

TL-88 PRO

LUTHOR[®]
TECHNOLOGIES

PMR 446 Transceiver

PMR
446 MHz

USER'S MANUAL

CE 0678 ⓘ



We want to appreciate the confidence shown by purchasing this transceiver **LUTHOR TECHNOLOGIES model TL-88 PRO**. This transceiver offers an innovative design in terms of technology and multi-functionality. Its high quality and extensive features make it one of the best equipments in its field, we trust in your total satisfaction with your expectations and communication needs.

On the design of this **TL-88 PRO** we have put the best of our knowledge, illusion and professionalism, to finally reach the result achieved, a **PROFESSIONAL** transceiver for **FREE USE** transceiver for **EASY USE** and a **RELIABILITY** only at the level of the best global manufacturers.

Its development was carried out together with the intervention of an important group of sector's professionals, although the most innovative had been joining forces with different kind of user's profiles in order to capture the needs of different groups: installation's professionals, industries, security forces, leisure, etc. Besides both the transceiver's **QUALITY** and **RELIABILITY**, the biggest concern was to get an equipment that could be used for professionals with experience using this devices as well as for users without any kind of experience, so the **TL-88 PRO** stands out brilliantly for its **EASE OF USE**.

Please read carefully the following manual before using the transceiver in order to guarantee the equipment's maximum performances.

The use of the symbol  shows that this equipment it's under use restrictions in certain countries.

Countries where the use of this equipment is permitted, without prejudice that in any of them their administration request a licence, an authorisation or indicates some restrictions. In case of doubt we recommend you to request the competent authority of the country where you intend to use this equipment.

AT	BE	DK	FI	FR	DE	GR	IS	LT	MT	PL
IE	IT	LI	LU	NL	NO	PT	ES*	SK	SI	
SE	CH	GB	CY	CZ	EE	HU	LV	BG	RO	

*ES: in the specific case of Spain, this PMR transceiver is free use and do NOT need a licence or authorisation for using it.

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Cautions and practical advices

- △ Both the transceiver and the elements supplied with it are not toys, and as you can see later on this text of compulsory reading for the user, prior to unpacking the equipment and its accessories detailed below, you should consequently keep them out of: children's, persons with reduced cognitive capacity, and domestic or wild animals reach.
- △ Any repair must be made only for qualified personal, in case of any problem in the equipment or any of its components you must contact your dealer or a professional and qualified technical service.
- △ Under no circumstances disassemble, modify or manipulate the transceiver, the battery or the charging elements. Apart from the physical hazard that this implies for the user, the equipment and the accessories would lose their warranty.
- △ The inappropriate handling of the transceiver or its accessories, could make change any of the technical features of them, in such a way that might affect their operation, the equipment's security, the user's physical integrity or the technical parameters, which may affect the features as designed, manufactured and marketed. In those cases the user shall be solely responsible for all the disadvantages and liquidated damages that might result of this action, both the manufacturer and the dealer shall be relieved of such liability.
- △ Do not use the transceiver for any purpose other than it was designed for.
- △ Do not use the transceiver if you see deterioration or breakage in any of its parts. Do not hit the equipment or the battery and by all means avoid the risk of falling that may damage it.
- △ Do not expose the product to extremely high temperatures up to 45° or temperatures below 0°. That could significantly affect its operation and the battery could even ignite or explode (read carefully the cautions and practical advices for batteries described in detail below in this manual).
- △ Do not place the transceiver or the battery above heating sources such as radiators, heaters, etc. that might seriously damage the equipment or the battery with the consequent risk of malfunctioning or overheating of them causing a burn down or an explode.
- △ Do not use or charge both the transceiver and the battery if they are wet. Make sure that

they are completely dry before using it or charging the battery. Neither use the equipment with your hands wet.

⚠ Do not supply the equipment with a different tension than the one indicated by the manufacturer. Neither use a different battery than the one supplied by the manufacturer for this equipment. It might cause a burn down or an explode. Do not following this advice will carry an important risk for both the equipment and the user.

⚠ Do not use the transceiver during a thunderstorm (lightning storm), you would be expose yourself to a potential risk and danger of serious injuries or even the death.

⚠ For cleaning the transceiver and its accessories make sure is turned off, use a damp cloth (not wet). Do not use liquids, detergents nor any other chemical substance. Do not clean with a dry cloth in order to avoid the creation of static electricity.

⚠ Do not use the transmission button PTT if is not necessary.

⚠ An extended transmission could lead to transceiver's or battery's overheating, causing a transceiver's failure, burns or even the battery's explosion. Take care specially if you change the battery, it is not recommended until the temperature has significantly reduced.

⚠ Do not use the transceiver in any susceptible of flammable or potentially explosive environment. Do not use the device specially on petrol stations, chemical industries, explosives factories, ammunition warehouses, close to combustibles, chemical products, storage silos, tank lorries with dangerous goods, in presence of gas, nor in demolition areas. For most of those scenes are some specially designed and authorised transceivers that can be used without any risk, consult your dealer.

⚠ Do not use the transceiver in hospitals nor close to medical equipments that can suffer interferences caused by radio frequencies. If you use medical equipments, get in contact with the manufacturer to ensure that the equipments are protected from the radio frequencies.

⚠ Do not use the transceiver close to a pacemaker. Do not use the device in a distance less than 30 centimetres from a pacemaker, since the device can interfere with it and result in a serious accident. To minimise the possible interference with a pacemaker, use the device on the opposite side of the body from the pacemaker location.

⚠ Turn off the transceiver when you board an aeroplane. The use of electronic devices on

board of an aeroplane is restricted and subjected to the rules applied to those devices. It can interfere with the navigation electronic instruments of the aeroplane. In case of doubt ask the crew members about the possible restrictions of using the transceiver also in other kind of public transports like trains, ships, etc.

△ Do not use the transceiver if you are driving any kind of vehicle. Concentrate yourself exclusively on driving. In addition to infringe traffic laws, you could put passengers, street users and your security, at serious risk.

△ In case of leaving the transceiver, leave it on a stable location. Giving a special attention on vehicles so that the device do not slow down the driving. Never place the transceiver in the operating range or on the inflatable protection systems (Airbag), because in case of a protection system activation, the transceiver will be throw out with at high speed and strength and could hit the driver or passengers with serious or lethal results.

△ On vehicles, it is possible that the transceiver could interfere or be interfered due to radio frequencies. That could cause the wrong operation of vehicle's electronic equipments or otherwise, the transceiver could be the interfered one. In this case, keep in contact with your dealer, technical service or manufacturer to report this abnormality. Keep special attention in case of electric or hybrid vehicles and prior of using the transceiver ask the manufacturer of this kind of vehicles.

△ When walking or moving, use the transceiver with caution to avoid physical risks of yourself and other people around.

△ To guarantee a greater performance of the transceiver's microphone and that the sound clearly arrives to your interlocutor, when you talk, make it keeping the transceiver between 5 and 10 centimetres from your mouth.

△ For connecting accessories like earphones, speakers, programming cables, etc. always turn off the transceiver previously. Once installed the accessory turn it on again. Use the manufacturer recommended accessories.

△ Prior to using earphones or micro-earphones, check the transceiver's volume, a high volume level will damage the ear. A prolonged use of those accessories could cause audition's harm: auditive capacity degradation, vertigo, dizziness, etc. that's why it is recommended to use a suitable volume and not extending its use for a long time, taking breaks and alternating the ear.

- △ Please pay special attention to the use of transceiver's external accessories like earphones or micro-earphones, etc. The cable used for those accessories could get caught up on machinery, vehicles, etc. causing the consequent transceiver's or accessory material risk or even pose a danger the user's physical integrity. This applies also to cases for protecting the transceiver or the transceiver itself when using the belt clip.
- △ While using the transceiver avoid the contact of the antenna with your eyes, your face or other parts of your body. Keep the antenna in a vertical position and far from your body during transmission, so the transceiver will give its maximum performance in addition to your physical integrity.
- △ Do not take nor grab your transceiver through the antenna, making that can cause damages both to the antenna and the transceiver. Besides the bad operation of the equipment can cause physical damages to the user or to others.
- △ Do not use the transceiver if the covering from the antenna is damaged, immediately replace the antenna if is a removable one or contact your authorised technical service if is a fixed antenna. Do not taking this advice into account can cause burns for radio frequency to the user.
- △ The cards and documents with a magnetic band, as credit, telephone or medical cards, savings books, etc. can be damaged due to the transceiver's radio frequency. Likewise, take care with information's storage or memory devices, those could be damaged by the transceiver's radio frequency.
- △ When using the transceiver in public places try not to disturb the people around you.

Cautions and practical advices for the battery and the charger

- △ This transceiver is supplied with a Lithium-Ion (Li-Ion) battery.
- △ The excessive battery's overheating can cause the battery to ignite or explode with the resulting risk of serious physical damages or even the death. Avoid exposing it to temperatures up to 45°.
- △ Be careful with the equipment and specially with the battery. A hit could damage the equipment or the battery and if the worst comes to the worst the explosion or burn of the battery.
- △ If you see a deterioration, a hit or a crack on the battery cover do not use it and replace it immediately. If you do not make it the battery could cause damages to the equipment or the user because of ignite or explode. Be particularly careful if from inside the battery leaks out any kind of liquid or another material, that could cause chemical burns on your skin or your eyes, in that case contact a doctor immediately for advice on how to proceed and go to the nearest emergency unit.
- △ **SERIOUS DANGER:** under no circumstances short-circuit or short across the battery terminals, that could irreversibly damage the battery and if the worst comes to the worst the explosion or burn of the battery with the possible physical damages for the user, that could be extremely serious injuries or even the death. Consequently you must:
 - Transport the equipment properly so that the terminals can not short-circuit accidentally.
 - Do not carry it in your pocket with metallic objects like keys, coins, etc.
 - Do not place the equipment with its terminals making contact on a metallic, wet or conductive surface, that will cause a short-circuit of the terminals.
 - Avoid the contact of the equipment and the battery with water or conductive liquids.
 - Do not lick, bite or touch with your wet hands the battery terminals.
- △ Do not use the supplied battery by the manufacturer for another transceiver than the one

supplied. Do not following this advice implies an important risk of ignite or explode, and could seriously damage both the equipment and other people around.

