Diamond Cut Millennium / LIVE Manual Addendum

We have added several new features since the last printing of the manual. These features are covered extensively by our new Help section, but we also thought we'd make mention of them here for you „Manual Readers".

2 New CDs available

We have two new CD's that are on the market since the last printing of the Manual.

Edison Diamond Disc Fox Trots: 1920 - 1923 (DCP-307D)
*Rudy Vallee and His Connecticut Yankees: 1928 - 1930 (DCP-308D)*

LIVE Log To Disk Mode

You can now „Log to Disk" (to your hard drive) the output content of the signal path being used in Live mode. This can be useful if it is necessary to create an archive recording of surveillance or a broadcast session. To perform this function, merely click on the „Log to Disk" toggle button on the Live screen. Thereafter, whenever you click on the „Live" button, whatever signal is being processed will be logged to the disk under the Filename indicated below the „Log to Disk" toggle button.
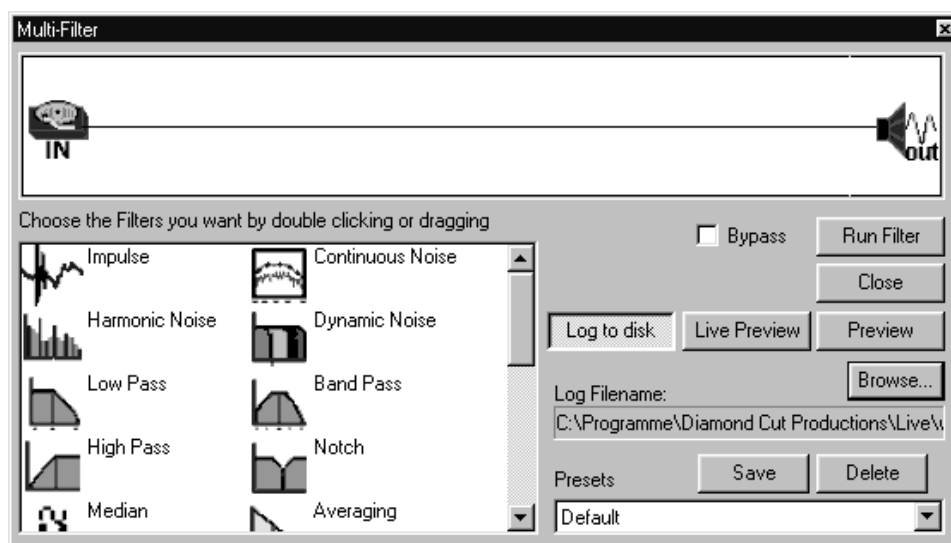
Automatic Level Control (ALC or AGC)

