



# AEQ LIVE 20 TR

## USER MANUAL

ED 05/07

## **LIVE 20 TR USER'S MANUAL**

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## **1. LIVE 20 TR GENERAL DESCRIPTION**

### **1.1 LIVE 20 TR GENERAL DESCRIPTION**

The AEQ LIVE 20 TR is a high specification FM transmitter for portable and mobile service.

The signal generators together with the RF output module and the audio processor forms a high quality transmitter capable of faithfully broadcasting work in any situation. Transmit frequency are delivered in digital frequency synthesizers and allow the selection of up to 16 pre-programmed channels.

The audio processor allows the use of dynamic microphones as well as line level sources.

A mechanized aluminium enclosure assures outstanding mechanical stability and immunity to interference and crosstalk.

In standard service the LIVE 20 TR is powered by a removable rechargeable battery pack, which can be recharged in the unit as well. Also supplied with the LIVE 20 TR is a  $\frac{1}{4}$  wavelength centered antenna.

A 9 pin sub-D connector in the left side of the unit allows external reprogramming.



## **1.2 CONSTRUCTION**

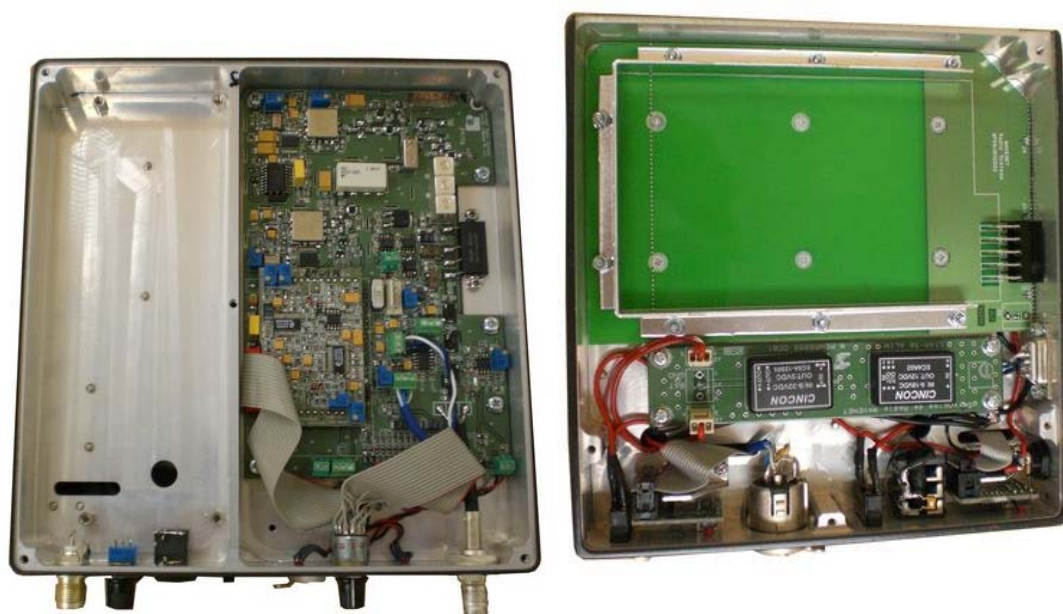
The boards of the AEQ LIVE 20 TR are made of epoxy glass fiber type FR4 with a thickness of 1,6 mm, 2 side type.

The AEQ LIVE 20 TR is equipped with Surface Mounted Devices (SMD) that give the equipment a high grade of robustness.

