RFE MAKING BROADCAST SMARTER

USER MANUAL
TRANSMITTERS DS SERIES

2000|3000W

Index

Introduction & general information structure

This manual contains all information for installation and maintenance of DS transmitters and is divided into two parts: the first concerning operator that has to use equipment, the other concerning maintenance technicians. The two sections are separated by one blue page to quickly identify them.

The operator who normally has experience in using the equipment should not try to perform any action which has been classified as belonging to the maintenance technician. Any incorrect operation may cause damage to equipment electronics and can be also potentially dangerous for operator's safety.

The RF power amplifier has been designed for continuous wave (CW) modes.

Technological cutting-edge solutions and latest generation materials (such as sixth generation LDMOS) ensure a high standard of quality and robustness.

Hazardous Voltage Warning

HAZARDOUS VOLTAGE

WARNING:

Voltage within equipment is high enough to endanger life!

Do not remove external and internal covers!

this operation is to be done by qualified and authorized personnel only!

General Safety Recommendations

All work on transmitter system as well as installed units, e-g- the VHF/FM transmitter, may only be carried out by trained personnel capable of identifying dangerous situations or conditions. Take note of the following:

- Before working on a transmitter system, that is even before removing the VHF/FM transmitter ensure that the correponding system documentation is consulted.
- Before workign on an open unit ensure that the fuse ahead of the unit is disengaged or the power cable to the unit is disconnected.
- Note that when service work is carried out, e.g. measurements or settings are made during transmitter operation, voltage carrying parts are not always secured against touching.
- All work is to be carried out with great caution.

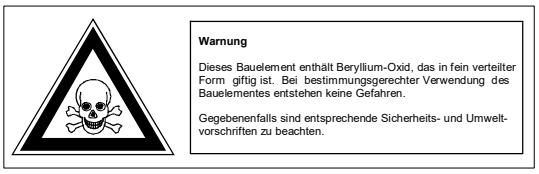
CAUTION!

The VHF/FM transmitter does not possed a mains switch. Even when the transmitter system is in the “OFF” state, voltages are still present at the assemblies of the VHF/FM transmitter, e.g. mains power at the input of the power supply module is live and the fan is in operation.

Identification of Toxic Substances

Assemblies with components incorporating toxic substances are labelled as follows:

A warning sign as shown in the adjacent figure is glued to a **component incorporating a Toxic substance** of glued in the vicinity of the component.



Warning notices in this Manual

Attention must be paid to important notices contained in this manual. They are labelled as follows:

WARNING!

This label is used in the manual to indicated where incorrect or non-compliance with directions or with procedures relevant to electrical safety could **easily lead to injury or fatal**

CAUTION!

This label is used in the manual to indicated where incorrect or non-compliance with directions or with procedures relevant to electrical safety could **easily lead to damage to**

Use according to stipulation

Transmitter systems and equipment of RFE Broadcast S.r.l. are built exclusively for use as in the terms of contract. Any other use is not in accordance with the manufacturers stipultaions. The manufacturer is not liable for damage resulting from such use; the risk is carried alone by the customer.

Use according to stipulation includes operating, maintenance and servicing procedures as directed by manufacturer. The transmitter system of RFE Broadcast S.r.l. may only be operated, maintened and serviced by qualified technical personnel familiar with the relevant safety precautions.

RFE Broadcast S.r.l. shall not be liable for any damages caused by unauthorised modifications carried out by the customer on the transmitter systems or equipment of RFE Broadcast S.r.l. or unauthorised modifications at interfaces to the equipment of RFE Broadcast S.r.l.

Original parts and accessories are specially design for our products. Parts and accessories not delivered by us have not been **tested nor approved** for use in our equipment. Fitting and/or use of suck items may alter the given characteristics of out products in an adverse manner such that **active and/or passive safety** may be **impaired**. **We assume no obligation or liability** for damages cause by **parts and accessories not delivered by us.**

First aid

Unresponsive Victim

Perform these steps quickly — in a minute or less!

Emergency Action steps

- Assess Scene. If the scene is not safe or at anytime becomes unsafe, GET OUT!
- Assess Victim. Victim is responsive? Identify yourself; ask if it's okay to help. If the victim appears weak, seriously ill, injured, or is unresponsive…
- Alert EMS. activate Emergency Action Plan.
- Attend to the ABCs. Ensure an open airway, normal breathing, and control bleeding.

A

Airway. Open Airway

- Tilt the head - lift the chin.

B

Breathing. Check Breathing.

- Look, listen, and feel for 5, but no more than 10 sec.
- If the victim is not breathing normally or you are unsure, perform CPR.
- If the victim is breathing normally, assess circulation.

C

Circulation.

- Look for blood pumping or pouring out of a wound.
- Control blood flow with direct pressure.
- Look for normal tissue color.
- Use your exposed wrist to feel for body temperature.

D

Continue to Attend to the ABCs

- Keep the airway open.
- Ensure normal breathing.
- Control bleeding.
- Monitor tissue color and temperature.
- Help maintain normal body temperature.
- If it's available and you are properly trained, give emergency oxygen.

Document structure

This document contains all the technical information relating to the transmitters of Series DS.

In the first part we have all the technical specifications, followed by directions for the first installation of the transmitter.

In the middle there is the explanation of the menu and functions of the transmitter, such as color display touch screen.

There are explanatory photos of the various components of the transmitter.

Finally, follow the wiring diagrams and layouts.

Scope of the document

Purpose of this document is to provide a comprehensive description of the functionalities of the **DS TRANSMITTER** and to provide operating information on the software elements of the system.

DS TRANSMITTER User Manual provides software setup information.

Introduction

The transmitter DS is designed with all the latest technologies, such as high efficiency using the latest generation LDMOS transistor and high efficiency power supplies. We used a modern interface and performance using a color display with touch screen, with easy management software and easy to use. Each transmitter DS is equipped with a LAN interface with the possibility of remote control completely the transmitter operation.

The transmitter DS is equipped with all audio inputs including Audio IP (as option), for a complete audio interface.

Fig. 1: Front View of the VHF/FM Transmitter DS2000-3000

The VHF/FM transmitter DS2000-3000 is intended for the transmission of frequency modulated broadcasts in mono or stereo. It works with broadband characteristics in the VHF frequency range from 87.5~108 MHz and can be operated with any frequency in this range without alignment.

The transmitter output power is variable between 10 W and 30 W. The transmitter is available with different remote control ports. It can store up to six broadcast programs including program specific parameters such as frequency, RF output power, modulation type, RDS, AF level and deviation limiting. DS2000-3000 transmitter is equipped with a LAN interface that permits the complete remote control of the transmitter operation via SNMP or Web Server.

The transmitter is accommodated in a 19“ chassis, 3-HU height. All operation and display elements are arranged on the front panel. The operating values are read from the LCD colour display with touch screen. All connections to the components of a transmitter system are arranged at the back of the unit.

VHF/FM Transmitter

Type Identification: DS2000-3000

Reference Number: ATF00130-R

Features

- State of the art performance
- LCD color display with touch screen for easy setting and reading parameters
- Extremely low distortion: THD, IMD & TIM (Transient Intermodulation Distortion) specified
- Highest stereo performance: typ. 60 dB
- L,/R, RDS / SCA, AUX, MPX, AES-EBU XLR & Optical, Audio IP
- Audio change over built-in
- Six Memory (frequency, sensitivity, power, etc.) which can be stored different setting. Ready for N+1 system
- Completely broadband
- Remote control for telemetry LAN, RS485
- RF amplifiers using the latest generation of semiconductors RF Power LDMOS
- Automatic Power Control (APC) maintaining stable pre-set RF power 1.5:1 VSWR. Higher VSWR value causes power reduction
- Nominal RF output level 30/50/100/300/500/1000W. Continuously adjustable power output
- Built-in RF harmonics filter and true wattmeter
- High spectral purity
- CCIR & FCC compilant

Technical Specifications

Power Output: 3000W, adjustable from front panel.
RF Output Impedance: 50 ohm.
RF Output Connector: "7/8".
Monitor RF: BNC connector.
VSWR: 1,5:1
Frequency Range: 87.5 ÷ 108.00 MHz, only for analog on request
66 ÷ 74 MHz (OIRT), 76 ÷ 90 MHz (JPN) Programmable in 10 kHz steps.
Frequency Stability: ±1 ppm from -5 to 45°C.
External Reference: 10 MHz SMA connector back panel.
Type of Modulation: DS series analog synthesis, Option full digital synthesis.
Off Lock Attenuation: ≥ -80 dBc.
Modulation Capability: ±150 KHz.
Limiter built in
Power Good Detector: adjustable from20÷90% of the power.
Audio Presence Detector: adjustable time from front panel.
External AGC: Automatic, with fine ADJ from front panel.
Modulation Mode: Mono, Stereo, Multiplex, SCA, RDS, Aux.
Preemphasis: Flat/50/75µs selectable from front panel.
Asynchronous AM S/N Ratio: -70 dB.
Synchronous AM S/N Ratio: -65 dB .
RF Harmonics: Exceeds EBU/CCIR/FCC requirements.
RF Spurious: Exceeds EBU/CCIR/FCC requirements.

MONAURAL OPERATION
Audio Input Impedance: 600 ohm - ≥10 Kohm balanced.
Audio Input Level: Digital -12 to +12 dBm, Analog -6 to +12 dBm
Input Connector: XLR female.
Audio Frequency Response: ±0.1 dB, 30 Hz to 15 KHz.
Total Harmonic Distortion + Noise: 0.01% @ 400 Hz.
Intermodulation Distortion: 0.01%, 1 KHz/1.3 KHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.01% 2.96KHz square wave and 14 KHz sine wave.
Distortion: 0.01% 2.96KHz square wave and 14 KHz sine wave.
FM S/N Ratio: -80 dB rms detector,-75 dB below ±75 KHz deviation.

STEREO OPERATION
Audio Input Impedance: 600 ohm - ≥10 Kohm balanced.
Audio Input Level: Digital -12 to +12 dBm, Analog -6 to +12 dBm Input Connector: XLR female.
Audio Frequency Response: ±0.1 dB, 30 Hz to 15 KHz.
Total Harmonic Distortion + Noise: 0.01% @ 400 Hz.
Intermodulation Distortion: 0.01%, 1 KHz/1.3 KHz, 1:1 ratio.
Transient Intermodulation Distortion: 0,01% 2.96KHz square wave and 14 KHz sine wave.
FM S/N Ratio: -80 dB rms detector, -75 dB below ±75 KHz deviation.
Stereo Separation: Digital 20 Hz ÷ 15 KHz ≥ -60dB, Analog -45 dB@30Hz ≥ -60dB@ Freq ≥ 100 Hz
Crosstalk attenuation: Digital Main to Sub -70 dB 30 Hz to 15 KHz, Analog ≥ 45 dB@15kHz.
38 KHz Suppression: ≥ -85 dB.
Pilot Frequency: 19 KHz ± 1 Hz
Output Pilot: Digital 1 Vpp. BNC female, analog 2Vpp adjustable from front panel

SIGNAL PROCESSING SECTION (only for Digital)
FM Carrier Generation: NCO-based synthesis
FM Modulation: Fully digital
Stereo Coder: Fully digital, integrated
Input Audio Limiter: Proprietary integrated Soft Limiter
Digital Signal Processing: Real-time internal24-bit digital processing
RDS Generator: Fully integrated
Monitoring Output Signals: Fully digitally generated

MULTIPLEX OPERATION
Composite Input Impedance: 2 Kohm unbalanced.
Composite Input Level: Digital -12 to +12 dBm, Analog -6 to +18 dBm
Input Connector: BNC female.
Composite Amplitude Response: ±0.1 dB, 30 Hz to 100 KHz.
Total Harmonic Distortion + Noise: 0.01% @ 400 Hz.
Intermodulation Distortion: 0.01%, 1 KHz/1.3 KHz, 1:1 ratio.
Transient Intermodulation Distortion: 0.01% 2.96KHz square wave and 14 KHz sine wave.
FM S/N Ratio: -80 dB rms detector, -75 dB below ±75 KHz deviation

AES/EBU OPERATION (optional for Analog)
Input Connector: XLR female, optical TOS-LINK.
Data Format: S/PDF,AES/EBU, IEC958, EIAJCP340/1201.
D/A Converter: 24 bit.
Sampling Frequency: from 32 to 96 KHz.

AUDIO IP (optional)
Lan: Audio IP and Web interface to control and configure
Transport protocol: RTP over UDP;
Protocols: RFE Codec: Alaw,OGG VORBIS, MP3, AAC
SHOUTCAST/ICECAST Codec : TX MP3, RX AAC, AAC+, MP3, OGG (icecast 2.x)

SCA, RDS, AUX OPERATION
Input Impedance: ≥ 2 Kohm.
Input Level: -6 to +12 dBm.
Frequency Response: ±0.1 dB, 50 KHz to 100 KHz.
Input Connector: BNC female.

AUXILIARY CONNECTIONS
RS485: DB9 connector back panel.
CAN BUS (optional): DB9 connector back pane
Telemetry Interface: connector DB25 back panel.
LAN: RJ45 connector back panel
MPX OUT: connector BNC back panel.

