



SERVICE MANUAL

FOR

RECEIVER TA-150

Design and Development by 3Dgruppen ab, Stockholm, Sweden
Manufactured by Lovanger Elektronik AB, Lovanger, Sweden

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1. GENERAL

TA-150 IS A FULLY COMPUTER CONTROLLED RECEIVER. THE OPERATOR COMMUNICATES WITH THE COMPUTER VIA ONE KNOB, 26 PUSHBUTTONS, 48 LEDs AND A FOUR DIGIT LED DISPLAY ON THE FRONT PANEL. THE COMPUTER IN TURN EFFECT ALL CONTROLS IN THE RECEIVER CIRCUITS VIA DIGITAL SIGNALS.

THE COMPUTER IS BUILT ON TWO PLUG-IN PRINTED CIRCUIT BOARDS. ONE CONTAINING A MICROPROCESSOR, MEMORY CHIPS AND BUFFERS IS CALLED THE "CONTROL CARD". THE OTHER CONTAINS ALL THE OPERATOR CONTROLS AND THE INDICATORS. IT IS CALLED THE "FRONT CARD".

THE RECEIVER ITSELF IS BASED ON CONVENTIONAL ANALOG CIRCUITS, BUT ALL CONTROLS ARE DIGITAL WITH CMOS ANALOG SWITCHES OPERATING RESISTOR NETWORKS. THE COMPUTER OPERATES THE SWITCHES VIA PULSE TRAINS (SERIES OUTPUT) FED IN PARALLEL TO "REGISTERS" CONTROLLING THE CMOS SWITCHES. "ENABLE" SIGNALS DECIDE WHICH REGISTERS WILL ACCEPT A PULSE TRAIN.

THE RECEIVER FUNCTIONS ARE BUILT ON SEVERAL PLUG-IN PRINTED CIRCUITS BOARDS, WHICH EVEN CONTAIN THE TERMINALS FOR OUTSIDE CONNECTIONS. THE PLUG-IN BOARDS OF THE COMPUTER AND THE RECEIVER ARE MOUNTED ON A PRINTED CIRCUIT "MOTHER BOARD", WHICH FORMS THE INNER BOTTOM OF TA-150 AND IS CALLED THE "BOTTOM CARD".

THE BOTTOM CARD CONTAINS ALL INTERCONNECTING WIRING BETWEEN THE FUNCTION CARDS, AND ALSO CONTAINS ALL POWER SUPPLY CIRCUITS.

A MALFUNCTION IN TA-150 CAN USUALLY BE CORRECTED BY REPLACEMENT OF A PLUG-IN FUNCTION CARD. THE EXCEPTIONS ARE FAULTS IN THE POWER SUPPLY CIRCUITS OR CONNECTORS ON THE BOTTOM CARD.

FAULTY FUNCTION CARDS WILL BE REPAIRED BY THE FACTORY IF RETURNED TO YOUR NEAREST SERVICE CENTER OR DISTRIBUTOR PER SEPARATE LISTING.

2. LAYOUT AND ORGANISATION

THE OVERALL LAYOUT OF TA-150 AND THE LOCATION OF ALL FUNCTION CARDS IS SHOWN IN DRAWING 3-150151.

THE INDIVIDUAL FUNCTION CARDS CONTAIN THE BASIC CIRCUITS AND FUNCTIONS LISTED IN TABLE I. A BLOCK DIAGRAM FOR THE TA-150 IS SHOWN IN DIAGRAM 3-150150.

3. HOW TO GET ACCESS TO PLUG-IN CARDS

REMOVE SIX SCREWS AT TOP, AND TWO AT EACH END OF TA-150, AND LIFT COVER STRAIGHT UP. (PULL LOWER SIDE EDGES SLIGHTLY OUTWARD IF NECESSARY).

NOTE: WHEN REPLACING SCREWS, USE 3 LONG SCREWS AT FRONT OF TOP. ALL OTHER SCREWS ARE SHORT.

TAPE CARD, PHONO CARD, FM CARD AND AM CARD ARE NOW REMOVABLE. PULL FRONT OF CARD UP SLIGHTLY, THEN LIFT ENTIRE CARD UPWARDS AND TOWARDS FRONT.

WHEN REINSERTING A CARD, TILT CARD SLIGHTLY WITH REAR END DOWN, GUIDE CARD INTO REAR SLOT, AND EASE FEMALE CONTACT STRIP ONTO PINS PROTRUDING FROM BOTTOM CARD. MAKE SURE CONTACTS MATE PROPERLY.

TONE CONTROL CARD AND CONTROL CARD ARE HELD IN PLACE BY TWO RETAINER CLIPS FASTENED WITH SCREWS. UNSCREW CLIPS, PULL TONE CONTROL CARD STRAIGHT UP AND REMOVE THE SHIELD PLATE. CONTROL CARD SHOULD BE PULLED STRAIGHT UP ONLY TILL DISENGAGED FROM PINS IN BOTTOM CARD, THEN MOVED SIDWAYS AND TILTED SO LARGE CAPACITORS CAN BE EASED OUT IN SLOT BETWEEN FRONT PANEL LIP AND SHIELD PLATE HOLDERS.

NOTE: THE TONE-CONTROL CARD IS REVERSIBLE, IF REINSERTED WITH COMPONENTS TOWARDS REAR, LEFT AND RIGHT CHANNELS ARE INTERCHANGED, THIS CAN BE USED TO DETERMINE IF A DIFFERENCE BETWEEN CHANNELS IS CAUSED BY A FAULT IN TONE-CONTROL CARD, THE TONE-CONTROL CARD SHOULD, HOWEVER, ALWAYS BE INSERTED WITH COMPONENT SIDE FACING SHIELD PLATE BEFORE TA-150 IS USED FOR REGULAR LISTENING,

WHEN REINSERTING, LOOK AND FEEL FOR PROPER MATING BETWEEN PINS AND CONTACT STRIP. NEVER USE FORCE TO GET CARD DOWN.

POWER AMPLIFIERS ARE EACH HELD IN PLACE BY 3 SCREWS THROUGH REAR PANEL INTO HEATSINKS, REMOVE THESE SCREWS WHILE SUPPORTING HEATSINK WITH ONE HAND, THEN LIFT HEATSINK AND CARD SECTION SIMULTANEOUSLY UP, THEN FORWARD AND FREE, BE CAREFUL NOT TO PUT STRAIN ON FLEXIBLE CONNECTION BETWEEN HEATSINK AND CARD.

FRONT CARD CAN BE UNPLUGGED ONLY AFTER DISASSEMBLY AS FOLLOWS:

- REMOVE BOTTOM COVER OF RECEIVER,
NOTE: LONG SCREWS AT FRONT EDGE ONLY WHEN REASSEMBLING
- UNSCREW 3 SCREWS AT BOTTOM LIP AND 3 AT TOP LIP OF FRONT PANEL, AND PULL FRONT PANEL OFF STRAIGHT FORWARD,
- REMOVE SCREWS HOLDING FRONT CARD, PULL FRONT CARD, LEFT EDGE FIRST, TILL PINS ON FRONT CARD DISENGAGE FROM CONTACT STRIP ON BOTTOM CARD, THEN SLIDE FRONT CARD SIDWAYS AWAY FROM CONTROL KNOB.

4. SUPPLY VOLTAGES

TABLE II LISTS THE CORRECT VOLTAGES, TOLERANCES AND MAX RIPPLE VOLTAGES FOR TEST POINTS INDICATED IN DRAWINGS 3-150151 AND 2-150101.

VOLTAGES SHOULD BE CHECKED WITH DC VOLTMETER OF MINIMUM 20 KOHM/ VOLT INPUT IMPEDANCE, VALUES ARE VALID WHEN PROGRAM SOURCES ARE CONNECTED AND VOLUME IS AT MINIMUM SETTING, ALL VOLTAGES MEASURED AGAINST GROUND (CHASSIS) UNLESS OTHERWISE SPECIFIED.

5. ADJUSTMENTS

TA-150 CAN ALWAYS BE REPAIRED BY REPLACEMENT OF A DEFECTIVE FUNCTION MODULE. NO ADJUSTMENTS OR ALIGNMENTS ARE REQUIRED OUTSIDE THE FACTORY.

FOR THOSE SERVICE TECHNICIANS WHO DESIRE TO PERFORM ORDINARY ALIGNMENT AND ADJUSTMENT PROCEDURES ON FUNCTION MODULES, WE DESCRIBE AND SPECIFY BELOW THE ONLY ADJUSTMENTS PERMITTED IN THE FIELD. DO NOT ATTEMPT ANY OTHER ADJUSTMENT OR REPAIR WITHOUT SPECIFIC PERMISSION FROM THE FACTORY OR AUTHORIZED SERVICE CENTER.

5.1 BIAS CURRENT IN POWER AMPLIFIER

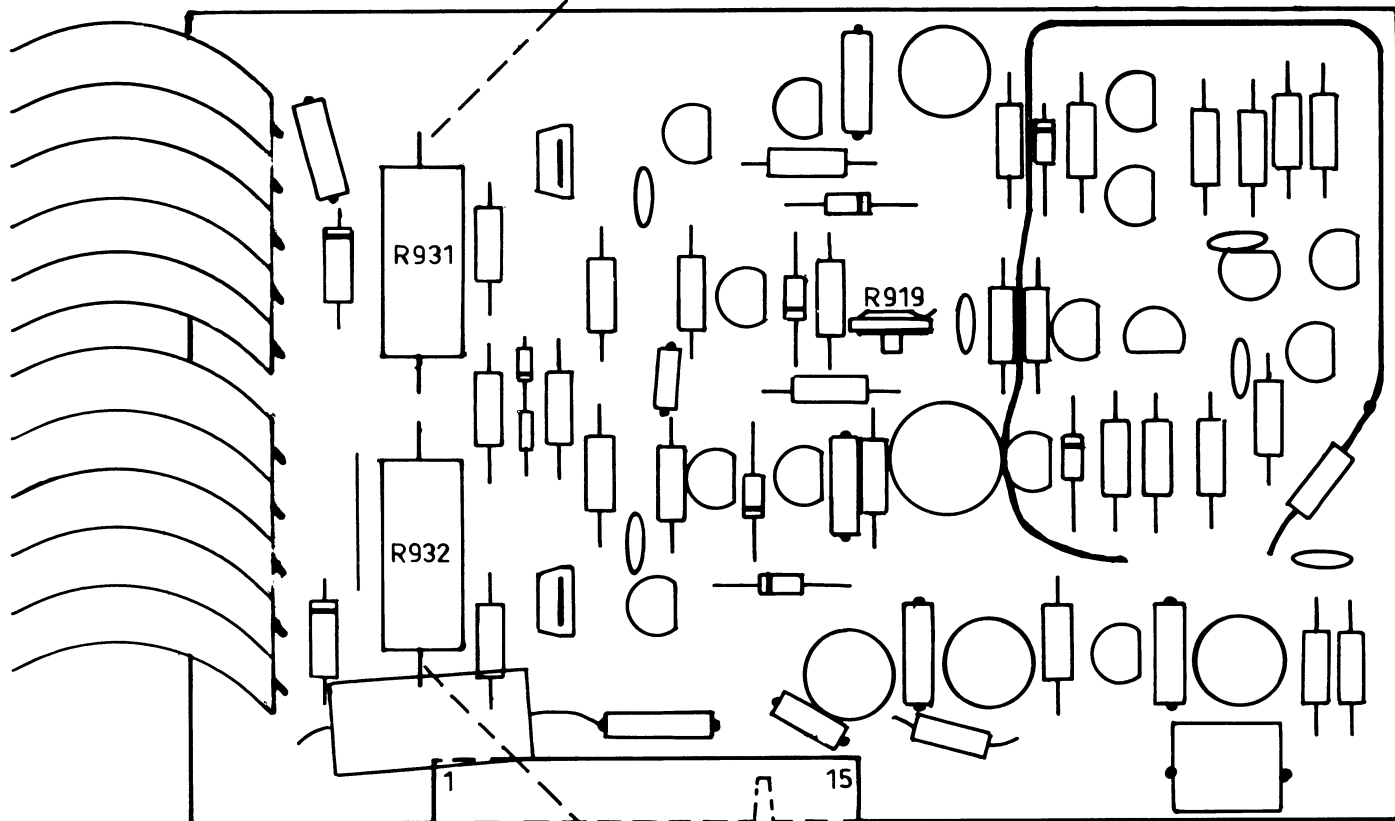
5.1.1 START WITH COLD UNIT.

