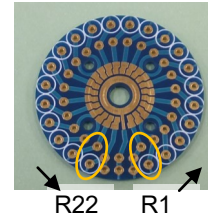




Let's make an attenuator !

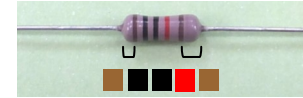
This is the assembly kit for an attenuator.
Please read the manual before assembling.

No-20170521-TKD



I. Preparation

You can put the resistor onto through-hole, R1-R22.
The resistance value is shown by the color-code.



The resistance value and the color code are as follows.
Please read the code from the side where the gap is small.

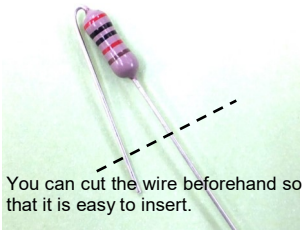
■ Brown ■ Gold ■ Orange

10kohm-kit				50kohm-kit				100kohm-kit									
	Resistance value	Color code		Resistance value	Color code		Resistance value	Color code		Resistance value	Color code		Resistance value	Color code			
R1	2kohm	Red-Black-Brown-Gold	R12	160ohm	Brown-Blue-Black-Brown	R1	10kohm	Brown-Black-Black-Red	R12	820ohm	Grey-Red-Black-Brown	R1	20kohm	Red-Black-Red-Brown	R12	1.6kohm	Blue-Black-Brown
R2	1.6kohm	Brown-Blue-Black-Brown	R13	130ohm	Brown-Orange-Black-Brown	R2	8.2kohm	Grey-Red-Black-Brown	R13	620ohm	Blue-Red-Black-Brown	R2	16kohm	Brown-Blue-Black-Brown	R13	1.3kohm	Brown-Orange-Black-Brown
R3	1.3kohm	Brown-Orange-Black-Brown	R14	100ohm	Brown-Black-Black-Brown	R3	6.2kohm	Blue-Red-Black-Brown	R14	510ohm	Green-Black-Black-Brown	R3	13kohm	Brown-Orange-Black-Brown	R14	1kohm	Brown-Black-Black-Brown
R4	1kohm	Brown-Black-Black-Brown	R15	82ohm	Grey-Red-Black-Gold	R4	5.1kohm	Green-Black-Black-Brown	R15	390ohm	Orange-White-Black-Brown	R4	10kohm	Brown-Black-Black-Red	R15	820ohm	Grey-Red-Black-Brown
R5	820ohm	Grey-Red-Black-Brown	R16	91ohm	White-Black-Black-Gold	R5	3.9kohm	Orange-White-Black-Brown	R16	470ohm	Yellow-Purple-Black-Brown	R5	8.2kohm	Grey-Red-Black-Brown	R16	910ohm	White-Black-Black-Brown
R6	680ohm	Blue-Grey-Black-Brown	R17	68ohm	Blue-Grey-Black-Gold	R6	3.3kohm	Orange-Black-Black-Brown	R17	330ohm	Orange-Black-Black-Brown	R6	6.8kohm	Blue-Grey-Black-Brown	R17	680ohm	Blue-Grey-Black-Brown
R7	510ohm	Green-Black-Black-Brown	R18	56ohm	Green-Blue-Black-Gold	R7	2.7kohm	Red-Purple-Black-Brown	R18	300ohm	Orange-Black-Black-Brown	R7	5.1kohm	Green-Black-Black-Brown	R18	560ohm	Green-Blue-Black-Brown
R8	430ohm	Yellow-Orange-Black-Brown	R19	43ohm	Yellow-Orange-Black-Gold	R8	2kohm	Red-Black-Black-Brown	R19	220ohm	Red-Red-Black-Brown	R8	4.3kohm	Yellow-Orange-Black-Brown	R19	430ohm	Yellow-Orange-Black-Brown
R9	330ohm	Orange-Black-Black-Brown	R20	24ohm	Red-Yellow-Black-Gold	R9	1.6kohm	Brown-Blue-Black-Brown	R20	120ohm	Brown-Red-Black-Brown	R9	3.3kohm	Orange-Black-Black-Brown	R20	240ohm	Red-Yellow-Black-Brown
R10	270ohm	Red-Purple-Black-Brown	R21	22ohm	Red-Red-Black-Gold	R10	1.3kohm	Brown-Orange-Black-Brown	R21	110ohm	Brown-Black-Black-Brown	R10	2.7kohm	Red-Purple-Black-Brown	R21	220ohm	Red-Red-Black-Brown
R11	200ohm	Red-Black-Black-Brown	R22	10ohm	Brown-Black-Black-Gold	R11	1kohm	Brown-Black-Black-Brown	R22	51ohm	Green-Black-Black-Gold	R11	2kohm	Red-Black-Black-Brown	R22	100ohm	Brown-Black-Black-Brown

II. How to wire

Tool : Soldering iron, Solder, Nippers, Tweezers,
Vise (Something to fix)

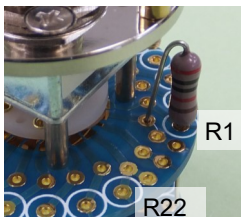
The way to wire : Wire and solder 22pcs resistors in order.
See [1]-[4] below.



You can cut the wire beforehand so that it is easy to insert.

*Please put one by one. It might be difficult work if you have done all at once. After measuring, continue with the second wafer.

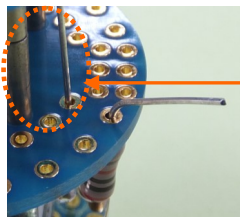
*Please be careful not to burn your hand.



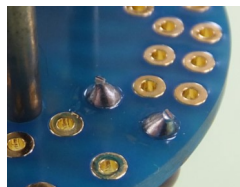
[1] Insert the resistor.



[3] Do soldering.

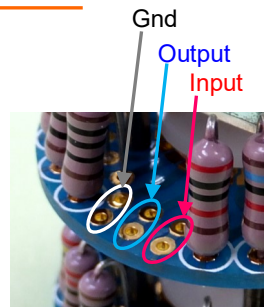


[2] Turn the rotary switch over and bend the outer lead wire to fix.



[4] Cut the extra lead wire.

Please take care not to touch the lead wire to the prop.



III. How to measure

*Please measure the resistance value and the attenuation before use.

Tool: Transmitter, Level meter, Circuit tester (Ohmmeter)

The way to measure :

- <1> Measure the resistance value between INPUT-GND.
- <2> Give a signal to INPUT through-hole from a transmitter and do output through-hole to a level meter.

Measure the attenuation of each step by turning the shaft.

*The input impedance of level meter must be 20 times (or more) as much as the impedance of the attenuator.

The way to measure without a transmitter and level meter.

- {1} Measure the resistance value between OUTPUT and GND at each step by turning the shaft.
 - {2} Calculate [The resistance value measured at (1)] divided by [The resistance value measured at <1>] at each step.
 - {3} Calculate the attenuation of each step in $20\log_{10}$ (Calculated value of {2})
- <3> If the figures are within the range of our spec, your attenuator is now complete!

Degrees	330	315	300	285	270	255	240	225	... 15deg step ...	60	45	30	15	0
dB	Cut off	60	50	45	40	36	33	30	... 2dB step ...	8	6	4	2	0

Otherwise the resistance might be lined out of order. Please double check soldering.