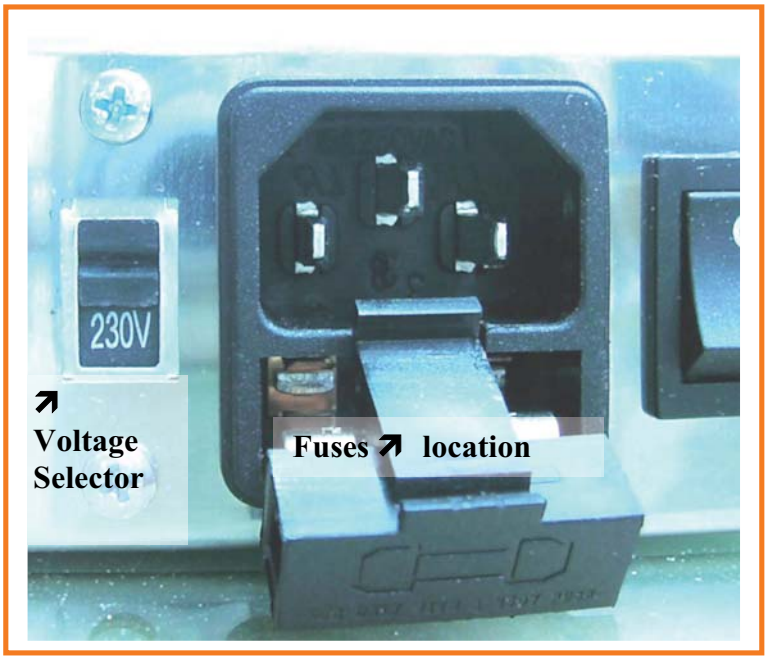
Ensure that both front and rear part of equipment are properly ventilated. To prevent high temperature inside equipment you must provide adequate ventilation to rack cabinet where equipment is installed (temperature should not exceed 45 ˚C degrees)

PLEASE NOTE: Transmitter **cannot** operate without top cover
The air-cooling system is designed to work in a closed box. Serious OVERHEATING will occur if transmitter operates without top cover

Avoid any mains voltage variation which exceed expected limits. The **worst** conditions occur with a **very low** RF power (i.e. 5W) and **very high** mains voltage (i.e. 250V), or vice versa

Do not ever exceed the recommended **max power of 30 W** (or 50, 100, 150 W depending on model). The transmitter can provide an increased RF power of approx. 10% above recommended limit

BE SURE that mains voltage **matches** the selected voltage. A mistake in the setting may cause serious problems to transmitter. The rear panel voltage selector is located close to the ON/OFF switch and indicates the preset voltage range. If you need to change voltage or replace a fuse, follow the instructions below



SWITCH-OFF AND DISCONNECTION FROM MAINS!

Slide out the internal black plastic cover of Mains socket to change the two fuses
Replace fuses by using one 2A fuse for 220/230 V range and one 4A for 110/117 V
Slide plastic cover back in
Use a screwdriver to turn the voltage selector and move up or down to select the desired input voltage (110/230 V)
Connect Mains voltage

DESCRIPTION OF THE ENCODER KNOB

The **encoder knob** located on front panel is the main access to control amplifier in conjunction with display readings. It rotates clockwise or anticlockwise, and can be pushed. The overall procedure to browse through the different menus is very intuitive.

The LCD display shows **two rows with sixteen characters** and a number of different menus. Three operating modes are possible:

visual only mode: it reads set values or parameters
program mode: it sets up parameters and/or other values to modify
special program: it resets power and upgrades firmware

In all cases when turning the encoder knob and the indication "**Push to Program**" appears on display it is possible to modify parameters. This simple message "Push to Program" is the basic way to select and store.

A description of all available menus displayed on the LCD is reported in the following sections.
It is important to remember that:

By rotating the knob: you scroll the sub-menus, increase or decrease a given value
By pushing/pressing: you select parameters to modify; you store values and confirm selection

DESCRIPTION OF FRONT PANEL LEDs & CONNECTORS

The green LED **[4]** indicates that transmitter is locked

The red LED **[5]** indicates that *program mode* is active and the operator must be alert

The blinking yellow LED **[6]** indicates that transmission data is active

Transmitter can be managed locally or remotely. When remote mode is selected yellow LED is active **[7]**

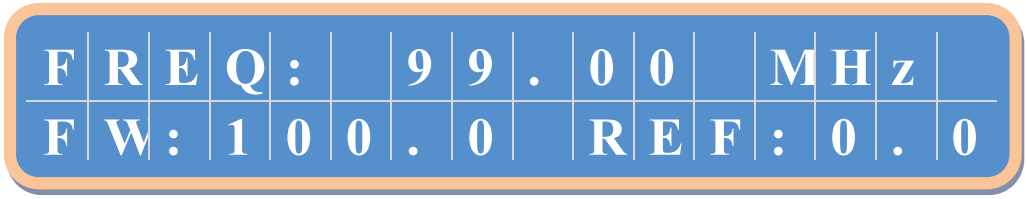
The two-color (green / yellow) LED **[3]** indicates whether a USB connection is active or not

There are 7 two-color LEDS (8) to indicate memory status

The USB connector **[2]** allows a PC connection
The BNC female connector **[12]** allows to monitor and measure RF

SWITCH ON

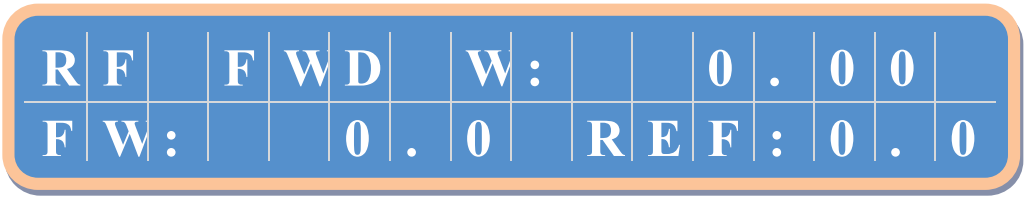
Connect the Jazz 30-50 (100-150) transmitter to a min 100(250) W dummy load and switch ON by pressing switch located on the rear panel **[20]** or press the rack switch if Transmitter is integrated in a system. The first slide on display reads



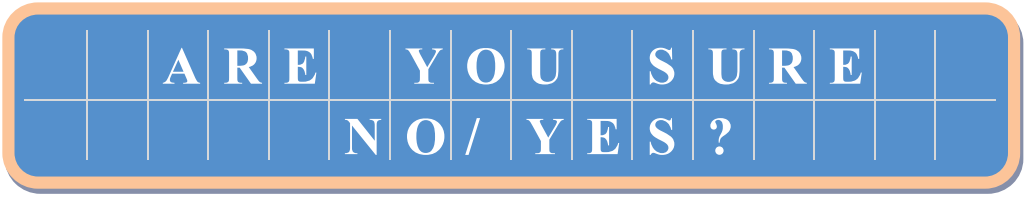
The PLL (Phase Locked Loop) starts the lock-in process which takes 4-5 sec. approximately (depending on the frequency) to capture the oscillator at the programmed frequency

Very Important Notice!

After the PLL locks RF power ramps up to the programmed value. If you want to reset the previously stored value of RF power you must switch OFF the transmitter. After that, **switch ON** and **simultaneously** keep the knob pressed. In this particular case the RF power is forced to 0 W and the first slide is (see: "Special Mode Program")



The slide can set the desired RF power by rotating the encoder. Move cursor under YES to confirm and close the power setting by pushing the encoder knob



When selection is made

The microcontroller stores data in the flash memory and value is set

SETTING MEMORIES

Our software stores all parameters in seven different memories from M1 to M7. Only one memory at a time is active and can control the transmitter.

All operating parameters or any other value such as power output or audio sensitivity can be stored in any of the seven memories. The program operation does not affect the active (working) memory. When data setting is completed data can be saved. All data will be changed simultaneusly if you activate a memory other than the one previously in use. Memory status is indicated by a green/yellow) LED **[8]**. Default memory (Memory 1) is indicated by first LED starting from top. From memory setting MENU shown in display you can select a different memory (from Memory 2 to Memory 7 via encoder knob or by remote control). Each selected memory is indicated by corresponding LED. The switching of a yellow LED shows which memory you are loading. Loaded memories are recalled by using memory activation menu in which case LED for active memory becomes green.

If modified data is saved in the active memory change will be operational when programming is completed (data is stored and program mode is closed).

RF output power control has two (2) different operating modes.
First to program RF power in the active memory. You enter the desired power value which changes in real time.
Second to program power in a non active memory. You enter power value and value is stored and becomes operational when memory is activated.

