TELEX

Airman 850

AIRMAN 850 Headset

en Customer maintenance manual

Table of contents

1 General information

1.1 Purpose of manual

This manual, Bosch part number F.01U.264.819, contains information for the overhaul and servicing of the Airman 850 headset.

1.2 Technical support

A liaison between the customer and factory is provided by the Electro-Voice Dynacord 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:

Electro-Voice Dynacord, LLC

Email: customerservice.aviation.nam@keenfinity-group.com

Attn: Aircraft Product Support Mgr.

Telephone: 877-863-4188

1.3 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

Electro-Voice Dynacord, LLC

Attn: **Parts department**

Telephone: 800-553-5992
Fax: 402-467-3279
E-mail: repairservice.nam@keenfinity-group.com

1.4 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.

2 Description

2.1 General description

The Telex Airman 850 is a lightweight aviation headset complete with a boom-mounted, noise-canceling electret microphone.
Lightweight design with soft, pliable cushions, adjustable headband, extended frequency drivers, and a noise canceling electret microphone result in a comfortable headset providing the ultimate in clear, understandable communications.
The Airman 850 headset with boom microphone is approved for aircraft use under FAA TSO's C57a and C58a.

2.2 Models covered

This manual only covers models listed here. Not all of the models listed here are currently active and may not be available in the market. Bosch can, at its discretion, discontinue models and part numbers.

Model number	Description	ANR	Connector
301317-000	Airman 850 Headset, Dual-sided	Yes	PJ-068 (or equivalent) & PJ-055 (or equivalent)
301317-002	Airman 850 Headset, Dual-sided	Yes	XLR
301317-003	Airman 850 Headset, Dual-sided	Yes	PJ-068 (or equivalent) & PJ-055 (or equivalent)
301317-101	Airman 850 Headset, Dual-sided, customer specific	No	PJ-068 & PJ-055
301317-200	Airman 850 Headset, Single-sided	No	PJ-068 (or equivalent) & PJ-055 (or equivalent)
301317-201	Airman 850 Headset, Single-sided, customer specific	No	PJ-068 & PJ-055
301317-300	Airman 850 Headset, Single-sided	Yes	PJ-068 (or equivalent) & PJ-055 (or equivalent)
301317-400	Airman 850 Headset, Dual-sided, customer specific	Yes	PJ-068 (or equivalent) & PJ-055 (or equivalent)
301317-001	Airman 850 Headset, Dual-sided, Single PJ-068	Yes	PJ-068 (or equivalent)

3 Disassembly / Assembly

3.1 Disassembly

The following procedure allows for complete disassembly of the Airman 850 final assembly.

Notice!
The removal process requires the steps to be followed in order. For example, to remove the boom assembly, item 13, all steps before the Removing the Boom Assembly step must be completed and in the listed order.

Assembly is the reversal of the disassembly procedure. Please take care when disassembling to note details that may be required in the assembly process.

3.1.1 Remove cushions (Item 3)

To remove the cushions, do the following:

- Grasp the edge of the cushion where it folds into the ear cup and gently pull up and away from the faceplate.

3.1.2 Remove faceplate assembly (item 4)

To remove the faceplate assembly, do the following:

1. At the same time, push the two (2) catches located in the faceplate out of the way.
2. Rotate the faceplate assembly approximately 10° counterclockwise.
3. Carefully, pull the faceplate assembly away from the housing (item 6 or 7).

Notice!
Do not pull more than 12 mm away from housing at this time.

4. Using a soldering iron, carefully disconnect the white and red wires from the speaker solder terminals.

Notice!
Be careful not to touch plastic housing with soldering iron.

5. Remove the faceplate assembly.

3.1.3 Remove sleeve (item 8)

To remove the sleeve, do the following:

1. Carefully slide a small tweezers or pick under the sleeve.

Notice!
Avoid touching or scratching the circuit board, item 9 or 10.

2. Gently pry the sleeve up and away from the circuit board.

Notice!
If necessary, prying up the sleeve in several locations may be required to free the sleeve from the housing (item 6 or 7), and the circuit board.

3. Once freed, carefully remove the sleeve from the housing.

3.1.4 Remove boom assembly / cover (item 13)

To remove the boom assembly/cover, do the following:

1. Insert a tweezers or small flat head screwdriver between the circuit board (item 9) and the housing (item 6), gently pushing the cover away from the housing.

Notice!
It may be necessary to push around the housing in several locations to get the cover snaps to free themselves from the housing.

2. Carefully desolder the four (4) cord unit wires from the circuit board (boom side only).
3. Gently pry the circuit board away from the cover being careful not to break the boom wires hidden on the other side.
4. Remove the cover foam (item11).
5. Once the board is free from the cover, desolder the three (3) boom wires from the circuit board(boom side only)
6. Remove the circuit board.

Notice!
The board is still attached to the overhead wires (dual-side versions only).

3.1.5 Removing the circuit board (item 9 or 10)

Follow the steps in *Remove boom assembly / cover (item 13), page 8*.

- Disconnect the four overhead wires (dual-side versions only).

Refer to

– *Remove boom assembly / cover (item 13), page 8*

3.1.6 Removing the housing (item 6 or 7) or temple plate assembly (item 15 or 16) from the headband assembly (item 1)

- Push the housing off the glider assembly (item 2) through the slot in the top of the housing.

Notice!
Care should be taken to not bend the headband assembly or housing during this process, as it may take some force to do.

3.1.7 Removing the glider assemblies (item 2) and glider springs (item 18)

1. Bend the upper metal portion of the glider assembly straight.
2. Gently pull the glider assembly out of the headband assembly (item 1).

Notice!
The glider spring is located under the glider assembly and may spring out if the glider assembly is removed too quickly.

3. Repeat steps 1 and 2 for other side of the headset.

3.1.8 Main cord removal

To remove the main cable on the Airman 850 from the boom side of the headset, do the following:

1. Remove the ear cushion (see *Remove cushions (Item 3)*, *page 7*).
2. Remove the faceplate (see *Remove faceplate assembly (item 4)*, *page 7*).
3. Remove the foam.
4. Remove the driver/faceplate subassembly from PCBA by unsoldering the red and white wires.
5. Remove the sleeve (see *Remove sleeve (item 8)*, *page 7*.
6. Disassemble the housing (item 6) and the cover (item 24) following step 1 of *Remove boom assembly / cover (item 13)*, *page 8*.
7. Remove the main cable from PCBA by unsoldering each of the main cable wires.

3.1.9 Overhead cordage removal

To remove the overhead cordage on the Airman 850, do the following:

1. Remove the overhead cable from the Boom side of the headset
2. Follow the steps of main cord removal procedure.
3. Remove the overhead cable from PCBA by flipping over the board and desolder each wire of the overhead cable.
4. Remove the overhead cable from the Non-boom side of the headset
5. Follow the steps 1 to 5 of main cord removal procedure.
6. Disassemble the housing (item 7) and the cover (item 12) following step 1 of *Remove boom assembly / cover (item 13)*, *page 8*.
7. Remove the overhead cable from PCBA by flipping over the board and desolder each wire of the overhead cable.
8. Remove the overhead cable by pulling it out from one side of the headset.

3.2 Cable Preparation

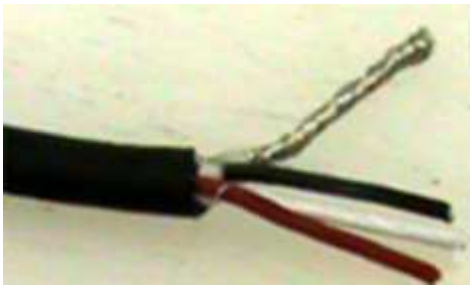
Required tools:

– Wire stripper and cutter

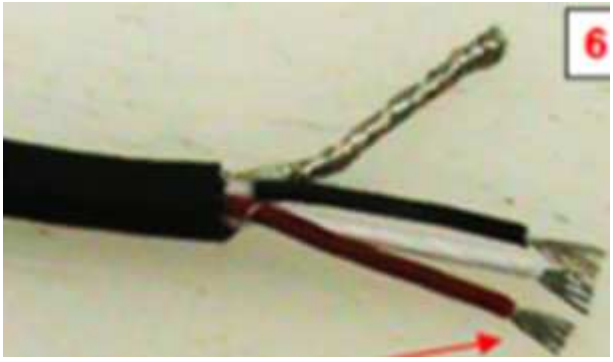
To prepare the cable for soldering, do the following:

1. Cut and remove the jacket from the cable.

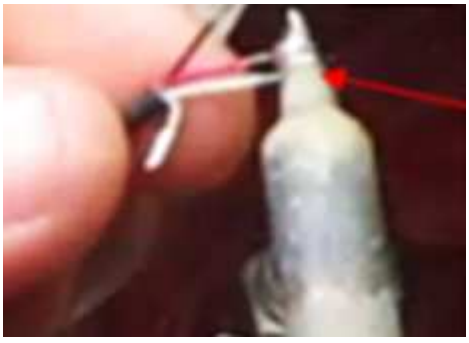
2. Separate the shield from the rest, by twisting the shield on its axis.
   (Skip this step if there is no shield).



