

Service
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Service Manual



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Version 1.4



PHILIPS

REPAIR POLICY OF PCBS

VERSION VARIATIONS:

Type /Versions:		MC145									
Board in used:	Service policy	/05	/12	/37	/55	/61	/78	/79	/85	/93	/98
DISPLAY BOARD		C			C	C					
MAIN BOARD (COMBI BOARD)		C			C	C					
DISPLAY BOARD		C			C	C					
Type /Versions:		MC145									
Features	Feature diffrence	/05	/12	/37	/55	/61	/78	/79	/85	/93	/98

* TIPS : C -- Component Lever Repair.
 M -- Module Lever Repair
 √ -- Used

SPECIFICATIONS

GENERAL:

Mains voltage	/37 : 120V
	/55/85/98 : 110 / 220V switchable
	/12/61/79/93 : 220 – 240V
Mains frequency	: 50/60 Hz
Power consumption	: < 20W max.
	< 3W at standby
Dimension center unit	: 168 x 224.5 x 214.5 mm
Dimension speaker	: 130 x 224.5 x 213 mm

TUNER:

FM

Tuning range	: 87.5 - 108 MHz
IF Frequency	: 10.7 MHz \pm 20kHz
Sensitivity at 26sb S/N	: < 18 μ V
Selectivity at 600 kHz	
Bandwidth	: > 45 dB
IF rejection	: > 50 dB
Image rejection	: > 20 dB
Distortion	: < 2%
Crosstalk	: > 20 dB

MW

Tuning range	/37/55 : 530 -1700 kHz (10 kHz grid)
	others : 531 -1602 kHz (9 kHz grid)
Grid	: 9/10 kHz
IF Frequency	: 450 kHz \pm 3kHz
Aerial input	: Inner bar antenna
Sensitivity at 26sb S/N	: < 4.4 mV/M
Selectivity at 18 kHz	
Bandwidth	: > 18 dB
IF rejection	: > 45 dB
Image rejection	: > 30 dB
Distortion	: < 5%

AMPLIFIER:

Output power	: 2 x 2 W RMS
Speaker impedance	: 8 ohm
Frequency response	
Within \pm 3dB	: 60Hz – 16 kHz
Bass Boost ON	: 6dB \pm 3dB at 120Hz
Headphone output	: 32 mW \pm 2dB at 32 Ω

CASSETTE RECORDER:

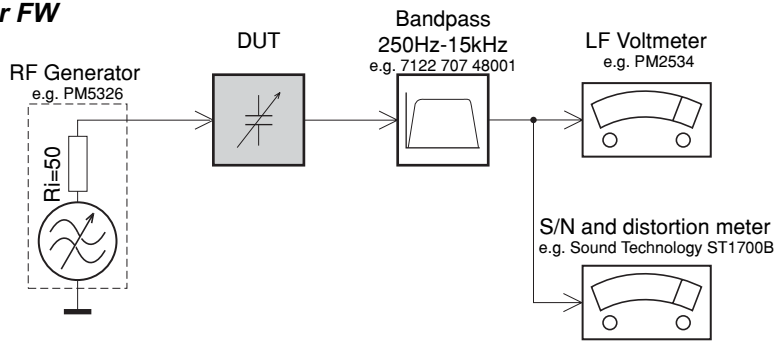
Number of tracks	: 2 x 2 stereo
Tape speed	: 4.76 cm/sec +2.5/-1.5%
Wow and flutter	: < 0.35% DIN
Fast-wind/rewind time	: < 130 sec. With C-60
Bias frequency	: 75 \pm 10 kHz
Frequency response (PB)	
	: 125 – 8 kHz (8 dB)
Signal to noise ratio	: > 35 dB with type 1 tape

COMPACT DISC:

No. of programming track	: 20
Frequency response	
Within \pm 3 dB	: 63 Hz – 16 kHz
Signal/Noise ratio	: 50 dB/A-weighted
Distortion at 1 kHz	: < 3%
Channel separation	
at 1 kHz	: > 25 dB

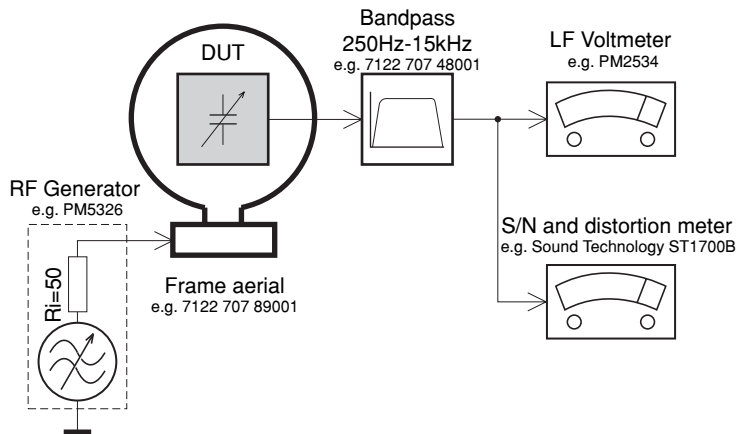
SERVICE MEASUREMENT

Tuner FW



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilotone (19kHz, 38kHz).

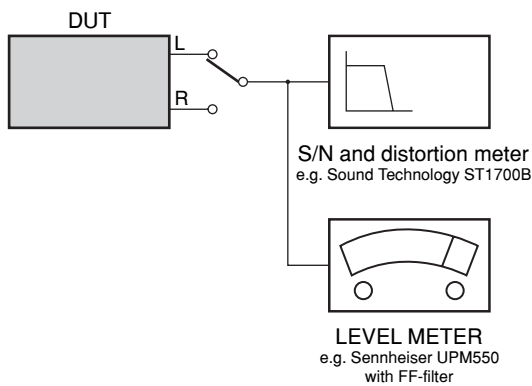
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday cage. Use a bandpass filter (or at least a high pass filter with 250kHz) to eliminate hum (50Hz, 100Hz).

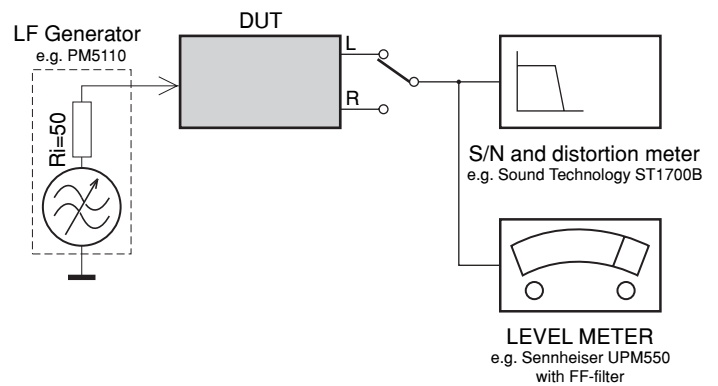
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



RECORDER

Use Universal Test Cassette Fe SBC420 4822 397 30071



ALIGNMENT INSTRUCTION

AM I.F. ALIGNMENT

1. Set the POWER BUTTON to POWER "ON".
2. Set the FUNCTION SELECTOR SWITCH to RADIO & AM BAND.
3. Connect a SWEEPSCOPE OUTPUT to AM antenna terminal.
4. Connect a SWEEPSCOPE INPUT to pin 13 of IC1 through a 1uf capacitor and ground.

STEP	SET SIGNAL	SET DIAL	ADJUST	ADJUST FOR
1	450KHz	GANG OPEN	T1(AM IF)	CENTER & MAXIMUM OUTPUT

AM R.F. ALIGNMENT

1. Connect an RF generator to a standard radiating loop.
2. Connect a SCOPE and VTVM across the speaker output.

STEP	SET SIGNAL	SET DIAL	ADJUST	ADJUST FOR
1	530KHz	GANG CLOSED	T2 (AM OSC COIL)	MAXIMUM OUTPUT
2	1700KHz	GANG OPEN	CT1	
3	612KHz	612KHz	(AM SENS COIL)	
4	1404KHz	1404KHz	CT3 (AM SENS TRIM.)	
5	REPEAT STEPS 3 AND 4 TO OBTAIN BEST TRACKING.			

FM I.F. ALIGNMENT

1. Set the POWER SWITCH to POWER "ON".
2. Set the FUNCTION SELECTOR to RADIO & FM BAND.
3. Connect a SWEEPSCOPE OUTPUT to pin5 of IC001 through a 20pF capacitor and ground.
4. Connect a SWEEPSCOPE INPUT to pin16 or 17 of IC001 through a 1uf capacitor and ground.

STEP	SET SIGNAL	SET DIAL	ADJUST	ADJUST FOR
1	10.7MHz	GANG OPEN	CHECK	MAX.AMPLITUDE BALANCED CURVE

FM R.F. ALIGNMENT

1. Connect an RF generator to the FM antenna terminal and ground.
2. Connect a SCOPE & VTVM across the speaker output.

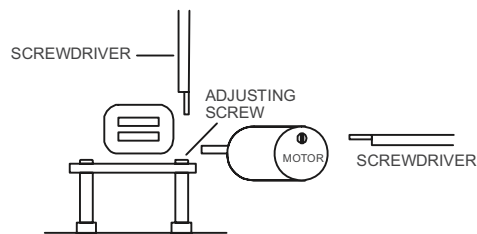
STEP	SET SIGNAL	SET DIAL	ADJUST	ADJUST FOR
1	87.5MHz	GANG CLOSED	L3 (FM OSC COIL)	MAXIMUM OUTPUT
2	108MHz	GANG OPEN	CHECK	
3	90MHz	90MHz	L4 (FM RF COIL)	
4	106MHz	106MHz	CT2	
5	REPEAT STEPS 3 AND 4 TO OBTAIN MAX ADJUST.			