The Dynamics Processor now includes an automatic level control feature (ALC). Sometimes, these algorithms or systems are referred to as automatic gain controls or AGC's. This feature provides upward expansion of signals below the threshold line and downward compression of signals above the same threshold. This feature is useful in Forensics applications where there is a large variation in signal levels between several different parties which may be communicating with one another. It is also useful for the broadcast of Live sporting events (if you have the LIVE version of the product) in which the crowd reaction is of interest when the announcer is not speaking. This feature is activated by simply clicking on the ALC box in the Dynamics Processor. The threshold, attack, and release controls are still active when this function is invoked.
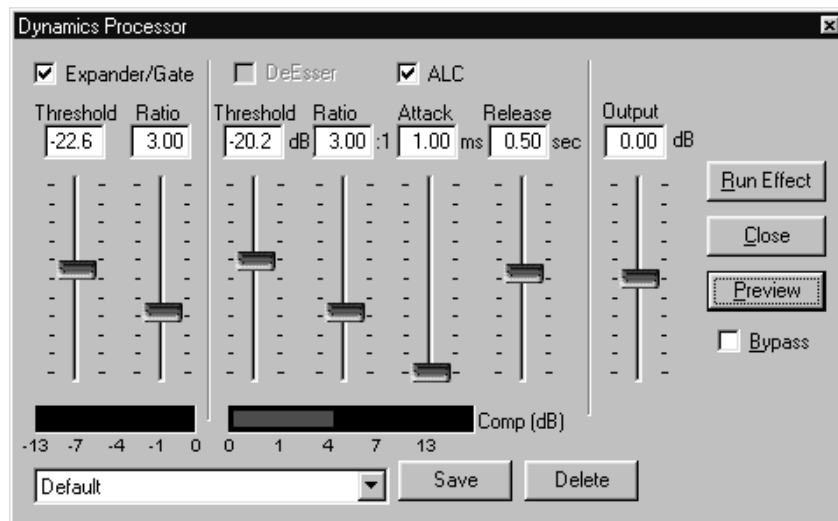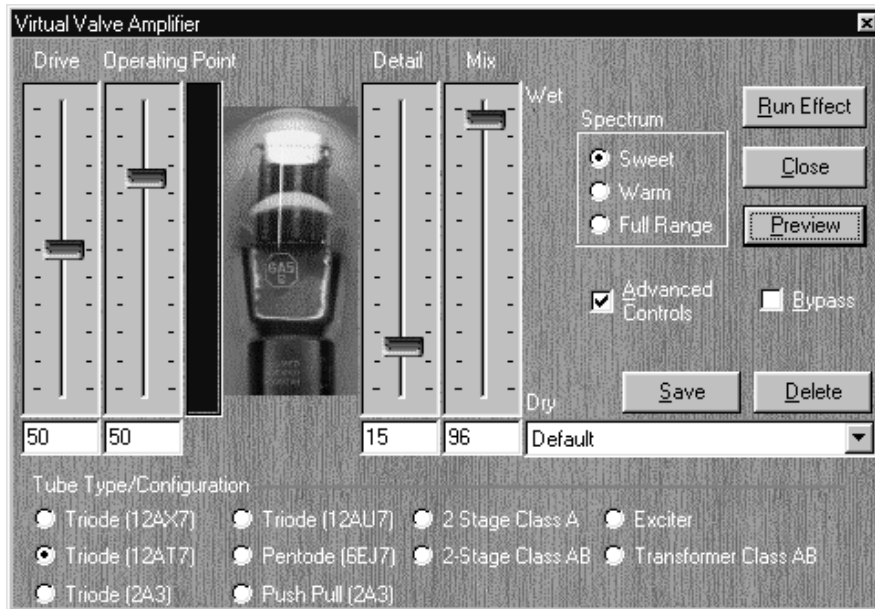