3. Cut the shield to length.
   (Skip this step if there is no shield).
4. Using the appropriate dimension of the wire strippers, strip the red, black, and white wires to the desired length (for example, 3/32").



5. With the soldering iron, tin the shield to 1/8" and tin the rest of the exposed wires to the middle of the exposed conductor.



3.3 Assembly

Notice!

Assembly is a reversal of the disassembly procedure.
Steps need to be done exactly the reverse order of the disassembly procedure to ensure proper headset fit and operation.
Please take care to properly align parts and wires to ensure proper operation.
See disassembly procedure, parts lists, assembly diagrams, and wiring diagrams for reference.

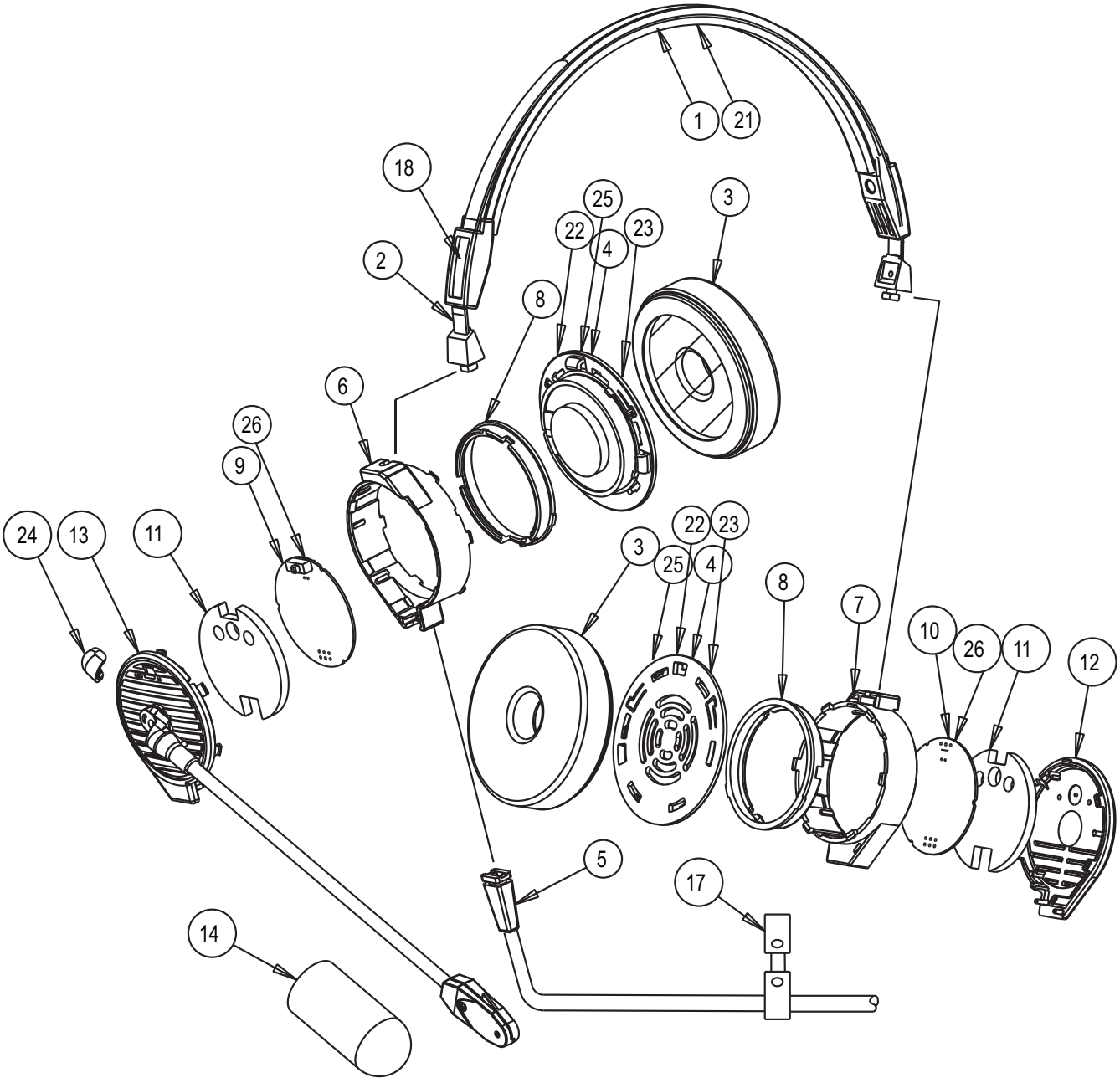


Figure 3.1: Airman 850 headset, dual sided, exploded view

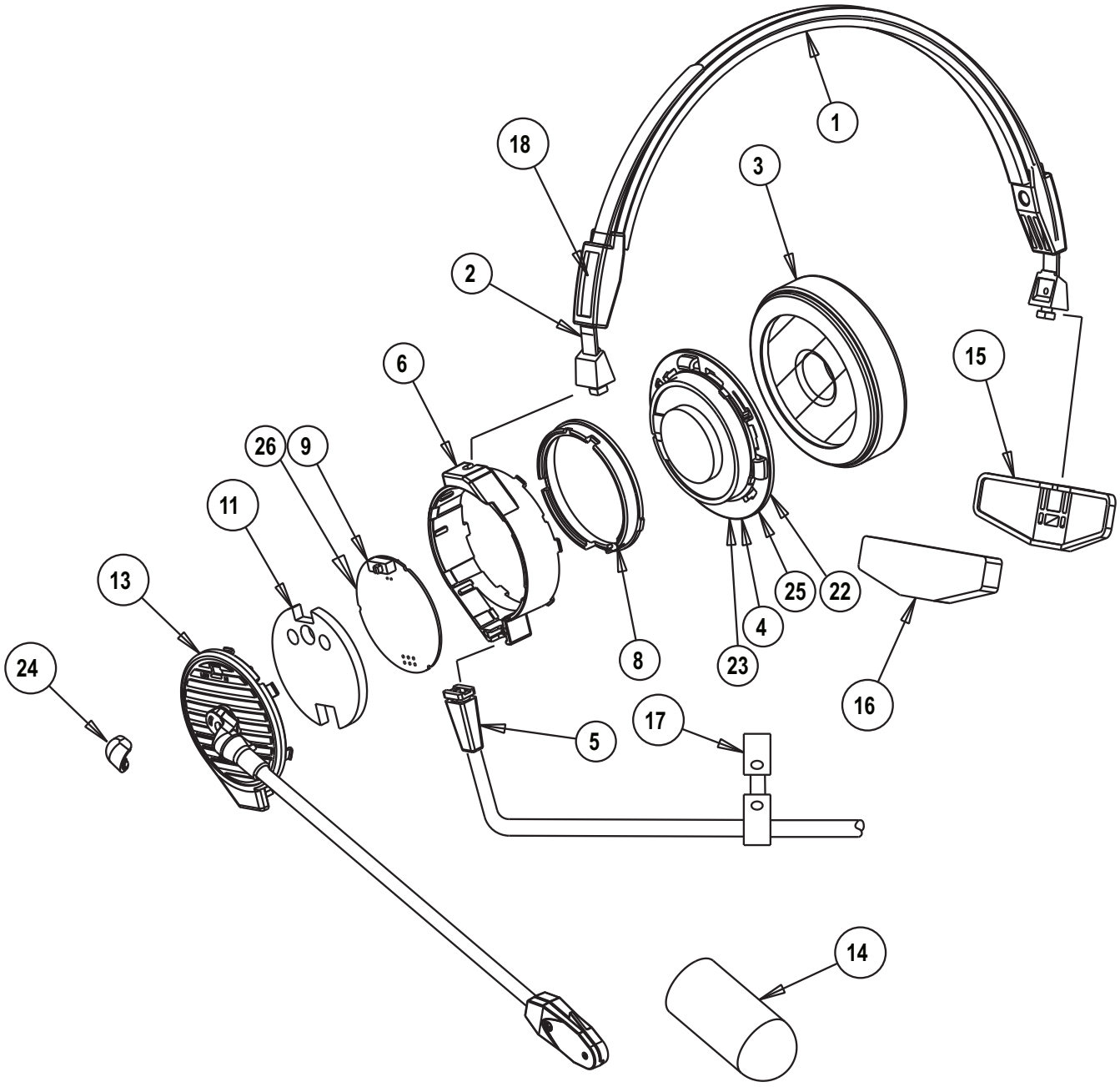


Figure 3.2: Airman 850 headset, single sided, exploded view

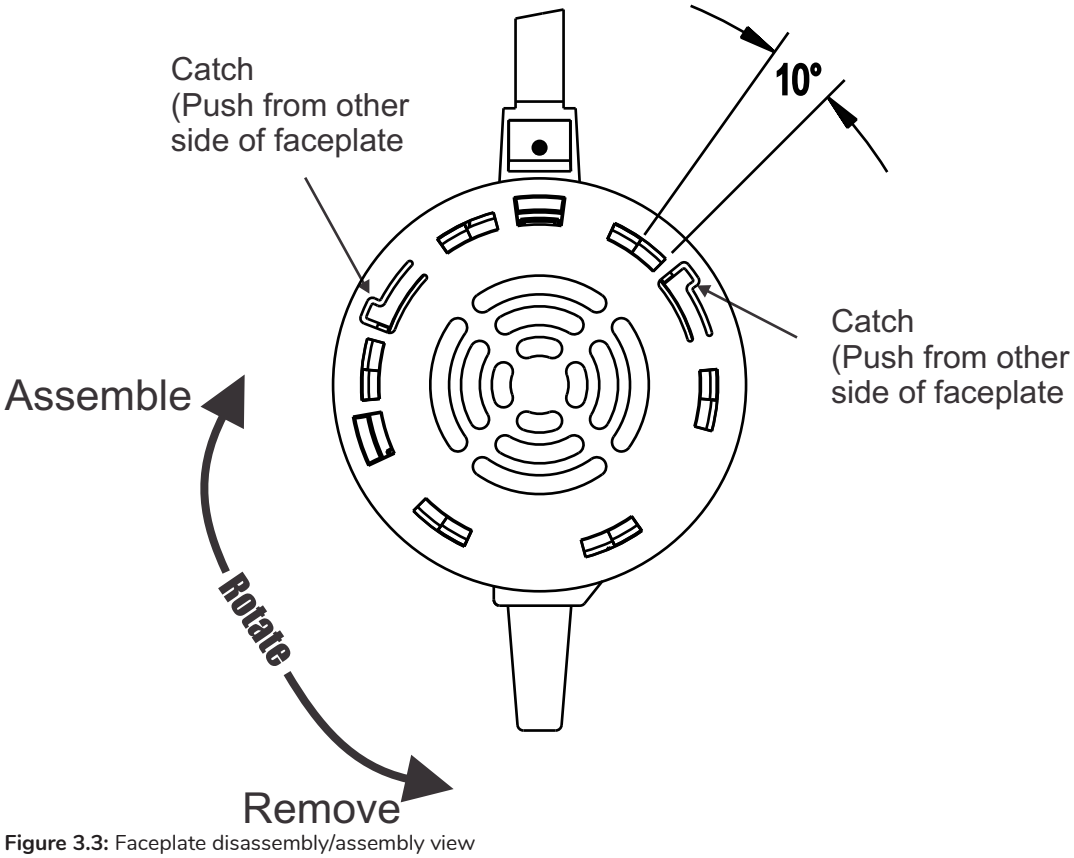
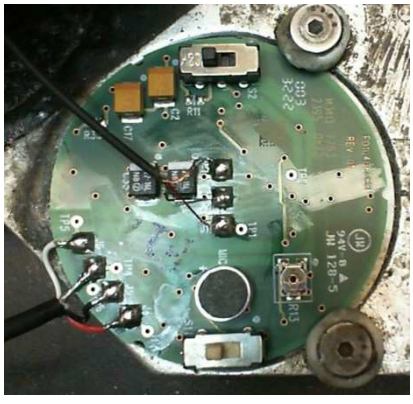


