

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

Sound Quality. Sound Engineering.

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## **PMA450A**

**Audio Selector Panel  
Marker Beacon Receiver  
Stereo Intercom System  
USB-C Charging System  
with Bluetooth<sup>®</sup> Connectivity**



## **Pilot's Guide and Operation Manual**

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Covered under one or more of the following Patents  
4,941,187; 5,903,227; 6,160,496; 6,493,450;  
7,391,877

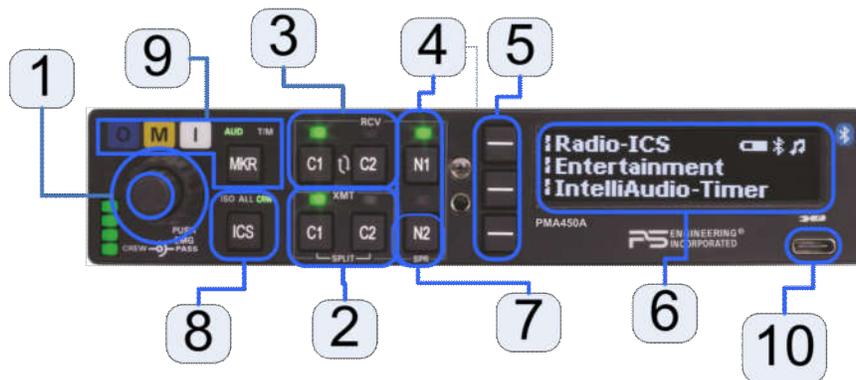
FAA-Approved: TSO C139a, C35d, C71

*Flying never sounded so good<sup>®</sup>*



This section provides detailed operating instructions for the PS Engineering PMA450A, 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 Pilot Guide is divided into sections covering the basic operating areas of the PMA450A systems. They are Communications Transceiver Selection, Audio Selector, Intercom, Marker Beacon Receiver and special functions, including IntelliAudio® and Bluetooth® functionality in the PMA450A.



*PMA450A Operating Controls*

### **Power Switch (1) (On/Off and EMG-Fail Safe Operation)**

Unit power is turned on and off by pushing the volume knob (1). There is a built in delay to prevent inadvertent shut off while adjusting the intercom volume. 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, intercom and marker beacon receiver. All transceiver and receiver selections will be remembered and return to the last state when turned on.

### **Menu Display (6)**

The PMA450A uses a Organic Light Emitting Display (OLED) and three line-select buttons to access advanced functionality in a very logical manner. Press the line select key to select a specific item on each menu. Items are toggled on and off by pressing the line select key as well.

When navigating the menus, the screen will automatically return to this "home" screen after a period of inactivity. This delay time is configurable for



between 1 and 30 seconds, on the initialization menu. A long press (>1 second) will back-up one menu level.

A vertical **bar** next to a button, indicates the button can perform a function on that menu.

A **split bar** indicates that a *secondary* function is available when that button is held for more than 1 second. On the home screen, this function is:



- Pilot Music on/off (lower button)

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

The PMA450A has four buttons to select communications transceiver functions, two each C1 and C2. C1 refers to VHF COM 1, and C2, to VHF COM 2. To select a VHF COM for transmit; push the lower button in the XMT (transmit) section. The radio is automatically selected to receive incoming radio calls when the XMT is selected. With a PMA450A, you will *never* transmit on a radio that you are not receiving. To select a VHF COM radio to listen only, push the C1 or C2 button in the RCV (Receive) section.



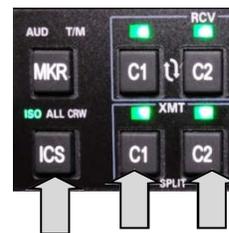
### **Split Mode**

In the SPLIT mode, the pilot position transmits and receives on COM 1, and the copilot can transmit and receive on COM 2 independently. Pressing the C1 and C2 XMT buttons together (above the 'SPLIT' legend), puts the PMA450A into SPLIT com mode.