OPTIONS
RDS/RBDS Programmable Coder via PC.
OIRT or JPN version.
SNMP
Audio Over IP
AES/EBU (only for Analog)

ELECTRICAL
AC Input Power: 90÷260 VAC 50/60 HZ single phase.
AC Apparent Power Consumption: 4200VA
Cos Φ> 0.98.
Cooling: Forced air.
Acoustic noise:< -56 dBa @ 1 meter.

ENVIRONMENTAL
Operating temperature: -5°C to +50°C.
Max Operating Altitude: 2000 mt.
Relative Humidity Range: 0 to 90%.

PHYSICAL DIMENSION
Mounting: Standard 19" chassis 3 U rack.
Size: W x 483 mm. D x 600 mm. H x 132 mm.
Weight: ~ 25Kg.

Software update
Core micro : Via Web

Installation and Use

Front panel

Fig. 2: DS2000-3000 Front view

The front panel has five LEDs that indicate the status of the transmitter, and are:

1	ON/ST.BY	LED green/yellow
2	LOCK	LED green
3	LOCAL	LED yellow
4	INTLK	LED yellow
5	FAULT	LED red

There are also four keys for the functions of:

6	ON
7	LOCAL
8	RESET
9	BACK

These LEDs and its buttons, integrate the capabilities of the LCD, to understand the status of the transmitter more clearly without access to the navigation menu.

Moreover on the front panel there is also a “RF monitor” (A) output.

The output level is 0dBm @ nominal output power.

Rear panel

Fig. 3: DS2000-3000 Rear view

On the rear panel connectors are located as follows:

A	FAN	
B	Reset	
C	RF Output	7/8 connector
D	AC Mains	6-poles AC connector
E	Optical	Optional
F	GSM Ant.	Optonal
G	AES/EBU input	XLR/TOS-LINK connector (optional for DS Series)
H	L/R audio input	XLR connector
I	SCA/RDS input	BNC connector
J	19kHz input	BNC connector
K	AUX input	BNC connector
L	MPX audio input	BNC connector
M	10 MHz input	SMA connector (optional only for DP series)
N	MPX audio input	BNC connector
O	1 PPS input	SMA connector (optional only for DP Series)
P	Fan connector	
Q	TLC/TLS	D25 connector (refer to appendix X for the pin description)

R	USB	USB connector
S	LAN POE	RJ45 connector
T	LAN	RJ45 connector
U	RS485	DB89 connector(refer to appendix X for the pin description)
V	RDS/RS232	DB89 connector (refer to appendix X for the pin description)

Operating instructions

Local operation of the DS2000-3000 transmitter is actuated via 4 front panel keys and 5 led.

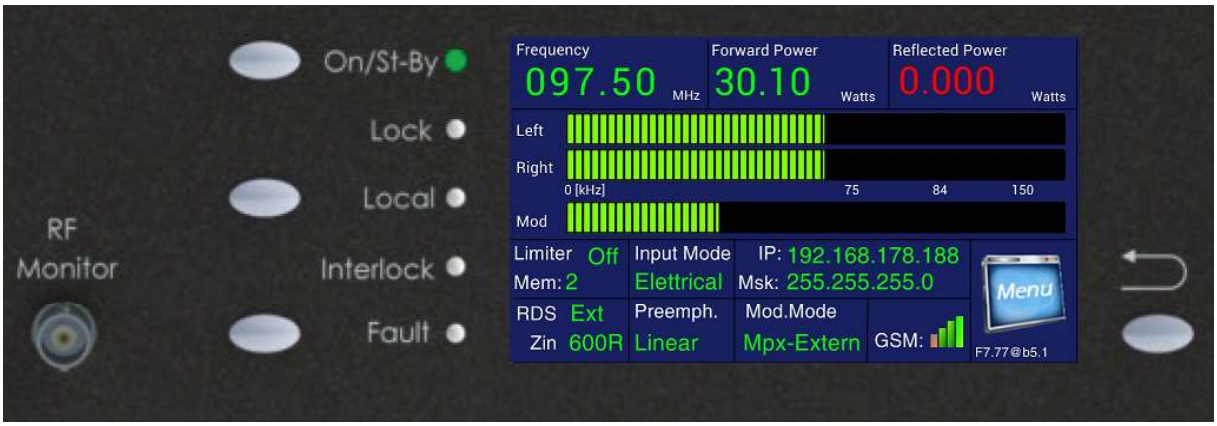


Fig. 4: DS30-50-100-300-500-1000 Transmitter Front Panel

led	Status
On/ST-BY	Green --> RF On Yellow --> RF Off
LOCK	Not Used
LOCAL	Yellow --> TX in Local Mode Off--> TX in Remote Mode
INTLK	Yellow --> TX Externally Locked Off--> TX Not Externally Locked
FAULT	Off--> TX in Normal Operation Red Fixed --> Alarm Mode – TX Off Red Blinking --> Prealarm Mode - TX On but some parameters are abnormal. Check temperatures, unbalance, reflected power etc.

CAUTION!

All the changes to the Transmitter must be done in Local mode.

In this mode the Transmitter is completely manually controlled.

All settings are under menu control from LCD colour display with touch screen except for transmitter “ON/ST-BY” switching and local/remote switch-over.

The current operating status is displayed on the LCD colour display with touch screen. During an operating procedure the individual menus, the set functions and parameters as well as the polled measured values are shown. LED’s on the front panel give a status indication of important operating parameters.

In remote control mode, the front panel keys and the LCD colour display with touch screen are inhibited. In local mode, no settings are possible via the remote control equipment.

All these Led and buttons, integrate the capabilities of the LCD, to understand the status of the transmitter more clearly without access to the navigation menu.

Aside from the operating and display elements, the front panel also incorporates an RF Monitor on a BNC connector, that can be used to attach a power meter, spectrum analyser or another measurement instrument.

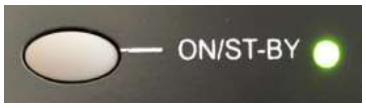
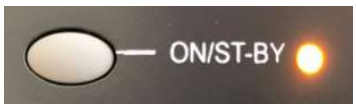
RF On/Off Switching

RF Off

The ON/ST.BY LED is yellow and the RF output is inhibited.

RF On

The ON/ST.BY LED is green and the RF output is enabled.

"ON/ST-BY" Key	LED	RF Output Status
	Green	ON
	Yellow	OFF

Local/Remote Mode

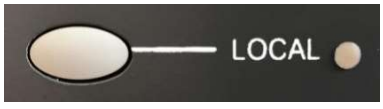
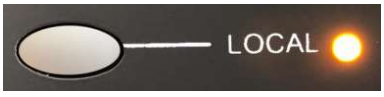
Local Mode

The Local yellow LED is on. The keys and the LCD display are enabled. All manual settings via the menu are enabled. Remote mode is inhibited.

Remote Mode

The Local yellow LED is off. The keys and the LCD display are inhibited. The transmitter can only be operated through the remote control interface. The menu system does not allow changes in settings. If an attempt is made to operate the transmitter via the menu system the following text is displayed:

This information is shown for 3-4 seconds.

"Local" Key	LED	Local/Remote Status
	Off	TX in **"REMOTE"** Mode
	Yellow	TX in **"LOCAL"** Mode

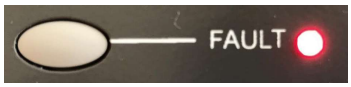
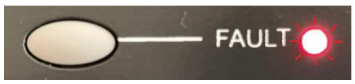
Fault/Reset key

Fault LED

If a failure in the device occurs, the red Fault LED is on or blinking.

Reset key

For clear a failure, push the Fault/Reset key and the LED will be off. If the LED remain On or blinking the alarm persist. In each case it is advisable check the Log Event.

"Fault" Key	LED	Alarm Status
	Off	TX in Normal Operation
	Red fixed	Alarm Mode - TX is "Off" mode
	Red blinking	Prealarm Mode - TX is On but some problem occurs

Home/Back key

Back key

Activate the blanked LCD Display or Return from submenus on the LCD Display.

Installation

Unpacking

The package contains:

- 1 DS Transmitter
- 1 CD-ROM with the User Manual
- 1 Mains power cable
- Accessories and spare parts (screws/front panel handles)

First power-on and setup

Unpack the transmitter and perform a visual inspection to determine that no apparent transport damages has been incurred. Ensure that all connectors are in perfect condition.

Connect the RF OUT of the transmitter to the antenna cable or a dummy load capable of dissipating the output power.

WARNING!

Electric shock hazard! Never handle the RF output connector when the equipment is powered on and no load is connected. Injury or death may result.

Ensure that the POWER switch on the rear panel is set to OFF.

Connect the mains power cable to the MAINS connector on the rear panel.

Quick start

Before power on the transmitter, make sure that the it is connected to the antenna or to an adeguate power dummy load; connect the mains plug and turn on the transmitter. If you want to turn on the transmitter with the lowest possible power, keep pressed the Home/Back and turn on the transmitter

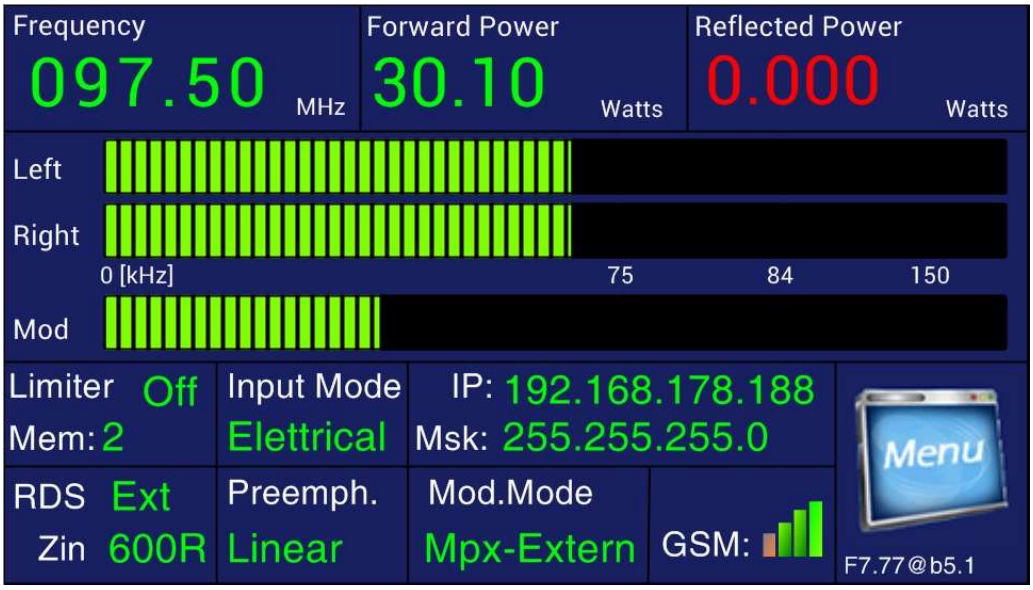


Fig. 5:Power-on transmitter display/Start page

The display will show some informations of the transmitter settings, such as:

- Frequency
- Forward Power
- Reflected Power
- L/R Modulation
- Deviation Modulation
- Limiter Status (On/Off)
- Input Mode
- RDS
- Input Impedance
- Preemphasis
- Modulation Mode
- Memory
- Lan IP Address & Subnet Mask
-
-

Menu

Display and programming of the transmitter is through the LDC display touch screen. From the first screen at power, as previously explained, can be accessed through the menu button to the submenu of the Audio, Frequency, Power, Setting, Memories and Alarm.

Touching a symbol on the display is accessed directly from the menu chosen and you can implement all the changes you want. Each menu is simple and intuitive without the need for any manual so that all changes following what appears on the display. Following are the main screens that allows the display.

That related to memories need an explanation, the transmitter can store six different settings in six memories, these can be called either remotely or locally; This is used in systems n + 1 in the case of transmitters reserve. The storing of data, frequency, power, etc. are possible with the transmitter on the air, without interrupting transmission. When storing the display shows "**SETTING MEMORIES**", at the end the display will show all the data chosen.

In the settings menu you will find all the possible configurations of the date and time, external interlock, LAN configuration, setting a general machine and all measures concerning the voltages and currents in the transmitter.

Fig. 6: Main menu

Menu - Frequency

By pressing the key frequency it accesses the relative panel for the setting of the transmission frequency of the transmitter.

