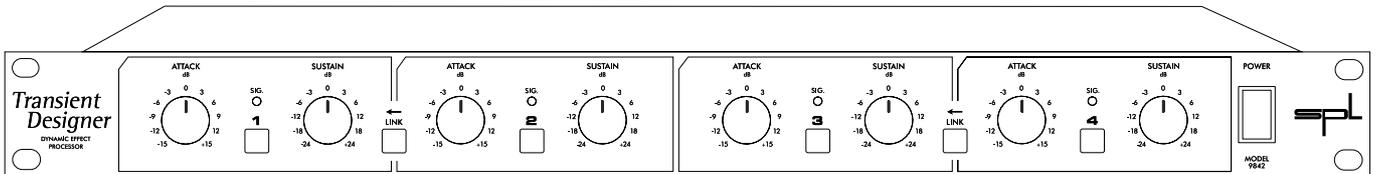




soundperformancelab.com



Manual



Transient Designer

Model 9842

Dynamic Effect Processor

Manual

R & D: Rubern Tilgner

Written by Hermann Gier and Paul White

Version 3.1 - 6/2005

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Dear customer,

Thank you for the confidence you have shown towards SPL electronics GmbH by purchasing the SPL TRANSIENT DESIGNER, a highly innovative Dynamic Processor manufactured to a high standard. As you would expect from an SPL unit, the TRANSIENT DESIGNER combines exemplary technical specifications with intuitive usability and unrivalled audio performance. Even though the TRANSIENT DESIGNER is very simple to use, please read this manual through carefully at least once to ensure you have all the information you need to get the best out of your new purchase.

We wish you every success with your new TRANSIENT DESIGNER.

Your Sound Performance Lab-Team

I would like to start with my thanks to all our staff, particularly Ruben Tilgner, who created the TRANSIENT DESIGNER. The importance of their exceptional qualification and talents cannot be overestimated.

Our products are often tested and compared in many publications, as well as by our customers themselves, and constantly attract praise for the high standard of audio performance they achieve. I would like to pass on this broad appreciation to those, who deserve it - my excellent colleagues.

Hermann Gier

Transient Designer

Contents

Foreword

Thanks

Introduction

The TRANSIENT DESIGNER is a revolutionary Dynamic Processor based on level-independent sound processing that makes it possible to radically change the attack and sustain characteristics of any musical sound in a creative way.

Transients can be accelerated or slowed down and sustain may be prolonged or shortened.

This is made possible by the use of adaptively optimised time-constant parameters.

SPL's Differential Envelope Technology® for level-independent processing.

The latest VCA-technology preserves audio transparency and minimises distortion.

There are four independent channels of signal processing in the TRANSIENT DESIGNER, though channels may also be linked for stereo operation.

The unit features a relay hard bypass and Signal-LEDs to simplify metering.

The new TRANSIENT DESIGNER provides a revolutionary concept for dynamic processing rendering controls such as Threshold, Ratio and Gain superfluous. The TRANSIENT DESIGNER's automation is highly developed, so that while the processing going on inside the box may be very complex, the user has to deal with just a few intuitive controls. SPL's Differential Envelope Technology® is the first solution for level-independent processing of envelopes allowing transients to be accelerated or slowed down and sustain prolonged or shortened. The degree of dynamic processing required to do this couldn't be duplicated even using a chain of several conventional compressors, yet only two controls per channel are required to allow the user to completely reshape the attack and sustain characteristics of a sound.

Attack can be amplified or attenuated by up to 15dB while Sustain can be amplified or attenuated by up to 24 dB, enabling weak drum sounds to be made much more percussive and powerful, or for over-percussive transients to be softened. All the necessary time-constants (Attack, Decay and Release) are automated and optimised adaptively in a musical manner according to the characteristics of the input signal. This results in natural sounding signal processing and fast operation.

The TRANSIENT DESIGNER uses envelope followers to track the curve of the natural signal so that optimum results are guaranteed regardless of the input signal's dynamics. Because of the level-independent processing inherent in Differential Envelope Technology®, manual threshold adjustments are not required. In order to maintain the cleanest possible signal path, the TRANSIENT DESIGNER uses the excellently specified THAT 2181-VCA's, which are especially natural sounding, transparent and create minimal distortion. High amplitudes are processed without damping of high frequencies or reducing bass.

