



# VOICEDUCER®

Ear Microphone System

Sistema Microauricular en Audífono

Système de microphone auriculaire

VOICEDUCER-Modul mit Ohrhörermikrofon

Система наушника/микрофона

MDRMN4044

MDRMN4045



Professional Radio

ACCESSORIES

## ABOUT YOUR VOICEDUCER EAR MICROPHONE SYSTEM

The concept of speaking and hearing through the ear is not new, but its application in the VOICEDUCER two-way communications device achieves a high level of performance that creates a breakthrough in remote voice communications. The ear microphone is unobtrusive to the casual observer, making it ideal for security applications. The miniature earpiece leaves the hands free and face unobstructed when worn by rescue and hazard-protection personnel, who still retain the ability for direct hearing and speaking. And its high speech clarity under noisy environmental conditions makes it ideal for airport, factory and military communications. For personnel required to wear breathing apparatus, communications with protective masks are as clear as communications without. The usefulness of this remarkable device cannot be over emphasized.

The VOICEDUCER system combines advanced electronic circuitry with rugged construction enhancing performance, strength, and reliability, while reducing the unit's size and weight. The advancements include:

- FM conformed circuitry
- Shielded cable which minimizes adverse RF interference
- Kevlar<sup>®</sup> reinforced ear microphone cable
- Die-cast housing

The VOICEDUCER represents a viable alternative to a headset with boom microphone or a hand-held speaker/microphone in those situations where existing equipment is not up to the task. The VOICEDUCER is a direct replacement for any conventional ear-mounted microphone, throat microphone or skull microphone. Its quality and versatility enable personnel to operate safely and effectively under adverse conditions.

The VOICEDUCER Ear Microphone Systems provide the following operating mode by choosing the interface module.

- The MDRMN4044 includes a Push-To-Talk (PTT) interface module that operates PTT only.
- The MDRMN4045 includes a PTT/VOX interface module that operates PTT or Voice Operated Transmit (VOX).

Even though the VOICEDUCER Ear Microphone is shown in the front cover photograph and included in text information, the ear

microphone is not included with the purchase of the VOICEDUCER Ear Microphone System. The ear microphone must be ordered separately. Three ear microphones are available for use with the MDRMN4044 and MDRMN4045 VOICEDUCER Ear Microphone Systems. Refer to the OPTIONAL ACCESSORY ITEMS list on page 15

**Caution**

This Interface Module is Approved for hazardous location classification Class I Division 1 Groups C and D and Class I, Division 2 Groups A, B, C, and D.

When connected to radios Approved for Class I and II, Division 1 Groups C, D, E, F, and G, the combination is reduced to Class I, Division 1 Groups C and D only.