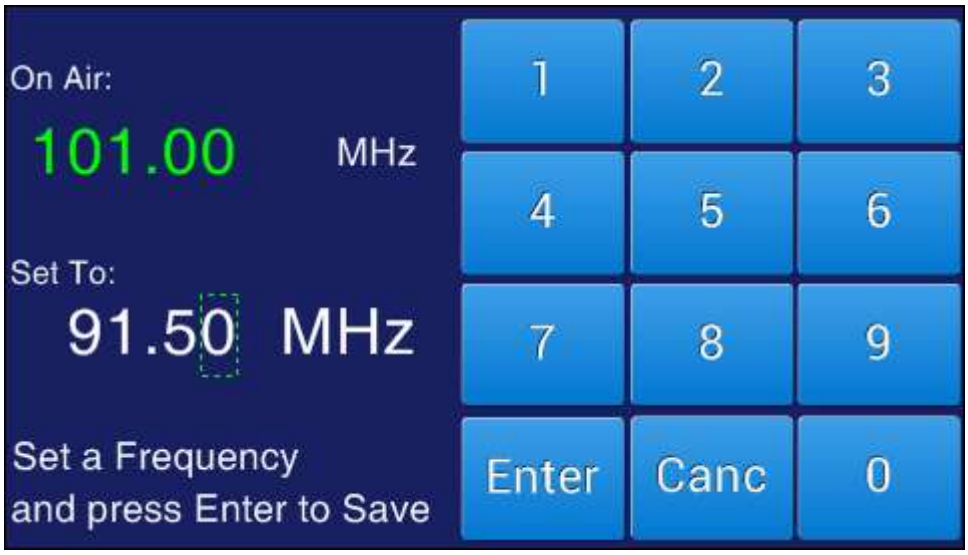


Fig. 7: Set frequency menu

In section On-Air is visible the frequency currently set on the transmitter.

From the keypad will be possible to type the new frequency, which must be confirmed by pressing on the key “ENTER”. In the case of error delete the typed value by pressing on the key “Delete”. The system will confirm the change made, you must confirm the change by answering “Yes”.

Menu - Power

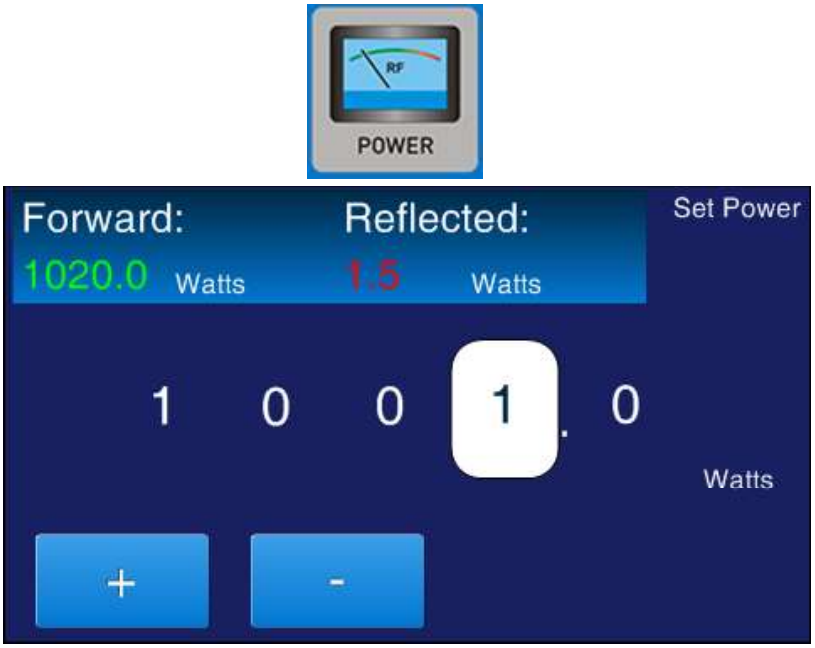


Fig. 8: Set power menu

From the Power menu you can set the output power of the transmitter. In the screen are also displayed the Forward and Reflected power.

Select a digit clicking on it. Click on the + & - buttons to increase/ decrease the output power (the power adjustment occurs immediately).

Menu - Audio settings

From the Audio button and it will be possible to change the parameters relative. In the Audio panel setting can be set:

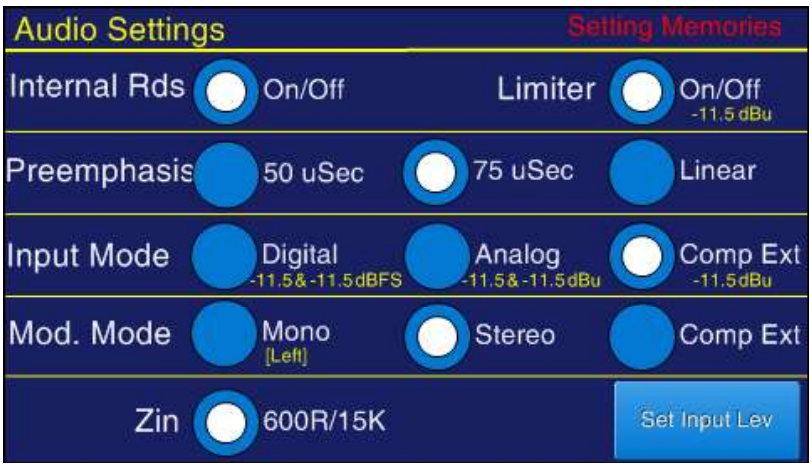


Fig. 9: Audio Selection menu options

- Internal RDS (On/Off)
- Limiter Action (On/Off) normally 84.2 kHZ (CCIR - Other Settings is available on request)
- Preemphasis
- Input Mode: it possible to set **Digital** - **Analog** or **Composite Ext.** input mode.
- Modulation Mode it possible to set **Mono** - **Stereo** - **Composite Ext.**
- Zin Input Impedance: **ENABLE** = Low 600R - **DISABLE** = High 15k

Other your can set Level Audio Input, to push button **"Set Input Lev"** open new panel.

From this panel you can set the various audio levels for each highlighted is the range within which fix the levels, by pressing the "Change" button it will be possible to set the new level.

Fig. 9: Setup Audio Input level

By clicking on the Change key the following panel appears, where it is possible change the input level:

Fig. 10: Settings value for Audio Input level panel

You can also set your preferences for both **Input Mode** Digital that for **Modulation Mode Mono**, as you can see from the subsequent images:

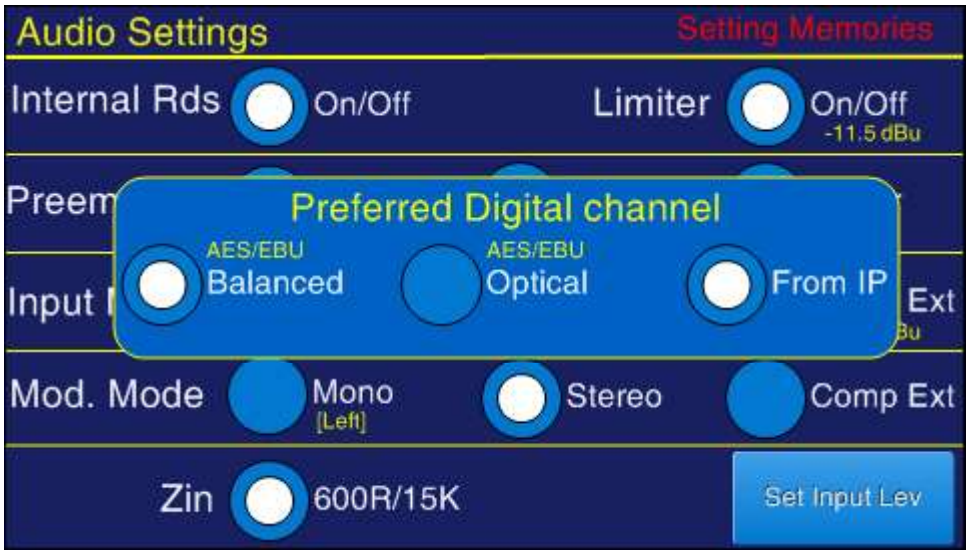


Fig. 11: Input mode settings

Fig. 12: Modulation mode settings

Menu - Settings

From the panel setting will be possible to visualize the general readings of the system and change the configuration of all the options available:

• Lan Setting
• Time Setting
• DB 25
• RS485 Address
• 19kHz OAmp
• 19kHz Dev Amp
• 19 kHz Dev Ph
• Power Red

• Set FSK
• Audio C.O.
• AES/EBU
• Options
• FSK En
• 19 kHz Out
• GMT En

Fig. 13: Settings menu

The displayed readings are:

- Ipa 1-2-3: currents supplied by the power supplies;
- 3v3/5v0/Serv: service voltages;
- Vpa: Voltage power amplifier, the voltage with which the RF is working;
- Eff: efficiency in percent;
- RF: RF heatsink temperature in Celsius degrees;
- Amb: room temperature in Celsius degrees.

In the main panel of setting, finally it is possible to enable or disable:

- FSK
- 19kHZ Out
- GMT En

Lan configuration

From this panel it is possible to configure the connection parameters to the LAN of your system Transmitter. You can set the IP address, the Subnet Mask, the Gateway, the Domain Name Server, and the Network Time Protocol Server address set by default at 193.204.114.232 and you can enable GMT synchronization with the server.

Touching the IP address to be configured will open the panel for configuring its address as shown in the figures.

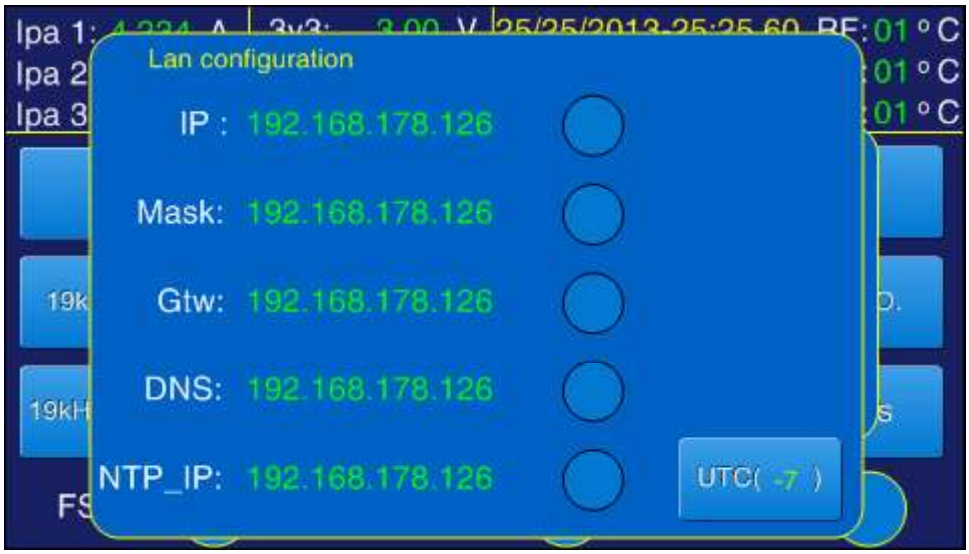


Fig. 14: Lan configuration

Clicking on each item in the list a settings panel opens, in which it is possible set the selected parameter.

Fig. 15: Setting LAN Ip Address

Fig. 16: Setting LAN Subnet Mask

Fig. 17: Setting LAN Gateway

Fig. 18: Setting LAN DNS

Fig. 19: Setting Time server

Date Time Setting

In this panel it is possible to set Date and Time, a numeric keypad will allow us to enter numerical values, pressing enter will confirm the values.

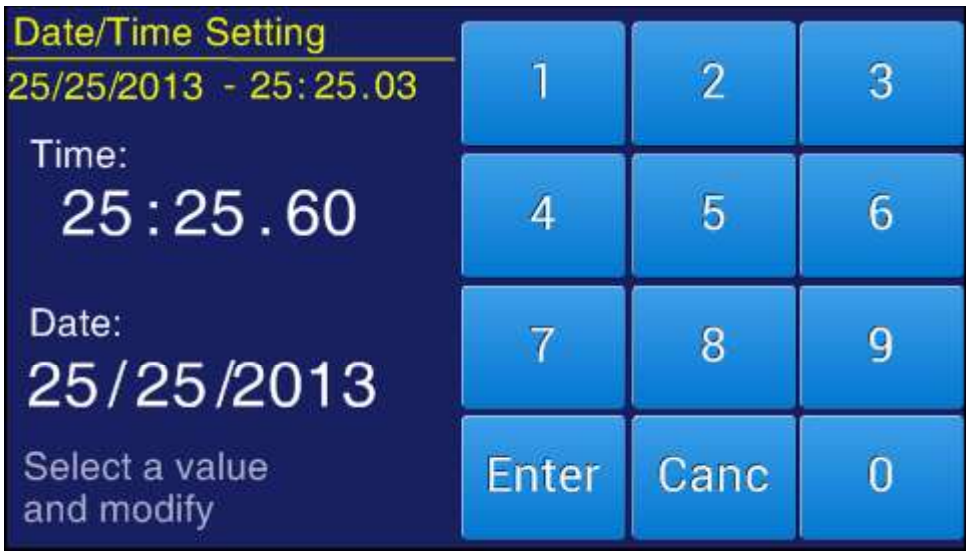


Fig. 20: Date and time settings

DB25 Setting

The transmitter can be controlled through the DB25 connector located in the rear pannel of the device.

Clicking on the “DB25” key it is possible setting:

- Power Check Pin (Normal Open or Normal Closed)
- Percent value Power
- Audio Mute time in second
- Audio Presence time in second
- Intrlock IN (Normal Open or Normal Closed)Address port RS465

Fig. 21: DB25 connector configuration panel

Address port RS465

The “Addr” button allows to set the RS485 communication port.

