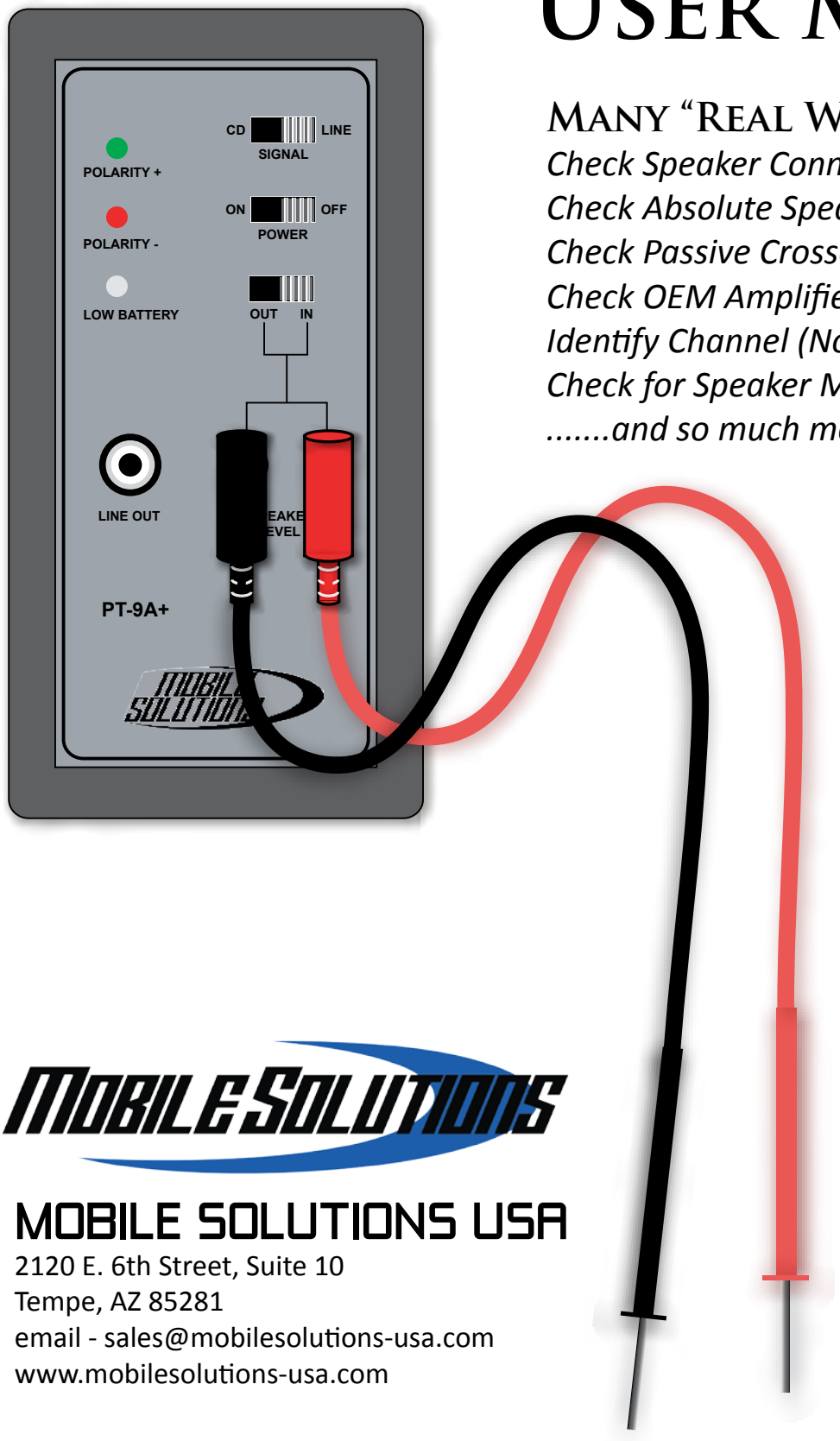
PT-9A+ Polarity Tester

Professional Speaker Calibration and Polarity Test Instrument

User Manual



Many "Real World" Uses:

Check Speaker Connections
Check Absolute Speaker Polarity
Check Passive Crossover Phase Shift
Check OEM Amplifier Outputs
Identify Channel (No more drill batteries)
Check for Speaker Mounting Leaks
.....and so much more!