CONNECT TONEGENERATOR 20 KHZ, 50 mV TO PHONO 1 INPUT. SET VOLUME TILL OUTPUT VOLTAGE AT SPEAKER TERMINAL IS 1 V. ADJUST R 919 CLOCKWISE TILL CROSSOVER DISTORTION STANDS TO APPEAR. (USE DISTORTIONMETER OUTPUT TO OSCILLOSCOPE) TURN VOLUME TO ZERO, AND READ VOLTAGE BETWEEN TESTPOINTS A AND B. (READING SHOULD BE BELOW 20 mV).

5.1.2. RUN AMPLIFIER FOR 5 MINUTES AT FULL OUTPUT POWER

(24 V OVER 8 OHM. ADJUST BY MEANS OF VOLUME CONTROL). TURN VOLUME TO ZERO, AND MEASURE VOLTAGE BETWEEN TEST POINTS A AND B. VOLTAGE SHOULD BE LESS THAN 30 mV. OBSERVE VOLTAGE WHILE POWER TRANSISTORS COOL, VOLTAGE SHOULD CHANGE TOWARDS VALUE MEASURED UNDER PAN. 5.1.1. AND MUST NOT TEND TO ENCREASE BEYOND THAT VALUE. IF VOLTAGE IS TOO HIGH, OR TENDS TO INCREASE TOO MUCH, WHEN TRANSISTORS COOL, R919 MUST BE READJUSTED SLIGHTLY CLOCKWISE. (RECHECK THAT CROSSOVER DISTORTION AT 20 KHZ REMAINS ACCEPTABLE).

Testpoint a



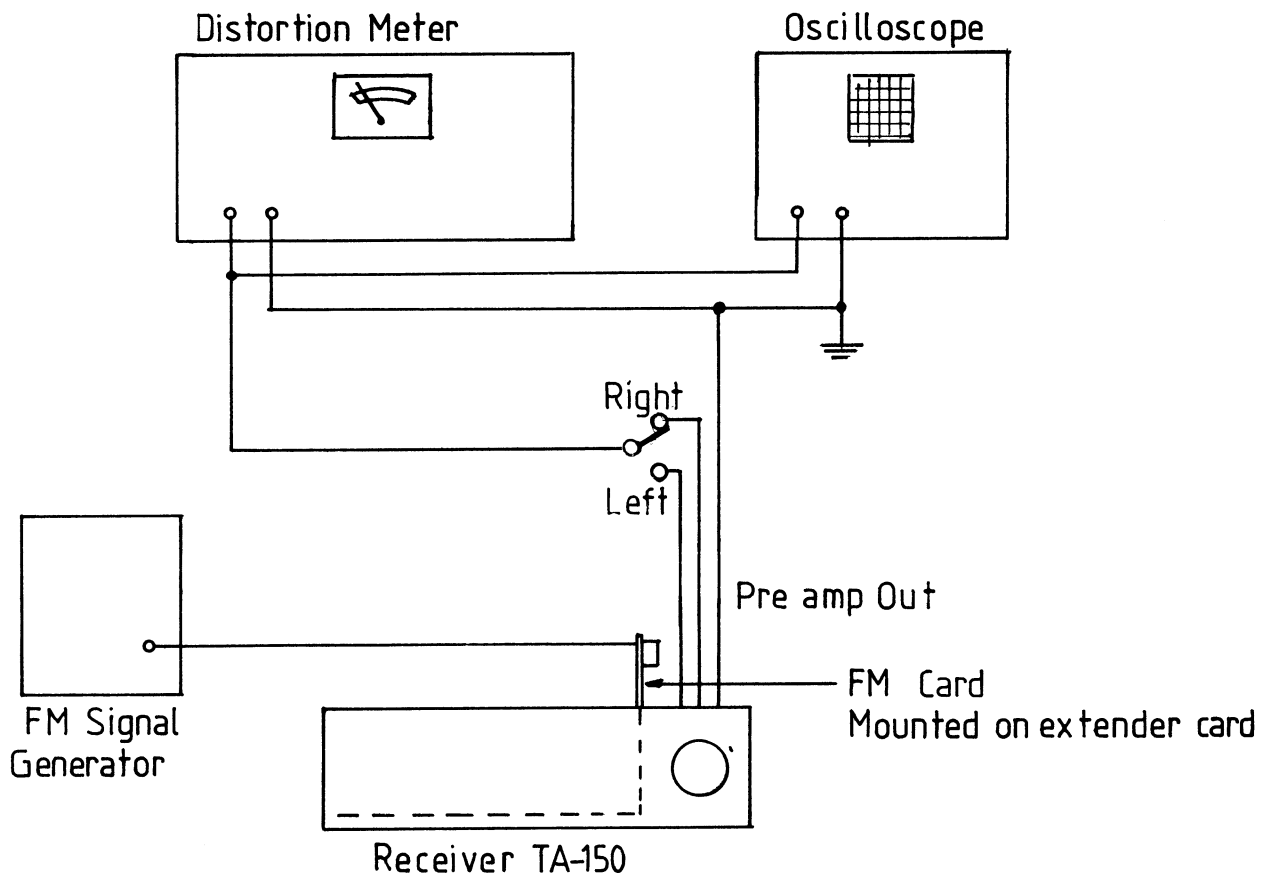
Testpoint b

5.2. ALIGN FM TUNER

EQUIPMENT NEEDED:

FM STEREO SIGNAL GENERATOR (EX. ST 1000A)
DISTORTION METER
OSCILLOSCOPE
EXTENDER CARD (TO LIFT FM CARD UP.)

SET UP EQUIPMENT FOR TEST AS ILLUSTRATED BELOW:



5.2.1. ADJUSTMENT OF TUNING RANGE

PRESS ANY ONE OF THE FM PROGRAM BOTTONS,
TUNE TO THE LOWEST FREQUENCY THAT CAN BE OBTAINED, THIS SHOULD
READ 87,0 - 87,5 MHz. IF READING IS NOT IN THIS RANGE, READJUST
TRIMPOT R440.

RETUNE TO THE HIGHEST FREQUENCY READING, AND VERIFY THAT APPROX.
108 MHz CAN BE TUNED IN.

5.2.2. COARSE ADJUSTMENT OF TUNER

- A) CONNECT APPROX. 1 MV RF SIGNAL TO ANTENNA, WITH 1 KHZ MONO-SIGNAL. SET MODULATION TO 100% IN USA AND CANADA (53% IN EUROPE.)
TUNE RECEIVER TO APPROX. 98 MHZ, AND ADJUST SIGNAL GENERATOR TO THE SAME FREQUENCY, SO MAXIMUM BRIGHTNESS IS OBTAINED ON TUNING INDICATORS ON TA-150.
ADJUST U 70 TILL BOTH LED'S ARE EQUALLY BRIGHT WHEN TA-150 IS IN "TUNING" MODE.
ADJUST U 80 FOR MINIMUM LF SIGNAL.
- B) REDUCE RF SIGNAL TOWARDS THE SENSITIVITY LIMIT, WHILE KEEPING TA-150 IN "TUNING" MODE (AFC OFF).
CHECK ON OSCILLOSCOPE THAT NOISE SIGNAL APPEARS SYMMETRICAL ON LF SIGNAL.
CHECK THAT THE NOISE SIGNAL REMAINS SYMMETRICAL WHEN TA-150 REVERTS TO "VOLUME" MODE (AFC ON) IF NOT, REPEAT PROCEDURE A) ABOVE.

5.2.3. ADJUST FOR MINIMUM DISTORTION

SET SIGNAL GENERATOR TO APPROX. 1 MV LEVEL, STEREO 1 KHZ, LEFT - RIGHT, PILOT 8%.