Fig. 22: RS485 connector configuration panel

19kHz Output Amplitude

This panel allows to change the amplitude of the pilot tone of 19kHz. This signal is not the one used in the MPX, but a copy of it and it is output of the BNC connector “19kHz” (H in the figure 3 pag 13 of the User Manual).

19kHz Dev Amplitude

This panel allows to change the frequency deviation amplitude of the pilot tone of 19kHz.

19kHz Dev Ph

This panel allows to change the phase deviation of the pilot tone of 19kHz.

The three parameters just mentioned can be modified through the following panel:

Fig. 23: 19kHz Output Amplitude/Frequency deviation/Deviation phase settings

Power Reduction Settings

You can program the power reduction in a determined time interval by configuring from the panel Power Reduction Setting a start time, an end time and the percentage reduction.

Fig. 24: Power Reduction settings panel

Set FSK/ID-Code Settings

You can configure the IDCode from the panel setting. By selecting the indent with the slider you can select the number or letter and confirm with the Enter key, the letter that staimo changing sara identified by the color green.

Fig. 25: ID-Code Settings

SCREEN ID CODE SETTINGS

The characters input occurs through a slider and forward/back arrows. When the correct number/letter is shown click on “Enter” to input in the IDCode. Then click on the next dash and repeat the input until the IDCode configuration is completed.

AES/EBU Settings

From this panel you can set the ratio of the digital audio signal (selected 128 bit or deselected 256 bit), the deemphasis (Off or Automatic) and finally the value in kHz of the deemphasis

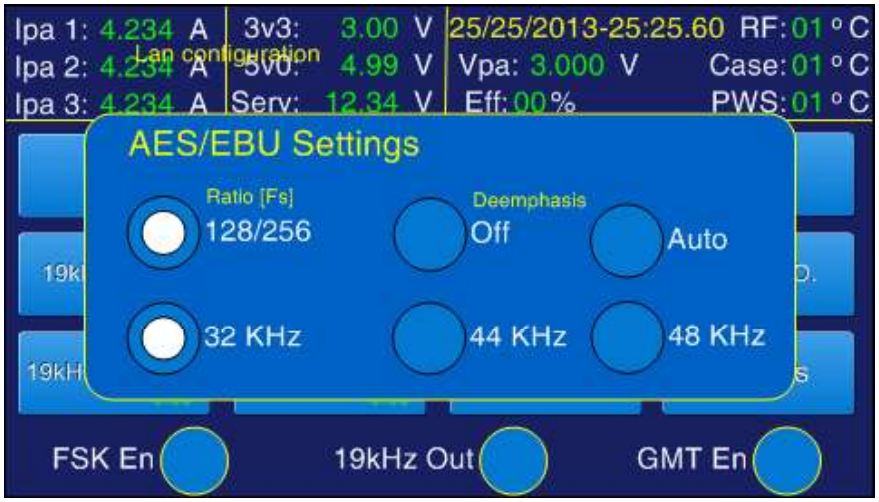


Fig. 26: AES/EBU Settings

Audio C.O./Reserve audio source

Fig. 27: Audio Change Over Settings

Descrizione Audio change over.

Options Status

This item is a summary of some parameters, as AES/EBU, GSM.

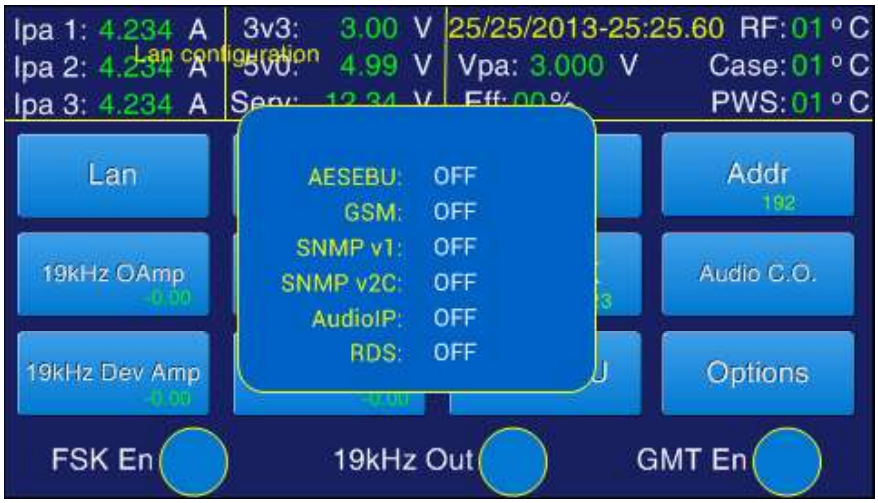


Fig. 28: Options Status screen

Preset - Settings

From this panel you can enter in the setting of the preset of the transmitter, in total there are 6 presets to setting.

The preset currently active is displayed on the main panel, if we are planning a preset on the main panel will display the number of the memory in the setting of color red.

Fig. 29: Zoom of the active memory indication in the main screen

In the Presets panel memory currently active shows down the button **“EXIT OF SETTING”**, while the other memories show buttons **ACTIVE** and **SET**. We can navigate the memories using the **+** and **-** buttons.

In the next figure is displayed on the page of the set memory on the transmitter, as you can see they do not appear in the active buttons and set but the Exit button of setting.

Fig. 30: Presets panel memory currently active

Values can be modified presets not used by pressing the **SET** button opens the menu panel with the text "**Setting Mem: number of memory**" of color that flashes red to indicate that we are changing the values of the preset and we are not changing the current values of the transmitter. In each page will be present the alert.

Fig. 31: Presets panel of an inactive memory

Fig. 32: Alert indicating that memory changes are in progress

Alarms/Log Event

In this panel you will be able to view all the event and error messages that the system registers. The log stores at most 100 messages that will be divided into pages that you can browse through the buttons located to the right.

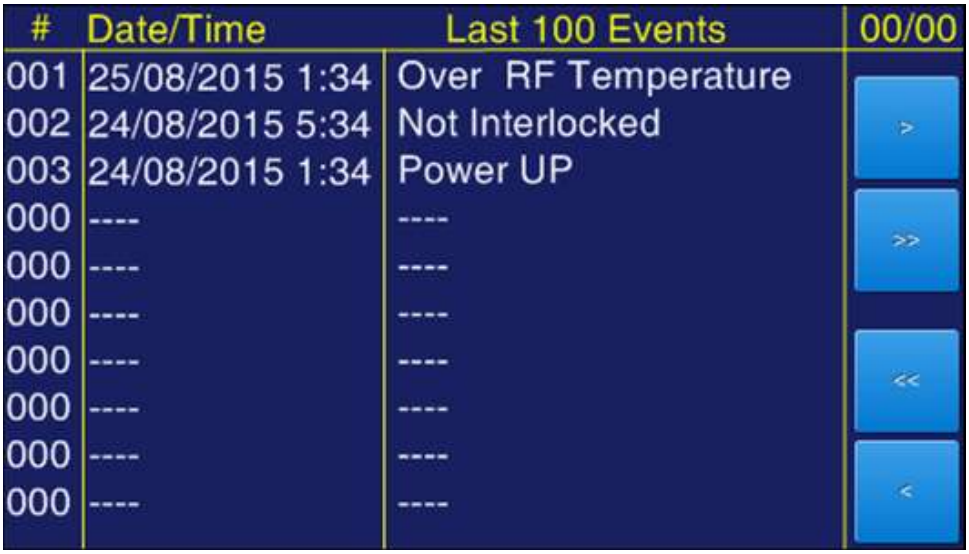


Fig. 33: Log-event screen

Appendix A - DB25 and DB9 pinout

DB25 (TLC/TLS) Rear connector

Pin N.	Type	Function	Notes
1		Ground	
2	Output - Analog	Analog IPA (Power Amplifier Current)	0~5Vdc Not present on 6kW TX
3	Output - Analog	Analog Reflected Power	5V@ nominal reflected power
4	Input - Optocoupled	External interlock	Software settable as NO or NC
5	Input - Optocoupled	Transmitter ON	Remote mode only as NO or NC
6	Input - Optocoupled	Set memory M2	Remote mode only
7	Input - Optocoupled	Set memory M4	Remote mode only
8	Input - Optocoupled	Set memory M6	Remote mode only
9	Output - Digital	General alarm relay - NO contact	Latched
10	Output - Digital	Power & Audio good relay - NO contact	NON Latched
11	Output - Digital	ON/Stand-byrelay - NO contact	Latched
12	Output - Digital	Local/Remote relay - NO contact	Latched
13	Output - Analog	+24VDC Service	max 500mA
14	Output - Analog	Analog VPA (Voltage Power Amplifier)	5V@ Maximum P.A. Supply Voltage Not present on 6kW TX
15	Output - Analog	Analog Forward Power	5V@ nominal power
16	Input - Optocoupled	Alarms reset	Remote mode only
17	Input - Optocoupled	Transmitter OFF	Remote mode only
18	Input - Optocoupled	Set memory M1	Remote mode only
19	Input - Optocoupled	Set memory M3	Remote mode only
20	Input - Optocoupled	Set memory M5	Remote mode only
21	Input - Analog	External AGC (from an external directional coupler)	0~3Vdc
22	Output - Digital	General alarm relay – Common contact	
23	Output - Digital	Power & Audio good relay – Common contact	
24	Output - Digital	ON/Stand-by relay – Common contact	

25	Output - Digital	Local/Remote relay – Common contact	

The functioning of the relays can be set from the front panel in normal open or normal closed.

DB9 Rear connector

Pin N.	Type	Function	Notes
1		Ground	
2	Data	RS 485 - A	
3	Data	RS 232 - TX	
4	Input - Optocoupled	RS 485 Address Bit 1	Service only
5	Output - Analog	+5VDC Service	max 500mA
6	Data	RS485 - B	
7	Data	RS 232 - RX	
8	Input - Optocoupled	RS 485 Address Bit 2	Service only
9	Input - Optocoupled	RS 485 Address Bit 0	Service only

Appendix B- Touch screen calibration

Requirements

Anything

Procedure

1) Put the device in "**LOCAL MODE**"
2) Press and hold simultaneously the keys "**HOME**" + "**REMOTE**"
3) Follow the instructions on the display

Appendix C - Upgrade Firmware

Reset & Upgrade Firmware via Force bootloader

To update the firmware and access the page for the control of the system it is necessary to connect the LAN to porat located on the rear panel of the transmitter shown in Fig. The Set IP address is visible on the first page of the LCD display.

Each RFE Transmitter/Amplifier have a local memory EPROM that stores some informations about the equipment (i.e. serial number, model, installed options and other info).

It may occur that stored contents will be erased. In this case it's necessary to use this

Fig. C1: Zoom of the LAN-POE connector on rear view of the transmitter

Requirements

- Personal Computer running Windows versio 7 to 10.
- Standard Lan Cable.
- TFTP Client Software (f.e. Weird "tftpc_free")

it can be dowloaded here: https://www.weird-solutions.com/dowloads/utilities.

- Reset Firmware file. This file is specific for each transmitter/amplifier; ask to our support team for the right reset file. Be aware, different reset firmware can cause TX malfunctions. (for example "*Reset-T500A0717044.bin*" can be used only to reset the memory of the TX with serial T500A0717044).
- Standard Firmware file; (for example "*Firmware-TX-7.62b.bin*" to upgrade a transmitter to firmware version 7.62b).

Firmware Reset Procedure

1. Configure the PC on the same class of IP addresses of the Transmitter (for example 192.168.178.1)

2. Connect it with a cable to the LAN connector on the rear panel (figure C1) of the TX/Amplifier.

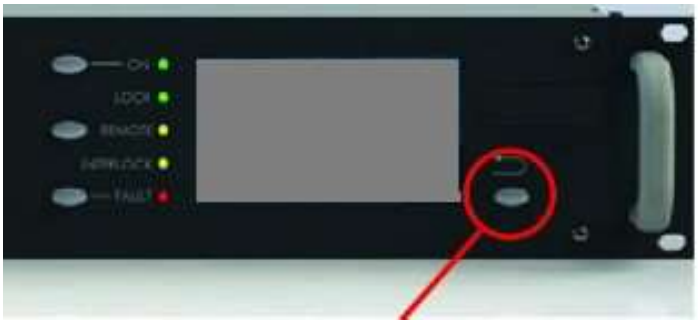
3. Launch the TFTP Client Software.

