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Technical Bulletin Public Address (PA) System Installation

Bell 212

TB-E212-725-2

Revision B

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1. Introduction

1.1. Approval

This Technical Bulletin is approved data in accordance with the following STC:

TCCA STC: SH07-28 FAA STC: SR02831NY

1.2. Purpose

To provide instructions for the Installation of a Public Address (PA) System.

1.3. Effectivity

MSN		
ALL		

1.4. Compliance

Optional

1.5. Description

This Technical Bulletin (TB) provides the information required for the installation of a Public Address (PA) System.

2. Installation Data

2.1. Required Drawings

Installation Number	Qty -011	Qty -013	Description
E212-725-9-01-1-1	1	1	PA LOUDSPEAKER INSTALLATION
E212-725-9-01-2-1	1	1	PA AMPLIFIER INSTALLATION
E212-725-9-01-2-3		1	CABIN PA AMPLIFIER INSTALLATION
E212-725-11-1-011	1		PUBLIC ADDRESS SYSTEM WIRING DIAGRAM
E212-725-11-1-013		1	PUBLIC ADDRESS SYSTEM WIRING DIAGRAM
E212-5005-011		1	FWD SPEAKER MOUNT INSTALLATION LH
E212-5005-012		1	FWD SPEAKER MOUNT INSTALLATION RH
E212-5005-013		1	MID SPEAKER MOUNT INSTALLATION LH
E212-5005-014		1	MID SPEAKER MOUNT INSTALLATION RH
E212-5005-015		1	AFT SPEAKER MOUNT INSTALLATION LH
E212-5005-016		1	AFT SPEAKER MOUNT INSTALLATION RH

Table 1 - Required Drawings

2.2. Weight and Balance

Item	Qty -011	Qty -013	Weight	Lateral		Lateral Longitud		gitudinal
				Arm	Moment	Arm	Moment	
TS300	1	1	10.40 lbs	19.50 in	202.80 in-lbs	80.30 in	835.10 in-lbs	
LSC22-001 / LSC22-003N	1	1	1.30 lbs	0.00 in	0.00 in-lbs	42.00 in	54.60 in-lbs	
LSA300-001	1	1	3.70 lbs	21.00 in	77.70 in-lbs	10.80 in	39.96 in-lbs	
LSA100-100		1	2.00 lbs	19.50 in	39.00 in-lbs	80.30 in	160.60 in-lbs	
CABIN PA SPEAKER 1		1	2.04 lbs	36.00 in	73.44 in-lbs	84.00 in	171.36 in-lbs	
CABIN PA SPEAKER 2		1	2.04 lbs	36.00 in	73.44 in-lbs	110.00 in	224.40 in-lbs	
CABIN PA SPEAKER 3		1	2.04 lbs	36.00 in	73.44 in-lbs	139.00 in	283.56 in-lbs	
CABIN PA SPEAKER 4		1	2.04 lbs	-36.00 in	-73.44 in-lbs	84.00 in	171.36 in-lbs	
CABIN PA SPEAKER 5		1	2.04 lbs	-36.00 in	-73.44 in-lbs	110.00 in	224.40 in-lbs	
CABIN PA SPEAKER 6		1	2.04 lbs	-36.00 in	-73.44 in-lbs	139.00 in	283.56 in-lbs	

Table 2 - Weight and Balance

2.3. Electrical Loads

System	Start & Warm-up		Take-off		Cruise		Land	
	15 Min.		15 Min.		15 Min.		15 Min.	
System	Qty	Qty	Qty	Qty	Qty	Qty	Qty	Qty
	-011	-013	-011	-013	-011	-013	-011	-013
Total for all DC Busses	50.90	Amps	109.70	Amps	114.00) Amps	110.20	Amps
TB-E212-725-2	22.00	28.20	22.00	28.20	22.00	28.20	22.00	28.20
(Max)	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
Total	72.90	79.1	131.70	137.90	136.00	142.20	132.20	138.40
	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps

Table 3 - Electrical Loads

3. Installation Procedure

3.1. Public Address (PA) System (-011)

1. Disconnect the battery and external power in accordance with ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- 2. Install Loudspeaker (PN TS300), Speaker Bracket Assy (PN E212-725-9-02-1-041) and Plate (PN E212-725-9-03-1-001) in accordance with E212-725-9-01-1-1 PA Loudspeaker Instl. See Figure 1.
- 3. Install Loudspeaker Amplifier (PN LSA300-001) in accordance with E212-725-9-01-2-1 PA Amplifier Instl. See Figure 2.
- 4. Install Loudspeaker Siren Controller (PN LSC22-001) on the centre console in accordance with AEM ASM-LSC22 Installation and Operation manual Rev 1.00 or later approved revision. Holes that are drilled in the console for attaching rail or avionics equipment should be de-burred and touched up with Alodine per MIL-C-5541 prior to installing the rivets or installing fasteners.
- 5. Install 3 amps (PA CONT PWR) and 15 amps (PA AMP PWR) circuit breakers in accordance with Figure 3. The CBs can be installed in any location inside the box noted in Figure 3.
- 6. Label the CBs "PA CONT PWR" and "PA AMP PWR" in accordance with E212-725-9-11-1-011.
- 7. Install the applicable wiring and configure the Loudspeaker Siren Controller (PN LSC22-001) in accordance with E212-725-9-11-1-011 Public Address Wiring Diagram.

3.2. Public Address (PA) System (-013)

1. Disconnect the battery and external power in accordance with ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- Install Loudspeaker (PN TS300), Speaker Bracket Assy (PN E212-725-9-02-1-041) and Plate (PN E212-725-9-03-1-001) in accordance with E212-725-9-01-1-1 PA Loudspeaker Instl. See Figure 1.
- Install Loudspeaker Amplifier (PN LSA300-001) in accordance with E212-725-9-01-2-1 PA Amplifier Instl. See Figure 2.
- 4. Install Cabin Amplifier (PN LSA100-100) in accordance with E212-725-9-01-2-3 PA Amplifier Instl. See Figure 4.
- 5. Install Cabin PA Speakers (PN FC6S-4FR-I), Speaker Mount (PN E212-5005-101) in accordance with E212-5005-011, -012, -013, -014, -015, and -016 Cabin PA Speaker Installation. See Figure 5.
- 6. Install Loudspeaker Siren Controller (PN LSC22-003N) on the centre console in accordance with AEM ASM-LSC22 Installation and Operation manual Rev 1.00 or later approved revision. Holes that are drilled in the console for attaching rail or avionics equipment should be de-burred and touched up with Alodine per MIL-C-5541 prior to installing the rivets or installing fasteners.
- Install 3 amps (PA CONT PWR), 15 amps (PA AMP PWR), and 7.5 amps (PA CABIN AMP PWR) circuit breakers in accordance with Figure 3. The CBs can be installed in any location inside the box noted in Figure 3.
- 8. Label the CBs "PA CONT PWR", "PA AMP PWR", and "PA CABIN AMP PWR" in accordance with E212-725-9-11-1-013.
- 9. Install the applicable wiring and configure the Loudspeaker Siren Controller (PN LSC22-003N) in accordance with E212-725-9-11-1-013 Public Address Wiring Diagram.

4. Test Procedure

4.1. Post Installation Test (-011)

1. Connect ground power and turn on aircraft power in accordance with ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- 2. Remove collars and push in the following circuit breakers:
 - PA CONT PWR
 - PA AMP PWR
- 3. On the 1P101 check the following pins:

PIN	MEASUREMENT	PASS /FAIL
1	+28 Vdc relative to ground	Pass: Tail: Initial:
2	+28 Vdc relative to ground	Pass: Tail: Initial:
4	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
14	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
15	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
16	continuity to ground (less than 0.5 Ω)	Pass: Fail: Initial:

4. On the 2P101 check the following pins:

PIN	MEASUREMENT	PASS /FAIL
A1	+28 Vdc relative to ground	Pass: Tail: Initial:
A4	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
9	continuity to ground (less than 0.5 Ω)	Pass: Fail: Initial:

- 5. Pull and collar the following circuit breaker:
 - PA CONT PWR
 - PA AMP PWR
- 6. Check all pins for shorts to ground or adjacent pins.
- 7. Ensure that all cables are properly secured, and shields are connected IAW E212-725-9-11-1-
- Ensure that all LRUs are grounded, and all connectors are disconnected. Record the measurement to airframe ground per the table below.

