

TELEX

ASCEND



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List of Effective Pages

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Purpose of Manual

This manual, Bosch part number F.01U.326.850, contains information for the overhaul and servicing of the ASCEND headset/headphone.

Technical Support

A liaison between the customer and factory is provided by the Bosch Product Support Department. Consultation and assistance on technical problems, part information, and availability of local and factory repair facilities is available. When writing, include all information concerning problem and mail to:

Bosch Communications, Inc.

8601 Cornhusker Hwy
Lincoln, NE 68507 U.S.A.

Attn: **Aircraft Product Support Mgr.**

Telephone: 877.863.4168

Parts Ordering

Replacement parts may be ordered from our parts department. When ordering, please include the following information:

- Model Number
- Part Description
- Part Number
- Quantity

Mail To:

Bosch Communications, Inc.

8601 Cornhusker Hwy
Lincoln, NE 68507 U.S.A.

Attn: **Parts Department**

Telephone: 800.553.5992
Fax: 402.467.3279
E-mail: repair.lincoln@us.bosch.com

Repairs

In order to maintain the FAA certification, all repairs to the headset must be made only by persons authorized under Part 43 of the Federal Aviation Agency regulations. Bosch offers full support and repair.

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Description and Specifications

1.0 Description and Specifications

1.1 General Description

The ASCEND is a dual-sided, modular aviation headset with ANR (Active Noise Reduction). Installation options include a dual plug or a XLR connector. The modular design allows users to interchange modules to achieve the best headset for different environments. Alternate modules allow for connection to a GPS, a MP3 player, and many other audio devices.

1.2 Models Covered

Model Number	Description	Connector and Wiring Used
PRD000252100	ASCEND Headset, Dual-sided ANR w/ mic	PJ-068 connector Figure 3 on page 19.
PRD000252150	ASCEND Headset, Dual-sided ANR w/ mic	XLR connector Figure 4 on page 19

1.3 Optional Modules

Electret Microphone, Dual Plugs

Electret Microphone, XLR Connector

Filler

Music, No Mic, 3.5mm Plug -audio input module?

1.4 Specifications

Headset:

XLR panel power / input power
6mA @ 28Vdc

Speaker:

Frequency Response: ± 6 dB, 350Hz - 3kHz
Distortion: <10% @ 110dB SPL, 350Hz - 3kHz
Sensitivity: 90 $\pm$ 5dB SPL/mW (standard volume setting)
Impedance at Plug: 600 $\Omega \pm 20$ %
Overload: 300mW @ 1kHz, 8hr
Acoustic Quality: No spurious sounds with 10mW to speaker, 350Hz - 6kHz
Headsets and Handsets with Active Circuits: Meets speaker requirements with ANR on or off.

Microphone:

Frequency Response: 100Hz-10kHz per DO-214 fig. 2-1
Distortion: <5% @ 114dB SPL, 350Hz - 6kHz
Sensitivity: -28 $\pm$ 3dBV/Pa @ 1kHz
Noise Level: <1mV RMS
Headset/handset Isolation: <2mV at mic with 10mV to speaker

Insulation Resistance:

> 10M Ω between exposed materials and electrical circuit

Cord:

Flexibility: No damage when coiled
Connector Flexibility: > 25,000 cycles
Pullout Strength: > 10kg

Drop Resistance:

No failures after 12 drops from 1m onto concrete floor

Final Distortion:

Meets mic and speaker distortion requirements after applicable environmental tests of DO-160

Noise Reduction (where applicable):

Up to 12dB noise reduction between 100Hz to 2000Hz
Receives power from boom microphone connection (microphone equipped versions only)

Plugs:

Dual Plug:
Headphone plug: .250 in. diameter, 2 conductor plug
Tip: SPK + (white)
Sleeve: SPK - (black/shield)

Microphone plug:

Ring: Mic + (white)

Sleeve: Mic - and Mic Shield (blue/shield)

Tip: N/C

XLR Plug:

5-pin, male plug:

Pin 1: SPK + (yellow)

pin 2: SPK - (black/shield outer)

Pin 3: Mic + (white)

Pin 4: Mic - and Mic Shield (blue/shield inner)

Pin 5: Power (green)

Music Plug:

3.5 mm, 3 conductor plug

Tip: Left (yellow)

Ring: Right (red)

Sleeve: Ground (black)

Gross Weight:

5 - 8 oz. (no battery)

Cord Length:

1.8m (straight)

Color:

Black

TABLE 1. Receiver Frequency Response (All Models)

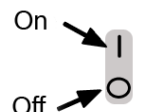
Frequency	dB above/below 1K ref.	Reference Tolerance
350Hz	2	±6dB
400Hz	4	±6dB
500Hz	6	±6dB
600Hz	10	±6dB
700Hz	11	±6dB
800Hz	9	±6dB
900Hz	5	±6dB
1000Hz	0	±6dB
2000Hz	-13	±6dB
3000Hz	-15	±6dB

1.5 Double-Sided Headset



FIGURE 1. Double-sided and ANR Double-Sided Reference View

1. Headset Slider
2. Headband Cushion
3. ANR Switch (ANR equipped module only)



NOTE: The switch label is used to determine the on and off position for ANR .

4. Battery Module/Filler Module
5. Ear Cup Cushions
6. Microphone Module
7. Microphone Windscreen
8. Side Pads

Disassembly/Assembly

2.0 Disassembly/Assembly

The following procedures allow for disassembly of the ASCEND headset. (see Figure 2). For numbered parts, see “Parts List” on page 17.

NOTE: All modules should be replaced, not repaired.