CASSETTE ALIGNMENT

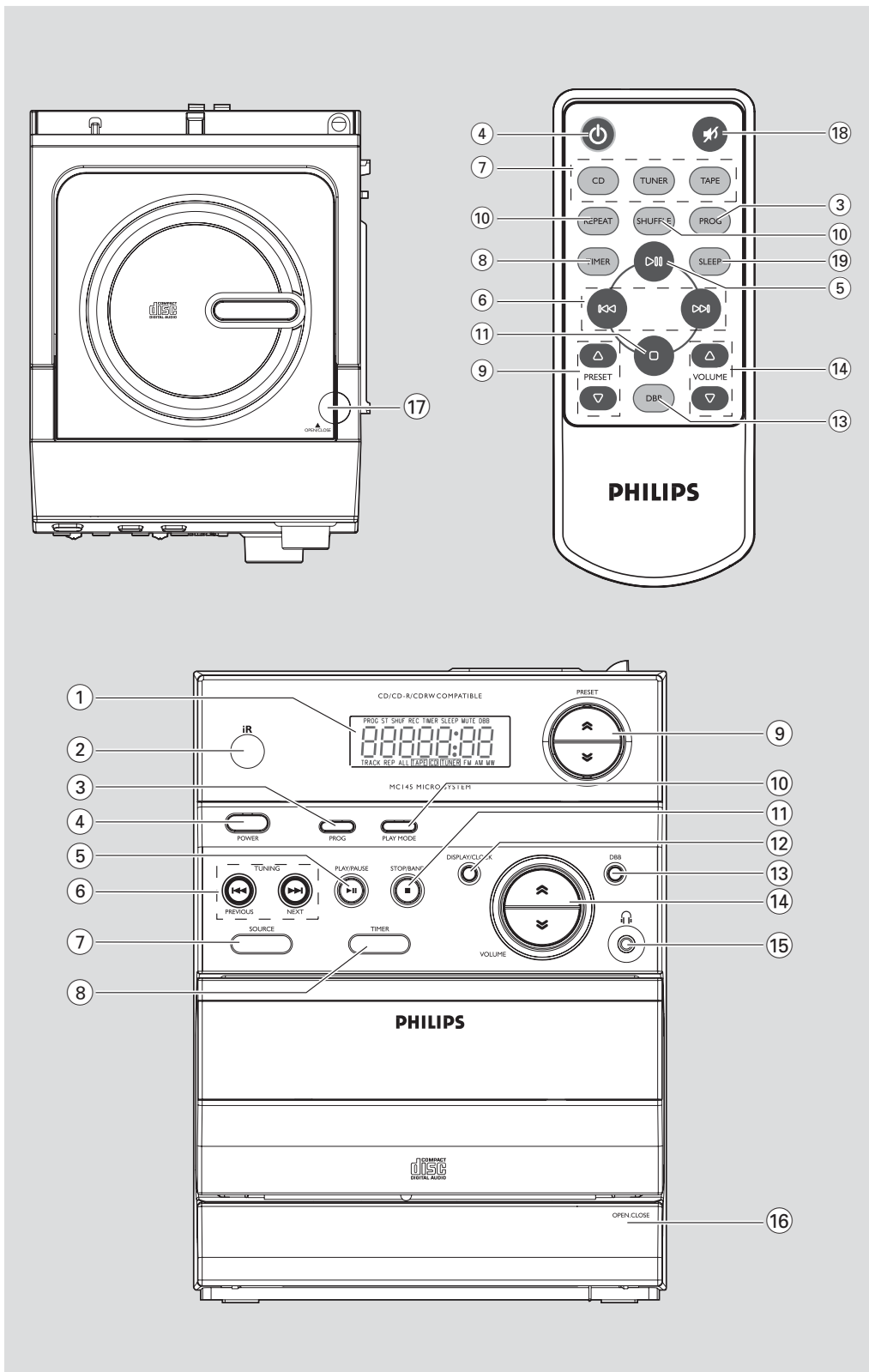
1. Set the FUNCTION SELECTOR BUTTON TO TAPE.
2. Connect a Scope & VTVM across the speaker output.
3. Insert the 8KHz tape in to cassette deck and push play BUTTON.
4. ADJUST HEAD for speaker maximum output.

CD ALIGNMENT

Auto alignment.



CONNECTION AND CONTROLS



CONNECTION AND CONTROLS

Controls (illustrations on page 3)

Controls on the system and remote control

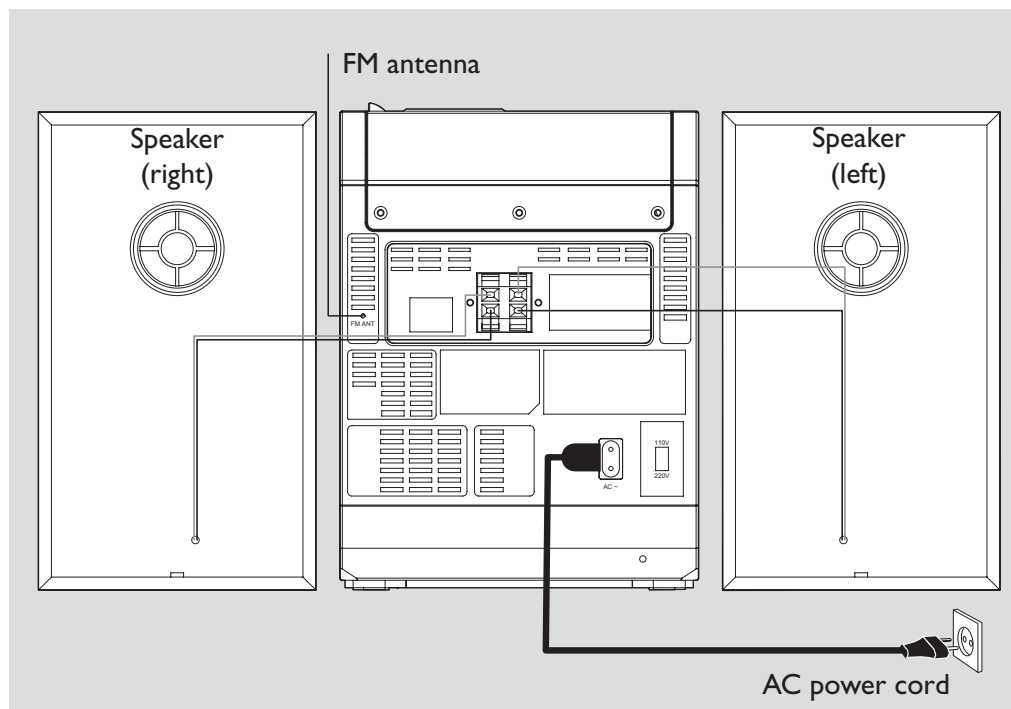
- ① **LCD Display**
 - shows the status of the system.
- ② **IR SENSOR**
 - infrared sensor for remote control.
- ③ **PROG**
 - for CD programs tracks and reviews the program.
 - for Tuner programs tuner stations manually or automatically.
- ④ **POWER / ⏻**
 - switches the system to standby/on.
- ⑤ **PLAY/PAUSE ▶||**
 - for CD starts or pauses CD playback.
- ⑥ **TUNING, PREVIOUS/NEXT (◀◀ / ▶▶)**
 - for CD skips to the beginning of a current track/previous/ next track.
 - fast searches back and forward within a track/CD.
 - for Tuner tunes to radio stations.
 - for clock/timer .. adjusts the hours and minutes for clock / timer functions
- ⑦ **SOURCE (CD/TUNER/TAPE)**
 - switches on the system.
 - selects the respective sound source for CD/TUNER / TAPE.
- ⑧ **TIMER**
 - activates/deactivates or sets the timer function.
- ⑨ **PRESET ⤴ / ⤵ (Δ / ▽ on remote control)**
 - for Tuner selects a preset radio station.
- ⑩ **PLAYMODE (REPEAT / SHUFFLE)**
 - repeats a track/CD program/ entire CD.
 - plays CD tracks in random order.
- ⑪ **STOP/BAND ■**
 - for CD stops CD playback or erase a CD program.
 - for Tuner (on the set only) selects waveband.
- ⑫ **DISPLAY/CLOCK**
 - for CD display CD remaining time.
 - at standby sets the clock function.
- ⑬ **DBB (Dynamic Bass Boost)**
 - enhances the bass.
- ⑭ **VOLUME ⤴ / ⤵ (Δ / ▽ on remote control)**
 - adjusts volume level.
- ⑮ **🎧**
 - connect headphones.
- ⑯ **Tape Deck Operation**
 - OPEN•CLOSE** ..Opens the tape key cover.
 - RECORD ●** starts recording.
 - PLAY ▶** starts playback.
 - ◀◀ / ▶▶** fast rewinds/forwards the tape.
 - STOP•OPEN** ... stops the tape; opens the tape compartment.
 - PAUSE** pauses recording or playback.
- ⑰ **OPEN•CLOSE**
 - opens/closes the CD door.
- ⑱ **MUTE 🔊**
 - switches playback sound off and on.
- ⑲ **SLEEP**
 - activates/deactivates or selects the sleeper time.

Notes for remote control:

- **First select the source you wish to control by pressing one of the source select keys on the remote control (for example CD , TUNER).**
- **Then select the desired function (for example ▶ , ◀ , ▶|).**

CONNECTION AND CONTROLS

Preparations



Rear connections

The type plate is located at the back of the system.

(A) Power

- Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.
- If your system is equipped with a Voltage Selector; set the VOLTAGE SELECTOR to the local power line voltage.

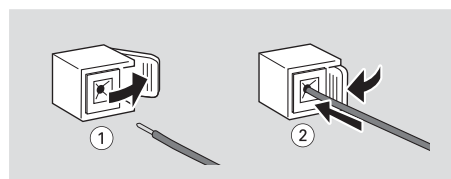
WARNING!

- **For optimal performance, use only the original power cable.**
- **Never make or change any connections with the power switched on.**

(B) Speakers Connection

Front Speakers

Connect the speaker wires to the SPEAKERS terminals, right speaker to "IGHT" and left speaker to "LEFT", coloured (marked) wire to "+" and black (unmarked) wire to "-".



- Fully insert the stripped portion of the speaker wire into the terminal as shown.

