ENGL
Gerätebau GmbH
Pallinger Straße 7
84529 TITTMONING-KAY
Tel. 08683/592

Circuit Diagrams and Repair-service documents

FOR THE PROGRAMMABLE TUBE-AMPLIFIER

Fault in the control-system:

One (or more) of the programmable controls does not work or one of the switches is defective.

The possible source of error:

1. The multiplex (IC) on the control-circuit-board is defective. Test the output (IC 13, IC 14; Pin 3) and revise whether every control-voltage is there in multiplexed form.

2. Fault in the digital-memory system:
   Check out whether all 8 Latches on the digital-memory board works in Manual-Mode of the amp together with the respective control.
   The sequence of the latches on the board is (from behind):

1. Bass	0,57 - 0,62	V
2. Middle	0,57 - 0,62	V
3. Reverb	0,5 - 0,62	V
4. Gain	0,5 - 0,62	V
5. Frequency	0,54 - 0,62	V
6. Treble	0,57 - 0,62	V
7. Volume	0,5 - 0,62	V
8. Leaddrive	0,5 - 0,62	V

Every DC-voltage-level is to be measured behind the respective Resistance-arry (A/D-converter) and at the inputs of the respective Norton OP-amps.
At the output's of the Latches (Pin 2, 5, 10, 12, 15) have to be square-ware-pulses with different frequences while tuning the control in Manual-Mode. The Presence-switching-voltage is at IC 7 Pin 7, the other one for the Effect-switch is at IC 8 Pin 7 (Memory circuit board!). If there isn't a mistake there, check the Norton OP-amps. (LM 3900).
At the main-plug the following DC-voltage-levels are to be measured:

P2, Bass, 2,9-10,1 V	o	o	P1, Gain 1-23 V
P4, Middle, 2,9-10,1 V	o	o	P3, Reverb, 1-11 V
P6, N.C.	o	o	P5, Presence, 0/12 V
P8, +24 V	o	o	P7, Effect, 0/12 V
P10, N.C.	o	o	P9, Lead-Boost, 0/12V
P12, Volume+Master, 0,5-23V	o	o	P11, Treble, 2,9-10,1 V
P14, Leaddrive, 0-22 V	o	o	P13, Frequency, 0,9-7,2 V

The Norton OP-amp behind contains Gain, Bass, Middle, Reverb and the other one contains Leaddrive, Frequency, Treble and Volume.
If you have made sure that the fault is not the multiplex one of the Latches and the Norton-OP-amp's; also the supply-voltages (+24 V, -12,7 V, GND) for the memory-electronic are at the 3 pin plug, comming from the power-supply and even then is no control-DC-voltage at the main plug, you have to change the whole digital-memory-circuit board. After having mounted the new board, check out whether the Memory-recall-illumination does work well:
Switch the amp in programe-Mode (1A or others) put on all controls to the end

and press down the write key. Now all LED's of the MRI system have to luminate (even when you tune a single controls during the write-in operation). If all or some does not luminate you are able to fix it with the little Trim-pot. on the control circuit board.

3. Fault in the preamplifier:

If all DC-control-voltages are there at the main-plug, check the voltage controled IC's on the preamp circuit board.
Sinue-wave 1000 HZ/100 mV_p at the input

TP 1: about 300 mV_p / 12 V DC
TP 2: about 1 V_p / 12 V DC

Gain-Control: 0 - 10

TP 3: 5 mV_p - 3,5 V_p / 11 - 13 V DC

Leaddrive-Control: 0 - 10

TP 5: 1 mV_p - 10 V_p / 11 - 13 V DC

To go on put in with the gain-control 1 V_p at TP 3.

TP 4: about 6 V_p / 305 V DC

To check TP 6 put in 6 V_p with the Leaddrive-control at TP 5.

