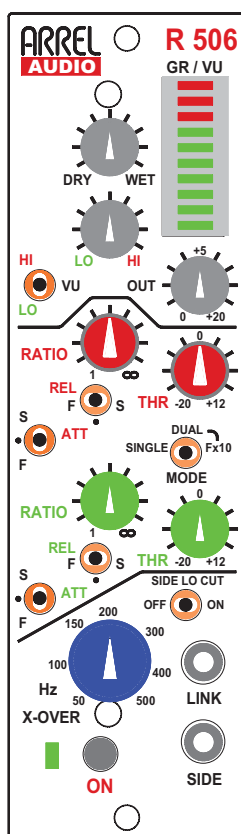




# R-506

## Dual/Mono Band VCA Compressor



## User Manual

Issue 0.1

## SAFETY INSTRUCTIONS



### WARNING

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Always follow the precautions listed below to avoid any possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

- Do not expose the instrument to liquids and rain. Do not use it near water or in damp or wet conditions, or place containers on it containing liquids. If any liquid seeps turn off the power and unplug the power cord from the AC outlet.
- Do not put burning items, such as candles, on the unit. A burning item may fall over and cause a fire.
- This instrument contains no user-serviceable parts. Do not open the instrument or attempt to disassemble or modify the internal circuit.
- Never insert or remove an electric plug with wet hands.
- Check the electric plug periodically and remove any dirt or dust which may have accumulated on it.
- Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.



### CAUTION

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Always follow the precautions listed below to avoid any possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

- Do not connect the instrument to an electrical outlet using a multiple-connector. Doing so can result in lower sound quality, or possibly cause overheating in the outlet itself.
- When removing the electric plug from the instrument or an outlet, hold the plug itself and not the cord. Pulling by the cord can damage it.
- Remove the electric plug from the outlet when the instrument is not to be used for extended periods of time, or during electrical storms.
- Do not place the instrument in an unstable position where it might accidentally fall over.
- Before moving the instrument, remove all connected cables.
- When setting up the product, make sure that the AC outlet you are using is easily accessible. If some trouble or malfunction occurs, immediately turn off the power switch and disconnect the plug from the outlet. Even when the power switch is turned off, electricity is still flowing to the product at the minimum level.
- When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.
- Use only the stand/rack specified for the instrument. When attaching the stand or rack, use the provided screws only. Failure to do so could cause damage to the internal components or result in the instrument falling over.



### Information for Users on Collection and Disposal of Old Equipment

This special symbol on the products, packaging, and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC.

By disposing of these products correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

#### **[For business users in the European Union]**

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

#### **[Information on Disposal in other Countries outside the European Union]**

This symbol is only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

## ARREL Audio Contacts

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**ARREL Audio** is continuously working to the improvement of its systems and related documentation.  
In any case, we reserve the right to change the specifications without notice but in the respect to the current legislation.

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**Disclaimer:**

The information contained in this manual has been carefully checked and we believed is accurate at the time of publication.  
In any case, we do not assume any responsibility for inaccuracies, errors or omissions nor any liability for any loss or damage resulting either directly or indirectly from use of the information contained in this manual.

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## TABLE OF CONTENTS

SAFETY INSTRUCTIONS .....	2
ARREL Audio Contacts .....	3
TABLE OF CONTENTS .....	4
INTRODUCTION .....	5
Housing.....	6
Installation Instructions .....	6
R-506 Front Panel Controls and Operations.....	7
DRY-WET knob .....	7
HI-LOW KNOB .....	7
OUT LEVEL knob.....	7
HI - V.U. – LO SWITCH .....	7
RATIO KNOB (HI AND LO BAND) .....	7
THRESH(old) KNOB (HI AND LO BAND) .....	7
REL(EASE) SWITCH (HI AND LO BAND) .....	7
ATT(ACK) SWITCH (HI AND LO BAND).....	8
OFF-ON-x10 SWITCH .....	8
CROSSOVER FREQUENCY KNOB.....	8
LINK JACK (3.5 mm STEREO jack).....	8
SIDE JACK (3.5 mm stereo jack).....	8
True BY-pass ON switch (LED) .....	9
R-506 Operating modes.....	9
R-506 Dual Band Mode .....	9
R-506 Single band (full bandwidth on the envelope) .....	9
R-506 Single band (LO cut on envelope detector).....	10
R-506 External connections.....	10
R-506 SIDE Jack .....	10
R-506 LINK JACK.....	10
APPENDIX A: Front Panel .....	11
APPENDIX B: EXTERNAL CONNECTIONS .....	12
APPENDIX C: 500 series module edge connector .....	13
TECHNICAL SPECIFICATIONS .....	14