Memories can be activated in three different ways:

Via the Encoder Knob as explained
Via USB using a dedicated PC program
Via the DB25 rear connector

Section *Four* ❹

VISUAL MODE OPERATION

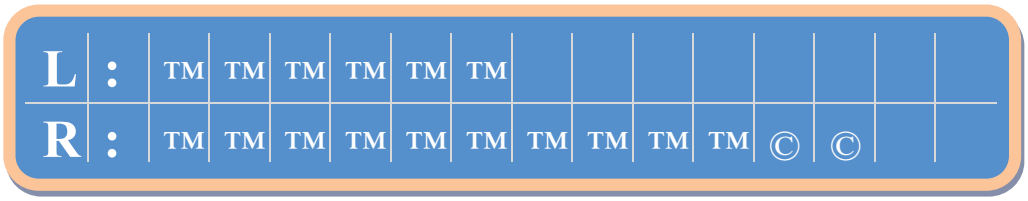
VARIOUS MENUS

Visual mode is designed to allow readings of numerous important parameters of the Amplifier. It is possible to visualize parameters and other stored data without making changes while Amplifier is operating normally. Visual mode is intended for consultation only and therefore described first in the sequence Visual/Program/Special modes. To ensure optimum reading the LCD is placed in the central section of the front panel, it contains two rows holding sixteen characters and visualizes the information listed below by simply rotating the encoder.

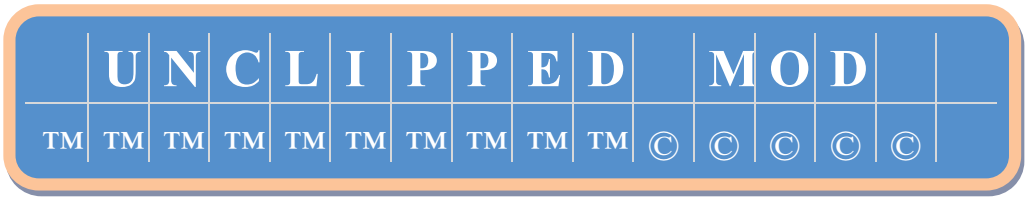
AUDIO READING PAGES

The Audio menu shows the slides described below

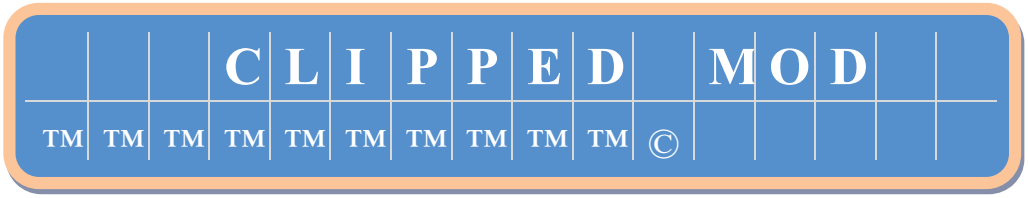
Left & Right bars show peak modulation. The ten filled square blocks indicate 10% each (7.5Khz) of the permitted deviation (75kHz). Four empty block shows over modulation



2) Unclipped Modulation



3) Clipped Modulation



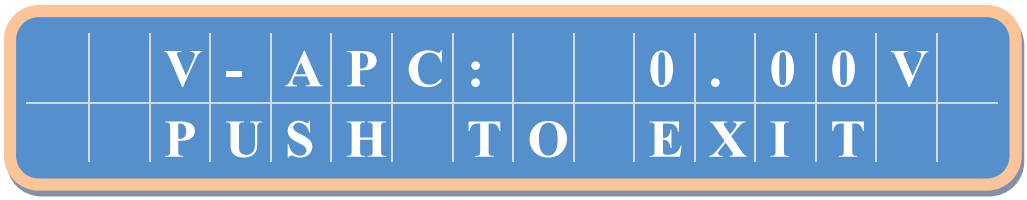
4) Clipped Action

PARAMETER READING SLIDES

The following slide shows the opening of the Readings Menu

The Readings page allows to control various important parameters. Turn the Encoder Knob and you read the following

1) V-APC



This is the voltage that controls the RF amplifier gain in order to stabilize output power. A value between 2 and 4V can be accepted. A typical value is 3.3 to 3.6V. Values out of specified range indicates a possible failure.

2) IPA

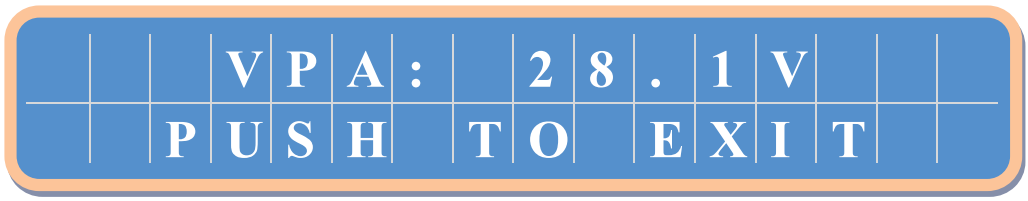
It indicates the current absorbed from the RF power stage. IPA current is the result of the driver and the power amplifier supply consumption. The RF driver section absorbs approx. 300mA. To evaluate the final amplifier current you must simply subtract 300mA from the total IPA current

The nominal current is as follow:

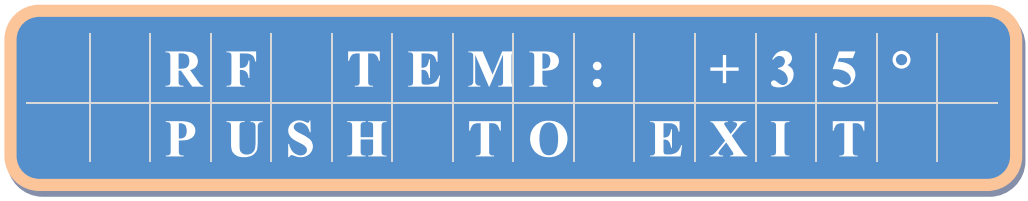
IPA @ 30W is xxA
IPA @ 50W is xxA
IPA @ 100W is xxA
IPA @ 150W is xxA

A value higher than 20%, it is an indication that a failure could occur.

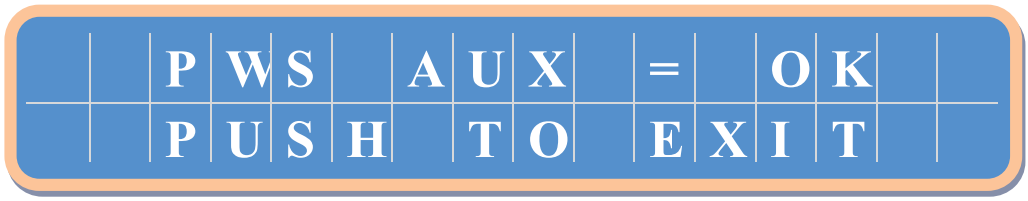
3) VPA



4) TEMPERATURE of RF STAGE

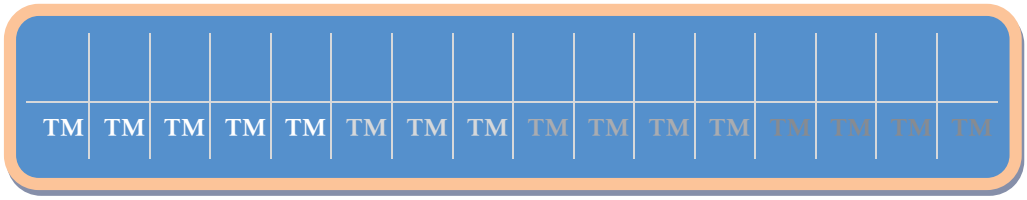


5) PWS AUX POWER SUPPLY



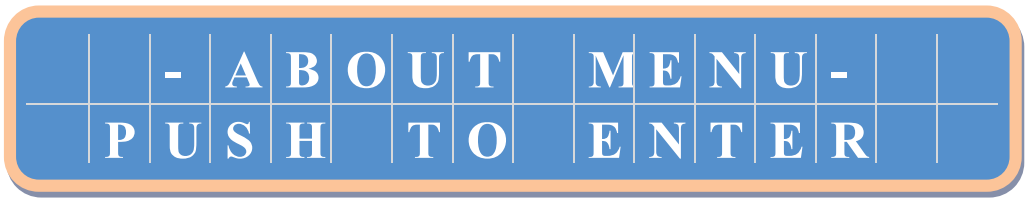
6) TUNING VOLTAGE (to VCO)

To exit slide push encoder knob and the following slide indicates menu is being shut



