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DRAWMER DS201 OPERATORS MANUAL

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SAFETY CONSIDERATIONS

CAUTION - MAINS FUSE

TO REDUCE THE RISK OF FIRE REPLACE THE MAINS FUSE ONLY WITH THE SAME TYPE, WHICH MUST BE A CLASS 3, 230 VOLT, TIME DELAY TYPE, RATED AT 32mA WHERE THE MAINS INPUT VOLTAGE SWITCH IS SET TO 230 VOLTS AC. AND 63mA WHERE THE MAINS INPUT VOLTAGE IS 115 VOLTS AC. ALL FUSES MUST COMPLY WITH BS EN 60127-2:1991, SHEET III. THE FUSE BODY SIZE IS 20mm x 5mm.

CAUTION - MAINS CABLE

DO NOT ATTEMPT TO CHANGE OR TAMPER WITH THE SUPPLIED MAINS CABLE.

CAUTION - SERVICING

DO NOT PERFORM ANY SERVICING. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

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INTRODUCTION

The Drawmer DS201 is a sophisticated dual channel noise gate, which may be used as two independent channels or linked for true stereo operation. It incorporates a number of impressive features, many pioneered by Drawmer, which are invaluable to the sound engineer and not found on conventional noise gates:

- Variable high-pass and low-pass filters for 'frequency conscious' gating;
- Comprehensive envelope control, attack, hold, decay and range;
- Extremely low-noise and low-distortion circuitry;
- Ultra-fast response time;

- Comprehensive side-chain filtering;
- 'Key listen' facility;
- 'Traffic light' display giving clear indication of gate status;
- Balanced inputs and outputs.

These features and the DS201's user-friendliness have helped it to become the worldwide 'industry standard' noise gate.

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INSTALLATION

The DS201 is designed for standard 19" rack mounting and occupies 1U of rack space. Use four M6 pan head screws to secure the unit into the rack. Fibre or plastic washers may be used to prevent the front panel becoming marked by the mounting bolts.

Care should be taken in the choice of positioning. The unit should not be mounted where other equipment obstructs the normal air flow. The unit should not be situated near any heat source, such as a radiator, stove or a high power amplifier that would generate heat.

The DS201 should not be operated near any water or in a location where moisture might be present.

AUDIO CONNECTIONS

All input and output connectors are balanced XLRs, with the wiring convention being: pin 2 hot, pin 3 cold and pin 1 ground. For unbalanced operation, it is important to short pin 3 of the XLR connector to ground (pin 1) at both input and output. Key inputs are made via 1/4" mono jack connectors.

If earth loop problems are encountered, never disconnect the mains earth but instead, try disconnecting the output signal screen at one end of the cables connecting the DS201 to the patchbay, we suggest inside the XLR connector itself. If such measures are necessary, balanced operation is recommended.

POWER CONNECTION

The unit will have been supplied with a power cable suitable for domestic power outlets in your country. For your own safety it is important that you use this cable. The unit should always be connected to the mains supply earth using this cable, and no other.

If for some reason the unit is to be used at a mains input operating voltage which is different to that as supplied, the following procedure must be carried out.

1. Disconnect the unit from the mains.
2. Using a number 1 size pozidrive screwdriver, remove the two self-tapping screws holding the voltage selection switch cover plate on the rear panel.
3. Remove the cover plate and slide the switch fully to its opposite end.
4. Rotate the cover plate one half turn, (180) and refit the two screws.
5. Replace with a correctly rated fuse for the selected operation voltage.
6. Re-connect to mains power source.

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CONTROL DESCRIPTION

L.F. The L.F. or Low Frequency filter is variable from 25Hz to 4kHz and works by severely attenuating frequencies below the cut-off frequency selected.

H.F. Variable from 250Hz to 35kHz, this High Frequency filter attenuates frequencies above the selected cut-off value. In other words, when both filters are set, it is the range between the two settings that is allowed to pass.

Note: Any side-chain filtering which implements high frequency attenuation will also cause a slight delay in the time the gate takes to trigger. Under most circumstances this will be quite imperceptible, but when transient sounds are being processed with the H.F. control set to a very low value, some degradation of the attack transient may become apparent. For this reason, always set the H.F. control to the highest possible value practicable when processing percussive sounds.

Threshold Sets the level below which gating starts to take place and may be set in the range -54dB to infinity. For normal noise removal applications, it is usual to set the Threshold as low as is possible without spurious triggering occurring, so that none of the desired signal is lost.

Attack This control determines how quickly the gate opens, and is variable from 10microSeconds to 1 Second; the fastest Attack time ensures that the gate does not clip the leading edge of extremely fast transients.

Note: See section on using Attack under 'OPERATION'

Hold Determines the amount of time the gate is held open after the signal falls below the Threshold. It is variable from 2mS to 2 Seconds. This helps to prevent spurious re-triggering when using fast Release times, but is also instrumental in creating the classic gated reverb sound which is often applied to drums.

