

DISPRE 2 V3

Assembly instructions

Introduction

Dispre 2 preamp is a successor to previous Dispre, simple differential, openloop concept. The previous Dispre had wide bandwidth, high slew-rate, robust output diamond buffer, and no global feedback. The tax for that concept was higher distortion of low order harmonics and quite high DC output voltage, which resulted in use of an output 3.3u foil capacitor.

Dispre2 follows positive experience obtained during tests and utilization of the original concept. It has wide bandwidth and high slew rate again, complementary-differential input stage and same output stage. It uses small amount of global feedback (20dB) to stabilize parameters and DC servo to avoid output capacitor. Complementary-symmetry brought much lower value of harmonic distortion. The output stage works in class A for amplitudes up to 6V into 600 ohm load or higher, or for load greater than 1k2 up to limitation.

Revision V3 solves output buffer UHF oscillation problem that has occurred at some of the Dispre 2 previously produced. Parts R21, R25, C17, C18 (buffer stopper) and R64, R65 (VAS load) were added. The PCB was modified.

Circuit description

Drawing dispre2 rev. V3 shows circuit diagram of the preamp. Let us speak about left channel only.

X1 terminal block is an input of audio signal. Then we have P1 or R1 potentiometer. It is only 1 part; the drawing includes 2 parts because of 2 pin distance options, 7.5mm and 10mm. Only one pot is used on the PCB. Then there is an input RC filter (R60, C10), followed by input transistors Q19, Q20, Q1, Q2. They constitute complementary-differential NPN-PNP input stage, with strong emitter degeneration by R2, R8, R22, and R23. Output current from this input stage is converted to voltage by VAS, folded cascode Q12, Q24. The cascode is followed by diamond buffer, Q4 – Q9. Output impedance is defined by R61 to 75 ohm (according to your taste you can go as low as 4R7. With the low resistor value, you may expect more "tough" sound). R24 and R10 create global negative feedback. Open loop gain of the circuit is about 32dB; closed loop gain is about 12dB. Output voltage of the preamplifier is connected to both terminal blocks X2 and XLR connector X4. The output is single-ended. The purpose of XLR X4 is to offer possibility of 3-wire connection to eventual true balanced input of power amplifier; the 3-wire connection reduces interference voltages across signal ground wire by subtraction.

Sheet 2 shows DC servo. Dispre2_v3_doc drawing shows component layout on the PCB board.

Assembly comments

The PCB board is to be assembled by components listed in the BOM (bill of materials).

Potentiometer P1 (R1)

Recommended is Alps 27mm, type RK27112, 2 x 10k log, ordering number at RS components is 219-9130.

Caution: body of Alps pot must be connected to PCB ground pin named as LSP1, located right from potentiometer. This can be done by short wire placed under potentiometer nut. The opposite end of this wire is to be soldered into LSP1 hole. If you do not follow these directions, you will get much worse inter channel crosstalk and the pot will be an antenna for RF/EMI signals.

Input filter capacitor (C10, C13)

Use 220pF, RM5mm, WIMA, type FKP 2, polypropylene.

DC servo (IC1, IC2)

uA741, TL071, OPA134, OP177 and OP97 were verified.

Heatsinks (KK1 – KK4)

Heatsinks used for BD139/BD140 transistors are SK 95 25 2 x M3 type, supplied by Fischer Elektronik. It is not absolutely necessary to use them, but much better if yes, because of output transistors temperature and mechanical fixing.

Power supply voltage

2 x 15 V stabilized. Current consumption per board is 2 x 60mA (standby), power supply should be able to deliver at least 2 x 200mA.

Signal and supply connection

See drawing dispre2_v3_doc - PCB board.

INPUT

X1-1 left channel live
X1-2 left channel ground
X1-3 right channel ground
X1-4 right channel live

OUTPUT

X2-4 left channel live
X2-3 left channel ground
X2-2 right channel ground
X2-1 right channel live

OUTPUT XLR (*XLR cables are shielded twisted pair*)

X4-1 left channel ground (shield)
X4-3 left channel ground (gnd, OUT-)
X4-2 left channel live (live, OUT+)
X5-1 right channel ground (shield)
X5-3 right channel ground (gnd, OUT-)
X5-2 right channel live (live, OUT+)

SUPPLY

X3-1 +15V
X3-2 0V (ground)
X3-3 -15V