

UNIT DESCRIPTION

CENTRAL UNIT

FOR NSM-PHONOGRAPHS

ES V-CD TECHNOLOGY

to
Technical Information, ASSY

176 393	THE PERFORMER GRAND II
176 352	THE WIZARD/ OLD FASHION WIZARD
176 514	THE PERFORMER CLASSIC
176 610	CD HIDE-AWAY II
176 598	FIREBIRD II
176 705	THE PERFORMER WALL

NSM

Aktiengesellschaft
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1 FUNCTION

The power supply, fan controls, stereo amplifier with inputs for microphone, CD and tape are all integrated on one circuit board "CENTRAL UNIT".

The output stages and the fan are connected to the central unit via ST 4, ST 8, ST 9. The music power per channel is 200 watts when matched to a loudspeaker impedance of 2 ohms.

1.1 Power Supply

The power transformer supplies 22 V, 2 x 11,5 V and 2 x 43 V from three separate secondary coils.

The supply voltage for the output stages is supplied with 2 x 43 V by a two-way rectifier (D 1) and the center tap of the transformer.

The supply voltage for the voltage regulators VR1 (V3 = +15 V) and VR2 (+VA = +15 V) is supplied with 22 V by a bridge rectifier (D2-D5) from the transformer.

The supply voltage for the voltage regulators VR 3 (V1 = +5 V), VR 4 (+VM = + 10 V) are supplied with 2 x 11,5 V by a two-way rectifier (D6 / D8) and the center tap of the transformer. Appropriate the supply voltage for VR 5 (-VM = -10 V) is supplied by D7 / D9 and the supply voltage for VR 6 (-VA = -15 V) is supplied by a voltage doubler D13, D14, D15 and C20 from the same cods of the transformer.

Fusing is accomplished with

Si 1, Si 2 = 6,3 A for the voltage V Amp.

Si 3, Si 4 = 3,15 A for voltages V1, V2, +VM, -VM, -VA

Si 5 = 2,5 A for voltages V3, V4, +VA

The LED's indicate at the same intensity the following supply voltages:

LED 1 = +28 V (V4)

LED 2 = +14 V (V2)

LED 3 = -14 V

LED 4 = -22 V

LED 5 = +60 V (V Amp.).

The TRIAC TC 1 controls the output stage fan depending upon the operational state of the amplifier (REJECT); i.e. the fan only runs when the amplifier is not muted.

1.2 Amplifier

The stereo amplifier is build up with a siemens audio processor TDA 4390 with 3 quadruple OpAmps 54 diodes, 23 transistors and 6 voltage regulators.

The output stage is designed without induction coils or transformers and is therefore ironless.

At full volume level the music power is 200 watts per channel.

1.3 Signal path

The input signals

- MIC is connected via the microphon amplifier IC 4 B and the background mixer IC 4 A to Pin 3 (right channel) and Pin 26 (left channel)
- TB is connected via the pre-amplifiers IC 3 C respectively IC 3 D to Pin 2 (right channel) and Pin 27 (left channel)
- CD (symmetrical inputs) is connected via the pre-amplifiers IC 3 A respectively IC 3 B to Pin 1 (right channel) and Pin 28 (left channel)

of the input selection circuit of the audio processor.

When the microphone switch is actuated (Pin 5 of socket MIC to GND) the MIC is switched precedencely. That means TB or CD are interrupted.

Beginning at a level higher then 3 mV of the signal, the TB input is automatically active, if there is no CD played or no microphone switched 1 on. The control circuit is build with IC 4 C and IC 4 D.

On output BU 4 / BU 5 (Out R / Out L) a signal is served to steer towards an additional amplifier.

Via an AVC-stage (automatic volume control), the switch for MONO, STEREO and S-STEREO the audio signal reaches the sound control network and the volume stage of the I²C-bus controlled audio processor. The output signals of this processor (Pin 13 / Pin 16) are connected to the inputs of the driver stage T 4 and T 6.

The parallel complementary power Darlington transistors T 151 through T 154 in the output stage allow a minimum loudspeaker impedance of 2 ohms.

Quiescent current compensation and thermic stabilization is accomplished with T 150, the quiescent current setting with TR 250. The amplifier is equipped with two protective circuits against overload mismatching and thermic overload.

T 155 acts as a threshold switch for the electronic fuse. When the emitter current of the output transistors exceeds a certain value, T 8 or T 9 is switched through by T 155 and reduces the volume via the control unit. The actuation of the electronic fuse is controlled by the control unit.

When its fuse is tripped a number of times within a certain period, the volume is reduced automatically by one step each time until the electronic fuse is no longer activated.

The terminating impedance at the loudspeaker output should not be less than 2 ohms. In the case of mismatching (less than 2 ohms), or short-circuit in the loudspeaker cable, the limiting circuit is actuated.

