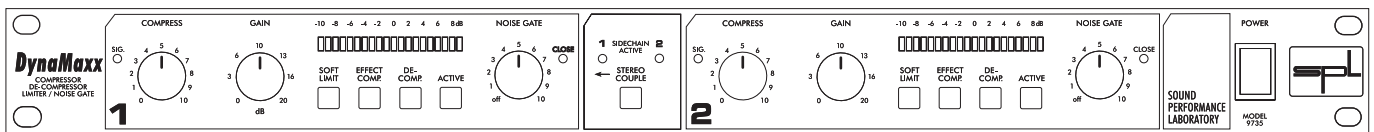




soundperformancelab.com



# Manual



# DynaMaxx

Model 9735

Compressor/De-Compressor, Limiter, Noise Gate

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# Manual

R & D: Ruben Tilgner

Version 2.3 - 8/2000

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Dear customer,

Thank you for the confidence you have shown towards SPL electronics GmbH by purchasing the SPL DYNAMAXX. You have decided to use a tool of high performance which sets you in the position to have faster success and a better sound quality in your music productions, live sound applications and pre-masterings. As a typical SPL unit the DYNAMAXX combines exemplary specifications and high manufacturing standards with excellent sound quality to provide you a precious component for recording purposes.

Please read this manual carefully to ensure you have all the information you need to use the DYNAMAXX. We wish you every success with your new DYNAMAXX.

*Your Sound Performance Lab-Team*

I would like to start with my thanks to all our staff, who created what is to be described here. The importance of their exceptional qualification and talents cannot be overestimated. Special thanks go to Ruben Tilgner for his extraordinary work on time constants automation.

Our products are often tested and compared in many publications and by our customers themselves and constantly valued with best results. I would like to pass on this broad appreciation to those, who deserve it – my excellent colleagues.

*Hermann Gier*

**Foreword**

**Thanks**

# Introduction

*The DYNAMAXX is a new type of compressor-limiter.*

*DYNAMAXX premieres a new function: the DE-COMPRESSOR.*

*DYNAMAXX adaptively and intelligently optimizes all time constants while processing so that you gain optimum compressor performance throughout a song.*

*DYNAMAXX is the first compressor to use the new THAT 2181 VCAs – in SPL's Double VCA-Drive™ mode.*

*The applications are in recording, mixing, and mastering.*

Part of the SPL Analog-Blue series, the DYNAMAXX is a new type of dynamics processor that has both corrective and creative applications in those areas normally addressed by conventional compressors. In keeping with the SPL design philosophy, it incorporates many new features not found on standard compressors, and a slightly unconventional approach to the control system makes it surprisingly easy to use.

DYNAMAXX also premieres a new facility, the DE-COMPRESSOR, which may be used to counter the effects of overcompression in previously processed source material. DYNAMAXX can be used to provide unobtrusive compression and limiting at the premastering stage, or to produce creative compression effects.

Why is DYNAMAXX so different? Though auto attack and release functions are nothing new, in the DYNAMAXX design, the time constants are automated in a very musical way. DYNAMAXX adaptively and intelligently optimizes all time constants in real time during processing so that the compression characteristics are continually matched to the source material. DYNAMAXX is also the first compressor to make use of the new THAT 2181 VCAs, and the circuit actually uses two of these excellent VCAs in SPL's Double VCA-Drive™ mode configuration, which doubles the operating range while increasing transparency and reducing distortion.

A benefit of the DYNAMAXX circuit is that high compression ratios do not affect high frequency detail – high amplitude, low-end bass can be controlled without introducing pumping or other negative side-effects. Similarly, complex stereo sources can be processed easily and very musically. DYNAMAXX has numerous applications in recording and mixing, as well as for cost-effective stereo mastering, and because of the level of intelligent processing within the unit, there are only two controls to adjust per channel, making operation very intuitive.

## CONTROL OVERVIEW

### **COMPRESS:**

Sets the amount of compression, while the degree of gain reduction is continually monitored via the LED meters.

### **GAIN:**

This is similar to the 'make-up' gain control used on conventional compressors and is provided to restore signal levels that have been reduced by the compressor action. This control also compensates for any gain increase in DE-COMPRESSION mode. The control has a range of 20dB.

### **SOFT LIMIT:**

Switches between COMPRESSION and SOFT LIMIT mode featuring a gentle soft-knee-characteristic to minimize audible side effects.

### **EFFECT COMPRESSION:**

In this mode, the Release time is set to a fixed 60ms to produce a 'vintage compression' effect that works well on solo instruments and occasionally voices.

### **DE-COMPRESSION:**

converts the compressor to an intelligent upward expander that allows you the de-compress highly compressed audio signals, such as samples, keyboards sounds or previously recorded tracks that have been overcompressed. For example, the sounds used in most drum machines are highly compressed, but processing them via the De-compress mode restores their dynamics and vitality.

Each channel incorporates a NOISE GATE with ARC (Auto-Release-Circuitry), and this too is highly automated. In a mastering situation, it may be used to provide click-free gating at the beginning and the end of a song. The CLOSE-LED indicates when the NOISE GATE shuts.

Both channels of DYNAMAXX are equipped with a 20-digit LED ladder meter displaying gain changes to a resolution of 1dB. The displayed values range from -10dB to +9dB.

Each channel also has an additional SIGNAL-LED which illuminates when the input signal is hotter than -40dB.

If it is required to patch in external processing, both left and right channels have SIDE CHAIN inputs. If an acceptable sidechain signal is being received, a LED on the front illuminates.

When processing stereo material, the STEREO COUPLE function should be switched on so that both channels produce the same-degree of gain change. This is necessary to maintain a coherent and stable stereo image. The front panel controls, including the ACTIVE switch of channel 1, function as master controls in STEREO COUPLE mode.