TP 6: about 30 V_p / 46 V DC

Reverb-Send: about 4 V_p / 12 V DC

Reverb-Return: put in about 5 mV_p

and you have to measure (without signal from the input!) about 0,4 V_p
Reverb control -> 10)
(Reverb input away, put in signal at the input again)

Equalizer: Test the cut and boost-effect

Treble at 5000 HZ (even the Presence-Switch!)
Middle at 500 - 2000 HZ
Bass at 50 HZ

at the respective output's of the single units.
Than EQ back in Linear-characteristic

TP 9: about 0,3 V_p (1000 HZ!)
TP10: 4 V_p

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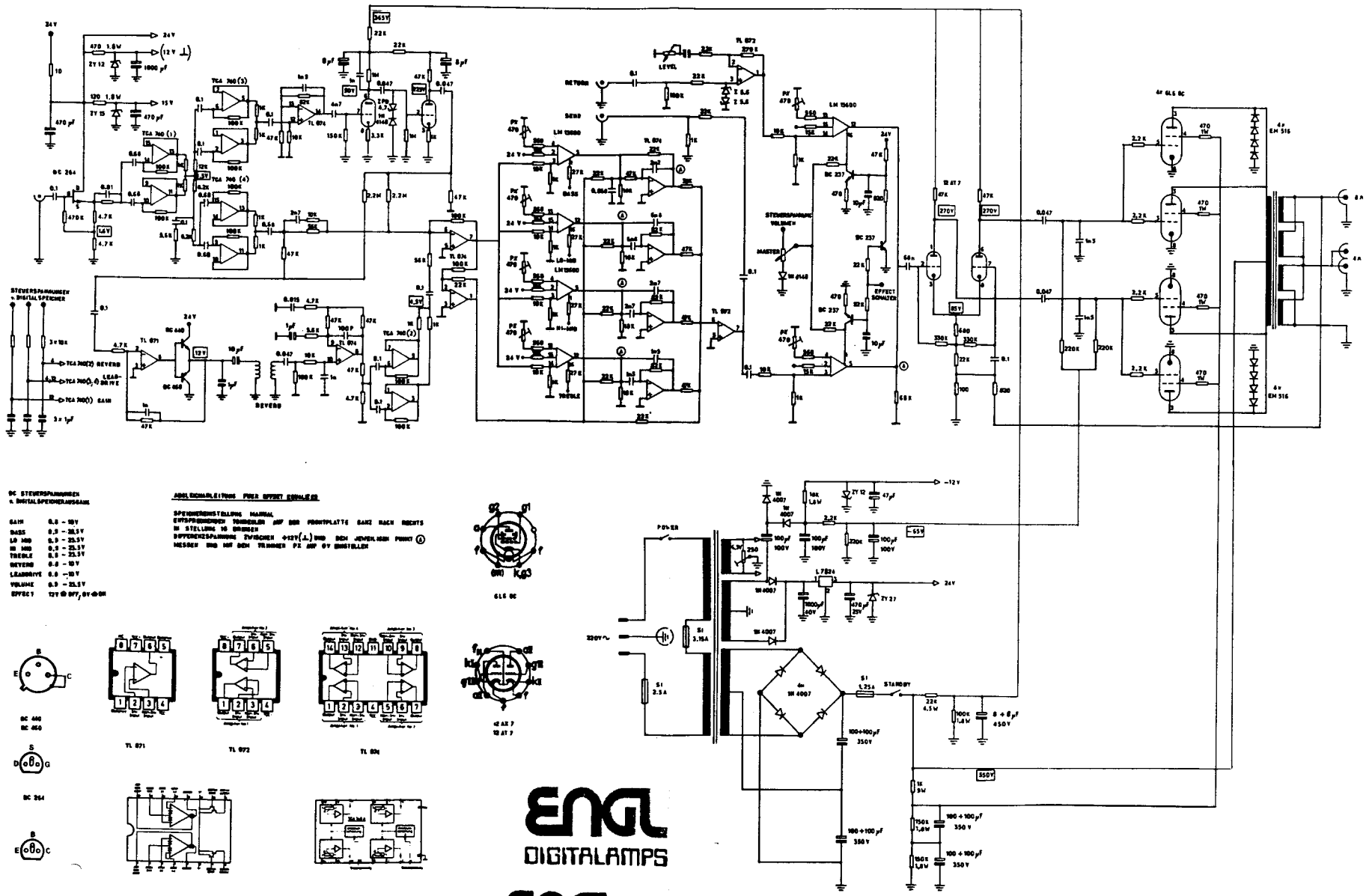
Erstes Model mit Hi und Lo Mid



