

Inawise (Australia) Pty Ltd

gpsXo™ Automotive audio GPS voice crossover system

User and installation guide

*Product features and
installation instructions for the
gpsXo™ voice crossover*

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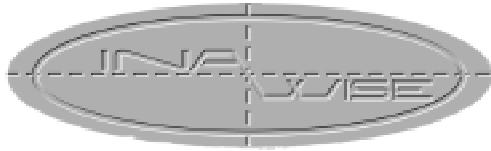
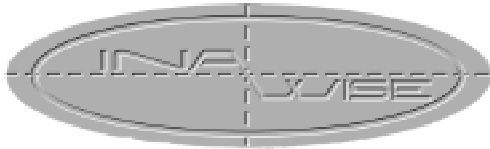


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Introduction

Product application and functionality

1. gpsXo Product description

The gpsXo™ is an interface device which allows audio signals from a GPS navigation system (or any other audio device such as a CB radio or HF radio) to be played over the vehicle's existing speaker system. The gpsXo™ provides a seamless crossover of the audio signal from the vehicles existing car stereo system to the audio voice prompt signal from a GPS navigation system.

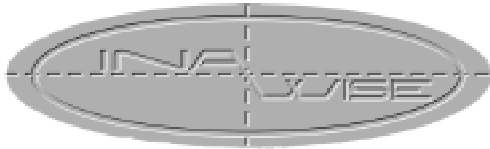
Users can benefit from the ability to listen to the vehicle stereo system at any desired volume and be able to clearly hear commands from the GPS navigation system, as the gpsXo™ simultaneously lowers the audio volume of the stereo system and redirects the GPS voice command to one of the front vehicle speakers.

The gpsXo™ supports both a two and four speaker stereo systems and has been designed to ensure no degradation of the quality of the audio signal going to the speakers. When the GPS voice prompt is active the level of the signal from the stereo system to the speakers is reduced enabling the GPS voice prompt to be clearly heard.

The system also incorporates safety features to protect both the unit itself and the GPS system from noise and dangerous voltage spikes, which could damage the sensitive electronics.

The need to connect the GPS unit into a cigarette lighter socket is eliminated, as all wiring, including power, is tapped from the vehicles existing wiring. This provides for a solution which is relatively easy to install, while ensuring all wiring is hidden behind the dash, away from view.

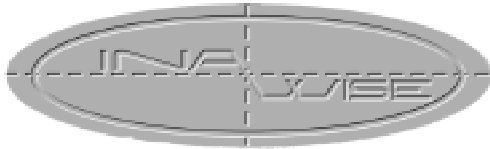
The GPS unit retains the ability to be easily unplugged, removed from the vehicle and transferred to another vehicle.



2. Product Features

2.1 Features summary

- ✓ Seamless automatic cross-over of audio signals to the vehicle speakers from the automotive stereo system to the GPS voice guidance navigation system.
- ✓ Once installed and set up, no user control or adjustment is required. The gpsXo™ can be mounted and hidden under/behind the dashboard of the vehicle.
- ✓ Allows driver to concentrate on driving and reduces the need for the driver to make adjustments to the vehicle stereo system or the GPS navigation system.
- ✓ Allows for instructions from the GPS system to be clearly heard through the larger, higher quality vehicle stereo speaker.
- ✓ Compatible with virtually any other device capable of driving a speaker including CB radios, mobile phones, two way radios, VHF radios etc.
- ✓ Near zero degradation of audio quality from either stereo system or GPS system.
- ✓ Easy to install, hard wired connections made via terminal blocks eliminating the need to crimp or solder wires in most installations.
- ✓ Wiring integrated into existing audio wiring looms and hidden behind dash.
- ✓ Audio system continues to function normally when GPS unit is unplugged.
- ✓ Power spike and surge protection for both gpsXo™ and GPS units.
- ✓ Adjustable GPS cross over level to ensure compatibility with different types of units.
- ✓ Adjustable GPS hold delay, maintaining low stereo volume for a period of 0-2 seconds after voice command has ended.
- ✓ Continues to operate if stereo system is switched off.
- ✓ Highest quality connectors and components utilised to produce a high quality reliable product.
- ✓ 1 year parts and labour warranty. Additional 1 year extension upon return of registration card.
- ✓ Compatible with most 2 or 4 speaker audio systems with up to 60W (per channel) output power.
- ✓ Compatible with many GPS voice guidance systems.
- ✓ Load protection on all 4 audio channels to prevent damage to stereo system.
- ✓ Low power consumption.
- ✓ Indicator LEDS to assist with installation and set up of unit.



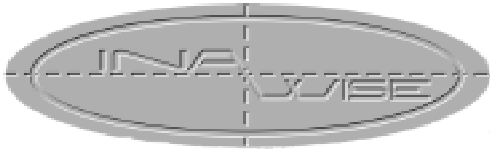
2.2 Theory of operation

Under normal conditions, with no audio output from the GPS / Auxiliary device, the outputs of the stereo player system are switched directly to the vehicle speakers. This is referred to as the “stereo” mode.

Once powered up the gpsXo™ unit monitors the audio signal from the GPS/Auxiliary device. When the signal reaches a preset level (as set by the level adjustment control) the unit triggers and connects the signal from the GPS unit to one of the speakers and simultaneously reduces the signal level going out to the other 3 speakers.

To ensure no damage is done to the output drivers of the stereo system, bypass loads are switched in, across the outputs of the stereo, in order to maintain a minimal safe load current.

When the signal from the GPS unit falls below the set threshold level, a time delay is activated before the unit reverts back to “stereo” mode. This time delay is user adjustable from 0 to 2 seconds via the “Delay” control on the unit. The time delay is useful for GPS systems which have a short pause between one audio command and the next. This delay should be set according to user preference.



3. Installation

Installation instructions for the gpsXo™

Premise: The unit does not require professional installation, however general aptitude with the ability to identify, cut and strip wires is required. In addition an aptitude in disassembling and removing access panels to the existing vehicle audio system is required. If you are not confident in your ability a professional installer should be considered.

