AT-216 Wireless Auditory Assistance Kit

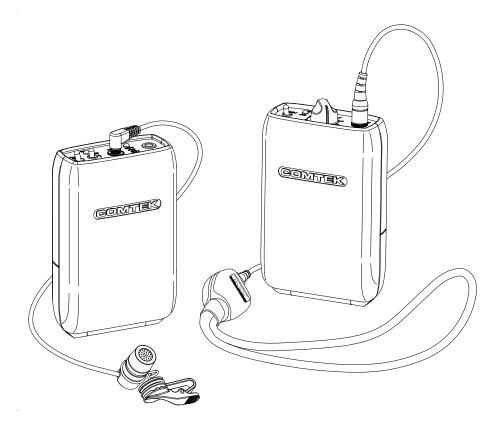




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AT-216

Digitally Synthesized Wireless Auditory Assistance Kit

A Close-Up On Sound®



Introduction

Thank you for purchasing the COMTEK AT-216 FM wireless auditory assistance system. For over 35 years, COMTEK FM systems have successfully proven to be an effective way to help the hearing-impaired individual in difficult listening situations.

The new AT-216 FM system combines the experience and integrity of COMTEK's preceding models with the advantages of today's digital technology. Plus, the all-new rugged packaging design of the receiver and transmitter ensures that this system will hold up to the rigors of every day use.

This product is made in the U.S.A. with strict quality control procedures to ensure your satisfaction. A careful reading of this quick-reference manual will acquaint you with the characteristics of the AT-216 system and ensure ease of operation.

1.1 Purpose of Equipment

The AT-216 system functions as a remote microphone for the user, overcoming the greatest listening problems for the hearing-impaired:

- High levels of background noise
- Reverberation effects
- Distance between the speaker and listener.

The AT-216 system enables persons with impaired hearing to comfortably take part in activities at school, home, work, and play. In addition to a hearing aid, the user wears the personal receiver and the neckloop retransmit device. The PR-216 personal receiver picks up the voice of the person wearing the M-216 transmitter, and the neckloop then retransmits it to the hearing aid for Close-Up Sound[®]. If no hearing aids are used, the receiver may also be used with headphones instead of the neckloop. Now the person with impaired hearing has a direct link to the speaker at greater distances for improved listening, clarity, and better understanding.

1.2 Unit and Accessories Supplied 1. Personal receiver (PR-216) 2. Neckloop transductor (NTC-102) 3. Two belt clips (BC-216's) 4. Transmitter (M-216) 5. Microphone and clip (CM-183RT) 6. Battery charger (NBC 9-3-2) 7. Rechargeable batteries (NH 9-200) 8. Attenuator adaptor cord (CB-36ST) 9. Earphone assembly (SM-N) 10. Flexible specialty antenna (FWA-216) 11. Convenient carrying case (C-216) 12. Conference table microphone adaptor (TM-10) (11)

Page 3

1.3 PR-216 Controls, Connectors and Indicators

• ENVIRONMENTAL MIC ON / OFF SWITCH:

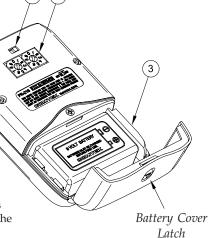
This switch turns the optional EnviroMic or Smart-Mic on and off.

(Set to right for ON and to left for OFF.)

2 CHANNEL SWITCHES: These rotary switches are set to the same channel as the transmitter. Actual frequency of operation must agree with the transmitter.

(See page 14 for frequency selection chart.)

3 BATTERY COMPARTMENT: The battery compartment features a hinged battery cover and an alignment system that ensures proper battery polarity. Battery installation and removal is facilitated by simply manipulating the bottom of the battery.

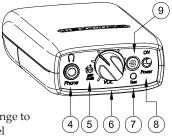


4 AUDIO OUTPUT JACK: This stereo 3.5 mm audio output jack accommodates any 32 to 125 ohms headphone — either stereo or mono; also, charging of rechargeable battery with

NBC 9-3-2 charger.

6 EnviroMic GAIN CONTROL: (Optional)

6 VOLUME CONTROL: This control has 50 dB of range to adjust the audio output for a comfortable listening level (clockwise for maximum level).