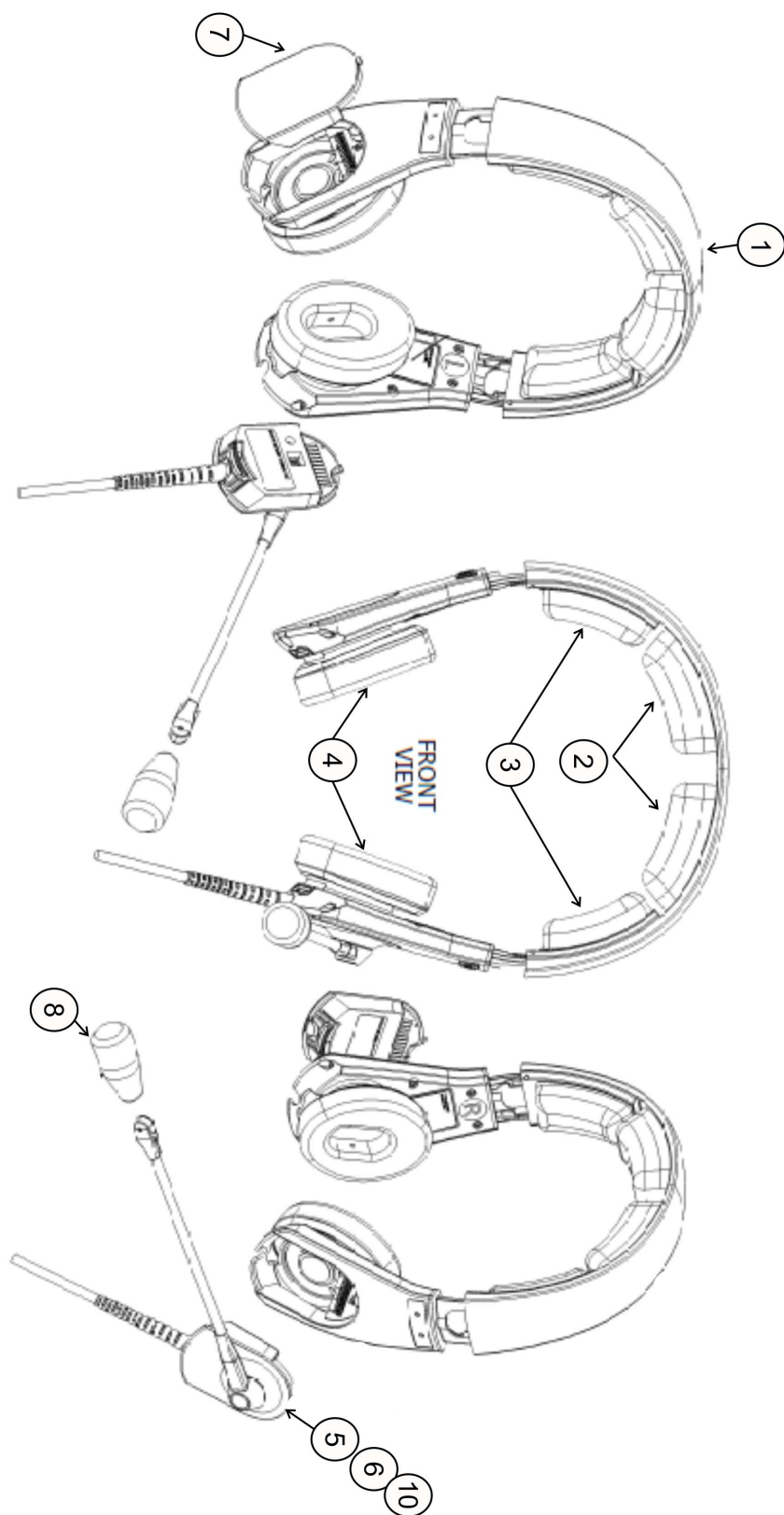


FIGURE 2. PRD000252

2.1 Remove and Replace Modules

All modules are removed and replaced the same way.

IMPORTANT: When removing a module, put only enough pressure on the module release button to pop the module out. The module release button is designed to be used with fingers only.
Do not use any sharp objects or tools to press the module release button.

To **remove a module**, do the following:

1. Press the **module release button** located at the bottom of the ear shell.
The module pops up from the ear shell.

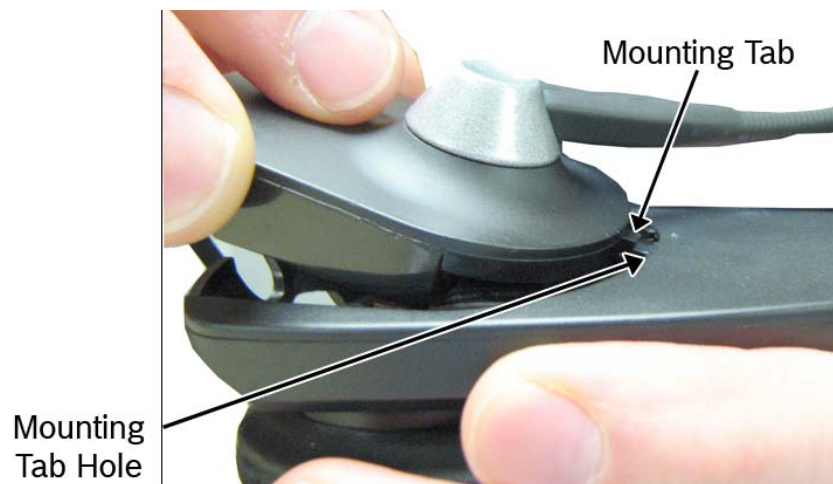


2. Slide the **module** out and up taking care to clear the mounting tab from the mounting tab hole.



To **replace a module**, do the following:

1. Align the **mounting tab** with the mounting tab hole.



2. Slide the **module** into place.
3. Press down on the **module**, snapping it into the ear shell.



2.2 Replace the Ear cup and Headband Cushions

There are two cushion replacement points on the Ascend Headset; two ear cup cushions and ~~one (1) headband cushion~~ (three headband cushions?)

To **replace the ear cup cushion**, do the following:

1. Grasp the **old ear cushion** and pull it **off the ear cup**.
2. Starting at the top of the ear cup, place the **top part of the back flap of the new ear cushion** over the top lip of the ear cup.

NOTE: The ear cup cushion hole orients to the bottom of the ear cup.

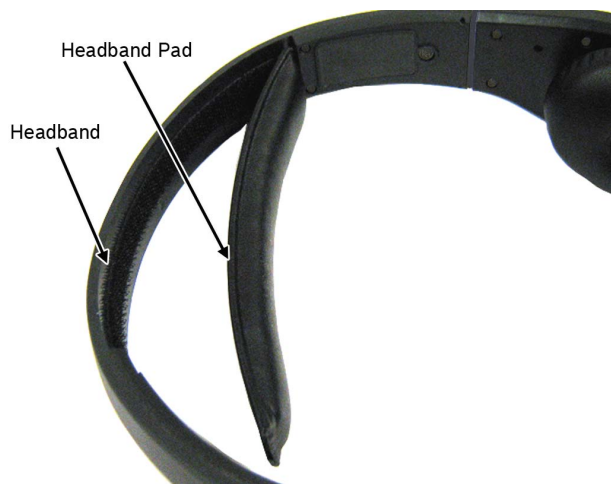


3. Using your fingers, work the **back flap of the ear cushion** around the ear cup.
4. Carefully pull the **bottom of the ear cushion** over the bottom lip of the ear cup.