ADJUST AS FOLLOWS:

AFC OFF: U 80 FOR MINIMUM DISTORTION (<0.3%)
AFC ON : U 70 " " " (<0.3%)

5.2.4. ADJUST FOR BEST STEREO SEPARATION

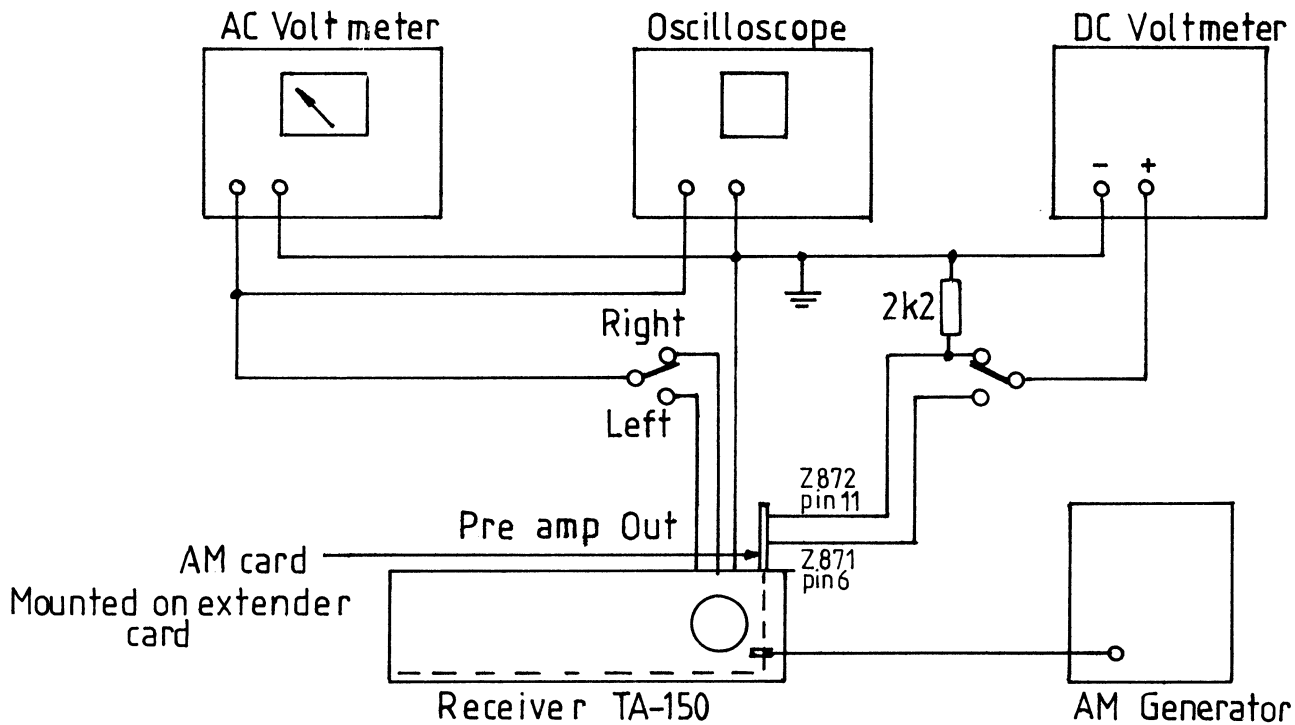
CONNECT OSCILLOSCOPE OR FREQUENCY COUNTER BETWEEN R437 AND R438. READING SHOULD BE 76 KHZ. ADJUST WITH R438.
RESET SIGNAL GENERATOR TO ONLY LEFT OR RIGHT CHANNEL.
ADJUST R 436 TILL MINIMUM SIGNAL ON THE CHANNEL NOT MODULATED IN SIGNAL GENERATOR (BETTER THAN - 35 DB).

5.3. ALIGN AM TUNER

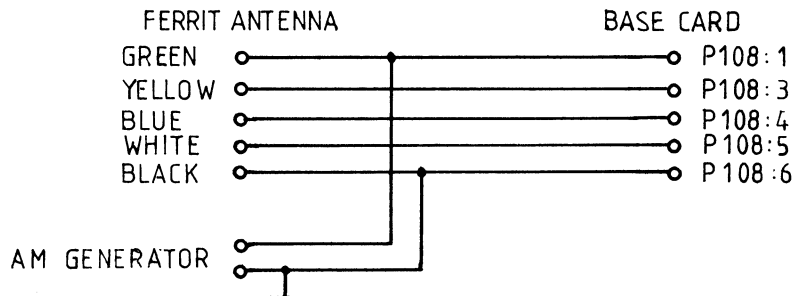
EQUIPMENT NEEDED:

- AM GENERATOR
- AC VOLT METER
- OSCILLOSCOPE
- EXTENDER CARD (TO LIFT AM CARD UP,)
- ADAPTER
- DC VOLT METER

SET EQUIPMENT UP FOR TEST AS SHOWN IN DIAGRAM BELOW.



DISCONNECT FERRITE ANTENNA, AND RECONNECT IT VIA AN ADAPTER ALLOWING AM GENERATOR TO BE CONNECTED BETWEEN ANTENNA AND AM CARD. (SEE DIAGRAM BELOW FOR WIRING OF ADAPTER.)



5.3.1. ADJUSTMENT OF TUNING RANGE

- A) CONNECT DC VOLTMETER TO Z 871 PIN 6,
TURN ON TA-150 BY PRESSING AM 1 (OR AM 2)
- B) PRESS TUNING BUTTON AND TUNE TO LOWEST FREQUENCY POSSIBLE,
ADJUST TRIMPOT R 876 TILL DC VOLTMETER READS $0,85 \text{ V} \pm 0,05\text{V}$,
ADJUST U 871 TILL FREQUENCY READS 510 KHz.
- C) PRESS TUNING BUTTON AND TUNE TO HIGHEST FREQUENCY POSSIBLE,
THE DC VOLTMETER SHOULD NOW READ APPROXIMATELY 30,5 VOLT,
ADJUST C 879 TILL FREQUENCY READING IS 1650 KHz.
- D) GO BACK AND FORTH BETWEEN B AND C TILL BOTH ARE CORRECT.

5.3.2. ALIGN RF STAGE

- A) CONNECT DC VOLTMETER, RANGE 3 VOLT, TO Z 872 PIN 11,
SHUNT VOLTMETER WITH A 2,2 KOHM RESISTOR DURING THIS TEST.
- B) PRESS TUNING BUTTON AND TUNE TO LOWEST FREQUENCY,
ADJUST AM GENERATOR FREQUENCY AND SIGNAL STRENGTH TILL THE
DC VOLTMETER SHOWS A SMALL DEFLECTION,
REDUCE SIGNAL STRENGTH FROM AM GENERATOR AS THE ALIGNMENT
PROGRESSES SO THAT THE VOLTAGE ON Z 872 PIN 11 NEVER EXCEEDS
3 VOLT. ADJUST U 872 FOR MAX DEFLECTION ON DC VOLTMETER.
- C) PRESS TUNING BUTTON AGAIN AND TUNE TO MAX FREQUENCY, ADJUST
THE AM GENERATOR FREQUENCY AND SIGNAL STRENGTH TILL A
DEFLECTION IS OBTAINED ON THE DC VOLTMETER,
ADJUST C 886 FOR MAX READING ON THE DC VOLTMETER.
- D) REPEAT B AND C TILL MAXIMUM SENSITIVITY IS OBTAINED.

6. TROUBLE SHOOTING TIPS

TABLE III CONTAINS A LISTING OF **SYMPTOMS**, CHECKS TO BE MADE, AND PROBABLE CAUSE IF CHECKS GIVE NEGATIVE OR FAULTY READINGS. CORRECT CAUSE BY REPLACING FAULTY COMPONENT.

A FEW BASIC TIPS SHOULD ALWAYS BE REMEMBERED:

A: FUSES IN TA-150 ARE INTENDED FOR SAFETY AND FIRE PROTECTION ONLY. A BURNT FUSE INDICATES A FAILURE WHICH SHOULD BE CORRECTED **BEFORE** THE FUSE IS REPLACED.

NOTE: THE POWER AMPLIFIERS ARE PROTECTED AGAINST **OVERLOAD** BY INSTANTANEOUS CURRENT LIMITING, AND AGAINST OVERHEATING BY THERMISTORS TURNING POWER OFF WHEN SAFE TEMPERATURE LIMIT IS REACHED. FUSES WILL BLOW ONLY IF A POWER TRANSISTOR IS SHORTED.

B. "No SOUND" **USUALLY** IS CAUSED BY:

- SPEAKER SWITCH ON REAR OF TA-150 NOT IN DEPRESSED POSITION.
- TAPE MONITOR IS ON.
- DIN PLUG INSERTED IN PREAMP-OUT/POWERAMP SEPARATES PREAMP AND POWERAMP.

C. IF TA-150 IS DEFECTIVE ON ARRIVAL, FIRST REMOVE COVER, AND CHECK THAT ALL CARDS ARE FULLY PLUGGED IN. CHECK ALSO THAT NO CARD IS LEANING SO IT TOUCHES METAL, AND THAT NO COMPONENT IS LOOSE.

TABLE I

CIRCUITS AND FUNCTIONS IN EACH PLUG-IN CARD

FRONT CARD

ALL OPERATOR INPUTS AND INDICATORS AND DIGITAL READOUT, PUSHBUTTONS AND KNOB READOUT CIRCUITS.

CONTROL CARD

ALL CONTROL FUNCTIONS, INTERLOCKS, PROGRAMS AND MEMORY. MICROPROCESSOR, PROGRAM MEMORY CHIP (ROM), OPERATING MEMORY CHIPS (RAM) WITH BACK-UP VOLTAGE, BUFFER CIRCUITS COUNTER AND DRIVER/MULTIPLEXER FOR DIGITAL READOUT.

TONE-CONTROL CARD

SEPARATE VOLUME CONTROL CIRCUITS FOR LEFT AND RIGHT CHANNELS, TONE CONTROL CIRCUITS, HIGH AND LOW FILTER SWITCHES, BY-PASS SWITCH FOR LINEAR FUNCTION, WITH ASSOCIATED AMPLIFIER CIRCUITS.

AM CARD

AM TUNER CIRCUITS WITH VOLTAGE CONTROLLED VARACTOR DIODES FOR TUNING, AM ANTENNA TERMINALS.

FM CARD

FM TUNER CIRCUITS WITH VOLTAGE CONTROLLED VARACTOR DIODES FOR TUNING, DEMODULATOR, AFC CIRCUITS, GENERATES VOLTAGES FOR CENTER TUNING INDICATORS AND STEREO BEACON, CONTAINS NOTCH FILTERS FOR PILOT AND SUB-CARRIER SUPPRESSION, PRESCALER (1:100) FOR FREQUENCY READOUT, FM ANTENNA TERMINALS.

PHONO CARD/FUNCTION SELECTOR

PHONO PREAMPLIFIERS, SUBSONIC FILTER, PROGRAM SELECTION SWITCHES, MONO SWITCH, TERMINALS FOR PHONO 1, PHONO 2, Aux.

TABLE I

TAPE CARD

TERMINALS FOR TAPE 1, TAPE 2, TERMINAL FOR PREAMP OUT/POWERAMP IN, WITH MECHANICAL SWITCH SEPARATING PREAMP AND POWERAMP WHEN PLUG IS INSERTED.

DIGITAL/ANALOG CONVERTER FOR TUNING VOLTAGES TO FM AND AM TUNER CARDS.

POWER AMP RIGHT
POWER AMP LEFT

INTERCHANGEABLE UNITS, CONTAIN COMPLETE POWER AMPLIFIER CIRCUITS INCLUDING HEAT SINK.

