



pocket tools colourizer



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user manual

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1. Introduction

Welcome to AER !

Thank you for purchasing an AER Pocket Tool. You are now the owner of a professional audio preamp, designed and manufactured to the highest pro audio technical specifications; capable of shaping, maximizing and delivering the tonal character of your instrument. At AER our complete focus, some say obsession, is on the 'true' reproduction of natural acoustic sound. A lifetime spent listening to and working with acoustic instruments helps us to create and refine the very best devices available; to enable you to craft your own unique acoustic identity. Make your instrument the very best it can be ...

Please take a moment to read this brief manual. We want you to understand how our product works and what it can do for you. We want you to gain benefit from its many features but most of all we want you to ENJOY it!

The AER Colourizer is a preamplifier for instrument or microphone (vocal or instrument microphone). You insert it into the signal chain between source and next point in the audio path (e.g. amplifier or mixing desk) to produce sound improvement – your signal will be stronger, richer and more stable.

How is this achieved? – The high grade input stage we have created makes your instrument's tone noticeably more rounded and fuller. Three individually switchable and adjustable filter systems – **tone**, **enhancer** and **equalizer** – may be used separately or in combination to influence sound character, harmonics and frequency spectrum. Furthermore these filters can be used to dampen natural resonant frequencies, helping to limit feedback.

The AER Colourizer also provides **24V phantom power** for a condenser microphone, an adjustable pro standard DI output for direct connection to a mixing desk and a phase switch.

Read on and have fun!

2. Safety Instructions

The following guidelines shall help minimize the risk of injury through fire or electric shock.

1. Carefully read these safety notes before you use the device!
2. Keep these safety notes in a safe place.
3. Pay attention to all warnings, instructions and additional texts on the unit.
4. Do not install or use your device in close proximity to water or if you are wet yourself.
5. Use your device in a safe place where nobody can step on cables or trip over and damage them.
6. Always pull the mains plug before cleaning your device. Use only a dry cloth for cleaning. Avoid the use of detergents and do not let any liquids seep into the unit.
7. Never install your device close to units with strong electromagnetic fields such as large mains transfor-

mers, revolving machines, neon illumination etc. Do not lay signal cables parallel to power current cables.

8. There are no user-serviceable components inside the unit. To avoid the risk of an electric shock, the unit must not be opened. All maintenance, adjustment and repair works should be carried out by qualified staff only. Any unauthorized tampering will void the 2-year warranty.
9. In keeping with the EMV regulations screened cables with correctly fitted connectors must be used for all signal connections.
10. Always use an earthed power supply with the correct mains voltage. If you are in doubt about the power outlets ground, have it checked by a qualified technician.
11. Cable up your device only when it is powered off.

3. Controls and Connections



Top Side

gain	input level control
clip	overload indicator
line/mic	signal source selector switch (combo socket): line: (only via jackplug) for instruments (pickup) and other line level sources mic: (only via XLR-connector) for microphones
DI level	DI signal level control
volume	line out signal level control
phase	phase invert switch
tone	tone balance circuit
balance	tone balance emphasis control
intensity	tone balance level control
enhancer	harmonic enhancement
intensity	enhancer level control
off/on	enhancer activation switch
equalizer	parametric filter network
level	level control
bandwidth	filter bandwidth control
frequency	filter frequency control
f1/f2	filter frequency range switch

Front Side

input	signal input, combo socket for 6,3 mm mono jackplug and XLR-male-connectors
power	on/off status indicator

Rear Side

dc 24 V	power supply connector socket (24 Volt DC)
24 V phantom power	24V phantom power switch
line out	signal output, 6.3 mm mono jack socket
DI-out	signal output, symmetrical, XLR socket

4. Operation Summary

4.1 Cabling and Starting-up

Before connecting to the mains, please ensure that your local mains voltage (e.g. 230V in mainland Europe, 120V in the USA) is suitable for the voltage input range of the included power supply. The relevant specs and safety symbols are printed on the rear side of the unit.

Note: 24V power supply

The 24VDC power supply is a certified wide-range model, capable of handling input voltages between 100V and 240V. A substantial amount of research, effort and testing went into the selection of this power supply. It is critical to the function of the preamp – please use no other power supply!

