

## Service Manual for Aleph P Version 1.0

### PRODUCT DESCRIPTION

The ALEPH P is a high performance Mosfet Class A audio preamplifier, intended for maximum performance in reproduction of music. It is a simple design, having only a single balanced gain stage consisting of a balanced pair of power Mosfets operated without feedback. The Mosfets are biased by resistors and loaded by resistors, will accept either single-ended or balanced input while delivering single-ended or balanced output.

To best understand the operation of the preamplifier, refer to the schematic of basic gain stage. Q101 and Q102 form the active portion of the gain stage, with Q101 receiving the + balanced input signal, and Q102 receiving the balanced input signal. Reference voltage A of 18.2 volts is used to bias the gates of the Mosfets through R109 and R110, and the inputs are capacitively coupled through C105 and C106. R111 and R112 are employed to prevent parasitic oscillation, and Z101 and Z102 protect the Mosfets from electrostatic high voltages at the input.

The Mosfets amplify the input signals and present them at the outputs, with the polarity inverted, so that the output of Q101 becomes the - signal, and the output of Q102 becomes the + output signal.

The gain stage is fed a regulated 60 volts which is decoupled twice using R101, R102, and C101 and C102. The output is capacitively coupled through C103 and C104.

The intrinsic gain of the output stage is set by the ratios of R103 and R104 divided by the combinations of R105 and R106 in conjunction with potentiometer P101 and R115. Minimum gain is 8 dB, and maximum is 14 dB.

The Drain (case) connections of the transistors operate at + 40 volts DC.

When using the circuit with a single-ended input, the negative input should be shorted to ground for best performance. This is accomplished by shorting plugs between pins 1 and 3 on the XLR input connector.

Referring to the schematic of the power supply, the toroidal power transformer provides an unregulated 80 volts across C1, which is passively filtered by R2 and C2. Active regulation consists of a 64 volt zener stack driving an NPN follower transistor.



Two reference voltages are also provided off the zener stack, Ref A at 18.2 volts, and Ref B at 9.1 volts.

Q2, R6, and R7 provide a power source for the relays in the volume control which shuts down when there is insufficient unregulated voltage for the regulation system to function properly.

The input selection system schematic shows the simple use of relays to switch the four inputs with four poles of connection each.

The volume control system schematic shows the 6 bit binary relay ladder circuits which perform precision attenuation of the output of the gain stages. In order to achieve good common mode rejection performance, the output attenuation must be matched far more precisely than can be accomplished with potentiometers, and so relays and precision resistors are used.

They are controlled by an analog to digital converter (AD0804) which reads the value of the voltage across the volume control potentiometer and converts it into the appropriate binary output.

Discrete components surrounding the AD0804 provide regulated supply, clocking, and turn-on time delay for the chip.

There are no adjustments in the Aleph P.

The Mosfets of each channel are matched to optimize performance and minimize noise while adjusting the individual gain controls. If it is necessary to replace one of these, please obtain a device from the factory which has the same match code (written on the device in felt pen).

The last figure is the component placement diagram for the preamplifier.