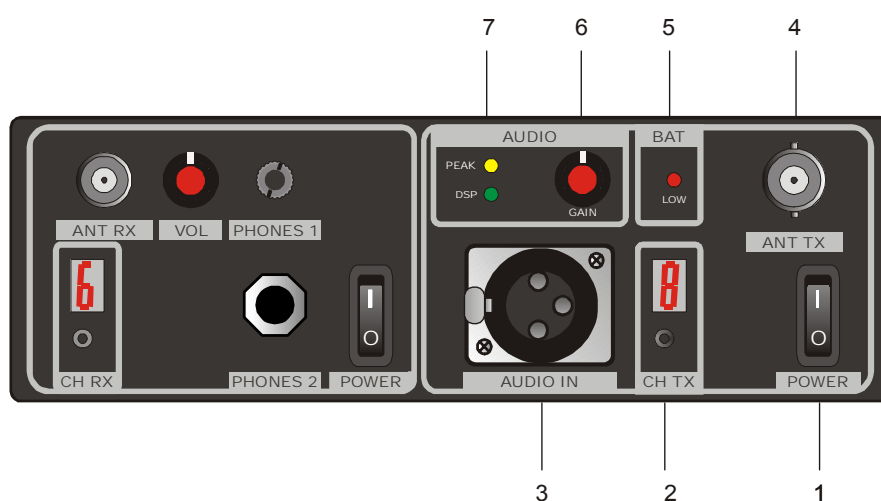
If one SMD is damaged, the defective component should be replaced with a new one.

Do not sense unsoldered components, even if they seem to be faultless.





### 1.3 FRONT PANEL VIEW



- 1.- ON/OFF switch
- 2.- Display and channel selector
- 3.- Audio input
- 4.- Tx antenna connector
- 5.- Low battery indicator
- 6.- Audio level adjustment
- 7.- Peak audio indicator

Note: The Rx section is not equipped

#### **1.4 FCC Compliance**

This device complies with part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interface.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **1.5 Warning to Users**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## **2. LIVE 20 TR HARDWARE**

### **2.1 ON/OFF SWITCH**

To switch on the equipment you must act over the switch labelled POWER.

When the “power” switch is activated, the internal microcontrollers will start executing some routines. Once the routines have been successfully executed, the equipment will provide the RF output power.

Until the microcontrollers have finished with the verification of the PLLs locking, the equipment will not provide RF power to the output.

The equipment will automatically start in the last selected channel.

### **2.2 DISPLAY AND CHANNEL SELECTOR**

The equipment is provided with a selector and an hexadecimal display in order to select the working frequencies.

The display will show the selected channel in hexadecimal format (0 to F).

The channel push button selector allows to the user to change the selected channel. It has a little action delay to prevent undesired frequency changes.

If the user maintains the button pressed, then the channel display changes continuously.

The 16 registries can only be changed by factory staff connecting a PC to the SUB-D(9p), located in one side of the equipment.

The frequency range of each equipment is specific and is adjusted at the factory before shipment.

## CHANNEL FREQUENCIES:

CHANNEL	FREQUENCY
0	161.00000
1	161.00625
2	161.01250
3	161.01875
4	161.02500
5	161.03125
6	161.03750
7	161.04375
8	161.05000
9	161.05625
A	161.06250
B	161.06875
C	161.07500
D	161.08125
E	161.08750
F	161.09375

### **2.3 AUDIO INPUT**

The audio input connector is a XLR, 3 pin audio connector which allows the connection of any kind of balanced or unbalanced audio signal source with levels varying from MIC level to LINE level.

### **2.4 TX ANTENNA CONNECTOR**

The TX Antenna connector is a BNC connector used to connect the proper antenna to the equipment.

The user can choose to connect the antenna to the equipment directly or to connect an antenna with a cable.

The output impedance of this port is 50 ohms.

This port can be used as well to check the equipment specifications in a laboratory bench.

### **2.5 LOW BATTERY INDICATOR**

The low-battery indicator is a red LED that shows the battery working status.

If the red led stays dark, then the battery is still in good working conditions.



If the red led is lighting, then means that the approximate remaining work time is around 20 minutes.

The decision to send the low battery message to the red light is taken by one of the inner microcontrollers.

One ADC (Analog to Digital Converter) takes the battery voltage data and then the microcontroller takes the decision to turn on or not the red led.