- The intercom is deactivated automatically when you enter SPLIT mode.
  - Push the ICS button until the green LED lights up CRW to restore intercom between pilot and copilot.
  - Intercom between crew and passengers is not possible in split mode

*The spatial component of IntelliAudio® is defeated in split mode.*

To exit SPLIT mode, simply select C1 or C2 XMT button.



### **COM Audio Selector (3)**

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.



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

With Swap switch, the pilot can change from the current Com transceiver to the other by pressing this optional button.

The Swap switch also serves as a remote intercom mode selector. By holding the swap button for more than 1 second, the ICS mode will change from ISO-ALL-CRW-ISO, etc. each time the button is pressed and held.

### IntelliAudio® Dimensional Audio

Communication audio signals are digitally processed to “appear” in a different location to the crew. IntelliAudio provides nine locations. This helps the crew to better comprehend speech by locating it in a manner easier differentiated by the human brain.

Intercom and other audio is not spatially processed, only the pilot and copilot VHF COM audio. Stereo headphones, in stereo mode, are **required**

### IntelliAudio: Auto

In AUTO mode, the IntelliAudio reverts to single when one of the radios is quiet. Separation will return as soon as both radios are active.



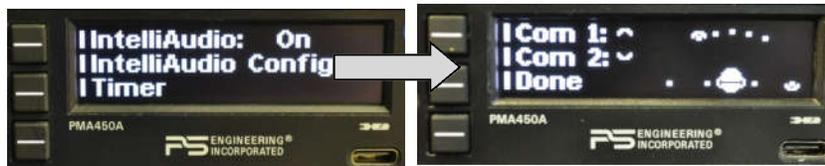
### Configuration

The spatially processed dimensional sound in the PMA450A can be adjusted to accommodate the user preferences.

This adjustment allows the Spatial Audio inputs to be “relocated” on any of nine (9) defined “Head Related Transfer Function” (HRTF) locations.

Push **IntelliAudio** → **IntelliAudio Config** to access. In the IntelliAudio® mode, repeated pressing of the COM 1 or COM 2 line select buttons moves the corresponding half-circle cursor to the locations relative to the listener graphic in sequence.

Pressing the **Done** button exits the configuration setting mode. This setting



is recalled at system power up.

### Com Monitor Mode

The PMA450A is equipped with a Monitor function, which allows a secondary com radio audio to be muted by the primary radio (selected for transmit).

To toggle the Monitor mode on and off, cycle the **IntelliAudio** button until **MONITOR** appears.



### Navaid Selection (4)

VHF Navigation receivers can be selected directly from the front panel with the N1 and N2 (VHF Navigation receiver 1 and 2) buttons. The selected source is indicated by a green LED.

Additional navigation aid or other audio sources can be selected using the LCD menus.

Press the lower line select **RADIO** → **SWITCHED INPUTS**, → and desired audio source.



*NOTE: Switched Inputs can be renamed at the configuration set up. See page 13 for more information.*

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

### Speaker Amplifier (7)

To activate the PMA450A cockpit speaker output, press and hold the **N2** button (**SPR**) for 1 second or until **SPR** appears in the display.

In “Split Mode” audio that the pilot hears will also be present in the speaker.

Unswitched audio #1 & #2, (the inputs dedicated to autopilot disconnect, altimeter warning, etc.) will come through the speaker regardless of the speaker button position. *Use of a cell phone will mute the radio audio over the speaker.*

Depending on installation, important audio annunciations such as radar altimeter 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.

### Public Address Function

To access PA function, press and hold the **N1** button for more than 1 second, until the display adds **PA**.

When the pilot is speaking on the PA, all intercom except for the Pilot will be disabled for complete and uninterrupted announcements.

The pilot microphone will be heard on the speaker and headsets when the pilot PTT is used, and **PUBLIC ADDRESS** is displayed.



The copilot can continue to use the selected com radio while the pilot will be heard over the speaker.

To exit PA mode, push and hold the **N1** button again until **PA** is off or cycle power on the audio panel.

### **Marker Beacon Operation (9) (050-450-0101, -0102 Only)**

The Marker Beacon Receiver uses visual and audio indicators to alert you when the aircraft passes over an ILS Marker Beacon transmitter.