TABLE II
SUPPLY VOLTAGES

<u>TEST POINT</u>	<u>VOLTAGE</u>	<u>RIPPLE VOLTAGE</u>
<u>REFER TO DRAWING 3-150151</u>		
+49 V (F104/F105)	45±1	0,2
	49±1 (NEW TRANSFORMER)	IF DIFFERENT CHECK BIAS CURRENT IN POWER AMPLIFIER
-49 V (F106/F107)	45±1	0,2
	49±1 (NEW TRANSFORMER)	
+47 V (RIGHT SIDE R124)	43±2	0,2
	47±2 (NEW TRANSFORMER)	
+30 V	30±2	0,2
+17,5 V	17,5±1	1,0
-17,5 V	17,5±1	1,0
+13,5 V	13,5±1	0,01
+12,4 V	12,4±0,5	0,01
-12,4 V	12,4±0,5	0,01
+11 V	11±0,5	0,005
-11 V	11±0,5	0,005
+7,5 V	7,5±0,3	0,02
-7,5 V	7,5±0,3	0,01
-5 V	5±0,2	

TABLE III
TROUBLE SHOOTING TIPS

<u>SYMPTOM</u>	<u>CHECK/ACTION</u>
TA-150 ALL DARK	A. AC POWER OK? B. CHECK FUSE F103 AND VOLTAGE SELECTOR C. CHECK FUSES F101 AND F102 D. CHECK 5V - IF WRONG, CHECK D103, V101 V102 E. REPLACE CONTROL CARD F. REPLACE FRONT CARD
CLOCK IS LIT, BUT PROGRAM SOURCES CAN NOT BE SWITCHED IN (No INDICATION)	A. REPLACE CONTROL CARD B. REPLACE FRONT CARD
CONTROLS INDICATE CORRECTLY, BUT NO SOUND ON ONE OR BOTH CHANNELS FOR ANY PROGRAM SOURCE.	A. CHECK THAT SPEAKER TERMINALS ARE PLUGGED IN, AND SPEAKER SELECTOR SWITCH IS PRESSED IN, B. CHECK THAT MONITOR IS OFF, C. REMOVE PLUG FROM PREAMP OUT/POWER AMP IN. D. CHECK FUSES F104, F105, F106, F107 E. CHECK VOLTAGES +7,5 AND -7,5 V, IF INCORRECT, CHECK DIODES D104, D106 F. MEASURE VOLTAGES +49 V AND -49 V IF INCORRECT CHECK: RELAY K101, RECTIFIER V106, PHONO CARD, CONTROL CARD, G. CONNECT SIGNAL TO POWER AMP IN PINS 3, 5 TO GROUND (2) IF NO SIGNAL ON SPEAKERS, THE POWER AMPLIFIER IS FAULTY, H. MEASURE VOLTAGES +12,4 V AND -12,4 V CHECK D107, V103 OR D108, V104 I. REPLACE PHONO CARD, J. REPLACE TONE-CONTROL CARD K. REPLACE CONTROL CARD

TABLE III

SYMPTOM

CHECK/ACTION

DISTORTED SOUND ON
PHONO, TAPE, AUX.

- A. CHECK FOR TOO LOW SPEAKER IMPEDANCE.
- B. CHECK FOR SHORT CIRCUITS IN POWER AMPLIFIER OUTPUT (HEATSINK WILL BE HOT).
- C. SAME AS H. ABOVE.
- D. REPLACE PHONO CARD.
- E. REPLACE TONE-CONTROL CARD
- F. REPLACE POWER AMPLIFIER.

FM OR AM CANNOT BE
SET. (NO INDICATION)

- A. CHECK +30 V -(D 111 OK?)
- B. CHECK +45 V -(R 124 OK?)
- C. CHECK +13,5 V - (V 105 OK?)
- D. REPLACE FM OR AM CARD.
- E. REPLACE TAPE CARD.
- F. REPLACE CONTROL CARD

FM DISTORTED OR NO
SOUND

- A. CHECK +13,5 V - (V 105 OK?)
- B. REPLACE FM CARD.
- C. REPLACE PHONO CARD.

PHONO DISTORTED OR
NO SOUND

- A. CHECK +11 V - (V 107 OK?)
- B. CHECK -11 V - (V 108 OK?)
- C. REPLACE PHONO CARD.

AUX, TAPE OR TAPE
MONITOR DISTORTED,
OR NO SOUND

- A. REPLACE PHONO CARD.
- B. REPLACE TAPE CARD.

LOW, HIGH, LOUD OR
LINEAR DO NOT WORK

- A. REPLACE TONE-CONTROL CARD
- B. REPLACE CONTROL CARD
- C. REPLACE FRONT CARD.

TABLE III

SYMPTOM

CHECK/ACTION

MONO DOES NOT
WORK RIGHT

- A. REPLACE PHONO CARD
- B. REPLACE CONTROL CARD
- C. REPLACE FRONT CARD.

FM MUTE DOES NOT
WORK

- A. REPLACE FM CARD.
- B. REPLACE CONTROL CARD
- C. REPLACE FRONT CARD.

VOLUME, BALANCE, BASS,
MIDRANGE, TREBLE AND/
OR TUNING DOES NOT WORK,
INDICATORS DO NOT
CHANGE

- A. REPLACE CONTROL CARD
- B. REPLACE FRONT CARD.

AS ABOVE, BUT
INDICATORS DO CHANGE

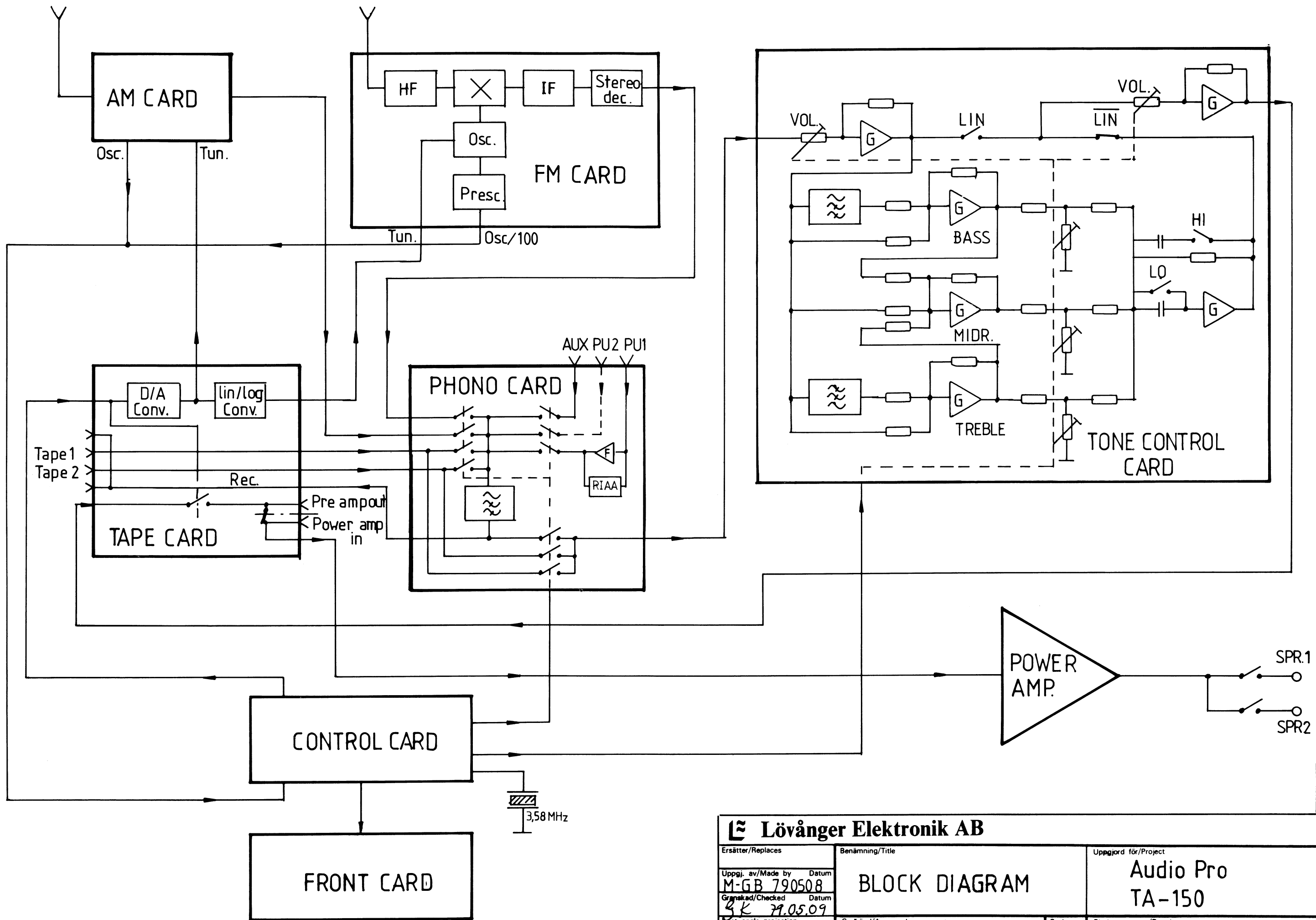
- A. REPLACE TONE-CONTROL CARD
- B. REPLACE CONTROL CARD

SOUND CHANGES WHEN
LINEAR OPERATED EVEN
THOUGH ALL TONE
CONTROLS ARE CENTERED
AND LOUDNESS IS OFF

- A. INITIALIZE COMPUTER BY PRESSING OFF -
FMI - AMI - MONO - MONITOR - MONITOR -
MONITOR.

