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PMA8000G

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Audio Selector Panel with Marker Beacon Receiver
High-fidelity Stereo Intercom with flightmate®
System Installation and Operation Manual
FAA- TSO C50c, C35d, C71
EASA ETSO C50c, 2C35d
Patented under one or more of the following;
No. 4,941,187; 5,903,227; 6,160,496 and 6,493,450

In certified aircraft, warranty is not valid unless this product is installed by an Authorized PS Engineering dealer.

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Rev	Date	Change
1	August 2016	Added supplementary text regarding flightmate® §2.5 & §3.9
2	August 2016	Changed installation kit and part numbers
3	September 2016	Added notes on dimmer §2.4.8 and repurposed pins.§2.5.1
4	October 2016	Update installation kit part numbers
5	January 2017	Update for FAA-TSO C71 Authorization
6	June 2017	Add CVR and dimming features (S/N F1256 and above)
7	July 2017	S/N DG01199 and above: Updated MKR button operation (§3.5). Add TEL functionality in PLAY button (§3.8), Monitor mode (§3.2.1.4) .
8	October 2017	Update flightmate® behavior
9	November 2017	Add jumper wired to disable Alert Triggers as desired for backward compatibility.
10	May 2019	Clarify information in §3.13
11	December 2019	Added notes to flighhtmate® section §2.5
12	June 2020	Corrected part number in §1.6
13	September 2020	Revised Installation Kit
14	March 2021	Added p/n 050-890-0917 removed marker beacon receiver
15	August 2021	Discontinued -0913 version
16	December 2021	Revised flightmate®
17	October 2022	Updated flightmate®
18	January 2023	Added new Bluetooth FCC ID, (S?N QG02016 & above
19	June 2023	Revise Installation kit materials
20	April 2024	Clarify flightmate® operation

Section I – GENERAL INFORMATION

1.1 INTRODUCTION

The PMA8000G represents another evolutionary step in cockpit audio control and intercommunications utility. Using our patented *IntelliVox*® design, front panel USB Charging port, and pilot programmable configurations, this marks the next level of audio control. The unit is designed for outstanding ergonomics and visually defined mode annunciation and selection.

Before installing and/or using this product, please read this manual completely. This will ensure that you will take full advantage of all the advanced features in the PMA8000G.

1.2 SCOPE

This manual provides detailed installation and operation instructions for the PS Engineering PMA8000G-series of Audio Selector Panel/Intercom Systems. This includes the following units:

Model	Description	Part Number
PMA8000G	Stereo Audio Selector Panel with Marker Beacon, USB charging, Internal Recorder System, IntelliAudio®, flightmate®	050-890-0912
PMA8000G	Stereo Audio Selector Panel with Marker Beacon, USB charging Internal Recorder System (**DISCONTINUED**)	050-890-0913
PMA8000G	Stereo Audio Selector Panel with Marker Beacon, USB charging Internal Recorder System /intercom expansion capability (includes 1 ea. 11636R	050-890-0914
PMA8000G	Same as 050-890-0913 but w/intercom expansion capability (**DISCONTINUED**)	050-890-0915
PMA8000G	Stereo Audio Selector Panel, USB charging Internal Recorder System, IntelliAudio®, flightmate® NO MARKER	050-890-0917
PMA8000G	Stereo Audio Selector Panel, USB charging Internal Recorder System, IntelliAudio®, flightmate® NO MARKER but w/intercom expansion capability (includes 1 ea. 11636R)	050-890-0918

1.3 EQUIPMENT DESCRIPTION

The PMA8000G is a state-of-the-art audio isolation amplifier and audio selector that contains an automatic voice activated (VOX) intercom system and integral marker beacon receiver. It can switch two transceivers (Com 1, Com 2) and four receivers; Nav 1, Nav 2, MKR and AUX (ADF & DME).

A full duplex TEL mode allows the PMA8000G to act as an audio interface between aircraft headphone and microphones and specific aircraft approved (FAA/FCC) cellular telephone equipment, through the Bluetooth connection.

Warning: Use of non-aviation approved cellular telephone equipment may be prohibited by FCC regulation. PS Engineering is not responsible for unauthorized airborne use of cellular telephones. For airborne use, the PMA8000G must be interfaced with an approved system.

There are four unswitched inputs, available for traffic or EGPWS, autopilot disconnect, and/or radar altimeter warning.

Pushbuttons select the receiver audio source provided to the headphones. A SPR button allows the user to listen to the receiver(s) selected on the cabin speaker. Except for the unswitched inputs, all speaker audio is muted during transmit. Unswitched inputs 1, 3, and 4 are always presented to the aircraft speaker. Unswitched input 2 will be presented to the speaker when the front panel SPR push button has been selected.

Pushbutton switches select one of the communication transceivers for the pilot and copilot position, and allow radio transmission. In "Split Mode" the PMA8000G has the ability to allow the pilot to transmit on Com 1 while the copilot can transmit on Com 2. A fail-safe mode connects the pilot headphone and micro-

phone to COM 1 if power is removed for any reason, or if the power switch is placed in the Off (Fail-safe) position. Unswitched input #1 is also provided to the pilot headphone in fail-safe

A six-station voice activated (VOX) intercom is included in the PMA8000G. This system has PS Engineering's patented *IntelliVox*® circuitry that eliminates manual adjustments. The intercom system incorporates pilot isolate, all and crew modes, two independent stereo music inputs with "SoftMute™". Intercom volume control is through two concentric front panel knobs and a pushbutton intercom mode switch. The small volume knob controls the intercom level for the pilot and copilot, while the large knob controls the passenger intercom volume. Intercom squelch is automatic.

A 3-light, 75 MHz Marker Beacon receiver is integrated in the PMA8000G. This provides the necessary Marker Beacon lights and audio indications necessary for that portion of an Instrument Landing System (ILS) approach. A pushbutton labeled MKR allows the pilot select high or low sensitivity as well as test and mute modes.

In the PMA8000G, a Bluetooth® wireless interface is available for wireless telephone and music connection.

Our newest innovation is flightmate®, a tool that can improve flight safety and reduce workload. Having flightmate on board will help to improve the pilot's ability to recall pertinent information about the flight. flightmate® is the world's first audio checklist system integrated into an audio panel. It is pilot configurable by recording messages as desired with 2 ½ minutes of storage. No computer or special equipment is required.

1.4 APPROVAL BASIS

FAA TSO Approval

The PMA8000G-series Audio Selector Panels are FAA approved under TSO C50c (Audio Amplifiers) TSO C35d (Marker Beacon Receivers) and TSO C71 (DC to DC Converters, ETSO C50c/ and 2C53d.

All systems comply with relevant portions of EUROCAE RTCA MPS WG No. 7/70, DO-143 and (*Marker Beacon Receivers*), ED-14C/DO-160C (*Environmental Conditions and Test Procedures for Airborne Equipment*), ED12B/DO-178B, Level D (*Software Considerations for Airborne Equipment*) and ED-18/DO-214 (*Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems*).

Operation is subject to the following conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

1.5 SPECIFICATIONS

TSO COMPLIANCE	
Marker Beacon:	FAA TSO C35d, Class A ETSO 2C35d
Audio Selector/Intercom:	FAA TSO C50c, Class 1a ETSO C50c
USB Power Converter	FAA-TSO C71
APPLICABLE DOCUMENTS:	RTCA/DO-214 RTCA/DO-143 RTCA/DO-160D RTCA/DO-178B DO-254
ENVIRONMENTAL Qualifications:	A1D1CABSMXXXXXXZBABATBXXE2XXX
Operating Temperature Range:	-15º C to 55ºC
Altitude:	Up to 50,000 feet in an non-pressurized area
DIMENSIONS:	Height: 1.3 in. (3.3 cm) Width: 6.25 in. (15.9 cm) Depth behind panel 7.15 in. (18.16 cm)
WEIGHT *PMA8000G Unit* *Rack with connectors*	 1.34 lb. (0.61 kg) 0.51 lb. (0.24 kg)

POWER REQUIREMENTS (Including Internal Lighting):	
Voltage:	11 to 33 VDC
Maximum Current:	2.5 Amp (Externally protected by a 5A pull-type breaker)
USB Charging Port:	Voltage - +5VDC Current - 2.0A (10W Maximum) output, short circuit and over-current protected

Audio Selector Specifications	
Audio selector panel input impedance:	510 Ω
Input Isolation:	-60 dB (min.)
Speaker Muting:	-60 dB (min.)
Speaker Output (into 4 Ω) with no clipping 14 VDC: 28 VDC:	 3 Watts (min.) 10 Watts (min.)
Receiver Inputs:	8 (Com 1, Com 2, TEL, Nav 1, Nav 2, ADF, DME, AUX)
Unswitched Inputs:	4
Transmitter Selections:	4 (Com 1, Com 2, TEL Com1/2)
Speaker Impedance:	4 Ω
Headphone Impedance:	150 – 1000 Ω
Headphone Output:	38 mW each headset, no clipping <1% THD typical
Microphone Impedance:	150 - 600 Ω
Bluetooth Radio	Class 3, FCC ID QOQWT32AE
Intercom Specifications	
Intercom Positions:	6 places (with individual *Intelli*Vox® circuits)
Music Inputs:	2, (Independent, Stereo)
Music Muting:	>-30 dB "Soft Mute" when Com or intercom active.
Distortion:	<1% THD @ 38 mW into 150Ω
Mic Freq. Response, 3 dB:	300 Hz - 6000 Hz
Music Freq. Response, 3 dB:	10 Hz – 26 kHz
MARKER BEACON RECEIVER:	
Frequency:	75 MHz Crystal Controlled
Sensitivity: Low: High:	Capable of: (preset at factory for field application) 1000 μVolts (Hard) (360 to 570 μV soft) 200 μVolts (Hard) (130 to 200 μV soft)
Selectivity:	-6 dB at ±10 kHz -40 dB at ±120 kHz
External Lamp Output:	7.5 (±4 VDC unloaded, at maximum brightness) VDC positive when active, max. current 125 mA
MM Sense:	Active high (4.5 ± 1.0VDC)

1.6 EQUIPMENT SUPPLIED

1 ea. of the following units:

Model	Description	Part Number
PMA8000G	Stereo Audio Selector Panel with Marker Beacon, USB charging, Internal Recorder System, IntelliAudio®, flightmate®	050-890-0912
PMA8000G	Stereo Audio Selector Panel with Marker Beacon, USB charging Internal Recorder System, (**DISCONTINUED**)	050-890-0913
PMA8000G	Same as 050-890-0913 but w/intercom expansion capability	050-890-0915
PMA8000G	Stereo Audio Selector Panel, USB charging Internal Recorder System, IntelliAudio®, flightmate® NO MARKER	050-890-0917

PMA8000G Installation Kit: 250-890-0500

Description	Quantity	Part Number
Installation rack assembly	1	430-890-0040
Rack back plate	1	430-890-0050
44-pin connector kit	2	120-891-2045
Back shell, bottom	2	625-025-1131
Back shell cover	2	625-025-1132
Strain Relief	4	425-149-1179
Zip Ties	2	800-000-0004
2-56 X 3/8 screw for connector shell	8	475-049-3189
4 40 X 7/16 screw w/nylon patch	4	475-440-0007
4 40 X 3/8 screw w/nylon patch	4	475-440-1038
4-40 x ¼" screw with lock washer	2	475-440-0001
Solder Lug	2	475-009-0001
Cable Clamp	1	625-001-0002
#6-32 x ½" Flat head Philips screw	6	475-632-0012
#6-32 Clip Nut	6	475-630-0002

1.7 EQUIPMENT REQUIRED BUT NOT SUPPLIED

a. Circuit Breaker: 1 ea.; 5 amp PULL TYPE REQUIRED for PMA8000G
b. Speaker, 4 Ω
c. Headphone Jacks (Stereo, as Required)
d. Microphone Jacks (as Required)
e. Headphones, 150 Ω (Stereo), up to 6 as required
f. Microphones, up to 6 as required
g. Marker Antenna (75 MHz, VSWR <1:1.5, and appropriate for the airspeed)
h. Interconnect Wiring

1.8 LICENSE REQUIREMENTS

None

PMA8000G Bluetooth™ Radio approval:

- FCC ID: QOQWT32AE, QOQWT32Ai, or 2AC7Z-ESP32WROVERE (S/N QG02016 and above)
- Industry Canada ID: 5123A-BGTWT32AE or 5123A-BGTWT32Ai
- CE EMC Directive 89/336/EEC as amended by Directives 92/31/EEC and 93/68/EEC

Section II - INSTALLATION

2.1 GENERAL INFORMATION

2.1.1 SCOPE

This section provides detailed installation and interconnection instructions for the PS Engineering PMA8000G Audio Selector Panel/Intercom/ with internal Marker Beacon.

