



IRAD+

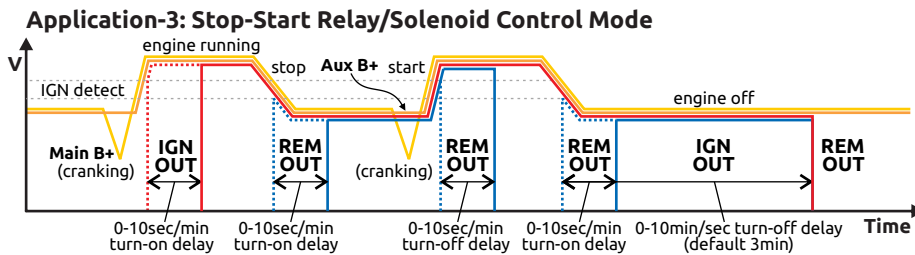
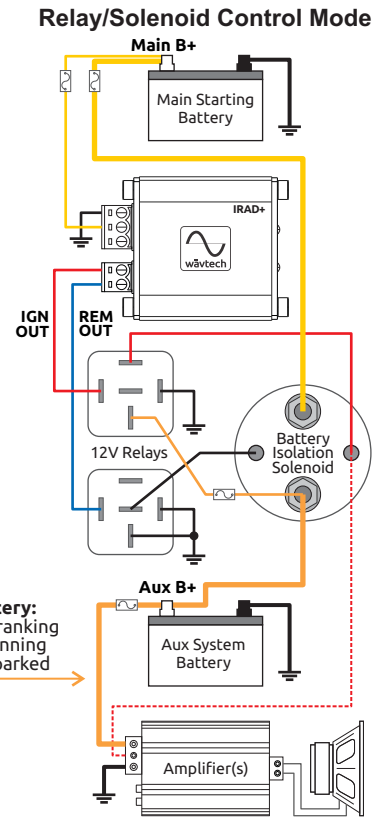
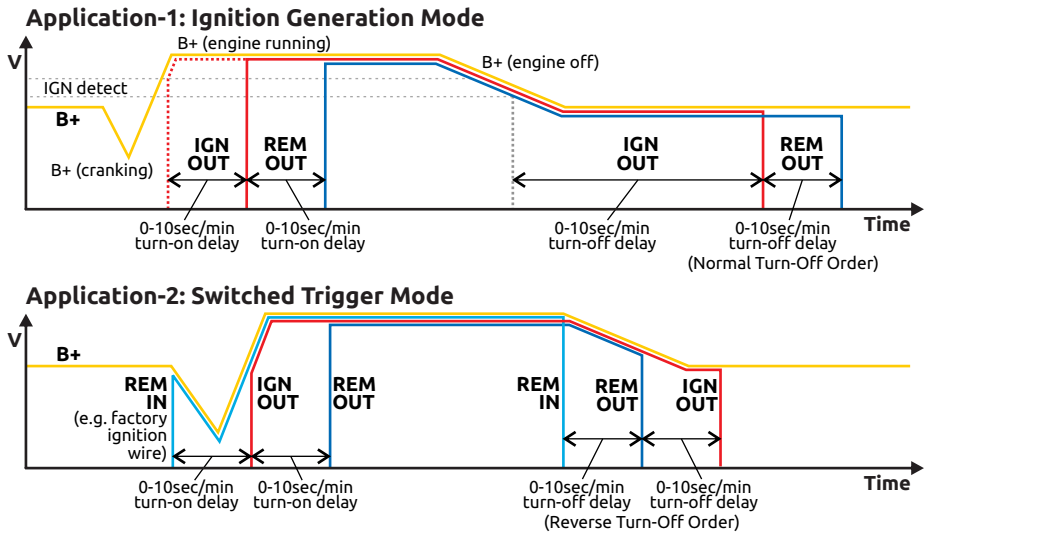
Ignition-Remote Generator + Delay



Patented



The IRAD+ is a unique installation accessory that provides solutions to several common problems installers face today. This easy to program device allows you to add a true switched ignition wire to vehicles without one readily available. It provides dual outputs, each with their own turn-on/turn-off delays and reversible turn-off order to eliminate pop noise between components. And for stop-start vehicles that cause some amps to power cycle, it provides automatic relay/solenoid control to keep the music playing even in the largest systems.

