

P44

TWIN RELAY SWITCH



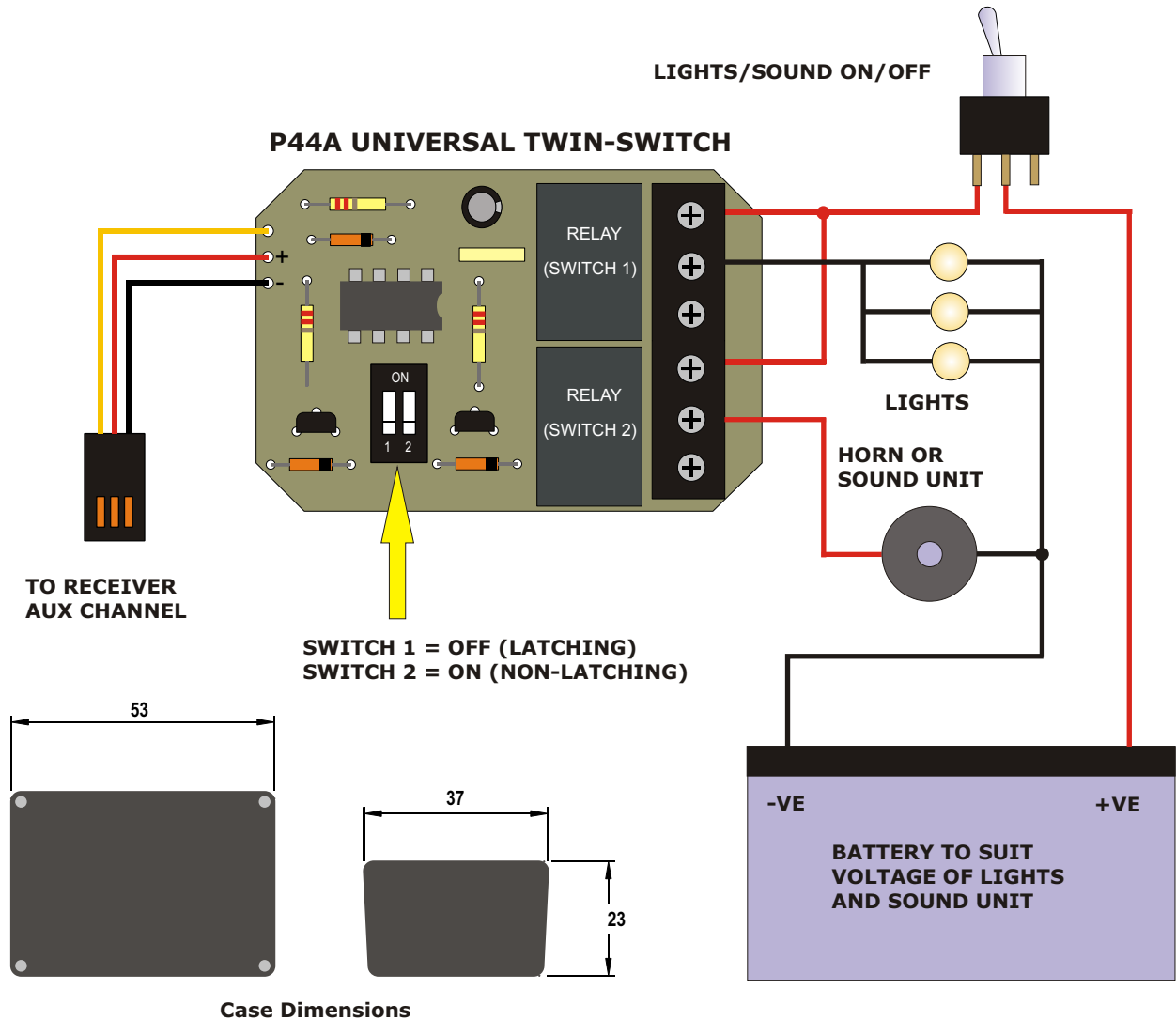
This universal twin switcher can be used as a twin latching switcher; one latching and one non-latching, or twin non-latching switcher. Use latching function for circuits which will remain on e.g. lights, smoke generator; and non-latching for units such as horns, whistles and hooters which will only be switched on briefly. The drawing shows examples of both types of circuit. Each relay output will handle up to 3A, and you may use different voltage batteries for each relay, if needed. It requires a standard 1 to 2 millisecond positive input. Note that this unit will NOT operate from a channel which is controlled by a two-way ON/OFF toggle switch on the transmitter (often labelled "Retract" or "Flaps").