Please read this manual carefully before beginning any installation to prevent damage and post-installation problems. Installation of this equipment requires special tools, test equipment (refer to section 2.13.1) and knowledge as required by 14 CFR 65.81 (b).

2.1.2 Certification Requirements

NOTE

The PMA8000G requires specialized knowledge and tools for an effective installation. An appropriately rated Certified Aircraft Repair Station **must** install this equipment in accordance with applicable regulations. PS Engineering, Incorporated warranty is not valid unless the equipment is installed by an authorized PS Engineering, Incorporated dealer.
Failure to follow any of the installation instructions, or installation by a non-certified individual or agency will void the warranty and may result in an **unairworthy** installation.

2.2 Unpacking and Preliminary Inspection

Use care when unpacking the equipment. Inspect the units and parts supplied for visible signs of shipping damage. Examine the unit for loose or broken buttons, bent knobs, etc. Verify the correct quantity of components supplied with the list in Section 1.6. If any claim is to be made, save the shipping material and contact the freight carrier. Do NOT return units damaged in shipping to PS Engineering. If the unit or accessories show any sign of external shipping damage, contact PS Engineering to arrange for a replacement. Under no circumstances attempt to install a damaged unit in an aircraft. Equipment returned to PS Engineering for any other reason should be shipped in the original PS Engineering packaging, or other UPS approved packaging.

2.3 Equipment Installation Procedures

2.3.1 Cooling Requirements

Forced air-cooling of the PMA8000G is not required. However, the units should be kept away from heat producing sources (i.e. defrost or heater ducts, dropping resistors, heat producing avionics) without adequate cooling air provided.

2.3.2 Mounting Requirements

The PMA8000G must be rigidly mounted to the instrument panel of the aircraft structure, within view and reach of the pilot position(s). Installation must comply with FAA Advisory Circular AC 43.13-2B, or other FAA-approved aircraft technical data. The unit may be mounted in any area where adequate clearance for the unit and associated wiring bundle exists.

To prevent noise, avoid installing the unit close to high current devices or systems with high-voltage pulse type outputs, such as DME or transponders. Avoid running the interconnecting bundles near any high current wires.

2.3.3 Audio Panel Mounting Rack Installation

Remove the unit from the mounting tray by unscrewing the 3/32" hex-head screw that is in the center of the unit. Use caution to avoid hitting the photo-detector lens. Carefully slide the unit free of the tray. Set the unit aside in a safe location until needed. Install the tray using six clip nuts (475-630-0002), and six FHP 6-32 x ½" screws (475-632-0012). The audio selector panel must be supported at front and rear of the mounting tray.

2.3.4 Audio Panel Tray and Connector Assembly

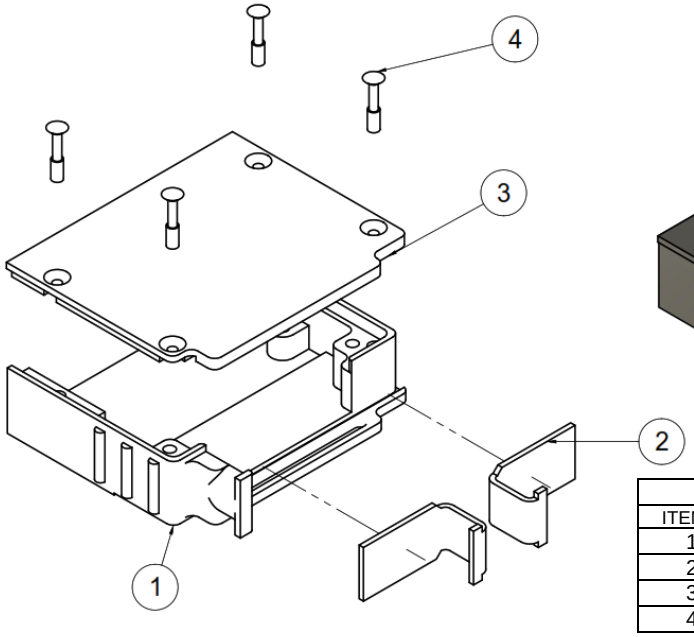
The rack connectors mate with two 44-pin connectors in the PMA8000G. The connectors are a sub-miniature crimp-type, and require the use a hand crimp tool, from table below (or equiv.).

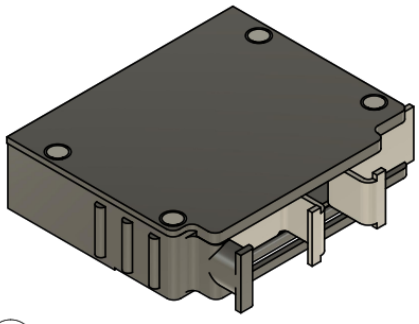
Manufacturer	Crimping Tool	Positioner	Extraction tool
AMP	601966-1	601966-6	91067-1
Daniels	AFM8	K42	M24308-1
ITT-Cannon	995-0001-584	995-0001-739	91067-1

Table 2-1 Connector Pin crimping tools

The connectors are mounted to the tray back plate with #4-40 screws (475-440-1038), from the inside of the tray. The connector back shell is two pieces, (625-025-1131 and cover 625-025-1132) held together by 4 #2-56 screws (475-049-3189). This allows the back shell to be installed after the connector is populated.

Assemble the connector back shell by attaching the top and bottom using 4 ea. special #2 x 56 Phillips screws and the two "J" strain relief sliders in the slot provided. Secure the cable bundle between the back shell and the sliders with Zip tie. The connectors are mounted to the tray back plate with #4-40 screws (475-440-1038), from the inside of the tray. Ensure that proper strain relief and chafing precautions are made during wiring and installation, using the cable clamp (625-001-0002).





PARTS LIST		
ITEM #	QUANTITY	PART NUMBER
1	1	625-025-1131
2	2	425-149-1179
3	1	425-025-1132
4	4	475-049-3189

Two grounding lugs are provided, which may be attached to the rear mounting plate with 2 ea. #4-40 x ¼" screws with captivated lock washers. These provide a convenient location to connect the shield ground terminations.

2.4 Cable Harness Wiring

Referring to the appropriate Appendix, assemble a wiring harness as required for the installation. All wires must be MIL-SPEC in accordance with current regulations. Two- and three-conductor shielded wire must be used where indicated and be MIL-C-27500 or equivalent specification. Proper stripping, shielding and soldering technique must be used at all times. It is imperative that correct wire be used.

Refer to FAA Advisory Circular 43.13-2B for more information. Failure to use correct techniques may result in improper operation, electrical noise or unit failure. Damage caused by improper installation will void the PS Engineering warranty.

2.4.1 Electrical Noise

Due to the variety and the high power of radio equipment often found in today's general aviation aircraft, there is a potential for both radiated and conducted noise interference.

The PMA8000G power supply is specifically designed to reduce conducted electrical noise on the aircraft power bus by at least 50dB. Although this is a large amount of attenuation, it may not eliminate all noise, particularly if the amplitude of noise is very high. There must be at least 13.8 VDC present at the connector, J2 pins 8 & 9, of the PMA8000G for the power supply to work in its designed regulation. Otherwise, it cannot adequately attenuate power line noise. Shielding can reduce or prevent radiated noise (i.e., beacon, electric gyros, switching power supplies, etc.) However, installation combinations can occur where interference is possible. The PMA8000G was designed in a RFI hardened chassis and has internal Electromagnetic Interference (EMI) filters on all inputs and outputs.

Ground loop noise occurs when there are two or more ground paths for the same signal (i.e., airframe and ground return wire). Large cyclic loads such as strobes, inverters, etc., can inject noise signals onto the airframe that are detected by the audio system. Follow the wiring diagram very carefully to help ensure a minimum of ground loop potential. Use only Mil Spec shielded wires (MIL-C-275000, or better). Under no circumstances combine a microphone and headphone wiring into the same shielded bundle. Always use a 2- or 3-conductor, shield wire as shown on the installation-wiring diagram.

The shields can be daisy-chained together, and then connected to the ground lugs mounted on the back plate shown in Appendix B.

Radiated signals can be a factor when low level microphone signals are "bundled" with current carrying power wires. Keep these cables physically separated. It is very important that you use insulated washers to isolate the ground return path from the airframe to **all** headphone and microphone jacks.

2.4.1.1 Music Inputs and Noise

PMA8000G units utilize a differential input to help prevent noise from entering the music system. This feature is usually transparent to the installer; however, it is important that the appropriate music signal and ground connections are made directly to the dedicated music signal and ground inputs on the PMA8000G. The power for IFE and audio panel should be a common bus.

If a music jack instead of a Bluetooth music source is installed for Music 1 or 2, we recommend grounding the jack to airframe ground.

NOTE

Adding a high-performance audio control system, particularly in conjunction with high-performance active noise canceling headsets, cannot improve on older avionics that were designed for cabin-speaker use. PS Engineering makes no claim that the audio panel will provide a noise-free audio quality under all installation conditions, particularly with older avionics.

2.4.2 Existing GMA340 Installation

If the installation replaces a GMA340, no changes are necessary as long as the existing installation meets the requirements. All existing functions of the GMA340 as well as all of the new capabilities afforded by the PMA8000G will become instantly available. Be advised, the PMA8000G does not support 3 VHF COMs, however. The PMA8000G handles two COM transceivers and a full-duplex cellular/satellite telephone.

Added capabilities include, IntelliVox®, DuTel™ duplex telephone, improved music fidelity and Soft Mute™ and Karaoke™ muting modes, improved and more flexible music distribution control, internal recorder function, additional unswitched audio inputs and USB charging port.

2.4.2.1 Differences with GMA340 connector

Connector	Pin	GMA340 Function	PMA8000G Function
J1	3	COM 3	TEL Audio Hi
J1	4	COM 3	TEL Lo

Connector	Pin	GMA340 Function	PMA8000G Function
J1	5	COM 3	TEL Mic Audio Hi
J1	6	COM 3	No Connection
J1	16	MASQ Inhibit	No Connection
J1	23	COM 3 Speaker Load	AUX Audio Input
J1	24	COM 3 Speaker Load	Reserved
J1	25	COM Speaker Load	No Connection
J1	26	COM Speaker Load	No Connection
J1	27	COM Speaker Load	No Connection
J1	28	COM Speaker Load	Reserved
J1	29	No Connection	Unswitched #3
J2	15	High Music Gain Select	Unswitched #4
J2	17	8Ω Speaker Select	Message Trigger #1
J2	18	No Connection	Aux Enable Output
J2	19	Tone Enable	Reserved
J2	29	Failsafe warn	CVR Output
J2	30	Com TX Mute	Reserved

Table 2-2 GMA340–PMA8000G connector differences

Installations where the external marker outputs are connected to a Sandel 3308 Navigation Display will require additional loading resistors. Refer to the Sandel installation data for more information.

2.4.3 Headphone Wiring

In order for the IntelliAudio® spatial audio to perform correctly, the audio panel **must be connected** to stereo headsets, and the left/right outputs wired correctly as shown in Appendix D.

2.4.4 Power

The PMA8000G is compatible with both 14- and 28-Volt DC systems. A five (5) Amp circuit breaker is required for all installations. Power and ground wires should be #22 connected to J2 Pins 8 and 9. Connect airframe ground to J2 Pin 10 and 11 only. No dropping resistors are required.

2.4.5 Communications Push-to-Talk

An important part of the installation is the PTT (Push-To-Talk) switches that allow the use of your aircraft communications radio for transmissions. There are three typical configurations that can be used. Select the case that best fits the installation. Only the person who presses their PTT switch will be heard over the radio. If the pilot and copilot both use the PTT, the only pilot position has access to the radio. The pilot position will have PTT control regardless of the mic selector switch or copilot PTT when the PMA8000G is in the OFF/EMG mode.

CASE I: PTT is built into both pilot and copilot yokes.

CASE II: PTT is in pilot yoke only. This configuration requires a modified external PTT switch plugged into the copilot's microphone jack (See Appendix A). When the copilot's PTT is pressed, the intercom switches the microphone audio from pilot to copilot mic.

CASE III: No built in PTT. This requires two built in PTTs to be installed or modified external PTT switches to be used. Modify external PTT as required. See Appendix A.

2.4.6 Audio Panel interface

The PMA8000G is designed to interface with standard aircraft avionics and presents a 510 Ω receiver impedance. For best results, a twisted-shielded cable is recommended from the avionics audio source to the audio panel, with the shield grounded at the audio panel end.

Some avionics do not provide a separate audio low and may introduce additional electrical noise into the system. For best results, connect the audio low from the audio panel to the radio ground, using one conductor of the twisted-shielded cable.

2.4.6.1 Speaker Load

The PMA8000G contains one speaker amplifier and does not provide a speaker load for legacy units. Some units with internal speaker amplifiers, such as the King Radio KX170-series, require a resistive load to prevent damage if their speaker amplifier is not used. Connect the speaker output from the legacy radio to an external speaker load of at least 16 Ω, 3W.