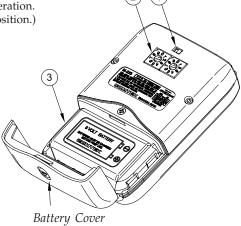


- **RECEIVER STATUS INDICATOR:** This LED indicator will display three functions:
 - a. Continuous illumination ----- No signal
 - b. Steady slow flash ----- Receiving signal
 - c. Rapid flash ----- Low battery Additionally there is an audible beeping to indicate a low battery.
- **3** ON/OFF SWITCH: This switch turns the receiver on and off.
- BUILT-IN ENVIRONMENTAL MIC/PLUG-IN MICROPHONE: (Optional) (See pages 8 and 9 for details.)

1.4 M-216 Controls, Connectors and Indicators

OPTIONAL COMPAND AUTO / OFF SWITCH: This switch overrides the automatic selection of the companded channels for non-companded operation. (This switch should remain in the "Auto" position.)

- **2 CHANNEL SWITCHES:** These rotary switches are set to the same channel as the receiver. Actual frequency of operation must agree with the receiver. (See page 14 for frequency selection chart.)
- **3** BATTERY COMPARTMENT: The battery compartment features a hinged battery cover and an alignment system that ensures proper battery polarity. Battery installation and removal is facilitated by simply manipulating the bottom of the battery.



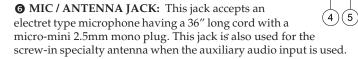
(10

Latch

4 AUXILIARY AUDIO INPUT JACK:

Allows transmitter to use line level, earphone level, or fixed AUX as an audio source; also, charging of rechargeable battery with NBC 9-3-2 charger.

6 AUDIO "VOICE" MODULATION INDICATOR: This indicator is used in making adjustment with the Audio Input Gain Control.



- **POWER / BATTERY TEST INDICATOR:** This LED indicator will illuminate continuously when the unit is on indicating normal operation. When the battery voltage drops below 6 volts, the LED will flash rapidly, indicating that a new battery or charging is needed.
- **3 OPTIONAL MIC MUTE SWITCH:** This switch turns off the voice from the microphone without turning off the transmitter carrier allowing the auxiliary input program to remain on.
- **9** AUDIO INPUT GAIN CONTROL: This is a microphone and AUX level input gain control. This control is used with the "Voice" modulation indicator.
- **ON/OFF SWITCH:** This switch turns the transmitter on and off.

2.1 Operating the System

A. Before operating the system:

- 1. Ensure that the M-216 transmitter and the PR-216 receiver are on the same channel (see frequency selection instructions in Section 2.4).
- 2. Check that new 9 volt alkaline batteries have been installed in both the receiver and the transmitter or that the rechargeable batteries have been recharged.
- 3. If 9 volt rechargeable batteries are used, ensure that they have been allowed to charge at least 14 hours to bring to a full charge (see battery charger instructions in Section 3).

B. Wireless microphone transmitter set up:

 Connect the microphone to the transmitter by inserting the microphone plug into the receptacle on top of the transmitter.

Note: The 36-inch microphone cord functions as part of the transmitter's antenna. The cord should be extended. Coiling or bunching the microphone cord will reduce the range of the system.

- 2. When the power switch is turned on, the green indicator lights up indicating condition of battery and that the transmitter is operating.
- 3. While speaking into the microphone with a normal speech level, observe the "voice" level indicator to ensure proper modulation. A normal speech level should produce low to moderate luminescence, and a loud voice should produce a full bright luminescence. With the small screwdriver, set the audio input gain control up or down until proper modulation is obtained.
- 4. The transmitter should be carried in a pocket or with the belt clip. The lapel microphone should be clipped high on the lapel for best performance.

2.1 Operating the System (Continued)

C. Receiver set up:

- 1. Slip the neckloop over the listener's head, and let it rest comfortably around the neck with the pendant in front. The neckloop can also be concealed underneath clothing.
- 2. Connect the neckloop to the receiver by inserting the neckloop plug into the output receptacle on top of the receiver, and turn on the receiver. The red LED indicator lights up indicating condition of battery and that the receiver is operating. When the transmitter is turned on the LED indicator should display a steady slow flash.
- 3. The receiver should be carried in a pocket or in the belt-clip pouch with the neckloop cord or earphone cord fully extended.