The result is distorted sound reproduction or reduction of the volume. After elimination of the mismatch the amplifier is ready for operation and the volume can be readjusted.

The thermal switch on the heat sink switches off the power supply to the output stage when the heat sink temperature reaches approx. 90° C (cooling malfunctioning). LED 150 is dark. The switch-on point (following cooling down) is approx. 60° C (switch-on hysteresis).

1.4 Adjustment of volume and sound characteristics

Volume adjustment for normal play mode is done by use of the command P053 of the service program. It is done separately for the right and the left channel:

keys "1" / "3" give more volume (left/right)

keys "7" / "9" give less volume (left/right)

keys "4" / "6" give a medium value (left/right) of the volume

keys "2" / "8" are controlling both channels (more/less).

Treble and Bass are controlled with P054 for both channels:

keys "1" / "7" more/less of bass key "4" medium value of bass

keys "3" / "9" more/less of treble key "6" medium value of treble.

The necessary adjustment depend on the given environmental conditions.

With the potentiometer POT 2 the volume of microphone signal is controlled and with potentiometer POT 1 the volume of sound while the microphone is active.

The adjustment of POT 2 depends on the distance between the phonograph and the microphone (feedback!)

The switch S1 is for selecting:

MONO: e.g. for separated music in different rooms.

STEREO: normal position

S-STEREO: base wide function

1.5 MIC socket, Microphone Connection

A dynamic microphone with an impedance of 200 ohms – 600 ohms with switch for relay control can be used.

NSM option accessories:

Microphone Order No. 224 223

Connection cable Order No. 171 880 (length: 10 m)

1.6 Tape Recorder Connection

The TB socket (cinch) allows to record the music from the phonograph on a tape recorder as well as to play music from a tape recorder by the phonograph.

The AF signal (analog signal) for recording on a tape recorder is on BU 4 and BU 5 and can be connected directly with a stereo cable.

For playback of a tape via the phonograph BU 2 and BU 3 are used.

1.7 Connection of an additional Amplifier

An additional amplifier can be connected to BU 4 and BU 5.

The input sensitivity of the external amplifier should be 1 V at a minimum input impedance of 10 KOhms.

2 Adjustment Instructions for Trimmer of Central Unit and Output Stage

TR 150 for quiescent current adjustment of the output stage: The quiescent current must be set to 40 mA +5 mA when volume level is 0.

After replacement of the output transistor T 151 through T 154 a correction may be required. Therefore the fuse Si 150 or the thermal switch is to be replaced by an ampere-meter.

3 Repair Aid

Amplifier integrated in central unit ES V

Malfunction: No sound, no output power:

It is assumed that LED 1 to LED 5 light with the same intensity and that the power supply is therefore O.K., the CD is on the CD player being played, and normal volume was set in program step P053 to "31".

3.1 Output Stage

LED 150 on the output stage circuit board is dark. Malfunction probably located in the output stage; check Si 150 and replace if required. If the fuse blows again, the output transistors are defective.

Remove output stage unit, pull out cover plates on the bottom. Check for short-circuit on transistors T 151/T 152 T 153/T 154 with ohmmeter. Since the transistors are connected in parallel, it is only possible to test them in pairs.