Also please bear in mind that any device powered from a power supply (as opposed to battery operation), may suffer interference carried by the electricity supply itself. To avoid this, always try and keep signal cables as short as possible.

We have opted for a „non-earthed power supply“ (class 2 with protective insulation) in order to avoid unwanted earth or ground loops that occur when using several earthed mains powered devices in the signal chain.

Please ensure that both the **tone balance** and the **equalizer level controls** are in their middle position (centre detent) and all other controls are turned all the way to the left. The pushbuttons should be off, i.e. not pushed.

Make all signal cable connections as desired (e.g. instrument or microphone to **input**, **line out** to amplifier input and maybe **DI out** to the mixing desk input). Now you can connect the unit to the power supply. The green **power** control LED indicates operational readiness.

4.2 Level adjustment

Note: Level adjustment

By setting the level correctly we mean that the signal level in one or several devices in a signal chain is neither too high nor too low. This applies equally to all components of a unit (here **tone**, **enhancer** or **equalizer** included).

Consequently, care must be taken that no part of the circuit is overloaded, or that distortion is unintentionally added to the signal. We have carefully designed the circuit to achieve this objective whilst also providing potentiometers (**gain**, **level**, **volume**) for „manual“ intervention.

The **colourizer** is equipped with a high-quality preamp which can handle line and microphone signals and has therefore a wide input sensitivity range.

Using the **line/mic** switch, select the preamp function to suit your signal source. **Mic** (pressed in) is suitable for microphones. (with condenser microphones please activate 24V **phantom power**) **Line** should be used for instrument pickup systems and most other signal sources. The **gain** control is used to match the **colourizer** input stage to your signal source, ensuring optimum function with the best possible signal-to-noise ratio (SNR).

Having selected the appropriate preamp function (mic or line) and with the **gain** controls set fully counter clockwise (minimum gain), turn up the **gain** whilst playing your instrument until the red **clip** indicator LED lights up occasionally with heavy strumming. Now turn down the **gain** control (or the volume control on the source) by a tiny amount to allow additional headroom for undistorted reproduction.

During play, the **clip** control LED should only flicker intermittently at most. With **line** (signal sources with a sufficient input signal level) the **gain** controls will probably sit between minimum gain and the 10 o'clock position. It's likely that in **mic** position the setting will be significantly higher. Finally the desired output level of the line output is controlled by the volume control. Please note that some of the filter stages are active and will therefore affect the overall level setting.

5. Functional Characteristics

5.1 DI level

The **DI-out** carries a balanced preamp signal. The **DI level** control determines the preamp's output signal level.

5.2 Phase

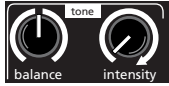
The **phase** switch allows reversal of the phase of the output signal of the colourizer relative to the input signal by 180°, thus matching it to the phasing of other devices in your signal chain.

5.3 24V Phantom power

The **24V phantom power** switch is located on the rear side of the housing. This provides phantom power to the XLR input for devices that require it eg condenser mics. The 24V phantom supply of your AER device complies with the DIN EN 61398 regulations in view of a 24V phantom power supply. Please note the supplement text on page 7.