2.4.7 Transmit Interlock

Some communications transceivers use a transmit-interlock system. To fully utilize the Split Mode feature, this function must be disabled. Consult that manufacturer's installation manual.

2.4.8 Backlighting

Control of the GREEN and **WHITE** button text and backlighting is through the aircraft avionics dimmer For 14 V aircraft, connect J2 Pins 6 and 7 to the aircraft dimmer bus, and pin 5 to ground. For 28-volt systems, connect pin 7 to the aircraft dimmer, and pins 5 and 6 to ground.

If an external dimmer control is **not** used, or the dimmer voltage is less than 0.5 VDC, the white text will be at full intensity.

There is a backlighting adjustment, see §2.8 for information.

2.4.9 Unswitched inputs

J1, pins 31, 29 and J2 pin 15 are unswitched, unmuted (by transmitter keying), inputs # 1, 3 and 4, respectively. These inputs are presented to the pilot and copilot regardless of the audio configuration and will always mute the entertainment inputs. These 510Ω inputs can be used for altimeter DH audio, GPS waypoint audio, autopilot disconnect tones, or any other critical audio signal. Unswitched #1 is always presented to the speaker, plus to the crew headphones, and is available to the pilot in fail-safe (off) mode.

Unswitched 3 and 4 inputs are always presented to the crew headphones and over the aircraft speaker.

Unswitched Input	Hear in Fail Safe	Hear in Crew Headset	SPR button Select	Gain
1	Yes	Yes	No	1:1(fixed)
2	No	Yes	Yes	1:1(fixed)
3	No	Yes	No	Adjustable
4	No	Yes	No	1:1(fixed)

Table 2-3 Unswitched input table

Unswitched #2, J1 pin 44 is unswitched is always connected to the Pilot's headphone. However, this unswitched audio is only presented to the aircraft speaker when the SPR push button has been selected.

The audio low for unswitched #4 (J2, pin 15) should be connected to a convenient audio low. However, this should NOT be connected to Music Low.

Unswitched #1 is presented to the pilot headphone in fail-safe (off) mode.

NOTE

Inputs 1, 2 and 4 are fixed (1:1), and any audio level adjustments must be made at the input source. Unswitched #3 has a variable adjustment control located on the bottom side of the unit. This control allows you to adjust the volume level of that unswitched input. Refer to Adjustments section.

2.4.10 "Swap" Button Functions

Function 1: When a momentary, normally open, push-button switch is connected between pin 20 on the J2 connector and aircraft ground, the user can switch between Com 1 and 2 by depressing this switch without having to turn the mic selector switch. This yoke-mounted switch eliminates the need to remove your hands

from the yoke to change transceivers. The transfer of TX indication from Com 1 to Com 2 shows that the swap has been initiated; there is no dedicated swap indicator.

Function 2: The remote Swap button also acts as a remote intercom mode selector. Holding the Swap button for more than 1 second will cause the ICS button to increment in the same way as if the front panel ICS button is pushed. [ISO-ALL-CREW-ALL-ISO] The panel indications track the intercom mode.

2.4.11 TEL (Duplex) Function for wired Satellite or Cell Phones

Audio streams selected by the intercom mode are provided to the Tel output, and audio from Tel is presented to the headset. This allows a telephone-like audio interface.

The TEL mode in the PMA8000G is compatible with many telephones with hands-free headset interfaces. A jack can be installed somewhere on the aircraft panel. The wired interface jack is connected with the PMA8000G as shown: A patch cord (3/32" to 3/32") is available from PS Engineering under P/N 425-006-7026.

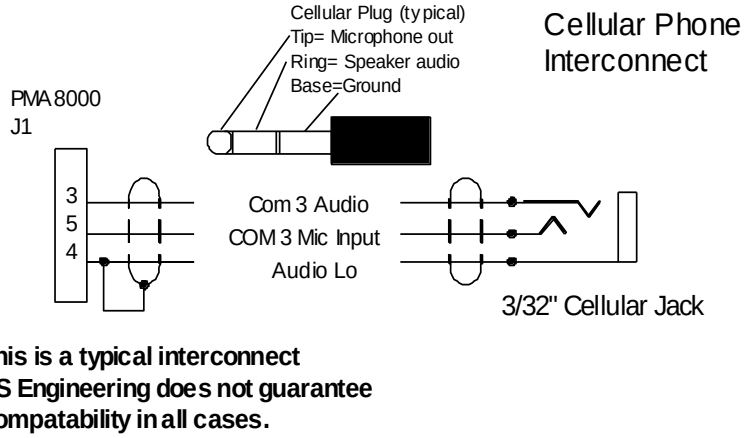


Figure 2-1 Wired telephone interface for rear connector, if an additional jack is desired

The PMA8000G is compatible with most Bluetooth® enabled devices for making and receiving telephone calls through the aircraft audio system.

NOTE

Unauthorized use of unapproved cellular telephone devices in aircraft is subject to FCC enforcement action, which may include a $10,000 fine per incident.
FCC Regulation 47 CFR § 22.925 *Prohibition on airborne operation of cellular telephones*.
Cellular telephones installed in or carried aboard airplanes, balloons or any other type of aircraft must not be operated while such aircraft are airborne (not touching the ground). When any aircraft leaves the ground, all cellular telephones on board that aircraft must be turned off.
PS Engineering, Inc. does not endorse using unapproved cellular telephone equipment in flight and takes no responsibility for the user's action.

2.4.11.1 Cell phone Sidetone

As shipped from PS Engineering, the PMA8000G provides cellular telephone sidetone (the user's voice fed back to the headset).

NOTE: PS Engineering does not guarantee compatibility with personal cellular telephones.

2.4.12 Public Address Mode

By pressing SPR pushbutton for more than 1 second, the PMA8000G will be placed into public address (PA) mode. SPR light will flash letting the pilot know PA Mode is active. In this mode, the pilot will be talking over the cockpit speaker when he presses his PTT switch. Copilot will still continue on the selected COM radio.

2.4.13 PA Mute (J2, Pin 12)

Pin 12 of J2 is a TTL logic *output* that is active low during PTT operation.

2.4.14 Miscellaneous Logic Output (J2, Pin 18)

Pin 18 of the J2 connector is pulled to ground whenever the AUX button is depressed. This serves as a control line for external devices, such as an entertainment system that the pilot wishes to control.

This pin can also be used to control passenger (Music 2) Karaoke Mode, by connecting to pin 13 of the J2.

NOTE
J2, Pin 18 should NOT be used if the AUX is going to be used to switch ADF, DME or auxiliary audio.

2.4.15 CVR Output (J2, Pin 29) (Serial Number F1256 and above only)

The CVR output contains the audio as heard by the pilot, including selected radios, sidetone, and intercom audio. CVR Audio low can be connected to any convenient audio low such as J2-34.

2.5 flightmate®

The flightmate® is an audio storage system for received radio playback and supplemental Alert messages.

2.6 Flightmate® Alert Messages

The user can program up to four audio messages (or use factory-prerecorded massages) to play when triggered by a discrete input. These inputs are either active low (or Message Trigger #1 is an active high). These are typically activated by aircraft systems that present a trigger output such as an engine sensor, etc.

2.6.1 Connections

NOTE: BEFORE USE, FLIGHTMATE MESSAGES MUST BE ENABLED.
CONTACT PS ENGINEERING FOR DETAILS.

2.6.2 Message triggers:

NOTE:

THESE MESSAGES ARE STRICTLY SUPPLEMENTAL AND PILOT OPTION, AND SHALL NOT REPLACE ANY EXISTING ALERTS IN THE AIRCRAFT.

IT IS THE INSTALLERS' RESPONSIBILITY TO DETERMINE IF THIS ALTERATION IS MAJOR OR MINOR AND PROVIDE APPROPRIATE DOCUMENTATION (FORM 337, SUPPLEMENTS, ETC.)

Function	Connector pin	Logic	Must be acknowledged
Message Trigger 1	J2-17	Active high (12 to 28 VDC)	No
Message Trigger 2	J2-19	Active Low	Yes
Message Trigger 3	J2-30	Active Low	Yes
Message Trigger 4	J1-24	Active Low	Yes
Message Acknowledge	J1-28	Active Low	

2.7 Intercom wiring

See Appendix C and D for intercom connection configurations. It is critical to the proper operation of this system to have this connector wiring made in accordance with these diagrams. Use 2- and 3-conductor, MIL-spec cable as shown. Connect the shields at the audio panel end only, and tie to the audio low inputs as shown.

2.7.1 Entertainment Inputs

The PMA8000G has two INDEPENDENT music inputs, input number 1 is J2 pins 23 (left channel) and 24 (right channel), with respect to pin 25, and Entertainment number 2 is connected to 26 (left channel), 27 (right channel), with respect to 28.

PMA8000G has wireless connectivity to stream music from a paired Bluetooth device. This stream is distributed as Music 1. Refer to §3.11.3 for more information.

NOTE

Use the low level output of any additional entertainment device to connect to the audio panel. Maximum signal level is **3 VAC** p-p. **DO NOT** use a speaker-level output; this will cause internal damage in the audio panel.

2.7.2 Music Distribution (DISTR)

Music distribution will be controlled by the MUSIC button. A long press (>1 second) will cycle through the positions below with a voice letting you know what mode the PMA8000G is in.

1. **Music #1 All Headsets** – everyone hears music #1/Bluetooth
2. **Music #1 Pilot**- Pilot will hear Music#1 or Bluetooth. Copilot and passengers hear music #2
3. **Standard Music Distribution**- Pilot & Copilot hear Music#1 or Bluetooth. Passengers will hear music#2

2.7.3 Entertainment muting

The PMA8000G incorporates a three-mode "Soft Mute™" system. This will mute the entertainment devices during ICS and/or radio conversation. See Section 3.8 for more information.

Press the **MUTE** switch to activate the three Karaoke modes (disabling crew Soft-Mute™). Turning down the entertainment volume allows the pilot to place the entertainment into the background while having the radios in the foreground and eliminates the constant interruption of the music while still keeping the radios a priority.

CAUTION

Local oscillators and internal signals from entertainment equipment can cause undesired interference with other aircraft systems. Before takeoff, operate the entertainment devices to determine if there is any adverse effect within the aircraft systems. If any unusual operation is noted in flight, immediately switch off the entertainment devices.

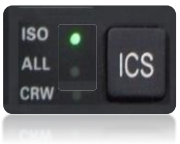
All additional entertainment devices must be switched off for both takeoff and landing.

2.7.3.1 Pilot Music on/off and in ISO intercom Mode

The (MUSIC) button will allow music to be added or removed from the pilot's headset quickly, with a short press, in any intercom mode.

When the PMA8000G is switched to ISO intercom mode, music is automatically removed from the pilot audio. However, if desired, music can be added by pushing the MUSIC button.

Once the music is activated while in the ISO mode then it will stay that way until the pilot manually removes it or cycles power to the audio panel.



While in the ALL mode if the pilot would like to add or remove music from the PILOT headset, then he can press the MUSIC button. This has no effect on copilot or passenger music.

2.7.3.2 Entertainment 2 Mute (J2 Pin 13 & 14)

Connecting J2 pin 13 to pin 14 (or ground) through a SPST switch places the entertainment #2 music source into the Karaoke Mode. In this mode, incoming music and intercom conversation will not mute the music for the passengers' intercom net. This allows uninterrupted music during casual conversation and at times when radio communications are of lesser importance.

If desired, the AUX button can act as the passengers' mute control. Connect J2 pin 18 (AUX logic) to J2 pin 13 (Entertainment. 2 Mute inhibit). Then, Entertainment 2 will not mute when the AUX button is on. (Not recommended if DME is input is used.)

2.7.4 Music Configuration

The music inputs can be configured by the user from the front panel by pressing the MUSIC button. There are three configurations available- Music #1 ALL Headsets, Music #1 Pilot and Standard Music Distribution.

Standard Music Distribution is selected. Input #1 or Bluetooth is provided to the pilot and copilot. Muting (SoftMute™) is controlled by the front panel "mute" button. Music 2 is provided to the passengers at all times, with muting controlled by an external switch.

Music 1 All Headsets is selected. All headsets will hear music #1 input and Bluetooth audio. Intercom selector mode will not affect music distribution.

Music 1 Pilot is selected. This will allow pilot to hear music #1 and Bluetooth while the copilot and passengers will listen to music #2.

2.7.5 Digital Recorder & flightmate® Play Back Feature

The flightmate® checklist can be played back from the front panel by pressing the PLAY button for at least 2 seconds.

Radio recorder playback is accomplished by momentarily pressing the PLAY button on the front panel.

