

# PS ENGINEERING<sup>®</sup> INCORPORATED

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## PMA5000EX



Document P/N 200-550-0100

Rev. New, January 2010

Audio Selector Panel with 4-Place IntelliVox<sup>®</sup> Stereo Intercom  
**System Installation and Operation Manual**

Patented under one or more of the following;

**No. 4,941,187; 5,903,227; 6,160,496 and 6,493,450**

***For use in Experimental/Non-certified aircraft ONLY***

Not intended for installation in certified aircraft

The product warranty is not valid unless this product is installed by an  
Authorized PS Engineering dealer.

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Rev	Date	Change
New	1/11/2010	New Release

## Section I – GENERAL INFORMATION

### 1.1 INTRODUCTION

The PMA5000EX is designed to provide the basic audio control and intercom features most desire for the Experimental / Light Sport Aircraft owner/pilot. Features like cellular telephone interface, music input with custom muting schemes, and PS Engineering's legendary IntelliVox® make this the perfect unit for many light aircraft.

**For use in Experimental/Non-certified aircraft ONLY**  
**This unit is NOT INTENDED FOR INSTALLATION IN CERTIFIED AIRCRAFT**

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 PMA5000EX.

### 1.2 SCOPE

This manual provides detailed installation and operation instructions for the PS Engineering PMA5000EX-series of Audio Selector Panel/Intercom Systems. This includes the following units:

<u>Model</u>	<u>Description</u>	<u>Part Number</u>
PMA5000EX	Stereo Audio Selector Panel with 4-place IntelliVox® Stereo Intercom and utility jack.	050-550-0200

### 1.3 EQUIPMENT DESCRIPTION

The PMA5000EX is a state-of-the-art audio isolation amplifier and audio selector that contains a 4-place automatic voice activated (VOX) intercom system. It can switch two transceivers (Com 1, Com 2) and five navigation receivers (Nav 1, Nav 2, AUX 1, AUX 2 and DME). Pushbuttons select the receiver audio source provided to the headphones (DME is paired with AUX 2).

A full duplex TEL mode allows the PMA5000EX to act as an audio interface between aircraft headphone and microphones and specific aircraft approved (FAA/FCC) cellular telephone equipment, through the front mounted jack.

**Warning:** Use of non-aviation approved cellular telephone equipment may be prohibited by regulation. PS Engineering is not responsible for unauthorized airborne use of cellular telephones. For airborne use, the PMA5000EX must be interfaced with an approved system.

There are five unswitched inputs, available for traffic or EGPWS, autopilot disconnect, and/or radar a-l-timeter warning, with the fifth unswitched input through a front-mounted utility jack, when configured to act as a fifth unswitched input.

Pushbutton switches select one of the communication transceivers for the pilot and copilot position, and allows radio transmission. In "Split Mode," the PMA5000EX 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 microphone 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 four-station voice activated (VOX) intercom is included in the PMA5000EX. 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.

## 1.4 APPROVAL BASIS **\*\*None\*\***

The PMA5000EX is **NOT INTENDED OR APPROVED** for installation or use in a certified aircraft.

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

<b>WEIGHT</b>	
<i>PMA5000EX Unit</i>	1.34 lb. (0.61 kg)
<i>Rack with connectors</i>	0.51 lb. (0.24 kg)
<b>POWER REQUIREMENTS (Including Internal Lighting):</b>	
<i>Voltage:</i>	11 to 33 VDC
<i>Maximum Current:</i>	2.5 Amp (Externally protected by a 5A pull-type breaker)
<b>Audio Selector Specifications</b>	
<i>Audio selector panel input impedance:</i>	510 $\Omega$
<i>Input Isolation:</i>	-60 dB (min.)
<i>Receiver Inputs:</i>	6 (Com 1, Com 2, TEL, AUX 1, AUX 2, DME)
<i>Unswitched Inputs:</i>	5 (including front jack)
<i>Transmitter Selections:</i>	4 (Com 1, Com 2, TEL Com1/2)
<i>Headphone Impedance:</i>	150 – 1000 $\Omega$
<i>Headphone Output:</i>	38 mW each headset, no clipping <1% THD typical
<i>Microphone Impedance:</i>	150 - 600 $\Omega$
<b>Intercom Specifications</b>	
<i>Intercom Positions:</i>	4 places (with individual <i>IntelliVox</i> ® circuits)
<i>Music Inputs:</i>	2, (Independent, Stereo)
<i>Music Muting:</i>	>-30 dB "Soft Mute" when Com or intercom active.
<i>Distortion:</i>	<1% THD @ 38 mW into 150 $\Omega$
<i>Mic Freq. Response, 3 dB:</i>	300 Hz - 6000 Hz
<i>Music Freq. Response, 3 dB:</i>	10 Hz – 26 kHz

## 1.6 EQUIPMENT SUPPLIED

1 ea. of the following units:

Model	Description	Part Number
PMA5000EX	PMA5000EX Audio Panel with Stereo intercom.	050-550-0200

PMA5000EX Installation Kit: 250-890-0000

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
Backshell, connector	2	625-025-2465
Backshell Retainer	2	431-881-0100
4 40 X 7/16 screw w/nylon patch	4	475-440-0007
4 40 X 3/8 screw w/lock washer	4	475-440-1038
4-40 Lock Nut	1	475-013-0001
Solder Lug	1	475-009-0001
Cable Clamp	1	625-001-0002
#6-32 x 1/2" Flat head Philips screw	6	475-632-0012
#6-32 Clip Nut	6	475-630-0002
Parts ID Sheet	1	002-890-0404

## 1.7 EQUIPMENT REQUIRED BUT NOT SUPPLIED

- a. Circuit Breaker: 1 ea; 5 amp PULL TYPE REQUIRED for PMA5000EX
- b. Speaker, 4  $\Omega$
- c. Headphone Jacks (Stereo, as Required)
- d. Microphone Jacks (as Required)
- e. Headphones, 150  $\Omega$  (Stereo), up to 6 as required
- f. Microphones, up to 4 as required
- g. Interconnect Wiring (contact PS Engineering for more information on custom wiring harnesses).