- Step 1.** Disconnect vehicle's main lead acid battery. This is done for safety reasons and is strongly recommended. Please remember if your stereo system incorporates a theft protection system, you will need to enter the PIN number to get it working again when the power is re-applied. If this is the case, make sure you have the number available before disconnecting the battery.
- Step 2.** Identify a location where you can gain access to the existing speaker wires. In most cases this will be at the point where the speaker wires enter the stereo head unit. This may require removal of the stereo head unit, which in turn may first require removal of the dashboard facia or console panels. Most modern stereo players incorporate a modular connector for quick removal from the vehicles wiring loom. Complete removal of the stereo player head unit may make it easier to work in the area and reduce the possibility of damaging the stereo head unit.
- Step 3.** With the speaker wires identified, identify the +12V "accessory" supply wire. This wire will be used to power the gpsXo™ unit as well as the GPS unit. The +12V power should only be on when the vehicle ignition key is in the accessory or run positions.
- Step 4.** Identify a ground wire or solid ground point for the return current path.
- Step 5.** Locate a position where the gpsXo™ unit can be mounted. Ideally the position should be directly behind the stereo head unit so that the speaker wires can be cut and connected into the gpsXo™ without the need of extending the wires. If this is not possible with your vehicle then an alternate location will need to be identified with the possibility of extending the wires in order to reach the gpsXo™ unit.



Step 6. Identify the front left speaker cable pair running from the stereo head into the front left speaker. There should be two wire conductors, one positive and the other negative running to the speaker. These two conductors are normally paired together in the one cable.

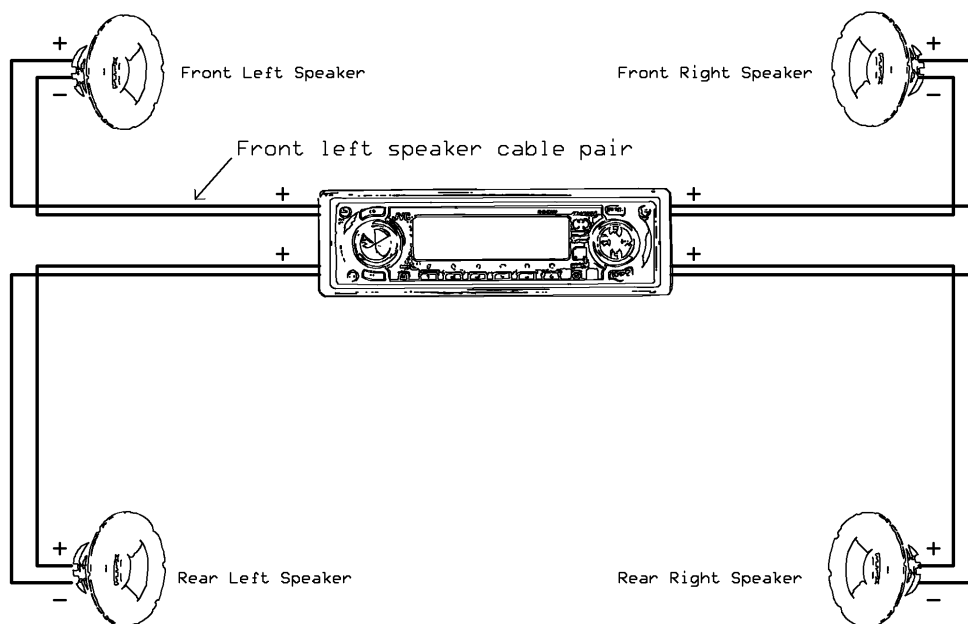
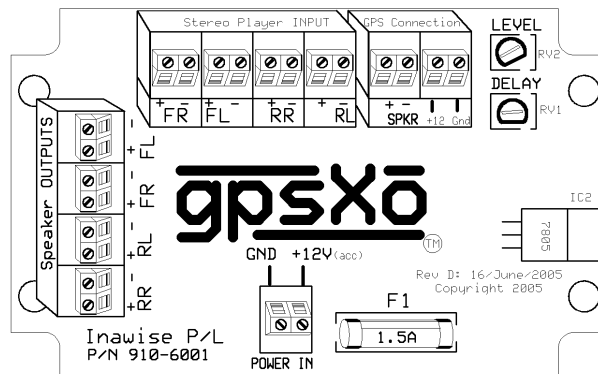


Figure 1: Front Left speaker cable identification



Step 7. Remove the back cover of the gpsXo™ unit by removing the 4 corner screws. Locate the gpsXo™ unit in the mounting location you have identified in step 5. Route the front left speaker wires so that they reach the terminal blocks on the gpsXo™ unit while still being able to reach the stereo head unit. Determine the most suitable location to cut this front left speaker cable and proceed to cut the cable. Strip both cable ends.

