HP105/HP405

VHF/UHF Handheld Transceiver

User's Manual

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Introduction

Congratulations. HP105/HP405 is a Professional Radio. Its rugged design allows it to be your reliable partner even during hard working days.

To extend the flexibility the radio is provided with VOX function, which allows switching the transmission just by talking in full hands free condition.

Transceiver's specifications provided in HP105/HP405 are compliant with ETS 300 086, moreover its top level design and resistance are compliant with IEC529 level IP54 and MIL STD 810 C,D,E.

CTE International is committed to continuous quality improve, for this reason specifications may vary without prior notice.

Warning notes

Every effort has been made to ensure that the information in this document is complete, accurate, and up-to-date. CTE International assumes no responsibility for the results of errors beyond its control. The manufacturer of this equipment also cannot guarantee that changes in the equipment made by non authorized people will not affect the applicability of the information in it.

Safety

Your HP105/HP405 handheld transceiver has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the radio:

- Read the instructions in this handbook carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the radio itself.
- **Don't carry the transceiver by the antenna**. This may damage the antenna or antenna terminal. Grasp it by its base (not the tip!) when you need to place or remove it.
- **Don't keep the radio with the antenna very close** to, or touching exposed parts of the body, while transmitting. The radio will perform best if the microphone is 5-10 cm away from the mouth and the radio is vertical.
- Be sure the PTT key is not depressed when you don't need to transmit.
- Do not operate the radio near unshielded electrical blasting caps or in an explosive atmosphere.
- **Don't transmit without the antenna fitted on the radio**. Though it is provided with a protection, it may damage the TX output final stage.
- **Respect the environment conditions**. The radio is designed to be used in heavy environments, however avoid exposing it to extremely hot or cold temperature (out of the range between –30 to +60°C). Don't expose the transceiver to excessive vibrations as well as dusty or rainy places.
- **Never try to disassemble or service the radio by yourself** (aside from the routine maintenance described in this handbook). It will immediately void the warranty and you may cause damage requiring extensive repair work. Always contact your local dealer for assistance.
- **Grasp your radios firmly**. Otherwise it may fall and be damaged.
- **Use only genuine accessories**. Non original ones could seriously damage your handheld transceiver.

- **Do not use your radio near water, or spill liquid of any kind into it**. If the transceivers get wet immediately dry it by a soft and clean cloth.
- **Switch the radio off before you clean it**. Strictly follow the directions reported in the paragraph "Care and maintenance".
- **Handle the battery properly**. Strictly follow the directions reported in "Care and maintenance".
- Be certain that your power source matches the rating listed for the supplied battery charger (AC adaptor). If you are not sure, check with your dealer or with your local power company.
- To avoid damaging the power cable of the battery charger, do not put anything on it or place it where it will be walked on.

This product complies with the requirements of the Council Directives 89/336/EEC and 73/23/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility and low voltage.

Conventions and Symbols in this Book

This symbol marks a 'note'. Notes are hints or tips which offer additional information to help you.

This symbol marks a 'caution'. Cautions are special notices which you should read and follow carefully to avoid possible damage to your equipment and to avoid potential danger to yourself or other people.

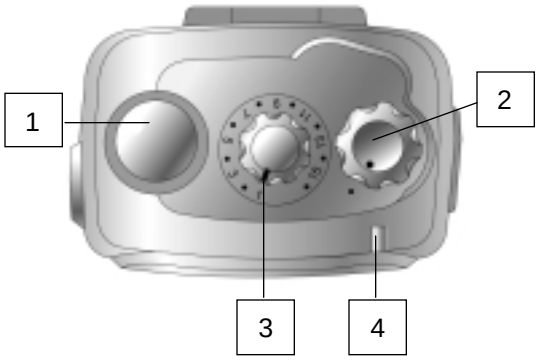
Key names will be highlighted in **bold**.

Important sentences and words are highlighted in *Italic*.

Part Names and their functions

Please have a look to the following parts description in order to familiarize with the transceiver's main parts and controls. Numbers in brackets refer to the illustration.

Top



[1] **Antenna connector.** Fit the antenna to this connector (MX thread type).

[2] **Power ON/OFF knob.** Rotate this knob to turn the transceiver on and off.

