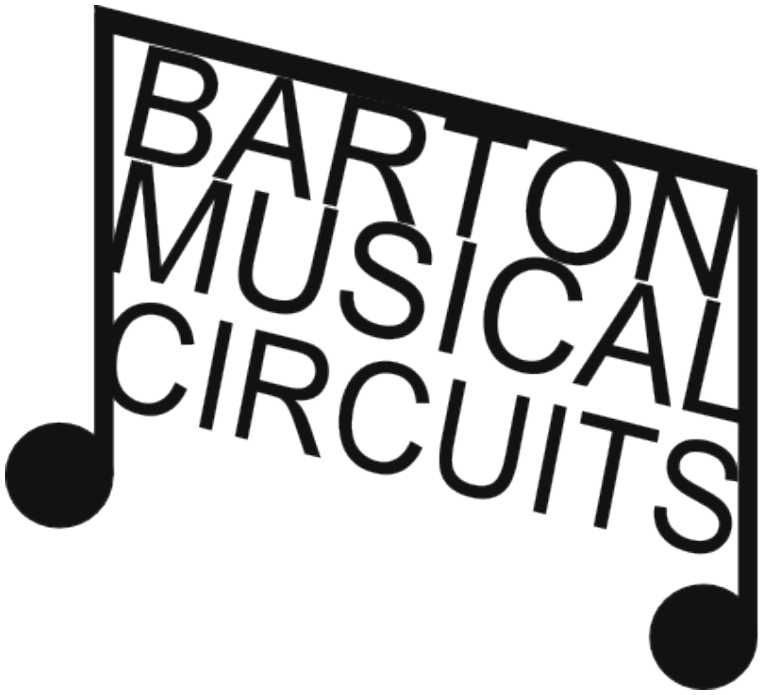

BMC082. 4HP Quad Triangle Frequency Doubler

If you have any questions, or need help trouble shooting, please e-mail
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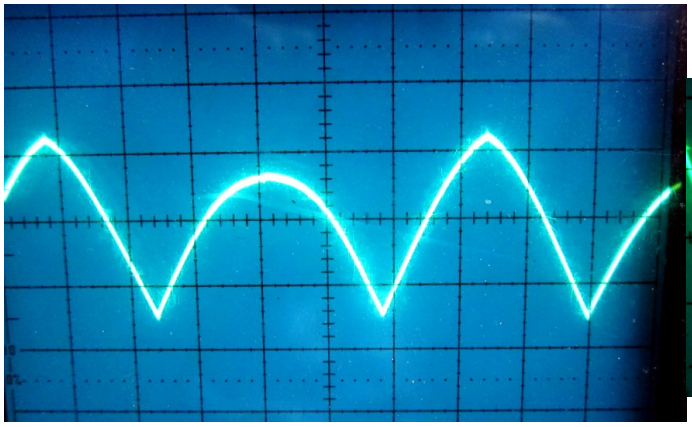
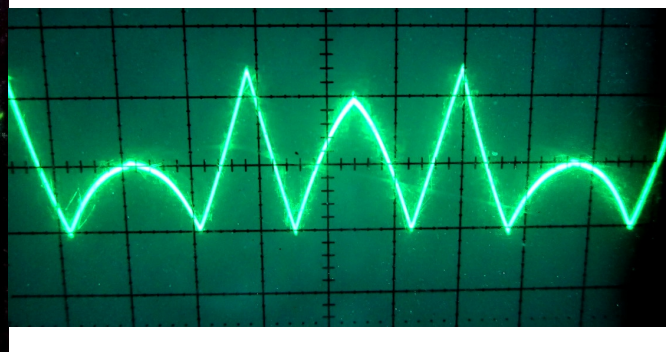
I. What it Does

This module consists of four triangle frequency doubling circuits. The circuit board normalizes the output of each doubling circuit to the input of the next so that it can easily be used to multiply frequency by 4, 8 or 16.