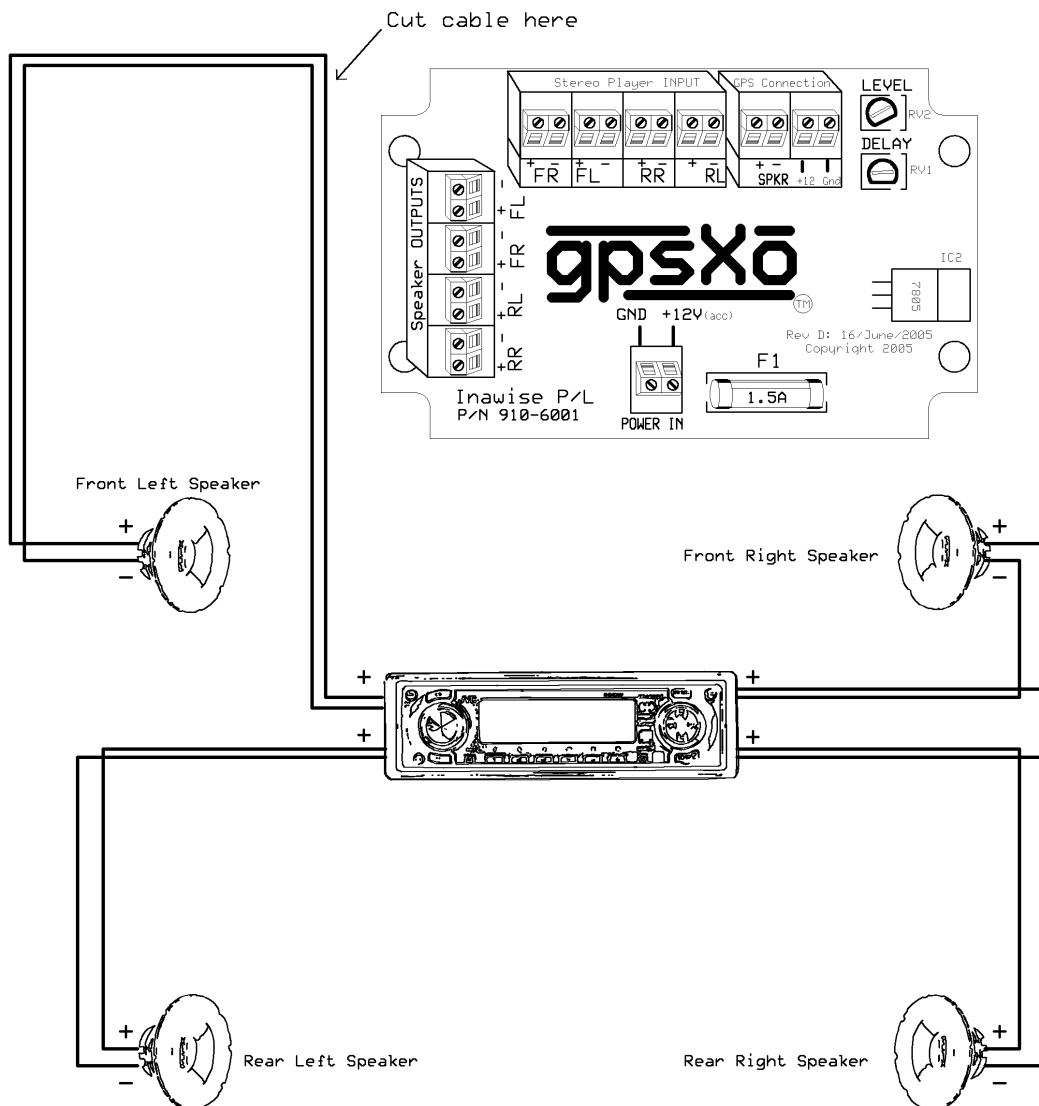
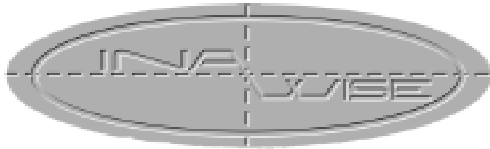


Figure 2: Left speaker cable cut location



Step 8. Screw the cable pair which runs off to the speaker into the terminal block marked “speaker OUTPUTS” / “FL” on the gpsXo™ unit. Note the polarity of the two cables. Most cables have a black line running through the negative. This wire should go to the terminal marked “-“ while the other positive wire should go to the terminal marked “+”.

(Note: The terminal block screws may be tightened down for shipping. If this is the case the screws will have to first be undone before the wires can be inserted)

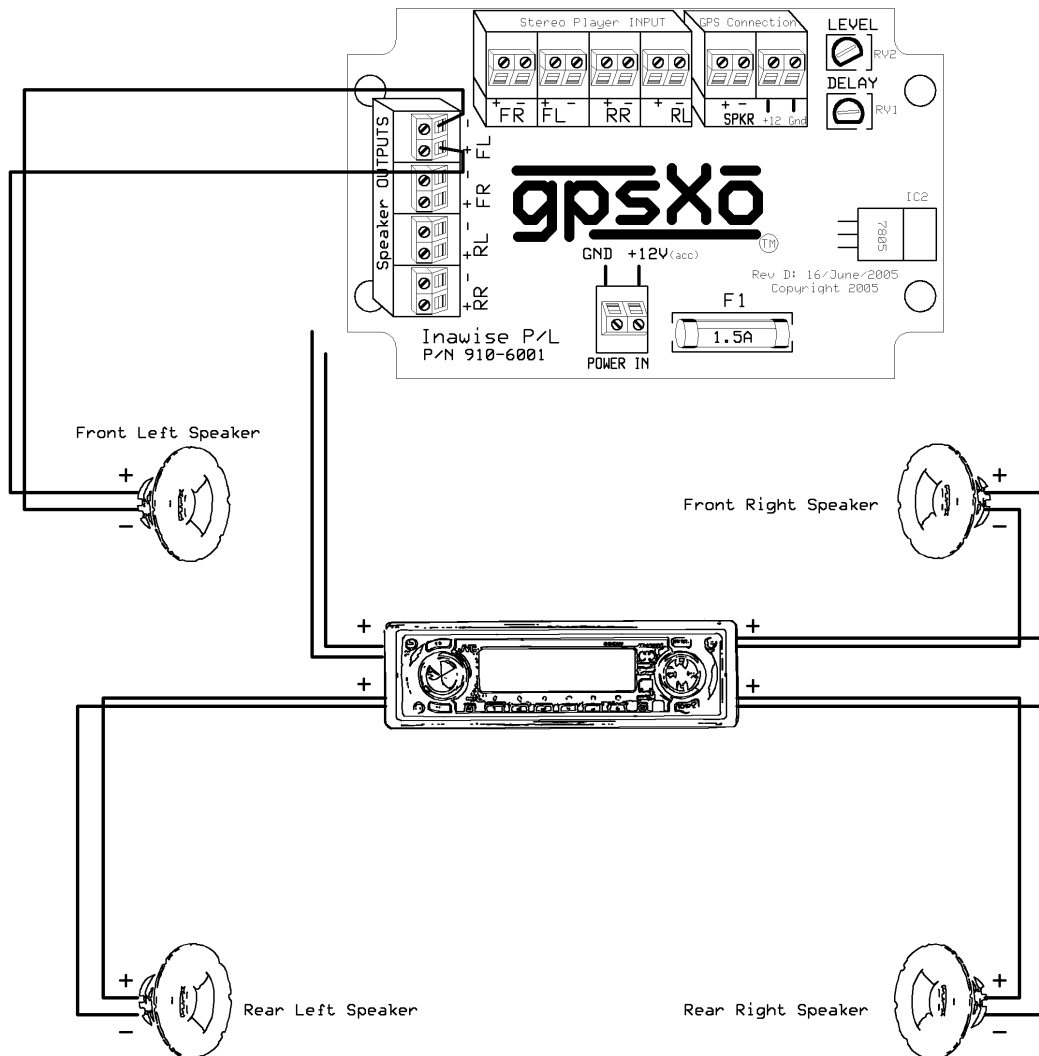
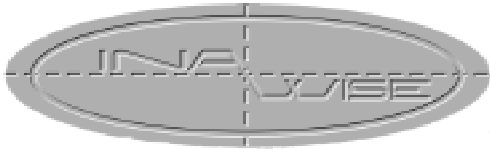