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DIGITALAMPS

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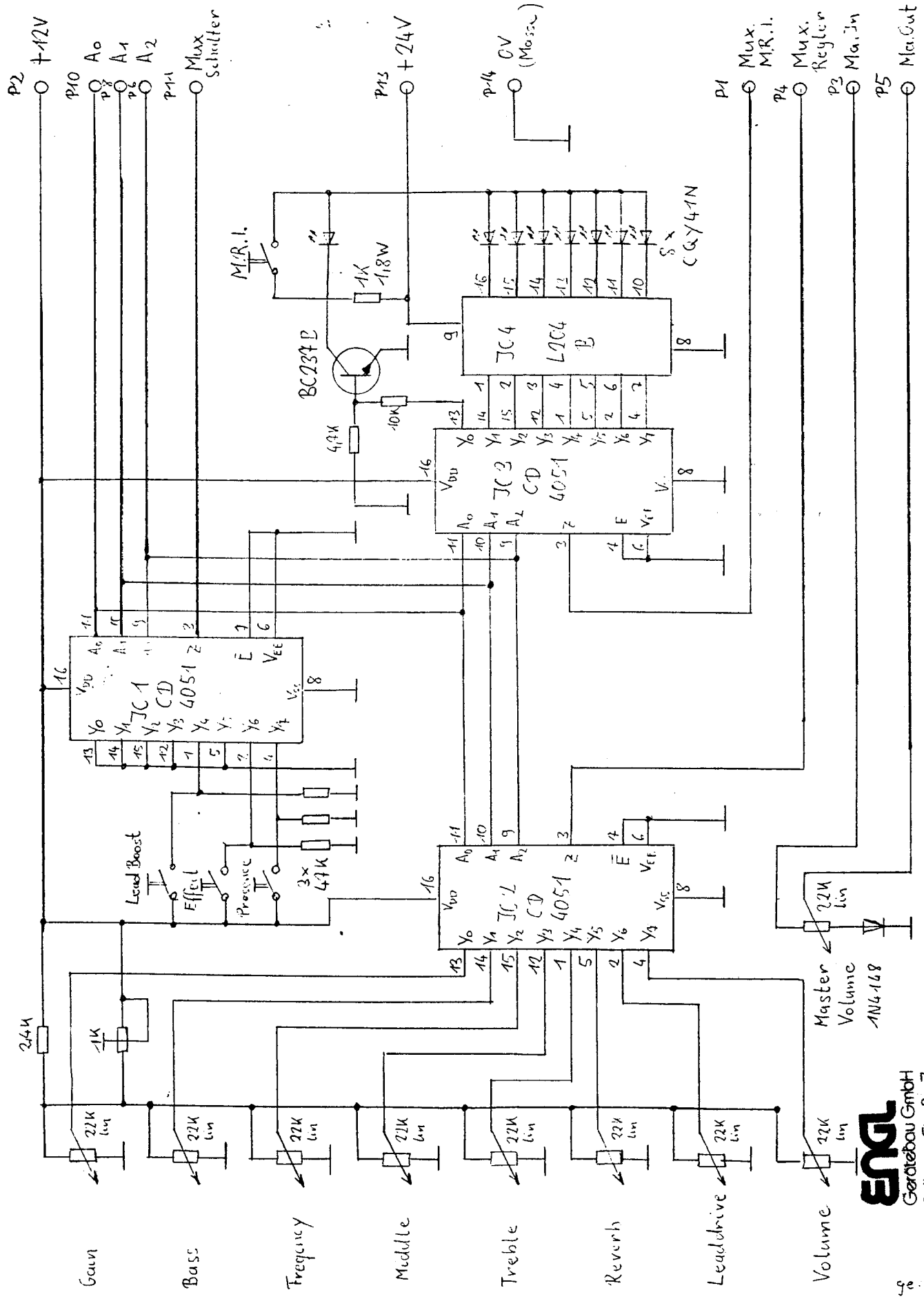
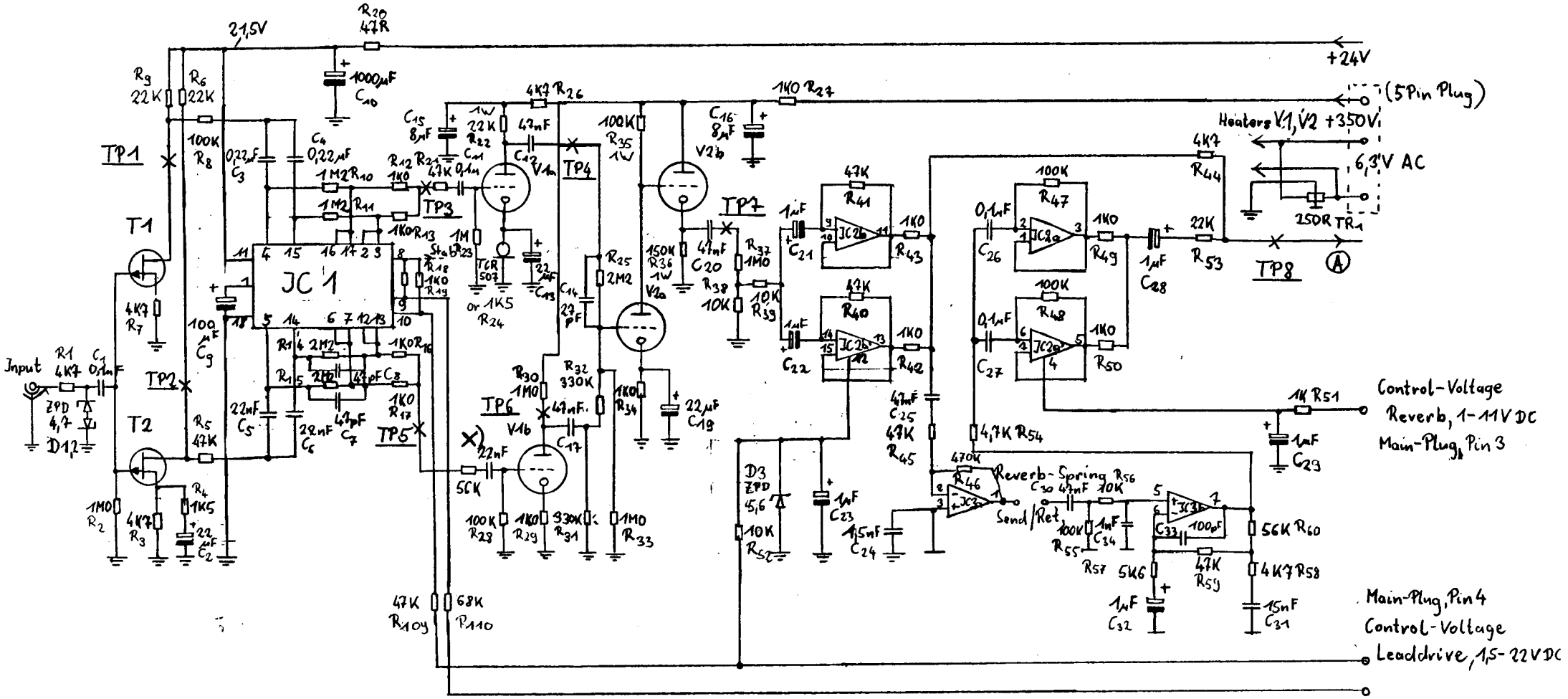
Engl Digitalamps