To **replace the one-cushion version headband cushion**, do the following:

~~Is this version still available? One headband cushion?~~

1. Grasp the **headband cushion**.
2. Pull the **old cushion** off the headband.



3. Align the **new headband cushion (loop)** to the headband loop material.
4. Firmly press **the new headband cushion** in place.

To **replace the three-cushion version headband cushion**, do the following:

1. One by one, grasp the **headband cushions**.
2. Pull the **old cushions** off the headband.

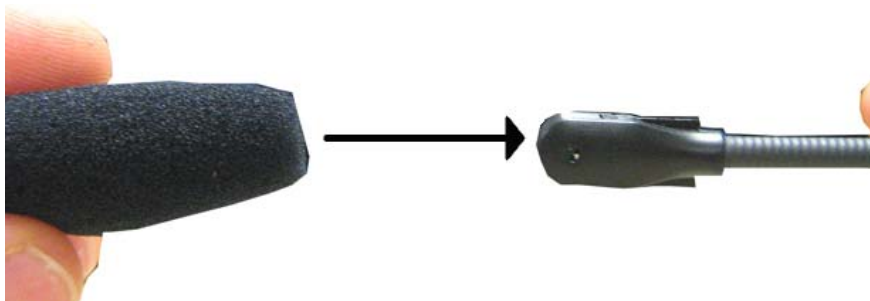


3. Align the **new top cushion** to the top of the headband.
4. Align the **right side cushion** to the right side of the headband.
5. Align the **left side cushion** to the left side of the headband.
6. Remove the **protective covering on the back of the cushions**.
**I added this step because it seems these cushions have tape/glue on the back. Is this correct?*
7. Firmly press the **new headband cushions** in place.

2.3 Replace the Windscreen

To **replace the wind screen**, do the following:

1. Remove the **existing windscreen** from the boom mic and throw away.
2. Gently push the **new windscreen** over the boom mic.



*Parts List***3.0 Parts List****3.1 General**

When replacing parts, consult Figure 2 on page 12 and the parts list.

ASCEND, Catalog Number PRD000252 (XXX) F01U149615

ITEM	CTN	YSPR	Description	000252100	000252150
1	S-F01U324292	F01U324292	HEADSET FRAME	1	1
2	S-F01U303134	F01U303134	HEAD PAD	1	
3	S-F01U303133	F01U303133	HEAD PAD, SIDE	2	2
4	S-PAR000775000	F01U289365	EAR CUSHION	2	2
5	S-ASY000858000	F.01U.289.364	MODULE ELECTRET MIC DUAL	1	
6	S-ASY000858001	F.01U.289.363	MODULE ELECTRET MIC XLR		1
7	S-ASY000861000	F.01U302516	MODULE, FILLER	1	1
8	S-PAR000866000	F.01U.268031	WINDSCREEN	1	1
9	590637000	F.01U.157.438	CLOTHING CLIP	1	1
10	*		MUSIC MODULE		
11	591622000	F01U151432	MICROPHONE ELECTRET	2	2
12	54857101	F01U150106	WHITE WIRE	2	2
13	54857103	F01U150110	RED WIRE	2	2
14	54857106	F01U150116	BLUE WIRE	2	2
15	54857102	F01U150108	BLACK WIRE	2	2
16	64305000	F01U110016	SPRING	4	

17	63989001	F01U152073 YSPR/YSPR	Y CORD HOUSING	2	2
18	63992001	F01U152075 YSPR/YSPR	PC BOARD	1	1
19	591474000	F01U151386	Microphone, AOI	1	1
20	590113001	F01U151177	MIC SEAL	1	1
21	63985001	F01U152062	WIRE-MAGNET 2 CONDUCTOR	.687	.687
22	35398005	F.01U.146873	NC_5MX PLUG BAG		1

* The music module only used on F01U149619/F01U149621.

