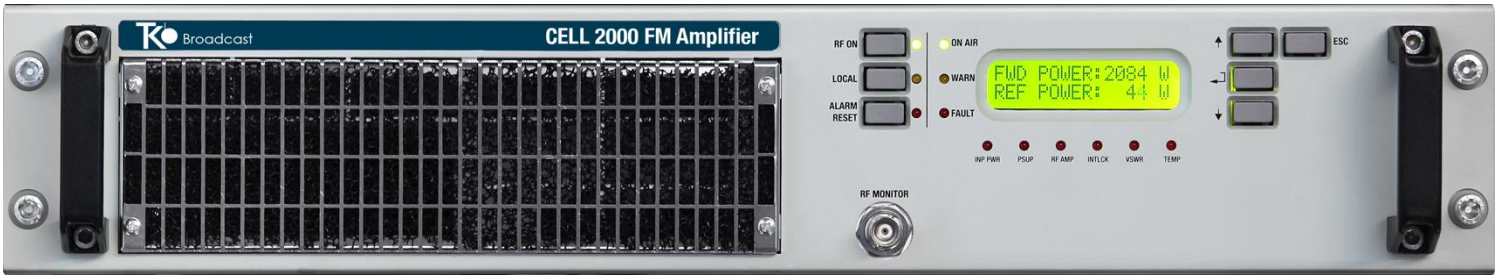
TEKO Broadcast

CELL 500 Amplifier
CELL 1000 Amplifier
CELL 2000 Amplifier
CELL 2500 Amplifier
CELL 3000 Amplifier



USER MANUAL

TEKO Broadcast

Equipment was designed using the latest technologies and techniques available for Hardware and Software and includes the following features:

- State-of-the-art performance at reasonable cost
- μP controlled
- Extremely high efficiency
- Compact weight and dimensions
- Completely broadband: instantaneous BW > 20 MHz
- User-friendly self-explaining monitoring of all important parameters and setting values
- Remote control for telemetry and commands available on rear panel (DB25, DB9)
- Two independent RS485 ports on rear panel
- Modular construction specifically designed to minimize spare parts set
- All RF amplifiers use last-generation semiconductors: RF Power LDMOS 1400W - BLF188XR or MRF1K50H
- Automatic Power Control (APC), maintaining stable RF output power up to 45°C.
- 1.5:1 is standard working VSWR - higher values cause power reduction
- Lightweight RF power module with removal and replacement from mainframe in less than five minutes
- Very fast acquisition latching indicators showing transient conditions
- Nominal RF o/p level exceeding 2000W. Typical and test max power in excess of 2200W. Continuously adjustable power output with extremely high efficiency
- Built-in RF harmonic filter and true wattmeter
- High spectral purity: harmonics < -80 dBc
- AC mains 190-265V reliable 3500W PWS with PFC
- CCIR & FCC compliant
- All functions controlled by push buttons and a two-row/sixteen character LCD display. Intuitive configuration of parameters
- External control of alarms, TX-on, TX -off, jack -ON, jack-OFF, mains absence, power good, IPA, VPA, REFLECTED Power, FORWARD Power through a DB25 connector located on rear panel
- Windows© SW for complete management of all transmitter functions
- Stand-alone equipment or in a system for higher power (4000, 6000, 10000, 12000, 14000 16000 W), if used withTEKO BroadcastPower Dividers Combiners (PDC)

TEKO Broadcast

Technical Specifications

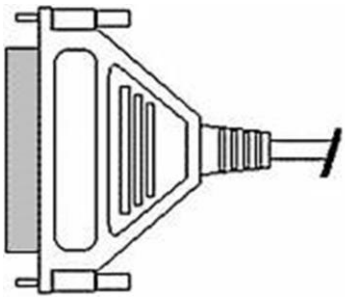
GENERAL	
1. Power Output	100 to 500W adjustable from front panel on CELL 500 100 to 1000W adjustable from front panel on CELL 1000 200 to 2000W adjustable from front panel on CELL 2000 200 to 2500W adjustable from front panel on CELL 2500 200 to 3000W adjustable from front panel on CELL 3000
2. RF Output Impedance	50Ω
3. RF Input Impedance	50Ω R.L.< -20dB
4. RF input & Output Connector	"N" female - Out:"7/16" - on request "7/8"
5. RF Drive requirement	800 mW
6. Monitor RF	-54 dBc - BNC connector
7. Frequency Range	87.5 to 108 MHz - on request 66 to 74 MHz (OIRT); 76 to 90 MHz (JPN)
8. VSWR	1.5:1 Maximum with automatic fold-back at higher VSWR
9. RF Harmonics	Exceeds EBU/CCIR/FCC requirements
10. RF Spurious	Exceeds EBU/CCIR/FCC requirements
11. Residual AM	Better than -60 dB

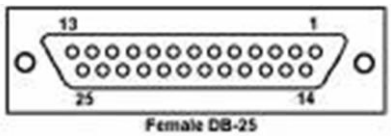
ELECTRICAL	
12. AC Input power	230 VAC + 10% / -15%; 50/60 HZ Single phase
13. AC Power consumption	650VA@500W, 1300VA@100W, 2800 VA @ 2000W
14. Power Factor	Cos Φ> 0.98
15. Cooling	Forced air

ENVIRONMENTAL	
1. Operating temperature	-5° C to + 45° C
2. Guaranteed performance temperature	0° C to + 40° C
3. Max operating altitude	3,000 mt.
4. Relative humidity range	0 to 90%

PHYSICAL	
1. Mounting STANDARD	Standard 19" chassis 2 U Rack
2. Mounting HOT-PLUGGABLE (optional)	Standard 19" chassis 2 U Rack with HOT-PLUG Adapter (see page 17-18-19-20)
3. Size	483 mm (W) x 650 mm (D) x 88 mm (H)
4. Weight	~ 15 Kg

AUXILIARY CONNECTORS	
1. USB	type B female connector - FRONT panel
2. RS485-1	serial interface RJ45 connector - REAR panel
3. RS485-2	serial interface RJ45 connector - REAR panel
4. Telecontrol (TC, TA, TS), Interface	DB25F connector - REAR panel
5. Telemetry Interface	DB9F connector - REAR panel





TEKO Broadcast

DB25 CONNECTOR
(See NEXT page)

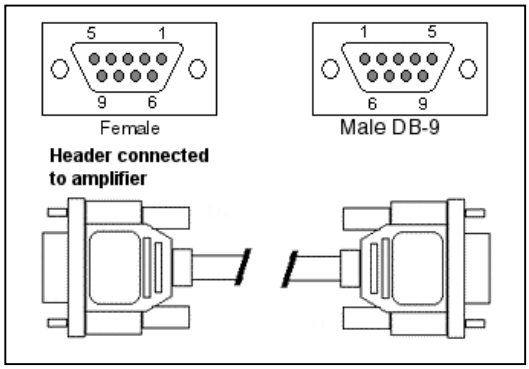
TEKO Broadcast

Connectors Pin-out

DB25 (REAR PANEL) *TC* = TELECONTROL; *TA* = TELEALARM; *TS* = TELESIGNALLING					
Pin	**Description**	**Acronyms**	**Type**	**I/O**	**Value @ & Operating Capability**
1	Interlock Output – changes status when Amp is in 'Fault'. Inhibits Exciter or other equipment	**OUT-INTRLK**	Control (TC)	➡	Open Drain, 20V max 20mA max. Pin can be set Normal open/Normal close; Ron =5 Ω
2	Acknowledge – changes status when Amp is in 'Wait'	**ACK-WAIT**	Signal (TS)	➡	Open Drain, 20V max 20mA max. Pin can be set Normal open/Normal close; Ron =5 Ω
3	Not Used	**--**	--	**--**	--
4	Power Good – changes status when read value decreases below programmed value	**ACK-PWRGOOD**	Alarm (TA)	➡	Open Drain 20V max 20mA max. Pin can be set Normal open/Normal close; Ron =5 Ω
5	Acknowledge OFF – changes status when Amp is OFF	**ACK-OFF**	Signal (TS)	➡	Open Drain 20V max 20mA max. Pin can be set Normal open/Normal close; Ron =5 Ω
6	Alarm Reset – resets alarm memory when temporarily connected to ground	**ALARM-RST**	Control (TC)	⬅	200 mSec pulse from open to ground; 1mA; < 100 Ω
7	Not Used	**--**	--	**--**	--
8	TX Off – switches off Amp remotely	**TX-OFF**	Control (TC)	⬅	200 mSec Pulse from open to +9 Volt (Pin 25) 1mA; < 100 Ω
9	Interlock Input – if not continuously connected to or open from ground depending on selection: N.O or N.C causes 'Wait'	**EXT-INTRLK**	Control (TC)	⬅	Contact resistance < 100 Ω
10	Set Memory # 6 (*) pin selects memory if continuously connected to ground	**M6**	Control (TC)	⬅	Contact resistance < 100 Ω
11	Set Memory # 4 (*) pin selects memory if continuously connected to ground	**M4**	Control (TC)	⬅	Contact resistance < 100 Ω
12	Set Memory # 2 (*) pin selects memory if continuously connected to ground	**M2**	Control (TC)	⬅	Contact resistance < 100 Ω
13	GROUND – pin is connected to ground	**GND**	Ground	**--**	Ground
14	General Alarm – changes status when Amp is in 'Fault'	**FAULT**	Alarm (TA)	➡	Open Drain 20V max 20mA max Ron =5 Ω
15	Not Used	**--**	--		--
16	GROUND – pin is connected to ground	**GND**	Ground	**-**	Ground
17	Not Used	**--**	--		--
18	Acknowledge – ON changes status when Amp is ON	**ACK-ON**	Signal (TS)	➡	Open Drain 20V max 20mA max Ron =5 Ω
19	1= Local 0= Remote	**LOC-REM**	Signal (TS)	➡	Open Drain 20V max 20mA max Ron =5 Ω
20	TX On – switches on Amp remotely	**TX-ON**	Control (TC)	⬅	200 mSec Pulse from open to +9 Volt (Pin 25) 1mA; < 100 Ω
21	Force to Internal Stereo (*) – forces MPX from Ext to Int Stereo coder	**FORCE-INT-STEREO**	Control (TC)	⬅	Contact resistance < 100 Ω
22	Set Memory # 7 (*) pin selects memory if continuously connected to ground	**M7**	Control (TC)	⬅	Contact resistance < 100 Ω
23	Set Memory # 5 (*) pin selects memory if continuously connected to ground	**M5**	Control (TC)	⬅	Contact resistance < 100 Ω
24	Set Memory # 3 (*) pin selects memory if continuously connected to ground	**M3**	Control (TC)	⬅	Contact resistance < 100 Ω
25	Auxiliary Power Supply Output	**+9V**	Output	➡	+9 Volt/100mA max
Symbols: ➡ Output ⬅ Input **(*)** Combo version only					

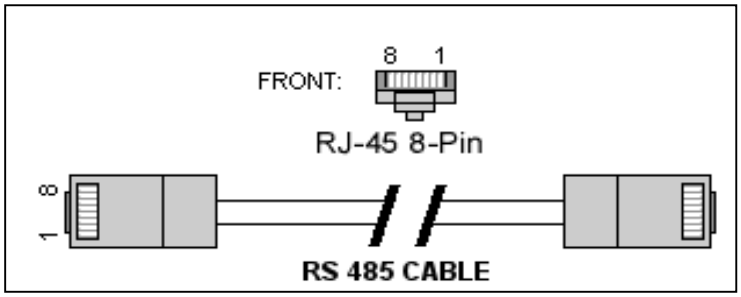
TEKO Broadcast

DB9



TELEMETRY DB9 (REAR PANEL)					
Pin	**Description**	**Acronyms**	**Type**	**I/O**	**Value @ / Impedance**
1	GROUND –	**GND**	Gnd	-	
2	Current reading – reads power Amp current	**IPA**	Analog value	➡	3.0V/50A Internal impedance > 100kΩ
3	Forward Input Power –reads Forward RF driving power	**INP-FWD-MEAS**	Analog value	➡	2.5V/30W Internal impedance > 100kΩ
4	Forward Output Power – reads Forward RF Output power	**OUT-FWD-MEAS**	Analog value	➡	3.0V/1300W Internal impedance > 100kΩ
5	Temperature – reads incoming air temperature	**TEMP-AIR-MEAS**	Analog value	➡	2.0V/80°C Internal impedance > 100kΩ
6	Voltage reading – reads voltage supplied to power Amp	**VPA**	Analog value	➡	3.0V/50V Internal impedance > 100kΩ
7	Input Reflected Power – reads Input reflected power	**INP-REF-MEAS**	Analog value	➡	2.5V/7W Internal impedance > 100kΩ
8	Output Reflected Power – reads Output reflected power	**OUT-REF-MEAS**	Analog value	➡	3.0V/250W Internal impedance > 100kΩ
9	RF Temperature – reads RF heat sink temperature	**RF-TEMP-MEAS**	Analog value	➡	1.0V/100°C Internal impedance > 100kΩ
Symbols: ➡ Output ⬅ Input					

RJ45



RS485 –CONNECTORS RJ45 1 & 2 (REAR PANEL)					
Pin	**Description**	**Acronyms**	**Type**	**I/O**	**Value @**
1	RS485 Line1 - Terminal A used for Telemetry Control	**A1**	Communication	⬅ ➡	Differential output(+/-5V) Baud rate 115200 b/sec Parameters - 9,N,1
2	RS485 Line1 - Terminal B used for Telemetry Control	**B1**	Communication	⬅ ➡	
3	GROUND	**Gnd**			
4	Not Used	**--**			
5	Not Used	**--**			
6	GROUND	**Gnd**			
7	RS485 Line2 - Terminal A used for External Host	**A2**	Communication	⬅ ➡	Differential output(+/-5V) Baud rate 115200 b/sec Parameters - 9,N,1
8	RS485 Line2-Terminal B used for External Host	**B2**	Communication	⬅ ➡	
Symbol: ⬅ ➡ by-directional					

TEKO Broadcast

LD-MOSFET devices

Order Now View Product Details

NXP MRF1K50H 1500W RF Power Transistor

NXP MRF1K50H 1500W RF Power Transistor combines the highest RF output power with superior ruggedness and thermal performance. The transistor is designed to deliver 1.50kW CW at 50V and reduces the number of transistors in high-power RF amplifiers. MRF1K50H has an unmatched input and output design allows for wide frequency range use from 1.8 to 500MHz. Applications include laser and plasma sources to particle accelerators, industrial welding machines, radio and VHF TV broadcast transmitters, and amateur radio linear amplifiers.

