



## DATA SHEET

DS01EN - April 2012

# D. R. E. i. ALL INSIDE

(Dynamic Reduction of Electronic Interactions)

## FEATURES

- Two independent monophonic channels
- A totally analogical process
- Developed to optimize the audio signal
- Low Distortion >0.004% to 1kHz Sine wave
- Low Power Consumption 48mA
- Supply Range  $\pm 15V$  to  $\pm 18V$
- Encapsulated in 20 pins
- Extremely simple to implement. Without adjustments
- Reinterprets non-sinusoidal waveforms
- It allows you to adjust the final soundstage
- 1:1 gain (modifiable on request)
- High thermal and mechanical stability

## APPLICATIONS

- Any audio equipment.
- Audio MIX consoles
- Preamplifiers
- Amplifiers
- Distribution amplifiers
- CD, DVD, SACD, BRD players
- Graphic/Parametric equalizers
- Multiple processors
- Hi-Fi & PRO Audio equipment
- DACs, A/D & D/A converters.
- Broadcasting equipment
- Active speakers & Subwoofers

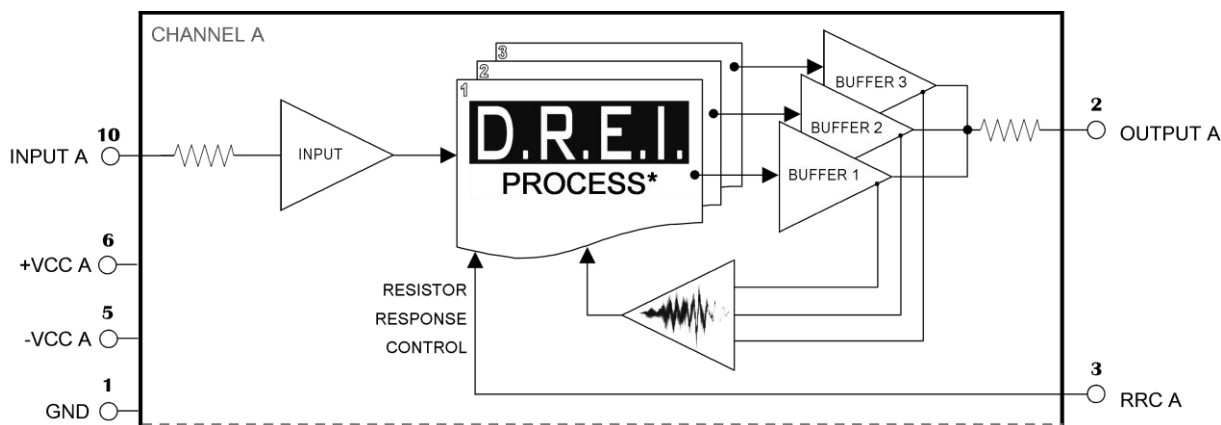
## DESCRIPTION

D.R.E.i. Technology (Dynamic Reduction of Electronic Interactions), developed by Neutral Audio Technologies is an advanced implementation of analog circuits to get maximum enjoyment from musical reproduction. It is a great step forward in sound, with a new and original technical approach.

This "ALL INSIDE" module includes everything you need so it can easily be included into the circuits of any audio equipment, especially those for music playing. CD players, DACs, Preamps, Amps, mixers, processors, active speakers, and generally where you want the highest quality sound and the highest efficiency of the associated reproduction system. No adjustments necessary, nor software control protocols. The audio signal does not suffer any digital process, everything is done in the analog domain.

The speakers can only reproduce sinusoidal type waves due to electromechanical limitations. DREi sends only the pure music signal without loss of information. This technique is directed to amplifiers, filters and speakers to increase their overall performance and dynamics.

6 high performance internal buffers are used and controlled by DREi. It allows you to optimize your sound response with associated electronic components, with the appropriate elements it can even be designed so that the end user can control this adjustment.