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Version 1.0

PT-9A+ Polarity Test Instrument

The PT-9A+ Polarity Tester is an essential measurement tool for building and tuning great car audio systems. Please read the user manual carefully and follow the instructions provided.

What is the Overall Goal?

The goal of any audio system with multiple speakers is to reproduce sound energy so that the absolute phase between all speakers is complimentary (rather than destructive). This means all speakers in the system need to be working together. The PT-9A+ allows the install technician to verify the absolute phase of each speaker in the system, both individually and as a group using a combination of internally generated pulses and pulses from the test tracks contained on the included USB thumb drive.

Simple **GREEN** or **RED** light pulses on the front of the instrument indicate the overall condition of the speaker(s) being evaluated in real time while installed in their final position(s) in the vehicle. It can't get much more accurate than that!

FEATURES

Internal Pulse Generator

The PT-9A+ features an internal pulse generator output that simultaneously processes speaker pulses through the built-in microphone located on the front of the instrument. This allows the unit to be entirely self contained. The internal generator provides evenly spaced, positive (pressure) pulses to both the line level jack and speaker level outputs for the duration of time the unit is on. The **LINE LEVEL** signal is sufficient to drive signal processor and amplifier inputs. The **SPEAKER LEVEL** signal is sufficient to drive a speaker directly. To use the internal pulse generator, be sure the **IN/OUT switch** is in the **OUT** position and the **SIGNAL switch** is in the **LINE** position.

Alternatively, the PT-9A+ can use only the built-in microphone with the **SIGNAL switch** is in the **CD** position to "hear" pulses generated by an external source, such as the pulse tracks provided on the included USB thumb drive. You can also download the pulses from the Mobile Solutions website and use a portable device (such as a smartphone) to generate pulses in the audio system.

Internal Pulse Reader

The PT-9A+ also functions as a pulse reader. The speaker jacks can be configured to accept speaker-level INPUT up to 4VAC to identify the electrical polarity of an audio signal. This feature allows the technician to determine which wire is positive (+) and negative (-) so that, when doing an OEM audio integration job, the inputs to a DSP or amplifier can be configured correctly with respect to polarity.

Test the outputs of an OEM source unit or OEM amplifier when the speakers in the vehicle have already been disconnected and removed. To use the internal pulse reader, be sure the **IN/OUT switch** is in the **IN** position and the **SIGNAL switch** is in the **LINE** position.