In addition, a remote momentary, normally open (NO) push button switch may be installed if desired to remotely activate the Radio Recording System playback. This switch can be located anywhere in cockpit convenient to the pilot's reach. The NO switch should be connected to pin 22 of J2 of the PMA8000G, and ground.

2.8 Marker Beacon Installation

2.8.1 Marker Antenna Installation

A marker beacon antenna, appropriate to the type and speed of the aircraft, is required (not included). Refer to aircraft and antenna manufacturer's installation instructions, as well as AC43.13-2B (or later revision), Chapter 3, for information on proper antenna installation techniques. The marker beacon antenna must be mounted on the bottom of the aircraft.

2.8.2 External Marker Lights

For installations that require external marker beacon lights, there are three outputs that can drive 12-Volt lamps only. The external output lamps are driven high (typically +7.0 VDC ±4.0 VDC unloaded, at MAX brightness) when active. Maximum source current per lamp is 125 mA. Voltage varies with photocell dimming.

2.8.3 Middle Marker Sense

A Middle Marker Sense output signal is available from the PMA8000G to certain flight control systems. This function will not operate during the test mode. This output will go to +4.5 VDC (± 1.0 VDC) when a valid Middle Marker signal is received. This output is J1, pin 39.

2.9 Adjustments

The PMA8000G is factory adjusted to accommodate the typical requirements for most aircraft configurations. There are several adjustments in the top cover that allow the installer to tailor the specific functions.

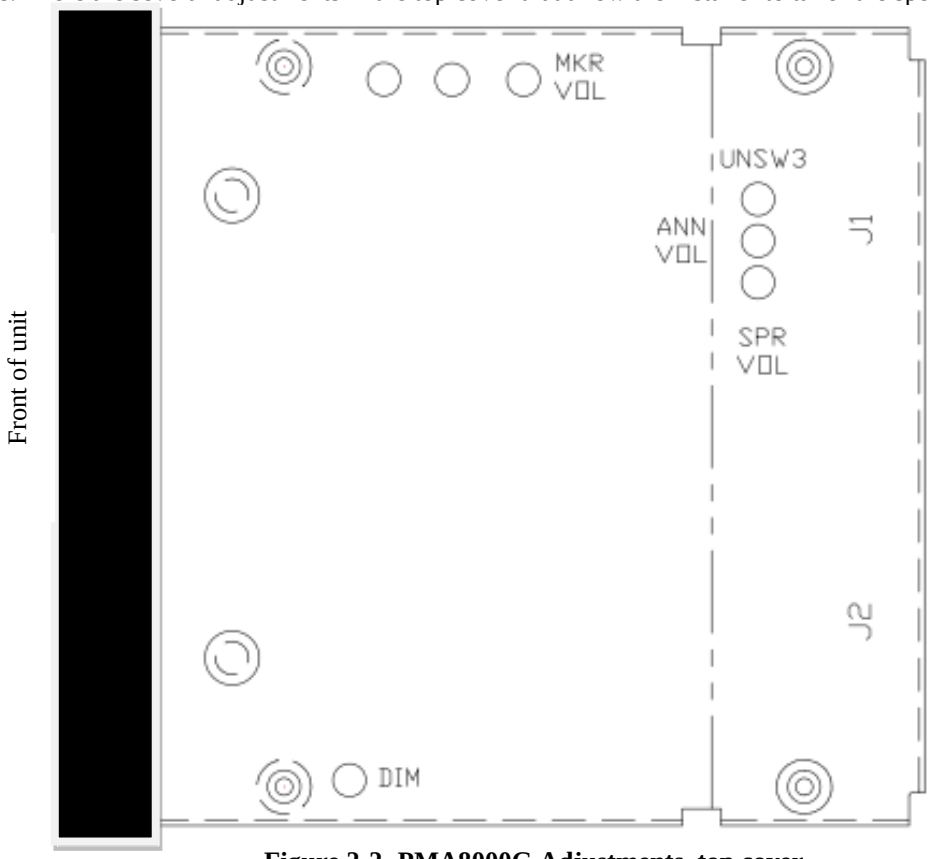


Figure 2-2- PMA8000G Adjustments, top cover

- Speaker Volume [SPR VOL] – Turn adjustment clockwise to increase cabin speaker output.
- Marker Beacon Volume [MKR VOL] –, turn adjustment counterclockwise to increase marker beacon audio level.
- Annunciation Volume [ANN VOL] – Function Mode Annunciation Volume – controls the level of the voice annunciations contained in the unit. (Top cover must be removed).
- Unswitched Input 3 Volume [UNSW 3] – adjust from 50% to 200% of input value.
- Dimmer [DIM] – (Serial Number E1255 and below) Adjusts the brightness of the white text backlighting.

2.9.1 Backlight Adjustments, (Serial Number F01256 and above)

The relative intensity of the white and green lighting can be adjusted to suit the specific cockpit condition

You will need to remove the top cover and top PC Boards.

Blue color pot is VR5 and will adjust the white brightness if you turn the pot "counterclockwise"

White color pot is VR6 and will adjust the green brightness if you turn the pot "clockwise"

Both pots are set from factory at midscale.

2.10 Communications Antenna Installation Notes

For best results while in Split Mode, it is recommended that the one VHF communications antenna is located on top of the aircraft while the other communications antenna is installed on the bottom. Any antenna relocation must be accomplished in accordance with AC 43.13-2B, aircraft manufacturers' recommendations and FAA-approved technical data.

WARNING

It is probable that radio interference will occur in the split mode when the frequencies of the two aircraft radios are adjacent, and/or the antennas are physically close together. **PS Engineering makes no expressed or implied warranties regarding the suitability of the PMA8000G in Split Mode.**

2.11 PMA8000G Pin assignments

J1	Function	J2	Function
1	Marker Antenna	1	Pilot Phones Lo
2	Marker Ant Lo	2	Copilot Phones Lo
3	**Satellite Telephone Audio In**	3	Copilot Phones (L)
4	**Satellite Telephone Audio Low**	4	Copilot Phones (R)
5	**Satellite Telephone Mic Audio**	5	Lights low
6	**No Connect**	6	14/28 V Lights
7	ADF Audio (Control with AUX)	7	14/28 V Lights
8	ADF Audio Lo (Control with AUX)	8	Aircraft Power
9	Com 1 Audio	9	Aircraft Power
10	Com 1 Audio Lo	10	Aircraft Ground
11	Com 1 Mic	11	Aircraft Ground
12	Com 1 Mic Key	12	PA Mute
13	Com 2 Audio	13	Mute #2
14	Com 2 Audio Lo	14	Mute #2
15	Com 2 Mic	15	Unswitched 4 Audio
16	**No Connect**	16	Pilot Phones (L)
17	Nav 1 Audio	17	**Reserved**
18	Nav 1 Audio Lo	18	**AUX logic output**
19	Nav 2 Audio	19	**Reserved**
20	Nav 2 Audio Lo	20	Swap/ICS Remote
21	DME Audio (Control with AUX)	21	Swap Lo
22	DME Audio Lo (Control with AUX)	22	**Playback**
23	AUX input (Control with AUX)	23	Music 1 (L)
24	**Reserved**	24	Music 1 (R)
25	**No Connect**	25	Music 1 Lo
26	**No Connect**	26	Music 2 (L)
27	**No Connect**	27	Music 2 (R)
28	**Reserved**	28	Music 2 Lo
29	Unswitched 3 Audio	29	**CVR Out**
30	Com 2 Mic Key	30	**Reserved**
31	Unswitched 1 Audio	31	Pilot Phones (Rt)
32	Unswitched Lo	32	Copilot Mic Audio
33	Pilot Mic Audio	33	Copilot Mic PTT
34	Pilot Mic PTT	34	Copilot Mic Lo
35	Pilot Mic Lo	35	Pass 1 Mic Audio/Exp Audio. In
36	Ext IM MKR	36	Pass 1 Mic Audio Lo/ Exp Lo
37	Ext OM MKR	37	Pass 2 Mic Audio/Exp Audio In
38	Ext MM MKR	38	Pass 2 Mic Audio Lo/Exp Lo
39	MM Sense	39	Pass 3 Mic Audio/Exp Power Out
40	Pass HP (L)/Exp. Audio Out (L)	40	Pass 3 Mic Audio Lo
41	Pass HP (R)/Exp. Audio Out (R)	41	Pass 4 Mic Audio/Exp Power Out
42	Pass HP Lo	42	Pass 4 Mic Audio Lo
43	Unswitched 2 Lo	43	Speaker Lo
44	Unswitched 2 Audio	44	Speaker Output

NOTE: Exp. Connections for 050-890-0914 & -0918 ONLY

2.12 Wiring Checkout

After wiring is complete, verify power is ONLY on pins 8 and 9 of the J2 and airframe ground on connector pins 10 and 11. Failure to do so will cause serious internal damage and void PS Engineering's warranty.

2.13 Unit Installation

To install the PMA8000G, gently slide the unit into the mounting rack until the hold-down screw is engaged. While applying gentle pressure to the face of the unit, tighten the 3/32" hex-head in the center of the unit until it is secure. DO NOT OVER TIGHTEN.

CAUTION

Apply steady pressure to the bezel while screwing the unit into the tray to ensure even seating of the unit and connectors. **WARNING** Do not over-tighten the lock down screw while installing the unit in tray. **Internal damage will result.**

2.14 Operational Checkout

2.14.1 Required Test Equipment

In order to return an aircraft to service after installation of the PMA8000G, the installer must have access to a Marker Beacon signal generator:

a. IFR NAV401L, NAV402AP, IFR4000
b. TIC T-30D, T-36C

Equivalent test equipment is acceptable as long as the testing requirements can be met.

2.14.2 Audio Panel Test

NOTE

The *IntelliVox*® is designed for ambient noise levels of 80 dB or above. Therefore some clipping may occur in a quiet cabin, such as without the engine running, in a hangar. This is normal.

1. Apply power to the aircraft and avionics.
2. Plug headsets into the pilot, copilot, and occupied passenger positions.
3. Verify fail-safe operation by receiving and transmitting on com 1 from the pilot position, with the audio panel power off. The Com audio will be present in one ear cup only.
4. Switch on the unit by pressing the volume (VOL) knob.
5. Check intercom operation.
6. Push the Com 1 XMT select button (lower row).
7. Verify that both of the **Com 1** buttons light. Verify that transmit button LED (Light Emitting Diode) near the mic selector is not blinking unless the radio P-T-T is pressed. If the LED is blinking without P-T-T, stop testing and troubleshoot the microphone PTT installation.
8. Verify proper transmit and receive operation from the copilot position, noting that the copilot PTT switch allows proper transmission on the selected transceiver. Verify that the Com 1 Xmt button blinks when transmitting.
9. Verify that pushing the **COM 2** button causes the button to illuminate, and the Com 2 receiver to be heard. Verify operation on Com 1 from the pilot position.
10. Repeat for Com 2
11. Press and hold the Com 1 Xmt button. While holding the Com 1 button, press the Com 2 Xmt button. This places the unit in "split Mode;" Verify that the pilot can transmit and receive on Com 1, while the copilot transmits and receives on Com 2.
12. Verify proper operation of all receiver sources by selecting them using the appropriate button. The button illuminates to show which source is in use.
13. Push the SPR button. Verify that all selected audio is heard in the cockpit speaker. Verify that the audio mutes when the mic is keyed.
14. Verify that the appropriate LED in the lower button row blinks when either push to talk is keyed.
15. Push both the HRTF button to activate the IntelliAudio™ function. Verify that the audio from COM 1 is present in the 10 o'clock headset position, and COM 2 is present in the 2 o'clock headset position.
16. Verify proper Intercom system operation in the **ISO, ALL** and **CREW** modes (see Table 3-1).
17. Verify that the audio selector panel system does not adversely affect any other aircraft system by systematically switching the unit on and off, while monitoring the other avionics and electrical equipment on the aircraft.

2.14.3 Marker Checkout

1. Connect a ramp generator at the antenna end of the marker coax. With the unit under test in HI sensitivity, verify that a 160 μV, modulated 95% with 1300 Hz, signal will illuminate the amber (M) marker light, and that marker audio is present in the headphones when the Marker Audio (MKR) push-button has been depressed. Select SPR for speaker to verify marker audio availability on the cabin speaker. Verify that the white (I) and blue (O) lights will illuminate within ± 3dB of the amber lamp, with 3000 HZ and 400 Hz applied, respectively.
2. Repeat with the unit in LOW sensitivity, with 430 μVolts applied.
3. Connect the marker antenna and verify proper operation.

2.14.4 Bluetooth Checkout

Verify that the PMA8000G will "pair" with a Bluetooth device, and interface with cellular phone and Music source.

2.14.5 Internal Recorder Checkout- PLAYBACK

With headset plugged into pilot's side jacks, tune COM 1 to local frequency, such as FSS or ATC ground. Select Com 1 on mic selector switch, and record several incoming radio transmissions.

