PS ENGINEERING® INCORPORATED

Sound Quality. Sound Engineering.

PAR200B

Audio Selector Panel
High-fidelity Stereo Intercom System
VHF Communications Transceiver Controller
With IntelliAudio®

Flying Never Sounded So Good! ®


Pilot's Guide
and
Operation Manual

Covered under one or more of the following
Patents No. 4,941,187, 5,903,227
6,160,496, 6,493,450

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This section provides detailed operating instructions for the PS Engineering PAR200B, Audio Selector Panel/Intercom/VHF Communication Control 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 PAR200B systems. They are Communications Transceiver Selection, Audio Selector, Intercom, VHF COM, entertainment, telephone, and display.
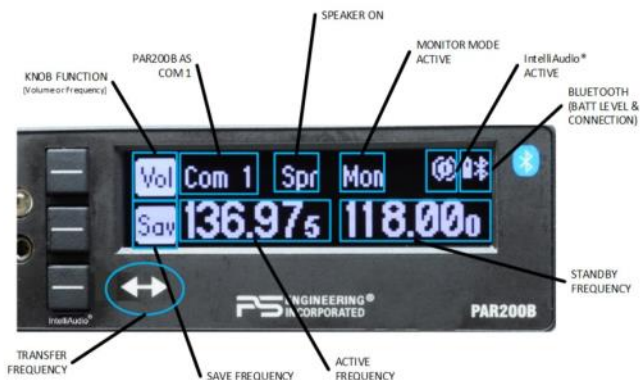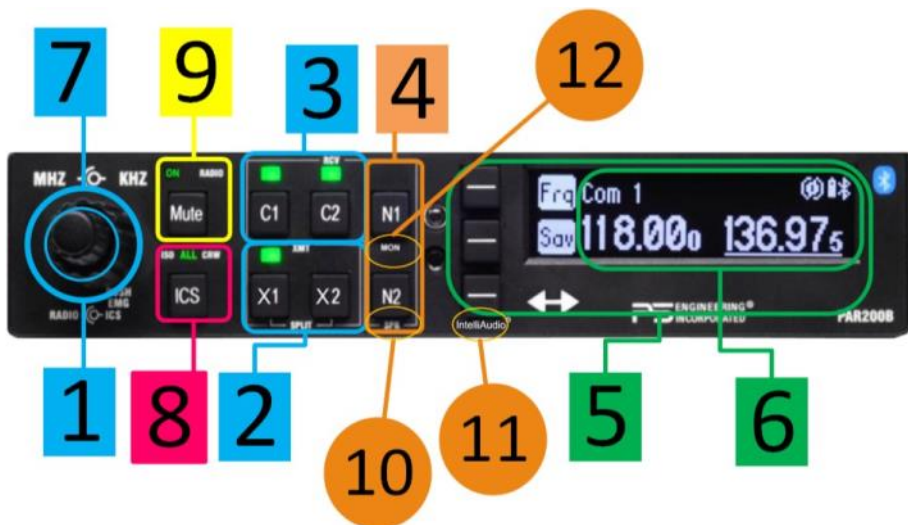
Power and Fail Safe (1)

Unit power is turned on and off by pushing the volume (left) 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 portion will revert to fail-safe mode.

The power switch controls all audio selector panel functions and the intercom. All pushbutton selections and menu modes (except Bluetooth telephone association) will be remembered and return to the last state when turned on.

Radio power (as COM 1)

The power supply for the remote communication transceiver is separate from the audio panel power and control. When the TY91L is installed as COM 1, it can be controlled separately in the event of a problem in the audio panel portion, or audio panel power loss.

If the audio panel is turned off by the left knob (or the audio panel breaker is opened), the display will indicate "COM 1 Shutdown in 6 (counts down)" If the Cancel button is not pushed, the com radio will also turn off, but if the button is pushed within the time limit seconds, the radio frequency display, volume and frequency control will remain active. Pushing the poser switch will run the audio panel back on.