The audio from the Marker Beacon Receiver can be heard by pushing the "**MKR**" button. **AUD** will light up green.

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.

Holding the **MKR** button for 1 second activates marker test lamp, labeled "**T/M**" and illuminates all three lamps simultaneously to assure the lamps (internal and external) are in working order. Test mode does not activate MM autopilot sense output. Releasing the button returns to the last sensitivity.

Pressing the marker mode select ("**MKR**") for one second, while beacon audio is active, will also cause the marker audio to mute for that beacon. The next beacon received will re-activate the audio.

The marker beacon receiver audio volume can be adjusted from the menu. Press **RADIO** → **VOLUMES** → **MARKER**, and turn the small knob to adjust the marker beacon volume. The green volume bar and numerical readout will indicate the receiver volume in this menu. NOTE: marker volume cannot be turned completely off. Units without marker receiver will not have a MKR Volume menu.



Marker Beacon sensitivity is changed from Low to High sensitivity by pressing and holding the MKR button for 2 seconds, or until "**H**" appears in the display, indicating High sensitivity is activated.

### **Intercom Operation (8)**

No adjustment of the *IntelliVox*® squelch control is necessary. Through individual signal processing, 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-214A, 1.3.1.1 (a)*).

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**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.

### **Intercom Volume Control (1)**

The smaller 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, larger volume control knob controls intercom volume for the passengers. It has no effect on radio or music levels. (Music can be adjusted independently from a dedicated music menu).

When the volume knobs are moved, the green volume bar indicator will show the level of the changing intercom volume.

Adjust the radios (at the radio itself) and intercom volume for a comfortable listening level.



### **Mono headsets in Stereo Installation**

*Not recommended*, because the benefit of *IntelliAudio*® is lost. However, if desired, the PMA450A can be installed monaurally by using the LEFT audio connections only (left side contains Fail-Safe audio). Do NOT short left and right together.



**NOTE: Mono headsets that short the tip and ring (i.e. older models) will introduce some audio distortion when used. Modern, stereo headsets are recommended in all positions.**

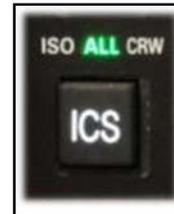


### Intercom Modes (8)

The “**ICS**” pushbutton switch on the panel provides the selection of the three intercom modes.

This button cycles through the intercom modes, from left to right, then right to left as: **ISO, ALL, CRW** and **CRW, ALL, ISO**. A green indicator shows which mode is currently active. This description of the intercom mode function is valid only when the unit is not in the "Split" mode. In the split mode, the pilot and copilot intercom is controlled by the **ICS** button selecting **CRW**.

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



**ALL:** All parties will hear the aircraft radio and intercom.

Crew and passengers will hear selected Music. 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. The music muting can be activated by radio only, radio and intercom, or nothing, for a Karaoke mode.

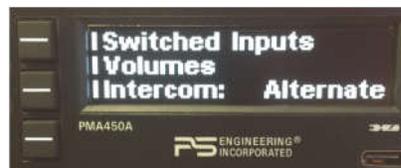
**CRW (CREW):** Pilot and copilot are connected on one intercom channel and have exclusive access to the aircraft radios. They may also listen to Music. Passengers can continue to communicate with themselves without interrupting the crew and may listen to music as configured.

### Alternate Intercom Mode

Alternate Intercom Mode allows intercom communications between crew and passengers, without affecting the crew's radio communications. The passengers do not hear the aircraft radio audio, and passengers microphones are blocked from the crew, while the radio is active. Passengers can still talk to each other.

To enable the Alternate Intercom Mode, press **RADIO-ICS** → **Intercom:** to switch between Standard,

**Alternate** modes and CP Pax modes. This state is remembered during power cycles.



### Copilot as Passenger (CP Pax) Mode

This function is useful when the right seat occupant does not wish to interact with the aircraft operation. When configured as “Copilot as Passenger,” the intercom station wired as copilot will behave as a passenger only.

To enable the Copilot as PAX Mode, press **RADIO-ICS** → **Intercom**: to switch between Standard, Alternate **CP Pax** and CPAX ALT modes. This is indicated by **CPX** on the display.