Schaltplan-progr. Röhrenamp, Potentiometerplatine

circuit diagram: Contol potentiometer board Digitalamp





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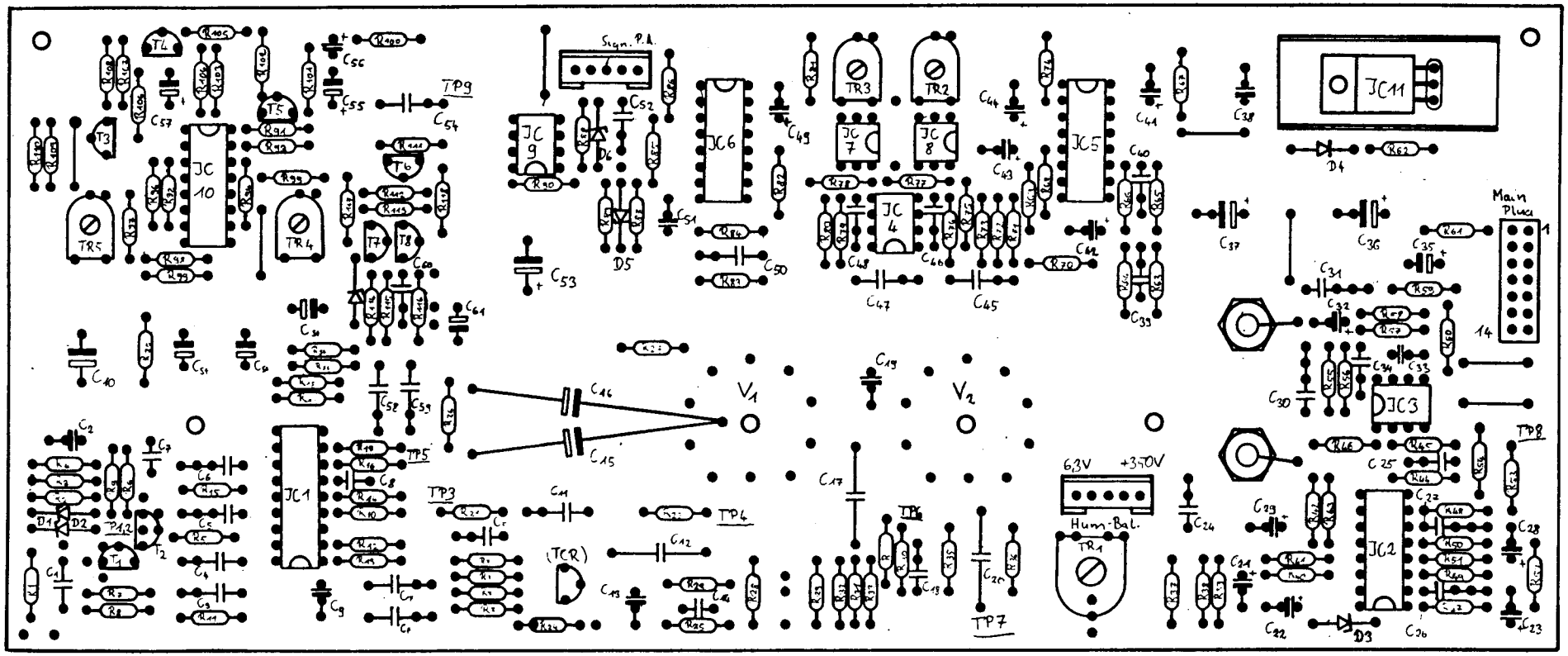
Developed:	Engl + Langer	
Drawn:	Langer	
Checked:	Engl	

Programmierbarer Röhrenverstärker, Vorstufe I
Programmable Tube-Amplifier, Preamp I



