Summit Audio Model DCL-200
Dual Compressor-Limiter
Operating Manual

IMPORTANT!: CAREFULLY READ THE ENTIRE INSTRUCTION MANUAL BEFORE HOOKUP OR OPERATION OF THE DCL-200.

WARNING!: **HIGH VOLTAGE**. THIS UNIT CONTAINS NO USER SERVICEABLE PARTS. SERVICING SHOULD ONLY BE DONE BY QUALIFIED SERVICE PERSONNEL OR FACTORY. DO NOT OPERATE THE DCL-200 WITH THE COVERS REMOVED.

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Product Introduction

The Summit Audio DCL-200 is a dual channel compressor/limiter with stereo linking capabilities. Based on a hybrid design, the DCL-200 combines the most desirable sonic characteristics of vacuum tubes with the increased reliability of solid state devices. DCL-200 circuitry incorporates selected 12AX7A vacuum tubes with high reliability 990 op-amps in a transformerless signal path, giving you an incredibly clean, precise sound, with the overtones and warmth of tube technology.

Features include:

Continuously variable attack and release times
Adjustable threshold
Variable slope (ratio)
Output gain control
Soft-knee transition characteristic
Stereo link switch
Dual true VU meters
Side chain insert
Bypass switch
Hand crafted in the USA

Having found this manual, carefully unpack the DCL-200 and it's power cord. Save the carton and packing material should it be needed for future shipping. Before powering the unit, read this manual. Please observe the cautions for HIGH VOLTAGE. Proceed by doing the following:

1. Set the line voltage switch to the proper position
2. Determine the proper fuse size by referring to the specifications
3. Check for pilot illumination when powered up.

THE CONTROLS

1. BYPASS: Removes the compressor/limiter from the signal path, although the tube circuit is left in the signal path. The meter will show gain reduction and output level as if the compressor/limiter is in the signal path.

2. GAIN: Sets the input level of the DCL-200. When linking both sides of the DCL-200 for stereo operation, this control will still need to be set individually for each side.

3. AC THRESHOLD: This controls the amount of gain reduction that will take place and the level at which compression starts. A high setting (far left) will require a large amount of signal to pass for compression to start and a low setting (far right) will require less signal to start compression.

4. SLOPE: Controls the compression ratio of the DCL-200. The higher the setting, the higher the compression ratio. This ratio changes depending on the signal level and the setting of the AC Threshold, and can vary from less than 1.1 to 1 to as high as 7 to 1.

5. ATTACK: This determines the time it takes the DCL-200 to respond to an incoming signal. A setting of 0 on this control yields a fast attack time of about .1mS and a setting of 10 produces a slower attack time (about 100mS).

6. RELEASE: The release control determines the amount of time it takes the DCL-200 to return to unity gain after compression. A setting of 0 is the fastest release time (up to 35mS) and 10 is the slowest (up to 10S). As the release time is increased, the DCL-200 becomes more and more program dependant.

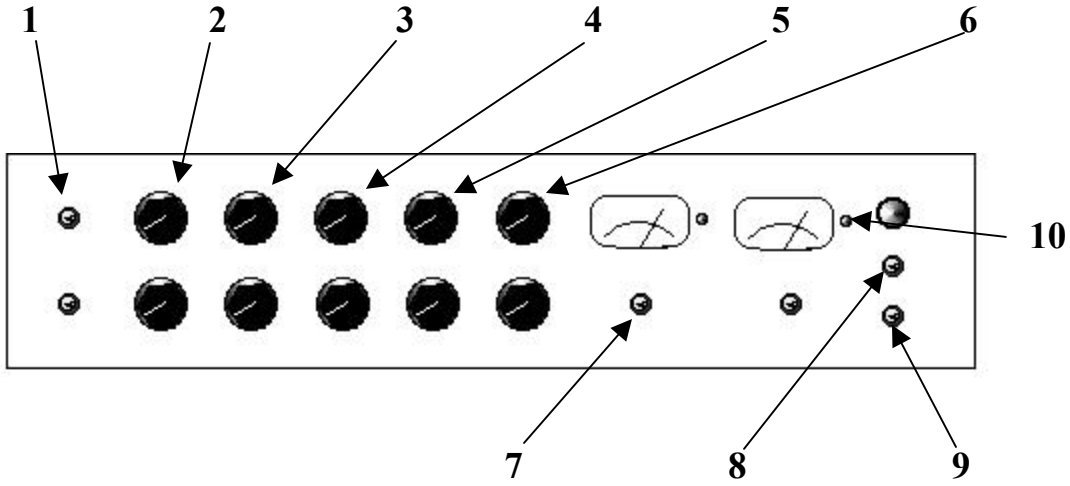
1) NOTE: *The attack and release values are not on the dial because they interact with each other and vary with different amounts of gain reduction, AC Threshold and Slope control settings. The given values for attack and release times are measured with 12 dB of gain reduction and full signal change.*
2) NOTE: *The DCL-200 has the capability of extremely fast attack and release times. This may tend to modulate complex waveforms, especially those with lots of low frequency content. A "clicking" sound may result. Increase the release (clockwise); this should alleviate the artifact.*