Momentarily press the PLAY button on the front panel. This action will then automatically play back the last recorded message. Momentarily press the PLAY button again to stop the play back, and then momentarily press again to play prior messages.

This audio should appear in the pilot and copilot headsets, and only be incoming transmissions from the transceiver selected in the mic select switch.

Depress the audio panels yoke mounted playback switch (hardwire), and verify that messages play, in the order received. Repeat for COM 2 The playback will be stopped by audio on the selected com. The message can be replayed from the beginning, and audio received during the playback will not be stored.

See §2.5 for full flightmate information.

2.15 Final Inspection

Verify that the wiring is bundled away from all controls and no part of the installation interferes with aircraft control operation. Move all controls through their full range while examining the installation to see that no mechanical interference exists. Verify that the cables are secured to the aircraft structure in accordance with good practices, with adequate strain relief. Ensure that there are no kinks or sharp bends in the cables and coaxial cables. Verify that the cables are not exposed to any sharp edges or rough surfaces, and that all contact points are protected from abrasion.

Complete documentation that may be required, such as a logbook entry, weight and balance computation and FAA Form 337. Sample text for FAA Form 337, and instructions for continuing airworthiness can be found in Appendix F. Return completed warranty registration application to PS Engineering, or complete online at www.ps-engineering.com

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Section III OPERATION

3.1 SCOPE

This section provides detailed operating instructions for the PS Engineering PMA8000G, Audio Selector Panel/Marker Beacon Receiver/Intercom Systems. Please read it carefully before using the equipment so that you can take full advantage of its capabilities.

This section is divided into sections covering the basic operating areas of the PMA8000G systems. They are; Communications Transceiver Selection, Audio Selector, Intercom, Marker Beacon Receiver and special functions, including the Bluetooth® functionality in the PMA8000G.

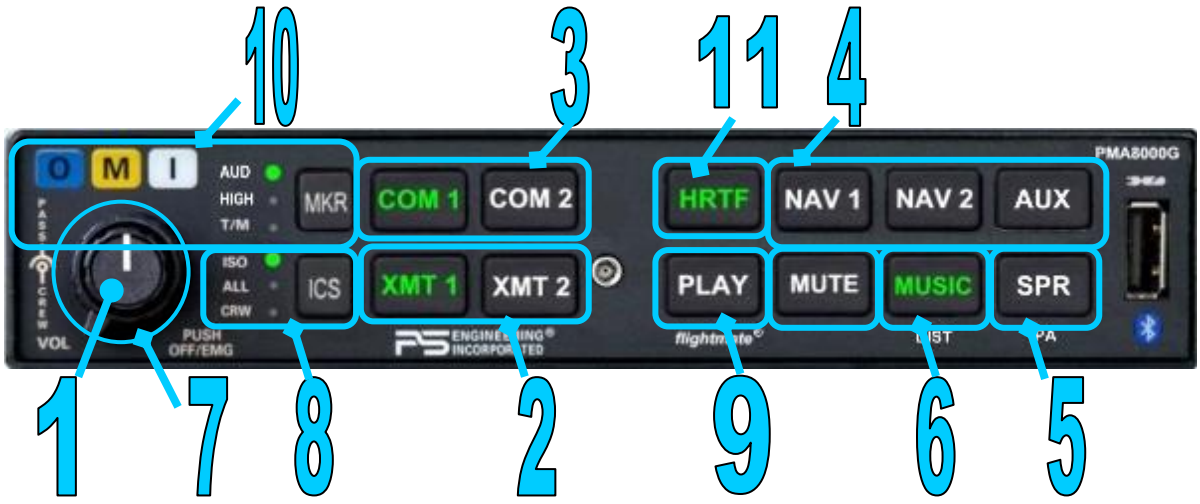


Figure 3-1 PMA8000G Operating Controls

Unit power is turned on and off by pushing the volume knob. In the OFF or "**EMG**" position, the pilot headset is connected directly to Com 1 as well as unswitched input #1. COM 1 & Unswitched is presented to the left ear.

This allows communication capability regardless of unit condition. Any time power is removed or turned OFF, the audio selector will revert to fail-safe mode.

The power switch controls all audio selector panel functions, intercom and marker beacon receiver. All pushbutton selections will be remembered and return to the last state when turned on.

3.2 Communications Transmit (XMT) Selection (2)

There are two pushbuttons associated with the transmitter selection. The two lower buttons (# 2) control which transceiver is selected for transmit. The top row of pushbuttons (# 3) allows selection of the receiver audio. Push the lower button to select the desired COM transmitter.

The PMA8000G has an automatic selector system. Audio from the selected transceiver is automatically heard in the headsets and speaker (if selected). You can check this function by switching from XMT 1

transmitter to XMT 2 transmitter by pressing the XMT 2 transmitter selector pushbutton. See that the associated Com 2 receive pushbutton indicator light that is located immediately above the Com 2 transmitter pushbutton turns green. This guarantees that the pilot will *always* hear the audio from the transceiver selected for transmit.

The PMA8000G "remembers" the receiver selection, so that when switching transmitters from COM 1 to COM 2, if COM 2 audio was previously selected, COM 1 audio will continue to be heard. This eliminates the pilot having to switch Com 1 audio back on, after changing transmitters.

When switching from COM 1 to COM 2 while Com 2 was not previously selected, COM 1 audio will be switched off. In essence, switching the mic selector will not override prior selection of COM receiver audio.

In normal (not split) modes, the PMA8000G gives priority to the pilot's radio Push-To-Talk (PTT). If the copilot it transmitting, and the pilot presses his PTT, the pilot's microphone will be heard over the selected com transmitter.

If the pilot microphone and headphones are connected to the cell phone, the pilot PTT will switch the pilot microphone to the selected com transceiver, and allow continued aircraft communications to continue.

The copilot will also be able to transmit on the other selected radio with his PTT as well.

3.2.1.1 Split Mode

The split mode can be activated at any time by pressing the **XMT 1** and **XMT 2** buttons at the same time. This places the pilot on COM 1 and the Copilot on COM 2.

Pilot on COM 2 and Copilot on COM 1 is not possible.

NOTE

Due to the nature of VHF communications signals, and the size constraints in general aviation aircraft, it is probable that there will be some bleed-over in the Split mode, particularly on adjacent frequencies. PS Engineering makes no warranty about the suitability of Split Mode in all aircraft conditions.

When the split mode is activated, the intercom between the pilot and copilot is inhibited, although the passengers can still talk among themselves. The crew intercom can be reactivated if desired by pressing the "Mute" button. The indicator LED in the Mute button will be green when the intercom is off (muted), and turn off to indicate that the intercom is not muted, and the crew can speak to each other.

3.2.1.2 Swap Mode (Switch from Com 1 to Com 2 remotely) Remote intercom mode control

With a yoke mounted, normally open momentary switch, the pilot can change from the current Com transceiver to the other by depressing this switch. To cancel "Swap Mode," the pilot may either press the yoke mounted switch again, or select a different Com with the XMT buttons.

The panel- or yoke-mounted optional "swap" switch can also act as a remote intercom mode. A long (>1 second) press of the swap switch will increment the intercom mode selector from ISO-ALL-CRW-ISO, etc. each time the button is pressed and held.

3.2.1.3 IntelliAudio® Head related Transfer Function (HRTF)(11)

PS Engineering's patented IntelliAudio feature will place COM 1 in the apparent 10 o'clock position to the flight crew's headset, and COM 2 in the apparent 2 o'clock position.

This feature is turned on and off by pressing the HRTF button.

NOTE: IntelliAudio requires stereo headsets in pilot and copilot locations with correctly oriented left and right ear cups.

3.2.1.4 Monitor Mode (S/N DG1199 and above)

The Monitor Mode causes the audio from a primary radio (selected for transmit) mute the secondary radio (selected for listen only) when the primary radio is receiving a signal. This allows the crew to copy weather but still hear ATC clearly. Press the COM button on secondary radio until "Monitor ON" is heard in the headset to activate the Monitor mode. The secondary COM button will blink in Monitor mode. NOTE: activating the monitor mode will turn on COM receive audio if not already selected.

3.3 Audio Selector (4)

Communication audio from the other radio, not selected for transmit, can be heard by pressing the associated receive button. You will always hear the audio from the selected transceiver.

Navigation receiver audio is selected through five momentary, push-button, backlit switches.

The users can identify which receivers are selected by noting which green switch LEDs are lit. Navigation aid audio push buttons are labeled **Nav 1**, **Nav 2**, **MKR** (Marker), **ADF, DME** and **AUX** (auxiliary). DME and ADF audio (if present) will come through when the **AUX** button is selected. When one of these buttons is pressed, the mode is active, and the LED will illuminate. Press the switch again and it will be "off" and remove that receiver from the audio output.

In SPLIT mode, only the pilot will hear selected navigation audio.

3.4 Speaker Amplifier (5)

The **SPR** switch will place all selected audio on the cockpit speaker when this switch is selected. Except for the unswitched audio, the speaker amplifier is not active in the "Split Mode".

Unswitched audio, (the inputs dedicated to autopilot disconnect, altimeter warning, etc.) will come through the speaker regardless of the speaker button position.

Depending on installation, important audio annunciations such as radar altimeter or autopilot disconnect will come over the speaker even if it is not selected, while other unswitched, but muted inputs, such as GPS alerts, will only be present if the SPR button is selected. Consult your professional avionics installer for these important configuration details.

3.4.1 Public Address Function

To access PA function, press and hold the **SPR** button for more than 1 second. The SPR button will blink, indicating PA mode is active. The pilot microphone will be heard on the speaker when the pilot PTT is used. The copilot can continue to use the selected com radio while the pilot will now be heard over the speaker. During Public Address, the **SPR** button will flash. To exit PA mode, push and hold **SPR** again or cycle power on the audio panel.

3.5 Marker Beacon Operation (10)

The Marker Beacon Receiver uses visual and audio indicators to alert you when the aircraft passes over a 75 MHz transmitter.

The Blue lamp, labeled "O", is the Outer Marker lamp and has an associated 400-Hertz 'dash' tone. The lamp and tone will be keyed at a rate of two tones/flashes per second when the aircraft is in the range of the Outer Marker Beacon.

The Amber lamp, labeled "M", is the Middle Marker lamp and is coupled with a 1300 Hertz tone. It is keyed alternately with short 'dot' and long 'dash' bursts at 95 combinations per minute.

The White lamp, labeled "I", is the Inner marker and has a 3000 Hertz 'dot' tone. The lamp and tone will be keyed at a rate of six times per second.

The audio from the Marker Beacon Receiver can be heard by selecting the "**MKR**" push-button switch. To adjust the volume level, there is a service adjustment located on the top of the unit.

A pushbutton is used to set the receiver sensitivity and to test the indicator lamps mute the marker audio.

Short press – Controls Marker audio on/off. The top indicator (AUD) will light green when selected. The button is backlit white at all times.

Medium press – Pressing this button for about one second will control Marker low & High Sense toggle. When HIGH is selected, the text next to the MKR will be lit in green. Selection will be remembered during power cycles.

Long press- As long as you are holding down the MKR button, you will activate the test marker LEDs only and light up the T/M text green next to the MKR button. Once you let go of the button the marker lamps will extinguish and the TEST text will go back to white back light.

PMA8000G, serial number DG01199 and above:

Short press – Controls Marker audio on/off. The top indicator (AUD) will light green when selected. The button is backlit white at all times.

Medium press – Pressing the MKR for one second, while beacon audio is active, will cause the marker audio to mute for that beacon. The next beacon received will re-activate the audio. This will also test the marker indicator lamps.

Long press – Pressing this button for about one second will control Marker Low & High Sense toggle. When HIGH is selected, the text next to the MKR will be lit in green. Selection will be remembered during power cycles.

3.6 Intercom Operation

3.6.1 *IntelliVox*® VOX-Squelch

No adjustment of the *IntelliVox*® squelch control is necessary. There is no field adjustment. Through three individual signal processors, the ambient noise appearing in all six microphones is constantly being sampled. Non-voice signals are blocked. When someone speaks, only their microphone circuit opens, placing their voice on the intercom.

The system is designed to block continuous tones; therefore people humming or whistling in monotone may be blocked after a few moments.

For consistent performance, any headset microphone **must** be placed within ¼-inch of your lips, preferably against them. (ref: *RTCA/DO-214, 1.3.1.1 (a)*).

NOTE

It is also a good idea to keep the microphone out of a direct wind path. Moving your head through a vent air stream may cause the *IntelliVox*® to open momentarily. This is normal.

The *IntelliVox*® is designed to work with normal aircraft cabin noise levels (70 dB and above). It loves airplane noise! Therefore, it may not recognize speech and clip syllables in a quiet cabin, such as in the hangar, or without the engine running. This is normal.