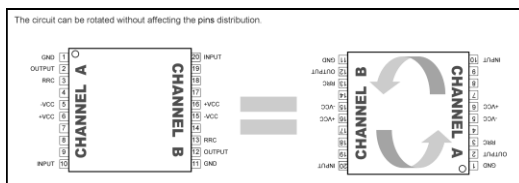
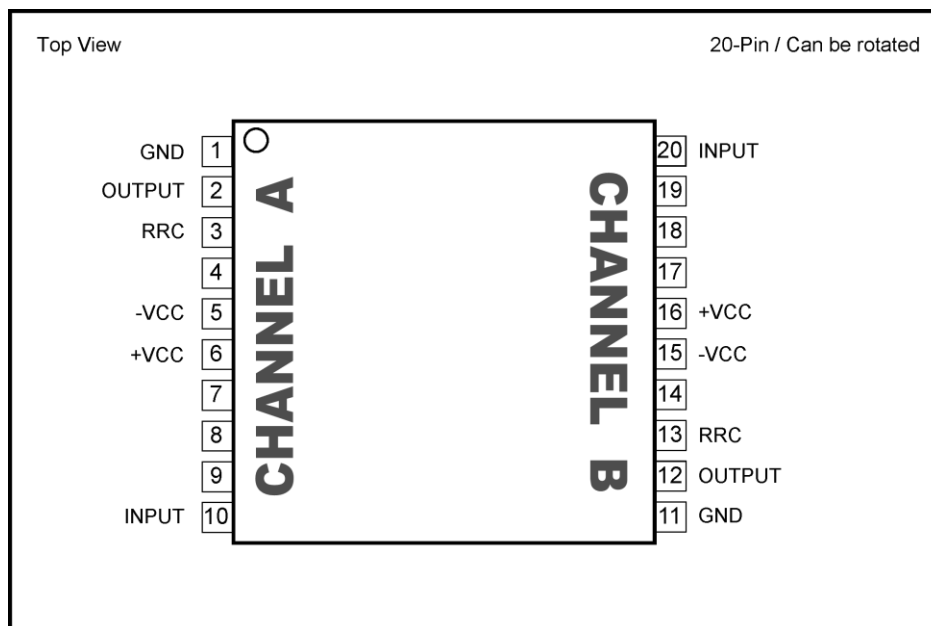


PRODUCTION DATA information is current as of publication date. The specification might have changed.  
Production processing does not necessarily include testing of all parameters.

## ABSOLUTE MAXIMUM RATINGS

Supply Voltage, +VCC and -VCC ..... +18V and -18V  
Input Voltage Maximum ..... 3.2Vrms (9Vpp)  
Output Short-Circuit (to ground) ..... Unlimited  
Operating Temperature ..... -40°C to +70°C  
Storage Temperature ..... -55°C to +120°C

## PIN CONFIGURATIONS



**VERY IMPORTANT**  
**THE FREE PINS**  
**MUSTN'T BE CONNECTED**

### NOTE:

Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may affect device reliability.

## ELECTROSTATIC DISCHARGE SENSITIVITY



This circuit can be damaged by EDS. Neutral Audio recommends that all circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

