Hendeca (11 Step) Resistance Substitution Box

This is an inexpensive way to make a stepped resistance box using a Single Pole - Twelve Position rotary switch and eleven resistors of equal value.

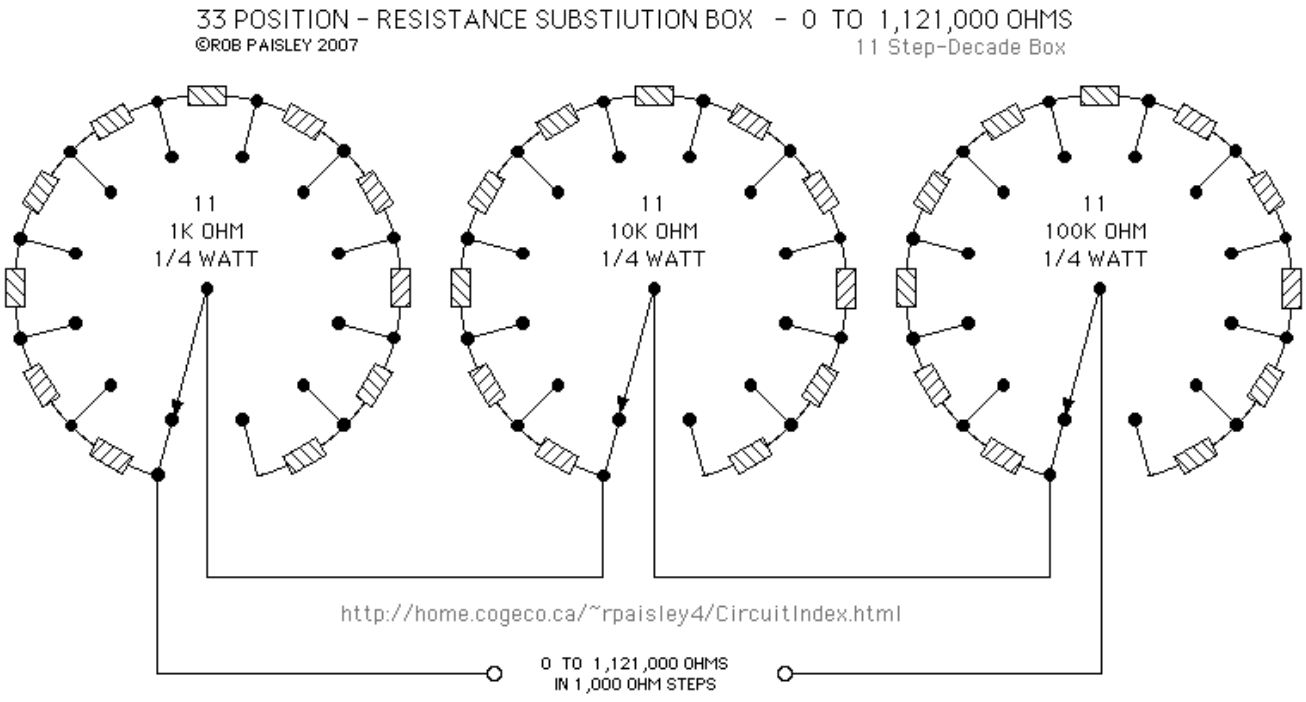
As there are eleven resistance steps for each rotary switch instead of the usual ten there is one step of overlap between switches.

The resistor tolerance can be 1, 5 or 10 percent, 5 percent is a good choice for most work. The wattage of the resistors depends on the maximum voltage that can be expected across a particular resistor. Lower resistances should be of higher wattage.

Two types of rotary switches are available, shorting and non-shorting. Either type will work but the non-shorting type will create a full switch cycle resistance circuit between each step. This may not be desirable in some applications.

---

33 Step - Hendeca Resistance Box Schematic



This is a photo of a 100 Ohm, twelve position switch. One-half watt resistors were used rather than one-quarter watt due to the expected higher current flow for these lower value resistors.