The housing of the DYNAMAXX has the standard 19"- EIA format and occupies 1U (44.45 mm) in your rack. When installing the unit in a 19"-rack, the rear side of the unit needs some support, especially in a touring case.

The DYNAMAXX should not be installed near units which produce strong magnetic fields or extreme heat. Do not install the DYNAMAXX directly above or below power amplifiers.

Check that the voltage details quoted on the back panel are the same as your local mains electricity supply. Use a minus (-) screwdriver to set the voltage selector to the voltage for the area in which the unit will be used.

Never cover up the ventilation slots on the top of the unit. If, during operation, the sound is interrupted or indicators no longer illuminate, or if abnormal odor or smoke is detected, or if liquids are spilled on the unit, immediately disconnect the power cord plug and contact your dealer.

Only clean your DYNAMAXX with a soft, lint-free cloth.

*Regain vitality and dynamics  
from highly compressed  
audio files*

**NOISE GATE** with Auto Release  
Circuitry

*20-digit metering with 1dB  
resolution*

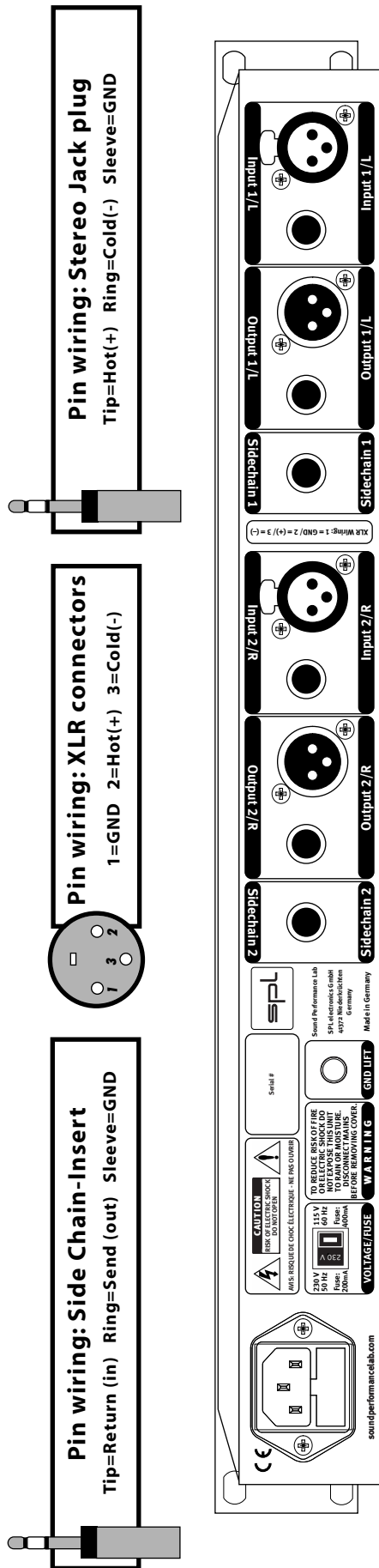
*SIDE CHAIN* inputs for external  
filtering or triggering

*STEREO COUPLE* mode

## **Operational Safety**

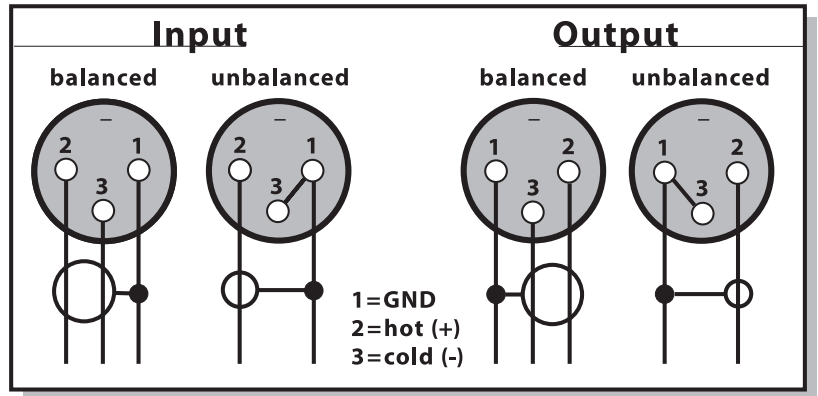


# Connections



DYNAMAXX is fitted with both XLR-connectors and TRS stereo jacks for balanced operation, though the jacks may be used with unbalanced connections simply by plugging in mono jack-plugs. The level difference that normally occurs when a balanced input or output is used unbalanced is automatically compensated for.

Should the need arise to use the XLR connectors in an unbalanced system, pin 3 of the XLRs should be grounded. Inserting a



mono jack also unbalances the XLRs.

Both output stages operate in parallel, so it is possible to connect two different destination units simultaneously, for example to record to two different media at the same time or split the output between a mixer and effects processor. However, only one type of input (jack or XLR) should be connected at a time – the DYNAMAXX is not intended to be used as a mixer!

To ensure optimal signal quality, SPL has developed a new hybrid-component balanced input/output stage using all laser-trimmed resistors with a tolerance of 0.01%. This approach has resulted in an exceptionally high CCMR (common mode rejection: -80 dB at 1kHz). As a precaution, before connecting the DYNAMAXX switch off the power to the unit and to all connected units.

## SIDE CHAIN

Each DYNAMAXX channel is equipped with a TRS jack sidechain insert point so that an equalizer may be inserted to provide frequency dependant processing. Connection requires only a conventional insert Y-lead, where the TRS ring connection provides the insert send signal and the tip the return. The front panel LED lights when the side chain signal is of adequate level.

