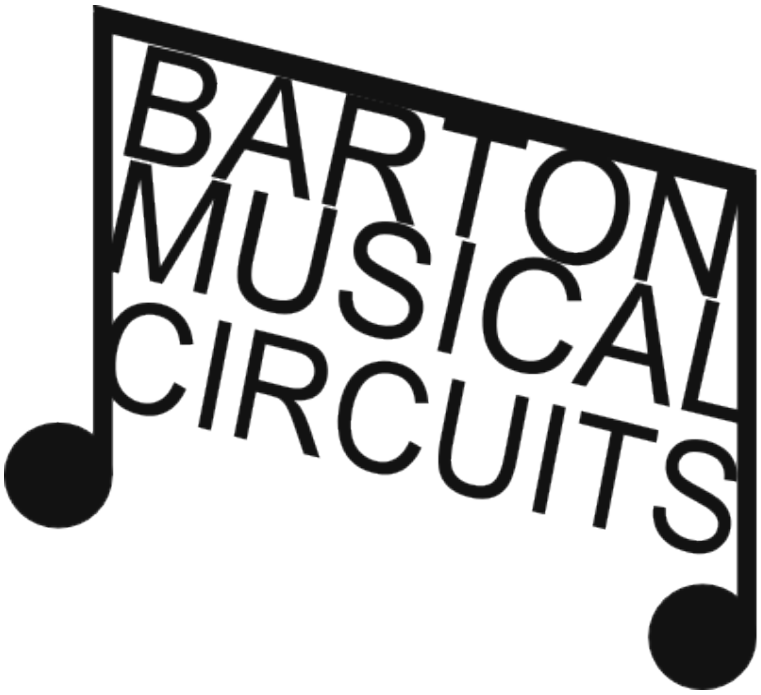


BMC116. VC Burst Generator

If you have any questions, or need help trouble shooting, please e-mail
Michael@Bartonmusicalcircuits.com

I. What it Does

This module takes a gate or trigger input and outputs a short burst of pulses. The pulses are always 50% pulse width, so burst frequency will change the length of the "gates" being output. The frequency and number of bursts per input can both be altered by external control voltage.

The bursts frequency can range from 2.5hz to 25hz. The number of bursts can be set either to a set number (1 to 16) or continuously burst for a certain length of time (65ms to 1s). The number of bursts can also be set to random. In random mode the burst length control acts as a maximum number of bursts control, every time a new gate is input a new random number is selected.

CONTROLS/INPUTS/OUTPUTS

1.Repeats Knob and Repeats CV knob – The Repeats knob sets the number of bursts per input and the Repeats CV knob attenuates a control voltage to modulate the number of repeats.

2.Frequency knob and Frequency CV knob – The frequency knob sets the frequency of the bursts and the frequency CV knob attenuates a control voltage modulating that frequency.