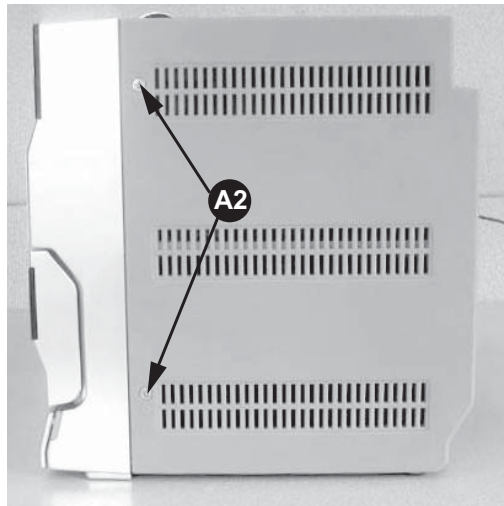
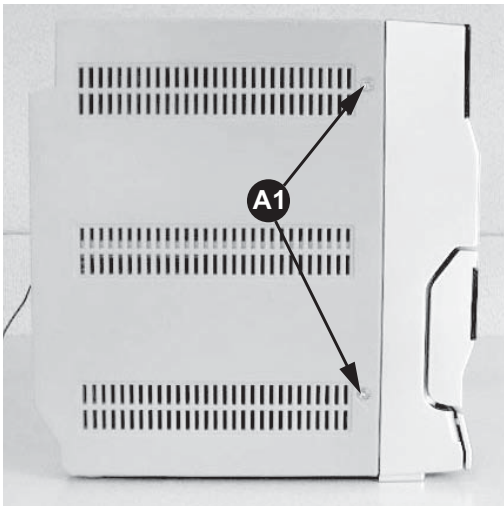
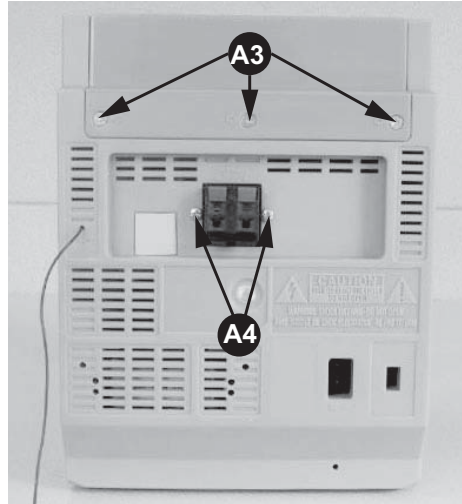
Notes:

- For optimal sound performance, use the supplied speakers.
- Do not connect more than one speaker to any one pair of + / - speaker terminals.
- Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.

DISASSEMBLY INSTRUCTION

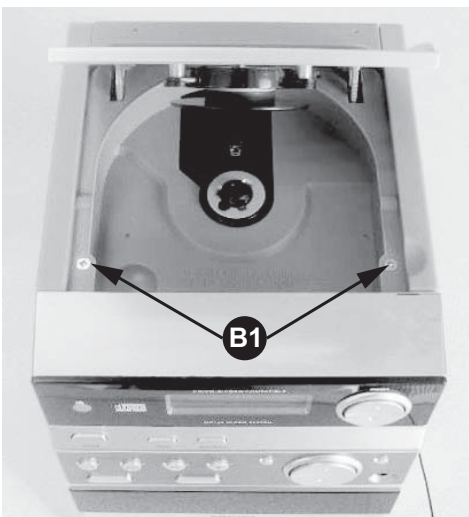
A. Remove Top Cabinet

- A1: Remove screws T3x8 (2 pcs)
- A2: Remove screws T3x8 (2 pcs)
- A3: Remove screws T3x10 (2 pcs)
- A4: Remove screws T3x10 (2 pcs)



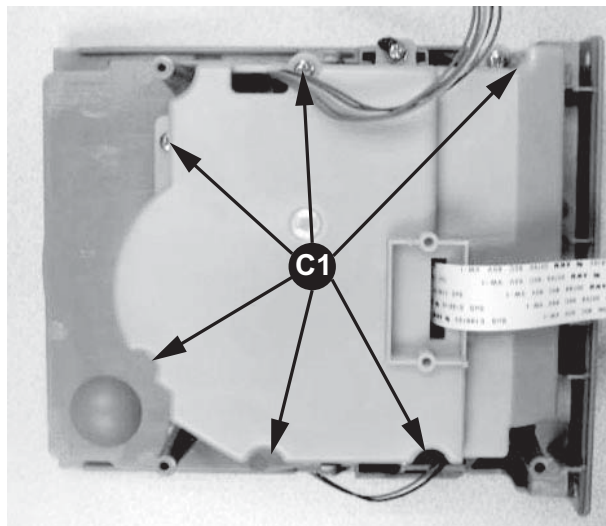
B. Remove CD Module

- B1: Remove screws T3x10 (2 pcs)



C. Remove CD Module Cover

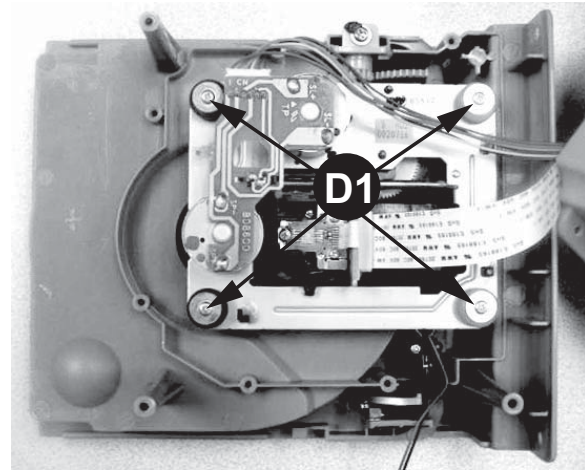
- C1: Remove screws T3x10 (6 pcs)



DISASSEMBLY INSTRUCTION

D. Remove CDM

D: Remove special screws (4 pcs)



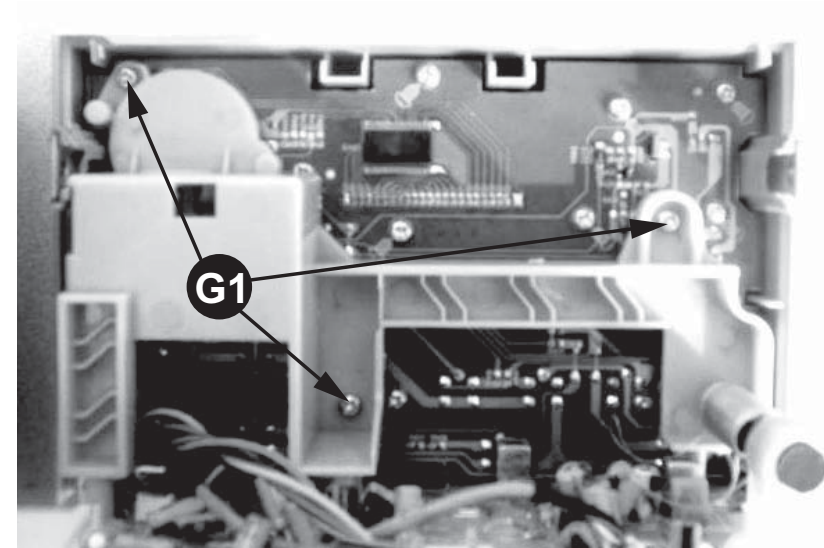
E. Remove Back Cabinet

E1: Remove screws T3x8 (2 pcs)



G. Remove PCB Bracket

G1: Remove screws T3x8 (3 pcs)

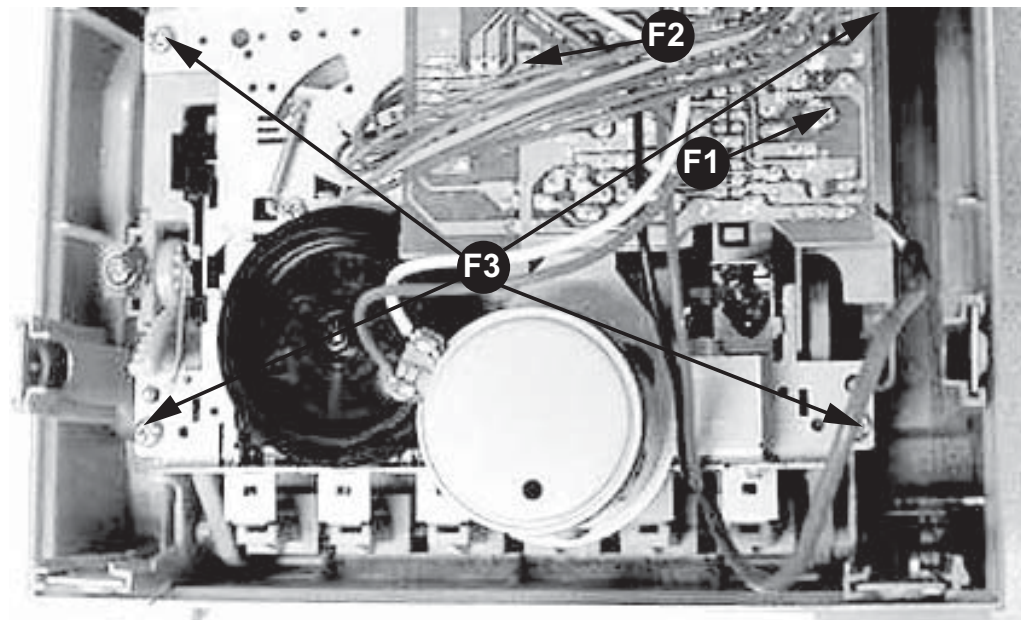


F. Remove Cassette Board Assy and Tape Deck

F1: Remove screw T3x8 (1 pc)