## Example: Frequency dependent filtering

Connect the TRS jack to the Side Chain connector of the DYNAMAXX. The ring of the TRS jack carries the original signal into the DYNAMAXX to the input of the equalizer. The equaliser's output is returned to the DYNAMAXX on the tip of the jack plug. A LED on the front illuminates when a sidechain signal is present.

Other rear panel connections and switches:

- Voltage selector: 220-240V/50Hz or 100-120V/60H
- VDE/CSA/UL approved 3-pole power plug
- GND-Lift switch

This section deals with the technical background of the DYNAMAXX and explains why we felt it necessary to do some things rather differently to the way other manufacturers do them. We will also explain the benefits of the DYNAMAXX design.

Generally, the function of an audio compressor is to compress the dynamic range of the source signal by altering the gain of its signal path in response to the relative level of the signal as compared to an arbitrary threshold level. In effect, this process can be thought of as providing additional gain to low-level signals or reducing gain in the presence of high-level signals.

### ***Why are conventional compressors unsatisfactory?***

One of the main difficulties in setting up a compressor is choosing the time constants Attack, Decay, Sustain, and Release (in short: ADSR). The most important time constants are Attack and Release – in the context of gain control, Decay and Sustain are generally fixed and in any event, they tend to play a minor role. The inappropriate choice of time constants is mainly responsible for the familiar pumping or breathing effects, though this effects may be deliberately sought for creative applications. Unless the attack time is set to be very short, fast transient attacks may get through the system, because the compressor response is too slow to bring them under control.

Threshold and Ratio are easier to set up, but when high compression ratios are used, high frequencies tend to become overcompressed, which makes the material sound dull or lacking in presence. It is normal to set up compressors based on the loudest peak in the program material, in which case the parameters are optimised for this moment in time only. The rest of the time, the time constants are less than optimal. Taking into consideration that each musical instrument has varying attack and release times, depending not only on the character of the instrument, but also on the way it is played, you can see that it is almost impossible to choose a set of fixed parameters that will be correct for an entire piece of music.

In modern music productions, vocals are often recorded directly to a digital format, which means that gain control is very important due to digital systems' inability to tolerate excessive levels. It is extremely important to compress or limit the vocal part during recording so as to make the best possible use of the available digital headroom while preventing digital clipping. Vocals can have an extremely wide dynamic range, especially in the case of untrained pop singers, so for the best results, it may become necessary to re-adjust the compressor settings while recording.

The DYNAMAXX solves these problems by the use of intelligent automation – the compressor's time constants are re-adjusted adaptively in response to the changing dynamic characteristics of the music. In other words, DYNAMAXX intelligently optimizes Attack and Release times on the fly, which is why the control system is so simple. Both Threshold and Ratio are combined within the COMPRESS-control, and the advanced Double VCA Drive™ Technology maintains signal clarity, even at high levels of compression.

*What are compressors doing?*

*A brief description of the well-known problems with standard compressors*

*Static or fixed time constants are responsible for the negative side-effects. Music is not static and the attack and release parameters of instruments or vocals change throughout a song.*

*DYNAMAXX ingeniously adapts the time constants to the music and generates better compression set-ups than standard compressors.*

*Multi-band compressors split the input in several bands to overcome pumping effects. Mixing the bands back together creates phase inter-modulations resulting in audible sound colouration and loss of dimensions.*

*The full-band technology of DYNAMAXX does not reduce dimensions and avoids incoherence and sound colouration.*

*DYNAMAXX can be set up much faster than a Multi-band system.*

*An example illustrates the problems of adjusting the Attack time.*

## **Full-Band versus Multi-Band**

Some compressors try to solve the problem of high frequencies being modulated by low frequency compression by moving to a split band system, so why don't we do that?

Multi-band compression seems like a good idea to overcome the pumping effects caused by heavy bass compression also causing high frequency sounds to be pulled down in level. For example, with a regular compressor, you may be compressing a bass-drum but the Release time is set a little too long with the result that the following hi-hat gets ducked in level. Multi-band technology splits the original signal into two or more bands to be processed individually, and in this way, heavy gain reduction at the bass end doesn't affect the level of the high frequencies. The problem is that unless the design is very elaborate and well thought out, phase differences and other problems can occur between the bands, resulting in a less natural sound or in an obviously processed sound ("radio sound").

Until now, you had to choose between using a conventional full-band compressor or a multi-band design, but DYNAMAXX works differently from either and has significant advantages over both.

The secret is DYNAMAXX's new Double VCA Drive Technology™ using the excellent „2181 Super-VCA's" from THAT Corporation, and in addition to a very clean signal path, it provides two main advantages:

1. As explained, Multi-band technology has a significant sonic short-coming due to the way the original signal has to be split up into various bands, compressed, then mixed back together in a summing stage. Due to different levels of processing within the various bands, each band's output may be changed in phase response, so that when the bands are recombined, the signal tends to have reduced dimensions and sounds incoherent and coloured. Because DYNAMAXX doesn't split the signal into separate frequency bands, this problem is avoided.

2. DYNAMAXX offers simplicity of control. With Multi-band systems you have to set all the time constants plus GAIN, Threshold, and Ratio for each band. With a fully manual Four-Band-compressor, this would mean 20 parameters to set up per channel. DYNAMAXX only needs 2!