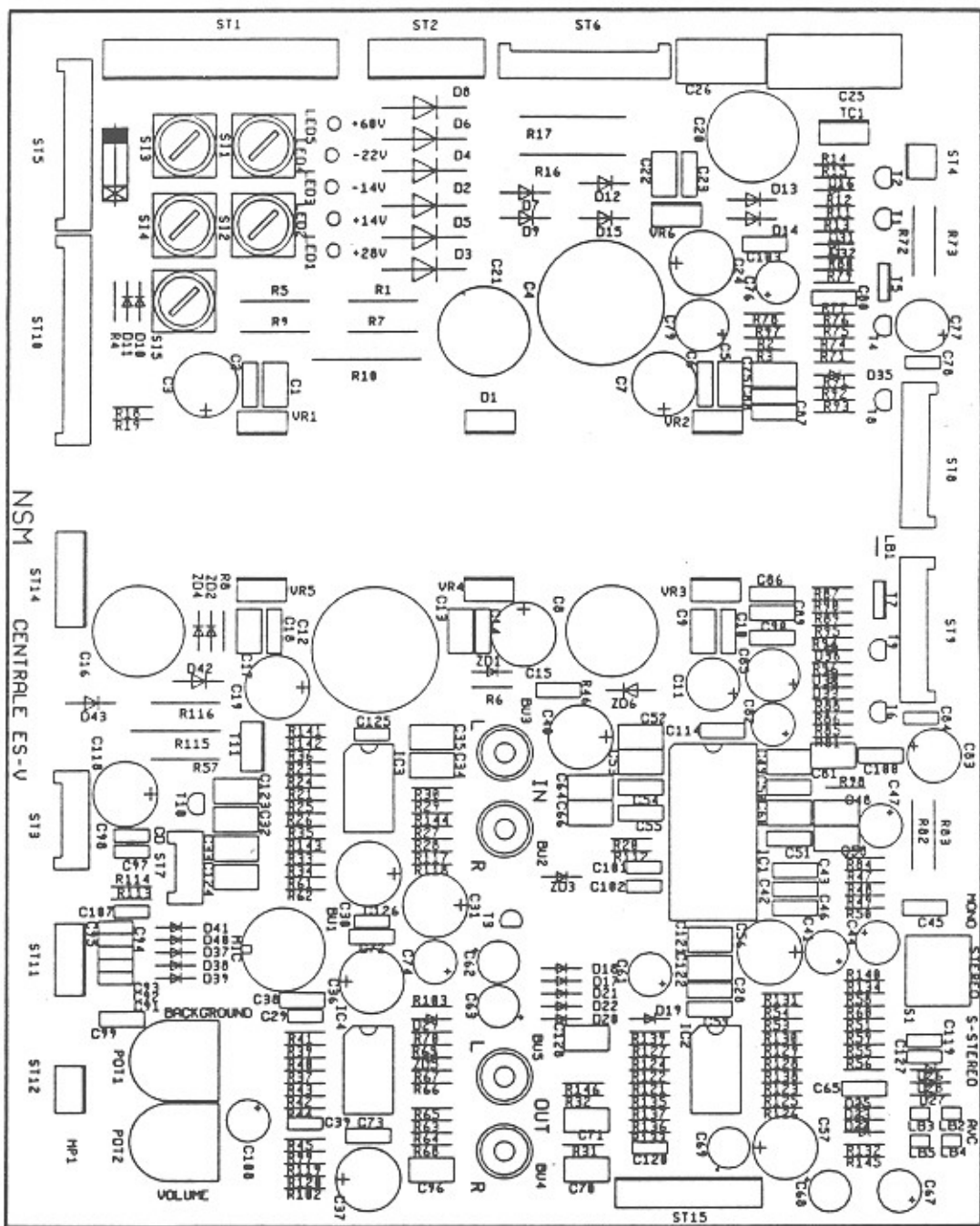
For individual testing one transistor must be unsoldered from the defective pair. After replacement of the defective transistors the quiescent current must be readjusted with TR 150 according to the adjustment instructions.

3.2 Tracing Sound Signal

Trace the sound signal arriving at CD plug according to the table below.
The point where the signal is missing is probably the cause of the malfunction.

NF Signal Point	Cause of Malfunction When Signal Missing
IC 1, PIN 1 or PIN 28	IC 3
IC 1, PIN 5 or PIN 24	IC 1
IC 1, PIN 6 or PIN 23	IC 2 (AVC)
IC 1, PIN 13 or PIN 16	IC 1
T 5 / T 7 (collector)	T 4, T 6, T 5, T 7

If the signal is there up to T 5, T 7, but no output signal arrives at the output stage, plug connectors ST 8 / ST 9 as well as the output stage have to be checked.



SPARE PARTS LIST

POS.	PART-No.	DESCRIPTION	DATA	QTY	
	176 326	<u>CENTRALE ES V, ASSY</u>	50 Hz	1	
Si 5	225 538	FUSE	T 2,5 A	1	
Si 3, 4	225 029	FUSE	T 3,15 A	2	
Si 1, 2	225 374	FUSE	T 6,3 A	2	
	225 747	CAP		5	
	176 327	<u>CENTRALE ES V, ASSY</u>	60 Hz	1	
Si 5	225 222	FUSE	2,5 A	1	
Si 3, 4	225 225	FUSE	3,2 A	2	
Si 1, 2	225 218	FUSE	6,25 A	2	
	225 748	CAP		5	
	150 687	COOLING PLATE		2	
	225 746	FUSE HOLDER		5	
	173 698	PROFILE, ASSY		1	
	171 629	HOLDER		2	
BU 1	225 244	SOCKET	S 5 prongs	1	
BU 2-5	225 986	RCA-SOCKET	BTOR 1 L	4	
S 1	222 550	SLIDE SWITCH	25149 NLDH 6	1	
ST 2	225 804	PIN PLUG	RM 3,96	6 prongs	1
ST 1	225 807	PIN PLUG	RM 3,96	12 prongs	1
ST 4	225 439	PIN PLUG	RM 2,5	3 prongs	1
ST 12	225 418	PIN PLUG	RM 2,5	4 prongs	1
ST 11	225 443	PIN PLUG	RM 2,5	6 prongs	1
ST 14	225 444	PIN PLUG	RM 2,5	8 prongs	1
ST 7	225 651	PIN PANEL	RM 2,5	4 prongs	1
ST 3	225 711	PIN PANEL	RM 2,5	6 prongs	1
ST 8, 9	225 654	PIN PANEL	RM 2,5	10 prongs	2
ST 15	225 655	PIN PANEL	RM 2,5	12 prongs	1
ST 5, 6	225 714	PIN PANEL	RM 2,5	12 prongs	2
ST 10	225 656	PIN PANEL	RM 2,5	15 prongs	1
VR 3, 4	221 572	IC-VOLTAGE	+ 5 V	1 A	2
VR 5	221 537	IC-VOLTAGE	- 5 V	1 A	1
VR 1, 2	221 476	IC-VOLTAGE	+15 V	1,5 A	2
VR 6	231 498	IC-VOLTAGE	-15 V	1,5 A	1
	222 447	IC-SOCKET	28 prongs		1
IC 1	231 540	IC-LINEAR	TDA 4390		1
IC 2-4	231 355	IC-LINEAR	TL 074		3
TC 1	231 028	TRIAC	TIC 206 D		1

