DR SCIENTIST

PHREAK

Multi Modem Ring Modulator

PHREAK Knob:
Controls the frequency of the ring mod effect.

Input, Output, Power
9VDC, centre neg, 2.1mm x 5.5mm barrel, 150mA.

Analog Mix and Volume controls.

Mode Pushbutton:
SET: Manual mode, control ring mod frequency with Phreak Knob, Exp/CV, or MIDI.
ENV: Envelope mode, freq responds to input dynamics.
LFO: Low Frequency Osc mode, modulate freq with 8 waveforms, tap in rate.

Alt Features Pushbutton:
SET Mode: Slow, Med, Fast rates for manual Phreak sweep (hold Multi).
ENV Mode: Reverse Direction of envelope.
LFO Mode: Choose from 8 waveforms for varying the ring mod frequency. .
Hold while pressing Mode Pushbutton for DSP effects

5 Pin DIN MIDI IN Jack:
Control all of Phreak's digital features (Phreak knob, Modes, Alt features, Clock, Multi and Bypass stomps,and Presets with standard MIDI CC and PC messages.

1/4" Exp and CV Jack:
Use TRS cable for exp, any resistance.
Use TS cable for 0-5V CV.

Multi Stomp:
SET Mode: Hold for freq sweep.
ENV Mode: Hold to freeze freq.
LFO Mode: Press for Tap Tempo.
Hold to ramp rate down.

Bypass Stomp:
Press for True Bypass.
Hold to tune the ring mod frequency to a note you play on guitar.

9VDC
+ ⊙ −

PHREAK   MIX   VOLUME

SET   SIN ST1
ENV   RMP ST2
LFO   SAW S&H
              SQU RND

PHREAK

MULTI   BYPASS

Hello and thank you very much for purchasing this Phreak! We really appreciate it and we hope you have a ton of fun with your new pedal! Please check out our Phreak playlist at www.youtube.com/drscientistsounds to see more examples of using the pedal. Email us, info@drscientist.ca, if you have any questions at all, and check out www.drscientist.ca for other goodies.

The Brief – Phreak is a digital ring modulator effect with powerful controls and multiple modes of operation. The ring mod effect, the combining of two rapidly modulated signals to create dissonant, bell-like tones, is digitally created for, in our humble opinion, the finest and funnest sound. You can control the frequency of the ring mod manually, by envelope, by LFO, by expression input or control voltage input, or by MIDI. You can tune the ring mod to a note on your guitar for a uniquely musical ring mod experience and we've even added some DSP effects you can choose from for some extra icing on your soundscake.

The Power – 9VDC, 150mA, centre negative 2.1mm plug. We recommend you use a quality, isolated, filtered, and regulated supply and be careful with daisy chaining or you could have hum. Email us if you need any power supply help! (There's no battery inside).

The Jacks – The Input and Output are located on the top panel and have arrow indicators showing in and out. On the left side of the pedal there's a standard 5 Pin DIN jack for MIDI Input. On the right side of the pedal there's a 1/4" jack for Expression/Control Voltage Input.

The PHREAK Knob – This knob controls the frequency or range of frequency of the ring mod effect in each Mode. In **SET** Mode this is your main ring mod frequency control. With the PHREAK knob all the way down you'll hear fast tremolo, turn the PHREAK knob up to increase the frequency and bring on the weird sounds. In **ENV** Mode you use the PHREAK knob to limit the range of the ring mod frequency, turn the knob up or down to keep the frequency in that range. In **LFO** Mode you use the PHREAK knob to set the frequency range the LFO will modulate. Leave it at noon for maximum LFO depth, turn it up or down to keep the LFO movement in that range.

The MIX Knob – This analog control (not accessible by MIDI or presets) sets the balance between your dry signal and the ring modulated signal. All the way down is your untouched dry signal passing only through a simple buffer, turn the MIX knob up to add ring mod signal in.

The Volume Knob – This also is an analog control (not accessible by MIDI or presets). Depending on how you use your Phreak pedal you might need to raise or lower your volume to keep your signal at unity or however you like it.

The Left Pushbutton – Chooses between the 3 operating modes of Phreak. **SET** is Manual Mode and this mode puts you in charge of the ring mod frequency. You can control the frequency with the PHREAK knob, an expression pedal, a control voltage, or MIDI messages. **ENV** is Envelope Mode, putting the dynamics of your playing in control of the ring mod frequency. (There's a little blue trimpot on Phreak's PCB that you use to adjust the envelope sensitivity to your specific instrument. It's on the right side, about the middle, and says ***ENV SENS*** above it). **LFO** mode uses 8 unique sounding digital waveforms to control the ring mod frequency dynamically. Set the LFO rate by tapping the Multi Stomp or sending MIDI Beat Clock and/or MIDI subdivisions/multipliers. This button is also used to save the current digital settings to the current onboard preset. Hold the button for one second and the settings will be saved. The LED will light up with the colour corresponding to the current preset.

The Right Pushbutton – Chooses the alternate settings for each of the Modes. In **SET** Mode you can choose between 3 different sweep rates for the momentary frequency sweep feature on the Multi Stomp. In **ENV** Mode you can choose the direction of the frequency sweep that follows your input signal's envelope, making the ring mod frequency speed up or slow down with your playing dynamics. In **LFO** Mode you can choose between 8 different digital waveforms: Sine, Ramp, Saw, Square, Step1, Step2, Sample & Hold, and Random.

