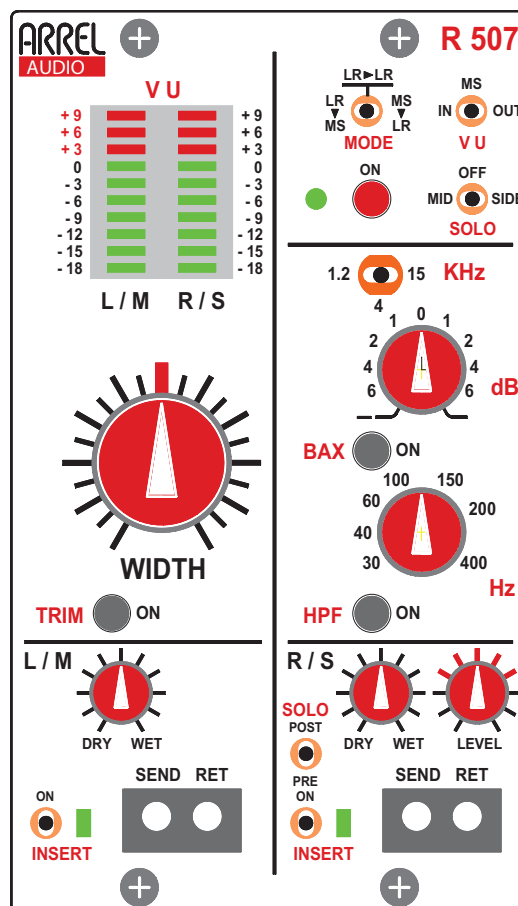




## R-507 MID-SIDE Unit



**User Manual**  
Issue 1.0



## 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.

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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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## INTRODUCTION

The **ARREL Audio R-507** MID-SIDE (M/S) unit is characterized by an outstanding sound quality and a number of new functions that are not available on other MID-SIDE units on the market. At present the R-507 is the first MID-SIDE unit available for the 500 series.

The unit has been designed to comply with the demands of professional recording and mastering engineers and also for live applications. MID/SIDE processing is based on the coding of a stereo signal into two components. The "MID" channel contains the information that appears in both the left and right channels, and the "SIDE" channel contains all the information that differs between the left and right channels.

Once encoded into M/S, these two signals can be processed independently, before being decoded back into L and R channels. The M/S technique gives more control over the width of the stereo image than techniques based on microphone placement techniques. The R-507 is a code/decode /stereo system to be used primarily for mastering, recording and live applications.

On top of its amazing sound quality, the R-507 MS unit features a unique set of functions. The mode switch permits the use of the M/S unit in three different operative modes:

1. Input L/R, output MID/SIDE. In this case the M/S coding function is used. This mode is typically used in broadcast applications
2. Input L/R, output L/R, in this case both the coding and decoding function are used. This mode is typically used in mastering applications.
3. Input M/S, output L/R, in this case the decoding function is used. This is the typical mode to be used in recording when a pair of mics are used in the MID/SIDE configuration.

The unit is equipped with a very flexible solo function. The solo can be OFF, or it can be configured to listen to the MID or the SIDE channel. This control is very useful for checking the effects on the inserts and also to check the original sound field when MID/SIDE recording is used. The ON led will blink and change its color to indicate the activation of the solo function.

The R-507 is equipped with a flexible metering system (VU). The time constant of the metering is slightly faster than the traditional electromechanical VU. The scale is extended in order to visualize up to +9 VU that means +13 dBu so we can check the level of the typical reference on the dBFS scale of the converter. The VU meter can be switched to visualize the level for Input, Output or of the MID and SIDE channels.

The main functions on the SIDE channel are:

1. Send gain to obtain the maximum Signal to Noise ratio in the insert audio path. This fact is important when compressors/limiters are used as inserts in the SIDE audio path.
2. High frequency BAX (Baxandall) filter (1.2, 4, 15 KHz), with emphasis/de-emphasis control over 8dB of dynamic range.
3. HPF filter with 30-400 Hz (12 dB/Oct) control knob.
4. Solo pre or post on the side channel (also the VU is affected).