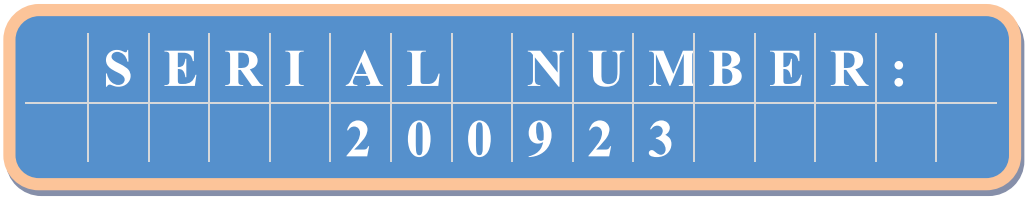
"ABOUT" SLIDES

Turn encoder knob to find the ABOUT MENU which contains various slides with general information on Amplifier's Model, Serial number, Manufacturer's address, Firmware version, Website and Email address

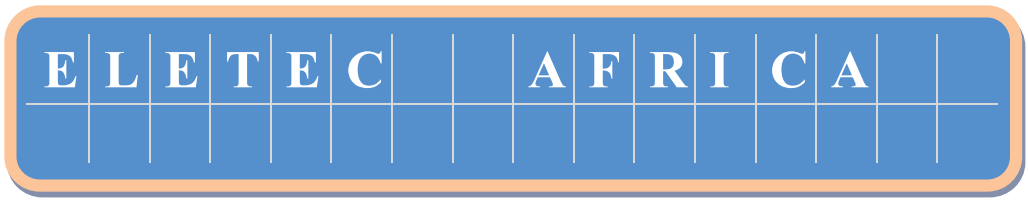


Scrolling down shows MODEL and installed optional parts

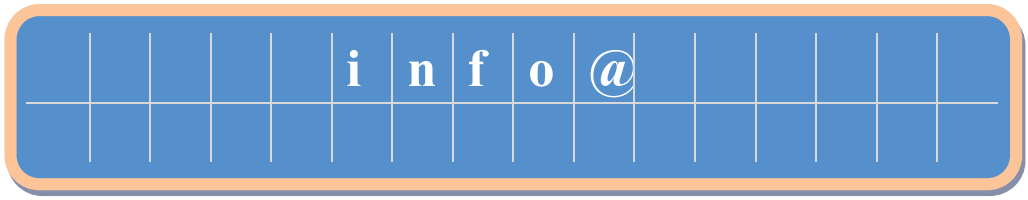
Serial Number



Address and Country of Manufacturer / Distributor



Company email address and website



Firmware Version and date

To exit return to main menu and push as indicated below

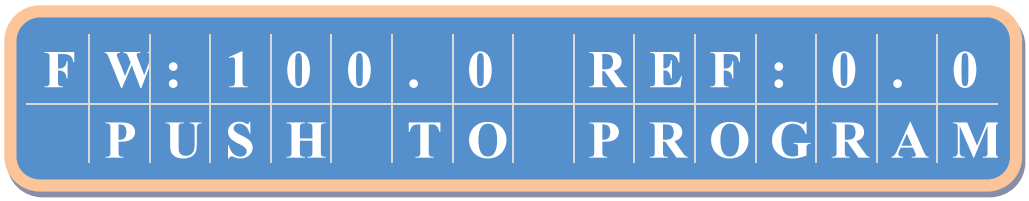
When exit is selected the following slide indicates menu is being shut

Section *Five* ❺

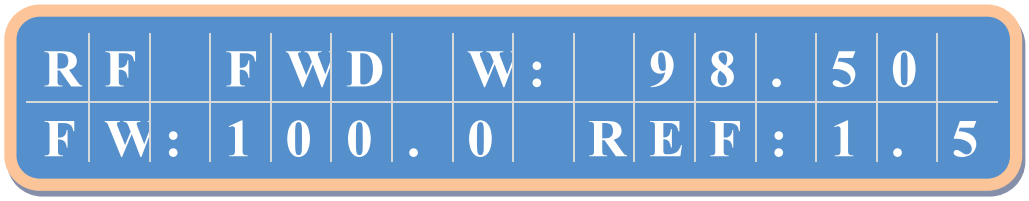
PROGRAM MODE OPERATION

RF POWER SLIDES

To program RF Power output rotate the encoder knob to find slide below. Follow instructions to push encoder knob to enter program mode

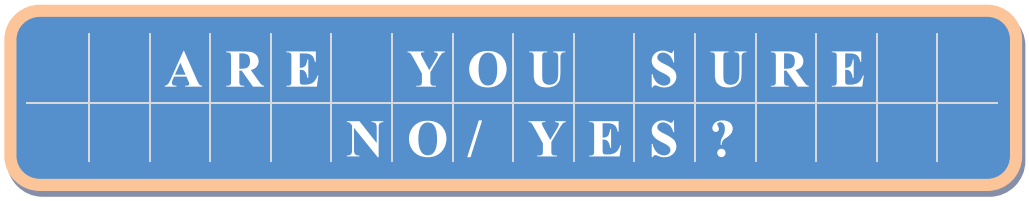


The first slide on front display reads the information below



The first line shows RF Forwards power
The second line shows real Forward and Reflected power

Turn encoder knob right or left to increase or decrease value as required
Confirm selected value by pressing encoder knob and following slide appear



Cursor highlights **NO** selection by default to prevent pushing the encoder knob and enter a mistaken value

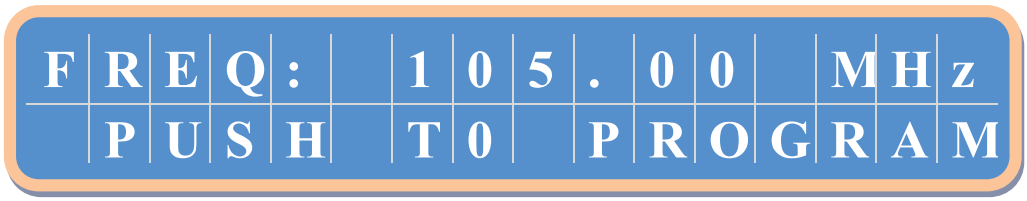
To validate your change move cursor to **YES** selection and press encoder knob, or move cursor back to **NO** selection to reject setting.

Each time a **YES** selection is made the following slide appears, or if no change is made programming is exited

The microprocessor stores data in the memory and selected value is active

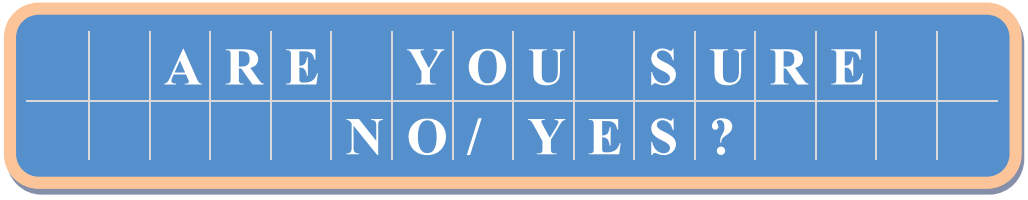
FREQUENCY SETTING

Rotate encoder knob to find slide to program frequency. Push encoder knob as indicated



Slide below shows current frequency at 105.00 Mhz. Value can be modified when cursor moves under relevant character. Turn encoder knob right or left to increase or decrease value

The range limits are: 87.500 MHz to108 MHz. The default step is 10 kHz, but upon request, it is possible to choose different threshold values (i.e. 25 or 50 kHz). Confirm new value and exit routine by pushing the encoder knob



Cursor highlights **NO** selection by default to prevent pushing the encoder knob and enter a mistaken value

To validate your change move cursor to **YES** selection and press encoder knob, or move cursor back to **NO** selection to reject setting

Each time a **YES** selection is made the following slide appears, or if no change is made programming is exited

The microprcessor stores new data in the memory and selected value is active

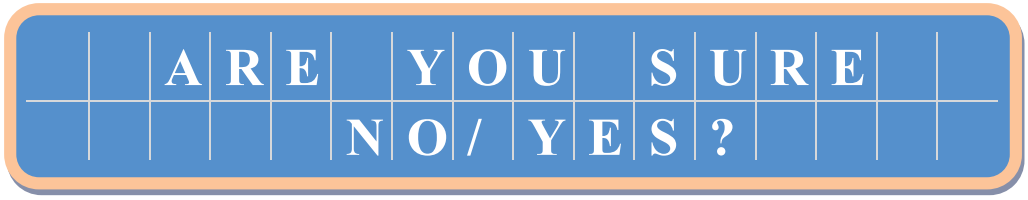
AUDIO SETTING

1) Z-in SETTINGS:

The following slide shows the stored Z-in and is also the access point to the slide for Z-in program