For optimum microphone performance, PS Engineering recommends installation of a Microphone Muff Kit from Oregon Aero (1-800-888-6910). This will not only optimize VOX performance, but will improve the overall clarity of *all* your communications.

Manufacturer	Model	Mic Muff™ Part Number
Bose	Dynamic Electret M87 Dynamic	90010 90015 90020
David Clark	H10-30 H10-20, H10-40 H10-13.4	90010 90015 90015
Lightspeed	All	90015
Peltor	7003 7004	90010 90015
Pilot	11-20 & 11-90	90015
Sennheiser		90015
Telex	Airman 750, Echelon AIR3000	90015 90010

Table 3-1 Mic Muff ™ Part Numbers

3.6.2 Intercom Volume Control (7)

The inner volume control knob adjusts the loudness of the intercom for the pilot and copilot. It has no effect on selected radio levels, music input levels or passengers' volume level.

The outer volume control knob controls intercom volume for the passengers. It has no effect on radio or music levels.

Adjust the radios and intercom volume for a comfortable listening level. Most general aviation headsets today have built-in volume controls; therefore, volume also can be further adjusted at the individual headset.

3.6.2.1 Mono headsets in Stereo Installation

The pilot and copilot positions will function with mono headsets. However, the **IntelliAudio® functionality will be lost.**

NOTE: Using mono headsets with HRTF on may result in receive and sidetone audio anomalies.

All passenger headsets are connected in parallel. Therefore, if a monaural headset is plugged in to a PMA8000G Stereo installation, one channel will be shorted. Although no damage to the unit will occur, all passengers with stereo headsets will not hear one channel, unless they switch to the "MONO" mode on their headset. Passengers will not receive **IntelliAudio functionality.**

3.6.3 Intercom Modes (8)

The "**ICS**" pushbutton switch on the left side of the panel provides the selection of the three intercom modes. The description of the intercom mode function is valid only when the unit is not in the "Split" mode. Then, the pilot and copilot intercom are controlled with the **Mute** button.

This button cycles through the intercom modes, from top to bottom, then bottom to top as: ISO, ALL Crew and Crew, ALL, ISO. An LED shows which mode is currently active.

ISO: The pilot is isolated from the intercom and is connected only to the aircraft radio system. He will hear the aircraft radio reception (and sidetone during radio transmissions). Copilot will hear passengers' intercom and entertainment, while passengers will hear copilot intercom and entertainment. Neither will hear aircraft radio receptions or pilot transmissions. The pilot can hear music if desired by pressing the MUSIC button.

ALL: All parties will hear the aircraft radio and intercom. Crew and passengers will hear selected entertainment. During any radio or intercom communications, the music volume automatically decreases. The music volume increases gradually back to the original level after communications have been completed.

CREW: Pilot and copilot are connected on one intercom channel and have exclusive access to the aircraft radios. They may also listen to Entertainment 1. Passengers can continue to communicate with themselves without interrupting the Crew and may listen to entertainment as configured.

3.6.3.1 Remote ICS Mode Control

The panel- or yoke-mounted optional "swap" switch can also act as a remote intercom mode selector. A long (>1 second) press of the swap switch will increment the intercom mode selector from ISO-ALL-CRW-ISO, etc. each time the button is pressed and held.

A short press activates the COM 1 to COM 2 to COM 1 swap function.

3.6.4 Split Mode Intercom

When Split mode is activated, the intercom for the crew is turned off (muted), automatically, and the **ICS** LED indicator goes off. This prevents confusion from multiple conversations. If crew intercom communication is desired, press the **MUTE** button to place the intercom into the **CREW** mode.

3.6.5 *Alternate Intercom Function*

This function controls the distribution of aircraft radio within the intercom, as well as passenger intercom muting, **when in the "ALL" intercom mode**. In the "*standard intercom function*" mode, aircraft radios are distributed to all, when the intercom is in the ALL mode. In CREW mode, only the pilot and copilot positions will hear aircraft radios.

When "Alternate Intercom" function is toggled (hold ICS button for more than three seconds) a voice announces, "*Alternate Intercom Function*," and the passengers will NOT hear aircraft radios, even in the **All** intercom mode. They will be able to converse with the crew. However, when the aircraft radio becomes active, the intercom audio from the passengers is muted, allowing the crew to focus on the radio. The passengers will still be able to talk to each other. Pressing holding the ICS button for three seconds again switches the intercom back to "*Standard Intercom Function*." Alternate Intercom mode is reset at power up.

3.7 Music and Music Muting (6)

The PMA8000G has two independent music inputs at the rear connector. The PMA8000G also has the ability to receive streaming music from a Bluetooth-enabled device.

Music 1 will be heard by the pilot and copilot positions. Music 1 can also be distributed to the passengers using the MUSIC DISTR control. The Bluetooth streamed music in the PMA8000G is also handled as Music 1.

NOTE:

All music devices should be turned off for takeoff, landing, or any critical phase of flight. FAA Regulation 14 CFR 91.21 restricts the use of portable electronic devices.

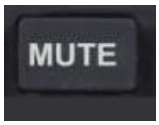
§91.21 "(a) Except as provided in paragraph (b) of this section, no person may operate, nor may any operator or pilot in command of an aircraft allow the operation of, any portable electronic device on any of the following U.S.-registered civil aircraft. . .

"(b)(5) Any other portable electronic device that the operator of the aircraft has determined will not cause interference with the navigation or communication system of the aircraft on which it is to be used."

You can refer to Advisory Circular 91.21-1A for more information, at http://www.faa.gov

The front panel "Mute" button has **three** modes and controls the Mute function for Music 1.

The SoftMute™ circuit will mute the music whenever there is conversation on the radio, the intercom, or both, depending on the "Mute" mode selected. When that conversation stops, the music returns to the previous level comfortably, over a second or so.



The mute mode functions are controlled through sequential pushes of the MUTE button and include annunciations of the mode selected. The PMA8000G always defaults to *Mute On* when turned on.

Mute On- music **will** mute with *either* intercom *or* radio - MUTE button is lit. Voice annunciation is "mute on."

Mute Off - "Karaoke" mode - music will not mute except during outgoing radio transmissions. - MUTE indicator is OFF. Annunciation is "mute off."

Radio Mute - *Radio* will mute music, but intercom will **not** mute music - MUTE indicator is OFF. Annunciation is "radio mute."

♫ Music	Intercom	Radio	Annunciation	Indicator
Mute	Muted	Muted	"Mute on"	Green
Mute Off	♫	♫	"Mute off"	Off (White)
Radio	♫	Muted	"Radio mute"	Off (White)

The passenger's intercom also has a SoftMute™ circuit. If the passengers hear the radio, or talk on the intercom, the music will mute. If the audio panel is in CREW mode, then the radio reception will not affect the passenger music.

Passengers also have a Mute Off or "Karaoke" mode. If the passengers are listening to the music 1 input or front panel input, their Mute Off is controlled by the front panel "Mute" button. If the passengers are listening to the music 2 input, their Karaoke Mode is activated by an external switch installed either in the panel or connected to the AUX button logic output pin on the PMA8000G.

3.7.1 Music Distribution (DISTR)

The Music button allows you either distribute the music 1 input to all intercom stations, all of the time, or have other distribution rules apply to your music inputs.

When "*Music one all headsets*" is selected (press and hold **MUSIC**), music 1 (from the rear connector input, Pins J2 23 & 24 only) or Bluetooth will be distributed to all headsets and is independent of the intercom mode switch. Therefore, even in the CREW mode, the passengers will hear Music 1, even though they will not hear the intercom or radios.

This mode allows you to use a single in-flight entertainment source aboard, and to send it everywhere, even in crew mode. The music muting will be normal and follow the selected mode of the crew or passengers.

Press and hold **MUSIC** again, this will select "*Music one, pilot*". This will allow the Music 1 and/or Bluetooth to be distributed to the pilot's headsets while the copilot and passengers listen to Music #2.

Press and hold **MUSIC** again, and you will hear "*Standard Music Distribution.*" In this mode, Music 2 becomes active, and will always be presented to the passengers on the intercom. Music 1 is only available to the pilot and copilot. The intercom mode switch doesn't have any effect on the music distribution.

When the music distribution is "standard," Music 1 will always go to the pilot and copilot positions and is never heard by the passengers. Music 2 is always heard by the passengers, and never heard by the pilot and copilot.

This mode is useful if your passengers have a different interest in entertainment or are watching a DVD, but do not want to be excluded from the intercom conversations.

The pilot and copilot will always hear **Music 1** through the unit rear connector. This is present in ALL and CREW intercom modes, and available to the copilot position in ISO mode.

The pilot can hear this music source in ISO mode, if desired, as follows: In the ISO mode, hold the (Music) button, and press the ICS mode button for more than one second. The ICS mode LED will blink slowly to indicate music is connected to the pilot headset, although the intercom is not.

Music 2 is provided to the passenger positions regardless of intercom mode, when the audio panel is in *Standard Music Distribution*. The pilot and copilot can never hear **Music 2**, under any condition.

If the passengers always want to hear the source in **Music 1**, input through the rear connector, regardless of the intercom mode (ISO/ALL/CRW), select "*Music 1 all headsets*."

3.7.2 Music in Pilot ISO mode

If desired, the pilot can elect to hear Music #1, in the ISO mode. Pressing the MUSIC button will add music to the pilot headset.

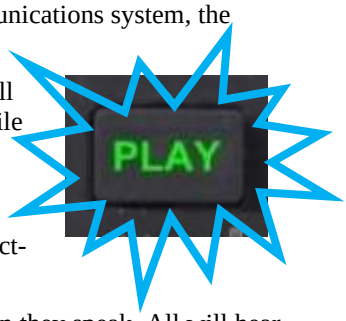
This mode will be indicated by the ICS ISO LED blinking slowly (once in every 5 seconds). The pilot will now hear Music #1, and it will mute in accordance with the Mute mode.

3.8 Bluetooth® Telephone Mode

Warning:

United States FCC Regulations contained in 47 CFR § 22.925 contain prohibition on airborne operation of cellular telephones. "Cellular telephones installed in or carried aboard airplanes, balloons or any other type of aircraft must not be operated while such aircraft are airborne (not touching the ground). When any aircraft leaves the ground, all cellular telephones on board that aircraft must be turned off."

The telephone mode serves as a full duplex interface for telephone systems such as cellular phones with Bluetooth® connectivity. When interfaced with an approved airborne telecommunications system, the PMA8000G can serve as an audio control and distribution center.



When the PMA8000G detects a Bluetooth® telephone call, the PLAY button will blink to indicate the signal. Pressing the PLAY button will pick up the call. While on a call, pressing PLAY again will end the phone call.

3.8.1 Bluetooth Telephone users

The individual connected to the telephone depends upon the intercom mode selected.

In **ALL** intercom mode, all crew and passengers will be heard on the phone when they speak. All will hear selected audio. Com audio is automatically heard in the headsets.

In **CREW** mode, the pilot and copilot are connected to the telephone. The pilot and copilot will have transmitted capability on the other selected transceiver Com 1 or 2, simply by using their respective PTT switch.

In **ISO** intercom mode, when the PMA8000G is in the **TEL** mode, the pilot position is in the "Phone Booth." Only the pilot will hear the telephone, and only he will be heard. He will also have access to Com 1 or 2 and will transmit on that radio using the PTT. All selected audio is provided.

NOTE

Because the cell phone uses an intercom circuit, all stations on that circuit will lose intercom capability when the cell phone is in use. Intercom conversations will still be present if the cell phone provides sidetone, or if the audio panel is modified for telephone sidetone.
PS Engineering does not guarantee compatibility with personal cellular telephones.
Visit www.ps-engineering.com for a list of phones that have been tested.

3.8.2 Cellular telephone sidetone

As shipped from PS Engineering, the PMA8000G provides cellular telephone sidetone (the user's voice fed back to the headset).

3.9 flightmate®

The flightmate® is an audio system with radio playback, Alert Messages (if installed).

3.9.1 Radio Playback

The radio recording portion is a continuous loop recorder, (last message received will be the first heard), the recorder has 45 seconds of recording time, or up to eight messages. There are no buttons to press to start recording. The system automatically begins to record the instant the radio selected for transmit be-

comes active. Only the pilot and copilot will hear the playback audio.

To play back the last recorded message, you quickly press the PLAY button. You must wait for the message to stop playing before accessing the prior message. To cancel the playback, quickly press the playback button for again. The next time the button is pressed for one second, the next earlier message will be heard. If the radio becomes active while a message is playing, the message playback will stop. The new audio will not be stored. Press play to restart the message you were playing.

Messages are lost when a different radio is selected for transmit.

The playback will stop whenever there is more incoming selected com audio, and the message can be replayed from the beginning. **Note:** an external playback button may also be installed in a convenient location.