## SPECIFICATIONS

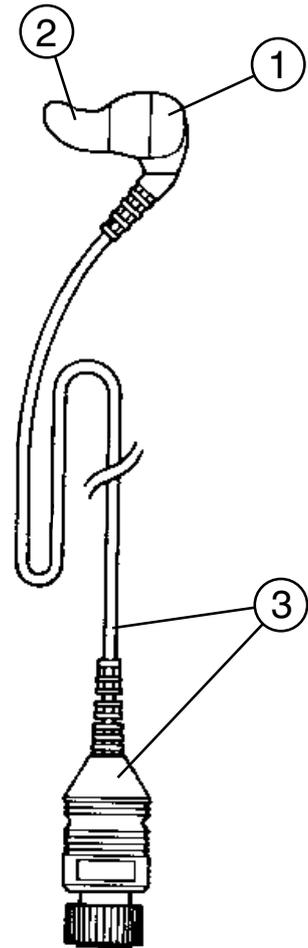
<p>Ear Microphone</p> <p>Dimensions (Earpiece)</p> <p>Cable Length</p> <p>Weight</p>	<p>16.4mm(W)X13.5mm(H)X26mm(L)</p> <p>110±5cm including connector</p> <p>Standard noise level ear mic: 17g</p> <p>High noise level ear mic: 20g</p>
<p>Microphone</p> <p>Type</p> <p>Output sensitivity</p> <p>Operating voltage</p>	<p>Piezo-electric accelerometer</p> <p>-31dB ± 5dB at 1kHz (0dB = 1 V/0.5G)</p> <p>DC 2.5 ~ 10V</p>
<p>Receiver</p> <p>Type</p> <p>Rated input</p> <p>Rated output S.P.L.</p>	<p>Electromagnetic receiver</p> <p>1 mW</p> <p>106 dB(C) ±5 dB at 1 mW, 1 kHz (0 dB = 20µPa)</p>
<p>Interface Module</p> <p>Power supply</p> <p>Min. operating voltage</p> <p>Operating temperature</p>	<p>AAA 1.5 V alkaline battery</p> <p>0.9 V</p> <p>-20 ~ +60°C</p>
<p>PTT Interface Module</p> <p>Battery life</p> <p>Dimensions (Housing)</p> <p>Weight</p>	<p>40 hrs (Alkaline) continuous transmit</p> <p>39mm(W)X27mm(D)X95mm(H)</p> <p>170g</p>
<p>VOX Interface Module</p> <p>Battery life</p> <p>VOX rise time</p> <p>VOX hang time</p> <p>Dimensions (Housing)</p> <p>Weight</p>	<p>35 hrs (Alkaline) in continuous VOX transmit</p> <p>0.3 sec. max.</p> <p>1.35 sec. ±20%</p> <p>39mm(W)X28mm(D)X95mm(H)</p> <p>180g</p>

## GENERAL INFORMATION

### VOICEDUCER Ear Microphone

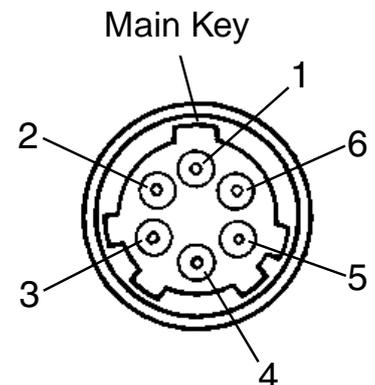
The VOICEDUCER two-way communications device was designed to fit the contours of the external ear canal. Although it looks like an ordinary earphone (receive only), the earpiece actually contains both a patented accelerometer microphone as well as miniature receiver component.

- ① Ear Microphone shell — Houses the accelerometer microphone and electromagnetic receiver.
- ② Silicone Eartip — Replaceable, facilitates user comfort and hygiene.
- ③ Ear Microphone Connector/Cable — Kevlar reinforced and allows connection of the ear microphone to the interface module.



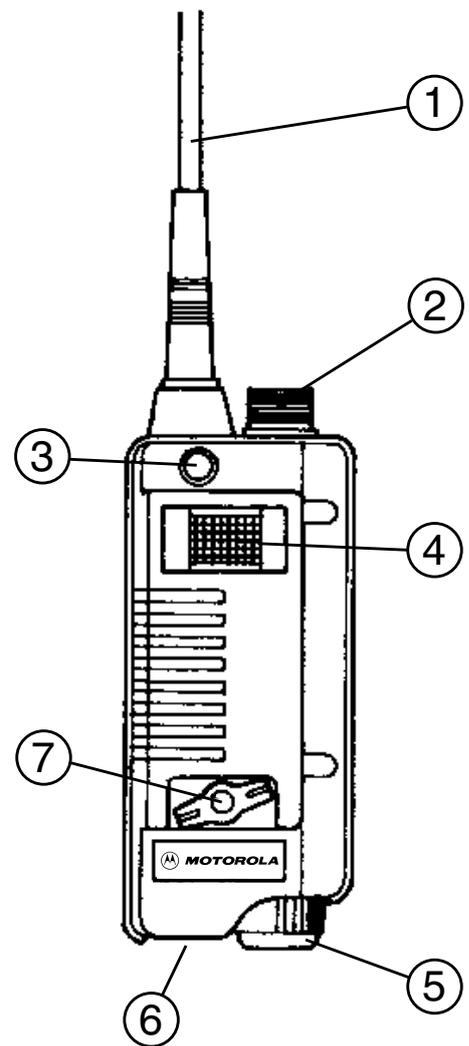
### Pin Assignments

- 1. Transmit Audio (white)
- 2. Receive Ground (shield/red)
- 3. Receive Audio (red)
- 4. Vacant
- 5. Microphone Ground (shield/white)
- 6. Vacant



