

Wiard GR-352 Borg Filters

Rev: 031001

BORG FILTERS	Two circuits - BORG1, BORG2	
	Generator	Processor
Audio	LFO high range filter self-oscillation	Filter LP, BP, HP
Control Voltage	LFO Low range	None

Filter LEDs
Blue - Filter LED, in series with the Vactrol LED, you see what it sees.
Green - Shows positive excursions
Red - Shows negative
Off - Close to 0 volts

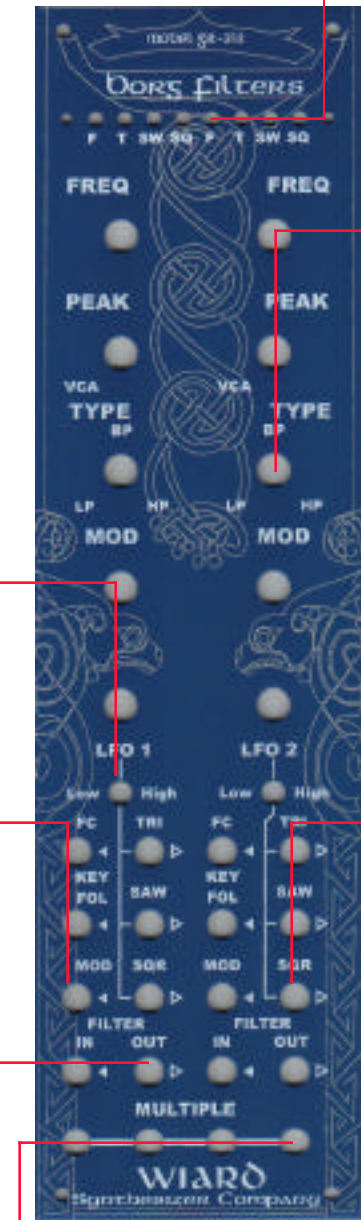
Modulation Controls
MOD [knob] - Filter modulation input attenuator, connects to *MOD* in.
LFO1/2 [knob] - Low frequency oscillator control
 •Low range is very slow to about 5KHz
 •High range is 5Hz to about 10KHz
 •High range may show some bleed through into filter channel. So switch to low range for quite operation.
LFO SWITCH [toggle switch] - Oscillator range switch. Note: While a high range has been included on the LFO, it is not a keyboard tracking oscillator like the Classic VCO. Some drift, pitch shift, soft synching, and feed through to the filter channels is

Filter Controls
FREQ [knob] - Filter cutoff frequency 0 Hz to 10 KHz. Note: Filter frequency extend to 20KHz with combination of FREQ knob and envelope voltage. Front control range is limited to make it more "playable".
PEAK [knob] Filter Peak Control - Off to wild oscillation, gain at Max is about 10 so reduce input amplitude to reduce distortion. There is a voltage controlled amplifier mode as well (VCA). The middle position of Lowpass Gate "simulates amplitude and frequency" characteristics of receding sound sources. Use with *TYPE* knob set to *LP*.
Warning!!! With **PEAK** knob at maximum the filter will output up to 25 volts peak to peak!!! DO NOT connect directly to power amplifier without intermediate volume control! Always begin with volume set to minimum and advance volume control slowly!!!
TYPE [switch] - Sets the type of filtering to
 •LP (12dB/Oct lowpass)
 •BP (6dB/Oct bandpass)
 •HP (12dB/Oct highpass)
 •Use both sections in series for a 24dB/Oct filters

Filter Modulation and Control
FC [in] - Oscillator frequency voltage control, approximately 1 volt per octave.
KEY FOL [in] - Filter keyboard follow, approximately 1 volt per octave.
MOD [in] - Filter modulation input.

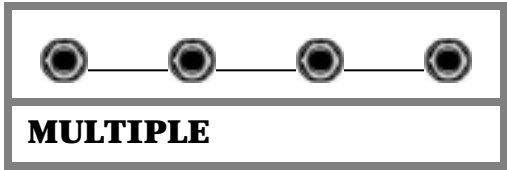
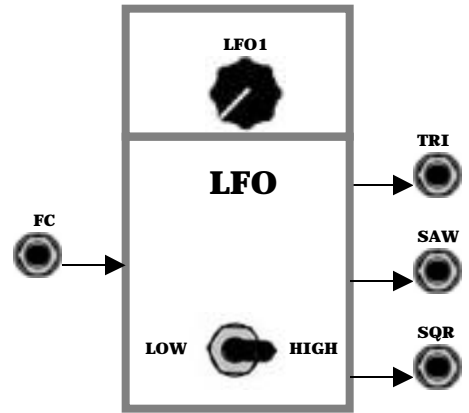
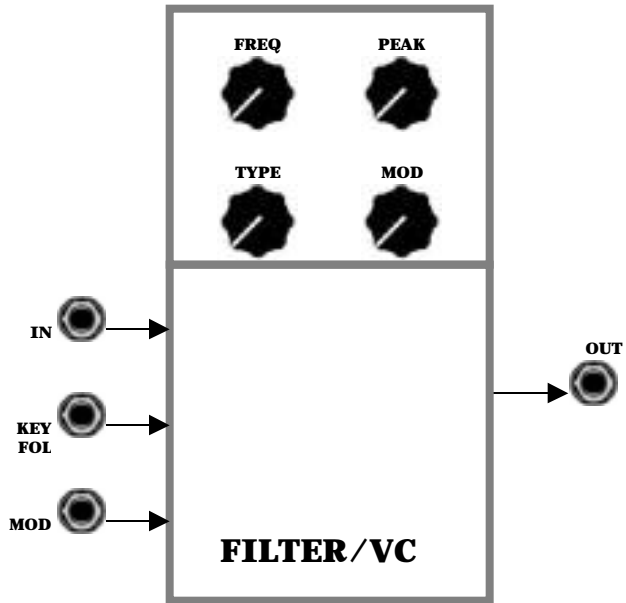
Oscillator Outputs
 Oscillator outputs +/-4 volts 1K Ohm
TRI [out] - Triangle wave.
SAW [out] - Descending sawtooth wave (Classic VCO saw is ascending).
SQR [out] - Square wave 50% duty cycle.