Figure 3: Front Left speaker connection



Step 9. Take the other end of the cut cable (which is running to the stereo head unit) and connect the wires to the terminal block marked “Stereo Player INPUT” / “FL”. Again the negative wire to “-” and the positive wire to “+”.

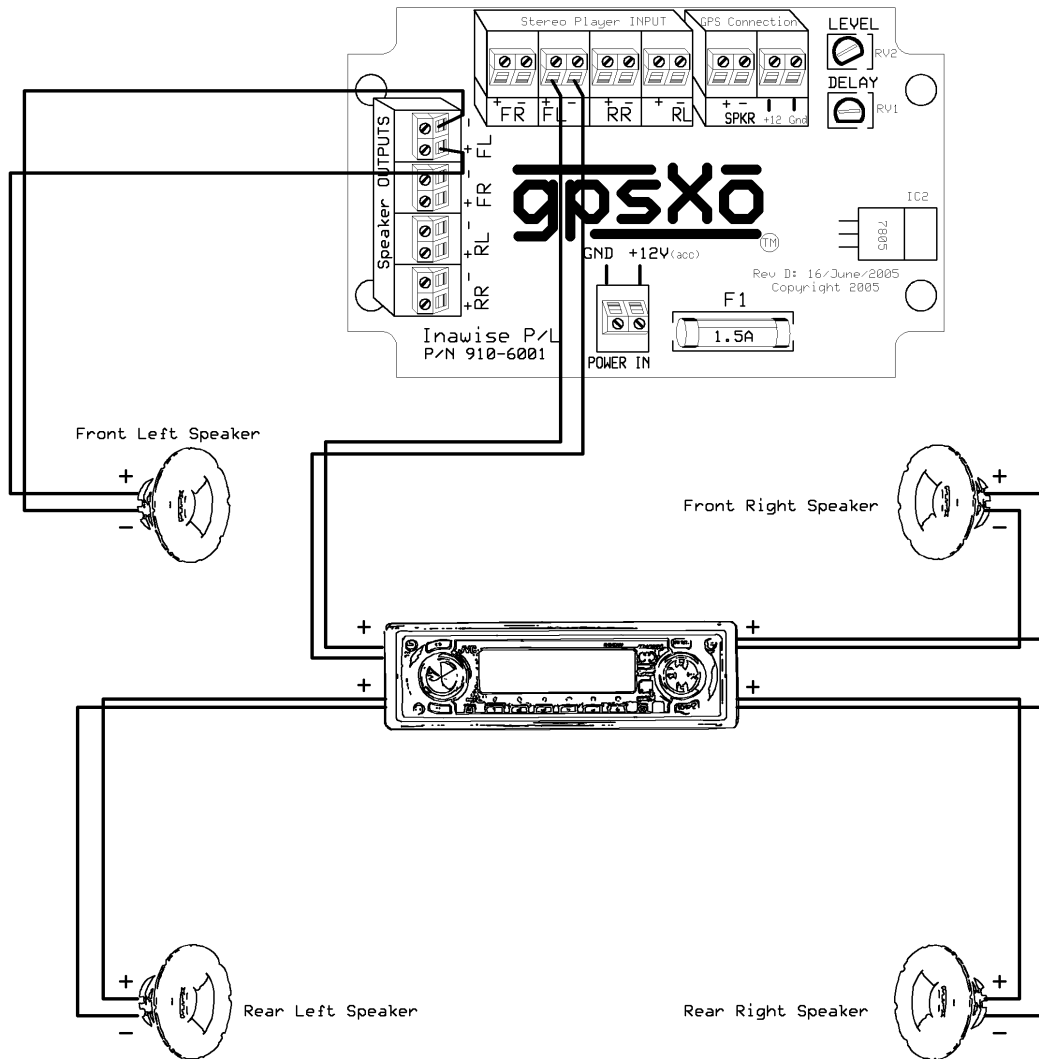


Figure 4: Front Left speaker head unit connection



Step 10. Repeat steps 7-9 for the Front-Right cable and then the Rear-Left and Rear-Right. If the system is only a two speaker system, the Rear-Left and Rear-Right terminals are left unconnected.

