

# Pelican PL-957

## Adding additional Tos Link (Digital Optical) inputs, and / or IR Remote

Table of Contents:

Background; .....	2
Section 1: Adding TosLink receivers.....	3
Section 2: Adding Remote Capability.....	12

This document provides information for modifying Pelican System Selector Pro PL-957 switch to add additional Digital Audio inputs (TosLink), and / or remote access capability to the switch.

## **Background;**

The PL-957, out of the box, switches 8 component video, 8 composite video, 8 analog audio, 3 digital audio, and 3 Ethernet inputs in a manual configuration. Back panel provides 7 component / composite video, and 1 set of inputs is on the front panel. Main circuit board for the unit comes in 2 styles, components and traces are the same for both, with the exception that one version employees a switch matrix and the other version uses transistor/resistor matrix for the same purpose. This document shows pictures with the matrix version, which is of later manufacture.

Circuit board for the unit includes all traces required to add additional TosLink receivers for a maximum of 7 on the back panel. This requires purchase of the receivers, fabrication and placement of 9 jumpers, addition of 5 capacitors and one 4066N cmos switch to the unit. Therefore, it is a simple modification. A single TosLink receiver can be added for a total of 4, by adding the receiver, 1 capacitor, and 1 jumper. In addition, the back panel must be modified by adding access holes to the back panel for the added receivers.

Remote capability can be added to the unit by the addition of a remote decoder, and associated relays to make momentary contact at 6 points on the switch control matrix. One method of adding remote capability is to add the DIY Kit 142, 12 channel IR Relay Board, from KitsRus, to the unit.

Each modification is detailed in this document.

**Warning: Opening the PL-957 and making modifications as indicated will void your warranty for the unit with the manufacturer.**

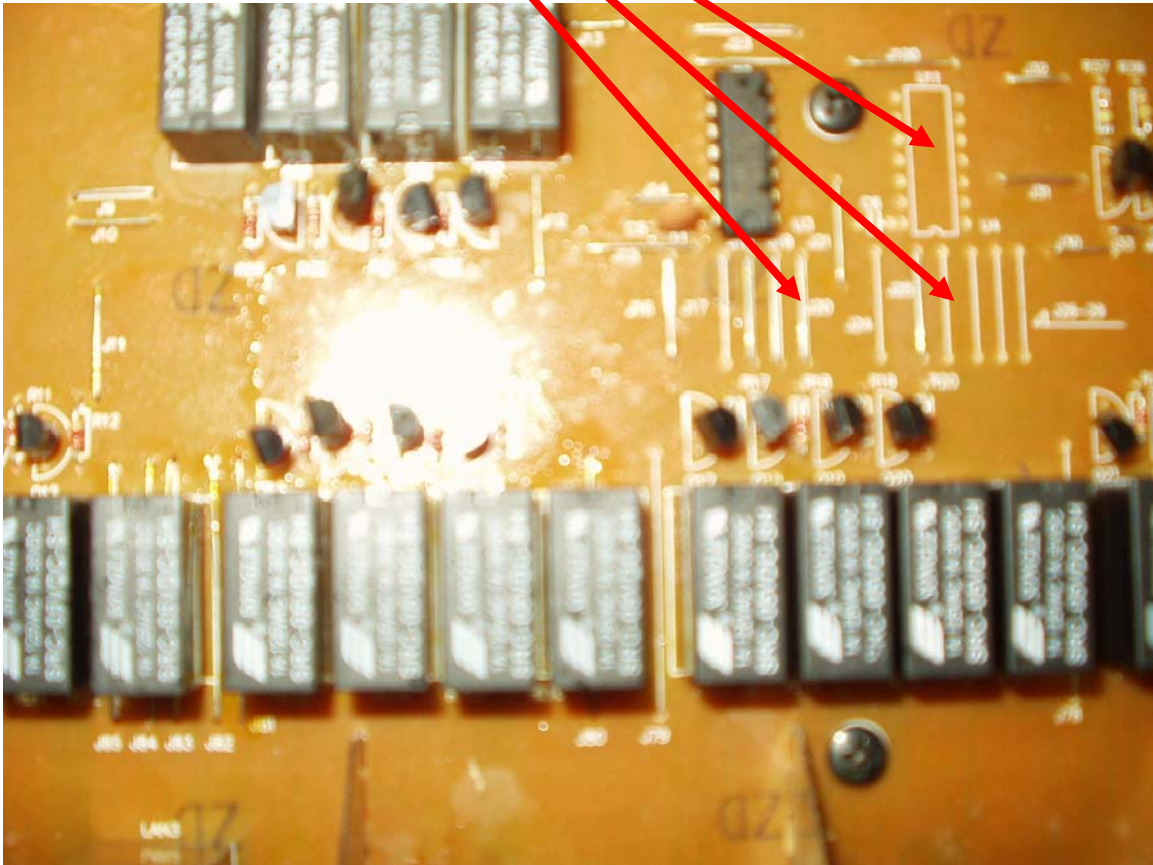
However, this unit is extremely well built, very robust, and I don't think voiding the warranty is that big of a deal, if you want the added capability.

## Section 1: Adding TosLink receivers

This picture shows the main board.