⚠ Do not apply a soldering iron on the battery terminals, could cause the battery overheating with the consequent risk of suffering a serious accident.

⚠ Remember that inside a vehicle could reach extreme heat or cold temperatures, in one of those situations the battery could ignite or explode.

⚠ Never charge the battery with another charger than the one original supplied by the manufacturer. The charger is specific for the battery's technology. Using another charger will damage the battery and could cause the battery to ignite or explode with the consequent risk of suffering a serious accident.

⚠ Both the battery and charger contacts must be at all times clean. A bad maintenance of those elements and its deterioration could cause a bad operation, overheat, ignite or explode from the equipment.

⚠ Do not leave the transceiver or the battery close to magnetic fields. It is possible that this cause the bad operation of the transceiver or the battery. It is also possible the battery's discharge due to the action of this magnetic fields.

⚠ In case of not using the transceiver during a long period of time of weeks or months, it is strongly recommended to take off the Li-Ion battery and store it on a cool and dry place, without direct sun light and with a temperature between 5 and 25 degrees. Never store the battery completely discharged or with only a low load, that could cause an irreparable damage to the battery to the point of becoming unusable. It is also inadvisable to store the battery for a long period of time with 100% of the load, the ideal is store it with a 40% of the load, this will extend the battery's working life.

⚠ After a long period of time without being used, the Li-Ion batteries gradually lose its load. Whereby try to use it and charge it with a certain frequency in order to extend the battery's working life.

⚠ Do not use the charger/feeder if the cables or plugs are damaged. That could cause electrical shocks, ignites and explodes. Dispose the product and buy a new one from your dealer.

⚠ Do not use the charger/feeder if the socket outlet is damaged or loose. That could cause

electrical shocks, ignites and explodes. In that case, call a professional electrician to solve the problem.

△ During the charging process do not touch none of its components nor the battery. That could cause electrical shocks with serious security risk or even the death.

△ Do not touch the charger, any of its components nor the battery with wet hands nor your bare feet. That could cause electrical shocks with serious security risk or even the death.

△ Do not short-circuit the charger/feeder terminals. That could seriously damage the system and void it or even catch on fire with a serious risk for the security of the people and facilities where the equipment is located.

△ The Li-Ion batteries have a circuit available that cuts the energy supply once the charge is completed. Usually the charger shows this situation through a LED indicator. But facing the possibility of an error or an overheating both on the charger and on the battery, is appropriate not to let the charger permanently connected to the wall outlet and even less with the battery installed. Once the charge is completed it is strongly recommended to quit the battery from the charger and disconnect it from the electricity supplies.

△ During the charging process, if any of its components: transceiver, battery, cables, charger, wall feeder, etc. will give off smoke or a strange smell, with great caution disconnect the charger from the wall outlet and remove the transceiver or the battery in case is being charged alone. If the battery is installed on the transceiver remove it immediately and do not use the equipment. Get immediately in contact with your dealer or technical service.

△ Do not cover nor put any kind of objects over the transceiver, the battery, the charger, the feeder or the cables. That could cause an overheating or damages on the elements with the consequent risk of burn or explosion.

Main features

PMR-446 Transceiver for free use without license

Output power: 500mW

128 memory channels

Analogical CTCSS and digital DCS tones

Channels encryption (scrambler)

Battery save system

Time Out Timer (TOT) function

Busy channel automatic lock

Hands free function (VOX control)

Transmission end warning (Roger Beep)

Channels search / Channels and tones scanner

FM 88 - 108MHz Radio function

Software programming via PC

High capacity Lithium battery



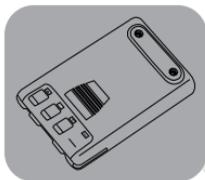
Unpacking of the equipment and content

Unpack carefully the content of your transceiver's box. We recommend you to verify the elements listed in the following table before discarding the package. If some element is missing or it had been damaged due to the shipping, please contact your dealer as soon as possible.

Supplied accessories



TL-88
Transceiver



Battery pack
TLB-405



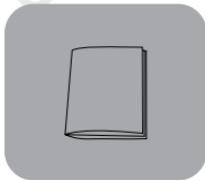
Charger adapter
TLC-435/1



Desktop charger
TLC-435

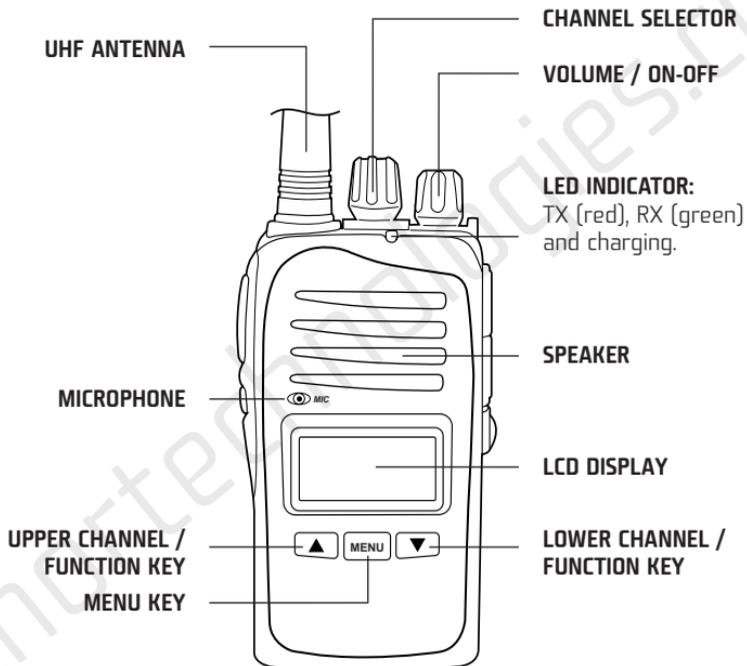


Belt-clip
TLP-411



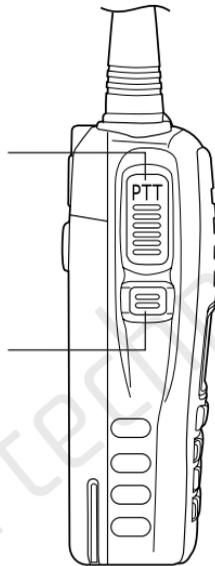
User's manual

Transceiver's description



Side transmission **PTT**
KEY (Press To Transmit
TX, release to receive
RX)

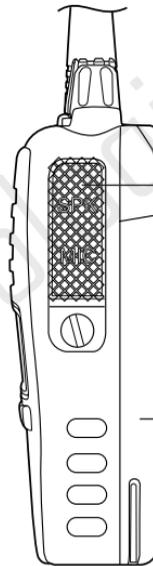
MONITOR Side Key



MIC/SPK
External accessories
connection:
programming cable,
earphone, speaker...

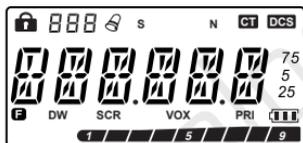
BATTERY LOCK BUTTON
(Move it up)

BATTERY

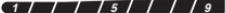


Introduction to display's icons

You can see different icons on the screen when the radio is turned on. The following table will help you to identify the meaning of screen's icons.



	Keypad lock ON
	Tones / Menu numbering
	Key tone beep ON
S	Battery save system ON
N	Digital DCS tone type "N" ON
CT	Analogical CTCSS tone ON
DCS	Digital DCS tone on, valid icon for "N" and "I" types
	Depending on working mode, displays channel or frequency number

75, 5, 25	In frequency mode, displays the complete frequency
F	Indicates that the transceiver is in MENU mode
DW	TX / RX transceiver's priority in FM Radio mode ON
SCR	Voice encryption ON
VOX	Hands free function (VOX Control) ON
PRI	Scanning beginning on active priority channel
	Battery charge indicator
	RX Reception and TX Transmission signal indicator

Working modes

The TL-88 PRO is able to work in three different modes: A- Channel mode, B- Frequency mode, and C-FM Radio mode.

A- Channel mode

It is the most common working mode for free use PMR-446 transceivers. The display shows the channel number and on the top left corner shows the CTCSS tone.



Selecting the appropriate channel and using whether it needs the combination of tones, the TL-88 PRO is compatible and able to communicate with any free use PMR-446 equipment of the market, in any segment: professional, semi-professional or any cheap one from the consumer market (we recommend you to carefully read the appendix “Use of the transceiver as a basic PMR-446 handheld” that you will find on page 63), still the TL-88 PRO is supplied with factory settings of 56 preprogrammed channels (memories), these 56 channels/memories are directly compatible with most of free use PMR-446 professionals equipments of the market (consult appendix: “Memorised channels”, on page 56).

By default the TL-88 PRO is supplied with 56 preprogrammed channels/memories, but the transceiver is able to memorise up to 128 channels through its easy and free programming software (warning: these 128 channels/memories will be always combining the 8 authorized free use frequencies with the equipment's tones, in this case 38 analogical tones (CTCSS) and 208 digital tones (DCS), for a total of more than 1900 different combinations to use or store in its

128 memories. Consult section “Advanced operations (software)”, on page 55).

B- Frequency mode

The frequency mode is not so common in this kind of equipments, but the TL-88 PRO can operate in it showing the complete number of the working frequency (the one that corresponds to the memorised channel) within the authorized 8 (remember: combining the tones in this mode you also have over 1900 different combinations).

