# Modulus Synthesiser DIY
## Edition 7

Dear all,

Well this has been a long time coming and I do apologise life has been hectic and when I started this thing I had plenty of spare time, now its less and the modules are getting harder to design/test and build.

This issue contains the schematic for the HSVCO which is 1v/oct and is designed to drive the PPGVCO digital section (modulus 6) but will drive many other applications where a 1v/oct HSVCO is required.

We start this issue with a circuit I've stuck together, true blue peter style with sticky tape and glue, from the data-sheet for the LM13600, TomG's web-page and a bit of suck it and see component selection. It's the High Speed VCO for the PPGVCO module. I've had a chance to test this with a keyboard (as of yet I'm still midi->CV less) but I have fed various levels of voltage in and I can get a 1v/oct response over about 6 octaves without any problems. The heart of this is the LM13600 dual OTA, and yes it's a tri/square generator, running at a max of about 900Khz (told you it was high speed). Point to note and be careful of, is the 10pF capacitor, Yes I do mean 10pF. Make sure it's a good quality one, you don't want this breaking down or mis-behaving.

The output of the data-sheet circuit wasn't strong enough at high frequencies to give enough signal to drive the next stages, so I added a simple emitter follower to give a bit more oomph. This drives a diode with a resistor and a zener to bring the +/-15v swing down to a nice +5/0v pulse train. This drives a 4024 divider and the outputs are fed to a rotary switch, I would recommend you use a screened cable for this bit. The output of the switch is then fed to the 4024 on the digital board of this module, in Modulus 6.

The Log converter was courtesy of TomG's web-page one of his MAXX Vco's used an LM13600 so I pinched it from there, thanks Tom!

The next module I will be working on is designed to take two waveforms and 'morph' between them. This will enable the user to get that 'PPG' sound.

Thank-you to all of you for your continued support… if anyone has an article they wish to submit please do. I hopefully wont take quite as long with edition 8.

Yours
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