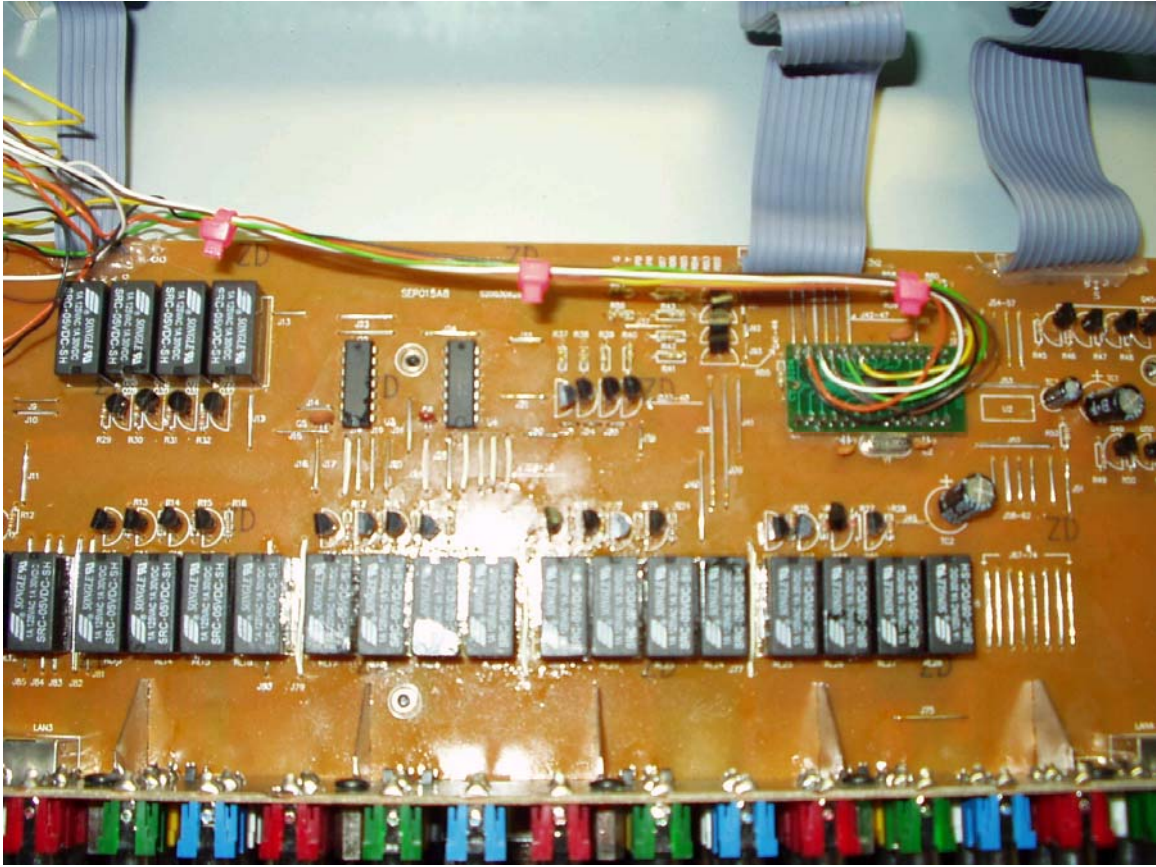
Opening the box is straightforward, remove 8 screws from top panel, 2 each side, 4 in back, (top/bottom/side). Remove top panel. Remove 8 screws from back panel standoffs. Then prepare board for removal, remove the rubber feet from the 2 feet at the front of the unit bottom, this gives access to the bottom stand off screws. Remove the board screws by using a top/bottom screwdriver hold, to keep the stand offs from spinning. I remove the board first time, fold it forward gently against front panel, then use a small wrench to hold the standoffs while I tighten the bottom standoff screws, from then on, I can remove the board screws without messing with the unit's rubber feet.

Arrows point to where all but the toslink receivers and their capacitors will go: (Yeah, it's a little blurry, but one look at your board makes it obvious. We are going to fill up the missing jumper spaces, add 1 cap, and a 4066N CMOS switch, next to it's buddy.



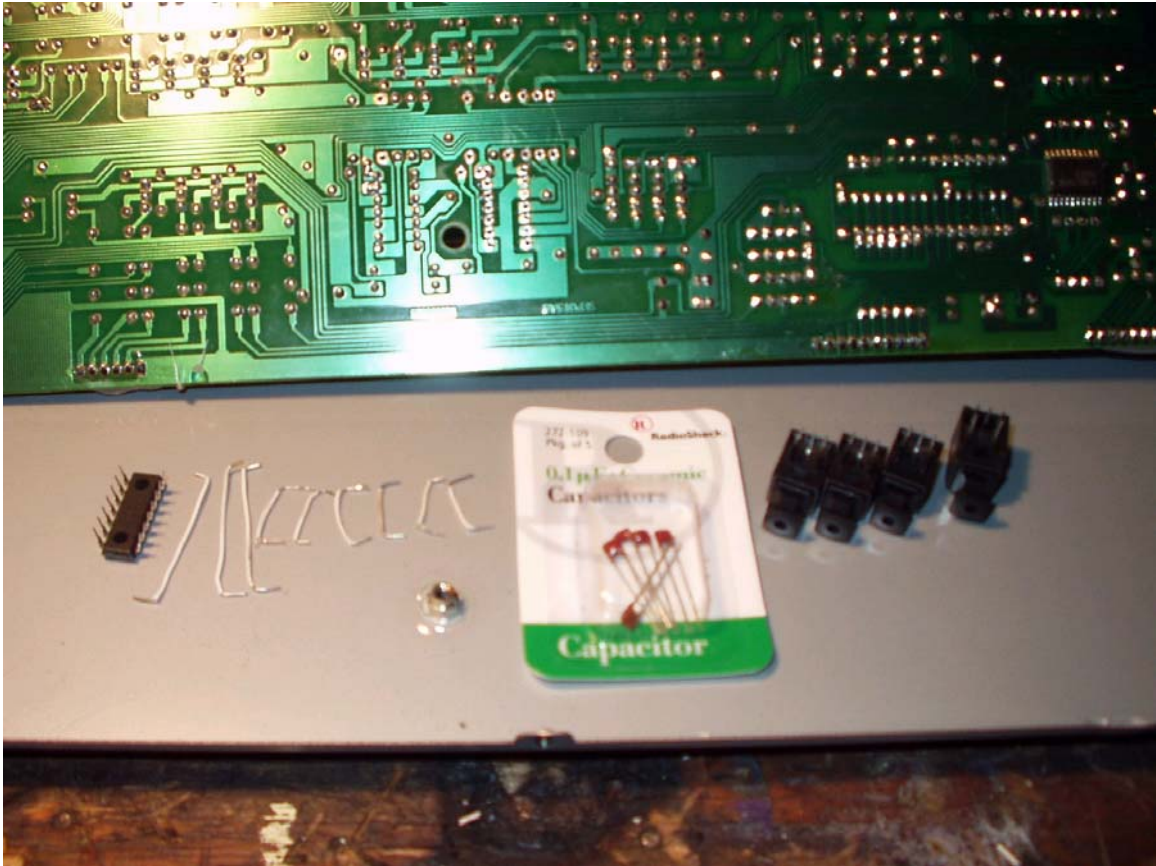
## Pelican PL-957, adding Toslink and Remote

Here is the main board with the parts installed, pay no attention to the wire bundle, that's for the remote in section 2.