EDS damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

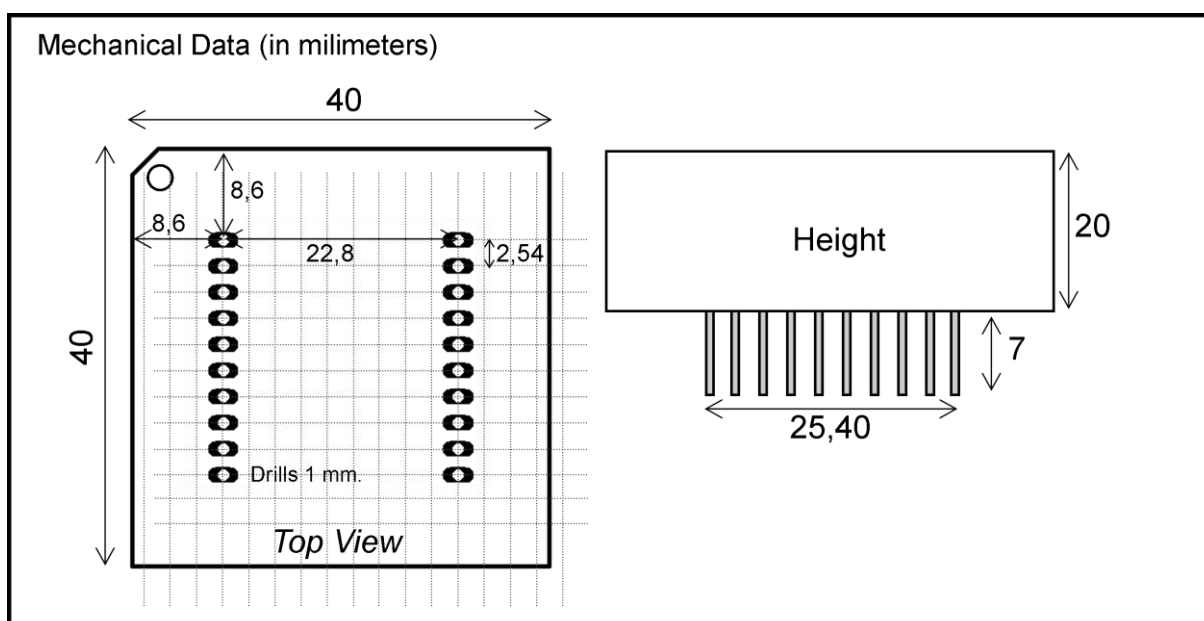
## PACKAGE/ORDERING INFORMATION

DREI9-ST	DREI ALL INSIDE Revision 9 for general use
DREI9-CU	DREi ALL INSIDE Revision 9 customized. With special parameters chosen by the customer. The ratio between input and output, the impedance and the ratio of the soundstage can be changed. Check the minimum units and the procedure
DREI9-TB	TEST BOARD Rev3 It includes everything needed (except for the power supply) to test the circuit adequately.

Gain *(Can be modified if requested)	1:1
Total Harmonic Distortion f = 1Khz, Sinewave, Vin = 1Vrms	>0.004 %
Noise	> 110 dB
Input Impedance	25 K $\Omega$
Output Impedance	600 $\Omega$
Maximum Input	2.3 Vrms to 15V 2.8 Vrms to 18V
Duration of Output Short-circuit	Unlimited
Frequency Response See graph on this page	1 Hz ~ 20 Khz $\pm 1$ dB 20 Khz ~ 100 Khz $\pm 5$ dB
Power Supply Recommended $\pm 15$ V	$\pm 15$ V to $\pm 18$ V
Maximum Current	$\pm 48$ mA
Temperature Operation Range	-40° C to +70° C



This graph shows the behaviour of DREi at frequencies from 20Khz to 200Khz.



## APPLICATIONS INFORMATION

DREi ALL INSIDE circuits include everything needed for its function and needs only a few passive components. It's internally composed of two monophonic blocks, channel A and B that can be used interchangeably. Each channel uses a high performance buffer at the input that adapts the sound signals at the appropriate levels for processing by the DREi, in a completely analog way and with no deterioration of the musical information.

The processed signal is directed to various buffers operating in parallel under the control of the DREi forming the output. Figure 1 shows the basic internal layout.

Their connection is really simple, for the channel "A" the original signal is applied to pin 10 and returns on pin 2. It can be directly attached to the output of any system, without any further amplification steps thanks to its 600Ω and 2.8Vrms output.