4. Configure the Client as in Figure C2:
   - TFTP server: **192.168.178.55**
   - Operation: **Upload**
   - Format: **Binary**
   - Local File Name: click on the folder button and select the file, for example *"Reset- T500A0717044.bin"*
   - Remote File Name: **firmware.bin** (Be carefully!!! Other file name doesn't work)

Fig. C2: TFTP Client Software screen

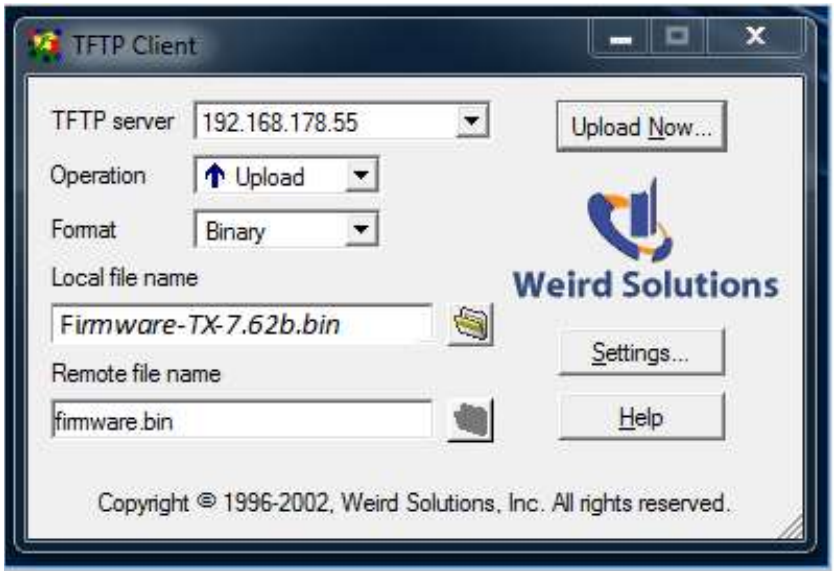
5. Make sure the TX is disconnected from AC line or the rear power switch is in "off" position.

6. Push the HOME button and turn on the TX; when the leds start blinking leave the button. The leds continue to blink and the LCD display is back.



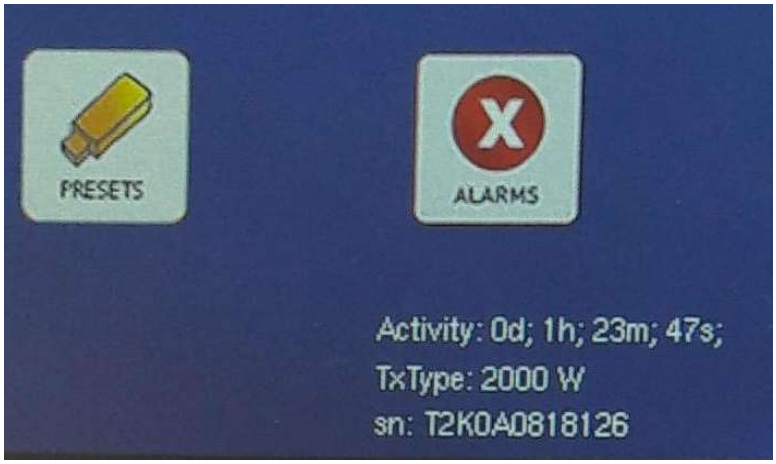
7. Go on the PC and press the button “Upload Now...”; the firmware is transferred to the TX. When the transfer is completed, the TX will restart automatically.

8. Now the data in the local memory are restored and it is possible to install the desidered firmware version. Repeat the steps from 4 to 7; the only difference is that in the **Local File Name** must be indicated the file name of the firmware that we want to install (for example *“Firmware-TX-7.62b.bin”*).



9. To make sure the procedure was successfull look under the “Menu” button on the LCD: where is shown the Firmware version loaded in the TX. Make sure it correspond with the loaded one.

10. Click on the “Menu” button; in the second page, on the right side of the LCD you can verify the TX type and the serial number. Make sure that all the informations are corrects.



Reset & Upgrade Firmware via Lan Address

This procedure is intended for the upgrade of the internal Firmware of the RFE Transmitters.

Requirements

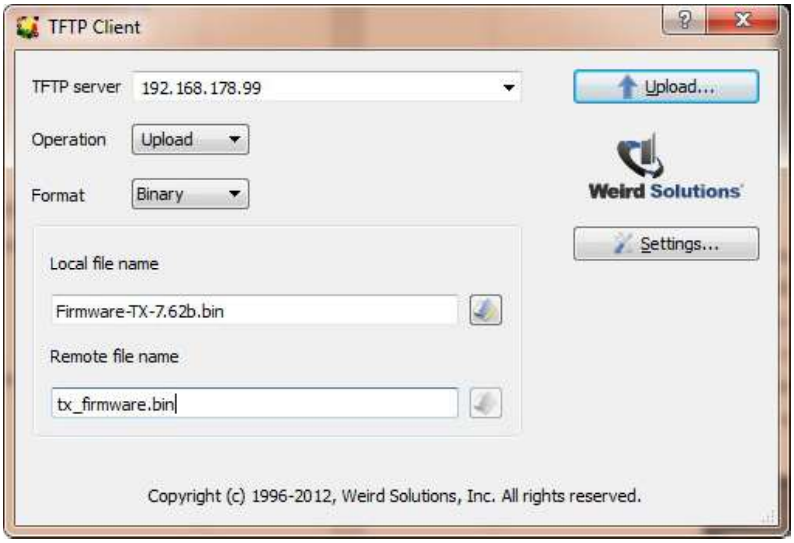
- Personal Computer running Windows versio 7 to 10.
- Standard Lan Cable.
- TFTP Client Software (f.e. Weird “tftpc_free”)

it can be dowloaded here: https://www.weird-solutions.com/dowloads/utilities.

- Standard Firmware file; (for example *“Firmware-TX-7.62b.bin”* to upgrade a transmitter to firmware version 7.62b).

Firmware Reset Procedure

1. Configure the PC on the same class of IP addresses of the Transmitter (for example 192.168.178.1)
2. Connect it with a cable to the LAN connector on the rear panel (figure C1) of the TX/Amplifier.
3. Launch the TFTP Client Software.
4. Configure the Client as in Figure C2:
   - TFTP server: **Lan address of the TX (i.e. 192.168.178.99)**
   - Operation: **Upload**
   - Format: **Binary**
   - Local File Name: click on the folder button and select the file, for example *“Firmware-TX-7.62b.bin”*
   - Remote File Name: **tx_firmware.bin** (Be carefully!!! Other file name doesn’t work).

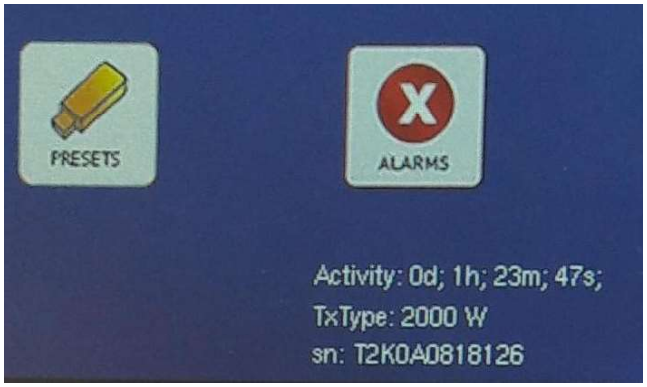


5. Press the button “Upload” on the PC; the Upgrade begin and when the progress bar arrive to 100%, if all is ok the led on the front panel of the TX became blinking fast for few seconds.

6. After the TX restart automatically and the new firmware is uploaded.

7. To make sure the procedure was successfully verify under the “Menu” button on the LCD display: here is showed the Firmware version loaded in the TX. Make sure it correspond with the loaded one.

Then click on the “Menu” button; in the second page, on the right side of the LCD you can verify the TX type and the serial number. Make sure that all the informations are corrects.



For any request contact us via out ticketing support system (www.rfebroadcast.com/support) or sending an email to support@rfebroadcast.com.

Appendix D - Log event & Alarms list

The system is equipped with a register of alarms, consulted both on the display that from web interfaces (where available). Each event that generates an alarm is registered with date and time at which the event occurred. In the following tables are detailed individual alarm signals.

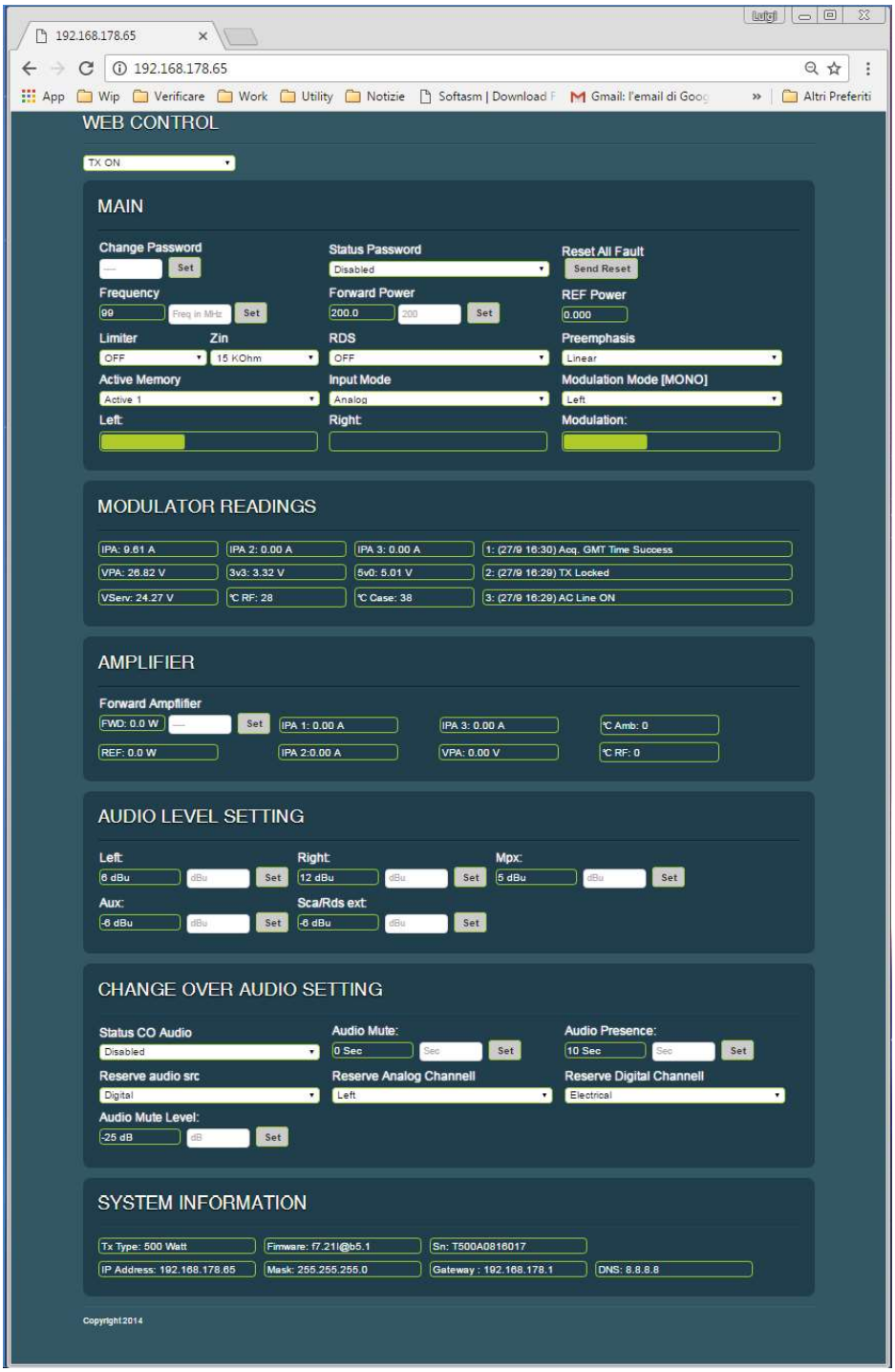
Text Alarms	Description
TX Power UP	Switching on the device
TX Powe DOWN	Turn off the device
TX in Local Mode	TX is operational only in local mode
TX in Remote Mode	TX is operational only in Remote mode
TX ON	TX in power
TX Stand-By	TX in stand-by
Alarm - OverCurrent	Absorbed current higher than that allowed
Reset - OverCurrent	Reset following to the Alarm - Over Current
Reset - FAULT	It was carried out a reset of all alarms blockers
Alarm - PowerGood	Power below the threshold of control set
Alarm - AudioGood	No sound for a time higher than the set value
Alarm - AC Line OFF	No mains powered device in POE
AC Line ON	Electrical network ok
Alarm - RF Burning	Alarm RF Section likely outbreak transistor
Alarm - 485TX Fault	Connection 485 absent
Alarm - Pmax	Power grater than nominal
Reset - Pmax Alarm	Reset following Power greater than nominal
Alarm - Temperature	RF temperature greater than 80°
Reset - Temperature	Reset followinf RF temperature greater than 80°
Alarm - VSWR Soft. Prot.	Alarm for increase Reflected Power Block Software
Reset - ACK VSWR HW	Reset following to the Alarm VSWR HW
Alarm - VSWR HW Prot.	Alarm for increase Reflected Power Block Hardware
Playing ID-Code	Activation ID-Code and airing
Alarm - Fan Fault	Alarm Fans blocked
Alarm - Modules Fault	Alarm RF Pallets Error
Alarm - Derating Pwr	Alarm power reduction due to Alarm VSWR
Power Reduction Prog	Power Reduction activation
Local Access Denied	If enabled password access denied locally
Web Accesss Denied	Access denied on the web
AES/EBU Error	Error of AES/EBU
Password Modified	Password Changed

Text Alarms	Description
Password Resetted=1000	Password Reset set as default = 1000
Enabled Password	
Disabled Password	
Acq. GMT Time Success	Acquisition GMT Successfull
Failed to Acq. GMT Time	Acquisition GMT failed
GMT Server error	
GMT server unreachable	
TX interlocked	TX blocked by external interlock
Not interlocked	TX enabled by external interlock
Reserve src Audio	Audio Active Reserve
TX Locked	TX hooked to the frequency set
TX Unlocked	TX released from the set frequency
Alarm - PWS 3 Absent	Power supply 3 absent
Alarm - PWS 2 Absent	Power supply 2 absent
Alarm - PWS 1 Absent	Power supply 1 absent
Alarm - PWS 1 Fault	Power supply 1 error
Alarm - PWS 2 Fault	Power supply 2 error
Alarm - PWS 3 Fault	Power supply 3 error
Primary src Audio OK	Primary audio present
Alarm - VSWR HW STOP	Device blocked for a high number of alarms VSWR HW
Temperature Derating	Derating of power due to Alarm for temperature higher than 75°
Message sent	The SMS Message sent
Message send failed	SMS Message not sent
Message received	SMS Message received
GSM Ready	GSM present and configured
Alarm - GSM NOT Ready	GSM is not present or not ready
Remote Restart Machine	Reboot machine remotely
Alarm - FWD OUT	Fault output power

Appendix E - Web Page Control/SNMP

Web Page Control

The system also allows the connection via LAN. A web page to check transmitter is accessible at the address visible on the first page of the LCD display, here will be visible all the parameters of the transmitter and the possibility to modify them. In order to be able to change the parameters you will need to enter a password (default 1000) and set the transmitter in the Remote Control.