MICROCOMPUTER & MOSFET DESIGN

- Number of switch functions
- Radio control channels required
- Latching or non latching selection
- Switching points
- Maximum receiver voltage
- Minimum receiver voltage
- Maximum load current (each relay)
- Output connections

- 2
- 1
- PCB switches
- Fixed, no adjustment
- 6 volts*
- 4.8 volts
- 3 amps
- Screw connectors

*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.



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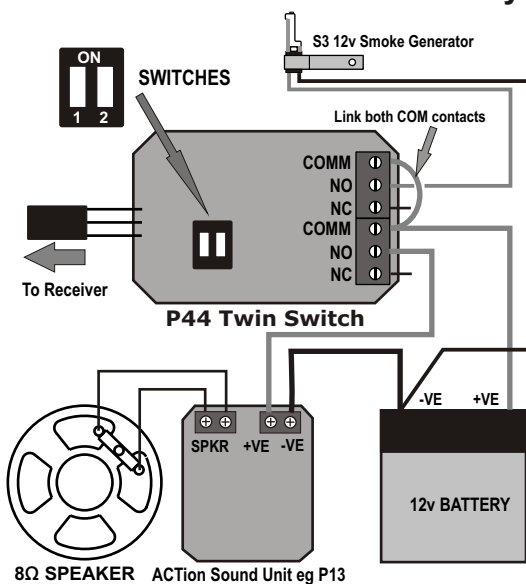
This universal twin switcher can be used as a twin latching switcher; one latching and one non-latching, or twin non-latching switcher. Each relay output will handle up to 3 amps. It requires a standard 1 to 2 millisecond positive input and a channel operated by either a spring-centred stick, a rotary knob or a 3-way (On/Off/On) switch. It will not work with a simple 2-way (On/Off) switched channel.

Number of switch functions	2
Radio control channels required	1
Latching or non latching selection	PCB switches
Switching points	Fixed, no adjustment
Receiver voltage	4.8v to 6 volts*
Maximum load current (each relay)	3 amps

***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.

Two loads with the same battery



CONNECTION/OPERATION

The setting of the two switches will depend on the type of load and the use. Example of the types of load are shown on the diagrams. Generally, any item that you wish to run for a long period (e.g. lights) should be set on latching, while any momentary function (e.g. whistle/ horn) should be set on non-latching. The 'ON' position of each of the switches gives non-latching.

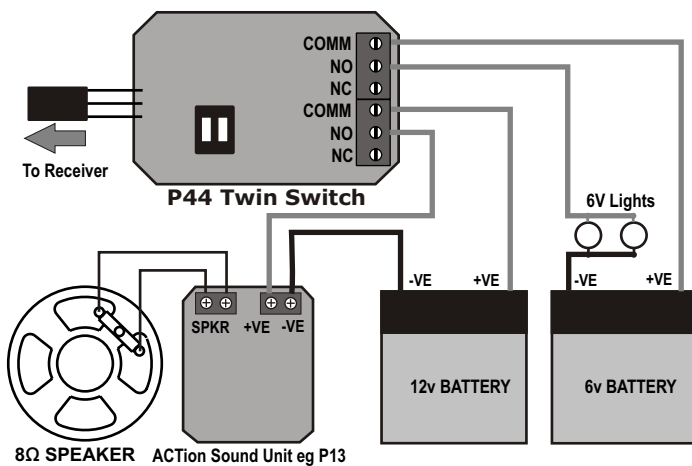
1. Plug lead into a spare r/c channel (i.e. not steering or speed)
2. Switch on transmitter then receiver in that order.
3. Moving the stick up and down (or left and right); you will hear the relays clicking.
4. Switch off receiver and transmitter.
5. Connect to whatever load you wish to drive.

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 £13.00 including parts (including return shipping cost in UK).