Sheet F01U149615 says these models (500, 500 (and 900)) are active, but they are not in SAP

Wiring Diagrams

4.0 Wiring Diagrams

4.1 Dual Plug Connector Wiring Diagram

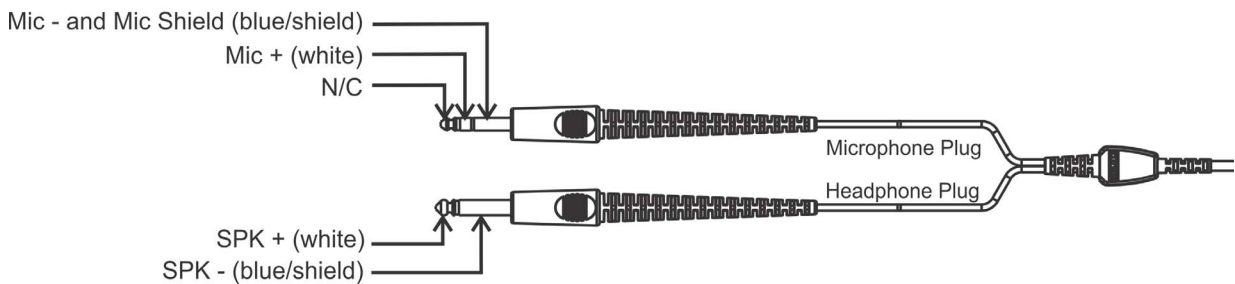


FIGURE 3. Dual Plug Connector Wiring Diagram

4.2 5-pin XLR (male) Connector Wiring Diagram

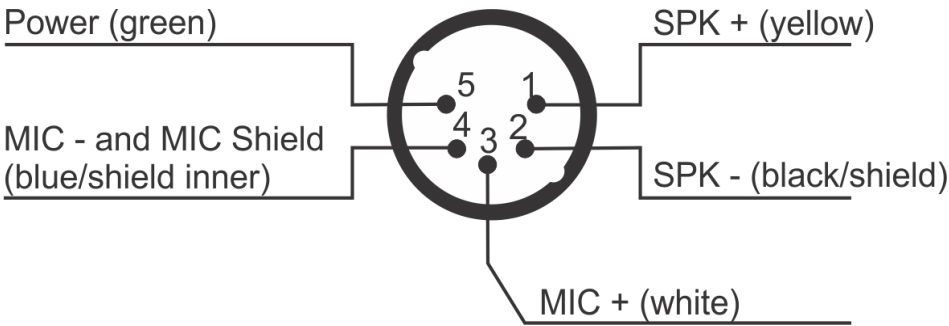


FIGURE 4. 5-pin XLR (male) Connector Wiring Diagram

4.3 Music Connector Wiring Diagram

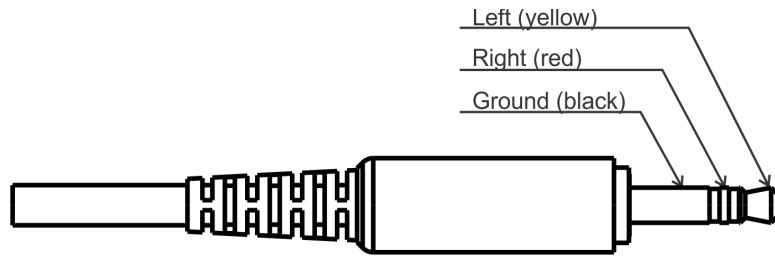


FIGURE 5. Music Connector Wiring Diagram

5.0 Maintenance

5.1 Microphone Validation and Adjustment

Before testing equipment, measure the current of the 12V power supply used to conduct the testing.

- The current should be $4\text{mA} \pm 1\text{mA}$ with sound pressure supplied to the mic and ANR turned on.
- The current should be less than 1mA without sound pressure supplied to the mic and ANR turned off.

NOTE: If the specifications are not met in either power on or power off mode, printed circuit board failure should be suspected, see “Troubleshooting Chart” on page 31.