In the picture below you will note the parts required, and note the backside board prep for the adding of the units, mainly, removing the solder from the places you will add components.

Pelican PL-957, adding Toslink and Remote



These are the parts you need to add one additional toslink receiver to fill out the first CMOS switch, this will give you 4 inputs, add 3 more plus the CMOS switch for the rest. 9 homemade jumpers, 5 #104 ceramic caps, four TosLink Receivers total. 1 4066N quad CMOS switch.

<http://www.toshiba.com/taec/components/Datasheet/TORX179P.pdf>

this site gives you the Toshiba data sheet info

<http://www.digikey.com/scripts/dksearch/dksus.dll?Criteria?Ref=96417&Site=US&Cat=31130587>

this should take you to digi-key, probably the cheapest source for the receiver and the 4066.

[http://www.semicon.toshiba.co.jp/eng/prd/pdf\\_presen/opto\\_toslink\\_e.pdf](http://www.semicon.toshiba.co.jp/eng/prd/pdf_presen/opto_toslink_e.pdf)

Another Tosh page, shows all the receivers, links to the data sheets

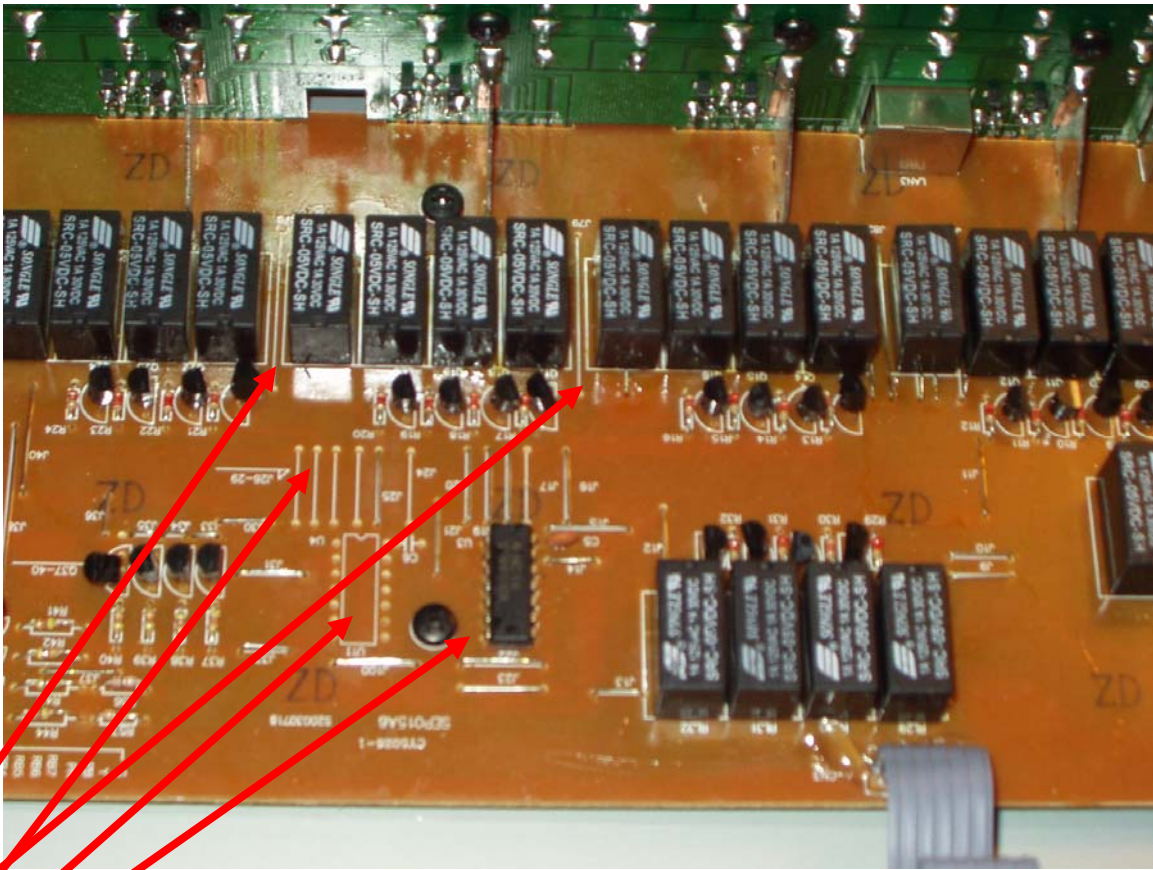
<http://www.toshiba.com/taec/howtobuy/tso/ca.shtml>