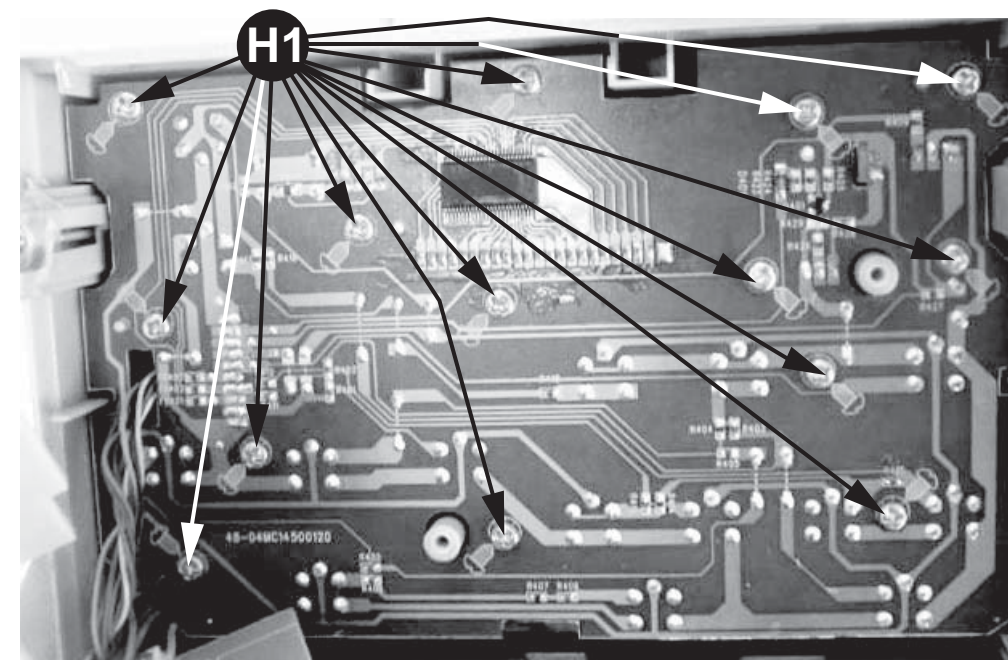
F2: Remove screw M3x6 (1 pc)

F3: Remove screws T3x10 (4 pcs)

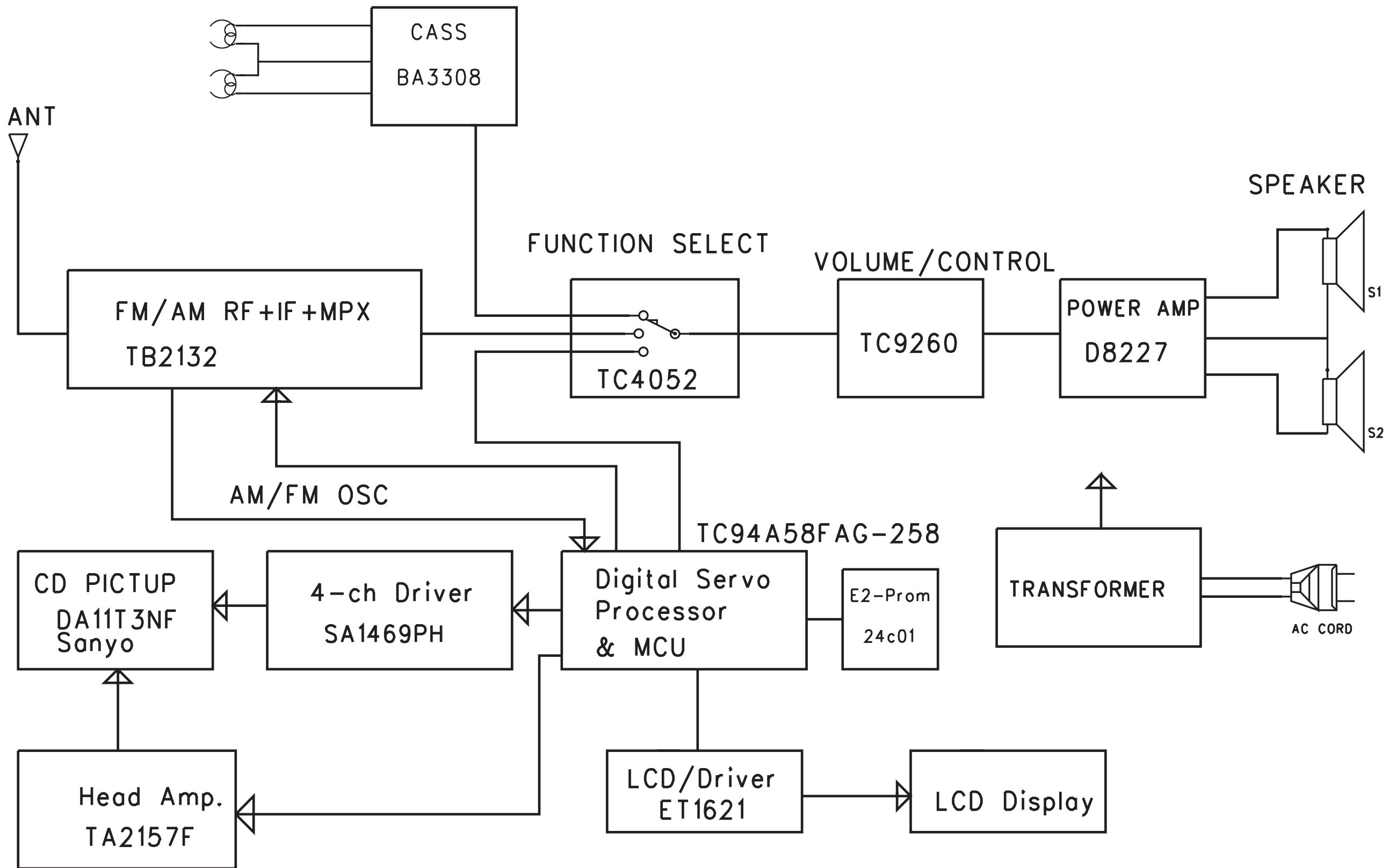


H. Remove Front PCB Assembly

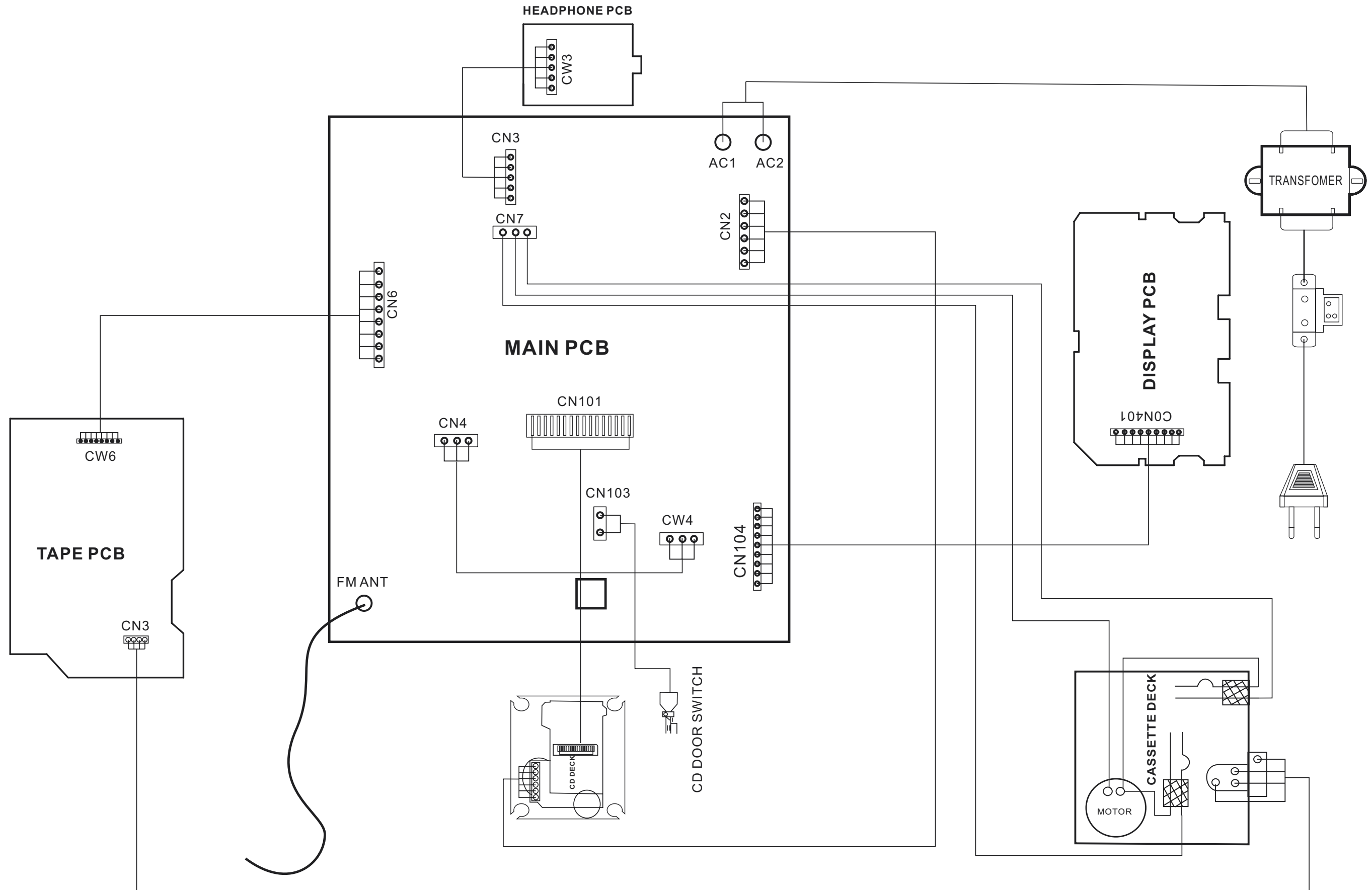
H1: Remove screws T3x8 (14 pcs)