Communications Transmit (XMT) Selection (2)

The two buttons **X1** and **X2** (# 2) in the **XMT** section control which communications radio is selected for transmit. The top row of pushbuttons (# 3) allows selection of the **C1** (COM 1) or **C2** (COM 2) receiver audio. Push the lower button to select the desired COM transmitter. A green LED above the button illuminates to indicate that the audio is selected.

The PAR200B has an automatic com receiver 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 PAR200B "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.

Split Mode

The split mode can be activated at any time by pressing the **X1** and **X2** <u>**XMT**</u> buttons <u>at the same time</u>. This places the pilot on Com 1 and the copilot on Com 2.
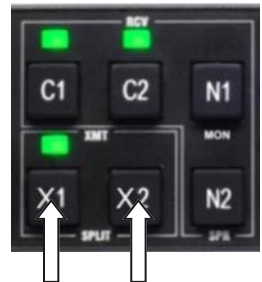
Pilot on Com 2 and Copilot on Com 1 is not possible. In the split mode, the intercom between pilot and copilot is inhibited to avoid confusion. To restore intercom if desired, press the "ICS" button.

NOTE

Due to the nature of VHF communications signals, and the size of 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 guarantee of the suitability of Split Mode in all aircraft conditions.

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

With an *optional* yoke mounted, normally open momentary switch, the pilot can change from the current Com transceiver to the other by depressing this switch (X1 to X2). To cancel "Swap Mode," the pilot may either press the yoke mounted switch again, or select a different Com with the XMT buttons. This does NOT flip-flop the PAR200B Active and Standby frequencies.

COM Audio Selector (2)

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.

In SPLIT mode, only the pilot will hear selected navigation audio (**N1** & **N2**).

IntelliAudio® Audio (11)

COM 1 and COM 2 receiver audio signals are processed to "appear" in a different locations to the crew. COM 1 will appear at 10:00 o'clock position and COM 2 at 2:00 o'clock position. This helps the crew to better comprehend speech by locating it in a manner more easily differentiated by the human brain.

To activate the IntelliAudio HRTF mode, press and hold the bottom line-select button next to the transfer arrow for about 1 second, until the icon appears. Intercom and other audio is not spatially processed, only the pilot and copilot VHF COM audio.

You must use stereo headsets, in stereo mode for this feature.

Navaid Audio selection (4)

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

The users can identify which receivers are selected by noting which green LEDs are lit above the button. Navigation aid audio push buttons are labeled **N1** and **N2**.

Any additional installed receiver audio (Marker, ADF, etc.) is interfaced through an unswitched input.

VHF Transceiver control (6)

The PAR200B is a dedicated control of the Trig TY91(L) VHF communications transceiver. Direct frequency selection is always directed to the STANDBY side of the display.

To defeat the automatic radio squelch, push and hold the top line-select button until the radio menu appears. Then turn the small knob counterclockwise until the Squelch display reads Off.

Frequency Selection (7)

Push the top line-select button to the **Frq** mode. Turn the large (outer) knob to change the Standby MHz, and the smaller, inner knob to change the standby KHz frequency.
Push the lower line select button momentarily to transfer standby frequency to the active frequency.

Adjust the radio 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.

Frequency Storage

The PAR200B will store five frequencies for future recall.
To store frequencies:
1. Enter the desired frequency it the **STBY** frequency.
2. Push the middle line select button, adjacent to the **Sav** icon.
3. Push the middle line select button to save in the location shown.

4. When a frequency has been saved, the **Sav** button becomes **Rcl** for Recall.
5. Use knob to select save location if desired. Push "Save" to overwrite or Insert to insert in new location.
6. Continue to enter frequencies as desired, then hold the **Rcl** button for 1 second, until the display switches to the "Save" as shown.