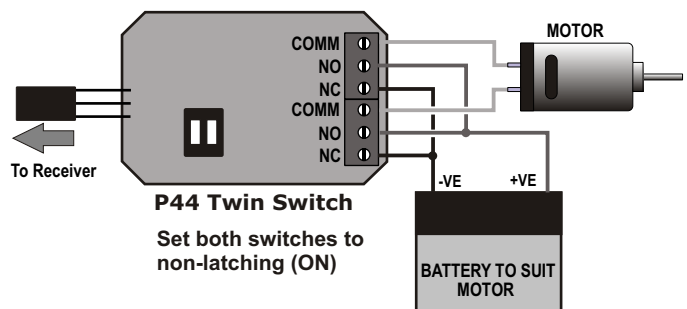
All returns should include Full Credit Card details (Name and Address of cardholder, Card Number, Expiry date and 3-digit Card Security Number)

Two loads with different batteries



**ACTION R/C Electronics, 1 Llwyn Bleddyn,
Llanllechid, Bangor LL57 3EF
United Kingdom**

Driving one motor in both directions



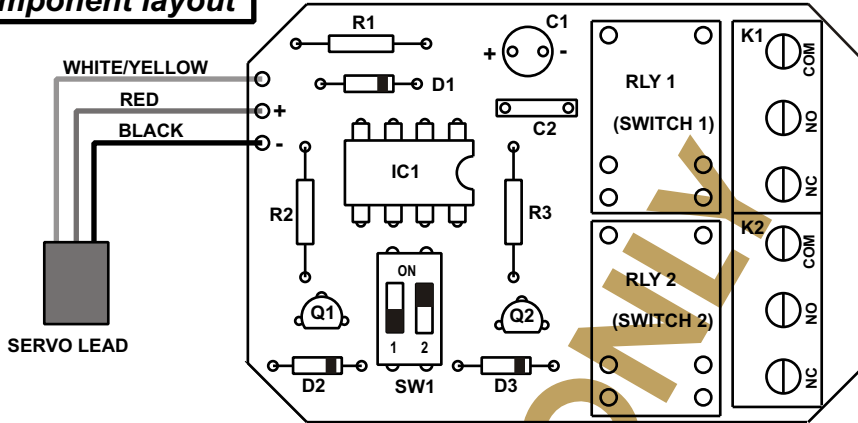
Sound units are polarity-critical! Take care to connect the battery correctly!

The small print.....
ACTION R/C Electronics guarantee all products to be free from manufacturing defects for 12 months from date of purchase. This does not cover suitability for specific applications; components worn or damaged by use, tampering or incorrect connection; alteration to original components; damage to batteries or other equipment through use; misuse, or shipping damage. Where goods are found to be faulty, the customer shall return them to ACTION R/C Electronics in their original condition and with their original instructions, packaging etc. Our liability is limited to repairing or replacing goods to their original specification and will not exceed the cost of the goods. By using the product the user accepts all liability. Where a fixed repair charge is applicable, ACTION R/C Electronics shall undertake repairs to the extent that they are judged economically viable. Where such is not the case then the customer will be offered the option of crediting the repair charge towards the cost of a new unit or having the faulty unit returned and the charge refunded (less the cost of return carriage). We reserve the right to modify this guarantee without notice.