This links to Tosh suppliers

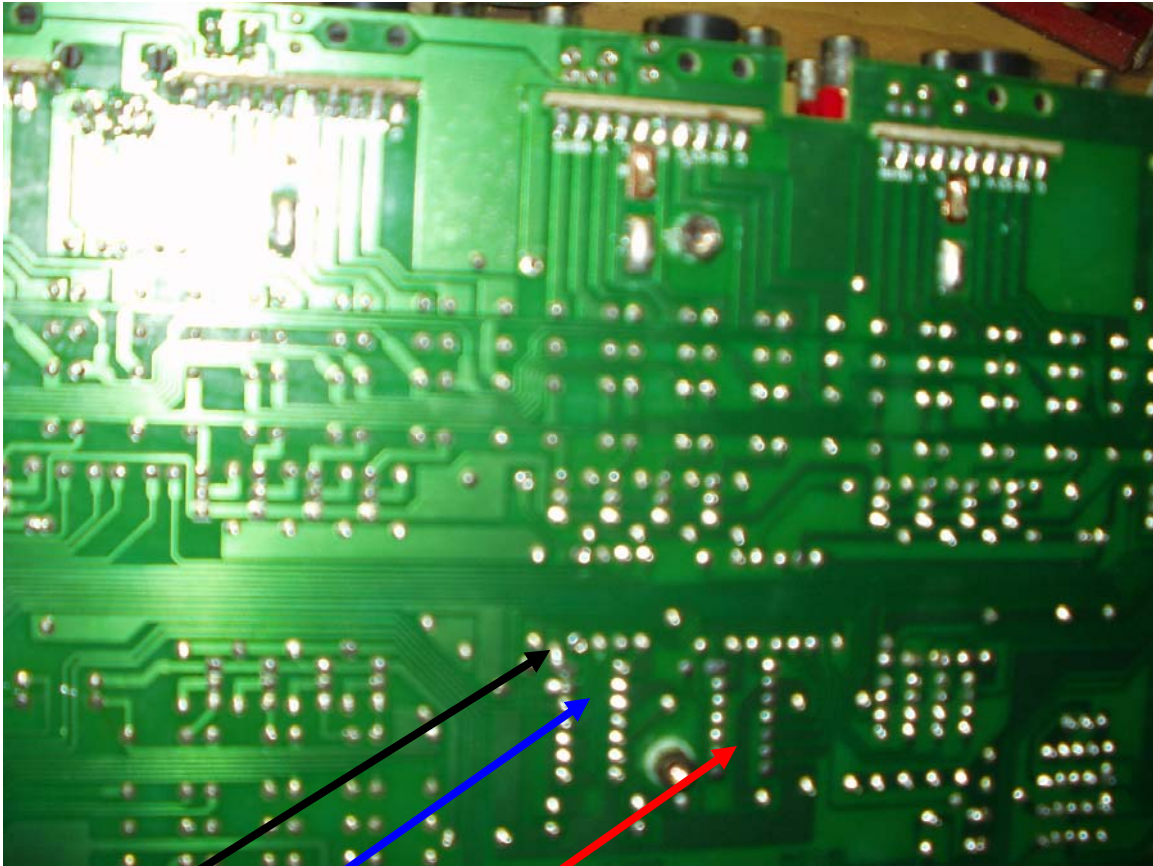
You can Google on "Toslink" and find some other suppliers if you wish.



Pelican PL-957, adding Toslink and Remote



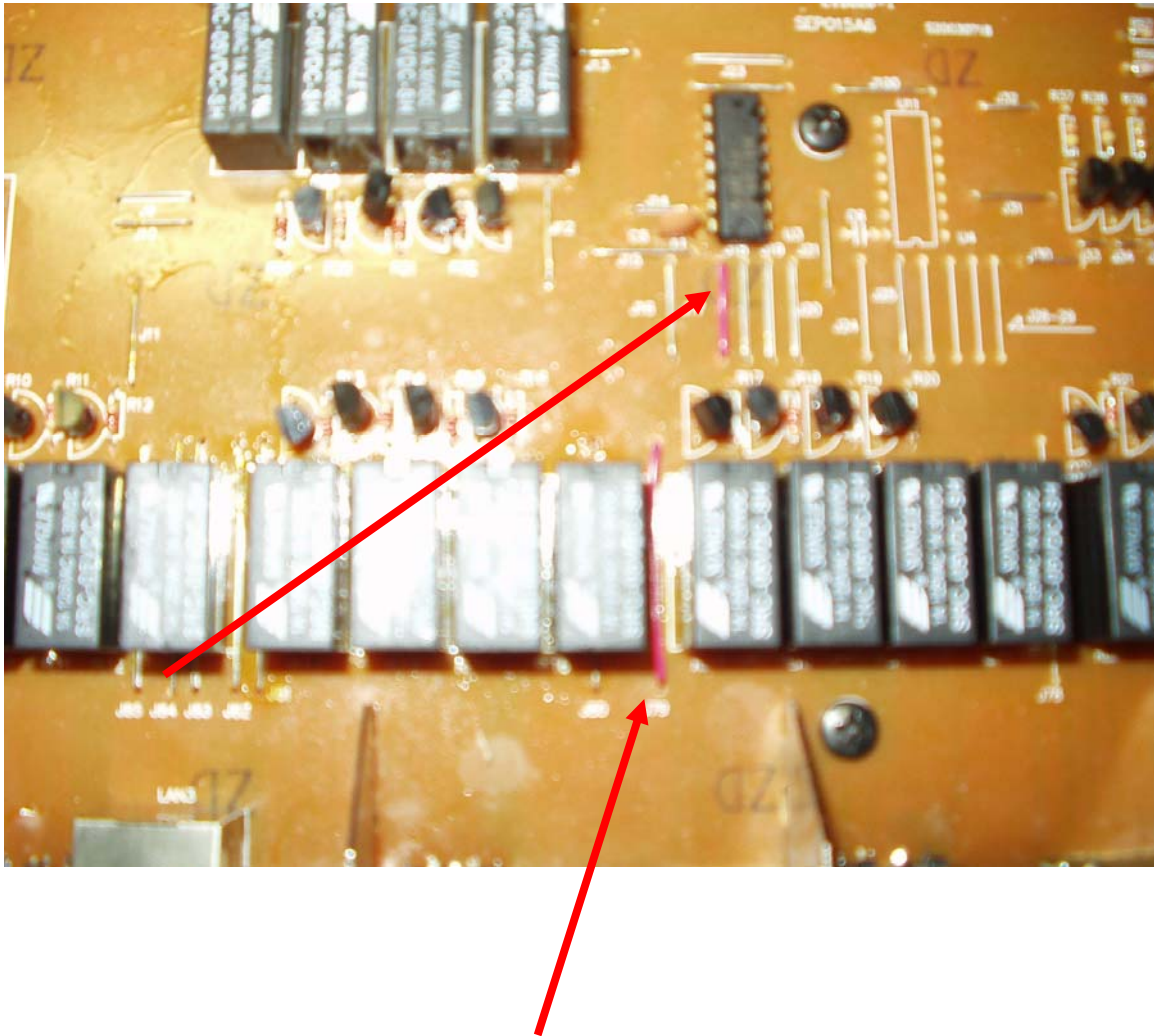
Arrows point to CMOS switch, placeholder for second switch if you want to add TosLinks to all 7 back panel inputs, and jumper locations. The discerning eye will note I'm using pictures from both board types, layout of components on both board types is the same.



Lines show back side of board, CMOS pins, installed CMOS is on left, (Blue arrow), placeholder for #2 is on right (Red). These are standard CMOS quad input switches, 4066 with a lot of cousins, if you decide to add one, get the lowest switching impedance you can, 4066n is about the best.....

