

Bout/Lin-1646 Output module

With this module we provide a tiny balanced output circuitry which can be directly mounted in a panel.

The internal line signal is buffered by this module.

Convert your line output(s) to the better, balanced one(s) !

The patented **OutSmarts™** technology provides an absolute transparent circuit, capable of driving long and capacitive cables.

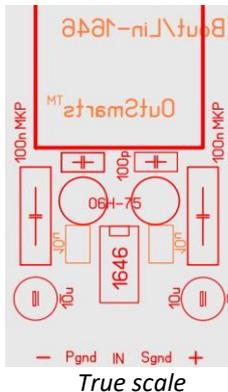
Balanced, transformer-like floating output with similar sound with 6dB gain

With the THAT 1646x chip as we use here, you obtain an extremely good balanced output on your preamplifier or any other circuit with an amazing voltage swing capability up to 16Vrms into 600 ohms, even with very long, capacitive cables!

RF interfering signals are also taken care of in the best possible way and immediately behind the output connector, as it always should be.....

Bout/Lin-1646 layout

The tiny, 30x48mm PCB contains all the parts required and a quality XLR male chassis connector.



From top to bottom:

- XLR male chassis connector (output)
- RF filtering parts
- [THAT 1646](#) 8pin DIP and MKP decoupling parts
- Small Power Supply capacitors
- Power Supply and Line input connections

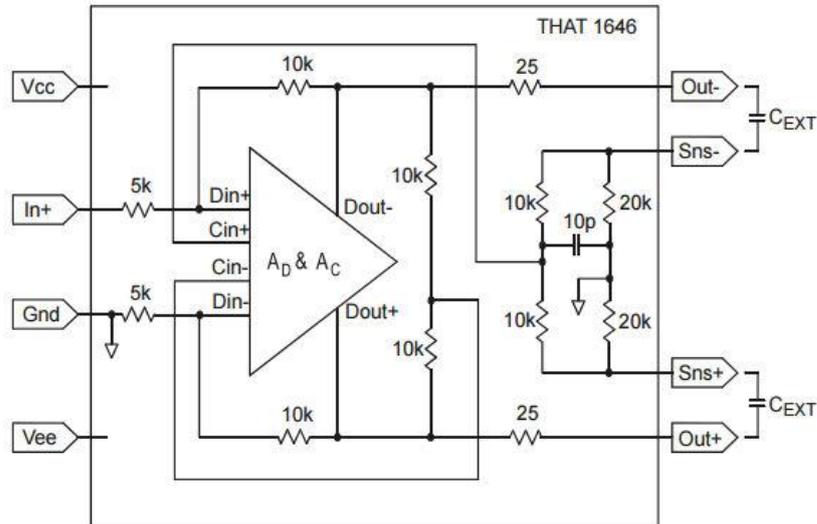
Since this PCB hardly has any weight, mounting the connector to the cabinet chassis is sufficient.

Mounting

Just widen up your Line input hole to \varnothing 22mm, drill two small holes for the mounting screws, mount this PCB and connect the former Line input to the output tab of this PCB, that's it.

Theory of operation

On this Bout/Lin-1646 module we provide a very special, patented balanced Opamp technology called [Outsmarts™](#). The layout of this IC is as in the picture below, where a single line signal is converted by a very high quality Opamp to a balanced (XLR) signal, capable of driving even hundreds of meters balanced cable without signal losses. This circuit converts a single signal in two exactly counter phase signals.



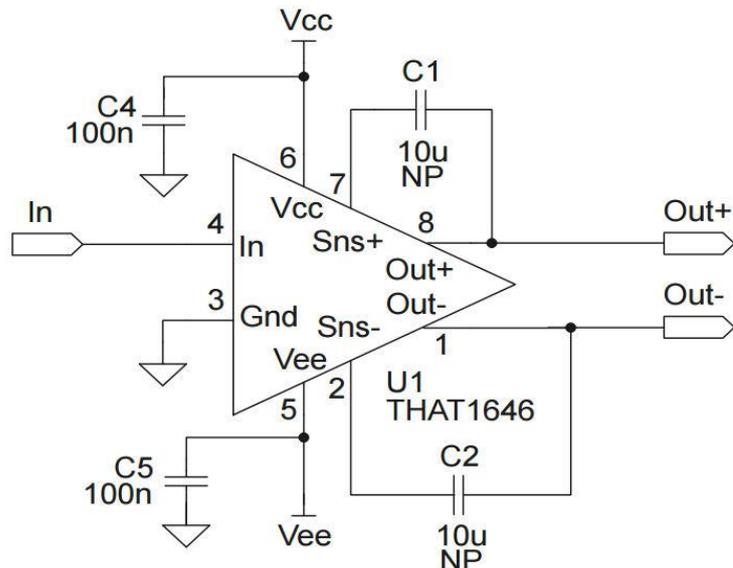
The internal resistors are ultra-precise, laser trimmed, and in the 8-pin DIP already.

Unfortunately, the – input is internally grounded, causing that we can't use this one for a Balanced out/Balanced in OutSmarts circuitry. The brother 1606 can though, but is too small for soldering by hand.

Please not that this is NOT just another Opamp based buffer circuit; the THAT 1646 is very transparent !

Circuit

The practical schematics as we used on our Bout/Lin-1646 circuit:



The circuit functions without C1/2 (shortcut), but then there is a slight DC voltage at the outputs. Since they do NOT need to be of high quality (not in the signal path!) and encountering a very low voltage we decided to use some extremely small MURATA SMD's here, mounted at the back side of the PCB.

We only added two 10uF Supply caps paralleled by small MKP caps and RFI filtering components close to the XLR socket in order to prevent RF-interference inside the electronics where this device is used, especially needed when long cables are used, which could function as a short wave antenna.



The gold plated XLR male (MC915G) chassis connector for the balanced output is mounted on the board.

The Line input signal is connected at the centre of the board.

A symmetrical power supply voltage is fed into the two most outer pins.

Pgnd leads to the supply and filter caps via the bottom ground plane.
Sgnd leads to the connector via the top ground plane.

Please note that the **Bout/Lin-1646** PCB's require a symmetrical supply voltage of +/- 4 to 18 Volts (<10mA).

Some figures

Input impedance:	5,0kohms
Output impedance:	50 ohms
Max voltage swing:	V power supply -2.2V (27,5dBu max)
Frequency range:	> 10MHz.
Slew rate:	> 15V/uS
Distortion:	< 0,0007% THD
Gain:	6dB
Noise figure:	< 101dBu
Output CMRR:	> 65dB @60Hz under all circumstances
Capacitive load:	unlimited
Power Supply voltage:	+/- 4 to 18V
Power supply current:	6mA
Dimensions	48x30x27mm (LxWxH)

The output is short circuit protected.

DIY

This THAT 1646 and other very interesting, rare, audiophile chips, transistors and passive components are available as well in [our webshop](#). We provide f.e. [EXICON](#) Mosfets (specifically designed for the highest quality analog amplifiers), [THAT](#) audiophile analog (!) IC's, [MUNDORF](#) power supply capacitors, crossover components and Air Motion Transformers (AMT's), [Audio Technology](#) and [VOXATIV](#) drive units, [PURESONIC](#) connectors, and many more nice stuff..... -)

If you have questions or comments on this project, [let us know!](#)

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