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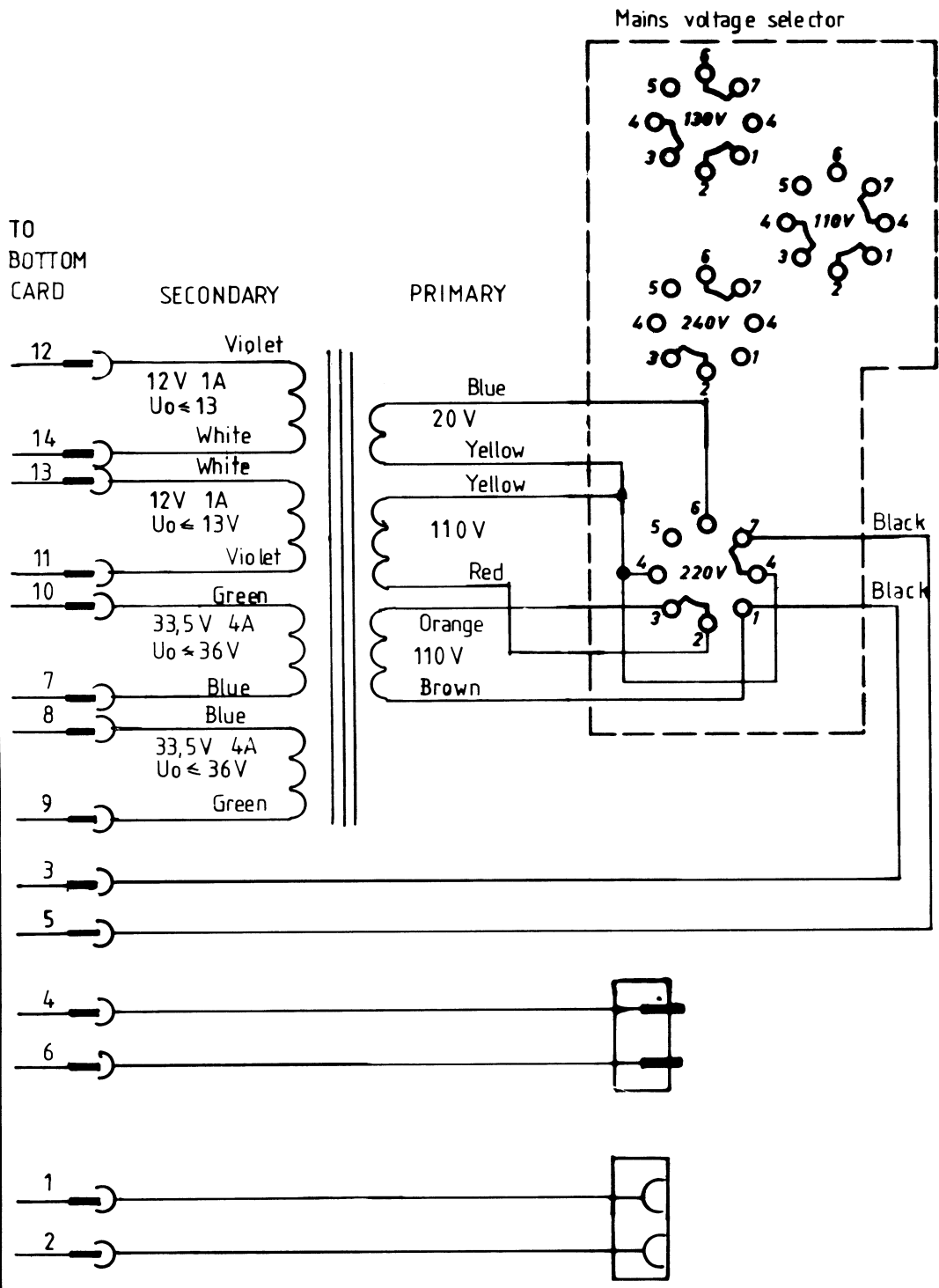
Lövånger Elektronik AB		
Ersätter/Replaces	Benämning/Title	Uppgjord för/Project
Uppgj. av/Made by	Datum	Audio Pro TA-150
M-GB 790508		
Granskad/Checked	Datum	Ritningsnummer/Drawing nr
SK 79.05.09		3-150150
1st angle projection	Godkänd/Approved	Scale
	79.05.09 <i>S. Westlander</i>	

I
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G
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KORR

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SEE ALSO 2-150101

I
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KORR

Lövänger Elektronik AB

Ersätter/Replaces	Benämning/Title POWER SUPPLY-CIRCUIT DIAGRAM	Uppgjord för/Project Audio Pro TA-150
Uppgj. av/Made by M-GB 781113	Datum 78.11.14	
Granskad/Checked G.K. 78.11.14	Datum 78.11.14	
1st angle projection 	Godkänd/Approved 78.11.14 G. Westlander	Scale 4-150050
		Ritningsnummer/Drawing nr 4-150050



Power amplifier
Left

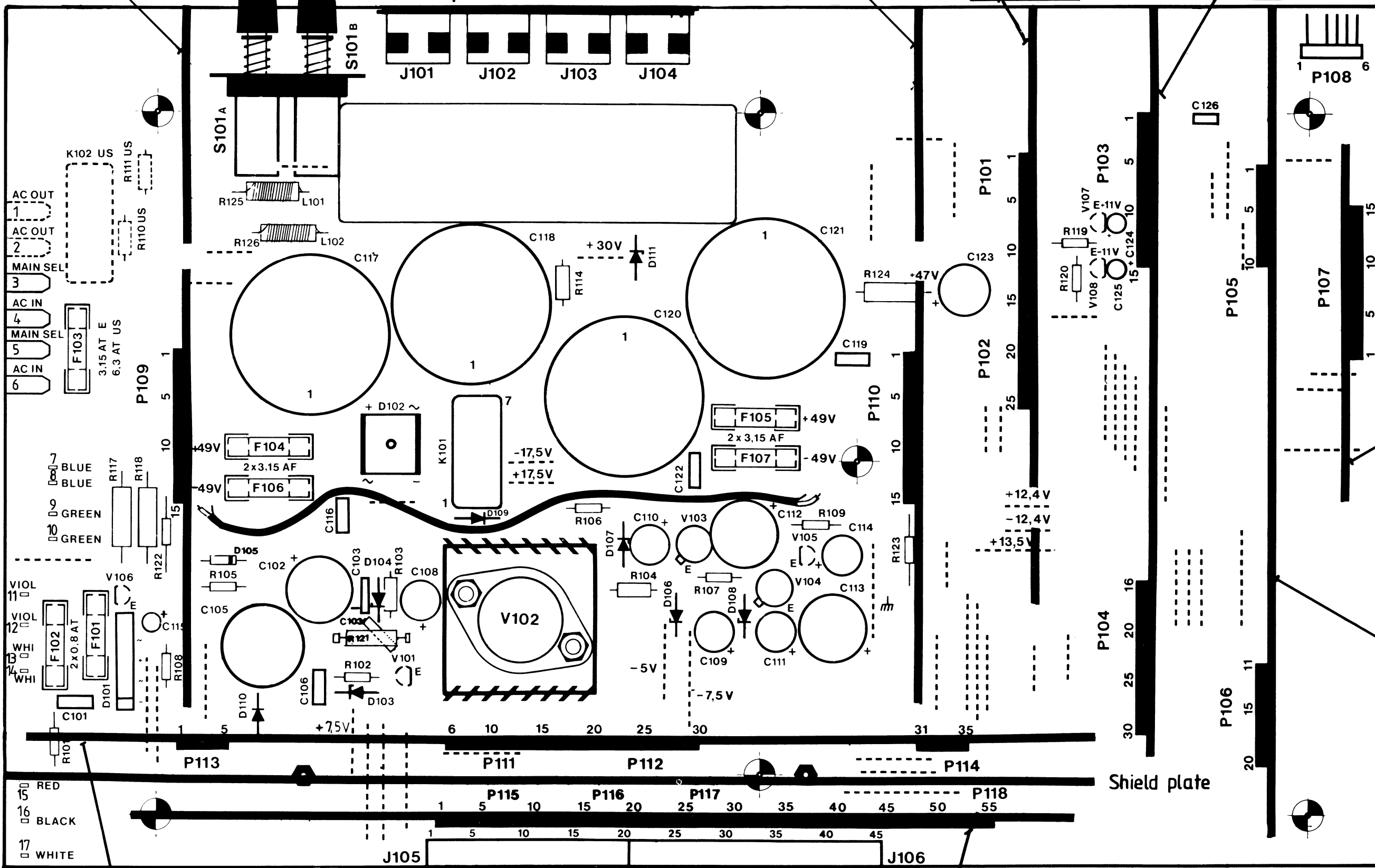
Speaker selector buttons

Speaker terminals

Power amplifier
Right

Tape card

Phono card



Tone-control card

Front card

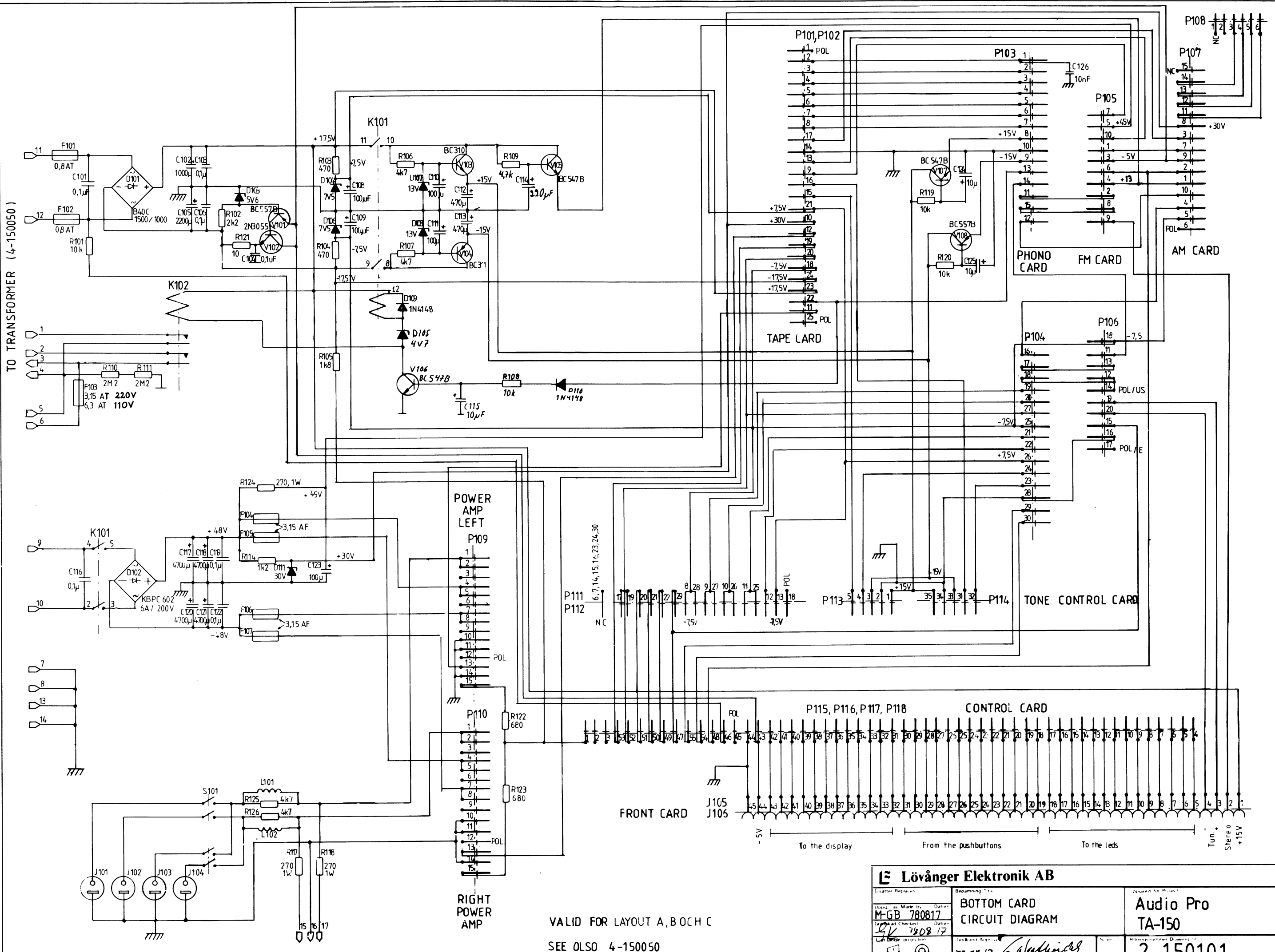
Control card

Shield plate

AM card

FM card

TO TRANSFORMER (4-150050)