Output VU Meters

Two 100 segment VU meters can be displayed which will indicate the output of any filter or multiple filters that are being used by LIVE or Millennium. These meters indicate the level of the left and right channels and have both average and peak reading ballistics. They are calibrated to indicated values from –50 dB to 0 dB, with 0 dB being full-scale output. Any signal above that level will be clipped by the system. These meters can be activated or de-activated under the View Menu. Also, they can be „dragged and dropped" anywhere on your desktop workspace using your left mouse button.
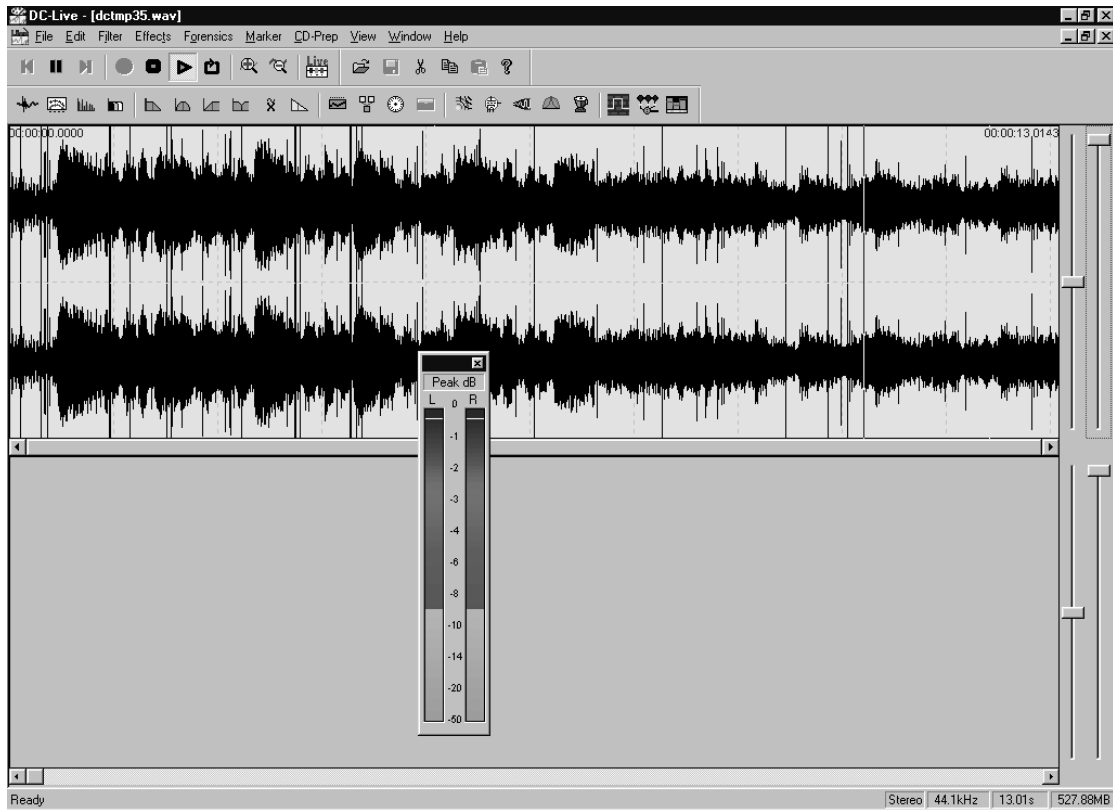
New Retro-Tube (2A3) Added

2A3 Push-Pull

The 2A3 is what some people refer to as a „retro – triode." It was invented in the 1930's, had a directly heated cathode, and produced a high power output at its time of development. It was often found used in theatrical applications and public address systems. The „Push-Pull 2A3" VVA setting uses the 2A3 triode implemented in a „push-pull" class AB1 power amplifier circuit designed to produce 15 Watts of output power. This configuration exhibits a more linear output transfer characteristic compared to its Pentode push-pull counterpart. We have included the 2A3 tube in this particular configuration in the Diamond Cut VVA because a musician friend of ours (Les Paul) recommended that we do so because of its unique characteristics. He explained to us that he used a push-pull pair of these devices as the power amplifier to „cut" all of the records that he released from his own home studios. The reason that he used these was the extremely clean sound that they produced. The particular devices that we used to create the 2A3 VVA models were of the „dual – plate" variety. The devices used were taken from new (unused) but old stock and were manufactured for the military by RCA Victor in 1953.

Virtual Valve Amplifier

Drive Operating Point Detail Mix Wet

Spectrum
- ○ Sweet
- ○ Warm
- ○ Full Range

☑ Advanced Controls ☐ Bypass

Dry

Run Effect
Close
Preview

Save Delete

50 50 15 96 Default

Tube Type/Configuration
- ○ Triode (12AX7) ○ Triode (12AU7) ○ 2 Stage Class A ○ Exciter
- ● Triode (12AT7) ○ Pentode (6EJ7) ○ 2-Stage Class AB ○ Transformer Class AB
- ○ Triode (2A3) ○ Push Pull (2A3)

2A3 Single-Ended

This is a single ended class A power amplifier implemented using the 2A3 power triode. It exhibits reasonably good linearity and about 4 watts of audio in a „single-ended" class A configuration. Its dominant distortion products are „evens." This is the only power triode in the Diamond Cut VVA suite of tubes.

