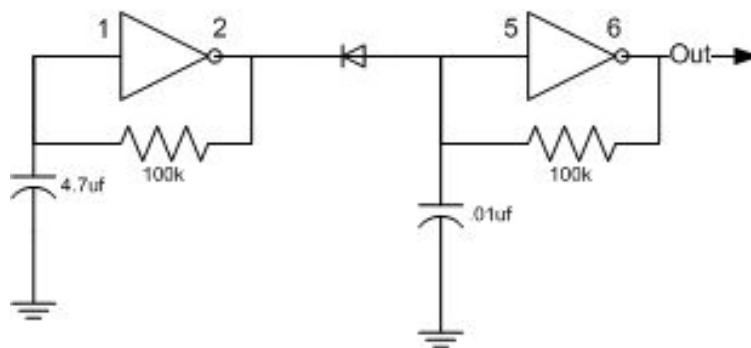
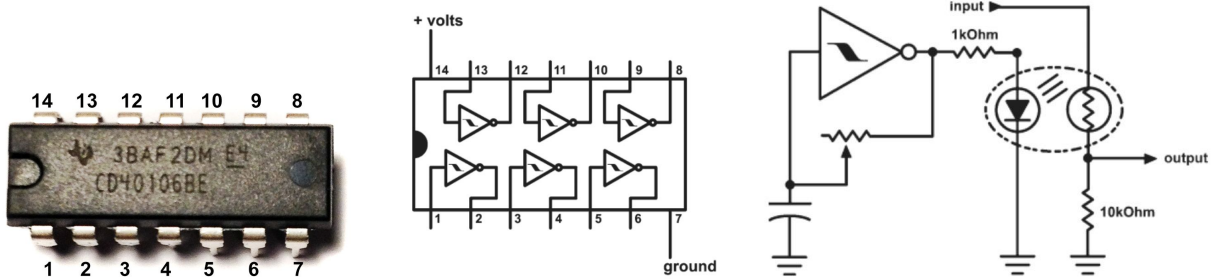
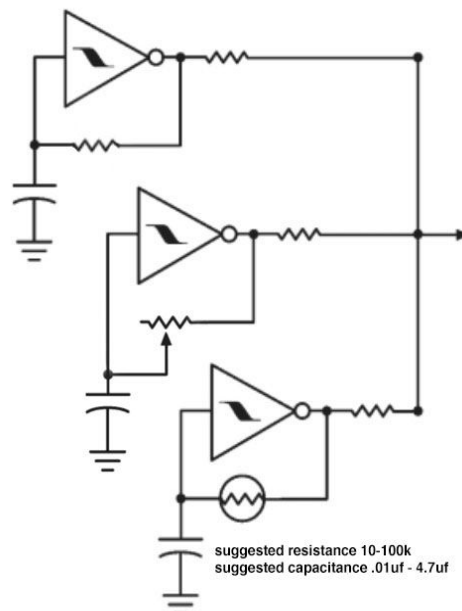


The 40106 IC is a Hex Schmitt Trigger that can be used to produce 6 musical square waves. These are some examples of how it could be wired up.