To operate in the frequency mode, with the transceiver turned off, keep pressed the **MENU** key and switch it on through the On-Off knob. Keep pressed the **MENU** key until the equipment shows the frequency on the display.



In this case, on the display the configuration changes, where the tone's numbers appear in Channel mode, the memory/channel numbers are now displayed corresponding the frequency showed on the display:



C- FM Radio mode

In FM Radio mode the transceiver becomes a receiving radio station between 88 and 108 MHz, the traditional commercial FM Radio stations, where the user can listen to music, news, talk shows or programs of diverse content.

To access to FM Radio mode, press the **MENU** key, then press the MONITOR side key and the transceiver will show the number corresponding to the FM station frequency.



Through the Channel selector you will be able to change the frequency of the stations or carry out a search or a scan using the **▲** and **▼** keys. To carry a search out just keep pressing about 3 seconds the key for the direction you want to make the FM station's scanning, then the display will show:



If you chose to do the search in ascending order.



If you chose to do the search in descending order.

In the moment that the transceiver locates a signal, it will stop in that frequency.

The user has two options on the FM Radio mode:

1. Listen unique and exclusively to commercial FM Radio.
2. Listen to commercial FM radio but if it receives a transmission or a signal in the last PMR-446 channel that was using before entering in the FM Radio mode, the transceiver will immediately leave the FM Radio mode to return to the display for the Channel/Frequency mode and you will be able to listen to the transmission, or even speak if you wish it. In this case, after a few seconds later from the end of the signal received or transmitted, the transceiver automatically returns to the FM Radio mode.

You will obtain more information about this practical function by referring to menu number 14 (DW function) “priority transceiver while using the FM Radio function”, on page 37.

To leave the FM Radio function and return to the PMR-446 transceiver mode, you must follow the same steps you have followed to enter: press **MENU** the key, then press the MONITOR side key and the transceiver will change to the working mode as a transceiver you have previously selected: channels or frequencies.

Menu's table

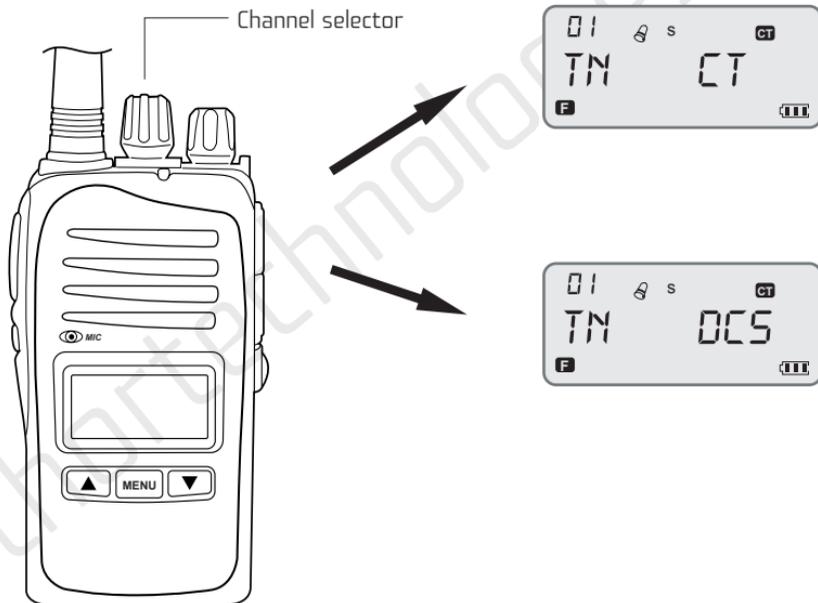
Menu 01 – Analogical CTCSS/Digital DCS tones (TN).....	24
Menu 02 – Channels encryption (SCR).....	25
Menu 03 – Squelch level or noise filter selection (SQL).....	26
Menu 04 – Battery save system (SAV)	27
Menu 05 – Time Out Timer (TOT).....	28
Menu 06 – Busy channel automatic lock (BCL).....	29
Menu 07 – Key “beep” sound (BP).....	30
Menu 08 – Display lighting (LMP).....	30
Menu 09 – Hands free function (VOX).....	31
Menu 10 – Roger beep (EOT).....	32
Menu 11 – Automatic key lock (ALK).....	33
Menu 12 – Channel and tones search/scan (SCN).....	34
Menu 13 – Selection of priority channel for scan (PRI).....	36
Menu 14 – Transceiver’s priority using FM Radio function (DW).....	37
Menu 15 – Reset/Reboot (RESET).....	38

Menu's configuration

Menu 01 - Analogical CTCSS/Digital DCS tones (TN)

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 01.

Using the channel selector you can choose between analogical (CTCSS) or digital (DCS) tones.



Once you have selected the tone type press the **MENU** key to access to the tone number selection you want to use or turn it off by selecting OFF. For that purpose press the key again, **MENU** you can see the numbers or the OFF option blinking on the display, using the **▲** and **▼** keys or **▶** the channel selector, you can select the wanted tone number or the OFF option. Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button twice.

Note: Consult appendix, "Technological parameters: CTCSS and DCS tables", on pages: 60, 61 and 62.

Menu 02 – Channels encryption (SCR)

The TL-88 PRO comes with an exceptional feature called encryption. This advanced option is reserved only for the best and more professional equipments of the market.

The encryption is a safety and privacy measure in conversations, once this option is activated, the conversations will be totally incomprehensible for any user who has not another transceiver provided with this same feature. Another user who would be in the same channel, even with the same tone and would not have the encryption or the same one as your TL-88 PRO, would hear a voice so distorted that it would be totally incomprehensible for him.

This feature turns the Luthor TL-88 PRO into an exceptional device, specially indicated for its use on groups where you want to keep the maximum possible privacy for security reasons.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 02. Press the **MENU** key to confirm you want to configure this option.



You will notice that the option to select is blinking on the display. Using the channel selector or pressing the and keys you will be able to choose if you adjust the channel encryption on (ON) or turn it off (OFF).

Once selected your option you must confirm it by pressing the key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the and keys or you can leave the menu to go straight to the channel's operating display by keep pressing the key during a few seconds or pressing the PTT button.

By selecting the ON (encryption enabled) option the display shows the "SCR" icon.



Menu 03 – Squelch level or noise filter selection (SQL)

Press the key and using the and keys, select the menu number 03. Press the key to confirm you want to configure this option.



You will notice that a number between 0 and 9 is blinking on the display. Using the channel selector or pressing the ▲ and ▼ keys you will be able to choose between 0 (squelch off) and 9 (maximum squelch level). The default level is intermediate level 5.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the ▲ and ▼ keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Important: "0" is open squelch and from 1 to 9 you will get the different levels of noise reduction, where "9" is the highest reduction's level. If you set a too high level, you will receive a signal that will be very clean of noise, but it will be at the expense of the communication, in other words, in this case you will lose reception's distance. On the other hand if your selection is a too low level or you deactivate the squelch, you will get a greater reception's distance but the radio will be more vulnerable to receive noises or worse quality signals. The most recommended level is intermediate level "5".

Menu 04 – Battery save system (SAV)

Press the **MENU** key and using the ▲ and ▼ keys, select the menu number 04. Press the **MENU** key to confirm you want to configure this option.



Remember: this icon shows the battery save system is activated.

You will notice that one of the options is blinking on the display. Using the channel selector or pressing the ▲ and ▼ keys you will be able to choose activating the battery save system (ON)

or deactivating (OFF) it. We recommend you to keep this option activated (ON).

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 05 – Time Out Timer (TOT)

This useful option allows you to limit the maximum transmission time. Highly recommended when working on a group, in this way you can limit the transmission time of all the people on the group and avoid the transmission's monopoly of a unique user.

This option allows you to select the maximum transmission time between 15, 30, 45... (15 s. increments) up to 300 seconds.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 05. Press the **MENU** key to confirm you want to configure this option.



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the **▲** and **▼** keys you will be able to select the maximum transmission time between 15 and 300 seconds, or turn it off selecting (OFF), if you choose this last option the maximum transmission time for the radio will be unlimited.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the  and  keys or you can leave the menu to go straight to the channel's operating display by keep pressing the  key during a few seconds or pressing the PTT button.

Menu 06 – Busy channel automatic lock (BCL)

This option prevents the user from the possibility of transmitting if the radio is receiving a signal. This way the radio will avoid to interfere another user that was previously talking. Only at the moment when a sign or a conversation is not detected the radio will stop the emission.

Press the  key and using the  and  keys, select the menu number 06. Press the  key to confirm you want to configure this option.



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the  and  keys you will be able to select between the three possible options:

OFF: turns off the busy channel automatic lock.

WAV: turns on the busy channel automatic lock from any signal detected in the channel or frequency used.

COD: turns on the busy channel automatic lock only from a signal matching with the same CTCSS/DCS tone number of the used channel.

Once selected your option you must confirm it by pressing the  key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the  and  keys or you can leave the menu to go straight to the channel's

operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 07 – Key “beep” sound (BP)

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 07. Press the **MENU** key to confirm you want to configure this option.



This icon is showed in case you have selected "ON".

You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the **▲** and **▼** keys you will be able to select between ON (the radio will emit a beep sound when pressing any key) option or OFF (the radio will not emit a beep sound when pressing any key) option.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 08 – Display lighting (LMP)

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 08. Press the **MENU** key to confirm you want to configure this option.



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the ▲ and ▼ keys you will be able to select between the three possible options:

OFF: turn off the display lighting.

ON: the display will light when pressing any transceiver's key or in the moment when you transmit or receive a signal.