VALID FOR LAYOUT A, B OCH C
SEE ALSO 4-150050

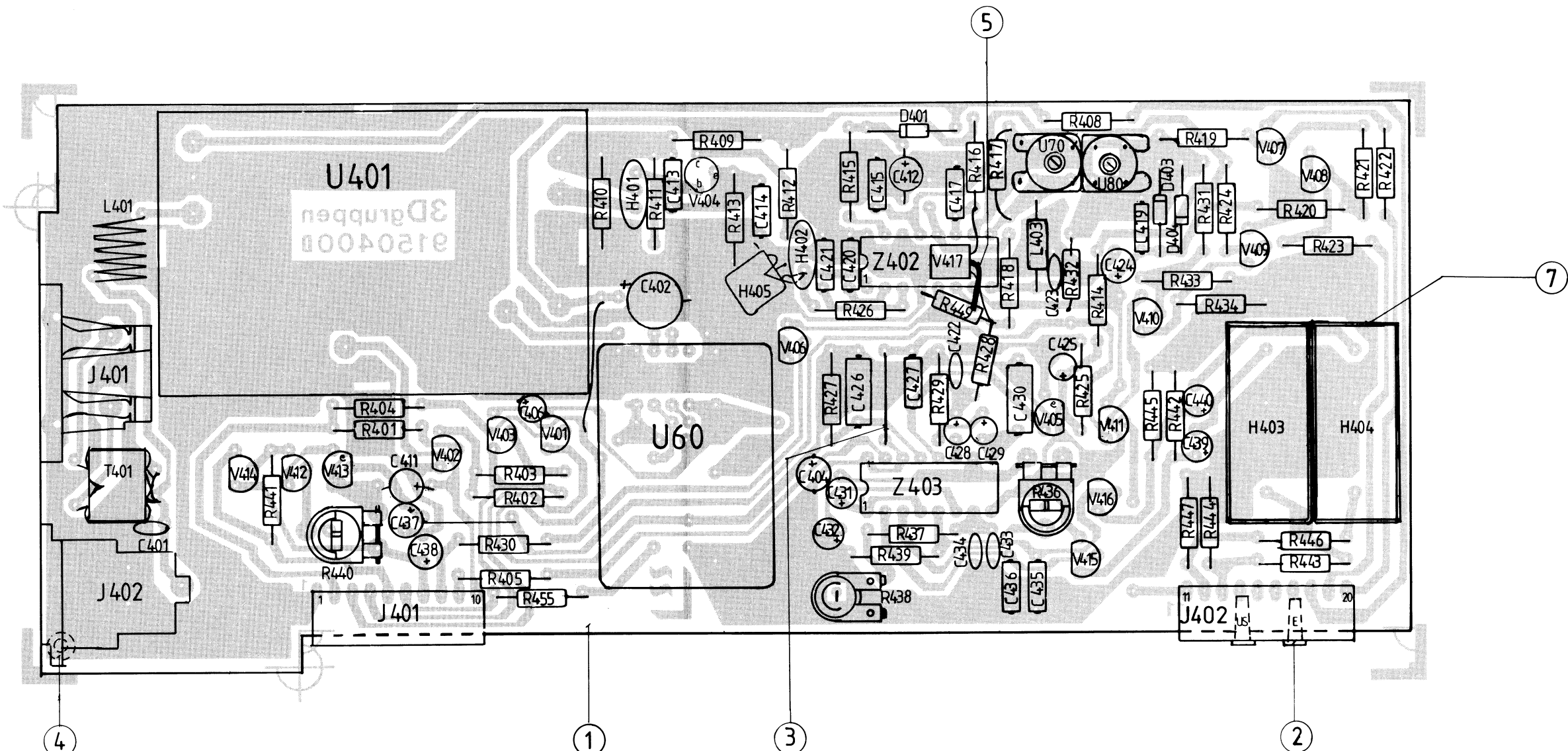
Lövånger Elektronik AB		Bearing No.	
Essäter Reparas		Bottom Card	
Drawing No. M-GB 780817		Circuit Diagram	
Checked Date 20 12 08 17		Audio Pro TA-150	
Task and Approval 78.08.17 G. Westinckel		2-150101	

KORR. A. REORAN Ag. B. R. 10.16 Ag. B. C. 98.10.01 Ag. B. U. 79.01.22 Ag. B. E. 79.03.02 Ag. B. 79.05.08 Ag. B. 79.05.23 Ag. B.

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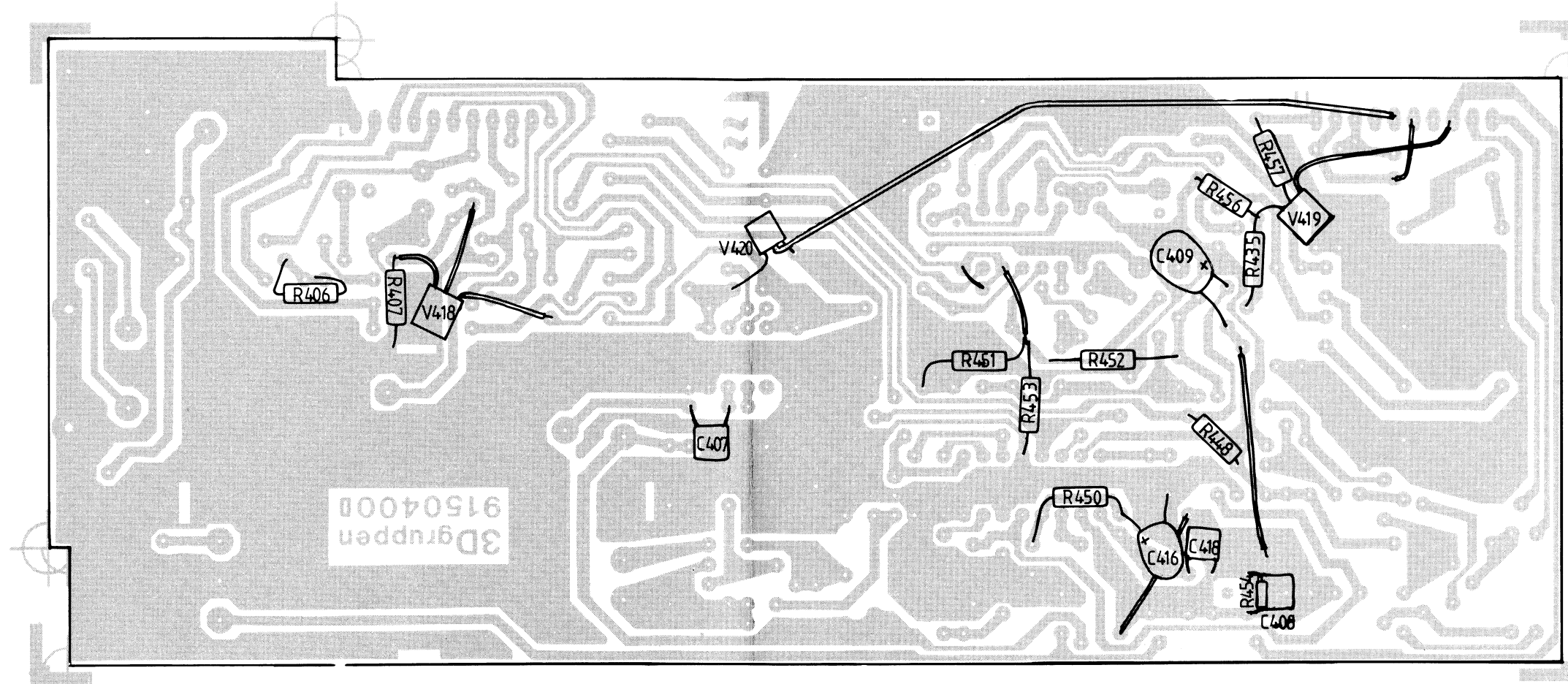
Lövänger Elektronik AB		
Ersätter/Replaces	Benämning/Title	Uppgjord för/Project
Uppgj. av/Made by M-GB 780829	FM CARD COMPONENT PLACEMENT	Audio Pro TA-150
Granskad/Checked SK 78.09.11	Godkänd/Approved 780911 Göran Wählén	Ritningsnummer/Drawing nr 2-150400 1(2)
1st angle projection	Scale 2:1	

KORR A 780829 1/2 B 780922 1/2 C 781005 1/2 D 781101 1/2 E 790117 1/2 F 790212 1/2 G 790306 1/2 H

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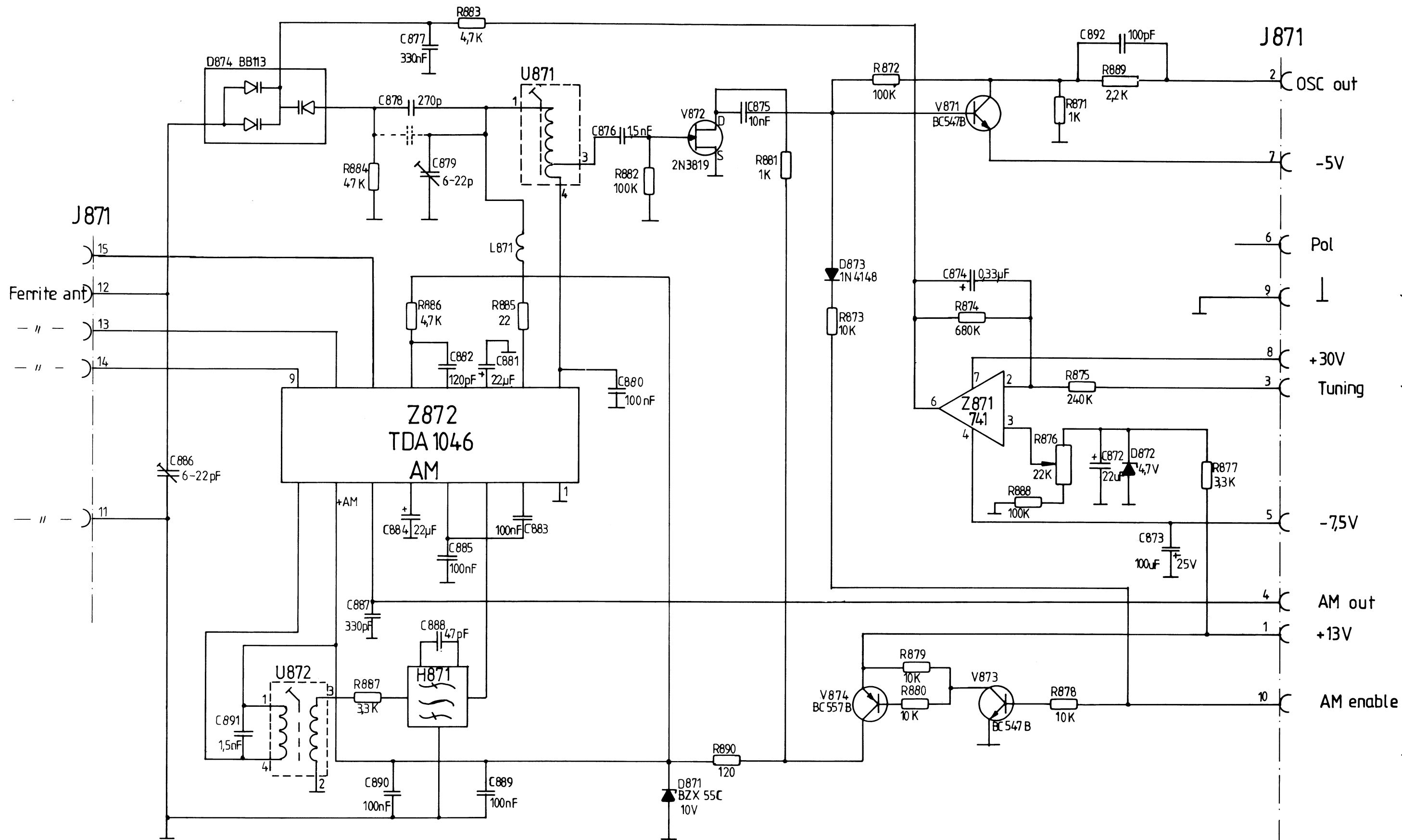