Features

- High Drain-source Avalanche Energy Absorption Capability
- Unmatched Input and Output Allowing Wide Frequency Range Utilization
- Device Can Be Used Single-Ended or in a Push-Pull Configuration
- Characterized from 30 to 50V for Ease of Use
- Suitable for Linear Application
- Integrated ESD Protection with Greater Negative Gate-Source Voltage Range for Improved Class C Operation
- RoHS Compliant

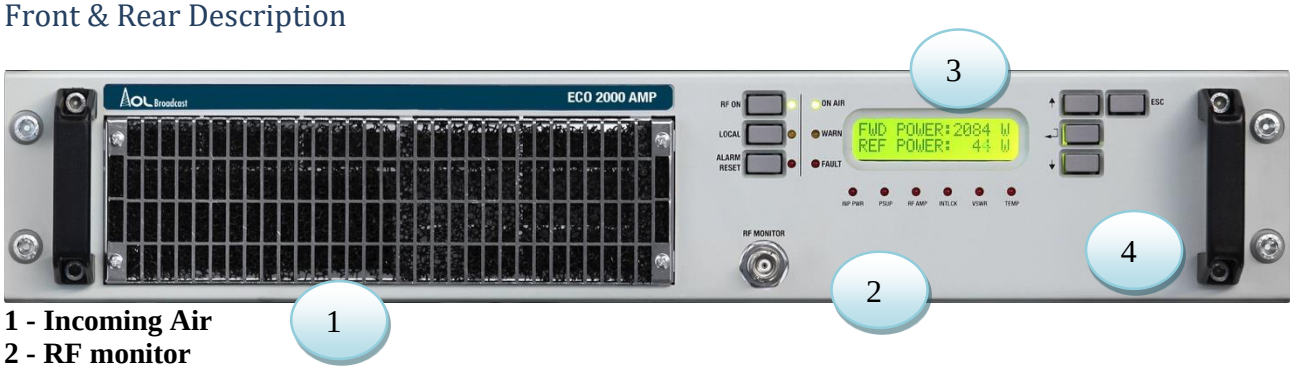
Technical

- Unmatched Input and Output
- Push-Pull
- Housed in an NI-1230 air-cavity ceramic package
- Extreme Ruggedness: 65:1 VSWR

Applications

- Industrial, Scientific, Medical (ISM)
  - Laser generation
  - Plasma etching
  - Particle accelerators
  - MRI and other medical applications
  - Industrial heating, welding and drying systems
- Broadcast
  - Radio broadcast
  - VHF TV broadcast
- Aerospace
  - VHF omnidirectional range (VOR)
  - HF and VHF communications
  - Weather radar
- Mobile Radio
  - VHF and UHF base stations

Front & Rear Description



1 - Incoming Air
2 - RF monitor
3 - LCD display
4 – Key board

Section Three

Installation & Use

Delivery

Please **carefully** inspect delivery box and check for punctures or other damage. If any,
Please notifyTEKO Broadcastas soon as possible.

For STAND ALONE equipment the following items are included:

- Amplifier
- Mains cable (in some countries cable is supplied with single connector and matching connector to adapt to local mains socket must be purchased by Customer

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

Operating Recommendations

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

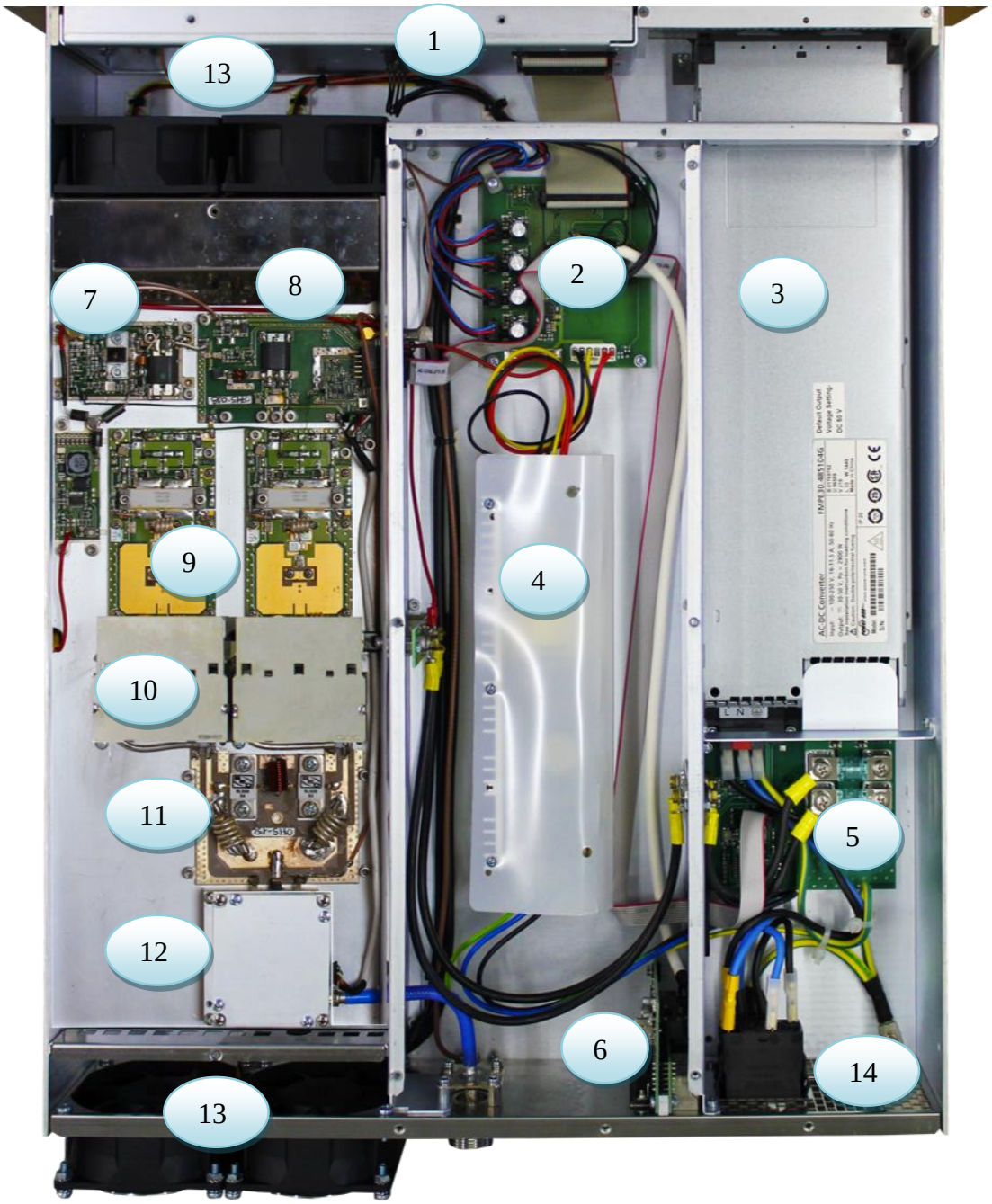
1. Ensure adequate ventilation to front and rear equipment. To prevent high temperature inside Amplifier ventilation must be provided to rack cabinet where equipment is installed (temperature should not exceed 45 °C degrees).

2. **Do not EVER operate Amplifier without cover**! Make sure TOP cover is in place and screws are locked firmly. Removing top cover causes serious damage to Amplifier.

3. Amplifier is built to provide a maximum power of 2100 W. We recommend to use amplifier at 2000 W power.

1- FANS for Exhaust Air
2- RF Output Connector
3- RF IN
4- Multi I-O Connector for Plug-In
5- On/Off Switch
6- VDE Ac Mains Socket 220/240 Vac

TOP VIEV



1 – LOGIC & DISPLAY BOARD	**6 – I/O BOARD**	**11 – 2KW COUPLER**
2 –INTERCONNECTION BOARDS	**7 – FM 30W DRIVER**	**12 – RF DETECTOR**
3 – AC/DC 3,5KW PWS	**8 – INPUT & PROTECTION**	**13 – FANS**
4 – AC/DC AUX 100W PWS	**9 – FM 1200W AMPLIFIER**	**14 – 16A VDE AND SWITCH**
5 – PWS CTRL BOARD	**10 – LOW PASS FILTER**	

Installation & Use

Delivery

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Description of CONTROL KEYS and LCD Display

The **control keys** located on front panel is the main access to control amplifier in conjunction with display readings. 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 modifies parameters and/or other values
- *special program:* it resets power and upgrades software

Description of Liquid Crystal Display

ROW #1➔

ROW #2➔

1	2	3	4	5	6	7	8	9	0	A	B	C	D	E	F
1	2	3	4	5	6	7	8	9	0	A	B	C	D	E	F

In all cases when pushing and the indication, "**Push to Program**" appears it is possible to modify parameters. This simple message "**Push to Program**" is the basic way to select and store data. A description of all available menus are detailed in the following sections

IMPORTANT FEATURES:

Up/Down keys: scrolls the sub-menus, increases or decreases a given value
Return Key : selects parameters to modify, stores values and confirms selection

Quick Start to Operate Amplifier

Power Supply Requirements

If mains cord is not supplied with connector, please attach an electric plug matching the socket used in your country to comply with required power and ground connection.

Power supply can work at any voltage between **185** and **265** VAC.

Switch On

Prior to installation and connection to the Mains and RF load or antenna, please connect Amplifier to the Exciter. The minimum required input power is **600 milliWatt**, but better results can be obtained if **800 milliWatt** power can be supplied.

Connect the Amplifier to (minimum required) 2500 W dummy load and turn it **ON** by pressing the switch placed on rear panel.

DEFAULT POWER IS NORMALLY SET AT APPROX. 200 W BY MANUFACTURER. PLEASE ADJUST VALUE TO REQUIRED POWER BEFORE USE

To adjust value enter **PROGRAM MODE**, select slide for power control and regulate accordingly. If Amplifier (previously set to power level) needs resetting to default value (approx. 200 W) please follow procedure detailed below.

Press the switch button on rear panel and **simultaneously** keep return key pressed. First slide appearing is

G1)

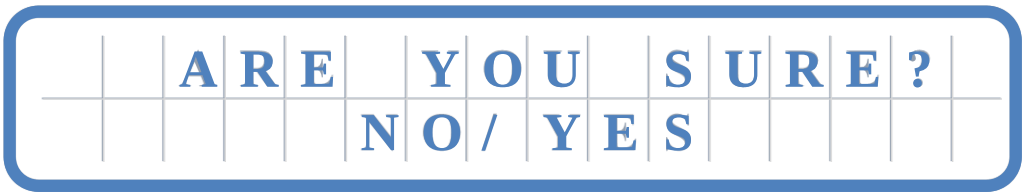
The routine procedure carries out preliminary tests. Power is automatically set to minimum RF output power and a sequence of dots indicates that ‘’test is in progress’’.

In addition, all LEDS switch ON in a sequence to self-test

REMEMBER: when initialising Amplifier *for the first time* you must keep return key pressed for a few seconds during the slide 'Init Test' until the slide below appears. This step is necessary to reset power values to default values

Forward power is approx. 200 W - slight variations may occur. Once Amplifier has completed Power Reset, Push up-down keys to program **RF** power

G2)

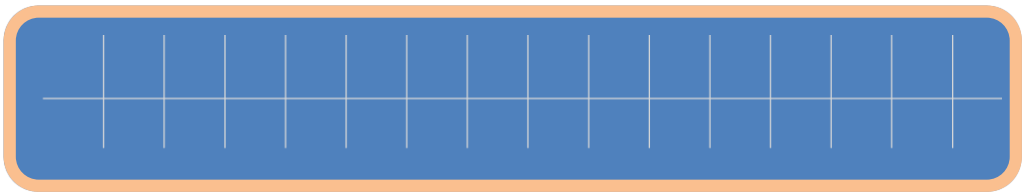


Cursor highlights **NO** selection by default. This avoids **accidentally** entering and confirming a value by mistake

To validate change move cursor to **YES** selection and press return key, or move cursor to **NO** selection to reject setting

Each time **YES** selection is made the following slide appears; if no change is made - programming is exited

G3)



The microcontroller stores data in the flash memory

Visual Mode

Visual Mode Description

Visual mode is designed to allow readings of main parameters of the Amplifier. It is possible to **visualize** parameters and other stored data whilst Amplifier is operating normally. Visual mode is intended for reading information and NO PROGRAM OPERATION is possible. Visual mode is therefore listed first in the sequence Visual/Program/Special. The Liquid Crystal Display is placed in the front panel central section to facilitate reading. It contains two rows of sixteen characters and visualizes the information listed below by simply press up/down key.