Press the encoder knob and the following slide is shown

Turn the encoder and set Z-in to High impedance (10 KOhm) or Low impedance (600 Ohm). Confirm selected value by pushing the encoder knob and the following slide appears



Cursor highlights **NO** selection by default to prevent pushing the encoder knob and enter a mistaken value

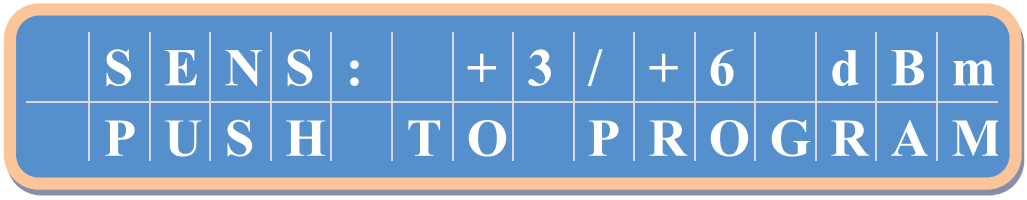
To validate your change move cursor to **YES** selection and press encoder knob, or move cursor back to **NO** selection to reject setting

Each time a **YES** selection is made the following slide appears, or if no change is made programming is exited

The microprocessor stores new data in the memory and selected value is active

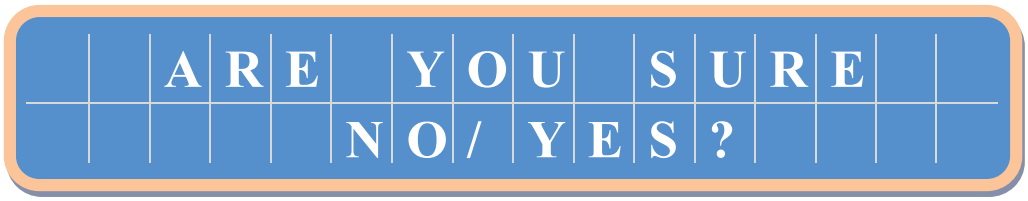
2) SENSITIVITY SETTINGS

The following slide shows stored Sensitivity value and consequently “on air”. This slide is also the access point to set or program Sensitivity value



Press encoder knob and the following slide is shown

Turn the encoder knob to increase or decrease Sensitivity value to: [-3,0], [0,+3], [+3,+6], [+6,+9]. Exit, or close and confirm new value by pushing the encoder knob



Cursor highlights **NO** selection by default to prevent pushing the encoder knob and enter a mistaken value

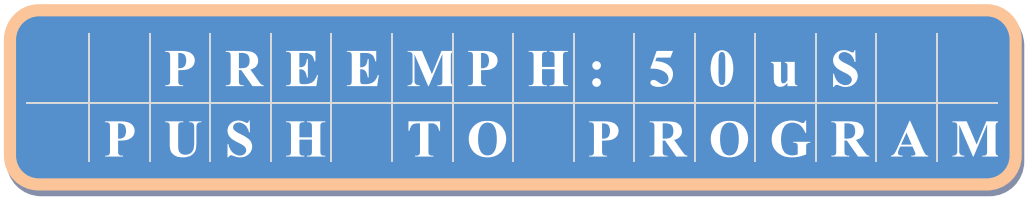
To validate your change move cursor to **YES** selection and press encoder knob, or move cursor back to **NO** selection to reject setting.

Each time a **YES** selection is made the following slide appears, or if no change is made programming is exited

The microprocessor stores the new data in the memory and selected value is active

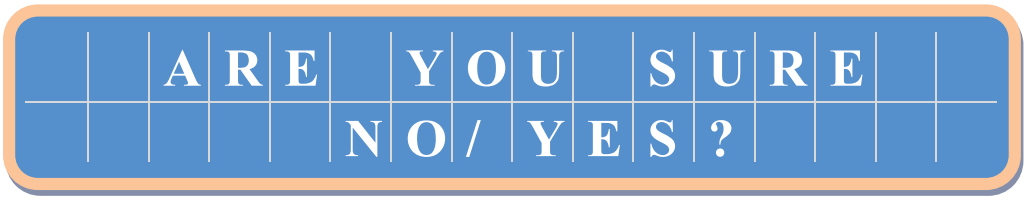
3) PRE-EMPHASIS SETTINGS

The following slide shows the stored Pre-emphasis value and consequently “on air”. It is also the access point to the slide for setting the Pre-emphasis value



Preemphasis is set at 50 uS. Push as indicated and the following slide is shown

Turn encoder knob to increase or decrease value. Set the Pre-emphasis value to 50uS, or 75uS or Linear.
Exit, or close and confirm new value by pushing the knob



Cursor highlights **NO** selection by default to prevent pushing the encoder knob and enter a mistaken value

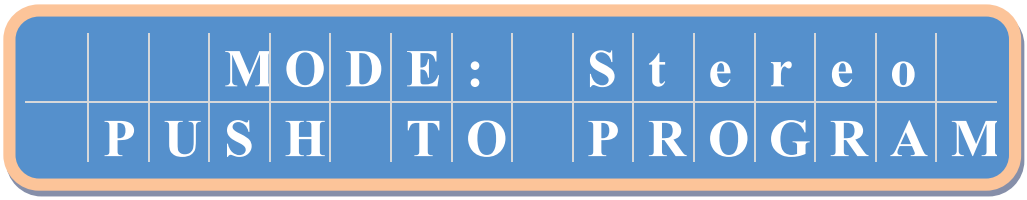
To validate your change move cursor to **YES** selection and press encoder knob, or move cursor back to **NO** selection to reject setting

Each time a **YES** selection is made the following slide appears, or if no change is made programming is exited

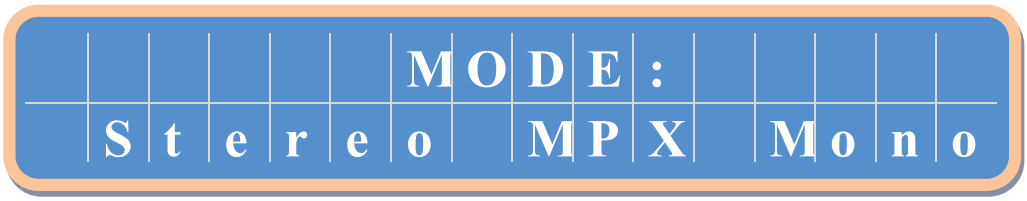
The micro stores the new data in the memory and new value is active

4) MODE SETTINGS

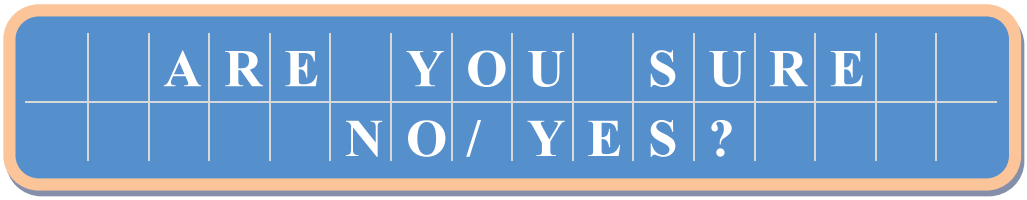
The following slide shows the stored MODE and consequently “on air”. It also allows the access to the slides for the MODE routine



Push encoder knob and the following slide displays



Turn the encoder knob and set MODE to Stereo, MPX or Mono. To enter new value press encoder knob, move cursor to YES selection to accept or NO to reject selection

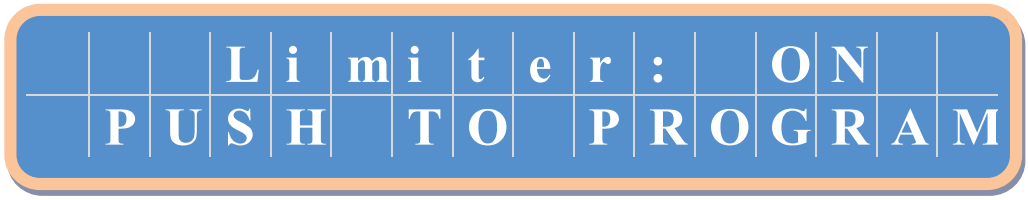


Next slide is

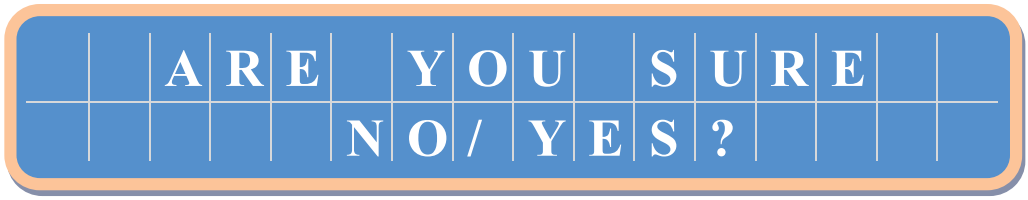
The microprocessor stores new data in the memory and new value is set