## Interface Module

- ① Connector/Cable Assembly — Allows for connection of the interface module to the radio.
- ② Ear Microphone Connector Jack — Allows for connection of the VOICEDUCER ear microphone.
- ③ Transmit Indicator Light-Emitting Diode (LED) — Indicates normal transmission (continuous red) when the push-to-talk (PTT) switch is pressed or while transmitting in Voice-Activated Transmit (VOX)\*.
- ④ PTT Switch — Pressing the PTT switch engages the radio transmitter.
- ⑤ Battery Hatch — Provides access to the battery housed inside the interface module.
- ⑥ Remote PTT Jack — Allows for connection of a variety of remote PTT switches.
- ⑦\* PTT/VOX Selector Switch — Selects between PTT or VOX.



\* VOX Interface Module only

## BASIC OPERATION OF YOUR VOICEDUCER

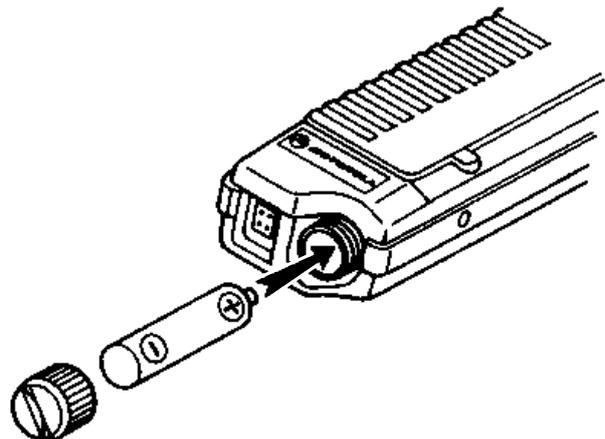
### Introduction

The VOICEDUCER provides two-way communications from a small device worn in the ear. The accelerometer microphone provides a signal-to-noise ratio equal to or exceeding the best noise-canceling microphones, which enables voice clarity to be maintained under conditions of high ambient noise. In the event hearing protection is required, the earpiece is small enough to wear under earmuffs. When suitable earmuffs are used, the operating range of the earpiece may be extended up to 125 dB noise levels. Otherwise, the user retains the ability for direct hearing and speaking under normal ambient noise conditions. The user's face is left unobstructed. In fact, the ear microphone provides completely clear, intelligible voice transmissions even in situations where the mouth is obstructed or speech is muffled by protective clothing, a face guard or breathing apparatus. The user consequently is afforded a much greater degree of freedom than has previously been possible with two-way radios.

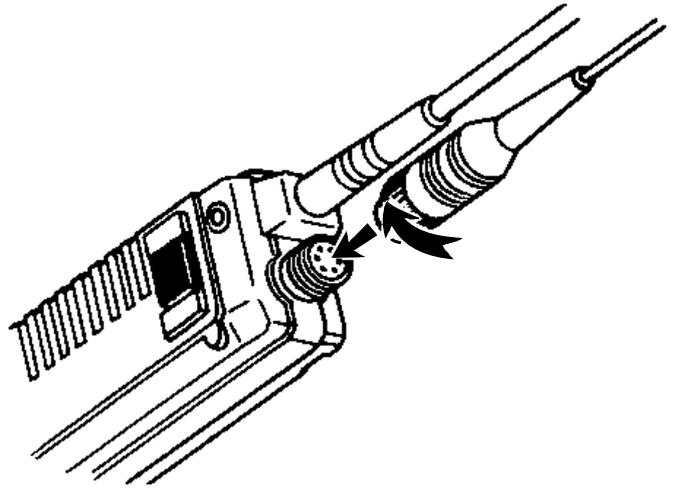
When properly inserted in the ear, the earpiece should feel comfortable and secure. The ear microphone detects speech-induced bone vibrations via direct contact with the ear canal wall. Thus, the speech conduction process takes place entirely inside the head. Because these vibrations occur whether one speaks softly or yells, you only have to speak at a moderate level for high speech clarity, even in high noise areas. It is not necessary to yell above the background noise in order to be understood. In addition, the ear microphone utilizes a quality sound-pressure receiver making radio transmissions easy to hear under noisy conditions.