## INTRODUCTION

**ARREL Audio R-506** is an advanced dual/mono band VCA based compressor conceived to offer to the 500 series user the superior audio performance of the ARREL audio high level products. The R-506 is characterized by high reliability, rugged design, outstanding audio quality, versatility and ease of use typical of the tradition of ARREL Audio products. The **R-506** is characterized by an extreme flexibility in a single slot 500 module. It includes the following features.

- ARREL high audio quality input and output buffers
- Dual envelope detector and dual VCA architecture
- Variable crossover with two bands (50Hz-500 Hz, 500Hz/5000Hz)
- Attack and Release three position switches separate for the LO and HI frequency bands
- Operative mode switch: Mono Band, Mono Band with LO cut on the envelope detector and Dual Band.
- Compression Ratio and Threshold knobs for the HI and LO band
- Compressed HI and Compressed LO bands mix knob
- Dry-Wet mix knob (for mono and dual band parallel compression)
- Flexible metering system (Compression HI, Compression LO, output level)
- Side Chain External input
- Side chain stereo link input
- True by-pass function

The **R-506** provides four operative modes:

1. Single band compressor (full band on the envelope detector).
2. Single band compressor (variable frequency LO cut on the envelope detector).
3. Dual Band compressor 50-500 Hz crossover range.
4. Dual Band compressor 500-5000 Hz crossover range.

An Internal dip switch can be used to set up different mix of LO and HIGH signals at the input of the respective envelope detector circuits.

**R-506** is the one of the ARREL 500 series modules (the other models are R-501, R-502, R-503, R-504, R-505, R-507) designed to give to the professional user the best audio tools for its application. To obtain an outstanding audio quality, no servo amplifiers are used in the **R-506** so it is not possible to unbalance the line out of the R-506. If you need an unbalanced connection follow the indications shown in APPENDIX B. The **R-506**, offers a very cool white front panel and a semi closed stainless steel enclosure. **R-506** is dedicated (due to his absolute sonic level quality) to high professional vocal recordings, classical instruments, high dynamic range instruments such as drums and percussions.

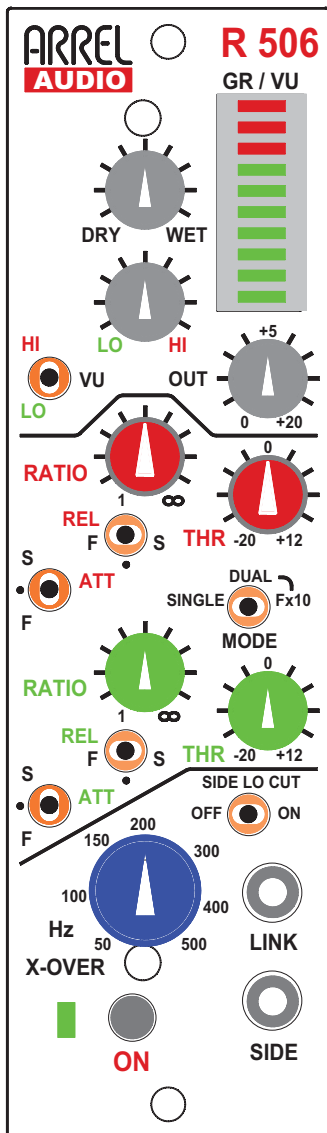
**ARREL Audio** products are designed and manufactured in Italy.

## Housing

The **R-506** dual band VCA compressor module has been designed to be compliant with the 500-series standard.