5) LIMITER SETTING

The following slide shows the LIMITER status and how to switch ON or off as required



To enter new value press encoder knob, move cursor to YES selection to accept or NO to reject selection



If YES is selected following slide is

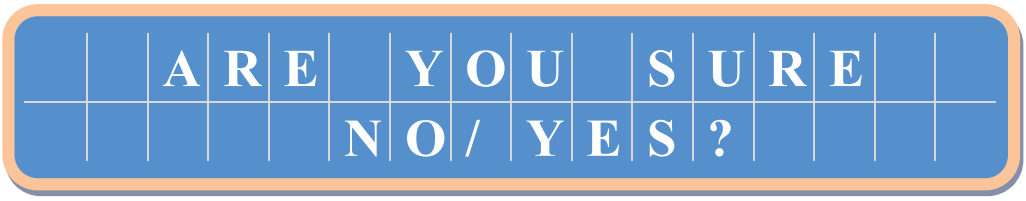
The microprocessor stores new data in the memory and new Limiter status is active

MEMORY SETTING

To program the different memories of Transmitter you must enter the SETTING MEMORY menu, as shown in the example below

Press encoder knob and the slide displays

Turn encoder knob to select the memory to program. Pushing the encoder knob to access the "setting state" which is indicated by the (yellow) front panel LED switching on. All selected parameters such as Frequency, Power, Audio, Address, etc etc can be set up and stored in the chosen memory



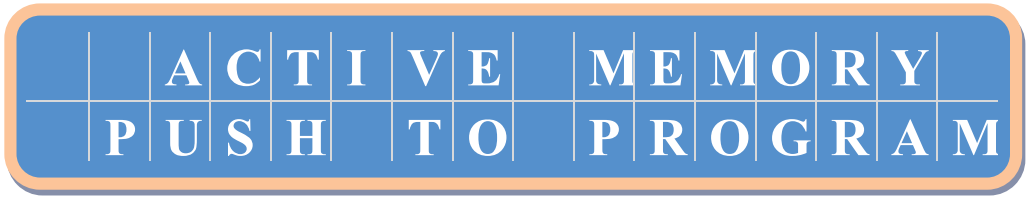
Slide above shows how to confirm as usual and below the micro loads new data

Note:
If you are in SETTING MEMORY only the slide for programming is displayed;
To activate a memory you must exit the SETTING MEMORY menu

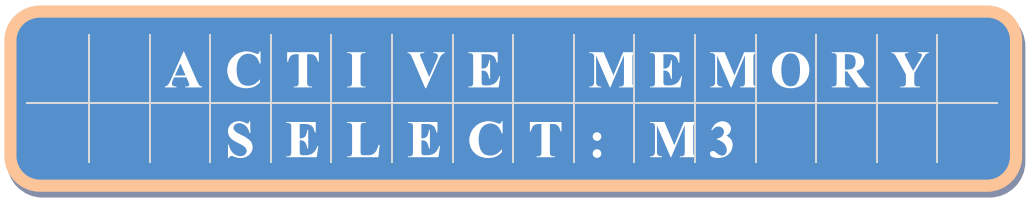
This is a very important slide: please pay attention to slide because it indicates:

1. Which memory successive data will enter (“MEMORY SET”)
2. Which memory must be set as operational for current configuration

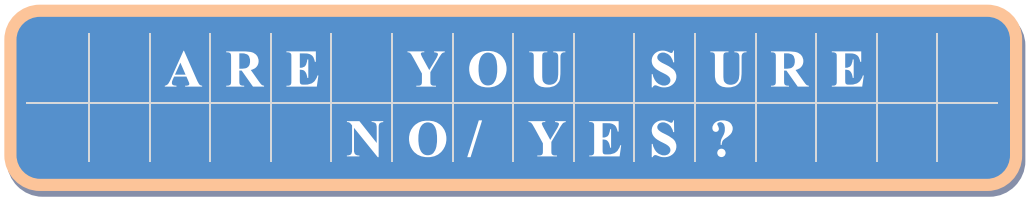
ACTIVE MEMORY



To activate the parameters stored in a different memory of the transmitter select the **ACTIVE MEMORY** menu as shown in the following slide



Turn the encoder knob to select a specific memory and confirm selection as usual. Move cursor to YES selection and press encoder knob



If YES selection

New data is stored

OTHER SETTING MENU

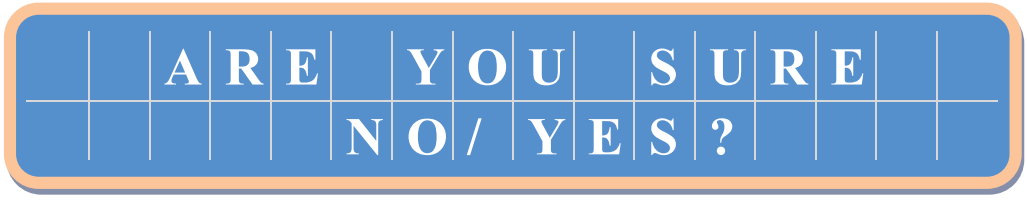
Setting Menu refers to a number of specific settings. Push the encoder knob to program the Local/Remote status, Interlock condition or Power good

1) LOCAL/REMOTE Operation

The following slide shows current mode of operation

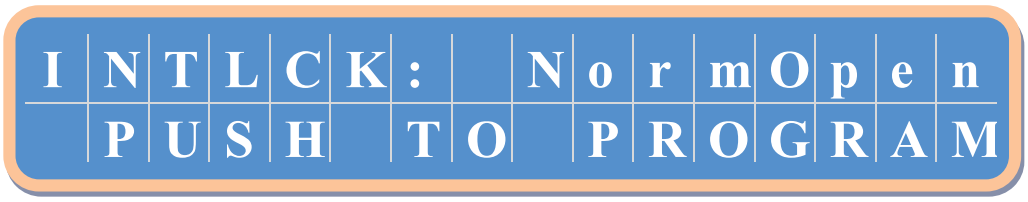
Push encoder knob to program new mode of operation

Turn encoder to select Local or Remote Operation as required. Move cursor to NO selection and press to confirm. New data is stored as usual

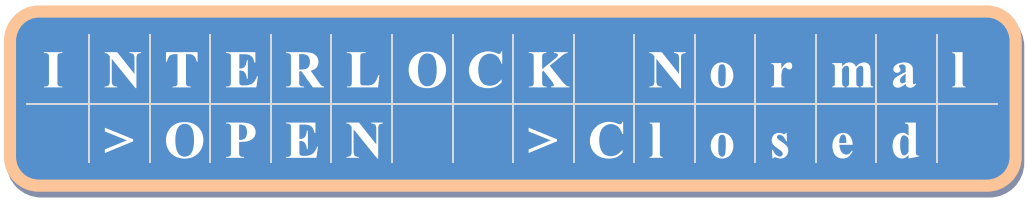


2) Normal Open\Normal Closed INTERLOCK

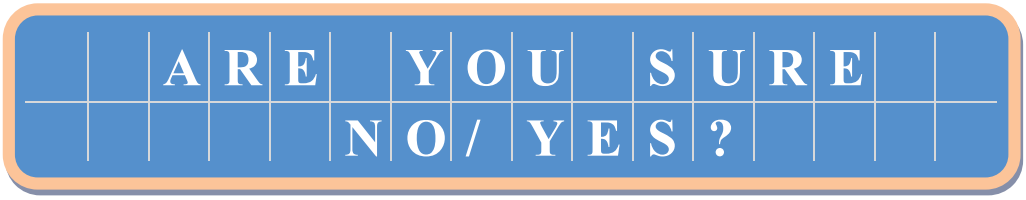
The following slide shows the currently stored “Interlock” status



Push encoder knob to program new data and slide shown is



Turn encoder knob to select Normal Open or Normal Closed operation for Interlock. Move cursor to YES selection and press to confirm. New data is stored as usual



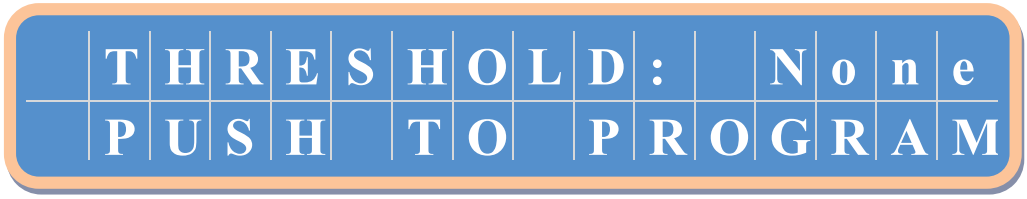
IF YES selection is made following slide is