This state is not remembered during power cycles, unless “Recall ICS” is activated in the setup.

The position will have intercom with the pilot, except when there is radio traffic, and never hear any radio audio. The intercom microphone to the pilot position will not be heard while there is radio audio present. Copilot seat becomes “front” and passenger becomes “rear” for the Music distribution menu. In this configuration, CREW mode cannot be activated.



### Music Control, Distribution and Muting

The top menu, middle line select button toggles the music on or off for the pilot. When music is active, a music icon (🎵) appears in the display.

The PMA450A has two independent music inputs at the rear connector. The PMA450A also has the ability to receive streaming music from a Bluetooth-enabled device.

The Music 1 Music 2 and Bluetooth inputs can be selectively delivered to the pilot, copilot and/or passengers using the music distribution menu.

Press **Music** → **Music Distribution** → and select desired combination.

**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 91.21-1C for more information, at [www.faa.gov](http://www.faa.gov).

### Music Muting

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 over a second or so.

The mute mode functions are controlled through Music Mute Menu



which has **three** modes for music inputs, **ALL**, **Mute Off** & **Radio** mute.

- **ALL** – music **will** mute with *either* intercom *or* radio
  - **Mute Off** – music will *not* mute except during outgoing radio transmissions.
  - **Radio** – *Radio* will mute music, but intercom will **not** mute music.
- The PMA450A defaults to *Mute ALL* when turned on, unless Mute Recall mode is enabled in setup.



In addition to the panel mute menu, a remote switch may be installed to allow the passengers local access to their Mute Off mode. When this switch is grounded, the menu choice is overridden.

### Music Volume

The volume of the three music inputs can also be adjusted from the menu of the PMA450A:

Press **Music** → **Music Volume** → set desired music input. The LED Volume bar and the numeric volume will show the volume level.



### Music in Pilot ISO mode

When the isolate (ISO) mode is activated, the music for the pilot is automatically disabled. If desired, the pilot can elect to hear Bluetooth, Music #1 or #2, in the ISO mode by toggling the Music line select with a long press or holding the ICS button, while in the ISO mode.



### Bluetooth® connection

The PMA450A has a Bluetooth interface. The audio panel is always “discoverable,” so you just need to search for the PMA450A from your Bluetooth-equipped phone or music source.

If the audio panel is turned on before the Bluetooth device, you will have to either reconnect from your phone, or turn the audio panel off and back on to connect.

When Bluetooth is active, a Bluetooth icon and the battery status of the device is displayed in the upper right corner of the home display.

### Pairing and unpairing Bluetooth devices

The PMA450A can be paired with up to eight individual devices, and will automatically reconnect with the first two it finds. When more than eight are



paired, the PMA450A will randomly drop a device to allow the new device to be added.

*When the PMA450A is first powered on, an auto connect sequence attempts to connect the BT to previously paired devices. During this period connection times may vary from 10 seconds to 1 minute. Although the PMA450A can store up to eight devices, we recommend limiting the number if practical. During start-up, the PMA450A will look for each previously paired device which may slow connection time.*

*Hint, if your old phone is not recognized by the PMA450A, you may need to reset from the Bluetooth menu.*

### **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, only one music source can be streaming at a time.

*NOTE: A previously paired iOS Hands Free device may experience from one to several connect/disconnects sequences when the PMA450A is first powered on. This is normal and will result in the device remaining connected when the auto connect process is completed.*

*If two iOS devices are paired and connected to the PMA450A, and one of them does not auto connect on the next power cycle (perhaps it isn't in the airplane, or the Bluetooth is turned off), it will be ignored until it is reconnected manually.*

### **Bluetooth® Telephone Mode**

The PMA450A serves as a full duplex interface for telephone systems such as portable cellular phones with Bluetooth connectivity.



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#### **Warning:**

United States FCC Regulations contained in 47 CFR § 22.925 currently 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."

When the Bluetooth-enabled cell phone rings, an incoming call menu opens, showing caller ID, and the call can be answered by pushing the top line-select button.