Twenty-eight (28) slides are described in **Section Four** to provide information on all parameters listed in the visual mode. Please note that information used in slides is only indicative.

Quick list of main parameters

1. **Output power**
- Forward power (FWD)
- Reflected power (REF)

2. **Power supply** (PWS)
- Current (I)
- Voltage (V)
- Mains AC voltage (AC-OK, AC-MIN/AC-LOW/AC-MAX)

3. **Evaluated efficiency** (% terms)
- RF section efficiency (Mosfet drain efficiency)
- Total efficiency (efficiency from Mains socket to RF Output connector)

4. **Temperature**
- Power supply temperature (PWS)
- Ambient temperature (AMB)
- Heat-sink RF block temperature (RF)

5. **Event log**
- Last twenty (20) events recorded, such as alarms or others

6. **General information** such as Software version, Manufacturer's website, Serial number, Telephone and Fax numbers

FURTHER INFORMATION IS FOUND IN '**LED DIODES DESCRIPTION**' (SEE NEXT PAGE)

Led Diodes Description

Brief colour classification:

- yellow LED - low attention warnings
- red LED - critical warnings
- green LED - correct status

Description:

RF ON: Green LED indicates RF is enabled

ON AIR: Green LED indicates amplifier is enabled

LOCAL (Local/Remote) Yellow LED indicates amplifier operates in local or remote mode (remote when light on)

WARN: Yellow LED indicates there is an incoming problem in the amplifier.

ALARM RESET: Red LED indicates to do reset of alarms

FAULT: Red LED indicates that a failure has occurred, or that any protection has reached the max numbers of attempts to restart.

INP PWR: Red LED shows a not correct power input, the input power must be set between 400mW and 800mW

PSUP: Red LED shows problem with AC/DC Power Supply (No DC voltage)

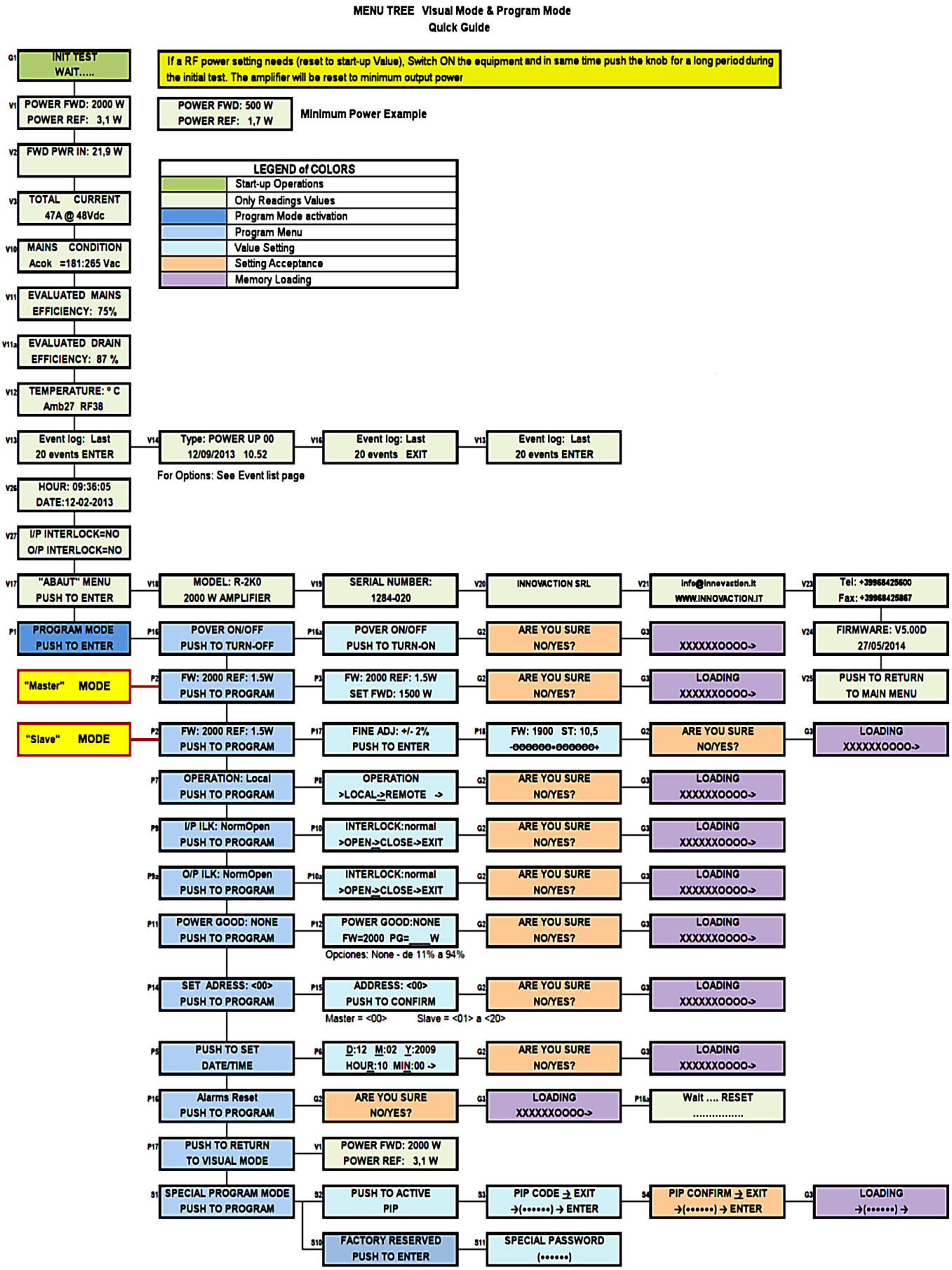
RF AMP: Red LED shows problem with RF section (No RF power out)

INTLCK: Red LED shows amplfier blocked from interlock chain

VSWR: Red LED indicating outpur reflected RF power is > 200W. Under these conditions amplifier is in stand-by

TEMP: indicates internal temperature > 70°C. Under these conditions amplifier is in stand-by

Flow chart (Return key Use) -Firmware 5.17-



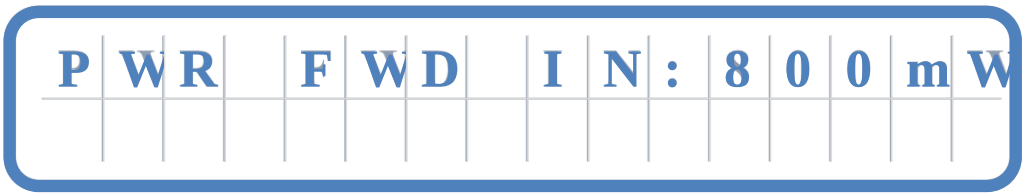
RF Slides

The following slide shows RF output power (**FWD**) and associated Reflected power (**REF**). This power is the actual power measured at **RF** Output connector

V1)

The following slide shows **RF** input power - the actual power measured at **RF** input connector. Both slides indicate readings of Forward **(FWD)** and Reflected **(REF)** power

V2)



Correct **D**riving power set-up is also indicated by led in front panel. Power should not exceed max level which causes amplifier to stop working, as indicated by **O**verdrive LED.

If this event occurs an alarm is saved in the memory

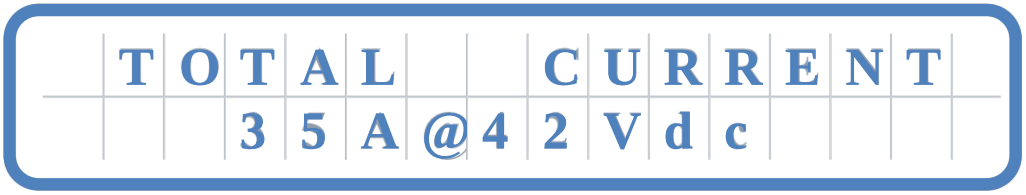
Supply Slides

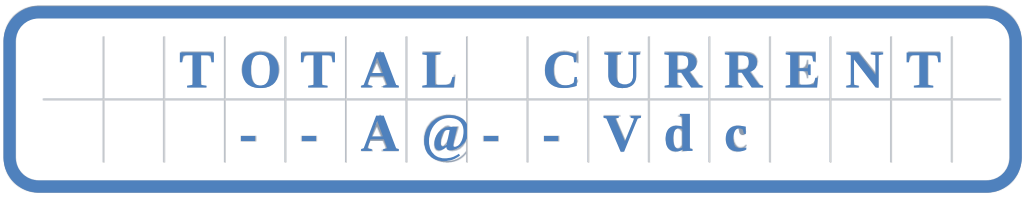
During Amplifier operating normally the slide below displays values of Power Supply section.

A : refers to Current absorption

Vdc : refers to Voltage supplied

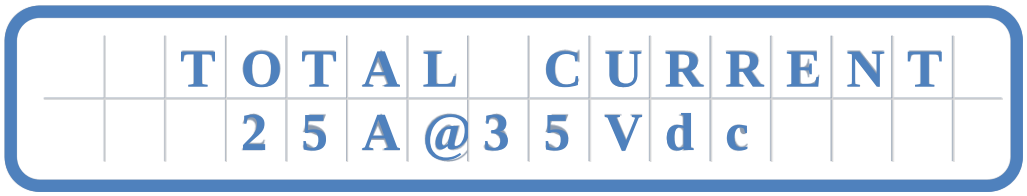
V3)





‘V3a’ shows empty spaces because protection has occurred and power supply is in stand-by mode

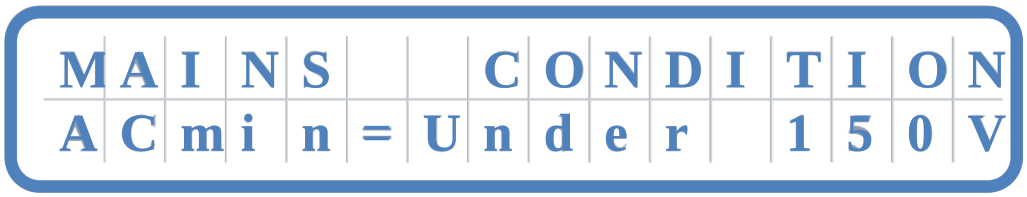
V3b)



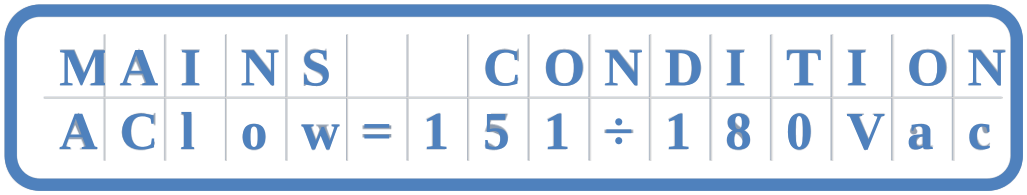
Total Current includes current absorbed at power stage and by fans and other sections. Hence the definition of **TOTAL CURRENT**

Only actual AC is highlighted below (only one out of the four slides below is displayed)

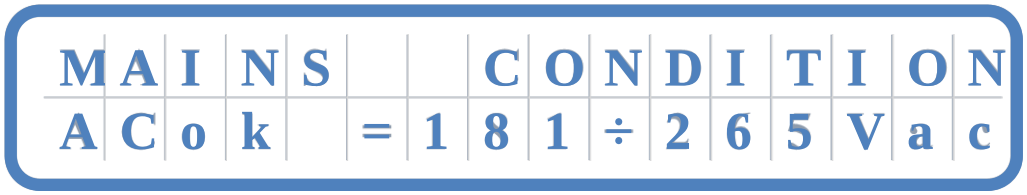
V4)



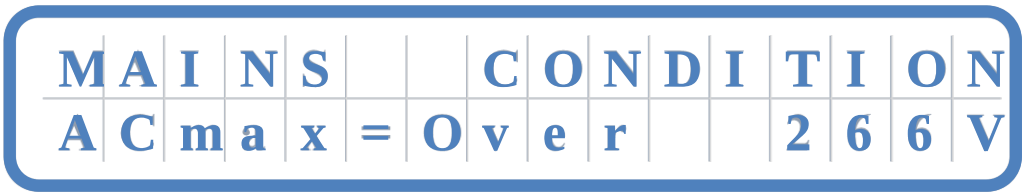
V5)



V6)

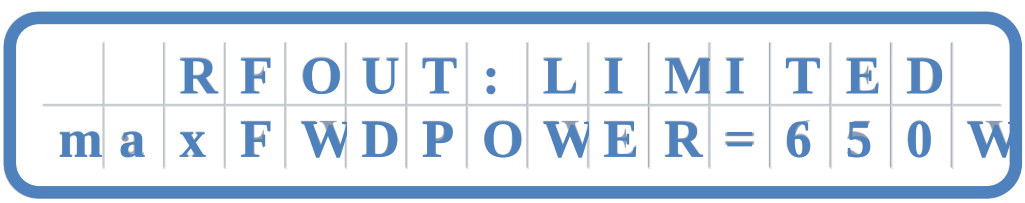


V7)