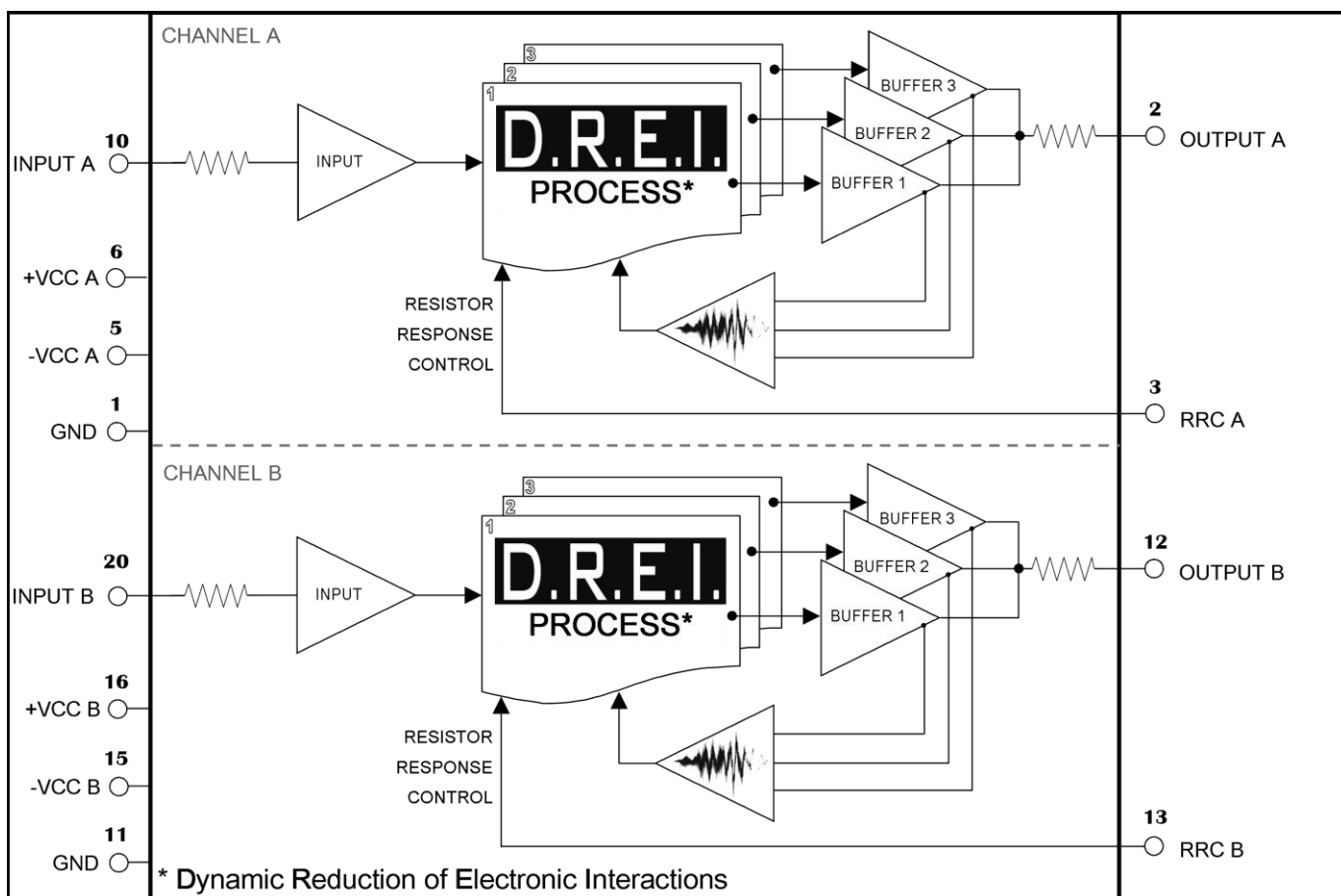


Figure 1: Internal blocks

## CONNECTION

Each channel has the power supply separated so it can be properly filtered. The use of electrolytic capacitors 1uF~10uF /25V in each voltage terminal is recommended (Figure 2). If the current is sufficiently pure or for design reasons it is not possible to put in these capacitors, they can be omitted, or only two of them added sharing them with the two channels.

The GNDs are also separated internally, and must be connected to the appropriate docks looking for symmetry between the tracks.

Remember when designing the circuit that will integrate with the DREi, that it can be rotated and will not affect the positions of the pins or its operation.

The capacitor between the 1uF and the 10uF Non Polarized and the 42K2 resistance of the output allows it to uncouple the small DC that may be generated within the DREi or that may be present at the input. The DC at the input is not a problem for operation, but if it is high you should consider placing another capacitor at the input.

