

# **IRLP Board Installation Manual**

For IRLP Boards, version 3.0X

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## **1** ***Introduction***

Thank you for purchasing the IRLP Interface board. This is the second “production” run for the IRLP interface board and documentation. If you have any comments or questions regarding the board or this document, please contact us immediately using the email address [installs@irlp.net](mailto:installs@irlp.net)

This document outlines the steps required to take your recently acquired IRLP interface board and cable and make a working system in an hour or two. The boards were specially designed to be easy to install. If you think that any part of this document is insufficient to install your IRLP node, please send us your comments as this document will be the primary source of information for individuals who want to run an IRLP node.

## 2 *Interface Board*

### 2.1 Physical Mounting

The boards are mounted on a standard male DB-25 (right angle) and a DB9 male cable, which is designed to mount easily into an enclosure. The intended enclosure is the computer itself, although any enclosure for a DB25 and DB9 can be used.

You can mount the board in the punch-out slots in the back of your computer case. Almost all cases have punch out holes for proprietary IO ports. If your computer does not have punch-out slots, or if they are all in use, you can use two slot-edge covers (may be supplied with your order).

#### IMPORTANT NOTES:

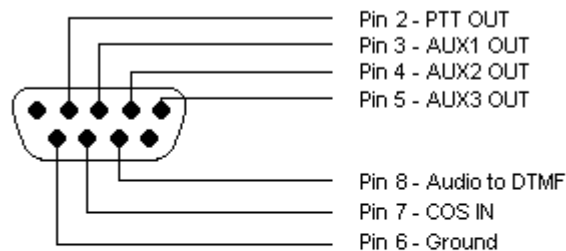
- The DB-9 cable can be installed onto the IRLP board in two ways, but only one way is correct. The marked red wire (pin 1) must be installed so it is farthest from the edge of the IRLP board (pointing inward towards the LEDs on the board).
- When using the dummy slot covers, you may have to mount the board upside down so that the components of the board do not interfere with the PCI, ISA, and AGP mounting slots.
- If you remove one of your existing IO ports to make space for your IRLP board, **ensure you are NOT removing** the parallel port (female DB25) as it is required for operation of the board.
- If your motherboard uses a small “ribbon cable dongle” to connect between the motherboard and the parallel port connector, you can plug that connector straight into the IRLP board DB25. This may allow for other mounting options.

## 2.2 Interfacing to your Radio (VERSION 3.0X ONLY)

**Pay CLOSE attention to the version of your IRLP board, and follow the wiring carefully. The version number is either written on the component side of the board, just above the 9-pin wire connector, or silkscreened on component side of the board.**

The interface between your radio and the IRLP interface board is through a 9-Pin computer connector. To do the wiring you will require a FEMALE DB-9 connector and a sub-hood.

The wiring is as follows:



SOLDER SIDE

# Ver 3.0 DB9

**NOTE:** The wiring for the Version 3.0 and later IRLP boards is different from Version 1 and Version 2.0.

### **Pin 2 – PTT Output to radio**

This pin should be connected to the radio PTT. This lead is active LOW only (goes to ground for radio to transmit).

### **Pin 3 – AUX1 Output**

This pin should be connected to any AUX source. This lead is active LOW only (goes to ground for AUX1 to activate).

### **Pin 4 – AUX2 Output**

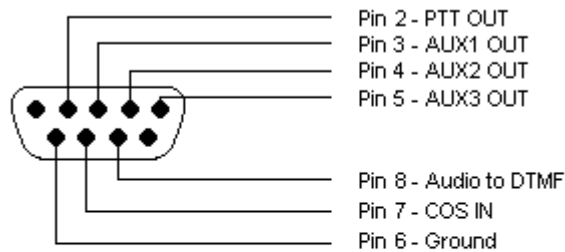
This pin should be connected to any AUX source. This lead is active LOW only (goes to ground for AUX2 to activate).

### **Pin 5 – AUX3 Output**

This pin should be connected to any AUX source. This lead is active LOW only (goes to ground for AUX3 to activate).

### **Pin 6 – Ground (common to radio and power source)**

The ground should be common to the chassis of the radio, and common to the power source.



SOLDER SIDE

## Ver 3.0 DB9

### **Pin 7 – COS (Carrier Operated Squelch) Input from radio**

The COS can be active high or active low. The COS jumper on the board switches between active high and active low. All boards are shipped with the jumper in the COS active HIGH position. The voltage swing point of the COS can also be adjusted with the LGC SEL jumper. By default the COS must swing above and below 2.7 volts. By switching the jumper, you can set that swing point to 1 volt.

