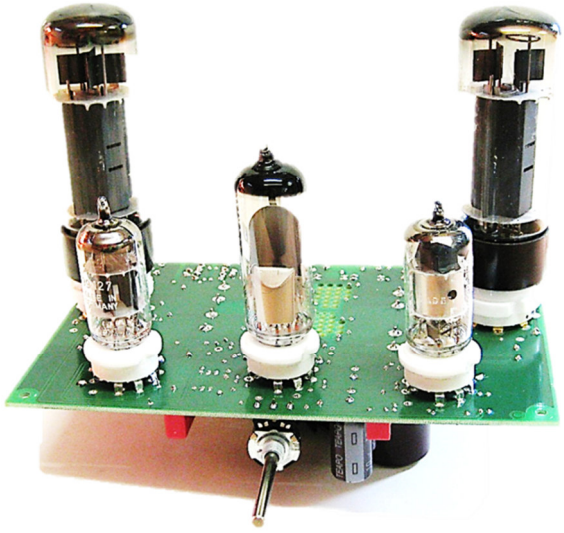
DataSheet
HiFi Tube power amplifier AMP5
Ultra linear circuit with 2x EL34 mono

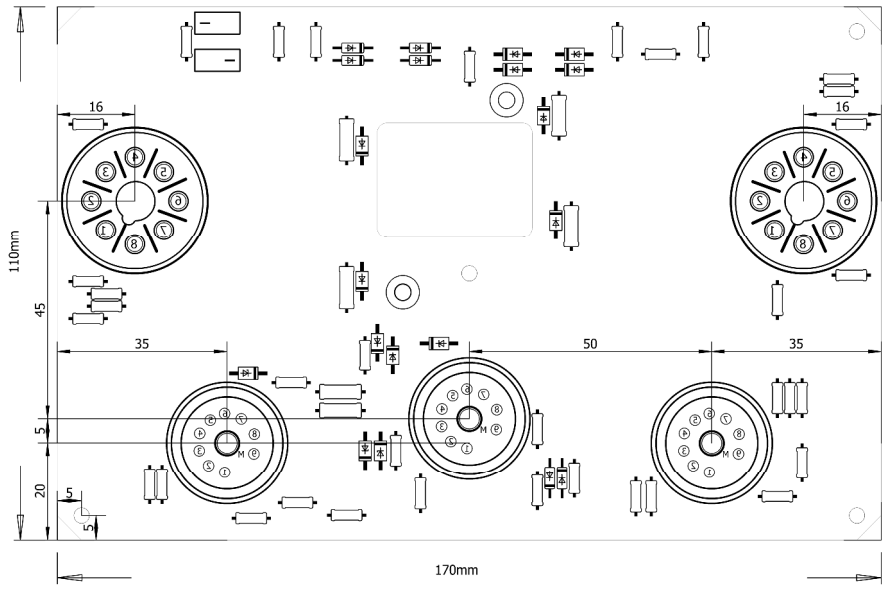


Key commercial data

Packing unit	1 pc
Weight per piece (excluding packing)	50g
Weight per piece (including packing)	75g
Country of origin	Germany

Technical data mechanically

Width (W)	170mm
Height (H)	110mm



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Technical data electric

Output power per channel – sinus	30W
Output power per channel – music	40W
THD (50Hz … 20kHz) per channel	0,5%
Input sensitivity per channel	140mV RMS
Gain coefficient per channel	approximately 26
Output impedance per channel	4Ω or 8Ω
Input resistance per channel	1,5MΩ
Frequency response per channel	20Hz … 40kHz
Nominal power P_N	100W

Circuit description

The principle of how the circuit works, based on a channel:

A pentode type EF86 serves as a preamplifier. This is followed by a phase shifter with the ECC83 double triode and finally a push-pull output stage with two EL34 pentodes, which control the loudspeaker via an output transformer. The EM80 Magic Eye is used to visualize the maximum level of the amplifier so that amplifier overload can be avoided. The EF86 is connected as a triode. The phase rotation required to control the output tubes is achieved with the double triode ECC83 with cathode coupling, which has a gain of around 26. Such a differential amplifier keeps the distortion factor to a minimum and also allows direct coupling to the preamplifier tube.
The output stage consists of a push-pull circuit with two EL34, which is operated with an anode voltage of around 450V. The resistors in series with the grids contribute to the stability of the circuit. The negative grid bias has the advantage that the tube operating point cannot shift as a result of the modulation.
The output transformer must be equipped with a screen grid winding and a center tap on the primary side, as well as a winding for the anode that has a resistance of 3,4kΩ (AC resistance) to ensure ideal power matching. The screen grid windings are connected to the screen grids of the tubes. It is recommended to use a full-range speaker (note the technical data). The volume can be adjusted using the potentiometer R33.

About the principle of the structure of the circuit:

The connections for the tube heaters must be soldered directly to the corresponding sockets using a twisted cable (see assembly plan and pictures). The kit should be installed in a metal housing and the PE protective conductor should be soldered to the circuit board. The ECC83 and EF86 tubes should also be shielded with a shielding cup so that ambient interference is not coupled into the tubes. If the tubes are installed in a closed housing, there must be enough air holes so that the heat can be dissipated well. An important point when building an amplifier is the wiring. Improper wiring will have a negative effect by causing the amplifier to hum. So keep cables as short as possible and avoid ground loops. Always use shielded cables for LF cables. Pay particular attention that the transformer is connected correctly according to the labeling on the circuit board. If the connections are swapped, this will have an audible effect (because the amplifier starts to oscillate) with a whistling sound.
If you have assembled the kit according to the assembly plan and connected it to the output transformer and the mains transformer, the amplifier should work well. Adjusting the amplifier is described in the commissioning section.

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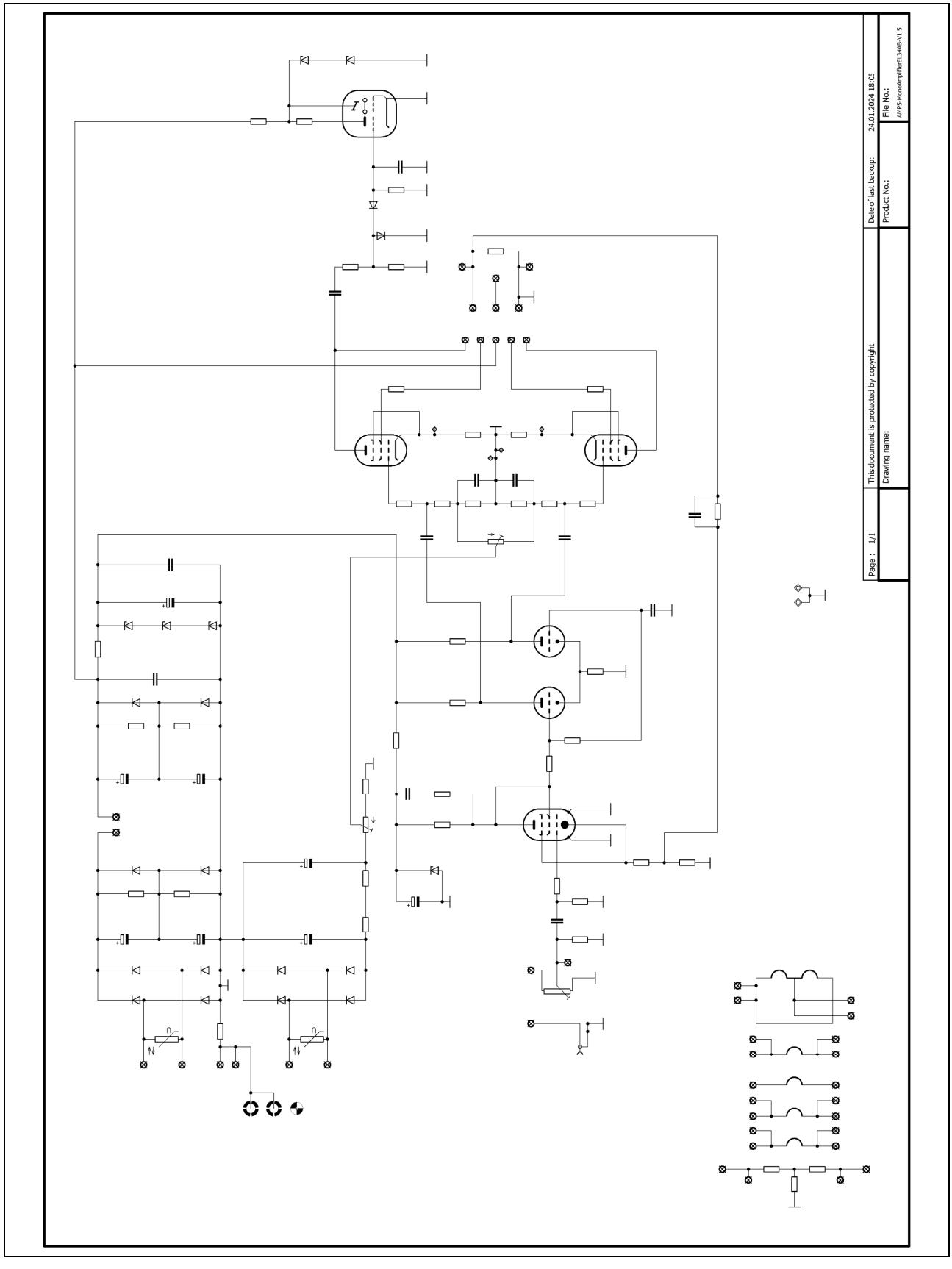
Circuit diagram