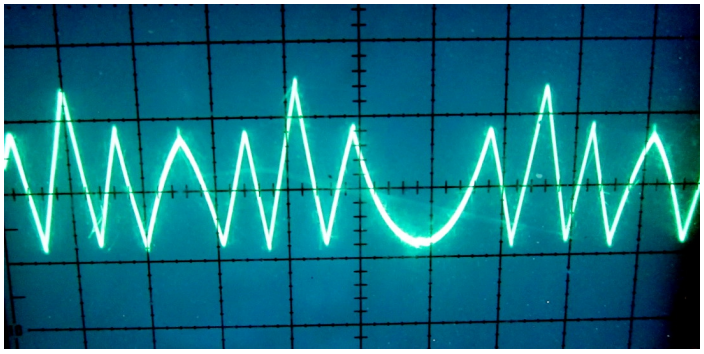
Other waveforms can be used instead of triangles but there will be more significant alterations of the output. Saw/Ramp waves will be transformed into triangles at the output due to the rectification used in the circuit. Pulse/Square Waves will be mostly unaffected by the rectification. Sine waves will change in an interesting way, as shown below.



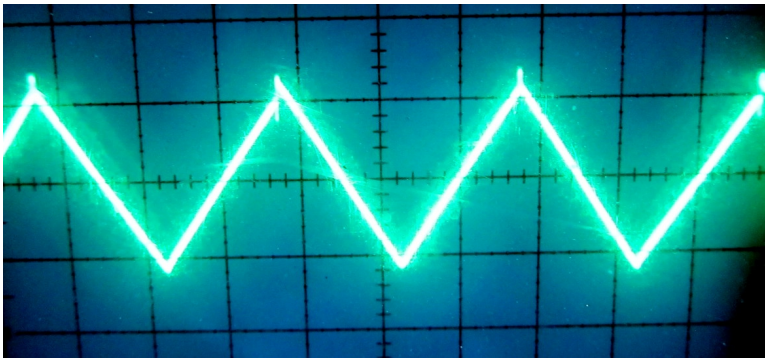
Sine wave x2 Frequency



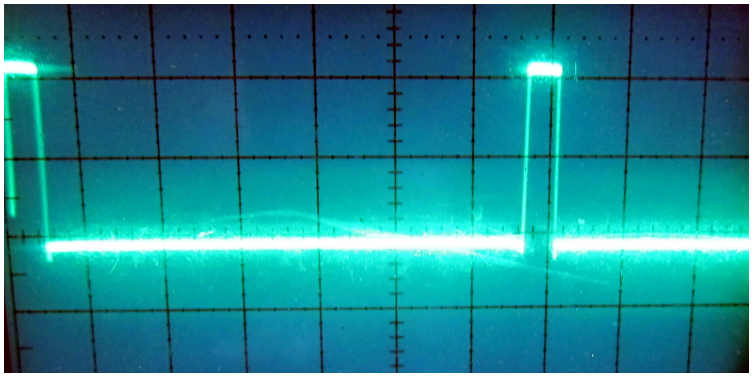
Sine wave x4 frequency



Sine wave x8 Frequency

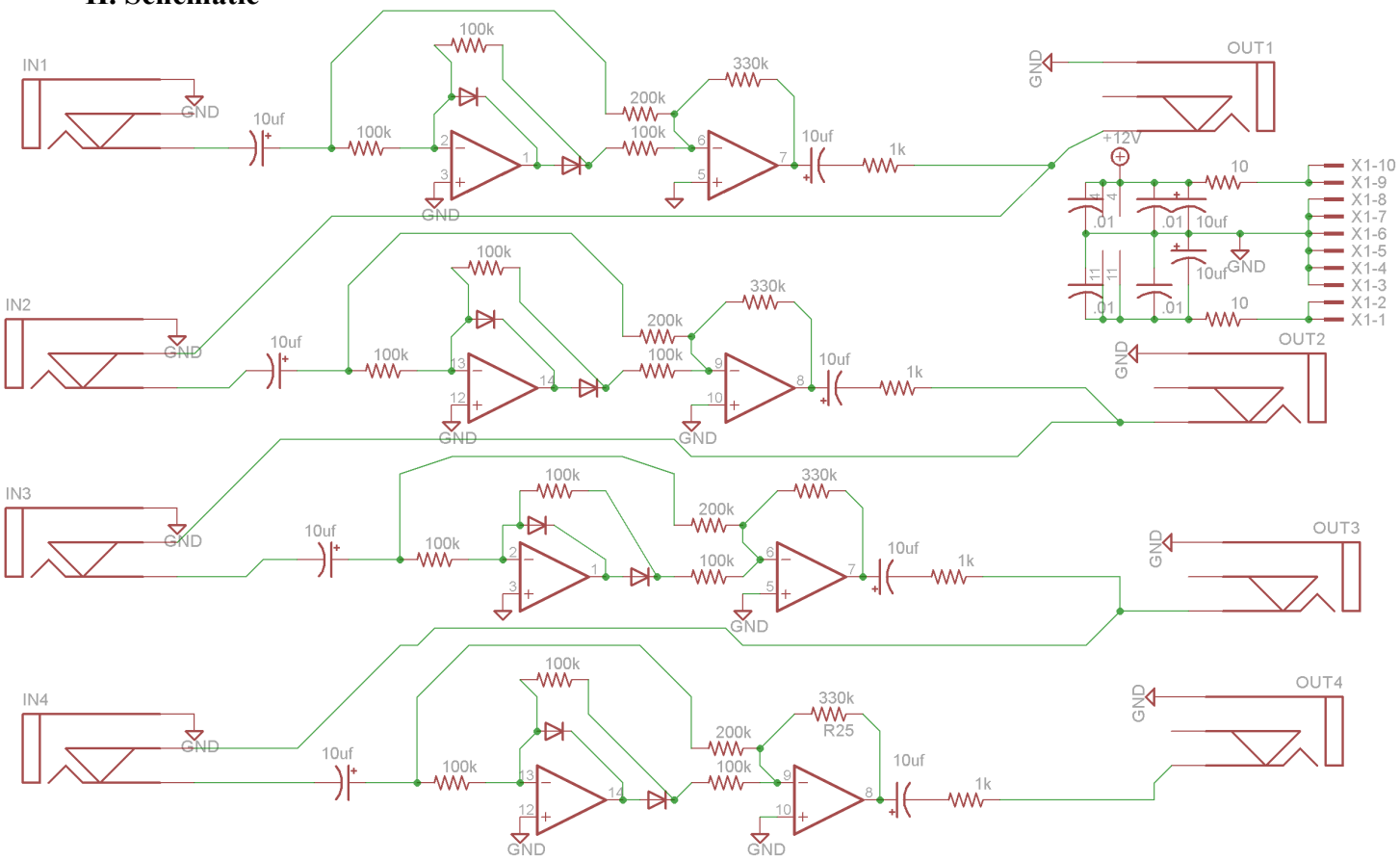


Saw wave transformed into triangle



Output of pulse input

II. Schematic



Above is the full schematic. Each doubling circuit is AC coupled on the input and output by a 10 uf capacitor. The doubling circuits are full wave rectifiers. If tweaking the output level, the 330K resistors can be increased in value to increase output level, though this may result in clipping and distortion with large signals.

The positive and negative voltage rails are filtered by a 10 ohm resistor / 10uf capacitor pair forming a low pass filter. Additional .01uf capacitors are placed next to the IC's power pins for further filtering.

III Construction

A.PARTS LIST

SEMICONDUCTORS

Name/Value	QTY	Notes
TL074	2	14 pin DIP package
1N4148	8	Or other switching diode

RESISTORS

Name/Value	QTY	Notes
10 ohms	2	All resistors 1/4W metal film except potentiometers
1K	4	
100K	12	
200K	4	
330K	4	

CAPACITORS

Name/Value	QTY	Notes
.1uf	4	cheap ceramic disc. Value not critical.
10uf	10	Electrolytic, 16V or higher rating.

OTHER

Name/Value	QTY	Notes
14 pin DIP socket	2	
Power connecter	1	Right angle 2x5 2.54mm, like this.
Jacks	8	PCB is designed around these jacks: PJ-323M

B. THE BOARD

The PCB is 97mm x 47mm. The jacks are spaced 12.7mm apart (.5 inch). Below are images of the PCB with and without traces present and a photograph of a completed module. The image of the PCB with traces does not show connections to ground.