P62

QUAD-SWITCH

ACTion R/C ELECTRONICS

Quadswitch can be used as a 4-way latching switcher from one channel of a R/C installation.
In operation, the switches are activated by "jabbing" the transmitter stick and then letting it spring back to neutral. One "jab" will switch on Relay No 1; two "jabs" will switch on Relay No 2 etc etc. To switch the circuits OFF, you simply jab the stick the appropriate number of times in the opposite direction. It's more difficult to describe than it is to do!

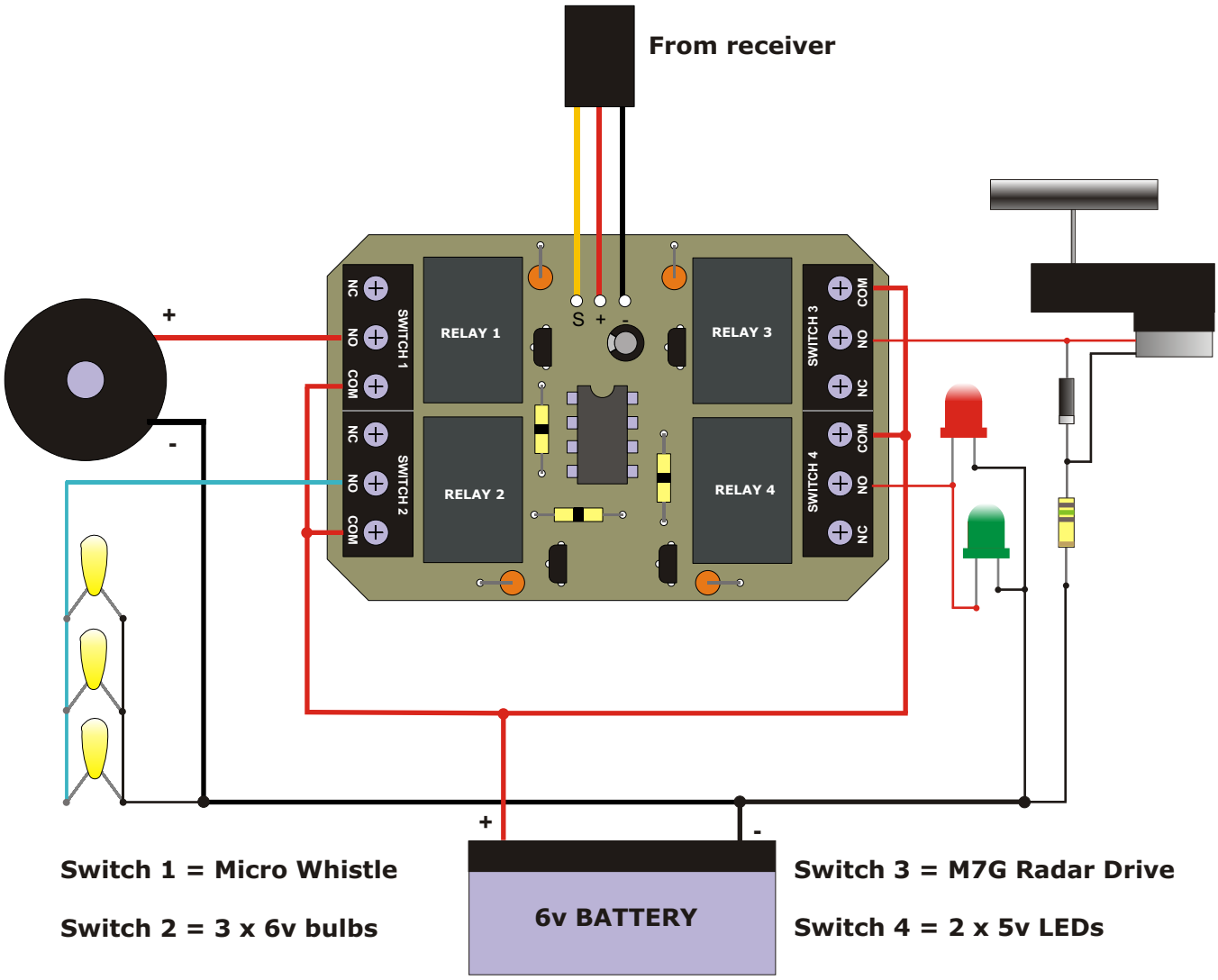
Please note that the P62 will NOT operate on a channel which is controlled by a two-way ON/OFF toggle switch on the transmitter (often labelled "Retract" or "Flaps").