KEY: the display will light when pressing any transceiver's key, nevertheless it will not light when emitting or receiving a transmission.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

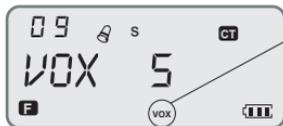
Once completed the previous operation you can continue operating on the menu to select other parameters using the ▲ and ▼ keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 09 – Hands free function (VOX)

This function allows the user to be able to automatically transmit without needing to press the PTT button and turning on only through the sound. Once you speak, the radio will start transmitting, if you stop speaking, the radio will stop transmitting. For that purpose you must turn on the VOX function and choose the sensibility level between 1 and 9. Level "1" is the most sensitive; meaning that the radio will be activated and will start transmitting at the time when the microphone detects a sound. On the contrary the level "9" is the less sensitive, consequently to activate the transmission, the sound level should be far greater than in any of the other levels. Keep in mind:

1. For using the VOX hands free system you will need an accessory, a micro-headset ready for this function. Not all the accessories have this option, contact your dealer.
2. The VOX system is quite practical but is difficult to use it on noisy environments, logically the system can be activated both by the voice sound and by the background noise surrounding the user. In such cases use the different sensibility levels to check if you can operate in any of them.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 09. Press the **MENU** key to confirm you want to configure this option.



The display will show this icon if you have selected any of the level 1-9.

You will notice that a number between 1 and 9 or the OFF option is blinking on the display. Using the channel selector or pressing the **▲** and **▼** keys you will be able to select the VOX sensibility level between 1 (maximum) and 9 (minimum).

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Note: the use of the VOX function makes the PTT button unable, so we recommend you to turn off this option selecting OFF on this menu when you finish using it.

Menu 10 – Roger beep (EOT)

The ROGER BEEP function is a practical option which makes the radio to transmit a confirmation sound at the end of the transmission. Without a doubt is very useful to confirm that the user has finished transmitting. This sound will be heard by both the transmitter and the users that were receiving.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 10. Press the **MENU**

key to confirm you want to configure this option.



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the and keys you will be able to select between the three possible options:

OFF: turns off the transmission of the ROGER BEEP sound.

SHB: once you stop transmitting the radio will emit a short “beep” sound.

LAB: once you stop transmitting the radio will emit a large “beep” sound.

Once selected your option you must confirm it by pressing the key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the and keys or you can leave the menu to go straight to the channel's operating display by keep pressing the key during a few seconds or pressing the PTT button.

Menu 11 – Automatic key lock (ALK)

Turning on (ON) this function the keyboard and the channel selector will be automatically locked after a few seconds from the last operation, in this way it prevents to accidentally changing the channel or an involuntary access to the menu. Only the PTT button and the MONITOR side key will be operative.

Press the key and using the and keys, select the menu number 11. Press the key to confirm you want to configure this option.

You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the and keys you will be able to select between ON (turning on the automatic

key lock) option or OFF (turning off the automatic key lock) option.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.



If you have selected the ON option on the top left side of the display a padlock icon will be shown.

To unlock the equipment and be able to access the menu or the channel selector, keep pressed



the **MENU** key for a few seconds. The radio will be available to manipulate it until you make the auto-lock again, a few seconds after the last operation.

Remember: You can lock or unlock the keyboard and the channel selector by keep pressing the **MENU** key for a few seconds.

Menu 12 – Channel and tones search/scan (SCN)

The channel and tones search or scanner option is one of the most exclusive features of this transceiver.

Through this advanced feature the transceiver will locate the channel/frequency where a transmission is being received, in addition, it offers the possibility of identifying both analogical CTCSS and digital DCS tones with which is operating the located signal.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 12. Press the **MENU** key to confirm you want to configure this option.



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the **▲** and **▼** keys you will be able to select between the four possible options:

OFF: turns off the scanner option.

CH: performs the channels/frequencies scanning and stops where a signal is received.

CT: performs the analogical CTCSS tones scanning and stops where a signal with that tone type is received, the analogical CTCSS tone number is identified and showed on display.

DCS: performs the digital DCS tones scanning and stops where a signal with that tone type is received, the digital DCS tone number is identified and showed on display.

Note: Consult appendix, “Technological parameters: CTCSS and DCS tables”, on pages: 60, 61 and 62.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Once selected one of the three possible scanning options: CH, CT or DCS and with the radio on operating mode for transmission and reception, to start the search or scan of the chose parameter, by keep pressing the ▲ (ascending search direction) or ▼ (descending search direction) keys, you will see the transceiver searching quickly through the channel or tone numbers on the display until it halts when receiving a signal or locating a tone.

Menu 13 – Selection of priority channel for scan (PRI)

This function allows you to select the channel from which the transceiver will start performing the channel or frequency scan when required to do so.

Press the **MENU** key and using the ▲ and ▼ keys, select the menu number 13. Press the **MENU** key to confirm you want to configure this option.



The display will show this icon if this option is enabled.

You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the ▲ and ▼ keys you will be able to select both the channel number from which the transceiver will start performing the search or the OFF option. If you select this last option the search or scan will start from the channel you were operating.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the ▲ and ▼ keys or you can leave the menu to go straight to the channel's operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 14 – Transceiver's priority using FM Radio function (DW)

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 14. Press the **MENU** key to confirm you want to configure this option.

The display will show this icon if you select "ON".



You will notice that the option to choose is blinking on the display. Using the channel selector or pressing the **▲** and **▼** keys you will be able to select between the two possible options:

ON: In FM Radio mode, if your equipment receives a signal or communication while you are listening to a commercial FM Radio station, it will automatically change to the transceiver mode in the last channel or frequency you had on display, to be able to answer or simply listen to the conversation. A few seconds later from the end of the receiving signal the transceiver will return to FM Radio mode in the commercial station frequency you had tuned. Likewise, in FM Radio mode if you press the PTT button it will also automatically and temporary change to the transceiver mode while the communication lasts.

OFF: In FM Radio mode, the transceiver will remain in this working mode until you leave it manually. While listening to a commercial FM Radio station the transceiver will not be operational for signal receptions.

Remember: For entering or leaving the FM Radio mode: press the **MENU** key and then the MONITOR side key.

Once selected your option you must confirm it by pressing the **MENU** key or the PTT button.

Once completed the previous operation you can continue operating on the menu to select other parameters using the **▲** and **▼** keys or you can leave the menu to go straight to the channel's

operating display by keep pressing the **MENU** key during a few seconds or pressing the PTT button.

Menu 15 – Reset/Reboot (RESET)

Warning: read carefully what we indicate below.

The RESET function returns the transceiver to the original programming. Meaning that any settings you had changed or programmed will be deleted from the equipment's memory, returning again to the original parameters and memorised channels the equipment had when you bought it. For this reason we recommend you that before performing this operation please make sure of your decision.

Press the **MENU** key and using the **▲** and **▼** keys, select the menu number 15. Press the **MENU** key to confirm you want to configure this option.



You will notice that the word “RESET” is blinking on the display.

Warning: By pressing now the PTT button you will confirm your decision to resetting your equipment so you will lose all the memories, configurations or parameters which you had personalized and the equipment will initialise with the factory settings (consult appendix “Factory settings”, on page: 59).

Once pressed the PTT button the equipment will be locked during approximately 5 seconds. After that time, the display will show on display all its segments:



To straightaway reset it with the parameters fixed on factory.



Special functions

The MONITOR side key

The MONITOR side key has as a main mission to open the squelch or noise filter. Keep pressing this key you will be able to hear the annoying noise which the transceiver would have without the squelch or noise filter, in other words, it would be equivalent of selecting OFF in the squelch function on the Menu 03 (on page: 26).

By keep pressing the MONITOR side key the CTCSS and DCS reception tones have temporarily no effect. At the time when you release the key the tones are reactivated.

The MONITOR side key is also used to activate the FM Radio mode and the cloning functions that are described straightaway.

FM Radio

The Luthor TL-88 PRO apart from being a high performance PMR-446 transceiver is a magnificent FM radio receiver for commercial stations: music, talk shows, news, etc. are at user's disposal by simply pressing the **MENU** key and immediately the MONITOR side key, with this simple procedure you will be able to enjoy the wide range of radio programs emitted on FM. To exit the FM radio mode repeat again the same procedure.

You will find more information about this issue in Working mode: C-FM Radio mode section on page: 20.

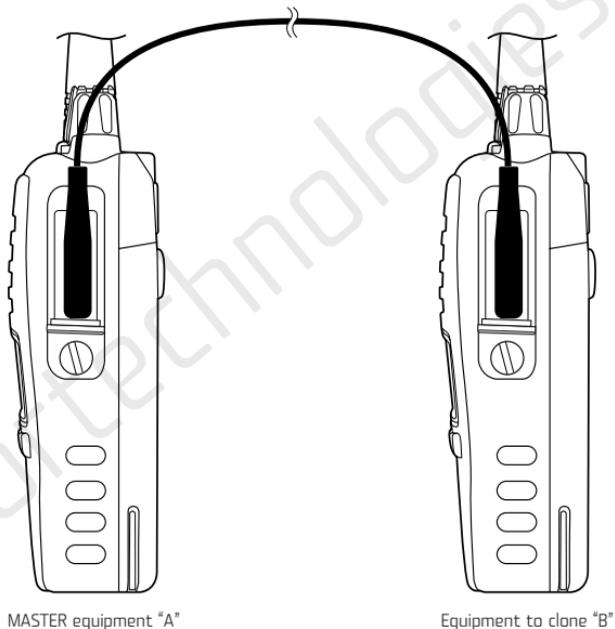
Cloning function

The cloning function as its name suggests, aims to exactly copy all the parameters and channels information from one transceiver to another. Certainly it is a very practical function so that in a very simple, quick way and without needing to use a PC, all the required equipments could be

programmed with the same data.

To carry the cloning procedure out you must have the optional TLCLON cable (consult the Optional accessories section on page: 69 and request it to your dealer).