New data is stored

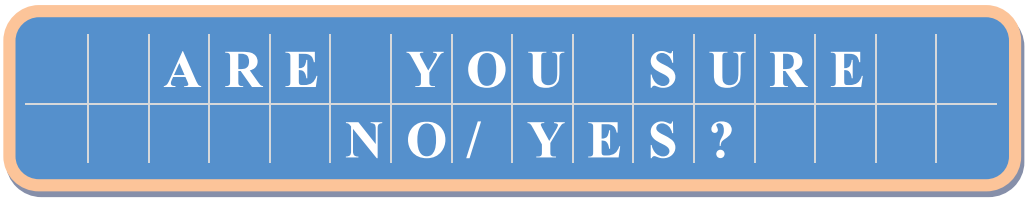
3) POWER GOOD

This value determines the minimum level for RF output power considered to be good. A value below this preset threshold causes the transmitter to fail.The slide below shows the “Power good” value currently stored

Push knob to program value and the following slide is



Turn the encoder knob to select and set value for power good. Move cursor to YES selection and press to confirm. New data is stored as usual



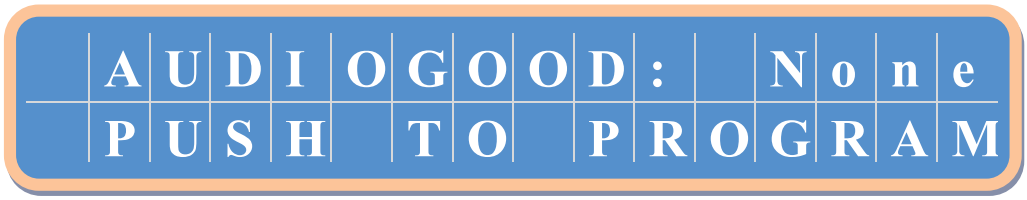
If YES selection is made

New data is stored

Note: if you select “None” power good is disabled

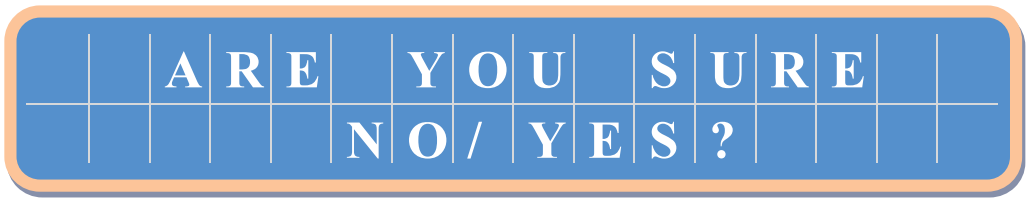
4) AUDIO GOOD

The following slide shows the "Audio good" value currently stored



Push encoder knob to program required value and the slide appearing is

Turn encoder knob to select desired value of audio good. Move cursor to YES selection and press to confirm. New data is stored as usual



If YES selection is made

New data is stored

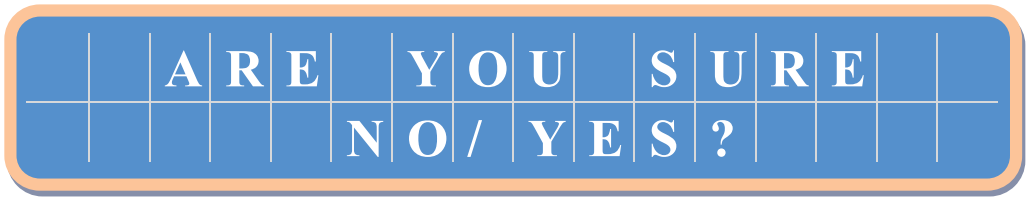
Note: if you select "None" audio good is disabled

NET CONFIGURATION PAGES

The following slide shows the address assigned to equipment; address (00) is default address assigned by manufacturer. This function allows equipment to be identified and addressed when included in a Network because each Transmitter is identified by address assigned

Push encoder knob to program a different address

Turn the encoder knob and a specific 2-digit address can be set and saved in memory. The usual confirmation and storing procedure



If YES selection is made

New data is stored

Section*Six* ❻

SPECIAL PROGRAM MODE OPERATIONS

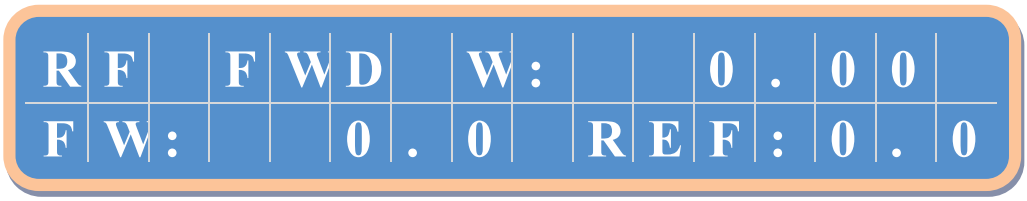
RF POWER RESET

This special feature has been included **to give** transmitter the capability of starting from 0 power. If you wish to start from zero (0) power and there is no Dummy Load available follow the procedure below.

IMPORTANT NOTICE: procedure must be carried out using both hands to avoid the accidental mistaken power reset

Switch OFF transmitter from rear panel
Keep the front panel encoder continuously pressed
Switch ON transmitter and keep encoder knob pressed simultaneously

Slide below appears



Set up required RF power output and push the encoder knob to confirm and store new data

Section Seven ❼

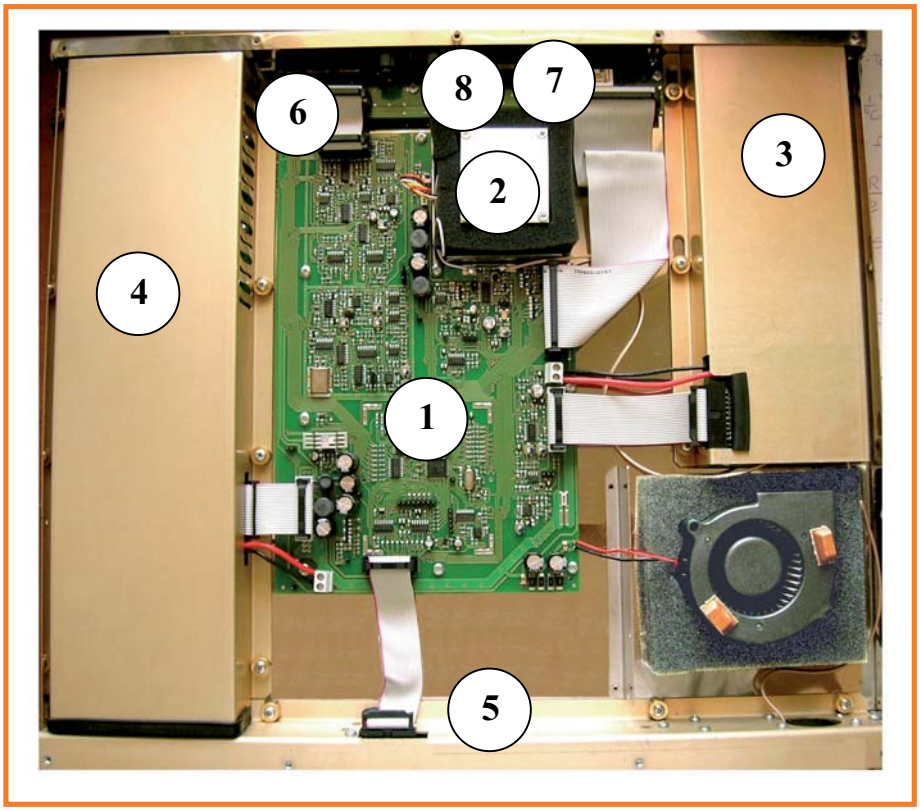
SERVICE & MAINTENANCE

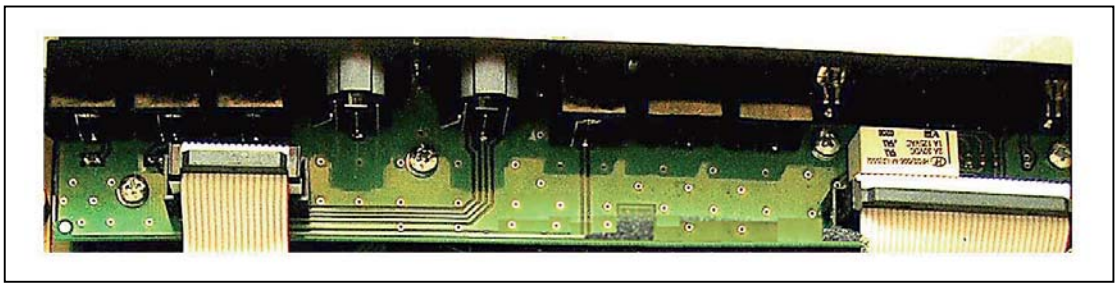
Transmitter subsystems

The transmitter is built using the following parts which are replaceable units:

1. Mother Board
2. VCO and 0.1 W Amplifer
3. RF Power amplifier, Low-Pass Filter, Directional Coupler
4. SMPS Power Supply
5. Logic Board and Display
6. Connector Board
7. AES-EBU Input Module (optional)
8. External Reference PLL synch (optional)

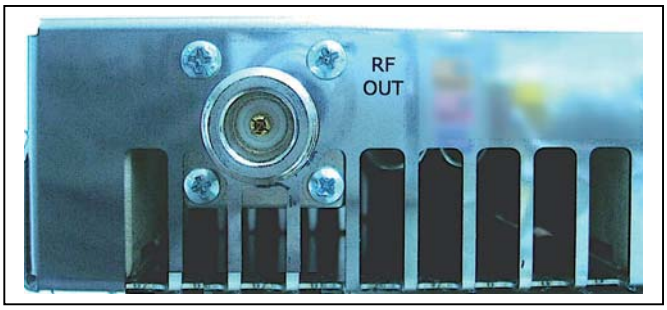
Parts Overview (version 2008)



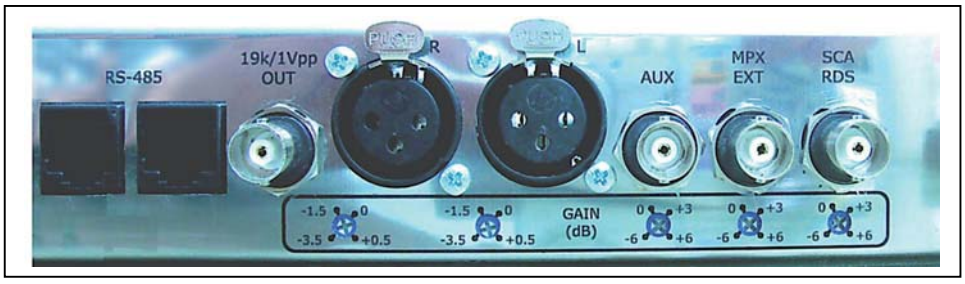


Rear Panel - Connector Board

Rear Panel - Mains Socket



Rear Panel – RF Output

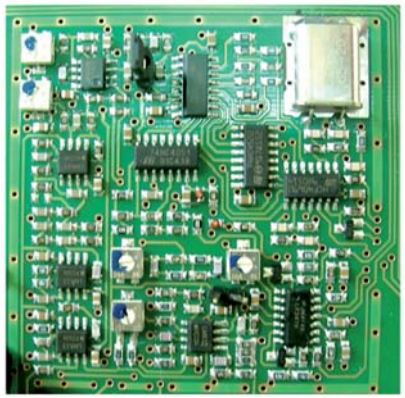


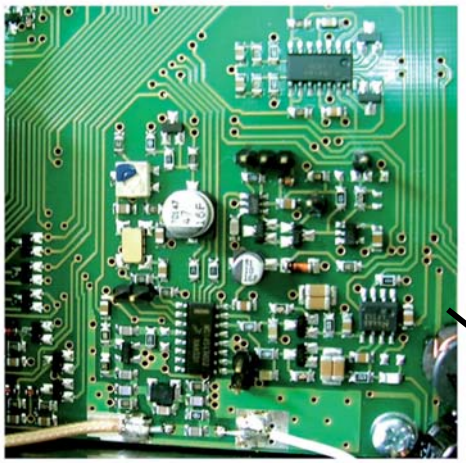
Rear Panel – Audio & BB Signal IN/OUT

This page was intentionally left blank

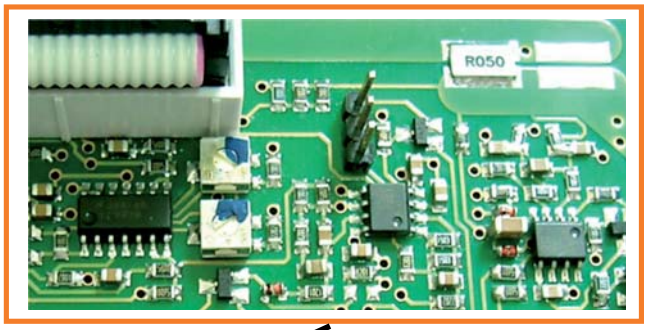
I

Stereo Coder

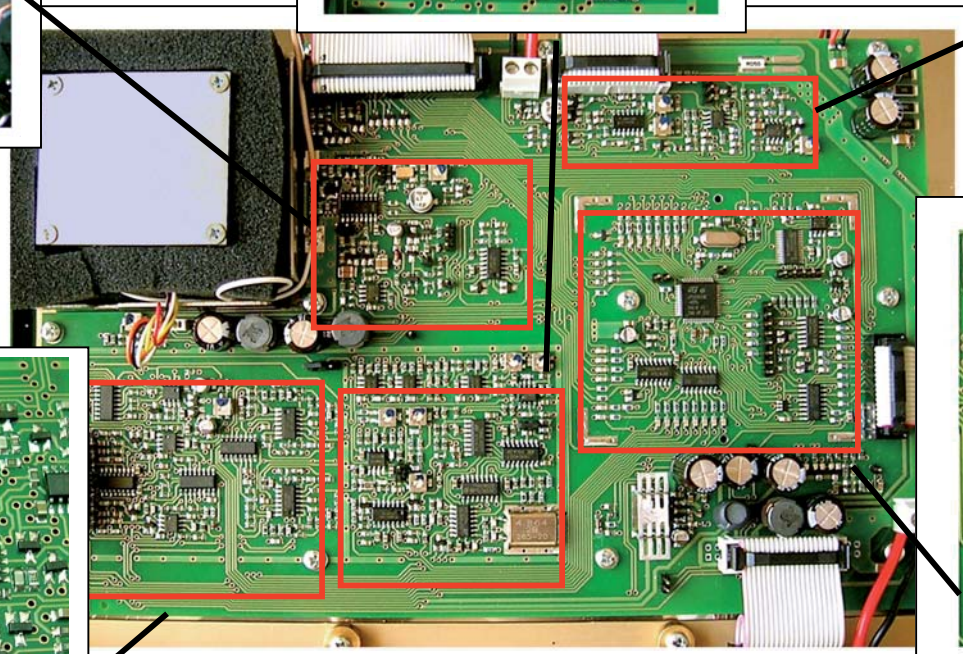




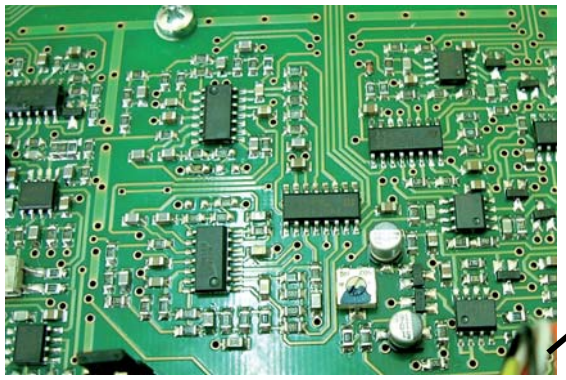
Phase Lock loop (PLL)

