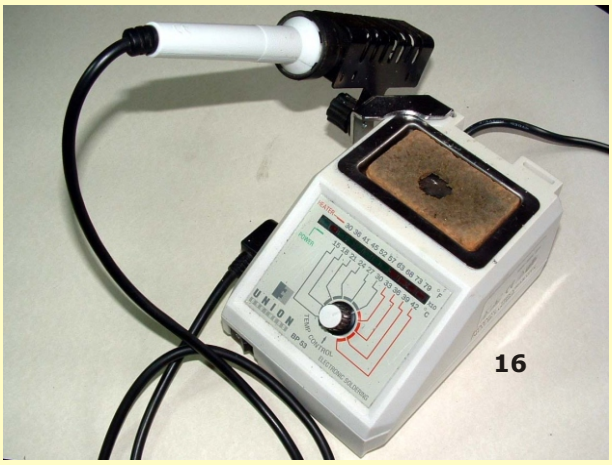
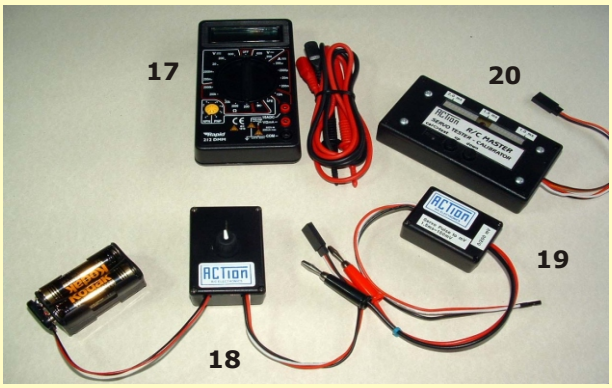
TOOLS AND TECHNIQUES

1 Bulldog clip
2 Tweezers
3 Self-locking tweezers
4 Small flat-nosed pliers
5 Side cutters
6 15 - 25W soldering iron
7 22SWG solder

8 Plastic tweezers (for handling I/C chips)
9 I/C chip leg straightener
10 I/C chip removal tool
11 Wire strippers
12 Desoldering braid
13 Set of small screwdrivers
14 Flat-blade terminal screwdriver
15 Desoldering pump

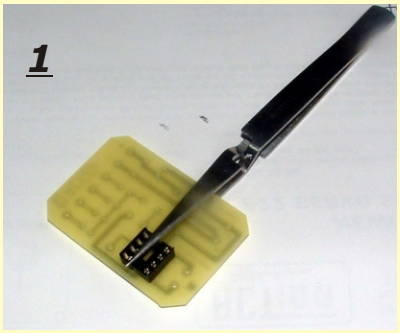


16 Temperature-controlled soldering station
(Posh alternative to soldering iron!)

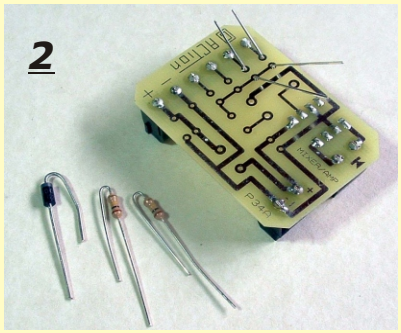


17 Digital Multimeter*
18 P22 Servo Swinger with 4 x AA battery pack*
19 DVM converter (mS/mV)
20 P59 R/C Master servo tester/calibrator*
(*All available from ACTion)

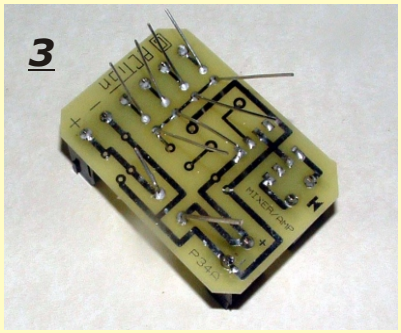
Items shown underlined are considered to be basic essentials - the rest may be added later.