3.10 Bluetooth® interface

The PMA8000G has a Bluetooth interface. The audio panel is always "discoverable," so you just need to search for the PMA8000G from your Bluetooth-equipped phone or music source. The default access code is 0000, if needed. Once the PMA8000G has been "paired" with your Bluetooth device, the TEL distribution will act as described in the manual.

You answer a call at the phone itself. Calls can only be answered from the telephone handset. You can disconnect the call from the handset.

When the PMA8000G is connected to a Bluetooth device for telephone or music, the Bluetooth indicator on the audio panel will illuminate.

3.10.1 Pairing and un-pairing Bluetooth devices

The PMA8000G can be paired with up to eight individual devices. When that number is exceeded, one device will be automatically un-paired to allow the new device. The device eliminate will be selected at random by the Bluetooth module. *Hint, if your old phone is not recognized by the PMA8000G, you may simply need to re-pair.*

3.10.1.1 Bluetooth Reset

If the Bluetooth stops responding to paired devices, it may be because of corrupted device data. Simply reset the Bluetooth system as follows:

1. Power off audio panel
2. Put the pilot's headset on
3. Hold down NAV1 and NAV2 buttons at the same time to clear the Bluetooth devices and not require a PIN to pair.
4. Turn ON the audio panel and continue to hold down the two buttons for at least 5 seconds or a "ding" chime is heard in headset. If you do not hear this chime start over.
5. After the audio panel re-initiation is complete,
6. Remove PMA8000G device from your smart phone.
7. Search for Bluetooth devices from your smart phone.
8. Select PMA8000G
9. If password is required use 0000
10. Once paired stream music and place phone call

3.10.1.2 Pairing separate music and telephone devices

It is possible to use a different music source (iPad, iPod with Bluetooth adapter, Bluetooth enabled laptop, etc.) and telephone. However, the music source must be paired second, after the telephone, if the telephone also has music streaming capability. Otherwise, the Smartphone will also take over the music streaming.

3.11 USB Charging Port

The PMA8000G contains a USB charging port that is capable of providing 5 VDC, 2.1 amps of current (at least 10 watts) to power or charge the batteries in smart phones and tablets used as Personal Electronic Devices. This is NOT a data transfer jack.

3.12 Backlighting

The panel light dimmer controls the **WHITE AND GREEN** lighting in buttons and backlit text. If the dimmer is not installed, or set to off, the white text will be maximum intensity.

Section IV – Warranty and Service

4.1 Warranty

In order for the factory warranty to be valid, the installations in a certified aircraft must be accomplished by an FAA-(or other ICAO agency) certified avionics shop and authorized PS Engineering dealer. If the unit is being installed by a non-certified individual in an experimental aircraft, a factory-made intercom harness must be used for the warranty to be valid.

PS Engineering, Inc. warrants this product to be free from defect in material and workmanship for a period of two (2) years from the date of sale. During the first **twelve (12) months** of the two-year warranty period, PS Engineering, Inc., at its option, will send a replacement unit at our expense if the unit should be determined to be defective after consultation with a factory technician. For the remaining **twelve (12) months** of the two-year warranty period, PS Engineering, Inc., at its option, will send a similar replacement unit at the customer's expense if the unit should be determined to be defective after consultation with an authorized PS Engineering dealer.

All transportation charges for returning the defective units are the responsibility of the purchaser. All domestic transportation charges for returning the exchange or repaired unit to the purchaser will be borne by PS Engineering, Inc. The risk of loss or damage to the product is borne by the party making the shipment, unless the purchaser requests a specific method of shipment. In this case, the purchaser assumes the risk of loss.

This warranty is not transferable. Any implied warranties expire at the expiration date of this warranty. PS Engineering SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. This warranty does not cover a defect that has resulted from improper handling, storage or preservation, or unreasonable use or maintenance as determined by us. This warranty is void if there is any attempt to dissemble this product without factory authorization. This warranty gives you specific legal rights, and you may also have other rights, which may vary from state to state. Some states do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusions may not apply to you.

All items repaired or replaced under this warranty are warranted for the remainder of the original warranty period. PS Engineering, Inc. reserves the rights to make modifications or improvements to the product without obligation to perform like modifications or improvements to previously manufactured products.

4.2 Factory Service

The units are covered by a two-year limited warranty. See warranty information. Call PS Engineering, Inc. at (865) 988-9800 before you return any unit. This will allow the service technician to provide any other suggestions for identifying the problem and recommend possible solutions.

After discussing the problem with the technician and you obtain a Return Authorization Number, ship product to:

PS Engineering, Inc.
Attn: Service Department
9800 Martel Rd
Lenoir City, TN 37772
(865) 988-9800 FAX (865) 988-6619
Email: support@ps-engineering.com

Units that arrive without an RMA number, or telephone number for a responsible contact, will be returned un-repaired. PS Engineering is not responsible for items sent via US Mail.

Appendix A – External PTT Hook Up

Part of the installation includes the installation of PTT (Push to Talk) switches that allow the use of your aircraft radio for communications transmissions.

There are three possible configurations; you must select the case that best fits your installation.

NOTE: Only the person who presses their PTT switch will be heard over the radio.

CASE I

The PTT is built into the pilot and copilot yokes

Simply install the plugs from the headset into the aircraft headphone jacks. Then use the yoke mounted PTT to transmit. No other action is required.

CASE II

Built in PTT only on the pilot side only

This configuration requires a modified external PTT switch plugged into the copilot's mic jack. (See Details Below) When the copilot's PTT is depressed, this activates an internal relay that switches the mic audio to the aircraft radio from the pilot to the copilot.

Case III

No built in PTT switch at all.

Two built-in PTT must be installed, or two external, modified PTT switches will be required for both the pilot and copilot. Modifications to the PTT are required. (See details below)

Push To Talk Modifications

When received from the manufacturer, an after-market PTT switch opens the mic audio path to the "ring" connection of the PTT mic plug until the button is pressed. When the PTT is between the intercom and the headset, the intercom function will not work unless the PTT switch is depressed. A simple modification can be performed to allow proper intercom operation. NOTE: This mod does not alter normal operation.

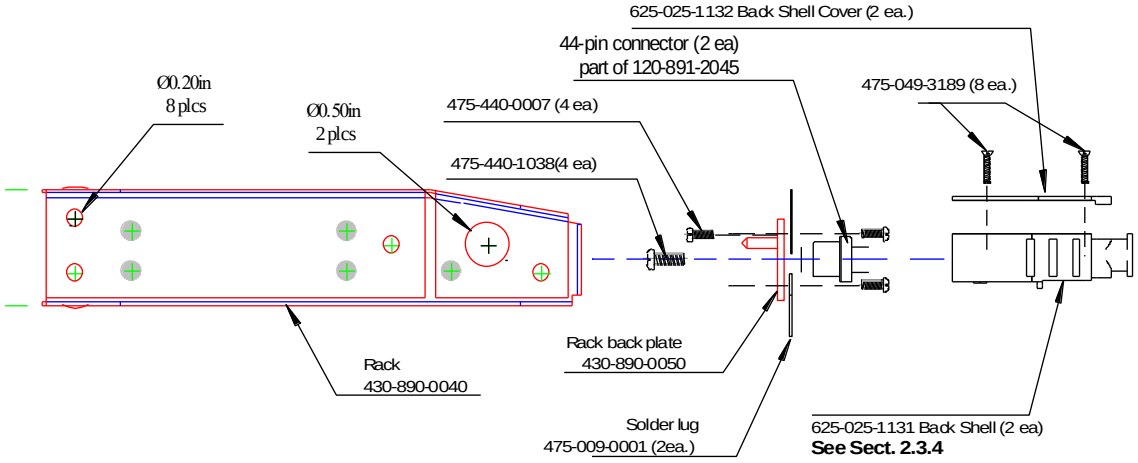
Below are some examples of typical modifications. Contact the PTT manufacturer for more details if necessary.

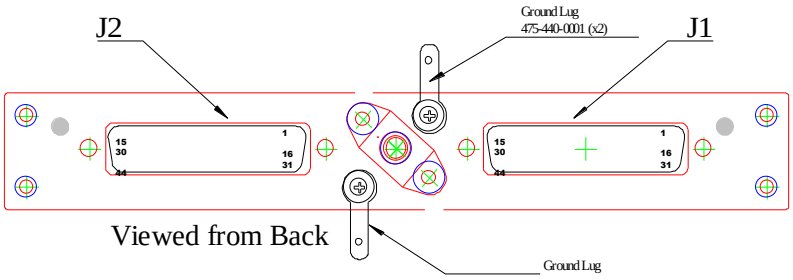
Procedures for David Clark PTT
Unscrew the round black plastic cover from the jack.
Connect the joined black wires to the red wire.
Replace the round black plastic cover.

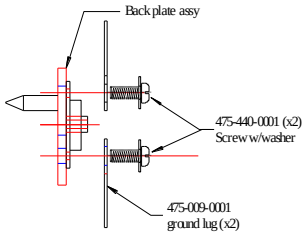
Procedures for Telex PT-200
Unscrew the round black plastic cover from the jack.
Cut the red wire in the middle of the wire.
Strip both ends of the insulation.
Solder the two ends to the ground lug to the PTT jack.
Replace the round black plastic cover.

Procedures for Telex PT-300
Unscrew the round black plastic cover from the plug jack.
Remove the heat shrink material from the joined black wires.
Solder these two wires to the lug that has a white wire already soldered to it.
Replace the round black plastic cover