MICROCOMPUTER , CMOS IC & MOSFET DESIGN

Number of switch functions	4 (plus "straight-through" servo)
Radio control channels required	1
Latching outputs	All 4 switches
Switching points	Fixed, no adjustment
Receiver voltage	4.8 volts to 6 volts*
Maximum load current	3 amps per relay
Output connections	Screw connectors
Servo connection	Plug in

***Do NOT use a 5-cell rechargeable pack or 6v Lead-acid battery to power the receiver *directly;* it will fatally damage the unit.**

Power *via* a regulated 5v supply such as a BEC-equipped speed controller or ACTion power board will be fine.



NOTE: Up to FOUR different voltages can be handled at the same time by this unit i.e. one per relay.

P62 QUAD-SWITCH

ACTion R/C ELECTRONICS

This Quadswitch switcher can be used as a 4-way latching switcher for a multichannel R/C installation. It requires a 1 to 2 millisecond positive input. As this is pretty much industry-standard it will work well with most modern R/C sets. It should be connected into a channel which is operated by either a spring-centred stick on the transmitter or a 3-way (On/Off/On) switch. It will NOT work with channels which are controlled by a simple 2-way (On/Off switch.

Number of switch functions	4
Radio control channels required	1
Latching outputs	All 4 switches
Receiver supply voltage	4.8 volts to 6 volts MAXIMUM*
Switching points	Fixed, no adjustment
Maximum load current	3 amp per relay
Output connections	Screw connectors
Servo connection	Plug in
Case size (external)	63mm x 43mm x 25mm

***Do NOT use a 5-cell rechargeable pack or 6v Lead-acid battery to power the receiver *directly;* it will fatally damage the unit.**

Power *via* a regulated 5v supply such as a BEC-equipped speed controller or ACTion power board will be fine.

CONNECTION IS SHOWN ON THE DRAWING OVERLEAF

OPERATING THE QUAD SWITCHER (This is harder to describe than to do)

Each switch output is what is termed a single pole double-throw contact (SPDT). When a relay is off, the (COM) Common connection is connected to the (NC) Normally Closed connection. When the relay is on, the (COM) common is connected to the (NO) Normally Open. The COM and NO contacts then become a simple switch and can be wired as such. Wiring to switch various different types of load is shown in the drawing overleaf. What is eventually wired to your switcher will, of course, depend on what you want to operate. Probably the best test load would be a bulb on each output for testing. If you do use bulbs, ensure that the battery voltage and the bulb voltage are the same.

Connect the servo lead on the input of the Quadswitch to your radio receiver.
Make sure that your transmitter and receiver batteries are fully charged before testing and your receiver and transmitter are switched on prior to test.

There is no need to connect anything up to the relays for testing purposes - you will be able to hear the relays "click" quite clearly as they are switched on and off.

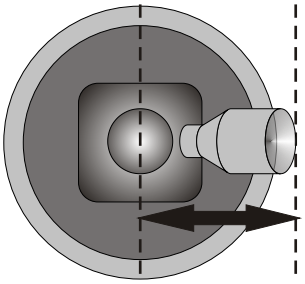
The transmitter stick for the channel you have selected to operate P62 will turn on the relays when moved in one direction, and turn them off again when moved in the opposite direction. The switch is programmed to wait for one second after it "hears" a signal before it turns on the appropriate relay. If it hears another signal within that time then the 1 second delay timer starts again, and so on up to the last relay.