Lövånger Elektronik AB			
Erätter/Replaces	Benämning/Title	Uppgjord för/Project	
Uppgj. av/Made by	Datum	FM CARD, BOTTOM VIEW	Audio Pro
M-GB 790509		COMPONENT PLACEMENT	TA-150
Granskad/Checked	Datum		
K 79.05.11			
Skildring/Projection	Godkänd/Approved	Scale	Ritningsnummer/Drawing nr
1st angle projection	79.05.11 G. Westhüdes	2:1	2-150400 2(2)

KORR A790523 H6 B C D E F G H I J

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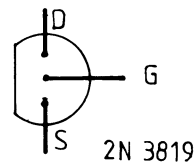


Trimpoints AM

C886 Tuning input stage max signal

C879 Tuning bandwidth 520-1640

U872 Tuning IF max signal



Bottom view

VALID FOR LAYOUT A AND B

Lövånger Elektronik AB

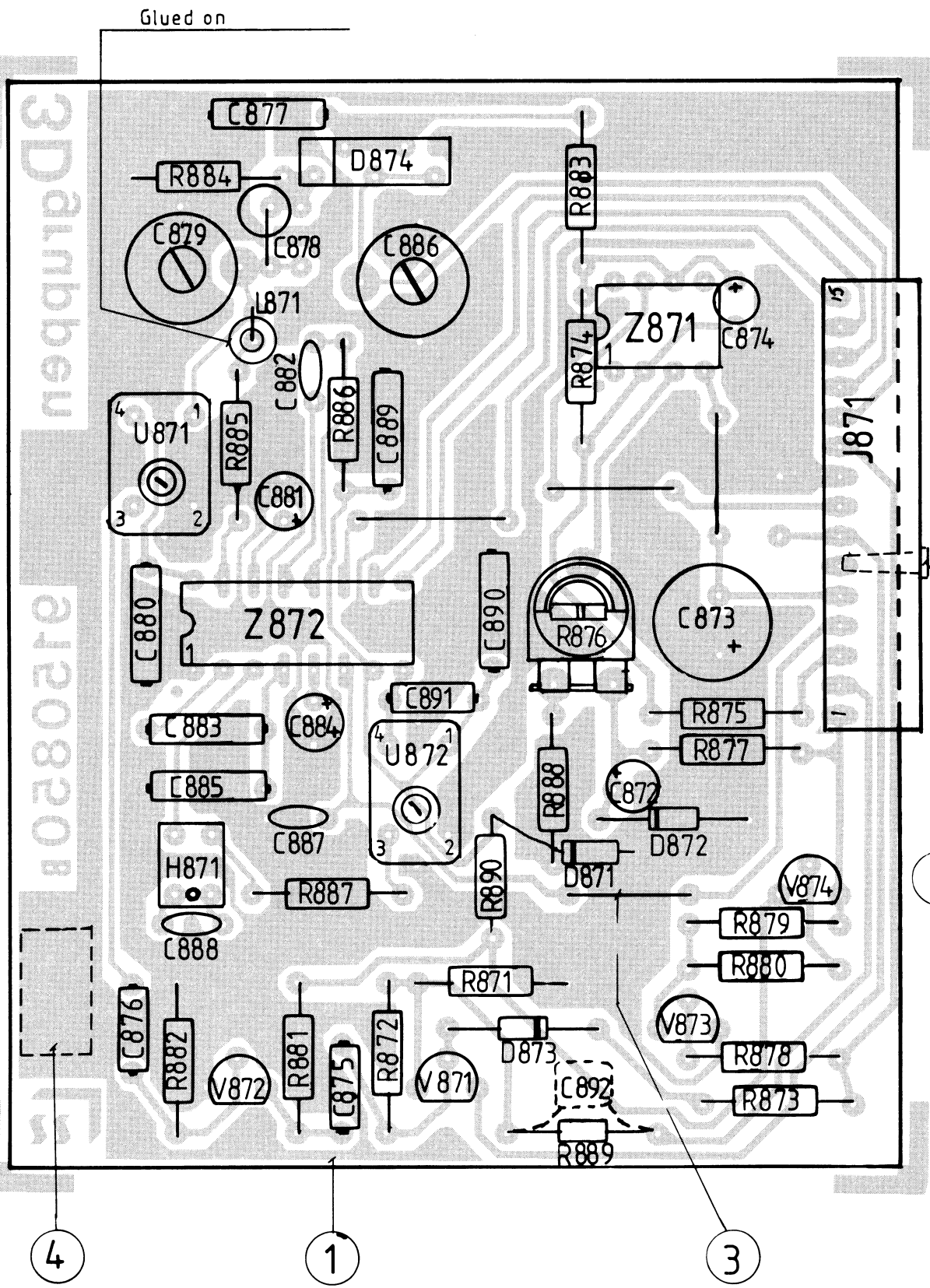
Ersätter/Replaces	Benämning/Title	Uppgjord för/Project
Uppgj. av/Made by M+GL 780830	AM CARD CIRCUIT DIAGRAM	Audio Pro TA-150
Granskad/Checked SK 780830	Godkänd/Approved 78.09.05 G. Westhede	Ritningsnummer/Drawing nr 3-150851
1st angle projection	Scale	

KORR A 78.09.11 1160851 B 78.09.22 1160851 C 78.10.10 1160851 D 78.10.16 1160851 E 78.11.19 1160851 F 79.01.22 1160851 G 79.04.03 1160851 H 79.04.25 1160851 I

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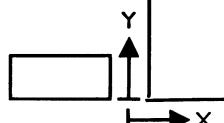
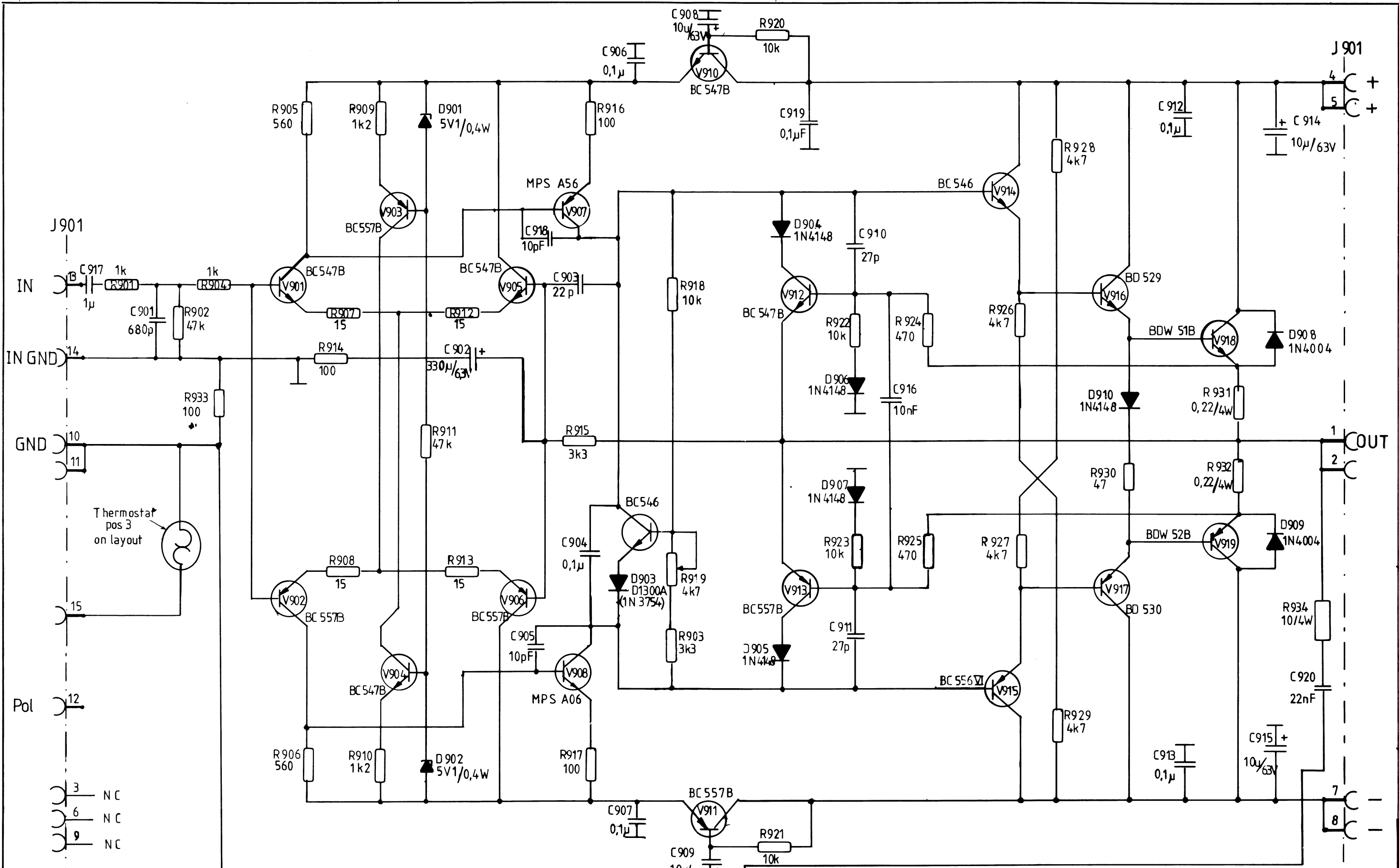
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KORR A 77.09.11 kgB B 78.10.16 kg6 C 78.11.02 kg6 D 79.01.22 kg6 E 79.07.03 kg6 F 79.04.25 kg6 G H I