## **Dynamic intelligence: Attack time automation**

### ***How does DynaMaxx adjust the Attack time?***

To understand this, it's first necessary to see what happens when a compressor is used with a fixed Attack time setting. For example, the sound of low bass guitar note can either come in smoothly (especially with fretless basses), or with a very fast transient attack when slapping or popping playing techniques are used. If the Attack time is set to minimum (very short), the compressor is able to catch the peak of the transient attack but



any closely following notes will suffer increased transient distortion because the control voltage within the compressor rises further as successive notes are processed. This behaviour is sometimes described as 'surfing', and can be overcome by setting a lightly longer attack time, but now some peaks get through because they are faster than the compressor's Attack time. This problem is widely appreciated, which is why many manufacturers include a separate Peak-Limiter to catch those fast transients that the compressor is unable to control. If this is done using two VCA stages, the signal undergoes more quality degradation than is desirable, but even with designs that use the same VCA for both compression and limiting, you still end up with more controls than necessary.

DYNAMAXX doesn't need a separate Peak-Limiter, because it detects very fast transients automatically and activates a second and faster attack time circuitry. This ensures that no peaks slip through, but the speed of activating the second attack stage is so fast that all signals stay within the soft-knee curve for a more natural sound. To activate the second stage, DYNAMAXX continuously compares the output of the Attack time control stage with the input of Attack time control stage. If the comparison reveals that a fast transient has slipped through the first Attack time control stage, a second, much faster Attack time control stage is immediately activated to catch the peak. DYNAMAXX uses 12 dB/octave filtering instead of the 6 dB/octave filtering used in standard compressor side-chains so as to increase the precision and speed of transient detection and processing.

#### **How does this work?**

DYNAMAXX can reduce its Attack time in the instant of a percussive hit or bass guitar slap to a minimum of 50 microseconds. As soon as the peak is passed, the attack returns to a longer time constant (up to 10ms of first Attack time circuitry), and in this way, both pumping and distortion are avoided.

The ability of DYNAMAXX to respond so quickly to changes in program dynamics is clearly valuable when complex stereo mixes are being treated. If, for example, a snare drum peak occurs, DYNAMAXX rapidly changes to a very short Attack time so that the snare hit keeps its original transient characteristics rather than sounding 'softened'. Following signals are compressed using longer Attack times to minimize distortion and surfing – short attacks are only brought in when necessary to deal with fast, high level transients. If DYNAMAXX is operated in its normal compression mode, breathing and pumping effects are unlikely to be encountered, so this is the mode to select when compression is being used purely to control levels and to compress the dynamic range of the source material.

If pumping effects are needed for creative reasons, you have the option either to turn COMPRESS control to maximum and/or switch the unit into EFFECT COMPRESSION mode. For heavier effects, you can also depress the SOFT LIMIT switch.

- *Attack too fast: adds distortion plus "surfing"-effects*
- *Attack too slow: peaks slip through*

*DYNAMAXX's Attack time re-adjustment is fast enough to make an additional Peak-Limiter redundant*

*DYNAMAXX automatically adapts the Attack times to the characteristics of the music:*

- *fast transients: fast Attack times (> 50 μs)*
- *slow transients: slow Attack times (< 10 ms)*

## Dynamic intelligence: Release time automation

### *How does DynaMaxx adjust the Release time?*

Again, it is beneficial to look at what happens when the Release time is too short: In this case the compressor will restore normal gain conditions as soon as the peak has passed, and this rapid increase in gain is what we call breathing. Breathing is especially annoying during a part with soft strings or low level layered sounds – whenever a peak comes along, the strings duck down with it, only to pump up again when the peak is over. Sonically the sound image swims and pumps while the subjectively perceived loudness remains at a low level.

DYNAMAXX uses a special technique to overcome these problems. First it monitors the average music level. If a loud transient sound occurs (bass drum, snare and so on) that also has a big gain step, a very short Release time is set and the signal level is reduced to the calculated average music level, not to the threshold! If the compressor reduces the level to the Threshold (which is what standard compressors do), you would again hear pumping effects, because of the way low-level signals are lifted in gain.

The Release time is controlled depending on the difference between the actual peak and calculated average signal levels. If a large difference is detected, DYNAMAXX will set a faster Release time, whereas if only a small level difference is detected, DYNAMAXX will release more slowly. The Release time setting is, in effect, controlled by an RC-based analogue computer that dynamically calculates the various Release times.

*DYNAMAXX calculates  
“Multi-Release-Times“:*

- *Big and fast Gain changes:  
fast Release times*
- *Small and slow Gain changes:  
slow Release times*

## Threshold and Ratio

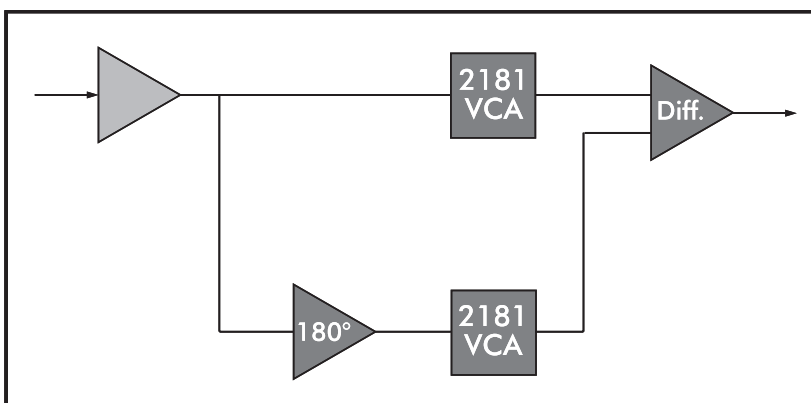
Threshold and Ratio are both set by the COMPRESS control; using a low setting for the COMPRESS control causes only the peak levels to be compressed, because the Threshold is relatively high. For more compression, turning the control clockwise has the effect of lowering the Threshold to include more low-level signals in the processing. As the Threshold is lowered, the Ratio is simultaneously increased, and the fully clockwise position is equivalent to a Ratio of around 3:1. However, the Threshold and Ratio values are not static, but rather vary depending on the attack and level characteristics of the source signal. Peak levels are automatically compressed with a higher Ratio to maintain control over maximum signal levels, but still using an unobtrusive soft-knee compression characteristic.