## 1.8 OPTIONAL ITEMS

- a. Cell Phone Patch Cord, 2.5mm to 2.5mm, PS Part Number 425-006-7026
- b. Music Patch Cord, 3.5mm to 5.5mm, PS Part Number 425-006-2535

## 1.9 LICENSE REQUIREMENTS

None

## Section II - INSTALLATION

### 2.1 GENERAL INFORMATION

#### 2.1.1 SCOPE

This section provides detailed installation and interconnection instructions for the PS Engineering PMA5000EX Audio Selector Panel/Intercom.

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

### 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 PMA5000EX 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 PMA5000EX must be rigidly mounted to the instrument panel of the aircraft structure, within view and reach of the pilot position(s). Installation should comply with FAA Advisory Circular AC 43.13-2B. The unit may be mounted in any area where adequate clearance for the unit and associated wiring bundle exist.

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 1/2" 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 PMA5000EX. The connectors are a sub-miniature crimp-type, and require the use a hand crimp tool, from table below (or equiv.). The connectors are mounted to the tray back plate with #4-40 screws (475-440-1038), from the inside of the tray and the

mounting block, 431-891-0100. Ensure that proper strain relief and chafing precautions are made during wiring and installation, using the cable clamp (625-001-0002).

<b>Manufacturer</b>	<b>Crimping Tool</b>	<b>Positioner</b>	<b>Extraction tool</b>
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**

## **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 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 PMA5000EX 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 PMA5000EX 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 PMA5000EX 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 a ground lug mounted on the corner of the back plate.

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**

PMA5000EX 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 PMA5000EX. The power for IFE and audio panel should be a common bus.

If a music jack instead of a 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 Power**

The PMA5000EX 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.

#### **2.4.3 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 PMA5000EX 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.

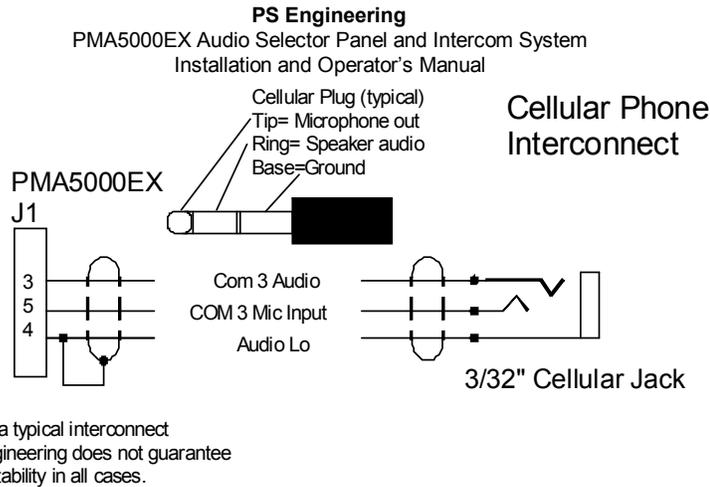
#### **2.4.4 Audio Panel interface**

The PMA5000EX is designed to interface with standard aircraft avionics, and presents a 510Ω 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.

#### **2.4.5 TEL (Duplex) Function for Cell Phones**

The TEL mode in the PMA5000EX is compatible with many cellular telephones with hands-free headset interfaces. The front panel 3/32" utility jack can be used as the interface to the Cell Phone, or a 3/32" jack can be installed somewhere on the aircraft panel. The wired interface jack is connected with the PMA5000EX as shown: A patch cord (3/32" to 3/32") is available from PS Engineering under P/N 425-006-7026.



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

#### 2.4.5.1 Cell phone Sidetone

As shipped from PS Engineering, the PMA5000EX does NOT provide cellular telephone sidetone (the user's voice fed back to the headset). Some cell phones do not provide sidetone. In PMA5000EX, telephone sidetone can be enabled by holding the TEL button for more than one second. This setting will be remembered when the power is off.

**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. PS Engineering, Inc. does not endorse using unapproved cellular telephone equipment in flight, and takes no responsibility for the user's action. PS Engineering does not guarantee compatibility with personal cellular telephones. For a list of phones that have been tested, visit [www.ps-engineering.com](http://www.ps-engineering.com).

#### 2.4.6 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.

#### 2.4.7 "Swap" Mode

When a momentary, normally open, push-button switch is connected between pin 20 on the J2 connector and aircraft ground (or J2-pin 21), 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.

#### 2.4.8 Backlighting

The PMA5000EX has an automatic dimming of the pushbutton annunciation LEDs controlled by a photocell. Control of the unit 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, a constant back light illumination can be established for nighttime viewing. Pin 6 or 7 (depending on system voltage) must be tied to power (J2, pin 8 or 9) for the back lighting system to work. The photocell mounted in the unit face will automatically adjust the intensity of the push-button annunciator LEDs.

#### 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.

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

**Table 2-2 Unswitched input table**

Unswitched #2, J1 pin 44 is unswitched is always connected to the Pilot's headphone.

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.