### Ear Microphone Installation

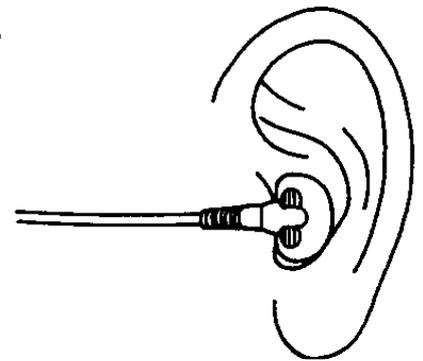
1. Unscrew the battery hatch on the bottom of the interface module and insert a fresh alkaline battery (AAA 1.5V).



2. Connect the ear microphone to the interface module and tighten by turning the outer ring clockwise.

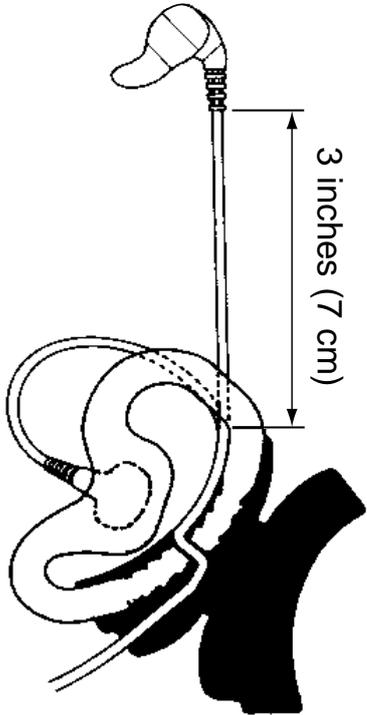


3. Connect the interface module to your radio. For optimum performance, be sure that the interface module cable or finger PTT switch cable is routed away from the radio antenna.
4. Secure the radio and interface module in place, for example, by clipping them to your belt.
5. Carefully insert the earpiece into the ear as shown.
6. Push the ear microphone toward the ear canal, jiggling the earpiece slightly until it is seated firmly in the ear.
7. Loop the cord over and behind the ear. Note the position of the cord where it intersects the ear microphone: the cord points forward about 45 degrees.
8. There are two styles of ear holders available as optional accessories that provide added security in keeping the earpiece firmly positioned in the ear. You may purchase an ear holder in a specific size, (S, M, L), and color, (black or clear), or an adjustable ear holder (black only), which is designed to reduce "cord noise." This particular ear holder is recommended for VOX (Voice-Activated) operations to prevent inadvertent "keying" of the VOX circuit due to "cord noise." The size of the ear holder should be

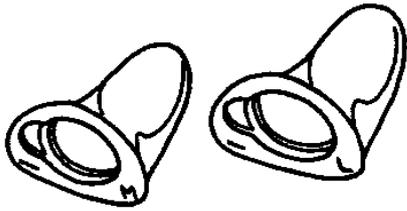


adjusted to fit your ear prior to the start of VOICEDUCER communications, and is done as follows:

- To adjust the size, first remove the outer clip from the ear holder housing. This will allow you to open the inner holder. Position the rubber tabs in the appropriate slots to achieve the desired size.
- Align the earpiece cable along the grooves inside the holder. Leave approximately three inches (7 cm) of cable between the earpiece and ear holder as shown in the drawing.
- Close the holder and reattach the outer clip.
- Insert the earpiece in the ear as described in Steps 5, 6, and 7. Put the ear holder up against the ear and pull the ear through the slot. Be sure that the earpiece is firmly in the ear canal to ensure proper communications.