Spectrum Analyzer Upgrade

We have made significant changes to the floating Spectrum Analyzer. This analyzer can be used with any of the Diamond Cut filters or effects. It is connected to the output of the filter or effect, so that you can see, in the frequency domain, how you have affected the file. If you want to compare the output of the filter or effect to the input, use the bypass function on the filter or effect window. Since the Diamond Cut Spectrum Analyzer utilizes constant Hertz per frequency band, it will display white noise as a flat, horizontal line. This is unlike octave weighted real time audio analyzers in which white noise produces a diagonal, positive sloped line, and pink noise produces a flat horizontal line. Conversely, pink noise displayed on the Diamond Cut Spectrum Analyzer will be displayed as a negative sloped diagonal line. Keep in mind that the use of the Spectrum Analyzer will slow your system down slightly. Therefore, when you are done using it, shut down the Spectrum Analyzer in order to maximize processing speed. The following displays are provided on the Diamond Cut Spectrum Analyzer:
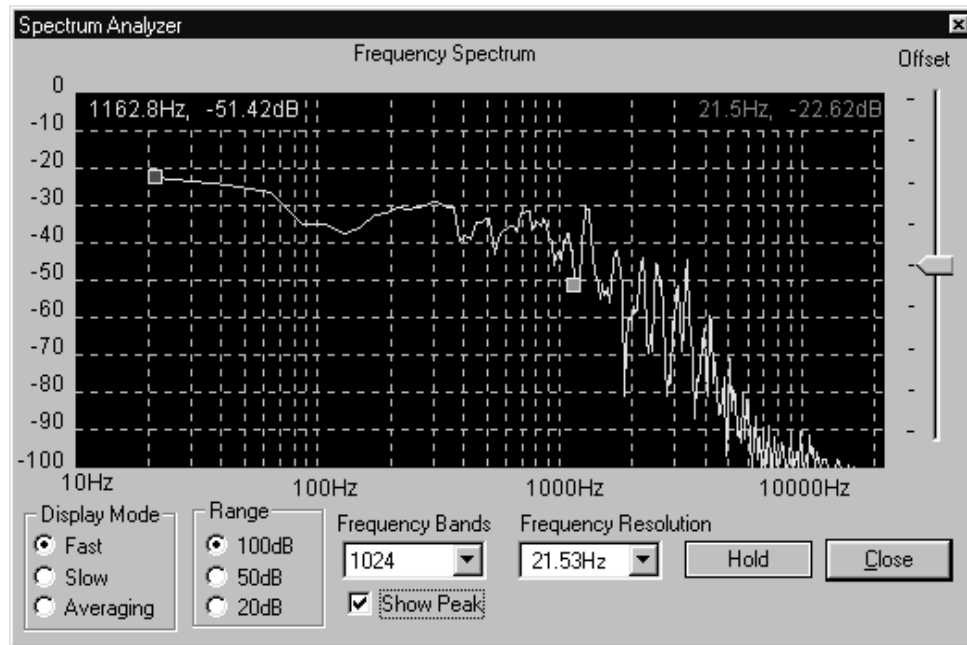
1. A frequency vs. amplitude graph of the signal is presented. The vertical axis indicates 0 dB at the top and ranges down to –100 dB at the bottom. The horizontal axis indicates frequencies from 10 Hz (left) to a little over 20 KHz (right.)

2. Two digital readouts indicate the frequency and amplitude of signals feeding the Spectrum Analyzer. One signal is the peak value and the other is user defined.

The following controls are provided:

1. Display Mode:

   Fast: Shows the spectrum in almost real time.

   Slow: Shows the spectrum with slower ballistics.

   Averaging: On / Off: This allows the system to provide you with the average signal spectrum rather than a real time display. The averaging interval will be as long as the analyzer is left in operation.

2. Frequency Bands: 3 selections (1024, 2048, or 4096 bands)

   This selection determines the frequency resolution of the Spectrum Analyzer. The higher the number selected, the better will be the frequency resolution of the display.

3. Range: This scales the vertical axis to 100 dB, 50 dB, or 20 dB full scale. This feature along with the offset control allows you to hone in on a particular signal.