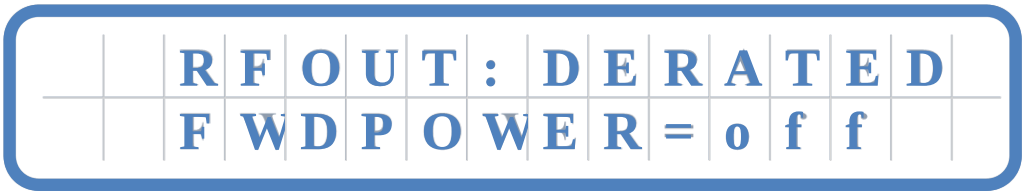
Slide below is not normally displayed and only appears in AC-Low condition - RF power is limited to 650 W, as described in Section 9

V8)

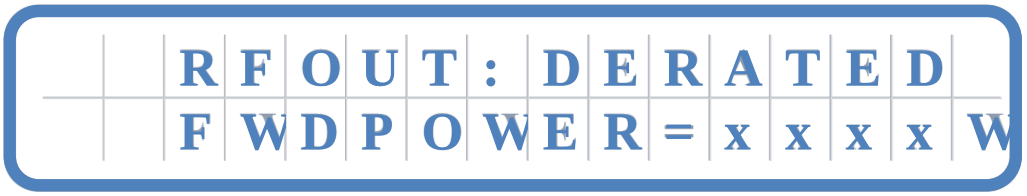


Slide below is also not normally displayed and only appears in case of AC-Min or AC-Max - FWD power is switched OFF, as described in Section 9

V9)



V9a)



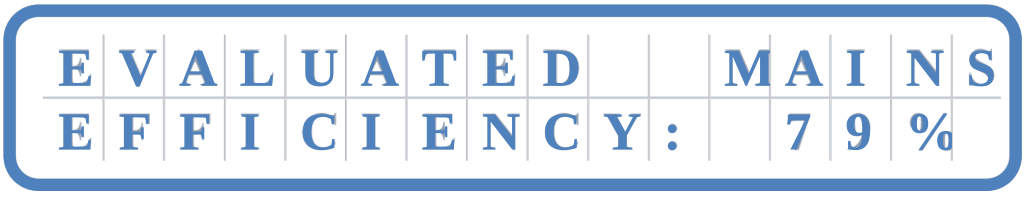
Last three slides of the visual mode sequence appear in any case where limited, derated or switched-off RF output power is required

Efficiency Slides

In addition to the parameters listed above it is also possible to read efficiency values. The slides below show readings of **RF** efficiency and **Mains** efficiency. Efficiency is calculated using a mathematic formula.

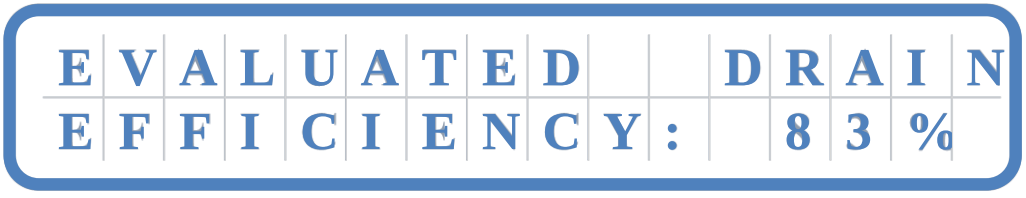
Evaluated **Mains** efficiency

V10)



Evaluated **RF** efficiency (MOSFETS Drain)

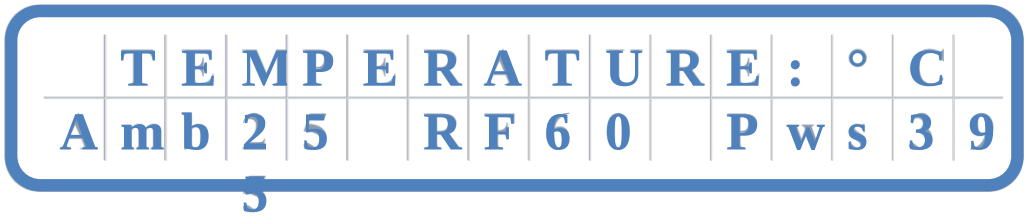
V11)



Temperature Slides

The following slide shows readings of Ambient Temperature (AMB) and **RF** Section Temperatures (**RF**) and Power Supply Temperature (PWS). Temperature is always expressed in **Celsius** degrees. See example below

V12)



V12a)

V12b)

Temperatures dropping below **- 9°** C are indicated as –T, and not as - 10, - 11, - 12 etc. etc. Surplus to say that extremely low temperatures are not compatible with correctly operating Amplifier. Temperatures rising above > **99** °C are not acceptable either and will be specified as + T. In both cases thermal protections are activated.

Thermal protections are also activated every time values exceed expected range, for further information please refer to section "**PROTECTIONS**".

Usual values indicate temperature read by Power Supply sensor at approx. 38 (°C) above room temperature, and also temperature read at **RF** section heatsink at approx. 60 (°C) above room temperature. These temperatures are evaluated as a typical statistic basis when using a perfectly matched dummy load. You should not be alarmed if values slightly exceed the expected range - as this is a normal condition. If differences in temperature values are CONSISTENT from expected range you should then monitor amplifier or check fans efficiency and the (load) antenna condition.

To convert **Celsius** to **Fahrenheit**, please apply the formula below:

°F = (°C x 1.8) + 32

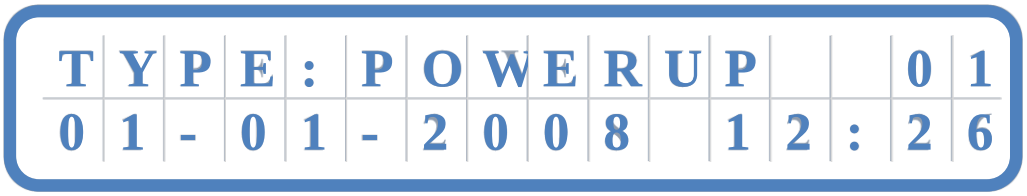
i.e.: 25 °C = 77 °F

Event Log Slides

V13)

The slide above display readings of last twenty (20) events stored in memory and numbered from 01 to 20. To enter EVENT LOG menu and see details push the return key and, as an example, a similar slide could appear

V14)



Other slides with events listed in the table on following page

V15)

First line reads type of events, i.e. **''POWERUP''** and event number "01". Second line reads date and time when event occurred. Push up-down keys to read (if any) successive events stored in memory. Press return keyonce to return to **EVENT LOG**

V16)

Select EXIT to abandon menu

Event List

Events stored and events to expect are detailed as follows:

EVENTS LISTING	
Acronym	**Description**
POWERUP	Turning **ON** the Amplifier
POWERDWN	Turning **OFF** the Amplifier
RFT-ALRM	When a temperature alarm occurs in RF section
PST-ALRM	When a temperature alarm occurs in Power supply
AMB-ALRM	When a temperature alarm occurs in severe ambient conditions
ID-ALRM	If **MAX** current is reached
PSM-ALRM	If any **AC** min problem in power supply
PSL-ALRM	If any **AC** low problem in power supply
REF-ALRM	If **MAX** standing wave ratio is exceeded
W-REDUCE	**RF** Pout reduction resulting in the event of any protection
DRV-ALRM	When the **MAX** driving power is exceeded
PWRGOOD	When powergood has occurred
INPUTILK	When equipment is locked by an interlock
ALARMRST	Alarm memory reset and restart

*Events can be deleted **only** by Manufacturer*

“About” Menu Slides

Push up-down keys to enter ‘’ABOUT MENU’’ and access the various slides containing general information on Amplifier. Slides below show Model, Serial number, Manufacturer’s address, Manufacture’s website and Software version

V17)

Amplifier model

V18)

Serial number

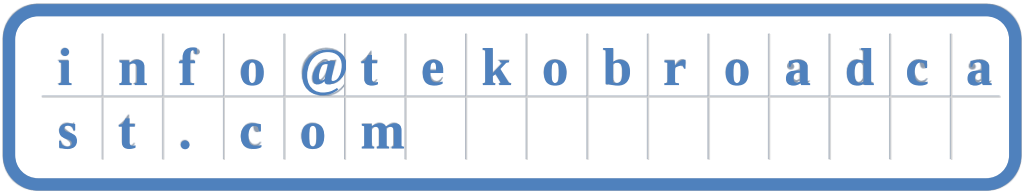
V19)

Manufacturer

V20)

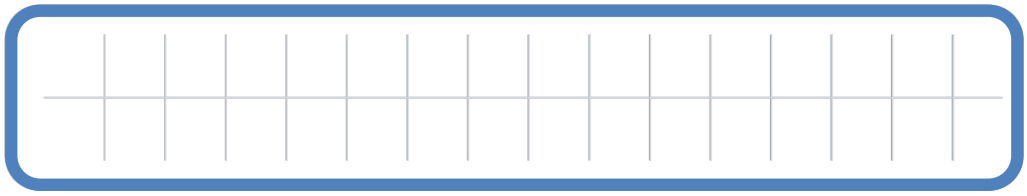
Email address

V21)



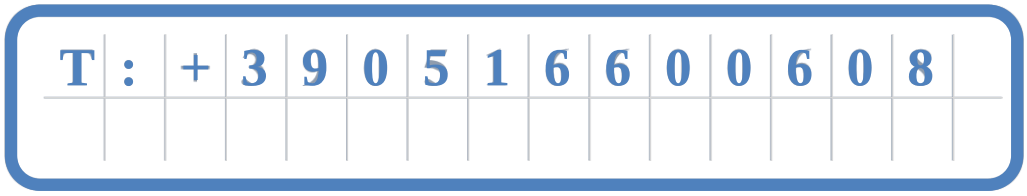
Website

V22)



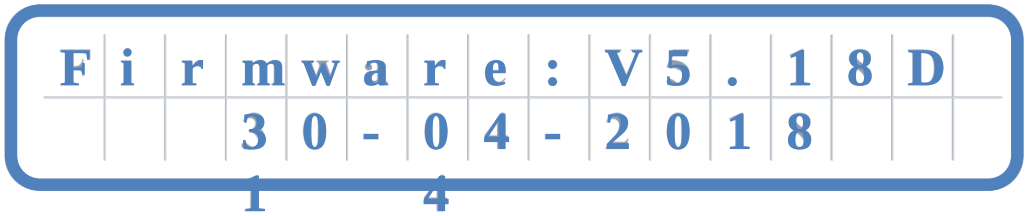
Telephone and Fax numbers

V23)



Software version and date

V24)



To **EXIT** slide push return key to main menu as indicated below

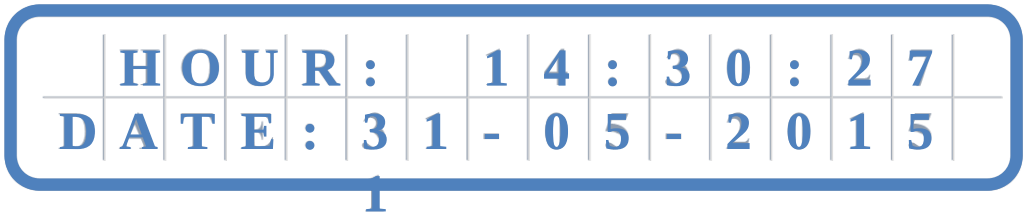
V25)

The slide above allows to quickly move from Visual to Program mode
Now we return to the last slides of the Visual Mode

Last Slides of Visual Mode

Three more slides that visualize **time & date**, **interlock status** and **remote OFF**

V26)



Interlock status

Following slide indicates actual interlock

V27)

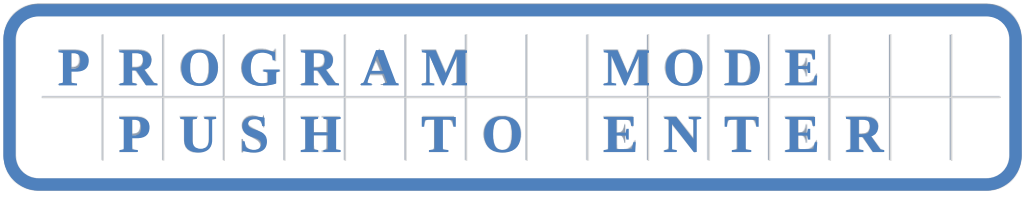
Interlock status and remote **OFF**

Slide **<u>appears</u>** and **display back light** flashes regardless of selected menu if amplifier is in remote **OFF**, or a stand-by condition occurs caused by input interlock

V28)

The above-described slides are the last in **Visual Mode**

To enter **PROGRAM MODE** push as indicated below, <u>or simply rotate</u> to remain in Visual Mode

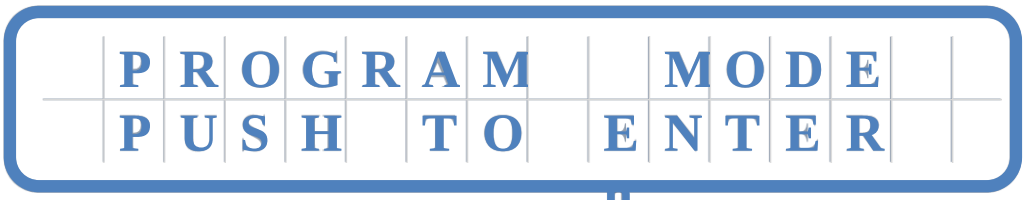


Section Five

Program Mode Operations

To enter **PROGRAM MODE** push keyas indicated below

P1)