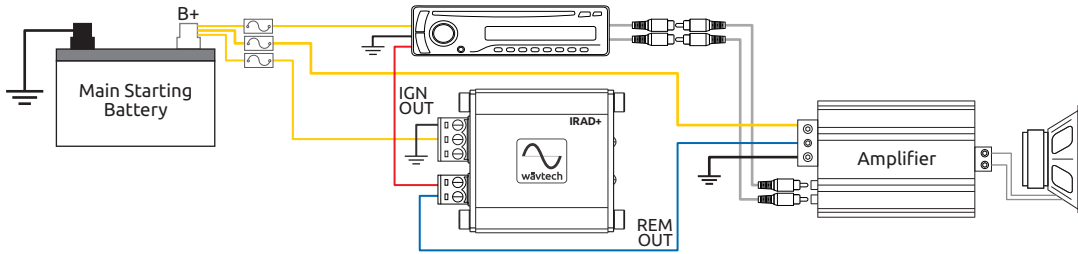


- Aux System Battery:**
- Isolated from cranking
 - Joined when running
 - Isolated when parked

Automatic Ignition Generator with Dual Outputs • Switched Trigger Isolator/Generator with Dual Outputs
 Independently Adjustable Turn-On/Off Delays • Reversible Turn-Off Order • Automatic Relay/Solenoid Control Mode
 REM IN Hold/Override over Ignition Detect • Unlink Mode for Separate Remote and Ignition Outputs
 3A Continuous Current Per Output • 6A Continuous Current Parallel Output
 Locking Detachable Terminals • Compact Aluminum Chassis • Detachable Mounting Tabs

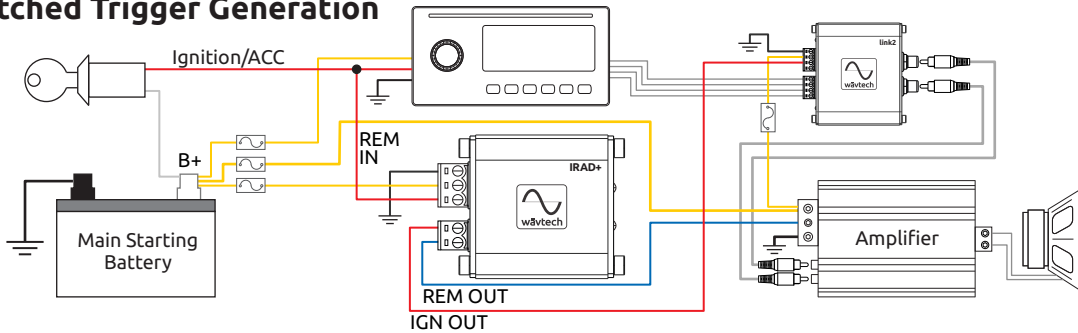
The IRAD+ can be used in a wide variety of applications for automatic ignition generation, adjustable turn-on/off delays, reversible turn-off order, battery isolation control for stop-start vehicles or even powering small devices directly. Here are just a few examples:

Example-1: Automatic Ignition and Remote Generation



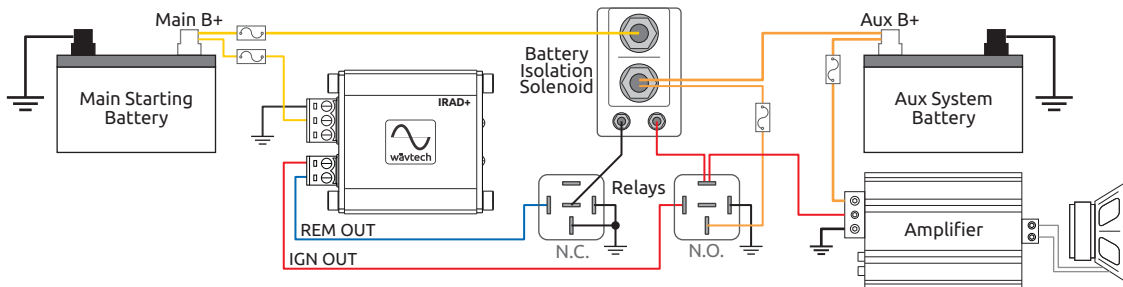
In this example, the IRAD+ is used to turn on the headunit when the engine is running via IGN OUT. For stop-start vehicles, turn-off delay can be added to keep the system on for up to 10min. Also the REM OUT turn-on for the amplifier can be delayed after IGN OUT, allowing the radio to stabilize first as well as reversing the turn-off order to eliminate pop noise.