INSERT points are available to connect outboards on the front panel (Bantam connectors) and they are selectable by push buttons.

Wet and dry signals from the SIDE and MID channel can be mixed together.

## ARREL Audio

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A very important function of the R-507 is the TRIM push button that permits a fine adjustment of the stereo width.

The ON push button is used to activate the unit (LED PERMANENTLY ON). When the solo function is activated, the on led will change the color and will blink.

### Housing

The **R-507** Mid Side Unit module has been designed to be compliant with the 500-series standard. Two slots are used to install the **R-507**.

### Installation Instructions

- Remove the R-507 module from the packaging.
- Turn off the 500-series enclosure and remove mains power.
- Find two empty slots in the 500-series rack and remove the 4 fastening screws, positioned one on the top of the enclosure and one the the bottom of the enclosure.
- Insert the R-507 into the empty slots in the 500-series enclosure. Be sure that the rear edge connector on the R-507 module mates correctly with the edge connectors of the 500-series enclosure.
- Replace the 4 fastening screws through the top & bottom holes in the R-507 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-507 Front Panel Controls and Operations

The R-507 input stage is based on a differential amplifier so it is “electronically balanced”. The standard input level for the **R-507** is + 4dBu.

### CODING SECTION

After the input stage, the **L** and **R** audio signals are processed by the analog processor (matrix) to obtain the **L+R (MID)** and **L-R (SIDE)** signals.

The **L+R** signal being the summation of two signals is in the range [0, +6dB], while the **L-R** signal is in the typical range of [0, -60 dB] (usually -20 dB). These levels are typical levels and their value depends exclusively on the characteristics of the **L** and **R** signals.

In the R-507, the **L+R** is equalized at a standard amplitude level while the **L-R** channel is equipped with a gain control to obtain correct level at the SIDE insert point. This fact is important when compressors/limiters are used as inserts in the MID-SIDE audio path.

### MODE SWITCH

The mode switch permits the use of the Mid Side unit in three different operative modes:

1. Input L/R, output MID/SIDE. In this case the M/S coding function is used. This mode is typically used in broadcast applications
2. Input L/R, output L/R, in this case the coding and decoding function is used. This mode is typical of mastering applications.
3. Input M/S, output L/R, in this case the decoding function is used. This is the typical mode to be used in recording when a pair of mics is used in the MID/SIDE configuration.

### SOLO SWITCH

The solo switch is used to monitor the input output or MID/SIDE channels. This control is very useful for checking the effects on the inserts and to check the original sound field when MID/SIDE recording is implemented. When the solo function is activated the ON LED will blink and will change its color.

### ON PUSH BUTTON

The activation of the unit is obtained by pressing this button. If the button is in the off position the unit will be deactivated to it is equivalent to a true by-pass.

### R/S LEVEL KNOB

This knob is used to change the level of the insert in the SIDE processing channel.

### HPF PUSH BUTTON

The HPF switch is used to activate the LO-CUT filter.

### HPF KNOB

The HPF knob is used to change the cut-off frequency of the LO-CUT filter. The frequency range is 30-400 Hz (12 dB/Oct)

## **BAX PUSH BUTTON**

The BAX switch is used to activate the Baxandall filter.

## **BAX KNOB**

The BAX knob is used to change the emphasis/de-emphasis of the Baxandall filter in a range of -8/+8 dB.

## **BAX SWITCH**

The BAX switch is used to change the frequency of the BAX filter, three positions are available corresponding to 1.2 KHz, 4 kHz, 15 kHz.

## **INSERT CONNECTORS**

The insert Bantam connectors on the front panel are used to connect outboards in order to process the L-R and the L+R channel. The four connectors correspond to balanced line level lines.