To recall stored frequencies:

1. Press the center line-select button next to the **Rcl** icon.
2. Using either of the knobs, select the desired location.
3. Push the center line-select button to accept this as **Active** frequency.

Tuning 8.33 kHz channel Spacing

Hold the top line select button for 1 second, which will show the radio menu. Press again to toggle between either 25 kHz spacing or 8.33 kHz spacing. This will be indicated on the OLED screen when the trailing digit on the 0.000 MHz is full size. As in the PAR200A, if the ICS button is held for 1 second, the radio menu will also appear.
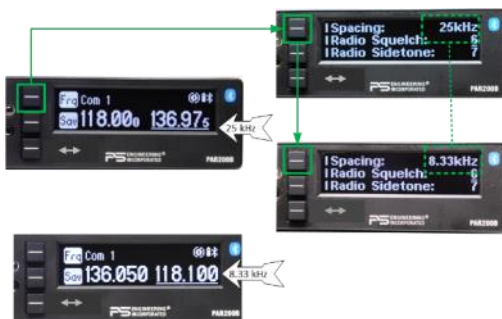
Monitor Mode (12)

If the TY91 is interfaced as a standalone COM or as COM 1, the radio's standby frequency monitor can be used. To activate the monitor mode, press and hold the **N1** button until "**MON**" appears in the display.


While receiving a signal on the <u>active frequency</u> - the standby channel is **NOT** monitored.
While receiving a signal on the standby frequency - the active channel is periodically monitored. If a signal is found on the active frequency the **TY91** will revert to the active frequency. After a signal has been received, the **TY91L** will return to monitoring both frequencies.

It will be important to remember which station is active and which is standby, to avoid answering a transmission on the standby frequency by transmitting a response on the active frequency. You may notice a slight "ticking" in the audio as the frequencies are being scanned in Monitor Mode.

If the active and standby frequencies are transferred, the Monitor mode is canceled.

ICS and Radio Volume Controls (1)
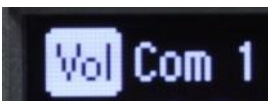
Push the top line-select to enter the volume mode (**Vol**). The small inner knob (ICS) controls the volume of the intercom audio. It does not affect the radio, telephone, or music volume.
The outer knob (RADIO) controls the volume of the Trig TY91 COM transceiver.

Cockpit Speaker (10)

When the cockpit speaker is turned on, any receiver audio selected will be heard in the speaker. Any unswitched audio will always be present in the cockpit speaker.

To activate the cockpit speaker, push and hold the **N2** for about 1 second or until the display shows **SPR**. Repeat to turn the speaker off.

Radio Sidetone & Radio Squelch Adjustment

To change the automatic squelch threshold and sidetone level for the Trig TY91 transceiver: Enter the Radio Volume mode by pressing the **ICS** button until the setup screen appears

Turn the rights side outer knob to set the squelch threshold to low (weak signals open), medium (normal operation) or high (blocks RF noise, requires stronger signals to open).

Turn the right side smaller inner knob to increase or decrease the radio sidetone. Typically, the radio sidetone is adjusted slightly lower volume than he received radio signals.

Intercom Operation (8)

IntelliVox® VOX-Squelch
No manual adjustment of the *IntelliVox®* squelch control is possible. Through individual signal processors, the ambient noise appearing in all four 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)*).

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.

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

Intercom Modes (8)

The "**ICS**" pushbutton switch on the lower 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.

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 LED behind the text shows which mode is currently active.

Iso: The pilot is isolated from the intercom and is connected only to the aircraft radio system. He will hear the aircraft radio reception (and sidetone during radio transmissions). Copilot will hear passengers' intercom and entertainment, while passengers will hear copilot intercom and entertainment. Neither will hear aircraft radio receptions or pilot transmissions.