Appendix B – PMA8000G Installation Drawings

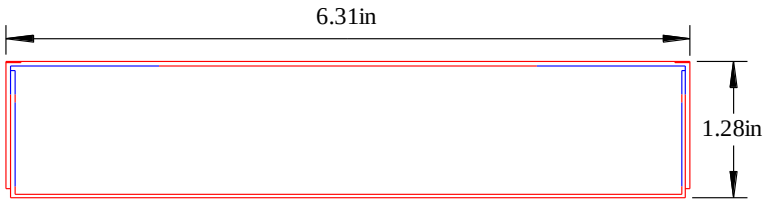


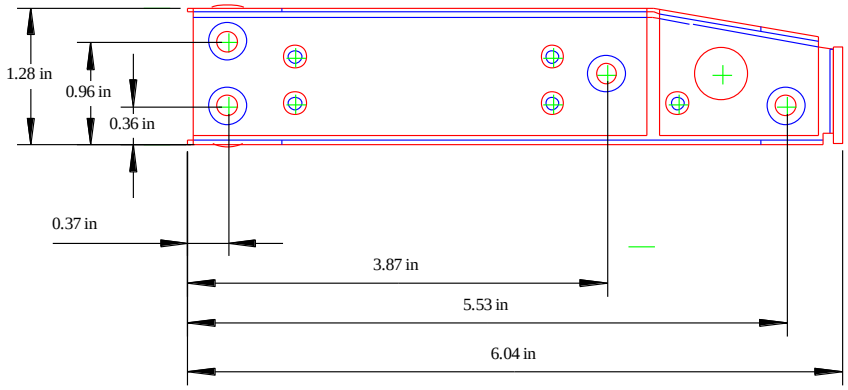




Ground lug detail

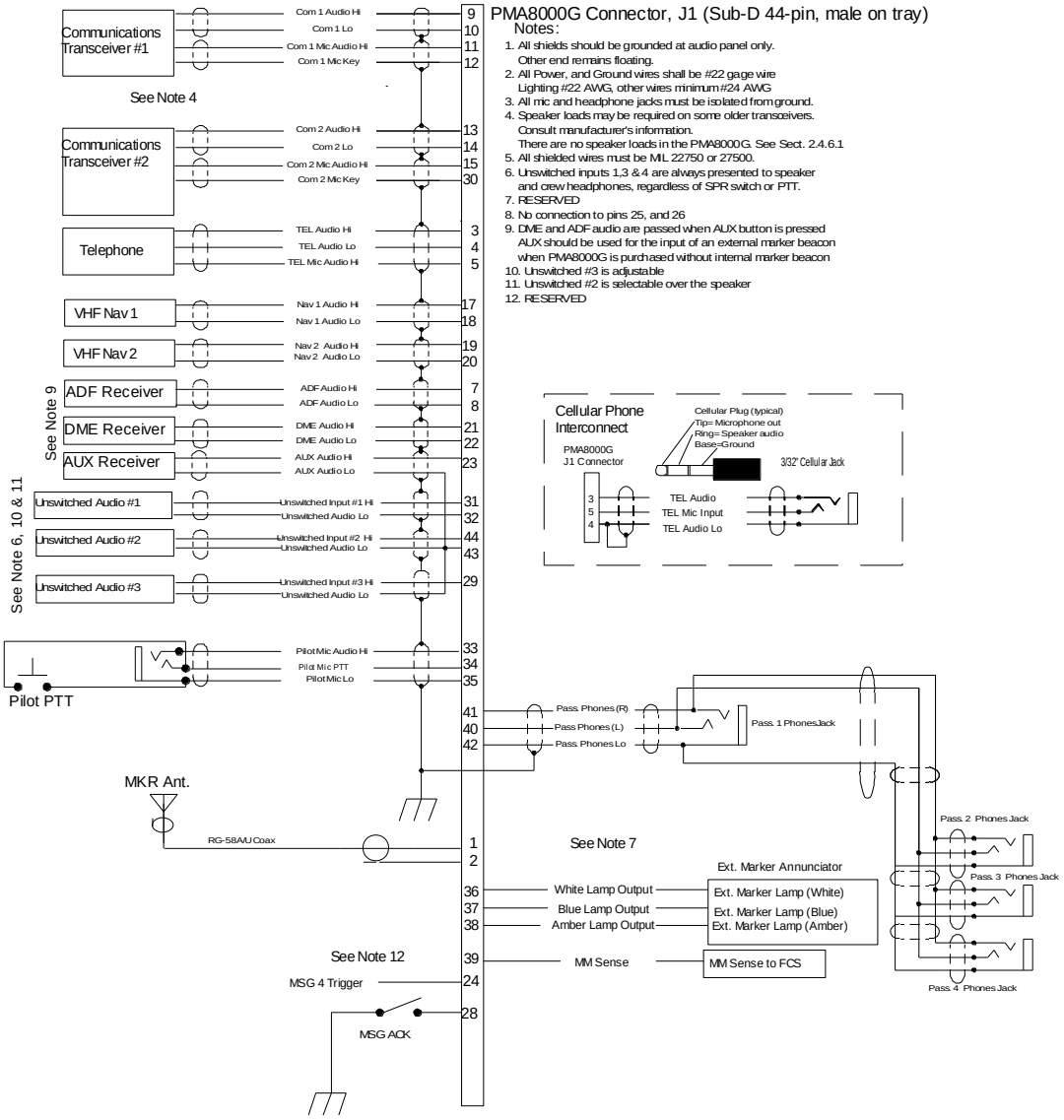
Rear plate detail (not to scale)



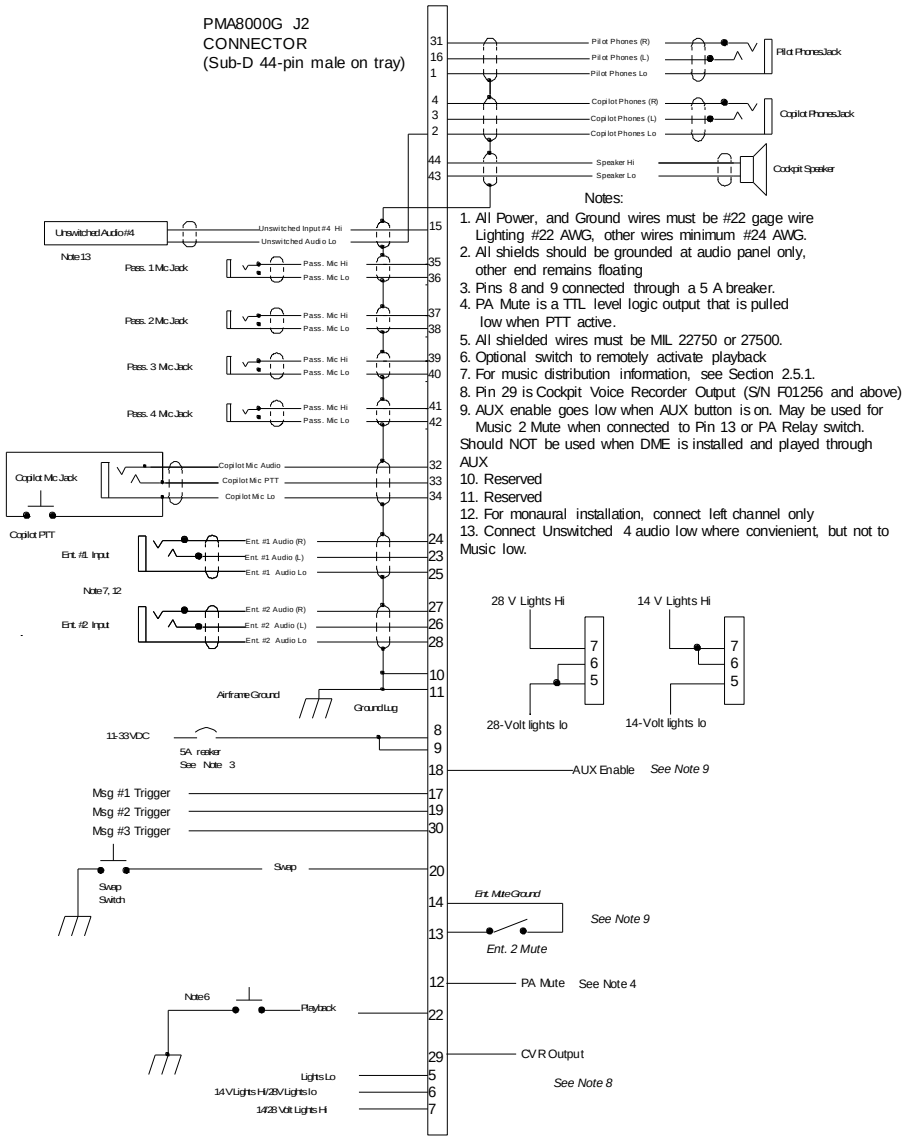


Caution: Apply steady pressure to the bezel while screwing the unit into the tray to ensure even seating of the unit and connectors.

Appendix C – J1 Connector Interconnect



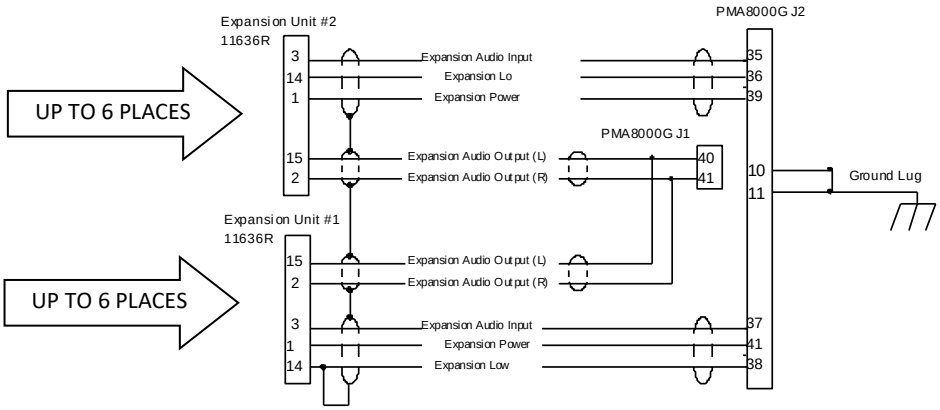
Appendix D – J2 Connector Interconnect



Notes:

1. All Power, and Ground wires must be #22 gage wire Lighting #22 AWG, other wires minimum #24 AWG.
2. All shields should be grounded at audio panel only, other end remains floating
3. Pins 8 and 9 connected through a 5 A breaker.
4. PA Mute is a TTL level logic output that is pulled low when PTT active.
5. All shielded wires must be MIL 22750 or 27500.
6. Optional switch to remotely activate playback
7. For music distribution information, see Section 2.5.1.
8. Pin 29 is Cockpit Voice Recorder Output (S/N F01256 and above)
9. AUX enable goes low when AUX button is on. May be used for Music 2 Mute when connected to Pin 13 or PA Relay switch. Should NOT be used when DME is installed and played through AUX
10. Reserved
11. Reserved
12. For monaural installation, connect left channel only
13. Connect Unswitched 4 audio low where convienient, but not to Music low.

PMA8000G with Expansion (Unit 050-890-0914 &-0918 only)



See IntelliPax Installation Manual, 200-250-0006,
for 11636R wiring information

Appendix E – Instructions for FAA Form 337 and continuing airworthiness

8.1 Instructions for FAA Form 337, Audio Panels

One method of airworthiness approval is through an FAA Form 337, *Major Repair and Alteration (Airframe, Powerplant, Propeller, or Appliance)* In the case of the PMA8000G, you may use the following text as a guide.

Installed audio selector and 6-place intercom, PS Engineering PMA8000G, part number 050-890-(XXXX) in (*location*) at station _____. Installed per *AC43.13-2, Chapter 2, paragraph 23* (Instrument Panel Mounting). Installed per PS Engineering *Installation Operators Manual* p/n 200-890-(XXXX), revision (), dated ( ).

These units are FAA-Approved under TSO C50c for audio amplifiers, and/or TSO C35d for Marker Beacon Receivers, TSO C71 for DC to DC power converters, and meets appropriate environmental qualifications outlined in RTCA DO-160D as appropriate or this aircraft.

Interface to existing aircraft radios in accordance with installation manual and in compliance with practices listed in *AC43.13-2*, Chapter 2. All wires are Mil-Spec 22759 or 27500. Connection to aircraft dimmer bus is _____. Power is supplied to the unit through a 3A circuit breaker (type and part number), and total electrical load does not exceed ____% of the electrical system capacity with the PMA8000G added.

Aircraft equipment list, weights and balance amended. Compass compensation checked. A copy of the operation instructions, contained in PS Engineering document 202-890-( ), revision ( ), dated ( ), is placed in the aircraft records. All work accomplished listed on Work Order_____.

8.2 Instructions for Continuing Airworthiness, Audio System

Sample ICA Checklist for PS Engineering Audio System:

Section	Item	Information
1	Introduction	Installation of audio control panel with integrated marker beacon receiver and intercommunications system.
2	Description	Installation as described in manufacturer's installation manual referenced on FAA Form 337, including interface with other avionics audio as required.
3	Controls	See installation and operator's guide referenced on FAA Form 337.
4	Servicing	None Required
5	Maintenance Instructions	On Condition, no special instructions
6	Troubleshooting	In the event of a unit problem, place the unit into "off," "fail-safe" and/or "emergency" mode. This allows pilot communications using COM 1. Follow checkout instructions in the installation manual referenced on the FAA Form 337. For a specific unit fault, contact the manufacturer at (865) 988-9800 for special instructions.
7	Removal and replacement information	Removal: Using a 3/32" Allen-head wrench, carefully unscrew the locking screw located in the center of the unit. While turning the wrench CCW, gently pull on the EDGES of the bezel until the unit is free from the mounting tray. Installation: Engage the locking screw at the back. Turn the locking screw CW, while applying slight pressure to the edges of the bezel. Do not over tighten!
8	Diagrams	Not applicable
9	Special Inspection Requirements	Not Applicable
10	Protective Treatments	Not Applicable
11	Structural Data	Not Applicable
12	Special Tools	None
13	Not Applicable	Not Applicable
14	Recommended Overhaul Periods	None
15	Airworthiness Limitations	Not Applicable
16	Revision	To be determined by installer

Appendix F – RTCA DO160D Environmental Qualification Form

Audio Selector Panel/Intercom/Marker Beacon Receiver

Part Number: 050-890-091( )

FAA TSO Number: C50c, C35d C71

Manufacturer: PS Engineering Incorporated 9800 Martel Road Lenoir City TN 37772

Conditions	Section	Conducted Tests
Temperature and Altitude	4.0	Equipment tested to CAT A1 & D1
Low Temperature	4.5.1	-55° C Survival, -15°C Low Operating (A1)
High Temperature	4.5.2	+85°C Survival, +70°C High Short Time Operating
In-flight Loss of Cooling	4.5.4	Not Applicable, no cooling required
Altitude	4.6.1	50,000' unpressurized (D1)
Decompression	4.6.2	Not Applicable
Overpressure	4.6.3	Not Applicable
Temperature variation	5.2	Equipment tested to Category C
Humidity	6.0	Equipment tested to Category A
Shock	7.0	Equipment tested to Operational test only
Operational	7.2	Equipment tested to Operational test only
Crash Safety	7.3	Equipment tested to Operational test only
Vibration	8.0	Equipment tested to Category S, Curve M
Explosion	9.0	Category X, not tested
Waterproofness	10.0	Category X, not tested
Fluids Susceptibility	11.0	Category X, not tested
Sand and Dust	12.0	Category X, not tested
Fungus	13.0	Category X, not tested
Salt Spray	14.0	Category X, not tested
Magnetic Effect	15.0	Equipment tested to Category Z
Power input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0	Equipment tested to Category B
Induced Frequency Susceptibility	19.0	Equipment tested to Category A
Radio Frequency Susceptibility	20.0	Equipment tested to Category T
Radio Frequency Emission	21.0	Equipment tested to Category B
Lightning Induced Transient Susceptibility	22.0	Equipment tested to Category XXE2
Lightning Direct Effects	23.0	Category X, not tested
Icing	24.0	Category X, not tested
ESD	25.0	Category X, not tested