With the equipments switched off connect the TLCLON cloning cable to both TL-88 PRO as shown below:



The MASTER equipment should be the one containing all the information you want to copy on the equipment to clone. Follow next steps:

1. Turn the equipment to clone "B" on.
2. By keep pressing the **MENU** key and the MONITOR side key turn the MASTER equipment "A" on. The display will show:



CLONE

Prepared to clone

3. On MASTER equipment "A" press again the MONITOR side key. The display will show:



CL DU

Cloning

4. The cloning will immediately begin and will last for a few seconds, if the cloning finally has been successfully completed the MASTER equipment "A" display will show the cloning has finished:



END

Clone successfully completed

If the cloning could not be successfully accomplished, the MASTER equipment "A" will show an error has occurred:



ERR

Cloning failed

In this latter case, repeat the procedure again making sure that the cable is properly connected to the equipments plugs and following the steps described above. If the cloning fails again after repeating the procedure, it is possible that the TLCLON cloning cable or one of the equipments could be damaged, therefore you will have to contact your dealer for advice.

Buttons and keys manual lock/unlock

To avoid accidentally manipulating the transceiver, the TL-88 offers the possibility to manually lock both the control buttons and the keyboard.

To carry the lock on, keep pressing the **MENU** key during about 3 seconds, after this time the equipment will not react to any key nor the channel selector. Only both the PTT button to be able to transmit and the Volume / On-Off knob will remain active.

Keyboard and channel selector locked



To unlock the transceiver keep pressing the **MENU** key during about 3 seconds, after this time the equipment will permit its manipulation.

Note: the keyboard's manual unlock is also used when the keyboard's automatic lock function [ALK Menu 11, on page: 33] is activated.

Battery charge

The TL-88 PRO is equipped with a Lithium Ion battery (also known as Li-Ion or simply Lithium battery). The main features of these batteries are its lightness, lack of memory effect and high energetic capacity in a reduced size. Mainly the Lithium batteries have more advantages than the Ni-Mh or the old fashioned and out-dated Ni-Cad batteries (the cadmium is a very polluting element), although it is necessary to take certain cautions with Lithium batteries, consequently we recommend you to read carefully the cautions regarding Lithium batteries described in the section located on pages 10, 11 and 12 of the Cautions and practical advices.

For charging the batteries; the equipment is supplied with the LUTHOR TL-435 charger, an intelligent charger that identifies the battery charge for recharging it only the required time to reach its complete capacity. In case the battery is completely unloaded the full capacity can be reached in approx. 5 hours.

Warning: it is never advisable recharging the battery with another charger than the original LUTHOR TLC-435 and nor trying to charge another battery different from the one provided by the company for this charger.

On the labelling under the charger you will notice its features and some icons showing the battery state, next we explain you its meaning:

INPUT: Indicates that voltage entry for this charger is 13,8 volts for direct current.

OUTPUT: Indicates that voltage exit and battery charge is 8,6 continuous volts with a current between 400 and 450 mAh.

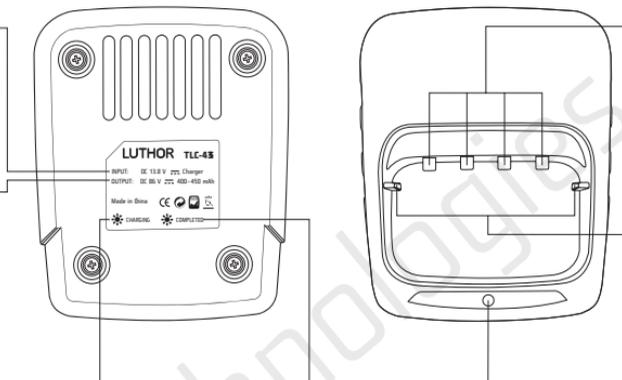
RED SIGN: Upper led lit in red colour indicates the battery is charging.

GREEN SIGN: Upper led lit in green colour indicates the battery has its charge completed.

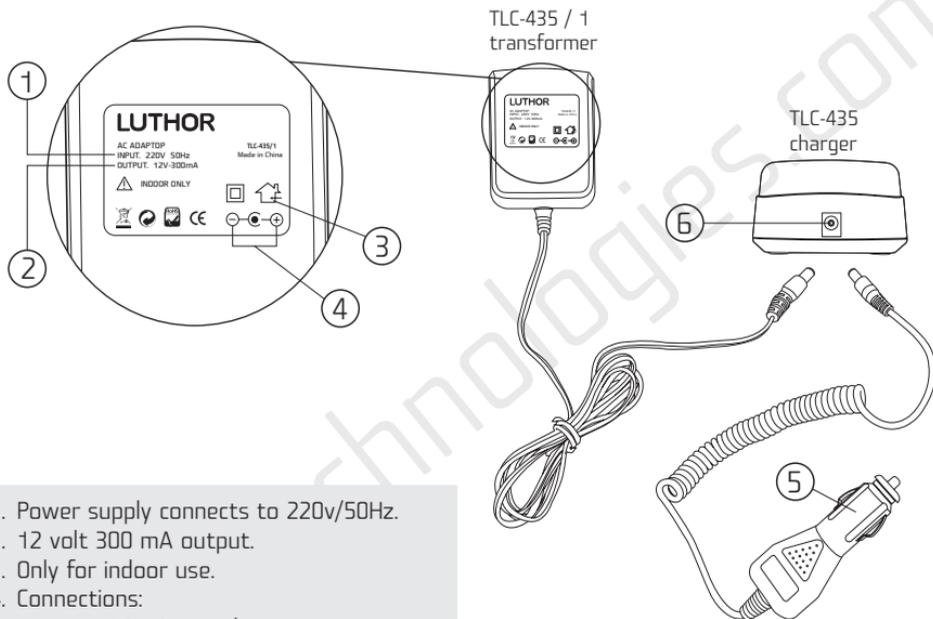
Operation indicator led and charge state.

Charging contacts.

Guide grooves for introducing the battery. Allow charging the battery alone or with the transceiver. Note: in case of carrying out the battery charging with the transceiver is advisable to do it with the handheld switched off.



The charger supply can be made from its own transformer with reference LUTHOR TLC-435/1 supplied with the equipment or with the connection known as vehicle “lighter”, whose optional reference is LUTHOR TLC-PLUG (consult OPTIONAL ACCESSORIES section on page 69).



1. Power supply connects to 220v/50Hz.
2. 12 volt 300 mA output.
3. Only for indoor use.
4. Connections:
 - + positive internal contact.
 - negative external contact.
5. "Lighter" connection, from 12 to 13,8 volts.
6. Back connection, from 12 to 13,8 volts max input.

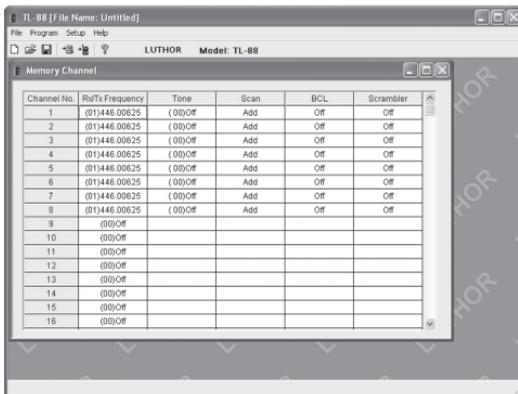
*TLB-50 charger
*optional accessories

Advanced operations (software)

The LUTHOR TL-88 PRO, thanks to its advanced technology, allows programming a total of 128 memories with its respective frequencies and user's configurable parameters. Just as it is mentioned in other sections of this manual, these 128 memories are synonymous of channels, which combining the 8 PMR-446 free use frequencies plus the available tones, we can say that the user will have available up to 128 channels (the receiver is supplied by default with 56 programmed memories/channels).

To enter the programming of the LUTHOR TL-88 PRO you shall purchase the TL-USB programming cable (consult Optional accessories appendix on page 69) and install the TL-SOFT88 programming software on your PC.

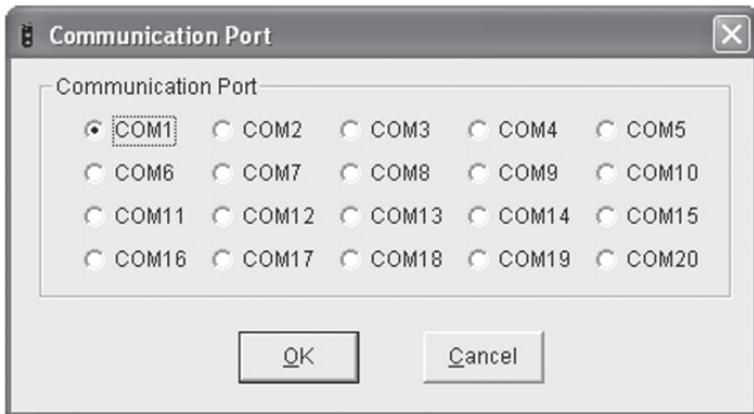
When you run the software the main window will open showing the following configuration:



The first step will be selecting the communication port so that the transceiver and the PC might be understood. To this effect select “Setup” on the top menu.



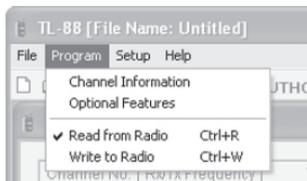
You will notice, as shown on the image, that a window is opened with a “Communication Port” option. Click on this option and a new window will open with the numbers of the different communication ports.



Select the suitable communication port.

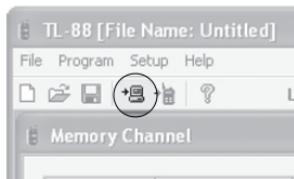
Once the right selection of the port is made the first step will be to check if communication exists, to this effect turn on your transceiver and carry out a reading of the memory of your TL-88 PRO.

You can implement this action through the top menu or the icons menu below.