## Installation Instructions

- Remove the R-506 module from the packaging.
- Turn off the 500-series enclosure and remove mains power.
- Find an empty slot in the 500-series rack and remove the 2 fastening screws, positioned one on the top of the enclosure and one the bottom of the enclosure.
- Insert the R-506 into the empty slot in the 500-series enclosure, Be sure that the rear edge connector on the R-506 module mates correctly with the edge connector of the 500-series enclosure.
- Replace the 2 fastening screws through the top & bottom holes in the R-506 module and screw into the 500-series enclosure. The module must be secured into the enclosure before turning the mains on.
- Apply mains power into the 500-series enclosure and turn on.
- The module is not designed to be hot-plugged, so please ensure the power to the 500-series enclosure is OFF before inserting or removing a module (this recommendation is useful in order to protect the 500 enclosure circuits, our product due to a very robust construction could be hot-plugged without problems).



## R-506 Front Panel Controls and Operations

### DRY-WET KNOB

The DRY-WET knob is used to mix the dry signal from the input of the compressor and the WET i.e. the compressed signal at the output of the compressor (mono and dual band compression).

### HI-LOW KNOB

The HI-LO knob is used to mix the compressed audio signal at the output of the two channels of the compressor (HI and LO channel).

### OUT LEVEL KNOB

The OUT knob is used to set the output level.

### HI/VU/LO SWITCH

It is used to select the measurement on the display. Select HI to visualize the compression factor on the HI channel. Select LO to visualize the compression factor on the LO channel. Select VU to visualize the level at the output of the compressor.

When the compressor is bypassed the VU meter is able to measure the input signal level.

### RATIO KNOB (HI AND LO BAND)

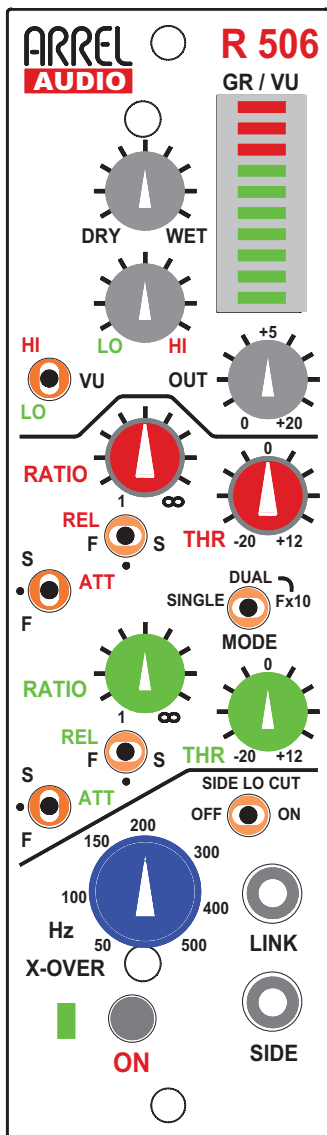
It is used to set the compression ratio of the compressor. A knob for each band. The compression ratio range is 1:1, to  $\infty$ :1.

### THRESH(OLD) KNOB (HI AND LO BAND)

It is used to set the threshold of the compressor. A knob for each band. The threshold range is -20 dBu, +13 dBu.

### REL(EASE) SWITCH (HI AND LO BAND)

Select one of the three positions to select slow, medium and fast (separate switch for HI and LO band).



## ATT(ACK) SWITCH (HI AND LO BAND)

Select one of the three positions to select slow, medium and fast (separate switch for HI and LO band).

## OFF-ON-X10 SWITCH

This is the most important switch of the compressor unit.

- Select OFF to use the compressor as a single band traditional compressor. In this operative mode the high section of the compressor is activated.
- Select ON to use the compressor as a dual band compressor. In this case the crossover frequency range knob works on a 50Hz-500 Hz range.
- Select x10 to use the compressor as a dual band compressor. In this case the crossover frequency range knob works on a 500Hz-5000 Hz range.

## CROSSOVER FREQUENCY KNOB

Rotate the knob to change the cutoff frequency of the crossover.

## LINK JACK (3.5 MM STEREO JACK)

The link Jack is used to link two R-506 units. In this way two R-506 can be linked for stereo compression. The left channel in the first unit is sent via the link cable to the second unit (right channel) and added to the right channel to generate the control signal to the right channel compressor. The same happens to the right channel that is sent to the first unit (left channel) and added to the left channel in the generation of the control signal for the left channel compressor. Each channel can then be controlled with the front panel controls.

## SIDE JACK (3.5 MM STEREO JACK)

The link Jack is used to control the VCAs by an external side chain signal.