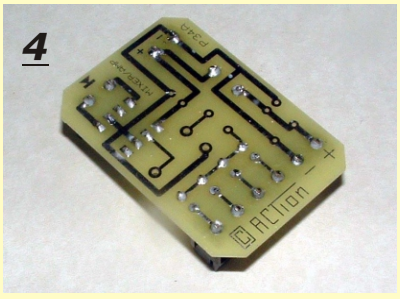
Use self-locking tweezers to hold IC sockets in place while soldering



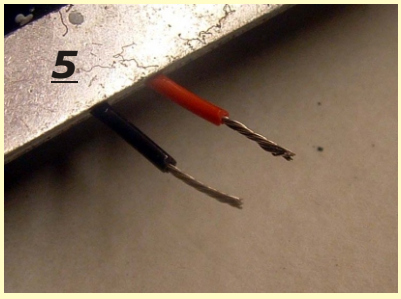
Bend legs of components as shown; push through PCB and bend to retain



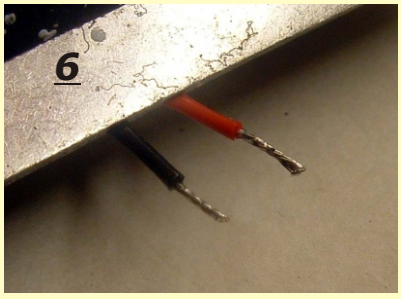
Apply tinned iron and solder at the same time BRIEFLY to complete joints



Clip off surplus leads with side-cutters



Twist strands of multi-core flex together & hold in clip



Apply tinned iron and solder until strands are filled. Crop ends at 45°

TOOLS AND TECHNIQUES

1. Bulldog Clip: We've tried several different fancy types of holder for workpieces, but the good old British bulldog clip is the most versatile, robust and cheap. Use it to hold twisted cable for tinning and printed circuit boards for soldering.
2. Tweezers: Useful for picking up and bending the leads on small components e.g. signal diodes.
3. Self-locking tweezers: Available in many different styles, we use these mainly to hold I/C sockets flush to the PCB for soldering.
4. Small flat-nosed pliers: For bending the leads on larger components e.g. 1A diodes like IN4003, and for handling hot iron tips when changing over in a hurry.
5. Side-cutters: Mandatory for clipping off surplus leads under the PCB. Don't cut them too close, though (see the little diagram Soldering Tips which appears on all our Kit Instruction leaflets)
6. 15-25W soldering iron: We could write a book on this. Purchase one with interchangeable bits for different jobs, and also obtain a stand with a sponge wipe. It's vital to keep the iron tip clean and tinned, so a quick wipe on the damp sponge followed by a touch with the solder will greatly assist decent soldering.
7. 22SWG solder: The best gauge for soldering components to circuit boards. Any thicker and you will have difficulty applying the right quantity of solder (thicker solder wire tends to produce joints with excessive solder).
8. Plastic tweezers: For picking up and manipulating I/C chips and other static-sensitive components.
9. I/C leg straightener: Pretty much self explanatory.
10. I/C removal tool: As above!
11. Wire strippers: Buy the type which can strip different thicknesses of wire. The type shown has an adjustable cam to set the width of the jaws.
12. Desoldering braid: You shouldn't need this unless you make a mistake and fit a component in the wrong way round or into the wrong holes. If you do, then heat the joint until the solder melts then touch it with the end of the braid and the solder should "wick" up into the braid and allow you to remove the component.
13. Small screwdrivers: You will need both flat blade and cross-point Philips/Posidriv types. The set shown has both and cost a couple of pounds from a tool stall at a model show.
14. Terminal screwdriver: With a flat blade approx 3mm wide for electrical terminals such as those in our P92 - P98 units.
15. Desoldering pump: Some folk prefer these for reworking joints with large amounts of solder.
16. Temperature-controlled soldering station: A nice gadget for the occasional user but a vital one if you do a lot of soldering. The one shown cost about £40 and has interchangeable bits, a sponge tray and a manually adjustable temperature control with indicator LEDs. Some more expensive types have digital read-outs and even desoldering tools; expect to pay a lot more for these.
17. Digital Multimeter: THE diagnostic tool for any suspect circuit. This one has all of the most useful ranges, including a continuity buzzer and a 10A DC current range. They used to be very expensive but, like most electronic items, have come down in price so much that you really can't afford not to have one.
18. P22 Servo Swinger: A simple off-air servo driver which allows you to operate a servo, R/C switch or ESC without having to find a transmitter and receiver with charged batteries. One of those items which you'll wonder how you managed without, and a great Christmas-stocking filler.
19. DVM converter: Not available to customers, but this little gizmo connects to a multimeter and gives a digital read-out of the value of an incoming signal.
20. P59 R/C Master: Along with the digital multimeter, this is probably the most useful test gadget we have. One is built into our ESC test rig and used to cycle-test new units prior to packing and despatch. It also checks and gives a visual display of signal values (e.g. to test the neutral pulse width of a Tx channel) and can show up a sticking servo or dirty Tx stick pot very quickly. Another of those how-did-I-manage-without-it items.