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 transmit capability on the other selected transceiver Com 1 or 2, simply by using their respective PTT switch.

In **ISO** intercom mode, when the PMA450A 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. There will not be telephone sidetone in ISO. The pilot will also have access to Com 1 or 2, and will transmit on that radio using the PTT. All other selected audio is provided.

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#### NOTE

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**PS Engineering does not guarantee compatibility with personal cellular telephones.**

#### Cellular telephone sidetone

Some cell phones do provide sidetone, and when combined with audio panel sidetone audio distortion may occur. In PMA450A Telephone sidetone can be enabled or disabled on the Telephone menu which is active when a call is in progress.



#### Bluetooth Reset

If the Bluetooth devices have trouble connecting, it may be necessary to reset the Bluetooth Module. The PMA450A Bluetooth Reset function is accessible from the setup menu. (See also User Setup Menu, next page)

During the unit boot up process (while the version numbers appear on the screen), hold the lower line select button until the setup screen appears. This places the unit into the "User Setup Mode-home screen", and allows resetting the Bluetooth Module

When **Unpair All** is pushed, the Bluetooth Module is reset and **ALL** Bluetooth devices are erased from the audio panel. Cycle the PMA450A power to exit setup screen.

#### Wired telephone/Satcom mode

The PMA450A can accommodate a wired telephone input as well as a Bluetooth connection. However, only one can be active at a time. The Bluetooth symbol is absent from wired menu.

The wired telephone screen menu is activated when audio is detected from the phone. Sidetone and telephone volume can be controlled from this menu. The telephone audio distribution is the same as Bluetooth, above.

This menu will switch off 25 seconds after the *incoming* conversation ends, or press End Call.

NOTE: The PMA450A does NOT answer or hang up the wired phone from this menu.

#### Internal Recorder and playback

The PMA450A has an internal recorder. This digital system stores the last incoming audio from the radio you have selected for transmit. It can store as

many as 8 incoming messages, and up to 45 seconds of audio. The pilot and copilot hear the playback. Recording is automatic.



To play back the last recorded message, press and hold the COM Receive pushbutton associated with the selected radio transmitter. You can either wait for the message to finish playing before accessing the prior message, or cancel the current playback and step backward. To cancel the playback, press and hold the



COM receive button for two seconds. The next time the button is pressed for one second the next earlier message is received. The screen displays a status message to indicate that playback is in progress. The playback will stop whenever there is more incoming selected COM audio, and the message can be replayed from the beginning by pressing the selected COM receive button again.

### User Setup menus

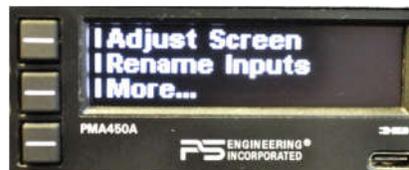
The PMA450A has several user adjustable functions accessible from a setup menu.



During the unit boot up process, press the lower line select button until the setup screen appears. This will place the unit into the “User Configurable Mode- home screen”. This allows adjustment for:

- Adjust Screen (OLED) & Timeout
- Rename Switched Inputs
- Bluetooth
- Recall Mute Modes
- Recall special Intercom Modes

Cycle the PMA450A power to exit setup screen.



### OLED Screen Adjustment

The first items are adjustments to the display, allowing the installer or user to tailor display to suit the cockpit conditions.

There are two modes: Display Brightness & Display Timeout. display will vary in real time while adjustments are made. LED bar & numeric indication will vary.

Adjusting the Brightness level requires selecting the small button and then turning the inner knob. Counter clockwise to lower the number (level of Brightness ) and clockwise to increase the number (level of Brightness).

To change the display:

Press the line select for the desired item

Turn the small, inner knob to change the brightness as desired.



Cycle the PMA450A power to exit setup screen.

### Display Timeout

This is a feature that allows the user to adjust how quickly the screen menus timeout (revert to main menu).

This allows adjustment of the timeout screen and can be configured from 1 second to 30 seconds by turning the inner knob.

For a user who is unfamiliar with the product, this will give them enough time to learn the system. After becoming more familiar the user can speed up the menu screen timeout as desired. A long press of the line select will also back up a menu level.

