DR SCIENTIST

DUSK

MULTI MODE LOW PASS FILTER

FILTER Knob:
Digital control over an analog OTA based 12dB/Oct LPF.

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

Analog Resonance and Volume controls. (Res trimpot on PCB for fine tuning of max feedback)

Mode Pushbutton:
CUT: Manual mode, control filter with Filter knob, Exp/CV, or MIDI.
ENV: Envelope mode, filter responds to input dynamics.
LFO: Low Frequency Osc mode, drive filter with 6 waveforms, tap in rate.

Alt Features Pushbutton:
CUT Mode: Slow, Med, Fast rates for manual filter sweep (hold Multi).
ENV Mode: Reverse Direction of envelope sweep, Up or Down.
LFO Mode: Choose from 6 waveforms for auto LPF.

5 Pin DIN MIDI IN Jack:
Control all of Dusk's digital features (Filter 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.

9VDC
+ -C- -

FILTER   RESONANCE   VOLUME

CUT   SIN SQU
ENV   RMP S&H
LFO   SAW RND

DUSK

MULTI   BYPASS

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

Bypass Stomp:
Press for True Bypass.
Hold to load and cycle Through 4 on board presets.

Hello and thank you very much for purchasing this Dusk! We really appreciate it and we hope you have a ton of fun with your new pedal! Please check out our Dusk 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 – Dusk is a digitally controlled analog filter. At its heart is an analog 12dB/Octave low pass filter based around an old school integrated circuit called an Operational Transconductance Amplifier or OTA. The OTA runs off of split +/-9V rails for great audio quality and a deep filter sound. The digital side brings a whole bunch of convenient and powerful features like controlling the filter setting, tap tempo, MIDI, 6 LFOs, and a platform for all the best filter modes in one small pedal.

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 Filter Knob – This knob controls the position of the filter in each Mode. In **CUT** Mode this is your main frequency cutoff control. With the Filter knob all the way up the filter is fully open, with the knob all the way down the filter is fully closed. In **ENV** Mode you can limit the range of the filter sweep, turn the knob up or down to keep the filter movement in that range. In **LFO** Mode you use the Filter knob to set the range of the filter sweep. Leave it at noon for maximum LFO depth, turn it up or down to keep the LFO movement in that range.

The Resonance Knob – This controls how much of the output signal is fed back into the input of the filter. Resonance adds an interesting tonal quality to the filter sweep, a sound that pairs well with sweeping through the frequencies and just sounds cool and filtery. Too much resonance can lead to feedback, a loud howling sound, or weird laser sounds, which may or may not suit your musical vision. There's a little blue trimpot on Dusk's PCB that lets you dial in the maximum resonance just right for your setup and tastes. (It's in the top right corner and says *RES ADJUST* around it).

The Volume Knob – Depending on how you use your filter, 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 Filter Modes of Dusk. **CUT** is Manual Mode and this mode puts you in charge of the filter sweep. You can control the filter with the Filter knob, an expression pedal, a control voltage, or MIDI messages. **ENV** is Envelope Mode, putting the dynamics of your playing in control of the filter setting. (There's a little blue trimpot on Dusk's PCB that you use to adjust the envelope sensitivity to your specific instrument. It's on the left side, lower middle, and says *ENVELOPE SENS* around it). **LFO** mode uses 6 unique sounding digital waveforms to

control the filter setting 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 **CUT** Mode you can choose between 3 different sweep rates for the momentary filter sweep feature on the Multi Stomp. In **ENV** Mode you can choose the direction of the filter sweep that follows your input signal's envelope, making the filter open or close with your dynamics. In **LFO** Mode you can choose between 6 different digital waveforms: Sine, Ramp, Saw, Square, Sample & Hold, and Random.

The Left Stomp – MULTI – Has different roles depending on the Mode. In **CUT** Mode you can hold down the Multi stomp for a momentary filter sweep. In **ENV** Mode you can freeze the envelope 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.

The Right Stomp – BYP – Turns your pedal on and off and you also use it to load and scroll through the 5 built in presets. Dusk's bypass is True Bypass using a relay and soft touch switch.

The MIDIs – Dusk is shipped set to receive MIDI messages on all channels. You can change the MIDI channel that Dusk 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 Byp 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 Resonance and Volume controls which are analog, are accessible by MIDI.

The Expression/CV System – The 1/4" jack on the right side of Dusk is where you can plug in an expression pedal or a control voltage and have it take over for the Filter knob, controlling the setting of the filter. **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. The Dusk filter will respond to 0-5VDC signals.

The Preset System – Dusk has 4 internal presets for you to save your favourite sounds. The presets remember digital things like the Mode, filter setting, LFO rate. They don't remember analog things like the Resonance or Volume. You save a preset by holding the Left Pushbutton. You load a preset by holding the Byp Stomp. When loading a preset, it will load the next preset each time you hold the Byp Stomp, 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 Dusk!

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

DUSK MULTI MODE LOW PASS FILTER

MIDI Implementation

CC#	Function	Value
9	Remote Tap	Any
20	Waveform Select	1 - 6 (0 becomes 1, >6 becomes 6)
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	Filter 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

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