For stereo operation the LINK function connects channel pairs (1,2 and/or 3,4) such that both channels are controlled by the same side-chain voltage so as to maintain a coherent and stable stereo image. When operating in LINK-mode, the control elements of the first (or third) channel, including the ACTIVE switch, control the second (or fourth) channel, too. Each channel is equipped with a relay hard bypass circuit to ensure a minimum signal path when the process is bypassed.

The Signal-LEDs provide a simple and positive means to quickly monitor the signal flow, which is particularly important if the four channels are connected to a patchbay.

Packaged in a standard 19" EIA format and occupying 1U (44,45 mm) of rack space, the TRANSIENT DESIGNER can be installed in a standard rack, but it is recommended that the rear of the case be supported, especially in touring applications. The TRANSIENT DESIGNER should not be installed near units which produce strong magnetic fields or extreme heat. Do not install the TRANSIENT DESIGNER directly above or below power amplifiers or digital processors. If possible, the TRANSIENT DESIGNER should be placed in an 'analogue rack' where the majority (or all) of the equipment installed is analogue. Check that the voltage details quoted on the back panel are the same as your local mains electricity supply.



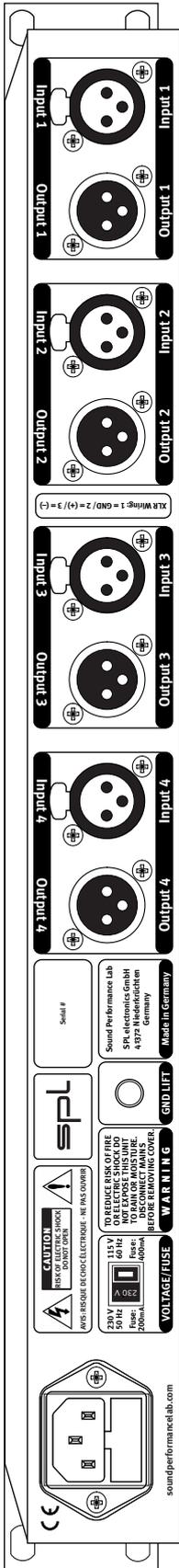
Important security advices

- Use a small, flat bladed 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 side of the unit.
- If, during operation, the sound is interrupted or indicators no longer illuminate, or if abnormal odour 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 TRANSIENT DESIGNER with a soft, lint-free cloth. Use only standard cleaning agents. Never use alcohol or paint thinner, because they may damage the finish.

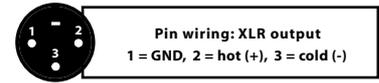
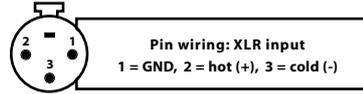
Connections

Before connecting the TRANSIENT DESIGNER switch power off at all connected units.

The TRANSIENT DESIGNER is fitted with XLR-connectors for balanced operation. The following illustration shows the pin-wiring:

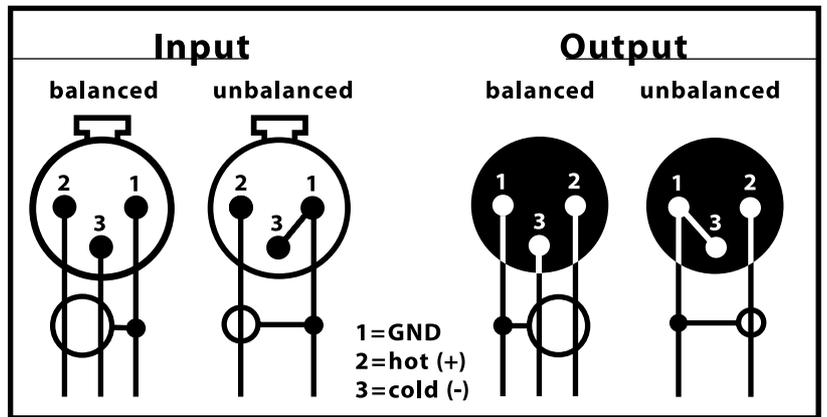


Rear panel TRANSIENT DESIGNER, model 9842



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 and -75 dB at 10 kHz.