LRU POINT	GROUND POINT	MEASUREMENT	PASS /FAIL
Suitable ground location on TS300 Loudspeaker chassis	Airframe ground near down post attachment.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:
Suitable ground location on LSA300-001 PA Amplifier chassis	Airframe ground near the hand controller ground point.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:
Suitable ground location on LSC22-001 PA Controller chassis	Airframe ground near the antenna attachment.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:

- 9. Connect the Loudspeaker Controller and the Loudspeaker Amplifier connectors.
- 10. Connect ground power and turn on aircraft power IAW ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- 11. Remove collars and push in the following circuit breakers:
 - PA CONT PWR
 - PA AMP PWR
- 12. Ensure the audio system is powered on.

CAUTION: Ensure Siren WAIL/YELP switch is in the center "OFF" position.

- Turn the 'VOL/PWR' knob, on the face of the LSC22-001 speaker control panel, to the 'ON' position and lowest volume setting.
- 14. Select 'EXT PA' on the LSC22-001 'EXT PA/INT PA' switch.
- 15. Select 'MIC' on the 'MIC/RADIO' switch.
- 16. Select 'PA' on the Audio Panel Control.
- 17. Press pilot cyclic transmit switch and speak into the headset microphone.

- 18. Verify microphone audio from the speakers. LSC22-001 volume control may need to be adjusted to hear audio.
- 19. Repeat above step from co-pilot's position.

WARNING: LSC22-001 control panel VOL control does not control the Siren Wail/Yelp volume.

- 20. Move LSC22-001 'MIC/RADIO' switch to center position.
- 21. On the LSC22-001/LSC22-003N speaker control panel select the Siren "YELP" position and verify loudspeaker audio.
- 22. On the LSC22-001/LSC22-003N speaker control panel select the Siren "WAIL" position and verify loudspeaker audio.
- 23. Perform EMI/EMC testing following the below steps. Refer to Table 4. For tests that include a frequency, test at the listed frequencies and at approximately one MHz intervals between the listed frequencies. For other radio systems with controllable frequencies, test in a similar manner for low, middle, and high frequency bands.
 - a. Ensure all systems are installed and functioning correctly. All previous steps in this section must be successfully completed before beginning EMI / EMC checks.
 - b. Ensure the aircraft is in a normal flight configuration. For example: all doors and windows are closed.
 - c. Using ground power, test each system outlined in Table 4 and record any aircraft abnormality that would indicate whether each system is a source or victim of EMI. Evaluate all possible scenarios and ensure that as many possible system settings are tested. Repeatedly perform tasks to ensure EMC (e.g., turn equipment on and off and adjust any user interfaces).
 - d. Using engine driven generators as the power source, complete testing of any systems that could not be tested on ground power (e.g., engine indications) and verify the evaluation performed in step c. Ensure that all systems are tested and any potential EMI that was noted is investigated further.
- 24. Turn LSC22-001 control panel 'VOL/PWR' knob to 'OFF'.
- 25. Turn off aircraft power and disconnect ground power IAW ICA-D212-725.