## **INSERT SWITCH**

The insert switches are used to activate the insertion of the outboards connected to the insert bantam connectors (LED).

## **DRY/WET KNOB FOR MID AND SIDE**

The DRY-WET knob is used to mix the DRY signal and the wet signal for the MID and SIDE channel.

## **STEREO WIDTH KNOB**

This knob controls the level of the L-R channel before the reconstruction of the stereo image.

## **TRIM PUSH BUTTON**

The trim push button can be used for a FINE tuning of the stereo width.

## **VU SWITCH**

The VU switch is useful for the monitoring of input, output and MID/SIDE levels in the unit. The time constant of the metering is slightly faster than the traditional electromechanical VU. The scale is extended in order to visualize up to +9 VU that means +13 dBu so we can check the level of the typical reference on the dBFS scale of the converter.

## **SIDE SOLO SWITCH**

The solo switch permits the control of the source signal of the side channel. Pre and post insert are the two available positions.

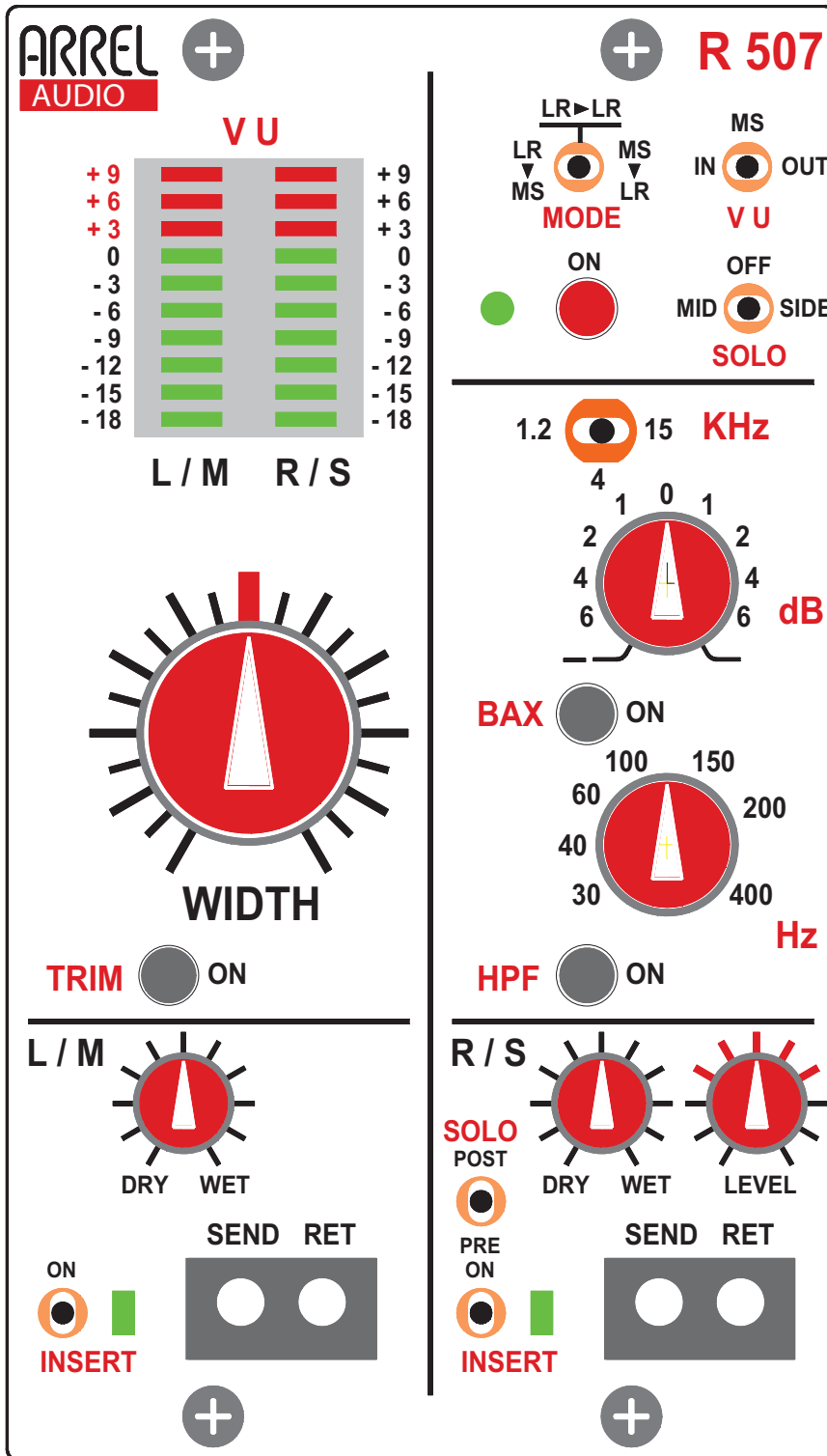


Fig.1 R-507 front panel

### **VU METER SWITCH**

The VU switch is used to select different signals at the input of the VU meter (Input L-R level after gain control, LEFT and RIGTH right output channels.)

### **BAR GRAPH DISPLAY**

A double 10 led bar graph display is used to visualize the audio level.