Black arrow points to traces from the Toslink jumpers, note they are grouped together, and easy to follow. To add a single receiver you do not have to do any soldering other than 2 jumpers, the receiver, and the cap. When adding receivers, be sure and place the caps first, much easier. No arrows, but the location for the Toslink receivers can be seen at the top of the picture.

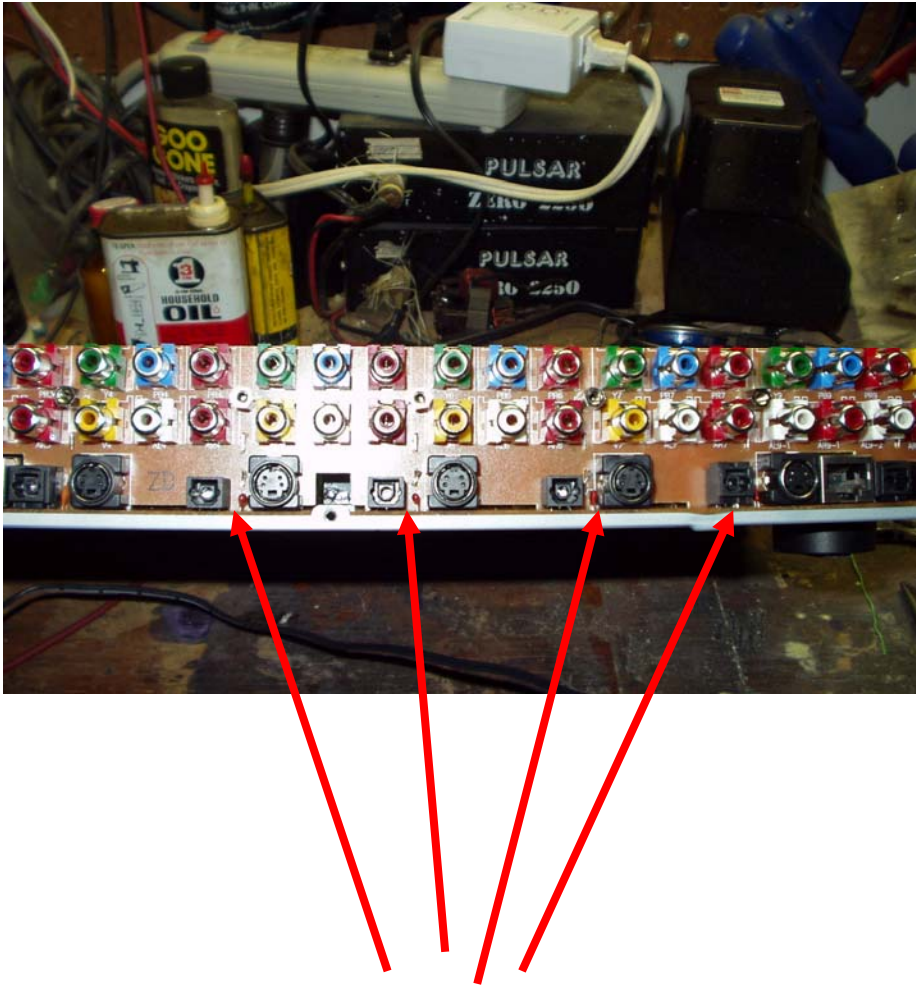
Pelican PL-957, adding Toslink and Remote



Ok, to the heart of the matter, arrows show position of the 2 jumpers, note the board orientation here is reversed from other shots. These are what is needed to add a single receiver and fill out the first 4066 switch.

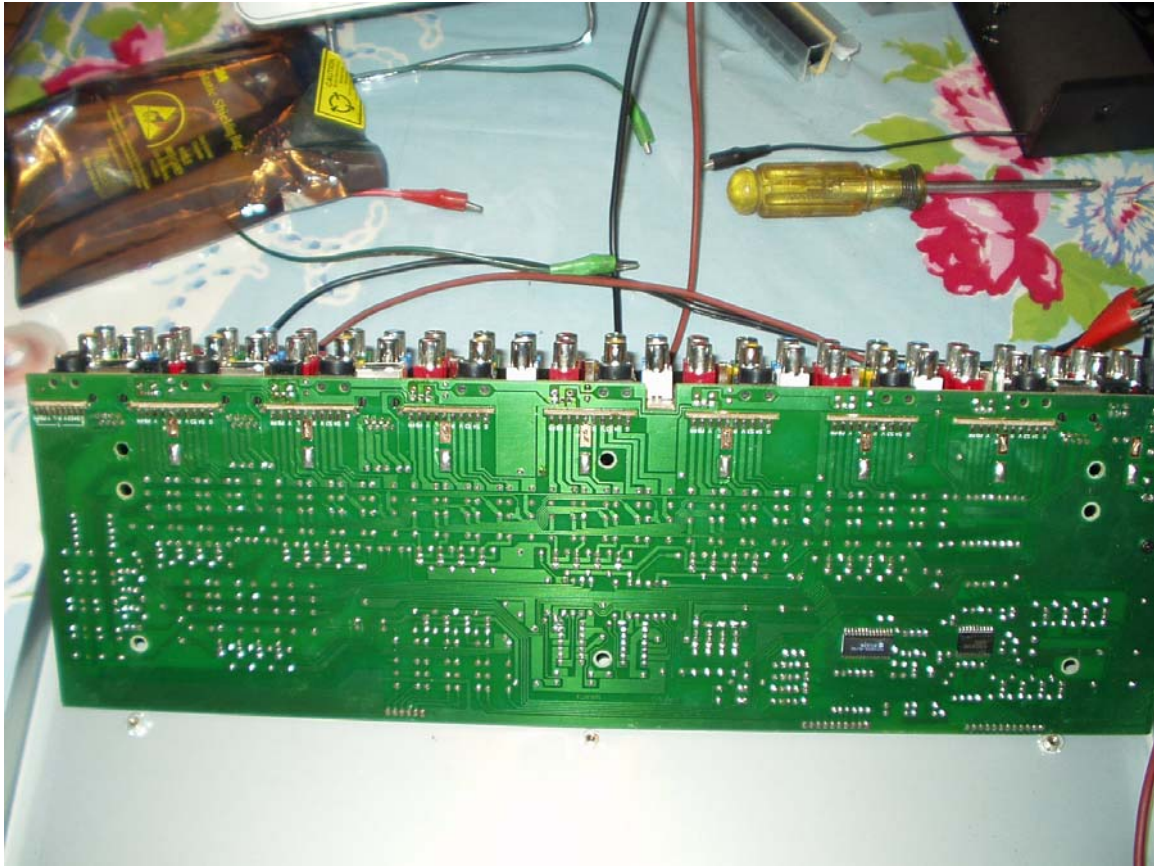


Pelican PL-957, adding Toslink and Remote



This shot is the back panel, arrows show the toslink and the cap placement,,,,, Put the cap in place first or you'll go nuts trying to get it in later! Note I'm using 2 different receivers here,,, I've tried all 3 that I've given links to up above, they all work the same.