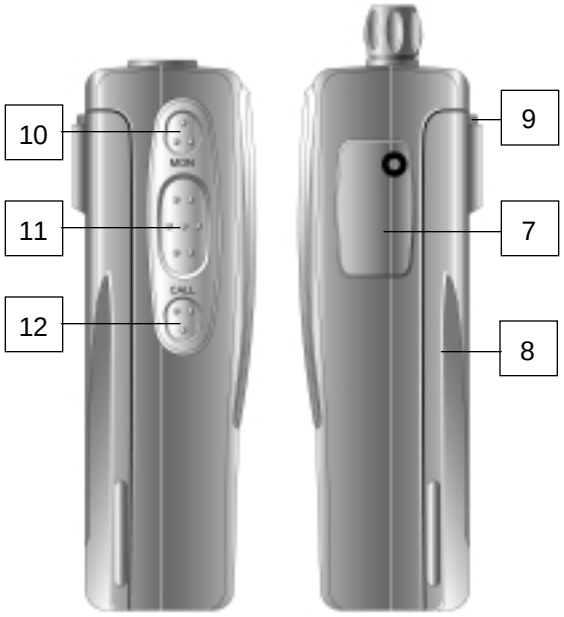
[3] **Channel selector knob.** Rotate this knob to select the operative channel.

[4] **Status LED**. Glows in different colors to show the current radio's status.

Front

[5] **Speaker**. The built in speaker located in this point emits the reception sound.

[6] **Microphone**. Your voice is detected by the microphone located in this place



Side (left and right)

[7] **Microphone connector**. For remote speaker/microphone, headsets for VOX use and other accessories. It must be protected with the supplied rubber cap when not in use. For the related pin connections please see to “Microphone connection”.

[8] **Battery pack**. This NiMH battery pack supplies energy to your radio.

[9] **Release** button (located on the battery’s body). Allows to remove the battery pack

[10] **MON** (monitor) button. Enables the loudspeaker for audio monitoring of the tuned channel

[11] **PTT** (Push To Talk) button. When pressed switches the transceiver from reception to transmission

[12] **FUN** (Function) button. Enables VOX and Scan Function. See VOX and Scan chapters.

Setup

Unpacking

The following items are in the package:

(a) Transceiver's main body

(b) Rubber ducky antenna

(c) Battery pack NiMH 1,300 mA/H

(d) Belt clip

(e) User's guide (this book!)

If something is missing please promptly advise your supplier.

Fitting/removing the antenna

To fit the antenna:

1) Locate the antenna terminal (thread MX connector) on transceiver's top.
2) Hold the transceiver with one hand and the base (the thicker part) of the antenna with the other one.
3) Attach the included rubber ducky antenna to the antenna terminal by turning it clockwise until it is firmly locked. Don't overtight it.

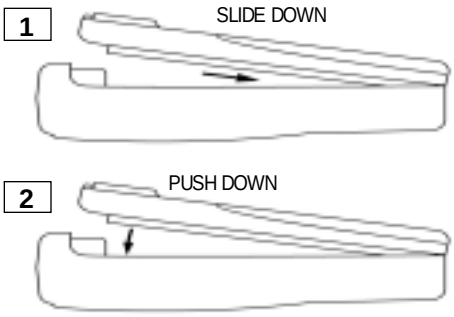
To remove the antenna do the same described procedure. At step 3 turn the antenna base counterclockwise.

Leave the antenna fitted on the radio. You can't communicate without it. Moreover, transmitting without the antenna may damage the TX output final stage. For the same reason use only the supplied antenna.

The supplied antenna is broadband type and covers the whole spectrum, so it doesn't need any alignment procedure.

Installing/removing the battery pack

To install the battery pack:

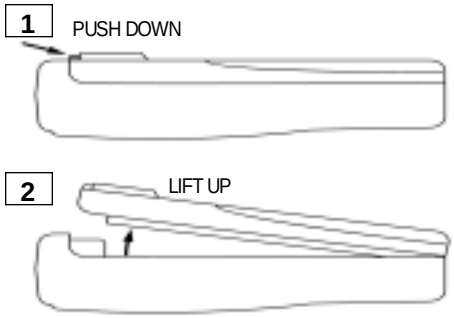


Hold the transceiver's body with one hand and the battery pack with the other. Put the battery pack onto the bottom of the transceiver.

Gently push the battery pack toward the transceiver's back edge.

At the end you will hear a click: the battery pack will snap into place and should be firmly locked.

To remove the battery pack:



Press the battery release button located in the back of the battery pack.