The Left Stomp – MULTI – Has different roles depending on the Mode. In **SET** Mode you can hold down the Multi stomp for a momentary ring mod frequency sweep. In **ENV** Mode you can freeze the envelope and thus the ring mod frequency momentarily by holding down the Multi stomp. In **LFO** Mode you use Multi to tap in your tempo, or hold it down to ramp the LFO rate down nice and slow momentarily, when you release it ramps back up to full speed. Can also be used when pedal is bypassed to sweep the ring mod frequency.

The Right Stomp – BYPASS – Turns your pedal on and off. Phreak's bypass is True Bypass using a relay and soft touch switch. The Bypass stomp is also used for **Tuning Mode**, more about that in the next section...

The Easter Eggs – Phreak has a few hidden features that we just had to include: **Tuning Mode**, **Bypass Sweep**, and **DSP Effects**. Enter **Tuning Mode** by holding down the Bypass Stomp for a few seconds.. while holding the Bypass Stomp down, play a note on your guitar and you'll hear the oscillator "tune" to your note. Now the main ring mod frequency will stay locked at that note, giving you a neat "musical" ring mod sound. **Bypass Sweep** is a neat little trick for when your pedal is turned off, you can still hold down the Multi Stomp to do a frequency sweep. (The sweep sound is based off your Phreak and Mix knob settings). And finally, we've included 7 bonus **DSP Effects** you can use with the main ring mod effect. To turn on the DSP Effects just hold the Alt Features Pushbutton while you press the Mode Pushbutton. You'll see the left side light change colour when you've selected a **DSP Effect**, which go in this order: Short Reverb, Medium Reverb, Long Reverb, BitCrusher, BitCrusher with Reverb, Alias, Alias with Reverb.

The MIDIs – Phreak is shipped set to receive MIDI messages on all channels. You can change the MIDI channel that Phreak receives MIDI messages on by holding the Right Pushbutton while the pedal turns on. Then use the two Pushbuttons to scroll up or down to the MIDI channel number you desire, using the **MIDI Channel Reference Chart** on the MIDI Implementation page for reference. When you have found the desired MIDI channel number, press the Bypass Stomp to confirm and select the new MIDI channel number. If you wish to exit this process without selecting a new MIDI channel number, press the Multi Stomp at any time to exit. **Please refer to the last 2 pages of this manual for MIDI implementation** but all the digital features of the pedal, excluding the Mix and Volume controls which are analog, are accessible by MIDI.

The Expression/CV System – The 1/4" jack on the right side of Phreak is where you can plug in an expression pedal or a control voltage and have it take over for the Phreak knob, controlling the setting of the ring mod frequency. **For expression you need to use a TRS cable**, the kind with 2 bands at the end. You can use any resistance for this input, anything from 10k to 500k will be fine. **For control voltage you need to use a regular TS cable**, the standard guitar/pedal patch cable with one band at the end. Phreak will respond to 0-5VDC signals.

The Preset System – Phreak has 4 internal presets for you to save your favourite sounds. The presets remember digital things like the Mode, Phreak knob setting, LFO rate. They don't remember analog things like the Mix or Volume. You save a preset by holding the Left Pushbutton. You load a preset by holding the Right Pushbutton. When loading a preset, it will load the next preset each time you hold the Right Pushbutton, cycling back to preset 1 after preset 4. Each preset will light up a different colour on the left side.

Thanks again! We really appreciate your support and we hope you enjoy Phreak!

-Dr. Scientist (Ryan & Tanya Clarke, Neil Graham)

MIDI Implementation

CC#	Function	Value
9	Remote Tap	Any
20	Waveform Select	1 - 8 (0 becomes 1, >8 becomes 8)
23	LFO Rate x 1 (in BPM)	0 - 127
24	LFO Rate x 2 (in BPM)	0 - 127 (x2)
25	LFO Rate x 3 (in BPM)	0 - 127 (x3)
27	Waveform ++	Any
28	Waveform --	Any
29	Mode 1 - 3	1 - 3(0 becomes 1, >3 becomes 3)
30	LFO Subdivisions	1 – Whole Note 2 – Dotted Half Note 3 – Half Note 4 – Dotted Quarter Note 5 – Quarter Note Triplet 6 – Quarter Note (Default) 7 – Dotted Eighth Note 8 – Eighth Note Triplet 9 – Eighth Note 10 – Dotted Sixteenth Note 11 – Sixteenth Note Triplet 12 – Sixteenth Note
55	Save Settings to Preset	1 - 99
80	Bypass Foot Switch	0 - 63 Off, 64 - 127 On
82	Left Stomp Hold	(0 - 63 Off, 64 - 127 On)
83	Freeze LFO	(0 – 63 Pause, 64 – 127 Resume)
102	Phreak Knob	0 - 127
103	Ramping Speed	1 – 20 (0 becomes 1, >20 becomes 20)
105	Mode ++	Any
106	Mode --	Any
107	Envelope Direction	0 – 63 Down, 64 – 127 Up
108	Additional DSP Effect ++	Any
109	Additional DSP Effect --	Any
110	Additional DSP Effect Selection	1-8, 0 = 1, >8 ignored
111	MIDI Clock Sync/Ignore	0 – 63 Sync, 64 – 127 Ignore

PC# 0 = Bypass, PC# 1 – 4 = Internal Preset # 1 – 4,
PC# 5 – 99 = Presets saved with MIDI CC #55,
MIDI Clock Controls LFO Rate

MIDI Channel Reference Table

Mode LED	Waveform LED	MIDI Channel
Off	Red	1
Off	Green	2
Off	Blue	3
Off	White	4
Red	Red	5
Red	Green	6
Red	Blue	7
Red	White	8
Green	Red	9
Green	Green	10
Green	Blue	11
Green	White	12
Blue	Red	13
Blue	Green	14
Blue	Blue	15
Blue	White	16
White	White	Omni