Test Tracks

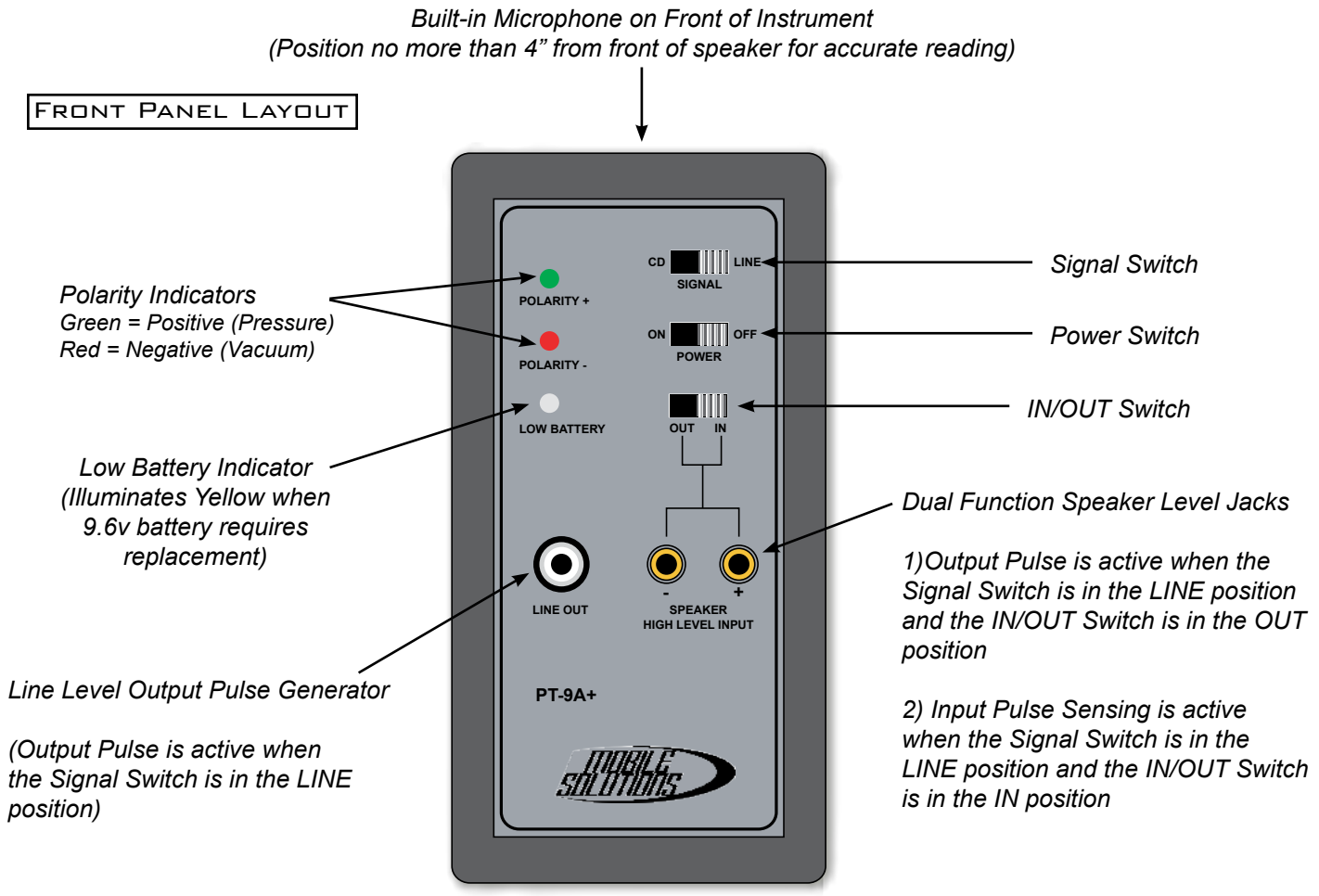
The included USB thumb drive contains a polarity pulses track to be used in conjunction with the PT-9A+. The sequence on the pulse track is three (3) POSITIVE pulses followed by one (1) NEGATIVE pulse. When wired correctly and responding in absolute phase, speakers tested in the system should show three (3) GREEN lights followed by one (1) RED light on PT-9A+. To use only the built-in microphone and pulses from an external source, move the **SIGNAL switch** into the **CD** position.

Pink Noise tracks are also included on the USB thumb drive or available for download. These are intended for use with a Real-Time Analyzer (RTA) to help with system tuning. One each left and right side mono pink noise track, along with a mono pink noise track for left and right channels combined.

Noise Free Testing Zone

It's very important that this instrument is used in an environment where there is not a high level or external ambient noise when checking the speaker polarity using the built-in microphone. Installation bays can contain a high level of noise during a productive day, so you may wish to close the vehicle doors and ask others nearby to minimize unnecessary noise. This will only help the accuracy of the built-in microphone.

Front Panel Layout



Operating Instructions

Verify an individual preamp-level (RCA) polarity using Internal Pulse Generator

1) Move the Signal Switch of the test instrument to the "**LINE"** position.

2) Switch "**SPEAKER/HIGH LEVEL INPUT**" button to "**OUT**".

3) Connect one RCA audio cable to the instrument's "**LINE OUT" RCA** jack. This can be the input cable to a signal processor or amplifier. Test only one channel at a time.

- The orientation of polarity on the "LINE OUT" RCA jack is positive (+) on the center pin and negative (-) on the outer shield.

4) Ensure the processor or amplifier is turned on so signal can pass from that component's input through the audio signal path and ultimately to the speaker(s) connected on that channel.

5) Move the Power Switch of the test instrument to the "**ON**" position.

6) Point the polarity tester's front panel microphone about **2-4 inches** from the cone (or grille) of the speaker you wish to test. You should hear a faint pulsing sound from the speaker.