APPENDIX A: Front Panel

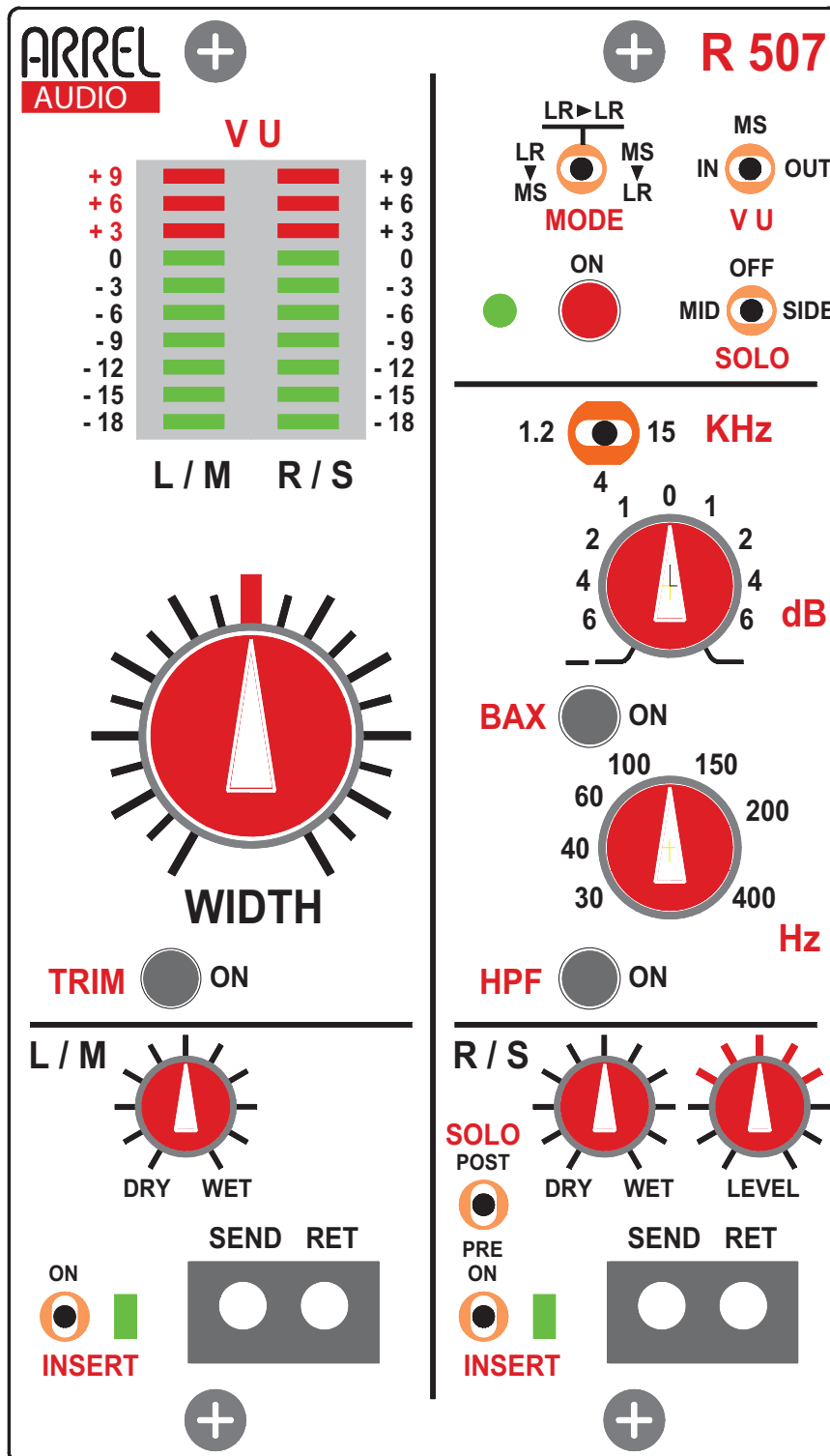


FIG. 2 R-507 front panel

APPENDIX B: EXTERNAL CONNECTIONS



WIRING R - 507

LINE INPUT	XLR	On the back panel
		1 = Ground 2 = PHASE + 3 = PHASE -
	Balanced line	Can be unbalanced
MAIN OUTPUT	XLR	On the back
		1 = Ground 2 = PHASE + 3 = PHASE -
	Balanced line only	- To use unbalanced lines disconnect pin 3
INSERT SEND	BANTAM	On the front panel
	Balanced line only	- To use unbalanced lines disconnect pin 3
INSERT RETURN	BANTAM	On the front panel
	Balanced line	Can be unbalanced