The front panel jack can be configured to act as a fifth unswitched input. When connected to an audio alert source, the input to this jack will be presented to the pilot and copilot headsets, and not muted.

**NOTE**

The front-mounted utility jack is intended for portable equipment that is advisory in nature. It is NOT INTENDED for use as a primary warning channel. Audio of importance MUST ALWAYS be hard-wired into the unswitched inputs of the audio panel.

## 2.5 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.

**NOTE**

The intercom harness can be custom made by PS Engineering, Inc. Simply call the factory or [www.ps-engineering.com](http://www.ps-engineering.com) to obtain a wire harness work sheet. The harness will be made to your specifications and fully functionally tested. Harness can be ordered with jack, or without the intercom jacks installed, for easier wire routing through the aircraft.

### 2.5.1 Entertainment Inputs

The PMA5000EX has two INDEPENDENT music inputs, PLUS a front mounted jack that is connected to Entertainment 1. Entertainment 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.

**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.

## 2.5.2 Entertainment muting

The PMA5000EX-system incorporates a "Soft Mute™" system. This will mute the entertainment devices during ICS or radio conversation. See [Section 3.7](#) for more information.

Any signal appearing in the hard wired unswitched audio inputs will always mute the entertainment sources, even though the passengers may not hear the audio tone itself.

Press the **Mute** switch to activate the four Karaoke modes (disabling crew SoftMute™). This allows the pilot to place the entertainment into the background while having the radios in the foreground. This eliminates the constant interruption of the music while still having 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.

### 2.5.2.1 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.

## 2.5.3 Alternate Music Distribution (J2 Pin 22)

The two music inputs can be configured in the PMA5000EX. There are two configurations available, independent, or ICS mode dependent.

If the inputs are independent, Input #1 (and the front jack) is provided to the pilot and copilot. Muting modes (SoftMute™) are controlled by the front panel "mute" button.

If the unit is configured for Alternate Music Distribution, the music inputs are intercom mode dependent; input 1 goes to the pilot, copilot and all passengers when the intercom is in the "ALL" mode. Music 2 is ONLY active in CREW mode, and then provided only to the passengers. The passenger SoftMute™ control becomes active in CREW.

To enable the alternate music distribution mode, J2, Pin 22 is connected to aircraft ground, either directly, or through a toggle switch, if control over this mode is desired.

## 2.6 Adjustments

The PMA5000EX is factory adjusted to accommodate the typical requirements for most aircraft configurations. The Telephone volume control is accessible through the top cover (figure 2-2).

The Unswitched #3 volume control is reached by removing the bottom cover, and is shown in Figure 2-3.

- TEL volume, turn adjustment Clockwise to increase the incoming telephone audio.
- Unswitched Input 3 Volume adjustment. (Bottom cover must be removed).

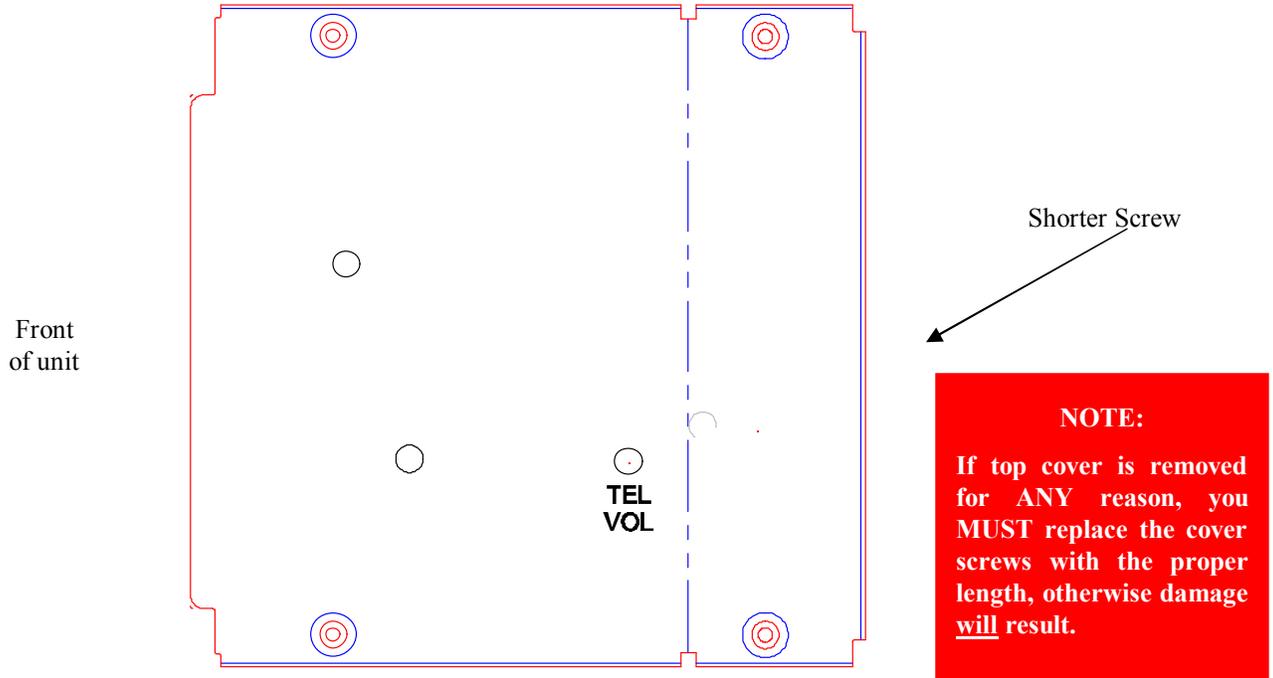


Figure 2-2- PMA5000EX Adjustments, top cover

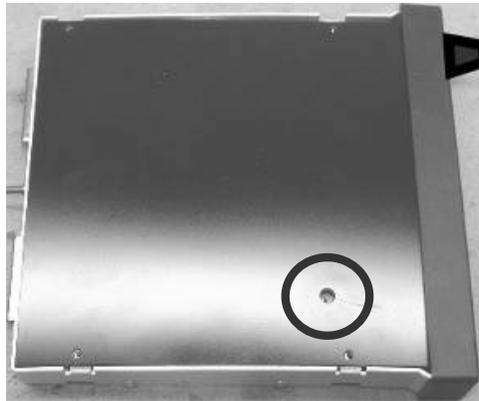


Figure 2-3 – Unswitched 3 Audio Level (bottom cover removed)

