

## 2.2 Factory Service

The unit is covered by a three-year limited warranty. See warranty information. Call PS Engineering, Inc. at (865) 988-9800 before you return the 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



9800 Martel Road  
Lenoir City, TN 37772

www.ps-engineering.com

# PMA7000S PMA7000M-S



## Pilot's Guide And Operation Manual

July 2001

**Audio Selector Panel  
Marker Beacon Receiver  
High-fidelity Stereo Intercom System**  
Patent No. 5,903,277 & 6,160,496  
FAA-Approved TSO C50c, C35d  
JAA-Approved JTSO-2C35d, C50c

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# 1 OPERATION

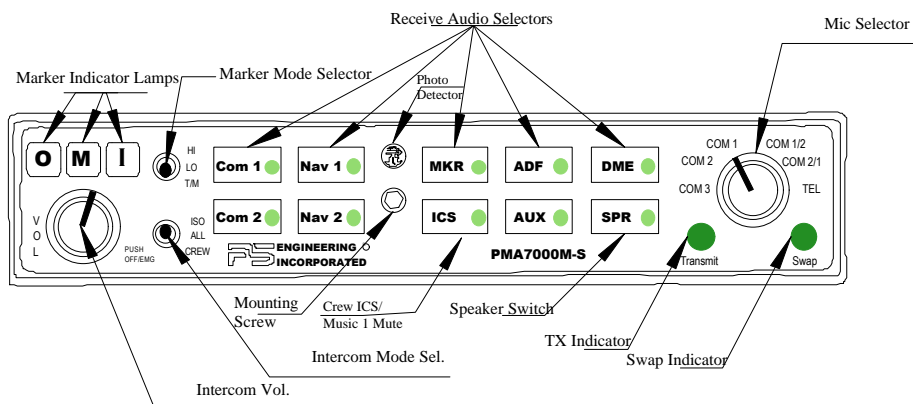
## GENERAL INFORMATION

### 1.1 SCOPE

This section provides detailed operating instructions for the PS Engineering PMA7000M-S, and PMA7000S 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 four sections covering the basic operating areas of the PMA7000M-S systems. They are Audio Selector, Transceiver Selection, Intercom, and Marker Beacon Receiver (7000M-S only).

#### PMA7000M-S controls



### 1.2 Power Switch (EMG-Fail Safe Operation)

Unit power is turned on and off by pushing the volume knob. In the OFF or "EMG" position, the pilot is connected directly to Com 1. This allows communication capability regardless of unit condition. Any time power is removed or turned OFF, the audio selector will be placed in the fail-safe mode.

The power switch also controls the audio selector panel functions, intercom, and marker beacon receiver, (PMA7000M-S only). Unless the mic selector is in Com 3 mode, at least one of the selected audio LEDs will be on (Com 1 or Com 2).

## Warranty and Service

### 2.1 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 three (3) years from the date of installation as recorded in aircraft logbook and/or on FAA Form 337. During the first **twelve (12) months** of the three-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 **twenty-four (24) months** of the three-year warranty period, the unit must be returned to PS Engineering, Inc., or an authorized warranty service facility, for no-cost repair.

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.

marker mute function was added. Pressing the marker mode select down (to “T/M”) will cause the marker audio to mute for that beacon. The next beacon received will re-activate the audio.

### 1.3 Internal Recorder System (Optional)

The Intercom Recording System (referred to here as the IRS) is a digital recording system allowing automatic storage and playback of aircraft radio traffic.

Operating as a continuous loop recorder, (first message received will be the last heard), the recorder has one minute of recording time or up to 16 messages. With its own built in VOX circuit, there are no buttons to press to start recording. The system automatically begins to record the instant the radio becomes active. Only aircraft radio audio in pilots headset is recorded and only the pilot will hear the playback audio.

#### 1.3.1 Operation

Recording is automatic; there is no action required by the pilot. To play back the last recorded message, simply press the momentary switch associated with the IRS. Each additional press of the button will play the preceding recorded message. You must wait for the message to finish playing before accessing the prior message.

To cancel the playback, press and hold the playback button for two seconds. The next time the button is pressed, the next earlier message will be heard.