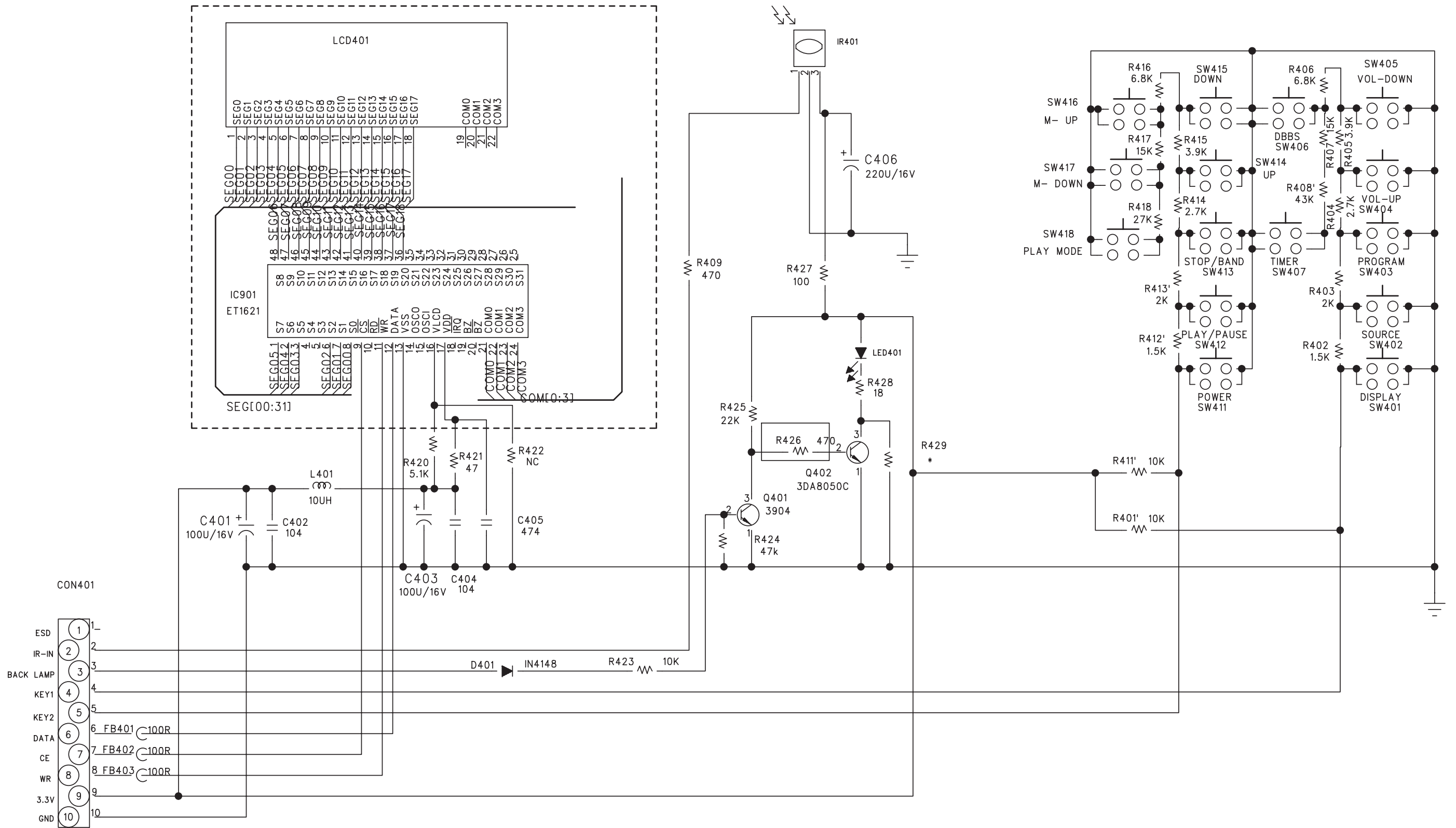
SET BLOCK DIAGRAM



SET WIRING DIAGRAM

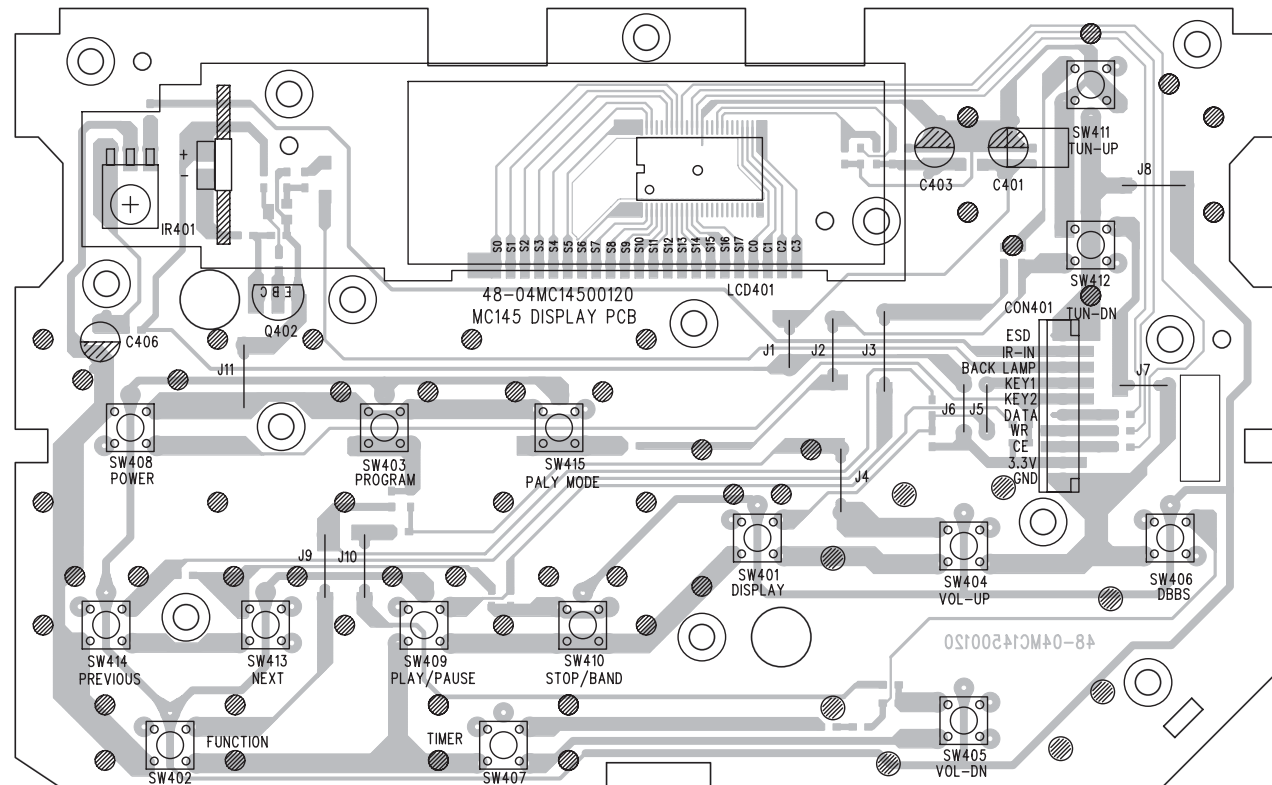


CIRCUIT DIAGRAM - DISPLAY BOARD

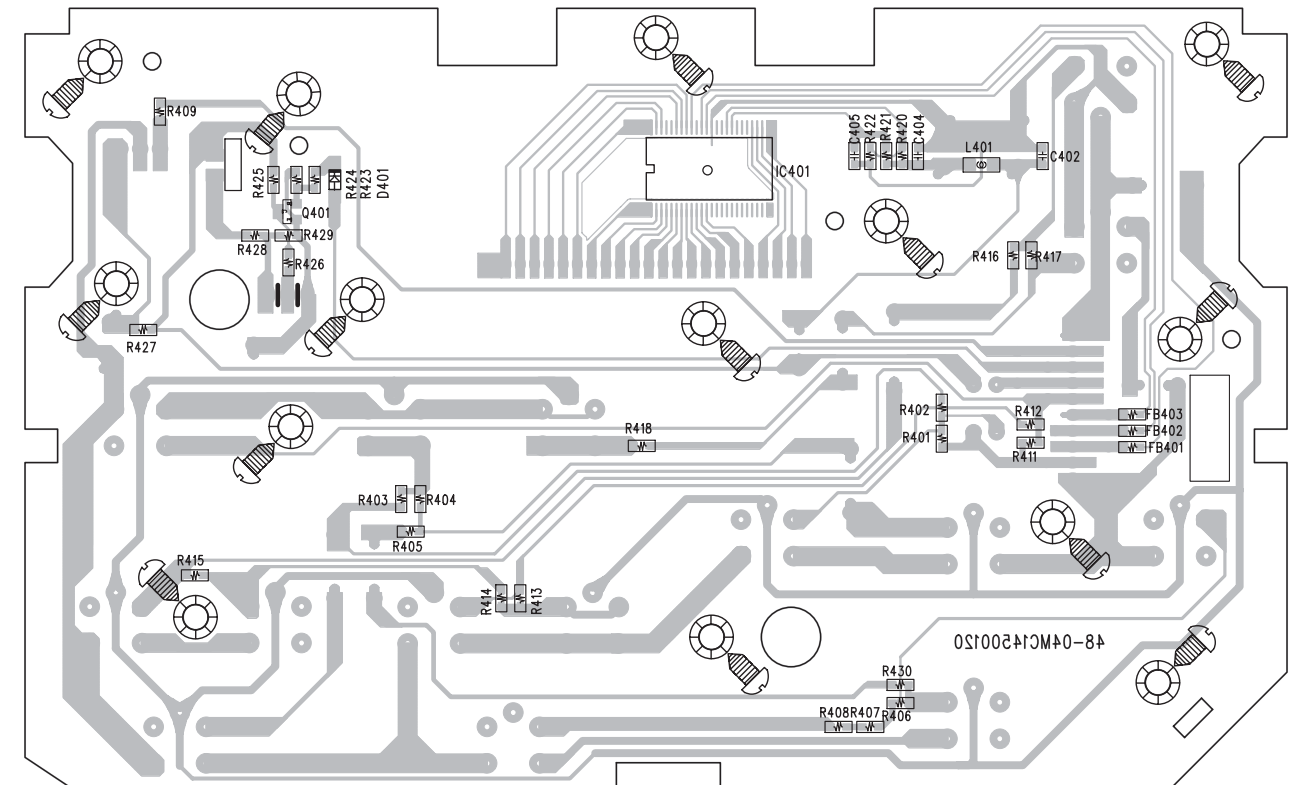


LAYOUT DIAGRAM - DISPLAY BOARD