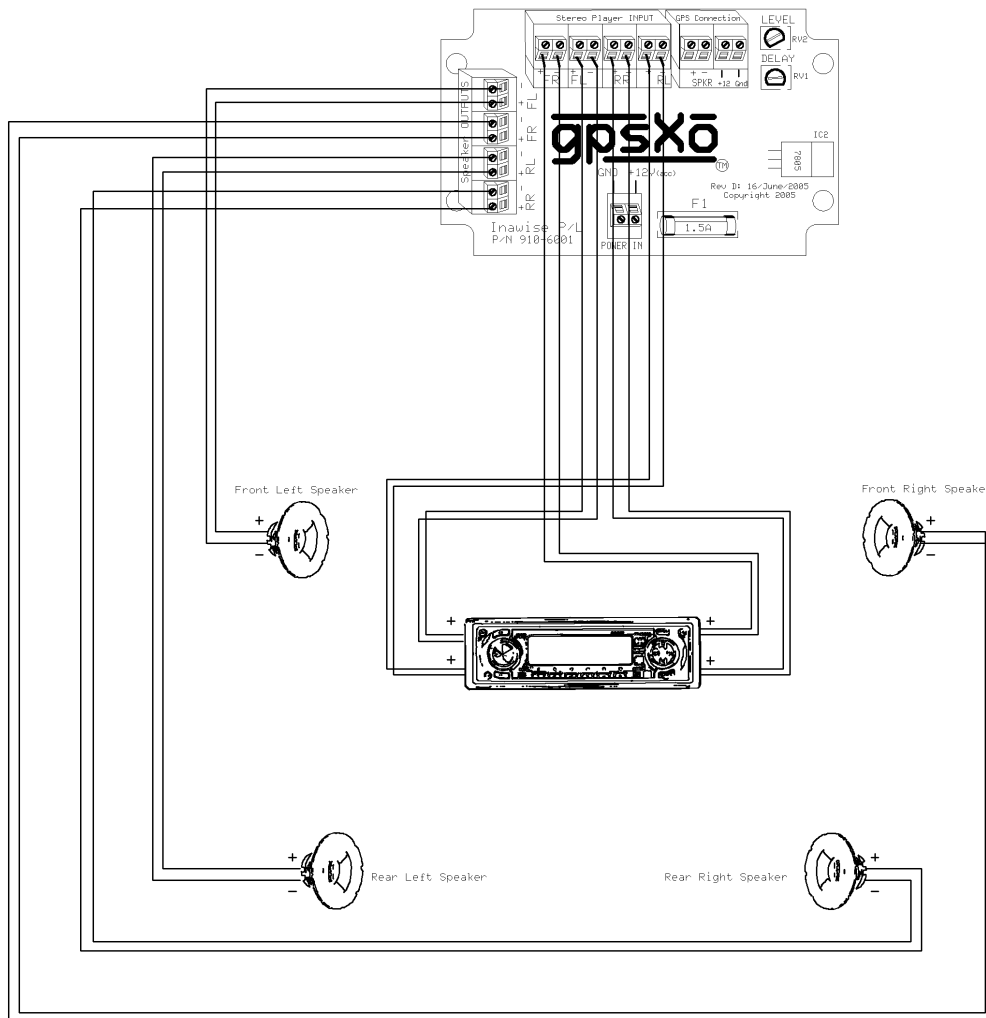
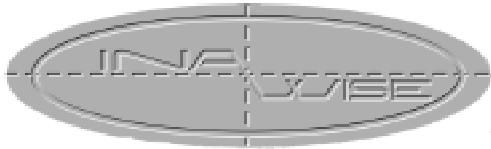


Figure 5: Three remaining speaker connections



Step 11. Connect the +12V accessory power to the “12V” connection of the “POWER IN” terminal block on the gpsXo™ unit. The +12V accessory power can be tapped off the wire running to the head unit or any other accessibly terminal or wire.

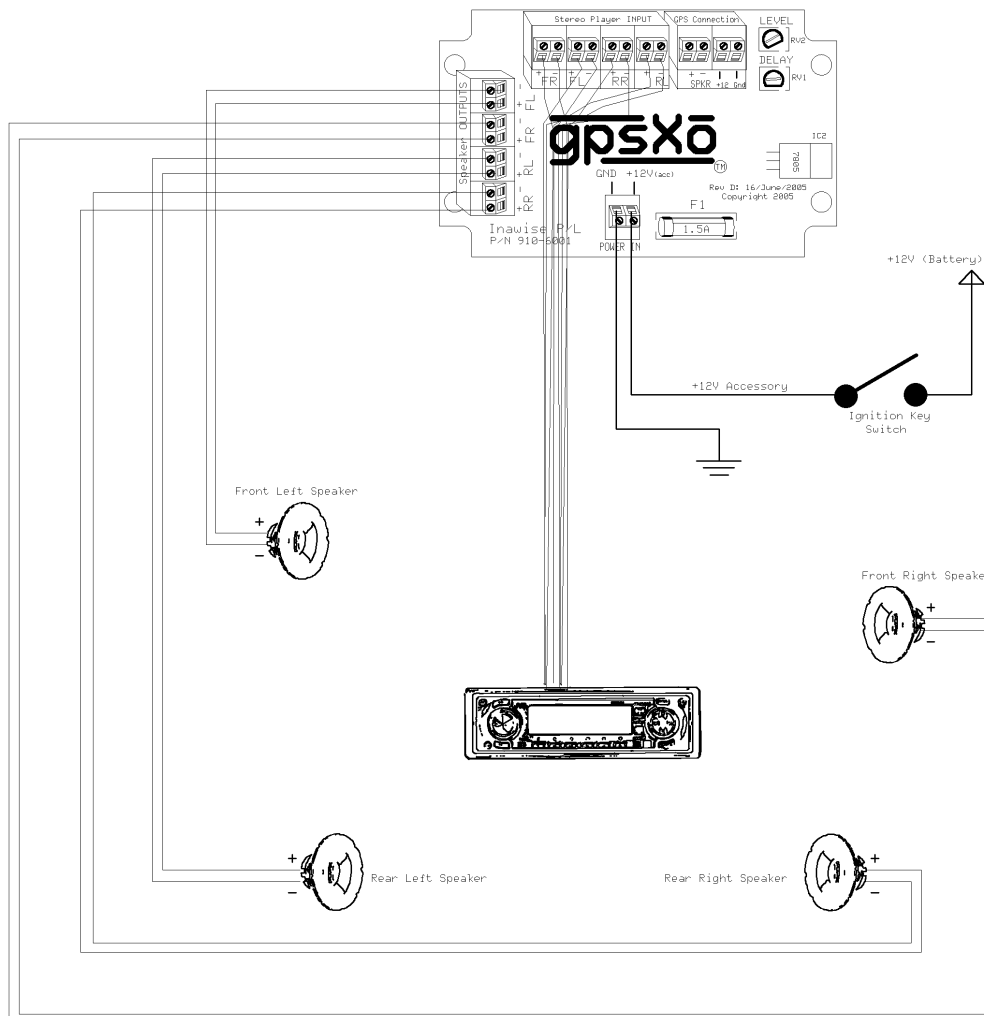
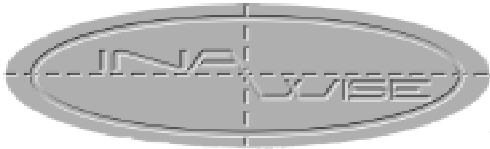


Figure 6: Power Connection

Step 12. Connect vehicle ground to the “GND” connection of the “POWER IN” terminal block on the gpsXo™ unit. As with step 11 the cable can be run from the most convenient ground point.