*The DYNAMAXX doesn't use static  
Threshold and Ratio values –  
they vary depending on the  
attack and level characteristics  
of the source signal.*

## SPL's Double VCA Drive Technology™

Double VCA Drive Technology™ utilizes two VCAs per audio channel, where one VCA handles positive current and the other negative. This way, the control voltage can effectively be halved, but the amount of gain change can be doubled. The benefit of this configuration is that the transistors within the VCAs don't run into saturation problems, which in turn avoids offset noise, generally audible as clicks and pops.

Compared with the acclaimed DBX 2150 VCA, the new THAT 2181 VCA is less sensitive to offset noise, and the Double VCA Drive configuration produces extremely good audio performance, both subjective and measured. The diagram illustrates the principle of this circuit:



**Diagram:**  
**SPL's Double VCA Drive Technology™**

The audio signal is split in two paths, one of which is phase inverted, and after having passed through the VCAs, the two signals are recombined in a differential amplifier. This topology causes a cancellation of negative side effects, mainly distortion and sound coloration, by the mechanism of common mode rejection (CMRR > 50 dB) within the differential amp. At the same time the original audio signal is increased in level by 6 dB.

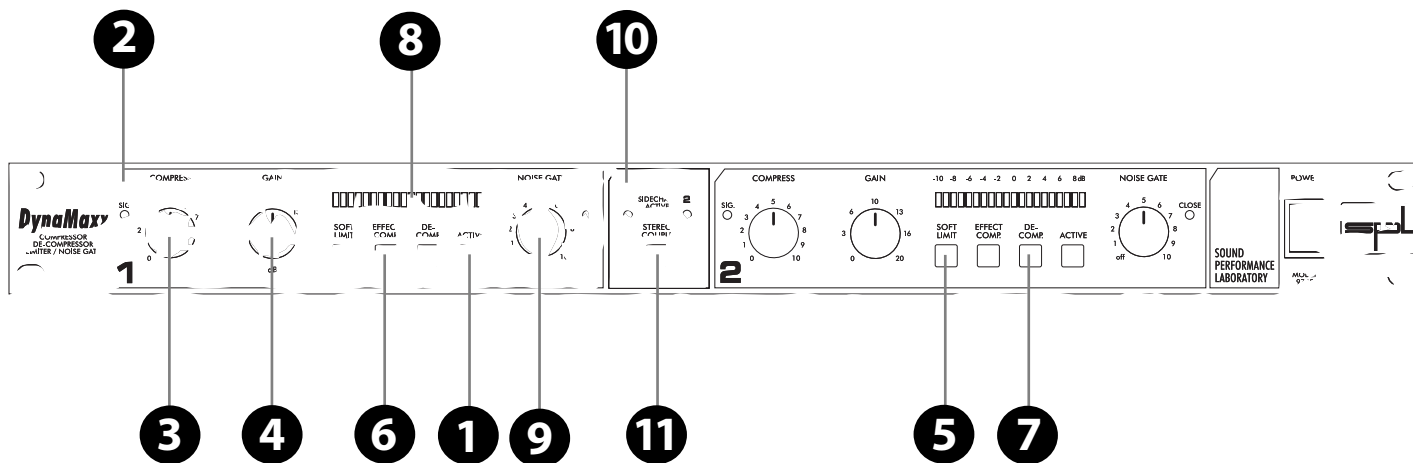
*SPL's Double VCA Drive Technology™ and the new „2181 Super-VCA“ from THAT Corporation double the operating range, realize extremely low noise and distortion figures as well as a unique sound quality.*

### **What are the practical advantages?**

Clearly one cannot expect the noise floor of the VCAs to be reduced by 50 dB, because noise is a non-correlated signal, but taking into account the 6dB signal boost, the noise floor is improved by 3 dB.

However, the real benefit is the reduction in THD (Total Harmonic Distortion). Although the THD spectrums of positive and negative half cycles are not identical, a significant degree of cancellation nevertheless takes place, and the residual THD is right at the limits of available measuring equipment. The same is true of intermodulation distortion and control voltage crosstalk, both of which are cancelled in the differential amplifier stage.

# Control Elements



## Active

*Relay hard-bypass XLR and jack inputs and outputs*

**1**

The ACTIVE switch operates a hard-bypass relay circuit to switch the channel in and out of processing and a status LED indicates that the channel is active.

The unit also switches to relay hard-bypass automatically in the case of a power failure, either on the primary or secondary side of the power supply, or when the unit is turned off at the POWER SWITCH.

If the DYNAMAXX is operated in the STEREO COUPLE mode (see 11), channel one's ACTIVE switch also switches channel two in and out. Note that channel two's ACTIVE status-LED will also follow channel one's ACTIVE switch status.

## Signal LED

**2**

Each channel is equipped with a SIGNAL LED (Sig. LED) that illuminates when the input signal exceeds -40dB. This is primarily an aid to setting up, and confirms a suitable input level, either when first adjusting the DYNAMAXX, or when inserting the unit into a new signal path.