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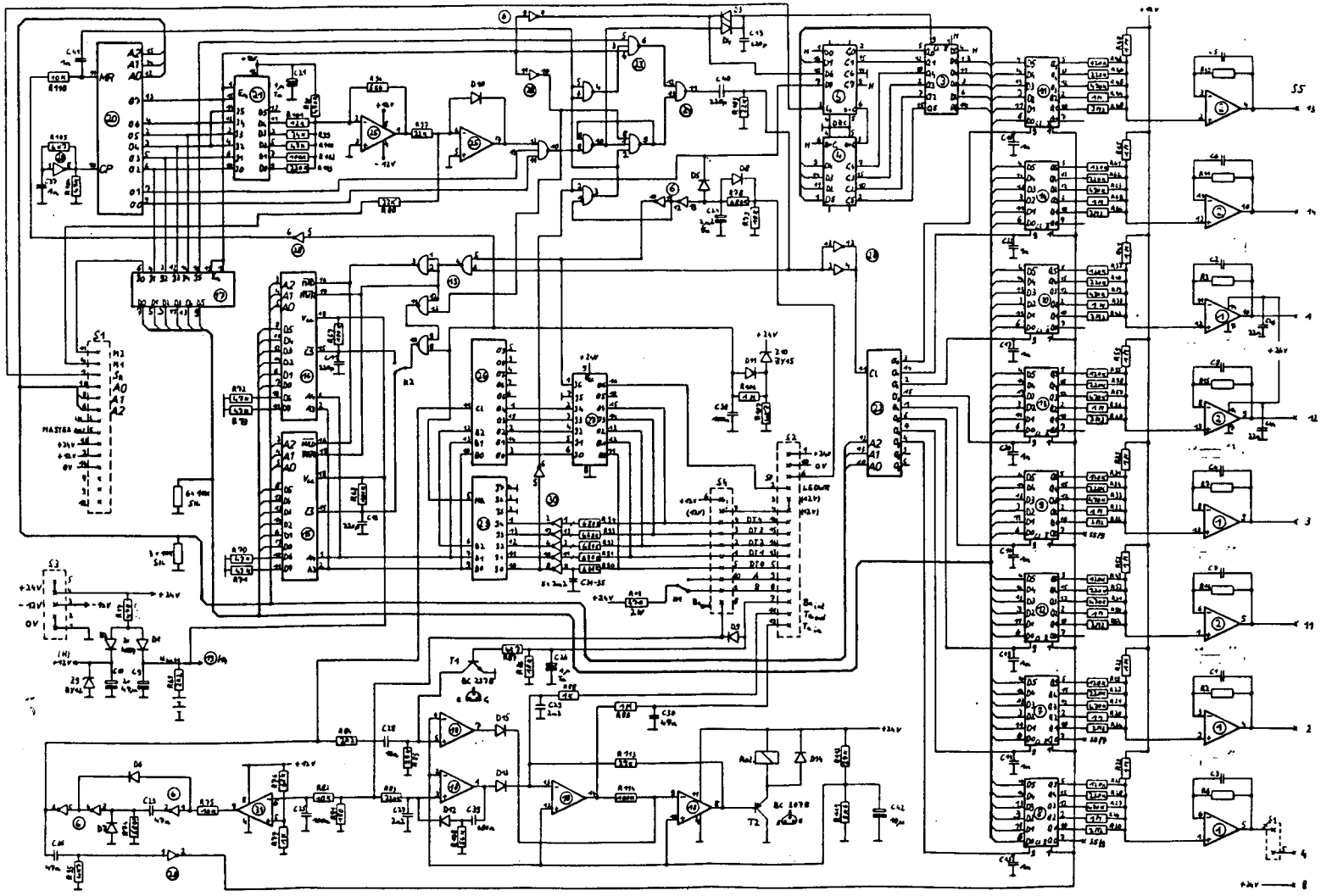

IC 1	LM3900
IC 2	LM3900
IC 3	CD40174
IC 4	CD4585
IC 5	CD4585
IC 6	CD40106
IC 7	CD40174
>	
>	
IC14	CD40174
IC15	CDP1824E
IC16	CDP1824E
IC17	CD4503
IC18	LM324
IC19	CD4093
IC20	CD4040
IC21	CD4503
IC22	CD4028
IC23	CD4023
IC24	CD4011
IC25	TL062
IC26	CD4028
IC27	ULN2004
IC28	CD40106
IC29	CD4532
IC30	CD40106
IC31	LM358