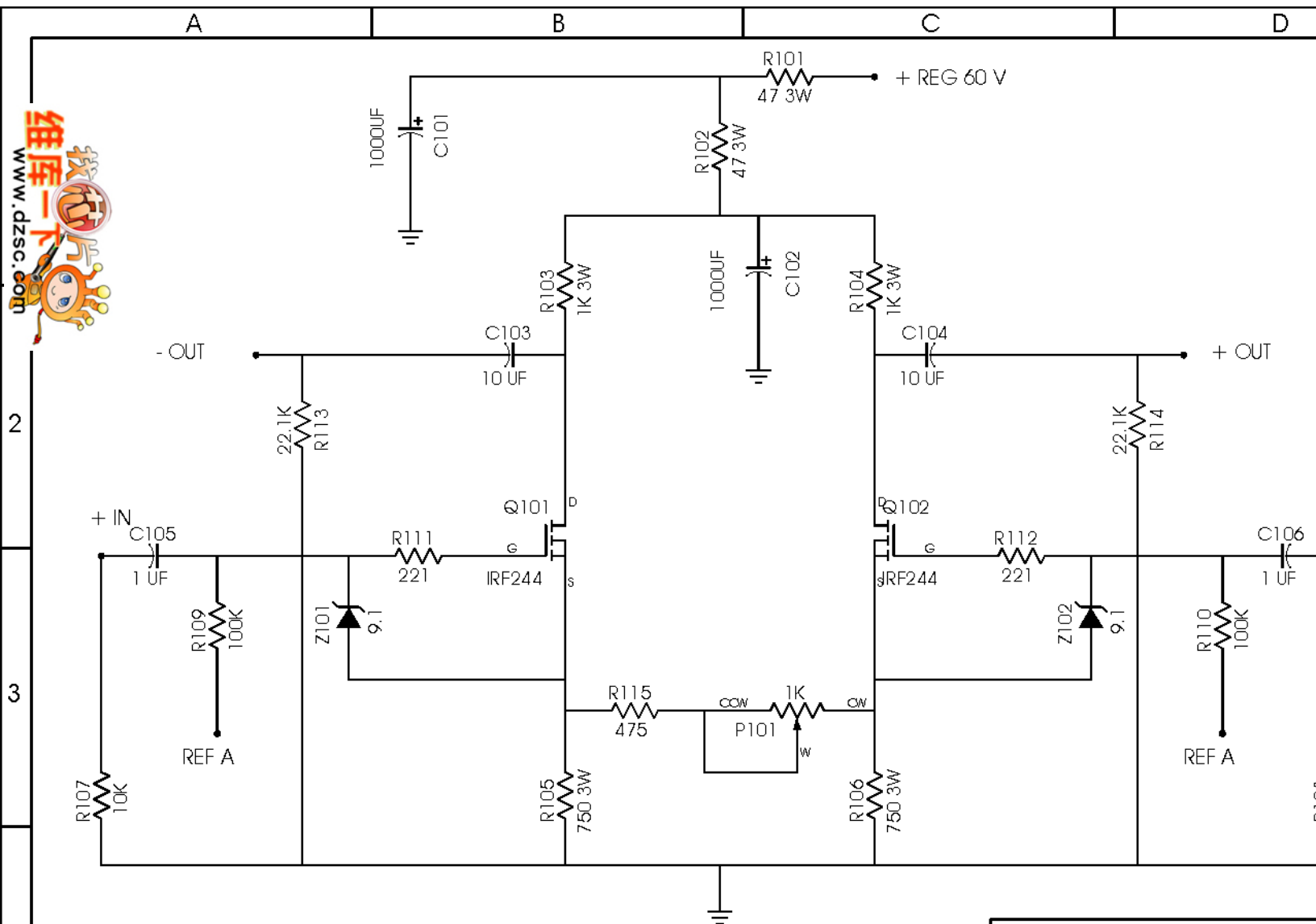
When checking operating voltages, look for +40 volts on the case of each gain device, +80 volts on the case of Q1, +62 volts on the emitter (pin 3) of Q1, and 5 volts on the source (pin 3) of Q3.



## SPECIFICATIONS

Maximum Gain	14 dB teal in / teal out 14 dB unbar in / teal out 8 dB teal in / unbar out 8 dB unbar in / unbar out
Freq. Response	-3 dB ~ 3 Hz -3 dB at > 100 KHz
Distortion	~ .1 %THD typically less than .01%
Maximum Output	20 volts rms. teal out 10 volts rms. unbar out
Output Impedance	0 - 1000 ohms
Input Impedance	20 KOhm balanced 10 KOhm unbalanced
Total CMRR	min 40 dB
Output Noise	5 microvolts, unweighted 20-20kHz
Power Consumption	20 watts
Dimensions	19"W x 11.5"D x 4"H