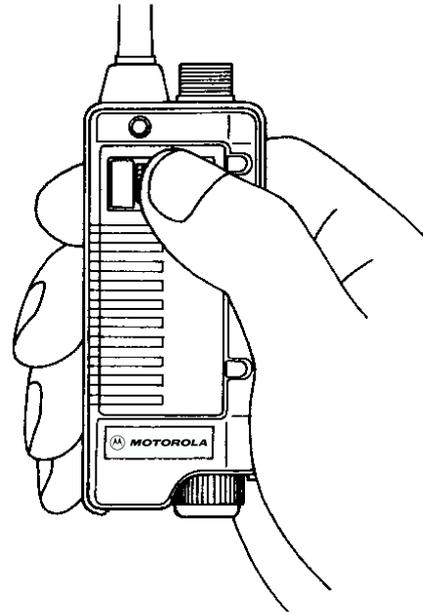
9. The ear microphone comes equipped with both Medium and Large size ear tips. Depending on whether the earpiece feels too loose or too tight, try switching ear tips to determine a suitable fit.



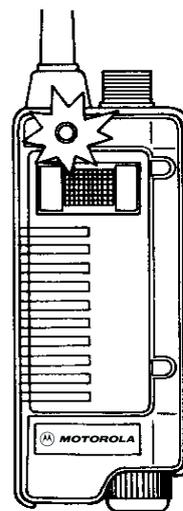
## Push-To-Talk Operation

Your MDRMN4044 VOICEDUCER Ear Microphone System is equipped with PTT only operation. With the radio and PTT interface module in position and the ear microphone properly inserted in the ear, you are ready to begin VOICEDUCER communications.

1. Before turning your radio on, make sure the volume is turned down.
2. Turn the radio on. Listen until you hear a transmission; adjust the volume control to a comfortable listening level.
3. When the channel is open, press and hold down the PTT switch on the front of the interface module and speak clearly. When you have finished talking (transmit), release the PTT switch to listen (receive).



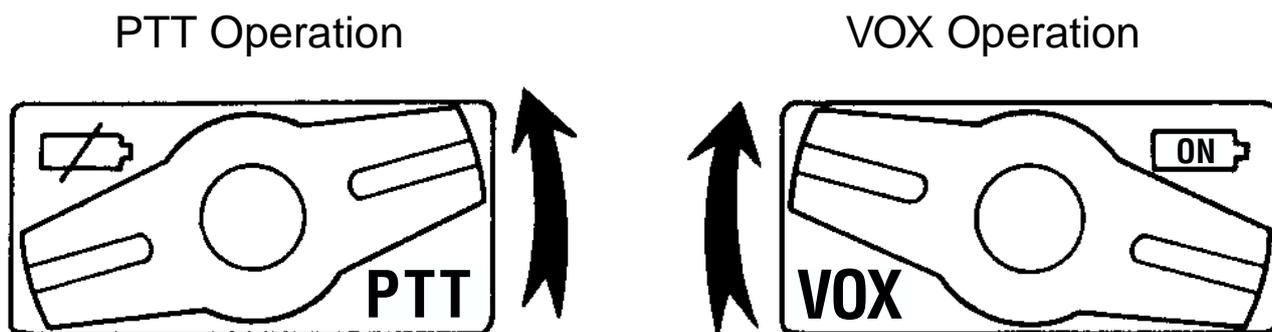
4. While transmitting, the transmit indicator LED on the interface module lights up indicating normal transmission.



## VOX Operation, VOX Interface Module Only

Your MDRMN4045 VOICEDUCER Ear Microphone System is equipped with PTT operation as well as Voice Operated Transmit (VOX). Before using your ear microphone system in VOX, please read the following operating procedures.