Pelican PL-957, adding Toslink and Remote



Above is the entire bottom side of the board. I do all the work with the board leaning against the front panel as much as possible so I don't worry the ribbon cables.

Pelican PL-957, adding Toslink and Remote



Here is the back panel where I made the holes for the new toslink receivers, you can picture it, get a drill, make a hole, etc etc, try to make it neat. Obviously, hole making is my worst skill. But it works!!

End of TosLink section.

## Section 2: Adding Remote Capability

The photos below show one method of adding remote to the PL-957, there are several others, this one is simple and straight forward. The kit used here is produced by kitsRus, [www.kitsrus.com](http://www.kitsrus.com), I got the one used in this unit from Qkits, <http://store.qkits.com/moreinfo.cfm/QK142>. Kit assembly is quick and easy, I do not cover kit assemble here. The kit comes with easy to follow instructions, full set of parts, and a remote matched to the receiver.

Modifications I made to the kit for this install are few, I only used 8 of the relays, that's about it. I purchased standoffs from Radio Shack for the remote kit, and I fitted the kit inside the PL-957 at the right front of the unit, facing forward. I put 2 standoffs on the front of the board, to match holes drilled in the bottom of the PL-957 to hold the kit. I cut down 2 standoffs by aprox 1/4" and put them on the rear of the kit, allowing the kit to rest on the main circuit board of the PL-957. These could be secured with hot melt glue if one chooses, I did not, so that the board is always easily removable. I mounted the IR receiver in the right front portion of the PL-957 front panel, so it sort of matches the "On" button of the Pelican switch, which is on the opposite side of the panel. I used one of the unused terminal blocks from the kit soldered to the 3 leads of the IR receiver to allow easy kit removal. I put 3 wires in place between the kit IR input and the terminal block. All is shown in the pictures included here.

Finally, I did not relish the idea of a separate power supply for the remote kit, seemed too busy to me, too much of a pain. So, I measured pull down voltage on the relays, and found they pull down at a little over 9 volts, too high for the Pelican power supply. I purchased a Radio Shack 10 volt power supply, replaced the connector end, and use it in place of the Pelican power supply. The Pelican board is completely isolated from the kit, and the 7805 voltage regulator on the main board runs the pelican switch and it's relays, so it stays at 5VDC. 7805's are rated at 35VDC max input voltage, so the 10 volt Radio Shack supply works fine there. I added a power cord for the remote kit by making a parallel attachment at the point of the power supply input on the PL-957. Thus, I run both units off a single power supply that attaches the same way the stock Pelican does. I have contacted Kits R us to see if they could supply the kit with 7.5VDC relays, which would be perfect for both units. Should that come to pass, this mod would be even easier. Since on this installation you only use one relay at a time in the momentary mode, the additional 35ma for each key press would be easy for the pelican power supply to handle.

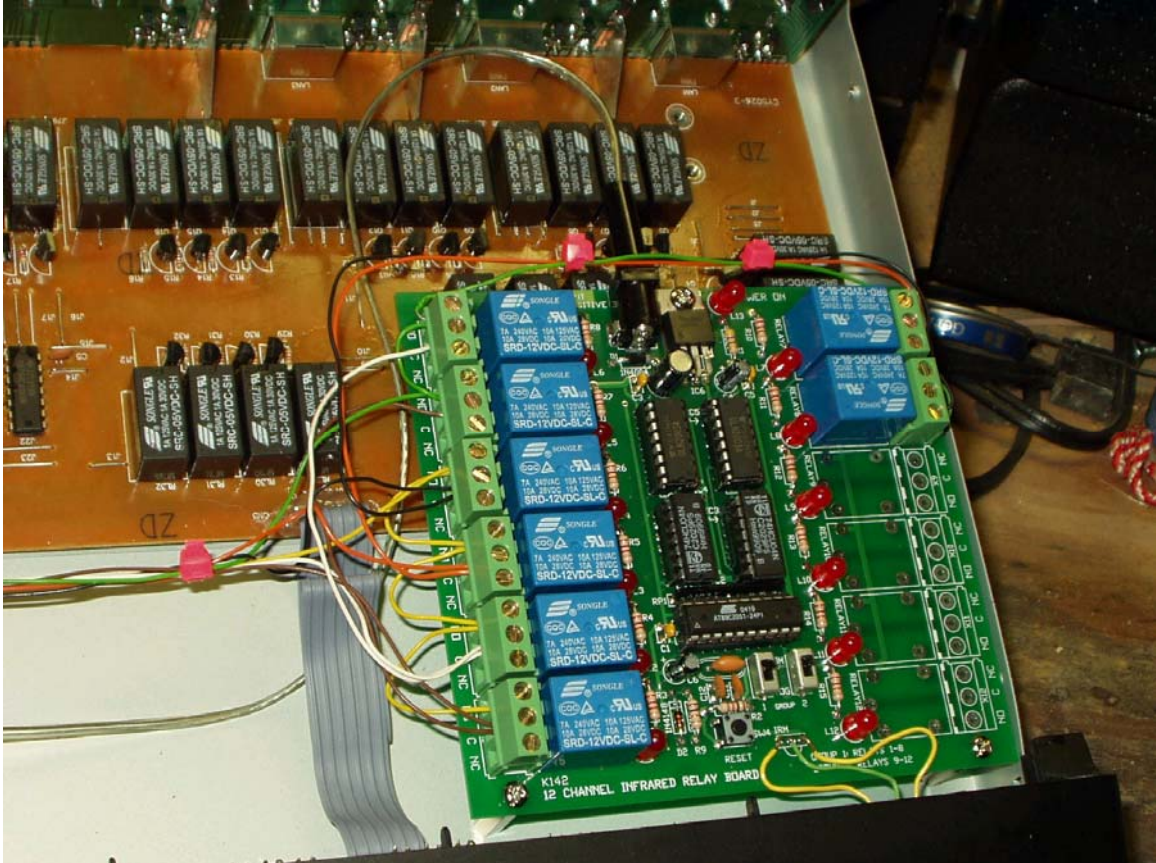
The above brings up the use of the relays to control the switch matrix. First, set the remote kit for momentary contact, that's all that is needed for the PL-957 relays to latch. The matrix switches the PL-957 buttons in 2 bands, low and high. There are 6 key contact points on the matrix, shown in pictures below. Contact 1 and 2 are low and high select, and 3-6 corresponds to the front panel buttons. So, for inputs 1 thru 4, it would require momentary contact between 1-3, 1-4, 1-5, etc. Inputs 5 thru 8 are controlled by 2-3, 2-4, etc. It's more appropriate to refer to points 1 and 2 as A and B, but you get the idea.