### 2.6.1 Microphone Gain Selection

In very high noise environments (such as open cockpit, etc.) the PMA5000EX can be switched to a lower microphone gain by configuring internal switches. [Contact PS Engineering](#) for more information.

## 2.7 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 should be accomplished in accordance with AC 43.13-2B, and /or aircraft manufacturers' recommendations.

### 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 PMA5000EX in Split Mode.**

## 2.8 PMA5000EX Pin assignments

J1	Function	J2	Function
1	No Connect	1	Pilot Phones Lo
2	No Connect	2	Copilot Phones Lo
3	TEL Audio in	3	Copilot Phones (L)
4	TEL Audio Lo	4	Copilot Phones (R)
5	TEL Mic Audio	5	Lights lo
6	No Connect	6	14/28 V Lights
7	AUX 1 Audio In	7	14/28 V Lights
8	AUX 1 Audio Lo	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	No Connect
13	Com 2 Audio	13	Music 2 Mute Inhibit
14	Com 2 Audio Lo	14	Music 2 Mute Inhibit Lo
15	Com 2 Mic	15	Unswitched #4
16	No connect	16	Pilot Phones (L)
17	Nav 1 Audio	17	no connect
18	Nav 1 Audio Lo	18	no connect
19	Nav 2 Audio	19	no connect
20	Nav 2 Audio Lo	20	Swap
21	DME Audio*	21	Swap Lo
22	DME Audio Lo	22	Alternate Music Distribution contro
23	AUX 2 Audio Hi*	23	Music 1 (L)
24	No Connect	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	No Connect	28	Music 2 Lo
29	Unswitched #3	29	No Connect
30	Com 2 Mic Key	30	No Connect
31	Unswitched Audio 1	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
36	No Connect	36	Pass 1 Mic Audio Lo
37	No Connect	37	Pass 2 Mic Audio
38	No Connect	38	Pass 2 Mic Audio Lo
39	No Connect	39	No Connect
40	Pass HP (L)	40	No Connect
41	Pass HP (R)	41	No Connect
42	Pass HP Lo	42	No Connect
43	Unswitched 2 Lo	43	No Connect
44	Unswitched 2 Audio	44	No Connect

DME and AUX 2 are controlled by the AUX 2 button

## 2.9 Post Installation Checkout

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

## 2.10 Unit Installation

To install the PMA5000EX, 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.**

## 2.11 Operational Checkout

### 2.11.1 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. If the LED is blinking, 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. Verify that the appropriate LED in the lower button row blinks when either push to talk is keyed.
14. Verify proper Intercom system operation in the **ALL**, **ISO** and **CREW** modes (see Table 3-1).
15. 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.

### **2.11.2 TEL Checkout**

Press the TEL button. Verify that the pilot headset is connected to the cellular telephone system (if installed). Verify that by using the pilot side PTT, the pilot can transmit on the other selected radio (Com 1 or Com 2). The telephone function will allow any person heard by the pilot on the intercom, also heard on the telephone.

### **2.12 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 any documentation that may be required, such as a logbook entry, weight and balance computation and place the supplied Pilot's Guide in the aircraft. Return completed warranty registration application to PS Engineering, or complete online at [www.ps-engineering.com](http://www.ps-engineering.com).

## Section III OPERATION

### 3.1 SCOPE

This section provides detailed operating instructions for the PS Engineering PMA5000EX, Audio Selector Panel/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 PMA5000EX systems. They are Communications Transceiver Selection, Audio Selector, Intercom special functions.

