

Example: 5 or 6 position switch as a potentiometer replacement

Because there is no 5 position switch we use 6 x 2 position switch and can define a level potentiometer replacement with resistors and the other plain stages LED display BB's.

Background:

The pot has 3 connectors 0V, 5V and the grinder pickup

The potentiometer provides 0V to 5V, in position 2.5 and has a resistance of 5Kohm

Potentiometer: 0V 2, 5V 5V

Remote control: - 100% 0% + 100%

PPM signal: 1000us 1500us 2000us (pure standard signal)

It now wants a switch with 5 stages realize, replacing the potentiometer, so you must divide the voltages according to the levels.

It begins with the Division always in the Middle so at 2, 5V = 0% = 1500us

From the bottom of 0V = and by the upper end leaving a band gap 5V

by free per ca 250mV depending on the distribution.

Thus, the available range of 5V is $(2 * \text{distance})$ so $5V (2 * 250ms) = 4.5 v$

Now comes the actual distribution:

5 Steps: (for odd number of stages, the medium setting is always exactly 2.5!)

Center = 2, 5V 2 steps upwards and 2 levels down 5 levels =

Bottom 2, 5V-0, 25V = 2,25V, top 4,75V-2,5V = 2,25V

Increment 2, $25/2 = 1,125V$

Percent jump $45\% 40\% * 1,125V = 100\% / 2.5 = 45\%$ per level

PPM signal step $225us = 500us / 2, 5V 200 * 1,125V = 225us$ per level

5 Useful steps are then:

	1.	2.	3.	4.	5.		Levels
0,00V	0,250V	1,375V	2,50V	3,625V	4,75V	5,00V	voltage
-100%	-90%	-45%	0%	+ 45%	+ 90%	+100%	Prozent
1000	1050	1275	1500	1725	1950	2000	PPM-Signal

The tensions the resistors can now calculate and distribute

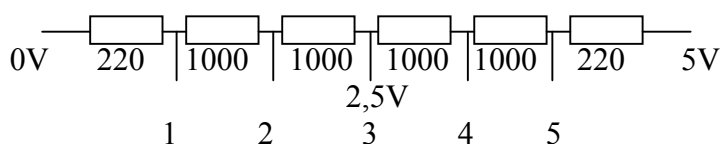
Pro level = 1,125V we simply choose 1Kohm (or 1,2K and 270 ohm)

On the edge with each = 0,250V we get 220 Ohm $((0,25/1,125) * 1Kohm = 222 ohms)$

Thus we have a symmetrical distribution of levels and resistance

The resistors we select set from the E24, metal film, 1% tolerance

Thus the voltage distribution is the percentage or PPM signals very accurately and thus



Now we need the PPM signal area or % share for the query.

But without overlapping and at a safe distance to the adjacent levels.

The exact spacing of the levels are 45% or 225us half on top and under would be 22.5% and 112, 5us, with some intervals per level, we take 20% and 100us

			PPM-Signal	%-Angaben
1.	1050-100	1050+100	950us - 1150us	-110% - 70%
2.	1275-100	1275+100	1175us - 1275us	-65% -25%
3.	1500-100	1500+100	1400us - 1600us	-20% +20%
4.	1725-100	1725+100	1625us - 1725us	+25% +65%
5.	1950-100	1950+100	1850us - 2050us	+70% +110%

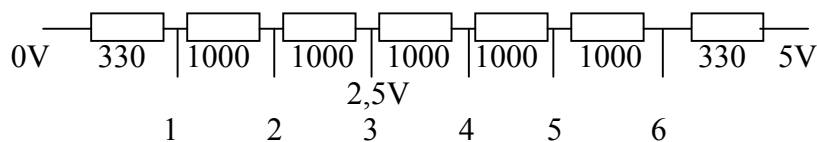
Who needs real 6 levels can proceed immediately

$5V (2 * 250mV) = 4.5 \text{ v}$ 4, $5V/6 = 0,75V$ per level

The voltages and levels are then

0.25 V 1,00V 1,75V 2,50V 3,25V 4,00V 4,75V 5,00V

Pro level again 1KOhm, on the edge of 330Ohm ($(0,75V/0,25V)*1Kohm = 333Ohm$)



With resistances of E24 series, metal film 1% tolerance we receive very precise divisions and tensions

So much for the theory, but:

Remote control will now see the following in the calibration of the "potentiometer" replacement.

Tier1 down 0.25 v Stufe mid 2(3) 2, 5V Stufe5(6) top 4,75V

And so this area then also again symmetrically divided

by - 100% 0% + 100%

Limit menu, you then can values it produces per level % and PPMus see

Then you can the 5 or 6 levels with some safe distance divide

Summary for purely symmetrical distribution:

Actually, this whole (expensive) counting is unnecessary.

Use per level 1Kohm and use 2 same resistance at the lower and upper end of per ca 220-270Ohm. Finish!

Calibrate the potentiometer replacement with the 5 or 6 levels in the channels menu.
Then read the level values in the limit menu % or PPMus out.
Then define these levels areas scope pane without overlaps,
The 5/6-position switch is ready.