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

CREW: Pilot and copilot are connected on one intercom channel and have exclusive access to the aircraft radios. They may also listen to Entertainment 1. Passengers can continue to communicate with themselves without interrupting the Crew and may listen to entertainment #2.
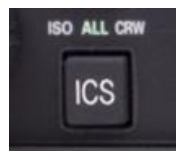
Mono headsets in Stereo Installation

NOTE: Stereo headsets must be used for IntelliAudio® to function properly. 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 PAR200B Stereo installation, one channel will be shorted. Although no damage to the unit will occur, passengers with stereo headsets will only hear in one ear, unless they switch to the "MONO" mode on their headset.

Bluetooth® Telephone Connection

Before the PAR200B can be used in TELEPHONE mode with a wireless Bluetooth connection, the unit <u>must</u> be associated with a specific phone.

Activate the "seek device" function on the cell phone (if required, enter the access code "**0000**") when the phone detects the "PAR200B" on the list of available devices.

This process will be necessary for any phone to be used, and only one cell phone can be associated with the audio panel at a time. If the additional phones are associated with the PAR200B at the same time, only the *first* phone will transfer audio to the panel.

If the Bluetooth connection fails to reconnect, or becomes unreliable for any reason, you can reset all connections through the user setup menu. This clears out all paired devices.

PS Engineering recommends this clearing process if you are having difficulties interfacing the PAR200B audio panel to your Bluetooth phone or device.

Telephone Operation

When the Bluetooth-enabled phone receives an incoming call, the PAR200B will play the ring tone from your phone. Answer the call by pushing the top line select button. The PAR200B exits the telephone mode automatically when the cellular phone hangs up, or the bottom line-select button is pushed.

In TELEPHONE mode, the pilot microphone and headphones are connected
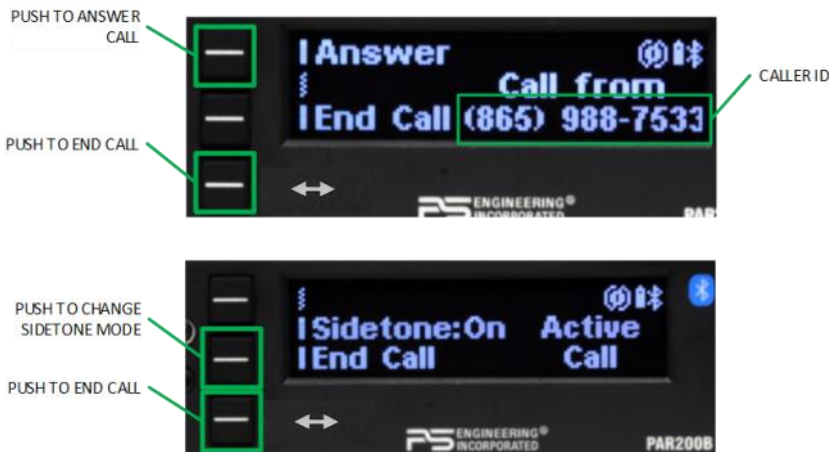
to the cell phone. The pilot PTT will switch the pilot mic to the selected com transceiver, and allow continued aircraft communications to continue.

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

Entering the TEL mode 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 are also heard in the headsets. If the pilot or copilot pushes the radio PTT, their microphone 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 PAR200B 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. Pilot will **not** have telephone sidetone in Isolate mode.

.US Federal Communications Commission regulation 47 CFR 22.925 prohibits the use of 800MHz Cellular handsets in any aircraft that is airborne. Violation of this rule could result in suspension of service and/or a fine.

Telephone Sidetone

Most cell phones do not provide sidetone (your voice in the headset when speaking). The PAR200B provides this sidetone from the factory. If your phone does provide sidetone, and the sound is distorted, pushing the middle line-select button will turn it off, while on a call. This setting is remembered

Music Muting (9)

There are two SoftMute™ muting circuits. The front panel "Mute" button controls the pilot's music.

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

The Pilot's Music mute functions are controlled through sequential pushes of the Mute button, with LED indication of the mode selected.