### 1.4 Audio Messaging system (Option 1, Option 2, only)

When this option is installed, the PMS7000M-S contains six stored messages. An outside annunciator, such as an Electronics International engine gage system triggers these messages. When there is an announcement, it will be repeated every two seconds until the remote-mounted ACK button is pushed. This stops the played annunciation, until the next announcement is required (the next falling edge).

#### 1.4.1 Concurrent Messages

When a recorded message or audio annunciation is playing, the other audio source is momentarily inhibited. For instance, if an IRS message is being played, the audio annunciation will not begin until the IRS message is finished. Conversely, the IRS recording cannot be played as long as there is an aural alert being played. There is no recording made if playing a recording or annunciation.

### 1.3 Microphone Selector (All models)



When the mic selector switch is in the **Com 1** position, both pilot and copilot will be connected to the Com 1 transceiver. Only the person who presses their Push To Talk (PTT), will be heard over the aircraft radio. Turning the rotary switch to the COM 2 position will place pilot and copilot on Com 2.

The PMA7000M-S gives priority to the pilot’s PTT. If the copilot is transmitting, and the pilot presses his PTT, the pilot’s microphone will be heard over the selected com transmitter.

Turning the mic selector fully counterclockwise places the pilot and copilot on Com 3. Com 3 receive audio is automatically placed in the headset (and speaker if selected). Com 1 and/or Com 2 receiver audio can be selected to monitor those transceivers.

The PMA7000M-S-Series has an automatic selector mode. Audio from the selected transceiver is automatically heard in the headsets and speaker. You can check this function by switching from COM 1 to COM 2 and watch the selected audio light on the selector change from COM 1 to COM 2. This ensures the pilot will *always* hear the audio from the transceiver he is transmitting on.

When switching the mic selector rotary switch from COM 1 to COM 2, while COM 2 audio had been selected, Com 1 audio will continue to be heard. This eliminates the pilot having to switch Com 1 audio back on, if desired.

When switching from COM 1 to COM 2 while Com 2 has NOT been selected, Com 1 audio will be switched off. In essence, switching the mic selector will not effect the selection of Com audio.

The “TEL” position, fully CW on the mic selector switch, is the pilot’s “hook” switch, when the system is interfaced to an appropriate approved wireless telecommunication system, such as the AirCell system. Placing the mic selector in TEL placed the pilot microphone and headphones on the cellphone. The pilot PTT will switch the pilot mic to the COM 1, and allow continued aircraft communications as well.

The copilot will also be able to transmit on COM 1 with his PTT as well.

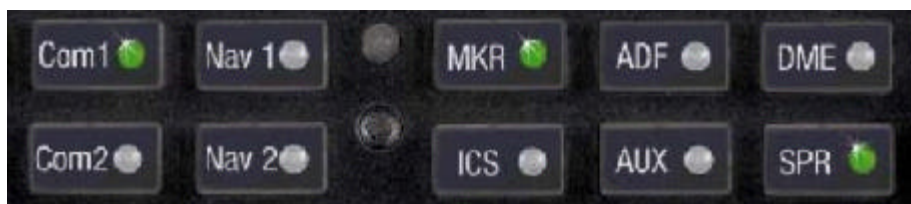
NOTE: Placing the mic selector switch in the TEL position will disable pilot and copilot intercom, as the intercom circuit is transferred to the telephone use. In crew or ISO mode, placing the switch in TEL mode removes the passengers access to the telephone.

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

With a yoke mounted, momentary switch, the pilot can change from the current Com transceiver to the other by depressing this switch. When "Swap Mode" is active, an annunciator in the lower right corner of the unit will illuminate, indicating that the Mic Selector switch position is no longer current. To cancel "Swap Mode," the pilot may either press the yoke mounted switch again, or turn the Mic Selector Switch to the Com that is active.

### 1.4 Receiver Audio Selector (All models)

Receiver audio is selected through two momentary and six latched, push-button, backlit switches. **Com 1** and **Com 2** are the momentary switches.



Because the rotary microphone selector switch controls what transceiver is being heard, the **Com 1** and **Com 2** push-buttons are of the momentary type and do not remain in when selected. This is also part of the "auto" function. You will always hear the audio from the transceiver that is selected for transmit by the rotary mic selector switch.

