

RESISTORS:

4-BAND RESISTOR COLOR CODE



1st Digit	2nd Digit	3rd Digit	Multiplier	Tolerance (+/-)	
0	0	0	1Ω		Black
1	1	1	10Ω	1.00%	Brown
2	2	2	100Ω	2.00%	Red
3	3	3	1,000Ω		Orange
4	4	4	10,000Ω		Yellow
5	5	5	100,000Ω	5.00%	Green
6	6	6	1,000,000Ω	0.25%	Blue
7	7	7	10,000,000Ω	0.10%	Violet
8	8	8	100,000,000Ω	0.05%	Grey
9	9	9	1,000,000,000Ω		White
			0.1Ω	5.00%	Gold
			0.01Ω	10.00%	Silver
				20.00%	White



5-BAND RESISTOR COLOR CODE

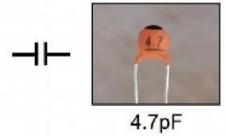
CAPACITORS:

MANY NUMBERS, CODES, AND MARKINGS.

CERAMIC DISC TYPES:

BLACK ON TOP DESIGNATES TYPE NPO.

OFTEN MARKED WITH PICOFARAD (PF) VALUE WITH THIRD DIGIT AS MULTIPLIER, FOR EXAMPLE 473 IS 47,000PF AND TRANSLATES TO 0.047 MICROFARAD (UF) AND 47 NANOFARAD (NF).

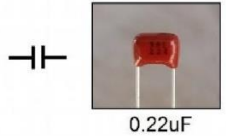


4.7pF

COMMON FUNCTIONAL EQUIVALENTS INCLUDE THE SIGNIFICANT DIGITS 47 FOR 50. FOR EXAMPLE, 473 AND 503 (0.047UF AND 0.05UF) ARE FUNCTIONAL EQUIVALENTS.

MYLAR (POLYESTER):

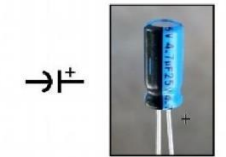
"224" = 220,000PF, 220NF, 0.22UF. OTHER MARKINGS ARE MANUFACTURER CODES, TOLERANCE, AND VOLTAGE RATINGS - 5%, 10%, 50V AND 100V ARE TYPICAL FOR PAIA KITS.



0.22uF

ELECTROLYTIC:

POLARIZED TYPE SHOWN. 4.7UF RATED TO WITHSTAND VOLTAGES TO 25V (> V RATING FOR SPECIFIED PART IS OK). MFD IS USED IN PLACE OF UF IN SOME PAIA KIT MANUAL TEXT.



4.7uF / 25V

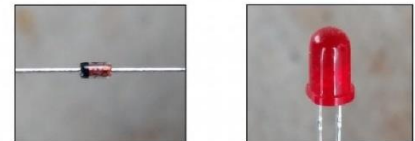
LONGER LEAD IS (+). OFTEN, BAR MARK ON SIDE OF PART IS (-).

SEMICONDUCTORS:

DIODES:

RECTIFIERS, SIGNAL, AND LIGHT EMITTING. POLARIZED. CATHODE (-) MARKED BY A BAND. FOR LEDs, CATHODE IS MARKED WITH A FLAT EDGE AND SHORTER LEAD.

FOR 1N400X RECTIFIERS, X MAY BE 1, 2, 3, OR 4.



TRANSISTORS:

NPN AND PNP TYPES. POLARIZED. FLAT WITH PART MARKINGS (MUST AGREE WITH KIT MANUAL DESCRIPTION).

MATCHED PAIRS (M.P.) ARE PACKED IN SETS IN PAIA KITS.



EBC (typical)

ICs:

VARIOUS PIN COUNTS IN DUAL-INLINE-PACKAGING (DIP). POLARIZED. NOTCHED END OR PIN 1 MARKING MUST AGREE WITH BOARD GRAPHIC AND KIT MANUAL DESCRIPTION.

SOME TYPES CAN BE DAMAGED BY STATIC DISCHARGE AND ARE PACKED IN PROTECTIVE ANTI-STATIC OR CONDUCTIVE (BLACK) FOAM. AVOID SHUFFLING AROUND WHILE CARRYING THEM. TOUCH A METAL DEVICE IN CONTACT WITH THE FLOOR OR THE WALL OUTLET GROUND BEFORE TOUCHING THEM.



Pin 1 Notch, Dimple

Flashing

C in part number = CMOS
Observe handling precautions.

Kit Assembly

Set-up in an area with space with good light to sort out all the pieces. Take care when handling the parts as static charges can damage or compromise them. Touch a metal desk or lamp before handling them and don't shuffle across a carpeted floor with them in hand. Inventory the contents of your package against the parts list for the kit and for multiple kit orders, check all the kits so any discrepancy can be corrected with one report. Match multiple wall-mount power sources (and the voltage output type, AC or DC) with their kits.

For soldering of wiring or other connections to the board, use only quality rosin-core solder for printed-circuit-board work (60/40 or 63/37 alloy in a 0.031 inch diameter). This solder does not require the use of paste flux. Paste flux, silver solder, lead-free solder, or water soluble flux are not recommended features for our kits.

Kester "44" is a quality solder, 60/40 alloy and in a 0.031" diameter. It readily wets and flows when making joints on our kits. Sources for soldering equipment and supplies include mouser.com, jameco.com, digikey.com, wassco.com, elexp.com, adafruit.com, etc...

Tools

A pencil-type soldering iron with a pointed tip (25-35W), diagonal cutters, needle-nose pliers, screwdrivers, wire-stripper, knife and a ruler for measuring wire lengths. Possibly you may need a desoldering tool or bulb. A dvm is useful for dc voltage testing and adjustments.

Soldering

Soldering involves using the tip of the iron to heat the metal or multiple pieces of metal and feeding in an amount of solder that will flow to join strands of wire or fill printed-circuit solder pad. There is a balance between the heating of the joint and the feeding of the solder to the joint. Touch the tip of the iron to the wire/pads and feed in a bit of solder. It will help with the heat transfer as it melts, then as it begins to flow to the wire or the pad and the wire feed in enough to fill the strands (tinning the wire) or the solder pad. Avoid too much heat or feeding in too much solder, but heat enough that the solder flows and not globs.

When soldering parts to a board, do them one at a time and avoid bending the legs over against the pad.

If there are many legs extending through they can get in the way of the iron tip and solder. If the legs are bent over all the way against the board the solder will not flow as readily as when they are just slightly splayed. A damp sponge works to keep the iron tip clean.

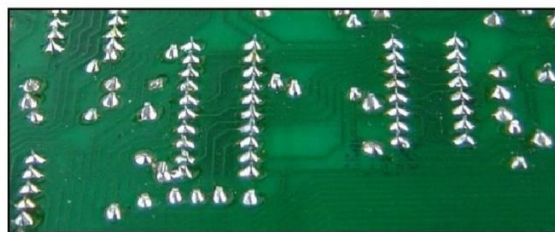
Successful completion and operation of the kit is most likely when you use the pieces we supply and complete the kit per the assembly manual.



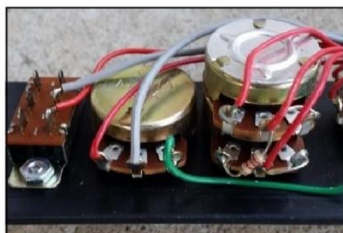
Tinned Wires



Prepared Shielded Cable (stripped insulation covers shield)



Printed Circuit Board Soldering



Panel Soldering/Wiring



Panel Soldering/Wiring