Figure 3.3: Faceplate disassembly/assembly view

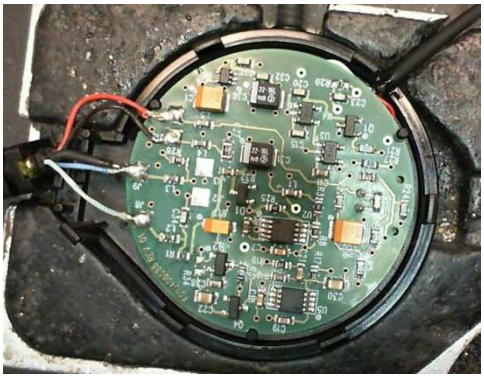
3.4 Soldering PCBAs

Overhead cable to PCBA boom side

YFIN	PCB BOOM SIDE	
F01U117604	F.01U.143.413	
Overhead cable soldering J4 - RED J5 - BLACK J7 - SHIELD J6 - WHITE		

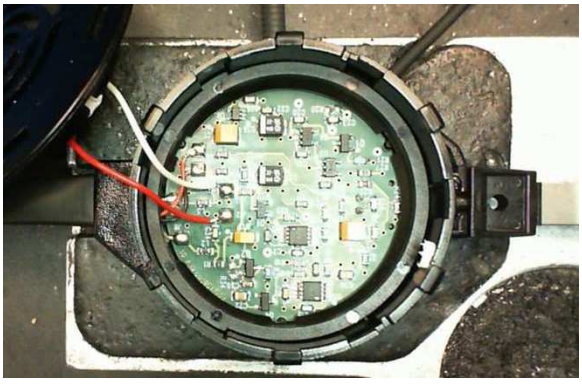
Main cable in the boom side PCBA

YFIN	MAIN CABLE SOLDER
F01U117604	F.01U.184.744
J11 - RED J10 - BLACK J9 - BLUE AND SHIELD J8 - WHITE	



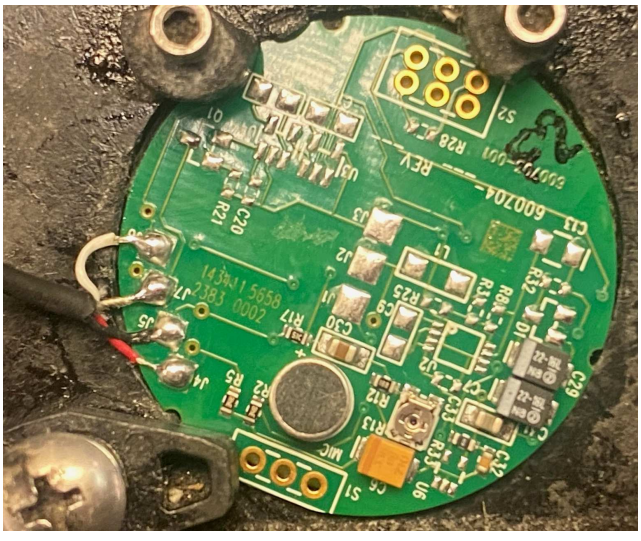
Speaker in the boom side PCBA

YFIN	SPEAKER SOLDER
F01U117604	
J12 - RED J13 - WHITE	



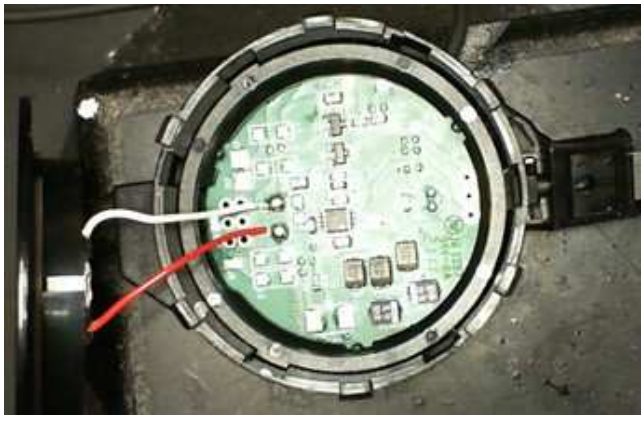
Overhead cable to PCBA non boom side

YFIN	OVERHEAD MAIN CABLE SOLDER
F01U117604	
J4 - RED J5 - BLACK J7 - SHIELD J6 - WHITE	



Speaker on PCBA non boom side

YFIN	SPEAKER SOLDER
F01U117604	
J12 - RED J13 - WHITE	



4 Parts list

4.1 General

When replacing parts, consult the illustrations in *Assembly, page 10* and the parts lists. Choose the parts corresponding to the catalog/model.