FIG. 3 External connections

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

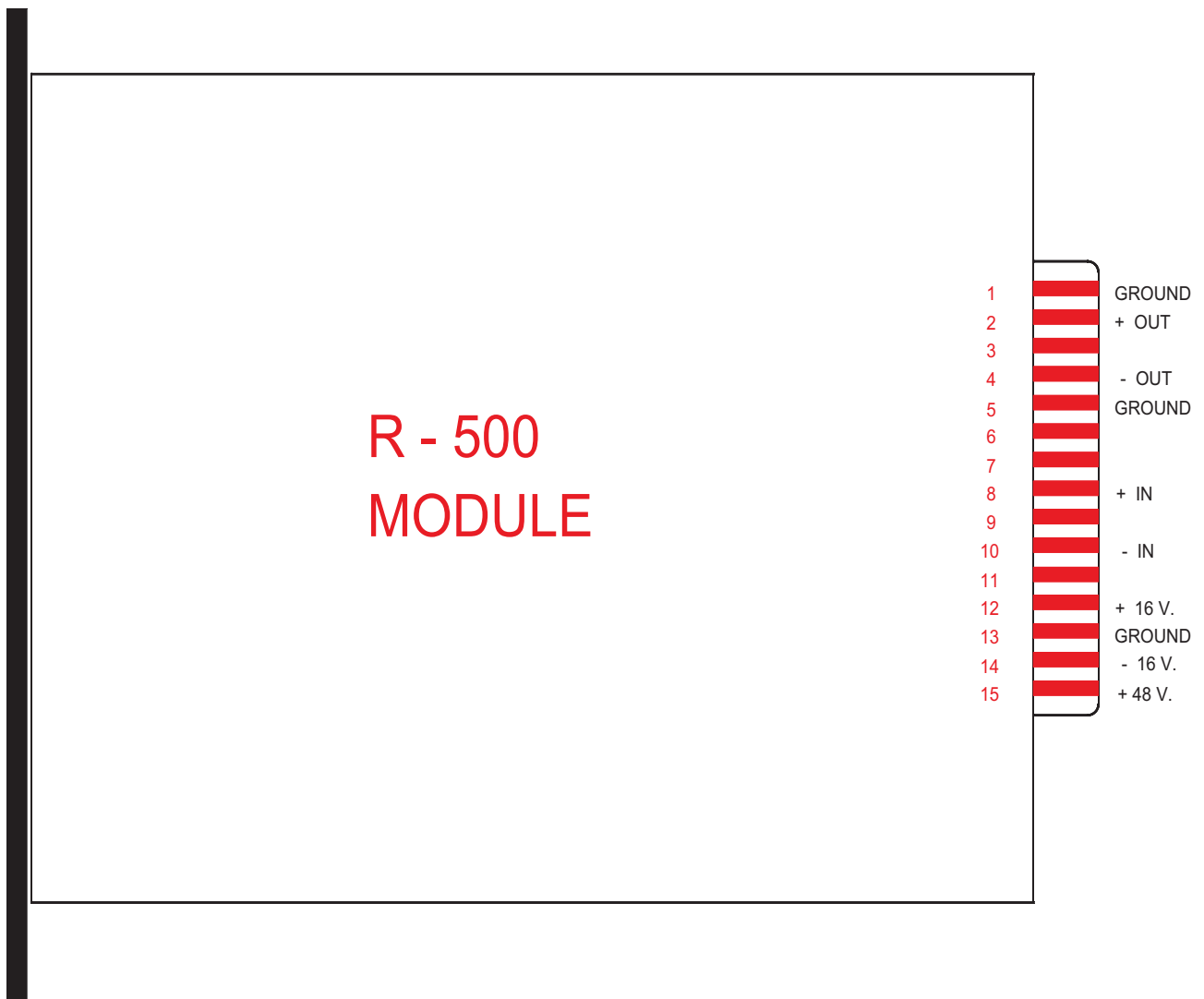
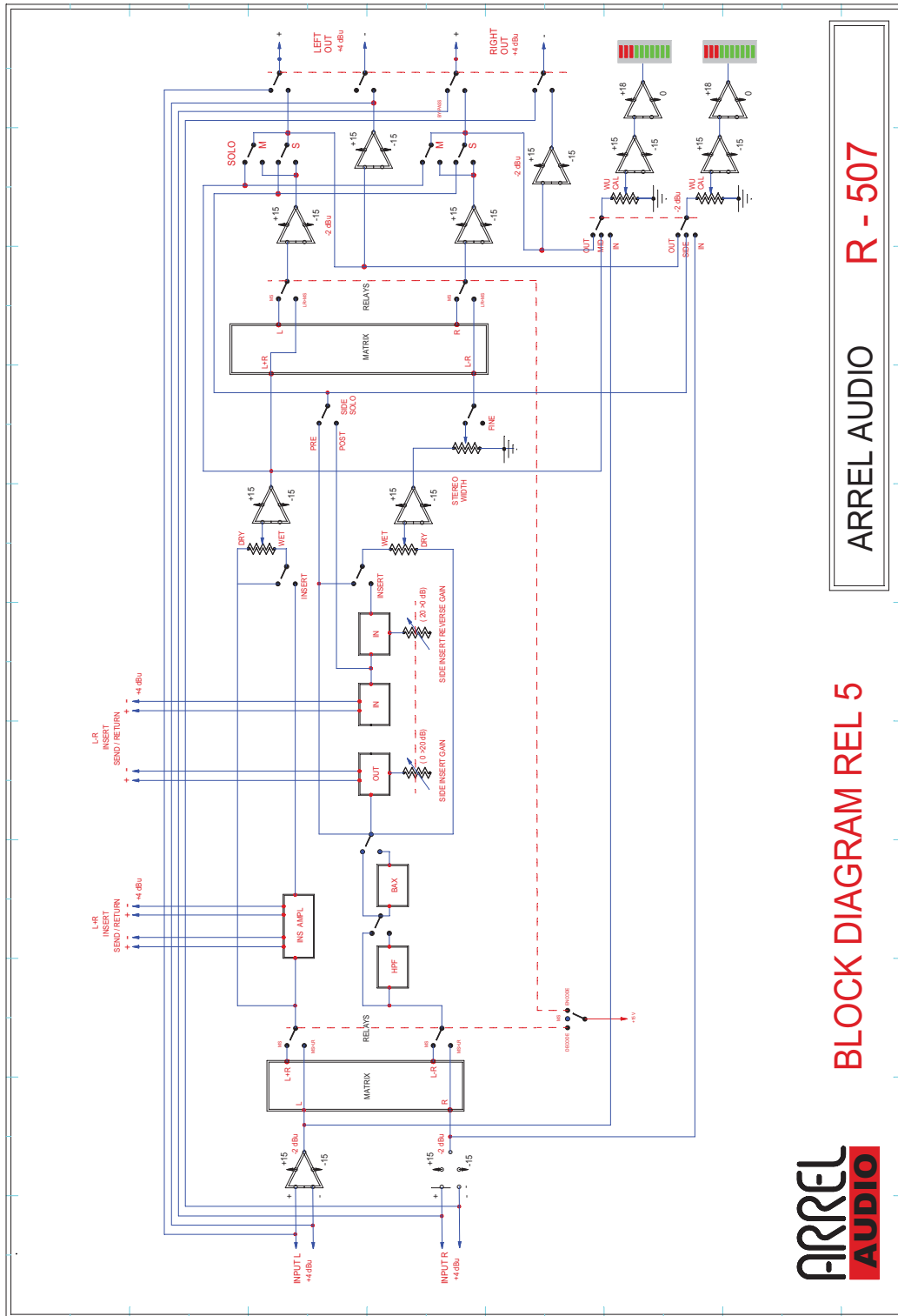