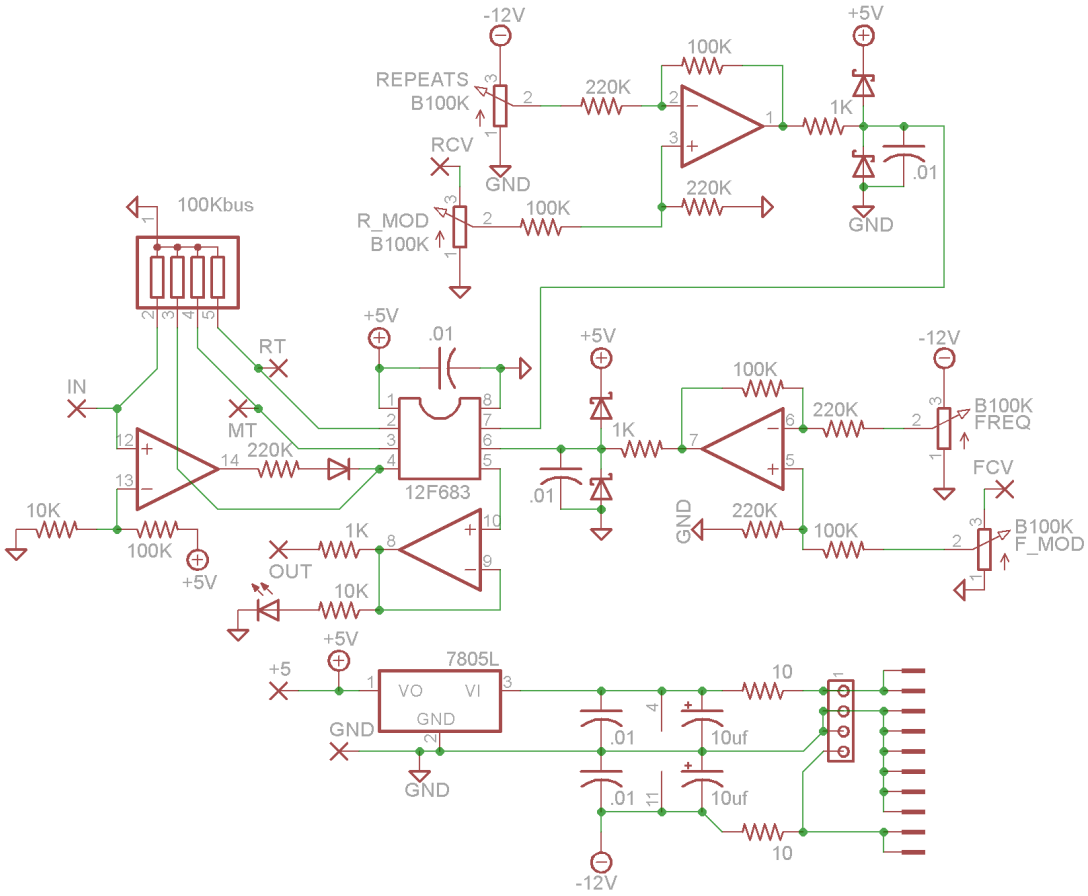
3.Mode Toggle – This changes whether the repeat knob is setting a number of repeats or an amount of time to repeat.

4.Random Toggle – This changes whether the repeat knob is directly controlling the repeats or setting the maximum amount of random repeats.

5.Repeat CV jack and Frequency CV Jack – Inputs for control voltages modulating the controls. Any synth signal can be input here.

6.Gate Input – Any gate or trigger can be input here to start a burst.

7.Output – Outputs 0V to +5V pulses.



II. Schematic

Above is the schematic for this module. This module uses a 12F683 microcontroller at it's core. The 12F683 is powered by the +5V supply on pin 1 and has a capacitor at the power pin for extra filtering.

The gate input is on the left of the schematic marked "IN." It connects to a 100K resistor bus connected to ground, this bus provides several 100K resistors to ground in a package that doesn't take up a lot of space on the PCB. The input then goes to a comparator, with it's threshold set at 0.5V by a 10K/100K voltage divider. The output of the comparator goes through a 220K resistor and a 1N4148 before connecting to pin 4 which also connects to the 100K bus. The 220K and 100K from the bus form a voltage divider which lowers the output of the comparator from ~11V to ~5V, and the diode makes it so only positive voltages pass, since pin 4 only wants to see voltage from 0 to +5V.

Pins 2 and 3 of the 12F683 connect to the toggle switches. MT is the mode toggle and RT is the random toggle. Both of these pins are tied to ground by the 100K bus.

Pins 6 and 7 are the CV inputs for 12F683. Repeats and Frequency controls are wired the same way, so only repeats will be described. The repeats knob attenuates the -12V supply to give a voltage from -12V to 0V at it's wiper, which then connects to the inverting input of an op-amp through a 220K resistor. The R_MOD pot attenuates the voltage from the RCV jack, and it's wiper connects to the non-inverting input of an op-amp through a 100K resistor with a 220K ground reference resistor. The op-amp has a 100K feedback resistor form it's output to the negative input creating a differential amplifier. The output of the amplifier goes through a 1K resistor and then to two shottky diodes referencing +5V and 0V, this will prevent voltages higher than +5V and lower than 0V from reaching the 12F683, and the 0.01uf capacitor to ground filters out any high frequency noise in the signal.

Pin 5 is the output of the 12F683. An op-amp is wired as a buffer and lights up an LED through a 10K current limiting resistor and a 1K resistor connects the buffer to the output jack.