## LO CUT SWITCH

Used in the mono band mode to insert a variable frequency Low Cut filter on the side chain. The Low



Cut, cut off frequency is changed by rotating the cross over knob in the range 50 Hz, 500 Hz.

## TRUE BY-PASS ON SWITCH (LED)

The compressor can be bypassed (true by-pass) by pressing the bypass button.

## R-506 Operating modes

The R-506 provides three main different operating modes:

1. Dual Band compressor.
2. Single Band compressor (full band on the envelope detector).
3. Single band compressor (LO cut on the envelope detector).

The operating mode is selectable by the ON-OFF-x10 switch shown in Fig. 1 and 2. Moreover the side chain can be externally controlled by using one external 3.5 mm jacks. The Side chain jack is mono.

## R-506 Dual Band Mode

In this operative mode the R-506 is a true dual band compressor.

The two channels at the out of the crossover circuit are compressed in parallel on two different gain processors.

The signal at the input of the two side chains (envelope detectors) can be user defined by an internal dip switch.

Four possibilities are provided:

DP1	DP2	Function
OFF	OFF	The side chain are controlled by the corresponding crossover output
ON	OFF	The LO side chain is controlled by a mix of the signals from the crossover outputs (68% signal from LO and 32% from HI)
OFF	ON	The HI side chain is controlled by a mix of the signals from the crossover outputs (68% signal from HI and 32% from LO)
ON	ON	The LO side chain is controlled by a mix of the signals from the crossover outputs (68% signal from LO and 32% from HI) The HI side chain is controlled by a mix of the signals from the crossover outputs (68% signal from HI and 32% from LO)

In the dual band mode, the two true RMS detectors (envelope detectors) speeds are optimized for the low and high band of the compressor.

## R-506 Single band (full bandwidth on the envelope)

In this case the compressor architecture is typical single band architecture. The HI gain control circuit and the corresponding chain are used to process the input signal (red knobs).

The envelope detector is controlled directly from the dry signal (input signal). The crossover is excluded.

### **R-506 Single band (LO cut on envelope detector)**

In this case the compressor architecture works as single band architecture. The HI gain control circuit and the corresponding chain are used to process the input signal. The envelope detector is controlled from the HI out of the crossover. So in this case the user is able to control the amount of low frequency signals to be used in the computation of the envelope.

### **R-506 External connections**

The R-506 can be connected in many different ways for the maximum flexibility.

#### **R-506 SIDE Jack**

By using this 3.5 mm mono jack the HI side chain section of the compressor can be controlled by an external signal. In this way the user can build the side chain signal by using external units (for example a multiband equalizer controlled by the same signal at the input of the R-506).

#### **R-506 LINK JACK**

By using this 3.5 mm stereo jack two R-506 units can be linked. In this way two R-506 can be linked for stereo compression for example. The left channel in the first unit is sent via the link cable to the second unit (right channel) and added to the right channel to generate the control signal to the right channel compressor. The same happen to the right channel that is sent to the first unit (left channel) and added to the left channel in the generation of the control signal for the left channel compressor. Each channel can then be controlled with the front panel controls.