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Equipment list

Resistors:

1x	S14K385 varistor				
1x	S14K50 varistor				
1x	1MΩ potentiometer mono log				
1x	10kΩ spindle-trimmer RTRIM3296Y				
1x	20kΩ spindle-trimmer RTRIM3296Y				
1x	390Ω power resistor in aluminum housing 50W				
5x	100Ω 1/4W	brown	black	brown	gold
6x	100kΩ 3/4W	brown	black	yellow	gold
1x	10kΩ 1/4W	brown	black	orange	gold
2x	150kΩ 1/4W	brown	green	yellow	gold
4x	1kΩ 1/4W	brown	black	red	gold
1x	82kΩ 1/4W	grey	red	orange	gold
2x	1MΩ 1/4W	brown	black	green	gold
3x	390Ω 1/4W	orange	white	brown	gold
2x	1,5MΩ 1/4W	brown	green	green	gold
1x	5,6kΩ 1/4W	green	blue	red	gold
2x	3,9kΩ 1/4W	orange	white	red	gold
3x	2,2kΩ 1/4W	red	red	red	gold
4x	47kΩ 1/4W	yellow	violet	orange	gold
2x	10Ω 1/4W	brown	black	black	gold
2x	27kΩ 1/4W	red	violet	orange	gold
2x	390kΩ 1/4W	orange	white	yellow	gold
1x	470kΩ 1/4W	yellow	violet	yellow	gold

Tubes:

1x	ECC83
1x	EF86
1x	EM80
2x	EL34

Capacitors:

2x	100µF 400V EB22,5D
2x	330µF 400V EB30D
2x	10µF 450V E5-13
2x	220µF 63V E5-10,5
8x	100nF 630V
1x	680pF 1000V
2x	470nF 63V
1x	100pF 1500V
1x	1nF 630V

Diodes:

8x	1N4007
6x	1N4148
4x	BZX85C200
2x	BZX85C47

Others:

3x	tube holder Noval
2x	tube holder Oktal
1x	heat sink alu WxHxD 62x30x8mm
1x	cinch-jack 1-pole
2x	M3x6 lens head screw
2x	M3x14 countersunk screw
2x	M3 screw nut
2x	M3x30 distance bolts inside/outside
2x	M3x7 distance bolts inside/inside
0,25m	LF cabel
3m	speaker cable 2x0,75mm^2

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