SPARE PARTS LIST

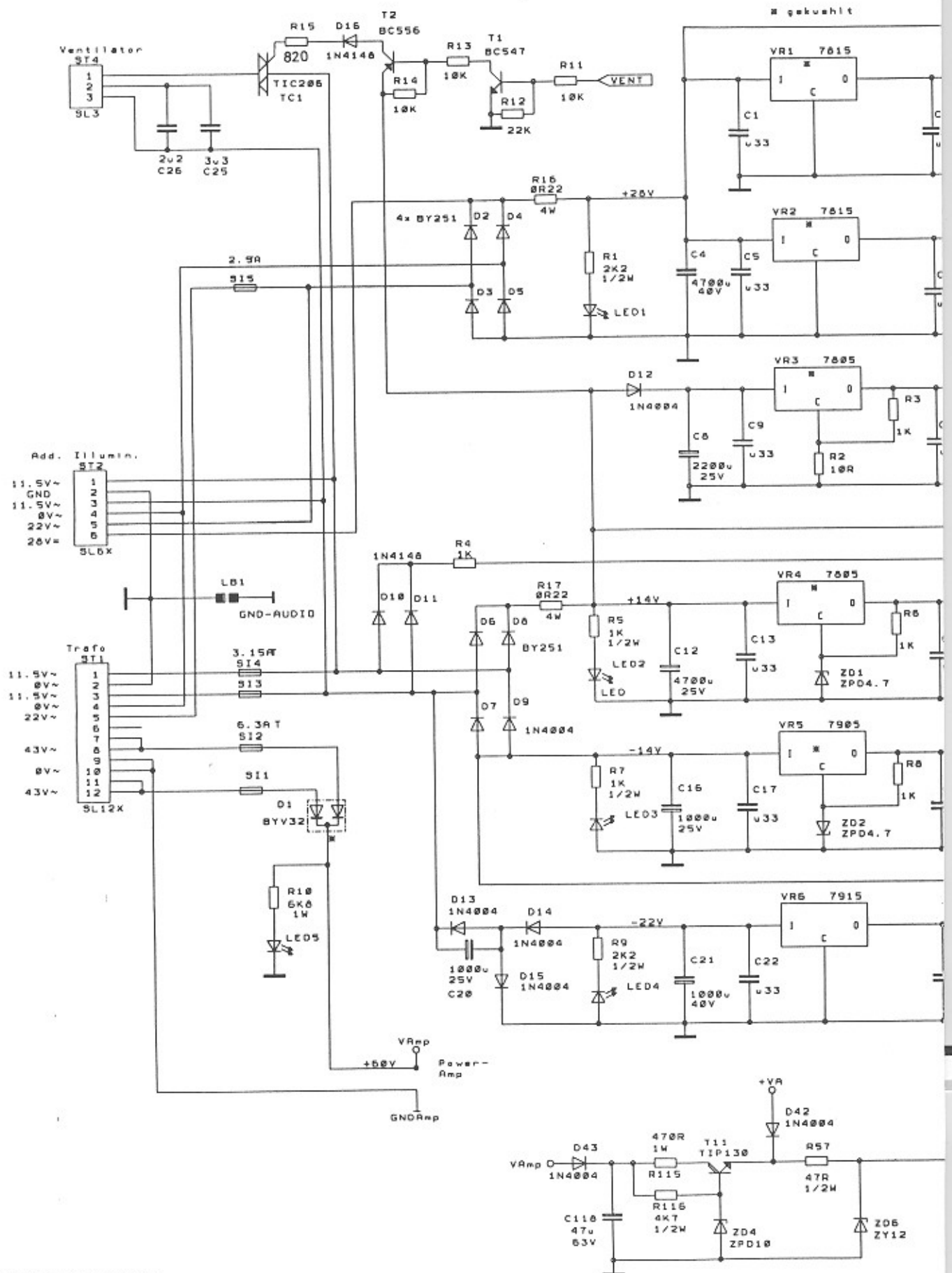
POS.	PART-No.	DESCRIPTION	DATA	QTY
D 10, 11, 16-29, 31-41	221 114	SI-DIODE	1 N 4148	> > 27
D 7, 9, 13, 14, 15, 42, 43	221 115	SI-DIODE	1 N 4004	> > 8
D 2-6, 8	221 463	SI-DIODE	BY 251	6
D 1	231 202	SI-DUO-DIODE	BYV 32/100	1
ZD 1-3, 5	231 079	ZENER-DIODE	ZPD 4,7	4
ZD 4	231 509	ZENER-DIODE	ZPD 10	1
ZD 6	221 406	ZENER-DIODE	ZY 12	1
LED 1-5	231 475	LUMINESZENZ-DIODE	LTL-4223-021	5
T 11	231 150	SI-TRANSISTOR	TIP 130	1
T 5, 7	221 488	SI-TRANSISTOR	BD 139-10	2
T 1, 3, 8-10	221 757	SI-TRANSISTOR	BC 547 B	> 5
T 2, 4, 6	221 459	SI-TRANSISTOR	BC 556 B	3
C 29, 39, 125, 126	220 266	CER.-CAPACITOR	27 pF	> 4
C 73	220 181	CER.-CAPACITOR	47 pF	1
C 80, 86	220 185	CER.-CAPACITOR	270 pF	2
C 2, 6, 10, 14, 18, 23, 38, 41, 42, 44, 45, 50, 51, 54, 55, 59, 65, 87 -90, 99, 114	220 481	CER.-CAPACITOR	0,1 µF	> > > > > > > > > 23
C 1, 5, 9, 13, 17, 22, 28, 32-35, 48, 49, 52, 53, 58, 60, 64, 66, 70, 71, 75, 81, 96, 121- 124	220 332	MKT-CAPACITOR	0,33 µF	> > > > > > > > > 28
C 107	220 335	MKT-CAPACITOR	22 nF	1
C 120	220 426	MKT-CAPACITOR	47 nF	1
C 26	220 336	MKT-CAPACITOR	2,2 µF	1
C 25	220 460	MKT-CAPACITOR	3,3 µF	1
C 101, 102	220 400	KT-CAPACITOR	1500 pF	2
C 72, 78, 84, 91-95, 119	220 435	KT-CAPACITOR	4700 pF	> > 9