That about covers it, now for the pictures:

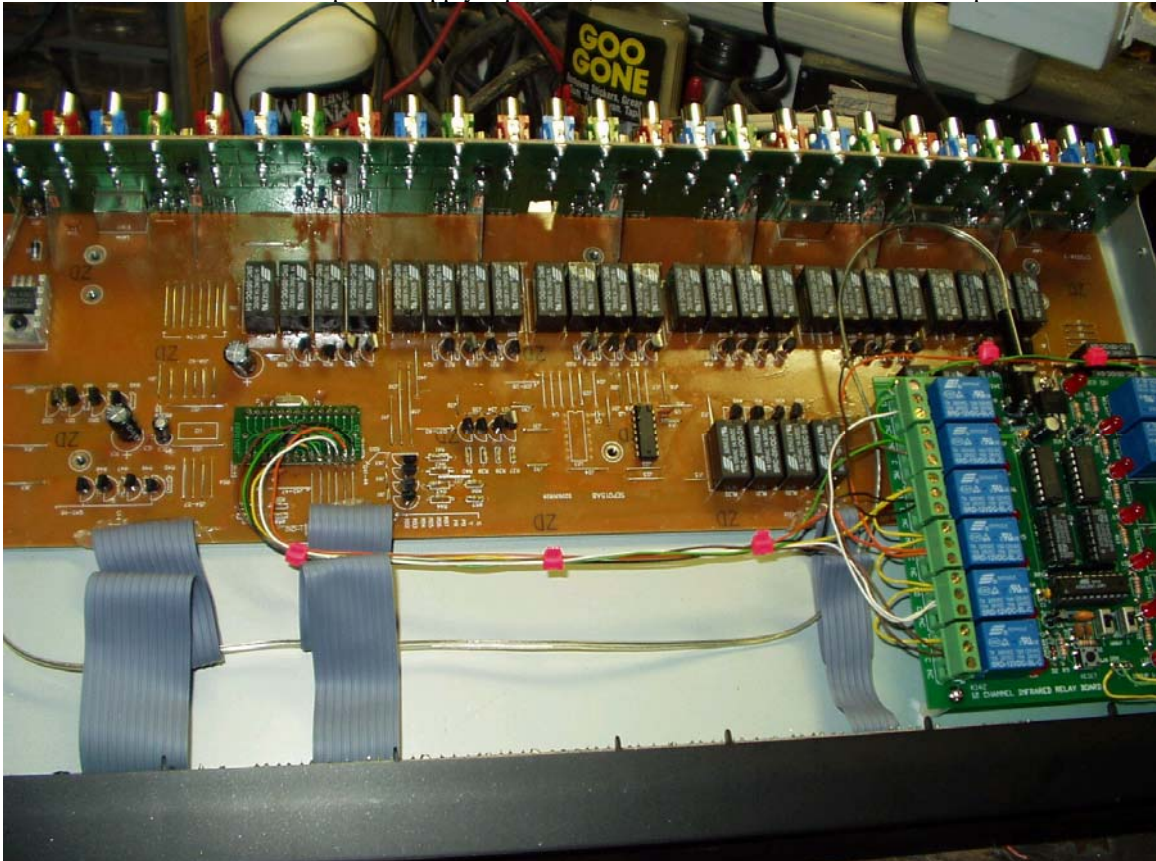


## Pelican PL-957, adding Toslink and Remote

This shows kit placement, and below, the wire bundle: Note the common yellow and green, 4 relays each.