Step 13. Finally connect the GPS (or auxiliary device) to gpsXo™ unit. The GPS unit should be supplied with a free lead cable, (other wise consult your GPS retailer). The free lead cable has a connector at one end which plugs into the GPS unit and bare wires on the other end. Similarly a CB radio or two way radio will have a connector or free lead wires coming out of the unit. Connect these wires to the “GPS Connection” terminal block on the gpsXo™ unit.

It may be more convenient to run the free lead cable first, through the dash and locate the GPS connector end in a location where it can mate with the existing GPS unit. The GPS free lead cable may have more than 4 wire, however only the “+12V power”, “Ground”, “speaker +” and “speaker -” are required. Screw these 4 wires into the designated locations on the “GPS Connection” terminal block. Any additional wires should be insulated with an electrical tape or equivalent to avoid any shorts with each other or any other ground or power supply.

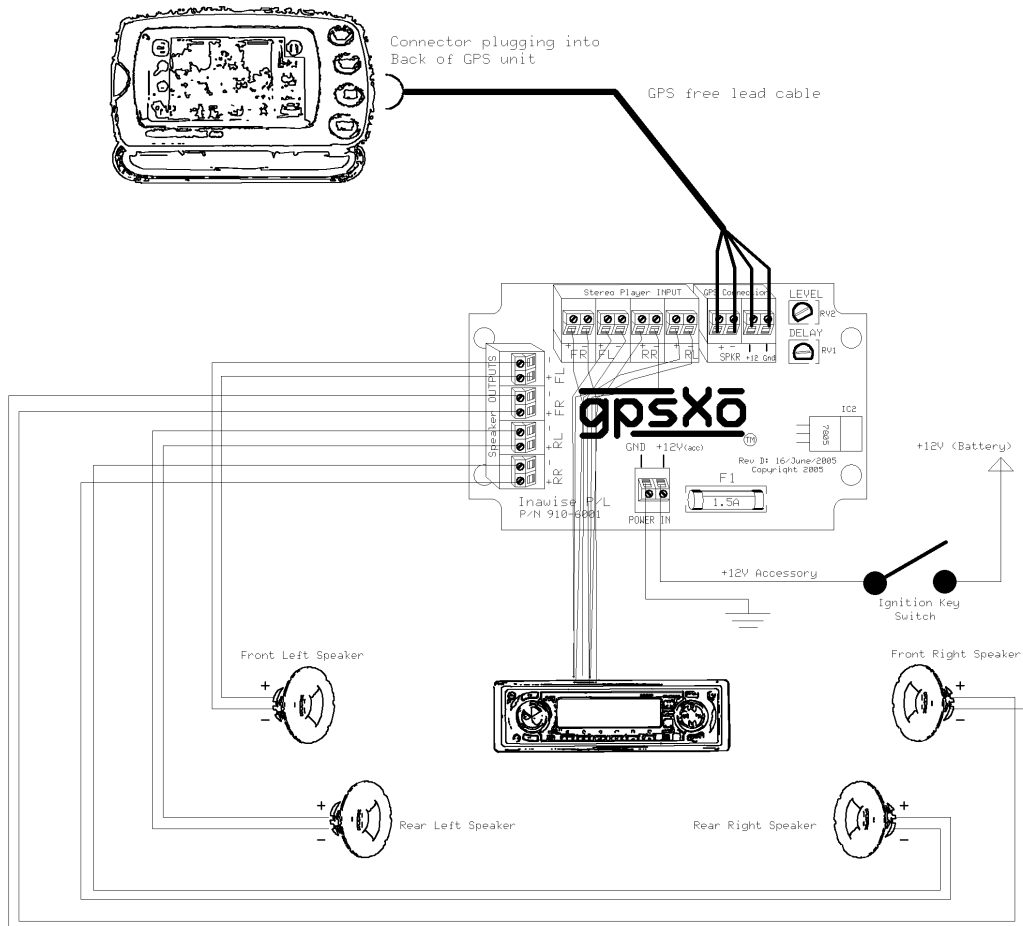
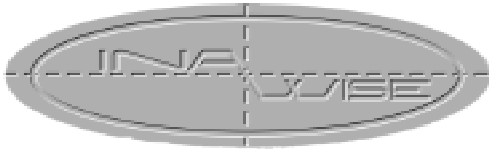


Figure 7: GPS free lead cable connection

Note: If the GPS/Auxiliary unit has its own power source (ie in-built batteries), only the speaker wires need to be connected. However to preserve the life of the unit's batteries it is advisable to run the unit from the vehicle +12V power if possible.



- Step 14.** Inspect the wiring and ensure all wires are secure with no frayed ends are sticking out and causing possible shorts.
- Step 15.** If still disconnected, temporarily plug in the stereo head unit, and reconnect battery power to the vehicle.
- Step 16.** Turn stereo system on and leave the GPS system turned OFF and the free lead cable DISCONNECTED from the GPS unit. If your stereo system has a security feature, you will need to enter you PIN number to un-lock it at this time. All speakers should work as before. The +5V LED and the +12V LEDs on the front panel of the gpsXo™ enclosure should light. The “Active” LED should be off. *(In case of any problem turn to the “Diagnostic” section of this manual).*
- Step 17.** Turn vehicle accessory key switch off to power down vehicle accessories. Plug the free lead cable into the GPS unit, turn accessory switch on, now powering up the stereo system and the GPS unit. Set the speaker volume on the GPS unit to around half volume. With the stereo playing, manipulate the GPS to generate audio instructions. You should observe the stereo volume dropping and the GPS voice coming out of the front right speaker. At the same time the “Active” LED should light up.
- Step 18.** Reduce the volume of the GPS unit. The gpsXo™ should continue to trigger and cross over to the GPS command at the lowest audio level you intend to use on the GPS. If the gpsXo™ stops triggering, the “LEVEL” control on the gpsXo™ can be adjusted to increase the sensitivity and hence reduce the audio level at which the gpsXo™ triggers. This is done by turning the “LEVEL” control anti clockwise.