Should the need arise to use the XLR connectors in an unbalanced system, pin 3 of the XLRs should be grounded. The following illustration shows how to properly unbalance a balanced signal:



In nearly every aspect the TRANSIENT DESIGNER is different from conventional Dynamic Processors or Compressors. You don't need to know how the TRANSIENT DESIGNER works in order to be able to use it effectively, but if you're at all curious as to what goes on inside the box, read this section while referring to the diagrams.

Differential Envelope Technology®

Differential Envelope Technology® maintains identical envelope processing from quiet to loud signals (from pianissimo to fortissimo) without the need for the user to adjust any external parameters. In a conventional system, low level signals would be excluded from processing. Both parameters (ATTACK and SUSTAIN) work in parallel and do not influence each other.

The ATTACK control circuitry

The ATTACK control circuitry uses two envelope generators. The first follows the shape of the original curve (Diagram 1: envelope follower Env 1), while the second generator produces the envelope Env 2 (Diagram 1) with a slower attack.

The hatched area shows the difference between Env 1 and Env 2 (Diagram 2), and the VCA control voltage is derived from this difference. Positive ATTACK values emphasise attack events, negative ATTACK values smooth out the attack envelopes of events.

SPL's Differential Envelope Technology® realises level-independent envelope processing, so doing away with the need for a conventional Threshold control.

Two envelopes are generated and compared - the VCA control voltage is derived from their difference.

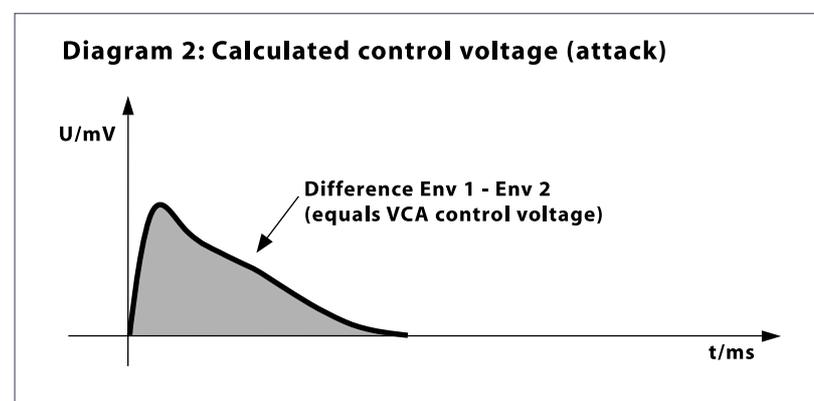
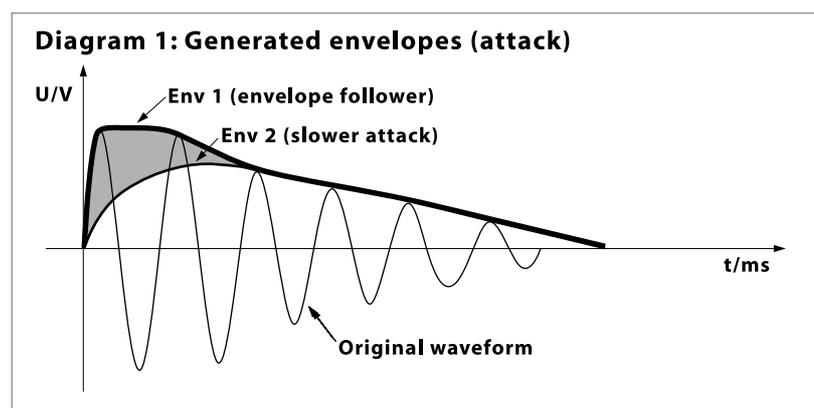