SPARE PARTS LIST

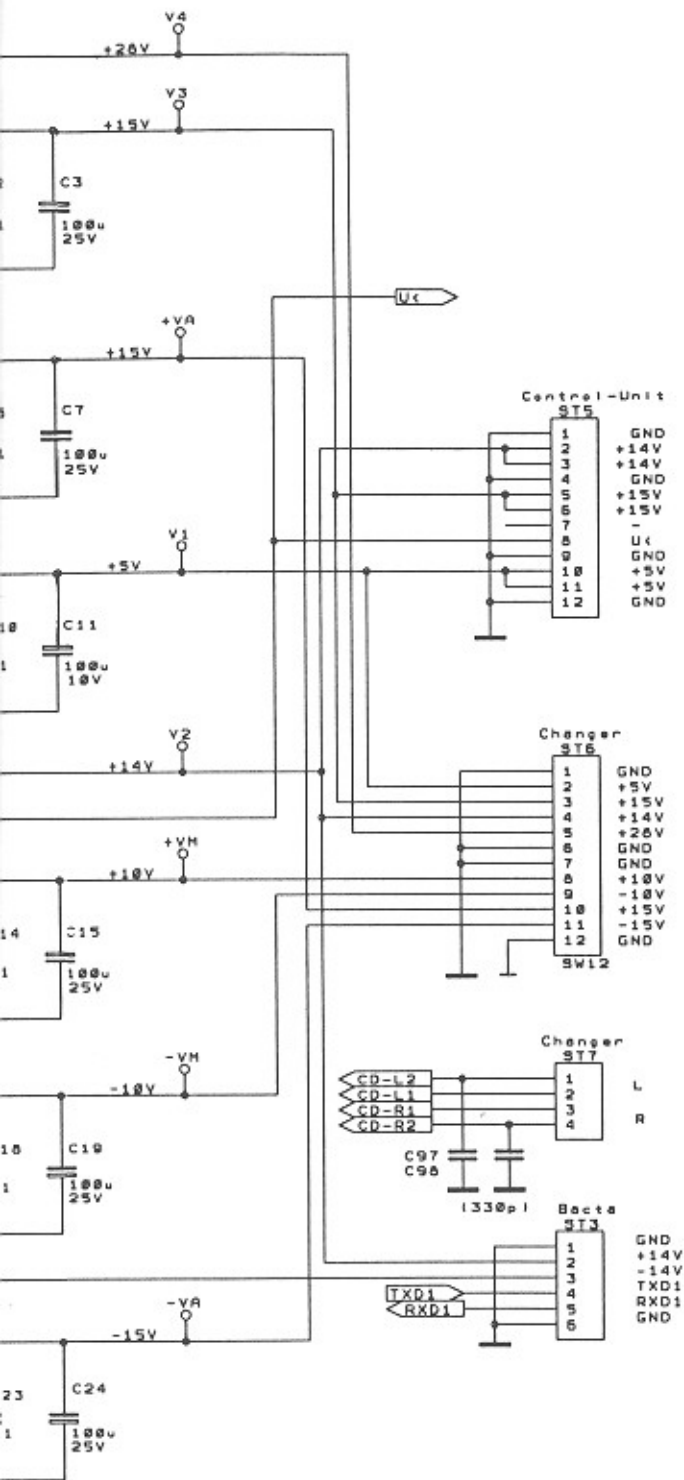
POS.	PART-No.	DESCRIPTION	DATA	QTY
C 61, 67	220 249	LYTIC	1 μ F	63 V 2
C 47, 76,				>
82	220 162	LYTIC	10 μ F	63 V 3
C 74, 77,				>
83	220 158	LYTIC	47 μ F	40 V 3
C 118	220 247	LYTIC	47 μ F	63 V 1
C 11	220 160	LYTIC	100 μ F	10 V 1
C 3, 7, 15,				>
19, 24, 30,				>
31, 36, 37,				>
40, 56, 57	220 250	LYTIC	100 μ F	25 V 12
C 79, 85	220 390	LYTIC	100 μ F	40 V 2
R 80, 90	221 095	RESISTOR	6,8 Ohm	1/4 W 2
R 2, 21, 37,				>
51, 71, 81	221 611	RESISTOR	10 Ohm	1/4 W 6
R 87, 88	221 096	RESISTOR	56 Ohm	1/4 W 2
R 64, 93,				>
96	221 600	RESISTOR	100 Ohm	1/4 W 3
R 44	221 099	RESISTOR	470 Ohm	1/4 W 1
R 112	221 100	RESISTOR	680 Ohm	1/4 W 1
R 3, 4, 6,				>
B, 43, 65,				>
91, 94	221 029	RESISTOR	1 KOhm	1/4 W 8
R 15, 79,				>
89	221 030	RESISTOR	1,5 KOhm	1/4 W 3
R 31, 32	221 031	RESISTOR	2,2 KOhm	1/4 W 2
R 77, 78	221 033	RESISTOR	3,3 KOhm	1/4 W 2
R 27, 29,				>
54, 56,				>
117-122	221 034	RESISTOR	4,7 KOhm	1/4 W 10
R 134, 140	221 607	RESISTOR	6,8 KOhm	1/4 W 2
R 48, 50	221 172	RESISTOR	8,2 KOhm	1/4 W 2
R 11, 13, 14,				>
18-20, 67,				>
114, 125,				>
127	221 035	RESISTOR	10 KOhm	1/4 W 10
R133,139	221 603	RESISTOR	12 KOhm	1/4 W 2
R131,137	221 036	RESISTOR	15 KOhm	1/4 W 2