Lövänger Elektronik AB

Ersätter/Replaces		Benämning/Title		Uppgjord för/Project	
Uppgj. av/Made by M-GB 780830		AM CARD, TOP VIEW		Audio Pro	
Datum		COMPONENT PLACEMENT		TA-150	
Granskad/Checked SK 78.08.30		Godkänd/Approved 78.09.05 S. Westlander		Scale 2:1	
1 st angle projection		Ritningsnummer/Drawing nr 4-150850			



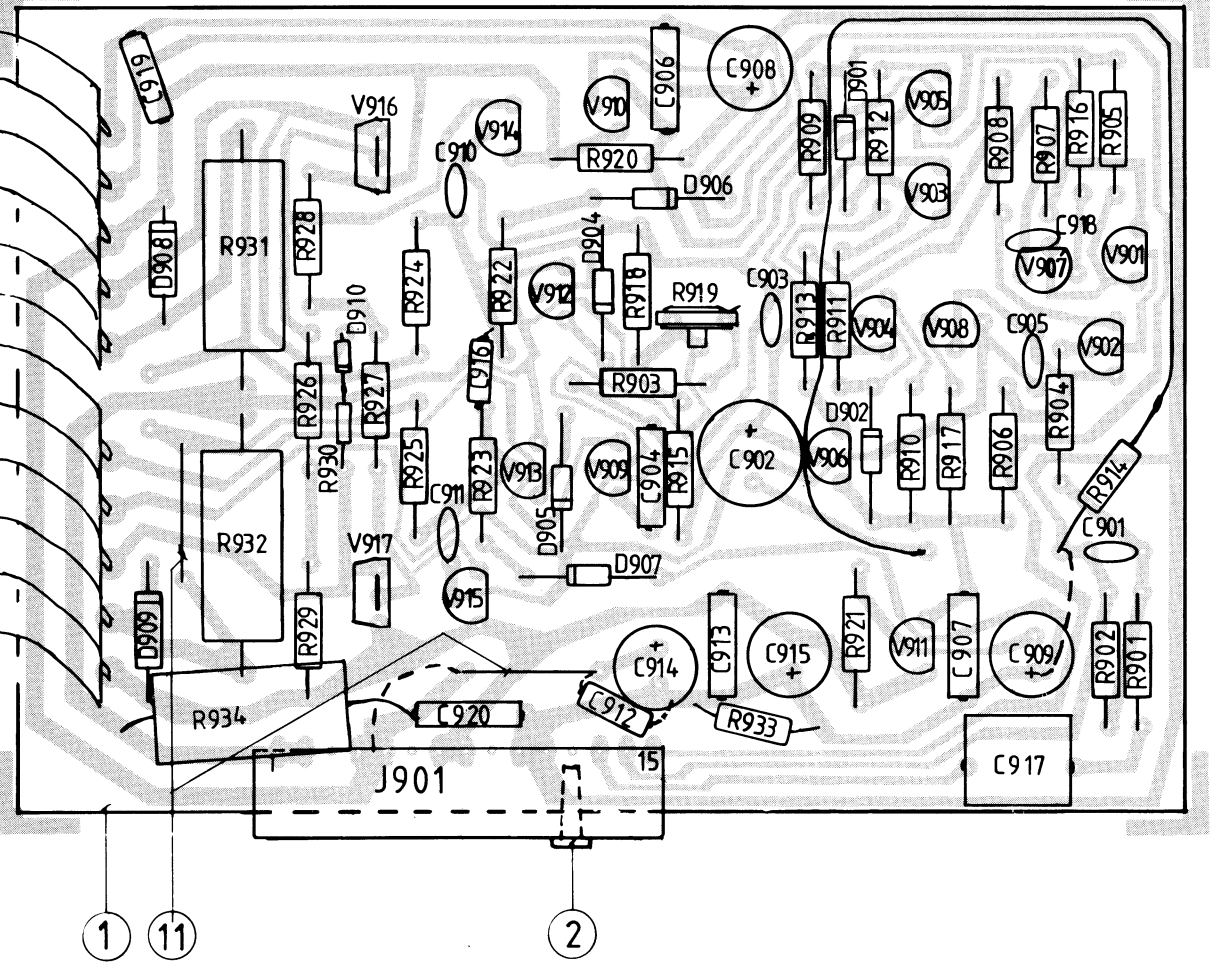
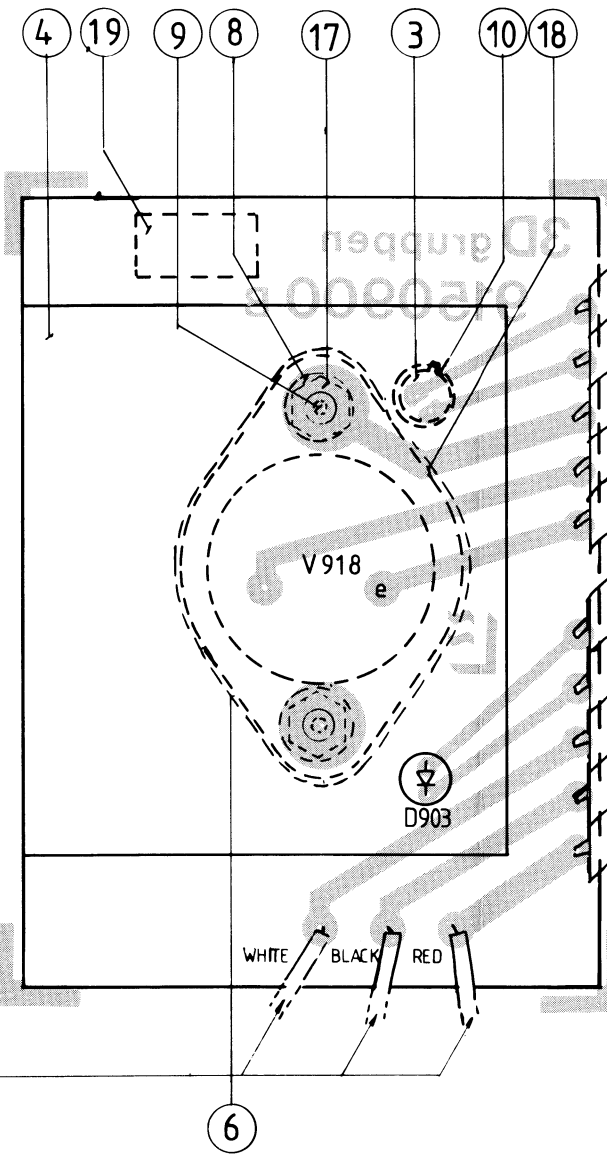
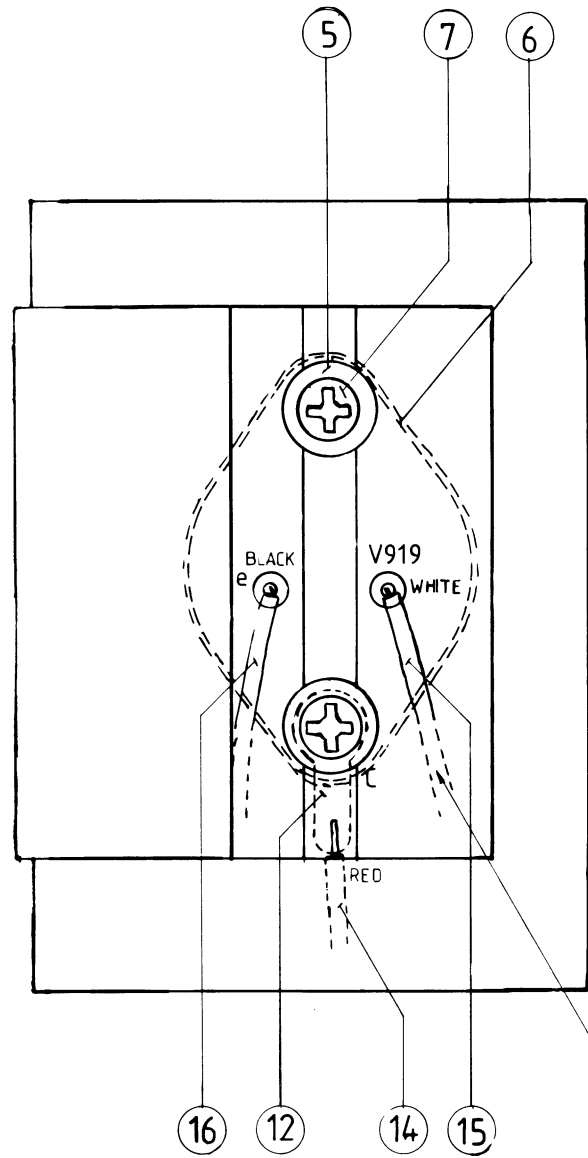
Lövånger Elektronik AB		
Ersätter/Replaces	Benämning/Title	Uppgjord för/Project
Uppgj. av/Made by M:GL 780606	Datum 78.08.04	POWER AMPLIFIER, CIRCUIT DIAGRAM
Granskad/Checked M:GL 7808.04	Datum 78.08.04	EFFEKTFÖRSTÄRKARKORT, KRETSCHEMA
1:1 angle projection	Godkänd/Approved 78.08.04 <i>W. W. W.</i>	Scale
		Ritningsnummer/Drawing nr 3-150901

KORR A 78.08.03 leg B 79.01.18 leg C 79.02.20 leg D
 H
 G
 F
 E

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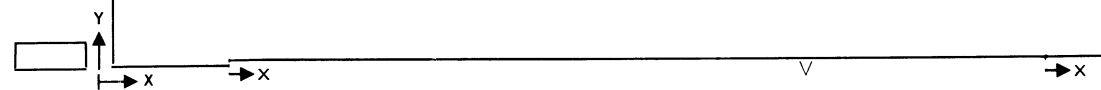
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WIRES TWISTED

Lövånger Elektronik AB			
Ersätter/Replaces	Benämning/Title	Uppgjord för/Project	
Uppgj. av Made by M-GB 780811	POWER AMPLIFIER, TOP VIEW	Audio Pro	
Granskad/Checked S.K 7808.17	COMPONENT PLACEMENT	TA-150	
1st angle projection	Godkänd/Approved 78.08.17 <i>[Signature]</i>	Scale 2:1	Ritningsnummer/Drawing nr 2-150900



KORR A 78074 60 B 780731 66 C 19.01.18 66 D 78.02.20 66 E 78.03.14 66 F G H I