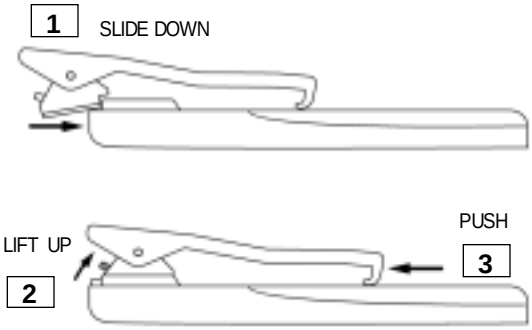
Keep the button pressed and gently pull the battery pack away from the transceiver back edge (the opposite operation of the previous step 2).

Remove the battery pack by separating it from the transceiver's body.

Installing/removing the belt clip

The supplied belt allows you to hang the transceiver up to your belt or jacket when you are not using the radio and you are just in stand-by condition (ready to receive calls).

To fit the belt clip onto the transceiver's body:



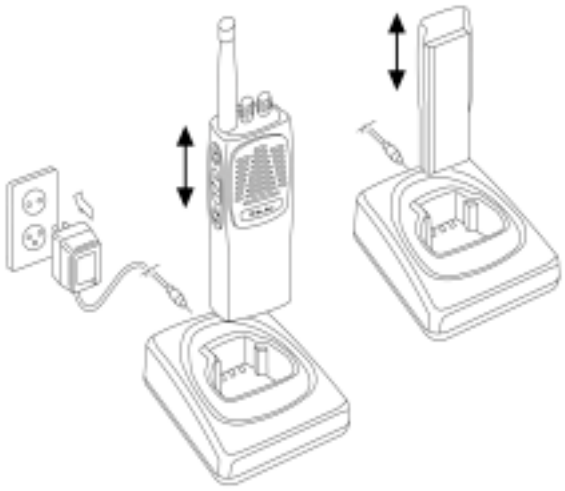
1) Just gently slide the clip into the appropriate guides located in the transceiver's back until it firmly locks.

To remove the belt clip:

2) Press the belt clip spring;
3) Reverse the over stated step 1.

Charging the battery pack

To charge the supplied battery pack you have to setup the standard charger and connect the radio as follows:



1) Connect the jack coming from the AC adaptor to the cradle's socket.
2) Connect the AC plug of the AC adaptor's power cable into an earthed AC power outlet.
3) Ensure that the radio is switched off.
4) Insert the radio into the cradle with the keypad toward you (the three metallic contacts of the battery pack must touch with the three contacts inside the cradle).
5) Wait 8-9 hours and remove the radio after that time.

Don't remove the radio before 8 hours, otherwise the battery's duty could be temporarily reduced.

Don't forget to remove the radio after 9 hours.

The battery charger is for indoor use only.

For the next charges, best duty and battery life please fully see the chapter "Battery Packs".

Basic Operations

This section describes how the standard operations work. Standard operation can be changed by programming, moreover the functions the radio includes can be modified via an IBM compatible PC. For this reason the way your radio operates may be upgraded and may slightly differ from what is described here.

> *IMPORTANT: Due to the full programmability of the radio, certain commands could be unavailable. In case of doubts please contact your dealer/radio network administrator for further details.*

Switching the radio ON/OFF

To switch the radio on:

1) Rotate the PWR/VOL knob clockwise until the radio is switched on: the CPU will start an autotest showing in sequence:
   - LED will light GREEN, then RED and finally OFF.
   - A beep confirms that the autotest is passed

   The self-test goes very fast, therefore the LED could not be seen.

To switch the radio off just rotate the PWR/VOL knob anticlockwise.

Adjusting volume

The PWR/VOL knob is used to adjust the RX volume: just turn it clockwise to increase or anticlockwise to reduce it.

Channel selection

If your radio has been programmed with more than one channel you can easily change it. To select a channel, turn the channel selector knob clockwise or anticlockwise until the channel indicator on the knob matches the wished channel.

Reception

Your radio could be previously programmed to work, channel by channel, in “Open traffic” or “GROUP MODE (CTCSS/DCS)”. Please have a look to each description and ask your radio network manager or dealer which mode your radio channels work.

- *OPEN TRAFFIC*: in this case you will hear any communication which will be transmitted on the selected channel. When the right carrier is received your squelch will unmute, you will see the status LED glowing green and you will hear the message.
- *GROUP MODE*:
  - *CTCSS/DCS* (Continuous Tone Code Squelch System - Digital Coded Squelch): they are systems which use particular TX signalling (a continuous sub audio tone for CTCSS or a digital code for DCS) as an access “key” to work a repeater (encoder) or to unlock the party’s signalling sensitive squelch. This last condition allows to share more radio networks in the same frequency. In this case you will receive only messages coming from parties sending a proper TX signalling. During CTCSS/DCS operation the radio may be set-up so that the appropriate CTCSS/DCS decoder

enables the speaker. Speaker will remain muted until the correct CTCSS tone or the correct DCS code is received. In case of unmuted speaker, the message will be heard and the status LED will glow amber. Units of the same group are not affected by communication on the same channel with wrong CTCSS/DCS.