Top menu

1. Select "Program"
2. Click on "Read from Radio"



Icons menu

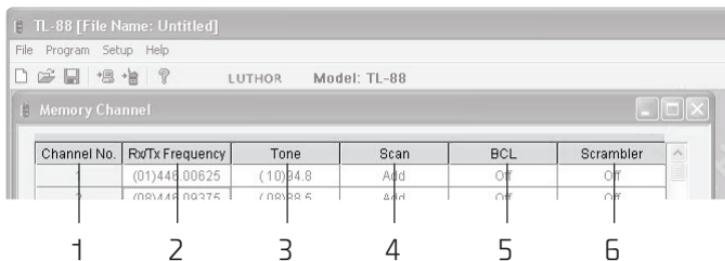
1. Click on the icon showing a Computer

The computer screen will show a status bar while the memory reading runs.



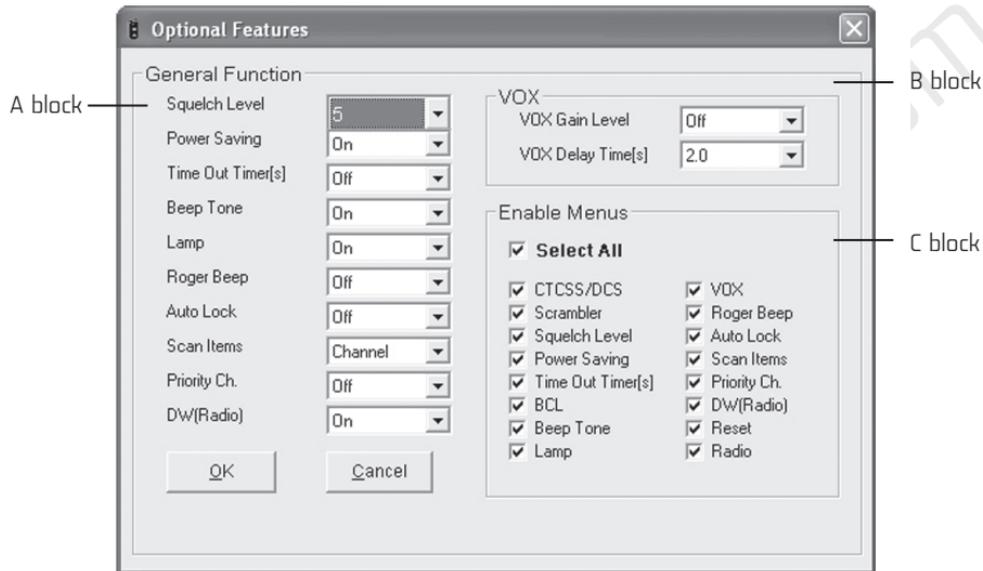
Warning: do not cancel none of the actions to read or programme the transceiver while they are running, it can seriously harm your TL-88 PRO memory.

Once finished the reading, your PC screen will show the 56 memorised channels with its different parameters. At this point you will be able to change both the channels frequencies and some of the parameters by channel. Next we show you the different selections you can make.



1. “Channel No.”: channel or memory number, as you prefer to call it.
2. “Rx/Tx Frequency”: channel frequency. You can select 1 of the 8 frequencies for free use. By clicking in the drop down menu you will see the frequency number and the corresponding channel number.
3. “Tone”: through the drop down menu you will be able to select either the channel’s tone number or to disable the tones.
4. “Scan”: to add this channel to the scanning channels list or to delete a channel from the search when the transceiver carries a scan out.
5. “BCL”: enables or disables the busy channel automatic lock for the channel.
6. “Scrambler”: enables or disables the encryption in the selected channel.

Next you can enter the optional parameters configuration “Optional Features”. To enter into the window, click on the “Program” top menu and next on “Optional Features” and the window for special options configuration will be opened.



Straightaway we describe you the blocks:

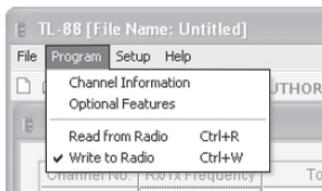
A block: "General Function": through the options and its drop down menus the user can configure a number of general functions such as selecting the squelch level, auto-lock enable/disable, time out timer, etc. Are functions that basically can also be configured through the transceiver menus and its keyboard.

B block: "VOX": on this option we can select:

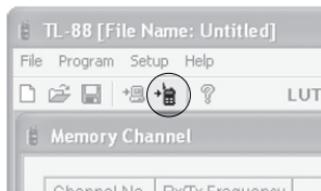
- VOX Gain Level: VOX sensitivity level or turn it off.
- VOX Delay Time(s): this option is only configurable through the TL-88 PRO software and fixes the time during which the equipment will continue in Tx transmission once the conversation has finished. This configuration is important when during a communication the user makes pauses, for example usually the logical pauses in breathing. If the configuration is adjusted at the minimum of 0.3 seconds, a short pause for breathing would cut the transmission, if, on the other hand, the configuration is adjusted at the maximum of 2.0 seconds, from the moment you stop talking the transceiver will wait 2 seconds until cutting the Tx transmission and returning to Rx receive mode.

C block: "Enable menus": menus enabled. This selection allows you to enable or disable the manipulation of those functions. By clicking on each function's check box the user locks or unlocks the possibility of configuring the menu option using the transceiver's keyboard. When the ✓ symbol is on the function's check box, it means that this function can be configured by the user through the transceiver's keyboard; obviously if the check box is not selected it means that the user can not configure these option through its LUTHOR TL-88 PRO keyboard.

Once all the configurations of frequencies, channels, parameters, etc. are made, in order to be effective on the transceiver, you must transmit them, to this effect you will have to use the "Write to Radio" write function. To do this procedure you can use the top menu by clicking on the "Program" top menu and next on "Write to Radio" or use the icons menu by clicking on the icon that represents a handheld.



Top menu

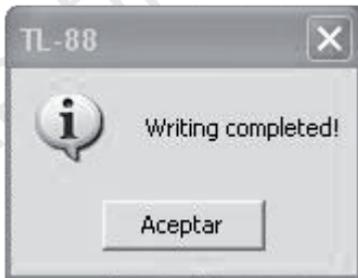


Icons menu

Just as when you made the transceiver's memory reading a window with the writing progress will appear again.

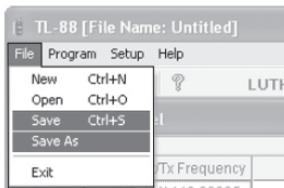
Warning: do not cancel none of the actions to read or programme the transceiver while they are running, it can seriously harm your TL-88 PRO memory.

Once finished the data transmission to the TL-88 PRO, if it has successfully completed your PC screen will display a window indicating it.



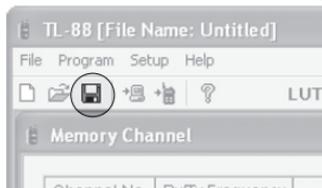
Click on Accept. Now the TL-88 PRO will have all that has been configured on the PC into its memory.

Finally you can save the edited file in order to use it again. To this effect click on the “File” top menu and next on “Save” or “Save as” or you can also do this procedure using the icons menu by clicking on the icon that represents a diskette.



Top menu

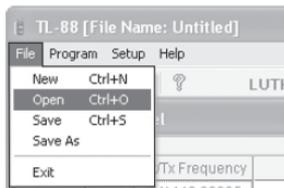
Save As
Save (rewrite an used file)



Icons menu

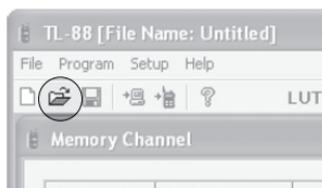
Rewrite an used file

You can access the files clicking on the “File” top menu option and next on “Open” but also using the icons menu by clicking on the icon that represents a folder.



Top menu

Open



Icons menu

Access to files

Appendices

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Use of the transceiver as a basic PMR-446 handheld	63
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Memorised channels

Channel Number	Frequency (MHz)	Tone Type	Tone Number	Tone Frequency
1	446,00625	CTCSS	10	94,8 Hz
2	446,09375	CTCSS	08	88,5 Hz
3	446,03125	CTCSS	13	103,5 Hz
4	446,06875	CTCSS	05	79,7 Hz
5	446,04375	CTCSS	17	118,8 Hz
6	446,01875	CTCSS	18	123,0 Hz
7	446,08125	CTCSS	19	127,3 Hz
8	446,05625	CTCSS	07	85,4 Hz
9	446,00625	CTCSS	14	107,2 Hz
10	446,09375	CTCSS	15	110,9 Hz
11	446,03125	CTCSS	16	114,8 Hz
12	446,06875	CTCSS	06	82,5 Hz
13	446,04375	DCS	23	D132N
14	446,01875	DCS	28	D155N
15	446,05625	DCS	24	D134N
16	446,08125	DCS	39	D243N
17	446,00625	DCS	17	D114N
18	446,01875	DCS	18	D115N
19	446,03125	DCS	01	D023N

20	446,04375	DCS	02	D025N
21	446,05625	DCS	03	D026N
22	446,06875	DCS	13	D071N
23	446,08125	DCS	14	D072N
24	446,09375	DCS	15	D073N
25	446,00625	DCS	27	D152N
26	446,01875	DCS	28	D155N
27	446,03125	DCS	29	D156N
28	446,04375	DCS	30	D162N
29	446,05625	DCS	31	D165N
30	446,06875	DCS	34	D205N
31	446,08125	DCS	35	D212N
32	446,09375	DCS	36	D223N
33	446,00625	-	OFF	OFF
34	446,01875	-	OFF	OFF
35	446,03125	-	OFF	OFF
36	446,04375	-	OFF	OFF
37	446,05625	-	OFF	OFF
38	446,06875	-	OFF	OFF
39	446,08125	-	OFF	OFF
40	446,09375	-	OFF	OFF
41	446,00625	CTCSS	01	67,0 Hz

42	446,01875	CTCSS	02	71,9 Hz
43	446,03125	CTCSS	03	74,4 Hz
44	446,04375	CTCSS	04	77,0 Hz
45	446,05625	CTCSS	05	79,7 Hz
46	446,06875	CTCSS	06	82,5 Hz
47	446,08125	CTCSS	07	85,4 Hz
48	446,09375	CTCSS	08	88,5 Hz
49	446,00625	DCS	02	D025N / Encrypted
50	446,01875	DCS	03	D026N / Encrypted
51	446,03125	DCS	04	D031N / Encrypted
52	446,04375	DCS	07	D043N / Encrypted
53	446,05625	DCS	08	D047N / Encrypted
54	446,06875	DCS	09	D051N / Encrypted
55	446,08125	DCS	10	D053N / Encrypted
56	446,09375	DCS	11	D054N / Encrypted

Warning: The 49 to 56 channels have been encrypted to provide a greater privacy in conversations. These channels are used exclusively by LUTHOR TL-88 PRO transceivers due to the encryption provided, consequently as the transceiver is supplied by default only another TL-88 PRO would be able to decode the conversation.