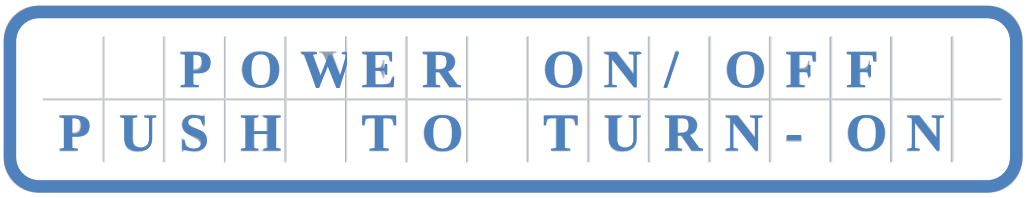


Program mode is designed to set up or change main parameters in a very simple way. We here illustrate it with sixteen (16) slides. To modify any parameter enter **PROGRAM MODE** and rotate keyto find required parameter. Select parameter, turn keyright or left to increase or decrease value and always confirm operation to validate change

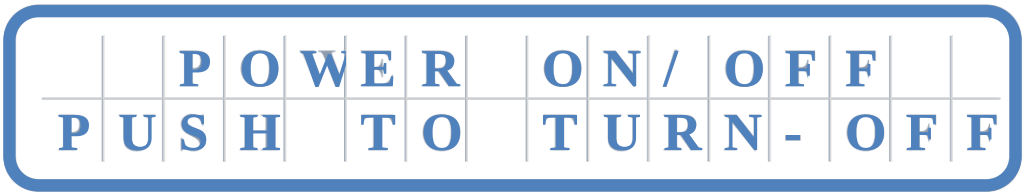
Power ON/OFF Slides

Following slide allows to switch power section **ON/OFF** and displays current programming

P1)



P1a)

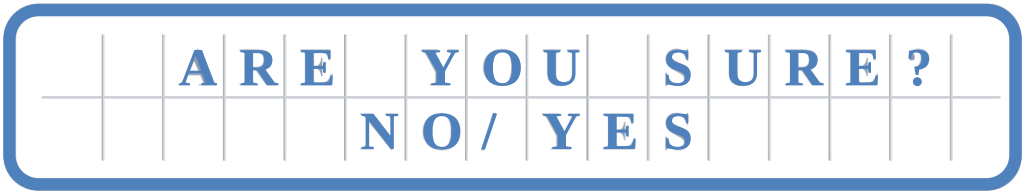


Second row changes depending on Amplifier being ON or OFF

If equipment is **ON** second line allows to turn **OFF**
If equipment is **OFF** second line allows to turn **ON**

When completed push keyto confirm

G2)



Each time **YES** selection is made the following slide appears

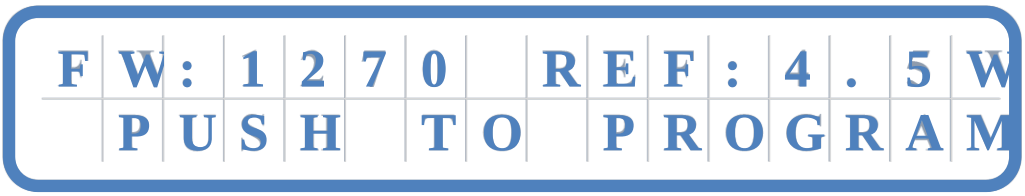
G3)

The microcontroller stores data in the flash memory

RF Power Slides

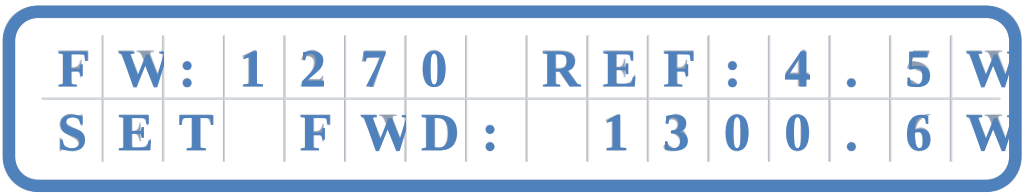
You can program **RF** power by pushing the return key to find following slide

P2)



Slide above shows current forward power **(FW)**; push to program as indicated to change output power

P3)

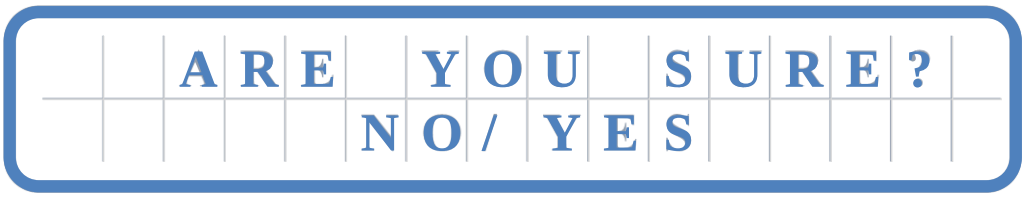


To select required power turn return key right or left to increase or decrease value. Please note that Reflected Power **(REF)** is here indicated with a decimal point. As an example, we set power at 1800. W.

if < 9.9 W
or without decimals (i.e. 12 W)

Push return key to enter desired value and following slide appears to confirm change

G2)



Cursor highlights **NO** selection by default. This avoids **accidentally** entering and confirming a value by mistake

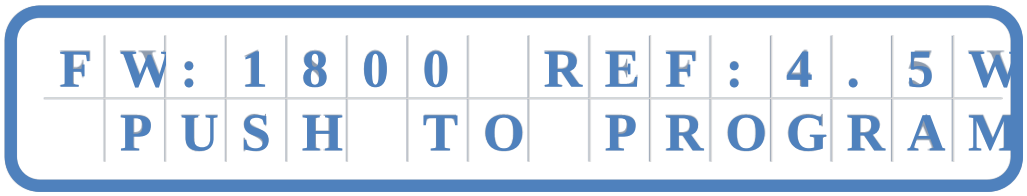
To validate your change move cursor to **YES** selection and press return key, or move cursor to **NO** selection to reject setting

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

G3)

The microcontroller stores data in the flash memory

P4)



Slide above is an example and values are only indicative

The first line reads **FW** power. However, in real terms power increases or decreases in a few seconds to reach programmed value. Before final value is reached minor variations are possible

If equipment is left in "**PROGRAM MODE**" and no activity is carried out in local or remote for approximately **15 minutes** (known as "abandon time") section is automatically quit. You now return to Visual Mode and the slide below is displayed. Forward power (**FWD)** is here indicated at 1800 W and 4.5 W. If any programming operation is **NOT CONFIRMED** within 60 seconds (confirm selection YES/NO?) abort time ensues. Amplifier returns to entry slide in **PROGRAM MENU**.

After **NO** activity for approx. 15 minutes the same event occurs and programming is automatically exited. You return to default slide in **VISUAL MODE**, here indicated as an example. The change in mode is indicated by the PRG led switching off (see display on page 18)

This slide shows **P**ower **F**orward and **P**ower **R**eflected with decimals

V 1)

If equipment is switched off via local Operator slide displayed is

If equipment is switched off via Interlock slide displayed is

Date/Time Slides

To set date or time push return key as indicated in the slide below. To choose date or time move flashing cursor to option required

P5)

Select date - slide will show how to enter date/ hour/minutes

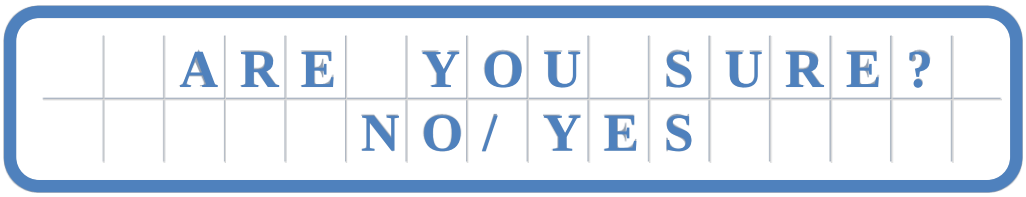
P6)

First row indicates the following fields:

D	:	current date (2 characters)
M	:	current month (2 characters)
Y	:	current year (4 characters)

Second row allows to set **time and minute** (hour format 0-23, minutes 0-59).
To enter required date/month/year/hour/minute - turn return key right or left to increase or decrease value. To confirm change move cursor to **YES** selection

G2)



Each time **YES** selection is made the following slide appears

G3)

The microcontroller stores data in the flash memory

Local/Remote Slides

Amplifier can work in ‘local or remote’ mode.To choose **LOCAL** or **REMOTE** operation

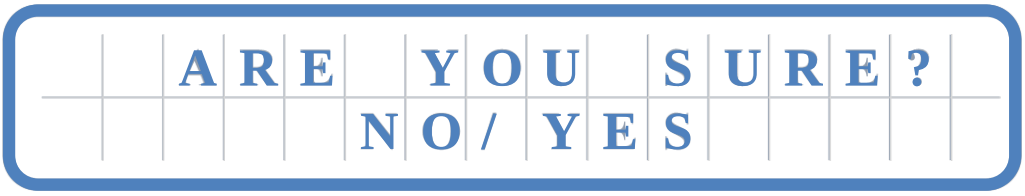
P7)

First row displays current mode of operation. Press return keyand the following slide is displayed

P8)

Display contains one arrow indicating current status; to select Local or Remote option rotate and push keyto confirm selection. The highlighting and underlining of first letter (as an example **L**OCAL) indicates selection to confirm. To confirm selection following slide appears to accept change

G2)



Each time **YES** selection is made the following slide appears

G3)

The microcontroller stores data in the flash memory

Important Note For Remote Or Local Operation

Please note that when choosing to work from **"REMOTE"** it is not possible for Operator to work from local. This would be in actual facts in conflict with Operator working from remote. The only option (to operate locally) is to return to ‘’**LOCAL**’’ by press retun key. Step-by-step procedure as follows:

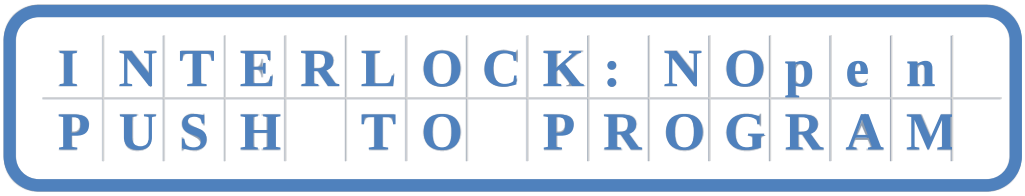
1) Return to **PROGRAM MODE** slide
2) Enter **OPERATION** slide
3) Select **LOCAL** option

*The front panel **LED** always indicates operation mode (remote or local)*

Interlock Slides

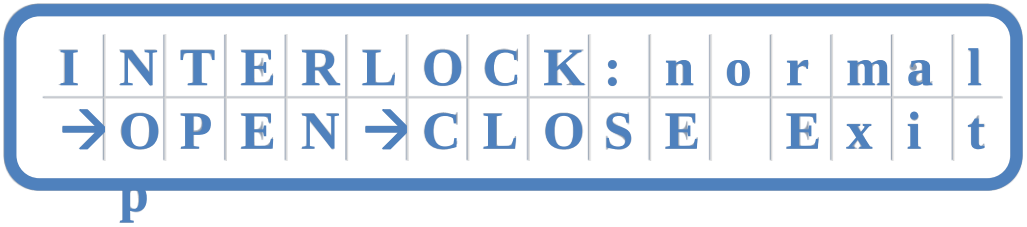
When in Program Menu Push up-down keys to enter Interlock page

P9)



Note: **NOpen** indicates actual status = Normal Open and **NClose** = Normal Close
Slide shows current INTERLOCK status – normal open or normal close and Exit option

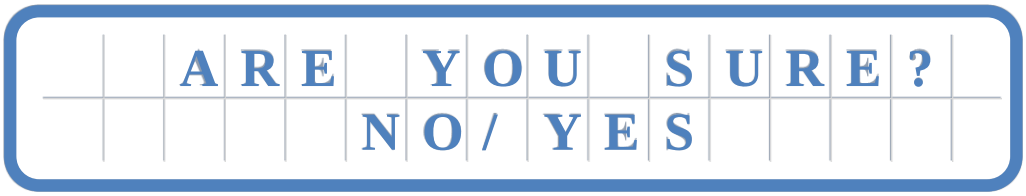
P10)



The **left** arrow indicates current *Normal open* or *Normal close* status. Please note that we show two arrows for the purpose of clarification, but in the actual display there will only be one arrow. When pushing keyyour cursor underlines and highlights first letter of each option: **O**pen, **C**lose or **E**xit. Press to confirm selection and if *Open or Close* is selected and confirmed, arrow will indicate your last selection next time you return to same menu.