D. System operation:

Caution: Check the hearing aid to be certain it is equipped with a "T" or "MT" switch position. The neckloop will only operate with hearing aids having a "T" switch. Direct audio input to the hearing aid may also be used with a direct audio input cord (optional). For best listening, choose a hearing aid with a microphone which can be turned off when a direct audio input cord is being used (see page 8).

- 1. Establish normal listening volume on your hearing aid with the hearing aid set in the "M" position.
- 2. Switch to the "T" position on the hearing aid. Have the speaker talk using the transmitter microphone with a normal speaking voice.
- 3. Turn the volume control on the receiver clockwise (if volume is too soft) or counterclockwise (if volume is too loud).
- 4. Now, alternate between the "M" and "T" positions on your hearing aid with the speaker talking and adjust the volume on the receiver until it is about equal in both settings.

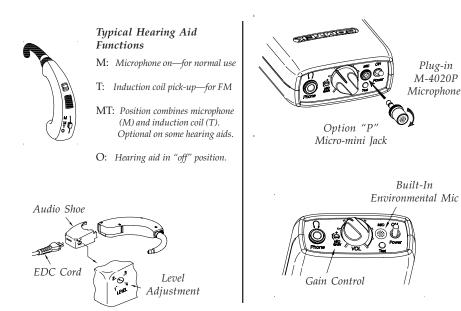
2.2 Optional EnviroMic and Smart-Mic

The PR-216 may be equipped or may be retrofitted with the optional EnviroMic or Smart-Mic feature for assistive listening applications where both environmental sounds and the speaker's voice from the transmitter must be heard.

This built-in or plug-in omnidirectional environmental microphone has been equalized to enhance speech discrimination when used with hearing aids, headphones, or button transducers.

When the PR-216 with EnviroMic or Smart-Mic is used with a hearing aid and neckloop or direct audio input cords, the hearing aid determines the frequency response and sound pressure level (SPL) delivered to the ear when the speaker uses the wireless microphone transmitter.

Note: The neckloop will only operate hearing aids having a "T" switch. Direct audio input cord to the hearing aid may also be used if the hearing aid has an audio input cord shoe with a level control. For best listening, a hearing aid which can operate in the "T" position only is preferred when using the PR-216 with the EnviroMic or Smart-Mic.



2.2 Optional EnviroMic and Smart-Mic (Continued)

1. The <u>EnviroMic</u> option allows both the environmental sounds and the speaker's voice from the transmitter to be heard simultaneously. The <u>Smart-Mic</u> option automatically prioritizes the speaker's voice from the transmitter over the environmental sounds. When the speaker stops talking, the Smart-Mic immediately amplifies the environmental sounds.

The environmental gain is set at the factory to a suitable level; however, if a gain adjustment is necessary, the following procedure should be used:

- a. Check that the environmental mic switch is turned "ON" (set to the right). See Section 1.3.
- b. With the small screwdriver provided, turn the microphone gain control fully counterclockwise for low gain before the PR-216 receiver power switch is turned "ON".
- c. Slowly turn the environmental microphone gain control clockwise until your voice level matches the voice level of the speaker using the wireless microphone transmitter. If higher microphone sensitivity level is required, additional gain can be used but only up to the threshold of feedback.

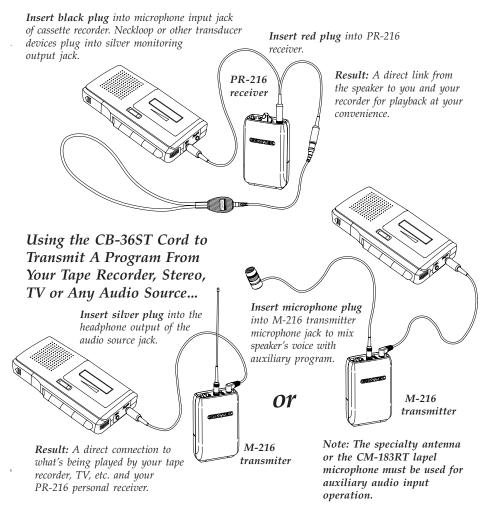
Note: Higher gain settings will bring up the voice signal as well as the background noise. Higher gain settings should only be used in a low noise environment.

