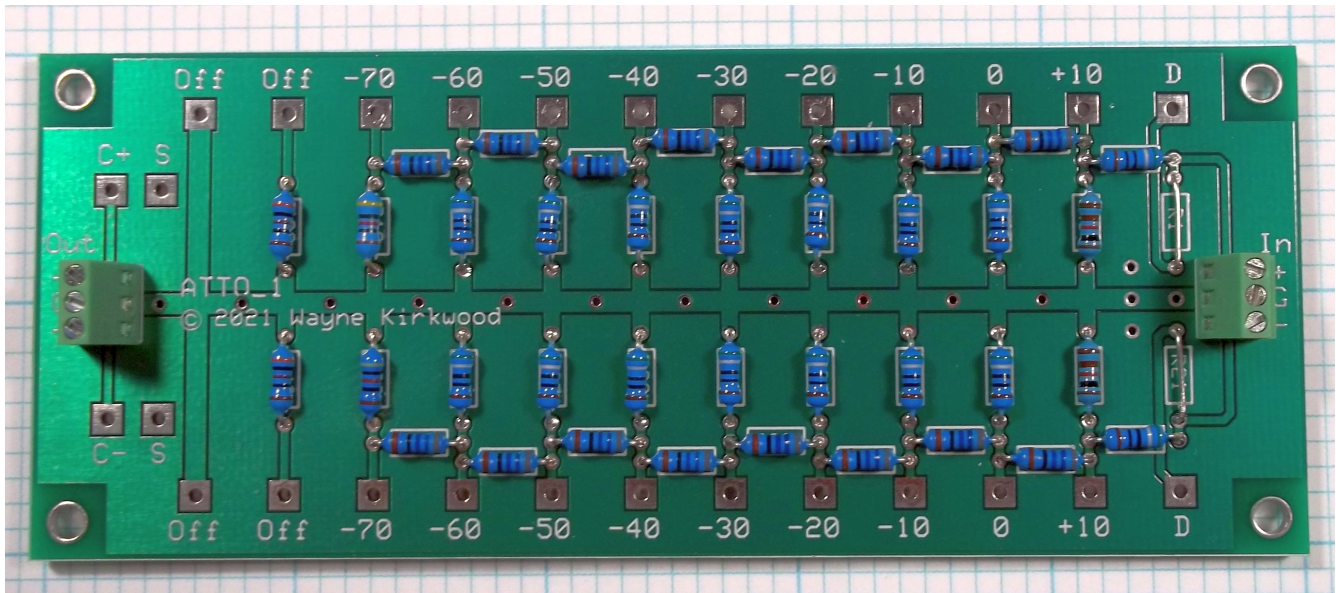


# Assembly Instructions for the KA Electronics "Atto" Balanced Attenuator

4-21-2024



*ULDO-Nacho PC Board*

## Install resistors

Install **two** 590 $\Omega$  1% resistors at R2 and R22. Save the trimmed leads.

If "Atto" is going to be used with an ULDO-Nacho Oscillator and the oscillator has 49.9 $\Omega$  resistors on its output, install wires from resistor leads at R1 and R2. If the 49.9 $\Omega$  resistors are not on the oscillator board install two 49.9 $\Omega$  1% at R1 and R21.

Install **two** 1K02 $\Omega$  1% resistors at R3 and R23.

Install **fourteen** 590 $\Omega$  1% resistors at R5, R7, R9, R11, R13, R15, R17, R25, R27, R29, R31, R33, R35 and R37.

Install **sixteen** 866 $\Omega$  1% resistors at R4, R6, R8, R10, R12, R14, R16, R18, R24, R26, R28, R30, R32, R34, R36 and R38.

Install **two** 402 $\Omega$  1% resistors at R19 and R39.

Install **two** 301 $\Omega$  1% resistors at R20 and R40.

## Install Phoenix three pin connectors

When installing the Phoenix connectors make sure that the wire openings point to the outside edge of the PC board.

Install **two** 3 pin Phoenix connectors on the PC board.

## Install Spacers

Install **four** hex spacers using 4-40 screws. The fiber washers should be installed between the PC board and spacer.

## Switch Installation

Atto, in conjunction with an ULDO-Nacho board, is designed to be used with a 2 pole 12 position rotary switch to provide a fully-balanced output with Direct (maximum level), +10 to -70 dBu output level and "Off" with both 301 $\Omega$ /leg and grounded termination.