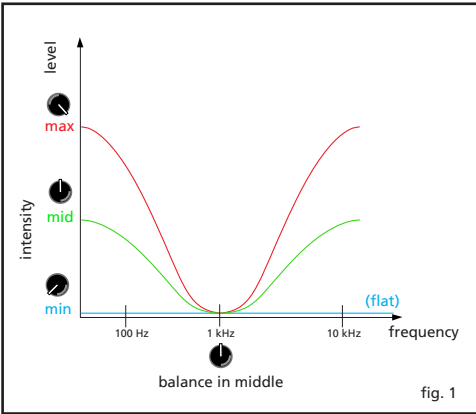
5.4 Filter network and filter stages

5.4.1 Tone Balance – How does it work?

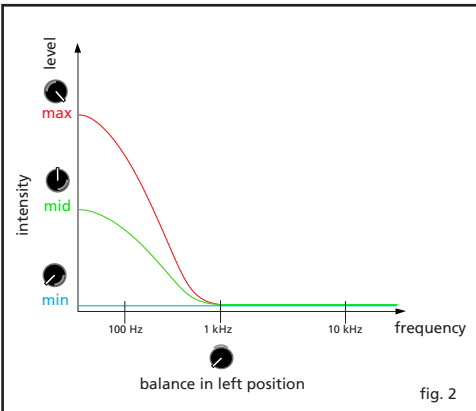


The „tone balance“ is served by the two controls **balance** and **intensity**. The **intensity** control determines the degree to which bass and treble are increased simultaneously and are mixed to the original signal (parallel mode). If the **intensity** control is far over to the left (**min**, s. fig.), then the original signal is not influenced (**flat**). Turning the control to the right (**--> mid --> max**) mixes the relevant bass and treble mix to the original signal.

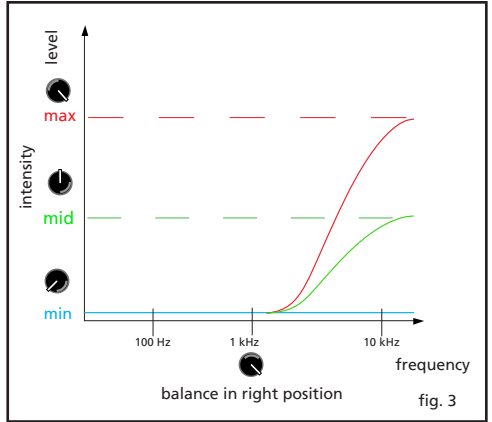
The **balance** control influences the relationship between bass and treble. If it is in **middle** setting, bass and treble are balanced. The **tone balance** is now in equation. (s. fig. 1)



If you turn the balance control to the left (fig. 2), the bass range is further increased, but the treble is decreased by max. 0dB.



A turning to the **right** (fig. 3) affects an increase in treble whilst at the same time reducing the bass.



In its function and signal path the **tone balance** is deliberately designed as a somewhat „different“ **equalizer**. It offers a comfortable way of giving the original signal more zip without distorting it. Especially on those occasions, when the **equalizer** has to be used to suppress resonance or feedback.

5.4.2 Enhancer



The **enhancer** built into the **colorizer** adds harmonics to the source signal thereby creating more brilliance and clarity. The **enhancer level** can be adjusted with the **intensity** control. Pressing the **off/on** switch will deactivate or activate the **enhancer**.

5.4.3 Equalizer

The equalizer is a parametric filter network, adjustable from **90 Hz** to **11 kHz** in two ranges: **f1= 90 Hz – 1,6 kHz** and **f2= 680 Hz – 11 kHz**. The ranges have been designed to meet the special requirements of acoustic instruments, microphones and other signal sources and to allow useful and accurate signal manipulation in order to suppress resonances and feed-



back. The filter technology ensures a constant bandwidth at any selected frequency.

Note:

A parametric equalizer is a filter network where all features of a filter (amplitude, i.e. boost or cut = level, frequency and Q factor = bandwidth) can be adjusted. Parametric means that not only the boost/cut, but also the location and width of the frequency bands can be adjusted. It offers the possibility to equalize (flatten) notches or peaks in the frequency response (hence the name equalizer) and to suppress feedbacks or resonant peaks. It can also be used as a flexible tone control for targeted sound alterations.

Sample application:

Suppose you notice an excessive signal increase (feedback). To counteract you will need to reduce the signal level of the corresponding frequency range. To do this, first set the **level** control (amplitude) to maximum cut (left-hand stop). Make sure that the **bandwidth** control is set to maximum bandwidth (right-hand stop). Using the **frequency** control you can now detect the centre frequency of the offending frequency range. (use the **f1/f2** preselect switch also) The peak should now be gone. To enhance the sonic result, you may reduce the **bandwidth** (increase the Q factor) or lower the amplitude (decrease the reduction), if necessary.