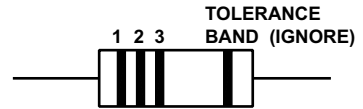


P44A UNIVERSAL TWIN SWITCH
Instructions for Kit version

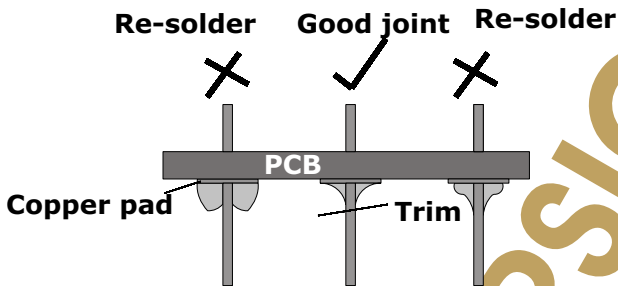
Component layout



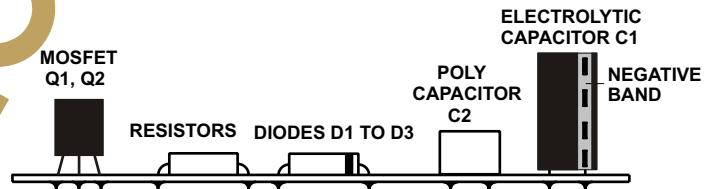
SW1: On = Non-Latching
Off = Latching



Resistor colour bands



Soldering Tips



Component mounting details

PARTS LIST

IC1,	12C508 (programmed) MICROCONTROLLER IC (CARE WHEN HANDLING)
Q1,2	2N7000 FET (CARE WHEN HANDLING)
D1,2,3	1N4148 SIGNAL DIODE (NOTE DARK BAR)
R1,2,3	220 OHMS 1/4 WATT RESISTOR (RED/RED/BROWN)
C1	2.2 uF ELECTROLYTIC CAPACITOR (marked 2.2 uF)
C2	0.22uF POLY CAPACITOR (marked .22 63)
SW1	TWIN PCB SWITCH
RELAY 1,2	5 VOLT COIL (3 AMP)
PCB	TYPE P44A
CON1,2	3-WAY SCREW CONNECTOR BLOCKS
CASE	Type RX2008 supplied with 4 self tapping screws
SERVO LEAD	Futaba generic type supplied, with alternative HiTec/JR type plug
WIRE	Not supplied with kit. Will depend upon the item to be switched.

P44A 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 for screw connectors, 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 fully prepared and requires no further work.

PARTS

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

- 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.
 - The resistors are the two-wire items with colour bands. All three, R1, 2, & 3 are the same value in this kit. The colour code can be read with reference to the Parts List, and the drawing shows the order in which the colour codes are read. The layout drawing shows the mounting positions and Component Mounting Detail shows how they are bent before insertion.
 - The 8-pin integrated circuit IC1 has a type code 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. Both 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 Mosfets). 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 D1,2 & 3 have a dark bar at one end (shown on drawing as a black band). This band determines which way round they are fitted. The layout 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 the layout drawing.
 - Component Mounting Detail drawing should help in the identification.
 - The small, square, white component with 2 pins is marked .22 J 63. This is a poly capacitor. It can be fitted either way round.
 - The twin miniature switch SW1 is marked 1 & 2 (for switch 1 & 2) and the ON position is marked. SW1 has four pins.
 - The small block components with 6 short solder pins are relays RL1 & RL2.
 - FET devices Q1 and Q2 (marked BS170P) have three legs, the shape of the case is the key as to which way round they are fitted. 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. The IC will be inserted into this socket as a later operation.
 - Fit the resistors in any order, into the right position with reference to the layout drawing, having bent them as shown. Each component when fitted and soldered, should have its spare lead length cut off.
 - Solder in diodes D1,D2 & D3 ensuring that the dark bars are positioned as per the layout drawing.
 - The switch SW1 can now be fitted. Make sure that the printing looks as per the drawing.
 - The electrolytic capacitor C1 can be fitted and soldered now, ensuring that + and - are correct in accordance with the drawing. After soldering, clip off the spare wire. C2 can now be soldered in; it can go either way round.
 - The two 3-way screw connector blocks will join together; the ridge on the side of one matches the recess on the side of the other. Join the two by sliding the ridge into the recess until the two 3-way blocks form a 6-way block. Now fit it. Ensure that the holes for the wires face the outside edge of the PCB.
 - Solder in the two Relays at this point; they will only fit one way round.
 - 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 rest 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 two BS170 (or 2N7000) MOSFET transistors Q1 and Q2, cutting off the spare ends. Insert the I/C into its socket, noting that the 'notch' on the IC is as per the drawing. Ensure that it is correctly seated.
 - A 3-wire ribbon lead is supplied for the connection to the receiver. Connect the Positive + lead (Red) and Negative - lead (Black) to the + and - holes as per the drawing. The third lead is the pulse signal lead (White) and is connected to the middle hole as per the drawing.

TESTING (Listen for the Clicks)

Each of the two outputs are what it termed a single pole double throw (SPDT) contact. 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. The switch SW1 can be used for the selection of the mode of operation of each switch. OFF is latching while ON is non-latching action.

The unit can be tested for relay "Click" even when no outputs are connected, because the relay coils get their voltage from the receiver battery. If the servo lead is connected to your radio receiver and your receiver and transmitter are switched on, the unit will be heard to click as you reach the switching points each side of neutral (centre stick).