Diagram 1

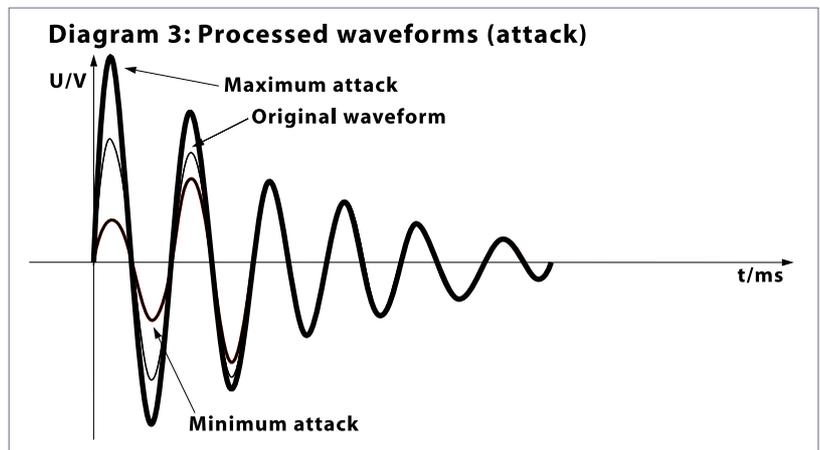
illustrates the original curve and both generated envelopes for processing the attack period. The envelope follower Env 1 corresponds to the shape of the original curve. The attack of Env 2 is lower.

Diagram 2

illustrates the difference from Env 1 and Env 2, giving the VCA control voltage.

Diagram 3

illustrates the shapes of the processed curves with maximum and minimum attack, compared to the original curve from Diagram 1.



The SUSTAIN control circuitry

The SUSTAIN control circuitry includes two further envelope generators. The envelope follower Env 3 (Diagram 4), again follows the shape of the original curve.

For a longer period the envelope generator Env 4 (Diagram 4) holds the sustain level according to the peak level and the VCA control voltage is generated by the difference between Env 3 (Diagram 4) and Env 4 (Diagram 5: hatched area).

The sustain is extended at positive settings and shortened at negative settings.

Diagram 4

illustrates the original curve and both envelopes generated for processing the sustain period. The envelope follower Env 3 corresponds to the original curve. The sustain of Env 2 is extended.

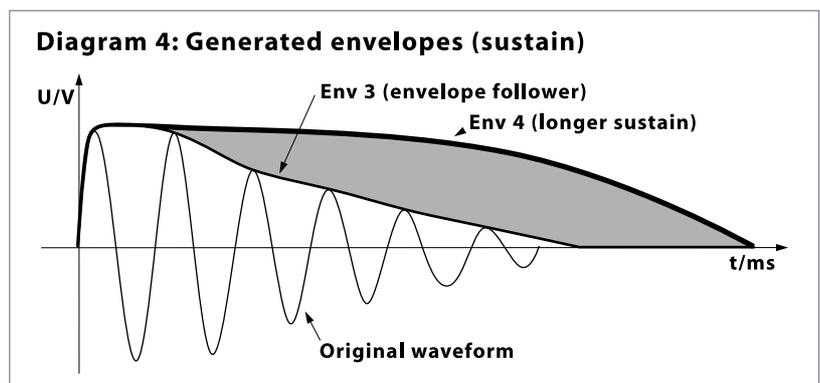
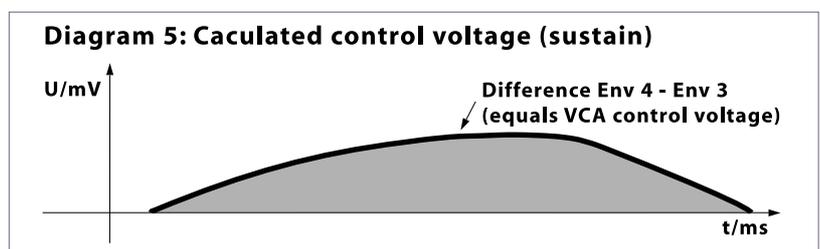


Diagram 5

illustrates the difference between Env 4 and Env 3. It determines the VCA control voltage.