4.2. Post Installation Test (-013)

1. Connect ground power and turn on aircraft power in accordance with ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- Remove collars and push in the following circuit breakers:
 - PA CONT PWR
 - PA AMP PWR
 - PA CABIN AMP PWR

3. On the 1P101 check the following pins:

PIN	MEASUREMENT	PASS /FAIL
1	+28 Vdc relative to ground	Pass: Tail: Initial:
2	+28 Vdc relative to ground	Pass: Tail: Initial:
4	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:
14	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:
15	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:
16	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:

4. On the 2P101 check the following pins:

PIN	MEASUREMENT	PASS /FAIL
A1	+28 Vdc relative to ground	Pass: Tail: Initial:
A4	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:
9	continuity to ground (less than 0.5Ω)	Pass: Tail: Initial:

5. On the 3P201 check the following pins:

PIN	MEASUREMENT	PASS /FAIL
1	+28 Vdc relative to ground	Pass: 🗌 Fail: 🔲 Initial:
9	+28 Vdc relative to ground	Pass: Fail: Initial:
8	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
12	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:
15	continuity to ground (less than 0.5 Ω)	Pass: Tail: Initial:

- 6. Pull and collar the following circuit breaker:
 - PA CONT PWR
 - PA AMP PWR
 - PA CABIN AMP PWR
- 7. Check all pins for shorts to ground or adjacent pins.
- 8. Ensure that all cables are properly secured, and shields are connected IAW E212-725-9-11-1-013.
- 9. Ensure that all LRUs are grounded, and all connectors are disconnected. Record the measurement to airframe ground per the table below.

LRU POINT	GROUND POINT	MEASUREMENT	PASS /FAIL
Suitable ground location on TS300 Loudspeaker chassis	Airframe ground near down post attachment.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:
Suitable ground location on all Cabin PA Speaker chassis	Airframe ground near down post attachment.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:
Suitable ground location on LSA300-001 PA Amplifier chassis	Airframe ground near the hand controller ground point.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:

LRU POINT	GROUND POINT	MEASUREMENT	PASS /FAIL
Suitable ground location on LSA100-100 PA	Airframe ground near the hand controller ground point.	3 Milliohms	Resistance:Ω
Amplifier chassis		(< 0.003Ω)	Pass: Fail: Initial:
Suitable ground location on LSC22-001/LSC22- 003N PA Controller chassis	Airframe ground near the antenna attachment.	3 Milliohms (< 0.003Ω)	Resistance:Ω Pass: ☐ Fail: ☐ Initial:

- 10. Connect the Loudspeaker Controller and the Loudspeaker Amplifier connectors.
- 11. Connect ground power and turn on aircraft power IAW ICA-D212-725.

WARNING:

OBEY ALL THE SAFETY PRECAUTIONS WHEN PERFORMING MAINTENANCE ON OR NEAR ELECTRICAL/ELECTRONIC EQUIPMENT

- 12. Remove collars and push in the following circuit breakers:
 - PA CONT PWR
 - PA AMP PWR
 - PA CABIN AMP PWR
- 13. Ensure the audio system is powered on.

CAUTION: Ensure Siren WAIL/YELP switch is in the center "OFF" position.

NOTE: On the LSC22-003N the power function on the front panel is removed. When power is applied to the LSC22-003N, the unit is powered on without any other action.

- 14. Select 'EXT PA' on the LSC22-003N 'EXT PA/INT PA' switch.
- 15. Select 'MIC' on the 'MIC/RADIO' switch.
- 16. Select 'PA' on the Audio Panel Control.
- 17. Press pilot cyclic transmit switch and speak into the headset microphone.
- 18. Verify microphone audio from the speakers. LSC22-003N volume control may need to be adjusted to hear audio.
- 19. Repeat above step from co-pilot's position.

WARNING: LSC22-003N control panel VOL control does not control the Siren Wail/Yelp volume.