R132,138	221 501	RESISTOR	18 KOhm	1/4 W 2
R 12, 39,				>
70, 113	221 604	RESISTOR	22 KOhm	1/4 W 4
R 68	221 037	RESISTOR	33 KOhm	1/4 W 1
R145,146	221 623	RESISTOR	39 KOhm	1/4 W 2
R23-26,28,				>
30,41, 2,				>
45,58,69,				>
92,95,99,				>
120,130,				>
135, 36,				>
141-144	221 038	RESISTOR	47 KOhm	1/4 W 22

SPARE PARTS LIST

POS.	PART-No.	DESCRIPTION	DATA	QTY
R 74, 84,				>
97, 98	221 039	RESISTOR	56 KOhm	1/4 W 4
R 47, 49,				>
53, 55	221 629	RESISTOR	68 KOhm	1/4 W 4
R 123, 124	221 044	RESISTOR	82 KOhm	1/4 W 2
R 40, 66,				>
75, 85,				>
126, 128	221 048	RESISTOR	100 KOhm	1/4 W 6
R 86, 76	221 045	RESISTOR	150 KOhm	1/4 W 2
R 103	221 047	RESISTOR	330 KOhm	1/4 W 1
R 33-36,				>
59-63	221 049	RESISTOR	470 KOhm	1/4 W 9
R 102	221 982	RESISTOR	3,3 MOhm	1/4 W 1
R 57	221 161	RESISTOR	47 Ohm	1/2 W 1
R 72, 82	221 230	RESISTOR	470 Ohm	1/2 W 2
R 5, 7	221 183	RESISTOR	1 KOhm	1/2 W 2
R 73, 83	221 210	RESISTOR	1,5 KOhm	1/2 W 2
R 1, 9	221 184	RESISTOR	2,2 KOhm	1/2 W 2
R 116	221 397	RESISTOR	4,7 KOhm	1/2 W 1
R 115	221 276	WIRE WOUND RESISTOR	470 Ohm	1 W 1
R 10	231 232	WIRE WOUND RESISTOR	6,8 KOhm	1 W 1
R 16, 17	231 176	WIRE WOUND RESISTOR	0,22 Ohm	4 W 2
Pot 1, 2	231 553	TRIMMER RESISTOR	500 KOhm	0,15 W 2
	231 235	SHAFT	red	2