7) Based on the orientation of the RCA LINE OUT jack as described in Step 3, a **GREEN** light indicates the speaker is in correct polarity with the RCA input of the device tested. A **RED** light indicates the speaker's polarity is backward (reversed) from the device's input polarity.

- If the RED LED illuminates, this means the speaker is wired backward, the input signal to (such as in OEM audio integration) is backward or the input of the device has an internal polarity reversal setting. Check and verify each of those scenarios that apply, make any necessary changes and test again.
- If **GREEN and RED** LEDs are both lit **AT THE SAME** time it may indicate a leaky speaker mount.

8) Repeat for other individual speakers as needed.

Verify an individual speaker's polarity using Internal Pulse Generator

1) Move the Signal Switch of the test instrument to the "**LINE"** position.

2) Switch "**SPEAKER/HIGH LEVEL INPUT**" button to "**OUT**".

3) Connect the probes to the speaker's terminals. **Red probe to + terminal** and **Black probe to - terminal**.

4) Move the Power Switch of the test instrument to the "**ON**" position.

5) Point the polarity tester's front panel microphone about **2-4 inches** from the cone (or grille) of the speaker you wish to test. You should hear a faint pulsing sound from the speaker.

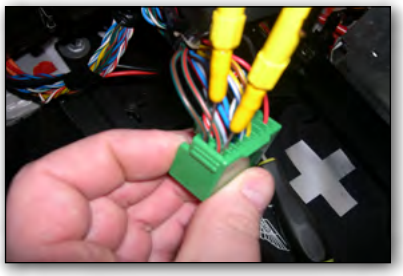
6) Based on the orientation of the probes as described in Step 3, a **GREEN** light indicates the speaker is in correct polarity with the position of positive and negative probes. A **RED** light indicates the speaker's polarity is backward (reversed).

- If the RED LED illuminates, this means the speaker is wired backward. Switch wiring and test again.
- If **GREEN and RED** LEDs are both lit **AT THE SAME** time it may indicate a leaky speaker mount.

7) Repeat for other individual speakers as needed.

Note - *if using in an OEM audio integration application where you are pulsing the wires in a factory head unit or amplifier harness (unplugged) to find the speaker locations, you may wish to use smaller "backprobe pin" type leads and clip onto the PT-9A+ test leads with an alligator clip as shown in the photos. This will eliminate any unnecessary damage to high density OEM wiring and connectors in the plug.*

Alligator Clip to Probe Side



Alligator Clip to Backpin Probes

Verify Acoustic Signal polarity using Polarity Pulse Test Track

1) Insert USB thumb drive with included polarity pulse track.

2) Move the Signal Switch of the test instrument to the "**CD"** position.

3) Switch "**SPEAKER/HIGH LEVEL INPUT**" button to "**OUT**".

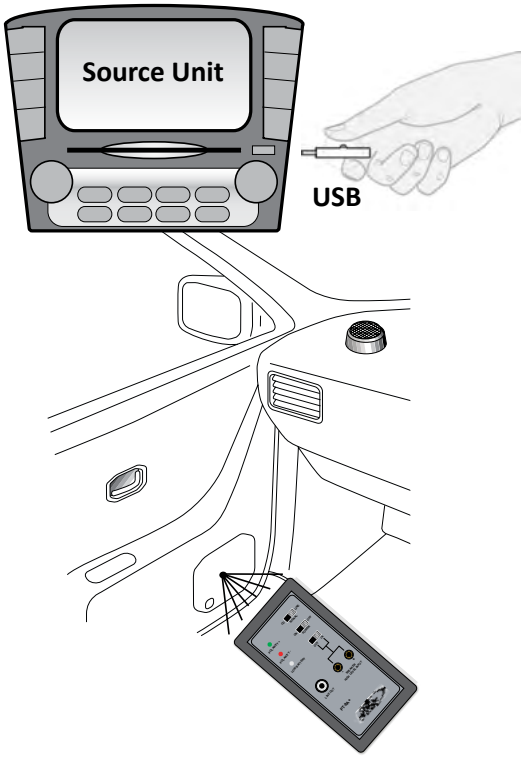
5) Move the Power Switch of the test instrument to the "**ON**" position.

6) Play the polarity pulse track. Set volume where pulses are just audible.