## **2.6 AUDIO LEVEL ADJUSTMENT**

The audio GAIN selector is a multi-position switch that provides audio level adjustments for a wide variety of audio sources.

Its associated set of precision resistors allows the user to select gain preset ranging from MIC level sources to LINE level sources.

This feature is very useful so that the user doesn't need any type of external attenuator to accommodate any type of audio signal source to the equipment audio signal envelope.

## **2.7 PEAK AUDIO INDICATOR**

When the red led is flashing, then the user is achieving the peak modulation deviation.

This indicator is very usefully to adjust the GAIN pot in order to have the best signal to noise ratio (SNR).

## **2.8 POWER SUPPLY**

The LIVE 20 TR is powered by an internal Lithium / Ion battery DR-202. Please **never** substitute this battery for any other or connect the equipment to any external feeder.



To re-charge a battery you must **only** use the charger supplied with the equipment.

Before operating the equipment, please ensure that the battery is fully charged. During normal (HI POWER) operation with fresh batteries you can expect more than 4 hours of continuous operation.

It is also possible to check the charge of the battery by clicking the rounded push button and the looking at the status of the 4 LEDs next to it.

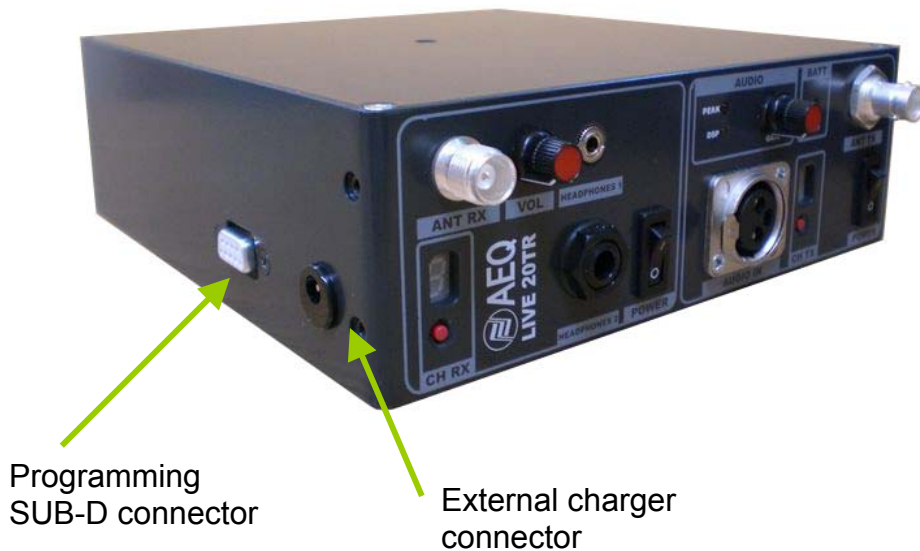


## **2.9 OTHER CONNECTORS**

In one side of the unit the user will find two connectors: one to charge the internal Li-Ion battery, the other one to program the internal microcontrollers.

The first connector is a standard low power supply connector to give the user the possibility to charge the battery from the external supplied charger.

The second one is a standard SUB-D connector for programming and reprogramming purposes, only to be used in factory.



### **3. TECHNICAL CHARACTERISTICS**

#### **3.1 TECHNICAL CHARACTERISTICS**

VHF TRANSMITTER	
Frequency range	150-214 MHz
RF max. output power	3W over 50 Ohm
Number of channels	16 selectable. PLL, digital selector
Modulation type	FM
Frequency stability	Better than 2 ppm
Maximum deviation	As required per the client
Spurious emissions	< -60 dBm
Adjacent channel power	-70 dB
Audio response	As required per the client
Emphasis:	As required per the client
Audio input	Adjustable from MIC to LINE
Compressor-limiter	

#### **3.2 MECHANICAL CHARACTERISTICS**

TX antenna connector	BNC Female
Audio input connector	XLR-3 Female
Power	DR-202 Li-Ion battery
Dimensions	190x74x182 mm
Weight	1.750 Kg ( batteries not included)