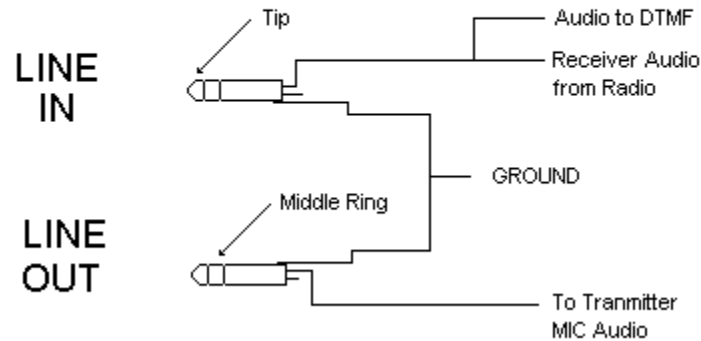
### **Pin 8 – Audio In for DTMF decoder (from receiver)**

This pin should have the audio from the receiver to be decoded. This is most commonly connected to the same line as the sound card LINE IN (see Section 3.3 for more details)

**NOTE:** The unused pins are NOT connected to ground on the IRLP board, and can be used for other wiring that may be required in your installation. Some people use the unused pins for transmit audio connections, to keep the installations nice and compact inside a single DB-9 connector.

## 2.3 Audio Wiring

### Radio / Computer Audio Schematic



Audio wiring is required to interface the audio from the computer to the radio and vice-versa. The sound card will use the LINE IN and LINE OUT jacks for transferring the audio between the sound card and radio. The MIC IN should not be used, as it can contain non-linear components such as automatic gain controls and filters.

You will require two STEREO 1/8 inch jacks. They can be purchased at your local electronics component store. Alternately, you can buy a single preformed cable, and cut it in half. The ground connections should all be wired together, and connected to the common grounds on the radio and IRLP board.

To wire the LINE IN, you have to connect the center tip of the jack to the receiver audio. Also connected on this line must be the audio input to the DTMF decoder on the IRLP board. This audio should be de-emphasized, and have passed through a CTCSS filter. Most "speaker" audio has been conditioned this way. DO NOT feed pre-emphasized audio into the IRLP, or you will just sound tinny to other users.

To wire the LINE OUT, you have to connect the middle ring of the other jack to the MIC input of the radio. An unused wire on the DB-9 connecting the radio to the computer (such as pin 9) can be used for this. This audio might have to be conditioned, depending on your radio. This audio can be directly applied to most radios and controllers, but might require DC blocking capacitors and/or resistors to reduce the level.

## 2.4 Final Hookups

**NOTE:** Failure to connect the IRLP board correctly to your computer will damage your parallel port and/or IRLP board. Please recheck your connections before applying power.

It is very important that the cables for the IRLP node be plugged into the correct places. The board may cause harm to your computer if plugged into the wrong ports by accident.

The interface cable that came with your IRLP board has 2 DB-25 (one male, one female).

The board also had a male DB-9 connector attached to it. The DB-9 cable can be installed onto the IRLP board in two ways, but only one way is correct. The marked red wire (pin 1) must be installed so it is farthest from the edge of the IRLP board (pointing inward towards the LEDs on the board).

The MALE DB-25 of the interface cable plugs into your computer's parallel port.

The FEMALE DB-25 of the interface cable plugs into the IRLP interface board.

The MALE DB-9 plugs into the custom cable you built for your radio in the sections above.

The FOUR CONDUCTOR POWER CONNECTOR on the IRLP board accepts any free IDE power connector from your computer power supply. This supplies 5V DC power to your IRLP board.

## 2.5 Testing Your Setup

The board has six LED indicators of the operation of the board. There is a green led (COS active), a red LED (PTT active), and a yellow LED (Valid DTMF detect). There are also three red LEDs which indicate the status of the three AUX outputs.

The two tests that are performed before the IRLP node software install are the DTMF valid test and COS test.

*NOTE: Some parallel ports MAY cause the IRLP board to transmit by default as soon as the computer is powered up. The software driver for the parallel port will fix this AFTER the software install.*

### **DTMF VALID TEST**

To perform the DTMF VALID test, apply power to the radio and interface board and transmit a DTMF tone into your radio. The yellow indicator should flash with each tone pressed.

If your board fails the DTMF valid test, check the wiring. Use a set of headphones to listen to the level of audio between the DTMF audio line to the DB9 and ground. The level should be loud enough to hear. If you are still having problems, contact [installs@irlp.net](mailto:installs@irlp.net) with your problem.

### **COS TEST**

Send a signal to your receiver. The green LED should light up while a signal is present on the radio, and turn off instantly when the signal is no longer present. If it does not, then try to switch the position of the COS jumper on the board. The jumper is in HIGH position when the jumper is positioned closest to the "H" silkscreen on the board. If this still fails, check the voltage swing on COS pin of the DB-9. If the voltage swing is low, you may have to change the LGC SEL jumper to the 1 volt position. You may also have to build a small buffer circuit for the radio to clean up the signal.

The PTT lockout jumper should not be changed unless your radio setup is capable of receiving and transmitting at the same time (full duplex). Changing the jumper allows DTMF commands to be received when the transmitter is transmitting. If you are not sure, leave this jumper unchanged.