Thus if you want to turn on relay #1 you push the Tx stick to its limit in the correct direction and let go smartly. After one second the relay will click on. If you want to operate relay #2 then you need to push the stick across and release it twice, with a delay of no more than a second between each "jab" of the stick. The relay will turn on one second after it "hears" the second signal. Relays 3 and 4 require three and four "jabs" of the stick respectively. If you are too slow then the switch will turn on the relay which relates to the last signal it received. A little practice will enable you to select the right relay quite quickly.

Turning off the relays is exactly the same procedure as turning them on except that you will push the stick in the opposite direction to "on". Note that you don't have to run through the relays in order i.e. you can turn on relay #2 without first turning on #1 etc.

Note 1:A noisy R/C environment may cause spurious operation of switches, due to the rapid response of the time measurement in the microcomputer. For this reason you should ensure that all servo wiring is kept well away from power leads; that the receiver aerial wire is kept away from all other leads, and that you fit suppressor capacitors to your motor(s). ACTion can supply a RFI suppressor kit see our lists for details.
Note 2:The maximum load current is 3 amps per relay.

TURNING ON THE RELAYS



Transmitter Stick

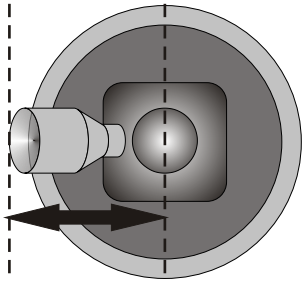
Relays 1-4 - 'Jab' stick to full throw in one direction and release quickly. Leave no more than one second between "jabs"

Relay 1 = Jab>Release (x1)
Relay 2 = Jab>Release>Jab>Release (x2)
Relay 3 =Jab>Release>Jab>Release>Jab>Release (x3)
Relay 4 = Jab>Release>Jab>Release>Jab>Release>Jab>Release (x4)

TURNING OFF THE RELAYS

Relays 1-4 - 'Jab' stick to full throw in opposite direction and release quickly. Leave no more than one second between "jabs"

Relay 1 = Jab>Release (x1)
Relay 2 = Jab>Release>Jab>Release (x2)
Relay 3 =Jab>Release>Jab>Release>Jab>Release (x3)
Relay 4 = Jab>Release>Jab>Release>Jab>Release>Jab>Release (x4)



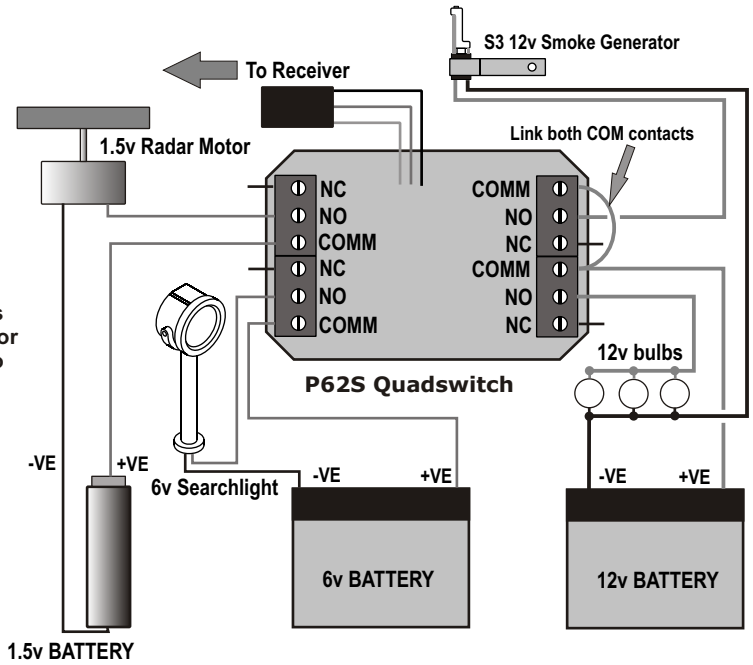
Transmitter Stick

RECOVERY SERVICE

A recovery or repairs service ensures that you will not be left with a dead unit for any reason. The Service Charge for this kit is £16.00 including parts (including return shipping cost in the UK).
Returns should include full Credit Card details (Name & Address of cardholder, Card Number, Expiry Date, Card Security Number)