APPENDIX A: Front Panel

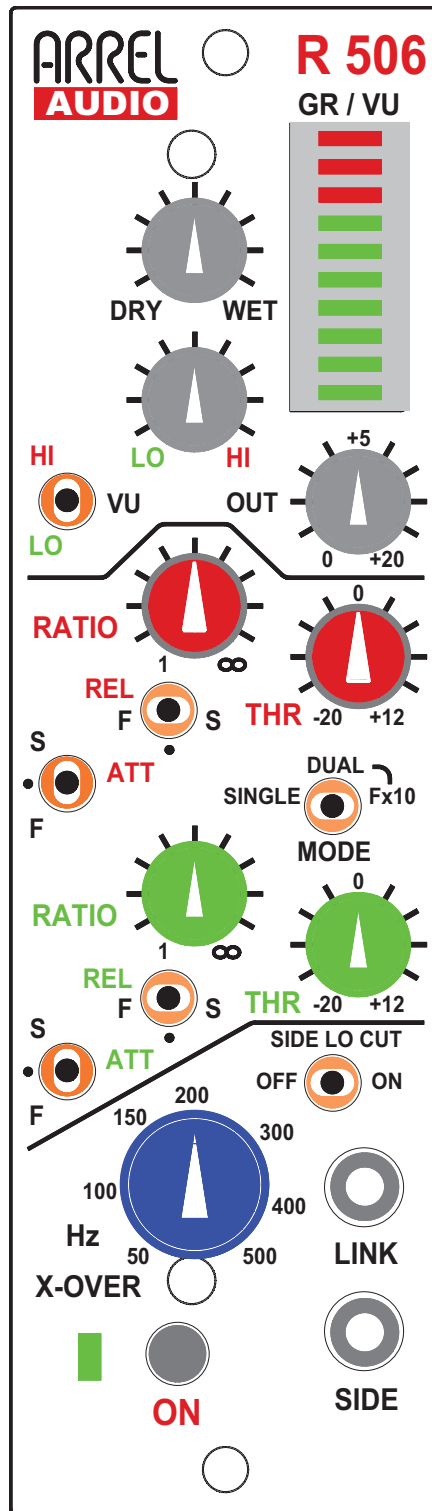


FIG. 1 R-506 Front Panel

APPENDIX B: EXTERNAL CONNECTIONS

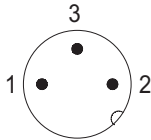


WIRING R - 506

LINE INPUT

XLR

On the back panel



- 1 = Ground
- 2 = PHASE +
- 3 = PHASE -

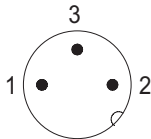
Balanced line

Can be unbalanced

MAIN OUTPUT

XLR

On the back panel



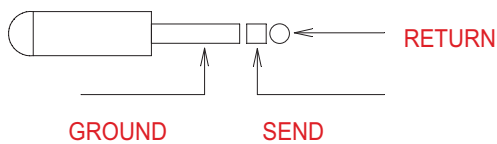
- 1 = Ground
- 2 = PHASE +
- 3 = PHASE -