Refer to

– *Assembly, page 10*

4.2 Airman 850, catalog number 301317-000; -002; -101; -200; -201; -300; and -400

	CTN / SAP Number Description	000	001	002	003	101	200	201	300	400
1	64318095 / F.01U.152.147 SPA Headband assy, Airman 850 301317-000	1								
	64318107 / F.01U.152.148 SPA Headband assy, Airman 850 301317-002			1						
	64318117 / F.01U.152.149 SPA Headband assembly 301317-003				1					
	64318099 / F.01U.290.347 SPA Headband Assembly 301317-101					1				
	S-F01U329357 / F.01U.329.357 SPA Headband Assembly 301317-300								1	
	S-64318118 / F.01U.216.802 SPA Headband Assembly, Airman 850									1

	CTN / SAP Number Description	000	001	002	003	101	200	201	300	400
2	800801000 / F.01U.153.681 SPP Glider Airman 850	2	2	2	2	2	1	1	1	2
3	800456020 / F.01U.118.432 Ear cushions, leatherette Airman 850 2pc	1	1	1	1	1	1	1	1	1
	ESP-F01U407423 / F.01U.411.086 SPP Ear cushion w/o cloth, A850 (2pcs)	1	1	1	1	1	1	1	1	1
4	800939000 / F.01U.153.698 SPA Faceplate Assembly Airman 850	2	2	2	2	2	1	1	1	2
5	70413002 / F.01U.152.604 SPP Y-Cord PJ055 and PJ068	1					1		1	1
	702171000 / F.01U.152.574 SPA Cord, XLR male 5 pin one end, 82"			1						
	70413011 / F.01U.152.609 SPA Y-cord, 1 PJ, 1 1/4" mono, 66"				1					
6	701613000 / F.01U.415.600 SPP Housing boom side Airman 850	1	1	1	1	1	1	1	1	1
7	701612000 / F.01U.110.129	1	1	1	1	1				1

	CTN / SAP Number **Description**	**000**	**001**	**002**	**003**	**101**	**200**	**201**	**300**	**400**
	SPP Housing non-boom side Airman 850									
8[2]	S-701614000 / F.01U.329.353 SPP Sleeve 10 pcs	1	1	1	1	1	1	1	1	1
9	S-F01U344779 / F.01U.344.779 SPA PCBA w/ ANR mic, boom -000 -001 -400	1	1							1
	S-F01U344780 / F.01U.344.780 SPA PCBA w/ ANR mic, boom side -002			1						
	S-F01U344776 / F.01U.344.776 SPA PCBA w/ ANR mic, boom side -003				1					
	S-F01U344775 / F.01U.344.775 SPA PCBA w/ ANR mic, boom side -300								1	
10	S-F01U344777 / F.01U.344.777 SPA PCBA w/ ANR mic, non-boom side	1	1	1	1					1
11	591385000 / F.01U.151.370 SPP Foam cover (goes on PCBA)	2	2	2	2	2	1	1	1	2
12	701610000 / F.01U.152.470 SPP Cover non-boom side Airman 850	1	1	1	1	1				1
13	800789000 / F.01U.153.679	1	1	1	1	1	1	1	1	1

	CTN / SAP Number Description	000	001	002	003	101	200	201	300	400
	SPA, Boom assy, Airman 850 ANR									
14[1]	S-F01U327249 / F.01U.327.249 SPP WINDSCREEN, ASCEND HDST 1 pc	1	1	1	1	1	1	1	1	1
	800456019 / F.01U.110.451 Windscreen, gray, Airman 850, 1 pc	1	1	1	1	1	1	1	1	1
	AIRMAN7-0900 / F.01U.313.415 Windscreen for Airman 7, 8, 8+, 2pcs	1	1	1	1	1	1	1	1	1
	AIRMAN7-9100 / F.01U.393.946 Windscreens Bulk 100pc Airman 850/7/8/8+	1	1	1	1	1	1	1	1	1
	AIRMAN7-9050 / F.01U.393.945 Windscreens Bulk 50pc Airman 850/7/8/8+	1	1	1	1	1	1	1	1	1
15	70531101 / F.01U.152.640 SPP Temple plate						1	1	1	
16	70533000 / F.01U.110.213 SPP Foam temple pad						1	1	1	
17	590637000 / F.01U.157.438 SPP Clothing clip, dual clips	1	1	1	1	1	1	1	1	1
18[2]	64305000 / F.01U.110.016	2	2	2	2	2	1	1	1	2

	CTN / SAP Number Description	000	001	002	003	101	200	201	300	400
	SPP Glider spring									
	S-F01U327240 / F.01U.327.240 SPP SPRING, AIRMAN 750 / 850 (10pcs)	1	1	1	1	1	1	1	1	1
19[3]	702126000 / F.01U.152.568 SPP Carry case Airman 850	1	1	1	1		1		1	1
	57893000 / F.01U.415.605 SPP Zipper pouch, black nylon, TELEX					1		1		
21[3,4]	53731000 / F.01U.109.567 SPP Cordage 3 conductor	1	1	1	1	1				1
22	54857101 / F.01U.150.106 White wires from PCB to speaker	2	2	2	2	2	1	1	1	2
23	54857103 / F.01U.150.110 Red wires from PCB to speaker	2	2	2	2	2	1	1	1	2
24[5]	701246000 / F.01U.152.411 SPP Boom rotator cap black	1	1	1	1	1	1	1	1	1
25[6]	701664000 / F.01U.152.484 Acoustic cloth	2	2	2	2	2	1	1	1	2
27[3,7]	35398005 / F.01U.146.873 SPP Conn XLR 5M			1						

1. Either part number is acceptable.
2. This item has 10 pieces. Only one or two springs are needed per unit.
3. Not shown.
4. This item is part of the headband assembly (no.1) or can be purchased separately.
5. This item is part of Boom assembly (no. 13) or can be purchased separately.
6. Acoustic cloth is now included as part of no.3. Only one acoustic cloth can be used at a time, either the spare part that needs to be attached to the faceplate (no. 4) or the cloth that is included in the replacement ear cushion.
7. This item is included in F01U152574 but is also sold separately.