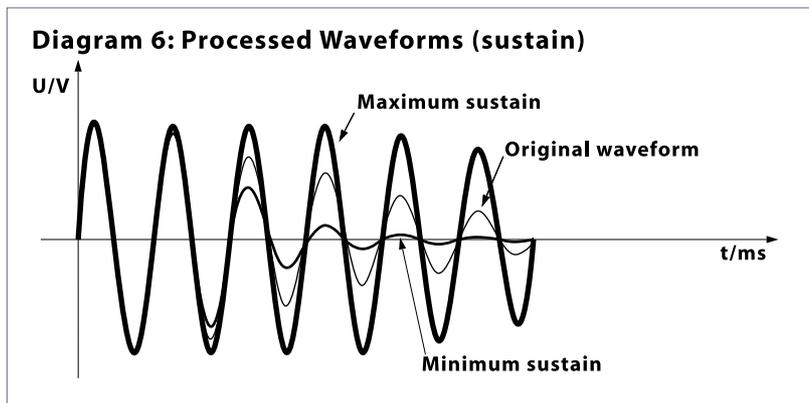


Diagram 6

illustrates the processed curves with maximum and minimum sustain compared to the original curve from Diagram 1.

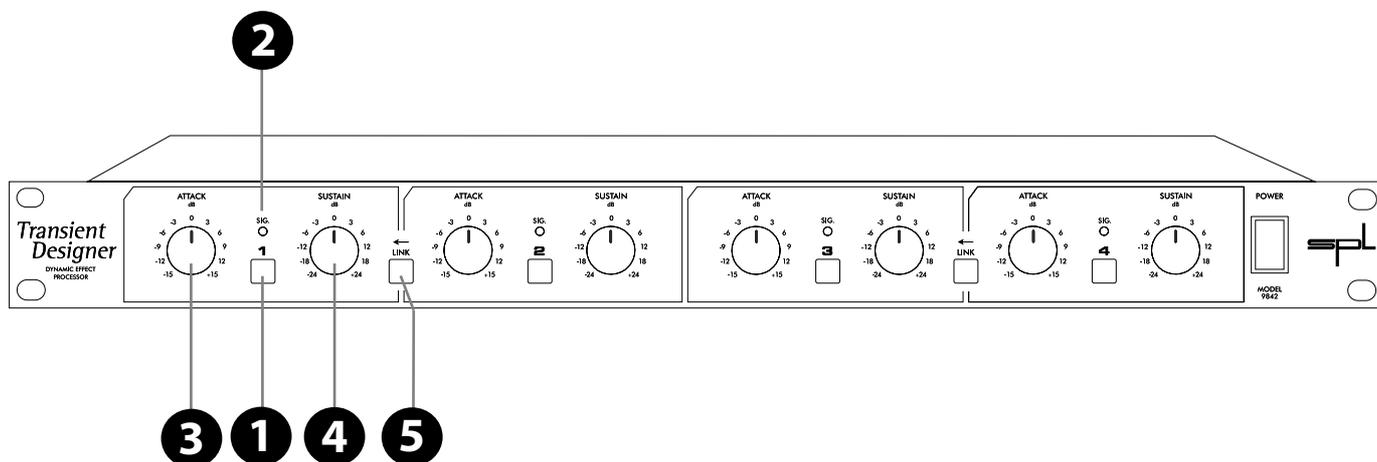
Important advice when connecting to digital recording systems:

Each unit connected to the TRANSIENT DESIGNER should be able to handle high input levels. With maximum ATTACK values the instantaneous input level can increase by up to +15 dB. For this reason it is recommended to connect the TRANSIENT DESIGNER to an analogue mixing console, because these generally have enough headroom to process peak levels of more than 15 dB without clipping. However, it is imperative to check the input levels of the mixer and any clip monitor LEDs at the channel inserts.

If the TRANSIENT DESIGNER is connected directly to a ProTools 888 interface, a Yamaha O2R mixer or similar units with internal A/D-converter, ATTACK values of about +6 dB may overload the converters. In such cases reduce the Input Gain of these systems to provide adequate headroom to accommodate the enhanced transients.