If this small DC isn't a problem with the peripheral circuits, these capacitors can be overridden.

## R.R.C. (Resistor Response Control)

A plus of DREi is its ability to alter the dynamic response of the internal buffers and thus adapt the final result to the tastes and needs of the designer, or the end customer. The DREi process always operates 100% independently of this setting.

For further understanding the graph (Figure 3) is attached in which you can observe the ratio in the range

of audible frequencies with resistance RRC. The value can be adjusted between  $2K2\Omega$  and  $1K\Omega$ . In any case the sound is never affected, only the behaviour described above.

We recommend experimentation so that each designer can evaluate an optimal value for their creations, as it also depends on the rest of the electronics. A good value can be  $1K1\Omega$ .

Figure 2

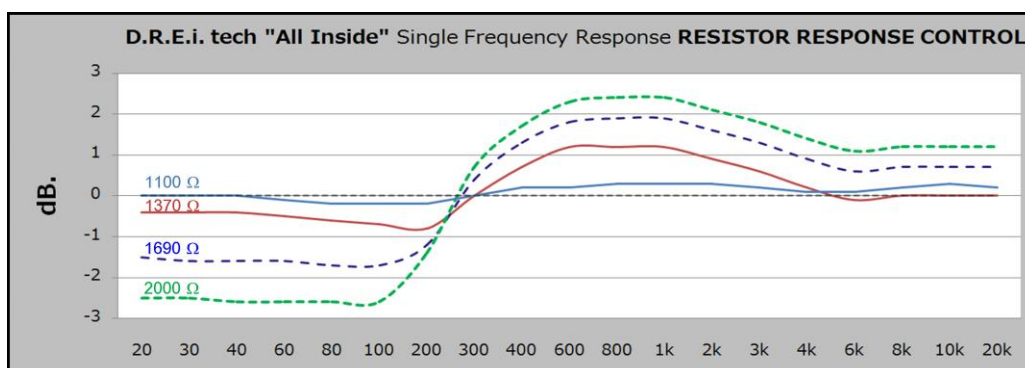
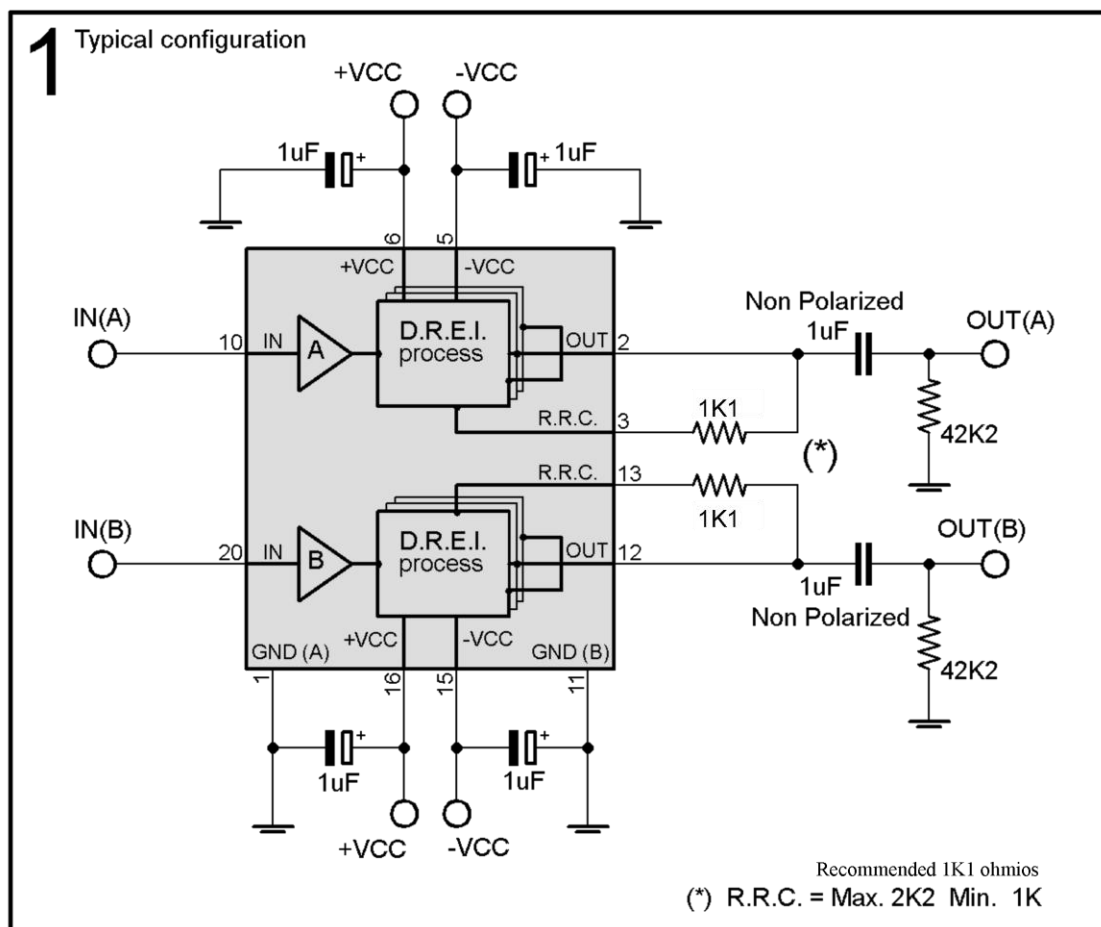