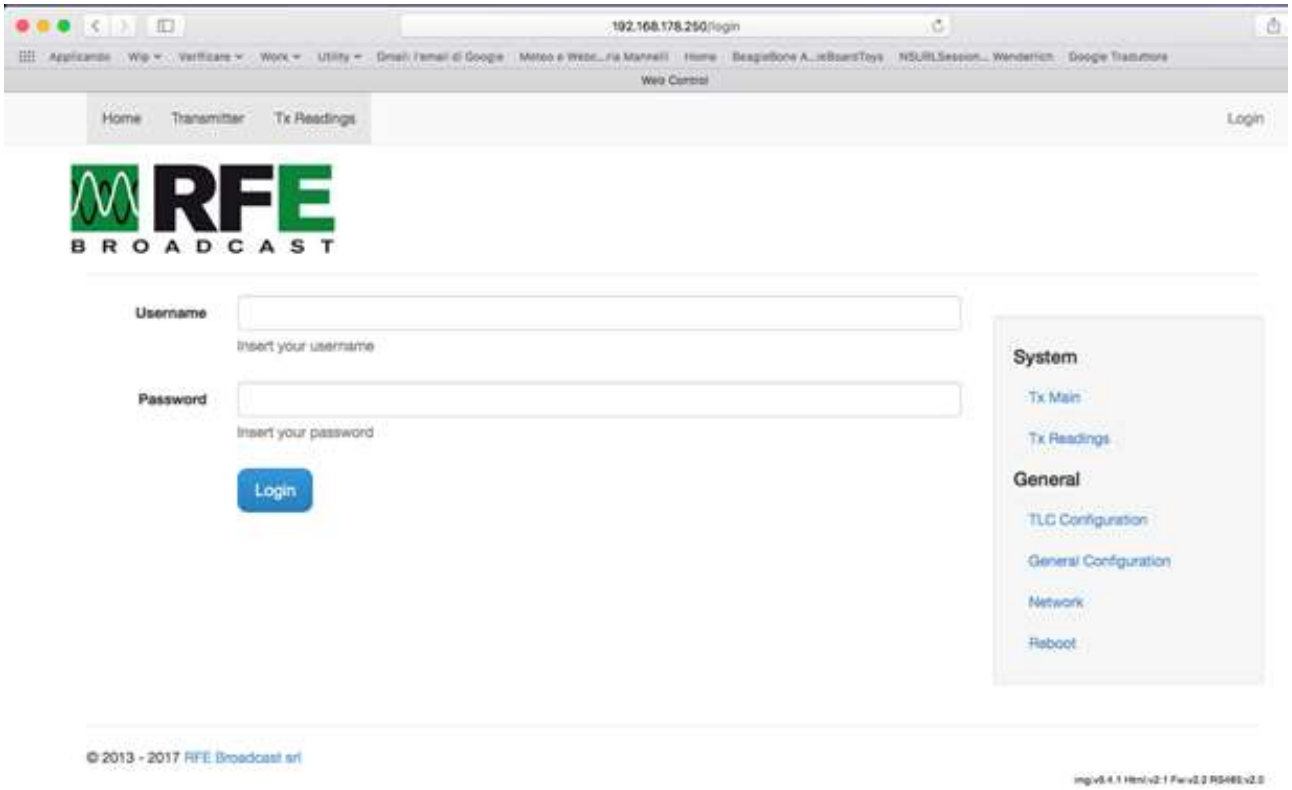


SnmpV2c Board with Evolute WebServer

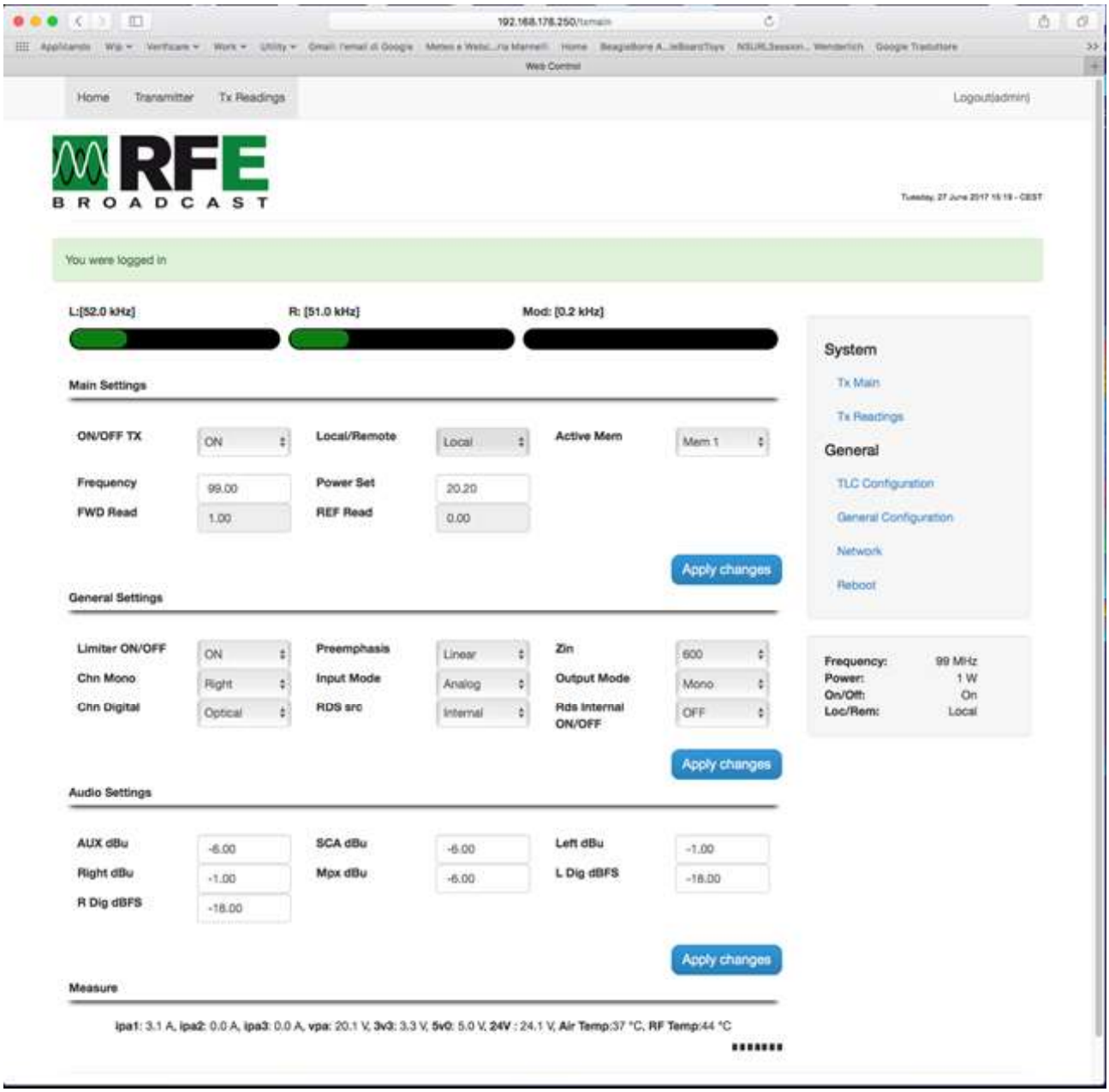
This function is optional in system. To access this web server is necessary to connect a LAN cable to port LAN2/AUDIO-IP as indicated in the figure.

The system requires the access with username and password (default user:**admin** password:**admin**) that can be edited once entered into the system.

The other page is used to control the machine via Webserver and configure the parameter of SNMPV2c.

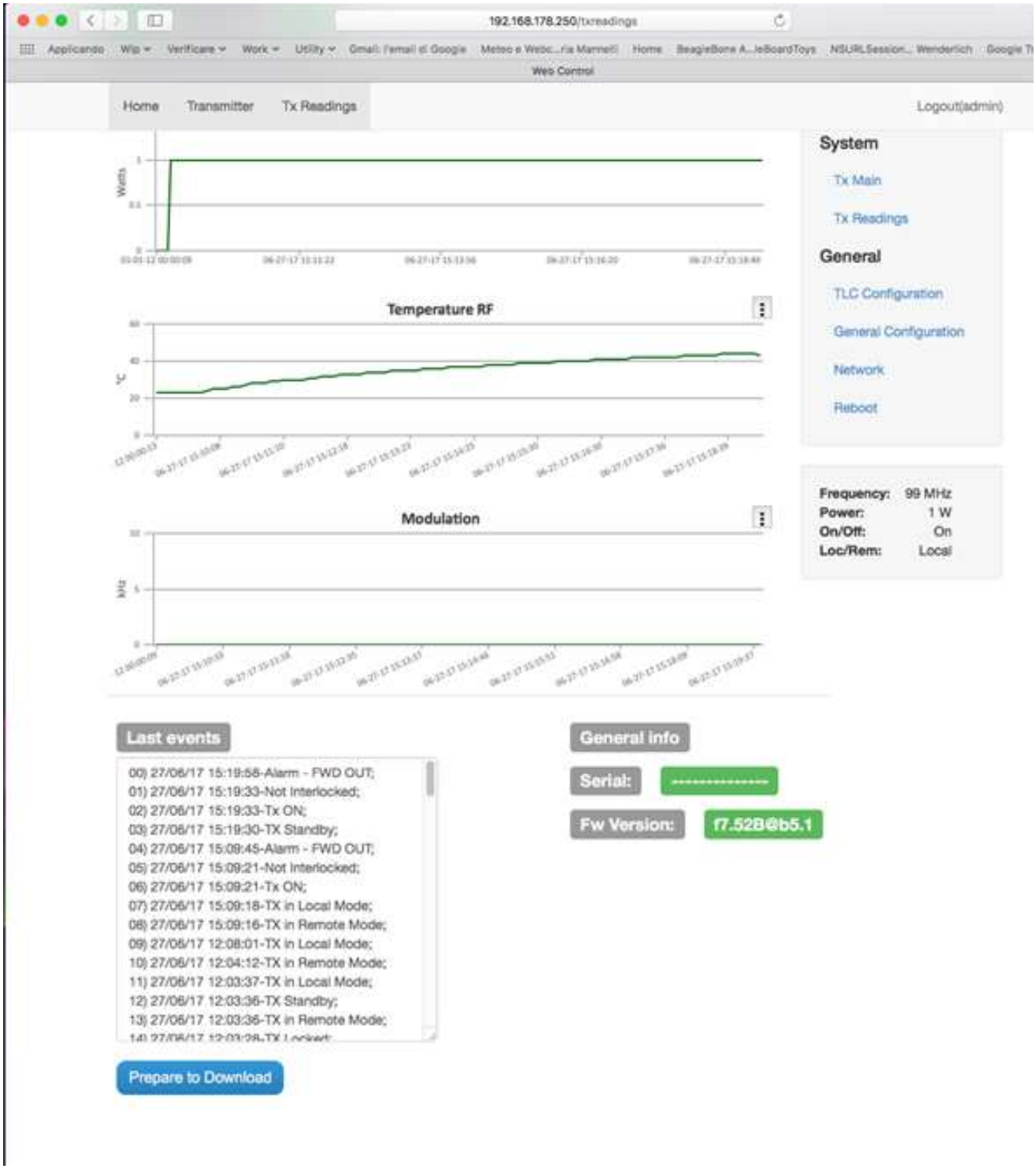


We you put the correct autentication code you will see the main page.