- d. The Smart-Mic option incorporates a speech recognition circuit. However, excessively high environmental noise level around the M-216 transmitter's clip-on omni-directional microphone may cause the Smart-Mic's voice recognition function to not operate properly. It may then be necessary to adjust the microphone sensitivity control down or use the optional HH-100C head-worn, noise-cancelling microphone.
- 2. The option "P" micro-mini 2.5mm jack uses the M-4020P plug-in environmental microphone for either EnviroMic or Smart-Mic operation. This input jack may also be used with other accessories such as hand-held directional microphones and clip-on speech training microphones. Consult COMTEK's technical services to ensure compatibility.

2.3 Connection Possibilities

The CB-48AT and the CB-36ST are specialty adaptor cables that must be used when connecting the M-216 transmitter or the PR-216 personal receiver to other electronic audio devices.

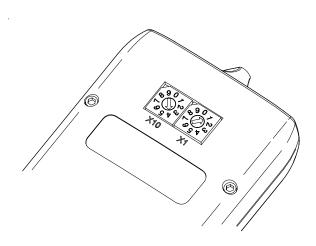
To Simultaneously Record and Monitor the Speaker Using the Optional CB-48AT Cord...



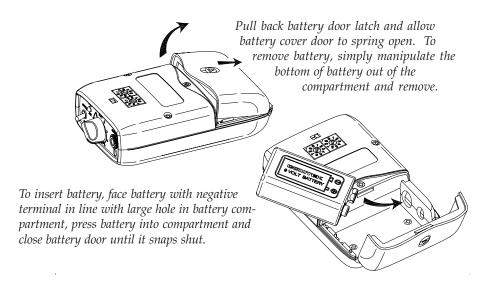
2.4 Frequency Selection (216-217 MHz)

The PR-216 personal receiver can operate on one of 57 available frequencies between 216 MHz and 217 MHz. COMTEK's channel designations indicate both standard, non-companded channels and high-fidelity, companded channels. Channels 1-40 are standard non-companded channels offering compatibility with other manufacturers' receivers. Channels 41-60 are high-fidelity, companded channels for use with COMTEK transmitters. COMTEK transmitters automatically transmit the proper modulation when set to channels 1-40 for standard non-companded or 41-60 for high-fidelity companded channels.

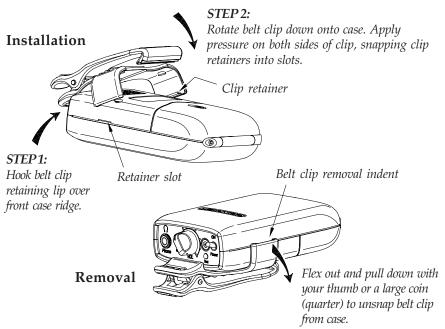
After you have determined the channel on which you are going to operate, position the two rotary switches to indicate the channel. The left rotary switch is for *tens* and the right rotary switch is for *ones*. To select channel 41 (216.0250 MHz), position the left rotary switch to point to 4 (X10), and position the right rotary switch to point to 1 (X1). *Refer to frequency charts on pages 14 and 15 for selectable frequencies.*



2.5 Battery Removal / Replacement



2.6 Belt Clip Installation / Removal



Battery Charger

The NBC 9-3-2 charger supplied with the AT-216 system will recharge Nickel-Metal Hydride (Ni-MH) batteries.

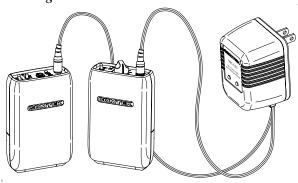
Ni-MH batteries are supplied with the AT-216 system.

Note: Do not attempt to charge alkaline batteries with the NBC 9-3-2 charger.