#### **4. ACCESSORIES**

The equipment is delivered with the following accessories:

- LI-ION battery DR-202
- Flight case
- Shoulder antenna base
- CH-20 battery charger
- Antennas
- Carrying leather bag

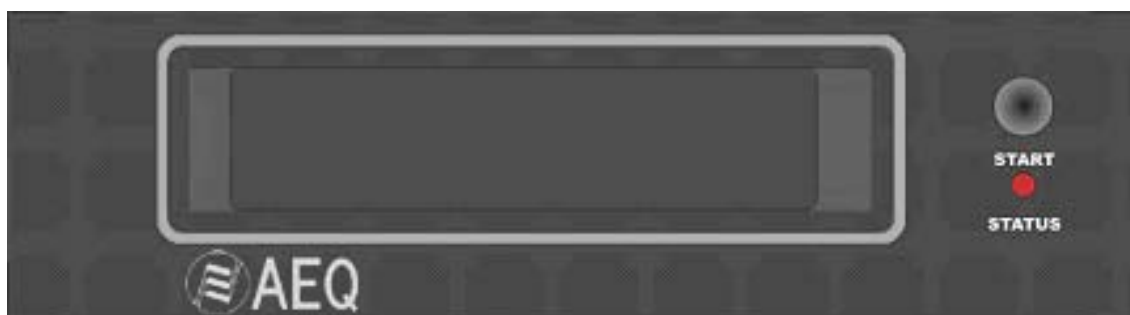


## **5. CH-20 BATTERY CHARGER**

### **5.1 GENERAL DESCRIPTION**

The CH-20 is a high-quality 12V fast charger, designed for charging Li-Ion and Li-Po type DR-202 batteries.

### **5.2 FRONT AND REAR VIEW**



### **5.3 CONNECTION AND STARTING TO WORK**

Connect the external power supply to the “DC IN” connector on the CH-20.

The CH-20 is internally protected with a automotive 7,5 A type fuse.

Insert the DR-202 battery into the CH-20 front hole or connect the LIVE 20 TR to the back “CHARGE OUT” connector with the supplied cable.

Switch on the CH-20 with the back panel switch.

Start the charge process by pressing the “START” button.

The charger will start evaluating the battery, so if the charge is very low, the charger will send several high-current impulses to try to fix it; if this is not possible, then you will hear 4 beeper sounds.

In case of doubt, repeat the charge process. When it reaches a suitable tension a beeper sounds and the LED remains fixed in green until it detects 3 elements and it blinks 3 times.

The end of the charge process will be indicated by the LED in orange and beep sound.

The finish of the charge process can be interrupted at any time by pressing the “START” button.

#### **IMPORTANT NOTE:**

Never charge one battery inside CH-20 together with another battery inside the LIVE 20 TR.

#### **5.4 INDICATIONS**

- LED “STATUS” flashes green at one-second intervals:
  - The CH-20 is ready for use
- LED “STATUS” glow green constantly after the “START” button is pressed:
  - The CH-20 is in the automatic detection process  
(may take up 5 minutes)
- LED “STATUS” flashes 3 times green to indicate the number of cells inside the DR-202 (3 cells):
  - The charge process start.
- LED “STATUS” flashes orange and beeper sound:
  - To indicate the DR-202 battery is approximately 95% fully charged.
- LED “STATUS” flashes orange to indicate 3 cells inside DR-202 and beeper sounds:
  - The charge process is completed
- LED “STATUS” flashes red and beeper sounds:
  - There are an error message with the following cases:
    - Battery broken
    - Input voltage too low
    - Reverse polarity at input
    - Circuit broken at charge output
    - Short circuit at charge output
    - Maximum charge time exceeded (3 hours)
    - Battery bad contact

#### **IMPORTANT NOTE:**

We recommend making two or three complete charge processes to assure an optimal yield of the DR-202 battery.

The cable of the feeder to the cable of charge of the LIVE 20 TR NEVER must be connected directly.