Readings Page:

The Graphical illustradet is condesed but you can select an area and you will see the zoom of value

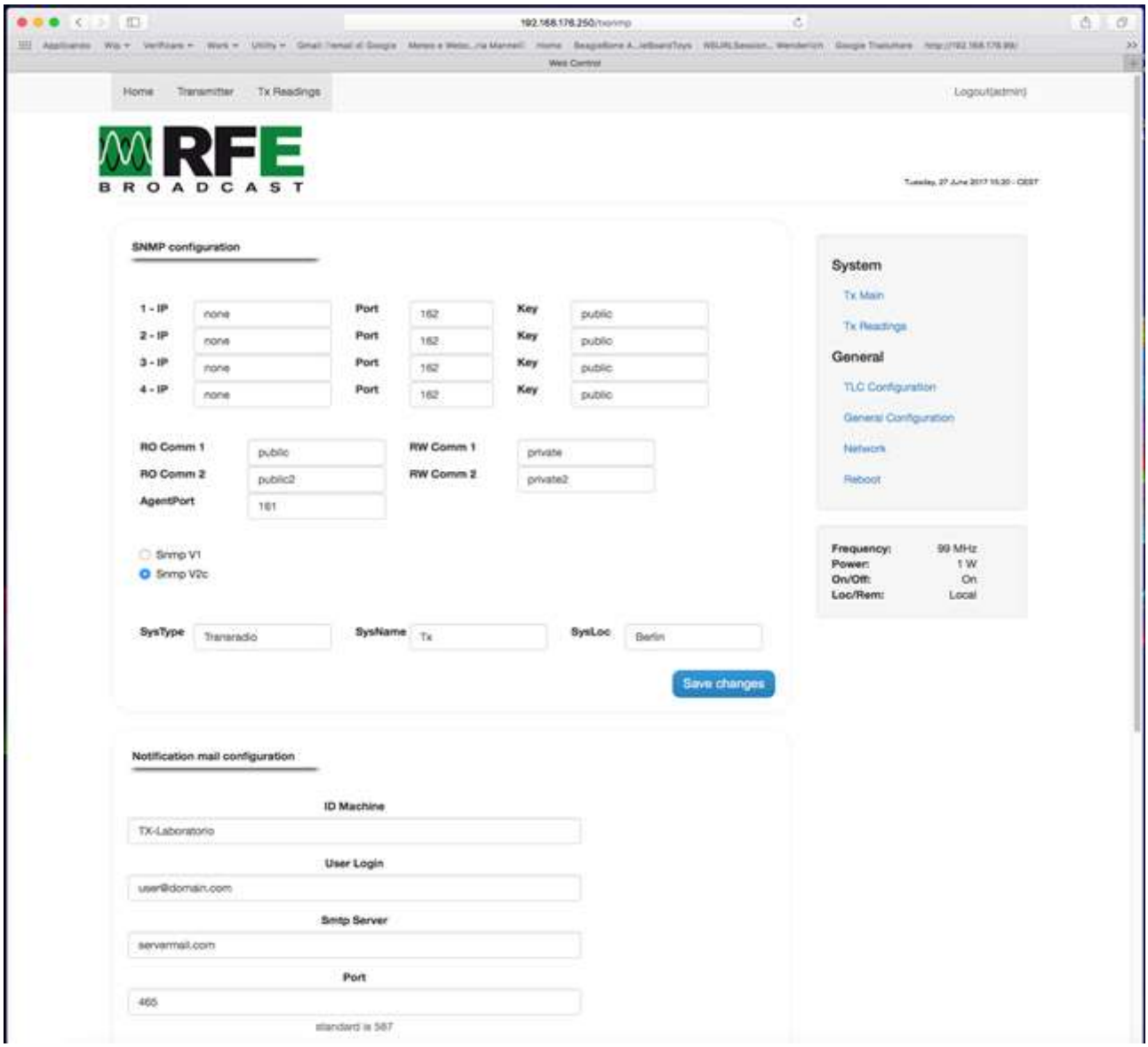


Configuration Page:

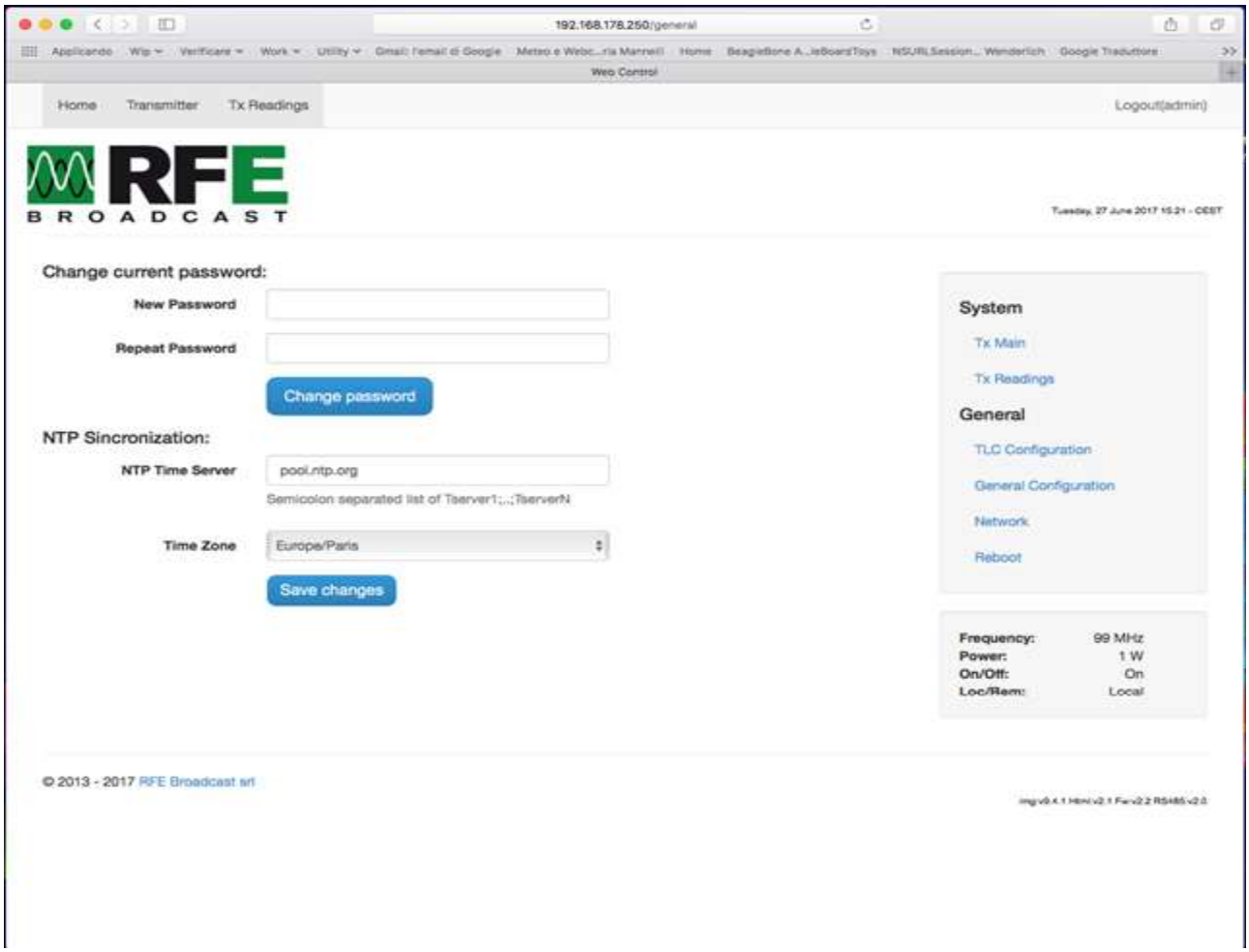
it is possibile to configure

- 4 Trap Server whit personal keyand
- 2 RO Community Key
- 2 RW Community Key
- Agent port
- Tipology of control SNMPv1 or V2c
- Basic ColdStart Trap Inporfamtion ans SysType,SysName,SysLoc

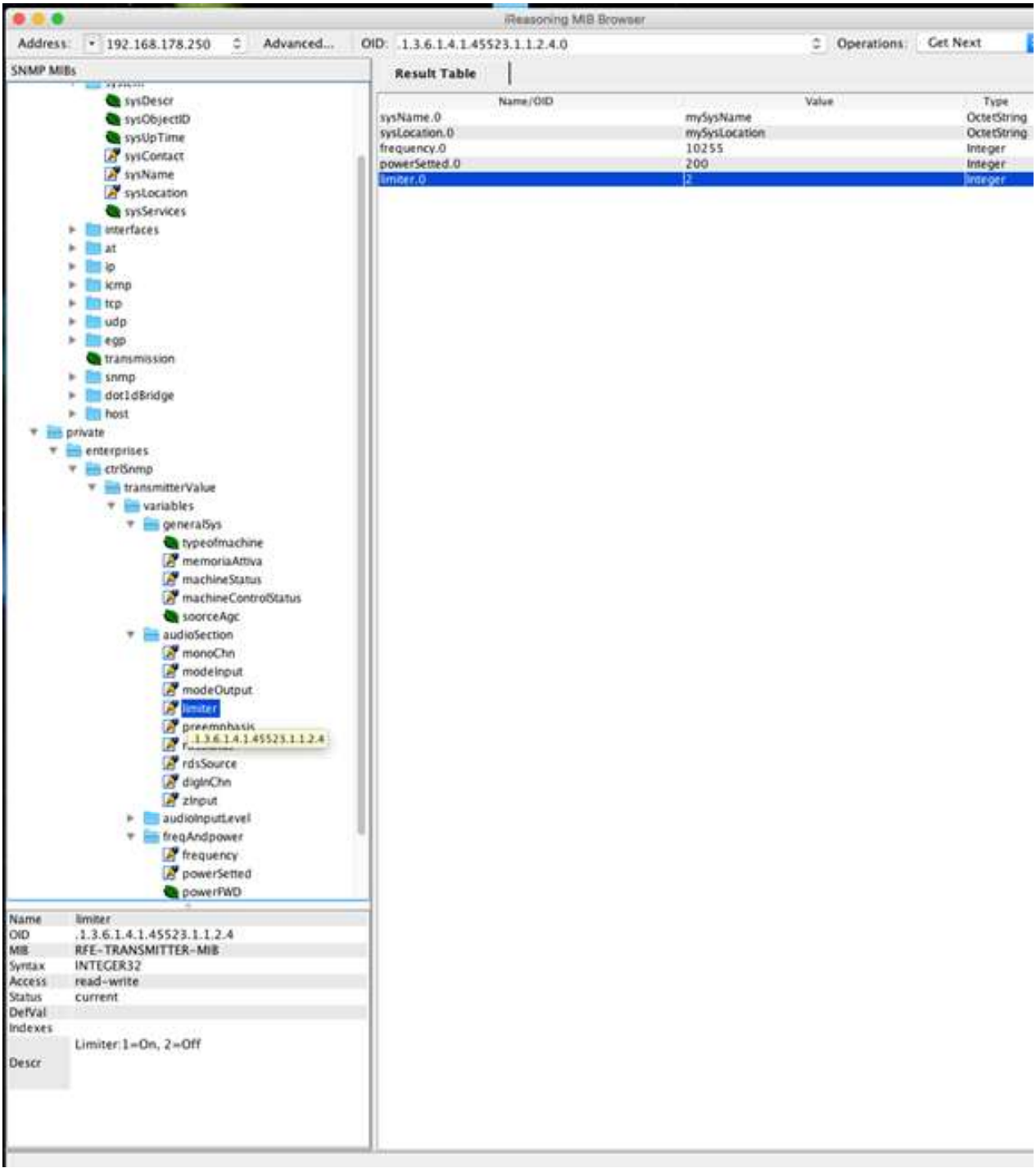
in the Same page it is possible also to Configure The system Notification Mail



NTP Server Syncronization



It is possibile to use a SNMP Server to Control the Machine, or a Normal MIB Browser like ireasoning Mib Browser.



Appendix F - Support system

Introduction & general information system

The new Customer Support System is available online at the following link:

www.rfebroadcast.com/support

The Support System can be used by customers to report any errors, problems or anomalies found in our products.

The System can ben used also without registering, however it will be required to provide some data such as email and company name.