## Compress

**3**

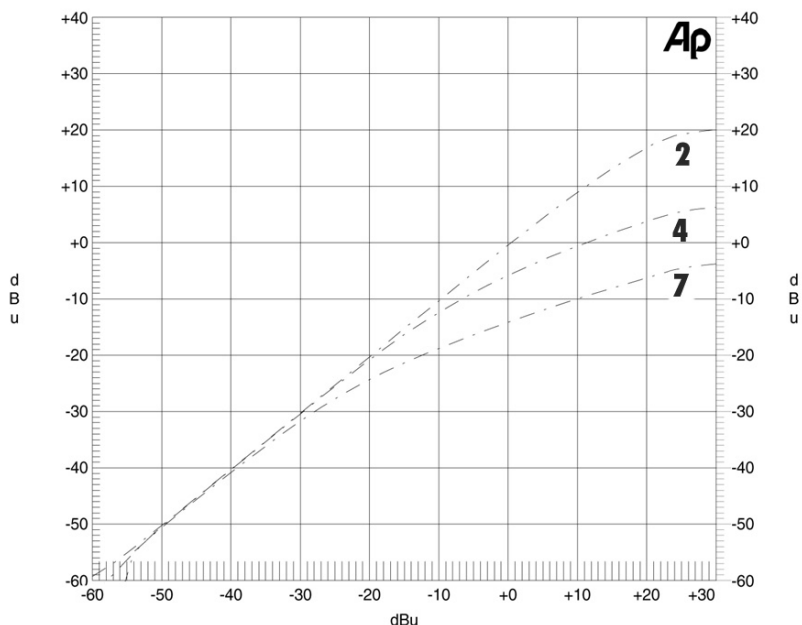
The COMPRESS control sets the compression intensity by varying both Threshold and Ratio simultaneously. Choosing low settings for the COMPRESS control will cause DYNAMAXX to operate as a peak compressor – as the Threshold is relatively high, only the peak levels are processed. For more compression turn the control clockwise, which lowers the Threshold and increases the ratio, thus extending the processing to lower level signals. The fully clockwise position is equivalent to a Ratio of 3:1, and the LED display (5) shows the equivalent gain reduction.

As with any compressor, the overall signal level decreases with increasing compression, so the GAIN control is used to compensate for this (also see 4). To compare input and output levels more accurately, monitor a precise PPM metering and set the GAIN control to a position where both the input and output peak levels are identical. This allows subjective judgements to be made concerning the increase in apparent loudness caused by the compression process.

**Examples on setting COMPRESS control**

1. You want to compress your program material only gently: Turn the COMPRESS control clockwise until the Gain Reduction LED ladder shows a peak level reduction of between 2 and 3dB. Turning the COMPRESS control further clockwise will lower the Threshold to include more low-level signals into the compression process.

2. Your audio source contains several amplitude peaks, but each peak has a different characteristic, so to obtain optimum results with a conventional device, it would normally be necessary to adjust the compressor during operation. DYNAMAXX performs this adjustment automatically so that peak levels are reduced according to both their actual peak level and their attack and release characteristics. The following diagram shows the gain control curve in normal compression mode. For better readability of the graph, the gain has been kept at 0dB, so no compensation for the gain reduction is applied.



**Diagram 1:**

*Normal Compression mode  
COMPRESS controls set to three values: 2, 4, and 7  
GAIN set to 0 dB*

The GAIN control compensates for any level decrease when applying COMPRESSION, EFFECT COMPRESSION (6), or SOFT LIMITING (5). The higher the processing intensity the lower the overall output level, the more Gain will be required to restore the same peak level.



**Gain**

## Gain

4

Turn the GAIN control clockwise until the peak level of the input is the same as the peak level of the output. If you use DYNAMAXX in a mastering application, you can use the LED display to evaluate the increase in subjective loudness. To do this, locate the highest peak level within the source material, and after having applied the desired degree of compression, set the GAIN control so that the peak level is reduced to 0 dB. For all lower-level sections of the material, the LED display shows the added loudness.

If the DE-COMPRESSION mode is active (7), the GAIN control compensates for the increase in peak level. Note that in this mode, turning the GAIN control clockwise decreases the output level. The control has a range of 20 dB.

## Soft Limit

5

In SOFT LIMIT mode, DYNAMAXX only processes the peak levels but leaves the gain structure of low-level signals unchanged. SOFT LIMIT mode is useful when recording on 'clipping-sensitive' media, such as digital recording systems as it improves the utilisation of headroom as well as the bit resolution.

The COMPRESS control sets the Threshold. The further the control is moved clockwise, the lower the Threshold, and all signals above the Threshold will be submitted to the limiting process as a fixed Ratio of ¥:1.

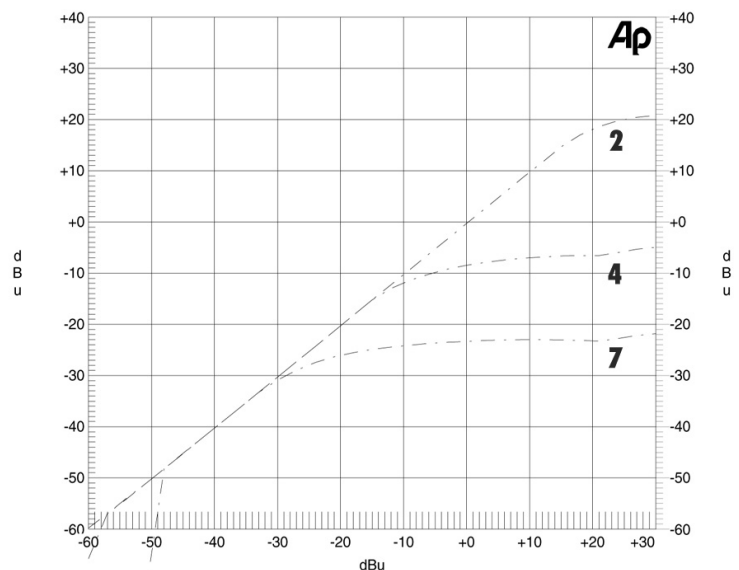
In comparison with a Hard Limiter, the Soft Limiter is less unobtrusive and sonically more natural. When a peak level exceeds the Threshold, the level isn't suddenly reduced, as would be the case with a Hard Limiter, but rather the Soft Limiter starts its processing earlier. This way, peak levels are limited far more smoothly once the Threshold is reached. The following measurements illustrate various soft-knee limiting curves from the DYNAMAXX.