Prevent overload

Control elements



Active 1

The ACTIVE switch operates a hard-bypass relay circuit to switch the channels 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 TRANSIENT DESIGNER is operated in the LINK mode (see 5), channel one's (or three's) ACTIVE also switches channel two (or four) in and out. Note that channel two's ACTIVE status-LED will also follow channel one's ACTIVE status.

Signal-LED 2

The SIGNAL-LED indicates an incoming signal with a level exceeding -40 dB. In complex studio arrangements the LED indication helps to check if a signal actually arrives at the TRANSIENT DESIGNER.

With the ATTACK control, the attack period of a signal can be emphasised or attenuated by up to 15 dB. For detailed information about the mode of operation of the ATTACK control please read the section 'Tech Talk' on pages 7 and 8.

Control elements

The ATTACK control circuitry incorporates two envelope generators. One follows the original curve while the second produces an envelope with a slower attack period (Diagram 1, page 7).

The difference (Diagram 2, page 7) between these envelopes results in a voltage that controls the VCA, boosting the transient for a period equal to the duration of the original transient. The amplitude of the attack is increased, if positive ATTACK values are set, while negative ATTACK values reduce the level of the attack transient. For detailed information about using the ATTACK control please refer to pages 12ff.

3

Attack

The SUSTAIN control increases or reduces the level of the sustain portion of a signal by up to 24 dB. For detailed information about the mode of operation of the sustain control please read the 'Tech Talk' section on pages 8 and 9.

Two envelope generators work in the SUSTAIN control circuitry, too. Again an envelope follower pursues the original envelope and adapts optimally to the curve of sustain. This second generator produces an envelope with extended sustain (Diagram 4, page 8). The difference between both envelopes is then used to calculate the voltage controlling the VCA, though as with the ATTACK circuitry, the enhancement ceases at the end of the signal being processed.

Sustain amplitude is increased for positive SUSTAIN settings and reduced for negative settings. For detailed information about using the SUSTAIN control please refer to pages 12ff.

4

Sustain

When processing stereo material, the LINK function should be switched on so that the linked 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 1 or 3, function as the master controls in LINK mode.

5

Link

Applications

The TRANSIENT DESIGNER is ideally suited for use in professional recording, in project or home studios and P.A. applications.

For the first time the TRANSIENT DESIGNER provides the technology to manipulate the attack and sustain characteristics of a signal regardless of level, and using simple controls. Usually equalisers are used to separate instruments in a mix – the tonal aspect of the signal is considered, but not the temporal aspect. By accelerating the transients or/and shortening the sustain of an instrument, the mix can be made to sound more transparent. Instruments can be mixed at lower levels, still maintaining their positions in the mix, but occupying less space.

'Front/rear-positioning' of drums or other percussive instruments can effectively be 're-miked' during the mix – at least, that's the subjective effect. Applied to single instruments or loops, this technology creates new sounds or adds weight and authority to existing sounds.

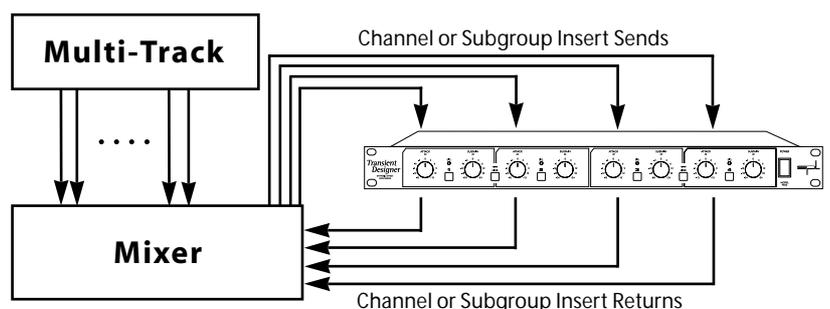
Connections

There are several ways to connect the TRANSIENT DESIGNER to your equipment. One of the most flexible options is wiring the TRANSIENT DESIGNER to a patchbay, and if your console has switchable insert points to prevent audio running through the patchbay when not required, so much the better.

Alternatively, the TRANSIENT DESIGNER may be connected directly to the channel or subgroup inserts.