Cycle the PMA450A power to exit setup screen.



### Rename “Switched” Inputs

The system is factory set to default as ADF, DME & AUX as shown.

The three inputs are from top to bottom:

- Switched input #1 J1, Pin 7 wrt Pin 8 (Default ADF)
- Switched input #2 J1, Pin 21 wrt Pin 22 (Default DME)
- Switched input #3 J1, Pin 23 wrt Pin 43 (Default AUX)

The user has access to rename these inputs. There is a maximum 9 letters per line, and *A — Z, a — z and 0 — 9* are available.

- Press the line select for desired input.
- Turn the large outer knob to select the letter to change.



- Turn the small, inner knob to increment or decrement the letter.
- You can clear the whole line quickly by turning the outer knob to move the cursor all the way to the right until the line clears.

Cycle the PMA450A power to exit setup screen.

### Recall Mute

As shipped by the factory, the PMA450A automatically default to “Mute Off.” This ensures that the music will always be muted until intentionally changed by the pilot. The PMA450A defaults to Standard Intercom from Alternate Intercom on power up.

Owners who want the PMA450A to remember the last music mute state can set the “Recall Mute” and remember Standard, Alternate Intercom and CPX mode set can “Recall ICS” in the user setup menu.

### Bluetooth Setup

There are three Bluetooth functions that can be changed in the user setup screen, Unpair All, Pair PIN code, and device ID.

**Unpair All (Bluetooth Reset)** When this is pushed, all Bluetooth devices are erased from the audio panel, and can then be added back as desired. This is useful in some cases where the unit or operator lose track of the devices paired, and cannot get them to connect.

**PIN:** The 4 digit pass code can be changed to any number desired. The default is 0000. This is useful if the owner wants to restrict access to the audio panel Bluetooth functions.

Some phones will not pair if a Personal Identification Number (PIN) is required. To disable the PIN Enter configuration menu, select Bluetooth. Select PIN code for editing. Press PIN button one more time. “Bluetooth Reset” will appear on screen. When the menu returns, the PIN code will report “Disabled”. To re- enable the PIN code for a different device, press the PIN button. “Bluetooth Reset” will appear on screen. When the menu returns, the last stored PIN code will be shown.

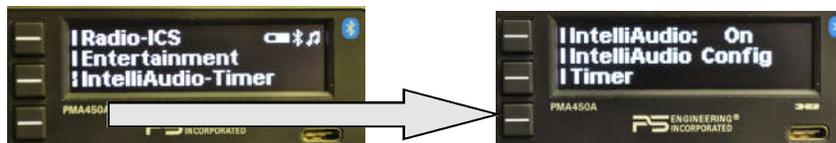
**ID:** The PMA450A can be renamed using this mode to show up on the devices with a personalized identifier.



### Timer Operation

The PMA450A contains a timer function with count down, or count up functions. This can be used as a convenient reminder for timed instrument approaches, fuel tank switching, flight elapsed time, etc.

The Timer is accessed from the main menu, bottom button. Press the SET button and use adjust the desired time using the outer knob for minutes, and the inner knob for seconds, up to 99:99. Press Start to begin counting down.





The display reverts to normal after a few seconds. Then as the countdown progresses, the display will momentarily show remaining time as the interval is divided in half (from 1 minute, then 30 seconds, then 15 seconds, etc). At one minute remaining, an audio alert says “One Minute.” The display show remaining time at 10 seconds, and audio alert says “Time Expired.”



The set time is remembered until changes, and can be reset to the last value. The count up timer simply shows elapsed time since START, and counts to 99 minutes, 99 seconds.