Note: Since the Hold cycle starts as soon as the Threshold is crossed, the envelope cycle will complete even if the Key source falls below the Threshold level before the Attack phase is completed.

Decay Determines the rate at which the gate closes, once the signal has fallen below the Threshold and the Hold time has expired. Variable from 2mS to 4 Seconds.

Range Sets the amount of attenuation applied to the input signal when the gate is closed, variable from 0dB to -80dB. This enables the gate to be used to remove unwanted signals entirely, or simply to attenuate signals which are too loud.

Note: This control is active on both channels, even in stereo linked operation

Ext/Int In the Int position, this switch causes the gate to respond to the dynamics of the signal present at the main signal input socket. In the Ext position, an external audio source may be used to control the gate action making it possible to gate one sound according to the dynamics of another, independent signal.

Gate/Duck Switches from normal Gating to Ducking, for applications such as voice-over or the removal of 'clicks' and 'pops'.

Note: See later sections on Ducking under 'OPERATION' and 'APPLICATIONS'.

Key Listen/Gate/Bypass When this switch is set to Key Listen, the effect of the key filters on the programme material is heard at the output. In normal operation, the Gate position is selected; the filters only affect the way the DS201 responds to the incoming programme material - they do not have any direct effect on the output signal. The Bypass position routes the input signal to the output with no processing.

Note: Although somewhat unorthodox, it is possible to leave the switch in the Key Listen position in order to use the DS201 simply as a filter rather than a gate.

Display Three LEDs show the functioning of the gate: When the gate is closed, the red LED above the Hold control is illuminated; when the gate is open the green and amber LEDs come on and the red one goes off. When the input signal falls below the threshold, the green LED will extinguish and the amber LED will fade over the duration of the release time.

Stereo Link This switch links both channels for two tracking channel operation, with channel one being master. The trigger source selected for channel one will actuate both channels' envelopes when this mode is selected.

Note: See section on Linking under 'APPLICATIONS'.

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OPERATION

Gating

The unit should be connected in-line with the signal to be processed via suitable insert points. Ensure, where possible, that the insert send and return level on your console approximately matches the operating level of the DS201.

For mono use, each channel may be considered as being completely independent and set up accordingly. For use with stereo signals, both channels may be linked; the envelope setting up is then done using the left hand channel's controls.

Initially, the L.F filter should be set fully anti-clockwise while the H.F. filter should be set fully clockwise. This will allow the full audio spectrum of the input programme to be monitored by the side-chain control circuitry. Set the Range control fully anti-clockwise and the output selector switch to Normal.

With the Decay control set at its mid-way position, and with suitable programme material fed into the DS201, increase the Threshold level from its anti-clockwise position until the gate starts to operate. This will be indicated by the activity of the traffic light LEDs and you should also hear the effect on the output signal, in that pauses in the programme will now be silent. If the Threshold setting is too high, the gate will start to cut out wanted pieces of programme so you should adjust it to as low a setting as possible consistent with the effective removal of low level noise. If the ends of sounds are obviously being truncated, then a longer Decay time may help. On the other hand, if unwanted noise is audible after the wanted sound has ended, a shorter Decay time may well be more appropriate.

There are circumstances when the programme material is corrupted not only by unwanted random noise, but by some other sound. For example, in a multi-miked drum kit setup, some hi-hat will inevitably leak into the snare microphone, some snare drum into the kick drum microphone and so on. Equally, when recording on location, you may experience problems due to wind or traffic noise or close-by conversation. If the unwanted noise is different in pitch to the wanted sound, it is often possible, by using the Key Listen facility, to use the filters to 'tune' in to the wanted sound while excluding as much of the unwanted sound as possible. Used carefully, these filters can significantly increase the gate's immunity to false triggering.

The Attack control on the DS201 has a very wide range; at its fastest, it can open almost instantaneously. Conversely, with signals having a naturally slow or moderate attack, setting the gate attack time too fast can cause clicks, particularly if the threshold has to be set high because of excessive background noise. This is one of the most common anomalies with noise gates, especially when the audio

signal being processed is in the lower frequencies (eg bass guitar, bass drum). With a high threshold, a low frequency sine wave will be ignored as the signal starts from its zero level point, as this wave climbs towards its peak, the level will suddenly exceed the threshold setting, at this point a very fast attack rate will switch the signal through the noise gate with such a steep (almost vertical) leading edge that the low frequency sound will have a single high frequency square wave added to its first cycle, in other words a 'click' will be heard. In cases like these, start with a fast attack time and moderate threshold, then gradually lengthen the attack time until the audible click just disappears when the gate opens, unless the 'click' is being added as an effect!

Once the gate envelope has been triggered, The attack cycle will continue to completion, even if the incoming trigger source is very short. This can be used to good creative effect by setting a long attack time, and then processing a crash cymbal or percussive sound, the resulting slow-attack envelope will completely change the character of the sound making it appear reversed or 'bowed'.