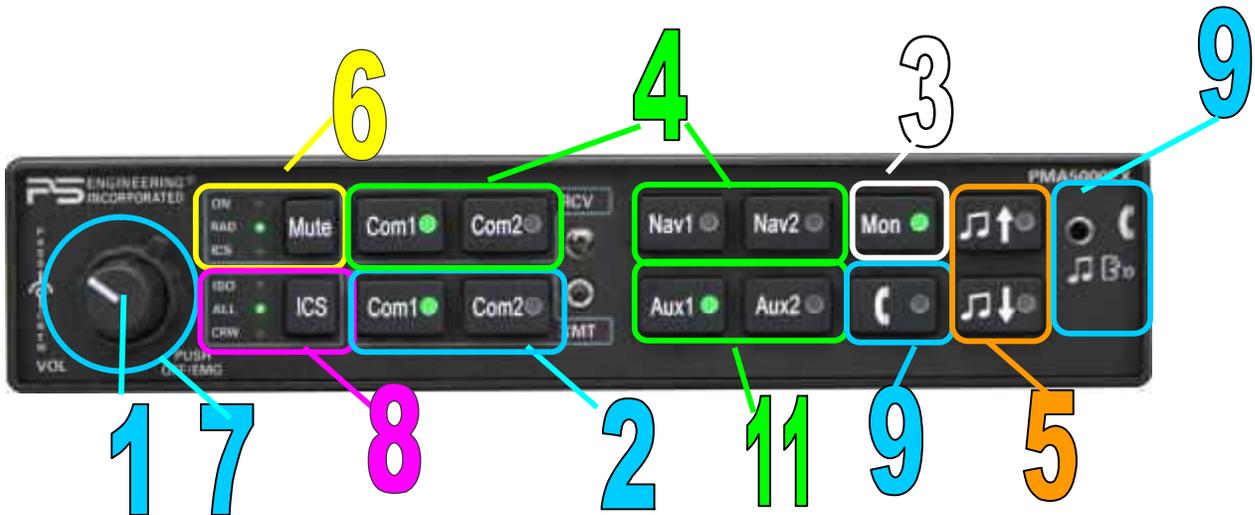


Figure 3-1 PMA5000EX Operating Controls

### 3.2 Power on-off EMG (1)

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. 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, and intercom. All pushbutton selections and function modes will be remembered and return to the last state when turned on.

### 3.3 Communications Transmit (XMT) Selection (2)

There are two pushbuttons associated with the communications transceiver 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 PMA5000EX-Series 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 COM 1 transmitter to Com 2 transmitter by pressing the COM 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 PMA5000EX "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 PMA5000EX gives priority to the pilot's radio Push-To-Talk (PTT). If the copilot is transmitting, and the pilot presses his PTT, the pilot's microphone will be heard over the selected com transmitter.

In TEL mode, the pilot microphone and headphones are connected to the cell phone. The pilot PTT will switch the pilot mic to the selected com transceiver, and allow continued aircraft communications to continue. (See Section 3.4 —TEL—for more details)

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

### **3.3.1 Split Mode**

The split mode can be activated at any time by pressing the **COM 1** and **COM 2 XMT** 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 mode indicator will show ON when the intercom between pilot and copilot is off (muted), and turn off to indicate that the intercom is not muted, and the crew can speak to each other. The passengers will be able to converse normally.

### **3.3.2 COM Radio Monitor (3)**

The PMA5000EX has a Monitor function that allows you to listen (monitor) to a communication receiver but when the other primary receiver becomes active, the audio from the monitored radio is turned off while the other radio is active.

For example, if COM 1 has been selected for transmit (XMT button pushed, both indicators on), it has been set as the primary radio. COM 2 can be selected to receive by pushing the COM 2 RCV button, and because it is NOT selected for transmitting, it is set as secondary. You will hear both receivers in your headset at the same time. When the MON button is pressed (and the LED indicator is on), COM 2 will be turned off while COM 1 receives.

This way, you can listen to AWOS on COM 2, but when ATC calls on COM 1, the weather audio is cut out while ATC is speaking.

### **3.3.3 Swap Mode (Switch from Com 1 to Com 2 remotely)**

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.

## **3.4 Audio Selector (4)**

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

Navigation receiver audio is selected through four 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**, **Aux 1** and **Aux 2**. DME audio (if present) will come through when the **AUX 2** 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.

### **3.5 Telephone (TEL) (9)**

The TEL mode serves as a full duplex interface and distribution for telephone systems such as AirCell or portable cellular phones with earpiece jacks. Pressing the TEL button activates the telephone mode.

This connects the telephone to the users as follows:

In **ALL** intercom mode, all crew and passengers will be heard on the phone when they speak. Com and other selected radio audio is also heard in the headsets. If the pilot or copilot pushes the radio PTT, their mic will be transferred to the selected Com radio. The telephone party will not hear ATC communications, and vice versa.

In **CREW** mode, only the pilot and copilot are connected to the telephone. Passengers will not hear the telephone. The pilot and copilot will also have transmit capability on the other selected transceiver.

In **ISO** intercom mode, when the PMA5000EX 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 to the pilot.

**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.

#### **3.5.1 Cell phone Sidetone**

As shipped from PS Engineering, the PMA5000EX does NOT provide cellular telephone sidetone (the user's voice fed back to the headset). Some cell phones do not provide sidetone. In PMA5000EX, Telephone sidetone can be enabled by holding the TEL button for more than one second.

### **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.

**Table 3-1 Mic Muff™ Part Numbers**

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

### 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 or 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 work with stereo or mono headsets. All passenger headsets are connected in parallel. Therefore, if a monaural headset is plugged in to a PMA5000EX Stereo installation, one channel will be shorted. Although no damage to the unit will occur, all passengers will lose one channel, unless they switch to the "MONO" mode on the headset. PS Engineering modifies headsets to add stereo capability, using high-fidelity speakers. Contact factory for details.

### 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 is 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 their entertainment source. Neither copilot or passengers will hear aircraft radio receptions or pilot transmissions. The pilot can hear music if desired. See §3.7.2

**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 is muted. 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.

### 3.7 Music Muting (6)



There are two SoftMute™ muting circuits. The front panel "Mute" button has four modes, and controls the Mute function for music 1. Music 2 muting is controlled by an external switch, and has two modes.

The SoftMute™ circuit will cut the music out 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 LED indication of the mode selected.

**MUTE ON** - music **will** mute with *either* intercom *or* radio – MUTE ON button is lit.

**RADIO MUTE** – Intercom will **not** mute music, radio *will* mute music. RAD LED indicator is on

**INTERCOM MUTE** - Radio will **not** mute music, intercom *will* mute music - MUTE ICS LED is ON.

**MUTE OFF** - "Karaoke" mode - music will not mute except during outgoing transmissions.- All Indicators off.

🎵 Music	Intercom	Radio	LED INDICATOR
<b>Mute ON</b>	Muted	Muted	ON
<b>Radio Mute</b>	🎵	Muted	RAD
<b>ICS Mute</b>	Muted	🎵	ICS
<b>Mute OFF</b>	🎵	🎵	None

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.