- 20. Select 'INT PA' on the LSC22-003N 'EXT PA/INT PA' switch.
- 21. If applicable, Perform steps 11 to 15.
- 22. Move LSC22-003N 'MIC/RADIO' switch to center position.
- 23. On the LSC22-003N speaker control panel select the Siren "YELP" position and verify loudspeaker audio.
- 24. On the LSC22-003N speaker control panel select the Siren "WAIL" position and verify loudspeaker audio.
- 25. Perform EMI/EMC testing following the below steps. Refer to Table 4. For tests that include a frequency, test at the listed frequencies and at approximately one MHz intervals between the listed frequencies. For other radio systems with controllable frequencies, test in a similar manner for low, middle, and high frequency bands.
 - a. Ensure all systems are installed and functioning correctly. All previous steps in this section must be successfully completed before beginning EMI / EMC checks.

- b. Ensure the aircraft is in a normal flight configuration. For example: all doors and windows are closed.
- c. Using ground power, test each system outlined in Table 4 and record any aircraft abnormality that would indicate whether each system is a source or victim of EMI. Evaluate all possible scenarios and ensure that as many possible system settings are tested. Repeatedly perform tasks to ensure EMC (e.g., turn equipment on and off and adjust any user interfaces).
- d. Using engine driven generators as the power source, complete testing of any systems that could not be tested on ground power (e.g., engine indications) and verify the evaluation performed in step c. Ensure that all systems are tested and any potential EMI that was noted is investigated further.
- 26. Turn off aircraft power and disconnect ground power IAW ICA-D212-725.

Aircraft Systems	EMI Source PA System		EMI Victim PA System		Notes
All of all Oystonis	YES	NO	YES	NO	140103
VHF COMM 1, 118.000 MHZ		_		_	
VHF COMM 1, 127.500 MHZ					
VHF COMM 1, 135.975 MHZ					
VHF COMM 2, 118.000 MHZ					
VHF COMM 2, 127.500 MHZ					
VHF COMM 2, 135.975 MHZ					
NAV (VOR/ILS) NO. 1, 108.000 MHZ					
NAV (VOR/ILS) NO. 1, 108.100 MHZ					
NAV (VOR/ILS) NO. 1, 113.500 MHZ					
NAV (VOR/ILS) NO. 1, 117.975 MHZ					
NAV (VOR/ILS) NO. 2, 108.000 MHZ					
NAV (VOR/ILS) NO. 2, 108.100 MHZ					
NAV (VOR/ILS) NO. 2, 113.500 MHZ					
NAV (VOR/ILS) NO. 2, 117.975 MHZ					
GPS1					
GPS2					
PILOT AUDIO					
CO-PILOT AUDIO					
PUBLIC ADDRESS SYSTEM	N/A	N/A	N/A	N/A	
PILOT PFD / MFD	14// (14//	14/71	14// (
CO-PILOT PFD / MFD					
ADAHRS 1					
ADAHRS 2					
HSVT					
STANDBY INSTRUMENT					
STANDBY COMPASS					
TRAFFIC ADVISORY SYSTEM (TCAS I)					
HTAWS					
RADIO ALTIMETER					
TRANSPONDER					
DME					
ELT					
GENERATOR / INVERTER					
EXTERIOR LIGHTS					
INTERIOR LIGHTS					
PUMPS / MOTORS					
PILOT TORQUE					
PILOT TORQUE PILOT DUAL TACH					
CO-PILOT TORQUE					
CO-PILOT DUAL TACH					
NG					
MGT					
FUEL QUANTITY					
FUEL PRESSURE					
ENGINE OIL TEMP. AND PRESSURE					
TRANSMISSION OIL TEMP. AND					
PRESSURE					
HYDRAULIC OIL 1 TEMP. AND					
PRESSURE			Ì		

Aircraft Systems	EMI Source PA System		EMI Victim PA System		Notes
	YES	NO	YES	NO	
HYDRAULIC OIL 2 TEMP. AND PRESSURE					
GENERATOR VOLTMETER AND AMMETER					
MASTER CAUTION PANEL					
FIRE DETECTION AND WARNING					
OTHER:					

Table 4 - EMI/EMC Check Sheet (-011 or -013)