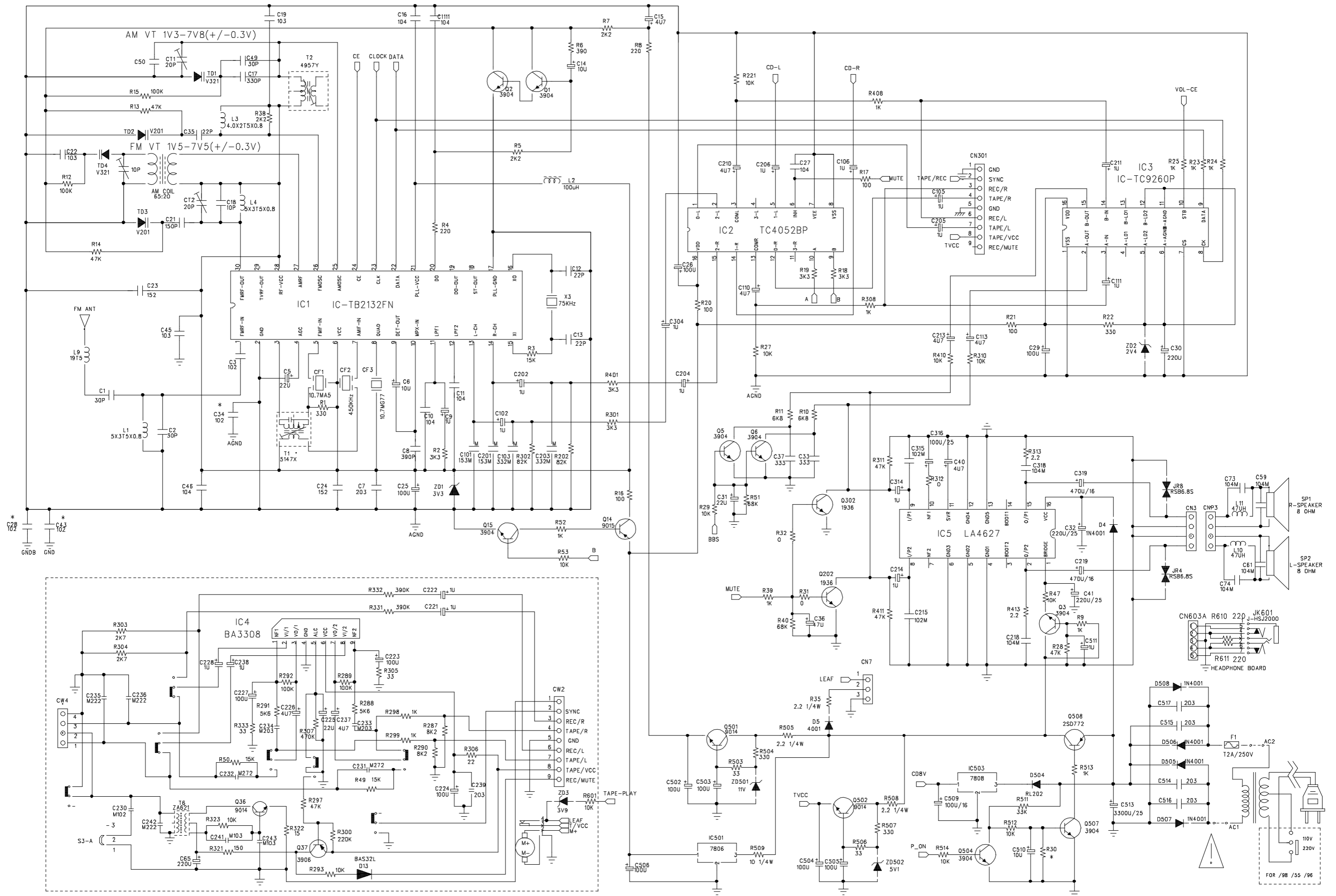
COMPONENT SIDE



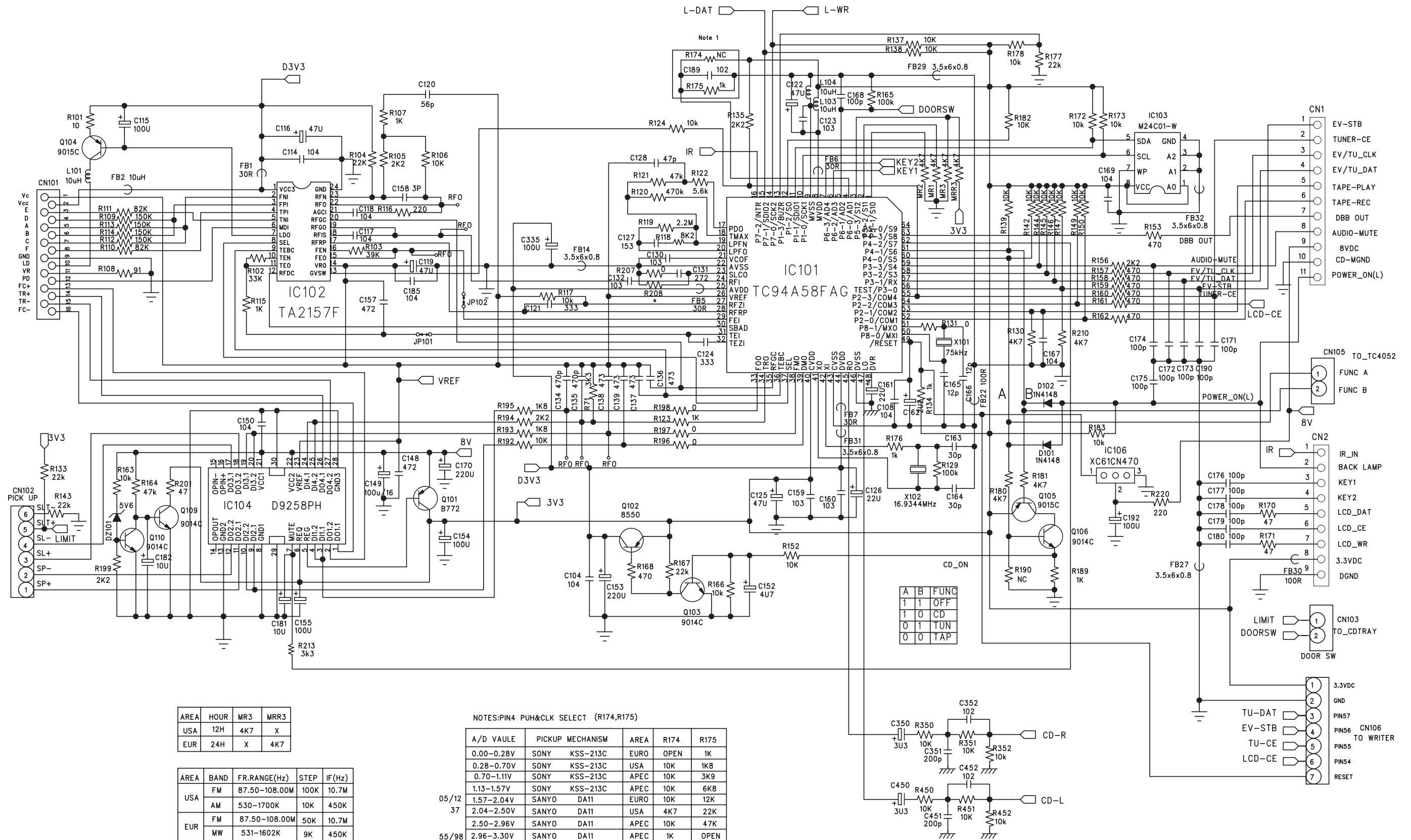
COPPER SIDE



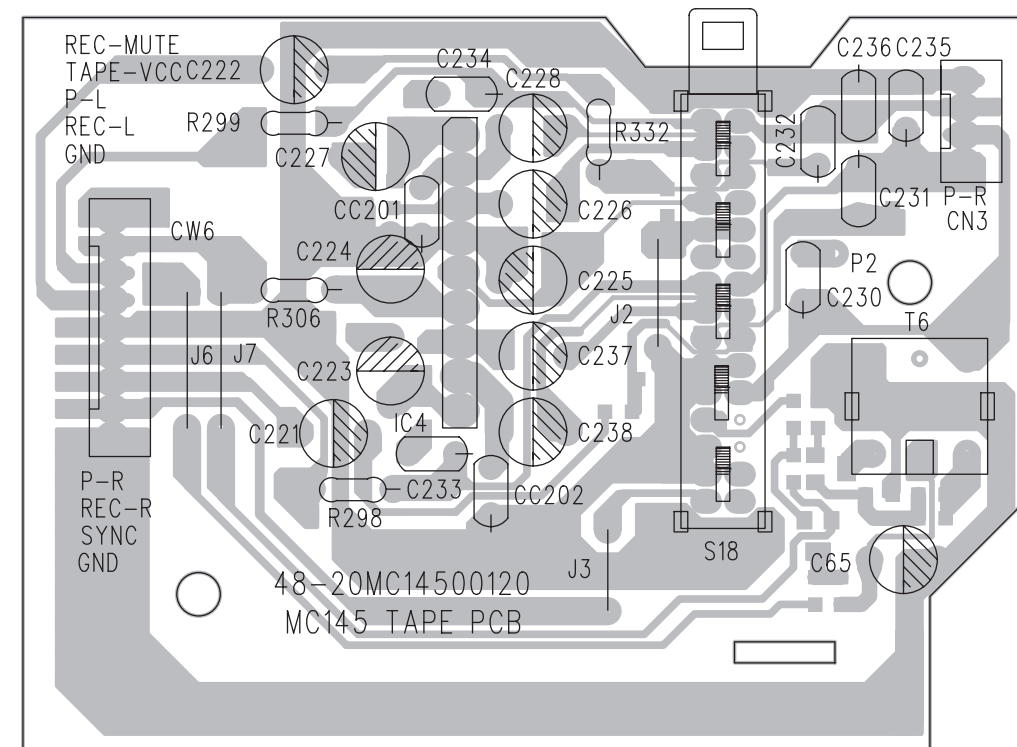
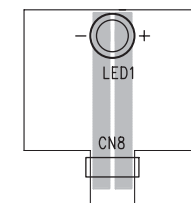
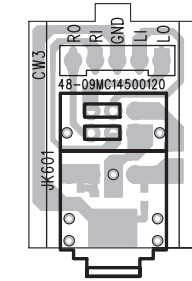