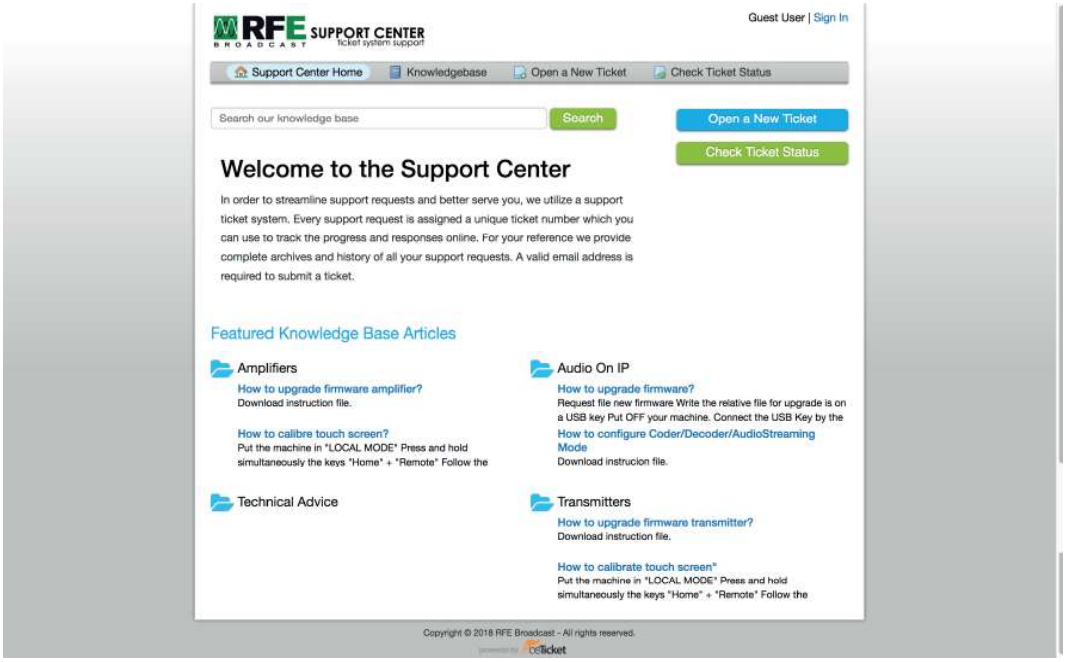


Fig. F1: Home Page Support System

Just click on the entry Open a new Ticket on the menu bar to access the form to submit a support ticket.

On the page below, in fig.F2, an asterisk marks the required fields to fill in: email and full name.

Then, prease select the type of ticket to be submitted from the drop-down menu “Select a Help Topic” between:

- Feedback
- General Inquiry
- Report a problem

- RMA

To report a technical problem, select the Report a Problem item and fill in the relevant detail form. On the page below, in fig. F3 you can find form for a “Report a problem” type of topic.

It will be necessary to provide some data such as the serial number and the firmware version of the equipment.

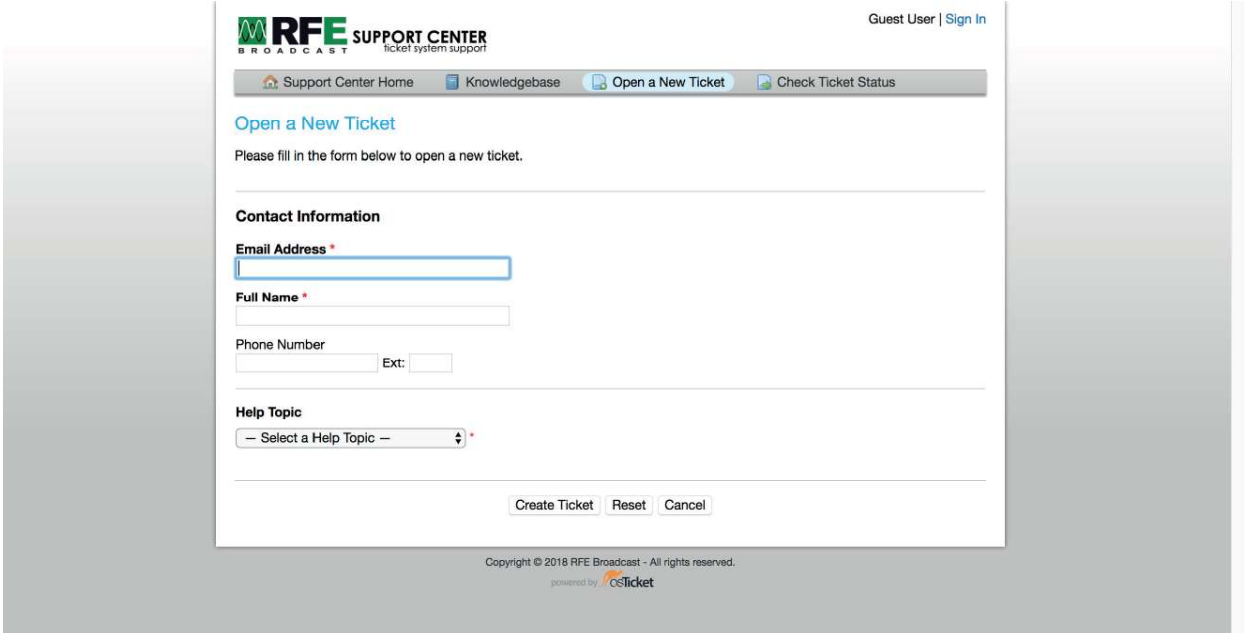


Fig. F2: Open a new ticket

It will also be possible to attach files such as images or text files necessary fro technical support to quickly find a solution to the reported problem.

After submitting the ticket by clicking on the red button “Create Ticket”, you will receive an email with the number assigned to the ticket and with references to be able to follow the progress of the ticket.

For unregistered users it will be possible to view the status of the ticket by clicking on the entry in the top menu bar “Check Ticket Status” and entering email and ticket number received by email as shown on the page below in fig. F4.

At the end of the assistance process, you will receive a message within the platform confirming that the support has been executed according to our internal standards and will be closed.

It would be welcome to receive feedback through the online support system expressing your satisfaction level by filling in a free text field with a commento for the support service received.

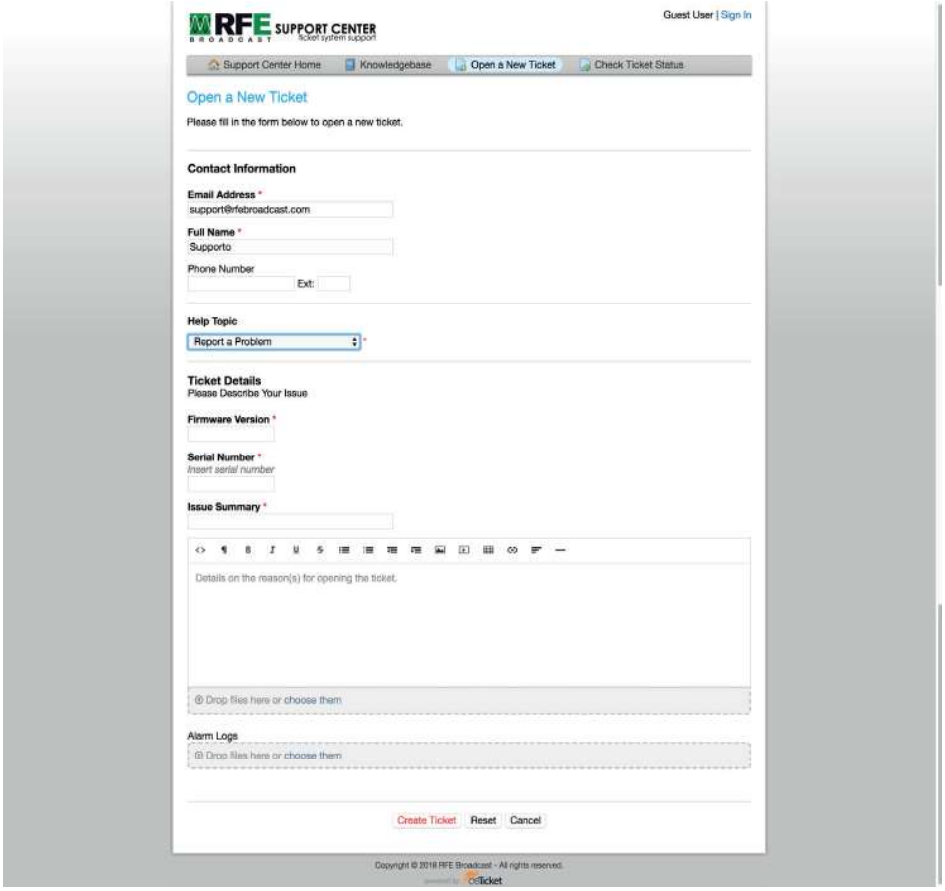


Fig. F3: Insert a new ticket detail

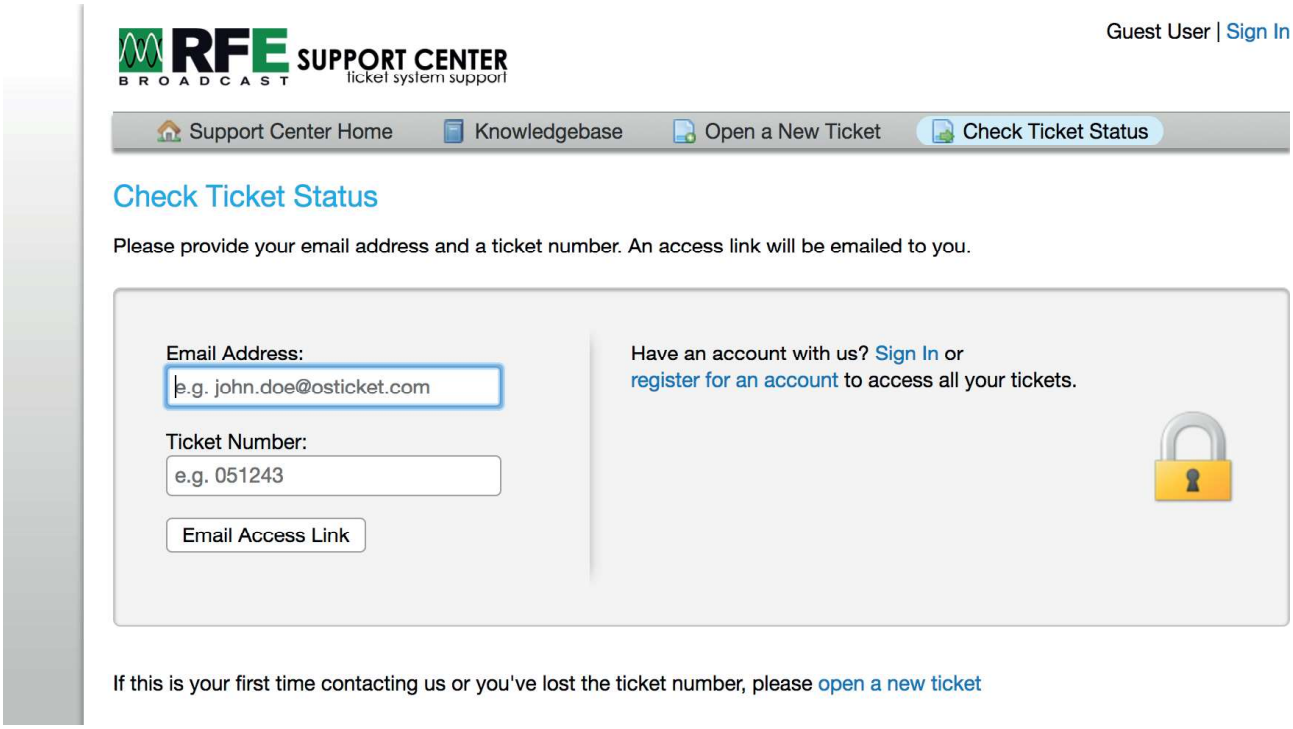


Fig. F4: Check ticket status

Note: RF EXPOSURE SAFETY DISTANCE (only for FCC & IC) *RF Exposure Limits for United States of America, according to FCC regulation: setting to the maximum of the output power of the apparatus, to guarantee the limits of exposure declared within this document, it is necessary that the antenna gain used with this device should be 0dBi or less and all persons should maintain a minimum separation distance of the following distances; depending on the output power of the transmitter for general uncontrolled exposure and general controlled exposure.*

RF Exposure Limits for Canada, according to IC regulation: setting to the maximum of the output power of the apparatus, to guarantee the limits of exposure declared within this document, it is necessary that the antenna gain used with this device should be 0dBi or less and all persons should maintain a minimum separation distance of the following distances; depending on the output power of the transmitter for general uncontrolled exposure and general controlled exposure.

Limites d'exposition RF pour le Canada, conformément à la réglementation IC: réglage au maximum de la puissance de sortie de l'appareil, pour garantir les limites d'exposition déclarées dans ce document, il est nécessaire que le gain d'antenne utilisé avec cet appareil soit de 0 dBi ou moins et toutes les personnes devraient maintenir une distance de séparation minimale des distances suivantes; en fonction de la puissance de sortie de l'émetteur pour une exposition générale non contrôlée et une exposition générale contrôlée.

For 30 and 50 Watt: FOR USA/FCC – 113.59 cm
FOR Canada – 141.39 cm

For 100 Watt: FOR USA/FCC – 184.66 cm
FOR Canada – 229.84 cm

For 300 Watt and 500 Watt: FOR USA/FCC – 446.25 cm
FOR Canada – 555.44 cm

For 1000 Watt, 2000 Watt and 3000 Watt: FOR USA/FCC – 1107.92 cm
FOR Canada – 1378.98 cm