Balanced line only - To use unbalanced lines disconnect pin 3

STEREO LINK

JACK STEREO 3.5 mm

On the front panel

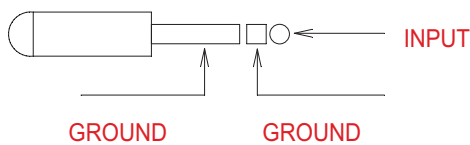


Unbalanced line

SIDE-CHAIN

JACK MONO/STEREO 3.5 mm

On the front panel



Unbalanced line

FIG. 2 External connections

**APPENDIX C: 500 series module edge connector**

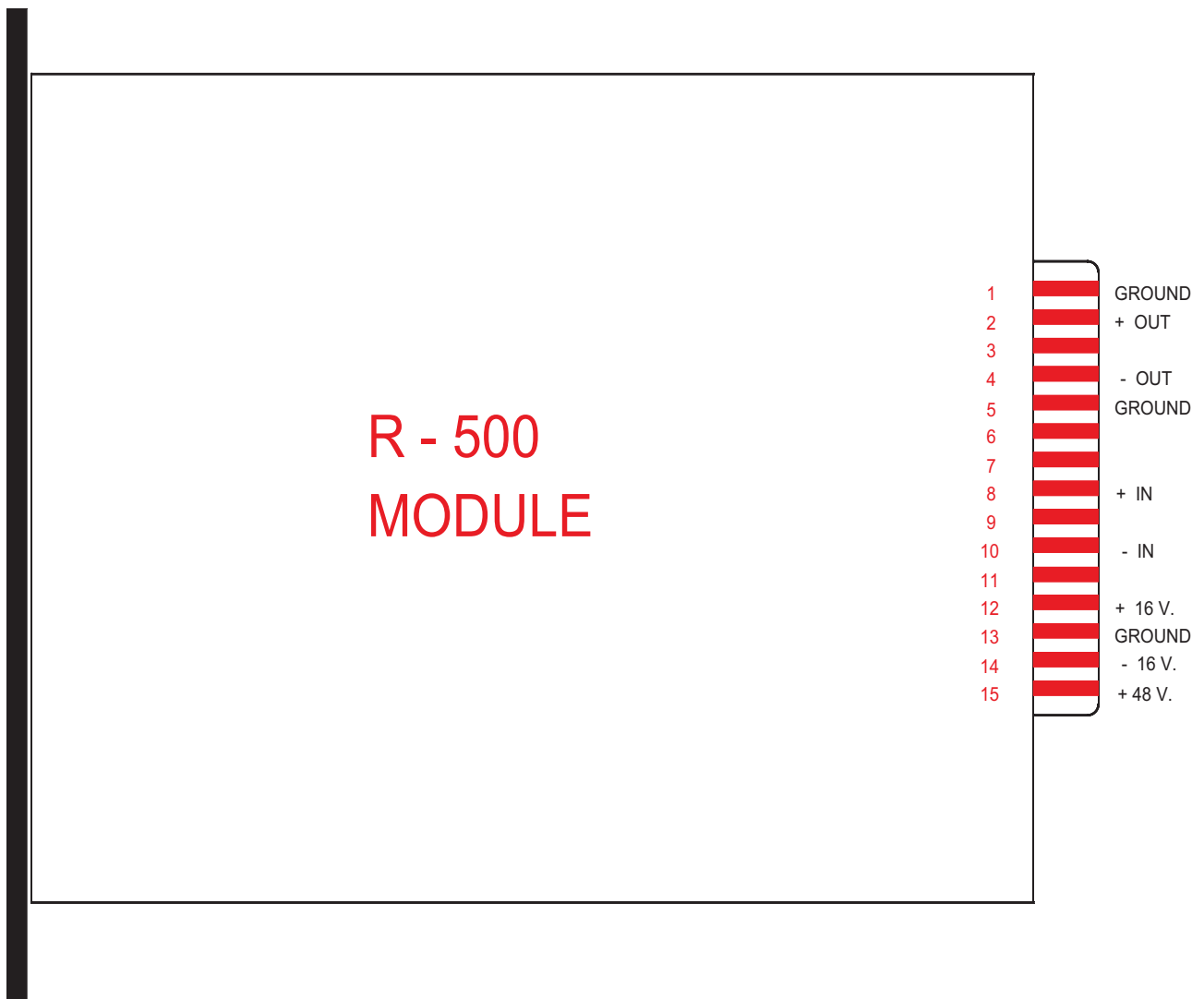


FIG. 3 500 Series module edge connector

## TECHNICAL SPECIFICATIONS

Number of Channels:	1
Power Supply	±16 VDC, very low power supply currents with respect to the 500 series standard
Line Input	Electronically Balanced, Impedance 20KΩ, Input Level +4dBu, Max +20 dBu.
Output Level	Electronically Balanced, Level +4 dBu, Max +27 dBu, Output Impedance 100 Ω
Bandwidth	5 - 150 KHz ±1 dB, perfect square wave up to 20 KHz
Distortion + Noise	<0.003% ( typical 0.001%).
Front Panel Controls	True By-Pass button (LED), DRY-WET mix knob LO-HI mix knob OUT level knob Ratio knobs (HI and LO) 1:1 to ∞:1 Threshold knobs (HI and LO) – 20 dBu, +13 dBu Attack switch (separate HI and LO): three positions (slow, mid, fast), Release switch (separate HI and LO): three positions (slow, mid, fast) Mode switch: dual band, mono band dry, mono band with side chain controlled by a variable cut off frequency LO cut filter. Crossover frequency Metering selection switch: three positions (Ho compression, LO compression, Output level)
Attack Time	HI (slow, mid, fast)=(33 msec, 10 msec, 2.3 msec) LO (slow, mid, fast) =(120msec, 23 msec, 5msec)
Release Time	HI slow, mid, fast)=(1 sec, 490 msec, 85 msec) LO (slow, mid, fast)=(200msec, 1 sec, 1.5 sec)
Crossover Frequency Bands	50Hz-500 Hz OFF-ON-X10 SWITCH in ON position 500Hz-5000 Hz OFF-ON-X10 SWITCH in X10 position
Front panel connectors	3.5 mm SIDE mono/stereo jack 3.5 mm LINK stereo jack
Rear Panel Input Connectors	500 series compatible connector
Construction	Compliant 500-series rack with PSU and external audio connections, Single 500-series rack slot required for each R-501 module.
Dimensions	Series 500 standard
Weight	500 g