### Diagram 2:

Soft Limit mode

COMPRESS control is set to three values: 2, 4, and 7

GAIN set to 0 dB



## 6

## Effect Comp.

The EFFECT-COMPRESSION function applies a fixed Release time of 60ms, but the Attack time is still automated. This mode increases the perceived loudness in comparison with the normal Compression mode, and audible compression artifacts can be generated for creative purposes.

The gain of the audio signal is restored to normal shortly after the 60 ms Release time has passed, creating deliberate breathing and pumping effects. The higher the COMPRESS control setting, the more intense those effects will become. The EFFECT-COMPRESSION mode is especially interesting when processing loops, samples or drum sounds.

The LED display provides a visual impression of the increased processing speed in EFFECT-COMPRESSION mode.

The DE-COMPRESSION function inverts the operation of the compressor to produce new dynamic headroom, which may be used to increase the dynamic range of a previously overcompressed signal. The process may also be used to expand the dynamic range of other sources, such as drum or synthesizer samples, but the expansion process is quite different to that normally found in compressors with integral downward expanders. A downward expander means that any signal below the Threshold will be even lower after processing, but with DYNAMAXX, signals above the Threshold are amplified and gain new headroom. For this process to be musically useful, it was essential that the time constants were musically automated – fixed time constants wouldn't do the required job. Perhaps that is one reason why it hasn't already been incorporated in the many compressors currently on the market.

### Special applications

1. To create a stereo-loop with a difference, try using the DYNAMAXX with both channels set separately rather than linked (STEREO COUPLE off). Channel one (left side), for example, could be set to pump and breath heavily by using EFFECT-COMPRESSION and setting the Compression control to 7 or 8. To increase the effect, turn up the Compression control to max or additionally switch in the Soft Limiter.

Channel two could be used in DE-COMPRESSION mode with the COMPRESS control also set to 7 or 8. For more dramatic action you can additionally activate the EFFECT-COMPRESSION and the Soft Limiter. Compensate for the level changes with the GAIN control and the result is amazing! You can either mix this underneath the original loop, use it as an effect or ...

2. If you are using drum sounds from samplers or drum machines, try processing them with DE-COMPRESSION mode: In addition to adding new life and dynamics to the sounds, individual beats get acoustically shorter, which helps them cut through a busy mix, even at lower levels.

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## De-Compression

**The DE-COMPRESSOR is not the same as an „Expander“!**

*The DE-COMPRESSOR inverts the function of a compressor and un-compresses audio signals.*

## De-Compression 7

Also the intonation of a Kick Drum is improved resulting in a better grooving rhythm. Remember that the operation of the GAIN control (4) is inverted when the DE-COMPRESSION mode is active. Turning the GAIN control clockwise lowers the output level to compensate for the level increase.

The DE-COMPRESSION mode has only a limited usability when processing stereo sources, but it can be useful to create special effects where the loudest sound elements practically jump out of the mix! After reducing the GAIN to restore the original peak level, you will naturally lose loudness.

The following measurements show various DE-COMPRESSION characteristics:

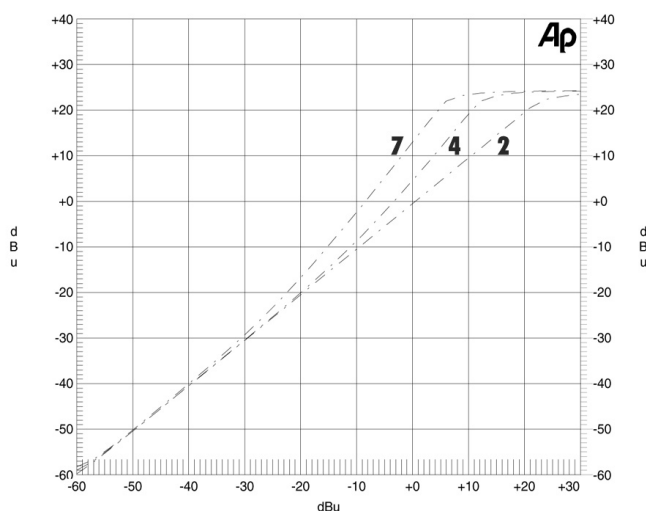
You can easily see from diagram 4, how the processing intensity is increased when the SOFT LIMIT mode is used at the same time as the DE-COMPRESSION mode. Peak levels will be amplified even more in this case.

### Diagram 3:

DE-COMPRESSION mode

COMPRESS control is set to three values: 2, 4, and 7

GAIN set to 0dB

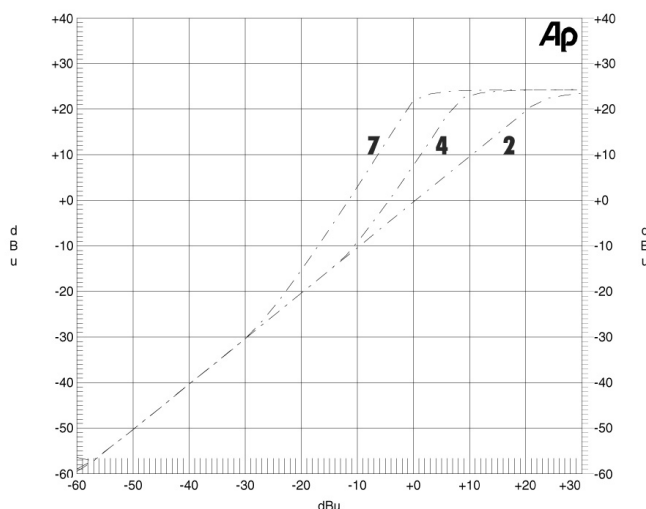


### Diagram 4:

DE-COMPRESSION plus SOFT LIMIT mode

COMPRESS control is set to three values: 2, 4, and 7

GAIN set to 0dB



Both channels of the DYNAMAXX are equipped with a 20-digit LED ladder meter capable of displaying gain changes to a resolution of 1dB over the range -10dB to +9dB.