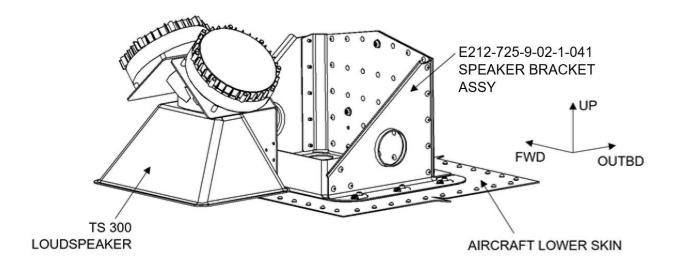


Figure 1 – Loudspeaker Installation (REF E212-725-9-01-1)

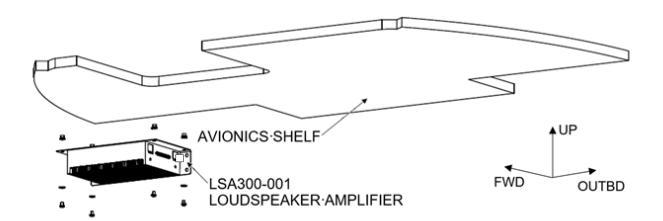


Figure 2 – Loudspeaker Amplifier Installation (REF E212-725-9-01-2)

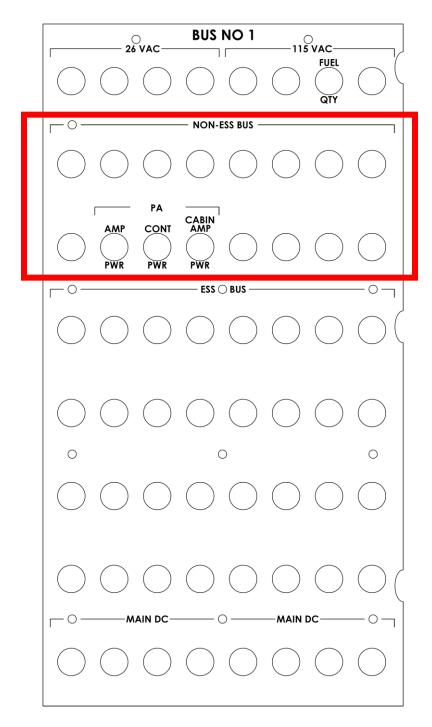


Figure 3 - Circuit Breaker Installation, Overhead Panel

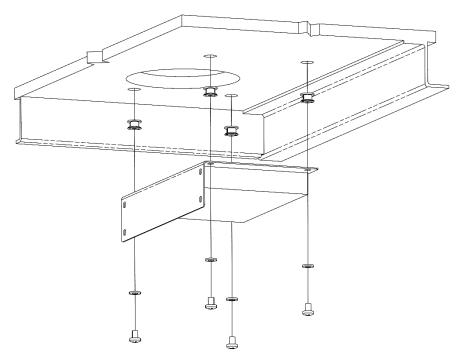
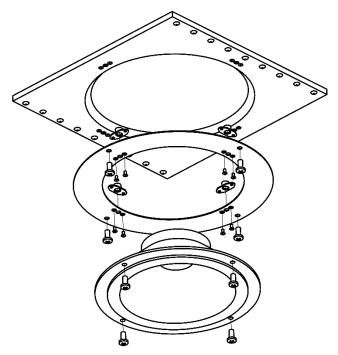


Figure 4 - Cabin Amplifier Installation (REF E212-725-9-01-2)



TYP LH & RH Cabin Speaker Mount

Figure 5 - Cabin PA Speaker Installation (REF E212-5005)

5. Aircraft Record Set Update and Eagle Notification

- 1. Make an entry in the aircraft record set that TB-E212-725-2-011 or TB-E212-725-2-013 has been incorporated.
- 2. Update the aircraft's Weight and Balance and Electrical Loads records with the values in Section 2 as required.
- 3. Notify Eagle Copters that TB-E212-725-2 has been incorporated by emailing the below information to customersupport@eaglecopters.com:

Aircraft Serial Number

Aircraft Owner

Date Incorporated

Configuration Incorporated