CTCSS/DCS allows to share more than one radio network in the same frequency, however they are just useful to avoid disturbing stations not owning of the same network with messages not related to them. In any case, if more than one station is transmitting at the same time, this will cause an interference. Don't transmit if the status LED is glowing. Wait till nobody is transmitting on the channel.

Monitor

Monitor button can enable / disable "GROUP MODE (CTCSS/DCS)".

1) *To enable GROP MODE.* Press **MON** button. A Sub Audible Tone mutes your speaker.
2) *To Disable GROUP MODE.* Press **MON** button. You are working in "Open Traffic".

NOTE: if CTCSS/DCS tone is not programmed, GROUP MODE function is not available.

3) *Press and Hold **MON** button:* internal squelch is disabled and your speaker in unmuted. Every environmental noise is heard.

Transmission

When you need to transmit please get used to follow all these steps:

1) *Ensure that the channel is not busy* (otherwise you will create an interference, please wait till that condition).
2) Press the **PTT** key: the status LED will glow red.
3) Start talking *at a normal voice level* at approximately 10 cm from the microphone (keep the **PTT** key pressed).
4) When your message is over, release the **PTT**

Don't shout! It won't increase the distance range, but rather will make you heard distorted.

*Don't release the **PTT** before your message is over or start talking before pressing it, otherwise your message will be "chopped".*

A handheld radio doesn't normally allow to talk and receive simultaneously, for this reason make your messages with a reasonable time. When you are talking the other parties can't do that, so don't occupy too much the channel. Use the common sense.

*The radio might be programmed with a **timeout timer** which automatically put your radio in reception if you talk too much (after a preset time). In this case release the PTT and wait for few seconds: the radio TX features will be automatically restored. Ask the network responsible or your dealer for further details.*

*The radio might be programmed with a **busy channel lock out** which automatically disables transmission if your channel is busy.*

Transmission Power

Your HP105/HP405 can transmit with two power levels according to the distance of your party station(s). This option is programmed via PC and it can not modified by the user. We do recommend, when possible, to use the Low power: it will increase the battery duty and will reduce the risk to make interference with stations not owning to your radio network which may sharing the same channel with you.

- *If the low battery mark is "blinking" (Low Battery indication), the Unit will then automatically revert to Low RF Power when transmitting in order to help prolong the Battery's operational life. In this case, two short beeps will be heard before transmission.*

Scanning channels

If you have more than one channel programmed, your HP105/HP405 can scan them: in other words it can cycle through them and stop when a signal is detected.

The advanced scan functions of the radio allow to optionally look for carrier or carrier with CTCSS/DCS or CTCSS.

1) To activate the scan Switch Off and then *Switch ON the radio holding MON and FUNC buttons*.
2) A long beep will be heard when enter the SCAN MODE.
3) During scanning the LED will blink amber.
4) Only the channel in the Scan List will be monitored for activity. The Scan List is programmed via PC.
5) During scanning the channel selector knob becomes invalid.
6) *To stop channel scan* Switch Off and then *Switch ON the radio holding MON and FUNC buttons*.
7) One among the programmed channels can be assigned as Priority Channel. The scanning will look back at the priority channel with high frequency.
8) User can select the priority channel:
    9) To select Priority channel, before starting the Scan Mode (before switching On the radio) select the channel using the selector knob.

- **NOTE***: If the Scan List has no channels, a low tone (error beep) will be heard when you switch On the radio holding MON +FUNC and radio will not start the Scan Mode. At least two channels must be in the Scan List for the Unit to be put in the SCAN Mode.*

- *When a proper signal is received on a channel, the radio will stop scanning and audio will become audible. When the activity on that channel ceases, the unit will automatically resume scanning.*

- *If CTCSS/DCS have been previously programmed, the scanning will stop only if the received carrier has the appropriate signalling.*

- *If PTT is pressed during scanning, the radio will transmit on the first vacant channel. In case of no activity, the Unit will automatically resume scanning.*

Advanced Operations

In this section we'll describe some advanced operation which you can do with your handheld transceiver:

Handsfree transmission (VOX)

VOX (Voice Operated eXchange) is an automatic system which allows you to automatically switch the transmission in hands free mode just by speaking in the built-in microphone of an headset (not provided with the unit). Please ensure that the handset is suitable for your transceiver as reported in the paragraph "Microphone connection". To insert the VOX and adjust sensitivity:

1) Switch on the radio keeping pressed the **FUNC** key.