### *VOX/PTT Mode Selector Switch Settings*



When attaching the VOICEDUCER VOX interface to the Professional portable radio, make sure that the radio is turned off, and that the interface module's VOX/PTT mode selector is set to the PTT position.



### Caution

When the selector switch is set for VOX operation, current is continuously drawn from the battery in the interface module. Remember to turn the selector switch back to PTT whenever VOX is not being used.

### **Operation**

1. Connect the interface to the Professional Radio audio accessory port and turn on the radio.
2. Place the earpiece into the ear as described in the manual and turn the VOX/PTT selector switch to VOX.

**Note:** When using the VOICEDUCER VOX system with the Professional Radio, do not program VOX into the radio. In addition, the VOICEDUCER VOX does not provide “voice sidetone”, so you will not hear yourself speak through the VOICEDUCER earpiece.

3. Speak in a normal voice to ensure that the VOX circuit is activated.

**Note:** When the VOX circuit is activated, you will hear a Tx tone signal via the ear microphone and the Tx LED will light up.

### **Remarks**

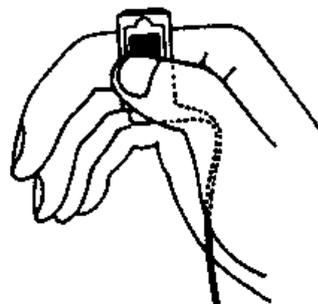
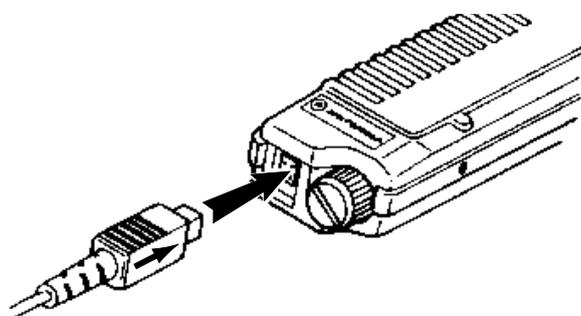
1. The rise time of the VOX circuit is set at approximately 0.3 seconds (which is fast). But due to this 0.3-second slight delay, the transmissions may be clipped at the beginning. To prevent this, we recommend that you initiate each transmission by transmitting a vowel sound like “EEE” to ensure smooth VOX communications.
2. The PTT switch on the VOX interface remains functional even when the system is operating in VOX mode.
3. When your voice is picked up by the VOICEDUCER earpiece and the VOX circuit is activated, you will hear a short “BEEP” confirming your transmission. Continue speaking after hearing this tone. It takes about 1.3 seconds for the VOX circuit to deactivate itself after you stop talking.
  - Talking or transmitting while receiving activates the VOX, interrupting both the transmission of outgoing signals as well as the reception of incoming signals.
  - Care must be exercised to time one's transmissions so as not to conflict or interfere with simultaneous transmissions on the same channel.

## Remote PTT Operation

### ***Finger PTT Switch (Motorola part number 0180358B38)***

Motorola provides an optional finger PTT switch which provides remote operation of the VOICEDUCER while minimizing interference with the use of the hands.

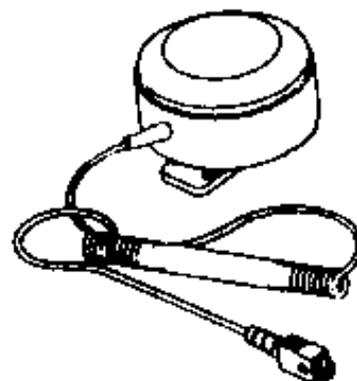
1. Connect the finger PTT plug to the jack located at the bottom of the interface module. Locate the raised arrow on the finger PTT plug and insert as shown.
2. Place the finger PTT on your index finger and press the switch to transmit.
3. The finger PTT has a coiled cable which extends to 1.3m. When discreet communications is necessary, the cable may be concealed under your shirt or coat sleeve.