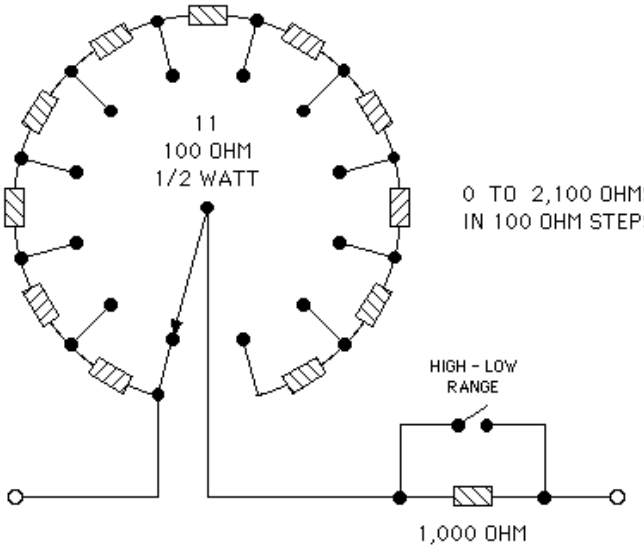
Switch Construction

Homemade Eleven Step Resistance Box

Two other substitution box possibilities.

11 POSITION - RESISTANCE SUBSTIUTION BOX - 0 TO 2,100 OHMS

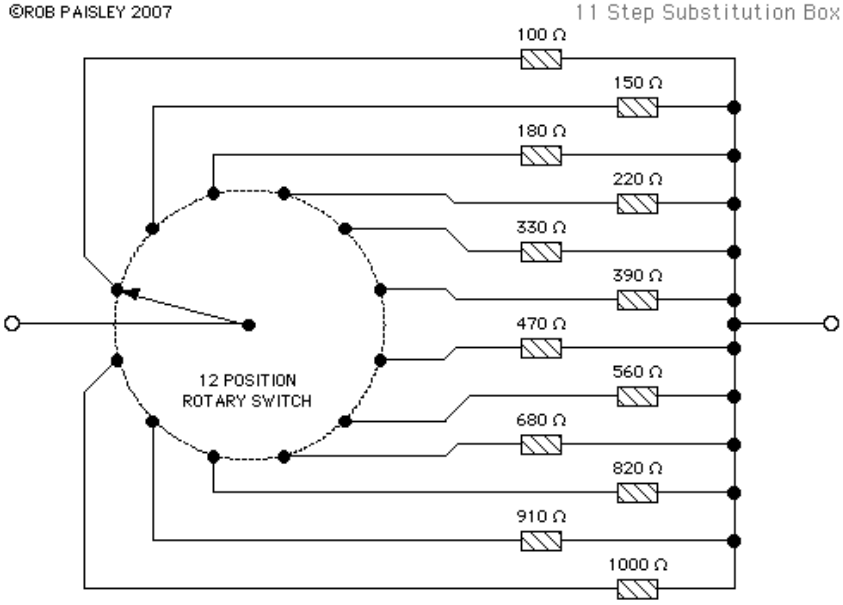
11 Step Decade Box 2



http://home.cogeco.ca/~rpaisley4/CircuitIndex.html

12 POSITION - RESISTANCE SUBSTIUTION BOX - STANDARD VALUES

11 Step Substitution Box



http://home.cogeco.ca/~rpaisley4/CircuitIndex.html

5% Standard Values

Decade multiples are available from 10 Ω through 22 MΩ

10 11 12 13 15 16 18 20 22 24 27 30

33 36 39 43 47 51 56 62 68 75 82 91

10% Standard Values

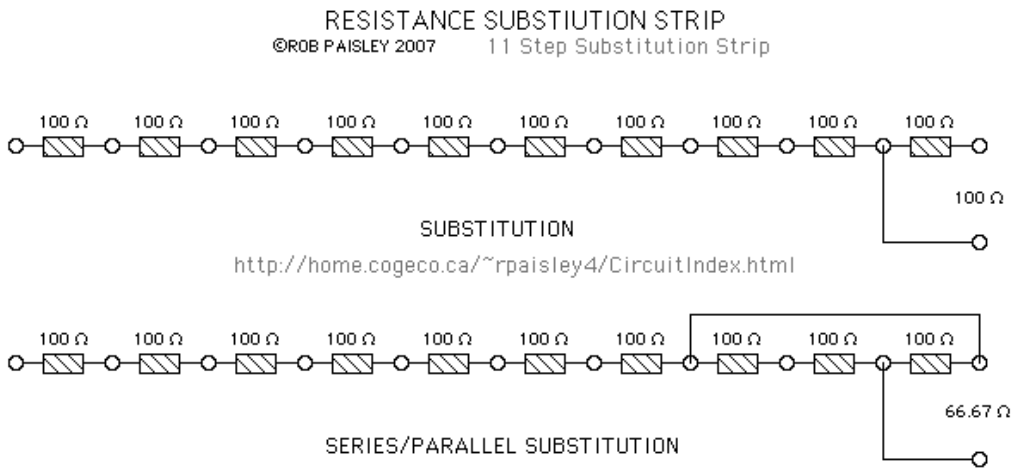
Decade multiples are available from 10 Ω through 1 MΩ

10 12 15 18 22 27 33 39 47 56 68 82

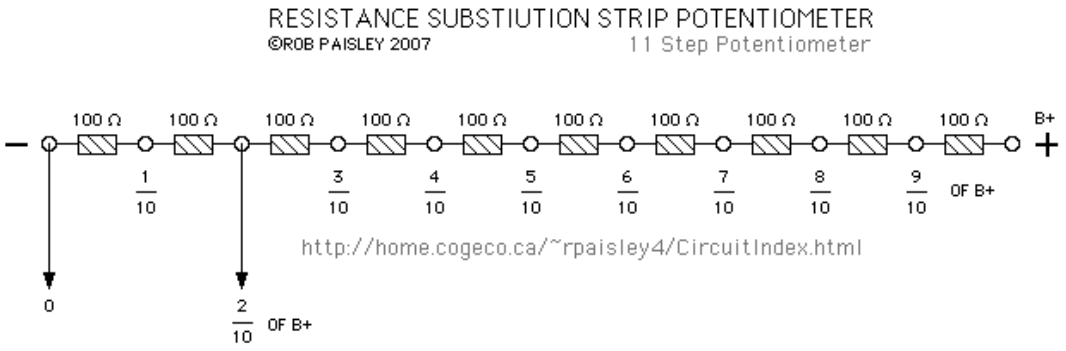
Another possibility would be to connect a number of resistors of equal of various values in series on a terminal strip or perhaps a strip of wood with the resistors soldered to brass or copper nails. Different

resistances could be sellected using jumpers connected to any two terminals or using three terminals in series/parallel arrangments.

Also, connecting the resistors in series instead of having individual resistors reduces the number of terminals needed from 2N to N+1 with 'N' being the number of resistors. (10 resistors in series = 11 terminals versus 20 terminals for separate resistors.)



The resistor strip could also be used as a potentiometer.



Return to the Main Page

Please Read Before Using These Circuit Ideas

The explanations for the circuits on these pages cannot hope to cover every situation on every layout. For this reason be prepared to do some experimenting to get the results you want. This is especially true of circuits such as the "Across Track Infrared Detection" circuits and any other circuit that relies on other than direct electronic inputs, such as switches.

If you use any of these circuit ideas, ask your parts supplier for a copy of the manufacturers data sheets for any components that you have not used before. These sheets contain a wealth of data and circuit design information that no electronic or print article could approach and will save time and perhaps damage to the components themselves. These data sheets can often be found on the web site of the device manufacturers.

Although the circuits are functional the pages are not meant to be full descriptions of each circuit but rather as guides for adapting them for use by others. If you have any questions or comments please send them to the email address on the Circuit Index page.

Return to the Main Page