If selecting *Open/Close* - usual slide appear to confirm

G2)



Each time **YES** selection is made the following slide appears

G3)

The microcontroller stores data in the flash memory

If *exit* is selected you return to default page of Visual Mode

Power Good Slides

"POWER GOOD" selects a value below which Operator wishes to set an alarm. This value can be expressed in dB or percentage terms. Our amplifier indicates **RF** Output Power value expressed in percentage terms. For example: if amplifier is set up to 1200 W of **RF** Output Power and Operator wishes to set up the **POWER GOOD** alarm every time power is for whatever reason reduced to less than half value (or >-3dB, i.e. less than 600 W) Operator only needs to adjust the **"POWER GOOD"** threshold to 50% of **RF** value. In this case 590 W is the alarm condition. Every value between 10% and 95% can be entered. Above 95% or below 10% the indication "NONE" appears. Select option if you wish to rule out **POWER GOOD** alarm. **POWER GOOD** status:

P11)

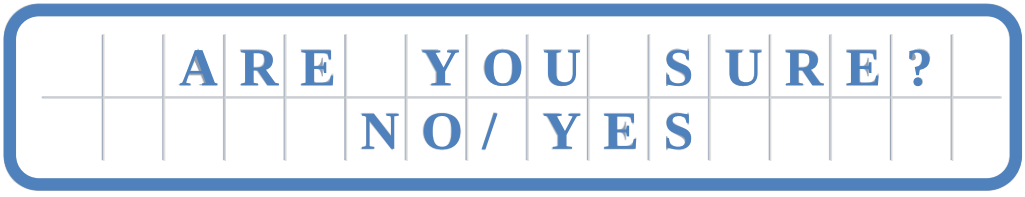
P11a)

If you push the return key the following information is displayed

P12)

Second line indicates current set power; rotate the return key to increase or decrease **POWER GOOD** value. Press return key to confirm and the slide below appears

G2)



Each time **YES** selection is made the following slide appears

G3)

The microcontroller stores data in the flash memory

Set Address Slides

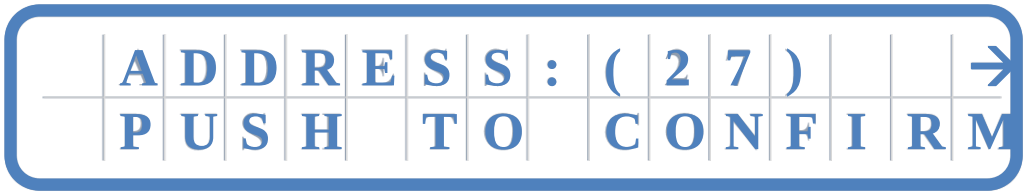
The following slide shows standard or default address (00 set by Manufacturer). The slide is important in the “CTE Transmitting Systems” because value unequivocally identifies hierarchy in the system and if Amplifier has privileges of MASTER or SLAVE.
MASTER means that Amplifier is the most important element in the network. If Amplifier is set up as MASTER, available data in RS485 network is sent to Amplifier. When Amplifier(s) is/are integrated in a N+1 system, only one Amplifier must and can be set up as MASTER. In a high power system, such as 2,500 W or 3,500 W or more, all Amplifiers are SLAVE and PDC becomes primary (MASTER). When Amplifier is Stand-Alone equipment (not integrated in aTEKO Broadcastsystem) it must be set up with special address 00.

set address 00 Stand Alone (out ofTEKO Broadcastintegrated system)
set adresses 01-68 MASTER
set adresses 69 - Master

P14)

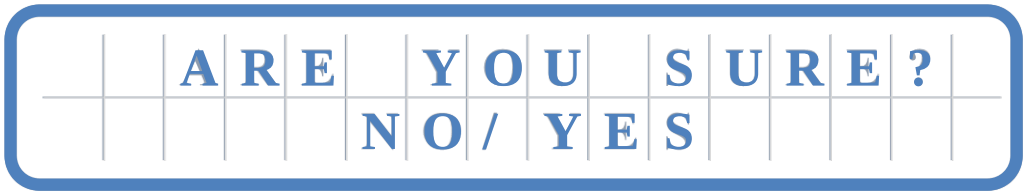
Turn the return key to set required address number which must be comprised between 01-68 or 00 for stand-alone. Slide shown below indicates cursor placed under number 27. Rotate keyright or left to increase/decrease value; value is confirmed by pressing return key as usual

P15)



When operation is completed push return key to confirm

G2)



Each time **YES** selection is made the following slide appears

G3)

The microcontroller stores data in the flash memory

Note: When CELL2000 AMP is put into a system needs to be logged by the dialer, once launched on the log of the procedure to combine the CELL2000 AMP slide has the following

And all the LEDs are lit. Just press the keyto match the CELL2000 AMP system and store the address of the combiner the presence of the machine

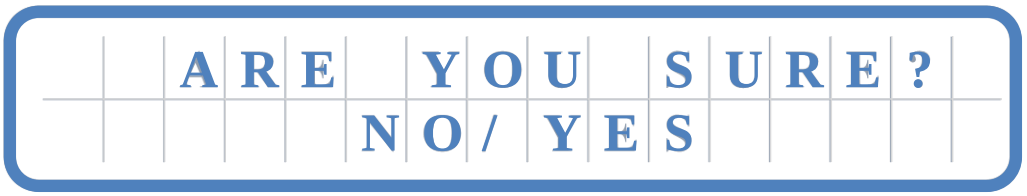
rtant Note Applying To All Slides So Far Described

Please note that our Amplifier is set up to always flash cursor on selection **NO** by default. This is to avoid ***inadvertedly*** entering a mistaken value

To validate your change move cursor to selection **YES** and press return key, or move cursor to selection **NO** to reject setting

Each time you program a new parameter the following slide appears

G2)



Each time **YES** selection is made the following slide appears

G3)

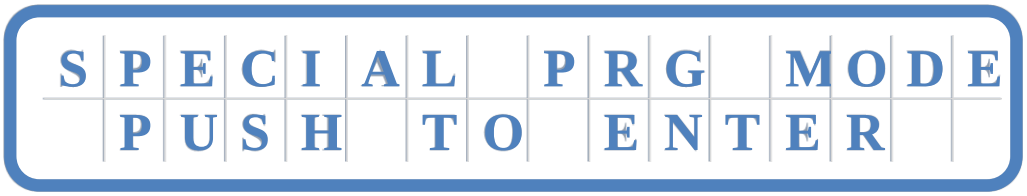
The microcontroller stores data in the flash memory

Section *Six* ❻

Special Program Mode

This section is dedicated to a few special one-off program features or other specific functions available in our Amplifier. These features are not included in the Program mode. There are 9 Special Program Slides available in this menu. Slide below is the access slide to enter **SPECIAL PROGRAM MODE**

S1)



PIP and SRC Codes

To ensure maximum safety and avoid misuse in case of theft or failure Amplifier can be protected by a **P**ersonal **I**dentification **P**ass (**PIP**) which can be activated when you first install equipment. The activation of the personal identification pass (**PIP**) is very easy and, although not obligatory, is highly recommended by Manufacturer. The **P**ersonal **I**dentification **P**ass (**PIP)** must be:

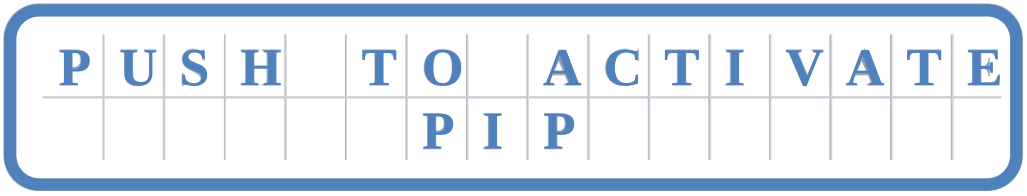
a numerical 6-digit password
used when programming parameters

The **P**ersonal **I**dentification **P**ass (**PIP)** can be reset or changed at any time.
If wrong **PIP** is entered more than nine times *only* release of a **SRC** (**S**afe **R**eset **C**ode) by Manufacturer can reset PIP section to start PIP activation or deactivation.

Follow instructions below for **first activation** of PIP code

Enter the **SPECIAL PROGRAM MODE** menu by pushing return key as required. The slide to activate your **P**ersonal **I**dentification **P**ass (PIP) is the following

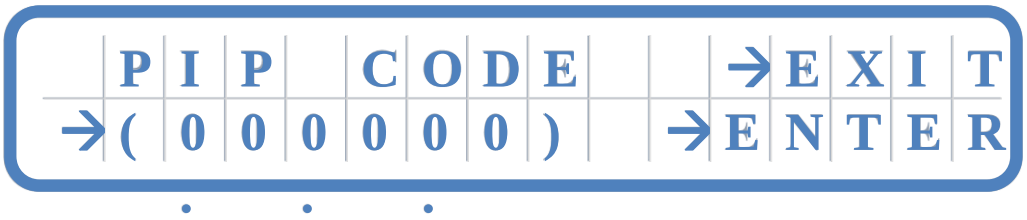
S2)



As specified in the previous page it is not compulsory to activate the **P**ersonal **I**dentification **P**ass (**PIP**), although recommended by Manufacturer. Push up-down keys to move arrow from ENTER to EXIT, or where required and press to confirm. When slide below appears Push up-down keys right or left to increase or decrease value and set required **PIP**. Every time you press the return key to confirm a number cursor moves onto next number.

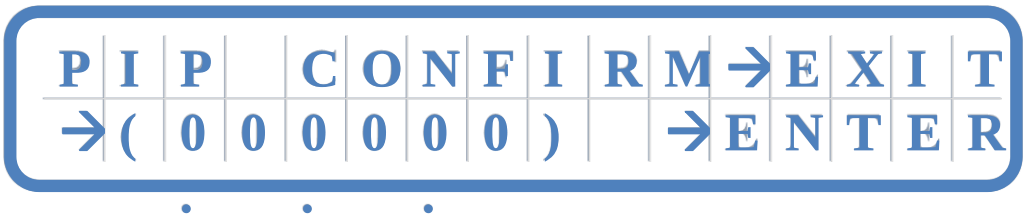
Initial default number is: (000000). If you wish to keep any 0 number simply press return keyand move on to next number. Once **PIP** is completed the highlighted arrow will indicate selection **ENTER**. You can now either confirm **PIP** or rotate keyto enter new **PIP**. You may still change or amend a wrong number. Select **EXIT** to return to previous menu without performing any operation

S3)



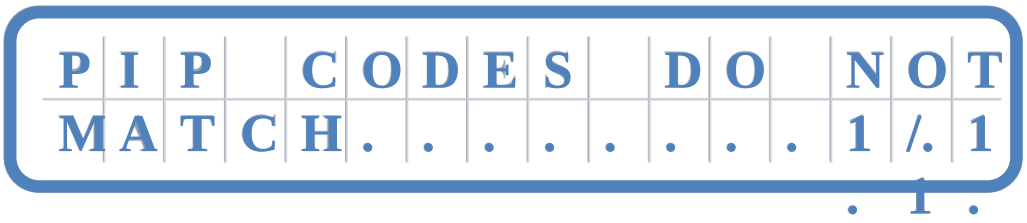
Amplifier will ask you to confirm your 6-digit **P**ersonal **I**dentification **P**ass (**PIP**)
Arrows works as described before

S4)



If **PIP** codes do not match slide visualizes the following slide for 3 seconds

S5)



Amplifier returns to initial slide to activate **PIP** and to allow you start procedure again

G3)

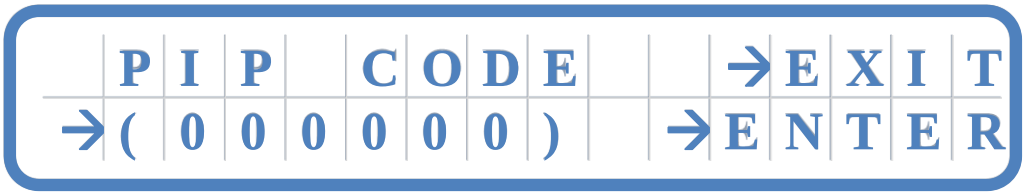
Amplifier stores data in the flash memory

If **PIP** was successfully activated following the procedure detailed above, you can **deactivate** your **P**ersonal **I**dentification **P**ass at any time by simply pushing return key to following slide

S6)

Press return key to find following slide

S4)



Enter **PIP** to reset amplifier and validate initial default **PIP** (000000)

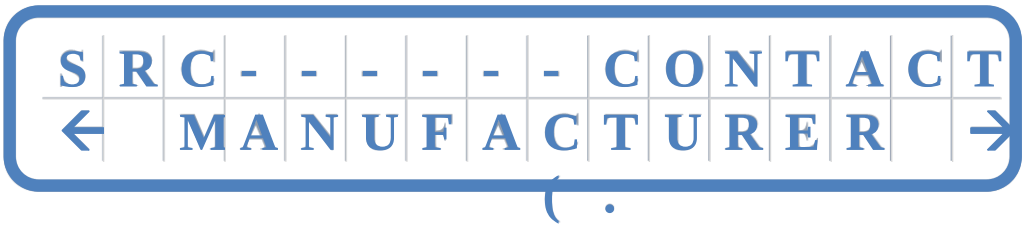
*Once **P**ersonal **I**dentification **P**ass (PIP) is activated you must always enter your login (**PIP**) to be allowed any program operation in **PROGRAM MODE***

Login slide below

S7)

ATTENTION! Failing to login correctly for nine (9) consecutive times causes **pass code lock** and the following slide appears

S8)



ENTER and **CONFIRM** as usual (rotate keyto select number, press to confirm and move onto next number). Remember that if **right** arrow is highlighted you can confirm or return to previous number to change it, or move to **left** arrow to exit slide and return to default slide of **VISUAL MODE** without entering **SRC**. If **SRC** code is correct amplifier moves to next slide and restarts. If desired, a new **PIP** can now be set up. This is an important reminder – you can only try **SRC** once! Entering SRC causes PIP code to reset to default value **(000000)**

G3)

Important Note: If **PIP** is activated but no **PIP** is entered during login, Amplifier will only work in "Visual Mode" and no program operations will be allowed. The only feature permitted will be the entering of **SRC** if necessary in "Special Program Mode". If Operator tries to change Power value or other parameters the slide below appears

S7)

S5)

If wrong **PIP** is entered number displayed on the right (1) indicates number of attempts tried; second number bottom right (9) indicates number of attempts left

ATTENTION! Nine (9) consecutive wrong logins cause a temporary **Amplifier lock-out** and no parameters can be changed until **SRC** is entered

Or if **PIP** is accepted slide displayed is

S8)

During PIP entering *session remains open until Operator performs any task, either in remote or local*
If ***15 minutes*** *elapse before any operation is performed, session* ***is automatically shut.***

To change any parameter re-enter **PIP** code

How to Obtain SRC from Manufacturer

SRC is a specific code to be released *only* by Manufacturer to protect Amplifier against theft or tampering. **SRC** code may also be issued by persons or companies qualified or authorized by Manufacturer. The easiest way to obtain your **SRC** code is to download the form from Manufacturer's website, fill it with your details and send it electronically as indicated in the website. As an alternative, print and fax **SRC** form to number indicated on Amplifier's display. If you experience any problems or difficulties please contact Manufacturer via email.