### ***Body-Switch PTT (Motorola part number 0180300E83)***

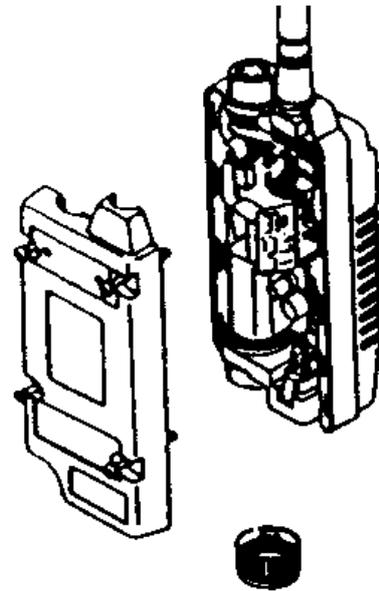
Motorola also provides an optional body-switch PTT with clothespin clip which allows for remote operation of the VOICEDUCER.

1. Connect the body-switch PTT plug to the jack located at the bottom of the interface module. Locate the raised arrow on the body-switch PTT plug and insert as shown.
2. The clothespin clip gives you the flexibility of positioning the body switch in several ways: under the arm, on the chest, or on the hip. Apply pressure anywhere on the body switch to activate the PTT and begin your transmission. When you have finished talking (transmit), release the PTT switch to listen (receive).
3. The body-switch PTT has a coiled cable which extends to 1.3m.



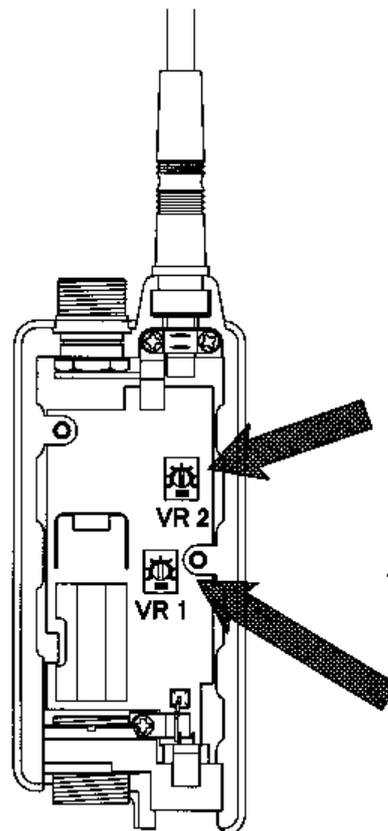
## SPECIAL ADJUSTMENTS

The VOX Sensitivity (VOX interface module) and Transmit Volume (PTT and VOX interface modules) have been preset at the factory. The associated diagrams illustrate these factory settings. Should your unit require a resetting, please refer to the following instructions:

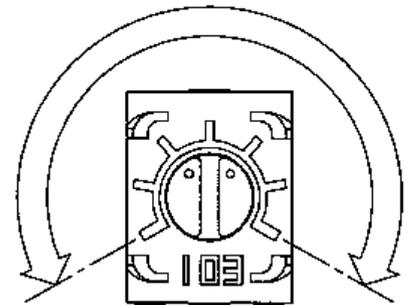


### VOX Sensitivity, VOX Interface Module Only

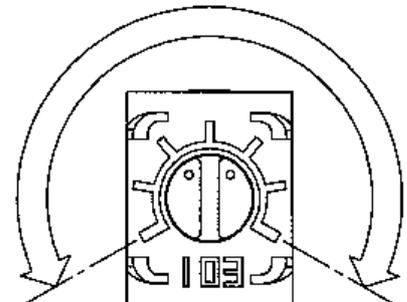
Unscrew the back of the interface module using a Phillips screwdriver (see diagram). Turn the pot screw labelled VR2 clockwise to increase the sensitivity or counterclockwise to decrease the sensitivity.



VOX Sensitivity Adjustment



Transmit Volume Adjustment



### Transmit Volume

Unscrew the back of the interface module using a Phillips screwdriver. Turn the pot screw labelled VR1 clockwise to increase the transmit volume or counterclockwise to decrease the transmit volume.