To charge the AT-216 system, please take the following steps:

- 1. Make sure that **rechargeable** batteries are installed in the receiver and transmitter. (Alkaline batteries must not be charged with the NBC 9-3-2 charger. Alkaline batteries are only installed for initial use.)
- 2. Make sure that M-216 transmitter and the PR-216 receiver are turned off.
- 3. Insert the NBC 9-3-2 charger into a 115 volt AC outlet.
- 4. Plug the charger output cords into the output receptacle of the PR-216 receiver and auxiliary input receptacle of the M-216 transmitter. (The red indicator on the receiver and the green indicator on the transmitter should **not** be lit.)
- 5. Note that the red charging indicators on the NBC 9-3-2 **should** be lit.
- 6. Allow the batteries to charge for 14 hours, which provides 8 hours of operation when Ni-MH type batteries are used.

Note: Excessive charging may reduce the life cycle expectancy and capacity of the batteries. Batteries should never be charged more than 72 hours with the NBC 9-3-2 charger.



Non-Companded Channels For use with COMTEK and other manufacturers

(Educational Standard)

CHANNEL (SWITCH POSITION)	FREQUENCY
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	216.0125 MHz
01	216.0375 MHz
02	
03	216.0625 MHz
04	216.0875 MHz
05	216.1125 MHz
06	216.1375 MHz
07	216.1625 MHz
08	216.1875 MHz
09	216.2125 MHz
10	216.2375 MHz
11	216.2625 MHz
12	216.2875 MHz
13	216.3125 MHz
14	216.3375 MHz
15	216.3625 MHz
16	216.3875 MHz
17	216.4125 MHz
18	216.4375 MHz
21	216.5125 MHz
22	216.5375 MHz
23	216.5625 MHz
24	216.5875 MHz
25	216.6125 MHz
26	216.6375 MHz
27	216.6625 MHz
28	216.6875 MHz
29	216.7125 MHz
30	216.7375 MHz
31	216.7625 MHz
32	216.7875 MHz
33	216.8125 MHz
34	216.8375 MHz
35	216.8625 MHz
36	216.8875 MHz
37	216.9125 MHz
38	216.9375 MHz
39	216.9625 MHz
40	216.9875 MHz

Companded Channels

For use with COMTEK equipment only

CHANNEL (SWITCH POSITION)	FREQUENCY
41	216.0250 MHz
42	216.0750 MHz
43	216.1250 MHz
44	216.1750 MHz
45	216.2250 MHz
46	216.2750 MHz
47	216.3250 MHz
48	216.3750 MHz
49	216.4250 MHz
51	216.5250 MHz
52	216.5750 MHz
53	216.6250 MHz
54	216.6750 MHz
55	216.7250 MHz
56	216.7750 MHz
57	216.8250 MHz
58	216.8750 MHz
59	216.9250 MHz
60	216.9750 MHz
61	216.0250 MHz
62	216.0750 MHz
63	216.1250 MHz
64	216.1750 MHz
65	216.2250 MHz
66	216.2750 MHz
67	216.3250 MHz
68	216.3750 MHz
69	216.4250 MHz
71	216.5250 MHz
72	216.5750 MHz
73	216.6250 MHz
74	216.6750 MHz
75	216.7250 MHz
76	216.7750 MHz
77	216.8250 MHz
78	216.8750 MHz
79	216.9250 MHz
70	216.9750 MHz