7. METER SWITCH: This switch selects the VU to meter either output level or gain reduction.

8. LINK: Links both channels of the DCL-200 for stereo operation. When in stereo (linked) mode, the AC Threshold, Slope, Attack, and Release controls of the top channel (channel 1) will control both channels. The bypass switch, meter switches, and the gain controls need to be set individually.

9. POWER: Switches the DCL-200 on and off.

10. OL LIGHT: The overload or cliplamp is an LED that will light between .25 and .5 dB before clipping. The lamp has a pulse stretcher circuit to make it easier to see on quick peaks. The OL lamp is always in the main signal path.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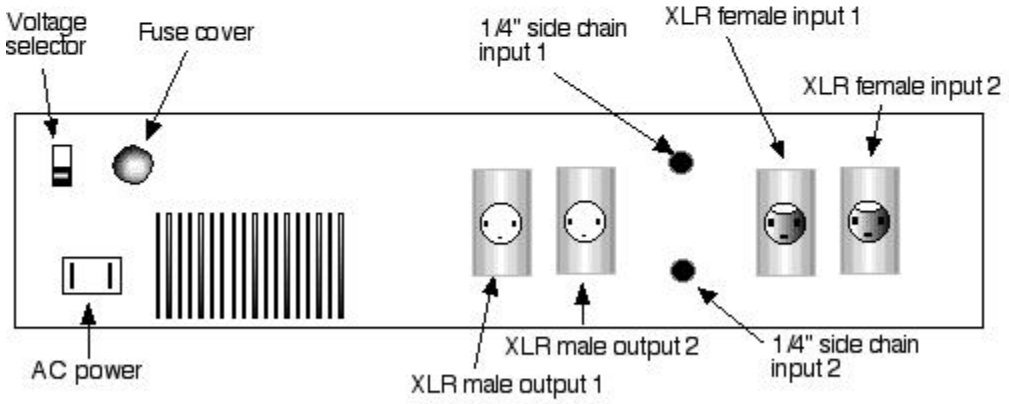

Voltage selector
Fuse cover
1/4" side chain input 1
XLR female input 1
XLR female input 2
AC power
XLR male output 1
XLR male output 2
1/4" side chain input 2

DCL-200

Use Scenarios and set up

Tracking, live sound, mixing: Plug the DCL-200 into your mixing console's insert jack or patch bay. Remember that the XLR's on the DCL-200 are pin 3 hot.

Compressing a stereo mix: Plug the DCL-200 into the main inserts of your mixing console. Set the DCL-200 into Link mode to run in stereo. The AC Threshold, Slope, Attack, and Release controls on channel one (the top channel) will operate both channels. The bypass switches, meter switches, and the gain controls will need to be set for each side.

De-essing: Plug a TRS insert cable into the side chain jack on the back of the DCL-200. Plug the send (tip) of the insert cable to the input of an EQ, and the return (ring) of the cable to the EQ output. Boost the frequencies on the EQ that you want to compress (de-ess).

Ducking: Send the output of the "lead" program material into the side chain input after inserting the DCL-200 on the "background" program material. Example: Send the output of a vocal mic into the side chain, with the DCL-200 inserted on the over-all music track. As the singer uses the vocal mic, the music will decrease in amplitude. This is perfect for broadcast use when the DJ needs to speak over music, or a lead guitar plays a solo over the rhythm track in mixing.