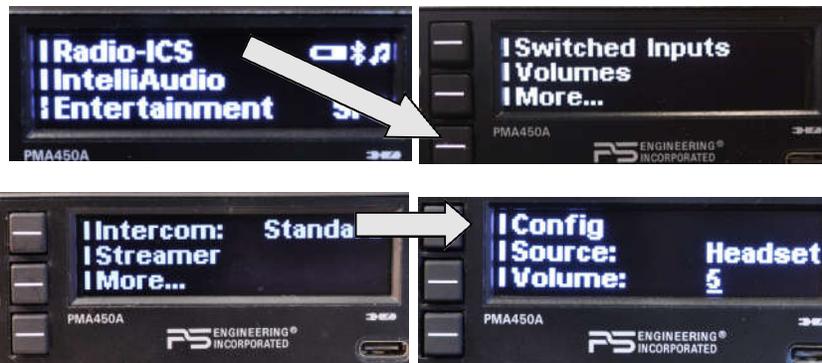
### USB Charging Port (10)

The PMA450A contains a USB-C charging port that is capable of providing 5VDC, 3 amps of current (15W) to charge the batteries in smart phones and tablets used as Personal Electronic Devices. This is NOT a data transfer jack.

# PS Streamer Option *for* PMA450A

**Unit Part Number 050-450-0102 Only**  
**Operation Manual Insert**

The PMA450A can be equipped with a PS Streamer audio module. This module provides a Bluetooth® output of selected signals from the audio panel. These can be streamed to compatible devices such as a GoPro camera equipped with a SENA adapter.



### Pairing to External Device

To pair the PMA450A PS Streamer with a compatible device, access the streamer menu from Radio-ICS → More → Streamer → Config → Init Pair. This will initiate the pairing sequence, and you may have to initiate the pairing on the other device as well.

This may take 30 seconds to complete.

After the module is paired the first time, it will connect to that device each time it is activated.

Depending on the Bluetooth device receiving the audio, pairing may have to be initiated on the device, or the audio panel first.

**NOTE:** During the time that the Streamer module is in the pairing process, the main Bluetooth connection to the telephone/music is inhibited,

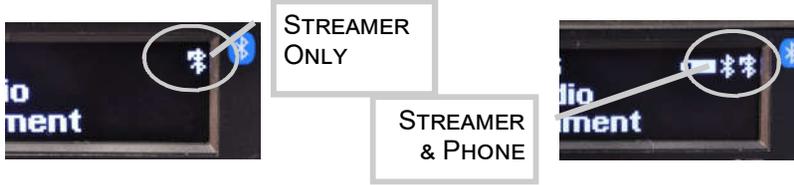


so music and telephone will not be available. When paired, a Bluetooth symbol will appear in the display.



**Streamer on/off**

Select: Radio-ICS → More → Streamer → Source  
Press the middle line select button to activate the PS Streamer source when it has been turned off.



The PS Streamer defaults to “off” when the audio panel is turned on each time. You will need to activate the PS Streamer for each flight when desired, but pairing will not be necessary. The module will reconnect when activated.

**Streamer Source Selection**

The output can contain either the audio heard by the pilot (radio, intercom, music, etc.) or only communications radio audio.

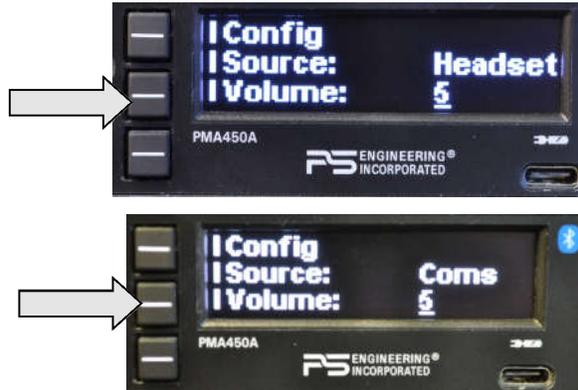


From the PS Streamer menu, push the middle line select button to toggle between communication radio audio and all audio heard in the pilot headset, including radio, intercom, music and telephone.

**Streamer Volume**

The volume of the radio output to the PS Streamer module can also be adjusted, press Radio-ICS → More. . . → Streamer → Volume, and use the small knob to set the level. We recommend starting at 10, the highest level.







## Warranty & Service

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 retail sale by authorized PS Engineering dealer. 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 will send a no-cost replacement unit at customer shipping expense.

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.

### 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: [contact@ps-engineering.com](mailto:contact@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.**

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