5 Wiring diagrams

5.1 Airman 850 wiring diagram (catalog numbers 301317-000; -002; -003; -101; and -400)

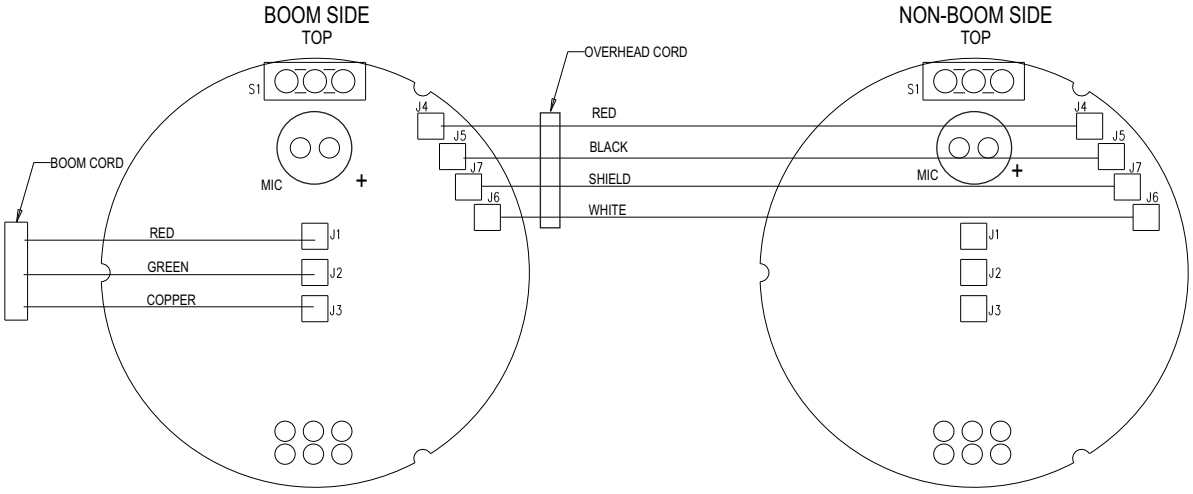


Figure 5.1: Top side, Airman 850, dual sided wiring diagram

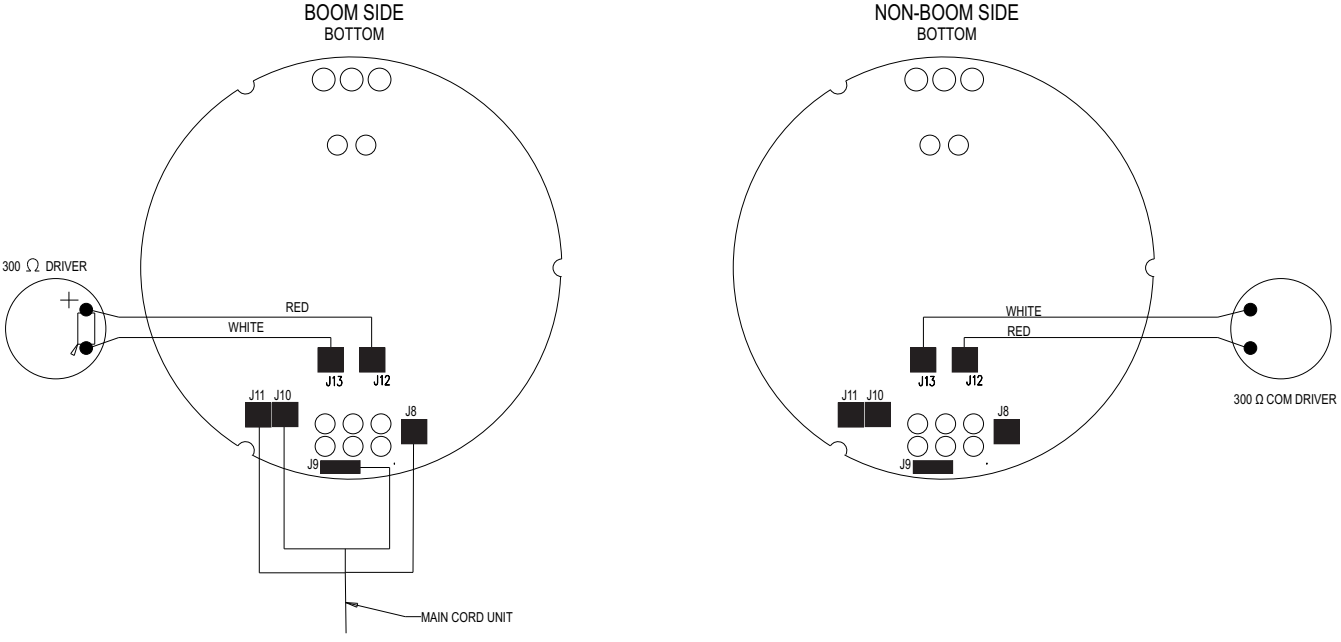


Figure 5.2: Bottom side, Airman 850 headset, dual sided wiring diagram

	-000, -101, -200, -201, -300, -400	**-001, -002**	**-003**
J11	RED	WHITE	RED
J10	BLACK	YELLOW	BLACK & SHIELD
J9	BLUE & SHIELD	BLACK & SHIELD	BLUE
J8	WHITE	RED	WHITE

5.2 Airman 850 wiring diagram (catalog numbers 301317-200; -201; and -300)

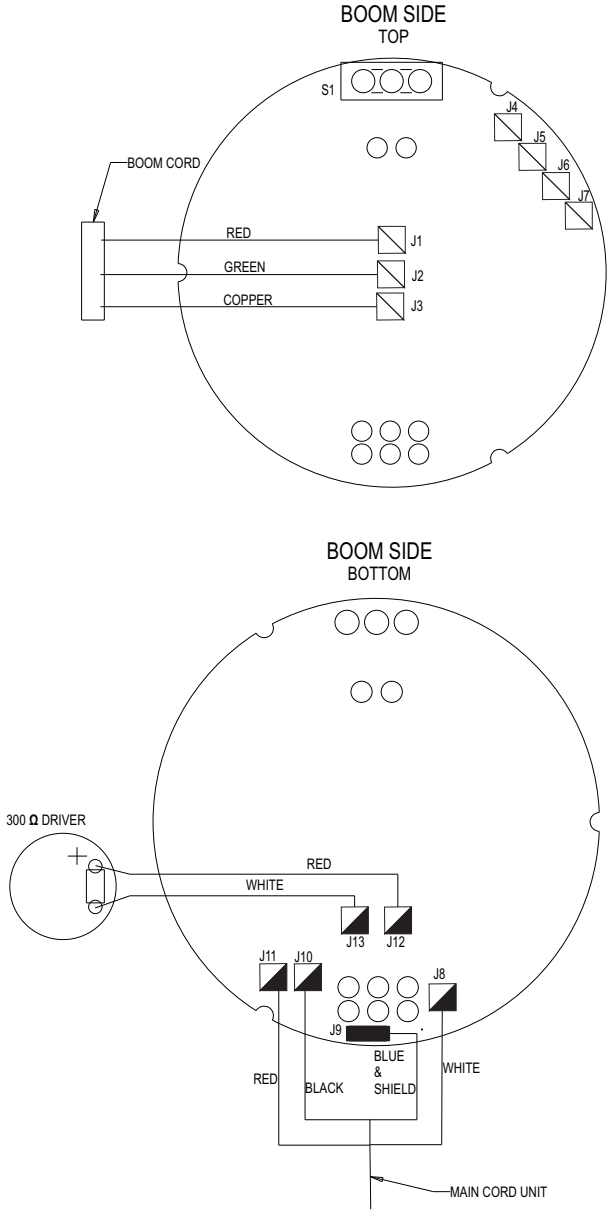


Figure 5.3: Airman 850 headset, single sided wiring diagram

5.3 Connector views / wiring diagrams

5.3.1 Connector view for catalog numbers 301317-000; -003; -200; -300; and -400

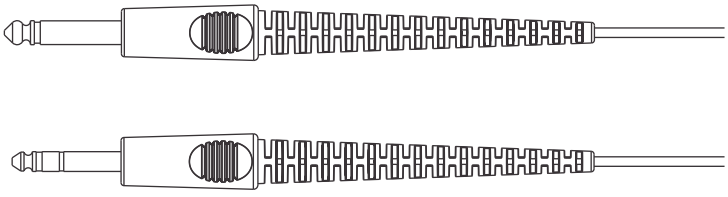


Figure 5.4: Airman 850 headset, connector view (molded plugs)

5.3.2 Connector view for catalog numbers 301317-101; and -201

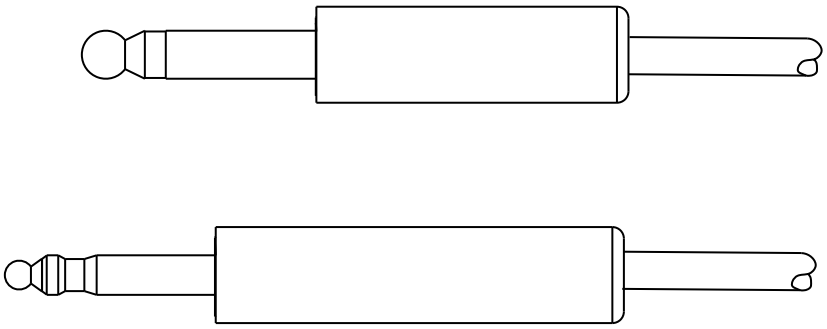


Figure 5.5: Airman 850 headset, connector view (mechanical plugs)