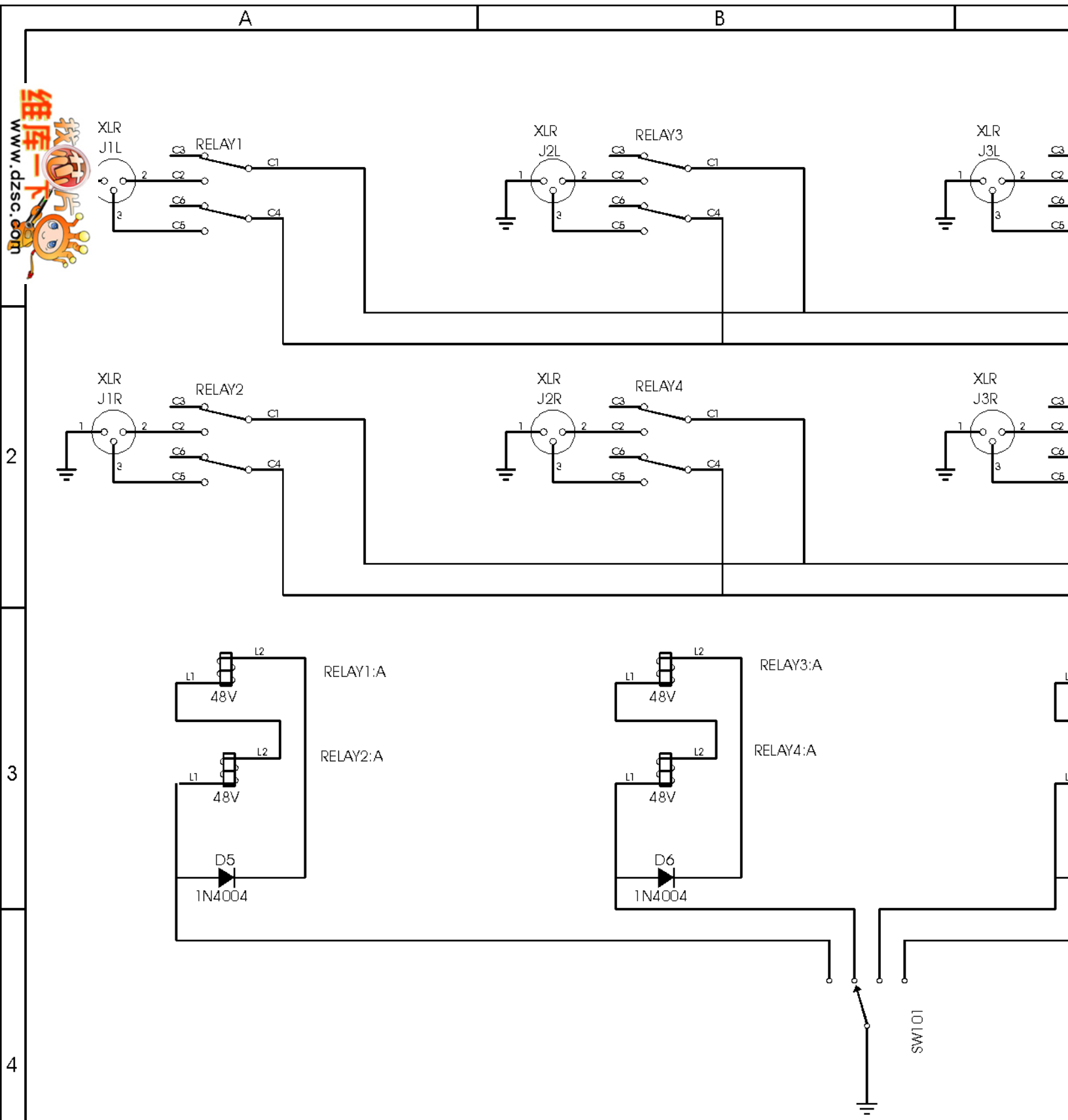




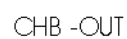
ALEPH P GAIN STAGE

Title	ALEPH P PREAMPLIFIER
Size	Number
A	





2



RELAY +

GND

+ REG 62 V

REF B

4