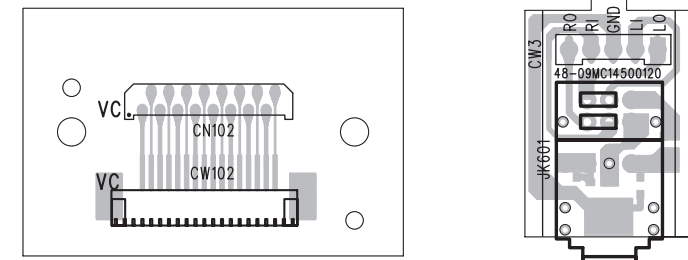
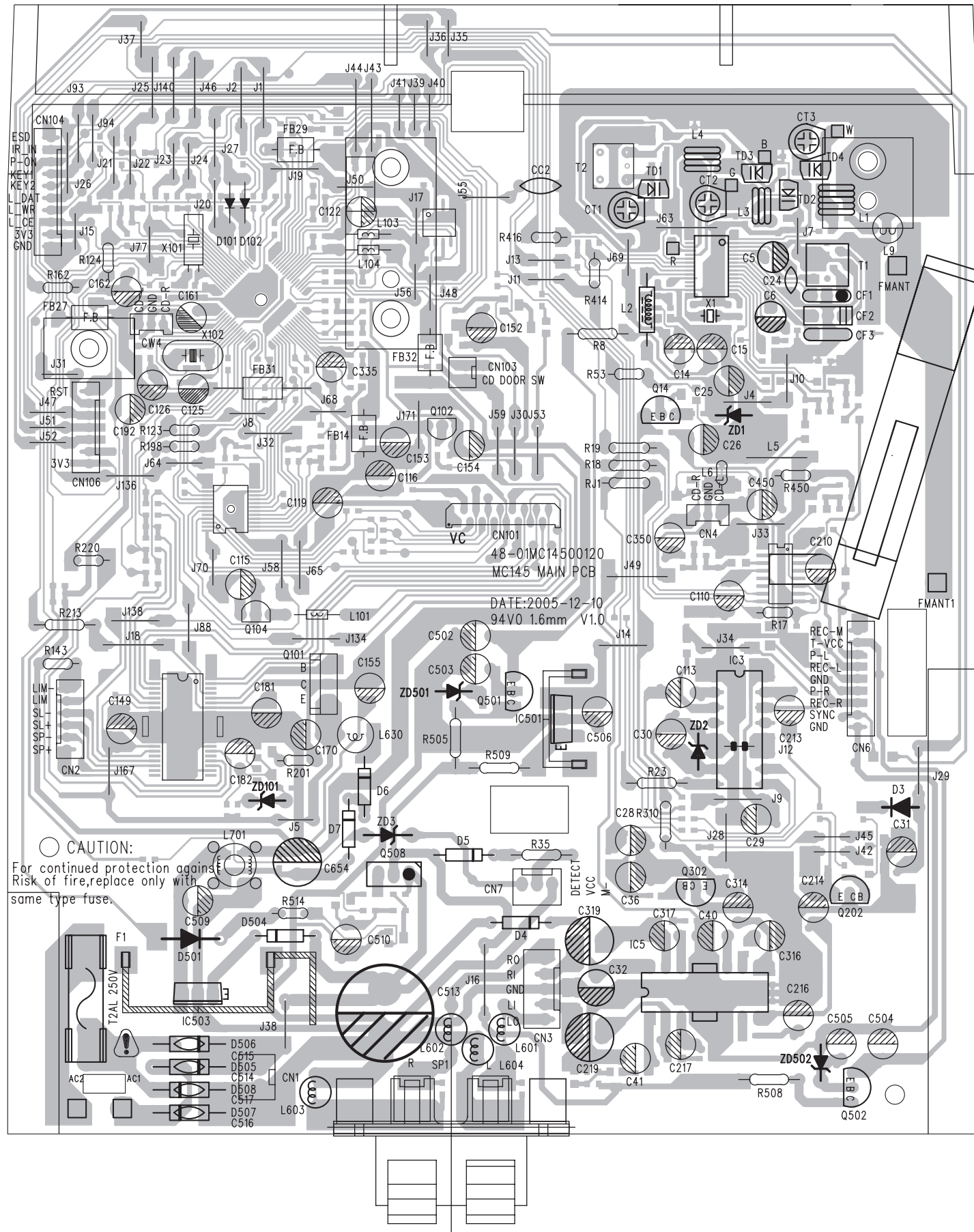
7-1
CIRCUIT DIAGRAM - COMBI BOARD (TUNER/TAPE/AMP)



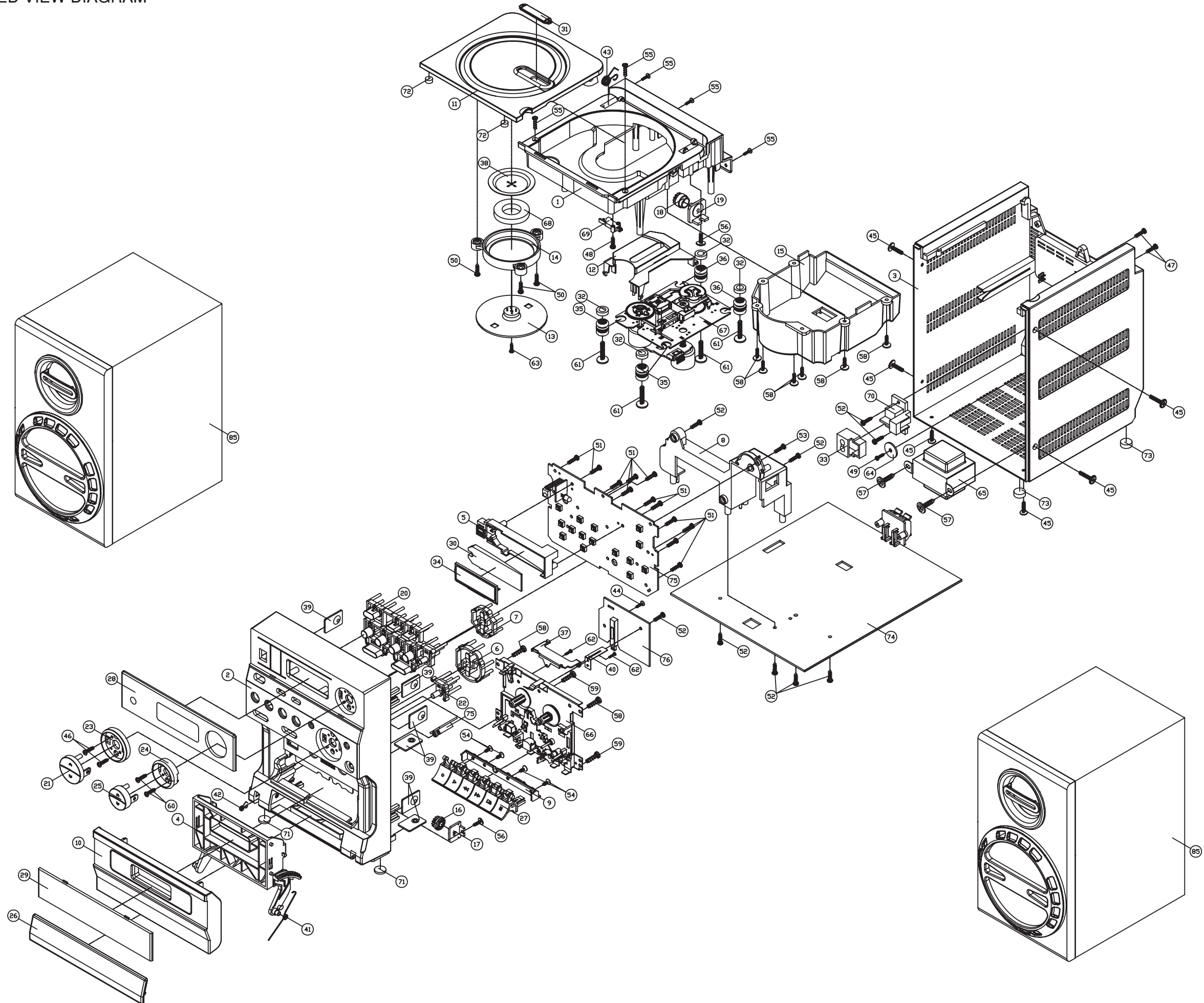
CIRCUIT DIAGRAM - COMBI BOARD (CD part)



LAYOUT DIAGRAM - COMBI BOARD (TOP VIEW)