Example-2: Switched Trigger Generation



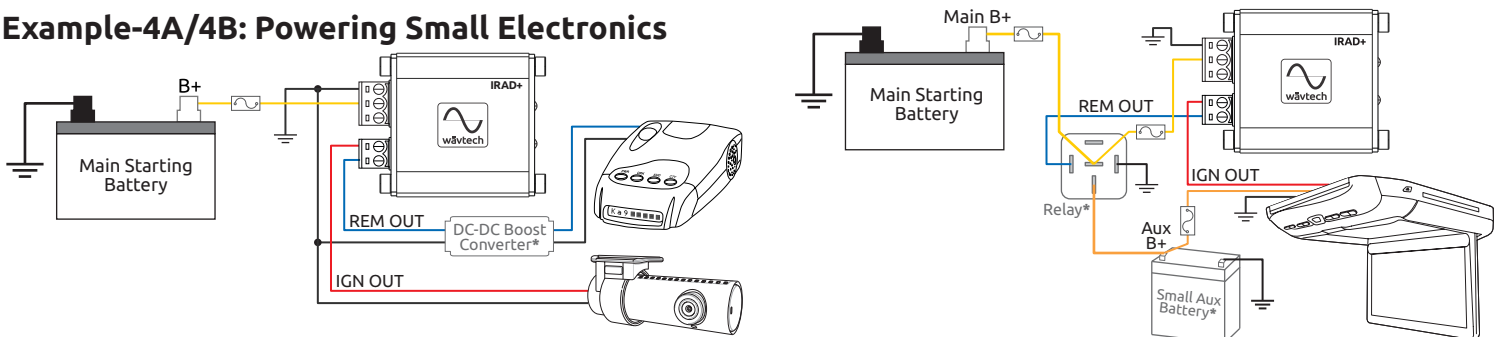
For cases when using an available switched +12V wire as a remote results in start-up timing conflicts between components, the IRAD+ may be used for its delays and reverse turn-off order capabilities to eliminate pop noise.

Example-3: Automatic Battery Isolation Control



In stop-start vehicles with larger systems, simply adding a small battery near the amp(s) may not reduce voltage drop enough to prevent cycling during cranking. For such cases, the IRAD+ may be changed to its Relay/Solenoid Control Mode where REM OUT (converted to an active ground with a relay) controls solenoid isolation when the engine shuts off while IGN OUT still provides +12V output to keep the system on for stops up to 10min.

Example-4A/4B: Powering Small Electronics



Finding a switched ignition wire in modern vehicles can waste a lot of time, or maybe there isn't one available at all. The IRAD+ provides a quick solution that can power most small electronic devices directly. Simply find any suitable +12V constant power in the vehicle and program the IRAD+ to generate up to two 3A switched outputs or one combined 6A parallel output. For devices that draw more current, simply add a relay.

*** For stop-start vehicles, some devices more sensitive to starter cranking may require voltage stabilization to prevent cycling.**

- For stop-start sensitive devices powered directly by the IRAD+, a DC-DC boost converter can be used to regulate the switched output.
- For stop-start sensitive devices with higher current draw, a small auxiliary battery may be required. If a battery is not enough by itself, use the IRAD+ in Relay/Solenoid Control Mode to automatically control a relay to isolate the batteries during stop-start events.