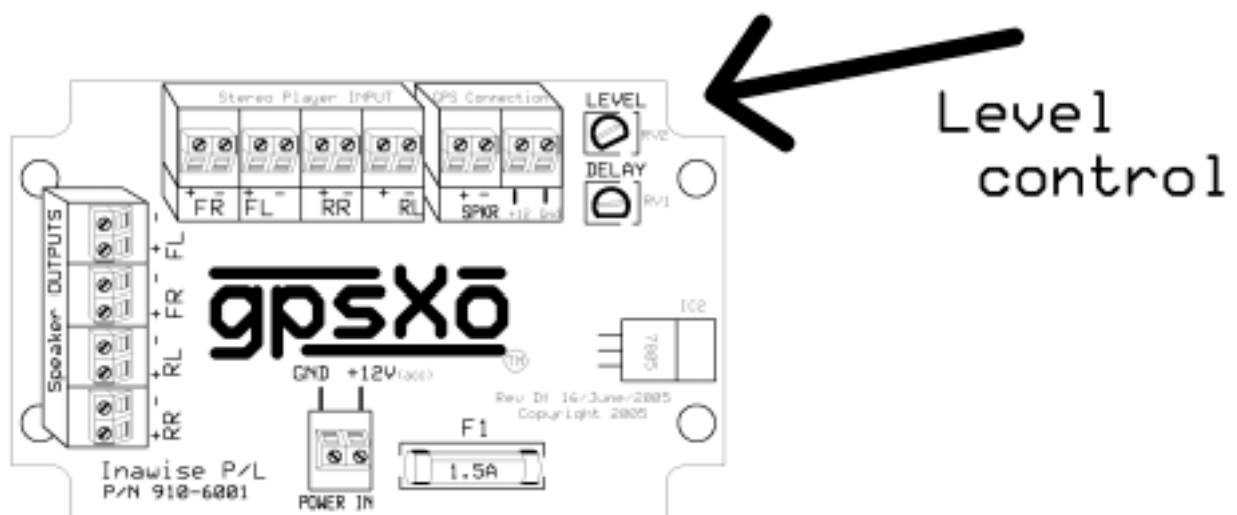
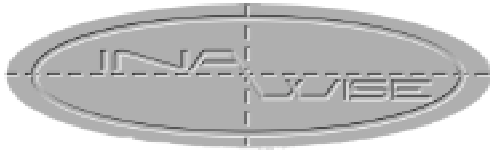
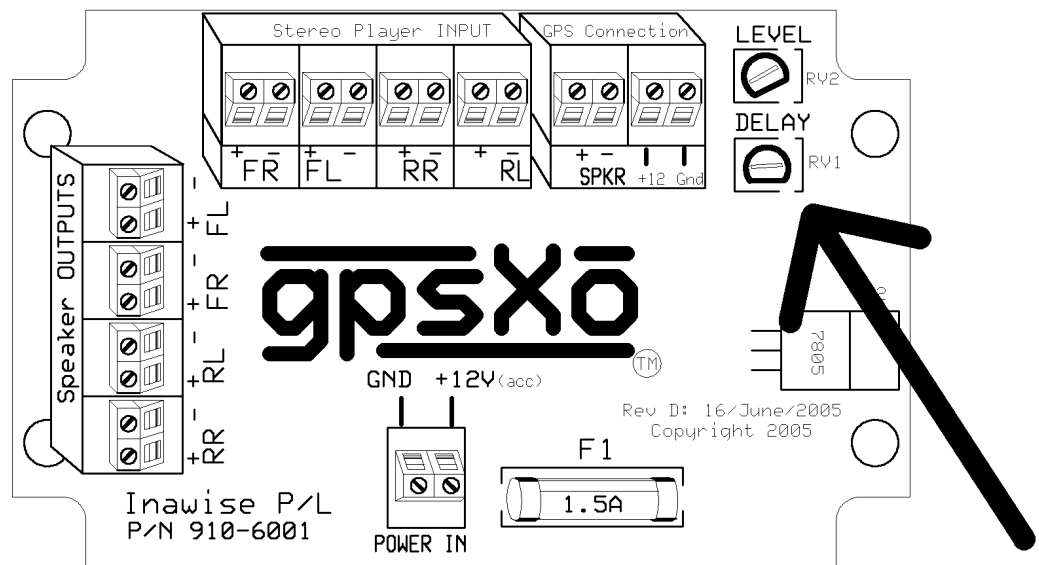


Figure 8: Level control adjustment

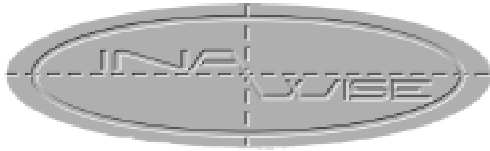


Step 19. The “DELAY” control determines the amount of time that the gpsXo™ remains crossed over to the GPS unit after the audio command has completed. The range is adjustable for 0-2seconds. Factory default is set to 1 second. This control can be adjusted to suit user preference. Turning the control anti-clock wise reduces the time while clock wise increases the time.



Delay control

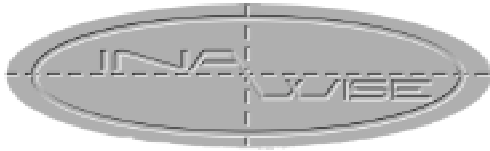
Figure 9: Delay adjustment



Step 20. Once the unit has been set up, turn the stereo and GPS units off. Turn accessory key switch off. Disconnect vehicle battery again.

Step 21. Fit the back cover on the gpsXo™ unit and mount it in its final mounting position. Re-fit stereo system head unit (if not already) into its permanent position securing it with all mounting screws and hardware. Re-fit any other vehicle panels or facies etc which had been removed.