#### 3.7.1 Music 2 Mute Control

Passengers also have a Karaoke Mode. If the passengers are listening to the music 1 input or front panel input, their Karaoke Mode 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.

#### 3.7.2 Music in Pilot ISO mode

If desired, the pilot can elect to hear Music #1, in the ISO mode.

Place the audio panel in the ISO intercom mode. Then push the TEL and ICS buttons at the same time. 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 as described in §3.7.

### 3.8 Music Volume (5)

Two buttons on the front of the audio panel control the volume level for music 1 input. Press and hold the up arrow to increase the volume, or the down arrow to decrease. The button LEDs will indicate that you are pressing the button.

The volume changes about three steps per second, so it takes about 10 seconds to ramp the volume across the full range.

It is possible to turn the volume completely off, so try pressing the volume up button if you don't hear music as expected.

### **3.9 Telephone Mode (9)**

The TEL mode serves as a full duplex interface for compatible telephone systems such as portable cellular phones with earpiece jacks. When interfaced with an approved airborne telecommunications system, the PMA5000EX can serve as an audio control and distribution center.

In **ALL** intercom mode, all crew and passengers will be heard on the phone when they speak. All will hear selected audio. Selected Com audio is simultaneously heard in the headsets. The pilot and copilot will have transmit capability on the selected Com 1 or 2 transceiver, simply by using their respective PTT switch.

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

In **ISO** intercom mode, when the PMA5000EX 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](http://www.ps-engineering.com) for a list of phones that have been tested.

#### **3.9.1 Cellular telephone sidetone**

As shipped from PS Engineering, the PMA5000EX does NOT provide cellular telephone sidetone (the user's voice fed back to the headset). Some cell phones do not provide sidetone. In the PMA5000EX, telephone sidetone can be enabled by holding the TEL button for more than three seconds.

### **3.10 Utility Jack**

The 2.5-millimeter (3/32") jack on the front of the PMA5000EX has three distinct functions:

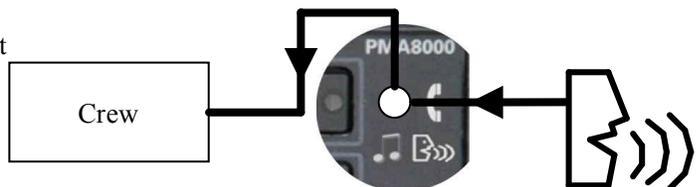
- Cell phone input
- Advisory audio input
- Music input

#### **3.10.1 Cellular phone**

When a cellular telephone is connected to this jack using a 2.5 mm to 2.5 mm adapter cord (PS Part Number 425-006-7026), the PMA5000EX audio panel will connect the intercom to the cell phone when the "TEL button is pressed (9), and behave as described in section 3.7. The telephone ringer, if present, will be heard unless the input is muted by other radio or intercom.

#### **3.10.2 Audio Advisory Input**

The front jack can be used as a priority advisory input for auxiliary systems such as a GPS terrain advisory or portable traffic watch system. To prevent radio or intercom from muting this input, press the "Mute" button.



**3.10.2.1 Smart Jack Function**

When the PMA5000EX has a signal on music #1 input coming in from the rear connector, the front panel jack automatically becomes a Priority Advisory input, and is heard in the crew headphones.

**NOTE**

The front jack is no substitute for the installation of alerts such as the GPS waypoint or autopilot tones. These still must be hard wired into the back by your installer.

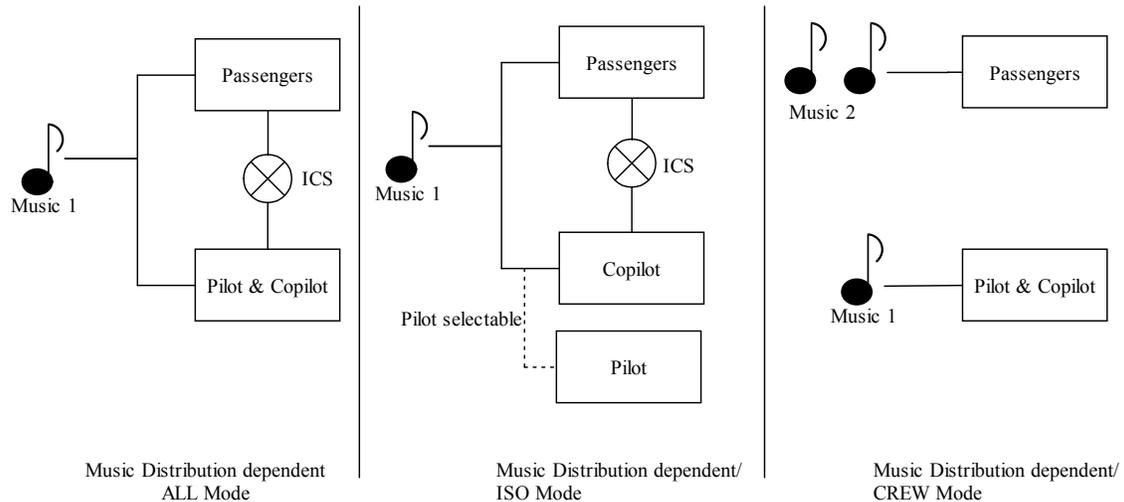
**3.10.3 Music Input**

When used as a music input, the front panel jack is treated as Music #1. A patch cord is available with 2.5 mm to 3.5 mm (3/32 to 1/8" ) adapter cord (PS Part Number 425-006-2535).