Factory settings

Menu Number	Function	Parameter	Factory setting
01	TN DCS / CT	Tones	Consult tone tables
02	SCR	Encryption	OFF
03	SQL	Squelch level	Level 5
04	SAV	Battery save	ON
05	TOT	Time Out Timer	OFF
06	BCL	Busy channel lock	OFF
07	BP	Key "beep" sound	ON
08	LMP	Display lighting	ON
09	VOX	Hands free function	OFF
10	EOT	Roger beep	OFF
11	ALK	Automatic key lock	OFF
12	SCN	Search / Scan	CH
13	PRI	Priority channel for scan	OFF
14	DW	FM Radio priority	ON
15	RESET	Reset / Reboot	RESET

Technological parameters: CTCSS and DCS tables

Analogical CTCSS tones. Table of number-frequency relationship									
Tone	Frequency	Tone	Frequency	Tone	Frequency	Tone	Frequency	Tone	Frequency
01	67,0 Hz	09	91,5 Hz	17	118,8 Hz	25	156,7 Hz	33	210,7 Hz
02	71,9 Hz	10	94,8 Hz	18	123,0 Hz	26	162,2 Hz	34	218,1 Hz
03	74,4 Hz	11	97,4 Hz	19	127,3 Hz	27	167,9 Hz	35	225,7 Hz
04	77,0 Hz	12	100,0 Hz	20	131,8 Hz	28	173,8 Hz	36	233,6 Hz
05	79,7 Hz	13	103,5 Hz	21	136,5 Hz	29	179,9 Hz	37	241,8 Hz
06	82,5 Hz	14	107,2 Hz	22	141,3 Hz	30	186,2 Hz	38	250,3 Hz
07	85,4 Hz	15	110,9 Hz	23	146,2 Hz	31	192,8 Hz		
08	88,5 Hz	16	114,8 Hz	24	151,4 Hz	32	203,5 Hz		



Digital DCS N tones. Table of number-frequency relationship

DCS	Freq.																
001	23 N	013	71 N	025	143 N	037	225 N	049	266 N	061	356 N	073	452 N	085	532 N	097	703 N
002	25 N	014	72 N	026	145 N	038	226 N	050	271 N	062	364 N	074	454 N	086	546 N	098	712 N
003	26 N	015	73 N	027	152 N	039	243 N	051	274 N	063	365 N	075	455 N	087	565 N	099	723 N
004	31 N	016	74 N	028	155 N	040	244 N	052	306 N	064	371 N	076	462 N	088	606 N	100	731 N
005	32 N	017	114 N	029	156 N	041	245 N	053	311 N	065	411 N	077	464 N	089	612 N	101	732 N
006	36 N	018	115 N	030	162 N	042	246 N	054	315 N	066	421 N	078	465 N	090	624 N	102	734 N
007	43 N	019	116 N	031	165 N	043	251 N	055	325 N	067	413 N	079	466 N	091	627 N	103	743 N
008	47 N	020	122 N	032	172 N	044	252 N	056	331 N	068	423 N	080	503 N	092	631 N	104	754 N
009	51 N	021	125 N	033	174 N	045	255 N	057	332 N	069	431 N	081	506 N	093	632 N		
010	53 N	022	131 N	034	205 N	046	261 N	058	343 N	070	432 N	082	516 N	094	654 N		
011	54 N	023	132 N	035	212 N	047	263 N	059	346 N	071	445 N	083	523 N	095	662 N		
012	65 N	024	134 N	036	223 N	048	265 N	060	351 N	072	446 N	084	526 N	096	664 N		



Digital DCS I tones. Table of number-frequency relationship

DCS	Freq.																
105	23 i	117	71 i	129	143 i	141	225 i	153	266 i	165	356 i	177	452 i	189	532 i	201	703 i
106	25 i	118	72 i	130	145 i	142	226 i	154	271 i	166	364 i	178	454 i	190	546 i	202	712 i
107	26 i	119	73 i	131	152 i	143	243 i	155	274 i	167	365 i	179	455 i	191	565 i	203	723 i
108	31 i	120	74 i	132	155 i	144	244 i	156	306 i	168	371 i	180	462 i	192	606 i	204	731 i
109	32 i	121	114 i	133	156 i	145	245 i	157	311 i	169	411 i	181	464 i	193	612 i	205	732 i
110	36 i	122	115 i	134	162 i	146	246 i	158	315 i	170	421 i	182	465 i	194	624 i	206	734 i
111	43 i	123	116 i	135	165 i	147	251 i	159	325 i	171	413 i	183	466 i	195	627 i	207	743 i
112	47 i	124	122 i	136	172 i	148	252 i	160	331 i	172	423 i	184	503 i	196	631 i	208	754 i
113	51 i	125	125 i	137	174 i	149	255 i	161	332 i	173	431 i	185	506 i	197	632 i		
114	53 i	126	131 i	138	205 i	150	261 i	162	343 i	174	432 i	186	516 i	198	654 i		
115	54 i	127	132 i	139	212 i	151	263 i	163	346 i	175	445 i	187	523 i	199	662 i		
116	65 i	128	134 i	140	223 i	152	265 i	164	351 i	176	446 i	188	526 i	200	664 i		

Use of the transceiver as a basic PMR-446 handheld

The main feature of the TL-88 PRO is its double personality, it has the ability to work as the best of the PROFESSIONAL transceivers and in turn do it like the typical low cost handhelds usually supplied in pairs that are easily found in any shopping centre. The TL-88 PRO is currently the most versatile transceiver of the market.

Straightaway we are going to give you some practical advices to make the TL-88 PRO compatible with any free use PMR-446 device.

On basic handhelds the most common is to find a display similar to the next image:



Without considering other function's icons of the different displays that may be, we will focus exclusively on the channel and tone numbers.

These handhelds have 8 channels, corresponding to the legal frequencies for free use PMR-446 and are:

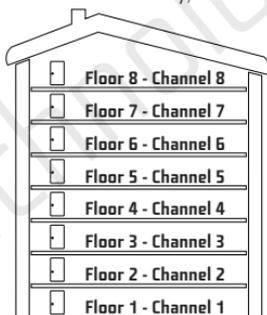
Table of equivalence, channel number - free use frequency.

Channel number	Frequency [MHz]
1	446,00625
2	446,01875
3	446,03125

4	446,04375
5	446,05625
6	446,06875
7	446,08125
8	446,09375

At the beginning, with the appearance of the free use regulation, these transceivers had only 8 channels without any tones.

To enhance understanding it easily we are going to use an example and we will talk about a building, each channel will be a floor number whereby, the building consists of:



Every floor of the building, with a total of 8 floors, has a single flat, therefore the building consists of 8 units. The question: how many families could live on each floor? The answer is obvious: 1 single family because there is only one flat per floor. What happens if we try to introduce in each flat 4, 7 or 12 families? The answer is obvious again: the cohabitation would be very difficult or impossible.

Extrapolating this to radio world, with only 8 channels, trying to talk on them becomes very difficult in certain moments, due to the numerous interferences of another people talking on them.

To solve this problem and to rationalise the communication the tones appeared, the analogical CTCSS type (usually the only ones available on basic handhelds) and the digital DCS type (only available on semi-professional or professional transceivers).

Let us focus on the most common, the analogical CTCSS tones. Usually they go from 1 to 38 and as in the case of channels, each number corresponds to a frequency, consult appendix “Technological parameters: CTCSS and DCS tables. Analogical CTCSS tones. Table of number-frequency relationship” on page 60.

Applying the tones to the building example, we would now have equally a building of 8 floors, but with 38 flats per floor, giving us a total of 304 flats.



So in the floor 1 we have that we can be inhabit flats ranging from 1 to 38. The same applies for the other floors. So if you wish to live in the flat 25 of the floor 1 your neighbours may live in the same floor with a different flat number, the flat 24 of the floor 1 and the flat 26 of the floor 1 may be occupied without any of the neighbours disturb each other.

Extrapolating again the building example to the field of radio communication, we would have a transceiver with 8 channels and 38 tones, where you select the channel in which you want to operate and the tone number between a total of 304 different combinations. If in the combination of channel and tone that you or your group select, you found it is being used by other users, you would only have to change the channel or tone or both if you wish.

In the concrete case of the LUTHOR TL-88 PRO the combinations number is even greater because it has 38 analogical tones plus 208 digital tones that multiplied by its 8 channels will give for the device more than 1.900 different combinations. Moreover, in the case of the LUTHOR TL-88 PRO is provided with the encryption function, which distorts the voice in such a way that it becomes incomprehensible for another user who does not have another TL-88 PRO available. Is certainly one of the very few existing devices provided with this exceptionally high level of confidentiality.