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

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

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

Music 2 Mute Control

Passengers can have access to their own Karaoke Mode control hardwired to the audio panel connector. If installed it will override the front panel music mute control for the passengers. If the passengers are listening to the music 2 input, their Karaoke Mode can be activated by an external switch.

Music Menus

Press and hold the "Mute" button for 1 second, until the music menu appears.

Using the line select buttons, chose either Music Mute Menu or Music Distribution.

The PAR200B has two independent music inputs at the rear connector, Music #1 & #2. The PAR200B also has the ability to receive streaming music from a Bluetooth-enabled device which is also Music #1. If both inputs (Music #1 & Bluetooth) are active, both will be heard in the headset at the same time, there is not any prioritization.

Pilot- Will only have the option to hear Music #1/Bluetooth.

In split mode copilot will not hear any music inputs, pilot can still monitor music #1/Bluetooth and passengers can select the music source of their choice. Passengers can select either music input while the audio panel is selected to split mode.

Music #1/Bluetooth can also be distributed to all headsets by using an external

switch (J2 pin 22) to place in all heads. the passengers using the rear connector control. The streamed Bluetooth music in the PAR200B is also Music 1.

User Setup Function

To access the user setup menu:

> Turn the PAR200B off by pushing the left knob, and allowing the unit to shut down.
>
> Turn the PAR200B back on.
>
> As soon as the PAR200B screen appears (after a brief logo slash screen), push the *bottom* line-select button to switch into setup mode.

Select the function using the line select buttons.

Display Brightness

The intensity of the OLED can be adjusted by pushing the *top* line-select button, and turning the small knob to set a value from 0 (full dim) to 10 (full bright). Regardless of the setting, the display intensity will also follow the photocell to respond to ambient light.

Display Time out

The length of time that a menu stays active can be adjusted by pushing the bottom line-select button, and setting the time from 1 second to 30 seconds. We recommend that the time be longer as you get used to the choices, but can be shorter with familiarity. 10-15 seconds works well for new users. In addition, holding any line select button for more than one second will revert to the previous menu.

Bluetooth

Pressing the center line select button activates the Bluetooth options menu, The top button will reset the Bluetooth module, and erase all paired devices. This is useful if you experience any connection issues with the Bluetooth. This can happen when many devices have been paired over time.

After Unpair All is pressed and the Bluetooth module resets, you will need to "Forget" the PAR200B from any devices, and re-pair from the device afresh.

Pressing the center line select button allows you to set a PIN code if your device requires it. Use of a PIN code is not recommended unless your device requires it.

Options

There are two user selectable options that affect what the default state of functions will be upon power up.

Recall Mute mode will allow the PAR200B to remember the music muting selection between power cycles when selected **On**. When Recall Mute is **Off**, the PAR200B will revert to "Mute ALL" mode at power on.

Knob Default sets the power on default state of the rotary select knobs. In **Frq** mode, the smaller knob controls the .100 MHz while the large knob changes the MHz of the Standby Frequency.

With **Vol** selected, the smaller knob controls the volume of the intercom for all users, while the larger knob adjusts the receive volume of the Trig TY91L transceiver connected to the PAR200B.

Regardless of the power on default function, the knob function selection will be controlled by the top line-select button and remain selected until changed during operation.

Several of the buttons have second functions that are activated by a long button press. These are:

Button	Label	Function	Display
N1	MON	Activates COM monitor mode	Mon
N2	SPR	Turns cockpit speaker on or off	Spr
Bottom Line-Select	IntelliAudio®	Turns IntelliAudio® on or off	
Top Line-Select	Short press	Toggle between Frequency and Volume	Vol Frq
Top Line-Select	Long Press	Activates Radio Menu	
Center Line-Select		Switches from Recall to Save mode	Rcl Sav

PAR200B Serial Number: _____

TY91 COM Serial Number: _____

Installed by: _____

Installation date:_____