5.1.1 Microphone/Amplifier Sensitivity Check

The headphone has two operations:

- (1) Passive- power is turned off.
- (2) Active - power is turned on.

All modes tested, unless noted otherwise.

To **test the sensitivity of the microphone**, do the following:

1. Construct a **test circuit**. For more information, see Figure 6.
2. Connect the **test circuit** to the microphone plug of the headset. For more information, see “Wiring Diagrams” on page 19.

NOTE: Verify correct polarity of connections.

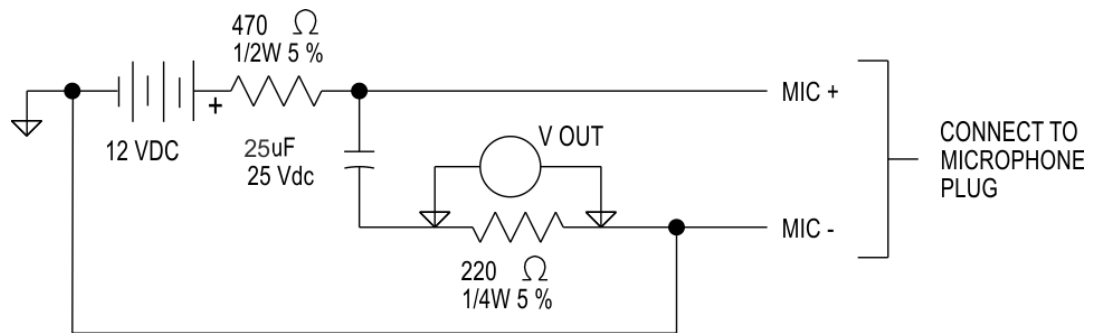


FIGURE 6. Test Circuit

3. Calibrate a **lab microphone**.
4. Place the **calibrated lab microphone** 1/4 inch (6mm) above an artificial mouth (Bruel and Kjaer type 4227).
5. Connect a **signal generator** to the artificial mouth.
6. Adjust for an **output of 114dB SPL at 1kHz @ 1/4 inch** from the opening to the lab microphone.
7. Remove the **lab microphone**.
8. Position the **headset microphone without windscreen** 1/4-inch (6mm) above the output of the artificial mouth.
9. Measure the **output of the headset microphone** with a digital volt meter.

The output measured should be $-28 \pm 3\text{dBV/Pa @ 1kHz}$.

5.1.2 Microphone Sensitivity Adjustment

The microphone gain has been factory-adjusted to the nominal level required for aviation use, and should not require adjustment. Any changes to the microphone gain should be done by a qualified avionics technician.

NOTE: Adjustments should be made in small increments.

To **adjust microphone sensitivity**, do the following:

1. Locate the **gain adjustment trimmer** on the back of the boom mic module.
2. With the cord at the bottom of the module, use a small screwdriver to turn the **gain adjustment trimmer**.

Clockwise adjustment increases output level.



FIGURE 7. Gain Adjustment

5.2 Speaker Validation and Adjustment

5.2.1 Speaker Sensitivity and Frequency Response Verification

NOTE: The headphone has two operations:

- (1) Passive- power is turned off.
- (2) Active - power is turned on.

All modes tested, unless noted otherwise.

Transducer Type:	Dynamic
Transducer Impedance (at the earphone plug):	600 $\pm$ 50 Ω @ 1kHz (double-sided mono, 100dB SPL/mW)
Sensitivity:	600 $\pm$ 20% all other modes (All Models) 90dB SPL $\pm$ 5dB at 1kHz, 1mW input to headset, in low volume setting
Frequency Response:	350Hz - 3kHz $\pm$ 6dB from sensitivity @ 1 kHz

To **measure the speaker**, do the following:

1. Using a B&K type 4152 with 6cc coupler or equivalent, place the **headset speaker** on an artificial ear, fitted with the appropriate coupler.
2. Supply the headset with a **1mW, 1KHz signal** to appropriate connector. See “Wiring Diagrams” on page 19 for connector wiring.
3. Measure **acoustic output of headset** using an audio analyzer. Sensitivity should be 90dB SPL $\pm$ 5dB re. 1mW at 1kHz, headset in low volume setting.
4. Measure and record the **acoustic output over the frequency range of 350Hz to 3KHz**.
The resultant curve should fit the limits as defined in Table 1 on page 9.
5. Repeat **steps 1 through 4** with the second speaker, if applicable.