5.3.3 Connector view for catalog number 301317-002

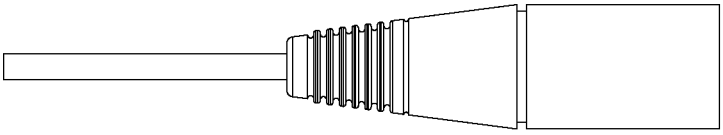


Figure 5.6: Airman 850 headset, connector view (XLR plug)

5.3.4 Connector wiring diagram for catalog numbers 301317-000; -003; -101; -200; -201; -300; and -400

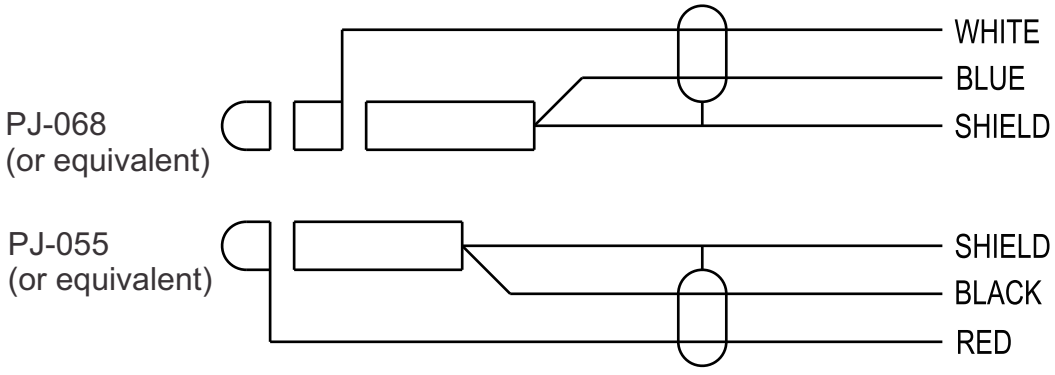


Figure 5.7: Airman 850 headset, connector wiring diagram

5.3.5 Connector wiring diagram for catalog number 301317-002 (5-pin XLR)

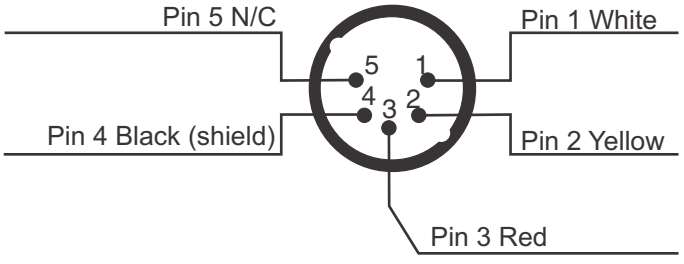


Figure 5.8: Airman 850 headset, 5-pin XLR wiring diagram

6 Maintenance

6.1 Microphone validation and adjustment

6.1.1 Microphone / amplifier sensitivity check

Headphone specifications are designed to comply with FAA TSO C57a, RCTA DO-214, and DO-160D.

The headphone has two (2) operations:

– Passive- power is turned off.
– 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 illustration below.
2. Connect the test circuit to the microphone plug of the Device-Under-Test (DUT) headset. For more information, see *Connector views / wiring diagrams*, page 23.

Notice!

Verify correct polarity of connections.

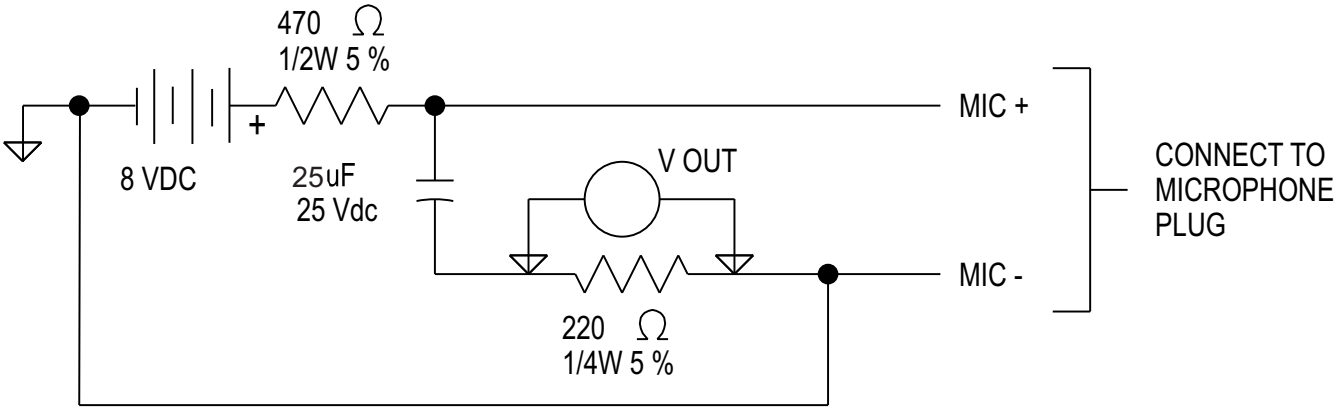


Figure 6.1: Airman 850 headset boom microphone sensitivity check and adjustment test circuit

3. Calibrate a lab microphone, either self-contained (such as Larson Davis sound level meter) or a separate measuring microphone with supporting equipment (such as Bruel and Kjaer type 4192 with type 2669-B preamp).
4. Place the calibrated lab microphone 6mm in front of an artificial mouth (Bruel and Kjaer type 4227, GRAS 44AB, etc.) or an equivalent speaker.
5. Connect a signal generator to the artificial mouth or the speaker.
6. Adjust for an output of 104dB SPL at 1 kHz @ 1/4 inch from the opening to the lab microphone.
7. Remove the **lab microphone**.
8. Position the DUT headset microphone 6mm in front of the artificial mouth or the speaker.

Notice!

The front acoustic port of the boom mic should be aligned with the center of the artificial mouth or the speaker opening.

9. Measure the **output of the headset microphone** with a digital voltmeter.

The output measured should be -18 ± 3dBV (or 89 - 178 mVRMS).

Measure current of 8V Power Supply

The current should be 4mA ±1mA 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.

Refer to

– *Connector views / wiring diagrams, page 23*

6.1.2 Microphone sensitivity adjustment

If the sensitivity of the microphone does not meet the requirements from *Microphone / amplifier sensitivity check, page 25*, readjust the sensitivity.

To adjust microphone sensitivity, do the following:

1. Turn the gain adjustment control in the microphone housing, using a small screwdriver. For more information, see the illustration below.
   Clockwise adjustment increases output level.

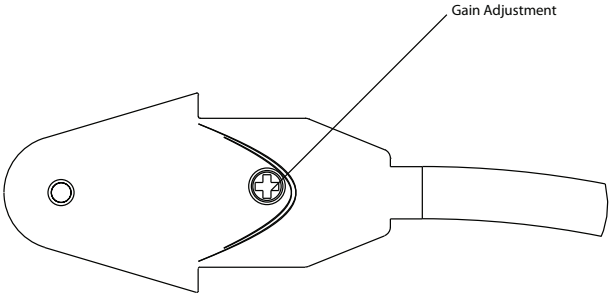


Figure 6.2: Airman 850 headset, boom microphone gain adjustment location

Refer to

– *Microphone / amplifier sensitivity check, page 25*

6.1.3 Troubleshooting mic failure

The microphone circuitry is in two (2) parts; the boom microphone preamp and main amp located on the main circuit board.

Testing the Boom microphone assembly

To test the boom mic assembly, do the following:

1. Prepare the boom mic assembly (shown in the illustration below) by disconnecting the three small boom mic wires from the main PC board.
2. Connect a 3.3 VDC power supply between the boom microphone RED (VCC) and the COPPER wire (GROUND), and connect a voltmeter between the boom microphone GREEN wire (OUTPUT) and the COPPER wire (GROUND).