## BATTERY

The VOICEDUCER is powered by a single AAA (1.5 volt) alkaline battery. Because of “memory effect,” which may reduce capacity, rechargeable Nickel Cadmium batteries are not recommended. Proper care and timely replacement of the battery will ensure optimum capacity and provide peak performance of the VOICEDUCER.

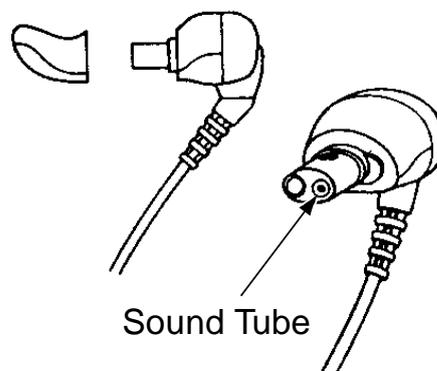
## BATTERY REPLACEMENT

1. When the battery in the interface module runs low, pressing the PTT switch generates an alert tone indicating a battery change is in order. When the battery runs low while operating in VOX (VOX interface only), the alert tone sounds continuously. It is recommended that, if at all possible, VOX be switched to PTT mode in order to conserve battery power.
2. The alert tone will be heard via the VOICEDUCER ear microphone in the ear. In either PTT or VOX mode, you will have approximately one hour in which to replace the battery once the alert tone starts.
3. The battery is easily replaced via the battery hatch located at the base of the interface module. Counterclockwise loosens the hatch; clockwise tightens it.

## CLEANING PROCEDURES

The ear microphone earpiece should be cleaned regularly for hygienic reasons.

1. After each use, wipe the external surface of the earpiece using alcohol applied with a soft cloth or tissue. Remove the eartip from the base of the ear microphone. To clean the inside of the eartip use alcohol and a cotton swab.
2. Be careful not to allow ear wax to accumulate in the eartip. Blockage of the sound tube inside the ear microphone will cause reduced audio reception, deteriorating VOICEDUCER performance.



## IN CASE OF OPERATING PROBLEMS

If you experience operating difficulties with your VOICEDUCER:

1. Review the appropriate steps in the operating procedures (pages 6 to 12).
2. Be sure that all connector contacts on the radio, ear microphone and interface module are clean.
3. Be sure that all connectors are in their correct positions and are securely fastened.
4. Make sure that your radio battery is charged.
5. Replace the battery in the interface module with a fresh unit.
6. If the quality of the transmit or receive signal is poor, check the radio after removing the interface module connector. The quality of VOICEDUCER transmissions is only as good as the radio.
7. Try several different operating locations, especially when operating the radio and VOICEDUCER inside buildings.
8. Check the VOICEDUCER by switching radios.
9. Should you still have difficulty, please contact your dealer or local service facility immediately.

## OPTIONAL ACCESSORY ITEMS

Motorola Part Number	Description
BDN6677	Ear Microphone for std. noise levels (up to 95dB), black
BDN6678	Ear Microphone for std. noise levels (up to 95dB), beige
BDN6641	Ear Microphone for high noise levels (up to 105dB),grey
0180358B38	Remote Push-to-Talk Ring Switch
0180300E83	Body-Switch PTT with Clothespin Clip
5080358B28	Ear Tip; size Medium, Black, pkg. 10
5080358B29	Ear Tip; size Large, Black, pkg. 10
5080358B30	Ear Tip; size Medium, Beige, pkg. 10
5080358B31	Ear Tip; size Large, Beige, pkg. 10
0180358B32	Ear Holder; size Small, Black
0180358B33	Ear Holder; size Medium, Black
0180358B34	Ear Holder; size Large, Black
0180358B35	Ear Holder; size Small, Clear
0180358B36	Ear Holder; size Medium, Clear
0180358B37	Ear Holder; size Large, Clear
0180300E25	Ear Guard with adjustable sizes (S, M, L)
4280369E44	Belt Clip with Screws



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