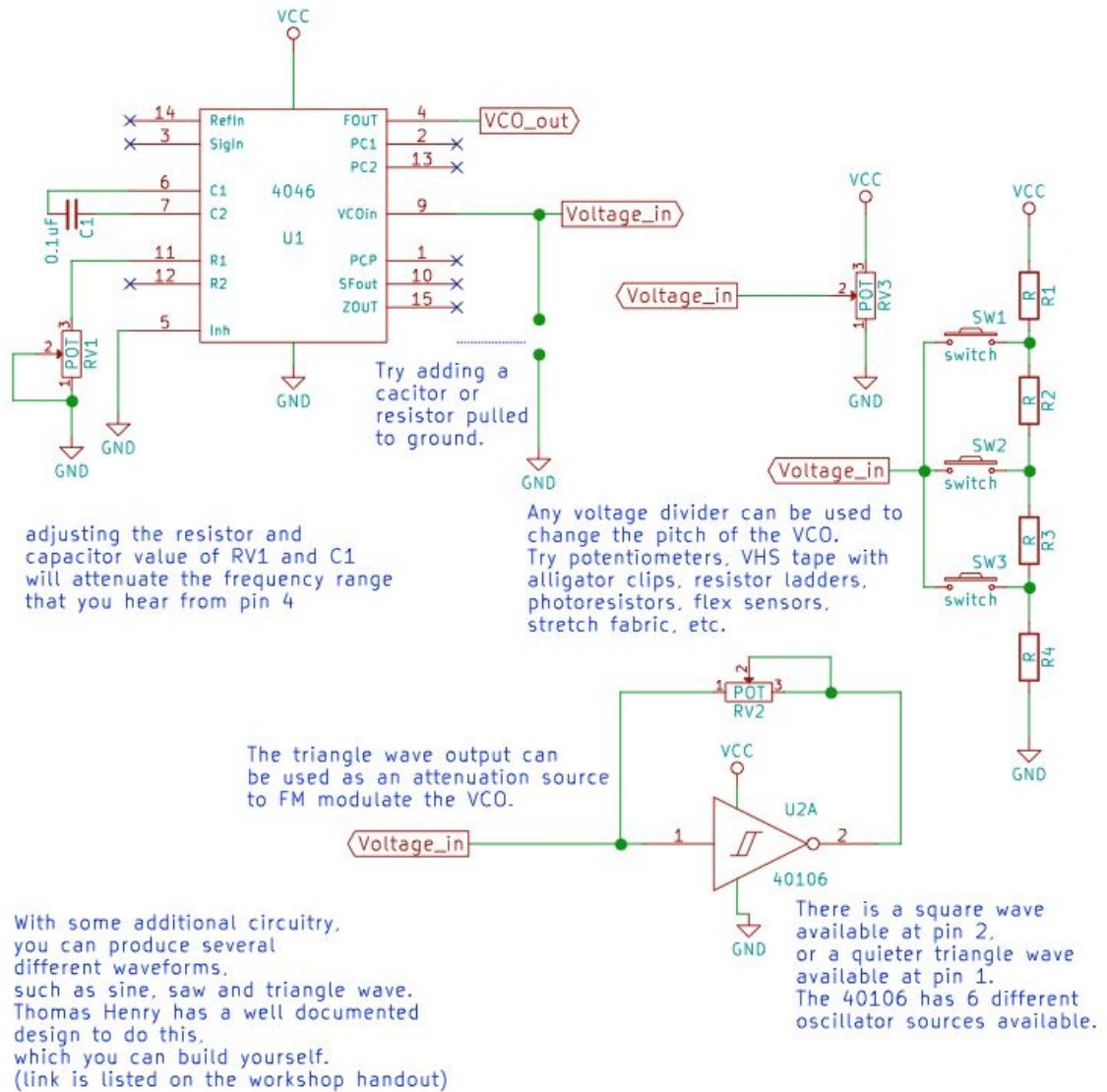
Use a diode or resistor to drive two schmitt trigger oscillators into each other



If you want to use multiple square waves, use either diodes or resistors to tie their outputs together.

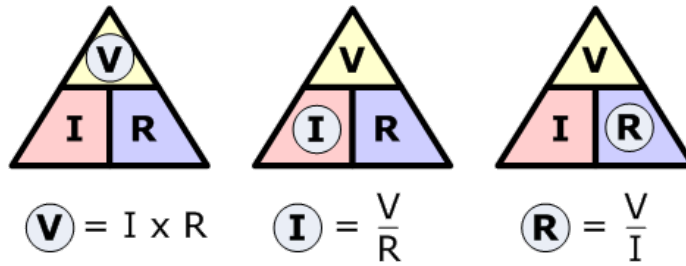


Examples of different ways to control the pitch of the VCO on the 4046.



Examples of different ways of driving the 4046, using variable resistors and the 40106 as an FM source.