EXPLODED VIEW DIAGRAM



MECHANICAL PARTS LIST

	<u>All other versions</u>	<u>for /37 only</u>	
1	9965 000 39082	9940 000 04833	TOP CAB
2	9965 000 39083	9940 000 04834	FRONT CAB
3	9965 000 39825		REAR CAB (/12, /61)
3	9965 000 39826		REAR CAB (/79)
3	9965 000 39106		REAR CAB (/93)
3	9965 000 39084		REAR CAB (/55/85/98)
3		9940 000 04835	REAR CAB (/37)
4	9965 000 39085	9940 000 04836	CASS BRACKET
5	9965 000 39086	9940 000 04837	DISPLAY BRACKET
6	9965 000 39087	9940 000 04838	BTN BRACKET
7	9965 000 39088	9940 000 04839	TUN BOTTON BKT
8	9965 000 39089	9940 000 04841	TUN BKT
9	9940 000 04389	9940 000 04389	CASS PRESS PLATE
10	9965 000 39090	9940 000 04842	CASS DOOR
11	9965 000 39091	9940 000 04843	CD DOOR (D.GREY)
12	9940 000 04392	9940 000 04392	LASER COVER (FOR SANYO CD)
13	9940 000 04393	9940 000 04393	MAGNET CAP BOTTOM
14	9940 000 04394	9940 000 04394	CD MAGNET HOLDER
15	9940 000 04395	9940 000 04395	DUSTPREVENTION COVER
16	9940 000 04845	9940 000 04845	DAMPER GEAR
17	9940 000 04846	9940 000 04846	DAMPER GEAR HOLDER
18	9965 000 39027	9940 000 04847	CD DOOR-GEAR (2)
19	9965 000 39028	9940 000 04848	GEAR HOLDER (2)
20	9965 000 39092	9940 000 04849	CD KEY
21	9965 000 39093	9940 000 04851	VOL KEY
22	9965 000 39094	9940 000 04852	DBB KNOB
23	9965 000 39095	9940 000 04858	VOL KEY RING
24	9965 000 39096	9940 000 04859	TRIM RING
25	9965 000 39097	9940 000 04853	24-TUN-BTN
26	9965 000 39098	9940 000 04844	CASS KNOB LID
27	9965 000 39099	9940 000 04854	CASS KNOB-KIT
28	9965 000 39100	9940 000 04855	DISPLAY LENS
29	9965 000 39101	9940 000 04856	CASS LENS
30	9940 000 04409	9940 000 04409	LCD LENS
31	9965 000 39102	9940 000 04857	CD DOOR LENS
35	9940 000 00505	9940 000 00505	CD DAMPER 658 TA 30
36	9940 000 00506	9940 000 00506	CD DAMPER 658 TB 40
38	9940 000 04378	9940 000 04378	MAGNET CAP TOP PLATE
41	9940 000 04103	9940 000 04103	CASS DOOR SPRING (SMALL)
42	9940 000 04379	9940 000 04379	CASSETTE KEY COVER SPRING
43	9940 000 03674	9940 000 03674	CD DOOR SPRING
66	9940 000 04374	9940 000 04374	F/CASS DECK CS-21SC-820DT
67	9940 000 03669	9940 000 03669	CD MECHANISM DA11VF
68	9940 000 04375	9940 000 04375	MAGNET 30X16MM H=5MM

ACCESSORIESVersions

	9965 000 39024	REMOTE CONTROL ASS'Y	/12
	9940 000 04334	REMOTE CONTROL ASS'Y	/37, /55, /61, /79, /85, /93, /98
	9965 000 39025	SPEAKER BOX ASS'Y (L/R)single	/12
	9940 000 04828	SPEAKER BOX ASS'Y (L/R)single	/37
	9940 000 04335	SPEAKER BOX ASS'Y (L/R)single	/55, /61, /79, /93, /98
	9965 000 39081	SPEAKER BOX ASS'Y (L/R)single	/85
	△ 9940 000 01688	AC CORD SET UL	/37
	△ 9940 000 03633	AC CORD SET VDE	/12, /55, /85, /98
	△ 9940 000 04411	AC CORD SET SAA	/79
	△ 9965 000 39105	AC CORD SET CCC	/93
	△ 9965 000 39076	AC CORD SET KS	/61

ELECTRICAL PARTS LIST**DISPLAY BD ASS'Y**Versions

	9940 000 04361	DISPLAY BD ASS'Y	all
D401	9940 000 04363	SMD DIODE PMLL4148L	
LED1	9940 000 04364	LED LAMP 5MM (BLUE)	
Q401	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q402	9940 000 04362	TRANSISTORS PSS8050D	
IC401	9940 000 04366	IC ET8861S	
IR401	9940 000 04367	OPTIC SENSER FM-6038TM2-5AN	
JK601	9940 000 04369	PHONE JACK TC38-063-05-01	
LCD401	9940 000 04365	LCD DISPLAY SDH-DC1373-TP-1	
SW401	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW402	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW403	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW404	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW405	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW406	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW407	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW408	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW409	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW410	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW411	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW412	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW413	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW414	9940 000 04368	TACT SWITCH 6X6MM H=5MM	
SW415	9940 000 04368	TACT SWITCH 6X6MM H=5MM	

RECORD BD ASS'YVersions

	9940 000 04371	RECORD BD ASS'Y	all
D13	9940 000 04363	SMD DIODE PMLL4148L	
Q36	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q37	9940 000 03937	SMD TRANSISTORS PMBT3906	
IC4	9940 000 03635	IC PRE AMP BA3308	
T6	9940 000 03648	COIL 10MM 621 (BLACK)	

ELECTRICAL PARTS LIST**MAIN BD ASS'Y**Versions

	9940 000 04861	MAIN BD ASS'Y (/05)	/12, /61, /79, /93
	9940 000 04336	MAIN BD ASS'Y (/55)	/55, /85, /98
	9940 000 04829	MAIN BD ASS'Y (/37)	/37
	9940 000 04355	FERRITE BAR 10X60MM	
CT1	9940 000 04351	TRIMMER 20PF (RED)	
CT2	9940 000 04351	TRIMMER 20PF (RED)	
CT3	9940 000 00254	TRIMMER 10PF 6MM (WH)	
AM ANT	9940 000 04358	AM COIL (AD)/M7 65:20T	
CF1	9940 000 03642	CER. FILTER LT10.7MA5-A RED	
CF2	9940 000 02857	CERAMIC FILTER SFU450B	
CF3	9940 000 04353	DISC. FILTER JT10.7MG77-A	
T1	9940 000 04356	I.F.T 7MM 7AC-249S0 (YELLOW)	
T2	9940 000 04357	I.F.T 7MM 7AL-272HM (RED)	
X1	9940 000 04352	CRYSTAL 75KHZ 12.5PF DT-381	
X101	9940 000 04352	CRYSTAL 75KHZ 12.5PF DT-381	
X102	9940 000 04354	RESONATOR CRA16.93MHZ -5%	
D1	9940 000 04341	SMD DIODE BAV99L	
D504	9940 000 03938	RECTIFIER DIODE RL-202	
TD1	9940 000 04343	VARICAP DIODE V149	
TD2	9940 000 04342	VARICAP DIODE V101	
TD3	9940 000 04342	VARICAP DIODE V101	
TD4	9940 000 04343	VARICAP DIODE V149	
Q1	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q2	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q3	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q5	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q6	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q14	9940 000 04144	PNP TRANSISTORS 9015C	
Q15	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q101	9940 000 01193	TRANSISTORS KSB772YS	
Q102	9940 000 04339	TRANSISTORS PSS8550D	
Q103	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q104	9940 000 04144	PNP TRANSISTORS 9015C	
Q105	9940 000 03937	SMD TRANSISTORS PMBT3906	
Q106	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q202	9940 000 04337	TRANSISTORS 2SD1936T-AC	
Q302	9940 000 04337	TRANSISTORS 2SD1936T-AC	
Q501	9940 000 04143	NPN TRANSISTORS 9014C	
Q502	9940 000 04143	NPN TRANSISTORS 9014C	
Q504	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q507	9965 000 20152	MMBT3904LT1 SMD SOT23	
Q508	9940 000 01193	TRANSISTORS KSB772YS	
IC1	9940 000 01614	IC TB2132FNG	
IC2	9940 000 04344	IC HEF4052BT	
IC3	9940 000 04347	IC TC9260P	
IC5	9940 000 04346	IC POWER AMP LA4627	
IC101	9940 000 04348	IC TC94A58FAG-264 (MASKING)	

ELECTRICAL PARTS LIST**MAIN BD ASS'Y (cont'd)**Versions

IC102	9940 000 02844	IC TA2157FN	
IC103	9322 131 04668	IC SM M24C01-WMN6 (ST00) R	
IC104	9940 000 02104	IC D9258 MOTOR DRIVERCD	
IC106	9940 000 04349	IC XC61CN4702PR	
IC501	9940 000 04345	IC KA7806E	
IC503	9940 000 00253	IC (SAMSUNG) KA7808	

MISCELLANEOUSVersions

	9940 000 03661	SPK JACK PT-22V11	
S18	9940 000 03656	PUSH SWITCH PS-102D13-NS	
	9940 000 03672	LEAF SWITCH TC-48021-01	
	9940 000 04376	SWITCH SL14-22AH-5AN	
	9940 000 04377	16P FLAT FLEX CABLE L=200MM	
F1	△ 9940 000 04359	FUSE 5X20MM T2A/250V BS/VDE	
	△ 9940 000 04373	TRANSFORMER EI48 117/234V	/55, /85, /98
	△ 9940 000 04412	TRANSFORMER 230V VDE	/12, /61, /79
	△ 9940 000 04831	TRANSFORMER 120V UL	/37
	△ 9965 000 39107	TRANSFORMER 220V	/93
	△ 9940 000 03673	AC SOCKET (VDE)	all except /37
	△ 9940 000 00563	AC SOCKET (UL)	for /37 only

REVISION LIST

Version 1.0 (3141 785 30680)

- First issue

Version 1.1 (3141 785 30681)

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Update Specifiation.
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Update mechanical parts list:
Add MC145/37
- Page 9-1 to 9-3
Update electrical parts list

Version 1.2 (3141 785 30682)

Add new versions: MC145/12, MC145/61,
MC145/85 and MC145/93.

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- Page 8-2
Update mechanical parts list:
- Page 9-1 to 9-3
Update electrical parts list

Version 1.3 (3141 785 30683)

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Update Specifiation.
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Update mechanical parts list:

Version 1.4(3141 785 30684)

- . Page 7-1 Update Circuit diagram.