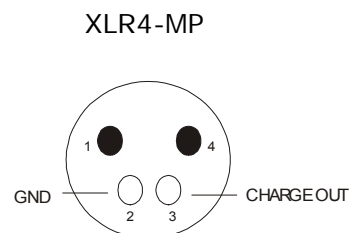
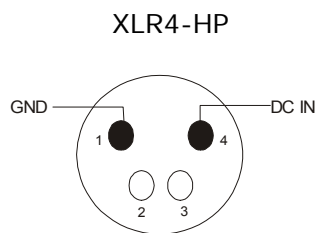
## **5.5 CHARACTERISTICS**

Input voltage:	11...15 VDC
Cell count:	1...4 Li-Ion/LiPo
Charge current:	2 A
Charge termination:	Automatic
Dimensions:	300x14,5x41,5 mm

## **5.6 PROTECTIONS**

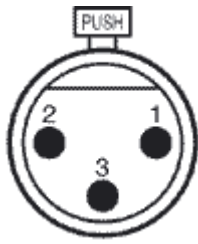
- Input reverse polarity
- Output reverse polarity
- Output short circuit

## **5.7 CONNECTORS PINOUTS**



## **ANNEX1. CONNECTORS PINOUT**

Audio Input connector: XLR 3p Female



1. GND
2. Phase +
3. Phase -

TX Antenna connector: BNC Female

## **ANNEX 2. SECURITY RECOMMENDATIONS**

Please do not switch on the equipment until you have connected the proper antenna to the termination point labelled ANT TX.

### **A.E.Q. Warranty**

AEQ guarantees that this product has been designed and manufactured under a certified Quality Assurance System and according to the ISO 9001/2002 Standard. AEQ therefore Guarantees that the necessary test protocols to assure the proper operation and the specified technical characteristics of the product have been followed and accomplished. This includes that the general protocols for design and production and the particular ones for this product are conveniently documented.

1. - The present guarantee does not exclude or limit in any means any legally recognized right of the client.
2. - The period of guarantee is defined to be twelve natural months starting from the date of purchase of the product by the first client. To be able to apply to the established in this guarantee, it is compulsory condition to inform the authorized distributor or –to its effect- an AEQ Sales office or the Technical Service of AEQ within thirty days of the appearance of the defect and within the period of guarantee, as well as to facilitate a copy of the purchase invoice and serial number of the product.

It will be equally necessary the previous and expressed conformity from the AEQ Technical Service for the shipment to AEQ of products for their repair or substitution in application of the present guarantee. In consequence, return of equipment that does not comply with these conditions will not be accepted.

3. -AEQ will at its own cost repair the faulty product once returned, including the necessary labour to carry out such repair, whenever the failure is caused by defects of the materials, design or workmanship. The repair will be carried out in any of the AEQ authorized Technical Service Center.

This guarantee does not include the freight charges of the product to or from such Authorized Technical Service Center.

4. – No Extension of the Guarantee Period for repaired product shall be applied. Nor shall a Substituted Products in application of this Guarantee be subject to Guarantee Period Extension.

5. - The present guarantee will not be applicable in the following situations:  
Improper use or Contrary use of the product as per the User or Instruction Manual; violent manipulation; exhibition to humidity or extreme thermal or

environmental conditions or sudden changes of such conditions; electrical discharges or lightning; oxidation; modifications or not authorized connections; repairs or non-authorized disassembly of the product; spill of liquids or chemical products.

6. - Under no circumstances, whether based upon this Limited Guarantee or otherwise, shall AEQ, S.A. be liable for incidental, special, or consequential damages derived from the use or from the impossibility of using the product.

AEQ shall not be liable for loss of information in the disks or data support that have been altered or found to be inexact, neither for any accidental damage caused by the user or other persons manipulating the product.



A.E.Q., S.A., the manufacturer of this equipment, is a “Registered Company” by AENOR with reg. no: ER-080/1/96, in accordance with UNE standard EN - ISO -9001

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