4. Hold Button: This is a „toggle" function and will allow you to freeze or un-freeze the spectral display update.

5. Show Peak Button: This feature will automatically find the peak amplitude signal and display its Frequency and Relative Amplitude value in the upper right hand corner of the Spectrum Display screen. The marker and display for this feature are red in color.

6. User Controlled Marker: You can place a marker anywhere you want on the spectral display by clicking the left mouse button on the peak that you are interested in measuring. To accomplish this, merely point the mouse cursor to the peak of interest and click the left mouse button. A green marker will appear at that location and a yellow digital display of the frequency and relative amplitude of the signal that you pointed to will appear in the upper left hand corner of the spectral display. To read another value, merely click the mouse again, pointing to a new spectral line. The marker and the display will then be updated.

7. Frequency Resolution: The Spectrum Analyzer has the ability to display frequencies with the following values of resolution:

·   21.53 Hz

·   10.77 Hz

·   5.38 Hz

·   2.69 Hz

·   1.35 Hz

·   0.67 Hz

You can choose any value you desire by selecting the appropriate setting.

8. Offset Slider Control: This allows you to move the centering of the spectral display up or down. It is of particular value when the „Range" control is set to a high sensitivity value such as 50 dB or 20 dB, and the signal appears to be off of the screen. By using the Range control and the „Offset Slider" control, you can zoom-in on a signal of interest.

9. Ultra High resolution forensics mode: If you click on 0.67 Hz, the system will re-scale the horizontal (X) axis of the spectral graph to indicate 500 Hz full scale rather than 20 KHz. To augment this capability, use the Range control setting at 20 dB and the Offset control to zoom in on the signals of interest. This combination of features are particularly useful when trying to determine if a forensics recording is a „dubb" of the original by looking for two discrete „hum" frequencies on the spectrum. Two separate „hum" signals indicates the presence of a „dubb."

If you have an original recording, it will inevitably include some line frequency noise (or hum) along with its signal. This "hum" is due to induced stray line frequency (usually "H") fields which gets into the recorder via small parasitic loop areas in the pre-amp circuit or via the dynamic mic (if that was the type used) or via the telephone line (if that was what was recorded). This signal will often be very small, but almost always measurable with a good spectrum analyzer. If a copy (or dub as we call it) is made of the original tape, a second frequency will show up in the spectrum. Now, you could argue that this new frequency should be the same as the original line frequency because the source frequency usually will be. However, because analog tape recorders do not record or play with perfect speed, the copy of the original will contain two frequencies at approximately the line frequency rate. One frequency will be related to the original noise signal from the original recording, and the other will be a signal induced via the power line emissions into the second recorder onto which the copy is being made. In Europe, the dominant component of these noise signals will usually be approximately 50 Hz, while in the US and some other countries, it will be approximately 60 Hz.

By measuring the signals in the 50 to 60 Hz range with the high resolution spectrum analyzer feature, one can resolve whether there exists the presence of a second line frequency (hum) spectral line. If there are two spectral lines, this is an indication that the specimen that one has analyzed is a copy of the original. If the specimen has only one spectral line occuring at the line frequency, then it is most likely an original recording.

Punch and Crunch

Punch and Crunch is a new four band dynamic expander (punch) and compressor (crunch). It is useful for a number of applications such as the following:

1. Adding dynamic range or „Punch" back into severely compressed radio broadcast or vinyl recordings.
2. Adding „dial presence" or „Crunch" (compression) to radio broadcasts, without suffering the „pumping" effect found in conventional wide-band dynamic compressors.
3. Decreasing the dynamic range of classical music so that it can be more „listen-able" in restaurant or automotive environments by applying the compressor function.
4. Improving the signal-to-noise ratio and dynamic range of old 78 RPM recordings.
5. Improving the intelligibility of forensics recordings.
6. Special Effects creation.
7. etc.
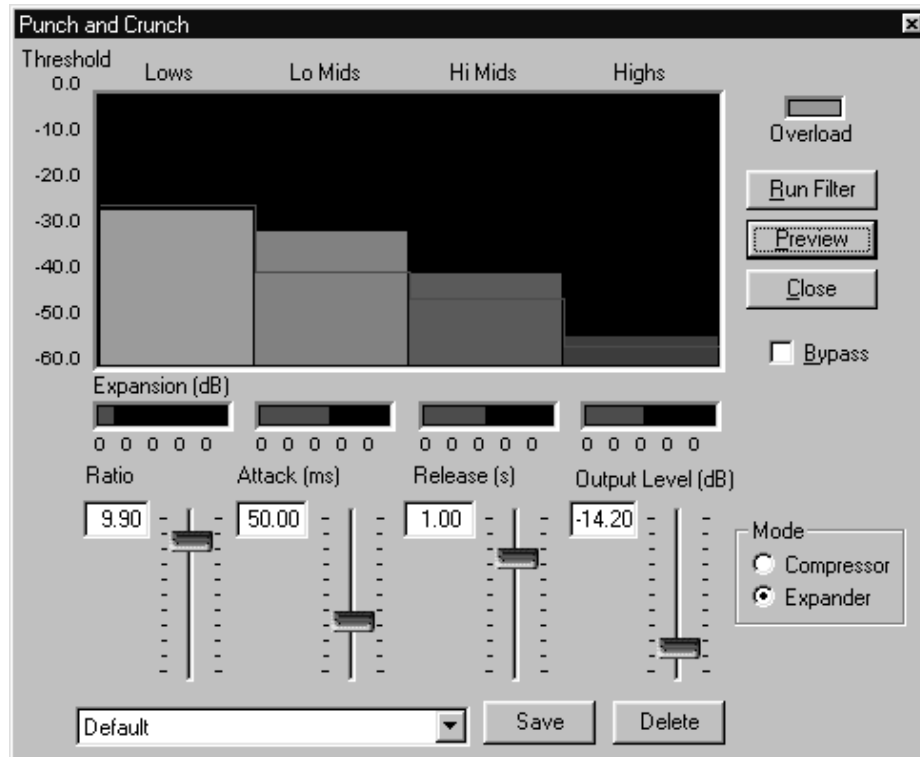
It works by breaking the audio spectrum into four separate bands. Each band is independently expanded or compressed when its signal exceeds the graphical display of its particular threshold line. The degree to which the bands are expanded or compressed is modified by using the ratio control. The actual compression or expansion of any particular band is shown by horizontal bar graphs for each band which are calibrated in dB. The bands are broken into the following „buckets":

Band 1: 0 to 125 Hz
Band 2: 125 to 900 Hz
Band 3: 900 to 4000 Hz
Band 4: 4000 to 20,000 Hz

The following controls are provided on Punch and Crunch:

1. Graphical Display of the four bands. Each band is represented on this graph and the incoming signal presented on each band will modulate the vertical displacement of each band. Threshold for each band can be dragged with the left mouse button to the desired position. When the threshold is dragged all the way to the top, that band will have no dynamic compression or expansion effect. When a band is dragged all the way to the bottom, it will have a maximum compression or expansion effect.

2. Graphical Display of the Expansion or Compression of each band. This graph is horizontally modulated and located beneath each of the four bands. It is calibrated in dB. It will tell you the amount of compression or expansion being applied to its associated band.

3. Ratio: This controls the degree of compression or expansion applied to the system. When the system is operating in compression mode, you can choose up to 30:1 compression. When the system is operating in expansion mode, you can choose up to 15:1 expansion.

4. Attack: This determines the time constant associated with the onset of this effect and is calibrated in mSec.

5. Release: This determines the time constant associated with the decay time for this effect and is calibrated in Seconds.

6. Output Level: This allows you to adjust the output level of the system. Use this in association with the Overload indicator to minimize clipping distortion.

7. Mode: This allows you to choose either Expansion (Punch) or Compression (Crunch) modes of operation.