PR-216

216 MHz NON-COMPANDED FREQUENCY GROUPS

Compatible with COMTEK and other manufacturers

GROUP A

CHANNEL	FREQUENCY
1	216.0125 MHz
9	216.2125 MHz
15	216.3625 MHz
24	216.5875 MHz
31	216.7625 MHz
36	216.8875 MHz

GROUP B

CHANNEL	FREQUENCY
4	216.0875 MHz
10	216.2375 MHz
14	216.3375 MHz
32	216.7875 MHz
35	216.8625 MHz
40	216.9875 MHz

GROUP C

CHANNEL	FREQUENCY
3	216.0625MHz
5	216.1125 MHz
12	216.2875 MHz
22	216.5375 MHz
38	216.9375 MHz

GROUP D

CHANNEL	FREQUENCY
17	216.4125 MHz
23	216.5625 MHz
30	216.7375 MHz
34	216.8375 MHz
39	216.9625 MHz

PR-216

216 MHz COMPANDED FREQUENCY GROUPS

For COMTEK equipment only

GROUP1

CHANNEL	FREQUENCY
41	216.0250 MHz
44	216.1750 MHz
51	216.5250 MHz
55	216.7250 MHz
60	216.9750 MHz

GROUP 2

CHANNEL	FREQUENCY
42	216.0750 MHz
49	216.4250 MHz
53	216.6250 MHz
58	216.8750 MHz

GROUP 3

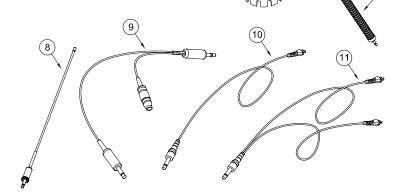
CHANNEL	FREQUENCY
43	216.1250 MHz
46	216.2750 MHz
51	216.5250 MHz
57	216.8250 MHz

GROUP 4

CHANNEL	FREQUENCY
44	216.1750 MHz
47	216.3250 MHz
54	216.6750 MHz
59	216.9250 MHz

Optional Accessories

- 1. NBC 9-3-12 Digital 12 station fast charger
- 2. BC-216 Snap-on belt clip (supplied with AT-216 kit)
- 3. HM-100H Headworn unidirectional electret microphone
- 4. LS-3 High efficiency headphones
- 5. CC-24 Cochlear speech processor cord (two types available)
- 6. TM-10 Conference table microphone adaptor
- 7. HH-185 Hand-held microphone boom adaptor
- 8. LW-216 Rigid specialty antenna
- 9. CB-48AT Attenuator adaptor cord
- $10.\,EDC\,\,Euro\,direct\,audio\text{-input}\,single\,cord$
- $11.\,EDC\text{-}V\,\,Euro\,direct\,audio\text{-}input\,"V"\,cord$



Batteries and Battery Charging

If...

Test indicator lamp doesn't illuminate when units are turned on...

Then...

- If rechargeable batteries are used, ensure that they have been allowed to charge at least 14 hours to a full charge. Verify that the charging indicator lamps are illuminated when the charging plugs are plugged into the units. The units' power switches must be in the "off" position for charging.
- If the test indicator lamp still does not illuminate after a full charge, verify that the system is operational by using a new alkaline battery. If the system is operational with alkaline batteries, the rechargeable batteries or charger may need to be replaced.
- The AT-216 system must be returned to COMTEK for service if the test indicator lamps do not illuminate when new alkaline batteries are used.

Transmitter Audio Problem

If...

There is no visual indication on the "Voice" modulation level indicator when speaking into the microphone of the M-216 transmitter...

Then...

- Turn up the microphone gain setting clockwise until the voice modulation indicator illuminates with speech level.
- Make sure the optional muting switch is in the "Mic on" position.
- Check the CM-183RT microphone for a broken or frayed microphone cord that may cause intermittent operation.
- Test the modulation indicator with the auxiliary audio input using a line level signal and the CB-36ST auxiliary audio input cable to verify normal operation. If the auxiliary audio input activates the voice modulation indicator normally, the CM-183RT microphone may need to be repaired or replaced.
- The AT-216 system must be returned to COMTEK for service if the auxiliary input test does not activate the voice modulation indicator.

Noisy or Distorted Audio

If...

You hear excessive background noise or distortion...

Then...

- Turn the AT-216 FM system "off" and leave the hearing aids on in the "T" position to determine if the noise or distortion is still present in the hearing aids. If the noise or distortion is still present, the hearing aids will need to be checked by your hearing aid specialist. If the noise or distortion is not present in the hearing aids, check the following items:
 - **1.** Check batteries in the receiver and transmitter. (The cut-off voltage for normal operation is 6 volts.)
 - Check that the M-216 transmitter and PR-216 receiver are set to the same channel and that the compand "Auto / Off" switch is set to the "Auto" position.
 - **3.** Check the microphone gain setting on the M-216 transmitter for normal operation with the "Voice" modulation indicator (see page 6 section 2.1 B(3)).
 - **4.** Monitor the system using the SM-N earphone assembly plugged directly into the PR-216 receiver.
 - **5.** Operating at distances greater than 200 feet may cause excessive noise.
 - **6.** Coiling or bunching the microphone cord of the M-216 transmitter will reduce the range of the system and could cause excessive noise.
 - 7. Microphone is defective. It is possible to damage the microphone with excessive heat or moisture.
- If the above steps do not correct the problems, the AT-216 system must be returned to COMTEK for service.