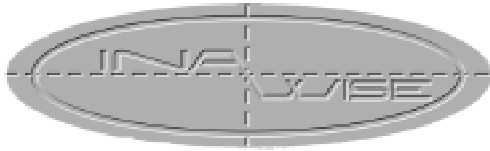
Step 22. Re-connect vehicle battery and re-test for correct operation. Remember, if your stereo systems has an anti theft lock enabled, you will have to enter your pin number again.



4. Specifications

Technical Specification for the gpsXo™

- *Operating voltage:* 10.5v to 15.5VDC
- *Power consumption:* 1W (max) 0.1W (typical)
- *Maximum stereo audio power:* 60W per channel
- *Operating temperature:* -5degC to 60degC (non-condensing)
- *Storage temperature:* -15degC to 75decC
- *Hold time delay:* 0-2 seconds
- *Audio level trigger level:* 30mV (min) to 850mV(max)
- *Spike / over-voltage clamping:* 18V
- *Stereo output loading:* 33ohm (5W max)
- *Switching cycles:* 200,000 (min)
- *Shock resistance:* 10G (functional)
- *Fuse protection:* 1.5A
- *Enclosure external dimensions:* 125mm x 80mm x 51.5mm
- *Total length including mounting tabs:* 149mm
- *Mounting hole pitch:* 138mm



5. Diagnostics

Fault finding and problem solving

5.1 Power Supply

The gpsXo™ runs on the +12V accessory supply from the vehicle electrical system. With the vehicle engine running, this voltage is actually in the order of around 14.7V to allow the vehicle lead acid battery to charge. The gpsXo™ unit incorporates an internal voltage regulator that lowers and regulates the +14.7 volts to an accurate 5.0 volts. This in turn is used to run the internal electronics within the gpsXo™ unit. The 14.7 volts entering the unit is protected by a 1.5A fuse (accessible by removing the bottom cover of the unit).

When the unit is powered up, both the +5V and +12V indicator LEDS on the front panel should light, indicating that the 12V (14.7V) is present that the internal regulator is functioning. The LEDS should have an even intensity and should not flicker in any way, indicating all power supplies are OK. If neither of the LEDS illuminate the following faults conditions could be present:

- 1) +12V power is not reaching the unit
- 2) Ground is not connected
- 3) The internal 1.5A fuse is blown
- 4) The gpsXo™ unit is faulty

If when powered up only one of the power indicator LEDS (5 volt, 12 volt) illuminates. The following fault condition could be present:

- 1) The gpsXo™ unit is faulty

The gpsXo™ 1.5A fuse keeps blowing, the following problems could exist:

- 1) Wiring problem
- 2) The GPS / Auxiliary devise is drawing to much power from the gpsXo™ unit.
- 3) A wiring fault has caused damaged the gpsXo™ unit.



5.2 Switching operation

The “Active” indicator LED on the front panel indicates when the unit is actively switching the audio signal from the GPS unit to the speaker output. This should only occur when a audio signal is present from the GPS unit, or momentarily (0.5 seconds to 2 seconds) when the gpsXo™ unit is first powered up.

When the gpsXo™ unit is powered up the “Active” indicator LED should light momentarily. If it does not the fault condition could be:

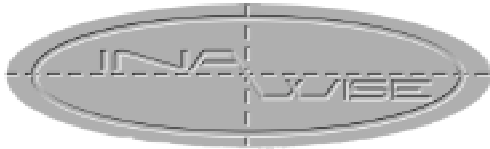
- 1) The gpsXo™ unit is faulty

If the “Active” indicator LED is always on, the following faults could be present:

- 1) The “LEVEL” control is set to a too sensitive level. Turn the “LEVEL” control clockwise to reduce the sensitivity.
- 2) Wiring to the unit has a problem. Check all wiring and if no problem is found try swapping the “SPRK + and -“ wires on the “GPS Connection” terminal block. (**NOTE: NEVER swap any of the power supply wires as this may cause serious damage to all devices including the gpsXo™ and the GPS unit.**) Speaker “+” and “-“ can be swapped without any damage to the units, however only the GPS speaker input should have any affect on how the gpsXo™ functions.
- 3) Turn power of and temporarily remove the speaker-input wires at the “GPS Connection” terminal block. Turn power on again and if the “Active” LED still remains on, the gpsXo™ unit is faulty.

If the “Active” indicator LED comes on momentarily at power up but does not come on when the GPS is outputting audio commands, check the following:

- 1) The “LEVEL” control is set to a too high level. Turn the “LEVEL” control anti-clockwise to increase the sensitivity.
- 2) Wiring to the unit has a problem. Check all wiring and if no problem is found try swapping the “SPRK + and -“ wires on the “GPS Connection” terminal block. (**NOTE: NEVER swap any of the power supply wires as this may cause serious damage to all devices including the gpsXo™ and the GPS unit.**) Speaker “+” and “-“ can be swapped without any damage to the units, however only the GPS speaker input should have any affect on how the gpsXo™ functions.
- 3) The gpsXo™ unit is faulty



6. Support and Warranty

Support contact details for gpsXo™

Inawise P/L warrants this product for a period of 12 months from the date of purchase, against faulty materials and workmanship. An additional 12 months warranty is provided upon return of the registration card.

Damage caused by mishandling, inappropriate use, wiring errors, wiring faults, or use outside the specification of the product as stated in this manual, will null and void any and all warranty on the product.

Warranty is based on a return to manufacturer basis. Any and all cost for freight are not covered by this warranty.

For service and support contact your local distributor or contact *Inawise Pty Ltd* directly:

WEB: www.inawise.com

Email: support@inawise.com

Disclaimer

While every attempt has been made to ensure all information in this manual is accurate, '*Inawise Pty Ltd*' or any of its associated companies or subsidiaries, will not be held liable in any way what so ever for any errors or omissions which may be present in this document.

Inawise Pty Ltd follows a policy of continuous improvement. Specifications may change at any time without notice.

Purchase and use of this product is subject to "Inawise" Terms and Conditions of Sale.

This product is to be using only for the purpose described in this manual.