FIG. 4 500 Series module edge connector

APPENDIX D: Block Diagram



**ARREL**  
**AUDIO**

BLOCK DIAGRAM REL 5

ARREL AUDIO R - 507

FIG. 5 R-507 Block Diagram



**TECHNICAL SPECIFICATIONS**

Power Supply	±16 VDC, very low power supply currents with respect to the 500 series standard
Input	Electronically Balanced, Impedance 20KΩ, Input Level +4dBu, Max +24 dBu.
Output Level	Electronically Balanced, Level +4 dBu, Max +26 dBu, Output Impedance 100 Ω
Bandwidth	5 - 200.000 Hz -1dB, perfect square wave up to 20 KHz
Distortion + Noise	<0.005% ( typical 0.001 %).
L-R Filters	BAX high frequency filter with 3 frequencies (1.2 kHz, 4 kHz, 15 kHz), emphasis/de-emphasis +/- 8 dB HPF (LO-CUT): 30-400 Hz, -12 dB Oct
Front Panel Controls	MODE SWITCH SOLO SWITCH VU METER SWITCH HPF (LO-CUT) SWITCH HPF KNOB BAX SWITCH BAX KNOB MID/SIDE DRY-WET KNOBS STEREO WIDTH KNOB TRIM PUSH BUTTON SIDE LEVEL KNOB MID/SIDE INSERT PUSH BUTTONS SIDE PRE/POST SOLO SWITCH
Front Panel Indicators	Two 10 led bar graph display
Rear Panel Input Connectors	500 series compatible connector (two standard units)
Construction	Compliant 500-series rack with PSU and external audio connections, Two 500-series rack slots are required for each R-507 module.
Dimensions	Series 500 compatible double module
Weight	500 g