Diagram 7

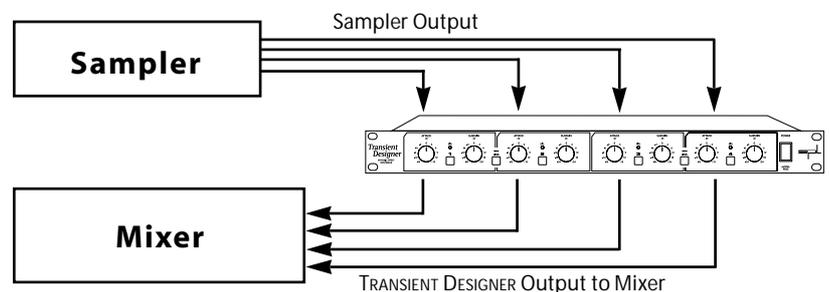
Connecting the TRANSIENT DESIGNER to the channel inserts of the mixer for processing different tracks.



The TRANSIENT DESIGNER may also be connected directly to the output stages of drum machines or samplers, if no suitable inserts are available, though it should not be connected via an effects aux send/return loop.

Diagram 8

Direct wiring between sampler or drum machine and mixer.



One of the most interesting applications of the TRANSIENT DESIGNER is processing drum and percussion sounds, both from samples to live drum sets:

- The attack of a bass drum or a loop can be emphasised to increase the power and presence in the mix.
- The sustain period of a snare or a reverb-flag can be shortened in a very musical way to obtain more transparency in the mix.
- Recording a live drum set, toms or overheads can be shortened without physically damping them.
- Miking live drums is considerably faster and easier, because the apparent 'distance' of the microphone can be corrected by varying the ATTACK and SUSTAIN values.
- The TRANSIENT DESIGNER is a perfect partner to noise gates in live drum miking.
- Corresponding adaptively to the duration of the original signal, the sustain can be shortened more musically than with tightly adjusted release times, effectively reducing crosstalk.
- When recording live drums or other instruments on a HD recording system, the TRANSIENT DESIGNER prevents time-consuming removing of crosstalk signals on the hard disk.
- It is possible to create unusual dynamic effects, including new and interesting pan effects. If, for example, a mono loop is patched through two channels of the TRANSIENT DESIGNER panned hard left and right in the mix, such that the left channel is processed with increased ATTACK and reduced SUSTAIN while the right channel is adjusted in the opposite way, a very special stereo loop sound is created. You have to try this to appreciate what it sounds like, but expect to hear a lot of unusual stereo movement.
- By reducing ATTACK and increasing SUSTAIN, signals that are too up-front sounding can be moved back into the mix. Additionally the FX parts of 'too dry' signals are strengthened.
- Drum sounds are easier to integrate into the mix. If the acoustic level of a snare is expanded to approximately +4 dB by increasing the attack value, the effective increase of peak levels in the overall mix is merely about 0.5 dB to 1 dB.

Drums & Percussion

Applications

Guitars

- Used to process guitar sounds, the TRANSIENT DESIGNER softens the instrument by lowering the attack. Alternatively, increasing the attack lets the sound jump to the front of the mix, which works particularly well for picking guitars.
- Highly distorted electric guitars are already highly compressed, leaving them with minimal dynamic range. This can obscure the note attacks, but increasing the attack setting clarifies the individual notes.
- High distortion also prolongs the sustain, broadening the sound. Reducing the SUSTAIN setting counteracts those effects.
- Increasing the sustain period of miked acoustic guitars produces clearer audible stereophonic sounds. Reducing the sustain value can help dry up the sound.

Backings

- When recording choirs, the effect of too much 'ambience' can be reduced by using a lower sustain setting.

Keyboards, Sampler, Drum-Machines

- Frequently keyboard and sample sounds are intensively compressed leaving little of their original dynamic range. Increasing the attack brings back the natural dynamics so the sounds need less space in the mix and are easier to pick out, even at lower levels.
- With the help of the TRANSIENT DESIGNER 'Budget' drum machines can provide sounds and grooves that sound far more powerful and dynamic than the original untreated sounds.