Ducking

Probably the most common form of Ducking is that used by radio announcers, whereby the volume of the music being played is dropped, enabling them to speak over it. In Duck mode the DS201 can simulate this effect; the music signal is routed to the input and an amplified version of the announcer's microphone signal is fed into the Key Input ('Ext/Int' switch should be set to 'External'.) The Stereo Link switch allows a stereo music track to be ducked.

The Range control is used to set the level to which the music will drop when the ducker is triggered from the Key Input, and the envelope controls determine the rate at which the level will drop and then recover. It is usual to select a fairly fast Attack time (so that the music level drops rapidly as soon as the announcer begins to speak), with a slow Release time of a second or so - this will bring the music level back up slowly and smoothly, and is hence less disconcerting to the listener. This same technique can be used to reduce the level of other instruments during a solo.

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APPLICATIONS

LINKED OPERATION

It is important to note that when both channels are linked, the control signal is derived entirely from the left-hand channel and not from a mix of the individual channels. This means that stereo signals where one channel differs significantly from another may fare better if the channels are not linked.

On the other hand, this mode of linking is very powerful in synchronising the start and finish of sounds, a typical application being to tighten up backing vocals. If one singer tends to finish notes on time while the others hang on too long, the correct version can be used as the master to ensure that all the others finish at the same time. Similarly, one sound can be used to gate another without having to resort to patching in an external key signal. An example might be to gate a low frequency tone from a bass drum signal and then add this gated tone to the drum sound to add depth.

By setting up one channel as a gate and the other as a ducker whilst in stereo link mode, the envelope controls can be used to create some interesting triggered panning effects, simply by feeding the same signal into both channels and setting both 'Range' controls to maximum attenuation.

DIFFICULT MATERIAL

As with any other gate, noise can only be removed during pauses in the wanted material. If the noise contamination is serious enough to be evident even during moderately loud programme material, then simple gating will do little to help. Indeed, the very fact that the gate produces near-perfect silence during pauses can make the noise content of the programme material even more apparent. In extreme cases reducing the range of the Gate to about -15dB will adequately reduce the noise during pauses but not sufficiently to cause an unacceptably dramatic change in noise level as the gate opens and closes.

More sophisticated processors such as the Drawmer DF320 are better able to cope with excessive noise as they adaptively filter the programme so as to mask the noise during low level passages or where there is little high frequency content present to mask it. However, the key filters in the DS201 may also be used to good effect, particularly in situations where the wanted signal does not occupy the full audio spectrum.

Taking the example of the electric guitar, this produces little below 100Hz or above 3kHz so setting one channel of the DS201 to Key Listen mode will enable you to use the filters to exclude much of the amplifier hum at the low end and hiss at the top end while having little effect on the sound of the guitar. Surprisingly, the same is true of the acoustic guitar; (even a bright-sounding steel-strung model), and the filters can be used to reduce the effect of string squeak or the player's breathing.

Other applications of the filter section include shaping direct injected (DI'd) electric guitar sounds to remove unpleasant overtones and to simultaneously clean and warm up digital synthesizer sounds. While we should always endeavour to get the highest quality of programme material at source, every engineer is occasionally confronted with inferior material from sources beyond his control. Conventional equalisers seldom have a sharp enough response to duplicate the function of the Key filters which invariably results in the wanted material being filtered as well as the unwanted noise.

Once a signal has been filtered in this way, it may then be processed by the other channel of the DS201 to apply conventional gating.

DUCKING

In addition to voice over applications, the Duck function of the DS201 may also be used to treat a signal where the peaks are too loud and require attenuating. In this application, 'Duck' and 'Int' modes should be selected, and the 'Range' control adjusted to give the desired attenuation to signals above the 'Threshold' setting. In extreme cases, the ducking action may be used to remove signal peaks altogether, and by careful use of the filters, it may be possible to remove a snare drum from a drum mix or clicks and pops from a recording.

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DS201 TECHNICAL SPECIFICATIONS

INPUT IMPEDANCE 20K Ohms

MAXIMUM INPUT LEVEL +17dB

OUTPUT IMPEDANCE 50 Ohms (bal) 100 Ohms (unbal)

MAXIMUM OUTPUT LEVEL +17dB

BANDWIDTH 23Hz to 31KHz -1dB

NOISE AT UNITY GAIN ref 0dB, GATE open

	Wideband	22Hz - 22KHz	CCIR ARM	IEC A	Q-Pk CCIR
AV	-90dB	-95dB	-95dB	-97dB	-84dB
RMS	-88dB	-93dB	-93dB	-95dB	-

DISTORTION

	100Hz	1KHz	10KHz
0dB input	< 0.025%	< 0.025%	<0.025%

POWER REQUIREMENTS 93-125Volt or 185-250Volt at 50-60Hz, 9 Watts

FUSE RATING 32mA for 230Volt, 63mA for 115Volt

FUSE TYPE 20mm x 5mm, Class 3 Time delay, 250 Volt working.

CONFORMING TO BS EN 60127-2:1991 SHEET III

CASE SIZE 482mm (w) x 44mm (h) x 200mm (d)

WEIGHT (incl packaging) 3.4 Kgs