Figure 3: R.R.C.

It is important to know that the response between frequencies when using the DREi is slightly altered because of its process. This graph shows the changes with single frequencies, but with music these differences are much smaller.

## WITH BYPASS

A typical configuration that we recommend is as follows (Figure 4) to which a DPDT switch was added, which can be a relay, a manual switch or controlled by software that allows a bypass between IN / OUT. So the end user can decide whether or not to connect the DREi and hear the improvements when this technology is on.

The change of the RRC resistance can also be selected by the customer if in its place a variable resistor is inserted between the indicated ranges, either with a manual switch or by software using a Digital Stereo Volume Control.

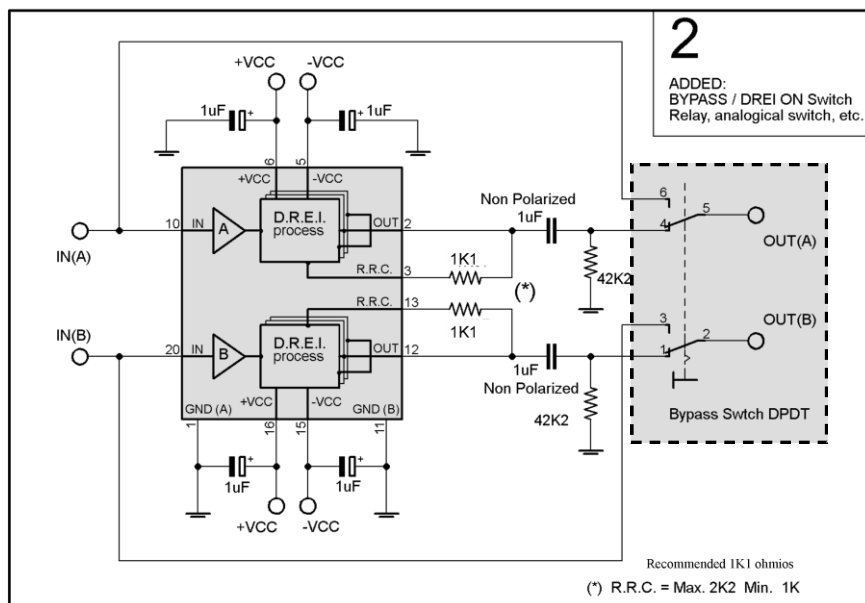
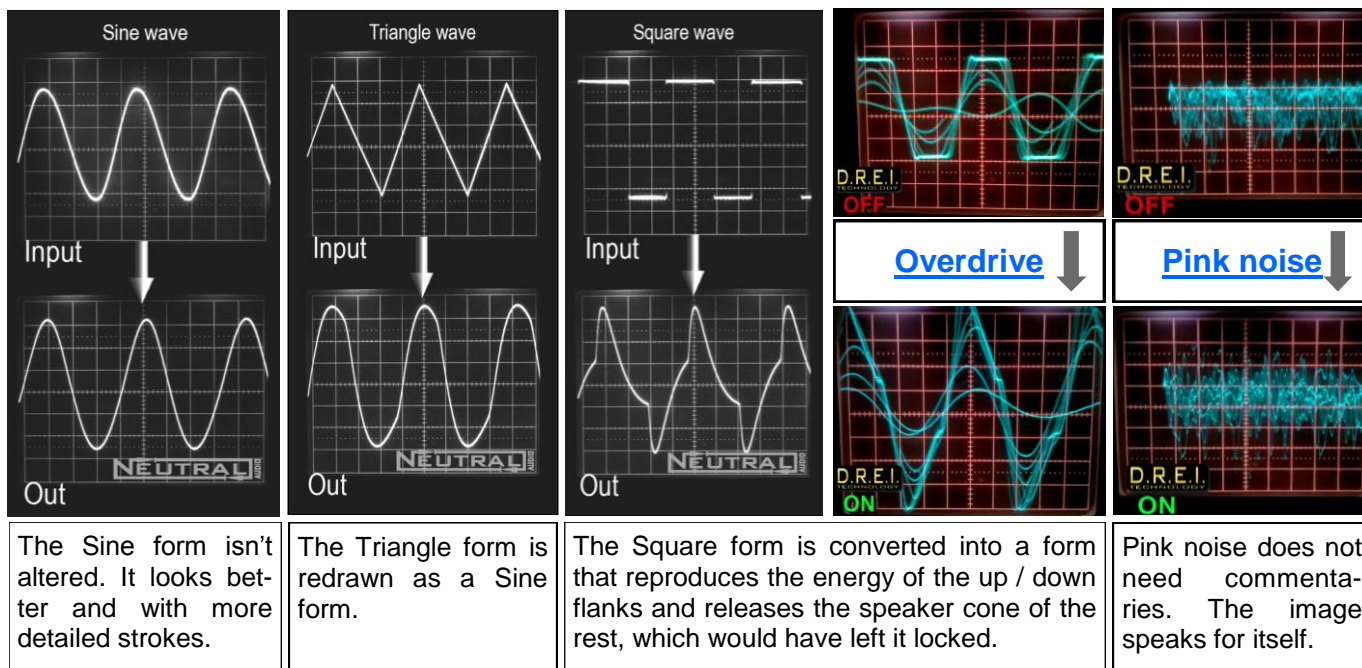


Figure 4, Added Bypass

## WAVE FORMS

Another important process that occurs in the DREI is the reinterpretation of the waveforms that should not be sent to the amplifier or to the filters and which reduce the performance of the speakers. It recovers en-

ergy from these waveforms, and the whole sound system gains efficiency. Due to its physical and electromagnetic limitations, for the speaker the ideal form is the Sine wave. The following images captured on an oscilloscope will help you to understand this function.



- Note that any wavelength that is distorted because of saturation is similar to a Square form, and therefore the cutting distortion which could have appeared in the input signal is also benefited by this new technology.

