

1

Principles of achieving ultra low noise here:

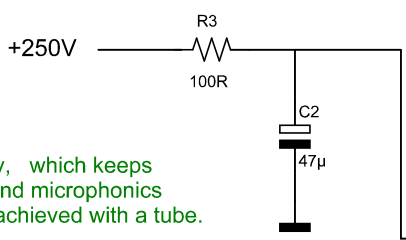
1) Output tube is used as impedance converter only, which keeps the signal to noise ratio very high. So noise, hum and microphonics added by the output tube will be lowest as can be achieved with a tube.

2) Output impedance at transformer output is only 20 Ohms, so external disturbances have no chance to interfere.

3) Low output impedance allows volume control at output. This attenuates noise, hum and microphonics at low volume also. So signal to noise ratio will be high, also at low volume.

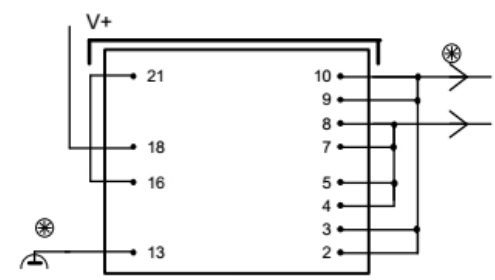
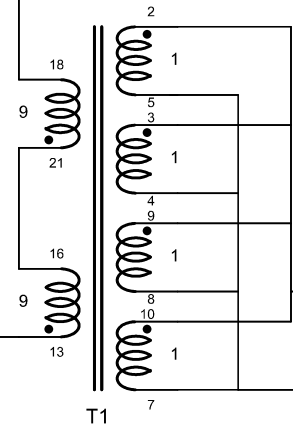
4) Necessary gain of 2x is achieved free of noise and hum, by the input transformer.

2



Wired "Alt R" for 18:1 (recommended)

Lundahl LL1689-18mA or LL1689-AM-18mA



Alt. R  
18 : 1  
Single End to Line Output

Volume  
1.5V Out

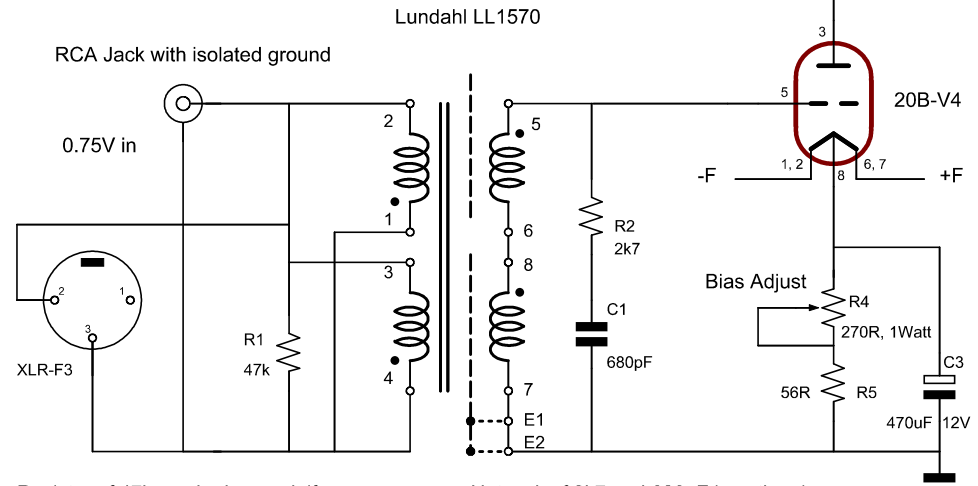


Yamamoto RCA Jack



XLR-F3

3



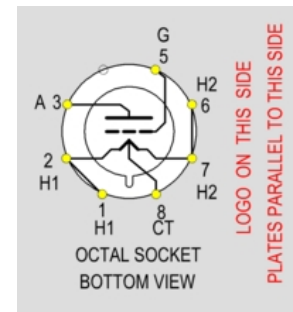
Resistor of 47k can be lowered, if another input impedance is preferred

Network of 2k7 and 680pF is optional for improved square wave response.

Connect F+ and F- to stabilized 5 Volt Supply, with floating output.

First set Bias Potmeter for maximum resistance Then adjust for 1 Volt across 56 Ohms Resistor. Mount Bias pot meter such that all clockwise = Zero ohms. Like the bias adjustment works clockwise for higher bias.

Bias Adjustment, allows nicely 18mA, so to use LL1689 and V20B-4 best way. Second, this allows some variation on the supply voltage of 250Volt, which does not need to be very precise now.



20B-V4 Connections

4

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**Revisions**

Date	Name	Drawn	Date	Name
			14-Dec-2017	JW

Dipl. Ing. Jac van de Walle



**Name:** Non Inverting, Ultra Low Noise Line Out Stage with 20B-V4. Total Gain = 2x

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