Filter I/O
FILTER IN [in] - Input is 50K.
FILTER OUT [out] - Output is 1K.



MULTIPLE [in/out]
 Any signal can be multiplied (that is, duplicated) by placing a signal into any of these jacks, and using the remaining three jacks as duplicate outputs.

Borg Filters First Order Units

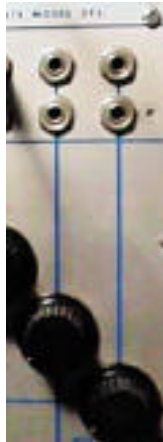


Borg Filters Module Description

A singularly distinct filter in the Wiard system is the Borg Filter. The Borg uses a completely new filter design using "Vactrol"-based electronics. There are two separate filters in this module -- each implemented as a 2-pole multi-mode. They can be linked as a 4-pole, or used as two independent filters. The Vactrol circuitry provides a certain amount of slew, giving the filter a very woody and warm tone.

The Borg also contains two LFOs (Low Frequency Oscillators). Low frequency might be a misnomer, since the oscillators will extend to a 15 KHz audio rate. These two oscillators can be used for filter modulation, or for clocking of a Sequantizer, vibrato on a Classic VCO and wave sequencing of a Waveform City.

Where did the Borg name come from? From the combination of the Buchla Model 292 Low-Pass Gate



...and the Korg MS-20 High and Low-Pass Filters.



The Borg Filter module contains:

- Two separate Borg filter (Controls - Freq, Peak, Type, Mod)
- Two low frequency oscillators (Controls - Speed)
- A jack multiple

Borg Filters Example Patches

Assumptions

- o Notation used: MPN (see *Modular Patch Notation (MPN) Explained* for a discussion on MPN)
- o Only one module: BorgFilters.
- o Two filter circuits in a Borg Filters module: Borg1, Borg2.

Hello World

Top BorgFilters

Borg1.Controls

```
[(PEAK, MOD)=12,
FREQ=2,
LFO1=2,
TYPE=LP,
OSCILLATOR SWITCH=LOW]
```

Borg2.Controls

```
[(FREQ, PEAK)=7,
MOD=5,
TYPE=LP,
OSCILLATOR SWITCH=LOW]
```

Connect

```
[KBD.CV -> KEY FOL,
+OSCILLATOR -> Borg1.FILTER IN,
Borg1.FILTER OUT -> Borg2.FILTER IN,
+ENVELOPE -> (Borg1.MOD, Borg2.MOD),
TRI -> +OSCILLATOR VIBRATO,
Borg2.FILTER OUT -> +MON]
```

Comment

This patch utilizes BORG1 as a VCF and BORG2 as a VCA. This simulates a "soft Buchla" architecture. An oscillator's output or other source is sent into the Borg filter acting as a VCF. An external envelope is used to control both sections of the module, while the keyboard pitch is used to drive the output of the filter section. Vary FREQ, PEAK, TYPE and MOD in the Borg1 for different effects. The Borg1 LFO1 knob set at 2pm should yield a setting of about 7Hz.

True Bandpass

Top BorgFilters

Borg1.Controls

```
[FREQ=2,
PEAK=9,
MOD=12,
TYPE=LP,
OSCILLATOR SWITCH=LOW]
```

Borg2.Controls

```
[FREQ=11,
PEAK=9,
MOD=12,
TYPE=HP,
OSCILLATOR SWITCH=LOW]
```

Connect

```
[+OSCILLATOR -> Borg1.FILTER IN,
Borg1.FILTER OUT -> Borg2.FILTER IN,
+ENVELOPE -> (Borg1.MOD, Borg2.MOD),
Borg2.FILTER OUT -> +MON]
```

Comment

Match and adjust the MOD controls on both sections for tracking. The FREQ knobs are used to set the bandwidth, while the PEAK knobs are used to set the

peaks (HP and LP peaks) of the band filtered in. Vary the peaks using the PEAK knobs for different results. Make sure that the Borg2's PEAK value is set below the Lowpass.

PS-3200 Style Resonator Effect

Top BorgFilters

Borg1.Controls

```
[(FREQ, PEAK)=12,
MOD=5,
LFO1=9,
TYPE=BP,
OSCILLATOR SWITCH=LOW]
```

Borg2.Controls

```
[(FREQ, PEAK)=12,
MOD=5,
LFO1=9,
TYPE=BP,
OSCILLATOR SWITCH=LOW]
```

Connect

```
[Borg1.TRI -> Borg1.MOD,
Borg2.TRI -> Borg2.MOD,
+OSCILLATOR -> Borg1.FILTER IN,
Borg1.FILTER OUT -> Borg2.FILTER IN,
Borg2.FILTER OUT -> +MON]
```

Comment

Set the PEAK controls in both sections to the maximum possible resonance value just before oscillation.