Component Shop.co.uk. Ltd, 1 Llwyn Bleddyn, Llanllechid, Bangor LL57 3EF

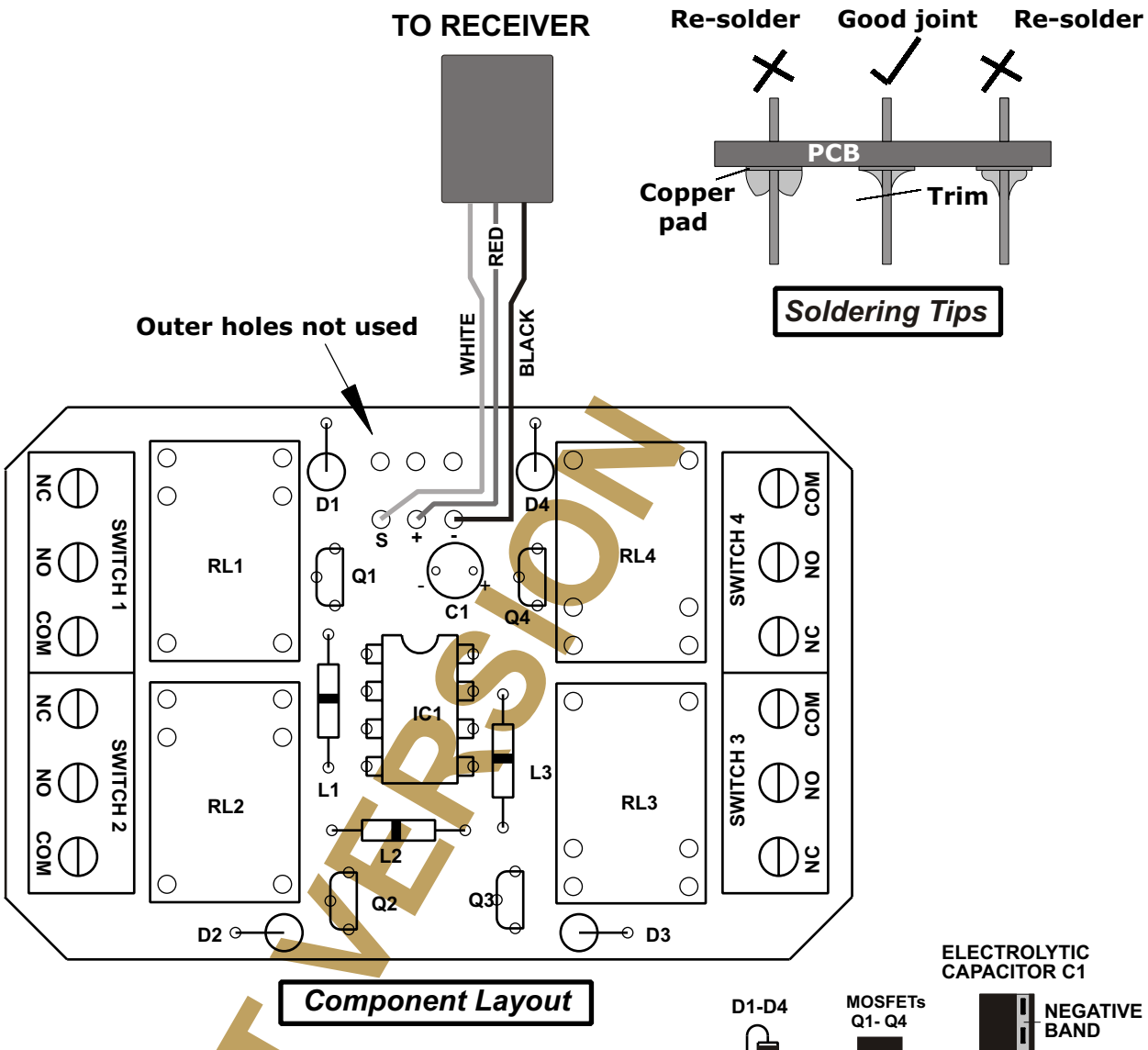
Drill suitable holes in ABS case to allow wires access to screw terminal connector blocks. Use Velcro pads to secure case to inside of model.