5.2.2 Speaker Volume Adjustment

NOTE: This feature is not available on the audio input module. (Music module?)

NOTE: To **adjust speaker volume**, do the following:

1. Locate the **dip switch window** on the back of either the boom mic module or the listen only module.
(Is listen only module available? on 2 active Ascend models?)

NOTE: The switches labeled 3 and 4 are used to configure speaker volume.

2. To intensify volume, move **both switches** as close to the numbers 3 and 4 as possible.

3. To normalize volume, move **both switches** as far from the numbers 3 and 4 as possible.

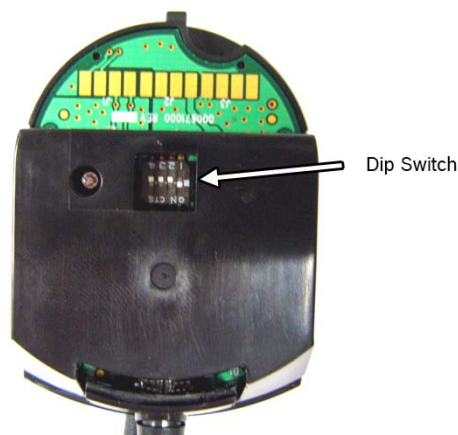
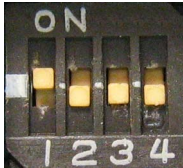
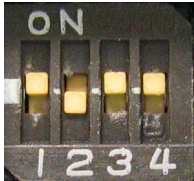


TABLE 2. Speaker Volume Dip Switch Setting

Dip Switch	Description
	Intensified Volume
	Normal Volume

5.2.3 Speaker Mono or Left Only Mode

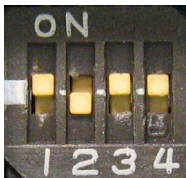
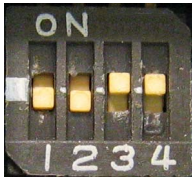
To **configure the headset audio to be Mono or Left Only**, do the following:

1. Locate the **dip switch window** on the back of **either the boom mic module or the listen only module**.

NOTE: The switches 1 and 2 are used to configure Mono or Left Only audio.

2. To set the audio to Mono, move **switch 1** as far away from number 1 as possible.
3. Then, move **switch 2** as close to number 2 as possible.
The headset audio is set to Mono.
4. To set the audio to Left Only Mode, move **both switches** as close to numbers 1 and 2 as possible.

TABLE 3. Mono and Left Only Mode Dip Switch Setting

Dip Switch	Description
	Mono Mode
	Left Only Mode

5.2.4 Active Noise Reduction (ANR Versions Only)

NOTE: Minimum attenuation requirements are not requirements of FAA TSO.

5.2.5 Minimum Attenuation Requirements (Linearize between points)

Frequency (Hz)	Active (dB)	
	Min	Max
200	-8.000	+2.000
300		-1.000
400	-10.000	-2.000
600		-3.000
800	-12.000	-1.000
1000	-12.000	+0.000

5.2.6 ANR Test Procedure

5.2.6.1 Required Equipment

The ASCEND ANR test and adjustment procedure requires the following acoustic test equipment and custom fixture.

1. Audio Test System (for purposes of this procedure the Audio Precision System 2 is referenced)
2. Artificial Mouth (Briel & Kjaer 4227)
3. Artificial Ear with 6cc Coupler (Briel & Kjaer 4153)
4. Supporting hardware for Microphone
5. Supporting hardware and software for audio test system
6. Custom ANR test and adjust fixture