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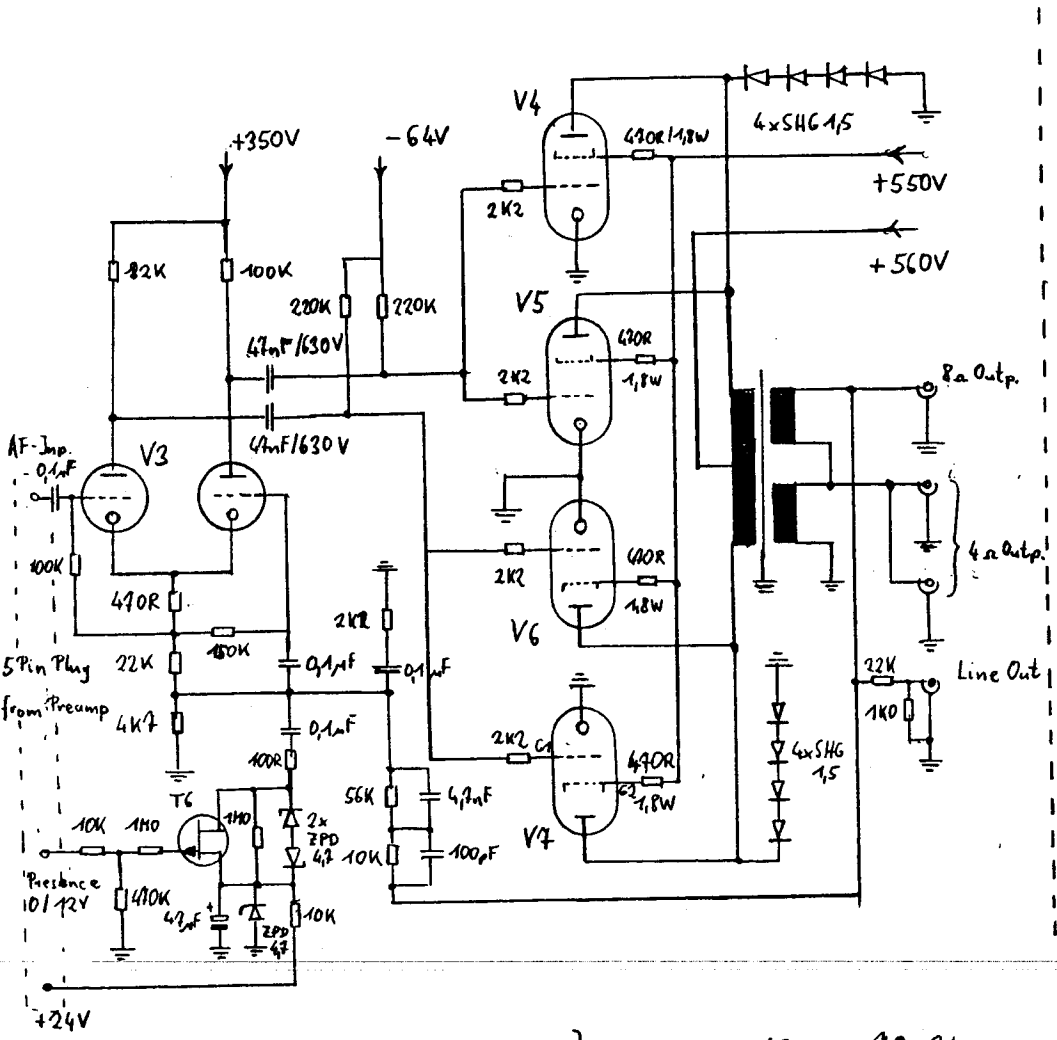
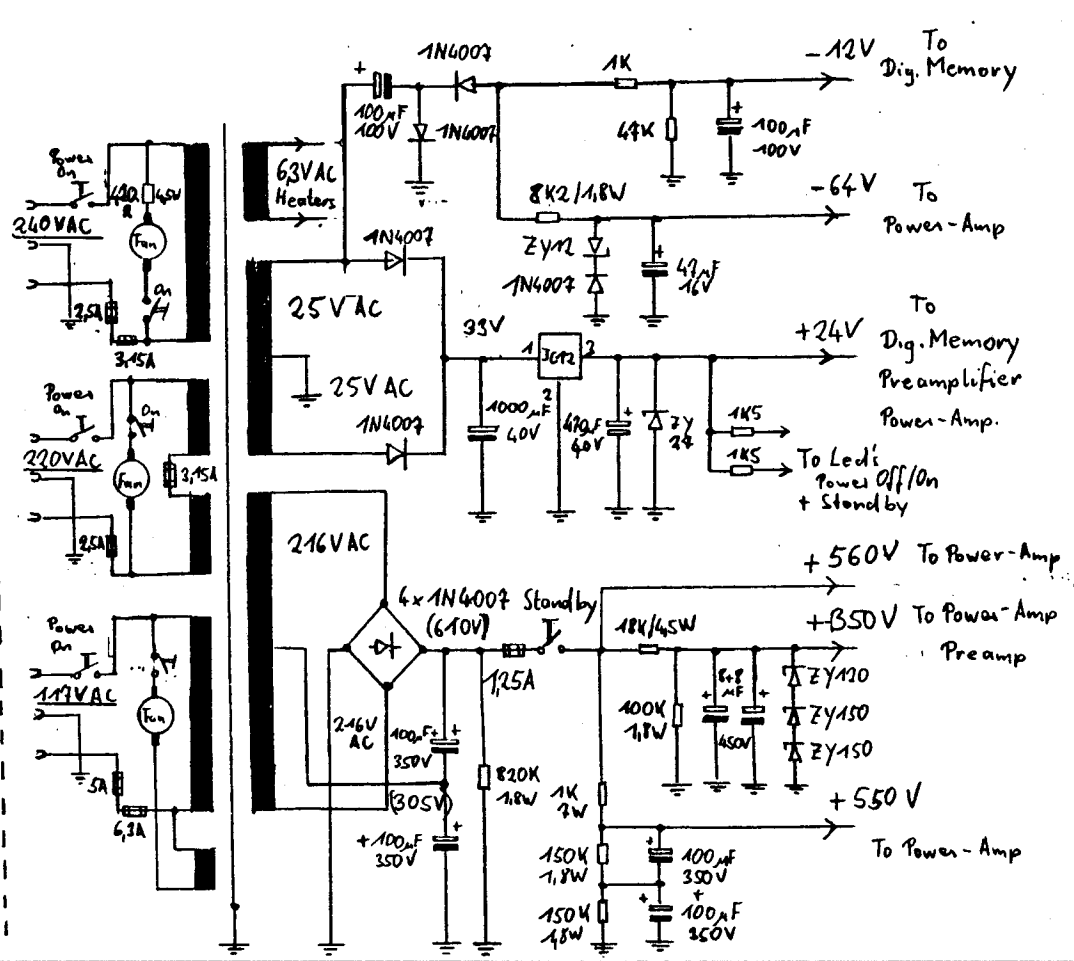
	Datum	Name
Bearb	16.7.84	K Wack
Gepr		
Norm		

Memory-board
Speicherplatine
EDS 2.1
ENGL - Digital amp's
Blatt 1

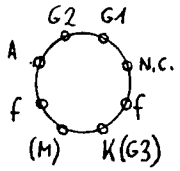




T6 ⇒ BF245 (siehe BC264C!)
(like BC264C!)

V3 ⇒ ECC83 (Preamp!)

V4-7 ⇒ 6L6GC



JC 12 ⇒ 7824
(siehe 7815! / like 7815!)

Fan ⇒ 230V/0,1A

Sicherungen/Fuses:

	extern	intern
240V	2,5AT	3,15AT
220V	2,5AT	3,15AT
117V	5AT	6,3AT

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Developed:	Engl + Lange
Drawn:	Lange
Checked:	Engl

Programmierbarer Röhrenverstärker, Endstufe + Netzteil
Programmable Tube-Amp, Power-Amp + Power-Supply