Circuit Explanation

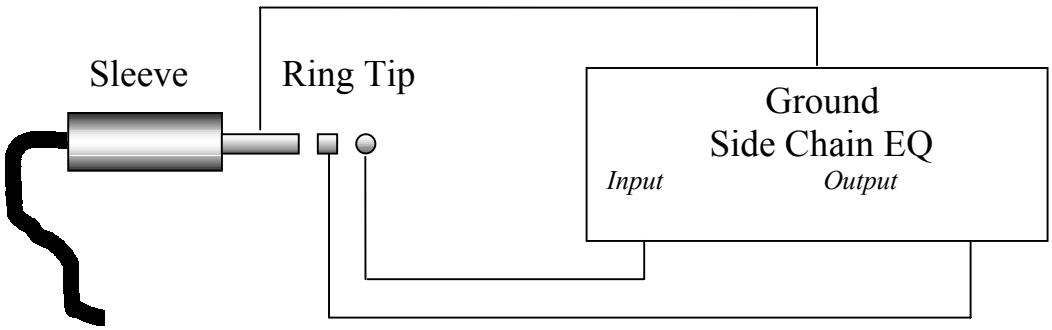
Linking:
The DCL-200 is organized so that in stereo link mode the AC Threshold, Slope, Attack, and Release controls on the top channel operate both channels. The channel 1 side chain is fed with the sum of channel 1 and 2 (combined mono signal). The side chain then generates the controls for both channels. The only problem with this method occurs if the stereo signal has a large out-of-phase component (180 degrees). This out-of-phase signal will sum to zero and not generate any gain reduction. Mono compatibility is necessary for any sound that has the potential for radio or TV play. The DCL-200's method of stereo linking will work very well when the source is mono compatible.

Attack and Release:
The attack and release settings will change the gain of the side chain. With the attack set at 10 and release set at 0, a voltage divider circuit is formed creating a low output voltage to the control circuit. In this case, increase the setting of the AC Threshold control. By setting the attack at 0 and release at 10, there is no voltage loss in the circuit. The AC Threshold control will need a much lower setting to achieve the same amount of gain reduction as in the previous example. By allowing this interaction, you can adjust the circuit for peak or average responding operation. This allows adjustment of the DCL-200 to deliver a larger variety of smooth sounds.

Audio Path:
The Audio path has a balanced input followed by the gain cell, a tube amplifier, and a balanced discrete output stage using Dean Jensen designed 990 Op Amps. The 990's are arranged so that operation in either balanced or unbalanced mode will result in the proper gain structure. The tubes are hand selected 12AX7A's which are tested in circuit and fully burned in before shipping. They have well regulated power supplies and DC on the filaments. All amplification is done with the vacuum tubes. The input stage is operated at a loss to provide the input clipping level of +24dBm.

The gain control device is a proprietary design that synthesizes what the old photo resistor, light source compressor-limiters did. Our approach allows a much faster response time, wider bandwidth, and lower distortion. The frequency response –3dB point is 70kHz and increases as you go into gain reduction. The meter displays the output signal level as if the DCL-200 is not bypassed, and when the DCL-200 is bypassed, the tubes are in the signal path.

Side Chain:
This connection allows for the insertion of an equalizer in the side chain to make the DCL-200 a frequency selective compressor-limiter. Program material with large amounts of low frequency may have the low frequencies attenuated in the side chain, causing the low frequency content to not affect the gain reduction. High frequency response of the side chain may be boosted to help prevent high frequency overload; the DCL-200 can become a "de-esser" in this mode. When stereo linked, the insert point for the top channel (channel 1) controls both channels 1 and 2.



Side Chain connections are unbalanced

A Word About Tubes

The tubes that are used in the DCL-200 are selected to give the best possible performance in the position that they are in on the printed circuit board. Switching them to different positions will cause performance deterioration on the audio path. Replacing them with "gold" or high end tube types may not be desirable. In cases that we have measured, these tubes have shown higher distortion and noise as compared to the tubes we have selected. In some cases, the so called "gold" or high end tubes have made the unit unusable. The reason for this is some of the "gold type" tubes are selected for high distortion in guitar amplifiers. Using gold tubes is no guarantee of better performance. All of these so called "Brand X" types are selected with 6.3 volts AC on the heaters, whereas Summit Audio uses 5 volts DC on the heaters for longer tube life and lower noise. The reduced gain can raise the noise floor, increase distortion, and reduce headroom.

For proper performance from a tube, the replacements must be selected using 5 volts DC on the filaments. The tubes we use are selected in the circuits that they are used in to ensure proper operation, long life, and low distortion and noise.

In at least 50% of the cases we have tested, gear that has been used for several years actually have lower noise and distortion levels than when new. This makes the question of when to replace tubes difficult to answer. If a tube turns micro-phonic, the distortion will be obvious and the tube must be replaced. However, tube life will most likely be greater than 10,000 hours of operation. Tubes are generally very reliable; don't replace them just because they are old. In the DCL-200 there are gain adjustments that will need to be checked when the tubes are replaced, or else the metering could become inaccurate and the noise floor could change. Replacement should be done on the bench with a distortion analyzer attached to ensure that the distortion levels are proper and it is comprised of second order harmonics.