Many units are polarity-critical! Take care to connect the battery correctly!

ACTion R/C ELECTRONICS

P62 QUADSWITCH FOUR FUNCTION SWITCH
Instructions for Kit version



PARTS LIST

IC1	12C508 MICROCONTROLLER IC (TAKE CARE WHEN HANDLING)
Q1,2,3,4	2N7000 FET (TAKE CARE WHEN HANDLING)
D1,2,3,4	1N4148 SIGNAL DIODE (NOTE DARK BAR)
L1,L2,L3	ZERO OHMS RESISTOR (CENTRE BLACK BAND)
C1	4.7 uF ELECROLYTIC CAPACITOR (marked 4.7 uF)
H1	3 PIN HEADER
RL1,2,3,4	RELAY 5 VOLT COIL, 3 AMP
PCB	TYPE P62
CON1,2,3,4	3 WAY SCREW CONNECTOR BLOCKS (interlocked in blocks of 6 way)
CASE	Type RX2009 supplied with 4 self tapping screws
SERVO LEAD	Futaba generic type supplied; also alternative HiTec/JR plug shell

P62 KIT INSTRUCTIONS

TOOLS
For construction you will require a soldering iron (anything between 15 to 30 Watts with a thin pointed bit) and flux cored solder (22 SWG recommended). A small screwdriver, a small pair of wire cutters to trim wires and a small file to work on the case covers all the tool requirements plus a good level of lighting.

PCB
The PCB for this project is manufactured from high quality Glass Fibre material, is fully prepared and requires no further work. The PCB has an insulated (Component Side) and a tinned track side. Components are mounted on the insulated side and soldered on the track side.

PARTS (DO NOT HANDLE ITEMS IN BLACK CONDUCTIVE FOAM UNTIL INSTRUCTED. THEY ARE MOS DEVICES)

- The short bars with a wire each end and a black band at the centre are ZERO value resistors (or links) L1, L2 & L3; see drawing. They are used to bridge across tracks between two holes in the PCB.
- The 8-pin integrated circuit IC1 has a type codes printed on it. The black moulded 8-pin IC socket supplied with the kit enables the builder to mount the IC by soldering in the socket then fitting the IC as the last operation in construction. The IC and the IC socket have a notch moulded in to determine which way round they are fitted. The IC is a CMOS device, supplied mounted on conductive foam (together with Q1,Q2,Q3 and Q4 Mosfet). These components should be left attached to the foam for protection against static electricity until they are required at the end of construction.
- The tiny glass diodes D1, D2, D3 and D4 have a dark bar at one end - shown on drawing Component Mounting as a black band. They must be bent exactly as per the drawing to ensure that they are correctly polarised. The drawing shows the orientation of these components on the PCB.
- The cylindrical electrolytic capacitor C1 has a band marked down one side with a (-) negative or minus sign on it; this signifies the negative (-) lead. The long lead is the positive (+). The + & - signs are marked on drawing, and the Component Mounting drawing should help in the identification.
- The small block components with 6 short solder pins are relays RL1, RL2, RL3 & RL4.
- The screw connector blocks are easy to identify from their description.
- The FET devices Q1, Q2, Q3 and Q4 (marked 2N7000) have three legs. The shape of the case is the key as to which way round they are fitted - note the round and flat sides. The layout drawing shows this shape clearly.