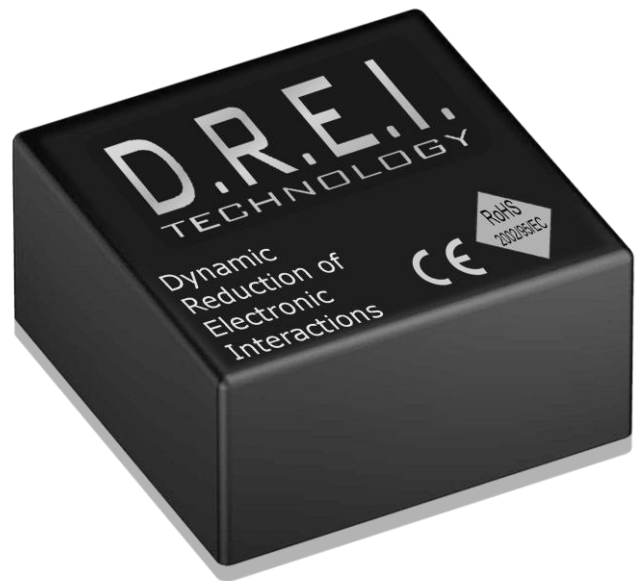


## AUDIO PERFORMANCE

The DREi's 100% analog process and the rest of the circuits have been designed to significantly increase the overall quality of any high quality audio system. Its low distortion and bandwidth allows it to be implemented in a wide range of sectors, from extremely high fidelity to the demanding professional audio industry.

As it's easy to use it makes the inclusion of DREi in circuit designs something to consider. No adjustments of any genre are required, nor digital controllers.

Having a DREi ALL INSIDE in your system gives you a clear sound differentiation with your competitors. The sound is energetic, extremely pure and very detailed.



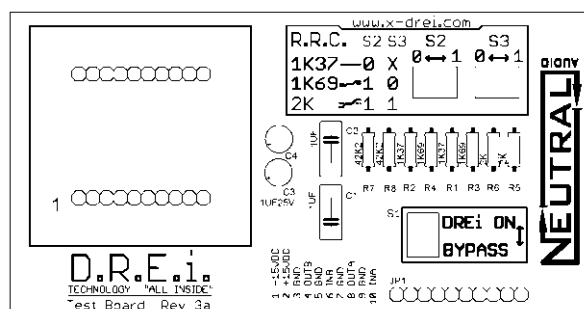
## TEST BOARD

A TEST BOARD is also available so you can experience the quality of this new technology.

[Order it using the form on the web.](#)

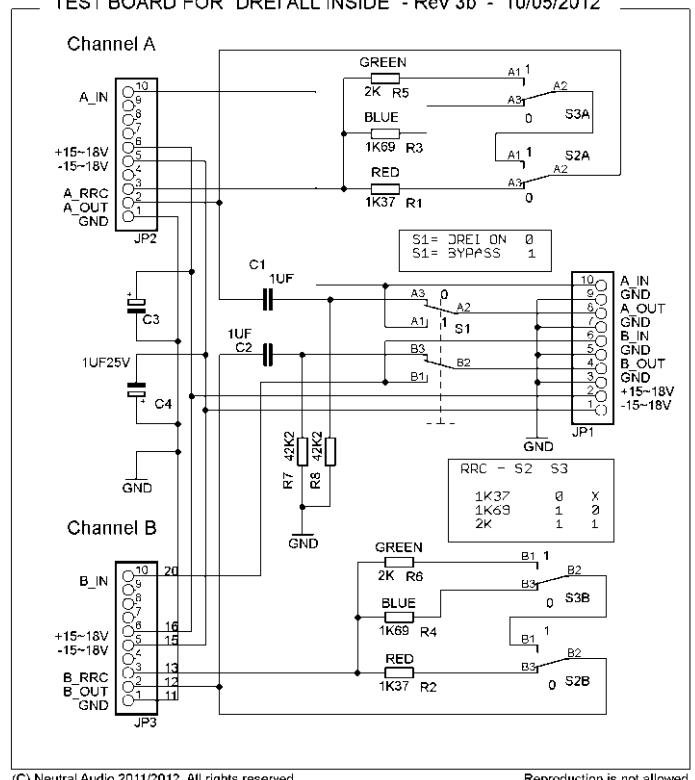
We also offer a customized integration service. You can send us the equipment you want to update with a DREi module to our customer technical service department and we will install it.

Consult the prices and [procedure in our web](#) or send an e-mail to [info@neutralaudio.com](mailto:info@neutralaudio.com)



[www.x-drei.com](http://www.x-drei.com)

TEST BOARD FOR "DREi ALL INSIDE" - Rev 3b - 10/05/2012



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There are DREi ALL INSIDE libraries available on the Web where you can download the design in CAD.

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