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+12V VAP

POWER - SUPPLY

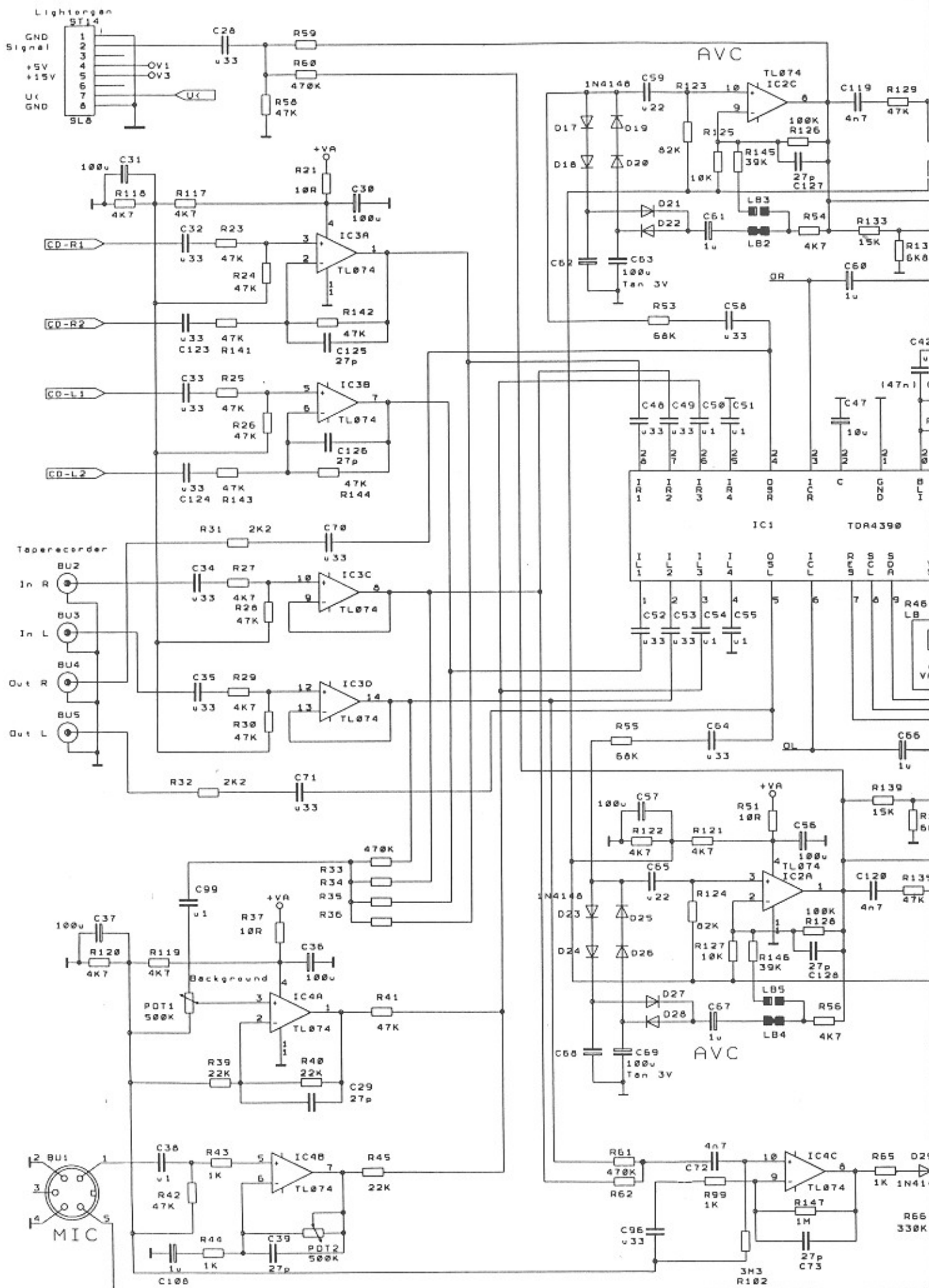
ÄNDERUNGEN IM SINNE DES TECHN FORTSCHRITTES VORBEHALTEN,
 JEDOCH KEINE NACHRÜSTPFLICHT!
 SUBJECT TO TECHNICAL MODIFICATION WITHOUT OBLIGATION
 TO MODIFY EQUIPMENT ALREADY DELIVERED!