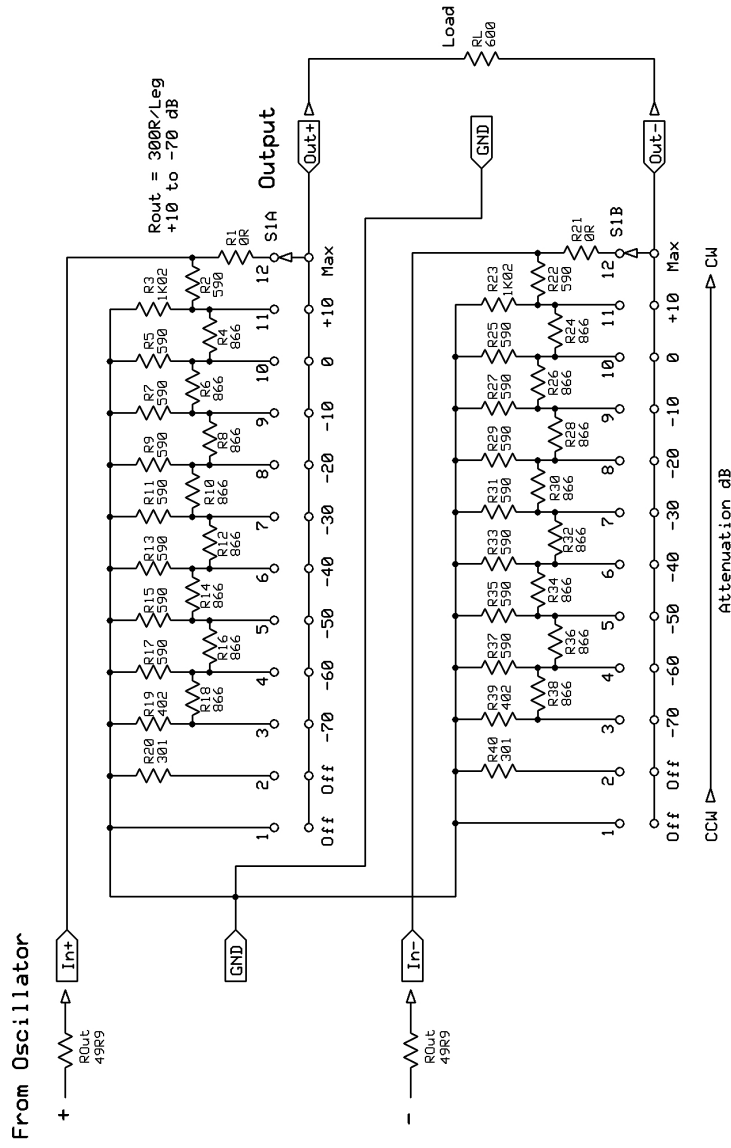
If balanced output is not needed then two separate single pole 12 position switches can be used for independent Left and Right attenuators.

If 12 position switches are not available or deep attenuation not needed, fewer positions can be used. The unused pads on Atto do not need to be connected for proper attenuation.

The rotary switch connects to Atto using flying leads.

The C+ and C- terminals are for the switch commutator or "common" terminals. The "S" pads are to connect one end of a shielded cable for the switch common leads. If shielded cable is used only one end of the cable requires grounding; the switch end does not require a shield connection.

A rotary switch attenuator is normally is wired with maximum level at full clockwise rotation and maximum attenuation at the full counter-clockwise position. **Atto's reversed "right-to-left" signal flow and terminal orientation is designed to follow the right-to-left contact pattern of the rotary switch's contacts.**



ULDO-Nacho Balanced Output Attenuator  
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## Detailed Parts List

A complete bill of materials is available from Mouser Electronics:  
Atto Attenuator PC Board:

<https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=315cb79440>

## Other Resources

Pro Audio Design Forum Build Thread:

<https://www.proaudiodesignforum.com/forum/php/viewtopic.php?f=7&t=1265>

Pro Audio Design Forum Design Thread:

<https://proaudiodesignforum.com/forum/php/viewtopic.php?f=6&t=887>

THD calculator to interpret Nacho's FFT readings:

<https://proaudiodesignforum.com/forum/php/viewtopic.php?f=6&t=887&start=130#p16443>

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