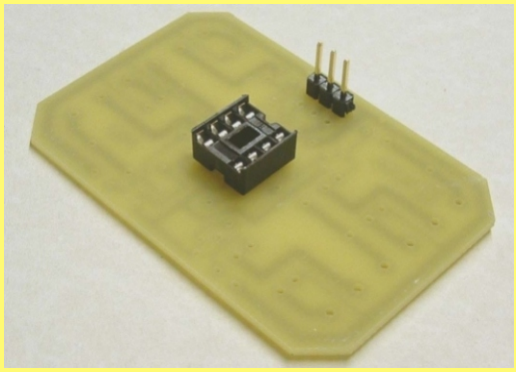
CONSTRUCTION
Construction is very straight forward, the components being easy to fit in any order. For those who would prefer an order of building, the following should help:

- Fit and solder the 8-pin IC socket, noting the direction of the 'notch' as per Layout. The IC will be inserted into this socket as a later operation. NOTE: great care will have to be taken with your soldering as one very fine track goes in between two of the tiny IC pin solder pads.
- Fit the links L1, L2 & L3 with reference to the Layout, having bent them as per Component Mounting. Each component, when fitted and soldered, should have its spare lead length cut off.
- The electrolytic capacitor C1 can be fitted and soldered now, ensuring that + and - are correct in accordance with Layout. After soldering, clip off the spare wire.
- Solder in diodes D1, D2, D3 and D4 ensuring that the dark bars are as per Component Mounting and that they are fitted as per Layout; clip off spare wire.
- The 3-way screw connector blocks come next . The blocks are designed to interlock. In this project two blocks are interlocked together to form a six-way screw block at each end of the PCB. When fitting and soldering them in, ensure that the connection holes for the wires face the outside edge of the PCB. This point is mentioned because of a problem that an earlier constructor had when he reported that it was difficult to connect to them; he had fitted them back-to-front.
- **NOTES ON CMOS DEVICE HANDLING. USE A SHEET OF ALUMINIUM, COOKING METAL FOIL WILL DO.** Place it on the work surface. Place the PCB, solder side down on it. Place the BLACK CONDUCTIVE FOAM on it and place your hands on it, holding them there while you read through this part of the instructions. The PCB, MOS ICs and you are now all at the same potential, i.e. any static voltage difference is now neutralised.
- Fit and solder the 2N7000 MOSFET transistors, Q1, Q2, Q3 and Q4 (note the shape shown on Layout) cutting off the spare wires after soldering. The IC is the last part to fit. Insert it into the IC socket, noting that the notch on the IC is as per the drawing Layout. Push it down well to ensure that it is correctly seated. Solder in the Relays now; they only fit one way round.
- **WARNING - DO NOT use the black foam as packing in the finished unit. It is CONDUCTIVE.**

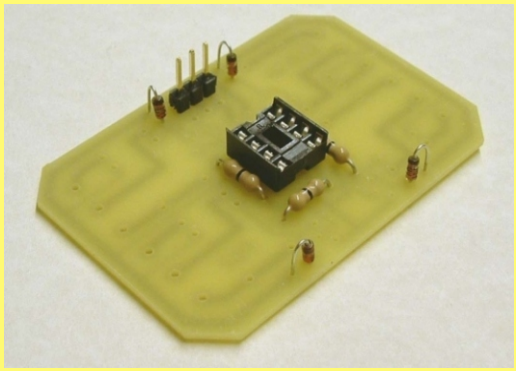
P62 QUADSWITCH

PHOTOGRAPHIC BUILD SEQUENCE FOR KIT VERSION

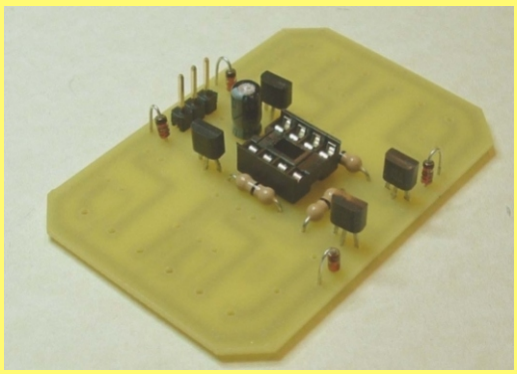
NOTE: The three-pin header shown is no longer fitted to P62.