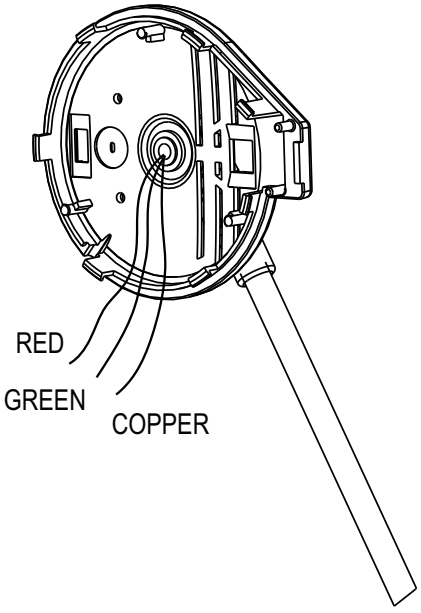
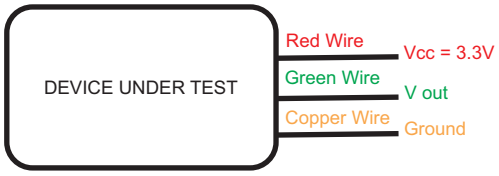


Figure 6.3: Airman 850 headset, boom assembly reference view



3. Follow the steps 4 through 8 in *Microphone / amplifier sensitivity check, page 25*, and then measure the output of the boom microphone. The output should be 24 mVRMS ± 7 mV

Notice!

If the output does not fall within the tolerances, adjust the gain pot as shown in the previous illustration.

This test is not designed for absolute accuracy, but rather to tell if the boom assembly is functioning properly.

If no output or no acceptable output is obtainable, then replace the boom assembly.

Testing the Circuit board assembly

To test the circuit board assembly, do the following:

1. Construct a test circuit. For more information, see illustration below.
2. Connect the circuit board to the test circuit.

With **Vin** measuring 100 mVRMS 1 Khz,

V out should read 210 mVRMS ±60 mV.

If the output is outside this range, replace the circuit board.

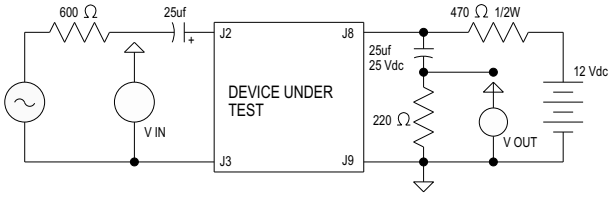


Figure 6.4: Airman 850 headset, circuit board test diagram

Refer to

– *Microphone / amplifier sensitivity check, page 25*

6.2 Operational test of the microphone and headphone

Notice!
This method is an alternative to *Speaker validation and adjustment, page 28* and requires a known-good headset and an intercom.

1. Insert the microphone and headphone plugs of a known-good (a.k.a. Reference) headset into the intercom jacks on the “Copilot” (a.k.a. Right) side.
   Aviation intercom is preferred such as Sigtronics Spo-22 2P, Pilot Usa Pa-200T, etc.
2. Wear the Reference headset and place its microphone (with windscreen attached) roughly 6mm in front of mouth. Speak into the microphone while adjusting intercom’s squelch control and Copilot’s volume switch until you can hear yourself (side tone) in both ears with sufficient loudness and clarity.
   Please make sure the front side of the microphone faces towards the mouth.
3. Insert the microphone plug of the DUT headset into the intercom jack on the “Pilot” (a.k.a. Left) side, and remove the Reference microphone plug from the intercom’s “Copilot” side. Place DUT microphone (with windscreen attached) next to the Reference microphone. Talk into the DUT microphone and compare its loudness and sound quality against that of the Reference microphone perceived in the previous step.
   For comparison purpose, it might be necessary to talk into the Reference microphone again after reinserting its plug into the intercom jack on the “Copilot” side.
4. If the DUT microphone yields comparable loudness and clarity to that of the Reference microphone, remove the plugs of the Reference headset from the intercom.
5. Wear the DUT headset and insert DUT’s headphone plug into the intercom jack on the “Copilot” side. Talk into the DUT microphone and assess its loudness and sound quality. If the outcome is comparable to that of step 3, then the DUT headphone is deemed acceptable.
   Please make sure the DUT microphone is still connected to the intercom jack on the “Pilot” side during this test.

Refer to
– *Speaker validation and adjustment, page 28*

6.3 Speaker validation and adjustment

6.3.1 Speaker sensitivity and frequency response verification

Notice!
Headphone specifications are designed to comply with FAA TSO C57a, DO-214 & DO-160D. The headphone has two (2) operations (ANR version only):
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):	See Receiver impedance by model table in *Specifications, page 34*, for impedance according to model.

Sensitivity:	(All Models) 90 dB SPL ±5 dB at 1 kHz, 1 mW input to headset, at LOW volume control setting. 1 mV based on input impedance of headset being tested.
Frequency response:	Must meet standards outlined in Receiver frequency response table in *Specifications*, page 34.

To measure the speaker, do the following:

1. Using a B&K type 4153 with 6cc coupler or equivalent, place the headset speaker on an artificial ear, fitted with the appropriate coupler.

1. Supply the headset with a 1mW, 1KHz signal to appropriate connector. See *Wiring diagrams*, page 22.
2. Measure acoustic output of headset using an audio analyzer.
   Sensitivity should be 90dB SPL ±5dB re. 1mW at 1kHz, headset in low volume setting.
3. Measure and record the acoustic output over the frequency range of 350 Hz to 3 KHz.
   The resultant curve should fit the limits as defined in Receiver frequency response table in *Specifications*, page 34.
4. Repeat steps 1 through 4 with the second speaker, if applicable.
5. Measure current of 12V Power Supply.

The current should be 4 mA ±1 mA with 1 mW applied to the speaker and ANR turned on.
The current should be less than 1 mA without 1 mW applied to the speaker and ANR turned off.

Notice!
If the specifications are not met in either power on or power off mode, printed circuit board failure should be suspected, see *Troubleshooting chart*, page 33.

Refer to

- *Specifications*, page 34
- *Wiring diagrams*, page 22
- *Troubleshooting chart*, page 33

6.4 ANR validation and adjustment

6.4.1 Active noise reduction (ANR versions only)

Notice!
Minimum attenuation requirement are not requirements of FAA TSO.

6.4.2 Minimum attenuation requirements (linearize between points)

Frequency (Hz)	Active (dB)
	Upper limit
200	2
300	-1
400	-2
600	-3
800	-1
1000	0

6.4.3 ANR test procedure

Required equipment

The Airman 850 ANR test and adjustment procedure requires the following acoustic test equipment and custom fixture:

- Audio Test System (Audio Precision or equivalent test system) or
- Artificial Mouth (Bruel & Kjaer 4227) or equivalent speaker
- Artificial Ear with 6cc Coupler (Bruel & Kjaer 4153)
- Supporting hardware for Microphone
- Supporting hardware and software for audio test system
- Custom ANR test and adjust fixture

Test setup block diagram

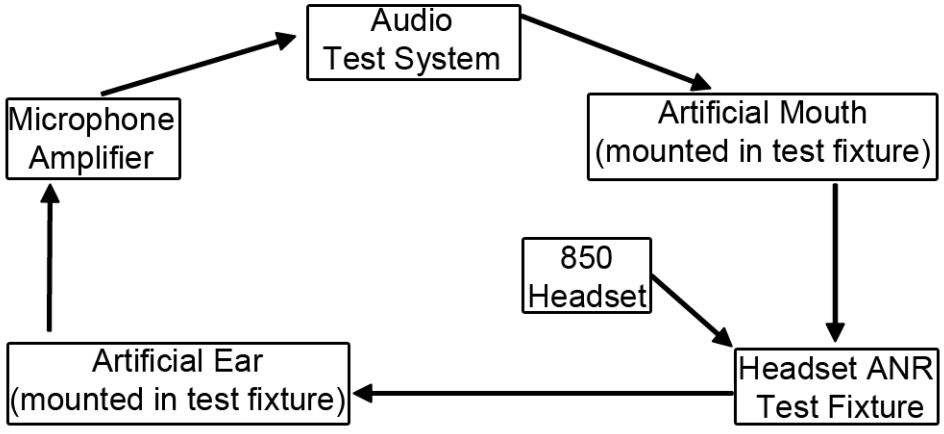


Figure 6.5: Test setup block diagram

Custom ANR fixture

Figure 6.6: Custom ANR test fixture with headset

Testing ANR

To test ANR, do the following:

1. Create a standard microphone test setup.
   A 1VRMS stimulus, such as swept sine or pseudo pink noise BP (Bandpassed) with 400Hz center frequency, should be applied to artificial mouth (or equivalent speaker) mounted to test fixture. See previous image.
   Microphone amplifier filter should be set to A-weighing, if available.
2. Adjust headset to minimum size.
3. Place headset on test fixture. For more information, see previous image
4. Measure the headset.
   With ANR turned off, perform a frequency sweep and save the file.
   With ANR turned on, perform a frequency sweep and save the file.
5. Subtract the two sweep results (files) measured in the previous step.
   The resulting curve should fit within the limits as shown in *Minimum attenuation requirements (linearize between points), page 30*.