Sheet: /
File: CMOScircuits.sch



OHMS LAW FORMULAS
I = Current, V = Voltage, R = Resistance

SOLDERING IS EASY

HERE'S HOW TO DO IT

<p>SOLDER WIRE CUTTER SOLDERING IRON PARTS</p>	<p>THE IRON IS HOT!! BE CAREFUL!</p> <p>YOUR KIT SHOULD COME WITH INSTRUCTIONS FOR WHAT PARTS GO WHERE AND WHAT WAY!</p> <p>CLEAN THE TIP OF YOUR IRON BEFORE EACH SOLDER CONNECTION!</p>	<p>PUT YOUR PART IN PLACE. BEND OUT THE LEADS SO IT STAYS IN PLACE</p> <p>LEAD</p>
<p>PUT THE PCB DOWN SO YOU CAN SOLDER.</p> <p>CAREFUL WITH THE SURFACE UNDERNEATH!</p> <p>FIND SOME GOOD WAY TO KEEP IT STEADY</p> <p>IF YOU NEED A THIRD HAND, YOU CAN MAKE A STANDING COIL OF THE SOLDER INSTEAD OF HOLDING IT IN YOUR HAND</p>	<p>OK, LETS SOLDER!</p> <p>FIRST, YOU WANT TO HEAT BOTH THE PAD AND THE LEAD FOR ABOUT 1 SECOND</p> <p>LEAD</p> <p>PAD</p> <p>PSST! CLEAN THE TIP FIRST!</p>	<p>TOUCH THE SOLDERING IRON TO BOTH THE PAD AND THE LEAD!</p>
<p>LEAD</p> <p>NOW FEED SOLDER UNDER THE TIP OF THE IRON ABOUT 1-3 MM</p> <p>SOLDER</p> <p>PCB</p> <p>3 MM</p>	<p>STOP FEEDING SOLDER, THEN HOLD FOR 1 SECOND SO THE SOLDER CAN FLOW PROPERLY</p> <p>SOLDER</p> <p>PCB</p>	<p>A GOOD CONNECTION COVERS THE PAD WITHOUT TOUCHING OTHER PADS AND SURROUNDS THE LEAD</p>
<p>CUT THE LEADS OFF WITH THE WIRE CUTTER</p> <p>ALWAYS HOLD ON TO THE LEAD!</p> <p>EYES DON'T LIKE JUMPING LEAD BITS!</p> <p>SOME LEADS ARE ALREADY SHORT, YOU DON'T NEED TO CUT THOSE.</p>	<p>THE SMOKE FROM THE MELTING SOLDER IS NOT TOXIC, BUT BLOW GENTLY ON IT TO AVOID BREATHING IT.</p> <p>LEAD ON THE OTHER HAND IS TOXIC, AND GETS ON YOUR SKIN WHEN HOLDING THE SOLDER</p> <p>WASH YOUR HANDS WHEN YOU'RE DONE!</p>	<p>KEEP SOLDERING EACH PART IN ITS CORRECT PLACE. REMEMBER SOME PARTS NEED TO GO IN A CERTAIN WAY!</p> <p>IF ALL YOUR CONNECTIONS ARE GOOD, YOUR CIRCUIT WILL JUST WORK!</p> <p>THERE ARE MORE TRICKS YOU WILL LEARN AS YOU KEEP SOLDERING, BUT NOW YOU KNOW ENOUGH TO MAKE MANY COOL THINGS.</p> <p>SOLDERING COURSE BY MITCH ALTMAN HTTP://CORNFIELD.ELECTRONICS.COM</p> <p>COMIC ADAPTATION BY ANDIE NORDGREN HTTP://LOS.ANDIE.SE</p> <p>PUBLIC DOMAIN, USE, COPY, SPREAD!</p>

Advanced builds using the 4046 IC:

The PCB designs and build instructions are available for this X4046 VCO synth by Thomas Henry, with the in-depth exploration article written by Scott Stites of Birth of a Synth

http://www.birhofasynth.com/Thomas_Henry/Pages/X-4046.html

Thonk DIY eurorack 4046 vco kit:

<https://www.thonk.co.uk/shop/foinitronik-th-x-4046-vco/>

Recommended Reading:

-The Logic Noise series by Elliot Williams at Hackaday are very well documented and dive into some of the musical designs possible with CMOS circuits

<http://hackaday.com/tag/logic-noise/>

-This is a well documented exploration of CMOS music circuits with several schematics you can build with just a few CMOS ICs. Written by Sebastian Tomczack

<http://milkcrate.com.au/other/sea-moss/>

-The electro-music forums have a great support forum for DIY electronics, with a whole subforum dedicated to 'Lunetta builds', which are primarily CMOS circuits that can be patched together. There's lots of helpful folks who can help answer any questions, and lots of fun CMOS designs shared by the community.

<http://electro-music.com/forum/forum-160.html>

How to use an LDR as a voltage divider. Good animations and a calculator to do the math.

http://www.petervis.com/GCSE_Design_and_Technology_Electronic_Products/Potential_Divider/Potential_Divider_with_LDR.html

Good Books:

Make: Electronics: Learning Through Discovery by Charles Platt

https://www.amazon.com/Make-Electronics-Discovery-Charles-Platt/dp/0596153740/ref=pd_sim_14_10?encoding=UTF8&pd_rd_i=0596153740&pd_rd_r=4YPD0NRTT3APQ2YVGHRF&pd_rd_w=7q9RR&pd_rd_wq=q68Dm&psc=1&refRID=4YPD0NRTT3APQ2YVGHRF

Make: Analog Synthesizers by Ray Wilson, the mastermind behind Music from Outer Space

https://www.amazon.com/gp/product/1449345220/ref=ox_sc_mini_detail?ie=UTF8&psc=1&smid=ATVPDKIKX0DER

Handmade Electronic Music by Nicolas Collins

<https://www.amazon.com/Handmade-Electronic-Music-Hardware-Hacking/dp/0415998735>

Good Hardware:

Tayda Electronics is the cheapest US supplier I've encountered. They have most things you'd need for DIY builds and PCBs available for some pre-existing designs. <http://www.taydaelectronics.com/>

The OMsynth by Casper Electronics:

This prototyping station was the reference for the workshop PCBs by LadyBrain Studios, and the PCB printing service was donated by OSHpark. This has everything that you need for a solid development setup, and even has an onboard speaker for listening to your experiments! There are some great oscillator tutorials built around it.

<http://www.bastl-instruments.com/instruments/omsynth/>

Available for sale here: <http://noise.kitchen/shop/bastl/the-omsynth-mini-lab-diy-kit/>