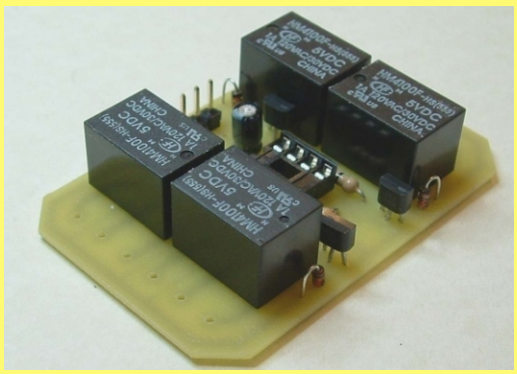
PICTURE 1: PCB with I/C socket and header pins fitted



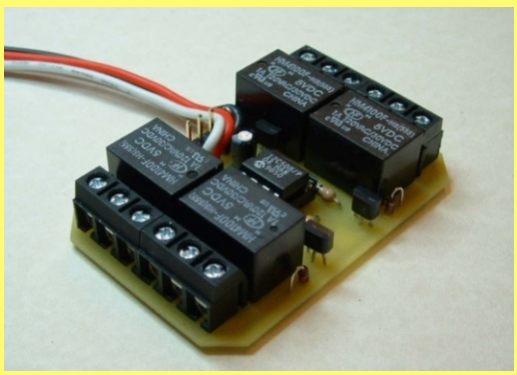
PICTURE 2: Resistors and diodes added



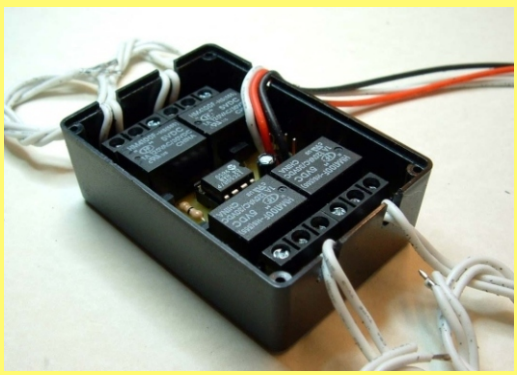
PICTURE 3: Capacitors and MOSFETs added



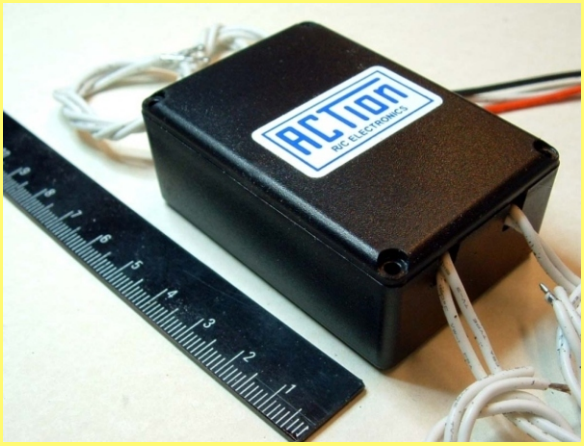
PICTURE 4: Relays added



PICTURE 4: Fit screw terminal blocks and Rx lead. Plug PIC chip into socket last. NB! ANTI-STATIC PRECAUTIONS REQUIRED



PICTURE 6: File slots in case for leads.



PICTURE 7: Finished unit, cased, with sticker.