The users can identify which receivers are selected by noting which of the green switch LEDs are illuminated. Push buttons labeled **Nav 1**, **Nav 2**, **DME**, **MKR** (Marker), **ADF**, **AUX** (auxiliary), and **SPR** (Speaker) are "latched" type switches. When one of these buttons is pressed, it will stay in the "in" position. Press the switch again and it be in the "out" position and remove that receiver from the audio.

#### 1.4.1 Speaker Amplifier

The "**SPR**" in the push-button section stands for speaker. This switch will place all selected audio on the cockpit speaker when this switch is selected. NOTE: Except for the unswitched audio, the speaker amplifier is not active in the "Split Mode."

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

##### 1.4.1.1 Public Address Function

In PMA7000M-S versions above "F" serial number for the top board (2<sup>nd</sup> set of unit serial numbers) a public address function was added. To access this

respective hook switch (the pilot selects TEL on the mic selector). Any passenger who places their switch into the off-hook position will also have access to the phone, and all four passengers will hear the conversation.

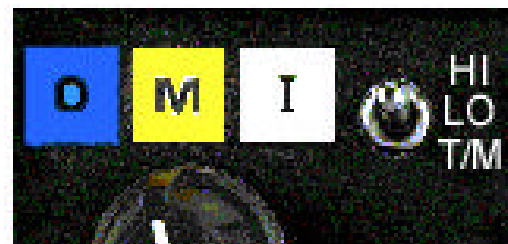
In **ISO** intercom mode, when the PMA7000M-S is in the **TEL** mode, the pilot position is in the "Phone Booth." Only the pilot will hear the telephone, and only he will be heard. He will also have access to Com 1, and will transmit on that radio using the PTT. All selected audio is provided. If any other passenger goes "off hook" they will hear the phone.

In all cases, only the pilot (and copilot in ALL or CREW) will hear the cellphone ring. At that time they can chose to allow a passenger to take the call, or answer the phone.

**Note: Because the cellphone uses an intercom circuit, all stations on that circuit will lose intercom capability when the cellphone is in use.**

### 1.2 Marker Beacon (PMA7000M-S)

The optional 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. See Section 2.5

A three-position switch is used to set the receiver sensitivity and to test the indicator lamps. Use "**HI**" sensitivity initially. This allows you to hear the outer marker beacon about a mile out. Then select the "**LO**" sensitivity to give you a more accurate location of the Outer Marker. The momentary down switch position is marker test, labeled "T/M" and illuminates all three lamps simultaneously to assure the lamps (internal and external) are in working order. TST does not activate MM sense output.

In units with serial numbers above "F" series in the first set of numbers, a

While in the ISO (Isolate) mode, the copilot will hear Entertainment 1 while the four passengers will hear Entertainment #2. The pilot will hear entertainment 1, at a muted level. In normal operation, whenever a person speaks, or if the aircraft radio becomes active, the music will automatically mute and then will gradually return to the original listening level when the intercom or radio conversation ceases.

When in the ALL mode, pilot and copilot will hear Entertainment 1 input while all passengers will hear the Entertainment 2 source. While in the CREW mode, pilot and copilot will hear entertainment input #1 while the passengers may listen to entertainment input #2.

It is also possible to use only one entertainment input device for both entertainment inputs. However, it is suggested that a switch (DPDT) be installed between the single entertainment device and entertainment input #1. This will allow the pilot and copilot decide if they hear entertainment while in the Crew mode.

### 1.1.2.2 Soft Mute and Soft Mute inhibit

The Soft Mute feature assures that the aircraft radio transmissions will not be missed due to entertainment playing. When there is radio reception or intercom conversation, the music level is dropped to a low, or background level. When the radio or intercom traffic ceases, the level gradually returns to normal.

The front panel ICS switch controls muting of entertainment source #1 (for pilot and copilot). Pushing this button places the ICS in Karaoke (or sing along) mode, which inhibits the soft mute feature. This allows the music to continue uninterrupted by intercom or radio traffic when cockpit workload is appropriate. Pushing the button again will release the mute inhibit function.

The passenger music, source #2, can be placed in the Karaoke mode if a remote switch is installed in the aircraft. See wiring information for details.

## 1.1 Telephone Mode

(When interfaced with a Each intercom position has a "hook switch." The pilot's hook switch is the "TEL" mode on the audio panel, the others are discrete switches mounted adjacent to the headset jacks.