Example-5A/5B: 2022-up Tesla Model Y: Battery Isolation and Trigger with Delays

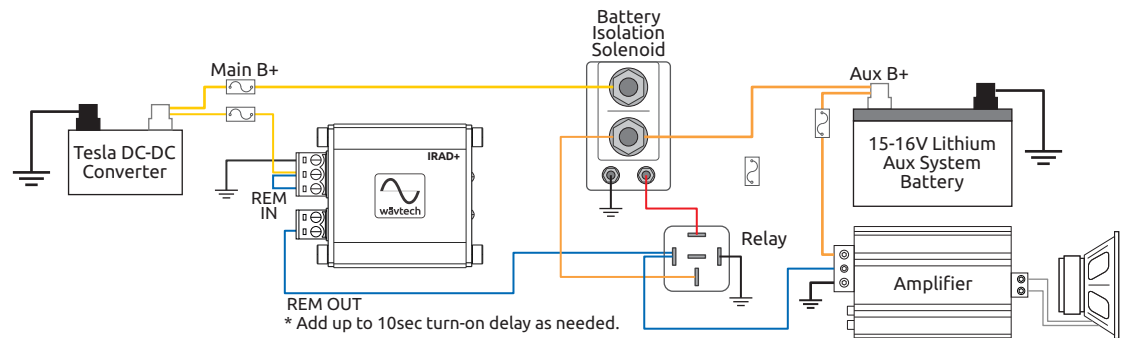
Although Tesla models X, S, 3 and previous models have a regular 12V battery up front, the new 2022 Tesla Model Y only has a small 6.9Ah 4S1P "12V" lithium battery. Power is available at the DC-DC converter lug under the rear seat, however, the voltage it provides is between 15-15.5V and it turns off after the vehicle goes to sleep. This DC-DC is believed to be rated at up to 200A, but is known to throw a code with sudden current spikes, such as charging up the capacitors in an aftermarket amplifier at startup. Therefore, when adding amplifiers it is recommended to use an appropriate auxiliary battery with a battery isolation solenoid. The auxiliary battery must be capable of being charged at up to 15.5V, and its state of charge needs to be matched to the DC-DC's voltage before initial connection to prevent large current flows to/from the factory system. Consult your battery supplier for recommended lithium chemistry options (LiFePO4, LTO, etc.) and the required cell-count (4S-6S) to operate at 15.5V.

While in some cases the 4-pin trailer harness can be tapped for a switched lead, it may not be activated depending on the trim level. Also, although any Wāvtech LOC can generate a trigger via signal sensing and provide about 2 seconds of turn-on delay, the factory wires stay active for several minutes after turning off the vehicle and remain on in "sentry mode". Therefore another trigger method may be needed or desired.

Example-5A: If the system staying on for several minutes after leaving the vehicle or while in "Sentry Mode" isn't an issue, simply use the DC-DC lug as a switched trigger. However, a potential issue is when everything turns on at the same time, factory and aftermarket electronics, it may trip the vehicle's over-current sensing and throw a code. This is where the IRAD+ comes in for it's ability to add up to 10 seconds of turn-on delay via IGN OUT and REM OUT.



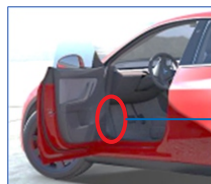
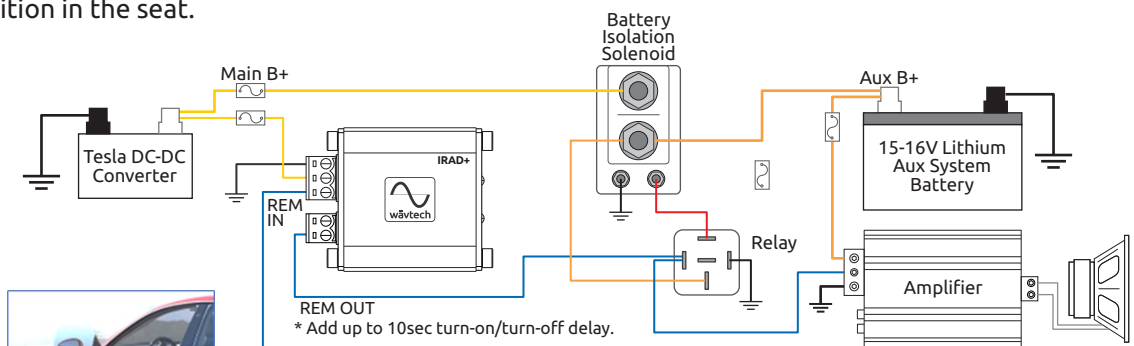
DC-DC "penthouse" lug under rear seat (~15-15.5VDC)



Example-5B: Another trigger option is the seat occupancy switch lead, a red wire located behind the front driver's side kick panel. This sensitive circuit should not be used to provide current to drive a relay or solenoid directly, so the first role of the IRAD+ here is to provide isolation from sensitive electronics. Due to its solid state design and ADC sensing, it does not draw any current and is safe to use with any switched factory wire with DC voltage between 5V-18V, as well as convert intermittent or $\geq 5V_p$ pulsed voltages to B+ by applying turn-off delay. Another reason to use an IRAD+ here is its ability to add turn-off delay if needed to prevent unintentionally deactivating the trigger when adjusting your position in the seat.



DC-DC "penthouse" lug under rear seat (~15-15.5VDC)



Front driver's kick panel, red 18ga wire from seat switch