5.2.6.2 Test Setup Block Diagram

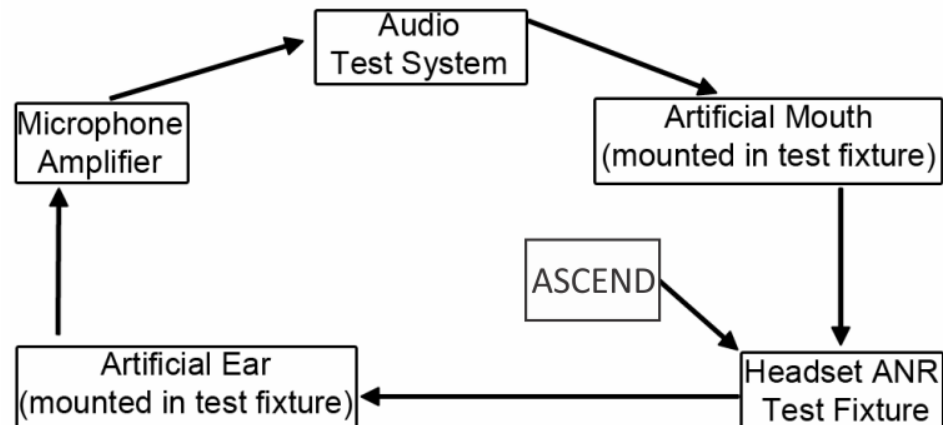


FIGURE 8. Test Setup Block Diagram

5.2.6.3 Custom ANR Fixture

FIGURE 9. Custom ANR Test Fixture with Headset **NEW PHOTO?**

5.2.6.4 Testing ANR

To **test ANR**, do the following:

1. Create a **standard microphone test setup**.
 - Output should be 1V, 400Hz, BP Pink Pseudo noise directly out to artificial mouth mounted to test fixture. See Figure 9
 - Microphone amplifier filter should be set to A-weighting, if available.
 - Frequency sweep should be set to 500Hz–1KHz Bandpass input filter.
2. Adjust **headset** to minimum size.
3. Place **headset** on test fixture. For more information, see Figure 9.

4. Measure the **headset**.
 - With ANR turned off, perform a bandpass sweep, save this file.
 - With ANR turned on, perform a bandpass sweep, save this file.
5. Subtract the **two sweep results (files)**, measured in step 3.
The resulting curve should fit within the limits as shown in “Minimum Attenuation Requirements (Linearize between points)” on page 25.

5.2.6.5 Adjusting ANR

5.2.6.5.1 Set up acoustic test system

To **set up the acoustic test system**, do the following:

1. Create a **standard microphone test setup**.

- Output should be 1V, 600Hz, sine wave directly out to artificial mouth mounted to the test fixture.
- Microphone amplifier filter should be set to A-weighting, if available.

2. Adjust **headset** to minimum size and place on test fixture, as shown in Figure 9.

5.2.6.5.2 Adjust the headset

To **adjust the headset**, do the following:

1. Place **adjustment screwdriver** through top of test fixture into back ANR adjustment pot of the headset.
2. Monitor the **microphone output** on the acoustic test system.
3. Adjust **ANR pot** until the minimum output level is achieved, as shown on the acoustic test system.
4. Perform the **ANR test** to confirm the headset meets the test requirements.

5.3 Mechanical Maintenance

5.3.1 Cleaning the Unit

IMPORTANT: Use a mild detergent or isopropyl alcohol wipes to clean the plastic and metal headset parts and ear cushions (not foam windscreen). Do not soak or allow the cleaner to puddle on the unit and sit for long periods of time. The cleaner should wipe off or evaporate quickly. Do not allow alcohol or any liquid to touch the speaker or microphone element.

Cleaning directions here are considered for external surfaces only. Internal surfaces should not require cleaning. The factory uses isopropyl alcohol to clean parts before shipping, if needed.

Troubleshooting

6.0 Troubleshooting Chart

My ANR (Active Noise Reduction) is no longer working.	• Verify the headset is plugged in. • Verify the ANR switch is in the on position. • If using a battery, verify the battery is charged. • If you have verified the previous bullets, then send the unit in for repair.
My headset does not work with my cell phone or MP3 player.	• Verify the cord for the device is plugged in firmly.
I need parts for my headset.	• Contact technical support for the part number you are looking for.
Technical Support phone number	• 1.800.898.6723 CORRECT NUMBER?
I want to repair my headset at home.	• We have custom developed test equipment which is required to qualify the product and is not available outside of the factory. Home repair may void TSO requirements.
How long will it take my headset to be repaired?	Repair duration is usually 7 to 10 working days plus shipping time back to the customer.