NSM MUSIKAUTOMATEN **ES V-CD** TECHNOLOGY
 PHONOGRAPHS

Schaltbild **CENTRALE ESV**
 WIRING DIAGRAM

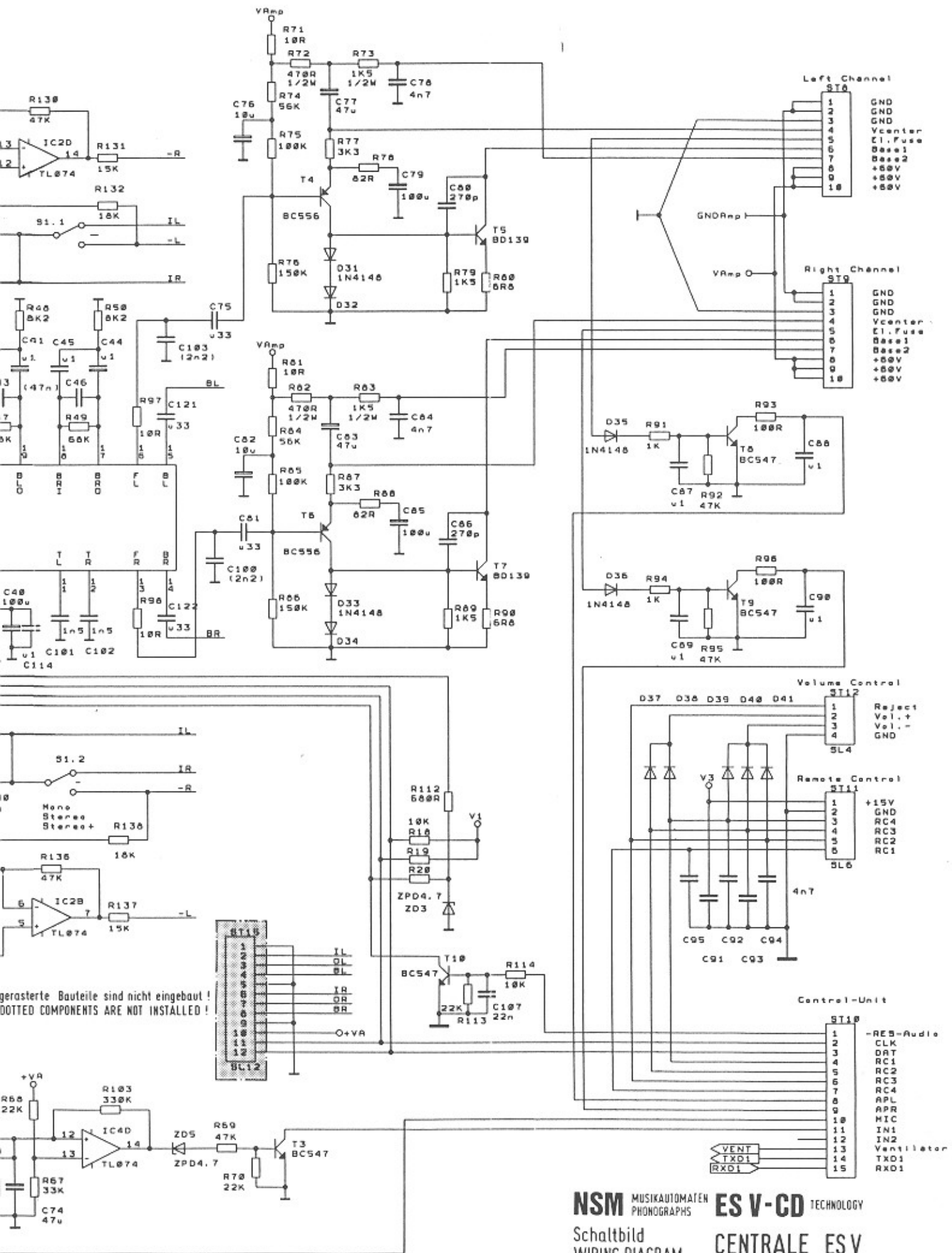
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AUD



gerasterte Bauteile sind nicht eingebaut!
DOTTED COMPONENTS ARE NOT INSTALLED!

NSM MUSIKAUTOMATEN PHONOGRAPHS **ES V-CD** TECHNOLOGY
Schaltbild WIRING DIAGRAM **CENTRALE ES V**

ÄNDERUNGEN IM SINNE DES TECHN. FORTSCHRITTES VORBEHALTEN,
JEDOCH KEINE NACHRÜSTPFLICHT!
SUBJECT TO TECHNICAL MODIFICATION WITHOUT OBLIGATION
TO MODIFY EQUIPMENT ALREADY DELIVERED!

Oct 29.06.92 Gert Braun Bernd *[Signature]*