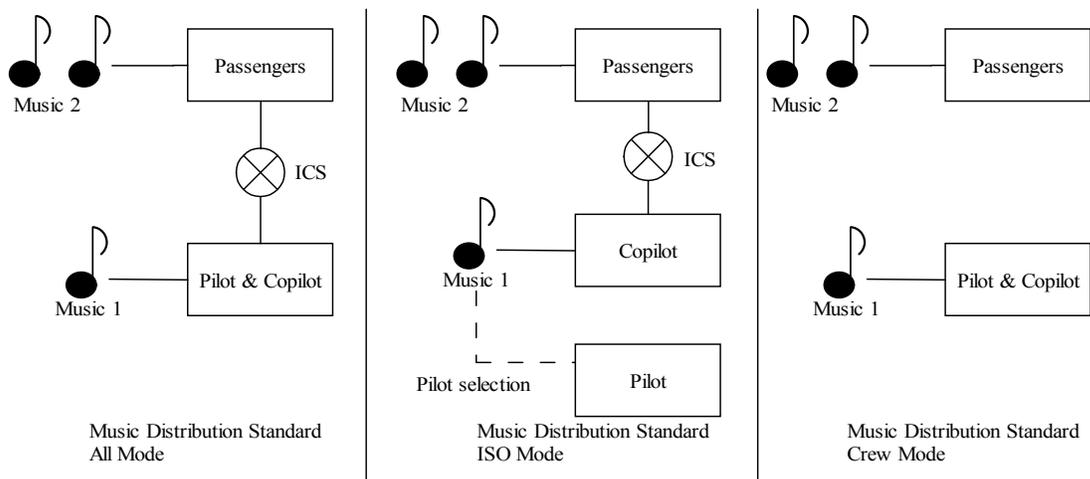
**3.10.4 Alternate Music Distribution**

The alternate music distribution allows you to configure your music to be either *independent* of the intercom mode, or to make Music 2 *dependent* on the intercom mode. This more is controlled by an optional, external switch, or by an installation strap, which makes the mode non-user selectable.

In Alternate Music Distribution, Music 2 will be active *only* when the intercom is in the CREW mode, and only the passengers will hear it. This distribution is similar to other brands of audio panels. It allows the passengers to have their music source come on only when they are not hearing the crew.



**Figure 3-2 Alternate Music Distribution**



**Figure 3-3 Standard Music Distribution**

When the music 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.

### **3.10.5 Music 1 Volume**

In general, we recommend adjusting the entertainment volume at the sources, and only using this as a master gain control. However, the Music 1 PMA5000EX input can be adjusted from the front panel, if desired, by pressing the volume up and down keys.

## Section IV – Warranty and Service

### 4.1 Warranty

In order for the factory warranty to be valid, the installations must be accomplished by an 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 one (1) year from the date of sale. During the **twelve (12) months** of the 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.

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 disassemble 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 one-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.