When the intercom is in ALL mode, the pilot can speak on the phone only if the mic selector switch is in TEL position. All intercom positions will hear the telephone conversation. If any passenger places his or her switch into the "off-hook" position all passengers will also be heard on the phone. All will hear selected audio. Com 1 audio is automatically heard in the headsets. The pilot and copilot will have transmit capability on Com 1, simply by using their respective PTT switch.

In CREW mode, the pilot and copilot are may use the telephone, with their

function, a switch is installed to connect the top connector, pin 18, to ground. This places the *pilot* microphone on the speaker output (Pin W) when the PTT is pushed. The copilot can continue to use the selected com radio.

We recommend that the switch transfer the audio from the cockpit speaker to a cabin speaker for public address. This will prevent feedback.

### 1.4.2 Key "Click"

The PMA7000M-S is equipped with a "click" function that provides an aural feedback to the user in addition to the tactile button push. This sound can be enabled or disabled by simultaneously holding the COM 1 and COM 2 buttons in for at least 5 seconds. Any person hearing the radios will also hear the key click.

Allow at least 20 seconds between turning the key click on and off.

## 1.5 Split Mode

Turning the rotary switch to COM 1/COM 2 places the PMA7000M-S into "Split Mode." This places the pilot on Com 1 and the copilot on Com 2. An example of this useful feature is when the pilot may want to talk to Air Traffic Control, while the copilot may be speaking to Flight Watch. Although this mode has limitations (see below) we believe you will find this to be a useful feature.

Switching to Com 2/Com 1 will reverse the "Split Mode" radio selection. The pilot will be on Com 2 and the copilot will be on Com 1.

### 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.**

**Note:** Split Mode does not turn off other (Nav, ADF, etc.) selected audio to **pilot**. However, the copilot will only hear the selected communications receiver.

### 1.5.1 Split Mode ICS

In split mode, the pilot and copilot are usually isolated from each other on the intercom, simultaneously using their respective radios. Depressing the ICS button in Split Mode will activate VOX intercom between the pilot and copilot positions. This permits intercommunication when desired between the crew. Pressing the ICS button again disables this crew intercom function.

## 1.6 Intercom Operation

### 1.6.1 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.

**NOTE:**

**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)).**

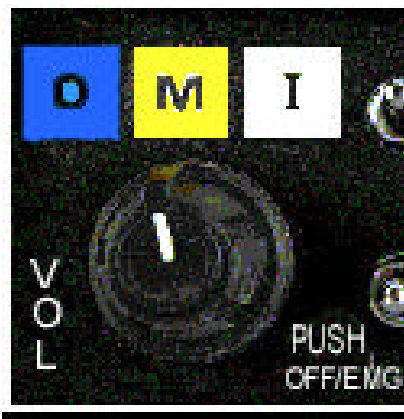
It is also a good idea to keep the microphone out of a direct wind path. Moving your head through a vent air stream may cause the *IntelliVox*® to open momentarily. This is normal.

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.

### 1.1.1 Volume Control

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



Adjust the radios and intercom volume for a comfortable listening level for the pilot. Most general aviation headsets today have built-in volume controls; therefore, passenger volume can be adjusted at the headset. If desired, passenger volume level can be adjusted by a screwdriver adjustment at the top of the tray.

### 1.1.1.1 Mono headsets in Stereo Installation

All passenger headsets are connected in parallel. Therefore, if a monaural headset is plugged in to a PMA7000M-S 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.

### 1.1.2 Intercom Modes

The lower switch on the left side is a 3-position mode switch that allows the pilot to tailor the intercom function to best meet the current cockpit situation. 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 ICS button.



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**ISO:** (Up Position): 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 1, while passengers will hear copilot intercom and Entertainment 2. Neither will hear aircraft radio receptions or pilot transmissions.

**ALL:** (Middle Position): All parties will hear the aircraft radio and intercom. Crew will hear Entertainment 1, passengers will hear Entertainment 2. 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** (Down Position): 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 also may listen to Entertainment 2.

Anytime the PMA7000M-S is in either the COM 1/COM 2, COM 2/COM 1 ("Split Mode"), the pilot and copilot intercom is controlled with the ICS button. The passengers will maintain intercommunications, but never hear aircraft radios.

### 1.1.2.1 Entertainment Input

The audio selector panel has provisions for two separate entertainment input devices. They operate independently in the PMA7000M-S. The volume control does not affect music level.