Movie Post Pro

- Effect sounds and sample libraries benefit from more punch and more power – useful when working on TV commercials or movie soundtracks.
- 'Out door' recordings often suffer from poor microphone positioning. The TRANSIENT DESIGNER can help create the effect of re-positioning the mics during the mix.

Mastering?

- However, like any good thing, you have to know where not to use it. For example, use in mastering is not recommended as it's rarely a good idea to treat a whole mix at once. Instead, treat individual elements within the mix.

Special care has gone into the design of the power supply of the TRANSIENT DESIGNER. 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 without an air gap to minimise induced hum and noise. The primary voltage may be selected between 230 V/50 Hz and 115 V/60 Hz by means of a recessed slide switch on the rear panel and a ground-lift switch is fitted for use where ground loops are causing hum problems. When the GND LIFT switch is set to off, 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 fuses have values of 200 mA/230 V and 400 mA/115 V.

On the secondary side of the power supply, an RC combination is used to filter out noise and hum. Both half-waves are smoothed with 2 x 1000 μ F capacitors in the positive and 2 x 1000 μ F capacitors in the negative voltage supply path, and both lines use precision voltage regulators for optimum stability. Deviations of only a few millivolts can impair audio quality, introducing artefacts such as loss of stereo imaging or a diffuse sound character. Particular care has gone into the circuit layout and component choice to minimise crosstalk between the audio circuitry and control voltages.

*Internal 15 VA torroidal
transformer*

Voltage selector

Ground-lift switch

*Transformer, power cord and
mains connector with VDE,
UL and CSA approvals.
Fuses (primary voltages):
200 mA/400 mA.*

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 / Power Fail Safety	

Measurements

Frequency response	20 Hz - 100 kHz
...	(100 kHz = -3 dB)
CCMR (common mode rejection)	- 87 dBu @ 100 Hz
...	- 80 dBu @ 1kHz
..	- 75 dBu @ 10 kHz
.	- 70 dBu @ 20 kHz
THD & N	0,004 % @ 1kHz
S/N CCIR 468-3	-89 dBu
S/N A-weightened	-105 dBu

Power Supply

Torroidal transformer	15 VA
Fuses (230 V / 115 V)	200 mA / 400 mA
Ground-Lift switch, Voltage selector	

Dimensions

Housing	Standard EIA 19"/1U,
...	482 x 44,45 x 237 mm
Weight	3,4 kg

Note: 0 dBu = 0.775 V. Subject to change without notice.

SPL electronics GmbH (hereafter called SPL) products are warranted only in the country where purchased, through the authorized SPL distributor in that country, against defects in material or workmanship. The specific period of this limited warranty shall be that which is described to the original retail purchaser by the authorized SPL dealer or distributor at the time of purchase.

SPL does not, however, warrant its products against any and all defects:

- 1) arising out of materials or workmanship not provided or furnished by SPL, or
- 2) resulting from abnormal use of the product or use in violation of instructions, or
- 3) in products repaired or serviced by other than authorized SPL repair facilities, or
- 4) in products with removed or defaced serial numbers, or
- 5) in components or parts or products expressly warranted by another manufacturer.

SPL agrees, through the applicable authorized distributor, to repair or replace defects covered by this limited warranty with parts or products of original or improved design, at its option in each respect, if the defective product is shipped prior to the end of the warranty period to the designated authorized SPL warranty repair facility in the country where purchased, or to the SPL factory in Germany, in the original packaging or a replacement supplied by SPL, with all transportation costs and full insurance paid each way by the purchaser or owner.

All remedies and the measure of damages are limited to the above services. It is possible that economic loss or injury to person or property may result from the failure of the product; however, even if SPL has been advised of this possibility, this limited warranty does not cover any such consequential or incidental damages. Some states or countries do not allow the limitations or exclusion of incidental or consequential damages, so the above limitation may not apply to you.

Any and all warranties, expressed or implied, arising by law, course of dealing, course of performance, usage of trade, or otherwise, including but not limited to implied warranties of merchantability and fitness for particular, are limited to a period of 1 (one) year from either the date of manufacture. Some states or countries do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state, country to country.

SPL electronics GmbH, D-41372 Niederkrüchten, Germany