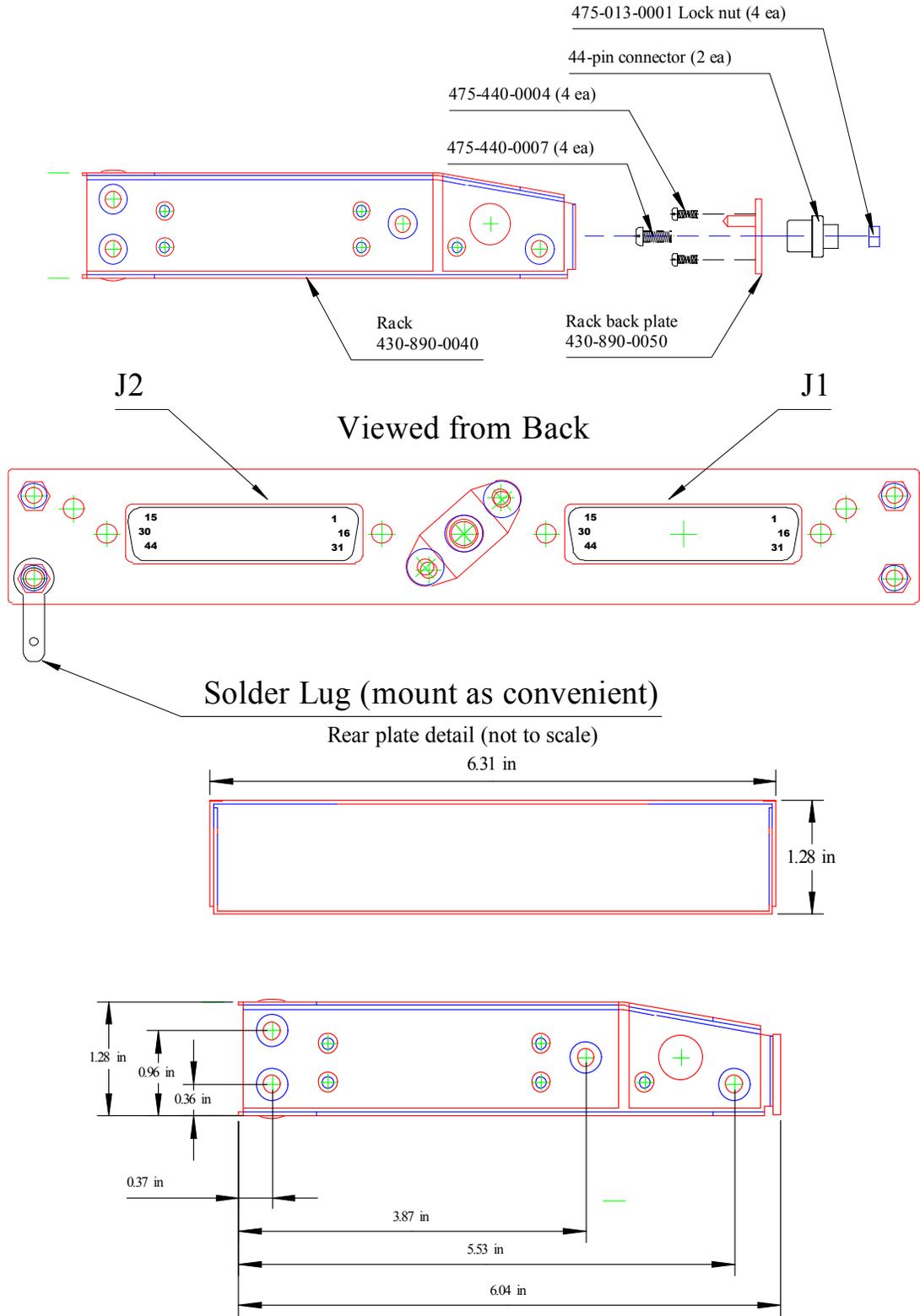
#### Procedures for Telex PT-200

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

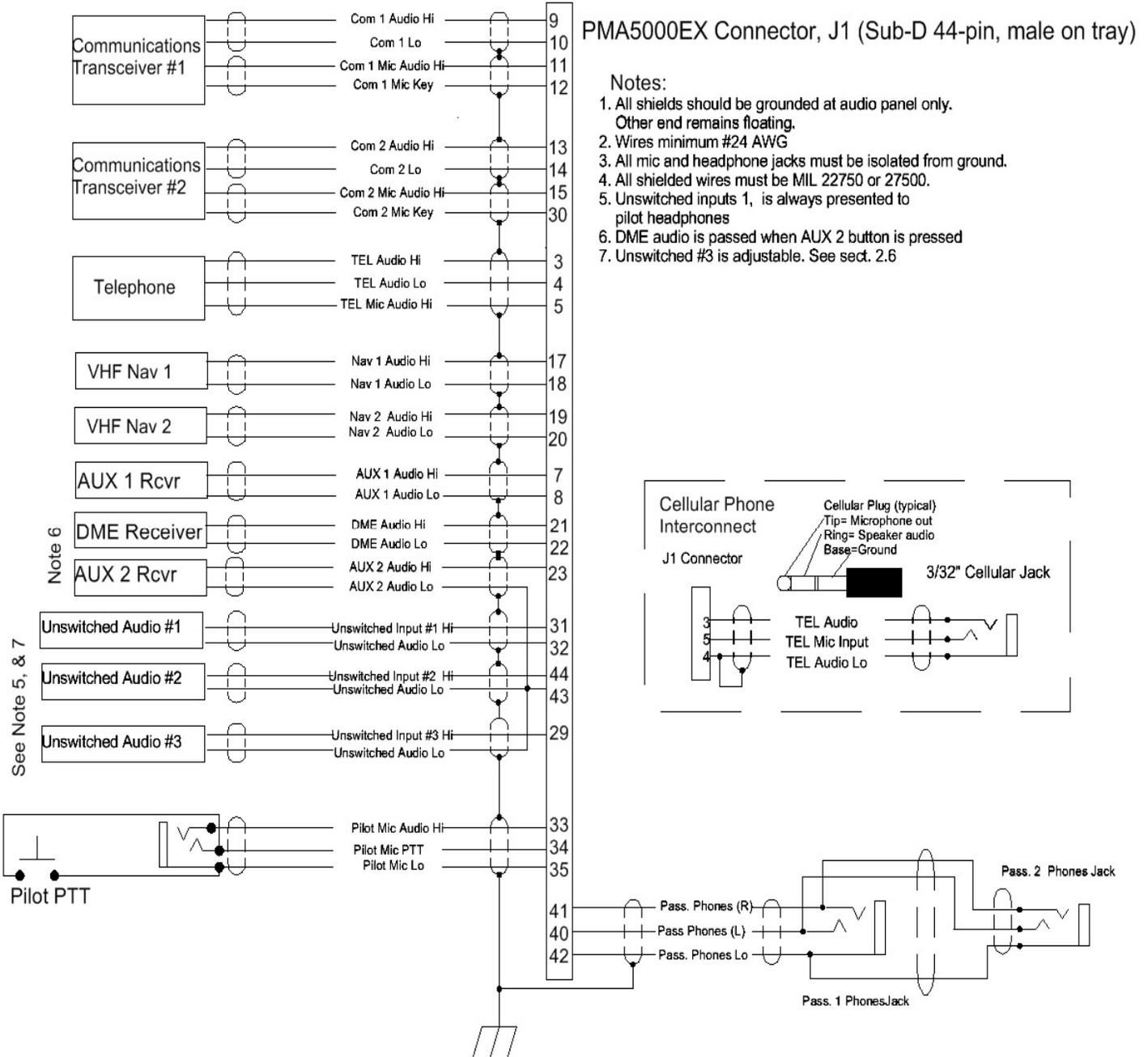
Unscrew the round black plastic cover from the plug jack.  
Remove the heat shrink material from the joined black wires.  
Solder these two wires to the lug that has a white wire already soldered to it.  
Replace the round black plastic cover

### Appendix B – PMA5000EX Installation Drawings



**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