7) Point the polarity tester's front panel microphone about **2-4 inches** from the cone (or grille) of the speaker you wish to test.

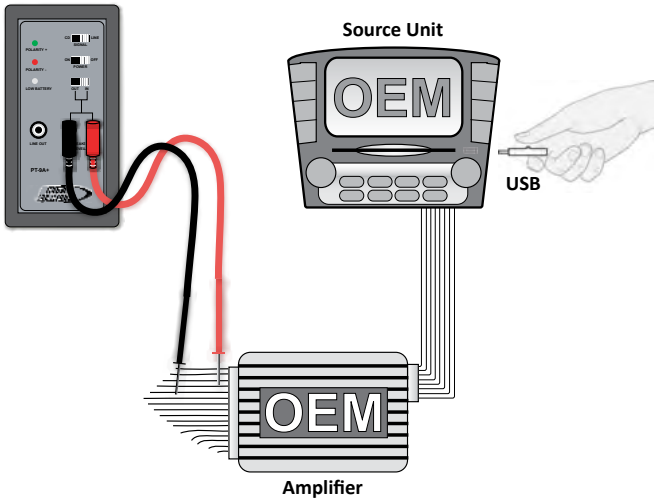
8) Evaluate your results:

- Three (3) **GREEN** lights followed by one (1) **RED** light indicates the speaker wiring is in correct polarity.
- Three (3) **RED** lights followed by one(1) **GREEN** light indicates the speaker wiring is in incorrect (reversed) polarity. This can also occur (typically on a tweeter) when using a 12dB/octave passive crossover network. Check the speaker individually rather than at the input of the crossover if this is the case.
- If **GREEN and RED** LEDs are both lit **AT THE SAME** time it may indicate a leaky speaker mount.



Verify individual speaker-Level Electrical Signal polarity using Internal Pulse Reader

Note: This test assumes the system's speakers have already been disconnected or they are not yet installed.



1) Insert USB thumb drive with included polarity pulse track.

2) Move the Signal Switch of the test instrument to the "**CD"** position.

3) Switch "**SPEAKER/HIGH LEVEL INPUT**" button to "**IN**".

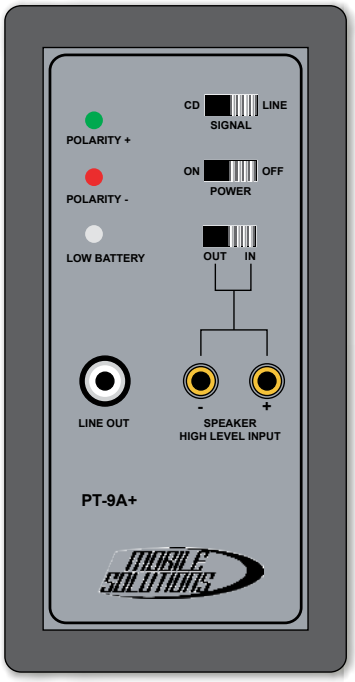
4) Connect the probes to the speaker wiring you wish to test. Connect the **Red probe to what you believe is the positive(+) speaker wire** and **what you believe is negative (-) speaker wire**.

5) Move the Power Switch of the test instrument to the "**ON**" position.

6) Play the polarity pulse track. Set volume where pulses are just audible.

7) Based on the orientation of the probes as described in Step 4:

- Three (3) **GREEN** lights followed by one (1) **RED** light indicates the speaker wiring is in correct polarity with the position of positive and negative probes.
- Three (3) **RED** lights followed by one (1) **GREEN** light indicates the speaker wiring is in incorrect (reversed) polarity with the position of positive and negative probes. Switch the probes on the speaker wiring and test again.



PT-9A+ Technical Specifications

• Output Pulse Voltage (RCA Jack)	0.05VAC RMS
• Output Pulse Voltage (Speaker Jacks)	1.5VAC RMS
• Output Pulse Duration (RCA or Speaker Jacks)	70mS (0.07 Second)
• Max Input Voltage (Speaker Jacks)	4V
• Speaker Jack Spacing	0.59" / 15mm
• Test Probe Leads for Speaker Jacks	4mm Banana w/Silicone Wire
• Power	9V Battery (not included)
• Weight (including battery, case & probes)	10.8oz / 305g