Within five (5) working days and prior to verifying information supplied by Customer to Manufacturer a valid **SRC** will be released **AT MANUFACTURER'S SOLE DISCRETION**.

*This procedure must be strictly complied with and Manufacturer considers it very important. The release of SRC might require to collect information from area reps or importer to determine **Customer's** identification or other relevant information.*

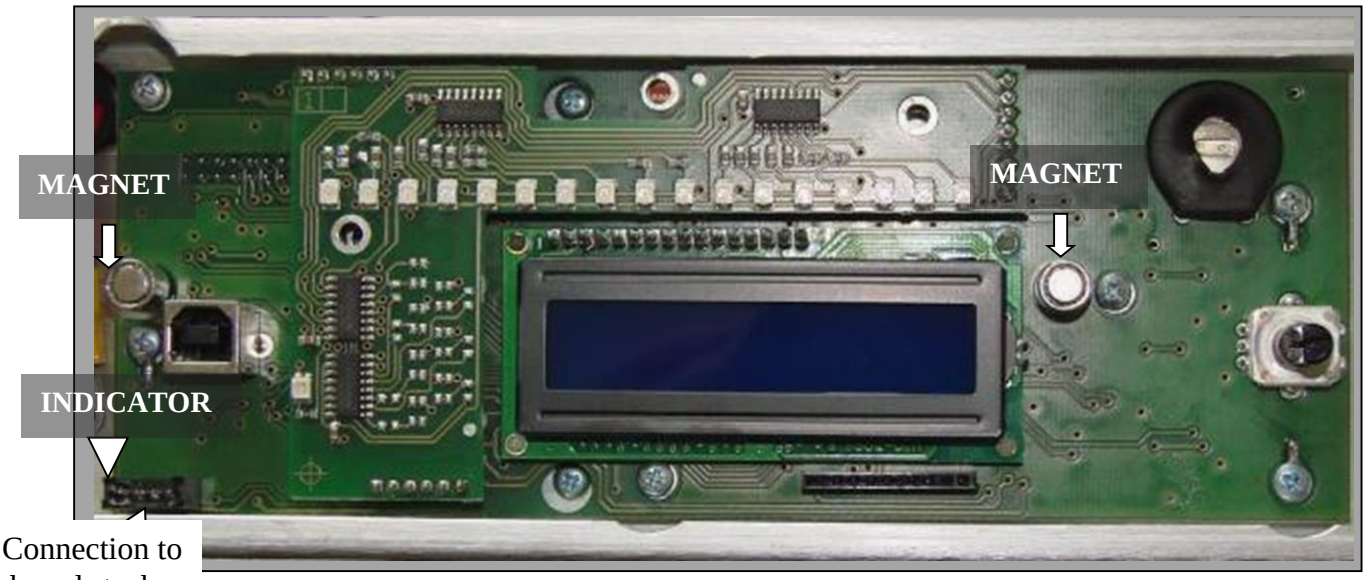
When requesting the **SRC** *Customer* authorizes *Manufacturer* to treat personal data in compliance with Italian Privacy Act.

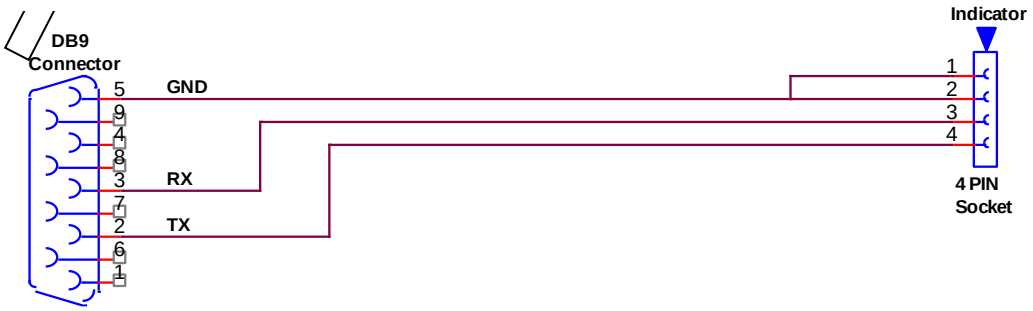
SRC can only be entered **once** - it is therefore necessary to pay maximum attention to avoid mistakes. In addition, any **SRC** is valid up to **30 days** and only for the Amplifier requested (Serial number determines release of valid SRC). Built-in software cannot change or alter this section even if software is updated

Firmware Upgrade Slides

To upgrade firmware please follow Standard Procedure as described below. Please note that ground pin is located above board stacker, as indicated by the white arrow. Wiring should comply to this indicator and as illustrated below.

Board stacker is placed in Amplifier's logic card and can be accessed only by removing front panel. To remove front panel use a screwdriver to unfasten the four screws located at bottom angles and top right and left angles. Front panel is secured firmly by two magnets shown in CAPTION 1 placed in left and right side of the board. To remove front panel you must therefore slightly pull it forward





CAPTION 2

Loading Firmware Standard Procedure

To load firmware tools listed below are required:

- Adaptor Cable (shown in caption 1 - previous page)
- "Flash Magic" Software. Download and instructions are found in: http://www.flashmagictool.com

Step-by step instructions in six simple moves

1) Firstly, check current installed version of firmware from Amplifier display

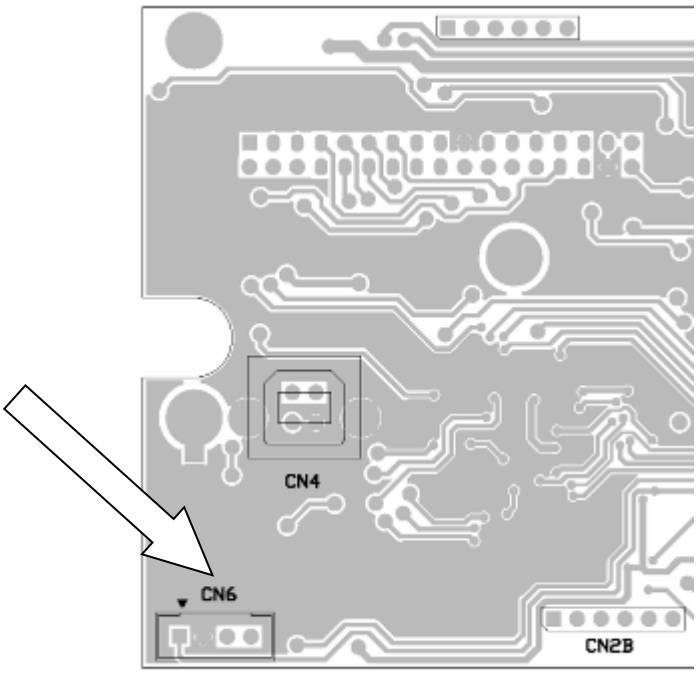
2) Contact Manufacturer to obtain access (PW) to reserved area in Manufacturer's website. Download firmware version available from MFR website

3) Connect computer RS232 Serial Com Port to DB9 connector cable end. Other end of cable is supplied with three-pin socket which attach to board stacker (please refer to previous page). Remember cable is supplied by Manufacturer on request (OPTIONAL)

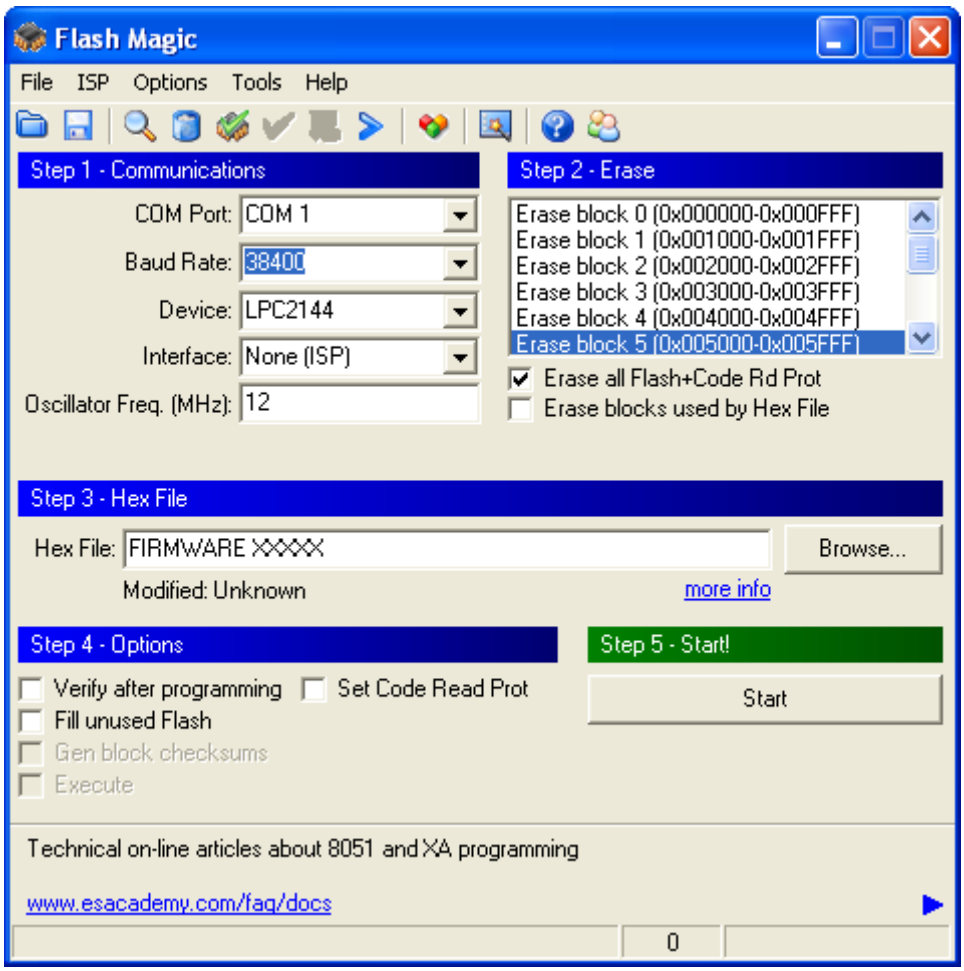
4) **CAREFULLY** connect pin 1 of Adaptor cable to pin 1 of CN6 (see caption 3)

5) Launch ''flash magic'' and fill in the slide shown in caption 4 with empty fields

After firmware upgrade turn Amplifier **OFF** and then turn it **ON** to allow system to store changes



CAPTION 3



CAPTION 4

STEP 1 (5 FIELDS required)

1) Choose **Com 1, Com 2** or **Com 3** port you are using in your PC
2) Enter Baud Rate at 38400 as indicated
3) Select device LPC 2144 among options
4) Set No interface (ISP)
5) Adjust Oscillator frequency at 12 MHz

STEP 2 (2 FIELDS required)

1) Tick in ''Erase all Flash + Code Rd Prot
2) Click on option ''Erase Block 5 (0x005000-0x005FFF) as indicated

STEP 3 (1 FIELD required)

1) Enter file path or browse through your directories to find saved file for Firmware upgrade

1) **STEP 4 (NO FIELD required)** - No option to select

STEP 5: (1 FIELD required)

1) PRESS START button and file transfer begins

Section Seven

Protections & Alarms

Amplifier is provided with a set of different alarms to indicated Reflected Power, Temperature, Voltage, Fans or to signal incorrect working conditions. This section describes actual warnings to monitor and which actions to take. It is important to monitor alarms as they may cause damage, interrupt the correct functioning or even stop Amplifier from working. The slides below will explain how to operate when alarms occur.

Protection For Over-Reflected RF Output Power

To ensure reflected power protection Amplifier is provided with two different systems, the first is based and works on a hardware circuitry and the second is based on software.

Hardware Protection: if **REF** power exceeds **200 W** - forward power is immediately cut off. This action is completed in less than one microsecond (typically 700nS) and leads to the WAIT mode. A specific alarm is then stored into the chronological non-volatile "Event List". WAIT and REF led switch on simultaneously on front panel; after about 5 seconds Amplifier tries to restart.