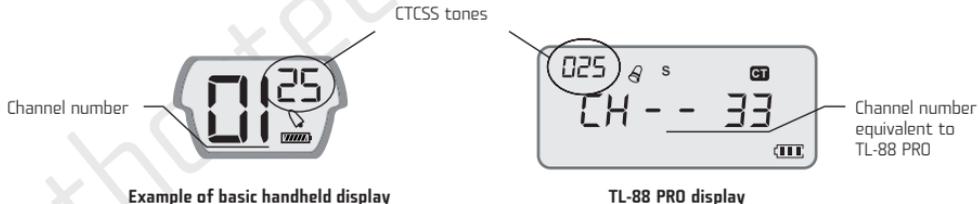
Once the concept of channels and tones is explained, next we explain the procedure to match through its keyboard the LUTHOR TL-88 PRO with any basic handheld which show on display the channel and tone numbers.

The TL-88 PRO is provided with 56 memorised channels (these 56 channels derive from the combination of the 8 free use legal channels/frequencies with the different available tones). From these 56 memorised channels, these comprised between the channel 33 and 40 have the free use frequencies without any activated tone stored, therefore they will be the ones we will use for this casuistry.

The resulting equivalence is:

Channel on basic handheld	Equivalent LUTHOR TL-88 PRO channel	Real frequency in megahertz (MHz)
1	33	446,00625
2	34	446,01875
3	35	446,03125
4	36	446,04375
5	37	446,05625
6	38	446,06875
7	39	446,08125
8	40	446,09375

As an example, we want to make the LUTHOR TL-88 compatible with any basic handheld which show on display the channel and tone numbers. The selected channel in the basic handheld is 1 with the tone 25:



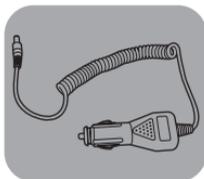
In the TL-88 PRO we will need to go to channel 33 and following the menu number 01 steps select the analogical CTCSS tone with number 25. If the channel of the basic handheld was 5, in the

TL-88 PRO you would need to locate the channel 37 and so on depending on the channel in which you intend to operate.

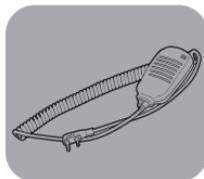
If the display setting of a basic handheld is easier for you to operate with the equipment, you can transform the TL-88 PRO to the basic display and channels use format, to this effect we refer you to the “Advanced operations (software)” appendix on page 47.

Among many other options through the programming software you can simplify the use of your TL-88 PRO, deleting the source channels/memories programmed and programming the channels from 1 to 8 with the equivalent frequencies. To this effect use the “Memorised channels” appendix on page xxxxx. With this format only the numbers from 1 to 8 will be showed on the display, then you can also select the tone number accessing the menu number 01, if desired.

Optional accessories



Vehicle charger
TLB-50



Microphone
MIA-115-K



Earphone
PIN-29-K



Programming cable
TL-USB

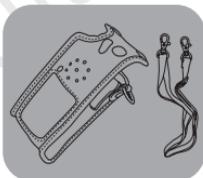


Cloning cable
TL-CLON



Alternative battery
TLB-428-EL

Installing it in place of the battery you can supply the transceiver from vehicle supply (maximum input 13,8V)



Leather case
TLF-488

To use it with a belt clip or hung over the shoulder

Troubleshooting guide

Problem	Possible cause	Possible solution
The transceiver does not ignite.	<ol style="list-style-type: none"> 1. The battery is not properly adjusted. 2. The battery is exhausted. 3. The battery is damaged. 4. The transceiver is damaged. 	<ol style="list-style-type: none"> 1. Check the right battery positioning. 2. Charge the battery. 3. Replace the battery. 4. Contact technical service.
The battery does not charge.	<ol style="list-style-type: none"> 1. The battery is damaged. 2. The desktop charger is damaged. 3. The wall feeder is damaged. 4. The battery does not make a good contact with charger. 	<ol style="list-style-type: none"> 1. Replace the battery. 2. Contact technical service. 3. Contact technical service. 4. Check the right anchoring of the battery on the guides.
Keyboard and channels keys do not respond.	<ol style="list-style-type: none"> 1. Keyboard manually locked. 2. Keyboard locked by automatic key lock function. 	<ol style="list-style-type: none"> 1. Unlock keyboard by keep pressing the Menu key. 2. Manually unlock and disable automatic key lock function.
The reception led is light up and the PTT button does not work.	The transceiver is set up with Busy channel lock function on and can not transmit when receiving a signal.	Turn off the Busy channel lock function.

Problem	Possible cause	Possible solution
<p>The green led lights up but no sound is heard from the speaker.</p>	<ol style="list-style-type: none"> 1. The volume is not properly adjusted. 2. Any CTCSS / DCS tone is enabled. 3. The squelch is set too high. 4. The speaker is damaged. 	<ol style="list-style-type: none"> 1. Increase the volume level turning the knob clockwise. 2. Check tones, the received signal does not match. 3. Set squelch to an appropriate level. 4. Press Monitor side key, if no noise is heard it will be damaged.
<p>During communication you listen to another conversation different from your group one.</p>	<p>The channel or frequency used match with another group, beside can also match the same tone.</p>	<p>Change the channel and enable CTCSS or DCS as not to be interfered not interfere others. Check if everybody in your group have the same parameters. Enable encryption if you want the maximum privacy level.</p>
<p>You receive a conversation but can understand nothing, is incomprehensible.</p>	<p>The conversation you are receiving is encrypted.</p>	<ol style="list-style-type: none"> 1. Enable encryption. 2. It may even have encryption enabled, we can not understand conversation, the signal may come from another transceiver different from TL-88 PRO with different encryption.

Problem	Possible cause	Possible solution
The PTT button is not responding when pressed.	VOX (hands free) function is enabled.	Disable VOX function.
While transmitting the conversation is automatically cut.	TOT function is enabled, so your radio has a maximum transmission time set, once reached the transmission is automatically cut.	Disable TOT function or increase the maximum transmission time of your transceiver.

Technical specifications general

Equipment's reference	LUTHOR TECHNOLOGIES TL-88 PRO
Frequency range	UHF PMR-446 (446,00625 - 446,09375MHz TX / RX) Commercial FM (only reception RX 88 - 108MHz)
Memory channels	128 memories / channels
Voltage	DC 7,4V
Output power	500mW (0,5watt)
Antenna type	Fixed flexible
Working temperature	from -20°C to +55°C
Channel spacing	12,5 KHz
Mode	F3E (FM) simplez or semi-duplex
Maximum deviation	< 2,5 KHz
Adjacent channel power	< -60dB
Sensibility	Minimum 21dB μ V / Maximum 26dB μ V
Output audio power	> 500mW
Weight	200g (battery included)
Dimensions (H x M x L)	115mm (250mm with antenna) x 59mm x 35mm

WARNING: Some of these specifications can be subject to modification without previous notice.

We have done everything possible to obtain the maximum of detail in this manual, but we are not responsible for any possible omission as well as printing errors or translation. All the specifications are subject to change by **LUTHOR TECHNOLOGIES** without previous notice.

Total or partial reproduction of this manual contents without the express authorisation of **LUTHOR TECHNOLOGIES** is prohibited..

Note on environmental protection



This symbol on the equipment or its packaging indicates that at the end of the useful life of this product the user is legally obligated to fulfil the European Directive 2012/19/EU, on 4 July 2012 (in the legislative Spanish system RD 110/2015 on 20 February 2015), on Waste Electrical and Electronic Equipment, which applies the following: the electrical and electronic equipment, as well as batteries and rechargeable batteries, can not be treated as normal household waste, but must be delivered to the corresponding collection point. By ensuring that this product is rejected correctly, you help with this action to prevent negative consequences for the environment and human health which could be caused by its inappropriate management. The recycling of materials helps to preserve natural resources. To receive detailed information about the recycling of this product, please contact the city office, the most nearby waste disposal service or the establishment where you purchased the product.

Declaration of conformity

CE 0678

The undersigned, in representation of:

Company: GENEREUS S.L.
Address: Industria, 5, Nave 8
08160 Montmeló – Barcelona (Spain)
Telephone number: (+34) 93 599 17 65
VAT number: B66339029
E-mail address: gestiontecnica@geneurus.com

We declare under our sole responsibility the conformity of the following product:

Type of equipment: UHF PMR-446 mobile transceiver for free use
Brand name: LUTHOR TECHNOLOGIES
Model number: TL-88 PRO
Manufacturer: GENEREUS S.L.
Manufacturing site: China

Which it refers this declaration, with the following rules or other policy documents:

EN 60950-1: 2006+A11:2009	Safety regarding information technology equipments. General requirements.
EN 301 489-1 V 1.8.1:2008 EN 301 489-5 V 1.3.1:2002	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech)
EN 300 341-1 V 1.3.1:2000/12 EN 300 341-2 V 1.1.1:2000/12	Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service (RP D2); Radio equipment using an integral antenna transmitting signals to initiate a specific response in the receiver; part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 300 296-1 V 1.2.1:2009-02 EN 300 296-2 V 1.2.1:2009-02	Rule referred to portable equipments for the land mobile service intended to be used on private mobile radio networks on the 446 (PMR446) frequency band.
Directive RoHS 2011/65/UE	About restrictions of the use of certain hazardous substances in electrical and electronic equipment (EEE).

In accordance with the requirements of Directive 2014/53/UE, of the European Parliament and the 16th April 2014 Council, transposed into Spanish law by Royal Decree 188/2016 of 6th May 2016.

More additional information related with the equipment, accessories, images, updated management software, etc. are available on the official website: www.luthortechnologies.com

Josefa Paredes Martínez

Manager

Montmeló, 9th March 2016

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