Channel Compatibility

If...

Two transmitters are operating on the same channel within 100 feet from one another, you will experience interference which sounds like distorted voices, static, or chirping sounds ...

Then...

 When only two transmitters are operating in the same proximity (within 100 feet) any different channel may be selected for the other transmitter.

If...

More than two transmitters are operating in the same proximity...

Then...

- The channels must be selected from the same frequency groups in section 4 (see page 15).
- Up to 5 channels may operate in the same proximity (within 100 feet).
- Each group of 5 channels may operate together if each group is separated by more than 100 feet.
- Same channel groups may be used together if they are separated by more than 200 feet.

Note: One transmitter can be used with several receivers set to the same channel, but one receiver cannot be used with several transmitters set to the same channel! This type of incorrect usage will cause cracking and chirping noises making the reception unacceptable.

Care and Maintenance

Avoid excessive heat. Don't leave the transmitter or receiver in hot sun, on a radiator, or near other sources of high temperature.

Avoid rough handling. The receiver and transmitter may be damaged if dropped. Use the snap-on belt clip whenever possible.

Remove batteries when you store unit for a long time. When battery becomes exhausted, it may leak and damage the instrument. Even a new battery may leak because of a slight imperfection. Occasionally check for leakage.

Keep battery terminals and contacts clean. Inspect to ensure that they are not corroded. If they are, polish them with a pencil eraser.

Inspect cords and connectors frequently—they are subject to wear. Replace frayed cords before they break.

F.C.C. Statement

This transmitter is authorized by rule under the low power radio service (47 C.F.R. Part 95) and must not cause harmful interference to TV reception or United States Navy SPASUR installations. You do not need an F.C.C. licence to operate this transmitter. This transmitter may only be used to provide: auditory assistance to persons with disabilities, persons who require language translation, or persons in educational settings; health care services to the ill; law enforcement tracking services under agreement with a law enforcement agency; or automated maritime telecommunications system (AMTS) network control communications. Two-way voice communications and all other types of uses not mentioned above are expressly prohibited.

Warranty

COMTEK transmitters and receivers are warranted to be free from defects in workmanship and material under normal stand-alone use and conditions for a period of two years from date of original purchase. Items such as headphones, earphones, neckloops, and cords are warranted to be free from defects in workmanship and material for a period of 90 days from the date of original purchase. Batteries are not covered by this warranty. Damage due to abnormal use, extreme conditions, misuse, use of the product as a component of another product, ill treatment and unauthorized modification and repairs are not covered by this warranty. COMTEK is not liable for any consequential or punitive damages arising out of any failure of the equipment to perform as intended. COMTEK shall bear no responsibility or obligation with respect to the manner of use of any equipment sold by it. COMTEK SPECIFICALLY DISCLAIMS AND NEGATES ANY WARRANTY OF MERCHANTABILITY OR FITNESS OF THE PRODUCT FOR A PARTICULAR PURPOSE INCLUDING, WITHOUT LIMITATION, ANY WARRANTY THAT THE USE OF SUCH EQUIPMENT FOR ANY PURPOSE WILL COMPLY WITH APPLICABLE LAWS AND REGULATIONS.

Service Policy

Warranty repairs must be done by COMTEK. Only factory technicians are authorized to perform warranty service on the AT-216 system. Before returning the AT-216 for service, a Return Authorization Number should be obtained from the service department by calling 1-800-496-3463 or 1-801-466-3463. Return the unit to the factory with the original or comparable packing. COMTEK will pay for insurance and ground return shipping costs in the United States for all warranty service.



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