The control ranges of the potentiometers are not running linear and thus allow specific influence of critical ranges. (e.g. 87,5%/f1 control the range of 300 Hz)

5.4.4 Frequency poti-rotation

poti-position	rotation 300°	f1	f2
lefthand stop	0%	55 Hz	600 Hz
	50%	100 Hz	1,3 KHz
	75%	180 Hz	2,3 KHz
	87,5%	300 Hz	3,7 KHz
	93%	455 Hz	5,6 KHz
righthand stop	100%	870 Hz	11 KHz

5.4.5 Bandwidth poti-rotation

poti-position	rotation 300°	octave
lefthand stop	0,0%	1/6
	12,5%	1/3
	25 %	1/2
	50%	2/3
righthand stop	100%	1

Supplement to article 5.3:

Use of 24V- resp. 48V-Phantom-Power

(Phantom power = remote supply, here: powering an audio device via the connected audio line)

Turn on the phantom power only if the unit connected to the XLR socket is designed to handle it!

In general, suitable units are e.g. condenser microphones, active DI boxes and other special audio devices, whose power supply is drawn from the phantom power. Such devices are also labelled accordingly; please heed the permissible power consumption (max.10mA).

High-quality dynamic microphones with a balanced signal need no phantom power, but can handle it anyway.

Other devices which have not been designed explicitly for phantom power operation can suffer from considerable malfunctions, and damage may result as well.

Examples of devices that may be damaged by incorrect application of phantom power include:

Low-cost dynamic microphones with a mono jack plug (unbalanced signal) that were fitted afterwards with an XLR connector.

Audio devices with a balanced XLR output (e.g. DI boxes, effects devices, instrument preamps with a DI output etc.) which are not protected against phantom power applied to their XLR output. (The DI connectors on AER products are protected against applied phantom power.)

Other audio devices (such as preamps, effects pedals etc.) whose unbalanced line output was replaced by an XLR socket.

If in doubt please consult the manufacturer of the device you are using.

Experiment and enjoy your new route to alternative soundscapes!

Any questions or suggestions? Please do contact us at:

tachauch@aer-amps.com

Thanks for reading!

6. Technical Specifications: pocket tools colourizer

Input	
input	<p>Switchable microphone or line input Combo socket, XLR and ¼" jack (6.35 mm)</p> <p>line mode (jack input) Unbalanced high impedance input for instrument pick-ups and line-level sources Gain adjustment range: +3...+20 dB Min. input voltage: 100 mV (-20 dBV) Max. input voltage: 3 V (+10 dBV) Input impedance: 2.2 MΩ 150 pF Signal-to-noise ratio (A-weighted) Min. gain: 104 dB Max. gain: 98 dB Frequency response: 20 Hz...20 kHz / ±1 dB THD + N (1 kHz): < 0.3%</p> <p>Phantom power: Ring contact of line out is connected to ring contact of input. Any external phantom power applied at the ring of line out will be available at the input.</p> <p>mic mode (XLR input) Balanced microphone input 1 = ground, 2 = positive (+), 3 = negative (-) Gain adjustment range: +4...+40 dB Min. input voltage: 10 mV (-40 dBV) Max. input voltage: 3 V (+10 dBV) Input impedance: 2.1 kΩ Unbalanced: 1.1 kΩ Signal-to-noise ratio (A-weighted): Min. gain: 104 dB Max. gain: 95 dB Frequency response: 20 Hz...20 kHz / ±1 dB THD + N (1 kHz): < 0.1%</p> <p>Phantom power: 24 V, R = 1.2 kΩ per terminal, switchable, total current max. 10 mA, short circuit protected</p> <p>Warning: External equipment may be damaged by inappropriate use of phantom power. In case of doubt keep the 24 V phantom power switch off (not pushed).</p> <p>Clip indicator Red LED Headroom: 12 dB</p>

Outputs	
line out	<p>Unbalanced line output after master Mono jack, ¼" (6.35 mm) Nominal output voltage: 1 V (0 dBV) Max. output voltage: 9 V (+19 dBV) Output impedance: 47 Ω Min. load impedance: 2 kΩ Residual noise (master fully anticlockwise): A-weighted: 1.2 µV (-118 dBV)</p>
DI-out	<p>Balanced XLR output 1 = ground, 2 = positive (+), 3 = negative (-) Level control Nominal output voltage (differential), adjustment range: 41...410 mV (-28...-8 dBV) Output impedance: 47 Ω each terminal to ground Min. load impedance (differential): 1 kΩ Residual noise (both channels in line mode): A-weighted: 2.3 µV (-113 dBV)</p>