Before replacing the tubes in your DCL-200, please talk to your dealer, call Summit Audio, or find a technician who has experience working with tubes and high end audio equipment.

Electrical Connections:

(This DCL-200 is wired as a pin 2 hot device. Units made before March 1st, 2003 come factory wired with pin 3 hot.)

Input:

Unbalanced:	3 pin XLR Connector Pin 1 – Ground Pin 2 – (+) Signal Pin 3 – Connect to Pin 1	Balanced:	3 pin XLR Connector Pin 1 – Ground Pin 2 – (+) Signal Pin 3 – (-) Signal

Output:

Unbalanced:	3 pin XLR Connector Pin 1 – Ground Pin 2 – (+) Signal Pin 3 – Connect to Pin 1	Balanced:	3 pin XLR Connector Pin 1 – Ground Pin 2 – (+) Signal Pin 3 – (-) Signal

Side Chain:
Tip – Signal output (to EQ)
Ring – Signal input (from EQ)
Sleeve - Ground

Note: When running an unbalanced output it is best to connect pin 3 to pin 1 in the connector that plugs into the DCL-200.

Allow the DCL-200 to warm up for at least 15 minutes before using it in your processing chain. The tubes and other circuitry need time to reach an electronic equilibrium before they will operate at optimal specifications. For the longest life, it is recommended that you turn off the unit when it is not in use.

Please mount the unit in your rack, making sure that there is sufficient ventilation, especially on the right and left side of the chassis. The DCL-200 will generate a significant amount of heat; therefore, it is necessary to have good air flow to prevent damage to your DCL-200 or any other pieces of gear housed in the rack with it.

The tubes in your Summit Audio DCL-200 have been intensely screened for desired distortion and gain characteristics. We recommend that you do not replace the tubes with "guitar amp" tubes. Please consult your dealer about availability of appropriate replacement tubes. These can also be ordered directly from Summit Audio.

Please fill out the enclosed warranty card. If you have any questions about the operation of your DCL-200, please do not hesitate to call our customer service department at (775) 782-8838 or contact us on the internet at: sound@summitaudio.com.

Note on specifications: Summit Audio is uncompromisingly committed to excellence. All of our specifications are made with the latest technology and are UNWEIGHTED measurements. What does this mean? When measurements are "weighted" (e.g. "A" weighted, dB (B), dB C weighted, etc.), the measurement devices are basically EQed or filtered before the measurement is taken. This filtering was developed so that sound pressure level (SPL) measurements can more nearly match human's non-linear hearing characteristics. However, when used in noise, frequency response, and distortion measurements, weighting will alter the results. Completely flat frequency measurements are key to giving accurate specifications. Summit Audio devices are the highest quality professional audio gear and the specifications below are made with the flattest possible unweighted measurements, giving the most accurate results.

Specifications:

- Output: +4dBu corresponds to 0 VU. The output is balanced or unbalanced using 990 operational amplifiers. Output impedance is 75 Ω. The recommended output load is 600 Ω or more. Maximum output approaches +30 dBu.
- Input: The input is electronically balanced with and input impedance of 40 k Ω, with input clipping at +24dBu.
- Frequency Response: 5 Hz to 70 kHz
- Noise: Less than –80 dBu at unity, 10 Hz to 80 kHz
- Distortion: Less than 0.05% at +4 dBu
- Attack Time: 0.1 mS to 100 mS
- Release Time: 45 mS to 10 S
- Slope: Adjustable from 1.1:1 to 7:1
- Panel Size: Standard 19" by 3.5" (2 units of rack space)
- Depth: 10.5"
- Power: 40 watts, 115 or 230 volts, 50 or 60 Hz
- Fuse Size: 0.5 Amp for 115 VAC, 0.25 Amp for 230 VAC
- Shipping Weight: 20 lbs. (9KGs)

To operate this unit on 115 volts, unplug the unit, switch the line voltage selector on the back of the unit to read 115 volts and confirm that the external fuse (mounted in chassis) is a [3 AG ½ Amp slow blow]. To operate this unit on 230 volts, switch the line voltage selector on the back of the unit to read 230 volts and confirm that the external fuse (mounted in chassis) is a [3 AG ¼ Amp slow blow].