Notice!
The following is an alternative way of testing ANR.

1. Wear the DUT headset with the ANR switch set to ON, and insert its microphone plug into the intercom jack.
2. With the intercom powered off, listen to the environmental noises.
3. Turn on the intercom, and then verify if the ambient noises are decreased somewhat from the previous step.
   Ensure that each side is free of any oscillation or other undesirable sounds.
   It might be necessary to turn off and on the intercom a few times in order to compare.

Notice!
If ANR needs adjustment, please contact Bosch ASA or Bosch certified facility for assistance.

Refer to

– *Minimum attenuation requirements (linearize between points), page 30*

6.5 Cleaning the unit

Warning!

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.

Use only isopropyl alcohol (70% minimum) on foam windscreen. Once removed soak the windscreen or spray onto the foam until it is completely saturated. Squeeze out excess liquid and allow to air dry at room temperature before reattaching.

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.

6.6 Storage

Notice!

We tested this product for environmental tolerance, but it performs best and lasts longest when you store it in a climate-controlled environment. Operating or storing the product for long periods in non-climate-controlled conditions can cause unintended and premature component degradation.

7 Troubleshooting

7.1 Troubleshooting chart

	Check plugs	Check main cord	Check amplifier gain adjust	Check overhead cord[1]	Check speakers	Check boom mic assembly	Check circuit boards
Receiver inoperative	X	X		X	X		X
Microphone inoperative	X	X	X			X	X
Receiver intermittent	X	X		X	X		
Microphone intermittent	X	X				X	X
Distorted receiver signal	X				X		X
Distorted microphone signal			X			X	X
Receiver level varies between left and right sides[1]				X	X		X
Receiver level does not meet specifications for power on and power off							X
Microphone level cannot be adjusted properly			X			X	X

1 Only applies to dual-sided versions.

8 Specifications

Receivers
Type: Dynamic
Impedance: see table below

Caution!
Damage could occur to avionics equipment if used with headset versions, which are not manufactured for use with 600 Ohm headsets. If in doubt, consult the avionics equipment manufacturer.

Frequency response: see table below
Sensitivity: volume selector in Low 90 dB SPL ±5 dB at 1 kHz, 1 mW input to headset, at LOW volume control setting.

Microphone
Type: noise-canceling amplified electret
Matching impedance: 150 Ohms
Frequency response: 100-10000 Hz (RTCA DO-214 curve)
Sensitivity: -48 ±3 dB
(ref. 1 V/ubar@1 kHz, 8 VDC, 470 Ohm DC / 150 Ohm AC load)
Operating voltage: 8-28 Vdc (470 Ohm load)
Distortion: a) Total Harmonic Distortion should be less than 5% between 350 and 6000 Hz under 114 dBSPL input; b) Increasing the input to 120 dBSPL at frequency response peak should yield an output increase of at least 5 dB.

Active noise reduction
All models with active noise reduction utilize the microphone system for power

Plug type
Varies by model, refer to parts list

Approximate wearing weight
2.9 oz single sided without cord
3.8 oz double sided without cord

Approximate gross weight
Single: 3.7 oz (105 g)
Double: 4.0 oz (113 g)

Cord length
Varies by model, refer to parts list

Color
Black

User controls
Volume HI/Low switch, ANR on/off switch (varies by model)

Frequency	dB above/below 1 K ref.	Reference tolerance
350 Hz	2	± 6 dB
400 Hz	4	± 6 dB
500 Hz	5	±6 dB
600 Hz	10	±6 dB
700 Hz	11	±6 dB

Frequency	dB above/below 1 K ref.	Reference tolerance
800 Hz	9	±6 dB
900 Hz	5	±6 dB
1000 Hz	0	±6 dB
2000 Hz	-13	±6 dB
3000 Hz	-15	± 6 dB

Table 8.1: Receiver frequency response (all models)

Model number	Description	Receiver impedance
301317-000	Airman 850 Headset, Dual-sided	150 Ohms
301317-002	Airman 850 Headset, Dual-sided	600 Ohms
301317-003	Airman 850 Headset, Dual-sided	600 Ohms
301317-101	Airman 850 Headset, Dual-sided, customer specific	150 Ohms
301317-200	Airman 850 Headset, Single-sided	150 Ohms
301317-201	Airman 850 Headset, Single-sided, customer specific	150 Ohms
301317-300	Airman 850 Headset, Single-sided	300 Ohms
301317-400	Airman 850 Headset, Dual-sided, customer specific	150 Ohms

Table 8.2: Receiver impedance by model

9 Appendices

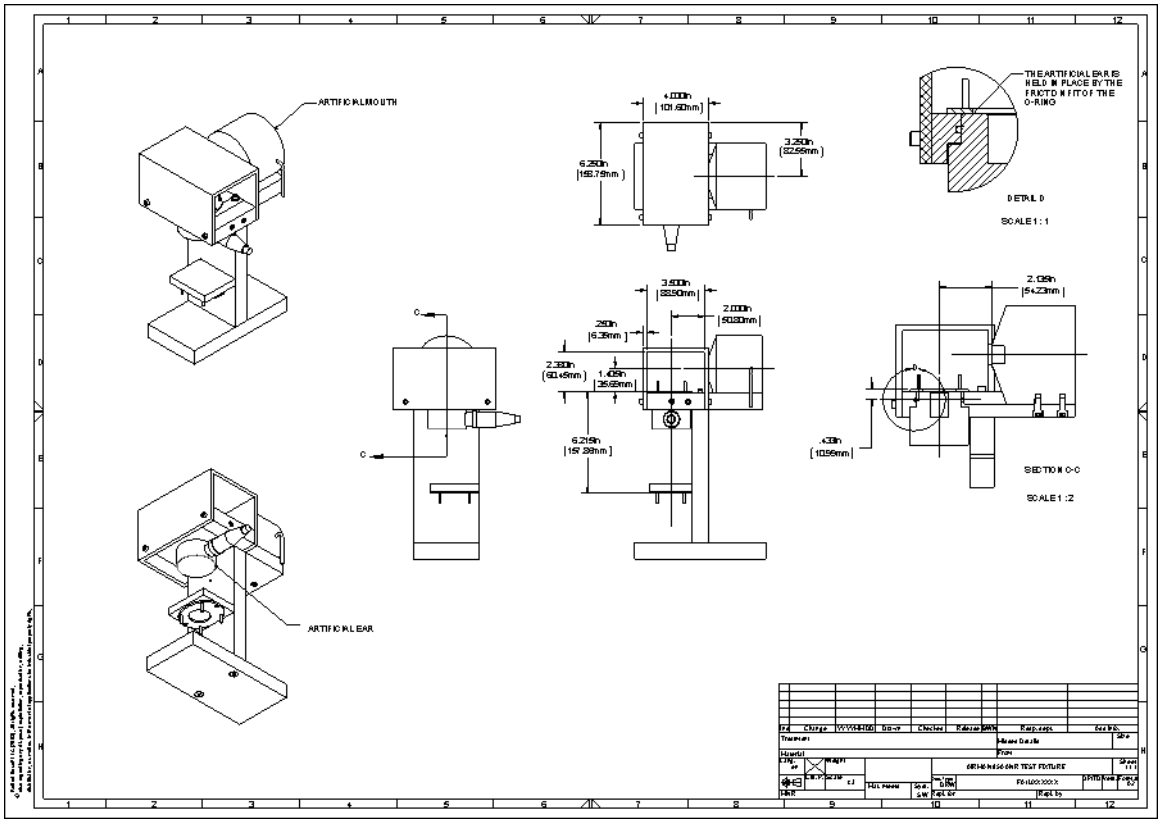


Figure 9.1: ANR test fixture drawing

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