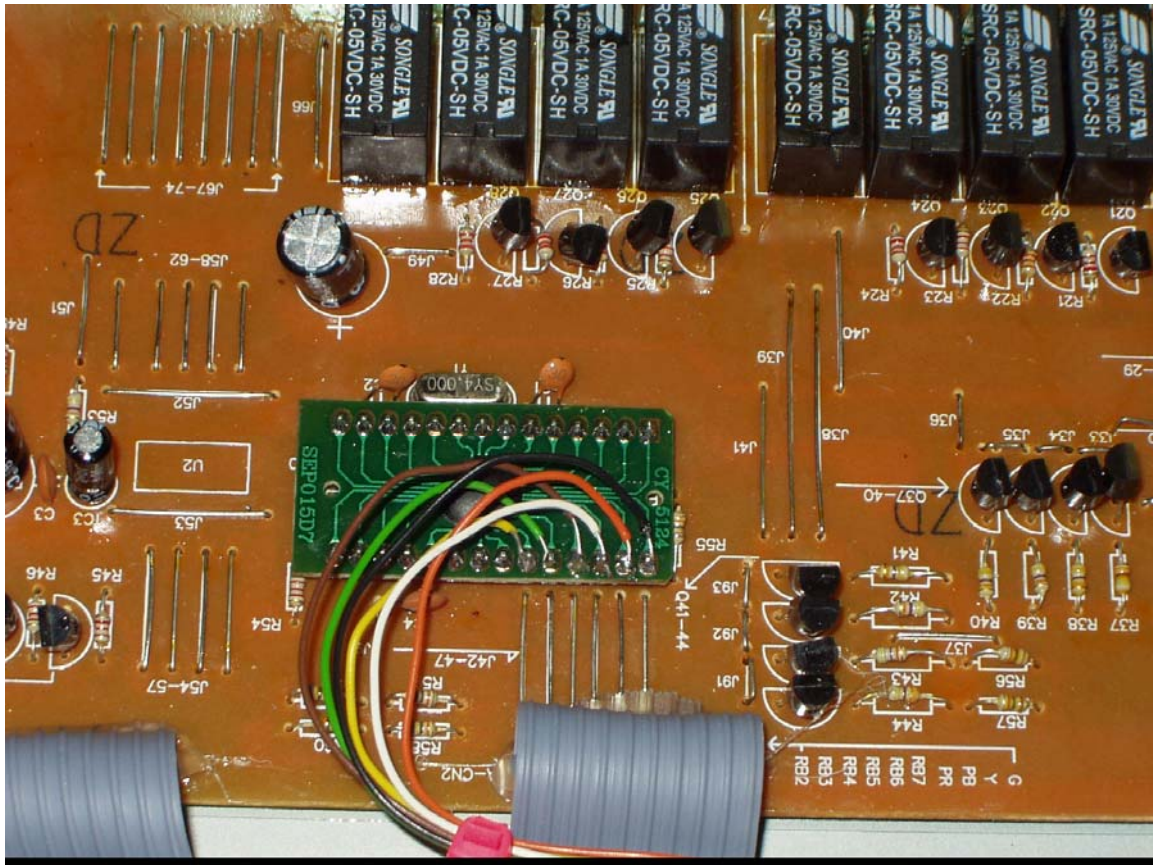
Wire bundle. You can see the power supply input also, between the wire bundle and front panel.





## Pelican PL-957, adding Toslink and Remote

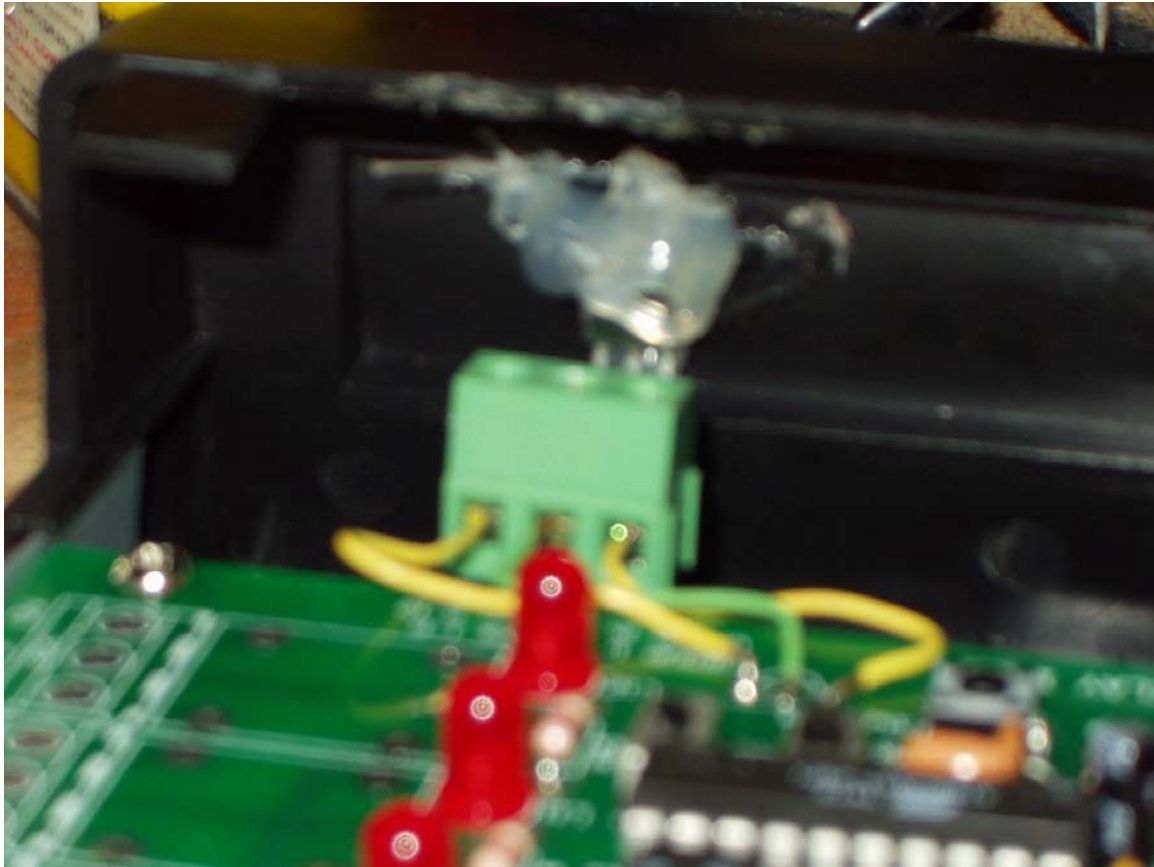
This shows bundle connection to the switch matrix, Yellow is bank one, low; Green bank two, high. Brown for contacts 1 and 5, White for 2 and 6, Orange for 3 and 7, Black for 4 and 8. It's that simple.



Note in the picture of the remote kit in position, that the control switches for each bank are in the MOM, or MOMENTARY, position. This is important for the correct operation of the unit.

## Pelican PL-957, adding Toslink and Remote

This shows the back side of the front panel, with the IR receiver in place, and sufficiently hot glued so as to withstand any normal earthquake. You can also see the use of the terminal block to allow removal of the kit should it be needed.



## Pelican PL-957, adding Toslink and Remote

Here is the front panel showing the point chosen for the IR receiver hole. This is the only external identifier that more is under the covers than the average PL-957! (Well, except for the toslink holes in the back, if you go that route. But who looks at the back?) You get a pretty good flash reflection off the IR receiver, actually you can hardly see it installed.



That's it. I've added this to my Harmony remote setup, and now any HD material, plus the PS2 and Xbox can be viewed on the TV by a single key press of the harmony remote. Teaching the remote kit to the harmony required the Harmony to be in "learn raw" mode on the harmony web site. Other than that it was very easy to add it in.

Hope you enjoy, and find this useful.