Software Protection: To better explain how software protection works we shall explain the restart phase. During restart power ramps up from about 150 W to programmed value; if 150 W **REF** power is reached, **FWD** power ramp-up is stopped - to **not exceed** the max 150 W **REF** permitted value. Should **REF** power exceed 200 W the hardware protection activates, as described above (hardware protection). Technically speaking, we passed from APC (Automatic Power Control) based on constant **FWD** power to APC based on constant **REF** power. Please note that hardware trigger point is 200 W, while software threshold is 150 W. The change in APC status is indicated by the  red LED flashing on front panel. When **REF** power drops below 130 W power protection is reset. This generates a 20 W hysteresis between the START phase and threshold protection.

Protection For Over-Temperature

Condition occurs when thermal sensors measure the following temperatures on RF heat sink:

- 80° C on RF heat sink causes de-rating by half power
- 90° C on same section causes forced STAND-BY. Amplifier restarts when temperature returns below 65° C.

Condition occurs when thermal sensors measure the following temperatures inside power supply:

- 70° C on power supply causes a forced STAND-BY
- At 50° C Amplifier restarts

Condition occurs when thermal sensors measure the following in-coming air temperatures:

- If > 45° C causes de-rating by half power
- If < 40° C full power is reset

Protection For Over-Current

Protection occurs when current absorbed is higher than 48A. This causes forced STAND-BY and triggers off a FAULT cycle which lasts 10 seconds and then Amplifier restarts. In the event of (10) ten consecutive overcurrent events occurring in the space of two hours amplifier automatically goes to '**FAULT**' mode and enters **STAND-BY.** If overcurrent is longer than two hours event counter starts from 0.

Protection For Mains Problems

Although there is no specific LED for AC-Min, AC-Low, AC-ok, AC-Max this information is given by Mains LED which is better clarified with a slide in Visual Mode.

1. **AC-Min** means that Mains is insufficient, i.e. < 150 V which causes Amplifier to enter stand-by. In this event Mains LED flashes 3 times a second, Wait LED and Fault LED are switched on. When Power supply returns above 155 V Amplifier restarts.

2. **AC-Low** means Mains is 150-194 V. Power supply may overheat if used on full power at 195 V; working at 150-195 is an unusual condition. To avoid interruption we force a power limit of 650 W regardless of set power even if set power is higher. Mains LED flashes once every second, and unlike previously described in section one, LEDS do not switch on.

3. **AC-Ok** is the normal operating condition and Mains LED is constantly switched on.

4. **AC-Max** occurs when Mains exceeds 265 V and can seriously damage PWS. Mains LED flashes 3 times a second, Wait LED and Fault LED are switched on and Amplifier enters Stand-by. When Power supply returns below 260 V Amplifier restarts.

*Since it is the same LEDS which flash or switch on we programmed a special slide in Visual Mode to differentiate **AC-Min** or **AC-Max** condition*

Protection For Overdriving

Overdriving power occurs above 26 W. The underdriving LED is yellow, the correct driving is green and the overdriving is red. To avoid LEDS switching randomly at trip points between APC levels we considered a hysteresis of 1 W. As an example, when power ramps up from 0 to Max, the **APC**-ok led stays ON between 15 to 26 W and switches off between 25 and 14 W when RF input power ramps down. If max input power is exceeded relay located inside amplifier is activated. Consequently, power is diverted on internal dummy load which can stand up to a max power of 50 W. Any power value above 50 W can seriously damage input circuity. Once overdriving occurs only overdriving LED indicates condition and simultaneously FAULT led switches ON. Amplifier will remain in this condition until driving power is set to normal range. Overdriving power will be stored in event log. In the event of (10) ten consecutive overdriving events occurring in the space of two hours amplifier automatically goes to '**FAULT**' mode and enters **STAND-BY** with an output power equals to 0 W. If overdriving is longer than two hours event counter starts from 0.

Protection For Fan(S) Failure

Amplifier is equipped with separate brushless fans whose speed is constantly checked by a specific circuit. This PWM controller receives input from a microprocessor which process thermal information in Amplifier. Every fan has an opto-coupled sensor which sends information on number of spins to central processor. If the controlling circuit or a fan break down and information is not supplied the fan failure alarm occurs. This generates a slide indicating failure and switches on the fan LED. If only a single fan fails Amplifier does not stop, but 'derates' power by half and causes the fan failure LED to switch on. This is recorded in the event log, however, if the controlling circuit or more than one fan breaks down Amplifier is forced into STAND-BY and requires technical intervention.

AC Alarm Slides

If AC drops lower than 150 V a warning is recorded and Amplifier automatically switches OFF. If this event occurs the slide below appears

V28)

The same event occurs if AC exceeds 265 V. The slide below shows AC voltage reaching the maximum permitted value - which will record a warning

V29)

If you wish to reset alarms to factory set-up, Push up-down keys to slide below and press to confirm

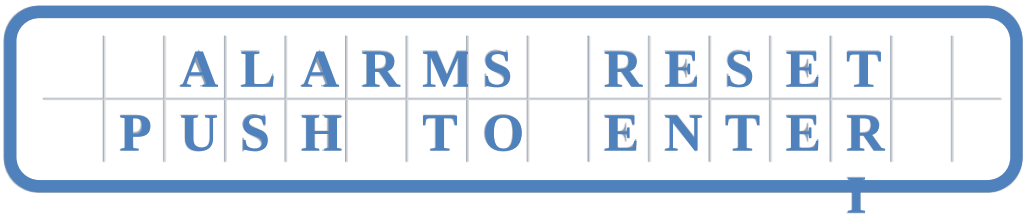
Temperature Alarm Slides

The RF amplifier temperature is continuously monitored; if RF section heatsink exceeds **80 °C** RF power is brought down to **60%** of programmed value and LEDS for max **TEMP** will flash. With RF section heatsink temperature exceeding **90 °C** RF power is inhibited. LEDS for max TEMP, **WAIT** and **FAULT** will stay switched **ON.** When temperature drops to **70 °C**, thermal protection is reset and RF power automatically ramps-up to the programmed value; all LEDS switch **OFF**.

Alarm Reset

In the event of (10) ten consecutive alarms occurring in the space of two hours amplifier automatically goes to '**FAULT**' mode and enters **STAND-BY** with 0 W output power. If alarms occurring in the space of two hours are fewer than 10, Amplifier does not switch **OFF** and recounts alarms from 0. To exit '**FAULT**' is only possible if you reset alarms; switching **OFF/ON** equipment will **not** reset it since a **FAULT** condition has been stored in the non-volatile memory.

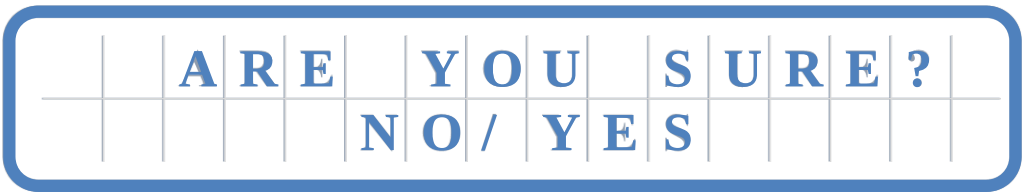
P16)



To reset alarms Push up-down keys to select **A**larm **R**eset slide (ABOVE) and push keyto confirm

Confirm (YES) and close power setting by pushing return key once more

G2)



Each time **YES** selection is made the following slide appears

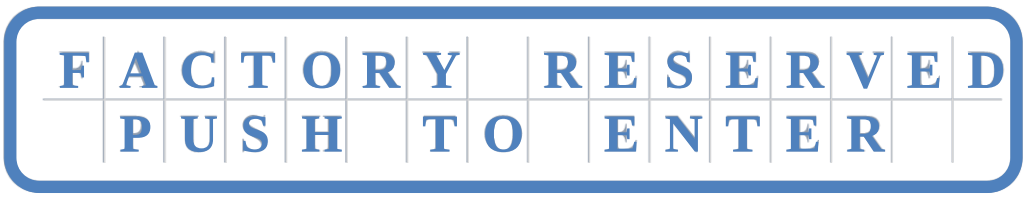
G3)

The microcontroller stores data in the flash memory

Factory Setup Slides

This slide is reserved to Manufacturer to allow specific software changes or set up given parameters

S10)



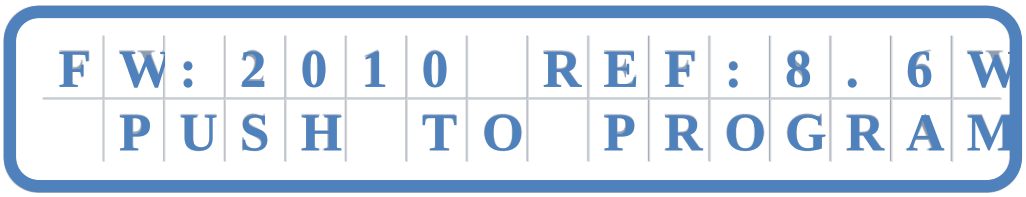
S11)

CELL2000 AMP Integrated In a System

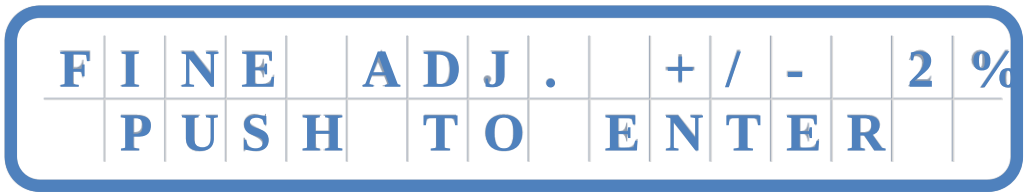
Slide Modification if Used In a System

If Amplifier is part of an integrated system, such as from 4000 W; to 16,000 W. the slides below are automatically used as replacement of standard slides when Amplifier RF power is set. This obviously refers to **PROGRAM MODE** only

P16)

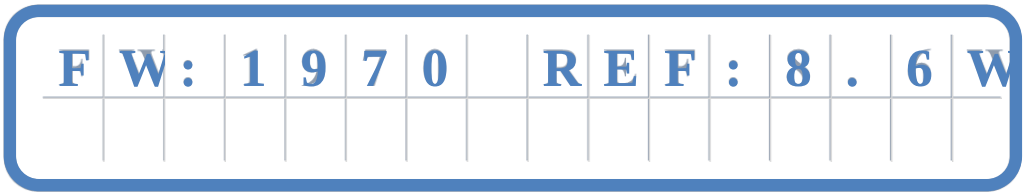


P17)



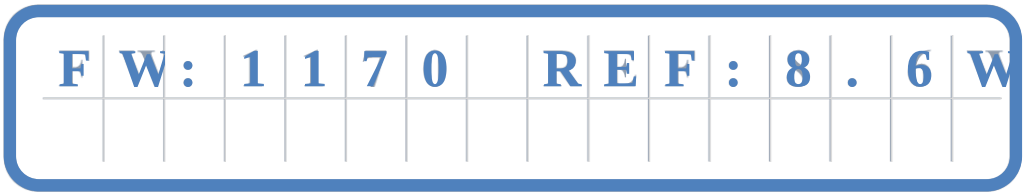
Enter menu and this slide appears

P 18)



Push up-down keys to move cursor to the right to increase (+) or left to decrease (-) and RF power will change in real time. Keep keypressed to confirm. Slide below shows a possible selection

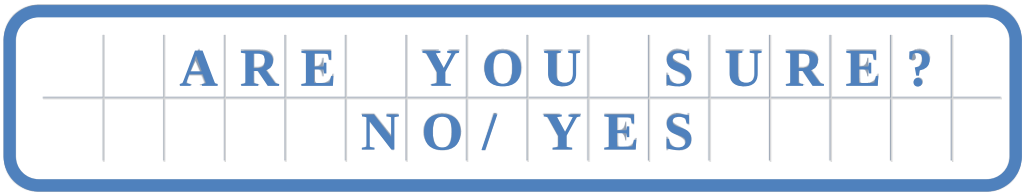
P19)



For 1000 W power the range varies from approx. -20W to + 20W. To manually control **RF** Output power means to reduce power dispersed by balancing resistors located in the coupler. Power is reduced by adjusting programmed value finely. Power regulation occurs in real time so that unbalanced power can be checked. Power reading on top row is actual power released. Once confirmed the bottom right arrow is highlighted, but to exit slide you must press encoder. Pushing keyto the right or left moves the little square box accordingly

To enter **PROGRAM** press return keyand you can always change a set value
Confirm as usual and following slide is

G2)

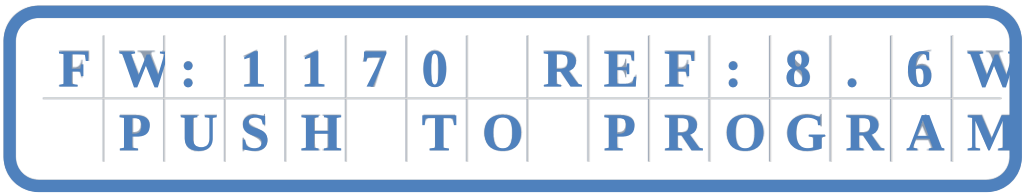


Each time **YES** selection is made the following slide appears

G3)

You return to (default) initial slide

P4)



Next time Amplifier integrated in the system is switched **ON** power ramps up from min to max value in three steps. This allows a group of amplifiers to reach set power steps without ‘’exceeding’’ unbalanced power

Change of Remote Setting

The Amplifier integrated in a system even if programmed to operate via ‘’Remote’’ will automatically reset operator’s control to ‘’Local’’ mode because a Master Unit (with Master privileges) in the system is dedicated to this function. Remote control is performed by Master equipment via RS485 system network