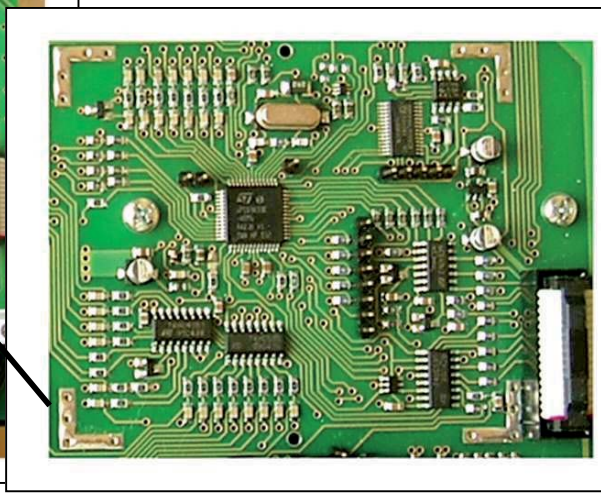


Readings

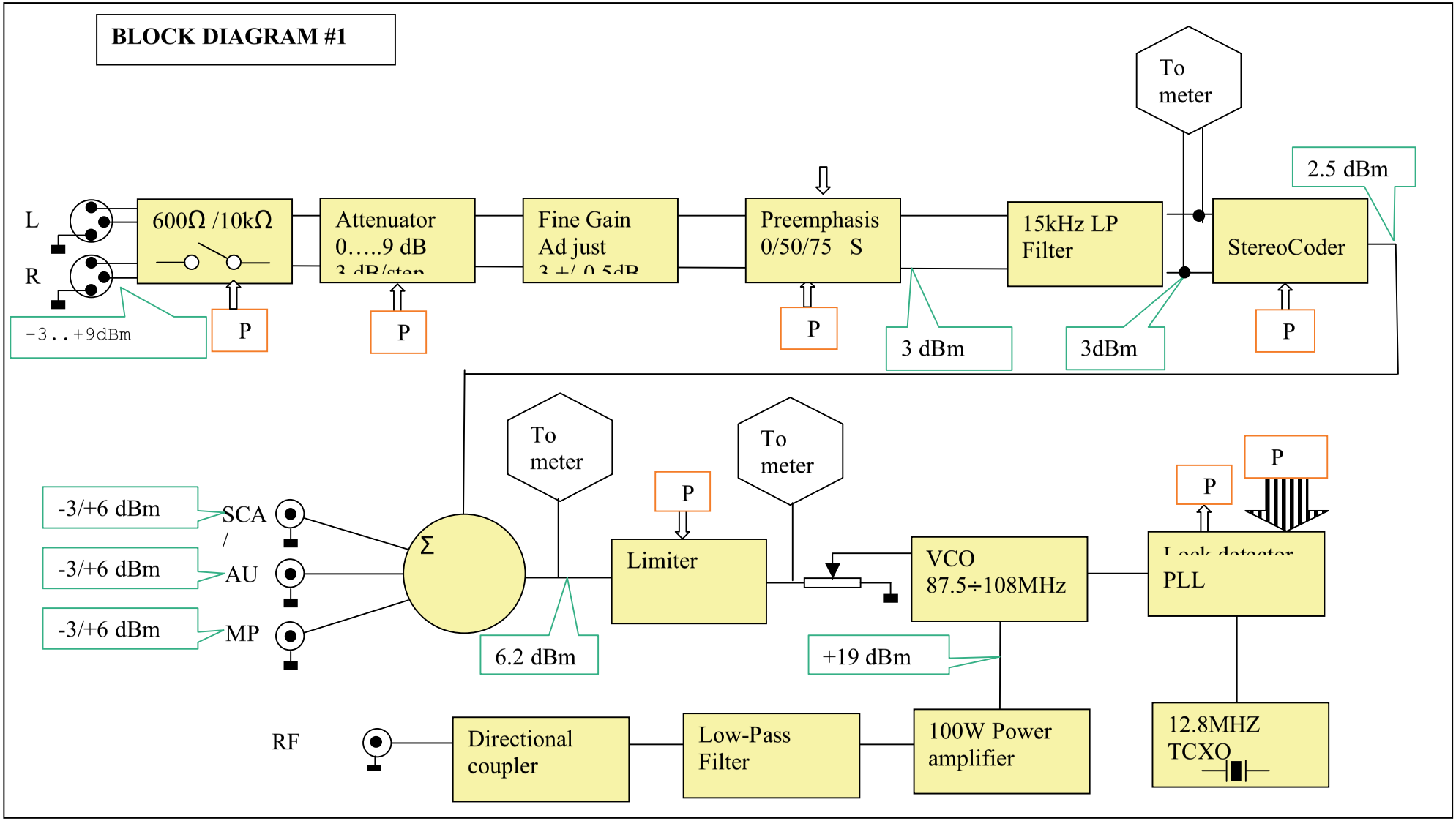


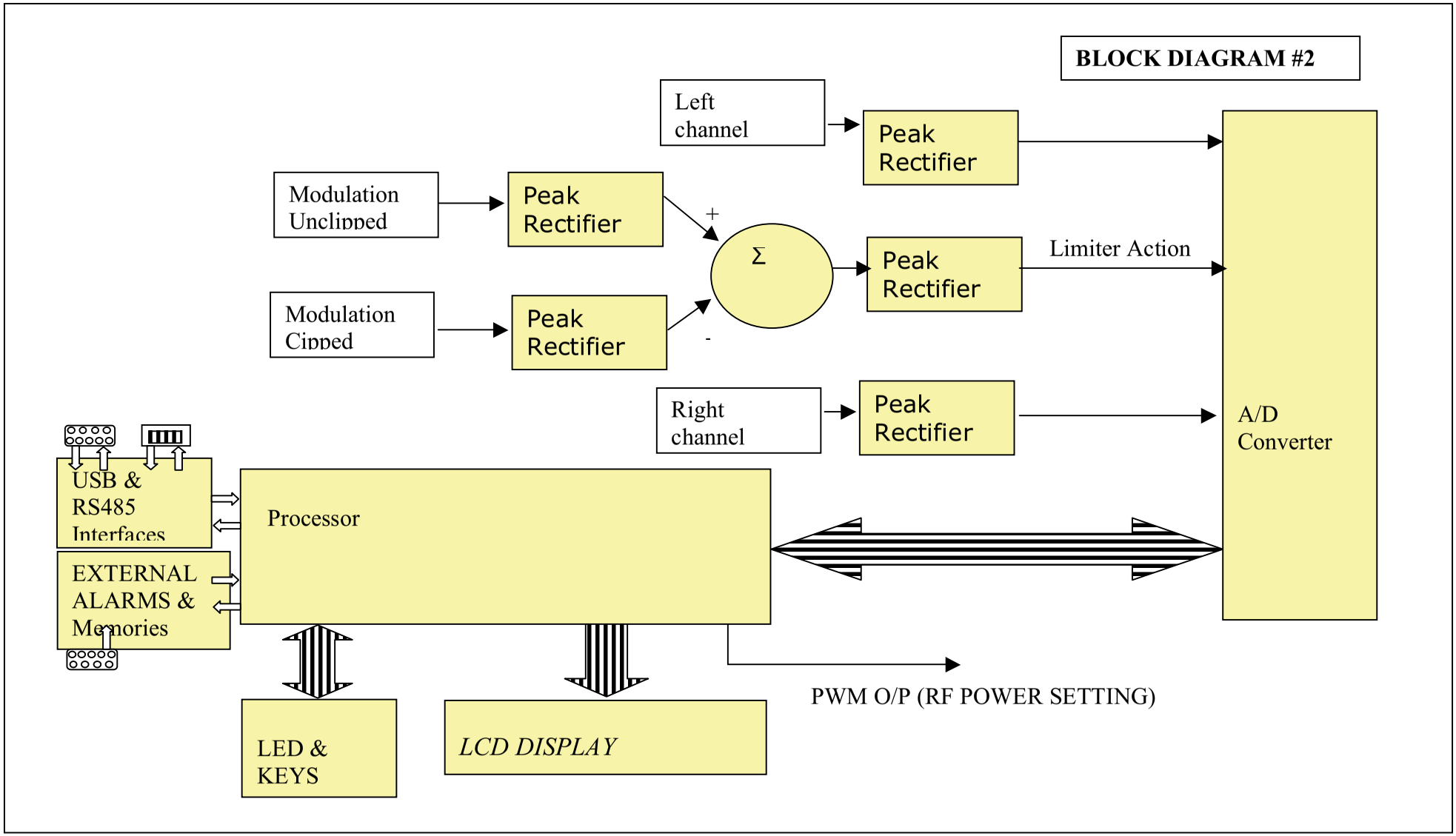
Audio Section & Filtering





Microprocessor & Logic


BLOCK DIAGRAM #1
To meter
2.5 dBm
L
R
600Ω /10kΩ
Attenuator 0…..9 dB
Fine Gain Ad just
Preemphasis 0/50/75 S
15kHz LP Filter
StereoCoder
-3..+9dBm
P
P
P
3 dBm
3dBm
P
To meter
To meter
P
P
P
-3/+6 dBm
SCA
/
-3/+6 dBm
AU
-3/+6 dBm
MP
Σ
Limiter
VCO 87.5÷108MHz
PLL
6.2 dBm
+19 dBm
RF
Directional coupler
Low-Pass Filter
100W Power amplifier
12.8MHZ TCXO


BLOCK DIAGRAM #2
Left channel
Peak Rectifier
Modulation Unclipped
Peak Rectifier
+
Σ
Peak Rectifier
Limiter Action
Modulation Cipped
Peak Rectifier
-
Right channel
Peak Rectifier
A/D Converter
USB & RS485 Interfaces
Processor
EXTERNAL ALARMS & Memories
PWM O/P (RF POWER SETTING)
LED & KEYS
LCD DISPLAY