When applying compression to the audio signal, the LED meter displays the amount of gain reduction taking place along with any gain compensation due to the GAIN control.

When the DE-COMPRESSION mode is active, the LED display shows the gain increase imparted to high-level signals.

Each channel incorporates a Noise Gate with ARC (Auto-Release-Circuitry), and like the compressor section, this too is adaptively automated. In a mastering situation, it may be used to provide click-free gating at the beginning and the end of a song.

The NOISE GATE control sets the Threshold above which the Noise Gate opens and below which the Noise Gate shuts, while the CLOSE LED provides a visual indication of when the gate is closed. The further the NOISE GATE control is turned clockwise, the lower the Threshold is set.

One important aspect of the Auto Release Circuitry is that it continually monitors the level difference between the audio signal and the Threshold set by the user. If a large difference is detected, a short Release time is applied, whereas with smaller level differences, longer Release times are applied, thus making the Gate action very musical. For example, if a song finishes with a reverb tail or a fade out, because the level differences within the fade are small, the Noise Gate will automatically set a long release time. In practice, the Release will track the decay down to -70dB, after which the Noise Gate finally closes, as indicated by the Close LED. If, on the other hand, the song finishes abruptly, the large level difference will cause the Noise Gate to apply a short Release time.

If it is required to patch in external side-chain processing, both left and right channels have SIDE CHAIN inputs, and if an acceptable side chain signal level is being received, a LED on the front illuminates.

Each DYNAMAXX channel is equipped with a TRS jack side-chain insert point so that an equaliser may be patched in to provide frequency dependent processing. Connection requires only a conventional insert Y-lead, where the TRS ring connection provides the insert send signal and the tip the return.

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## ***LED display***

**9**

## ***Noise Gate***

**10**

## ***Side Chain***

## ***Stereo Couple***

**11**

When processing stereo material, the STEREO COUPLE function should be switched on so that both channels produce the same degree of gain change, regardless of any difference in levels of the two channels. This is necessary to maintain a coherent and stable stereo image.

The front panel controls, including the ACTIVE switch of channel one, function as the master controls in STEREO COUPLE mode.

The Close LED of the second channel is independent from that of channel one, although the control voltage of the Noise Gate is still derived from channel one.

# Power Supply

Special care has gone into the design of the power supply of the DYNAMAXX because the power supply is the heart of any electronic system, and the better it is, the better the whole system works. In an audio system, this translates into better sound quality, lower noise and lower distortion.

The power supply is based around a 15 VA torroidal transformer and is designed to minimize induced hum and noise due to the lack of an air-gap.

The primary voltage may be selected between 230V/50 Hz and 115V/60 Hz by means of a recessed slide switch on the rear panel and a rear panel ground-lift switch is fitted for use where ground loops are causing hum problems. When the GND LIFT switch is depressed, the circuit ground is isolated from the chassis ground.

The detachable power cord is a standard 3-wire type fitted with an IEC mains connector; the transformer, power cord and mains connector have VDE, UL and CSA approvals.

The fuse has a value of 315 mA.

On the secondary side of the power supply, an RC combination is used to filter out noise and hum voltages. Both half-waves are smoothed with 10,000 microF capacitors in the positive and negative supply path, and both lines use precision voltage regulators for optimum stability. Deviations of only a few millivolts can impair audio quality, introducing artifacts such as loss of stereo imaging or a diffuse sound character.

Particular care has gone into the circuit layout and component choice to minimize crosstalk between the audio circuitry and control voltages.

*Torroidal transformer*

*Voltage selector*

*Ground-lift switch*

*Transformer, power cord and mains connector with VDE, UL and CSA approvals.*

*FUSES (primary voltages):*

*115 V: 800 mA*

*230 V: 315 mA*

*Positive and negative voltage paths are smoothed with 10,000 mF capacitors*

# Specifications

## Input & Output

Instrumentation amplifier, electronically balanced (differential), transformerless

Nominal input level .....	+6 dB
Input impedance .....	= 22 kOhms
Output impedance .....	< 600 Ohms
Max. input level .....	+24 dBu
Max. output level .....	+22,4 dBu
Minimum load ohms .....	600 Ohms
Relay Hard Bypass .....	yes
Power Fail Safety .....	yes

## Measurements

Frequency response .....	20 Hz - 100 kHz (100 kHz = -3 dB)
CCMR (common mode rejection) .....	> 80 dBu @ 1 kHz
THD & N .....	0,002% @ 1 kHz
S/N CCIR 468-3 .....	-89 dBu
S/N A-weightened .....	-105 dBu

## Power Supply

Torroidal transformer .....	15 VA
Fuse .....	315 mA
Ground-Lift switch .....	yes
Voltage selector .....	yes

## Dimensions

Housing.....	Standard EIA 19"/1U, 482 x 44 x 237 mm
Weight .....	3,4 kg

Note: 0 dBu = 0.775 V

Subject to change without notice.

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