2) Connect the optional headset with built-in microphone to the microphone connector located on the transceiver's side.

10) Ensure that the headset's built-in microphone is located close to the side of your mouth.

11) Hold the **FUNC** key for more than 2 seconds to toggle VOX sensitivity from HIGH to LOW and vice versa. Adjust the VOX sensitivity in order to ensure a stable transmission when speaking with a normal voice level.

We recommend to set the just minimum sensitivity as possible. A too high value could cause accidental transmissions, especially in hi-noise environments.

PTT button is disabled during VOX.

Care and Maintenance

Battery Packs

Information on rechargeable batteries

- When the battery pack is new it doesn't provide 100% of its efficiency; it means that it might be discharged earlier. To reach the full battery life you have to "run-in" the battery with at least 3-4 deep charging/discharging cycles, after that it will reach its maximum capacity. Please see "Properly charge of battery packs" for further details.

- Should you properly use the battery pack, you will obtain at least 400 charging/discharging cycles (300 with the optional rapid charger). The battery duty will progressively reduce after 2/3 of its life (approx.).

- Rechargeable battery packs lose their charge with the time if left unused (self discharge); this is normal. A NiMH (Nickel Metal Hydrate) battery can reduce 10 to 20% of its stored energy in few days.

Properly charge of battery packs

1) Ensure that the radio is switched off,.
2) Insert the radio into the cradle as explained in the paragraph "Charging the battery pack"
3) Wait the necessary time to provide a full charge. If the pack isn't completely discharged you will need less than 8 hours.

Don't overcharge the battery: always remember to remove the radio after the necessary time.

The battery charger is for indoor use only.

When possible, charge the battery when it is fully discharged or, at least, you have used it for the major part of its duty; otherwise the battery's duty could be temporarily reduced. Please see the paragraph "Memory effect".

Don't remove the radio before the necessary time, otherwise the battery's duty could be temporarily reduced. Please see the paragraph "Memory effect".

Memory effect

The supplied NiMH (Nickel Metal Hydrate) battery pack is made with a more advanced technology than normal NiCd (Nickel Cadmium) battery. For this reason it is virtually free of what is called "memory effect", which affects NiCd batteries. Memory effect is a temporary capacity reduction which reduces the battery duty. Memory effect may occur just if you *regularly* charge the battery when you haven't discharged it at least at 50-70%. Memory effect can be easily avoided by following these simple rules:

- When possible charge battery packs only when they are completely discharged, i.e. when the battery icon has no bars inside.
- Don't remove the battery from the charger before the necessary time to provide a full charge.
- Provide at least two deep charge/discharge cycles per month.
- The best way to avoid memory effect is to use two battery packs and alternate their use with the radio. This will allow you to keep on your transceiver's operation by replacing the battery pack just when it's fully discharged and use the spare (charged) one. At the end of your working day you will charge the discharged pack for 8 hours.

Erasing memory effect

Memory effect can be easily erased just by applying 3-4 deeper charge/discharge cycles:

1) Use the battery fitted in the radio and wait *till the radio switches off*.
2) Wait at least one hour and then try to switch on the radio: you will note that some energy has restored in the battery, because the radio can be switched on.
3) Leave the radio in RX until the radio switches off again.
4) Repeat steps 2) and 3) three times.
5) Fully charge the battery for 9 hours and check the battery duty. If some memory effect still exist go back to step 1.

> *If the battery duty doesn't improve after three of the over stated cycles, it means that your battery pack is faulty or has reached the end of life (please see "Information on rechargeable batteries"). In this case please ask your dealer to provide a new battery pack.*

Warnings for battery and chargers use

Please use these cautions to avoid damaging battery packs or the transceiver:

- ***Before using the battery charger carefully read any related warning or caution.***
- ***Don't short battery terminals: this may cause fire, burns or explosions.***
- ***Never dispose batteries into fire they may explode causing fire, burns or explosions. Strictly follow any disposal regulation of your Country.***
- ***Use only genuine batteries and chargers. The use of non genuine accessories may cause burns, fire or explosions; making serious damages to the radio/battery or serious injuries to people.***
- ***Battery chargers are for indoor use only.***
- ***Be certain that your power source matches the rating listed for the supplied battery charger (AC Adaptor). If you are not sure, check with your dealer or with your local power company.***
- ***To avoid damaging the power cable of the battery charger, do not put anything on it or place it where it will be walked on. Insert the plug in socket provided with earth connection.***
- ***Avoid strong shocks. Don't use the charger if it received a strong shock, has fallen down or it appears damaged; immediately contact an authorized service station.***

- ***Never try to disassemble or service the charger by yourself. Always contact your local dealer for assistance.***

- ***To reduce the risk of electric shocks disconnect the plug before providing any cleaning or maintenance. Grasp the plug (not the cable) to remove the plug from the socket. The use of non suitable extension can cause fire or electric shocks.***

- ***Don't expose batteries directly to temperatures below -20°C or greater than 35°C during their use and don't charge them outside the range of +5 to +55°C.***

Radio maintenance

Cleaning battery packs

Wipe the battery contacts with a clean and lint free cloth to remove dirt, grease or any other material which may prevent a good electrical contact. If contacts are very dirty you can also wipe them using a *soft pencil rubber* (not hard erasers for ink!). If you feel that battery contacts aren't still working properly, please contact your authorized dealer.

- ***Do not use liquid, alcohol or aerosol cleaners.***

Cleaning the radio

- Wipe the radio with a clean and lint free cloth to remove dust. If it is very dirty, you can use a damp (*slightly* moistened with *water*) cloth.

- ***Do not use liquid, alcohol or aerosol cleaners.***

  If you normally use your radio in dusty or hard environments, we do recommend to use the optional carrying case. Please see "Optional accessories".

Connectors

When the connectors are not being used, they should be fitted with the supplied cover caps.

- ***Only suitable accessories must be connected to the related connectors.***

Optional accessories

These optional accessories can be used to improve the transceiver's performances:

- Spare battery pack. It extends the duty time and minimizes the possibility of memory effect (please see "Memory effect").
- Rapid charger. It recharges the battery packs in 1 hour and provides trickle charge when they reached their full charge.
- Carrying case. It protects your radio against small shocks and scratches; the best for use in hard environments.

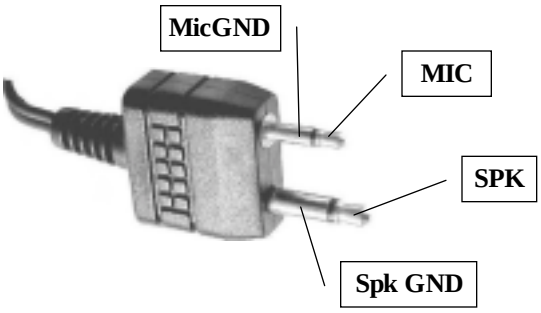
Microphone connector

The microphone connector is designed for the connection of two basic accessories (not supplied as standard):

- *An external speaker/microphone*, which allows to use the radio firmly secured to your belt by means of the supplied belt clip.
- *An headset with built-in microphone*, which additionally add the VOX facility, in other words you can switch the transmission just by talking at the headset's microphone in hands free convenience. For further details please see "Hands free transmission (VOX)".

Any kind of accessory for the above stated purposes can be connected to the microphone connector, provided that they meet the following requirements:

- Jack connectors for Speaker (SPK) and Microphone (MIC) must be respectively standard type 3,5 mm and 2,5 mm. and connected as follows:



- The suggested speaker input impedance is 8 Ohms
- The microphone should be condenser low-impedance type.
- Any accessory should be hi-quality suitable for professional use.

Please don't connect any accessory which you are not sure meet the above stated requirements. You could create serious damages to your radio. In case of doubt please contact your authorized dealer.

Quick reference

Operation resume

Should you are now familiar with your transceiver you do know now that it's very easy to use one of its function, you just have to do what follows:

1) Press the **MON** to enable/disable GROUP MODE.
2) Press and Hold **MON** button to enable/disable the squelch.
3) Press the **MON + FUN** keys at the switching ON to enter the SCAN.
4) Before entering the SCAN MODE, use the channel selector knob to select the priority channel.
5) Hold the **FUNC** key and switch on the radio to enable/disable VOX.
6) When VOX function is enabled, Press the **FUNC** to set HIGH or LOW VOX sensitivity.

Press the MON key and switch on the unit. The unit enters the PROGRAMMING MODE. This operation is only allowed to authorized person.

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