

## CONSTRUCTION GUIDELINES

Elektor Electronics (Publishing) does not provide parts and components other than PCBs, and preprogrammed ICs (not necessarily for all projects). Components are usually available from a number of retailers – see the adverts in the magazine. Selected projects are supplied as kits.

Large and small values of components are indicated by means of one of the following prefixes :

E (exa) = $10^{18}$	a (atto) = $10^{-18}$
P (peta) = $10^{15}$	f (femto) = $10^{-15}$
T (tera) = $10^{12}$	p (pico) = $10^{-12}$
G (giga) = $10^9$	n (nano) = $10^{-9}$
M (mega) = $10^6$	$\mu$ (micro) = $10^{-6}$
k (kilo) = $10^3$	m (milli) = $10^{-3}$
h (hecto) = $10^2$	c (centi) = $10^{-2}$
da (deca) = $10^1$	d (deci) = $10^{-1}$

In some circuit diagrams, to avoid confusion, the value of components is given by substituting the relevant prefix for the decimal point.

For example,

$$3k9 = 3.9 \text{ k}\Omega$$

$$4\mu F7 = 4.7 \mu F$$

Unless otherwise indicated, the tolerance of resistors is  $\pm 5\%$  and their rating is  $\frac{1}{2}$ – $\frac{1}{4}$  watt. The working voltage of capacitors is  $\geq 50$  V.

In populating a PCB, always start with the smallest passive components, that is, wire bridges, resistors and small capacitors; and then IC sockets, relays, electrolytic and other large capacitors, and connectors. Vulnerable semiconductors and ICs should be done last.

**Soldering.** Use a 15–30 W soldering iron with a fine tip and good quality solder tin. Insert the terminals of components in the board, bend them slightly, cut them short, and solder; wait 1–2 seconds for the tin to flow smoothly and remove the iron. Do not overheat, particularly when soldering ICs and semiconductors. Unsoldering is best done with a suction iron or special unsoldering braid.

**Faultfinding.** If the circuit does not work, carefully compare the populated board with the published component layout and parts list. Are all the com-

ponents in the correct position? Has correct polarity been observed? Have the powerlines been reversed? Are all solder joints sound? Have any wire bridges been forgotten?

If voltage levels have been given on the circuit diagram, do those measured on the board match them – note that deviations up to  $\pm 10\%$  from the specified values are acceptable.

Possible corrections to published projects are published from time to time in this magazine. Also, our online Forum often contains useful comments/additions to the published projects.

The value of a resistor is indicated by a colour code as follows.

color	1st digit	2nd digit	mult. factor	tolerance
black	–	0	–	–
brown	1	1	$\times 10^1$	$\pm 1\%$
red	2	2	$\times 10^2$	$\pm 2\%$
orange	3	3	$\times 10^3$	–
yellow	4	4	$\times 10^4$	–
green	5	5	$\times 10^5$	$\pm 0.5\%$
blue	6	6	$\times 10^6$	–
violet	7	7	–	–
grey	8	8	–	–
white	9	9	–	–
gold	–	–	$\times 10^{-1}$	$\pm 5\%$
silver	–	–	$\times 10^{-2}$	$\pm 10\%$
none	–	–	–	$\pm 20\%$

Examples:

brown-red-brown-gold = 120  $\Omega$ , 5%

yellow-violet-orange-gold = 47 k $\Omega$ , 5%