Tone controls	
Tone	<p>Flat if intensity is set fully anticlockwise. The following values apply if intensity is set fully clockwise: balance left: +9 dB at 100 Hz, shelf type balance center: +7 dB at 100 Hz, and +12 dB at 10 kHz, shelf type balance right: -1 dB at 50 Hz +12 dB at 10 kHz, shelf type</p>
Enhancer	<p>Enhancer intensity fully clockwise, 1 V RMS at line out: Frequency response: +3 dB at 10 kHz Harmonic distortion: THD ≈ 10% at 1 kHz</p>
Parametric equalizer	<p>Adjustable band boost / cut (bell curve) filter Frequency range: 90 Hz...1.6 kHz / 680 Hz...11 kHz (switchable) Gain range: ±15 dB at center frequency of filter Bandwidth range: 0.4 – 2.2 octaves ("half-dB" method, measured between +7.5 dB points with level set to +15 dB)</p>
Power	
Supply voltage	24 V=, 0.2 A Use only supplied mains adapter.
Mains adapter	Mains voltage: 100-240 V~ Power consumption when used with Colourizer: max. 10 W
General	
Metal housing	Aluminium
Finish	Anodized black
Dimensions	65 mm (2.56") high 105 mm (4.13") wide 135 mm (5.31") deep
Weight	480 g (1.06 lbs)

Definitions and conditions

Input and output voltages are RMS values for a sine signal and 1 kHz unless stated otherwise.

Tone controls in neutral position (equalizer level in center position, tone intensity and enhancer intensity fully anticlockwise) unless stated otherwise.

Min. input voltage: Input voltage for nominal output voltage at line out with gain and volume fully clockwise.

Max. input voltage: Permissible input voltage that does not cause distortion more than the rated THD + N (assuming suitable control settings).

Signal-to-noise ratio (SNR): Ratio of nominal output voltage to noise voltage at line out, at specified gain setting, master fully clockwise, input shorted, 20 Hz...20 kHz.

Note: SNR is specified for each channel depending on its control settings. The SNR found at line out may be less than the specified SNRs of the channels because both channels contribute to the output noise.

Residual noise: Noise voltage at an output when all gain and level settings are minimal.

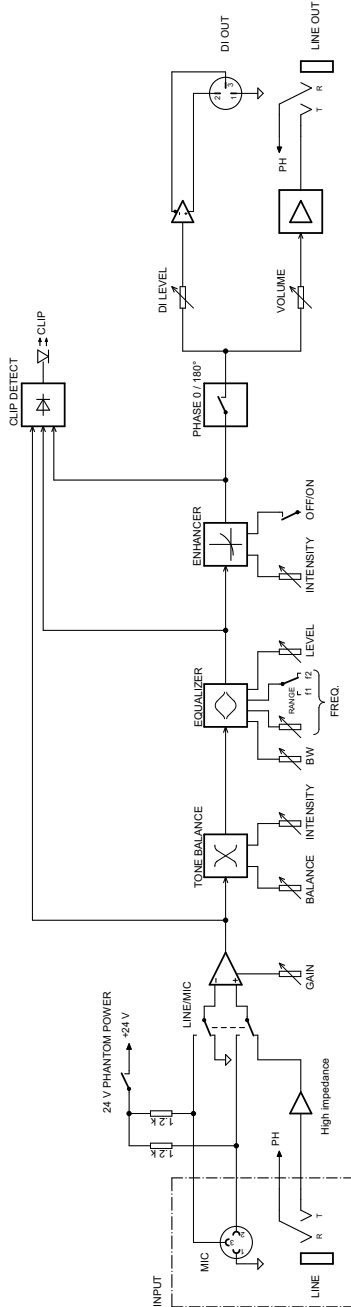
THD + N: Total harmonic distortion + noise for nominal output voltage at line out

Specifications and appearance subject to change without notice.

TD20111123



7. Circuit Diagram: pocket tools colourizer



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