The power arrangement is at the bottom of the schematic. Eurorack and MOTM style power connectors are present. A 10ohm/10uf passive low pass filter helps filter out fluctuations in voltage from other modules in your system and 0.01uf capacitors on the power pins of the op-amp provide extra high frequency filtering. The +5V supply is created by a 78L05 voltage regulator.

III Construction

A.PARTS LIST

SEMICONDUCTORS

Name/Value	QTY	Notes
12F683	1	Should have come with your PCB
TL074	1	Or any quad op-amp
1N4148	1	
1N60P	4	Or any small schottky diode
LED	1	3mm
78L05	1	+5V regulator TO-92 package

RESISTORS

Name/Value	QTY	Notes
10	2	1/4W metal film
1K	3	1/4W metal film
10K	2	1/4W metal film
100K	5	1/4W metal film
220K	5	1/4W metal film. For +/-15V builds, 270K resistors might give better response on the controls.
100K Bussed Array	1	5 pin array, or make one yourself with 4 more 100K resistors.
B100K pot	4	Either 9mm or 16mm PC mount package

CAPACITORS

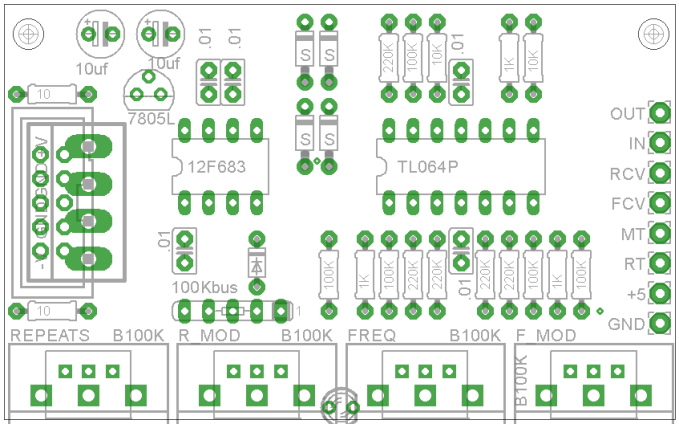
Name/Value	QTY	Notes
.01uf	5	Ceramic disc
10uf	2	Electrolytic

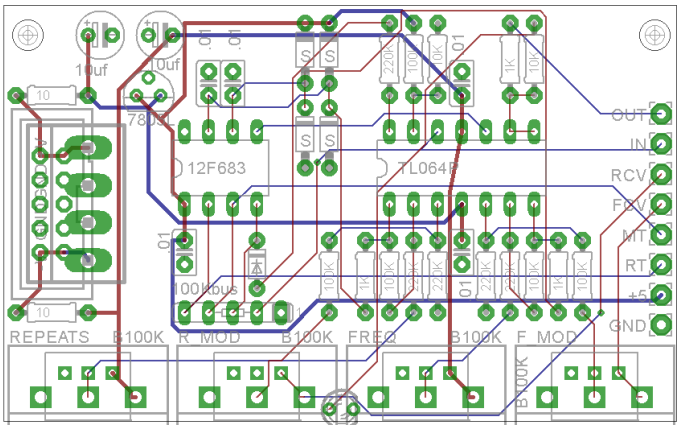
OTHER

Name/Value	QTY	Notes
3.5mm Jack	4	Or whatever jack your synth format uses
SPDT	2	Mini toggle, SPST works fine too!
Power connector	1	10 pin eurorack style or 4 pin MOTM style
8pin DIP socket	1	
14 pin DIP socket	1	

B. THE BOARD

Below are renderings of the PCB, both with and without traces present. The PCB is 70mm x 44mm, with the pots spaced 18mm apart.





C. Wiring.

Wirepads should be connected as follows:
GD – ground, wire to the sleeve of any jack.
+5V – Wire to the top (closest to the PCB) lug of the two toggles
RT – Wire to the center lug of the random toggle
MT – Wire to the center lug of the mode toggle.
FCV – Wire to the tip of the frequency CV jack
RCV – Wire to the tip of the repeats CV jack
IN – Wire to the tip of the gate input jack
OUT – Wire to the tip of the output jack.
Below is a photo of a wired module.